

Safety Issues Involving Workers on Building Construction Sites in Nigeria: An Abuja Study

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ABSTRACT

The term Building Worker refers to any personnel engaged in the physical construction of a building. Just like every other occupation they are faced with challenges in performing their duties. The safety of building construction workers on sites is key to achieving success in any project, when these workers are physically healthy work can go on smoothly as virtually all works on site are dependent on the workers for implementation. Numerous building projects are situated in Abuja, Nigeria with little or no attention being paid to safety issues. This research looked into the level of safety implementation of the Construction companies and the level of safety awareness of the workers in Abuja city. 80 questionnaires were issued, 69 (85%) copies were retrieved.

The findings revealed that building site workers in Nigeria lacked the requisite trainings needed to perform their trades. The Construction company's practice of not providing the basic safety materials and facilities was also exposed. The older workers were aware of their rights as employees on site. Lack of safety training was the major cause of accidents among the workers with minor injuries being mostly experienced. The Unqualified laborers were most frequently engaged in accidents on the sites. Accidents mainly occurred among workers less than 20 years of age. The Governmental agencies need to step up their enforcement activities in order to adequately protect these workers, the available safety regulations need updating and if possible solely Nigerian regulations should be designed.

Keywords: Safety, Building Construction Workers, Nigerian Construction Industry.

ÖZ

İnşaat İşçisi bir binanın yapımında çalışan herhangi bir personel olarak adlandırılır. Diğer mesleklerde olduğu gibi işçiler görevlerini yerine getirirken birtakım zorluklarla karşılaşır. İnşaat işçilerinin güvenliği herhangi bir projenin başarısında anahtar rol oynamaktadır. İşçiler fiziksel olarak sağlıklı olduklarında, şantiyedeki işler sorunsuz olarak devam edebilir çünkü hemen hemen bütün işler işçilere bağlıdır. Abuja-Nijerya’da yapılmakta olan birçok bina projesinde güvenlik konularına çok az veya hiç dikkat edilmemektedir. Bu araştırma, Abuja kentinde işverenlerin güvenlik uygulamaları düzeyi ve işçilerin İş Güvenliği farkındalık düzeyini araştırmaktadır. Araştırma kapsamında 80 anket dağıtılmıştır, 69’u geri toplanmıştır.

Bulgular Nijerya’daki inşaat işçilerinin mesleklerini uygulamaları için gerekli eğitimlerden yoksun olduklarını göstermektedir. İşverenlerin, işyerinde temel güvenlik malzemeleri ve olanaklarını sağlamadıkları ortaya çıkmıştır. Yaşlı işçiler çalışanlar olarak haklarının daha çok farkındadırlar. İş Güvenliği konusundaki eğitim yetersizliği işçiler arasındaki küçük yaralanmaların başlıca nedeni olmuştur. İşçiler sık olarak şantiyede kazalara maruz kalmaktadırlar. Kazalar daha çok 20 yaş altı işçilerde görülmektedir. Devlet kurumlarının işçileri yeterince korumak için kendi uygulama faaliyetlerini hızlandırmaları, mevcut İş Güvenliği yönetmeliklerinin güncellenmesi ve mümkünse ilgili Nijerya Tüzüklerinin tasarlanması gerekiyor.

Anahtar Kelimeler: İş Güvenliği, İnşaat işçileri, Nijerya inşaat sektörü.

This thesis work is dedicated to God Almighty, to my parents Mr. Isaac N. Kolo,
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Chapter 1

INTRODUCTION

1.1 Background

The safety of building construction workers on building sites is paramount to achieving success in any project. Importance of safety in any kind of construction activity is unparalleled, as stated by Okoye chuks et al (2013). Only when these workers are in a sound state of mind and are physically healthy that work can go on smoothly as virtually all works on site are dependent on the workers for implementation. Occurrence of accidents or injury to workers tends to demoralize the workers and in some cases leads to suspension of construction activities.

Gray (1990), defined safety as the condition of being free from harm it is key to achieving success in construction. The building construction sector is a very hazardous one, as other construction sectors experiencing very frequent accident cases. This sector is very vital to all other industries as it provides the environment for their operation (Jimoh, 2012). Shelter is one of mans basic necessity in life, the quest for the provision of adequate housing has led to an increase in the activities of the building construction industry in Nigeria. Little or no attention is paid to the safety of the workers who see to the realization of these buildings, they are mostly illiterate and are ignorant of their rights and privileges.

Construction safety is an issue which affects the global construction industry, concerns usually arise whenever major construction activities are to take place (Hinze, 2007). The reality on ground is that accidents and injuries continually occur on construction sites, some even leading to loss of lives. Most employers fail to provide a safe and conducive working environment while in some cases the workers use the facilities inappropriately, these practices have implications to the workers themselves, the construction company and even the society at large (Ikechukwu et al., 2012). There has been much improvement in safety issues as regard to the construction industry, it should however be noted that there is room for more improvement especially in developing nations, Nigeria inclusive.

The problems experienced are not restricted to a particular country as they cut across virtually all countries construction sectors. These problems tend to be more persistent in the poor developing nations than in the more developed richer nations. The construction industry in developing nations have performed far below expectation in the area of safety, Nigeria's situation is worse as even the national building code approved by the national executive council in the year 2006 is not being enforced effectively till date. Safety during construction is usually not given priority in most developing nations like Nigeria as it is regarded to be a burden (Godwin, 2011). Safety records in these developing counties are usually poor (Huang, 2006). Okeola (2009) stated that there are no reliable data on construction accidents in Nigeria, this is because most contractors fail to report cases of accidents to the ministerial departments in charge of such occurrences, they don't keep proper records themselves. According to him, the Punch newspaper of July 2005 reported a case of the collapse of a four (4) storey building in Port Harcourt city, this incident led to the death of about 20 site workers. Such occurrences point to the fact that Nigerian

building construction workers are constantly being made to work under unsafe conditions which pose danger to their lives. Deaths and permanent disabilities have occurred as a result of these poor standards. This shows the government needs to enforce the available regulations to check these accidents. Idoro (2011) was of the opinion that accident and injury rates in Nigeria as at the year 2006 were 2 accidents per 100 workers and 5 injuries per 100 workers, these rates were really not different between the indigenous companies and multinational companies.

A number of challenges limit the performance of the construction industry in Nigeria, they include: lack of skilled labour, shortage of materials, power cuts etc (Dantata, 2008). Despite the introduction of mechanization in construction process, and advancement in technology the reality on most sites is that about 50% of manual labour is still utilized in these processes (Okeola, 2009). This high rate of manual labour implementation perhaps plays a significant role in the high accident rates recorded among workers in the construction industry.

1.2 Statement of Problem

Accidents occur frequently on building construction sites in Nigeria with little or no documentation. While some of these accidents are caused by the workers themselves (due to illiteracy, lack of commitment to work etc) some are caused as a result of the poor or none safety measures employed by the construction companies/site staff on site. Ede (2010) in a research about the casualty trends in the cities of Lagos, Abuja and Port Harcourt reported the nature of casualties experienced in the building construction sector within the period of 2000-2010. His research revealed Lagos had the highest casualty rates followed by Abuja and lastly Port Harcourt city. This

research seeks to point out safety issues faced by workers on building sites and thereafter develop effective strategies aimed at addressing them.

1.3 Scope and Objectives

This study will deal with the safety of Nigerian building construction site workers, with the purpose of establishing critical issues affecting their welfare on site, identifying shortcomings on the building sites and making recommendations towards addressing the shortcomings. This work aims at:

- Identifying the importance of safety in building construction sites.
- Controlling hazardous working conditions and unsafe worker activities.
- Evaluating construction contractor's safety implementation programs.

The objectives are:

- Develop a theoretical framework which confronts safety issues experienced by a typical Nigerian building site worker.
- Review literature on safety issues of workers on building sites so as to get a clear picture of safety related issues experienced.
- Make appropriate recommendations which will help protect the rights and privileges of workers on Nigerian building sites.

1.4 Why Abuja

Abuja is the capital city of Nigeria, located in the centre of the country. It replaced Lagos as the capital officially on the 12th of December 1991, though Lagos is still the most populous city. Abuja and Lagos account for a large percentage of most building construction works in Nigeria when compared to other cities. The choice of Abuja for this study is because of the obvious reason of it being the nation's capital. Being a relatively new city, it is still expanding and thus adequate construction sites exist. Nigerian newspapers have reported a number of stories regarding accidents and

casualties in Abuja building sites, this gives an embarrassing and unsafe picture of the building sector in Abuja. In April, 2014 Premium times reported a case of a 5-storey building collapse in Maitama injuring four people, three of the injured were labourers. Bukola (2010) reported that 13 people died in a building in Ikole street Abuja, the building was earlier marked for demolition by the Federal capital development Authority (FCDA) because the owner had increased the number of floors from a 3-storey building to 4-storey building. They put a stop work order on the building on the 12th of December 2009 but the building collapsed before they could eventually demolish it, this critically highlights non compliance with building rules and regulations by most property developers in Abuja.

Most problems encountered on sites in Abuja can be fairly generalized to the whole country due to the synonymous nature of the construction industry in Nigeria. Therefore this will not in any way minimize the importance of the findings. A large number of multinational construction companies are also resident in Abuja.

1.5 Outline of Methodology

Background information on workers was gathered, from the information's key problems confronting building construction sites were highlighted. With these information's a questionnaire was developed to collect data from the sites, the data were analyzed using Statistical Package for Social Sciences 21 (SPSS 21).

The targeted respondents to the questionnaires were Contractors, Site engineers, Project managers with active sites and the site workers. A total of Eighty (80) questionnaires were issued, fifty (50) for the workers and thirty (30) for the company

staff. The questionnaires were distributed and retrieved in person from the construction sites visited.

1.6 Achievements of the Study

This research revealed that virtually all building construction firms in Nigeria are privately owned and are small scale companies employing within the range of 10-100 workers. The hypothesis test revealed that Nigerian building construction workers lack safety consciousness in their practice, it further revealed that the workers do not get adequate training before they start work. The compromise on the part of the building construction companies in providing the basic safety materials and facilities was also exposed.

1.7 Outline of This Study

This work is grouped into six (6) chapters, the first being the introductory part. Chapter 2 presents a detailed literature review about safety in the construction industry in general. Chapter 3 covers the Nigerian construction sector in particular. It also looks at a brief history of how building practice started in Nigeria and some causes of accidents in Nigerian construction sites, the available regulations and legislations in Nigeria are discussed here. Chapter 4 presents the methodology used in this research, structured questionnaires as well as site visits and inspections were the main sources of obtaining the information used for the study. Chapter 5 shows a breakdown of data obtained from the issued questionnaires. The analysis of the results obtained is also given in this chapter. Chapter 6 contains some suggestions and views on how safety in Nigerian building construction industry can be enhanced.

Chapter 2

CONSTRUCTION SAFETY

2.1 Introduction

This chapter presents a literature review of the nature of construction industries in various countries round the world, the role played by key actors in the building construction sector is also discussed. A brief as to how safety regulations in the construction industry came to be is enumerated here.

2.2 Construction Safety

Accidents frequently occur on building construction sites. These accidents could be in the form of Workers falling from heights, exaction accidents, the risk of falling debris or equipments etc. Researchers have shown that accidents and injuries in developing countries are generally high when compared to other European countries (Idoro, 2007). Some of these accidents could be attributed to the fact that work takes place in unsuitable site conditions. It is worthy of mentioning that safety is not giving consideration during construction project delivery process in most developing nations, it is deemed to be an unnecessary aspect of the process. (Mbuya and Lema, 1996). Ibrahim et al (2014) stated that the building construction industry is made up of several personnel with different trades, these personnel are assembled on the sites at various stages of the construction process. This single factor adds more complexity to construction process, control of activities and personnel is usually not easy as they come from different backgrounds with unique characteristics special to them.

Hinze (2005), was of the opinion that in order to improve safety performance on construction sites, the construction firms must be structured and positioned to make changes when it is needed. He also stated that for the companies to be really up to the task in safety issues, they need adopt a safety approach which will not be based on monitoring injuries alone but rather also deal in measures/policies which can lead to better safety performance. Unfortunately, though prequalification is widely practiced in Nigeria in the process of awarding contracts, safety factors are not given priority in these processes (Olatunji and Ade, 2005). Indoor (2011) also concluded that all categories of Nigerian contractors do not perform better than each other in health and safety issues, hence solicited the support of stake holders in construction to improve health and safety performance. The effects of inadequate Health and Safety performance in the Nigerian construction industry is evident in the high number of fatalities and injuries recorded across the country (Ayedun et al.,2012).

Molenaar et al (2002) advocated that safety plans must not stop at the levels of drafting them, rather they should go beyond that and ensure creation of adequate safety culture, although Farooqi et al (2008) are of the perception of a good and efficient implementation of health and safety measures in developing countries. Virtually all construction sites in developing countries are faced with unsafe conditions exposing the labourers to a wide range of hazards. These hazards are unfortunately not pointed out to the workers, most of which are usually novice in construction activities. The main goal of contractors in these countries is the profit they make from executing such projects, hence they try as much as possible to maximise profit.

Records relating to safety in construction industry still remain the poorest despite the dramatic improvement recorded in recent times (Foad, 2011). Okoye (2010) suggested that accidents in the construction industry are poorer than that of the manufacturing industry and factories because the working condition in these factories and industries are controlled, the personnel usually remain stable whereas that of the construction industry is largely dynamic in nature. The workers are frequently changing hence control of working condition is difficult, if a set of workers are enlightened the enlightenment leaves with them when they stop working on that site hence the process needs to be repeated when new set of workers are employed.

Koehn et al (1995) revealed that accidents are usually not reported in developing countries, the employers usually provide some cash compensations to these workers for injuries sustained while working on site. These compensations are usually regarded to be generosity from the employer as they can do without making such payments. Samuel et al (2010) revealed that there was a serious lack of structures and procedures regarding worker safety at all levels of construction chain in Ghana. Bruno et al (2012) also suggested that about 81.1% of Nigerian construction Site workers do not wear personal protective equipments (PPE) provided by the contractors, there reasons for these being that the protective equipments are either oversized/undersized or heavy. These lapses result in serious injuries when accidents occur. Mba et al (2004) stated that there was a poor safety culture in Nigerian construction industry, they also revealed the existence of a significant relationship between poor safety culture and rate of fatalities in Nigerian construction industry. Only big Multi-National firms in Nigeria recognize occupational health and safety, this is mostly the case with developing countries (Adeogun et al., 2013). Aniekwu

(2007) concluded that accidents occur because majority of the works are done manually in the Nigeria construction industry. Globalization has significant effects on the practice of building in Nigeria with obvious threats and opportunities which key players should recognize and adequately respond to (Mbali et al., 2012). The Bureau of Labour Statistics estimates that about 150,000 construction site accidents occur every year (OSHA, 2010).

2.3 Global Construction Industry Safety Outlook

With the recent breakthroughs in technology, the construction industry has benefitted positively. However, these growths have led to unsafe work environments (Farooqui, 2008). Findings from researches have revealed that individuals who spend their lives engaged on construction sites have 1 in 300 chances of being killed on these sites. Revealed further was the likelihood of being inflicted with injuries or serious illness is much higher if compared to other available industries. The workers are expected to at some certain point in time/days be unavailable for work as a result of the injuries or illnesses they might have sustained from working on these sites (Foad, 2011).

According to Foad (2011) being hit by falling objects and falling at ground level were the commonest reasons for occurrence of accidents. Zeng et al (2008) also revealed that falling from height and being hit by falling materials were the most predominant reasons for accident occurrence in the Chinese construction industry. Likewise a study conducted in the year 2000 in China by Huang et al cited in Farooqui (2008) showed that 3000 workers lose their lives in work related accidents in construction sites, Hong Kong recorded about 275 incidences per every 1000 worker in each year. The case of United Kingdom is about 50 per every 1000 worker each year (Foad, 2011).

The case of Pakistan as reported by Farooqui (2008), he highlighted the labour intensive nature of the industry, the workers were largely unskilled and migrate in a group wise manner leaving behind their families. They further revealed that a major divide existed between the large scale contractors and small ones. The large scale contractors had existing safety policies which were unfortunately not being implemented as their employees were basically ignorant of the existence of these policies. These workers were generally faced with lack of medical facilities, poor housing and poor sanitation problems. Okeola (2009) was of the view that in Canada, company practices had an impact on safety performance. Projects where a Safety Officer was employed had better safety performance records.

2.4 Trends in Developing Countries Workers Skills

This sector of every Nations economy is referred to as a labour-intensive sector (it used number of workers per unit of output than other sectors). The labourers in the construction industry account for about 75-80% of total work force in the industry (Habitat International, 1983). The International labour organizations 2001 report confirmed the labour-Intensive nature of most developing countries construction industry, it stated that “despite mechanization, the industry is still largely labour-intensive especially in developing countries...” this might perhaps not be unconnected with the high illiteracy rate among workers in these countries which Nigeria is also part of and above all financial constraints making the acquisition of such machines look challenging and impossible in some cases.

The workers are classified into three (3) groups, with respect to their skills, they are: unskilled, semi-skilled and skilled workers though majority of workers in the construction industry are unskilled (John, 2004). Construction work usually serves as

an alternative to farmers who usually jump into it without prior skills/adequate training (ILO, 2001). In Brazil around 1960-1980, an estimated 30 Million people left the Rural areas for Urban areas, most of this population ended up joining the construction industry without acquiring adequate skills (ILO, 2001). Similarly in India, about 670 unskilled workers on 11 construction sites in Delhi migrated from rural towns to urban centres, with the major reasons behind their actions being poverty and unemployment (Anand, 2000).

In China, the growth of the construction industry also attracts excess labour from rural areas. Most of the urban construction sites rely mainly on the labour provided by the rural workers. In 1996 Beijing construction industry employed a total of 424,000 workers from 60 different provinces (Lu and Fox, 2001). This trend in employing such rural migrant workers by construction firms in most developing countries might perhaps be because of the cheap labour they provide, neglecting their level of education and training. This translates into the high number of illiterate workers in most construction sites across developing countries (Nigeria inclusive).

2.5 The Role of Professionals in Ensuring Safety on Building Construction Sites

It is the duty of all professionals on site to guaranty a safe atmosphere for effective implementation of building activities .The professionals include the contractors, design professionals (Architects and Engineers) etc. Studies have shown that most construction accidents can be reduced, avoided or even eliminated if effective decisions are made during the design and planning phase of a project (Hecker, 2005).

2.5.1 The Role of the Contractor in Site safety

The success of any project depends on the amount of planning and quality of decisions taken on site. Virtually all construction accidents occur as a result of lack of proper training, deficient enforcement of safety, unsafe equipments, unsafe site conditions and poor attitude towards safety (Toole, 2002). Generally, the role of contractors is unclear as they tend to transfer their responsibilities to others. The prime contractor is charged with the responsibility of overall site safety (OSHA 1926.16). They have the highest influence on site safety because they coordinate, direct and monitor the work of other subcontractors. The subcontractors are usually saddled with tasks of providing labour on site, as such if they create hazards, they must fashion out measures to protect their employees.

2.5.2 The Role of Design Professionals in Site Safety

The Design professionals are the Architects or Structural Engineers who design the building plans to be implemented on site. Design professionals primary role in construction is the design of buildings. Most at times workers safety is left solely to the contractors, but the design professionals can influence safety on construction sites by taking effective decisions while designing structures. International labour office in 1985 recommended that designers should consider the safety of workers who will work on sites to erect the buildings they design. It is suggested that the designers should point out those sections in their designs which can result in accidents in the process of implementation, giving adequate guidelines and instructions on how they can be safely implemented.

2.6 History of Safety Regulations

The evolution of Occupational Health and Safety services led to implementation of laws and regulations in 1833 among the English. They put to a halt believe that

accidents were inevitable and predestined to happen, they argued that these accidents could be controlled. They suggested that ignorance, carelessness of the workers led to accidents in the then expanding mechanized world. Hence they advocated safety education to help reduce suffering of factory workers.

The passage of the “Health and Morals Act” in 1802 by the British Parliament marked the beginning of such laws. The act aimed at limiting the hours of work for children and providing for inspection of the factories to assess the working conditions. It demanded for adequate protection of workers from injuries.

Several trades were grouped under the British Factories Act, in 1864 the act was later widened to include several industries and places which employed more than 50 persons. It prevented workers from eating in poisonous or unpleasant plant atmosphere hence it required artificial ventilation to be put in place for such factories. The inspection of factories began in 1897, this led to the adoption of workers compensation.

Klein (2009) revealed that in the United States of America, E.I du Pont by his singular act of stating that people must understand the hazards in which they live at his gun powder factory in the year 1802 was one of the earliest documented individual acts of safety. This act was a mere statement and not a regulation. Until the year 1916, all works were regulated with the “common law”, the common laws allocated the workers safety to themselves. The employers were not liable in any form. The worker compensation law was established after 1916 by the American government , this law enforced the employers to be liable for the workplace safety issues. The employers were subjected to catering for the medical care and lost wages

of the workers during their absence from work. This was deemed to be a moral responsibility before being a duty (Reese, 2003). This forced payments made the employers more safety conscious hence translating into reduced accidents rates, death rates declined too (Petersen, 1971). The Occupational Safety and Health Act (OSHAct) became effective in the United States of America in April 1971 being applied to more than 5 million businesses and about 60 million workers (Hammers et al., 2000).

2.7 Construction Accidents and Worker Compensation

Workers compensation is basically an insurance policy which covers injuries sustained by workers on site. If by any means however the employer (Contractor) is liable to blame in any way possible as to the cause of the injury legal means could be used in resolving such cases (Mitchel and Goff, 2012). In Nigeria, it is widely believed that most compensation are based on the Contractors generosity (Umoh, 2000). This is aided because of the high rate of unemployment and underdevelopment which cuts across the country.

2.7.1 Worker Compensations

Worker compensation is a collection of laws which clearly state precise benefits injured employees are entitled to in case of occurrence of any accidents during work hours or on site (findlaw.com). Findlwa.com a leading online resource for legal issues presented some entitlements to workers as follows:

- **Medical Care:** The worker has the right to all available medical care to cure or reduce the effect of the injury. All medical bills drug prescriptions and even transportation to and from the Hospital is to be covered by the employer. The Worker is however bound by the worker compensation

benefits to use the company Doctor though they could seek for care elsewhere after 30 days with a written request to that effect.

- **Temporary Disability:** If the nature of injury sustained entails the worker taking some time off the job, the worker might be entitled to temporary disability payments, though this payments will not be up to the normal wages earned. It normally equals about two-thirds of the workers weekly pay.
- **Permanent Disability:** Workers are entitled to some monetary benefits in cases when they fail to recover fully from injuries sustained. This form of disability implies that the worker cannot compete in the labour market with other healthy workers. In order to determine the amount to be paid as compensation, the age of the affected worker, occupation and earnings are usually considered. Such a worker might also be trained in other vocations in which they can perform with the disability in order to help serve as a source of income in the future.

For effectiveness of such claims by the workers, they should ensure the following:

- Report the injuries to their employers, best done in writing keeping a personal copy for record purposes.
- Complete a claims form, also keep a copy of the claims form filled. The employer is then mandated to the Workers compensation Insurance Company for assistance.
- All these processes should however be completed as soon as possible to avoid delays, (findlaw.com, 2013).

2.8 Statistical Distribution of Building Construction Site Accidents

According to the National Safety Council (NSC), the statistical distribution of accidents experienced in building construction sites is as follows: Hand tools- 8%, transport-6%, machinery-8%, being struck by falling objects-11%, Personal falls-27%, handling of materials-26% and miscellaneous-6%. These statistics give a clue about the sources of accidents on building sites.

2.8.1 Construction Site Accidents Age Trends

Breslin et al (2003) revealed that studies have shown that younger less experienced workers experience more work injuries than older experienced workers. According to the Australian Bureau of Statistics, age group 0-14 and 15-24 experienced more injuries in 2001. They were of the opinion that the older the age group of workers, the less accidents cases experienced.

In the United States of America, Canada and Europe however, adolescents are frequently injured making it suitable to be considered a public health hazard (Breslin et al., 2003). The study showed that male adolescents experienced accidents 1.5 - 4 times more than those over 25 years old. Prenesti (1996) also showed that workers above 25 years are more likely to be injured than older workers, he further stated that young workers rarely know their rights and hence they were easily manipulated by employers to participate in unsafe tasks. The basic risks young workers take is trying to grow up too fast (Wortham, 1998) thus adequate training and supervision is essential when employing the services of young workers. Dehaas (1996) also suggested that training and supervision were critical to young workers safety, recommending the implementation of induction processes on sites in order to address workplace hazards and training. Rix (2001) in his research on work injuries

in America showed that workers within the age ranges of 16-19 years accounted for 3.5 % of injuries, 20-24 years accounted for 11.6%, 25-34 years had 28.2%, 35-44 years with 28.2%, 45-54 years with 18%, 55-64 years with 7.6 % and those Over 65 years accounting for about 1.2% of the injuries. The Bureau of Labour Statistics estimated that about 150,000 accidents occur on construction sites each year with workers between the age of 25 and 34 years being most likely to be injured.

However, Wang Yousong (1998) in a study conducted in China from the construction site statistics concluded that there was no significant relationship between accidents and age group, i.e. the probability of accidents occurring across all age groups on site is the same. In Nigeria, there is little or no statistics about workers safety issues, this makes it look as if the problem is a Western one because most data available are obtained from these western countries whereas the reality on ground is that such problems are more rampant in developing Nations.

2.8.2 Construction Accidents and Body Injuries

Research has shown that contusions and cuts were the most common injury types accounting for about 29.4% and 22.4% respectively (El-Shafei, 2007). A hospital showed that lacerations had 37%, sprain, strains and pain had 22.3% and contusions/abrasions accounted for 15.3%. Cases of injuries to the eye were about 10.8% while fractures had 8.7% (Hunting et al., 2004). Non fatal injuries like lacerations were common among construction workers in Egypt. These injuries usually occurred on the upper and lower limbs of the body, interestingly none of the injured workers reported receiving first-aid treatment (Reem Abbas et al., 2013).

2.9 Building Construction Worker

The term building construction worker refers to a person engaged in the physical construction of a building. These individuals could be either skilled or unskilled, depending on the nature of work they are expected to perform on the building site. (sokanu.com).

Building construction workers perform a wide range of tasks, although virtually all these tasks require some form of training and experience, some can be performed with little or no skills. The typical building site worker executes some basic tasks like:

- Load or unload building materials to be used on site.
- Clean and prepare construction sites by removing all the debris and potential hazards around the site.
- Operate machines used in construction works (concrete mixers, cranes etc).

A variety of trades are usually generally grouped as building construction works, they include the following:

1. Masons (Brick layers).
2. Carpenters.
3. Electricians.
4. Painters.
5. Plumbers.
6. Roofers.
7. Steel benders.
8. Labourers.
9. Tillers etc.

Chapter 3

CONSTRUCTION SAFETY AND LEGISLATIONS IN NIGERIA

3.1 Introduction

This chapter presents a review of literature about the Nigerian construction industry in general and the building construction sector in particular. A review of the available laws and regulations guiding the activities of workers was also done in this chapter.

3.2 Construction Safety

Safety is the condition of being free from harm or danger. It is the condition of being free from danger (legal point of view). It could also be seen as a state of being secured from accidents, injury or death as a result of some measures put in place. The safety issues experienced these days are enormous if compared to those of past years (Folawiyo, 1995).

From the above definitions, safety at work place primarily focuses on measures geared towards mitigating occurrence of hazards at the work place. Construction site safety could therefore be seen as the measures aimed at mitigating hazards at construction sites.

3.3 Brief Overview of Nigeria

Nigeria is located in West Africa precisely in the gulf of guinea. The nation came to be on 1st January 1914 after the amalgamation of both the southern and northern protectorates by the then Colonial leader Sir Lord Lugard. The country covers a

land mass of about 923,768 square kilometers [360,000 square miles approximately] (National Bureau of Statistics, 2010).

After the National population census conducted in 2006, the total population of Nigeria stood at about 140,003,542 people (National Bureau of Statistics, 2007). More than two-thirds (2/3) of Nigeria's population reside in villages and rural areas engaging mainly in Agricultural practices. About 70% of the population also live below \$1 (USD) per day. The country is divided into four (4) regions: north, south, west and east with six (6) geopolitical zones: northwest, northeast, north central, southwest, south-south and southeast. These zones contain all the thirty-six (36) states and Abuja, the federal capital territory. It is a multi-linguistic and multi-religious nation, about 371 different tribes can be found in Nigeria (Uchenna, 2010) with about 521 different languages (Okoye, 2010). The most populous ethnic groups are the Hausa, Igbo and Yoruba people. The official language spoken is English language. The major religious faiths found in the country are the Christians, Muslims and the African traditional religion.

3.3.1 Overview of Abuja

Abuja is Nigerians Federal Capital Territory. The Capital Territory came into existence by virtue of the Federal Capital Act of 1976, it covers a land mass of about 8,000 square kilometres with six (6) area councils namely: Municipal, Abaji, Bwari, Gwagwalada, Kuje and kwali. The FCT was created on 4th February, 1976 but developmental activities started around 1980. The Federal administration formally moved to Abuja in 1991.

3.3.2 Geographical description

It has a land of about 8,000 square kilometres, bounded by Kaduna in the north, Niger on the west, plateau on east and south-east and Kogi state on south-west.

Abuja falls within latitude 7°25' N and 9° 20' north of the equator and longitude 5° 45' and 7° 39'.

3.3.3 Administration

The Federal capital Territory Administration (FCTA) was established on 31st December 2004 after the ministry of the federal capital territory (MFCT) was scrapped, the FCTA since its inception till date has played a pivotal role in the governance and developmental activities of Abuja. It is under the supervision of the minister of the FCT, the minister is assisted by a Permanent Secretary and Directors. The minister reports to the president of the country. The president has the final say on all administrative issues and policies.



Figure 3.1: Map of Nigeria showing Abuja Source: www.amazon.co.uk

3.4 The Role of Construction Actors in Construction

3.4.1 The Client

The client is the most important figure in the team, he/she is responsible for financing and initiating all the activities involved to be performed on the construction site. The major contribution of the client is in specifying his/her needs to the designers before the designs are prepared (Smart, 2012). Clients also ensure that adequate financial reimbursements are made before the commencement of projects stating their limits in spending.

3.4.2 The Consultant

Consultants mainly deal with quality and cost considerations; they ensure that the projects are executed within the financial limits set by the clients and too the desired standards set. Cost analysis is crucial to the success of every project, thus clients require adequate cost analysis from the consultants (Smart, 2012).

3.4.3 The Workers

Workers role in the construction industry is primarily to carry out the work allocated to them on site, they utilise the materials and equipments for the success of the project in order to achieve completion in good time and cost (Smart, 2012). The workers literarily are responsible for the physical erection of the structures on site.

3.5 Unsafe Acts and Unsafe Conditions

Any act engaged in by a person without due consideration to his or her own safety or safety of others around is regarded as an unsafe act (Akintobi, 1999). About 80% of accidents in construction sites result from unsafe acts and unsafe conditions (Smart, 2012). Akintobi (1992) listed some unsafe and unsafe conditions to include: improper use of tools, use of equipment and tools for works they were not designed to perform, working with electrical equipment without switching them off etc.

De Reamer (1980) also viewed unsafe acts as "departure from an accepted normal correct procedure, practice or unnecessary exposure to hazards". He further suggested that these construction hazards continually build up unknowingly in construction sites. If these hazards are left uncorrected and unattended to, they may result in the following:

- I. Fire hazards.
- II. Improper illumination (Poor lightning).
- III. Building site itself e.g the floors may not be levelled, slippery floors etc.

Not every unsafe act or procedure on sites causes accidents, it is however the responsibility of a supervisor to correct such unsafe acts before it results in an accident.

Anderson (1992) was of the opinion that proactive safety performance is achieved by providing plants and equipments fit for reducing risk recognized from identified hazards, employing people who are competent to manage the activities and equipments. Other safety measures include the provision of a comprehensive safety policy statement, review of constructability of projects, pre-construction meetings, a transparent contractor screening, inspections and an efficient housekeeping.

3.5.1 Need for site Safety Practices

Accidents that result in disabilities or high fatalities have a negative effect on operations on sites. Accidents cost money and affect the morale of the workers. Many dangers exist in construction due to the nature of works performed, this makes the issue of safety to be of mutual interest to both the workers and the general public. The importance of ensuring safety and protecting lives is understood by all parties concerned (Occupational Safety and Health hearing, 1998).

The factors that motivate the enforcement of safe practices on sites include the following:

1. Humanitarian concerns.
2. Economic costs and benefits.
3. Legal and regulatory considerations.

Litigations often arise as a result of accidents which occur on sites, the courts of law over the years have established the principle of employer liability for cases of deaths and injury (Occupational Safety and Health hearing, 1998). The courts charged the employers with some responsibilities, they include:

- They are responsible for providing a reasonable work place.
- Responsible for the provision of reasonably safe appliances, tools and equipment.
- Reasonable care in selecting employees/workers.
- Enforce reasonable safety rules.
- Inform workers on the dangers associated with the work.

3.6 Hazardous site Worker Practices in Nigeria

Hazards on construction sites are all real or likely situations which can lead to death or injuries to the workers, damage/loss of items or belongings (Foad, 2011). Typical workers on Nigerian building sites pay little or no attention to their personal Safety; they neglect their personal safety while working on sites. They engage in practices that eventually pose danger to them. Okoye (2012), outlined some unsafe practices among workers on Nigerian construction sites to include: working bare footed, use of bamboo as scaffolds, mixing concrete with bare hands without protection. Some unskilled labourers are in the practice of carrying bags of cement on their bare heads, they do this because wheelbarrows are not provided on site. Some cases however

exist where wheelbarrows are available but these unskilled labourers still prefer carrying them on their heads. These practices are seen as normal norms in the Nigerian construction industry, this is however not the case in most developed nations construction industries. Nigeria lacks a Construction industry training board (CITB), this board if established will provide training and advisory services to the Nigerian construction industry workforce as a whole.

3.7 Causes of Accidents on Building Construction Sites

Accidents don't just happen, they are caused. For every accident that occurs there exists a remote reason why it happened. Various researches have been done pertaining this topic with various conclusions reached. A variety of causes exist for accidents which occur on building construction sites, as such it becomes the responsibility of the personnel in charge of the site to recognize the cause when it occurs and proffer effective ways to tackle them (Siriwardena et al., 2006). Natural phenomenon's referred to in Nigerian construction industry as "Acts of God" also play some role in causing construction accidents, the researchers listed rains, earthquakes, flooding and landslides as some of the "Acts of God" which exist and are capable of disrupting construction activities and causing accidents. Man has no control over the occurrence of these natural phenomenon's, in the event of their occurrence construction activities are automatically suspended. During the rainy season, workers engaged at height could lose balance as a result of the slippery scaffolds from the rains, hence Adeniyi (2001) suggested that it is much easier to work on construction sites during the dry season than the rainy season.

Workers accidents on construction sites can be attributed to two aspects, unsafe acts and unsafe conditions (Toolboxtopics.com). Unsafe acts are controlled by the

construction worker e.g using faulty equipments to work, disregarding posted warning signs on site unsafe conditions (mostly found across all construction sites) include insufficient lightning on site, poor ventilation etc (Toolboxtopics.com). Aniekwe (2007) in his research concluded that the factors leading to accidents on construction sites include:

- Use of faulty tools.
- Non compliance to standard safety rules and regulations.
- Improperly maintained and inadequate scaffolding.
- Lack of experience.
- Improper handling and storage of flammables.
- Poor handling of tools and equipment.
- Worker fatigue and boredom.
- Improper Supervision.
- Management attitude.
- Workers Operating environment.
- Natural causes.
- Inadequate management of work environment.
- Faults in design details and specifications.
- Faulty construction techniques.
- Workers physical condition.
- Lack of Job satisfaction.
- Monotony (exposure to a particular job constantly).

Zaynab et al (2012) in a research conducted in Yola, the capital city of Adamawa state in Nigeria concluded that the main causes of accidents on construction sites include the following , listed in order of superiority:

- Lack of safety training.
- Poor understanding of the risks associated with the work.
- Influence of unsafe behaviour by workmates.
- Over confidence.
- Shortage of equipment.

It should be pointed out that all these researches are broadly based on the construction industry in general be it road construction, bridge construction etc. It is based generally on all civil construction works, this research will focus primarily on the building construction industry in order to fashion out issues associated precisely with this sector.

Accidents are generally common in the construction sector worldwide; these accidents hinder the progress of activities on construction sites. They result in injuries or even death of the workers and also financial drain on the part of the construction firm (Ameachi, 1990).

Sidwell (2009) listed some major factors capable of causing accidents among workers on sites. The factors include:

1. Carelessness.
2. Effects of alcohol fatigue or shock.
3. Negligence.
4. Lack of knowledge to handle new materials and techniques.
5. Deliberate risk for bonus or speed.
5. Lack of education.

Elufidipe (2009) was of the opinion that occurrence of accidents is either because of unsafe working conditions or unsafe acts. He further stated that some accidents happen as a result of employers assigning some jobs to employees (workers) who are not trained to handle such particular jobs without supervision. According to him, unsafe acts on sites could be summarized as follows:

- a. Failure to use safety attire or personal protective equipments.
- b. Unsafe loading, arranging and placing.
- c. Use of improper tools or equipments.
- d. Taking unsafe positions or postures.
- e. Hazardous ways of handling equipments or tools.

3.7.1 Effects of Accident on Building Construction Industry

It is known that accidents which occur on construction sites lead to injuries and different kinds of dangers to the workers or properties. Ameachi (1990) listed effects of construction accidents on the construction sites to include the following:

1. Damage to materials or equipment.
2. Loss of client's investments.
3. Partial or Total halt to the work in progress.
4. Loss of wages for the employees during hospitalization.
5. Injury or death of worker.

These effects affect the various groups of professionals engaged on building sites in distinct ways, these have been enumerated below:

3.7.1.1 Effects of Accident on the Contractor

According to Ameachi (1990), the contractor mainly experiences financial losses in the event of accidents on sites, this might lead to delays in the project execution. The

delay will lead to loss of confidence in the contractor by clients who engage their services. The financial losses could take the following forms:

- I. High cost of treating injured Workers.
- II. Cost of litigations in the event of claims / settlement.
- III. Higher premium cost where insurance policy is taken.
- IV. Liquidated and ascertained damages payable to the client as a result of delay in completion.

3.7.1.2 Effects of Accidents on the Employee

Employees on construction sites usually feel the physical effect of accidents the most. These accidents result in bodily injury or even death. Loss of income, psychological effects is also experienced by such workers. Research conducted by Anthony (2010), about the number of casualties in the building construction sector of Lagos, Abuja and Port Harcourt between the year 2000-2010 revealed that Lagos state led in the casualty figures with 178 casualties within the period, Abuja came in second with 65 casualties while Port Harcourt recorded 30 casualties. A breakdown of Anthony's result is given in figure 3.2 below:

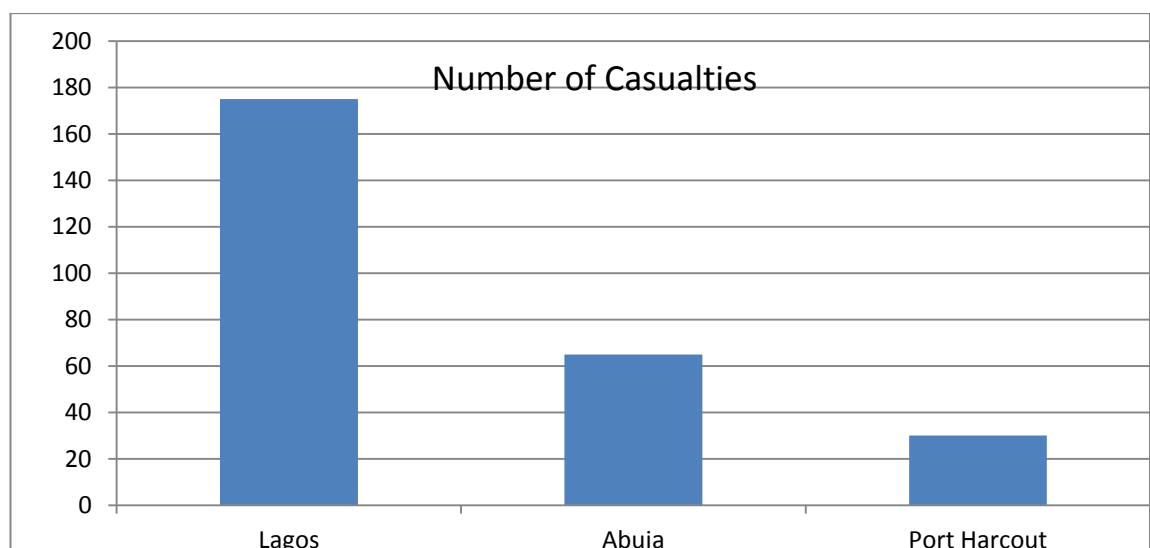


Figure 3.2: Casualty rates in Abuja, Lagos and Port Harcourt 2000-2010

Source: Anthony (2010)

3.7.1.3 Effects of Accidents on the Client

Brigg (1994) stated that financial losses of accidents are transferred to the clients. This could lead to additional professional fee payable to consultants, cost of litigations and delays in completion of the project.

3.7.2 Types of Construction Accidents

Onuegbu (1999) classified types of accidents on construction sites as follows:

1. Accidents involving plants and tools.
2. Falling accidents.
3. Ancillary accidents.

3.7.2.1 Accidents Involving Plants and Tools

These accidents can further be categorized into accidents due to operators error, accidents due to improper maintenance, accidents due to lack of technical knowhow of equipments and accidents due to defective plants and equipments.

Operator errors could be personal mistakes by operators, carelessness etc. Carelessness is usually the cause in most cases. The case of improper maintenance occurs as a result of poor maintenance of plants and equipment. The use of defective plants also leads to accidents, defective plants could be worn out plants, imitated (fake) etc. These defective plants ideally should be repaired, removed or kept out of workers reach (Heinrich, 1980).

3.7.2.2 Falling Hazards

27% of building accidents occur as a result of persons being struck by falling objects. Elufudipe (2009) also revealed that 40% of the accidents occurred due to persons falling from high levels. Falling accidents could be caused by removing the formwork for concrete structures on site before the work hardens or set. Removing

these form works could result in collapse which could pose danger to the workers on site.

3.7.2.3 Ancillary Causes

These causes do not fall within the above two (2) classes mentioned. Ancillary causes include negligence on the part of operators or other personnel working on site (building journal, 1985). It also covers other forms of accidents related with electric current, exposure to extreme temperatures, noise, fire hazards etc.

3.7.3 Accident Prevention on Building Construction Sites

Accident prevention on building construction sites involves predicting the occurrence of future accidents and the perceived characteristics of these accidents given the immediate nature of the site and surrounding environment (Kennedy, 2014). Construction accidents on building construction sites can be effectively checked if the following measures are effectively enforced on sites:

- **Site Safety Precautions:** The task of providing adequate safe site environment lies with the main contractor (Kennedy, 2014). In 1958, building regulations were amended, the amendment applied to all works in the construction industry. Safety training courses should be introduced on the construction sites. These will help reduce the amount of accidents on sites as the workers will be educated on the dos and don'ts as well as the best ways to go about their works.
- **Site Discipline:** Respect and obedience on site can help reduce to a great extent the amount of accidents on sites. There should be no hurry while working with mechanical plants. Break periods should also be strictly obeyed to ensure that the operators refresh themselves before continuing

work. Absence of such breaks results in operators working under fatigued conditions (Kennedy, 2014).

- **Training and Educating Site Workers:** According to Griffin (1950) modern job training has taken a new dimension as the employees learn how to perform a job in the safest way possible. They learn how to identify possible hazards and how to avoid them. He further suggested that the employees must be taught what to do and what not to do on site, if safety training is to be effective. He was of the opinion that workers involved in building construction should be trained in the following areas:
 - Safety awareness and consciousness.
 - Correct operational procedure and activity timing.
 - Skill acquisition.
 - Correct operational methods.

Exposing unskilled workers to hazardous conditions on site is generally unwise and can be catastrophic, even the well trained workers need the control of a supervisor for an acceptable safety standard.

- **First Aid Provision:** First aid is “that which is rendered subject to a secondary medical treatment or any subsequent redressing “(Ameachi, 1990). Ideally, adequate provisions should be made on sites for the treatment of injury or illnesses (Blake, 1990), he advised that in order to achieve a satisfactory functioning first aid service on sites, it is necessary to have the following in place:
 - Have a competent / qualified first aid attendant.
 - Have proper organizational record.
 - Adequate housing facilities and equipment.

3.8 Economic Contribution of Nigerian Construction Industry

The construction industry is believed to be a pillar of domestic economy in most nations. In 2011, the national statistics office in the United Kingdom reported that over 2 million people were employed in various roles in more than 250,000 construction firms in United Kingdom, contributing an estimated £75 billion to the economy in 2008 (Office of national statistics,2012). Likewise in Nigeria, it contributed about 5-7% in the GDP growth, and over 42% of fixed capital growth over the last four (4) decades. (Dye et al., 2010). The table below gives a breakdown of the economic contribution of various sectors and their contribution to Nigeria's GDP for the year 2012, the contributions of the building construction sector will be discussed.

Table 3.1: Contribution of various Sectors to Nigeria's GDP in 2012

Activity sector	Nominal GDP (Naira billion)		Real GDP (Naira billion)		Growth rate (%)		Contribution to growth		% of GDP	
	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Industry	15,194.56	16,022.83	158.19	160.3	5.95	2.41	19.39	8.38	25.52	24.4
Coal mining	0.00	0.00	0.00	0.00	8.80	8.74	0.00	0.00	0.00	0.00
Crude petroleum and natural	14505.76	15275.68	123.27	122.57	5.25	-0.57	10.72	-1.22	15.88	14.71
Metal ores	0.04	0.05	0.01	0.01	11.59	11.35	0.00	0.00	0.00	0.00
Quarrying and other mining	45.69	52.38	2.65	2.95	12.08	11.48	0.50	0.53	0.34	0.35
Manufacturing	643.07	694.72	32.26	34.71	7.57	7.60	3.96	4.29	4.16	4.16
Oil refining	61.31	70.65	1.05	1.12	7.28	6.25	0.12	0.11	0.14	0.13
Cement	22.23	25.79	0.68	0.75	10.56	10.72	0.11	0.13	0.09	0.09
Other manufacturing	559.53	598.28	30.53	32.84	7.51	7.57	3.72	4.05	3.93	3.94
Electricity	67.43	77.43	23.35	24.07	2.96	3.05	1.17	1.25	3.01	2.89
Water	2.86	3.28	1.15	1.27	10.20	10.18	0.19	0.21	0.15	0.15
Building and construction	394.67	456.04	15.45	17.35	11.85	12.26	2.86	3.32	1.99	2.08

Source: NBS/NPC,2012

Resources for construction are usually very unevenly distributed in most developing countries. According to the 1984 World Bank report, construction sector accounts for between 3 and 8% of the GDP in these countries around the 70's. Nigeria's GDP fell after the oil boom, fluctuating between 1.3 and 1.9% over the years before the near recovery in the year 2011. (CBN, 2011).

From Table 3.1 above it can be seen that the building and construction sector sustained its growth in the year 2010 as compared to other sectors. It increased from 11.85% in 2010 to 12.26% in the year 2011. The contribution to GDP increased 2.86% in 2010 to 3.32% in the year 2011. The overall GDP growth rate also increased from 1.99% in 2010 to 2.08% in 2011. Similarly, the cement sector which is also vital to the building and construction sector showed some positive increases. Its contribution to growth increased from 0.11% in 2010 to 0.13% in 2011, its percentage GDP growth however remained same for these two years 0.09% (NBS/NPC,2012). The growth in these two sectors translates to the fact that the construction industry activities in Nigeria is on the rise.

3.9 Categorization of Nigerian Construction Companies

Going by a particular definition for the categorization of companies might not be possible as these definitions change from country to country, and from sector to sector (Gunasekaran et al., 2001). They are usually grouped according to annual turnover, staff strength, volume of work performed (Financial limit of work capable of being executed), equipment capacity etc.

In Nigeria, the number of employees, turnover and capital invested has been used by the National Council on Industry (NCI) to group the companies into Small, Medium and Large Companies. The 13th council meeting of NCI held in July 2001, grouped them as follows:

- Micro/Cottage Industry: Not more than 10 workers, total cost not more than 1.5 million naira including capital, excluding the cost of land.
- Small Companies: labour size of 11-100 workers, total cost of not more than 50 million naira including working capital but excluding cost of land.

- Medium Companies: labour size of 101-300 workers or a total cost of over 50 million naira but not more than 200 million naira, including working capital but excluding cost of land.
- Large Companies: labour size of over 300 workers or a total cost of over 200 million naira, including working capital but excluding cost of land (Popoola, 2001).

3.10 Ownership of Nigerian Construction Firms

Virtually all construction firms in Nigeria are privately owned (Okoye, 2010). The private individuals primary goal is profit making as such they tend to neglect the workers in a bid to maximize profit. They pay little or no attention to worker safety trainings, the large multinational construction firms tend to pay more attention to safety as some even compile their company safety manuals. These manuals however are inconsistent with the Nigerian industry as they are prepared from foreign countries. It is worthy of noting that the Council of registered builders of Nigeria (CORBON) and Nigerian institute of building (NIOB) have been working out ways to adopt a health and safety plan suitable and compatible with the Nigerian Building construction industry. The Nigerian construction industry is made up of mainly small and medium enterprise indigenous firms, large firms account for about 5% of the population of contractors but yet control about 95% of the jobs. (Enobong et al., 2010).

Insurance of workers is also an issue which is widely neglected by contractors in Nigeria, they only insure them when they bid for government contracts. This is because it is one of the requirements needed to secure federal government contracts Okoye (2012). The Nigerian government over the years have encouraged private

developers to invest more in the building sector in order to actualize its vision of providing adequate housing for all its citizens as such more should be done by relevant government establishments to ensure that these workers are insured against unforeseen accidents which might happen in the course of carrying out their jobs.

3.11 Background to Building Construction Practice in Nigeria

The practice of building is an ancient practice which is believed to be as old as humanity, organized building in Nigeria was believed to have commenced around 1930's, during this era majority of activities related to construction were handled by the public works department (PWD) and the Royal Army Engineers (which evolved to Nigerian Army Engineers). The major means of project delivery at this time was direct labour. The engagement of contractors in the Nigerian construction industry began in the 1940's where few British and Italian companies were engaged (Olowo – Okere, 1985). With the advent of the “oil boom” in the 1970's construction contracting received an upsurge, sadly this period was also characterised with high level of degeneration in standards.

The National Council for works at its 13th conference in 1984 recommended direct labour for capital projects delivery, this gained overwhelming acceptance by all the three (3) tiers of government. Impressive results were recorded initially, though some abuses were later discovered (Dawaki, 1987).

Until the year 2006, Nigeria did not have clearly defined regulations and Standards for design and construction of buildings. This metamorphosed to the deplorable state of affairs in the building industry where non professionals were employed and substandard building materials were rampantly used. These shortcomings gave rise to

the decision by the National council of housing and urban development to develop a National building code to regulate building construction activities in Nigeria.

Wahab (2005), showed great displeasure with the number of unskilled workers in the Nigerian construction industry which led to an increase in the number of imported expertise from neighbouring countries like Togo, Ghana, Benin republic etc. This trends if allowed to continue are potential threats to the growth of Nigeria's construction sector.

Nigerian construction workers are typically migratory in nature, they move from rural areas to urban areas, they stay away from their homes for several months just to be able to secure a means of livelihood (Okoya, 2010).

3.11.1 Housing Demand in Nigeria

As a result of the acute deficit of housing in major cities in Nigeria, the need for both government and the private sector to invest in this sector is imperative. GEMS (2010) asserted that the property market is experiencing a boom as a result of the investments being made in the construction of hotels, shopping malls, office buildings, residential houses etc. The government plays a major role in the demand for construction activities (Nongiba, 2008). As majority of Nigerians move from rural to urban centers, the resulting social, environmental, economic and political challenges need to be urgently addressed (Raji, 2008). The housing deficit at the moment in Nigeria is put to be about 15 million houses and the cost of providing them is four (4) times the annual budget of the country. The Federal and state governments are doing quite well through their various mass housing schemes, but it should be noted that a lot still needs to be done. The private developers are key

players in the quest of achieving adequate housing for all as such the government at all level should welcome their contributions.

3.12 Worker Safety Legislations in Nigeria

In Nigeria, virtually all legal requirements and legislations associated with the construction sector were received from the British legal system with little or no changes made. Some provisions from these laws do not necessarily meet the conditions experienced in Nigeria. Most professionals in Nigeria lack awareness of their legal responsibilities while the government rarely shows determination in enforcing these laws (Aniekwu, 1989). Okojie (2010) was of the opinion that after his close interaction with the Director of Inspectorate of Factories in the federal ministry of labour Abuja, he was intimated that shutting down defaulting construction companies rarely occurs because these companies are mostly owned by influential members of the society, the politicians or their close associates. An attempt to shut them down might result in losing their jobs too, hence they allow them operate.

In Nigeria before the colonial era, the main occupation then was un-mechanized agriculture and Animal husbandry with the workforce then comprising of mainly women and children. After the world war several industries began to come up in Nigeria, the rail lines and coal mining companies were some of them. They employed many workers on 12-14 hours shift each day for the 7 days in a week in poor working conditions, little or no attention was paid to prevention of hazardous conditions in work places. Salaries were very small compared to the works performed with frequent dismissals being the order of the day as there were too many people seeking for employment. The reaction of workers to the poor working

conditions in Enugu coal mines led to the death of miners. This formed the basis for the celebration and commemoration of the Nigerian workers day, the deaths led to the formation of some safety legislations in Nigeria regarding worker safety. Some early legislations in Nigeria include the Workmen Compensation Act and the Factory Act (1987). The Workmen Compensation Act primarily dealt with provisions to ensure compensation payment to workers for injuries they sustain on site while the factories act dealt with ventilation, lightning, drainage of floors and ensuring all equipments and machinery (hoist, cranes, prime movers etc) are in good working condition. The Workmen Compensation Act of 1987 was modified into the Workmen Compensation Act of 2004, it was further updated into the Employees Compensation Act of 2011. The Safety, Health and Welfare Bill of 2012 was also passed by the National assembly in 2012. Adeogun and Okafor (2013) however stated that these available legislations are not being enforced in Nigeria because despite the existence of these laws there are reports of unhealthy exposure of workers to risks in various organizations.

Britain colonized Nigeria as such some of these laws were carved out from what is obtained in Britain, the laws carry some elements of British regulations in them. Idoro (2008) suggested that the existing Nigeria Factory Act of 1990 was adopted from the United Kingdom Factory Act of 1961 while Occupational Health Act of 1970 was solely an American legislation. The Personal Protective Equipment at Work Regulation of 1992, Management of Health and Safety at Work Regulation of 1999 are all British laws. These laws are also applicable in Europe because they are yet to be transformed into a Nigerian version designed solely for Nigeria. The Factory Act is the only regulation from the available ones presently which is a Nigerian version, it was designed to suit the characteristics of the Nigerian factories.

The National building code is also a collection of different foreign countries codes. This gives rise to the need to urgently review these laws and develop Nigerian versions.

Nigeria is a member of the United Nations, it employs the conventions of the International labour organization (ILO). Nigeria also has its own labour law as stated in the laws of the Federation of Nigeria (2004). The Labour Act cap L1 empowers Nigerian ministers of labour and productivity on regulations regarding Health, Safety and Welfare of workers in their workplace. The Factories Act of 2004, Labour safety, Health and Welfare Bill of 2012, Workmen Compensation Act of 1987, The Nigerian building Code, Safety, Health and Welfare Bill of 2012 which was passed by the national assembly in 2012 are some of the relevant documents which exist in Nigeria and are all geared towards protecting and ensuring the welfare of the Nigerian worker.

The ILO's code of practice of construction enumerates guidelines needed for the smooth implementation of Health and Safety of all workers on site, it shows the necessary guidelines in ensuring the provision of adequate welfare facilities, protective personal equipments (PPE) and ultimately a safe working environment for workers on site. Some aspects of the code which are useful to this research have been briefly explained below:

3.12.1 Personal Protective Equipment

Under the ILO codes of practice, employers were to provide personal protective equipments (PPE) and protective clothing suitable for the nature of work to be performed, the PPE and Protective clothing should comply with the standards set by

Authorities. These PPEs should however fit perfectly and be convenient because if they aren't comfortable the workers would refuse using them.

3.12.2 Types of PPE and Protective Clothing

The law binds employers to provide the following PPE & protective clothing for workers on site:

- Waterproof clothing and head coverings when engaged on sites with adverse weather conditions.
- Gloves, Overalls, respirators, impermeable foot wears to guard against hazards in workplaces exposed to harms like radioactive threats.
- Foot wears when exposed to sites liable to adverse weather conditions or sharp.
- Clear or coloured goggles, a screen face, a face shield or other suitable devices when workers are faced with threats of potential eye injury.

3.12.3 Welfare Facilities

The ILO code states thus: “at or within reasonable access of every construction site, the following facilities should, depending on the number of workers and the duration of the work be provided , kept clean and maintained:

- Sanitary and washing facilities.
- Facilities for changing & for storage and drying of clothing.
- Accommodation for taking meals and for taking shelter during interruption of work due to adverse weather conditions.

The Federal Ministry of Labour & Productivity and the Nigerian Institute for Safety Professionals are saddled with the oversight functions to ensure strict implementation of the regulations in Nigeria. Some responsibilities of employers of labour to their workers based on the Labour Bill passed in 2012 are briefly stated below. The bill

was passed as a result of the report on the joint committee on employment, labour & productivity, health & establishment and Public service (Pedro, 2012). This bill is stricter, it enables the state to charge and prosecute cooperate organizations and firms where they are found wanting. They include:

- An employer is liable to his employee when injuries result due to his failure to exercise due care.
- It is the employer's responsibility to provide a work environment that is free from recognized hazards for his workers.
- Employers are expected to adhere strictly to the laid down safety standards set by appropriate regulatory bodies, failure of which could lead to both civil and criminal penalties which will be enforced by appropriate authority.
- It is the employer's responsibility to provide safe tools and appliances necessary in the performance of particular work he engages the workers to perform.
- The employer is required to display a poster informing the workers of their rights and responsibilities regarding safety & health hazards.

The building construction sector in Nigeria lacks formal safety management systems, effective safety regulations are also lacking. Though this sector is a vital contributor to economic growth of the nation, virtually all available labour laws in Nigeria do not apply to this sector. The lack of such laws makes enforcement of safety norms and procedures on Nigerian building sites difficult, the workers as a result of this unfortunate scenario are left vulnerable and unprotected. No comprehensive law as regards to Occupational Health and Safety exists in Nigeria (Okoye, 2012). Virtually all existing regulations in Nigeria today which relate to health and safety emanated from foreign countries (Idoro, 2008).

3.13 National Building Code of Nigeria

The Nigerian Building Code came into existence in August 2006, its purpose was to regulate the conduct and operations of professionals and stakeholders in the construction industry. According to the National Building Code drafting committee, the need for developing a building code for the country was because of some peculiar deficiencies noticed in Nigerian building industry, some of which include:

Lack of town planning in Nigerian cities, frequent cases of collapse of buildings, dearth of standards for regulating building designs, incessant involvement of quacks in the industry, use of substandard materials and the poor maintenance culture in the industry. All these factors were highlighted by the National Council on Housing and Urban Development as the main reason for developing a National Building Code for the country. The provisions made by the code in section 7.49.1 says that the general public and construction workers should be protected whenever a building is to be erected, demolished or repaired. It has the following provisions to ensure safety implementation during works on site:

- **Fences:** Every site located 1.5m from the streets plot line should be enclosed with a 2.4m high fence to prevent and restrict entry of unwanted persons.
- **Lightning:** All parts of a building undergoing construction or demolition should be adequately lighted when workers are working on site.
- **House Keeping:** All rubbish and trash shall not be allowed to accumulate on site, they shall be removed as fast as possible.
- **Protective Equipment:** All protective equipments shall be kept in closed containers.

- **Ladders:** Temporary ladders for working on site should extend at least 1.0 meters above the ground level.
- **Concrete Forms:** Highly combustible materials should not be stored on a building site under construction, unless all combustible concrete forms are removed.
- **Signs:** All signs on site should be at least 100mm in height with a conspicuous color.
- **Hoist:** All hoist materials should be protected effectively, especially when erected outside buildings higher than 26 meters or Seven (7) floors. The hoist structure should be built on fire-retardant materials exempting the loading platform. (National Building Code of Nigeria, 2006).
- **Scaffolds:** Scaffolds and their components should be able of carrying without failure at least four (4) times the maximum intended load. Their platforms should be able of supporting minimum live loads in kilograms per meter square of the platform. The table below shows required scaffold capacities:

Table 3.2: Scaffold requirement for various site works

CLASSIFICATION	SERVICE TYPE	LOAD KILOS PER SQUARE METER
Light Duty	Carpenters	122.05
	Stone Setters	122.05
	(No Stone on Scaffold)Miscellaneous	122.05
Medium Duty	Brick Layers	244.10
	Stucco	244.10
	Lathers & Plasterers	244.10
Heavy Duty	Stone Masons	366.15

(Source: National Building Code of Nigeria, pp 205)

Chapter 4

METHODOLOGY

4.1 Introduction

This chapter presents the methodology used to explore the safety issues associated with workers on building construction sites in Nigeria (Abuja). Having done a review of literature, the observations were compiled into a well structured questionnaire.

In order to achieve the aims set for a study, it is important to consider the kind of method being adopted (Naoum, 2001). This necessitated the researcher to gather information from two (2) main sources namely:

- a. Primary Source.
- b. Secondary Source.

4.2 Primary Source

This represents the main source of data used for the research. The primary data were obtained from questionnaires issued on-site in addition to face-to-face interviews/interactions with the respondents. The questionnaires were quite simple to read and understand, this helped facilitate participation of the respondents especially the workers. Some cases of illiterate workers were encountered, the researcher read out the questions to them and helped them think their responses.

4.3 Secondary Source

A comprehensive literature review was undertaken on topics related to safety in order to have a sound knowledge of the topic. Research journals, academic thesis and conference papers were the main sources of the secondary data gathered. The secondary data helped in shaping out the structure of the research questionnaire.

4.4 Questionnaire Survey

Two (2) sets of questionnaires were designed for this research. One was designed to be issued to the workers on site while the second was designed and issued to the company Staff. This research focuses on the workers perspective, however the site staff questionnaires were issued in order to seek their opinion and views about worker safety on building sites.

Workers in this context refer to all personnel who are engaged in any activity on the building site, both the skilled and unskilled. Anyone paid to render any form of service for the successful completion of the building project while Site staff refers to representative of construction companies on the site. They could be the Site Engineers, project manager, Architect etc.

Both set of questionnaires are divided into two (2) parts (A and B). Section A in both cases is titled as Personal data section, it contains general information about the respondent. Section B in both questionnaires is titled as worker safety issues, it contains questions regarding safety of building site workers.

Most of the questions were closed-ended questions except in some cases where it was deemed necessary to seek the personal opinions of the respondents; open-closed

questions were used in such cases. Closed-ended questionnaires are easily answered by respondents and are also easily analyzed by researchers (Glasow, 2005). The company staff questionnaire contains fourteen (14) questions in total, seven (7) in section A and seven (7) in section B while the workers questionnaire contains a total of twenty eight (28) questions, seven (7) in section A and twenty one (21) questions in section B.

4.5 Reliability of Research Instrument

In order to ensure the validity of the questionnaires, they were designed in a simple and straight forward manner, they are easy to read and respond to. All questionnaires were issued in person and also retrieved in person.

4.6 Data Collection

The two sets of questionnaires were issued and retrieved in person, some were retrieved on the same day of issuance while some were retrieved on later days. This was because some of the workers claimed they couldn't read and write and needed the help of a third party to fill the questionnaires while some others claimed to be busy on site and will fill them after the close of work.

Out of the eighty (80) questionnaires distributed sixty-nine (69) were retrieved, one (1) was returned unfilled. This left the effective number of copies used for analysis at sixty-eight (68). Forty-two (42) copies of the workers questionnaire were retrieved while twenty-six (26) copies of the site staff questionnaire were retrieved. This brought the response rate to about 85% which is adequate (Oladapo,2005). Newman et al (2002) cited in Fedrick (2010) suggested that a response rate of about 30% was adequate for construction industry studies. The breakdown of the positions of the company staffs who participated is given in Table 4.1 below.

Table 4.1: Position of site staff in the construction companies visited

Position in Company	Frequency	Percent	Valid Percent	Cumulative Percent
Contractor	3	11.5	11.5	11.5
Project Manager	6	23.1	23.1	34.6
Site Engineer	7	26.9	26.9	61.5
Architect	6	23.1	23.1	84.6
Others	4	15.4	15.4	100.0
Total	26	100.0	100.0	

4.7 Method of Data Analysis

The questions were analyzed using simple bar charts and pie charts, showing their percentages and frequencies. Questions 10 and 11 on the employers/site staff questionnaire and question 17 on the workers questionnaire were however analyzed using mean score values, Relative Importance index (RII) values. Pearson correlations and Hypotheses testing were also used to check if certain relationships existed among the workers on building construction sites in Nigeria.

The variables were grouped on a five (5) point Likert scale, the mean score values and RII values were computed thus:

$$\text{Mean Score} = \frac{\text{Ranking} \times \text{Number who chose the ranking}}{\text{Total number of respondents}}$$

$$\text{RII} = \frac{\sum fx}{\sum f} \cdot \frac{1}{k}$$

$$= \frac{x}{k}$$

Where x = Point on Likert scale (1,2,3,4 and 5)

F = frequency of the respondents choice

k = maximum point on the Likert scale (5 in this case)

While ranking the RII values, the item with the highest RII value is ranked 1st, it takes this order till the least item. According to (Mbamali, 2012) RII values are interpreted as follows:

$RII < 0.60$: Implies item has low rating.

$0.60 \leq RII \leq 0.8$: Implies item has high rating.

$RII \geq 0.80$: Implies item has very high rating.

4.7.1 Pearson Correlation

This is usually denoted as (**r**), it is used to determine if a positive or negative relationship exist between variables. Its values range from -1 to +1 i.e perfect negative to perfect positive correlations.

If $r > 0$: Positive relationship

$r < 0$: Negative relationship

$r = 0$: No relationship

Table 4.2: Correlation value ranges Bruce (2000)

R	Strength of relationship
-1.0 to -0.5 or 1.0 to 0.5	Strong
-0.5 to -0.3 or 0.3 to 0.5	Moderate
-0.3 to -0.1 or 0.1 to 0.3	Weak
-0.1 to 0.1	None or Very weak

4.7.2 Mean Score

This is a statistical operation in which numerical or ordinal values are replaced by assigned ranks. This ranking is usually done either in ascending or descending order. The item ranking highest is usually assigned the figure 1, second is 2 and so on till the least ranked item.

4.7.3 T-Test

This test was used to test for the hypothesis, after the test is performed on SPSS the significance on the output table is checked. If the significance (P-value) is less than 0.05, we reject the null hypothesis (H_0). If P-value is greater than 0.05, the null hypothesis (H_0) is accepted and the alternative hypothesis is discarded.

Chapter 5

ANALYSIS AND DISCUSSION OF RESULTS

5.1 Introduction

This chapter deals with the analysis of the data generated from the retrieved questionnaires. Statistical package for social sciences (SPSS) version 21 was used for these analyses. Correlation and test of hypothesis were also done to check if certain relationships exist between some variables regarding the workers on site. The two (2) set of set of questionnaires will be analyzed separately.

5.2 Demography

5.2.1 Demography of Company staff

The respondents from the company staff who took part in this study were made up of Project managers, Contractors, Site Engineers, Architects, Estate Surveyors, Builders and Quantity surveyors. The questions asked sort to determine their years of experience in the building construction industries, position in the companies, age group, educational qualification, number of workers employed and their opinions on the provisions of safety materials and facilities for workers on sites. Figure 5.1-5.3 shows a breakdown of their positions in the companies, educational qualification and duration in the building construction industry respectively.

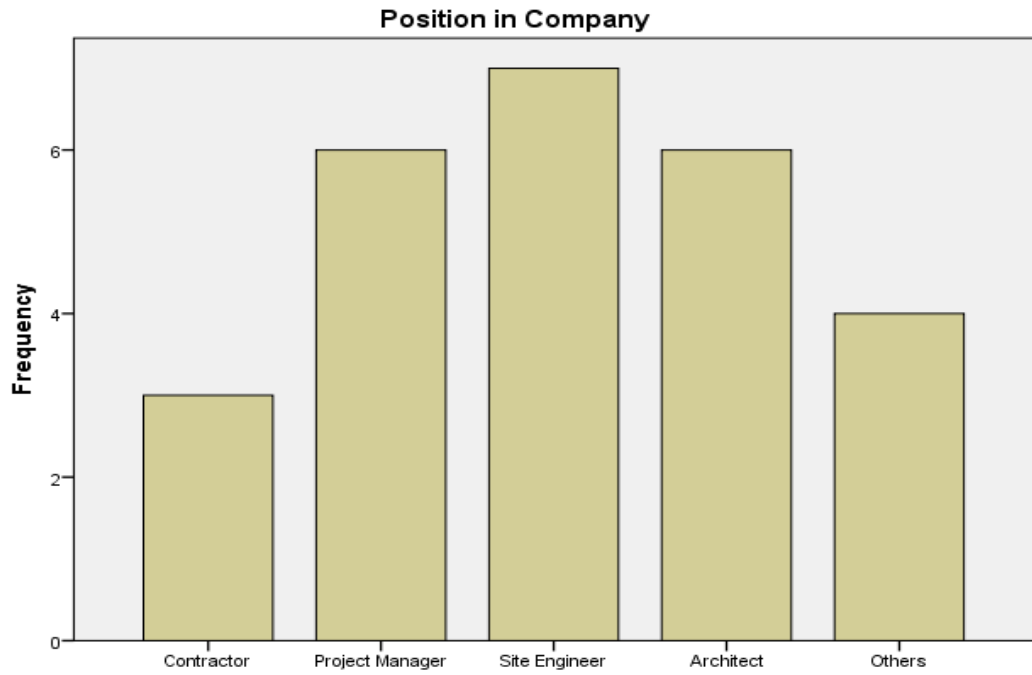


Figure 5.1: Positions of the Company staff in their construction companies

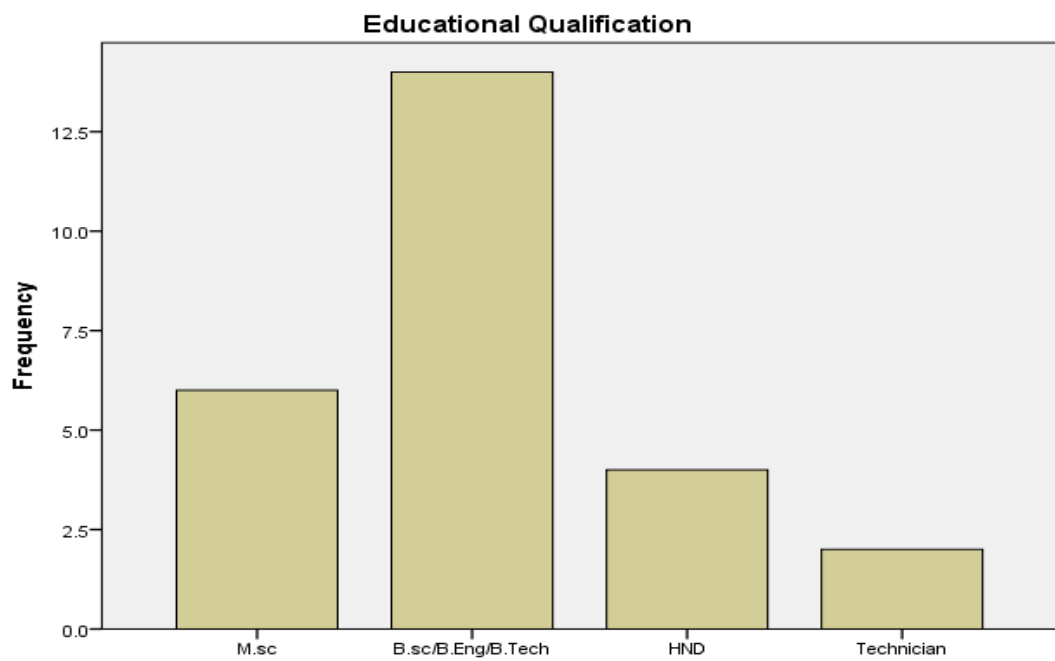


Figure 5.2: Educational qualification of Company staff

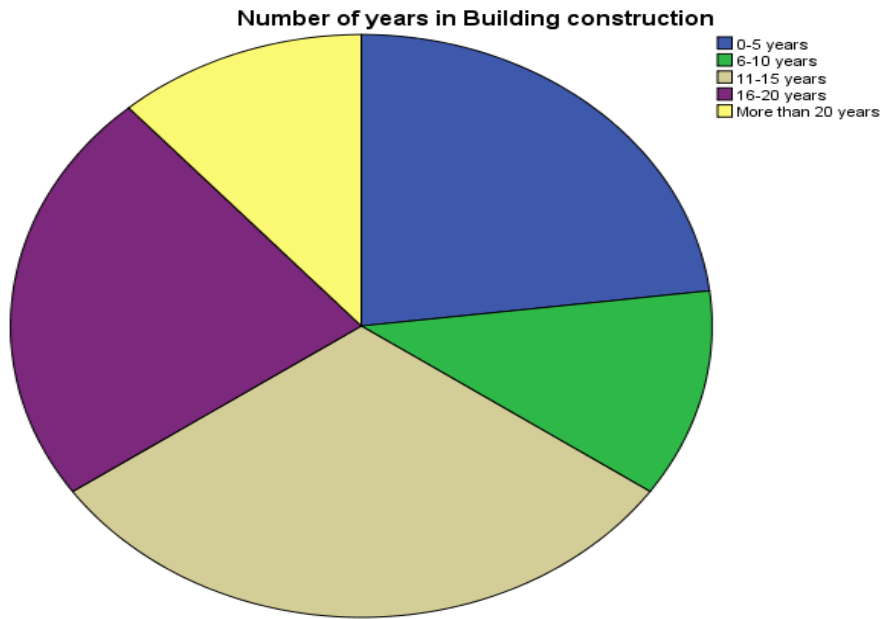


Figure 5.3: Years of experience of Company staff

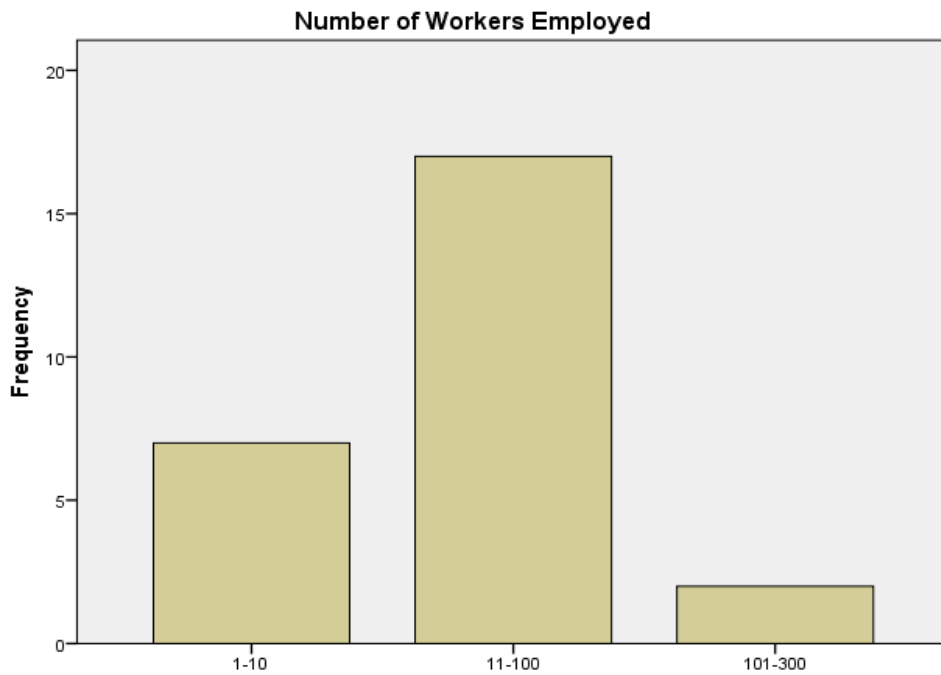


Figure 5.4: Number of workers employed

5.2.2 Position in Construction Company

Majority of the staffs who responded to the questionnaire as seen in Figure 5.1 were Site Engineers. Out of the 26 respondents, 7 (26.9%) respondents were Site Engineers, 6 (23.1%) were Project managers, 6 (23.1%) were Architects and 4

(15.4%). Estate surveyor, Quantity surveyor, Site clerk and an Urban and regional planner made up the others list (See Figure 5.1).

5.2.3 Educational Qualification

When asked about their educational qualifications, 14 (53.8%) were holders of B.Sc, B.Eng or B.Tech degrees, 6 (23.1%) had M.Sc degrees, 4 (15.4%) had HND certificates, while 2 (7.7%) were Technicians (See Figure 5.2).

5.2.4 Duration in Building Construction Industry

6 (23.1%) of the respondents said they had 0-5 years working experience, 3 (11.5%) had 6-10 years experience, 8 (30.8%) had 11-15 years experience, 6 (23.1%) had 16-20 years experience while 3 (11.5%) had more than 20 years working experience in building construction industry. This indicates that the respondent all had fairly reasonable experience in the industry. This is broken down in Figure 5.3.

5.2.5 Number of Workers Employed

It was observed that majority of the building construction companies in Abuja were small scale construction companies. This decision was reached based on Nigerian National council on Industry classification of construction companies which is as follows:

- Micro/Cottage Industry: Not more than 10 workers, total cost not more than 1.5 million naira including capital, excluding the cost of land.
- Small Companies: Labour size of 11-100 workers, total cost of not more than 50 million naira including working capital but excluding cost of land.
- Medium Companies: Labour size of 101-300 workers or a total cost of over 50 million naira but not more than 200 million naira, including working capital but excluding cost of land.

- Large Companies: Labour size of over 300 workers or a total cost of over 200 million naira, including working capital but excluding cost of land.(Afeez Popoola,2001).

7 (26.9%) of the companies had 1-10 workers employed, 17 (65.4%) had 11-100 workers employed while 2 (7.7%) had 101-300 workers employed. None of the companies had above 300 workers employed. This result points to the fact that majority of building construction firms in Nigeria are small sized companies. From literature it was revealed that these small scale companies are profit minded their safety implementation plans are usually inadequate (See figure 5.4).

5.2.6 Nature of Ownership of Company

Table 5.1: Nature of ownership of building construction companies

Ownership of Company	Frequency	Percent	Valid Percent	Cumulative Percent
Public	3	11.5	11.5	11.5
Private	23	88.5	88.5	100.0
Total	26	100.0	100.0	

As shown from Table 5.1 above, majority of Nigerian building construction companies are privately owned with 23 (88.5%) of respondents signifying that their companies were privately owned. Just 3 (11.5%) of the respondents signified their companies were public companies. These points to the fact that the Nigerian government needs to invest more and show more determination towards the development of the building construction industry.

5.2.7 Nature of Workers Employment

Table 5.2 : Number of permanent Staff in the companies

Permanent Staff	Frequency	Percent	Valid Percent	Cumulative Percent
1-20	13	50.0	50.0	50.0
21-40	7	26.9	26.9	76.9
41-60	5	19.2	19.2	96.2
61-80	1	3.8	3.8	100.0
Total	26	100.0	100.0	

13 (50%) of the companies had 1-20 permanent staff, 7 (26.9%) had 21-40 permanent staff employed, 5 (19.2%) had 41-60 permanent staff and 1 (3.8%) had 61-80 workers employed in their company. This result shows a large portion, about 50% of the companies have about 1-20 permanent staff, this implies that most of the Nigerian building construction firms employ workers casually without any form of legal bond whatsoever binding them to the workers. This practice aids in subjecting these workers to ill treatments as the management of these companies can decide to lay them off whenever they feel like. The sense of Job security is lacking as virtually all the workers are not on permanent employments rather they were temporarily employed.

5.2.8 Number of Projects Handled

Table 5.3: Number of projects handled by the construction companies

Number of Projects Handled	Frequency	Percent	Valid Percent	Cumulative Percent
0-5	1	3.8	3.8	3.8
6-10	3	11.5	11.5	15.4
11-15	1	3.8	3.8	19.2
16-20	8	30.8	30.8	50.0
Above 20	13	50.0	50.0	100.0
Total	26	100.0	100.0	

13 (50%) of the companies visited signified they handled above 20 projects, 8 (30.8%) handled 16-20 projects. 3 (11.5%) handled 11-15 projects, 1 (3.8%) handled 6-10 projects while 1 (3.8%) handled about 0-5 projects. This statistics indicate that the companies visited were quite active ones with significant amount of projects handled till-date.

5.3 Worker Safety Issues

5.3.1 Available Worker Safety Regulations

When asked if their respective companies were aware of the available worker safety regulations put in place by the Nigerian government, they overwhelmingly signified awareness of the available regulations see table 5.4 below

Table 5.4: Response to awareness of available safety regulations by employers

Available Worker safety Regulations	Frequency	Percent	Valid Percent	Cumulative Percent
YES	22	84.6	84.6	84.6
NO	4	15.4	15.4	100.0
Total	26	100.0	100.0	

5.3.2 Site Inspection

They also overwhelmingly confirmed that government agencies do visit their respective sites to carry out site inspections. This is a commendable aspect as such inspections if done frequently will help check the activities of the workers and employers on building construction sites (See Table 5.5 below).

Table 5.5: Response to visits for site inspections

Site Inspection	Frequency	Percent	Valid Percent	Cumulative Percent
YES	25	96.2	96.2	96.2
NO	1	3.8	3.8	100.0
Total	26	100.0	100.0	

The Company staff opinions were sort on the relevance of provision of some safety facilities and safety materials for their workers on site, their responses were analyzed below:

When asked the question *what is your Opinion to the relevance of provision of the following Safety facilities for Workers on building site. Please indicate your reaction by checking the appropriate cell?*

The following response was obtained:

5.3.3 Safety Facility

Table 5.6: Company staff response to the provision of safety facilities

Safety Facility	SA	A	N	DA	SDA	Mean Score	Grand Mean
First Aid Equipment	21(80.77%)	5(19.23%)	–	–	–	4.81	4.28
Personal Protective	18(69.23%)	7(26.92%)	1(3.85%)	–	–	4.08	
Sanitary Facilities	6(23.08%)	17(65.38%)	3(11.54%)	–	–	3.81	
Appointing Safety officer on site	14(53.85%)	9(34.62%)	3(11.53%)	–	–	4.42	
Scaffold/Ladder	10(38.46%)	15(57.69%)	1(3.85%)	–	–	4.35	
Rain gear	4(15.38%)	20(76.92%)	2(7.69%)	–	–	4.08	
Hoisting Equipment	7(26.92%)	15(57.69%)	4(15.38%)	–	–	4.12	
Hand Gloves	19(73.08%)	7(26.92%)		–	–	4.73	
Hearing Protection	5(19.23%)	18(69.23%)	3(11.54%)	–	–	4.08	

SA= Strongly Agree

A=Agree

N= Neutral

DA= Disagree

SDA= Strongly Disagree

From Table 5.6 above it is seen that the site staff strongly agree to the relevance provision of safety facilities for their workers on site. All mean score values were above the weighted average of 2.5, with the grand mean of 4.28. First aid equipment was viewed as most important followed by appointment of safety officer was ranked 2nd with mean value of 4.42 then scaffold/ladder with mean score value of 4.35. This strongly indicated that they knew the importance of these safety facilities to their workers. Personal inspection of the sites visited coupled with interaction with the

workers however disputed this fact, these facilities are not provided by the employers for workers use. A few of the sites visited actually had a safety officer on ground.

When asked the question *what is your opinion as to the relevance of the following Safety materials?*

The following response was obtained:

5.3.4 Safety Material

Table 5.7: Company staff response to the provision of safety materials

Safety Material	VI	I	N	NI	NVI	Mean Score	Grand Mean	RII	Rank
Safety Sign	22(84.62%)	4(15.38%)	–	–	–	4.85	4.50	0.97	3 rd
Helmets	24(92.31%)	2(7.69%)	–	–	–	4.93		0.98	2 nd
Head Pan	3(11.54%)	22(84.61%)	1(3.85%)	–	–	4.08		0.79	6 th
Safety Boots	25(96.15%)	1(3.85%)	–	–	–	4.96		0.99	1 st
Shovel	3(11.54%)	19(73.08%)	4(15.38%)	–	–	4.0		0.79	7 th
Hand gloves	16(61.53%)	9(34.62%)	1(3.85%)	–	–	4.58		0.92	4 th
Eye Glasses	5(19.23%)	18(69.23%)	3(11.54%)	–	–	4.07		0.82	5 th

VI=Very Important (5)

I= Important (4)

N= Neutral (3)

NI= Not Important (2)

NVI= Not Very Important (1)

Table 5.7 summarizes the site staff responses to the provision of safety materials for their workers on site, 22 (84%) were of the opinion that safety signs are very important component of site safety, 24 (92.3%) considered helmets as very

important. 16 (61.53%) viewed hand gloves as very important and 25 (96.15%) indicated safety boots as very important. Shovels and eye glasses were considered important with response of 19 (73.08%) and 69.23% respectively. The mean score values also pointed to the fact that the employers knew the importance of these safety materials as the values were above the weighted average of 2.5. The Relative importance index values had very high ratings (above 0.80) with safety boots ranking first with RII value of 0.99. Head Pan and Shovel both had RII values of 0.79 signifying high rating.

It should be noted that though the site staff attached importance to the provision of these safety facilities and safety materials listed above, a visit to virtually all the site reveals that these materials and facilities are grossly inadequate and in some cases unavailable. The evidence of these is presented in the appendix.

From the list of safety materials scaffold/ladder were the most common available while appointment of safety officer on site and first aid equipment were available in some selected sites. The safety materials was not different as Head pans and shovels were the two (2) most commonly available materials seen on all sites visited, the others were either not available or in some cases insufficient. The Contractors usually provide the facilities and materials which are vital to the day's work the absence of which could hinder the work progress. The governmental agencies need to do more in ensuring these safety materials and facilities are provided for workers on site.

5.3.5 Nature of Accidents

When asked to indicate the main type of accident that occurs on their sites, their responses are given below:

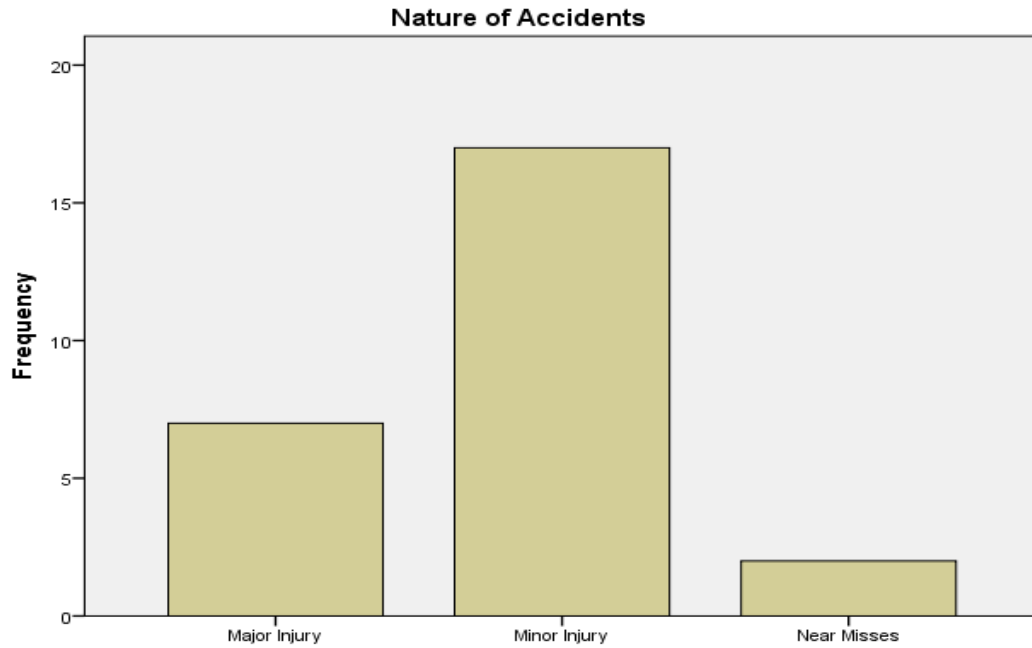


Figure 5.5: Company Staff response to Nature of accidents mainly experienced

From Figure 5.5 above, the staff identified minor injuries as the major type of accident which occurs mainly on their construction sites. 17 (65.4%) chose minor injury, 7 (26,9%) chose major injury as mostly experienced on their sites while 2 (7.7%) of the site staff chose near misses as most frequently experienced on their sites, None of the employers however acknowledged the occurrence of fatal accidents on their construction sites. With this response it can be said that from the site staff perspective, the major type of accidents experienced on building construction sites in Nigeria is minor injuries.

5.3.6 Causes of Accidents

The staffs were also asked what the major cause of accident among workers on their sites was the bar chart below shows the breakdown of their opinion:

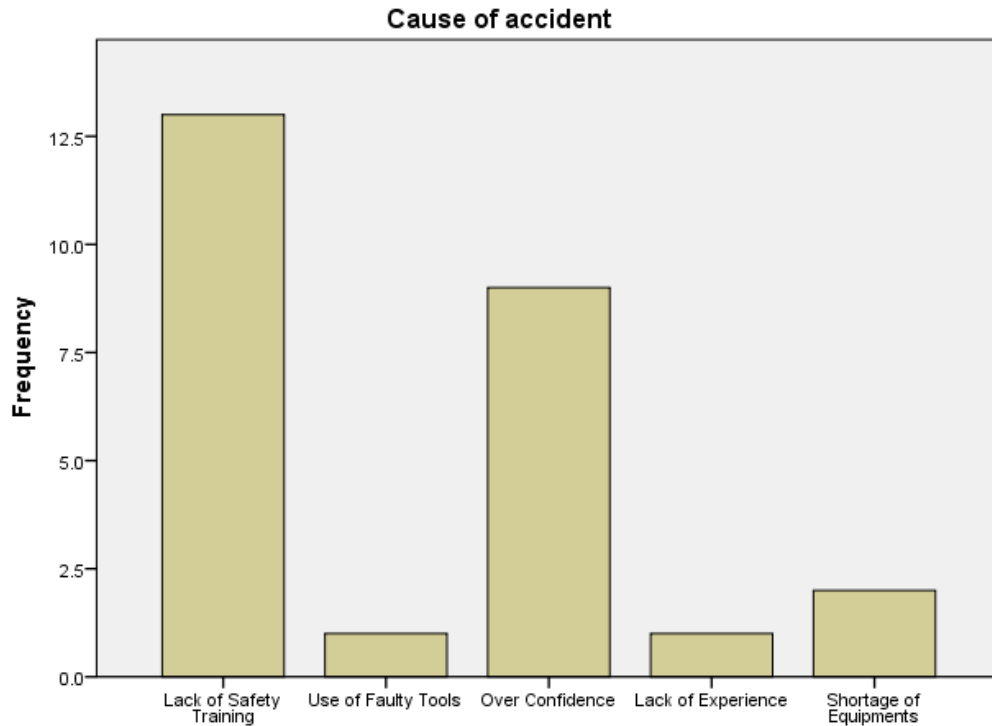


Figure 5.6: Company staff response to the causes of accident

From Figure 5.6 above, 13 of the company staff about 50% identified lack of safety training as the major cause of accident, 1 of the respondent representing 3.8% identified use of faulty tools as the major cause of accident, 9 (34.6%) identified over confidence among workers as the major cause of accident. Lack of experience with 3.8% while shortage of equipment represented 7.7%. From these responses the site staffs view lack of safety training as the major cause of accidents on Nigerian building construction sites.

5.4 Demography of Workers

The workers who participated in this research cut across the various trades available in the building sector. The most senior and experienced workers were identified on each site visited and given the questionnaires to fill. The respondents included Masons, Carpenters, Labourers, Tillers, Plumbers, Electricians, Steel benders and painters. The responses they gave for the various questions asked are given below.

5.4.1 Duration in Building construction Industry

Table 5.8: Workers duration in building construction industry

Duration in building construction sector	Frequency	Percent	Valid Percent	Cumulative Percent
0-5 years	17	40.5	40.5	40.5
6-10 years	8	19.0	19.0	59.5
11-15 years	4	9.5	9.5	69.0
16-20 years	5	11.9	11.9	81.0
Over 20 years	8	19.0	19.0	100.0
Total	42	100.0	100.0	

Table 5.8 above shows that 17 (40.5%) of the workers have 0-5 years experience in building, 8 (19%) have 6-10 years experience, 4 (9.5%) have 11-15 years experience, 5 (11.9%) have 16-20 years experience and 8 (19%) with over 20 years experience. This result shows that a majority of workers on building construction lack experience as about 40% of the sample size had just 0-5 years working experience.

5.4.2 Age Group of Workers

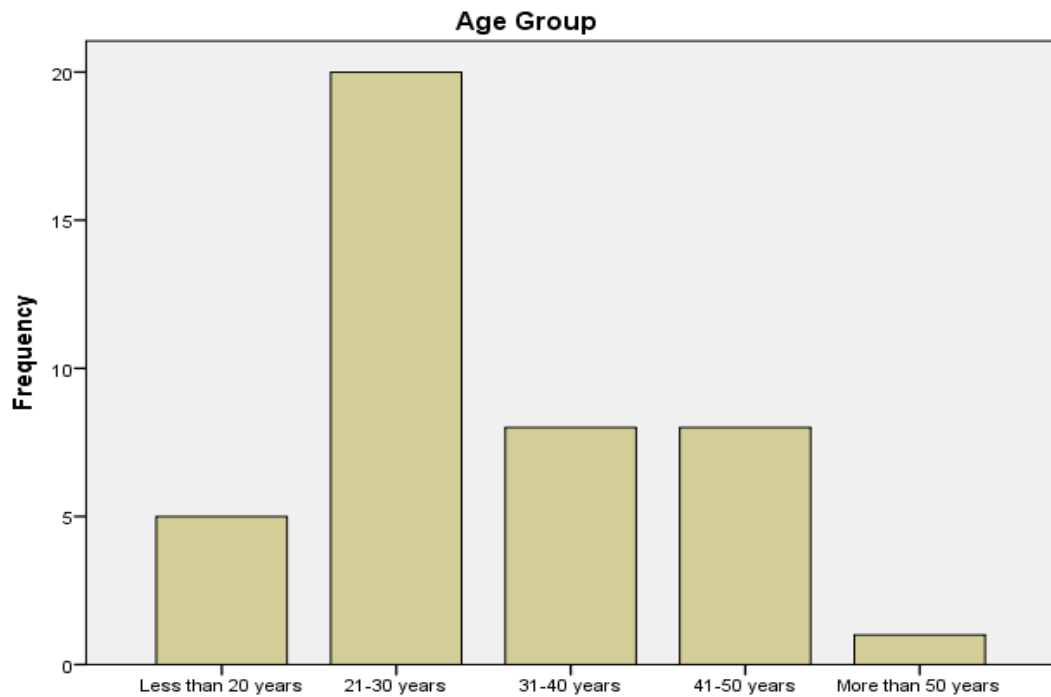


Figure 5.7: Age group distribution of the workers

Figure 5.7 above shows that majority of workers on building construction sites fall within the age range of 21-30 years. They are matured and should be responsible for their actions or inactions while carrying out their duties on site. This age group is a very agile one and if effectively utilized, it could enhance productivity on construction sites.

5.4.3 Educational Qualification of workers

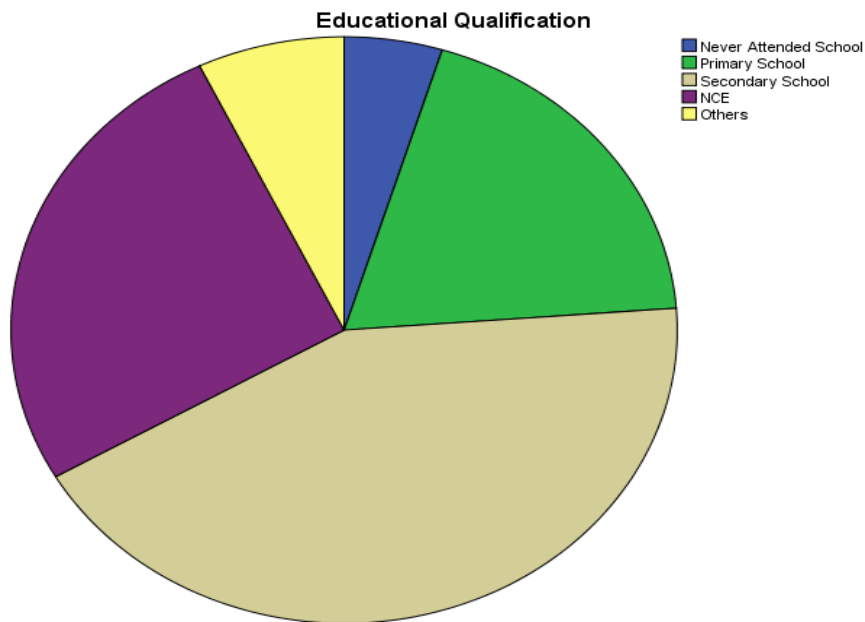


Figure 5.8: Educational qualification of the workers

The pie chart above shows that majority of the workers 18 (42.9%) had secondary school leaving certificates, followed by NCE certificate holders accounting for 11 (26.2%) of the population. 8 (19%) had primary school leaving certificates, while 2 (4.8%) of the respondents claimed to have never attended school. The others category was made up of OND certificate, diploma certificate and HND in building certificate holders, they accounted for 3 (7.1%) of the respondents. Basic education is not really a criteria for employing this workers, especially the unskilled laborers. It is however it is being advocated for the personal development of these unskilled laborers. This will provide them with the ability to read and understand the regulations guiding their activities on site.

5.4.4 Training

The workers were asked if they received any form of training before they joined the construction industry, 17 (40.5%) responded YES confirming they received some

sort of training before they joined the industry, 25 (59.5%) however responded NO. They just started work without prior training. This result indicates that majority of workers on building sites in Nigeria do not go for adequate training before they join the industry, rather they learn on the job. The danger associated with this trend is that all mistakes and accidents that are supposed to occur during the learning process do occur on the actual site itself, this could be fatal in some cases. This practice should be widely discouraged among the workers. 10 (55.6%) received Apprenticeship training while 6 (33.3%) of the workers attended Vocational training schools for training. 2 (11.1%) of the workers however signified they got some sort of professional training.

5.4.5 Nature of Employment

When asked about the nature of their employment with their various construction companies, 20 (47.6%) responded YES indicating they were permanent staffs of the companies while 22 (52.4%) responded NO to indicate they were temporary staff in their construction companies. This shows that a large percentage of the workers are temporarily employed, this could hinder their commitments and out put on sites as there is no sense of job security. The employers/contractors also exploit such cases as they tend to treat such workers with little or no regards as they know they can lay them off anytime. The workers usually gather in the mornings at strategic points where the employers come and pick the number they need for the execution of the day task, this method points to the fact that no legal backing is attached to such transactions. The employers are thus at liberty to do as they wish with them without fear of legal prosecution or whatsoever.

5.4.6 Place of Residence

31 (73.8%) of the workers indicated they reside in Abuja while 11 (26.2%) indicated they do not reside in Abuja, they leave in satellite towns around the federal capital territory. They transport themselves daily to these construction sites in Abuja. Interaction with the workers who signified they resided in Abuja revealed they leave in uncompleted building sites, containers on site and some on the same site they are employed to work. This is because their meager pay cannot afford to pay for the exorbitant house rents being charged by landlords in Abuja city.

5.5 Worker Safety Issues

5.5.1 Rights as an Employee

Table 5.9 shows the breakdown of responses obtained pertaining to the workers awareness of their rights on construction sites, 38 (90.5%) of the workers indicated they knew their rights on construction sites while 4 (9.5%) said they didn't know their rights on the construction sites. This means that though the workers know when their rights are being impeded upon by their employers/contractors they keep quite acting ignorant in order not to lose their source of income. During personal interactions with the workers their responses confirmed this, Aminu a laborer on one of the construction sites visited in Maitama spoke in this light. When he was asked if he fully knew his rights as a worker, this was his response: *"Bross person never see food chop you they talk about rights, make you ask me that one after belle full"*. Nigerian pidgin English implying he doesn't have food on his table as such he shouldn't be asked about rights, when he has enough to eat we can talk about his rights. This is a typical example of the mindset of the workers, they do whatever it takes to make money for survival.

Table 5.9: Workers response to awareness of their rights

Rights as an Employee	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	38	90.5	90.5	90.5
No	4	9.5	9.5	100.0
Total	42	100.0	100.0	

5.5.2 Awareness of Available Government or Non-Governmental Safety Agencies

34 (81%) of the workers claimed to be aware of the available Governmental or Non-Governmental agencies in Nigeria which are saddled with the responsibility of ensuring safe practices on construction sites. 8 (19%) of the workers claimed ignorance of such agencies, 33 (78.6%) indicated that these agencies pay visits to their sites for inspection. A majority of these visits according to the workers 23 (67.23%) was for company safety issues while just 11 (32.4%) indicated the visits were for workers safety issues. This entails that the available safety agencies need to channel more effort towards addressing safety issues confronting the workers as the present situation suggests they channel more effort towards the construction companies than the workers.

5.5.3 Safety Training

The workers response to the provision of safety training is given in the table below:

Table 5.10: Workers response to the provision of safety training by their companies

Safety Training Before starting work	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	22	52.4	52.4	52.4
No	20	47.6	47.6	100.0
Total	42	100.0	100.0	

52% of the workers receive safety practices training from their companies while 47.6% of the workers did not receive any form of safety training from their employers. As such the government needs to enlighten these companies on the necessity and importance attached to safety training programs.

5.5.4 Break Periods

All (100%) of the workers confirmed they had break periods during the days job, the duration of break period however differed from one construction site to another. 50% of the respondent indicated the break period on their sites was above 20 minutes. This is very good as the workers get enough time to rest before engaging in the 2nd part of the days job. The workers if well rested concentrate and have more efficiency on site.

5.5.5 Measures against Defaulting contractors

The workers indicated that there measures put in place by the government against contractors found to violate safety regulations in the course of executing their projects the penalties were fines, revocation of contract, suspension of contractor from professional body and stop of work on site. The responses is seen in figure 5.9 below

Penalty for Defaulting Contractors

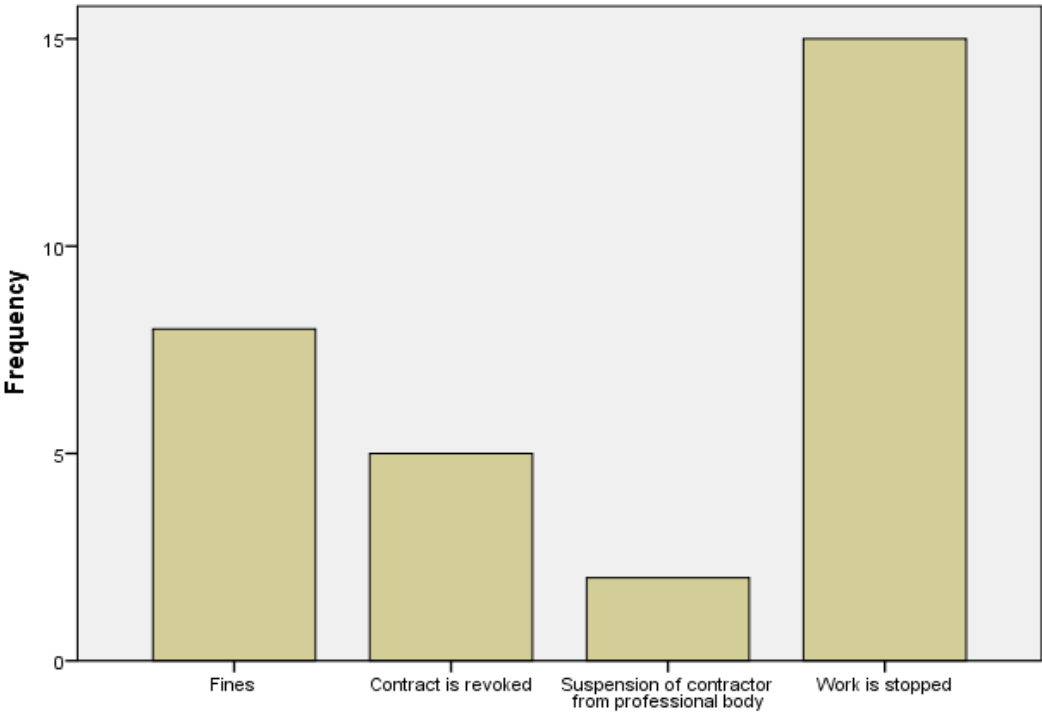


Figure 5.9: Workers response to the penalties for defaulting contractors

5.5.6 Safety Materials

Table 5.11: Workers response to the provision of safety materials

Safety Material	SA	A	N	DA	SDA	Mean Score	Grand Mean	RII	Rank
Safety Signs	–	1(2.83%)	–	15(35.71%)	26(61.90%)	4.57	3.47	0.91	1 st
Helmet	1(2.38%)	1(2.38%)	1(2.38%)	21(50%)	18(42.86%)	4.28		0.86	2 nd
Head Pan	8(19.05%)	11(26.19%)	7(16.67%)	12(28.57%)	4(9.52%)	2.83		0.57	7 th
Safety Boots	1(2.38%)	2(4.76%)	2(4.76%)	26(61.90%)	11(26.19%)	4.05		0.81	3 rd
Shovel	8(19.05%)	26(61.90%)	3(7.14%)	5(11.90%)	–	2.12		0.42	8 th
Hand Gloves	–	1(2.38%)	11(26.19%)	23(54.76%)	7(16.67%)	3.86		0.77	6 th
Eye Glasses	–	–	8(19.05%)	23(54.76%)	11(26.19%)	4.07		0.81	4 th
Scaffold/Ladder	21(50%)	21(50%)	–	–	–	1.5		0.30	9 th
Rain gear	–	1(2.38%)	9(21.43%)	22(52.38%)	10(23.81%)	3.97		0.80	5 th

SA= Strongly Agree (1)

A= Agree (2)

N= Neutral (3)

DA= Disagree (4)

SDA= Strongly Disagree (5)

The workers agreed to the provision of scaffolds and shovels as they were below the weighted average of 2.5; however they disagreed to the provision of the remaining safety materials on site as they all had weighted values above 2.5. This result reveal that the provision of Safety materials by Nigerian contractors have been seriously compromised. The RII values computed showed the workers viewed provision of safety materials as very important as five (5) Of the variables had very high ratings ($RII \geq 0.8$) the remaining three(3) had low ratings ($RII < 0.6$). Safety sign was the most important material from the workers perspective it ranked first (1st) with RII value of 0.91 followed by Helmets with RII value of 0.86 then safety boots with RII of 0.81 while the least ranked was scaffold/ladder. This implies the workers attached more importance to the provision of safety signs than any other safety material on the list. . The workers ranked safety signs as the most important material which is lacking on the sites. They hinted that safety signs were rarely provided on building construction sites. The provision of these signs could help reduce drastically the number of accidents recorded. Paul McEvoy, 2007 reported that NCC a major property development company provided pictorial books for their workers and it resulted in a drastic reduction in work related accidents. These pictorial books/leaflets typically contain mostly pictures depicting hazardous and poor worker practices among workers on site, such pictures are marked “x” with a red color indicating they shouldn’t be practiced. The safe and acceptable practices are usually indicated beside them so the workers would easily know how to go about implementing these safe procedures. Nigeria can implement such policies too. The reality on ground on the sites visited is that these materials are mostly not provided on sites but in some cases if provided are generally inadequate. The workers engage in unsafe practices like carrying cement bags on their bare heads, work barefooted on

the site, mix cement without hand gloves etc. This is presented as pictures in the appendix.

5.5.7 Obligations of the Employers

The workers claimed to be aware of the fact that the regulations available saddled the employers with the responsibility of providing a safe working site environment. When asked why they were still on site working in spite of the obvious shortcomings in this area on their site, their responses was as follows (see figure below).

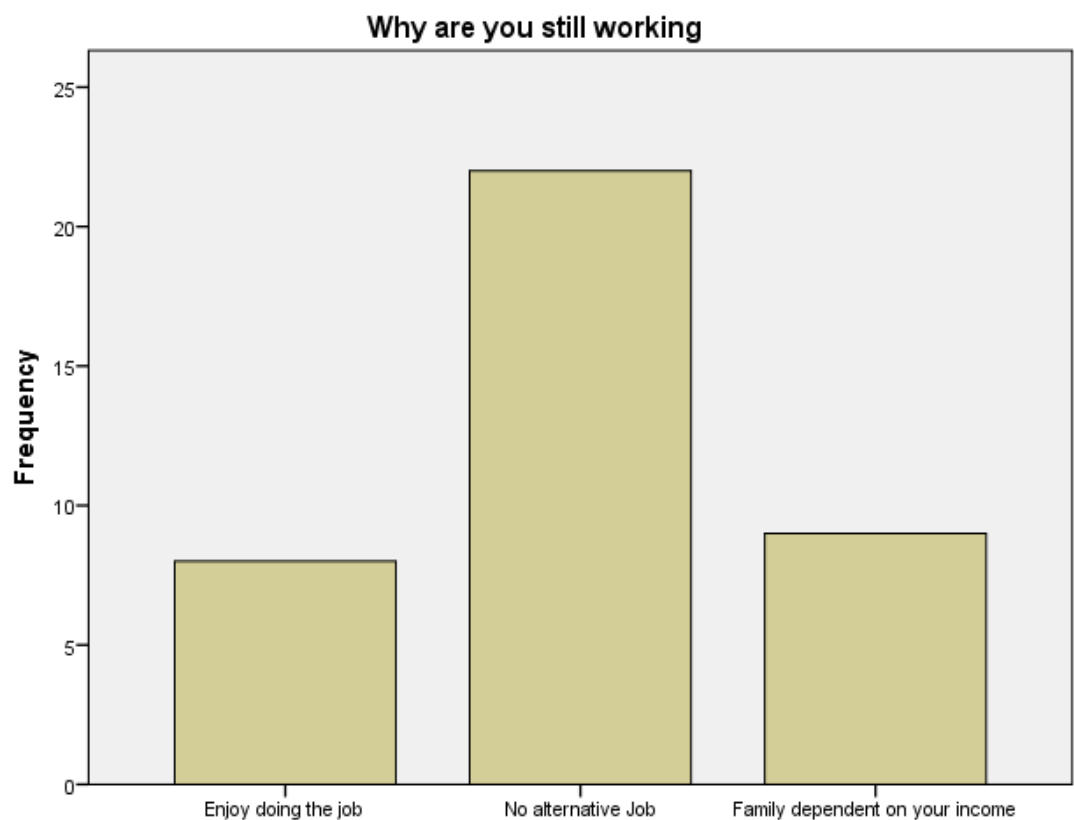


Figure 5.10: Workers reason for working on sites despite lack of safe practices

Figure 5.10 above reveals that majority of the workers 22 (56.4%) stayed on to continue working despite the conditions because they had no alternative jobs to fall back to. This is rather a peculiar case as the number of unemployed in Nigeria is very high so the workers count themselves lucky of having a source of income. They care less about the working condition as long as their pay is guaranteed. 9 (21.4%)

signified that they stayed back on the sites to work because their family members are dependent on them while 8 (19%) said they stayed back because they enjoyed and derived satisfaction while working on site.

5.5.8 Accident Cases

Table 5.12: Workers involvement rate in accidents

Involvement in accidents	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	33	78.6	78.6	78.6
No	9	21.4	21.4	100.0
Total	42	100.0	100.0	

78.6% of building construction workers confessed to have been engaged in one form of accident or the other while 21.4% of them claimed not to have ever been involved in any form of accidents on site. The workers were of the opinion that workers less than 20 years of age are mostly involved in accidents. This is perhaps because of their young age and basically lack of experience in the sector (See figure 5.11 below).

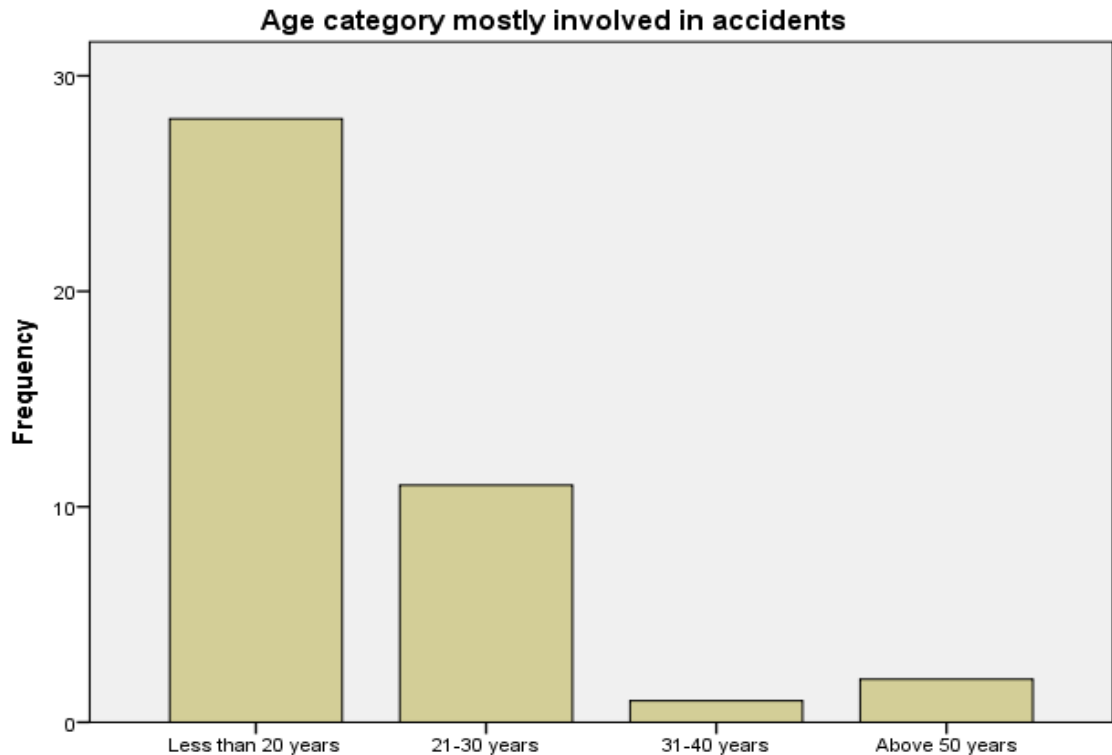


Figure 5.11: Age group mostly involved in accidents

41 out of the 42 sample size indicated they do report accident cases which occur to their employers/contractors. The measures taken by the contractors are thus: Took care of treatment (53.7%), giving day off (36.6%), nothing was done (7.3%). 1 (2.4%) of the workers indicated as other measures taken that he was given financial help from the employer. These responses are convincing as they reveal the contractors show some sort of care for their workers.

Unqualified labourers emerged the profession with the highest accident rates, this might be for the fact that most of the unqualified labourers on building sites are young and lack experience. The fact that the workers are mostly unskilled and find it difficult to jump into other trades like carpentry, plumbing and electrical works might also be a reason. These fields require a certain level of training, before they can indulge themselves in them. (See figure 5.12 below).

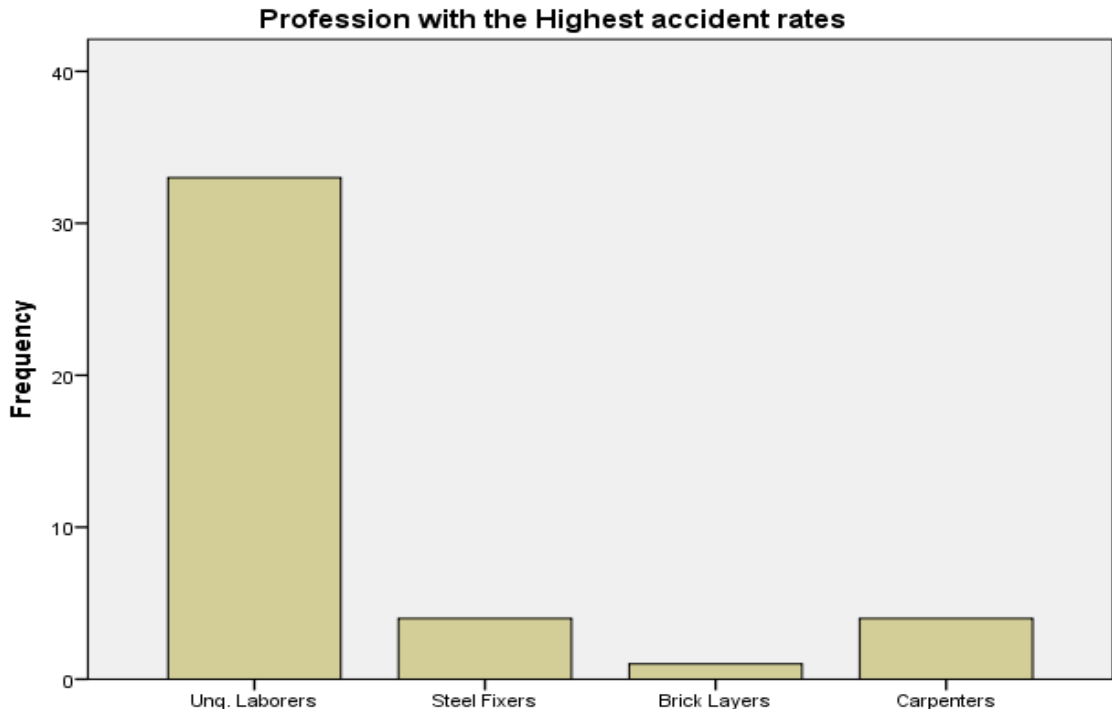


Figure 5.12: Profession with the highest accident rate

5.5.9 Nature of Accidents

Table 5.13: Nature of accidents mostly experienced on building site

Nature of injury mostly experienced	Frequency	Percent	Valid Percent	Cumulative Percent
Major injury	1	2.4	2.4	2.4
Minor injury	35	83.3	83.3	85.7
Near misses	6	14.3	14.3	100.0
Total	42	100.0	100.0	

Minor injuries mostly occurred on the site while near misses and major injury occasionally occurred. None of the workers however indicated the occurrence of fatal injuries on their construction sites.

5.5.10 Cause of Accidents

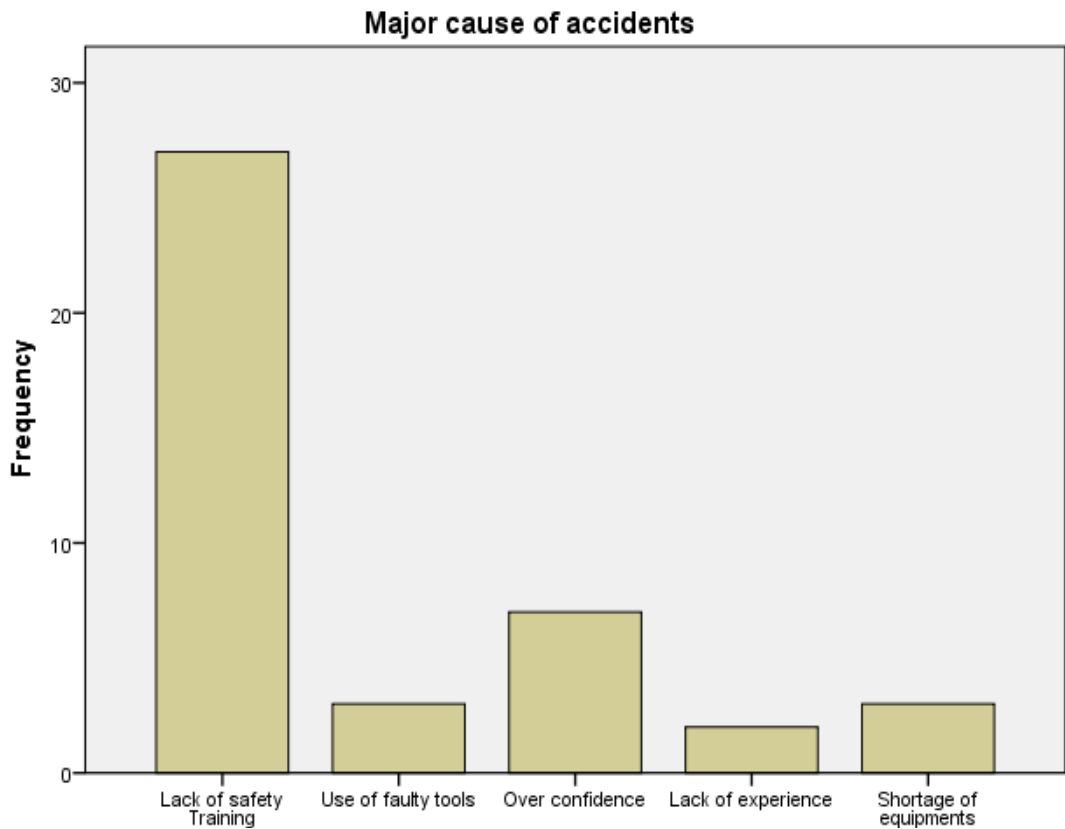


Figure 5.13: Cause of accident among workers

Lack of safety training ranked as the major cause of accident among the workers on Nigerian building sites with 27 (64.3%). Overconfidence came in second on the list with 7 (16.7%), use of faulty tools and shortage of equipment were third and fourth respectively both with 3 (7.1%) while the fifth on the list was lack of experience with 2 (4.8%). This result further confirms the fact that Nigerian building site workers do not get training before indulging into the construction sector.

5.6 Insurance

Table 5.14: workers response to being insured

Insurance	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	6	14.3	14.3	14.3
No	36	85.7	85.7	100.0
Total	42	100.0	100.0	

36 (85.7%) of the workers claimed they didn't have any form of insurance while 6 (14.35%) claimed to have an insurance policy. Those with insurance policy however confirmed they had received assistance from the insurance company in the past. This result highlights the poor rate of insurance among workers in the building construction sector as such the governmental agencies need to do more in collaboration with the insurance agencies to ensure the workers get insured.

5.7 Correlation Analysis

The term Pearson correlation was first developed by Karl Pearson in 1896. This aspect of statistics is more than a century in existence and over the years it kept gaining wide acceptance (Bruce, 2000). Pearson correlation is a test of the strength of linear relationship between two given variables. When this relationship is not linear it implies the correlation coefficients do not really represent the strength of the relationship that exist between these variables (David, 2004).

Pearson's Correlation analysis was employed to determine if certain relationships either positive or negative existed among workers practices. The following variables were tested for:

5.7.1 Workers duration in construction industry and involvement in accidents

Table 5.15: Correlation analysis between workers duration in the industry and Accident rates

Correlations		How long have you worked as a building site Worker	Have you been involved in any accidents
How long have you worked as a building site Worker	Pearson Correlation	1	-.279
	Sig. (2-tailed)		.074
	N	42	42
Have you been involved in any accidents	Pearson Correlation	-.279	1
	Sig. (2-tailed)	.074	
	N	42	42

As seen from Table 5.15 above, the correlation coefficient r has a value of -0.27 , this implies a negative correlation. It is however a weak correlation. This means the two factors are independent of each other. The P-value of 0.074 which is greater than 0.05 the significance level implies we can conclude thus: The number of years spent by Nigerian building site workers has an effect on the amount of accidents they experience. The longer experience the less accident they experience.

5.7.2 Age group and Rights as an employee

Table 5.16: Correlation between workers age group and knowledge of their rights

Correlations		Age Group	Rights as an Employee
Age Group	Pearson Correlation	1	.073
	Sig. (2-tailed)		.646
	N	42	42
Rights as an Employee	Pearson Correlation	.073	1
	Sig. (2-tailed)	.646	
	N	42	42

From Table 5.16 above, it is seen that the relationship has a positive correlation coefficient value of 0.073, this is however a weak positive correlation. The p-value is 0.642 which is above the 0.05 significance level. We can conclude that there is a positive relationship between the age group of workers and knowledge of their rights as employees i.e the older the worker the more awareness they get about their rights as workers.

5.7.3 Correlation between workers age and level of awareness of the available safety regulatory agencies

From Table 5.17 below, the coefficient of correlation value of -0.253 signifies a very weak correlation between the variables, the p-value of 0.106 is however greater than the 0.05 significance level, so we can conclude that a negative correlation exist between the variables. As one variable increases, the other reduces.

Table 5.17: correlation between workers age and level of awareness of available safety regulatory agencies

Correlations		Age Group	Awareness of Worker safety Agencies
Age Group	Pearson Correlation	1	-.253
	Sig. (2-tailed)		.106
	N	42	42
Awareness of Worker safety Agencies	Pearson Correlation	-.253	1
	Sig. (2-tailed)	.106	
	N	42	42

5.8 Hypotheses Testing

Hypothesis could be defined as written down statements relating to concepts that are testable. (Shindler et al., 2002).

The test of hypotheses was done using T-test. Hypothesis testing basically is a technique for statistical data collection used to answer questions with the aid of statistical models. Each opinion is posed as a null hypothesis (H_0), the null hypothesis implies there are no differences of the dependent variables.

For most disciplines, when hypothesis testing is implemented, researchers watch out for a significance level of 0.05, this value signifies that only a 5% probability that the output obtained occurred by chance. Martyn Shuttlewort (2008).

Hypothesis testing consists of four (4) steps, these steps are to be observed before a decision is reached on accepting or rejecting the null hypothesis. The steps include:

- Stating the Hypothesis: Here the null and alternate hypothesis are stated clearly. The null and alternate hypothesis must be mutually exclusive to each other (if one is true, the other is false).
- Designing an Analysis Plan: Here, the criteria for analyzing the null hypothesis is stated.
- Analyze Data: Entails reading the values of the T-test output table.
- Interpret Result: Here the decision rule is applied, the decision of accepting or rejecting the null hypothesis is reached here based on the p-value.

(<http://www.stattrek.com/hypothesis-test/hypothesis-testing.aspx>)

H_0 = Null Hypothesis

H_1 = Alternative Hypothesis

The following hypothesis were tested for

5.8.1 Hypothesis one

H_0 : Nigerian building construction workers are not being conscious about safety on site

H₁: Nigerian building construction workers are being conscious about safety on site

The result of independent sample T-test conducted is given on Table 5.18 below.

From the Levenes test column a significance of 0.043 was obtained, this value is less than 0.05. This therefore implies that equal variances not assumed hence the second (2nd) row was read to obtain the values. The T-test result showed a significance of 0.043, this value is less than 0.05 thus we accept the null (H₀) hypothesis. Therefore we conclude that:

Nigerian building construction workers are not being safety conscious on site.

Workers engage in site works paying little or no attention to their personal safety, they work with the mindset that as long as they are being paid their allowances they are ready to work. They tend to ignore the poor safety standards on site as long as they have a source of income, they intentionally overlook situations when their rights are being violated by their employers. They believe they might end up losing their jobs if they try to speak against such rights violations. The laborers on site are the most vulnerable group, this assertion is collaborated by the workers who confirmed laborers to be the most group experiencing accidents on building sites. A large percentage of them are young and agile so they tend to engage in unsafe acts and practices while discharging their work, when bonuses are attached to completion of certain tasks the desire for these bonuses also drive them into engaging in unsafe practices. The reality is that poverty has driven these workers to a state where they accept any situation that comes their way and keep quiet. The sensitization of these workers should therefore be given adequate attention by the relevant governmental agencies, sensitization awareness on the importance and benefits attached to being safety conscious before joining the construction sector should be clearly highlighted.

The relevant governmental agencies thus need to step up measures to check the shortcomings and violations of these Employers.

5.8.2 Hypothesis two

H₀: Nigerian building construction site workers are not adequately trained

H₁: Nigerian building construction site workers are adequately trained

The result for the T-test is given on Table 5.19. The Levenes test column read a significance of 0.46, this implies Equal variances not assumed hence the second (2nd) row is read to obtain t-test results. The T-test gave a significance of 0.778 which is greater than 0.05, hence we accept the null (H₀) hypotheses. Thus we can conclude that:

Nigerian building construction site workers are not adequately trained.

Nigerian workers jump into the construction industry without gaining adequate training, they tend to learn on the job. This scenario implies that all the mistakes that may occur during the course of learning the job occurs on actual sites, this could be disastrous in terms of serious accidents. Most of the workers confirmed they learnt their various trades this way; their families connected them with their masters with whom they learnt the trade. Instead of paying for learning they serve the masters for some period of years during which they gather enough experience. The masters are left with the obligation of providing them with money for lunch daily on the sites, this practice is done throughout the period of learning. This method is rather archaic and should be discouraged by the relevant government authorities.

Most of the workers testified to the fact that they were on temporary employments with their construction companies (about 52.4%), this might be a contributing factor as they feel free to engage in any practice they like as they feel they are not under

any obligation with anyone as such they do what they feel like doing. These temporary staffs are not registered with any union hence they cannot be called to other. The training of these workers should therefore be given adequate attention by the relevant governmental agencies, sensitization awareness on the importance and benefits attached to gaining adequate training before joining the construction sector should be clearly highlighted.

A summary of some responses obtained from both the workers and employers is given on table 5.20.

Table 5.18: T-test results for Hypothesis one (1)

Independent Samples Test		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Age	Equal variances assumed	4.366	.043	.629	40	.533	.24242	.38562	-.53693	1.02178
Group	Equal variances not assumed			.801	19.677	.433	.24242	.30265	-.38956	.87441

Table 5.19: T-test result for Hypothesis two (2)

Independent Samples Test		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Age	Equal variances assumed	.556	.460	-.276	40	.784	-.08941	.32364	-.74351	.56468
Group	Equal variances not assumed			-.284	37.473	.778	-.08941	.31507	-.72753	.54871

Table 5.20: Summary of Some responses from workers and Site staff

Item	Workers Response	Employers Response	Comment
Duration In building Construction Industry	17 (40.5%) of the workers have 0-5 years experience in building, 8 (19%) have 6-10 years experience, 4 (9.5%) have 11-15 years experience, 5 (11.9%) have 16-20 years experience and 8 (19%) with over 20 years experience	6 (23.1%) of the respondents said they had 0-5 years working experience, 3 (11.5%) had 6-10 years experience, 8 (30.8%) had 11-15 years experience, 6 (23.1%) had 16-20 years experience while 3(11.5%) had more than 20 years working experience in Building construction industry.	Most of the workers were relatively new to the construction industry with just 0-5 years working experience while the employers to some extent had adequate experience in building construction with about 16-20 years experience.
Age group	majority of workers on building construction sites fall within the age range of 21-30 years		This age group is a very agile one, they are matured and should be responsible for their actions on site. If this group of workers are effectively utilized, it could enhance greatly productivity on construction sites
Educational Qualification	18 (42.9%) had secondary school leaving certificates, followed by NCE certificate holders accounting for 11 (26.2%) of the population. 8 (19%) had primary school leaving certificates, while 2 (4.8%) of the respondents claimed to have never attended school.	14 (53.8%) were holders of B.sc, B.Eng or B.Tech, 6 (23.1%) had M.sc degrees, 4 (15.4%) had HND certificates, while 2 (7.7%) were Technicians	The Workers had basic educational qualification with majority of them being educated up to secondary school level while the Employers were adequately qualified for their positions with about 53.8% of them possessing a 1 st degree.
Safety Materials	The workers agreed to the provision of Scaffolds and shovels as they were below the weighted average of 2.5 Safety sign was the most important material from the workers perspective it ranked first (1 st) with RII value of 0.91 followed by Helmets with RII value of 0.86 then safety boots with RII of 0.81 while the least ranked was scaffold/ladder.	Safety boots ranked first (1 st) with RII value of 0.99. Head Pan and Shovel both had RII values of 0.79 signifying high rating. All mean score values were above the 2.5 average.	The Employers signified they knew the importance of the safety materials to their workers, however the reality on ground is that these materials are not being provided by the employers on site, in some cases they are inadequate. Shovels, Scaffolds and Head pans were the most commonly available safety materials seen on all sites visited.
Profession involved	Laborers emerged the profession with the highest accident rates, this might be for the fact that most of the laborers on		Laborers take little or no precautions regarding their safety on site, they are usually young and full of energy. This youthful

most in accident	building sites are young and lack experience		exuberance in some cases drives them to engage in unsafe practices while working on site.
Causes of Accident	Lack of safety training ranked as the major cause of accident among the workers on Nigerian building sites with 27 (64.3%). Overconfidence came in second on the list with 7 (16.7%), use of faulty tools and shortage of equipment were third and fourth respectively both with 3 (7.1%) while the fifth on the list was lack of experience with 2 (4.8%).	13 (50%) of the employers/company staff identified Lack of safety training as the major cause of accident, 1 (3.8%) identified use of faulty tools as the major cause of accident, 9 (34.6%) identified over confidence among workers as the major cause of accident. Lack of Experience with (3.8%) and Shortage of equipment with 2 (7.7%)	Both Workers and Employers Ranked Lack of safety training as the major cause of accident on building construction sites, this indicates that attention is not being paid to the training of workers as regards to safety as such the relevant governmental agencies need to step up and provide the needed enlightenment of safety training for workers to help reduce the number of accidents experienced on building sites

5.9 Recommendations

Based on the findings of this research, the following recommendations will be most useful:

1. The government should ensure all construction sites erect safety signs before construction can commence. Pictorial books/leaflets presenting different hazardous working conditions should also be provided for the workers, these books should contain just pictures so it would be easily understood by even the illiterate workers.

In cases where write-ups are needed, it is strongly recommended that they are translated into Hausa, Igbo and Yoruba languages which are the three (3) most popular languages in Nigeria. This will benefit workers who understand either of the languages.

2. The federal ministry of labor and the Nigerian institute of safety professionals who are the agencies with oversight functions of ensuring strict implementation of the regulations should be strengthened and provided with the legal backing to carry out their roles effectively, accident documentation on these sites should be done effectively.
3. The establishment of a Nigerian building society will help check the activities of building practice in Nigeria. Building societies are available in other countries of the world as such Nigeria should replicate this.
4. Nigeria lacks a construction industry training board (CITB), it should be established to serve the purpose of training and advisory services for the construction workers.

5. The Council for the regulation of building in Nigeria (CORBON) and Nigerian institute of building (NIOB) should be strengthened and giving all legal backings in order to carry out their statutory responsibilities effectively.
6. Nigerian employers should be sensitized on the need for adopting safety measures first before considering profit making and other benefits.
7. The Insurance companies should make insurance of workers on site a priority.
8. The available regulations urgently need to be updated. Most importantly they should be updated into solely Nigerian versions making them suitable for implementation on Nigerian construction sites. The bill for the enforcement of the National building code of Nigeria passed in 2006 also needs to be passed by the national assembly.
9. A National bank of commerce and industry could be set up in Nigeria, it will specifically deal with financial issues related to the labor sector. Registered building site workers could get financial assistance from such banks.
10. Site meetings should be encouraged on site, such meetings will enable workers express their grievances, observations and challenges to their employers easily.

Chapter 6

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The importance attached to the safety of workers on building construction sites can never be overemphasized. This is because of the mere reason that occurrence of accidents on sites result in far reaching consequences like delays in project completion time, alter overall cost of executing project, taint the reputation of the construction firm, de-motivate the co-workers and in some cases lead to death.

Data about records of accidents in Nigeria and Abuja in particular were not readily available, this was basically because Company staffs in Nigeria do not report accident cases to the responsible government agencies for adequate documentation. The workers also act in the same manner as they rarely report cases of accidents too, they just notify the employers in some cases who in turn fail to notify the governmental agencies. Nigerian workers need to be sensitized on the importance and necessity of reporting accidents to the appropriate authorities, most of the available records cited in this work were mostly gotten from the accident cases that attracted media interest. These accidents recorded some casualties and the newspapers reported them on the pages of their dailies.

- This work has explored the safety aspect of building construction practice in Nigeria pointing out issues faced by the workers on site, the shortcomings on

the part of the construction companies in providing some basic safety materials and facilities was exposed. Though the employers overwhelmingly signified their knowledge/awareness of the available safety regulations guiding the industry, this research indicated they obviously neglected implementing them. This obviously indicated that the responsible governmental agencies and ministerial departments in charge of the construction industry are seriously lacking in carrying out their roles and services.

- There was a consensus between the Site staff and workers as to the major cause of accident on Nigerian building sites, they both believed lack of safety training was the major cause of accidents experienced. Educational qualification is also an important aspect which needs to be addressed, most of the workers have the opinion that they do not need any formal education/training in order to be successful in the industry as such majority of the workers signified they didn't get any formal training before joining construction.
- Review of literature on the available legislations in Nigerian construction sector revealed that virtually all the laws are old and outdated. These regulations urgently need to be updated to solely Nigerian versions.
- This research revealed that virtually all building construction firms in Nigeria are privately owned and are small scale companies employing within the range of 10-100 workers. The hypothesis test revealed that Nigerian building construction workers lack safety consciousness in their practice, it further revealed that the workers do not get adequate training before they start work. The longer years spent on site, the fewer amounts of accidents experienced by

the workers, it was however observed that the older workers had more awareness of their rights and privileges.

6.2 Recommendations for Future Research

There is a lot to be explored as regards to workers safety. This work analyzed the issues experienced on typical building sites in Abuja, there are however some more areas which need more research:

1. Further research can be conducted in more cities preferably at least one city from each geopolitical zone of Nigeria in order to get a clearer picture of events. This research was limited to Abuja city.
2. Research should be carried out on the source of funding of the building construction companies. The result will reveal if the reason for poor safety implementation plans is as a result of inadequate resources or not.
3. Future research should look into the roles played by safety officers in the various building construction sites in Nigeria.

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APPENDICES

Appendix A: QUESTIONNAIRE COVER PAGE

Department of Civil Engineering,
Eastern Mediterranean University,
Cyprus.

SURVEY QUESTIONNAIRE

SAFETY ISSUES INVOLVING WORKERS ON BUILDING CONSTRUCTION SITES IN NIGERIA

Dear Sir/Madam,

This questionnaire forms part of M.sc research work which aims at studying the Safety issues related to Workers on Nigerian Building construction sites highlighting critical issues associated with the workers. It is expected that this research will help improve the conditions of these workers.

I am assuring you that all information provided will be **strictly confidential and will be used purely for research purposes only**. Please tick (√) the appropriate cell for your response. Thank you for your time and valid contribution in advance.

Yours Faithfully,

Daniel Ndakuta Kolo

Msc Student

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Assoc. Prof. Dr. Ibrahim Yitmen

Supervisor of Msc Research

Appendix B: SITE STAFF QUESTIONNAIRE

DEPARTMENT OF CIVIL ENGINEERING EASTERN
MEDITERANEAN UNIVERSITY CYPRUS

BUILDING CONSTRUCTION SITE EMPLOYER/COMPANY STAFF ASSESMENT ON SAFETY ISSUES INVOLVING WORKERS

(A) PERSONAL DATA

1. What is your Position in the Company?
 - a. Contractor []
 - b. Project Manager []
 - c. Site Engineer []
 - d. Architect []
 - e. Others Specify -----

2. Please tick (\surd) to indicate Educational qualification
 - a. M.Sc []
 - b. B.Sc / B.Eng /B. Tech []
 - c. HND []
 - d. Technician []
 - e. Others please specify -----

3. How long have you worked in the Building Construction Sector?
 - a. 0-5 years []
 - b. 6-10 years []
 - c. 11- 15 years []
 - d. 16- 20 years []
 - e. More than 20 years []

4. How many Workers do you have employed on Site?
 - a. 1 – 10 []
 - b. 11 – 100 []
 - c. 101 – 300 []
 - d. Above 300 []

5. What is the nature of ownership of your company?
 - a. Public
 - b. Private

6. How many Permanent Staffs do you have as workers?

- a. 1 – 20
 - b. 21- 40
 - c. 41 – 60
 - d. 61 – 80
 - e. 81 – 100
7. How many projects has your company handled to-date?
- a. 0 – 5
 - b. 6 – 10
 - c. 11 – 15
 - d. 16 – 20
 - e. Above 20

(B) WORKER SAFETY ISSUES

8. Is your Company aware of the available regulations regarding Worker safety in Nigeria?

a. Yes []

b. No []

9. Do Government or non-governmental agencies visit your site for inspection?

a. Yes []

b. No []

10. What is your Opinion to the relevance of provision of the following Safety facilities for Workers on Building Site. Please indicate your reaction by checking the appropriate cell.

Safety Facility	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
First Aid Equipment					
Personal Protective Equipment (PPE)					
Sanitary Facilities					
Appointing Safety officer on site					
Scaffold/Ladder					
Rain gear					
Hoisting equipments					
Hand gloves					
Hearing protection					
Helmets					

11. What is your opinion as to the relevance of the following Safety materials?

Safety Material	Very Important	Important	Neutral	Not Important	Not very Important
Safety Signs					
Helmets					
Head Pan					
Safety Boots					
Shovel					
Hand gloves					
Eye Glasses					

12. What type of Building is being constructed?

- a. Bungalow []
- b. Duplex []
- c. Office complex []
- d. Shopping Mall []
- e. Others Please Specify -----

13. Please tick (√) from the following, the nature of accidents which mainly occurs among Workers on your Site.

- a. Fatal Injury []
- b. Major Injury []
- c. Minor injury []
- d. Near Misses []
- e. None []

14. From your opinion, what is the major cause of accidents among workers on building construction sites?

- a. Lack of Safety Training []
- b. Use of Faulty Tools []
- c. Over Confidence []
- d. Lack of experience []
- e. Shortage of equipment's []

Appendix C: WORKERS QUESTIONNAIRE

DEPARTMENT OF CIVIL ENGINEERING EASTERN
MEDITERANEAN UNIVERSITY CYPRUS

BUILDING CONSTRUCTION SITE WORKERS ASSESMENT ON SAFETY ISSUES INVOLVING WORKERS

(A) PERSONAL DATA

1. How long have you been Working as a building Construction Site Worker?
 - a. 0 – 5 years
 - b. 6 – 10 years
 - c. 11 – 15 years
 - d. 16 – 20 years
 - e. Over 20 years

2. Please tick (√) your age group
 - a. Less than 20 years
 - b. 21 – 30 years
 - c. 31 – 40 years
 - d. 41 – 50 years
 - e. More than 50 years

3. Please indicate your Educational qualification
 - a. Never attended school
 - b. Primary School
 - c. Secondary School
 - d. NCE
 - e. Others please specify -----

4. Did you receive any form of Formal training before joining construction?
 - a. Yes
 - b. No

5. If YES, What type of training did you receive?
 - a. Apprentice
 - b. Vocational School
 - c. Others Specify -----

6. Are you a permanent staff of the Company?
 - a. Yes
 - b. No

7. Do you reside in Abuja?
a. Yes []
b. No []

(B) WORKER SAFETY ISSUES

8. Do you know your rights as an employee of the construction company?
a. Yes []
b. No []

9. Are you aware of any government or non-governmental establishments which deal with construction workers safety?
a. Yes []
b. No []

10. Do government or non-governmental agencies visit your site for Safety inspection?
a. Yes []
b. No []

11. If YES, what kind of safety inspection?
a. Company safety []
b. Worker/employee safety []

12. Does your company provide safety training for workers before starting work?
a. Yes []
b. No []

13. Do you go on break during a day's job?
a. Yes []
b. No []

14. If YES, how long is the break period?
a. 0 – 5 minutes
b. 6 – 10 minutes
c. 11 – 15 minutes
d. 16 – 20 minutes
e. Above 21 minutes

15. Are there strict measures put in place against contractors who violate safety regulations in executing their projects?

- a. Yes []
- b. No []

16. If YES, what is the penalty?

- a. Fines
- b. Contract is revoked
- c. Suspension of contractor from professional body
- d. Work is stopped
- e. Others , please specify -----

17. What is your Opinion to the provision of the following Safety materials by Contractors, please indicate by ticking your reaction to the provision of each Safety material from the list below:

Safety Material	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Safety Signs					
Helmets					
Head Pan					
Safety Boots					
Shovel					
Hand gloves					
Eye Glasses					
Scaffold/Ladder					
Rain gear					

18. Are you aware it is the obligation of the employer to provide the necessary Safety materials on Site?

- a. Yes []
- b. No []

19. If YES, why are you still on site working?

- a. Enjoy doing the job []
- b. No alternative Job []
- c. Family dependent on your income []

- d. To keep busy
- e. Others please specify -----

20. Have you ever been involved in any type of accident on Site?

- a. Yes
- b. No

21. From your opinion & experience on Building construction sites, which category of Workers have mostly been involved in Accidents?

- a. Less than 20 years
- b. 21- 30 years
- c. 31 – 40 years
- d. 41 – 50 years
- e. Above 50 years

22. Do you report Cases of Accidents to your Employer?

- a. Yes
- b. NO

23. If YES, what was the measure taken by the employer?

- a. Took care of the treatment
- b. Nothing was done
- c. Giving the day off
- d. Others please Specify -----

24. Which Profession recorded the higher accident rates?

- a. Laborers
- b. Steel Benders
- c. Brick Layers
- d. Carpenters
- e. Others, please Specify -----

25. What is the nature of accidents mostly experienced?

- a. Fatal injury
- b. Major Injury
- c. Minor Injury

d. Near Misses []

26. From your Opinion, what is the major cause of accidents among Workers on Building construction Sites?

a. Lack of Safety Training []

b. Use of faulty Tools []

c. Over Confidence []

d. Lack of Experience []

e. Shortage of Equipment's []

27. Do you have any form of Insurance?

a. YES []

b. No []

28. If Yes, have you ever received any assistance from the Insurance company in terms of accidents?

a. Yes []

b. No []

Appendix D: UNSAFE WORKER PRACTICE PICTURES



Labourer carrying a Bag of Cement on his bare head



Masons and Labourers working at height without personal protective equipments



Worker mixing cement bare footed on site



Worker working bare footed on site



Carpenter creating formworks without hand gloves



Steel Benders working on reinforcement bars without hand gloves, boots or Helmets