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RELATIONSHIP BETWEEN UNSAFE ACTS/CONDITION AND ACCIDENTS IN CONSTRUCTION COMPANY IN NIGERIA.

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Abstract

This paper studies the relationship between unsafe acts/conditions and accidents in construction company in Nigeria. For this study, an XYZ Construction Company is chosen as it is a large scale company with 600 workers, which is believed to be sufficient to represent the typical construction company in Nigeria. XYZ is an engineering and construction company currently carrying out an upgraded of flow station. In the beginning of the project, occurrence of accident was minimal that the company tends to overlook the importance of investigating unsafe acts/conditions at that point of project lifecycle. However, as the project progresses, the number of unsafe acts/conditions have increased rapidly and more accidents were recorded only within a short period of three years. The aim of this study is to analyze the unsafe acts/conditions and accidents occurrences in XYZ Company so as to identify the relationship between their occurrences. The analysis of the company's database shows that there have been 582 unsafe acts/conditions and 91 accidents recorded since 2008 to 2012. Results of this study show significant relationship between unsafe acts/condition and accidents occurrences by positive correlation of 0.877. Based on the result of this study, employers will appreciate the need to eliminate unsafe acts and unsafe conditions for reducing the occurrence of accidents in the industry.

Keywords: Construction, unsafe acts, unsafe conditions, accidents, correlation.

Abstrak

Dalam kertas ini,kajian di antara hubungan perbuatan yang tidak selamat / keadaan dan kemalangan dalam syarikat pembinaan di Nigeria telah dilakukan. Untuk kajian ini, Syarikat pembinaan XYZ telah dipilih kerana ia merupakan syarikat berskala besar dengan 600 orang pekerja, yang dipercayai mencukupi untuk mewakili syarikat pembinaan yang biasa di Nigeria. XYZ adalah sebuah syarikat kejuruteraan dan pembinaan dan kini sedang menjalankan naik taraf stesen aliran. Diawal projek itu, kejadian kemalangan adalah minimum dan menyebabkan syarikat cenderung untuk terlepas pandang kepentingan menyiasat perbuatan yang tidak selamat / keadaan ketika kitaran hayat projek. Walau bagaimanapun, apabila projek berterusan, jumlah tindakan yang tidak selamat / keadaan telah meningkat secaramendadak dan lebih kemalangan berlaku dicatatkan dalam hanya empoh yang singkat iaitu tiga tahun. Tujuan kajian ini adalah untuk menganalisis perbuatan yang tidak selamat / keadaan dan kejadian kemalangan yang berlaku didalam XYZ Syarikat untuk mengenal pasti hubungan antara kejadian tersebut. Analisis pangkalan data syarikat menunjukkan bahawa terdapat 582 perbuatan tidak selamat / keadaan dan 91 kemalangan dicatatkan sejak 2008 hingga 2012. Kepurusan kajian menunjukkan hubungan yang signifikan antara perbuatan yang tidak selamat / keadaan dan kemalangan kejadian dengan korelasi positif sebanyak 0,877. Berdasarkan hasil kajian ini, majikan akan menghargai keperluan untuk menghapuskan perbuatan yang tidak selamat dan keadaan yang tidak selamat untuk mengurangkan berlakunya kemalangan di didalam industri.

Kata Kunci: Pembinaan, tindakan yang tidak selamat, keadaan yang tidak selamat, kemalangan, korelasi.

1.0 INTRODUCTION

The construction industry is regarded as one of the major indicators of economic performance especially in developing countries (Ofori 1990, Finkel 1997). Periods of prosperity are usually associated with high levels of construction output. Nigeria's construction industry is fast growing and has the potential to grow astronomically over the next decade based on forecast study made in June 2010 (Pootman, 2011), hence making it possibly be one of the biggest construction markets in the world. According to the National Bureau of Statistics (2010), the construction industry is actually contributed only about 1.98% of the total Gross Domestic Product (GDP) to the Nigeria economy in 2008, yet its importance and roles in the economic development of any nation can never be disputed. In the first quarter of 2012, the building and construction industry contributed 3.01% of the total Gross Domestic Product (GDP) to the Nigerian economy (National Bureau of Statistics, 2012).

However, despite its clear economic benefits, the construction industry globally has a poor safety record (Rowlinson, 2004; Hinze, 2007). Similar scenario also is faced by the construction industry in Nigeria. For example in 2005, a four-storey building under construction in Port Harcourt collapsed and not less than twenty workers died in the accident barely 24 hours after a similar accident occurred in Lagos. Another worth mentioned is the accident that took place in the premises of Saint Thomas Anglican Church, Akure Nigeria in September 30, 1998 (Lubega, 2002) which killed twenty workers. Besides in 2000, several cases of buildings under construction had collapsed leading to the loss of many lives especially in Lagos and Portharcort, Nigeria (Ogunjobi, 2002).Generally, quite a number of people have met their ultimate death in construction sites in Nigeria while others have become permanently crippled from construction related injuries (The Punch, 2005). Reacting to this state of affairs, Idoro (2007; 2008) argues that the framework of the existing occupational safety and health conditions in Nigerian construction industry is grossly fragmented and inadequately enforced. Good health and safety condition is important as it constitutes good and safe business practice in construction (Idoro, 2008).

Accidents on construction sites, whether minor or fatal, could result to loss of resources and loss of lives in cases of fatalities and make construction industry as a deadly working place. Basically the accidents can result in direct and indirect impacts. Injuries on construction sites for example may have direct impacts on the individuals involved as well as on the productivity level. On the other hand, indirect impacts may also occur including revenue losses on the owner side due to the late project delivery and reduced morale of the work force. Basically accidents on construction sites are not inevitable; therefore all means need to be taken to prevent minor or serious-consequences on workers. The primary work to be done in construction activities for reducing accidents to the barest minimum is to identify unsafe acts and unsafe conditions then appropriate counter measures can be identified to eliminate those hazards.

To date, numbers of papers have been published on analysis of near misses, unsafe acts and conditions (incidents) with respect to construction industry in Nigeria - among others are those by Abdelhamid et al. (2000); Cesarini et al. (2013); Aksorn and Hadikusumo (2007). However, not much studies have been conducted to identify any existing relationship between the unsafe acts/conditions and accidents occurrences in Nigerian construction industry. Therefore, this study adopted a holistic analysis to achieve the aforementioned aim, which will assist employers and employees to develop a deep understanding on the factors that can trigger accidents. In this study, accidents and incidents data from the XYZ Construction Company will be used.

XYZ Construction Company (not the actual name due to confidentiality issue) is an engineering and construction company in Nigeria, carrying out an upgraded of flow station at Bayelsa State, Nigeria. The upgraded plant consists of construction of the new sub-station where there will be an automated central control system replacing the manual control in the old sub- station. A new upgraded flow station is also built to accommodate for new accommodation and office buildings, new pipe racks, laying of pipes, new gas turbine installation and new tank farms. In the beginning of the construction project 2008 (the occurrence of accident was minimal that the company tends to overlook the importance of investigating unsafe acts and unsafe conditions at that point of project lifecycle. However, as the project progresses, the rate of unsafe acts and conditions has increased rapidly and more accidents were recorded within a short period of three e years only from 2008 to 2012 which signifies danger if effective and immediate preventive actions are not taken. So there is urgent need to investigate the sources of unsafe acts and unsafe conditions as this will assist in reducing the rate and consequently curb the occurrences of accidents at long run.

1.1 Examples of Construction Accidents Occurrences In Other Countries.

Previous studies have shown that construction workers are three times more likely to be killed and twice as likely to be injured compared to workers in other occupations (Kheni et al., 2008; Che et al., 2007, Okoye, 2012, Hinze, 1997). In Italy, the mortal accidents in constructions represent 25% of the total accidents that occurred in industry and services (Baldacconi and Santis, 2000). In New South Wales, Australia for year In year 1991, the US National Safety Council (NSC) found that construction injuries accounted for nearly 11% of all work related injuries and more than 30% of all fatalities in the US due to negligence to OHS practices in construction industries (Eppenberger and Haupt, 2003). While many construction industries in developed countries have embraced a zero accident policy as their goal and implemented effective health and safety

practices, construction industries in developing countries are unable to even identify their hazards. To make it worse, proper accident recording and notification systems are mostly not exist in many developing countries (Hamalainen et al., 2006). The above reasons have hindered proper and effective ways of preventing incidents. However among the most prominent ones is the failure to early identify the possible causes to the accidents, which can be done by analysing the existing accidents database of companies in similar industry.

2.0 METHODOLOGY

The objective of this study is to identify the relationship between unsafe acts, conditions and accidents occurrences in XYZ Construction Company through the database analysis between 2008 and 2012. This is achieved by using two main approaches. First was through extensive literature review to gather the information about the previous studies related to Nigerian construction industry, accidents, unsafe acts and unsafe conditions. The second approach was through analysis of cases from the database of the XYZ Construction Company. This study analysed 582 unsafe acts/ conditions and 91 accidents observed from 2008 to 2012. The data were subjected to descriptive analyses using Minitab statistical version 16 to study the correlation between unsafe acts/conditions and accidents occurrences. Pearson's correlation (Laura 2004) was used to determine the extent of the relationship between the unsafe acts/conditions and accidents. R represents person correlation. The results can be interpreted in three major findings: a correlation value of less than 1 < 1) indicates a totally negative correlation; a correlation value of 1 (= 1) indicates perfect correlation; whereas a correlation value of zero (= 0) indicates no correlation at all.

3.0 RESULTS AND DISCUSSIONS

The unsafe acts and unsafe conditions recorded in the database between years 2008 to 2012 were classified according to the common sources of accidents in construction industries (Haslam et al., 2005). This includes unsecured load and suspended load, improper use of ladder, failure in safe speed, defective working tools, unguarded machine, poor communication, working at height without fall protection, improper route plan or short cuts, absence of caution sign within dangerous areas, performing unauthorised task and ignoring safe working procedures as summarized in Table 1. The accidents data for the same period of years also were classified according to the type of accidents that commonly occur in construction industry (Seixas et al., 1998). This includes fall from height, electrocution, struck-by, caught-in, collapse of scaffold, crane toppling and falling materials. The annual frequency of unsafe acts/conditions as well as accidents for those five years are tabulated in Tables 1 and 2, respective

Table 1 Frequency of unsafe acts/conditions in XYZ construction Company from 2008 to 2012

Unsafe acts/ conditions	Year	2008	2009	2010	2011	2012
		year				
	Total frequency	51	90	120	143	181
Unsecured load and suspended load.		9	13	32	40	61
Improper use of ladder		5	8	8	10	14
Failure in safe speed		4	8	10	7	8
Defective working tools.		0	0	4	9	5
Unguarded machine.		0	5	7	3	0
Poor communication		5	9	12	15	7
Work at height without fall protection.		7	16	20	21	26
Improper route plan/ short cuts		7	12	9	10	12
Absence of caution sign within dangerous areas		5	6	8	12	20
Performing unauthorised task		3	5	0	3	10
Ignoring safe procedures		6	8	10	13	18

Table 2 Frequency of accidents in XYZ Construction Company from 2008 to 2012

Accidents	Year	2008	2009	2010	2011	2012
		Year				
	Total freq.	2	6	8	20	55
Fall from height		1	2	2	5	12
Electrocution		0	0	0	3	5
Struck-by		0	0	1		7
Caught in		0	1	1	2	6
Collapse of scaffold		0	0	1	2	0
Crane toppling		0	0	0	2	6
Falling loads/materials		1	3	3	6	19

From the Tables, it is clearly shown that the company recorded only a few numbers of unsafe acts and unsafe conditions and minimal accidents occurrences in the first year of its operation (2008). However, as the number of unsafe acts and conditions began to increase in the subsequent years (2008-2012), the accidents rates were also increased even though not exactly in the same frequency. This indicates that accidents prevention should be better controlled at the point of unsafe acts and unsafe conditions before they culminate to accidents. This somehow suggests the possible relationship between unsafe acts/conditions and accidents occurrence, which will be further confirmed through Pearson's correlation analysis.

From Table 1, it can be observed that the number of unsafe acts and conditions in the first year of study (2008) showed that unsafe acts and unsafe conditions were very minimal, especially for some classifications i.e. 'failure in safe speed' and 'defective working tools' (with the recorded number of cases of 4 to 5). In the second year, the number of cases was still minimal but showed small increment to 7-8 cases for 'working at height without fall protection' and 'improper route plan or short cuts' classifications. In the third, fourth and fifth year, it is observed that the number of unsafe acts and unsafe conditions has increased in all classifications as presented in Table 1. It is clearly evident from Table 1 that there is a pattern of continuous increase rate of unsafe acts and conditions in all classifications over the past three years. The reason might be that the company failed to control and eliminate the unsafe acts/conditions at the inception stage of the project. However, with the increasing rate of unsafe acts/conditions alongside the progression years of the project, there is an urgent need to eliminate these conditions to avoid them from triggering accidents.

Similarly from Table 2, the average number of accidents for all classifications in the first year of the project was almost zero and the number was still very minimal up to the second year. However starting from the third year, the accidents rate started to increase in all classifications presented in Table 2. In the fourth and fifth year of the project, there was a huge increment in the number of accidents in all classifications. This somehow indicates the lack of effective accident control from the sources of hazards. If the situation is not arrested then the accident rate will continue to increase which could cause loss of lives, property damage and loss of company reputation.

3.1 Correlations Between Unsafe Acts/ Conditions Vs. Accident Occurrence

The relationship between the occurrences of unsafe acts/conditions and accidents in the XYZ Construction Company was analysed using Pearson's correlation method so as to identify the level of correlation. The result showed that there is a strong, positive correlation between the two aspects under study with r value of 0.877. However, the correlation significantly showed more on the unsafe acts/conditions of unsecured load/suspended load; work at height without fall protection, improper route plan and accidents occurrences on fall from height and falling materials which have highest record of occurrences. This indicates that the unsafe conditions in the falls related areas triggered the outcome of falls accidents occurrences.

4.0 CONCLUSION

The number of unsafe acts and conditions which was small in the beginning of the construction project in 2008 (51 occurrences) started to increase consistently in the subsequent years 2009 to 2012 (90, 120, 143 and 181 occurrences) due to the company's negligence towards safety aspect. However the most prominent unsafe acts/conditions include unsecured load/suspended load; work at height without fall protection, improper route plan. They tend to overlook safety because of the so called 'good safety record' of the company when they started off the project. . This trend was also replicated by the occurrence of accidents in the company. More so, the accident rate which was minimal in 2008 (2 occurrences) at the beginning of the project increased rapidly from 2010 to 2012 (6, 8, 20 and 55 occurrences). Therefore correlation analysis was performed to study the relationship between the occupational of unsafe acts/conditions and accidents in the company using Pearson's correlation method. The study revealed that there is a strong, positive correlation between the two aspects with correlation value of r= of 0.877. R represents person correlation. The results can be interpreted in three major findings: a correlation value of less than 1 < 1) indicates a totally negative correlation; a correlation value of 1 (= 1) indicates perfect correlation; whereas a correlation value of zero (= 0) indicates no correlation at all.

As a conclusion, analyzing unsafe acts and unsafe conditions to determine their relationship with accidents occurrences is highly important and essential for reducing the likelihood of accidents through prevention and management strategies. The outcome of this study will give invaluable knowledge to both the employers and employees of construction companies' generally in Nigeria a deeper understanding on the potential accident causes can be developed and subsequently be benefitted to avoid record accidents in construction sites.

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