

**ASSESSMENT OF THE PRACTICES OF CONSTRUCTION WORKERS ON  
OCCUPATIONAL SAFETY AND HEALTH IN MEDIUM AND HIGH-RISE  
BUILDING CONSTRUCTION IN ABUJA, NIGERIA.**

**BY**

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**2007/1/27287BT**

**DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION  
FEDERAL UNIVERSITY OF TECHNOLOGY  
MINNA, NIGER STATE.**

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**A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF INDUSTRIAL  
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**OCTOBER 2012**

## APPROVAL PAGE

This project has been read and approved as meeting requirement for the award of B.Tech degree (Building Tech) in Industrial and Technology Education, School of Science and Science Education, Federal University of Technology, Minna.

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Supervisor

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External Examiner

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Sign-date

## DECLARATION

I Folarin Folake Florentina, Matric Number “2007/1/27287BT” an undergraduate student of the Department of Industrial Technology Education, declare that the work embodied in this project is original and has not been submitted in part or full for any other Diploma or Degree of this other University.

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Signed

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Date

## **DEDICATION**

This project is dedicated to the Almighty God, who watched and protected throughout my course of study, and also blessed me with wisdom and understanding. It is also dedicated to the entire family of Folarin.

## ACKNOWLEDMENT

My greatest appreciation goes to Almighty God for granting my heart desire to be a profound graduate of the Federal University of Technology, Minna. I sincerely thank my supervisor Mr. E Raymond, who devoted much time of his time in reading, correcting, advicing, guiding and giving me some useful suggestions that helped and improved the quality of my work, may God continue to bless, favour and protect him and his entire family.

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## **ABSTRACT**

This study was designed to investigate the assessment of the practices of construction workers on occupational safety and health in medium and high-rise building construction in Abuja, Nigeria. Three research questions and three hypothesis were formulated to guide the study. The research design employed is a descriptive survey, a well-structured questionnaire was developed by the researcher and used for data collection. The study was carried out in Julius Berger Nigeria Plc. A total number of 100 respondents comprising of 50 management and 50 non-management staffs was used as population for the study. The instrument was validated by three lecturers from the department of Industrial and Technology Education, Federal University of Technology, Minna. The data collected was analyzed using mean and standard deviation while the t-test statistic was used to test the three hypothesis at 0.05 level of significance. The findings revealed that workers are aware of the general safety and health precautions during construction operations. The findings also revealed that safety enacted at different times of every country deals with the protection of workers safety and health through the provision of complete first aid kits and competent first aid attendance at the construction site. Based on the findings it was recommended that government should set up one or more inspectorate to visit the site from time to time and skilled workers should supervise the work of the unskilled workers.

## CHAPTER ONE

### INTRODUCTION

#### **Background of the Study**

Health is a sound state of the body and mind of people from illness resulting from the materials, processes or procedures used in the workplace, while safety is the protection of people from physical injury (Betts,Ofori,Mathur,Cher,2008). Thus occupational health and safety (OHS) can be seen to concern the physical and mental well-being of the individual at a place of work. Workplace in the construction industry is most often than not referred to as construction site. Therefore, occupational health and safety issues become a primary concern to governments, employers, employees, and project participants alike, as construction activities are likely to adversely affect the health of both construction workers and other persons on construction sites (Danso, 2010).

The development of occupational health in developing countries, many of which were attaining by political and economic emancipation that followed the path already lay down by their industrialized colonial masters (Asogwa, 2007).Certain features in these newly emergent nations have mirrored the situations in their colonial masters. As a result, what one sees is not only a replication of some of the labour laws relating to occupational health and safety but also the pattern of occupational health as it exists in the countries of their former colonial masters with whom they still maintain strong economic ties. The healthproblems resulting from the industrialization necessitated the services ofhealth personnel to save the life of the employees in industries and other work environments.

The doctors were the earliest health personnel engaged in the services of occupational health (Asogwa, 2007). The services provided were depends on the nature of the industry.Occupational accidents that take place in construction constitute an economic and

social problem of the first magnitude. It is difficult to quantify the labour accidents on a world scale, as many countries provide no information to this regard. Each accident is a tragedy that affects not only the worker but also his or her surroundings: family, friends, co-workers, etc.

The first occupational health services in Nigeria was introduced by the Medical examination Board of Liverpool Infermary in 1789 with the main aim of caring for the health of British slave dealers from Africa to Britain. However, after the abolition of slave trade, the Royal Niger Company of Britain increased its exploration and trading activities in Nigeria. The Company organized its own health services which were later inherited by the United African Company (UAC). The earliest practices that can be regarded as occupational health services in Nigeria were carried out by British Companies like UAC, John Holt. This was followed by establishment of some occupational health services by Nigerian governments in the Railway Corporation and Coalmines. Such services included pre-employment and periodic medical examination, treatment of minor illnesses and accidents. People of Nigeria who lived between world war periods had no knowledge between work conditions and health (Achal, 2000). They accepted work related illnesses and injuries as part of the job and lived shorter lives. Employers attributed workers' poor health and early death to workers' personal habits on the job and their living conditions at home. Little or no attention was paid to prevention of the hazards in work places. Payment was very poor and dismissal is very common because job seekers were many. Workers' reaction to poor conditions at work resulted in killing of coal miners in Enugu (Achal, 2000). That exposed the working conditions of coal miners and the origin of worker's day in Nigeria. These developments and awareness lead to the establishment of some occupational health services in some Nigerian industries and occupational health legislations Act in Nigeria.

In the last two decades population has witness increment due to urbanisation in Nigeria (Ajanlekoko, 2001). Cities of Nigeria in 1950's was about fifty six (56) with population of

10.6% lived in her metropolis. The population tends to increase in 1963 to 19.1% and also in 1985 to 24.5%. Nigeria population of recent is estimated to be about 160 million people with 30% of the populace reside in urban regions. With the discovery of the oil sector in the economy in the early 1970's, immigration from rural to urban within Nigeria played a role to the growth of the nation resulting to huge amount of housing difficulty in urban areas. The National Rolling Plan (NRP) has proved that Nigerian housing in the range of 500,000 and 600,000 units in the cities which requires up to fourpercent tenancy space fraction. Solving this problem requires appropriate planning of housing development in cities of Nigeria. However, there should be an appropriate measure to conquer hazard facing by the worker of construction of medium and high rise building in Nigeria especially, Abuja. Abuja has experienced more than double of construction of medium and high rise building in the recent. Practising of occupational safety and health of the construction worker of buildings which contributed to increment of urbanisation in Abuja has to be assessed with adequate measure and planning.

Public and private sector organizations throughout the world are increasingly concerned with improving occupational safety and health. In both industrialized and developing countries, the rapid pace of technological change, combined with the persistence of unsafe or environmentally threatening working conditions, has served to focus attention on the need to create a safe, healthy work environment and to promote a safety culture at the workplace

## **Statement of the Problem**

Hazard is something with potential to cause accident with varying severity from cut and bruises to serious illness, disability or death. Accidents are by their nature unplanned and uncontrolled events (Okeola, 2009). Accidents that occur during construction of building do not necessarily have to be injurious or damaging events but it can interrupt or disrupt the completion of medium and high rise building project activities (MHBPA). The accident often occurs during working hour of medium and high rise building project activities (MHBPA). It resulted to loss of time of injured employee; cost of work stoppage of other employees from curiosity; sympathy, cost of providing of more assistance; loose of supervisory time from assisting injured employee; rearranging of work crews due to employee loose of life and delay of time of project execution. In Nigeria though there is no reliable data on accident cases in construction site. In 2005, a four-storey building under construction in Port Harcourt collapsed and not less than twenty workers died in incident barely 24 hours after similar incident in Lagos (Chinwe, the Punch July 2005).

The menace of collapse building during construction is an indicator of unsafe places and system of work in which workers are subjected to and therefore already at risk of accident even where there is no collapse. Many people have met their ultimate death on construction sites in Nigeria while others have become permanently crippled from injury (Okeola, 2009). Improper safety and health practices may put construction worker in medium and high rise building into high risk in Abuja. Therefore the problem of this study is to investigate the safety and health practices of workers in construction site in Abuja.

### **Purpose of the Study**

The purpose of the study is to assess the practices of construction workers on occupational safety and health in medium and high – rise building construction in Abuja, Nigeria.

Specifically, the study will determine:

- i. The extent of which construction workers are aware of safety and health regulation on construction site in Abuja, Nigeria.
- ii. The occupational safety and health practices of construction workers in medium and high rise buildings in Abuja, Nigeria.
- iii. Ways of improving awareness of occupational safety to construction workers in Abuja, Nigeria.

### **Significance of the Study**

This findings of this study will benefit the engineers, labourers, government and the construction industry.

The findings will of this study will benefit the labourers and engineers by reducing the accident rates on building construction site thereby making the site a safe and healthy environment to work.

The findings of this study will benefit the government by helping to establish a basic source of revenue and improvement of the economy, most un- employed youths are put to work on construction site without fear of sudden death or being permanently handicapped from accidents.

The findings of this study will benefit the construction industry by providing more physically and mentally fit workers to work on construction site, reduce the risk associated with working on a construction site and also bring about the advancement of the construction industry.

## **Scope of the Study**

This study was delimited to assessment of the practices of construction workers on construction workers on occupational safety and health in medium and high – rise building construction in Abuja, Nigeria. The building construction engineer’s opinion and the master’s craftsman’s opinion on construction safety and health will be assessed using questionnaire.

## **Assumption of the Study**

The following assumption throughout the study:

- i. Construction workers are partially aware of workers safety and health practices during construction of medium and high – rise buildings.
- ii. Questionnaire method was adopted for seeking opinion because the participant are knowledgeable of construction of medium and high rise buildings and this shall help for validating the opinion.
- iii. The validated results of the study would be applied for improving the present state of construction safety and health in medium and high- rise building construction.

## **Research Questions**

The following research questions are tested in the study and they include by:



- i. What is the extent to which construction workers are aware of the components safety and health regulations on construction site in Abuja, Nigeria?
- ii. What are the occupational safety and health practises of construction workers in medium and high rise buildings Abuja, Nigeria?
- iii. What are the ways for improving awareness of occupational safety to construction workers in Abuja, Nigeria?

### **Hypothesis of Study**

The following hypotheses were drawn and tested 0.05 level of significance to guide the study

HO<sub>1</sub>: There is no significant difference in mean responses of the building construction engineers and master craftsmen on the extend of which construction workers are aware of safety and health regulations on construction site Abuja, Nigeria .

HO<sub>2</sub>:There is no significant difference in the mean responses of the building construction and master craftsmen on the occupational safety and health practices of construction workers in medium and high- rise buildingsin Abuja, Nigeria.

HO<sub>3</sub>: There is no significant difference in the mean responses of the building construction engineers and the master's craftsmen on the ways of improving awareness of construction workers in Abuja, Nigeria.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

Work related to present study was reviewed under the following sub headings

- Construction Safety Development in Nigeria.
- Health, Hazards, First aid and Occupational Health Services
- Benefits of Occupational Health Promotion in Construction Industry
- Safety and health in Construction Industry
- Occupational Safety and Health (OSH) Management

### **Construction Safety Development in Nigeria**

The importance of the construction industry in the national (Nigeria) development cannot be overemphasized considering the fact that at least 50% of the investments in various development plans is primarily in construction (Oyatoye, 1994). Therefore it becomes necessary to assess its safety and health hazards during working. It is against the background that the construction industry has been recognized concurrently as a major economic force and one of the more hazardous industries. Carter and Smith (2001), states that actions to ensure safe access and safe working areas must be regularly reconsidered as construction proceeds otherwise safety would be compromised. It has been established that the reduction of hazardous events is fundamental to good construction safety management because it is these events that have the potential to cause accidents which may result in injuries and fatalities (Asogwa, 2007).Asogwa further states that occupational health should aim at the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations.

(Okeola 2005) states that present-day construction is marked by rapid execution of projects and the extensive use of machinery and mechanized production processes. However, despite a relatively large pool of construction machines and mechanism as well as high level of prefabrication in building construction and installations, the proportion of manual labour

remains approximately 50% (Atev, Bondarik, Zolotnitsky, Gromov 1995). Construction has many sub-sectors ranging from simple housing to major high-rise buildings as well as bridge, road, tunnel, and even under water construction. Each sector has its distinct hazard and risks determined by the peculiarities of its labour process as indeed every production process does irrespective of whether a good or service is produced. This emphasized the need for adequate occupational health and safety strategies for workers in their site working environment, because the costs of accidents are immense to the individual, the employer and the society. Occupational health and safety in construction is all about preventing people from been injured at work or becoming ill through appropriate precaution and providing a satisfactory working environment. The need for safety and health measure would arise to functionalize occupational health condition of construction workers in Abuja. This study is focusing on assessing the practise of construction workers base on occupational safety and health in medium and high rise building construction in Abuja, Nigeria.

According to Ajanlekoko (2001), provision of houses as a basic need is an essential commodity to all life. Housing is a force that lays the foundation of a national investment in any country's economic development that plays a vital role. The well being of a nation imitate in the number of housing its gross domestic product (GDP) display or delivers. Wealth creation includes all forms of human venture that adds up in the economy. Improve standard of living is among the bases of human wants worthy of an individual. Therefore increase in wealth and success both for individual and a country leads to improvement in human as a natural quest and economic growth. For increasing the standard of living in Nigeria, licences were provided to shelters owners in the country within period of 1993 to 1994 by the licensed primary mortgage finance institution (LPMFI) from 251 to 276 respectively.

The National Housing Planning (NHP) in 1994 to 1998 in that period was expected to deliver 121,000 housing units. These figures declined in 1998 to 115 when the government changed

likewise its capital expenditure increased by more than 500% to 4818.3 million same year, from 776.7 million in 1988 but declined by 2% to 722.0 million in 1998 (CBN, 1994). Since the colonial period till date plus the huge investment by the government, Nigeria still remains in difficult housing problem. Situation has gotten bad in the urban areas in Nigeria. Out of the 121,000 housing unit only 1014 were completed between 1994 and 1995 (CBN, 1994). Ajanlekoko (2001) proves that 85% of the Nigerian population lives in the urban places are living in single rooms and this contributes low hygienic and healthy conditions.

### **Benefit of Construction Safety Development in Nigeria Economy**

In the recent times, portfolio managers believe real estate holdings are one of the most important asset classes. Every portfolio seeks to achieve diversification as well as be cautious against inflation. In fact in the latest asset mix recommendation of J.P. Morgan and Goldman Sachs, real estate is as good as 5% of a defensive portfolio. In an aggressive portfolio real estate is allocated 10%. Nigeria, with estimated population of 160million, has 17million households. Property in Nigeria is mainly and tightly held by the landlords who are generously estimated at less than 5% of the population. Thus over 90% of urban Nigeria is tenants. Also there is no organized or efficient mortgage finance business. Thus most working or emerging middleclass people have no hope of chance of ever raising finance to buy or build their own houses. Estimates are that the shortfall of housing in Nigeria is 17million.

A programme to bridge this gap will lead to an investment of no less than fifty nine trillion naira (N59.5trn) this is approximately 180% of GDP into direct construction, building materials and supplement of infrastructure requirements. By applying an investment multiplier of 10% on this the impact on GDP is N5.95trn which is very significant. On the funding and supply side the story is more astounding. There is approximately N2trn of pension assets in Nigeria, with only adequate exposure to real estate. If Nigeria on one hand increases national

savings and pension contribution and simultaneously its commitment to real estate the result shall have impact on economic growth, capital market development and national stability. This impact jobs creation and downstream benefits which are beyond any imagination. Developing of real estate market in Nigeria would provide a large and buoyant capital market and better economy (Oteh, 2011).

### **Planning in Building Construction**

According to Akinsola (1993), planning is one of the tools necessary to functionalise building location competitively in society. Planning is needed by the construction industry stakeholders at all stages of construction projects. It is of crucial importance to incorporate the utilisation of surveying firms in the entire process of tendering for the purpose of enhancing quality and safety of the services.

Planning services are the basis for taking off an implementation of any component of building and civil engineering works. These works are found in almost all public and private sector institutions. The sectors include agriculture, forestry, fisheries, defence and security forces, transportation and communication, production, energy, aviation, lands and mapping, statistics, research, exploration and construction. Therefore, the irrigation channels are built in the agricultural sector, hydropower dams in energy, channels dredging and docking wharfs in marine, tunnelling and shafts excavations in mining, high precision installation of machines in industrial and production engineering, just to mention a few, do require high quality surveying services. According to Ambogo (2008), the following factors are required to functionalise construction industry:

- i. Selection of appropriate maps for preliminary study of the construction viability
- ii. Identification of location of the construction site for clearance

- iii. Production of topographical maps for landscaping, architectural and engineering designs
- iv. Planning include horizontal and vertical critical points for erection of structures, calculation of earthwork quantities, and checking for approval the completion and/or the beginning of a particular task, e.g. filling and cutting levels in route projects.
- v. Fixing and checking the alignment of the buildings and floors of rising structures as per specifications.
- vi. Preparation for built plan of the constructed infrastructures for proper management.
- vii. Monitoring the magnitude and behaviour of deformation displacements of the structures as surveillance mechanism of preventing fast deterioration and disastrous occurrences; e.g. collapsing of structures.

### **Construction Technological Management**

According to Jackson (2007), the creation of new business strategies give competitive advantages and new direction in organisation structure towards human and information technology development. The use of technology would help to facilitating managing organisation like construction industry. For maximising the potential benefits of organisation, managing approach could be anticipated. In order to achieve or adopt the initiative, a top management officer must take possession of human resources and information and communication technology (ICT) departments in the organisation. The construction industry presents opportunity for electronic data interchangeable (EDI) implementation. The use of EDI would save cost in the construction industry in data exchange illustrated by the European Construction Institute (ECI) and the US construction industry. This technology aids in dealing with difficult clients and application of such have shown reasonable reduction in cost management. Two factors are known by ECI and they are namely cost and profit.

Organisations within the construction industry are constrained with the processes that support their current infrastructure and technologies.

### **Benefit of IT in Construction Industry**

Benefit of information technology (IT) could be strategic or operational perspective. This reason offers a competitive advantage from that perspective. Betts *et al.* (1991), the gains of using IT in real estate industry is that it reduces the cost of operation and service delivery by gaining advantage amongst its peers in strategy, proved by research. Managerial information and better communication can be ascertained from the operational viewpoint. All these help to develop good scheduling, saves cost, time and a good project planning. Storage of documents and retrieval from a central database can be done using the web based electronic document management system. Reduction in errors in data re-entry and monitoring construction project since IT supports data integration. Three areas are identifies as important of IT in construction industry (Peansupap, 2004):

- i. Data amalgamation
- ii. Communication, teamwork plus project management and control
- iii. Electronic procurement and commerce

### **Health's Hazards, First Aid and Occupational Health Services**

For works which by their very nature expose workers to hazards arising from the use or presence of chemical, physical or biological agents and climatic conditions, appropriate

preventive measures should be taken to avoid any danger to the safety and health of workers. The preventive measures should place emphasis on the need to eliminate or reduce the hazard at the source and in particular should require (ILO, 1992):

- i. The replacement of hazardous substances, equipment or processes with substances, equipment or processes less harmful or hazardous to workers' safety and health;
- ii. The reduction of noise and vibration caused by equipment, machinery, installations and tools;
- iii. control of the release of harmful agents or chemicals into the working environment; training in manual lifting;
- iv. proper working postures when workers are required to work in fixed working positions or when they are carrying out repetitive work;
- v. appropriate protection against climatic conditions likely to jeopardise health;
- vi. where the foregoing measures are inappropriate: instituting work practices which will eliminate or minimise danger to safety and health;
- vii. Supplying and requiring the use of personal protective equipment and clothing.

### **Benefits of Occupational Health Promotion in Construction Industry**

Generally, the introduction of occupational health in industries and other occupations can benefit everybody especially the management, the employers and the employees. The workplace is an ideal setting for promoting the health and well being of the employees and the employers. This is because a large number of the population spends greater number of their time and energy at work environment each day. In essence, the work place is the second home for any employer. Also Occupational health is meant not only for the worker but is extended to the family members and the entire community directly or indirectly. When the employees are healthy physically, emotionally and psychologically the atmosphere within the



occupational setting becomes encouraging, relaxed and inviting. The productivity increases, the company stands better chance of growth. Introduction of occupational health into the companies reduces items of loss and cost reduction due to absenteeism as a result of illness and accidents. Through occupational health, conditions that cause illness and accidents are far more reduced if not prevented. The benefits of occupational health at work settings could be summarised thus (Ezenduka and Olubiyi, 2010):

- i. Improvement of worker's health behaviour due to relaxed atmosphere in the work setting
- ii. Improved worker's health
- iii. Improved workers moral and job-satisfaction
- iv. Improved workers efficiency and productivity
- v. Lower sickness rates, lower accidents and injury rates
- vi. Reduced absenteeism reduced labour turnover
- vii. Reduced health cost to the employee, the management and the employers
- viii. Improved corporate image and industrial relations
- ix. Lower compensation for occupational illnesses and injuries
- x. Improved intra-personal and inter-personal relationship within the companies, the family and in the community

### **Effects of Work on Health**

Achalu (2000) there are many benefits that can be obtained and they are:

- i. Work serves to relieve boredom
- ii. It provides avenue for creativity
- iii. It serves as means of personal/economic gain and means of livelihood
- iv. It contributes to life satisfaction and happiness.

- v. It serves as source of challenge for human growth and development
- vi. It creates opportunity for socialisation and companionship.
- vii. Good health increases capacity to work
- viii. It increases capacity to enjoy work
- ix. It increases capacity to desire satisfaction at work.
- x. It promotes productivity and increases worker's performance.
- xi. It encourages emotional and psychological satisfaction
- xii. It reduces stress and promotes intra and interpersonal relationship in the work setting.
- xiii. It increases alertness to danger.

### **Safety and Health in Construction Industry**

According to ILO (1992), the employer should provide for the setting up of or access to an occupational health service consistent with the objectives and principles of the Occupational Health Services Convention and Recommendation. All workers should be subject to health surveillance. Monitoring and control of the working environment and planning of safety and health precautions should be performed as prescribed by national laws and regulations. A multiplicity of health hazards are present in construction work and every effort should be made to promote awareness of this fact and of the need to safeguard health. Whenever new products, equipment and working methods are introduced, special attention should be paid to informing and training workers with respect to the implications for safety and health.

Safety is just a simple word that the most of people take for granted and tend to forget this simple word may cause a harmful to us in daily routine. Most of body defined safety approach from the citation taken by McGhee (1951), American College Dictionary; safety is defined as “Freedom from injury or danger, quality or insuring against hurt, injury, danger of

risk”. Meanwhile the New English Dictionary echoes the same negative ideas, “exemption from hurt or injury: freedom from harm and others”. Wikipedia, safety is as being ‘safe’ in term of conditions being protected against any physical, social, spiritual, financial, political, emotional, occupational, psychology, education or other types of consequences of failure, damage, error, accident, harm, or any event which could be considered non-desirable. Safety’s aim is to reduce the accidents among employee at the workplace. Safety triangle shows the relationships between the unsafe work situation and injuries. According toMcSween (2003), unsafe work behaviour is according to the result of:

- i. Physical environment,
- ii. the social environment and
- iii. workers’ experience within environment

Generally, a code of practice is a set of rules according to which people in a particular profession are expected to behave or practise. The ILO’s Code of Practice on Health and Safety on Construction site provides guidelines in the implementation of the health and Safety practise on construction sites for all workers including casual workers. The document outline the steps that have to be taken, among others to provide adequate welfare facilities, personal protective equipment appropriate for a job and provision and maintenance of safe working environment to all workers on site. Salient portions of the code relevant to this study are explained and presented below (Danso, 2010)

### **Welfare Facilities**

Under the general provisions of welfare facilities, it writes “at or within reasonable access of every construction site, the following facilities should, depending on the number of workers and the duration of the work, be provided, kept clean and maintained(ILO, 1992).

- i. sanitary and washing facilities or showers;
- ii. facilities for changing and for the storage and drying of clothing;
- iii. accommodation for taking meals and for taking shelter during interruption of work due to adverse weather conditions”

### **Sanitary Facilities**

The Sanitary facilities are defined to include toilet, privies, chemical closet. The understanding from the document is that, the provision, the construction and the installation of these facilities should comply with the requirements of the authorities (laws of the land). Further, no toilet other than a water flush toilet should be installed in any building containing sleeping, eating or other living accommodation, and should be adequately ventilated and not open directly into occupied rooms. Adequate washing facilities should be provided as near as practicable to toilet facilities.

### **Washing Facilities**

The rules governing washing facilities (e.g. shower-bath) are that, the number and the standard of construction and maintenance of washing facilities should comply with the requirements of the authorities. Washing facilities should not be used for any other purpose and where workers are likely to be exposed to skin contamination by poisonous, infectious or irritating substances, or oil, grease or dust, there should be a sufficient number of appropriate washing facilities or shower-baths supplied with hot and cold water.

### **Drinking Water**

The code requires that, contractors must provide enough water for all workers and the treatment of the drinking water will be as follows. All drinking water should be from a source approved by the authorities. Where such water is not available, the authorities should ensure

that the necessary steps are taken to make any water to be used for drinking fit for human consumption. Drinking water for should be stored in closed containers only, from which the water should be dispensed through taps or cocks. If drinking water has to be transported to the worksite, the transport arrangements should be approved by the authorities. The transport tanks, storage tanks and dispensing container should be designed, used, cleaned and disinfected at suitable intervals in a manner approved by the authorities. Water that is unfit to drink should be conspicuously indicated by notices prohibiting workers from drinking it. A supply of drinking water should never be connected to a supply of water that is unfit to drink.

### **Facilities for Food and Drink**

Contractors are required in appropriate cases, depending on the number of workers, the duration of the work and its location, adequate facilities for obtaining or preparing food and drink at or near a construction site should be provided, if not otherwise available. The facilities should be hygienic and located in hygienic environment.

### **Living Accommodation**

The code of practice requires that suitable living accommodation should be made available for all the workers at construction sites which are remote from their homes. Adequate transportation between the site and their homes should be provided, and where this is not possible other suitable living accommodation should be provided. Men and women workers should be provided with separate sanitary, washing and sleeping facilities.

### **Personal Protective Equipment and Protective Clothing**

Under this provision, employers were to note that suitable personal protective equipment and protective clothing, having regard to the type of work and risks, should be provided and maintained by them without cost to the workers. Also under this provision,

personal protective equipment and protective clothing should comply with standards set by the authorities, taking into account as far as possible the ergonomic principles. Further, employers should provide the workers with the appropriate training to enable them to use the individual protective equipment, and should require and ensure its proper use (ILO, 1992).

### **Types of Protective Equipment and Protective Clothing**

Employers are required by law to provide all workers including casual workers with the following personal protective equipment and protective clothing on site.

- i. safety helmets or hard hats to protect the head from injury due to falling or flying objects, or due to striking against objects or structures;
- ii. clear or coloured goggles, a screen, a face shield or other suitable device where workers are likely to be exposed to eye or face injury from airborne dust or flying particles, dangerous substances, harmful heat, light or other radiation, and in particular during welding, flame cutting, rock drilling, concrete mixing or other hazardous work;
- iii. protective gloves or gauntlets, appropriate barrier creams and suitable protective clothing to protect hands or the whole body as required, against heat radiation or while handling hot, hazardous or other substances which might cause injury to the skin;
- iv. footwear of an appropriate type when employed at places where there is the likelihood of exposure to adverse weather conditions, or of injury from falling or crushing objects, hot or hazardous substances, sharp-edged tools or nails and slippery or ice-covered surfaces;
- v. respiratory protective equipment, suitable for a particular environment, where workers can be protected against airborne dust, fumes, vapours or gases by ventilation or other means;

- vi. a suitable air line or self-contained breathing apparatus when employed in places likely to have an oxygen deficiency;
- vii. respirators, overalls, head coverings, gloves, tight-fitting boiler suits, impermeable footwear and aprons appropriate to the risks of radioactive contamination in areas where unsealed radioactive sources are prepared or used; and
- viii. waterproof clothing and head coverings when working in adverse weather conditions

From the above section, it can be concluded that the legal framework (i.e. the ILO's Code of Practice on Health and Safety on Construction site) for construction workers in general is adequate to protect them. This legal framework covers both permanent and casual workers. It does not prohibit or exclude any section of workers from its protection (Danso, 2010).

### **Ways of improving Construction Awareness**

The following steps are required for improving safety and health of construction worker (ILO, 1992).

### **Workers should be adequately and suitably**

- i. informed of potential safety and health hazards to which they may be exposed at their workplace;
- ii. Instructed and trained in the measures available for the prevention and control, and protection against, those hazards.

### **Requirement for Working**

A person has to receive the necessary information, instruction and training so as to be able to do the work competently and safely. The competent authority should, in collaboration

with employers, promote training programmes to enable all the workers to read and understand the information and instructions related to safety and health matters.

### **The Information, Instruction and Training should be given in a Language**

Information need to be understood by the worker and written, oral, visual and participative approaches should be used to ensure that the worker has assimilated the material.

### **National Laws or Regulations**

The national body guiding the construction worker should provide:

- i. The nature and length of training or retraining required for various categories of workers employed in construction projects;
- ii. The employer has the duty to set up appropriate training schemes or arrange to train or retrain various categories of workers.
- iii. Wherever required by national laws and regulations, only drivers, operators or attendants holding a certificate of proficiency or license should be employed to operate particular vehicles, lifting appliances, boilers or other equipment.

### **Training for Safety and Health Measures in Construction Site**

Copies of the relevant safety and health rules, regulations and procedures should be available to workers upon the commencement of and upon any change of employment. Control measure need to be provided:

- i. General rights and duties of workers at the construction site;
- ii. Means of access and egress both during normal working and in an emergency;
- iii. measures for good housekeeping;



- iv. location and proper use of welfare amenities and first-aid facilities provided in pursuance of the relevant provisions of this code;
- v. proper use and care of the items of personal protective equipment and protective clothing provided to the worker;
- vi. general measures for personal hygiene and health protection;
- vii. fire precautions to be taken;
- viii. action to be taken in case of an emergency;
- ix. Requirements of relevant safety and health rules and regulations.

### **Specialized Instruction and Training**

- i. Drivers and operators of lifting appliances, transport vehicles, earth-moving and materials-handling equipment and plant, and machinery or equipment of a specialized or dangerous nature;
- ii. workers engaged in the erection or dismantling of scaffolds;
- iii. workers engaged in excavations deep enough to cause danger, or shafts, earthworks, underground works or tunnels;
- iv. workers handling explosives or engaged in blasting operations;
- v. workers engaged in pile-driving;
- vi. workers working in compressed air, cofferdams and caissons;
- vii. workers engaged in the erection of prefabricated parts or steel structural frames and tall chimneys, and in concrete work, formwork and such other work;
- viii. workers handling hazardous substances;
- ix. workers working as signalers;
- x. Other specialized categories of workers.

## **Reporting of Accidents and Diseases**

National laws or regulations should provide for the reporting of occupational accidents and diseases to the competent authority. All accidents to workers causing loss of life or serious injury should be reported forthwith to the competent authority and an investigation of these accidents should be made. Other injuries causing incapacity for work for periods of time as may be specified in national laws or regulations, and prescribed occupational diseases should be reported to the competent authority within such time and in such form as may be specified. Dangerous occurrences such as:

- i. explosions and serious fires;
- ii. the collapse of cranes, derricks or other lifting appliances;
- iii. The collapse of buildings, structures or scaffolds, or parts thereof, should be reported forthwith to the competent authority in such form and manner as may be prescribed, whether any personal injury has been caused or not.

## **Occupational Safety and Health (OSH) Management**

The use of life cycle of continuous improvement would help the top management reviewing the operations of the OSH to assess whether it being fully implemented and remains suitable for achieving the organization's stated OSH policy and objectives. The review should also consider whether the OSH policy and objectives. The documentation may include minute of review, revisions to the OSH policy and objectives, specific corrective or improvement actions with assigned responsibilities and target dated for completion, review of corrective action and areas of emphasis to be reflected in the planning of future OSH audits.

## **Policy**

Policy being made based on the situation what happen on the organization. Every policy will be altered base on the cases that happened in the organization. The policy will be changed to overcome the future accident in the workplace. Instead the person in charge of creating the policy is known as the policy maker. Policymaker is a person with power to influence or determine the policies and practices in international, national, regional or local areas. The policymaker faced a difficult time in creating or establishes the policy when the policymaker receives the non genuine information. Statistical information can be extremely valuable in policy analysis but misinterpreted statistics too often contribute to poor policy (Hussain, 2009). The basis of the OSH policy is to develop, implement and improving an organization safety and health management system (OHSMS). A documented policy statement that gives an overall sense of direction and sets the principles of action for an organization should be produced and authorize by the organization's top management. The policymaker alsohas to sets the objective. Instead it reflects the responsibilities, performance and continual improvement to make sure the effectiveness of the safety and health being implemented efficiently. Besides, by reducing the number of accident rate, effective safety and health management reduces cost of doing the business and promote business effectively. Managing safety and health at the workplace is important for at least three main reasons, legal, moral obligation and economic.

## **Planning**

As planning is the second elements of organization safety and health management system (OSHMS) continues improvement, any organization should provide total backup planning and future planning toward any potential injury in the organization.OHS is in domain after using the process of hazard identification, risk assessment and risk control. The documented procedure should be establishes and maintained to identify the accident and determine level of the risk associated with the identified accidents, give description or

reference to measure or monitor and control the risks particularly those are hard to tolerate, OHS objective and actions aims to reduce identified risk and follow up activity to monitor progress in their reduction, identification of the competency and training requirements to implement the control measures, necessary control measures as part of the operational control and last but not least is to records generated by each of the documented procedures.

### **Legal and other requirements**

The organization need to be aware of how its activities are affected by applicable legal and other requirement and to communicate this information to relevant personnel. The organization must have procedures for identify and access information and identify which requirements apply and where monitoring the implementation of controls consequent to changes in OSH legislation.

### **OHS management arrangements**

The

organization shall have a documented OHS management program (strategies and plans of actions) to achieve its policy an objectives. The program should identify and allocate responsibility and authority to deliver OHS objectives (at each relevant level). It should identify the tasks to be implemented, allocate time-scale to meet the related objectives, and provide allocation resource to each task.

### **Implementation and Operation**

In a process of implementing planning policy, the organization shall define the responsibility, authority and relationship of personnel who manage, identify, evaluate and

OSH hazards. An organization having multiple departments of OHS functions should define the authority of each function and describe how each related.

### **Checking and Correction Action**

Checking and monitoring is important for top management to check the performance and measurement of an OHS performance in an organization. The organization should identify the key performance parameters to determine policy and objective are being achieved, risk controls have been implemented and effective, and lessons have been learnt from OSHMS failure, including hazardous events (accidents, near misses and illness cases), awareness, training, communication and consultation programmers for employees and interested parties and information that can be used to review and improve OSH (Hussain, 2009).

### **Costs of Occupational Injury/Disease**

Work-related accidents or diseases are very costly and can have many serious direct and indirect effects on the lives of workers and their families. For workers some of the direct costs of an injury or illness are (Asogwa, 2007; Achalu; Ezenduka and Olubiyi, 2010):

- i. The pain and suffering of the injury or illness
- ii. The loss of income
- iii. The possible loss of a job
- iv. Health-care costs
- v. It has been estimated that the indirect costs of an accident or illness can be four to ten times greater than the direct costs, or even more.

An occupational illness or accident can have so many indirect costs to workers that it is often difficult to measure them. One of the most obvious indirect costs is the human

suffering caused to workers' families, which cannot be compensated with money. Social costs are very necessary and following economic costs must be added (Niosh, 2002 and Rubio *et al.*, 2005)

- i. Costs to the worker
  - a) Lower income (for not being insured, for the loss of other income beyond normal job),
  - b) Greater expenses (expenses for other family members to help the victim's family, uninsured medical, rehabilitation, assistance expenses, etc.), and
  - c) Lower quality of living (relapses, permanent disorders, complications).
- ii. Costs to the company
  - a) Costs from lower production, or from taking special compensation measures,
  - b) Costs from material damages,
  - c) Costs from guaranteeing the safety of the production system,
  - d) Costs of accident-insurance premium and compounded
  - e) rates based on the number of accidents,
  - f) Variable costs of accident-prevention measures, and
  - g) Costs caused by personal injury: medical aid, sick pay, administrative consequences, salaries of the injured and others affected during the accident or temporarily stopped interference from accident investigation, etc.
- iii. Costs to the state
  - a) Lower income from taxes as a consequence of lower production
  - b) Lower income from taxes from companies (lower GNP),
  - c) Greater expenses (medical coverage, rehabilitation, disability pay, etc.).

A study on the quality, working conditions, and economic performance of the European Construction Industry (Lorent, 1991) estimates that the total cost of labour accidents in construction represents 3% of the cost of the finished work. The report evaluates

the cost of prevention of labour risks at 1.5% of the cost of the finished work, equivalent to half the cost of the accidents. In addition to the economic costs of occupational accidents, the social cost imposed by the death of a worker should not be overlooked: such costs are inadmissible for a society of the 21st century equipped with the most advanced technologies of construction for the execution of vast works of civil engineering. The costs to employers of occupational accidents or illnesses are also estimated to be enormous. For a small business, the cost of even one accident can be a financial disaster. For employers, some of the direct costs are:

- i. Payment for work not performed;
- ii. Medical and compensation payments;
- iii. Repair or replacement of damaged machinery and equipment;
- iv. Reduction or a temporary halt in production;
- v. Increased training expenses and administration costs;
- vi. Possible reduction in the quality of work;
- vii. Negative effect on morale in other workers.

## **CHAPTER THREE**

### **METHODOLOGY**

The chapter deals with research research design, area of the study, population, sample, instrument for data collection, validation of the instrument, administration of the instrument, method of data analysis and decision rule.

#### **Research Design**

The research design is adopted for this study was a descriptive survey design. This is because the study employed the questionnaires to assess the practice of construction workers occupational safety and health in medium and high rise building in Abuja. The study problems are identified with possible solution through use of adequate safety measure during construction, therefore the study tends to be explanatory. Survey design method was considered suitable since the study will seek information from a sample that was drawn from a population using questionnaire.

#### **Area of the Study**

The study was carried out in Abuja. The selected construction industries were Julius Berger Nigeria Plc. Julius Berger has been standing-out on merit status as construction industry in Nigeria.

#### **Population of the Study**

The population for this study composed of the 50 management and 50 non – management staff of Julius Berger construction industry in Abuja and they are professional engineers,



building technologists, master's craftsmen and safety officers/health personnel of Julius Berger Plc.

### **Instruments for Data Collection**

The data required for assessing the construction occupational safety and health condition was through structured, open-ended and focusing questions. The question tries to solve the postulated hypothesis in the study. The questionnaire was developed by the researcher and divided into section A and B. Section B was further divided into sub-sections as shown:

Section A: Deals with the respondents personal data

Section B: Consists of research question one which contains 15 items sought to determine the extent of which construction workers are aware of safety and health regulation on construction site in Abuja, Nigeria.

Section C: Consists of research question two which contains 15 items sought to find out the occupational safety and health practiced by construction workers in medium and high – rise building in Abuja, Nigeria

Section D: consists of research question three which contains 15 items sought to find out the ways for improving awareness of construction workers in Abuja, Nigeria.

### **Validation of the Instrument**

The instrument for data collection was validated by three lecturers from the department of Industrial and Technology Education, Federal University of Technology,

Minna. They were required to suggest modification on the structure of the item, organization and appropriate and then rate them according to their stability for the study.

### **Administration of Instrument**

The instrument for data collection was administered to the respondents by the researcher and one research assistant from each industry. The administered questionnaire was later collected with 100% return.

### **Method of Analysis**

The research data collected was analysed using mean and standard deviation while t-test was used to test the hypothesis at 0.05 level of significance.

SA	Strongly agree	=	Very Highly Aware (VHA)	=	4pts
A	Agree	=	Highly Aware(HA)	=	3pts
D	Disagree	=	Aware (A)	=	2pts
SD	Strongly Disagree	=	Unaware (UA)	=	1pt

### **Decision Rule**

To determine the acceptable level. The mean cut – off of 2.50 was used as deciding point between agreed and disagreed. Responses with a mean of 2.50 and above were considered agreed. While responses below 2.50 were considered disagree. Also an inferential statistics t-test was used to test the hypothesis of 0.05 level of significance to compare the mean responses of the two groups. A t- critical value of  $\pm 1.96$  was selected based on the 148 degree of freedom at 0.05 level of significance. Therefore, any item with t- calculated value greater than or equal to t- critical was regarded as rejected or significant.

**CHAPTER FOUR**  
**DATA PRESENTATION AND ANALYSIS**

This chapter deals with the presentation and analysis of data with respect to the research question and hypothesis formulated for this study. The result of data analysis for the research question were presented first followed by those of the hypothesis tested for the study.

**Research Question 1:**

What is the extent to which construction workers are aware of safety and health regulations on construction site in Abuja, Nigeria.

**Table 1: Mean Responses of Building Construction Workers both Management and Non- Management Staffs on the Extent Construction Workers are Aware of the Components of Safety and Health Regulation in Building Construction Site in Abuja, Nigeria.**

S/NO	ITEMS	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	Remark
1.	General safety and health precaution during Construction operation.	3.57	3.81	3.75	Highly aware
2.	Assessment of the workers medically before allowed to work on site.	2.80	2.76	2.75	Highly aware
3.	Strength test for equipment or machine to be sure it's safe for use on construction site.	3.15	2.75	3.13	Highly aware
4.	Protection of adjoining building or roofs against damage when a new building is erected or demolition of an existing building.	3.26	3.67	3.33	Highly aware
5.	Removal of debris in a way which prevents injury or damage to persons and adjoining property.	3.55	2.70	3.10	Highly aware
6.	Provision of fire extinguishers on site	2.80	2.70	2.75	Highly aware
7.	Wearing of personal protective clothing.	3.65	3.28	3.00	Highly aware
8.	Availability and use of safety helmet	3.85	3.70	3.60	Highly aware
9.	Use of fall arrest harness system when working	3.40	2.45	3.53	Highly aware

10. Supervision of working environment by necessary health personnel	2.21	2.40	2.24	Unaware
11. Provision of edge protection for stairs and open Floors	3.85	3.60	3.20	Highly aware
12. Provision of proper post signs for dangerous and excavations site.	3.28	3.00	3.40	Highly aware
13. Proper handling and stacking of combustible or hazardous products or chemicals.	3.56	3.80	3.33	Highly aware
14. Securing of license or certificate before working on hoist apparatus by personnel.	1.84	2.50	2.18	Unaware
15. Provision of complete first aid kits and competent first aid attendance	3.40	3.28	3.20	highly aware

Analysis from table 1 shows that all the respondents agree with 13 out of 15 items with mean ranging from 2.75- 3.65 two items 10 and 14 were considered disagree with mean value of 2.24 and 2.18. This signifies that all construction workers are highly aware of the components of safety and health regulations but posed in the two items 10 and 14 were disagreed thus unaware.

## Research Question 2:

What are the occupational safety and health practices of construction workers in medium and high- rise building in Abuja, Nigeria?

**Table 2: Mean Responses of Building Construction Workers both Management and Non- Management Staffs on Occupational Safety and Health Practices of Construction Workers in Medium and High- Rise Building in Abuja, Nigeria.**

S/NO	ITEMS	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	Remark
16.	Inspection of soil profile type before erecting structures on site.	3.45	3.60	3.53	Agreed
17.	Keeping of accidents record properly	3.45	3.00	3.23	Agreed
18.	Following and obeying building construction codes and regulations.	3.75	3.40	3.58	Agreed
19.	Awareness of the proper posture when lifting loads and materials on construction site.	3.85	3.80	3.83	Agreed
20.	Availability of skilled labour on site for safe construction.	3.80	3.60	3.70	Agreed
21.	Participation of all workers in safety awareness programmes organized by the employer.	3.20	3.15	3.10	Agreed
22.	Adequate and up to date knowledge should be available to workers about the hazard attached to working on construction site.	3.50	3.20	3.10	Agreed
23.	Approved or trained personnel should handle special like excavations and blasting operations.	3.75	2.90	3.33	Agreed
24.	Servicing and maintenance of equipment and machinery.	3.50	3.00	3.20	Agreed
25.	Communication between the engineers and the	3.75	3.00	3.38	Agreed

workers in case of any emergency should be available.

26. Employers should be responsible for non- employers or visitors safety and health on the construction site.	3.85	3.10	3.48	Agreed
27. Knowledge should be made available on safe working environment.	3.40	3.00	3.20	Agreed
28. Controlling the number of operatives and persons on site in a working area or allocated to a task.	3.45	3.24	3.50	Agreed
29. Concrete should undergo slump test before casting.	3.60	3.48	3.70	Agreed
30. Undue haste should be discourage by operators when working on site.	3.33	3.23	3.48	Agreed

The data presented in table 2 revealed that the entire respondents agreed with all the items with mean score ranging 3.15- 3.83. This signifies that all items are the occupational safety and health practices of construction workers in medium and high - rise building in Abuja, Nigeria.

### **Research Question 3:**

What are the ways of improving awareness of occupational safety and health to construction workers in Abuja, Nigeria?

**Table 3: Mean Responses of Building Construction Workers both Management and Non- Management Staffs on the Ways of Improving Awareness of Occupational Safety and Health to Construction Workers in Abuja, Nigeria.**

S/NO	ITEMS	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	Remark
31.	Government should set up one or more inspectorate with unquestionable authority to visit construction site from time to time.	3.70	3.30	3.50	Agreed
32.	Enforcing all safety laws and precautions to all construction company regardless of its size.	3.45	3.70	3.73	Agreed
33.	Ensuring adequate site planning	3.85	3.49	3.53	Agreed
34.	Government should make sure workers employ the attitude of testing the workability of their construction materials.	3.70	3.55	3.63	Agreed
35.	Safety laws and regulations should be known to all the workers in the construction of building.	3.73	3.55	3.73	Agreed
36.	Physically, mentally fit, well- disciplined and trained workers should be employed for site work.	3.85	3.70	3.60	Agreed
37.	The machined and equipment should be serviced regularly.	3.50	3.45	3.60	Agreed
38.	Skilled workers should supervise the work of the unskilled workers.	3.60	3.45	3.70	Agreed
39.	Seminars on safety should be organized periodically in the building construction site.	3.80	3.64	3.78	Agreed
40.	Government should set standards that can be legally	3.58	3.33	3.15	Agreed



enforced with penalties in construction site.

41. Written handbook containing building construction regulation should be provided to worker on site.	3.76	3.30	3.10	Agreed
42. Regulations and rules of building construction should be placed in the environment and gates of the site.	3.45	3.55	3.64	Agreed
43. Workers without proper training should not be allowed on site.	3.30	3.60	3.58	Agreed
44. Machine and equipment should have the manufacturer's instructions and guides and must be read by operators.	3.78	3.65	3.45	Agreed
45. Training of both old and new workers on safety rules and regulations.	3.56	3.70	3.68	Agreed

The data presented in table 3 revealed that the entire respondents agreed with all the items with mean scores ranging between 3.33 – 3.78

### **Hypothesis 1:**

H<sub>01</sub>: There is no significant different in the mean responses of building construction engineers and master craftsmen on the extend of which construction workers are aware of safety and health regulations on construction site in Abuja, Nigeria.

**Table 4: T- test Analysis of Building Construction Workers both Management and Non – Management Staffs on the Extent to Which Construction Workers are Aware of the Components of Safety and Health regulation in Building Construction site in Abuja, Nigeria.**

S/NO	ITEMS	X <sub>1</sub>	SD <sub>1</sub>	X <sub>2</sub>	SD <sub>2</sub>	T-CAL	REMARKS
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1. General safety and health precaution during construction operation.	3.57	0.75	3.81	0.60	-1.79	Not Significant
2. Assessment of the workers medically before allowed to work on site.	2.80	0.80	2.76	1.16	0.30	Not Significant
3. Strength test for equipment or machine to be sure its safe for use on construction site.	3.15	1.39	2.75	0.44	0.81	Not Significant
4. Protection of adjoining building or roofs against damage when a new building is erected or demolition of an existing building.	3.26	0.76	3.67	0.59	1.60	Not Significant
5. Removal of debris in a way which prevents injury or damage to persons and adjoining property.	3.55	0.74	2.70	0.90	2.75	Significant
6. Provision of fire extinguishers on site	2.80	0.80	2.70	1.00	1.10	Not Significant
7. Wearing of personal protective clothing	3.65	0.57	3.28	0.75	2.02	Significant
8. Availability and use of safety helmet	3.85	0.86	3.70	0.46	0.60	Not Significant
9. Use of fall arrest harness system when working on heights	3.40	0.66	2.45	0.65	1.01	Not Significant
10. Supervision of working environment by necessary health personnel	2.21	0.56	2.40	0.60	0.10	Not Significant
11. Provision of edge protection for stairs and open floors.	3.85	0.86	3.60	0.66	1.26	Not Significant
12. Provision of proper post signs for Not dangerous and excavations site	3.28	0.75	3.00	1.00	1.03	Significant
13. Proper handling and stacking of	3.56	0.75	3.80	0.59	-1.79	Not Significant

combustible or hazardous products or chemicals.							Significant
14. Securing of license or certificate before working on hoist apparatus by personnel.	1.84	0.9	2.50	0.70	0.39		Not Significant
15. Provision of complete first aid kits and competent first aid attendance	3.40		0.66	3.28	0.75	0.81	Not Significant

The analysis in table 4 showed that t-cal values of 13 items; 1,2,3,4,6,8,9,10,11,12,13,14,15 were below the t-table value while items 5 and 7 were greater than the t-table value. Therefore, the null hypothesis was rejected for each of the 2 items while it was accepted for each of the 13 items. This implies that there is no significant difference for items rejected on the extent of which construction workers are aware of safety and health regulations on construction site in Abuja, Nigeria.

**Hypothesis 2:**

H<sub>02</sub>: There is no significant difference in the mean responses of the building construction and master craftsmen on the occupational safety and health practices of construction workers in medium and high-rise building in Abuja, Nigeria.

**Table 5: T-Test Analysis of Building Construction Workers both Management and Non-Management Staffs on Occupational Safety and Health Practices of Construction Workers in Medium and High-Rise Building in Abuja, Nigeria.**

S/NO	ITEMS	X <sub>1</sub>	SD <sub>1</sub>	X <sub>2</sub>	SD <sub>2</sub>	T-CAL	Remarks
16.	Inspection of soil profile type before	3.45	0.81	3.60	0.66	1.09	Not

erecting structures on site.							Significant
17. Keeping of accidents record properly	3.45	0.81	3.00	0.98	1.05		Not Significant
18. Following and obeying building construction and regulations.	3.75	0.84	3.40	0.66	0.50		Not Significant
19. Awareness of the proper posture when lifting loads and materials on construction site.	3.85	0.36	3.80	0.40	1.28		Not Significant
20. Availability of skilled labour on Site for safe construction.	3.80	0.40	3.60	0.66	1.21		Not Significant
21. Participation of all workers in safety awareness programmes organized by the employer.	3.20	0.98	3.15	0.95	0.66		Not Significant
22. Adequate and up to date knowledge should be available to workers about the hazard attached to working on construction site.	3.50	0.97	3.20	0.98	1.09		Not Significant
23. Approved or trained personnel should handle special like excavations and blasting operations.	3.75	0.84	2.90	1.00	1.50		Not Significant
24. Servicing and maintenance of equipment and machinery.	3.50	0.97	3.00	0.94	1.46		Not Significant
25. Communication between the engineers and the workers in case of any emergency should be available.	3.75	0.84	3.00	0.94	1.56		Not Significant
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26. Employers should be responsible for Non- employers or visitors	3.85	0.36	3.10	0.94	1.60		Not Significant

and health on the construction site.							
27. Knowledge should be made available on safe working environment.	3.40	0.86	3.00	1.00	1.08	Not Significant	
28. Controlling the number of operatives and persons on site in a working area or allocated to a task.	3.45	0.81	3.24	0.90	1.05	Not Significant	
29. Concrete should undergo slump test before casting.	3.60	0.66	3.48	0.84	1.49	Not Significant	
30. Undue haste should be discourage by operators when working on site.	3.33	0.45	3.23	0.36	1.38	Not Significant	

The analysis in table 5 showed that the t- cal values of all the items were below the t – table value. Therefore, the null hypothesis was accepted for all the item. Hence, the opinions of the respondents did not differ in all the items concerning the on the extent to which construction workers are aware of the components of safety and health regulation in building construction site in Abuja, Nigeria.

**Hypothesis 3:** There is no significant difference in the mean responses of the building construction engineers and the master’s craftsmen on the ways of improving awareness of construction workers in Abuja, Nigeria.

**Table 5: T-Test Analysis of Building Construction Workers both Management and Non-Management Staffs on the Ways of Improving Awareness of Occupational Safety and Health to Construction Workers in Abuja, Nigeria.**

S/NO	ITEMS	X <sub>1</sub>	SD <sub>1</sub>	X <sub>2</sub>	SD <sub>2</sub>	T-CAL	Remarks
31.	Government should set up one or more inspectorate with unquestionable authority to visit construction site from time to time.	3.70	0.56	3.30	1.01	1.32	Not Significant
32.	Enforcing all safety laws and precautions to all construction company regardless of its size.	3.45	0.81	3.70	0.56	0.65	Not Significant
33.	Ensuring adequate site planning	3.85	0.36	3.49	0.85	0.27	Not Significant
34.	Government should make sure workers employ the attitude of testing the workability of their construction materials.	3.70	0.56	3.55	0.81	0.50	Not Significant
35.	Safety laws and regulations should be known to all the workers in the construction of building.	3.73	0.54	3.55	0.81	0.91	Not Significant
36.	Physically, mentally fit, well- disciplined and workers should be employed for site work.	3.85	0.36	3.70	0.56	0.60	Not Significant
37.	The machined and equipment should be serviced regularly.	3.50	0.87	3.45	0.81	0.72	Not Significant
38.	Skilled workers should supervise the work of the unskilled workers.	3.60	0.49	3.45	0.81	0.75	Not Significant
39.	Seminars on safety should be organized periodically in the building construction site.	3.80	0.67	3.64	0.50	1.14	Not Significant
40.	Government should set standards	3.58	0.89	3.33	0.72	0.85	Not Significant

that can be legally enforced with penalties in construction site.							Significant
41. Written handbook containing building construction regulation should be provided to worker on site.	3.76	0.91	3.30	0.69	1.11		Not Significant
42. Regulations and rules of building construction should be placed in the environment and gates of the site.	3.45	0.81	3.55	0.81	1.20		Not Significant
43. Workers without proper training should not be allowed on site.	3.30	0.69	3.58	1.01	1.16		Not Significant
44. Machine and equipment should have the manufacturer's instructions and guides and must be read by operators.	3.78	0.96	3.65	0.79	1.28		Not Significant
45. Training of both old and new workers on safety rules and regulations.	3.56	0.83	3.70	0.56	1.37		Not Significant

The analysis in table 6 showed that the t-test value of all the items were below the t- table values. Therefore, the null hypothesis was accepted for all the items. Hence the opinion of the respondents did not differ in all item concerning the ways of improving awareness of occupational safety and health to construction workers in Abuja, Nigeria.

## Findings

Base on the data collected and analyzed, the following finding were made according to the research questions raised for the study.

Findings related to the extent to which construction workers are aware of the components of

safety and health regulations on construction site in Abuja, Nigeria. Respondents agreed with the followings.

- General safety and health precautions is known to all building construction workers.
- Availability and use of safety helmet.
- Provision of a complete first aid kits and competent first aid attendance
- Provision of fire extinguishers
- Strength test for equipment or machines to be sure its safe for use on construction site
- Use of fall arrest harness system when working on heights
- Assessment of the workers medically before allowed to work on site

Findings related to what are the occupational safety and health practices of construction workers in medium and high- rise building in Abuja, Nigeria.

- General safety and health precautions are not known to all building construction workers
- Unavailability of skilled workers on site
- Lack of adequate servicing and maintenance of equipment and machinery.
- Haste is encouraged by operators when working on site
- Employers are not responsible for visitor or non- employers safety and health on the construction site.
- Lack of communication between the engineers and the workers in case of any emergency should be available.
- All workers don't participate in safety awareness programmes organized by the employer

Findings related to what are the ways of improving awareness of occupational safety and health to construction safety and health to construction workers in Abuja, Nigeria.



Findings related to what are the ways of improving awareness of occupational safety and health to construction workers in Abuja, Nigeria.

- Government should set up one or more inspectorate with unquestionable authority to visit the construction site from time to time.
- Ensuring adequate site planning.
- The skilled workers should supervise the work of the unskilled workers
- Enforcing all safety laws and precautions to all construction company regardless of its size
- Workers without proper training should not be allowed on site
- Physically, mentally fit, well disciplined and trained workers should be employed for site work
- Machines and equipment should have the manufacturer's instructions and guides and must be read by operators.

### **Discussion of Findings**

The discussion of the findings are based on the research question raised for the study findings from table 1. The findings revealed that there is availability and use of safe helmet. This is in agreement with Patton (2001) who defines safety as rules enacted at different times of every country deals with the protection of workers health, through control of working environment to reduce or control hazards. The study also reveals that there is a need for complete first aid kits and competent attendant in the building construction site, this also agreed with George (1990) who lamented that most of the lives that were lost due to accident occurrence are as a result of poor first aid treatment.

The findings shows the use of fire extinguishers. This is in agreement with Al-Bahar (2003) who says it is the responsibility of the construction site engineers to

ensure that maximum level of safety precautions is attained and one of the ways of attaining this level is through the availability of fire extinguishers and they must be serviced regularly.

The findings reveals that strength test for equipment or machines to be sure its safe for use on construction. This is in agreement with Al-Bahar (1999) who asserted that no construction industry or sector excels without proper maintenance and constantly checking of the equipment and machines used in that industry, he proceeded by saying equipment and machineries should be regularly checked to avoid failure when in use. The findings revealed that assessment of the workers medically before allowed to work on site. This is in agreement with Achalu (2000). he proceeded by saying work related accident and illness is attributed to employers paying little or no attention to the health of its employees, construction workers should be placed under medical assessment before and when working on construction site.

The findings also revealed the occupational safety and health practices of construction workers is through adequate knowledge on safe working condition. This is in line with Alexander (2001) who through maintain that workers in the building construction industry should be trained on how to work in a safe environment or how to work in a safe environment or how to make their working environment conducive in table 2 revealed that Nigeria safety laws are not known to all workers in the building construction site. This is inline with the findings of (Mandell 1986) maintain that Nigeria lacks statutory regulation on health and safety condition of factories, he went further by saying this is one of the major causes of accidents that occur in the building s construction site.

The findings also reveal that work in the construction industry lack proper orientation and training on safety precaution. The view of the responding is in line with Umaieye (1999)

who revealed that building construction workers lack proper orientation and also training, and this has a serious effect on the performance of the workers in the building industry.

Findings from the study revealed that one of the factors affecting the occupational safety and health practices of construction workers in the building construction site is improper posture when lifting loads. This was supported by Yomi (1993) who says some injuries or accident are caused by the workers themselves, he said good posture should be used in lifting heavy loads as this can result in a severe accidents if the loads are lifted using bad posture.

The findings also revealed that unavailability of modern tools and machinery in building construction, occupational safety and health practices of construction workers in building construction site. This is in support with the finding of Maxwell (2000) who exclaims that the building construction is a fast growing industry and needs to be in current line with the latest technology in term of modern tools and machinery.

The findings also indicated that negligence of building regulation is one of the factors affecting the implementation of safety measure in the building construction site. This is in support with the view of Doro (2004) who maintain that Nigerian building construction industry workers lack statutory regulation on safety precaution.

The findings in table 3 indicated that government should set up on or more inspectorate with unquestionable authority to visit the construction sites from time to time. This was buttressed by main (2001) who says government should set up a panel to inspect the work of the construction industry if it is line s with safety rules.

The findings also reveals that one of the techniques for enhancing safety measures in the building construction site is by controlling the numbers of operative other person on site. The finding also indicate that skilled workers should supervise the work of the unskilled

worker. This is in line with findings of Blake (2006) who skilled workers in every establishment serve on the site manager to possess extensive knowledge and experience in their crafts or profession. So therefore, monitors the works of the unskilled workers.

The findings reveals that all site safety precaution should be adhere to. This is in line with Josh (1988) who asserted that one of the ways of eliminating hazards in the industry is by following the safety rules and precautions.

The finding revealed that one of the techniques for enhancing the occupational safety and health practices of construction workers is by ensuring adequate maintenance of all the equipments and plants in the construction industry. This was supported by Igwe (2007) who asserted that workers should have adequate knowledge and experience on proper maintenance of tools and equipments used in the construction industry.

The findings also reveal that any employee who endangers the life of other employee should be liable to fine. This is true because some workers carelessly without considering the consequences that follow their reckless act, if the any employee who works carelessly are liable to fine the, some of the workers that work recklessly with caution or minimize their reckless act.

## **CHAPTER FIVE**

### **Summary, Conclusion and Recommendations**

#### **Summary**

Safety is seen as the practical certainty that injury will not occur from the use of substance, agent or equipments while implementation is seen as a realization of application or executive or an idea plan, model, design, specification, standard and policy. Safety implementation is an act implementing safety to ensure one is free from danger or accident. The construction industry dwells in an hazardous environment i.e.s worker in the building construction site everyday. That is why this study tends to investigate the implantation level of safety measure on building construction site in FCT Abuja.

The study used a survey research approach to find out the level of implementation of safety measure in the building site FCT Abuja, the factors affecting the implementation of safety measures and techniques for enhancing the implementation of safety measures on the building construction site in FCT Abuja. Forty five (45) items were generated in the questionnaires to elicit building construction engineers and master craftsman responses and the questionnaires was validated by the researchers supervisor in the department. A total of 100 questionnaires were issue to 50 management and 50 non- management staff in Abuja populace. The instrument for data collection was analysed using mean, standard deviation and t-test statistics.

### **Implication**

It could be deducted from the study that increase in accident rate on the building construction site is as a result of inadequate level of safety measure on the building construction site in Abuja metropolis. This implies that the implementations level of safety

measure is low compare to the factor that bring about the occurrence of accidents on the building construction site. This implies that various challenges are affecting the implementation of safety measure on the building construction site, which are;

Unavailability of modern tools, use of obsolete equipment, lack of adequate maintenance ,lack of proper orientation and training on safety precaution etc. This implies that as long as the defects are corrected, the construction safety measure on the building construction site will increase and the accident rate will be reduced.

The findings of the study will have occupational safety and health practices of medium and high-rise building construction as they would use the finding to determine their occupational safety and health measure, if it is accurate or inaccurate. It could also be deduced that the study will enable the building engineer to know their own contribution on the challenges affecting the implementation of safety measure on the building construction site.

## **Conclusion**

In conclusion, it was discovered from the study that the increase in accident rate on the building constructed site is as a result of inadequate of safety and health measure on the building construction site in Abuja metropolis.

Therefore, effort should be made to fight against the challenges affecting the safety and health measure on the building construction site of medium and high-rise construction in other to reduce the accident rate occurrence on the construction site. The building construction management and non-management staff should make effort to tackle the factor affecting the implementation of safety measure on building construction site. It is worthy to state here that unless these factors affecting the implementation of safety measure on building construction

site are seriously taken into consideration and fully implemented, the accident rate will keep increase and the negative effect on the construction industry will be seriously felt.

### **Recommendations:**

Based on the findings of the study following recommendations are made;

1. The federal government should set up one more inspectorate with unquestionable authority to visit the construction site from time to time.
2. Communication should be available between the engineers and workers on site in case of any emergency.
3. Only well trained, disciplined, physically and mentally fit workers should be allowed to work on site.
4. Carelessness and undue haste by operate should be discouraged
5. The number of operating other person on site in the working area or allocated tasks should be controlled.
6. The skilled workers should supervise the work of the unskilled workers
7. Concrete used in the building construction site should undergo slump test before casting
8. All safety precaution on the site should adhered to
9. Adequate maintenance should be given to all the equipments and plants on the construction site.
10. An employees who endangers the live of another employee should be fined.
11. Machines and equipment should have the manufacturer's instructions and guides and must be read by operators.

### **Suggestion For Further Research**

1. Management of job related hazards affecting construction works.

2. Investigation into the construction workers national health and safety policies in building construction industry.