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EVALUATING THE RELATIONSHIOP BETWEEN RISK ASSESSMENT AND WORKPLACES ACCIDENTS IN THE CONSTRUTION INDUSTRIES

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ABSTRACT

Accidents in workplaces have been a general concern in construction industries and approximately 3.3 million working days was lost due to injuries in construction industries in 2000/10 (HSE, 2010). This report focuses on the construction industries to evaluate the relationship between risk assessment and accident in workplaces.

The main cause of injury in the construction industries is as a result of falls from elevated positions, body contact with moving machinery as well as trapped by and failing overturns, which occur as a result of human errors, ignorance and a deliberate act of violation has consistently led to different injuries in workplace.

A cursory consideration of the statistics for workplaces injuries from HSE illustrates the gradual decline in the occurrence of these workplaces accidents more so with the introduction of Health and Safety Acts regulations and Construction Design and Maintenance Regulation. These regulations, which are enforced by law for every employer facilitate the provision of a safer working environment for the workers via the prompt identification of the risk and while simultaneously initiating preventive measures to eliminate the risk thus limiting the occurence of accidents.

Risk assessment, as a technique used in identifying and reducing any potential risk arising in workplaces, must be reviewed continually as part of the management structure if its efficiency must be sustained.

Furthermore, the enforcement of legislation via Health and Safety and fines for defaulting companies has also encouraged the development of proper risk assessment methods which are continually reviewed to neutralise possible mistakes.

Keywords: *Risk Assessment, Accidents, Construction etc.*

I. INTRODUCTION

Risk is a part of our daily lives that we often take for granted leading to injuries and loss of lives. Indeed, the recognition of the role of risk management inspired the introduction of Health and Safety Legislations in a bid to ensure safety in workplaces for both worker and generally public. Construction industries so far have higher percentage of reported injury cases in workplaces, especially fall from height leading to concerns by the government and stakeholders (Aneziris *et al*, 2008).

Health and safety Executive in its annual report 2009/2010 showed that:

- Approximately 28.5 million days was lost in all industries with 23.4 million as a result of ill-health while 5.1 as a result of work injuries.
- 0.8 million abandon their work due to illness
- In construction, approximately 3.3 million working days was lost due to injuries. (HSE, 2010)

The aim of this article is to examine how effective the risk assessment is in the construction industries with respect to the availability and effectiveness of legislation in guiding and providing a safe working environment.

II. INJURIES AND WORKPLACES ACCIDENT STATISTICS IN CONSTRUCTION INDUSTRY IN UK

Construction industry in the UK so far has the highest figure of incurable injuries after husbandry and extractive industries with 42 incurable injuries in 2009/2010 at an average of 2.2 percent of every100,000 workers (HSE, 2010) though the occurrence of the incurable injuries have been reducing via 63% from year 2000/2001 and 70% decrease ever since 1981.

The major causes of accident/ injuries in the construction industries are: sky-scraping falls of 35% with 276 injuries reported, smack by a stirring declining object, body contact with moving machinery, trapped by failing overturn, and

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used of electrical energy of 24.8% with 89 injuries reported. The minor injuries in the construction industries are: slips and trips, hurt when handling (HSE, 2010b).

The workplace injuries data for different industries annually are published by HSE. Figures 1 and 2 are showing the range of workplace injuries and ill health in construction industries from 2000/01 to 2009/10. Figure 1 below shows the number and rate of fatal injury to workers.

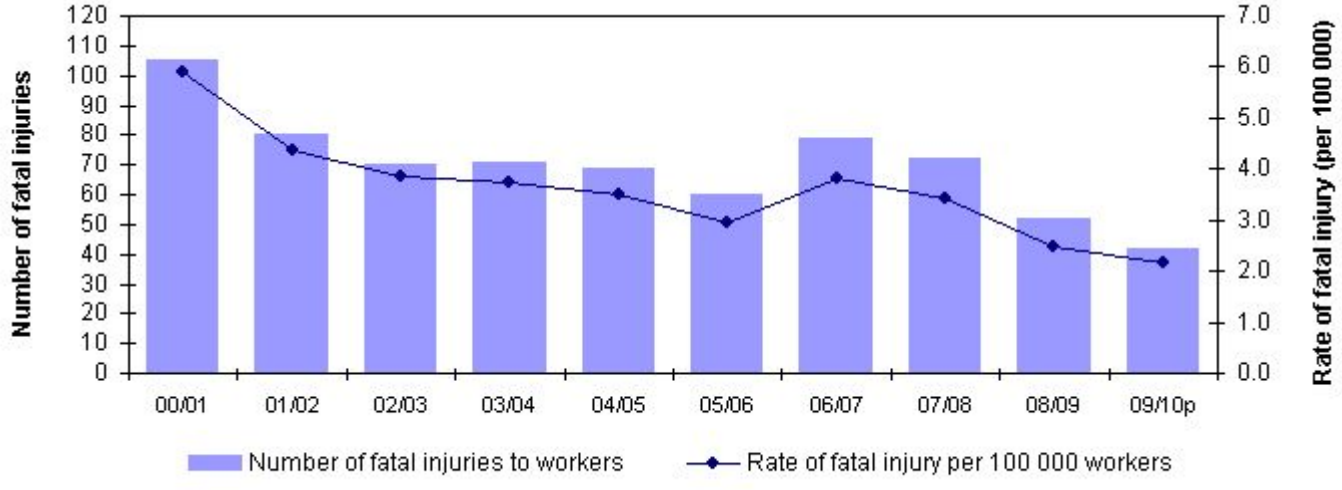

Figure 1: Rate of fatal injury to workers in construction industries from 2000-2010 (HSE, 2010c)

Figure 1 above shows that there is a decrease in incurable injuries on workers since the last 4 as a result of continuous training. This training focuses on how to prevent risk, checking working situation before the start of the work which is governed by "Construction Design and Management CDM Regulation 2007" but slight increase in 2007 as a result of non compliance to the CDM Regulation which is equivalent to human errors due to distraction (Hughes and Ferrett, 2008). Figure 2 below shows the major incurable injuries to workers from 2000-2010.

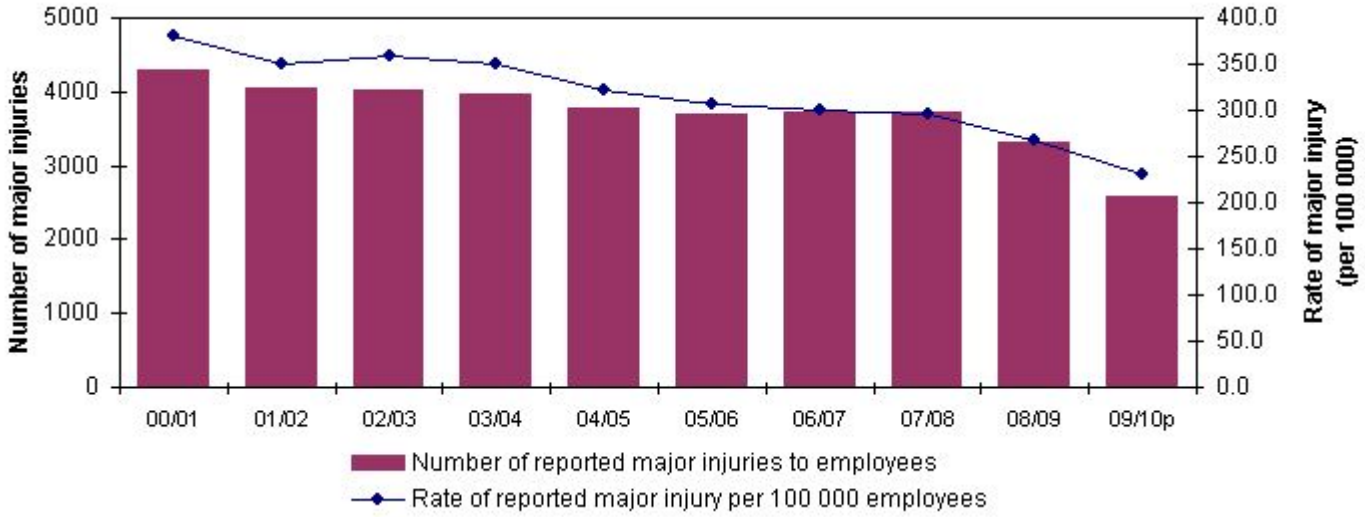

Figure 2: Rate of key injury to workers in construction industries from 2000-2010 (HSE, 2010c)

The rate of major incurable injuries in construction has remained constant in the past 3 years with a slight improvement on risk reduction in the 2008 to date as a result of effective monitoring and reviewing. . Figure 3 below shows the rate of more than 3 days injuries to workers in construction from 2000-2010.

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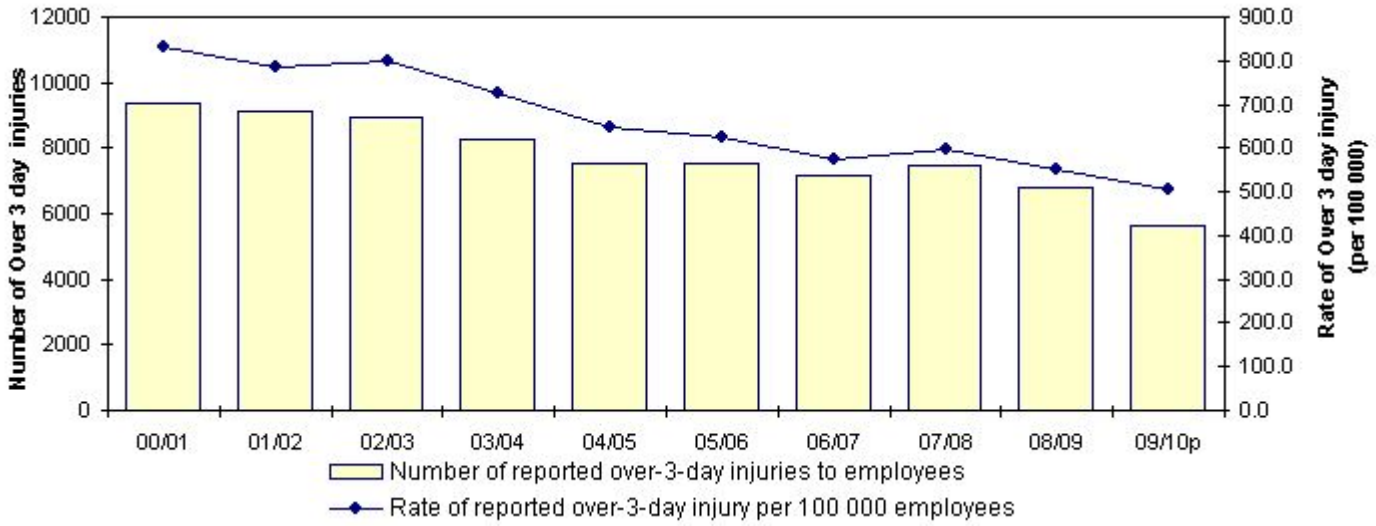

Figure 3: Rate of more than 3 days injury to workers in construction industries from 2000-2010 (HSE, 2010c)

The graphs shows that there is a slight decrease concerning the report on more than 3 days injury on workers over the past 3 years and constant in the year 2007-2008. The reduction is due to effective use of risk assessment and training of the workers especially on trips and slips.

The statistics shown above on the various workplaces injuries indicates that there is a drastic reduction in injuries as a result of the introduction of the Health and Safety Work Act 1974, training given to employees, advancement in technology, and the fear of been penalized for any failure in effectively assessing risk.

III. RISK ASSESSMENT

Risk assessment as a preparation phase, is crucial to facilitate the recognition of possible risks with the aim of preventing it from harming people in workplaces. According Health and Safety at Work Act 1974, the responsibility of employers to his worker is the provision of risk assessment (Hughes and Ferrett, 2008) which gives risk assessment a legal backing for employers to create safer working environment for his workers to reduce the potential mistakes and ill health which can ruin lives.

IV. RISK ASSESSMENT IN CONSTRUCTION INDUSTRIES

The CDM regulations (HSE, 1994) suggested that risk assessment in construction should be carried out during the designing stage by the designer and contractor. The identification of risk during the theoretical development helps the designer to known the possible problems and ways of extenuating it by reviewing the design. It can be deduced that CDM regulations has helped in identifying and preventing an unpredicted risk thus making the workplaces safer(Griffith and Howarth, 2000). Robertson *et al*, (1974) also concluded that the behaviour toward risk cannot be changed even if it is identified until proper precaution is taken using the Health and safety standard and culture.

There are 5 various steps in assessing risk assessment in construction identified by the Health and Safety Executive which are listed below:

- Identifying the hazards
- Decides who might be hurt and how
- Evaluate the risks and the precaution
- Record the finding and how to implement it
- Continuous review of assessments and update when due

(HSE, 2010e)

Croner, (2004) identify the preventives measures in dealing with risks which are: “avoid risk, combat risk at source, and control risk”. The risks in the construction which are recognised by the designer during the design stage can be eliminated via redesigning with mitigation must be carried out to prevent the risk from happening. This guarantees a safe working environment even as the construction proceeds to different stages. The following must be identified when analysing risk assessment in the construction industries:”working at heights, use of electricity, fire, plant and equipment, hazardous materials, Excavations, site aspects and public safety” Griffith and Howarth, 2000).

Brabazon et al. (2000) also reported that ever since the introduction of "Construction Design and Maintenance Regulations" in the UK, the total number of injuries has been reducing by 10% yearly.

The effectiveness of risk assessments depends on how it is been carried out and managed. Montague, (2004) however argues that "Risk assessment gives people a false sense of safety about, and provide a seemingly ''scientific'' and authoritative stamp of approval for, dangerous and destructive activities". Thus by identifying risk without giving options to the available risk assessment it fails leading to loss of lives while risk assessment have also contributed more toxic chemicals into the environment by setting limit on the amount chemicals that should be released which later accumulate causing damages to our planet earth to both human and human, flora and fauna.

Duff *et al*. (1993) presented another method in evaluating a safety performance on the bases of conforming to the safety style and culture at any point in time. Robertson et al, 1999 that include different kinds of "safety management strategies such as performance auditing, training design, incentive system design, and goal-setting", identified the techniques.

It can be deduced that risk assessment have helped in reducing injuries in different workplaces in construction, and can cause a severe damage to human and the environment at large if ignored as a result of human error, working effectively if properly used, monitor, reviewed and enforced by law.

The lapses of risk assessment in the construction industry, which led to accidents, are discussed below with the most efficient risk assessment in the construction industries being the qualitative risk assessments. This is based on figures and quickly identifies a preventive control over unforeseen, example is fall from ladders which was identified by Aneziris *et al*, 2008 and preventive measure in affording the falls which are 'strength of ladder, stability of ladder, types of ladder, placement and protection, and stability of users on the ladder. It can be deduced from Aneziris *et al* that qualitative risk assessment does prevent risk on site and most of the data information is obtained by direct contact with workers, reviewing the document about the site and reviewing the health and Safety standard which do give optimistic solution for fall from height.

V. LAPSES TOWARDS RISK ASSESSMENT IN CONSTRUCTION INDUSTIRES

Risk assessment is a techniques used in minimizing injuries in workplaces and can only work efficiently if it is monitored and reviewed often to identify any lapses present in the assessment. The most common lapses about risk assessment in construction industries occur as a result of human errors, ignorance and a deliberate act of violation which has led to different injuries in workplaces like falling from heights which is shown in the Fig 4 below. The various lapses in risk assessment and examples are discussed below.

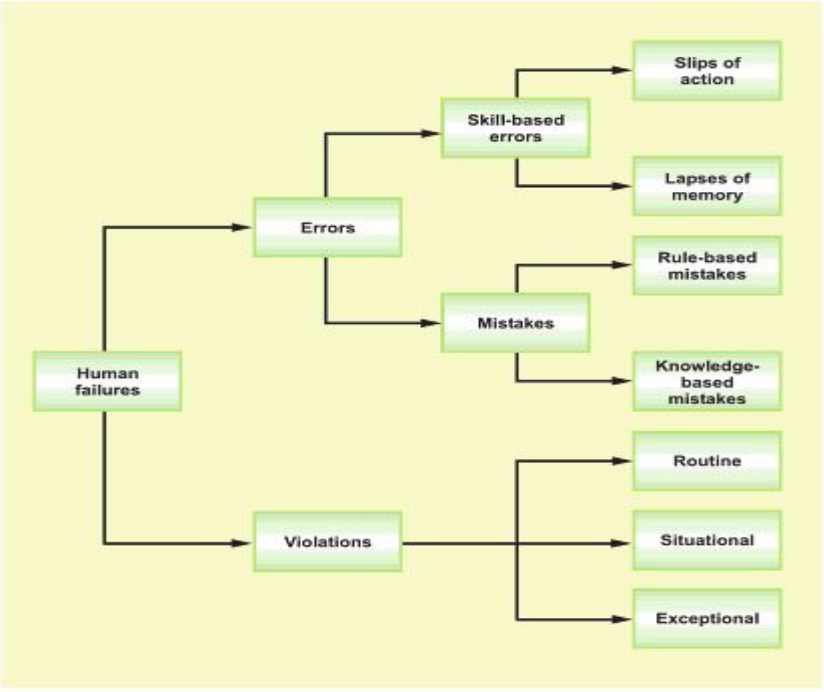

Figure 4: Types of human failure (Hughes and Ferrett, 2008)

In 2009, Laing O'Rourke Construction Ltd were fine £80,000 under the Health and Safety at Work Acts (HASAWA) 1974 s2 as a result of lapses in their risk assessment. There was no provision for safe working environment for its workers which led to a fall from height of a worker during a construction works on a concrete stairs in a building sustaining severe injuries (HASTAM, 2009).

Also, in 2008, William Birch and Son Ltd were fined £12,000 with a cost of £2,500 under the Health Safety Act 1974 s7 when workers fell from a "cherry picker" along the road side, used in accessing building when it was hit by a moving van. Although training was provided the workers failed to consider the safety of the working environment before the use of the "cherry picker" (HASTAM, 2008a)

In 2008, Demolition Dismantling Services Ltd was fine £3,350 under the Health Safety Act 1974 s3 when a worker fell from a fragile roof, landed on a concrete floor. The accident occured as a result of lack of proper training about the work, no standard risk assessment measures and fewer monitoring is available for the inexperience workers (HASTAM, 2008b).

In December 2006, SGB Services Ltd in Surrey was found guilty at "Birmingham Magistrates' Court" under the Work at Height Regulation 2005 8b and was fined £4,000 with a payment cost of £6,000 as a result of scaffolding not been erected properly which may cause harms to employee and the general public (HSE, 2009).

Also, British Telecommunication (BT) was found guilty at "Southwark Crown Magistrate Court" under the Health and Safety Work Act 1974 2(1) and was fined £300,000 with a payment cost of £196,150 as a result of death of is worker who fell from a ladder due to improper risk assessment at work and the used of not reviewing company working manual (HSN, 2010b)

With aim of ensuring safety in workplaces, "the North East construction work from Teesside to Northumberland" has been stopped from working as a result of perilous ways in which they work especially on roofing and renovation works by Health and safety Executive. "39 sites and 77 contractors "were visited unexpected, 9 stop work letter was issue out due to the concern of employee working at a high elevation and 9 upgrading notice was given to different contractors to further train their workers and the need for a protecting kit (HSN, 2010).

The total number of prosecution by HSE in 2009/10 as a result of inadequate risk assessment that led to accident of workers in workplaces or the general public is 1033, 737 were convicted. The conviction occured as a result of not compliance with Health and safety Regulation Work Act and the employer is held responsible for the failure. The total money received from the companies that found guilty of Health and Safety Regulation is £11.6 Million, with an average penalty of £15 817 per violators (HSE, 2010f). From the table below, it can be deduce that the number of prosecutions and convictions is reducing yearly as result of compliance with the Health and Safety Regulation, via training and reviewing their working manuals to suit the present legislations.

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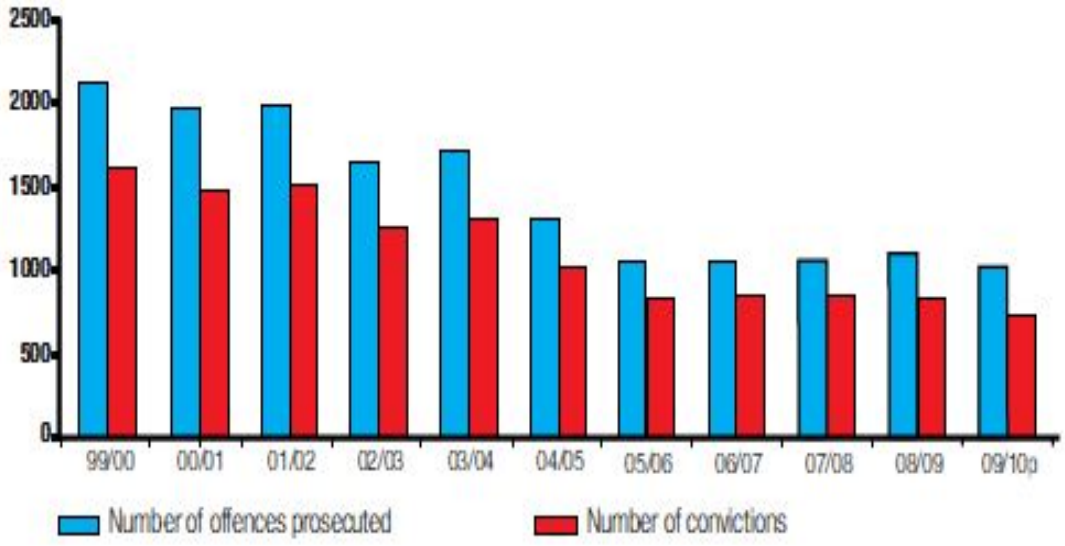

	Offences prosecuted		Convictions	
	HSE	ORR	HSE	ORR
2005/06	1 056	-	840	-
2006/07	1 041	10	846	6
2007/08	1 060	2	853	2
2008/09	1 099	16	837	16
2009/10p	1 026	7	735	2

**In Scotland, the Procurator Fiscal prosecutes on behalf of HSE; such prosecutions are included in the above figures.*

Figure 5: Showing the numbers of offenses prosecuted by HSE from 1999-2010 (HSE, 2010)

From all the lapses examples on risk assessments, it can be deduced that risk assessment is just a techniques used to prevent harms and injuries in workplaces if used effectively and there is no guarantee of 100 percent risk reduction.

VI. RISK ASSESSMENT AND MANAGEMENT COMMITMENT TO SAFETY

Risk assessment has been a technique used in reducing harms in workplaces though rigorous steps, but its success depends on the management commitment by promoting Health and Safety Act principles.

Wentz (1998) identified that management commitment should be promoted by ensuring the safety of its workers which should be done by: "effectively managing health and safety programmes, attending health and safety meetings, performing inspections, investigating near-miss accidents and reviewing safety performance at all levels" and effectual communication style about any changes on the working manual and guide. This allows the management to his responsibility to his worker on safety precautions should be carried out more in a practical way but not as an administrative work of writing and filing to a cabinet.

VII. CONCLUSION

The reduction of accidents and safety at workplaces has been the concern of the government, employers and the stakeholders while there cannot be 100 percent reduction in accident but can be minimized by efficient use of risk assessment which should be part of the management structure.

The reduction in injuries at workplaces has been efficient as a result of Construction Design and Management, Health and safety Regulations: Act at Work and Working at Height. This guarantees that all employers must provide a safety working environment for workers and identify any potential risk and a mitigation in solving it without causing harm to the worker or the general public.

The key reason for the total reduction of accidents in workplaces is a result of the enforcement of the law via the Health and safety Regulation and the fear of been penalised and fined. So far, risk assessments have reduced much more of accidents in workplaces and which should be encouraged for continual review

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