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SAFETY AND HEALTH FOR CONSTRUCTION WORKERS IN BRIDGE CONSTRUCTION

Muhamad Ekwan Haniffah bin Baharudin¹ and Syarifah Nur Nazihah bt Syed Jamalulil²

¹, ²Faculty of Architecture, Planning and Surveying, Universiti Teknologi MARA Perak Branch, Seri Iskandar Campus, 32610 Seri Iskandar, Perak Malaysia. *Email ¹muhdekwan@gmail.com, ² syari5008@perak.uitm.edu.my*

Abstract:

A bridge is a structure built to span physical obstacles without closing the way underneath such as a body of water, valley, or road, for the purpose of providing passage over the obstacle. However, there are many risks in constructing a bridge. The aim of this research is to identify the safety and health of construction workers in bridge construction. The objective of this research is to determine the worker's level of awareness on safety and health in bridge construction, to identify the main safety precautions taken by the construction workers in bridge construction and to determine the major barriers faced to implement safety and health in bridge construction. Review of literature was conducted and a questionnaire survey was used to obtain the information needed. A total of 100 questionnaires was distributed and 60 only respondents are responding to the survey. The distribution involved all the worker that works on the bridge construction site in Pasir Mas, Kelantan. The data were analyzed by using the SPSS software with Average Index. The findings indicate that most of the construction workers are aware that safety and health practices on site are important to achieve zero accident and death on site. This study will help the construction workers to Have a clearer exposure on the safety and health practices in the bridge construction site.

Keywords: Bridge Construction; Construction Worker; Safety And Health.

1.0 INTRODUCTION

Civil construction is a segment of the broader construction industry focused on building core infrastructures like pipelines, telecommunications, sewers, water treatment systems, highways, roads, bridges, subway tunnels and light rail transit lines. A bridge is a structure built to span physical obstacles without closing the way underneath such as a body of water, valley, or road, for the purpose of providing passage over the obstacle. There are many different designs that each serve a particular purpose and apply to different situations. Designs of bridges vary depending on the function of the bridge, the nature of the terrain where the bridge is constructed and anchored, the material used to make it, and the funds available to build it (Balasubramanian, 2017). On the other hand, bridge construction means a structure including supports erected over a depression or an obstruction, such as water, road- or railway, and having a track or carriageway for carrying traffic or other moving loads. There are many risks in constructing a bridge. Falling and tumble are the common accidents that happen in bridge construction. The construction labors must adopt a high precaution in every construction site. They must be aware and know how to manage the unpredictable event that might happen. Safety and health practices on site are one of the most important aspects of avoiding any accidents or injuries. Even though there are many studies on safety and health in a construction site, a further research will be carried out in order to find out the safety and health of construction workers in bridge construction. This research only focuses amongst the workers that work in the bridge construction in Pasir Mas, Kelantan.

2.0 LITERATURE REVIEW

2.1 Safety and Health

Safety and health are one of the most important aspects especially when on the construction site. All construction stakeholders are responsible for the safety and health of the construction site which includes the contractor, client, authority, sub-contractor, consultant and the workers themselves. Many agencies are involved in Occupational Safety and Health activities in Malaysia. There are numerous safety activities have been developed according to each agency, under the Ministry of Human Resources (Mohamad Yunus & Latiffi, 2017). Figure 1 shows the OSH activities by each agency in Malaysia.

Standard setting regulations	
•DOSH	
Enforcement	
•DOSH	
Training consultation	
•NIOSH	
Certification	
•DOSH,NIOSH,CIDB	
Information disscmination and services, OSH awareness promotion	
•DOSH,NIOSH,SOCSO	
Research and Development	
NIOSH, Private and Public universities	
Compensation	
•SOCSO, welfare department	

Figure 1: OSH activities in Malaysia by each agency. SOURCES: OSHA

Malaysia is the first country in Asian to have enacted safety and health legislation covering all occupation. The safety and health legislation main objective is to ensure that the workers get the safe working condition that was provided by the employers. The employers must provide a safe working condition that free from any hazards or any dangerous event such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, heat or cold stress or unsanitary conditions.

2.2 Construction Workers

In the construction industry, construction workers are the main key to making sure a construction project run smoothly and finish on time. A construction worker is a person who does numerous fundamental tasks that require physical labor on construction sites. Basically, construction workers who work on construction sites, doing a variety of tasks from the very easy to the extremely difficult and hazardous. Although many of the tasks they do require some training and experience, most jobs usually require little expertise and can be adapted rapidly.

A construction worker commonly does the following:

- Cleans and prepares construction sites by removing debris and possible hazards
- Loads or unloads building materials to be used in construction
- Builds or takes apart bracing, barricades, forms (molds that determine the shape of concrete), scaffolding, and temporary structures
- Digs trenches, backfills holes, or compacts earth to prepare for construction
- Operates or tends equipment and machines used in construction, such as concrete mixers

- Helps other craft workers with their duties
- Follows construction plans and instructions from the people they are working for

In other to finish a construction project, there are several types of construction workers needed. This is why the construction workers can be classifying into three categories which are skilled workers, semiskilled workers, and unskilled workers. All these categories of workers are differing in several ways and had their own entitlement eligibility but all of them are important in the construction industry.

2.3 Safety & Health for Construction Workers in Bridge Construction

Safety and health is the most crucial aspect that needs to take seriously by all stakeholders. It is important to make sure all working place are in safe condition to starting a job. This is because construction industry can be the most hazardous and dangerous other than another sector. The construction industry has held the first place in the most dangerous jobs list for quite some time. Statistic had shown that the accidents in construction sites are increasing year by year. Department of Safety and Helath (DOSH) indicated there is a total of 187 construction workers died due to accidents at construction sites in Malaysia during the period of 2011-2013. The records are only in Malaysia, in another country there still numerous of accidents had been records and the percentage of accidents are increasing day by day.

Safety must be taken to the next level that all parties that involved in the construction industry must take part to make sure that the construction site free from any hazardous or any dangerous event. Moreover, safety and health at the construction site itself have been all construction stakeholder's responsibilities, which include the contractor, client, authority, sub-contractor, consultant and the workers themselves.

As above stated, the construction industry is one of the most dangerous and hazardous sector compared to another sector. Bridge construction is one of the sectors that contribute to the percentage of accidents that happened on a construction site. The statistic also has recorded that in the construction of the bridge, numerous of accidents had happened. Furthermore, the accidents also lead to the injuries even death to the construction workers. This is why safety and health also essential for the construction workers in bridge construction. The construction workers must be aware of the safety and health in bridge construction. They also must take s safety precautions to prevent any unexpected event that can lead to injuries or death. They must know the safety precautions that need to be taken.

In the construction site, safety precaution is the most important things before any activities started. Because the construction industry is the dangerous sector other than another sector, safety precaution is needed to prevent any unexpected event that will lead to any injuries or death. PPE is the common precaution use by the construction workers. PPE stands for Personal Protective Equipment. Personal Protective Equipment (PPE) is all equipment (including clothing affording protection against the weather) which is intended to be worn or held by a person at work and which protects them against one or more risks to his health or safety.

There are several PPE equipment used in a construction site.

- i. Foot Protection
- ii. Hand Protection
- iii. Head Protection
- iv. Eye and Face Protection

PERSONAL PROTECTIVE EQUIPMENT	DIAGRAM	DESCRIPTION		
		Construction workers should wear work shoes or boots with slip-resistant and puncture-resistant soles.		
FOOT PROTECTION		• Safety-toed footwear is worn to prevent crushed toes when working around heavy equipment or falling objects.		
HAND PROTECTION	No. of the second se	• Gloves should fit snugly.		
		• Workers should wear the right gloves for the job (examples: heavy-duty rubber gloves for concrete work; welding gloves for welding; insulated gloves and sleeves when exposed to electrical hazards).		
HEAD		• Wear hard hats where there is a potential for objects falling from above, bumps to the head from fixed objects, or of accidental head contact with electrical hazards.		
PROTECTION		• Hard hats – routinely inspect them for dents, cracks or deterioration; replace after a heavy blow or electrical shock; maintain in good condition.		
EYE AND FACE PROTECTION		 Safety glasses or face shields are worn any time wo operations can cause foreign objects to get in the ey For example, during welding, cutting, grinding, naili (or when working with concrete and/or harm chemicals or when exposed to flying particles). 		
		• Eye and face protectors – select based on anticipated hazards.		

Table1:	Descriptive	for Prot	ective Ea	uipment
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2.4 The worker's level of awareness on safety and health in bridge construction.

The lack of awareness of contractors on Occupational Safety and Health (OSH) management systems in construction capable contribute to the accident at a construction site. Many of the injuries at the workplace are a direct result of the attitude and actions of the individual themselves. Besides that, the high rates of injury are primarily due to inadequate or non-existence of an OSH management systems. Many occupational accidents and injuries are due to a breakdown in the existing OSH management system (I.F. Mohd Kamar, 2014).

2.5 The safety precautions are taken by the construction workers in bridge construction.

Construction accident investigation techniques and reporting systems identify what type of accidents occur and how they occurred. Unfortunately, they do not properly address why the accident occurred by identifying possible root causes, which is only possible by complementing these techniques with theories of accident causation and theories of human error (Abdelhamid & Everett, 2000).

2.6 The barriers faced implementing safety and health in bridge construction.

Although safety and health are important, it cannot be applying easily. There must be applied step by step and it must be barriers to implementing the safety and health in a construction site. There are 3 main barriers in implementing safety and health in a construction site (Wong et al., 2015):

a) Cost barriers

- i. lack of expertise or resources
- ii. lack of financial benefit in OHS investment
- iii. lack of bargaining power
- b) Time barriers
 - i. long training and education time
 - ii. tight project deadlines
- c) Lack of safety awareness and concern
 - i. The fragmented nature of constructed industry
 - ii. Wrong perception or underestimation of risk
- iii. Onerousness and variability of legislation

3.0 METHODOLOGY

This research will involve a compilation from primary and secondary sources, which some are featured for literature review and obtain the data. The secondary data consists of information that was retrieved from the journal, magazines, references books, articles, websites and other sources of information. The process of collecting the primary data were which through the questionnaire distribution. At least 60 questionnaires were distributed to the construction workers that work on the bridge construction in Pasir Mas, Kelantan. Data collected from the questionnaire survey was then analyzed using the Statistical Package for Social Sciences (SPSS). The question asked in the questionnaire are based on a Likert scale. Likert scale questionnaire requires each respondent to rate the statement from the scale 1 = strongly disagree, scale 2 = disagree. Scale 3 = neutral, scale 4 = agree, and scale 5 = strongly agree.



4.0 ANALYSIS AND FINDINGS

Figure 1: The Workers Level of Awareness On Safety and Health in Bridge Construction

Summary from Figure 1 concluded that majority of the respondents agree with all four (4) out of seven (7) level of awareness on safety and health in bridge construction that were listed above. The other three (3) level of awareness is in the range of neutral. The awareness on safety and health in a construction site is one of the most important aspect help to prevent from any accidents or injuries. The top rank of the awareness is the worker's knowledge of personal protective equipment (PPE) at the site. This show that it is important to use the PPE when performing a work especially on the construction site. However, all the awareness that listed in section B is still important to avoid and reduce the accidents or injuries happened in the construction of a bridge.



Figure 2: The Main Safety Precautions Taken by The Construction Workers in Bridge Construction.

Summary from Figure 2 conclude that majority of the respondents agree with all four (4) out of seven (7) main safety precautions taken by the construction workers in bridge construction that were listed above. The other three (3) level of awareness is in the range of neutral. Safety precaution in the workplace can help in preventing any accident or issues related to safety and health. The main safety precaution taken by the construction workers is the provider of complete Personal Protective Equipment (PPE). This show

that it is important to use the PPE when performing a work especially on the construction site. However, all the safety precaution that listed in Section C are still important to prevent or avoid any accident and issues related to safety and health in the construction of a bridge.



Figure 3: The Major Barriers Faces to Implement Safety and Health in Bridge Construction.

Summary from Figure 3 conclude that the respondents agree majority of the respondents agree with all two (2) out of seven (7) major barriers faced to implement the safety and health in bridge construction that were listed above. The other four (4) of the barriers faced are in the range of neutral. Poor communication skill with the workers appears as the major barriers faced in implementing the safety and health in bridge construction. This show that the communication between an employer with the workers is one of the most important aspects of implementing the safety and health in bridge construction. This poor communication skill problem can contribute to the risk of accidents at a construction site. According to Trajkovski and Loosemore (2006), good communication skills help to reduce the accidents risks and one of the factors that lead to the effectiveness and efficiency of the construction process. However, all the barriers faced in implementing safety and health that listed in Section Dare still important to prevent or avoid any accident and issues related to safety and health in the construction of a bridge.

5.0 CONCLUSION

This research has explored all the matters which relates to the safety and health of workers in bridge construction. Based on the finding shown in the figure, the majority of the workers that work on the bridge construction are aware of the safety and health that been practice on the site. The findings had shown that the communication between employer and the workers are the most important aspect of implementing the safety and health practice in the construction site. Furthermore, this study helps the construction workers in improving their safety and health practices in bridge construction site.

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