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Investigation on the Compliance of Occupational Safety and Health (OSH) Legislations among Contractors and Potential Interventions to Improve Construction Safety Performance

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Abstract: The Malaysian construction industry contributes more than one-third of fatalities out of all industries and further proves that safety performance in the construction industry lags behind most other industries. One of the causes is due to the lack integration of technological system and people in safety and health (OSH). This study suggests that one of the ways to avoid accidents at construction site is through an effective OSH management planning tool, with proper management of the interaction between technological systems and people. As an initial step towards the development of the tool, this study aims to investigate the contractors' compliance with OSH legislation in the Malaysian construction industry. It also attains construction stakeholder's perceptions of the current situation and intervention to improve OSH performance in the construction industry by providing information or creating a system that can provide information according to the acts and regulations. The information was collected through interviewing selected respondents from several organizations and enforcers in construction industry. The results revealed that the majority of construction organizations followed the OSH requirements, though they did not comprehensively follow them. Lack of knowledge about OSH was also acknowledged by the organizations, even though they were aware about the OSH requirements. The findings also revealed that there is no available tool that can provide information about legislation on OSH requirements which can facilitate the construction teams effectively and lead to prevent an accident happens at the construction site. Therefore, it is essential to improve the safety performances including provide the guidelines of the OSH according to the acts and requirements and enhancing the management in improving the safety at construction sites.

Keywords: Construction, accidents, contractors, OSH requirements, safety performance, planning tool

1. Introduction

The construction industry has unique characteristics compared with other economic sectors and is also known as the most dangerous industry. The construction industry is a dangerous industry due to the high incidence of accidents and fatalities (Ganesh et al., 2016, Abas et al, 2021). The rapid economic growth has not only caused Malaysia to see significant growth in the industry but also an increase in the number of deaths and injuries at work. Some precautions and programs have been implemented in reducing accidents at the construction site, but the accident rates continue to rise every year.

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In Malaysia, it is reported by the DOSH that one of the causes of the increased number of accidents on construction sites is due to the lack of compliance of the safety provided by the OSHA legislation of many parties, particularly employers in meeting OSH provisions to ensure the safety, health, and welfare of the workers. The statistic reports of accidents and injuries of a worker at a construction site showed increments every year compared to other industry sectors [DOSH, 2019]. Based on Forensic Unit, Department of Occupational Safety and Health reported that the national occupational accident rate per 1000 workers reduce from 3.10 in 2014 to 2.18 in 2020, but the occupational fatality rate per 100,000 workers is increased from 4.21 in 2014 to 4.90 in 2017 and in 2020 it decreased to 2.09. In the construction industry specifically, the fatality rates per 100,000 workers showed an increment at almost 106 % from 7.26 in 2014 to 14.94 in 2017 [DOSH, 2017]. However, it is to be noted that the figures only cover the cases reported to the DOSH. Therefore, it is the responsibility of all parties involved in the construction industry, especially employers, o overcome the accident happen especially at the construction site and provide safety prevention in the workplace.

Realizing the importance of protecting workers from occupational accidents and injury, the Government of Malaysia has introduced the necessary legislation related to the industry, which is to be complied with by the parties involved in the workplace (including employers and employees). In Malaysia, the main legislations covering health and safety in the workplace are the Occupational Safety and Health Act (OSHA) 1994, Building Operations and Works of Engineering Construction (BOWEC) and Factory and Machinery Act (FMA) 1967. The introduction of the comprehensive legislation was in response to the need to cover a more diverse employee base and newer hazards to be introduced in the workplace for the safety of the workers [Abas, 2017].

Occupational Safety and Health Act 1994 (Act 514) is the legislation enforced by the Department of Occupational Safety and Health (DOSH) which is a legislative framework in the Malaysia construction industry to ensure the safety, health, and welfare of persons who are at work and to protect other people against safety risk or health in connection with the activities of persons at work [Abas, 2015]. Other than that, Construction Industry Development Board (CIDB), Act 520 provides the functions relating to the construction industry and for matters connected. It also stated that CIDB is to regulate the implementation for quality and safe construction works, enhancing construction quality through registration of construction personnel as well as skills and competency certification. Moreover, Act 520 also helps to ensure that the contractors' and site managers' responsibility to ensure the safety of buildings during or after the construction work [CIDB, 2016]. Other than that, the Factory and Machinery Act 1967 (Act 139) is to provide for the control of factories for matters relating to safety, health, and welfare of persons therein, the registration and inspection of machinery, and for matters connected therewith. These legislations need to be complied with by the employers at the workplace. On the construction site, the contractor is the most responsible party in ensuring the safety, health, and welfare of the workers. One of the ways the contractor can do to address this is through effective occupational safety and health (OSH) planning at the construction site and necessary administrative arrangements before the commencement of construction activity. Contractors need to comply with safety and health requirements stipulated in OSHA 1994 and FMA 1967 to minimize the accident that happens on the construction worksite [Abas et. al, 2017].

However, even though several construction companies have prioritized OSH requirements for their construction projects (Fernandez-Muniz et. al, 2007), it is believed that the awareness of contractors on OSH management is still lacking (Dorjil et. al, 2006), as well as their compliance to the OSH legislation. This study intends to investigate the contractors' compliance with OSH legislation in the Malaysian construction industry and to obtain construction stakeholder perceptions of the current situation and intervention to improve OSH performance in the construction industry.

2. OSH Legislation Requirement at Construction Site

2.1 Legislation related to Occupational Safety and Health (OSH)

In Malaysia, the legislations that covering safety and health in the workplace is the Occupational Safety and Health Act (OSHA) 1994 and Factory and Machinery Act (FMA) 1967. The Department of Occupational Safety and Health (DOSH) is the main government department in charge for enforcement of both acts. Malaysia adopted a self-regulation approach in regulating Occupational Safety and Health (OSH) in the workplace especially in construction site. This means that employers and employees should be responsible to ensure the safety of their own workplace. However, the Occupational Safety and Health Act (OSHA 1994) which provides the legal framework for OSH regulations places a huge responsibility on the employer to provide a safe and healthy workplace for all employees. The following sections describe the legislation in detail. The intention of these legislations is to avoid accidents and ensure that the workplace is a safe and healthy environment. Therefore, OHS in construction needs a significant and expedient overhaul of its current site safety practices, as it is a legal requirement mandated by Malaysia's government to ensure safety and health within the industry.

2.2 Occupational Safety and Health Act (OSHA) 1994

The Occupational Safety and Health Act (OSHA) 1994 are enforced by the Department of Occupational Safety and Health (DOSH). The principle of the act is to make further provision for securing the safety, health and welfare of persons at work, for protecting others against risks to safety or health in connection with the activities of persons at work, to establish the National Council for Occupational Safety and Health and for matters connected therewith. This Act was created from the philosophy of the Robben's Commission and Health and the UK Safety at Work Act 1974. Prior to 1994, the legislation (such as FMA 1967) was prescriptive, thus the Robben's style 'general duties' approach 15 legislation in 1994 was introduced in response to the need to cover newer hazards in the workplace due to a wider employee base.

According to Abas (2015), 'The duties of the employer include the provision of: a safe system of work; training; maintenance of the work environment; and arrangement of works for minimizing risks to a level as low as is reasonably practicable. Meanwhile, the duties of the designer or manufacturer are to ensure the plant and substance they design, manufacture, import or supply are safe and without risk to health, maintaining risk levels that are as low as is practicable. However, the duties of the designer prescribed in this Act are general and do not specifically address the designers of buildings/structures. The duties of employees include ensuring the safety and health of themselves and other persons who may be affected by their acts or faults at work. Therefore, it can be said that the Act empowers the participation of all person in OHS, where the responsibility of OHS is made to rest on those who create the risks (employers and designers or manufacturers) and those who work with the risk (employees).

Furthermore, the concerted efforts are required to improve the safety performance of the construction industry in Malaysia. One of the ways to do this is to instill the awareness of OSH requirements relevance to the legislations, to the employers of the workplace (i.e. the contractors). This will further ensure effective management planning, which will then avoid unwanted incident at the workplace (Abas et. al, 2017). The next section provides overview of the OSH requirements for construction project, relevance to the OSHA 1994 and its regulations and FMA 1967 and its regulations.

2.3 Factories and Machinery Act (FMA) 1967

The Factory and Machinery Act (FMA) was enacted in 1967. Enforcement of the Act's provisions for managing safety and health problems associated with manufacturing industries was the responsibility of the Factories and Machinery Department. (The Factories and Machinery Department was formerly known as Machinery Department. It is now known as the Department of Occupational Safety and Health, or DOSH, to reflect changes in its responsibilities under the Ministry of Human Resources.) The objective of the Act is to regulate the control of factories with respect to matters relating to the safety, health and welfare of its employees, an improvement over earlier legislation. In 1970, a number of regulations were introduced to further strengthen this Act. This includes the Building Operations and Works of Engineering Construction (BOWEC), a piece of legislation addressing specific safety and health issues in the construction industry. BOWEC was introduced in 1986. The limitations of FMA include: i) it only encompasses 'factories', ii) it was prescriptive in nature, the ways to overcome the identified hazards were stipulated and in a command form, and iii) the risk control approaches relied heavily on the effectiveness of enforcement. Nevertheless, the FMA 1967 (and its regulations) was the cornerstone for OHS improvement before the introduction of the Occupational Safety and Health Act 1994.

2.4 Building Operation of Work Engineering and Construction (BOWEC) 1986

BOWEC regulation was gazette by the Malaysian Parliament on 1 October 1986 and is implemented under section 56, sub-section 1 of the Factories and Machinery Act 1967. This safety legislation has been enacted in order to provide a more comprehensive legal framework for the prevention of accidents, particularly on building and construction sites. This legislation is divided into 17 parts and was gazette for the purpose of providing a guideline to execute operations of building or engineering works safely. This legislation includes a very comprehensive list of safety measures for building operations and engineering work in the construction industry.

The regulation to ensure the safety, health and welfare of workers and to secure other people against hazards or health issues at work. It is also the regulation relating to the matters of the registration and inspection of machinery, and for matters related therewith. These legislations need to be complied with by the employers at the workplace. The contractor is the person in charge to make sure the safety, health, and welfare of the employees. An effective occupational safety and health (OSH) planning at the construction site is one of the ways that the contractor can do. Besides that, the contractor shall also prepare the essential administrative provisions before the beginning of construction.

3. Methodology

This study employed an interview approach to attain the information required. There are two different interviews were conducted, which involved different participants and questions for each interview, in regards to achieving the

aims of the study. Interviews are conducted face-to-face with agreed respondents and take approximately 30 to 60 minutes for each respondent.

In order to investigate the contractors' compliance with OSH legislation, the interviews were conducted with 5 contractors Grade 7 who were involved in building construction projects. The respondents were selected among those who were responsible for managing safety and health at construction sites. The backgrounds of the respondents are as follows:

Table 1 - Background of the respondents (Construction Company)

Participant's ID	Interviewee's ID	Position	Years of Experience
Company A	A	Safety and Health Manager	8
Company B	B	Safety and Health Officer	7
Company C	C	Safety and Health Officer	9
Company D	D	Safety and Health Officer	14
Company E	E	Safety and Health Officer	10

During the interview, the following questions were asked to the respective respondents about safety and health at the construction site;

i) Question 1: Do you implement OSH management at your construction site?
ii) Question 2: Do your management team comply with OSHA 1994 and FMA 1967 in managing the safety and health at the site?
iii) Question 3: Which source do you get the OSH legislations i.e. Act, Regulations, Guidelines, etc?
iv) Question 4: Do you have any standard guidelines or checklists in implementing OSH management at the construction site?

Meanwhile, to obtained information about the construction stakeholder's perceptions of the potential intervention of safety management issues dan ways to improve OSH performance in the construction industry were done also using interview approaches with selected respondents as indicates in Table 2.

Table 2 - Background of the respondents (Government Agencies)

Interviewee's ID	Position	Years of Experience
F	Enforcement Officer (DOSH)	9
G	Enforcement Officer (CIDB)	12

The respondents were asked about the current situation regarding OSH management in the industry. For each question, they were required to state their agreement or disagreement with the statement and elaborate on their answer. The questions for the interview were as follows:

i) Question 1: The construction industry contributes to the highest frequency of incidents and accidents due to a lack of knowledge in OSH management among construction stakeholders, such as clients, consultants, contractors, etc' Do you agree?
ii) Question 2: There is no technology or any software to facilitate all parties involved in building construction projects regarding legislations requirement in construction stages. Do you agree?
iii) Question 3: SHASSIC (Safety & Health Assessment System in Construction) tool which is developed by the Construction Industry Development Board (CIDB) covers 3 main components of assessment namely Document Check, Site and Workplace Inspection, and Personnel's Interview. What is your opinion on the tool?

4. Results and Discussion

4.1 Interview with Respondents (Construction Companies)

With regards to Question 1 which was whether the selected contractors implemented OSH management at their construction sites, all respondents were complying and implementing the OSH management at their workplace. Interviewee A stated that their company always complied and implemented the OSH management at the construction site and monitor the implementation from the early stage of the construction process. Interviewee E mentioned that their company also implemented OSH management from the construction stage until commissioning. However, according to Interviewee B, their company only partially complied and implemented OSH management. None of the interviewees explained the extent of the compliance and implementation of OSH management.

When being asked about Question 2 whether their management complied with OSHA 1994 and FMA 1967 in managing the safety and health at the site. Most of the respondents agreed that they have complied with the required

legislation imposed on them, however, they failed to explain in detail the Acts. In specific, for interviewee A, they only practicing the basic safety procedures and the company did not follow the OSHA 1994 and FMA 1967 in implementing the OSH requirements at their construction site. Meanwhile, interviewees B and C, answered their company were knowing and was aware of the guidelines of the OSH management based on the OSHA 1994 and FMA 1967 however, their company did not fully follow the guidelines in their safety practices at the construction sites. Whereas, for interviewee D, which respond to the SHASSIC requirement, their company did carry out SHASSIC but they did not know the main purposes of SHASSIC relating to their job scopes. Finally, interviewee E explained that their company did not follow OSHA 1994 and FMA 1967 on their construction site at all.

As for Question 3, it was about the sources of OSH legislation i.e. Act, Regulations, Guidelines, etc. From the interview, it was revealed that interviewee A got the resources of OSH legislation from the DOSH department and CIDB while interviewees B and C got the resources from the DOSH and CIDB websites. On the other hand, interviewees D and E had the resources from DOSH and the person in charge of the CIDB.

Finally, for Question 4, all interviewees were asked whether they had any standard guidelines or checklists in implementing OSH management at the construction site. Interviewee A stated that their company had the guidelines and checklist based on OHSAS 18001:2007. Meanwhile, Interviewee B stated that their company had a checklist of safety management in their construction site that was taken from the previously experienced checklist, whereas Interviewees C and D mentioned that their company only applied a general checklist which had the basic requirement of the occupational safety and health. Meanwhile, Interviewee E stated that his company only had the checklist that was based on the Public Works Department guidelines.

Based on the result of the interview, it was found that all respondents did not have a specific guideline or checklist in implementing the safety and health to achieve effective OSH management and planning at the construction site. Most of the respondents stated the safety precautions were general and stated in the project tender document. It was depending on the requirement of the project and a briefing session related to safety and health was carried out before the construction work starts. From the interviews, interviewees were had known only the basic procedures and did not know the main purposes of implementing the OSHA 1994 and FMA 1967 in their construction sites. They also knew that they were compulsory to implement the Acts but were unable to do it due to the lack of guidelines and information about the Acts.

4.2 Interview with Respondents (Government Agencies)

Regarding Question 1 which related to the statement of the highest frequency of incidents and accidents in the construction industry due to lack of knowledge in OSH management among construction stakeholders. The findings from the interviews show interviewee F stated that they did not agree with the statement. They pointed out that the DOSH statistics of incidents and accidents from the construction industry might have the highest fatality rate, but the highest statistics of incidents and accidents had come from other sectors for instance from the manufacturing industry. The available report showed that the manufacturing industry was contributing to the most statistics of incidents and accidents at the site. However, interviewee G did not deny that one of the significant factors of the accident was due to the lack of knowledge in OSH management.

For Question 2, interviewee F was asked about the absence of technology or software to facilitate all parties involved in building construction projects concerning the legislation, regulation, or act requirement in the design stage, construction stage, and commissioning stage. Interviewee F had informed that there was a perimeter scaffold technology to provide safe working platform for working at height. This equipment was focusing on the high-rise building, especially for the scaffolding erection. Besides, for software technology, BIM (Building Information Modeling) was implemented during construction, but only for certain and big projects. The BIM obviously could identify and clarifies the hazard and the location of the danger area based on the 3 Dimension (3D) drawing, but not relating to the regulations and legislation required for each activity. The BIM software was only focusing on technical issues and specification of drawing by 3 dimensions and not helping OSH practitioners to comply with the required regulations in the construction. Moreover, DOSH Officer mentioned that currently there was still no available software in the industry focusing on legislation compliance with the activity in the construction. Only the safety and health officer and engineer could identify and clarify the legislation required for any activities in the construction.

For Question 3, the interviewee G was being asked about the SHASSIC (Safety & Health Assessment System in Construction) developed by the CIDB. The interviewee pointed out that the SHASSIC assessment could only be conducted when the project had reached within 25% to 75% physical progress and was not fully related to legislation, regulation, and act requirement, and did not cover from the early of the construction stage. Therefore, the interviewee G agreed and mentioned that to reduce the hazard, the prevention of the accidents shall start from the planning stage before the construction took place. In Malaysia, the enforcement and the site assessment from DOSH and CIDB only focusing on the construction stage only therefore it is hard to identify and clarify the hazard from the early stage and failed to reduce the rate of accidents at site. DOSH Officer had suggested using Construction Design and Management (CDM) regulations in the Malaysian scenario because CDM was a good medium to reduce the rate of fatalities in construction that had been used in the United Kingdom and had proven effective in reducing the number of construction accidents in the United Kingdom.

Based on the interview with the respondent from CIDB and DOSH, both interviewees have the same agreement that the development of the system to facilitate OSH requirements for building construction projects was essential and required to improve the safety and health performance in the Malaysian construction industry. The reason for this is although CIDB has introduced a tool known as SHASSIC, which was used to evaluate the safety performance of construction projects by setting safety and health management requirements for all construction work activities by contractors (16), however, the functions of SHASSIC are still limited. In addition, SHASSIC had provided a valuable checklist for safety and health in compliance with the contractors, but the checklist was not comprehensive enough which only cover three (3) aspects namely document check, site or workplace inspection, and employee interview. Based on this, this study suggests that it is important to attain the stakeholder's opinions, particularly from the government enforcement body related to construction safety, before developing the proposed system that can cover the regulations and legislation aspects. The developed system will overcome this problem by developing a system that can be used by contractors or other parties to effectively manage or plan the OSH requirements for their project, which comply with the related OSH legislation.

5. Conclusion

It can be concluded from this study that most of the contractors involved in building construction only met the general execution of safety and health and did not organize any course to ensure the safety of the workers as from the interviews the interviewees did not mention that their company giving the employees course about safety. It was also found that the contractors had no proper guidelines in execution safety and health in a construction site and not comprehensively implemented OSH requirements as stipulated in the legislation. Therefore, this study is proposed to develop a system that can produce a checklist of OSH requirements based on the project information undertaken which can improve the quality and safety of workers while helping to facilitate the implementation of safety and health at the construction site. Effective safety could only be achieved when there was proper management of the interaction between technological systems and people [15]. For the next future study, the application of proposed system tools will be evaluated to assess the system tool's effectiveness in complying with the legislation, regulation, and act according to OSH requirements in the construction industry. In this way, it may help to reduce the number of accidents that happened at the construction sites.

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References

Abas, N. H., Adman, N. & Deraman, R. (2017). Development of Occupational Safety and Health Requirement Management System (OSHREMS) Software Using Adobe Dreamweaver CS5 for Building Construction Project, MATEC Web of Conferences, 103, 03011.

Abas, N. H., Blismas, N. & Lingard, H. (2021). Development of risk assessment tool using damaging energy and argumentation theory for evaluating construction occupational safety and health risks, *Engineering, Construction and Architectural Management, 28*(10), pp. 2967-2993.

Abas, N.H (2015). *Development of a Knowledge-Based Energy Damage Model for Evaluating Industrialized Building System (IBS) Occupational Health and Safety (OSH) Risk*. RMIT University: PhD Thesis.

Asari, K. S., Leman, A. M. & Hamid, S. (2018). Site Safety and Health Compliances Assessment Using SHASSIC method, *Advanced Science Letters, 24*(6), pp. 4106-4109.

CIDB (2016). Construction Industry Standard (CIS) 10:2008 Safety and Health Assessment System in Construction, Malaysia: Construction Industry Development Board (CIDB).

Dorjil, K. & Hadikusumo, b. H. W. 92006). Safety Management Practices in the Bhutanese Construction Industry, Journal of Construction in Developing Countries, 11(2), pp. 53-75.

DOSH (2017). Accident Statistics, Department of Occupational Safety and Health, (2017), Retrieved on October 17, 2017 from http://www.dosh.gov.my

DOSH (2019). Accident Statistics, Department of Occupational Safety and Health, (2019), Retrieved on March 20, 2020 from http://www.dosh.gov.my

Fernandez-Muniz, B., Montes-Peon, J. M. & Vasquez-Ordas, C. J. (2007). Safety management system: Development and validation of a multidimensional scale, Journal of LossPrevention in the Process Industries, 20(1), pp. 52-68.

Ganesh, C.S. & Krishnan, R. (2016). Review of Occupational Injury Research in Malaysia, *Med J Malaysia ,71*(1), pp. 100-104.

Mohd Kamar, I. F., Lop, N. S., Mat Salleh, N., Mamter, S. & Suhaimi, H. A. (2014). Contractor's Awareness on Occupational Safety and Health (OSH) Management Systems in Construction Industry, *E3S Web of Conferences, 3*, 01019.

Vijayan, V. & Riyana M. S. (2018). A Study about the Status of Implementation on Safety Standards and Legal Requirements Pertaining to Construction Safety, *Journal of Emerging Technologies and Innovative Research*, 5(4), pp. 1-4.