Health & Safety Management

Title: Serious accidents on fall of person in working at height in renovation work are resulted from workers' failing to use fall arresting systems provided by the employers

1. INTRODUCTION

The construction industry has experienced tremendous growth over the last decades, and this has led to an increase in company profits, growth in product demand and financial accessibility in Britain and the rest of the world. The building and construction enterprise significantly contributes to the economy of a country. However, the industry has been labelled as one of the most hazardous industry across the globe (Yu et al. 2003). Construction projects are considered hazardous due to the complex nature of their working sites and use of labour – since most of the construction activities are labour intensive. The projects are also described as short-term and transitory since the personnel involved in the construction projects are usually engaged temporarily, and a considerable proportion of this workforce is multilingual. Thus, constructions workers are highly exposed to occupational accidents, deaths and injuries that may lead to permanent disabilities because the workers spend most of their time at the construction sites. Accidents that occur in the construction sites include falling, tripping and slipping. Studies, however, indicate that falls from the heights (FFH) are the most common construction accidents compared with other types of accidents such as electric shocks, hits by falling objects and vehicle collisions (Marr & Thau 2014; NSW Business Chamber 2012).

According to van der Molen & Frings-Dresen (2014), falls are construction accidents that cause serious injuries of 62% and fatalities of 36%. This indicates that falls from heights generate more than one-third of construction injuries and are the primary cause of multiple injuries and deaths encountered on the building site. For instance, in 2013, fall from heights contributed to more than 40% of occupational injuries in Britain

and 37% in Hong Kong. Various studies have been conducted to ascertain the factors that cause falls in the construction sites however the multidimensional relationship of factors has received little attention from scholars. Extensive literature review on the subject has focused mainly on limited interventions such as research on workers' behaviour while in construction sites, factor influencing falls and prevention measures and solutions to falls

Construction fatalities is a topic that has attracted the attention of several researchers'. For example, (NSW Business Chamber 2012) conducted a study that focused on factors that lead to falls in construction sites. Marr & Thau (2014) have gone a step further to carry out a study on the significance of postural stability metrics in development. The studies done in the past have however failed to address major factors that lead to falling from heights as well as coming up with recommendations or solutions that can aid in mitigating fall incidents in the construction sites. The present overview has covered several causes of falls from heights including a justification for legislations associated with FFH and safety measures designed to prevent FFH.

1.2. Factors that contribute to people falling from heights during renovation work

FFH injuries occur mostly at the construction site when workers at the site execute dangerous tasks. The riskiness of the tasks varies although scaffolding and roofing are reported to be the most hazardous jobs that lead to FFH. Roofing workers are predisposed to fall-related accidents due to the use of brittle roofing materials and pressure from large tools and equipment used. In other cases, factors such as task complexity and diversion of workers attention while handling tasks at significant heights

can lead to FFH.

According to Fung et al. (2010), individual variables also play a fundamental role in the FFH accidents. This is based on personal characteristics of construction workers such as their education level, demographic attributes such as age, gender. Physical and human behaviour characteristics and health issues such as chronic ailments. In most cases, demographic characteristics of workers such as age, weight and gender are strongly linked with an individual's health, education and experience level. For instance, fatigue can be related to weight since workers who are overweight tend to get exhausted quickly and, this is one of the leading causes of FFH. To add to this, older workers are prone to FFH more easily as compared to young workers due to their age. Another demographic factor is knowledge level whereby constructors that lack education skills tend to have limited knowledge in safety measures. This makes them have a poor working practice, poor communication and tolerance skills and capabilities.

Worker's behaviour such as sloppiness, miscalculation or brashness contributes significantly to deaths or permanent disabilities after falling from heights (Li et al. 2015). Such actions are dangerous and, they tend to risk worker's lives irrespective of their experience and knowledge levels. Another factor that causes FFH accidents is work depression and sleep deprivation. These factors occur due to issues such as workload pressure, fatigue and lack of enough rest and intensive physical efforts that lead to burnouts. Fatigue is majorly caused by a worker's physical characteristics and health status, as well as working for long intervals.

Organisation's variables are also significant factors that are linked with FFH accidents. There are various elements under organisational variables that attribute to FFH accidents in Britain and Hong Kong. Firstly, Hong Kong construction companies are often in small-scale business. Close to 98% of general construction is done by small firms that employ a capacity of 15 employees or less (Hajibabai et al. 2011). Most construction companies are small in size since they are mostly involved in short-term business contracts. In this case, small size constructions companies do not invest in proper safety measures such as personal protective equipment, defective safety belts, personal fall arrest systems and security measures training for its employees hence making them have high incidences of FFH accidents. Small-sized construction companies are also risky since they overburden staff due to limited personnel thus making workers' to lose focus on a given assignment.

The second element under an organisation's variables is contractors and sub-contractors. Lack of capability and resources for contractors and sub-contractors significantly contributes to FFH accidents in the construction sites. This is because contractors and sub-contractors dominate most of the work done on the construction sites and they thus need to put in place safety regulation measures on their day to day work. In this case, FFH can be prevented by using personal protective equipment and personal arrest system tests (Stocks et al. 2011). Due to limited resources, most contractors and sub-contractors operate without safety equipment and protective measures and, this eventually leads to FFH accidents.

The last component under an organisation's variables is project management. Lack of proper management of tasks generates pressure on worker's hence leading to a lack of motivation and negative attitude towards the job and supervisors. This makes employees to complete the tasks in a hurry without putting in consideration safety standards. This is likely to cause FFH accidents, especially in the afternoon hours when workers are tired and hungry.

1.3. The rationale behind the legislative framework and technical standards on safe working at height at the workplace.

The Health and Safety Laws ought to provide that construction workers should be protected from injury arising from falling from heights while carrying out renovations. However, for a majority the workers the reality is quite different. For instances, more than 3 million workers worldwide die annually from accidents related to falls from heights. Besides, there are more than 100,000 million non-fatal construction-related accidents every year globally. The adverse effects caused by these kinds of accidents to workers and their loved ones is multitudinous.

Economically speaking, Sousa et al. (2014) approximate that over 3 per cent of the world's yearly GDP is used to cater for accidents associated with construction. Employment agencies face high-cost early retirements leading to loss of experienced workers. Most employers also have to confront the issue of absenteeism, and expensive insurance premiums as a result of renovations work-related fatalities. Nevertheless, most of these accidents can be averted through the enactment and enforcement of proper safety laws and inspection routines. The regulations on occupational health and security

in buildings offer essential tools for, employers, employees and government to guarantee maximum safety at work (Bowen et al. 2014). There is also a need for having common global laws to ensure the safety of workers worldwide.

As has been discussed, FFHs have been liable for numerous fatal and non-fatal injuries annually. For instance, if an individual falls from a height more than two meters there is a high chance that they will be severely injured. Most of the renovation activities entail working at heights. Working from, scaffolds, ladders and wooden platforms are some of the examples. However, there are several other instances where construction staff have to work at varying heights. A few of the examples include roofing activities, working on top of tanks or at the edge of tall buildings. The primary hazards linked to working at great heights include individuals falling onto other people below. These accidents may happen as a result of lack of proper edge protection, or from poorly secured platforms (Sousa et al. 2014). It is only through having strict legislative measures aimed at protecting workers and employers that FFH accidents would be significantly reduced.

1.4. The decision with sound reasons for the provision of different types of safety measures to be designed and implemented for working at height.

The importance of studying FFH accidents is to ameliorate the severity of injuries. Most of the publications and OSHB websites have offered either recommendation on preventive measures of mitigating falling cases. This section provides reasons and justification for both passive and proactive methods in preventing accidents. Very few publications have provided active strategies to be used in renovation sites. The most

important protective ways would be to incorporate on-site precautionary strategies. Educating and training the workers on how to use these measures would help in the prevention of FFH accidents, whereas the importance of passive approach often lies on assessing the fall cases data for prospective plans (Farrow & Reynolds 2012).

The proactive, precautionary principle can be an effective method of curtailing FFH cases. Besides, coming up with little safety workshops for the workers that centred on work at height hazards, might have a significant effect on employees" behaviour thus mitigating FFH scenarios. Moreover, reducing the kinds of risk agents and the period exposure can go a long way to lessen the seriousness of FFH. Furthermore, researching on ways improve unsafe structures could also reduce FFH. For example, it is critical to redesign scaffolds to diminish their complex structure in such a way that it can be erected and dismantled quickly.

Workers setting up scaffolding systems ought to be competent enough for the kind of scaffolding assignment they are carrying out. They need to have received relevant training on the scaffolding they are using. The law requires that if any the scaffold is 6 feet or more above the ground, the Ministry of Business and Innovation has to be notified about its erection and dismantling.

Most of the construction industries are subjected to certain safety guidelines as outlined by OSHB. Such regulations are necessary for enhancing the safety of construction personnel to preclude fall accidents while working. Consistent safety regulations amendments and regular inspections comprise the possible measures carried out to cut down on work-associated FFH.

Before any construction work starts the contracting agencies must evaluate the site to ascertain whether the work platforms have the critical strength to hold the staff safely. After it is confirmed that the work platforms can, in fact, support the workers, the employer needs to assess if fall protection measures are required (checking on the HSE and OSHB guidelines) and, if so, supply the employees with fall arresting systems that utilization of fall arrest systems when renovations workers work at heights of more than 6 feet (Russ 2010). It also applies to heights of less than 6 feet when there are activities taking place near risky equipment such machines with exposed drive belts.

Moreover, prevention of FFH can be ensured through the utilisation of guardrail structures, or personal fall arrest equipment. The OSHB refers to such material as universal fall protection agents. Other methods of fall aversions may be incorporated when performing certain construction activities. For instance, when dealing with platforms, a positioning machine would be necessary to use. OSHB requires that employers employ systems that preclude falls of any form.

Construction workers involved in renovating residential houses more than 6 feet tall are required to use conventional fall arrest equipment unless a special provision in OSHB guidelines offers for a different fall aversion strategy (Chapman 2012). However, when the contractor can prove that such an approach is not feasible or might increase the risk hazard, the employer has to design and enforce a site-customized fall protection strategy which complies with the requirements of OSHB.

A personal fall protection/arrest system is an equipment used to safely stop an individual falling from a height of more than 6 feet. It is made up of connectors, Anchorage,

and a harness. Some may have included a deceleration system or lanyard, or both. The Subpart M, of OSH prohibits the use of safety belts as components of personal fall arrest equipment. When organisations choose to utilise fall arrest equipment as a way of protecting workers from FFHs, optimal stopping force on the user-to-user should be limited to 2,000 lbs. When combined with a body harness. The system has to be rigged so that to prevent the user from falling from a height of more than 6 feet. The employee should be brought to a complete arrest the maximum deceleration expanse the user drops should be limited to 4 feet (Health and Safety Executive 2010). The arrest equipment should also have enough strength to handle three times the kinetic energy from the user's free fall from greater heights. Lastly, the device must regularly be inspected for wear and serviced consistently.

Even though other fall protection devices such as fall restraint systems are not frequently talked about in Subpart M, HSE acknowledges the equipment as prevention equipment. If the instrument is properly utilised, it can protect the user in a way that will prevent any FFH. Just like the fall arrest system, this equipment has a safety belt and a supporter. The anchorage system has to be robust enough to bar the user from falling from a height greater than 6 feet.

2.0. Conclusion and Recommendations

Construction firms have grown over the years with the subsequent increase in revenue. Unfortunately, this has also lead to the growth in the rate of workers falling from heights while carrying out renovation work. This paper has pointed out several causes of falls from height including lack of information by individuals on the importance of using personal arrest systems negligence on the part of contractors, and weather factors. To reduce the incidences of falls from heights, there is not only need to enacting proper laws or guarantee the safety of workers but also, the safety regulations need to be regularly updated. Some the recommended protection measures include the use of scaffolds, personal arresting systems and conducting employee training workshops on how to use the safety systems.

Hence, from the literature reviewed, it can be concluded that although various or some "*Serious accidents on fall of the person in working at height in renovation work have resulted from workers' failing to use fall arresting systems provided by the employers"* but it is not the entire scenario since numerous other factors contribute to such accidents – thus this statement is not entirely true.

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