**Safety Practices and Its Influence on Productivity of Workers on Construction Site in Kaduna, Kaduna-Nigeria**

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**Abstract**

*Construction sites poses serious threat and damages to construction workers as it is regarded as one of the most injury prone sector, when compared with other sector. Poor safety practices by managements and construction workers have great effects on the productivity of the construction in general. The study aimed to assess the safety practices and its influence on productivity of workers on construction sites in Kaduna, Kaduna State, Nigeria. The study had three objectives, which includes; to determine the safety practices of management staff and workers on construction sites; to examine the factors that influence worker’s productivity on construction sites; to examine the impact of safety practices on workers on construction sites. Data was collected from 30 (Thirty) registered construction companies with Kaduna State Public Procurement Authority(KSPPA) using open ended and close ended well-structured questionnaire administered to 360 people (management, workers and supervisory bodies) in their construction sites in Kaduna. The data was analyzed through the descriptive and inferential statistical methods (Percentage tables, Pie chart, Mean score). Findings from data revealed that, on safety practices of management and workers in construction sites, provision of adequate site supervision and inspection is rated highest, followed by provision of adequate safety measures respectively. As a strategy to enhance performance through safety practices, the study recommended that safety managers should be engaged and training of workers on safety practices should be given adequate priority. There is need to avoid poor supervision of construction work always to reduce communication breakdown and Professional should be charged with supervisory roles on sites.*

**Key words: Health, Safety, Accident, Hazard, Productivity, Construction Firms**

1. **Introduction**

The construction firm is known to be one of the riskiest industries in most countries and one of the most dangerous industries in which to work (Agwu and Hilda, 2013). It is believed to employ over 7% of the world’s entire workforce and contributes to more than a 10th of the global Gross Domestic Product (GDP). It currently shows increasing trends, not only in terms of volumes of work done, but also in terms of the complexity of construction according to Kayumba, (2013).

However, it is of great importance to provide a safe working environment for workers due to intrinsic hazards and risks associated with every situation (Olutuase, 2014). This because workers work better in a safe and conducive environment free from harm or danger. The mental and physical well-being of workers is a great priority in work delivery, since workers will only partake in construction when they are sound and fit. Again, workers are three times more likely to be killed and twice as likely to be injured as workers in other occupations. Hong Kong recorded a total of 3,001 convictions for health and safety offences with a total fine of $17million in 1993. Out of this figure, 1,382 convictions with a total fine of $1million were related to construction sites (Okeola, 2009).

The problem is not that safety measures on site are unknown but implementations are not adhered to and it is prevalent many construction sites in developing countries. Management failed to provide adequate safety tools and training, as they lay claim to cost of providing them and as well training the workers on how to apply them, hence they go in search for workers who are not acquitted with the knowledge of safety to reduce cost.

Safety practices are parameter to measure successful project delivery which is most paramount to the client because they greatly influenced construction projects performance and aids in achieving efficiency and effectiveness amongst professionals and even workers in the construction industry (Famakin and Fawehinmi, 2012) and Agwu and Hilda, (2013) asserted that more people have met their untimely death on construction sites in Nigeria while others have become permanently crippled from construction related injuries and fatalities that are by their nature unplanned and uncontrolled events. Since fatalities are unplanned events, they tend to occur uncontrolled and when they occur, they result in injuries and damages that are life-threating and might have psychological and mental effects on not only the victim but also on the victim’s family. This study assessed the health and safety practices and its influence on productivity of workers on construction sites in Kaduna. The rest of the paper is organized into four sections. Section two presents a review of related literature on Safety practices, Productivity, and Safety Regulations etc. Section three discusses the methodology adopted by this paper. Section four is on results and discussions. While, section five presents a summary, conclusion and recommendations arising from findings of the study.

**2.0** **Literature Review**

**2.1 General Concept on Construction Industry**

In Nigeria construction industry according to Oresegun (2009), 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. According to Ezenwa, (2011) construction site should adopt appropriate Health and safety methods that will reduce or eliminate risk to death or injury and based on this fact, construction industry would need to invest in safety practices as rise in technology and infrastructure would leads to construction sites 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.

However, in the recent past in Nigeria especially 2005 till date, death tolls, permanent disability and severe environmental threat had been on the increase through collapse of buildings and major operational accidents especially in Abuja, Lagos and Port Harcourt (Awodele, and Ayoola, 2005).

Okeola, (2009), asserts that Health and Safety in construction is all about preventing people from been killed or injured at work or becoming ill through appropriate precaution and providing a satisfactory working environment. Ikechukwu and Dorothy, (2013) argued that Nigeria falls within the category of countries having no adaptive health and safety laws and regulations, where organizations allocate little resources to health and safety management, rarely keep, report, or release accurate records of accidents and injuries on site, leading to poor health and safety performance. They further argued that effective management of health and safety is motivated by various factors of which could be centered on the need to abide by existing rules and regulations, a consideration of human lives that are involved (socio-humanitarian perspective), or on the direct and indirect cost involved (financial-economic perspective).

**2.1.1 An Overview of Construction industry in developed Countries**

In most developed countries in the world, accident and injuries occur at greater rate than in developing countries. In the United States of America (USA), it accounts for 22% of all fatal accidents and only 7% of the employed (Che Hassan, Basha, and Wan Hanafi, 2007). Omran and Kadir (2010), averred that the construction industry is characterized as one with a poor safety culture globally. Bomel, (2001) noted that in Japan, construction accidents account for 30%-40% of the overall industrial accidents, with the total being 50% in Ireland and 25% in the United Kingdom (UK). Construction industries in United States according to Godwin, (2011), currently accounts for over 22%of all occupational death in the country despite the fact that it employs less than 7% of the country’s workforce.

**2.1.2 An Overview of Construction industry in developing Countries**

Construction industries in developing countries according to Kazaz and Ulubeyli, (2004) suffers from delays and cost overruns due to labour productivity and most developing countries share the characteristic of low productivity. In this regard, Okolie and Okoye, (2013) affirmed that the emergence of new regulations, laws, standards and codes would greatly assist in making many construction organizations to improve their safety performance.

However, practices are not that simple, they required carefully planned and organized measures which are well implemented and controlled. Construction is generally a labour-intensive industry and improving the productivity of labour constitutes a prime target (Tran and Tookey, 2011). According to Attar et al. (2012), productivity signiﬁes the measurement of how well an individual entity uses available resources to produce outputs from inputs. In the view, it is stated that in developing countries, physical construction activities alone provide between 2 and 6% of the employment demands of the nation and the subsidiary activities provide an additional 2 to 4%, while in the developed countries the figure rises to between 6 to 10% and 4 to 6% (Cockburn and Charles, 1970; Anonymous, 2005; Okeola, 2009).

**2.2.3 General Concept on Safety regulations in Construction**

In Nigeria, the first effort towards regulating and controlling Health and Safety at work was the Factories Act of 1958, but unfortunately there is lack of provisions for the enforcement of Health and Safety standards in construction industry. This Act was repealed in 1987 and replaced with the Factories Decree No. 16 and Workman’s Compensation Decree No. 17. Both were signed into law on June12, 1987, but became effective in 1990 which Adeogun and Okafor (2013), are not being enforced in Nigeria as evidenced from the reports of unhealthy exposure to risks of workers and employees in various organizations are rampant.

Idoro, (2008) and (2011) observed that almost all the existing safety and health regulations in Nigeria originated from foreign countries. The Factories Act of 1990 is an adaptation of the UK Factories Act of 1961 (Idoro, 2008) while the Occupation Safety and Health OSH Act of 1970 was said to originated from America. The control of substances hazardous to health regulation of 1988, the PPE at work regulations of 1992, and management of health and safety at work regulations of 1999 are all British regulations (Idoro, 2011). The first effort in terms of regulation relating to health and safety at work in Nigeria was the Factories Act of 1958 (Dodo, 2014).

**2.3 Productivity Rate in Construction Industry**

Productivity according Bamisile (2004) cannot be economically achieved through the use of force but the creation of conditions that will encourage self-motivation and engender team spirit. Ogunlana, (1993) and Drucker, (1980) cited by Ameh and Osegbo, (2011) argued that there is nothing as dangerous to an economy as a decline in productivities because it creates inﬂationary pressure, social conﬂicts and mutual suspicion. While late arrival of materials or labour, equipment break-downs, poor lay out of work plan, and inability to provide information (Thomas and Raynar, 1997 in Mojahed, 2005) will lead to non-productive or down time. Debrah and Ofori (2001) asserted that the main priority is to improve construction productivity is by tackling the factors which impede productivity enhancement in the industry, this can be achieved by improvements of productivity and not to stop at improving manpower but it requires including improving many areas of construction industry.

Finally, according to Brenner, (2004) the ability of employees within an organization to share knowledge throughout the system depends on the conditions of their work environment. The construction industry in Nigeria focuses great attention towards improving productivity on site as it increases their profit and the concern for productivity especially in the public sector has increased with intensity, culminating to the establishment of the national productivity center under the Federal Ministry of Employment, Labour and Productivity (Osoba, 1999; Umeh and Usman, 2000).

**2.3.2 Productivity Rate in Construction Industry in Nigeria**

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**2.5 General considerations for Safety Practices in Construction Industry**

Jackson *et al.,* (2009) defines workplace safety and health as the physiological-physical and psychological conditions of a workplace that result from the work environment provided by the organization as employees are more satisfied and motivated when their jobs are meaningful, when they create a feeling of responsibility, and when jobs are designed to ensure that some feedback is available. Every job virtually carried the potential risk of injuries or diseases (Leigh, 2011) and each accident, injury or disease developed from multi-linear interactions of the contributory factors and causes (Toft *et.al.,* 2012).

According to Rachenthin, (2004) poor safety practices could negatively influence company morale and make recruiting difficult particularly in high-risk industries. However, to be effective, safety communication and feedback should be a two-way process rather than simply a top-bottom approach as opines by Vinodkumar, and Bhasi, (2010) employees should also be encouraged to give their feedback on safety-related matters to the management and suggest ways of improving the work processes. Safety practices should be considered when planning for construction layout, accessibility, storage of equipment, plant, fencing and hoarding etc.

**2.6 General Considerations for Safety Practices in Nigerian Construction Industry**

According to Borys, *et al.* (2019), relevant, reliable and valid health and safety performance data is crucial to informing the operational and strategic decisions by driving management of health and safety effectively. Frequent safety meeting according to Tam cited in Hassouna (2005), are essential for communicating safety information to the parties involved.

Safety meetings are crucial to every construction industry, as most information on safety practices are passed and discussed in such meetings. However, in most construction industry, safety meeting is only schedule when accidents occur and only when the projects go beyond design schedule and when the projects require technicality and workers are to be informed on the challenges of the project work.

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 Centre’s in different parts of Nigeria.

1. **Methodology**

The methodology involved a descriptive survey with a well-structured questionnaire administered to the thirty registered construction industry in Kaduna with Kaduna State Public Procurement Authority. A total of 360 questionnaires was administered, out of which 249 (70% response rate) was returned. This questionnaire was created using a five-point likert scale with each point representing different levels of compliance (with 1 indicating " very good," 2 indicating "good," 3 indicating "fair," 4 indicating "poor," and 5 indicating "very poor.") and was analyzed using IBM SPSS*.* The mean score and standard deviation was used to analyze the findings among the impact of safety practices of workers and effects of supervision of workers on productivity and safety, and ranking was based on mean scores and standard deviation.

1. **Results and Discussions**

**4.1 Background Data of Respondents**

The results show that the respondents were between the age group of; 23% of the 20-29, 47% of the respondents were between the age group of 30-39, 21% of respondents were between the age group of 40-49 while 8% of the respondents were above 50 years of age. Educational qualifications showed that 15% of the respondents have attended only primary school, 40% of the respondent were N.D holder, 32% of the respondents were having HND, 1% of the respondents hold B.Sc / B.Tech, 8% holds M.Sc / M.Tech, while 5% of the respondents holds PhD degrees. It was further discovered that 10% of the respondents were regulatory bodies, 19% of the respondent were management staff while 71% of the respondents were construction workers. This signifies that majority of the respondents to this research questions were construction workers. Finally, it was discovered that 18% of the respondents have undertaken mostly public utility, 24% of the respondent have undertaken commercial, 21% of the respondents have worked on industrial while, 37% have mostly worked on residential.

The background data of respondents is presented in Table 1

**Table 1: Background Data of Respondents**

|  |  |  |
| --- | --- | --- |
| **Profile** | **Frequency** | **Percentage (%)** |
| **Age of Respondents** |  |  |
| 20-29 | 57 | 23 |
| 30-39 | 117 | 47 |
| 49-50 | 53 | 21 |
| Above 20 | 20 | 8 |
| **Educational Qualification** |  |
| Primary School | 38 | 15 |
| ND | 98 | 40 |
| HND | 78 | 32 |
| Bsc/B.Tech | 21 | 1 |
|  |  |  |
| **Industry Professionals** |  |  |
| Regulatory bodies | 25 | 10 |
| Managements | 47 | 19 |
| Workers | 175 | 71 |
| **Project undertaken** |  |
| Residential | 197 | 37 |
| Commercial | 127 | 24 |
| Industrial  | 114 | 21 |
| Public utility | 97 | 18 |
|  |  |  |

**4.2 Analysis of the Observation**

**4.2.1 Objective One: determines the safety practices of management and workers in construction sites**

Table 4.2: Safety practices of management and workers on construction sites

|  |  |  |  |
| --- | --- | --- | --- |
| **Statements**  | **N** | **Mean** | **Std.Deviation** |
| Provision of adequate site supervision and inspection | 247 | 1.66 | 0.81 |
| Provision of adequate safety measures | 247 | 1.37 | 0.67 |
| Monitoring and ensuring the use of personal protective equipment by workers | 247 | 1.32 | 0.60 |
| Ensures workers use efficient handling and storage devices | 247 | 1.23 | 0.50 |
| Make provision for effective communication and information dissemination amongst workers | 247 | 1.53 | 0.72 |

**4.2.2 Objective Two: Examine the factors that influence workers productivity on construction sites**

Table 4.3: Factors that influence workers productivity on construction sites

|  |  |  |  |
| --- | --- | --- | --- |
| **Statements**  | **N** | **Mean** | **Std. Deviation** |
| Provision for fall protection and building collapse | 247 | 1.28 | 0.65 |
| Provision for effective scaffolds and ladders | 247 | 1.50 | 0.84 |
| Provision of tools/equipment such as crane | 247 | 1.92 | 0.99 |
| Provision for excavation, concrete and underground works | 247 | 1.39 | 0.76 |
| Provision for transport, earth moving and lifting equipment | 247 | 1.31 | 0.61 |

**4.2.3 Objective Three**: **Examine the impact of safety practices on workers on construction site**

Table 4.3 Impact of safety practices on workers on construction site

|  |  |  |  |
| --- | --- | --- | --- |
| Statements  | N | Mean | Std. Deviation |
| Use of personal protective clothing's and facilities | 247 | 1.77 | 1.02 |
| Workers presence at safety meetings | 247 | 1.90 | 1.14 |
| Provision of medium for report and feedback on site | 247 | 1.85 | 1.05 |
| Workers adherence to safety measures | 247 | 1.31 | 0.72 |
| Workers presence at safety training, meeting, seminars | 247 | 1.43 | 0.77 |

Analysis in Table 4.2 shows safety practices of management and workers in construction sites, it was discovered that provision of adequate site supervision and inspection score a mean of 1.66 and Standard deviation of 0.81; provision of adequate safety measures has a mean score of 1.37 and Standard deviation of 0.67; monitoring and ensuring the use of personal protective equipment by workers score a mean of 1.32 and Standard deviation of 0.60; Ensuring workers use efficient handling and storage devices score a mean of 1.23 and Standard deviation of 0.50; make provision for effective communication and information dissemination amongst workers score a mean of 1.53 and a Standard deviation of 0.72. This agrees with Muhammad, Abdulateef and Ladi (2017) findings that workers’ compliance with health and safety regulations have great impact in determining workers’ quality and productivity on construction projects.

Again, Table 4.2 shows that Provision for fall protection and building collapse score a mean of 1.22 and Standard deviation of 0.65, Provision for effective scaffolds and ladders score a mean of 1.50 and a Standard deviation of 0.84, Provision of tools/equipment such as crane score a mean of 1.92 and a Standard deviation of 0.99, Provision for excavation, concrete and underground works score a mean of 1.39 and a standard deviation of 0.76, Provision for transport, earth moving and lifting equipment score a mean of 1.31 and a standard deviation of 0.61.

1. **Conclusion and Recommendations**

This study investigated influence of safety practices on productivity of workers on construction sites in Kaduna. Based on the findings of this study, it was concluded that the causes of accident are lack of adaptability of workers to safety practices as against traditional practices, ineffective communication between safety personnel and workers, lack of training on key issues pertaining health and safety consciousness, workers’ lack of understanding about the workplace safety rules, operatives’ engagement in improper conduct that affect others workers and failure of construction managers from engaging the best strategy to implement effective safety practices on site.

Further conclusion is that strategies to improve safety practices on sites should include: training of new staff on safety practices against the traditional practices of workers, strictly enforcing safety consciousness by workers on sites, training on proper use of scaffoldings, daily safety briefing by safety manager, inspection of scaffolds, equipment and tools before the start of work. The study further concluded that effects of safety practices may include; reduction of accident impact on operatives, cost savings as a result of absent of injury, improved worker’s productivity, reduction in project delay and improvement in work place environment.

The study recommends that safety managers should be engaged to achieve effective safety practices on construction sites. In addition, training of workers on safety practices should be given adequate priority. This would ensure optimum utilization of human resources on construction sites and promote sustainable development. It was also recommended in the study, that there is need to avoid poor supervision of construction work always to reduce communication breakdown; inexperienced and uncommitted supervisor; inadequate documentation of records; lack of motivation and unclear instruction that affect productivity.

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