# CAUSES OF ACCIDENTS IN THE NIGERIAN CONSTRUCTION INDUSTRY

**BY**

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## Abstract

*Many accidents occur in the course of construction activities especially in developing countries like Nigeria due to factors attributable to frontline workers, contractors and policy makers. The literature therefore discusses various causes of accidents. A gap in the extant literature informs the aim of this research which partly is to evaluate the impact of negligence as a cause of accidents in the construction industry in Nigeria. A quantitative method was employed where data was collected using a questionnaire. 100 questionnaires were administered to relevant stakeholders and 72 of these were fully completed and returned. Descriptive statistics was used to analyse the data which reveal that, three of the top-4 ranked causes of accidents are attributable to acts of negligence on the part of workers. The study therefore concludes that workers are the key contributors to accidents in the construction industry of Nigeria. It also recommends that negligence should not be addressed in isolation, as many other factors contribute to accidents.*

**Keywords:** *Accidents, Construction, Health and safety, Negligence*

## Introduction

Accidents in construction can be caused by various factors which include lack of knowledge, non-compliance with rules and regulations, non-use of Personal Protective Equipment (PPE), unsafe acts, and negligence (Ndekugri and Corbett, 2004). The number of accidents in construction undertakings in Nigerian is quite high (Olubunmi, 2012). Nigeria is a country with a population of more than 188 million people (National Population Commission, 2016) and it has various types of construction companies that deliver diverse types of projects and employ many people (Kadiri *et al*, 2014). Many uneducated and unskilled workers are often employed to work in the Nigerian construction industry and they often exhibit a poor understanding of the Health and Safety (H&S) regulations as well as a lack of diligence and caution which makes them prone to various degrees of accidents and

injuries. However, this view cannot be substantiated statistically as the construction industry does not always report accidents to the relevant authority (Agwu and Olele, 2014). Measurable information in this regard is thus scarce, e.g. less than 100 accidents were reported between the years 2001 to 2006 (Olubunmi, 2012; Kadiri et al, 2014). There is also a dearth of published literature on the subject matter. For the overall safety performance of the construction industry to be improved in especially Nigeria, the root causes of accidents should be scrutinized and addressed (Abdul Hamid *et al*, 2014).

Given the foregoing context, an exploratory research was carried out, aimed at evaluating the contributions of negligence and other causes to accidents in the Nigerian Construction Industry. The underpinning literature is discussed in the next section, followed by the research methodology. The findings are then presented before wrapping up with a discussion and conclusions.

## Literature Review

Globally, over 317 million fatal accidents are attributed to construction activities (ILO, 2013). Non-compliance with safety acts by workers, not obeying working procedures, low-level of technical knowhow, poor site management, lack of cooperation and teamwork are among the causes of construction accidents (Alhajeri, 2011; Bashir, 2013). Other common causes of accident are falls from a high object or structure, being smashed by any falling/moving object from crane tower, collision with moving vehicles, striking a fixed or stationary object and slips, trips and falls (Hughes and Ferrett, 2011).

Indeed, there are many causes of accidents. Bashir, (2013) considers onsite versus offsite causes of accidents while Zailani (2012) reflects on the two-fold classes of: 1) incident Occurrence (e.g. slips, trips and falls) versus 2) immediate causes (such as using equipment improperly, not using PPE (Personal Protection Equipment) when required, etc.).

Construction workers face many risks (*UK Essays*, 2013) e.g. of being hit by falling objects and falling from heights (Rahman, 2015). The exposure of frontline construction workers to harsh environmental conditions like sun, rain, wind, etc makes them more prone to ailments like backache, headache, skin diseases, joint pains, lung disorders and other muscular skeletal disorders (Tiwary, and

Gangopadhyay, 2011). Working in confined spaces and tight schedules compounds the risks of construction (Orji *et al*, 2016).

The Construction industry employs many workers (Tiwary and Gangopadhyay, 2011). The UK construction industry is quite massive (Fewings, 2013) employing over 2 million people (Rhodes, 2015) and contributing immensely to the British economy (Monagha, 2014). This sector's annual turnover recently reached over £250 billion (Hughes and Ferrett, 2016) and has significantly recorded great health and safety (henceforth H&S) achievements by reducing the number of fatal injuries and degree of accidents (HSE, 2015). Many programs have raised the level of awareness of UK construction workers towards the relevance and thus compliance to safety regulations (Hackett, 2015). Likewise, safety standards are high in the US (Ghule, 2008). In contrast, it has been suggested that accidents in construction projects in developing countries are relatively more frequent than in developed countries (Idoro, 2011; Abdul Hamid *et al* 2014). Hence the research being reported directed its attention at developing countries.

Whilst Fewings (2013) maintains that the performance of H&S in both developed and developing countries is poor, the analysis of Awwad *et al* (2016) suggests a disparity. Many cases of accidents and fatalities occur more in developing countries where the causes include "extensive subcontracting, absence of safety training, lack of safety awareness, inefficiency of safety regulations and legislations, and unsupportive top management" (Awwad *et al*, 2016, pp.2). Other contributors are the weak commitment of management, ineffective supervision, inadequate training and lack of competency on the part of workers on construction sites (Awwad *et al*, 2016).

Nigeria is performing well economically (National Bureau of Statistics, 2012). Her construction industry contributed 3.01% of the total Gross Domestic Product (GDP) during the first quarter of 2012 (National Bureau of Statistics, 2012). Despite the size of this sector, many construction firms are performing below expectations (Odediran, *et al.*, 2012). Likewise, many construction companies do not value the H&S of their workers (Chia-fen *et al*., 2014). Many unskilled persons can be found on Nigerian construction sites working with bare slippers as footwear and without using other PPE (Odediran *et al*., 2012). Measures which will enable employers and employees to understand H&S deeply and implement it fully in Nigerian

construction are needed (Augusta *et al.*, 2015). One action that can be taken is to identify the main causes of accidents and address these.

Negligence is an important factor identified in accidents in the construction industry. The Gerling law defines negligence in the workplace as the failure of an organisation to maintain and uphold its standards of operations, behaviour, or protocol, which in turn may lead to harm, injury, or damage to employees during the process of operating or moving around (Gayle, 2015). The contribution of negligence to accidents in the construction industry in especially developing countries like Nigeria has been acknowledged by researchers like Abdulhamid *et al*. (2014) and Alhajeri (2011). Rahman (2015) considers workers who intentionally operate without using personal protective equipment (PPE) as being negligent. Employers too may contribute to this default by not insisting on the use of PPE (Orji *et al,* 2016). This insight opens a door into studying negligence as a cause of accidents and this subject matter is explored in the paper. Understanding the causes of accidents is very important for devising solutions for overcoming these (Radomsky *et al*., 2001; Ford, 2016), hence this research lays more emphasis on this subject matter.

Policies and regulations are used to control as well as improve the standards of H&S at work places. In the UK for instance, the working at height regulation (WAHR) act of 2004 demands that suitable and sufficient measures be employed to prevent any person from falling when working up at a height that would be liable to cause personal injury (Anderson, 2004). Several measures to minimise the occurrence or impact of accidents can be teased out of the WAHR e.g. the use of airbags to arrest falls (Hughes and Ferrett, 2011).

The Construction Design and Management (CDM) regulations were also first introduced in the UK in 1994 and subsequently revised in 2015. These regulations are aimed at maintaining the H&S of workers in the construction industry particularly (Chudley and Greeno, 2014). These regulations demand an all-party, integrated and planned approach to H&S throughout a construction project period (Joyce, 2015). There has been a great reduction in the number and rates of accidents and injuries in construction as well as a significant improvement of H&S generally since the introduction of the CDM regulations. Jafar *et al.* (2015) opine that these regulations can be applicable to developing nations like Nigeria.

It is important to have effective and efficient H&S rules and regulations in the Nigerian construction industry (Anderson, 2004). According to Dodo (2014) the *Nigerian Factories Act* of 1958 which was updated in 2002 placed the burden of responsibility for the health, safety and welfare of personnel that are operating in many industries including construction on the Federal Ministry of Labour and Productivity. This act was later replaced with the Factories Decree No.16 and Workman's Compensation Decree No.17 and later signed into law and became effective in 1990. However, it seems that H&S regulations are virtually not enforced in developing countries like Nigeria (Diugwu *et al.*, 2012; Idubor and Oisamoje, 2013). Thus, Umeokafor *et al*, (2015) opine that the Nigeria government has failed to provide functional H&S regulations.

Despite the availability of regulations and their implementation, the construction sector is still experiencing high numbers of work-related accidents which have led to many injuries and sometimes fatalities. The situation is graver in developing countries like Nigeria, where the attention to the proper implementation of H&S is relatively low (Awwad *et al.*, 2016). In order to prevent accidents in Nigeria, Bashir *et al.* (2012) suggest the application of lean construction tools on sites. Anieku (2007) suggests that workers should be encouraged by companies to adhere to safety rules through periodic H&S seminars and workshops, safety campaigns, warning signs, etc. Some principles which can be adopted to prevent accidents in construction in developing countries like Nigeria include the use of modern technology and standard materials, eliminating risks from the early stages of projects, and encouraging workers to practice H&S in all aspects of their activities.

Accidents are still rampant in the Nigerian construction industry. Thus, having used literature to establish the many causes of accidents in construction, a focus on negligence and illiteracy are investigated further empirically in the Nigerian context. These two attributes are associated with many workers in Nigerian construction.

## Research Method

A quantitative approach was adopted as the researcher needed to first explore how much the two chosen constructs impact on accidents in Nigeria. A questionnaire was used to collect data and it was administered to 100 stakeholders in the Nigerian construction industry and selected using simple random sampling. The profile of respondents is shown in Table 1. The respondents included a Project manager (1%),

Engineers (19%), Supervisors (7%), Health & Safety officers (31%), Labourers (21%) and others (21%): 96% of these were from contractors' organisations while 4% worked for clients.

An introductory letter was used to explain to the potential respondents that their completion of the questionnaire would help towards addressing the many accidents and fatalities in construction; which they might have witnessed or heard about. Data was collected from large-scale indigenous firms. This tactic worked where 72% of the administered questionnaires were completed and returned. Moser and Kalton (1971) suggest that a response rate in excess of 40% is satisfactory. Based on these suggestions, the analysis proceeded with the 72 completed questionnaires.

The data was analysed using the Statistical Package for Social Sciences (SPSS) software was used. This paper infers from the results the main causes of accidents in Nigerian construction.

**Table 1: Information about the respondents**

| *Age* | *Size of respondents* | *Highest Qualification* | *Size of respondents* | *Experience in construction* | *Size of respondents* |
|---|---|---|---|---|---|
| Below 18 | 0% | None | 0% | 0-4 years | 17% |
| 18-24 | 4% | Primary school | 0% | 5-9 years | 36% |
| 25-34 | 46% | Secondary School | 21% | 10-15 years | 32% |
| 35-44 | 31% | HND/ND | 44% | Over 15 years | 15% |
| 45-54 | 15% | BSc/BA | 31% | | |
| Above 55 | 4% | MSc/MA | 4% | | |

**Results**

Four per cent of the respondents indicated they had not witnessed any accident in construction while the other 96% recorded witnessing between 1 and 4 instances of accidents. On the frequency of accidents in their organisation, the respondents indicated weekly (4%), monthly (78%) and yearly (18%).

**Use of PPE**

Table 2 shows that PPE are fairly used by many but not all workers. The same pattern is reflected in the levels by which safety rules are observed. Despite the importance of safety and the risks associated with accidents on site; why are some workers still not mindful of H&S procedures? Could it be due to sheer negligence?

**Causes of accidents**

The respondents were asked to rate the contribution of different causes of accidents, using a 4-point Likert scale that was calibrated as: Strongly disagree, Disagree, Agree and Strongly agree. The ratings generated nominal data which was analysed by aggregating the frequencies of Strongly agree, Agree, Disagree and Strongly disagree in that order of priority. This computation was then used to rank the relative causes of accidents as shown on Table 3.

**Table 2: Level of use of PPE**

| Safety aspect | | Frequency of use | | | | |
|---|---|---|---|---|---|---|
| | | Always | Few times | Seldom | Once | Never |
| Use of PPE | Safety Boots | 93% | 7% | 0% | 0% | 0% |
| | Safety Helmet | 90% | 6% | 2% | 0% | 2% |
| | Safety hand gloves | 49% | 21% | 28% | 2% | 0% |
| | Safety Harness | 33% | 22% | 39% | 2% | 4% |
| | Eye protective equipment | 43% | 17% | 33% | 0% | 7% |
| | Proper working dress | 87% | 7% | 4% | 2% | 0% |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Use of Hi-Viz Vest | 77% | 10% | 7% | 3% | 3% |
| Observing safety rules | Operating unknown equipment | 6% | 2% | 15% | 25% | 52% |
| | Avoiding moving objects | 63% | 18% | 6% | 0% | 13% |
| | Abiding by the general site rules | 93% | 5% | 0% | 0% | 2% |
| | Sticking to zebra crossing rules | 84% | 0% | 12% | 2% | 2% |

According to Table 3, three of the top-4 causes of accidents are worker-related and can be associated with negligence. This suggests that many, or at least some, of the accidents that occur in the construction industry may be caused by the negligence of workers. If some workers fail to observe known safety protocols either deliberately or willingly, then they may be risking not only their lives but those of colleagues.

**Table 3: A rating of the causes of construction accidents in Nigeria**

| **Cause of accidents** | **Rank** |
|---|---|
| Lack of compliance to safety rules by the worker | 1 |
| Lack of adequate training to enable workers carry out tasks safely | 2 |
| Carelessness/ Recklessness of workers in the course of discharging their duties in the workplace | 3 |
| Unsafe acts e.g. performing any task willingly that may lead the worker to injury | 4 |
| Lack of necessary skills to carry out a task by a worker | 5 |
| Corrupt practices by the policy makers | 6 |
| Inadequate supervision of workers by some contractors | 7 |
| Inability of the contractors to employ literate/skilled workers | 8 |

| | |
|---|---|
| Lack of awareness of health and safety procedures | 9 |
| Lack of representation of policy makers in the industry | 10 |
| Lack of proper communication by contractors | 11 |
| Non-existence of any policy that will penalize contractors who compromise the health and safety of their workers | 12 |
| Lack of proper coordination by contractors | 13 |
| Ineffective management actions | 14 |
| Use of Improper construction methods by some contractors | 15 |
| Lack of commitment and concern to citizens' health and safety by the policy makers | 16 |
| Non-use of Personal Protective Equipment (PPE) | 17 |
| Poor coordination of the site activities by the project manager | 18 |
| Complexity of the work to be done | 19 |
| Poor monitoring of construction activities by the policy makers | 20 |
| Poor communication between the project manager, the supervisor and the health and safety officer | 21 |
| Not giving periodic training to the employees in the workplace | 22 |
| Lack of commitment of the contractors to the health and safety of their workers | 23 |
| Ineffective communication mechanisms between the policy makers and the representative of the construction industry | 24 |
| Ineffective planning and scheduling of the work by the contractors | 25 |
| Lack of proper communication by some contractors | 26 |
| Lack of accident reporting standards | 27 |

| | |
|---|---|
| Lack of (not keeping) proper accident record | 28 |
| Poor supervision of the employees by the project manager | 29 |
| Using unqualified technical staff by the contractors | 30 |
| Immaturity of the worker | 31 |
| Political interference in the construction industry | 32 |
| Diversity of the levels of experience of workers | 33 |

**Discussions of the Results**

The level of experience of the respondents and the number of accidents they have witnessed provides a reasonable basis for them to proffer acceptable opinions on the subject matter of the research. Table 2 suggests that safety practices are being implemented but gaps or even oversights remain. For example, 39% of the respondents indicated that safety harnesses are seldom used, 33% also indicated that eye protection equipment are seldom used while 6% reported the use and/or operation of an unknown machine. Such practices pose a great risk of accidents to workers.

According to Table 3, attributes ranked as numbers 1, 3, 4 and 17 can be associated with negligence on the part of workers. Given that three quarters of the aspects of negligence feature amongst the top-4 causes of accidents, it can be surmised that the rate of negligence amongst Nigerian construction workers is quite high. This finding concurs with views by Ndekugri and Corbett (2004).

Abdul Hamid *et al*. (2014) and Kadiri et al. (2014) are of the opinion that carelessness can lead to workers' injury on site. The least ranked element of workers' negligence, at No.17 on Table 3, was the non-use of PPE. Its lower ranking is not surprising as Table 1 had indicated that many workers use PPE.

About 20 causes of accidents in Table 3 can be associated with an element of practice of a contractor's organisation. Five of these were ranked amongst the top-10, at numbers: 2, 5, 7, 8 and 9. Further, 10 of the top-ranked 20 causes of accidents could be linked to contractors' practices. So in as much as the negligence of employees may be contributing highly to accidents, contractors' practices also have influence in this

regard. Awwad *et al* (2016) indicate that inadequate supervision of workers by project managers has contributed to causing accidents in developing countries like Nigeria. Tam *et al.* (2004) and Ali *et al.* (2010) decry the poor keeping of proper records of accidents in the construction industry as a contribution to accidents onsite, as this hinders the use of past information to take precautionary measures. Furthermore, construction companies need to organise their working environments properly so as to minimise the chance of accidents (Tapurra *et al.,* 2014; Yildizel *et al.,* 2015). The findings presented in Table 2 seem to agree with these observations from literature, that contractors' practices can cause or prevent accidents.

Two practices associated with policy makers were ranked in the top 10 and five in the top 20. A few other causes of accidents could be attributed to more than one source, e.g. 'immaturity of a worker' which can be linked to either or both of two things: 1) deceit of a worker in making exaggerated claims about their capability, or 2) failure/inability of an organisation to properly assess the qualities and competencies of their employee. Causes ranked at numbers 19, 21, 31 and 33 fall into this category. Overall, a mixture of many factors contributes to accidents in construction in Nigeria.

**Conclusions**

This study evaluated the contribution of negligence to causing accidents in Nigerian construction. The findings, however, show that various factors combine to cause accidents; even though, negligence seems to play a role in this regard. Lack of compliance to safety rules by workers is a strong factor in causing accidents. The findings expose a loophole that needs plugging. Construction workers should be made to observe all H&S rules and all project managers should observe their workers more closely to ensure compliance. Construction organisations could consider introducing penalties for offences pertaining to negligence about H&S.

It is recommended that periodic training and frequent reminders should be introduced to the workers through notice boards, placards and other means of conveying information onsite. This will definitely help to minimise negligence on the part of workers and thus reduce the number of accidents in construction in Nigeria.

Even though the findings are based on the opinions of 72 respondents, but the patterns revealed in Tables 2&3 can be projected to the entire country because many contractors tend to engage many unskilled and uneducated personnel as frontline

workers to actually carry out the physical construction. One reason for this practice being that construction contracts may not be regular and so employing and maintaining skilled personnel may be very expensive. Also, unskilled persons may pressurise contractors into engaging them, even at a cheaper rate, because that may be the only job they can find due to a very high unemployment rate in the country. Clients do not overtly object to whoever is employed on site as long as the construction is carried out for them. The issue of negligence on the part of workers can be addressed if contractors can be more diligent in scrutinising the people they employ on site; and follow this up with supervising them adequately and enforcing H&S practices. All relevant workers should be provided with PPE and not exposed to risks of e.g. operating machines they do not know.

Government too can help by promulgating regulations and policies that will improve and uphold very high standards of H&S on projects. For example, mandatory training programmes on H&S for all employees could be introduced, and so forth. Government can also follow this up with more effective monitoring and control of happenings on construction sites. Another aspect Government can step-up is the reporting of accidents on site. The mechanism to ensure that accidents are fully reported can be firmed up.

The findings of this research indicate that good H&S practices have not yet attained their peak in Nigeria. Greater efforts are needed by many stakeholders to help improve the situation. There is a lot that can be done in future by experts in this area.

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