Common Defects and Structural Problems in the Buildings of Northern Cyprus, their Reasons and Prevailing Applicable Solutions

Mohammed Akilah

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Assoc. Prof. Dr. Ali Hakan Ulusoy Acting Director

I certify that this thesis satisfies the requirements as a thesis for the degree of Master of Science in civil Engineering.

Assoc. Prof. Dr. Serhan Şensoy Chair, Department of Civil Engineering

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Master of Science in Civil Engineering.

Assoc. Prof. Dr. Giray Özay Supervisor

Examining Committee

1. Assoc. Prof. Dr. Mehmet Cemal Geneş

2. Assoc. Prof. Dr. Giray Özay

3. Asst. Prof. Dr. Umut Yıldırım

ABSTRACT

In the recent years, building sector grows rapidly parallel to the human needs. Sometimes these quick productions cause several types of problems on the buildings. These problems occur in varying intensities depending on the type, location, environment, materials and the construction conditions of the building. Problems and failures in buildings can be broadly attributed to either defects, deteriorations or structural problems. Mostly, these defects or structural problems arise due to error or omission that is breach of contract or negligence by designer, contractor, or user. In general, lack of care and knowledge in specification or workmanship are the main reasons of various defects and structural problems. On the other hand, deterioration is natural process, which may be unavoidable, although minimized by care in design and the selection of materials. Cracks, efflorescence, peeling on painting, mouldiness, rising dampness, soft storey, short column, shear cracks, compression cracks, irregularities in plan, irregularities in elevation and etc. are some of the most significant problems that occur in building of Northern Cyprus.

These defects, deteriorations and structural problems have negative effects both on human and building lives. They mostly harm to the health and economy. Besides, they reduce the aesthetic quality. On this basis, the aim of the study is to discuss these prevailing defects and structural problems with their reasons which occur in North Cyprus. It is also expected to present the most common precautions and available applied methods for preventing or reducing these problems. Work to be carried out:

1. General search about the building defects and structural problems and categorization.

2. According to the first step (researches), the most common precautions and available applied methods for preventing or reducing these defects and structural problems were investigated and presented.

3. Case studies in different districts of North Cyprus were visited and the collected data were analysed and compared. There are a total of 125 case studies in this thesis divided into two samples. The first sample represents completed buildings contains 100 case studies consisting of 25 case studies for each of the four following districts: Mağusa, İskele, Lefkoşa and Girne. This sample is aimed for the study of reinforced concrete defects and non-structural defects. The second sample represents buildings under construction contains 25 case studies. This sample is aimed for the study of seismic design faults.

Keywords: Building Defects, Deteriorations, Structural Problems, Seismic Design, Northern Cyprus. Son yıllarda, inşaat sektörü insanların ihtiyaçlarına paralel olarak hızla büyümektedir. Bazen bu hızlı büyüme, binalarda çeşitli sorunlara sebep olmaktadır. Bu sorunlar, binanın tipi, konumu, kullanılan malzeme, çevre koşulları ve binanın yapım şartlarına bağlı olarak değişen seviyelerde meydana gelmektedir. Binalardaki problemler, kusurlara, bozulmalara ve/veya yapısal sorunlara dayanır. Çoğunlukla, bu kusurlar ve yapısal sorunlar tasarımcının, yüklenicinin ve/veya kullanıcının ihmali nedeniyle ortaya çıkar. Genel olarak, ihmal, şartnamelerle ilgili bilgi eksikliği veya işçilik problemleri binalardaki kusurlar ve yapısal sorunların ana nedenleridir. Öte yandan, binalardaki problemler, tasarım, periyodik bakım ve doğru malzeme seçimi ile minimize edilse de doğası gereği tamamen engellenemeyebilir. Çatlakları, çiçeklenme, boyada soyulma, küf, zeminden yükselen nem, yumuşak kat, kısa kolon, kesme kuvveti çatlakları, basınç çatlakları, planda düzensizlik durumları, düşey doğrultuda düzensizlik durumları gibi sorunlar Kuzey Kıbrıs'ta bulunan binalarda meydana gelen en önemli sorunlar arasında yer almaktadır.

Bu kusurların, bozulmaların ve yapısal problemlerin insan sağlığı ve binaların ömrü üzerinde olumsuz etkileri vardır. Çoğunlukla da sağlık ve ekonomiye zarar vermektedirler. Bunun yanında, binalardaki estetik kalitesini de düşürmektedirler. Bu temele dayanarak, çalışmanın amacı Kuzey Kıbrıs'taki yapılarda meydana gelen bu problemleri ve sebeplerini ortaya koymaktır. Buna ek olarak seçilen vaka incelemeleriyle, bu problemlerin önlenmesi veya azaltılmasına yönelik çözüm önerileri ve metotlarını sunmaktır. Gerçekleştirilecek çalışmada:

1. Bina kusurları, yapısal sorunlar ve bunların sebepleri ile ilgili detaylı bilgi verilmesi.

2. İlk adımda yapılan araştırmalar ışığında, bina problemlerinin önlenmesi veya azaltılması için gerekli çözüm önerileri ve metotlarını araştırmak ve sunmak.

3. Kuzey Kıbrıs'ın farklı şehirlerindeki (Mağusa, İskele, Lefkoşa ve Girne) yapılardan örnekler seçilerek incelenmesi ve toplanan verilerin analiz edilmesi ve karşılaştırılması.

Bu tez kapsamında toplam 125 örnek vaka incelenmiştir. İlk 100 vaka çalışmasında her şehirden (Mağusa, İskele, Lefkoşa ve Girne) 25 bina seçilerek betonarme kusurları ve yapısal olmayan problemler incelenmiştir. Geriye kalan 25 bina yine bu şehirlerden ve yapım aşamasındaki binalardan seçilerek sismik tasarım hataları incelenmiştir.

Anahtar Kelimeler: Bina kusurları, bozulmalar, yapısal sorunlar, sismik tasarım, Kuzey Kıbrıs.

This thesis is dedicated To My Parents for sponsoring my education financially

And To Humanity wishing for peace, tolerance and better future for the world through science

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Chapter 1

INTRODUCTION

1.1 General

Since the dawn of mankind, humans lived in various types of homes. Buildings are very important for sustaining life. Defected buildings can cause problems to its occupants. In earthquake regions these problems may result in injuries or even worst; death. It is a natural desire wanting to be safe in our homes.

There are several types of structural systems, construction methods and building materials used around the world. The types of structures and construction methods used in any country depend not only on availability of material but also soil type, weather conditions, infrastructure, availability of professionals and workers to carry out required tasks.

In North Cyprus, RC skeletons are the most common structural system constructed using conventional methods and bricks as infill walls. Furthermore, the most common surface finishing practice is 3-layer plastering using cement sand based plaster (gypsum is used as the 3rd layer sometimes) before carrying on painting. Reinforced concrete structures started to become more popular in North Cyprus since mid-1960s. From late 1970 till today the conventional reinforced concrete structures are still dominating building construction in Cyprus. Steel framed buildings are rarely found as their number is so far less than 5% of all the buildings in North

Cyprus. Steel as a material is not available locally but imported mainly from Turkey and mainly used for industrial buildings. Therefore steel structure and other locally rarely found building materials are excluded from this thesis as they are not common in North Cyprus.

Currently TS 500 (Turkish Reinforced Concrete Design Code, 2000) is commonly used for reinforced concrete structures design in North Cyprus. The concrete grade used in North Cyprus is minimum C20 (20 N/mm²). Therefore, it is critical to take into consideration any defects or factors that could reduce the compressive strength of concrete members or alternatively increase the design load in concrete members particular when subjected to earthquake forces.

The functions of the buildings found in North Cyprus range between industrial, military, commercial, residential, public and educational buildings. However, this investigation is focused on mainly residential and some commercial buildings.

The prevailing heights of buildings of North Cyprus are normally ranged between low to medium rise. Table 1.1 and Figure 1.1 show the statistics of the number of buildings constructed in North Cyprus between the years 1993 and 2014. In the recent years there has been a construction boom in North Cyprus. The local construction industry was not ready for such increase in demand. The lack of enforcement of the existing rules and regulations are added to the poor supervision on site and increased number of inexperienced labour working for unqualified contractors result in a significant drop in the quality of buildings.

			District				Tota	
			Lefkoşa	Mağusa	Girne	Güzelyurt	İskele	TOLA
	1993	Urban	76	42	79	-	-	520
		Rural	134	114	75	-	-	520
	1994	Urban	44	50	48	-	-	500
		Rural	187	85	95	-	-	509
	1995	Urban	52	79	56	-	-	(10
		Rural	167	107	149	-	-	610
	1996	Urban	30	68	104	-	-	570
		Rural	99	114	163	-	-	578
	1997	Urban	76	160	52	-	-	025
		Rural	174	204	169	-	-	835
	1998	Urban	110	161	52	-	-	
		Rural	147	146	166	-	-	782
	1999	Urban	55	121	116	-	-	=0.0
		Rural	186	154	148	-	-	780
	2000	Urban	45	136	109	17	18	
		Rural	150	80	139	63	37	794
	2001	Urban	43	278	67	32	48	
		Rural	84	40	84	39	46	761
	2002	Urban	45	95	60	21	14	
		Rural	157	58	86	32	83	651
	2003	Urban	63	115	108	5	21	
	2000	Rural	179	75	190	53	36	845
rear	2004	Urban	109	147	95	17	112	
	2004	Rural	169	67	331	46	56	1,149
	2005	Urban	80	176	84	10	127	
	2000	Rural	215	116	647	32	110	1,59'
	2006	Urban	229	221	123	27	102	
		Rural	320	137	995	55	186	2,39
	2007	Urban	205	253	230	42	57	
		Rural	389	186	1,178	76	189	2,80
	2008	Urban	170	315	1,170	28	55	
	-000	Rural	432	181	1,217	83	209	2,84'
	2009	Urban	245	227	1,217	18	103	
		Rural	346	140	1,013	58	203	2,470
	2010	Urban	297	247	1,013	21	114	
	2010	Rural	348	141	906	56	209	2,47
	2011	Urban	289	155	89	76	149	
	ZUII	Rural	424	227	967	58	184	2,618
	2012	Urban	136	178	907	54	93	
	2012	Rural	339	241	822	52	122	2,12
	2013	Urban	168	165	247	63	91	
	2013	Rural	460	509	754	48	54	2,55
	2014	Urban	310	141	137	48 65	85	
	2014					5		2,410
	verall [Rural	354 8,337	445 7,097	766	1,252	108 3,021	33,12

Table 1.1: Number of Buildings Constructed Between 1993 and 2014 (TRNC Statistical Yearbook 2014)

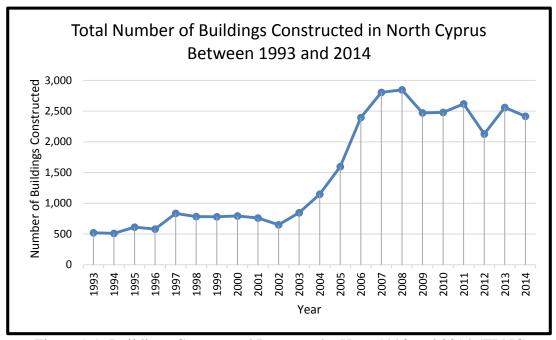


Figure 1.1: Buildings Constructed Between the Years1993 and 2014 (TRNC Statistical Yearbook 2014)

Non-structural defects and deteriorations in buildings have negative effects both on human and building lives. They mostly harm to the health and economy causing relevant socioeconomic harm to individuals and companies associated with the construction industry. Besides, reducing buildings' efficiency and aesthetic quality. On the other hand, structural problems develop risks leading to injuries or casualties. Most of these problems can be detected at their early stages through visible evidences. If not immediately treated, minor problems can grow into severe ones, becoming more expensive to repair, leading to failure or sudden collapse and jeopardizing lives.

Defects take place in numerous patterns and to various intensities in all sorts of structures of all ages. Mostly, these defects or structural problems arise due to error or omission that is breach of contract or negligence by designer/detailer, contractor, or user. In general, lack of care and knowledge in specification or workmanship are

the main reasons of various defects and structural problems. On the other hand, deterioration is natural process, which may be unavoidable, although minimized by care in design and the selection of materials and regular maintenance. Cracks, efflorescence, peeling on painting, mouldiness, rising dampness, soft storey, short column, shear cracks, compression cracks, irregularities in plan, irregularities in elevation and etc. are some of the most significant problems that occur in building of Northern Cyprus.

This thesis investigates the defects and problems of buildings and structures in North Cyprus. Reasons of these defects and problems were identified together with their most common precautions and available applied methods for preventing or reducing these problems. Selected case studies in different cities of North Cyprus were investigated, analysed and compared.

1.2 Literature Review and Previous Work Done

Various studies have been done on structural configuration design flaws and in describing building defects' symptoms and classifying them in deferent ways. Besides investigated their sources and proposing remedies and ways of prevention.

Suffian (2013) expressed the importance of maintenance role on building defects by examining a number of Social Security Organization (SOCSO) buildings across Malaysia. Celikag and Ozbilen (2007) examined over 100 construction sites in North Cyprus and to identify construction defects and inadequacies. Naimi and Celikag (2010) investigated 14 buildings in Mağusa, North Cyprus devided into 2 groups: under-construction, recently constructed and old buildings to indentify their defects and their reasons. Celikag and Naimi (2011) identified variety of construction

problems in North Cyprus and promoted for the use of alternative construction system (steel structure). Sassu and De Falco (2014) collected and reported data of defects from buildings in Italy and classified them according to various categories based on the type of damage encountered and carried out a comparison statistical study. Ozmen and Unay (2007) wrote about and gatogorized comonly encountered seismic design faults of residential buildings in Turkey. Ozay and Ozay (2005) discussed in their article the most common defects on housing surfaces in Northern Cyprus.

Emmons (1993) illustrated and classified concrete defects and described their causes together with their repair technique. Charleson (2008) wrote and illustrated about seismic design. Trotman, Sanders, and Harrison, (2004) explained and illustrated in their book about dampness and its effects, causes, diagnosis and remedies.

Chin-man (2002) publish a Building Maintenance Guidebook under the national Codes of Practice, Design Manuals and Guidelines of Hong Kong when he describes the symptoms, causes and common appropriate solutions of buildings' defects in Hong Kong.

1.3 Aim and Scope

The dissemination of failure-related information, with detailed description of their causes, mainly for civil engineers and architects, is necessary for developing awareness on the building construction process and preventing further failures.

The aim of this thesis is to identify, highlight and help to provide knowledge and awareness about building defects and problems due to design and construction faults to construction professionals such as engineers and architects in order to resolve and avoid these problems through proper design, construction process and quality control for RC structures.

This thesis investigates various common defects and problems in RC buildings of different ages together with their causes and ways of avoiding them. Selected case studies in North Cyprus were visited to identify inadequacies in building design and construction.

1.4 Organization of the Thesis

The first chapter of this thesis starts with a general introduction by defining the problem, describing the regional construction practice and urban context of North Cyprus. Published previous work done related to the topic of building defects both structural and non-structural were reviewed. The aim of the study were stated and the scope were defined.

Chapter 2 starts by presenting a category of structural problems which is related to earthquake and designing, namely: seismic design faults. The title is then divided and subdivided into various problem types in the following sections. The second section is concerned about weak column-strong beam problem. While the third section is about horizontal and vertical structural configuration problems, such as: irregularities in plan and elevation, elementary design faults about structural members and short column.

Chapter 3 describes the types of defects which occur in concrete and reinforce concrete which is the dominant material used for the construction in North Cyprus together with their precautions, prevention, remedies or repair if available. After the introduction section, the second section is concerned about corrosion of metals embedded in concrete and the accelerators of such corrosion together with the accompanied consequences of cracks and spalls. The third section describes drying shrinkage cracks or cracks due to moisture effects. The fourth section is concerned about construction defects particularly those due to faulty workmanship of designers, detailers or contractors, e.g., improper reinforcing steel placement, premature removal of forms, cold joints, segregation, honeycombing and improper grades of slab surfaces. The fifth and last section is concerned about structural cracks in concrete, i.e., cracks due to load effects, e.g., punching shear cracks, cantilevered member's cracks and settlement cracks.

Chapter 4 describes the non-structural defects, such as: waterproofing defects, defected wooden doors and non-structural cracks, e.g., joint cracks. Besides, common surface defects, e.g., dampness, efflorescence, paint peeling, mouldiness, staining and wall finished workmanship problems.

Chapter 5 is the case studies chapter. It starts with brief introduction followed by defining the methodology of the carried investigation and the faced challenges and limitation of the investigation before presenting the case studies and ending by presenting the findings and discussing the results.

The conclusion chapter starts with a highlight and summary of the problem, causes and solutions. Followed by recommendation for the construction and maintenance practice for the buildings of North Cyprus.

Chapter 2

SEISMIC DESIGN FAULTS

2.1 Introduction

Natural disasters, e.g. earthquakes, can expose flaws in the design of structures. Flaws in design, conceptual planning or in some cases an inefficient system of codes and regulation may lead to disastrous results in urban contexts. Seismic design faults negatively affect the seismic performance and structural behaviour of buildings.

During the last century there has been fast progress in design standards and construction methods. Introduction of earthquake codes for structural design helped researchers and engineers to design buildings for more realistic loads. North Cyprus contains earthquake zones 2 and 3 only (Table 2.1). There are a number of tremors throughout the year some of which are high in magnitude. Cyprus has been hit in the recent years by earthquakes of magnitude up to 6.8 (Table 2.2). Therefore it is necessary when designing structures to take into account earthquake loads and pursuit achieving quality design and work to increase the safety of structures and their occupants.

Municipality	Earthquake Zone
Akdoğan	2
Akıncılar	2
Alayköy	3
Alsancak	3
Beyarmudu	2
Büyükkonuk	3
Çatalköy	3
Değirmenlik	3
Dikmen	3
Dipkarpaz	3
Esentepe	3
Mağusa	2
Geçitkale	3
Girne	3
Gönyeli	3
Güzelyurt	2
İnönü	3
İskele	3
Lapta	3
Lefke	2
Lefkoșa	3
Mehmetçik	3
Paşaköy	3
Serdarlı	3
Tatlısu	3
Vadili	2
Yeni Boğaziçi	3
Yeni Erenköy	3

Table 2.1: Local Site Classes in North Cyprus (Regulation on Buildings to Be Constructed in Earthquake Region in TRNC, 2015, p.165)

Table 2.2: List of Earthquakes that Hit Cyprus in the Recent Years (United States Geological Survey (USGS))

Date	1995/2/23	1996/10/9	1999/8/11
Magnitude	5.9	6.8	5.6

Before 1982 earthquake resistant structural analysis for building of up to four stories was not obligatory and could be skipped if the structural elements were buffed or if a certain configuration of shear walls were provided. The 1975 version of Turkish earthquake code was the first earthquake code to be followed in North Cyprus (in the early 1990s) followed by the 1997 version before North Cyprus having its own earthquake code in 2005 which is basically an adapted 1997 Turkish Earthquake Code. Hence, the majority of old buildings were not designed to withstand realistic earthquake loads and some may need strengthening.

The main goal for any earthquake code is the prevention of casualties. Table 2.3 below shows what the Turkish Earthquake Code expects for the structural and non-structural elements of a building to behave during different earthquake intensities (Ministry of Public Works and Settlement, 1997, 2007).

Table 2.3: Turkish Earthquake Code Expectation of Structural and Non-Structural Elements Behaviour during Different Earthquake Intensities

Small earthquake	Medium earthquake	Strong earthquake
No damage	Damage should be within	No partial or total
	repairable limits	collapse

This chapter attempts to contribute to the effort of raising an awareness about the concept of earthquake resistant design and explores the design flaws that are made by designers.

2.2 Strong Beam and Weak Column Problem

The aim of seismic design is to prevent building collapse in an event of an earthquake. This can be achieved by absoping the earthqake energy through ductile hinges at the joints between columns and beamns. In week column-strong beam frames, hinges form at column ends. While in strong column-weak beam frame, hinges form at bream ends. Figure 2.1 bellow compares between the undesirable week column-strong beam frame (Figure 2.1a) and the desirable strong column-weak beam frame (Figure 2.1b). The basic idea behind adopting the strong column-weak beam method is to avoid columns failing first, loosing a beam is less dangerous than lossing a column. Therfore, week column-strong beam designs are prohibited by all codes and must be avoided. Column depths must never be less than those of the beams in order to avoid strong beam-weak column problem and achieve the seismically desirable frames ductility.

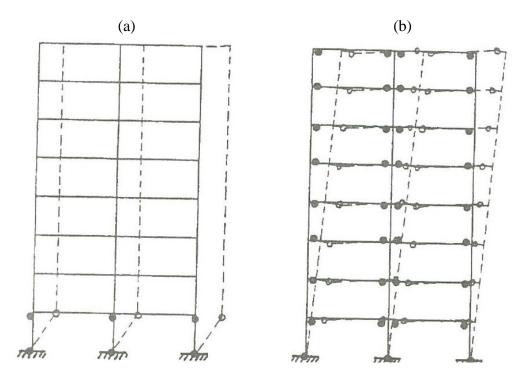


Figure 2.1: A Comparision Between Two Frames; the Undesirable Weak Column-Strong Beam on the left and the Desirable Strong Column-Weak Beam on the right

2.3 Structural Configuration Problems

Configuration in structural design means the horizontal and/or vertical arrangement of structure and its elements. The seismic performance of a building configuration is the combination the seismic performance of all individual structural members with it. The structural configuration quality determines the survivability of a building after an earthquake.

Building configuration is mainly the responsibility of designers because designers decides on the overall scheme of a structure. The approach towards regularity and symmetricity of plans and elevations should be adopted by designers while designing any building. Buildings are classified into regular and irregular buildings. Designers should always aim for regularity by minimizing or eliminating irregularities. Irregularities lead to unfavourable seismic behaviour. Irregularities are also uneconomical since codes ask for structural members of irregular buildings to be stronger than ordinary. The American Institute of Civil Engineers standard ASCE/SEI 7-05 (2006) forbids the construction of irregular buildings in high seismicity regions.

Irregularities increases the chance for a structural and non-structural damage during an earthquake. However, by implementing advanced engineering techniques some little to medium irregularities can be tolerated by structural engineers and design codes. Normally the structural designer builds a 3D digital model of buildings with irregularity before applying code-specified seismic forces into it. This topic is subdivided in the followings into horizontal and vertical structure configuration problems.

2.3.1 Horizontal Structure Configuration Problems

Horizontal structure is a crucial part of any earthquake force path since earthquake forces travel horizontally first through horizontal structure before traveling vertically downwards all the way to the foundations. Every building needs a horizontal structure which resists and circulate earthquake forces into columns and shear walls. For that reason, the description of horizontal structure always goes before vertical structure in almost every seismic design related literature.

In general, the best method to approach an adequate horizontal configuration is to reduce the complexity of floor plan geometry by dividing it into regular shapes using seismic separation gaps. This section is concerned about horizontal configuration, i.e., floor plan shapes and its structural layout in plan. This section is subdivided in the followings into these subtopics: irregularities in plan, elementary design faults in beams and slabs.

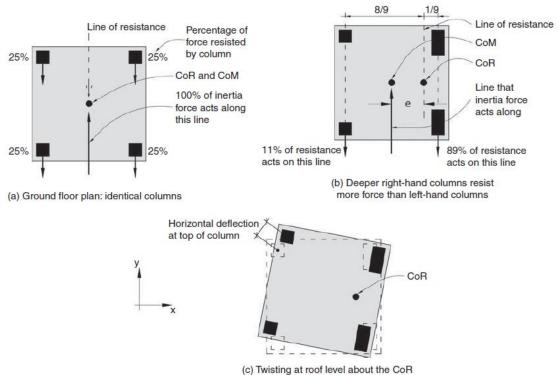
2.3.1.1 Irregularities in Plan

In 2007 Turkish Earthquake Code, irregularities in plan are ordered as: torsional irregularity, floor discontinuities and projections in plan.

2.3.1.1.1 Torsional Irregularity (Torsion Eccentricity)

To minimize torsion in buildings during earthquake, it should be taken into consideration by designers when designing floor plans to minimize the distance between the centre of mass and the centre of rigidity or resistance as much as possible (making them coincide is the best scenario). Distance between centre of mass and centre of rigidity creates eccentricity and as a sequence, a torsion moment equal to the inertia force (lateral earthquake force) multiplied by eccentricity twists the building around the centre of rigidity. Efforts must be made to prevent torsion. If a structure twists, the columns furthest away from the centre of rigidity endure the most damage caused by excessive torsion-induced horizontal deflections. The location of the centre of mass usually influenced by the geometrical centre of the floor plan and therefore not convenient to manipulate; on the other hand, the location of the centre of rigidity/resistance can be manipulated by modifying the cross-sections (stiffness) and the locations of vertical structural members (Figure 2.2).

Figure 2.2a shows an ideal situation of a perfectly symmetrical plan where the centre of rigidity and centre of mass coincide, thus zero eccentricity exist. Figure 2.2b shows how increasing the size of columns on one side on a plan shifts the centre of rigidity and thus creating eccentricity. Figure 2.2c shows how the columns furthest away from the centre of rigidity endure the most deflection and thus damage.



(c) Twisting at root level about the COR

Figure 2.2: A Symmetrical Structure is Modified to Illustrate Torsion and How it Causes a Building to Twist (Charleson, 2008)

The uniform earthquake force acting on the floor plan is simplified to a point force acting at the centre of mass. This horizontal forces is resisted by columns and shear walls. In general, in both direction x and y, the length of eccentricity should be kept less than quarter the length of the structure measured perpendicular to the direction of earthquake force (Charleson, 2008).

Ozmen and Unay (2007) illustrated in an asymmetrical floor plan example the possibility of moving the centre of resistance closer to the centre of mass in order to minimize the torsion eccentricity and the resultant shear forces by the addition of shear-walls (Figure 2.3).

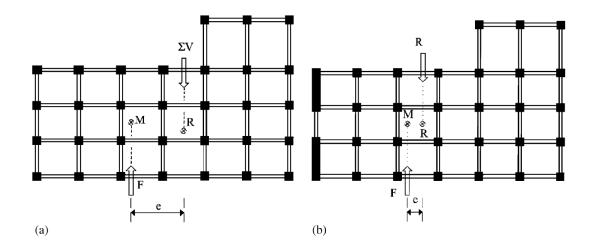


Figure 2.3: Modifying the Centre of Rigidity/Resistance (Ozmen and Unay, 2007)

Lift cores or staircases enclosed in shear walls should be located in a way to eliminate or minimize the distance between the centres of mass and the centre of rigidity/resistance. Locating them on one side of the structure will create excessive torsion eccentricities and unequal deflections (Figure 2.4a). They should be distributed symmetrically across the plan or placed at the centre of the building (Figure 2.4b) (Ozmen and Unay, 2007).

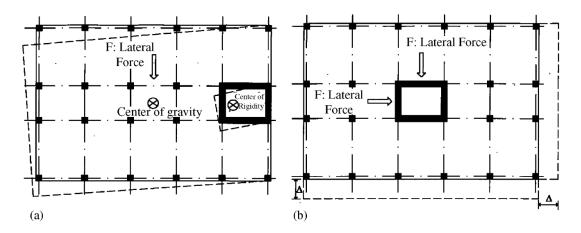


Figure 2.4: Location of Shear-Walls (Ozmen and Unay, 2007)

According to the 2007 Turkish Earthquake Code, a building is considered torsionally irregular if the ratio of the maximum displacement to the average displacement for any of the two orthogonal earthquake directions at any storey is more than 1.2 in the same direction. In any torsionally irregular building where the rigidity is not symmetrically distributed, the less rigid portion of the structure will do more shift (and damage) than the more rigid portion.

2.3.1.1.2 Floor Discontinuities

Cavities in floor plans serve variety of purposes, such as:

- To provide stairs, escalators or lefts.
- Air ventilation or light cavity purposes.
- Spatial comfort and aesthetics purposes.
- Building services cavities, such as; air ducts and pipes.

The lateral inertia forces on the structure are distributed to vertical structural members by the floor slabs. Large cavities within floor plans ruin their structural integrity. Thus, designers should locate them in a way that they will not endanger the diaphragm's ability to transfer horizontal loads to columns or shear-walls. Any interruption on the earthquake force path must avoided. Thus, the optimal locations for cavities are where bending moments or shear stresses are low. Figure 2.5d shows a cavity located in minimum shear stress area. Generally, the following two principles should be considered by designers when locating a floor slab cavity:

- The cavity should not cuts through a chord or beam (Figure 2.5a). If cavity location cannot be adjusted, then the edge beam must continue through the cavity to restore continuity of the diaphragm chord (Figure 2.5b). The Cavity in Figure 2.5d is in the centre of the floor plan safely away from beams which carry tension and compression stresses.
- Placement of a cavity should not be located on areas of maximum shear forces as shown in Figure 2.5c. There is 2 ways that can be implemented to prevent undesirable shear failure mode in this case:
 - a) The length of Cavity must to be shortened.
 - b) The depth of floor slap or/and beams must be increased and far more heavily reinforced in those areas.

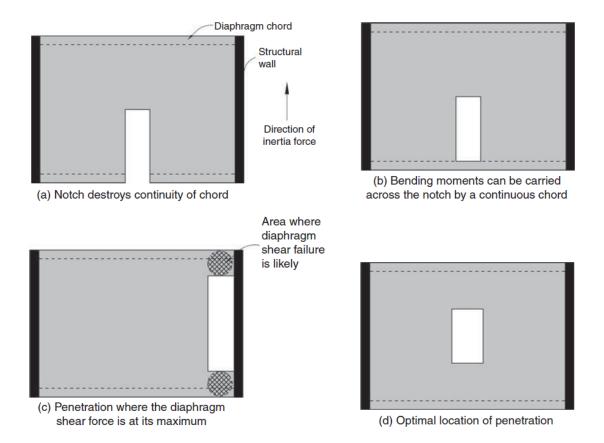


Figure 2.5: Diaphragm Cavities in Various Locations (Charleson, 2008)

The 2007 Turkish Earthquake Code consider a building to be irregular by floor discontinuity if the total area of openings exceed third of gross floor area. Cavities introduce potential weakness into diaphragms and could negatively affect the dynamic behaviour of the building as there will be uneven horizontal deflections leading to additional shear stresses. The following are some options and methods that can be applied when designing Cavities in floor plans to reduce and overcome their negative effects:

- Increasing the rigidity of the columns and beams surrounding the opening.
- Positioning shear-walls around the openings.
- Reducing the dimensions of openings.
- Thickening and reinforcing the surrounding of an opening.

- Bridging the opening slot by introducing a section of diagonal steel framing or inserting horizontal vierendeel frame.
- Separating the structure into portions/sections (independent structures) with the cavity between them.

Another type of diaphragm discontinuity is when a floor diaphragm consists of two or more levels. Figure 2.6 illustrates this scenario and shows a step in a diaphragm.

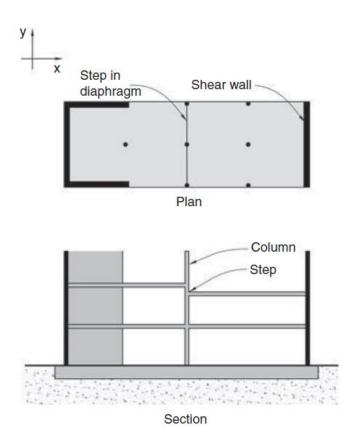


Figure 2.6: A Stepped Diaphragm (Charleson, 2008)

Two ways to overcome this type of discontinuity:

- a) Divide the structure into two independent structures
- b) Introduce a shear-wall or moment frame, depending on the existing structural system, along the line of the step.

2.3.1.1.3 Projections in Plan (Re-Entrant Corners)

Projections in plan can be in many geometry shapes (Figure 2.8). If these projections are too large they impose possibility for damage due to the different dynamic responses of each projection which leads to additional stresses on the structure (Figure 2.7). During an earthquake, the more flexible wing, depending on the direction of inertia force, swings about the stiffer area (torsional rotation effect) which may result in:

- Damage in diaphragm joint between projections, due to critical shear forces and moments occurring in the intersection line of the projection and the main body.
- Damage in the far end columns of the more flexible wing, due to torsion eccentricities.

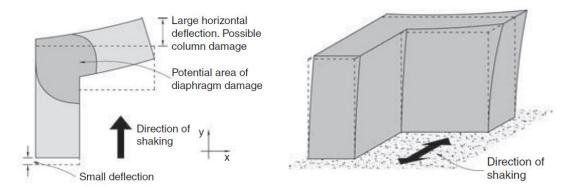


Figure 2.7: When a Building is Under the Dynamic Loads of Earthquake, Re-Entrant Corners Can Deflect in a Way Creating Possible Damage at Joints (Charleson, 2008)

Codes require undertaking a 3D dynamic analysis for buildings with re-entrant corners. Most codes define projections in plan irregularity as where the ratio of the length of a projecting corner to the length of the entire plane exceeds 15% in the same. However, in the 2007 Turkish Earthquake Code the ratio is set to 20% (Figure 2.8).

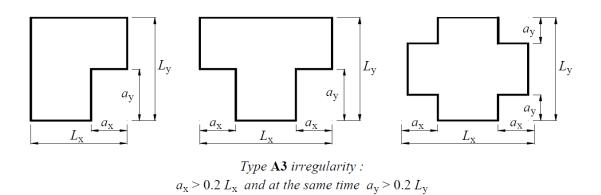


Figure 2.8: 2007 Turkish Earthquake Code Definition of an Irregular Projections in Plan (Ministry of Public Works and Settlement, 2007)

If re- entrant corners are necessary, there are two ways to design them as to avoid diaphragm tearing and excessive horizontal deflections damaging columns:

- Balancing the projections' relative stiffness by playing with shape and reinforcements. Nevertheless, this method might not be structurally sound, if the wings are long or if the diaphragm is weakened by cavities where the projections join.
- The common and most preferable solution method which should be applied for re-entrant corner buildings whenever possible is to divide and separate the structure into independent structures or sections with structural joints in between (Figure 2.9).

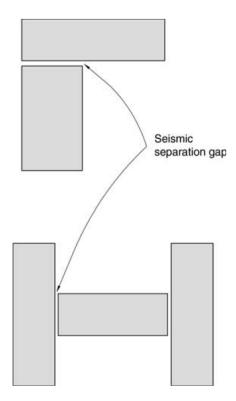


Figure 2.9: The Plan Irregularity of Re-entrant Corners can be solved by separating the structure into several blocks (Charleson, 2008)

2.3.1.2 Beams' Elementary Design Faults

2.3.1.2.1 Non-Continuous Beams

Designing non-continuous beams in floor plans should be avoided. When having a non- continuous beam, the lateral earthquake inertia force within this beam is transferred to the structural elements in the opposing side through the relatively thin floor slab (Figure 2.11). Calculating the pattern and the effects of this force distributions is complicated. The lateral displacement properties of the entire structure should always be considered by the designer. Two design approaches which increases the rigidity of the slab that could be applied if such configuration is absolutely necessary (Ozmen and Unay, 2007):

- Increasing the slab thickness between the non-continues beam.
- Using joist slab between the non-continues beam.

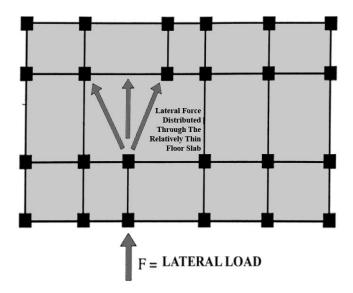


Figure 2.11: Non-Continuous Beam in a Floor Plan (Ozmen and Unay, 2007)

2.3.1.2.2 Non-Uniform Beam's Span and Cross-Section

Designers should avoid non-uniform beam's span and cross-section. Non-uniform spans of beams will vary the lateral rigidity of the diaphragm. Furthermore, these changes in span lengths are often accompanied with alternation of beam cross-section; with the longer spanning beam having greater depth and the shorter spanning beam having less depth, due to varying imposed loads on them. These non-uniformities makes it difficult to estimate critical stresses and difficult to predict the behaviour of the building during an earthquake. Moreover, there will be an increase in the cost of formworks due to non-uniformity (Özmen, 2008). Besides, complications in the details of steel bars reinforcements and difficulties in producing them (Figure 2.12). However, variations of beam spans could be acceptable if the design is symmetrical in plan. Yet, care should be taken in minimizing eccentricities in joints of beams with different cross-sections. If the joint is not properly reinforced, failure can easily occur at the joint.

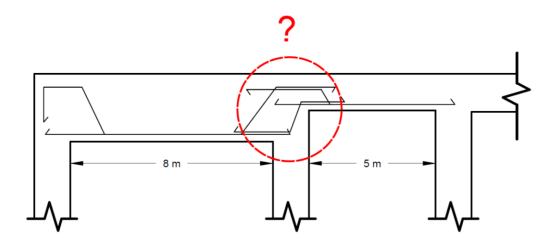


Figure 2.12: Non-Uniform Span and Cross-Section of a Beam (Ozmen and Unay, 2007)

2.3.1.2.3 Absence of Vertical Support at Beams' Intersections

In some designs, vertical load-bearing member at beam-to-beam intersection are either absent or shifted (Figure 2.13). This could be dangerous under horizontal earthquake inertia forces since one beam will be exposed to a large point load from another at the intersection generating critical moments which may lead to large deflections and cracks on the beams. Furthermore, such a configuration would require additional reinforcements and a big increase in the beam cross-section, therefore increase in the cost. When such a configuration cannot be avoided, the intersection point should not be close to the column/shear-wall (Figure 2.13b). One should remember that stiffness is negatively proportional with the length of the element. The short beam shown in Figure 2.13b can create very critical torsion moments on itself and the adjacent beam and column (Özmen, 2008).

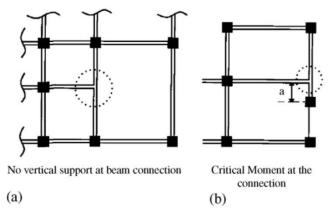


Figure 2.13: Beams Intersecting Without Vertical Supports (Ozmen and Unay, 2007)

2.3.1.2.4 Beams and Frames with Broken Axis

Breaking the axis of beams and columns in plans makes them less resistant to lateral forces as additional torsion forces will develop during force transferring between them (Figure 2.14a). The configuration shown in Figure 2.14b forms a short and over-rigid beam, thus should be avoided (Özmen, 2008).

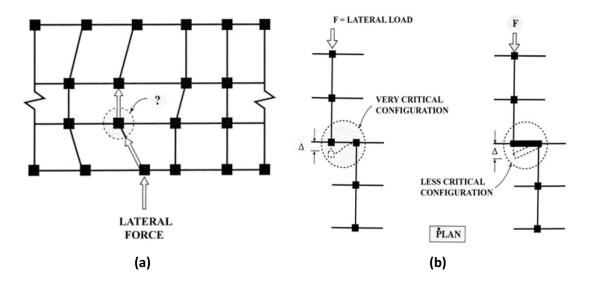


Figure 2.14: Beams with Broken Axis (Özmen, 2008)

2.3.1.3 Slabs' Elementary Design Faults

2.3.1.3.1 Over-Stretched One-Way Slabs

Sometimes when designing central long corridors for circulation purpose in multistorey buildings, designers use over-stretched one-way slabs. This over-stretched one-way slabs are created by omitting the beams bellow the corridors to avoid visual or service obstacles in the ceiling of the corridor bellow. Thus, breaking the continuity of the structural axes which leads to structural deficiencies (Figure 2.15). Designers should avoid such a design by not omitting beams and adding suspended ceilings to overcome and hide visual and service problems without sacrificing structural integrity. Over-stretched one-way slabs break the continuity of beams which leads to non-continuous beams design fault explained earlier.

Over-stretched one-way slab creates an area of weekend rigidity within the diaphragm that transfers lateral earthquake inertial forces to vertical structural elements. Therefore, relatively large deflections can easily occur under lateral earthquake inertial forces. Moreover, since it is difficult to place reinforcement in the long direction of such a long slab, frequent contraction cracks will occur (Özmen, 2008).

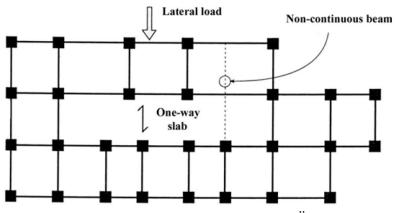


Figure 2.15: Over-Stretched One-way Slab (Özmen, 2008)

2.3.1.3.2 Cantilever Slabs

Cantilever projections in RC buildings are either open as in balconies or enveloped by masonry to act as extension for rooms. If the projection of cantilevered slab is long, it is prone to large deflection even without earthquake lateral inertia loads. Enveloped cantilevers are more prone to critical deflections than open cantilevers especially under earthquake forces due to the weight of the masonry wall positioned at the far end of the cantilevered slab, which may results in partial collapse. While designing cantilevered projections, it is best to have four beams under the cantilevered slab as following (Figure 2.16):

- Two cantilevered beams which should be continuous and
- Two side beams one of them under the far end of the cantilevered slab and the other connecting the columns supporting the cantilever.

This way increases the overall rigidity of the cantilever. Besides, the earthquake lateral inertia forces will be transferred directly to the supporting columns without being distributed to the relatively less rigid floor slabs (Özmen, 2008).

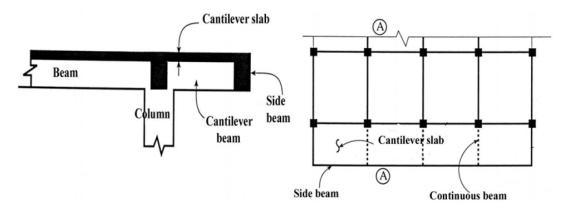


Figure 2.16: Cantilever Slabs (Özmen, 2008)

2.3.1.4 Pounding and Separation Problems between Buildings

The shape of the building and its mass distribution influences its seismic behaviour. Complex buildings with irregular mass distribution, like those consisting of large numbers of blocks, will have varying natural periods and lateral rigidities between its block, each block will behave independently during an earthquake. As a result, critical torsions and shear stresses will develop at the regions where they join. Therefore, to solve this problem and accomplish a successful seismic behaviour of such complex buildings, each block have to be divided into structurally independent sections. The blocks should be disconnected from one another by separation joints, which can be designed in multiple styles.

Irregular distribution of masses can take place within a building in multiple ways. A structure can appear to be regular from outside but additional masses of building services, such as heavy machines and water tanks can develop torsion eccentricities and additional shear stresses depending on where they are located within a building. Projections in Plan (Re-entrant corners), projections in elevation (cantilevers) and setbacks are another patterns of irregular mass distribution frequently detected in residential buildings. Especially, if they were not symmetrical around the centre of the structure as they will cause torsion eccentricities.

On the other hand, some urban residential building patterns contains buildings very close to each other which could be very dangerous during an earthquake and should be avoided. Every building will swing differently during an earthquake according to its own natural period. Therefore, buildings should be located after setbacks of their boundary except street frontage in order to achieve some gaps between them. The drift of a building during an earthquake should not reach the neighbouring site boundary. If there are no adequate separation between the buildings and they swing toward each other, they will hit each other which could critically damage or destroy structural elements leading to a collapse or partial collapse.

The amount of spacing between buildings is calculated on the flexibility and height of a building. The required gap obviously increases with height. On the other hand, to avoid uneconomical wide gaps, stiff structural system could be adopted in the design. The maximum allowed drift of a building during an earthquake is specified in typical codes as 0.02 X height. Some codes allow a 50% reduction of the spacing with the condition that the floor levels of adjacent buildings align, since pounding a floor slab into a floor slab is not as dangerous as a floor slap hitting columns or shear-walls of the adjacent building. The minimum spacing requirement between buildings specified by the 2007 Turkish Earthquake Code is 30 mm for buildings up to a height of 6m. From there on, the spacing should be increased 10 mm for every 3 m raise in the height. However, even if these suggestions of the code are followed, sometimes it could still be inadequate. The adequacy of spacing should be checked and confirmed by calculations or computer simulation (Ozmen and Unay, 2007). Separation gaps are usually lined and covered using flexible sacrificial materials to allow movements, as trying the separated structures should be avoided (Charleson, 2008).

2.3.2 Vertical Structure Configuration Problems

This section is subdivided in the followings into these subtopics: irregularities in elevation, elementary design faults in vertical structural elements and short column.

2.3.2.1 Irregularities in Elevation

In 2007 Turkish Earthquake Code, Irregularities in elevation are: inter-story strength irregularity (weak story), inter-storey stiffness irregularity (soft storey), and discontinuity of vertical structural elements.

2.3.2.1.1 Inter-Storey Strength Irregularity (Weak Storey)

Weak storey occurs when omitting or reducing the cross section area of columns, shear walls and masonry partition walls of the storey immediately bellow. Weak storey can occur at any storey level (except top storey level), but it most commonly occurs in ground storey level. This is because a lot of medium-rise apartment building in North

Cyprus are designed with an open ground storey to function as parking. Masonry partition walls contribute to the resistance of earthquake force together with columns and/or shear walls. Therefore omitting masonry partition walls in a story make it weaker than the storeys above and as a result higher stresses are imposed on the columns of the weak storey which might lead to failure during an earthquake.

The 2007 Turkish Earthquake Code specifies for a storey to be weak is when the ratio of the sum of cross section area of columns and shear walls and 0.15 of masonry partition walls of a storey to the storey immediately above is less than 0.8.

It is best to design continuous masonry partition walls and not to omit them on lower storeys, but if an open storey is unavoidable and the ratio is between 0.8 and 0.6, then the columns and/shear walls of the weak storey must be buffed while taking into consideration that the cross section area of columns and/or shear walls in a storey should never be greater than the storeys below). However, if the ratio is less than 0.6, the codes prohibits such a design and redesigning shall be carried (Turkish Earthquake Code, 2007).

2.3.2.1.2 Inter-Storey Stiffness Irregularity (Soft Storey)

Soft storey irregularity is much the same as weak storey irregularity. It occurs when a level in a structure is more flexible and/or weaker than the level immediately above. However in soft storey irregularity, average story drift is in concern rather than the storey effective shear area which is linked to weak story irregularity. Soft storey occurs commonly in on ground floors in residential building in North Cyprus, which are functioning as shopping stores or more commonly as car parking. The danger of

such irregularity is that earthquake energy will concentrate on this weaker soft storey, which will cause serious damage to the storey's columns leading to collapse. The followings are three factors that contribute in the occurrence of soft story in floors (Ozmen and Unay, 2007):

- I. Relative absence of masonry infill walls in one of the floors (Figure 2.17a). Masonry infill walls contribute in the lateral rigidity of a floor, omitting them in a floor, such as in the case of ground floor car parking, would subject its columns to a significant increase in moment and shear forces (this cause both weak and soft storey).
- II. Increasing the height of the floor than the height of the floors above without decreasing the columns cross-section of those on the floors above (Figure 2.17b). The lateral rigidity of the floor will be less than of those above and thus its drift will be more (this cause soft storey only).
- III. Omitting columns or shear-walls in a lower floor (non-continuous column or shear-wall) (Figure 2.17c). It is more critical in lower floors such in the case of ground floor which would subject its columns to very critical shear stresses (this cause both weak and soft storey).

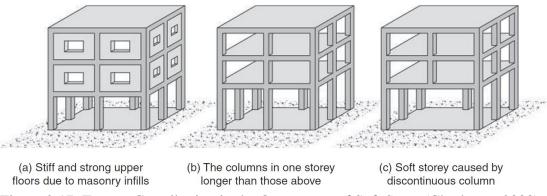


Figure 2.17: Factors Contributing in the Occurrence of Soft Story (Charleson, 2008)

According to Charleson (2008) this irregularity is the most serious among irregularities in elevation and it is the most prevalent cause for multi-storey buildings collapses. A seismic code may tolerate some reasonably minor degree of soft storey. However, special analyses must be undertaken with additional strength and ductile detailing.

The 2007 Turkish Earthquake Code specifies for a storey to be soft is when the ratio of average storey drift at a storey to the storey immediately above or below is greater than 2.

2.3.2.1.3 Discontinuity of Columns or Shear Walls

In some old designs, columns or shear-walls are omitted in some floors due to spatial, functional or aesthetical purposes. A beam could support the load of a column, but it would be uneconomical as it will need a relatively huge beam dimensions since the 2007 Turkish Earthquake Code requires a 50% increase of the design loads of the beam supporting the column and the other beams and columns neighbouring to the beam. Besides, the beam will be subject to critical moments and shear stresses under earthquake forces (Ozmen and Unay, 2007). However, it is prohibited by the 2007 Turkish Earthquake Code for:

- Columns to be supported by cantilever beams or gussets of the columns underneath.
- Shear-walls to rest on columns or/and beams.

The 2007 Turkish Earthquake Code described the cases which causes this type of irregularity as: where columns or structural walls are omitted at lower stories which causes columns of the stories immediately above to be carried by bellow gusseted columns (Figure 2.18a) or beams (Figure 2.18b), or where shear walls to

be carried by columns (Figure 2.18c) or beams (Figure 2.18d) of the storey immediately bellow.

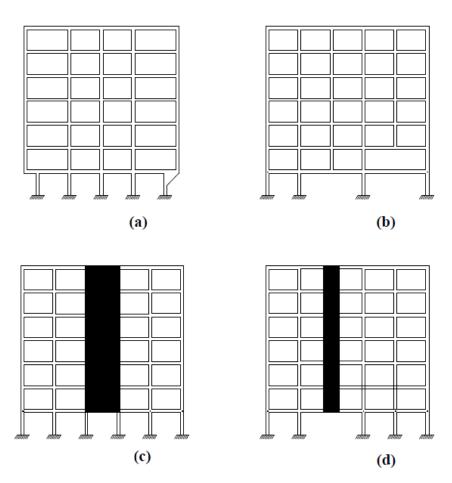


Figure 2.18: Discontinuity of Vertical Structural Elements Irregularity (Ministry of Public Works and Settlement, 2007, P.10)

2.3.2.2 Vertical Structural Elements' Elementary Design Faults

2.3.2.2.1 Broken Axis Columns

A broken axis column creates eccentricities and additional moments within the column, thus broken axis columns should be avoided during design stage. Interior broken axis column are not usually found as often as in exterior columns due to the desire of smooth façade. If smooth façade are desired when the cross-section of upper levels exterior columns are reduced, a plaster or masonry wall could be used to

fill the areas of reduced sections. However these fillings could be danger as it can fall off during earthquake motion if not installed properly. The centre line of a column should be continuous from foundation to roof to avoid any additional eccentricities and moments which may lead to cracks on structural members (Figure 2.19) (Ozmen and Unay, 2007).

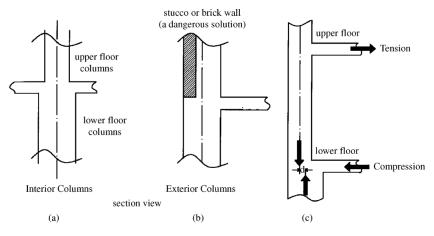


Figure 2.19: Broken Axis Columns (Ozmen and Unay, 2007)

2.3.2.2.2 Irregular Column and Shear-Wall Plan Configuration

Having Irregular column plan configuration will result in two elementary design faults about beams; namely: non-continuous beams and broken-axis beams (Figure 2.20a). As a result, critical torsion moments will be developed on the system under earthquake lateral inertia forces. Uneven deflections will develop due to varying rigidity throughout the diaphragm. Another disadvantage of irregular column plan configuration is that it requires uneconomical large cross-section structural element to compensate its lake of lateral resistivity. On the other hand, having a regular column plan configuration (Figure 2.20b) where column are regularly placed and organized according to an axial column grid system to resist X and Y earthquake force directions, will result in even rigidity, limited deflections and reduced stresses on structural elements (Ozmen and Unay, 2007).

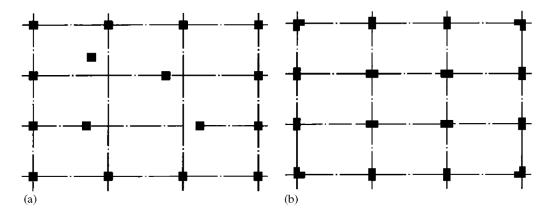


Figure 2.20: Irregular vs. Regular Configuration of Columns (ozmen and unay, 2007)

A shear-wall is a load-bearing wall having a longer edge to a shorter edge ratio >7. The minimum width of a shear-wall according to the 2007 Turkish Earthquake Code is 20 cm. Similar to columns, the configuration of shear-walls should be also regular by organizing them according to an axial grid system. Additionally, it is always preferable to distribute shear-walls symmetrically across the plan and evenly for X and Y directions (Figure 2.21). A shear wall have a high rigidity in the long direction which makes it very effective in reducing excessive deflections in that direction. Therefore, when using mix system of columns and shear-walls combination, it is best to place shear-walls parallel to the shorter edge of the building which is the direction of critical lateral earthquake force (Özmen, 2008).

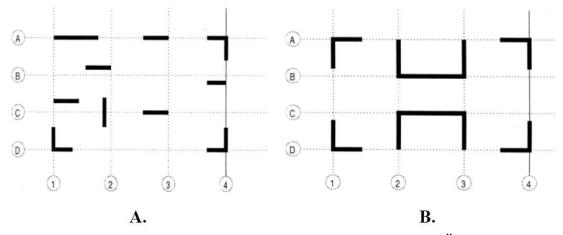


Figure 2.21: Irregular vs. Regular Configuration of Shear-Walls (Özmen, 2008)

2.3.2.3 Short Column

When the length of a column is reduced, its lateral rigidity increases which as a result attracts more lateral forces to it. Therefore short columns will be the first column to fail and in shear causing disasters during an earthquake. Short columns can occur in two scenarios:

- I. Some columns are shorter than others within the structure.
- II. Columns which most of their lengths are restricted from deflecting

Examples of the first short column scenario where some columns are shorter than others can be where columns are shortened by beams and in foundation columns on sloped topography (Figure 2.22).

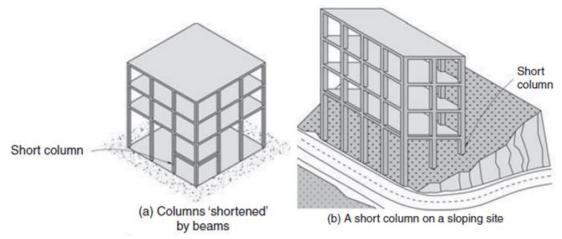


Figure 2.22: Examples of Short Columns Among Longer Columns (Charleson, 2008)

One way to overcome the type of short column problem shown in Figure 2.22a is to pin both ends of the beams that form short columns. However, this solution could generates a soft storey problem which must be considered. On the other hand, to overcome the problem of short columns on sloped site (Figure 2.22b), short columns can be lengthen and prevented from contacting the ground by sleeves or casings which allow the column to freely deflect (Figure 2.23). However, soft story could generate by this solution and should be checked.

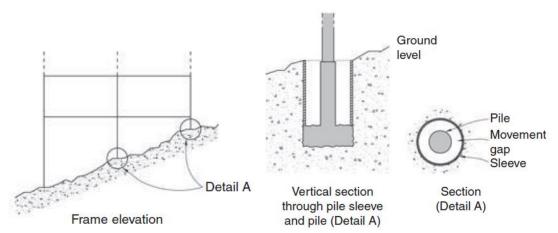


Figure 2.23: A Way to Overcome Short on Column on Sloped Site (Charleson, 2008)

In the second short column scenario where most of the column's length is restricted from deflection, columns are partially restricted usually by masonry infill walls (Figure 2.24). Masonry infill walls can intentionally or unintentionally act as shearwalls in buildings. Short columns are commonly caused by short masonry walls such as those found in parking buildings. Charleson (2008) mentioned the following ruleof-thumb on judging short columns: a column can be called a short column if the unrestricted length is less than twice its depth.

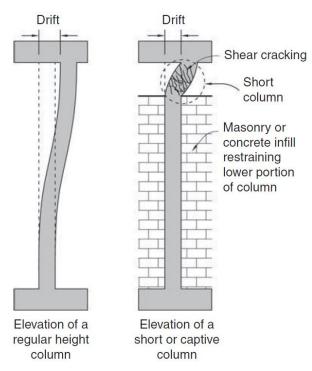


Figure 2.24: Short Column Occur When a Column is Partially Restricted from Deflecting Leading to Potential Damage in Form of Shear Cracking in the Unrestricted portion of the Column Under Lateral Force (Charleson, 2008)

To avoid the creation of short columns here, these short walls have to be isolated from the vertical structural elements using earthquake joints. Another method is illustrated in Figure 2.25. In this method, short column failure wouldn't occur because compression forces will act diagonally into the joint between column and beam (Charleson, 2008).

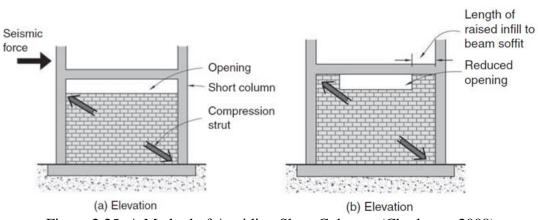


Figure 2.25: A Method of Avoiding Short Columns (Charleson, 2008)

Chapter 3

CONCRETE AND REINFORCED CONCRETE PROBLEMS

3.1 Introduction

Concrete does not always behave as desired; some of the undesirable defects can be seen as disintegration, spalling, cracking, leakage, wear, deflection or settlement. There are a combination of factors working together which contribute to concrete defects. These factors can be listed as: exposure conditions, service conditions, service load, construction, materials and design. The defects listed in this chapter can jeopardize the structural integrity and/or reduce the strength capacity of concrete. Thus, these defects can be categorised under structural defects as well.

In this chapter the following defects in concrete will be discussed together with their types, symptoms, causes, precautions, prevention, remedies and repair: corrosion of embedded meals, drying shrinkage cracks, construction defects, and structural cracks.

3.2 Corrosion of Metals Embedded in Concrete

Concrete is a high alkalinity material. A fresh concrete usually has a pH value between the range of 12 and 13. Within this range of alkalinity, a passive film is formed on the surface of steel embedded in concrete which protect it. Therefore, corrosion will start when this passive film is faded. Corrosion rate is very slow in low permeable concrete (high quality concrete) because it is harder for water and oxygen to find their way to embedded steel which are the requirements for corrosion to initiate. However, the mistake of adding extra water to the concrete mix at construction sites is committed sometimes which increases the permeability of the concrete and thus increasing the chance of steel corrosion.

The ultimate structural load capacity of concrete members decreases as the percentage of corrosion increases due to reduction of bar diameter and cracking of concrete surrounding the embedded steel bar which may occur.

3.2.1 Accelerators of Corrosion

If the alkalinity (pH) is dropped (carbonation) or if aggressive chemicals or dissimilar metals are introduced into concrete, corrosion will be accelerated. Figure 3.1 shows the relationship between pH of concrete and corrosion rate. Corrosion of reinforcing bars is one of the most common building defect that can be found in the buildings of North Cyprus. The following subsections are the three accelerators of corrosion, namely: chlorides, carbonation and embedment of dissimilar metals.

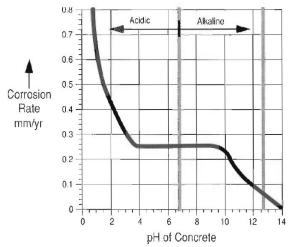


Figure 3.1: Relationship Between pH of Concrete and Corrosion Rate (Emmons, 1993)

3.2.1.1 Chlorides

Steel Corrosion could take place even if concrete is high alkaline when chlorides are present. Corrosion does not consume chlorides, they remain present in concrete because they only act as motivator to the process of corrosion (Emmons, 1993).

There are 3 ways for chlorides to be introduced into concrete:

 a) By coming contacting environments that contain chlorides, like sea water or salts.

Chlorides penetration begins from surface, then moves inward. The rate of penetration time depends on: Chlorides amount contacting concrete, concrete permeability (durability) and available moisture amount.

When chlorides concentrations contact steel bars, corrosion occurs with the presence of moisture and oxygen. When the rust around steel grows and expands, tensile stresses will be developed and cause concrete to crack and delaminate. Those cracks and spalls accelerate corrosion as they evolve because they will make it easier for corrosive salts, oxygen, and moisture to access concrete. Deeper embedded steel bars will then be affected by corrosion.

Concentration level of chlorides necessary to promote corrosion decreases as the pH value of concrete decreases. Therefore it is easier for chlorides to promote corrosion as the alkalinity of concrete is lowering.

North Cyprus has a problem of high salt levels in its underground water. Therefore, when the water isolation is absent or inadequate, these is a good chance for corrosion

of reinforcing bars to start in the foundations reaching to the lower parts of the column causing cracks (Figure 3.2).



Figure 3.2: Corrosion Crack in the Lower Part of a Column. Mağusa, North Cyprus. (Case Study #1 (Page 93)).

b) Through existing cracks.

Cracks in concrete permits corrosive chemicals such as salts to enter the concrete and access embedded reinforcing steel bars easier. Table 3.1 presents tolerable crack widths in reinforced concrete according to ACI 224R-01.

Exposure condition	Tolerable crack width	
Exposure condition	in	mm
Dry air or protective membrane	0.016	0.41
Humidity, moisture air, soil	0.012	0.30
De-icing chemicals	0.007	0.81
Seawater and seawater spray, wetting and drying	0.006	0.15
Water- retaining structure excluding non-pressure pipes	0.004	0.10

Table 3.1: Tolerable Crack Widths in Reinforced Concrete According to ACI 224R-01

c) Cast-in chlorides.

Chlorides can be introduced intentionally to concrete during concrete mix stage as an accelerator, or in the form of natural ingredients found in some aggregates. Concrete made with beach sand or using seawater as mixing water will result in cast-in chlorides. Table 3.2 shows suggested chloride ion limits in concrete before concrete is placed in service according to ACI 201.2R-01.

Table 3.2: Suggested Chloride Ion Limits in Concrete Before Concrete Is Placed in Service According to ACI 201.2R-01

Service condition	% of chloride ion to weight of cement
Pre-stressed concrete	0.06
Conventionally reinforced concrete in a moist environment	0.10
and exposed chloride	
Conventionally reinforced concrete in a moist environment	0.15
not exposed chloride	
Above-ground building construction where concrete will	No limit
stay dry	

In old constructions of North Cyprus (buildings constructed more than 30-40 years ago) especially before 1974 water, sand and aggregate used in mixing concrete were mainly supplied from seawater and seashore. This is one of the most important reasons of corrosion in reinforced concrete and deterioration of RC buildings from that time. Figure 3.3 shows an old building constructed around 40 years ago suffering from corrosion-induced spalling due to cast-in chlorides in Palm Brach area in Mağusa, North Cyprus.



Figure 3.3: Corrosion-Induced Spalling and Cracking Due to Cast-in Chlorides in an Abundant Old Building. Palm Beach Area, Mağusa, North Cyprus. (Case Study #23 (Page 115)).

3.2.1.2 Carbonation

The reaction between acidic gases in atmosphere and cement hydration products (calcium hydroxide dissolved in the pore water) is called carbonation. Normal air contains relatively low concentrations of carbon dioxide (0.03%). Industrial atmospheres contains higher level of carbon dioxide. Carbon dioxide penetrates into the pores of concrete by diffusion and existing cracks would help reducing the travel distance of carbonation. Carbonation reaction would result in reducing the alkalinity of concrete to a pH value of 10 which will lead to loss of concrete protection of the reinforcing steel. The passivity of the protective film on steel will be destroyed. If passive film of steel is lost and the concrete is acidic or mildly alkaline, corrosion will take place when moisture and oxygen are present in concrete. When the rust around steel grows and expands, tensile stresses will be developed and cause concrete to crack and delaminate.

In low permeable concrete (high quality concrete), carbonation is very slow (1mm/year). Besides, carbonation needs constant drying and wetting cycle, carbonation will not take place if concrete is constantly submerged under water (Emmons, 1993).

3.2.1.3 Embedment of Dissimilar Metals

Corrosion can occur in concrete when two different materials are cast into concrete structure, along with an adequate electrolyte (known as galvanic corrosion). A moist concrete matrix provides for a good electrolyte. Different metals promote different levels of electrochemical activity. Gold for example, is very active, while zinc is inactive, followings are some metals in order of increasing activity: zinc, aluminium, steel, iron, nickel, tin, lead, brass, copper, bronze, stainless steel and gold.

When two metals are in contact via an active electrolyte, the less active metal will be corroded. One of the most common examples found in buildings is the use of aluminium cast into reinforced concrete. Aluminium was used as an electrical conduit, and more recently, as hand rails. Aluminium has less activity than steel; therefore, the aluminium is the metal that corrodes. The steel will actually become cleaned, and the aluminium surfaces will grow a white oxide, which will cause tensile forces to crack the surrounding concrete. Figure 3.4 shows residential building's balconies having cracks due to dissimilar metal corrosion around handrail's embedded metal balusters.



Figure 3.4: Cracks Due to Dissimilar Metal Corrosion around Handrail's Embedded Metal Balusters of Balconies. Residential Building, Palm Beach, Mağusa, North Cyprus. (Case Study #24 (Page 116)).

3.2.2 Corrosion-Induced Cracking and Spalling

The following factors influencing concrete cracks and spalls due to corrosion of reinforcing steel bars: tensile strength of concrete, concrete cover quality, passive film condition, steel bar diameter, corrosion percentage. In order for spalling and delamination to occur, natural gravity force must act on loose concrete. As the coverto-bar diameter ratio (C/D) increases the percentage of corrosion needed to cause cracking increases (Alsulaimani et al., 1990) (Figure 3.6).



Figure 3.5: Cracks and spalls in concrete short walls. Public structures, Mağusa, North Cyprus.

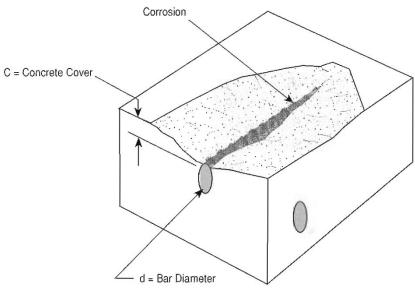


Figure 3.6: Corrosion-induced spalling (Emmons, 1993)

3.2.3 Precautions, Prevention, Remedies and Repair

3.2.3.1 Precautions and Prevention

The followings are methods for precautions and prevention of embedded metal corrosion in concrete:

- 1. Any permanent direct water at concrete surface or persistent water leakage should be dealt with and eliminated.
- Deteriorative concrete caused by aging such as those of aged buildings should be cured.
- 3. Avoiding using salty water or/and seashore aggregate in concrete mix.
- Cracks due to overloading should be dealt with immediately to avoid ease access of O₂ and H₂O to steel bars through cracks.
- 5. Precautions in handrail detailing, material selection and installation to avoid galvanic corrosion.
- 6. Adequate concrete cover above steel bars should be selected during design and detail stage. Besides, ensuring the proper execution of these details through adequate site supervision.
- 7. Water isolation should be properly installed and any defects in water isolation should be minimized. Besides, proper selection of water isolation type.
- Minimizing the direct exposure of concrete to CO₂ to avoid reduction of concrete alkalinity (carbonation) especially in polluted cities and industrial areas.

3.2.3.2 Common Remedies and Repair Methods

3.2.3.2.1 Patch Repair

If the damage is limited within concrete only, like concrete cover spalling, but reinforcing bars are still considered fine, then this method is the most common repair method for such a situation. Loose concrete must be removed till reaching intact concrete bed. Then, the exposed area of rusty steel bars and concrete must be well cleaned and dust free. Otherwise, they won't bond properly with the patching up mortars. Before patching up, the cleaned exposed steel bars should be primed using special cement/epoxy based primer suitable for the patching up mortar. Finally, patch up using suitable repair mortars to cover and prevent rusting of reinforcement bars. There are 2 material types commonly used for ordinary patching up (Chin-man, 2002):

- 1) Cementitious mortars, e.g. cement mortar and polyester-modified cementitious mortar.
- 2) Resin-based mortars, e.g. epoxy resin mortar and polyester resin mortar.

3.2.3.2.2 Replacement of Reinforcement Bars

The addition or replacement of reinforcement steel bars method is applicable when the damage is more severe in a way, after cleaning out the rust, it is revealed that the steel bars have lost significant amount of its diameter. The specifications of the old reinforcement bars have to be identified before carrying on estimates on the needed steel bars replacement or addition and the needed lapping of the existing and introduced bars.

3.2.3.2.3 Strengthening by using Carbon Fiber Reinforced Polymer (CFRP)

After carrying out the proper repairs of cracks, spalls and corroded bars, structural members can be strengthened using Carbon Fiber Reinforced Polymer (CFRP)

which is one of the materials being used recently for strengthening of RC buildings in North Cyprus (Figure: 3.7). The old bazaar in İskele was also built around 40 years ago. The use of salty water and aggregate were the main reasons for the deterioration of the building and the corrosion of reinforcing bars in the structural members. This building is currently being repaired and strengthened by using CFRP. Also new columns and new foundations were introduced for proper strengthening of this old building (Naimi and Celikag, 2010).



Figure 3.7: Strengthening of the Old Bazaar by Using CFRP in İskele, North Cyprus (Naimi and Celikag, 2010)

3.3 Cracks Due to Drying Shrinkage (Cracks Due to Moisture Effect)

When exposed to air, concrete loses some of its original water by means of evaporation and shrinks as a result. Shrinkage cracks are commonly found on the floor screed surface and normally caused by improper curing process.

Drying shrinkage, if unrestrained, results in shortening of the member without a build-up of shrinkage stress. If the member is restrained from moving, stress buildup may exceed the tensile strength of the concrete. This over-stressing results in dry shrinkage cracking. Shrinkage cracks are commonly found on the floor screed surface and normally caused by improper curing process. (Emmons, 1993) showed the factors affecting drying shrinkage in Table 3.3.

Factor	Reduced Shrinkage	Increased shrinkage
Cement type	Type I, II	Type III
Aggregate size	38 mm	19 mm
Aggregate type	quarts	sandstone
Cement content	$325 (kg/m^3)$	$415 (kg/m^3)$
Slump	76 mm	152 mm
Curing	7 days	3 days
Placement temperature	16°C	29°C
Aggregate state	washed	dirty

Table 3.3: Factors Affecting Drying Shrinkage (Emmons, 1993)

3.3.1 Precautions and Prevention

Correct placement of reinforcing steel in the member distributes the shrinkage stresses and controls crack widths. Adequate curing process must be insured to avoid drying shrinkages.

3.4 Construction Defects Due to Faulty Workmanship

Methods used to construct concrete structures are different from methods used in other type of construction. Concrete is one of the few materials in which raw ingredients are brought together at, or near, the construction site, where they are mixed, placed and moulded into final product. There are numerous variables influencing the production of concrete that there is a probability at all times for something to go wrong. Every building process includes a sequence of necessary step-by-step operations from conceptual plan to finished structure. Mistakes can be classified into two groups: wrong detailing and inexperienced labourers. Errors can be committed at one or more of the following main stages: conceptual planning, design, construction, and maintenance. Sometimes, designers are not paying adequate attention and not giving importance to some of the construction and structural details at design stage which are essential for sufficient building design and preventing defective workmanship or wrong detailing and design errors. Furthermore, inadequacy of quality control and problems in workmanship due to shortage of experienced and skilled workers to perform construction works, which is the consequence of unusual increase in the demand of construction industry in recent years, lead to the poor construction quality in RC building construction in North Cyprus.

On the other hand, workmanship issues are always associated with small contractors as they are not well trained to be in the construction industries. In many cases their quality of works is low due to lacks of experiences and improper guidance from the relevant parties. Workmanship issue are less to arise among established contractors/suppliers as they have strong financial record and expertise in carrying the works. The local government should through various entities make efforts to improve knowledge and skill of those small contractors by conducting field training, seminar and short courses.

Unfortunately, inadequacy in supervision of the construction at the sites in North Cyprus is a main factor of construction defects. Buildings are constructed with insufficient site control. This causes various construction defects in the construction industry. Chambers of the architect and engineers could only carry out the project control on submitted paper work (Özbilen, 2004).

The following subsections are aimed to highlight the problems in RC structures that can be seen mostly in buildings under construction due to mainly wrong/inadequate detailing, lack of workmanship and vibration. Some of these faults are not recognized by the professionals or construction workers since over the years they are naturally being accepted as necessary applications and no body questions why a particular work is done in such away.

3.4.1 Improper Reinforcing Steel Placement

There are three important reasons to control the proper location of reinforcing steel in structures:

- a) Steel bars are used in concrete to carry tensile loads, and if the steel is placed improperly, that might denies the concrete the ability to carry tensile loads. Cantilevered slabs, and negative moment areas near columns pose particular risk.
- b) Steel bars needs sufficient concrete cover to prevent them from getting rusty. The alkalinity of the concrete is a natural corrosive inhibitor. If the concrete cover is inadequate, steel bars will be vulnerable to corrosion in short time (Figure 3.8 a). Shifted reinforcing bar cages in columns, walls or beams may also cause the reinforcing steel to lose proper cover as shown in Figure 3.9. The ACI-required concrete cover for corrosion protection is shown in Table 3.4.

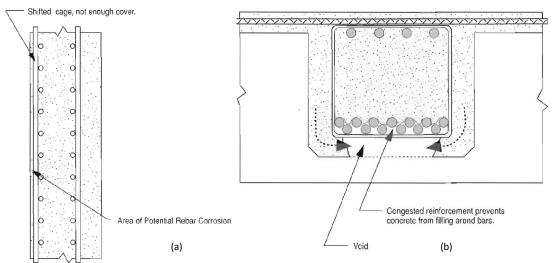


Figure 3.8: Illustrations of Improper Reinforcing Steel Placement: (a) Shifted Cage Causing Inadequate Concrete Cover. (b) Congested Reinforcement. (Emmons, 1993)

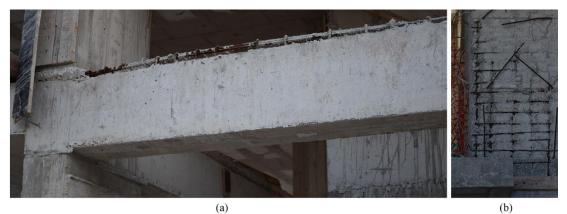


Figure 3.9: Shifted Reinforcing Bar Cages in: a Beam (a) and in a Sheer Wall (b). Residential Buildings, Mağusa, North Cyprus. (Case Study #111 (Page 203)).

Condition	Cover required (mm)
Concrete deposited on the ground	76
Formed surfaces exposed to weather: bars > 19 mm	51
Formed surfaces exposed to weather: Bars < 16 mm	38
Formed surfaces not exposed to weather: Beams, girders, columns	38
Slabs, walls, joists: Bars < 36 mm	19
Slabs, walls, joists: Bars 43 mm, 57 mm	38

Table 3.4: ACI-Required Concrete Cover for Corrosion Protection

c) Beams and columns are usually heavily reinforced members. Lap splices require overlaps of bars and may result in a mat of steel that concrete mix cannot pass through during placement and consolidation. The result is either a visible, or worse, a latent void around the reinforcement (Figure 3.8b) and (Figure 3.10). High congested reinforcement should be reduced by taking it into consideration during design stage.



Figure 3.10: Visible Voids around Reinforcements Due to High Congestion. Residential Building, Mağusa, North Cyprus. (Case Study #104 (Psge 196)).

3.4.2 Premature Removal of Forms

Removal of forms (including shorting) before the concrete reaches a suitable strength may result in compression and tensile stresses, leading to cracks, deflection, and probable collapse (Figure 3.11).

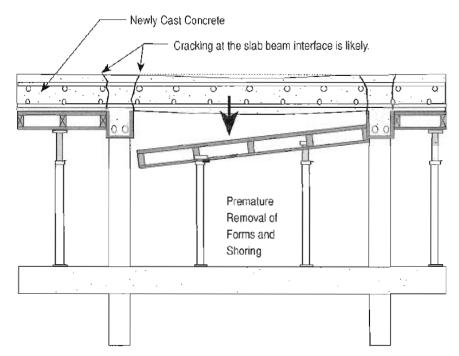


Figure 3.11: Illustration of Premature Removal of Forms (Emmons, 1993)

3.4.3 Cold Joints

Cold joints are regions of discontinuity within a member where concrete may not tightly bond to itself. Cold joints may occur within a planned placement if a part of concrete in one placement sets, and then the rest of the concrete is placed on it. During the set, laitances form, providing for a weakened plane. The result is a weak connection between placements that could rebuilt in weakness. To achieve proper bond and water-tightness, the surface of hardened concrete must be free of dirt, debris, and laitance. Figures 3.12 and 3.13 shows some cold joints in columns.



Figure 3.12: Cold Joints in Columns. Residential Buildings, Mağusa, North Cyprus. (Case Study #111 (Page 203)).



Figure 3.13: Cold Joint in Column. Residential Buildings, Mağusa, North Cyprus. (Case Study #104 (Page 196)).

Cold joints can also be found at intersections between members where timber is not properly removed from the reinforced concrete as shown in Figure 3.14. This can eases the initiation of corrosion in exposed bars which can lead to other serious problems during the building's lifespan.



Figure 3.14: Cold Joint Between Column and Slab. Residential Buildings, Mağusa, North Cyprus. (Case Study #111 (Page 203)).

3.4.4 Segregation

Segregation of concrete results in non-uniform distribution of its constituents (Figure 3.15). High slump mixes, incorrect methods of handling concrete and over-vibration are causes of this problem. Segregation causes upper surfaces to have excessive water-cement ratio. The resultant concrete may lack acceptable durability.

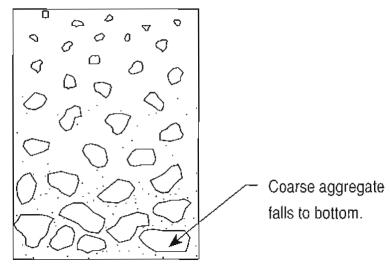


Figure 3.15: Illustration of Segregation (Emmons, 1993)

3.4.5 Honeycombing

Honeycomb is a void found in concrete because mortar has failed to fill the gaps between course aggregates (Figure 3.16). This air void creates a low compressive strength spot within the concrete member. Honeycombing occur mainly because of insufficient vibration of concrete during pouring. Excessive honeycombing in columns could result in a failure of the column under earthquake forces. Emmons (1993) summarized the primary causes of honeycomb in Table 3.5.



Figure 3.16: Honeycomb in a Column. Residential Building, Mağusa, North Cyprus. (Case Study #104 (Page 196)).

Honeycombing in concrete if not fixed can lead to water seepage which in return lead to: rust staining, paint/wallpaper peeling, water dripping, mouldiness and defective concrete, plaster or tiles (Chin-man, 2002).

	Design of members	Forms	Construction conditions	Properties of fresh concrete	Placement	Consolidation
a	Highly congested reinforcement	Leaking at joints	Reinforcement too close to forms	Insufficient fines	Excessive free-fall	Vibrator too small
q	Narrow section	Sever grout loss	High temperature	Low workability	Excessive travel in forms	Frequency too low
C	Internal interference	-	Accessibility	Early stiffening	Lift that is too high	Amplitude too small
q	Reinforcement splices	ı	ı	Excessive mixing	Improper tremie or drop chute	Short immersion time
e	r		I	Aggregate that is too large	Segregation	Excessive spacing between insertion
f	T	ı	I	-		Inadequate penetration

Table 3.5: Primary Causes of Honeycomb

3.4.6 Improper Grades of Slab Surfaces

Slabs requiring drainage for proper runoff need special attention. Drains should be at low, not high points. Proper slop-to-pitch for quick runoff is important to prevent deterioration and leakage within the structure. Standing water provides concrete with the potential for saturation (Figure 3.17). The quicker the water runs off the structure, the less leakage can occur through joints and cracks.

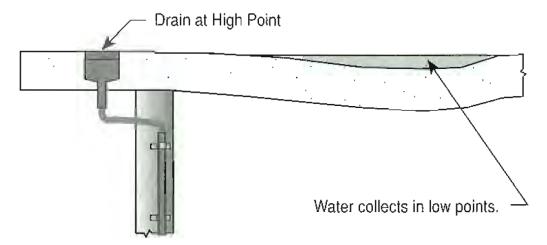


Figure 3.17: Improper Grades of Slab Surfaces (Emmons, 1993)

3.5 Cracks in RC Due to Load Effects (Structural Cracks)

Concrete structures and individual members all carry loads. Some carry only their own weight, while others carry loads applied to the structure. All materials change volume when subject to stress. Concrete is no exeption. Most concrete members are subject to tensile forces. Slabs and beams are the most common members subject to significant tension. When subject to tensile stress, concrete stretches; when subject to compressive stress, it shortens. Reinforced concrete is a structural composite made up of two types of materials: concrete and reinforcing steel. Concrete possesses high compressive strength but low tensile strength (about 10 percent of its compressive strength), and reinforcing steel bars are placed in the concrete to provide the needed strength in tension. Steel and concrete work effectively togother in a composite material for several reasons:

- 1. Similar thermal expansion coefficient.
- 2. Rebar-concrete bond prevents slipping of rebars relative to the concrete.
- 3. Good quality concrete adequately protects reinforcing steel from corrosion.

Concrete problems, such as excessive deflection, cracking, or spalling may be caused by volume change associated with load effects. A simply supported beam with loading from top experiences tension in its bottom portion (maximum tension at midspan). While compressive forces are acting in the top portion (maximum compression at midspan).

When reinforcing bars are subjected to tension, they stretch. The concrete arround the reinforcing bars in consequently subject to tension and stretches. When tension in exces of tensile strength of concrete is reached, transverse cracks may appear near the reinforcing bars.

When structural cracks are observed, the building must be checked immediately by experts. Stuctural cracks mean the building or part of it is overstressed which may lead to a sudden collapse.

3.5.1 Slab/Beam-to-Column Shear (Punching Shear) Cracks

Column connections to slabs and beams experience considerable shear stress. Excessive stress produces cracks in the beams and in the surrounding slab (Figures 3.18 and 3.19).

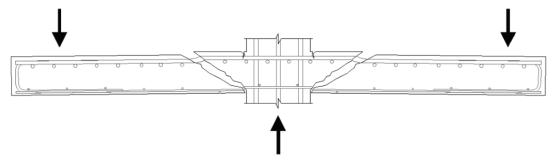


Figure 3.18: Illustration of Punching Shear (Sacramento et al., 2012, p. 594)

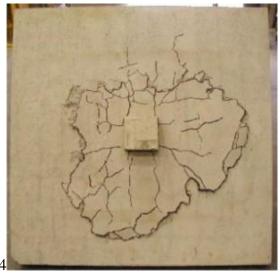


Figure 3.19: Plan View of Punching Shear Cracks in a Test Specimen at University of Waterloo, Ontario. (Curtis, 2013)

Shear cracking at column-beam/slab connections can also be caused by horizontal movement. Horizontal forces can accumulate from: Volume changes caused by temperature changes and foundation movements caused by settlement or earthquakes.

In seismic/moment resisting frames, columns support beams (Figure 3.20a). These beams usually provide enough thickness to resist punching shear. However, some structures do not only consist of seismic/moment resisting frames, but a combination of seismic resisting frames and gravity only columns. These gravity only columns support flat slabs directly, and here were the punching shear is in high concern (Figure 3.20b).

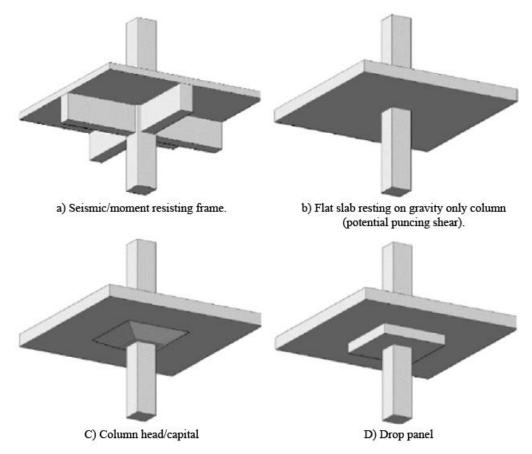
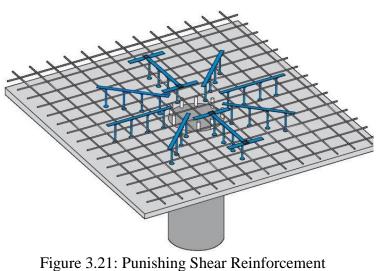


Figure 3.20: Some Methods of Increasing Punching Shear Resistance.



http://www.bpress.cn/ex/tag/PEIKKO/

3.5.1.1 Precautions and Prevention

There are several design methods to increase punching shear resistance. The simplest method is to increase the slab depth, yet it is the least economical method. It would be more economical to increase the depth of the slap in the column area only by providing column heads (capital) or/and drop panels (Figure 3.20c and d). Another method can be by playing with reinforcements, such as providing additional negative reinforcements, shear links or shear studs (Figure 3.21).

3.5.2 Cantilevered Members' Cracks

Cantilevered members are supported only on one side, balcony slabs are a typical example. Tension forces are acting in the member's top portion. Top portion tension is also known as negative moment. Tension is greatest at the member's fixed end. Tension forces are carried by the reinforcing steel located in the top portion of the member. Two critical factors should be considered when using cantilevered members:

- The negative moment steel must be placed in the correct position near the member's top surface. Improper placement of the reinforcing steel may result in bending failure of a structural member.
- Tension cracks that develop over the negative moment steel are natural canyons for moisture and other corrosion-inducing substances (Figure 3.22). Heavy corrosion results in section loss and causes proportional loss in tension capacity. Yielding of reinforcing steel may result in hinging and complete failure.

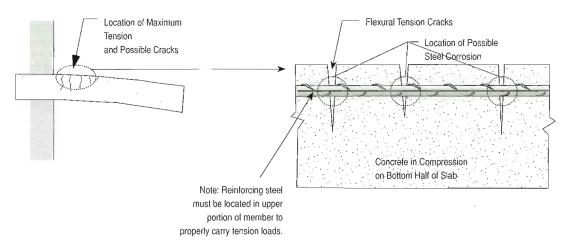


Figure 3.22: Illustration of Cracks in Cantilevered Slab (Emmons, 1993)

3.5.2.1 Precautions, Prevention, Remedies and Repair

3.5.2.1.1 Precautions and Prevention

Avoiding overloading and exceeding the designed strength capacity of the cantilevered member. Besides, care in designing and placing the reinforcement bars in their correct position on top to counteract negative moment.

3.5.2.1.2 Remedies and Repair

After the provision of temporarily external supports, the cracks are commonly repaired by carrying out pressure injection of non-shrinkage grout or epoxy resin or by open-up and refill/recast with concrete (Chin-man, 2002).

3.5.3 Problems and Cracks Associated with Foundation/Soil Settlement

When the soil underlying the building is inadequately compacted or when it get swollen or shrunk by the effect of water in some soil types such as clays, the building or part of it subsides by the help of its weight leading to structural cracks and other serious problems. Soil settlement is critical to buildings and infrastructures. Settlements lead to structural movements and can be caused by the mistake of selecting wrong foundation types due to lake of soil investigation.

Unwanted ground settlements and excessive movement of the building structure can result in causing diagonal cracks at corners of openings such as windows and doors. Besides, long continuous crack across width of walls or/and possibly structural elements. Those cracks on external wall not just destroying finishes but actually penetrate all the way to the other side through the masonry wall or concrete member. If not fixed, they can lead to water seepage which in return lead to: rust staining, paint/wallpaper peeling, water dripping, mouldiness and defective concrete, plaster or tiles (Chin-man, 2002).

Earthquake codes specifies whether site specific soil investigation is to be carried or not. For example in the 2007 Turkish Earthquake Code, site specific soil investigation is mandatory only if:

- I. The height of the building is more than 60m in the first and second seismic zone (see Table 2.1 to refer to seismic zones in North Cyprus).
- II. Buildings with importance factor of 1.5 and 1.4 irrespective of height and seismic zones (highlighted in red in Table 3.6).

Worthy to mention, the chamber of civil engineers funded a project to create a macro map of soil baring capacity, soil liquefaction and settlement properties for Tuzla region which is located in Mağusa. Table 3.6: Building Importance Factor (I) (Ministry of Public Works and Settlement, 2007, p.11)

Purpose of Occupancy or Type	Importance
of Building	Factor (I)
1. Buildings to be utilised after the earthquake and buildings	
containing hazardous materials	
a) Buildings required to be utilised immediately after the earthquake	
(Hospitals, dispensaries, health wards, fire fighting buildings and	
facilities, PTT and other telecommunication facilities, transportation	1.5
stations and terminals, power generation and distribution facilities;	
governorate, county and municipality administration buildings, first	
aid and emergency planning stations)	
b) Buildings containing or storing toxic, explosive and flammable	
materials, etc.	
2. Intensively and long-term occupied buildings and	
buildings preserving valuable goods	
a) Schools, other educational buildings and facilities, dormitories	1.4
and hostels, military barracks, prisons, etc.	
b) Museums	
3. Intensively but short-term occupied buildings	1.2
Sport facilities, cinema, theatre and concert halls, etc.	1.2
4. Other buildings	
Buildings other than above-defined buildings. (Residential and	1.0
office buildings, hotels, building-like industrial structures, etc.)	

3.5.3.1 Precautions, Prevention, Remedies and Repair

3.5.3.1.1 Precautions and prevention

Soil investigation and compaction should be carried out properly and the foundation

design is bases on the results of soil investigation. Construction work should not start

on site without any soil investigation.

3.5.3.1.2 Remedies and repair

3.5.3.1.2.1 Soil settlement

Solving foundation settlement problem caused by problematic soils is difficult, expensive and often of limited effectiveness. Any solution must stabilize the water content of the soil beneath the building.

There are many remedial methods for soil settlement due to inadequate soil compaction, one of them is slab lifting method using special resin where risen is to be injected into the ground at various levels so that it mixes and improves the soil properties. It is much faster compare to other method despite its higher cost. Figure 2.23 shows the improvement before and after the treatment at Social Security Organisation (SOCSO) building in Penang, Malaysia.



Figure 2.23: Before (on the left) and After (on the right) the Treatment Using Resin Injection at Social Security Organisation (SOCSO) Building in Penang, Malaysia (Suffian, 2013).

3.5.3.1.2.2 Cracks

Crack on brick walls can be repaired easily with straight forward methods such as applying repair mortar / putty onto the affected area (for cracks < 3mm) together with suitable wire meshes provided the surface preparation is carried out in proper ways (Suffian, 2013).

On the other hand, structural cracks (cracks found on structural elements) deserve immediate attention. The cracks are commonly repaired by carrying out pressure injection of non-shrinkage grout or epoxy resin or by open-up and refill/recast with concrete (as Chin-man, 2002).

Chapter 4

NON-STRUCTURAL PROBLEMS

4.1 Introduction

Non-structural defects vary widely, ranging from finishing flaws, water or moisture problems, and deterioration of materials. They usually don't jeopardize the structural integrity of a building but may affect the aesthetics and may cause health and comfort problems. The following non-structural defects will be discussed in this chapter: dampness, crazing, map cracking, efflorescence, paint peeling, mouldiness, staining, waterproofing defects, joint cracks and wooden door defects.

4.2 Surface Defects

Façade finishes of buildings in north Cyprus are of aluminium cladding and most commonly plaster and paint.

4.2.1 Dampness

Many surface defects are observed as dampness, resulted from insufficient protection of exterior surfaces, inadequate or poor water insulation, or capillary action. Dampness is the presence of undesirable moisture in the building's walls or ceilings etc. This undesirable moisture can lead to discolouration, staining, degradation of finishes or mouldiness on the damp surface. There are several types of dampness depending of the source of the moisture. However, the most common types of dampness in buildings are: condensation, rising damp and rain penetration (Trotman et al., 2004). Dampness does not only affect buildings but it can also affect the health of buildings' inhabitants, knows as sick building syndrome, as the unwanted moisture allows for growth and multiplication of microbes such as moulds, fungi and bacteria causing poor indoor air quality. Besides, dampness deteriorates and disintegrates materials into air causing indoor air pollution. The followings are the effects of dampness on buildings:

- It causes corrosion of metals.
- It deteriorates furniture and other various building materials, such as: wood, plaster and paint.
- It damages electric installations.
- It shortens the life-span of the building.
- It is visually unpleasant (stains and discolouration).
- It causes mouldiness and efflorescence, which will be discuses later in this chapter.

Condensation, which is damp from the air, is the type of dampness caused by high air humidity. Indoor activities such as cooking, bathing/showering, washing and drying dishes and cloths and even breathing emit moisture and vapour into air increasing the air humidity and if not ventilated the risk of condensation damp within a building. Condensation normally occurs in tropical climates and in winter as for condensation to happen warm vapour need to meet a colder surface. Condensation affect the performance of buildings and hence the liveability of interior areas. Condensation can allow for mould to grow creating black spots on walls or ceilings, and if left untreated, condensation can damage paint and plaster. Sassu and De Falco (2014) listed the primary causes of water condensation as follows:

- Inadequate air circulation and ventilation.
- Deficient thermal insulation (as in order for condensation to occur, warm vapour must meet colder surfaces).
- Thermal bridges.
- Prevention of wall breathing by External cladding.
- Insufficient drying time of newly constructed walls and floors before cladding.

To prevent and solve the damp problem of condensation, dehumidifier can be used, adequate insulation, heating and ventilation should be applied and moisture generation should be minimized (e.g. dry cloths outdoor instead of indoor).

Rising damp is the type of dampness where moisture from groundwater moves upwards through the pores in walls of basements and ground floors by capillary action. It occurs in old building where damp-proof course (DPC) is not installed or in case of modern buildings, when ground water bypass it or penetrate a defective DPC. The damp-proof course (DPC) is the line of black waterproofing material, usually seen between two rows of bricks about 150mm above ground level. If left untreated, rising damp can cause degradation and damage of skirting, crumbling of plaster, as well as peeling of paint and wallpaper on the lower section of the wall (usually not higher than 1.5m), often with wet patches. In rising dampness, mouldiness can only occur in the early stages as rising dampness brings with it salts that prevent the growth of moulds. To overcome rising damp:

• Firstly: moisture sources should be eliminated, methods of removing groundwater usually expensive and requires experts. Or prevent moisture from bridging and bypassing the DPC.

- Secondly: replacement or/and adequate installation of water proofing insulation should be applied, such as damp-proof course (DPC).
- Thirdly: re-plastering of the affected area.

Rain penetration is the type of dampness where rainwater makes its way into a wall or ceiling by leakage or even through the surface itself. Additionally, sometimes moving cars can splash rainwater into external walls of buildings adjacent to streets causing them to damp. Eaves and overhangs play an important role in protecting of external surfaces from getting damped by rainwater. Therefore pitched roof building, which usually have eaves acting as overhangs, performs better than flat roofs in the protection against rainwater. Modern building designs, which favours flat roofs, requires special attention in detailing efficient rainwater drainage system. Waterproofing specially in flat roofs is essential for preventing rainwater to access buildings. If the roof waterproofing membranes is defected or not well sealed at joints, such as the joints between the roof and external walls, there will be higher chance for dampness to occur. Traditional pitched roof design such as gabled or hipped roof doesn't only perform better than flat roof, but they also do not require as much attention in detailing waterproofing and drainage as for those in flat roofs since they simply allow the rainwater flow out of the building (Sassu and De Falco, 2014). Rain penetration causes discolouration, staining, mouldiness and efflorescence on walls (Figure 4.1). Designing roof and windows with sufficient eaves or overhangs can to some extends protect walls from rainwater. Defective roof guttering or deficient drainage system increases the change for rain penetration dampness to occur: when rainwater drainage system get blocked or fail, rainwater running down the walls may damage them, accelerating the deterioration of the facade.

Spills and leaks are another moisture sources witch often causes dampness. Dampness causes by leakage of defected pipes or frequent floor washing with too much water can be easily mistaken for rising damp, rain penetration or condensation (Figure 4.2). The first and most important step of treating any kind of dampness is to eliminate the moisture sources.



Figure 4.1: Dampness on the Upper Section of the Wall Due to Rain Penetration. Civil Engineering Department, Eastern Mediterranean University (EMU), Mağusa, North Cyprus.



Figure 4.2: Dampness on The Lower Part of Second Floor Walls Due to Wet Floors Caused by Frequent Floor Washing Using Too Much Water Which Can Be Mistaken Eeasily as Rising Damp. Akdeniz Gormitory, Eastern Mediterranean University (EMU), Mağusa, North Cyprus.

4.2.2 Surface Cracks on Wall Finishes

Sometimes multi-directional hair-line cracks develops on walls and sometimes accompanied with paint peeled off. They are mostly cosmetic shrinkage cracks developed within wall fishes such as plaster or other cement sand based rendering finishes. These cracks disturb the finishes and the wall's aesthetic only and doesn't usually lead to structural hazard as they do not penetrate down to the reinforced concrete structure. Besides they do not pose any safety concern. These cracks should be repaired by open-up and repair by mortar with the required key (Chin-man, 2002).

4.2.2.1 Crazing and Map or Pattern Cracking

Crazing appears on the surface as a net arrangement of hair-line cracks which doesn't penetrate a lot beyond the surface (rarely more than 3 mm deep). Crazing cracks encompass small concrete areas less than 50 mm (2 in.). The cause of crazing is minor surface shrinkage due to rapid surface drying of unhardened concrete due to low humidity, high air temperature, hot sun, or drying wind, either separately or in any combination. This drying at the surface causes the concrete at the surface to shrink at a faster rate than the concrete below causing stresses at the surface. Prevention of crazing lies in curing, curing should start as early as possible to stop rapid surface drying and lower the surface temperature specially when the temperature is high and the sun is out. The concrete should be protected against rapid changes in temperature and moisture wherever feasible.

Map/pattern cracking is similar to crazing, but the difference between crazing and map or pattern cracking is that the cracks of crazing are very fine and hard to notice unless when the concrete surface is allowed to dry after being wetted. While map/pattern cracking is more visible and its cracks encompass larger areas of concrete. Another difference is that the cause of map cracking is not only because of surface drying shrinkage restrained by underlying concrete that shrinks less, but it can also be one of the followings non-common causes:

- Expansion due to alkali-silica reaction within the concrete (ASR). Alkalis in Portland cement combine with reactive silica in some aggregates to form a gel around the aggregate particles. The gel absorbs water, causing internal expansion of the concrete and map cracking. Crack widths usually are large, reaching 1/2 inch in severe instances.
- Restrained thermal contraction, particularly at early ages. This typically occurs in thick concrete sections with enough mass to develop significant heat during cement hydration. The surface cools and then tries to contract, but the interior concrete that hasn't yet cooled restrains it. Map cracking then occurs.

Other than early water loss prevention and early curing mentioned in the prevention of crazing, map cracking can also be prevented by considering ASR in mix design. In the case when placing a large mass of concrete, concrete temperature can be minimized by cooling or by reducing cement content, or by using insulation blankets so the concrete surface doesn't cool too rapidly while the interior is still hot.

Although, both types of cracks are not structurally serious (except for map cracking caused by one of the two non-common causes mentioned above), they are undesirable as they may be aesthetically unacceptable and they can collect dirt, besides could lead to paint peeling(Figure 4.3).



Figure 4.3: Map cracking on the Column of the Top Floor That Led to the fall of some of the Paint Cover. English Preparatory School, Eastern Mediterranean University, Mağusa, North Cyprus.

4.2.3 Efflorescence

Efflorescence is a whitish bleeding or deposit on concrete (Figure 4.4) and brick wall surfaces which occurs due to chemical reaction between chemicals in the wall materials and chemicals in the atmosphere prior to painting process. Another cause is when moisture dissolves the soluble salts in the wall material, this salt-water solution is then moved toward the surface by evaporation or hydrostatic pressure. Left on the surface, water then evaporates, leaving a salt deposit at the surface. Efflorescence is structurally harmless but it is visually unattractive.

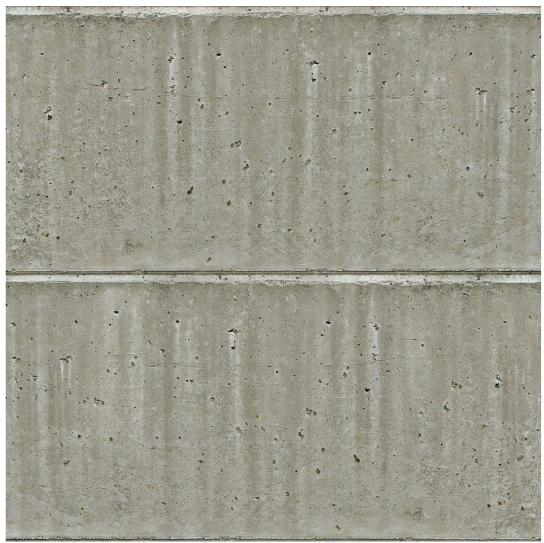


Figure 4.4: Efflorescence on Concrete Surface. http://www.docfoc.com/concrete-cast-in-place-flat-grey-efflorescence

4.2.3.1 Precautions, Prevention, Remedies and Repair

4.2.3.1.1 Precautions and Prevention

If one of the following components which cause efflorescence are absent, efflorescence will not occur: water, evaporation or salts. When mixing concrete avoid the use unwashed sand and aggregate. Sand should meet the requirements in the standard of the American Section of the International Association for Testing Materials ASTM C33. Besides, ensure the use clean water and avoid using seawater. Less permeable concrete is less prone to efflorescence and thus lower permeability is favoured.

4.2.3.1.2 Remedies and Repair

This problem can be resolved by determining and isolating or eliminating the source of moisture, completely removing the finishes and removing the salts on the affected surface by brushing and washing and then repainting in suitable condition (Suffian, 2013).

4.2.4 Paint Peeling

Paint is a common wall finishing in North Cyprus. Paint peeling is when paint losses its adhesion to the wall and curls or fall off, also known as delamination. Paint peeling affects the aesthetic of the building and if wall surface is wet, it can lead to fungal and mould growth unless the used paint type has the property to prevent them. As discussed earlier in dampness, one of the symptoms of dampness is peeling of paint. Other than moisture there are causes for paint peeling, the followings are the common reasons for paint peeling:

- Age of paint: as time passes, paint degrades and losses its adhesive bond strength with the wall. Bad weather and intense or prolonged exposure to UV lights can accelerate this process. This is why paint peeling is more often on exterior walls. Therefore, periodic maintenance is necessary.
- Applying paint on dirty, dusty, wet, too smooth/glossy or hot surfaces: theses reduces the adhesion of the paint.
- Incompatible paint: this is common when applying a new paint over an older one without checking the compatibility between them which can cause the newer one separating off the older one, known as intercoat peeling.
- Moisture and damp Walls (most common cause): Moisture transmission through a wall forces off the paint.
- Using cheap/poor quality paint.

• Poor workmanship, such as: presence of trapped air, application of thick paint coat and un-dried undercoat.

4.2.4.1 Remedies and Repair

To solve the problem of paint peeling on a wall, the loose paint must be removed and surface roughed and sanded before dust removal and cleaning prior to repainting under a good condition with a compatible good quality paint.

4.2.5 Mouldiness

Mouldiness in houses is where surfaces such as walls and ceilings are covered with moulds which have grown on them. As discussed earlier in dampness, mouldiness can be caused by dampness, especially condensation. Mould spores are always present in the air and they are invisible to the naked eye. However, they become apparent when they land on a surface and start multiplying. To achieve that, moulds need four elements: food, moisture, a suitable temperature (between 2 and 40 degrees Celsius) and oxygen. At houses, oxygen is available always naturally in the air and the temperature usually is suitable. Moisture is offered by condensation and food (starch) is usually obtained from surface finishes such as wallpaper or emulsion paint and from ceiling tiles. Of these four things, we can only control mould growth by cutting out moisture or cutting out their food by using other wall finishing materials that prevent mouldiness such as anti-mould paint. The longer the material is exposed to water, the higher the risk of mouldiness. The quantity of water is not as important as the duration of exposure for moulds to grow.

Mouldiness affect the aesthetic appearance and causes stains or discolouration to the surface finishing material. Besides, the presence of moulds in the interior is unhealthy and can cause health problems. Hence, it should be dealt with as early as possible.

4.2.5.1 Precautions, Prevention, Remedies and Repair

4.2.5.1.1 Precautions and Prevention

Preventing moisture from reaching surfaces and using wall finishing materials that prevent mouldiness such as anti-mould paint.

4.2.5.1.2 Remedies and Repair

The first and most important step in treating mouldiness is to eliminate the source of the dampness (refer to dampness section). Light mould staining on hard surfaces such as painted walls can be removes using a solution of water and vinegar, otherwise wipe down the walls with a fungicidal wash or diluted bleach. The final step is repainting with a good quality fungicidal paint to help prevent mould recurring.

4.2.6 Staining

After few years of painting, many building facades experiences staining problems such as water mark, rust marks, existence of moss, fungus and algae attacks, etc.

4.2.6.1 Precautions and Prevention

To minimize these problems, high quality external paint containing antifungals agents can be used. It may not offer a total solution but it helps to prolong a good appearance of the buildings.

4.3 Waterproofing Defects, Water Leakage and Seepage

To suit a modern concept of design and ease of maintenance, many building designers in North Cyprus have opted for a flat roof concept rather than traditional pitched roof. However, the problem that mostly associates with the flat roof is a waterproofing-related issues. Flat roofs are usually more vulnerable to leakage problems compare to that of pitched roof (Douglas and Ransom, 2006).

There are numerous waterproofing systems that are used around the world, such as; liquid, bituminous membrane and cementations water proofing system. There are two techniques of applying waterproofing materials: liquid-application and membrane-application. Some waterproofing materials are able to withstand exposure to atmosphere and others need to be covered with finishes like cement sand screeding or tiles. Some materials are more elastic and suitable for anticipated movements in the roof structure. Waterproofing materials have life expectancy starting from of 5 years to more than 20 years.

Tests need to be performed after applying waterproofing to check its performance. Some water proofing test examples: flooding/ponding tests and thermal scanning

According to a study done by (Suffian, 2013) on Buildings in Malaysia, the bituminous membrane caused regular problem which its root causes was identified as follows:

- The burning process of membrane was not properly carried out resulting weak bonding to the substrates. Water may have tracked between the membrane and the slab thus makes it difficult to trace the source of the leak (Figure 4.5).
- No screed to protect the membrane from punching forces.
- Failure to repair minor defects at early stage that escalated to become major.



Figure 4.5. Failed Torch-on Membrane at Social Security Organisation (SOCSO) in Seberang Jaya, Malaysia (Suffian, 2013).

Suffian (2013) shows that increasing the thickness of membrane from 3 mm to 4 mm makes it performs better. The reason being that the burning process is more stable and easier resulting better bond to the slab.

Defective waterproofing can lead to water seepage which in return lead to: rust staining, paint/wallpaper peeling, water dripping, mouldiness and defective concrete, plaster or tiles (Chin-man, 2002).

4.3.1 Precautions, Prevention, Remedies and Repair

4.3.1.1 Precautions and Prevention

Some problems can be avoided much at early stage if the installer strictly follows the instruction such as constructing angle fillet at corners, fully cleaned the substrate surface prior to installation, accurately mixed components, etc. Installing waterproofing requires special attention to workmanship:

- To avoid ponding on roofs, waterproofed surfaces must have adequate slopping surface to allow for water to run off and find its way to drainage.
- Attention must be paid to the thickness of the applied waterproofing. If the thickness is for some reason is less that intended, problems might arise.
- Attention must be paid to overlapping the water proofing membranes at their edges.
- Corners are potential areas of problems. Therefore waterproofing material must be upturned and downturned where necessary such as walls, pipes and drain holes.
- When installing machines on roofs, attention must be paid to avoid excessive movement which can damage waterproofing integrity.

4.3.1.2 Remedies and Repair

4.3.1.2.1 Repair of Water Leakage in Roof

When it comes to repairing roof leakage problems, the easiest way is to totally replace the old or damaged waterproofing material. On the other hand, partial patch repair has some limitations and it has a higher probability to fail than the total replacement method. Partial patch repair can be applicable only if the source of the leakage such as

Partial application of waterproofing materials may be effective provided that the source of leakage such as cuts and holes can be precisely located, and the new material is compatible with the old one for effective bonding. Additionally, attention must be paid for sufficient overlapping and gradient of the surface to allow for water to run off and prevent ponding.

There are some temporary leakage repair technique which can be applied from ceilings, such as the use of chemical additives to existing concrete surfaces or chemical injection into the cracks and voids. These temporary leakage repair technique are applicable in apartments when the residents of the apartment above are not cooperative. These repair leakage methods can be applied as temporary solution only as water will still leak through other weak points.

4.3.1.2.2 Repair of Water Leakage in External Walls

Water can leak through external walls because of one or more of the followings:

- Penetrating cracks.
- Concrete defects such as honeycombing.
- Defects or loss of external finishes which protect the wall from the rain.

Common repair techniques:

- Penetrating cracks are either chemically injected or opened up before being repaired using waterproofing mortar.
- Honeycombing is cleaned before being patched using compatible waterproofing mortar.

Repairs can be applied internally or externally, depending on the location of the problem. After the repair is done, the surface can be smoothened, plastered and covered with finishes matching the existing ones. Special additives to the repair mortar or rendering can be used to improve waterproofing capabilities.

4.4 Non-Structural Cracks

4.4.1 Joint Cracks

Joint cracks are commonly seen at the joint between column or beams and infill walls. The common causes of such cracks are identified due to the difference thickness of plastering, insufficient bonding element that holds bricks to the column or beams and thermal movement.

4.4.1.1 Remedies and Repair

These cracks should be repaired by injection of specially designed chemicals (Chinman, 2002).

4.5 Wooden Door Defects

Sometime the door frame and leaf of the toilet and other wet areas is found to be darkened in colour and fine dust of wood falls out of them on the floor. This symptom indicates termite attacks. Soft or damp timber attracts termites. This phenomenon happens when timber is dampened due leakage or insufficient floor tiles slope which allows water to travel to or near the door.

4.5.1 Remedies and Repair

A pest control professionals should be appointed to check and treat the problem. Infected wooden doors must be disposed (Chin-man, 2002).

Chapter 5

CASE STUDIES

5.1 Introduction

In order to highlight defects and inadequacies of design and construction in North Cyprus, numerous case studies were visited and data was collected about the types of defects and mistakes done. The priority of this investigation is to mainly identify the construction inadequacies, design faults, defects of structural members and nonstructural members as well such as walls, finishes, insulations etc.

5.2 Methodology

There are a total of 125 case studies in this thesis divided into two groups. The first group which represents completed buildings contains 100 case studies divided into 25 case studies for each of the following four districts: Mağusa, İskele, Lefkoşa and Girne. The second group contains 25 case studies and represents uncompleted buildings, i.e., buildings under construction. The reason for dividing case studies into two groups is because it is easier to detect and consider seismic design faults for buildings which are not completed, i.e., buildings under construction. Case studies in this thesis were coded by using a letter followed by sequence number. For example, Mağusa case studies are M1-M25, İskele İ1- İ25, Lefkoşa L1-L25, Girne G1-G25 and for under construction buildings are C1-C25.

Upon visiting a case studies, visual inspection was carried merely by naked eye. Observation of defects and problems then were checked into a prepared checklist (Check Appendix A for checklist sample) and documented by photographs when possible. The camera used for photographs is Nikon D5300 which has a built-in GPS, so the coordinates of each case study is recorded as well. The case studies were chosen randomly from noticeably defected buildings while driving, cycling or walking around the country. The location information, i.e., coordinates were extracted using ViewNX 2 software program. Using the coordinates, area and street names are determined through Google maps. Aided by the registered coordinates, the approximate age of the building are determined as well by using Google Earth software program which contain a set of historical imaginary satellite maps dating as far as 2003 (Note the age is approximate as there are missing maps such as those of the years between 2003-3008). If the building age is less than 14 years old, then the approximate age is determined by using Google Earth software program. However if it is more than 14 years old, there is no way to know the age of the building if not told by the owners of the buildings. Moreover, some of the 43+ years old building can be determined easily from the construction methods and materials used such as uncrushed aggregates (note that 43 is the age of the conflict of Cyprus).

5.3 Challenges and Limitations

- Most of the buildings were inspected exteriorly only as it is very difficult to inspect each of them interiorly.
- Without the provision of floor plans, elevations and detailed drawings, calculations to precisely determine irregularities cannot be carried. Visual determination of potential seismic design fault can only be possible if the building is under construction and in its skeleton form.
- Some of dampness defects are seasonal defects which occur mainly in winter. Crazing on the other hand is a surface defect which hard to detect unless if

the surface is allowed to dry after being wet, e.g. by rain. However, sometimes they leave evidences behind them which lead to their determination such as discoloration, stains and paint peeling.

5.4 Case Studies

		Case	Stu	udy	#1 (M	(1)			
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		and a state of the	. an			y ir	Floor discontinuity		
					iguration	Irregularity in plan	Projections in plan		
					conf		Non-continuous beams		
				configuration Horizontal structural configuration	Beam elementary design faults	Non-uniform beam span and cross-section			
District:				Structural configuration	contal str	n ele sign	Absence of vertical support at beams intersection		
				gura		3ear de	Broken axis beams and		
Area:	S	akarya		nfig	Horiz	щ	frames		
				co.		Slab	Over-stretched one-way slab		
Street name:	Sala	mis Yolu		ural		elementary			
				uct		design fault	fouded culture vered stabs		
Latitude:		<u>89' (35°8'47.3")</u>		Str		Poun	ding and separation problem		
Longitude:		<u>0' (33°54'37.8")</u>				ity on	Weak storey		
	<14 Da	te (if available):			al	Irregularity in elevation	Soft storey		
Structure age:	Between 14 ar (1974-2003)	-			Vertical structural configuration	Irreg in el	Discontinuity of columns or shear walls		
	>43 years (Be				al s figu	Vertical	Broken axis columns		
	Apartment				artic con	structural element	Irregular column and/or		
	Residential	House			Ve	elementary			
Building type:	Dormitory	Dormitory				design fault	t		
	Public						Short column		
	Commercial			Non-Structural Defects Waterproofing defects, water leakage and seepage					
Building status:	Under Constru Occupied	letion							
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Reinfo	rced Concrete	Defects			SSS	Rising damp			
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Corrosion of		duced cracking		def		ce cracks	crazing		
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		inforcing steel		Paint peeling Mouldiness					
Construction		ement				Wall finish	es workmanship problem		
defects (faulty	Premature re	nature removal of forms					Staining		
workmanship): designer, detailer,	Cold	l joints			-structural		Joint cracks		
and contractor		egation		(cracks				
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Cracks in RC due		column shear							
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Construction Improper reinforcing steel Mouldiness Premature removal of forms Wall finishes workmanship problem Vertication Premature removal of forms Vertication Segregation Segregation Cracks Improper grades of slab Surfaces Slab/beam-to column shear Other notes (if available): Cracks in RC due Slab/beam-to column shear (structural cracks) Cantilevered member cracks	_	Corrosion-in	duced cracking		efe	Surfac	ce cracks		
Construction Improper reinforcing steel Mouldiness Premature removal of forms Wall finishes workmanship problem Vertication Premature removal of forms Vertication Segregation Segregation Cracks Improper grades of slab Surfaces Slab/beam-to column shear Other notes (if available): Cracks in RC due Slab/beam-to column shear (structural cracks) Cantilevered member cracks			Ū,		ce d		<u>U</u>		
Construction Improper reinforcing steel Mouldiness Premature removal of forms Wall finishes workmanship problem Vertication Premature removal of forms Vertication Segregation Segregation Cracks Improper grades of slab Surfaces Slab/beam-to column shear Other notes (if available): Cracks in RC due Slab/beam-to column shear (structural cracks) Cantilevered member cracks					rfac				
Construction placement Wall finishes workmanship problem Defects (faulty Premature removal of forms Staining workmanship): Cold joints Non-structural designer, detailer, Honeycombing Joint cracks Improper grades of slab surfaces Other notes (if available): Slab/beam-to column shear (punching shear) cracks Other notes (if available): (structural cracks) Cantilevered member cracks Other notes (if available):	iii concrete	dissimilar me	tals (handrails)		Su		P	aint peeling	
Construction Premature removal of forms Staining defects (faulty Cold joints Non-structural workmanship): designer, detailer, Segregation cracks and contractor Honeycombing Joint cracks Improper grades of slab surfaces Other notes (if available): Cracks in RC due Slab/beam-to column shear Other notes (if available): (structural cracks) Cantilevered member cracks Other notes (if available):									
defects (faulty workmanship): designer, detailer, and contractor Premature removal of forms Staining Mon-structural cracks Cold joints Non-structural cracks Joint cracks Improper grades of slab surfaces Improper grades of slab surfaces Other notes (if available): Cracks in RC due to load effects (structural cracks) Slab/beam-to column shear (punching shear) cracks Other notes (if available):	Construction	placement					Wall finishes		
workmanship): designer, detailer, and contractor Cold joints Non-structural cracks Joint cracks Honeycombing Improper grades of slab surfaces Other notes (if available): Cracks in RC due to load effects (structural cracks) Slab/beam-to column shear (punching shear) cracks Other notes (if available):								Staining	
designer, detailer, and contractor Segregation Cracks Honeycombing Improper grades of slab surfaces Other notes (if available): Cracks in RC due to load effects (structural cracks) Slab/beam-to column shear (punching shear) cracks Other notes (if available):				\square				Joint cracks	
Improper grades of slab surfaces Other notes (if available): Cracks in RC due to load effects (structural cracks) Slab/beam-to column shear (punching shear) cracks Other notes (if available):					(TACKS			
Surfaces Other notes (if available): Cracks in RC due to load effects (structural cracks) Slab/beam-to column shear (punching shear) cracks	and contractor			$\left - \right $					
Cracks in RC due to load effects (structural cracks) Slab/beam-to column shear (punching shear) cracks Cantilevered member cracks					Othe	er notes (<u>if available):</u>		
to load effects (structural cracks) Cantilevered member cracks	Cracks in RC due	Slab/beam-to	o column shear						
(structural cracks)		· ·							
Southing to the second se	(structural cracks)								
		Settern							

		Case	Stud	ly -	#4 (M	4)			
	Profile						e Design Faults		
			_	_		Week colu	mn-strong beam		
							Torsional Irregularity		
1112 e		1	<u></u>			, in	(Torsion eccentricity)		
		A				n n	Floor discontinuity		
					Horizontal structural configuration	Irregularity in plan	Projections in plan		
					COJ	Ś	Non-continuous beams		
				ructural	Beam elementary design faults	Non-uniform beam span and cross-section			
District:	Ν	lağusa	•	ation	tal stru	ım ele esign	Absence of vertical support at beams intersection		
Area:	S	akarya	٤	Structural configuration	orizon	Bec	Broken axis beams and frames		
	T:1 01			co	H	Slab	Over-stretched one-way slab		
Street name:]	Fül Sk		ura		elementary design faults	Poorly supported or heavily		
Latitude:	N 35°9.134' (35°9'8.1")			uct			loaded cantilevered slabs ng and separation problem		
Lantude: Longitude:		4' (33°54'16.5")	- č	Str		Toulia	Weak storey		
Longitude.		4 (55 54 10.5) te (if available):				arity ation	Soft storey		
Structure age:	years Between 14 ar	nd 43 years			Vertical structural configuration	Irregularity in elevation	Discontinuity of columns or		
~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	(1974-2003)	ia ie jeuis			ertical structur configuration	E E	shear walls		
	>43 years (Be	fore 1974)			ıl st igui	Vertical	Broken axis columns		
		Apartment			tica	structural			
	Residential	House			Ver c	element elementary	Irregular column and/or		
Building type:		Dormitory			r	design fault	shear-wall plan configuration		
	Public						Short column		
	Commercial Under Constru	action		Non-Structural Defects Waterproofing defects, water leakage and seepage					
Building status:	Occupied			Defected wooden door					
Dunung status.	Abandoned					Defected	Condensation		
Reinfo	rced Concrete	Defects			ess		Rising damp		
					dampness	Rain penetration			
Dryin	g shrinkage crac	ks		ects	dar	Leaking pi	pes, spills and other moisture sources		
Corrosion of		duced cracking		def		ce cracks	crazing		
metals embedded		duced spalling		lce	on wal	l finishes	Map/pattern cracking		
in concrete		embedment of	د	Surface of the second s			Efflorescence		
		tals (handrails)		Su Su			aint peeling		
		inforcing steel ement					Mouldiness workmanship problem		
Construction	1	moval of forms	-	Non-structural		wan minsnes	Staining		
defects (faulty		joints	N						
workmanship):		egation			racks		Joint cracks		
designer, detailer, and contractor		combing							
and contractor		rades of slab	0)the	r notes (if available):			
		faces		uie	a notes (n avanable):			
Cracks in RC due		column shear							
to load effects		shear) cracks	_						
(structural cracks)		member cracks							
	Settlem	ent cracks							

	Case	Stuc	Case Study #5 (M5)								
					a • •						
MI Reden	Profile	1. J.				c Design Faults					
						mn-strong beam Torsional Irregularity (Torsion eccentricity)					
					ity	Floor discontinuity					
				Horizontal structural configuration	Irregularity in plan	Projections in plan					
				cor	y	Non-continuous beams					
				ructural	Beam elementary design faults	Non-uniform beam span and cross-section					
District:	Mağusa		Structural configuration	ntal str	am elementa design faults	Absence of vertical support at beams intersection Broken axis beams and					
Area:	Sakarya	_	onfigu Iorizc			frames					
Street name:	Hüdoğanlur Sk		ral co	Н	Slab elementary	Over-stretched one-way slab Poorly supported or heavily					
		_	ctu		design faults	loaded cantilevered slabs					
Latitude:	N 35°9.188' (35°9'11.3")	_	tru		Poundi	ng and separation problem					
Longitude:	E 33°54.210' (33°54'12.6")	_	<i>o</i> 2		ty on	Weak storey					
	<14 Date (if available): years			ral	Irregularity n elevation	Soft storey					
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration	Irre, in el	Discontinuity of columns or shear walls					
	>43 years (Before 1974)			al st ïgu	Vertical	Broken axis columns					
	Apartment	_		tica	structural						
D 111	Residential House			Vei c	element elementary	Irregular column and/or shear-wall plan configuration					
Building type:	Dormitory				design fault						
	Public					Short column					
	Commercial					ructural Defects					
D '11' / /	Under Construction			Waterpro		, water leakage and seepage					
Building status:	Occupied Abandoned				Defected	l wooden door					
Doinfo	rced Concrete Defects			SS		Condensation Rising damp					
Kenno	itted Concrete Defects			pne		Rain penetration					
Dryin	g shrinkage cracks		ects dampness		Leaking pipes, spills and other moisture sources						
Corrosion of	Corrosion-induced cracking		Surface defects		ce cracks	crazing					
metals embedded	Corrosion-induced spalling		ace	on wal	ll finishes Map/pattern cracking						
in concrete	Cracks due to embedment of		urf			fflorescence					
	dissimilar metals (handrails)	_	1 8								
	Improper reinforcing steel		Mouldiness								
Construction	placement Premature removal of forms		-		vv all linisnes	s workmanship problem Staining					
defects (faulty	Cold joints	N	Jon	structural							
workmanship):	Segregation			racks		Joint cracks					
designer, detailer, and contractor	Honeycombing										
and contractor	Improper grades of slab		741	n n = t	f ove:1-11)						
	surfaces		Jine	notes (if available):						
Cracks in RC due	Slab/beam-to column shear (punching shear) cracks										
to load effects	Cantilevered member cracks										
(structural cracks)	Settlement cracks										

	Case	Stu	ıdy	#6 (M	6)		
	Profile					Design Faults	
<i>i</i> II	the second secon				Week colur	nn-strong beam	
the the	the H	and a			_	Torsional Irregularity	
					y in	(Torsion eccentricity)	
					arit.	Floor discontinuity	
	KERELI			Horizontal structural configuration	Irregularity in plan	Projections in plan	
				co	<u>5</u>	Non-continuous beams	
				ictural	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	Mağusa		ion	l stru	n eler sign	Absence of vertical support at beams intersection	
•	Gazimağusa Sanayi Bölgesi		Structural configuration	onta	ean des	Broken axis beams and	
Area:	(Famagusta Greater Industrial Area	a)	ıfig	rizo	В	frames	
			cor	Hc	Slab	Over-stretched one-way slab	
Street name:	Yeni Hastane Yolu		ıral		elementary	Poorly supported or heavily	
T	N 2500 0001 (2500152 011)	-	lctu		design faults	loaded cantilevered slabs	
Latitude:	N 35°8.899' (35°8'53.9")	-	Strı		Pouliuli	ng and separation problem	
Longitude:	E 33°53.905' (33°53'54.3") <14 Date (if available):				ity ion	Weak storey	
~	years			ıral 1	Irregularity in elevation	Soft storey	
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration	lrre in e	Discontinuity of columns or shear walls	
	>43 years (Before 1974)			str	Vertical	Broken axis columns	
	Apartment			ical	structural		
	Residential House			'ert co	element	Irregular column and/or	
Building type:	Dormitory			-	elementary design fault	shear-wall plan configuration	
	Public				design fuult	Short column	
	Commercial				Non-Str	uctural Defects	
	Under Construction		Waterproofing defects, water leakage and seepage				
Building status:	Occupied			wooden door			
	Abandoned					Condensation	
Reinfo	rced Concrete Defects			dampness		Rising damp	
				ıdım	Rain penetration		
Dryin	g shrinkage cracks		Surface defects		Leaking pipes, spills and other moisture sources		
Corrosion of	Corrosion-induced cracking	$\left - \right $	de		ce cracks	crazing	
metals embedded	Corrosion-induced spalling Cracks due to embedment of	\vdash	ace	on wal	l finishes	Map/pattern cracking fflorescence	
in concrete	dissimilar metals (handrails)		urf			aint peeling	
	Improper reinforcing steel		01			Aouldiness	
	placement					workmanship problem	
Construction	Premature removal of forms					Staining	
defects (faulty workmanship):	Cold joints		Non	-structural		Joint cracks	
designer, detailer,	Segregation		C	cracks			
and contractor	Honeycombing						
	Improper grades of slab		Othe	er notes (if available):		
	surfaces Slab/beam-to column shear						
Cracks in RC due	(punching shear) cracks		The	buildin	g is used as s	torage	
to load effects	Cantilevered member cracks						
(structural cracks)		$\left - \right $					
	Settlement cracks						

		Case	Stu	udy	#7 (M	(7)		
	Profile					Seismio	e Design Faults	
. 1							mn-strong beam	
人物人							Torsional Irregularity	
-	N	M-1				н.	(Torsion eccentricity)	
						ity	Floor discontinuity	
					Horizontal structural configuration	Irregularity in plan	Projections in plan	
				uctural con		Non-continuous beams		
					Beam elementary design faults	Non-uniform beam span and cross-section		
District:	Ν	lağusa		ation	tal str	am ele lesign	Absence of vertical support at beams intersection	
Area:	K	arakol		Structural configuration	orizon		Broken axis beams and frames	
				co	H	Slab	Over-stretched one-way slab	
Street name:	me: Başbuğ Sk			ural		elementary	Poorly supported or heavily	
	250 7157 10111		_	ıctı		design faults	loaded cantilevered slabs	
Latitude:		7'56.18"N	_	Str		Poundi	ng and separation problem	
Longitude:		5'31.13"E				ty on	Weak storey	
	years	te (if available):			ral	Irregularity n elevation	Soft storey	
Structure age:	Between 14 ar (1974-2003)	-			Vertical structural configuration	Irre in e	Discontinuity of columns or shear walls	
	>43 years (Be	fore 1974)			ıl st igu	Vertical	Broken axis columns	
		Apartment			tica	structural		
	Residential	House			Ver c	element elementary	Irregular column and/or	
Building type:		Dormitory				design fault	shear-wall plan configuration	
	Public					-	Short column	
	Commercial			Non-Structural Defects Waterproofing defects, water leakage and seepage				
Duilding status	Under Constru	letion		Defected wooden door				
Building status:	Occupied Abandoned					Defected	Condensation	
Reinfo	rced Concrete	Defects			SS		Rising damp	
Keimo		Derects			pne		Rain penetration	
Dryin	g shrinkage crac	ks		cts	dampness	Leaking pi	pes, spills and other moisture sources	
	Corrosion-in	duced cracking		Surface defects	Surfac	ce cracks	crazing	
Corrosion of	Corrosion-in	duced spalling		ce c		ll finishes	Map/pattern cracking	
metals embedded	Cracks due to	embedment of		rfae		Efflorescence		
in concrete	dissimilar me	tals (handrails)		Sur			aint peeling	
		inforcing steel				Ν	Mouldiness	
Construction		ement				Wall finishes	workmanship problem	
defects (faulty		moval of forms				_	Staining	
workmanship):		ljoints			structural		Joint cracks	
designer, detailer,		egation		(cracks			
and contractor		combing	┝╴┦					
	Improper grades of slab surfaces			<u>Oth</u> e	er notes (<u>if available):</u>		
		o column shear	$\left \right $					
Cracks in RC due		shear) cracks						
to load effects		member cracks						
(structural cracks)								
	Settlem	ent cracks						

district: Mağusa under construction Başbuğ Sk under construction Başbuğ Sk egenetize Genetize Başbuğ Sk Başbuğ Sk Street name: Başbuğ Sk Stab Cerestretched one-way slab Latitude: 33°55'32.21"E Years Pounding and separation problem Longitude: 33°55'32.21"E Years Years Street name: Wak storey years Between 14 and 43 years Between 14 and 43 years Bit in the section Broken axis columns or shear walls Structure age: Apartment House Dormitory Vertical Broken axis columns or shear walls Building type: Apartment House Dormitory Vertical Broken axis columns or shear-wall plan configuration Building status: Occupied Dormitory Defected wooden dor Condensation Abandoned Abandoned Structure age: String damp Rising damp Building status: Occupied Defected wooden dor Condensation Rising damp Building status: Ocrorsion-induced cracking Stufface cracks Crazing	Case Study #8 (M8)								
Week column-strong beam Week column-strong beam Versional interpretation Versional interpretation District: Mağusa Area: Karakol Street name: Başbuğ Sk Latitude: 33° 55' 32.21 "E Street name: Başbuğ Sk Latitude: 33° 55' 32.21 "E Street name: Cover stretched one-way slab Building type: Apartment Residential House Dormitory Dormitory Public Commercial Commercial Non-Structural Defects Building status: Occupied Occupied Standoned Reinforced Concerte Defects Stating damp Reinforced Concerte Defects Residential Drving shrinkage cracks Torsional terestron									
District: Mağusa Area: Karakol Street name: Başbuğ Sk Latitude: 33°55'32.21"E Vertical Street name: Building type: Cordination Public Apartment Residential House Districtial Apartment Building type: Public Public Commercial Ourrent Construction Waterproofing defects, water leakage and seepage Districtial Under Construction Reinforced Concrete Defects Street name: Building status: Operation Organization Residential House Structural ge: Building status: Operation Organization Status: Occupied Abandoned Driving shrinkage cracks Status:		Profile							
Image: Structure age: Commercial Area: Karakol Structure age: Structure age: Commercial Apartment Building type: Apartment Apartment Public Commercial Vertical Broken axis columns Commercial Waterproofing defects, water leakage and seepage Distriction Non-Structural Defects Building status: Concurrent Defects Standoned Residential House Building status: Dormitory Public State columns State columns Residential House State columns State columns State columns Residential House State columns State columns State columns Residential House State columns State columns State columns Residential House State columns State columns State columns Building status: Cocupied Abandoned Kaising damp Kaising damp Residential Loadi columns Residential House Resing damp Drying shrinkage cracks Materproofing defects, water leakage and seepage Resing damp				_	Week colur				
District: Mağusa Area: Karakol Street name: Başbuğ Sk Latitude: 35° 7'55.46"N Longitude: 33° 5'32.21"E Structure age: element 14 and 43 years (1974-2003) Vertical Between 14 and 43 years (1974-2003) >43 years (Before 1974) Vertical Public Commercial Commercial Waterproofing defects, water leakage and seepage During status: Occupied Reinforced Concrete Defects Sague 7 Drying shrinkage cracks sague 7									
District: Mağusa Area: Karakol Street name: Başbuğ Sk Latitude: 35° 7'55.46''N Longitude: 33°55'32.21"E Structure age: Residential Building type: Apartment House Dormitory Public Short columns Commercial Non-Structural Broken axis columns of shear walls Under Construction Waterproofing defects, water leakage and seepage Diding attatus: Occupied Dormitory Public Commercial Non-Structural Defects Building status: Occupied Drving shrinkage cracks Tain penetration					E.				
District: Mağusa Area: Karakol Street name: Başbuğ Sk Latitude: 35° 7'55.46''N Longitude: 33°55'32.21"E Structure age: Residential Building type: Apartment House Dormitory Public Short columns Commercial Non-Structural Broken axis columns of shear walls Under Construction Waterproofing defects, water leakage and seepage Diding attatus: Occupied Dormitory Public Commercial Non-Structural Defects Building status: Occupied Drving shrinkage cracks Tain penetration					aity a	Floor discontinuity			
Street name: Başbuğ Sk Başbuğ Sk Poorly supported or heavily loaded cantilevered slabs Latitude: 35° 7'55.46"N Pounding and separation problem Longitude: 33°55'32.21"E Weak storey Structure age: Between 14 and 43 years (1974-2003) Soft storey >43 years (Before 1974) Apartment Building type: Apartment House House Irregular column and/or shear-wall plan configuration Public Non-Structural Defects Under Construction Waterproofing defects, water leakage and seepage Occupied Occupied Condensation Reinforced Concrete Defects Rain penetration Drying shrinkage cracks Structure Structure				nfiguration	Irregular plar	Projections in plan			
Street name: Başbuğ Sk Başbuğ Sk Poorly supported or heavily loaded cantilevered slabs Latitude: 35° 7'55.46"N Pounding and separation problem Longitude: 33°55'32.21"E Weak storey Structure age: Between 14 and 43 years (1974-2003) Soft storey >43 years (Before 1974) Apartment Building type: Apartment House House Irregular column and/or shear-wall plan configuration Public Non-Structural Defects Under Construction Waterproofing defects, water leakage and seepage Occupied Occupied Condensation Reinforced Concrete Defects Rain penetration Drying shrinkage cracks Structure Structure			1	co	ý				
Street name: Başbuğ Sk Latitude: 35° 7'55.46"N Longitude: 33°55'32.21"E Structure age: Between 14 and 43 years (1974-2003) Soft storey >43 years (Before 1974) Apartment Building type: Public Commercial Non-Structural Defects Building status: Under Construction Building status: Occupied Drying shrinkage cracks String damp	J J J J J J J J J J J J J J J J J J J			ctural	nentar aults	Non-uniform beam span and cross-section			
Street name: Başbuğ Sk Latitude: 35° 7'55.46"N Longitude: 33°55'32.21"E Structure age: Between 14 and 43 years (1974-2003) Soft storey >43 years (Before 1974) Apartment Building type: Public Commercial Non-Structural Defects Building status: Under Construction Building status: Occupied Drying shrinkage cracks String damp	District:	Mağusa	tion	al stru	n eler sign 1				
Street name: Başbuğ Sk Latitude: 35° 7'55.46"N Longitude: 33°55'32.21"E Structure age: Between 14 and 43 years (1974-2003) Soft storey >43 years (Before 1974) Apartment Building type: Public Commercial Non-Structural Defects Building status: Under Construction Building status: Occupied Drying shrinkage cracks String damp	Area:	Karakol	Foura	izonta	Bear de				
Street name: Başbuğ Sk Başbuğ Sk Poorly supported or heavily loaded cantilevered slabs Latitude: 35° 7'55.46"N Pounding and separation problem Longitude: 33°55'32.21"E Weak storey Structure age: Between 14 and 43 years (1974-2003) Soft storey >43 years (Before 1974) Apartment Building type: Apartment House House Irregular column and/or shear-wall plan configuration Public Non-Structural Defects Under Construction Waterproofing defects, water leakage and seepage Occupied Occupied Condensation Reinforced Concrete Defects Rain penetration Drying shrinkage cracks Structure Structure			- fuc	Hor	Slab		+		
Longitude: 35'53 52.21' E Weak storey Structure age: <14	Street name:	Başbuğ Sk		F			1		
Longitude: 35'53 52.21' E Weak storey Structure age: <14									
Longitude: 35*35 32.21 E Weak storey Structure age: Date (if available): years Soft storey Between 14 and 43 years (1974-2003) Between 14 and 43 years (1974-2003) Vertical Broken axis columns or shear walls >43 years (Before 1974) Apartment Vertical Broken axis columns Building type: Apartment House Irregular column and/or shear-wall plan configuration Public Dormitory Non-Structural Defects Building status: Under Construction Waterproofing defects, water leakage and seepage Occupied Defected wooden door Abandoned Condensation Brising damp Rain penetration Drying shrinkage cracks Taipenetration	Latitude:	35° 7'55.46"N			Poundi				
<14							-		
Image: hear walls (19/4-2003) Shear walls >>43 years (Before 1974) Apartment Broken axis columns Building type: Apartment House Irregular column and/or shear-wall plan configuration Public Dormitory Short column Short column Commercial Under Construction Waterproofing defects, water leakage and seepage Building status: Occupied Defected wooden door Abandoned Condensation Rising damp Reinforced Concrete Defects Rain penetration Rain penetration Drying shrinkage cracks The state of the spills and other moisture Spills and other moisture		<14 Date (if available):		I	ularity vatior	-	T		
Building type: Dormitory Image: Construction Dormitory Image: Construction Short column Building status: Under Construction Waterproofing defects, water leakage and seepage Building status: Occupied Defected wooden door Abandoned Condensation Reinforced Concrete Defects String damp Drying shrinkage cracks Taking pipes, spills and other moisture	Structure age:	Between 14 and 43 years		uctura	Irreg in ele	Discontinuity of columns or	T		
Building type: Dormitory Image: Content of the second sec	-			str gura	Vortical		-		
Building type: Dormitory Image: Content of the second sec				cal		Broken uxis columns	+		
Building type: Dormitory Cententary design fault shear-wait plan configuration Public Short column Commercial Non-Structural Defects Building status: Under Construction Waterproofing defects, water leakage and seepage Occupied Defected wooden door Abandoned Condensation Reinforced Concrete Defects Sting damp Drying shrinkage cracks Leaking pipes, spills and other moisture				erti		Irregular column and/or			
Public Short column Commercial Non-Structural Defects Building status: Under Construction Waterproofing defects, water leakage and seepage Occupied Defected wooden door Abandoned Condensation Reinforced Concrete Defects Rising damp Drying shrinkage cracks Leaking pipes, spills and other moisture				>		shear-wall plan configuration			
Commercial Non-Structural Defects Under Construction Waterproofing defects, water leakage and seepage Building status: Occupied Defected wooden door Abandoned Condensation Reinforced Concrete Defects Drying shrinkage cracks The shrinkage cracks	Building type:				design fault				
Building status: Under Construction Waterproofing defects, water leakage and seepage Occupied Defected wooden door Abandoned Condensation Reinforced Concrete Defects Rising damp Drying shrinkage cracks Leaking pipes, spills and other moisture	_								
Building status: Occupied Defected wooden door Abandoned Condensation Reinforced Concrete Defects Rising damp Drying shrinkage cracks Leaking pipes, spills and other moisture									
Abandoned Condensation Reinforced Concrete Defects Rising damp Drying shrinkage cracks Rain penetration									
Reinforced Concrete Defects Rising damp Drying shrinkage cracks Rain penetration	Building status:				Defected		_		
Remorced Concrete Defects Sing damp Drying shrinkage cracks Rain penetration Corrosion of Corrosion-induced cracking Corrosion of Corrosion-induced cracking	D . C			s					
Drying shrinkage cracks Signature Rain penetration Corrosion of Corrosion-induced cracking Surface cracks crazing	Reinfor	ced Concrete Defects		nes			_		
Corrosion of Corrosion-induced cracking Surface cracks Corrosion-induced cracking	Devina	shrinkaga araaka		amp	Looking ni		_		
Corrosion of Corrosion-induced cracking e Surface cracks crazing			fects	q q		sources			
$1 \rightarrow 2 \rightarrow 2$	Corrosion of		م	Surfac		8			
Corrosion induced spalling o on wall finishes Map/pattern cracking metals embedded Cracks due to embedment of Efflorescence			ace	on wa					
in concrete Cracks due to embedment of discimilar metals (handraile)	in concrete		11 F				_		
Information Image: Additional state Image: Addit Image: Addit Image:				2					
placement Wall finishes workmanship problem									
Construction Premature removal of forms Staining	Construction	2			wan minsiles				
defects (faulty Cold joints Non structure)			No	n structure!					
workmanship): Segregation cracks Joint cracks					-	Joint cracks			
designer, detailer, Uservanhing									
Improper grades of slab	and contractor								
surfaces <u>Other notes (if available):</u>			Ot	ther notes (<u>if available):</u>				
Slab/beam-to column shear									
Cracks in RC due (punching shear) cracks									
to load effects Cantilevered member cracks									
(structural cracks)		2 million of the monitor of ucks	1 1						
	(suructural clacks)	Settlement cracks							

		Case S	Study	#9 (M	(9)	
	D (*1				a • •	
	Profile					e Design Faults
						nn-strong beam Torsional Irregularity (Torsion eccentricity)
ETA		M.			ity i	Floor discontinuity
				Horizontal structural configuration	Irregularity in plan	Projections in plan
		1	ructural con	у	Non-continuous beams	
				Beam elementary design faults	Non-uniform beam span and cross-section	
District:	Ν	lağusa	ation	ıtal str	ım ele esign	Absence of vertical support at beams intersection
Area:	K	larakol	nfigura	nizon	Bea	Broken axis beams and frames
Street name:	Fadıl Rıza Sk		Structural configuration	Hc	Slab elementary design faults	Over-stretched one-way slab Poorly supported or heavily loaded cantilevered slabs
Latitude:	N 35°7.98	30' (35°7'58.8")	ruct		-	ng and separation problem
Longitude:		3' (33°55'36.8")	St			Weak storey
		ate (if available):		I	Irregularity In elevation	Soft storey
Structure age:	Between 14 ar (1974-2003)	nd 43 years		Vertical structural configuration	Irreg in ele	Discontinuity of columns or shear walls
	>43 years (Be	fore 1974)		ll str igur	Vertical	Broken axis columns
		Apartment		tica	structural	
Building type:	Residential	House		Ver c	element elementary	Irregular column and/or shear-wall plan configuration
Bunding type.	Public	Dormitory	_		design fault	Chart as house
		Commercial			Non-Str	Short column ructural Defects
	Under Constru	iction		Waterpr		water leakage and seepage
Building status:	Occupied			Waterpr	<u> </u>	wooden door
0	Abandoned					Condensation
Reinfo	rced Concrete	Defects		ess		Rising damp
				dampness		Rain penetration
Dryin	g shrinkage crac		Surface defects		Leaking pipes, spills and other moisture sources	
Corrosion of		duced cracking	def		ce cracks	crazing
metals embedded		duced spalling of embedment of	ace	on wa	ll finishes	Map/pattern cracking
in concrete		etals (handrails)	urf			fflorescence
		inforcing steel	S	L		aint peeling Mouldiness
		ement				workmanship problem
Construction		moval of forms				Staining
defects (faulty		l joints	Nor	-structural	1	
workmanship): designer, detailer,		egation		cracks		Joint cracks
and contractor		combing				
		grades of slab	Oth	er notes i	(if available):	
		faces		10100	<u></u>	
Cracks in RC due Slab/beam-to column shear (punching shear) cracks Marti Apt. NO 11						
to load effects (structural cracks)	Cantilevered	member cracks				
(structural clacks)	Settlem	ent cracks				

	Case	Stuc	Case Study #10 (M10)								
	Profile					Design Faults					
					Week colui	nn-strong beam					
						Torsional Irregularity					
					y in	(Torsion eccentricity)					
					urity In	Floor discontinuity					
				nfiguration	Irregularity in plan	Projections in plan					
				[CO]	Σ.	Non-continuous beams					
				Horizontal structural configuration	menta	Non-uniform beam span and cross-section					
District:	Mağusa		ation		Beam elementary design faults	Absence of vertical support at beams intersection					
Area:	Karakol		Structural configuration	orizon		Broken axis beams and frames					
Streat	End Darre Ol-		l co	H	Slab	Over-stretched one-way slab					
Street name:	Fadıl Rıza Sk		ural		elementary design faults	Poorly supported or heavily loaded cantilevered slabs					
Latitude:	N 35°7.954' (35°7'57.3")	-	ucti			ng and separation problem					
Longitude:	E 33°55.584' (33°55'35.0"		Str			Weak storey					
Longitude.	<14 Date (if available):				rity tion						
Structure age:	years Between 14 and 43 years			Vertical structural configuration	Irregularity in elevation	Soft storey Discontinuity of columns or					
Structure age:	(1974-2003)			ertical structur configuration	Irr in	shear walls					
	>43 years (Before 1974)			l str gur	Vertical	Broken axis columns					
	Apartment			ical	structural						
	Residential House			/ert co	element	Irregular column and/or					
Building type:	Dormitory			-	elementary design fault	shear-wall plan configuration					
0.71	Public	+			design laun	Short column					
	Commercial				Non-Str	ructural Defects					
	Under Construction		Waterproofing defects, water leakage and seepage								
Building status:	Occupied		Defected wooden door								
	Abandoned					Condensation					
Reinfo	rced Concrete Defects			ess	Rising damp						
				dampness		Rain penetration					
Dryin	g shrinkage cracks		Surface defects		0.1	pes, spills and other moisture sources					
Corrosion of	Corrosion-induced cracking		def		ce cracks	crazing					
metals embedded	Corrosion-induced spalling		ace	on wal	l finishes Map/pattern cracking						
in concrete	Cracks due to embedment of		urf			fflorescence					
	dissimilar metals (handrails)		Ñ			aint peeling					
	Improper reinforcing steel placement					Mouldiness workmanship problem					
Construction	Premature removal of forms	+	·		wan minsnes	Staining					
defects (faulty	Cold joints	+	Nor	-structural							
workmanship):	Segregation	\square		cracks		Joint cracks					
designer, detailer, and contractor	Honeycombing										
and contractor	Improper grades of slab		0.1								
	surfaces		Othe	er notes (<u>if available):</u>						
	Slab/beam-to column shear										
Cracks in RC due to load effects	(punching shear) cracks	Ш									
(structural cracks)	Cantilevered member cracks										
(structurur crucks)	Settlement cracks										

Case Study #11 (M11)								
	Profile						c Design Faults	
				_		Week colu	mn-strong beam	
							Torsional Irregularity	
						rrity in n	(Torsion eccentricity)	
							Floor discontinuity	
					Horizontal structural configuration	Irregularity in plan	Projections in plan	
				l co	Ŋ	Non-continuous beams		
				uctural	menta	Non-uniform beam span and cross-section		
District:	Ma	ğusa	acitacity of the second second second second second second second second second second second second second se	Structural configuration	ıtal strı	Beam elementary design faults	Absence of vertical support at beams intersection	
Area:	Ka	rakol			orizon	Bea	Broken axis beams and frames	
G		D C1		00	Н	Slab	Over-stretched one-way slab	
Street name:	Fadil	Rıza Sk	10	ıral		elementary design faults	Poorly supported or heavily	
T (') 1	N 2597 075	1 (2507150 511)		lctu		-	loaded cantilevered slabs	
Latitude:		' (35°7'58.5")	v	Str -		Pound	ing and separation problem	
Longitude:		(33°55'39.8")	_			ity on	Weak storey	
	years	(if available):			ıral 1	Irregularity in elevation	Soft storey	
Structure age:	Between 14 and	43 years			tion	Irre in e	Discontinuity of columns or	
	(1974-2003) >43 years (Befor	r_{2} 1074)	-		Vertical structural configuration	** .* *	shear walls Broken axis columns	
		Apartment			cal nfig	Vertical structural	BIOKEII AXIS COIUIIIIIS	
					erti coi	element	Irregular column and/or	
Building type:		House	_		>	elementary	shear-wall plan configuration	
Dunung type.		Dormitory	_			design fault		
	Public Commercial					Non St	Short column ructural Defects	
	Under Construct	tion		I	Waterpro			
Building status:	Occupied			Waterproofing defects, water leakage and seepage Defected wooden door				
Dunung status.	Abandoned					Defected	Condensation	
Reinfo	rced Concrete De	efects			ess		Rising damp	
					udu		Rain penetration	
Dryin	g shrinkage cracks	5	0400	Surface defects		Leaking pipes, spills and other moisture sources		
Corrosion of	Corrosion-indu		dof.	def		ce cracks	crazing	
metals embedded	Corrosion-indu		0	ace	on wal	Il finishes Map/pattern cracking		
in concrete	Cracks due to e		- me	urta		Efflorescence		
	dissimilar meta		ΰ	S -			Paint peeling	
	Improper rein			Mouldiness				
Construction	placer Premature rem		_	-		wall finishe	s workmanship problem	
defects (faulty	Cold j		N	[on -	structural		Staining	
workmanship):	Segreg		110		racks		Joint cracks	
designer, detailer,	Honeyco							
and contractor	Improper gra							
		surfaces		the	r notes (if available):		
	Slab/beam-to c							
Cracks in RC due	(punching sh	ear) cracks						
to load effects (structural cracks)	Cantilevered m	ember cracks						
(surdetural cracks)	Settlemen	t cracks						

Profile Scisnic Dsigo End(s) Week column-strong beam Torsional Irregularity (Torsion eccentricity) Floor discontinuity Floor discontinuity District: Magusa Arua: Karakol Street name: Zümrüt Sk Latitude: N 35°7.903' (35°754.2') Longitude: F 33°55.837' (33°5550.2') Structure age: Berween 14 and 43 years (1974) Building type: Berkeen 14 and 43 years (1974) Building type: Residential Dormitory Dormitory Public Dormitory District: Magusa Building type: Construction Building type: Construction Drying shrinkage cracks Torsion-induced cracking Construction Construction Presence Construction Presence Construction Presence Construction Presence Construction Presence Construction Presence Construction Presence Matery prime shifts and other moisture sources Construction Presen	Case Study #12 (M12)								
Week colum-strong beam District: Magusa District: Magusa Area: Karakol Street name: Zümrüt Sk Latitude: N 35°7.903' (35°754.2') Longitude: E 33°55.837' (33°5550.2') Street name: Zümrüt Sk Latitude: N 35°7.903' (35°754.2') Longitude: E 33°55.837' (33°5550.2') Structure age: Perusent Jam 43 years House Dare (if available): years Dare (if available): years Dormitory Public Commercial Commercial Kater point Building type: Construction Drying shrinkage cracks Corrosion-induced cracking: Construction Corrosion-induced cracking: Subscence Construction Corrosion-induced cracking: Map/pattern cracking Construction Corrosion-induced cracking: Subscence Construction Corrosion-induced cracking: Subscence Construction Corrosion-induced cracking: Map/pattern cracking									
District: Magusa District: Magusa Area: Karakol Street name: Zümrüt Sk Lutitude: N 35°7.903' (35°754.2') Longitude: E 33°55.837' (33°5550.2') Street name: Zümrüt Sk Lutitude: N 35°7.903' (35°754.2') Longitude: E 33°55.837' (33°5550.2') Structure age: Between 14 and 43 years (1974-2003) Building type: Apartment Residential Dormitory Public Dormitory Public Dormitory Public Construction Construction Construction Residential metals emoded in concrete Corrosion-induced cracking Conston-induced state to the oraking Conston-induced oraking Constate to the orakin		Profile							
District: Magusa Area: Karakol Area: Karakol Street name: Zümrit Sk Latitude: N 35°7.903° (35°754.2°) Longitude: E 33°55.8377 (33°5550.2°) Street name: Zümrit Sk Latitude: N 35°7.903° (35°754.2°) Longitude: E 33°55.8377 (33°5550.2°) Structure age: Residential House Dormitory Jost Construction Commercial Monecoling Aparaneet Public Construction Drying shrinkage cracks Occupied Corrosion-induced cracking Corrosion-induced cracking Construction Corrosion-induced cracking Construction Construction Meanuer eraks Suiting damp Construction Corrosion-induced cracking Construction Construction Machinet Painture eraks Construction Construction Grass due to embedment of dissimal metals (handrals) Suiting damp Improper grades of slab suiting Suiting damp Corrosion-induced cracking		1 1				Week colu			
District: Magusa Area: Karakol Area: Karakol Street name: Zümrtit Sk Latitude: N 35'7.903' (35'754.2'') Longitude: E 33'5'5.837' (35'754.2'') Longitude: E 33'5'5.837' (35'754.2'') Longitude: E 33'5'5.837' (35'754.2'') Longitude: E 44 Disc (if available): Years Years Apartment Residential House Divercost Dormitory Public Non-continue and/or shear walls Commercial Dormitory Public Non-continue and/or shear walls Corrosion of metals embedded in concrete Corrosion-induced cracking Corrosion of metals embedded in concrete Corrosion-induced cracking Corrosion of defects Corrosion-induced cracking Corrosion of metals embedded in concrete Corrosion-induced cracking Corrosion of defects Corrosion-induced cracking Corrosion of defects Corrosion-induced cracking Corrosion of defects Corrosion-induced cracking Corrosion of defects Corrosion-induced cracking Corrosion of defects Corrosion-induced cracking Corrosion of defects Corrosion-induced cracking Corrosion		and the second second							
District: Magusa Area: Karakol Street name: Zümrüt Sk Latitude: N 35°7.903' (35°754.2') Longitude: E 33°5.837' (35°5550.2') Street name: Zümrüt Sk Building type: At a: Non-uniform beam span and cross-section Area: Karakol Street name: Zümrüt Sk Latitude: N 35°7.903' (35°754.2') Longitude: E 33°5.837' (35°5550.2') <41						, in			
District: Magusa Area: Karakol Street name: Zümrüt Sk Latitude: N 35°7.903' (35°754.2') Longitude: E 33°5.837' (35°5550.2') Street name: Zümrüt Sk Building type: At a: Non-uniform beam span and cross-section Area: Karakol Building type: Commercial Down Streethed one-way slab Poorly supported or beavily loaded cantitevered slabs Joaded cantitevered slabs Building type: Public Dormitory Public Dormitory Public Dormitory Public Stort columns Corrosion of metals embedded in concrete Defects Waterproving defects, water leakage and seepage Corrosion of metals embedded in concrete Defects Staff and painter eranks Construction defects (faulty workmanship); coligities Non-structural calking pipes, spills and other moisture sources Construction defects (faulty workmanship); coligities Non-structural calks Caraks in RC due (Slab) Slab/beam-to column shear (punching skear) cracks Under Construction defects (faulty workmanship); coligities Non-structural cracks Construction defects (aulty workmanship); coligints Non-structural cracks <tr< td=""><td>and the second</td><td></td><td>_</td><td></td><td></td><td>urity un</td><td>Floor discontinuity</td></tr<>	and the second		_			urity un	Floor discontinuity		
Street name: Ziimrüt Sk elementary Poorly supported or heavily Latitude: N 35°7.903' (35°754.2") Pounding and separation problem Longitude: E 33°55.837' (33°55'50.2") Weak storey Weak storey Structure age: Edween 14 and 43 years (1974-2003) Weak storey Discontinuity of columns or shear walls Building type: Apartment (1974-2003) Apartment Dormitory Vertical structural elementary design fault Broken axis columns Building type: Residential Under Construction Occupied Drying shrinkage cracks Mapartment House Non-Structural elementary design fault Broken axis columns Reinforced Concrete Defects Under Construction Occupied Waterproofing defects, water leakage and seepage Corrosion -induced cracking Condensation Corrosion of metals embedded in concrete Corrosion-induced cracking Cracks due to embedment of dissimilar metals (handrails) Yeing Segregation Surface cracks cracks Cracks Construction defects (faulty workmanship); designer, detailer, and contractor Improper reinforcing steel placement Non-structural cracks Joint cracks Construction defects Slab/beam-to column shear (punching shear) cracks Other notes (if available);			Ĩ		nfiguration	Irregula			
Street name: Ziimrüt Sk elementary Poorly supported or heavily Latitude: N 35°7.903' (35°754.2") Pounding and separation problem Longitude: E 33°55.837' (33°55'50.2") Weak storey Weak storey Structure age: Edween 14 and 43 years (1974-2003) Weak storey Discontinuity of columns or shear walls Building type: Apartment (1974-2003) Apartment Dormitory Vertical structural elementary design fault Broken axis columns Building type: Residential Under Construction Occupied Drying shrinkage cracks Mapartment House Non-Structural elementary design fault Broken axis columns Reinforced Concrete Defects Under Construction Occupied Waterproofing defects, water leakage and seepage Corrosion -induced cracking Condensation Corrosion of metals embedded in concrete Corrosion-induced cracking Cracks due to embedment of dissimilar metals (handrails) Yeing Segregation Surface cracks cracks Cracks Construction defects (faulty workmanship); designer, detailer, and contractor Improper reinforcing steel placement Non-structural cracks Joint cracks Construction defects Slab/beam-to column shear (punching shear) cracks Other notes (if available);			- Carl		00	È			
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Longitude: E 33 53.63 / (33 53.0.2 /) Structure age: <14	Street normal	70000000		co	H				
Longitude: E 33 53.63 / (33 53.0.2 /) Structure age: <14	Street name:	Zumrut SK		ural					
Longitude: E 33 53.63 / (33 53.0.2 /) Structure age: <14	Latitude:	N 35°7 903' (35°7'54 2")		uct					
Structure age: <14 Date (if available): years Date (if available): metals embedded in concrete Soft storey Building structure Building structure ad contractor Apartment House Apartment House Broken axis columns Building status: Apartment Residential Apartment House Broken axis columns Public Commercial Vertical Building status: Broken axis columns Abandoned Short column Short column Corrosion of metals embedded in concrete Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails) Sufface cracks on wall finishes Map/pattern cracking Mouldiness Construction defects (faulty workmanship); Improper reinforcing steel placement Non-structural cracks due to combedment of placement Sufface cracks on wall finishes Map/pattern cracking Mouldiness Construction defects (faulty workmanship); Improper reinforcing steel placement Non-structural cracks in RC due to load effects Non-structural cracks in RC due to load effects Stab/beam-to column shear (punching shear) cracks Other notes (if available):				Str					
Image: construction defects (faulty workmanship); Construction defects (faulty cold joints workmanship); Construction defects (faulty cold joints workmanship); Improper reades of slab surfaces Surface cracks (faulty cold joints workmanship problem structural cracks (faulty cold joints workmanship); Surface cracks (faulty cold joints workmanship problem structural cracks (faulty cold joints workmanship problem structural cracks (faulty cold joints workmanship); Cracks in RC due (constructor) Slab/beam-to column shear (punching shear) cracks (cracks of slab surfaces Non-structural column shear (punching shear) cracks (cracks of slab surfaces Cracks in RC due (cold feets Slab/beam-to column shear (punching shear) cracks Other notes (if available); Cracks in RC due (cold feets Slab/beam-to column shear (punching shear) cracks Other notes (if available);	Zonghudoi	<14 Date (if available):			П	ularity vatior			
Building type: Dormitory Shear-wall plan configuration Public Commercial Non-Structural Defects Building status: Under Construction Waterproofing defects, water leakage and seepage Occupied Defected wooden door Abandoned Corrosion-induced cracking Drying shrinkage cracks Surface cracks Corrosion of metals embedded in concrete Corrosion-induced spalling Cracks due to embedment of defects (faulty workmanship): Improper reinforcing steel placement Premature removal of forms Non-structural glain contractor Resing damp Staining Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks	Structure age:	Between 14 and 43 years			uctura ation	Irreg in ele			
Building type: Dormitory Shear-wall plan configuration Public Commercial Non-Structural Defects Building status: Under Construction Waterproofing defects, water leakage and seepage Occupied Defected wooden door Abandoned Corrosion-induced cracking Drying shrinkage cracks Surface cracks Corrosion of metals embedded in concrete Corrosion-induced spalling Cracks due to embedment of defects (faulty workmanship): Improper reinforcing steel placement Premature removal of forms Non-structural glain contractor Resing damp Staining Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks					l str gur	Vertical			
Building type: Dormitory Shear-wall plan configuration Public Commercial Non-Structural Defects Building status: Under Construction Waterproofing defects, water leakage and seepage Occupied Defected wooden door Abandoned Corrosion-induced cracking Drying shrinkage cracks Surface cracks Corrosion of metals embedded in concrete Corrosion-induced spalling Cracks due to embedment of defects (faulty workmanship): Improper reinforcing steel placement Premature removal of forms Non-structural glain contractor Resing damp Staining Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks					ica				
Building type: Dormitory Shear-wall plan configuration Public Commercial Non-Structural Defects Building status: Under Construction Waterproofing defects, water leakage and seepage Occupied Defected wooden door Abandoned Corrosion-induced cracking Drying shrinkage cracks Surface cracks Corrosion of metals embedded in concrete Corrosion-induced spalling Cracks due to embedment of defects (faulty workmanship): Improper reinforcing steel placement Premature removal of forms Non-structural glain contractor Resing damp Staining Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks		Residential House			Vert cc				
Public Dominancy Commercial Non-Structural Defects Building status: Under Construction Building status: Occupied Drying shrinkage cracks Drying shrinkage cracks Drying shrinkage cracks Teaching pipes, spills and other moisture sources Corrosion of metals embedded in concrete Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails) Improper reinforcing steel placement Plaint peeling Premature removal of forms Staining Construction defects (faulty workmanship): Segregation designer, detailer, and contractor Slab/beam-to column shear (punching shear) cracks Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks	Building type:		-		-		shear-wall plan configuration		
Commercial Non-Structural Defects Building status: Under Construction Waterproofing defects, water leakage and seepage Occupied Defected wooden door Defected wooden door Reinforced Concrete Defects Rising damp Rain penetration Drying shrinkage cracks The second	0.11					debigii idait	Short column		
Building status: Under Construction Waterproofing defects, water leakage and seepage Occupied Defected wooden door Abandoned Rising damp Reinforced Concrete Defects Rising damp Drying shrinkage cracks The second se						Non-Str			
Building status: Occupied Abandoned Defected wooden door Reinforced Concrete Defects Rising damp Drying shrinkage cracks Rising damp Drying shrinkage cracks Rain penetration Corrosion of metals embedded in concrete Corrosion-induced cracking Corrosion-induced spalling Surface cracks Corrosion of metals embedded in concrete Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails) Surface cracks crazing on wall finishes Map/pattern cracking Construction defects (faulty workmanship): Improper reinforcing steel placement Paint peeling Premature removal of forms defects (faulty, workmanship): Non-structural cracks Joint cracks Building staty Segregation cracks Improper grades of slab surfaces Stab/beam-to column shear (punching shear) cracks Other notes (if available):					Waterpro				
Reinforced Concrete Defects Rising damp Drying shrinkage cracks Rain penetration Corrosion of metals embedded in concrete Corrosion-induced cracking Cracks due to embedment of dissimilar metals (handrails) Surface cracks Cracks Improper reinforcing steel placement Improper reinforcing steel placement Mouldiness Premature removal of forms Staining Staining Construction defects (faulty workmanship): Segregation Staining Improper grades of slab surfaces Improper grades of slab surfaces Other notes (if available): Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks Other notes (if available):	Building status:								
Corrosion of metals embedded in concrete Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails) Surface cracks on wall finishes Crazing Map/pattern cracking Construction defects (faulty workmanship): designer, detailer, and contractor Improper reinforcing steel placement Mouldiness Vertice Segregation Staining Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks Other notes (if available):									
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesCrazing Map/pattern crackingConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementMouldinessPremature removal of forms designer, detailer, and contractorNon-structural SegregationJoint cracksCracks in RC due to load effectsSlab/beam-to column shear (punching shear) cracksOther notes (if available):	Reinfo	rced Concrete Defects			nes				
Corrosion of metals embedded in concrete Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails) Surface cracks on wall finishes Crazing Map/pattern cracking Construction defects (faulty workmanship): designer, detailer, and contractor Improper reinforcing steel placement Mouldiness Vertice Segregation Staining Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks Other notes (if available):	Davin	a shriplaga araala			amp	Looking ni			
Improper reinforcing steel Mouldiness Construction placement Wall finishes workmanship problem Vertication Premature removal of forms Staining Premature removal of forms Non-structural Joint cracks Cold joints Non-structural Joint cracks Constructor Honeycombing Improper grades of slab Surfaces Slab/beam-to column shear Other notes (if available): Cracks in RC due Cantilevered member cracks Cantilevered member cracks	Diyin			ects	ą	Leaking pi			
Improper reinforcing steel Mouldiness Construction placement Wall finishes workmanship problem Vertication Premature removal of forms Staining Premature removal of forms Non-structural Joint cracks Cold joints Non-structural Joint cracks Constructor Honeycombing Improper grades of slab Surfaces Slab/beam-to column shear Other notes (if available): Cracks in RC due Cantilevered member cracks Cantilevered member cracks	Corrosion of		Щ	def			ĕ		
Improper reinforcing steel Mouldiness Construction placement Wall finishes workmanship problem Defects (faulty Premature removal of forms Staining Version defects (faulty Cold joints Non-structural Version defects (faulty Segregation Cracks Mouldiness Mouldiness Version defects Mouldiness Mouldiness Staining Version defects Segregation Improper grades of slab surfaces Slab/beam-to column shear Other notes (if available): Cracks in RC due Cantilevered member cracks				ace	on wal				
Improper reinforcing steel Mouldiness Construction placement Wall finishes workmanship problem Vertication Premature removal of forms Staining Premature removal of forms Non-structural Joint cracks Cold joints Non-structural Joint cracks Constructor Honeycombing Improper grades of slab Surfaces Slab/beam-to column shear Other notes (if available): Cracks in RC due Cantilevered member cracks Cantilevered member cracks	in concrete			urf					
Construction placement Wall finishes workmanship problem defects (faulty Premature removal of forms Staining workmanship): Cold joints Non-structural designer, detailer, and contractor Honeycombing Joint cracks Improper grades of slab surfaces Other notes (if available): Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks Other notes (if available):				S					
Construction Premature removal of forms Staining defects (faulty Cold joints Non-structural workmanship): designer, detailer, Segregation cracks and contractor Honeycombing Improper grades of slab Surfaces Cracks in RC due Slab/beam-to column shear Other notes (if available): Cracks in RC due Cantilevered member cracks Other notes (if available):									
defects (faulty workmanship): Cold joints Non-structural cracks designer, detailer, and contractor Segregation Cracks Improper grades of slab surfaces Improper grades of slab surfaces Other notes (if available): Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks Other notes (if available):						wan minsiles			
Workmanship): designer, detailer, and contractor Segregation cracks Honeycombing Improper grades of slab surfaces Slab/beam-to column shear (punching shear) cracks Cracks in RC due to load effects Cantilevered member cracks				Non-	structural				
and contractor Honeycombing Improper grades of slab surfaces Other notes (if available): Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks Other notes (if available):				C	racks		JOINT CRACKS		
Improper grades of slab surfaces Other notes (if available): Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks Other notes (if available):									
Cracks in RC due to load effects Slab/beam-to column shear (punching shear) cracks Cantilevered member cracks		Improper grades of slab		Othe	er notes (if available).			
Cracks in RC due (punching shear) cracks to load effects Cantilevered member cracks				<u> </u>		<u></u>			
to load effects Cantilevered member cracks	Cracks in RC due								
(structural cracks) Cantilevered memoer cracks			\vdash						
	(structural cracks)								
Settlement cracks		Settlement cracks							

	Case	Stuc	ly #	13 (M	(13)			
	Profile					e Design Faults		
(Second			Week column-strong beam					
- Been -					Torsional Irregularity			
					'n,	(Torsion eccentricity)		
					n n	Floor discontinuity		
				Horizontal structural configuration	Irregularity in plan	Projections in plan		
				00	λ	Non-continuous beams		
				actural	Beam elementary design faults	Non-uniform beam span and cross-section		
District:	Mağusa		ation	tal str	am elementa design faults	Absence of vertical support at beams intersection		
Area:	Piyale Paşa		Structural configuration	orizon		Broken axis beams and frames		
Street name:	On Dea A živetes D1		l co	H	Slab elementary	Over-stretched one-way slab		
Street name:	On Beş Ağustos Blv		ural		design faults	Poorly supported or heavily loaded cantilevered slabs		
Latitude:	35° 6'43.70"N	-	uct		-	ng and separation problem		
Longitude:	33°55'29.62"E	-	Str		Toundi	Weak storey		
Longitude.	<14 Date (if available):				rity ion			
Structure ego:	years			Vertical structural configuration	Irregularity n elevation	Soft storey Discontinuity of columns or		
Structure age:	tructure age: Between 14 and 43 years (1974-2003) >43 years (Before 1974)			ertical structur configuration	in	shear walls		
				. str gura	Vertical	Broken axis columns		
	Apartment			ical	structural			
	Residential House			erti co	element	Irregular column and/or		
Building type:	Dormitory	+		>	elementary design fault	shear-wall plan configuration		
	Public					Short column		
	Commercial				Non-Str	ructural Defects		
	Under Construction			Waterpro	oofing defects,	water leakage and seepage		
Building status:	Occupied				Defected	wooden door		
	Abandoned					Condensation		
Reinfo	rced Concrete Defects			nes		Rising damp		
D .	1 . 1			dampness	T 1 · · ·	Rain penetration		
Dryin	g shrinkage cracks		Surface defects			pes, spills and other moisture sources		
Corrosion of	Corrosion-induced cracking		de		ce cracks	crazing		
metals embedded	Corrosion-induced spalling Cracks due to embedment of		ace	on wal	ll finishes	Map/pattern cracking fflorescence		
in concrete	dissimilar metals (handrails)		Surf			aint peeling		
	Improper reinforcing steel	+	01			Mouldiness		
	placement					workmanship problem		
Construction	Premature removal of forms	\square			,, un minorico	Staining		
defects (faulty	Cold joints		Non-	-structural				
workmanship): designer, detailer,	Segregation		C	cracks		Joint cracks		
and contractor	Honeycombing							
	Improper grades of slab		Othe	er notes (if available):			
	surfaces	\square	<u></u>		<u></u>			
Cracks in RC due	Slab/beam-to column shear							
to load effects	(punching shear) cracks							
(structural cracks)	Cantilevered member cracks	\square						
	Settlement cracks							

		Case S	Stu	dy #	[‡] 14 (M	(14)			
						~ .			
	Profile						ic Design Faults		
TT							Torsional Irregularity (Torsion eccentricity)		
						ityi	Floor discontinuity		
					Horizontal structural configuration	Irregularity in plan	Projections in plan		
1 - 50					con	~	Non-continuous beams		
Re-			-		uctural	Beam elementary design faults	Non-uniform beam span and cross-section		
District:	Ν	lağusa		ration	ntal str	am elementa design faults	Absence of vertical support at beams intersection		
Area:	Nam	uk Kemal		ıfigu	rizor	Be	Broken axis beams and frames		
Street name:	İker	Karter Cd		Structural configuration	Hc	Slab elementary design faults	Over-stretched one-way slab Poorly supported or heavily loaded cantilevered slabs		
Latitude:	35°	7'0.46"N		truc		Pound	ing and separation problem		
Longitude:		6'42.80"E		S		y n	Weak storey		
	<14 Da years	te (if available):			al	Irregularity in elevation	Soft storey		
Structure age:	Between 14 au (1974-2003)				Vertical structural configuration	Irreg in eld	Discontinuity of columns or shear walls		
	>43 years (Before 1974)				al st ïgu	Vertical	Broken axis columns		
		Apartment			ttica	structural element	T 1 1 1 /		
Building type:	Residential	House Dormitory			Ve	elementary design fault	Irregular column and/or shear-wall plan configuration		
Public						•	Short column		
	Commercial						ructural Defects		
Duilding status	Under Constru Occupied	iction			Waterpro		s, water leakage and seepage		
Building status:	Abandoned					Defected wooden door Condensation			
Reinfo	rced Concrete	Defects			ess		Rising damp		
					ampness		Rain penetration		
Dryin	g shrinkage crac			Surface defects	p		vipes, spills and other moisture sources		
Corrosion of		duced cracking	\square	dei		ce cracks	crazing		
metals embedded		duced spalling	\vdash	ace	on wal	ll finishes	Map/pattern cracking		
in concrete		etals (handrails)		Surf			Paint peeling		
		inforcing steel	$\left - \right $	•1			Mouldiness		
Count i		ement			<u> </u>		s workmanship problem		
Construction defects (faulty		moval of forms					Staining		
workmanship):		l joints	\square		-structural		Joint cracks		
designer, detailer,		egation combing		(eracks				
and contractor		rades of slab	┝─┦						
		faces		Othe	er notes (if available):			
Cracks in RC due		o column shear shear) cracks							
to load effects		member cracks	\square						
(structural cracks)		ent cracks							

	Case S	Stud	y #	15 (M	15)	
	Profile	_				e Design Faults
/					Week colu	mn-strong beam
/					_	Torsional Irregularity
				, in	(Torsion eccentricity)	
					urity In	Floor discontinuity
					Irregularity in plan	Projections in plan
There I and a mary of				co	È	Non-continuous beams
				ıctural	mentar faults	Non-uniform beam span and cross-section
District:	Mağusa		ation	Horizontal structural configuration	Beam elementary design faults	Absence of vertical support at beams intersection
Area:	Namık Kemal		Structural configuration	orizon		Broken axis beams and frames
Street name:	İker Karter Cd		l co	Ĥ	Slab	Over-stretched one-way slab
Street name:	Iker Karter Cd		ural		elementary design faults	Poorly supported or heavily loaded cantilevered slabs
Latitude:	35° 6'59.31"N	-	ucti		-	ng and separation problem
Longitude:	33°56'43.25"E	-	Str			Weak storey
Longhude.	<14 Date (if available):			_	Irregularity in elevation	Soft storey
Structure age:	years Between 14 and 43 years (1974-2003)			Vertical structural configuration	Irregu in ele	Discontinuity of columns or shear walls
	>43 years (Before 1974)			str zur	Vertical	Broken axis columns
	Apartment			cal	structural	
	Residential House			erti co	element	Irregular column and/or
Building type:	Dormitory			>	elementary design fault	shear-wall plan configuration
	Public				0	Short column
	Commercial				Non-Str	uctural Defects
	Under Construction			Waterpro	oofing defects.	water leakage and seepage
Building status:	Occupied				Defected	wooden door
	Abandoned					Condensation
Reinfo	rced Concrete Defects			dampness		Rising damp
D .	1 . 1			dun	T 1 · · ·	Rain penetration
Dryin	g shrinkage cracks		Surface defects			pes, spills and other moisture sources
Corrosion of	Corrosion-induced cracking		de		ce cracks	crazing
metals embedded	Corrosion-induced spalling Cracks due to embedment of		ace	on wal	l finishes	Map/pattern cracking fflorescence
in concrete	dissimilar metals (handrails)		urf			aint peeling
	Improper reinforcing steel		01			Mouldiness
	placement		i			workmanship problem
Construction	Premature removal of forms		ŀ		tt un minsiles	Staining
defects (faulty	Cold joints]	Non-	structural		
workmanship): designer, detailer,	Segregation			racks		Joint cracks
and contractor	Honeycombing					
	Improper grades of slab surfaces		Othe	er notes (if available):	
Cracks in RC due	Slab/beam-to column shear (punching shear) cracks					
to load effects	Cantilevered member cracks					
(structural cracks)	Settlement cracks					

	Case S	Stud	y #	16 (M	16)	
4	Profile					e Design Faults
m / /					Week colu	mn-strong beam
					_	Torsional Irregularity
					y in	(Torsion eccentricity)
					arit	Floor discontinuity
			Horizontal structural configuration	Irregularity in plan	Projections in plan	
- Inthe P		-		l cc	цу	Non-continuous beams
				uctura	Beam elementary design faults	Non-uniform beam span and cross-section
District:	Mağusa		ation	al str	m ele esign	Absence of vertical support at beams intersection
Area:	Suriçi		Structural configuration	rizont	Bea	Broken axis beams and frames
			con	Но	Slab	Over-stretched one-way slab
Street name:	Kişla Yolu Sk		ral		elementary	Poorly supported or heavily
		-	Ictu		design faults	loaded cantilevered slabs
Latitude:	N 35°7.511' (35°7'30.7")	-	Stru		Poundi	ng and separation problem
Longitude:	E 33°56.462' (33°56'27.7")	_	•1		on	Weak storey
	<14 Date (if available): years			ral	Irregularity in elevation	Soft storey
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration	Irre in e	Discontinuity of columns or shear walls
	>43 years (Before 1974)			ıl st iguı	Vertical	Broken axis columns
	Apartment			tica	structural	
	Residential House			Ver c	element elementary	Irregular column and/or
Building type:	Dormitory			F	design fault	shear-wall plan configuration
	Public				6	Short column
	Commercial				Non-Str	uctural Defects
	Under Construction			Waterpro		water leakage and seepage
Building status:	Occupied					wooden door
	Abandoned					Condensation
Reinfo	rced Concrete Defects	_		less		Rising damp
				dampness		Rain penetration
Dryin	g shrinkage cracks		Surface defects			pes, spills and other moisture sources
Corrosion of	Corrosion-induced cracking		dei		ce cracks	crazing
metals embedded	Corrosion-induced spalling Cracks due to embedment of		ace	on wal	l finishes	Map/pattern cracking
in concrete	dissimilar metals (handrails)		urf			fflorescence aint peeling
	Improper reinforcing steel	-	S			Mouldiness
	placement					workmanship problem
Construction	Premature removal of forms		ľ		wan minsiles	Staining
defects (faulty	Cold joints	1	Non-	structural		
workmanship): designer, detailer,	Segregation			racks		Joint cracks
and contractor	Honeycombing					
	Improper grades of slab	6	Othe	er notes (if available):	
	surfaces		Jun		<u></u>	
Cracks in RC due	Slab/beam-to column shear					
to load effects	(punching shear) cracks					
(structural cracks)	Cantilevered member cracks					
	Settlement cracks					

		Case S	tudy	y #	17 (M	17)		
	Profile						c Design Faults	
and the second s		The star	N -1	_		Week colu	mn-strong beam	
	Ser '	THE CON					Torsional Irregularity	
And and	1	1-m-1-	à			/ in	(Torsion eccentricity)	
and a second						n ity	Floor discontinuity	
					Horizontal structural configuration	Irregularity in plan	Projections in plan	
and the second			3		co	È	Non-continuous beams	
					uctural	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	N	lağusa		ation	tal str	am elementa design faults	Absence of vertical support at beams intersection	
Area:	E	aykal		Structural configuration	orizon	Bec	Broken axis beams and frames	
Store the	T7.4 11	Castin SI		co	H	Slab	Over-stretched one-way slab	
Street name:	Erbil	Çetin Sk		ural		elementary design faults	Poorly supported or heavily loaded cantilevered slabs	
Latitude:	N 35°7 17	9' (35°7'10.7")	_	uct		-	ing and separation problem	
Longitude:		17' (33°56'1.0")	_	Str			Weak storey	
Longhude.	<14 Da	te (if available):				larity ation	Soft storey	
Structure age:	years Between 14 ar	d 43 years			Vertical structural configuration	Irregularity in elevation	Discontinuity of columns or	
	(1974-2003)	. 1074)			stru ural		shear walls	
	>43 years (Bet		-		cal fiig	Vertical structural	Broken axis columns	
	~	Apartment	-		ertic	element	Irregular column and/or	
Building type:	Residential	House Dormitory	-1		V	elementary design fault	shear-wall plan configuration	
	Public	Domitory				6	Short column	
	Commercial					Non-St	ructural Defects	
	Under Constru	ction		1	Waterpro	oofing defects	s, water leakage and seepage	
Building status:	Occupied					Defected	d wooden door	
	Abandoned				s		Condensation	
Reinfor	rced Concrete l	Defects			nes		Rising damp	
During	1	1			dampness	T 1'	Rain penetration	
Drying	g shrinkage crac			Surface defects			ipes, spills and other moisture sources	
Corrosion of		duced cracking		c de		ce cracks	crazing Man/nattorn gradking	
metals embedded		duced spalling embedment of		face	on wal		Map/pattern cracking	
in concrete		tals (handrails)	Paint peeling					
		nforcing steel		Mouldiness				
		ement		-			s workmanship problem	
Construction		noval of forms					Staining	
defects (faulty workmanship):		joints	Non-structural cracks Joint cracks					
designer, detailer,	-	egation						
and contractor		combing						
		rades of slab	6	Dthe	r notes (if available):		
		faces column shear						
Cracks in RC due		shear) cracks	The building is for sale					
to load effects	Cantilevered	member cracks						
(structural cracks)	Settleme	ent cracks						

		Case S	Stu	dy #	⁴ 18 (M	18)	
						<i>a</i>	
	Profile						c Design Faults
			+			week colu	mn-strong beam Torsional Irregularity
CULL OF MALL	1 Mile					c	(Torsion eccentricity)
NAME	NU CONTRACTOR					ty i	Floor discontinuity
					ation	Irregularity in plan	Projections in plan
	7 24				nfigura	II	
					CO:	Ś	Non-continuous beams
A BA					Horizontal structural configuration	Beam elementary design faults	Non-uniform beam span and cross-section
District:	Ν	lağusa		Structural configuration	ntal str	am elementa design faults	Absence of vertical support at beams intersection
Area:	I	Baykal		onfigu	Iorizoi		Broken axis beams and frames
Street nome	M	Vuetulus Cl-		al co	Ξ	Slab	Over-stretched one-way slab
Street name:	Mustara	Kurtuluş Sk		ctura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs
Latitude:	N 35°7.23	36' (35°7'14.2")		struc		-	ng and separation problem
Longitude:	E 33°56.0	88' (33°56'5.3")		01		y n	Weak storey
	years	te (if available):			al.	Irregularity in elevation	Soft storey
Structure age:	Between 14 au (1974-2003)				Vertical structural configuration	Irreg in el	Discontinuity of columns or shear walls
	>43 years (Be	fore 1974)			al st ïgu	Vertical	Broken axis columns
		Apartment			rtic: sonf	structural element	
	Residential	House			Vei	elementary	Irregular column and/or shear-wall plan configuration
Building type:		Dormitory				design fault	shour wan plan configuration
	Public						Short column
	Commercial Under Constru	ation			Watama		water leakage and seepage
Building status:	Occupied	iction			waterpro		wooden door
Dunung status.	Abandoned					Derected	Condensation
Reinfo	rced Concrete	Defects			ess		Rising damp
					dampness		Rain penetration
Dryin	g shrinkage crac	ks		Surface defects			pes, spills and other moisture sources
Corrosion of		duced cracking		def		ce cracks	crazing
metals embedded		duced spalling embedment of		ace	on wa	ll finishes	Map/pattern cracking fflorescence
in concrete		tals (handrails)		Surf			aint peeling
		inforcing steel	\square	•1			Mouldiness
Construction	plac	ement				Wall finishes	workmanship problem
Construction defects (faulty		moval of forms				_	Staining
workmanship):		l joints	Щ		-structural		Joint cracks
designer, detailer,		egation combing		(eracks		
and contractor		rades of slab					
		faces		Othe	er notes (<u>if available):</u>	
Cracks in RC due	Slab/beam-to	o column shear shear) cracks					
to load effects		member cracks					
(structural cracks)		ent cracks					

		Case S	Stud	ly #	19 (M	19)	
	Profile						e Design Faults
	À.						nn-strong beam Torsional Irregularity (Torsion eccentricity)
13.13 m 3	I III	Ś.				ityi	Floor discontinuity
					Horizontal structural configuration	Irregularity in plan	Projections in plan
			-		con	>	Non-continuous beams
					uctural	Beam elementary design faults	Non-uniform beam span and cross-section
District:	Ν	lağusa		ration	ıtal str	am elementa design faults	Absence of vertical support at beams intersection
Area:	S	akarya		Structural configuration	orizor		Broken axis beams and frames
Street name:	Gazi Muo	tafa Kemal Blv		ul co	Н	Slab elementary	Over-stretched one-way slab Poorly supported or heavily
Street name.	Gazi Wius	tala Kellal Div		stura		design faults	loaded cantilevered slabs
Latitude:	N 35°8.45	52' (35°8'27.1")		truc		Poundi	ng and separation problem
Longitude:		24' (33°54'31.4")		S		Уц	Weak storey
	<14 Da years	te (if available): ~ 2008			al.	Irregularity in elevation	Soft storey
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration	Irreg in el	Discontinuity of columns or shear walls
	>43 years (Be	fore 1974)			al st ïgu	Vertical	Broken axis columns
		Apartment			rtic	structural element	Irregular column and/or
	Residential	House			Ve ,	elementary	shear-wall plan configuration
Building type:		Dormitory				design fault	
	Public		_				Short column
	Commercial Under Constru	uction			Waterpr		uctural Defects water leakage and seepage
Building status:	Occupied	iction			waterpro		wooden door
Dunning statust	Abandoned					20100100	Condensation
Reinfo	rced Concrete	Defects			less		Rising damp
		_			dampness		Rain penetration
Dryin	g shrinkage crac			Surface defects			pes, spills and other moisture sources
Corrosion of		duced cracking duced spalling	\mid	e de		ce cracks	crazing Map/pattern cracking
metals embedded		b embedment of		face	on wa		fflorescence
in concrete		etals (handrails)		Sur			aint peeling
	Improper re	inforcing steel		ľ			Mouldiness
Construction	plac	ement				Wall finishes	workmanship problem
defects (faulty		moval of forms				_	Staining
workmanship):		l joints			structural racks		Joint cracks
designer, detailer,		egation combing			adex 5		
and contractor		grades of slab		0.1			
	sur	faces o column shear		Othe	er notes (<u>if available):</u>	
Cracks in RC due		shear) cracks					
to load effects		member cracks					
(structural cracks)		ent cracks					

		Case S	tud	y #	20 (M	20)	
	D (*1.					a • •	
	Profile		5				c Design Faults mn-strong beam
	10	245					Torsional Irregularity (Torsion eccentricity)
		Autumit her	rę:			ty i	Floor discontinuity
					Horizontal structural configuration	Irregularity in plan	Projections in plan
	TA- NEW MAL	Barrie about			onf		Non-continuous beams
					ictural c	Beam elementary design faults	Non-uniform beam span and cross-section
District:	Ν	ſağusa		ration	ntal stri	am elementa design faults	Absence of vertical support at beams intersection
Area:	S	akarya		Structural configuration	lorizoı		Broken axis beams and frames
Street name:	Kö	roğlu Sk		ural co	Η	Slab elementary	Over-stretched one-way slab Poorly supported or heavily
Latituda	250	017 64"N	_	ruct		design faults	loaded cantilevered slabs ng and separation problem
Latitude: Longitude:		8'7.64"N 55'1.04"E	-	St		Found	Weak storey
Longitude.		ate (if available):			I	Irregularity in elevation	Soft storey
Structure age:	Between 14 au (1974-2003)	nd 43 years			Vertical structural configuration	Irreg in ele	Discontinuity of columns or shear walls
	>43 years (Be	fore 1974)			l st igur	Vertical	Broken axis columns
		Apartment			tica onf	structural	
	Residential	House			Ver c	element elementary	Irregular column and/or shear-wall plan configuration
Building type:		Dormitory				design fault	shear-wan plan configuration
	Public	-					Short column
	Commercial						ructural Defects
D 111	Under Constru	iction			Waterpro		, water leakage and seepage
Building status:	Occupied Abandoned					Defected	wooden door Condensation
Reinfo	rced Concrete	Defects			SS		Rising damp
Keimo		Delectis			dampness		Rain penetration
Dryin	g shrinkage crac	eks		Surface defects	dam	Leaking pi	pes, spills and other moisture sources
Corrosion of		duced cracking		def		ce cracks	crazing
metals embedded		duced spalling		ace	on wal	l finishes	Map/pattern cracking
in concrete		embedment of etals (handrails)		Jurf			fflorescence aint peeling
		inforcing steel		5			Mouldiness
		ement		ŀ			workmanship problem
Construction		moval of forms					Staining
defects (faulty workmanship):		l joints	1		structural		Joint cracks
designer, detailer,		egation		С	racks		
and contractor		combing					
		grades of slab faces	<u>(</u>	Othe	r notes (if available):	
Cracks in RC due	Slab/beam-to	column shear shear) cracks					
to load effects		member cracks					
(structural cracks)		ent cracks					

		Case S	Study	y #:	21 (M	21)	
	Profile		/				e Design Faults
		11.0				Week colui	nn-strong beam
1						_	Torsional Irregularity (Torsion eccentricity)
						y in	
1 11						ularit plan	Floor discontinuity
					Horizontal structural configuration	Irregularity in plan	Projections in plan
			V.		cor	y	Non-continuous beams
					uctural	Beam elementary design faults	Non-uniform beam span and cross-section
District:	Ν	lağusa		ration	ıtal str	am ele lesign	Absence of vertical support at beams intersection
Area:	Nam	uk Kemal	5	Structural configuration	orizor	Be	Broken axis beams and frames
C.		1. 01		l co	H	Slab	Over-stretched one-way slab
Street name:	N	adir Sk		ura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs
Latitude:	350	7'6.88"N	_	ruct			ng and separation problem
Longitude:		7'27.49"E	- 1	-St			Weak storey
Longhude.		te (if available):			1	Irregularity n elevation	Soft storey
Structure age:	Between 14 ar (1974-2003)	nd 43 years			Vertical structural configuration	Irregu in ele	Discontinuity of columns or shear walls
	>43 years (Before 1974)				l str gur	Vertical	Broken axis columns
		Apartment			ical	structural	
	Residential	House			Vert cc	element	Irregular column and/or
Building type:		Dormitory	-		-	elementary design fault	shear-wall plan configuration
Public		lic				•	Short column
	Commercial						uctural Defects
D 111	Under Constru	iction			Waterpro		water leakage and seepage
Building status:	Occupied Abandoned					Defected	wooden door Condensation
Reinfo	rced Concrete 1	Defects	_		SS		Rising damp
		Derects			ampness		Rain penetration
Dryin	g shrinkage crac	ks		ects	dam	Leaking pi	pes, spills and other moisture sources
Corrosion of	Corrosion-in	duced cracking	, ,	Surface defects	Surfac	ce cracks	crazing
metals embedded		duced spalling		ace	on wal	l finishes	Map/pattern cracking
in concrete		embedment of	· · · · ·	urfa			fflorescence
		tals (handrails)		aint peeling			
		inforcing steel ement		-			Mouldiness workmanship problem
Construction		moval of forms	-	-		wan minsnes	Staining
defects (faulty		joints	N	Ion-	structural		
workmanship):		egation			racks		Joint cracks
designer, detailer, and contractor		combing					
and contractor		rades of slab	0)the	r notes (if available):	
		faces		/ule	<u>a notes (</u>		
Cracks in RC due	(punching	o column shear shear) cracks					
to load effects (structural cracks)	Cantilevered	member cracks					
(surdetural cracks)	Settlem	ent cracks					

		Case S	Stu	dy#	22 (M	(22)	
						<i>а</i>	
	Profile						e Design Faults
							mn-strong beam Torsional Irregularity (Torsion eccentricity)
						ity i 1	Floor discontinuity
					Horizontal structural configuration	Irregularity in plan	Projections in plan
					poorf		Non-continuous beams
	a black				uctural e	Beam elementary design faults	Non-uniform beam span and cross-section
District:	Ν	lağusa		iration	ntal str	sam elementa design faults	Absence of vertical support at beams intersection
Area:	Nan	uk Kemal		nfigu	orizo	Be	Broken axis beams and frames
Street name:	N	adir Sk		Structural configuration	Η	Slab elementary design faults	Over-stretched one-way slab Poorly supported or heavily loaded cantilevered slabs
Latitude:		7'8.49"N		Stru		Poundi	ng and separation problem
Longitude:		7'25.28"E		•1		y n	Weak storey
	<14 Da years	te (if available):			al	Irregularity In elevation	Soft storey
Structure age:	Between 14 au (1974-2003)	-			Vertical structural configuration	Irreg in el	Discontinuity of columns or shear walls
	>43 years (Be	fore 1974)			ıl st ïguı	Vertical	Broken axis columns
		Apartment			tica	structural	
	Residential	House			Vei c	element elementary	Irregular column and/or shear-wall plan configuration
Building type:		Dormitory				design fault	shear-wan plan configuration
	Public						Short column
	Commercial						ructural Defects
	Under Constru	iction			Waterpro		, water leakage and seepage
Building status:	Occupied Abandoned					Defected	wooden door Condensation
Reinfo	rced Concrete	Defects			SS		Rising damp
					dampness		Rain penetration
Dryin	g shrinkage crac	ks		Surface defects	dan	Leaking pi	pes, spills and other moisture sources
Corrosion of		duced cracking		def		ce cracks	crazing
metals embedded		duced spalling		ace	on wal	ll finishes	Map/pattern cracking
in concrete		embedment of etals (handrails)		urf			fflorescence
		inforcing steel		S			aint peeling Mouldiness
		ement					workmanship problem
Construction	1	moval of forms					Staining
defects (faulty workmanship):		l joints		Non-	structural		Joint cracks
designer, detailer,		egation		C	racks		Joint cracks
and contractor		combing	┝──┦				
		grades of slab faces		Othe	er notes (if available):	
Cracks in RC due	Slab/beam-te	o column shear	\square				
to load effects	· ·	shear) cracks	\vdash				
(structural cracks)		antilevered member cracks					
	Settlem	ent cracks					

Profile Scienci Design Faults Week column-strong beam Torsional Irregularity (Torsion eccentricity) District: Magusa District: Magusa Area: Namuk Kemal Street name: Nadir Sk Latitude: 35° 71/2.76'N Longitude: (137-725.79°F) Street name: Nadir Sk Latitude: 33° 57'25.79°F. Structure age: Between 14 and 43 years (1974-2003) Public Oorestruction Public Magunal Public State tornumentry Public Oracing defects, water leakage and separation problem Non-continuous beams Irregular columns or shear walls Building type: Residential House Public Construction Variant beams Corrosion of metals (hadrails) Torsion-induced cracking Rising damp Corrosion of metals (hadrails) Corrosion-induced secking steel Majopattern cracking Corrosion of metals (hadrails) Corrosion-induced secking steel Majopattern cracking Corrosion of metals (hadrails) Non-strecrecked on door Non-structural		Case Study #23 (M23)								
Week column-strong beam Week column-strong beam District: Magusa Area: Namk Kemal Area: Namk Kemal Strict: Magusa Area: Namk Kemal Latitude: 35° 7'12.76°N Longitude: 33° 57'25.70°E Structure age: Between 14 and 43 years (1974-2003) Vertical Vertical Booken axis beams and frames Non-uniform beam span and cross-section Non-uniform beam span and cross-section Vertical Broken axis beams and frames Structure age: Street name: Nadi 'Sk Vertical Broken axis columns or span span and cross-section Vertical Broken axis columns or span span and cross-section Vertical Broken axis columns or span span and cross-section Vertical Broken axis columns or span span and cross-section Vertical Broken axis columns or span span and cross-section Vertical Broken axis columns or span span and cross-section Vertical Broken axis columns or span span and cross-section Vertical Broken axis columns or span and cross-section										
District: Magusa District: Magusa Area: Namk Kemal Street name: Nadir Sk Latitude: 35° 7712.76°N Longitude: 33° 57'25.79°F Structure age:		Profile								
District: Magusa Area: Namk Kemal Street name: Nadir Sk Latitude: 33°5725.79'E Congitude: 33°5725.79'E Vertical Beilding type: Public Oormercial Commercial Waterprofing defects, water leakage and sepage District: Magusa Area: Namk Kemal Street name: Nadir Sk Latitude: 33°5725.79'E Vertical Benemary Poorty supported or heavily Poorty supported or heavily Vertical Broken axis columns or shear walls Vertical Broken axis columns or shear walls Vertical Broken axis columns or shear walls Vertical Broken axis columns or shear walls Vertical Broken axis columns or shear walls Vertical Broken axis columns or shear walls Occupied Dormitory Public Condensation Corrosion of metals enbedded in concrete Defeets Stort columns or sources Occupied Defected wooden door Abandoneed Corosin-induced crasking Cracks due to embedment o		CAR CONTRACT		<u> </u>	_		Week co			
District: Magusa Area: Namuk Kemal Street name: Nadir Sk Longitude: 35° 7'12.76"N Longitude: 33° 5'7'25.79"E Street name: Nadir Sk Longitude: 33° 5'7'25.79"E Street name: Nadir Sk Longitude: 33° 5'7'25.79"E Street name: Vertical favoration of torread babs Pounding and separation problem Pounding and separation problem Longitude: 104'14'14'14'14'14'14'14'14'14'14'14'14'14										
District: Mağusa Area: Namuk Kemal Street name: Nadir Sk Latitude: 35° 7'12.76'N Longitude: 33°57'25.79'E Structure age: Between 14 and 43 years (1974-2003) Public Oren-structural Commercial Residential House Public Short structural Commercial Commercial Waterproofing defects, water leakage and seepage Occupied Abandoned Construction Reinforced Concrete Defects Drying shrinkage cracks Corrosion of detects (faulty Construction Corrosion-induced cracking Corrosion-induced spalling Construction detects (faulty workmanship): designer, detailer, workmaship): designer, detailer, Honeycombing Non-structural Segregation							, in			
District: Mağusa Area: Namuk Kemal Street name: Nadir Sk Latitude: 35° 712.76°N Longitude: 33°5725.79°E Structure age: Between 14 and 43 years (1974-2003) Public Oren-structural Commercial Residential House Public Short structural Commercial Commercial Waterproofing defects, water leakage and seepage Occupied Abandoned Concenter Defects Drying shrinkage cracks Trying shrinkage cracks Corrosion of metals embedded in concrete Corrosion-induced cracking Construction Torosion-induced cracking Corrosion of defects (faulty Docining defects (faulty Docining defects (faulty Dormitory Surface cracks Condensation Construction defects (faulty Premature removal of forms Premature removal of forms Construction Surface cracks Corrosion of Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handralis) Segregation defects (faulty Cold joints Non-structural Construction Surface cracks Corrosion of Corrosion-induced of cracking Corrosion of Corrosion-induced of cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handralis) Segregation Non-structural Construction Joint cracks Mall finishes Map/pattern cracking Corrosion of Corrosion-induced spalling Cracks due to embedment							urity u	Floor discontinuity		
Street name: Nadir Sk Latitude: 35° 7'12.76"N Longitude: 33°57'25.79"E Structure age: elementary (1974-2003) Agartment House Agartment House House Bridge and the structural elementary (1974-2003) Agartment House Public Short columns Commercial Non-Structural Defects Under Construction Waterproofing defects, water leakage and seepage Occupied Abandoned Abandoned Corrosion-induced cracking Corrosion of metals embedded in concrete Corrosion-induced cracking Corrosion of metals embedded in concrete Corrosion-induced cracking Construction Improper reinforcing steel placement Construction Improper reinforcing steel placement Construction Improper reinforcing steel placement Improper reinforcing steel placement Finishes Marking problem Mouldiness Mault finishes May/plattern cracking Construction metals embedded in concrete Improper reinforcing steel placement Improper reinforcing steel placement Non-structural eracks Juber reaction Segregation Segregation Segregation						figuration	Irregula	Projections in plan		
Street name: Nadir Sk Latitude: 35° 7'12.76"N Longitude: 33°57'25.79"E Structure age: elementary (1974-2003) Agartment House Agartment House House Bridge and the second and the sec	21/2 DIAL					con	~	Non-continuous beams		
Street name: Nadir Sk Latitude: 35° 7'12.76"N Longitude: 33°57'25.79"E Variable 33°57'25.79"E Structure age: Between 14 and 43 years (1974-2003) Apartment Agartment House House Dormitory Public Short Columns Commercial Non-Structural design fault Building type: Public Dromitory Dormitory Public Short Columns Commercial Non-Structural Defects Building status: Occupied Drying shrinkage cracks Surface cracks Corrosion of metals embedded in concrete Corrosion-induced spalling Construction Improper reinforcing steel placement Improper reinforcing steel placement Improper reinforcing steel placement Improper reinforcing steel placement Improper reinforcing steel placement Improper reinforcing steel placement Non-structural cracks Vall finishes May/pattern cracking Madiness Mauldiness Under Construction Surface cracks Corrosion of metals embedded in concrete Corrosion-induced spalling Construction Improper reinforcing steel placement Presenting steel plac						uctural e	ementary faults	cross-section		
Street name: Nadir Sk Latitude: 35° 7'12.76"N Longitude: 33°57'25.79"E Variable 33°57'25.79"E Structure age: Between 14 and 43 years (1974-2003) Apartment Agartment House House Dormitory Public Short Columns Commercial Non-Structural design fault Building type: Public Dromitory Dormitory Public Short Columns Commercial Non-Structural Defects Building status: Occupied Drying shrinkage cracks Surface cracks Corrosion of metals embedded in concrete Corrosion-induced spalling Construction Improper reinforcing steel placement Improper reinforcing steel placement Improper reinforcing steel placement Improper reinforcing steel placement Improper reinforcing steel placement Improper reinforcing steel placement Non-structural cracks Vall finishes May/pattern cracking Madiness Mauldiness Under Construction Surface cracks Corrosion of metals embedded in concrete Corrosion-induced spalling Construction Improper reinforcing steel placement Presenting steel plac	District:	Ν	lağusa		ration	ıtal stı	am ele design	at beams intersection		
Street name: Nadir Sk Stab Other structure and stab Latitude: 35° 7'12.76"N Poordy supported or heavily loaded cantilevered slabs Latitude: 33°57'25.79"E Poordy supported or heavily loaded cantilevered slabs Structure age: Anate (if available): years Poordy supported or heavily loaded cantilevered slabs Structure age: Between 14 and 43 years (1974-2003) Apartment Functional structural elementary design fault Broken axis columns or shear walls Building type: Apartment Commercial House Vertical structural elementary design fault Broken axis columns Building status: Occupied Non-Structural Abandoned Non-Structural Defects Irregular column and/or shear-wall plan configuration Building status: Occupied Non-Structural Defects Condensation Drying shrinkage cracks Corrosion-induced cracking Corrosion of metals embedded in concrete Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails) Turface cracks Cracks crazing Orage Construction Improper reinforcing steel placement Improper reinforcing steel placement Mouldiness Maufinishes Maufinishes Maufinishes Maufinishes Construction metals embedded in concrete Improper reinforcing steel placement Non-structural eracks Joint cracks	Area:	Nam	uk Kemal		nfigu	orizor	Be	frames		
Longitude: 33°57'25.79"E Weak storey Structure age: <14	C .		1. 01		ul cc	H				
Longitude: 33°57'25.79"E Weak storey Structure age: <14	Street name:	N	adir Sk		tura					
Longitude: 33°57:25.79°E Weak storey Structure age: <14	Latitude:	35° ′	7'12.76"N	-	truc					
Structure age: Oute (if available): years Structure age: Soft storey Between 14 and 43 years (1974-2003) Apartment Vertical structural element Biologian Soft storey Building type: Apartment House Vertical structural element Broken axis columns Building type: Public Non-Structural Defects Irregular column and/or shear-wall plan configuration Building status: Commercial Non-Structural Defects Irregular column Corrosion of metals embedded in concrete Corrosion-induced cracking Cracks due to embedment of dissimilar metals (handrails) Surface cracks Crazing Mouldiness Improper reinforcing steel placement Improper reinforcing steel placement Non-structural placement Efflorescence Valid finishes Mau/pattern cracking Mouldiness Wall finishes workmanship problem Segregation Segregation Segregation Segregation Non-structural cracks Joint cracks					S					
(19/4-2003) >43 years (Before 1974) Agartment Apartment Building type: Apartment Public House Public Shear walls Commercial Mouse Building status: Under Construction Occupied Defected wooden door Abandoned Condensation Resinforced Concrete Defects Rising damp Drying shrinkage cracks Surface cracks Corrosion of metals embedded in concrete Corrosion-induced spalling Construction defects (faulty workmanship): Improper reinforcing steel placement Premature removal of forms Cold joints Construction defects (faulty workmanship): Cold joints Non-structural graph Staining		<14 Date (if available):				al	gularity evation			
Building type: Dormitory Image: Corrosion of metals embedded in concrete Corrosion-induced cracking Corrosion-induced spalling Coracks due to embedment of dissimilar metals (handrails) Surface cracks Surface cracks crazing on wall finishes Surface cracks crazing on wall finishes Construction defects (faulty workmanship): designer, detailer, and contractor Image: Cold joints Non-structural Defects Non-structural contractor Image: Construction defects (faulty workmanship): designer, detailer, and contractor Segregation	Structure age:	Between 14 and 43 years (1974-2003) >43 years (Before 1974)				ructur cation	Irreg in eld			
Building type: Dormitory Detention of the second s						ıl st igur	Vertical			
Building type: Dormitory Detention of the second s						tica				
Building type: Dormitory design fault Intervention Public Commercial Non-Structural Defects Building status: Under Construction Waterproofing defects, water leakage and seepage Occupied Defected wooden door Abandoned Condensation Reinforced Concrete Defects Rising damp Drying shrinkage cracks Rain penetration Corrosion of metals embedded in concrete Corrosion-induced cracking Construction Corrosion-induced spalling Construction Cracks due to embedment of dissimilar metals (handrails) Improper reinforcing steel placement Premature removal of forms Premature removal of forms Segregation Cold joints Non-structural cracks Joint cracks Joint cracks		Residential	House			Ver c				
Public CommercialNon-Structural DefectsBuilding status:Under ConstructionWaterproofing defects, water leakage and seepageOccupiedDefected wooden doorAbandonedCondensationReinforced Concrete DefectsRain penetrationDrying shrinkage cracksSegregationCorrosion of metals embedded in concreteCorrosion-induced cracking Cracks due to embedment of dissimilar metals (handrails)Surface cracksConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementSurface cracksConstruction defects (faulty workmanship): designer, detailer, and contractorCold jointsNon-structural cracksJoint cracks	Building type:					ŗ	•	blied wall plan configuration		
Building status:Under ConstructionWaterproofing defects, water leakage and seepageBuilding status:OccupiedDefected wooden doorAbandonedCondensationReinforced Concrete DefectsRain penetrationDrying shrinkage cracksTaking pipes, spills and other moisture sourcesCorrosion of metals embedded in concreteCorrosion-induced crackingConstruction defects (faulty workmanship):Improper reinforcing steel placementPremature removal of formsNon-structural cracksConstruction defects (faulty workmanship):SegregationContaction defects (faulty workmanship):SegregationContaction defects (faulty workmanship):Non-structural cracksJoint cracksJoint cracks		Domitory					-	Short column		
Building status: Occupied Abandoned Defected wooden door Reinforced Concrete Defects Rising damp Drying shrinkage cracks Rain penetration Corrosion of metals embedded in concrete Corrosion-induced cracking Corrosion-induced spalling Surface cracks on wall finishes Rain penetration Concrestence Corrosion-induced spalling Surface cracks Crazing Construction defects (faulty workmanship): Improper reinforcing steel placement Mouldiness Paint peeling Vertication defects (faulty workmanship): Premature removal of forms Non-structural Segregation Non-structural cracks Joint cracks		Commercial								
AbandonedCondensationReinforced Concrete DefectsRising dampDrying shrinkage cracksRain penetrationDrying shrinkage cracksLeaking pipes, spills and other moisture sourcesCorrosion of metals embedded in concreteCorrosion-induced cracking Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesCracks Map/pattern crackingConstruction defects (faulty workmanship):Improper reinforcing steel placementMouldinessConstruction defects (faulty workmanship):Premature removal of formsNon-structural cracksJoint cracks			iction		1	Waterpro				
Reinforced Concrete DefectsDrying shrinkage cracksImage: Specific concrete DefectsDrying shrinkage cracksSpecific concrete Corrosion-induced crackingCorrosion of metals embedded in concreteCorrosion-induced spallingConstruction defects (faulty workmanship):Improper reinforcing steel placementConstruction defects (faulty workmanship):Improper removal of formsConstructor defects (faulty workmanship):Cold jointsNon-structural defects (faulty workmanship):SegregationConstructorSegregationHoneycombingNon-structural cracksHoneycombingContractor	Building status:	-			_					
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishescrazing Map/pattern crackingConstruction defects (faulty workmanship):Improper reinforcing steel placementImproper reinforcing steel placementMouldinessConstruction defects (faulty workmanship):Premature removal of formsStainingCold joints and contractorNon-structural HoneycombingJoint cracks	Doinfo		Dofoots			ss				
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishescrazing Map/pattern crackingConstruction defects (faulty workmanship):Improper reinforcing steel placementImproper reinforcing steel placementMouldinessConstruction defects (faulty workmanship):Premature removal of formsStainingCold joints and contractorNon-structural HoneycombingJoint cracks	Keilito		Defects			pne:				
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishescrazing Map/pattern crackingConstruction defects (faulty workmanship):Improper reinforcing steel placementImproper reinforcing steel placementMouldinessConstruction defects (faulty workmanship):Premature removal of formsStainingCold joints and contractorNon-structural HoneycombingJoint cracks	Dryin	g shrinkage crac	ks			dam	Leaking	-		
Improper reinforcing steel Mouldiness placement Wall finishes workmanship problem Premature removal of forms Staining Cold joints Non-structural designer, detailer, Segregation and contractor Honeycombing	5	0 0			ects	, in the second s	e			
Improper reinforcing steel Mouldiness placement Wall finishes workmanship problem Premature removal of forms Staining Cold joints Non-structural designer, detailer, Segregation and contractor Honeycombing	Corrosion of									
Improper reinforcing steel Mouldiness placement Wall finishes workmanship problem Premature removal of forms Staining Cold joints Non-structural designer, detailer, Segregation and contractor Honeycombing				g on wall finishes Map/pattern cracking						
Improper reinforcing steel Mouldiness placement Wall finishes workmanship problem Premature removal of forms Staining Cold joints Non-structural designer, detailer, Segregation and contractor Honeycombing	in concrete			Efflorescence Paint peoling						
Construction defects (faulty workmanship): designer, detailer, and contractor placement Wall finishes workmanship problem Segregation Non-structural cracks Joint cracks										
Construction Premature removal of forms Staining defects (faulty Cold joints Non-structural workmanship): Segregation cracks designer, detailer, Honeycombing Joint cracks										
defects (latify workmanship): designer, detailer, and contractor Cold joints Non-structural cracks Joint cracks										
designer, detailer, and contractor Honeycombing				N	Non-	structural		Joint cracks		
and contractor Honeycombing			-		С	racks		Joint cracks		
	and contractor									
Improper grades of slab Other notes (if available):				<u>C</u>	Othe	er notes (if available)	<u>):</u>		
Cracks in PC due Slab/beam-to column shear The structural system of this house is mixed between				г	The	structu	al system	of this house is mixed between		
Cracks in RC due (punching shear) cracks		(punching	shear) cracks	S S						
Cantilevered member cracks	to load effects (structural cracks) Cantilevered member cracks				ioaucearing wans and remoteed concrete frames.					
Settlement cracks	(su deturur erdens)	Settlem	ent cracks							

		Case S	Stud	ly #	24 (M	24)		
	Profile	7					c Design Faults	
Wite .						Week colu	mn-strong beam	
							Torsional Irregularity	
						н.	(Torsion eccentricity)	
						ity 1	Floor discontinuity	
					Horizontal structural configuration	Irregularity in plan	Projections in plan	
					on		Non-continuous beams	
	NE STR				uctural c	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	Ν	lağusa		ration	ntal str	am ele desigr	Absence of vertical support at beams intersection	
Area:	Nam	uk Kemal		Structural configuration	Iorizoi		Broken axis beams and frames	
C ()				al co	щ	Slab	Over-stretched one-way slab	
Street name:		miye Sk		uctura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs	
Latitude:		7'13.15"N	_	Str		Poundi	ng and separation problem	
Longitude:		7'27.01"E	_			ty on	Weak storey	
	years	te (if available):			ral	Irregularity in elevation	Soft storey	
Structure age:	Between 14 au (1974-2003)				Vertical structural configuration	Irre in e	Discontinuity of columns or shear walls	
	>43 years (Be		_		al s ïgu	Vertical	Broken axis columns	
		Apartment			rtic	structural	T 1 1 1/	
	Residential	House			Vei c	element elementary	Irregular column and/or shear-wall plan configuration	
Building type:		Dormitory				design fault	shear-wan plan configuration	
	Public						Short column	
	Commercial					Non-St	ructural Defects	
	Under Constru	iction			Waterpro	oofing defects	, water leakage and seepage	
Building status:	Occupied					Defected	l wooden door	
	Abandoned						Condensation	
Reinfo	rced Concrete	Defects			less		Rising damp	
					dampness		Rain penetration	
Dryin	g shrinkage crac			Surface defects			ipes, spills and other moisture sources	
Corrosion of		duced cracking		del		ce cracks	crazing	
metals embedded		duced spalling		ace	on wal	l finishes	Map/pattern cracking	
in concrete		embedment of tals (handrails)		urf			fflorescence	
		· · · · · ·	Paint peeling Mouldiness					
		inforcing steel ement		-			s workmanship problem	
Construction	1	moval of forms		-		wan minsnes	Staining	
defects (faulty		joints		Non	structural			
workmanship):		egation			racks		Joint cracks	
designer, detailer,		combing						
and contractor		rades of slab		0.1				
		faces column shear		Othe	er notes (if available):		
Cracks in RC due		shear) cracks						
to load effects		member cracks						
(structural cracks)		ent cracks						

Profile Stisnic Design Faults Veck column-strong heam Image: Strong heam	Case Study #25 (M25)										
Week colum-strong beamImage: the second											
Juilding type: Area: Namik Kemal Non-continuous beams Non-continuous beam	Profile										
Non-continuous beamsDistrict:MagusaNon-uniform beam span and cross-sectionAbeance orveitcal supportArea:Namik KemalMagusaMon-uniform beam span and cross-sectionMon-uniform beam span and cross-sectionStreet name:Nadir SkMadir SkMon-uniform beam span and cross-sectionMon-uniform beam span and cross-sectionLatitude:33°57715.09°NStab elementaryOver-stretchod one-wy slabLongitude:33°57724.80°EPoundiry and separation problemLongitude:33°57724.80°EPoundiry and separation problemJay surs (Before 1974)Poundiry and separation problemDiscontinuity of columns or shear wallsBuilding type:PublicPoundiry and separation problemDiscontinuity of columns or shear wallsBuilding status:OccupiedDormitoryDiscontinuity of columns or shear wallsIrregular column and/or shear wallsDrying shrinkage cracksCorcosion -induced cracking elementaryStortecupiedNon-water tracking and Rain penetrationCorrosion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -induced spalling recorsion -i				V				Torsional Irregularity (Torsion eccentricity)			
Non-continuous beamsDistrict:MagusaNon-uniform beam span and cross-sectionAbeance orveitcal supportArea:Namik KemalMagusaMon-uniform beam span and cross-sectionMon-uniform beam span and cross-sectionStreet name:Nadir SkMadir SkMon-uniform beam span and 		A	= = -				n nity	Floor discontinuity			
Street name: Nadir Sk Shab Shab Ore Subcled une way shap Latitude: 35° 7'15.09'N Image: Structure age: 37° 57'24.80'E Pounding and separation problem Image: Structure age: Structure age: Between 14 and 43 years (1974-2003) Verical Soft storey Image: Structure age: Between 14 and 43 years (1974-2003) Soft storey Image: Structure age: Between 14 and 43 years (1974-2003) Image: Structure age: Between 14 and 43 years (1974-2003) Image: Structure age: Structure age: Dormitory Image: Structure age:						guration	Irregula pla	Projections in plan			
Street name: Nadir Sk Shab Shab Ore Subcled une way shap Latitude: 35° 7'15.09'N Image: Structure age: 37° 57'24.80'E Pounding and separation problem Image: Structure age: Structure age: Between 14 and 43 years (1974-2003) Verical Soft storey Image: Structure age: Between 14 and 43 years (1974-2003) Soft storey Image: Structure age: Between 14 and 43 years (1974-2003) Image: Structure age: Between 14 and 43 years (1974-2003) Image: Structure age: Structure age: Dormitory Image: Structure age:						tuo		Non-continuous beams			
Street name: Nadir Sk Shab Shab Ore Subcled une way shap Latitude: 35° 7'15.09'N Image: Structure age: 37° 57'24.80'E Pounding and separation problem Image: Structure age: Structure age: Between 14 and 43 years (1974-2003) Verical Soft storey Image: Structure age: Between 14 and 43 years (1974-2003) Soft storey Image: Structure age: Between 14 and 43 years (1974-2003) Image: Structure age: Between 14 and 43 years (1974-2003) Image: Structure age: Structure age: Dormitory Image: Structure age:						uctural c	ementary faults				
Street name: Nadir Sk Skate Skate Skate Decive stretched une-way skate Decive stretc	District:	Ν	lağusa		Iration	ntal stı	am ele design	at beams intersection			
Street name: Nadir Sk Skate Skate Skate Decive stretched une-way skate Decive stretc	Area:	Nan	nk Kemal		configu	Iorizo		frames			
	Street name:	Ν	adir Sk		ctural c	Π	elementary	Poorly supported or heavily			
	Latitude:	35° '	7'15.09"N	_	truc		-				
Structure age: <14 years					S						
$ \begin{array}{ $		<14 Da				al	gularity evatio				
Building type: Dormitory Image: Public Shear-Wail plan configuration Public Commercial Short column Image: Public Commercial Under Construction Waterprofing defects, water leakage and seepage Defected wooden door Building status: Occupied Defected wooden door Defected wooden door Abandoned Drying shrinkage cracks Thising damp Image: Public Drying shrinkage cracks Torsion-induced cracking Rain penetration Image: Public Corrosion of metals embedded in concrete Corrosion-induced spalling Surface cracks Carazing Image: Public Construction Improper reinforcing steel placement Paint peeling Paint peeling Image: Public Premature removal of forms Non-structural Joint cracks Paint peeling Image: Public Gesigner, detailer, and contractor Slab/beam-to column shear (punching shear) cracks Non-structural Joint cracks Image: Public Cracks in RC due Slab/beam-to column shear (punching shear) cracks Cantilevered member cracks Cantilevered member cracks Cantilevered member cracks Cantilevered member cracks	Structure age:	(1974-2003)				tructui ration	Irreg in el				
Building type: Dormitory Image: Public Shear-Wail plan configuration Public Commercial Short column Image: Public Commercial Under Construction Waterprofing defects, water leakage and seepage Defected wooden door Building status: Occupied Defected wooden door Defected wooden door Abandoned Drying shrinkage cracks Thising damp Image: Public Drying shrinkage cracks Torsion-induced cracking Rain penetration Image: Public Corrosion of metals embedded in concrete Corrosion-induced spalling Surface cracks Carazing Image: Public Construction Improper reinforcing steel placement Paint peeling Paint peeling Image: Public Premature removal of forms Non-structural Joint cracks Paint peeling Image: Public Gesigner, detailer, and contractor Slab/beam-to column shear (punching shear) cracks Non-structural Joint cracks Image: Public Cracks in RC due Slab/beam-to column shear (punching shear) cracks Cantilevered member cracks Cantilevered member cracks Cantilevered member cracks Cantilevered member cracks	-	>43 years (Be		_		al sı figu		Broken axis columns			
Building type: Dormitory design fault Public Non-Structural Defects Commercial Non-Structural Defects Under Construction Mandoned Abandoned Condensation Reinforced Concrete Defects Rising damp Drying shrinkage cracks Rising damp Corrosion of metals embedded in concrete Corrosion-induced cracking Construction Corrosion-induced spalling Construction Corrosion-induced spalling Construction Corrosion-induced spalling Construction Improper reinforcing steel placement Premature removal of forms Non-structural cracks in RC duite Slab/beam-to column shear (punching shear) cracks Non-structural cracks Slab/beam-to column shear (punching shear) cracks Other notes (if available):		Residential				Vertic: conf	element				
Commercial Non-Structural Defects Building status: Under Construction Waterproofing defects, water leakage and seepage Occupied Defected wooden door Abandoned Abandoned Condensation Rising damp Reinforced Concrete Defects Rising damp Rain penetration Drying shrinkage cracks Corrosion-induced cracking Rain penetration Leaking pipes, spills and other moisture sources Corrosion of metals embedded in concrete Corrosion-induced spalling Surface cracks Cracks due to embedment of dissimilar metals (handrails) Surface cracks Map/pattern cracking Improper reinforcing steel placement Improper reinforcing steel placement Non-structural cracks Vall finishes workmanship problem Paint peeling Gesigner, detailer, and contractor Segregation Cracks of slab surfaces Joint cracks Other notes (if available): Cracks in RC due to load effects (fautty to load effects (fautury curved member cracks Cantilevered member cracks Other notes (if available):	Building type:		Dormitory					shear-wan plan configuration			
Building status: Under Construction Waterproofing defects, water leakage and seepage Occupied Defected wooden door Abandoned Reinforced Concrete Defects Reinforced Concrete Defects Rising damp Drying shrinkage cracks Rain penetration Corrosion of metals embedded in concrete Corrosion-induced cracking Surface cracks Construction defects (faulty workmanship): Improper reinforcing steel placement Paint peeling Vorkmanship): Segregation Staining Vall finishes Building status: Slab/beam-to column shear (punching shear) cracks Other notes (if available):			•								
Building status: Occupied Abandoned Defected wooden door Reinforced Concrete Defects Rising damp Drying shrinkage cracks Rain penetration Drying shrinkage cracks Corrosion-induced cracking Corrosion-induced spalling Ruinpenetration Corrosion of metals embedded in concrete Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails) Surface cracks Crazks Improper reinforcing steel placement Paint peeling Mouldiness Mouldiness Premature removal of forms Mal finishes workmanship problem Staining Mouldiness Cold joints Non-structural cracks in RC due to load effects (structural cracks) Slab/beam-to column shear (punching shear) cracks Other notes (if available):											
Abandoned Condensation Reinforced Concrete Defects Rising damp Drying shrinkage cracks Rain penetration Drying shrinkage cracks Improper cracks Corrosion of metals embedded in concrete Corrosion-induced spalling Surface cracks Crazing Construction defects (faulty workmanship): Improper grades of slab surfaces Non-structural cracks Vall finishes workmanship problem Cracks in RC due to load effects (structural cracks) Slab/beam-to column shear (punching shear) cracks Non-structural cracks Joint cracks			iction			Waterpro					
Reinforced Concrete Defects Rising damp Drying shrinkage cracks Rain penetration Rain peneting Rain penetration Ra	Building status:			-							
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Coracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesCrazing Map/pattern crackingConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementMouldinessImproper MouldinessImproper Paint peelingImproper MouldinessConstruction defects (faulty workmanship): designer, detailer, and contractorPremature removal of forms SegregationNon-structural cracks in RC due (punching shear) cracksNon-structural cracksJoint cracksCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksOther notes (if available):	Reinfo		Defects								
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Coracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesCrazing Map/pattern crackingConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementMouldinessImproper MouldinessImproper Paint peelingImproper MouldinessConstruction defects (faulty workmanship): designer, detailer, and contractorPremature removal of forms SegregationNon-structural cracks in RC due (punching shear) cracksNon-structural cracksJoint cracksCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksOther notes (if available):						upne					
Construction Improper reinforcing steel Mouldiness placement Wall finishes workmanship problem Premature removal of forms Staining Construction Cold joints Non-structural designer, detailer, Honeycombing Joint cracks Improper grades of slab surfaces Other notes (if available): Cracks in RC due Slab/beam-to column shear Other notes (if available): (structural cracks) Cantilevered member cracks Other notes (if available):	Dryin	g shrinkage crac	ks		st de la construction de la cons		Leaking p	· · ·			
Construction Improper reinforcing steel Mouldiness placement Wall finishes workmanship problem Premature removal of forms Staining Construction Cold joints Non-structural designer, detailer, Honeycombing Joint cracks Improper grades of slab surfaces Other notes (if available): Cracks in RC due Slab/beam-to column shear Other notes (if available): (structural cracks) Cantilevered member cracks Other notes (if available):	Corrosion of		-		def						
Construction Improper reinforcing steel Mouldiness placement Wall finishes workmanship problem Premature removal of forms Staining Construction Cold joints Non-structural designer, detailer, Honeycombing Joint cracks Improper grades of slab surfaces Other notes (if available): Cracks in RC due Slab/beam-to column shear Other notes (if available): (structural cracks) Cantilevered member cracks Other notes (if available):					ace	on wal					
Construction Improper reinforcing steel Mouldiness placement Wall finishes workmanship problem Premature removal of forms Staining Construction Cold joints Non-structural designer, detailer, Honeycombing Joint cracks Improper grades of slab surfaces Other notes (if available): Cracks in RC due Slab/beam-to column shear Other notes (if available): (structural cracks) Cantilevered member cracks Other notes (if available):	in concrete				urf						
Construction placement Wall finishes workmanship problem defects (faulty Premature removal of forms Staining vorkmanship: Cold joints Non-structural designer, detailer, Segregation cracks and contractor Improper grades of slab surfaces Slab/beam-to column shear (punching shear) cracks Other notes (if available): Cracks in RC due Cantilevered member cracks Cantilevered member cracks				-	01			· · · · ·			
Construction Premature removal of forms Staining defects (faulty Cold joints Non-structural workmanship): designer, detailer, Joint cracks and contractor Honeycombing Joint cracks Improper grades of slab surfaces Other notes (if available): Cracks in RC due Slab/beam-to column shear Other notes (if available): (punching shear) cracks Cantilevered member cracks Other notes (if available):					-						
workmanship): designer, detailer, and contractor Cold joints Non-structural cracks Joint cracks Honeycombing Improper grades of slab surfaces Other notes (if available): Cracks in RC due to load effects (structural cracks) Slab/beam-to column shear (punching shear) cracks Other notes (if available):		Premature re	moval of forms								
designer, detailer, and contractor Segregation Cracks Honeycombing Improper grades of slab surfaces Other notes (if available): Cracks in RC due to load effects (structural cracks) Slab/beam-to column shear (punching shear) cracks Other notes (if available):]				Joint cracks			
and contractor Honeycombing Improper grades of slab Other notes (if available): Slab/beam-to column shear (punching shear) cracks to load effects Cantilevered member cracks			00		С	racks	_	Joint Cracks			
Surfaces Other notes (if available): Cracks in RC due to load effects (structural cracks) Slab/beam-to column shear (punching shear) cracks Other notes (if available):											
Cracks in RC due (punching shear) cracks to load effects (structural cracks) Cantilevered member cracks		sur	faces	9	Othe	er notes (<u>if available):</u>				
to load effects (structural cracks) Cantilevered member cracks	Cracks in RC due										
(structural cracks)											
	(structural cracks)										

		Case	Stu	dy	#26 (İ	1)		
	Profile					a		
			Seismic Design Faults Week column-strong beam					
						Week colu		
						_	Torsional Irregularity	
						y in	(Torsion eccentricity)	
						arit; an	Floor discontinuity	
					Horizontal structural configuration	Irregularity in plan	Projections in plan	
TON & GAN	C. Contant				co	ſŊ	Non-continuous beams	
Carlo Barg					uctural	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	-	İskele		ation	tal str	ım ele esign	Absence of vertical support at beams intersection	
Area:	Loi	ng Beach		Structural configuration	nizon	Bea	Broken axis beams and frames	
				COI	Hc	Slab	Over-stretched one-way slab	
Street name:	Gazimağusa	-Karpaz Anayol	u	ıral		elementary	Poorly supported or heavily	
			-	ictu		design faults	loaded cantilevered slabs	
Latitude:		<u>/2' (35°14'52.3")</u>		Stru		Poundi	ng and separation problem	
Longitude:		'9' (33°53'52.8")	_	•1		ity on	Weak storey	
	years	Date (if available):			ral	Irregularity in elevation	Soft storey	
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration	Irre in e	Discontinuity of columns or shear walls	
	>43 years (Be	fore 1974)			al sı ïgu	Vertical	Broken axis columns	
	Apartment		_		tica	structural		
	Residential	House			Vei c	element elementary	Irregular column and/or	
Building type:		Dormitory				design fault	shear-wall plan configuration	
	Public			_			Short column	
	Commercial			Non-Structural Defects				
D 111 4 4	Under Constru	iction		Waterproofing defects, water leakage and seepage				
Building status:	Occupied Abandoned			Defected wooden door Condensation				
Doinfo	rced Concrete	Dofoota	-					
Kenno	rceu Concrete.	Defects		Rain penetration				
Dryin	g shrinkage crac	eks						
	Corrosion-in	duced cracking		Surface defects	Surfac	ce cracks crazing		
Corrosion of		duced spalling		se d		ll finishes	Map/pattern cracking	
metals embedded		embedment of		rfac		E	fflorescence	
in concrete	dissimilar me	etals (handrails)		Sui		Р	aint peeling	
		inforcing steel]	Mouldiness	
Construction		ement				Wall finishes	s workmanship problem	
defects (faulty	Premature re	moval of forms					Staining	
workmanship):		l joints	1		structural		Joint cracks	
designer, detailer,		egation		С	racks			
and contractor		combing						
		grades of slab faces	<u>(</u>	Othe	er notes (<u>if available):</u>		
Slab/beam-to column shear				Rair	n penetr	ation in this	case is evident on the terrace	
Cracks in RC due to load effects	(punching	shear) cracks						
(structural cracks)	Cantilevered	member cracks		which acts as a flat roof (not the pitched roof)				
(Structurur eracks)	Settlem	ent cracks						

		Case	Study	y #27 (İ	(2)			
	Profile					ic Design Faults		
				_	Week colu	umn-strong beam		
	1 T				_	Torsional Irregularity (Torsion eccentricity)		
-		de la			y ir			
					ularit	Floor discontinuity		
				Horizontal structural configuration	Irregularity in plan	Projections in plan		
Į				con	~	Non-continuous beams		
A.				uctural	Beam elementary design faults	Non-uniform beam span and cross-section		
District:		İskele	Structural configuration	ntal str	am elementa design faults	Absence of vertical support at beams intersection		
Area:	Loi	ng Beach	pur	IOZ	Bea	Broken axis beams and		
		6		Hori		frames Over-stretched one-way slab		
Street name:	Gazimačusa	-Karpaz Anayol			Slab elementary	Poorly supported or heavily		
Street name.	Gaziniaguse	-Karpaz Anayor	u int		design faults			
Latitude:	35°1	4'52.66"N	truc		Pound	ling and separation problem		
Longitude:		3'55.49"E	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	2	~ =	Weak storey		
	<14 Da	te (if available): Early 2008		al	Irregularity In elevation	Soft storey		
Structure age:	(1974-2003)	14 and 43 years 03)		Vertical structural configuration	Irreg in eld	Discontinuity of columns or shear walls		
	>43 years (Be	fore 1974)		ul st igun	Vertical	Broken axis columns		
		Apartment		tica	structural			
	Residential	House		Ver c	element elementary	Irregular column and/or		
Building type:		Dormitory			design fault	shear-wall plan configuration		
	Public					Short column		
	Commercial			Non-Structural Defects				
	Under Constru	action		Waterpr		s, water leakage and seepage		
Building status:	Occupied				Defected wooden door			
D • 6	Abandoned		_	Condensation				
Reimo	rced Concrete	Defects	_	ones	Rising damp Rain penetration			
Drvin	g shrinkage crac	vks		dampness	Leaking	pipes, spills and other moisture		
Diyin	g similikuge eru	×K5	sets	p	Leaking	sources		
Corrosion of		duced cracking	Surface defects	Surfa	ce cracks	crazing		
metals embedded		duced spalling	ce	on wa	ll finishes	Map/pattern cracking		
in concrete		embedment of	ırfa			Efflorescence		
		etals (handrails)	S	2		Paint peeling		
		inforcing steel		—		Mouldiness es workmanship problem		
Construction	1	moval of forms		—	vv all tillisfie	Staining		
defects (faulty		l joints	No	n-structura	1			
workmanship):	Segregation			cracks		Joint cracks		
designer, detailer, and contractor	Honeycombing							
	Improper g	grades of slab	04	her notes	(if available):			
		faces o column shear						
Cracks in RC due		shear) cracks		-		s acting on the terrace acting as a		
to load effects		member cracks	fla	flat roof (not the pitched roof)				
(structural cracks)		ent cracks						
	1							

		Case	Stud	dy	#28 (İ	3)			
			Seismic Design Faults						
				Week column-strong beam					
	Market Biogram		a				Torsional Irregularity		
		and the				'n,	(Torsion eccentricity)		
	in the second second					n n	Floor discontinuity		
					Horizontal structural configuration	Irregularity in plan	Projections in plan		
					con	~	Non-continuous beams		
	erent and all all all all all all all all all al				ructural o	Beam elementary design faults	Non-uniform beam span and cross-section		
District:	j	İskele		ration	ntal st	am el design	Absence of vertical support at beams intersection		
Area:]	Boğaz		Structural configuration	lorizoi	Be	Broken axis beams and frames		
				al cc	Η	Slab	Over-stretched one-way slab		
Street name:	Karpa	az Anayolu		tura		elementary design faults	Poorly supported or heavily		
Latitude:	25°1	8'49.24"N	-	ruc		-	loaded cantilevered slabs ng and separation problem		
Longitude:		57'7.29"E		S			Weak storey		
	<14 Da	tte (if available):			_	Irregularity in elevation	Soft storey		
Structure age:	years Between 14 at	nd 43 years			Vertical structural configuration	Irregu in elev	Discontinuity of columns or shear walls		
	(1974-2003) >43 years (Be	fore 1974)			strı gura	Vertical	Broken axis columns		
	>45 years (Be	Apartment	-		ical	structural			
	Residential	House			co	element	Irregular column and/or		
Building type:	Residential				>	elementary	shear-wall plan configuration		
Dunung type.	Public	Dormitory	_			design fault	Short column		
	Commercial					Non-Structural Defects			
	Under Constru	iction		,	Waterpro		fing defects, water leakage and seepage		
Building status:	Occupied				wooden door				
Ū.	Abandoned					Condensation			
Reinfo	rced Concrete	Defects			less		Rising damp		
					dampness		Rain penetration		
Dryin	g shrinkage crac			Surface defects	-		ipes, spills and other moisture sources		
Corrosion of		duced cracking		dei		cracks	crazing		
metals embedded		duced spalling embedment of		ace	on wal	l finishes	Map/pattern cracking		
in concrete		etals (handrails)		Jurf		Efflorescence Paint peeling			
		inforcing steel					Mouldiness		
		ement		-			s workmanship problem		
Construction	Premature re	moval of forms		-			Staining		
defects (faulty workmanship):	Cold	l joints	N		structural		Joint cracks		
designer, detailer,		egation		С	racks		Joint cracks		
and contractor		combing							
		grades of slab	C	Dthe	er notes (if available):			
		faces column shear	⊢ ⁻						
Cracks in RC due		shear) cracks							
to load effects		member cracks	\square						
(structural cracks)		ent cracks							

		Case Study	# Ca	ase	Study	# 29 (İ 4)			
	Profile						ic Design Faults		
						Week col	umn-strong beam		
							Torsional Irregularity		
						, in	(Torsion eccentricity)		
		AAAI				nity n	Floor discontinuity		
					Horizontal structural configuration	Irregularity in plan	Projections in plan		
10 10 Mar					con	~	Non-continuous beams		
					uctural	Beam elementary design faults	Non-uniform beam span and cross-section		
District:	-	İskele		ration	ıtal str	am ele lesign	Absence of vertical support at beams intersection		
Area:]	Boğaz		onfigui	orizor	Bea	Broken axis beams and frames		
Street name:	Karpa	az Anayolu		Structural configuration	Н	Slab elementary design faults			
Latitude:	35°1	8'58.64"N		tru		Pound	ling and separation problem		
Longitude:	33°:	57'9.35"E		S		2 4	Weak storey		
	<14 Da years	ate (if available):			Vertical structural configuration	Irregularity in elevation	Soft storey		
Structure age:	Between 14 au (1974-2003)	nd 43 years				Irreg in el	Discontinuity of columns or shear walls		
	>43 years (Be	fore 1974)			l st igur	Vertical	Broken axis columns		
		Apartment			tica	structural			
	Residential House				Ver c	element	Irregular column and/or		
Building type:		Dormitory		-	elementary design fault				
0.01	Public	Domitory				design num	Short column		
	Commercial			Non-Structural Defects					
	Under Constru	uction					ts, water leakage and seepage		
Building status:	Occupied						ed wooden door		
0	Abandoned			Condensation					
Reinfo	rced Concrete	Defects		Rising damp			Rising damp		
				Rising damp Rain penetration Leaking pipes, spills and other					
Dryin	g shrinkage crac	ks		Surface defects		-	pipes, spills and other moisture sources		
Corrosion of		duced cracking		dei		ce cracks	crazing		
metals embedded		duced spalling		ace	on wal	l finishes	Map/pattern cracking		
in concrete		embedment of		urfi			Efflorescence		
		etals (handrails)	$\left - \right $	S			Paint peeling Mouldiness		
		inforcing steel ement		-		Wall finich	es workmanship problem		
Construction		moval of forms		-		vv an minsh	Staining		
defects (faulty				Non	structural				
workmanship):	Cold joints Segregation				racks		Joint cracks		
designer, detailer,	Honeycombing								
and contractor	,	grades of slab							
	sur	faces		Othe	er notes (if available)	<u>.</u>		
		o column shear]	This	s non-fu	nctional ho	tel was hosting what seemed to		
Cracks in RC due to load effects		shear) cracks					· · · · · · · · · · · · · · · · · · ·		
(structural cracks)	Cantilevered	member cracks		50 H	be like construction workers who were sleeping the				
(structurar cracks)	Settlem	ent cracks							

	Case	Stu	ıdy	#30 (İ	5)			
		Seismic Design Faults						
					Week colur	nn-strong beam		
	1	1				Torsional Irregularity		
Alient					н.	(Torsion eccentricity)		
TA REALERANT		B.			rity n	Floor discontinuity		
				Horizontal structural configuration	Irregularity in plan	Projections in plan		
the states				co	5	Non-continuous beams		
				ıctural	Beam elementary design faults	Non-uniform beam span and cross-section		
District:	İskele		ration	tal stri	am elementa design faults	Absence of vertical support at beams intersection		
Area:	Boğaztepe		Structural configuration	rizon	Bea	Broken axis beams and frames		
			l co	Нс	Slab	Over-stretched one-way slab		
Street name:	Cumhuriyet Sk		stura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs		
Latitude:	35°18'56.58"N		Struc			ng and separation problem		
Longitude:	33°56'49.87"E		•1		y n	Weak storey		
	<14 Date (if available): years			ral	Irregularity In elevation	Soft storey		
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration	Irreg in el	Discontinuity of columns or shear walls		
	>43 years (Before 1974)			al s figu	Vertical	Broken axis columns		
	Apartment			rtic	structural	Impoular column and/or		
	Residential House			Vei c	element elementary	Irregular column and/or shear-wall plan configuration		
Building type:	Dormitory				design fault	shear-wan plan configuration		
	Public					Short column		
	Commercial					uctural Defects		
	Under Construction			Waterpro	ofing defects, water leakage and seepage			
Building status:	Occupied		Defected wooden door					
	Abandoned			Condensation				
Reimo	rced Concrete Defects		Rising damp Rain penetration					
Dryin	g shrinkage cracks		cts	د الدوم الحول ال حول الحول ا حول ال		pes, spills and other moisture sources		
	Corrosion-induced cracking		Surface defect	Surfac	e cracks	crazing		
Corrosion of	Corrosion-induced spalling		ce d		l finishes	Map/pattern cracking		
metals embedded in concrete	Cracks due to embedment of		rfac		E	florescence		
in concrete	dissimilar metals (handrails)		Su		P	aint peeling		
	Improper reinforcing steel					Aouldiness		
Construction	placement				Wall finishes	workmanship problem		
defects (faulty	Premature removal of forms					Staining		
workmanship):	Cold joints	$\left - \right $		structural		Joint cracks		
designer, detailer,	Segregation Honeycombing		C	racks				
and contractor								
	Improper grades of slab surfaces		Othe	er notes (if available):			
	Slab/beam-to column shear							
Cracks in RC due	(punching shear) cracks							
to load effects	Cantilevered member cracks							
(structural cracks)	Settlement cracks							

	Case	Stu	ıdy	#31 (İ	6)	
	Profile	1				c Design Faults
					Week colu	mn-strong beam
The second second						Torsional Irregularity
					, in	(Torsion eccentricity)
	1 1	-			urity In	Floor discontinuity
				Horizontal structural configuration	Irregularity in plan	Projections in plan
	THE THE SAL	210		COJ	<u>y</u>	Non-continuous beams
				uctural	Beam elementary design faults	Non-uniform beam span and cross-section
District:	İskele		ration	ıtal str	am ele lesign	Absence of vertical support at beams intersection
Area:	Yarköy (Agios Ilias)		Structural configuration	orizon	Be	Broken axis beams and frames
	No street names were found	in	ul cc	Ĥ	Slab	Over-stretched one-way slab
Street name:	the village		tura		elementary design faults	Poorly supported or heavily
Latitude:	35°19'32.95"N		ruc	-		loaded cantilevered slabs ng and separation problem
Longitude:	33°55'48.85"E		St			Weak storey
Longhude.	<14 Date (if available): years			la	Irregularity In elevation	Soft storey
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration	Irregu in ele	Discontinuity of columns or shear walls
	>43 years (Before 1974)			l sti gur	Vertical	Broken axis columns
	Apartment			tica	structural	
	Residential House			Vert cc	element	Irregular column and/or
Building type:	Dormitory			-	elementary design fault	shear-wall plan configuration
	Public			-	design hunt	Short column
	Commercial				Non-Str	ructural Defects
	Under Construction			Waterpro		, water leakage and seepage
Building status:	Occupied				Defected	wooden door
	Abandoned		Condensation			
Reinfo	rced Concrete Defects		Rising damp			
Dryin	g shrinkage cracks		ts	Leaking pipes, spills and other mo		Rain penetration ipes, spills and other moisture
	Compaign in 1 1		Surface defect	G 6	1	sources
Corrosion of	Corrosion-induced cracking Corrosion-induced spalling	\square	e de		e cracks	crazing Map/pattern cracking
metals embedded	Cracks due to embedment of		face	on war		fflorescence
in concrete	dissimilar metals (handrails)		Sur			aint peeling
	Improper reinforcing steel		•1			Mouldiness
	placement					workmanship problem
Construction	Premature removal of forms					Staining
defects (faulty workmanship):	Cold joints			structural		Joint cracks
designer, detailer,	Segregation		C	cracks		Joint Clacks
and contractor	Honeycombing					
	Improper grades of slab		Othe	er notes (i	if available):	
	surfaces Slab/beam-to column shear	\square				
Cracks in RC due	(punching shear) cracks					
to load effects	Cantilevered member cracks	\vdash				
(structural cracks)	Settlement cracks					
	Settlement cracks					

		Case	Stu	ıdy	#32 (İ	7)		
						~ •		
	Profile						ic Design Faults	
						Week col	umn-strong beam	
		d				-	Torsional Irregularity (Torsion eccentricity)	
Addres _		- HAR - F	= =			y ir		
						ularit. plan	Floor discontinuity	
		ME			guration	Irregularity in plan	Projections in plan	
					tuo		Non-continuous beams	
				-	Horizontal structural configuration	Beam elementary design faults	Non-uniform beam span and cross-section	
District:]	İskele		Structural configuration	ntal stı	am ele design	Absence of vertical support at beams intersection	
Area:	Turna	lar (Gerani)		onfigı	lorizoi	Be	Broken axis beams and frames	
C.	No street nat	nes were found	in	al c	H	Slab	Over-stretched one-way slab	
Street name:		e village		ructur		elementary design faults	loaded cantilevered slabs	
Latitude:		1'37.63"N	_	St		Pound	ling and separation problem	
Longitude:		5'19.41"E				on	Weak storey	
	<14 Date (if available): years				n n	Irregularity in elevation	Soft storey	
Structure age:	Between 14 au	nd 43 years			Vertical structural configuration	Irre in e	Discontinuity of columns or	
	(1974-2003) >43 years (Be	fore 1074)			. str gura	Vertical	shear walls Broken axis columns	
	245 years (De	Apartment	\square		ical nfiș	structural		
	Residential	House			/ert co	element	Irregular column and/or	
Building type:	Residential	Dormitory			~	elementary design fault	shear-wall plan configuration	
	Public						Short column	
	Commercial						tructural Defects	
D III AA	Under Constru	iction		Waterproofing defects, water leakage and seepage				
Building status:	Occupied Abandoned			Defected wooden door				
Doinfo	rced Concrete	Dofoets		Condensation			Rising damp	
Kenno		Defects			ampness	Rain penetration		
Dryin	g shrinkage crac	ks		Surface defects	dam	Leaking	pipes, spills and other moisture sources	
Compains of	Corrosion-in	duced cracking		defe	Surfac	ce cracks	crazing	
Corrosion of metals embedded		duced spalling		ce (on wal	l finishes	Map/pattern cracking	
in concrete		embedment of		ırfa			Efflorescence	
		tals (handrails)		S			Paint peeling	
		inforcing steel					Mouldiness	
Construction	1	ement	\vdash			Wall finishe	es workmanship problem	
defects (faulty		moval of forms l joints	┝─┦	Non	-structural		Staining	
workmanship):		egation	\square		racks		Joint cracks	
designer, detailer,		combing						
and contractor	Improper grades of slab		╞	o :				
		faces		Othe	er notes (if available):	<u>-</u>	
		o column shear						
Cracks in RC due to load effects		shear) cracks	Щ					
(structural cracks)	Cantilevered	member cracks						
(substatut erucits)	Settlem	ent cracks						

	Case	e Sti	udy	#33 (İ	8)			
	Profile		Seismic Design Faults					
				Week column-strong beam				
						Torsional Irregularity		
					'n,	(Torsion eccentricity)		
		_			n	Floor discontinuity		
				Horizontal structural configuration	Irregularity in plan	Projections in plan		
		4		C01	y	Non-continuous beams		
				ctural	nentar aults	Non-uniform beam span and cross-section		
District:	İskele		ation	al stru	Beam elementary design faults	Absence of vertical support at beams intersection		
Area:	Yeni İskele (Trikomo)		Structural configuration	rizont	Bear	Broken axis beams and frames		
			COI	Но	Slab	Over-stretched one-way slab		
Street name:	Onay Fadıl Demirciler Cd		ıral		elementary	Poorly supported or heavily		
			uctı	-	design faults	loaded cantilevered slabs		
Latitude:	35°16'59.57"N		Str		Poundii	ng and separation problem		
Longitude:	33°53'36.26"E	_			on	Weak storey		
	<14 Date (if available): years		In	Irregularity in elevation	Soft storey			
Structure age:	Between 14 and 43 years			Vertical structural configuration	lrre in e	Discontinuity of columns or		
	(1974-2003)			strı sura	Vertical	shear walls		
	>43 years (Before 1974)			cal nfig	structural	Broken axis columns		
	Apartment Residential House			erti coi	element	Irregular column and/or		
Duilding type	Residential House Dormitory			>	elementary	shear-wall plan configuration		
Building type:	Public			-	design fault	Short column		
	Commercial				Non Str	uctural Defects		
	Under Construction			Waterpro		water leakage and seepage		
Building status:	Occupied			waterpre		wooden door		
D uniting status	Abandoned				Derected	Condensation		
Reinfo	rced Concrete Defects			ess		Rising damp		
Dryin	g shrinkage cracks		ts	dampness	Leaking pi	Rain penetration pes, spills and other moisture		
	Corrosion-induced cracking		efec	Surfac	e cracks	crazing		
Corrosion of	Corrosion-induced spalling	+	Surface defect		l finishes	Map/pattern cracking		
metals embedded	Cracks due to embedment of		fac	011 // 41		florescence		
in concrete	dissimilar metals (handrails)		Sur			aint peeling		
	Improper reinforcing steel	Π				Aouldiness		
Construction	placement				Wall finishes	workmanship problem		
defects (faulty	Premature removal of forms					Staining		
workmanship):	Cold joints	Ш		-structural		Joint cracks		
designer, detailer,	Segregation		(eracks				
and contractor	Honeycombing							
	Improper grades of slab surfaces		Othe	er notes (if available):			
	Slab/beam-to column shear	+						
Cracks in RC due	(punching shear) cracks							
to load effects	Cantilevered member cracks	+						
(structural cracks)	Settlement cracks	+						
	Settlement cracks							

	Ca	se St	tudy	#34 (İ	9)	
	Profile					Design Faults
					Week colur	nn-strong beam
						Torsional Irregularity
					∕ in	(Torsion eccentricity)
					urity In	Floor discontinuity
					Irregularity in plan	Projections in plan
	THE PARTY OF LOW			cont		Non-continuous beams
			_	ructural c	Beam elementary design faults	Non-uniform beam span and cross-section
District:	İskele		iration	Horizontal structural configuration	am el desigr	Absence of vertical support at beams intersection
Area:	Yeni İskele (Trikomo)		Structural configuration		Be	Broken axis beams and frames
	Şht. Üstteğmen Mustafa C	rhan	al ci	Н	Slab	Over-stretched one-way slab
Street name:	Cd		tura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs
Latitude:	35°17'1.02"N		truc		-	ng and separation problem
Longitude:	33°53'23.63"E		S			Weak storey
Longitude.	<14 Date (if available):		ıl	Irregularity in elevation	Soft storey
Structure age:	years 2003 Between 14 and 43 years			Vertical structural configuration	Irregu in ele	Discontinuity of columns or
	(1974-2003) >43 years (Before 1974)		-	l str gur	Vertical	shear walls Broken axis columns
	Apartment			tica	structural	
	Residential House			Vert cc	element	Irregular column and/or
Building type:	Dormitory			-	elementary design fault	shear-wall plan configuration
	Public					Short column
	Commercial					uctural Defects
	Under Construction			Waterpro		water leakage and seepage
Building status:	Occupied				Defected	wooden door
Deinfe	Abandoned			SS	Condensation Dising down	
Kellilo	rced Concrete Defects			pnes		Rising damp Rain penetration
Dryin	g shrinkage cracks		cts	dampness	Leaking pi	pes, spills and other moisture sources
	Corrosion-induced cracking		Surface defects	Surfac	ce cracks	crazing
Corrosion of metals embedded	Corrosion-induced spalling		ce c	on wal	ll finishes	Map/pattern cracking
in concrete	Cracks due to embedment of		ırfa			florescence
	dissimilar metals (handrails)		Sc			aint peeling
	Improper reinforcing steel					Aouldiness
Construction	placement		Wall finishes workmanship problem			
defects (faulty	Premature removal of forms Cold joints		Non	-structural		Staining
workmanship):	Segregation		-	cracks	L	Joint cracks
designer, detailer,	Honeycombing					
and contractor	Improper grades of slab		01		(:c '1 1 1 \	
	surfaces		Oth	er notes (if available):	
Creater in D.C. 1	Slab/beam-to column shear					
Cracks in RC due to load effects	(punching shear) cracks		-			
(structural cracks)	al cracks)					
	Settlement cracks					

		Case	Stu	dy i	#35(İ1	0)	
	Profile						ic Design Faults
			_			Week colu	Imn-strong beam
	h M h					_	Torsional Irregularity
		and the second s	-			y ir	(Torsion eccentricity)
and the second s		in the second second second second second second second second second second second second second second second				ularit plan	Floor discontinuity
					Horizontal structural configuration	Irregularity in plan	Projections in plan
					con	~	Non-continuous beams
					ructural	Beam elementary design faults	Non-uniform beam span and cross-section
District:	j	skele		Iration	ntal st	am el desigr	Absence of vertical support at beams intersection
Area:	Yeni İsk	ele (Trikomo)		Structural configuration	lorizoi	Be	Broken axis beams and frames
	Şht. Üstte	ğmen Mustafa		al co	Η	Slab	Over-stretched one-way slab
Street name:		han Cd		stur		elementary design faults	Poorly supported or heavily loaded cantilevered slabs
Latitude:	35°1	7'2.09"N	-	truc	-	-	ing and separation problem
Longitude:		3'25.90"E		<i>S</i> ₁			Weak storey
		te (if available):		al	Irregularity in elevation	Soft storey	
Structure age:	Between 14 ar (1974-2003)	nd 43 years			Vertical structural configuration	Irreg in ele	Discontinuity of columns or shear walls
	>43 years (Be	fore 1974)			ıl st ïgu	Vertical	Broken axis columns
	· · ·	Apartment			onf	structural	
	Residential	House			Vei c	element elementary	Irregular column and/or
Building type:		Dormitory		,	design fault	shear-wall plan configuration	
	Public						Short column
-	Commercial				W		ructural Defects
Duilding status:	Under Constru Occupied	lction			waterpro		s, water leakage and seepage
Building status:	Abandoned					Defecte	Condensation
Reinfo	rced Concrete	Defects			SS		Rising damp
		Serectis			anqı		Rain penetration
Dryin	g shrinkage crac	ks		Surface defects	dampness	Leaking p	vipes, spills and other moisture sources
Corrosion of		duced cracking		defe		e cracks	crazing
metals embedded		duced spalling		lce	on wal	l finishes	Map/pattern cracking
in concrete		embedment of		urfa			Efflorescence
		tals (handrails)		Ñ			Paint peeling
		inforcing steel ement					Mouldiness
Construction	1	moval of forms	Wall finishes workmanship problem				Staining
defects (faulty		joints	ו	Non-	structural		
workmanship):		egation			racks		Joint cracks
designer, detailer, and contractor	Honey	combing					
		rades of slab		Othe	er notes (if available):	
		faces	`	Juic	A HUIES (.	<u>11 availaule).</u>	
Cracks in RC due		o column shear					
to load effects		shear) cracks					
(structural cracks)		member cracks					
	Settlem	ent cracks					

		Case	Stu	dy i	#36 (İ1	1)	
	Profile						ic Design Faults
						Week colu	umn-strong beam
		1 AN					Torsional Irregularity
						, in	(Torsion eccentricity)
						n ty	Floor discontinuity
					Horizontal structural configuration	Irregularity in plan	Projections in plan
26 68 N 18 1	1 10		r _a		puo		Non-continuous beams
				u	ructural c	Beam elementary design faults	Non-uniform beam span and cross-section
District:	i	skele		Iration	ntal st	am el design	Absence of vertical support at beams intersection
Area:	Yeni İsk	ele (Trikomo)		Structural configuration	Horizor	Be	Broken axis beams and frames
	Sht. Üstteğm	en Mustafa Orh	an [al c		Slab	Over-stretched one-way slab
Street name:		Cd		uctura		elementary design faults	
Latitude:		7'0.28"N		Str		Pound	ling and separation problem
Longitude:		3'26.69"E				y n	Weak storey
	<14 Da years	te (if available):			ral	Irregularity in elevation	Soft storey
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration	Irreg in el	Discontinuity of columns or shear walls
	>43 years (Bef	fore 1974)			al s ïgu	Vertical	Broken axis columns
		Apartment			rtic	structural element	Impoular column and/or
Building type:	Residential	House Dormitory			Ve	elementary design fault	Irregular column and/or shear-wall plan configuration
	Public					0	Short column
	Commercial						tructural Defects
D 1111	Under Constru	ction			Waterpro	s, water leakage and seepage	
Building status:	Occupied Abandoned					Defecte	d wooden door
Dointo	rced Concrete l	Dofoota			ss		Condensation Rising damp
Kenno	Teeu Concrete I	Defects			pne		Rain penetration
Dryin	g shrinkage crac	ks		cts	dampness	Leaking p	pipes, spills and other moisture sources
	Corrosion-in	duced cracking	\square	Surface defects	Surfac	ce cracks	crazing
Corrosion of metals embedded		duced spalling		ce c		l finishes	Map/pattern cracking
in concrete		embedment of		rfa		I	Efflorescence
in concrete		tals (handrails)		Su			Paint peeling
		nforcing steel					Mouldiness
Construction		ement				Wall finishe	es workmanship problem
defects (faulty		moval of forms				_	Staining
workmanship):		joints			structural racks		Joint cracks
designer, detailer,	-	egation combing		C	Tacks		
and contractor		rades of slab					
		faces		Othe	er notes (<u>if available):</u>	
	Slab/beam-to	o column shear					
Cracks in RC due to load effects		shear) cracks					
	structural cracks)						
(structural cracks)	Settleme	ent cracks					

		Case	Stud	ly ‡	#37 (İ 1	(2)		
	Profile						c Design Faults	
						Week colu	mn-strong beam	
	A in						Torsional Irregularity	
11		F				y in	(Torsion eccentricity)	
						arit. an	Floor discontinuity	
					figuration	Irregularity in plan	Projections in plan	
UBB TILLING					puos	~	Non-continuous beams	
					ructural e	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	j	İskele		ration	Horizontal structural configuration	am elc desigr	Absence of vertical support at beams intersection	
Area:	Yeni İsk	ele (Trikomo)		Structural configuration		Be	Broken axis beams and frames	
	Sht Üstte	eğmen Mustafa		ul co	H	Slab	Over-stretched one-way slab	
Street name:	Oı	han Cd		uctura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs	
Latitude:		6'59.45"N	_	Str		Pound	ing and separation problem	
Longitude:		3'26.67"E	_			n ty	Weak storey	
	<14 Da years	te (if available): 2003			ral	Irregularity in elevation	Soft storey	
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration	Irre, in el	Discontinuity of columns or shear walls	
	>43 years (Be	fore 1974)			al s figu	Vertical	Broken axis columns	
		Apartment	_		rtic	structural element	Irregular column and/or	
	Residential	House			Ve	elementary	shear-wall plan configuration	
Building type:		Dormitory				design fault		
	Public						Short column	
	Commercial Under Constru	ation		1	ructural Defects			
Building status:	Occupied			Waterproofing defects, water leakage and seepa Defected wooden door				
Dunding status.	Abandoned					Defected	Condensation	
Reinfo	rced Concrete	Defects					Rising damp	
					dampness		Rain penetration	
Dryin	g shrinkage crac	ks		Surface defects	dar	Leaking p	ipes, spills and other moisture sources	
Corrosion of		duced cracking		def		e cracks	crazing	
metals embedded		duced spalling		ace	on wal	l finishes	Map/pattern cracking	
in concrete		embedment of		urf			Efflorescence	
		tals (handrails)		Ñ			Paint peeling	
		inforcing steel ement					Mouldiness s workmanship problem	
Construction		moval of forms	-	-		wan minsie	Staining	
defects (faulty		l joints	۲	Non-	structural			
workmanship):		egation	-		racks		Joint cracks	
designer, detailer, and contractor		combing						
		grades of slab			r notes (if available):		
		faces	<u>`</u>	Jule	A HOLES (<u>n avanaule):</u>		
Cracks in RC due		column shear						
to load effects		shear) cracks						
(structural cracks)		member cracks						
,	Settlem	ent cracks						

		Case	Stu	dy i	#38 (İ 1	(3)	
	Profile					Seism	ic Design Faults
1			3				umn-strong beam
	ra		*				Torsional Irregularity
		Concession of the local division of the loca	r ,			E	(Torsion eccentricity)
			19.95			nity n	Floor discontinuity
					Horizontal structural configuration	Irregularity in plan	Projections in plan
	Bassassel	Land Filters			con	>	Non-continuous beams
					uctural	Beam elementary design faults	Non-uniform beam span and cross-section
District:	İ	skele		ration	ıtal str	am ele lesign	Absence of vertical support at beams intersection
Area:	Yeni İske	ele (Trikomo)		onfigu	orizon	Be	Broken axis beams and frames
		~ .		al co	Ή	Slab	Over-stretched one-way slab
Street name:		mmuz Cd		Structural configuration	-	elementary design faults	
Latitude:		7'7.94"N	_	Str		Pounc	ling and separation problem
Longitude:		3'52.27"E	_			ity on	Weak storey
	years	te (if available):			ıral n	Irregularity In elevation	Soft storey
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration	- ·=	Discontinuity of columns or shear walls
	>43 years (Bef	ore 1974)			al s figu	Vertical	Broken axis columns
		Apartment			ertic con	structural element	Irregular column and/or
Building type:	Residential	House Dormitory			Ve	elementary design fault	shear-wall plan configuration
0.11	Public						Short column
	Commercial						tructural Defects
	Under Constru	ction			s, water leakage and seepage		
Building status:	Occupied					Defecte	d wooden door
Doinfo	Abandoned rced Concrete I	Dafaata			SS		Condensation Rising damp
Kellilo		Derects			pne:		Rain penetration
Dryin	g shrinkage crac	ks		ects	dampness	Leaking	pipes, spills and other moisture sources
Compaign of	Corrosion-inc	luced cracking		Surface defects		ce cracks	crazing
Corrosion of metals embedded		duced spalling		ice (on wal	l finishes	Map/pattern cracking
in concrete		embedment of		urfa			Efflorescence
		tals (handrails) nforcing steel	\mid	ŝ			Paint peeling Mouldiness
		ement				Wall finish	es workmanship problem
Construction		noval of forms	\vdash			•• an minsik	Staining
defects (faulty		joints		Non-	-structural		
workmanship): designer, detailer,	Segre	gation		cracks			Joint cracks
and contractor		combing					
	surf	rades of slab		Othe	er notes (if available):	
Cracks in RC due		column shear shear) cracks					
to load effects		nember cracks					
(structural cracks)		ent cracks					

	Case	Stu	dy a	# 39 (İ1	4)				
	Profile					e Design Faults			
		-		Week column-strong beam					
A						Torsional Irregularity			
- All al		8			k in	(Torsion eccentricity)			
1					urity un	Floor discontinuity			
				Horizontal structural configuration	Irregularity in plan	Projections in plan			
				con	>	Non-continuous beams			
	and and the			uctural	Beam elementary design faults	Non-uniform beam span and cross-section			
District:	İskele		Iration	ıtal str	am elementa design faults	Absence of vertical support at beams intersection			
Area:	Yeni İskele (Trikomo)		Structural configuration	orizor	Be	Broken axis beams and frames			
G			al co	Н	Slab	Over-stretched one-way slab			
Street name:	20 Temmuz Cd		uctura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs			
Latitude:	35°17'7.84"N	_	Str		Poundi	ng and separation problem			
Longitude:	33°53'50.53"E	_			on	Weak storey			
	<14 Date (if available): years			ıral n	Irregularity In elevation	Soft storey			
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration	Irre in e	Discontinuity of columns or shear walls			
	>43 years (Before 1974)			al s figu	Vertical	Broken axis columns			
	Apartment			rtic	structural element				
	Residential House	Jacintia		Vei c	elementary	Irregular column and/or shear-wall plan configuration			
Building type:	Dormitory			design fault	shear-wan plan configuration				
	Public					Short column			
	Commercial					ructural Defects			
D 1111	Under Construction		Waterproofing defects, water leakage and seepag						
Building status:	Occupied				Defected	wooden door			
Dainfa	Abandoned rced Concrete Defects			ss	Condensation				
Kellilo	rceu Concrete Delecis			pne		Rising damp Rain penetration			
Dryin	g shrinkage cracks		cts	dampness	Leaking pi	ipes, spills and other moisture sources			
	Corrosion-induced cracking		Surface defects	Surfac	e cracks	crazing			
Corrosion of metals embedded	Corrosion-induced spalling		ce (l finishes	Map/pattern cracking			
in concrete	Cracks due to embedment of		urfa			fflorescence			
	dissimilar metals (handrails)		Su			aint peeling			
	Improper reinforcing steel					Mouldiness			
Construction	placement	+			Wall finishes	workmanship problem			
defects (faulty	Premature removal of forms	+				Staining			
workmanship):	Cold joints	+		-structural cracks		Joint cracks			
designer, detailer,	Segregation Honeycombing	+ +	(TACKS					
and contractor	Improper grades of slab	+							
	surfaces		Othe	er notes (if available):				
	Slab/beam-to column shear	+							
Cracks in RC due	(punching shear) cracks								
to load effects	Cantilevered member cracks	\square							
(structural cracks)	Settlement cracks								

	Case	Stu	dy a	#40 (İ 1	15)	
	Profile					c Design Faults
					Week colu	mn-strong beam
	Andrea a					Torsional Irregularity
-]					Е.	(Torsion eccentricity)
					n rity	Floor discontinuity
				Horizontal structural configuration	Irregularity in plan	Projections in plan
				C01	y	Non-continuous beams
Construction of the second				ctural	Beam elementary design faults	Non-uniform beam span and cross-section
District:	İskele		uc	stru	eler gn f	Absence of vertical support
District.	ISKele	_	rati	tal	m e	at beams intersection
Area:	Yeni İskele (Trikomo)		Ing	con	3ea d	Broken axis beams and
nicu.		_	nfi	oriz		frames
G			l cc	Η	Slab	Over-stretched one-way slab
Street name:	20 Temmuz Cd		ura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs
Latitude:	35°17'8.47"N	-	Structural configuration			ng and separation problem
Longitude:	33°53'46.81"E	-	Sti		Touliu	Weak storey
Longitude:					ity ion	weak storey
	years			Vertical structural configuration	Irregularity in elevation	Soft storey
Structure age:	Between 14 and 43 years			ucti atio	Irre in e	Discontinuity of columns or
	(1974-2003) >43 years (Before 1974)			str gura	Vertical	shear walls Broken axis columns
	Apartment			ertical structur configuration	structural	Broken axis columns
	Residential House			erti co	element	Irregular column and/or
Building type:	Dormitory			>	elementary	shear-wall plan configuration
Dunung type.	Public			design fault	Short column	
	Commercial				Non-Str	suctural Defects
	Under Construction			Waternro		, water leakage and seepage
Building status:	Occupied			(atorpro		wooden door
0	Abandoned					Condensation
Reinfo	rced Concrete Defects			ess		Rising damp
				dampness		Rain penetration
Dryin	g shrinkage cracks		ects	dar	Leaking p	ipes, spills and other moisture sources
Corrosion of	Corrosion-induced cracking		Surface defect		ce cracks	crazing
metals embedded	Corrosion-induced spalling		JCe	on wal	l finishes	Map/pattern cracking
in concrete	Cracks due to embedment of		urfî			fflorescence
	dissimilar metals (handrails)	_	S			aint peeling
	Improper reinforcing steel					Mouldiness
Construction	placement Premature removal of forms	\vdash			wall finishes	workmanship problem
defects (faulty	Cold joints	Staining				
workmanship):	Segregation	Non-structural Joint cracks				Joint cracks
designer, detailer,	Honeycombing					
and contractor	Improper grades of slab		<i>c</i> .			
	surfaces		Othe	er notes (<u>if available):</u>	
Cracks in RC due	Slab/beam-to column shear (punching shear) cracks					
to load effects	Cantilevered member cracks	\vdash				
(structural cracks)		\vdash				
	Settlement cracks					

		Case	Stuc	dy #	#41 (İ 1	l6)			
	Profile						ic Design Faults		
*						Week col	umn-strong beam		
		-					Torsional Irregularity		
	-					, in	(Torsion eccentricity)		
					nity n	Floor discontinuity			
					Horizontal structural configuration	Irregularity in plan	Projections in plan		
					con		Non-continuous beams		
					uctural o	Beam elementary design faults	Non-uniform beam span and cross-section		
District:]	skele		uration	ıtal str	am ele lesign	Absence of vertical support at beams intersection		
Area:	Mehmet	çik (Galateia)		Structural configuration	orizoi	Be	Broken axis beams and frames		
	NT	0		al c	Н	Slab	Over-stretched one-way slab		
Street name:	No street na	ames were found	1	actura		elementary design faults	fouded culture of the blues		
Latitude:	35°2	5'17.33"N		Stri		Pound	ling and separation problem		
Longitude:	34° -	4'17.25"E				y n	Weak storey		
	<14 Da years	te (if available):			ral	Irregularity in elevation	Soft storey		
Structure age:	Between 14 at (1974-2003)	nd 43 years			Vertical structural configuration	Irreg in el	Discontinuity of columns or shear walls		
	>43 years (Be	fore 1974)			al sı ïgu	Vertical	Broken axis columns		
		Apartment			tica	structural	T 1 1 1		
	Residential	House			Ve c	element elementary	Irregular column and/or shear-wall plan configuration		
Building type:		Dormitory				design fault			
	Public Commercial		- 1			No. C	Short column		
	Under Constru	uction			Waterpr		tructural Defects s, water leakage and seepage		
Building status:	Occupied	letion			waterpro		ed wooden door		
Dunung status.	Abandoned					Defecte	Condensation		
Reinfo	rced Concrete	Defects			SSS		Rising damp		
					dampness		Rain penetration		
Dryin	g shrinkage crac	ks		cts	dan	Leaking	pipes, spills and other moisture sources		
	Corrosion-in	duced cracking		Surface defects	Surfac	ce cracks	crazing		
Corrosion of metals embedded	Corrosion-in	duced spalling		ce (on wal	l finishes	Map/pattern cracking		
in concrete		embedment of		urfa			Efflorescence		
		tals (handrails)		SL			Paint peeling		
		inforcing steel				XX7 11 (** * * *	Mouldiness		
Construction	1	ement	Wall finishes workmanship problem						
defects (faulty		moval of forms	Non-structural				Staining		
workmanship):		egation	Joint cracks			Joint cracks			
designer, detailer,		combing							
and contractor		rades of slab		0.1					
	sur	faces	<u> </u>	Othe	er notes (if available):	<u>.</u>		
		o column shear]						
Cracks in RC due to load effects		shear) cracks							
(structural cracks)	Cantilevered	member cracks							
(ou actural crucks)	Settlem	ent cracks							

Building type: Construction Puble Add 4 12/70°E Puble Stable of Puble Stable of Puble Week column-strong beam Annonation Processorial Building type: Iskelee			Case	Stu	dy 4	#42 (İ 1	17)	
We ker colume strong beamDistrict:IskeleIskeleDistrict:IskeleIskeleArea:Mehmetçik (Galateia)IskeleArea:Mehmetçik (Galateia)IskeleArea:Mehmetçik (Galateia)IskeleArea:Mehmetçik (Galateia)IskeleArea:Mehmetçik (Galateia)IskeleArea:Mehmetçik (Galateia)IskeleArea:Mehmetçik (Galateia)IskeleArea:Mehmetçik (Galateia)IskeleArea:Mehmetçik (Galateia)IskeleArea:Mehmetçik (Galateia)IskeleArea:Mehmetçik (Galateia)IskeleArea:Mehmetçik (Galateia)IskeleArea:Mehmetçik (Galateia)IskeleArea:Mehmetçik (Galateia)IskeleArea:Mehmetçik (Galateia)IskeleArea:Mehmetçik (Galateia)IskeleArea:Area:Mehmetçik (Galateia)Area:Area:Mehmetçik (Galateia)Yea:Area:Mehmetçik (Galateia)Yea:Area:Mehmetçik (Galateia)Yea:Area:Mehmetçik (Galateia)Yea:Area:Mehmetçik (Galateia)Yea:Area:Mehmetçik (Galateia)Yea:Area:Mehmetçik (Galateia)Yea:Area:Mehmetçik (Galateia)Yea:Area:Mehmetçik (Galateia)Hora:Area:Mehmetçik (Galateia)Poht:Dec:Mehmetçik (Galateia)Poht:								
District: Iskele Non-continuous beams District: Iskele Non-continuous beams Area: Mehmetçik (Galateia) Non-continuous beams Area: Mehmetçik (Galateia) Non-continuous beams Street name: No street names were found Absence of vertical support at beams and frames Latitude: 35°257.67"N Bith Longinde: 34°412.70"E Public Pounding and separation problem Ayarment Residenial House Sore of continuity Apartment House Building type: Apartment Public Construction Cornosion of metals embedded in correte to preinforcing steel types withinkage cracks Non-structural galage Corrosion of metals embedded in correte to preinforcing steel types withinkage cracks Non-structural galage Construction metals embedded in correte to forme Non-structural placement of designer, detailer, surface cracks Non-structural terming defense Construction metals embedded in correte to forms Non-structural placement of designer, detailer, surface cracks Non-structural terming defense Construction metals embedded in coartet Corrosion-induced cracking placement of designer, detailer, surface cracks Non-structural terming defense Construction defeets (fauly workmanshig) Non-structural pla		Profile						
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District: Iskele Iskele Non-continuous beams No		- La	~					
District:IskeleNon-uniform beam span and cross-sectionArea:Mehmetçik (Galateia)Area:Mehmetçik (Galateia)Street name:No street names were foundLatitude:35°257.67"NLongitude:34°412.76"EVerarVeristreet namesVararVeristreet namesBuilding type:24District:14District:34°412.76"EVerarVeristreet namesVerarStreet namesVerar34°257.67"NLongitude:34°412.76"EVerarVeristreet alabesPoolsStrate fore 1974)VerarPoolsVerarPoolsVerarPoolsVerarPoolsVerarPoolsPublicPoolsPublicPublicPublicPublicDriseCorrosion induced rackingOccupiedOccupiedDryis strikage cracksPoolsCorrosion induced rackingPoolsPublicCorrosion induced rackingCorrosion induced spallingCorrosion induced rackingCorrosion induced spallingPoolsCorrosion induced spallingPoolsCorrosion induced spallingPoolsCorrosion induced spallingPoolsCorrosion induced spallingPoolsCorrosion induced spallingPoolsCorrosion induced spallingPoolsCorrosion induced spallingPoolsCorrosion induced spallingPoolsC	- 11-1-		and the second second				, in	
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Street name: No street names were found Stab Stab Orderstretund offerway shab Latitude: 35°25'7.67"N Poording and separation problem Poording and separation problem Longitude: 34° 4'12.76"E Weak storey Poording and separation problem Structure age: <14							Irregula pla	Projections in plan
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Longitude: 34° 4'12.76°E Structure age: Construction of dects (fauly shinkage cracks in RC duity workmanship): Construction design fault Date (if available): years (1974.2003) Soft storey Discontinuity of columns or shear walls Building type: Apartment House Dormitory Public Short column Short column and/or shear-wall plan configuration Building status: Under Construction Waterproofing defects, water leakage and seepage Short column Corrosion of metals embedded in concrete Corrosion-induced cracking Corrosion-induced cracking Dissimilar metals (handrails) Surface cracks Caracks due to embedment of dissimilar metals (handrails) Construction defects (faulty workmanship): Improper grades of slab surfaces Non-structural cracks Catilevered member cracks Cracks in RC due to load effects Slab/bean-to column shear (punching shear) cracks Non-structural cracks Joint cracks			_		al c	Н		
Longitude: 34° 4'12.76°E Structure age: Construction of dects (fauly shinkage cracks in RC duity workmanship): Construction design fault Date (if available): years (1974.2003) Soft storey Discontinuity of columns or shear walls Building type: Apartment House Dormitory Public Short column Short column and/or shear-wall plan configuration Building status: Under Construction Waterproofing defects, water leakage and seepage Short column Corrosion of metals embedded in concrete Corrosion-induced cracking Corrosion-induced cracking Dissimilar metals (handrails) Surface cracks Caracks due to embedment of dissimilar metals (handrails) Construction defects (faulty workmanship): Improper grades of slab surfaces Non-structural cracks Catilevered member cracks Cracks in RC due to load effects Slab/bean-to column shear (punching shear) cracks Non-structural cracks Joint cracks	Street name:	No street na	ames were found	1	actura	_		
Structure age: <14 years	Latitude:	35°2	25'7.67"N		Stri		Poundi	ng and separation problem
$ \begin{array}{ $	Longitude:	34° -	4'12.76"E				Уп	Weak storey
$ \begin{array}{ $			ate (if available):			al	ularit	Soft storey
Building type: Dormitory Image: Public Shear-Wail plan configuration Public Commercial Short column Short column Building status: Onccupied Vaterproving defects, water leakage and seepage Defected wooden door Building status: Occupied Defected wooden door Environmercial Building status: Occupied Defected wooden door Environmercial Building status: Occupied Environmercial Environmercial Environmercial Drying shrinkage cracks Corrosion-induced cracking Fising damp Environmercial Corrosion of metals embedded in concrete Corrosion-induced spalling Surface cracks Crazing Efflorescence Construction Improper reinforcing steel placement Paint peeling Paint peeling Premature removal of forms Figure staining Vaterprovidiness Vaterprovidiness Segregation Esgregation Cracks in RC due Slab/beam-to colum shear (punching shear) cracks Non-structural Inproper grades of slab surfaces Slab/beam-to colum shear (punching shear) cracks Cantilewered member cracks	Structure age:	Between 14 and 43 years				ructur	Irreg in eld	
Building type: Dormitory Image: Public Shear-Wail plan configuration Public Commercial Short column Short column Building status: Onccupied Vaterproving defects, water leakage and seepage Defected wooden door Building status: Occupied Defected wooden door Environmercial Building status: Occupied Defected wooden door Environmercial Building status: Occupied Environmercial Environmercial Environmercial Drying shrinkage cracks Corrosion-induced cracking Fising damp Environmercial Corrosion of metals embedded in concrete Corrosion-induced spalling Surface cracks Crazing Efflorescence Construction Improper reinforcing steel placement Paint peeling Paint peeling Premature removal of forms Figure staining Vaterprovidiness Vaterprovidiness Segregation Esgregation Cracks in RC due Slab/beam-to colum shear (punching shear) cracks Non-structural Inproper grades of slab surfaces Slab/beam-to colum shear (punching shear) cracks Cantilewered member cracks			fore 1974)			al st ïgu	Vertical	
Building type: Dormitory Image: Public Shear-Wail plan configuration Public Commercial Short column Short column Building status: Onccupied Vaterproving defects, water leakage and seepage Defected wooden door Building status: Occupied Defected wooden door Environmercial Building status: Occupied Defected wooden door Environmercial Building status: Occupied Environmercial Environmercial Environmercial Drying shrinkage cracks Corrosion-induced cracking Fising damp Environmercial Corrosion of metals embedded in concrete Corrosion-induced spalling Surface cracks Crazing Efflorescence Construction Improper reinforcing steel placement Paint peeling Paint peeling Premature removal of forms Figure staining Vaterprovidiness Vaterprovidiness Segregation Esgregation Cracks in RC due Slab/beam-to colum shear (punching shear) cracks Non-structural Inproper grades of slab surfaces Slab/beam-to colum shear (punching shear) cracks Cantilewered member cracks		-				ntica		.
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Commercial Non-Structural Defects Building status: Under Construction Waterproofing defects, water leakage and seepage Occupied Defected wooden door Abandoned Abandoned Condensation Rising damp Building status: Corrocter Defects Rising damp Image: Corrosion-induced cracking Drying shrinkage cracks Corrosion-induced cracking Surface cracks crazing Image: Corrosion-induced spalling Corrosion of metals embedded in concrete Corrosion-induced spalling Surface cracks Cracks due to embedment of dissimilar metals (handrails) Surface cracks Crazing Image: Corrosion spalling Surface cracks Crazing Image: Corrosion spalling Image: Corrosion spalling Surface cracks Crazing Image: Corrosion spalling Image: Corrosion spalling Image: Corrosion spalling Image: Corrosion spalling Image: Corrosion spalling Image: Corrosion spalling Image: Corrosion spalling Image: Corrosion spalling Image: Corrosion spalling Image: Corrosion spalling Image: Corrosion spalling Image: Corrosion spalling Image: Corrosion spalling Image: Corrosion spalling Image: Corrosion spalling Image: Corrosion spalling Image: Corrosion spalling Image: Corrosion spalling <t< td=""><td>Building type:</td><td></td><td>Dormitory</td><td></td><td></td><td></td><td>•</td><td>shear-wan plan configuration</td></t<>	Building type:		Dormitory				•	shear-wan plan configuration
Building status: Under Construction Waterproofing defects, water leakage and seepage Occupied Defected wooden door Abandoned Reinforced Concrete Defects Drying shrinkage cracks Rising damp Corrosion of metals embedded in concrete Corrosion-induced cracking Rain penetration Corrosion-induced spalling Caracks due to embedment of dissimilar metals (handrails) Surface cracks crazing Improper reinforcing steel placement Paint peeling Mouldiness Paint peeling Vorkmanship): designer, detailer, and contractor Segregation Staining Other notes (if available): Cracks in RC due to load effects (faulty to load effects) Slab/beam-to column shear (punching shear) cracks Other notes (if available):								
Building status: Occupied Defected wooden door Abandoned Abandoned Contaction Condensation Reinforced Concrete Defects Rising damp Rain penetration Rain penetration Drying shrinkage cracks Corrosion-induced cracking Surface cracks crazing Corrosion of metals embedded in concrete Corrosion-induced spalling Surface cracks crazing Construction defects (faulty workmanship): Improper reinforcing steel placement Paint peeling Mouldiness Vortaces due to embedment of defects (faulty workmanship): Segregation Staining Valid finishes workmanship problem Construction defects (faulty workmanship): Segregation Non-structural cracks Joint cracks Cracks in RC due to load effects (faulty conching shear) cracks Cantilevered member cracks Other notes (if available):								
Abandoned Condensation Reinforced Concrete Defects Rising damp Drying shrinkage cracks Rain penetration Corrosion of metals embedded in concrete Corrosion-induced spalling Surface cracks Cracks due to embedment of dissimilar metals (handrails) Surface cracks Cracks Cracks due to embedment of placement Map/pattern cracking			uction					
Reinforced Concrete Defects Rising damp Rain penetration Drying shrinkage cracks Improve previous of metals embedded in concrete Corrosion-induced cracking Surface cracks Cracks due to embedment of dissimilar metals (handrails) Surface cracks Cracks Cracks due to embedment of dissimilar metals (handrails) Efflorescence Improper reinforcing steel placement Mouldiness Mouldiness Improper reinforcing steel placement Mouldiness Improper grades of slab surfaces Improper grades of slab surfaces Slab/beam-to column shear (punching shear) cracks Other notes (if available): Other notes (if available):	Building status:						Defected	
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesSurface cracks Map/pattern crackingMap/patternConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementMon-structural cracks of slab surfacesNon-structural cracksJoint cracksImproperCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksNon-structural cracksJoint cracksImproperCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksOther notes (if available):ImproperCracks in RC due to load effects (structural cracks)Slab/beam-to cracksOther notes (if available):Improper	Datate		D - f 4			s		
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Construction Improper reinforcing steel Mouldiness Premature removal of forms Wall finishes workmanship problem Premature removal of forms Staining Cold joints Non-structural Construction Segregation Gesigner, detailer, Honeycombing Improper grades of slab surfaces Slab/beam-to column shear Other notes (if available): Cracks in RC due Cantilevered member cracks (structural cracks) Cantilevered member cracks	Dryin	g shrinkage crac	eks		cts	damj	Leaking p	ipes, spills and other moisture
Construction Improper reinforcing steel Mouldiness Premature removal of forms Wall finishes workmanship problem Premature removal of forms Staining Cold joints Non-structural Construction Segregation Gesigner, detailer, Honeycombing Improper grades of slab surfaces Slab/beam-to column shear Other notes (if available): Cracks in RC due Cantilevered member cracks (structural cracks) Cantilevered member cracks		Corrosion-in	duced cracking		efec	Surfac	e cracks	
Construction Improper reinforcing steel Mouldiness Premature removal of forms Wall finishes workmanship problem Premature removal of forms Staining Cold joints Non-structural Construction Segregation Gesigner, detailer, Honeycombing Improper grades of slab surfaces Slab/beam-to column shear Other notes (if available): Cracks in RC due Cantilevered member cracks (structural cracks) Cantilevered member cracks			-		e d			Ŭ
Construction Improper reinforcing steel Mouldiness Premature removal of forms Wall finishes workmanship problem Premature removal of forms Staining Cold joints Non-structural Construction Segregation Gesigner, detailer, Honeycombing Improper grades of slab surfaces Slab/beam-to column shear Other notes (if available): Cracks in RC due Cantilevered member cracks (structural cracks) Cantilevered member cracks					fac			
Improper reinforcing steel Mouldiness placement Wall finishes workmanship problem Premature removal of forms Staining Order of the segregation Non-structural Constructor Segregation Honeycombing Improper grades of slab Surfaces Slab/beam-to column shear (punching shear) cracks Other notes (if available):	in concrete				Sui			
Construction Premature removal of forms Staining defects (faulty Cold joints Non-structural Joint cracks workmanship): designer, detailer, Honeycombing Joint cracks and contractor Improper grades of slab surfaces Other notes (if available): Cracks in RC due Slab/beam-to column shear Other notes (if available): (punching shear) cracks Cantilevered member cracks Other notes (if available):		Improper re	inforcing steel		ľ			
defects (faulty workmanship): Premature removal of forms Staining designer, detailer, and contractor Segregation Improper grades of slab surfaces Joint cracks Stab/beam-to column shear to load effects (structural cracks) Slab/beam-to column shear Other notes (if available):	Construction	plac	ement				Wall finishes	
workmanship): Cold joints Non-structural designer, detailer, Segregation cracks and contractor Honeycombing Improper grades of slab surfaces Other notes (if available): Cracks in RC due (punching shear) cracks Other notes (if available): (structural cracks) Cantilevered member cracks					Staining			
designer, detailer, and contractor Segregation Clacks Honeycombing Improper grades of slab surfaces Other notes (if available): Cracks in RC due to load effects (structural cracks) Slab/beam-to column shear (punching shear) cracks Other notes (if available):	· · ·			\square				Joint cracks
Improper grades of slab surfaces Other notes (if available): Cracks in RC due to load effects (structural cracks) Slab/beam-to column shear (punching shear) cracks Other notes (if available):					С	TACKS		
Surfaces Other notes (if available): Cracks in RC due to load effects (structural cracks) Slab/beam-to column shear (punching shear) cracks	and contractor			╞				
Cracks in RC due to load effects (structural cracks) Slab/beam-to column shear (punching shear) cracks Cantilevered member cracks					Othe	er notes (if available):	
Cracks in RC due (punching shear) cracks to load effects (structural cracks) Cantilevered member cracks				$\left - \right $				
to load effects (structural cracks) Cantilevered member cracks								
(structural cracks)								
	(structural cracks)			\square				
		~ > • • • • • • • • • • •						

		Case	Stu	dy #	#43 (İ1	(8)		
	Profile	<i>II</i>	1				c Design Faults	
	1		<i>2</i> –			Week column-strong beam		
							Torsional Irregularity	
1V						v in	(Torsion eccentricity)	
			100 A			un u	Floor discontinuity	
					guration	Irregularity in plan	Projections in plan	
1999					onf		Non-continuous beams	
					Horizontal structural configuration	Beam elementary design faults	Non-uniform beam span and cross-section	
District:]	İskele		Iration	ıtal stı	am ele design	Absence of vertical support at beams intersection	
Area:	Mehmet	çik (Galateia)		Structural configuration	lorizoi	Be	Broken axis beams and frames	
		_		al c	Η	Slab	Over-stretched one-way slab	
Street name:	No street na	ames were found	t	tur		elementary design faults	Poorly supported or heavily	
Latitude:	2500	25'5.94"N	-	truc			loaded cantilevered slabs ng and separation problem	
Longitude:		4'12.59"E	-	Ś			Weak storey	
Longitude.		te (if available):				rity tion	· · · · · · · · · · · · · · · · · · ·	
Structure ages	years	· · ·			Vertical structural configuration	Irregularity in elevation	Soft storey	
Structure age:	Between 14 at (1974-2003)	id 45 years			ertical structur configuration	in	Discontinuity of columns or shear walls	
	>43 years (Be	fore 1974)			ıl st igur	Vertical	Broken axis columns	
	```	Apartment			tica	structural		
	Residential	House			Ver c	element elementary	Irregular column and/or	
Building type:		Dormitory			ſ	design fault	shear-wall plan configuration	
	Public						Short column	
	Commercial						ructural Defects	
D 1111	Under Constru	iction			Waterpro		, water leakage and seepage	
Building status:	Occupied Abandoned					Defected	l wooden door	
Doinfo	rced Concrete	Dofoots			SS		Condensation Rising damp	
Kenno		Defects			pne		Rain penetration	
Dryin	g shrinkage crac	ks		cts	dampness	Leaking p	ipes, spills and other moisture sources	
Corrosion of	Corrosion-in	duced cracking		Surface defects	Surfac	ce cracks	crazing	
metals embedded		duced spalling		ce (	on wal	l finishes	Map/pattern cracking	
in concrete		embedment of		ırfa			fflorescence	
		etals (handrails)		St			Paint peeling	
		inforcing steel					Mouldiness	
Construction	1	ement moval of forms	$\left  - \right $	-		wall finishes	s workmanship problem	
defects (faulty		noval of forms		Non	structural		Staining	
workmanship):		egation	$\left  - \right $		racks		Joint cracks	
designer, detailer,		combing						
and contractor		rades of slab		01				
	sur	faces		Othe	er notes (	if available):		
Creaks in DC da		column shear						
Cracks in RC due to load effects		shear) cracks	$\square$					
(structural cracks)		member cracks						
, , , , , , , , , , , , , , , , , , , ,	Settlem	ent cracks						

	Case	Stu	dy i	#44 (İ1	(9)	
	Profile					c Design Faults
					Week colu	mn-strong beam
					_	Torsional Irregularity
					y in	(Torsion eccentricity)
	The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon				arit. an	Floor discontinuity
				Horizontal structural configuration	Irregularity in plan	Projections in plan
				con	~	Non-continuous beams
PAR				ructural e	Beam elementary design faults	Non-uniform beam span and cross-section
District:	İskele		Iration	ıtal stı	am ele design	Absence of vertical support at beams intersection
Area:	Pamuklu (Tavros)		Structural configuration	orizoi	Be	Broken axis beams and frames
<b>C</b> , , , , , , , , , , , , , , , , , , ,		, I	al c	Н	Slab	Over-stretched one-way slab
Street name:	No street names were found	d	uctura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs
Latitude:	35°23'42.23"N	_	Str		Poundi	ng and separation problem
Longitude:	34° 4'38.86"E	_			on ty	Weak storey
	<14 Date (if available): years		ıral	Iral 1	Irregularity in elevation	Soft storey
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration	Irre, in el	Discontinuity of columns or shear walls
	>43 years (Before 1974)			al s figu	Vertical	Broken axis columns
	Apartment			rtic	structural element	Irregular column and/or
	Residential House	aentitai		Ve ,	elementary	shear-wall plan configuration
Building type:	Dormitory				design fault	
	Public					Short column
	Commercial			Weterman		ructural Defects
Building status:	Under Construction Occupied			waterpro		, water leakage and seepage
Dunung status.	Abandoned				Defected	Condensation
Reinfo	rced Concrete Defects			SS		Rising damp
				lampness		Rain penetration
Dryin	g shrinkage cracks		ects	dan	Leaking p	ipes, spills and other moisture sources
Corrosion of	Corrosion-induced cracking		Surface defects	Surfac	ce cracks	crazing
metals embedded	Corrosion-induced spalling	Ш	ice (	on wal	l finishes	Map/pattern cracking
in concrete	Cracks due to embedment of		urfa			fflorescence
	dissimilar metals (handrails)		S			Paint peeling
	Improper reinforcing steel					Mouldiness
Construction	placement Premature removal of forms	Wall finishes workmanship problem				Staining
defects (faulty	Cold joints	Non structural				
workmanship):	Segregation	cracks Joint cracks			Joint cracks	
designer, detailer,	Honeycombing					
and contractor	Improper grades of slab		0.1			
	surfaces		Othe	er notes (	<u>if available):</u>	
Create in DC 4	Slab/beam-to column shear					
Cracks in RC due to load effects	(punching shear) cracks	$\square$				
(structural cracks)	Cantilevered member cracks					
(and a run or works)	Settlement cracks					

		Case	Stu	dy 7	#45 (İ2	20)	
	Profile		- 56				c Design Faults
			-			Week colu	mn-strong beam
1	1						Torsional Irregularity
and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s	The second second					.ii	(Torsion eccentricity)
H	H					rity n	Floor discontinuity
					Horizontal structural configuration	Irregularity in plan	Projections in plan
	NARA LALAN	1250 C 1284 C	1		noc	~	Non-continuous beams
					uctural e	Beam elementary design faults	Non-uniform beam span and cross-section
District:	j	skele		ration	ıtal str	am ele lesign	Absence of vertical support at beams intersection
Area:	Pamuk	lu (Tavros)		Structural configuration	orizon	Be	Broken axis beams and frames
		-	.	al cc	Н	Slab	Over-stretched one-way slab
Street name:		mes were found	1	uctura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs
Latitude:		5°23.709'	_	Str		Poundi	ing and separation problem
Longitude:		4°4.622'	_			on ty	Weak storey
	years	te (if available):			ural 1	Irregularity in elevation	Soft storey
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration		Discontinuity of columns or shear walls
	>43 years (Bet	fore 1974)			al s figu	Vertical	Broken axis columns
		Apartment			rtic	structural element	Irregular column and/or
	Residential	House			Ve	elementary	shear-wall plan configuration
Building type:		Dormitory				design fault	
	Public					N	Short column
	Commercial Under Constru	ation			Watana		ructural Defects s, water leakage and seepage
Building status:	Occupied	cuon			waterpro		d wooden door
Dunung status.	Abandoned					Defected	Condensation
Reinfo	rced Concrete l	Defects			SSS		Rising damp
					lampness		Rain penetration
Dryin	g shrinkage crac	ks		Surface defects	dan	Leaking p	ipes, spills and other moisture sources
Corrosion of		duced cracking		def		ce cracks	crazing
metals embedded		duced spalling	$\square$	lce	on wal	l finishes	Map/pattern cracking
in concrete		embedment of		urfa			Efflorescence
		tals (handrails)		Š			Paint peeling
		nforcing steel ement					Mouldiness
Construction		noval of forms	-			wall linishes	s workmanship problem Staining
defects (faulty		joints		Nor	structural		
workmanship):		gation	[-]		racks		Joint cracks
designer, detailer, and contractor		combing					
and contractor		rades of slab		041	n not (	f avail-1-1-)	
		faces		othe	er notes (	if available):	
Cracks in RC due	(pulleting shear) erdeks						
to load effects		member cracks					
(structural cracks)	(structural cracks) Settlement cracks						

		Case S	Stud	ly ‡	#46 (İ2	(1)		
	Profile						nic Design Faults	
A A				_		Week col	umn-strong beam	
						_	Torsional Irregularity	
	- And And					y in	(Torsion eccentricity)	
						arit;	Floor discontinuity	
			A.		Horizontal structural configuration	Irregularity in plan	Projections in plan	
2	C. Briting	12-AC			fuo		Non-continuous beams	
				-	ructural o	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	İs	skele		Structural configuration	ontal st	eam elo desigr	Absence of vertical support at beams intersection	
Area:	Derince (	(Vathylakas)	;	configu	Iorizo	Be	Broken axis beams and frames	
Street normal	No start to			al c	Ц	Slab	Over-stretched one-way slab	
Street name:	No street nat	mes were found		ctur		elementary design fault		
Latitude:	N 35°28 964	5' (35°28'57.9")		tru	-	-	ding and separation problem	
Longitude:		5' (34°10'56.7")					Weak storey	
Zonghudoi		e (if available):		al		Irregularity in elevation	Soft storey	
Structure age:				Vertical structural configuration	Irreg in ele	Discontinuity of columns or shear walls		
	>43 years (Before 1974)				al st ïgui	Vertical	Broken axis columns	
	Apartment				onf	structural		
	Residential	House			Vei c	element elementary	Irregular column and/or	
Building type:		Dormitory				design fault	Shear wan plan configuration	
	Public						Short column	
	Commercial			Non-Structural Defects				
<b>D</b> 1111	Under Construc	ction		Waterproofing defects, water leakage and seepage				
Building status:	Occupied Abandoned			-		Defecte	ed wooden door Condensation	
Doinfo	rced Concrete D	ofacts			SS	Rising damp		
Kenno	rteu Concrete D				pne		Rain penetration	
Dryin	g shrinkage crack	CS		cts	dampness	Leaking	pipes, spills and other moisture sources	
	Corrosion-ind	uced cracking		Surface defects	Surfac	e cracks	crazing	
Corrosion of metals embedded	Corrosion-ind			ce	on wall	finishes	Map/pattern cracking	
in concrete		embedment of		ırfa			Efflorescence	
		als (handrails)	-	Sc			Paint peeling	
		nforcing steel		_		TTT 11 /4 · ·	Mouldiness	
Construction	<b>1</b>	ment	_	-		Wall finish	es workmanship problem	
defects (faulty	Premature ren			<b>,</b>	1		Staining	
workmanship):	Cold Segre				structural racks		Joint cracks	
designer, detailer,	Honeyc				. avito			
and contractor	Improper gr							
	surf		<u>C</u>	<u>)the</u>	er notes (i	if available)	<u>.</u>	
	Slab/beam-to	column shear						
Cracks in RC due	(punching s	hear) cracks						
to load effects (structural cracks)	Cantilevered r	nember cracks						
(suructural cracks)	Settleme	nt cracks						

	Profile							
	Profile				Sciencia Design Foults			
							ic Design Faults	
		No.				Week col	umn-strong beam	
							Torsional Irregularity	
						, in	(Torsion eccentricity)	
						nity n	Floor discontinuity	
					Horizontal structural configuration	Irregularity in plan	Projections in plan	
CALINAL DIG	UNIVER STATE	and the second			cont		Non-continuous beams	
		Minderin		ſ	ructural e	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	İ	skele		Iration	ntal st	am el desigr	Absence of vertical support at beams intersection	
Area:	Derince	(Vathylakas)		Structural configuration	orizoi	Be	Broken axis beams and frames	
			.	al c	Ŧ	Slab	Over-stretched one-way slab	
Street name:		mes were found	1	nctura		elementary design faults		
Latitude:		8'57.50"N	_	Sti		Pound	ling and separation problem	
Longitude:		0'54.63"E	_			n ty	Weak storey	
	<14 Da years	te (if available):		ral		Irregularity in elevation	Soft storey	
(	Between 14 an (1974-2003)				Vertical structural configuration	Irreg in el	Discontinuity of columns or shear walls	
	>43 years (Bef	ore 1974)			al s ïgu	Vertical	Broken axis columns	
		Apartment			crtic	structural element		
Building type:	Residential	House Dormitory			Ve	elementary design fault	Irregular column and/or shear-wall plan configuration	
]	Public						Short column	
	Commercial			Non-Structural Defects				
	Under Constru	ction			Waterpro		s, water leakage and seepage	
	Occupied			Defected wooden door				
	Abandoned		_		Condensation			
Reinforc	ced Concrete I	Defects			nes		Rising damp	
Drying s	shrinkage crac	ks		ts	dampness	Leaking	Rain penetration pipes, spills and other moisture	
	Corrosion_in	luced cracking		Surface defects	Surfac	ce cracks	crazing	
Corrosion of		duced spalling		e d		l finishes	Map/pattern cracking	
metals embedded		embedment of		fac			Efflorescence	
in concrete	dissimilar me	tals (handrails)		Sui			Paint peeling	
	Improper rei	nforcing steel		Mouldiness				
Construction	place	ement				Wall finishe	es workmanship problem	
defects (faulty		noval of forms					Staining	
workmanship):		joints			structural		Joint cracks	
designer, detailer,		egation		С	racks			
and contractor		combing						
		rades of slab faces		Othe	er notes (	if available):		
		column shear	$\square$					
Cracks in RC due		shear) cracks						
to load effects		member cracks						
		in the states						
(structural cracks)	Settleme	ent cracks						

	Case	Stu	dy i	#48 (İ2	23)			
_	Profile	_				ic Design Faults		
		_		Week column-strong beam				
					_	Torsional Irregularity		
					y in	(Torsion eccentricity)		
Aluta					arit; an	Floor discontinuity		
IQI				Horizontal structural configuration	Irregularity in plan	Projections in plan		
A Kentral - A Varia				con	/	Non-continuous beams		
Carlo Martin			ſ	ructural 6	Beam elementary design faults	Non-uniform beam span and cross-section		
District:	İskele		Iratior	ıtal st	am el desigr	Absence of vertical support at beams intersection		
Area:	Derince (Vathylakas)		onfigu	orizor	Be	Broken axis beams and frames		
		.	Structural configuration	H	Slab	Over-stretched one-way slab		
Street name:	No street names were found	d			elementary	Poorly supported or heavily		
T (') 1	25020152.07//N	_	ruc		design faults	loaded cantilevered slabs		
Latitude:	35°28'53.97"N 34°10'59.01"E	-	SI		Pouliu	Weak storey		
Longitude:	<14 Date (if available):				Irregularity n elevation	Soft storey		
Structure age:	Between 14 and 43 years			Vertical structural configuration	Irregularity in elevation	Discontinuity of columns or		
	(1974-2003) >43 years (Before 1974)			l str gura	Vertical	shear walls Broken axis columns		
	Apartment			ical nfiș	structural	Broken axis columnis		
	Residential House			'ert co	element	Irregular column and/or		
Building type:	Dormitory			>	elementary design fault	shear-wall plan configuration		
Dunung type	Public				design faun	Short column		
	Commercial				Non-St	ructural Defects		
	Under Construction			s, water leakage and seepage				
Building status:	Occupied			d wooden door				
	Abandoned					Condensation		
Reinfo	rced Concrete Defects			ampness	Rising damp			
Durin				duu	Rain penetration			
Dryin	g shrinkage cracks		scts	dî	Leaking p	bipes, spills and other moisture sources		
Comolon of	Corrosion-induced cracking		Surface defects	Surfac	e cracks	crazing		
Corrosion of metals embedded	Corrosion-induced spalling		ce e	on wal	l finishes	Map/pattern cracking		
in concrete	Cracks due to embedment of		ırfa			Efflorescence		
	dissimilar metals (handrails)	$\left  - \right $	Sı			Paint peeling		
	Improper reinforcing steel					Mouldiness		
Construction	placement Premature removal of forms	$\left  \right $			wan finishe	s workmanship problem Staining		
defects (faulty	Cold joints	+	Non	-structural				
workmanship):	Segregation	+		cracks		Joint cracks		
designer, detailer, and contractor	Honeycombing							
	Improper grades of slab		041	n notes (	f available)			
	surfaces		othe	er notes (	if available):			
Cracks in RC due	Cracks in RC due Slab/beam-to column shear (punching shear) cracks							
to load effects	Cantilevered member cracks	++						
(structural cracks)		+						
	Settlement cracks							

	Case	Stu	dy a	#49 (İ2	24)			
	Profile				Seismic	Design Faults		
					Week colur	nn-strong beam		
						Torsional Irregularity		
	CONTRACTOR OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE				'in	(Torsion eccentricity)		
					urity u	Floor discontinuity		
				Horizontal structural configuration	Irregularity in plan	Projections in plan		
					<b>y</b>	Non-continuous beams		
				ictural	Beam elementary design faults	Non-uniform beam span and cross-section		
District:	İskele		ation	tal strı	am elementa design faults	Absence of vertical support at beams intersection		
Area:	Taşlıca (Neta)		nfigu	rizon	Bea	Broken axis beams and frames		
Street name:	No street names were found	d	Structural configuration	Hc	Slab elementary design faults	Over-stretched one-way slab Poorly supported or heavily loaded cantilevered slabs		
Latitude:	35°28'9.85"N		true		Poundir	ng and separation problem		
Longitude:	34°12'52.80"E		S		у ц	Weak storey		
	<14 Date (if available): years		ral		Irregularity in elevation	Soft storey		
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration	Irreg in el	Discontinuity of columns or shear walls		
	>43 years (Before 1974)			al sı figu	Vertical	Broken axis columns		
	Apartment			rtic	structural element	Irregular column and/or		
	Residential House			Ve ,	elementary	shear-wall plan configuration		
Building type:	Dormitory				design fault			
	Public				Short column Non-Structural Defects			
	Commercial Under Construction			Watorpro				
Building status:	Occupied		Waterproofing defects, water leakage and seepag Defected wooden door					
Dunung status.	Abandoned				Defected	Condensation		
Reinfo	rced Concrete Defects			ess		Rising damp		
Dryin	g shrinkage cracks		cts	dampness	Leaking pi	Rain penetration pes, spills and other moisture sources		
_	Corrosion-induced cracking		Surface defec	Surfac	ce cracks	crazing		
Corrosion of metals embedded	Corrosion-induced spalling		ce d		l finishes	Map/pattern cracking		
in concrete	Cracks due to embedment of		rfae		Ef	fflorescence		
	dissimilar metals (handrails)		Su			aint peeling		
	Improper reinforcing steel					Aouldiness		
Construction	placement				Wall finishes	workmanship problem		
defects (faulty	Premature removal of forms Cold joints	+	Non	structural		Staining		
workmanship):	Segregation	+		racks		Joint cracks		
designer, detailer, and contractor	Honeycombing							
	Improper grades of slab		Oth	ar notes (	if available).			
	surfaces			notes (	<u>if available):</u>			
Cracks in RC due	Slab/beam-to column shear (punching shear) cracks							
to load effects	Cantilevered member cracks							
(structural cracks)	Settlement cracks	$\Box$						

	Case	Stu	ıdy <del>i</del>	#50 (İ2	25)	
_	Profile	_				Design Faults
		-			Week colui	nn-strong beam
					_	Torsional Irregularity
					y in	(Torsion eccentricity)
					arit	Floor discontinuity
				Horizontal structural configuration	Irregularity in plan	Projections in plan
				cor	2	Non-continuous beams
				ictural	Beam elementary design faults	Non-uniform beam span and cross-section
District:	İskele		Structural configuration	al stri	am elementa design faults	Absence of vertical support at beams intersection
Area:	St Andrew (Apostolos Andreas)			orizont	Bea	Broken axis beams and frames
			co	Hc	Slab	Over-stretched one-way slab
Street name:	Karpaz Anayolu		ural		elementary design faults	Poorly supported or heavily
<b>T</b>			uct			loaded cantilevered slabs
Latitude:	35°39'28.61"N		Stı		Poundi	ng and separation problem
Longitude:	34°34'27.31"E <14 Date (if available):				ity ion	Weak storey
	years		Vertical structural configuration		Irregularity n elevation	Soft storey
Structure age:	Between 14 and 43 years			ertical structur configuration	lrre in e	Discontinuity of columns or shear walls
	(1974-2003) >43 years (Before 1974)			l str gur	Vertical	Broken axis columns
	Apartment			ical	structural	Dioken axis columnis
	Residential House			/ert cc	element	Irregular column and/or
Building type:	Dormitory			-	elementary design fault	shear-wall plan configuration
0.51	Public				design fault	Short column
	Commercial				Non-Str	uctural Defects
	Under Construction			water leakage and seepage		
Building status:	Occupied				Defected	wooden door
	Abandoned			s		Condensation
Reinfo	rced Concrete Defects			nes		Rising damp
Dryin	g shrinkage cracks		cts	dampness	Leaking pi	Rain penetration pes, spills and other moisture sources
-	Corrosion-induced cracking		Surface defects	Surfac	ce cracks	crazing
Corrosion of metals embedded	Corrosion-induced spalling		ce c		l finishes	Map/pattern cracking
in concrete	Cracks due to embedment of		Irfa			fflorescence
	dissimilar metals (handrails)		Su			aint peeling
	Improper reinforcing steel					Mouldiness
Construction	placement				Wall finishes	workmanship problem
defects (faulty	Premature removal of forms Cold joints		N	1		Staining
workmanship):				-structural cracks		Joint cracks
designer, detailer,						
and contractor	and contractor Improper grades of slab					
	surfaces		Othe	er notes (	if available):	
	Slab/beam-to column shear					
Cracks in RC due	(punching shear) cracks					
to load effects (structural cracks)	Cantilevered member cracks					
(suuctural clacks)	Settlement cracks					

		Case	Stu	dy	#51 (L	1)		
	D (*1					<b>a</b> •		
	Profile						c Design Faults	
			t				Torsional Irregularity (Torsion eccentricity)	
						ity	Floor discontinuity	
					Horizontal structural configuration	Irregularity in plan	Projections in plan	
	a constant of the second second second second second second second second second second second second second s	and a second second second			fuo		Non-continuous beams	
					uctural e	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	Lefkoş	a (Nicosia)		uration	ntal str	eam elementa design faults	Absence of vertical support at beams intersection	
Area:	Cihang	gir (Epicho)		config	Iorizo		Broken axis beams and frames	
Street name:		nes were found	in	Structural configuration	Ţ	Slab elementary design faults	Over-stretched one-way slab           Poorly supported or heavily           loaded cantilevered slabs	
Latitude:		3'21.58"N		Stri		Pound	ing and separation problem	
Longitude:		0'54.51"E				y n	Weak storey	
	years	te (if available):			Iral 1	Irregularity in elevation	Soft storey	
Structure age:	Between 14 and 43 years (1974-2003) >43 years (Before 1974)				Vertical structural configuration		Discontinuity of columns or shear walls	
					cal ifig	Vertical structural	Broken axis columns	
	D 11 .1 1	Apartment House			ertio	element	Irregular column and/or	
Building type:	Residential	Dormitory		>	elementary design fault	shear-wall plan configuration		
	Public						Short column	
	Commercial Under Constru	ation		Non-Structural Defects				
Building status:	Occupied	iction		Waterproofing defects, water leakage and seepag Defected wooden door				
Dunung status.	Abandoned					Derected	Condensation	
Reinfo	rced Concrete I	Defects			ess		Rising damp	
					lampness		Rain penetration	
Dryin	g shrinkage crac			Surface defects	.5	Leaking pipes, spills and other moistur sources		
Corrosion of		duced cracking		dei		e cracks	crazing	
metals embedded		duced spalling embedment of		ace	on wal	l finishes	Map/pattern cracking	
in concrete		tals (handrails)		Surf			Paint peeling	
		inforcing steel		-1			Mouldiness	
Construction	plac	ement					s workmanship problem	
Construction defects (faulty		moval of forms					Staining	
workmanship):		joints	$\square$		structural		Joint cracks	
designer, detailer,		egation		С	cracks			
and contractor	and contractor Improper grades of slab							
		faces		Othe	er notes (i	<u>if available):</u>		
	Slab/beam-to	o column shear						
Cracks in RC due	(punching shear) cracks							
to load effects (structural cracks)	Cantilevered	member cracks						
(structural cracks)	Settleme	ent cracks						

		Case	Stu	dy	#52 (L	.2)	
	Profile						ic Design Faults
			_			Week colu	umn-strong beam
a and the state of		Th	1				Torsional Irregularity
A PARTY A			7			v in	(Torsion eccentricity)
	A Barton	E III	4			arity In	Floor discontinuity
A DEC					liguration	Irregularity in plan	Projections in plan
	Contraction of the second				tuo		Non-continuous beams
				Structural configuration	ructural c	Beam elementary design faults	Non-uniform beam span and cross-section
District:	Lefkoş	a (Nicosia)			Horizontal structural configuration	eam el design	Absence of vertical support at beams intersection
Area:	Değirme	nlik (Kythrea)		configu			Broken axis beams and frames
Streat	No street nar	nes were found	in	al c	Т	Slab	Over-stretched one-way slab
Street name:	th	e town		ctur		elementary design faults	Poorly supported or heavily loaded cantilevered slabs
Latitude:	35°1	4'23.84"N		truc		-	ling and separation problem
Longitude:		9'19.65"E		S			Weak storey
Zonghudoi		te (if available):			al	Irregularity in elevation	Soft storey
Structure age:	Between 14 ar (1974-2003)	nd 43 years			Vertical structural configuration	Irreg in ele	Discontinuity of columns or shear walls
	>43 years (Be	fore 1974)			al st ïgu	Vertical	Broken axis columns
		Apartment			cut	structural	Ima anlan a channa an d/an
	Residential	House			Vei c	element elementary	Irregular column and/or shear-wall plan configuration
Building type:		Dormitory				design fault	
	Public						Short column
	Commercial				<b>X</b> 7 4		tructural Defects
Duilding status	Under Constru Occupied	iction			Waterpro		s, water leakage and seepage
Building status:	Abandoned					Defecte	Condensation
Reinfo	rced Concrete	Defects			SS		Rising damp
Kenno	reeu concreter	Delectis			pne		Rain penetration
Dryin	g shrinkage crac	ks		Surface defects	dampness	Leaking j	pipes, spills and other moisture sources
Corrosion of		duced cracking		def		ce cracks	crazing
metals embedded		duced spalling		ce	on wal	l finishes	Map/pattern cracking
in concrete		embedment of		urfa			Efflorescence
		tals (handrails)		S			Paint peeling
		inforcing steel ement				Wall f	Mouldiness
Construction	<b>1</b>	moval of forms	$\left  - \right $	·		wan ninishe	es workmanship problem Staining
defects (faulty		joints		Non	structural		
workmanship):		egation	$\left  - \right $		racks		Joint cracks
designer, detailer,		combing					
and contractor		rades of slab		0/1		:c: 1 1 1 >	
	sur	faces		Othe	er notes (	if available):	
Cracks in RC due		column shear					
to load effects		shear) cracks	$\left  - \right $				
(structural cracks)		member cracks					
	Settlem	ent cracks					

	Case	Stu	dy	#53 (L	.3)	
	Profile					e Design Faults
		_			Week colui	mn-strong beam
1. M.					_	Torsional Irregularity
	The second second second second second second second second second second second second second second second se				y in	(Torsion eccentricity) Floor discontinuity
					ularit plan	Floor discontinuity
				Horizontal structural configuration	Irregularity in plan	Projections in plan
				con	~	Non-continuous beams
		4		uctural	Beam elementary design faults	Non-uniform beam span and cross-section
District:	Lefkoșa (Nicosia)		Structural configuration	ntal str	am ele lesign	Absence of vertical support at beams intersection
Area:	Değirmenlik (Kythrea)			orizon	Be	Broken axis beams and frames
G				Ĥ	Slab elementary design faults	Over-stretched one-way slab
Street name:	No street names were found	1				Poorly supported or heavily
Latitude:	35°14'56.37"N	-				loaded cantilevered slabs
Longitude:	33°28'52.78"E	-	S			Weak storey
Longhudo	<14 Date (if available): years		al		Irregularity in elevation	Soft storey
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration	Irreg in ele	Discontinuity of columns or shear walls
	>43 years (Before 1974)			al st ïgu	Vertical	Broken axis columns
	Apartment			rtic:	structural element	Impeular column and/or
	Residential House			Ve	elementary	Irregular column and/or shear-wall plan configuration
Building type:	Dormitory				design fault	
	Public					Short column
	Commercial			W7		ructural Defects
Building status:	Under Construction Occupied			waterpro		water leakage and seepage wooden door
Dunung status.	Abandoned				Defected	Condensation
Reinfo	rced Concrete Defects			ess		Rising damp
				dampness		Rain penetration
Dryin	g shrinkage cracks		Surface defects			pes, spills and other moisture sources
Corrosion of	Corrosion-induced cracking		def		ce cracks	crazing
metals embedded	Corrosion-induced spalling Cracks due to embedment of		ace	on wal	l finishes	Map/pattern cracking
in concrete	dissimilar metals (handrails)		urf			fflorescence aint peeling
	Improper reinforcing steel		01			Mouldiness
	placement					workmanship problem
Construction	Premature removal of forms					Staining
defects (faulty workmanship):	Cold joints	1		structural		Joint cracks
designer, detailer,	Segregation		C	racks		Joint Clacks
and contractor	Honeycombing					
	Improper grades of slab surfaces		Othe	er notes (	if available):	
	Slab/beam-to column shear	$\vdash$				
Cracks in RC due	(punching shear) cracks					
to load effects	Cantilevered member cracks					
(structural cracks)	Settlement cracks					

		Case	Stuc	dy	#54 (L	4)		
	Profile						c Design Faults	
	I A	-		Week column-strong beam				
	A REAL PROPERTY AND INCOMENT	A like					Torsional Irregularity	
						, in	(Torsion eccentricity)	
-						n ity	Floor discontinuity	
					figuration	Irregularity in plan	Projections in plan	
					con	~	Non-continuous beams	
		A CONTRACTOR			Horizontal structural configuration	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	L	efkoşa		Structural configuration		am ele lesign	Absence of vertical support at beams intersection	
Area:	Yiğit	er (Arsos)		onfigu	orizon	Be	Broken axis beams and frames	
				al co	H	Slab	Over-stretched one-way slab	
Street name:		atan Sk		uctura	_	elementary design faults	Poorly supported or heavily loaded cantilevered slabs	
Latitude:		5'23.02"N	_	Str		Poundi	ing and separation problem	
Longitude:		7'38.38"E	_			b ty	Weak storey	
	years	te (if available):		ıral		Irregularity in elevation	Soft storey	
Structure age:	Between 14 ar (1974-2003)				Vertical structural configuration	<b>-</b> . <b>I</b>	Discontinuity of columns or shear walls	
	>43 years (Before 1974)				al s figu	Vertical	Broken axis columns	
		Apartment			rtic	structural element	Irregular column and/or	
	Residential	House			Ve	elementary	shear-wall plan configuration	
Building type:		Dormitory				design fault		
	Public						Short column	
	Commercial						ructural Defects	
D 111 4 4	Under Constru	ction		Waterproofing defects, water leakage and seepage Defected wooden door				
Building status:	Occupied Abandoned					Defected	Condensation	
Doinfo	rced Concrete l	Dofoota			ss		Rising damp	
Kenno	reeu Concrete I	Delects			pne		Rain penetration	
Dryin	g shrinkage crac	ks		ects	dampness	Leaking p	ipes, spills and other moisture sources	
Corrosion of		duced cracking		Surface defects		e cracks	crazing	
metals embedded		duced spalling		ce	on wal	l finishes	Map/pattern cracking	
in concrete		embedment of		urfa			Efflorescence	
		tals (handrails)	$\square$	Sı			Paint peeling	
	Improper rei	nforcing steel		-			Mouldiness	
Construction		ement noval of forms	$\left  - \right $			wall finishes	s workmanship problem	
defects (faulty				Non	structural		Staining	
workmanship):		Cold jointsNoSegregation			racks		Joint cracks	
designer, detailer,		combing						
and contractor	and contractor Improper grades of slab			0.1		C 1111		
	sur	faces		Othe	er notes (i	if available):		
		column shear						
Cracks in RC due to load effects		shear) cracks						
(structural cracks)	Cantilevered	member cracks						
(Suractural cracks)	Settlem	ent cracks						

	Case	Stud	ly i	#55 (L	.5)			
	Profile	-				c Design Faults		
		_			Week colu	mn-strong beam Torsional Irregularity		
					-	(Torsion eccentricity)		
and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s					y ii	Floor discontinuity		
C C The Star Section	A CONTRACTOR OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OWNER OF THE OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNE OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNER OWNE				ularit plan			
				Horizontal structural configuration	Irregularity in plan	Projections in plan		
				puos	_	Non-continuous beams		
				uctural e	Beam elementary design faults	Non-uniform beam span and cross-section		
District:	Lefkoşa		Iration	ntal str	am ele design	Absence of vertical support at beams intersection		
Area:	Yiğitler (Arsos)		Structural configuration	lorizoi		Broken axis beams and frames		
Street name:	No street names were found		al c	Ш	Slab elementary	Over-stretched one-way slab Poorly supported or heavily		
Sueet name.	No sueet names were round		Ictui		design faults	loaded cantilevered slabs		
Latitude:	35° 5'17.64"N		Stru		Poundi	ng and separation problem		
Longitude:	33°37'28.47"E				y n	Weak storey		
	<14 Date (if available): years		ral		Irregularity in elevation	Soft storey		
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration		Discontinuity of columns or shear walls		
-	>43 years (Before 1974)	_		al s figu	Vertical	Broken axis columns		
	Apartment	_		econ	structural element	Irregular column and/or		
	Residential House	- 1	-	Ve	elementary	shear-wall plan configuration		
Building type:	Dormitory	+			design fault			
	Public Commercial				Non C4	Short column		
	Under Construction		1	Waterpro		Non-Structural Defects defects, water leakage and seepage		
Building status:	Occupied			waterpre	Defected wooden door			
	Abandoned					Condensation		
Reinfo	rced Concrete Defects			ess		Rising damp		
				dampness		Rain penetration		
Dryin	g shrinkage cracks		Surface defects			ipes, spills and other moisture sources		
Corrosion of	Corrosion-induced cracking		dei		cracks	crazing		
metals embedded	Corrosion-induced spalling Cracks due to embedment of	_	face	on wal	l finishes	Map/pattern cracking fflorescence		
in concrete	dissimilar metals (handrails)		Surf			aint peeling		
	Improper reinforcing steel		•1			Mouldiness		
	placement					workmanship problem		
Construction defects (faulty	Premature removal of forms					Staining		
workmanship):	Cold joints	N		structural		Joint cracks		
designer, detailer,	Segregation			racks		some crucks		
and contractor	and contractor Honeycombing							
	Improper grades of slab surfaces	<u>C</u>	Othe	er notes (	if available):			
	Slab/beam-to column shear							
Cracks in RC due	(punching shear) cracks							
to load effects	Cantilevered member cracks							
(structural cracks)	Settlement cracks							

	Case	Stu	dy	#56 (L	(6)			
					<i>a</i> • •			
	Profile					c Design Faults		
3	The Martine				week colu	mn-strong beam Torsional Irregularity		
					=	(Torsion eccentricity)		
		1			ty i	Floor discontinuity		
				Horizontal structural configuration	Irregularity in plan	Projections in plan		
				cont	~	Non-continuous beams		
				uctural e	Beam elementary design faults	Non-uniform beam span and cross-section		
District:	Lefkoșa		Iration	ıtal stı	am ele design	Absence of vertical support at beams intersection		
Area:	Yiğitler (Arsos)		Structural configuration	lorizoi		Broken axis beams and frames		
Streat	No streat remain the first		al c	Ξ	Slab	Over-stretched one-way slab		
Street name:	No street names were found	1	ructur	-	elementary design faults	Poorly supported or heavily loaded cantilevered slabs		
Latitude:	35° 5'17.64"N	-	Stı		Pound	ing and separation problem		
Longitude:	33°37'39.63"E	_			ity on	Weak storey		
	<14 Date (if available): years		ural		Irregularity in elevation	Soft storey		
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration	Irre in e	Discontinuity of columns or shear walls		
	>43 years (Before 1974)			al s figu	Vertical	Broken axis columns		
	Apartment			rtic	structural element	Irregular column and/or		
Building type:	Residential House Dormitory			Ve	elementary design fault	shear-wall plan configuration		
	Public					Short column		
	Commercial					ructural Defects		
Duilding status	Under Construction			Waterpro	Dofing defects, water leakage and seepage Defected wooden door			
Building status:	Occupied Abandoned				Defected	Condensation		
Reinfo	rced Concrete Defects			ss		Rising damp		
				lampness		Rain penetration		
Dryin	g shrinkage cracks		ects	dan	Leaking p	ipes, spills and other moisture sources		
Corrosion of	Corrosion-induced cracking		Surface defects		ce cracks	crazing		
metals embedded	Corrosion-induced spalling		ace	on wal	l finishes	Map/pattern cracking		
in concrete	Cracks due to embedment of		urfî			Efflorescence		
	dissimilar metals (handrails)		S			Paint peeling		
	Improper reinforcing steel placement					s workmanship problem		
Construction	Premature removal of forms				wan minsile.	Staining		
defects (faulty	Cold joints		Non-	structural				
workmanship): designer, detailer,	Segregation		c	cracks		Joint cracks		
and contractor	Honeycombing							
	Improper grades of slab		Othe	er notes (	if available):			
	surfaces Slab/beam-to column shear	$\square$						
Cracks in RC due	Cracks in RC due (punching shear) cracks							
to load effects	to load effects Cantilevered member cracks							
(structural cracks)	Settlement cracks							

Profile         Scientic Design Faults           Week column-strong heam         Torsional Irregularity (Torsional Irregularity)           District:         Lefkoşa           Area:         Yiğitler (Arsos)           Street name:         No street names were found           Latitude:         35° 5'30.57'N           Longitude:         33°3744.35'E           Street name:         No street names were found           Latitude:         35° 5'30.57'N           Longitude:         33°3744.35'E           Building type:         Apatriantia           Public         Apatriantia           Optimized         Apatriantia           Public         Optimized           Divince ial         Apatriantia           Public         Commercial           Divince definition induced cracking         Condensation           Construction         Corrosion-induced cracking           Construction         Corrosion-induced cracking           Construction         Corrosion-induced cracking           Construction         Corrosion-induced cracking           Construction         Corrosion-induced cracking           Corrosion of metals enbedded         Corrosion induced cracking           Corrosion of metals enbedded         Corros			Case	Stu	dy	#57 (L	.7)	
Week column-strong beam           District:         Lefkoga           Area:         Yigitler (Arsos)           Street name:         No street names were found           Latitude:         35° 5'30.57"N           Longinud:         (33°37'44.57'E           Juidling type:         (44) 2003           Between 14 and 43 years         (17) 3000           (14) 2003         (14) 2003           Juidling type:         Residential           Building type:         Residential           Public         Construction           Occupied         Construction           Drying shrinkage cracks         Construction           Projections induced spalling         Construction           Projections         Residential           Drying shrinkage cracks         Construction           Projection         Residential           Projection         Residential           Drying shrinkage cracks         Suffice cracks           Construction         Construction           Projection         Residential           House construction         Projections and separation           Construction         Construction           Residential         House           Drying shrinkage crack								
District:       Lefkoşa         Area:       Yiğiler (Arsos)         Street name:       No street names were found         Latitude:       35° 3730.57"N         Longitude:       33°3744.35°E         Street name:       No street names were found         Latitude:       35° 3730.57"N         Longitude:       33°3744.35°E         Street name:       No street names were found         Longitude:       33°3744.35°E         Structure age:       Petblic         Operative data       Soft anale         Public       Domitory         Commercial       Domitory         Public       Commercial         Construction       Corrosion-induced stabs         Reinforced Concrete Defects       Mater finance         Drying shrinkage cracks       Corrosion-induced stab ing         Corrosion of metals embedded in concrete finance       Corrosion-induced stab ing         Corrosion of metals embedded in concrete reacks       Corrosion-induced stab ing         Corrosion induced stab ing       Mater reacking         Corrosion induced stab ing       Corrosion-induced stab ing         Corrosion induced stab ing       Corrosion-induced stab ing         Corrosion induced cracking       Corrosion-induced stab ing		Profile						
District:       I.efkoşa         Arcu:       Yiğiler (Arsos)         Street name:       No street names were found         Latitude:       35° 5'30.57"N         Longinde:       33°3744.35"F.         Gravarding and separation problem       Pounding and separation problem         Jostrict:       Constance columns and cross-section         Ionginde:       33°3744.35"F.         Bailding type:       Cit and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and the and		1		,			Week co	
Jointrict:       Lefkoşa         Area:       Yiğitler (Arsos)         Street name:       Nos street names were found         Latitude:       33*3744.35°E         Longitude:       33*3744.35°E         Between 14 and 43 years       Pounding and separation problem         Verifield       Dorde continuous beams         Non-uniform beam span and cross-section       Slab         Latitude:       33*3744.35°E         Longitude:       33*3744.35°E         Structure age:       Ciff available):         Between 14 and 43 years       Pounding and separation problem         Iongitude:       Apartment         Residential       House         Dormicry       Dormicry         Public       Commercial         Commercial       Dormicry         Drying shrinkage cracks       Concoston-induced palling         Corosion of metals (handrails)       Concoston-induced palling         Construction       Concoston-induced palling         Construction       Condensation         Construction       Condensation         Construction       Concoston-induced palling         Construction       Concoston-induced palling         Concoston-induced forms       Stating pipes, spills and othe								
District:     Lefkoşa       Area:     Yiğitler (Arsos)       Street name:     No street names were found       Latitude:     35° 5'30.57'N       Longitude:     33°37'44.35'E       Street name:     No street names were found       Latitude:     35° 5'30.57'N       Longitude:     33°37'44.35'E       Street name:     (16'4-2003)       >     Yarar (fir Aranos)       Building type:     Public       Dorminory     Dorminory       Public     Dorminory       Public     Dorminory       Public     Commercial       Drying shrinkage cracks     Corrosion-induced cracking       Corrosion of metals embedded in concrete     Corrosion-induced cracking       Corrosion of metals embedded in concrete     Corrosion-induced cracking       Corrosion of metals embedded in concrete     Corrosion-induced cracking       Corrosion of metals embedded in concrete     Stable metal cracking       Construction     Corrosion-induced cracking       Construction     Corrosion-induced cracking       Corrosion-induced cracking     Corrosion-induced cracking       Corrosion-induced cracking     Corrosion-induced cracking       Corrosion-induced cracking     Surface cracks       Corrosion-induced cracking     Corrosion-induced cracking       Co		1					in.	
District:     Lefkoşa       Area:     Yiğitler (Arsos)       Street name:     No street names were found       Latitude:     35° 5'30.57'N       Longitude:     33°37'44.35'E       Street name:     No street names were found       Latitude:     35° 5'30.57'N       Longitude:     33°37'44.35'E       Street name:     (16'4-2003)       >     Yarar (fir Aranos)       Building type:     Public       Dorminory     Dorminory       Public     Dorminory       Public     Dorminory       Public     Commercial       Drying shrinkage cracks     Corrosion-induced cracking       Corrosion of metals embedded in concrete     Corrosion-induced cracking       Corrosion of metals embedded in concrete     Corrosion-induced cracking       Corrosion of metals embedded in concrete     Corrosion-induced cracking       Corrosion of metals embedded in concrete     Stable metal cracking       Construction     Corrosion-induced cracking       Construction     Corrosion-induced cracking       Corrosion-induced cracking     Corrosion-induced cracking       Corrosion-induced cracking     Corrosion-induced cracking       Corrosion-induced cracking     Surface cracks       Corrosion-induced cracking     Corrosion-induced cracking       Co		The second	MOUTHIN	-			ity 1	Floor discontinuity
Street name:     No street names were found     Stab     Stab     Over street ourse vary stab       Latitude:     35° 5'30.57"N     Pounding and separation problem       Longitude:     33°37'44.35"E     Pounding and separation problem       Structure age:     Classical event 14 and 43 years (1974-2003)     Pounding and separation problem       Building type:     Correstore 1974)     Partment     Pounding and separation problem       Public     Dormitory     Public     Brocknastic columns or shear walls       Commercial     Dormitory     Public     Stort column       Commercial     Under Construction     Waterproofing defects, water leakage and seepage       Defected Wooden door     Abandoned       Abandoned     Conrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)     Surface eracks     Map pattern cracking Paint peeling       Construction     Improper reinforcing steel placement     Paint peeling     Map pattern cracking       Construction     Premature removal of forms Construction     Non-structural Pain peeling     Joint cracks       Madded     Stabing     Joint cracks     Joint cracks       Construction defects (faulty workmanship):     Segregation     Non-structural cracks     Joint cracks       Construction defects (inauit     Slab/beam-to c						figuration	Irregular plar	Projections in plan
Street name:     No street names were found     Stab     Stab     Over street ourse vary stab       Latitude:     35° 5'30.57"N     Pounding and separation problem       Longitude:     33°37'44.35"E     Pounding and separation problem       Structure age:     Classical event 14 and 43 years (1974-2003)     Pounding and separation problem       Building type:     Correstore 1974)     Partment     Pounding and separation problem       Public     Dormitory     Public     Brocknastic columns or shear walls       Commercial     Dormitory     Public     Stort column       Commercial     Under Construction     Waterproofing defects, water leakage and seepage       Defected Wooden door     Abandoned       Abandoned     Conrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)     Surface eracks     Map pattern cracking Paint peeling       Construction     Improper reinforcing steel placement     Paint peeling     Map pattern cracking       Construction     Premature removal of forms Construction     Non-structural Pain peeling     Joint cracks       Madded     Stabing     Joint cracks     Joint cracks       Construction defects (faulty workmanship):     Segregation     Non-structural cracks     Joint cracks       Construction defects (inauit     Slab/beam-to c						tion		Non-continuous beams
Street name:     No street names were found     Stab     Stab     Over street ourse vary stab       Latitude:     35° 5'30.57"N     Pounding and separation problem       Longitude:     33°37'44.35"E     Pounding and separation problem       Structure age:     Classical event 14 and 43 years (1974-2003)     Pounding and separation problem       Building type:     Correstore 1974)     Partment     Pounding and separation problem       Public     Dormitory     Public     Brocknastic columns or shear walls       Commercial     Dormitory     Public     Stort column       Commercial     Under Construction     Waterproofing defects, water leakage and seepage       Defected Wooden door     Abandoned       Abandoned     Conrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)     Surface eracks     Map pattern cracking Paint peeling       Construction     Improper reinforcing steel placement     Paint peeling     Map pattern cracking       Construction     Premature removal of forms Construction     Non-structural Pain peeling     Joint cracks       Madded     Stabing     Joint cracks     Joint cracks       Construction defects (faulty workmanship):     Segregation     Non-structural cracks     Joint cracks       Construction defects (inauit     Slab/beam-to c					-	ructural c	ementary 1 faults	cross-section
Street name:     No street names were found     Stab     Stab     Over street ourse vary stab       Latitude:     35° 5'30.57"N     Pounding and separation problem       Longitude:     33°37'44.35"E     Pounding and separation problem       Structure age:     Classical event 14 and 43 years (1974-2003)     Pounding and separation problem       Building type:     Correstore 1974)     Partment     Pounding and separation problem       Public     Dormitory     Public     Brocknastic columns or shear walls       Commercial     Dormitory     Public     Stort column       Commercial     Under Construction     Waterproofing defects, water leakage and seepage       Defected Wooden door     Abandoned       Abandoned     Conrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)     Surface eracks     Map pattern cracking Paint peeling       Construction     Improper reinforcing steel placement     Paint peeling     Map pattern cracking       Construction     Premature removal of forms Construction     Non-structural Pain peeling     Joint cracks       Madded     Stabing     Joint cracks     Joint cracks       Construction defects (faulty workmanship):     Segregation     Non-structural cracks     Joint cracks       Construction defects (inauit     Slab/beam-to c	District:	L	efkoşa		Iration	ntal st	am eld lesigr	
Street name:     No street names were found     Stab     Stab     Over street ourse vary stab       Latitude:     35° 5'30.57"N     Pounding and separation problem       Longitude:     33°37'44.35"E     Pounding and separation problem       Structure age:     Classical event 14 and 43 years (1974-2003)     Pounding and separation problem       Building type:     Correstore 1974)     Partment     Pounding and separation problem       Public     Dormitory     Public     Brocknastic columns or shear walls       Commercial     Dormitory     Public     Stort column       Commercial     Under Construction     Waterproofing defects, water leakage and seepage       Defected Wooden door     Abandoned       Abandoned     Conrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)     Surface eracks     Map pattern cracking Paint peeling       Construction     Improper reinforcing steel placement     Paint peeling     Map pattern cracking       Construction     Premature removal of forms Construction     Non-structural Pain peeling     Joint cracks       Madded     Stabing     Joint cracks     Joint cracks       Construction defects (faulty workmanship):     Segregation     Non-structural cracks     Joint cracks       Construction defects (inauit     Slab/beam-to c	Area:	Vičit	ler (Arsos)		ïgu	uoz	Bei	Broken axis beams and
Street name:     No street names were found     Stab     Stab     Over street ourse vary stab       Latitude:     35° 5'30.57"N     Pounding and separation problem       Longitude:     33°37'44.35"E     Pounding and separation problem       Structure age:     Classical event 14 and 43 years (1974-2003)     Pounding and separation problem       Building type:     Correstore 1974)     Partment     Pounding and separation problem       Public     Dormitory     Public     Brocknastic columns or shear walls       Commercial     Dormitory     Public     Stort column       Commercial     Under Construction     Waterproofing defects, water leakage and seepage       Defected Wooden door     Abandoned       Abandoned     Conrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)     Surface eracks     Map pattern cracking Paint peeling       Construction     Improper reinforcing steel placement     Paint peeling     Map pattern cracking       Construction     Premature removal of forms Construction     Non-structural Pain peeling     Joint cracks       Madded     Stabing     Joint cracks     Joint cracks       Construction defects (faulty workmanship):     Segregation     Non-structural cracks     Joint cracks       Construction defects (inauit     Slab/beam-to c	Alta.	1 Ign	iei (Aisos)	_	onf	lori		
Longitude:       33°3744.35"E         Structure age:       cl4       Date (if available): years       Date (if available): years       Soft storey         Structure age:       Between 14 and 43 years (1974-2003)       Apartment       Broken axis columns or shear walls         Building type:       Residential       Apartment       House       Dormitory         Public       Commercial       Non-Structural Defects         Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Dccupied       Occupied       Defected wooden door         Abandoned       Corrosion-induced cracking Corrosion-induced cracking       Surface cracks       Cracks due to embedment of dissimilar metals (handrails)         Construction       Cold joints       Non-structural placement       Surface cracks       Crazing mouldiness         Construction       Segregation       Segregation       Staining       Mouldiness         Construction       Segregation       Non-structural cracks       Joint cracks       Grazing         Construction       Segregation       Non-structural cracks       Joint cracks       Grazing         Construction       Improper grades of slab surfaces       Non-structural cracks       Joint cracks       Joint cracks         Cold joints       S					al c	Н		
Longitude:       33°3744.35"E         Structure age:       cl4       Date (if available): years       Date (if available): years       Soft storey         Structure age:       Between 14 and 43 years (1974-2003)       Apartment       Broken axis columns or shear walls         Building type:       Residential       Apartment       House       Dormitory         Public       Commercial       Non-Structural Defects         Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Dccupied       Occupied       Defected wooden door         Abandoned       Corrosion-induced cracking Corrosion-induced cracking       Surface cracks       Cracks due to embedment of dissimilar metals (handrails)         Construction       Cold joints       Non-structural placement       Surface cracks       Crazing mouldiness         Construction       Segregation       Segregation       Staining       Mouldiness         Construction       Segregation       Non-structural cracks       Joint cracks       Grazing         Construction       Segregation       Non-structural cracks       Joint cracks       Grazing         Construction       Improper grades of slab surfaces       Non-structural cracks       Joint cracks       Joint cracks         Cold joints       S	Street name:	No street na	ames were found	1	uctura		design fault	s loaded cantilevered slabs
Structure age:       Classical and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second	Latitude:				Str		Poun	ding and separation problem
Image: construction of metals embedded in concrete       Corrosion of defects (faulty workmanship): designer, detailer, and contractor       Corrosion of defects (faulty workmanship): designer, detailer, and contractor       Corrosion of defects (faulty workmanship): designer, detailer, and contractor       Corracks in RC due volum shear (punching shear) cracks       Start column shear (punching shear) cracks       Start column shear (punching shear) cracks         Cracks in RC due voluced cracks       Start column shear (punching shear) cracks       Other notes (if available);         Cracks in RC due voluced cracks       Startaces       Other notes (if available);	Longitude:	33°3	7'44.35"E				y n	Weak storey
Image: construction of metals embedded in concrete       Corrosion of defects (faulty workmanship): designer, detailer, and contractor       Corrosion of defects (faulty workmanship): designer, detailer, and contractor       Corrosion of defects (faulty workmanship): designer, detailer, and contractor       Corracks in RC due volum shear (punching shear) cracks       Start column shear (punching shear) cracks       Start column shear (punching shear) cracks         Cracks in RC due voluced cracks       Start column shear (punching shear) cracks       Other notes (if available);         Cracks in RC due voluced cracks       Startaces       Other notes (if available);			ate (if available):		ral		gulari levatio	Soft storey
Building type:     Dormitory     Shear-Wall plan configuration       Public     Commercial     Non-Structural Defects       Building status:     Under Construction     Waterproofing defects, water leakage and seepage       Occupied     Defected wooden door       Abandoned     Environmentation       Reinforced Concrete Defects     Rain penetration       Drying shrinkage cracks     Corrosion of metals embedded in concrete     Corrosion-induced spalling       Corrosion of metals embedded in concrete     Corrosion-induced spalling     Surface cracks     Cracks due to embedment of dissimilar metals (handrails)       Improper reinforcing steel placement     Paint peeling     Mouldiness       Premature removal of forms     Segregation     Staining       Conductor     Stabing     Staining       Cortacks in RC due to load effects (juructural cracks)     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):	Structure age:		nd 43 years			ructui		
Building type:     Dormitory     Shear-Wall plan configuration       Public     Commercial     Non-Structural Defects       Building status:     Under Construction     Waterproofing defects, water leakage and seepage       Occupied     Defected wooden door       Abandoned     Environmentation       Reinforced Concrete Defects     Rain penetration       Drying shrinkage cracks     Corrosion of metals embedded in concrete     Corrosion-induced spalling       Corrosion of metals embedded in concrete     Corrosion-induced spalling     Surface cracks     Cracks due to embedment of dissimilar metals (handrails)       Improper reinforcing steel placement     Paint peeling     Mouldiness       Premature removal of forms     Segregation     Staining       Conductor     Stabing     Staining       Cortacks in RC due to load effects (juructural cracks)     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):			fore 1974)			ıl st igu	Vertical	
Building type:     Dormitory     Shear-Wall plan configuration       Public     Commercial     Non-Structural Defects       Building status:     Under Construction     Waterproofing defects, water leakage and seepage       Occupied     Defected wooden door       Abandoned     Environmentation       Reinforced Concrete Defects     Rain penetration       Drying shrinkage cracks     Corrosion of metals embedded in concrete     Corrosion-induced spalling       Corrosion of metals embedded in concrete     Corrosion-induced spalling     Surface cracks     Cracks due to embedment of dissimilar metals (handrails)       Improper reinforcing steel placement     Paint peeling     Mouldiness       Premature removal of forms     Segregation     Staining       Conductor     Stabing     Staining       Cortacks in RC due to load effects (juructural cracks)     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):						tica		
Building type:     Dormitory     Shear-Wall plan configuration       Public     Commercial     Non-Structural Defects       Building status:     Under Construction     Waterproofing defects, water leakage and seepage       Occupied     Defected wooden door       Abandoned     Environmentation       Reinforced Concrete Defects     Rain penetration       Drying shrinkage cracks     Corrosion of metals embedded in concrete     Corrosion-induced spalling       Corrosion of metals embedded in concrete     Corrosion-induced spalling     Surface cracks     Cracks due to embedment of dissimilar metals (handrails)       Improper reinforcing steel placement     Paint peeling     Mouldiness       Premature removal of forms     Segregation     Staining       Conductor     Stabing     Staining       Cortacks in RC due to load effects (juructural cracks)     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):		Residential				Ver c(		
Public       Short column         Commercial       Non-Structural Defects         Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Dccupied       Defected wooden door         Abandoned       Controstion       Rain penetration         Drying shrinkage cracks       The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon	Building type:		Dormitory			-		shear-wall plan configuration
Commercial       Non-Structural Defects         Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Occupied       Defected wooden door       Abandoned         Reinforced Concrete Defects       Condensation       Rising damp         Drying shrinkage cracks       Improve reinforcing defects, water leakage and seepage       Condensation         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Tracks due to embedment of dissimilar metals (handrails)       Surface cracks       Crazing         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Paint peeling       Bouildiness         Cracks in RC due to load effects (faulty to load effects)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):	6 JI						design radi	
Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Occupied       Defected wooden door       Defected wooden door         Abandoned       Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced spalling       Surface cracks       crazing         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Paint peeling       Mouldiness         Premature removal of forms       Cold joints       Non-structural cracks       Joint cracks       Other notes (if available):         Cracks in RC due to load effects (faulty to load effects)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):							Non-S	
Building status:       Occupied Abandoned       Defected wooden door         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Drying shrinkage cracks       Surface cracks         Corrosion of metals embedded in concrete       Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)       Surface cracks       Crazing on wall finishes         Improper reinforcing steel placement       Improper reinforcing steel placement       Paint peeling         Premature removal of forms       Staining         Cold joints       Non-structural cracks       Joint cracks         Building status:       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):		Under Constru	uction					
Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Surface cracks       crazing         Construction defects (faulty workmanship): designer, detailer, and contractor       Improper grades of slab surfaces       Non-structural cracks       Mouldiness       Mouldiness         Cracks in RC due to load effects (structural contractor       Slab/beam-to column shear (punching shear) cracks       Non-structural cracks       Joint cracks       Other notes (if available):	Building status:	Occupied						
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesSurface cracks Map/pattern crackingConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementMouldinessImproper Tremature removal of formsCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksNon-structural cracksJoint cracksCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksOther notes (if available):						Condensation		
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesSurface cracks Map/pattern crackingConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementMouldinessImproper Tremature removal of formsCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksNon-structural cracksJoint cracksCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksOther notes (if available):	Reinfo	rced Concrete	Defects					Rising damp
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesSurface cracks Map/pattern crackingConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementMouldinessImproper Tremature removal of formsCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksNon-structural cracksJoint cracksCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksOther notes (if available):						udu		
Improper reinforcing steel placement     Mouldiness       Construction defects (faulty workmanship): designer, detailer, and contractor     Improper reinforcing steel placement     Mouldiness       V     Mouldiness     Mouldiness       V     Wall finishes workmanship problem       Segregation     Staining       Honeycombing     Joint cracks       Improper grades of slab surfaces     Mouldiness       Slab/beam-to column shear (punching shear) cracks     Other notes (if available):	Dryin	g shrinkage crac	ks		s	dar	Leaking	pipes, spills and other moisture
Improper reinforcing steel placement     Mouldiness       Construction defects (faulty workmanship): designer, detailer, and contractor     Improper reinforcing steel placement     Mouldiness       V     Mouldiness     Mouldiness       V     Wall finishes workmanship problem       Segregation     Staining       Honeycombing     Joint cracks       Improper grades of slab surfaces     Mouldiness       Slab/beam-to column shear (punching shear) cracks     Other notes (if available):				$\square$	ect			
Improper reinforcing steel placement     Mouldiness       Construction defects (faulty workmanship): designer, detailer, and contractor     Improper reinforcing steel placement     Mouldiness       V     Mouldiness     Mouldiness       V     Wall finishes workmanship problem       Segregation     Staining       Honeycombing     Joint cracks       Improper grades of slab surfaces     Mouldiness       Slab/beam-to column shear (punching shear) cracks     Other notes (if available):	Corrosion of			$\square$	def			2
Improper reinforcing steel placement     Mouldiness       Construction defects (faulty workmanship): designer, detailer, and contractor     Improper reinforcing steel placement     Mouldiness       V     Mouldiness     Mouldiness       V     Wall finishes workmanship problem       Segregation     Staining       Honeycombing     Joint cracks       Improper grades of slab surfaces     Mouldiness       Slab/beam-to column shear (punching shear) cracks     Other notes (if available):				$\vdash$	ace	on wal	I finishes	
Improper reinforcing steel placement     Mouldiness       Construction defects (faulty workmanship): designer, detailer, and contractor     Improper reinforcing steel placement     Mouldiness       V     Mouldiness     Mouldiness       V     Wall finishes workmanship problem       Segregation     Staining       Honeycombing     Joint cracks       Improper grades of slab surfaces     Mouldiness       Slab/beam-to column shear (punching shear) cracks     Other notes (if available):					urf			
Construction defects (faulty workmanship): designer, detailer, and contractor       Premature removal of forms       Wall finishes workmanship problem         Cold joints       Non-structural cracks       Joint cracks         Moneycombing       Improper grades of slab surfaces       Joint cracks         Cracks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):				$\left  - \right $	S			
Construction       Premature removal of forms       Staining         defects (faulty       Cold joints       Non-structural         workmanship):       designer, detailer,       Segregation       cracks         and contractor       Improper grades of slab       surfaces       Other notes (if available):         Cracks in RC due       Slab/beam-to column shear       (punching shear) cracks       Other notes (if available):         (structural cracks)       Cantilevered member cracks       Cantilevered member cracks       Other notes (if available):					-		W/-11 (* * *	
defects (faulty workmanship): designer, detailer, and contractor       Cold joints       Non-structural cracks       Joint cracks         Moneycombing       Improper grades of slab surfaces       Other notes (if available):         Cracks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):	Construction				ŀ		wall finish	* *
Workmanship): designer, detailer, and contractor     Segregation     cracks       Improper grades of slab surfaces     Improper grades of slab surfaces     Other notes (if available):       Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):	defects (faulty				N	1		Staining
designer, detailer, and contractor       Honeycombing         Improper grades of slab surfaces       Other notes (if available):         Cracks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):				$\left  - \right $				Joint cracks
Improper grades of slab surfaces     Other notes (if available):       Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):	<b>U</b>					Aucro		
Surfaces     Other notes (if available):       Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks	and contractor							
Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks       Cantilevered member cracks					Othe	er notes (	if available)	<u>n</u>
Cracks in RC due to load effects (structural cracks)     (punching shear) cracks       Cantilevered member cracks								
to load effects (structural cracks) Cantilevered member cracks	Cracks in RC due	Cracks in RC due (punching shear) cracks						
(structural cracks)								
Settlement cracks	(structural cracks)			$\vdash$				
		Settiem	ent cracks					

Case Study #58 (L8)									
	Profile						e Design Faults		
	1					Week colu	mn-strong beam Torsional Irregularity		
						=	(Torsion eccentricity)		
			r			ty i	Floor discontinuity		
					Horizontal structural configuration	Irregularity in plan	Projections in plan		
					sonf		Non-continuous beams		
					uctural c	Beam elementary design faults	Non-uniform beam span and cross-section		
District:	L	efkoşa		iration	ntal str	am ele lesign	Absence of vertical support at beams intersection		
Area:	Erdemli	(Tremetousia)		Structural configuration	Iorizoi		Broken axis beams and frames		
Street name:	No street	mag man f		ral c	Ξ	Slab	Over-stretched one-way slab		
Street name:	No street names were found			ctur		elementary design faults	Poorly supported or heavily loaded cantilevered slabs		
Latitude:	35°	5'4.14"N	10	Stru			ng and separation problem		
Longitude:	33°3	6'17.01"E				y n	Weak storey		
	<14 Da years	ate (if available):		l ral	Irregularity in elevation	Soft storey			
Structure age:	Between 14 au (1974-2003)	-			Vertical structural configuration		Discontinuity of columns or shear walls		
	>43 years (Be	fore 1974)		-	al s figu	Vertical	Broken axis columns		
		Apartment	_		con	structural element	Irregular column and/or		
Building type:	Residential	House Dormitory			>	elementary design fault	shear-wall plan configuration		
	Public	· · · ·			-		Short column		
	Commercial			Non-Structural Defects					
D 111	Under Constru	iction		Waterproofing defects, water leakage and seepa Defected wooden door					
Building status:	Occupied Abandoned					Defected	Condensation		
Rainfo	rced Concrete	Defects			SS		Rising damp		
Kenno		Defects		Rising damp			Rain penetration		
Dryin	g shrinkage crac	eks		Surface defects	dampness	Leaking p	pes, spills and other moisture sources		
Corrosion of		duced cracking	d of	def		e cracks	crazing		
metals embedded		duced spalling		e o	on wal	l finishes	Map/pattern cracking		
in concrete		embedment of		urta			fflorescence		
		etals (handrails)	Ŭ	2			aint peeling		
		inforcing steel		-			Mouldiness workmanship problem		
Construction		moval of forms				wan minsie	Staining		
defects (faulty		l joints	N	on-stru	uctural				
workmanship): designer, detailer,	Segr	egation		crac	ks		Joint cracks		
and contractor		combing							
	Improper grades of slab		0	ther n	otes (	if available):			
	Slab/beam-to column shear								
Cracks in RC due			T	'he ho	ouse	is for sale			
to load effects		member cracks							
(structural cracks)		ent cracks	$\neg$						

		Case	Stu	dy i	#59 (L	<b>(9</b> )			
	D (11					<i>a</i>			
	Profile						c Design Faults		
							mn-strong beam Torsional Irregularity (Torsion eccentricity) Floor discontinuity		
					figuration	Irregularity in plan	Projections in plan		
					computation Horizontal structural configuration	Beam elementary design faults	Non-continuous beams Non-uniform beam span and cross-section		
District:	L	efkoșa		uratior	ontal st	eam ele desigr	Absence of vertical support at beams intersection		
Area:	Ha	amitköy		configu	Horizo		Broken axis beams and frames		
Street name:		Mehmet Sk		Structural configuration		Slab elementary design faults	Over-stretched one-way slab           Poorly supported or heavily           loaded cantilevered slabs		
Latitude:		13'3.40"N	_	Sti		Poundi	ng and separation problem		
Longitude:		2'35.78"E				y n	Weak storey		
	years	ate (if available): 2009-2010		Iral 1		Irregularity in elevation	Soft storey		
Structure age:	Between 14 au (1974-2003)	-			Vertical structural configuration		Discontinuity of columns or shear walls		
	>43 years (Be		<u> </u>		cal ıfig	Vertical	Broken axis columns		
Building type:	Apartment       Residential     House       Dormitory			Vertio	structural element elementary	Irregular column and/or shear-wall plan configuration			
Building type.	Public	Domitory	H			design fault	Short column		
	Commercial					Non-Str	cuctural Defects		
	Under Constru	uction		Waterproofing defects, water leakage and seepage					
Building status:	Occupied				Defected wooden door				
U	Abandoned			Condensation					
Reinfo	rced Concrete	Defects			ess	Rising damp			
Dryin	g shrinkage crac	eks		ts	dampness	Leaking p	Rain penetration     ipes, spills and other moisture		
	C	d	$\vdash$	Surface defects	<b>C</b> . C	1	sources		
Corrosion of		duced cracking duced spalling	$\left  - \right $	e de		ce cracks	crazing Map/pattern cracking		
metals embedded		b embedment of	$\left  - \right $	ace	on wa		fflorescence		
in concrete		etals (handrails)		Juri			aint peeling		
		inforcing steel	H	•1			Mouldiness		
		ement		ŀ			s workmanship problem		
Construction		moval of forms	[-]			,, an minimu	Staining		
defects (faulty		l joints		Non-	structural				
	designer, detailer,				racks		Joint cracks		
and contractor									
Improper grades of slab			04		if ove:1-11)				
	surfaces			othe	er notes (	if available):			
Cracks in RC due		o column shear shear) cracks							
to load effects	Cantilevered	member cracks	$  \neg$						
(structural cracks)	Settlem	ent cracks							

	Case Study #60 (L10)									
_	Profile						c Design Faults			
and the second	-				Week column-strong beam					
						_	Torsional Irregularity			
		The second second second second second second s				y in	(Torsion eccentricity)			
	1111					Irregularity in plan	Floor discontinuity			
		1		u	gulari plan	Projections in plan				
					atic	ITE				
					iguı					
					onf		Non-continuous beams			
					al c	ary s	Non-uniform beam span and			
Second Street and an other street and street and street and street and street and street and street and street					tura	ent	cross-section			
				u	Horizontal structural configuration	lem n fî				
District:	L	efkoşa		atio	al s	Beam elementary design faults	Absence of vertical support at beams intersection			
				gur	ont		Broken axis beams and			
Area:	Ha	amitköy		nfi	oriz	щ	frames			
-				l cc	H	Slab	Over-stretched one-way slab			
Street name:	Sütçü Mehmet Sk			tura		elementary	Poorly supported or heavily			
<b>T</b>	0.50		_	Structural configuration		design faults	loaded cantilevered slabs			
Latitude: Longitude:		13'4.24"N 2'33.72"E	-	St		Pound	ing and separation problem Weak storey			
Longitude:		ate (if available):				ity ion	weak storey			
	years				ıral n	Irregularity in elevation	Soft storey			
Structure age:	Between 14 au	nd 43 years			Vertical structural configuration	lrre in e	Discontinuity of columns or			
	(1974-2003) >43 years (Be	fore 1974)			l str gura	Vertical	shear walls Broken axis columns			
	245 years (Be	Apartment			ical	structural				
	Residential	House			/ert cc	element	Irregular column and/or			
Building type:	residentia	Dormitory			-	elementary design fault	shear-wall plan configuration			
0.11	Public					design ruure	Short column			
	Commercial			Non-Structural Defects						
	Under Constru	uction		Waterproofing defects, water leakage and seepage						
Building status:	Occupied Abandoned					Defected	d wooden door Condensation			
Doinfo	rced Concrete	Dofoots	-		Rising damp					
Kenno		Defects					Rain penetration			
Dryin	g shrinkage crac	ks			dam	Leaking p	pipes, spills and other moisture			
				ects			sources			
Corrosion of		duced cracking	$\square$	Surface defects		ce cracks	crazing			
metals embedded		duced spalling o embedment of	$\left  - \right $	ace	on wal	l finishes	Map/pattern cracking			
in concrete		etals (handrails)		Surf			Paint peeling			
		inforcing steel					Mouldiness			
		ement		ľ			s workmanship problem			
Construction	Premature re	moval of forms		-			Staining			
defects (faulty workmanship):		l joints			structural		Joint cracks			
designer, detailer,		egation		С	racks					
and contractor		combing								
		grades of slab faces		Othe	er notes (	if available):				
	Cracks in RC due Slab/beam-to column shear (punching shear) cracks									
to load effects		member cracks								
(structural cracks)	Settlem	ent cracks								

	Case Study #61 (L11)									
	Profile					Seismio	: Design Faults			
A Contraction			_			Week colu	nn-strong beam			
							Torsional Irregularity			
						v in	(Torsion eccentricity)			
			2			urity un	Floor discontinuity			
					Horizontal structural configuration	Irregularity in plan	Projections in plan			
					cont	~	Non-continuous beams			
			and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second se	_	ructural c	Beam elementary design faults	Non-uniform beam span and cross-section			
District:	Ι	.efkoşa		uration	ntal st	am el desigr	Absence of vertical support at beams intersection			
Area:	Н	amitköy		Structural configuration	lorizoı	Be	Broken axis beams and frames			
<u><u> </u></u>	~			al c	H	Slab	Over-stretched one-way slab			
Street name:		incak Sk		ructur		elementary design faults	Poorly supported or heavily loaded cantilevered slabs			
Latitude:		2'59.96"N	_	St		Poundi	ng and separation problem			
Longitude:		22'29.36"E	_			ity on	Weak storey			
	<14 Date (if available): years		ural n	Irregularity in elevation	Soft storey					
Structure age:	Between 14 a (1974-2003)	-			Vertical structural configuration	I I	Discontinuity of columns or shear walls			
	>43 years (Be				cal s ufigu	Vertical structural	Broken axis columns			
		Apartment			ertic cor	element	Irregular column and/or			
D 111 /	Residential	House			V(	elementary	shear-wall plan configuration			
Building type:	D 11	Dormitory				design fault				
	Public Commercial					Non Str	Short column ructural Defects			
	Under Constr	uction		Waterproofing defects, water leakage and seepa						
Building status:	Occupied			Defected wooden door						
J. J. J. J. J. J. J. J. J. J. J. J. J. J	Abandoned			Condensation						
Reinfo	rced Concrete	Defects		Rising damp Rain penetration Leaking pipes, spills and other m						
		1			ıdun	<b>T</b> 1 · · ·	Rain penetration			
Drying	g shrinkage cra	cks		cts	dî	Leaking pi	pes, spills and other moisture sources			
	Corrosion-ir	duced cracking		Surface defects	Surfac	ce cracks	crazing			
Corrosion of metals embedded	Corrosion-in	nduced spalling		ce d		ll finishes	Map/pattern cracking			
in concrete		o embedment of		urfa		E	fflorescence			
		etals (handrails)		Su			aint peeling			
		einforcing steel		-			Mouldiness			
Construction	1	cement emoval of forms		-		wall finishes	workmanship problem Staining			
defects (faulty		d joints		Non	structural					
workmanship):		regation			racks		Joint cracks			
designer, detailer, and contractor	designer, detailer, Honeycombing									
	Improper grades of slab			Oth	er notes (	if available):				
	surfaces			Juit	A HOLES (	<u>11 availaUle).</u>				
Cracks in RC due	Cracks in RC due Slab/beam-to column shear (punching shear) cracks									
to load effects			$\vdash$							
(structural cracks)		member cracks	$\vdash$							
	Settlen	ent cracks								

ProfileSeismic Design FaultsVeek column-strong beamTorsional Irregula (Torsion eccentric)Image: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsVeek column-strong beamImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design FaultsImage: Seismic Design Fau	city) iity
Week column-strong beam         Week column-strong beam         Torsional Irregula         (Torsion eccentric         Floor discontinu         Projections in pl         Non-continuous be         Non-continuous be         Non-continuous be         Non-uniform beam sp         cross-section	city) iity
Image: Second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second	city) iity
Image: Second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second	city) iity
Image: Second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second	iity
Non-continuous be       Image: Second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second se	•
Non-continuous be       Image: Second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second se	lan
District:     Loffrage     B     Loffrage     B     Mon-continuous be training	
District:     Laffrage     B     Transmission     Non-uniform beam signature	
District:	
District: Lefkoşa Absence of ventears at beams intersec	tion
District:LefkoşaI I I I II I I I I II I I I I I IAbsence of vertical s 	
$\overrightarrow{S}$ $\overrightarrow{T}$ Slab Over-stretched one-w	
Street name:         Anittepe Cd         elementary design faults         Poorly supported or loaded cantilevered	
Latitude: 35°12'57.11"N Pounding and separation proble	
Longitude: 33°22'25 40"E Weak storey	
<14 Date (if available):	
Structure age:     years     2006       Between 14 and 43 years (1974-2003)     Image: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Structure age: Str	imns or
>43 years (Before 1974)	mns
Apartment $336$ structural	
Residential House 5 element House 5 elementary shear-wall plan config	
Building type: Dormitory design fault	guration
Public Short column	
Commercial Non-Structural Defects	
Under Construction         Waterproofing defects, water leakage and seep           Building status:         Occupied         Defected wooden door	age
Abandoned Condensation	
Reinforced Concrete Defects       Set       Rising damp         Drying shrinkage cracks       E       Leaking pipes, spills and other model	
Drying shrinkage cracks     End to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end to be an end	isture
Corrosion of Corrosion-induced cracking ⁵ Surface cracks crazing	
Corrosion-induced spallinggon wall finishesMap/pattern crackimetals embeddedCracks due to embedment ofEfflorescence	ng
Incluse clusted of in concrete     Cracks due to embedment of dissimilar metals (handrails)     Efflorescence	
Improper reinforcing steel         Mouldiness	
placement Wall finishes workmanship problem	<b>F</b>
Construction Premature removal of forms Staining	
defects (faulty workmanship): Cold joints Non-structural Joint cracks	
designer detailer Segregation cracks	
and contractor Honeycombing	
Improper grades of slab surfaces <u>Other notes (if available):</u>	
Slab/beam-to column shear	
Cracks in RC due (punching shear) cracks	
to load effects Cantilevered member cracks	
(structural cracks) Settlement cracks	

	Case Study #63 (L13)									
	Profile						e Design Faults			
				_		Week colu	nn-strong beam			
							Torsional Irregularity			
						, in	(Torsion eccentricity)			
Villes 1						urity un	Floor discontinuity			
					Horizontal structural configuration	Irregularity in plan	Projections in plan			
-					con	Beam elementary design faults	Non-continuous beams			
					cuctural o		Non-uniform beam span and cross-section			
District:	L	efkoşa		Structural configuration	ıtal str	am ele desigr	Absence of vertical support at beams intersection			
Area:	Ha	ımitköy	5	onfigu	orizoi	Be	Broken axis beams and frames			
<b>C</b> , , ,				al c	Ξ	Slab	Over-stretched one-way slab			
Street name:	Anı	ttepe Cd		tura		elementary design faults	Poorly supported or heavily			
Latitude:	2501	2152 52"N	_	Iruc			loaded cantilevered slabs ng and separation problem			
		2'52.53"N 2'24.62"E		S		Poullul	Weak storey			
Longitude:		te (if available):				ity ion	weak storey			
<b>6</b> .	years 2004-2005	ural n	Irregularity in elevation	Soft storey						
Structure age:	Between 14 ar	nd 43 years			ertical structur configuration	lrre in e	Discontinuity of columns or			
	(1974-2003) >43 years (Be	fore 1074)			l str gur	Vertical	shear walls Broken axis columns			
	245 years (be	Apartment			ica	structural				
	Residential	House			/ert cc	element	Irregular column and/or			
Building type:	Residential	Dormitory			-	elementary design fault	shear-wall plan configuration			
0.71	Public					design fault	Short column			
	Commercial					Non-Str	uctural Defects			
	Under Constru	iction		Waterproofing defects, water leakage and seepage						
Building status:	Occupied			Defected wooden door						
	Abandoned			Condensation						
Reinfo	rced Concrete	Defects					Rising damp			
Durin	1	1			duu	Rain penetration Leaking pipes, spills and other moistur				
Drying	g shrinkage crac	KS		Surface defects	dź	Leaking pi	sources			
Corrosion of	Corrosion-in	duced cracking		defe	Surfac	ce cracks	crazing			
metals embedded		duced spalling		ce	on wal	l finishes	Map/pattern cracking			
in concrete		embedment of	· · · · ·	ırfa			fflorescence			
		tals (handrails)	1	S			aint peeling			
		inforcing steel		-			Mouldiness			
Construction	-	ement	-	-		Wall finishes	workmanship problem			
defects (faulty		moval of forms	N	Jon	structural		Staining			
workmanship):		egation			racks		Joint cracks			
designer, detailer,		combing								
and contractor	and contractor Improper grades of slab			2.1						
		faces		Ithe	r notes (	if available):				
		column shear	]							
Cracks in RC due to load effects		shear) cracks								
(structural cracks)	Cantilevered	member cracks								
(structural cracks)	Settlem	ent cracks								

	Case Study #64 (L14)										
	Profile					e Design Faults					
					Week colui	nn-strong beam					
					_	Torsional Irregularity					
		6			y in	(Torsion eccentricity)					
					arit.	Floor discontinuity					
				Horizontal structural configuration	Irregularity in plan	Projections in plan					
			cor	x	Non-continuous beams						
					Beam elementary design faults	Non-uniform beam span and cross-section					
District:	Lefkoşa		Structural configuration	ıtal str	am elementa design faults	Absence of vertical support at beams intersection					
Area:	Hamitköy		onfigu	orizor	Be	Broken axis beams and frames					
<b>G</b> ( (			al c	Н	Slab	Over-stretched one-way slab					
Street name:	Anıttepe Cd		uctura	-	elementary design faults	Poorly supported or heavily loaded cantilevered slabs					
Latitude:	35°12'53.26"N		Sti		Poundi	ng and separation problem					
Longitude:	33°22'26.27"E	_			ity on	Weak storey					
	<14 Date (if available): years		ural	Irregularity In elevation	Soft storey						
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration		Discontinuity of columns or shear walls					
	>43 years (Before 1974)			cal	Vertical structural	Broken axis columns					
	Apartment Residential House			ertic	element	Irregular column and/or					
Building type:	Dormitory			Ň	elementary design fault	shear-wall plan configuration					
	Public					Short column					
	Commercial		Non-Structural Defects								
Devil dia a statuar	Under Construction		Waterproofing defects, water leakage and seepage Defected wooden door								
Building status:	Occupied Abandoned				Defected	Condensation					
Reinfo	rced Concrete Defects			ss		Rising damp					
Keimo	ited concrete belees			pne		Rain penetration					
Dryin	g shrinkage cracks		ects	dampness	Leaking pi	pes, spills and other moisture sources					
Corrosion of	Corrosion-induced cracking		Surface defects		e cracks	crazing					
metals embedded	Corrosion-induced spalling		lce	on wal	l finishes	Map/pattern cracking					
in concrete	Cracks due to embedment of		urfê			fflorescence					
	dissimilar metals (handrails)	$\left  - \right $	ŝ			aint peeling					
	Improper reinforcing steel placement					Mouldiness workmanship problem					
Construction	Premature removal of forms	$\left  - \right $			vv an minsnes	Staining					
defects (faulty	Cold joints		Non-	structural							
workmanship):	Segregation			racks		Joint cracks					
designer, detailer, and contractor	Honovoombing										
	Improper grades of slab		Oth.	r notos (	if available)						
	surfaces	$\square$		a notes (	if available):						
Cracks in RC due	Slab/beam-to column shear (punching shear) cracks		The	building	g is used as f	ruits storage.					
to load effects	Cantilevered member cracks	$\vdash$									
(structural cracks)											
	Settlement cracks										

	Case Stud	y #65	/103 (L	(15/C3)			
	Drofflo			<b>G</b> a <b>:</b> a:	Design Founds		
	Profile	_			nn-strong beam		
AL-					Torsional Irregularity (Torsion eccentricity)		
				rity n	Floor discontinuity		
			Horizontal structural configuration	Irregularity in plan	Projections in plan		
			con	y	Non-continuous beams		
			tructural	Beam elementary design faults	Non-uniform beam span and cross-section		
District:	Lefkoşa	Structural configuration	ntal str	am ele design	Absence of vertical support at beams intersection		
Area:	Hamitköy	onfio	orizo	Be	Broken axis beams and frames		
		al co	H	Slab	Over-stretched one-way slab		
Street name:	Güven Sk	Tuctur		elementary design faults	Poorly supported or heavily loaded cantilevered slabs		
Latitude:	35°12'46.80"N	Str		Poundi	ng and separation problem		
Longitude:	33°22'27.68"E	_		ty on	Weak storey		
	<14 Date (if available): years		n al	Irregularity in elevation	Soft storey		
Structure age:	Between 14 and 43 years (1974-2003)		ertical structur configuration	Irre in e	Discontinuity of columns or shear walls		
	>43 years (Before 1974)		al s figu	Vertical	Broken axis columns		
Building type:	Apartment       Residential     House       Dormitory		Vertical structural configuration	structural element elementary design fault	Irregular column and/or shear-wall plan configuration		
	Public Commercial				Short column		
	Under Construction		Non-Structural Defects Waterproofing defects, water leakage and seepage				
Building status:	Occupied		(futerpr	Defected wooden door			
	Abandoned			Condensation			
Reinfo	rced Concrete Defects		ness		Rising damp		
Dryin	g shrinkage cracks	cts	dampness	Leaking pi	Rain penetration pes, spills and other moisture sources		
Corrector	Corrosion-induced cracking	Surface defects	Surfa	ce cracks	crazing		
Corrosion of metals embedded	Corrosion-induced spalling	Ce (	on wa	ll finishes	Map/pattern cracking		
in concrete	Cracks due to embedment of dissimilar metals (handroils)	IIII			fflorescence		
	dissimilar metals (handrails) Improper reinforcing steel	ý.			aint peeling Mouldiness		
	placement		<b>—</b>		workmanship problem		
Construction	Premature removal of forms				Staining		
defects (faulty workmanship):	Cold joints	No	n-structural	l	Joint cracks		
designer, detailer,	Segregation		cracks		Joint crucks		
and contractor	Honeycombing						
	Improper grades of slab surfaces	Ot	her notes (	(if available):			
Cracks in RC due	Slab/beam-to column shear (punching shear) cracks			-	hed except for the ground floor and occupied. Thus it is		
to load effects (structural cracks)	Cantilevered member cracks				-		
(structurar cracks)	Settlement cracks		- considered a shared case study between Lefcosa case				
			study section and the under construction case study				
		see	ction.				

	Case Study #66 (L16)									
_	Profile	and the Barry of					ic Design Faults			
		and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s	-		Week column-strong beam					
			ţ.			_	Torsional Irregularity			
5000.		2 02				y in	(Torsion eccentricity)			
			a			arit. an	Floor discontinuity			
					Horizontal structural configuration	Irregularity in plan	Projections in plan			
					fuo		Non-continuous beams			
				u	uctural c	Beam elementary design faults	Non-uniform beam span and cross-section			
District:	L	efkoşa		uration	ntal str	Beam elementa design faults	Absence of vertical support at beams intersection			
Area:	Ha	ımitköy		Structural configuration	Horizo.		Broken axis beams and frames			
<b>C</b> ( (	~	<b>C1</b>		al c	H	Slab	Over-stretched one-way slab			
Street name:	Ca	nan Sk		ctur		elementary design faults	Poorly supported or heavily loaded cantilevered slabs			
Latitude:	35°1	2'45.18"N		true	·	-	ling and separation problem			
Longitude:		22'7.75"E		<i>o</i> 2			Weak storey			
		te (if available):			al	Irregularity in elevation	Soft storey			
Structure age:	Between 14 au (1974-2003)	nd 43 years			Vertical structural configuration		Discontinuity of columns or shear walls			
	>43 years (Be				al s figu	Vertical	Broken axis columns			
		Apartment			rtic	structural element	Irregular column and/or			
	Residential	House			Ve	elementary	shear-wall plan configuration			
Building type:		Dormitory				design fault				
	Public						Short column			
	Commercial Under Constru	ation		Non-Structural Defects Waterproofing defects, water leakage and seepage						
Building status:	Occupied	iction			waterpro		d wooden door			
Dunung status.	Abandoned					Defecte	Condensation			
Reinfo	rced Concrete	Defects			ess		Rising damp			
					dampness		Rain penetration			
Dryin	g shrinkage crac	ks		Surface defects	dan	Leaking	pipes, spills and other moisture sources			
Corrosion of		duced cracking	$\square$	def		ce cracks	crazing			
metals embedded		duced spalling	$\left  - \right $	ace	on wal	l finishes	Map/pattern cracking			
in concrete		embedment of tals (handrails)		urf			Efflorescence			
		inforcing steel		S			Paint peeling Mouldiness			
		ement		-		Wall finish	es workmanship problem			
Construction		moval of forms		-		vv un minsik	Staining			
defects (faulty		l joints		Non-	structural					
workmanship): designer, detailer,		egation		с	racks		Joint cracks			
and contractor	and contractor Honeycombing									
	Improper grades of slab			Othe	er notes (	if available):				
	surfaces			<u></u>	<u> </u>	<u></u>				
Cracks in RC due (nunching shear) cracks										
to load effects	e (punching shear) cracks Cantilevered member cracks									
(structural cracks)			$\left  - \right $							
	Settlem	ent cracks								

	<b>Case Study #67 (L17)</b>									
	Profile						c Design Faults			
4	1					Week colu	mn-strong beam			
	- Cart						Torsional Irregularity			
154131		-				.Щ	(Torsion eccentricity)			
						n ty	Floor discontinuity			
					Horizontal structural configuration	Irregularity in plan	Projections in plan			
			-		con	~	Non-continuous beams			
					uctural (	Beam elementary design faults	Non-uniform beam span and cross-section			
District:	L	efkoşa		ration	ntal str	am ele lesign	Absence of vertical support at beams intersection			
Area:	G	oenyeli		onfigu	orizor	Bec	Broken axis beams and frames			
Street name:	Taşkınsu Sk			Structural configuration	Н	Slab elementary design faults	Over-stretched one-way slab Poorly supported or heavily loaded cantilevered slabs			
Latitude:	35°1	2'41.64"N		Stru		Poundi	ng and separation problem			
Longitude:	33°17'35.24"E						Weak storey			
		te (if available):			al	Irregularity in elevation	Soft storey			
Structure age:	Between 14 at (1974-2003)	nd 43 years			Vertical structural configuration	Irreg in eld	Discontinuity of columns or shear walls			
	>43 years (Be	fore 1974)			al sı ïgu	Vertical	Broken axis columns			
		Apartment			tic: onf	structural				
Building type:	Residential	House Dormitory	H		Veı c	element elementary design fault	Irregular column and/or shear-wall plan configuration			
6 91	Public						Short column			
	Commercial			Non-Structural Defects						
	Under Constru	iction			Waterpro		, water leakage and seepage			
Building status:	Occupied					Defected	wooden door			
	Abandoned		_		ŝ		Condensation			
Reinfo	rced Concrete	Defects			nes		Rising damp			
Dryin	g shrinkage crac	ke			ampness	Rain penetration Leaking pipes, spills and other moisture				
Drym	g sinnkage erae	KS		cts	p	Leaking pi	sources			
	Corrosion-in	duced cracking		lefe	Surfac	ce cracks	crazing			
Corrosion of		duced spalling		Surface defects		ll finishes	Map/pattern cracking			
metals embedded		embedment of		rfac		E	fflorescence			
in concrete	dissimilar me	tals (handrails)		Su		Р	aint peeling			
	Improper re	inforcing steel		1			Mouldiness			
		ement		ľ		Wall finishes	workmanship problem			
Construction	Premature re	moval of forms		Ī			Staining			
defects (faulty workmanship):	Cold	l joints		Non-	structural		Joint cracks			
designer, detailer,	Segr	egation		С	cracks		John cracks			
and contractor	and contractor Honeycombing									
		rades of slab faces		<u>Oth</u> e	er notes (	if available):				
	Slab/beam-to	o column shear					s the rear facade as the front			
Cracks in RC due	(punching	shear) cracks			-	lots of parkin				
to load effects	Cantilevered	member cracks		Tava		iots of parkin	ig cars.			
(structural cracks)	Settlem	ent cracks								

	Case Study #68 (L18)									
	Profile					Seismie	: Design Faults			
		and the state				Week colu	mn-strong beam			
· ·		Pine I have					Torsional Irregularity			
		3				н.	(Torsion eccentricity)			
						n nity	Floor discontinuity			
					Horizontal structural configuration	Irregularity in plan	Projections in plan			
A many					con	~	Non-continuous beams			
				u	ructural	Beam elementary design faults	Non-uniform beam span and cross-section			
District:	L	efkoşa		Iratior	ntal st		Absence of vertical support at beams intersection			
Area:	G	oenyeli		Structural configuration	orizor		Broken axis beams and frames			
G	~	11 01		al c	Н	Slab	Over-stretched one-way slab			
Street name:	Sazlıka Sk			tura		elementary design faults	Poorly supported or heavily			
Latitude:	35°1	2'40.60"N	-	truc		-	loaded cantilevered slabs ng and separation problem			
Longitude:		7'36.01"E	_	S			Weak storey			
Longhude.		te (if available):			al	Irregularity in elevation	Soft storey			
Structure age:	Between 14 ar (1974-2003)	nd 43 years			Vertical structural configuration	Irregu in ele	Discontinuity of columns or shear walls			
	>43 years (Be	fore 1974)			l sti gur	Vertical	Broken axis columns			
		Apartment			tica	structural				
	Residential	House			Ver c(	element elementary	Irregular column and/or			
Building type:		Dormitory			F	design fault	shear-wall plan configuration			
	Public					8	Short column			
	Commercial						uctural Defects			
	Under Constru	iction		Waterproofing defects, water leakage and seepage						
Building status:	Occupied					Defected	wooden door			
Dainfa	Abandoned rced Concrete 1	Dofesta	_		s		Condensation			
Keinio	rcea Concrete	Defects			lampness		Rising damp Rain penetration			
Dryin	g shrinkage crac	ks		ects	damj	Leaking pi	ipes, spills and other moisture sources			
Corrosion of		duced cracking		Surface defects		ce cracks	crazing			
metals embedded		duced spalling		ice.	on wal	l finishes	Map/pattern cracking			
in concrete		embedment of		urfa			fflorescence			
		tals (handrails)	$\vdash$	Ñ			aint peeling			
		inforcing steel ement					Mouldiness workmanship problem			
Construction		moval of forms		-		wall finishes	Staining			
defects (faulty		joints	N	Non	structural					
workmanship):		egation			racks		Joint cracks			
designer, detailer,	and contractor Improper grades of slab									
and contractor				Դ <b>քե</b> -	r notas (	if available)				
		faces		Jine	a notes (	if available):				
Cracks in RC due	Slab/beam-to column shear									
to load effects		shear) cracks	$\left  - \right $							
(structural cracks)		member cracks								
	Settlem	ent cracks								

		Case	Stu	dy #	<b>#69 (L</b>	19)		
	D (#1							
	Profile		-				: Design Faults	
			-			Week colur	nn-strong beam Torsional Irregularity	
		a kind				-	(Torsion eccentricity)	
The second		is i				y ii	Floor discontinuity	
						ularit plan	Floor discontinuity	
			Ţ		Horizontal structural configuration	Irregularity in plan	Projections in plan	
					cont	x	Non-continuous beams	
				-	ructural e	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	Ι	efkoşa		uratior	ntal st	eam el desigr	Absence of vertical support at beams intersection	
Area:	G	oenyeli		Structural configuration	Iorizo		Broken axis beams and frames	
Street nome	<b>I</b> Z :	ulaam Cl-		al c	Ţ	Slab	Over-stretched one-way slab	
Street name:	K12	ulçam Sk		ctur		elementary design faults	Poorly supported or heavily loaded cantilevered slabs	
Latitude:	35°1	2'40.97"N	_	true			ng and separation problem	
Longitude:		7'41.41"E		S			Weak storey	
		ate (if available): 2004-2005			al	Irregularity in elevation	Soft storey	
Structure age:	Between 14 at (1974-2003)				Vertical structural configuration	Irreg in ele	Discontinuity of columns or shear walls	
	>43 years (Be	fore 1974)			al st ïgu	Vertical	Broken axis columns	
	•	Apartment			trica	structural		
	Residential	House			Vei c	element elementary	Irregular column and/or shear-wall plan configuration	
Building type:		Dormitory				design fault	shear-wan plan configuration	
	Public						Short column	
	Commercial	<u>.</u>		Non-Structural Defects				
D 111 / / /	Under Constr	uction		Waterproofing defects, water leakage and seepage				
Building status:	Occupied Abandoned					Defected	wooden door Condensation	
Reinfo	rced Concrete	Defects			SS		Rising damp	
Kenno		Defects			pne		Rain penetration	
Dryin	g shrinkage crao	:ks		ets	dampness	Leaking pi	pes, spills and other moisture	
	Corrosion-in	duced cracking		Surface defects	Surfa	ce cracks	crazing	
Corrosion of		duced spalling		ie d		l finishes	Map/pattern cracking	
metals embedded		o embedment of		rfac			fflorescence	
in concrete	dissimilar me	etals (handrails)		Sui			aint peeling	
	Improper re	inforcing steel					Mouldiness	
Construction		cement				Wall finishes	workmanship problem	
defects (faulty		moval of forms					Staining	
workmanship):		l joints	Щ		-structural		Joint cracks	
designer, detailer,		egation	⊢∣	C	eracks			
and contractor		combing	┝─┦					
		grades of slab faces		Othe	er notes (	if available):		
		o column shear	$\square$					
Cracks in RC due		shear) cracks						
to load effects	d effects Cantilevered member cracks							
(structural cracks)		ent cracks	$\square$					

	Case	Stud	ly #	470 (L2	20)			
	Profile					Design Faults		
			Week column-strong beam					
and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second sec					_	Torsional Irregularity		
and a start					۲. in	(Torsion eccentricity)		
		d.		Horizontal structural configuration	n ty	Floor discontinuity		
Charles de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la compa					Irregularity in plan	Projections in plan		
AND AN TON				CO1	ý	Non-continuous beams		
And the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s				ıctural	Beam elementary design faults	Non-uniform beam span and cross-section		
District:	Lefkoșa		ration	tal stru	am elementa design faults	Absence of vertical support at beams intersection		
Area:	Goenyeli		Structural configuration	orizon	Bea	Broken axis beams and frames		
Store at me	Vecer De Y- 01		ıl cc	H	Slab	Over-stretched one-way slab		
Street name:	Yaşar Doğu Sk		ura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs		
Latitude:	35°12'46.35"N	-	ruct		-	ng and separation problem		
	33°18'0.86"E	-	Sti			Weak storey		
Longitude.	Longitude:33°18'0.86"E<14			la	larity /ation	Soft storey		
Structure age:	years     Between 14 and 43 years			Vertical structural configuration	Irregularity in elevation	Discontinuity of columns or		
	(1974-2003)			str gura	Vertical	shear walls		
	>43 years (Before 1974)			cal nfig	structural	Broken axis columns		
	Apartment Residential House			erti coi	element	Irregular column and/or		
Building type:	Residential House Dormitory		>	elementary	shear-wall plan configuration			
Bunding type.	Public				design fault	Short column		
	Commercial				Non Str	uctural Defects		
	Under Construction			Waterpro		water leakage and seepage		
Building status:	Occupied			(futerpro	Defected wooden door			
	Abandoned			ess		Condensation		
Reinfo	rced Concrete Defects					Rising damp		
				dampness		Rain penetration		
Dryin	g shrinkage cracks		ects	dar	Leaking pi	pes, spills and other moisture sources		
Corrosion of	Corrosion-induced cracking	$\square$	Surface defect		ce cracks	crazing		
metals embedded	Corrosion-induced spalling	$\square$	ace	on wal	l finishes	Map/pattern cracking		
in concrete	Cracks due to embedment of		urf			florescence		
	dissimilar metals (handrails)	$\square$	S			aint peeling		
	Improper reinforcing steel placement					Aouldiness		
Construction	Premature removal of forms	$\left  - \right $			wan ninishes	workmanship problem Staining		
defects (faulty	Cold joints		Non	structural				
workmanship):	Segregation	╆╋┥		racks		Joint cracks		
designer, detailer,	Honeycombing							
and contractor	Improper grades of slab		. ·					
	surfaces	<u> </u>	Othe	er notes (	if available):			
	Slab/beam-to column shear		The	profile	picture show	s the rear facade as the front		
Cracks in RC due	(punching shear) cracks			-				
to load effects (structural cracks)	Cantilevered member cracks		facade is covered with vegetation.					
(suuctural cracks)	Settlement cracks							

		Case	Stu	dy #	71 (L2	21)			
	Profile						ic Design Faults		
					Week column-strong beam				
						_	Torsional Irregularity		
						y ir	(Torsion eccentricity)		
						arit.	Floor discontinuity		
					Horizontal structural configuration	Irregularity in plan	Projections in plan		
		WINNING	A		tuo		Non-continuous beams		
					uctural c	Beam elementary design faults	Non-uniform beam span and cross-section		
District:	L	efkoşa		Iration	ntal str	am ele design	Absence of vertical support at beams intersection		
Area:	G	oenyeli		Structural configuration	lorizoi	Be	Broken axis beams and frames		
<b>S</b> t. (	<b>X</b> 7	- D - X - C1		al c	Ξ	Slab	Over-stretched one-way slab		
Street name:	Y aşa	r Doğu Sk		ctur		elementary design faults	Poorly supported or heavily loaded cantilevered slabs		
Latitude:	35°1	2'45.84"N	-	truc		-	ing and separation problem		
Longitude:		7'59.29"E	-	~			Weak storey		
Zonghuddi		te (if available):			al	Irregularity in elevation	Soft storey		
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration	Irreg in ele	Discontinuity of columns or shear walls		
	>43 years (Be	fore 1974)			al sı ïgu	Vertical	Broken axis columns		
		Apartment			cut	structural			
	Residential	House			Vei c	element elementary	Irregular column and/or shear-wall plan configuration		
Building type:		Dormitory				design fault			
	Public						Short column		
	Commercial				XX 7 4		ructural Defects		
Duilding status	Under Constru	iction			Waterpro	- U	s, water leakage and seepage		
Building status:	Occupied Abandoned			ſ		Defected	d wooden door Condensation		
Reinfo	rced Concrete	Defects			SS		Rising damp		
Kenno		Derects			pne		Rain penetration		
Dryin	g shrinkage crac	ks		Surface defects	dampness	Leaking p	vipes, spills and other moisture sources		
Corrosion of		duced cracking		def		ce cracks	crazing		
metals embedded		duced spalling	$\square$	lce	on wal	l finishes	Map/pattern cracking		
in concrete		embedment of		urfa	Efflorescence				
		tals (handrails)	$\left  - \right $	Ñ			Paint peeling		
		inforcing steel ement		-			Mouldiness		
Construction		moval of forms	$\left  - \right $	-		wan ninishe	s workmanship problem Staining		
defects (faulty		l joints		Non	structural				
workmanship):		egation			racks		Joint cracks		
designer, detailer, and contractor		combing							
and contractor		grades of slab		041-	n not /	f oucilable)			
		faces		otne	er notes (	if available):			
Creaks in DC da		column shear							
Cracks in RC due to load effects		shear) cracks							
(structural cracks)	ructural cracks)								
(	Settlem	ent cracks							

	Case	Stud	ly #	<b>#72 (L</b> )	22)	
	Profile				Seismic	Design Faults
					Week colur	nn-strong beam
		7				Torsional Irregularity
		12			Ξ.	(Torsion eccentricity)
Julian -					aity 1	Floor discontinuity
				Horizontal structural configuration	Irregularity in plan	Projections in plan
				coi	y	Non-continuous beams
				ıctural	Beam elementary design faults	Non-uniform beam span and cross-section
District:	Lefkoşa		ation	tal strı	am elementa design faults	Absence of vertical support at beams intersection
Area:	Goenyeli		Structural configuration	rizont	Bea	Broken axis beams and frames
			l co	Нс	Slab	Over-stretched one-way slab
Street name:	Yaşar Doğu Sk		ural		elementary design faults	Poorly supported or heavily
T	25010142 2CUN	-	uctı		0	loaded cantilevered slabs
Latitude:	35°12'43.36"N	-	Str		Poundir	ng and separation problem
Longitude:	33°17'59.34"E				ity on	Weak storey
	<14Date (if available):years2004-2005			Iral 1	Irregularity in elevation	Soft storey
Structure age:	Between 14 and 43 years			Vertical structural configuration	Irre n el	Discontinuity of columns or
	(1974-2003)			stru		shear walls
	>43 years (Before 1974)	$\square$		cal ıfig	Vertical structural	Broken axis columns
	Apartment			erti cor	element	Irregular column and/or
	Residential House			V.	elementary	shear-wall plan configuration
Building type:	Dormitory				design fault	
	Public					Short column
	Commercial			<b>XX</b> 7 4		uctural Defects
Building status:	Under Construction Occupied			waterpro		water leakage and seepage wooden door
Bunung status.	Abandoned				Defected	Condensation
Reinfo	rced Concrete Defects			SS		Rising damp
Kenno				pne		Rain penetration
Dryin	g shrinkage cracks		ects	dampness	Leaking pi	pes, spills and other moisture sources
Corrosion of	Corrosion-induced cracking		defe	Surfa	ce cracks	crazing
metals embedded	Corrosion-induced spalling		Surface defect	on wal	l finishes	Map/pattern cracking
in concrete	Cracks due to embedment of		ırfa			florescence
	dissimilar metals (handrails)	$\square$	St		aint peeling	
	Improper reinforcing steel					Aouldiness
Construction	placement	$\left  - \right $			Wall finishes	workmanship problem
defects (faulty	Premature removal of forms	+	N			Staining
workmanship):	Cold joints Segregation	$\left  - \right $		-structural cracks		Joint cracks
designer, detailer,	Honeycombing			racks		
and contractor	Improper grades of slab	┼─┦				
	surfaces		Othe	er notes (	<u>if available):</u>	
	Slab/beam-to column shear	$\square$				
Cracks in RC due	(punching shear) cracks					
to load effects	Cantilevered member cracks	$\square$				
(structural cracks)	Settlement cracks					

		Case	Stud	ly #	73 (L2	23)	
	Profile						c Design Faults
		A	_			Week colu	mn-strong beam
							Torsional Irregularity
						, in	(Torsion eccentricity)
						urity u	Floor discontinuity
	1		Horizontal structural configuration	Irregularity in plan	Projections in plan		
					fuo		Non-continuous beams
and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second sec				_	ructural c	Beam elementary design faults	Non-uniform beam span and cross-section
District:	L	efkoşa		Iration	ntal str	am ele design	Absence of vertical support at beams intersection
Area:	G	oenyeli		Structural configuration	lorizoi	Be	Broken axis beams and frames
<b>S</b> ( )	•	1. 17		al c	Ξ	Slab	Over-stretched one-way slab
Street name:	Anamur	li Kurt Ali Sk		ctur		elementary design faults	Poorly supported or heavily loaded cantilevered slabs
Latitude:	35°1	2'52.22"N	-	struc	·		ing and separation problem
Longitude:		18'5.99"E					Weak storey
		ate (if available):			al	Irregularity in elevation	Soft storey
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration	Irreg in ele	Discontinuity of columns or shear walls
	>43 years (Be	fore 1974)			al st ïgu	Vertical	Broken axis columns
		Apartment			onf	structural	<b>T</b> 1 1 1/
	Residential	House			Vei c	element elementary	Irregular column and/or shear-wall plan configuration
Building type:		Dormitory				design fault	
	Public						Short column
	Commercial				XX 7 4		ructural Defects
Duilding status	Under Constru	iction			Waterpro		, water leakage and seepage
Building status:	Occupied Abandoned					Defected	Condensation
Reinfo	rced Concrete	Defects			SS		Rising damp
					dampness		Rain penetration
Drying	g shrinkage crac	ks		Surface defects	dan	Leaking p	ipes, spills and other moisture sources
Corrosion of		duced cracking		def		e cracks crazing	
metals embedded		duced spalling	$\square$	tce	on wal	l finishes	Map/pattern cracking
in concrete		embedment of		urfa			fflorescence
		etals (handrails)		Ñ			Paint peeling
		inforcing steel					Mouldiness s workmanship problem
Construction		moval of forms	$\vdash$	-	Staining		
defects (faulty		l joints		Non-	structural		
workmanship):		egation			racks		Joint cracks
designer, detailer, and contractor		combing					
and contractor		grades of slab		Ot1-	m mot (	f avail-1-1-)	
		faces		othe	notes (	if available):	
Creaks in DC da		o column shear					
Cracks in RC due to load effects		shear) cracks					
(structural cracks)							
)	Settlem	ent cracks					

	Case	Stud	y ≢	74 (L2	24)	
	Profile				Seismic	e Design Faults
					Week colu	nn-strong beam
						Torsional Irregularity
					Ξ.	(Torsion eccentricity)
		P			n n	Floor discontinuity
		0		Horizontal structural configuration	Irregularity in plan	Projections in plan
				cont		Non-continuous beams
				ructural e	Beam elementary design faults	Non-uniform beam span and cross-section
District:	Lefkoşa		uration	ıtal st	am elo desigr	Absence of vertical support at beams intersection
Area:	Goenyeli	;	Structural configuration	orizoi	Be	Broken axis beams and frames
G			al c	H	Slab	Over-stretched one-way slab
Street name:	Şht. Hüseyin Amca Cd		uctura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs
Latitude:	35°12'54.84"N		Str		Poundi	ng and separation problem
Longitude:	33°17'48.26"E	_			on ty	Weak storey
	<14Date (if available):years2002-2003			ural 1	Irregularity in elevation	Soft storey
Structure age:				Vertical structural configuration	Irre, in el	Discontinuity of columns or shear walls
	>43 years (Before 1974)			al s figu	Vertical	Broken axis columns
Duilding turge	Apartment           Residential			Vertic	structural element elementary	Irregular column and/or shear-wall plan configuration
Building type:	Public Dormitory				design fault	Short column
	Commercial				Non-Str	uctural Defects
	Under Construction		1	Waterpro		water leakage and seepage
Building status:	Occupied				Defected	wooden door
	Abandoned			0		Condensation
Reinfo	rced Concrete Defects			nest		Rising damp
Dryin	g shrinkage cracks		ts	dampness	Leaking pi	Rain penetration           pes, spills and other moisture
	Compaign induced and it		Surface defects	<b>C</b> . <b>C</b>	sources	
Corrosion of	Corrosion-induced cracking Corrosion-induced spalling	$\square$	e de		ce cracks	crazing Map/pattern cracking
metals embedded	Cracks due to embedment of	H.	fact	on wal		fflorescence
in concrete	dissimilar metals (handrails)		Sur			aint peeling
	Improper reinforcing steel		- 1			Mouldiness
0	placement					workmanship problem
Construction	Premature removal of forms					Staining
defects (faulty workmanship):	Cold joints	N	Non-	structural		Joint cracks
designer, detailer,	Segregation		С	racks		
and contractor	Honeycombing					
	Improper grades of slab	C	Othe	er notes (	if available):	
	surfaces Slab/beam-to column shear				······································	
Cracks in RC due	(punching shear) cracks					
to load effects	Cantilevered member cracks					
(structural cracks)	Settlement cracks					
	Settlement Cracks					

Profile         Stismic Design Enaits           Image: Structure age:         Lefkoşa         Image: Structure age:         Non-continuous beams and cross-section           Italitude:         35'1221 96'N         Stab         Non-continuous beams and cross-section           Italitude:         35'1221 96'N         Stab         Poordice of vertical support of a beam's intersection           Italitude:         35'1221 96'N         Stab         Poordice of vertical support of a beam's intersection           Structure age:          Apartment of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those of those o		Case	Stuc	dy #	‡75 (L2	25)			
Week column-strong beam         More-continuity           District:         Lefkoşa         Non-continuous beams           District:         Lefkoşa         Non-continuous beams           Area:         Alayköy Sanayi Bölgesi         Non-continuous beams           Area:         Alayköy Sanayi Bölgesi         Bisb           Street name:         No street names were found         Bisb           Latitude:         33°165.66'E           yaar         2009-2010           Structure age:         Between 14 and 43 years           Building type:         Dismitori           Home         Home           Commercial         Weet column-structure           Under Construction         Dismitory           Public         Information           Construction         Domitory           Public         Construction           Construction         Construction           Dreinding ataus:         Construction           Dreinding ataus:         Concrision-induced cracking           Construction         Construction           Dreinding ataus:         Concrision-induced cracking           Construction         Construction           Construction         Construction           Drestructure b									
District:     Lefkoşa       Area:     Alayköy Sanayi Bölgesi       Street name:     No street names were found       Nos street names:     No street names were found       Latitude:     35°1221.96°N       Longiude:     33°165.66°E       Years     2009-2010       Structure age:     eksiennial       House     100 mainton with the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of the structure of t		Profile				Seismic	Design Faults		
District:       Lefkoşa       Non-continuous beams         Area:       Alayköy Sanayi Bölgesi       Non-continuous beams         Area:       Alayköy Sanayi Bölgesi       Non-continuous beams         Street name:       No street names were found       Stab         Latitude:       35°1221.96'N       Bish         Latitude:       35°1221.96'N       Bish         Street name:       No street names were found       Stab         Latitude:       35°1221.96'N       Poinget and storega         Structure age:       Cata       Date (if available):       Between 14 and 43 yeas         Building type:       Public       Poinget and storega       Borken axis beams and frames         Public       Apartment       Broken axis beams and frames       Broken axis beams and frames         Public       Date (if available):       Bish       Poinget and storega       Bish         Public       Date (if available):       Bish       Borken axis beams and frames       Tragglar columns or shear walls         Building type:       Date (if available):       Bish       Poinget and storega       Soft storeg         Dominicr       Public       Date (if available):       Broken axis columns       Tregglar columns or shear walls         Building type:       Construc									
District:       Lefkoşa         Area:       Alayköy Sanayi Bölgesi         Street name:       No street names were found         Nostreet name:       No street names were found         Latitude:       35°12'21.96''N         Longitude:       33°16'5.66'E         years       2009-2010         Structure age:       Entret 1 and 43 years (1974-2003)         Avage Commercial       Apartment (1974-2003)         Auiding type:       Assame and streemas         Public       Commercial         Under Construction       Dornitory         Building type:       Conson-induced cracking Conson of metals embedded in concrete       Corrosion-induced cracking Corrosion of defects (faulty)       Corrosion-induced cracking Corrosion of defects (faulty)       Corrosion-induced cracking Corrosion of defects (faulty)       Stab       Over structure of structure age:       Staffare eracks Connercial       Corrosion-induced cracking Corrosion-induced cracking Corrosion-induced spaling Corrosion-induced spaling Condersing steel placement       Staffare Corrosion-induced spaling Condersing steel placement       Staffare Corrosion-induced spaling Condersing       Non-structurel Paint peeling       Non-structurel Monuliness         Condersing       Condersing steel placement       Non-structurel Condersing       Non-structurel Staffare       Joint cracks         Condointis       Non-structurel place									
District:     Lefkoşa     Non-uniform beam span and cross-section       Area:     Alayköy Sanayi Bölgesi     Nos-uniform beam span and cross-section       Street name:     No street names were found       Latitude:     35°12'21.96'N       Longitude:     33°16'5.66'E       yaars     2009-2010       Between 14 and 43 years (1974-2003)     Between 14 and 43 years (1974-2003)       Area:     Alayköy Sanayi Bölgesi       Building type:     Alaykör Sanayi Bölgesi       Building status:     Commercial Occupied       Dormitory     Dormitory       Building status:     Commercial Corrosion induced stabiling Crorosion induced stabiling       Drying shrinkage cracks     Surface cracks       Corrosion induced stabiling cracks due to embedment of the stafut realized in inconcete     Surface cracks       Construction defects (faithy workmaship):     Condensation Cracks due to embedment of the surfaces       Construction defects (faithy workmaship):     Non-surterutural placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placemen						н.			
District:     Lefkoşa     Non-uniform beam span and cross-section       Area:     Alayköy Sanayi Bölgesi     Nos-uniform beam span and cross-section       Street name:     No street names were found       Latitude:     35°12'21.96'N       Longitude:     33°16'5.66'E       yaars     2009-2010       Between 14 and 43 years (1974-2003)     Between 14 and 43 years (1974-2003)       Area:     Alayköy Sanayi Bölgesi       Building type:     Alaykör Sanayi Bölgesi       Building status:     Commercial Occupied       Dormitory     Dormitory       Building status:     Commercial Corrosion induced stabiling Crorosion induced stabiling       Drying shrinkage cracks     Surface cracks       Corrosion induced stabiling cracks due to embedment of the stafut realized in inconcete     Surface cracks       Construction defects (faithy workmaship):     Condensation Cracks due to embedment of the surfaces       Construction defects (faithy workmaship):     Non-surterutural placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placement placemen						rity n	Floor discontinuity		
Street name:     No street names were found     Siab     Order-stretund one-way stad       Latitude:     35°12'21.96'N     Pounding and separation problem       Longitude:     33°16'5.66''E       Structure age:     <14						Irregula pla	Projections in plan		
Street name:     No street names were found     Siab     Order-stretund one-way stad       Latitude:     35°12'21.96'N     Pounding and separation problem       Longitude:     33°16'5.66''E       Structure age:     <14					onf		Non-continuous beams		
Street name:     No street names were found     Siab     Order-stretund one-way stad       Latitude:     35°12'21.96'N     Pounding and separation problem       Longitude:     33°16'5.66''E       Structure age:     <14					ructural c	ementary 1 faults	cross-section		
Street name:     No street names were found     Siab     Order-stretund one-way stad       Latitude:     35°12'21.96'N     Pounding and separation problem       Longitude:     33°16'5.66''E       Structure age:     <14	District:	Lefkoșa		uration	ntal stı	am ele desigr	at beams intersection		
Street name:     No street names were found     Siab     Order-stretund one-way stad       Latitude:     35°12'21.96'N     Pounding and separation problem       Longitude:     33°16'5.66''E       Structure age:     <14	Area:	Alayköy Sanayi Bölgesi		onfigu	Iorizo:	Be	frames		
Longitude:       33°16'5.66"E         Structure age:       Date (if available): 2009-2010         Structure age:       Between 14 and 43 years (1974-2003)        Soft storey         >-43 years (Before 1974)        Building type:       Apartment House       Vertical       Broken axis columns         Building type:       Public       Dormitory       Dormitory       Short column       Short column         Building status:       Under Construction       Under Construction       Waterproofing defects, water leakage and seepage         Drying shrinkage cracks       Corrosion-induced cracking Corrosion-induced spalling       Taising damp         Construction defects (Malty workmanship):       Corrosion-induced cracking Cold joints       Surface cracks       Crazing         Construction defects (Malty workmanship):       Improper reinforcing steel placement       Paint peeling       May/pattern cracking         Construction defects (Malty workmanship):       Segregation       Non-structural cracks       Joint cracks         Cracks in RC due to load effects       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):	Street name:	No street names were found	1	actural c	Ч	elementary	Poorly supported or heavily		
Construction of metals embedded in concrete       Corrosion -induced cracking Corrosion -induced spalling Cracks in RC du to tool of forms       Sufface cracks of the construction of designed to the motes (if available):       Soft storey         Construction defects (faulty workmanship): designer, detailer, and contractor       Corrosion of metals embedded       Corrosion -induced cracking Cracks in RC du to tool of forms       Sufface cracks of the column shear (punching shear) cracks       Sufface cracks (crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks crazing cracks cracks crazing cracks crazing cracks cracks crazing cracks cracks crazing cracks cracks crazing cracks cracks crazing cracks cracks crazing cracks cracks crazing cracks cracks crazing cracks cracks cracks crazing cracks cracks cracks crazing cracks cracks cracks crazing cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks cracks crazing cracks cracks cracks cracks cracks crac	Latitude:	35°12'21.96"N		Stru		Poundir	ng and separation problem		
(19/4-2003)       >43 years (Before 1974)       shear walls       shear walls         Building type:       Apartment       House       Junce       Irregular column and/or shear-wall plan configuration         Building type:       Public       Short column       Short column       Short column         Building status:       Occupied       Mathematical Structural elementary design fault       Short column       Short column         Building status:       Occupied       Mathematical Structural Defects       Short column       Condensation         Building status:       Occupied       Corrosion-induced cracking       Structural elementary       Rain penetration       Eakage and seepage         Drying shrinkage cracks       Corrosion-induced cracking       Surface cracks       Condensation       Surface cracks       Gracks due to embedment of dissimilar metals (handrails)       Surface cracks       Gracks due to embedment of dissimilar metals (handrails)       Surface cracks       Gracks due to embedment of dissimilar metals (handrails)       Surface cracks       Gracks due to embedment of dissimilar metals (handrails)       Surface cracks       Gracks workmanship problem       Ffflorescence       Gracks due to embedment of dissimilar metals (handrails)       Surface cracks       Gracks workmanship problem       Gracks of slab       Joint cracks       Gracks of slab       Joint cracks       Gracks of slab       Joint	Longitude:	33°16'5.66"E		•••		> u	Weak storey		
(19/4-2003)       >43 years (Before 1974)       shear walls       shear walls         Building type:       Apartment       House       Junce       Irregular column and/or shear-wall plan configuration         Building type:       Public       Short column       Short column       Short column         Building status:       Occupied       Mathematical Structural elementary design fault       Short column       Short column         Building status:       Occupied       Mathematical Structural Defects       Short column       Condensation         Building status:       Occupied       Corrosion-induced cracking       Structural elementary       Rain penetration       Eakage and seepage         Drying shrinkage cracks       Corrosion-induced cracking       Surface cracks       Condensation       Surface cracks       Gracks due to embedment of dissimilar metals (handrails)       Surface cracks       Gracks due to embedment of dissimilar metals (handrails)       Surface cracks       Gracks due to embedment of dissimilar metals (handrails)       Surface cracks       Gracks due to embedment of dissimilar metals (handrails)       Surface cracks       Gracks workmanship problem       Ffflorescence       Gracks due to embedment of dissimilar metals (handrails)       Surface cracks       Gracks workmanship problem       Gracks of slab       Joint cracks       Gracks of slab       Joint cracks       Gracks of slab       Joint					ral	gularit	Soft storey		
Building type:     Dormitory     Image: Public     Dormitory     Image: Public     Shear-wall plan configuration       Public     Commercial     Non-Structural Defects     Short column       Building status:     Occupied     Vaterproofing defects, water leakage and seepage     Defected wooden door       Abandoned     Abandoned     Environmetrial     Condensation       Reinforced Concrete Defects     Rising damp     Rain penetration       Drying shrinkage cracks     Corrosion-induced cracking     Surface cracks     Carazing       Corrosion of metals embedded in concrete     Corrosion-induced spalling     Surface cracks     Carazing       Construction defects (faulty workmanship):     Improper reinforcing steel placement     Paint peeling     Map/pattern cracking       Premature removal of forms     Segregation     cracks     Vall finishes workmanship problem       designer, detailer, and contractor     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):       Cracks in RC due to load effects     Slab/beam-to cracks     Cantilevered member cracks	Structure age:	Between 14 and 43 years			structu	Irreg in el			
Building type:     Dormitory     Image: Public     Dormitory     Image: Public     Shear-wall plan configuration       Public     Commercial     Non-Structural Defects     Short column       Building status:     Occupied     Vaterproofing defects, water leakage and seepage     Defected wooden door       Abandoned     Abandoned     Environmetrial     Condensation       Reinforced Concrete Defects     Rising damp     Rain penetration       Drying shrinkage cracks     Corrosion-induced cracking     Surface cracks     Carazing       Corrosion of metals embedded in concrete     Corrosion-induced spalling     Surface cracks     Carazing       Construction defects (faulty workmanship):     Improper reinforcing steel placement     Paint peeling     Map/pattern cracking       Premature removal of forms     Segregation     cracks     Vall finishes workmanship problem       designer, detailer, and contractor     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):       Cracks in RC due to load effects     Slab/beam-to cracks     Cantilevered member cracks					al s figu	Vertical	Broken axis columns		
Public       Image number of the problem       Description       Image number of the problem         Building status:       Under Construction       Waterproofing defects, water leakage and seepage       Defected wooden door         Building status:       Occupied       Defected wooden door       Defected wooden door         Reinforced Concrete Defects       Drying shrinkage cracks       Zorrosion-induced cracking       Controsion-induced cracking         Drying shrinkage cracks       Corrosion-induced cracking       Zorrosion-induced spalling       Surface cracks       Crazing         Corrosion of metals embedded in concrete       Corrosion-induced spalling       Surface cracks       Cracks due to embedment of dissimilar metals (handrails)       Surface cracks       Cracks       Cracks       Crazing         Construction defects (faulty workmanship):       Segregation       Segregation       Staining       Mouldiness         Vorkmanship):       Slab/beam-to column shear (punching shear) cracks       Contlevered member cracks       Other notes (if available):	Building type:	Residential House			Vertic	element elementary			
Commercial       Non-Structural Defects         Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Occupied       Defected wooden door       Abandoned         Abandoned       Condensation       Rising damp         Reinforced Concrete Defects       Rising damp       Rain penetration         Drying shrinkage cracks       Corrosion-induced cracking       Surface cracks       Crazing         Corrosion of metals embedded in concrete       Corrosion-induced spalling       Surface cracks       Crazing         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Paint peeling       Mouldiness         Vertex (faulty workmanship):       Segregation       Cracks       Non-structural cracks       Joint cracks         Cracks in RC due to load effects (faulty to load effects)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):	Building type.					design fault	Short column		
Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Occupied       Defected wooden door         Abandoned       Reinforced Concrete Defects         Drying shrinkage cracks       Rising damp         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Surface cracks         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Paint peeling         Premature removal of forms       Non-structural cracks       Staining         Construction defects (faulty workmanship):       Segregation       Non-structural cracks       Joint cracks         Cracks in RC due to load effects       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):						Non-Str			
Building status:       Occupied Abandoned       Defected wooden door         Reinforced Concrete Defects       Condensation         Drying shrinkage cracks       Rain penetration         Drying shrinkage cracks       Surface cracks         Corrosion of metals embedded in concrete       Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)       Surface cracks         Improper reinforcing steel placement       Paint peeling         Premature removal of forms       Mouldiness         Reinforced contractor       Segregation         Improper grades of slab surfaces       Non-structural cracks       Joint cracks					Waterpro				
Abandoned       Condensation         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Surface cracks       crazing         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Paint peeling       Mouldiness         Premature removal of forms       Segregation       Staining       Staining       Improper grades of slab surfaces         Signer, detailer, and contractor       Slab/beam-to column shear (punching shear) cracks       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):	Building status:								
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesCrazing Map/pattern crackingConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementJoint cracksMap/pattern crackingPaint peelingMouldinessPremature removal of formsWall finishes workmanship problemCold jointsNon-structural cracksJoint cracksMoneycombingImproper grades of slab surfacesNon-structural cracksSlab/beam-to column shear (punching shear) cracksOther notes (if available):Cracks in RC due to load effectsCantilevered member cracks	C						Condensation		
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesCrazing Map/pattern crackingConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementJoint cracksMap/pattern crackingPaint peelingMouldinessPremature removal of formsWall finishes workmanship problemCold jointsNon-structural cracksJoint cracksMoneycombingImproper grades of slab surfacesNon-structural cracksSlab/beam-to column shear (punching shear) cracksOther notes (if available):Cracks in RC due to load effectsCantilevered member cracks	Reinfo	rced Concrete Defects			less		Rising damp		
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesCrazing Map/pattern crackingConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementJoint cracksMap/pattern crackingPaint peelingMouldinessPremature removal of formsWall finishes workmanship problemCold jointsNon-structural cracksJoint cracksMoneycombingImproper grades of slab surfacesNon-structural cracksSlab/beam-to column shear (punching shear) cracksOther notes (if available):Cracks in RC due to load effectsCantilevered member cracks					udu				
Construction defects (faulty workmanship):       Improper reinforcing steel placement       Mouldiness         Premature removal of forms       Wall finishes workmanship problem         Construction defects (faulty workmanship):       Cold joints       Non-structural cracks         designer, detailer, and contractor       Honeycombing       Joint cracks         Improper grades of slab surfaces       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):         Cracks in RC due to load effects (structural cracks)       Cantilevered member cracks       Other notes (if available):	Dryin			fects			sources		
Construction defects (faulty workmanship):       Improper reinforcing steel placement       Mouldiness         Premature removal of forms       Wall finishes workmanship problem         Construction defects (faulty workmanship):       Cold joints       Non-structural cracks         designer, detailer, and contractor       Honeycombing       Joint cracks         Improper grades of slab surfaces       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):         Cracks in RC due to load effects (structural cracks)       Cantilevered member cracks       Other notes (if available):	Corrosion of		$\square$	dei					
Construction defects (faulty workmanship):       Improper reinforcing steel placement       Mouldiness         Premature removal of forms       Wall finishes workmanship problem         Construction defects (faulty workmanship):       Cold joints       Non-structural cracks         designer, detailer, and contractor       Honeycombing       Joint cracks         Improper grades of slab surfaces       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):         Cracks in RC due to load effects (structural cracks)       Cantilevered member cracks       Other notes (if available):		* *	$\left  - \right $	ace	on wal				
Construction defects (faulty workmanship):       Improper reinforcing steel placement       Mouldiness         Premature removal of forms       Wall finishes workmanship problem         Construction defects (faulty workmanship):       Cold joints       Non-structural cracks         designer, detailer, and contractor       Honeycombing       Joint cracks         Improper grades of slab surfaces       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):         Cracks in RC due to load effects (structural cracks)       Cantilevered member cracks       Other notes (if available):	in concrete			urf					
Construction defects (faulty workmanship): designer, detailer, and contractor       Premature removal of forms       Wall finishes workmanship problem         Segregation       Staining         Improper grades of slab surfaces       Joint cracks         Slab/beam-to column shear (punching shear) cracks       Other notes (if available):			$\left  \right $						
Construction defects (faulty workmanship): designer, detailer, and contractor       Premature removal of forms       Staining         Monostructural designer, detailer, and contractor       Cold joints       Non-structural cracks       Joint cracks         Improper grades of slab surfaces       Improper grades of slab surfaces       Other notes (if available):         Cracks in RC due to load effects (structural cracks)       Cantilevered member cracks									
defects (faulty workmanship):       Cold joints       Non-structural cracks         designer, detailer, and contractor       Segregation       cracks         Improper grades of slab surfaces       Improper grades of slab surfaces       Other notes (if available):         Cracks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):			H			wan minsies			
Workmanship):       Segregation       cracks       Joint cracks         designer, detailer, and contractor       Honeycombing       Improper grades of slab surfaces       Other notes (if available):         Cracks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):				Non-	-structural				
designer, detailer, and contractor       Honeycombing         Improper grades of slab surfaces       Other notes (if available):         Cracks in RC due to load effects       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):         Cantilevered member cracks       Cantilevered member cracks       Other notes (if available):		6					Joint cracks		
Improper grades of slab surfaces     Other notes (if available):       Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):	—								
Cracks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks	and contractor			Othe	er notes (	if available).			
Cracks in RC due to load effects     (punching shear) cracks       (structural cracks)     Cantilevered member cracks			$\square$	<u></u>	. 1101003 (	<u></u>			
to load effects (structural cracks) Cantilevered member cracks	Cracks in RC due								
(structural cracks)			$\left  - \right $						
Settlement cracks			$\square$						
		Settlement cracks							

	Case Study #76(G1)									
	Profile						c Design Faults			
			-			Week colu	mn-strong beam			
	Contraction of the second second second second second second second second second second second second second s		2				Torsional Irregularity			
162 6						v in	(Torsion eccentricity)			
						urity un	Floor discontinuity			
					Horizontal structural configuration	Irregularity in plan	Projections in plan			
	- <b>1</b>				con	~	Non-continuous beams			
	And			-	ructural	Beam elementary design faults	Non-uniform beam span and cross-section			
District:		Girne		ration	ntal st	am el design	Absence of vertical support at beams intersection			
Area:	Bahçel	i (Kalograia)		onfigu	lorizo	Be	Broken axis beams and frames			
Street name:		ames were found	1	Structural configuration	H	Slab elementary design faults	Over-stretched one-way slab           Poorly supported or heavily           loaded cantilevered slabs			
Latitude:		0'29.67"N		Str		Poundi	ng and separation problem			
Longitude:		7'40.73"E				y n	Weak storey			
	<14 Da years	ate (if available): ~2005			ral	Irregularity in elevation	Soft storey			
Structure age:	Between 14 au (1974-2003)	nd 43 years			Vertical structural configuration	Irre, in el	Discontinuity of columns or shear walls			
	>43 years (Be	fore 1974)			al s figu	Vertical	Broken axis columns			
		Apartment			rtic	structural element	Imagular column and/or			
Building type:	Residential	House Dormitory			Ve ,	elementary	Irregular column and/or shear-wall plan configuration			
Building type:	Public	Domitory				design fault	Short column			
	Commercial					Non-Stu	ructural Defects			
	Under Constru	uction			Waterpro		, water leakage and seepage			
Building status:	Occupied				•	Defected	wooden door			
	Abandoned						Condensation			
Reinfo	rced Concrete	Defects			ıess		Rising damp			
					dampness		Rain penetration			
Dryin	g shrinkage crac	CKS		cts	da	Leaking p	ipes, spills and other moisture			
	Corrosion-in	duced cracking		Surface defects	Surfac	ce cracks	crazing			
Corrosion of		duced spalling		e d		ll finishes	Map/pattern cracking			
metals embedded		b embedment of		fac			fflorescence			
in concrete		etals (handrails)		aint peeling						
	Improper re	inforcing steel		Mouldiness						
Construction		cement	Wall finishes workmanship problem				workmanship problem			
defects (faulty		moval of forms		Staining						
workmanship):		l joints			structural		Joint cracks			
designer, detailer,		egation		C	cracks					
and contractor		combing								
		grades of slab faces		Othe	er notes (	<u>if available):</u>				
		o column shear	$\square$							
Cracks in RC due		shear) cracks								
to load effects		member cracks	KS							
(structural cracks)		ent cracks								

		Case	Stu	dy i	#77 (G	(2)		
	D					a •	• <b>D</b> • <b>D</b> •	
	Profile						ic Design Faults umn-strong beam	
		and the second		ſ		Week con	Torsional Irregularity	
						q	(Torsion eccentricity)	
						ity i	Floor discontinuity	
						Irregularity in plan	Projections in plan	
		Part of the second second			tuo		Non-continuous beams	
and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s					Horizontal structural configuration	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	(	Girne		uration	ntal str	eam ele design	Absence of vertical support at beams intersection	
Area:	Esentepe (A	gios Amvrosios	;)	confign	Horizo:		Broken axis beams and frames	
Street name:	No street na	ames were found	1	Structural configuration	H	Slab elementary design faults	Over-stretched one-way slab           Poorly supported or heavily           loaded cantilevered slabs	
Latitude:	35°2	0'28.56"N	$\neg$	Stru		-	ling and separation problem	
Longitude:		4'55.83"E					Weak storey	
		te (if available):			ral	Irregularity in elevation	Soft storey	
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration	Irreg in ele	Discontinuity of columns or shear walls	
	>43 years (Bet	fore 1974)			al sı figu	Vertical	Broken axis columns	
		Apartment			rtic	structural element	Irregular column and/or	
Building type:	Residential	House Dormitory			Ve	elementary design fault	Irregular column and/or shear-wall plan configuration	
	Public						Short column	
	Commercial						tructural Defects	
D 111 / /	Under Constru	iction			Waterpro		s, water leakage and seepage	
Building status:	Occupied Abandoned			ſ		Defecte	d wooden door Condensation	
Reinfo	rced Concrete I	Defects			SSS		Rising damp	
Kolino		<i>bereeus</i>			dampness		Rain penetration	
Dryin	g shrinkage crac	ks		Surface defects	dan	Leaking	pipes, spills and other moisture sources	
Corrosion of		duced cracking		def		e cracks	crazing	
metals embedded		duced spalling	$\square$	ace	on wal	l finishes	Map/pattern cracking	
in concrete		embedment of tals (handrails)	Paint peeling					
		inforcing steel	Mouldiness					
		ement		-		Wall finishe	es workmanship problem	
Construction	Premature ren	moval of forms		ľ			Staining	
defects (faulty workmanship):		joints			structural		Joint cracks	
designer, detailer,		egation		С	racks		Joint clucks	
and contractor		combing						
		rades of slab faces		Othe	er notes (	if available):		
		column shear	$\square$					
Cracks in RC due		shear) cracks						
to load effects	Cantilevered	member cracks	CS					
(structural cracks)	Settleme	ent cracks						

Profile       Scimic Design Faults         Week column-strong beam       Torsional Irregularity         Under Construction       Introduced Faults         District:       Gime         Area:       Escentepe (Agios Amvrosios)         Street name:       No street names were found         Latitude:       33°34'59.67'E         Structure age:       Better 14 and 34 years (1974-2003)         Structure age:       Construction         Residential       House         Divide:       Construction         Residential       House         Divide:       Construction         Residential       House         Divide:       Construction         Residential       House         Divide:       Construction         Residential       House         Drying shrinkage cracks       Construction         Construction       Construction         Meets challener       Majore         Statise       Condensation         Construction       Construction         Reinforced Construction       Construction         Construction       Construction         Meeter statise       Majore         Monodidness       Construction			Case	Stu	dy a	<b>#78</b> (G	-3)	
Week column-strong beam         Week column-strong beam         District:       Gime         Area:       Esentepe (Agios Amvrosios)         Street name:       No street names were found         Latitude:       33°34'59.67"E         yaas       Poordiscontinuity         Building type:       Public         Public       Apartment         Dormercial       Dormitory         Public       Dormitory         Public       Dormotoriniduced spalling         Drying shrinkage cracks       Construction         Orcursion of metals embedded in concrete       Construction         Construction       Construction         Orcursion of metals embedded in concrete       Construction         Construction       Construction         Drying shrinkage cracks       Construction         Construction       Construction         Construction       Construction         Construction       Construction         Construction       Construction         Construction       Construction         Construction       Construction         Construction       Construction         Construction       Construction         Construction       Construc							~ .	
District:       Gime         Area:       Esentepe (Agios Amvrosios)         Street name:       No street names were found         Latitude:       35°20'31.00°N         Longitude:       33°34'59.67°E         Variation       Stable Original (1974-2003)         Structure age:       Between 14 and 43 years         (1974-2003)       Apartment         Building type:       Public         Public       Apartment         Dormitory       Dormitory         Public       Corrosion of         Corrosion of       Corrosion-induced spalling         Corrosion of       Corrosion-induced spalling         Corrosion of       Corrosion-induced spalling         Corrosion of       Corrosion-induced spalling         Corrosion of       Corrosion-induced spalling         Construction       Condensation         Construction       Condensation         Construction       Condensation         Construction       Construction         Construction       Construction         Construction       Construction         Construction       Construction         Construction       Construction         Construction       Construction		Profile						
District:       Gime         Area:       Esentepe (Agios Amvrosios)         Street name:       No street names were found         Latitude:       35°20'31.00"N         Longitude:       33°3459.67"E         Verstretched one-way slab       Poortiscontinuity         Poortiscontinuity       Poortiscontinuity         Verstretched one-way slab       Poortiscontinuity         Poortiscontinuity       Poortiscontinuity         Verstretched one-way slab       Poortiscontinuity         Poortiscontinuity       Poortiscontinuity         Structure age:       Between 14 and 43 years (1947-2003)       Poortiscontinuity         Structure age:       Residential       Apartment House       Poortiscontinuity of columns or short support         Building type:       Public       Non-structural       Broken axis columns         Commercial       Vorestretched one-may slab       Irregular column and/or storemail         Building status:       Occupied       Vertex       Storestruction         Orrestruction       Waterproofing defects, water leakage and seepage       Defected woolen door         Drying shrinkage cracks       graph       Rain penetration         Correstion of metals embedded in concrete       Correstion-induced spalling Corosion-induced spalling Corosion-induced spalling Coro				~	_		Week colu	
District:         Gime           Area:         Esentepe (Agios Amvrosios)           Street name:         No street names were found           Latitude:         35°20'31.00"N           Longitude:         33°3459.67"E           Structure age:         Bordeen 14 and 43 years (1974-2003)           Structure age:         Bestentepe (Agios Amvrosios)           Building type:         Commercial Under Construction           Public         Domitory           Public         Domitory           Public         Domitory           Public         Short columns or shear walls           Drying strinkage cracks         Concreste Defects           Drying strinkage cracks         Support           Construction metals embedded in concrete         Corresion-induced cracking Cracks due to embedment of dissinilar metals (handrails)           Construction defects (faulty workmanship); designed.         Construction Premature removal of forms           Construction defects (faulty workmanship); designed.         Non-structural placement placement cracks         Non-structural cracks							-	
District:       Gime         Area:       Esentepe (Agios Amvrosios)         Street name:       No street names were found         Latitude:       35°20'31.00'N         Longitude:       33°34'59.67'E         Vertical       Poorty supported or heavily loaded cantilevered slabs         Poorty supported or heavily loaded cantilevered slabs       Poorty supported or heavily loaded cantilevered slabs         Structure age:       Between 14 and 43 years (1974-2003)       Pointiony         >43 years (Before 1974)       Vertical House       Broken axis columns or shear walls         Building type:       Public       Stort columns         Public       Corrosion-induced cracking Crorosion of metals embedded in concrete       Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)       Year         Surface cracks       Corrosion-induced spalling Construction       Surface cracks       Crazing Corrosion of metals embedded in concrete       Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)       Year         Surface cracks       Construction Premature removal of forms       Surface cracks       Crazing Cracks due to embedment of dissimilar metals (handrails)         Construction       Premature removal of forms       Surface cracks       Crazing Caraks due to embedment of dissimilar metals (handrails)         Segregration						y ir		
District:       Gime         Area:       Esentepe (Agios Amvrosios)         Street name:       No street names were found         Latitude:       35°20'31.00'N         Longitude:       33°34'59.67'E         Vertical       Poorty supported or heavily loaded cantilevered slabs         Poorty supported or heavily loaded cantilevered slabs       Poorty supported or heavily loaded cantilevered slabs         Structure age:       Between 14 and 43 years (1974-2003)       Pointiony         >43 years (Before 1974)       Vertical House       Broken axis columns or shear walls         Building type:       Public       Stort columns         Public       Corrosion-induced cracking Crorosion of metals embedded in concrete       Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)       Year         Surface cracks       Corrosion-induced spalling Construction       Surface cracks       Crazing Corrosion of metals embedded in concrete       Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)       Year         Surface cracks       Construction Premature removal of forms       Surface cracks       Crazing Cracks due to embedment of dissimilar metals (handrails)         Construction       Premature removal of forms       Surface cracks       Crazing Caraks due to embedment of dissimilar metals (handrails)         Segregration							arit	Floor discontinuity
Street name:     No street names were found     Total Street names were found     Total Street names were found     Overstate due one-way stab       Latitude:     35°20'31.00"N     Poorly supported or heavily loaded cantilevered slabs       Latitude:     33°34'59.67"E       Structure age:     Retween 14 and 43 years (1974-2003)     Weak storey       >43 years (Before 1974)     Apartment       House     Dormitory       Public     Apartment       Residential     House       Dormitory     Dormitory       Public     Condensation       Commercial     Non-Structural elementary design fault       Building status:     Coccupied       Corrosion of metals embedded in concrete     Corrosion-induced cracking Cracks due to embedment of dissimilar metals (handrails)       Construction defects (faulty workmanship): designer, detailer, Cold joints       Non-structural defects (faulty     Improper reinforcing steel placement       Premature removal of forms     Non-structural cracks       Vertical staining     Joint cracks						figuration	Irregul	Projections in plan
Street name:     No street names were found     Total Street names were found     Total Street names were found     Overstate due one-way stab       Latitude:     35°20'31.00"N     Poorly supported or heavily loaded cantilevered slabs       Latitude:     33°34'59.67"E       Structure age:     Retween 14 and 43 years (1974-2003)     Weak storey       >43 years (Before 1974)     Apartment       House     Dormitory       Public     Apartment       Residential     House       Dormitory     Dormitory       Public     Condensation       Commercial     Non-Structural elementary design fault       Building status:     Coccupied       Corrosion of metals embedded in concrete     Corrosion-induced cracking Cracks due to embedment of dissimilar metals (handrails)       Construction defects (faulty workmanship): designer, detailer, Cold joints       Non-structural defects (faulty     Improper reinforcing steel placement       Premature removal of forms     Non-structural cracks       Vertical staining     Joint cracks						puos		Non-continuous beams
Street name:     No street names were found     Total Street names were found     Total Street names were found       Latitude:     35°20'31.00"N     Poorly supported or heavily loaded cantilevered slabs       Latitude:     33°34'59.67"E     Pounding and separation problem       Structure age:     etween 14 and 43 years (1974-2003)     Pounding and separation problem       >-43 years (Before 1974)     Apartment     Vertical       -43 years (Before 1974)     Ormitory     Vertical       Public     Domitory     Public       Public     Condensation       Occupied     Domitory       Building status:     Occupied       Corrosion of metals embedded in concrete     Corrosion-induced cracking Cracks due to embedment of dissimilar metals (handrails)       Construction defects (faulty Cold joints     Non-structural placement of dissimilar metals (handrails)       Mappattern renoval of forms     Non-structural cracks       Construction defects (faulty Cold joints     Non-structural cracks       Mappattern cracking     Mappattern cracking       Construction defects (faulty Cold joints     Non-structural cracks						uctural co	ementary faults	
Street name:     No street names were found     Total Contensate and the avails design faults     Overside and the avails design faults       Latitude:     35°20'31.00"N     Poorly supported or heavily loaded cantilevered slabs       Latitude:     33°34'59.67"E     Pounding and separation problem       Structure age:     etween 14 and 43 years (1974-2003)     Weak storey       >-43 years (Before 1974)     Apartment     Vertical       -43 years (Before 1974)     Ormitory     Vertical       Building type:     Public     Vertical       Public     Commercial     Non-Structural elementary design fault       Building status:     Coccupied     Dormitory       Drying shrinkage cracks     statising damp       Corrosion of metals embedded in concrete     Corrosion-induced cracking Cracks due to embedment of dissimilar metals (handrails)       Construction defects (faulty workmanship); designer, detailer, Cold joints     Non-structural cracks       Construction defects (faulty Cold joints     Non-structural cracks	District:		Girne		uration	ntal stı	am ele design	at beams intersection
Street name:     No street names were found     Total Contensate and the avails design faults     Overside and the avails design faults       Latitude:     35°20'31.00"N     Poorly supported or heavily loaded cantilevered slabs       Latitude:     33°34'59.67"E     Pounding and separation problem       Structure age:     etween 14 and 43 years (1974-2003)     Weak storey       >-43 years (Before 1974)     Apartment     Vertical       -43 years (Before 1974)     Ormitory     Vertical       Building type:     Public     Vertical       Public     Commercial     Non-Structural elementary design fault       Building status:     Coccupied     Dormitory       Drying shrinkage cracks     statising damp       Corrosion of metals embedded in concrete     Corrosion-induced cracking Cracks due to embedment of dissimilar metals (handrails)       Construction defects (faulty workmanship); designer, detailer, Cold joints     Non-structural cracks       Construction defects (faulty Cold joints     Non-structural cracks	Area:	Esentepe (A	agios Amvrosios	;)	configu	lorizoi	Be	frames
Longitude:       33°34'59.67"E         Structure age:       <14	C+ +	NT	c ·		al c	Ш		
Longitude:       33°34'59.67"E         Structure age:       <14				1	ructur		design faults	loaded cantilevered slabs
Structure age:       <14 years       Date (if available): years       Soft storey         Structure age:       Between 14 and 43 years (1974-2003)       Apartment         Building type:       Apartment       House         Public       Dormitory       Dormitory         Public       Commercial       Non-Structural Defects         Building status:       Occupied       Defects         Occupied       Defects       Short column         Building status:       Corrosion of metals embedded in concrete       Corrosion-induced cracking Corrosion-induced spalling       Sufface cracks         Construction defects (faulty workmanship):       Cold joints       Non-structural cold joints       Sufface staining         Non-structural designer, detailer,       Cold joints       Non-structural cold joints       Joint cracks				_	St		Pound	
(1)742003)       Sitear waits         >>43 years (Before 1974)       Apartment         Building type:       Residential       House         Public       Dormitory         Public       Commercial       Non-Structural Defects         Building status:       Occupied       Defected wooden door         Abandoned       Contraction       Waterproofing defects, water leakage and seepage         Drying shrinkage cracks       Corrosion-induced cracking       Context cracking         Drying shrinkage cracks       Surface cracks       Cracks due to embedment of dissimilar metals (handrails)         Improper reinforcing steel placement       Improper reinforcing steel placement       Mault finishes         Premature removal of forms       Staining       Mouldiness         Water finishes       Water finishes       Staining	Longitude:						ity on	
(1)742003)       Sitear waits         >>43 years (Before 1974)       Apartment         Building type:       Residential       House         Public       Dormitory         Public       Commercial       Non-Structural Defects         Building status:       Occupied       Defected wooden door         Abandoned       Contraction       Waterproofing defects, water leakage and seepage         Drying shrinkage cracks       Corrosion-induced cracking       Context cracking         Drying shrinkage cracks       Surface cracks       Cracks due to embedment of dissimilar metals (handrails)         Improper reinforcing steel placement       Improper reinforcing steel placement       Mault finishes         Premature removal of forms       Staining       Mouldiness         Water finishes       Water finishes       Staining		years				ıral n	gulari levati	
Building type:       Dormitory       design fault       shear-wall plan configuration         Public       Ommercial       Non-Structural Defects         Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Building status:       Occupied       Defected wooden door         Abandoned       Condensation       Condensation         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Surface cracks       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Surface cracks       crazing         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Mouldiness       Mouldiness         Vortexture removal of forms       Cold joints       Non-structural cracks       Joint cracks	Structure age:					structu aratio		shear walls
Building type:       Dormitory       design fault       shear-wall plan configuration         Public       Ommercial       Non-Structural Defects         Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Building status:       Occupied       Defected wooden door         Abandoned       Condensation       Condensation         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Surface cracks       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Surface cracks       crazing         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Mouldiness       Mouldiness         Vortexture removal of forms       Cold joints       Non-structural cracks       Joint cracks		>43 years (Be				tigu		Broken axis columns
Building type:       Dormitory       Public       Shear-wall plan configuration         Public       Ommercial       Non-Structural Defects         Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Building status:       Occupied       Defected wooden door         Abandoned       Condensation       Condensation         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Surface cracks       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Surface cracks       crazing         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Mouldiness       Mouldiness         Construction defects (faulty workmanship):       Cold joints       Non-structural cracks       Joint cracks						ertic		Irregular column and/or
Building type:       Dormitory       design fault         Public       Short column         Commercial       Non-Structural Defects         Building status:       Occupied       Defected wooden door         Abandoned       Abandoned       Condensation         Reinforced Concrete Defects       Rain penetration         Drying shrinkage cracks       Surface cracks       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced spalling       Surface cracks       crazing         Construction       Cracks due to embedment of dissimilar metals (handrails)       Buildiness       Map/pattern cracking         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Mouldiness       Wall finishes workmanship problem         Cold joints       Non-structural cracks       Joint cracks       Joint cracks		Residential				Ne ve		
CommercialNon-Structural DefectsBuilding status:Under ConstructionWaterproofing defects, water leakage and seepageOccupiedDefected wooden doorAbandonedCondensationReinforced Concrete DefectsRising dampDrying shrinkage cracksRain penetrationCorrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spallingSurface cracksConstruction defects (faulty workmanship): designer, detailer,Corneston of formsSurface cracks Paint peelingConstruction defects (faulty workmanship): designer, detailer,Improper reinforcing steel placementNon-structural cracksMouldinessConstruction defects (faulty workmanship): designer, detailer,SegregationNon-structural cracksJoint cracks	Building type:	<b>D</b> 111	Dormitory				design fault	
Building status:Under ConstructionWaterproofing defects, water leakage and seepageOccupiedDefected wooden doorAbandonedCondensationReinforced Concrete DefectsRising dampDrying shrinkage cracksRain penetrationCorrosion of metals embedded in concreteCorrosion-induced cracking Cracks due to embedment of dissimilar metals (handrails)Surface cracksConstruction defects (faulty workmanship): designer, detailer,Improper reinforcing steel placementNon-structural cracksMouldinessVertice Defected wooden doorNon-structural cracksJoint cracks							Non C	
Building status:       Occupied       Defected wooden door         Abandoned       Condensation         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Surface cracks         Cracks due to embedment of dissimilar metals (handrails)       Cracks due to embedment of dissimilar metals (handrails)       Building status:         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Mouldiness         Vortage and the segregation       Non-structural cracks       Joint cracks			uction			Waterpro		
Abandoned       Condensation         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Drying shrinkage cracks       Leaking pipes, spills and other moisture sources         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Surface cracks       crazing         Cracks due to embedment of dissimilar metals (handrails)       Cracks due to embedment of dissimilar metals (handrails)       Paint peeling         Improper reinforcing steel placement       Improper reinforcing steel placement       Mouldiness         Premature removal of forms       Staining         Cold joints       Non-structural cracks       Joint cracks	Building status:					waterpro		
Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Drying shrinkage cracks       Leaking pipes, spills and other moisture sources         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Surface cracks       crazing         Cracks due to embedment of dissimilar metals (handrails)       Cracks due to embedment of dissimilar metals (handrails)       Efflorescence       Map/pattern cracking         Improper reinforcing steel placement       Paint peeling       Mouldiness         Premature removal of forms       Vall finishes workmanship problem       Staining         Cold joints       Non-structural cracks       Joint cracks	Dunuing status.						Defecte	
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spallingSurface cracks on wall finishesCrazing Map/pattern crackingConstruction defects (faulty workmanship): designer, detailer,Improper reinforcing steel placementMouldinessConstruction defects (faulty workmanship):Improper reinforcing steel placementMouldinessConstruction defects (faulty workmanship):Non-structural cracksJoint cracks	Reinfo		Defects			ess		
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spallingSurface cracks on wall finishesCrazing Map/pattern crackingConstruction defects (faulty workmanship): designer, detailer,Improper reinforcing steel placementMouldinessConstruction defects (faulty workmanship):Improper reinforcing steel placementMouldinessConstruction defects (faulty workmanship):Non-structural cracksJoint cracks						udu		
Improper reinforcing steel placement     Mouldiness       Construction defects (faulty workmanship): designer, detailer,     Premature removal of forms     Wall finishes workmanship problem       Segregation     Staining       User Staining     Joint cracks	Dryin	g shrinkage crac	eks		ects	dar	Leaking J	
Improper reinforcing steel placement     Mouldiness       Construction defects (faulty workmanship): designer, detailer,     Premature removal of forms     Wall finishes workmanship problem       Segregation     Staining       User Staining     Joint cracks	Corrosion of				def			
Improper reinforcing steel placement     Mouldiness       Construction defects (faulty workmanship): designer, detailer,     Premature removal of forms     Wall finishes workmanship problem       Segregation     Staining       User Staining     Joint cracks					ace	on wal		
Improper reinforcing steel placement     Mouldiness       Construction defects (faulty workmanship): designer, detailer,     Premature removal of forms     Wall finishes workmanship problem       Segregation     Staining       User Staining     Joint cracks	in concrete							
Construction defects (faulty workmanship): designer, detailer,     placement     Wall finishes workmanship problem       Output     Premature removal of forms     Staining       Non-structural cracks     Segregation     Joint cracks			( /		S			
Construction defects (faulty workmanship): designer, detailer,     Premature removal of forms     Staining       Vertication     Cold joints     Non-structural cracks     Joint cracks					-		Wall finishe	
defects (faulty workmanship):     Cold joints     Non-structural cracks     Joint cracks       designer, detailer,     Honouroombing     Image: Cold joint structural cracks     Joint cracks					ľ		wan minsik	
designer, detailer, Honourombing				]	Non-	structural		
			0		с	racks		Joint cracks
	and contractor	Honey	combing					
Improper grades of slab					Othe	er notes (	if available).	
surfaces					Juic		11 u vulluble).	
Cracks in RC due Slab/beam-to column shear (punching shear) cracks	Cracks in RC due							
to load affacts				$\left  - \right $				
(structural cracks)	(structural cracks)							
Settlement cracks		Settlem	ent cracks					

		Case	Stu	dy :	<b>#79</b> (G	<del>(</del> 4)	
	D (#1						
	Profile						ic Design Faults
Ante Martine						week colt	Torsional Irregularity
States - States						-	(Torsion eccentricity)
CALL FOR						ty ir	Floor discontinuity
						ularit plan	
						Irregularity in plan	Projections in plan
					con	2	Non-continuous beams
		And and a second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second			Horizontal structural configuration	Beam elementary design faults	Non-uniform beam span and cross-section
District:		Girne		Structural configuration	ntal str	am elementa design faults	Absence of vertical support at beams intersection
Area:	Esentepe (A	Agios Amvrosios	;)	configu	Horizo:		Broken axis beams and frames
Street nome:	No streat n	amaa wara fauna	4	ral c	ц	Slab	Over-stretched one-way slab           Poorly supported or heavily
Street name:	No street fi	ames were found	1	ctui		elementary design faults	loaded cantilevered slabs
Latitude:	35°2	20'38.30"N		Stru		-	ing and separation problem
Longitude:		34'40.02"E		•1			Weak storey
	<14 Date (if available): years				ral	Irregularity in elevation	Soft storey
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration	Irreg in eld	Discontinuity of columns or shear walls
	>43 years (Be	fore 1974)			al sı figu	Vertical	Broken axis columns
		Apartment			rtic	structural element	Irregular column and/or
Building type:	Residential	House Dormitory			Ve	elementary design fault	shear-wall plan configuration
6 51	Public					uesigii iauti	Short column
	Commercial						ructural Defects
	Under Constr	uction			Waterpro		s, water leakage and seepage
Building status:	Occupied					Defected	d wooden door
Dointo	Abandoned rced Concrete	Dofoota			SS		Condensation Rising damp
Relifio	rcea Concrete	Defects			pne:		Rain penetration
Dryin	g shrinkage crac	cks		ects	dampness	Leaking p	pipes, spills and other moisture sources
Corrosion of	Corrosion-in	duced cracking		Surface defects		ce cracks	crazing
metals embedded		nduced spalling	Ц	ice .	on wal	l finishes	Map/pattern cracking
in concrete		o embedment of		urfa		Efflorescence	
		etals (handrails)		Ñ			Paint peeling
		einforcing steel					Mouldiness s workmanship problem
Construction		emoval of forms	$\square$			wall linishe	Staining
defects (faulty		d joints	$\vdash$	Non	-structural		
workmanship):		regation	$\square$		cracks		Joint cracks
designer, detailer, and contractor		/combing					
		grades of slab		Oth	er notes (	if available):	
		rfaces			I HOLES (		
Cracks in RC due		o column shear					
to load effects		shear) cracks					
(structural cracks)							
	Settlem	ent cracks					
	Settlem	ient Clacks					

		Case	Stu	dy i	#80 (G	5)	
_	Profile						c Design Faults
	4		_		Imn-strong beam		
			-			_	Torsional Irregularity
						y in	(Torsion eccentricity)
						arit. an	Floor discontinuity
					Horizontal structural configuration	Irregularity in plan	Projections in plan
						>	Non-continuous beams
					uctural	Beam elementary design faults	Non-uniform beam span and cross-section
District:		Girne		uration	ntal str	am ele lesign	Absence of vertical support at beams intersection
Area:	Esentepe (A	gios Amvrosios	)	Structural configuration	orizor	Be	Broken axis beams and frames
G	NT I I	6		al co	H	Slab	Over-stretched one-way slab
Street name:		mes were found	1	uctura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs
Latitude:		0'38.28"N		Str		Pound	ing and separation problem
Longitude:	Longitude: 33°34'41.61"E					on	Weak storey
	years	te (if available):			ıral 1	Irregularity In elevation	Soft storey
Structure age:	Between 14 ar (1974-2003)	-			Vertical structural configuration		Discontinuity of columns or shear walls
	>43 years (Bet	fore 1974)			al s figu	Vertical	Broken axis columns
		Apartment			rtic	structural element	Irregular column and/or
	Residential	House			Ve	elementary	shear-wall plan configuration
Building type:		Dormitory			_	design fault	
	Public						Short column
	Commercial				W/		ructural Defects
Building status:	Under Constru Occupied	letion			waterpro		s, water leakage and seepage
Building status.	Abandoned					Defected	Condensation
Reinfo	rced Concrete l	Defects			SS		Rising damp
		Serectis			dampness		Rain penetration
Dryin	g shrinkage crac	ks		ects	dam	Leaking p	ipes, spills and other moisture sources
Corrosion of		duced cracking		Surface defects		e cracks	crazing
metals embedded		duced spalling	$\square$	ace	on wal	l finishes	Map/pattern cracking
in concrete		embedment of		urf			Efflorescence
		tals (handrails)		S			Paint peeling
		inforcing steel ement		·			Mouldiness s workmanship problem
Construction		moval of forms				wan minsie	Staining
defects (faulty		joints		Non	structural		
workmanship):		egation			racks		Joint cracks
designer, detailer, and contractor		combing					
and contractor		rades of slab		Oth	er notes (	if available).	
		faces			a notes (	if available):	
Cracks in RC due		column shear					
to load effects		shear) cracks					
(structural cracks)		member cracks	Щ				
	Settlem	ent cracks					

		Case	Stu	dy a	<b>#81</b> (G	6)		
						~		
	Profile						e Design Faults	
						Week colu	mn-strong beam Torsional Irregularity	
						E	(Torsion eccentricity)	
						ty ii	Floor discontinuity	
						ularit plan		
			1		Horizontal structural configuration	Irregularity in plan	Projections in plan	
					con	/	Non-continuous beams	
		- Alle			uctural e	Beam elementary design faults	Non-uniform beam span and cross-section	
District:		Girne		uration	ıtal stru	am elementa design faults	Absence of vertical support at beams intersection	
Area:	Arap	köy (Klepini)		configu	Iorizoi	[	Broken axis beams and frames	
Street nome	D _{ar} I	Parmaklar Cd		al c	Т	Slab	Over-stretched one-way slab	
Street name:	Beş I	armakiar Co		Structural configuration		elementary design faults	Poorly supported or heavily loaded cantilevered slabs	
Latitude:	N 35°18	022' (35°18'1.3")	-			-	ng and separation problem	
Longitude:				S			Weak storey	
	E 33°26.124' (33°26'7.4") <14 Date (if available): years 2004-2005				al	Irregularity in elevation	Soft storey	
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration	Irreg in ele	Discontinuity of columns or shear walls	
	>43 years (B	efore 1974)			al s figu	Vertical	Broken axis columns	
		Apartment			rtic	structural element	Imperial actions and/or	
	Residential	House	_		Ve	elementary	Irregular column and/or shear-wall plan configuration	
Building type:	Building type: Dormitory					design fault		
	Public						Short column	
	Commercial			Non-Structural Defects Waterproofing defects, water leakage and seepag				
Duilding status	Under Const Occupied	ruction			Waterpro		water leakage and seepage wooden door	
Building status:	Abandoned					Defected	Condensation	
Reinfo	rced Concrete	Defects		SSS			Rising damp	
					bne		Rain penetration	
Drying	g shrinkage cra	acks		stop de le cracks on wall finishes		Leaking pi	pes, spills and other moisture sources	
Corrosion of		nduced cracking		def		ce cracks	crazing	
metals embedded		induced spalling		lce	on wal	ll finishes	Map/pattern cracking	
in concrete		to embedment of		urfî			fflorescence	
		netals (handrails)	$\left  - \right $	ŝ			aint peeling	
		einforcing steel		·			Mouldiness workmanship problem	
Construction		emoval of forms	$\vdash$	-		wan minsnes	Staining	
defects (faulty		ld joints		Non-	structural			
workmanship):		regation			racks		Joint cracks	
designer, detailer, and contractor	Hone	cycombing						
und contractor		grades of slab		 Oth∠	er notes (	if available):		
		urfaces		Jun	1 110103 (	<u>11 u vullu010].</u>		
Cracks in RC due		to column shear g shear) cracks						
to load effects	_							
(structural cracks)	Cantilevered member cracks							
	Settlei	nent cracks						

		Case	Stu	dy 7	<b>#82</b> (G	<b>5</b> 7)				
	Profile						c Design Faults			
		and the second			Week column-strong beam					
1 Million		*					Torsional Irregularity			
		1				y in	(Torsion eccentricity)			
			2		Horizontal structural configuration	arity un	Floor discontinuity			
						Irregularity in plan	Projections in plan			
					tuo		Non-continuous beams			
			uctural c	Beam elementary design faults	Non-uniform beam span and cross-section					
District:		Girne		ration	tal str	am ele lesign	Absence of vertical support at beams intersection			
Area:		y or Kazafana or Kazaphani)		Structural configuration	orizon	Bec	Broken axis beams and frames			
		• /		al co	Ĥ	Slab	Over-stretched one-way slab			
Street name:	Sehit Necn	ni Kaya Caddesi		uctura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs			
Latitude:		19'2.66"N		Str		Pound	ing and separation problem			
Longitude:		1'14.00"E				y n	Weak storey			
	<14 Da years	te (if available):			ral	Irregularity in elevation	Soft storey			
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration	Irreg in el	Discontinuity of columns or shear walls			
	>43 years (Be	fore 1974)			al s figu	Vertical	Broken axis columns			
		Apartment			rtic	structural element	In a selen a share and/an			
	Residential	House			Ve	elementary	Irregular column and/or shear-wall plan configuration			
Building type:		Dormitory				design fault				
	Public						Short column			
	Commercial						ructural Defects			
D 1111	Under Constru	iction			Waterpro		s, water leakage and seepage			
Building status:	Occupied					Defected	d wooden door			
Deinfe	Abandoned	Defects	_		SS		Condensation Dising down			
Reimo	rced Concrete	Defects			ones		Rising damp Rain penetration			
Dryin	g shrinkage crac	ks		cts	dampness	Leaking p	ipes, spills and other moisture sources			
	Corrosion-in	duced cracking		Surface defects	Surfac	ce cracks	crazing			
Corrosion of		duced spalling		ce d		ll finishes	Map/pattern cracking			
metals embedded		embedment of		rfac			Efflorescence			
in concrete	dissimilar me	etals (handrails)		Su			Paint peeling			
		inforcing steel					Mouldiness			
Construction	-	ement				Wall finishe	s workmanship problem			
defects (faulty		moval of forms					Staining			
workmanship):		l joints			structural		Joint cracks			
designer, detailer,		egation		С	racks					
and contractor		combing	├── <b> </b>							
		rades of slab faces		Othe	er notes (	if available):				
		o column shear	$\left  - \right $							
Cracks in RC due		shear) cracks								
to load effects		member cracks								
(structural cracks)		ent cracks	$\vdash$							
	Settielli	cin clacks								

	Ca	se Stu	ıdy	<b>#83 (</b> G	<b>(8</b> )																			
	Profile					Design Faults																		
					Week colur	nn-strong beam																		
					-	Torsional Irregularity (Torsion eccentricity)																		
The C					y ii	Floor discontinuity																		
					ularit plan																			
THE REAL					Irregularity in plan	Projections in plan																		
		1		tonf		Non-continuous beams																		
			u	Horizontal structural configuration	Beam elementary design faults	Non-uniform beam span and cross-section																		
District:	Girne		Structural configuration	tal st	um el esign	Absence of vertical support at beams intersection																		
A.m.a.u	Ozanköy or Kazafana	a a	iguı	zon	Bea	Broken axis beams and																		
Area:	(Kazafani or Kazaphar	ni)	onf	lori:		frames																		
			al c	Н	Slab	Over-stretched one-way slab																		
Street name:	Zafer Caddesi		stur		elementary	Poorly supported or heavily																		
Latitude:	35°18'29.44"N		struc		design faults	loaded cantilevered slabs																		
Longitude:	33°21'1.46"E		01			Weak storey																		
Longhude.	<14 Date (if available	e):		1	Irregularity in elevation	Soft storey																		
Structure age:	years     Between 14 and 43 years			Vertical structural configuration	rregu n elev	Discontinuity of columns or																		
	(1974-2003)			stru ura		shear walls																		
	>43 years (Before 1974)			cal ıfig	Vertical structural	Broken axis columns																		
	Apartment Residential House			erti cor	element	Irregular column and/or																		
Building type:	Residential House Dormitory			N N	elementary	shear-wall plan configuration																		
Building type.	Public			design fault	Short column																			
													Commercial									Non-Structural Defects		
	Under Construction			Waterpro		water leakage and seepage																		
Building status:	Occupied				<b>U</b>	wooden door																		
	Abandoned					Condensation																		
Reinfo	ced Concrete Defects		ced Concrete Defects		ced Concrete Defects		ced Concrete Defects		ced Concrete Defects		ced Concrete Defects		ed Concrete Defects			dampness		Rising damp						
D .	1 . 1			īdun	T 1 · · ·	Rain penetration																		
Dryin	g shrinkage cracks		cts	dî	Leaking pi	pes, spills and other moisture sources																		
	Corrosion-induced cracking	2	Surface defects	Surfac	ce cracks	crazing																		
Corrosion of	Corrosion-induced spalling		ce d		l finishes	Map/pattern cracking																		
metals embedded in concrete	Cracks due to embedment o	of	rfa			fflorescence																		
	dissimilar metals (handrails		Su			aint peeling																		
	Improper reinforcing steel			-		Aouldiness																		
Construction	placement	_			Wall finishes	workmanship problem																		
defects (faulty	Premature removal of form Cold joints	s	Non	atma atama1		Staining																		
workmanship):	Segregation			-structural cracks		Joint cracks																		
designer, detailer, and contractor	Honeycombing																							
and contractor	Improper grades of slab		041	or not /	f aveilable).																			
	surfaces		Othe	er notes (	<u>if available):</u>	. BU BINA .																		
Cracks in RC due	Slab/beam-to column shear	r		BU	BİNA	21-11-1986 TARIHINDE																		
to load effects	(punching shear) cracks		21-		TARİHİND	the second second second second second second second second second second second second second second second se																		
(structural cracks)	Cantilevered member crack	S			ACILMISTI	R 8-6-2001 TARIHINDE																		
	Settlement cracks				ΓARİHİNDE																			
					EDİLMİSTİ	Contraction of the second second second second second second second second second second second second second s																		
1			NE:	STORE	EDITIMI211																			

		Case	Stu	dy i	<b>#84</b> (G	<b>(9</b> )	
	Profile						c Design Faults
			4			Week colu	mn-strong beam
AL .			50			_	Torsional Irregularity
	<b>F</b>					v in	(Torsion eccentricity)
H						un ty	Floor discontinuity
		REGA			Horizontal structural configuration	Irregularity in plan	Projections in plan
					con	~	Non-continuous beams
				ſ	n tructural	Beam elementary design faults	Non-uniform beam span and cross-section
District:	Girne			Iratio	ntal st	am el design	Absence of vertical support at beams intersection
Area:	Girne	e (Kyrenia)		Structural configuration	lorizo:	Be	Broken axis beams and frames
	20 Temm	uz Kordonboyu		al c	H	Slab	Over-stretched one-way slab
Street name:		addesi		ctur		elementary design faults	Poorly supported or heavily
Latitude:	2500	0'30.12"N	-	truc		-	loaded cantilevered slabs
Longitude:		9'15.62"E	-	S		Toulia	Weak storey
Longitude.		te (if available):				ion	weak storey
<i></i>	years		Ц		ural n	Irregularity in elevation	Soft storey
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration		Discontinuity of columns or shear walls
	>43 years (Be				cal : tig	Vertical structural	Broken axis columns
		Apartment			ertic	element	Irregular column and/or
Building type:	Residential	House Dormitory	-		Vé	elementary	shear-wall plan configuration
Dunuing type.	Public					design fault	Short column
	Commercial						ructural Defects
	Under Constru	uction			Waterpro		, water leakage and seepage
Building status:	Occupied					Defected	l wooden door
	Abandoned				~		Condensation
Reinfo	rced Concrete	Defects			nes		Rising damp
Dryin	g shrinkage crac	ks		cts	dampness	Leaking p	Rain penetration ipes, spills and other moisture sources
	Corrosion-in	duced cracking		Surface defects	Surfac	ce cracks	crazing
Corrosion of		duced spalling		ie d		l finishes	Map/pattern cracking
metals embedded		embedment of		rfac			Efflorescence
in concrete	dissimilar me	etals (handrails)		Sui		F	Paint peeling
	Improper re	inforcing steel					Mouldiness
Construction		ement				Wall finishe	s workmanship problem
defects (faulty		moval of forms					Staining
workmanship):		l joints			-structural		Joint cracks
designer, detailer,		egation		C	eracks		
and contractor		combing grades of slab					
		faces		Othe	er notes (	<u>if available):</u>	
		o column shear	$\square$				
Cracks in RC due		shear) cracks					
to load effects		member cracks					
(structural cracks)		ent cracks					
	I						

		Case S	Study	y #	85 (G	10)	
	D (#1					<i>a</i> • •	
	Profile						c Design Faults
100 C	T					Week colu	mn-strong beam Torsional Irregularity
and the second second	1					ц	(Torsion eccentricity)
and the second second						ty i	Floor discontinuity
					Horizontal structural configuration	Irregularity in plan	Projections in plan
					cont	~	Non-continuous beams
					uctural o	Beam elementary design faults	Non-uniform beam span and cross-section
District:	Girne			Iration	ntal str	am ele design	Absence of vertical support at beams intersection
Area:	Sadrazar	nköy (Livera)		Structural configuration	Iorizoi		Broken axis beams and frames
Character and a second	N. stars at a			al c	j,T,	Slab	Over-stretched one-way slab
Street name:	No street na	ames were found		lctur		elementary design faults	Poorly supported or heavily loaded cantilevered slabs
Latitude:	35°2	3'11.72"N		Str		Poundi	ng and separation problem
Longitude:		7'49.88"E				Уп	Weak storey
	<14 Da years	te (if available): 2004~2007			ral	Irregularity in elevation	Soft storey
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration	Irreg in el	Discontinuity of columns or shear walls
	>43 years (Be	fore 1974)			al s figu	Vertical	Broken axis columns
		Apartment			rtic	structural element	Imagular column and/or
Building type:	Residential	House Dormitory			Ve	elementary design fault	Irregular column and/or shear-wall plan configuration
6 51	Public						Short column
	Commercial						ructural Defects
Duilding status	Under Constru	iction			Waterpro		, water leakage and seepage
Building status:	Occupied Abandoned					Defected	Condensation
Reinfo	rced Concrete	Defects	-		SS		Rising damp
Reinfo		Derects			ampness		Rain penetration
Drying	g shrinkage crac	ks		Surface defects	dam	Leaking p	ipes, spills and other moisture sources
Corrosion of		duced cracking		def		ce cracks	crazing
metals embedded		duced spalling		ace	on wal	l finishes	Map/pattern cracking
in concrete		embedment of		urf			fflorescence
		etals (handrails)	_	Ñ			Paint peeling
		inforcing steel ement					Mouldiness s workmanship problem
Construction		moval of forms		ŀ			Staining
defects (faulty		l joints	N	Non-	structural		
workmanship):		egation			racks		Joint cracks
designer, detailer, and contractor		combing					
		grades of slab	C	) Dthe	r notes (	if available):	
		faces o column shear	<u> </u>				
Cracks in RC due		shear) cracks					
to load effects		member cracks					
(structural cracks)		ent cracks					

		Case	Stu	dy #	<b>#86(G</b> 2	11)	
	Profile						ic Design Faults
						Week colu	imn-strong beam
	Allanticological	_					Torsional Irregularity
						v in	(Torsion eccentricity)
		JE Color	1			arity In	Floor discontinuity
					Horizontal structural configuration	Irregularity in plan	Projections in plan
1 Inm la			0		cont		Non-continuous beams
TUBORG - TO L				r	cuctural o	Beam elementary design faults	Non-uniform beam span and cross-section
District:		Girne		Iratio	ıtal st	am el design	Absence of vertical support at beams intersection
Area:	Girne	e (Kyrenia)		Structural configuration	orizor	Be	Broken axis beams and frames
	20 Temm	uz Kordonboyu		al co	H	Slab	Over-stretched one-way slab
Street name:		Caddesi		ctura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs
Latitude:	35°2	0'31.46"N		Stru			ing and separation problem
Longitude:		19'9.66"E		•1			Weak storey
8		ate (if available):			al	Irregularity in elevation	Soft storey
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration	Irreg in ele	Discontinuity of columns or shear walls
	>43 years (Be	fore 1974)			ıl st igur	Vertical	Broken axis columns
		Apartment			tica	structural	
Devil din a ferra et	Residential	House			Vei c	element elementary	Irregular column and/or shear-wall plan configuration
Building type:	Public	Dormitory				design fault	Short column
	Commercial					Non-St	tructural Defects
	Under Constru	uction			Waterpro	oofing defect	s, water leakage and seepage
Building status:	Occupied					Defecte	d wooden door
	Abandoned				s		Condensation
Reinfo	rced Concrete	Defects			nes		Rising damp Rain penetration
Dryin	g shrinkage crac	cks		ts	dampness	Leaking p	pipes, spills and other moisture
	Corrosion.in	duced cracking		Surface defects	Surfa	ce cracks	crazing
Corrosion of		duced spalling		ie d		l finishes	Map/pattern cracking
metals embedded		o embedment of		rfac		l	Efflorescence
in concrete	dissimilar me	etals (handrails)		Sui			Paint peeling
	Improper re	inforcing steel					Mouldiness
Construction	-	cement				Wall finishe	es workmanship problem
defects (faulty		moval of forms					Staining
workmanship):		l joints	$\square$		structural		Joint cracks
designer, detailer,		egation	┝─╽	(	eracks		
and contractor		combing grades of slab	┝─┦				
		faces		Othe	er notes (	if available):	
Cracks in RC due	Slab/beam-t	o column shear					
to load effects		shear) cracks	$\square$				
(structural cracks)		member cracks	Щ				
	Settlem	ent cracks					

Profile         Scisnit Design Faults           Image: Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second S			Case S	Stud	ly #	<b>87 (G</b>	12)	
District:       Considered and separation problem       Non-continuous beams         District:       Cinne       Non-continuous beams         Area:       Aşağı Taşkertı or Kaynakoy       Non-continuous beams         Nor-continuous beams       Non-continuous beams         Area:       Aşağı Taşkertı or Kaynakoy       Non-continuous beams         Nor-continuous beams       Non-continuous beams         Nor-continuous beams       Non-continuous beams         Nor-continuous beams       Non-continuous beams         Nor-continuous beams       Non-continuous beams         Nor-continuous beams       Non-continuous beams         Nor-continuous beams       Non-continuous beams         Nor-continuous beams       Non-continuous beams         Nor-continuous beams       Non-continuous beams         Nor-continuous beams       Non-continuous beams         Nor-continuous beams       Non-continuous beams         Nor-continuous beams       Non-continuous beams         Nor-continuous beams       Non-continuous beams         Nor-continuous beams       Non-continuous beams         Nor-continuous beams       Non-continuous beams         Nor-continuous beams       Non-continuous beams         Nor-continuous beams       Non-continuous beams         N								
District:     Gime     Non-continuous beams       Area:     Aşağı Taşkent or Kaynakköy (Sychari or Sichari)     Non-continuous beams       Area:     Aşağı Taşkent or Kaynakköy (Sychari or Sichari)     Non-continuous beams       Street name:     No street names were found     Absence of vertical support at beams and frames       Inorginde:     33*2258.68*E     Non-continuous beams       Structure age:     Atasta and a spearation problem     Poorly supported heavily loaded cantilevered slabs       Building type:     Aputtnent Residential     Aputtnent House       Building type:     Public     Non-continuous beams       Corrosion of meals embedded in contret frame     Corrosion-induced cracking Carcis du to embednet frames     Non-continuous beams       Construction     Corrosion-induced cracking Carcis du to embednet frames     Non-continuous beams       Residential frame     Aputtnent Residential frame     Material frames       Building staus:     Cocupied Corrosion-induced cracking Carcis du to embednet frames     Non-structurel frames       Construction meals embedded in contre transpand contractor     Corrosion-induced cracking Carcis du to embednet frames     Non-structurel frames       Construction meals embedded in contractor     Corrosion-induced cracking Carcis du to embednet frames     Non-structurel frames       Construction meals embedded in contractor     Corrosion-induced cracking Carcis du to embednet framerenet <t< th=""><th>_</th><th>Profile</th><th></th><th></th><th></th><th></th><th></th><th></th></t<>	_	Profile						
District:       Gime       Non-continuous beams         Area:       Aşâği Taşkent or Kaynakköy (Sychari or Sichari)       Non-continuous beams         Street name:       No street names were found       Stab         Latitude:       35°16'2.68'N         Longitude:       35°16'2.68'N         Bailding type:       Etween 14 and 43 years (1974-2003)       Tormitory         Public       Street name:       Apartment         Building status:       Construction       Other nation         Residential       Apartment       Barder of availy Dormitory       Stat street         Public       Other national provided (Construction)       Toregular columns and frames       Tregular columns or shear walls         Building status:       Under Construction       Wateproofing defects (wall provided in concrete       Vateproofing defects, water leakage and seepage         Corrosion of metals embedded in concrete       Corrosion-induced graphing Cracks due to embedment of dissimilar metals (handrals)       Non-structural elementary       Efforescence         Construction defects (fully workmaship)       Corrosion enduced cracking Cracks due to embedment of dissimilar metals (handrals)       Non-structural enduced       Joint cracks         Mathematics       Slabbeam-to column shear functore ranks       Cartely printoring shear vall       Joint cracks         Corost							Week colu	
District:       Gime       Non-uniform beam span and cross-section         Area:       Aşağı Taşkent or Kaynakköy (Sychari or Sichari)       Silab       Non-uniform beam span and cross-section         Street name:       No street names were found       Silab       Over-stretched one-way slab         Latitude:       35°167.66"N       Dould canlibered slabs       Dould canlibered slabs         Latitude:       35°167.66"N       Dould canlibered slabs       Dould canlibered slabs         Structure age:       Between 14 and 43 years       Pounding and separation problem         Verifield       Dormitory       Discontinuity of columns or shear avails columns         Public       Commercial       Orcursion-induced canking       Stats force         Drying shrinkage cracks       Controsion-induced canking       Stats       Controsion-induced canking         Construction defects (taulity)       Controsion-induced canking       Stats       Cracks in RC due to other moletum of dissinilar metals (handrails)         Monegreen reaks       Canzing       Controsion-induced splating       Stats       Joint cracks         Construction defects (suity)       Cold joints       Non-structural cracks       Joint cracks       Joint cracks         Construction defects (suity)       Cold joints       Non-structural cracks       Joint cracks								
District:     Gime     Non-uniform beam span and cross-section       Area:     Aşağı Taşkent or Kaynakköy (Sychari or Sichari)     Sizentames were found       Latitude:     35°16'2.68"N       Longitude:     33'22'S8.68"E       Structure age:     elementary       Bailding type:     elementary       Public     Over-stretched one-way slab       Poorly supported or heavily     loaded canlievered slabs       Building type:     elementary       Public     Over-stretched one-way slab       Public     Soft storey       Public     Over-stretched one-way slab       Public     Over-stretched one-way slab       Poorly supported or heavily     Soft storey       Building type:     elementary       Public     Over-stretched one-way slab       Public     Over-stretched one-way slab       Public     Over-stretched one-way slab       Public     Over-stretched one-way slab       Public     Over-stretched one-way slab       Public     Over-stretched one-way slab       Public     Over-stretched one-way slab       Occupied     Non-uniform beam span and cross-section       Building status:     Occupied       Occupied     Occupied       Corrosion-induced cracking     Startacc construction       Corrosion-induc							E.	
District:     Gime     Non-uniform beam span and cross-section       Area:     Aşağı Taşkent or Kaynakköy (Sychari or Sichari)     Sizentames were found       Latitude:     35°16'2.68"N       Longitude:     33'22'S8.68"E       Structure age:     elementary       Bailding type:     elementary       Public     Over-stretched one-way slab       Poorly supported or heavily     loaded canlievered slabs       Building type:     elementary       Public     Over-stretched one-way slab       Public     Soft storey       Public     Over-stretched one-way slab       Public     Over-stretched one-way slab       Poorly supported or heavily     Soft storey       Building type:     elementary       Public     Over-stretched one-way slab       Public     Over-stretched one-way slab       Public     Over-stretched one-way slab       Public     Over-stretched one-way slab       Public     Over-stretched one-way slab       Public     Over-stretched one-way slab       Public     Over-stretched one-way slab       Occupied     Non-uniform beam span and cross-section       Building status:     Occupied       Occupied     Occupied       Corrosion-induced cracking     Startacc construction       Corrosion-induc		Silve D					n rity	Floor discontinuity
Street name:     No street names were found     Stab     Stab     Order Subcide due with stab       Latitude:     35°16'2.68'N     Poorty suppride or heavily loaded cantilevered slabs     Poorty suppride or heavily loaded cantilevered slabs       Longitude:     33°22'58.68'E     Pounding and sparation problem       Structure age:     14     Date (if available): years     Fg. gg     Soft storey       Structure age:     Between 14 and 43 years (1974-2003)     Image: Fg. gg     Soft storey     Soft storey       Ad years (Before 1974)     Fg. gg     Soft storey     Soft storey       Building type:     Public     Fg. gg     Store columns or shear walls     Store columns or shear walls       Building status:     Commercial     Non-struction     Non-structural design fault     Broken axis columns       Building status:     Corrosion-induced cracking in concrete     Corrosion-induced cracking Corrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)     Surface cracks     Surface cracks     Staining       Construction defects (faulty workmanship): Cold joints     Improper reinforcing steel placement     Non-structural cracks     Joint cracks     Joint cracks       Condenstation metals embedded in concrete     SlabArbane     Non-structural placement     Joint cracks     Joint cracks       Sl	And and Abbrent and and a second					iguration	Irregulai plai	Projections in plan
Street name:     No street names were found     Stab     Stab     Order Subcide due with stab       Latitude:     35°16'2.68'N     Poorty suppride or heavily loaded cantilevered slabs     Poorty suppride or heavily loaded cantilevered slabs       Longitude:     33°22'58.68'E     Pounding and sparation problem       Structure age:     14     Date (if available): years     Fg. gg     Soft storey       Structure age:     Between 14 and 43 years (1974-2003)     Image: Fg. gg     Soft storey     Soft storey       Ad years (Before 1974)     Fg. gg     Soft storey     Soft storey       Building type:     Public     Fg. gg     Store columns or shear walls     Store columns or shear walls       Building status:     Commercial     Non-struction     Non-structural design fault     Broken axis columns       Building status:     Corrosion-induced cracking in concrete     Corrosion-induced cracking Corrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)     Surface cracks     Surface cracks     Staining       Construction defects (faulty workmanship): Cold joints     Improper reinforcing steel placement     Non-structural cracks     Joint cracks     Joint cracks       Condenstation metals embedded in concrete     SlabArbane     Non-structural placement     Joint cracks     Joint cracks       Sl				2		onf		Non-continuous beams
Street name:     No street names were found     Stab     Stab     Order Subcide due with stab       Latitude:     35°16'2.68'N     Poorty suppride or heavily loaded cantilevered slabs     Poorty suppride or heavily loaded cantilevered slabs       Longitude:     33°22'58.68'E     Pounding and sparation problem       Structure age:     14     Date (if available): years     Fg. gg     Soft storey       Structure age:     Between 14 and 43 years (1974-2003)     Image: Fg. gg     Soft storey     Soft storey       Ad years (Before 1974)     Fg. gg     Soft storey     Soft storey       Building type:     Public     Fg. gg     Store columns or shear walls     Store columns or shear walls       Building status:     Commercial     Non-struction     Non-structural design fault     Broken axis columns       Building status:     Corrosion-induced cracking in concrete     Corrosion-induced cracking Corrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)     Surface cracks     Surface cracks     Staining       Construction defects (faulty workmanship): Cold joints     Improper reinforcing steel placement     Non-structural cracks     Joint cracks     Joint cracks       Condenstation metals embedded in concrete     SlabArbane     Non-structural placement     Joint cracks     Joint cracks       Sl							mentary faults	
Street name:     No street names were found     Stab     Stab     Order Subcide due with stab       Latitude:     35°16'2.68'N     Poorty suppride or heavily loaded cantilevered slabs     Poorty suppride or heavily loaded cantilevered slabs       Longitude:     33°22'58.68'E     Pounding and sparation problem       Structure age:     14     Date (if available): years     Fg. gg     Soft storey       Structure age:     Between 14 and 43 years (1974-2003)     Image: Fg. gg     Soft storey     Soft storey       Ad years (Before 1974)     Fg. gg     Soft storey     Soft storey       Building type:     Public     Fg. gg     Store columns or shear walls     Store columns or shear walls       Building status:     Commercial     Non-struction     Non-structural design fault     Broken axis columns       Building status:     Corrosion-induced cracking in concrete     Corrosion-induced cracking Corrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)     Surface cracks     Surface cracks     Staining       Construction defects (faulty workmanship): Cold joints     Improper reinforcing steel placement     Non-structural cracks     Joint cracks     Joint cracks       Condenstation metals embedded in concrete     SlabArbane     Non-structural placement     Joint cracks     Joint cracks       Sl	District:		Girne		ration	tal stri	um ele esign	
Street name:     No street names were found     Stab     Stab     Order Subcide due with stab       Latitude:     35°16'2.68'N     Poorty suppride or heavily loaded cantilevered slabs     Poorty suppride or heavily loaded cantilevered slabs       Longitude:     33°22'58.68'E     Pounding and sparation problem       Structure age:     14     Date (if available): years     Fg. gg     Soft storey       Structure age:     Between 14 and 43 years (1974-2003)     Image: Fg. gg     Soft storey     Soft storey       Ad years (Before 1974)     Fg. gg     Soft storey     Soft storey       Building type:     Public     Fg. gg     Store columns or shear walls     Store columns or shear walls       Building status:     Commercial     Non-struction     Non-structural design fault     Broken axis columns       Building status:     Corrosion-induced cracking in concrete     Corrosion-induced cracking Corrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)     Surface cracks     Surface cracks     Staining       Construction defects (faulty workmanship): Cold joints     Improper reinforcing steel placement     Non-structural cracks     Joint cracks     Joint cracks       Condenstation metals embedded in concrete     SlabArbane     Non-structural placement     Joint cracks     Joint cracks       Sl	Area:			у	nfigu	orizon	Bea	
Longitude:       33°22'58.68"E         Structure age:       Cl4       Date (if available): years       Date (if available): years       Soft storey         Structure age:       Cl4       Date (if available): years       Soft storey         Building type:       Apartment House Dormitory       Vertical House       Broken axis columns         Building type:       Residential Under Construction       House Dormitory       Short column         Building status:       Coccupied Occupied       Short column       Short column         Building status:       Corrosion-induced cracking Corrosion-induced cracking       Vaterproofing defects, water leakage and seepage         Corrosion of metals embedded in concrete       Corrosion-induced cracking Corrosion-induced spalling Cortosion-induced cracking       Surface cracks       Crazing Corrosion-induced cracking         Construction defects (faulty workmanship): designer, detailer, and contractor       Improper grades of slab surface       Non-structural placement       Joint cracks         Slab/beam-to column shear (punching shear) cracks       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):			,		l cc	Η	Slab	
Longitude:       33°22'58.68"E         Structure age:       Cl4       Date (if available): years       Date (if available): years       Soft storey         Structure age:       Cl4       Date (if available): years       Soft storey         Building type:       Apartment House Dormitory       Vertical House       Broken axis columns         Building type:       Residential Under Construction       House Dormitory       Short column         Building status:       Coccupied Occupied       Short column       Short column         Building status:       Corrosion-induced cracking Corrosion-induced cracking       Vaterproofing defects, water leakage and seepage         Corrosion of metals embedded in concrete       Corrosion-induced cracking Corrosion-induced spalling Cortosion-induced cracking       Surface cracks       Crazing Corrosion-induced cracking         Construction defects (faulty workmanship): designer, detailer, and contractor       Improper grades of slab surface       Non-structural placement       Joint cracks         Slab/beam-to column shear (punching shear) cracks       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):	Street name:			1	uctura		design faults	loaded cantilevered slabs
Structure age:       <14 years	Latitude:				Str		Pound	ing and separation problem
Image: construction of metals embedded in concrete     Corrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spa	Longitude:	33°2	2'58.68"E				y n	Weak storey
Image: construction of metals embedded in concrete     Corrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spalling Corrosion-induced spa			ate (if available):			ral	gularit evatio	Soft storey
Building type:     Dormitory     Image: Public     Shear-wall plan configuration       Public     Commercial     Short column       Commercial     Under Construction     Non-Structural Defects       Building status:     Occupied     Defected wooden door       Abandoned     Abandoned     Image: Rain penetration       Building status:     Correstor Defects     Rising damp       Drying shrinkage cracks     Surface cracks     Condensation       Corrosion of metals embedded in concrete     Corrosion-induced spalling     Surface cracks     crazing       Construction     Improper reinforcing steel placement     Improper reinforcing steel placement     Paint peeling       Mondiness     Paint peeling     Improper grades of slab surfaces     Staining       Coracks in RC dua to load effects     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):       Cracks in RC dua to load effects     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):	Structure age:					tructu	Irreg in el	
Building type:     Dormitory     Image: Public     Shear-wall plan configuration       Public     Commercial     Short column       Commercial     Under Construction     Non-Structural Defects       Building status:     Occupied     Defected wooden door       Abandoned     Abandoned     Image: Rain penetration       Building status:     Correstor Defects     Rising damp       Drying shrinkage cracks     Surface cracks     Condensation       Corrosion of metals embedded in concrete     Corrosion-induced spalling     Surface cracks     crazing       Construction     Improper reinforcing steel placement     Improper reinforcing steel placement     Paint peeling       Mondiness     Paint peeling     Improper grades of slab surfaces     Staining       Coracks in RC dua to load effects     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):       Cracks in RC dua to load effects     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):		>43 years (Be	fore 1974)			al s figu		Broken axis columns
Building type:     Dormitory     Image: Public     Shear-wall plan configuration       Public     Commercial     Short column       Commercial     Under Construction     Non-Structural Defects       Building status:     Occupied     Defected wooden door       Abandoned     Abandoned     Image: Rain penetration       Building status:     Correstor Defects     Rising damp       Drying shrinkage cracks     Surface cracks     Condensation       Corrosion of metals embedded in concrete     Corrosion-induced spalling     Surface cracks     crazing       Construction     Improper reinforcing steel placement     Improper reinforcing steel placement     Paint peeling       Mondiness     Paint peeling     Improper grades of slab surfaces     Staining       Coracks in RC dua to load effects     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):       Cracks in RC dua to load effects     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):			Apartment			tric		<b>T 1 1 1</b>
Building type:       Dormitory       design fault       Commercial         Public       Short column       Short column         Commercial       Waterproofing defects, water leakage and seepage       Dordercost         Building status:       Occupied       Defected wooden door       Rising damp         Reinforced Concrete Defects       Abandoned       Rising damp       Rising damp       Rising damp         Drying shrinkage cracks       Torsion-induced cracking       Surface cracks       Construction       Surface cracks       Cracks due to embedment of dissimilar metals (handrails)       Surface cracks       Cracks due to embedment of dissimilar metals (handrails)       Surface cracks       Cracks       Cool joints       Mouldiness         Voorstruction       Improper reinforcing steel placement       Non-structural       Joint cracks       Mouldiness         Valta cracks in RC due to load effects (faulty       Segregation       Cracks of slab surfaces       Other notes (if available):       Other notes (if available):         Cracks in RC due to load effects (structural cracks       Cantilevered member cracks       Cantilevered member cracks       Cantilevered member cracks		Residential				Vei		
CommercialNon-Structural DefectsBuilding status:Under ConstructionWaterproofing defects, water leakage and seepageOccupiedDefected wooden doorAbandonedCondensationReinforced Concrete DefectsRising dampDrying shrinkage cracksTracks in RC dueCorrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesImproper reinforcing steel placementMap/pattern crackingPremature removal of forms defects (faulty workmanship):Non-structural cracks on RC due to load effects (structural cracks)Cracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksBuilding state (structural cracks)Cantilevered member cracksCracks in RC due to load effects (structural cracks)Cantilevered member cracksCracks in RC due to load effects (structural cracks)Slab/bea	Building type:	D 11	Dormitory				design fault	
Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Defected wooden door       Defected wooden door         Abandoned       Reinforced Concrete Defects         Drying shrinkage cracks       Rising damp         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced spalling       Surface cracks       crazing         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Paint peeling       Mouldiness         Vorkmanship):       Segregation       Staining       Non-structural cracks       Joint cracks         Cracks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):							NI	
Building status:       Occupied       Defected wooden door         Abandoned       Abandoned       Reinforced Concrete Defects       Rising damp       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration       Rain penetration			ation			Watarpr		
Abandoned       Abandoned       Image: Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration       Rain penetration         Drying shrinkage cracks       Corrosion-induced cracking       Leaking pipes, spills and other moisture sources         Corrosion of metals embedded in concrete       Corrosion-induced spalling       on wall finishes       Map/pattern cracking         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Paint peeling       Mouldiness         Premature removal of forms       Segregation       Staining       Staining       Improper         Cortacks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):       Other notes (if available):	Building status:					waterpro		
Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Drying shrinkage cracks       Corrosion-induced cracking         Corrosion of metals embedded in concrete       Corrosion-induced spalling         Construction defects (faulty workmanship):       Cold joints         Market (faulty workmanship):       Segregation         Metalse and contractor       Slab/beam-to column shear (punching shear) cracks         Cracks in RC due to load effects (faulty column shear (punching shear) cracks       Slab/beam-to column shear (punching shear) cracks	Dunung status.						Defected	
Corrosion of metals embedded in concreteCorrosion-induced cracking coracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesCrazing Map/pattern crackingImpo cracks metalsConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing ste	Reinfo		Defects			SS		
Corrosion of metals embedded in concreteCorrosion-induced cracking coracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesCrazing Map/pattern crackingImpo cracks metalsConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing steel placementImproper reinforcing ste			Derects			pne		
Construction       Improper reinforcing steel       Mouldiness         Premature removal of forms       Wall finishes workmanship problem         Premature removal of forms       Staining         Construction       Other notes (if available):         designer, detailer, and contractor       Improper grades of slab         Cracks in RC due to load effects       Slab/beam-to column shear         (punching shear) cracks       Cantilevered member cracks	Dryin	g shrinkage crac	eks		ects	dan	Leaking p	ipes, spills and other moisture
Construction       Improper reinforcing steel       Mouldiness         Premature removal of forms       Wall finishes workmanship problem         Premature removal of forms       Staining         Construction       Other notes (if available):         designer, detailer, and contractor       Improper grades of slab         Cracks in RC due to load effects       Slab/beam-to column shear         (punching shear) cracks       Cantilevered member cracks	Compaignet	Corrosion-in	duced cracking		defe	Surfac	ce cracks	
Construction       Improper reinforcing steel       Mouldiness         Premature removal of forms       Wall finishes workmanship problem         Premature removal of forms       Staining         Construction       Other notes (if available):         designer, detailer, and contractor       Improper grades of slab         Cracks in RC due to load effects       Slab/beam-to column shear         (punching shear) cracks       Cantilevered member cracks		Corrosion-in	duced spalling		ce (	on wal	l finishes	Map/pattern cracking
Construction       Improper reinforcing steel       Mouldiness         Premature removal of forms       Wall finishes workmanship problem         Premature removal of forms       Staining         Construction       Other notes (if available):         designer, detailer, and contractor       Improper grades of slab         Cracks in RC due to load effects       Slab/beam-to column shear         (punching shear) cracks       Cantilevered member cracks					urfa		E	fflorescence
Construction       placement       Wall finishes workmanship problem         Defects (faulty       Premature removal of forms       Staining         Vorkmanship):       Cold joints       Non-structural         designer, detailer,       Segregation       cracks         and contractor       Improper grades of slab       Surfaces         Slab/beam-to column shear       (punching shear) cracks       Other notes (if available):         Cracks in RC due       Cantilevered member cracks       Cantilevered member cracks					Su			
Construction       Premature removal of forms       Staining         defects (faulty       Cold joints       Non-structural         workmanship):       designer, detailer,       Segregation       cracks         and contractor       Improper grades of slab       surfaces       Other notes (if available):         Cracks in RC due       Slab/beam-to column shear       (punching shear) cracks       Other notes (if available):         Cracks in RC due       Cantilevered member cracks       Cantilevered member cracks       Other notes (if available):								
defects (faulty       Premature removal of forms       Staining         workmanship):       Cold joints       Non-structural         designer, detailer,       Segregation       cracks         and contractor       Improper grades of slab       other notes (if available):         Slab/beam-to column shear       (punching shear) cracks       Other notes (if available):         Cracks in RC due       Cantilevered member cracks	Construction	-			_		Wall finishe	
workmanship): designer, detailer, and contractor     Cold joints     Non-structural cracks     Joint cracks       Honeycombing     Improper grades of slab surfaces     Other notes (if available):       Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):								Staining
designer, detailer, and contractor     Segregation     Ctacks       Honeycombing     Improper grades of slab surfaces     Other notes (if available):       Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):								Joint cracks
Improper grades of slab surfaces     Other notes (if available):       Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):		-	-		С	TACKS		
Surfaces     Other notes (if available):       Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks	and contractor							
Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks					Othe	er notes (	if available):	
Cracks in RC due to load effects (structural cracks)     (punching shear) cracks				$\vdash$				
to load effects (structural cracks) Cantilevered member cracks								
(structural cracks)								
Southennent cracks	(structural cracks)			$\vdash$				
		Settielli	on cracks					

		Case S	Stuc	dy #	<b>88 (G</b>	13)	
_	Profile						c Design Faults
		di ta	1			Week colu	mn-strong beam
A		THE OF					Torsional Irregularity
t and		with and				'n	(Torsion eccentricity)
	1 Vitte					n ity	Floor discontinuity
	1.				Horizontal structural configuration	Irregularity in plan	Projections in plan
	1	stille	-23		tion		Non-continuous beams
					ructural (	Beam elementary design faults	Non-uniform beam span and cross-section
District:		Girne		ration	ıtal str	am ele lesign	Absence of vertical support at beams intersection
Area:	, . ,	ent or Kaynakkö ri or Sichari)	У	Structural configuration	orizor	Be	Broken axis beams and frames
				al co	Н	Slab	Over-stretched one-way slab
Street name:		ames were found	1	uctura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs
Latitude:		6'45.09"N	_	Str		Poundi	ng and separation problem
Longitude:		2'39.66"E	_			y n	Weak storey
	<14 Da years	te (if available): ~2006			ural 1	Irregularity in elevation	Soft storey
Structure age:	Between 14 ar (1974-2003)	-			Vertical structural configuration	Irre, in el	Discontinuity of columns or shear walls
	>43 years (Be	fore 1974)			al s figu	Vertical	Broken axis columns
		Apartment			rtic	structural element	Irregular column and/or
	Residential	House			Ve ,	elementary	shear-wall plan configuration
Building type:		Dormitory				design fault	
	Public						Short column
	Commercial				XX7 .		ructural Defects
Duilding status	Under Constru Occupied	iction			Waterpro		, water leakage and seepage
Building status:	Abandoned					Defected	Condensation
Reinfo	rced Concrete 1	Defects			SS		Rising damp
		Derects			dampness		Rain penetration
Dryin	g shrinkage crac	ks		ects	dan	Leaking p	ipes, spills and other moisture sources
Compaign of	Corrosion-in	duced cracking		Surface defects	Surfac	ce cracks	crazing
Corrosion of metals embedded		duced spalling		ce	on wal	l finishes	Map/pattern cracking
in concrete		embedment of		urfa			fflorescence
		tals (handrails)		S			Paint peeling
		inforcing steel		-			Mouldiness
Construction	1	ement	$\left  - \right $	-		Wall finishes	s workmanship problem
defects (faulty		moval of forms	$\vdash$	N	-4		Staining
workmanship):		l joints egation	$\left  - \right $		structural racks		Joint cracks
designer, detailer,		combing					
and contractor		grades of slab	╞				
		faces		Othe	er notes (	<u>if available):</u>	
Cracks in RC due		o column shear shear) cracks					
to load effects	Cantilevered member cracks						
(structural cracks)		ent cracks	$\square$				
	Settern						

		Case	Stud	ly ‡	<b>#89(G</b> 1	14)	
	Profile						nic Design Faults
						Week col	umn-strong beam
Constant of the second	A						Torsional Irregularity
	anality in the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s					/ in	(Torsion eccentricity)
		J	22			nity n	Floor discontinuity
						Irregularity in plan	Projections in plan
Martin Inc. Martin	THE REAL PROPERTY.		7.		con		Non-continuous beams
					Horizontal structural configuration	Beam elementary design faults	Non-uniform beam span and cross-section
District:		Girne		ratior	ıtal stı	am ele lesigr	Absence of vertical support at beams intersection
Area:	Dikme	n (Dikomo)		Structural configuration	nizon	Be	Broken axis beams and frames
				l co	Hc	Slab	Over-stretched one-way slab
Street name:	Dr. Faz	il Küçük Cd		ura		elementary	
			_	ruct		design faults	
Latitude:		6'17.95"N	-	Sti		Pound	ding and separation problem
Longitude:		19'3.92"E	_			ity on	Weak storey
	years	te (if available):			ral	Irregularity in elevation	Soft storey
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration	Irre, in el	Discontinuity of columns or shear walls
	>43 years (Be	fore 1974)			l st igur	Vertical	Broken axis columns
		Apartment			tica	structural	
	Residential	House			Ver c(	element elementary	Irregular column and/or
Building type:		Dormitory				design fault	Shear wan plan configuration
	Public						Short column
	Commercial						tructural Defects
	Under Constru	iction		1	Waterpro		ts, water leakage and seepage
Building status:	Occupied					Defecte	ed wooden door
Doinfo	Abandoned rced Concrete	Dofoota	_		SS		Condensation
Kellilo	rcea Concrete	Defects			ones		Rising damp Rain penetration
Drvin	g shrinkage crac	ks			dampness	Leaking	pipes, spills and other moisture
	6			Surface defects	0	Dealing	sources
Corrosion of	Corrosion-in	duced cracking		defe	Surfac	ce cracks	crazing
metals embedded		duced spalling		ce	on wal	l finishes	Map/pattern cracking
in concrete		embedment of		ırfa			Efflorescence
		etals (handrails)		S			Paint peeling
		inforcing steel				W/ 11 C · · ·	Mouldiness
Construction	1	ement		-		Wall finish	es workmanship problem
defects (faulty		moval of forms	N	Non	structural		Staining
workmanship):		egation			racks		Joint cracks
designer, detailer,		combing					
and contractor		grades of slab		0.1			
	sur	faces		Othe	er notes (	if available)	<u>.</u>
		o column shear					
Cracks in RC due to load effects		shear) cracks					
(structural cracks)	Cantilevered member cracks						
(structural cracks)	Settlem	ent cracks					

	Case S	Stud	ly #	<b>490 (G</b> 2	15)	
					~	
	Profile					e Design Faults
C II		-			Week colui	nn-strong beam
					-	Torsional Irregularity (Torsion eccentricity)
		11			y ii	Floor discontinuity
					ularit plan	
				Horizontal structural configuration	Irregularity in plan	Projections in plan
				con	~	Non-continuous beams
			ructural	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	Girne		Structural configuration	ıtal stı	am ele lesign	Absence of vertical support at beams intersection
Area:	Dikmen (Dikomo)		nfigu	orizon	Bee	Broken axis beams and frames
			ul cc	Η	Slab	Over-stretched one-way slab
Street name:	Dr. Fazil Küçük Cd		tura		elementary	Poorly supported or heavily
<b>T 1</b>		_	ruct	-	design faults	loaded cantilevered slabs
Latitude:	35°16'22.70"N	-	St		Poundi	ng and separation problem
Longitude:	33°18'45.48"E				ity ion	Weak storey
	<14 Date (if available): years			ural n	Irregularity In elevation	Soft storey
Structure age:	ructure age: Between 14 and 43 years (1974-2003)			Vertical structural configuration	Irre in e	Discontinuity of columns or shear walls
	>43 years (Before 1974)			al st ïgu	Vertical	Broken axis columns
	Apartment			onf	structural	
	Residential House			Vei c	element elementary	Irregular column and/or
Building type:	Dormitory				design fault	shear-wall plan configuration
	Public					Short column
	Commercial					uctural Defects
	Under Construction			Waterpro		water leakage and seepage
Building status:	Occupied				Defected	wooden door
D	Abandoned	-		s		Condensation
Reinfo	rced Concrete Defects			ones		Rising damp Rain penetration
Dryin	g shrinkage cracks		ects	dampness	Leaking pi	pes, spills and other moisture sources
Comparing of	Corrosion-induced cracking		Surface defects	Surfac	e cracks	crazing
Corrosion of metals embedded	Corrosion-induced spalling		ce	on wal	l finishes	Map/pattern cracking
in concrete	Cracks due to embedment of		ırfa			fflorescence
	dissimilar metals (handrails)	$\square$	S			aint peeling
	Improper reinforcing steel					Mouldiness
Construction	placement				Wall finishes	workmanship problem
defects (faulty	Premature removal of forms Cold joints		Nor	structural		Staining
workmanship):	Segregation	$\square$		racks		Joint cracks
designer, detailer,	Honeycombing					
and contractor	Improper grades of slab		0.1			
	surfaces		Othe	er notes (	if available):	
	Slab/beam-to column shear					
Cracks in RC due to load effects	(punching shear) cracks					
(structural cracks)	Cantilevered member cracks					
(and the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of the order of	Settlement cracks					

		Case S	Stud	ly #	<b>91 (G</b>	16)			
	D 011					<i>a</i> <b>.</b>			
	Profile			Seismic Design Faults Week column-strong beam					
	Aller asette					week con	Torsional Irregularity		
	Arrive Contraction	1 hrs				=	(Torsion eccentricity)		
	The second					ty i	Floor discontinuity		
					Horizontal structural configuration	Irregularity in plan	Projections in plan		
	SATI	LIK	-see		onf		Non-continuous beams		
			cuctural e	Beam elementary design faults	Non-uniform beam span and cross-section				
District:		Girne		uration	ntal str	eam elementa design faults	Absence of vertical support at beams intersection		
Area:	Dikme	n (Dikomo)		config	Horizo.		Broken axis beams and frames		
Street name:	Dr. Faz	il Küçük Cd		Structural configuration	Ŧ	Slab elementary design faults	Over-stretched one-way slab           Poorly supported or heavily           loaded cantilevered slabs		
Latitude:	35°1	6'22.63"N		Strue		-	ing and separation problem		
Longitude:		8'44.95"E		<i>S</i>			Weak storey		
		ate (if available):			ral	Irregularity in elevation	Soft storey		
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration		Discontinuity of columns or shear walls		
	>43 years (Be				al s figu	Vertical	Broken axis columns		
		Apartment			rtic	structural element	Irregular column and/or		
Building type:	Residential	House Dormitory			Ve	elementary design fault	shear-wall plan configuration		
	Public						Short column		
	Commercial			,			ructural Defects		
Building status:	Under Constru Occupied	iction			waterpro		s, water leakage and seepage		
Dunung status.	Abandoned					Defette	Condensation		
Reinfo	rced Concrete	Defects			ess		Rising damp		
					dampness		Rain penetration		
Dryin	g shrinkage crac			Surface defects			bipes, spills and other moisture sources		
Corrosion of		duced cracking		dei		ce cracks	crazing		
metals embedded		duced spalling	$\left  - \right $	face	on wal	l finishes	Map/pattern cracking		
in concrete		etals (handrails)		Surf			Paint peeling		
-		inforcing steel		•1			Mouldiness		
Count :		ement					s workmanship problem		
Construction defects (faulty		moval of forms					Staining		
workmanship):		l joints			structural		Joint cracks		
designer, detailer,		egation combing		С	racks				
and contractor		grades of slab							
		faces	<u> </u>	Othe	er notes (	<u>if available):</u>			
Cracks in RC due	Slab/beam-to	o column shear shear) cracks	,	The	house i	s for sale.			
to load effects		member cracks							
(structural cracks)		ent cracks							
	I								

		Case S	Study	y #	<b>92 (G</b>	17)	
	D (*1					G •	
	Profile						ic Design Faults
			_	_		Week col	umn-strong beam
	T	TH TH				_	Torsional Irregularity (Torsion eccentricity)
	. A CONT					y ir	
						ularit. plan	Floor discontinuity
			F		Horizontal structural configuration	Irregularity in plan	Projections in plan
					tonf		Non-continuous beams
						Beam elementary design faults	Non-uniform beam span and cross-section
District:		Girne		uration	ntal str	am ele design	Absence of vertical support at beams intersection
Area:	Girne	(Kyrenia)		Structural configuration	lorizoi	Be	Broken axis beams and frames
<b>G</b> , ,		<b>T</b> 1 (C1		al c	H	Slab	Over-stretched one-way slab
Street name:		Talat Cd		ructur		elementary design faults	
Latitude:		0'11.54"N	-	St		Pound	ling and separation problem
Longitude:		8'23.95"E	_			ity on	Weak storey
	years	te (if available):			ıral 1	Irregularity in elevation	Soft storey
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration		Discontinuity of columns or shear walls
	>43 years (Be				al s figu	Vertical	Broken axis columns
		Apartment			rtic	structural element	Irregular column and/or
Building type:	Residential	House Dormitory			Ve	elementary design fault	shear-wall plan configuration
	Public						Short column
	Commercial						tructural Defects
	Under Constru	iction			Waterpro		ts, water leakage and seepage
Building status:	Occupied		_	_		Defecte	ed wooden door
Detech	Abandoned rced Concrete		_		s		Condensation
Reimo	rced Concrete	Defects	_		ones		Rising damp Rain penetration
Dryin	g shrinkage crac	ks		cts	dampness	Leaking	pipes, spills and other moisture sources
	Corrosion-in	duced cracking		Surface defects	Surfac	ce cracks	crazing
Corrosion of metals embedded		duced spalling		ce c		l finishes	Map/pattern cracking
in concrete	Cracks due to	embedment of		rfa			Efflorescence
		tals (handrails)		Su			Paint peeling
		inforcing steel					Mouldiness
Construction		ement		-		Wall finish	es workmanship problem
defects (faulty		moval of forms					Staining
workmanship):		l joints	N		structural		Joint cracks
designer, detailer,		egation		c	racks		
and contractor		combing rades of slab					
		faces	<u>C</u>	Othe	er notes (	if available):	<u>.</u>
Cracks in RC due	Slab/beam-to	o column shear shear) cracks					
to load effects		member cracks	$\square$				
(structural cracks)							
	Settlem	ent cracks					

Profile     Stismic Design Faults       Image: Structure age:     Grime     Image: Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:     Structure age:			Case S	Stuc	dy #	493 (G	18)	
District:         Gime         Non-continuous beam         Non-continuous beams           District:         Gime         Non-continuous beams         Non-continuous beams           Area:         Karaoglanoğlu (Agios Georgios)         Non-continuous beams         Non-continuous beams           Street name:         Karaoglanoğlu Cadddesi         Stab         Over-stretched one-way slab           Latitude:         35*20'27.88'N         Joad et al. 100'200'100'100'100'100'100'100'100'100'								
District:       Gime         Area:       Karaoglanoglu Caddesi         Area:       Karaoglanoglu Caddesi         Georgios)       Structure age:         Structure age:       etam.         Atatinde:       35°20'37.88"N         Longinde:       33°15'42.93°E         Building type:       etail and forme         Apatrnent       Residential         Apatrnent       House         Occumental       Discriming defects, water leakage and seenge         Commercial       Construction         Disting type:       Corrosion induced cracking         Building type:       Corrosion induced cracking       Short columns of shear walls and forme source sources         Building type:       Corrosion induced cracking       Corrosion-induced spalling         Corrosion of metals embedded in concrete for preinforming telefore lower induced spalling       Short columns of shear wall pain configuration         Building status:       Cocrosion-induced cracking       Corrosion-induced spalling         Corrosion of metals embedded in concrete formation       Corrosion-induced spalling         Corrosion of metals embedded in concrete formation       Non-structured by each spalling         Corrosion induced cracking       Mappattern cracking         Corrosion induced cracking shear cracks <td< th=""><th></th><th>Profile</th><th></th><th></th><th></th><th></th><th></th><th></th></td<>		Profile						
District:       Gine       Non-continuous beams         District:       Gine       Non-continuous beams         Area:       Karaoğlanoğlu (Agios       Non-continuous beams         Street name:       Karaoğlanoğlu Cadddesi       Bib         Latitude:       35°2037.88'N       Bröken axis beams and frames         Longinde:       33°1542.93'E       Between 14 and 43 years         (1974-2003)       Portinory       Portical       Portoka axis columns         Vagars       Apartment       Between 14 and 43 years       Bröken axis beams         Public       Opartment       Broken axis beams       Stab         Public       Opartment       Stab       Discontinuity of columns or shear walls         Public       Opartment       Broken axis beams       Non-continuous beams         Building type:       Public       Discontinuity of columns or shear walls       Short column         Cornosion of meetals       Construction       Waterprocling defects, water leakage and seepage       Condensation         Building status:       Corrosion-induced spalling       Cornosion-induced spalling       Stab       Stab         Cornosion of meetals       Cornosion-induced spalling       Non-structural       Efforescence         Corosion of meetals       Cornosion-indu			and a second second second second second second second second second second second second second second second				Week colu	
District:       Girne         Area:       Karaoglanoglu (Agios Georgios)         Stroet name:       Karaoglanoglu Cadddesi         Latitude:       35°20'37.88"N         Longinde:       33°1342.93°E         Building type:       Stab         Public       Order status         Commercial       Monercontinuity         Building type:       Assence of reverseched one-way slab         Point discontinuity       Stab         Observed Longing       Astrong Longing         Residential       House         District:       Georging         Commercial       Dominory         Public       Commercial         Districts:       Conson-induced carking         Construction       Construction         Occupied       Conconscial status         Occupied       Conconscial status         Corrosion of metals (hadrails)       Conconscial status       Conconscial status         Concoston-induced carking       Condonstation         Conderstruction       Condenstation         Conderstruction       Concoston-induced carking         Construction       Concoston-induced spaling         Machandeed       Stab       Markatorelekage and seepage								
District:     Gime     Non-uniform beam span and cross-section       Area:     Karaoglanoğlu (Agios Georgios)     Mon-uniform beam span and cross-section       Street name:     Karaoglanoğlu Cadddesi       Latitude:     35°20'37.88'N       Longitude:     33°15'42.93'E       yaars     Poorty supported or heavily       Building type:     Abanco dr vertical support       Residential     House       District:     Over-stretched one-way slab       Public     Soft storey       Public     Soft storey       Public     Dorminory       Public     Dorminory       Public     Occupied       Occupied     Abanco ed residual       Orrosion induced spalling     Orrosion-induced racking       Corrosion induced spalling     Condenation       Corrosion induced spalling     Surface cracks       Corrosion induced spalling     Condenation       Corrosion induced spalling     Non-uniform       Construction     Oscipied       Corrosion induced spalling     Non-uniform       Construction     Oscipied       Occupied     Condenation       Corrosion induced cracking     Sufface cracks       Corrosion induced spalling     Sufface cracks       Construction     Perestrue renoval of forms							.Щ	
District:     Gime     Non-uniform beam span and cross-section       Area:     Karaoglanoğlu (Agios Georgios)     Mon-uniform beam span and cross-section       Street name:     Karaoglanoğlu Cadddesi       Latitude:     35°20'37.88'N       Longitude:     33°15'42.93'E       yaars     Poorty supported or heavily       Building type:     Abanco dr vertical support       Residential     House       District:     Over-stretched one-way slab       Public     Soft storey       Public     Soft storey       Public     Dorminory       Public     Dorminory       Public     Occupied       Occupied     Abanco ed residual       Orrosion induced spalling     Orrosion-induced racking       Corrosion induced spalling     Condenation       Corrosion induced spalling     Surface cracks       Corrosion induced spalling     Condenation       Corrosion induced spalling     Non-uniform       Construction     Oscipied       Corrosion induced spalling     Non-uniform       Construction     Oscipied       Occupied     Condenation       Corrosion induced cracking     Sufface cracks       Corrosion induced spalling     Sufface cracks       Construction     Perestrue renoval of forms				24			rity n	Floor discontinuity
Street name:     Karaoglanoglu Cadddesi       Latitude:     35°20'37.88"N       Longitude:     33°15'42.93"E       Structure age:     <14						iguration	Irregula pla	Projections in plan
Street name:     Karaoglanoglu Cadddesi       Latitude:     35°20'37.88"N       Longitude:     33°15'42.93"E       Structure age:     <14		8				onf		Non-continuous beams
Street name:     Karaoglanoglu Cadddesi       Latitude:     35°20'37.88"N       Longitude:     33°15'42.93"E       Structure age:     <14						ructural (	smentary faults	cross-section
Street name:     Karaoglanoglu Cadddesi       Latitude:     35°20'37.88"N       Longitude:     33°15'42.93"E       Structure age:     <14	District:				ration	ıtal str	am ele lesign	at beams intersection
Street name:     Karaoglanoglu Cadddesi       Latitude:     35°20'37.88"N       Longitude:     33°15'42.93"E       Structure age:     <14	Area:				onfigu	orizon	Be	
Longitude:       33°15'42.93"E         Structure age:       Construction       Construction       Soft storey         Building type:       Apartment       House       Vertical       Broken axis columns         Building type:       Public       Dormitory       Short column       Short column         Building status:       Under Construction       Commercial       Non-Structural Defects         Building status:       Corrosion-induced cracking       Corrosion-induced cracking       Corrosion-induced cracking         Construction       Corrosion-induced cracking       Surface cracks       Cracks due to embedment of dissimilar metals (handrails)         Metacts final defects (faulty workmanship):       Cold joints       Non-structural cracks       Surface cracks       Cracks         Construction       Improper grades of slab surfaces       Non-structural cracks       Joint cracks       Cother notes (if available):         Cracks in RC due to load effects       Slabbean-to column shear (punching shear) cracks       Other notes (if available):			<b>~</b> /		ul co	H		Over-stretched one-way slab
Longitude:       33°15'42.93"E         Structure age:       Construction       Construction       Soft storey         Building type:       Apartment       House       Vertical       Broken axis columns         Building type:       Public       Dormitory       Short column       Short column         Building status:       Under Construction       Commercial       Non-Structural Defects         Building status:       Corrosion-induced cracking       Corrosion-induced cracking       Corrosion-induced cracking         Construction       Corrosion-induced cracking       Surface cracks       Cracks due to embedment of dissimilar metals (handrails)         Metacts final defects (faulty workmanship):       Cold joints       Non-structural cracks       Surface cracks       Cracks         Construction       Improper grades of slab surfaces       Non-structural cracks       Joint cracks       Cother notes (if available):         Cracks in RC due to load effects       Slabbean-to column shear (punching shear) cracks       Other notes (if available):	Street name:	_			uctura		design faults	loaded cantilevered slabs
Construction       Construction       Soft storey         Building type:       Apartment       House       Discontinuity of columns or shear walls         Building type:       Apartment       House       Under Construction       Soft storey         Public       Dormitory       Discontinuity of columns or shear walls       Irregular column and/or shear walls         Building status:       Coccupied       Dormitory       Defected wooden door         Drying shrinkage cracks       Corrosion of metals embedded in concrete       Corrosion-induced cracking Cracks due to embedment of dissimilar metals (handrails)       Tracks due to embedment of dissimilar metals (handrails)       Surface cracks       Surface cracks         Construction       Derestructural cracks       Surface cracks       Vall finishes workmanship problem       Surface cracks         Construction       Segregation       Non-structural cracks       Vall finishes workmanship problem       Statining         defects (faulty workmanship):       Segregation       Segregation       Cracks of slab surfaces       Other notes (if available):         Cracks in RC due to looking shear) cracks       Cantilevered member cracks       Other notes (if available):	Latitude:				Str		Poundi	
(19/4-2005)       >43 years (Before 1974)       shear walls       shear walls         Building type:       Apartment       House       Junder Construction       Vertical       Broken axis columns         Public       Commercial       Under Construction       Short column       Short column         Building status:       Occupied       Occupied       Short column       Short column         Building status:       Occupied       Occupied       Condensation       Eaking damp       Rain penetration         Drying shrinkage cracks       Corrosion-induced cracking       Surface cracks       Surface cracks       Surface cracks       Surface cracks         Construction defects       Improper reinforcing steel       Paint peeling       Paint peeling       Paint peeling         Improper reinforcing steel       placement       Non-structural       Joint cracks       Joint cracks         Construction defects       Segregation       Cracks of solab       Non-structural       Joint cracks         Construction defects       Slab/beam-to column shear       Other notes (if available):       Joint cracks	Longitude:						y n	Weak storey
(19/4-2005)       >43 years (Before 1974)       shear walls       shear walls         Building type:       Apartment       House       Junder Construction       Vertical       Broken axis columns         Public       Commercial       Under Construction       Short column       Short column         Building status:       Occupied       Occupied       Short column       Short column         Building status:       Occupied       Occupied       Condensation       Eaking damp       Rain penetration         Drying shrinkage cracks       Corrosion-induced cracking       Surface cracks       Surface cracks       Surface cracks       Surface cracks         Construction defects       Improper reinforcing steel       Paint peeling       Paint peeling       Paint peeling         Improper reinforcing steel       placement       Non-structural       Joint cracks       Joint cracks         Construction defects       Segregation       Cracks of solab       Non-structural       Joint cracks         Construction defects       Slab/beam-to column shear       Other notes (if available):       Joint cracks			ate (if available):			ral	gularit evatic	Soft storey
Building type:     Dormitory     Image: Shear-Wail plan configuration       Public     Commercial     Short column       Commercial     Under Construction     Waterproofing defects, water leakage and seepage       Building status:     Occupied     Defected wooden door       Abandoned     Abandoned     Entropy of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the	Structure age:					tructu	Irreg in el	
Building type:     Dormitory     Image: Shear-Wail plan configuration       Public     Commercial     Short column       Commercial     Under Construction     Waterproofing defects, water leakage and seepage       Building status:     Occupied     Defected wooden door       Abandoned     Abandoned     Entropy of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the		>43 years (Be	fore 1974)			al s ïgu	Vertical	Broken axis columns
Building type:     Dormitory     Image: Shear-Wail plan configuration       Public     Commercial     Short column       Commercial     Under Construction     Waterproofing defects, water leakage and seepage       Building status:     Occupied     Defected wooden door       Abandoned     Abandoned     Entropy of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the						rtic		
Public       Short column         Commercial       Non-Structural Defects         Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Abandoned       Defected wooden door       Abandoned         Reinforced Concrete Defects       Defected wooden door       Rising damp         Drying shrinkage cracks       Z       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Surface cracks       crazing         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Paint peeling       Mouldiness         Premature removal of forms       Non-structural cracks       Staining       Staining         Cracks in RC due to load effects       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):	Building type:	Residential				Ve	elementary	
Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Occupied       Defected wooden door       Abandoned         Abandoned       Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced spalling       Surface cracks       crazing         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Paint peeling       Mouldiness         Premature removal of forms       Cold joints       Non-structural cracks       Joint cracks       Joint cracks         Cracks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):	0.01							
Building status:       Occupied Abandoned       Defected wooden door         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Drying shrinkage cracks       Corrosion-induced cracking Corrosion-induced spalling       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)       Surface cracks on wall finishes       Cracks (crazing Map/pattern cracking         Improper reinforcing steel placement       Paint peeling       Mouldiness         Premature removal of forms       Mal finishes workmanship problem       Staining         Cold joints       Non-structural cracks in RC due to load effects       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):								
Abandoned       Condensation         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Leaking pipes, spills and other moisture sources         Construction defects (faulty workmanship):       Cold joints       Surface cracks       Cracks         Premature removal of forms and contractor       Premature removal of forms       Mouldiness         Vortacks in RC due to load effects (faulty workmanship):       Segregation       Staining         Construction defects (faulty workmanship):       Segregation       Non-structural cracks       Joint cracks         Cracks in RC due to load effects (faulty conting shear) cracks       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):			uction			Waterpro		
Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Surface cracks       crazing         Construction defects (faulty workmanship):       Cold joints       Surfaces       Moult finishes       Map/pattern cracks         Construction defects (faulty workmanship):       Segregation       Non-structural cracks       Joint cracks       Improper grades of slab surfaces         Cracks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):	Building status:						Defected	
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesCrazing Map/pattern crackingConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementMouldinessImproper SegregationMouldinessCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksNon-structural cracksJoint cracks	Doinfo		Dofoata	-		SS		
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesCrazing Map/pattern crackingConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementMouldinessImproper SegregationMouldinessCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksNon-structural cracksJoint cracks	Kenno	rcea Concrete	Defects			pne		
Construction       Improper reinforcing steel       Mouldiness         placement       Wall finishes workmanship problem         Premature removal of forms       Staining         Premature removal of forms       Non-structural         Cold joints       Non-structural         designer, detailer, and contractor       Honeycombing         Improper grades of slab       surfaces         Slab/beam-to column shear       Other notes (if available):         Cracks in RC due to load effects       Cantilevered member cracks	Dryin	g shrinkage crac	cks		ects	damj	Leaking pi	pes, spills and other moisture
Construction       Improper reinforcing steel       Mouldiness         placement       Wall finishes workmanship problem         Premature removal of forms       Staining         Premature removal of forms       Non-structural         Cold joints       Non-structural         designer, detailer, and contractor       Honeycombing         Improper grades of slab       surfaces         Slab/beam-to column shear       Other notes (if available):         Cracks in RC due to load effects       Cantilevered member cracks		Corrosion-in	duced cracking		lef€	Surfac	ce cracks	
Construction       Improper reinforcing steel       Mouldiness         placement       Wall finishes workmanship problem         Premature removal of forms       Staining         Premature removal of forms       Non-structural         Cold joints       Non-structural         designer, detailer, and contractor       Honeycombing         Improper grades of slab       surfaces         Slab/beam-to column shear       Other notes (if available):         Cracks in RC due to load effects       Cantilevered member cracks		Corrosion-ir	duced spalling		ce (	on wal	ll finishes	
Construction       Improper reinforcing steel       Mouldiness         placement       Wall finishes workmanship problem         Premature removal of forms       Staining         Premature removal of forms       Non-structural         Cold joints       Non-structural         designer, detailer, and contractor       Honeycombing         Improper grades of slab       surfaces         Slab/beam-to column shear       Other notes (if available):         Cracks in RC due to load effects       Cantilevered member cracks					Irfa			
Construction defects (faulty workmanship): designer, detailer, and contractor       Premature removal of forms       Wall finishes workmanship problem         Cold joints       Non-structural cracks       Joint cracks         Improper grades of slab surfaces       Improper grades of slab surfaces       Other notes (if available):         Cracks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):					Su			
Construction       Premature removal of forms       Staining         defects (faulty       Cold joints       Non-structural         workmanship):       designer, detailer,       Joint cracks         and contractor       Improper grades of slab       surfaces         Slab/beam-to column shear       (punching shear) cracks       Other notes (if available):         Cracks in RC due       Cantilevered member cracks       Cantilevered member cracks								
defects (faulty workmanship):       Premature removal of forms       Staining         designer, detailer, and contractor       Cold joints       Non-structural cracks       Joint cracks         Honeycombing       Improper grades of slab surfaces       Other notes (if available):         Cracks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):	Construction	1		$\square$	-		Wall finishes	11
workmanship):     Cold joints     Non-structural       designer, detailer, and contractor     Segregation     cracks       Honeycombing     Improper grades of slab     Other notes (if available):       Slab/beam-to column shear (punching shear) cracks     Other notes (if available):       Cracks in RC due to load effects (structural cracks)     Cantilevered member cracks				$\vdash$				Staining
designer, detailer, and contractor       Honeycombing         Improper grades of slab surfaces       Other notes (if available):         Cracks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):	workmanship):		0	$\vdash$				Joint cracks
Improper grades of slab surfaces     Other notes (if available):       Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):	=							
Surfaces     Other notes (if available):       Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks	and contractor							
Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks       Cantilevered member cracks					Othe	er notes (	if available):	
to load effects (structural cracks) Cantilevered member cracks	Cracks in RC due							
(structural cracks)								
Southenient cracks	(structural cracks)			$\left  - \right $				
		Settlelli						

	Case Study #94(G19)								
	Profile						c Design Faults		
						Week colu	mn-strong beam		
							Torsional Irregularity		
						y in	(Torsion eccentricity)		
						n ty	Floor discontinuity		
					Horizontal structural configuration	Irregularity in plan	Projections in plan		
					onf		Non-continuous beams		
					uctural c	Beam elementary design faults	Non-uniform beam span and cross-section		
District:		Girne		Ination	ıtal str	am ele lesign	Absence of vertical support at beams intersection		
Area:		anoğlu (Agios eorgios)		onfigu	orizor	Be	Broken axis beams and frames		
Street name:	_	noğlu Cadddesi		Structural configuration	Н	Slab elementary design faults	Over-stretched one-way slab           Poorly supported or heavily           loaded cantilevered slabs		
Latitude:		20'37.55"N	_	St		Poundi	ng and separation problem		
Longitude:		15'44.01"E	_			ty on	Weak storey		
	<14 D years	ate (if available):			ral	Irregularity in elevation	Soft storey		
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration	Į.	Discontinuity of columns or shear walls		
	>43 years (Be	efore 1974)			al s figu	Vertical	Broken axis columns		
		Apartment			rtic	structural element	Irregular column and/or		
Building type:	Residential	House Dormitory			Ve	elementary design fault	shear-wall plan configuration		
	Public	· ·					Short column		
	Commercial			Non-Structural Defects					
	Under Constr	uction		Waterproofing defects, water leakage and seepage					
Building status:	Occupied					Defected	wooden door		
	Abandoned				s		Condensation		
Reinfo	rced Concrete	Defects			nes		Rising damp		
Dryin	g shrinkage cra	cks		cts	dampness	Leaking pi	Rain penetration ipes, spills and other moisture		
	Corrosionair	duced cracking	$\left  - \right $	Surface defects	Surfa	ce cracks	crazing		
Corrosion of		nduced spalling	$\left  - \right $	e d		ll finishes	Map/pattern cracking		
metals embedded		o embedment of		rfac			fflorescence		
in concrete	dissimilar m	etals (handrails)		Sui		Р	aint peeling		
	Improper re	einforcing steel				Ν	Mouldiness		
Construction	1	cement				Wall finishes	workmanship problem		
Construction defects (faulty		emoval of forms				_	Staining		
workmanship):		d joints	$\square$		structural		Joint cracks		
designer, detailer,		egation		C	racks				
and contractor		combing							
		grades of slab rfaces		Othe	er notes (	if available):			
		o column shear	$\left  - \right $						
Cracks in RC due		shear) cracks							
to load effects		member cracks							
(structural cracks)		ent cracks							

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Week columi-strong beam         New columination           District:         Gime         Figure 1           District:         Gime         Non-continuous beams           Area:         Alsancak (Karavas)         Non-continuous beams           Street name:         Ankara Cd         Bisho         Over-stretched one-way lab           Latitude:         35°20/47.44"N         Absence of vertical support at the sens intersection         Broken axis beams and frames           Latitude:         35°20/47.44"N         Oute (f available):         Stab         Over-stretched one-way lab           Latitude:         35°20/47.44"N         Oute (f available):         Stab         Over-stretched one-way lab           Structure age:         Maxima Cd         Stab         Over-stretched one-way lab         Over-stretched one-way lab           Building type:         Residential         House         Discontinuity of columns or there at a scolumns         Iteration           Building status:         Occonstruction         Over-stretched one-way lab         Discontinuity of columns or there at a scolumns           Building status:         Corrosion-induced cracking         Torestretched one-way lab         Over-stretched one-way lab           Occonstruction         Corrosion-induced spalling         Torestretched one-way lab         Over-stretched one-way lab     <									
Justici:       Gime         Distric:       Gime         Area:       Alsancak (Karavas)         Street name:       Ankara Cd         Latitude:       35°2047.44"N         Longitude:       33°1220.04"E         Verses:       Stab         Pointing and separation problem         Construction       Over-stretched one-way slab         Pointing and separation problem       Soft and the second of the strip second slabs         Structure age:       Stab for entrice of the strip second slabs         Building type:       Alsancak (Karavas)         Public       Soft and the second slabs         Commercial       Monumity         During and separation problem       Store columns or shear walls         Building type:       Apartment         Residential       House         Under Construction       Corresion-induced cracking         Corrosion of metals embedded       Corrosion-induced cracking         Corrosion of metals embedded       Corrosion-induced cracking seed         Plack of solution shear       Monumity forms         Plack to to onlom seed       Gravita (bhandrails)         Manoned       Corrosion-induced cracking         Corrosion of metals embedded       Corrosion-induced cracking		Profile							
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Longitude:     33°12'20.04"E       Structure age:       Date (if available): years       Structure age:          Building type:      Apartment       Residential     House       Dormitory        Public        Commercial        Building status:     Under Construction       Drying shrinkage cracks        Construction     Corrosion-induced cracking Cracks due to embedded in concrete       Construction     Corrosion-induced cracking Construction       Construction     Corrosion-induced cracking Construction       Improper reinforcing steel placement       Preature removal of forms       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Premature removal of forms	Street name:				uctural c	E	elementary design faults	Poorly supported or heavily loaded cantilevered slabs	
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Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Surface cracks       Crazing       on wall finishes       Map/pattern cracking       on wall finishes       Map/pattern cracking       Improper reinforcing steel       Map/pattern cracking       Improper reinforcing steel       Map/pattern cracking       Improper reinforcing steel       Map/pattern cracking       Improper reinforcing steel       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab       Improper grades of slab	Building status:								
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Construction       Improper reinforcing steel       Mouldiness         placement       Wall finishes workmanship problem         Premature removal of forms       Staining         Cold joints       Non-structural         Construction       Segregation         Gesigner, detailer, and contractor       Improper grades of slab         Surfaces       Slab/beam-to column shear         (punching shear) cracks       Other notes (if available):		Corrosion-in	duced cracking		efe	Surfac	ce cracks		
Construction       Improper reinforcing steel       Mouldiness         placement       Wall finishes workmanship problem         Premature removal of forms       Staining         Cold joints       Non-structural         Construction       Segregation         Gesigner, detailer, and contractor       Improper grades of slab         Surfaces       Slab/beam-to column shear         (punching shear) cracks       Other notes (if available):					ce d			ě	
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Construction       placement       Wall finishes workmanship problem         Defects (faulty       Premature removal of forms       Staining         workmanship):       Cold joints       Non-structural         designer, detailer,       Honeycombing       Joint cracks         Improper grades of slab       surfaces       Other notes (if available):         Slab/beam-to column shear       (punching shear) cracks       Other notes (if available):         (structural cracks)       Cantilevered member cracks       Other notes (if available):	in concrete	dissimilar me	tals (handrails)		Su		]	Paint peeling	
Construction       Premature removal of forms       Staining         defects (faulty       Cold joints       Non-structural         workmanship):       designer, detailer,       Joint cracks         and contractor       Honeycombing       Improper grades of slab         Suffaces       Slab/beam-to column shear       Other notes (if available):         Cracks in RC due       Cantilevered member cracks       Cantilevered member cracks		Improper re	inforcing steel						
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Constant and Constant and Constant and Constant and Constant and Constant and Constant and Constant and Constant						_	Torsional Irregularity (Torsion eccentricity)	
		1 .				y ir	Floor discontinuity	
House of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local division of the local div						ularit plan	Floor discontinuity	
					Horizontal structural configuration	Irregularity in plan	Projections in plan	
					cont		Non-continuous beams	
				ſ	ructural c	Beam elementary design faults	Non-uniform beam span and cross-section	
District:		Girne		Structural configuration	ntal st	am el desigr	Absence of vertical support at beams intersection	
Area:	Alsanca	ak (Karavas)		onfigu	lorizoi		Broken axis beams and frames	
G				al co	H	Slab	Over-stretched one-way slab	
Street name:	An	kara Cd		tur		elementary design faults	Poorly supported or heavily loaded cantilevered slabs	
Latitude:	3507	0'38.90"N	-	truc	-	-	ing and separation problem	
Longitude:		1'55.44"E	-	S			Weak storey	
Longhudo		te (if available):			al	Irregularity in elevation	Soft storey	
Structure age:	Between 14 and 43 years (1974-2003)				Vertical structural configuration	Irreg in ele	Discontinuity of columns or shear walls	
	>43 years (Be	fore 1974)			al st ïgu	Vertical	Broken axis columns	
		Apartment			onf	structural	<b>.</b>	
	Residential	House			Vei c	element elementary	Irregular column and/or shear-wall plan configuration	
Building type:		Dormitory				design fault	shear-wan plan configuration	
	Public						Short column	
	Commercial			Non-Structural Defects				
D '11' / /	Under Constru	iction		Waterproofing defects, water leakage and seepage				
Building status:	Occupied Abandoned			Defected wooden door Condensation				
Reinfo	rced Concrete	Defects			SS		Rising damp	
Kenno		Delects			pne		Rain penetration	
Dryin	g shrinkage crac	ks		Surface defects	dampness	Leaking p	ipes, spills and other moisture sources	
Corrosion of		duced cracking		def		ce cracks	crazing	
metals embedded		duced spalling		lce	on wal	l finishes	Map/pattern cracking	
in concrete		embedment of		urfî			fflorescence	
		tals (handrails)	$\left  - \right $	ŝ			Paint peeling	
		inforcing steel ement		-			Mouldiness s workmanship problem	
Construction		moval of forms		ŀ		wan minsie	Staining	
defects (faulty		l joints		Non-	structural			
workmanship):		egation			racks		Joint cracks	
designer, detailer, and contractor		combing						
		rades of slab		Oth	er notes (	if available):		
		faces	$\square$	Juit	A HOLES (	<u>n avanable):</u>		
Cracks in RC due		column shear						
to load effects	(putering shear) cracks							
(structural cracks)	(structural cracks)							
	Settlem	ent cracks						

		Case S	Study	<b>#97</b> (G	22)		
	Profile					c Design Faults	
None Contraction	and the state of the				Week colu	mn-strong beam	
		A Distance of	1			Torsional Irregularity	
E FEER		-1257	F		Ξ.	(Torsion eccentricity)	
		- 1		ity 1	Floor discontinuity		
P Darah Rectaurie				Horizontal structural configuration	Irregularity in plan	Projections in plan	
				on		Non-continuous beams	
				ructural c	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	1	Girne	ratio	ntal st	am el lesign	Absence of vertical support at beams intersection	
Area:	Alsance	ak (Karavas)	Structural configuration	orizor	Be	Broken axis beams and frames	
				Ž H	Slab	Over-stretched one-way slab	
Street name:	An	kara Cd	erthor		elementary design faults	Poorly supported or heavily loaded cantilevered slabs	
Latitude:	35°2	0'37.39"N	Ctri		Poundi	ing and separation problem	
Longitude:		1'40.07"E			~ 5	Weak storey	
		te (if available):		al	Irregularity in elevation	Soft storey	
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration	Irreg in ele	Discontinuity of columns or shear walls	
	>43 years (Be	fore 1974)		ıl st iguı	Vertical	Broken axis columns	
	· · · ·	Apartment		tica	structural		
	Residential	House		Ver c	element	Irregular column and/or	
Building type:		Dormitory			elementary design fault	shear-wall plan configuration	
0.51	Public					Short column	
	Commercial			Non-Structural Defects			
D 111	Under Constru	iction		Waterpr		, water leakage and seepage	
Building status:	Occupied				Defected	l wooden door	
	Abandoned		_	ş		Condensation	
Reinfo	rced Concrete	Defects		ones		Rising damp	
Dryin	g shrinkage crac	ks	te	dampness	Leaking p	Rain penetration ipes, spills and other moisture sources	
	Corrosion-in	duced cracking	Surface defects	5 Surfa	ce cracks	crazing	
Corrosion of		duced spalling	d d	on wa	ll finishes	Map/pattern cracking	
metals embedded		embedment of	fac			Afflorescence	
in concrete		tals (handrails)	City			Paint peeling	
		inforcing steel				Mouldiness	
Construction	plac	ement				s workmanship problem	
Construction defects (faulty		moval of forms				Staining	
workmanship):		l joints	No	on-structura	1	Joint cracks	
designer, detailer,		egation		cracks		20mt crucks	
and contractor		combing					
		rades of slab	Of	her notes	(if available):		
		faces					
Cracks in RC due		o column shear shear) cracks					
to load effects			$\vdash$				
(structural cracks)		member cracks					
	Settlem	ent cracks					

		Case St	udy a	#98(G2	23)			
_	Profile				Seismic	Design Faults		
1	•			Week column-strong beam				
N.	-					Torsional Irregularity		
	States Inda				/ in	(Torsion eccentricity)		
4					urity In	Floor discontinuity		
MANA				Horizontal structural configuration	Irregularity in plan	Projections in plan		
				cont		Non-continuous beams		
				ructural c	Beam elementary design faults	Non-uniform beam span and cross-section		
District:	Girne	•	Iration	ntal st		Absence of vertical support at beams intersection		
Area:	Sadrazamköy	(Livera)	onfigu	orizoi	Be	Broken axis beams and frames		
Street name:	No street names		Structural configuration	Н	Slab elementary design faults	Over-stretched one-way slab Poorly supported or heavily loaded cantilevered slabs		
Latitude:	35°23'9.8		Sti		Poundir	ng and separation problem		
Longitude:	32°57'48.'				ty on	Weak storey		
		Date (if available): 2004~2007		iral 1	Irregularity in elevation	Soft storey		
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration	Irre. in el	Discontinuity of columns or shear walls		
	>43 years (Before 1	974)		al s figu	Vertical	Broken axis columns		
	ApaResidentialHou	artment ise		Vertic con	structural element elementary	Irregular column and/or shear-wall plan configuration		
Building type:	Dormitory			design fault	shear-wan plan configuration			
	Public					Short column		
	Commercial		Non-Structural Defects					
D 111 4 4	Under Construction			Waterproofing defects, water leakage and seepage Defected wooden door				
Building status:	Occupied Abandoned				Defected	Condensation		
Rainfo	rced Concrete Defect	ts		SS		Rising damp		
Konno	itted Concrete Delet			mpness		Rain penetration		
Dryin	g shrinkage cracks		cts	dam	Leaking pi	pes, spills and other moisture sources		
	Corrosion-induced	cracking	Surface defects	Surfac	ce cracks	crazing		
Corrosion of metals embedded	Corrosion-induced	l spalling	ce c		l finishes	Map/pattern cracking		
in concrete	Cracks due to embe		ırfa			florescence		
	dissimilar metals (h		Su			aint peeling		
	Improper reinforc					Aouldiness		
Construction	placement		_		Wall finishes	workmanship problem		
defects (faulty	Premature removal of forms		NT.	 		Staining		
workmanship):	Cold joints Segregation		-	-structural cracks		Joint cracks		
designer, detailer,			-rueko					
and contractor	Improper grades							
	surfaces		Othe	er notes (	if available):			
Cracks in RC due	Slab/beam-to colu (punching shear)							
to load effects	fects Cantilevered member cracks							
(structural cracks)	Settlement cra							

	Case S	Stuc	ly #	<b>99 (G</b>	24)		
	Profile					e Design Faults	
				Week column-strong beam			
	Date					Torsional Irregularity	
Term					, in	(Torsion eccentricity)	
					n n	Floor discontinuity	
		1 miles		Horizontal structural configuration	Irregularity in plan	Projections in plan	
		in .		con		Non-continuous beams	
the second			ration	ructural c	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	Girne			ntal st	am el desigr	Absence of vertical support at beams intersection	
Area:	Sadrazamköy (Livera)		Structural configuration	lorizoi	Be	Broken axis beams and frames	
<b>C</b>			al c	н	Slab	Over-stretched one-way slab	
Street name:	No street names were found	1	uctura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs	
Latitude:	35°23'23.20"N		Sti		Poundi	ng and separation problem	
Longitude:	32°56'57.67"E	_			u ty	Weak storey	
	<14 Date (if available): years 2004~2007			ural 1	Irregularity in elevation	Soft storey	
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration	Irre, in el	Discontinuity of columns or shear walls	
	>43 years (Before 1974)			al s figu	Vertical	Broken axis columns	
	Apartment			rtic	structural element	Imagular column and/or	
	Residential House			Ve	elementary	Irregular column and/or shear-wall plan configuration	
Building type:	Dormitory			design fault	shear-wan plan configuration		
	Public					Short column	
	Commercial					uctural Defects	
	Under Construction		Waterproofing defects, water leakage and seep				
Building status:	Occupied				Defected wooden door		
	Abandoned		Condensation				
Reinfo	rced Concrete Defects			nes		Rising damp	
				dampness	Rain penetration		
Dryin	g shrinkage cracks		ts	da	Leaking pi	pes, spills and other moisture	
	Comparing induced encelsing		efec	Courfe	ce cracks	sources	
Corrosion of	Corrosion-induced cracking Corrosion-induced spalling	-	Surface defects		l finishes	crazing Map/pattern cracking	
metals embedded	Cracks due to embedment of	-	faco	on wa		fflorescence	
in concrete	dissimilar metals (handrails)		Sur			aint peeling	
	Improper reinforcing steel		•1			Mouldiness	
	placement		ľ			workmanship problem	
Construction	Premature removal of forms					Staining	
defects (faulty	Cold joints		Non-	structural			
workmanship):	Segregation			racks		Joint cracks	
designer, detailer, and contractor	Honeycombing						
und contractor	Improper grades of slab surfaces		Othe	er notes (	if available):		
	Slab/beam-to column shear						
Cracks in RC due	(punching shear) cracks						
to load effects	Cantilevered member cracks						
(structural cracks)	Settlement cracks						

	Case S	Stud	ly #	100 (G	325)	
					~ .	
	Profile					nic Design Faults
		-				lumn-strong beam Torsional Irregularity (Torsion eccentricity)
					urity un	Floor discontinuity
				uration	Irregularity in plan	Projections in plan
				ıfig		Non-continuous beams
			u	Horizontal structural configuration	Beam elementary design faults	Non-uniform beam span and cross-section
District:	Girne (Kyrenia)		guratic	ontal s	Beam e desig	Absence of vertical support at beams intersection
Area:	Arapköy (Klepini)		Structural configuration	Horiz		Broken axis beams and frames
Street name:	Beş Parmaklar Cd		tura		Slab elementary	Over-stretched one-way slab           Poorly supported or heavily
Street name.	Deş i armaklar ed		truc		design fault	
Latitude:	35°18'6.72"N		S		Poun	ding and separation problem
Longitude:	33°26'9.65"E				y n	Weak storey
	<14 Date (if available): years December 2004			ral	Irregularity n elevation	Soft storey
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration		Discontinuity of columns or shear walls
	>43 years (Before 1974)			cal : ıfig	Vertical	Broken axis columns
Building type:	Apartment           Residential         House           Dormitory			Vertic	structural element elementary	
Dunung type.	Public				design faul	Short column
	Commercial				Non-S	Structural Defects
	Under Construction			Waterpro		ts, water leakage and seepage
Building status:	Occupied				Defect	ed wooden door
	Abandoned			~		Condensation
Reinfo	rced Concrete Defects			ness		Rising damp
Davia	a shrinkaga arasha			dampne	T1-1	Rain penetration pipes, spills and other moisture
Drym	g shrinkage cracks		cts	çp	Leaking	sources
	Corrosion-induced cracking		Surface defects	Surfac	ce cracks	crazing
Corrosion of	Corrosion-induced spalling		ce d		l finishes	Map/pattern cracking
metals embedded in concrete	Cracks due to embedment of		rfae			Efflorescence
III concrete	dissimilar metals (handrails)		Su			Paint peeling
	Improper reinforcing steel					Mouldiness
Construction	Construction placement				Wall finish	es workmanship problem
defects (faulty	Premature removal of forms		27			Staining
workmanship):	Cold joints Segregation			-structural cracks		Joint cracks
designer, detailer,	Honeycombing					
and contractor	Improper grades of slab surfaces		Othe	er notes (	if available)	<u>r</u>
	Slab/beam-to column shear		Thi	s case	study is a	bout a suspended project called
Cracks in RC due to load effects	to load effects (structural cracks)				valley p	
(structural cracks)				inished l	houses due	to technical and legal problems.
	Settlement cracks					

	Case S	Stud	ly #	[‡] 101 (0	C1)		
					~		
	Profile					e Design Faults	
					Week colui	mn-strong beam	
La seconda de la seconda de la seconda de la seconda de la seconda de la seconda de la seconda de la seconda de					_	Torsional Irregularity (Torsion eccentricity)	
					y ii	Floor discontinuity	
					ularit plan	Floor discontinuity	
				ıfiguration	Irregularity in plan	Projections in plan	
				coi	<u>5</u>	Non-continuous beams	
and the second second				uctural	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	Mağusa		ation	Horizontal structural configuration	m ele esign	Absence of vertical support at beams intersection	
Area:	Gazimağusa Sanayi Bölgesi (Famagusta Greater Industrial Area	ı)	Structural configuration		Bea	Broken axis beams and frames	
			COI	Ho.	Slab	Over-stretched one-way slab	
Street name:	Yeni Hastane Yolu		ıral		elementary	Poorly supported or heavily	
		_	lctu		design faults	loaded cantilevered slabs	
Latitude:	N 35°8.646' (35°8'38.8")	_	Stru		Poundi	ng and separation problem	
Longitude:	E 33°54.189' (33°54'11.3")		•1		u ty	Weak storey	
	<14 Date (if available): years 2004 ~ 2007		r al		Irregularity in elevation	Soft storey	
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration	rreg n el	Discontinuity of columns or	
				stru ura		shear walls	
	>43 years (Before 1974)			cal tfig	Vertical structural	Broken axis columns	
	Apartment			ertic	element	Irregular column and/or	
D 111	Residential House	-		° N	elementary	shear-wall plan configuration	
Building type:	Dormitory	Dormitory			design fault		
	Public					Short column	
	Commercial Under Construction		Non-Structural Defects Waterproofing defects, water leakage and seepage				
Building status:	Occupied			waterpro			
Dunung status.	Abandoned		Defected wooden door Condensation				
Reinfo	rced Concrete Defects			SS		Rising damp	
				dampness		Rain penetration	
Dryin	g shrinkage cracks		ects	dan	Leaking pi	pes, spills and other moisture sources	
Corrosion of	Corrosion-induced cracking		Surface defect		e cracks	crazing	
metals embedded	Corrosion-induced spalling		lce	on wal	l finishes	Map/pattern cracking	
in concrete	Cracks due to embedment of		urfa			fflorescence	
	dissimilar metals (handrails)		Š			aint peeling	
	Improper reinforcing steel					Mouldiness	
Construction	placement Premature removal of forms				wall finishes	workmanship problem	
defects (faulty	Cold joints		Nor	structural		Staining	
workmanship):	Segregation	1		structural racks		Joint cracks	
	designer, detailer,						
and contractor	and contractor Improper grades of slab						
	surfaces		Othe	er notes (	if available):		
Cracks in RC due	Slab/beam-to column shear (punching shear) cracks						
to load effects	Cantilevered member cracks						
(structural cracks)	Settlement cracks						
	Settlement erdeks						

	Case	Stud	ly #	[‡] 102 (0	C2)		
	Profile					Design Faults	
					Week colur	nn-strong beam	
						Torsional Irregularity	
14 110					/ in	(Torsion eccentricity)	
					nity n	Floor discontinuity	
				Horizontal structural configuration	Irregularity in plan	Projections in plan	
				uctural con	ý	Non-continuous beams	
					Beam elementary design faults	Non-uniform beam span and cross-section	
District:	Mağusa		ation	tal stri	m ele esign	Absence of vertical support at beams intersection	
Area:	Gazimağusa Sanayi Bölgesi (Famagusta Greater Industrial Area	ı)	Structural configuration	rizon	Bea	Broken axis beams and frames	
			cor	Но	Slab	Over-stretched one-way slab	
Street name:	Yeni Hastane Yolu		ral		elementary	Poorly supported or heavily	
			Ictu		design faults	loaded cantilevered slabs	
Latitude:	N 35°8.784' (35°8'47.0")	_	Stru		Poundir	ng and separation problem	
Longitude:	E 33°54.123' (33°54'7.4")		•1		b ty	Weak storey	
	<14 Date (if available): years 2009 ~ 2010		ral		Irregularity in elevation	Soft storey	
Structure age:	Between 14 and 43 years			Vertical structural configuration	irreg n el	Discontinuity of columns or	
	(1974-2003)			stru ura		shear walls	
	>43 years (Before 1974)			cal tig	Vertical	Broken axis columns	
	Apartment			ertic	structural element	Irregular column and/or	
	Residential House			Ve	elementary	shear-wall plan configuration	
Building type:	Dormitory			design fault			
					Short column		
	Commercial		Non-Structural Defects Waterproofing defects, water leakage and seepage				
Derilding states	Under Construction			Waterpro		water leakage and seepage wooden door	
Building status:	Occupied Abandoned				Defected	Condensation	
Doinfo	rced Concrete Defects	-		SS		Rising damp	
Keilito	itten Concrete Defects			pne		Rain penetration	
Dryin	g shrinkage cracks		cts	dampness	Leaking pipes, spills and other moisture sources		
	Corrosion-induced cracking	$\square$	Surface defect	Surfac	ce cracks	crazing	
Corrosion of	Corrosion-induced spalling		ce c		ll finishes	Map/pattern cracking	
metals embedded in concrete	Cracks due to embedment of		rfa		Ef	florescence	
iii concrete	dissimilar metals (handrails)		Su		Pa	aint peeling	
	Improper reinforcing steel					Aouldiness	
Construction	placement				Wall finishes	workmanship problem	
defects (faulty	Premature removal of forms					Staining	
workmanship):	Cold joints			structural		Joint cracks	
designer, detailer,	Segregation		C	cracks			
and contractor	Honeycombing Improper grades of slab						
	surfaces		Othe	er notes (	if available):		
	Slab/beam-to column shear						
Cracks in RC due	(punching shear) cracks						
to load effects	Cantilevered member cracks	$\square$					
(structural cracks)	Settlement cracks						

	Case S	Study	#103 (0	C3)		
	Profile				c Design Faults	
				Week colu	mn-strong beam	
	W			_	Torsional Irregularity	
S				y in	(Torsion eccentricity)	
I -				urity un	Floor discontinuity	
			Horizontal structural configuration	Irregularity in plan	Projections in plan	
			COI	ý	Non-continuous beams	
			ictural	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	Mağusa	ation	al stru	am elementa design faults	Absence of vertical support at beams intersection	
Area:	Gazimağusa Sanayi Bölgesi (Famagusta Greater Industrial Area	Central configuration	rizont	Bear	Broken axis beams and frames	
		102	Ho	Slab	Over-stretched one-way slab	
Street name:	Yeni Hastane Yolu	lr.al		elementary	Poorly supported or heavily	
		1.1		design faults	loaded cantilevered slabs	
Latitude:	N 35°8.717' (35°8'43.0")			Poundi	ng and separation problem	
Longitude:	E 33°53.985' (33°53'59.1")		-	ty Dn	Weak storey	
	<14 Date (if available): years		ural 1	Irregularity in elevation	Soft storey	
Structure age:	Between 14 and 43 years		Vertical structural configuration	irre, n el	Discontinuity of columns or	
	(1974-2003)		stru ura		shear walls	
	>43 years (Before 1974)	_	cal ıfig	Vertical structural	Broken axis columns	
	Apartment	_	ertic	element	Irregular column and/or	
	Residential House	_	Ve	elementary	shear-wall plan configuration	
Building type:	Dormitory	_		design fault		
	Public				Short column	
	Commercial	Non-Structural Defects Waterproofing defects, water leakage and seepage				
D 111 4 4	Under Construction		Waterpro			
Building status:	Occupied Abandoned			Defected	wooden door           Condensation	
Doinfo	rced Concrete Defects	-	SS		Rising damp	
Kenno	red concrete beretis		pne		Rain penetration	
Dryin	g shrinkage cracks	suc	dampness	Leaking p	ipes, spills and other moisture sources	
	Corrosion-induced cracking	lefe	Surfac	ce cracks	crazing	
Corrosion of metals embedded	Corrosion-induced spalling	Surface defect	on wal	ll finishes	Map/pattern cracking	
in concrete	Cracks due to embedment of	rfa	1011	E	fflorescence	
	dissimilar metals (handrails)	Į.	2		aint peeling	
	Improper reinforcing steel				Mouldiness	
Construction	placement			Wall finishes	workmanship problem	
defects (faulty	Premature removal of forms				Staining	
workmanship):	Cold joints	No	on-structural cracks		Joint cracks	
designer, detailer,	Segregation		Clacks			
and contractor	Honeycombing					
	Improper grades of slab surfaces	Ot	her notes (	if available):		
Cracks in RC due	Slab/beam-to column shear					
to load effects	(punching shear) cracks	_				
(structural cracks)	Cantilevered member cracks					
	Settlement cracks					

		Case S	Stud	<b>y</b> #	104 (0	24)		
						a .		
and a free photoe from the second second second second second second second second second second second second	Profile	4					ic Design Faults	
and a start of the second	Land Categorian and	State of the second second second				week con	Imn-strong beam Torsional Irregularity	
	ter and termination		1			_	(Torsion eccentricity)	
			Ī			ty i	Floor discontinuity	
						ulari plan		
					Horizontal structural configuration	Irregularity in plan	Projections in plan	
					con	>	Non-continuous beams	
					ructural	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	1	Mağusa		Iration	ıtal str	am ele design	Absence of vertical support at beams intersection	
Area:	5	Sakarya		Structural configuration	orizoi		Broken axis beams and frames	
G	TT	D. 1. 1. 01		al co	H	Slab	Over-stretched one-way slab	
Street name:	Hasan	Barboçoli Sk		tura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs	
Latitude:	350	° 8'1.39"N	-	truc	-	-	ing and separation problem	
Longitude:		55'10.08"E		S			Weak storey	
	<14 D	ate (if available):				Irregularity in elevation	Soft storey	
Structure age:	years Between 14 a	2014 ~ 2015			Vertical structural configuration	egu elev	Discontinuity of columns or	
Su detare ager	(1974-2003)	ind 45 years			srtical structur configuration	n. I	shear walls	
	>43 years (Be	efore 1974)			al s figu	Vertical	Broken axis columns	
		Apartment			rtic	structural element	Irregular column and/or	
	Residential	House			Ve	elementary	shear-wall plan configuration	
Building type:		Dormitory				design fault		
	Public						Short column	
	Commercial Under Constr	nation		Non-Structural Defects Waterproofing defects, water leakage and seepage				
Building status:	Occupied	uction			waterpro		d wooden door	
Dunung status.	Abandoned			Condensation				
Reinfo	rced Concrete	Defects					Rising damp	
					dampness		Rain penetration	
Dryin	g shrinkage cra	cks		Surface defects	daı	Leaking p	bipes, spills and other moisture sources	
Corrosion of		nduced cracking	$\square$	def		e cracks	crazing	
metals embedded		nduced spalling	$\vdash$	ace	on wal	l finishes	Map/pattern cracking	
in concrete		o embedment of etals (handrails)		urf			Efflorescence Paint peeling	
		einforcing steel		01			Mouldiness	
		cement		-		Wall finishe	es workmanship problem	
Construction		emoval of forms					Staining	
defects (faulty workmanship):		d joints	Ν	Non-	structural		Joint cracks	
designer, detailer,		regation		с	racks		Joint clacks	
and contractor	and contractor Honeycombing							
		grades of slab		<u>Ot</u> he	e <u>r no</u> tes (i	if available):		
		rfaces to column shear	$\vdash$					
Cracks in RC due								
to load effects	cts Cantilevered member cracks							
(structural cracks)		nent cracks	$\left  - \right $					
	Settien	ient erdeko						

		Case S	Study	#105 (	C5)			
	<b>D 0</b> 11							
	Profile					c Design Faults		
					Week colu	mn-strong beam		
					_	Torsional Irregularity (Torsion eccentricity)		
					y ii	Floor discontinuity		
					ularit plan	Floor discontinuity		
				Horizontal structural configuration	Irregularity in plan	Projections in plan		
				uctural co	5	Non-continuous beams		
					mentai faults	Non-uniform beam span and cross-section		
District:	Ν	lağusa	ation	ıtal strı	Beam elementary design faults	Absence of vertical support at beams intersection		
Area:	Tuzla	a (Enkomi)	Structural configuration	orizon		Broken axis beams and frames		
Street name:	Mohm	et Ömer Sk	COI	H	Slab elementary	Over-stretched one-way slabPoorly supported or heavily		
Street name.	Mehmet Ömer Sk		ural		design faults	loaded cantilevered slabs		
Latitude:	35° (	9'22.10"N	uctu		-	ing and separation problem		
			Str			Inter-storey strength		
Longitude:	33°5	3'41.12"E			Irregularity in elevation	irregularity (Weak storey)		
	<14 Da	ate (if available):		I	egularity elevation	Inter-storey stiffness		
	years Early 2014			on	gul	irregularity (Soft storey)		
Structure age:	Between 14 au	nd 43 years		ruc	lrre e	Discontinuity columns or		
	(1974-2003) >43 years (Before 1974)		-	Vertical structural configuration	Vertical	shear walls Broken axis columns		
	>45 years (Be	Apartment		ctics	structural	Broken axis columnis		
	Residential	House		Ver	element	Irregular column and/or		
Building type:	Residential	Dormitory			elementary	shear-wall plan configuration		
Building type.	Public	Dominiory			design fault	Short column		
	Commercial			Non-Structural Defects				
	Under Constru	uction		Waterproofing defects, water leakage and seepage				
Building status:	Occupied			Defected wooden door				
	Abandoned					Condensation		
Reinfo	rced Concrete	Defects		dampness		Rising damp		
		1		idun	<b>.</b>	Rain penetration		
Dryin	g shrinkage crac	CKS	cts	dĉ	Leaking p	oppes, spills and other moisture		
	Corrosion-in	duced cracking	Surface defects	Surfa	ce cracks	crazing		
Corrosion of		duced spalling	e d		ll finishes	Map/pattern cracking		
metals embedded		b embedment of	fac			Efflorescence		
in concrete		etals (handrails)	Sur			Paint peeling		
	Improper re	inforcing steel				Mouldiness		
Construction		cement			Wall finishe	s workmanship problem		
defects (faulty		moval of forms		L		Staining		
workmanship):		l joints		-structural cracks	I	Joint cracks		
designer, detailer, Segregation			Clacks					
and contractor		grades of slab						
		faces	Oth	er notes (	(if available):			
	Slab/beam-te	o column shear						
Cracks in RC due	(punching	shear) cracks						
to load effects	Cantilevered	member cracks						
(structural cracks)	Settlem	ent cracks						

		Case S	Study	y #	⁴ 106 (C	C6)		
	Profile					Colorest	Destan Faulta	
	Frome						c Design Faults mn-strong beam	
		No.				Week colu	Torsional Irregularity	
La Landerer	end to the local					.Ξ	(Torsion eccentricity)	
						ity	Floor discontinuity	
				guration	Horizontal structural configuration	Irregularity in plan	Projections in plan	
					tuo		Non-continuous beams	
					uctural c	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	Ν	Aağusa		uration	ntal stı	am ele design	Absence of vertical support at beams intersection	
Area:	k	Karakol	ز	Structural configuration	Horizo.		Broken axis beams and frames	
Street name:	De	embe Sk	-	ral d	H	Slab elementary	Over-stretched one-way slab Poorly supported or heavily	+
Street name.			ctui		design faults	loaded cantilevered slabs		
Latitude:	35°	č	Stru		Poundi	ng and separation problem		
Longitude:		54'28.07"E		-1		y u	Weak storey	
	<14 Days	ate (if available): 2015			Vertical structural configuration	Irregularity in elevation	Soft storey	
Structure age:	Between 14 ar (1974-2003)	-				Irreg in el	Discontinuity of columns or shear walls	
	>43 years (Bet				tal s figu	Vertical	Broken axis columns	
		Apartment	_		ertic	structural element	Irregular column and/or shear-	
Building type:	Residential         House           Dormitory				Vé	elementary design fault	wall plan configuration	
	Public						Short column	
	Commercial				W. (		uctural Defects	-
Building status:	Under Constru Occupied	letion			waterpr		water leakage and seepage wooden door	
Dunung status.	Abandoned					Defected	Condensation	
Reinfo	rced Concrete	Defects			ess		Rising damp	
					dampness		Rain penetration	
Dryin	g shrinkage crac			Surface defects			pes, spills and other moisture sources	
Corrosion of		duced cracking		e de		cracks on	crazing	
metals embedded		duced spalling of embedment of		face	wall	finishes	Map/pattern cracking fflorescence	$\vdash$
in concrete		etals (handrails)	τ	Sur			aint peeling	
		inforcing steel		-1			Mouldiness	
Construction	placement			Ī		Wall finishes	workmanship problem	
Construction defects (faulty	Premature removal of forms						Staining	
workmanship):	vin): Cold joints		N		structural		Joint cracks	
designer, detailer,		egation		С	cracks			
and contractor		combing grades of slab						
		faces	<u>0</u>	)the	er notes (i	if available):		
Cracks in RC due	Slab/beam-to column shear							
to load effects		member cracks						
(structural cracks)		ent cracks						

Schnic Design Faults         Week columns-strong beam       Torsional Inregularity (Torsion eccentricity)         Bisrict:       Magusa       Torsional Inregularity (Torsion eccentricity)         Area:       Sakarya       Non-uniform beams pan and cross-section multiple participation and or shears and frames       Non-uniform beams pan and cross-section participation and or shears and frames         Area:       Sakarya       Bisho       Over-stretched one-way slah         Street name:       Hasan Barboçoli Sk.       Bisho       Over-stretched one-way slah         Latitude:       35° 753.65°N       Pounding and separation problem       Does and separation problem         Longiuda:       33° 5571.409°E       Pounding and separation problem       Discontinuity of columns or shear walls.         Building type:       Residential       House       Derived valiable): valiable on the stress on the second state separation problem         Building status:       Construction       Apattment Add 3 years (Before 1974)       Waterproofing defects, water leakage and sepage         Drying shrinkage cracks       Corrosion induce degrafing cracks due to embodient of dissimilar metals (handrils)       Non-structural before separation problem         Building status:       Construction       Construction design and sepage       Condensation separation problem         Construction       Construction       Dore			Case	Stud	ly #	<b>#107 (C</b>	C7)	
Week colum-strong beam       District:     Magusa       District:     Magusa       Area:     Sakarya       Street name:     Hasan Barboçoli Sk       Longitude:     32°55'14.09'E       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise       Vertex     Strattise								
District:     Magusa       Area:     Sakarya       Area:     Sakarya       Street name:     Hasan Barboçoli Sk       Latitude:     35° 753.65 'N       Longitude:     33° 551.499'E       Street name:     Hasan Barboçoli Sk       Longitude:     33° 551.699'E       Street name:     Hasan Barboçoli Sk       Latitude:     35° 753.65 'N       Longitude:     33° 551.499'E       Building type:     Edit (di available):       Public     Edit (di available):       Verside     Botween 14 and 43 years       (D74-2003)     -43 years (Before 1974)       -43 years (Before 1974)     Apartment       Public     Dormiory       Public     Dormiory       Public     Ororsion-induced cracking       Cornstonetion     Cornstonetion       Building status:     Corrosion-induced spaling       Construction     Corrosion-induced forms       Puip shrinkage cracks     Torsion ad sepagation       Construction     Condensation       Residential     Non-structural       Construction     Corrosion-induced forms       Corrosion of decret forms     Corrosion-induced forms       Construction     Condensation       Corosion of decret ko to encohoonenof dissing damp <tr< th=""><th></th><th>Profile</th><th></th><th></th><th></th><th></th><th></th><th></th></tr<>		Profile						
Jostrict:       Magusa         Area:       Sakarya         Jostrict:       Magusa         Area:       Sakarya         Street name:       Hasan Barboçoli Sk         Latitude:       33*57753.65"N         Longitude:       33*57753.65"N         Longitude:       33*57753.65"N         Street name:       Hasan Barboçoli Sk         Latitude:       33*57753.65"N         Longitude:       33*57753.65"N         Structure age:       Between 14 and 43 years         Hessien Barboçoli Sk       Founding and separation problem         Building type:       Poulic         Public       Pounding and separation problem         Commercial       Dorenitory         Public       Pounding and separation problem         Commercial       Dorenitory         Public       Commercial         Droger rindricting stell       Maphystem of the moisture sources         Building status:       Occursion -induced cracking Cracks due to mekement of dissimilar metals (handrails)         Gracks due to mekement of dissimilar metals (handrails)       Non-structunal cleaking miles wills and other moisture sources         Building status:       Corrosion -induced cracking Cracks due to mekement of dissimilar metals (handrails)       Non-structunal cleaking							Week colu	
District:     Magusa       Area:     Sakarya       Area:     Sakarya       Street name:     Hasan Barboçoli Sk       Latitude:     35° 573.65°N       Longitude:     33° 55714.99°E       Between Handy 2015     Between Handy 2015       Between Handy 2015     Stab       Pounding and separation problem     Discontinuity of columns on sis hears and frames       Residential     Apartment       Residential     House       Dying shrinkage cracks     Torocrete Concersion induced cracking       Corrosion of metals embedded in concerse     Corrosion-induced cracking       Corosion of metals (hadratis)     Corrosion-induced cracking       Corosion of decis (taily)     Corosion-induced cracking       Corosion of decis (taily)     Corosion-induced cracking       Corosion of decis (taily)     Corosion-induced cracking       Corosion of decis (taily)     Corosion-induced spling       Corosion of decis (taily)     Corosion-induced spling       Corosion of decis (taily)     Corosion-induced spling       Corosion of decis (taily)     Corosion-induced spling       Corosion of decis (taily)     Corosion-induced spling       Corosion of decis (taily)     Corosion-induced spling       Corosion of decis (taily)     Corosion-induced spling       Corosion-induced spling     Map/pat							F	
District:       Magusa       Non-uniform beam span and cross-section         Area:       Sakarya       Sakarya         Street name:       Hasan Barbocoli Sk       Sakarya         Latitude:       33°5514.99°E       Slab       Over-stretchel one-way slab         Street name:        Area:       Sa'5514.99°E       Over-stretchel one-way slab         Structure age:       Between 14 and 43 years       Over-stretchel one-way slab       Poorly supported or heavily         Building type:       Occupied       Over-stretchel one-way slab       Poorly supported or heavily         Building status:       Occupied       Occupied       Over-stretchel one-way slab         Dormitory       Dormitory       Under Construction       Werk storey       Discontinuity of columns or shear         Building status:       Occupied       Occupied       Over-stretchel one-way slab       Poorly supported or heavily         Dormitory       Public       Under Construction       Waterprovide structural demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental de							y ii	• • •
District:       Magusa       Non-uniform beam span and cross-section         Area:       Sakarya       Sakarya         Street name:       Hasan Barbocoli Sk       Sakarya         Latitude:       33°5514.99°E       Slab       Over-stretchel one-way slab         Street name:        Area:       Sa'5514.99°E       Over-stretchel one-way slab         Structure age:       Between 14 and 43 years       Over-stretchel one-way slab       Poorly supported or heavily         Building type:       Occupied       Over-stretchel one-way slab       Poorly supported or heavily         Building status:       Occupied       Occupied       Over-stretchel one-way slab         Dormitory       Dormitory       Under Construction       Werk storey       Discontinuity of columns or shear         Building status:       Occupied       Occupied       Over-stretchel one-way slab       Poorly supported or heavily         Dormitory       Public       Under Construction       Waterprovide structural demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental demental de						iguration	arit an	Floor discontinuity
Street name:     Hasan Barboçoli Sk     Jado       Latitude:     35° 753.65"N       Longitude:     33°5514.99"E       Structure age:     Early 2015       Bruilding type:     <14							Irregul	Projections in plan
Street name:     Hasan Barboçoli Sk     Jado       Latitude:     35° 753.65"N       Longitude:     33°5514.99"E       Structure age:     Early 2015       Bruilding type:     <14						con	~	Non-continuous beams
Street name:     Hasan Barboçoli Sk     Jado       Latitude:     35° 753.65"N       Longitude:     33°5514.99"E       Structure age:     Early 2015       Bruilding type:     <14						uctural c	ementary 1 faults	cross-section
Street name:     Hasan Barboçoli Sk     Tege     Stade     Our stretchard       Latitude:     35° 753.65'N     Dord statutentary     Poording and separation problem       Longitude:     33° 55'14.90°E     Pounding and separation problem       Structure age:     Early 2015     Early 2015       Building type:     Residential     Pounding and separation problem       Verical     Broken axis columns or shear walls       Verical     Broken axis columns or shear walls       Building type:     Public       Commercial     Commercial       Drying shrinkage cracks     Verical streation       Corrosion of metally cloaded drift and and oner     Sort column       Corrosion of metally cloaded drift and and oner     Sort column       Corrosion of defects (faulty workmanship):     Corrosion-induced spalling cracks were reaks on crazing placement       Construction defects (faulty column proper reinforcing steel placement     Pain peeling       Premature removal of forms cold joints     Non-structural cracks       Verticel structural cleating pipes, spills and other moisture sources     Stain peeling       Cracks in RC due to load effects     Slabohoed softs       Cracks in RC due to load effects     Slabohoen cracks       Cracks in RC due to load effects     Slabohoen cracks	District:	]	Mağusa		Iration	ntal st	am ele desigr	beams intersection
Street name:     Hasan Barboçoli Sk     Tege     State     Orderstechnick of Average and Separation       Latitude:     35° 753.65'N     Dorgi supported of heavily loaded cantilevered slabs     Pounding and separation problem       Longitude:     33° 55'14.90°E     Pounding and separation problem       Structure age:     Between 14 and 43 years (1974-2003)     Early 2015       Building type:     Residential Public     Pounding and separation problem       Commercial     Apartment Dormitory     Vertical Stort solutural design fault     Broken axis columns or shear walls       Building type:     Public     Dormitory     Irregular column and/or shear- leement design fault       Building status:     Commercial     Non-Structural design fault     Irregular column       Drying shrinkage cracks     Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)     Tege of the solution     Statising damp       Construction defects (faulty workmanship): designer, detailer, and contractor     Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)     Non-structural placement     Statising Pail metals embedied in concrete     Improper reinforcing steel placement       Premature removal of forms designer, detailer, and contractor     Slab/beam-to column shear (punching shear) cracks     Non-structural cracks     Joint cracks       Cracks in RC due to load effects     Slab/beam-to calums hear (punching shear) cracks	Area:	:	Sakarya		onfigu	orizoi	Be	frames
Longitude:     33°55'14.99"E       Structure age:	<b>G</b> .	**			al c(	H		
Longitude:     33°55'14.99"E       Structure age:	Street name:	Hasan	Barboçolı Sk		tura			
Longitude:     33°55'14.99"E       Structure age:     Cl4     Date (if available): years     Early 2015       Between 14 and 43 years (1974-2003)     Early 2015     Discontinuity of columns or shear walls       Building type:     Apartment Residential     House Dormitory     Verical House     Broken axis columns       Public     Commercial     Non-Structural Defects     Broken axis columns       Building status:     Occupied     Short column       Occupied     Defected     Condensation       Drying shrinkage cracks     Torrosion-induced cracking Corrosion-induced cracking     Torrosion-induced cracking       Construction     Corrosion-induced cracking     Surface cracks on Cracks due to embedment of dissimilar metals (handrails)       Inproper reinforcing steel placement     Inproper reinforcing steel placement       Premature removal of forms and contractor     Non-structural Cracks in RC due to load effects       Cracks in RC due to load effects     Slab/beam-to column shear (punching shear) cracks	Latitude:	350	7'53 65"N	-	truc	-		
Structure age:       <14 years       Date (if available): Early 2015       Image: Farly 2015         Between 14 and 43 years (1974-2003)       Apartment       Vertical structural element design fault       Broken axis columns         Building type:       Apartment House       Apartment Dormitory       Vertical Dormitory       Broken axis columns         Building status:       Commercial       Vertical Dormitory       Broken axis columns       Irregular column and/or shear- wall plan configuration         Building status:       Occupied Abandoned       Non-Structural Abandoned       Building status:       Short column         Corrosion of metals embedded in concrete       Corrosion-induced cracking Cracks due to embedment of dissimilar metals (handrails)       The status Surface cracks       Surface cracks on wall finishes       Cracks on Ma/pattern cracking         Construction defects (faulty workmanship): designer, detailer, and contractor       Improper reinforcing steel placement       Non-structural cracks       Efflorescence         Improper grades of slab surfaces       Slab/beam-to column shear (punching shear) cracks       Non-structural cracks       Joint cracks				-	Š			
Image: construction of metals embedded in concrete       Corrosion of metals embedded in concrete       Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (hadrails)       Yet construction function for the second spalling Cracks in RC due for the second spalling Construction function for the second spalling cracks       Yet construction function for the second spalling cracks       Yet construction function for the second spalling cracks       Yet construction function for the second spalling cracks       Yet construction function for the second spalling cracks function for the second spalling cracks       Yet construction function for the second spalling cracks function for the second spalling cracks       Yet construction function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks function for the second spalling cracks functing the second spalling cracks function for the second spalling cra	Longhude.	<14 <u>C</u>	Date (if available):			I	ularity vation	
Building type:       Dormitory       Image: Public commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commerce commercial commercial commercommercial commer	Structure age:	Between 14 a				ation	Irregu in ele	
Building type:       Dormitory       Image: Public commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commerce commercial commercial commercommercial commer		>43 years (Be	fore 1974)			l sti igur	Vertical	
Building type:       Dormitory       Image: Public commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commerce commercial commercial commercommercial commer						tica	structural	
Building type:       Dormitory       Image: Public commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commercial commerce commercial commercial commercommercial commer		Residential				Ver c(		
Public       Short column         Commercial       Non-Structural Defects         Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Occupied       Defected wooden door         Abandoned       Condensation         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Sufface cracks on crazing         Corrosion of metals embedded in concrete       Corrosion-induced spalling         Construction defects (faulty workmanship):       Improper reinforcing steel placement         Premature removal of forms       Segregation         Reinforced contractor       Segregation         Construction defects (faulty workmanship):       Slab/beam-to column shear (punching shear) cracks         Cracks in RC due to load effects       Slab/beam-to column shear (punching shear) cracks         Cracks in RC due to load effects       Slab/beam-to column shear (punching shear) cracks         Cracks in RC due to load effects       Cantilevered member cracks	Building type:		Dormitory			ŕ		wall plan configuration
Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Occupied       Defected wooden door       Defected wooden door         Reinforced Concrete Defects       Rain penetration       Rain penetration         Drying shrinkage cracks       The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second								
Building status:       Occupied Abandoned       Defected wooden door Abandoned         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rising damp         Corrosion of metals embedded in concrete       Corrosion-induced cracking Corrosion-induced spalling       Surface cracks on dissimilar metals (handrails)       Surface cracks on metals embedded       Corrosion-induced spalling Corrosion-induced spalling         Construction defects (faulty workmanship): designer, detailer, and contractor       Improper reinforcing steel placement       Surface Surfaces       Non-structural cracks       Joint cracks         Cracks in RC due to load effects       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):	-							
Abandoned       Condensation         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced spalling       Surface cracks on crazing         Corrosion-induced spalling       Carcks due to embedment of dissimilar metals (handrails)       Bufface cracks       Surface cracks on crazing         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Mouldiness       Mouldiness         Cold joints       Non-structural cracks       Staining       Joint cracks         Improper grades of slab surfaces       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):	D 111 ( )		uction			Waterpr		
Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Surface cracks on       Crazing         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Premature removal of forms       Non-structural cracks       Mouldiness         Cracks in RC due to load effects (structural contractor       Slab/beam-to column shear (punching shear) cracks       Non-structural cracks       Joint cracks	Building status:						Defected	
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishescrazing Map/pattern crackingConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementMouldinessCracks in RC due to load effects (structural cracks)Improper grades of slab surfacesNon-structural cracksJoint cracksCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksOther notes (if available):	Reinfo		Defects			SS		
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishescrazing Map/pattern crackingConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementImproper reinforcing steel placementMouldinessConstruction defects (faulty workmanship): designer, detailer, and contractorImproper grades of slab surfacesNon-structural cracksJoint cracksCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksOther notes (if available):		recu concrete	Delects			pne		
Improper reinforcing steel placement     Mouldiness       Construction defects (faulty workmanship): designer, detailer, and contractor     Improper reinforcing steel placement     Mouldiness       Verticity     Premature removal of forms     Staining       Cold joints     Non-structural cracks     Joint cracks       Improper grades of slab surfaces     Improper grades of slab surfaces     Other notes (if available):       Cracks in RC due to load effects     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):	Dryin	g shrinkage cra	cks		ects	dan	Leaking p	pipes, spills and other moisture
Improper reinforcing steel placement     Mouldiness       Construction defects (faulty workmanship): designer, detailer, and contractor     Improper reinforcing steel placement     Mouldiness       Verticity     Premature removal of forms     Staining       Cold joints     Non-structural cracks     Joint cracks       Improper grades of slab surfaces     Improper grades of slab surfaces     Other notes (if available):       Cracks in RC due to load effects     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):	Correction of				defé			crazing
Improper reinforcing steel placement     Mouldiness       Construction defects (faulty workmanship): designer, detailer, and contractor     Improper reinforcing steel placement     Mouldiness       Verticity     Premature removal of forms     Staining       Cold joints     Non-structural cracks     Joint cracks       Improper grades of slab surfaces     Improper grades of slab surfaces     Other notes (if available):       Cracks in RC due to load effects     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):					JCe	wall		
Improper reinforcing steel placement     Mouldiness       Construction defects (faulty workmanship): designer, detailer, and contractor     Improper reinforcing steel placement     Mouldiness       Verticity     Premature removal of forms     Staining       Cold joints     Non-structural cracks     Joint cracks       Improper grades of slab surfaces     Improper grades of slab surfaces     Other notes (if available):       Cracks in RC due to load effects     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):					urfa			
Construction defects (faulty workmanship): designer, detailer, and contractorPlacementWall finishes workmanship problemConstruction defects (faulty workmanship): designer, detailer, and contractorPremature removal of formsStainingMon-structural cracksNon-structural cracksJoint cracksHoneycombing surfacesImproper grades of slab surfacesOther notes (if available):Cracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksOther notes (if available):					S			
Construction       defects (faulty         workmanship):       defects (faulty         designer, detailer,       and contractor         Image: Designer detailer,       Honeycombing         Image: Designer detailer,       Honeycombing         Image: Designer detailer,       Honeycombing         Image: Designer detailer,       Honeycombing         Image: Designer detailer,       Honeycombing         Image: Designer detailer,       Honeycombing         Image: Designer detailer,       Honeycombing         Image: Designer detailer,       Honeycombing         Image: Designer detailer,       Honeycombing         Image: Designer detailer,       Honeycombing         Image: Designer detailer,       Honeycombing         Image: Designer detailer,       Honeycombing         Image: Designer detailer,       Honeycombing         Image: Designer detailer,       Slab/beam-to column shear         (punching shear) cracks       Cantilevered member cracks         Cantilevered member cracks       Each		niproper r	cement		·			
defects (latify workmanship): designer, detailer, and contractor       Cold joints       Non-structural cracks       Joint cracks         Moneycombing       Improper grades of slab surfaces       Other notes (if available):       Other notes (if available):         Cracks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):					ŀ		vv an minsie	
Workmanship): designer, detailer, and contractor     Segregation     cracks       Honeycombing       Improper grades of slab surfaces       Slab/beam-to column shear (punching shear) cracks       Cracks in RC due to load effects (structural cracks)       Cantilevered member cracks					Non-	-structural		
and contractor       Honeycombing         Improper grades of slab surfaces       Other notes (if available):         Cracks in RC due to load effects       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):         Cracks in RC due to load effects       Cantilevered member cracks       Other notes (if available):			0		c	cracks		Joint cracks
Improper grades of slab surfaces     Other notes (if available):       Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):								
Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks       Cantilevered member cracks					Othe	er notes (i	f available):	
Cracks in RC due to load effects (structural cracks)     (punching shear) cracks       Cantilevered member cracks			┝─┤ ╴					
to load effects (structural cracks) Cantilevered member cracks								
(structural cracks)								
	(structural cracks)							
		Bettlefi						

		Case S	tudy	#108 (0	C8)		
	Profile	N				e Design Faults	
				T	week colui	nn-strong beam	
			,		-	Torsional Irregularity (Torsion eccentricity)	
					y ii	Floor discontinuity	
					ularit plan	Floor discontinuity	
				Horizontal structural configuration	Irregularity in plan	Projections in plan	
				fuo		Non-continuous beams	
				uctural (	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	1	Mağusa	Structural configuration	atal str	am ele design	Absence of vertical support at beams intersection	
Area:	I	Karakol	onfigu	orizoi	Be	Broken axis beams and frames	
	÷	. <b>†</b>	al co	Ξ	Slab	Over-stretched one-way slab	
Street name:	Isme	t İnönü Blv	tura		elementary design faults	Poorly supported or heavily	
Latitude:	250	8'19.51"N	truc		0	loaded cantilevered slabs ng and separation problem	-
Longitude:		55'3.70"E	Š		Found	Weak storey	
Longhude.		ate (if available):			ity ion	weak storey	
Star tan	years	Late 2015		Vertical structural configuration	Irregularity in elevation	Soft storey	
Structure age:	Between 14 au (1974-2003)	nd 43 years		uct	Irre in e	Discontinuity of columns or shear walls	
	>43 years (Be	fore 1974)	-	rtical structur configuration	Vertical	Broken axis columns	
	>45 years (Be	Apartment		tica	structural		
	Residential House			Ver c	element	Irregular column and/or shear-	
Building type:		Dormitory			elementary design fault	wall plan configuration	
	Public				8	Short column	
	Commercial					uctural Defects	
	Under Constru	uction		Waterpi		water leakage and seepage	
Building status:	Occupied				Defected	wooden door	
	Abandoned			Š		Condensation	
Reinfo	rced Concrete	Defects		ones		Rising damp Rain penetration	
Dryin	g shrinkage crac	cks	ts	dampness	Leaking pi	ipes, spills and other moisture	
	<u> </u>	1 1 1	Surface defects	0.6	1	sources	
Corrosion of		nduced cracking	e de	Surface	cracks on	crazing Map/pattern cracking	-
metals embedded		o embedment of	face	wall		fflorescence	-
in concrete		etals (handrails)	Sur			aint peeling	
		einforcing steel				Mouldiness	
	placement					workmanship problem	
Construction defects (faulty	Premature removal of forms					Staining	
workmanship):	. Cold joints		Not	n-structural		Joint cracks	
designer, detailer,		regation		cracks			
and contractor		combing					
		grades of slab rfaces	Oth	ner notes (	if available):		
		o column shear	$\dashv$				
Cracks in RC due		shear) cracks					
to load effects		member cracks	$\neg$				
(structural cracks)		nent cracks	$\neg$				
	Betten	ion ordens					

		Case S	Study	#109 (	C9)		
	Duefie				<b>C</b> . • •		
	Profile	c 3				c Design Faults mn-strong beam	
			,			Torsional Irregularity (Torsion eccentricity)	
					ity i	Floor discontinuity	
				Horizontal structural configuration	Irregularity in plan	Projections in plan	
		- 1		conf		Non-continuous beams	
				uctural c	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	Ν	lağusa	Structural configuration	ntal str	eam ele design	Absence of vertical support at beams intersection	
Area:	Du	mlupınar	Confign	Horizo		Broken axis beams and frames	
Street name:	Serbest I	iman Yolu Sk	ural c	L T	Slab elementary	Over-stretched one-way slab Poorly supported or heavily	
Latitude:	250	7'50.63"N	friici		design faults	loaded cantilevered slabs ng and separation problem	
Longitude:		5'55.31"E	<u> </u>	2		Weak storey	
Longhude.		ate (if available): 2015		al	Irregularity in elevation	Soft storey	
Structure age:	Between 14 an (1974-2003)			Vertical structural configuration	Irreg in ele	Discontinuity of columns or shear walls	
	>43 years (Bef	ore 1974)		al sı ïgu	Vertical	Broken axis columns	
	Residential	Apartment House		Vertic	structural element elementary	Irregular column and/or shear- wall plan configuration	
Building type:	D.1.1"	Dormitory	_		design fault		
	Public Commercial				Non St	Short column ructural Defects	
	Under Constru	ction		Watern		, water leakage and seepage	
Building status:	Occupied			// atorp		wooden door	
U	Abandoned					Condensation	
Reinfo	rced Concrete l	Defects		less		Rising damp	
				ampness		Rain penetration	
Dryin	g shrinkage crac		Surface defects	da		ipes, spills and other moisture sources	
Corrosion of		duced cracking duced spalling		Surfac	e cracks on	crazing Map/pattern cracking	
metals embedded		b embedment of	face	wall		fflorescence	
in concrete		etals (handrails)	Sur			aint peeling	
		inforcing steel		·		Mouldiness	
	placement				Wall finishes	workmanship problem	
Construction defects (faulty	Premature removal of forms					Staining	
workmanship):	Cold joints		No	on-structura	1	Joint cracks	
designer, detailer,		egation		cracks			
and contractor		combing					
		grades of slab faces	Ot	her notes	(if available):		
Cracks in RC due	Slab/beam-te	column shear shear) cracks					
to load effects		member cracks					
(structural cracks)		ent cracks					
	Settien	eraeno					

		Case S	tudy #	#110 (C	C10)		
	<b>T</b>				~		
	Profile					c Design Faults	
	R _x					mn-strong beam Torsional Irregularity (Torsion eccentricity)	
13PA					ity	Floor discontinuity	
				Horizontal structural configuration	Irregularity in plan	Projections in plan	
				con	~	Non-continuous beams	
				uctural	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	Mağusa			ntal str	am ele design	Absence of vertical support at beams intersection	
Area:		Sakarya	nfigu	orizoi	Be	Broken axis beams and frames	
Street name:	Hasar	Barboçolli Sk	Structural configuration	H	Slab elementary	Over-stretched one-way slab Poorly supported or heavily	
<b>T</b> (* 1	25		ruct –		design faults	loaded cantilevered slabs	
Latitude:	35° 7'54.46"N				Poundi	ng and separation problem Weak storey	
Longitude:	<14			IF	Irregularity In elevation	Soft storey	
Structure age:	years Between 14 (1974-2003)	2015 and 43 years		Vertical structural configuration	Irregu in ele	Discontinuity of columns or shear walls	
	>43 years (B	efore 1974)	_	ul st igur	Vertical	Broken axis columns	
-		Apartment		onf	structural		
	Residential	House		Vei c	element elementary	Irregular column and/or shear- wall plan configuration	
Building type:	Dormitory           Public		_		design fault	Short column	
	Commercial				Non-Str	suctural Defects	
	Under Const	ruction		Waterproofing defects, water leakage and seepage			
Building status:	Occupied					wooden door	
	Abandoned					Condensation	
Reinfo	rced Concret	e Defects		ness		Rising damp	
Dryin	g shrinkage cr	acks	cts	dampness	Leaking pi	Rain penetration ipes, spills and other moisture sources	
a	Corrosion-	induced cracking	Surface defects	Surface	e cracks on	crazing	
Corrosion of metals embedded		induced spalling	ce (	wall	finishes	Map/pattern cracking	
in concrete		to embedment of	urfa			fflorescence	
		metals (handrails)	Si			aint peeling	
		reinforcing steel				Mouldiness	
Construction	placement		_		wall linishes	workmanship problem Staining	
defects (faulty	Premature removal of forms Cold joints		No	n-structural	1		
workmanship):		gregation		cracks		Joint cracks	
designer, detailer, and contractor		eycombing					
		r grades of slab	04		:f:1-1-1-).		
		urfaces	Oth	er notes (	if available):		
Cracks in RC due to load effects	(punchin	-to column shear g shear) cracks	Ap	artment	name: UZUN	23	
(structural cracks)	Cantilevere	d member cracks					
(ou deturur erdeks)	Settle	ment cracks					

Structure age:     Structure age:     Structure age:     Advance and speam       Building status:       Occurrice Construction       Optimized Construction       Structure age:     Structure age:       Building status:       Optimized Construction       Optimized Construction       Optimized Construction       Structure age:     Construction       Building status:       Construction       Optimized Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction       Construction <th c<="" th=""><th></th><th>Case S</th><th>Stud</th><th>ly #</th><th>111 (C</th><th>211)</th><th></th></th>	<th></th> <th>Case S</th> <th>Stud</th> <th>ly #</th> <th>111 (C</th> <th>211)</th> <th></th>		Case S	Stud	ly #	111 (C	211)	
Weak columnation of the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon						<b>a</b> .		
District:     Maĝusa     Non-continous beams     Non-continous beams       District:     Maĝusa     Non-continous beams     Non-continous beams       Area:     Karakol     Maĝusa     Non-continous beams     Non-continous beams       Street name:     M. Abdullah Sk     Mabuso     Mabuso     Mon-uniform beam span and cross-section       Street name:     M. Abdullah Sk     Stab     Stab beams and frames       Latitude:     35° 756.90'N     Pounding and separation problem       Longitude:     33° 5549.67'E     Non-uniform beam span and cross-section       Juitude:     33° 5549.67'E     Pounding and separation problem       Longitude:     33° 5549.67'E     Pounding and separation problem       Juitude:     33° 5549.67'E     Pounding and separation problem       Juitude:     33° 5549.67'E     Pounding and separation problem       Juitude:     33° 5549.67'E     Pounding and separation problem       Juitude:     33° 5549.67'E     Pounding and separation problem       Juitude:     33° 5549.67'E     Pounding and separation problem       Juitude:     33° 5549.67'E     Pounding and separation problem       Juitude:     33° 5549.67'E     Pounding and separation problem       Juitude:     Stab bears and separation problem     Inter-storey stiffiess       Correscino:		Profile						
MagusNon-uniform beam span and cross-sectionAbsence of vertical support at hears intersectionArea:KarakolAbsence of vertical support at hears intersectionAbsence of vertical support at hears intersectionArea:KarakolStreet name:M. Abdullah SkStab elementaryOver-streetched one-way slab segmentation problemLongitude:33°55'49.67"EPoundiry and spantation problemInter-storey strength irregularity (Weak storey)Structure age:244 (194-2003)PoundiryPoundiry and spantation problemInter-storey strength irregularity (Weak storey)Building strati:Ocer-streetched pain (194-2003)Apartment HousePoundiryPoundiry and spantation problemBuilding strati:Ocer-streetched pain (194-2003)Apartment HouseInter-storey strength irregularity (Weak storey)Inter-storey strength irregularity (Weak storey)Building strati:Ocer-streetched pain (194-2003)Apartment HouseInter-storey strength irregularity (Weak storey)Building strati:Occrossion (Intersected Contrect Defects dissinitar metals (handrails)Apartment irregularityInter-storey strength irregularityConstructionCorrossion-induced erakling i paint painter metals (handrails)Inter-storey strength irregularityInter- irregularityConstructionCorrossion-induced erakling i paint ereals (handrails)Inter- irregularityInter- irregularityConstructionCorrossion-induced erakling i paintere metals (handrails)Inter- irregularityInt							Torsional Irregularity (Torsion eccentricity)	
Street name:     M. Abdullah Sk     Stato     Order stretcherway Stato       Latitude:     35° 7'56.90'N     Poording and separation problem     Poordy supported or heavily loaded cantilevered slabs       Longitude:     33° 55'49.67''E     Poording and separation problem     Inter-storey strength irregularity (Weak storey)       Structure age:     214     Date (if available):     Poording and separation problem     Inter-storey strength irregularity (Soft storey)       Structure age:     8etween 14 and 43 years (BFore 1974)     Inter-storey strength irregularity (Soft storey)     Inter-storey strength irregularity (Soft storey)       A3 years (BFore 1974)     Apartment     Building type:     Public     Dormitory       Public     Dormitory     Dormitory     Irregular column and/or shear-walls     Irregular columns       Building status:     Occupied     Occupied     Soft column     Irregular column and/or shear-walls       Drying shrinkage cracks     Corrosion-induced cracking     Cordensation     Irregular column and/or shear-walls       Corrosion of metals embedded in concrete     Corrosion-induced cracking     Sing damp     Icaking pheteration       Construction     Corrosion-induced cracking     Main penetration     Icaking pheters       Corrosion of metals embedded in contractor     Corrosion-induced cracking     Main penetration     Icaking phetage       Corrosion of metals emb					iguration	Irregula pla	Projections in plan	
Street name:     M. Abdullah Sk     Stato     Order stretcherway Stato       Latitude:     35° 7'56.90'N     Poording and separation problem     Poordy supported or heavily loaded cantilevered slabs       Longitude:     33° 55'49.67''E     Poording and separation problem     Inter-storey strength irregularity (Weak storey)       Structure age:     214     Date (if available):     Poording and separation problem     Inter-storey strength irregularity (Soft storey)       Structure age:     8etween 14 and 43 years (BFore 1974)     Inter-storey strength irregularity (Soft storey)     Inter-storey strength irregularity (Soft storey)       A3 years (BFore 1974)     Apartment     Building type:     Public     Dormitory       Public     Dormitory     Dormitory     Irregular column and/or shear-walls     Irregular columns       Building status:     Occupied     Occupied     Soft column     Irregular column and/or shear-walls       Drying shrinkage cracks     Corrosion-induced cracking     Cordensation     Irregular column and/or shear-walls       Corrosion of metals embedded in concrete     Corrosion-induced cracking     Sing damp     Icaking pheteration       Construction     Corrosion-induced cracking     Main penetration     Icaking pheters       Corrosion of metals embedded in contractor     Corrosion-induced cracking     Main penetration     Icaking phetage       Corrosion of metals emb					ural conf	entary ults	Non-uniform beam span and	
Street name:     M. Abdullah Sk     State     State     State     State     State     State     State     Deriver state way state       Latitude:     35° 7'56.90"N     33° 55'49.67"E     Point and separation problem     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls	District:	Mağusa		ion	al struc	m elem esign fa		
Street name:     M. Abdullah Sk     State     State     State     State     State     State     State     Deriver state way state       Latitude:     35° 7'56.90"N     33° 55'49.67"E     Point and separation problem     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls     Point state walls	Area:	Karakol		figurat	orizont	Bear de	Broken axis beams and	
Longitude:       33°55'49.67"E       Inter-storey strength irregularity (Weak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength inregularity (Meak storey)       Inter-storey strength inregularity (Meak storey)       Inter-storey strength inregularity (Meak storey)       Inter-storey strength inregularity (Meak storey)       Inter-storey strength inter-storey strength istructural element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element	Street name:	M. Abdullah Sk		stural con	Н	elementary	Poorly supported or heavily	
Longitude:       33°55'49.67"E       Inter-storey strength irregularity (Weak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength irregularity (Meak storey)       Inter-storey strength inregularity (Meak storey)       Inter-storey strength inregularity (Meak storey)       Inter-storey strength inregularity (Meak storey)       Inter-storey strength inregularity (Meak storey)       Inter-storey strength inter-storey strength istructural element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element element	Latitude:	35° 7'56.90"N		truc		Pour	nding and separation problem	
(1974-2003)       >43 years (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status	Longitude:			S		y in n	irregularity (Weak storey)	
(1974-2003)       >43 years (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status (Before 1974)       Image: Status		<14 Date (if available): years 2015	2015		tural on		irregularity (Soft storey)	
Building type:ResidentialInduceelementary design faultwall plan configurationBuilding type:PublicOrmitoryImposeShort columnImposeBuilding status:Under ConstructionWaterproofing defects, water leakage and seepageImposeImposeBuilding status:OccupiedOccupiedDefected wooden doorImposeReinforced Concrete DefectsAbandonedImposeImposeImposeDrying shrinkage cracksTorrosion-induced crackingImposeImposeImposeCorrosion of metals embedded in concreteCorrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on vall finishesCrazingImposeConstruction defects (faulty workmanship):Improper reinforcing steel placementImproper reinforcing steel placementNon-structural cracksStainingImposeCracks in RC due to load effectsSlab/beam-to column shear (punching shear) cracksNon-structural cracksJoint cracksImproper surfacesCracks in RC due to load effectsSlab/beam-to column shear (punching shear) cracksOther notes (if available):Joint cracksCracks in RC due to load effectsCantilevered member cracksOther notes (if available):ImproperCracks in RC due to load effectsCantilevered member cracksOther notes (if available):ImproperCracks in RC due to load effectsCantilevered member cracksOther notes (if available):ImproperCracks in RC due<	Structure age:	(1974-2003)			l struc gurati		shear walls	
Public       Commercial       Non-Structural Defects         Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Building status:       Occupied       Defected wooden door         Abandoned       Abandoned       Condensation         Building status:       Corrosion-induced cracking       Corrosion-induced cracking       Zeaking pipes, spills and other moisture sources         Drying shrinkage cracks       Zeaking pipes, spills and other moisture sources       Surface cracks on crazing       Surface cracks on crazing         Corrosion of metals embedded in concrete       Corrosion-induced spalling       Zeaking pipes, spills and other moisture sources       Surface cracks on crazing         Construction defects (faulty workmanship):       Cold joints       Non-structural cracks       Paint peeling         Improper grades of slab surfaces       Improper grades of slab surfaces       Non-structural cracks       Joint cracks         Cracks in RC due to load effects       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):	Building type:	ApartmentResidential	ApartmentResidential		Vertica confi	structural element elementary	Irregular column and/or shear- wall plan configuration	
CommercialNon-Structural DefectsBuilding status:OccupiedWaterproofing defects, water leakage and seepageOccupiedDefected wooden doorAbandonedAbandonedCondensationCondensationReinforcet Concrete DefectsRising dampRain penetrationDrying shrinkage cracksTorrosion-induced crackingSurface cracks onCracingCorrosion of metals embedded in concreteCorrosion-induced crackingSurface cracks onCracingCorrosion of metals embedded in concreteCorrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks onCracingImproper reinforcing steel placementImproper reinforcing steel placementNon-structural cracksPaint peelingConstruction defects (faulty workmanship):SegregationNon-structural cracksJoint cracksSlab/beam-to column shear (punching shear) cracksSlab/beam-to column shear (punching shear) cracksOther notes (if available):Cracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksOther notes (if available):	8 9 91		+			ucsign rau		
Building status:     Occupied     Defected wooden door     Image: constant in the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the perturbation of the		Commercial						
Abandoned       Condensation         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Leaking pipes, spills and other moisture sources         Corrosion of metals embedded in concrete       Corrosion-induced spalling       Surface cracks on crazing         Cracks due to embedment of dissimilar metals (handrails)       This proper reinforcing steel placement       Paint peeling         Vertex (faulty workmanship):       Cold joints       Non-structural cracks       Joint cracks         Machoned       Segregation       Cracks in RC due to column shear (punching shear) cracks       Other notes (if available):         Cracks in RC due to load effects (faulty workmaship):       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):					Waterpr			
Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Leaking pipes, spills and other moisture sources         Corrosion-induced spalling       Cracks due to embedment of dissimilar metals (handrails)       Surface cracks on crazing       Map/pattern cracking         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Mouldiness       Mouldiness         Vorkasing eracks       Segregation       Non-structural cracks       Joint cracks       Improper grades of slab surfaces         Cracks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):	Building status:		$\square$			Defect		
Corrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)     Surface cracks on wall finishes     Cracks on Map/pattern cracking       Construction defects (faulty workmanship): designer, detailer, and contractor     Improper reinforcing steel placement     Mouldiness       Premature removal of forms     Wall finishes workmanship problem       Segregation     Staining       Improper grades of slab surfaces     Non-structural cracks       Improper grades of slab surfaces     Slab/beam-to column shear (punching shear) cracks       Slab/beam-to column shear (punching shear) cracks     Other notes (if available):					s			
Corrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)     Surface cracks on wall finishes     Cracks on Map/pattern cracking       Construction defects (faulty workmanship): designer, detailer, and contractor     Improper reinforcing steel placement     Mouldiness       Premature removal of forms     Wall finishes workmanship problem       Segregation     Staining       Improper grades of slab surfaces     Non-structural cracks       Improper grades of slab surfaces     Slab/beam-to column shear (punching shear) cracks       Slab/beam-to column shear (punching shear) cracks     Other notes (if available):	Reinfo	rced Concrete Defects			nes			
Construction       Improper reinforcing steel       Mouldiness         placement       Wall finishes workmanship problem         Premature removal of forms       Staining         Cold joints       Non-structural         geregation       Joint cracks         Honeycombing       Improper grades of slab         surfaces       Slab/beam-to column shear         (punching shear) cracks       Other notes (if available):	Dryin	g shrinkage cracks		cts	damļ	Leaking	g pipes, spills and other moisture	
Construction       Improper reinforcing steel       Mouldiness         placement       Wall finishes workmanship problem         Premature removal of forms       Staining         Cold joints       Non-structural         geregation       Joint cracks         Honeycombing       Improper grades of slab         surfaces       Slab/beam-to column shear         (punching shear) cracks       Other notes (if available):		Corrosion-induced cracking	H	lefe	Surface	cracks on		
Improper reinforcing steel     Mouldiness       placement     Mouldiness       placement     Wall finishes workmanship problem       Premature removal of forms     Staining       Construction     Other notes (if available):       Wall finishes     Mouldiness       Wall finishes     Mouldiness       Premature removal of forms     Staining       Cold joints     Non-structural       Segregation     cracks       Honeycombing     Improper grades of slab       surfaces     Slab/beam-to column shear       (punching shear) cracks     Other notes (if available):				ce c				
Improper reinforcing steel     Mouldiness       placement     Mouldiness       placement     Wall finishes workmanship problem       Premature removal of forms     Staining       Construction     Other notes (if available):       Wall finishes     Mouldiness       Wall finishes     Mouldiness       Premature removal of forms     Staining       Cold joints     Non-structural       Segregation     cracks       Honeycombing     Improper grades of slab       surfaces     Slab/beam-to column shear       (punching shear) cracks     Other notes (if available):				rfa			Efflorescence	
Construction       placement       Wall finishes workmanship problem         defects (faulty       Premature removal of forms       Staining         workmanship):       Cold joints       Non-structural         designer, detailer,       Honeycombing       Joint cracks         Improper grades of slab       surfaces       Other notes (if available):         Slab/beam-to column shear       (punching shear) cracks       Other notes (if available):         (structural cracks)       Cantilevered member cracks       Table Structural	mediciete		$\square$	Su				
Construction       Premature removal of forms       Staining         defects (faulty       Cold joints       Non-structural         workmanship):       designer, detailer,       Joint cracks         and contractor       Honeycombing       Improper grades of slab         Surfaces       Slab/beam-to column shear       Other notes (if available):         Cracks in RC due       (punching shear) cracks       Cantilevered member cracks								
defects (faulty workmanship):       Cold joints       Non-structural cracks       Joint cracks         designer, detailer, and contractor       Honeycombing       Cracks       Joint cracks         Improper grades of slab surfaces       Slab/beam-to column shear       Other notes (if available):         Cracks in RC due to load effects (structural cracks)       Cantilevered member cracks       Other notes (if available):	Construction		+			Wall finisl		
Workmanship): designer, detailer, and contractor     Segregation     cracks       Improper grades of slab surfaces     Improper grades of slab surfaces     Other notes (if available):       Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):	Premature removal of forms			Ner	otmostra 1		Staining	
designer, detailer, and contractor     Degregation       Honeycombing     Improper grades of slab surfaces       Slab/beam-to column shear (punching shear) cracks     Other notes (if available):       Cracks in RC due to load effects (structural cracks)     Cantilevered member cracks							Joint cracks	
Improper grades of slab surfaces     Other notes (if available):       Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):		and contractor Improper grades of slab						
Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks       Cantilevered member cracks	and contractor			Othe	er notes (	if available)		
to load effects (structural cracks) Cantilevered member cracks		Slab/beam-to column shear						
(structural cracks)		(punching shear) cracks						
Settlement cracks		Cantilevered member cracks						
	(suuctural cracks)	Settlement cracks						

		Case S	tudy ‡	#112 (C	212)		
					a		
4	Profile					c Design Faults	
And And						mn-strong beam Torsional Irregularity (Torsion eccentricity)	
					y ir	Floor discontinuity	
				Horizontal structural configuration	Irregularity in plan	Projections in plan	
				cont		Non-continuous beams	
				uctural e	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	Mağusa			ntal str	am ele lesign	Absence of vertical support at beams intersection	
Area:	Ça	anakkale	nfigur	orizor		Broken axis beams and frames	
Street name:	Наст	Bektaş Sk	Structural configuration	H	Slab elementary design faults	Over-stretched one-way slab Poorly supported or heavily	+
Latitude:	250	7'44 46"N			-	loaded cantilevered slabs	
		35° 7'44.46"N				Inter-storey strength	-
Longitude:		55'4.14"E			Irregularity in elevation	irregularity (Weak storey) Inter-storey stiffness	
	<14Date (if available):years2015			tural on	egularity elevation	irregularity (Soft storey)	
Structure age:	Between 14 au (1974-2003)	-		Vertical structural configuration		Discontinuity of columns or shear walls	
	>43 years (Be			ical	Vertical	Broken axis columns	
Building type:	Residential	Apartment House		Vert	structural element elementary	Irregular column and/or shear- wall plan configuration	
Bunding type.	Public	Dormitory	_		design fault	Short column	
	Commercial				Non-St	ructural Defects	
	Under Constru	uction		Waterpi		, water leakage and seepage	
Building status:	Occupied				Defected	l wooden door	
	Abandoned			s		Condensation	
Reinfo	rced Concrete	Defects		nes		Rising damp	
Dryin	g shrinkage crac	cks	cts	dampness	Leaking p	Rain penetration ipes, spills and other moisture sources	
	Corrosion-ir	duced cracking	Surface defects	Surface	e cracks on	crazing	
Corrosion of metals embedded	Corrosion-in	nduced spalling	ce d	wall	finishes	Map/pattern cracking	
in concrete		o embedment of	urfa			ifflorescence	
		etals (handrails)	St	<u> </u>		Paint peeling	-
		einforcing steel		L		Mouldiness	_
Construction		cement		L	wall linisnes	s workmanship problem Staining	
defects (faulty	Premature removal of forms Cold joints		No	n-structural			
workmanship):	mp): Sagragation		1,01	cracks		Joint cracks	
designer, detailer, and contractor		ycombing					
		grades of slab rfaces	Oth	ner notes (	if available):		
		o column shear	$\neg$				
Cracks in RC due		shear) cracks					
to load effects		member cracks					
(structural cracks)	Settlem	ent cracks					

		Case S	study	#1	13 (C	13)	
	Profile					Co.tor	
	Prome						nic Design Faults lumn-strong beam
							Torsional Irregularity (Torsion eccentricity)
						ity	Floor discontinuity
					Horizontal structural configuration	Irregularity in plan	Projections in plan
		<b>HERONA</b>			cont		Non-continuous beams
					uctural o	Beam elementary design faults	Non-uniform beam span and cross-section
District:	Ν		Structural configuration	ntal str	am ele design	Absence of vertical support at beams intersection	
Area:	]	Baykal	و	figur	orizoı	Be	Broken axis beams and frames
				con	Нс	Slab	Over-stretched one-way slab
Street name:	Mustafa	a Kurtuluş Sk	-	ral		elementary	
	250			lctu		design fault	
Latitude:	35°	7'6.74"N	č	Stru		Pour	ading and separation problem
Longitude:	33°5	33°55'49.61"E				Irregularity in elevation	Inter-storey strength irregularity (Weak storey)
	<14 D	ate (if available):			al	egularity elevation	Inter-storey stiffness
<b>C</b>	years	2004~2007			ctur ion	egul	irregularity (Soft storey)
Structure age:	Between 14 ar (1974-2003)	-			Vertical structural configuration		Discontinuity of columns or shear walls
	>43 years (Bet				tica	Vertical structural	Broken axis columns
D '11' (	Apartment           Residential         House           Dermitery         Dermitery				Ver c(	element elementary	
Building type:	Dormitory           Public			design faul	t Short column		
	Commercial					Non-S	Structural Defects
	Under Constru	iction		Ţ	Waterpr		ets, water leakage and seepage
Building status:	Occupied				<b>^</b>		ed wooden door
	Abandoned						Condensation
Reinfo	rced Concrete	Defects			nest		Rising damp
Dryin	g shrinkage crac	ks		cts	dampness	Leaking	Rain penetration g pipes, spills and other moisture sources
	Corrosion-in	duced cracking		Surface defects	Surface	cracks on	crazing
Corrosion of metals embedded		nduced spalling		lce	wall	finishes	Map/pattern cracking
in concrete		embedment of	د	urfa			Efflorescence
		etals (handrails)		S			Paint peeling Mouldiness
		inforcing steel cement		-		Wall finish	nes workmanship problem
Construction		moval of forms				,, 111151	Staining
	defects (faulty workmanship):     Tremative removia of forms       designer, detailer, and contractor     Segregation       Honeycombing     Improper grades of slab		N	Jon-s	structural		Joint cracks
				cr	acks		John clacks
surfaces		<u>0</u>	Other	notes (i	f available):		
Cracks in RC due		o column shear shear) cracks					
to load effects		member cracks					
(structural cracks)		ent cracks					

		Case S	tudy ‡	#114 (C	214)		
	Ducella				<b>C</b> a <b>*</b> areas		
	Profile					ic Design Faults	
Â		Const Const				Torsional Irregularity (Torsion eccentricity)	
					ity i	Floor discontinuity	
				Horizontal structural configuration	Irregularity in plan	Projections in plan	
				conf	,	Non-continuous beams	
				uctural e	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	Mağusa		ration	ntal str	am elementa design faults	Absence of vertical support at beams intersection	
Area:	]	Baykal	onfigu	lorizoi	Be	Broken axis beams and frames	
Street name:	Mustafa	a Kurtuluş Sk	Structural configuration	щ	Slab elementary design faults	Over-stretched one-way slab Poorly supported or heavily loaded cantilevered slabs	
Latitude:	35°	7'8.87"N	truc		-	ling and separation problem	
Longitude:		55'54.97"E				Weak storey	
		ate (if available): 2017		ral	Irregularity in elevation	Soft storey	
Structure age:	Between 14 ar (1974-2003)	nd 43 years		Vertical structural configuration	Irreg in el	Discontinuity of columns or shear walls	
	>43 years (Bet			al s figu	Vertical	Broken axis columns	
		Apartment		ertic	structural element	Irregular column and/or shear-	
Building type:	Residential         House           Dormitory			Ň	elementary design fault	wall plan configuration	
	Public					Short column	
	Commercial			Watana		ructural Defects	
Building status:	Under Constru Occupied	letion		waterpi		s, water leakage and seepage d wooden door	
Dunding status.	Abandoned				Derecte	Condensation	
Reinfo	rced Concrete	Defects		ess		Rising damp	
				dampness		Rain penetration	
Dryin	g shrinkage crac		Surface defects			pipes, spills and other moisture sources	
Corrosion of		duced cracking	c de		cracks on	crazing Map/pattern cracking	
metals embedded		b embedment of	face	wall		Efflorescence	_
in concrete		etals (handrails)	Sur			Paint peeling	
	Improper re	inforcing steel				Mouldiness	
Construction	placement				Wall finishe	s workmanship problem	
	defects (faulty workmanship):					Staining	
workmanship):			Noi	n-structural cracks		Joint cracks	
designer, detailer,	v	combing		CIACKS			
and contractor		grades of slab					
	surfaces		Oth	er notes (	if available):		
Cracks in RC due	Slab/beam-to column shear (punching shear) cracks						
to load effects		member cracks					
(structural cracks)	Settlem	ent cracks					

	Profile					
	Profile					
						c Design Faults
1					Week colu	mn-strong beam
						Torsional Irregularity
No.					/ in	(Torsion eccentricity)
					rity n	Floor discontinuity
				guration	Irregularity in plan	Projections in plan
				onf		Non-continuous beams
				Horizontal structural configuration	Beam elementary design faults	Non-uniform beam span and cross-section
District:	Ν	lağusa	ration	ntal str	am elementa design faults	Absence of vertical support at beams intersection
Area:	Ça	nakkale	Structural configuration	orizor	Be	Broken axis beams and frames
		_		H	Slab	Over-stretched one-way slab
Street name:	No street n	ames were found	C III		elementary	Poorly supported or heavily
					design faults	loaded cantilevered slabs
Latitude:	35° 7'19.23"N				Poundi	ng and separation problem
Longitude:		5'22.74"E	_		ty on	Weak storey
у	/ears	ate (if available): March 2016		Iral 1	Irregularity in elevation	Soft storey
	Between 14 an (1974-2003)	-		Vertical structural configuration		Discontinuity of columns or shear walls
>	>43 years (Bef	ore 1974)		al s figu	Vertical	Broken axis columns
		Apartment		rtic	structural element	T 1 1 1/ 1
Building type:	Residential	House Dormitory	-	Ve	elementary design fault	Irregular column and/or shear- wall plan configuration
	Public	·			design iddit	Short column
(	Commercial				Non-St	ructural Defects
U	Under Constru	ction		Waterpr	oofing defects	, water leakage and seepage
Building status:	Occupied				Defected	wooden door
A	Abandoned					Condensation
Reinforce	ed Concrete 1	Defects		dampness		Rising damp
				npr		Rain penetration
Drying s	shrinkage crac	ks	Surface defects	dan	Leaking p	ipes, spills and other moisture sources
Corrosion of		duced cracking	def	Surface	cracks on	crazing
motals ambaddad		duced spalling	و	wall	finishes	Map/pattern cracking
in concrete		embedment of	Info			fflorescence
		etals (handrails)	Ū.	5		aint peeling
		inforcing steel				Mouldiness
Construction		ement			Wall finishes	s workmanship problem
defects (faulty		moval of forms				Staining
workmanship):	r, Segregation		No	on-structural cracks		Joint cracks
designer, detailer,				CLACKS		
and contractor						
		grades of slab faces	Ot	her notes (	if available):	
		o column shear				
Cracks in RC due		shear) cracks				
			—			
to load affacts	Cantilavarad	member groots				
to load affacts	Cantilevered	member cracks ent cracks				

	Case S	Study	#116 (0	C16)			
	Profile			<b>Q</b> . <b>1 1</b>			
	Prome		Seismic Design Faults Week column-strong beam				
					Torsional Irregularity (Torsion eccentricity)		
				ity i	Floor discontinuity		
	H	百	configuration Horizontal structural configuration	Irregularity in plan	Projections in plan		
			onf		Non-continuous beams		
				Beam elementary design faults	Non-uniform beam span and cross-section	Π	
District:	Mağusa		Structural configuration Horizontal str	am ele design	Absence of vertical support at beams intersection		
Area:	Çanakkale	و	ontigu	Be	Broken axis beams and frames		
Street name:	Sht. İbrahim Kazım Cd	-	H	Slab elementary	Over-stretched one-way slab Poorly supported or heavily	+	
Street name:	Siit. Iorannin Kazini Cu	-	ctur	design faults	loaded cantilevered slabs		
Latitude:	35° 7'25.53"N	2	Stru	-	ng and separation problem		
Longitude:	33°55'24.20"E			y n	Weak storey		
	<14 Date (if available): years Mid 2016		ral	Irregularity in elevation	Soft storey		
Structure age:	Between 14 and 43 years (1974-2003)		Vertical structural configuration	Irreg in el	Discontinuity of columns or shear walls		
	>43 years (Before 1974)		al s figu	Vertical	Broken axis columns		
	Apartment		ertic	structural element	Irregular column and/or shear-		
D 111	Residential House	Dormitory	Ve	elementary	wall plan configuration		
Building type:	Public			design fault			
	Commercial			Non-Str	Short column ructural Defects		
	Under Construction		Watern		, water leakage and seepage		
Building status:	Occupied				wooden door		
-	Abandoned				Condensation		
Reinfo	rced Concrete Defects		ness		Rising damp		
Dryin	g shrinkage cracks		octs dampness	Leaking pi	Rain penetration ipes, spills and other moisture sources		
Corrosion of	Corrosion-induced cracking			e cracks on	crazing		
metals embedded	Corrosion-induced spalling		g wall	finishes	Map/pattern cracking		
in concrete	Cracks due to embedment of	-	urts		fflorescence	_	
	dissimilar metals (handrails)	2	2		aint peeling Mouldiness		
	Improper reinforcing steel placement				workmanship problem		
Construction	Premature removal of forms			wan minisites	Staining		
defects (faulty	defects (faulty workmanship): Cold joints		on-structura	1	Joint cracks		
designer, detailer,	Segregation		cracks				
and contractor	Honeycombing						
	Improper grades of slab surfaces	0	ther notes	(if available):			
	Slab/beam-to column shear	$\vdash$					
Cracks in RC due	(punching shear) cracks						
to load effects	Cantilevered member cracks						
(structural cracks)	Settlement cracks						

		Case S	tudy <del>;</del>	#117 (C	C17)		
	Drofilo				Cotor.	a Dari en Faulte	
	Profile					c Design Faults	
		<b>\$</b>			week colu	Imn-strong beam Torsional Irregularity	
					=	(Torsion eccentricity)	
		Mar -			ty i	Floor discontinuity	
				Horizontal structural configuration	Irregularity in plan	Projections in plan	
				con	~	Non-continuous beams	
				uctural	Beam elementary design faults	Non-uniform beam span and cross-section	
District:		Mağusa	ration	ttal str	am ele lesign	Absence of vertical support at beams intersection	
Area:	Ç	anakkale	Structural configuration	orizon	Be	Broken axis beams and frames	
				Ë	Slab	Over-stretched one-way slab	
Street name:	Sht. İbr	ahim Kazım Cd	ura		elementary	Poorly supported or heavily	
<b>T</b>	250		ruct		design faults	loaded cantilevered slabs	
Latitude:	35° 7'31.93"N 33°55'20.07"E			i	Pound	ing and separation problem Weak storey	
Longitude:		Date (if available):			ity ion	weak storey	
	years	2017		n	Irregularity in elevation	Soft storey	
Structure age:	Between 14 a (1974-2003)	-		Vertical structural configuration		Discontinuity of columns or shear walls	
	>43 years (Be			cal s tfigu	Vertical	Broken axis columns	
		Apartment	_	ertic	structural element	Irregular column and/or shear-	
Building type:	Residential House Dormitory		-	^^	elementary	wall plan configuration	
Dunung type.	Public	Dominiory		design fault	Short column		
	Commercial				Non-St	ructural Defects	
	Under Constr	uction		Waterpi		s, water leakage and seepage	
Building status:	Occupied			_	Defected	d wooden door	
	Abandoned			s		Condensation	
Reinfo	rced Concrete	Defects		nes		Rising damp	
Dryin	g shrinkage cra	cks	cts	dampness	Leaking p	Rain penetration bipes, spills and other moisture sources	
	Corrosion-i	nduced cracking	Surface defects	Surface	e cracks on	crazing	
Corrosion of metals embedded	Corrosion-	nduced spalling	ce d	wall	finishes	Map/pattern cracking	
in concrete		to embedment of	Irfa			Efflorescence	
		netals (handrails)	St			Paint peeling	
		einforcing steel		<u> </u>		Mouldiness	
Construction		cement	_	<u> </u>	wall finishe	s workmanship problem Staining	
defects (faulty			No	n-structural		-	
workmanship):		regation	110	cracks		Joint cracks	
designer, detailer, and contractor		ycombing					
and contractor	Improper	grades of slab		her notes (	if available):		
		irfaces		ner notes (	n avanable).		
Cracks in RC due	n RC due Slab/beam-to column shear (punching shear) cracks						
to load effects	Cantilevere	l member cracks					
(structural cracks)	Settler	nent cracks					

	Case Study #118 (C18)								
	D (*1			Seismic Design Faults					
	Profile					c Design Faults mn-strong beam			
						Torsion al Irregularity (Torsion eccentricity)			
					rity n	Floor discontinuity			
				Horizontal structural configuration	Irregularity in plan	Projections in plan			
				con	~	Non-continuous beams			
			uctural	Beam elementary design faults	Non-uniform beam span and cross-section				
District:	Mağusa Çanakkale		Structural configuration	ontal str	cam elementa design faults	Absence of vertical support at beams intersection			
Area:			onfigu	orizoı	Be	Broken axis beams and frames			
			ul cc	Ĥ	Slab	Over-stretched one-way slab			
Street name:	Süvariler Sk		actura		elementary design faults	Poorly supported or heavily loaded cantilevered slabs			
Latitude:	35° 7'47.84"N		Stru		Pounding and separation problem				
Longitude:		55'1.08"E			u n	Weak storey			
	<14 Days	ate (if available): 2017		ral	Irregularity in elevation	Soft storey			
Structure age:	Between 14 ar (1974-2003)	id 43 years		Vertical structural configuration	Irreg in el	Discontinuity of columns or shear walls			
	>43 years (Bet	fore 1974)		al st ïgu	Vertical	Broken axis columns			
		Apartment		rtica	structural	T 1 1 1/ 1			
	Residential	House		Vei	element elementary	Irregular column and/or shear- wall plan configuration			
Building type:		Dormitory			design fault				
	Public					Short column			
	Commercial	ation		Non-Structural Defects Waterproofing defects, water leakage and seepage					
Building status:	Under Constru Occupied	ction		Waterproofing defects, water leakage and seepage Defected wooden door					
Dunung status.	Abandoned				Defected	Condensation			
Reinfo	rced Concrete	Defects		ess		Rising damp			
				dampness	Rain penetration Leaking pipes, spills and other moisture sources				
Dryin	g shrinkage crac		Surface defects	dan					
Corrosion of		duced cracking	def		e cracks on crazing				
metals embedded		duced spalling	ace	wall finishes Map/pattern cracking					
in concrete		etals (handrails)	urf			fflorescence Paint peeling			
		inforcing steel				Mouldiness			
	placement					s workmanship problem			
Construction	Premature re	moval of forms				Staining			
defects (faulty workmanship):		l joints		-structural		Joint cracks	$\square$		
designer, detailer,		egation		cracks					
and contractor		reades of slab							
		grades of slab faces	Oth	er notes (i	if available):				
		o column shear							
Cracks in RC due		shear) cracks							
to load effects		member cracks							
(structural cracks)	Settlem	ent cracks							

	Case Study #119 (C19)								
	Profile			Seismic Design Faults					
	Prome						mn-strong beam		
×.							Torsion al Irregularity (Torsion eccentricity)		
						n n	Floor discontinuity		
					figuration	Irregularity in plan	Projections in plan		
			E.		con	x	Non-continuous beams		
					Horizontal structural configuration	Beam elementary design faults	Non-uniform beam span and cross-section		
District: Mağusa			ation	Absence of vertical support at beams intersection					
Area:	Çanakkale			Structural configuration	orizor	Bea	Broken axis beams and frames		
_				l co	Нс	Slab	Over-stretched one-way slab		
Street name:	Akç	akoca Sk		tura		elementary design faults	Poorly supported or heavily		
Latitude:	35° 7'53.06"N		-	ruct			loaded cantilevered slabs ng and separation problem		
Longitude:		4'55.72"E	-	St			Weak storey		
Longitude.	<14 Date (if available):		_	Irregularity in elevation	Soft storey				
Structure age:	years Between 14 ar	Mid 2016			Vertical structural configuration	regul	Discontinuity of columns or		
U	(1974-2003)	-			artical structur configuration	I I	shear walls		
	>43 years (Bet				:al s figu	Vertical	Broken axis columns		
		Apartment			ertic	structural element	Irregular column and/or shear-		
Building type:	Residential	House Dormitory	$\left  \right $		Ve	elementary	wall plan configuration		
Dunning type.	Public	Domitory				design fault	Short column		
	Commercial					Non-Str	uctural Defects		
	Under Constru	ction		Waterproofing defects, water leakage and seepage					
Building status:	Occupied			Defected wooden door					
	Abandoned			Condensation					
Reinfo	rced Concrete	Defects		Rising damp Rain penetration Leaking pipes, spills and other sources					
Dryin	g shrinkage crac	ks				Leaking pi			
Corrosion of		duced cracking		Surface defects		cracks on	crazing		
metals embedded		duced spalling		ace	wall	finishes	Map/pattern cracking		
in concrete		embedment of etals (handrails)		urf			fflorescence		
		inforcing steel	$\vdash$	S			aint peeling Mouldiness		
		ement		ŀ			workmanship problem		
Construction		moval of forms		ľ			Staining		
defects (faulty workmanship):		l joints	1	Non-	structural		Joint cracks		
designer, detailer,	U U	egation		C	cracks		John Clacks		
and contractor		combing							
		grades of slab faces		Othe	er notes (i	if available):			
		o column shear	H						
Cracks in RC due		shear) cracks							
to load effects		member cracks	$\square$						
(structural cracks)	Settlem	ent cracks							

Profile     Scisnic Design Faults       Week column-strong beam     Torsional Irregularity (Torsion eccentricity)       District:     Magusa       Area:     Tuzla (Enkomi)       Street name:     Saduk Cemil Sk       Longitude:     35° 9716.43°N       Longitude:     35° 9344.12°E       Verteal     Between 14 and 43 years (1974-2003)       Structure age:     Extrement 14 and 43 years (1974-2003)       Building type:     Public       Commercial     Dormitory       Public     Construction       Construction     Construction       Public     Construction       Construction     Construction       Public     Construction       Construction     Construction       Prematic exclose     Stable (Inreaked Stable)       Occupied     Construction       Prematic exclose     Stable (Inreaked Stable)       Construction     Construction       Problic     Construction       Construction     Construction       Prematic exclose     Maguage       Prematic exclose     Maguage       Problic     Construction       Construction     Construction       Prematic exclose     Mappattern ericks on Mouldiness       Construction     Prematic exclose		Case S	Study	y #1	120 (C	220)			
Week colum-strong beam         District:       Magusa         District:       Magusa         Area:       Tuzla (Enkomi)         Street name:       Saduk Cernil Sk         Longitude:       33°53'44.12"F.         Building type:       Patient District:         Building type:       Patient District:         Building type:       Patient District:         Building type:       Construction         Dormitory       Production         Public       Construction         Construction       Construction         Drying shrinktage cracks       Construction         Construction       Construction         Premeticial theores on the product of theores on the product of theores on the product of theores on the product of the product of theores on theore product of theores on theore product of theores on theore product of theores on theore product of theores on theorem product of theorem on theorem on the product of theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on the product of theorem on theorem on the product of theorem on the product of theorem on the product of theorem on theorem on theorem on theorem on theorem on theorem on the product of theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem on theorem o		D (*1.			Saiamia Design Faults				
District:       Magusa         Area:       Tuzla (Enkomi)         Street name:       Sadik Cemil Sk         Latitude:       35°916.43°N         Longitude:       33°5344.12°E         Jostifict:       Magusa         Structure age:       C14         Date (if available):       Stable):         years       2015         Structure age:       Between 14 and 43 years         Commercial       House         Dominory       Public         Public       Commercial         Drying shrinkage cracks       Construction         Drying shrinkage cracks       Corrosion-induced cracking         Corrosion of metals (handword)       Corrosion-induced forms         Premating reaction       Master cracking         Corrosion of design and configuration       Corrosion-induced forms         Public       Corrosion-induced forms         Drying shrinkage cracks       Sufface cracks on cracking         Corrosion of design and configuration       Construction         Prenative reacks       Controsion forms         Construction       Prenative reacks         Drying shrinkage cracks       Sufface cracks on cracking         Controsion of metals (handraiis)       Prenotect (if available		Profile							
District:     Magusa       Area:     Tuzla (Enkomi)       Street name:     Sadik Cemil Sk       Latitude:     33°53'44.12"E       Jogga 2015     Slab       Structure age:     Between 14 and 43 years (1974-2003)       Longitude:     33°53'44.12"E       Java 2015     Pounding and separation problem       Building type:     Public       Commercial     Magusa       Under Construction     Oracipied       Drying shrinkage cracks     Construction       Construction of metals embedded in contract     Construction detects (failty workmanship); designed and contractor     Vaterproofing defects, and opper minority surfaces       Construction detects failty workmanship; designe, detailer, and contractor     Concented parates (fort-cracks in RC due to boad effects       Construction defects faulty workmanship; designe, detailer, and contractor     Stab beams intersory structure surface cracks of cracks in RC due to boad effects							Torsional Irregularity (Torsion eccentricity)		
Street name:     Sadik Cemil Sk       Latitude:     35° 9'16.43"N       Longitude:     33°53'44.12"E       Vertical     Pounding and separation problem       Structure age:     (14)       years     2015       Between 14 and 43 years     2015       Between 14 and 43 years     (17)       years     2015       Between 14 and 43 years     (17)       years     Apartment       House     Boroken axis columns or shear walls       years     Apartment       Building type:     Apartment       Public     Dormitory       Public     Dormitory       Corrosion of metals embedded     Corrosion-induced cracking       Corrosion of metals embedded     Corrosion-induced spalling       Corrosion of metals embedded     Corrosion-induced cracking       Corrosion of metals embedded     Improper reinforcing steel       Miproper reinforcing steel     Paint peeling       Miproper reinforcing steel     Paint peeling       Money Cold joints     Non-structural       Stating deamp     Stating       Corrosion of metals embedded     Premature removal of forms       Corrosion of metals embedded     Partmet reacks       In concrete     Improper reinforcing steel       placement     Money/pattern crack					ictural configuration	Irregularit plan			
Street name:     Sadik Cemil Sk       Latitude:     35° 9'16.43"N       Longitude:     33°53'44.12"E       Vertical     Pounding and separation problem       Structure age:     214       years     2015       Between 14 and 43 years     100 effective (Weak storey)       >>43 years (Before 1974)       >>43 years (Before 1974)       >>43 years (Before 1974)       >>43 years (Before 1974)       >>43 years (Before 1974)       >>43 years (Before 1974)       >>43 years (Before 1974)       >>43 years (Before 1974)       >>43 years (Before 1974)       Dormitory       Public       Commercial       Durder Construction       Corrosion of metals embedded       Drying shrinkage cracks       Corrosion -induced cracking       Corrosion of metals embedded       Corrosion of metals embedded       Incorrecte       Drying shrinkage cracks       Construction       Quartities and the mole of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of the suble of						nentary faults	Non-uniform beam span and		
Street name:     Sadik Cemil Sk     January Street name:     Sadik Cemil Sk       Latitude:     35° 9'16.43"N     Poorly supported or heavily loaded cantilevered slabs       Longitude:     33°53'44.12"E     Pounding and separation problem       Structure age:     (14 pate (if available): years (1974-2003)     Pounding and separation problem       Building type:     Apartment     Pounding and separation problem       Building type:     Apartment     Pounding and separation problem       Public     Public     Shore dementary design and/or shear-walls       Corrosion of metals embedded in concrete     Corrosion-induced cracking     Shore dementary dementary design and/or shear-walls       Corrosion of metals embedded in concrete     Corrosion-induced cracking     Corrosion-induced cracking       Corrosion of metals embedded in concrete     Corrosion-induced cracking     Surface cracks on crazing       Corrosion of metals embedded in concrete     Corrosion-induced cracking     Surface cracks on crazing       Construction     Corrosion-induced spalling cracks due to embedment of dissimilar metals (handrails)     Non-structural before       Segregation     Cracks due to embedment of dissimilar metals (handrails)     Non-structural cracks       Corrosion of metals embedded in contractor     Premature removal of forms     Non-structural cracks       Corrosion of metals embedded in contractor     Premature removal of forms	District:	:: Mağusa		ation	Horizontal stru	ım eler lesign f	beams intersection		
Street name:     Sadik Cemil Sk     January design faults     Defer account one of availy loaded can illevered slabs       Latitude:     33° 53° 44.12° E     Pounding and separation problem       Longitude:     33° 53° 44.12° E     Pounding and separation problem       Structure age:     (14 pate (if available): years (1974-2003)     Pounding and separation problem       Building type:     Apartment     Pounding and separation problem       Building type:     Apartment     Pounding and separation problem       Public     Dormitory     Public       Commercial     Martment       Drying shrinkage cracks     Corrosion -induced spalling     Corrosion-induced spalling       Corrosion of metals embedded in concrete     Corrosion-induced spalling     Surface cracks       Construction     Corrosion-induced spalling     Corrosion-induced spalling       Construction     Premature removal of forms     Surface cracks       Construction     Partment reacks     Vertical       Building status:     Corrosion-induced spalling     Corrosion-induced spalling       Corrosion of metals embedded     Corrosion-induced spalling     Surface cracks       Construction     Partment reacking     Efflorescence       Construction     Improper reinforcing steel     Paint peeling       Parematic     Non-structural     Mary pattern cracking <td>Area:</td> <td colspan="2">Tuzla (Enkomi)</td> <td>nfigur</td> <td>Bea</td> <td>frames</td> <td></td>	Area:	Tuzla (Enkomi)		nfigur		Bea	frames		
Longitude:     33°53'44.12"E     Inter-storey stringth       Structure age:     <14	Street name:			ctural co		elementary design faults	Poorly supported or heavily		
Longitude:       33°53'44.12"E       Inter-storey stringth         Structure age:       <14	Latitude:	35° 9'16.43"N		Pound		Poundi			
(19/4-2003)       >43 years (Before 1974)         Agartment       Apartment         House       Irregular column and/or shear- elementary         Building type:       Public         Public       Shear walls         Commercial       Non-Structural Defects         Building status:       Occupied         Building status:       Occupied         Drying shrinkage cracks       Striking damp         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Sufface cracks on         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Sufface cracks on       Staining         Construction defects (faulty workmanship):       Improper grades of slab surfaces       Non-structural elementary       Joint cracks         Cracks in RC due to load effects       Slab/beam-to column shear (punching shear) cracks       Other notes (if available);	Longitude:					ty in on	irregularity (Weak storey)		
(19/4-2003)       >43 years (Before 1974)         Agartment       Apartment         House       Irregular column and/or shear- elementary         Building type:       Public         Public       Shear walls         Commercial       Non-Structural Defects         Building status:       Occupied         Building status:       Occupied         Drying shrinkage cracks       Striking damp         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Sufface cracks on         Construction defects (faulty workmanship):       Improper reinforcing steel placement       Sufface cracks on       Staining         Construction defects (faulty workmanship):       Improper grades of slab surfaces       Non-structural elementary       Joint cracks         Cracks in RC due to load effects       Slab/beam-to column shear (punching shear) cracks       Other notes (if available);		years 2015			ctural ion	egulari elevati	irregularity (Soft storey)		
Building type:     Residential     House     wall plan configuration       Public     Commercial     Short column       Commercial     Non-Structural Defects       Building status:     Under Construction     Waterproofing defects, water leakage and seepage       Occupied     Defected wooden door       Abandoned     Contente Defects       Drying shrinkage cracks     Sufface cracks on dissimilar metals (handrails)       Corrosion of metals embedded in concrete     Corrosion-induced spalling       Construction     Improper reinforcing steel placement       Premature removal of forms     Sufface so dissimilar metals (handrails)       defects (faulty workmanship):     Segregation       Casts in RC due to load effects     Slab/beam-to column shear (punching shear) cracks       Cracks in RC due to load effects     Slab/beam-to column shear (punching shear) cracks       Cracks in RC due to load effects     Cantilevered member cracks		(1974-2003)			al struc figurat		shear walls		
Public       Short column         Commercial       Non-Structural Defects         Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Occupied       Defected wooden door         Abandoned       Condensation         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       gradie         Corrosion of metals embedded in concrete       Corrosion-induced cracking       gradie         Corrosion of metals embedded       Corrosion-induced spalling       gradie         Construction defects (faulty)       Improper reinforcing steel placement       Paint peeling         Premature removal of forms       Segregation       Staining         Vorkmanship):       Segregation       Segregation         and contractor       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):         Cracks in RC due to load effects       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):		ApartmentResidentialHouseDormitory			Vertic	structural element elementary	Irregular column and/or shear-		
Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Descripted       Defected wooden door       Defected wooden door         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second									
Building status:       Occupied Abandoned       Defected wooden door         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rising damp         Corrosion of metals embedded in concrete       Corrosion-induced cracking Corrosion-induced spalling       Surface cracks on dissimilar metals (handrails)       Surface cracks on wall finishes       Crazing         Construction defects (faulty workmanship): designer, detailer, and contractor       Improper reinforcing steel placement       Mouldiness       Mauldiness         Honeycombing       Improper grades of slab surfaces       Non-structural cracks       Joint cracks         Cracks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):									
Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Drying shrinkage cracks       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced spalling       Paint peeling         Cracks due to embedment of dissimilar metals (handrails)       Paint peeling       Map/pattern cracking         Improper reinforcing steel placement       Paint peeling       Mouldiness         Vortkasing defects (faulty workmanship):       Segregation       Staining       Staining         Gesigner, detailer, and contractor       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):       Other notes (if available):	Building status:	Occupied		Defected wooden door			wooden door		
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesCrazingConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementJoint cracksCracks in RC due to load effects (structural cracks)Improper grades of slab surfacesNon-structural cracksJoint cracksCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksOther notes (if available):	Reinfo				SS	Rising damp Rain penetration			
Corrosion of metals embedded in concreteCorrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)Surface cracks on wall finishesCrazingConstruction defects (faulty workmanship): designer, detailer, and contractorImproper reinforcing steel placementJoint cracksPremature removal of forms Cold jointsNon-structural cracksStainingCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksOther notes (if available):					lampne				
Construction       Improper reinforcing steel       Mouldiness         placement       Wall finishes workmanship problem         Premature removal of forms       Staining         Construction       Premature removal of forms         defects (faulty       Cold joints         workmanship):       Segregation         designer, detailer,       Honeycombing         and contractor       Improper grades of slab         surfaces       Slab/beam-to column shear         (punching shear) cracks       Other notes (if available):	2191			ects	Ċ.				
Construction       Improper reinforcing steel       Mouldiness         placement       Wall finishes workmanship problem         Premature removal of forms       Staining         Construction       Premature removal of forms         defects (faulty       Cold joints         workmanship):       Segregation         designer, detailer,       Honeycombing         and contractor       Improper grades of slab         surfaces       Slab/beam-to column shear         (punching shear) cracks       Other notes (if available):			$\left  \right $	se def					
Construction       Improper reinforcing steel       Mouldiness         placement       Wall finishes workmanship problem         Premature removal of forms       Staining         Construction       Premature removal of forms         defects (faulty       Cold joints         workmanship):       Segregation         designer, detailer, and contractor       Honeycombing         Improper grades of slab       surfaces         Slab/beam-to column shear       Other notes (if available):         Cracks in RC due to load effects       Cantilevered member cracks		Cracks due to embedment of		Irfa			fflorescence		
Construction defects (faulty workmanship): designer, detailer, and contractorplacementWall finishes workmanship problemPremature removal of forms Cold jointsNon-structural cracksStainingMoneycombing Improper grades of slab surfacesImproper grades of slab surfacesNon-structural cracksCracks in RC due to load effects (structural cracks)Slab/beam-to column shear (punching shear) cracksOther notes (if available):	mediciete			Su					
Construction       Premature removal of forms       Staining         defects (faulty       Ocid joints       Non-structural         workmanship):       designer, detailer,       Joint cracks         and contractor       Improper grades of slab       surfaces         Improper grades of slab       Slab/beam-to column shear       Other notes (if available):         Cracks in RC due       Slab/beam-to column shear       Cantilevered member cracks				-					
defects (faulty workmanship):       Cold joints       Non-structural cracks         designer, detailer, and contractor       Segregation       Improper grades of slab surfaces         Cracks in RC due to load effects       Slab/beam-to column shear (punching shear) cracks       Other notes (if available):         Cracks in RC due to load effects       Cantilevered member cracks       Other notes (if available):	Construction		+	-		Wall finishes			
Workmanship):     Segregation     cracks       designer, detailer, and contractor     Honeycombing       Improper grades of slab surfaces     Improper grades of slab surfaces       Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks				Non-	structural		<u> </u>		
designer, detailer, and contractor       Honeycombing         Improper grades of slab surfaces       Other notes (if available):         Cracks in RC due to load effects (structural cracks)       Slab/beam-to column shear (punching shear) cracks			1				Joint cracks		
Improper grades of slab surfaces     Other notes (if available):       Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks     Other notes (if available):									
Cracks in RC due to load effects (structural cracks)     Slab/beam-to column shear (punching shear) cracks       Cantilevered member cracks		Improper grades of slab		Othe	er notes (i	if available):			
to load effects (structural cracks) Cantilevered member cracks		Slab/beam-to column shear							
(structural cracks)			$\square$						
Settlement cracks	(structural cracks)	Settlement cracks							

Profile       Scisnic Design Faults         Week column-strong heam       Torsional Irregularity         Understand       Intervention         District:       Magusa         Area:       Tuzla (Enkomi)         Street name:       No street names were found         Latitude:       33°5'918.67"N         Longitude:       33°5'9218.67"N         Juilding type:       Area:         Public       Over-stretched one-way slab         Public       Over-stretched one-way slab         Discritiction       Measure         Area:       Tuzla (Enkomi)         Street name:       No street names were found         Latitude:       33°5'918.67"N         Longitude:       33°5'923.00°E         Versa       Dornitory         Public       Over-stretched one-way slab         Dornitory       Dornitory         Public       Store construction         Commercial       Weaterrooning defects, ware leakage and seepage         Defected       Dornitory         Public       Connercial         Commercial       Stort column         Commercial       Stort contarity or columns or consistend department econstruction         Mandoned       Condensation			Case S	Stud	<b>y</b> #	121 (C	21)		
Week column-strong beam           Week column-strong beam           User construction         Non-uniform beam span and cross-section           District:         Magusa           Area:         Tuzla (Enkomi)           Street name:         No street names were found           Latitude:         33°53'23.00"E           Longitude:         Classes           Years         2017           Building type:         Pablic           Public         Construction           District:         Magusa           Area:         Tuzla (Enkomi)           Structure age:         Classes         2017           Between 14 and 43 years (1974-2003)         Construction         Operation problem           Occupied         Dormicry         Pounding and separation problem           Building type:         Public         Construction         Soft storey           Drying shrinkage cracks         String certex bedment of dissimilar metals (handrails)         Sufface cracks on wall finishes         Maguage dissimilar metals (handrails)           Public         Correstence         Sufface cracks on wall finishes         Magiage dissimilar metals (handrails)           Pring shrinkage cracks         Correstence         Sufface cracks on wall finishes         Magipattern cracking Building s		D					<b>a</b> •		
Justrict:     Magusa       District:     Magusa       Area:     Tuzla (Enkomi)       Street name:     No street names were found       Latitude:     35° 9'18.67'N       Longitude:     33° 53'23.00'E       Vertical     2017       Structure age:     etween 14 and 43 years (1974-2003)       Vertical     Magusa       Area:     2017       Building type:     Public       Public     2017       Building type:     Public       Public     Public       Corrosion of metals embedded in concrete     Corrosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion of Construction     Vertical Corrosion of Corrosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosion-induced spalling Crorosio		Profile							
District:       Magusa         Area:       Tuzla (Enkomi)         Street name:       No street names were found         Latitude:       35° 9'18.67"N         Longitude:       33° 53'23.00°E         Structure age:       (14 and 43 years)         Vertical       Broken axis columns or shorter than 43 years         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns         Vertical       Broken axis columns	and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s	-		-			week col		
District:       Magusa         Area:       Tuzla (Enkomi)         Street name:       No street names were found         Latitude:       35° 9'18.67"N         Longitude:       33°53'23.00"E         Vertical       Stab         Vertical       Between 14 and 43 years         (1974-2003)       >43 years         Vertical       Before 1974)         Structure age:       Residential         Building type:       Public         Commercial       Non-Struction         Drying shrinkage cracks       Corrosion of metals embedded in concrete       Corrosion-induced cracking Corrosion of metals embedded       Corrosion-induced cracking Corrosion of metals embedded       Corrosion-induced cracking Corrosion of metals embedded       Corrosion-induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced cracking Corrosion induced	and the second second			r l			ц		
District:       Magusa         Area:       Tuzla (Enkomi)         Street name:       No street names were found         Longitude:       33° 5° 9'18.67"N         Longitude:       33° 5° 3'23.00"E         Vertical       Street name:         Vertical       Corrosion of metals embedded         Corrosion of metals embedded       Corrosion-induced cracking Corrosion of metals embedded         Corrosion of metals embedded       Corrosion-induced cracking Corrosion of metals embedded       Corrosion-induced cracking Corrosion of metals embedded         Contruction       Mayopatter nacking Corrosion of metals embedded       Corrosion induced cracking Corrosion induced spalling Cracks due to embedment of dissimilar metals (handrails)       Yartment House Description       Yartment House Dormitory         Magusature       Corrosion induced cracking Cracks due to embedment of dissimilar metals (handrails)       Yartment House Defected wooden door         Madioned       Corrosion induced spalling Cracks due to embedment of dissimilar metals (handrails)       Yartment House Defected wooden door         Mayopatter cracking Corrosion of metals embedded       Corrosion-induced cracking Cracks due to embedment of dissimilar metals (handrails)       Yartment House Defected woolden door         Mayopatter cracking Corrosion induced reaking Cracks due to embedment of dissimilar metals (handrails)       Yartment House Defected woolden dor         Mayopatter c							ty i	• •	
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Street name:     No street names were found     The state of the structure of the structure of the structure dementary design faults     Poor Structure of the structure dementary design faults       Latitude:     35° 9'18.67"N       Longitude:     33° 53'23.00"E       Structure age:     214     Date (if available): years       generation problem     Weak storey       Structure age:     214     Date (if available): years       Between 14 and 43 years (1974-2003)     Apartment       House     Dormitory       Public     Dormitory       Public     Dormitory       Public     Under Construction       Building status:     Occupied       Derying shrinkage cracks     Corrosion-induced cracking       Corrosion of metals embedded in concrete     Corrosion-induced cracking       Construction     Construction dissimilar metals (handrails)       Improper reinforcing steel placement     Paint peeling       Improper reinforcing steel placement     Paint peeling       Improper reinforcing steel placement     Paint peeling       Improper reinforcing steel placement     Vali finishes       Mouldiness     Wall finishes workmanship problem						uctural c	mentary faults		
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Street name:     No street names were found     The statute of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of the status of th	Area:	Tuzla (Enkomi)			onfigu	lorizor	Be	frames	
Longitude:       33°53'23.00''E       Weak storey         Structure age:       <14	G	Number			al c	Ξ			
Longitude:       33°53'23.00''E       Weak storey         Structure age:       <14	Street name:	No street na	ames were found		tura				
Longitude:       33°53'23.00''E       Weak storey         Structure age:       <14	Latituda:	35° 9'18 67''N		-	Inc	-	-		
Structure age:       Date (if available): years       2017         Between 14 and 43 years (1974-2003)       2017       Discontinuity of columns or shear walls         Vertical Building type:       Apartment House       Vertical Broken axis columns       Broken axis columns         Public       Apartment House       Vertical Building status:       Broken axis columns       Broken axis columns         Building status:       Under Construction       Mathematical Abandoned       Non-Structural Defects       Irregular column and/or shear- wall plan configuration         Building status:       Under Construction       Non-Structural Defects       Soft storey         Drying shrinkage cracks       Corrosion-induced cracking Corrosion-induced spalling Cracks due to embedment of dissimilar metals (handrails)       Surface cracks on Construction defects (faulty       Construction Premature removal of forms         Construction defects (faulty       Improper reinforcing steel placement       Paint peeling Mouldiness       Map/pattern cracking Staining				-	S				
Image: Residential served construction defects (faulty       Construction defects (faulty       Construction defects (faulty       Structural element elementary design fault       Broken axis columns         Structural element elementary design fault       Public       Short column       Irregular column and/or shear-wall plan configuration         Building status:       Public       Non-Structural element elementary design fault       Short column         Building status:       Occupied       Non-Structural Defects       Short column         Corrosion of metals embedded in concrete       Corrosion-induced cracking Corrosion-induced spalling       Trazing       Rain penetration         Improper reinforcing steel placement       Improper reinforcing steel placement       Paint peeling       Mouldiness         Vertical status:       Improper reinforcing steel placement       Non-structural       Structural element elementary design fault	Longitude.	<14 Da	te (if available):			al	ularity v ation		
Building type:     Dormitory     Public     Wall plan configuration       Public     Commercial     Short column       Commercial     Under Construction     Waterproofing defects, water leakage and seepage       Building status:     Occupied     Defected wooden door       Abandoned     Condensation       Reinforced Concrete Defects     Rain penetration       Drying shrinkage cracks     Improver reinforcing stelling       Corrosion of metals embedded in concrete     Corrosion-induced cracking       Construction     Corrosion-induced spalling       Improper reinforcing steel placement     Improper reinforcing steel placement       Premature removal of forms     Wall finishes workmanship problem       Statining     Staining	Structure age:	Between 14 an				ructur	Irreg in ele		
Building type:     Dormitory     Public     Wall plan configuration       Public     Commercial     Short column       Commercial     Under Construction     Waterproofing defects, water leakage and seepage       Building status:     Occupied     Defected wooden door       Abandoned     Condensation       Reinforced Concrete Defects     Rain penetration       Drying shrinkage cracks     Improver reinforcing stelling       Corrosion of metals embedded in concrete     Corrosion-induced cracking       Construction     Corrosion-induced spalling       Improper reinforcing steel placement     Improper reinforcing steel placement       Premature removal of forms     Wall finishes workmanship problem       Statining     Staining			ore 1974)			al st ïgu	Vertical		
Building type:     Dormitory     Dermitory     Detendentary     wall plan configuration       Public     Occumencial     Short column       Commercial     Under Construction     Waterproofing defects, water leakage and seepage       Building status:     Occupied     Defected wooden door       Abandoned     Condensation       Reinforced Concrete Defects     Rain penetration       Drying shrinkage cracks     Surface cracks on crazing       Corrosion of metals embedded in concrete     Corrosion-induced cracking       Construction defects (faulty     Improper reinforcing steel placement       Premature removal of forms     Surface sworkmanship problem       Premature removal of forms     Staining		• • • •				tica			
Building type:     Dormitory     design fault     Durry our pair our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our grant our gra		Residential	House			Vei c			
PublicShort columnCommercialNon-Structural DefectsBuilding status:Under ConstructionWaterproofing defects, water leakage and seepageOccupiedDefected wooden doorAbandonedCondensationReinforced Concrete DefectsRain penetrationDrying shrinkage cracksLeaking pipes, spills and other moisture sourcesCorrosion of metals embedded in concreteCorrosion-induced crackingConstruction defects (faultyImproper reinforcing steel placementPremature removal of formsPaint peelingMouldinessMouldinessConstruction defects (faultyCold joints	Building type:		Dormitory					wall plan configuration	
Building status:       Under Construction       Waterproofing defects, water leakage and seepage         Building status:       Occupied       Defected wooden door         Abandoned       Condensation         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Improver reinforcing defects, water leakage and seepage         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Surface cracks on crazing         Concrete       Corrosion-induced spalling       Surface cracks on wall finishes       Crazing         Construction defects (faulty       Improper reinforcing steel placement       Mouldiness       Mouldiness         Verticities       Verticities       Verticities       Verticities         Construction defects (faulty       Cold joints       Non structured								Short column	
Building status:       Occupied       Defected wooden door         Abandoned       Abandoned       Condensation         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Surface cracks on crazing         Corrosion-induced spalling       Surface cracks on crazing       Surface cracks on crazing         Concrete       Corrosion-induced spalling       Surface cracks on wall finishes       Map/pattern cracking         Construction defects (faulty       Improper reinforcing steel placement       Mouldiness       Wall finishes workmanship problem         Verticity       Cold joints       Non structural       Staining									
Abandoned       Condensation         Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Drying shrinkage cracks       Leaking pipes, spills and other moisture sources         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Surface cracks on crazing         Corrosion-induced spalling       Cracks due to embedment of dissimilar metals (handrails)       Wall finishes       Map/pattern cracking         Improper reinforcing steel placement       Improper reinforcing steel placement       Mouldiness         Construction defects (faulty       Cold joints       Non structural			ction						
Reinforced Concrete Defects       Rising damp         Drying shrinkage cracks       Rain penetration         Corrosion of metals embedded in concrete       Corrosion-induced cracking       Leaking pipes, spills and other moisture sources         Corrosion-induced spalling       Carcks due to embedment of dissimilar metals (handrails)       Surface cracks on crazing         Construction defects (faulty       Improper reinforcing steel placement       Mouldiness         Vertex       Vall finishes workmanship problem         Staining       Staining	Building status:						Defecte		
Corrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling     Surface cracks on wall finishes     Crazing Map/pattern cracking       Corrosion-induced spalling     Surface cracks on dissimilar metals (handrails)     Surface cracks on wall finishes     Crazing       Construction defects (faulty     Improper reinforcing steel placement     Map/pattern cracking       Construction defects (faulty     Premature removal of forms     Vall finishes workmanship problem	Datate					S			
Corrosion of metals embedded in concrete     Corrosion-induced cracking Corrosion-induced spalling     Surface cracks on wall finishes     Crazing Map/pattern cracking       Corrosion-induced spalling     50     Efflorescence       Corrosion-induced spalling     50       Cracks due to embedment of dissimilar metals (handrails)     50       Improper reinforcing steel placement     Map/pattern cracking       Paint peeling     Mouldiness       Wall finishes workmanship problem       Staining	Reimo	rced Concrete I	Defects		Rising damp				
Improper reinforcing steel placement         Mouldiness           Premature removal of forms         Wall finishes workmanship problem           Cold joints         Non structural	Dryin	g shrinkage crac	ks		cts	damj	Leaking	pipes, spills and other moisture	
Improper reinforcing steel placement         Mouldiness           Premature removal of forms         Wall finishes workmanship problem           Cold joints         Non structural	Como	Corrosion-in	duced cracking		defe	Surface	cracks on		
Improper reinforcing steel placement         Mouldiness           Premature removal of forms         Wall finishes workmanship problem           Cold joints         Non structural					ce (	wall	finishes	Map/pattern cracking	
Improper reinforcing steel placement         Mouldiness           Premature removal of forms         Wall finishes workmanship problem           Cold joints         Non structural					ırfa				
Construction defects (faulty         placement         Wall finishes workmanship problem           Construction defects (faulty         Premature removal of forms         Staining	in concrete				Si				
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defects (faulty Cold joints Non structural	Construction			$\left  - \right $	-		Wall tinish		
NON-CITICITIES NON-CITICITIES	defects (faulty				Nor	otmiotime1		Statiling	
Workmanship): Segregation cracks Joint cracks	workmanship):							Joint cracks	
designer, detailer, Honoryomhing			<u> </u>						
Improper grades of slab	and contractor				0.1		c 11.1.1.		
surfaces <u>Other notes (if available):</u>		sur	faces		Othe	er notes (i	<u>1 available):</u>		
Slab/beam-to column shear	Carala in D.C. 1								
Cracks in RC due (punching shear) cracks									
(structural cracks) Cantilevered member cracks		Cantilevered	member cracks						
Settlement cracks	(an actural crucks)	Settlem	ent cracks						

	Profile							
	Profile							
							c Design Faults	
				_		Week colu	mn-strong beam	
						_	Torsional Irregularity	
						y in	(Torsion eccentricity)	
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					figuration	Irregularity in plan	Projections in plan	
	1. National and a state				conf	~	Non-continuous beams	
					uctural c	nentary faults	Non-uniform beam span and cross-section	
District:	Mağusa Tuzla (Enkomi)			Structural configuration	Horizontal structural configuration	Beam elementary design faults	Absence of vertical support at beams intersection	
Area:				nfigu			Broken axis beams and frames	
	No street names were found			al co	H	Slab	Over-stretched one-way slab	L_
Street name:	No street na	mes were found		tura		elementary design faults	Poorly supported or heavily	
Latitude:	35° 9'18.93"N		_	ruc	-	design faults         loaded cantilevered slabs           Pounding and separation problem		
	33°53'23.79"E		-	St		Toulia	Weak storey	
Longitude:		te (if available):				ity	weak storey	
y	vears	2016			Vertical structural configuration	Irregularity in elevation	Soft storey	
	Between 14 an	d 43 years			ertical structur configuration	Irre in e	Discontinuity of columns or shear walls	
	1974-2003) -43 years (Bef	ore 1974)	-		l stı gur	Vertical	Broken axis columns	<u> </u>
	45 years (Ber	Apartment	-		nfi	structural	Bloken axis columns	-
	Residential	House			/ert cc	element	Irregular column and/or shear-	
Building type:	Residential	Dormitory			-	elementary design fault	wall plan configuration	
	Public		_		-	design faun	Short column	
	Commercial					Non-Str	ructural Defects	
U	Jnder Constru	ction		Waterproofing defects, water leakage and seepage				
	Occupied			Defected wooden door				
	Abandoned			Condensation				
Reinforce	ed Concrete I	Defects		Rising damp				
				Rising damp Rain penetration Leaking pipes, spills and other n				
Drying s	hrinkage crac			Surface defects	0		ipes, spills and other moisture sources	
Corrosion of		luced cracking	_	de		cracks on	crazing	<u> </u>
matals ambaddad		duced spalling embedment of		ace	wall finishes Map/pattern cracking			┣─
in concrete		tals (handrails)		urf		Efflorescence		
		nforcing steel	_	S			aint peeling Mouldiness	-
		ement		H			workmanship problem	
Construction		noval of forms		F			Staining	
defects (faulty		joints	Ν	Non-	structural			
workmanship): designer, detailer,	Segre	gation		с	racks		Joint cracks	
and contractor		combing						
		rades of slab	C	Othe	r notes (i	f available):		
		faces		2 410	- 110100 (1	<u> </u>		
Cracks in RC due		column shear shear) cracks						
to load effects								
	Cantilevered member cracks Settlement cracks							
(structural cracks)								

	Case S	tud	y #	123 (C	23)		
	D(9).				a • •		
	Profile					e Design Faults	
	111 101	-		Week column-strong beam Torsional Irregularity			
All the first	the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon				=	(Torsion eccentricity)	
		ç			ty i	Floor discontinuity	
				Horizontal structural configuration	Irregularity in plan	Projections in plan	
				con	7	Non-continuous beams	
				ructural	Beam elementary design faults	Non-uniform beam span and cross-section	
District:	District: İskele		Structural configuration	ıtal str	am elementa design faults	Absence of vertical support at beams intersection	
Area:	Taşlıca (Neta)			orizon	Be	Broken axis beams and frames	
C			al co	H	Slab	Over-stretched one-way slab	
Street name:	No street names were found		uctura	-	elementary design faults	Poorly supported or heavily loaded cantilevered slabs	
Latitude:	N 35°28.151' (35°28'9.1")		Str		Poundi	ng and separation problem	
Longitude:	E 34°12.948' (34°12'56.9")	_			ity on	Weak storey	
	<14 Date (if available): years 2013			ural n	Irregularity in elevation	Soft storey	
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration		Discontinuity of columns or shear walls	
	>43 years (Before 1974)			al s figu	Vertical	Broken axis columns	
	Apartment			econ	structural element	Irregular column and/or	
Building type:	Residential House Dormitory			Ve	elementary design fault	shear-wall plan configuration	
	Public			-		Short column	
	Commercial		Non-Structural Defects				
	Under Construction		Waterproofing defects, water leakage and seepage				
Building status:	Occupied		Defected wooden door				
D	Abandoned	-	Condensation				
Reimo	rced Concrete Defects		Rising damp			Rain penetration	
Dryin	g shrinkage cracks		cts	dampness	Leaking pi	pes, spills and other moisture sources	
	Corrosion-induced cracking		Surface defects	Surfac	e cracks	crazing	
Corrosion of metals embedded	Corrosion-induced spalling		ce c		l finishes	Map/pattern cracking	
in concrete	Cracks due to embedment of		rfa		E	fflorescence	
	dissimilar metals (handrails)		Su			aint peeling	
	Improper reinforcing steel					Mouldiness	
Construction	placement	$\square$			Wall finishes	workmanship problem	
defects (faulty	Premature removal of forms	$\vdash$	N			Staining	
workmanship):	Cold joints Segregation	$\left  - \right $		structural cracks		Joint cracks	
designer, detailer,	Honeycombing						
and contractor	Improper grades of slab		. ·				
	surfaces		Othe	er notes (	if available):		
Cracks in RC due	Slab/beam-to column shear (punching shear) cracks						
to load effects	Cantilevered member cracks						
(structural cracks)	Settlement cracks						

Street name:Lefkoşa-0Latitude:3:Longitude:3:Structure age:<14Between 14(1974-2003)>43 years (14)	Lefkoşa		suration		e Design Faults nn-strong beam Torsional Irregularity (Torsion eccentricity) Floor discontinuity		
District:         Area:       Düzo         Street name:       Lefkoşa-0         Latitude:       3         Longitude:       3         Structure age:       Between 14 (1974-2003)         >43 years (14)	Lefkosa		guration	Week colur	nn-strong beam Torsional Irregularity (Torsion eccentricity) Floor discontinuity		
Area:DüzoStreet name:Lefkoşa-OLatitude:3:Longitude:3Structure age:<14Between 14(1974-2003)>43 years (	Lefkosa		guration		Torsional Irregularity (Torsion eccentricity) Floor discontinuity		
Area:DüzoStreet name:Lefkoşa-OLatitude:3:Longitude:3:Structure age:<14	Lefkosa		guration	rregularity in plan	(Torsion eccentricity) Floor discontinuity		
Area:DüzoStreet name:Lefkoşa-OLatitude:3:Longitude:3Structure age:<14	Lefkosa		guration	rregularity ir plan	Floor discontinuity		
Area:DüzoStreet name:Lefkoşa-OLatitude:3:Longitude:3Structure age:<14	Lefkosa		guration	rregularit. plan			
Area:DüzoStreet name:Lefkoşa-OLatitude:3:Longitude:3:Structure age:<14	Lefkosa		guration	rregula			
Area:DüzoStreet name:Lefkoşa-OLatitude:3:Longitude:3:Structure age:<14	Lefkosa		<u>10</u> ;	Ι	Projections in plan		
Area:DüzoStreet name:Lefkoşa-OLatitude:3:Longitude:3:Structure age:<14	Lefkosa		onf		Non-continuous beams		
Area:DüzoStreet name:Lefkoşa-OLatitude:3:Longitude:3:Structure age:<14	Lefkosa		Horizontal structural configuration	Beam elementary design faults	Non-uniform beam span and cross-section		
Street name:Lefkoşa-(Latitude:3:Longitude:3:Structure age:<14 yearsBetween 14 (1974-2003)>43 years (	LUIKUşa	ration	ntal str	am ele design	Absence of vertical support at beams intersection		
Latitude:3:Longitude:3Structure age:<14	va (Exometochi)	Structural configuration	Iorizoi		Broken axis beams and frames		
Latitude:3:Longitude:3Structure age:<14 yearsBetween 14 (1974-2003)>43 years (	Jazimačusa Anoral		L L	Slab elementary	Over-stretched one-way slab		
Longitude:3<14	Lefkoşa-Gazimağusa Anayolu			design faults	Poorly supported or heavily loaded cantilevered slabs		
Longitude:3Structure age:<14 yearsBetween 14 (1974-2003)>43 years (	35°12'45.80"N			-	ng and separation problem		
Structure age: Structure age:	3°31'25.46"E		2		Weak storey		
Structure age: Between 14 (1974-2003 >43 years (	<14 Date (if available):	al	Irregularity in elevation	Soft storey			
>43 years (	and 43 years		Vertical structural configuration	Irreg in ele	Discontinuity of columns or shear walls		
	Before 1974)	_	al st ïgu	Vertical	Broken axis columns		
Desidenti	Apartment		onf	structural			
Residentia	1 House		Vei c	element elementary	Irregular column and/or shear-		
Building type:	Dormitory			design fault	wall plan configuration		
Public					Short column		
Commercia			Non-Structural Defects				
Under Con	struction		Waterproofing defects, water leakage and seepage				
Building status: Occupied		_	Defected wooden door				
Abandoned Reinforced Concre		-	s	Condensation Rising damp			
Reinforced Collere	le Defects	_	pne	Rain penetration			
Drying shrinkage o	racks	cts	dampness	Leaking pi	pes, spills and other moisture sources		
Corrosion	-induced cracking	Surface defects	Surface	cracks on	crazing		
Corrosion of Corrosion	n-induced spalling	Ce C	wall f	finishes	Map/pattern cracking		
in concrete Cracks du	e to embedment of	rfa			fflorescence		
dissimilar	metals (handrails)	-S			aint peeling		
	reinforcing steel				Mouldiness		
	olacement	_		Wall finishes	workmanship problem		
defects (feulty) Premature	e removal of forms				Staining		
workmanshin):	cold joints	No	on-structural cracks		Joint cracks		
designer, detailer, Ho	egregation neycombing		CIACKS				
	er grades of slab						
	surfaces	Ot	her notes (i	f available):			
Slab/bear							
Cracks in RC due (punchi	n-to column shear						
to load effects Cantileve	n-to column shear ng shear) cracks						
(structural cracks) Sett							
	ng shear) cracks						

	Case Study #65/125 (L15/C25)							
	Profile				Soiomio	Design Faults		
	Trome					nn-strong beam		
ALT-						Torsional Irregularity (Torsion eccentricity)		
					rity n	Floor discontinuity		
				Horizontal structural configuration	Irregularity in plan	Projections in plan		
	And Mindel Marker	Ani			>	Non-continuous beams		
			T	ructural 6	Beam elementary design faults	Non-uniform beam span and cross-section		
District:	Lefkoşa		Structural configuration	ntal st	am ele design	Absence of vertical support at beams intersection		
Area:	Hamitköy		config			Broken axis beams and frames		
Street name:	Güven Sk	ven Sk		Η	Slab elementary design faults	Over-stretched one-way slab Poorly supported or heavily loaded cantilevered slabs		
Latitude:	35°12'46.80"N		Pounding and separation problem					
Longitude:	33°22'27.68"E		Ī		y n	Weak storey		
	<14     Date (if available):       years     gradient for the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second se	ıral 1	Irregularity in elevation	Soft storey				
Structure age:	Between 14 and 43 years (1974-2003)			Vertical structural configuration		Discontinuity of columns or shear walls		
	>43 years (Before 1974)			al s figu	Vertical	Broken axis columns		
Building type:	Apartment       Residential     House       Dormitory			Vertic	structural element elementary design fault	Irregular column and/or shear-wall plan configuration		
8 91	Public Commercial					Short column uctural Defects		
-	Under Construction		Waterproofing defects, water leakage and seepage					
Building status:	Occupied				Defected	wooden door		
	Abandoned					Condensation		
Reinfo	rced Concrete Defects			ampness		Rising damp		
Dryin	g shrinkage cracks		Surface defects	damp	Rain penetration Leaking pipes, spills and other moisture sources			
Corrosion of	Corrosion-induced cracking		def		ce cracks	crazing		
metals embedded	Corrosion-induced spalling		ace	on wal	ll finishes	Map/pattern cracking		
in concrete	Cracks due to embedment of dissimilar metals (handrails)		urf			florescence aint peeling		
	Improper reinforcing steel					Annt peening		
	placement					workmanship problem		
Construction defects (faulty	Premature removal of forms					Staining		
workmanship):	Cold joints	1		structural		Joint cracks		
designer, detailer,	Segregation Honeycombing		С	cracks				
and contractor	Improper grades of slab surfaces	(	Othe	er notes (	if available):			
Cracks in RC due	Slab/beam-to column shear (punching shear) cracks				-	hed except for the ground floor		
to load effects	Cantilevered member cracks					and occupied. Thus it is		
(structural cracks)	Settlement cracks		considered a shared case study between Lefcosa o			· · · · · · · · · · · · · · · · · · ·		
				•	on and the	under construction case study		
		S	sect	ion.				

# 5.5 Findings and Discussion

## 5.5.1 Sample 1: Completed Buildings

## 5.5.1.1 Building Ages of the Case Study Sample

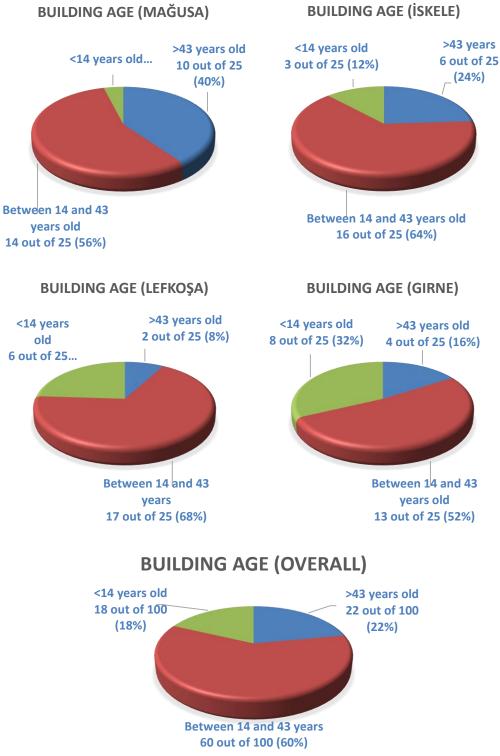


Figure 5.1: Pie Chart Showing the Statistics for Ages of the Case Studies

While roaming around North Cyprus looking for case studies, it was found that the easiest buildings to find are of those aged between 14 and 43 years old. Thus this age range composed the majority of the case studies in all the four cities (60% overall).

It is difficult to find intensely defected buildings that are younger than 14 years old, thus they composed the minority of the case studies with an overall percentage of 18%. However, in the cities of Lefkoşa and Girne this age group was not the minority with percentages of 24% and 32% respectively. This could be because these 2 cities are larger in urban than Mağusa and İskele which results for a higher demand for developments and thus more chance to find defected new buildings (see Table 1.1).

On the other hand, old buildings (buildings before 1974) are quite easy to find in North Cyprus. They are mostly abandoned and excessively defected. They composed 22% of the overall sample. Worthy to mention, the district of Mağusa included the highest percentage of old building at 40% followed by İskele at 24%. This is not a surprise since Mağusa contains the famous ghost city named Maraş/Varosha. The area around this ghost city and the areas near the border between the Turkish Republic of North Cyprus and the Republic of Cyprus contain abundant of old buildings.

## 5.5.1.2 Building Type

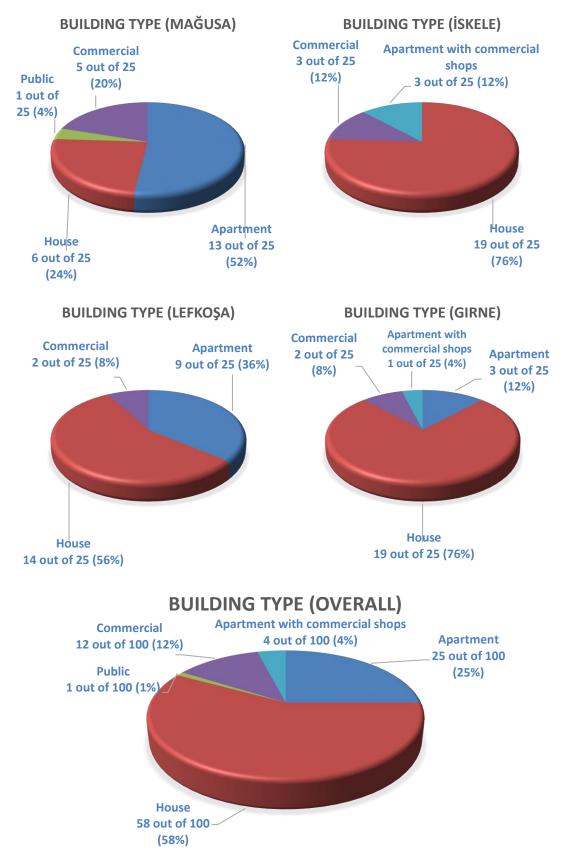


Figure 5.2: Pie Chart Showing the Statistics for Building Types of the Case Studies

Residential Building types composed the majority of the case studies (87%). They varied between houses (58%), apartments (25%) and apartments with commercial shops on the ground floor (4%). The house type represented the majority of the residential buildings in all the cities except for Mağusa where apartment case studies were more than house ones (52% apartment type residential buildings in Mağusa). Apartments with commercial shops composed 4% and existed only in the cities of İskele and Girne with a percentage of 12% (3 cases) and 4% (1 case) respectively.

On the other hand, commercial type buildings composed only 12% of the sample and varied between 8% in both Lefkoşa and Girne (2 cases each), 12% (3 cases) in İskele and 20% (5 cases) in Mağusa. There was only a single case of public building type in the city on Mağusa.

### 5.5.1.3 Building Status

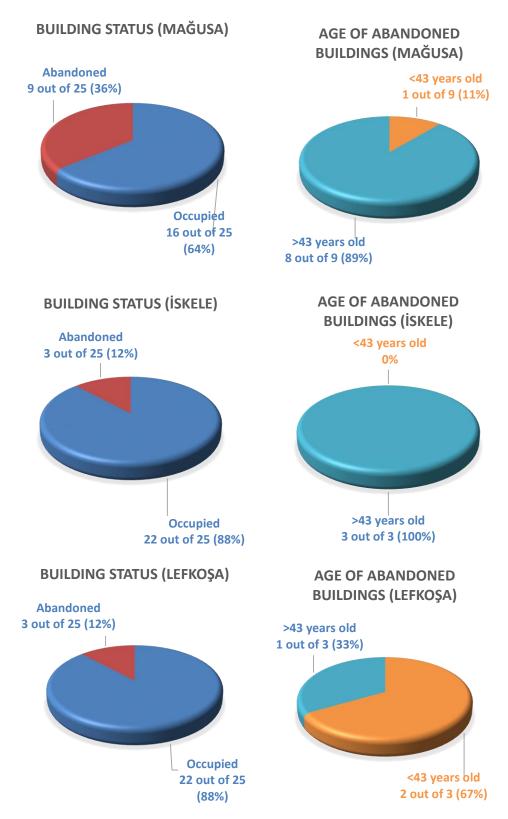


Figure 5.3: Pie Chart Showing the Statistics for Status of the Case Studies (Whether Occupied or Abandoned) and the Ages of Abandoned Buildings for Mağusa, İskele and Lefkoşa Districts

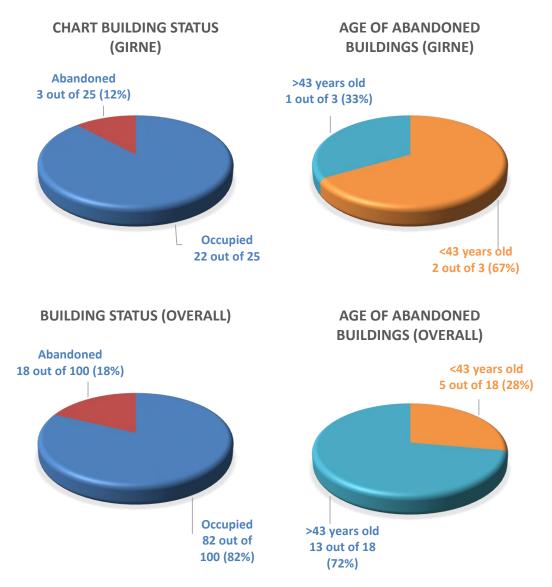


Figure 5.4: Pie Chart Showing the Statistics for Status of the Case Studies (Whether Occupied or Abandoned) and the Ages of Abandoned Buildings for Girne District and Overall

For relevance issues, abandoned building were kept minimum (18% of the case studies were abandoned buildings). There are 3 abandoned buildings for each district (12% per district) except for the district of Mağusa which has 9 (36% of Gazimagiusa case studies). No surprise, most of these abandoned building are older than 43 years (72% of the abandoned building are older than 43 years old) as abandoned buildings younger than 43 years old made 28% of the total abandoned buildings.

#### 5.5.1.4 Defects

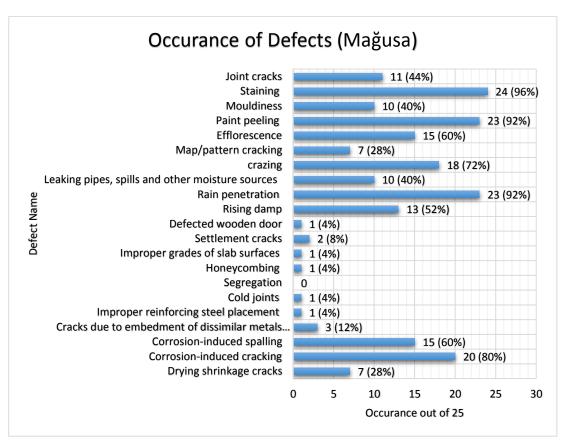


Figure 5.6: Bar Chart Showing the Occurrence of Defects in Mağusa District (M1-M25)

Mağusa had the highest percentage of crazing (72%). Besides, it had the highest corrosion-induced cracking and spalling with percentages of 80% and 60% respectively. This is reasonable since Mağusa's sample contained the most numbers of old buildings. Moreover it had the highest percentage of dampness due to leaking pipes, spills and other moisture sources (40%). This is reasonable since Mağusa's sample contained the highest number of apartments. On the other hand it had the lowest settlement cracks and rising damps (8% and 52% respectively).

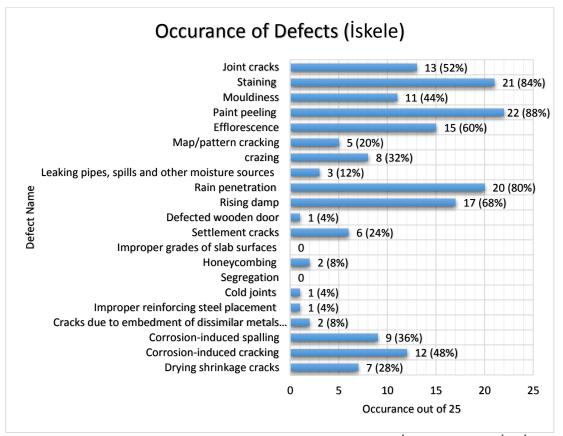


Figure 5.7: Bar Chart Showing the Occurrence of Defects in İskele District (İ1- İ25)

İskele had the highest percentage of settlement cracks (24%), but the lowest crazing and map/pattern cracking (32% and 20% respectively). Additionally, it had the lowest percentage of dampness due to leaking pipes, spills and other moisture sources (12%). This is reasonable since İskele's sample contained the least number of apartments.

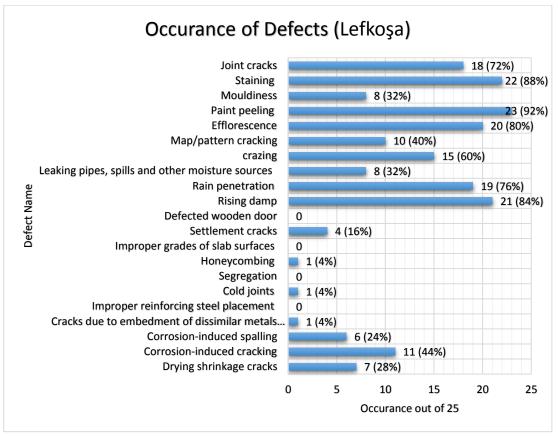


Figure 5.8: Bar Chart Showing the Occurrence of Defects in Lefkoşa District (L1-L25)

Lefkoşa had the least rain penetrations dampness (76%), besides the least corrosioninduced cracking with a percentage of 44%. This is reasonable since Lefkoşa is not a coastal city. However, it had the highest rising damp with a percentage of 84% and as a result the highest percentage of efflorescence with a percentage of 80%.

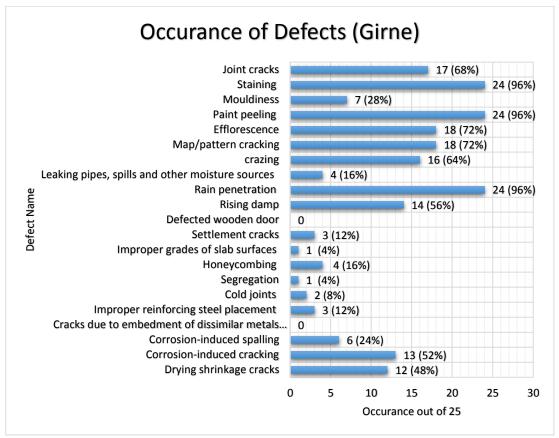


Figure 5.9: Bar Chart Showing the Occurrence of Defects in Girne District (G1-G25)

Girne had the highest drying shrinkage cracks with a percentage of 48% compared to 28% each for the other cities. Additionally, it had the highest rain penetration dampness with a percentage of 96%.

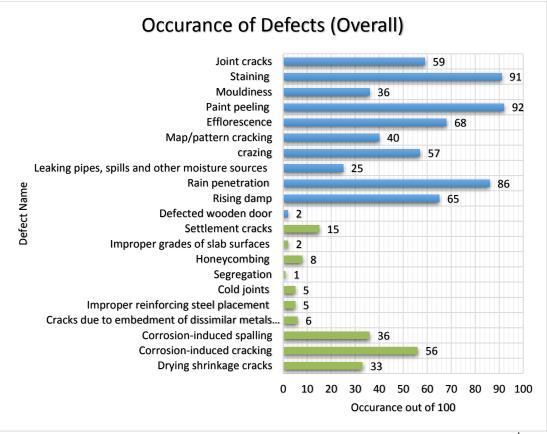


Figure 5.10: Bar Chart Showing the Overall Occurrence of Defects (M1-M25, İ1-İ25, L1-L25 and G1-G25)

Joint cracks and crazing were fairly evident in the building of the sample having percentages of 59 % and 57% respectively. On the other hand, map/pattern cracking was found to be less than crazing by having a percentage of 40% (compared to 57% for crazing).

The surface defects of staining and paint peeling were the most common defects found having percentages of 91% and 92% respectively. While segregation was the least common having a percentage of 1% each. The reason for this could be because segregation would be hard to detect in this sample since the buildings here are mostly completed so any form of segregation would be covered under finishes. However, they are much easier to detect in the buildings under construction sample (see section 5.5.2).

33% of the buildings had drying shrinkage cracks. 6% of the buildings were found to have cracks due to embedment of dissimilar metals which can be found around metal handrails. Corrosion-induced cracking were found to be in 56% of the building, while corrosion-induced spalling which can be consider as a severe of the former one were found to be at 36%. Mouldiness also shares the same percentage of corrosioninduced spalling (36%).

Efflorescence and one of its causes; rising damp, were found to be at 68% and 65% respectively. Dampness due to rain penetration was the most common type of dampness with a percentage of 86%. Dampness due to leaking pipes, spills and other moisture sources was found in quarter of the sample (25%). The structural cracks of settlement cracks were found in 15% of the building of the sample.

Honeycombing (8%), cold joints and improper reinforcing steel placement (5% each) are all construction defects. Therefore their detectibly if exited is difficult in such a sample of completed buildings as they would have been hidden under finishes. Finally, defected wooden doors and improper grades of slab surfaces were found in 2% only each of the buildings. The reason for this could be because in order to detect improper grades of slab surfaces, it must be raining during the day of inspection for water bonds to form.

#### **5.5.1.4.1** Corrosion Statistics

First of all, it is noticeable that Lefkoşa had the least corrosion problems among the four district. This is understandable since it is the only non-costal (inland) districts in North Cyprus.

56% of the buildings in the sample had corrosion-induced cracks. However, what about the relation between the age of the building and corrosion? The following table can give us an idea of the chance of corrosion in relation to age.

	Age	Groups of Case Stu	dies
	>43 years old	Between 14 and 43 years old	<14 years old
Number of corroded buildings	19	33	4
Percentage of corroded	19 corroded out	33 corroded out	4 corroded out
building per age group	of 22 (86.36%)	of 60 (55.00%)	of 18 (22.22%)

Table 5.1: Relationship Between Corrosion and Age of Case Study

It can be concluded from the table above that the older the building, the more it is prone to corrosion problems. One of the reasons for this could be because of the improvement of construction practice quality, such as the stop of usage of sea water, aggregate and sand as well as the improvement concrete quality used in construction in North Cyprus overtime. The factor of time should not be forgotten also, as corrosion develops and becomes more sever overtime.

# 5.5.2 Sample 2: Buildings Under Construction

	Under Constr	ruction Case Studies (C1-C25)	)
	Defect or Design Fault *	Number of Case Studies Involved (Out of 25 Total)	Percentage of Occurrence %
	Week column-strong beam	1	4.00%
	Torsional Irregularity	3	12.00%
	(Torsion eccentricity)	5	12.0070
	Floor discontinuity	1	4.00%
	Non-continuous beams	12	48.00%
	Non-uniform beam span and cross-section	5	20.00%
lts	Absence of vertical support at	1	4.00%
Seismic Design Faults	Broken axis beams and frames	17	68.00%
sig	Over-stretched one-way slab	1	4.00%
iic De	Poorly supported or heavily loaded cantilevered slabs	2	8.00%
Seism	Inter-storey strength irregularity (Weak storey)	2	8.00%
	Inter-storey stiffness irregularity (Soft storey)	3	12.00%
	Discontinuity of columns or shear walls	1	4.00%
	Broken axis columns	2	8.00%
	Irregular column plan configuration	9	36.00%
	Short column	7	28.00%
ts	Drying shrinkage cracks	2	8.00%
<b>Concrete Defects</b>	Improper reinforcing steel placement	7	28.00%
ete	Cold joints	19	76.00%
ncr	Segregation	3	12.00%
C01	Honeycombing	19	76.00%
*		crete defects are hard to deter	

 Table 5.2: Statistics for the Under Construction Case Study Group (C1-C25)

* Not all are listed. Some concrete defects are hard to detect at the time of inspection. Additionally, some seismic design faults are hard to detect without the provision of plans and dimensions.

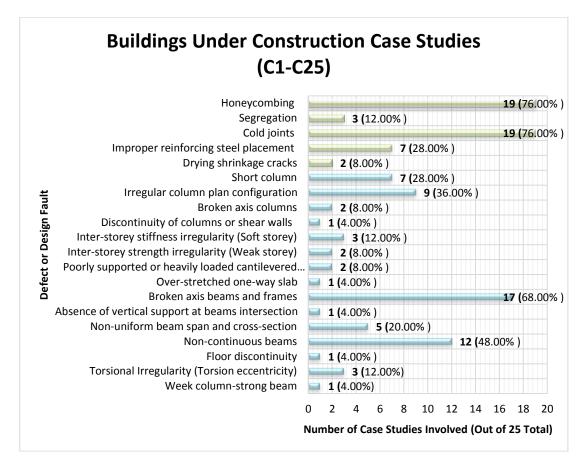


Figure 5.11: Bar Chart Showing the Statistics for the Under Construction Case Study Group (C1-C25)

The concrete defects of honeycombing and cold joint were found to be the most common defects among the under construction sample with a percentage of 76% each (nearly three quarters of the sample). The second common concrete defect was found to be the improper placement of reinforcing steel at 28% followed by segregation (12%) and drying shrinkage cracks (8%).

On the other hand, the most common design flaws were found to be related to beams; namely: broken axis beams at 68% followed by non-continuous beams at 48%. The third and fourth most common design flaws were related to columns; namely: irregular column plan configuration (36%) and short column (28%) respectively. Non-uniform beam span and cross-sections was found in 20% of the sample.

Torsional irregularity and soft storey were found in 12% each, while broken axis columns, weak storey and poorly supported or heavily loaded cantilevered slabs were found in 8% each. The least common design flaws were: floor discontinuity, discontinuity of columns or shear walls, over-stretched one-way slab and week column-strong beam which each of them were found in only 4% of the sample.

All of the building in this sample are younger than 14 years old except for two which are between 14 and 43 years old in which the sole case of week column-strong beam design fault was found in one of them.

# Chapter 6

# **CONCLUSION AND RECOMMENDATION**

### 6.1 Conclusion

There are numerous problems in the process of constructing a safe and sustainable building in North Cyprus, such as, lack of site control or supervision, inexperienced, and unqualified workers employed in the construction industry, lack of soil investigation and lack of experienced and aware engineers and site control. These problems can be solved and avoided by considering the recommendations.

Training programs for workers can be very useful in assisting the quality control of construction. Water isolation problem can be solved by choosing the correct materials for isolation and construction. Seminars and conferences can help engineers, architects and other professionals in construction industry to be updated with design requirements, construction methods and applications. Having the necessary knowledge and awareness the people in the industry will be better qualified for designing and construction works which will be built to the required quality avoiding unnecessary construction problems.

Some owners tend to cut on the costs of construction control. The lack of construction control is one of the main reasons for the defects. Other reasons are: poor workmanship due to rapid construction and lack of qualified workers, inadequate material quality, environmental effects and lack of periodic maintenance.

On the other hand, as North Cyprus has poor building maintenance culture and concept, more awareness should be developed on the importance of good and systematic building maintenance. Maintenance of building is a complicated process and costly but if it is carried out wisely it could save money besides potential extended life span of the building. The maintenance process must involve two types of maintenance i.e. preventive maintenance and corrective maintenance, but it should always be minded that prevention is always better than cure. Architects, engineers, planners etc. should study the potential maintenance and operational problem before working out the design.

Owners should be aware of the importance of construction control as cutting the cost of construction control will later increase the repair and maintenance expenses. North Cyprus need major updates in quality control at all processes of construction. New rules and regulations restricting construction control should be added. Also, the variety of structural systems need to be increased to help in solving some of the problems by reducing the inadequate applications in construction industry by adding alternative systems, such as, pre-fabricated RC, pre-stressed RC and steel framed structures. However, qualified people and imported materials are required to design and construct such systems. Besides, it is very difficult to change the well settles long going construction culture in the country.

The following are the recommendations to overcome construction problems and inadequacies:

- Wrong detailing should be minimized or preferably avoided in projects.
- Inexperienced labourers should be trained according to their skills.

- Soil investigation should be carried out and the foundation design is bases on the results of soil investigation. Construction work should not start on site without any soil investigation.
- Design codes and good practice guide for construction should be informed.
- People involved in all levels of construction should have enough knowledge and experience about their work area and they should continuously develop themselves through the regularly hold seminars and training sessions.
- There should be stricter rules for better control of the design and construction process.

In addition, seismic design faults can lead to defects that can be brought out only after the event of an earthquake. Therefore, designers should be aware of them. The design of the structural system is a critical stage as it is decisive in the behaviour of the building during an earthquake. This thesis can act as a reference, especially for students, about building defects, seismic behaviour of RC buildings and common seismic design faults.

Nevertheless, there are noticeable improvements over time relating to building defects in North Cyprus. For example after using readily mixed concrete instead of on site mixed concrete, it can be said that the concrete quality improved. Also less intensity of corrosion cracks occurred in building after abandoning the usage of water, sand and aggregate from the sea in mixing concrete. Similarly, less seismic design faults are noticed in new buildings compares to old ones. For example, the weak column-strong beam design fault found only in a relatively older building.

# **6.2 Recommendations for Future Studies**

This thesis was carried out by a solo researcher. It would be recommended for future studies to carry out similar researches carried by a team and covering larger number of case studies and including regions that have not been included in this thesis, such as the district of Güzelyurt and Lefke. It is also recommended for future research to be cooperated with some governmental authority to allow for the possibility of attaining detailed drawings and floor plans of case studies for more detailed data, identification and analysis of seismic design faults and other defects.

# REFERENCES

ACI 201.2R-01, Guide to Durable Concrete.

ACI 224R-01, Control of Cracking in Concrete Structures.

- Alsulaimani, G. J., Kaleemullah, M., Basunbul, I. A., & Rasheeduzzafar. (1990). Influence of Corrosion and Cracking on Bond Behavior and Strength of Reinforced-Concrete Members. ACI Structural Journal, 87(2), pp 220.
- American Institute of Civil Engineers (2006). Minimum Design Forces for Buildings and Other Structures (ASCE/SEI 7-05).
- Arnold, C. (1984). Building configuration: the architecture of seismic design.
  Bulletin of the New Zealand National Society for Earthquake Engineering, 17: 2, 83–88.
- Celikag, M., & Naimi, S. (2011). Building Construction in North Cyprus: Problems and Alternatives Solutions. Proceedings of the Twelfth East Asia-Pacific Conference on Structural Engineering and Construction (Easec12), 14, 7. doi:10.1016/j.proeng.2011.07.286.
- Celikag, M., & Ozbilen, M. (2007). Inadequate Applications of Construction Industry in North Cyprus and Recommendations. In 11th International Conference on Inspection Appraisal, Repair and Maintenance of Structures (Vol. 14-17), Kyrenia, North Cyprus, PP.109-115.

- Charleson, A. (2008). Seismic Design for Architects (First ed.). Oxford, UK: Elsevier Ltd.
- Chin-man, L. (2002). Building Maintenance Guidebook. Hong Kong.
- Curtis, C. (2013). What is Punching Shear? Retrieved from: http://evstudio.com/what-is-punching-shear/
- Douglas J. & Ramson B. (2006). Understanding building failures. 3rd. Taylor and Francis, London: 222-232.
- Emmons, P. H. (1993). Concrete Repair and Maintenance Illistrated (N. Smit Ed.). Kingaton, Massachusetts, United States of America: R.S.Means Company.
- European Committee for Standardization (2004). Eurocode 8: Design of Structures for Earthquake Resistance – Part 1: General Rules, Seismic Actions and Rules for Buildings (BS EN 1998–1:2004).
- Kitagawa, Y. & Takino, F. (1994). Chapter 24 Japan. In International handbook of earthquake engineering: Codes, programs, and examples. (Paz, M. Ed.). US: Chapman & Hall.
- Naimi, s., & Celikag, m. (2010). Problems of Reinforce Concrete Building Construction in North Cyprus. Proceedings of the 12th international conference on inspection appraisal repairs and maintenance of structures, vols 1 and 2, 821-828.

- Ozay, G., & Ozay, N. (2005). The Most Common Defects on Housing Surfaces in Northern Cyprus. World Congress on Housing. Transforming Housing Environments through Design. Pretoria, South Africa.
- Ozmen, C., & Unay, A. I. (2007). Commonly encountered seismic design faults due to the architectural design of residential buildings in Turkey. Building and Environment, 42(3), 1406-1416. doi:10.1016/j.buildenv.2005.09.029
- Sacramento, P. V. P., Ferreira, M. P., Oliveira, D. R. C., and Melo, G. S. S. A.. (2012). Punching strength of reinforced concrete flat slabs without shear reinforcement. Revista IBRACON de Estruturas e Materiais, 5(5), 659-691. <u>https://dx.doi.org/10.1590/S1983-4195201200050000</u>
- Sassu, M., & De Falco, A. (2014). Legal Disputes and Building Defects: Data from Tuscany. Journal of Performance of Constructed Facilities, 28(4), 8. doi:10.1061/(asce)cf.1943-5509.0000520
- Specifications for Buildings to Be Built in Seismic Zones. (Ministry of Public Works and Settlement, 1997, 2007). Ankara, Turkey.
- Suffian, A. (2013). Some Common Maintenance Problems and Building Defects: Our Experiences. 2nd International Conference on Rehabilitation and Maintenance in Civil Engineering (Icrmce), 54, 101-108. doi:10.1016/j.proeng.2013.03.009.

- Trotman, P., Sanders, C., & Harrison, H. (2004). Understanding Dampness: Effects, Causes, Diagnosis and Remedies (illustrated ed.). UK: BRE Bookshop.
- TS 500 Turkish Standards "Requirements for Design and Construction of Reinforced Concrete structures" February 2000. Ankara, Turkey.

United States Geological Survey (USGS). https://earthquake.usgs.gov/

- Özmen, C. (2008). A Comparative Structural And Architectural Analysis Of Earthquake Resistant Design Principles Applied In Reinforced Concrete Residential Buildings In Turkey. (PHD Thesis), Middle East Technical University, Ankara, Turkey.
- Özbilen, M., (2004). Inadequate applications of construction industry in North Cyprus and Recommendations. Famagusta, MS. Thesis, Turkish Republic of Northern Cyprus: Eastern Mediterranean University.

APPENDIX

	Case Study # ?							
	Profile						Design Faults	
						Week colur	nn-strong beam	
			1			Ξ.	Torsional Irregularity	
						ity	(Torsion eccentricity)	
					Ę	ulari plan	Floor discontinuity	
	ERT PROFI CTURE HEI				Horizontal structural configuration	Irregularity in plan	Projections in plan	
						~	Non-continuous beams	
					ural cc	nentary aults	Non-uniform beam span and cross-section	
District:			٦	ion	l struct	Beam elementary design faults	Absence of vertical support at beams intersection	
Area:				Structural configuration	zontal	Bear de	Broken axis beams and frames	
				onf	lori	Slab	Over-stretched one-way slab	
Street name:				al c	Н	elementary	Poorly supported or heavily	
				tura		design faults	loaded cantilevered slabs	
Latitude:				ruc		Poundir	ng and separation problem	
Longitude:				St		on	Weak storey	
	years	te (if available):			ıral n	Irregularity in elevation	Soft storey	
Structure age:	Between 14 an (1974-2003)	-			Vertical structural configuration		Discontinuity of columns or shear walls	
	>43 years (Bef				cal ; ifig	Vertical structural	Broken axis columns	
Building type:		Apartment			ertic cor	element	Irregular column and/or	
	Residential	House			Ve	elementary	shear-wall plan configuration	
	DIF	Dormitory				design fault		
	Public Commercial					Non Str	Short column	
	Under Constru	ction		<b>Non-Structural Defects</b> Waterproofing defects, water leakage and seepag				
Building status:	Occupied	etion			Defected wooden door			
Dunung statust	Abandoned					Deneeuu	Condensation	
Reinfo	rced Concrete I	Defects			ess		Rising damp	
				s dampness		Rain penetration		
Dryin	g shrinkage cracl	<b>κ</b> s		Surface defects	dan	Leaking pipes, spills and other moisture sources		
Corrosion of		luced cracking		def		ce cracks	crazing	
metals embedded		luced spalling		ace	on wal	l finishes	Map/pattern cracking	
in concrete		embedment of		urfs			florescence	
		als (handrails)		Š			aint peeling	
		nforcing steel					Nouldiness	
Construction		ement noval of forms				wall finishes	workmanship problem	
defects (faulty		joints		Nor	structural		Staining	
workmanship):		gation			-structural cracks		Joint cracks	
designer, detailer,								
and contractor	Honeycombing Improper grades of slab							
		aces		Othe	er notes (	<u>if available):</u>		
	Slab/beam-to	column shear						
Cracks in RC due	(punching s	hear) cracks						
to load effects	Cantilevered 1	nember cracks						
(structural cracks)		nt cracks						

# Appendix A: Case Study Checklist Sample