

Assessment of Cost Impact in Health and Safety on Construction Projects

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ABSTRACT : *The study assesses the cost impact of Health and Safety management within the construction industry. The purpose of the study is to help identify the impact of cost directly to projects. Toward this end, a field survey was conducted with a sample of fifty contractors selected in a given geographical region with high density of construction work. Data were collected using structured questionnaires and analyzed using a tabular presentation identifying percentages of given responses. The results reveal that contractors are aware that health and safety compliance is correlated with the scope of their operations. The study results also reveal that the accident and injury rates in the Nigerian construction industry are high. Thus, the results reveal the challenges facing Nigerian contractors and companies in terms of high cost incurred as a result of injuries and hazards on site.. The findings indicate the need for effective health and safety management and regulation and control of activities in the Nigerian construction industry more definitively.*

KEYWORDS : *Health and safety, construction organizations, occupational-accidents, cost*

I. INTRODUCTION

Workplace Health and Safety on its own is a global challenge to the sustainable development of our society and civilization. According to the international labour office, work related accidents and illnesses contribute 3.9 percent of all deaths and 25 percent of the world's population suffers a minor or major occupational accident or work related disease in any one year [1]. Other than the moral concerns, the economic cost is huge. The poor performance of the construction industry in some key areas has been lamented and one of such areas is health and safety, which is regarded as a key performance indicator in the construction industry [2]. The acceptance of Health and Safety Management System (HSMS) demonstrate in real terms, the readiness of an organization to minimize the frequency and brutality of work related accidents, ill health and damage to property [2]. [3] believes that the construction industry has hinged the successful management of construction projects on the traditional parameters of Cost, Time and Quality. The growing rate of construction accidents has increased the awareness of construction health and safety, thereby involving its inclusion as part of project performance criteria.[4] stated that the non-existent and/or lack of enforcement of the health and safety regulations, and byelaws is one of the major causes of building failures opining that health and safety in construction is a highly practical guide to help any professional understand the implications of health and safety legislations for the role in a project. This implies that there is expected to be a realistic plan to help adopt a health and safety culture in the construction industry. In the recent past in Nigeria, especially 2005 till date, death tolls, permanent disability and severe environmental threat had been on the increase through collapse of buildings and major operational accidents especially in Abuja, Lagos and Port Harcourt ([4]; [5]. It is against this backdrop that this research was carried out to examine the cost impact on health and safety management on construction projects, with the intent to proffer suitable solutions to the problem which will serve as a roadmap for effective construction project delivery. This research is aimed at identifying the effect of health and safety in the successful delivery of construction projects by investigating if there is an existing framework for health and safety implementation or conformance on construction/project site and also to identify the cost implication for non-adherence to existing health and safety policies in construction site.

Study Area : The area of study for this research is Abuja. Abuja is the capital city of Nigeria, with an estimated

population of 5million (National Population Commission, 2006).

II. Health and Safety Performance of the Nigerian Construction Industry

Over the decades, construction industry has geared efforts towards improving its health and safety performance. However, these efforts have been shifted from monitoring safety performance to preventive measures of improving safety performance. The health and safety performance of the industry remains a glaring challenge in its effort to tackle the developmental initiative of many nations including Nigeria [1].[2] opined that Nigeria falls within the category of countries having no adaptive health and safety laws and regulations, where organizations allocate little resources to health and safety management, rarely keep, report, or release accurate records of accidents and injuries on site, leading to poor health and safety performance. He further suggests that effective management of health and safety is motivated by various factors of which could be centered on the need to abide by existing rules and regulations, a consideration of human lives that are involved (socio-humanitarian perspective), or on the direct and indirect cost involved (financial-economic perspective). In the same vein, [6] reveals that legislation on health and safety are endorsed by parliament including International Labour Organization (ILO) conventions however their implementation by the relevant government bodies is poor. Construction within developing countries often fails to meet the needs of modern competitive businesses in the marketplace; and rarely provides best value for clients and taxpayers. [7], Added that the construction sector of developing countries also demonstrates poor performance in respect of health and safety due to the absence of any rigid safety and construction laws.

Health and Safety Performance Cost : In order to maintain a healthy working environment, the cost of safety are those incurred in order to comply with legal requirements with respect to accident prevention, to implement measures to prevent accidents during construction work and to improve health and safety conditions in all areas of the work performed. The cost of health and safety was generally perceived as a necessary and beneficial business expense [1]. According to [8], avoidance or reduction of accident and work-related ill health costs per se does not appear to be the primary motivating factor for effective health and safety management. However, [8] acknowledged that health and safety failures might ultimately impact on the financial performance of an organization through any of the higher level factors like customers and client expectation, workers morale, productivity, efficiency and service delivery etc. In view of the above position, [9] argue that safety investment cannot be absolute and a rational judgment for safety cost is required and maintain that costs associated with rigorous safety parameters in developing countries might simply be unjustifiable and that the stakeholders cannot bear the safety cost for economic survival if the real cost of accident is too low in the economy. ([10] estimates that the cost of implementing Health and Safety systems within a construction company lies between 0.5% and 3% of total project costs.

Cost of Accident (CoA) : The Cost of Accident (CoA) is the final measure that can readily be related to by all stakeholders as it can be expressed as a percentage of organizational business volume or construction completed. It could also be categorized as being either direct or indirect which collectively constitutes the total Cost of Accident and it is noted that in South Africa, the estimated CoA is around 5% of the value of the completed construction as cited by [11]. [10] establishes that the indirect costs of accidents are 14.2 times the direct costs. A report from the Health and Safety Authority Research Series (HSARS 02/2007) shows that Employer costs from the accidents included salary costs for replacement staff or overtime payments, production and productivity losses, retraining costs, personal injury claim compensation, repair bills, medical & travel expenses and increased supervision. Literature has enabled us ascertain the likely hood of negligence of health and safety compliance in construction projects. The empirical analysis would further provide us with detailed insight to this phenomenon.

III. THE RESEARCH METHODOLOGY ADOPTED FOR THE STUDY

Haven reviewed related literatures on various research methods and strategies, this study decided to adopt the quantitative methods of approach which can be used as a tool to enquire into social or human problem based on testing a theory composed of variables, measured with numbers and examined using statistical procedures in order to determine whether the predictive overview of the theory hold true.

Sampling Size : Sampling size of sixty (60) professionals in the construction industry were targeted for this research however, fifty (50) of the sample size was accessible.

Sampling Technique : The study adopts probability sampling technique also known as random sampling technique; in which every respondent in the defined population were given equal chance during the administration of the questionnaire. This was achieved by ensuring the number of questionnaire administered to

each of the respondent equals the calculated size.

IV. RESEARCH POPULATION

For the purpose of this research, the target population of interest includes construction professionals such as project managers, consultants, contractors, and all other workers who are directly involve in construction project sites in the Federal Capital Territory Abuja. Information was gathered from professionals involved in project execution in the construction industry.

Questionnaire Design/Survey : The questionnaire developed and used in the study comprised questions with fixed response categories along with open-ended and close-ended questions. The questionnaires were divided into three parts; (part A, B, and C). The part 'A' requested profiles of respondents/construction Company (e.g. Years of experience of respondent, position of respondent, name and location of company, years of existence of the company, number of projects carried out over the last five years). The part 'B' raised response on the health and safety implementation policy and compliance level of the company. Part 'C' raised questions on the cost implications of health and safety policy on construction project.

Method of Analysis of Data : The study employed the use of descriptive statistical methods of analysis to analyze the collected data in order to achieve the objectives of the study as discussed.

V. DATA ANALYSIS

Analysis of Company/Respondents Profile : The total number of questionnaires administered during the course of this work is 60 and only 84% (50) was returned. The sampled population shows a response rate of 6 project managers (12%), 4 consultants (8%), 8 contractors (16%), 20 workers (40%) and 12 numbers of other construction site workers (24%).

Table 4.1: Response rate among sampled population

Research population	Administered questionnaire	Questionnaire Response rate/return rate	Percentage(%) Of response
Project manager	8	6	12%
Consultants	8	4	8%
Contractors	10	8	16%
Workers	20	20	40%
Others	14	12	24%
Total	60	50	100%

Table 4.2: Years of experience of the construction professionals

Years of experience	Frequency	Percentage (%)
Less than 1 year	0	0
1-3 years	8	16
3-5 years	24	48
5-10 years	11	22
More than 10 years	7	14

The table clearly shows the experience of all the construction professionals sampled in the research work. The result shows that there is no professional whose experience is below 1 year as the response shows that they have been working with the construction company to know the state of health and safety on the construction site in the FCT Abuja.

Table 4.3: Number of projects executed in the last five years

Number of projects	Frequency of response	Percentage response (%)
Less than 10	0	0
11-20	0	0

21-30	5	10
More than 30	45	90

The table shows the number of project executed by the sampled construction sites in the last five years. 45 (90%) respondents says they had executed more than 30 projects in the last five years and only 5 (10%) claim to have executed 21-30 within same last five years. This shows that majority of the construction industries in the FCT Abuja have been carrying out numerous construction projects and may have experienced health and safety issue in one way or another.

Health and Safety Implementation Policy and Level of Compliance : The table below presents the response of the respondents when asked about their opinion as to the implementation of health and safety policy in their construction site. Their response is based on ticking ‘NO’ or ‘YES’.

Table 4.4: Health and safety implementation policy

QUESTIONS	NUMBER OF RESPONSE “YES”	NUMBER OF RESPONSE “NO”	PERCENTAGE (%) RESPONSE “YES”	PERCENTAGE (%) RESPONSE “NO”
Is there an existing framework for health and safety implementation in your company?	42	8	84%	16%
Is there a clear safety policy for your company and project?	44	6	88%	12%
Is there a proper documentation for accidents and policy violation during the execution of your projects?	18	32	36%	64%
Is there any sign post indicating a restricted or danger zone in your project site?	36	14	72%	28%

Table 4.4 shows clearly that 84% of the respondents said there is a framework for health and safety policy implementation in their construction site while 16% were of the response that there was no health and safety implementation policy in their construction site. In respect to whether there is a clear policy for the Construction Company and projects, 88% agrees there is clear and safety policy for their company while only 12% of the respondents have a contrary opinion. 64% of the respondents said there is no proper documentation for accidents and policy violation during the process of executing their project while 36% agrees that there is proper documentation of accidents and policy violations. The availability of sign post indicating a restricted of danger zone in the construction site were agreed to by 72% of the respondents while 28% claims there is no such thing in their construction site . To conclude the above result clearly shows that despite the implementation of health and safety policy and frame work in the construction site, there is still lack of proper documentation of occurring site incidents and violations of construction site policy in the construction site.

Table 4.5: Strict measure against contactors/subcontractors that make a safety violation

QUESTION	Percentage(%) response of ‘YES’	Percentage(%)) response of ‘NO’	If ‘YES’, how?	If ‘NO’, why?
Is there strict measure taken against any contractor/subcontractor who makes a safety violation during the execution of their project?	38% (19)	62% (31)	Measures taken through immediate suspension and fining of contractor	No measure taken on any contractor/subcontractors who makes safety policy violation

Table 4.5 reveals that 38% of the respondents are of the opinion that strict measures have so far being taken against any contractor subcontractor who fails to comply with or violate the existing health and safety policy in the construction site and that the measures taken against them include suspension from work which this is assumed as a way of punishing the contractor. Contrary to this response, 62% Of the respondents claimed that no any measure or forms of strict action has been taken against the contractors and subcontractors who violates or did not comply with safety policies.

Cost Implications of Health and Safety Policy on Construction Site : This part presents the analysis of the cost implications of health and safety policies on construction project site. The table below shows the opinion of the sampled population in respect to whether the implementation of health and safety programs on the

construction site increases the project cost or not.

Table 4.6: cost implications of health and safety programs on construction site

Construction professionals	Number of 'YES' response	Number of 'NO' response	Percentage(%) response of 'YES'	Percentage(%) response of 'NO'
Project manager	5	1	10%	2%
Consultants	4	0	8%	0%
Contractors	8	0	16%	0%
Workers	18	2	36%	4%
others	9	3	18%	6%
Total	44	6	88%	12%

The table shows the response of all the construction site officials concerning the cost implications arising from the implementation of health and safety programs on the construction sites at the FCT Abuja and the total response ratio of yes to no is 88:12%. 5(10%) of the project managers responded that the implementation of health and safety programs in the construction project site increases the cost of the project while 1(2%) of the sampled population of project managers says it doesn't. All the consultants 4 (8%) believed that implementing a health and safety programs in the construction site will definitely increase the project cost. All contractors 8 (16%) also agreed it increases the project cost. 18(36%) of the construction workers are of the opinion that health and safety programs when implemented on the construction site will increase the cost of the project while 2 (4%) disagree with that opinion. Finally, 9 (18%) of other construction site officials also agreed that health and safety program implementation increases the cost of the project and only 3 (6%) said it doesn't. the above analysis clearly reveals that majority of construction workers were of the opinion that implementing health and safety program on the construction site goes a long way increasing the cost of the project. This could be perceived as being the reason why many construction professionals at the FCT Abuja gives little or no attention to health and safety issues on the construction project sites.

Table 4.7: the aspect of project cost grossly affected by construction site accidents

Cost aspect of project	Response frequency	Percentage response
Prime cost	6	12%
Preliminary cost	4	8%
Overall project cost	39	78%
Other cost	1	2%

From the above table (table 4.7), 6 (12%) of the sampled population said the prime cost aspect of a project is affected more by the accidents which usually occurs on construction sites. 4(8%) said the cost aspect affected by the accidents on construction site is the preliminary cost aspect of the project, 39(78%) the overall project always bears the effects of any claims and extra additional work which may arise as a result of accident on the site while only 1(2%) of the respondent believes that the accident affect other cost aspect of the project.

VI.

DISCUSSION

The analyses of data as presented above specify that there are health and safety framework and policy in the construction site as revealed by 42(84%) of the sampled population . The finding is an indication that construction companies have health and safety policy in place. Despite the presence of this framework, 36(64%) of the respondent claims there was no proper documentation of accidents and policy violation in the construction site. This present the bad situation on which the construction project sites at the FCT Abuja is presently at. On the other hand the compliance to this policies and framework are unfortunately below the average (percentage compliance is between 0-15% as revealed by 30(60%) Of the respondent. The findings also highlighted the availability of safety equipment on construction site and ranked the presence of health personnel and first aid kit, safety helmet, foot wear and safety and fire extinguishers on site as 1st 2nd and 3rd respectively. The findings also revealed that the respondents agree that implementing a health and safety policy increases the cost of the projects. In the same view health and safety issues result in claims, delays and additional work in the project. The findings also indicated that the overall construction cost is the most grossly affected by accident and injuries with a response rate of 39(78%) as compared to the prime cost, preliminary cost and other aspects of the project cost.

VII. CONCLUSION

it was discovered that construction companies have one a framework for health and safety policy

installed on construction site, but unfortunately do not comply with the policy. Despite having identified the necessary equipment for a workable healthy and safe construction site, full compliance is still below the average. This has resulted in some forms of policy violation by the contractors and improper documentation of accidents on site since no strict measure is taken against anyone who breaches conformance to the regulating policy. The analysis of the data also revealed that implementing health and safety programs on construction sites tend to increase the overall cost of the project. In this vein, non-conformance to the policy which often results in accidents also increase the overall cost of the project. Majority of the respondents amounting to 82% of the total respondents strongly agreed that the health and safety of the employees have a great impact on determining the quality output of the construction project. Unsafe design, poor safety planning and high rate of accidents were identified as an obstacle which inhibits the quality of construction output. If there are noticeable rates of accidents in a particular construction site, and the management failed to put in place adequate safety measures, it may affect the health and productive capacity of the workers which in turn may affect the overall project delivery. It is hereby recommended that actions be taken to improve the health and safety of employees on any project site. Where health and safety policies are put in place, a unit or group should be saddled with the responsibility of making sure there is above the average compliance. The following should be put into consideration:

- [1]. Appointment of a safety officer by a construction company to primarily ensure or enforce health and safety policies e.g., ensuring that workers on site always wear safety boots and helmets, etc.
- [2]. On the job as well as off the job training should be provided to employees on their health and safety and its impact on the output of the project.
- [3]. Cases of accidents and injuries should be acknowledged so as to make provision for accident investigation which aids effective accident control in future projects.
- [4]. Regulating agencies e.g. the ministry of works and productivity should appoint his agent which will carry out regular and spontaneous visits to construction sites in order to keep the contractors in check.
- [5]. Severe measures and punishments should be meted out to contractors who violate safety policy, and where there is a recurring violation of policies, the contractor certificate may be rescinded.

This research was aimed at assessing the impact of health and safety on the delivery of construction projects. It was deduced that health and safety have an impact on the delivery of a construction project either in terms of cost or quality. However, the research was unable to determine precisely how health and safety impact on the quality of a project output.

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