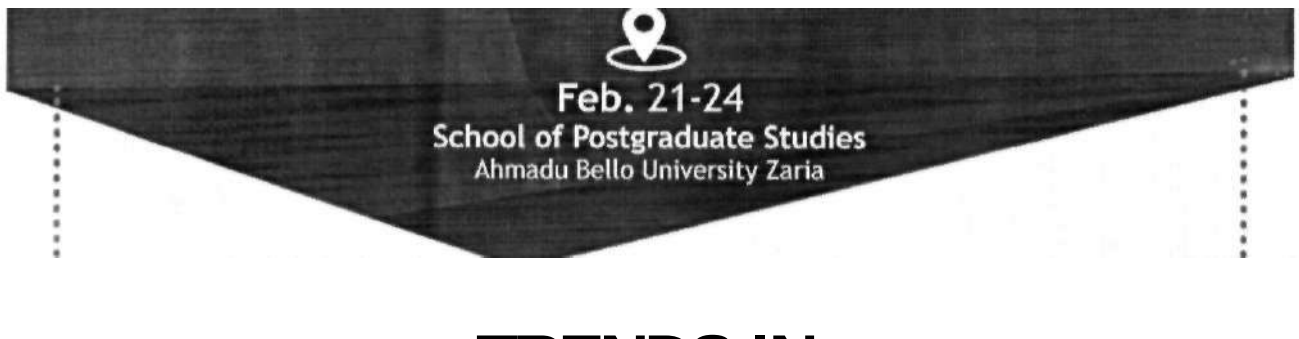
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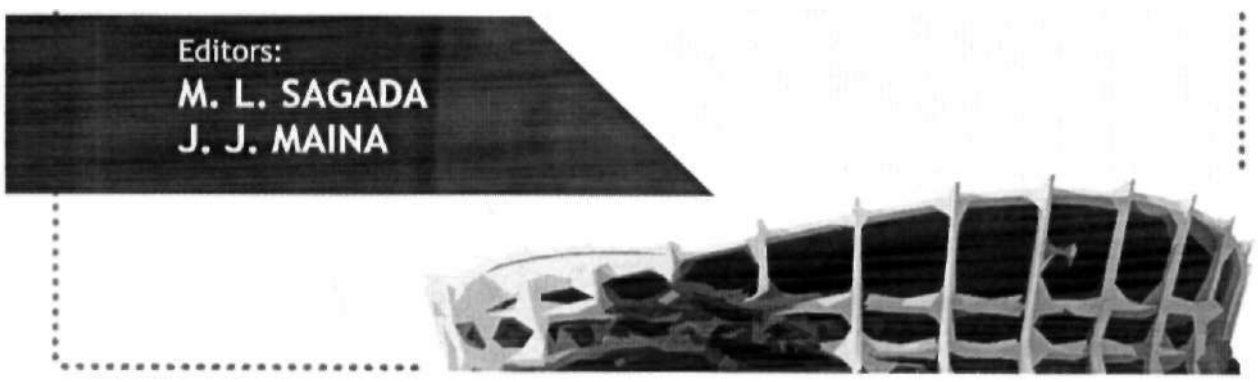
PROCEEDINGS

of the

2018 NATIONAL CONFERENCE



TRENDS IN 21ST CENTURY ARCHITECTURE AND SUSTAINABLE BUILT ENVIRONMENT



Association of Architectural Educators in Nigeria

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OF THE

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CONFERENCE

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WELCOME ADDRESSS BY THE VICE CHANCELLOR. AHMADU BELLO UNIVERSITY

Presented By The Deputy Vice Chancellor Administration, Prof. Kabir Bala

Chairman of the Occasion,
Dean, Postgraduate Studies,
Dean, Faculty of Environmental Design,
Other Deans here present,
HODs and Professors,
Conferees,
Students,
Members of the Press,
Invited Guests,
Distinguished Ladies and Gentlemen

First, I welcome each and everyone of you to this Association of Architectural Educators Conference holding this year at the great Ahmadu Bello University.

I would also like to welcome you to our unique campus with its serene environment, which is conducive for these kinds of activities. I am sure however, that it is home-coming for many of you, ABU being home to the first School of Architecture in Nigeria.

The theme of this year's conference, "Trends in 21st Century Architecture and Sustainable Built Environment" is quite apt. Development in Materials Technology on one hand and the global drive towards Sustainable Development on the other hand make it imperative for architects to evolve building design that will take both phenomena into account. Population trends, especially in developing countries are increasing at a very rapid rate, thus making a corresponding need for infrastructure to accommodate the number the people in the planet. Architecture will play a very central role in the provision of these infrastructure.

The theme of the 9th World urban Forum (WUF), which recently held in Kuala Lumpur in Malaysia was "Cities for all 2030". Professional, Administrators, Governments and many other stakeholders spent several days discussing issues of inclusivity in 21st Century Cities. A broad spectrum of issues such as education, employment, health and sanitation, and well-being etc. are involved. The 9th WUF was aimed at Habitat III (Setting the New Urban Agenda) in Quito in October 2016. Again the contribution of architecture to the realisation of this objective is quite obvious. A number of the 17 SDGs are infrastructure related.

Renewable energy has taken centre stage in the Sustainability dialogue. The reasons are not far-fetched. Hydrocarbon based energy sources are being de-emphasised due primarily

- Their contribution to the production of Green House Gases (GHGs) on the environment
- Depletion of known reserves and the detrimental effect

It therefore presented a credible challenge to architecture to evolve designs that are energy friendly. For instance the design of buildings that exploit passive instead of

active energy sources has become extremely important. Some of the passive phenomena include day light and natural ventilation.

Materials also constitute another important component of the sustainability debate. The need to utilise environmentally friendly materials has also become more and more important. The need to factor the issue-embodied energy in our buildings is imperative. Lighter materials with the prospect of the re-use could be explored. The use of traditional building materials (cement, stone, timber) should be thoroughly be examined. In many parts of the world, Portland cement is no longer being produced, having been taken over by blended varieties and the use of timber for temporary operation such as formwork and scaffolding have been disallowed, with stiff penalties for defaulters. Continued research in the field of materials and technology is therefore necessary.

Architects also need to evolve design of infrastructure bearing in mind the possibility of re-using the materials and components. Buildings should be designed in such a way that they can be de-coupled or precisely deconstructed. This will promote very important aspects of sustainability, recycling, reduction and reuse.

The need to factor in sustainability indicators in design is also very important. There is an overarching need for architects to 'green' their designs. Green building rating should be considered by the appropriate government agencies. But before then, architects can perhaps do a lot by rating their design with an existing rating tool such as LEED, BREAM, Green star etc.

These are the thoughts of a novice in architecture and I hope that I have raised some important issue which will be more professionally and intellectually discussed in the next two days.

I wish you fruitful deliberations.

AN APPRAISAL OF ACCIDENT RECORD MANAGEMENT PRACTICES OF NIGERIAN CONSTRUCTION FIRMS

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ABSTRACT

The construction industry continues to record a high prevalence of accidents compared to other industries. Although previous research efforts have developed different approaches towards improving the safety performance of the construction industry, lack of records has been identified as a major impediment to addressing the safety challenges faced by construction workers. In developing countries, poor accident records management practices continue to be a major barrier to the realization of any meaningful improvement in construction health and safety performance. This research assesses the record management practices of construction accidents in Nigeria. Quantitative research approach was adopted, using structured questionnaires to collect data from safety officers and construction project managers of small and medium construction firms in Abuja, Kaduna and Kano. Findings revealed that most of these companies do not have a structured accident record management system and there is no legislation mandating them to record and report accidents and their causal factors to any government agency. It was recommended that stakeholders should put in place a proper accident reporting and record management system in the Nigerian construction industry to achieve significant safety improvement.

Keywords: *accident reporting, construction safety, incidence record management practice*

Introduction

The construction industry has been widely described as dangerous or highly hazardous because of the disproportionately high incidence of accidents and fatalities that occur on construction sites around the world (Smallwood and Haupt, 2008, sohail (1999), Globally construction workers are two to three times more likely to die

on the job than workers in other industries while the risk of serious injury is almost three times higher. Accidents, illnesses and fatalities on a large scale impoverish individuals and their families, and undermine attempts to improve working conditions. In addition to immeasurable human suffering, they cause major economic losses for construction firms and society as a whole, such as lost in productivity and reduced work capacity.

In developing countries like Nigeria, where the construction sector is dominated by small and medium sized contractors, which operate mainly within the domestic markets, the issues of construction safety are often neglected. These contractors give little attention to health and safety issues and therefore contribute significant numbers of accidents and ill health. It has been reported that health and safety performance in these countries is poorer than that of developed countries (Kheni, et al, 2006). Several studies alluded that accident and injury rate in many developing countries such as Nigeria is considerably higher than in Europe, U.S. and Australia (Idoro, 2004 & 2007). Bust, Gibb & Pasquire (2004) reported that there are 8 or 9 times as many fatalities and accidents on construction sites in developing countries than in industrialized developed regions of the world. This is similar to the claims of Awodele & Ayoola, (2005) and Smallwood & Haupt (2005) that not less than hundreds of construction workers are being killed each year and many more rendered permanently disabled on Nigerian construction sites. It is either the safety management system is poorly implemented or the safety system is not adequately addressing all the relevant safety issues involved in each construction project and site, thereby making workers highly prone to accidents.

Other studies reported that contractors in developing countries are usually constrained by inadequacy of resources, which impact negatively on the management of health and safety (Bust and Gibb 2006). The legal and institutional arrangements for the management of construction safety are mostly obsolete or have little impact on the attitudes of owner-managers of small and medium-sized contractors towards health and safety (Diugwu et al, 2012).

To address the problem, previous research efforts have developed different approaches towards improving the safety performance of the construction industry, these approaches were taken from either the management perspective or from technology application perspective. (Zhou, et al, 2015). In any case, lack of records has been identified as a major impediment to addressing the safety challenges of the construction workers. In developing countries, poor accident records management practices continue to be a major hindrance to the realization of any meaningful improvement in construction health and safety performance. This research sets out to examine the record management practices of construction accidents by small and medium firms in Nigeria, with a view to highlighting areas of improvement.

LITERATUREREVIEW

Construction Accidents

An accident is an undesirable incidental and unplanned event that could have been prevented had circumstances leading up to the accident been recognised, and acted upon, prior to its occurrence (Hinze, 1997). An accident does not necessarily result in an injury. It can be in term of damage to equipment and materials and especially those that

result in injuries receive the greatest attention

Most scientists who study unintentional injury avoid using the term "accident" and focus on factors that increase risk of severe injury and that reduce injury incidence and severity (Robertson, 2015). Accidents can also be viewed as "any avoidable action by personnel or any failure of equipment, tools or other devices that interrupts production and has the potential of injuring people or damaging property". All accidents, regardless of the nature of the damage or loss, should be of concern. Accidents that do not cause damage to materials or equipment or injury to personnel may foretell future accidents with less desirable results.

Construction-site accidents are very common because the sites are highly risk prone. The likelihood that an accident will have severe consequences increases when it involves vehicles, scaffolding, structures, or ladders (Lopez et al. 2008). Specific training for scaffolding and other equipment is not well administered in many places. Halperin and McCann (2004) have pointed out that most scaffold-competent persons do not have adequate training to allow them to ascertain when a scaffold is unsafe. A large proportion of construction accidents are due to workers falling.

Occupations such as construction laborers, roofers, carpenters, and structural metal workers are commonly involved in falls, and these hazards should be specifically addressed through fall-prevention efforts (Huang and Hinze 2003).

Recording accidents and near misses is vital for analysis because the reports could highlight the causes towards which prevention efforts can be directed. Different approaches have been used to find the causes of construction accidents. Records have been found to be central in identifying and proffering solutions to the root causes of accidents and injuries in construction sites.

Accident Reporting

Accurate reporting of work-related injuries and illnesses is paramount to the success of every safety management system. It helps the employers to identify unsafe work environments and work practices; monitor workers' health and well-being; and eliminate hazards; or, at least, control the health and safety risks to employees. (Lander, et al. 2011). With a safe working environment, employees are expected to work without worries from time to time.

According to Daniels and Marlow, (2005), accident reporting can be made for insurance purposes and for regulatory reasons. The latter is mostly used in construction sites, where a company establishes a system in which all accidents and related injuries and near misses are recorded for learning useful lessons and taking preventive measures in the future. In an insurance-based accident reporting system, data are collected by public or private insurers, depending on the national arrangements, but because of the economic incentive to report, reporting levels are nearly 100%.

Schofield, et al. (2013), reported that accident reporting systems and disease reporting systems can be similar, however, accidents are much easier to identify and cause and effect (injury) are normally closely related in time, whereas this is not the case for most occupational diseases, where multiple exposures over a long period of time are more likely to be the cause, and the effect (disease) may be slow to manifest and may not be immediately attributed to the exposure which has major implication for data capture.

Construction professionals attribute the poor accident record practices in companies to poor safety culture, inadequate systems in place for reporting dangerous occurrences, inactive management commitment and so on.

The ostensible goal of any accident reporting system is to help make the working environment safer. Reported incidents should inspire those in positions to do so to make changes to make the system safer. According to Schofield et al. (2013), poor organizational safety performance is caused by stagnant safety practices in the face of technological advances, decreasing safety consciousness, eroding safety goals and disappointing safety programs, safety complacency, unintended side effects of safety fixes and *unsuccessful problem resolution, fixing* symptoms rather than root causes, inappropriately designed reporting schemes and other regulatory requirements, and a vicious circle of bureaucracy. Thee have resulted in serious underreporting of workplace accidents in the construction sector.

Underreporting of Construction Accidents

Underreporting of safety occurrences in the work environment poses a serious challenge to the effectiveness of safety management system in the construction industry (Leigh et al. 2004). There are different reasons for underreporting of safety incidences in workplace. Some are purposeful (evasion), though others are unexpected (lack of awareness). Likewise, underreporting can happen at any level of stakeholders (laborer, director, manager) (Schofield et al. 2013).

Studies show that underreporting of safety incidents is a global phenomenon (Pearce et al, 2005). However, the magnitude of this problem varies from country to country depending on cultural differences as well as variation in reporting systems and legislation, (Daniels and Marlow, 2005). Whether the incidents are underreported or over-reported intentionally or unintentionally at any level of the organization, a situation like this can produce mistaken estimates of incidents (Pearce et al, 2005). As a result, the data are not provided accurately to the appropriate quarters. As a result, no meaningful lessons are learnt by employers, employees and other stakeholders who will take action to forestall future occurrence.

Various studies on organizational-level under-reporting linked the issue to multiple factors. Typical issues would be the general safety climate, the specific *industrial, sector, the company size and* the perceived lack of management commitment (Leigh et al., 2004; Daniels and Marlow, 2005). At individual level, under-reporting has been ascribed to factors such as fear of reprisals, loss of benefits or a fatalistic attitude that injuries are a fact of life in certain lines of work (Sinclair and Tetrick, 2004). Additionally, underreporting prevents companies from obtaining an effective feedback mechanism and utilizing the information to implement changes in the work when it is required, (McCraven, 2012).

Accident record management

Due to the hierarchical nature of construction organizations (Zohar and Luria, 2005), injuries and illnesses are reported at multiple organizational levels. First, when injuries occur at the shop-floor level, workers must notify their safety managers. Second, incident reports must be made accessible to the employer's safety officer, and then, employers are usually mandated to record incidents accurately in the to

appropriate government agencies for several purposes.

In addition to the multi-level nature of the construction setting, a capital project site includes many subcontractors executing multiple activities ranging from excavation to finishing work. Each subcontractor is only responsible for keeping records of incidents of his own employees. This has been found to make the whole practice haphazard and, in some cases, unstructured.

Safety Management System

There is an increased interest with systematic approaches to manage occupational health and safety as an organizational strategy for the prevention of work-related injuries, ill health, and fatalities. Safety standards and environmental standards, such as OHSAS 18001:2007 and ISO 14001, are being implemented in many countries to improve safety performances.

The main objective of the Occupational Health and Safety Management System certification scheme is to encourage and enhance safety awareness, to promote safe work practices, and to raise the safety standards of the construction industry (Teo and Ling. 2006). Bottani et al. (2008) found, through an empirical investigation, that companies adopting safety management systems exhibited higher performance for all the topics encompassing company attitude to;

- Define safety and security goals, and communicate them to employees;
- Update risk data and perform risk analysis;
- Identify risks and define corrective actions; and
- Develop employees' training programs.

While the principles behind safety management are simple in concept, it is during the implementation of such a program that construction companies may encounter their most difficult obstacles (Wilson 2000). Issues such as cooperation from others are vital, yet profoundly ignored, by construction companies which is why seemingly simple problems continue to exist.

RESEARCH METHODOLOGY

Quantitative research method was adopted for this study, because it involves the use of mathematical and statistical techniques to identify facts and casual relationships between variables.

Data Collection Instrument

The data collection for this study was done through the use of structured questionnaire which was divided into four sections. Section A contained the background of the respondents, section B inquired about the background of the firms/project, section C inquired about the accident/incident recording systems in the firms, while section D requested the respondents' opinions on the barriers to accident reporting.

Population and sample size

The population for this research are the small and medium and medium construction firms in Nigeria. Due to the difficulty in ascertaining the total number of the firms, Cochran (1963) Equation was used to calculate the sample size for the study as:

$$SS = \frac{Z2 \times (p) \times (1 - p)}{C2}$$

SS = Sample Size
Z = Z-valueA (e.g., 1.96 for a 95 percent confidence level)
P = Percentage of population picking a choice, expressed as decimal
C = Confidence interval, expressed as decimal (e.g., .04 = +/- 4 percentage points).

Ninety per cent (90%) confidence level, five per cent (5%) of the population and +/- 9 percentage point was adopted for this research therefore a total 84 questionnaires were distributed to construction managers across Kaduna, and Kano states whom were involved in handling small and medium construction projects. Purposive sampling technique was used to distribute the questionnaires.

Data Analysis

The data obtained from the survey was analysed and presented using simple descriptive statistical tools and ranking. A t-test was used for the Likert scale for section (d) to analyze the degree to which each of the barriers to accident/incident record management. Statistical package for the social sciences (SPSS) computer software was used to run the analyses.

RESULTS AND DISCUSSION

Result of the administered questionnaires

A total of 84 were administered to construction/project managers within the area of study. The illustration below shows that a total of 63 (75%) of the administered questionnaires were returned and analysed from the total questionnaires administered, while 25 (25%) were not returned.

Table 1: Number of projects handled by respondents in the last five years.

No. of Projects	Frequency	Percentage (%)
Less than 10	6	9.52
10-15	8	12.70
15-20	33	52.38
20 and above	16	25.40

From Table 1, 6 out of 63 respondents were involved in less than ten (10) small and medium construction projects in the last five years, representing 9.52% of the respondents. 8 among them were involved in about 10 to 15 projects representing 12.70%. A total number thirty-three (33) of the respondents were involved in 15 to 20 projects in the last 5 years, representing a large share of 52.38% of the respondents. The remaining sixteen 16 respondents were involved in 20 and above small and medium construction projects representing 25.40%. This implies that the respondents have adequate experience in handling the category of construction projects in the study, and therefore the responses are

Table 2: Years of practice of respondents.

Years of practice	Frequency	Percentage (%)
Less than 5yrs.	33	52.38
5-10	20	31.75
10-15	10	15.87
15-20	0	0
20 and above	0	0

Source: Field Survey (2017)

From Table 2, the result shows that, a large percentage of the respondents have years of practice of less than 5 years. These set of respondents represent

52.38% of the returned questionnaires. Respondents with 5 to 10 years of practice and 10 to 15 years of practice represent 31.75% and 15.87% respectively while neither of the respondents have experience of 15 years and above. This indicates that the respondents to have a fair level of experience adequate enough to validate the results of the questionnaires.

Background of projects

This section inquired about the backgrounds of projects handled by the respondents in which they practice the accident record management. Construction projects where classified into: type and nature; with regards to types of projects, table 3a shows that 39.68% which represent a larger percentage of the respondents practice accident record management on only private projects, 34.92% practice accident record management on only public projects while 25.40% of the respondents practice accident record management on both public and private projects.

Likewise, Table 3b summarizes the nature of construction projects in which the respondents practice accident record management. The table shows that 57.14% of the respondents practice accident record management on new construction projects only, 20.63% practice accident record management only on projects in the projects involving of Repairs, Maintenance, Addition and Alterations (RMAA) while 22.22% of the respondents practice accident record management on both.

Table 3a and b Responses on type and nature of construction projects

Project Type	Frequency	Percentage (%)
Private Projects.	25	39.68
Public Projects.	22	34.92
Both.	16	25.40

Source: Field Survey (2017)

Project Nature	Frequency	Percentage (%)
New Construction Project.	36	57.14
R.M.A.A.	13	20.63
Both.	14	22.22

Source: Field Survey (2017)

Accident reporting.

The respondents were asked on the types of accidents they report in their work places to see the extent of practice of accident reporting in their companies. Responses from this section of the questionnaires show that the total of 79.57% of the respondents reported fatal accidents while all the respondents claimed they reported work related accidents which cause certain serious injuries with a total of 100% of the overall responses. Also, table 4 shows that 20.63% reported over-seven-day injury to workers and 22.22% reported injuries to non-workers. Only 14.29% of the responses reported occupational diseases while only a few respondents reported dangerous occurrences with 7.94% of the returned questionnaires

Table 4: Types of accidents reported

Type of Accident	Overall Frequency	Overall Percentage
Fatal accidents.	50	79.57%
Work-related accident which cause certain serious injuries.	63	100%
Over-seven-day injury to workers.	13	20.63%
Injuries to non-workers.	14	22.22%
Occupational diseases.	9	14.29%
Dangerous occurrences.	5	7.94%

Source: Field Survey (2017)

Table 5: Mode of accident reporting used in the firms

Mode of Accident Reporting	Frequency	Percentage
a. Verbally to safety technicians/site managers	32	50.79
b. Directly on forms by the workers	13	20.63
c. Electronic reporting system	6	9.52
d. Both a & b	12	19.05

Source: Field Survey (2017)

Table 5 reveals that workers generally report accidents verbally to the safety technicians or site managers with a percentage of 50.79% while 20.63% of the responses shows that workers report accidents information directly in a standardized form. Only 9.52% of the respondents claimed that they report accidents on electronic reporting system while 19.05% of the responses reported both verbally to safety technicians and directly on forms by the workers. This shows that the accident reporting practices are not fully advanced in the surveyed firms.

Table 6: Accidents reporting timeframe.

Period	Frequency	Percentage
Within 48 hours	48	76.19
After 3 days	15	23.81
After 7 day	0	0

Source: Field Survey (2017)

Table 6 reveals that majority of respondents report accidents within 48 hours with a percentage of 76.19% of the responses while only 23.81 of respondents report accidents after 3 days. None of the responses reported accident after 7 days. This shows that the respondents 'accident reporting practices are fairly timely.

Table 7: Organization that mandate and regulates accident record practices in Nigeria

Response	Frequency	Percentage
Yes	5	7.94%
No	58	92.06%

Source: Field Survey (2017)

Table 7 reveals that only 7.94% of the respondents believe that there is a body that mandates and regulates accident reporting in Nigeria while the majority of 92.06% do not believe that, further investigations revealed that there is no any organization that mandate companies to practice accident reporting in Nigeria.

Barriers to Accident Reporting

A total of 10 possible barriers to the practice of accident reporting and record management practices in small and medium construction projects were presented and the respondents were requested to rate the significance of these barriers using a 5-point Likert scale (where 0 = Not a barrier, 1 = somewhat of a barrier, 2 = moderate barrier, 3=high a barrier, 4 = extreme barrier)

Table 8: Barriers to Accident Reporting on Construction Sites

Barriers to Accident Reporting on Construction Sites	Mean	Standard Deviation	P.Value	Rank
Lack of time.	0.89	0.93	0.007	10
Lack of budget.	1.89	1.05	0.760	5
Unfair treatment to the workers	1.33	1.12	0.111	9
Lack of employee knowledge on incident/accident reporting.	1.89	1.05	0.760	5
No access to usable reporting method.	2.11	1.17	0.782	3
Lack of incentives to workers on incident/accident report.	1.56	1.01	0.225	8
Lack of management knowledge on incident/accident recording	1.67	1.22	0.438	7
Lack of available safety managers in the projects	2.22	1.30	0.622	2
Lack of experience	2.11	1.36	0.813	3
Lack of any health and safety regulating body	2.67	1.11	0.111	1

Source: Field Survey (2017)

Table 8 indicates that "lack of access to usable reporting method, "lack of experience" and "lack of any health and safety regulating body" are the most significant barriers to the practice of accident reporting and record management in construction sites based on their overall mean scores. Also, the one-sample t-test result implied that these factors significantly affect the practice of accident record management at the 0.10 significance level. "Lack of any health and safety regulating body" was considered as the most significant barrier with a mean score of 2.67. "Lack of trained safety managers in the projects" was ranked 2nd with a mean score of 2.22. "Lack of access to usable reporting method" has been ranked 3rd with a mean score of 2.11.

"Lack of experience" also plays a major role in the lack of accident record management practice in construction sites which has been ranked 3rd with a mean score of 2.11.

"Lack of budget", and "lack of management knowledge on accident reporting" were both ranked 5th with the same mean and standard deviation of 1.89 and 1.05 respectively. Followed by "Lack of employee knowledge on incident/accident recording" ranking 7th in the list of barriers to accident reporting in the projects.

Moreover, the remaining three barriers "Lack of incentives to workers on incident/accident report", "unfair treatment to the workers" and "lack of time "obtained scores lower than the test value, the one-sample t-test results indicated that there mean scores were significantly different from the test value. Thus, they were not impactful barriers to accident reporting practices in small and medium construction projects.

CONCLUSION AND RECOMMENDATION

The research has explored the accident record management practices of small and medium construction projects in some states of Nigeria. The paper concludes as follows though, the respondents claim that accident reporting is being practiced, lack of any agency mandating and regulating the accident reporting practices of construction firms in Nigeria hampers the effectiveness of the practices. Most of the companies do not have structured accidents record management system. For those that have it, serious under-reporting, particularly of minor injuries and near miss events, undermines the validity of the record. The paper recommends that accident records management practices should be instituted and regulated by the Nigerian government in order to establish a system for ameliorating the construction accidents profile of the Nigerian construction sector.

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