

ASSESSMENT OF SAFETY BEHAVIOUR OF CONSTRUCTION WORKERS IN ABUJA

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ABSTRACT

The construction industry is recognized as one of the fastest growing industries as well as the driver of economic growth in Nigeria. Its contribution to gross domestic products (GDP) in most developing economies is about 10-12% annually. However, the industry has been classified as one of the most hazardous industries when it comes to occupational accidents and fatalities. Construction accidents do not only result to demonization of workers, but also causes delay of project delivery, affect the quality of work delivered, increases overall cost of project, as well as arise to compensation of injured workers among others. The aim of this study is to investigate the safety behaviour of workers on construction sites. To achieve this, well-structured questionnaires were administered to workers on medium construction firms in Abuja-Nigeria, where safety requirements are being implemented. The data collected were analyzed using the statistical package for social sciences (SPSS) version 21. Results from the data analysis indicated that workers both complied and participated to some of the safety rules on site, but however ignored some. The study however recommended that construction firms should closely monitor every activities exhibited by workers on construction site while they are engaged, while every site operatives on their part must comply with all safety rules if accident and casualties are to be eliminated from our job sites.

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INTRODUCTION

The construction industry is no doubt the backbone of the economic and social development of every nation (Okoye, 2016). The industry is also one of the fastest growing industries as well as one of the highest number of employers of workforce both directly and indirectly worldwide. It contribution to gross domestic products (GDP) in most developing economies is between 10-12% annually. This means that, if the industry gets it right then the economic stability of any nation cannot be shaken. Despite its huge significance, the construction industry is still facing untold challenges especially in developing countries (Okoye, et al., 2015). Such challenges include accidents and fatalities especially on construction sites.

According to Lingard (2013) every year, more than 60000 fatalities are reported from construction related projects around the world. Experts in the construction sector described the industry as one of the most hazardous industries when it comes to occupational accident. No wonder Sohail (1999) labels the construction industry as very hazardous and prone to casualties. Ahmed, Azhar and Forbes (2006) opined that apart from emotional and physical distress, the yearly cost of work related injuries exceed 48 billion dollars in terms of litigations in the United States of America.

Smallwood and Haupt (2002) viewed accidents as part of the building production process that is very difficult to avoid, this is because the industry is prone to fatalities, meaning compliance or non-compliance to safety practices will capitulate the impact of safety regulations. Over the past twenty-five years, the construction industry in the United Kingdom has a leading accident prone occupation when compared to other allied industries (HSE, 2016). According to Wikipedia, safety is seen as the condition or feeling of being secured or protected from danger. When the term safety is measured what comes to mind is accident. Accident according to Hinze (1997) is defined as an unplanned event. The terms undesirable, unexpected and uncontrolled have been used to describe such events (De Reamer, 1958). Accidents that result to damage to equipment and materials and especially those that result in injuries receive the greatest attention. It is very common for many injuries to be blamed on workers behaviour, if not for no other reason that the worker is often the last party involved in the chain of events. Hinze (2006) opined that more than 70% of construction injuries

involve workers unsafe behaviour especially on site. Haslem et al. (2005) on the other hand discovered that workers lack essential safety knowledge despite having received meaningful safety training. Safety behaviors are actual behaviors that individuals perform at work place (Christian, et al. 2009). Neal, et al., (2000) differentiated safety behaviors into safety participation and safety compliance. These two dimensions have been adopted by many following safety behavior-related studies, such as Lu and Yang (2010), and Vinodkumar & Bhasi (2010). Safety participation refers to frequent voluntary behaviors that are not likely to promote the personal safety directly but contribute to improving safety in workplace, such as attending meetings and helping co-workers. In contrast, safety compliance denotes mandated behaviors that should be conducted to maintain the safety of workplace, such as wearing personal protective equipment and complying with safety rules and procedures.

Effectively managing the safety behaviour of workers offer significant opportunities and benefits to the industry. Such benefits include; reduce risk at work places, increase in productivity, fewer accidents and less threats of legal actions, improve standing amongst clients and partners, and obviously, it reduces cost of the project, guarantees quality and ensures project delivery time is met as scheduled. Additionally, construction work must often take place outdoors, in conditions that may not be completely favorable for health and safety. In addition to constant change in the nature of the work and in the mix of workers on construction projects, the locations of the work frequently change for the workers. Although the special attributes of construction may be attractive to some workers, the safety record amassed in the industry is not to be envied. Those attributes need not result in injuries and casualties or fatalities. There is also a growing concern for the high rate of construction accidents and casualties; therefore studies that help in providing a better understanding of the safety needs and implementation strategies of construction workers particularly in Nigeria is not only timely but very necessary. The aim of this paper is therefore to explore the safety behaviour of workers on construction sites.

Non-compliance versus accident as a measure of safety performance

Arewa & Farell (2012) stated that the phrase "compliance with health and safety", has no specific definition. It is often used to mean orthodoxy of health and safety rules and regulations. This can therefore be deduced that the term "non-compliance" means not adhering to safety rules and regulations. According to the UKGBL (2012) compliance with health and safety is a legal responsibility of all employers to everyone affected by the employers' businesses which entails; 1) carrying out thorough health and safety risk assessment, 2) drawing up a health and safety policies-for business with more than five employees, 3) ensuring work places meet minimum standards of conformity and cleanliness, 4) recording serious injuries, diseases or dangerous accidents in an accident book. Muhammad & Abdulateef & Ladi (2015) noted that, workers compliance with health and safety regulations will have a positive influence in assessing workers quality delivery and productivity of construction projects. Ismail, Ahmad and Ismail (2012) reported that exhibiting a proactive safety measures will not only assist in improving safety performance but also bring about a reduced significance in the rate of injuries and cost to managing it, improvement on co-operation, involvement and communication between management system, ownership of safety by workforce, enhanced acceptance of responsibility for safety and better understanding of the relationship between safe behaviour and accidents.

Taylor (2010) opined that, non-compliance with health and safety leads to accident and work place accidents have a potential to take 30 percent off company annual profits; also that failure to manage safety has a much larger social cost. According to Duff et al. (1993) accident frequency is the most objective measure of safety performance. A study conducted by Elias et al. (2011) that examined a total of 79 contractors of various sizes, found that the cost benefits of compliance with health and safety surpass the cost of accidents or safety in the event of adverse safety by a ratio of

approximately 3:1. That is why Philips (2011) suggested that compliance with health and safety regulations will lead to substantial cost savings. Purvis (1999) on the other hand argued that British businesses need to know that good health and safety management is worthwhile; that when business ventures comply with safety regulations, such ventures can be turned from a cost into a benefit.

A study carried out by Arewa and Farell (2012) titled 'A review of compliance with health and safety regulations and economic performance in small and medium construction enterprises' reviewed that SMEs commitment to health and safety spins off into many aspects of business performance and thus they simultaneously also benefit from better profitability. The study further reviewed that, remedial cost of non-compliance with health and safety tends to be higher per accident in SMEs than in larger firms. The study however recommended that, there is a need for health and safety regulatory bodies to constantly and consistently echo the benefits of investment in health and safety to SMEs.

Manzella (2018) carried out a study titled 'measuring safety performance to achieve long term improvement', presented six steps to implementing a shift toward safety system that emphasizes conformance to established methods and correction of system deficiencies, these steps include the following; 1) establish standards, 2) set priorities, 3) agreement, 4) accountability, 5) communication, 6) measurement. Babu (2015) study aimed at investigating safety performance on the construction sites. The study sought the opinion of construction participant using copies of structured questionnaire to appraised safety performances on their construction sites. The outcome revealed inadequate support from the government, insurance companies, ministry of labour, and construction participant.

Safety measures adopted by a company is just as important as measuring their financial performance. The major reason for measuring a company's health and safety performance is to provide important information on the current status, as well as the progress of the strategies and processes used by the company to mitigate health and safety measures related risks. That is why when workers fail to comply with safety regulations and when management on their part fail to implement and enforce safety requirements, then there is every tendency for accident and casualties to occur.

The consequences of non-compliance with safety Requirement by Site Operatives A study carried out by Martinelli (2017) titled "what are the consequences of poor health and safety procedures", suggested that a poor health and safety culture can be disastrous for business, clients, and employees, and so it's important to invest time and money to get it right. When a proper health and safety mechanism is installed at any work place, injuries and fatalities are avoided. A work-related illness or injury can not only put an employee out of work for a while and impact their quality of life; it may also damage the company's reputation, productivity, and finances- all of which can be very difficult to recover from. Also, a good reputation is a crucial part of any business success. It can bring to the business a greater volume of investors and clients, an improved community opinion of the owner's business, and a larger number of individuals who will be eager to join the team. However, poor safety regulations will cost the reputation of the company. When safety regulations are strictly adhere to, the workers are motivated and there will be some form of confidence that the workers are prevented from all forms of accidents and casualties. Awwad et al. (2016) examined construction safety practices and challenges in a Middle Eastern developing country. Face to face surveys were conducted using structured questionnaire with the construction practitioners, insurance firms and government agencies. The findings of the study however showed the availability of construction labour safety law but lack necessary implementation, absence of monitoring, failure of safety awareness and inadequate support from the entire participant concerned with implementations of safety practices on construction sites. The study however called for appropriate awareness within the construction firms' which might be helpful in curbing these challenges The view about safety according to Brueggman (2001) is seen as that which all

associated risks with a particular job are well managed in a particular manner. In the workplace, there is also widespread evidence of a high level of routine violations. Many accidents and injuries arise partially or wholly through various violations, such as removing guards on machinery. Some recent disasters have highlighted the degree to which violations can become the normal way of working. Violations have not been identified systematically in most incident reports, because of their often controversial nature. Thus, the hard evidence of accident statistics doesn't help. However, there is enough information to suggest that they are a very significant type of human error. According to HSE Accident Prevention Advisory Unit, human errors underlie 70-90 percent of accident and injuries, meanwhile violations are an important contributor to industry's risks and costs.

Ahmad et al. (2016) reported that safety focus on curbing accidents at work setting and its negative effect on the workers in all manners. Famakin & Fawchinmi (2012) added that safety practices are parameter to measure successful project delivery which is most paramount to the client because they greatly influence in achieving efficiency and effectiveness amongst professionals and even workers in the construction sector. Hyland (2018) in his study "the consequences of non-compliance with OSHA regulations"- opined that in the U.S., companies that violate occupational safety and health administration regulations can end up paying a variety of prices, some which are definite and simple to calculate, and others that are less quantifiable, but real. In addition to this, employers stand the risk to face legal costs to settle claims brought by injured workers, estates of employees killed as a result of an in fracture and other potential penalties beyond any OSHA fines. A recent survey of executives conducted by the American society of safety Engineers (ASSE) found that for every dollar spent on direct costs related to an accident, there are another three to five dollar worth of indirect costs- putting the actual cost of an accident (with direct medical and compensation costs of \$15000) at somewhere between \$45000 and \$75000. Okoye, Ezeokonkwo, and Ezeokoli (2016) studied building construction workers' health and safety knowledge and compliance on sites in Anambra State, Nigeria. The research employed Mean Score Index and Pearson's Product-moment Correlation Coefficient (r) to analyze the data randomly sampled from the fifteen (15) selected construction sites in the study area. However, the outcome of the research showed that, low safety awareness and compliance among the sites operatives, this resort into low project performance. The study recommended that, knowledge and compliance with health and safety practices alone cannot achieve optimum project performance, it would require safety culture which encompassed other factors are as follows: management commitment, workers involvement and strict enforcement of safety regulation should be adopted.

The major components of a compliance system are regular inspections, reporting, incident investigation, follow-up, enforcement, recognition and award. The system should emphasize fact finding, not fault finding. Although changing behaviours and fostering a culture of compliance can be challenging but management on their part should put in all efforts in ensuring that workers strictly follow this rules and regulations. Rules for safe behaviour and penalties for all violation should be clearly stated in advance to make everyone aware of them. If workers are aware that a violation to these rules have a serious consequences then effort will be put in order to avoid such consequences and penalties as well.

Methodology

This study was carried out within the Federal capital territory of Nigeria (Abuja). Abuja was chosen as a result of the city being labeled as one of the fastest growing cities in sub-Saharan Africa as massive infrastructural projects are currently on going in the city. The target population for this study is construction sites operatives who are engaged in construction firms where safety requirements are taken as the company's policy. This study also adopted a quantitative research approach. The study involved the conduct of a survey with the help of self-administered well-structured questionnaire. The questionnaire was designed in simple form to enable the respondents to answer appropriately. The questionnaire was designed to have two sections, these sections

include section A which sought general information of the respondents while section B on the other hand was designed to seek information on the two set aside objectives of the study. Question 1 was designed to get answers from the site operatives on the key components of compliance with safety requirement on construction sites by workers. The question was "what is your level of agreement with the key components on compliance with safety requirement on sites? Question 2 sought to explore information on the key components of participating with safety rules on site. The question was "what is your level of agreement with the key components on participation with safety requirement on site. Respondents were asked to indicate their level of agreement with each of the component from 1-5, where 1=never, 2=seldom, 3=sometimes, 4=often, and 5=always. The sample size was computed using the formula established by (Yamani 1986). The formula is; $n = \frac{N}{1 + N(e^2)}$. Where n is required sample, N is population size, e is error in percentage (5%). Out of the 160 questionnaires distributed 120 were returned back and were found useful for the study. The numerical data obtained from the survey were compiled and entered into the statistical package for social sciences (SPSS) version 21 software. The quantitative data were analyzed and results of descriptive statistics obtained include measures of central tendency (mean) and standard deviation. Meanwhile, the independent samples t-test was performed in order to see if differences between the groups are statistically significant at 0.05.

Result and Discussion

The result from the demographic feature of the respondents reviewed that 91.67% of the respondents have the senior school certificate while the remaining 8.33% have the first school leaving certificate. Also, 96% of the respondents have 1-15 years of industry experience while 4% have 16 years and above meaning the respondents are suitable to give answers to the questions in the research questionnaire. The result further reviewed that 96% of the respondents are 15-45 years of old while the remaining 4% are above 45 years. Finally, 58.33% of the respondents admitted the presence of a safety officer on their sites regularly while the remaining 41.67% disagree to this question.

From table 1 below, 13 key components of compliance with safety requirements by workers on construction sites were identified and ranked accordingly using a five-point scale ranging from never to always. The key component with the highest mean score of 4.75 is "the use of safety nets for building above two floors", this shows that workers take seriously this safety rule. The second most significant component is "the use of scaffold when required" with a mean score of 4.08, the third component is "the use of safety wears and other personal protective equipment with a mean score of 4.04. However, it is worthy to note that, workers strictly adhered to the safety behaviour at workplace especially with all the negative components such as "eating while working" with a low mean score of 1.00, and the "use of ladder less than one meter above landing place" with a mean score of 1.17 and followed by operating phones while on duty with a mean score of 1.24.

Table 2 below expressed 14 components which is the second objective of the study. The result showed that the component with the highest mean score of 4.17 is "attending safety meetings" followed by "requesting for replacement of safety wears and other protective equipment that is damaged" with a mean score of 4.11 and then the 3rd highest mean score of 3.17 is "motivating co-workers by my safety behaviour". However, the components with the least mean scores are the following, "fighting / quarrelling while working" with a mean score of 1.00, "giving co-workers alcohol and other hard drugs during work hours" with mean score of 1.00 and then "drinking while working" with a mean of score 1.00 respectively.

Table 1: Workers reaction on the level of compliance with safety requirements on construction sites

S/N	Components of workers compliance with safety Requirements on contribution sites	Respondent's Choices					Mean Score	Rank
		1	2	3	4	5		
i.	The use of safety nets for building above two floors	0	0	0	30	90	4.75	1
ii.	The use of scaffold when required	0	0	20	70	30	4.08	2
iii.	Use of safety wears/personal protective equipment	0	0	0	115	5	4.04	3

iv.	Use of scaffold when not totally boarded	0	0	58	60	2	3.53	4
v.	The use of defective ladders	0	0	75	15	25	3.38	5
vi.	Examination of scaffold equipment and tools before the commencement of work	40	0	2	18	50	3.07	6
vii.	Use of scaffolds when ladders are not provided	10	50	12	30	18	2.97	7
viii.	Use of scaffolds without rail guards	42	58	20	0	0	1.82	8
ix.	Wearing of seat belts while in company's vehicle	73	20	7	20	0	1.78	9
x.	Taking of hard drugs before commencement of work	100	0	10	8	2	1.43	10
xi.	Operating phones while on duty	97	20	3	0	0	1.24	11
xii.	Using ladder less than one meter above landing place	100	20	0	0	0	1.17	12
xiii.	Eating while working	120	0	0	0	0	1.00	13

Table 2: Workers reaction on the level of participation with safety requirements on construction sites

S/N	Components of workers participation with safety Requirements on contribution sites	Respondent's Choices					Mean Score	Rank
		1	2	3	4	5		
i.	Attending safety meetings	0	0	40	20	60	4.17	1
ii.	Requesting for replacement safety wears and other protective equipment that may be damaged	0	0	10	87	23	4.11	2
iii.	Motivating co-workers by my actions	0	0	100	20	0	3.17	3
iv.	Following instructions as issued by safety officers	10	20	57	13	20	3.11	4
v.	Adhering to safety signs	0	0	110	7	3	3.08	5
vi.	Using a scaffold when ladder is not provided	40	30	20	20	10	2.42	6
vii.	Using a scaffold that is not tally boarded	60	0	40	10	10	2.25	7
viii.	Reading safety instructions before commencing work	37	77	0	0	6	1.84	8
ix.	Agreeing to work when safety wear was not provided	97	13	10	0	0	1.28	9
x.	Reporting defaulters who do not follow safety rules	100	20	0	0	0	1.25	10
xi.	Arguing with safety officer when scolded for unsafe behavior	90	30	0	0	0	1.25	10
xii.	Drinking while working	90	20	10	0	0	1.00	12
xiii.	Giving co-workers alcohol and other hard drugs during work	120	0	0	0	0	1.00	12
xiv.	Quarrelling/fighting while working	120	0	0	0	0	1.00	12

Additionally, correlation analysis was carried out to determine the relationship between the two variables of the study (compliance and participation). The study sets level of statistical significance at 5%, hence for any value of probability (P) from 0.00 to 0.05 there is significance in the test but values greater than 0.05 there is no significance in the test. The result in table 3 and 4 reviewed that the P-value which is .238 is higher than the level of significance which is set at 0.05 hence the result suggest that the correlation is not statistically significant, this lead to the acceptance of the null hypothesis H_0 which indicates that there is a negative relationship between both variables.

Table 3: Correlation between components of compliance and participation

Correlations

	Compliance	Participation
Pearson Correlation	1	.352
Compliance Sig. (2-tailed)		.238
N	13	13
Pearson Correlation	.352	1
Participation Sig. (2-tailed)	.238	
N	13	14

Table 4: Summary of correlation analysis between compliance and participation of safety workers

NO. Variables

X	Y	R (%)	P _{value}	LOS	Remark	Action on Hypothesis	
1	Compliance	Participation	89	.238	0.05	NS	Accept H ₀

• Keys: SS = Statistically Significant NS = Not Significant LOS = Level of Significance.

Similarly, an independent sample T-test between the components of compliance and participation to compare the mean scores of the respondent's assessment was carried out, table 5, 6 and 7 below reviewed that P-value was higher than 0.05, thus this implies that the relationship between the key components of compliance and participation was not statistically significant at 5% level of significance. Hence the null (H₀) hypothesis is accepted.

Independent sample T-test between the components of compliance and participation

Table 5: Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Components	Compliance	2	4.4150	.47376	.33500
	Participation	2	4.1400	.04243	.03000

Table 6: Independent Samples Test

	Levene's Test for Equality of Variances	t-test for Equality of Means								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Components	Equal variances assumed	6864033469 8273312.000	.000	.818	2	.499	.27500	.33634	-1.17216	1.72216
	Equal variances not assumed			.818	1.016	.562	.27500	.33634	-3.84245	4.39245

Variable	Mean	Mean difference	D.f	P-Value	Inference	Remark decision
Compliance	4.4150	0.275	2	0.50	NS	Accepted
Participation	4.1400	0.275				

Conclusion

This study investigates the safety behaviour of workers on construction sites using two set aside objectives. The first objective was to determine the level of compliance with safety requirements by workers on construction sites. The second objective on the other hand was to determine the level of participation with safety requirements of workers on construction sites. For each objective, questions were asked to find out if respondents actually complied or participated fully with the safety rules on each of their sites.

The findings of the study reviewed that site operatives (workers) conformed to certain safety rules such as "the use of safety nets for building above two floors as well as the "use of scaffolds" but however, workers ignored some of the safety rules by not participating fully. Rules such as "reading safety instructions before the commencement of work, "reporting defaulters who do not follow safety rules" were not taken seriously.

Recommendation

This research has contributed to knowledge by expressing in full the two divisions of safety behaviour (compliance and participation). The study also showed the key components in each of the divisions. From the assessment of workers, the study found that most workers took seriously certain rules than others. It is therefore recommended that all the components of safety requirement must be given full attention if the occurrence of accident and casualties on our sites must completely be eliminated. Also firms / companies must ensure that their workers are closely monitored in order to them to observe all the safety rules on site. Further studies should be carried out to investigate the factors that cause non-compliance with safety requirements by site operatives on construction sites.

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