



## **Accidents at Construction Sites toward Materials Handling in Yobe State, Nigeria**

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### ***Abstract***

*The construction work site is often a chaotic place with an incredibly high amount of action taking place. Workers and machines move about in frenzy, with everyone focused on the task at hand. In such an environment construction accidents such as handling of materials take place. This paper explains accidents in material handling at construction sites in Yobe State and also identifies their main causes and frequency. The questionnaire forms an important source of data collection for this research. The questionnaire was tested for validity and reliability with the statistical package for social science (SPSS); which results show a cronbach's alpha of 0.958. Based on the research conducted, the major cause of accident in materials handling is identified as low level of safety implementation/ standard and compliance in most of Yobe State construction industry.*

***Keywords:*** *Accidents. Materials handling, construction sites, questionnaire survey.*

## **Introduction**

Accidents in material handling are inevitable in most construction sites. To identify such accidents and their occurrence rate is an issue of great concern to engineers, construction practitioners as well as researchers in the field of construction. The construction industry is considered as one of the most dangerous industries on the basis of accident

frequency (Kumar, 1991, Salminen 1995) and injury rate (Everling et al, 1990). The construction work site is often a chaotic place where several activities are undertaken dependently or independently. People and machines move freely with each individual focused on his/her tasks. It is inevitable that a place of such nature with a greater magnitude of workforce is bound

to be exposed to accidents. Only mining, agriculture, forestry and fishing have higher fatalities rates compared to the construction site (Hunting et al, 1999). The accident and injuries from construction sites are enormous. In USA and most European countries, accidents and injuries from materials handling at construction sites has been increasing over the years.

Accidents are unfortunately an integral part of materials handling at sites (Lortie and Pelletier, 1996). Some previous studies show that a quarter of accidents and injuries sustained at construction sites involves material handling (Helender, 1991).

Several studies have made concerted attempts to specify different trades in the construction industries and their relationship to the type of accidents (Kumar, 1991, Culver et al 1993, Hunting et al 1999, Larso and Field 2002).

The construction site is an active and dynamic industry, but it is also one that contains a large number of hazards and risks (European Agency information, 2005). Accidents can therefore be regarded as any unplanned, undesirable, unexpected and uncontrolled event. An accident therefore does not necessarily result in an injury. It can be in terms of damage to materials and equipment (Hinze, 1997). Available statistics indicates that more than a thousand construction workers were killed annually on the job. Greater percentage of the deaths or injuries that result from these sites can be prevented. But more importantly, the construction industry plays a crucial role in the infrastructural development of Yobe State. Developing countries all over the world have significant percentage of their labor force engaged productively in the construction sector. Nigeria construction industries have their practice legislated, necessary measures put in place, all with the aim of having a safe working environment.

However, the construction industry in Yobe State has its own fair share of accidents in materials handling. The cost of these accidents is immense to the individual, the employer as well as to the society. It has been reported in various journals that accidents in materials handling at sites may cause physical injuries, health illness or sometimes permanent disabilities or even death.( Hamid and Yusuf et al 2013)

Most accidents or injuries at construction sites occur when we move or handle construction materials. Many people feel that moving and handling materials at site every day is an ordinary task, not something that they really need to be concerned so much about, yet there are hundreds of thousands of material handling accidents every year.(Borger Ding. G2002). In everyday operations, workers handle, transport and store construction materials. They undertake such activities manually or by powered operated devices. In undertaking such activities, accidents may occur due to a number of factors which if tackled appropriately on the onset may reduce the accident rates.( Brown, I.D; 1995) .Most reported accidents in materials handling at construction sites in Yobe State are attributed to a numbers of factors which in most cases are artificial (Yee Ibrahim 2018). It is therefore necessary for site engineers, safety officers and construction practitioners to identify all

the possible causes of such accidents and investigate avenues to forestall their future occurrences in the industries.

The paper seeks to provide in- depth clarification on accidents in material handling, their causes, and frequency of occurrence, determine an appropriate measure or proffer remedial measures to forestall future occurrences thereby saving lives, reducing cost of medication, medical leaves as well as control construction work in addition to safety of materials at sites.

Physical inspection, site visit and questionnaire survey were used extensively in gathering sources for the research work. The questionnaire survey was conducted to ascertain the factors leading to accidents in materials handling in the construction sites after a thorough validation of the questionnaire.

It was thereafter administered to site engineers, safety officers, site supervisors as well as the labor force. Five distinct sites namely, construction sites for high rise buildings, residential buildings, roads, industrial/factory and retaining structure construction sites were involved. The outcomes of the questionnaire responses were discussed in the main body of the paper (Bowling 2005)

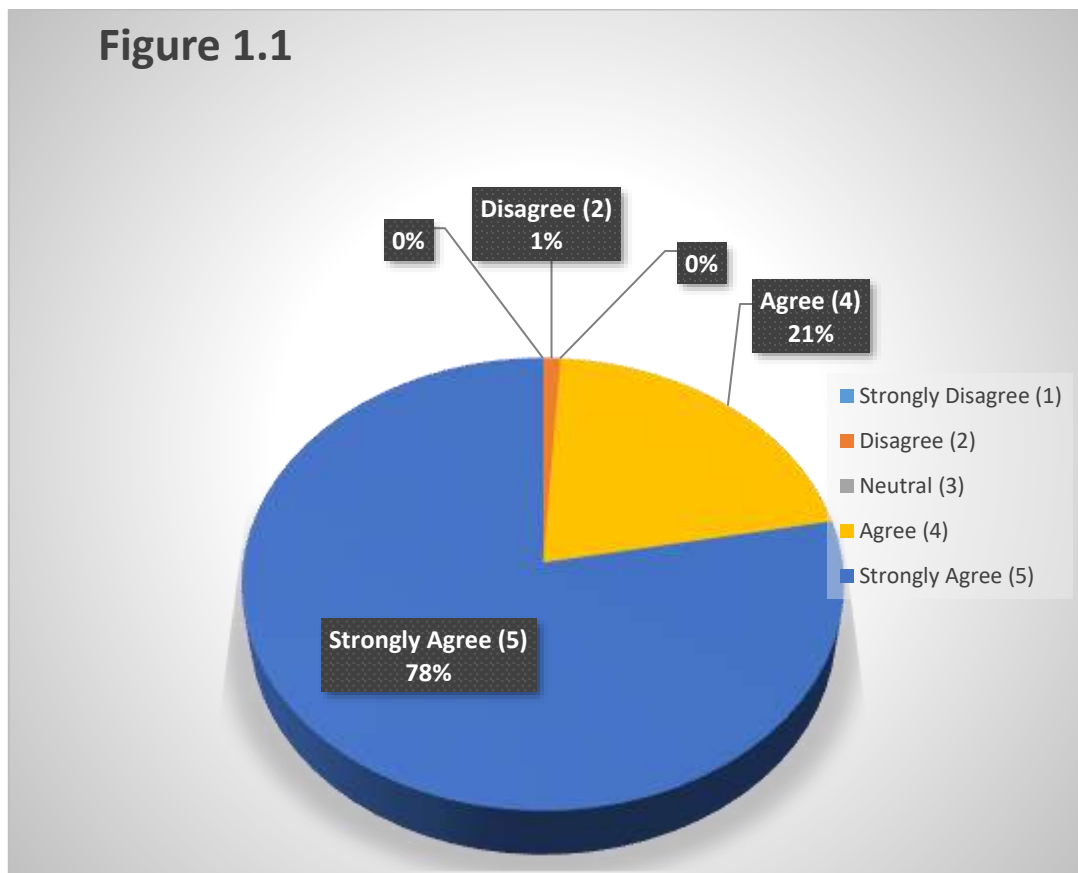


Figure 1.1 illustrate the percentage distribution in the pie chart with two dominant answers of strongly agree and agree with 78% and 21% while a mere 1% disagree.

## SECTION B

Identification of factors causing accidents in materials handling at construction sites in Yobe State.

Table 3.1 Responses to likely cause of accidents

<b>Strongly Disagree (1)</b>	<b>Disagree (2)</b>	<b>Neutral (3)</b>	<b>Agree (4)</b>	<b>Strongly Agree (5)</b>
Nil	1	Nil	6	53

Table 3.1 above illustrates the summary of the respondents responses in section B of the questionnaire where factors that may likely cause accidents in material handlings at construction sites in Yobe State were identified.

Table 3.2 percentage distribution of frequency

<b>Scale</b>	<b>% Distributions</b>	<b>Frequency</b>
<b>Strongly Disagree (1)</b>	0	0
<b>Disagree (2)</b>	1	1
<b>Neutral (3)</b>	0	0
<b>Agree (4)</b>	10	6
<b>Strongly Agree (5)</b>	89	53

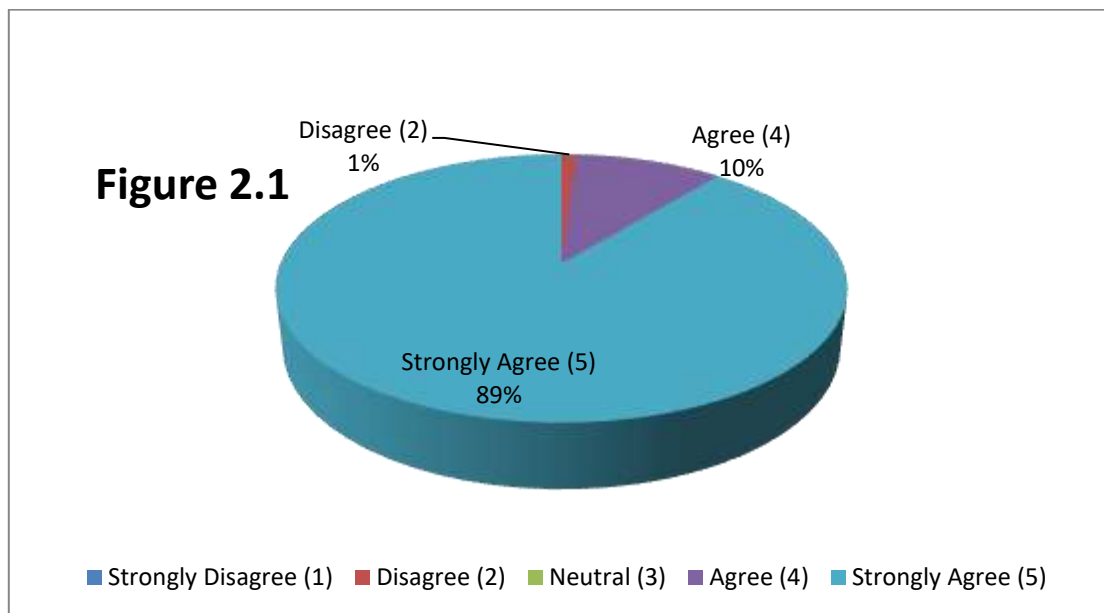


Figure 2.1 illustrates the percentage distributions in the pie chart where eighty nine (89%) and ten (10%) are in agreement with the assertion raised in questionnaire while just one (1%) disagreed.

**SECTION C**

**Measures to improve/mitigate future occurrences of accidents in material handling at construction sites in Yobe State.**

Table 4.1 Measures to improve/mitigate future occurrences of accidents in material handling at construction sites in Yobe State.

<b>Strongly Disagree (1)</b>	<b>Disagree (2)</b>	<b>Neutral (3)</b>	<b>Agree (4)</b>	<b>Strongly Agree (5)</b>
Nil	3	Nil	2	55

Table 4.1 illustrates the summary of the questionnaire for the section C where measures to improve/mitigate future occurrences of accidents in materials handling at construction sites in Yobe State was advocated by authors and respondent responses were shown. Fifty five (55) and two (2) numbers respondents are in agreement with the assertion raised by the author while three (3) respondents disagreed with the measures advocated by the authors.

Table 4.2 percentage distribution and frequency

<b>Scale</b>	<b>% Distributions</b>	<b>Frequency</b>
<b>Strongly Disagree (1)</b>	0	0
<b>Disagree (2)</b>	5	3
<b>Neutral (3)</b>	0	0
<b>Agree (4)</b>	3	2
<b>Strongly Agree (5)</b>	92	55

Table 4.2 above illustrates the summary of the percentage distribution and frequency distributions. Ninety two (92%) and three (3%) are in agreement with the measures while three (3%) of respondents disagree with assertion.

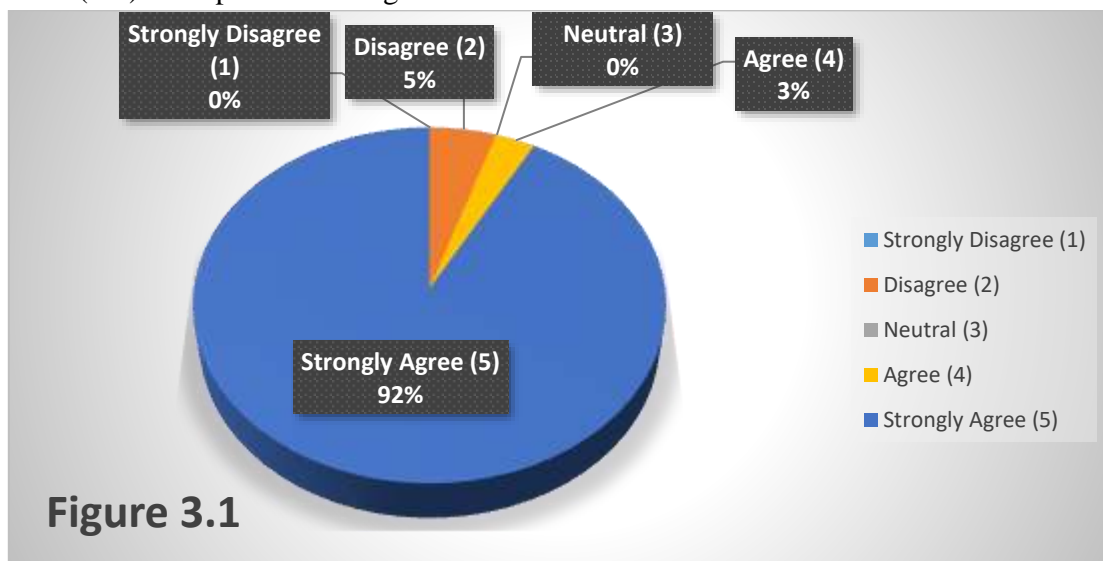


Figure 3.1 shows the percentage distribution in the pie chart with (92%) respondent strongly in agreement with measures, (3%) are in agreement, while (5%) are in disagreement with the assertion advocated.

## **CONCLUSION**

Accidents in materials handling at construction sites in Yobe State are indeed worrisome. The present trend where construction companies are at liberty to conduct their business without adhering to laid down rules and regulations as provided by regulatory bodies such as Department of Occupational Safety and Health (DOSHS) and National Institute for Occupational Health (NIOSH) leaves much to be desired; base on the research conducted, the followings are identified as main causes of most accidents in material handling at construction sites in Yobe State:

- I. The current level of safety implementation/ standard and compliance in Yobe State construction site is low.
- II. People at some few construction sites do not obey or follow basic safety standards in materials handling at sites.
- III. Non-availability of personal protection equipment (PPE)
- IV. Inadequate trained manpower.
- V. Falls from height and collapsing objects.
- VI. Working in space unprotected in a confined area.
- VII. Poor enforcement by regulatory agencies such as DOSHS and NIOSH.

Authors' opinions based on the research conducted on ways to mitigate/ improve future occurrences of accidents in materials handling.

- I. Construction sites should engage a competent safety/ supervisor to be in charge of safety matters.
- II. Construction companies should provide awareness campaign and safety trainings/ courses periodically to their employees as conducted by CIDB and NIOSH.
- III. Application and enforcement of relevant personal protection equipment (PPE).
- IV. Ladders, scaffolding and roofs must be rigidly fixed at all times to avoid falls from height.
- V. Safety and health promotions, promoting safe work practice and continuous upgrading/ updating of publications on safety and health precautions.
- VI. Capacity building of enforcement agencies officers.
- VII. Improving accidents reporting mechanism.
- VIII. Safety and health incentives and disincentives.

Accidents in material handling can be reduced significantly if the identified measures are put in place. Yobe State construction industries are indeed in need of total overhaul in

terms of accidents reporting mechanism. It involves a lot of bureaucracy for one to report and get accidents documented and equally get paid by insurance companies if at all the construction firm has insured its workforce.

## **TYPES OF CONSTRUCTION SITES ACCIDENTS IN YOBE STATE CONSTRUCTION SITES**

Most of the common encountered accidents at construction sites which also relates directly to accidents in materials handlings are scaffoldings accidents, workers being injured by moving vehicle or falls from heights ,operating equipment, excavation cave in, falls, fire, and explosions, welding accidents, nails and other sharp-edge/pointed objects, cement burns.

Each of these happenings shown below can be tragic and deadly and they can be completely curtailed through enforcement of basic safety procedures.

- a) Scaffolding Accidents which may include defective scaffolding, improperly assembled scaffolding.
- b) Unsafe/faulty ladders
- c) Defective power tools
- d) Defective derricks
- e) Defective hoist
- f) Defective conveyors
- g) Defective woodworking tools
- h) Elevator shaft falls
- i) Falling objects
- j) Crane accidents
- k) Crane falls on construction site
- l) Run over by operating equipment
- m) Hit by highway vehicle
- n) Electric shock electrocutions
- o) Power line contact
- p) Trench collapse

## **METHODOLOGY/MAIN DISCUSSION**

The questionnaires form an important method of data collection for the research paper apart from the physical site visit. It was divided into three (3) distinct parts namely section A, B and C. Every section has a set of twenty (20) questions relating to accidents in materials handling, apart from section A which is aimed at ascertaining the expertise and experience of the respondents in the construction industry.

It is imperative to state that section B dwelled on the likely causes of accidents in materials handling in the Yobe State construction sites. While section C deals with the authors

opinion on the factors/solutions proffered which if implemented may go a long way in curtailing/mitigating future occurrences of accidents in materials handling.

A sample of ten (10) answered questionnaires was used to determine the questionnaire validity using the statistical package for social science (SPSS). A Cronbach alpha of 0.958 was obtained for the reliability/ validity test which is an indication of excellent questionnaire.

The lists of variables tested are as follows:

- 1) Section A is to determine the knowledge and expertise of respondents on accidents in materials handlings and their experiences in the field of construction.
- 2) Section B is the identification of factors causing accidents in materials handling at construction sites.
- 3) Section C is to proffer measures to improve/mitigate future occurrence of accidents in materials handling at construction sites in Yobe State.

The response from the respondents on these three basic key issues was used for the analysis and findings as illustrated in tables and figures.

### **RELIABILITY OF VARIABLES**

The reliability of measure is defined as the degree to which research results would be similar if the research were to be repeated in future or with a different sample or subjects. (Ticehurst and veal, 1999). It essentially entails testing the goodness of data.

There are various models used to conduct reliability analysis of a measurement tool such as Cronbach alpha ( $\alpha$ ), strictly parallel and parallel model.

However, Cronbach's Alpha ( $\alpha$ ) was used for this research paper; as it is commonly used by researchers and is accepted as a perfectly adequate index (Sekaran, 2000). Besides, Cronbach's alpha ( $\alpha$ ) is a reliability that indicates how well the items in a set are positively correlated to one another (Sekaran, 2000). The reliability of the research instruments will be higher when the value of Cronbach's alpha ( $\alpha$ ) is closer to one (1). (Sekaran, 2000). In this research, a reliability test was conducted for the questionnaire framed work which was measured using 5- point likert scale.

The result shows that the Cronbach's alpha ( $\alpha$ ) is 0.958. Generally speaking, Cronbach's alpha ( $\alpha$ ) of less than 0.60 are considered to be poor, whereas those in the range of 0.70 range are considered acceptable and those over 0.80 are considered to be very good (Nunally, 1978). The reliability coefficient of the measures used in this study was examined using stastical package for social science (SPSS); the results obtained from the answered questionnaire were analyzed in detail as illustrated in the pie-chart and tables in the later part of the paper.

Table 1.1 RELIABILITY STATISTICS

<b>Cronbach's Alpha</b>	<b>No. of item</b>
<b>0.958</b>	<b>60</b>



## **VARIABLES**

**TABLE 1.2** Case processing summary

	<b>N</b>	<b>%</b>
<b>Valid</b>	10	100
<b>Case excluded</b>	0	0
<b>Total</b>	10	100.00

### **1.3 Scale Statistics**

<b>Mean</b>	<b>Variance</b>	<b>Standard Deviation</b>	<b>N of Items</b>
227.7000	964.900	31.06284	60

## **ANALYSIS AND FINDINGS**

The sixty (60) number questions administered in the questionnaire were successfully responded to and the sections of each part namely section A, B and C is highlighted as follows.

### **SECTION A**

To determine the knowledge and expertise of respondents on accidents in material handling at construction sites in Yobe State.

The questionnaire is based on likert scale as illustrated in the table.

Table 2.1 summary of questionnaires

<b>Strongly Disagree (1)</b>	<b>Disagree (2)</b>	<b>Neutral (3)</b>	<b>Agree (4)</b>	<b>Strongly Agree (5)</b>
Nil	1	Nil	13	46

Table 2.1 illustrates the summary of the entire questionnaires for the section. Respondents responses were as shown where forty six (46) respondents strongly agreed, thirteen (13) agreed while only one disagreed with the issues raised in the questionnaire which is essentially on respondents expertise and knowledge in the construction industry particularly on material handling on site.

Table 2.2 percentage distribution and frequency

<b>Scale</b>	<b>% Distributions</b>	<b>Frequency</b>
<b>Strongly Disagree (1)</b>	0	0
<b>Disagree (2)</b>	1	1
<b>Neutral (3)</b>	0	0
<b>Agree (4)</b>	21	13
<b>Strongly Agree (5)</b>	78	46

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