

IMPACT OF CONSTRUCTION HEALTH & SAFETY REGULATIONS ON PROJECT PARAMETERS IN NIGERIA: CONSULTANTS AND CONTRACTORS VIEW

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Abstract

The effectiveness of the construction industry can only be enhanced by repositioning the construction health and safety regulations to safeguard the health of the workers and the entire community. This paper seeks to assess the views of consultants and contractors about the impact of construction health and safety regulations in Nigeria. Data was collected using the questionnaire survey distributed among construction professionals and statistical tools employed include tables, percentages and mean score ranking. The study revealed that construction health and safety is still perceived to be more important than the traditional project parameters in the form of cost, time and quality. Designers perceive that an enhanced environment is the resultant impact of construction health and safety regulations while quantity surveyors see improved quality as having the resultant impact while contractors perceive improved maintenance as having the resultant impact on health and safety regulation. The study recommends that better attention is given to health and safety should as a project parameter and that related practice notes and guidelines should be evolved for all project stakeholders.

Keywords: Health and safety, consultants, contractors, regulations and Nigeria.

Introduction

In construction today, as always, there is a pressing need to meet all quality, safety, cost and time related objectives. Though by its nature, it remains a high-risk business that employs high numbers and continues to have high accident and fatality rates. The construction industry is one of the world's largest contributors to global economy, and traditionally many parties are involved in the design and construction process (SGS Group, 2009). Smallwood & Haupt (2006) is of the opinion that the construction industry has hinged the successful management of construction projects on the traditional parameters of cost, time and quality which is responsible for the increasing rate of construction accidents thereby calling for increased level of awareness of construction health and safety making its inclusion as part of project performance criteria a necessity.

There are a number of problems in the construction industry caused by bad management, and the situation seems to be getting worse as projects are frequently late, over budget and suffer from poor workmanship and materials (Vasilescu, Dima, and Vasilache, 2009). Conflict is increasing, resulting in litigation and arbitration with depressing regularity. The aesthetics of the built environment are subject to much criticism in the popular press, and this is often reinforced by more serious publications. All of these problems seem to arise from a non-existent and/or lack of enforcement of construction health and safety regulations and from the application of outdated ideas about the roles of professionals in creating a flexible, responsive and dynamic

construction team with a safe and accident free construction environment (Ayininuola and Olalusi, 2004).

The highest ranked business environment group factor causing contractor's business failure in developing countries is absence of construction regulations (Adnan, Khalid and Sherif, 2006). Construction regulations are various statutory requirements which construction projects are subject to, due to its relatively hazardous nature. They are planning permission and health and safety laws in the industry purposed to reduce further the unacceptable levels of avoidable accidents, injuries and deaths.

Project delivery requirements are generic and include health and safety – the construction regulations have scheduled a range of specific health and safety requirements relative to both clients and designers (Smallwood & Haupt, 2005). Huang & Hinze (2006) rightly argued that the involvement of clients (owners) is an essential requirement for the zero injuries objective. Consequently, within the context of health and safety, designers are required to contribute either as designers, or as client-appointed health and safety agents. The relevance of the definition of 'conformance to requirements' to health and safety is obvious, as health and safety legislation, standards, and organization policy and rules constitute requirements (Crosby, 1984).

Literature review

Construction Regulations

These are statutory instruments setting out the minimum legal requirements for construction works and relate primarily to the health, safety and welfare of the workforce which must be taken into account when planning construction operations and during the actual construction period (Chudley & Greeno, 2006). According to him, the construction (health, safety & welfare) regulation of 1996 sets goals for the wellbeing of site personnel, with objectives emphasizing assessment of risk. It broadly covers timbering works; safeguarding excavations; ventilation of workplaces; doors, gates and entrapment; traffic routes, safe access and egress; good site organization and planning; emergency lighting; segregation of site traffic and personnel; and welfare facilities, accommodation, sanitation, protective clothing, first aid equipment/personnel, means to heat and prepare food.

Mohammed (2010) is of the opinion that construction regulations must incorporate a provision that the contractor who plans to perform any construction shall before carrying the work notify in writing the competent authority for construction planning, particularly if the construction work includes use of explosives, dismantling of fixed plant, excavation work. He also stated that it is incumbent for the client to furnish a documented health and safety specifications for the construction work ensuring that the construction stage of any project does not commence unless a health and safety plan complying with established technical standards has been prepared in respect of that project.

Health and Safety on construction sites

Oresegun (2009) views health and safety as an inevitable aspect of construction since the only time an employee will perform his duties is when he is in good health, sure of a safe working condition and assured of good health care even when an accident occurs. Based on this assertion, it is well understood that there will be the need for a higher level of health and safety protection due to rapid technological advancements in the construction industry leading to more fatal construction accidents.

Clients or his representatives should exercise complete control over their employees and ensure strict adherence to safety practices. The company must comply with all provisions of safety and health regulations that pertain to the construction works itself. It should be realized that implementation of safety and occupational health in construction works is not only for compliance purposes. Provision of health and safety plan and policies/programs such as workers welfare arrangements, clear and agreeable compensation plans, good working tools, conducive working environment and use of safety equipment; has positive result in the productivity for the company, hence increase profit. Long-term indicators have it that, lack of health and safety policies and programs not only will affect the company dividend but the worker, family and the community. Making changes to improve health and safety standards and reduce accidents and ill health can also increase profitability; increase productivity; improve recruitment and retention; and improve quality (Gibson 2002).

Consultants' roles in ensuring health and safety

The Quantity Surveyor

Quantity surveyor according to Wikipedia (2008) is "a professional trained, qualified, and experienced in handling construction cost, construction management and construction communication on behalf of the client". He manages all costs relating to building and civil engineering projects from the initial calculations to the final figure seeking to minimize the cost of the project and enhance value for money while still retaining the quality and required standards specified by statutory building regulations.

Nigerian Institute of Quantity Surveyors (2004) defined a quantity surveyor as the expert professionally trained and experienced in dealing with construction cost, construction management and construction communication; which is exhibited in various types of projects including building construction, civil and structural engineering, mechanical building and engineering services, petrochemicals, mineral extraction, cost and production engineering, environmental economics, planning and urban development, landscaping, interior design and all other relevant areas.

In terms of the construction regulations, according to Smallwood & Haupt (2006), the definition of the designer includes the quantity surveyor who specifies articles or draws up specifications. Quantity surveying practices therefore need to address health and safety within the confines of their practices. However, quantity surveyors invariably visit projects, and therefore could be exposed to hazards and risk. Furthermore, given that quantity surveyors specify articles and draw up specifications, they are also allocated the responsibility to ensure that such article is safe and without risks to health.

The Designers

The designer is defined in the CDM Regulations (2007) as the person who prepares or modifies the design or arranges another to do so. They are those who have a trade or a business which involves them in preparing designs for construction work, including variations. This includes preparing drawings, design details, specifications, bills of quantities and the specification (or prohibition) of articles and substances, as well as all the related analysis, calculations, and preparatory work or arranging for their employees or other people under their control to prepare designs relating to a structure or part of a structure.

Designers are in a unique position to reduce the risks that arise during construction work with a key role to play in health and safety. They develop initial concepts, detailed

specification which often involves different teams and people at various stages. At each stage, designers from all disciplines can make a significant contribution by identifying and eliminating hazards, and reducing likely risks from hazards where elimination is not possible. Designers' earliest decisions fundamentally affect the health and safety of construction work thereby influencing later design choices leading to a considerable work if it is necessary to unravel earlier decisions. It is therefore vital to address health and safety at the conception of the design (CDM Regulations, 2007).

Designers' responsibilities extend beyond the construction phase of a project. They also need to consider the health and safety of those who will maintain, repair, clean, refurbish and eventually remove or demolish all or part of a structure as well as the health and safety of users of workplaces. For most designers, buildability considerations and ensuring that the structure can be easily maintained and repaired will be part of their normal work, and thinking about the health and safety of those who do this work should not be an important consideration. Failure to address these issues adequately at the design stage will usually increase running costs, because clients will then be faced with more costly solutions when repairs and maintenance become necessary. Where significant risks remain when they have done what they can, designers should provide information with the design to ensure that the client, other designers and contractors are aware of these risks and can take account of them (CDM Regulations, 2007).

Designers should, for all project, make sure that they are competent and adequately resourced to address the health and safety issues likely to be involved in the design; check that clients are aware of their duties; avoid foreseeable risks to those involved in the construction and future use of the structure when carrying out design work, and in doing so, they should eliminate hazards (so far as is reasonably practicable, taking account of other design considerations) and reduce risk associated with those hazards which remain; provide adequate information about any significant risks associated with the design; co-ordinate their work with that of others in order to improve the way in which risks are managed and controlled. In carrying out these duties, designers need to consider the hazards and risks to those who: carry out construction work including demolition; clean any window or transparent or translucent wall, ceiling or roof in or on a structure or maintain the permanent fixtures and fittings; use a structure designed as a place of work; may be affected by such work, for example customers or the general public (CDM Regulations, 2007).

Furthermore, the International Labor Office (ILO) (1992) specifically states that designers should receive training in health and safety and integrate the health and safety of construction workers into the design and planning process, without including anything in a design which would necessitate the use of dangerous structural or other procedures or hazardous materials which could be avoided by design modifications or by substitute materials. He should also take into account the health and safety of workers during subsequent maintenance.

Furthermore, in terms of ethics, Gambatese (1998) contends that current American designer practices contradict the first Fundamental Canon of the National Society of Professional Engineers' code of ethics in the USA: "Engineers, in the fulfilment of their professional duties, shall hold paramount the safety, health, and welfare of the public." This contention is based upon the reality that the public includes workers and not solely the public during the use of a structure.

The Contractor

The contractor is defined in the CDM regulations (2007) as the person who carries out or manages the construction work. Contractors and those actually doing the construction work are most at risk of injury and ill health. They have a key role to play in planning and managing the work to ensure that risks are properly controlled. All contractors (including utilities, specialist contractors, contractors nominated by the client and the self-employed) have a part to play in ensuring that the site is a safe and healthy place to work. The key to this is the proper co-ordination of the work strengthened by good communication and co-operation between all those involved. Anyone who directly employs or engages construction workers and controls or manages construction work is a contractor for the purposes of these regulations. This includes companies that use their own workforce to do construction work on their own premises. The duties of contractors apply whether the workers are employees or self-employed and to agency workers without distinction.

For all projects, contractors must check that clients are aware of their duties; satisfy themselves that they and anyone they employ or engage are competent and adequately resourced; plan, manage and monitor their own work to make sure that workers under their control are safe from the start of their work on site; ensure that any contractor who they appoint or engage to work on the project is informed of the minimum amount of time which will be allowed for them to plan and prepare before starting work on site; provide workers under their control (whether employed or self-employed) with any necessary information, including about relevant aspects of other contractors' work, and site induction which they need to work safely, to report problems or to respond appropriately in an emergency; co-operate with others and co-ordinate their work with others working on the project; ensure the workforce is properly consulted on matters affecting their health and safety; and obtain specialist advice (for example from a structural engineer or occupational hygienist) where necessary when planning high-risk work – for example alterations that could result in structural collapse or work on contaminated land (CDM Regulations, 2007).

Contractors should always plan, manage, supervise and monitor their own work and that of their workers to ensure that it is carried out safely and that health risks are also addressed. The effort invested in this should reflect the risk involved and the experience and track record of the workers involved. Where contractors identify unsafe practices, they must take appropriate action to ensure health and safety (CDM Regulations, 2007).

Contractors must not start work on a construction site until they have been provided with basic information. This should include information from the client about any particular risks associated with the project (including information about existing structures where these are to be demolished or structurally altered), and from designers about any significant risks associated with the design. Contractors must ensure, so far as is reasonably practicable, that every worker has a suitable induction; and any further information and training needed for the particular work (CDM Regulations, 2007).

The responsibilities of the contractor in the provision of health and safety as stated by the occupational health and safety act are: provide equipment, materials and protective devices, and shall maintain them in good condition and ensure that they are used as prescribed; ensure the measures and procedures prescribed are carried out in the workplace; provide information, instruction, and supervision to employees to protect their health or their safety; ensure that when appointing supervisors, they are

competent with respect to their responsibilities; afford assistance and co-operation to the health and safety committee or any of its members in discharging their responsibilities; provide the Health and Safety Committee with the results of reports prepared respecting health and safety; advise workers of the results of health and safety reports; safeguard workers from undue exposure to biological, chemical or physical agents as prescribed; provide workers with written instructions as to the measures and procedures to be taken for the protection of employees, where prescribed in the; carry out training programs for employees, supervisors and committee members as may be prescribed.

Methodology

Primary source of data collection was through the administration of well-structured questionnaires to construction professionals in Lagos State, Nigeria using the convenient sampling method.

Tables were employed in this research for data presentations and analysis of the collected data was carried out using the following statistical methods: frequencies and percentages, and the mean internal score (MIS).

Data Presentation and Analysis

Table 1: Demographic information of respondents

| | | Frequency | Percentage |
|--|--------------|-----------|--------------|
| Academic Qualification of respondent | OND/HND | 15 | 27.3 |
| | B.Sc/B.Tech | 28 | 50.9 |
| | PGD | 1 | 1.8 |
| | M.Sc/M.Tech | 11 | 20.0 |
| | PhD | 0 | 0.0 |
| | Total | 55 | 100.0 |
| Number of years of existence of respondent's organization | 0-5 | 6 | 10.9 |
| | 6-10 | 22 | 40.0 |
| | 11-15 | 13 | 23.6 |
| | 16-20 | 11 | 20.0 |
| | Above 20 | 3 | 5.5 |
| | Total | 55 | 100.0 |
| Mean years of respondent organization = 11.45 years | | | |
| Number of years of experience of respondent | 0-5 | 11 | 20.0 |
| | 6-10 | 29 | 52.7 |
| | 11-15 | 7 | 12.7 |
| | 16-20 | 6 | 10.9 |
| | Above 20 | 2 | 3.6 |
| | Total | 55 | 100.0 |
| Mean years of respondent experience = 9.27 years | | | |
| Number of projects handled since inception | 0-5 | 1 | 1.8 |
| | 6-10 | 3 | 5.5 |
| | 11-15 | 10 | 18.2 |
| | 16-20 | 17 | 30.9 |
| | Above 20 | 24 | 43.6 |
| | Total | 55 | 100.0 |
| Mean number of projects handled = 18.45 | | | |

Table 1 above reveals the demographic information of firms involved as respondents for this study. 50% of the respondents are B.Sc/B.Tech holders, the mean number of years of respondents organization is 11.45 years while mean number of years of respondents experience is 9.27 years and the mean number of projects handled since inception is about 19. This indicates that the respondents involved and their organizations have vast experience in various construction projects and activities.

Table 2: Degree of importance of various project parameters to respondent's organization

| Project parameters | Quantity Surveyors | Rank | Architect | Rank | Engineers | Rank | Contractors | Rank | Overall | Rank |
|-----------------------|--------------------|------|-----------|------|-----------|------|-------------|------|---------|------|
| Client's satisfaction | 4.79 | 1 | 4.60 | 4 | 4.58 | 3 | 4.33 | 4 | 4.52 | 4 |
| Health & safety | 4.67 | 2 | 4.70 | 3 | 4.75 | 1 | 4.56 | 1 | 4.55 | 1 |
| Productivity | 4.67 | 2 | 4.80 | 2 | 4.42 | 5 | 4.33 | 4 | 4.53 | 2 |
| Quality | 4.67 | 2 | 4.60 | 4 | 4.42 | 5 | 4.33 | 4 | 4.47 | 5 |
| Cost | 4.67 | 2 | 5.00 | 1 | 4.50 | 4 | 4.22 | 7 | 4.53 | 2 |
| Environment | 4.54 | 6 | 4.50 | 7 | 4.42 | 5 | 4.44 | 2 | 4.45 | 6 |
| Time | 4.50 | 7 | 4.60 | 4 | 4.67 | 2 | 4.44 | 2 | 4.44 | 7 |

Table 2 shows the degree of importance of various parameters that are considered for construction projects by organizations as perceived by various construction professionals. It can be seen that even though all the project parameters considered have been highly rated by all construction professionals, health and safety is perceived as most important to engineers and contractors; while client's satisfaction is of paramount importance to the quantity surveyors and cost is the most important project parameter to the architect.

Table 3: Level of Contribution of Project Stakeholders to Construction H&S Regulations

| Project stakeholders | Mean score | Rank |
|----------------------|------------|------|
| Structural Engineers | 4.33 | 1 |
| Project Managers | 4.31 | 2 |
| Contractors | 4.13 | 3 |
| Electrical Engineers | 4.12 | 4 |
| Client | 4.06 | 5 |
| Builders | 4.03 | 6 |
| Mechanical Engineers | 4.03 | 6 |
| Architect | 4.02 | 8 |
| Quantity Surveyors | 3.91 | 9 |
| Subcontractors | 3.69 | 10 |
| Suppliers | 2.94 | 11 |

The majority of respondents indicated that contractors, architects, project managers, quantity surveyors, clients, engineers, builders and subcontractors contribute to the Construction H&S Regulations. Table 3 indicates the level of contribution of project stakeholders to the implementation of Construction Health and Safety Regulations in

terms of a mean score ranging from 1 (very low) to 5 (very high). Majority of the mean scores which are above the midpoint score of 3.00 indicates that in general all stakeholders contribute to construction health and safety regulations. However, given that the mean scores for the first four stakeholders are between 4.10 and 5.00, the respondents can be deemed to perceive them to be between high to very high. The mean score of 2.94 relative to the Supplier indicates that respondents can be deemed to perceive it to be very low. It is significant that the Structural Engineer is ranked 1st followed by Project Managers and Contractors.

Table 4: The Impact of Construction H & S Regulations on Project Performance

| Impact | Quantity Surveyor | Rank | Architect | Rank | Engineer | Rank | Contractors | Rank | Overall | Rank |
|----------------------------------|-------------------|------|-----------|------|----------|------|-------------|------|---------|------|
| Improved quality | 4.50 | 1 | 4.00 | 8 | 4.17 | 2 | 4.33 | 4 | 4.27 | 2 |
| Less worries | 4.46 | 2 | 4.20 | 2 | 3.75 | 9 | 3.78 | 13 | 4.03 | 7 |
| Increased productivity | 4.46 | 2 | 3.90 | 9 | 4.08 | 3 | 4.11 | 10 | 4.16 | 5 |
| Increased client satisfaction | 4.38 | 4 | 4.20 | 2 | 3.75 | 9 | 4.33 | 4 | 4.22 | 3 |
| Increased efficiency | 4.38 | 4 | 4.10 | 4 | 3.83 | 6 | 3.89 | 12 | 3.92 | 11 |
| Reduced absenteeism | 4.33 | 6 | 3.60 | 11 | 3.83 | 6 | 4.33 | 4 | 4.00 | 8 |
| Increased profitability | 4.21 | 7 | 3.90 | 9 | 3.83 | 6 | 4.78 | 2 | 4.09 | 6 |
| Enhanced environment | 4.17 | 8 | 4.40 | 1 | 4.25 | 1 | 4.67 | 3 | 4.36 | 1 |
| Improved maintenance | 4.17 | 8 | 4.10 | 4 | 4.00 | 4 | 4.88 | 1 | 4.22 | 3 |
| Reduced cost | 4.08 | 10 | 3.50 | 13 | 3.75 | 9 | 4.33 | 4 | 3.95 | 10 |
| Lower compensation insurance | 4.04 | 11 | 4.10 | 4 | 3.58 | 12 | 4.13 | 9 | 3.86 | 12 |
| Improved recruitment & retention | 4.00 | 12 | 4.10 | 4 | 3.92 | 5 | 4.33 | 4 | 3.98 | 9 |
| Less rework | 3.96 | 13 | 3.60 | 11 | 3.50 | 13 | 4.00 | 11 | 3.66 | 13 |

Table 4 shows the impact of construction health and safety regulations on the performance of building projects as perceived by various constructions professional. It can be seen that even though all the identified impact of construction health and safety regulations have been considered high by all construction professionals with none of them having less than a mean item score of 3.50, improved quality is considered as having the highest impact by the quantity surveyors; while an enhanced environment has the highest impact as rated by the architect and engineers which according to the construction health and safety regulations are classified as designers and improved maintenance is considered by the contractors as having greatest impact on the performance of building projects.

Conclusion

Based on the findings, it could be concluded that the construction health and safety regulations in Nigeria construction industry have direct impact on project delivery. Its impact is such that, if the industry lacks health and safety regulations, problems such as low quality, time overrun, cost overrun, absenteeism of workers due to injuries etc. will be prevalent on construction projects due to the hazardous nature of the construction environment. Hence, the unquestionable and non-negotiable need to invest in construction health and safety policies and programmes through the regulations right from the design stage and through the entire construction process.

The construction health and safety regulations are very important in achieving efficiency and effectiveness amongst professionals and even workers in the construction industry because it influences project delivery parameters which are most paramount to the client. The implementation of construction health and safety policies and

programmes stipulated in the regulations will remain one of the most important aspects of project planning and management.

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