

EVALUATION OF COMPLIANCE WITH HEALTH AND SAFETY TRAINING BY CONSTRUCTION FIRMS IN ABUJA, NIGERIA

ABSTRACT

Health and Safety (H&S) training is one of the most widely adopted practices for improving workplace safety. Existing H&S literature focuses more on the training of workers in construction firms of developed nations. This leaves out issues of H&S training of workers in the construction firms of developing nations such as Nigeria. The result of this is the problem of poor safety performance in the form of higher rate of accident, fatalities and injuries to workers on construction sites. This study therefore evaluated the compliance with H&S training by construction firms in Abuja, with a view to proposing strategies for reducing accidents on construction sites. In order to achieve the aim, the study examined the components of the H&S training capable of enhancing safety awareness among construction workers in construction firms; examined the level of compliance of firms with the provision of the identified components of H&S training; determined the impact of H&S Training practices on the safety performance of construction firms; and proposed strategies for reducing the rate of accidents, injuries and fatalities on construction sites. The population for the study constitutes the safety officers of 25 construction firms registered with the Federation of Construction Industry (FOCI) operating within Abuja metropolis. The study adopted both quantitative and qualitative approaches. Data were collected using structured questionnaire and interview. Analysis of data was carried out using frequency counts, percentage, Relative Importance Index (RII), Mean Item Score (MIS) and Spearman Rank correlation analysis. The study identified 12 important components of H&S Training (average RII = 0.813) which are averagely complied with (average MIS = 4.067). Seven (7) important Regulations identified have significant impact on H&S performance of construction firms (average MIS = 4.08). The study also found that there exists a significant relationship between H&S Training and H&S Budget Amount ($r = 25.5$; $p = 0.074$); and between H&S Training and number of accidents ($r = -42.7$; $p = 0.002$). Fifteen (15) effective strategies were identified for reducing the rate of accidents, injuries and fatalities on construction sites (average MIS = 3.89). It was concluded that the components of H&S training are effective but not completely complied with by construction firms in Abuja. Therefore, the level of compliance with the components of H&S training among construction firms in Abuja is fairly good. It was thus recommended that construction firms should implement the suggested strategies to the latter in order to create a conducive atmosphere for both management and workers to implement the H&S Regulations and H&S Training practices for enhanced H&S performance.

HAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

Health and Safety (H&S) training is one of the most widely adopted practices to improve workplace safety. Every year, construction firms invest millions of dollars toward training the workforce on issues such as hazard recognition, risk management, and injury prevention (Al-Emran, Elsherif and Shaalan, 2016). H&S is an inevitable aspect of construction due to its nature of being made up of the conglomerations of people from diverse backgrounds and disciplines with each individual's output determining the level of success to be recorded at each construction stage (Dodo, 2014). Occupational Health and Safety (OHS) is an interdisciplinary area that involves protecting the health, safety and welfare of people in the work place, and others that may be affected directly or indirectly by the activities at the workplace. Construction site is a place where a building is being built or repaired (MacMillan Dictionary, 2017).

The importance of providing safe workplace has been reiterated by various related studies because of the intrinsic hazard and risk factors that undoubtedly underlie every work situation and their negative impact on a company's overall performance (Olutuase, 2014). H&S is relevant to all branches of industry, it is particularly important for the construction industry. The construction industry has been identified with the highest occurrence rate of accidents compared to any other industry (Williams *et. al.*, 2018). In the recent past, death tolls, permanent disability, partial disability and some other severe environmental threat had increasingly been on the rise through collapse of buildings and other major operational accidents (Williams *et. al.*, 2018). Due to the nature of work,

construction sector is considered very complex and dynamic. There are several phases in construction like viability, design, plan, execution, decommissioning, demolition and clearance. Similarly, plumbing, electrical wiring and carpentry are also linked with construction. Various contractors have different nature of work and different working protocols, and they work in same working area. Contractors often replace their workers and since it's an open environment, workers are prone to diseases (David and Saviley, 2015).

One in six fatal accidents at work occurs in a construction site (ILO, 2011). Although, an analysis of the patterns and causation of accidents provides the basic information for safety planning. It is not sufficient for predicting when and where they will occur. Such prediction needs coordination with other branches of project management (Yi and Langford, 2006). The fact that a construction job or work environment is considered as highly risky and hazardous does not mean that its susceptibility to accident is not controllable – this largely depends on “work situation” which is humanly controllable. Several research articles have focused on evaluating and developing effective safety training interventions (Burke *et al.*, 2011; Weidman *et al.*, 2015, David and Saviley, 2015; Mostafa *et al.*, 2016). However, ironically, research in construction safety continues to show alarming deficits in safety knowledge among construction workers (Baldwin and Ford 1994; Cromwell and Kolb 2004; Haslam *et al.*, 2005) while few studies have focused on understanding why training efforts fail in construction (Goldenhar *et al.*, 2001; Wang *et al.*, 2008; Demirkesen and Arditi, 2015).

Most safety training programs within construction use conventional classroom techniques that do not sufficiently engage workers (Wilkins, 2011). Such passive and ineffective instructional methods have limited value, and can sometimes instigate

negative attitudes among workers to safety issues (Haslam, 2004; Haslam *et al.*, 2005). To improve safety training effectiveness, Wilkins (2011) recommended replacing traditional classroom-type training with analogical approaches that are more effective in engaging adult learners with modern and more pro-active ones. More recently, Mostafa *et al.* (2016) argued that engaging safety training methods that facilitate dialogue, feedback, and action can result in higher learning gains. In similar thought, Shittu *et al.* (2016) and Shittu (2016) found that H&S Education and Training is the practice with the highest likelihood of improving the safety performance of construction firms out of the five core and modern H&S practices (Education and Training, Communication, H&S Planning, Workers' Consultation and Participation and Company's Commitment) identified. Hence, this research attempts to evaluate the compliance with H&S training by construction firms in Nigeria.

1.2 Statement of Research Problem

Existing H&S literature focuses more on the training of workers in construction firms of developed nations. This leaves out issues of H&S training of workers in the construction firms of developing nations such as Nigeria as reported by Shittu *et al.* (2016). The result of this is the problem of poor safety performance in the form of higher rate of accident, fatalities and injuries to workers on construction sites.

Given the high proportion of fatal and non-fatal accidents occurring in the construction industry, construction firms constantly seek different and novel strategies to reduce the number of work-related accidents. One such strategy that is mentioned often in the literature is formal, well organised and effective H&S training (BLR, 2007; Han *et al.*, 2008; Burke *et al.*, 2011; Evia, 2011; Wilkins, 2011; Lin *et al.*, 2012; OSHA, 2012; Hallowell, 2012; Ruttenberg, 2013; Hinze *et al.*, 2013; Weidman *et al.*, 2015; David

and Saviley, 2015). Extensive review of literature, however, revealed that a variety of studies in the construction safety management literature have investigated construction H&S training within developed countries mostly (Wilkins, 2011; Li *et al.*, 2012; Hinze *et al.*, 2013; Ruttenberg, 2013; Demirkesen and Arditi, 2015; Mostafa *et al.*, 2016; Namian *et al.*, 2016). However, efforts made by the studies of Kheni (2008) and Shittu (2016) focused more on the impact of organisational characteristics on the H&S practices of the construction firms. It did not specifically study how training could be employed to effectively improve the safety practices of the construction firms. Kheni (2008) studied Ghanaian construction firms while Shittu (2016) studied Nigerian construction firms.

Therefore, there is a dearth of research in construction literature on how effectively H&S training can improve the safety performance of construction firms in developing nations and Nigeria in particular. These construction firms carryout large portion of the construction volume and are required to train a large number of workers on safety issues like their foreign counterparts. It is thus imperative to fill this gap by evaluating the compliance with H&S training by construction firms in Nigeria using Abuja as the study area.

1.3 Research Questions

In order to address the research problem identified, the following questions were answered by this research:

- i. What are the components of the H&S training capable of enhancing safety effectiveness among construction workers in construction firms?
- ii. What are the regulations capable of enhancing the effectiveness of H&S training practices of construction firms in Abuja?

- iii. What is the level of compliance of firms with the provision of the identified components of H&S training capable of enhancing safety awareness among construction workers?
- iv. What is the impact of the identified H&S regulations and training on the safety performance of construction firms?
- v. What are the strategies for reducing the rate of accidents, injuries and fatalities on construction sites?

1.4 Aim and Objectives of the Study

1.4.1 Aim

The aim of this research is to evaluate the compliance with H&S training by construction firms in Abuja, with a view to proposing strategies for reducing accidents on construction sites.

1.4.2 Objectives

The objectives through which the above stated aim were achieved are as follows:

- i. To identify and examine the components of the H&S training capable of enhancing safety awareness among construction workers in construction firms.
- ii. To identify and examine the regulations capable of enhancing the effectiveness of H&S training practices of construction firms in Abuja.
- iii. To examine the level of compliance of firms with the provision of the identified components of H&S training capable of enhancing safety effectiveness among construction workers.

- iv. To determine the impact of the identified H&S regulations and training practices on the safety performance of construction firms.
- v. To propose strategies for reducing the rate of accidents, injuries and fatalities on construction sites.

1.5 Justification for the Study

To improve safety performance, construction firms invest millions of dollars in designing, developing, and delivering effective health & safety training practices. The goal of these training programs is to equip workers with the skills necessary to recognise and manage hazards in complex environments (Hinze and Gambatese, 2003).

This research represents an empirical attempt to evaluate the mechanisms through which construction firms adopt H&S training to achieve, sustain and improve construction safety performance. The findings of this study can significantly advance theory and practice in the area of construction safety and H&S training design and delivery. The results of the study will be beneficial to construction firms and practicing professionals interested in designing H&S training programs that translate to improved safety performance in construction.

1.6 Scope of the Study

The study evaluated the compliance with H&S training by construction firms in Abuja, Nigeria. For the purpose of this study, construction firms that engage in building and civil engineering works registered with the Federation of Construction Industry (FOCI) in Abuja were considered.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Safety Training in Construction

Many researches (Wilkins, 2011; Demirkesen and Arditi, 2015; Mostafa *et al.*, 2016) have used empirical methods to evaluate the effectiveness of training in improving safety. A regression analysis of the safety strategies and the site safety records of 45 Hong Kong construction companies identified safety training as one of the four most effective components of a safety programme (Tam and Fung, 1998). A similar analysis of 70 Thai construction projects found that safety inductions were effective in reducing unsafe conditions (Aksorn and Hadikusumo, 2008). Based on a survey of design and construction firms in Pennsylvania with 105 responses, Toole (2002) identified lack of training as one of eight root causes of construction site accidents.

Training is defined as the systematic acquisition of knowledge, skills and attitudes in order to develop the competencies necessary for effective performance in the work environment (Salas and Cannon-Bowers, 2001). Effective training involves changing cognition, attitudes and behaviours and consequently the way people conduct themselves at work (Tannenbaum and Yukl, 1992). In the light of work-related injury, research has shown that effective safety training assists in the reduction of these events leading to an improvement in organisational culture (Zohar, 1980; Kinn *et al.*, 2000; Varonen and Mattila, 2000; Gillen *et al.*, 2002; Dong *et al.*, 2004).

Different authoritative reviews of the general health and safety training literature and job training in particular, emphasize the importance of certain elements as critical to an effective safety training program (Goldstein and Buxton, 1982; Campbell, 1988;

Tannenbaum and Yukl, 1992; Cohen *et al.*, 1998). The Occupational Safety and Health Administration (OSHA) set of voluntary training guidelines to assist employers in furnishing safety and health information and instruction to workers (OSHA, 1988) mimics most of the same elements within an occupational safety and health context.

According to Philips (1997), training goals presuppose: 1) consistency with organisational goals, 2) the presence of jobs designed to yield performance outputs that meet the organization's goals, and 3) performance levels dependent on knowledge of the job tasks, skill, attentiveness to the work or factors where training can make a difference. Philips (1997) further noted that expecting training to solve problems related to internal organizational conflicts or to overcome deficiencies in equipment or work methods is unrealistic. Job analyses determine which of the relevant performance factors comprise the highest priority training needs either now or in the future (Philips, 1997). The process includes defining the tasks involved, their order of importance (in terms of frequency, criticality, complexity), and details of the steps necessary to accomplish them.

There are several types of safety training in construction. These include: supervisory and management training, induction/orientation training, specialist training and job specific training (Phil and Ferret, 2007).

2.1.1 Supervisory and management training

Supervisory and management health and safety training follows similar topics to those contained in an induction training course (Phil and Ferret, 2007).

There has been considerable research over the years into the failures of managers that have resulted in accidents and other dangerous incidents. According to Phil and Ferret (2007), these failures have included:

- i. Lack of H&S awareness, enforcement and promotion (in some cases there has been an encouragement to circumvent health and safety rules).
- ii. Lack of consistent supervision of and communication with employees.
- iii. Lack of understanding of the extent of the responsibility of the supervisor. It is important that all levels of management, including the board, receive health and safety training. This will not only keep everybody informed of health and safety legal requirements, accident prevention techniques and changes in the law, but also encourage everybody to monitor health and safety standards during visits or tours of the organisation.

2.1.2 Induction/orientation training

According to Phil and Ferret (2007), induction training should always be provided to new employees, trainees and possibly contractors. While such training covers items such as pay, conditions and quality, it must also include H&S. It is useful if the employee signs a record to the effect that training has been received. This record may be required as evidence should there be a subsequent legal claim against the organisation. According to Phil and Ferret (2007), most induction training programs include the following topics:

- i. The H&S policy of the organisation including a summary of the organisational arrangements including employee consultation.
- ii. A brief summary of the H&S management system including the name of the employee's direct supervisor, safety representative and source of H&S information.
- iii. The employee responsibility for H&S including any general H&S rules (e.g. smoking prohibitions).

- iv. The accident reporting procedure of the organisation, the location of the accident book and the location of the nearest first aider.
- v. The fire and other emergency procedures including the location of the assembly point.
- vi. A summary of any relevant risk assessments and safe systems of work.
- vii. The location of welfare, canteen facilities and rest rooms.
- viii. Internal transport routes and pedestrian walkways (e.g. fork lift truck operations).
- ix. The correct use of personal protective equipment and maintenance procedures
- x. manual handling techniques and procedures.
- xi. Details of any hazardous substances in use and any procedures relating to them (e.g. health surveillance).

2.1.3 Specialist training

Specialist H&S training is normally needed for activities that are not related to a specific job but more to an activity (Phil and Ferret, 2007). Examples include first aid, fire prevention, fork lift truck driving, overhead crane operation, scaffold inspection and statutory health and safety inspections (Phil and Ferret, 2007). These training courses are often provided by specialist organisations and successful participants are awarded certificates (OSHA, 2014). Details of two of these courses will be given here by way of illustration. Fire prevention training courses include the causes of fire and fire spread, fire and smoke alarm systems, emergency lighting, the selection and use of fire extinguishers and sprinkler systems, evacuation procedures, high risk operations and good housekeeping principles (Phil and Ferret, 2007). A fork lift truck driver's course would include the general use of the controls, loading and unloading procedures, driving

up or down an incline, speed limits, pedestrian awareness (particularly in areas where pedestrians and vehicles are not segregated), security of the vehicle when not in use, daily safety checks and defect reporting, refueling and/or battery charging and emergency procedures (Phil and Ferret, 2007).

2.1.4 Job-specific training

Job-specific training ensures that employees undertake their jobs in a safe manner (Phil and Ferret, 2007). Such training, therefore, is a form of skill training and is often best done ‘on the job’, sometimes known as ‘toolbox training’. Details of the safe system of work or, in more hazardous jobs, a permit to work system should be covered. In addition to normal safety procedures, emergency procedures and the correct use of personal protective equipment also needs to be included (Phil and Ferret, 2007). The results of risk assessments are very useful in the development of this type of training (Phil and Ferret, 2007). It is important that any common causes of human errors (e.g. discovered as a result of an accident investigation), any standard safety checks or maintenance requirements are addressed. It is common for this type of training to follow an operational procedure in the form of a checklist which the employee can sign on completion of the training. The new employee will still need close supervision for some time after the training has been completed (Phil and Ferret, 2007).

2.2 Training Objectives Establishment and Specification

According to Philips (1997), the needs assessment provides the information to establish the objectives of the training program. Philips (1997) also highlighted that these training objectives are stated as observable behaviours expected of the trainee after the

instruction, and they may acknowledge the conditions under which they should be performed and the required level of proficiency.

According to Kirkpatrick (1998), content represents the knowledge or skill that the trainee must master to be able to meet the behavioural objectives. The judgement of those who know the job demands is the most common approach to specifying training contents. Other approaches may be the products of problem solving exercises, or be based on mistakes people make in using a skill such as to design corrective learning measures (OSHA, 2015). Evidence that one teaching method such as lectures, televised instruction, computer-aided instruction, or interactive video methods is superior to another is not that clear (Kearsley, 1991). Much depends on the specific training needs, makeup of trainee group and other factors. Why or how a particular method facilitates learning and how it can be made more effective are issues requiring further study (Kearsley, 1991).

2.3 Evaluation of Training Effectiveness

The evaluation of training as noted by Goldstein and Buxton (1982) offers information as to whether the instruction has had its intended effect on the measures set out for that purpose. Seldom do the data indicate a program was a complete success or a failure, given multiple criteria for gauging the results. Rather, the data may indicate better understanding, retention or application of some course material as compared with others. Gaps or variations in knowledge or competencies resulting from the training may reflect needs to consider more training time, alternative instructional techniques, or more capable instructors (OSHA, 2006).

To make sure that the training program is accomplishing its goals, an evaluation of the training can be valuable (OSHA, 1988). Training should have, as one of its critical

components, a method for measuring the effectiveness of the training (Kirkpatrick, 2006). When course objectives and content are developed for a training program, a plan for evaluating the training session(s) should be designed and integrated into the program's other elements (Kirkpatrick, 2006). Kirkpatrick (2006) also highlighted that an evaluation will help employers or supervisors determine the amount of learning achieved and whether a worker's performance has improved on the job.

Safety training evaluation is the systematic collection of descriptive as well as judgmental information necessary to make effective training decisions related to the selection, adoption, value and modification of various instructional activities involved in training (Goldstein, 1986). This definition mentions not only descriptive but also summative information which are available and also equally present in any given training and development intervention (Neeraj *et al.*, 2014). Training evaluation includes the systematic collection of necessary information according to a predetermined plan so as to ensure that the information shared is both appropriate and useful (Philips, 1997). Training evaluation is the means generally used to determine the worth or value of the training (Noe, 2002). It is a process of assessing the results or outcomes of training. It determines the significance of the training including to what extent and how well the training met and satisfied the individual as well as organisational needs (Noe, 2002).

Training evaluation shows the benefits of training with reference to learning and job performance, and these benefits should be informed to both the top management and the stakeholders of their investments in terms of money, time and effort. At a glance, training evaluation focuses especially on learning outcomes, it gives a micro view of training results. According to Kirkpatrick (2006), every training program must be evaluated because there is no any alternative method of ensuring that investments on training are

worthwhile without doing evaluation. Kirkpatrick (2006) further asserted that evaluation is a tedious process to do well but it must be attempted in order to enhance the standard and also the effectiveness of the programs being offered. It must be conducted throughout the training program in order to achieve training goals. The experts of training evaluation believe that the evaluation is not just another element to the training program but must be incorporated within the training process so as to examine the effectiveness of the training program (Philips, 1997; Kirkpatrick, 2006; NIOSH, 2015; OSHA, 2014). According to Kirkpatrick (2006), there is no point of ignoring the training evaluation. OSHA (2014) pointed out that effective evaluation is not only well-planned but also a reliable way to understand the training goals are achieved or not. Hence, organisations must closely study the data collected from the training evaluation to upgrade the present training programs rather than obtain data just for the purposes of training evaluation, particularly for organizations, which have invested millions of dollars and will continue investing more in training programs (OSHA, 2014). Assessing the effectiveness of training programme is the most important place it is done to observe how well the goals have been achieved and whether it is the best method for accomplishing the goals (Goldstein, 1986).

2.4 Characteristics of Safety Training Programs

The under listed are characteristics of a comprehensive training program:

- i. Clarity: Training programs must not only be accurate and believable, but they must also be clear and understandable to the participant (OSHA, 2015). If the material is only understandable to someone with a college education or someone

who understands the jargon, then the program falls short of meeting workers' needs. Training materials should be written in the language and grammar of the everyday speech of the participants (OSHA, 2015). Training developers should ensure that readability and language choices match the intended audience.

- ii. **Credibility:** Training facilitators should have a general safety and health background or be a subject matter expert in a health or safety related field (Kirkpatrick, 2006). Furthermore, they should have experience training adults or experience working with the target population. Practical experience in the field of safety and health as well as experience in training facilitation contribute to a higher degree of facilitator credibility (Kirkpatrick, 2006).
- iii. **Accuracy:** Training materials should be prepared by qualified individuals, updated as needed, and facilitated by appropriately qualified and experienced individuals employing appropriate training techniques and methods (Philips, 1997).
- iv. **Practicability:** Training programs should present information, ideas, and skills that participants see as directly useful in their working lives (OSHA, 2015). Successful transfer of learning occurs when the participant can see how information presented in a training session can be applied in the workplace (OSHA, 2015).

2.5 Importance of Health and Safety Training

According to Raheja (2015), the importance of health and safety training in construction can be summarised as follows:

- i. **Duty Performance Consistency:** A well-organised safety training program gives the workers constant knowledge and experience. Consistency is very vital when

it comes to an organisation or company's procedures and policies. This mostly includes administrative procedures and ethics during execution of duty.

- ii. **Improvement of Workers' Performance:** A properly trained employee becomes more informed about procedures for various tasks. The worker confidence is also boosted by training and development. This confidence comes from the fact that the employee is fully aware of his/her roles and responsibilities. It helps the worker carry out the duties in better way and even find new ideas to incorporate in the daily execution of duty.
- iii. **Reduction in Supervision:** The moment they gain the necessary skills and knowledge; employees will become more confident. They will become self-reliant and require only little guidance as they perform their tasks. The supervisor can depend on the employee's decision to give quality output. This relieves supervisors the burden of constantly having to give directives on what should be done.
- iv. **Addressing Employee Weaknesses:** Most workers have certain weaknesses in their workplace, which hinder them from giving the best services. Training assists in eliminating these weaknesses, by strengthening workers' skills. A well organised safety training program helps employees gain similar skills and knowledge, thus bringing them all to a higher uniform level. This simply means that the whole workforce is reliable, so the company or organization doesn't have to rely only on specific employees.
- v. **Reduced Cost:** Safety training results with optimal utilization of resources in a company or organisation. There is no wastage of resources, which may cause extra expenses. Accidents are also reduced during working. All the machines and resources are used economically, reducing expenditure.

- vi. **Worker Satisfaction:** Safety training makes the employee also feel satisfied with the role they play in the company or organization. This is driven by the great ability they gain to execute their duties. They feel they belong to the company or the organization that they work for and the only way to reward it is giving the best services they can.
- vii. **Increased Productivity:** Through safety training the employee acquires all the knowledge and skills needed in their day to day tasks. Workers can perform at a faster rate and with efficiency thus increasing overall productivity of the company. They also gain new tactics of overcoming challenges when they face them.
- viii. **Improved Quality of Services and Products:** Employees gain standard methods to use in their tasks. They are also able to maintain uniformity in the output they give. This results with a company that gives satisfying services or goods.

2.6 Regulations Capable of Enhancing Effectiveness of H&S Training Practices of Construction Firms

According to Chudley and Greeno (2006) and Famakin and Fawehinmi (2007), construction regulations are statutory instruments setting out the minimum legal requirements for construction works and relate primarily to the health, safety and welfare of the workforce which must be taken into account when planning construction operations and during the actual construction period.

Mohammed (2010) reported that construction regulations must incorporate a provision that the contractor who plans to perform any construction shall, before carrying the work, notify in writing the competent authority for construction planning, particularly if the construction work includes use of explosives, dismantling of fixed plant, excavation work. Mohammed (2010) stated further that it is incumbent for the client to furnish

documented H&S specifications for the construction work ensuring that the construction stage of any project does not commence unless a H&S plan complying with established technical standards has been prepared in respect of that project.

Smallwood and Haupt (2006) reported that the Construction Regulations promulgated in the Republic of South Africa require a range of interventions by clients and designers. Smallwood and Haupt (2006) added that in order to have a safe and smooth construction environment and process, legal requirements must be met, the client must ensure that appropriate resources and organisation are in place, the health and safety reports must routinely inform the project board and the client must lead from the front, embedding the policies through the organisation.

H&S management system therefore involves the introduction of processes designed to decrease the incidence of injury and illness in the employer's operation (Alberta, 2006). The successful implementation of this system requires management commitment to the system, effective allocation of resources, and a high level of employee participation. The components of effective H&S management system, according to Alberta (2006) are management leadership and organisational commitment through H&S Education & Training; roles and responsibilities; management commitment; employee participation; hazard identification and assessment process; determine controls; hazard control; enforcement of controls and emergency response plan.

Based on the above, the various regulations capable of enhancing the effectiveness of H&S training practices are summarised in Table 2.1.

Table 2.1: H&S Regulations Capable of Enhancing the Effectiveness of H&S Training Practices

S/No	H&S Regulations	Source(s)
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1	H&S Provision in Condition of Contract	Famakin and Fawehinmi (2007), Shittu <i>et al.</i> (2015); Shittu <i>et al.</i> (2016); Shittu (2016)
2	H&S Provision in Workmen Compensation Act	Shittu <i>et al.</i> (2015); Shittu <i>et al.</i> (2016); Shittu (2016)
3	H&S Provision in Factories Act 1990	Shittu <i>et al.</i> (2015); Shittu <i>et al.</i> (2016); Shittu (2016)
4	H&S Provision in Public Health Act 1990	Shittu <i>et al.</i> (2015); Shittu <i>et al.</i> (2016); Shittu (2016)
5	NESREA Act 2007	Shittu <i>et al.</i> (2015); Shittu <i>et al.</i> (2016); Shittu (2016)
6	National Building Code 2006	Shittu <i>et al.</i> (2015); Shittu (2016)
7	H&S Provision in Labour, Safety & Welfare Bill 2012	Shittu <i>et al.</i> (2015); Shittu <i>et al.</i> (2016); Shittu (2016)

Source: Researcher's Literature Compilation (2019)

2.7 Components of H&S Training Practices Capable of Enhancing Safety Effectiveness among Construction Workers

The activities of the construction industry have raised serious H&S concerns amongst governments, H&S stakeholders, H&S professionals and researchers over the past few decades (Kheni, 2008). In response, H&S 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. H&S management in the construction industry has evolved from measures adopted in accident prevention to more systematic and proactive approaches to minimising the risk of hazards in the industry.

In addition, Agumba and Haupt (2014) reported that H&S performance measurement can be broadly classified in to two: lagging indicators and leading indicators or positive performance indicators. Leading indicators are either subjective (perception measures) or objective indicators (number of occasions an activity has been administered). Unfortunately, the construction industry continues to greatly depend on the traditional lagging indicators such as accident and workers compensation statistics. With the use of

leading indicators, a more thorough and constant surveillance is required than when lagging indicators are used. Changes can be made and interventions introduced early to redress the weakness before accidents occur as a result of the adoption of leading H&S indicators in construction. Hence, the use of leading indicators instead of lagging indicators is increasingly advocated (Hinze, 2005). Sadly, there is no consensus of the elements and measuring indicators that should be considered to be vital for improved H&S culture which is a leading indicator of H&S performance. It was therefore established by Agumba and Haupt (2014) that for H&S performance to improve, the corporate H&S culture should comprise H&S commitment, H&S, sub-contractors involvement, H&S accountability and disincentives and above all H&S training.

Past researches have shown that certain training practices can lead to improved H&S performance and therefore constitute good H&S practices. The findings of these researches as summarised from the review of literature in this study are presented in Table 2.2. Some H&S training practices are required by H&S legislation to be implemented on construction sites in some countries. For instance worker's involvement in health and safety, training in health and safety, and health and safety committees, are covered by health and safety regulations in the UK. See Table 2.2 for a summary of H&S training practices identified from the review of literature in this study:

Table 2.2: Summary of Researches on H&S Training Practices

S/No.	H&S Training Practices	Source(s)
1	Safety inductions	Kheni (2008); Shittu <i>et. al.</i> (2015)
2	Safety training and orientations	Kheni (2008); Agwu (2012(a)); Shittu <i>et. al.</i> (2015)
3	Alcohol- and substance-abuse programme	Kheni (2008); Shittu <i>et. al.</i> (2015)
4	Training and retraining of employees on safe work procedure	Kheni (2008); Agwu (2012(b)); Shittu <i>et. al.</i> (2015)
5	Safety policies and procedures	Agumba and Haupt (2014)
6	Fire protection programme	Kheni (2008); Agwu (2012(b)); Shittu <i>et. al.</i> (2015)
7	Detailed safety programmes	Kheni (2008); Agwu (2012(b)); Shittu <i>et. al.</i> (2015)

8	Safety meetings	Kheni (2008); Agwu (2012(b)); Shittu <i>et al.</i> (2015)
9	Communicating safety value to corporate stakeholders and Two-way safety communication	Agwu (2012(a)); Shittu <i>et al.</i> (2015)
10	Focusing of monthly safety meetings on employees' attitudinal change towards safety	Kheni (2008); Shittu <i>et al.</i> (2015)
11	Use of posters and other signs to give safety education	Shittu <i>et al.</i> (2015); Shittu <i>et al.</i> (2016)
12	Use of external assistance with respect to health and safety issues	Shittu <i>et al.</i> (2015); Shittu <i>et al.</i> (2016)

Source: Researcher's Literature Compilation (2019)

2.8 Level of Compliance of Firms with the Provision of Components of H&S Training

A study conducted by Shittu (2016) revealed that the H&S practice implemented the most under “H&S Education and Training” by construction SMEs is “Organizing orientation on safety for new workers”. The reason given for this was that “Organizing orientation on safety for new workers” was among the most important H&S practices identified under “H&S Education and Training”. The study revealed that the least H&S training practice complied with is “Organizing alcohol- and substance-abuse programme”.

In addition, the study of Shittu *et al.* (2016) revealed that majority of construction SMEs have H&S policy in place guiding their H&S training practices, implying that majority of the construction SMEs have a safety policy in place as parts of the requirements of the conditions of contract, but do not properly implement it.

It can be deduced from the studies of Shittu (2016) and Shittu *et al.* (2016) that the level of compliance of the construction SMEs with the H&S Regulations and Training practices by construction SMEs is low in spite of the fact that most of the construction SMEs have safety policies in place. This is also corroborated by the findings of Adeniran (2013) and Kalejaiye (2013) that despite the enactment of these health and safety Regulations in Nigeria cases of occupational accidents and illnesses are still highly

recorded annually. In the same vein, Iden (2010), Okojie (2010) and Idoro (2011) also discovered that it is only the large construction companies that recognise H&S Regulations while the smaller companies give H&S Regulations little attention.

Peter *et al.* (2016) describes compliance as applying measures designed to comply with legal requirements with the regulator being primarily more concerned with improved outcomes than prosecution results. According to Peter *et al.* (2016), lack of strict enforcement of OSH regulations enables non-compliance to OSH regulations and non-compliance to OSH regulations is a major contributor to the poor state of OSH in Nigeria. Hence compliance with Occupational Health and Safety legislations can increase productivity in industries by reducing accidents, because accidents result in decreasing productivity and damage to equipment or property (Peter *et al.*, 2016). On the other hand, OHS measures are said not to be effective in improving safety and health conditions in workplace and OHS regulations are just symbolic gestures and useless (Peter *et al.*, 2016). Thus the prevalence of health and safety abuses on construction site among construction stakeholders calls for an intensive investigation into the level of health and safety knowledge and compliance of construction workers. This is because enforcement and compliance with OHS regulations are not the standalone steps for improving OHS, as improving organisational culture can also improve OHS (Peter *et al.*, 2016). This therefore, implies that regulation without strict compliance and management commitments amounts to waste of time and resources (Peter *et al.*, 2016).

Peter *et al.* (2016), further disclosed some level of compliance of firms to the provision and implementation of components of H&S training practices for enhancing safety awareness among construction workers which includes: Availability of health and safety plan before commencement of construction project; Scaffoldings properly and

adequately fixed and inspected before mounting them; Ladders fixed and adequately secured in positions before ascending them; Compulsory use of personal protective equipment's (PPE) on site; Working environment always cleared and kept free from all objects that can cause harm or injury to the workers; Strict monitoring of safety policy and proper keeping of safety records; Observation of standing Safety rules and regulations on site; Safety brief before commencement of any day work on site; Construction equipment's handled with utmost care; Possession of basic Safety training and education; Prompt and adequate communication of safety issues to all concerned; Availability of first aid and welfare facilities on site.

In another related study by (Priyadarshani, 2013), revealed a variety of factors militating against level of compliance of firms to the provision and implementation of components of H&S training practices as follows: Employment of full-time safety officers, Lack of budgetary constraints, Presence of owner in coordination meetings, Maintaining safe work conditions, Establishing safety training, Educating workers and supervisors in developing good safety habits, Effective control of the numerous subcontractors by the main contractor, Time devoted to safety issues by the company safety coordinator, Promoting safe practices by safety award, Management talks on safety, Provision of safety booklets, Provision of safety equipment, Providing a safe environment, Appointing a trained safety representative at site.

Based on the literatures reviewed the level of compliance of firms to the provision and implementation of components of H&S training practices for enhancing safety awareness among construction workers are summarized in Table 2.3

Table 2.3: Level of Compliance to Provision and Implementation of Components of H&S Training Practices

S/No	Level of compliance	S/No	Level of compliance
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1.	Availability of health and safety plan before commencement of construction project.	7.	Strict monitoring of safety policy and proper keeping of safety records.
2.	Scaffoldings properly and adequately fixed and inspected before mounting them.	8.	Observation of standing Safety rules and regulations on site.
3.	Ladders fixed and adequately secured in positions before ascending them.	9.	Safety brief before commencement of any day work on site.
4.	Compulsory use of personal protective equipment's (PPP) on site.	10.	Safety rules and regulations on site; Safety brief before commencement of any day work on site.
5.	Working environment always cleared and kept free from all objects that can cause harm or injury to the workers.	11.	Educating workers and supervisors in developing good safety habits.
6.	Construction equipment's handled with utmost care.	12.	Effective control of the numerous subcontractors by the main contractor.
13.	Possession of basic safety training and education.		
14.	Prompt and adequate communication of safety issues to all concerned.		
15.	Availability of first aid and welfare facilities on site		
	Employment of full-time safety officers.		
	Lack of budgetary constraints.		
	Presence of owner in coordination meetings.		
16.	Maintaining safe work conditions.		
17.			

Source: Researcher's Compilation (2019)

2.9 Impact of H&S Regulations on Safety Performance Construction Firms

The construction industry in both developed and developing countries have witnessed serious health and safety hazards. This has, in a way or the other, brought about poor reward of H&S management. According to Lingard and Rowlinson (1994), international standards show that Hong Kong's site safety record is poor. In 1991, 374 reportable accidents per 1000 workers were recorded. This figure is approximately twice that of the USA and 25 times more than Japan and Singapore. United Kingdom figures show that approximately three construction workers in every 1000 suffer a major injury each year.

Langford *et al.* (2000) reported that the scale of the construction safety problem has been of considerable concern to the industry and calls for improvements in performance have been heard from trade unions, employers' associations and the Health and Safety

Executive. This concern has been translated into a search for a better understanding of the safety problem and to install better safety regimes. Part of this control is exercised by the Construction Design & Management (CDM) regulations and personified by the planning supervisor who will influence the performance, in respect of safety observance, of construction managers. Hopefully, the influence of the safety plan and the planning supervisor trickles down to shape the values and culture of the site operatives. Nonetheless, the achievements of the regulatory framework have been to identify methods of uniformly classifying accidents, instrument safety measurement methods, and instigate behavioural studies to educate workers about safety risks.

Okeola (2009) reported that all over the world construction workers are 3 times more likely to be killed and twice as likely to be injured as workers in other occupations. In Nigeria there is no reliable data on accident cases in construction, because contractors do not report accidents at appropriate Ministries nor keep proper records on accidents. According to Akpan (2011), management policy, especially in developing economies is yet to properly address the issue of employee H&S and this has resulted in frequent accidents and hazards, leading to high costs in the areas of hospital bills, salaries for hospitalised workers and compensations. Increased labour turnover, absenteeism, strained management-labour relationship; operational inefficiency and ultimately decreasing performance become noticeable in such organisations.

Idubor and Oisamoje (2013) traced the inception of the modern safety movement to around 1912 with the first cooperative congress and the organisation of the National Safety Council. It was at about this time that State Workmen's Compensation laws were enacted which imposed financial responsibility upon the employer to compensate personnel injured on the job as well as to pay for the expenses of hospitalisation. The

National Safety Council also began to carry out its sensitisation campaign of educating employers on the hidden and indirect costs of industry related accidents and diseases. This opened the eyes of employers that operating an unsafe plant is costly and that safety is good business. Here the interest of the employer and employee coincide because the employee does not want to be injured and the employer does not want to be incurring the cost of the employee's injury.

Idubor and Oisamoje (2013) added that Nigeria as a member of the United Nations has adopted the conventions and recommendations of the International Labour Organisation. In addition to the above Nigeria has her own labour law as spelt out in the laws of the Federation of Nigeria (2004). In the Labour Act Cap L1 under Nigeria laws, the Minister of Labour has powers to make regulations for health, safety and welfare of the worker in the workplace. The Factories' Act of 2004, the Workmen's Compensation Act of 1987 and the Labour Safety, Health and Welfare Bill of 2012 are important documents aimed at protecting the H&S of the Nigerian worker. In addition to these, the Federal Ministry of Labour and Productivity and the Nigerian Institute of Safety Professionals also have oversight functions.

It is therefore true that the rate at which accidents occur on construction sites in Nigeria is alarming in spite of the enactment of the existing H&S laws and regulations. This has been a source of concern to all professionals in the construction industry and the general public.

2.10 Impact of Training Practices on Safety Performance of Construction Firms

Construction works are specific and present one of the most dangerous business fields in both developed and developing countries. The reasons why occupational accidents in the construction field occur have a number of various causes (Sukys *et al.*, 2011). Significant

reasons directly influencing accidents at work in the construction sector include a shortage of knowledge and training, a lack of supervision, awareness about the safe implementation of assigned work, which are negligence, apathy and total carelessness. This is called unsafe behaviour and it should be one of the fundamental factors influencing accidents at work, which shows a poor safety culture in a company.

Sukys *et al.* (2011) added that many construction companies are slowly building safe working items; however, due to injuries, large financial losses are suffered, pecuniary penalties are paid and potential working force is being lost. Today, the prevention of accidents at work in construction companies is a very important issue in both developed and developing nations. A safe and healthy work environment is the most important condition for leading working life because a safe workplace is a way of successful business. The employee's efficiency along with general and occupational morbidity depends on the quality of working conditions.

In the Nigerian Scenario, cost, time, quality and safety have been identified as important characteristics of every project (Awodele and Ayoola, 2005). However, the construction industry laid greater emphasis on the first three aspects at the expense of safety leading to the occurrence of different types of accidents (both minor and major ones) on sites in both rural and urban cities in different parts of the world. Awodele and Ayoola (2005) added that in 2005 alone several cases of buildings under construction had collapsed leading to the loss of many lives especially in Abuja, Lagos and Port Harcourt, Nigeria. The problem associated with accidents include not only direct physical injury to persons or damage to properties but also short and long term effects of accident due to other exposures on sites that affect workers' health and physical well-being.

In the same vein, Dimuna (2010) reported that one fundamental principle of building design is that a building should be designed and constructed to meet its owner's requirements and also satisfy public health, welfare and safety requirement because no part of such building should pose a hazard to its occupants. Simply put, the purpose of structural design is the provision of a structure satisfying the client's and user's requirements. It must be economical, safe, serviceable and aesthetically adequate. These requirements are therefore lacking in most of the buildings constructed in the Nigerian construction industry because the frequency of collapse of building structures in Nigeria in the past few years had become very alarming and worrisome. Many lives and properties have been lost in the collapse of buildings mostly in Port Harcourt, Abuja and Lagos.

Health is the greatest asset of a country and it is the foundation on which the entire production capacity of the people rests. The conservation of health in the economically active age groups therefore results in increased productivity of the labour force and also facilities return on investment (Kalejaiye, 2013). According to Kalejaiye (2013), despite the importance of health, industrialisation and mechanisation are increasing in Nigeria while occupational health problems are becoming prominent. These health problems are caused by exposure to harmful chemicals, biological agents, physical, mechanical and ergonomic hazards. Health problems resulting from such hazards may appear to occur less frequently than other major disabling diseases, due to lack of knowledge and pattern of illness of such hazardous diseases. Unfortunately, occupational health practitioners are few and are mostly engaged in multinational and large national establishments and medical schools. There are few independent consultant firms especially in Lagos and Port Harcourt. They provide service to medium and large scale industries. Those in the

informal sector have little or no access to occupational health services. For this category of Nigerian workforce, government hospitals, private general practice clinics, chemist shops and dispensaries are the main source of health care for their general health problem.

2.11 Strategies for Reducing the Rate of Accidents, Injuries and Fatalities on Construction Sites

Workplace Health and Safety is a global challenge to the sustainable development and civilization (Peter *et al.*, 2016). The H&S performance of the construction industry remains a staring challenge in its effort to tackle the developmental initiative of many nations including Nigeria (Peter *et al.*, 2016). The study further reveals that the neglect of safety on sites may have considerable impact of worker productivity and performance and capable of undermining the reputation of construction companies thereby increasing expenses. In Libya for instance, (Peter *et al.*, 2016) shows that there was still a lack of commitment from the government, the insurance company, the labour ministry, the owners, consultants, and the contractors to improving safety performance on the construction sites. Although calls have been made to the stakeholders in the industry to improve their health and safety performance (Peter *et al.*, 2016), the number of fatalities and injuries arising from construction activities across the country as at today is highly worrisome. Peter *et al.* (2016) stated that improvement of safety performance can only be effective if construction firms is structured and positioned to make changes when it is deemed appropriate. (Peter *et al.*, 2016) suggested a shift in thinking where the focus is on those actions that can lead to good safety performance, for a better approach is to focus on proactive efforts dealing with the factors responsible for such accidents and injuries and how to control them.

H&S has been identified as a parameter which should be used along with the traditional parameters: cost, quality and time, to measure the success of projects. The reasons for considering safety and health are human factor, legislation and financial issues (Adan, 2004). According to Grace *et al.* (2014), Health and Safety Measures in Construction are the following listed below:

- i. Site Layout and Planning
- ii. Personal Protective Equipment (PPE)
- iii. First aid Kits and Accident Reporting
- iv. Health and Safety Warning Signs
- v. Safety Policy

Musonda (2005) stated that the level of implementation of H&S improvement measures in construction projects and the level of implementation of H&S requirement is still inadequate. Musonda (2005) further stated that due to the fact that those who have been involved in project undertakings have witnessed major and minor accidents and health incidents with no action taken to improve the situation. Some of the reason are highlighted below:

- i. H&S is not taken seriously by parties involved in construction projects, clients and consultants are more concerned with quality of finished work rather than H&S matters
- ii. Most sites do not have safety personnel and safety equipment
- iii. Construction workers are not sensitized or trained on the need to observe H&S requirements

- iv. H&S matters are not budgeted for
- v. H&S matters are not considered at the tendering stage as result clients expect contractors to bear H&S associated cost during project execution
- vi. Clients and contractors assume that by not making allowance for H&S the project construction cost is reduced

2.11.1 Changes in Permanent Design

A hundred construction accidents were studied by Gibb *et al.* (2005) and it was determined that changes in the permanent design would have eased the probability of the accidents experienced in 47% of the cases (Toole *et al.*, 2008).

2.11.2 Hazard Identification and Risk Assessments (HIRAs)

Leung *et al.* (2012) stated that the prevention of injuries is one of the principal aims of H&S management, it is crucial to identify the causes of accidents and develop equivalent prevention measures in the industry.

2.11.3 Financial Provision for H&S

A study conducted by Chiocha *et al.* (2011) revealed that the inability, or rather the apparent reluctance of organisations to allocate adequate “budget towards studies relative to H&S issues” is notable.

2.11.4 Effective Communication

According to the South African Council for the Project and Construction Management Professions (SACPCMP) 2006, a CPM should have the knowledge and the ability to “establish and implement Communication Management Processes including the

preparation of agenda, chairing and preparing minutes of all necessary meetings on the project”

2.11.5 Partnering

Partnering has been designated “the most significant development to date as a means of improving project performance” and it represents an essential shift from the conventional adversarial relationships in construction (Bygballe *et al.*, 2010). Ali *et al.* (2010) revealed that relationship between two or more organizations, which is formed with the intent of improving performance in the delivery of projects.

2.11.6 Risk Management

Risk management is one of the nine construction management knowledge areas, and although H&S risks are merely one category of risk, inadequate H&S and accidents marginalize performance relative to the other project parameters (Smallwood *et al.*, 2002).

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Research Design

This research employed the use of both quantitative and qualitative research approaches. Data were collected using structured questionnaire with both opened and closed ended questions and interview. Analysis of data was carried out using the descriptive and inferential methods of analysis.

3.2 Research Population

Verma and Beard (1981) described population as a large group from which a sample is selected for study. Population is also seen as the entire group whose characteristics are to be estimated (Wimmer *et al.*, 2011). A population can also be defined as the universe

represented in a group of interest which the researcher wishes to draw information and generalize result of a study. For the purpose of this study, the population constitutes the number of construction firms operating within Abuja metropolis and registered with the Federation of Construction Industry (FOCI). The register of FOCI has 25 construction firms registered with Abuja's business address (see Appendix C). This makes up the population size for the study.

3.3 Sampling Frame

The sampling frame of the study constitutes the safety officers of the construction firms registered by FOCI in Abuja. This forms the sampling element that were targeted in order to obtain the sample size of the study and information about the construction firms operating within Abuja metropolis registered with FOCI.

3.4 Sample Size

A sample is a smaller percentage of a populace chosen for remark and investigation; the small sample size had been calculated using a simplified procedure proportion as demonstrated simply by Glenn (2013). Since the population size for the study is small (25), a census of the safety officers of the whole number of construction firms in Abuja registered with FOCI was therefore made. The sample size is therefore 25 just as the population size.

3.5 Sampling Technique

Due to the fact that the population size is few (less than 200), the study employed the use of a census of the total number of the population for the research. This is in line with the assertion of Watson (2001) that if the population size is few (i.e. 200 or less), it is

preferable to do a census of the whole population rather than taking a sample from the total population size. For the interview, 10 construction firms were considered based on the availability of an active construction site and years of experience of the safety officer.

3.6 Method of Data Collection

Data were collected with the use of structured questionnaire and interview in this study. The questionnaire was designed in the opened and closed ended format (see Appendix A). The closed ended part of the questionnaire was basically designed using the five-point Likert's Scale response format. The questionnaire contains six sections. The first section was based on the profile of the respondents. The other sections addressed the research objectives respectively. A copy of questionnaire was administered to the safety officer of each of the construction firms. This was due to the fact that the Safety Officer is usually the professional directly involved in the monitoring of H&S budget and compliance in construction project execution. Ten (10) of the construction firms were considered for the interview in order to serve as a follow up to the data obtained from the questionnaire. The interview guide (see Appendix B) sought for information from the safety officer of each construction firm on site on the level of compliance with the components of H&S training by the firms.

3.7 Method of Data Analysis

Data collected from the study were presented using tables for ease of use for analysis. The data were analysed using descriptive and inferential methods of analysis. In view of this, the study used percentage, Relative Importance Index (RII), Mean Item Score (MIS) and Spearman Rank Correlation analysis to analyse the data collected.

The use of frequency counts and percentage were employed to analyse the responses obtained from the interview conducted. In order to examine the identified regulations capable of evaluation of the effectiveness of H&S training in order of importance, the use of RII was adopted in order to achieve Objective 1 of the study. RII was also used to examine the components of the H&S training capable of enhancing safety awareness among construction workers in order of importance to achieve Objective 2 of the research. MIS was employed to examine the level of compliance of workers with H&S training capable of enhancing safety awareness among workers to achieve the third objective of the study. In order to determine the impact of the identified H&S Regulations and training practices on the safety performance of construction firms, the use of MIS and Spearman Rank Correlation analysis were employed to achieve Objective 4 of the research. The use of MIS was employed in order to examine the strategies for reducing the rate of accidents, injuries and fatalities on construction sites in order of effectiveness for achieving the fifth objective of the study.

3.7.1 Decision rule for RII and MIS analyses

The response of the respondents, on the RII and MIS analyses, were ranked and analysed based on the cut-off points presented in Table 3.1.

Table 3.1: Cut- off Points to Responses

Scale	Cut-off points RII	Cut-off points MIS	Remarks/ Decision			
			Importance	Compliance	Significance	Effectiveness
5	0.81 – 1.00	4.50 -5.00	Very important	Total compliance	Very Significant	Very Effective
4	0.61 – 0.80	3.50 -4.49	Important	Average compliance	Significant	Effective
3	0.41 – 0.60	2.50 -3.49	Less Important	Partial compliance	Less Significant	Less Effective
2	0.21 – 0.40	1.50 -2.49	Least Important	Least compliance	Least Significant	Least Effective
1	0.01 – 0.20	1.00 -1.49	Not important	Non compliance	Not Significant	Not Effective

Source: Adapted and modified from Morenikeji, (2006); Agumba and Haupt, (2014); and Shittu *et al.* (2016)

The study of Agumba and Haupt, (2014) identified core H&S practices of small and medium sized construction firms in South African construction industry, while Shittu *et*

al. (2016) identified 5 core H&S practices of small and medium sized construction firms in Nigerian construction industry. These studies used a bench mark of above 3.00 for good or important H&S practices which is far above average on a 5- point scale. The choice of this was based on the fact that H&S is a very sensitive issue where error margin should be the barest minimum. This justifies the adoption of similar cut-off point for this study.

3.7.2 Decision rule for Spearman Rank correlation analysis

This is a non-parametric test that is used to measure the degree of association between two variables. The following formula (equation 3.1) is used to calculate the spearman rank correlation.

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2-1)} \dots\dots\dots 3.1$$

Where:

ρ = spearman rank correlation

d_i = the difference between the ranks of corresponding variables

n = number of observation

i. P test:

The decision rule here states that:

- If P value is < 0.05 significance level then relationship is significant
- If P value is > 0.05 significance level then relationship is not significant

ii. Coefficient of Correlation (R):

The decision rule here states that:

- If $R \geq 50\%$ (0.5) then Correlation is strong.
- If $R < 50\%$ (0.5) then Correlation is weak.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSIONS

4.1 Data Analysis and Discussion of Results of Questionnaire Survey

This section presents and discusses the results of the analysis of data collected for the study.

4.1.1 Level of compliance with the provision of the components of H&S training

The study identified 12 components of H&S Training. These components were ranked in order of importance using RII and the result is presented in Table 4.1. The level of compliance to these components of training practices was determined using MIS and the result is presented in Table 4.2.

Table 4.1: RII Ranking on Level of Importance of Components of H&S Training

S/NO	COMPONENTS OF H&S TRAINING	RII	RANK	DECISION
1	Safety policies and procedures	0.856	1st	Very Important
2	Safety meetings	0.856	1st	Very Important
3	Communicating safety value to corporate stakeholders and Two-way safety communication	0.848	3rd	Very Important
4	Safety inductions	0.840	4th	Very Important
5	Training and retraining of employees on safe work procedure	0.832	5th	Very Important
6	Fire protection programme	0.824	6th	Very Important
7	Detailed safety programmes	0.816	7th	Very Important
8	Focusing of monthly safety meetings on employees' attitudinal change towards safety	0.808	8th	Very Important
9	Use of posters and other signs to give safety education	0.792	9th	Important
10	Use of external assistance with respect to health and safety issues	0.792	9th	Important
11	Alcohol- and substance-abuse programme	0.776	11th	Important
12	Safety training and orientations	0.720	12th	Important
<i>Average</i>		<i>0.813</i>		<i>Very Important</i>

Source: Researcher's Analysis of Data (2019)

It is shown from Table 4.1 that the most important components of H&S training practices are Safety policies and procedures and Safety meetings with RII value of 0.856 each. On the average, all the identified components of H&S training practices are very important (average RII = 0.813). The finding here is in line with finding of Shittu (2016) which

revealed that the H&S practice implemented the most under “H&S Education and Training” by construction SMEs is “Organizing orientation on safety for new workers”.

Table 4.2: MIS Ranking on Compliance to H&S Training

S/NO	COMPONENTS OF H&S TRAINING	MIS	RANK	DECISION
1	Safety policies and procedures	4.280	1st	Average Compliance
2	Safety meetings	4.280	1st	Average Compliance
3	Communicating safety value to corporate stakeholders and Two-way safety communication	4.240	3rd	Average Compliance
4	Safety inductions	4.200	4th	Average Compliance
5	Training and retraining of employees on safe work procedure	4.160	5th	Average Compliance
6	Fire protection programme	4.120	6th	Average Compliance
7	Detailed safety programmes	4.080	7th	Average Compliance
8	Focusing of monthly safety meetings on employees' attitudinal change towards safety	4.040	8th	Average Compliance
9	Use of posters and other signs to give safety education	3.960	9th	Average Compliance
10	Use of external assistance with respect to health and safety issues	3.960	9th	Average Compliance
11	Alcohol- and substance-abuse programme	3.880	11th	Average Compliance
12	Safety training and orientations	3.600	12th	Average Compliance
Average		4.067		Average Compliance

Source: Researcher's Analysis of Data (2019)

Table 4.2 shows that all the identified components of H&S training are averagely complied with by the construction firms. These range from “safety training and orientation” (MIS = 3.60) to “Safety policies and procedures/safety meetings” (MIS = 4.28). The average MIS is 4.067. This implies that the construction firms should improve their level of compliance. The finding of this study here agrees with that of Agumba and Haupt (2014) and Shittu *et al.* (2016) where it was established that for H&S performance to improve, the corporate H&S culture should comprise H&S commitment, H&S, sub-contractors involvement, H&S accountability and disincentives and above all H&S training.

4.1.2 Impact of H&S Regulations and training on safety performance of construction firms

The study identified 7 important Regulations for enhancing the H&S performance of construction firms. These are H&S Provision in Labour, Safety & Welfare Bill 2012; National Building Code 2006; H&S Provision in Workmen Compensation Act; NESREA Act 2007; H&S Provision in Public Health Act 1990; H&S Provision in Condition of Contract; and H&S Provision in Factories Act 1990 with RII ranging from 0.768 – 0.888 (see Table 4.3). The MIS results on the impact of these Regulations on the performance of construction firms is summarised in Table 4.4.

Table 4.3: Level of Importance of H&S Regulations

S/NO	HEALTH AND SAFETY REGULATIONS	RII	RANK	DECISION
1	H&S Provision in Labour, Safety & Welfare Bill 2012	0.888	1st	Very Important
2	National Building Code 2006	0.848	2nd	Very Important
3	H&S Provision in Workmen Compensation Act	0.832	3rd	Very Important
4	NESREA Act 2007	0.832	3rd	Very Important
5	H&S Provision in Public Health Act 1990	0.824	5th	Very Important
6	H&S Provision in Condition of Contract	0.816	6th	Very Important
7	H&S Provision in Factories Act 1990	0.768	7th	Important
<i>Average</i>		0.830		Very Important

Source: Researcher's Analysis of Data (2019)

Table 4.4: Impact of H&S Regulations on H&S Performance of Construction Firms

S/NO	IMPACT OF H&S REGULATION ON SAFETY PERFORMANCE	MIS	RANK	DECISION
1	Increased labour turnover	4.280	1st	Significant
2	Operational inefficiency and ultimately decreasing performance become noticeable	4.120	2nd	Significant
3	High costs in the areas of hospital bills	4.080	3rd	Significant
4	Salaries for hospitalised workers and compensations	4.040	4th	Significant
5	Absenteeism	4.000	5th	Significant
6	Strained management-labour relationship	3.960	6th	Significant
<i>Average</i>		4.080		Significant

Source: Researcher's Analysis of Data (2019)

It was shown from Table 4.4 that the identified H&S Regulations have significant impact on the H&S performance of construction firms (average MIS = 4.08). The most significant impact of H&S Regulation on H&S performance of firms is “Increased labour turnover” with MIS of 4.28 while the least significant is “Strained management-labour relationship” with MIS of 3.96. The MIS results on the impact of H&S training the performance of construction firms is summarised in Table 4.5.

Table 4.5: Impact of H&S Training on the Performance of Construction Firms

S/NO	IMPACT OF H&S TRAINING ON SAFETY PERFORMANCE	MIS	RANK	DECISION
1	Shortage of knowledge and training,	3.440	1st	Less Significant
2	Lack of supervision	3.160	2nd	Less Significant
3	Biological agents	3.040	3rd	Less Significant
4	Awareness about the safe implementation of assigned work	3.000	4th	Less Significant
5	Ergonomic hazards	3.000	4th	Less Significant
6	Large financial losses	2.960	6th	Less Significant
7	Lack of knowledge and pattern of illness	2.920	7th	Less Significant
8	Apathy and total carelessness	2.840	8th	Less Significant
9	Mechanical	2.800	9th	Less Significant
10	Exposure to harmful chemicals	2.720	10th	Less Significant
11	Physical	2.680	11th	Less Significant
	Average	2.960		Less Significant

Source: Researcher's Analysis of Data (2019)

Table 4.5 revealed that the H&S training identified have less significant impact on the safety performance of construction firms. These impacts range between “Shortage of knowledge and training” and “Physical impact” (MIS = 3.44 and 2.68 respectively). This agrees with findings from literature (Famakin and Fawehinmi, 2007; Shittu *et al.*, 2015; Shittu *et al.*, 2016; Shittu, 2016) which stated that construction firms have peculiar H&S challenges. Further analysis was carried out on the impact of H&S Regulations/H&S Training and H&S Budget Amount/Number of Accidents using Spearman's Rank Correlation analysis. The result of the Spearman's Rank Correlation is presented in Table 4.6.

Table 4.6: Results of Spearman's Rank Correlation Analysis

Analys is No.	Variables		Observations			Inferences	
	X ₁	X ₂	r	(%)	P _{value}	Strength of Relationship	Remark
1	Level of Implementing H&S Regulations	H&S Budget Amount	25.5		0.074	Weak	Not Significant
2	Level of Implementing H&S Regulations	Number of Accidents	-42.7		0.002	Slightly Strong	Significant
3	Level of Implementing H&S Training	H&S Budget Amount	34.0		0.016	Slightly Weak	Significant
4	Implementing H&S Training	Number of Accidents	-64.5		0.000	Strong	Significant

Source: Researcher's Analysis of Data (2019)

It is revealed from Table 4.6 that there exists a positive, weak and non-significant relationship between the level of implementing H&S Regulations and H&S Budget

Amount. The correlation coefficient observed was 25.5% implying weak correlation between the variables. The probability value (p) observed was 0.074 and was greater than the level of significance for the study (0.05) indicating a non-significant relationship. The second analysis in Table 4.6 shows that there exists a negative, slightly strong and significant relationship between the level of implementing H&S Regulations and Number of Accidents. The correlation coefficient observed was -42.7% implying slightly strong correlation between the variables. The probability value (p) observed was 0.002 and was less than the level of significance for the study (0.05) indicating a significant relationship. The negative correlation observed between the variables indicates that increase in the level of implementing H&S Regulations will be followed by a decrease in the Number of Accidents and vice versa. The third analysis in Table 4.6 shows there is a positive, slightly weak and significant relationship between the level of implementing H&S Training and H&S Budget Amount. The correlation coefficient observed was 34.0% implying slightly weak correlation between the variables. The probability value (p) observed was 0.016 and was less than the level of significance for the study (0.05) indicating a significant relationship. The positive correlation observed between the variables indicates that increase in the level of implementing H&S Training will be followed by an increase in the H&S Budget Amount and vice versa. The results of the fourth analysis in Table 4.6 revealed that there exists a negative, strong and significant relationship between H&S Training and Number of Accidents. The correlation coefficient observed was -64.5% implying a strong correlation between the variables. The probability value (p) observed was 0.000 and was less than the level of significance for the study (0.05) indicating a significant relationship. The negative correlation observed between the variables indicates that increase in the level of implementing H&S Training will be followed by a decrease in the Number of Accidents and vice versa. From

these results, it has been established that there is the need for construction firms to intensify their level of compliance with the provision of the H&S Regulations and H&S training components for improved safety performance of workers on site. This result is in line with the MIS results presented in Tables 4.4 and 4.5.

The results in this section are in line with the findings from literature (Famakin and Fawehinmi, 2007; Sukys *et al.*, 2011; Shittu *et al.*, 2015; Shittu *et al.*, 2016; Shittu, 2016) which stated that construction firms have peculiar H&S challenges which limit their capabilities to manage construction site activities in a healthy and safe manner. These past studies also revealed that significant reasons directly influencing accidents at work in the construction sector include a shortage of knowledge and training, a lack of supervision, awareness about the safe implementation of assigned work, which are negligence, apathy and total carelessness. Therefore, effective implementation of H&S Regulations and H&S Training will improve the safety performance of construction firms and site workers through the reduction of rates of accidents and improved H&S Budget implementation.

4.1.3 Strategies for reducing the rate of accidents, injuries and fatalities on construction sites

The MIS result of the 15 identified strategies for reducing the rate of accidents, injuries and fatalities on construction sites is presented in Table 4.7.

Table 4.7: Strategies for Reducing the Rate of Accidents, Injuries and Fatalities on Construction Sites

S/NO	STRATEGIES FOR REDUCING ACCIDENT RATES	MIS	RANK	DECISION
1	Supervision	4.200	1st	Effective
2	Health and Safety Warning Signs	4.080	2nd	Effective
3	Risk Management	4.080	2nd	Effective
4	Financial Provision for H&S	4.040	4th	Effective

5	Effective Communication	4.040	4th	Effective
6	Partnering	4.040	4th	Effective
7	Safety incentives	4.000	7th	Effective
8	Proper Equipment	3.960	8th	Effective
9	Safety record keeping and follow-ups	3.920	9th	Effective
10	Changes in the permanent design	3.880	10th	Effective
11	Personal Protective Equipment (PPE)	3.840	11th	Effective
12	First aid Kits and Accident Reporting	3.760	12th	Effective
13	Hazard Identification and Risk Assessments (HIRAs)	3.600	13th	Effective
14	Site Layout and Planning	3.560	14th	Effective
15	Safety Policy	3.400	15th	Less Effective
Average		3.893		Effective

Source: Researcher's Analysis of Data (2019)

It was shown from Table 4.7 that the strategies identified for reducing the rate of accidents, injuries and fatalities on construction sites are effective (average MIS = 3.893).

The most effective strategy is “Supervision” (MIS = 4.20) while the least effective one is “safety policy” (MIS = 3.40). This agrees with the study of Grace *et al.* (2014) that these H&S measures are proactive strategies for reducing the rate of accidents, injuries and fatalities on construction sites. These practices are therefore effective towards the improvement of the safety performance of workers on site.

4.2 Results and Discussions of Interview Data

The interview conducted covered 10 construction sites. The interview collected data on the components of the level of compliance of construction firms with the components of H&S training. The results of the analysis of the interview data are summarised in Table 4.8.

Table 4.8: Compliance to the Components of H&S Training by Construction Firms in Abuja

COMPONENTS OF H&S TRAINING (if available in H&S Policy)	

FIRM/ SITE	H&S POL ICY	H&S OFFI CER	Safety meeting s	Commu nicating safety value to corpora te stakehol ders	Safet y indu ction s	Trainin g and retraini ng of employe es	Fire protec tion progra mme	Detail ed safety progra mmes	Focusing safety meetings on employees' attitudinal change	Sum	Perce ntage (%)
A	1	1	1	1	1	0	1	1	1	8	88.89
B	1	1	0	1	1	1	1	1	1	8	88.89
C	1	1	0	1	1	1	1	1	0	7	77.78
D	1	1	1	1	1	1	1	0	1	8	88.89
E	1	1	1	1	1	1	0	1	1	8	88.89
F	1	1	0	1	0	0	1	1	0	5	55.56
G	1	1	1	0	1	1	0	1	1	7	77.78
H	1	1	0	1	0	1	1	0	1	6	66.67
I	1	1	1	0	1	1	1	0	1	7	77.78
J	1	1	0	1	1	1	0	1	0	6	66.67
Sum	10	10	5	8	8	8	7	7	7		
Perce ntage (%)	100	100	50	80	80	80	70	70	70		

Source: Researcher's Analysis of Data (2019)

Table 4.8 shows that the construction firms interviewed do not completely comply with the provision of H&S training towards improving the safety performance of workers on sites. The level of compliance with Safety meetings is 50%; Communicating safety value to corporate stakeholders and Two-way safety communication is 80%; Safety inductions is 80%; Training and retraining of employees on safe work procedure is 80%; Fire protection programme is 70%; Detailed safety programmes 70%; and Focusing of monthly safety meetings on employees' attitudinal change towards safety is 70%. On the average, the level of compliance of the construction firms with the provision of the components of H&S training towards improving the safety performance of workers on sites ranges from 66.67 – 88.89%. This implies that the level of compliance of the firms with the H&S training fairly good. In view of this, there is need for improvement of the level of compliance of the construction firms with the provision of the components of H&S training towards improving the safety performance of workers on sites through

effective and implementable strategies. The results observed in the analysis of the interview data agree with that of the questionnaire data analysis.

4.3 Summary of Findings

The analysis of data carried out for this research revealed the following:

- i. The components of H&S training identified are averagely complied with by the construction firms (average MIS = 4.067).
- ii. The identified H&S Regulations have significant impact on the H&S performance of construction firms (average MIS = 4.08).
- iii. The components of H&S training identified have less significant impact on the safety performance of construction firms ranging between “Shortage of knowledge and training” and “Physical impact” (MIS = 3.44 and 2.68 respectively).
- iv. The relationship between H&S Regulations and H&S Budget Amount is not significant ($r = 25.5$; $p = 0.074$). The relationship between H&S Regulations and Number of Accidents is significant ($r = -42.7$; $p = 0.002$).
- v. The relationship between H&S Training and H&S Budget Amount is significant ($r = 34.0$; $p = 0.016$). The relationship between H&S Training and Number of Accidents is significant ($r = -64.5$; $p = 0.000$).
- vi. The strategies identified for reducing the rate of accidents, injuries and fatalities on construction sites are effective (average MIS = 3.893).

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

In view of the research findings, it can be concluded that the components of H&S training are effective but not completely complied with by construction firms in Abuja. The H&S Regulations and the components of H&S Training practices have significant impact on the safety performance of construction firms. The strategies for reducing the rate of accidents, injuries and fatalities on construction sites are effective. It is therefore clear that the level of compliance with the components of H&S training among construction firms in Abuja, Nigeria is fairly good.

5.2 Recommendations

In view of the conclusion of the study, the following recommendations are made:

- i. Construction firms should adopt the relevant H&S provisions in the identified H&S Regulations especially “H&S Provision in Labour, Safety & Welfare Bill 2012” and “National Building Code 2006” in order to formulate their H&S policies in order to increase the level of compliance with H&S training.
- ii. The adoption of the H&S Training practices should be adopted by construction firms in order to improve the safety performance of construction firms.
- iii. Construction firms should implement the suggested strategies to the latter in order to create a conducive atmosphere for both management and workers to be able to implement the H&S regulation and training practices for enhanced H&S performance.

5.3 Contribution to Knowledge

The findings of this study has made the following significant impact in the research domain of safety at work places in the construction industry:

- i. It was revealed that the identified H&S regulations can significantly improve the safety performance of construction firms at about 81.6% likelihood tendency (MIS = 4.08 on a scale of 5 - point).
- ii. The study revealed that the H&S Training practices are averagely complied with in Abuja (MIS = 4.067). therefore, there is need for construction firms to improve the level of compliance with H&S Training practices in order to address their peculiar H&S challenges.
- iii. It was also revealed that the identified H&S Training practices can significantly improve safety performance of construction firms in terms of reduction in rates of accidents ($p = 0.000$) and improved H&S Budget implementation ($p = 0.016$).
- iv. The strategies identified for reducing the rate of accidents, injuries and fatalities on construction sites are about 78% effective (MIS = 3.893 on a scale of 5 - point).

5.4 Areas for Further Studies

In view of the limitations of this study, the following areas can be researched in the nearest future:

- i. Comparison in the level of compliance to H&S Regulations and Training amongst small, medium and large sized construction firms.
- ii. Effect of Total Quality Management on the safety performance of medium and large sized construction firms.

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APPENDIX

APPENDIX A: Research Questionnaire

COVERING LETTER ON QUESTIONNAIRE SURVEY

Dear Sir/Madam,

Research on: EVALUATION OF COMPLIANCE WITH HEALTH AND SAFETY TRAINING BY CONSTRUCTION FIRMS IN ABUJA, NIGERIA

I wish to request you to contribute to an M. Tech research, which aims at evaluating the compliance with health & safety training by construction firms in Abuja, with a view to proposing strategies for reducing accidents on construction sites. The research is being carried out at the Department of Quantity Surveying, Federal University of Technology, Minna, Niger State – Nigeria under the supervision of Dr. A. A. Shittu.

As part of this research, a survey is conducted to achieve the following objectives:

- i. To identify and examine the components of the H&S training practices capable of enhancing safety awareness among construction workers in construction firms.
- ii. To identify and examine the regulations capable of enhancing the effectiveness of H&S training of construction firms in Abuja.
- iii. To examine the level of compliance of construction firms with the provision of the identified components of H&S training practices capable of enhancing safety awareness among construction workers.
- iv. To determine the impact of the identified H&S Regulations and training on the safety performance of construction firms.
- v. To examine strategies for reducing the rate of accidents, injuries and fatalities on construction sites.

It would be greatly appreciated if you would fill the questionnaire as soon as possible. I want you to also note that your responses will be treated confidentially.

Thanks.

Yours faithfully,

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Department of Quantity Surveying

**Federal University of Technology
Minna – Nigeria**

QUESTIONNAIRE SURVEY

**EVALUATION OF COMPLIANCE WITH HEALTH AND SAFETY TRAINING
BY CONSTRUCTION FIRMS IN ABUJA, NIGERIA**

SECTION A: General Profile of Respondents

Please enter your name, position and the details of your organisation.

All responses will be confidential and will not be connected in any way to yourself or your organisation.

Name (Optional): _____

Profession: _____

Organisation: _____

Years of Experience: _____

Telephone: _____

Postal Address: _____

Email: _____

SECTION A1 – Organisational Characteristics of Firm

Q1: When was your company established? *(Please write in the box)*

--

Q2: How many employees were there in your company from 2013 till date? *(Please tick in the boxes provided below).*

NUMBER OF EMPLOYEES	2014	2015	2016	2017	2018	2019
Not more than 30 employees						
31 - 70 employees						
71 - 200 employees						
Greater than 200 employees						

Q3. What type of construction work does your company undertake? *(Please enter approximate percentage % in the box below).*

TYPE OF CONSTRUCTION WORK		APPOXIMATE PERCENTAGE
Building Construction		
Civil Engineering		
Others (Please Specify)		

Q4: What was your company's approximate turnover for the past five years?
(Please tick)

TURNOVER	2015	2016	2017	2018	2019
Less than =N=2,000,000.00					
Between =N=2,000,000.00 and =N=5,000,000.00					
Greater than =N=5,000,000.00 but not exceeding =N=10,000,000.00					
Greater than =N=10,000,000.00 but not exceeding =N=15,000,000.00					
Greater than =N=15,000,000.00 but not exceeding =N=20,000,000.00					
Greater than =N=20,000,000.00					

SECTION A2: Firms' Health and Safety (H&S) Management Practices

Q5: Does your company have a health and safety (H&S) policy? (Please tick)

YES	NO

* If you answered yes to question 5 (Q5), please it would be greatly appreciated if a copy could be returned with the completed questionnaire.

Q6: Does your company have specific budget for health and safety? (Please tick)

YES	NO

Q7. If you answered yes to question 6 (Q6), please state the budget amount for a five-year period. (Please write in the box below)

YEAR	2015	2016	2017	2018	2019
HSE BUDGET AMOUNT (=N=)					

Q8: How many accidents have occurred annually in your business from 2015 - 2019? (Please write in the boxes below)

SEVERITY OF INJURY	FIGURE				
	2015	2016	2017	2018	2019

Minor injuries requiring less than one day off work					
Injuries requiring one to three days off work					
Four or more days off work including strains, sprains, lacerations etc resulting in four or more days off work					
Fatal injuries causing permanent disability or death of employee					

SECTION B: Components of the H&S Training Capable of Enhancing Safety Awareness among Construction Workers

Q10: The study has identified the following as the components of the H&S training capable of enhancing safety awareness among construction workers. Please indicate by ticking in the blank spaces provided in the table below, the level of importance of these Components on a five-point scale in your opinion.

S/No.	Components of H&S Training	5 Most Important	4 Very Important	3 Important	2 Less Important	1 Least Important
1	Safety inductions					
2	Safety training and orientations					
3	Alcohol- and substance-abuse programme					
4	Training and retraining of employees on safe work procedure					
5	Safety policies and procedures					
6	Fire protection programme					
7	Detailed safety programmes					
8	Safety meetings					
9	Communicating safety value to corporate stakeholders and Two-way safety communication					
10	Focusing of monthly safety meetings on employees' attitudinal change towards safety					
11	Use of posters and other signs to give safety education					
12	Use of external assistance with respect to health and safety issues					

SECTION C: Level of Compliance of Construction Firms with the Identified Components of H&S Training Practices Capable Of Enhancing Safety Awareness among Construction Workers

Q11: Please fill in the blank spaces below the level of compliance of your firm on the implementation and provision of the identified components of H&S training practices

capable of enhancing safety awareness among construction workers on a five-point scale in your opinion.

S/No.	Level of Compliance to Components of H&S Training	5 Total Compliance	4 Average Compliance	3 Partial Compliance	2 Least Compliance	1 Non Compliance
1	Availability of health and safety plan before commencement of construction project					
2	Scaffoldings properly and adequately fixed and inspected before mounting them					
3	Ladders fixed and adequately secured in positions before ascending them					
4	Compulsory use of personal protective equipment's (PPP) on site					
5	Working environment always cleared and kept free from all objects that can cause harm or injury to the workers					
6	Construction equipment's handled with utmost care					
7	Strict monitoring of safety policy and proper keeping of safety records					
8	Observation of standing Safety rules and regulations on site					
9	Safety brief before commencement of any day work on site					
10	Safety rules and regulations on site; Safety brief before commencement of any day work on site					
11	Educating workers and supervisors in developing good safety habits					
12	Effective control of the numerous subcontractors by the main contractor					

13	Possession of basic safety training and education					
14	Prompt and adequate communication of safety issues to all concerned					
15	Availability of first aid and welfare facilities on site Employment of full-time safety officers					
16	Lack of budgetary constraints					
17	Presence of owner in coordination meetings					
18	Maintaining safe work conditions					

SECTION D: Regulations Capable of Enhancing the Effectiveness of H&S Training Practices of Medium Sized Construction Firms

Q9: The study has identified the following regulations capable of enhancing the effectiveness of H&S training practices of medium sized construction firms in Nigeria. Please indicate by ticking in the blank spaces provided in the table below, the level of importance of these regulations on a five-point scale in your opinion.

S/No.	H&S Regulations	5 Most Important	4 Very Important	3 Important	2 Less Important	1 Least Important
1	H&S Provision in Condition of Contract					
2	H&S Provision in Workmen Compensation Act					
3	H&S Provision in Factories Act 1990					
4	H&S Provision in Public Health Act 1990					
5	NESREA Act 2007					
6	National Building Code 2006					
7	H&S Provision in Labour, Safety & Welfare Bill 2012					

SECTION E1: Impact of the Identified H&S Regulations on the Safety Performance of Construction Firms

Q12: The study has identified the following as the impact of the identified H&S Regulations on the safety performance of construction firms. Please indicate by ticking in the blank spaces provided in the table below, the level of significance impacts on a five-point scale in your opinion.

S/No.	Impact of H&S Regulations on Safety Performance	5 Most Significant	4 Very Significant	3 Significant	2 Less Significant	1 Least Significant

1	High costs in the areas of hospital bills					
2	Salaries for hospitalised workers and compensations					
3	Increased labour turnover					
4	Absenteeism					
5	Strained management-labour relationship					
6	Operational inefficiency and ultimately decreasing performance become noticeable					

SECTION E2: Impact of the Identified H&S Training Practices on the Safety Performance of Construction Firms

Q13: The study has identified the following as the impact of the identified H&S Training Practices on the safety performance of construction firms. Please indicate by ticking in the blank spaces provided in the table below, the level of significance impacts on a five-point scale in your opinion.

S/No.	Impact of H&S Training Practices on Safety Performance	5 Most Significant	4 Very Significant	3 Significant	2 Less Significant	1 Least Significant
1	Shortage of knowledge and training,					
2	Lack of supervision					
3	Awareness about the safe implementation of assigned work					
4	Apathy and total carelessness					
5	Large financial losses					
6	Exposure to harmful chemicals					
7	Biological agents					
8	Physical					
9	Mechanical					
10	Ergonomic hazards					
11	Lack of knowledge and pattern of illness					

SECTION F: Strategies for Reducing the Rate of Accidents, Injuries and Fatalities on Construction Sites

Q14: The following are the identified strategies for reducing the rate of accidents, injuries and fatalities on construction sites. Please indicate by ticking in the blank spaces provided in the table below the level of effectiveness of these strategies in your opinion on a five-point scale.

S/No.	Strategies	5 Most Effective	4 Very Effective	3 Effective	2 Less Effective	1 Least Effective
1	Site Layout and Planning					
2	Personal Protective Equipment (PPE)					
3	First aid Kits and Accident Reporting					
4	Health and Safety Warning Signs					
5	Safety Policy					
6	Changes in the permanent design					
7	Hazard Identification and Risk Assessments (HIRAs)					
8	Proper Equipment					
9	Safety incentives					
10	Safety record keeping and follow-ups					
11	Financial Provision for H&S					
12	Effective Communication					
13	Partnering					
14	Risk Management					
15	Supervision					

Q15: What other suggestions do you have for helping contractors to manage construction site health and safety more effectively to minimize the fatalities, incidence of ill health and accidents on construction sites? (Please use a separate sheet if necessary)

Thank you very much for your co-operation.

For further enquiries please contact:

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Email: halimat.salako@yahoo.com

Department of Quantity Surveying

Federal University of Technology,

Minna - Nigeria.

APPENDIX B: Interview Guide

**Department of Quantity Surveying
Federal University of Technology
Minna – Nigeria**

INTERVIEW GUIDE

EVALUATION OF COMPLIANCE WITH HEALTH AND SAFETY TRAINING BY CONSTRUCTION FIRMS IN ABUJA, NIGERIA

SECTION A: General Profile of Respondents

Good day to you and thanks for taking your time out to be part of this research. All responses given will be confidential and will not be connected in any way to yourself or your organisation.

Name (Optional): _____

Profession: _____

Organisation: _____

Years of Experience: _____

Telephone: _____

Postal Address: _____

Email: _____

SECTION B: Firms' H&S Policy

Q1. Please, can I have a look at your company's H&S policy?

Q2. Are well do your site workers understand all the rules written in your H&S policy?

Q3. Do you give them the opportunity to interact with you from time to time in order to seek clarifications on the clauses in your H&S policy or to be more conversant with these clauses?

Q4. What arrangement do you have for your site workers to be more conversant with having better attitude towards working on the site in a safe and healthy manner?

SECTION C: Components of H&S Training (if being practiced or available in Firms' H&S Policy)

Q5. How often do you conduct safety meetings with all your employees (i.e. both site and non-site workers)?

Q6. Do you allow for feedback from your workers after training them on safety issues?

Q7. How do you implement the practices of communicating safety value to corporate stakeholders and Two-way safety communication?

Q8. How do you accommodate your newly employed staff to the site?

Q9. What measures do you take in order to comply with the practice of safety inductions?

Q10. Do you invest on evaluating the safety performance of your well experienced staff from time to time?

Q11. How do you go about training and retraining of employees on safe work procedure in your organisation?

Q12. Have you ever experienced the incidence of fire outbreak on site?

Q13. Do you have a procedure in place in your H&S policy on fire protection programme?

Q14. Do you have a designated period of the year (whether a day, days or a week) for detailed safety programmes?

Q15. What are the strategies you employ in order to implement the practice of detailed safety programmes in your organisation?

Q16. What can you comment about the attitude of your site workers towards workplace health and safety?

Q17. What measures do you put in place to ensure that your periodic safety meetings are focused on employees' attitudinal change towards safety?

Q18. What can you comment generally on the level of compliance to health and safety measures by construction firms in Nigeria?

Q19. How do you think the attitude of workers and construction firms can be improved towards health and safety on construction project sites?

Thank you for your time!

APPENDIX C: FOCI List of Abuja Contractors

<https://foci.org.ng/full-members/>

S/N	NAME OF COMPANY	STREET ADDRESS	CITY	PHONE NO	EMAIL
1	B. Stabilini & Company Limited	Plot 3032	Abuja		
2	BNL Eng. & Constr. Limited	Plots 564/565 Block D Central Area	P.O. Box 1669, Garki		info@bouygues-construction.com
3	Bullet International Nigeria Limited	Plot CBD, P.M.B. 4, 2567, Garki		+234 (0) 98707414	info@buletng.com
4	Dumez Nigeria Limited	Plot 3120, Rima Street	Maitama,	+234 803 400 70 70	contact@dumeznigeria.com
5	Dantata & Sawoe Construction Co. Nig. Ltd.	Nnamdi Azikiwe Way	Garki	+234-(0)9-33 00 000	info@dantata-sawoe.com
6	Gilmor Engineering Nigeria Ltd	No. 69 Usuma Street	P.O. Box 8841, Wuse,	080-55880001	gilmor@gilmornigeria.com
7	Gitto Costruzioni Generali Nig. Ltd	Plot 737, Mabushi	Mabushi	234-(0)95242380	abuja@gittonigeria.com
8	HAJAIG Const. Nig. Ltd. HAJAIG Const. Nig. Ltd.	No. 11, Vaal Street, No. 11, Vaal Street,	Maitama, Maitama,	070-61971781 070-61971781	paul_bnigeria@yahoo.com
9	Paul-B Nigeria PLC	51, Parakou Street	Abuja	080681148 97	
10	P.W. Nigeria Limited	Plot 09, Outer Northern Expressway	P.M.B. 7016, Garki	0813 989 0080	pw@pwnigeria.com
11	PICCOLO-Brunneli Engineering Ltd.	23, Danube Street,	Maitama District		
12	R.C.C. Nigeria Limited	No. 28, Ebitu Ukiwe Street	P.M. Box 5059, Jabi,	234-8054090165-7	md@rccnigeria.com
13	Sageto Limited	Plot 64 Nouakchott Street	G.P.O. 4261, Abuja	+234) 08036100900	info@sagetolimited.com
14	Salini Nigeria Limited	Plot 16 Blantyre Street P.O. Box 7558,	Wuse	+234 09 5238428	abuja@salini-impregilo.com
15	S & M Nigeria Limited	Plot BDEX/CP/292, Opp. Abuja Model City	P.O. Box 5820 Garki	+234 815 973 2153	
16	Structural Skyline Limited	Suite D9, 3rd Floor, SHM Complex,	Mabushi		
17	Standard Construction Limited	Plot 766 Mabushi	Mabushi,		standardconltd@yahoo.com
18	S.C.C. Nigeria Limited	Plot 741 Cadastral Zone B4,	Jabi District, P.O. Box 4486, Garki	08039043000	abuja@sccnigeria.com
19	Setraco Nigeria Limited	Setraco Building, Plot 526, Shehu Yar'adua Way,	P.M.B. 105, Garki,	+234-806-9447441	info@setraco.net
20					
21	Zeberced Limited	Off Gbazango Road,	Kubwa,	08155149898	info@zeberced.com
22	Greenville Oil & Gas Company Ltd	45B, T.Y. Danjuma Street	Asokoro	+234 906246000 9	sales@greengasnligeria.com
23	Ringardas Nig. Ltd.	49, Mamman Nasir Street	Asokoro,	0703 417 1368	info@ascanigeria.com
24	A & A Yawas International Limited	Suite No. 2 Aguyi Ironsi Complex	Asokoro	+234 9 3142146	
25	Afro Dimensions Co. Limited	Suite A12, Bensima House, Plot 2942, Aguyi Ironsi Street	Maitama	+234 9 4130779, 4130780	