



ISSN 2278 – 0211 (Online)

Accidents in Building Construction Sites in Nigeria; a Case of Enugu State

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Abstract:

Construction processes in Nigeria are characterized by unsafe practices leading to accident that leaves severe consequences on both the project and the workers. Accidents in building construction sites, whether minor or fatal could result to injuries, loss of resources, partial or permanent disability and death in case of fatalities. This paper explores the class of workers that are mainly responsible for construction accidents, the factors that causes accidents and the types of accidents that is been encountered in building construction sites and the frequency of their occurrence. It was achieved through the review of existing literature and use of survey. The literature reviewed the consequences and causes of building construction accidents while the field survey used questionnaire to obtain data from respondents. This was administered through convenience sampling techniques in Enugu State. The descriptive analysis tools were used for the analysis and the findings revealed that labourers are the major class of workers that are responsible for construction accidents, failure to use personal protective equipment is the major factor that causes accident on sites and injuries from equipment are often encountered. Conclusion was reached and recommendations based on the findings were made in the paper.

Keywords: Accidents, causes, building construction site, Enugu State

1. Introduction

The construction industry has been identified with the highest occurrence rate of accidents compared to any other industry. In the recent past, death tolls, permanent disability, partial disability and some other severe environmental threat had increasingly been on the rise through collapse of buildings and other major operational accidents (Olatunji et al., 2007; Orji 2014, cited in Orji, Nwachukwu and Enebe 2016).

Construction projects involves numerous unpredictable and complex processes and as such earned the construction sites the reputation of having the highest injury rate of all dangerous working environment. Hunter (2011) cited in Orji, Nwachukwu, and Enebe (2016), emphasized that construction sites are the most potentially hazardous and accident prone parts of any working environment. This implies that construction workers are constantly exposed to excessive site hazards which exposes them to injuries and possibly death. Occupational safety and health administration (2005) cited in Kadiri et al., (2014) has fixed the number of fatal accidents on constructions sites around the world annually at 60,000 which excludes Nigeria, because the construction industry in Nigeria does not have records of fatalities and non-fatality from any construction site bearing in mind that more than 70 percent of the construction workers in Nigerian are foreigners where some of them are working without permit. Accident in construction can be said to be a sudden and unanticipated occurrence that interrupts planned activities, hence resulting to injury to personnel, damage to plants and equipment, loss of working hour, loss of money, lowering of workers moral, loss of confidence on the part of the constructor and delay to completion time. The poor safety performance of the Nigerian construction industry requires adequate attention from all stakeholder to address the huge problems of construction accidents and improve safety performance. Hence, this research is aimed at identifying the class of workers that contribute majorly to construction accidents, the different factors that causes accident and the types of accident that is been encountered particularly in building construction sites and their frequency of occurrence in Enugu state with the intention to recommending safe construction practices.

2. Literature

The nature of a construction project according to Chi et al., 2004; Lipscomb et al., 2006; Imriyas et al., 2007; cited in Yusuf, Akhmad, Yulianto and Rosmariansi (2011) has potential hazards of accidents in it, since it has the following characteristics

- i. It is unique
- ii. It has open space
- iii. It involves many unskilled labour
- iv. It has tight schedule of short targeted project duration
- v. It confined space and
- vi. Has a psychologically and physically vulnerably working environment.

According to Oladiran, Ogunsanmi and Soyngbe (2008), accidents in construction sites are inevitable and unquantifiable, whether minor or fatal could result to loss of resources. In line with this ascertain, Auguster, Mimi, and Kamarizan (2015) submitted that accidents can result in direct and indirect impacts. Injuries in construction sites may have direct impacts on the individual involved as well as the productivity level. On the other hand, indirect impact could be revenue losses on the side of the client due to late delivery. Many Employers according to Abdul and Muhd (2008), have not established comprehensive accident prevention policies, instead, they concentrate on maximizing profit. They do not emphasize on safety because they do not know how high the cost of an accident is until it occurs. That is why Oladiran, Ogunsanmi and Soyngbe (2008) revealed that greater emphasis has been on cost, schedule and quality at the expense of the safety of the workers who are the facilitators of construction work. Again, Abdul and Muhd (2008) strongly agreed with Oladiran, Ogunsanmi and Soyngbe's revelation and further revealed that lack of adherence to safety requirement has led to increased exposure of workers and the general public to risky situation at construction sites resulting in a high chance of accident occurrence.

According to Ali, Kamaruzzaman, and Sing (2010), accidents does not only cause injury to the workers, it can also destroy tools, equipment and materials. Therefore, forecasting accidents for future projects would be advantageous for the required preparation and budget allocation to help minimize the overall damages (Asanka and Renasinghe 2015)

2.1. Causes of Construction Accident

Construction sites accident in Malaysia according to Abdul and Muhd (2008), are caused by a wide range of factors, some of which are unsafe equipment, job site conditions, unique nature of the industry, unsafe method, human element and management. They further stated that the causes of construction accident is a multi-faceted phenomenon mainly attributed to workers negligence, failure of workers to obey work procedure, work at high elevation, operating equipment without safety devices, poor site management, harsh work operation, low knowledge and skill level of workers, failure to use personal protective equipment (PPE), and poor workers attitude about safety.

Haslam et al. (2005) conducted a research through the use of focus groups and detailed studies of 100 accidents in Great Britain and concluded that the factor that causes construction accident includes unsafe acts by workers, poor communication, problems with site conditions and shortcomings with equipment and materials.

Dunlap (2012) revealed that from 2001 through 2010, there were over 10,000 fatalities and 195,000 none-fatal injuries in the United State of America. These injuries and fatalities were very costly to the United State economy in terms of lost time, workers compensation costs, and lost productivity. This is in addition to the human suffering and pains over the loss or injury of a loved one.

Kadiri et al., (2014) conducted a research in Abuja, the Federal Capital Territory of Nigeria, using some selected construction firms and concluded that labourers are the main class of workers that are responsible for accidents on construction sites and are also the major victims of construction sites accidents. According to them, the main effect of accident on construction site is the loss of time in project execution.

Dejus (n.d) narrowed his opinion to fall accidents in the republic of Lithuania. In his opinion, the big number of accidents relating to fall from height in the republic is caused by misprision of risk of working in height, with unpredicted and unrealized safety equipment. He further stated that over 60% of construction accidents that happens in the republic is because of a wrongly organized work in height procedure and workers disobedient to standard rules.

Fatih (2015) also conducted a research in turkey and classified the causes of construction accidents into lack of attention, dangerous behavior, disregarding occupational safety rules, misapplying the rules of working at height, disusing of lifting vehicles and hand tools, which have a high potential for accidents, lack of maintenance and control of equipment, lack of experts, technical staff, lack of inspection and training.

3. Methodology

The objective of this study was achieved by using two main approaches. The first was through literature review and the second was through field survey. The literature review was used to summarize the consequences and causes of building construction sites accidents while the field survey involving 60 building construction sites in Enugu State were used to investigate the class of workers that are mainly responsible for construction site accidents, factors that causes accidents and the types of accidents been encountered on sites and the frequency of their occurrence. A total number of 75 well-structured questionnaires were distributed to building construction professionals on 75 selected projects out of which 60, representing 80% were duly completed and returned. The data collected was analyzed by the use of mean score ranking and simple frequency table.

3.1. Data Analysis and Result

Qualification obtained	Number	% of number	% cumulative	Work experience	number	% of number	% cumulative
OND	-	-	-	0 – 5 yrs.	2	3.33	3.33
HND	4	6.67	6.67	5 – 10 yrs.	13	21.67	25.00
B.Sc/B.Tech	9	15.00	21.67	10 – 15 yrs.	21	35.00	60.00
M.Sc/M.Tech/M.Phil	26	43.33	65.00	15 – 20 yrs.	20	33.33	93.33
Ph.D	21	35.00	100.00	20 yrs. - above	4	6.67	100
Total	60	100%			60	100%	

Table 1: Qualification and work experience of respondents

Source: Field Survey 2016

Table 1 shows the academic qualification and the work experience of the respondents. It can be seen that the respondents are educated up to tertiary institution and they are well experienced in construction activities, therefore, their responses can be sufficiently relied upon.

Encounter accident on site	Frequency	Percentage of frequency	Percentage cumulative
Always	6	10	10
Sometimes	45	75	85
Never	9	15	100
Total	60	100%	

Table 2: Position of respondents on encountering accidents on site

Source: Field Survey 2016

Table 2 shows the position of the respondents on encountering accidents on site. It can be observed that 6 out of 60 respondents (10%) always encounter accident on site, 45 respondents (75%) sometimes encounter accidents, while 9 respondents (15%) never encountered accident on site. The figure therefore indicates that construction sites are prone to accidents which pose danger to the lives of the workers, the project itself and passerby.

Construction team	Frequency	Percentage of frequency	Percentage cumulative
Architects/Builders/Engineers	3	5.00	5.00
Clients	-	-	5.00
Supervisors/foreman	8	13.33	18.33
Artisans	19	31.67	50.00
Labourers	30	50.00	100.00
Total	60	100%	

Table 3: Position of respondents on the class of workers mainly responsible for accidents in construction sites

Source: field survey 2016

Table 3 shows the position of the respondents on the class of workers mainly responsible for accidents in construction sites. It can be seen that labourers contribute 50% while the artisans contributes about 31.67% to construction accidents respectively. These groups of people are either engaged on a daily pay basis or finish and go method which creates an avenue for been hasty and impatiently carrying out their responsibility. These factors deliberately ignore the use of personal protective equipment and safe working practices which create grounds for accidents to occur.

	Factors that cause accidents	Frequency (f)/response (x)			Σf	\bar{X}	Rank
		3	2	1			
1.	Faulty/defective equipment	8	41	10	59	1.97	2 nd
2.	Excessive noise	9	9	40	58	1.47	10 th
3.	Sub-standard construction material	5	38	14	57	1.84	3 rd
4.	Ignoring safe procedure	-	40	19	59	1.68	4 th
5.	Failure to use personal protective equipment (PPE)	20	32	8	60	2.20	1 st
6.	Human factor	4	31	25	60	1.65	6 th
7.	Engaging unqualified persons	5	29	23	57	1.68	4 th
8.	Unsafe/incorrect construction method	5	30	25	60	1.67	5 th
9.	Lack of safety training	10	16	34	60	1.60	7 th
10.	Poor illumination in site	8	12	40	60	1.47	10 th
11.	Poor house keeping	10	15	35	60	1.58	8 th
12.	Absence of caution sign	9	10	39	58	1.48	9 th

Table 4: Respondents opinion on factors that causes accident on construction site

Source: Field Survey 2016

Table 4 shows the factors that causes accidents on site. It can be observed that failure to use the personal protective equipment (PPE) ranked as the number one factor that causes accidents on site, which indicates that most of the construction workers in Enugu State rarely use the personal protective equipment (PPE) while working on site. Similarly, faulty/defective equipment and sub-standard construction material were ranked second and third respectively. This indicates that most construction managers and organization in Enugu State rarely inspect to ascertain the state of their equipment and mechanical plants on a daily basis before use. The rate of influx of sub-standard construction materials in the market is on the rise, which is an indication of an unregulated market. Despite the ranking of these factors, the respondents acknowledged the importance of the construction sector in Nigeria and advocates that all stakeholder in the construction industry should come together to address the issue of accidents in construction sites.

Types of Accident		Frequency (f)/response (x)			Σf	\bar{x}	Rank
		3	2	1			
1	Collapse of building or part of it	-	28	30	58	1.48	9 th
2	Collapse of scaffold	12	18	30	60	1.70	7 th
3	Electrocution	12	20	28	60	1.73	6 th
4	Fall from the same level	12	36	12	60	2.00	5 th
5	Fall from height	44	16	-	60	2.73	3 rd
6	Fire outbreak/explosion	6	16	19	60	1.15	10 th
7	Injury from equipment	54	6	-	60	2.90	1 st
8	Slip and trip	18	28	14	60	2.07	4 th
9	Struck by object/moving vehicle	22	14	4	60	1.63	8 th
10	Stepping on sharp object	50	8	2	60	2.80	2 nd

Table 5: Respondents opinion on the types of accident encountered on site
Source: Field Survey 2016

It can be seen from table 5 that injury from equipment was ranked high, which indicates that most construction managers and organization in Enugu State carryout their construction work with equipment and mechanical plants. Even though they rarely inspect to ascertain the state of the equipment and mechanical plants before use. Similarly stepping on sharp objects and falls from height were ranked second and third respectively. This, has also confirmed that most of the construction workers in Enugu State rarely use the personal protective equipment (PPE) while working on site. Fire outbreak/explosion was ranked the least as indicated by the respondent's responses. Despite the frequency of these accidents on site, the respondents opined that a precautionary measure taken in advance is the best way to mitigate or avoid these accidents on site.

4. Conclusion and Recommendation

The construction industry is indeed a dangerous and a highly hazardous place of work because of its high incidences of accidents and fatalities. The study revealed the class of workers that are mainly responsible for building construction accidents, the factors that causes accidents and the types of accidents that is been encountered in building construction sites in Enugu State. According to the research, labourers are the main class of workers that are responsible for construction site accidents. They are always in a haste to finish their work and go without considering safety practices

Failure to use personal protective equipment was ranked the highest factor that causes accident in construction site, faulty/defective equipment and the use of sub-standard construction material were ranked second and third respectively. Other factors are engaging unqualified persons to do construction work, unsafe and incorrect construction methods, ignoring safety procedure, human factors, lack of safety training, poor housekeeping, and absence of caution signs; poor illumination in site and excessive noise were both ranked the least.

The types of accident that is been encountered includes injury from equipment which was ranked first, stepping on sharp object and falls from height were ranked second and third respectively. Other accidents are slip and trip, fall from the same level, electrocution, collapse of scaffold, struck by objects or moving vehicle and collapse of building or part of it; fire outbreak/explosion was ranked the least. The consequences of building construction accident are enormous and cannot be easily quantified, though inevitable but could be controlled to prevent minor or serious consequences on both the workers and the project itself. In this regards, the study therefore recommends that Enugu State government should ensure that appropriate legislation to enforce construction professionals on total compliance to safety rules on site should be put in place, the use of personal protective equipment should be enforced on all the workers, equipment should be inspected on a daily basis before use, standard organization of Nigeria should step up their surveillance to regulate the standard of construction materials in the market, building constructions should be carried out by registered builders with the aid of skilled artisans, safety officers should be employed on site to plan and ensure adherence to safety precautions and construction professionals including the professional bodies in Nigeria should come together to address the issue of not keeping adequate records of fatalities and non-fatality accidents in our construction sites.

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