



## Approaches for Bridging Health and Safety Skills Gap of Nigerian Construction Professionals

*\*<sup>1</sup>Oni Oluwole Joseph and \*\*<sup>2</sup>William Samuel Opeyemi*

\*<sup>1</sup>Department of Quantity Surveying, Federal Polytechnic, Ado Ekiti, Nigeria

\*\*<sup>2</sup>Quantity Surveying Department, Rufus Giwa Polytechnic, Owo, Ondo State.

Email: [browoleoni@gmail.com](mailto:browoleoni@gmail.com)

### ABSTRACT

*Skills gap refers to inadequacy in the abilities required to carry out specific job functions. This occurs when the workers lack the necessary knowledge, skills, and competencies to meet the required standards. In Nigeria, there exist skills gap in the area of health and safety among professionals in the construction industry. The objective of this study is to investigate the current skills gap in health and safety among construction professionals with the view to plugging the gap. The study utilizes a questionnaire survey as a quantitative method to gather data from participants, which include Architects, Quantity Surveyors, Builders, and Civil Engineers. A total of ninety (90) questionnaires were distributed, and seventy (70) were returned and used for analysis. The data was analyzed using descriptive statistics, specifically mean and relative importance index. The results indicate that training in working in confined spaces and the provision of emergency response equipment are the most critical areas needing improvement with the health and safety skills of construction professionals. The study also found that construction fatalities and cost overrun of projects are most rated implication of the skills gap in health and safety on project delivery. In conclusion, the study proposes a series of strategies for addressing the skills gap in health and safety among construction professionals.*

**KEYWORDS:** *Health and Safety, Skills gap, Construction Professionals, Strategies*

### INTRODUCTION

The construction sector plays a major role in the economy of any country. Health and safety challenges have been well established to be an important concern in the industry (Hyoung et al., 2009; Pinto et al, 2011). According to Kheni et al. (2008) health and safety on construction sites deals with matters that concern physical and psychological wholesomeness of construction site workers and other individuals whose well-being may be likely affected by site operations. The effect of these hazards can be minimized by using the hazards control strategies by all the stake holders including the site manager, the employer, professionals and the operatives. Each has certain responsibilities. Mbuya and Lema, (2004) argues that in most developing nations, health and safety concerns in construction are not accorded adequate attention, and sometimes safety measures are seen or perceived as a burden during construction activities.

Health and safety training and awareness are some of the main areas that need to be considered to improve the state of the construction industry for instance in a developing country like Nigeria. Armstrong (2001) described training as the formal and systematic adjustment of behaviour via learning which takes place through of knowledge acquisition, training growth and planned experiential exposures. Construction sector training is usually focused on a particular outcome of providing experience which improves the workers' behaviour specifically in some needed skills, knowledge and attitude. Planned training is the avenue for supplying capable, qualified and skilled manpower to the industry. It is also the strategy for continuous improvement of capacity and competencies of workers. Such is usually planned and systematic; designed to take care of the immediate and future needs touching both personal and organizational concerns. To realize this efforts are made to advance knowledge and develop appropriate skills. The outcome of this boosts workers' productivity. The process also serves to aid adaptation to new changes and keeping abreast of new developments.

The goals of organizations can be achieved through their workers. It has been established (Ikediash et al., 2012) that continuous development and training is the only way to remain current and up-to-date. At the same time, it is the major means of improving workforce performance (Mselle, 2000).

Essentially, training programmes are the major organizational strategy for updating knowledge and skills of their workers. Thus, training needs have long been established as one of the major avenue within the construction sector for ensuring organizational success and meeting workers' skills need (Ghufli, 2012). Skills training occupies the center stage of creating, sustaining and improving the workforce who contribute majorly to the achievement of the objectives of construction projects (Teixeira and Pires, 2006). The aim of this study is to investigate health and safety skills gap of construction professionals in Nigeria construction industry with the view to plugging it.

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## METHODOLOGY

This research chose quantitative research design; and specifically utilized questionnaire survey. This was supported with review of extant literature. The instrument that was employed in data collection was a well-structured questionnaire with five point Likert scale. This was essentially crafted to actualize the goal of the study. Respondents were served the questionnaires by hand. The data obtained from the survey was analyzed using (SPSS) software. Descriptive statistics were utilized; and specifically, Means Score (MS) and Relative Importance index (RII) were the tools employed in the analysis.

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## LITERATURE REVIEW

According to Lin *et al.* 2010, for anyone or firm to keep abreast of new developments and improving employees' performance in the construction industry, continuous development is key. Thus, training involves direct expenditure of construction organisations in the area. Due to the fact that training is such an essential investment, organisations are expected to direct necessary attention to the present needs before undertaking any training. Menzel and Messina (2011) opines that Training Needs Assessment (TNA) is the first critical stage in the training cycle because it provides management with the opportunity to establish gaps in knowledge and weaknesses in processes. The process of creating Training Needs Assessment (TNA) for construction professionals' health and safety starts with the documentation of a list of required or needed skills and then comparing them with already acquired ones.

Construction environment essentially involves three major components. These include man, machine and the environment. These are connected with myriads of hazards. Unsafe working environment cripples workers efficiency. Therefore, for any organization to really achieve its set objectives, safety and health of every employee must be accorded very serious priority. Okolie and Okoye, (2012) assert that site accidents have far reaching negative implications which include dampening the morale of workers, scuttling project progress, interrupting site activities, affecting reducing productivity, leading to cost overrun and ultimately hampering the reputation of the construction organisation involved.

Health and safety trainings are crucial to achieve safe completion of any construction activities embarked upon. However, these are not given adequate attention by many construction stakeholders. According to Okoye (2016) there are increase in construction accidents taking place during construction project over the years and this is attributed to poor attention paid to the training of construction professionals and other site workers in the area of health and safety concerns.

### 3.1.1 *Areas of Health and Safety Training Needs*

Training for safety is crucial for enhancing performance the area of safety in the construction sector. This statement has been backed by researchers (Huang and Hinze, 2003; Aksorn and Hadikusumo, 2008). Effectively training construction workers can be one of the most important methods to enhance safety concerns on site (Tam *et al.*, 2004). The subsequent sections will discuss the various aspects of health and safety training.

### 3.1.2 *Working at elevated heights*

On construction sites, it is frequently required to work at significant heights, on platforms and steps, in windows and on rooftops and if caution is not exercised, could result in an accident (OSHA, 2009). A fall is classified when an individual is harmed after falling or leaping from a step, platform, building, rooftop, or other elevated location or working area and landing, with force, on the ground or surface below. These incidents might arise from various causes such as Improper platform construction, Unsafe portable steps, scaffold not horizontally and firmly erected on the sloping floor, fall arrestor and independent lifeline were not correctly installed, thus failing to prevent the operative from falling etc. which may lead to bone fracture or fatality (OSHA 2015).

### 3.1.3 *Handling of electrical equipment*

According to Peterson (2005) because construction sites usually have ongoing operations, there is commonly exposed wires, incomplete electrical works in various points. Any contact by mistake with these cables could lead to electrocution or shock, when using electrical hand tools or performing electrical tasks. Site worker may experience injuries such as shock, burns or death due to the electrocution which can be caused by leakage of current from the electric apparatus, power supply not disconnected before tasks were performed, insulations of some of the wires had been damaged or workplace was damp and with water pools etc. (OSHA, 2009) OSHA's electrical standards address electrical workplace hazards as a highly significant aspect of health and safety noting that site operatives working on, near or around electricity may be exposed to dangers such as electric shocks, electrocution, burns, fires and explosion. Therefore, these must be completely supervised to reduce the potential hazard that could lead to the untimely death of any worker.

### 3.1.4 *Handling of Hazardous Substances*

ILO (2005) submits that chemicals constitute a frontline health hazard because there are numerous chemical substances used within the construction industry. These include paints, insecticides, preservatives, adhesives, cleansing agents, fungicides amongst others. Many of those chemical substances are dangerous, with poisoning capabilities. Persistent exposure to toxic chemical substances could result in acute health damages. Cement mixes is also a well-known cause of skin disease. Lead is found in electricity cables, pipes gutters and lead sheet roofs. Excessive lead absorption by humans can lead to serious abdominal pain, anemia, weak muscles, constipation and possibility of kidney malfunction (Tam, *et al* 2004).

### **3.1.5 Performing lifting operation**

Construction operations are essentially associated with lots of lifting activities which include lifting of some materials like blocks, concrete, tiles, cements etc. and if not carefully carried out may lead to overexertion. Overexertion can contribute to serious construction accidents. The situation may result in dehydration, exhaustion and reduced mental clarity. Minor error could lead to terrible accidents that may abruptly terminate the lives of one or more individuals

### **3.1.6 Emergency response equipment**

Emergency response equipment include first aid box, firefighting equipment, fire alarm, etc. and noting that construction sites are risky environment, as such, first aid and rescue equipment should always be on standby. What is required is a function of the size of the site and the number of people working there. OSHA (2009) suggested that on large construction sites with over 200 persons are working on site, there should be a first aid room well equipped and a minimum of one person on every shift who is well trained and experienced in first aid operations.

### **3.1.7 Operating in confined spaces**

A confined space is an area that is purposely designed with limited openings for going in and moving out, and has limited natural air circulation that may generate dangerous air pollutants, and is not designed for continuous occupation by workers or operatives (OSHA, 2015). Dangers associated with such or any confined space are dictated by either the material or chemical kept or used within the space, or the operations carried out within the space, or the effect of the environment.

Poorly organized and messy site is also a factor in many accidents such as stumbling, sliding, or falling over materials and equipment that have been carelessly left scattered about, stepping on exposed nails from wood, falls of materials, and collisions between workers and machinery.

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## **IMPLICATION OF INADEQUATE HEALTH AND SAFETY SKILLS**

Okolie and Okoye (2012) assert that Nigeria construction sector lacks legislation governing Occupational Health and Safety (OHS), and stakeholders such as clients, consultants, and contractors pay inadequate attention to OHS. The resulting consequence is a high number of accidents and injuries. When these incidents occur on-site, they lead to numerous human tragedies, demoralize workers, disrupt construction activities, cause project delays, and impact overall project expenses, as well as the negative image of the company involved (Okolie and Okoye 2012). Other consequences include disruption of construction activities, compensation for injuries or deaths, legal expenses for defending against claims, increased insurance costs, and an increase in the mortality rate, among others

### **4.1.1 Delay in project progress**

Ensuring timely completion of projects is a fundamental principle that all construction experts must follow when undertaking a project. In the event of worker injuries on-site, it can cause a delay in the progress of the work being performed by said workers (Shah, 2006). Finding replacements for these workers may also require additional time, consequently extending the projected completion date.

### **4.1.2 Possible loss of experienced site workers**

When accident occurs on site, it could be to anyone (i.e. either to skilled to unskilled worker). O.S.H.A, (2015) submits that experienced site workers may also get involve in these accidents which could either leads to death or loss of major part of their body like legs, hands etc. and when such happens, it will lead to the termination of such worker in participating in any construction work throughout his lifetime.

### **4.1.3 Cost overrun of projects**

Every project is expected to be completed at a stipulated amount as estimated before the commencement of such project and one of the criteria to exceed the cost limit of such project is accident. When accident occurs, there are emergency expenses such as hospital bills which will be incurred in the process and will definitely increase the overall cost of the project in the final account of such project which may later be abandoned (Zeng, et al 2008)

### **4.1.4 Compensation of injury or death**

This is another impact for lack of adequate safety provision to worker and may arise from legal actions taken by the relative of the affected workers due to non-compliance of the construction company to the existing health and safety policies. When this happens, the relatives may demand high cost of compensation fees which may be incurred by either party to the contract thereby affecting the project and may even leads to abandonment (Iqbal & Malik 2012).

#### 4.1.5 Legal fees and Disruption of site activities

Accident on site could lead to serious injury which may affect any part of the body of a worker and thereby leading to compensation for such worker. If the entitlement is not totally settled at all or partly settled. This may lead to legal action being taken by the operative concerned or the family members. Certainly, this development will affect the expenditure of such construction outfit or organisation involved (Siriwardena, et al 2013).

## RESULTS AND DISCUSSION

**TABLE 1: DEMOGRAPHICS OF THE RESPONDENTS**

<b>Demographics of the Respondents</b>		
<b>Variables</b>	<b>No of Respondent</b>	<b>Percentage (%)</b>
<b>Profession</b>		
Architecture	12	17.1
Building	16	22.9
Civil Engineering	10	14.3
Quantity Surveying	17	24.3
Urban Planning	8	11.4
Land Surveying	7	10.0
Total	70	100
<b>Highest Qualification</b>		
ND	1	1.4
HND	20	28.6
BSc	31	44.4
Masters	15	21.4
PhD	3	4.3
Total	70	100
<b>Years of Experience</b>		
1-5 years	1	1.4
6-10years	26	37.1
11-15 years	30	55.7
16-20 years	2	2.9
20 years and above	2	2.9

**Source:** Researcher's Field Survey, 2022

The result shown in Table1 reveals that 10(14.3%) respondents were Civil Engineers, 12(17.1%) respondents were Architect, 17(24.3%) respondents; being the majority, were Quantity Surveyors, 16(22.9%) respondents were Builders while 8(11.4%) and 7(10%) professionals in Urban and Regional planning and Surveying and geo-informatics respectively

It also indicates that 20(28.6%) of the total respondents' had HND certificate, 31(44.3%) of them, being the majority, were holders of Bachelor's degree, 15(21.4%) Master's degree, 3(4.3%) were Ph.D. holders while only 1(1.4%) were holders of ND/NCE certificate. This implies that sizeable number of construction professionals were graduates.

Also it further shows that 26 respondents representing 37.1% of the total sample had between 6-10years working experience, 39(55.7%) respondents; being the majority had between 11-15years experience, 1(1.4%) between 1-5years experience while 2(2.9%) had 15-20years and above 20 years working experience in each case.

## SPECIFIC AREAS OF HEALTH AND SAFETY SKILLS GAP OF CONSTRUCTION PROFESSIONALS

Table 2 indicates the respondents' perceptions on specific areas of H&S skills gap of construction professionals. It is noteworthy that all the specific areas of health and safety needs have all the mean scores within the range  $MS > 4.31 \leq 4.56$  and  $MS > 4.56 \leq 5.00$ , and an overall mean score (OMS) of 4.45 for all the specific areas of health and safety training needs. This shows that the participants strongly agree / agree with the specific areas of H&S skills gap of construction experts. Most notable among the areas of health and safety training needs of constructional professional professionals are the ones with the MS values of 4.45 and above, noting here that the OMS value is 4.45.

Based on this outcome in the table, the participants can be considered to agree with the majority of the items of health and safety skills inadequacies of construction experts, including working in restricted areas and provision of emergency response equipment, which rank first on the average ranking. This is followed by Handling of dangerous substances, Working at elevated heights, Utilizing personal protective equipment, Handling of electrical devices,

Performing job hazards, Performing lifting operations, analysis and Risk assessment and management, ranking 3rd, 4th, 5th, 6th, 7th, 8th, and 9th respectively..

**Table 2: Specific areas of health and safety training needs of construction professionals**

Areas	SUM	$\sum fx$	Mean	RII	Ranking
Working in confined spaces	70	319	4.56	0.91	1 <sup>st</sup>
Provision of emergency response equipment	70	319	4.56	0.91	1 <sup>st</sup>
Handling of hazardous substances	70	318	4.54	0.90	3 <sup>rd</sup>
Working at height	70	317	4.53	0.90	3 <sup>rd</sup>
Using personal protective equipment	70	313	4.47	0.89	5 <sup>th</sup>
Handling of electrical equipment	70	308	4.40	0.88	6 <sup>th</sup>
Performing job hazard analysis	70	306	4.37	0.87	7 <sup>th</sup>
Performing lifting operation	70	303	4.33	0.87	7 <sup>th</sup>
Risk assessment and management	70	302	4.31	0.86	9 <sup>th</sup>

**Source:** Researcher's Field Survey, 2022

Table 3 shows field responses from respondents with regards to implications of health and safety skills inadequacies on project delivery.

It can be seen that all the items under the implications of inadequate H&S skills on project delivery have all the mean scores within the range  $MS > 4.21 \leq 4.57$  and  $MS > 4.57 \leq 5.00$  for all the implications of health and safety skills inadequacies on project delivery. This reveals that the respondents strongly agree / agree with the implications of inadequate H&S skills on project execution. Most notable among the implication of health and safety skills gap on project delivery are the ones with the MS values of 4.39 and above, noting here that the OMS value is 4.39.

Based on the findings in the table, it can be concluded that the participants generally agree with the majority of the implications of a gap in health and safety skills on project delivery. The top-ranked implication is cost overrun of projects, followed by an increase in accidents on site ranked second. The third-ranked implication is a negative impact on the reputation of the firm, while the fourth-ranked implication is a delay in project progress. The fifth, sixth, seventh, eighth, ninth, and tenth-ranked implications are legal fees for defending against claims, disruption of site activities, an increase in insurance costs, a possible loss of experienced site workers, an increase in the death rate, and compensation for injury or death, respectively.

**Table 3: Implications of health and safety skills gap on project delivery**

Implication	SUM	$\sum fx$	Mean	RII	Ranking
Cost overrun of projects	70	3.20	4.57	0.91	1 <sup>st</sup>
• Increase in accident on site	70	3.16	4.51	0.90	2 <sup>nd</sup>
Negatively impact firms reputation	70	3.12	4.46	0.89	3 <sup>rd</sup>
Delay project progress	70	3.11	4.44	0.88	4 <sup>th</sup>
Legal fees for defense against claims	70	3.08	4.40	0.88	4 <sup>th</sup>
Disruption of site activities	70	3.07	4.39	0.88	4 <sup>th</sup>
Increase in the costs of insurance	70	3.05	4.36	0.87	7 <sup>th</sup>
Possible loss of experienced site workers	70	3.04	4.34	0.87	7 <sup>th</sup>
Increase in the death rate	70	2.96	4.23	0.85	9 <sup>th</sup>
Compensation of injury or death	70	2.95	4.21	0.84	10 <sup>th</sup>

**Source:** Researcher's Field Survey, 2022

## MEASURES FOR BRIDGING HEALTH AND SAFETY SKILLS GAPS OF CONSTRUCTION PROFESSIONALS

Table 4 shows the respondents' responses on the measures for bridging health and safety skills gaps of construction professionals. It should be noted that all the items on the measure for closing health and safety skills gaps of construction professionals have all the mean scores within the range  $MS > 4.36 \leq 4.66$  and  $MS > 4.66 \leq 5.00$ , for all the measures for bridging health and safety skills gaps of construction professionals. This shows that the respondents strongly agree / agree with the measures for bridging H&S skills gaps of construction professionals. Most notable among the measures for bridging H&S skills gaps of construction professionals are the ones with the MS values of 4.49 and above.

From this result in the table, the respondents can be deemed to agree with most of the measures for bridging H&S skills gaps of construction professionals as Training on the use of emergency response equipment is ranked as 1<sup>st</sup> followed by other strategies such as Monitoring the compliance with safety policies on site ranked 2<sup>nd</sup>, Regular safety training of professionals on site ranked 3<sup>rd</sup>, Assessment of health and safety risk ranked 4<sup>th</sup>, Appointment of well-trained safety officer, Health and safety education in construction degree awarding institutions, Provision of safe working environment, Identifying the meaning of health and safety warning signs and Training on the use of personal protective equipment ranked 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup> and 9<sup>th</sup> respectively

**Table 4: Measures for closing health and safety skills gaps of construction professionals**

Measures	SUM	$\sum fx$	Mean	RII	Ranking
Training on the use of emergency response equipment	70	326	4.66	0.93	1 <sup>st</sup>
Monitoring the compliance with safety policies on site	70	324	4.63	0.92	2 <sup>nd</sup>
Regular safety training of professionals on site	70	317	4.53	0.91	3 <sup>rd</sup>
Assessment of health and safety risk	70	315	4.50	0.90	4 <sup>th</sup>
Appointment of well-trained safety officer	70	313	4.47	0.89	5 <sup>th</sup>
Health and safety education in construction degree awarding institutions	70	311	4.44	0.88	6 <sup>th</sup>
Provision of safe working environment	70	309	4.41	0.88	6 <sup>th</sup>
Identifying the meaning of health and safety warning signs	70	308	4.40	0.88	6 <sup>th</sup>
Training on the use of personal protective equipment	70	305	4.36	0.87	9 <sup>th</sup>

Source: Researcher's Field Survey, 2022

## CONCLUSION

The main purpose of this research was to examine health and safety skills gap of construction professionals through collecting necessary data and analyzing it to facilitate proposing required strategies for bridging the skills gap. The study had confirmed with empirical evidence that there exist inadequate health and safety skills among construction professionals. The causative factors responsible for this gap have been identified and evaluated. The research had also proposed measures for bridging the skills gaps of these construction professional so that there would be improvement in health and safety concerns in the construction sector. Without any hesitation, there is a need for appropriate actions to be taken so that the situation will not be exacerbated. The measures proposed in the study, if implemented would to a great extent assist to close the gap of inadequate skills in health and safety area among construction professionals.

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