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# EXAMINE COMPLIANCE WITH FALL SAFETY DOCUMENTS IN CONSTRUCTION INDUSTRY

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**Abstract** - *The number of construction workers fall to death over the years have increased and that in 2012 falls, slips or trips took the lives of 668 workers. Despite the existence of OSHA regulation the incidence and accidents rate are high which indicate the need for further improvement on the existing regulation. This study will attempt to examine the compliance with fall safety documents in construction industry with a view to improve fall prevention employed on sites. The study strategy adopted was to observe the compliance with a range of standard safety documents and reviewing the available company document relevant to fall safety management. 19 construction sites meet the research criteria and the general assessment of the sites document was conducted using the assessment criteria adapted for the study. The documentation assessment indicates the quantity of safety documentation available on site; it was evident that the majority of the document lacked quality. Safety plans were in general very broad and generic. It can be concluded that there much that could be done in the majority of the sites. A systematic evaluation strategy needs to be urgently developed in order to improve the strengths and the weakness of various safety documents.*

**Keywords:** Fall accident, Preventive measures, fall regulation, Safety document.

## 1. INTRODUCTION

Falls are the most frequent cause of fatalities at construction sites and annually account for one of every three construction – related deaths (OSH Academy, 2017). According to BLS, (2012) the number of construction workers fall to death over the years have increased and that in 2012 falls, slips or trips took the lives of 668 workers. OSHA



regulations were promulgated to reduce the number of work site injuries and fatalities occurring as a result of falls, also a significant portion of the regulation are focused on fall protection (Ghule, 2008). Despite the existence of OSHA regulation the incidence and accidents rate are high which indicate the need for further improvement on the existing regulation. OSHA were able to classified accident involving falls are complex event and consequently OSHA standard ensure that both human and equipment issues are taking in to consideration while protecting workers from fall hazard. The revised OSHA construction industry safety standard was designed to prevent employees from falling off or through working levels and to protect employees from being struck by falling objects. According to OSHA academy, (2017) the revised rule covers most construction workers except those inspecting, investigating or assessing construction worksite condition prior to the commencement of work or after completion of all work. The revised rules ensure that the employer must protect their employees from fall hazard and falling objects whenever an employee is working at 6 feet (1.8 meter) or more above lower level. Also protection must be provided to workers who are exposed to the hazard of falling into dangerous equipment. Fall protection can be provided through the use of guardrail systems, safety net systems, personal fall arrest system, positioning device systems and warning line system etc. Falls accidents are preventable if proper safety measures are followed. Construction fall safety documents are aimed at reducing/eliminating falls and accidents on construction sites, but the threat of fall still continues to be a concern to the construction safety professionals. This study will attempt to examine the compliance with fall safety documents in construction industry with a view to improve fall prevention employed on sites.

## **2. LITERATURE REVIEW**

Construction workers engage in many activities that expose them to serious hazard, such as falling from above. In many parts of the world, falls from height are leading causes of fatalities in construction operations (Sorock *et al.*, 1993). Internationally, falls from heights in New Zealand are the leading cause of occupational injuries (Bentley *et al.*, 2006). Falls account for approximately 51% of injuries in China's construction industry (Yong, 2009). In Hong Kong, work-related falls



from heights represented more than 47% of the total fatal incidents in 2004 (Chan *et al.*, 2008). According to Mba and Halda (2014), lack of reliable data or accidents record on construction site is due to the fact contractors do not report accidents to appropriate authorities. The lack of reliable data or accidents record in Nigerian construction industry is due to absence of Occupational Safety and Health Act (OSHA). As at 2017 the act is yet to be passed and sign in to law. The contractors need to be aware that there is great penalty if they fail to report accident to relevant authorities. As contain in the Factory and Machinery Act (FMA), it is the duty of every contractor to report any occurrence of accidents on their site to the Director General (DG) of the Department of Occupational Safety and Health (DOSH) in the Ministry of Labor and Productivity. In the opinion of Idoha, (2011) that accident and injuries rates in Nigeria as at the year 2006 were 2 accidents per 100 workers and 5 injuries per 100 workers. The records do not provide the types of accident. The primary causes of fall accidents in construction were falling from a roof, erecting structural steel, exterior carpentry, exterior masonry, installing equipment, demolition (MaCann, 2002; Murty, *et al.*, 2006). According to BLS, (1996) special trade contractors had the highest frequency of fatal work-related deaths, accounting for approximately 57.5% of all fatal work-related falls in this industry in 1994. Fall from roofs, ladders, and scaffolds account for approximately 28.5 % of the total fatal work-related events in the construction industry (BLS, 1996). A study conducted by Centre for construction research and training, (2018), using data from NIOSH concluded that between 1982 and 2015:

1. 42% of the fatalities involves falls.
2. 54% of the workers killed have no access to a Personal Fall Arrest System (PFAS) and 23% had access to PFAS but did not use it.

The study reveal that 107 of the 325 falls accident were from 30 feet or higher and 20% of the 368 death occurred in the victims first two month on the job. Fall from roof are one specific concern at construction site as it is the most frequent cause of fatal fall. From 2003 to 2007, 686 fatalities in construction sites are due to fall from roof (OSHA Academy, 2017). According to OSHA Academy, (2017), fall – related injuries and fatalities are preventable. As it can be deal in the following ways:

1. Fall prevention  
Preventing workers from falling by using engineering control such as guardrails and hole covers or restraint system.
2. Fall arrest/rescue  
Preventing fall injury using personal fall arrest system (PFAS) or safety net and having an effective rescue plan.

Fall protection can be effectively achieved as outline in OSHA Academy, (2017) as follows:

1. Making fall protection part of construction worksite safety and health program.
2. Identify and evaluate fall hazards.
3. Eliminate fall hazards if possible
4. Train workers to recognize fall hazards
5. Use appropriate equipment to prevent falls and protect workers from falling
6. Inspect and maintain fall – protection equipment before and after using it.
7. Become familiar with OSHA and company fall – protection rules.

### **3. METHODOLOGY**

The study basically aimed at examining the compliance with fall safety documents in construction industry. In particular, the study strategy adopted was to observe the compliance with a range of standard safety documents and reviewing the available company document relevant to fall safety management. Due to the absence of a comprehensive database of the number and location of construction sites in Minna and Abuja and the current stage of their project, it becomes impossible to construct a probabilistic random sampling. As such the sample was stratified according to the following criteria.

1. The construction site must be in Minna and Abuja
2. The project must be building or civil engineering project
3. The construction company must be register as Medium and Large Construction Company.
4. The progress of work on site must be above 50%
5. The contract price of such project must be above 10million Naira.



Based on the above criteria, 19 projects met the study criteria as shown in Table 3.1. The selection of 19 projects is similar to the work of McDonald and Hrymak, (2003)

**Table 3.1: Sites selection**

Location	Medium size construction company	Large size construction company	Total
Minna	5	1	6
Abuja	3	10	13
<b>Total</b>	<b>8</b>	<b>11</b>	<b>19</b>

Source: Researcher Fieldwork, (2018)

The general assessment on the site safety document was conducted at each site, i.e 19 sites. All the sites safety document/documentation was inspected using the following assessment criteria as adapted from the work of McDonald and Hrymak, (2003).

1. Evidence of a well-documented site safety plan
2. Evidence of well-documented site risk assessment
3. Evidence that those risk assessment were site specific for identified site activities
4. Evidence of a well-documented site accident logbook
5. Evidence of a well-documented site safety meeting
6. Evidence of a well-documented site safety audits
7. Evidence of safety meeting
8. Overall general assessment of site safety documentation

#### **4. RESULT AND DISCUSSION**

##### **Documentation Analysis**

Assessment of site safety documentation was conducted during the latter half of the construction project. Safety documentation was evaluated on

the nineteen sites visited. The table 4.1 shows the results of evaluation carry out in the nineteen sites

a. Safety Plan

Is a personalized written document with elaborate process of identifying the hazards on site and the procedure of elimination or reducing the identified hazards. Virtually, all the sites have documented written safety plans. The safety plans varied considerably in length, details and presentation. Three (3) sites have well documented, lengthy, detail and up to date well-presented safety plan that can be applied to any construction sites. The three sites safety plan contained a clear management structure with clear delegation of responsibilities. Sixteen (16) sites safety plan are not as elaborate in details and are not updated in accordance with site safety development and progress of work. The site safety plan are not signed by relevant personnel, the safety plan also do not contain safety plan statement of their relevant subcontractors.

**Table 4.1 Results of safety document evaluation**

Site number	Safety plan	Risk assessment	Site specific risk assessment	Accident logbook	Safety meeting	Safety audits	Safety training	Overall assessment
1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Very Good
2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Very Good
3	Yes	Yes	No	Yes	Yes	Yes	Yes	Good
4	Yes	Yes	No	Yes	No	No	No	Poor
5	Yes	Yes	No	Yes	No	No	Yes	Poor
6	Yes	Yes	No	Yes	No	No	No	Poor
7	Yes	Yes	No	Yes	No	No	No	Very Poor
8	Yes	Yes	No	Yes	Yes	No	Yes	Poor
9	Yes	Yes	No	Yes	Yes	Yes	Yes	Good
10	Yes	Yes	No	Yes	No	No	Yes	Poor
11	Yes	Yes	No	Yes	No	No	No	Very Poor
12	Yes	Yes	No	Yes	No	No	Yes	Good
13	Yes	Yes	No	Yes	No	No	Yes	Good
14	Yes	Yes	No	Yes	Yes	No	Yes	Good
15	Yes	Yes	No	Yes	Yes	No	Yes	Good
16	Yes	Yes	No	Yes	Yes	No	Yes	Good
17	Yes	Yes	No	Yes	No	No	Yes	Good
18	Yes	Yes	No	Yes	Yes	No	Yes	Good
19	Yes	Yes	No	Yes	No	No	Yes	Good

Source: Researchers Analysis, 2018



- b. Risk assessment.  
Is simply a careful examination of what on workplace could cause harm to workers, so that necessary precaution to be taken in order to prevent such harm. It was observed that only two sites have a well-documented risk assessment for their sites activities and associated hazards. Those sites also have a documented control measures for reduce/eliminate identified site hazards. More than 80% of the sites do not have any documented risk assessment to address working at height, scaffolding and ladder which are all everyday tasks on the sites.
- c. Site specific risk assessments  
It involves assessing and qualifying for likelihood of possibility of injury and severity of any injury so occurred. Over 90% of the risk assessments of all sites were not site specific as these risk assessment did not address activities and hazard peculiar to their sites. Two sites have site specific risk assessment but not all site activities were addressed. For instance the two sites had a specific risk assessment for working on roofs, but have no risk assessment for working on scaffolding.
- d. Accident logbook  
This involves keeping records of all types of accident that occur on sites. The method of accident occurring documentation varies from site to site. Some sites had a formal systematic logbook that record specific accidents information e.g gender, age, type of accident etc. Other sites maintained a 'site diary' where accident cases were logged. Seventy per cent (70%) of the sites have the latter format of accident logbook. Inspecting the site accident logbook, it can be reported that sites with well reported accident logbook have few site accidents.
- e. Safety meeting  
Safety meeting is important to building a strong safety culture and reinforcing construction company/firm commitment to protection of their workers. Workers safety should be number one priority of every construction site management. It should be conducted on a regular basis to educate workers on safe work practices. Ten sites did not have any documented evidence of safety meeting, while nine sites indicates that safety meetings were conducted in terms of minutes of site safety meetings. In many cases 'safety' was also on



the agenda of other sites meeting like plant and machine meeting, subcontractors meeting, management/workers meeting.

f. Safety audits

This involves a standard process whereby information is collected as regard to the efficiency, effectiveness and reliability of the safety management system practice on sites. Four sites had documented sites safety audits presented in a checklist format. The documented audits within the four sites varied in terms of frequency, details, audited items, rating scale and audited outcomes. The four sites had scaffolding audits dedicated to inspection of site scaffolding. Two of the four sites had documented improvement suggestion or recommended control measures. Fifteen sites had no documentation relating to their auditing activities.

g. Training

Providing safety training makes employee's workplace safer. Fifteen sites indicate safety training had been conducted. Safety booklets were also disseminated to operatives during the safety programme. In the fifteen sites register of certificates indicating personnel were trained and competent to operate particular machinery and equipment example certificates of crane, forklift truck and dumper, and scaffold were available. Four sites have no evidence of safety training be conducted.

h. Overall general assessment

Two of the nineteen sites received an overall rating of very poor, they have no safety plan, no documented accident logbook, no safety audits and training. Five sites received an overall rating of poor. Their safety plan was sub - standard and had no well documented accident logbook, safety audits and training. Ten sites received an overall rating of good, their safety plan is standard, well documented accident logbook, safety audits and training but site risk assessment were not of site specific. Two sites received an overall rating of very good with standard safety plan well documented accidents logbook, safety audits and training. There sites risk assessments were of site specific when compare to others.

## 5. CONCLUSION AND RECOMMENDATION

The documentation assessment indicates the quantity of safety documentation available on site; it was evident that the majority of the



document lacked quality. Safety plans were in general very broad and generic. Safety plans were poorly managed and not updated as the work on the site progressed. Half the sites had risk assessments which were site specific, in some of these sites not all the relevant site activities were addressed. While nearly more than half of the sites cannot provide evidence of the safety audits that they have undertaken. As such it can be concluded that there much that could be done in the majority of the sites in order to improve of site safety documents. A systematic evaluation strategy needs to be urgently developed in order to improve the strengths and the weakness of various safety documents and adjust them with a reasonable expectation of improving the overall programme.

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