ASSESMENT OF SAFETY IN NIGERIA CONSTRUCTION INDUSTRIES

BY

MMEGHA, REMIGIUS TOCHUKWU (B.ENG)

(20124762438)

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CERTIFICATION

We certify that this work, *Assessment of safety in Nigeria construction industry* was carried out by **MMEGHA, REMIGIUS TOCHUKWU (20124762438)** in partial fulfilment for the award of degree of Master of Science in Project Management Technology of the Federal University of Technology Owerri.

..... 06/01/2022.....

Dr. C.I. Anyanwu **Date**

(Project Supervisor)

..... 6/6/2023.....

Dr. I.I. Echeme **Date**

(HOD, PMT)

....

Prof. O.T. Ebiringa **Date**

Dean, SMAT

....

Prof. B.O. Esonu **Date**

Dean, Postgraduate School

....

External Examiner **Date**

DEDICATION

This research project is dedicated to GOD Almighty for His infinite mercies during the course of this work and to my late mother Mrs. Mmegha Victoria who died at the period of this work

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ABSTRACT

The study investigated the occupational health and safety of the Nigeria casual worker in the building construction sites for the purpose of establishing the critical issues affecting the overall welfare and safety of casual workers on building construction sites. The population of the study is 235 construction workers/staff in five selected construction sites in Anambra State. A sample of 174 was selected from a cluster junior and senior staff using the random sampling technique. A 48-item, 5-point Likert-type instrument was used to elicit responses that formed the data for the study. The descriptive statistics (frequencies, percentages) were used in answering the research questions and to describe the characteristics of the respondents, while the hypotheses were tested with Chi-square. The results showed that accidents occur in construction sites and the most common sources are trench collapse, faulty assemble of scaffolding and falls; the most common health/safety problems are dislocation of joints, eye problem, chest/heart problem, vibration of white finger, and deafening; among the factors responsible for health/safety problems of constructions workers are complacency, indulgence in unsafe acts, use of improper tools, unguarded open holes, non-use of personal protective equipment and safety gadgets, bad layout and organization, bad construction and design, faulty machines or tools/work techniques, taking things from machine while on motion, insensitivity and responsiveness. The findings further indicate that measures for mitigating health hazards in construction include training, competence, supervision and clear instructions, access to washing and toilet facilities, access to the right tools, equipment, plant and protective clothing, employees' health surveillance, abstinence from alcohol/drugs and use of mechanism to report all work-related illness to the appropriate authorities. Finally, the results showed that observance of health and safety procedures significantly controls the rate and nature of accidents on construction sites. The study thus concludes that construction is a risky industry. Though, so many hazards are present at construction sites, observance of health and safety procedures significantly control the rate and nature of accidents on construction sites. Among the recommendations to control hazards in construction site is that the regulatory body should be set up to monitor the safety of construction workers and to sanction companies whose staff are adjudged highly prone to accidents at construction sites.

Keywords: Occupational Health and Safety, Construction Industries, Welfare of Casual Workers.

CHAPTER ONE

INTRODUCTION

1.1Background Information

Construction is widely regarded as an accident prone industry by Haslam et al.,(2005). The reasons construction is risky and prone to health and safety risks are because of the physical environment of the work, nature of the construction work operations, construction methods, construction materials, heavy equipment used, and physical properties of the construction project itself.

There are statutory instruments and legislative frameworks in many developed countries to govern construction operations on site to help minimize health and safety hazards. For example, the construction (Design and Management) Regulations on Health and Safety in the UK construction industry 2007. However, the characteristics of construction in developing countries are not the same as characteristics of construction in developed countries.

Hence, Health and Safety policies and procedures may vary and needs to be contextualized. The aim of this thesis is to investigate the state of health and safety on construction sites in Anambra state,Nigeria based on a study of the following five construction sites selected,construction of office complex in Chukwuemeka Odumegwu Ojukwu University Uli Anambra state, construction offactory/production hall at kotec group Nnewi Anammbra state, construction of

company administration office complex at Chicasson Group Nnewi Anambra state, construction of faculty of engineering building at Chukwuemeka Odumegwu Ojukwu university in uli Anambra state and construction ofshopping mall in Nnewi Anambra state**.** In 2000, the labordepartment (2000) reported that the construction sites in Nigeria accounted for the highest rate of occupational deaths in comparison to other industrial sectors. According to the labor department (2000) report, 56 out of a total of 902 occupational accidents that occurred in construction in the year 2000 were fatal. This thesis aims to ascertain where the construction industry in Nigeria is in the contrast of international Health and Safety (H&S) standards and practices on construction sites and make recommendations for taking H&S forward in the construction industry in Nigeria.

1.2 Problem Statement

The proliferation of casual workers in Nigeria construction industry has brought with its accompanying occupational health and safety issues giving a bad image to the socio-economic importance of the construction industry. Currently there appears to be virtually no documented empirical evidence of contemporary issues of occupational health and safety on casual workers in the Nigeria building construction sites. In order to address these shortfalls, the research seeks to find out the occupational health and safety issues confronting casual workers on the building construction sites in Nigeria and from which a strategy can be developed

to help to establish policies aimed at protecting the rights and the safety of these workers.

In view of the objective of this study, the following research questions are posed to drive the study:

i. What are the types of accidents associated with building construction activities?
ii. What are the types of health/safety problems associated with building activities?
iii. What are the factors that cause these construction problems?
iv. How can these problems be mitigated?
v. Can the observance of health and safety provisions during construction reduce the rate of accident occurrence?

1.3 Objective of the Study

The major of this research is to study the occupational health and safety of the Nigeria casual worker on the building construction sites for the purpose of establishing the critical issues affecting the overall welfare and safety of casual workers on building construction sites. The specific objectives are:

i. To identify health and safety problems, associated with building construction industry.
ii. To find out factors that lead to health and safety problems

iii. To investigate how to avoid accidents in the building construction industry

1.4 Research Hypothesis

The following null hypothesis was formulated to guide the study

HO: The observance of health and safety procedures does not significantly control the rate and nature of accidents on construction sites.

1.5 Justification of the Study

It is the desire and expectation of every developer to accomplish any development project without much hitch or draw backs. When an integrated approach of good production planning and accidents preventive mechanism is adopted, the outcome is quality assurance of the project delivery process.

It is an outcome so much desired by all stakeholders. The problem had always been: who bells the cat? Who initiates the process that challenges the status quo of practices that are inimical to the common and collective good?

This study will equally provide the following benefits:

i. It will lead to more harmonious work environment.
ii. It will show safer and healthier ways to carry out site work.
iii. It will show how good site planning can lessen site accidents.

iv. It will lead to savings in the use of human and material resources.

v. It will be a factor to arrest cost and time overruns of projects.

vi. Its adoption will save the following costs.

1.6 Scope and Limitations of the Study

This study is focused on the use of production planning approach that observes health and safety procedures, to curb accidents arising from execution of production activities on sites within the confines of building industry. It does not cover high engineering projects like bridges and oil and gas sectors.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Conceptual Framework

The main health and safety site requirements in construction relate to tidy sites and decent welfare, falls from height, manual handling, and transport on site. Site operatives are normally required to plan and organize their operations, ensure that they are trained and competent and know the special risks of their trade and raise problems with their site supervisor or safety representative (HSE, 2009). The main personal protective equipment (PPE) in construction (including clothing affording protection against the weather) which is intended to be worn or held by a person at work and which protects him against one or more risks to his health or safety. Other methods should be considered and used that will reduce or eliminate risk to injury. However, where PPE is the only effective means of controlling the risks to injury or ill health, then employers must ensure that PPE is available. PPE should be worn at all construction sites. A typical construction site may require workers to wear a hard hat, coveralls, safety footwear, gloves, eye protection and high visibility vest. These must be provided to all employees.

2.2 Construction Health and Safety Responsibilities

Construction health and safety should be of primary concern to employers, employees, governments and project participants (Kheni, 2008). Thus the main parties responsible for health and safety are the client, main contractor, regulatory agencies and employees.

2.3 Health and safety duties of state and regulatory agencies

Government regulatory agencies often enact regulations to help ensure that a construction project is safe to build, safe to use, and safe to maintain and delivers good values to the client. Good health and safety planning also helps to ensure that a project is well managed and that unexpected costs and problems are minimized.

2.4 Health and safety duties of employer:

Clients have a big influence over how work is done. Where potential health and safety risks are low, clients are required to do little. Where they are higher, clients need to do more. Employers must assess the work being undertaken and the environment his/her employees operate when determining the appropriate PPE to be worn.

2.5 Health and safety duties of main contractor:

Main contractors must check that all subcontractors are conforming by providing PPE for all their employees (those who are self-employed for tax reasons, but who otherwise work in an employee-employer relationship are also entitled to receive PPE) free of charge.

2.6 Health and safety duties of employees:

Employees should be made aware of their responsibility to wear the PPE appropriately, take care of equipment and report any defects. They should also be informed that if they do not wear or misuse any PPE that has been appropriately issued that this could lead to disciplinary action. This equipment is provided for their protection.

2.7 Causes of Accidents in Construction

The Department for work and pension in the UK commissioned a research into construction health and safety practices to ascertain the underlying causes of construction fatal accidents in the UK. The underlying causes of construction accidents identified were categorized under societal and industry wide influences (macro); project and process factors (mezzo) and worker/supervisor/workplace cause (micro). The causes of construction accidents at the macro level were identified to include immature corporate systems, inappropriate enforcement, lack of proper accident data, lack of leadership from 'Government' as a key client and a lack of influence of trades unions in practice on most sites, especially for

smaller projects. Mezzo factors were identified as immature project systems and processes, inappropriate procurement and supply chain arrangements, lack of proper accident investigation/data and consequently, a lack of organizational learning. Micro factors included a shortage of competent supervisors; a lack of individual competency and understanding of workers and supervisors; the ineffectiveness or lack of training and certification of competence; a lack of ownership, engagement and empowerment of, communication with and responsibility for workers and supervisors. These factors were also exacerbated by poor behavior, cost pressures; poor equipment or misuse of equipment, including personal protective equipment; site hazards; poor employment practices; an itinerant workforce and inadequate management of and provision for vulnerable workers such as younger, older or migrant workers. The study was based on an international consultation with 15 overseas construction industry expert stakeholders; phone/email interviews/consultation with 27 UK senior construction industry expert stakeholders; in-depth face to face interviews with 15 practitioners from UK construction industry; and phone interviews with 15 workers representing the UK's smaller organizations/sole-traders (Brace et al., 2009).

2.8 Health and Safety Problems on Construction Sites

There are health and safety problems on almost all construction sites which relate to reporting accidents, employing and subcontracting.

All personnel who are employed to carry out construction work on site must be trained, competent and fit to do the job safely and without putting their own or others' health and safety at risk; properly supervised and given clear instructions; have access to washing and toilet facilities; have the right tools, equipment, plant and protective clothing; educated about health and safety issues; have arrangements for employees' health surveillance if required. All accidents or work-related illness should be reported to the appropriate authorities within a reasonable or stipulated timeframe.

Main contractors should ensure that they check the health and safety performance of the subcontractors they plan to use; give subcontractors the health and safety information they need for the work; talk about the work with them before they start; make sure everything agreed is provided (e.g. safe scaffolds, the right plant, access to welfare, etc.); and check their performance and remedy shortcomings.

The study by Kheni (2008) on health and safety practices among construction SMEs in Nigeria revealed serious problems. The main problems identified by him include lack of skilled human resources, inadequate government support for regulatory institutions and inefficiency in institutional frameworks responsible for health and safety standards

2.9 Construction Accidents

The importance of the use of plant and equipment in construction works seems to be increasing on daily basis. Manual methods are fast giving way to mechanical methods in the effort to increase productivity, meet increasing complex specifications, construct or actualize the growing complexity of modern designs, utilize the numerous new construction materials that are being introduced into the industry, meet the tight schedules and targets placed by clients' demands, implement control measures required to bring projects on track and ensure effective and efficient utilization of the numerous resources involved in the construction of projects. New plant and equipment are being developed and produced regularly in response to the needs of the industry Godwin (2011). In appreciation of the important role that plant and equipment play in achieving project objectives, clients are placing greater emphasis on the use of plant and equipment as a major criterion for the award of contracts. In response to this development, contractors often embark on efforts to own construction plant and equipment in order to be able to compete favorably with their counterparts during tendering. They also stipulate mechanized methods in their production methods statement during tendering. They are also compelled to implement the methods stipulated in their tenders when eventually contracts are won and have to be executed.

Mechanization goes with hazards as the use of plant and equipment is prone to accidents and injuries. Research studies have confirmed that the construction

industry is one of the most hazardous industries all over the world (Godwin, 2011).

In most countries, the rates of accident and injury prevailing in the industry are higher than what prevail in other industries (Loushine et al., 2003).

HSE (2009), reports that Britain's construction industry, which is one of the biggest industries as it provides employment for 2.2 million people, is also one of the most dangerous recording over 2,800 deaths from injuries in the last 25 years. The situation in developing countries is worst because research studies discover that accident and injury rates in many of the developing countries such as Nigeria (Idoro, 2004). Thailand (International Labor organization, 2005) are very high and that of Tanzania are considerably higher than in European countries. Mbuya and Lema (2003) opine that in most developing countries, safety consideration in construction projects delivery is not given a priority and the employment of safety measures during construction is considered a burden (Enhassi el al., 2008). He also discovered that in many developing countries, the legislation governing occupational health and safety OHS is significantly limited when compared with UK. The report further stated that rarely, there are no special provisions for workers' safety, and the general conditions for workers safety are often not addressed. Lee and Halpin (2003), Earlier discovered that in many of the countries where safety legislation exists, the regulatory authority is weak and employers pay lip service to regulations, (Koehn et al., 2003).

Further discovered that in developing countries, injuries are often not reported and the employer only provides some form of cash compensation for an injury to the employee. This phenomenon has several implications on the construction industries of developing countries. Rowlinson (2003), Observes that the cost of accidents accounts for 8.5% of the total tender price in the Chinese construction industry. The Nigeria construction industry shows almost all the features discovered about developing countries. The industry has no legislation governing organization of health and safety OHS on regulatory authority, accident and injuries are not reported and clients, consultants and contractors give little or no attention to organizational health and safety OHS regulation. The resulting implication is high incidence of accidents and injuries. (Godwin,2011).

2.10 Global Construction Safety Performance Scenario

In developed countries, recent advancement in technology, has contributed positively to industrial productivity, but on the other hand, has created a more challenging and unsafe work environment (Farrooqui et al., 2007). According to research findings, those who spend their working lives on construction sites have 1 in 300 chance of being killed at work. The chance of being disabled by injury or serious illness is much greater than in most other industrial fields. Every construction worker is likely to be temporarily unfit for work at some time as a

result of a minor injury or a health problem after working on a construction site (Ahmed et al., 2000).

Alazeb (2004), stated that being struck by an object, falling at ground level, and being hit by falling objects were the most common reason of accidents leading to injuries in Egypt, and a study of Zeng et al., (2008) pointed out that some accidents such as falling from height and hit by falling materials were the most common reason of accidents leading to injuries in Chinese.

Rowlinson (2003), Reported that between 1989 and 1992, 256 people were fatally injured in the Australian construction industry. Statistics revealed that the fatality rate was 10.4 per 100,000 workers, which was similar to the fatality rate of road accidents.

In Hong Kong, 275 reportable accidents per 1,000 workers per year were recorded in 1994; this figure stood at around 150 in 2000 (Rowlinson, 2003). In comparison, 10 construction workers in every 1,000 suffer an injury in a year in japan, and the figure is around 50 for the United Kingdom (Rowlinson, 2003). A study of the Egyptian construction concluded that safety programs applied by contractors operating in Egypt were less formal and the accident insurance costs were fixed irrespective of the contractors' safety performance (Farrogi e. al 2008).

2.11 Occupational health and safety management in construction

The activities of the construction industry have raised serious health and safety concerns amongst governments, health and safety stakeholders, health and safety professionals and researchers over the past few decades (Enshassi and Mayer 2002, Gibb 2005, International Labor Organization (ILO) 2005, Kaplinski 2002, Leopold and Leonard 1987, Rowlinson 2004). In response, health and safety legislation has been developed to ensure management of construction businesses, and recently many other participants in a project assume responsibility for managing the risks associated with construction projects. Occupational health and safety management in the construction industry has evolved from measures adopted in accident prevention to more systematic and proactive approaches to minimizing the risk of hazards in the industry.

2.12 Occupational Health and Safety Management Systems

A number of construction business manage the health and safety function in their business by carrying out health and safety activities aimed at minimizing or eliminating the risk of hazards on their sites. A growing number of construction businesses, particularly larger ones tend to adopt Occupational Health and Safety Management systems which have their origin in Deming's Plan-Do-Check-Act model of continuous quality improvement system has four primary elements:

- Planning;
- Implementing the plan

- Reviewing the plan
- Evaluation and taking measures to improve strategy

Despite the popularity of literature on Occupational Health and Safety Management systems, a commonly accepted definition is lacking due to the variable nature of the elements often composing them.

Helledi (1999) reported on the adoption of a simple, non-bureaucratic Occupational Health and Safety Management system by SMEs in the Finnish construction industry which proved effective in reducing the numbers of site accidents experienced by contractors. The elements of the Occupational Health and Safety Management system comprised a planning phase involving the assessment of risks, an implementation phase involving communication of critical tasks to be carried out on site, a control phase involving monitoring the activities and a follow up phase which provides feedback and enable corrective measures to be taken.

Approaches to Occupational Health and Safety Management reported in construction hardly qualify as Occupational Health and Safety Management systems because they lack one or more of the elements of Deming's Plan-Do-Check-Act (PDCA) cycle. This Occupation Health and Safety Management system involves planning as part of the safety engineering process but lacks clear

elements or procedures on how to continuously improve health and safety performance.

The effectiveness of occupational health and safety management systems in the construction industry has not been assessed. At best, it is only the individual elements that make up the system which have been shown to be associated with improved health and safety management performance. The adoption of comprehensive occupational health and safety management systems has been shown to be a difficult task for SMEs (Dawson et al. 1988, Eakin et al. 2000, Mayhew 2000). Some reasons as to why SMEs might find it difficult adopting such systems include lack of adequate resources, the fact is that they operate in a competitive environment and operate under relatively informal management procedures (Banfield et al. 1996, Mayhew 1997, Vassie et al. 2000). Therefore, there is reason to doubt the applicability of comprehensive occupational health and safety management systems to construction SMEs.

2.13 Health and Safety Integrated Management Systems

Research suggests integrating the Occupational Health and Safety Management function of a business with other management functions could enhance the overall performance of the business. Gibb and Ayoade (1996) have pointed out client pressure, cost reduction, legislation and total project management as factors promoting their adoption.

Many management systems, especially health and safety, environment and quality have many identical elements. For instance, policy, training of personnel, auditing, responsibility for task and controls are common elements in all three areas of management. These, therefore, makes it possible to integrate them as a single management system. Proponents of integrated systems argue that such an integrated system will lead to management effectiveness, reduce duplication, and elimination of conflicting responsibilities and harmony of objectives (Douglas and Glen 2000, Scipioni et al. 2001).

Dias (2000) examined the possible integration of the elements of families of standards, ISO 9000, ISO 14000 and a similar standard in health and safety in construction. Many elements of the three standards were found to be candidate for possible integration. Hamid et al. (2004) investigated the integration of safety, health, environment and quality in the construction industry. Their findings indicate that safety, health, environment and quality have many common grounds which make integration possible. Based on the similarities in many areas of these management functions, the authors proposed a model of integrated management system for the construction industry. Similarly, Kirbert and Coble (1995) explored the integration of health and safety regulations with environmental regulations in the construction industry. Arguing that environmental issues are safety issues, the authors suggest a single administrative procedure for safety and environment via an environmental safety plan. The benefits of such a procedure

include fewer processes involved in regulatory agency reviews and workers benefiting from training in both environmental and safety aspects of their work environment.

2.14 Behavioral Approaches to Occupational Health and Safety Management

Seventy to ninety per cent of accidents are caused by unsafe behavior. A number of theories have linked accidents to the failure of persons (by their actions or omissions) in the accident chain to avert accidents (Haslam et al. 2003). These explanations have therefore formed the basis of psychological approaches to occupational health and safety management which aims or objectives is the modification of behavior so as to break the chain of events leading to most accidents.

Duff et al. (1994) reported on behavioral modification procedures use in improving safety on construction site. The authors of the study used a combination of goal-setting and feedback to influence the behavior of site operatives. The findings of the study suggest goal setting and feedback can greatly enhance health and safety performance. Duff (1998) pointed out that behavioral methods should not be restricted to site operatives but could be extended to include site management staff and senior corporate management. Lingard and Rowlinson (1994) examined the effectiveness of the goal-setting and

feedback approach in the Honk Kong construction industry. It was found that labor commitments to the group and to the organization are intervening variables in the application of behavioral techniques.

Workers need to behave on site in a manner that will not expose them or their colleagues to hazard, particularly workers need to:

- Report incidence to their employers
- Take care of their own health
- Abstain from alcohol and drugs that would otherwise increases their exposure to hazards
- Take care to avoid adversely affecting the health and safety of fellow workers and persons likely to be affected by their actions and omissions
- Follow health and safety rules on site and
- Use PPE when provided.

2.15 Integration of Health and Safety with Project Management

Studies in construction accidents suggest many accidents on construction sites could be prevented by taking appropriate steps in all phases of the project life. Thus, participants in a project have a role to play in improving the health and safety of construction sites and completed projects. Current thought on health and safety in construction put emphasis on integrating Occupational Health and Safety Management into the entire construction process. This view of

Occupational Health and Safety Management is, at least to some extent, largely driven by developments in health and safety legislation in Europe and USA. This view of integration of Occupational Health and Safety Management into construction processes requires responsibility for health and safety to be equitably shared between the key participants to ‘’think health and safety’’ throughout the phases of a project. As Hinze (1998) has emphasized, addressing the safety of construction workers in the design phase involves recognizing the potential impact designers’ decisions can have on the health and safety of construction site workers. Similarly, owners’ involvement in construction safety could reduce cost of safety to minimum.

In the UK and other countries which are members of the European Union, the European Directive on Temporary and Mobile Construction Sites calls for health and safety to be considered during the early stages of a project. However, maximum benefits can be derived from considering health and safety at the early stages of project if procurement routes are adopted which facilitate coordination and team spirit (Kheni and Gibb 2006). Integration of health and safety into project planning has been promoted by authors such as Kartam (1997), Cameron and Duff (2002), Murray (2002), Saurin et al. (2004), Pavitt et al. (2004), Gibb and Pendlebury (2005) and Hare et al. (2006). The work of these authors have each sought to explore avenues for managing health and safety as integral aspect of projecting planning during one or more of phases of project execution. For

instance, one the most recent studies, Hare et al. (2006) investigated the integration of health and safety with the pre-construction phases of projects. The author highlighted the importance of effective teams and effective two-way flow of information for successful integration.

2.16 Problem of Occupational Health and Safety Management in SMEs

Anecdotal evidence suggests that implementation of health and safety standards in SMEs are problematic because of their particular characteristics. A survey conducted by Baldock et al., (2005) revealed marked variations in firms' health and safety practices. External factors found in the study which influenced the business decisions to improve health and safety included; regulatory enforcement activity, use of external assistance on health and safety and membership of trade associations. Internally, the size of SME (number of employees and turnover), growth performance and management experience were found to correlate with propensity to adopt health and safety improvement measures. A study by Champoux and Brun (2002) also suggests small business characteristics are associated with health and safety management practices; even where businesses operate in the same industry, there can be marked variation in their health and safety practices depending on the nature of the product or service they render. Birchall and Finalayson (1996) found that, in the construction sector, the effectiveness of occupational health and safety management systems varies with organizational size and type of business activity.

2.17 Construction Safety Performances Scenario in Developing Countries

Construction in developing countries, such as Pakistan and India, is more labor intensive than in the developed areas of the globe, involving 2.5-10 times as many workers per activity (Farooqui, 2008). Typically workers tend to be unskilled and migrate in a group, with or without their families, throughout the country in search of employment. In fact, they are usually divided into various factions. Communication problems related to difference in language tend to inhibit safety on the work site.

In Pakistan, there is a significant difference between large and small contractors. Most large firms do have a safety policy on paper, but employees in general are not aware of its existence. Nevertheless, a number of major constructions exhibit a concern for safety and have established various safety procedures. They also provide training for workers and maintain safety personnel on the jobsite. For the majority of contractors, however, maximizing profit is the prime concern. Unsafe conditions exist on many sites, both large and small, and laborers are subjected to numerous hazards.

Injuries generally are unreported; however, if necessary alaborer might receive first aid or preliminary medical care. In most cases, specialized medical treatment

or compensation is unavailable. Workers themselves consider accidents as due to their own negligence, and accept that construction is a dangerous occupation. Nevertheless, major accidents involving death of a worker may be reported due to the financial expenses and litigation that could be involved.

Maintenance and inspection schedules often are not followed, and only after a breakdown is equipment repaired. This approach leads to loss of time, idle workers, and project delays. It may also cause damage to property. Breakdown of concrete mixers, vibrators, water pumps and tractors are common. Electrocution is also a major hazard, due to use of substandard electrical equipment and underground cables. Workers, especially young ones, take chances, and often do not follow safety norms or use personal protective equipment.

Also laborers and staff are sometimes under the influence of alcohol and drugs. Unfortunately, crew members are not checked for drugs and alcohol before the start of work and during work.

As an example, for any accident that takes place on site due to lack of safety practices, the particular low-level activity supervisor (engineer/technician), not the construction manager, is theoretically held responsible and may in exceptional cases be subject to physical abuse, harm from the victim's group of friends. In extreme circumstance, the supervisor may also be charged with a criminal

offence. However, cash payments are usually accepted in lieu of pressing charges. In addition, because workers are usually non-residents of the local area and are often unaware of their rights, accidents are often not reported to the proper authorities or, if reported, are lost in the local bureaucracy.

Owners and consultants do stress safety before work commences, but as the work progresses their concerns for deadlines becomes a priority and they tend to pay less attention to safety. On large projects, the owners may provide medical facilities at the site, but ultimately safety is the contractors' responsibility.

According to the survey conducted by Farroqui et al. (2007), the ,major injuries faced by contracting firms in Pakistan on their projects site, in descending order of occurrence, were given as follows:

- Fall injuries.
- Struck by wastage and raw materials.
- Heart stroke.
- Head injuries.
- Eye injuries.
- Burning cases.

In the same study, some informal assessments identified a few major reasons for safety non-performance which included:

- Lack of development of construction sector in the shape of mechanization and industrialization.
- Lack of professional construction management practices, inadequate safety provisions laid by the existing regulatory environment which has failed to establish safety as major industry objective, insufficient and incentive-less insurance mechanisms which have failed to establish safety as a business survival issue, and unfavorable business environment which has led to adversarial business relationship among stakeholders resulting in controversies, conflicts, claims and litigation and hence diverting the focus from issues like safety (Farooqui et.al 2008).

2.18 Safety Management

Management and planning is one way to avoid unplanned events. Since accidents are unplanned events, an effective safety management can help avoid job injuries. Safety management must be through, and it must be applicable to all aspects of the job, form the estimating phase of the project until the last worker has left the premise at the completion of the project. All parties to a construction project must be included in some way in the safety program every party is responsible.

In Australia, almost all respondents agreed with the statement ‘’safety is the responsibility of both management and the workers together (Hassouna, 2005). Concluded in their study that owners, as part of his safety responsibly, must

ensure that the designs safe projects. He also ensures that the contractor has a safety program. The owner should include the safety program as an element of the bidding technicalities.

Tam, el.al, (2004), identified that poor safety awareness of firms' top leaders and poor safety awareness of projects managers were the main factors affecting construction safety performance in China. Jannadi et.al, (1998) in Saudi Arabia stated that the responsibility for safety on any construction projects should be shared between all the parties involved in the projects, namely, the owners, the designer or architect and the contractor.

Tam et al (2004), did a study in China and noticed that the causes of accidents were due to poor safety awareness from top leaders; lack of training; poor safety awareness of managers; reluctance to input resources for safety; reckless operation; lack of certified skill labor; poor equipment; lack of first aid measures; lack of enforcement of safety regulations; lack of organizational commitment; low education level of workers; poor safety conscientious of workers (Abdul Rehim et.al 2008).

2.19 Safety Program

Aksorn (2009), uncovered that a safety program that has the most effect on site safety consist of management talks on safety, provision of safety booklets.

Provision of safety equipment, providing a safe environment and appointing a trained safety representative on site (Akesornet al.2009)

Hassanien (2007), surveyed the nature of safety programs in the largest 100 construction firms in the USA, and concluded that larger firms had more formal safety programs. They also had the safest performance. Lower injury rates were in companies that provided workers with formal safety orientation; companies that gave incentives to workers and foremen and companies that employed full time safety representatives. Safer performance was noted to occur when safety representatives were hired and trained by safety directors (Hassanein et al. 2007). The studies conducted by Aksorn (2009). Poon et al., (2000), to evaluate the influence of safety program on improved construction safety performance revealed that successful safety program, however, do not need extensive elements, but should at least include the critical elements including safety policy, safety committees, safety inductions, safety training, and safety inspections (Aksorn et al. 2009).

2.20 Safety policy

Evelyn, 2005, presented the results of a postal survey of contractors in Singapore. The findings revealed that site accidents are more likely to happen when there are inadequate company policies (Hassanein 2007). The health and safety policy

statement should contain the aims which are not measurable, and objectives which are measurable of the organization or company.

Aims will probably remain unchanged during policy revisions, whereas objectives will be reviewed and modified or changed each year. The statement should be written in clear and simple language so that it is easily understandable (Phi Hughes et. al 2001).

The following points should be included or considered when a health and safety policy statement is being drafted:

- The aims should cover health and safety, welfare and relevant environmental issues.
- The position of the senior person in the organization or company who is responsible for health and safety (normally the chief executive).
- The names of the health and safety adviser and any safety representatives.
- A commitment to the basic requirements of the health and safety at work (access egress, risk assessments, safe plant and systems of work, transport and handling of articles and substances, information, training and supervision).
- Using a safety committee or plant council.
- Specific policies of the organization (violence to staff).

2.21 Cost of Safety

Rowlinson (2003), observe that the construction projects total cost of accidents accounts approximately 8.5% of the total tender price in the Chinese construction industry (Godwin et al., 2011). Hassouna (2005) found in Palestine the cost of safety depends on the size of projects, and nature of projects.

In Kuwait, many managers think that safety procedures substantially increase the cost of construction (Kartam et al, 2000). They also found that accident costs and safety procedures are not considered in the contractors' bid and only the insurance cost is considered for those items in Kuwait. The responded managers in the Kartam et al. (2000), survey estimated the cost implementing safety procedures and regulations in Kuwiat to be 0.25-2% of total projects value. Hassanein (2007) Re-examined the total costs of accidents and injuries to the construction industry. The total cost of accidents has risen to somewhere between 7.9% and 15% of the total costs of non-residential new construction (Hassanein 2007).

2.22 Safety Training

A study by Hinze and Gambatese (2003),.Concluded that specialty contractors' safety performance was consistently influenced in part by a number of factors. The factors show to improve safety performance include: minimizing workers turnover; implementing employee drug testing and training of workers, Hassanein (2007). Huang and Fang (2003) believed that in the safety programs,

for each projects of many contractors, it is a requirement that anyone working on site should receive at least eight hours of safety training.

Langford et al. (2000) identified the critical factors that influence the attitudes of construction workers towards safe behavior on construction sites. According to the results of their study, training of operative and safety supervisors is important for safety awareness and improved performance. The importance of safety training is to improve the safety performance in the construction industry has been addressed by many researchers Huang et al. (2003). Effective training of construction workers can be one of the best ways of improving site safety performance. Chinese construction industry had received limited education about safety issues Zeng et al. (2008). Similarly, in the study by Dingsdag et al. (2008) construction workers identified training as a necessary element of safety performance.

In Gaza Strip Hassouna (2005) found that 24% of the respondents were receiving training courses and all of them achieved a good benefits from it, the main course which was received include the first aid courses, causes of accidents, ways to prevent accidents, the safe technique of scaffolding, and using safety tools. It was also found that part of respondents received safety training abroad such as in Saudi Arabia and in the United Arab Emirates (UAE) and other part received training courses in the syndicate of engineering and in the contractor union. For organized safety training courses for managers, engineers and laborers, Ahmed

(2005) found 10% (8) of the respondents, from a total of 83 respondents, have training on how to use equipment and how to perform the danger safety, but the other respondents 90% (75) did not have any training for their workers, engineers and laborers.

2.23 Accident Investigations

A subsequent study by Hinze and Raboud (1998), on large building construction projects in Canada has shown that larger firms generally had better safety records (Hassanein, 2007). The investigation of an accident can provide meaningful information that can be used effectively to reduce or even eliminate foreseeable hazards (Hassouna (2005).

In their research, it was found that in USA, the majority of respondents in their survey to record and investigate construction injuries agreed that accident investigations were vital to improved safety performance. In Hong Kong, accident reporting and investigation program was found to be most significant contributor to reducing site accident frequency rate (Poon, Ma and Ho, 2003), in Hassaouna (2005). Respondents in Hong Kong also believed that reporting and investigating injury provides useful information to prevent similar accident in recurring. The information gathered from accident/incident investigation is also useful and effective mechanism to formulate the corrective actions (Poon Ma and Ho, 2003), in Hassouna (2005).

2.24 Safety Meetings

A study by Hinze and Raboud (1988), in Hassanein (2007). Concluded that lower injury rates were noted on projects that employed safety officers, those which conducted job site safety inspections; and those which included safety in coordination meetings (Hassanein 2007). Tam et al. (2004), believed that regular safety meeting are necessary for communicating safety information to all parties. 36% of the respondents in their study claimed that they had regular safety meeting, and the other indicated that safety issues were discussed and presented at other meetings, such as construction planning meetings. However, 87% of the respondents in Tam et al. (2004), survey in China argued that the management seldom attended the safety meetings.

2.25 Safety Regulations

The study of Tam, et la (2004), China found that there was a consensus between the respondents of their surveys that safety regulation is significant to reduce accidents in the construction site.

In the study of Hassouna (2005), it was found that 75% respondents, from total of (83) respondents had accidents in their construction projects during the last five years; 10% (5) of the respondents had death cases, while 14% (7) of them had injuries that caused permanent inability and more than 40% (20) of them had temporary injuries as the majority of contractors had a very high number of light.

CHAPTER THREE

METHODOLOGY

3.1 Research design

Cross-sectional studies design will be suitable for this study. This forms a class of research methods that involve observation of all element of a population, or a representative subset, at one specific point in time over a period of time. A cross-sectional survey collects data to make inferences about a population of interest (universe) at one point in time. Cross-sectional surveys have been described as snapshots of the populations about which they gather data.

3.2 Study Area

This study is conducted in Anambra state Nigeria, situated in South East Nigeria sharing boundary with Imo state, Enugu state and Delta State and the reason for chosen is purposive.

3.3 Study Population

The study populations for this research work are the 235 construction workers/staff in the five selected construction sites in Anambra statethat is made up of junior and senior workers/staff. And these are the staff that carry out statutory responsibilities of this department and are more prone to these job hazards. This population is chosen as a result of its statutory responsibilities.

The table below shows details of construction workers/staff found in the five selected construction sites in Anambra state.

Table 3.1 Detail of selected construction sites

S/N	CLIENT	CONTRACTOR	PROJECT NAME/ CONSTRUCTION SITE	NO. OF CONSTRUCTION WORKERS/STAFF
1	VICE CHANCELLOR, CHUKWUEMEKA ODUMEGWU OJUKWU UNIVERSITY	AUSTONA ENTERPRESES	OFFICE COMPLEX ULI ANAMBRA STATE	43
2	KOTEC GROUP NNEWI	MACK DONS	FACTORY/PRODUCTION HALL, NNEWI ANAMMBRA STATE	54
3	CHICASSON GROUP NNEWI	TRANS VIEW LTD	COMPANY ADMINISTRATION OFFICE COMPLEX. NNEWI ANAMBRA STATE	35
4	VICE CHANCELLOR, CHUKWUEMEKA ODUMEGWU OJUKWU	RICCAN ASSOCIATES	CONSTRUCTION OF FACULTY OF ENGINEERING BUILDING. ULI ANAMBRA STATE	55
5	ANAMBRA STATE GOVERNMENT	JULIUS BEGGER	SHOPPING MALL. NNEWI ANAMBRA STATE	48
	Total			235

3.4 Sample Size

This is the percentage of the population required to be interviewed, this can be derived through the algebraic approach, since the entire population of the

construction workers/staff is about 235, and all the workers/staff will not be incorporated into this study. Thus, sampling will be considered necessary and a percentage will be interviewed and this percentage will be considered as the representative of the whole population whose opinions are considered crucial to this study.

As a result, the population that comprises of both junior and senior totaling 235 workers/staff will be divided into two (2), 60 for senior staff and 175 for junior staff. Hence, the number to be interviewed will be derived as follows;

$$N = \frac{t^2 P(1-P)}{D^2}$$

Where;

N= minimum sample required

t = confidence interval

P= Population

m= marginal error.

Where population of junior staffs 172 and the senior is 60, t= 1.96, m= 0.95

Therefore;

$$N = \frac{1.96^{2\times} 175(1-175)}{0.95^2}$$

N = 122 (approx.)

The number of the junior staffs to be interviewed is 122

And for the senior

$$N = \frac{1.96^{2\times} 60(1-60)}{0.95^2}$$

N =52 (approx.)

52 out of population of 60 will be required for this sample size while 122 out of 175 will be needed for sample size. Hence, the total number of people to be interviewed will be 174 staffs. This table assumes a 95% confidence level, identifying a risk of 1 in 20 that actual error is larger than the margin of error (greater than 5%).

3.5 Sampling Techniques

Cluster sampling will be most suitable for this research work as the workers/staff comprise of junior and senior cadre. As a result the population will be divided into junior and senior cadre. The purpose of this is to give each cluster the fair chance of being equally represented

3.6 Research Instrument

Data were collected through self-administered, 5-point Likert structured questionnaire. The questionnaires is a 48 item instrument. The questionnaire was made up of six sections. Section A contained eight questions that deal with the demographic characteristics of the respondents. Sections B to F comprised five

sections that contained questions that deal with the five research questions posed for this study.

3.7 Method of Data Analysis

Descriptive statistics such as frequencies, percentages were used in answering the research questions. It was used to describe the characteristics of the respondents.The hypotheses will betested with Chi-square. A well-known statistical package SPSS (Statistical Package for Social Sciences) version 17.0 will be used in order to analyze the data on the questionnaire.

3.8 Decision Rule

Using the SPSS, the hypotheses will be tested at 0.05 level of significance. At 5% level of significance, reject null hypotheses for tests with probability estimates lower than 5% (0.05) and conclude that they are statistically significant. Otherwise, we accept (when probability estimates are above 0.05) and conclude that there is no overall statistically significance.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.0 Introduction

This instrument was administered in 52 junior and 122 senior staff of the construction workers/staff in the five selected construction sites in Anambra state. All the questionnaires were properly completed and returned giving 100% return rate to the study instrument. The analysis of the data gathered through questionnaire administration wasanalyzed based on the research objectives of the study. The analyses are presented on three tables. Table 1 is the demographic characteristics of the sample, Tables 2, 3, 4 and 5 are analyses for research objectives 1, 2, 3 and 4 respectively.

4.1 Demographic Characteristics

The result on Table 4.1 showed the demographic characteristics of the study sample. The table showed that 141 (81%) of the respondents are male majority of employees in construction companies are male while 33 (19%) are female. This suggest that majority of employees in construction companies are male.

The results further showed that the age distribution of respondents is: 15 to 24 years (17.8%); 25 to 34 years (29.3%); 35 to 44 years (36.8%); 45 to 54 years

(13.2%) and 55 to 64 years (2.9%). This implies that most of the respondents (36.8%) fall within the age bracket of 35 – 44 years.

The sample of the study drew respondents from Structural/Civil Engineering (8.6%), Quantity Surveying (9.2%), Building (29.9%), Architecture (21.3%), Mechanical /Electrical Engineering (5.2%), Administration/Accounting (10.3%) and others (15.5%). This tends to indicate that the sample is well spread across the building and construction professionals including the administration of man and machine.

Table 4.1: Characteristics of the Respondents

SN	Variables	Frequency	Percentage
1	**Gender**		
	Male	141	81.0
	Female	33	19.0
	Total	**174**	100
2	**Age Group**		
	15 to 24 years	31	17.8
	25 to 34 years	51	29.3
	35 to 44 years	64	36.8
	45 to 54 years	23	13.2
	55 to 64 years	5	2.9
	Total	**174**	**100**
3	**Profession**		
	Structural/Civil Engineering	15	8.6
	Quantity Surveying	16	9.2
	Building	52	29.9
	Architecture	37	21.3
	Mechanical /Electrical Engineering	9	5.2
	Administration/Accounting	18	10.3
	Others	27	15.5
	Total	**174**	**100**
4	**Marital Status**		
	Single	35	20.1
	Widowed	11	6.3
	Married	96	55.2
	Separated	27	15.5

	Divorced	5	2.9
	Total	**174**	**100**
5	**Level of Education**		
	Primary	11	6.3
	Secondary	30	17.2
	NCE/OND	41	23.6
	First Degree	71	40.8
	Postgraduate	21	12.1
	Total	**174**	**100**
6	**Working Experience**		
	1 to 5 Years	21	12.1
	6 to 10 Years	52	29.9
	11 to 15 Years	54	31.0
	16 to 20 Years	35	20.1
	21 years and above	12	6.9
	Total	**174**	**100**
7	**Grade Level**		
	2 to 4	28	16.1
	5 to 7	51	29.3
	8 to 10	64	36.8
	11 to 13	30	17.2
	14 and above	1	.6
	Total	**174**	**100**
8	**Religion**		
	Christianity	115	66.1
	Islam	27	15.5
	Traditionalist	22	12.6
	Atheist	10	5.7
	Total	**174**	**100**

Source: Field Survey (2014) Analyzed on SPSS 17

The marital status revealed that 20.1% of the respondents are single, 6.3% widowed; 55.2% married, while 15.5% and 2.9% are separated and divorced respectively. The overall result indicates that most of the respondents are married and lives with their partners.

Again, the educational levels of the respondents are normally distributed. Persons with primary education are 11(6.3%); secondary education is 30 (17.2%),

OND/NCE holders are 41 (23.6%), first degree holders are 71 (40.8%) and postgraduates are 21 (12.1%). Besides first degree holders are the majority.

The working experience of the respondents revealed that most of them have stayed with the company for as long as 11 to 15 years. The result indicates that 21 persons (12.1%) have worked for 1 to 5 years; 52 persons (29.9%) have stayed between 6 to 10 years. Furthermore, 54 representing 31% of the respondents have worked for 11 to 15 Years. Others have worked for 16 to 20 Years (20.1%) and 21 years and above (6.9%).

The distribution of the respondents by grade level indicate that 28 (16.1%) of the respondents are grade levels 2 to 4; 51 (29.3%) of the respondents are 5 to 7; 64 (36.8%) between 8 to 10 grade level and only one person is 14 grade level or above.

The religious distribution indicate that Christianity (66.1%). is the popular religion among the respondents Islam is 15.5%, traditionalist are 12.6% and atheists are 5.7% of the sample.

Summarily, the sample of the study is made of majority of male Christians within the age bracket of 35 – 44 years. Most of the persons have worked with the company for a long time (above 11 years). These characteristics among others suggest that the respondents have had experiences on the tradition of the company

and thus have sound knowledge of the company. Therefore, they can give reliable answers on the company of the study.

4.2 Analyses of Research Questions

Table 4.2: Types of accidents associated with building construction

SN	**Variables**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Decision**
9	Trench collapse	7 (4.0%)	40 (23.0%)	16 (9.2%)	93 (53.4%)	18 (10.3%)	Agree
10	Accident due to faulty assemble of scaffolding	16 (9.2%)	43 (24.7%)	21 (12.1%)	84 (48.3%)	10 (5.7%)	Agree
11	Machine accident	33 (19.0%)	59 (33.9%)	25 (14.4%)	46 (26.4%)	11 (6.3%)	Disagree
12	Fall accident	8 (4.6%)	25 (14.4%)	14 (8.0%)	99 (56.9%)	28 (16.1%)	Agree
13	Welding accidents	22 (12.6%)	94 (54.0%)	38 (21.8%)	20 (11.5%)	0	Disagree
	Cumulative result (%)	**9.88%**	**30%**	**13.1%**	**39.3%**	**7.68%**	**Agree**

Source: Field Survey (2014) Analyzed on SPSS 17

The respondents were asked to answer whether the following accidents on Table 4.2 have occurred in their construction sites. The results showed that "agree" for trench collapse, accidents due to faulty assemble of scaffolding, and fall accidents. They "disagree" on accidents by machine and welding. The cumulative result indicates "agree". This implies that accidents occur in construction sites of the company, and the most common sources are trench collapse, faulty assemble of scaffolding and falls.

Table 4.3: Types of health/safety problems associated with building activities

SN	**Variables**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Decision**
14	Dislocation of joints from falls	3 (1.7%)	26 (14.9%)	17 (9.8%)	112 (64.4%)	16 (9.2%)	Agree
15	Pneumonia from cold weather	42 (24.1%)	75 (43.1%)	6 (3.4%)	51 (29.3%)	0	Disagree
16	Eye problems from fire	31 (17.8%)	44 (25.3%)	29 (16.7%)	70 (40.2%)	0	Agree
17	Chest/Heart problems from gas	0	31 (17.8%)	31 (17.8%)	92 (52.9%)	20 (11.5%)	Agree
18	Electric shock or outright electrocution.	12 (6.9%)	91 (52.3%)	52 (29.9%)	4 (2.3%)	15 (8.6%)	Disagree
19	Vibration white finger	3 (1.7%)	50 (28.7%)	29 (16.7%)	92 (52.9%)	0	Agree
20	Hard hearing or deafening	18 (10.3%)	22 (12.6%)	36 (20.7%)	71 (40.8%)	27 (15.5%)	Agree
	Cumulative result (%)	**8.93%**	**27.81%**	**16.43%**	**40.40%**	**6.40%**	**Agree**

Source: Field Survey (2014) Analyzed on SPSS 17

As result on Table 4.2 indicate that accidents occur in construction sites, Table 4.3 above have reported the health/safety problemsnormally suffered byconstruction workers. The responses of the majority indicate that the common health/safety problems are dislocation of joints, eye problem, chest/heart problem, vibration of white finger, and deafening. The respondents “disagree” that pneumonia and electric shocks are associated with construction work. From the cumulative result, it is suggested that construction workers suffer health/safety problems as a result of dangers in construction sites.

Table 4.4:Factors that cause construction health/safety problems

SN	**Variables**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Decision**
21	Taking chances (complacency).	0	6 (3.4%)	57 (32.8%)	81 (46.6%)	30 (17.2%)	Agree
22	Indulging in unsafe acts.	0	51 (29.3%)	32 (18.7%)	91 (53.2%)	0	Agree
23	Using improper tools.	7 (4.0%)	22 (12.6%)	18 (10.3%)	105 (60.3%)	22 (12.6%)	Agree
24	Leaving an open hole unguarded.	0	8 (4.6%)	33 (19.0%)	119 (68.4%)	14 (8.0%)	Agree
25	Not wearing protective clothing provided.	9 (5.2%)	22 (12.6%)	25 (14.4%)	89 (51.1%)	29 (16.7%)	Agree
26	Not wearing safety gadgets in a relevant workshop.	12 (6.9%)	38 (21.8%)	24 (13.8%)	74 (42.5%)	26 (14.9%)	Agree
27	Bad layout and organization.	5 (2.9%)	25 (14.4%)	30 (17.2%)	114 (65.5%)	0	Agree
28	Bad construction and design.	5 (2.9%)	31 (17.8%)	25 (14.4%)	80 (46.0%)	33 (19.0%)	Agree
29	Faulty machines or tools/work techniques.	11 (6.3%)	15 (8.6%)	10 (5.7%)	109 (62.6%)	29 (16.7%)	Agree
30	Taking things from machine while on motion.	15 (8.6)	25 (14.4%)	38 (21.8%)	63 (36.2%)	33 (19.0%)	Agree
31	Insensitivity and responsiveness.	0	54 (31.0%)	2 (1.1%)	80 (46.0%)	38 (21.8%)	Agree
32	Carelessness or wrong attitudes.	23 (13.2%)	40 (23.0%)	32 (18.4%)	79 (45.4%)	0	Agree
33	Ignorance and lack of training.	9 (5.2%)	9 (5.2%)	32 (18.4%)	84 (48.3%)	40 (23.0%)	Agree
34	Lack of discipline/distraction.	30 (17.2%)	38 (21.8%)	35 (20.1%)	70 (40.2%)	1 (0.6%)	Agree
35	Poor communication.	6 (3.4%)	37 (21.3%)	45 (25.9%)	86 (49.4%)	0	Agree
36	Conflict of interest (i.e. bonus bearing).	24 (13.8%)	26 (14.9%)	32 (18.4%)	84 (48.3%)	8 (4.6%)	Agree
37	Lack of planning/organization resources.	0	16 (9.2%)	37 (21.3%)	88 (50.6%)	33 (19.0%)	Agree
	Cumulative result (%)	**5.27%**	**15.64%**	**17.16%**	**50.62%**	**11.36%**	**Agree**

Source: Field Survey (2014) Analyzed on SPSS 17

Results on Table 4.4 indicate factors that cause construction health/safety problems to workers. The responses indicate “agree” to all the questionnaire items 21 to 37. This means that the factors responsible for health/safety problems

of constructions workers include complacency, indulgence in unsafe acts, use of improper tools, unguarded open holes, non-use of protective clothing and safety gadgets, bad layout and organization, bad construction and design, faulty machines or tools/work techniques, taking things from machine while on motion, insensitivity and responsiveness. Others are carelessness or wrong attitudes, ignorance and lack of training, lack of discipline/distraction, poor communication, conflict of interest (i.e. bonus bearing), and lack of planning/organization resources.

Having identified that accidents occur in constructions sites which lead to health/safety problems for construction workers; the factors responsible for the accidents and attendant health problems have been shown. The next objective is to find out how to mitigate the problems. Table 4.5 below presents the analyses of responses on the issue.

Table 4.5:How to mitigate construction health/safety problems

SN	**Variables**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Decision**
38	Training;	3 (1.7%)	33 (19.0%)	40 (23.0%)	95 (54.6%)	3 (1.7%)	Agree
39	Competent and fit to do the job safely and without putting their own or others' health and safety at risk;	10 (5.7%)	49 (28.2%)	11 (6.3%)	98 (56.3%)	6 (3.4%)	Agree
40	Proper supervision and clear instructions;	12 (6.9%)	30 (17.2%)	34 (19.5%)	89 (51.1%)	9 (5.2%)	Agree

41	Access to washing and toilet facilities;	15 (8.6%)	29 (16.7%)	35 (20.1%)	79 (45.4%)	16 (9.2%)	Agree
42	Access to the right tools, equipment, plant and protective clothing;	20 (11.5%)	26 (14.9%)	30 (17.2%)	75 (43.1%)	23 (13.2 %)	Agree
43	Arrangements for employees' health surveillance ;	4 (2.3%)	40 (23.0%)	22 (12.6%)	75 (43.1%)	33 (19.0 %)	Agree
44	Abstinence from alcohol and drugs that would otherwise increases exposure to hazards;	18 (10.3%)	31 (17.8%)	22 (12.6%)	95 (54.6%)	8 (4.6%)	Agree
45	All work-related illness should be reported to the appropriate authorities within a reasonable timeframe.	0	0	0	163 (93.7%)	11 (6.3%)	Agree
	Cumulative result (%)	**5.88%**	**17.10%**	**13.91%**	**55.24%**	**7.83%**	**Agree**

Source: Field Survey (2014) Analyzed on SPSS 17

The respondents were asked to identify whether following safety rules are available in your sites to help avoid or reduce health/ safety problems. The results showed that all the principles identified on Table 4.5 are ways to mitigate health/safety problems in construction sites. They include training, competence, supervision and clear instructions, access to washing and toilet facilities, access to the right tools, equipment, plant and protective clothing, employees' health surveillance,abstinence from alcohol and drugs that would otherwise increases exposure to hazards, and mechanism to report all work-related illness to the appropriate authorities. When all these principles are imbibed, it is expected that health/safety problems in construction sites will be avoided. The cumulative result answered "agree" which indicate that health/safety problems are avoidable.

Table 4.6: Observance of health and safety provisions and rate of accident occurrence

SN	**Variables**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Decision**
46	Our company do not observe health and safety rules at construction sites	10 (5.7%)	93 (53.4%)	33 (19.0%)	21 (12.1%)	17 (9.8%)	Agree
47	The rate of accidents at our construction site is high	35 (20.1%)	86 (49.4%)	25 (14.4%)	23 (13.2%)	5 (2.9%)	Agree
48	Observance of health and safety provisions reduces the rate of accident at construction sites	12 (6.9%)	14 (8.0%)	57 (32.8%)	91 (52.3%)	0	Agree

Source: Field Survey (2014) Analyzed on SPSS 17

The last objectives aim to find out whether observance of health and safety provisions can reduce the rate of accident occurrence. The result is presented on Table 4.6 above. The research question is addressed with questionnaire items 46 to 48. On the first hand, the respondents "agree" that construction companies do not observe health and safety rules at construction sites. They also "agree" that the rate of accidents at our construction sites is high. Furthermore, the majority of them "agree" that observance of health and safety provisions reduces the rate of accident at construction sites.

4.3 Observational evidence of safety in the selected construction sites in Anambra state.

This study undertake an on the site safety audit using observational method. Five construction sites were visited during the period of the study and the following observations were made;

At the first site, construction of office complex in Chukwuemeka Odumegwu Ojukwu university Anambra state, it was observed that 65% of the entire workers/staff did not put on personal protective equipment such as, head cover (helmet), whereas those working on a height on scaffolds were working without safe belt and there are no caution tape for a risk prone areas.

Second site, construction of factory/production hall, at kotec Group Nnewi Anambra state, use of personal protective equipment such as safety boot was totally neglected. At the third site, Construction of company administration office complex at Chicasson group Nnewi Anambra state, 70% of the ladders positioned for use were not properly position thereby leaving the users at the risk of slip and fall. Fourth site, construction of faculty of engineering building in Chukwuemeka Odumegwu Ojukwu University uli Anambra state, 50% of the welderswere working without eye protector and no caution tape was used to barricade all the dangerous zones. Finally the fifth site construction of shopping mall in Nnewi Anambra state, it was observed that there were too many restricted access thereby making the workers to work in a confined space andexposing them to strain injury. Caution sign were not properly situated at a very good strategic places for easy access to safety informationon site

4.4 HYPOTHESES TESTING

Hypothesis (Ho): The observance of health and safety procedures does not significantly control the rate and nature of accidents on construction sites.

Table 4.7: Test of Hypothesis

q48 Observance of health and safety provisions reduces the rate of accident at construction sites

	Observed N	Expected N	Residual
Strongly disagree	12	43.5	-31.5
Disagree	14	43.5	-29.5
Neutral	57	43.5	13.5
Agree	91	43.5	47.5
Total	174		

Test Statistics

	q48 Observance of health and safety provisions reduces the rate of accident at construction sites
Chi-Square	98.874[a]
Df	3
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 43.5.

Source: Analysis from SPSS 17

Using the SPSS, the hypothesis was tested at 0.05 level of significance. The chi-square test produced a value of 98.874with probability 0.000 (P. < 0.05). Since the significance level is less than 5%, we reject null hypothesis and conclude that they are statistically significant. This means that the observance of health and safety procedures significantly control the rate and nature of accidents on construction sites

4.5 Discussion of Results

Following the fact that construction is widely regarded as an accident prone industry, there are statutory instruments and legislative frameworks in many developed countries to govern construction operations on site to help minimize health and safety hazards. Reports from Labor Department of Nigeria have posited thatconstruction accounted for the highest rate of occupational deaths in comparison to other industrial sectors. This prompted this study into identifying health and safety problems, associated with building construction industry; finding out factors that lead to health and safety problems, and thus investigating how to avoid accidents in the building construction industry.

Using construction workers/staff in the five selected construction sites in Anambra stateas a case, this study has employed a 48 Likert-type instrument to elicit desired from 174 workers/staff of the various companies.

The results showed that:

i. Accidents occur in construction sites, and the most common sources are trench collapse, faulty assemble of scaffolding and falls.
ii. The common health/safety problems are dislocation of joints, eye problem, chest/heart problem, vibration of white finger, and deafening.
iii. So many factors are responsible for health/safety problems of constructions workers among which are complacency, indulgence in unsafe acts, use of

improper tools, unguarded open holes, non use of protective clothing and safety gadgets, bad layout and organization, bad construction and design, faulty machines or tools/work techniques, taking things from machine while on motion, insensitivity and responsiveness and so on.

iv. The measures for mitigating health hazards in construction include training, competence, supervision and clear instructions, access to washing and toilet facilities, access to the right tools, equipment, plant and protective clothing, employees' health surveillance, abstinence from alcohol/drugs and use of mechanism to report all work-related illness to the appropriate authorities.

v. Furthermore, observance of health and safety procedures significantly controls the rate and nature of accidents on construction sites.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The study indicated that construction is a risky industry. Though, so many hazards are present at construction sites, observance of health and safety procedures significantly control the rate and nature of accidents on construction sites. Thus, the present of accidents and array of health/safety problems in construction sites suggest that construction industry in Nigeria has not lived up to expectation.

5.2 RECOMMENDATIONS

Based on the findings and conclusion from this study, the following recommendations are made:

i. Regulatory body should be set up to monitor the safety of construction workers and to sanction companies whose staffs are adjudged highly prone to accidents at construction sites.

ii. Safety guideline should be given to all construction companies and the regulatory body should ensure the adherence to such guidelines.

iii. Professionals should be hired for all construction work, and any construction personnel not duly certified nor formally trained should be sanctioned.

iv. This work is thus recommended to ministry of works and other regulatory body and also to lecturers and students for the findings made and also for lecturing and research purposes.

REFERENCES

Abdul Rahim A, H, Muhd, Z, Abd Majid, B, S, (2008), Malaysian journal of Civil Engineering 20(2):242-259(2008).

Aksorn ,T,& Bonaventura,(2009),Measuring effectiveness of Safety programmers in Thailand Construction industry,25 November,(2009).

Baldock FC, Blazer V, Callinan RB, Hatai K, Karunasagar I, Mohan CV and Bondad-Reantaso MG, 2005. Outcomes of a short expert consultation on epizootic ulcerative syndrome (EUS): Reexamination of causal factors, case definition and nomenclature. In: Diseases in Asian Aquaculture V. Eds Walker PJ, Lester RG and Bondad-Reantaso MG. Fish Health Section, Asian Fisheries Society, Manila, 555-585

Brace, C., Gibb, A., Pendlebury, M. and Bust, P. (2009) Health and safety in the construction industry: Underlying causes of construction fatal accidents, Phase 2 Report, Department of Work and Pensions Inquiry into the underlying causes of construction fatal accidents, June 2009

Construction (Design and Management) Regulations 2007 (CDM 2007) Available from: http://www.hse.gov.uk/construction/cdm.htm

Dingsdag, D., Biggs, H. and Cipolla, D. (2008). Safety effectiveness indicators (SEIs): Measuring construction industry safety performance. In Thomas, J. and PiekkalaFletcher, A. (eds). Proceedings: Third Conference of the Cooperative Research Centre (CRC) for Construction Innovation: Clients Driving Innovation: Benefiting from Innovation. Australia: Cooperative Research Centre for Construction Innovation

Douglas, A., and Glen, D. (2000). Integrated management systems in small and medium enterprises. Total Quality Management, 11(4/5&6), 686-690

Enshassi, A., Choudhry, R.M., Mayer, P.E. and Shoman, Y. (2008). Safety performance of subcontractors in the Palestinian construction industry. Journal of Construction in Developing Countries, 13(1): 51–62

Fang, D.P., Xie F., Huang, XY., Li, H. (2004). Factor analysis-based studies on construction workplace safety management in China. International Journal of Project Management, Vol. 22, 43-49.

Farooqui A.A., Farooqui T., and Horrocks L.A. (2008). Metabolism and Functions of Bioactive Ether Lipids. Springer, New York

Farooqui A.A. and Horrocks L.A. (2007). Phospholipids in Brain. Springer, New York

Farooqi R.U.,(2008), Safety Performance In Construction Industry of Pakistan, first International Conference on Construction Education ,Research& Practice August 4-5,(2008),Karachi, Pakistan.

Gibb, A.G.F., Haslam, R.A., Hide, S., Gyi, D.E. and Duff, A.R. (2006) Why accidents happen, Civil Engineering, Proceedings of the Institution of Civil Engineers, Vol. 159, November 2006, pp. 46-50, ISSN 0965 089 X – ICE Gold Medal Winner 2007

Gibb, A.G.F. and Pendlebury, M.C. (2005). The CIRIA Offsite Project Toolkit. CIRIA, London

Godwin I, I, (2011), Effect of Mechanisation on Occupational Health and Safety performance in the Nigerian construction industry, Journal of Construction in Developing Countries, (2011)

Hare, R. D., & Neumann, C. S. (2006). The sociation. PCL-R assessment of psychopathy Development, structural properties and new directions. In C. Patrick (Ed.), Handbook of psychopathy (pp. 58–90). New York: Guilford Press

Haslem,R., Hides, S. Gibbs, A. Gyi D. Pavitt T. Atkinsona S. (2005) *''Construction factors in construction accident''* Applied Ergonomics vol 36 pp 401-405

Haslam, R. A., Hide, S. A., Gibb, A. G. F., Gyi, D. E., Atkinson, S., Pavitt, T. C., Duff, R., and Suraji, A. (2003). Causal factors in construction accidents. Health and Safety Executive HSE Report RR156 September 2003 22pp.

Hassanein and Ragaa S, H, (2007), Safety Programs in Large –Size Construction Firms Opertaing in Egypt Journal of SH&E Research (2007), Vol.4, Num1.

Hassouna,M,A,(2005)'' Improving Safety Performance In Construction Projects In Gaza Strip Thesis (98),(2005).

Health and Safety Executive (HSE) (2009) Construction Division, The Construction Intelligence Report, Available to download from: http://www.hse.gov.uk/construction/pdf/conintrep0405.pdf

Helledi, U. (1999) Development and implementation of an occupational health and safety management system on construction sites-experiences from twelve small and medium-sized contractors. Proceedings of the Second International Conference of CIB Working Commission W99, Hawaii, 3-10.

Hinze, J. and Gambatese, J. (2003). Factors that influence safety performance of specialty contractors. Journal of Construction Engineering and Management, 129(2), 159-164

Hinze, J. and Rabound, P. (1988). Safety on large building construction projects. Journal of Construction Engineering and Management, 114(2), 286-293

http://www.who.int/occupationalhealth/publications/en/oehstress.pdf

Kheni, Nongiba Alkanam (2008) Impact of health and safety management on safety performance of small and medium-sized construction businesses in Ghana, Unpublished PhD thesis, Department of Civil Engineering, Loughborough University, UK

Lee, S. and Halpin, D.W. (2003). Predictive tool for estimating accident risk. Journal of Construction Engineering and Management, 129(4): 431–436.

Lingard, H., and Rowlinson, S. (1994). Construction site safety in Hong Kong. Construction Management and Economics, 12, 501-510.

Lingard, H. and Rowlinson, S. (2005) Occupational Health and Safety in Construction Project Management, Spon Press, ISBN 0 419 26210 5

Loushine T. w., Hoonakker P., Carayon P., and Smith M. J. (2004). The relationship between safety and quality management in construction. Accessed online at http://www.google/seach.com

Mayhew, C. (2000). Occupational Health and Safety Issues for Young Workers in the Fast-food Industry, Sydney

Rowlinson, S. (2003). Hong Kong Construction Safety Management and the Law. 2nd Edition. Hong Kong: Sweet and Maxwell

Tam C.M., Zeng S.X., and Deng Z.M. (2004). Identifying elements of poor construction safety management in China. Safety Science, Vol. 42, 569-586.

Zeng,S.X.,Tan,V.W.Y., and Tam,C.M.(2008),Towards occupational health and safety systems in the construction industry of China', Safety Science, (2008),Volume 46,pp 1155-1168.

APPENDIX 1: QUESTIONNAIRE

Department of Project Management
Technology,
Federal University of Technology,
Owerri, Imo State.

Dear Respondent,

QUESTIONNAIRE ON ROLE OF SAFETY IN CONSTRUCTION INDUSTRIES

I am an M.Sc. student of Federal University of Technology, Owerri, Imo state, in the department of Project Management Technology, conducting a research on Role of Safety in construction industries.

Please read each question carefully and tick the appropriate boxes to enable me have a successful study. By reading and ticking the appropriate box you will be contributing positively to efforts to improve Safety in Nigeria construction industries.

Responses will highly be confidential.

Thank you

Researcher

Mmegha, Remigius

Please indicate by ticking the appropriate box below if it will interest you to know the summary of the outcome of the research.

Yes [ ] No [ ]

Provide your Email address if Yes……

Definition of Safety

Safety is a state of being protected from danger, relative freedom from danger, health risk or threat of harm, injury or loss to personnel

SECTION A

Biosocial Data

Choose by ticking the box that correspond to your answer

1. Gender?
    a) Male [ ]
    b) Female [ ]
2. What age group do you fall into?
    a) 15-24 [ ]
    b) 25-34 [ ]
    c) 35-44 [ ]
    d) 45-54 [ ]
    e) 55-64 [ ]
3. Respondents Profession
    a) Structural/Civil Engineering [ ]
    b) Quantity Surveying [ ]
    c) Building [ ]
    d) Architecture [ ]
    e) Mechanical /Electrical Engineering [ ]
    f) Administration/Accounting [ ]
    g) Others specify ……..
4. What is your marital status?
    a) Single [ ]
    b) Widowed [ ]
    c) Married [ ]

d) Separated [ ]s

e) Divorced [ ]

5. What is your level of education?
   a) Primary [ ]
   b) Secondary [ ]
   c) NCE/OND [ ]
   d) First Degree [ ]
   e) Postgraduate [ ]
6. How long have you been working in this organization?
   a) 1-5yrs [ ]
   b) 6-10yrs [ ]
   c) 11-15yrs [ ]
   d) 16-20yrs [ ]
   e) 20yrs and above [ ]
7. What grade level are you in this organization?
   a) 2-4 [ ]
   b) 5-7 [ ]
   c) 8-10 [ ]
   d) 11-13 [ ]
   e) 14 and above [ ]
8. What is your religion?
   a) Christianity [ ]
   b) Islam [ ]
   c) Traditional [ ]
   d) Atheist [ ]
   e) Others, specify [ ]

SECTIONS B: Types of accidents associated with building construction activities

Choose by ticking the box that correspond to your answer

SN	Variables	Strongly disagree	Disagree	Neutral	Strongly agree	Agree
	The following accidents have occurred in our construction sites					
9	Trench collapse trapping or crushing worker(s).					
10	Accident due to faulty assemble, unsafe guard rails and improper planking of scaffolding					
11	Machine accidentto cut from machines malfunction or improper use.					
12	Fall accident resulting from debris on the ground, faulty flooring, slipping surfaces, lack of ropes and harnesses/dangerous ladder					
13	Welding accidents resulting from serious burns or eye injury due to improper protective gear as well as to illness due to the inhalation of dangerous fumes in an improperly ventilated area.					

SECTIONS C: Types of health/safety problems associated with building activities

Choose by ticking the box that correspond to your answer

SN	**Variables**	**Strongly disagree**	**Disagree**	**Neutral**	**Strongly agree**	**Agree**
	The following health/safety problems are normally suffered by our workers					
14	Dislocation of joints from falls					
15	Pneumonia from cold weather					
16	Eye problems from fire					
17	Chest/Heart problems from gas					

18	Electric shock or outright electrocution.					
19	Vibration white finger					
20	Hard hearing or deafening					

SECTIONS D: Factors that cause construction health/safety problems

Choose by ticking the box that correspond to your answer

SN	Variables	Strongly disagree	Disagree	Neutral	Strongly agree	Agree
	Do you know that the following are causes of construction health/safety problems to workers?					
21	Taking chances (complacency).					
22	Indulging in unsafe acts.					
23	Using improper tools.					
24	Leaving an open hole unguarded.					
25	Not wearing protective clothing provided.					
26	Not wearing safety gadgets in a relevant workshop.					
27	Bad layout and organization.					
28	Bad construction and design.					
29	Faulty machines or tools/work techniques.					
30	Taking things from machine while on motion.					
31	Insensitivity and responsiveness.					
32	Carelessness or wrong attitudes.					
33	Ignorance and lack of training.					
34	Lack of discipline/distraction.					
35	Poor communication.					
36	Conflict of interest (i.e. bonus bearing).					

37	Lack of planning/organization resources.					

SECTION E: How to mitigate construction health/safety problems

Choose by ticking the box that correspond to your answer

SN	Variables	Strongly disagree	Disagree	Neutral	Strongly agree	Agree
	The following safety rules are available in your sites to help avoid or reduce health/safety problems?					
38	Training;					
39	Competent and fit to do the job safely and without putting their own or others' health and safety at risk;					
40	Proper supervision and clear instructions;					
41	Access to washing and toilet facilities;					
42	Access to the right tools, equipment, plant and protective clothing;					
43	Arrangements for employees' health surveillance ;					
44	Abstinence from alcohol and drugs that would otherwise increases exposure to hazards;					
45	All work-related illness should be reported to the appropriate authorities within a reasonable timeframe.					

SECTION F: Observance of health and safety provisions during construction and reduction ofthe rate of accident occurrence

SN	Variables	Strongly disagree	Disagree	Neutral	Strongly agree	Agree

46	Our company do not observe health and safety rules at construction sites					
47	The rate of accidents at our construction site is low					
48	Observance of health and safety provisions reduces the rate of accident at construction sites					

APPENDIX 2: RESULT OF ANALYSES

Frequencies

```
FREQUENCIES VARIABLES=Gender Age Prof Marriage Edu Experience Grade
Religion q9 q10 q11 q12 q13 q14 q15 q16 q17 q18 q19 q20 q21 q22     q23 q24
q25 q26 q27 q28 q29 q30 q31 q32 q33 q34 q35 q36 q37 q38 q39 q40 q41 q42 q43
q44 q45 q46 q47 q48   /ORDER=ANALYSIS.
```

Frequency Table

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	141	81.0	81.0	81.0
	Female	33	19.0	19.0	100.0
	Total	174	100.0	100.0	

Age Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15 to 24 years	31	17.8	17.8	17.8
	25 to 34 years	51	29.3	29.3	47.1
	35 to 44 years	64	36.8	36.8	83.9
	45 to 54 years	23	13.2	13.2	97.1
	55 to 64 years	5	2.9	2.9	100.0
	Total	174	100.0	100.0	

Profession

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Structural/Civil Engineering	15	8.6	8.6	8.6
	Quantity Surveying	16	9.2	9.2	17.8
	Building	52	29.9	29.9	47.7
	Architecture	37	21.3	21.3	69.0
	Mechanical /Electrical Engineering	9	5.2	5.2	74.1
	Administration/Accounting	18	10.3	10.3	84.5
	Others specify	27	15.5	15.5	100.0
	Total	174	100.0	100.0	

Marital Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single	35	20.1	20.1	20.1
	Widowed	11	6.3	6.3	26.4
	Married	96	55.2	55.2	81.6
	Separated	27	15.5	15.5	97.1
	Divorced	5	2.9	2.9	100.0
	Total	174	100.0	100.0	

Level of Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary	11	6.3	6.3	6.3
	Secondary	30	17.2	17.2	23.6
	NCE/OND	41	23.6	23.6	47.1
	First Degree	71	40.8	40.8	87.9
	Postgraduate	21	12.1	12.1	100.0
	Total	174	100.0	100.0	

Working Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 to 5 Years	21	12.1	12.1	12.1
	6 to 10 Years	52	29.9	29.9	42.0
	11 to 15 Years	54	31.0	31.0	73.0
	16 to 20 Years	35	20.1	20.1	93.1
	21 years and above	12	6.9	6.9	100.0
	Total	174	100.0	100.0	

Grade Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2 to 4	28	16.1	16.1	16.1
	5 to 7	51	29.3	29.3	45.4
	8 to 10	64	36.8	36.8	82.2
	11 to 13	30	17.2	17.2	99.4
	14 and above	1	.6	.6	100.0
	Total	174	100.0	100.0	

Religion

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Christianity	115	66.1	66.1	66.1
	Islam	27	15.5	15.5	81.6
	Traditionalist	22	12.6	12.6	94.3
	Atheist	10	5.7	5.7	100.0
	Total	174	100.0	100.0	

q9. Trench collapse

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	7	4.0	4.0	4.0
	Disagree	40	23.0	23.0	27.0
	Neutral	16	9.2	9.2	36.2
	Agree	93	53.4	53.4	89.7
	Strongly Agree	18	10.3	10.3	100.0
	Total	174	100.0	100.0	

q10. Accident due to faulty assemble of scaffolding

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	16	9.2	9.2	9.2
	Disagree	43	24.7	24.7	33.9
	Neutral	21	12.1	12.1	46.0
	Agree	84	48.3	48.3	94.3
	Strongly Agree	10	5.7	5.7	100.0
	Total	174	100.0	100.0	

q11. Machine accident

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	33	19.0	19.0	19.0
	Disagree	59	33.9	33.9	52.9
	Neutral	25	14.4	14.4	67.2
	Agree	46	26.4	26.4	93.7
	Strongly Agree	11	6.3	6.3	100.0
	Total	174	100.0	100.0	

q12. Fall accident

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	8	4.6	4.6	4.6
	Disagree	25	14.4	14.4	19.0
	Neutral	14	8.0	8.0	27.0
	Agree	99	56.9	56.9	83.9
	Strongly Agree	28	16.1	16.1	100.0
	Total	174	100.0	100.0	

q13.Welding accidents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	22	12.6	12.6	12.6
	Disagree	94	54.0	54.0	66.7
	Neutral	38	21.8	21.8	88.5
	Agree	20	11.5	11.5	100.0
	Total	174	100.0	100.0	

q14. Dislocation of joints from falls

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	1.7	1.7	1.7
	Disagree	26	14.9	14.9	16.7
	Neutral	17	9.8	9.8	26.4
	Agree	112	64.4	64.4	90.8
	Strongly Agree	16	9.2	9.2	100.0
	Total	174	100.0	100.0	

q15. Pneumonia from cold weather

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	42	24.1	24.1	24.1
	Disagree	75	43.1	43.1	67.2
	Neutral	6	3.4	3.4	70.7
	Agree	51	29.3	29.3	100.0
	Total	174	100.0	100.0	

q16. Eye problems from fire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	31	17.8	17.8	17.8
	Disagree	44	25.3	25.3	43.1
	Neutral	29	16.7	16.7	59.8
	Agree	70	40.2	40.2	100.0
	Total	174	100.0	100.0	

q17. Chest/Heart problems from gas

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	31	17.8	17.8	17.8
	Neutral	31	17.8	17.8	35.6
	Agree	92	52.9	52.9	88.5
	Strongly Agree	20	11.5	11.5	100.0
	Total	174	100.0	100.0	

q18. Electric shock or outright electrocution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	12	6.9	6.9	6.9
	Disagree	91	52.3	52.3	59.2
	Neutral	52	29.9	29.9	89.1
	Agree	4	2.3	2.3	91.4
	Strongly Agree	15	8.6	8.6	100.0
	Total	174	100.0	100.0	

q19. Vibration white finger

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	1.7	1.7	1.7
	Disagree	50	28.7	28.7	30.5
	Neutral	29	16.7	16.7	47.1
	Agree	92	52.9	52.9	100.0
	Total	174	100.0	100.0	

q20. Hard hearing or deafening

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	18	10.3	10.3	10.3
	Disagree	22	12.6	12.6	23.0
	Neutral	36	20.7	20.7	43.7
	Agree	71	40.8	40.8	84.5
	Strongly Agree	27	15.5	15.5	100.0
	Total	174	100.0	100.0	

q21. Taking chances (complacency).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	6	3.4	3.4	3.4
	Neutral	57	32.8	32.8	36.2
	Agree	81	46.6	46.6	82.8
	Strongly Agree	30	17.2	17.2	100.0
	Total	174	100.0	100.0	

q22. Indulging in unsafe acts

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	51	29.3	29.3	29.3
	Neutral	32	18.4	18.4	47.7
	Agree	91	52.3	52.3	100.0
	Total	174	100.0	100.0	

q23. Using improper tools

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	7	4.0	4.0	4.0
	Disagree	22	12.6	12.6	16.7
	Neutral	18	10.3	10.3	27.0
	Agree	105	60.3	60.3	87.4
	Strongly Agree	22	12.6	12.6	100.0
	Total	174	100.0	100.0	

q24. Leaving an open hole unguarded

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	8	4.6	4.6	4.6
	Neutral	33	19.0	19.0	23.6
	Agree	119	68.4	68.4	92.0
	Strongly Agree	14	8.0	8.0	100.0
	Total	174	100.0	100.0	

q25. Not wearing protective clothing provided

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	9	5.2	5.2	5.2
	Disagree	22	12.6	12.6	17.8
	Neutral	25	14.4	14.4	32.2
	Agree	89	51.1	51.1	83.3
	Strongly Agree	29	16.7	16.7	100.0
	Total	174	100.0	100.0	

q26. Not wearing safety gadgets in a relevant workshop

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	12	6.9	6.9	6.9
	Disagree	38	21.8	21.8	28.7
	Neutral	24	13.8	13.8	42.5
	Agree	74	42.5	42.5	85.1
	Strongly Agree	26	14.9	14.9	100.0
	Total	174	100.0	100.0	

q27. Bad layout and organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	2.9	2.9	2.9
	Disagree	25	14.4	14.4	17.2
	Neutral	30	17.2	17.2	34.5
	Agree	114	65.5	65.5	100.0
	Total	174	100.0	100.0	

q28. Bad construction and design

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	2.9	2.9	2.9
	Disagree	31	17.8	17.8	20.7
	Neutral	25	14.4	14.4	35.1
	Agree	80	46.0	46.0	81.0
	Strongly Agree	33	19.0	19.0	100.0
	Total	174	100.0	100.0	

q29. Faulty machines or tools/work techniques

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	11	6.3	6.3	6.3
	Disagree	15	8.6	8.6	14.9
	Neutral	10	5.7	5.7	20.7
	Agree	109	62.6	62.6	83.3
	Strongly Agree	29	16.7	16.7	100.0
	Total	174	100.0	100.0	

q30. Taking things from machine while on motion

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	15	8.6	8.6	8.6
	Disagree	25	14.4	14.4	23.0
	Neutral	38	21.8	21.8	44.8
	Agree	63	36.2	36.2	81.0
	Strongly Agree	33	19.0	19.0	100.0
	Total	174	100.0	100.0	

q31. Insensitivity and responsiveness

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	54	31.0	31.0	31.0
	Neutral	2	1.1	1.1	32.2
	Agree	80	46.0	46.0	78.2
	Strongly Agree	38	21.8	21.8	100.0
	Total	174	100.0	100.0	

q32. Carelessness or wrong attitudes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	23	13.2	13.2	13.2
	Disagree	40	23.0	23.0	36.2
	Neutral	32	18.4	18.4	54.6
	Agree	79	45.4	45.4	100.0
	Total	174	100.0	100.0	

q33. Ignorance and lack of training

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	9	5.2	5.2	5.2
	Disagree	9	5.2	5.2	10.3
	Neutral	32	18.4	18.4	28.7
	Agree	84	48.3	48.3	77.0
	Strongly Agree	40	23.0	23.0	100.0
	Total	174	100.0	100.0	

q34. Lack of discipline/distraction

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	30	17.2	17.2	17.2
	Disagree	38	21.8	21.8	39.1
	Neutral	35	20.1	20.1	59.2
	Agree	70	40.2	40.2	99.4
	Strongly Agree	1	.6	.6	100.0
	Total	174	100.0	100.0	

q35. Poor communication

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	3.4	3.4	3.4
	Disagree	37	21.3	21.3	24.7
	Neutral	45	25.9	25.9	50.6
	Agree	86	49.4	49.4	100.0
	Total	174	100.0	100.0	

q36. Conflict of interest (i.e. bonus bearing).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	24	13.8	13.8	13.8
	Disagree	26	14.9	14.9	28.7
	Neutral	32	18.4	18.4	47.1
	Agree	84	48.3	48.3	95.4
	Strongly Agree	8	4.6	4.6	100.0
	Total	174	100.0	100.0	

q37. Lack of planning/organization resources

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	16	9.2	9.2	9.2
	Neutral	37	21.3	21.3	30.5
	Agree	88	50.6	50.6	81.0
	Strongly Agree	33	19.0	19.0	100.0
	Total	174	100.0	100.0	

q38. Training

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	1.7	1.7	1.7
	Disagree	33	19.0	19.0	20.7
	Neutral	40	23.0	23.0	43.7
	Agree	95	54.6	54.6	98.3
	Strongly Agree	3	1.7	1.7	100.0
	Total	174	100.0	100.0	

q39. Competent and fit to do the job safely and without putting their own or others' health and safety at risk

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	10	5.7	5.7	5.7
	Disagree	49	28.2	28.2	33.9
	Neutral	11	6.3	6.3	40.2
	Agree	98	56.3	56.3	96.6
	Strongly Agree	6	3.4	3.4	100.0
	Total	174	100.0	100.0	

q40. Proper supervision and clear instructions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	12	6.9	6.9	6.9
	Disagree	30	17.2	17.2	24.1
	Neutral	34	19.5	19.5	43.7
	Agree	89	51.1	51.1	94.8
	Strongly Agree	9	5.2	5.2	100.0
	Total	174	100.0	100.0	

q41. Access to washing and toilet facilities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	15	8.6	8.6	8.6
	Disagree	29	16.7	16.7	25.3
	Neutral	35	20.1	20.1	45.4
	Agree	79	45.4	45.4	90.8
	Strongly Agree	16	9.2	9.2	100.0
	Total	174	100.0	100.0	

q42. Access to the right tools, equipment, plant and protective clothing

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	20	11.5	11.5	11.5
	Disagree	26	14.9	14.9	26.4
	Neutral	30	17.2	17.2	43.7
	Agree	75	43.1	43.1	86.8
	Strongly Agree	23	13.2	13.2	100.0
	Total	174	100.0	100.0	

q43. Arrangements for employees' health surveillance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	2.3	2.3	2.3
	Disagree	40	23.0	23.0	25.3
	Neutral	22	12.6	12.6	37.9
	Agree	75	43.1	43.1	81.0
	Strongly Agree	33	19.0	19.0	100.0
	Total	174	100.0	100.0	

q44. Abstinence from alcohol and drugs that would otherwise increases exposure to hazards

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	18	10.3	10.3	10.3
	Disagree	31	17.8	17.8	28.2
	Neutral	22	12.6	12.6	40.8
	Agree	95	54.6	54.6	95.4
	Strongly Agree	8	4.6	4.6	100.0
	Total	174	100.0	100.0	

q45. All work-related illness should be reported to the appropriate authorities within a reasonable timeframe

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	163	93.7	93.7	93.7
	Strongly Agree	11	6.3	6.3	100.0
	Total	174	100.0	100.0	

q46 Our company do not observe health and safety rules at construction sites

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	10	5.7	5.7	5.7
	Disagree	93	53.4	53.4	59.2
	Neutral	33	19.0	19.0	78.2
	Agree	21	12.1	12.1	90.2
	Strongly Agree	17	9.8	9.8	100.0
	Total	174	100.0	100.0	

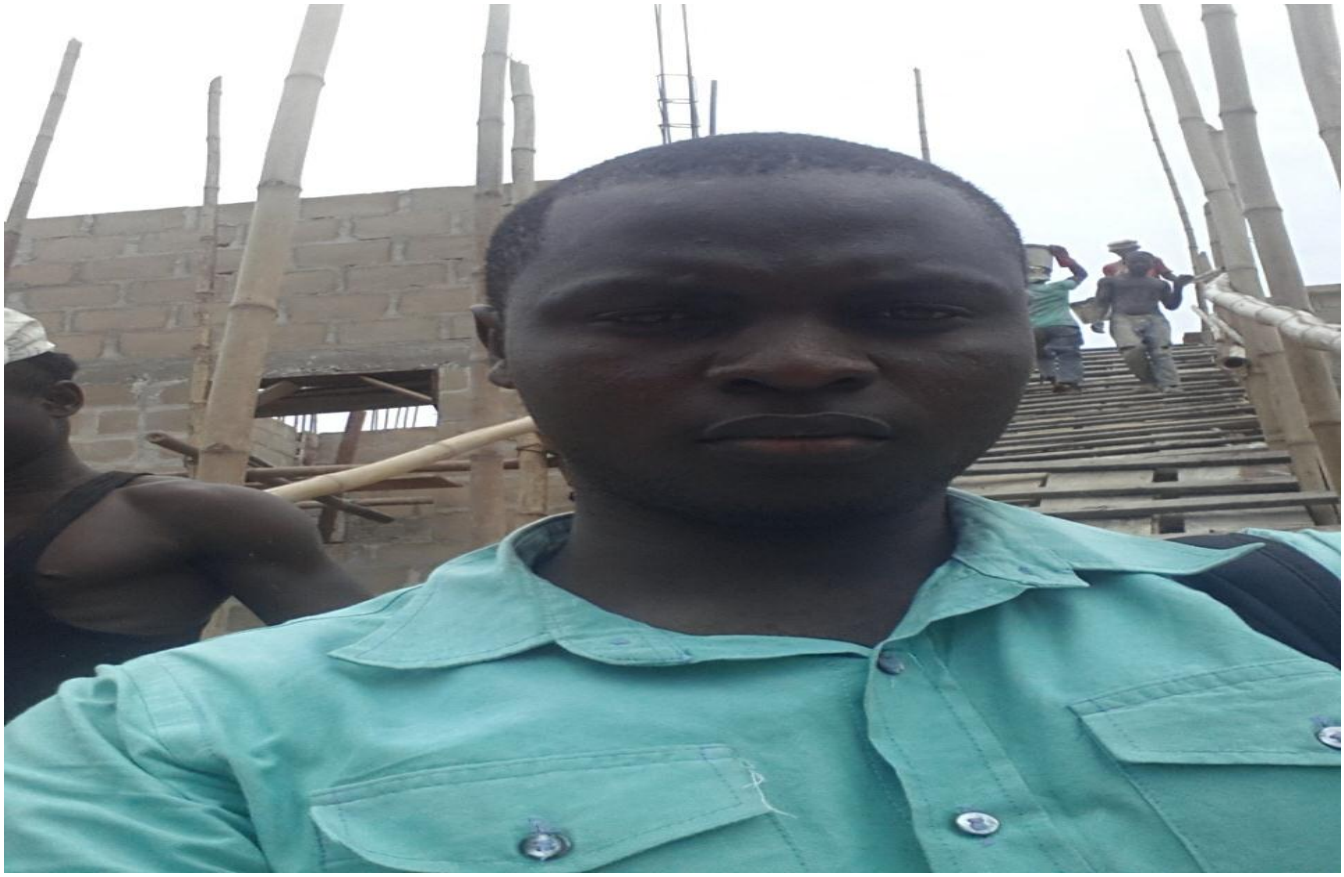
q47 The rate of accidents at our construction site is high

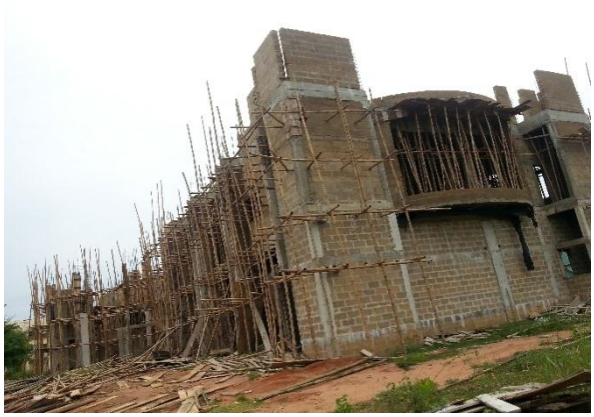
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	35	20.1	20.1	20.1
	Disagree	86	49.4	49.4	69.5
	Neutral	25	14.4	14.4	83.9
	Agree	23	13.2	13.2	97.1
	Strongly Agree	5	2.9	2.9	100.0
	Total	174	100.0	100.0	

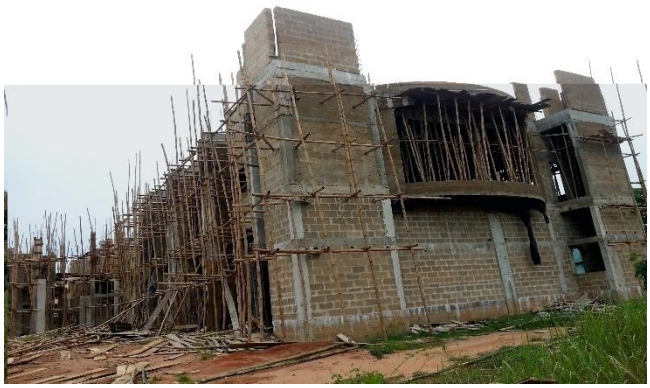
q48 Observance of health and safety provisions reduces the rate of accident at construction sites

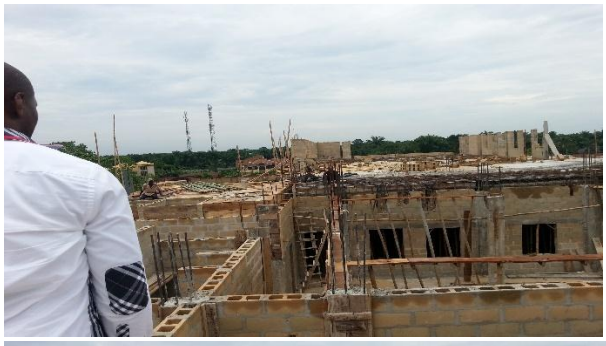
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	12	6.9	6.9	6.9
	Disagree	14	8.0	8.0	14.9
	Neutral	57	32.8	32.8	47.7
	Agree	91	52.3	52.3	100.0
	Total	174	100.0	100.0	

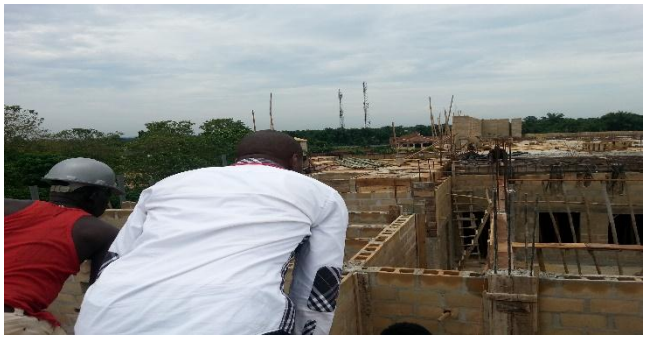
APPENDIX 3: PICTORIAL VIEW

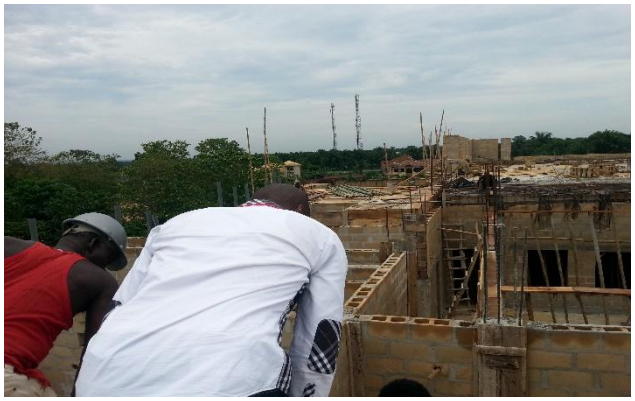


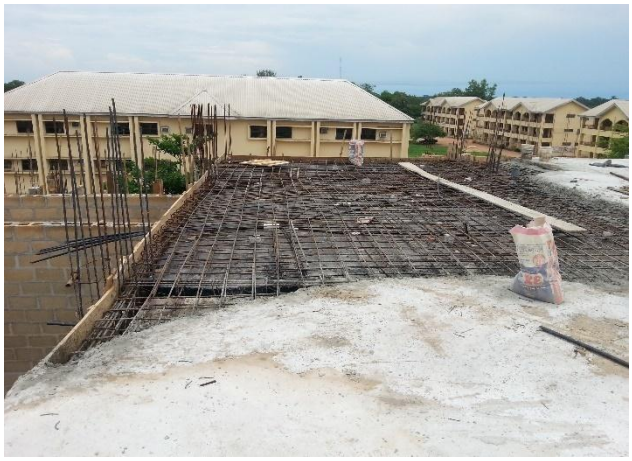


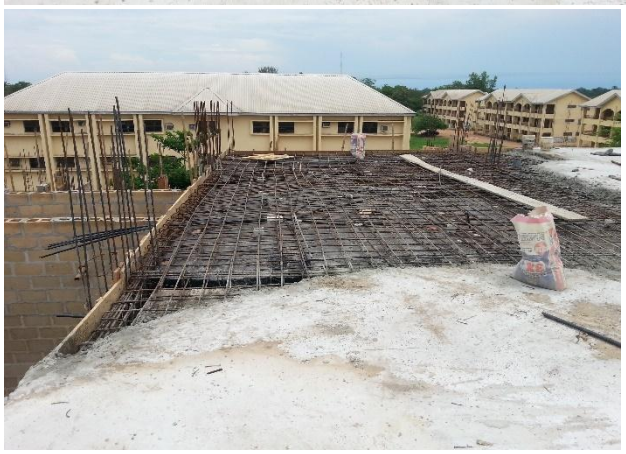


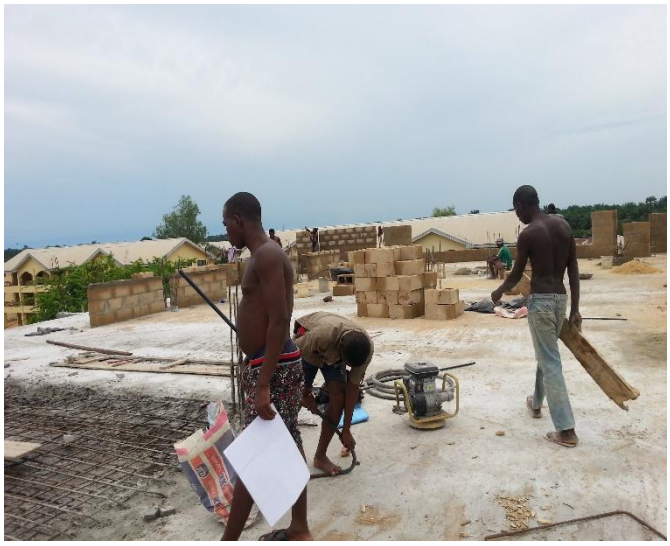


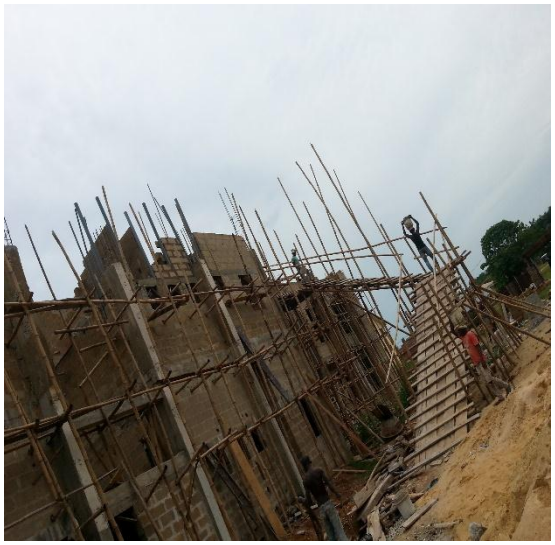


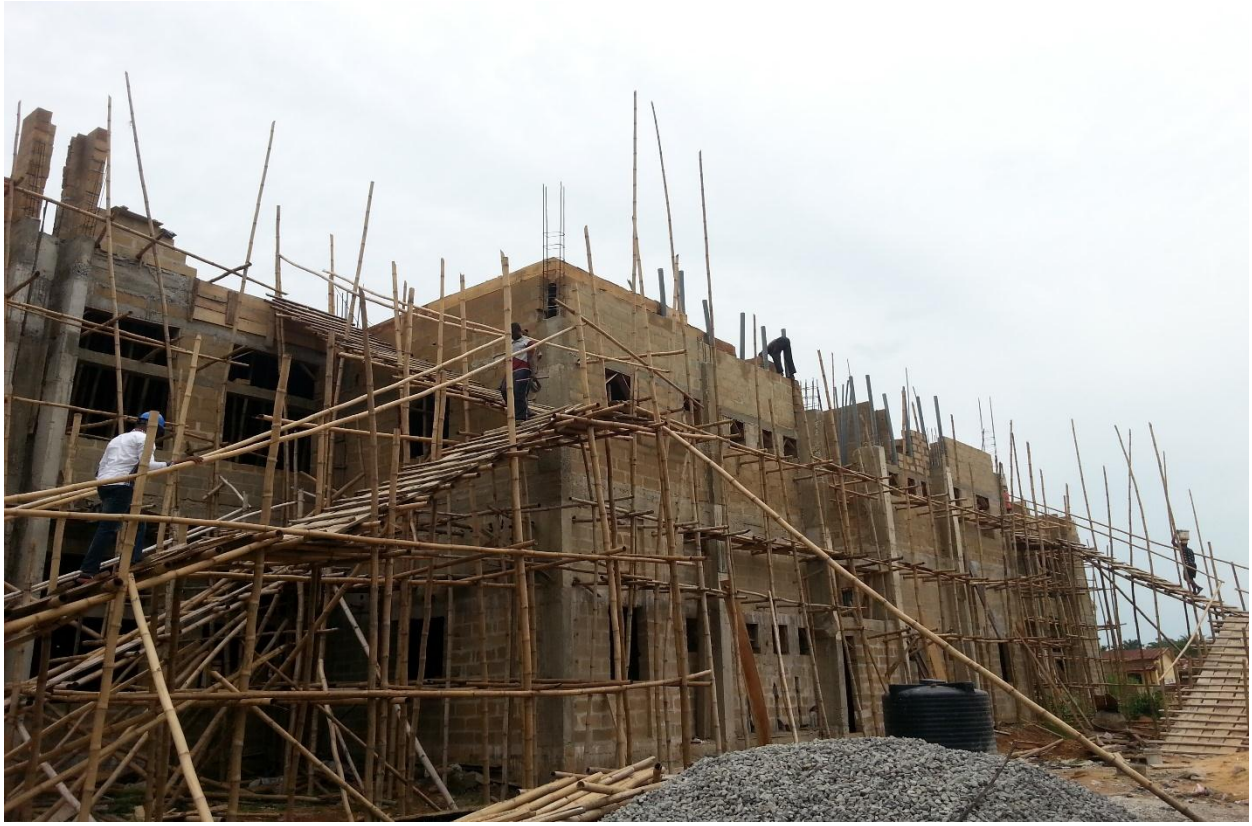


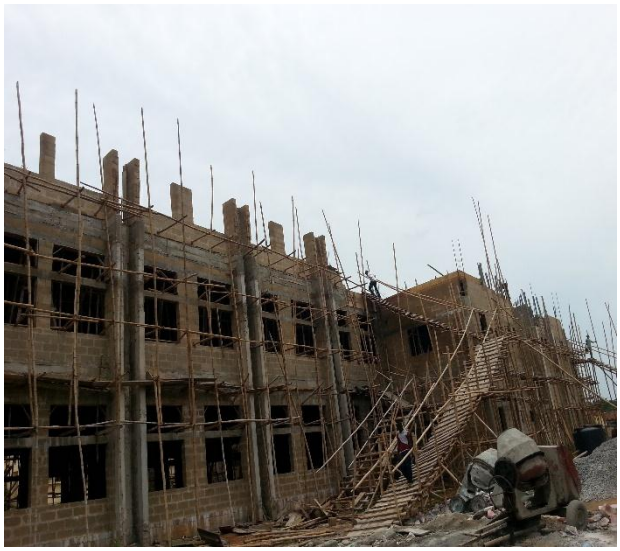


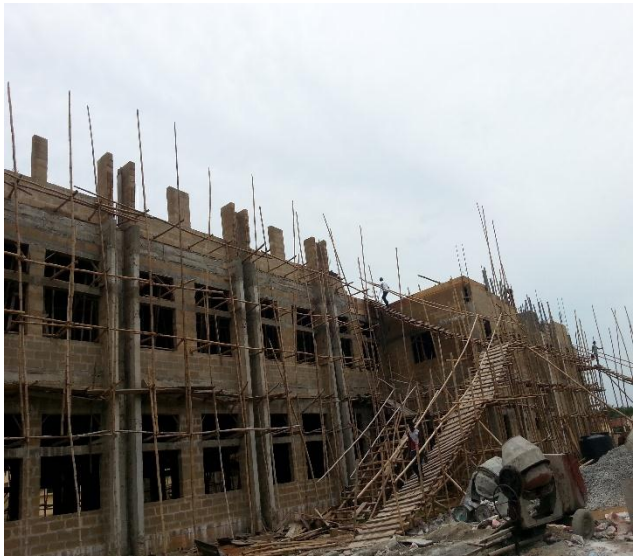


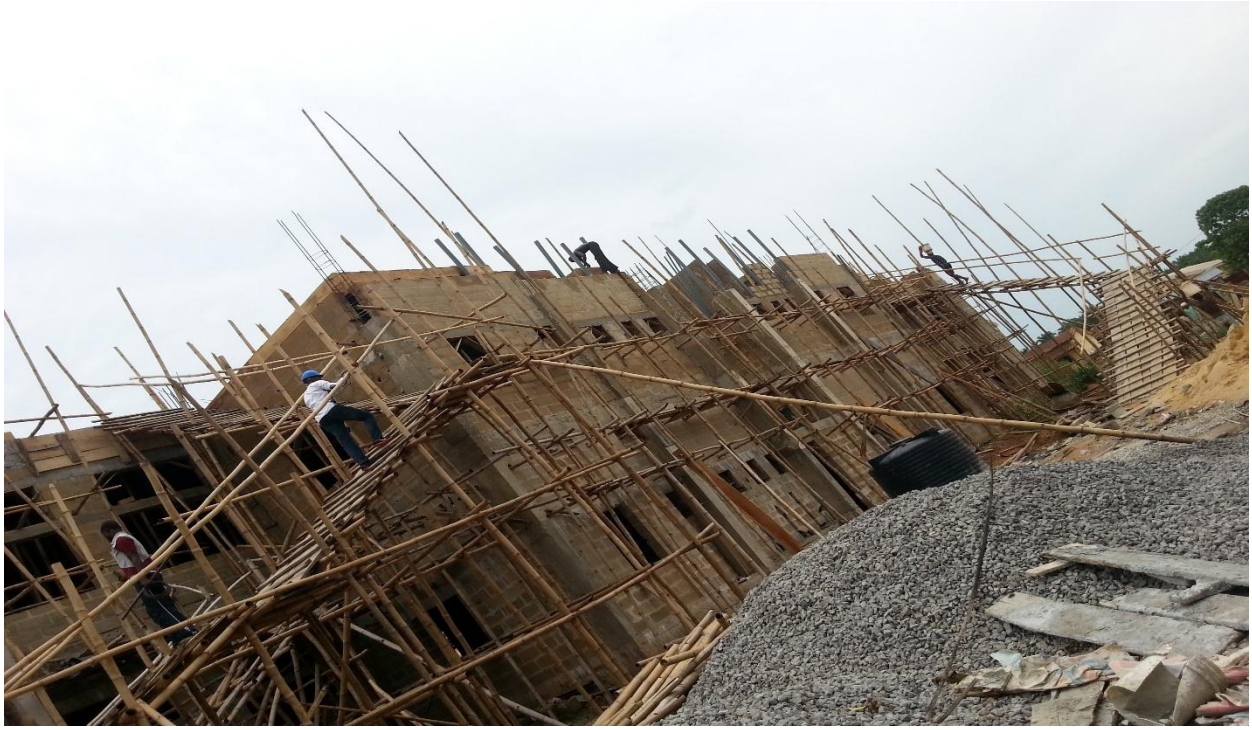


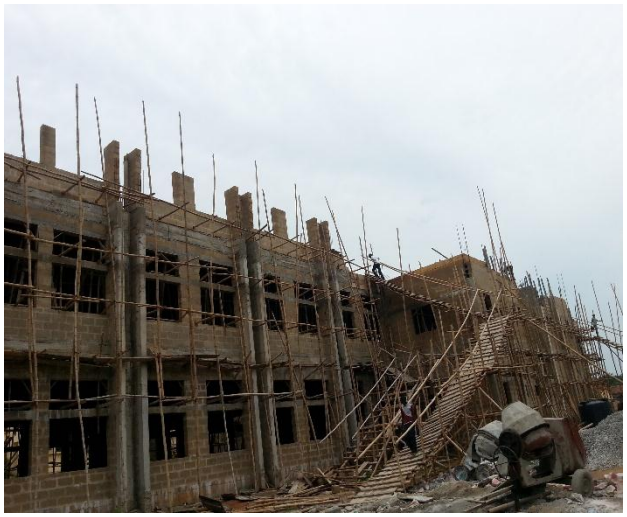


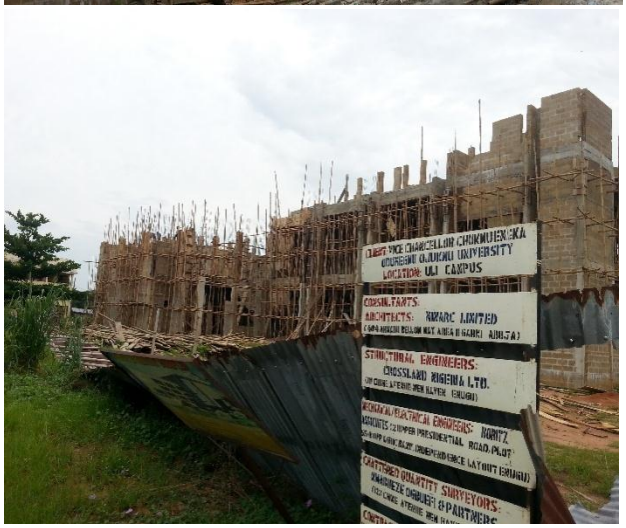








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