Quantity Surveyors Role in the Construction Health and Safety Management in Nigeria

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Abstract. The issues of adequate implementation of construction Health and Safety (H&S) good practice during project tendering and execution stages has not attracted needed attention by the quantity surveyors (QS). This study assessed the roles of Quantity Surveyors (QS) to foster construction H&S good practice. This study adopted a research mixed method, a sample of hundred and fifty (150) questionnaires distributed among professional registered QS within the South-West Nigeria, and only seventy (70) were completed, and valid this resulted in a response rate of 47%. In addition, an in-depth interviews amongst five-selected Registered Member Nigerian Institute of Quantity Surveyors. The interviews assisted the researcher to gain insights of respondents’ perceptions, and to validate the questionnaire results. The study findings suggested that the Quantity Surveyors lacks the earnest commitment and leadership inputs to foster financial provision for H&S items in the bills of quantities. The study findings further revealed that QS play little or no significant role to advice or select the contractors with H&S competencies during tendering stage. Thus, if the QS would play active leadership role in integrating of H&S cost items in bill of quantities it will significantly promote construction H&S good practice in Nigerian construction industry.

Keywords: Construction, health and safety good practice, Nigeria, quantity surveying, site workers.

1. Introduction

Construction project sites are considered as one of the most hazardous workplaces to work, due to the increasingly cases of injuries and fatalities across globe [1] [2]. The probability of workers being injured or having fatalities in construction related activities is 7-10 times higher compared to other industries [3]. The Nigerian construction industry ranked the second highest sector with incidents of accidents and fatalities of human lives whilst transportation sector account for the highest human fatalities [4]. It has been estimated that construction industry related accidents cost various national economies over 5% of their gross domestic product (GDP) [3]. The economic liability of construction site related accidents and fatalities is a critical challenge to the government of Nigeria and all the stakeholders alike. However, the poor records of construction site accidents...
and incidents in the Nigerian construction sector call for commitment and involvement of all the design team, quantity surveyors inclusive.

Construction site workers are being exposed to countless hazardous working environment such as challenging heights, underwater terrain, and potential dangerous chemical substances [5]. These form part of their daily routine. However, it has been widely acknowledged that construction workers are increasingly exposed to risk of a site related accident, ill health and fatality while undertaking site activities in comparison to other sectors; and this is an alarming experience [6] [7] [8] [9]. The clients and their design team have significant roles to play in improving construction site fatalities and injuries [10]. This was echoed by the United Kingdom (UK) revised version of Construction (Designs and Management) Regulations (CDM) (2007) cited by [11], which recognized the important contributions of clients and the design team relative to construction H&S management. The CDM regulations (2007) impose duties and responsibilities on everyone involved in construction projects which quantity surveyors are included. Compliance with the requirement of the CDM regulations (2007), demands that all parties to construction process are competent to contribute optimally to the on-going process. Therefore, quantity surveyors should contribute optimally to the improvement and sustainability of construction industry H&S management [11].

The 21st century construction design process and delivery calls for an active participation from all key project teams/participants, including quantity surveyor. Thus, the quantity surveyor should strive to be one of active decision marker in assuming leadership role with issues concerning construction workers’ health, safety and wellbeing. The Quantity Surveyor (SQ) as a financial adviser to the clients has duties and responsibilities to ensure that competent H&S contractors were selected during the project tendering stage [12]. Thus, most of construction contractors struggle to adequately provide personal protective equipment (PPE) to their site workers as they barely create room for H&S items during their tendering of a given project [13]. In addition, a research conducted by [14] asserts that the insufficient provision and allocation of financial resources for construction H&S items by the quantity surveyor during the project tendering stage is potentially hampering the H&S good practice and improvement. Thus, there is a growing research undertaking on the issues of H&S management and critical factors fostering construction site accidents in Nigeria [14]. However, little empirical studies has been carried out towards exploring the roles of the quantity surveying profession relative to construction projects H&S management in Nigerian construction sector. The aim of this study is assess the impact of quantity surveyors’ role in fostering adequate provision of funds for implementation of H&S good practice during the planning and execution of construction projects. Thus, the key proposition of this paper is that quantity surveyors could significantly contributes to an improvement of construction projects H&S good practice and performance, as the cost adviser to the clients and contractor.

2. Literature Review

2.1 Motivation for Addressing Health & Safety Practice in Construction Industry

The Cost of Accidents (CoA) is being acknowledged as a critical issue and motivation to tackle the implications of construction site H&S challenges [15]. The raise of construction related accidents could be perceived as cancerous event for construction workers [15]. Thus, the cost implications of construction site related casualties and lost with regard to the clients and overall economic activities are a huge concern [15]. More so, the cost implication of construction site accidents to the contractors could diminish their profit margins and productivity. The Health and Safety Executive (HSE) (2008) IN UK acknowledged that the costs of accidents could be about 4.5% of the tender figure [16]. Whilst in in South Africa, [17] claims that
the monetary costs of accidents could be 4.2% of the tender price in a given project. In addition, study carried out by [18] claims that the total CoA is about 6.5% of the worth of finished construction project. More so, [16] in the United Kingdom claims that the total CoA in construction could be about 8.5% of the tender price of a project. Thus, one of the critical concern is the harmful impact of construction site related accidents and fatalities is the exacerbating of human suffering among construction workers' families, which cannot be insufficiently quantified and compensated in a monetary terms [13].

By the words of an eminent researcher, late professor Hinze, construction site accidents are indeed a cancer of construction. Thus, the above findings relative to the evil effects of accidents on construction projects should be a good motivator to quantity surveyors as project cost/ financial specialists in the construction sector to have an attitudinal/ behavioral change towards construction workers’ H&S improvement. The overall costs of construction accidents and ill health for workers and their families and employers are significant and need to be adequately addressed. However, the estimated monetary cost implications of construction site related accidents, ill health and fatalities could be about 7-10% to most country's gross national product [19].

2.2 Legislative Framework Challenges for Nigerian Construction Industry H&S

In the Nigerian construction industry, there is no clear and specified legislation framework with regard to occupational health and safety issues to clients and design team in contrast to the United Kingdom of Construction of Design and management Regulations (2007) cited by [11]. Nigeria does not have clear statutory regulations on construction H&S and that the existing legislation that serves as a point of reference is either British or American [20]. The Nigeria Factory Act of 1990 is an adoption of the United Kingdom Factory Act of 1961, and the Occupation Safety and Health Act of 1970 is an American legislation [20]. The existing scenario is not peculiar to Nigerian construction industry alone, but common among Sub-Saharan Africa countries. The absence of these important documents has left workers at the mercy of contractors who hardly keep insufficient account of construction site related causalities on site or report such information. In the developed countries, such as the UK, there are recent statutory regulations on construction H&S. An example is the Construction (Design and Management) Regulations (1997) which have the other version of (2007). The new version demands full participation and involvement of clients and the design team, quantity surveyors inclusive [20].

The Construction Design and Management Regulations (2007) clearly identifies the roles of clients and the design team with regard to project H&S management. Clients shall inter alia: permit adequate period for the completion of projects; pre-qualify contractors on H&S good practice; conduct periodic audits of contractors’ H&S performance during project execution. The design team, which includes quantity surveyors, has duties and responsibilities relative to construction project H&S management. The CDM (2007) section 3:12 specifically states that quantity surveyors shall provide sufficient information in the Bills of Quantities (BoQ) for H&S; carry out a critical evaluation of contractors during selection based on H&S competencies, and certifying that contractor made sufficient financial provision for H&S items in their tendering stage. With regards to the UK CDM regulations and other international legislation relation to project H&S, it becomes imperative that Nigerian quantity surveyors should understand their critical H&S roles and contribute effectively to the enhancement of H&S performance in the industry [20].

2.3 The Quantity Surveyors’ roles in construction site H&S performance

Finance is the bedrock of all developmental projects [9]. A successful completion of construction projects is principally reliant on the obtainability of funds and other related factors. By order of importance, the quantity surveyors are the construction cost experts, and saddled with responsibility to advice, and support clients and contractors on financial implications of their projects. Research findings of Akintoye and Macleod (1997) cited by [14] indicates that a lack of finance contributes to inadequate implementation of construction site H&S good practice, which in turn affect the overall performance of construction industry.
However, the issue of insufficient fund is one of the critical factors contributing to construction contractors’ poor implementation of H&S good practices [14]. In addition, many contractors are failing to provide insufficient personal protective equipment (PPE) to their employees working on site as a result inadequate financial resource for H&S items during project tendering stage [17]. The quantity surveyor can facilitate for sufficient financial support for H&S items in the two major construction contract documents: conditions of contract and bills of quantities (BoQs). [13] asserts that quantity surveyors can assist to alleviate poor implementation of H&S good practice experienced by construction site workers if adequate provision for financial support for H&S through the provisional sums.

Contractors tendering for projects have responsibility to conform to the preliminary and general sections of the BoQs, which should foster promotion of H&S good practice. Quantity surveyors have a duty to ensure that contractors comply with these sections in their tender documents. In addition, quantity surveyor can infuse financial resource for H&S items in line with the construction standard form of contract, which highlights critical clauses that hinge on insurance and indemnity cover to construction related injury and fatalities [13]. Thus, if a quantity surveyor fails to plan and infuse sufficient funds for H&S items in the BoQs or standard form of contract, the consequences would result into poor implementation of H&S good practice by the contractors during the project execution as earlier noted. Arguably, when some of construction contractors would compromise towards making adequate provision of H&S resource for the site workers as a result of insufficient funds and resource. The consequential outcome would be construction workers’ causalities and fatalities. Some of the construction contractors and site supervisors clench on the incorrect notion that planning of construction H&S good practice is less critical and is a needless cost [15]. The [17] states that H&S good practice and items should be considered as one of critical factors for measuring project success relation to cost, time, and quality at the project design stages. The [15] affirms that implementation of H&S management entails an unification of H&S with cost control, scheduling and quality. Thus, Quantity Surveyor should always demonstrate commitment and active leadership to promote H&S good practice by ensuring that selected contractor(s) is H&S competent and have to detailed plan for suitable financial support for H&S items in the tender documents.

Paucity of funds can affect negatively on contractors’ site H&S management management. Quantity surveyor as the construction financial expert is saddled with an important responsibility to prepare the periodic valuation of completed project works executed by the contractor [13]. Thus, timely valuation would assist the construction contractors in order to sustainable financial inflow and outflow. Thus, inadequate provision would therefore negatively affect the implementation of construction site H&S good practice and performance. Prudent management of financial resources on the site is linked to optimal H&S performance that will invariably/ultimately reduced site injuries and fatalities [13] [14].

2.4 Effect of site accident in the construction project performance

One of the significant effects of site accidents on construction projects’ performance could be visible through recurring absenteeism and overall poor productivity [21]. It is estimated that about 30 000 man’s hours are vanished day-to-day due to construction site related causalities [19]. The lost hours has a weighty negative impact on economy outlook of any given country. It has been widely acknowledged that incidents of construction site related accidents and fatalities have a far-reaching devastating impact contractors’ profit margin and sustainability. Indeed, one understandable result of construction site causalities is the people’s misery from the affected construction workers’ families [22]. There are significant financial consequences for many families for losing their dear ones and the breadwinner. Furthermore, poor construction site H&S management tarnishes contractors’ image [15]. This concern make construction industry unattractive because of poor image, which may result in the contractors being less attractive to prospective client [14]. Construction site accident is also usually characterised by long legal disputes and litigation that may end with huge claims that is paid to workers or their families. Given the economic and social impacts of construction site accidents and incidents, quantity surveyors should demonstrate commitment and visible leadership in their professional calling [14].

3. Research Method
To realize the purpose of this research, a mixed research approach was adopted. The factor underlying a mixed research method represents the two aspects of data continuum [23]. Research problems are better understood by utilising both quantitative and qualitative methods in a complementary manner [24]. Supporting the adoption of mixed methods in research, [23] claims that the central objective of a mixed method is to adequately address the research problem with a compendium of research methods that have balanced approach, thus taking into consideration weakness and their complementary strengths of each research methods. This study involves human behaviour, interaction, and objective perceptions and therefore the mixed method was adopted as most appropriate.

The quantitative data collection method involved a distribution of questionnaires to one hundred and fifty Registered Quantity Surveyors within the South-West Geopolitical zone of Nigeria. The study’s questionnaire have two parts. The first parts entail the personal profile of the research respondents. The second part involved of research closed questions based on statements with regard to the construction practice of H&S management and site accident and fatalities. Respondents were requested to respond by rating the statements contained in the closed questions in accordance with the six (6) point Likert scale. A research sample size of hundred and fifty (150) questionnaires were distributed; only seventy (70) were completed, returned and found valid, which accounted for 47% response rate for the study. The response rate obtained in this research is comparable to studies conducted by [25] [26]. It could be concluded from [25], [26] that obtained statistical analysis in survey within the response rate equal to or above the threshold of thirty percentage (30%) is acceptable. Thus, 47% response rate obtained in this survey provides valid data for analysis. In addition, an in-depth interview scheduling were also conducted with the five selected Registered Member of three (3) Registered Member (MNIQS) and two (2) Fellows (FNIQS) of the NIQS, in order to gain and elicit insightful inputs towards understanding the research problems under investigation [24]. This approach assisted the researcher to gain insights of respondents’ perceptions, and to validate the questionnaire results.

3.1 Data analysis and interpretation of study findings.

This study adopted a research mixed method approach, where a sample of hundred and fifty (150) questionnaires distributed among professional registered QS within the South-West Nigeria, and only seventy (70) were completed, returned, and valid and this resulted in a response rate of 47%.

Figure 1, indicates that 71 % of the respondents have been involved in construction for the past 10 -15 years, whilst 29% have between 1-5 years’ experience in the construction industry. The experience of the respondents denote how significant their inputs are in this study.

3.2 Respondents’ Highest Qualification

[Figure 1: Respondents’ Industry experience in the South-West Nigerian Construction Market]
Figure 2, indicates that 61% have a Higher National Diploma certificate in Quantity Surveying and 39% hold bachelor degree in quantity surveying qualification.

![Figure 2: Respondents’ Highest Qualification](image)

### 3.3 Respondents’ Job Position

However, Figure 3, indicated that 83% of respondents holds managerial position in their firms, whilst 17% of respondents are managing members and principals of their firms. Thus, this indicate the strategic influence the respondents occupied within the respective firms and how significant their inputs are to the study.

![Figure 3: Respondents’ Job Position](image)

### 4. Presentation of Research Findings

Table 1 examines the roles of quantity surveying profession in construction H&S management in Nigerian construction industry. The questions were framed to elicit respondents’ perceptions on the extent to which identified statements contributed to poor implementation of Health & Safety (H&S) practice in the construction industry within the South-West Nigeria. Respondents were requested to rank and rate the provided statements in accordance with the six (6) point Likert scale.

| Un | Response (%) | MS | Ra |
|----|--------------|----|----|
| Higher National Diploma certificate in Quantity Surveying | 43 | 10 | 20 |
| Bachelor Degree in Quantity Surveying | 27 | 30 | 40 |
| QS: Managerial Position | 58 | 50 | 60 |
| QS: Managing member and Principal position | 12 | 0 | 10 |

**Table 1.** Quantity Surveyor’s roles in construction site H&S management
Please kindly indicate the extent of your agreement on impact of the below statement with regard to role of Quantity Surveyors (QS) in or not facilitating H&S practice in the construction industry has a minor or major consequence.

| minor | major |
|-------|-------|
| 1     | 2     |
| 3     | 4     |
| 5     |       |

|                  | Minor | Major |
|------------------|-------|-------|
| Inadequate facilitation of financial provision for H&S in the BoQ is a result of QS’s lack of earnest commitment. | 4.2   | 6.3   |
| The QS usually fail to ensure that contractor has made adequate financial provision for H&S. | 9.1   | 4.9   |
| The non-inclusion of an H&S section in the BoQ has undermine serious of H&S practice in construction. | 7.7   | 5.6   |
| The QS’s inadequate capability to identify health hazard and risk assessment during construction planning stage. | 8.4   | 7.7   |
| Lack of pre-qualification of contractors’ history of H&S practice during the appointing of contractors. | 6.3   | 5.6   |
| Inadequate H&S information in BoQ. | 5.6   | 9.1   |
| Inadequate project duration estimation. | 7.0   | 9.9   |
| Poor choice of procurement system. | 7.7   | 6.9   |

Table 1 indicates a 6-point Likert-scale dimension was utilised to elicit the opinions of the respondents, which were used in analysing the result of this study. The Liket scales are useful approach to elicit participants’ opinions on various statements [24]. The SPSS Statistics (version 10.0) was employed in generating the descriptive and inferential statistics of this study accordingly.

From the analysis in Table 1, respondents ranked the “Inadequate facilitation of financial provision for H&S in the BoQ is as a result of QS’s lack of earnest commitment” was concerned considered as major that has significant negative impact towards facilitating H&S practice in the construction process. The issues such as; non-inclusion of an H&S section in the BoQ; QS’s inadequate capability to identify health hazard and risk assessment during construction planning stage; and lack of pre-qualification of contractors’ history of H&S practice during the appointing of contractors by the QS has undermine serious of H&S practice implementation in construction. These findings validate the case made by [14] that insufficient fund is one of the critical factors fostering to contractors’ poor H&S implementation during construction execution process. In addition, [17] affirms that H&S items/activity should be a considered as significant aspect of construction process and deserved status equal to that of cost, time, and quality at the project design stages. Thus, these findings strongly indicate that professional QS should intensify their strategic role towards influencing H&S best practice in the construction industry. When using Likert scales, it is vital to calculate and report Cronbach’s alpha coefficients as well as the internal consistency and reliability [27].
Thus, [28] recommend that the following guidelines for the interpretation of Cronbach’s alpha coefficient: 0.90 – high reliability; 0.80 – moderate reliability, and 0.70 low reliability. The questionnaire survey shows a high reliability Cronbach’s alpha of 0.90.

4.1 Interview Schedule Analysis

The research data was sourced through the use of unstructured and in-depth interviews, which were voice recorded, transcribed, interpreted and documented to achieve the following: Firstly, the profile of the interviewees was presented and analysed. The response rates of the research were assessed. Secondly, the narrative data were transcribed and analysed from “Section A” part of the interviews. The qualitative data collection method employed in this study involved in-depth interviews. The in-depth interviews supported the researchers to understand the level of mindfulness and perceptions of respondents relative to construction projects H&S management in the Nigerian construction industry. The qualitative method does not have statistical strength rather its strength lies on the quality of information in real life environment through face-to-face interviewing [23].

Interviewees were chosen from among registered members of practicing Quantity Surveyors. The condition for interviewee selection included knowledge of the field; should have being working on a construction industry for five years and should have been a Registered Member of the Nigerian Institute of Quantity Surveyors (MNISQ) and a Fellow of the Nigerian Institute of Quantity Surveyors (NISQS). Safe working environment are important matters that relate to the general health, safety and well-being of working people, quantity surveyors should be more committed to their professional duties. Construction site accidents and incidents is preventable and should be prevented by ensuring that contractor has made adequate financial provision for H&S, facilitating of financial resource for H&S in the BoQ, and contract documents. Literature indicated that quantity surveyors have pivotal roles to play in improving construction projects H&S. In instances, where quantity surveyors failed to perform those important duties, the consequences would be insufficient funds for implementation of site H&S good practice. Base on this fact, interview questions was posed to interviewees.

Interview question 1: As a construction cost expert, do you make adequate financial provision for H&S in your bills of quantities and other contract documents such as Conditions of Contract?

All the interviewees answered. “Yes” and went further to state that I ensure adequate funds were located/allowed for projects H&S in the BoQs as provided by Building and Engineering Standard Method of Measurement (BESMM) in the Preliminaries section 2.7. “A Fellow of the NIQS added that Clause 36 of the General Conditions of Contract from the Bureau of Public Procurement in Nigeria empowers Quantity Surveyors to make financial provision for projects risk, safety and welfare of workers on site”.

There is existing legislation and laws in Nigeria concerned with prevention and protection of workers from workplaces accidents and hazards. The purpose of these laws entails that workers’ wellbeing is taken care of. Legislation and laws on their own cannot achieve the desired results without commitment. Therefore, Quantity Surveyors as cost experts in the construction industry have the duty and responsibility to ensure that adequate funds were located for projects site H&S management. Construction (Design and Management) Regulations details out duties and responsibilities of the design team which Quantity Surveyors were included. The Regulations empowered he design team to pre-qualify contractors on H&S competencies before award of contract. On this fact, a question was posed to the interviewees.

Interview question 2: As one of the design team and cost adviser to the clients and contractors, do you consider contractors’ H&S competencies as one of the important criteria during pre-qualification, final selection and award of contracts to contractors?
There are contradictory opinions from the interviewees on their answers to the question. Some answered “yes’, we considered project H&S as important as other project perimeter such as cost, time and quality”. A senior Fellow of NIQS made the contradictory statements. “That in Nigeria public projects, recommendations of the design team are often overturned by the clients”. “Contracts are awarded on political patronage not on competencies”. “Corruption is so endemic in our culture”. He went further and stated. “That a project completed with flaws in terms of site accidents and incidents cannot be said to be successfully completed”.

The resultant effects of the lacks of commitment and unethical behaviour by clients would result in workplace injuries, fatalities and project abandonment or cost overruns, in public projects. The poor leadership and lack of commitment to construction projects H&S, particularly among the public sectors clients in Nigeria confirmed in the literature.

5. Conclusion

Based on the research results and literature review, it can be concluded that lacks of commitment and involvement towards projects (H&S) design and implementation by the quantity surveyors could contribute to construction site accidents and incidents. Low involvement of quantity surveyors in the selection and appointment of competent H&S contractors, lacks of commitment in facilitation of financial provision for H&S in the contract documents such as BoQs and other contract documents and failure to ensure that contractors have made adequate financial provision in their tender documents are impediments to effective construction projects H&S management. In addition, lack of commitment by quantity surveyors in carrying out regular interim or monthly valuation that improves contractors’ steady cash-flow, as lack in discharging this important duty contribute to contractors’ lacks of funds for site H&S intervention.

It was found that Nigeria has no construction regulations or laws that define the duties and responsibilities of quantity surveyors with relative to construction project H&S, in contrast to what obtain in the UK and other developed countries. The study also revealed that clients and contractors do not consider project’s H&S equal important as cost, time and quality, therefore projects H&S suffered due to inadequate allocation of funds for H&S. The consequences are site fatalities, injuries, plants and equipment damage. The following recommendations arise from the study:

- Quantity surveyors as cost adviser to construction clients must ensure that adequate financial provision for H&S have been made during the early projects planning stages.
- Quantity surveyors should demonstrate commitment and active involvement towards the projects H&S by ensuring that contractors with H&S competencies are appointed during the tender adjudication process.
- Quantity surveyors should diligently facilitate financial provision for H&S in the contract documents and bills of quantities.
- Quantity surveyors should show more commitment in the preparation of interim monthly valuation certificates to enhance contractors’ cash-flow that ensures regular funds for site H&S interventions by contractors.
- Clients and contractors should consider project H&S equally important as the other three project variables such as cost, time and quality, if projects H&S performance should be improved in the Nigerian construction environment.

Government, construction stakeholders and the Nigerian Institute of Quantity Surveyors should come up with the Nigeria version of the Construction (Design and Management) Regulations as obtained in the UK and other developed countries, as it will help in defining the critical H&S roles of clients and the design team.

6. References

[1] World Health Organisation (WHO). (2010). World Health Report 2010 Geneva: London.
[2] Fewings, P. (2010). Working at Height and Formwork, In McAleenan, P. and Oloke, D. ed. *ICE Manual of Health and Safety, London: Thomas Telford*, 165-179.

[3] International Labour Organisation (ILO). (2011). Guidelines on Occupational Safety, Health and Management Systems, Geneva: ILO.

[4] National Occupational Safety and Information Centre (NOSHIC). (2006). Nigeria: Report of the National Occupational Safety and Health Information Centre (CIS). Geneva: NOSHIC. Available at [https://www.ilo.org/legacy/english/protection/safework/cis/about/mtg2006/pnga_mlpid.pdf](https://www.ilo.org/legacy/english/protection/safework/cis/about/mtg2006/pnga_mlpid.pdf) [Accessed on 19/02/2020].

[5] Coke, A. and Sindler, D. (2010). Controlling Exposure to Biological Hazards, In McAleenan, P. and Oloke, D. ed. *ICE Manual of Health and Safety, London: Thomas Telford*, 121-133.

[6] Behm, M. (2005). Linking Construction Fatalities to Design for Construction Safety Concept, *Safety Science*, 43(8), 589-611.

[7] Kheni, N. A. (2008). Impact of Health and Safety Performance on Small and Medium Sized Construction Businesses in Ghana. Unpublished PhD: Loughborough University.

[8] McAleenan, P. (2010). Controlling Exposure to Chemical Hazards, In McAleenan, P. and Oloke, D. ed. *ICE Manual of Health and Safety, London: Thomas Telford*, 135-148.

[9] Gambatese, J.A. (2008). Research issues in Prevention through Design. *Journal of Safety Research*, 39 (2), pp. 153-156.

[10] Spangenberg, S. (2009). An Injury Risk Model for Large Construction Projects, *Risk Management an International Journal*, 11 (2), 111-129.

[11] Goetsch, D.L. (2013). Construction safety and health, 2nd edition New Jersey: Prentice Hall.

[12] Jagboro, G.O. (2010). Unmasking the Tower of Babel and Scourge of Abandoned Projects in Nigeria: Obafemi Awolowo University, Ile Ife, Inaugural Lecture Series 286.

[13] Olatunji, O.A., Sher, W. & Gu, N. (2011). Building Information and Quantity Surveying Practice, *Emirates Journal for Engineering Research*, 15(1), 57-67.

[14] Okorie, V.N. (2014). Behaviour-based Health and Safety Management in Construction: A Leadership-focused Approach, Unpublished PhD Thesis: Nelson Mandela Metropolitan University. South Africa.

[15] Hinze, J. W. 2006, *Construction safety*, New Jersey: Prentice-Hall.

[16] Health and safety Executive (HSE). (2008). HSE Construction Intelligence Report: Analysis of Construction Injury and ill Health Intelligence. London: HSE.

[17] Smallwood, J.J. (2000). The Role and Influence of Clients and Designers in Construction Health and Safety, *First European Conference on Construction Health and Safety Coordination in the Construction Industry*, Barcelona, 21-22 February, 2008.

[18] Hibbert, L. (2008). Averting Disaster, *Professional Engineering*, 21(11), 20-31.

[19] International Labour organisation (ILO). (2010). ILO standard on occupational safety and health promoting safe and healthy working environment: Geneva, ILO.

[20] Idoro, G. I. (2004). The Effect of Globalisation on Safety in the Construction industry in Nigeria: In *proceedings of International Symposium of Globalisation and Construction*, Bagdok: Thailand, 43-58.

[21] Hughes, P. & Ferrett, E. D. (2010). *Introduction to Health and Safety in Construction*, Butterworth-Heinemann, Elsevier Linacre House, Jordan Hill Oxford 0X2 8DP, UK.

[22] Oloke, A.O. (2010). Responsibility of Key Duty Holders in Construction Design and Management, In McAleenan, P. and Oloke, D. ed. *ICE Manual of Health and Safety, London: Thomas Telford*, 29-37.

[23] Flick, U. (2014). *An introduction to qualitative research*, 5th edition. London, Sage.

[24] Leedy, P.D. & Ormrod, J.E. (2010). *Practical research: Planning and design*, 8th edition, Upper saddle River, New Jersey: Pearson.
[25] Sutrisna, M. (2009). Research methodology in doctoral research: Understanding the meaning of conducting qualitative research, Working Paper presented in ARCOM Doctoral Workshop, Liverpool, John Moores University, 12 May.

[26] Danity, A.R.J. (2008). Methodological pluralism in construction management research, In: Knight, A. and Roddock, L. (Eds). Advanced research methods in the built environment, Oxford: Wiley-Blackwell, pp.1-13.

[27] Gliem, J.A. & Gliem, R.R. (2003). Calculating, interpreting Cronbach’s alpha reliability coefficient for Likert-type scales. In: 21th Annual Midwest Research-to-practice Conference on Adult, Continuing and Community Education, 8-10 October, Columbus: Ohio, pp.82-88.

[28] Maree, K. and Pietersen, J. (2007). Surveys and the use of questionnaire, In: Maree, K. (Ed.). First steps in research. Pretoria: van Schaik Publisher, pp. 155-170.