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## Integration of Occupational Safety and Health during Pre-construction Stage in Malaysia

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### Abstract

Unsatisfactory Occupational Safety & Health (OSH) in the construction industry has turned out to be an issue as it contributes to numbers of incidents and fatality to the construction players and public. Previous research suggested that early introduction of safety & health elements within the project implementation contributed towards minimising this issue. Hence, the objective of this paper is to identify the occupational safety & health elements during pre-construction. This paper is an initial study with the hope the finding will lead its way to the output of occupational safety & health indicators for pre-construction in Malaysia.

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*Keywords:* Compliance; Occupational Safety & Health element; pre-construction indicator and risk

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### 1. Introduction

The subject matter of this paper is the Occupational Safety & Health (OSH) implementation during Pre-construction stage. Both in construction and other industries, the consideration of safety and health requirements since the early stages has been widely recognized as a beneficial approach for OSH

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management, since it is an effective way of either eliminating or reducing hazards at their sources (DOSH, 2008). The objectives of this research are to identify the occupational safety & health elements during pre-construction stage. This research will be focusing on the OSH practices in Malaysian construction industry and will be focusing on the preconstruction. The reason is to show the gaps that should be filled in by the OSH in order to catch up with the current developments that have been happening in other countries. It is important to note that this paper only provide a literature search for this topic. The methodology used was synthesizing literatures from relevant sources.

### *1.1 Occupational Safety & Health Issue in Construction*

Nowadays, one of the most pressing concerns for this construction industry is the occupational safety & health which is an increase in the accidents and health problem (Solicitors, 2010). Unsatisfactory Occupational Safety & Health (OSH) in the construction industry has turned out to be an issue as it is the most hazardous industry with complex processes that contribute to numbers of incidents and fatality to the construction players and public. OSH issues are most important to the project process as it is influence the quality of work and time. OSH issues are not limited to the construction stage of a construction project management but also arise throughout a project's life (Haywood, 2004). Since accidents has emerged as the most serious OSH issues of this time therefore, it is vital important for Malaysian construction industry to further implement the OSH which eliminates the negative impact on the construction industry. Based from Table 1, eight (8) out of twenty-five (25) fatality cases were reported to Department of Occupational Safety & Health Malaysia from January 2011 until July 2011 were in Construction Industry (CIDB, 2009; DOSH, 2011). Thus, construction industry has the higher score which are 32 percent mostly because of no safe work procedure or other describe it management control (CIDB, 2009; DOSH, 2011; HSE, 2003).

Table 1. Number of recorded accidents in Malaysia Jan-July 2011. Source: DOSH, 2011.

No.	Classification of Accident	Date	Industry	Reason
1.	Pinched	31-07-2011	Workshop	No Safe Work Procedure Not competent
2.	Crushed by falling object	28-07-2011	Construction	No Safe Work Procedure
3.	Fall from height	04-07-2011	Office	No monitoring
4.	Fall	02-06-2011	Construction	Crane not well maintain & no inspection
5.	Rolled over by object	31-05-2011	Factory	No Safe Work Procedure
6.	Crushed by object	23-05-2011	Construction	No Safe Work Procedure
7.	Buried alive	17-04-2011	Estate	No Safe Work Procedure
8.	Suffocation	17-04-2011	Services	No Safe Work Procedure
9.	Crushed by object	14-04-2011	Logging	No Safe Work Procedure
10.	Fall from height	09-04-2011	Construction	No Safe Work Procedure
11.	Fall from height	05-04-2011	Construction	No Safe Work Procedure
12.	Crushed by object	29-03-2011	Estate	No Safe Work Procedure
13.	Rolled over by object	26-03-2011	Estate	No Safe Work Procedure
14.	Wegged	25-03-2011	Factory	No Safe Work Procedure
15.	Struck by object	16-03-2011	Factory	No Safe Work Procedure
16.	Fall	09-03-2011	Service	No Safe Work Procedure
17.	Hit by object	01-03-2011	Estate	No Safe Work Procedure
18.	Fall from height	24-02-2011	Construction	No Safe Work Procedure
19.	Hit by object	14-02-2011	Logging	No Safe Work Procedure
20.	Drowning	13-02-2011	Mining	No Safe Work Procedure
21.	Fall from height	12-02-2011	Construction	No Safe Work Procedure
22.	Hit by object	27-01-2011	Estate	No Safe Work Procedure
23.	Fall from height	12-01-2011	Factory	No Safe Work Procedure
24.	Fell and buried alive	03-01-2011	Construction	No Safe Work Procedure
25.	Fell into machine	02-01-2011	Factory	No Safe Work Procedure

The increasing of accidents and OSH issue in the construction industry, the government introduced “Master Plan for Occupational Safety and Health in Construction Industry”(CIDB, 2009). Based on CIDB, (2009), the successful implementations of the Master Plan is depended on the stakeholders’ incorporation of its guidelines and objectives into their business operations also use it as part of forward planning document within their organizations. Previous researcher explain that the cause of accident is divided into three which are Design, Planning, & Construction (Sulaiman & Mahyuddin, 2005). Hence, the integration of OSH during pre-construction stage is essential.

## 1.2 OSH during Pre-construction

### 1.2.1. The Pre-construction

Based from Fig.1, Construction Project management is divided into 3 sections, Pre-construction, Construction & Post-construction(K.S., 2002; Tregenza, 2004). Pre-construction stage is the initial stage for a Construction Project Management, which covers Inception & Feasibility, Design, and Tendering (K.S., 2002). It is commence with “Inception & Feasibility”. This stage was more on the client’s requirement and being describe as pre-project planning (Hendrickson & Au, 2000). It encompass the project objectives, land matter, feasibility study and setting up project organisation structure. “Design” fall after Inception & Feasibility which contain project brief, conceptual & schematic design development, planning approval, detailing design, cost budget preparation, and value of engineering (Hendrickson & Au, 2000). The goal during this phase is to acquire a complete and accurate understanding of project requirements. The last stage in Pre-construction is “tendering”. During this stage, the tender document being an issue and then being evaluate to choose potential contractor (College, 2011).

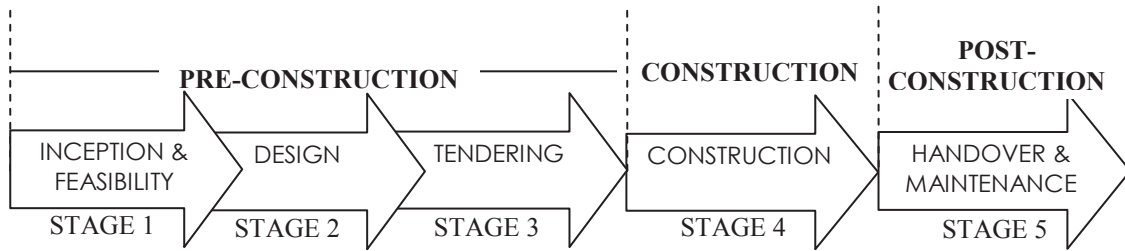


Fig 1. Construction Project Management. Source: K.S., 2002.

The preconstruction process is cooperating by several construction personal plays their roles in difference stages. Table 2 shows the person involves in all 3 stages during pre-construction are architect, engineer, quantity surveyor, and town planner were involved in both 3 stages (K.S., 2002). The person who is responsible and involve for the whole construction project management is developer or better known as the client (Hung, 2006).

Table 2. Personal involve during pre construction

No.	Person Involved	Inception & Feasibility	Design	Tendering
1	Developer/ Owner	Y	Y	Y
2	Valuer	Y		
3	Research Firm	Y		
4	Real Estate Agent	Y		
5	Financial Advisor	Y		
6	Architect	Y	Y	Y
7	Engineer	Y	Y	Y
8	Quantity Surveyor	Y	Y	Y
9	Town Planner	Y	Y	Y
10	Other Specialist	Y	Y	Y
11	Project Manager		Y	Y
12	Regulatory Bodies/ Authorities		Y	
13	Contractor		Y	Y

### 1.3. OSH Elements during Pre-construction

Accident in the construction industry was extremely higher than other industry. CIDB (2009), mention the principal reasons for the occurrence have not been analysed and studied. Pre-construction stage is the beginning stage for a Construction Project Management. It is widely recognized that effective planning can play a major role in the success of projects. Waly & Thabet (2002), in their research on Construction Environment for preconstruction planning suggested that macroplanning is vital importance to successful delivery and execution of a project. Decisions make at macrolevel is standing for major decision making.

Therefore, a study done by Sulaiman & Mahyuddin (2005), explain that Design & Planning are the “upstream” activities while, “downstream” is construction. They also mention that Government should concern about OSH on “upstream” rather “downstream” activities.

Health and safety issues are not confined to the construction phase of a project but occur throughout a project or facility’s life. Many of the common health and safety problems encountered during construction and operation could be avoided if due consideration and effort were invested during the project brief and design phases (Haywood, 2004). Clients are demanding that the industry improves the delivery of projects, particularly the management of design and that it should learn from the best in construction practice.

Hare *et.al*, (2006) done a research on exploring the integration of health and safety with pre-construction planning suggest to future researcher to develop the critical events and integrate the factors show previously with the overall model for construction project management, which also mention by (Saurin & Feroso, n.d). Thus, in order to gain success, the integration of OSH during pre-construction stage should be considered.

#### 1.3.1. Inception & Feasibility Stage

Many of the common health and safety problems encountered during construction and operation could be avoided if due consideration and effort were invested during the project brief and design phase (Haywood, 2004). As in Section 15 in OSHA (1994) mention, employer is accountable to his employees’

safety & health. Employer also has a responsibility for the visitor or public as state in Section 17 (OSHA, 1994). Client should concern on including OSH during objective identification and project brief. Project owners or client can positively influence project safety & health performances since they are the one who contribute funding for the project (Huang & Hinze, 2006; Sulaiman & Mahyuddin, 2005). As it is management responsible to change the attitude of Safety & Health of their employee (Thye, 2006).

### 1.3.2. *Design*

According to Flemming (2006), half of the occupational safety and health issue arises from inadequate design. This may be cause by the design professionals that distance themselves from responsibility due to the lack of safety education and training, lack of safety design tools and their attempt to limit their liability exposure (Gambatese, 1996). Hence, considering safety & health in the design stage are taken into accord. The industry are now realizing in coping with the safety & health issue, it is important to start at the top of the construction pyramid first rather than only educating the bottom tier of erectors and laborers. Hung, (2006); “The need for changes in attitude does not stop at educating erectors to work more safely. It has to go back to the architect and engineer who should not only ask themselves if it can be built, but can it be built safely. Therefore, it is clear that in creating a safer construction industry, the health and safety factors has to be included into the design, by doing so it will create a ripple effect disseminating the safety and health throughout the industry players.

Consequently, the US construction industry was introducing a very important fundamental concept of prevention through design (PtD). Prevention through design stands on the significance of design out the safety and health hazards rather than protecting the workers or warning them from hazards (Gambatese, 2000). Therefore, safety in design is supposedly to be pre thought as opposed to being an afterthought.

### 1.3.3. *Tendering*

When talking about the element of safety and health, it leads to being legal and moral responsibility (Huang & Hinze, 2003). Therefore, parties that were involved with the tendering out of contractors have to play their parts in embracing safety and health. Starting from the client, it is their optimal responsibility in insisting on the safe performance of the construction’s contractors in making their selection. Looking at the traditional procurement, it only focuses on tender cost, hence restricting the contractors to work in a more efficient manner (Flemming, 2006).

In selecting a procurement method in tendering, it is best to include the element of best value. It enables contractors to look into the construction project holistically. During the tendering phase, contractors have to be chosen not only based on its ability to produce a lower tender cost, but other criteria’s such as; contractors ability in predictive of safe project performance, equally applicable to different construction firms and its objectives (Levitt, 1981). By doing so, it will not only reduce the safety & health hazards, but it also will increase the productivity level of the contractors.

The contract was suppose to put out to tender, and potential principal contractors were required to present their preferred solutions to the clients, Project Engineers and Safety Manager. Selection of the Principal contractor was based on the most cost-effective solution to control the health, safety and food quality risks.

## 2. Methodology

Literature review was selected as the method to determine the element of OSH during pre-construction. As one of the reasons for conducting it is exploratory (Creswell, 2003). Stebbin (2001), cited that conducting exploration allow the researcher to familiarised with something by studying, examining, analyzing or investigate on the matters. Therefore, effort will be put into in ensuring adequate information regarding the subject. Comprehensive literature reviews also help in providing knowledge and information that could further apply to the research.

## 3. Discussion & Conclusion

Extensive review of the literature from journal articles and proceeding had been conducted to identify the OSH element during pre-construction stage. Table 3 shows on OSH element point out by previous researcher. Both of the elements, the “designer safety education & training” and the “contractor safety & health performance” were mention by more than one author. The others are OSH in the project brief & objective and preventive through design. The result of this objective proves that there still have a few ‘gap’ for the construction industry in Malaysia. Currently, there are no specific legal obligations imposed on clients, designers, and other “upstream stage” personal to ensure the construction project in Malaysia to run safely & healthy. By bringing the “upstream stage” players and constructor together, it enables problem pertaining safety and health to be solved at early stage as opposed to the traditional project management methods. This paper is an initial study with the hope that the finding will lead its way to the output of occupational safety & health indicators to be addressed for pre-construction in Malaysia. The researcher will prolong this research with other method.

Table 3. OSH elements in pre-construction.

<i>Author</i>	<i>OSH Element</i>			
	OSH in project brief & objective	Designer safety education and training	Prevention through Design (PtD)	Contractor Safety & Health performance
Flemming, 2006				/
Gambatese, 1996		/		
Gambatese, 2000			/	
Haywood, 2004	/			
Huang, 2003		/		
Levit, 1981				/

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## References

- CIDB. (2009). *Occupational Safety & Health Master Plan for Malaysia 2015*. Kuala Lumpur: Construction Industry Development Board.
- College, I. (2011). Capital Project & Planning. Retrieved 4/08/2011, 2011, from <http://www3.imperial.ac.uk/capitalprojects/projectprocedures/stages/tender>
- Creswell, J. W. (2003). *Research Design; Qualitative, Quantitative and Mixed Methods Approaches* (2<sup>nd</sup> Edition ed.). United States of America: Sage Publication.
- DOSH. (2008). *Guideline for Hazard Identification, Risk Assessment, & Risk Control*.
- DOSH. (2011). *Summary of Accident Cases in Malaysia*. Retrieved 13/08/2011, 2011, from [http://www.dosh.gov.my/doshV2/index.php?option=com\\_wrapper&view=wrapper&Itemid=142&lang=en](http://www.dosh.gov.my/doshV2/index.php?option=com_wrapper&view=wrapper&Itemid=142&lang=en)
- Gambatese, J. A. (1996). *Addressing Construction Worker Safety In The Project Design*. University of Washington, Seattle.
- Gambatese, J. A. (2000, February 20-22, 2000). *Owner involvement in construction site safety*. Paper presented at the Proceedings Of Construction Congress VI, Orlando, Florida.
- Haywood, G. (2004). *Achieving excellence in construction procurement. Actions to Improve Safety & Health in Construction*.
- Hendrickson, C., & Au, T. (2000). *Project Management for Construction, Fundamental Concepts for Owners, Engineers, Architects and Builders*
- HSE (Producer). (2003, 03 August 2011) *Biggest Single Cause of Construction Accidents is Simply Getting to the 'Workface'*. retrieved from <http://www.hse.gov.uk/press/2003/e03208.htm>
- Huang, X., & Hinze, J. (2003). *The owner's role in construction safety*. University of Florida.
- Huang, X., & Hinze, J. (2006). *Owner's Role in Construction Safety*. *Journal of Construction Engineering and Management*.
- Hung, M. Y. (2006). *Client's Contributions To Project Safety Performance: A Comparison Between Public and Private Construction Projects* University of Hong Kong, Hong Kong.
- K.S., I. H. S. (2002). *Engineering and Construction Contracts Management*. Singapore: Lexis Nexis.
- Levitt, R. E., Nancy M. Samelson, Greg Mummy. (1981). *Improving construction safety performance: the user's role*. Stanford University, Stanford, CA.
- Occupational Safety & Health Act and Regulations, Act 514 C.F.R. (1994).
- Saurin, T. A., & Feroso, C. T. (n.d). *Guidelines for considering construction safety requirements in the design process. Industrial engineering and Transportation Department*.
- Solicitors, M. (Producer). (2010, 1 August 2011) *Construction industry leads statistics on most workplace accidents*. *Work Accident*. retrieved from <http://www.worksaccident.co.uk/workplace-accident/construction-industry-leads-statistics-on-most-workplace-accidents>
- Sulaiman, K., & Mahyuddin, N. (2005). *Safety in the Construction Industry: Are we Barking at the Wrong Tree?* [NIOSH]. *Journal of Occupational, Safety, & Health*, 2(1), 7.
- Thye, T. S. L. L. (2006, September 2006). *Leadership and the Development of OSH Culture*. Paper presented at the 9th NIOSH Conference And Exhibition on Occupational Safety & Health, Kuala Lumpur.
- Tregenza, T. (2004). *Action to Improve Safety & Health in Construction. Magazine of the European Agency for Safety & Health at Work*.