

Influence of Health and Safety Practices on Performance of Construction Projects in Abuja

¹Richard Jimoh, ¹Luqman Oyewobi, ²Kabir Ibrahim and ¹Kadiri Abibu

¹Department of Building

Federal University Technology, Minna, Nigeria

Email: ¹rosney@futminna.edu.ng

²Construction Management Department

Nelson Mandela Metropolitan University, Port Elizabeth, 6031, South Africa

Abstract:

In most developing countries, health and safety consideration in construction project delivery is not given much priority, and employment of safety measures and practices during construction is considered a burden. Although significant progress has been made over the years, the need to continually improve the health and safety practices on construction sites cannot be over-emphasised as a result of the dangerous nature of the industry. Hence, this paper assessed the influence of health and safety practices on the performance of construction projects in Abuja, with the use of questionnaire survey and personal observation. Findings indicated that there was no statistical significant relationship between health and safety practices and the project objectives (cost, time and quality). Furthermore, the personal observations carried out showed that the level of compliance in terms of terms of safety rules and scaffolding and materials storage/handling was fair. The study concluded that health and safety practices have no influence on project objectives due to the little importance attached to health and safety practices. Health and safety plan should be made mandatory for all contractors during bidding process in order to improve health and safety practices and by extension construction performance. The implication of the study on contractors is that adhering to health and safety practices may go a long way in ensuring that cost, time and quality objectives are met thereby making sure that clients have better value for their investment.

Key words:

Construction industry, Health and safety, and Performance

1 Introduction

In Nigeria, Occupational health and safety programmes were first introduced when the country was a British colony (Onyejeji, 2011). Though there is no reliable data on accident cases in construction, because contractors do not report accidents at appropriate ministry nor keep proper records on accidents (Agwu and Hilda, 2013). Construction industry in Nigeria needs special attention as far as safety is concerned and this is because the industry harbours a lot of quacks and questionable tradesmen, most building contracts in the rural areas both private and government contracts fall into the hands of illiterate “money bags” who have taken over constructing jobs in Nigeria (Makinde, 2014).

Many people according to Agwu and Hilda (2013), have met their untimely death on construction sites in Nigeria, while some others have lost their hands or limbs from construction related injuries and fatalities due to some unplanned and uncontrolled events. Laufer and Ledbetter (1986) describe fatalities as chance-caused events that are normally not given to direct observation but rather most methods are based on post-factum measurement. Fatalities can result in direct and indirect cost. Direct costs of construction fatalities are: medical bills,

premiums for compensation benefits, liability and property loss while the indirect costs are: time lost in attending burial ceremonies, time lost in fatality investigations, down time of damaged equipment and losses arising from site closure (Agwu and Hilda, 2013).

However, the poor safety performance of the construction industry has been a cause for concern (Haslam *et al.*, 2005) even though the industry, contributes to the economic development of any developing nation (Kheni *et al.*, 2008), and especially in an expanding economy like Nigeria (Ibironke, 2004; Shittu & Shehu 2010). Okeola (2009) averred that at least 50% of the investment in various development plans is primarily in the construction and the industry is the highest employer of labour after agriculture in developing countries. The construction industry in Nigeria generates almost 70% of the nation's fixed capital formation, in spite of that, its performance within the economy is very poor (Arazi & Mahmoud, 2010).

The synergy between health and safety and other project parameters (cost, environment, productivity, quality and schedule) that would have been created which will have given rise to better performance within the industry is lacking (Smallwood, 1996 cited in Smallwood, 2002). Hence, due to this challenge bedevilling the construction industry with respect to health and safety performance, the paper assessed the influence of health and safety practices on the performance of construction projects in Abuja, Nigeria.

2 Literature Review

2.1 Health and Safety Practices in the Construction Industry

In most developing countries, health and safety consideration in construction project delivery is not given much priority, and employment of safety measures and practices during construction is considered a burden (Mbuya and Lema, 1996). However, in the Nigerian construction industry according to Oresegun (2009), health and safety is viewed as an inevitable aspect of construction since the only time an employee will perform his duties is when he or she is in good health, sure of a safe working condition and assured of good health care even when an accident occur. It is based on this view that most construction firms in Nigeria would need to improve their health and safety practices as the rise in technological advancements in the construction industry will lead to an upsurge in construction accidents. Datta (2000) also 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.

The health and safety performance of the construction industry remains a glaring challenge and efforts to tackle the challenges that comes with this developmental initiative by many nations including Nigeria are minimal (Okoye, and Okolie, 2014), hence Diugwu and Baba (2014) argued that Nigeria falls within the category of countries having no adaptive health and safety laws and regulations, where organisations allocates 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. They further argued that effective management of health and safety is motivated by various factors of which could be centred 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).

Okolie and Okoye, (2012) asserted that the institutional and regulatory framework for construction health and safety is highly fragmented and poorly implemented and call for urgent

need for provision of adequate and enforceable health and safety regulations for construction operations as well as the establishment of construction industry training institutes including trade centres in different parts of Nigeria. Olatunji and Aje (2005) opined that though prequalification has gained tremendous support and popularity in contract procurement in Nigeria, health and safety factors of contractor performance are not popularly prioritized. In the same vein, Idoro, (2011) revealed that all categories of contractors operating in the Nigerian construction industry do not perform better than each other in terms of health and safety and hence calls on all the stakeholders in the industry to improve their health and safety performance. The results of health and safety non-performance in Nigerian construction industry are untold and can be seen in the number of fatalities and injuries arising from construction activities across the country (Awodele and Ayoola, 2005; Dimuna, 2010; Ayedun *et al.*, 2012).

2.2 Construction Performance in Developing Countries

According to Ashford (1989), construction performance in developing countries can be improved by the commitment of government and other relevant stakeholders, whose decisions are key to performance in the construction industry. Most companies in the construction industry use performance measurement to judge their project performances both financially or otherwise and they use the results in comparing and contrasting their firm's performance with other firm so as to increase their firm's productivity. Takim and Akintoye, (2002) stated that construction project is acknowledged as successful when it is completed on time, within budget, and in accordance with specifications and in accordance to stakeholder's satisfaction.

Managing construction project for effective project performance according to Shigenobu and Takayuki (2009), is the ability and capability of identifying the system, controlling the work and accepting its output efficiently and effectively under required conditions. Lock (2007) stated that the importance of effective project management for effective performance is to be able to predict the dangers and problems, plan, organize and control activities for the project to be completed within scheduled. According to Manuele (2003), 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 industry on health and safety, thereby involving its inclusion as part of project performance criteria. But this can be achieved according to Goetzel (1999), by inculcating safety culture in employees, which is directly related to the productivity and profitability of organizations.

The construction industry in Nigeria generates almost 70% of the nation's fixed capital formation, in spite of that, its performance within the economy is very poor (Federal Office of Statistics, Abuja as cited in Arazi and Mahmoud, 2010). Falemu-Ojo (2009) revealed that quality of materials and workmanship in the Nigerian construction industry is not satisfactory and that the problem lies in the use of inappropriate materials supplied to sites and inefficient supervision of workmen which affects the construction performance. In a related development, Balogun (2005) stated that most construction projects in Nigeria fail due to poor contractors' performance which he characterized as poor workmanship, rework, low productivity, late completion, cost overruns, high accidents rate, poor work practice and site conflicts. The last decade however exposed the declining level of clients' satisfaction from the built facilities as a result of poor quality performance in addition to the perennial problems of time and cost overruns in the Nigerian construction industry (Arazi & Mahmoud, 2010). Defects can result in reduction of durability, strength and satisfaction to be derived from the project.

Galliker (2000) pointed out that organization's employees safety culture has a direct relationship with employees' productivity, in view of the fact that assigned tasks can only be safely accomplished when the work environment is safe and conducive for the execution of the assigned duties, be it construction, manufacturing or servicing, thus, any phenomenon that affects human production capacity will invariably affect organizational productivity hence improving workers wellbeing offers the company the opportunity of enhancing its performance.

3 Research Methodology

The research used a combination of questionnaire survey and observation for data collection for the study, where 80 questionnaires were randomly self-administered to construction professionals in small, medium and large sized construction firms in Abuja-Nigeria and 10 active construction sites were observed in order to determine their level of compliance in terms of site management. Random sampling technique was adopted in order to eliminate bias in sampling as illustrated by Morenikeji (2006). The methods used were based on the works of Famakin *et al.* (2012) adopted survey; Cheng, Ryan and Kelly (2012) used survey and Shibani, Saidani and Alhajeri (2013) adopted survey and interview. The data obtained from the survey was analysed using Kendall tau to determine the influence of health and safety practices on project objectives of cost, time and quality. Furthermore, the observations were analysed using mean score and the results were ranked. Cut-off points indicated below to determine the consensus based on the 5 point Likert scale was used.

1.0-1.49 Very poor; 1.50-2.49 Poor; 2.50-3.49 Fair; 3.50-4.49 Good; ≥ 4.5 Very good

4 Findings and Discussion

Table 1: Categories of Respondents by profession

Profession	Frequency	Percentage
Architect	12	21.4
Builder	15	26.8
Civil Engineer	8	14.3
Quantity surveyor	5	8.9
Others	16	28.6
Total	56	100.0

Source: Researcher

The table indicates that 12 of the respondents were architects representing about 21.4% of the total respondents. 15 were builders representing about 26.8%. 8 were civil engineer representing about 14.3%. 5 of the respondents were quantity surveyor representing 8.9%. 16 of the total respondents were from others representing about 28.6%.

Table 2: Numbers of Workers

Numbers of workers	Frequency	Percentage
1-49	28	50
50-249	16	28.6
250	12	21.4
Total	56	100.0

Source: Researcher

From the table above, it is shows that 50% of the respondents were employed by firms with workers ranging from 1-49, 28.6% represents firms with workers ranging from 50-249 and

finally 21.4% represents those with workers above 250. From the table, that those with workers from 1-49 has the largest percent and this could skew the results obtained.

4.1 Hypothesis Testing

To determine the statistical significant relationship between influence of health and safety practices and the performance indicators (Quality, Cost and Time), three hypotheses were formulated and Kendall tau test was used to determine the level of statistical significance as presented below.

4.2 First Hypothesis

Null Hypothesis Ho: there is no statistical significant relationship between influence of health and safety practices and quality.

Table 3: Influence of Health and Safety Practices on Quality

VARIANCE	P-value	Significant (2-tailed)	Significant if $P < \alpha = 0.05$
Health and safety practices	1.000	0.188	Not Significant
Quality performance	0.467		

Source: Researcher

Table 3 above shows the summary of test of statistical significant relationship between health and safety practices and quality. From the table above it can be deduced that health and safety practices do not have influence on quality. Since the significant (2-tailed) value for all the responses should be less than or approximately equals to $\alpha = 0.05$, therefore it can be concluded certainty that there is no statistical significant relationship between the two parameters measured. Hence the Null hypothesis is accepted.

4.3 Second Hypothesis

Null Hypothesis Ho: there is no statistical significant relationship between health and safety practices and cost.

Table 4: Influence of Health and Safety on Cost

VARIANCE	P-value	Significant (2-tailed)	Significant if $P < \alpha = 0.05$
Health and safety practices	1.000	1.000	Not Significant
Cost performance	0.000		

Source: Researcher

Table 4 shows the summary of test of statistical significant relationship between health and safety practices and cost. Based on the result, it can be concluded that there is no statistical significant relationship between health and safety practices and cost. Hence the Null hypothesis is accepted.

4.4 Third Hypothesis

Null Hypothesis Ho: there is no statistical significant relationship between health and safety practices and time.

Table 5: Influence of Health and Safety Practices on Time

VARIANCE	P-value	Significant (2-tailed)	Significant if P<a=0.05
Health and safety practices	1.000	0.348	Not Significant
Time performance	-0.333		

Source: Researcher

From the table, it can be concluded that there is no statistical significant relationship between the health and safety practices and time at 95% confidence level. Hence the Null hypothesis is accepted.

4.5 Analysis of the Observations

Ten active construction sites were visited to observe how their sites were managed in terms of the following; compliance with safety rules and scaffolding and materials storage/handling.

Table 6: Safety rules

s/n	SAFETY RULES	Level of compliance					MS	Rank	Decision
		1	2	3	4	5			
A	Hard hats	0	0	4	3	3	3.9	1	Good
B	Shirts with sleeves worn.	1	4	1	2	2	3.0	2	Fair
C	Work shoes worn	2	2	0	6	0	3.0	3	Fair
D	Work areas safe and clean	0	4	2	4	0	3.0	4	Fair
E	Provision for fall protection for their employees.	4	2	4	0	0	2.4	5	Poor

Source: Researcher

The table above shows the safety rules carried out to determine the ten firms' compliance level, Hard hats came first with a Mean Score of 3.9 which indicate it is being worn on sites, shirts with sleeves worn, work shoe worn and work areas safe and clean came second with Mean Score of 3.0, 3.0, 3.0 respectively and lastly provision for fall protection for their employees came third with Mean Score of 2.4 and it indicates poor compliance among the list.

Table 7: Scaffolding and material storage/handling

s/n	SCAFFOLDING AND MATERIAL STORAGE/HANDLING	Level of compliance					MS	Rank	Decision
		1	2	3	4	5			
A	Properly cross-braced	0	5	3	2	0	2.7	3	Fair
B	Proper guardrails and toe boards	4	1	2	2	1	2.5	4	Fair
C	Scaffold planks capable of supporting at least four (4) times the maximum intended load	0	1	1	5	2	3.0	1	Fair
D	Materials are sited at least two (2) feet from edge of excavation site.	4	2	2	1	1	2.3	5	Poor
E	Proper protective gear worn when handling chemicals.	2	3	2	1	2	2.8	2	Fair

Source: Researcher

Scaffold planks capable of supporting at least four (4) times the maximum intended load with Mean Score of 3.0, came first, Proper protective gear worn when handling chemicals with Mean Score of 2.8 came second, properly cross-braced with Mean Score of 2.7 came third, proper guardrails and toe boards with Mean Score 2.5 came fourth, while materials are sited at least 2 feet from edge of excavation with Mean Score of 2.3 came fifth. This indicates medium level of compliance, so more emphases need to focus on improving the use and management of scaffold.

The above results are not surprising due to the 50% responses received from the respondents that were employed in small sized construction firms as shown in Table 2. Okongwu (2010) that stated firms do not comply with health and safety provisions; Windapo and Jegede (2013) echoing the same thing stated that compliance level of indigenous construction firms in terms of health and safety policies and procedures was low. This study is consistent with Famakin *et al.* (2012) that stated that construction health and safety is not given adequate attention in the same way as project parameters of cost, time and quality. In a related development, Shibani, Saidani and Alhajeri (2013) stated that some safety managers in the United Arab Emirates showed more concern for cost than health and safety. However, the study was different from Cheng, Ryan and Kelly (2012) that was undertaken in Hong Kong where more priority is accorded health and safety issues than what is obtainable in this study area especially when small sized firms are involved.

5 Conclusion

The influence of health and safety practices on the performance of construction projects in Abuja was assessed. Based on the study, health and safety practices do not have influence on construction project performance in terms of quality, cost and time parameters. Furthermore, the results of the observations carried out indicated that the level of compliance with regards to safety rules and scaffolding and materials storage/handling could be deemed to be fair. Health and safety plan should be made mandatory for all contractors during bidding process in order to improve health and safety practices and by extension construction performance. The implication of the study on contractors is that adhering to health and safety practices may go a long way in ensuring that cost, time and quality objectives are met thereby making sure that clients have value for their money.

6 References

- Agwu, M. O. and Hilda, E.O. (2013). Fatalities in the Nigerian Construction Industry: A Case of Poor Safety Culture; *British Journal of Economics, Management & Trade*, 4(3), 431-452.
- Arazi, B. I. and Mahmoud, S. (2010). Framework for Evaluating Quality Performance of Contractors in Nigeria. *International Journal of Civil & Environmental Engineering*, 10(01), 34-39.
- Ashford, J. L. (1989). *The Management of Quality in Construction*, London E& FN Spon.
- Awodele, O. A., and Ayoola, A. C. (2005). An Assessment of Safety Programs on Construction Sites. In: *Journal of Land Use & Development Studies*, 1(1), 1-13.
- Ayedum, C.A., Durodola, O.D., and Akinjare, O.A. (2012). An Empirical Ascertainment of the Causes of Building Failure and Collapse in Nigeria. *Mediterranean Journal of Social Sciences*. 3(1), 313-322.
- Cheng, E.W.L, Ryan, N and Kelly, S (2012). Exploring the perceived influence of safety management practices on project performance in the construction industry. *Safety Science*, 50, 363-369
- Datta .M, (2000). Challenges Facing the Construction Industry in Developing Countries Gaborone, Botswana, *Proceedings of the 2nd International Conference on Construction in Developing Countries*, 15-17.
- Dimuna, K.O. (2010). Incessant Incidents of Building Collapse in Nigeria: Challenges to Stakeholders. *Global Journal of Researches in Engineering*, 10(4), 75-84.
- Falemu-Ojo, A. (2009). Relationship Between Collapse and Quality of Material and workmanship in Nigeria. *Proceedings of the Royal Institution of Chartered Surveyors Construction and Building Research Conference (COBRA)* University of Cape Town, South Africa, 10-11th September
- Famakin, I.O, Makanjuola, S.A, Adeniyi, O and Oladirin, T.O (2012). Impact of construction health and safety regulations on project parameters in Nigeria: Consultants and contractors view. *FUTY Journal of the Environment*, 7(1), 114-122
- Galliker, D. (2000). Betriebe in Bestform, GesundheitQualitat and Umweltschutzauseinermguss, Wiesbaden.
- Goetzel, R. (1999). *Health and Productivity Management II*, Measuring and Reporting Workforce Productivity, Best Practice Report, Houston.
- Haslam, R.A., Hide, S.A., Gibb, A.G.F., Gyi, D.E., Pavitt, T., Aikinson, S. and Duff, A.R. (2005). Contributing Factors in Construction Accidents. *Applied Ergonomics*, 36, 401-415
- Ibironke, O. T. (2004). *Building Economics*. Birnin-Kebbi, Nigeria: TimlabQuanticost.
- Idoro, G. I. (2011). Comparing Occupational Health and Safety (OHS) Management Efforts and Performance of Nigerian Construction Contractors. *Journal of Construction in Developing Countries*,16(2), 151-173
- Diugwu, I.A and Baba, D.L (2014). A Health and Safety Improvement Roadmap for the Construction Industry. *KICEM Journal of Construction Engineering and Project Management*, 4(1), 37-44.
- Kheni, N. Gibb, A. G. F., and Dainty, A. R. J. (2008). Health and Safety Management in Developing Countries: A Study of Construction SMEs in Ghana. *Construction Management & Economics*, 26(11) 1159-1169
- Laufer, A. and Ledbetter, W.B. (1986). Assessment of Safety Performance Measures at Construction Sites. *Journal of Construction Division, ASCE*. 112(4), 530-542.
- Lock, D. (2007). *Project Management* (9th Edition). UK: Ashgate Publishing Limited.

- Makinde, J. (2014). Assessments of Safety Measures on Building Sites (A Case Study of Minna, North Central Nigeria; *Greener Journal of Environmental Management and Public Safety* 3(1), 001-008.
- Manuele, F. A. (2003). *On the Practice of Safety*. New Jersey: John Wiley & Sons.
- Mbuya, E. and Lema, N.M. (1996). Towards Development of a Framework for Integration of Safety and Quality Management Techniques in Construction Project Delivery Process. *International Journal of Quality*. 14(5), 1–15.
- Morenikeji, Wole. 2006. "Research and Analytical Methods." *For Social Scientists, Planner and Environmentalists*. Nigeria: Jos University Press
- Okeola, O.G. (2009). Occupational Health and Safety (ohs) Assessment in the Construction Industry. Available at www.scribd.com
- Okolie, K.C. and Okoye, P.U. (2012). Assessment of National Culture Dimensions and Construction Health and Safety Climate in Nigeria. *Science Journal of Environmental Engineering Research*, 2012, Article ID sjeer-167.
- Okongwu, S.E. (2010). Effective safety and health planning on construction sites in Onitsha and Awka of Anambra State. Unpublished MSc thesis submitted to the Department of Building, Nnamdi Azikiwe University, Awka
- Okoye, P. U., and Okolie, K. C., (2014). Exploratory Study of the Cost of Health and Safety Performance of Building Contractors in South- East Nigeria. *British journal of Environmental sciences*, 2(1) 21-33.
- Olatunji, O.A. and Aje, O. I. (2005). An Assessment of the Use of Prequalification in Contractors' Selection in Construction Project Delivery: Challenges for Quantity Surveyors. *Proceedings for 2005 Quantity Surveyors' National Convention*, Malaysia.
- Onyejeji, N., (2011). Nigeria Public Policy Global Policy Brief, No 18, January. Available at [www.bc.edu/agingandwork assessed 21/3/2013](http://www.bc.edu/agingandwork%20assessed%2021/3/2013).
- Oresegun, D. (2009). Health and Safety: The Nigerian Perspective. Available at www.scribd.com.
- Shibani, A, Saidani, M and Alhajeri, M (2013). Health and safety influence on the construction project performance in United Arab Emirates. *Journal of Civil Engineering & Construction Technology*, 4(2), 32-44
- Shigenobu, O. and Takayuki, A. (2009). Japanese Project Management: KPM – Innovation, Development and Improvement: Modern Institute of Management. *Japanese management and International studies*, 3.
- Shittu, A. and Shehu, M.A. (2010). Impact of Building and Construction Investment on the Nigerian Economy during the Military Era (1991 – 1998) and Civilian Era (1999 - 2006). *Nigerian Journal of Construction Technology and Management*. 11(1&2), 89-98.
- Smallwood, J.J. (2002). The influence of health and safety (H&S) culture on H&S performance. In: Greenwood, D (Ed.) *Proceedings of the 18th Annual ARCOM Conference*, 2-4 September 2002, University of Northumbria. Association of Researchers in Construction Management
- Takim .R, and Akintoye .A. (2002). A Conceptual Model for Successful Construction Project Performance. *Paper presented at the Second International Postgraduate Research Conference in Built and Human Environment*, University of Salford, Salford, 11-12 April.
- Windapo, A.O. and Jegede, O.P. (2013). A study of health, safety and environment (HSE) practices of Nigerian construction companies. *The Professional Builder*, 4(1), 92-103