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Stakeholder's Attitude Towards Construction Worker's Safety and Health

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Abstract: The construction industry in Malaysia as in many other countries is considered one of the riskiest industries due to the high rate of accidents and their devastating consequences. The construction safety has been debated for centuries with numerous research on the methods, techniques and interventions in order to minimize accidents occurred on site. Safety and health performance is influenced by among other things, stakeholder's attitude towards the safety of the construction workers. The main objective of this research is to identify the attitude of the main stakeholders towards the duties and obligation of the designer, contractor and client in terms of safety and health. The respondents of this research are the designers, architects and civil engineers, contractors and others. A questionnaire was used as the main instrument on a Likert-type scale with a total of 97 respondents received. The research found positive results gain on the attitudes of the stakeholders towards the duties and obligation of the designers, contractors and clients. However, this does not diminish the importance of increasing the awareness on the duties and obligation of these stakeholders in terms of safety and health of the construction workers. Thus, the research suggests three recommendations for the future direction of implementing design safety in Malaysia, approach curricula in the universities, additional training programmes and awareness in terms of safety and health of the construction workers.

Key words: Health and safety, construction workers, duties and obligations, designers, contractors, clients

INTRODUCTION

Safety begins with the responsibility of the top management. Although, the construction work is dangerous, however, it can be controlled and sometimes completely eliminated if safety is treated as a vital part in the overall production schedule. In fact, accidents are preventable with timely precautions and care of the management, workers, clients and contractors. Therefore, passive measures are taken to decrease the likelihood of the risks and are the most preferred means of control there is. The best time to eliminate hazards from a project is during the initial design phases of feasibility and early concept design. As the project develops, the opportunities to eliminate hazards will decrease. This concept is known as design for construction Safety. While other countries have been implemented this years back, the Malaysian Construction Industry is still lacking on this. Therefore, this study is to identify the attitude of the main stakeholders towards the duties and obligation of the designer, contractor and client in terms of safety and health. These duties are based on the CDM Regulations and design safety as a focal.

Worker's safety and health through design phase: Between the years of 2008-2012, the Malaysia's construction industry employs only nine per cent of the total workforce of this country which is equivalent to 5.4 million workers (MOHR., 2012). However, with this small amount of employment rate, the construction industry has become the third highest accidents occurred for the past 9 years in Malaysia. The accidents have been increasing from 102 fatalities and 1,736 disablement cases in the year 2008 to 124 fatalities and 6,180 disablement for the year 2015. In addition, for the year 2016, the first 3 months has led to 42 fatality cases and 1479 for disablement cases of construction site accidents reported (MOHR., 2016). With various technologies and safety methods introduced, accidents relating to construction sites are still high and rising. These technologies and methods mostly focused on the risks and hazards during the construction phase. On the other hand, Design for Construction Safety concept introduced to reduce hazards and risks during construction through a thorough consideration done during the design phase.

Design for Construction Safety (DfCS) has been defined as a process where it influences design decisions

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of a permanent building, facility or structure to eliminate, mitigate or reduce the need of personal protective equipment such as fall protection both during the construction phase and maintenance (Mroszczyk and Gambatese, 2006). It is a concept where is requires the designers to be aware of their influences as well as their roles and responsibility in the context of construction workers site safety. Unfortunately, we faced difficulty to implement this concept in the near future as the current culture are more focussed on the contractor's role in assuring safety of their workers rather than a shared responsibility between all parties, especially by the architects and engineers.

Stakeholder's mindset and attitude: The mindset and attitude vary based on the stakeholder role and duties in a construction project. Based on past research, engineers believe that the designer should be responsible for supervising the construction project including the safety of the construction workers. As for the architects, majority supports the concept, however, there are a still a handful whom does not consider themselves in charge of providing and preserving safety on site claiming that they were not and are not likely to affect the safety of workers on construction sites because of the lack of direct involvement of the management of construction sites (MOHR., 2012). This mindset and attitude may change if they fully understand the concept of design safety and how they can affect the safety and health of a construction worker through their design.

As for the other stakeholders such a the mechanical engineers, quantity surveyors and safety officers, many agree on that the contractor or construction manager is the person responsible on the safety and health of the workers. Agreeing to that some contractors prefer to retain the freedom to be creative in the development of the construction sequence (Faida and Misnan, 2014).

Duties and obligations in terms of safety and health: The duties and obligations are based on the construction (design and management) regulations, one of the earliest regulations that implemented the design for construction safety concept.

Designer: A designer is anyone who prepares or arranges for anyone to prepare a design relation to a structure or part of the structure includes drawings, design details, specifications and bills of quantities (Perry, 2003; CIOB., 2008). Practicing DfCS is not making a construction site a safer place but to build the structure using the safest method. Hence, the designer requires knowledge and experience of the construction process and technique to be able to predict and foresee potential hazards. With that they will be able to identify potential hazards and risks that may develop during the construction, maintenance, cleaning and dismantling of the design. There are four main roles of the designer under the CDM 2007, however, this research will only focus on the duties and obligations of the designers in terms of safety and health.

The designer is required to consider how foreseeable risks may be avoided at source while minimizing risks to all parties involved (Perry, 2003). These include those who are constructing, maintaining, cleaning, repairing, dismantling, demolishing or using the structure. The designers, engineers, architects and other design professionals, based on the regulations should avoid the use of dangerous structural procedures or materials hazardous to health or safety in their design by design modifications or substitute materials available (CIOB., 2008). They should be able to identify any occupational safety and health hazards of their design and take steps to avoid, reduce or control them. Designers must not produce designs that cannot be constructed, maintained, used or demolished in reasonably safety.

The designer is expected to address risks as reasonably practicable at the time as the design is prepared. If risks cannot be satisfactorily reduced, they should consider methods that will protect worker's safety and health, especially, during the construction process. In short, during the design phase, designers should provide the best usage and safety to the end-user of the building but also, protecting the safety of the workers involved.

Contractor: A contractor is anyone whom undertake building works, conducts, manages or employs people to conduct construction works whom are responsible for all specific safety issues includes ensuring and carry out works safely. At this current culture, they are the one who manage the safety of the site and is burden with the responsibilities of any accidents happen on site. The list of duties and obligations of the contractor includes (Perry, 2003; CIOB., 2008):

- To produce a Health and Safety Plan at the tender stage include method statement and pricing
- To make arrangements for ensuring health and safety of workers
- To ensure that subcontractors are competent, adequately resourced and properly coordinate to carry out any sub-contract work
- To take health and safety in consideration in all contractual activities while ensuring all sub-contracts comply with the health and safety legislation
- To ensure all workers are properly trained
- To ensure site rules, site access arrangements and notices are displayed on site
- To provide information for the health and safety file

Client: The client is defined as a person whom a construction project is carried out for and pays for it either central or local government, including industrial companies, public utilities, property developers and building owners and leaseholders (Perry, 2003; CIOB., 2008). His main duty or obligation is to ensure that there are sufficient means of financial capital for his construction project. However, with the implementation of CDM Regulations 2007, his duty had become wider than previous. The list of duties and obligations of the clients includes (CIOB., 2008):

- To request the designer to take occupational safety and health in consideration when designing the project
- To provide the planning supervisor with relevant safety and health information related to the project including drawings of existing structure or services
- Require the tenderer to make a provision for the cost of safety and health measures during the construction process
- To ensure that the construction work does not begin until the Safety and health plan is fully developed
- To ensure that the safety and health file has been completed and available to the client upon completion of the project in respect of any future works in connection with the structure

MATERIALS AND METHODS

Research strategy: In order to identify the attitude precisely, the measurement techniques should include an appropriate scale. In academic research, the Likert technique is one of the best options, presenting a set of attitude statements or questions. A questionnaire was designed to capture attitudes to the duties and obligations based on the literature review. The questionnaire was designed to comprise two sections. Section A was designed to capture personal data about the following variables, background in the industry, level of education, rank and years of experience. These variables were considered to be possible independent variables that influenced the main stakeholder's attitude to the duties and obligations. Section B was designed to capture data about the stakeholder's attitude to the duties and obligations of designer, contractor and client in terms of safety and health to which they agreed with statements derived from the literature review on a Likert-type scale (1-strongly disagree, 2-disagree, 3-neutral, 4-agree and 5-strongly agree).

The survey was distributed by using the online survey tool Google forms, by hand and by airmail. All identifying information from participants was stripped from the responses prior to data analysis.

Data collection and preparation: To establish the reliability of the variables, a standard reliability test was carried out. Cronbach's alpha values of 0.860, 0.885, 0.864 were obtained for the attitude to duties and obligations of the designer, contractor and client, respectively. The value of this coefficient is considered high and acceptable thus, confirm the consistency of the variables used in capturing underlying factors.

As much as 97 respondents were received. The number of years of experience in the construction industry, among the respondents, ranged from 0 to more than 20 year with the majority of respondents under 2 years of experience with 29.9%; 2-5 years (19.6%); 5-10 years (19.6%), 10-20 years (18.6%) and for more than 20 years (12.3%). Among the respondents, the level of education was distributed as follows: secondary school (1%), high school (1%), diploma (18.6%), degree (69.1%) and master (10/3%). The type of firm was distributed between the architecture firm (29.9%), civil engineering firm (18.6%), contractor firm (40.2%), subcontractor firm (4.1%), developer (4.1%), client (2.1%) and quantity surveying firm (1%).

RESULTS AND DISCUSSION

On the Likert-type scale used; (1-strongly disagree to 5-strongly agree) 2 the mean score of the stakeholder's attitude to duties and obligations of the designer, contractor and client in terms of safety and health was 4.33, 4.41 and 4.32, respectively.

The results on the duties and obligations of the designers shows that majority of the respondents strongly agree on the duties and obligations of the designer with the highest agreement in 'Required to consider how foreseeable risks may be avoided by design modifications or substitute materials available' and providing the best usage and safety to the end-user of the building but also, protecting the safety of the workers involved with 4.392. The lowest score is 'To include occupational safety and health as part of the design review process from the earliest stages' (4.217). Based on the results it shows that the civil engineers have the least agreement (3.971) on the duties and obligations of the designer.

The results the duties and obligations of the contractors shows that majority of the respondents strongly agree on the duties and obligations of the contractor with the highest agreement 'To take occupational safety and health in consideration in all contractual activities while ensuring all sub-contracts comply with the health and safety legislation' (4.485). The lowest score is 'To make arrangements for ensuring occupational safety and health of worker's (4.299). Based

on the results it shows that the civil engineers have the least agreement (3.978) on the duties and obligations of the contractor.

The results the duties and obligations of the client shows that majority of the respondents strongly agree on the duties and obligations of the client with the highest agreement for 'Require the tenderer to make a provision for the cost of occupational safety and health measures during the construction process (4.485). The lowest score is 'to provide relevant occupational safety and health information related to the project including drawings of existing structure or services' and to request the designer to take occupational safety and health in consideration when designing the project with 4.227. Based on the results it shows that the civil engineers have the least agreement (4.000) on the duties and obligations of the client.

Based on the findings, we gained positive results or positive attitude towards the duties and obligations of these three main stakeholders. There are at least three possible explanation for the positive results gain on the attitudes of the stakeholders towards the duties and obligation of the designers, contractors and clients; increased vigilance and awareness about health and safety, the respondents did not take the questionnaire seriously and measurement error. The increased of awareness may due to the government initiatives in promoting health and safety towards construction workers. On the other hand, the results may also affected by respondents whom did not take the questionnaire seriously due to time consuming and less consciousness on safety and health. Surveys involving samples are subjected to measurement error such as bias and unreliability that are difficult to quantify.

However, this does not diminish the importance of design safety and the awareness on the duties and obligation of these stakeholders in terms of safety and health of the construction workers. When analyzed closely on the results, we found that the civil engineers; although gained positive result but among all the stakeholders has the least agreement on the duties and obligation for the three main stakeholders. This shows their attitude in adapting a new culture where it might interfere with their current norm is the lowest.

The stakeholders strongly agreed with considering safety and health modifications and best usage in order to protect the workers safety and health but least agreement on applying it in the design review process. This shows that, although, they are aware on their influences to the workers but still unable to fully commit to perform the concept, especially when it comes to applying it during the design phase. Furthermore, the stakeholder's least agreement for the client is to provide relevant information and to request the designer to take occupational safety and health in consideration when designing the project. These shows that the true mindset of the stakeholders where although, they strongly agreed with part of the concept, however, they might not agree on the implementation during the design stages.

CONCLUSION

Improvement in design safety awareness in Malaysia is important despite the positive results gained from this research.

SUGGESTIONS

Therefore, the following suggestions for the future direction of implementing design safety in Malaysia and possibly other countries are put forward.

Holistic approaches to improve or upgrade of designer's curricula in the universities. This can be done by the accreditation board to make it a requirement to adapt safety design into the existing course and gradually improve as a primary subject to the undergraduate designers.

Effective training programmes on design safety should be regular and lifelong. This can be done by making it a requirement by Professional Bodies to attend the trainings or seminars in order to register or renew their professional license.

It may be a good idea to include the awareness of designers, contractors, clients and other stakeholders on on each of their duties and obligations in terms of safety and health of the construction workers in training programmes.

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