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**Confluence of Research, Theory and Practice in the
Built Environment**

EDITORS:

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FOREWORD

This is the Third Research Conference of The Nigerian Institute of Quantity Surveyors (NIQS) which is building on the theme "*Confluence of Research, Theory and Practice in Quantity Surveying Profession for a Sustainable Built Environment*". The maiden edition was held in September 2013 in Abuja, the second one at the Federal University of Technology, Akure in September 2015. Here we are again in September 2017 in Bauchi for the third edition. The NIQS Research Conference is dedicated to providing stimulating debates and discussions between researchers and practitioners from within and outside Nigeria whilst providing the basis for new areas of research in Quantity Surveying and the Construction Industry.

Research is a systematic inquiry that investigates hypotheses, suggests new interpretations of data or texts, and poses new questions for future research. Research is very important as it helps us find answers to issues that were previously unknown and attempts to fill gaps in knowledge. The real object of research is to "*extend human knowledge of the physical, biological, or social world beyond what is already known.*"

A theory is a set of interrelated concepts, definitions, and propositions that explains or predicts events or situations by specifying relations among variables. Theories are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and *extend existing knowledge* within the limits of critical bounding assumptions. Theories are not 'guesses' but reliable accounts of the real world which have been substantiated based on a body of facts that have been researched.

Over the years, practitioners in the Nigerian Construction Industry (NCI) have dispensed their acquired academic training in their various organisations and institutions. However, there is a paradigm shift in the way Quantity Surveying and indeed all professions in the Built Environment are being practiced. Traditional roles and responsibilities are being extended beyond what was the previous norm. There are emerging roles that need to be explored and one way to do this is to conduct research into the applicability of such principles and theories guiding these roles.

Knowledge management is key to social, economic and sustainable development of any profession and this research conference is a way-forward to achieving such developments. The combination of technological developments and the tremendous advancements in the use of Information and Communications technology has necessitated research in order to understand the current status quo while seeking for better ways to extend existing knowledge. We must grow continuously and challenge the status quo if we are to be practitioners who can extend our skills beyond traditional roles and beyond geographical boundaries.

The interactions between practice and academia has been on-going and the research policy of the Institute provides for further strengthening with such forums as this research conference. This conference brings together professionals in academia, and industry; and together we can seek for ways to adopt the findings of research as a means of growing the profession and promoting our

influence. We are a profession with a capacity to engage the government and provide policy solutions that would build a sustainable built environment.

It is my expectation that this third research conference by the Nigerian Institute of Quantity Surveyors will provide a bridge between the research efforts of academics and the practice solutions by practitioners in the Industry and Government.

I wish to heartily congratulate the Professional Development Committee of the Institute headed by Mr Adebowale Oyinleye *FNIQS*, the Chairman and members of the Conference Organising Committee and all who contributed to the success of the conference.

QS Mercy T. Iyortyer, FNIQS
President
The Nigerian Institute of Quantity Surveyors
September, 2017

PREFACE

The 3rd Research conference (RECON3) of Nigerian Institute of Quantity Surveyors (NIQS) is a follow up on the 1st and 2nd conferences held in 2013 and 2015 respectively. This Research conference aims at providing a forum for further research and discussions in the Built Environment, it was therefore expanded to include additional thematic areas in order to encourage more participation and to remove boundaries in areas of research interest which is fast becoming a global best practice.

It was anticipated that the theme “Confluence of Research, Theory and Practice in the Built Environment” would raise awareness and understanding regarding issues of collaboration between the scholars and/or professionals. The level of interest in the subject matter of the conference was maintained from the previous event and over 180 suitable abstracts were submitted for presentation at the conference. These were subjected to a double blinded peer review process before selection of final papers for the conference.

The selected topics depicted a vast pool of knowledge, resources and expertise of the research community, which in turn made a substantial contribution to the quality of the papers. The conference was highly successful, the 66 presented papers maintained the high promise suggested by the written abstracts and the programme was chaired in a professional and efficient way by the session chairmen who were selected for their standing in the subject.

Driven by the fast paced advances in the Built Environment, papers focused on issues in Building Information Modelling (BIM), Cost and Value Management, Construction Financing, Project Management and Construction Procurement and Contract Administration. Others in the field of Alternative Dispute Resolution, Asset, Property and Facility Management, Public Private Partnership, Ethic and Professional Issues were also welcome. Furthermore, papers on Change Management, Disaster Management, Health and Safety, ICT in construction and Knowledge Management and Construction Organisation provided a broad array of topics in the conference.

This required the programme to be organised in four parallel sessions, each on a specific theme, to provide each paper with sufficient time for presentation and to accommodate all of them within the overall time allocated. The sessions, therefore, represented a unique platform encouraging Local/International scholars and professionals by augmenting their experiences and invaluable insights. The conference offered a truly comprehensive view of the research while inspiring the authors and participants to come up with propositions to interrogate existing theories as opined by W. Edward Deming that “If you do not know how to ask the right questions, you discover nothing”. It inextricably addressed academics and practitioners and provides a colloquy for a number of perspectives, based on either conjectural analysis or empirical case studies that enhances excogitation and exchange of ideas.

In this year's conference we have succeeded in getting more practice-based research showing the high level of interest in the conference framework. This is evidenced by the large number of academic Institutions and Practitioners represented by the authors and participants. However,

there are further areas of researches to be explored in the future and we cannot afford to rest on our oars.

I would like to take this opportunity to appreciate the President of The Nigerian Institute of Quantity Surveyors, Mrs Mercy Iyortyer, FNIQS and the National Executive Council (NEC) 2015-2017 for their commitment and support. I also wish to thank the keynote speakers Mallam Abba Bello Ingawa and Prof. Kabir Bala, the resource persons and authors for their invaluable contribution, and the local organising committee led by Prof Yakubu Ibrahim for their commitment to the success of the conference.

Oyinleye Adebawale. O, FNIQS
Secretary, Professional Development & Library
The Nigerian Institute of Quantity Surveyors
September, 2017

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We are very grateful to the President of the Nigerian Institute of Quantity Surveyors (Mrs Mercy T. Iyortyer, FNIQS, RQS, MAPM) and the entire members of the National Executive Council 2015-2017, particularly the Secretary for Professional Development and Library (Mr Oyinleye A. O, FNIQS, MRICS, PMP) for their vision, leadership and support which has made this third edition of research conference a reality. We are also grateful to the people and organisations who have contributed to the success of the conference: authors, delegates, local organising committee, scientific committee and members of the Professional Development and Library committee of the NIQS.

We are particularly grateful to firms and organisations that provided sponsorship towards hosting of the conference. We would like to thank the Keynote Speakers: Mal. Abba Bello Ingawa and Prof. Kabir Bala. We are also grateful to the Resource Persons that anchored the Research Skills Workshop: Prof. D. R. Ogusemi, Prof. A.D. Ibrahim, Prof. Y.M. Ibrahim, Prof. Fred Job, Ass Prof K.J Adogbo, Dr(Mrs). A.D. Lamptey-Puddicambe, A. Y. Waziri and Dr. I.I Inuwa. We are also grateful to Dr. Idris Katun (Conference Secretary) for ensuring excellent administration and smooth running of the conference organisation.

Finally, we are grateful to the Secretariat of the Nigerian Institute of Quantity Surveyors for the logistic and administrative support.

Editors:

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IMPLEMENTING EMERGENCY RESPONSE SAFETY PROCEDURES BY SMALL-SIZED CONSTRUCTION FIRMS IN ABUJA, NIGERIA

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ABSTRACT

Despite the global acknowledgement of the socio-economic importance of the construction industry, it is adjudged to be the most injury prone sector. Thus this study investigated the level of implementing emergency response safety procedures by small-sized construction firms (SSSF) in Abuja, Nigeria. Forty questionnaires were administered to construction firms registered with the Federation of Construction Industry (FOCI) in Nigeria. Data collected were analysed using mean item score and regression analysis. Findings showed that there exists a weak, positive and non-significant relationship between the level of implementing emergency response safety procedures and number of accidents recorded on site. It was observed on the other hand that there exists a strong, positive and significant relationship between the number of accidents recorded on site and amount of compensation paid to victims. It was concluded that small-sized construction firms in Abuja averagely implement the emergency response safety procedures which are requirements in conditions of contracts. It was recommended that regular check-up should be carried out on timely basis to ascertain the compliance level of workers on site. Small-sized contractors should embark on periodic on the job training of their operatives on Health and Safety (H&S) practices as well as set up a feedback mechanism to monitor their H&S performance.

Keywords: *Emergency response, Implementation, Safety procedure, Small-sized firms.*

INTRODUCTION

The construction industry plays an important role in the economy, and the activities of the industry are so vital to the achievement of socio-economic development goals of providing shelter, infrastructure and employment. Typically, construction industry contributes to 11% of Gross Domestic Products (GDP) in most developing countries (Giang and Pheng, 2010). However many construction activities are inherently health and safety risks such as working at height, working underground, working in confined spaces and close proximity to falling materials, handling load manually, handling hazardous substances, noises, dusts, using plant and equipment, fire, exposure to electric current, poor site sanitation and workers' discomfort.

In view of the above, the construction industry is considered as being risky with frequent and high accidents rate and ill-health problems to workers, practitioners and end-users. The construction industry has therefore earned the reputation of being a dangerous or highly hazardous industry because of the disproportionately high incidence of accidents and fatalities that occur on construction sites around the world (Smallwood *et al.*, 2008). Similarly, Shittu *et al.* (2015a) labels construction industry as very hazardous. Internationally, 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 (Okeola, 2009; Shittu *et al.*, 2016). H&S therefore is an economic as well as social concern that requires proper management control.

One of the most common myths that have plagued this industry is that health and safety comes at a cost. Construction managers tend to believe that introducing and executing measures that ensure health and safety in construction sector will lead to higher cost, and hence lower profitability. However, it has been proved that investment in construction H&S actually increases the profitability by increasing productivity rates, boosting employee morale and decreasing attrition (Mohammed, 2010). Construction safety and health management therefore deals with actions that managers at all levels can take to create a setting in which workers will be trained and motivated to perform safe and productive construction work. The system should delineate responsibilities and accountabilities. It should also outline procedures for eliminating hazards and identifying potential hazards before they become the contributing factors to unfortunate accidents.

In developing countries and indeed Nigeria, there are fewer large construction companies compared with small and medium-sized construction companies (Kheni, 2008; Idoro, 2011). These small and medium-sized construction companies (construction SMEs) lack the capability to manage complex construction projects in a safe manner. They are therefore known to have peculiar health and safety problems as reported by Diugwu *et al.* (2013). The construction SMEs operate within domestic markets and also play an important role in the national economy. The health and safety risks posed by the activities of construction SMEs cannot be ignored due to their high population. Shittu *et al.* (2015b) emphasized the need for small-sized construction firms to fully implement important H&S management practices required to improve H&S performance on sites. In the light of this, the study investigated the level of implementing emergency response safety procedures by small-sized construction firms in Abuja, Nigeria with a view to improving safety performance on sites.

2.0 REVIEW OF RELATED LITERATURE

2.1 Factors Affecting Construction Safety Performance

Omran *et al.* (2008) discovered that budget, awareness and understanding, inadequate training, equipment and facilities and workers' attitude are factors that contribute to low implementation of the H&S requirements in Libya. They further stated that accidents occur on sites due to lack of knowledge, training or supervision, lack of means to carry out a task safely, errors in judgment, carelessness, laziness or total irresponsibility. More so, the lack of a controlled working environment and the complexity and diversity of the sizes of organisations have an effect on safety performance in the industry. Above all, inadequate safety precautions, non-implementation of rules, limited funds, deficient knowledge and

unqualified officers cause unexpected accidents in the construction industry especially in developing nations.

2.2 Challenges in the Management of Health and Safety

There are three unique challenges of construction companies in addressing safety issues, such as: projects temporary nature; uniqueness of a construction project; and project complexity (Shittu, 2016). There are prominent challenges associated with the management of H&S in the constructions among which are: insufficient protective equipment and personal, poor personal protective gear maintenance culture, insufficient top management support for the H&S management in construction sites, insufficient enforcement mechanisms, poor welfare facilities, absence of H&S committees, lack of first aid equipped and kits. Furthermore welfare facilities are also serious challenge as they are not adequately provided in most construction sites, likewise protective equipment for the personal. Some site supervisors indicated that Lack of enough funds, monitoring and evaluation, and personal protective equipment are parts of barriers to the management of H&S (Muiruri & Mulinge, 2014).

In addition, measures that could be used to mitigate some of these challenges associated with H&S in the construction sites are provision of protective gear, safety committees formation, adequate inspections by the appropriate authority, and training and education (Kheni, 2008; Agwu, 2012; Belel and Mahmud, 2012; Shittu *et al.*, 2015a & b). Most construction firms lack mechanisms of enforcing H&S requirements to the extent that H&S policy are not implemented, to tackle this obstacle there must be inspections to check adherence to H&S on construction (Kheni, 2008; Akpan, 2011; Adeniran, 2013; Kheni & Braimah, 2014).

2.3 Health and Safety Measures in Construction

The effectiveness of the Safety Policy depend on those in charge, they are to make it work. All employees must be provided with appropriate and suitable personal protective clothing and equipment, appropriate to the work which is to be undertaken (Adeogun and Okafor, 2013). Full training and instruction in the use, maintenance and storage of such equipment will be provided to members of all staff. Safety training programmes are to be promoted with the object of achieving personal awareness of risks and hazards, and knowledge of personal responsibility (Kheni, 2008; Idoro, 2011). The Policy is to be explained to all new staff as part of their induction training, before they start work, and a copy of the policy will be made available for reference by any member of staff. An annual review of the Health and Safety Policy and Procedures Manual will be carried out in conjunction with our safety advisors to ensure that the procedures and controls remain valid and relevant to site activities. All accidents, no matter how minor, are to be reported and recorded in the company's accident book (Umecokafor *et al.*, 2014a & b). Significant accidents will be promptly investigated to ensure that the appropriate preventative measures are implemented to prevent a recurrence as appropriate.

Construction Design and Management Regulations (2007) cover the working environment, general safety, facilities for washing, eating, changing and good housekeeping. There is need to provide sound working conditions in accordance with the regulations e.g. temperature, lighting, ventilation and working areas. Suitable workstations needed to be provided. Floor should be free from obstructions. In the working areas effective measures must be in place to prevent employees and non-workers from being struck by falling objects etc. The Health and Safety signs and signals is expected to be provided based on H&S regulations of 1996. This require employers to provide and maintain safety signs where there is significant risk to H &

A sign that has not been avoided or controlled by other means (e.g. safe systems of work) provided that the use of a sign can help reduce the risk. The H&S (First Aid) Regulations 1981 specify the first-aid equipment, facilities and personnel required must be provided depending on the nature of the work and numbers of employees involved or workplace. It is the duty of the Contracts Manager to ensure that all these requirements are established before work starts. The company may need to conduct first aid risk assessment to determine the number of trained first aiders to be employed as part of the requirement (Kheni, 2008).

2.4 Basic Safety Procedures Required for Emergency Response

Health refers to the protection of bodies and minds of people from illness resulting from materials, process or proceedings used in the workplace whereas safety is protection of people from physical injury (Hughes and Ferret, 2008). Health and safety practices from the definition above involves economic and humanitarian concerns and therefore requires proper control and management because construction managers are of the belief that engaging health and safety practices on site increases the cost and reduces profit of the construction project, but according to Loewenson (1998), occupational injury, illness and fatality currently accounts for significant losses, with over 3% GDP losses annually due to these causes. This means investments in occupational H&S can bring gains in productivity and market access (Loewenson, 1998). Okolie and Okoye (2012) reported that the importance of safety practices on construction sites and safety of construction workers can never be over emphasized, because when accidents happen on site, they cause many human tragedies, demotivate workers, disrupt site activities, delay project progress, and affect overall project cost, productivity and reputation of the firms concerned.

H&S procedures implemented to control emergency H&S risks on sites were found to vary from site to site (Kheni, 2008). Construction firms generally made an attempt at adopting emergency H&S measures on sites to maintain a satisfactory safe and healthy environment although such measures could not guarantee the minimum standards in the Factories, Offices and Shops Act. It appears fear of loss of image play a significant role in the implementation of measures to control hazards on site (Kheni and Braimah, 2014).

Observations made by Shittu (2016) on project sites indicated that basic emergency H&S procedures such as provision of first aid, personal protective equipment, latrines, accident reporting, accident records, cloakrooms, drinking water, first aid and transport to convey the injured to a clinic or hospital which are the basic and normal emergency preparations on site provided for on most sites were not implemented to the latter on some sites. However, at some other sites these H&S procedures were stringently adhered to.

The provision of health, safety and welfare facilities on site is covered by contract clauses for most building and civil engineering contracts. Although facilities such as site toilets, urinals, drinking water, cloakrooms, offices, and personal protective equipment may be provided for in contracts, on site, they may not be adequately provided. The requirements for providing these emergency procedures on sites are clearly given in these clauses and conditions of contracts. In spite of this, work processes on sites often undermine H&S and on very small sites H&S procedures may even be overlooked (Kheni, 2008; Shittu, 2016).

In view of the above, Kheni (2008); Kheni *et al.* (2008) and Shittu (2016) identified some basic H&S procedures which are requirement in the Conditions of Contract and are required

for emergency response on site in order to improve good safety practices. These procedures are summarised in Table 1.

Table 1: Basic Safety Procedures Required for Emergency Response on Construction Sites.

S/NO	Health & Safety Procedures
1	Provision of First Aid Box
2	Provision of Drinking Water
3	Provision of Cloak & Toilet Service
4	Provision of Canteen
5	Provision of Adequate Work Space & Neat Environment
6	Provision of PPE
7	Provision of Insurance Cover for Site & Employee
8	Designated HSE Personnel
9	Formal HSE Policy
10	Provision of Accident Reporting Procedure

Source: Authors' Compilation (2016)

From Table 1, ten (10) basic H&S procedures required for emergency response on construction sites have been identified by this research. The application of procedures contained in Table 1 is clearly contained contract clauses and conditions of contract for specific projects.

2.5 Gap Identified from Study's Background and Literature Review

Despite its importance, construction industry is considered as being risky with frequent and high accidents rate and ill-health problems to workers, practitioners and end users. Occupational Health and Safety (OHS) practices have generally been given little research attention and as a result, it has continued to remain outside mainstream organisational and management researches (Puplampu & Quartey, 2012). Most countries scarcely recognize OHS practice as a crucial determinant of national development and therefore mainstreaming OHS into national agenda becomes an important consideration for not only developed countries but also for developing countries as well.

The issue of safety on construction sites is a global problem and it is even more prevalent in many developing countries including Nigeria. According to Kheni (2008) the body of literature on health and safety management deals with workplace practices to control the risks of workplace hazards but the importance of institutional arrangements, political climate, national economy and national socio-cultural environments and how these affect health and safety management within businesses have not been developed in the health and safety literature.

Okeola (2009) discovered that the effort made by the Government to regulate health and safety in the construction industry in Nigeria through the legal and institutional context is far from being effective. Idoro (2011), in a research to study OHS management efforts and performance of Nigerian construction contractors, discovered that the rates of injury per

worker and per accident of multi-national and national contractors in Nigeria are indications of production methods that are prone to high injury and recommendation made was the need for measures to be taken on the part of all stake holders in the Nigerian construction industry especially contractors, consultants and the Government to bring about improvement in the OHS performance of the industry. Adeogun and Okafor (2013) added that the few companies that recognise OHS are the big multinationals who are running the policies as constituted in their parent countries of origin. Most of the indigenous establishments see Health, Safety and Environment (HSE) myopically such as cleanliness of the environment alone. Hence, the perspective of most industries and organisations show that the stage of Occupational Health, Safety and Environment is still at infancy in Nigeria due to employer/employee attitudinal behaviour, lack of safety culture and non-implementation of HSE policies. This makes the implementation of emergency H&S procedure poor in the construction industry especially among the SSCFs.

It is therefore clear from the study's background and review of literature that it is necessary to study the level of implementation of the stake holders in the construction industry in relation to health and safety management to form a good basis to develop a framework for improving H&S performance in the Nigerian construction industry. To address the identified problem, this research will be carried out as a pilot study to an ongoing research being undertaken to identify the regulations guiding H&S practices in small and large construction firms with a view to assessing the H&S procedures put in place by SSCFs to address emergency issues on site which will lead to the development of a framework for improving safety performance of construction firms.

The study was therefore set to assess the level of implementing the basic emergency response H&S procedures which are provisions in the conditions of contract. In order to achieve the aim, the following objectives were formulated for the study:

- i. To identify and assess the level of implementing emergency H&S procedures by the SSCFs on site.
- ii. To determine the relationship between the level of implementing emergency H&S procedures and SSCFs accidents records on site.
- iii. To establish the relationship between the number of accidents recorded by SSCFs on sites and amount of compensations paid to victims.

The objectives of the study and findings from literature review gave rise to the following research hypotheses:

- i. SSCFs do not completely implement emergency H&S procedures on site.
- ii. There is no significant relationship between the level of implementing the health and safety procedures and number of recorded accidents on site.
- iii. There is significant relationship between the number of recorded accidents on sites and amount of compensations paid to victims.

3.0 RESEARCH METHODOLOGY

This research adopted a mixed methods research approach. This involves the use of field survey by using questionnaire survey and personal visitation to sites of the selected construction firms to gather primary data. The construction firms studied were small-sized

construction firms who are registered with Abuja's business addresses with the Federation of Construction Industry (FOCI, Nigeria) in Abuja, Nigeria. Data were collected for a sixteen-year period (2000-2016). The questionnaires were administered to the small sized construction firms in order to have accurate data to assess the level of implementing health and safety procedures by small-sized construction firms in Abuja. The personal visitation was carried out by visiting the sites of the selected construction firms to ascertain if the firms actually provided for HSE procedures for emergency response on sites.

The study's population is comprised of the number of construction firms registered with Abuja's business addresses with the Federation of Construction Industry in (FOCI, Nigeria). The register of FOCI, Nigeria has 83 registered construction firms (Full Members) as at 2014 of which 40 firms operate in Abuja. The population for the study is therefore 40 as a result of this. Since the population is few, there is no need to select a sample from the population but rather to use the whole population for the study. This is in line with the report of Watson 2001 who stated that that if your population is small (200 people or less), it may be preferable to do a census of everyone in the population, rather than a sample.

The basic H&S procedures which are provision in the condition of contract required for emergency response on site were identified through review of literature and interview with construction firms. The study employed the use of both descriptive and inferential methods of analysis to analyse the collected data in order to achieve the objectives of the study.

Mean item score was employed to assess the level of implementing the basic H&S procedures put in place by the construction firms based on a 5- point Likert's Scale. The decision rule used for the 5- point ranking is summarised in Table 2.

Table 2: Decision Rule for Mean Ranking

Rank	Cut-off Point	Decision
5	4.50 - 5.00	Completely
4	3.50 - 4.49	Averagely
3	2.50 - 3.49	Partially
2	1.50 - 2.49	Fairly
1	1.00 - 1.49	Not at all

Source: Adapted and modified from Morenikeji (2006)

The use of regression analysis was employed to determine the relationship between the level of implementing the H&S procedures and number of recorded accidents on site and between the number of accidents on site and amount of compensation paid to victims. Regression analyses were carried out with the aid of IBM SPSS 20.0 software.

RESULTS AND DISCUSSION

4.1 Data Presentation

Data collected for the study were on the safety records and accident statistics of 40 construction firms. The data gathered from the questionnaires are summarised in Table 3 to make them useable for analysis. Data gathered from only twenty firms are presented in Table

Table 3: Research Data on Accident/Safety Records and Compensation to Victims

Construction Firms	No. of Accidents (2000-2015)	Amount Compensation (=N=)	of Level of Implementing HSE Procedure
1	10	110,000.00	3.30
2	9	75,000.00	3.30
3	5	57,850.00	3.40
4	10	72,000.00	3.30
5	3	125,000.00	3.10
6	6	42,000.00	3.10
7	0	0.00	3.40
8	10	108,000.00	3.30
9	16	215,000.00	3.40
10	12	78,000.00	4.80
11	15	210,000.00	4.80
12	5	47,600.00	4.60
13	8	69,770.00	4.10
14	22	317,000.00	4.50
15	15	170,000.00	4.20
16	4	27,660.00	4.10
17	18	370,000.00	4.20
18	12	86,000.00	4.80
19	4	39,750.00	4.30
20	10	123,500.00	4.00

Source: Researchers' Field Survey (2016)

4.2 Level of Implementing Health and Safety Procedures for Emergency Response

The study identified ten (10) basic H&S procedures for responding to emergency issues on sites by construction firms. The results of the mean ranking employed to determine the level at which the construction firms implement these H&S procedures are summarised in Table 4.

Table 4: Level of Implementing Emergency Response H&S Procedures on Site

S/NO	Health & Safety Procedures	Mean Score	RFI	Rank
1	Provision of First Aid Box	4.98	1.00	1st
2	Provision of Drinking Water	4.85	0.97	2nd
3	Provision of Cloak & Toilet Service	4.83	0.97	3rd
4	Provision of Canteen	4.45	0.89	4th
5	Provision of Adequate Work Space & Neat Evt	4.40	0.88	5 th
6	Provision of PPE	4.10	0.82	6 th
7	Provision of Insurance Cover for Site & Employee	4.10	0.82	6 th
8	Designated HSE Personnel	3.90	0.58	8 th
9	Formal HSE Policy	3.13	0.63	9 th
10	Provision of Accident Reporting Procedure	2.90	0.58	10 th

Source: Researchers' Field Survey (2016)

It was revealed in Table 4 that the H&S procedures implemented the most or completely implemented are Provision of First Aid Box (Mean Score = 4.98), Provision of Drinking Water (Mean Score = 4.85), Provision of Cloak & Toilet Service (Mean Score = 4.83), Provision of Canteen (Mean Score = 4.45) and Provision of Adequate Work Space & Neat Environment (Mean Score = 4.40). Provision of PPE; Provision of Insurance Cover for Site & Employee; and Having Designated HSE Personnel on Site with mean score of 4.10, 4.10 and 3.90 respectively. Having a formal H&S Policy (mean score = 3.13) and Provision of Accident Reporting Procedure (mean score = 2.90), on the other hand, are procedures which are fairly implemented by the construction firms. On the average, the SSCFs implement most of the H&S procedures completely. The null hypothesis was rejected in this case. This finding agrees with the finding of Shittu *et al.* (2016) where it was discovered that these procedures form part of the most important H&S practices of small and medium-sized construction companies.

4.3 Results of Regression Analysis

It was observed in the first analysis that there exists a weak, positive and non-significant relationship between the level of implementing emergency H&S procedures and number of accidents recorded on site. The coefficient of determination (R^2) value observed was 4% implying weak relationship and the correlation coefficient (R) observed was 19% indicating weak degree of association between the variables. The positive correlation observed between the variables indicates a tendency that an increase in the level of implementing emergency H&S procedures will be followed by an increase in the number of accidents recorded on site and vice versa. The value of F calculated of 1.489 observed was less than the value of F tabulated of 4.08 while the probability (P) value of 0.230 observed was greater than 0.05. This led to the acceptance of the null hypothesis in this case. The result of this analysis agrees with the findings of Kheni (2008), Agumba and Haupt (2014) and Shittu (2008) where it was

discovered that small and medium sized construction companies poorly implement H&S procedures in the construction industry in Ghana, South Africa and Nigeria respectively

It was observed in the second analysis that there exists a strong, positive and significant relationship between the number of accidents recorded on site and amount of compensation paid to victims. The R^2 value observed was 86% implying strong relationship and the R value observed was 93% indicating strong degree of association between the variables. The positive correlation observed between the variables indicates a tendency that an increase in the number of accidents recorded on site will be followed by an increase in the amount of compensation paid to victims and vice versa. The value of F calculated of 223.600 observed was greater than the value of F tabulated of 4.08 while the P value of 0.000 observed was less than 0.05. This led to the rejection of the null hypothesis in this case. The result of this analysis is in line with that of Okolie and Okoye (2014) where it was discovered that H&S performance of contractors affect success of building projects in terms of delivery time, quality, cost and productivity. This is because the level of implementing emergency H&S procedures is represented by number of accidents while delivery time, quality, cost and productivity are influenced by the amount of compensation paid to victims.

The results of the regression analysis are summarised in Table 5.

Table 5: Summary of Regression Results

Analysis No.	Variables		Type of Model	Observations				Inferences			
	X	Y		Regression Equation	R/R (%)	F _{cal}	F _{tab}	P _{value}	Strength of Relationship	Remark	Action On Hypothesis
1	Implementation of HSE Procedure	Nr. of Accidents	Linear (Simple)	$Y = 0.681 + 2.494x$	19/4	1.489	4.08	0.230	Weak	NS	Accept H ₀
2	Nr. Of Accidents	Amount of Compensation	Linear (Simple)	$Y = 3350.096 + 16153.410x$	93/8	223.60	4.08	0.000	Strong	SS	Reject H ₀

Source: Researchers' Field Survey (2016)

Key:

SS = Statistically Significant

NS = Not Significant

CONCLUSIONS AND RECOMMENDATIONS

Findings from the analyses led to the following conclusions:

- i. Provisions of first aid box, drinking water, toilet services, canteen, adequate work space & neat environment, PPE, insurance cover, HSE personnel, HSE policy and accident reporting procedure are the basic health and safety procedures required for emergency response on construction sites.
- ii. The level of implementing the health and safety procedures does not have a significant impact on the number of recorded accidents on sites.
- iii. The number of recorded accidents on sites has a significant impact on the amount of compensation paid to victims.
- iv. It can finally be concluded that small-sized construction firms in Abuja averagely implement the procedures which are requirements in conditions of contracts for emergency response on sites.

The following recommendations are made based on the research findings:

- i. The parties involved in construction firms should always ensure strict adherence to the guide lines provided (i.e. rules and regulations) by the competent authorities by ensuring that their respective roles are being properly discharged as required.
- ii. Regular check-up should be carried out on timely basis to ascertain the compliance level of workers on site since they are the party highly affected by construction accidents
- iii. Small -sized contractors should embark on periodic on the job training of their operatives on Health and Safety (H&S) practices as well as set up a feedback mechanism to monitor their H&S performance.

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APPENDIX A

RESEARCH DATA

Table A1: Research Data on Accident/Safety Records and Compensation to Victims

Construction Firms	No. of Accidents (2000-2015)	Amount of Compensation (=N=)	Level of Implementing HSE Procedure (Scale 1 – 5)
1	10	110,000.00	3.30
2	9	75,000.00	3.30
3	5	57,850.00	3.40
4	10	72,000.00	3.30
5	3	125,000.00	3.10
6	6	42,000.00	3.10
7	0	0.00	3.40
8	10	108,000.00	3.30
9	16	215,000.00	3.40
10	12	78,000.00	4.80
11	15	210,000.00	4.80
12	5	47,600.00	4.60
13	8	69,770.00	4.10
14	22	317,000.00	4.50
15	15	170,000.00	4.20
16	4	27,660.00	4.10
17	18	370,000.00	4.20
18	12	86,000.00	4.80
19	4	39,750.00	4.30
20	10	123,500.00	4.00
21	11	97,000.00	3.80
22	27	440,000.00	4.30
23	8	35,900.00	3.80
24	3	25,000.00	4.50
25	2	15,000.00	4.20
26	15	210,000.00	4.80
27	1	8,500.00	4.60
28	7	29,000.00	4.20
29	21	290,000.00	4.00
30	13	185,000.00	4.70
31	16	287,000.00	4.20
32	0	0.00	4.20
33	15	275,000.00	4.40
34	6	34,500.00	4.20
35	3	6,500.00	4.30
36	7	84,000.00	3.90
37	5	65,775.00	4.10
38	9	96,500.00	4.10
39	14	235,000.00	4.00
40	1	1,900.00	4.20

Source: Researchers' Field Survey (2016)