

# SAFETY PRACTICES OF NIGERIAN CONSTRUCTION SITE WORKERS:

A Case Study of Benin-City and Gombe Metropolis.

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**ABSTRACT-** Safety practices on Nigerian construction sites cannot be overemphasized because it plays a huge role in the timely deliverability of projects and indeed the wellbeing of the construction site worker who bears the direct impact of construction site hazards which often most times is life threatening in the event that safety practices on construction sites are not strictly adhered to. The research objectives were to establish that construction workers attitude towards safety practices is determined by their understanding of construction site risks, safety rules and general work procedures; also to determine the extent of the relationship between poor safety culture and increased rate of unsafe acts in the Nigerian construction industry. It focused on workers of medium sized Construction Companies and specialized contractors operating within Benin City, South-South Nigeria and Gombe Metropolis, North-East Nigeria. The duration of study is between March 2017 and November 2018. Primary and secondary data were both collected through comprehensive literature review, personal interviews, structured questionnaire and observations. Five hundred (500) questionnaires (250 each administered within the study areas) were distributed to workers of construction companies to access their perception and understanding of safety practices on construction sites workplaces. Ranking on five point scale was used to analyze the questionnaires and to measure a range of opinions from most important to least important. The results shows Lack of safety training was ranked the highest; while Shortage or absence of safety equipments was ranked the lowest cause of workers' accidents on construction sites. 65% of the respondents affirmed that their companies practice safety programs while 35% affirmed otherwise. Amongst the Benefits of practicing Safety culture on construction sites, reduced accident occurrence is ranked the highest while the keeping of accidents and near misses records in relation to improving safety and preventing construction sites accidents ranked lowest. As a good safety practice on construction sites, it is the responsibility of the construction company and indeed its workers to identify unsafe construction site practices and conditions, and then try to correct them.

**Keywords—** Safety practices, Nigerian construction workers, Construction site, Accidents, Risk

## I. INTRODUCTION

Many construction workers blame their site accidents on ill luck. This is a misconception owing to the lack of safety practices awareness on construction site work places.

The studies on Site Injuries Cases (2013) indicates that many accidents are preventable simply by taking measures such as practicing safety to include good housekeeping of construction sites, provision of safety trainings to workers and proper use of personal protective equipments.

Diaz – Cebrera et al., (2007), defines safety culture to include a set of beliefs, attitudes, norms, roles, social and technical practices that are concerned with minimizing the exposure of employees, managers, customers, and members of the public to conditions considered dangerous or injurious.

Cooper, D.C (1996) defines safety culture as the collective behaviors of a people in an organization that over time becomes patterns, typical or habit.

A safety practice on construction site simply put is a workplace environment where people do their venture/responsibility safely and according to laid down rules and regulations.

According to the International Training Centre of the International Labour Organization (2011), one in six fatal accidents at work places occur on a construction site. Furthermore, it states that no more than 60,000 fatal accidents occur on construction sites around the world on a yearly basis. Injuries Board (2009) and Keller & Keller (2009) have made similar conclusions.

The above conclusion that a construction site is considered a highly risky and hazardous environment does not mean that its susceptibility to accident occurrence is not controllable.

Koehn, Ahmed, and Jayanti (2000), Idoro (2008) and Enhassi, Choudhry, Mayer & Shoman (2008), have all expressed similar worry regarding the worse safety conditions persisting on construction sites in most developing countries (like Nigeria) when compared to the developed countries of the world. The irony of the situation is that the casual factors of construction site accidents are well known and almost all preventable.

The problem in developing countries, according to Singh, A. et al., (1999) is that laws meant to protect workers from construction site accidents may not be enforced strictly by contractors and the workers themselves tend to ignore basic safety rules and regulations which are meant to protect and guild them from getting involved in accidents.

In a uniform recommendation by Bluff (2003); Needleman (2000); Saksvik & Quinlan (2003); LaMontagne et al., (2003); and Indian Council of Medical Research (2003), construction companies should adopt safety practices systems that seek to prevent the occurrence of construction site accidents rather than reliefs or essentially managing accidents cases and victim by form of compensation or offsetting their medical bills.

Bluff (2003), highlights the core of such safety practice management system to include hazard identification, control and assessment of risk, review and evaluation of risk control measures so that they are effectively implemented and maintained.

On the other hand, Needleman (2000) recommend that an effective safety system should require Construction Company's management commitment to occupational safety health (OSH); assignment of responsibilities; OSH procedures; OSH mechanism for communication, identification of hazards, control and prevention; investigation of accidents; training in OSH; evaluating the effectiveness of the program and documentation.

Bluff (2003) went further to opined that for such safety management system to be effective and productive, then responsibility should vested on a designated competent safety personnel who will determine and enforce the required accident preventive measures; the workers themselves will be actively involved; and that the safety practices procedures are documented and should be repeatable.

A successful safety culture on construction sites should be policy-based and clearly stated.

Awodele & Ayoola (2005); Aksorn & Hadikusomo (2007) and Enhassi, Choudhry, Mayer & Shoman (2008) all indicate the benefit of practicing effective safety culture to include reduced: site accidents and injuries, fatalities, sick pay, lost of work hours, compensation claims, absenteeism, workers agitation, overall costs of projects; and also a significant improvement in efficiency and profitability.

As an organization's management leadership, history, workforce, health and safety practices develop; so does the organization's safety culture develop. Reason, J. (1998).

Safety culture procedures and programs of construction companies are expected to guarantee highly safe construction sites if they are well spelt out, followed and implemented. Research studies by Idoro (2004) and Idoro (2007) however claim that accident and injury rates in many developing countries like Nigeria is considerable higher than in Europe, the United States of America and Australia.

Statistics from research studies carried out by Koehn, Ahmed & Jayanti (2000) reported in Bust, Cribb & Pasquire (2004) has shown that the fatalities of accidents and injuries occurring on construction sites in developing countries are 8 or 9 times more severe than in industrialized developed countries.

Awodele & Ayoola (2005) and Smallwood & Haupt (2005) present similar claims when their research findings concluded that these Nigerian construction site workers not less than hundreds are being killed each year and many more permanently disabled.

If the Nigerian construction site worker is still falling victim to construction sites accidents, then it is either the installed safety system is poorly managed or not adequately addressing all relevant safety practices the worker is meant to abide by for his/her safety while on the job/task.

This research study seeks to access the performance level of safety practices of Nigerian construction site workers using Benin-City and Gombe Metropolis as case studies.

## II. RESEARCH OBJECTIVES

The objectives of the research are as follows:

1. To establish that construction workers attitude towards safety culture is determined by their understanding of construction site risks, safety rules and general work procedures.
2. To determine the extent of the relationship between poor safety culture and increased rate of unsafe acts in Nigerian construction sites.

### III. THE STUDY AREA:

#### *BENIN-CITY*

Benin City is the administrative capital of Edo State located in the southern part of Nigeria with a total land area of 1,204 km<sup>2</sup> (465 sq mi). Benin City is located on coordinates 6°20'00" North and 5°37'20" East and it is situated at elevation 88 meters above sea level. Benin City has an estimated population of 1,125,058 making it the biggest city in Edo State. It operates on WAT time zone. (worldatlas.com/af/ng/ed/where-is-benin-city.html)

Benin City has a tropical climate with a Koppen-Geiger climate classification of Aw; having an average annual temperature of 26°C and annual precipitation of about 2025mm. (en.climate-data.org/Africa/Nigeria/edo/benin-city-764230/?amp=true)

In Benin City, the months of April/March marks the beginning of the rainy season while October/November marks its end. The rainfall is of high intensity with a little dry spell in the month of August. Due to rural-urban migration, Benin City has witnessed rapid territorial expansion. (Atedhor, et al 2011)

**Figure 1: Map of Benin-City**



Source: Google Maps

#### *GOMBE METROPOLIS*

Gombe Metropolis is approximately located between latitude 9° 30' and 12° 30' North and longitude 8° 45' and 11° 45' East of the Greenwich meridian and has an area of 52 square kilometer. Gombe state Ministry of Land and Survey, Gombe (2008). It is a commercial, administrative town and capital of Gombe state popularly referred to as the "*Jewel in the Savanna*". Agbonkhese, O. et al., (2017). The town is a confluence of economic activities by its position as the meeting point for business people from the surrounding states of Yobe to the north, Borno to the east, Taraba and Adamawa to the south, and Bauchi to the west. To support

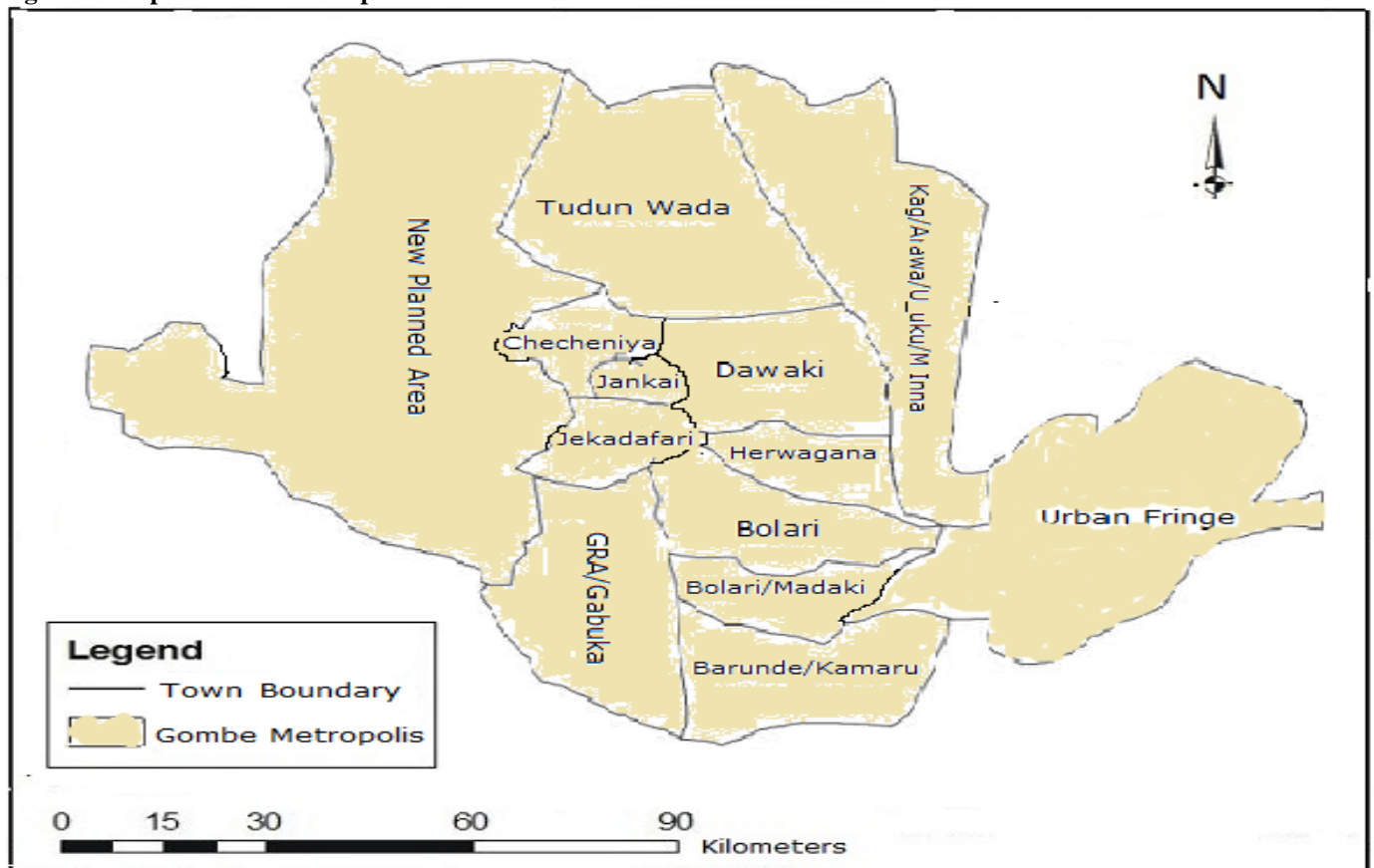
the vibrant commercial activities in Gombe Metropolis, there exist numerous banks, filling stations and hotels. Another factor that led to the growth of the town is rural-urban migration experienced from the surrounding towns and villages.

Gombe Metropolis is located within the sub-Saharan climatic zone and has two distinct climates of dry and rainy season: the dry season spans during the months of November-March and the rainy season, the months of April-October. The average annual rainfall in Gombe metropolis is 850 mm with a mean annual temperature of about 32°C. Gombe Metropolis comprises of sandstones, clay and silt, while the vegetation is that of savanna woodland comprising scattered shrubs and trees.

According to National Population Commission (2006) and Mbaya (2013), the total population of Gombe Metropolis was 266,844 in 2006 and increased to almost double (400,000) in 2010.

According to Gombe State Ministry of Land and Survey (2003) and Agbonkhese, O. et al., (2017), the most densely populated area is the oldest core part of the metropolis with 260 persons per square hectare and coincidentally, the most densely part of the metropolis in terms of buildings. The urban growth around the oldest part of the town and the urban fringes together with visible poor town planning is causing a spontaneous development and in poor spatial order. Due to the shortage of housing and the desperate efforts of private developers, there is an emergence of the unplanned residential sectors, especially on places considered unsuitable for development.

**Figure 2: Map of Gombe Metropolis.**



Source: Author

#### IV. LITERATURE REVIEW

An organization that adopts, develops and maintains a strong safety culture on workplaces is more effective at preventing individual and large scale workplace accidents. Baram and Schoebel (2007).

For safety culture practices on construction sites to be effective, the line between acceptable and unacceptable behavior must be clearly spelt out and understood. A successful safety culture program must focus on preventing site accidents by assuming proper engineering of critical crane lifts, preventing falls from heights, struck by moving vehicle, trench collapse, exposure to hot or harmful substance, etc. Reason, J (1998).

According to Idoro, G.I (2004), construction sites injuries and accidents rates are considerably higher in developing countries than in European countries. In most developing countries, priority considerations are not given to safety in construction projects delivery and it is considered a burden to employ safety measures during construction works on site. Mbuya and Lema (1996).

According to Enhassi et al., (2008), in many developing countries, legislations governing the Occupational Health and safety of workers is significantly limited when compared to that obtained in the United Kingdom. Their research work further indicated that Provisions for safety and the general conditions of work of the construction workers' in developing countries are often not addressed.

The regulatory authority is weak and non-existence in many of the countries where safety legislation exist and employers do not take safety regulations seriously. Lee and Halpin (2003).

In a research study carried out by Koehn et al., (1995), their findings indicates that in developing countries, report of injuries are not documented while employees' involved in workplace accidents are offered forms of cash compensations.

More importantly to note is that Nigerian construction companies often push safety to the bottom end of their priority list when carrying out their construction activities. It should be noted that the human life, loss of man-hours and material progress are irreplaceable in the event of a fatal accident occurring on construction sites. In developing countries like Nigeria, the laws meant to protect construction site workers may not strictly be enforced as contractors and their employees do not obey basic safety practices. Singh, A. et al., (1999).

There is great need to integrate safety culture into organizational system of every construction company as safety on construction sites should be considered the topmost priority.

International scholars agree to the fact that safety cultural practice on construction sites is a key factor for the safety of workers of an organization and indeed the organization itself. Pidgeon, N (1998). According to Choudhry, R.M et al., (2007), in recognition of the high importance of safety culture on safety outcomes of construction site accidents, increasing interest by scholars have been shown in the research studies of safety practices in the construction industry.

Pidgeon and O'Leary (1997), argues that leadership is the fundamental key affecting effective practice of safety culture. In a related research work conducted by Pigeon and O'Leary (2000), they concluded that four factors are responsible for promoting practice of a good safety culture. These four variables are: Commitment to safety by senior management, Concern for hazards and solicitude for its impacts on workers; Norms and rules about hazards should be realistic and flexible; monitoring analysis and feedback system.

Hudson, P. (2007), presents a safety maturity model which divides existing safety culture of an organization into five categories based on just two criteria which includes being informed and trust. And the safety culture in these five categories ranges from pathological to generative.

A safety culture maturity model was also proposed by Anastacio et al., (2010), which are used in measuring the maturity stage of safety culture of an organization but the model does not take into influence the importance of national culture on safety culture such that if the model is applied in a single multinational company in two different countries with varying cultures, it would lead to the same maturity level not taking the different national cultures into account.

According to the United States Department of Labor. Creating a Safety Culture (2012), a strong safety culture operated by any construction company or organization ensures that everyone feels responsible for safety and on a daily basis while pursuing it; employee endeavor to identify unsafe workplace conditions and behaviors and then try to correct them.

Ali, T.H (2006), is of the opinion that in developing countries, working on construction sites is one of the most dangerous given the safety criteria wherever reliable safety records are available.

## V. RESEARCH METHODOLOGY

Medium sized Construction companies and specialized contractors operating within Benin-City and Gombe Metropolis were used as the focus of this research. In other to establish the basis for this investigation, comprehensive literature review of previous studies was carried out. This research study sought to identify the various causes of accidents on construction sites, safety practices of preventing them and the frequently safety rules and regulations. Five hundred (500) questionnaires (250 each administered within the study areas) were distributed to workers of construction companies.

Ranking on five point scale was used to analyze the questionnaires and to measure a range of opinions from most important to least important.



VI. LIMITATIONS OF THE STUDY

Collection of primary data in the study areas was difficult given that majority of the site workers who made up the correspondence were either illiterates not knowing how to read, write and interpret the questionnaires in which case the researchers had to fill out their responses for them and their unwillingness to cooperate with answers to the questions asked. Some construction company management staffs and Site engineers were not also willing to allow their workers partake in the survey due to secrecy and indifference on their part and this can have adverse affects on results of the study.

The tight work schedule of some respondents delayed the answering of the questionnaires and interviews. Despite these limitations, the researchers were able to explore all avenues in securing the relevant and vital information needed for the study.

VII. RESULTS AND DISCUSSION

Duration of the study within which data collection was carried out was March 2017 to November 2018. The numbers of duly completed questionnaires retrieved were 460 (92%). The data were then categorized in accordance with the objectives of study, displayed in tabular form and analyzed

- **Age Distribution of Respondents:**

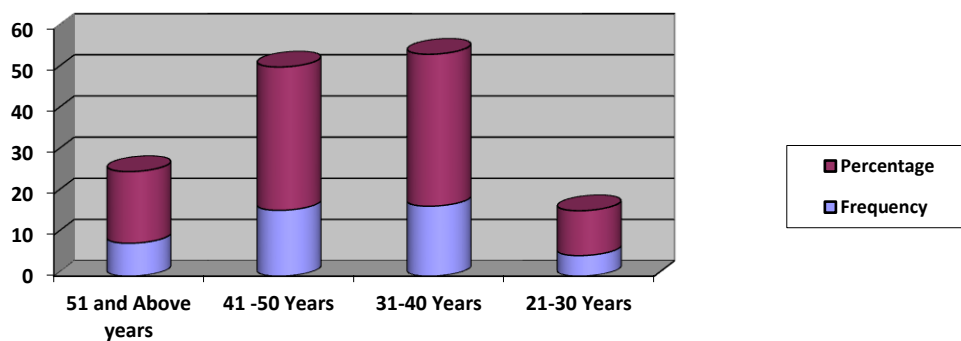
The age distribution of the respondents is presented in table 1 and figure 3 below. It was revealed that 17.4% of the respondents were of age 51years and above; 34.8% were between the age bracket of 41years and 50years; 37.0% were between the age ranges of 31years to 40years; while 10.9% of the respondents were within the age range of 21years to 30years.

The response of the sample population is an indication that majority of the work force within the study areas falls within the age distribution of 41-50years and 31-40years.

**Table 1: Age distribution of Respondents**

AGE RANGE DISTRIBUTION	FREQUENCY	PERCENTAGE
51 and ABOVE	80	17.4
41-50	160	34.8
31-40	170	36.9
21-30	50	10.9
<b>TOTAL</b>	<b>460</b>	<b>100</b>

Source: Field Work.



**Figure 3: Age distribution of Respondents.**

- **Years of Experience of Respondents:**

The years of experience of the respondents is presented in table 2 and figure 4 below. 15.2% respondents indicated having been a construction worker for over 25years; 19.6% respondents had 16-25years of experience on the job; 26.1% respondents fell within 11-15years of experience as a construction worker; 30.4% respondents had years of experience falling within 5-10years; while 8.7% respondents indicated to have had about 5years experience as a construction worker.

The response of the sample population is an indication that years of experience as a construction worker do not exacerbate, reduce or eliminate the rate of construction site accidents.

**Table 2: Years of experience of Respondents**

YEARS OF EXPERIENCE	FREQUENCY	PERCENTAGE
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25 and ABOVE	70	15.2
16-25	90	19.6
11-15	120	26.1
5-10	140	30.4
ABOUT 5 YEARS	40	8.7
<b>TOTAL</b>	<b>460</b>	<b>100</b>

Source: Field Work.

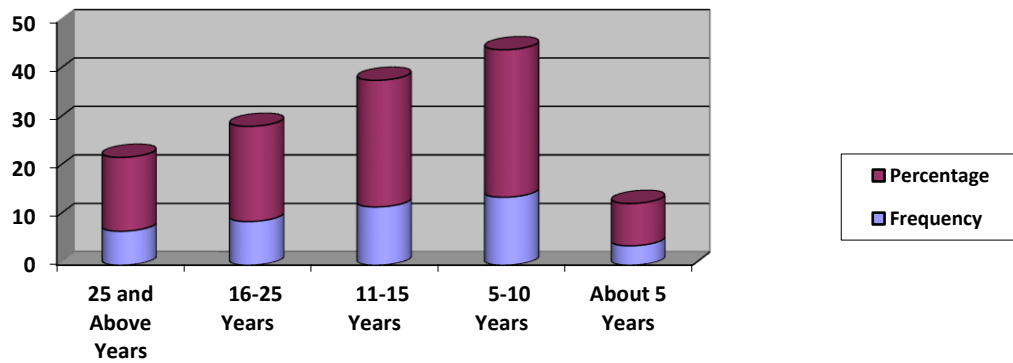
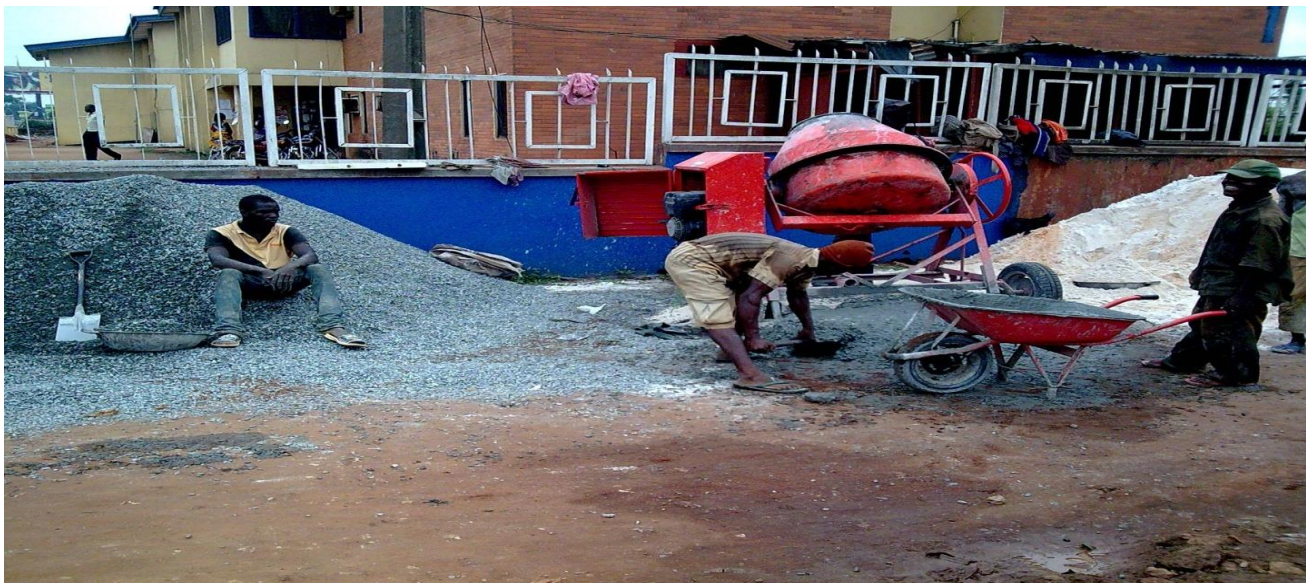


Figure 4: Years of experience of Respondents.

- Below are pictures of some respondents (construction workers) working on construction site:



Picture 1: Construction workers mixing and transporting concrete.





*Picture 2: Construction workers casting drainage base.*



**Picture 3: Construction workers casting drainage walls.**





*Picture 4: Construction workers at work; producing and transporting concrete onto the deck of a building.*



*Picture 5: Building Construction in progress (Gombe Metropolis).*

- **Liability, Who's Responsibility?**

The response to their perception of who should be responsible for safety culture on construction sites:

80 (17.4%) respondents affirmed it should be the employee;  
While 380 (82.6%) respondents affirmed it should be the employer.

On if the workers' identified any potential hazard(s) on construction sites and lodged any reports to assigned responsible persons/management,

180 (39.1%) indicated to have reported noticed potential site hazard(s) to responsible persons /management while 280 (60.9%) affirmed otherwise stating lack of appropriate actions by responsible persons/management towards correcting past reported noticed hazard(s) which still persists on site.

Although it is the liability of employers to ensure the safety and health of employees at construction site workplaces, employees should themselves take their safety and health at the workplaces more seriously by effectively ensuring strict adherence to safety rules and regulations as specified by employers on construction sites. Should any potential hazard at the construction site be noticed, such observation should be brought to the attention of the organization’s designated safety officer so as to ensure proper actions are taken towards improving the installed safety culture.

• **Accident cases on Construction sites.**

During the course of their work on construction sites over the period of experience gained, 320 (69.6%) of the respondents admitted to have been involved in accidents on site while 140 (30.4%) respondents claimed they never had been involved in accidents on site. 300 (65.2%) of the respondents affirmed to have reported near misses and accident cases, 100 (21.7%) do not report while 60 (13%) report only when accident cases were fatal. 210 (45.7%) respondents confirmed their companies practice record keeping of construction site accidents involving their employees, 160 (34.8%) affirmed in the opposite while 90 (19.6%) stated they were unaware of any records being kept as they have been solely responsible for ensuring their safety on site since they provide their own safety equipments and watch out for themselves.

On actions taken in the event of a serious accident occurring on site, 320 (69.6%) of the respondents indicated to opt for stop work until the accident and risk is cleared; 100 (21.7%) stated they would continue work and allow responsible persons to handle the situation while 40 (8.7%) indicated they would continue work but only after administer of first aid to accident victims.

• **Safety Culture Programs.**

300 (65%) stated that their companies have safety culture programs. Of the 300 respondents, 200 (67%) affirmers admitted that their companies undertake formal safety induction trainings for all new employees, and they also use safety clothing and equipments on site. However, 70 (35%) of the 200 (67%) affirmers revealed the lack of enforcement by their companies to safety rules and regulations on construction site environment aside from making safety culture rules and regulations known during induction exercises. 130 (65%) indicated that their companies do enforce safety cultural practices on construction site environment. While the other 100 (33%) of the 300 respondents affirmed that periodic induction trainings for new employees are not carried out by their companies; safety clothes and equipments are not worn by them on site but have however attended safety trainings in the past.

160 (35%) respondents claimed their companies do not safety programs. Of the 160 (35%) affirmers, 60 (38%) indicated wearing safety clothes and equipments despite never attending any safety courses while the other 100 (62%) acknowledge not to use safety clothes or equipments because such personal protective equipments are not made available by their companies.

• **Causes of accidents on construction sites.**

Five variables were identified to be the main casual factors of accidents on construction sites. These identified variables were included in the research questionnaires. The responses received from respondents were then analyzed and ranked thus indicating the frequencies of respondents’ feedbacks regarding the main causes of construction site accidents as shown in the table below

The identified variables include:

- (I). Poor understanding of the risk associated with the work;
- (II). Shortage or absence of safety clothes and equipments;
- (III). Impacts of unsafe behaviors of co-workers;
- (IV). Over confidence in performing site works;
- (V). Lack of safety training of workers.

**Table3: Causes of accidents on construction sites**

VARIABLES	RESPONDENTS SCORE					TOTAL	MEAN	RELATIVE INDEX	RANK
	1	2	3	4	5				
Poor understanding of	30	50	220	110	50	1480	3.2	0.64	2

risk.									
Shortage or absence of safety clothes.	130	120	80	90	40	1170	2.5	0.51	<b>5</b>
Impacts of unsafe behaviors.	70	120	100	80	90	1380	3.0	0.60	<b>3</b>
Over confidence in work.	80	110	50	200	20	1350	2.9	0.59	<b>4</b>
Lack of safety training of workers.	20	130	80	70	160	1600	3.5	0.70	<b>1</b>

Source: Field Work.

From the above tabulated analysis, the Lack of safety training of workers emerged as the number one cause of accidents on construction sites; Poor understanding of risks and hazards associated with the work to be performed by construction workers was ranked the second casual factor of accidents on construction sites ; The third casual factor of construction site accidents was the impacts of unsafe behaviors by co-workers; Over confidence on the part of construction workers in performing assigned site works was ranked the fourth casual factor; The shortage or absence of safety clothes and equipments then emerged the least ranked important causal factor of accidents on construction sites

- **Benefits of practicing effective Safety culture.**

Five variables were again identified to be the main benefits of practicing effective safety culture on construction sites.

These variables include:

- (I). Better output and productivity;
- (II). Reducing the rate of accident occurrence;
- (III). Record keeping of accidents and near misses towards safety culture improvement;
- (IV). Improving Firm/company image;
- (V). improving human relations.

These identified variables were included in the research questionnaires. The responses received from respondents were then analyzed and ranked thus indicating the frequencies of respondents' opinions regarding the benefits of practicing effective safety culture.

**Table4: Benefits of practicing effective safety culture on construction sites**

VARIABLES	RESPONDENTS SCORE					TOTAL	MEAN	RELATIVE INDEX	RANK
	1	2	3	4	5				
Better output and productivity.	100	50	60	80	170	1550	3.4	0.67	<b>2</b>
Reducing accident occurrence.	90	40	80	90	160	1570	3.4	0.68	<b>1</b>
Record keeping of accidents and near misses.	50	130	140	80	60	1350	2.9	0.59	<b>5</b>
Improving firm/company image.	60	90	100	100	110	1490	3.2	0.64	<b>3</b>
Improving human relations.	50	140	80	90	100	1430	3.1	0.62	<b>4</b>

Source: Field Work.



The most important benefit of practicing effective safety culture as ranked in the table above is reducing the rate of accident occurrence on construction sites. Record keeping of accidents and near misses was ranked the least benefit of practicing effective safety culture.

### VIII. CONCLUSION AND RECOMMENDATIONS.

The paper has discussed the safety practices of Nigerian construction site workers: a case study of Benin City and Gombe Metropolis.

It assumes that effective practice of safety culture on construction sites will lead to optimum safety of the construction worker; successful management of projects being executed; and deliverability of projects within stipulated time frame and with budgeted funds.

From the surveyed results, it is apparent that poor safety culture exists in the Nigerian construction industry. Poor safety culture and increased rate of unsafe acts in the Nigerian construction industry are significantly related. The practice of Safety culture on construction sites is not given the required attention by most of the construction companies.

The benefits of record keeping of accidents and near misses towards improving the installed safety culture and preventing future occurrence of accidents is not accorded top priority or recognition by most of the construction companies.

Individual workers, foremen, project supervisors and executives should be accountable for safety culture adherence in their day to day operations. It should be mentioned that incorporating an effective practice of safety culture on construction sites will ensure responsibility of every worker to obey safety rules and regulations and thus reduce possibilities of accidents occurrence. Fewer accidents during construction works will result to greater productivity.

Every new employee deployed to construction sites should be given appropriate orientation regarding safety culture and there should be effective regular staff training on safe work procedures by construction companies. This will sharpen and improve their hazard identification skills and reduce unsafe acts/conditions in the workplace. Though, staff training involves expenditure of money, the expenditures associated with fatalities are greater comparatively. Management may resist regular staff training on the basis costs, greater awareness will bring about a change in attitude over a period of time.

There should be conduction of regular site safety audits as this will facilitate the identification/elimination of potential workplace hazards and enable management to sense the safety climate of the work site. Though, this may involve commitment of time and other resources, the associated benefits of accident elimination far outweigh the costs. This may be resisted initially as time wasting and unproductive, greater awareness will bring about a change in attitude.

During management meetings, safety culture on site should be discussed. Programs on safety and incentives should be recognized and effectively implemented and developed. The costs of introducing safety incentive schemes far outweigh the costs of accidents/fatalities in the construction industry. This introduction of safety incentive schemes may be resisted initially as a waste of resources since workers are being paid salaries, greater management awareness will bring about a change in attitude.

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