ASSESSMENT OF SAFETY BEHAVIOUR OF WORKSERS ON CONSTRUCTION SITES

ABSTRACT

The Construction industry has been classified as one of the most hazardous industry when it comes to occupational accidents and fatalities. Construction accidents do not only result to demotivation of workers, but also causes delay of project delivery, affect the quality of work delivered, increases overall cost of project, as well as arise to compensation of injured workers among others. The aim of this study was to determine the degree of compliance to safety behaviour of Workers on Construction Site in Abuja, Nigeria. To achieve this, well-structured questionnaires were administered to 137 Safety Representatives practicing with medium construction Firms in Abuja-Nigeria, where Construction works were currently on-going. The data were collected, presented and analyzed using descriptive and inferential statistics. Results from the data analysis indicated that among the several reasons why casualties still happen on construction sites noncompliance or total compliance to safety regulations stands out as a major influencer. The study however recommended the following: the need for all sites to have a safety representative and their role and functions should be spelt out, site Operatives should be educated on hazard management, workers must be punished for violating safety rules and be rewarded for effective compliance and workers must ensure they are adequately equipped with personal protective equipment before being engaged to work.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Study

Without a question, the Construction sector is the backbone of every nation's economic and social growth (Okoye *et al.,* 2016). It serves as a rallying point for national growth by connecting all other sectors of the economy and services through its forward and backward linkages. For example, in the first quarter of 2019, the industry contributed 6.17 percent to nominal GDP, up from 4.13 percent the previous quarter and contributed 5.03 percent in the fourth quarter of 2018 (NBS, 2019).

Despite its importance, the construction industry continues to face numerous challenges, especially in low income nations of which Nigeria is not an exemption (Okoye *et al.*, 2015). The construction industry, on the other hand, has badly performed in terms of protection (Okoye *et al.*, 2016). Experts define the industry as one of the most dangerous when it comes to workplace accidents.

Safety, known as the state or feeling of being safe or protected from risk, is essential to everyone in the construction industry, but it is widely believed that it is not completely adhered to. The word "accident" comes to mind when the phrase "safety" is mentioned. Injury is not often the outcome of an accident. According to Hinze (1997), an accident is an unintended event. Accidents that cause damage to machinery and products, as well as those that cause injury. occurrence. Unwanted, unpredictable, uncontrollable occurrences have been used to identify them. Injury is not often the outcome of an accident. Accidents that cause damage to machinery and products, as well as those that cause injury, attract the most

coverage. Accidents should be avoided at all costs, regardless of the extent of the harm or loss. Accidents that do not result in material or equipment damage or personnel injury can foreshadow potential accidents with less favorable outcomes.

Accidents are often defined as occurrences that occur as a result of a chain of events. Each event in a sequence is connected by the fact that it is followed by another event. The chain of events is a representation of how an accident occurs. The accident occurs when all of the events in the sequence or chain occur at the same time. Furthermore, the accident could have been avoided if all of the events in the chain had not happened. Many accidents are often blamed on worker conduct, if only because the worker is often the last party involved in the chain of events. It is important to note the other events in the chain if safety is to be promoted not just the final action of the worker who becomes injured (Hinze, 1997). To actually blame injured workers for many of their own accidents is to disregard the influences on worker actions that other parties have.

The term safety behaviour refers to the actions that people take at work (Christian *et al.*, 2009). Safety activities were divided into two categories by Neal *et al.* (2000): safety participation and safety enforcement/compliance. Many safety behavior-related research, such as Vinodkumar & Bhasi (2001) have adopted these two dimensions. Attending meetings and assisting coworkers are examples of safety participation. Safety participation refers to repeated voluntary activities that do not necessarily encourage personal safety but do contribute to improving workplace safety. Safety enforcement, on the other hand, applies to required habits that must be followed in order to keep the workplace safe, such as wearing personal protective equipment and following all safety regulations. As a result, this study assessed the safety behavior of workers on construction sites, with a particular emphasis on

the degree of compliance with safety standards by site operatives on construction sites in Abuja, Nigeria.

1.2 Statement of Research Problem

Construction-related mishaps have been identified as agents of construction activity obstruction (Williams *et al.*, 2018). Furthermore, researchers have established four major categories of accidents that still occur on Nigerian construction sites: Human errors, particularly among construction workers, have been linked to interaction with tools and equipment, vehicle/machine-related, slip and trip, and fall-related accidents, as well are the causes of these accidents.

Unsafe behavior or non-compliance with safety standards was often blamed for these mistakes. When there are accidents on the job, it is common for activities to be halted on the job site to allow for accident investigation, loss of personnel, payment of funeral costs or reimbursement or insurance claims for the deceased, loss of productivity, high labor turnover, loss of corporate credibility. Researchers and authors have attempted to understand the true cause of injuries, especially on construction sites. According to Muhammed *et al.* (2015) adherence with health and safety regulations will have a positive effect on assessing construction workers' standard of delivery and production. Although some have claimed that accidents are caused by a combination of factors such as workers' dangerous behavior, others have claimed that accidents are caused by an act of God or unknown causes. However, little was said about why accidents happen on construction sites, especially in Abuja, Nigeria. Managers are working to minimize accidents on our building sites and Supervisors are

advised to inculcate the habit of safety requirements in all their sites since workers on their part would not want to be injured while they are working, so supervisors are encouraged to instill the habit of safety standards in all of their locations. Also, given the effects of man-made accidents, which are often rooted in workers' unsafety habits, safety studies must go beyond determining the causes of safety issues and instead concentrate on the safe behaviour of workers before it results into accident. Since fatalities are caused by people's dangerous behavior, they can be avoided by instilling a strong safety culture in Nigeria's construction industry.

1.3 Research Questions

To direct the investigation, research questions were developed thus,

1. What is the extent of worker compliance with safety behaviour on construction sites?

2. What factors influence compliance with safety behaviour?

3. What are the methods for improving compliance with safety practices by Site Operatives?

4. What effect does workers' safety behavior have on construction site?

1.4 Aim and Objectives of the Study

The aim of the study is to determine the degree of compliance with safety standards on construction sites where a safety management plan is in place, with the goal of improving a safer working environment for all construction workers. The following are the objectives to achieve this goal, to;

1. determine the extent to which workers on construction sites adhere to safety regulations.

2. describe the factors that influence worker adherence to safety requirements;

3. determine the method that will enhance worker compliance with safety regulations;

4. investigate the effect of construction workers' safety practices on job sites.

1.5 Research Hypothesis

This research Null-hypothesis was put to the test in order to back up the study's findings. The hypothesis is based on the study goals:

Ho1: Safety compliance has no substantial impact on construction site.

1.6 Justification for the Study

The value of construction site safety management plan cannot be overstated, as it provides substantial opportunities and benefits to the industry. Reduced workplace risks, increased efficiency, less injuries and legal challenges, improved standing among clients and partners, and, of course, cost savings, quality assurance, and project delivery are just a few of the advantages.

The built environment according to Hinze (1997), is unique among industries in that it provides employees with numerous opportunities to participate in a variety of projects of interest. Furthermore, construction work often takes place outside, in conditions that aren't always ideal for safety. On construction projects, in addition to the continuous shift in the design of the job and the mix of employees, the position of the work often changes for the workers. While some employees may be drawn to construction because of its unique characteristics, the industry's safety record is not to be envied. Such characteristics do not have to result in accidents, losses, or deaths.

There is also increasing concern about the high rate of construction accidents and fatalities, as well as a low level of compliance with safety requirements by site operatives, especially in developing countries.

1.7 Scope of the Study

The research area is medium-sized construction companies and firms in Abuja, Nigeria. Abuja was chosen as the case study because it has been dubbed one of the fastest growing cities in Sub-Sahara Africa in recent years due to the city's numerous infrastructure and construction projects. The research was limited to construction sites that were in the process of being developed. The study was limited to firms and construction sites where works were currently on going to achieve relevant data and not the entire construction companies in the research area.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Concept of Safety

The government, employers, and staff are all concerned about the number of deaths on the job in the construction sector (HSA, 1999). According to estimates from McDonald & Hrymak (2002), the construction sector is only second to agriculture in terms of fatalities. The majority of academics, on the other hand, believe that construction workers are to blame for these deaths.

The state of being safe, or being shielded from harm or other undesirable outcomes, is known as safety. Safety can also be described as the management of known risks to achieve an appropriate level of risk. Safety refers to the state of being protected from physical, psychological, occupational, and mechanical failure, injury, accident, death, or other particularly undesirable incidents in the context of occupational health and safety. It's often referred to as a situation in which positive controls or established hazards are in place in order to achieve a safe level of measured risk, such as a reasonable exposure limit.

Safety can be described as the point at which all of the risks associated with a specific job are effectively handled in a responsible manner (Brueggman, 2001). According to Ahmad *et al.* (2016), safety is a one-time occurrence that is critical to maintaining efficiency. Safety is one of the most important considerations in any company, whether profitable or not. Management is entirely responsible for coordinating and enforcing all safety measures in the workplace to protect all workers and property from any type of threat. Local rules, industrial standards, and procedures all require safety. Employers, on the other hand, must be educated

and aware of potential safety hazards in the workplace. Since injuries, harm, injury, and other health hazards cost money, impede production or service, and have a significant negative impact on employee morale and business goodwill, safety monitoring and control is one of the most important day-to-day activities of management.

On the other hand, behavior is described as the way one acts or conducts themselves, particularly towards others. A person's or an animal's behavior in response to a specific circumstance or stimulus is often referred to as behavior. Individuals, species, processes, and artificial beings engage in a variety of behaviors and mannerisms in relation to themselves and their surroundings which includes the other systems or organisms around as well as the physical environment.

The term "safety habits" refers to the actions that people take at work (Christian *et al.*, 2009). When viewed in the sense of a specific community, it becomes clear that individual behavior, as well as the expectations that influence these behaviors, are critical in assessing an organization's safety efficiency. An organization’s safety culture can be broken down into three main elements; 1) psychological aspects- how people feel, 2) behavioral aspects- what people do and say, 3) situational aspects- what we have.

Leaders must ensure that these components are positively engaged with one another. People's positions normally determine how much power they have over any of these factors, but their ability and motivation to make a difference can determine their effect. The safety behaviors and expectations of a workforce are primarily governed by the leadership that is demonstrated to them, just as workers' behavior ultimately dictates the success of any tasks.

2.2 Construction-Related Fatalities around the World

According to ILO statistics from 1996 to 2018, every year, over two million women and men die as a result of accidents or diseases caused by globalization.; this equates to over 6000 deaths every day (ILO, 2018). Furthermore, the organization stated that there are approximately 340 million workplace injuries worldwide per year.

According to Brabazon *et al.* (2000), between 1993 and 1998 Injury rates in the main construction trades were 1 in 11,000 per year, scaffolding trades (1 in 5400), roofing trades (1 in 3800), steel erectors, bar bending, and structural trades were all ranked first in the survey (1 in 3000). According to the report, these were well in excess of the HSE guidelines. The study found that since the introduction of building design and maintenance regulations in 1994, the overall fatality rate has decreased by 10%. The number of accidents on construction sites, on the other hand, is now on the decline. According to Davies & Tomasin (1996), falls account for 70-80 percent of all fatalities in the United Kingdom each year. The study went on to claim that falls from one floor to another, as well as machinery and objects dropping and striking, all of which ultimately hit and kill people, were factors in the percentage. Just 52 percent of the 681 construction-related deaths between 1981 and 1985 fell into this group, according to the report.

Perkins (2018) recorded that there were 38 fatal construction worker accidents from the beginning of the year to the end of March 2018, compared to 30 the previous year. This translated to a fatal injury rate of 1.64 in 100,000 employees, which was lower than the industry's average of 1.77 in 100,000 workers over the previous five years.

According to the survey, 144 work-related deaths occurred in 2017/2018 across all sectors, with construction responsible for the most deaths (29), agriculture (15), manufacturing (15), and transportation/storage (15). According to the report, falls from great heights are the leading cause of death in all sectors, accompanied by being hit by a moving vehicle (26), being struck by a moving object (23), being trapped by a collapsing object (16), and being struck by heavy machinery (16).

According to Berg (1999), falls are the major cause of death in the construction sector worldwide. Berg went on to say that falls on German construction sites account for 50% of all deaths in that industry. Between 1980 and 1989, Cattledge *et al.* (1996) looked at construction fatality rates in the United States. They found that construction sites accounted for 49.6% of all workplace deaths due to falls.

Takala (1999) claims that data on workplace injuries is not available from all countries. Underreporting, inadequate scope of reporting and compensation programs, and non-harmonized injury tracking and warning systems are the reasons for this. According to the analysis, fatal workplace injuries reported to the International Labour Office are applied to the total working population in countries and regions not covered by the reported data, and rates from other countries with similar or equivalent conditions are used.

Using data from the National Institute for Occupational Safety and Health's (NIOSH) fatality assessment and control evaluation (FACE) program, researchers discovered records for 768 construction industry fatalities. After reviewing the results, they discovered that between 1982 and 2015, 42 percent of the 768 construction industry deaths occurred, and 54 percent of those killed did not have access to a vehicle, although 23% had access to one, they did not use it. The bulk of those without PFAS worked in the roofing, siding, and sheet metal

industries for residential building contractors, twenty percent of the 768 deaths happened within the first two hours of the victim's life, with 107 of the 325 falls being 30 feet or higher.

Every year, about 2.3 million people die as a result of workplace injuries and diseases, with over 350,000 deaths due to industrial accidents and over 2 million deaths due to worker-related diseases (ILO, 2014). According to the International Labour Organization, there were over 313 million non-fatal workplace injuries in 2010, taking at least four days off work, implying that occupational accidents injure or ill-health nearly 860,000 people every day.

Low- and middle-income countries in Southeast Asia and the Western Pacific region account for the majority of workplace deaths in most developing countries. These countries have the largest proportion of the world's working population, as well as the highest proportion of workers in dangerous occupations, as do other developing countries.

As a result, workers in the informal sector face significant protection and health risks. This term describes a wide range of precarious jobs, many of which are found in developing countries, and in which the employee has no formalized relationship with his or her employer. Informal employees, on the whole, have a bad working climate and welfare facilities, as well as almost no access to occupational health services. According to a recent report by the International Labour Organization (ILO), the informal sector now employs roughly half of the world's workforce.

Nonetheless, as shown in Figure 2.1, high-income countries have a high rate of work-related deaths, while fatal accidents account for a smaller proportion of their total death toll.

Figure 2.1: Safety and health at work: A vision for sustainable prevention.

Source: (ILO, 2014)

Figure 2.2, as reproduced by the ILO, shows the total number of deaths due to workplace injuries and diseases.

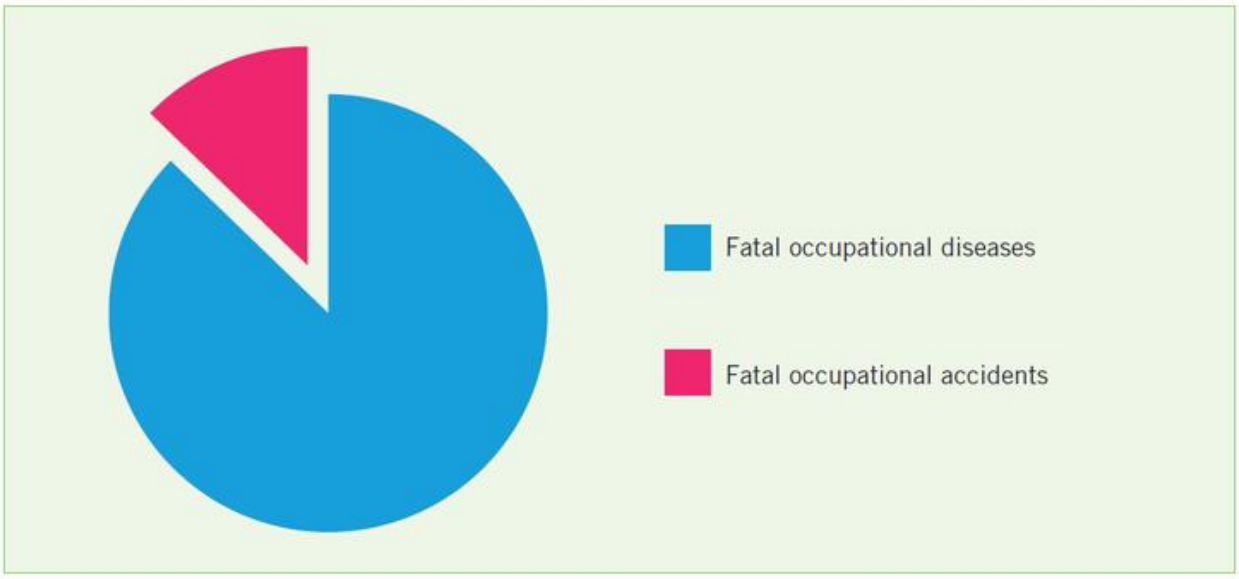

Figure 2.2: Workplace safety and health: A view of long-term prevention. Geneva hosts the XX World Congress on Workplace Safety and Health.

Source: (ILO, 2014)

Figure 2.3 shows global work-related mortality by area in 2010 (the top segments correspond to fatal workplace injuries, while the lower segments correspond to fatal work-related diseases).

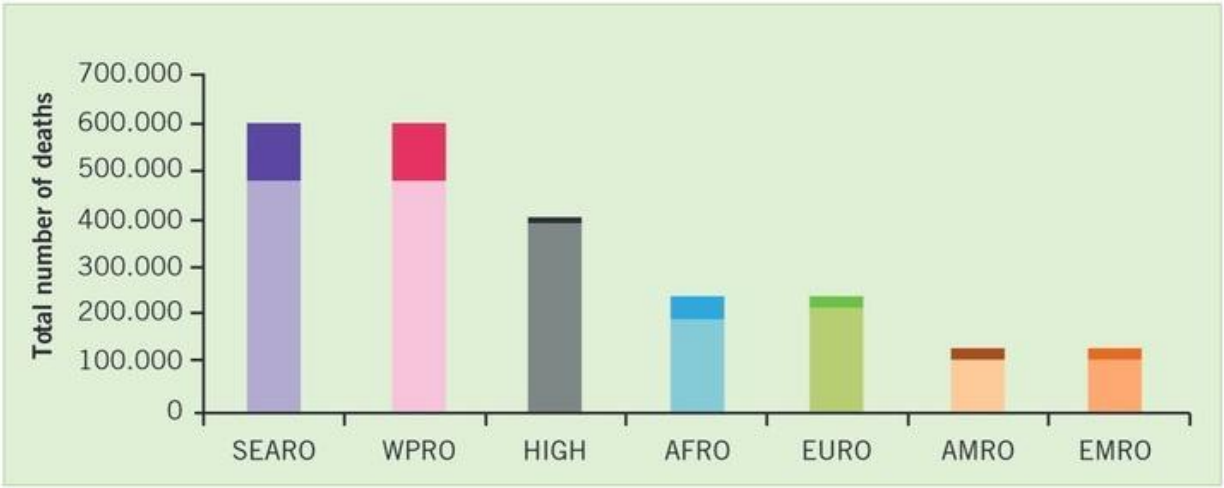

Figure 2.3: Workplace safety and health: A vision for long-term prevention

Source: (ILO, 2010)

According to the International Labour Organization (ILO), the fatality rate in advanced developed economies is approximately half that of Central and Eastern Europe, China, and India. Job that is hazardous can be ten to one hundred times more dangerous. Building sites in developing countries are ten times more dangerous than those in developed countries.

Table 2.1 throws more light on that;

Calculated rates by employment sector			
WHO Regional grouping	**Agriculture**	**Industry**	**Services**
High income countries (global)	10,2	4,3	1,6
LMIC* Africa Region	18,9	21,1	17,7
LMIC Americas Region	10,7	11,1	6,9
LMIC Eastern Mediterranean Region	20,0	10,1	5,3
LMIC European Region	19,1	10,3	4,5
LMIC South-East Asia and Western Pacific Regions	19,1	9,7	6,1

* LMIC – Low and Middle Income countries

** Accident incidence rates are the numbers of accidents per 100,000 workers

Table 2.1: ILO Introductory Report: Global Trends and Problems in Occupational Safety and Health, XIX World Congress on Safety and Health at Work.

Source: (ILO Introductory Report, 2008)

In most of the studies carried out by Researchers all over the world, construction-related fatalities have greatly been attributed to falls from height by workers. The question now is what reasons actually led to the constant fall of workers from heights especially when carrying out their respective tasks. Have safety professionals on site done enough to avert this constant trend that is devastating and degrading to the industry at large or has the average worker been ignorant about the safety requirement on every site?

2.3 Construction Related Fatalities in Nigeria

In the second quarter of 2018, the Nigerian construction sector grew by 44.09 percent in nominal terms (year on year), up 26.52 percent points from the previous quarter's pace of 17.57 percent (NBS, 2019). Its contribution to overall real GDP in the third quarter of 2018 was 4.51 percent, up from 4.25 percent in the same quarter the previous year and 4.04 percent in the previous quarter.

The construction industry's significance cannot be overstated, however when compared to other labor-intensive sectors, it has traditionally had a relatively increase in number of disabilities, injuries and fatalities for its scale (Hinze, 1997).

According to a study conducted by Bomel (2001), building accidents account for 30 to 40 percent of all industrial accidents in Japan, with the number being 50 percent in Ireland and 25 percent in the United Kingdom. In low income countries where there are no reliable sources of accident data, the situation is even worse (Agwu & Olele, 2014).

Since it is suspected that most contract managers do not report accidents to the appropriate ministry or keep proper records on accidents, there is no credible data on accident cases in the construction sector in Nigeria (Agwu & Olele, 2014). According to a variety of reports, falls from heights account for around half of all construction fatalities. This case is also unique to Nigerian construction sites due to the high number of fatalities.

According to Idoro (2011), a 2006 study of forty (40) contractors found that casualties and injury rates are disproportionately high in the Nigerian construction industry, with the best safety ratios being two accidents per one hundred employees and five injuries per one hundred workers.

According to Idoro (2004), Idoro (2007), and Idoro (2011), casualties and damage rates are significantly higher in many developing countries, especially Nigeria, Thailand, and Tanzania, than in European countries combined.

The amount and severity of construction-related accidents that occur and are published in Nigeria, according to Diugwu *et al.* (2012), Okolie & Okoye (2012), Idubor & Oisamoje (2013), and Umeokafor *et al.* (2014), indicate a lack of safety practices. The authors came to the conclusion that meeting safety criteria is still one of the most important factors in a project's progress.

Akinwale & Olusanya (2016) explored the impact of occupational health and safety intelligence in Nigeria, the researchers used a cross-sectional study design and risk society and sense-making theories. The researchers steered in-depth interviews with Directors and senior staff members of the chosen organizations in Lagos, Nigeria, the data was examined using content analysis and ethnographic techniques. According to the study, managers and staff are the primary targets of occupational health hazards such as lost man-hours, productivity, and job protection. While there was a high degree of knowledge about the importance of workplace safety, there was insufficient investment in safety capacity building programs in the organization. As a result, the study suggests that good health plan, as well as sufficient investment in safeguards and safety intelligence, would help individuals and organizations thrive in Nigeria.

Occupational safety is an important aspect of construction operations, according to Dodo (2014), because of the industry's uniqueness. Various crafts and talent are required to be carried out in a secure setting, but individual contributions decide the project's success. When an accident occurs on the job site, it results in a loss of man-hours, material waste, lost time

and productivity, high labor turnover, a loss of corporate image, and the payment of funeral costs as well as insurance claims for the deceased. In a society with a high rate of construction casualties, economic growth efforts are typically hampered. Employers and employees should instill the habit of taking precautions when performing their jobs, especially on construction sites.

2.4 Safety Behaviour of Construction Workers

Workers are the most valuable resource on construction projects, so everyone on the job, regardless of their level of education, should practice safe behavior when performing their individual tasks. It is critical to understand that every worker is capable of conducting the work in a safe manner in order for a safety program to be effective. There isn't anything that can be done to track staff to see if they have a proclivity for getting hurt. The only exception is drug testing, which is intended to reduce the hiring of employees who could act in an unhealthy manner, putting other workers in risk.

Unsafe acts have been reported as a major factor in construction incidents, according to Xu *et al.* (2018). The concept of planned behaviour, on the other hand, was used to shed more light on the factors that influence unsafe behavior by creating a connection between attitude, intention, and behavior. According to Gao *et al.* (2016), a desire not to perform safety may be induced by a desire not to perform safety. According to Fang *et al*. (2016), when a person refuses to act safely, it is a decision that can be clarified using psychological theory because it addresses how the mind, expectations, and beliefs influence safety behavior.

In a study titled "Empirical investigation of factors leading to the psychological safety environment on construction sites," Shen *et al.* (2015) found that different factors at both the

organizational and person levels play a crucial role in the decision-making process, and that those factors may often be contradictory. However, according to the report, expected behavior does not account for attitudinal ambivalence induced by a variety of factors that lead to unsafe actions, and thus offers an incomplete image of the connection amongst safety behavior and safety attitude.

Xu *et al.* (2018) summarizes the four ways in which conflict can arise on construction sites, including: 1) Workers' safety actions can change when they choose to enjoy the comfort or are under stress, anger, or difficulty; 2) workers' safety acts may change when they choose to enjoy the comfort or are under stress, anger, or difficulty; 3) In construction groups, safety trainings can conflict with habitual unsafe behavior, leading to unsafe behavioural intent when the habitual unsafe behavior prevails; 4) Individual team members' safety attitudes and behaviors can differ, and the impact of coworkers can be greater than that of the project organization higher safety management. Khosravi *et al.* (2014) investigated the factors that influence dangerous behavior and construction site injuries. The research looked at 56 previous studies that were linked. The nature, sort, figures collection methods, analytical methods, variables, and key findings of these studies were all categorized. To derive variables, patterns, and causes, a qualitative content analysis protocol was used. The findings discussed the role of more ad hoc variables such as society and organization, as well as project management, in minimizing the likelihood of dangerous behaviors and accidents by promoting site condition and individual characteristics.

Agwu & Olele (2014) conducted a report on casualties in the Nigerian construction sector. The study concluded that investing in machinery and technology in the Nation’s built environment would improve worker safety (lower rate of unsafe attitude) and the industry's

overall efficiency (reduced rate of accidents and fatalities). However, the study suggested that routine employees training may develop hazard recognition skills, involve managers and employees in resolving safety concerns, reduce possible workplace hazards, and make hazard identification and reporting everyone's responsibility. In a qualitative investigation of factors causing unsafe work behavior on construction projects, Hassan *et al. (*2018) discovered that unsafe work behavior is a significant component in the chain of incidents, and therefore plays a role in accident prevention programs on construction sites. Field observation, in-depth interviews, and focus group discussion were used in the study's methodology over a two-year period with 113 informants from different megaprojects. The study's findings identified fourteen themes within the conceptual model's four categories: general management, organizational influences, safety supervision and management, and individual characteristics. According to the results of the report, the overall management and organizational culture were introduced as crucial preconditions and contributing factors resulting in human error and unsafe actions on construction sites.

2.5 Safety Culture in the Organization

Safety culture, according to DeMaria (2017), relates to how occupational safety problems are treated. Employees' attitudes, opinions, expectations, and values about workplace safety are reflected in safety culture. The expression "the way we do things around here" has been used to describe safety culture, which is a part of organizational culture (DeMaria, 2017).

Researchers differ about the best approaches to handling occupational safety management theory, resulting in a fractured theory on safety environment and community (Guldenmund 2000 & Zohar 2010). According to Zohar (2010), there is still no consensus about what constitutes a safety culture and what does not. According to Biggs *et al.* (2013) definition

appears to include a fairly detailed overview of the idea of safety culture. They describe safety culture as “the sum of individual and community beliefs, behaviors, competencies, and behavioral habits that decide an establishment's pledge to, and style and expertise in, health and safety management” (ASCN). However, most studies modify this definition to operational its usage to suit their theoretical position or industrial context. Despite these conceptual difficulties, the value of a strong safety culture cannot be overstated.

Safety culture has been represented in a variety of ways in theory. To begin, the interpretative theory proposes that safety culture arises from all worker groups' common beliefs and behavioral experiences, rather than being a result of senior management's engineering. It is regarded as a gradual and stable, yet ever-evolving phenomenon arising from mutual beliefs, values, and attitudes. On the other hand, the functionalist viewpoint argues that safety culture is a compilation of ideal behaviors, attitudes, values, and beliefs that are carefully designed by management and taught to staff through a carefully crafted set of reinforcements. A third school of thought sees safety culture as an unattainable state of safety conduct that senior management in a company wishes to achieve and to which all employees strive. This is known as the absolutist approach to safety culture. Accordingly, the relativist theory of safety culture views safety culture as a continuum of desirable standards to which any company aspires, with companies being assigned to this continuum based on their safety results relative to the norm.

An organizational safety culture can be broken down into three aspects; (1) psychological aspect; (2) behavioural aspect; (3) situational aspect. All these three are closely linked to one another.

2.5.1 Psychological aspect

The psychological component refers to the individual's thoughts. It has to do with their views, expectations, behaviors, and values. Interviews and/or personalized questionnaires may be used to assess this aspect. Safety culture is often considered under the heading of psychological components in questionnaires and/or interviews, according to studies performed the UKHSE.

2.6 Behavioural Approaches to Safety Performance

A variety of studies have found evidence that human conduct, either by acts or inactions, causes injuries in organizations (Haslam *et al.*, 2005). Several recent studies have called for a behavioral approach to safety risk management, in which human behavior is targeted and modified to achieve desired outcomes. Firms in the construction industry and other sectors can improve the safety performance of their projects and enhance overall progress in occupational health management systems globally, according to Duff *et al.* (1994). By integrating target setting and using input for changes in human conduct, firms in the construction industry and other sectors can improve the safety performance of their projects and enhance overall improvement in occupational health management systems globally.

Duff *et al.* (1994) also suggested that the application of behavioral approaches for occupational safety management be expanded to include not only operatives but also managers and management staff. This is because existing research shows that managers and management have a significant role to play in ensuring better safety management practices in construction companies, and their actions have ramifications for site worker safety. Lingard & Rowlinson (1997) used similar approaches to improve the overall safety efficiency of construction companies in Hong Kong, concluding that setting targets for safety

performance and receiving input improves overall safety performance. They emphasized the importance of employee loyalty to the company and work groups in achieving defined safety performance targets. This is because worker safety is interconnected, and any individual's actions will affect not only the individual's safety, but also the safety of others. As a result, overall safety can be enhanced by changing individual actions. Workers are more likely to disclose instances of risk exposure, look out for their own and coworkers' protection, obey site-specific health and safety codes, and use personal protective equipment, among other beneficial behavioral characteristics, if they are encouraged to embrace safety management as their own.

2.7 Construction Workers Level of Compliance to Safety Requirements

Because of the industry's uniqueness, Dodo (2014) believed Safety at workplace is an important part of construction operations. As a result, to adhere with health and safety legislation remains one of the critical constraints for achieving effective project execution.

Occupational safety and health in Nigeria is a serious problem, especially in the construction industry (Umeokafor *et al.,* 2014). Occupational safety and health (OSH) have received insufficient attention and funding in low income countries such as Nigeria, either from industry players or the government. According to Diugwu *et al.* (2012), occupational safety and health statutes and provisions are ineffective, and the extent of compliance with operational safety and health regulations in Nigeria leads to the construction industry's low OSH (Diugwu *et al.,* 2012; Okolie & Okoye, 2012).

According to a report by Umeokafor *et al.* (2014) titled "Compliance with Occupational Safety and Health Regulations: An Analysis of Nigerian Construction Industry," the level of

safety and health compliance in Nigeria is low. The research also discovered the following main problems that influence compliance with safety regulations: (1) client influence; (2) insufficient enforcement; (3) insufficient regulations; and (4) unemployment. In the absence of government intervention and adequate implementation, the study concluded that industry stakeholders and management engagement would go a long way toward promoting compliance with workplace safety and health regulations. According to the report, OSH professionals should use the economic benefits of OSH enforcement to attract management engagement, and contractors' workplace safety and health records should be a requirement for further selection.

2.8 Workers Participation to Safety Behaviour on Construction Sites

Worker involvement is described by Occupation and safety health Association as the process of establishing, reviewing, running, and enhancing a safety program. Worker participation in an EHS program should meet certain requirements, according to OSHA. These criteria include: 1. Workers should be encouraged to participate and feel very comfortable reporting safety rules, 2. Workers should have all necessary information needed to effectively participate in safety programs, 3. Workers should have the privilege to participate in all stages of program and design and implementation, 4. Workers should not experience retaliation if and when they report safety concerns.

According to Gallup (2017), businesses with more engaged employees in America had 70% less safety injuries than companies with low levels of engagement, demonstrating an undeniable connection that as participation increases, safety improves and accidents decrease.

Curcuruto (2016) conducted a study titled "Health Participation in the Workplace: An Evaluation Method of Individuals' Proactive Safety Orientation." The study built a model tool questionnaire on current conceptual dimensions of organizational proactivity applied to workplace safety issues. Eighteen occupational safety experts from different organizations participated in the first round of semi-structured interviews. The contents of the interview were reviewed by the work psychologist's research team. According to the results, members value “shared responsibility for safety priorities and targets, as well as control of the safety program.” Research carried out by Shuang *et al.* (2015) opined that traditional safety performance evaluation approaches have struggled to be broadly successful because they are heavily reliant on manual and experienced inspection processes with lagging assessment indicators. The study established a framework for assessing personal safety success in a systematic way, as well as a realistic approach to personal safety participation.

Employee engagement is critical to the effectiveness of a safety and health initiative (OSHA, 2017), so use this knowledge base to create effective initiatives. Staff who regularly engage in safety programs such as training and workshops to consider danger on the job, documenting hazards and any deficiencies to avoid accidents on the job, training to be vigilant in searching for health and safety changes, and so on, then there is every probability that accident and casualties on construction sites can be totally avoided.

2.9 Factors that Affect Compliance to Safety behaviour by Workers

Individual recognition that construction casualties are an inevitable act due to the nature of activities involved on building sites has led to a general belief that non-compliance with organizational health and safety legislation is a common belief. Sawacha & Fong (1999) list the following as factors that affect safety performance: historical, economic, psychological, technological, operational, and administrative issues. The historical factor is determined by the individual's context and attributes, such as years and skill, while the economic factor is determined by monetary values associated with protection, such as hazard pay, according to the report while the psychological factor is assessed by the safety behaviour of fellow workers and safety officers; The organizational and environmental factors are assessed by the type of policy that the management adopts to site safety. The technological and procedural factor is assessed by the provision of instruction and the handling of safety equipment on site; and finally, the organizational and procedural factor is assessed by the type of policy that the management adopts to site safety.

Olutuase (2014) investigated safety management in Nigerian industry with the aim of comparing levels of conformity to international standards. The study's findings confirmed the presence of safety regulations in construction project management. Nevertheless, inefficiency and a lack of documentation seem to plague the method. According to the report, construction managers should pay careful attention to the provisions of the site management protection regulations.

Umeokafor *et al.* (2014) used a strategic review of previous research on the topic of health and safety to investigate reasons for non-adherence with health and safety requirements in Nigerian construction sites, such as owner influence and poor implementation. Safety staff

should recognize the value of incorporating safety provisions to entice construction managers and contractors in developing a comprehensive safety management on construction sites, according to the report, while clients should use health and safety records as a necessary document for prequalifying contractors. Meanwhile, Ismail *et al.* (2012) investigated the factors that influence the implementation of a construction site safety management system. The research was carried out using a standardized questionnaire for construction workers, as well as interviews with skilled labour. According to the findings of the study, personal knowledge and coordination are the most important safety management factors. It became essential for site managers to conduct enlightenment programs among their employees in order to familiarize them with the importance of safety awareness on the job. The literature advocated for the use of personal protective devices, as well as a decrease in manual labor without overlooking the proper use of equipment and resources.

Othman (2012) investigated the reasons and consequences of contractors' non-compliance with health and safety regulations in the South African construction industry. The following factors, according to the literature review, lead to contractors' not following health and safety regulations: Workers' inability to concentrate, and their failure to wear personal protective equipment, Staff believe personal protective equipment is unnecessary, improper use of PPE, outdated equipment and PPE, nature of the job, poor site management, a rough working climate, a lack of preparation, and a lack of safety compliance, to name a few.

Cost experts' perceptions of building health and safety regulations in Nigeria were investigated by Famakin & Fawehinmi (2012). According to the report, health and safety controls is lacked in the industry and problems such as poor quality, time overruns, cost overruns, worker absenteeism due to accidents, and others harmed project goals. Because of

its impact on project implementation, it was recommended that health and safety policies and programs be included in the design stage and continued through the completion stage.

The effect of the national building code on worker health and safety was investigated. The study looked at a variety of ways that a national building code would help builders practice and track the problems that come with safety policies in the construction industry. The findings revealed the significance of the National Building Code in terms of construction project protection and management. However, the study's focus did not include the adoption and enforcement of the code by the sampled construction firms, as well as the effect on those firms that followed the code's provisions. The level of consciousness among construction workers on safety practices has increased over the year, according to (Muhammad *et al.*, 2015); Ezeokonkwo & Ezeokoli (2016); Akinwale & Olusanya (2016).

Muhammad *et al.* (2015) looked at the financial impact of well-being and safety on construction projects. The study found a high rate of accidents in the Nigerian construction industry, as well as a high expense associated with damages and perils on the job site. Any effort to incorporate health and safety policies on construction sites, on the other hand, will boost the project's total cost. As a result, non-compliance with the regulation increases the total expense of the programs while also increasing the risk of injuries. According to the findings, the following actions should be taken: To ensure compliance with health and safety regulations, safety managers/supervisors must be named, and contractors that breach the policy should face substantial penalties.

2.10 Methods for Improving Workers Compliance with Safety Behaviour

No company or employee wants to be hurt, and no worker wants to be hurt. Most businesses genuinely want to run a healthy business where no one gets hurt. Companies say they are following all of the correct procedures in their safety programs. Meanwhile, there are many advantages of having a good safety culture (Smith, 2014). Companies with less casualties have better morale. It's fantastic. Companies with less casualties have better morale. It's always a good idea to encourage workers to take pride in their work, and safety is a great place to start.

According to Barboka (2016), both efficiency and safety should be treated as priorities that can be accomplished at the same time, so the following methods, when applied, can help employees follow without causing output to suffer, These include; 1) Setting targets and making them clear demonstrates management's belief in their employees.; 2) Staff may be engaged in a variety of ways, but the most effective is through monthly safety meetings. 3) Acknowledgement- Being recognized in front of colleagues for a job well done is a powerful motivator. 4) Encouragement- providing financial incentives to employees who perform exceptionally well may encourage others to do the same; 5) appreciation- safety offers a wonderful opportunity to express gratitude in an environment that is vital to all employees and the company's finances; 6) reputation- in order to build credibility, management must first meet the basics, such as reacting to safety hazards and making safety suggestions.

Barborka (2016) concluded that both efficiency and safety should be treated as priorities that can be accomplished at the same time, and that the following three methods, when implemented, can assist employees in following these goals without hindering production: 1) Emphasize safety in trainings- a successful safety program prioritizes safety from the start.

Incorporating safety issues into new hire orientation communicates to the employee that safety is a priority in your organization's culture and demonstrates your dedication to keeping employees safe. 2) Encourage open communication- In 2016, OSHA released a regulation prohibiting employers from discouraging workers from reporting injuries or engaging in behavior that falls under one of OSHA's 22 whistleblower rules. It also mandates that employers remind their employees of their right to report accidents when they happen. 3) Take advantage of digital technologies—by replacing old machinery or using digital record-keeping tools that monitor key safety indicators in all of your locations, you can increase safety and efficiency by using digital tools.

2.11 The Impact of Safety Behaviour on Construction Sites

Workers' awareness and comprehension of safety practices at work, according to Hassan *et al.* (2007) are critical in fostering safety among themselves on construction sites. One of the causes of accident on site has been attributed to skipping rules, and can be viewed under the action and human factor method. Construction workers are the primary cause of fatalities, according to the behavior approach, since they make an infinite amount of expensive errors at various stages of the building development process. The human factors approach, on the other hand, suggests that workers were the first victims of construction fatalities, not because of individuals' dangerous conduct, but because of the working environment.

Hinze & Gambatese (2003) conducted a study to determine the factors that influence specialty contractors' safety commitment. Three separate specialty contractor communities were surveyed using standardized e-mail questionnaires. The study however revealed that a specialty contractor's safety performance is often influenced by a variety of factors that minimize worker benefit. Staff morale, on the other hand, was not seen as a better indicator

of safety success. Training is recommended, and safety motivations should be approached with caution, according to the report.

2.12 Construction Site Accidents and Their Causes

An accident is described as an unanticipated incident with negative consequences that occurs without the victim's knowledge or consent. An accident, according to Hinze (1997), is an unplanned occurrence. Unwanted, unpredictable, and uncontrollable have all been used to characterize such an occurrence. An injury is not always the outcome of an accident. Any accident that causes significant injury or damages to equipment or products, on the other hand, should be taken seriously. All incidents should be taken seriously, in spite of the nature of the harm, since accidents that do not result in equipment, material, or personnel injuries can lead to significant damage or injury in the future.

Unsafe conditions and unsafe behavior are two factors that contribute to workplace injuries. According to a study conducted by Elufidipe (2009), the occurrence of injuries can be due to either unsafe working conditions or unsafe acts. The study also revealed that certain incidents occur when some operatives are given tasks that they are not qualified to do, such as asking operatives to handle tools and equipment or using safety wears that they have not been trained to use, which may lead to an accident. According to Idulor & Oisamoje (2013), disasters and casualties are considered as act of God, as well as a product of unknown causes, hazardous circumstances, and unsafe actions. On the other hand, Guldenmund *et al*. (2013) said that incidents occur due to bad omen or apathy.

As the word "accident" is used, it raises a number of issues in terms of accident prevention. For starters, the word is often associated with incidents that are thought to be outside the

control of the individuals involved. Regardless of how incidents are perceived, the best approach to prevention is to concentrate on the underlying cause. The second issue raised by the word "accident" is the widespread belief that an accident entails damage to equipment or materials as well as injuries to people. Many unplanned accidents occur without causing any harm or injury. Such accidents are not handled in the same manner as property harm or bodily injury are.

Meanwhile, Sherratt (2014) suggested that those who work in the sector are to blame for the industry's problems. On the other hand, Kolawole (2014) suggests that accidents occur as a result of worker indiscipline, poor communication, and site characteristics.

According to Lehaney *et al.* (2012), the causes of construction site incidents in Nigeria are due to a collapsed occupational safety system in the Nigerian construction sector, which can be traced to a lack of legislative regulations and provisions. Meaningful protection standards for construction workers have not been widely accepted, according to Dodo (2014).

Hinze (1997) described the following hypotheses of accident causation: 1) accident-proneness—the belief that when a group of people is put in similar circumstances, some would be more likely to suffer an injury than others; 2) goals-freedom-alertness theory: this theory holds that safe job success is the product of a mentally satisfying work environment; 3) The adjustment-stress theory notes that an environment that diverts workers' attention compromises healthy results. 4) The distraction theory notes that safety is situational, as mental distractions vary in nature, and responses to those distractions can need to differ for healthy output to occur; 5) According to the chain-of-events theory, incidents are often defined as occurrences that are the result of a sequence of events.

Attempt have been made by Researchers and Authors to explain the true cause of accidents especially on construction sites. While some have suggested that accidents are caused by combination of certain factors such as workers unsafe behaviour, others argued that accidents might be as an act of God or unknown causes. But little was said on why accident occurs on construction sites especially in Nigeria. In order to eliminate accident on our construction sites, managers and supervisors are advised to inculcate the habit of safety requirement in all their sites since workers on their part would not want to be injured while they are working.

2.13 Non-Compliance versus Accidents as Measures of Safety Performance

According to Arewa & Farell (2012), the term "health and safety compliance" has no clear meaning. It is also used to denote a strict adherence to health and safety laws and regulations. As a result, it can be deduced that the word "non-compliance" refers to a failure to follow safety laws and regulations. According to the UKGBL (2012), health and safety enforcement is a legal duty of all employers to everyone impacted by their companies, which includes: 1) conducting a comprehensive health and safety risk evaluation, 2) developing a health and safety policy for businesses with more than five workers, and 3) ensuring that work environments meet minimum standards of conformity and cleanliness, 4) Keeping track of serious injuries, illnesses, and potentially fatal events in an accident book. Workers' compliance with health and safety laws, according to Muhammad *et al.* (2015), would have a positive impact on evaluating workers' quality delivery and efficiency on construction projects. According to Ismail *et al*. (2012), demonstrating constructive safety initiatives would not only help to improve safety efficiency but will also result in a reduction in the incidence of accidents and the cost of handling them, improved collaboration, participation,

and coordination among management systems, employee ownership of safety, increased recognition of responsibility for safety, and better safety performance.

According to Taylor (2010), Injuries result from noncompliance with health and safety laws, which can cost a company up to 30% of its annual income. Furthermore, failing to ensure protection has a significantly higher social consequence. Accident frequency, according to Duff *et al.* (1994), is the most reliable indicator of safety efficiency. Elias *et al.* (2011) found that the financial advantages of enforcement on safety management plan outweigh the expense of injuries or safety in the event of adverse safety by a ratio of approximately 3:1 in a sample of 79 contractors of different sizes. As a result, according to Philips (2011), adherence to health and safety legislation would result in significant cost savings. Purvis (1999) argued that the United Kingdom businesses need to realize the value of good health and safety management, and that when businesses follow safety regulations, they will go from a loss to a profit.

According to a report by Arewa & Farell (2012) titled "An analysis of compliance with health and safety regulations and economic performance in small and medium construction enterprises," SMEs' dedication that many aspects of corporate success are affected by the commitment to health and safety, and they benefit from increased profitability at the same time. The study also found that in SMEs, the cost of correcting non-adherence to safety regulations is higher per accident than in larger corporations. The study did suggest, however, that health and safety regulatory bodies should continually and regularly emphasize the benefits of investing in health and safety to SMEs.

Manzella (2018) outlined six steps to introducing a move toward a safety framework that emphasizes conformance to existing methods and correction of system deficiencies in a

study titled "measuring safety efficiency to achieve long-term change." These steps include the following: 1) establish expectations, 2) establish goals, 3) reach an agreement, 4) hold each other accountable, 5) communicate, and 6) measurement.

It is just as necessary to measure a company's financial results as it is to measure its safety measures. The primary goal of evaluating a business safety performance is to provide critical information on the current state of the firm's health and safety policies, as well as the effectiveness of the company's plans and processes for mitigating health and safety risks. This is why when workers fail to comply with safety regulations and when management on their part fails to implement and enforce safety requirements, then there is every tendency for accident and casualties to occur.

2.14 The Consequences Due to Non-Compliance to Safety Requirements

Brueggman (2001) defines protection as "any related risks with a specific job being well handled in a specific manner. There is also systematic evidence of a high degree of routine breaches in the workplace. Many incidents and injuries are caused in part or entirely by various violations, such as the removal of guards from machinery. Some recent disasters have brought to light the extent to which abuses can become the standard. Because of their often-contentious existence, violations have not been reported routinely in most incident reports. As a result, the hard proof of injury statistics is useless. There is, however, ample evidence to indicate that they are a very common form of human error. Human errors cause 70-90 percent of accidents and injuries, according to the HSE Accident Prevention Advisory Unit, while violations are a significant contributor to industry risks and costs.

According to Ahmad *et al.* (2016), workplace safety focuses on reducing workplace injuries and their negative impact on employees in general. Safety practices, according to Famakin & Fawehinmi (2012), are a criterion for measuring efficient project execution that is most important to the client because they have a significant impact on achieving productivity and effectiveness among professionals and even staff in the field. In his study "the implications of non-compliance with OSHA regulations," Hyland (2018) stated that in America, companies that breach occupational safety and health administration regulations may face a variety of penalties, some of which are definite and easy to quantify, and others that are less quantifiable but still actual. In addition to any OSHA fines, employers risk incurring legal costs to resolve lawsuits brought by injured workers, the estates of employees killed as a result of an in fracture, and other possible penalties. According to a new survey of executives conducted by the American Society of Safety Engineers (ASSE), for every dollar spent on direct injury costs, three to five dollars are spent on indirect costs, putting the total expense of an accident (with direct care and compensation costs of $15000) anywhere between $45000 and $75000.

According to a study conducted by Martinelli (2017) titled "What are the Effects of Bad Health and Safety Practices," a poor health and safety culture can be devastating for business, customers, and workers, so it's critical to spend time and money to get it correct. Injuries and deaths are prevented when a proper health and safety mechanism is installed at every workplace. A work-related illness or accident can affect an employee's quality of life as well as the company's image, efficiency, and finances, all of which can be difficult to recover from. A strong reputation is also critical to every company's success. It would attract more buyers and employees, as well as a more positive community view of the owner's

business and a larger number of people eager to join the team. However, a poor safety regulation could jeopardize the company's reputation.

When safety policies are strictly enforced, staff are empowered and have some level of assurance that they will be safe from all types of incidents and casualties. Awwad *et al.* (2016) investigated the traditions and problems of construction safety in a Middle Eastern developing country. With building professionals, insurance companies, and government departments, a one on one survey was conducted using a standardized questionnaire. The study's results, however, revealed that while there is a construction labor safety regulation, it is not being implemented properly, there is no oversight, there is a lack of safety knowledge, and there is insufficient cooperation from all parties involved in the implementation of safety programs on construction sites. The study did, however, call for increased awareness among construction companies, which might help to alleviate these issues.

“Safety measures on construction sites: a case study of Minna, North Central Nigeria,” carried out by Kolawole (2014). The study looked at the safety strategy used by construction companies in Minna, as well as whether enforcing safety regulations eliminates workers' claims for accidents on the job or motivates them to perform better. The study's population was chosen at random from construction firms using copies of a structured questionnaire. Construction workers value "safety training" because it improves their efficiency and reduces workplace injuries, according to the report, and the government lacks a well-defined safety act for construction activities. The study recommended that employers educate and retrain their employees on the importance of safety procedures, and that the government adopt and implement a "safety act" to control site-based injury.

Idoro (2011) investigated the impact of mechanization on the Nigerian construction industry's Occupational Health and Safety (OHS) results. The degree of mechanization in the industry and its relationship to Occupational Health and Safety (OHS) quality, as well as the effects of mechanization on OHS performance and the contractors' commitment to good OHS compliance, were investigated in this report. Questionnaire was used, and percentages, means, t-tests, and Spearman's correlation tests were used to evaluate the data. According to the report's results, the rate of incidents and injuries increased as mechanization increased. According to the study, failure to effectively handle mechanization on project sites wreaks havoc on OHS performance. l. However, before implementing new or additional safety wears, managers of construction should formulate appropriate measures to ensure OHS production is regulated.

Agwu (2012) investigated total safety management, a method for enhancing organizational efficiency in Nigerian construction firms. The study used a stratified and random sampling technique for the copies of the questionnaire distributed among the selected six most prominent construction firms operating in Nigeria. The selected firms include: (Julius Berger PLC), Setraco Nigeria Ltd, Fourgerolle Nigeria Ltd, Arab-Contractors Nigeria Ltd, Dantata & Sawoe Nigeria Ltd & Costain Nigeria Ltd). The findings indicated that incorporating total safety management into organizational strategy would improve construction project safety practices. The study concluded that, in order to retain the benefit of complete safety practices in Nigeria, operatives must maintain good attitudinal conduct and systemic changes in construction management.

Okoye *et al.* (2016) investigated the health and safety experience and compliance of building construction workers in Anambra State, Nigeria. The data was randomly collected from

fifteen (15) construction sites in the study area and analyzed using the Mean Score Index and Pearson's Product-moment Correlation Coefficient (r). According to the study's findings, however, bad project results were caused by a lack of safety knowledge and compliance among the site's operatives.

According to the report, awareness and compliance with health and safety standards are insufficient to achieve optimal project performance; instead, safety culture, which includes the following factors, is required: job commitment, management commitment

Daily inspections, reporting, incident review, follow-up, enforcement, acknowledgment, and award are the main components of a compliance regime. The framework should place a greater emphasis on fact-finding rather than fault-finding. While changing behaviors and cultivating a compliance culture can be difficult, management should make every effort to ensure that employees adhere to the rules. To ensure that everyone is aware of the rules for safe behavior and the consequences for any violations, they should be outlined clearly in advance. If employees are aware that breaking these laws has severe consequences, they will make every effort to prevent such consequences and penalties.

2.15 The Importance of a Safe Working Environment in the Delivery of Projects

Dingsdag *et al.* (2007) evaluated the abilities, attitudes, emotions, and awareness of construction participants that contribute to safety culture in order to recognize and define employees' views to assess organizational health and safety competency on construction sites. The study used a structured questionnaire sent via e-mail and self-addressed pre-paid envelopes to collect the required data. According to the results of the report, workers have four most "influential safety critical positions" at construction sites rather than at head office:

Workers' perspectives on the promotion of a safety culture through training and education, a thorough understanding of rules and regulations, effective communication and interpersonal skills, and attitudes and actions that could enforce and track safety. It was recommended that workers' training be improved, as well as that safety standards be improved.

Workers' awareness and comprehension of safety practices at work, according to Che Hassan *et al.* (2007) & Shamsuddin *et al*. (2015), are critical in fostering safety among themselves on construction sites. Worker absence is a cause of construction accidents, according to Shamsuddin *et al.* (2015), and can be viewed under the action and human factor method. Construction workers are the primary cause of fatalities, according to the behavior approach, since they make an infinite amount of costly errors at various stages of the building development process. The human factors approach, on the other hand, suggests that workers were the first victims of construction fatalities, not because of individuals' dangerous conduct, but because of the working environment...

Hinze & Gambatese (2003) conducted research to identify factors that influence specialty contractors' safety commitment. Via standardized questionnaires sent via e-mail, three separate specialty contractor populations were surveyed. The findings of the study indicate that a specialty contractor's safety performance is often influenced by a variety of factors that minimize worker benefit. Staff morale, on the other hand, was not seen as a better indicator of safety success. Training is recommended, and safety motivations should be approached with caution, according to the report.

A research by Cheng *et al.* (2011) looked at the effect of practicing safety on construction production. The construction gaffers classified safety management mechanism as the most significant, followed by safety management knowledge and committees. However, when the

effect of the "three safety management practice categories on the performance of a composite project was tested, it was discovered that the safety management knowledge and safety management panel categories had a positive impact on project performance. According to the report, the building industry should use safety committee to manage site safety.

2.16 Strategy for Controlling Construction Safety Practices on Sites

One of the real needs to improve construction project safety, according to Bust *et al.* (2014), is to enhance professionals' engagement in safety practices and the use of awareness systems, which must be put in place and demonstrated by the operatives. Manager that has been trained to understand safety regulations should be employed on any construction site to ensure that operatives' behavior and activities are compliant with safety standards, and that his or her job would have a positive impact. As a result, safety managers should be given the authority to carry out their responsibilities in the safety management system.

Traditional usage of the external approach to safety is fair enough for making safety procedures, but it overlooks how the inside characteristics of the worker and the relationships affect work practices and influence the risk of errors and injuries.

Agwu and Olele (2014) investigated construction-related deaths in Nigeria. The study concluded that incorporating a positive safety culture into the Nigerian construction industry by devoting in machines and technology (socio-technical investments) would result in improved employee safety (lower number of dangerous acts) and company efficiency (reduced rate of fatalities). The respondents were chosen at random from twelve construction industries, two from each of Nigeria's six geopolitical zones, and the study lasted a year. In

the Nation’s built sector, there is a noticeable difference between a low safety culture and an increased number of fatalities. Daily staff training, according to Agwu & Olele (2014), could develop hazard detection skills, involve employers and employees in resolving safety-related issues, establish constant site safety, safety committees, and eliminate possible workplace hazards, as well as make hazard identification/reporting everyone's responsibility.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Research Design

A research design is a blueprint for evaluating a study's outcome appropriate to exert control over variables that could undermine the findings' genuineness Burns & Grove (2013). This study adopts a descriptive survey approach in assessing the safety behaviour of workers on construction sites in Abuja, Nigeria. This technique was used with the aid of a well-structured questionnaire aimed at construction Safety Representatives. Since the collection of information will only be one case and at a particular point in time, the authors decided that survey analysis was sufficient.

3.2 Population of the Study

The term "research population" refers to a group of people or things to which the results of a study could be applied uniformly (Koul, 2001). This category often shares a shared trait that the researcher is interested in learning more about in the analysis. The population of this study are safety Representatives drawn from professionals of the construction industry and other allied industry who have been trained and obtained professional certification in health and safety management who are particularly practicing in firms in Abuja, Nigeria. The city of Abuja was chosen because it has been dubbed one of the fastest growing cities in Sub-Sahara Africa, with numerous infrastructure projects currently underway. However, only safety representatives who work for construction companies who have a safety management plan as one of their strategies were sampled. This is because the study focuses on the issue of compliance with safety requirements by workers on construction sites. The population for

this study is 210 respondents which was achieved from the register of the Institute of Safety Professionals Abuja Chapter.

3.3 Sampling Frame

A broader population sampling technique is commonly used to produce accurate statistical data and generalize a research result. The sourced material or system from which a sample is taken is referred to as a sample frame. It is a list of all those inside the population under investigation that are used to calculate sample size (Osuala, 2005). The sample frame for this study comprise construction Safety Officer = 90 and Safety Representatives = 120.

3.4 Sample Size

Any empirical study that aims to draw inferences about a population from a survey must take sample size into account. Due to the researcher's desire to examine the whole population and the study's short duration, assessing sample size is extremely difficult. A number of Construction sites were identified around the study area which in this case is Abuja, but however, only 25 sites were selected due to the fact that construction activities were on-going on each of the selected site as well as the sites compulsory implementation of the safety management scheme. The sample size was calculated using the study's total population, which in this case is 210 respondents. This value of 210 was subjected to the formula established by (Yamani, 1986). The formula is thus given as;

$$n = N / 1 + N (e^2)$$

(3.1)

Where;

n is required sample size

N is population size

e is error in percentage (5%)

$$n = \frac{210}{(3.2)} = 137$$

$$1 + 210\ (0.05^2)$$

137 structured questionnaires were distributed out of which 110 were the returned copies and 100 of these returned copies were found useful the analysis representing 73% of the response rate.

3.5 Sampling Techniques

Researchers can use statistical sampling techniques to determine the number of subjects that can be included in the survey, the type of sampling techniques used, the length of the analysis, the number of materials used, ethical issues, topic and sample availability, the need for the study, and the amount of workforce required. This research used both probability and non-probability methods.

The study also needed information from active construction sites, rather than the total number of construction companies in the study field. However, in order to minimize respondent bias and ensure proper representation of the target population and data consistency, questionnaires were directly administered to the respondents.

3.6 Data Collection and Instrument

Testing instruments, according to (Ojo, 2003), are methods used to gather data for a proposed study in order to test hypotheses and provide answers to research questions. Primary and secondary data were established as being essential to the successful conduct of this study.

The research information for this analysis was focused on data obtained from a sample of the population under study, in accordance with the primary data. Questionnaire was used to accomplish a success in the researcher's investigation. The questionnaire was well-structured in plain English to allow for easy comprehension of the questions and the best possible outcome.

3.7 Data Analysis

When the questionnaire survey approach is used, the entire analysis process typically includes measurement and interpreting descriptive analysis, according to Ofo (1999). The data was presented and analyzed using the statistical package for social sciences (SPSS v21) and descriptive and inferential analytical methods such as frequency percentage distributed table, mean, and Relative Important Index for the purposes of this study.

3.7.1 Demographic information

The demographic information in this analysis offers general information on the survey participants. To summarize the information provided by the participants, descriptive statistics were used. The demographic data does not answer particular concerns, but rather offers general information about the workers. Education history, respondent years of experience, and respondent gender are examples of such detail.

3.7.2 Frequency distribution tables

It's typically set up in rows and columns, each with its own set of data. This was used in the research to show both collected and analyzed data. To put it another way, frequency distribution tables was used to generate the distribution characteristics of the variables from

which data was analyzed. In addition to frequency and percentage distribution, descriptive statistics such as mean and standard deviation were used.

3.7.3 Relative important index

Variables are rated against a scale in the relative Important Index measure to aid in determining the importance of each element. To evaluate the ranks of the different factors, the scale was transformed into an index known as the Relative Important Index (RII) for each factor. The Relative Important Index or RII formula was used in this study's analysis, and it is calculated as follows:

$$RII = \frac{1n_1+2n_2+3n_3+4n_4+5n_5}{5(n_1+n_2+n_3+n_4+n_5)} = \left(\sum_{i=1}^{5} W_i \times F_{xi}\right) \quad (3.3)$$

Where n1-n5 denotes the lowest to highest integer.

$$RII = \left(\sum_{i=1}^{5} W_i \times F_{xi}\right) x\frac{100}{N} \quad (3.4)$$

Where, **w**= the weight age of the respondents **i =** 1, 2, 3, 4, 5

F_{xi}**=** the frequency of every respondent

F_{x1}= lower integer up to F_{x5}= highest integer

N = total number of respondents

The first and second formulas are derived from (Tawil et al., 2011). According to previous research, the mean and standard deviations are ineffective statistics for determining a

phenomenon's overall rating. Based on the Relative Importance Index (RII) provided a consistent descriptive interpretation to the critical factor. RII values are interpreted as follows: RII<0.60: Connotes item has low rating. 0.60≤ RII ≤ 0.8: Connotes item has high rating. RII ≥ 0.80: Connotes item has very high rating.

3.7.4 Regression analysis

Regression is a method for determining a statistical relationship between two or more variables. The simplest type of regression, known as linear regression, depicts the values of the independent variables (denoted by X) and dependent variables (denoted by Y) plotted on a graph (denoted by Y). The result is a dot pattern. The aim of regression is to find a straight line that better represents the relationship or other variables by fitting a straight line through the dots. The “least square” approach is widely used, in which individual point deviations from the chosen lines are held to a bare minimum. The equation for the straight line is usually written as Y = a + bx where “a” is the intercept of the straight line.

CHAPTER FOUR

4.0 RESULT AND DISCUSSION

4.1 Demographic Information of the Respondents

According to Table 4.1, 88 (88.0%) of the respondents had an HND/B.SC certificate, while 12 (12.0%) had an M.sc/M.Tech/M.Eng or higher. As a result, the respondents were deemed highly competent and experienced to respond to the questions.

In addition, 96 (96.0 percent) of the respondents were men, while only 4 (4.0 percent) were women, indicating that men outnumbered women as safety representatives. Meanwhile, the percentage distribution of their age brackets revealed that 39 (39.0%) of the respondents are between the ages of 20 and 29, 41 (41.0%) are between the ages of 30-39, 15 (15.0%) are between the ages of 40 and 49, and 5 (5.0%) are between the ages of 50 and 49.

Finally, 82 (82.0%) have more than 5 years of work experience, while 18 (18.0%) have less than 6 years of industry experience, indicating that a significant number of them have a strong understanding of the construction industry. Also, the number of safety Representatives per site was explored. The table 4.1 shows that 100 (100.0%) of the respondents have at least two or more safety Representatives for each of their site.

Table 4.1: Background information of respondents

Category	Respondents	
Demographic information	Frequency	Percentage
Academic qualification		
HND / B.SC	88	88.0%
M.SC and Above	12	12.0%
Gender		
Male	96	96.0%
Female	4	4.0%
Age Group		
20-29	39	39.0%
30-39	41	41.0%
40-49	15	15%
50 and above	5	5.0%
Years of experience		
1-5 years	18	18.0%
6-10 years	67	67.0%
11-15 years	13	13.0%
16years and above	2	2.0%
Number of safety Representative per site		
1	0	0.0%
2	50	50.0%
3	35	35.0%
4 and above	15	15.0%

Source: Researcher's field survey (2019)

4.2 The Extent to which Workers Complied with Safety Behaviour

Table 4.2 illustrate the level of compliance with safety behaviour on site by workers on a Likert scale 1-5 to test respondent's opinion on the listed variables (where 1= never, 2= seldom, 3= sometimes, 4= often, 5= always).

The table ranked and compared the mean scores of the respondent's perceptions on the level of compliance with safety requirements on construction sites by workers. The first five highest scores on the list of compliance with safety requirements by workers were: the use of safety wears (MIS, 4.82) and is followed by work on scaffolds with guard rails (MIS, 4.81), request for replacement of damaged personal protective equipment (MIS, 4.80) in the 3rd position, use of safety nets for building whose heights exceeds nine (9) meters (MIS, 4.65) in the fourth position, working on scaffolds that is totally boarded (MIS, 4.63) in the 5th position.

However, the following had the three (3) lowest mean responds; avoiding the use of mobile device while on duty (MIS, 1.74), and reading safety rules before undertaking tasks (MIS, 2.32) and adherence to instructions issued by safety Representatives (MIS, 3.88) this implied that majority of the workers do not take some of these safety rules seriously and this might significantly affect the safety management plan as a default to one of the rules is also a default to the entire rules.

Table 4.2: Extent to which Workers complied with Safety Behaviour on construction sites

Variables	MIS	SD	Rank
Use of safety wear.	4.82	0.218	1st
Working on scaffolds with guard rails.	4.81	0.215	2nd
Requesting for replacement of damaged PPE.	4.80	0.212	3rd
Use of safety nets for building whose heights exceeds 9.00 meters.	4.65	0.167	4th
Working on scaffolds that is totally boarded.	4.63	0.161	5th
Climbing scaffolds only when ladders are provided.	4.57	0.143	6th
Use of ladder that is tied and secured properly.	4.54	0.133	7th
Attending safety briefings.	4.21	0.064	8th
Use of non-defective ladder when climbing heights.	4.20	0.092	9th
Non-adherence to alcohol.	3.98	0.086	10th
Adherence to instructions as issued by safety Representative.	3.88	0.066	11th
Reading safety rules before undertaking tasks.	2.32	0.536	12th
Avoiding the use of mobile device while on duty.	1.74	0.711	13th

Source*:* Researcher's field survey, (2019)

4.3 Factors that Influence Workers Compliance to Safety Behaviour on Site.

The second objective identify some of the factors that influence worker's compliance with safety requirements on construction sites on a Likert scale 1- 5 to test respondents' opinion on the listed variables where (1= not affected, 2= less affected, 3= sometimes affected, 4= moderately affected, 5= mostly affected).

Table 4.3 presents the relative important index of the responses on the factor that affects worker's compliance with safety requirements on site. The five top ranked scores from the RII are the following; lack of quality knowledge on hazards management by workers (RII, 0.940), workers are not rewarded for effective compliance with safety requirements (RII, 0.936), workers see compliance to safety rules as a delay in achieving task (RII, 0.936), safety wears are not comfortable to workers (RII, 0.926), workers influence each other by their improper conduct (RII, 0.906).

In contrast, respondents argued that the following are the least factors that affect compliance to safety behaviour; workers do not comply to safety rules due to religion and traditional believe with a very low RII (11^{th}, 0.140). This imply that traditional or one's religion believe do not stop workers from complying with safety requirements while they are engaged. Another factor which the respondents argued on was, there are few safety Representatives to cover the large amount of workers on site (10^{th}, 0.740), this also implies that safety representatives will have a significant impact on worker conduct and compliance with safety regulations; however, this will only happen if there are enough safety representatives to closely track the vast number of employees who are employed at the same time. Safety representatives must continuously communicate the importance of adhering to all safety standards at all times, as this will help to avoid accidents and other potential injuries on construction sites in the long run.

Table 4.3: Factors that Influence Compliance to Safety Behaviour by Workers on Site

Variables	RII Rank
Lack of quality knowledge on hazard management by workers.	0.940 1st
Workers are not rewarded for effective compliance with safety rules.	0.936 2nd
Workers see compliance to safety rules as a delay in achieving task.	0.936 2nd
Safety wears are not comfortable to workers.	0.926 4th
Workers influence each other by their improper conduct.	0.906 5th
Workers are not motivated by the nature of their work environment.	0.894 6th
There is an ineffective communication between Workers and safety Representatives.	0.880 7th
Workers are not punished when they default safety requirements.	0.872 8th
Lack of training on key issues as regards safety requirements.	0.852 9th
There are few safety Representatives on each site to monitor the amount of Workers on duty.	0.740 10th
Workers do not comply to safety rules due to religion and traditional believe.	0.140 11th

Source*:* Researcher's field survey, (2019)

4.4 Method for Improving Workers Compliance to Safety Practices

The third objective of the study identified the strategies which may improve workers level of compliance with safety requirements. Respondents were asked to give answers to the identified variables on a Likert scale of 1- 5 (where 1= very insignificant, 2= of less significant, 3= slightly significant, 4= moderately significant, 5= very significant).

According to table 4.4, the variables with the highest mean scores are safety wears must be worn by workers before being engaged is 1st on the list with (MIS, 4.60) and it is followed by workers should be adequately trained on key issues as regards safety before being engaged (MIS, 4.58), workers with disability should not be hired for works that require special attention came 3rd with (MIS, 4.57), the 4th is workers should be tested for alcohol and other hard drugs before engaged (MIS, 4.52), workers should surrender all mobile device before engaged to work (MIS, 4.52) is the 5th position. There was a strong agreement amongst respondents as regards the strategies for improving worker's compliance with safety requirements, respondents believed that if safety wears are worn constantly there is every tendency that accident and other casualties can be avoided from taking place on site. Also, it is believed that adequate training of workers before and after recruitment can play a vital role in assuring compliance with safety requirements by workers on construction sites. The respondents also agreed that workers who are physically challenged should not be hired for works that requires special attention especially for works that involves climbing of height or working on a roof top this can be very dangerous to such workers. Drinking of alcohol before work have often be peculiar with site workers and has led to various accident on site, therefore a constant test which should be undertaken by workers before being engaged to work will go a long way in avoiding these menace that berates our job site. Finally, it is also believed that if workers are requested to drop their mobile device before being engaged then workers will be more focused on the job and avoid all distractions which may affect their total concentration while working.

On the contrary the three least scores on the list include workers should be rewarded for effective compliance to safety rules (11th, 4.17), site must be arranged before the

commencement of work (10th, 4.26) and workers should be punished for violating safety rules (9th, 4.41).

Table 4.4: Method for Improving Workers level of compliance to Safety practices

Variables	Mean	SD
Rank		
Safety wears must be worn by workers before being engaged. 1st	4.60	0.042
Workers should be adequately trained on key issues as regard safety before being engaged. 2nd	4.58	0.036
Workers who are physically challenged should not be hired for works that requires special attention. 3rd	4.57	0.033
Workers should be tested for alcohol and other hard drugs before being engaged to work. 4th	4.52	0.018
Workers should surrender all mobile device before being engaged. 4th	4.52	0.018
Workers must be motivated by their working environment. 6th	4.50	0.012
There should be effective communication between safety representatives and workers. 7th	4.49	0.009
More safety representatives should be provided to cover the amount of Workers on each construction site. 8th	4.48	0.006
Workers should be punished for violating safety rules. 9th	4.41	0.015
Site must be properly arranged before the commencement of work. 10th	4.26	0.060
Workers should be rewarded for effective compliance with safety rules. 11th	4.17	0.087

Source: Researchers Field Survey, (2019)

4.5 Impact of Workers Safety Behaviour on Construction Sites

The fourth objective explored the effect of Construction Worker safety behaviour on construction site. Eleven (11) variables were listed for respondents to score accordingly using Likert scale 1- 5 (where 1 = never, 2= seldom, 3= sometimes, 4= often, 5= always).

Table 4.5 shows that there was agreement amongst respondents on the impact of safety behaviour on construction sites as eight out of the eleven variables have overall mean scores that is above the (4.00) scale. It is believed that safety behaviour prevent accident and other casualties on site (1^{st}, 4.81), avoid unnecessary compensation due to accident (2^{nd}, 4.75), workers work with ease (3^{rd}, 4.67), uphold company's reputation (4^{th}, 4.62) and workers are motivated (5^{th}, 4.57). When site operatives (workers) adhere to all safety regulations while they are engaged it will go a long way in preventing accidents and very serious casualties from occurring on construction for no worker want to be injure especially when they are on the job and no company will be happy to spend money unnecessarily as compensation due to accident. Also, when there are few or no accident on site, workers will be willing and confident to work as the fear of getting injured or even being killed while on the job would not be entertained. No organization will be happy if her name is found on the pages of newspaper for a negative reason as every organization would love their reputation be held on high esteem, therefore, if organizations want to achieve this, then workers must act correctly while on the job. They must ensure all safety rules are strictly followed without any compromise. Finally, according to the respondent, safety behaviour motivate workers and motivation increases productivity, therefore organization must put in every available resource in ensuring that safety requirements are maximized on site if they really want an increase in their output.

However, respondents argued that safety behaviour cannot really reduce the overall cost of the project with a very low mean score of (3.88), this may mean that other parameters such as cost control, cost plan, value management etc. are the reason why the overall cost of a project can be reduced.

Table 4.5: Impact of Workers Safety Behaviour on Construction Sites

Variables	Mean	Rank
Prevent accident and other casualties on sites.	4.81	1st
Avoid unnecessary compensation due to accident.	4.75	2nd
Workers work with ease.	4.67	3rd
Uphold company's reputation.	4.62	4th
Workers are motivated.	4.57	5th
There is a lesser amount to legal action.	4.54	6th
Workers confidence level is high.	4.46	7th
Project are delivered on time.	4.20	8th
Guarantees quality of work delivered.	4.19	9th
Organization is rewarded with more jobs.	3.98	10th
Reduces overall project cost.	3.88	11th

Source: Researcher's field survey, (2019)

4.6 Test of Null-Hypothesis

Ho1: Safety Compliance has no substantial impact on construction sites.

INFERENTIAL ANALYSIS

Table 4.6 illustrate statistical inference between compliance to safety Behaviour and the impact of safety behaviour on Construction sites. A Pearson product-moment correlation coefficient was computed to assess the relationship of the statistical inference between Compliance to safety behaviour and impact of safety Behaviour of workers on construction sites.

The correlation table however revealed the mean between both variables as X1 and X2 respectively. The mean value of X1=4.2945 at a standard deviation of SD=0.80079 while that of X2=4.4245 at a standard deviation of SD=0.31437 and both variables have the same number of population (N= 100). The correlation coefficient was observed to be > 0 where r = 0.821, thereby indicating a positive relationship exist between both variables. P = 0.002 value was observed to be < 0.005, this thus led to the rejection of the Null-hypothesis.

Table 4.6

	Variable	**N**	**Mean**	**S.Dev**	**r**	**P.(Val)**	**Strength of relationship**	**Inference remark**	**Action on Hypothesis**
Compliance	X_1	100	4.2945	0.80079	0.821	0.002	Strong	SS	Reject H_0
Impact	X_2	100	4.4245	0.31437					

Source: Researcher's Survey, (2019)

4.7 Discussion of Results

This section discusses the results of this research by linking the results to the existing literature.

4.7.1 Extent to which Workers Complied with Safety Behaviour on Site

Workers wore safety gear, worked on scaffolds with guard rails, demanded replacement of damaged personal protective equipment, used safety nets for buildings taller than nine meters, and worked on fully boarded scaffolds, according to the findings of the study.

However, the least ranked variables include avoiding the use of mobile device during work hours, reading of safety rules by workers before being engaged, following all instructions as issued by safety representatives, non-adherence to alcohol and the use of non-defective ladder when climbing heights. It is important to state that, it has been a common practice by workers especially on construction sites to operate their mobile device while they are being engaged and this thus have led to so many casualties to such workers. Finally, if any of the safety rules are broken by staff, the safety management plan would be incomplete. This is in line with a study conducted by Okoye *et al.* (2016), which found that low safety awareness and enforcement among workers resulted in poor project results.

4.7.2 Factors that Influence Compliance to Safety Regulations

The study outlined the factors that influence worker adherence to workplace safety regulations. Workers failed to comply with safety requirements for the following reasons, according to the study: they are not compensated for successfully complying with safety requirements, they lack quality information on hazard management, and they perceive compliance with safety regulations as a pause in achieving their goals, workers consider

safety wear as a burden and achieving their daily task and workers influence each other by their behaviour. However, the respondents do not believe that compliance with safety rules are caused by religion belief, meaning one's traditional or religious belief should not be the parameter in determining the reason why workers behave the way they behave while on duty. The results also show that if workers are well-informed about hazard detection and management, they would be more aware of the value of detecting and reporting all hazardous conditions on the job site to the appropriate authorities.

A back up to this is in line with a study carried out by Othman (2012) which studied the Causes and effects of Contractors non-compliance with health and safety regulations in south African construction industry, Workers' lack of focus, failure to wear personal protective equipment by workers, workers' perception that personal protective equipment is unnecessary, inappropriate use of PPE, outdated equipment and PPE, nature of the job, and poor site conditions were all listed as causes of non-compliance with health and safety regulations by contractors in the literature review.

4.7.3 Method for improving Compliance to Safety Behaviour

The study here identified the strategies for improving worker's level of compliance to safety behaviour. The study found that worker's compliance to safety requirements is improved only if workers are adequately trained on key issues that involves safety management especially before the engagement of workers. This is in line with the study conducted by Barboka (2016) which highlighted the three substantive methods (encouraging open

communications; trainings; and taking advantage in digital technologies) can improve compliance to safety behaviour and also improve efficiency on construction sites

Another strategy for improving compliance with safety rules is that workers should be tested for alcohol before being engaged to work, this way workers who are filled with alcohol and are likely to be involved in an accident due to the alcohol taken can be singled out from the rest and avoid all necessary distraction due to casualties that may affect the work. Also, safety wears must be worn by all workers at the entrance of the construction site before the commencement of work. Finally, employees must be inspired by their workplace. Before the start of the day's work, the appropriate apparatus and equipment must be set up and checked by safety representatives; this would prevent accidents and other injuries from affecting the workforce.

4.7.4 The Impact of Safety Behaviour on Construction Sites

The study finally examined the impact of safety behaviour on construction site. According the respondents, the importance of safety requirements in the order of their hierarchy are; accident and other related casualties are prevented on site, unnecessary compensation due to accident are avoided, workers work without fear of being injured, workers will be motivated when performing their task, company's reputation is maintained in the positive way, there may be no need for dispute resolution due to litigation among others all these are in line with the study as carried out by Ismail *et al.* (2012) according to the study, the safety management scheme provides the industry with substantial opportunities and benefits; reduced workplace risks, increased efficiency, less injuries and legal challenges, improved standing among clients and partners, and, of course, cost savings, quality assurance, and on-time project performance are just a few of the advantages. However, respondents argued that safety

behaviour only cannot bring about into cost reduction in a project or even organization being awarded for more jobs due to effective safety management scheme, they believed other parameters must be added for all these to be achieved.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The aim of this study was to determine how construction site workers in Abuja behaved in terms of safety. The study used a survey design methodology to investigate the extent to which workers complied to safety behaviour on construction sites, the factors that influence workers' compliance with safety behaviour, and the techniques that can help workers comply with safety behaviour. The study's findings revealed that while workers in the study area followed certain safety clauses/rules, they did not maintain the same level of compliance with other rules that they did not believe were necessary. Safety management scheme is incomplete if all the safety requirements are not strictly followed. Ignoring any of the rules will jeopardize the success of the entire scheme.

Some construction firms see safety management scheme as a scheme which might be too expensive to implement. They fear the scheme might take some proportion of their income but they however forget to consider the cost of compensating an injured worker or even paying off the family of a dead worker, the delay such accident may cause in delivering the project within schedule, the confidence level of workers, the quality of work that will be delivered due to fear of uncertainty as a result of working on a hazardous condition; may take a greater portion of their revenue at end of the day if the scheme is ignored. As a result, construction companies must revisit their safety procedures and take a holistic approach to addressing some of the important questions posed about safety practices, which has become a major concern for the industry in recent years.

5.2 Recommendations

It is very appropriate to make some recommendations which aroused from the findings of the study as well as the review of certain literatures. The following are therefore recommended;

i) The study has shown the role which safety Representatives can play in influencing both the behaviour and attitudinal character in complying with safety requirements therefore, the roles and functions of safety representatives must be spelt out.

ii) Site operatives must be educated on key issues related to hazard detection and management; additionally, companies do not presume that newly hired employees already know how to handle their health and safety techniques; instead, firms should ensure that newly hired employees are trained before they are hired. However, it is critical to ensure and demonstrate that this training is successful, and that the safety messages are translated to the job site, resulting in healthy behaviour and better safety management.

iii) However, on-site safety instruction, the distribution of safety booklets in a variety of languages, and good waste management can also help to keep accidents to a bare minimum.

iv) Workers should be punished when they violate safety rules and should be rewarded when they effectively comply to same safety rules.

v) Safety wears must be worn before the commencement of work.

vi) It is proposed that more safety representatives be employed to protect the entire population at a large site with many employees but few safety representatives to cover the entire population.

5.3 Contributions to Knowledge

From the findings, the following are the contributions of the research work to existing knowledge:

1. The study revealed the level of compliance to safety behaviour by construction Workers on site.
2. The study expressed the various factors that affect Workers compliance to safety behaviour on construction sites.
3. The study has also increased the understanding of the strategies that would help to improve Workers compliance to safety behaviour which will assist in preventing the occurrences of accident and casualties on our job sites.
4. Finally, the study gave an insight about the impact safety behaviour can have on construction sites.

5.4 Area for Further Research

The study recommends the following further research;

1. Further study could be conducted to determine the effect of accidents on the overall project cost.
2. Further study could also be carried out to determine the level of participation to safety requirements by Construction management team.
3. The cost of accident versus the cost of safety management system on construction projects in Nigeria

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Appendix: QUESTIONNAIRE

Department of Quantity Surveying,

School of Environmental Technology,

Federal University of Technology,

Minna, Niger state.

Dear Sir/Madam

A QUESTIONNAIRE ON "ASSESSMENT OF SAFETY BEHAVIOUR OF WORKERS ON CONSTRUCTION SITES".

This survey seeks to assess the safety behaviour of Workers on construction sites in Abuja, Nigeria, in partial fulfillment of the requirements for the award of a master of Technology degree in Quantity Surveying of the above named institution. However, the findings of this study will solely be used for academic purposes and the confidentiality of Respondents is highly guaranteed.

I humbly request you spare me some time out of your busy schedule to give sincere answers to the following questions. I will be very grateful if this request is granted to me.

Sincerely yours

Godwin Anoh

GUILDING INSTRUCTIONS

Please tick, circle, or give a brief answer where necessary to the following questions.

SECTION A (BACKGROUND INFORMATION OF RESPONDENTS)

1. What is your highest level of academic qualification?

   (a) SSCE (b) OND (c) HND/B.SC/TECH/ENG (d) M.SC/TECH/ENG and Above

2. What is your gender?

   (a) Male (b) Female

3. Please indicate the age group you belong to.

   (a) 20-29 years (b) 30-39 years (c) 40-49 years (d) 50 years and above

4. How many years of experience do you have in construction?

   (a) 1-5 years (b) 6-10 years (c) 11-15 years (d) 16 years and above

5. How many safety Representative(s) are attached at each site in your establishment?

   (a) 1 (b) 2 (c) 3 (d) 4 and above

SECTION B (LEVEL OF COMPLIANCE WITH SAFETY BEHAVIOUR ON SITE BY WORKERS)

Please tick any of the component on a scale of 1-5 where you think is applicable; where 1= never, 2= seldom, 3= sometimes, 4= often, 5= always

s/n	QUESTIONS	1	2	3	4	5
(i)	Use of safety wears					
(ii)	The use of personal protective equipment					
(iii)	Working with scaffolds that is totally boarded					
(iv)	Working on scaffolds with guard-rails					
(v)	Climbing scaffolds when ladders are provided					

(vi)	Using ladder that is tied and secured properly					
(vii)	Using a good ladder when climbing heights					
(viii)	Using safety nets when provided for building whose height exceeds 9 meters					
(ix)	Non adherence to alcohol					
(x)	Avoiding the use of mobile device during working hours					
(xi)	Following instructions as issued by safety officers					
(xii)	Reading safety rules before undertaking tasks					
(xiii)	Attending safety briefing					

SECTION C (FACTORS THAT INFLUENCE WORKERS COMPLIANCE WITH SAFETY BEHAVIOUR ON SITES)

Please tick any of the component on a scale of 1-5 where you think is applicable; where 1= not affected, 2= less affected, 3= sometimes affected, 4 = moderately affected, 5 = always affected.

s/n	QUESTIONS	1	2	3	4	5
(i)	Lack of training on key issues as regard safety requirements					
(ii)	Safety wears are not comfortable to site operatives					
(iii)	Workers see compliance to safety rules as a delay in achieving task					
(iv)	Workers are not punished when they default safety rules					
(v)	Workers are not motivated by the nature of the work environment					
(vi)	Workers are not rewarded for effective compliance with safety requirements					
(vii)	There is an ineffective communication between workers and safety Representatives					
(viii)	There are very few safety Representatives on each site to monitor the amount of workers on duty					

(ix)	Lack of quality of knowledge on hazards management by workers					
(x)	Workers influence each other by their improper conduct					
(xi)	Workers do not comply to safety rules due to religion and traditional believe					

SECTION D (METHOD FOR IMPROVING WORKERS LEVEL OF COMPLIANCE WITH SAFETY BEHAVIOUR)

Please tick any of the components on a scale of 1-5 where applicable where; 1 = very insignificant, 2 = of less significant, 3 = slightly significant, 4 = moderately significant, 5 = very significant.

s/n	QUESTIONS	1	2	3	4	5
(i)	Workers should be adequately trained on key issues as regards safety before being engaged					
(ii)	Safety wears must be worn by workers before entering construction sites					
(iii)	Workers must be punished for violating safety rules					
(iv)	Workers must be rewarded for effective compliance with safety requirements					
(v)	There should be effective communication between safety Representatives and workers					
(vi)	Workers must be tested for alcohol and other hard drugs before being engaged to work					
(vii)	More safety Representatives must be provided to cover the amount of workers on each construction site.					
(viii)	Workers must be motivated by their working environment					

(ix)	Site must be properly arranged before the commencement of work					
(x)	Workers must be examined constantly on issues of safety rules					
(xi)	Workers with disability should not be hired especially for works that requires special attention					
(xii)	Workers must surrender all mobile device before being engaged					

SECTION E (THE IMPACT OF SAFETY BEHAVIOR ON CONSTRUCTION SITES).

Please tick any of the component on a scale of 1-5 where you think is applicable; where 1= never, 2= seldom, 3= sometimes, 4= often, 5= always

s/n	QUESTIONS	1	2	3	4	5
(i)	Prevent accident and other casualties on site					
(ii)	Reduces overall project cost					
(iii)	There is lesser amount of legal action					
(iv)	Avoid unnecessary compensation due to accident					
(v)	Workers confidence level is high					
(vi)	Guarantee quality of work					
(vii)	Project are delivered on time					
(viii)	Upholds company's reputation					
(ix)	Workers are motivated					
(x)	Organization are awarded with more jobs in the future					
(xi)	Workers work with ease					

THANK YOU FOR TAKING TIME TO GIVE ANSWERS TO THESE QUESTIONS!!!