

## **An Assessment for Safety Management of Construction Plant and Machinery in Malaysia**

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### **Abstract**

Within these past few years, the Malaysian government has made an effort on executing safety and health policies through the enforcement of guidelines as well as conducting site safety seminars and certifications. Ranked as a second industry in Malaysia that contribute to highest percentage of accidents at the worksite, the impact of loss of profit and unhealthy workplace affect the construction industry. Statistic from research by Social Security Organization (SOCSO) has shown that construction plant and machineries becomes one of the caused for the accidents. Hence, this seminar which titled "Safety Management of Construction Plant and Machinery" tries to delineate the relationship and the importance of safety management for construction plant and machinery by designing and proposing an application model that can be used as guidelines for the management. Knowing that 'safety management' is a new management concept in Malaysia, this paperwork aims to determine the extent of safety management in Malaysia and to initiate basic concept that can be logically implemented for the management of construction plant and machinery. Myriad adjustment which requires a long process and time will procrastinate the empowerment of safety management for construction plant and machinery within a short period of time. Therefore, a proposed model which is also a framework is seen as a procurable method on defining the basic concept of safety management for construction plant and machinery. A basic management application model as suggested by Walker (1993) is proposed to be used as a generic model to highlight the key features.

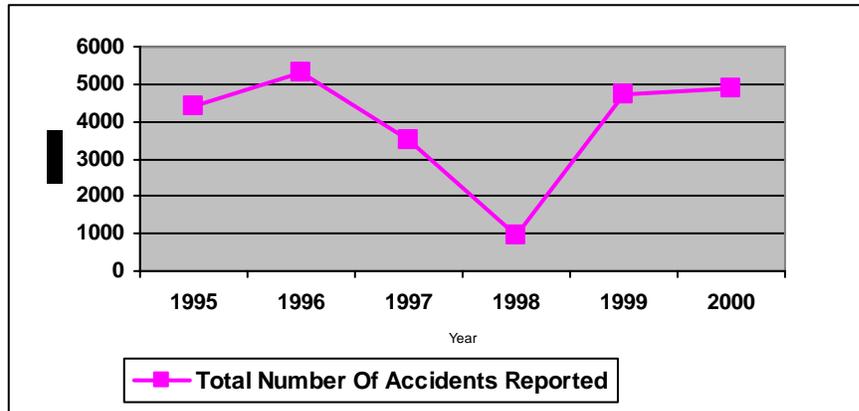
### **Keywords**

Safety, Quality management, Construction plant and machinery, Application model

### **1. Introduction**

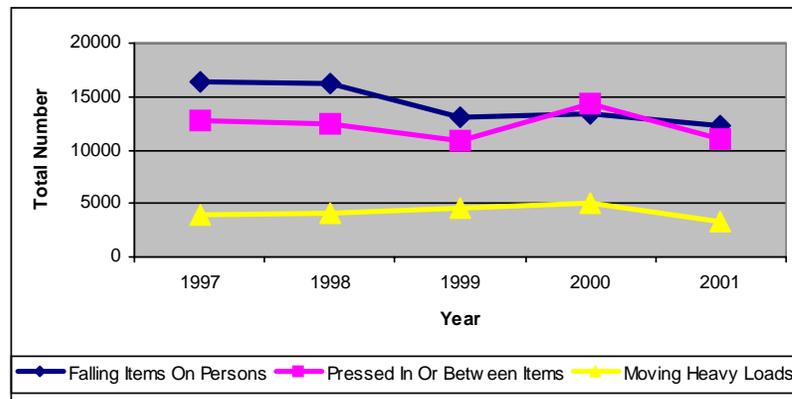
The present Occupational Safety and Health (OSH) situation in the workplace is still very much adverse and below expectation. Accidents and diseases still occur and they are a cause for concern as the available statistics show that the percentage of accident occurs in the workplace is alarmingly increased (SOCSO, 2000) (refer Figure 1). Precedent studies and analysis done by Department of Occupational Safety & Health (DOSH) revealed that the number of accidents occur in this industry is very high. In addition, it is also a known fact that a lot of minor accidents go unreported. When the Statistics for the year 2000 was released, the Malaysian Society for Occupational Safety and Health responded immediately. It said that the scenario could have been better if a comprehensive and effective plan or programmed is carried out to eliminate the problems.

As the building construction industry has been one of the major industries in Malaysia with many high-rise and low-rise projects across the country prior to the economic recession. The size of the workforce has increased tremendously over the years and has reached into the thousands who are providing manpower to the industry. Therefore, there is a need on implementing a safety control in order to prevent the increasingly alarming rate of injuries and accidents to not take its toll on the country and economy. Fatal accidents due to improper control of construction machineries and plants such as cranes and scaffolding are common on-site accidents. Lack of control and monitoring in the aspect of managing the construction tools and machineries contribute to the fatal accidents. Knowing the importance of health and safety aspect in construction machineries and plants management, this research will focus on the appropriate framework and guidelines, in accordance to the enforcement of Acts and Guidelines in Malaysia.



**Figure 1: Reported Accidents in the Construction Industry from Year 1995-2000**  
(Source: SOCSO, 2000).

Working in construction industry especially involved with plant and machinery is very prone to accidents. Lacking of safety of the construction plant may results in falling items on workers, pressed in or between items and moving heavy loads may caused accidents (refer Figure 2).



**Figure 2: Statistics of Accidents Involving Plant and Machinery According to Categories of Causes of Accidents for the Period 1997-2001.**  
(Source: Abdul, 2002)

Based on the statistics of industrial accidents in Malaysia, fatal accident in the construction industry is the second highest compared to other industrial sectors (SOCISO, 2000). The dramatic increase of total accidents in the construction industry shows that there is a loophole on the existing occupational safety and health in Malaysia. As known, presently, Malaysia has regulates several regulations and requirements specifically to minimize the risk of accidents and injury, particularly in the construction field. Active involvement from participating parties such as The National Labour Centre (MTUC) and The Malaysian Department of Occupational Safety and Health (DOSH) on raising the awareness amongst all levels of construction management and workforce is still not completely implemented. The recent analysis done by DOSH specifically to collect information on the current safety management practices on construction site revealed that:

- i) Almost 10% of the sites were considered high-risk
- ii) 90% had formed safety committees with 50% of them active
- iii) 90% were inclined towards Occupational and Safety Health Act (OSHA), 1994.
- iv) Although all the sites had safety policies and objectives, none had clear vision, mission and guidelines with respect to achieving safety and health at work.
- v) Very poor state of machinery guarding, working platforms, scaffoldings, dangerous openings, fencings, pathways, formworks and warning signs.

Knowing the fact that improvement is vital and needed a framework of construction plants and machineries safety management is formulated and adopted based on the practice of hazard prevention in construction site. This new concept in construction plants and machineries safety management brings forth a more comprehensive approach allowing participation and contribution of the management and the workforce, particularly in the management of safety at workplace.

## **2. Definitions**

### **2.1 Definition of Safety Management**

The term ‘safety management’ actually is used for convenience and for brevity, and wherever it is used it should be taken to refer to the management of occupational health and the environment as well as safety. Safety management is concerned with, and achieved by, all the techniques which promote the subject. In addition, safety management is also concerned with influencing human behaviour and with limiting the opportunities for mistakes to be made which would result in harm or loss.

As described in Occupational Safety and Health (OHSAS 18001), Occupational Health and Safety Management System (OHSMS) is:

*“Part of the overall management system that facilitates the management of the OH&S risks associated with the business of the organization. This includes the organizational structure, planning activities, responsibilities, practices, processes and resources for developing, implementing, achieving, reviewing and maintaining the organization’s OH&S policy.” (Shamsul., 2002).*

### **2.2 Definition of Construction Plant And Machinery**

Construction Plant Management (CPM), is a concept in Construction Management. In general definition, construction plant refers to “...includes any plant or equipment, gear machinery apparatus or appliance, or any part thereof” (Factories And Machinery Act, Building Operations and Works of Engineering Construction; 1986). Examples of plant and equipment include concrete mixer, scaffolding and cranes.

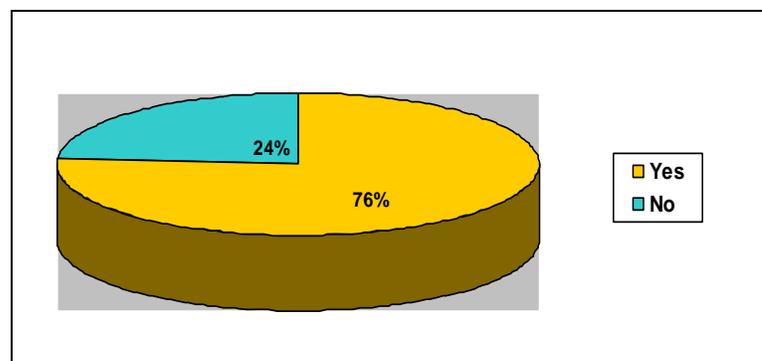
### 3. Research Methodology

The research methodology comprises of the strategies to collect, to analyze and to formulate the information and finding, which are obtained from the studies done. Generally, the research conducted comprises of the following steps:

- a) Information and data collected from various primary and secondary sources such as published books, regulation and journals.
- b) Findings from the prepared questionnaires that are distributed to 25 selected contractors. The reason on the preparation of questionnaire set is to obtain direct answer and detail information that can be used for descriptive analysis of the actual safety practice for construction plant and machinery. Informal interview is also conducted during site visit to the contractor's companies, construction site and authorities as well as other responsible agencies including National Institute of Occupational Safety & Health (NIOSH) and Construction Industry Development Board (CIDB).
- c) Analyzation of data in order to derive specific finding that can be formulated in accordance to the highlighted objectives.

### 4. Analysis and Findings

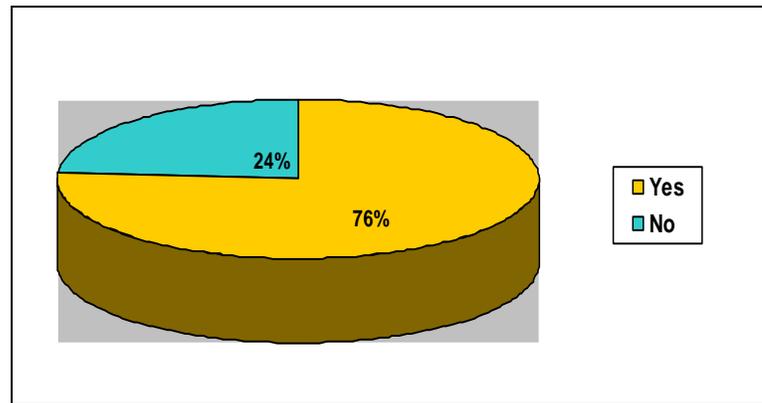
Based on the gathered data derived from the research's survey, findings of the establishment of proper plant department or safety department that manages safety aspect particularly associated with construction plant and machinery. It reveals that 76% of the respondents claimed that there is a department established within the companies to handle all matters related to construction plant and machinery. Some of the companies established a Plant Department specifically as management organization of construction plant and machinery while others claimed that the construction plant and machinery management is under the responsibility of Logistic Department. Out of 100% percentage, 24% of the respondents admit that there is no specific department established for handling the construction plant management. It reveals that matters concerning construction plant are being managed by the procurement department. Figure 3 depicts the findings of this question.



**Figure 3: Analysis on Establishment of Construction Plant Department within Respondents' Companies**

Figure 4 depicts the analysis of implications on whether regulations and guidelines play an important part in the establishment of company's safety management for construction plant. Out of the overall percentage, 76% of the respondents highly agreed that regulations and guidelines have the greatest impact

on the establishment of company's safety management for construction plant while 24% agrees that there are other key factors that contribute to the establishment of this aspect.



**Figure 4: Analysis on the Importance of Regulations and Guidelines for Establishment of Safety Management for Construction Plant**

## 5. Application of Safety Management Model for Construction Plant

In general, Safety Management is a concept that brings forth a more comprehensive approach, allowing participation and contribution of all levels of management and workforce. This management approach is developed from the conventional safety management (CSM), taking all the characteristics and actual on-site risks into consideration. In fact, it has the potential to increase competitiveness and improve productivity for an organization. The concept of Safety Management is based on a well-planned system in which the main pillar for this system is the roles and responsibilities of the consultants or participants involved within specific project. The creation of safety programs comes in a very wide scope and there is just no limitation on the strategies that can be taken to provide an efficient health and safety planning and procedures to be practiced. As construction site is the main source of fatalities and accidents in the construction industry, the concept of the safety management which stressed the importance of a well-defined organization structure and the safety planning, eventually, this concept is seen as having the potentials on eliminating the hazard risks that normally occur on the construction site.

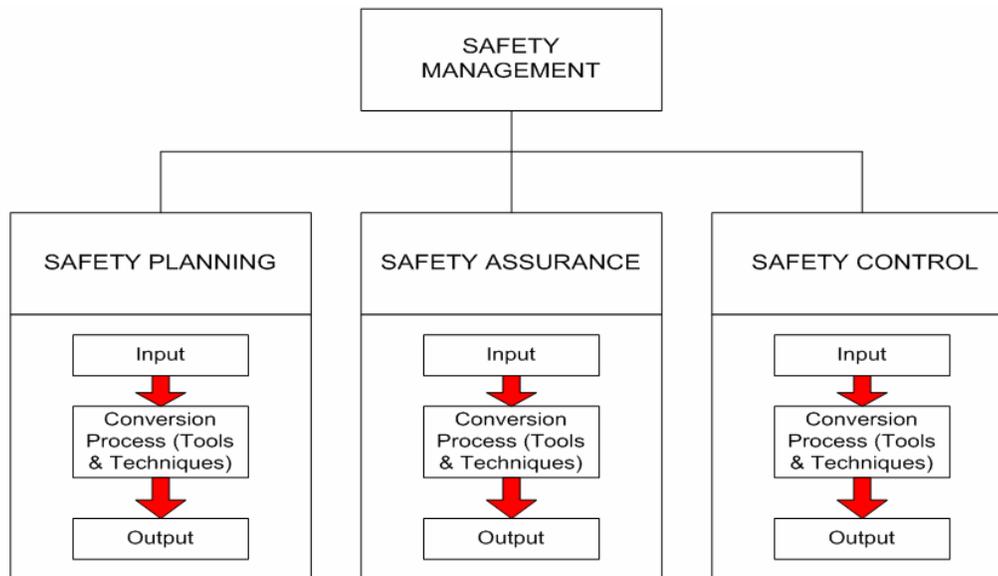
## 6. Assessment of Safety Management Application Model

The Project Quality Management model consists of three components; i) planning, ii) assurance, and iii) control. As for safety management, the key elements that build the whole safety management consists of 5 areas, i) policy, ii) organizing, iii) planning and implementation, iv) measure and v) review. Under each of these elements, the concept of management as theoretically defined by Walker is adopted. Basically, the model defines the process of “input-conversion process-output” as the method on achieving the achievement of management's goals and objectives. Input is considered as the planning effort, the strategies or the approaches used in achieving the output whilst the conversion process is the measuring and conversion process which is also known as ‘tools and techniques’ that should contribute to expected result. The rule of thumb used for the development of safety management application model is i) Quality management + safety management = First development model, ii) First development model + construction plant management = Final development model.

### 6.1 First Development Model

The central idea of identifying the safety key elements is viewed as a process which depends upon continual feedback, certainly from reviews and audits, but also during the earlier stages, so that there is a

continual, dynamic system in place (Holt, 2001). This model is adopted in Malaysia with some variations to suit the existing practice and the early development of safety and health program locally (Dept. of Standards Malaysia, 2003). Taking similar concept, elements and system, the safety management model is developed using the same basis which is as depicted in Figure 5. Quality Management model is used as basis for designing the safety management model due to its rational development and relevancy of one element to others.



**Figure 5: First Development of Safety Management Application Model**

## 6.2 Final Development Model

The method of developing the final model is by applying the first development model to construction plant management. The integration of these two models contributes to more comprehensive model (Figure 6) that can be used in ensuring the magnitude of the management. Both safety aspect and construction plant management are covered through this application model. The result ensures a more strategic approach on achieving the objectives of the management. Besides, the management organizational structure is profoundly formed. Conversion process includes the project's requirements and the regulations of which these two must be relatively linking with each other. In general, the main goal for the management is to provide a 'Safe Workplace'. In fact, this is the output of the overall process. In more defined scope and in accordance to the construction plant management model, the output should be able to produce, i) Plant vs. Activities Schedule that shows the relation of safety management on plants and activities schedule, as part of the work programme, ii) Maintenance schedule of the plant and equipment, and iii) Accountability of workers in implementing safety while operating the plant and equipment.

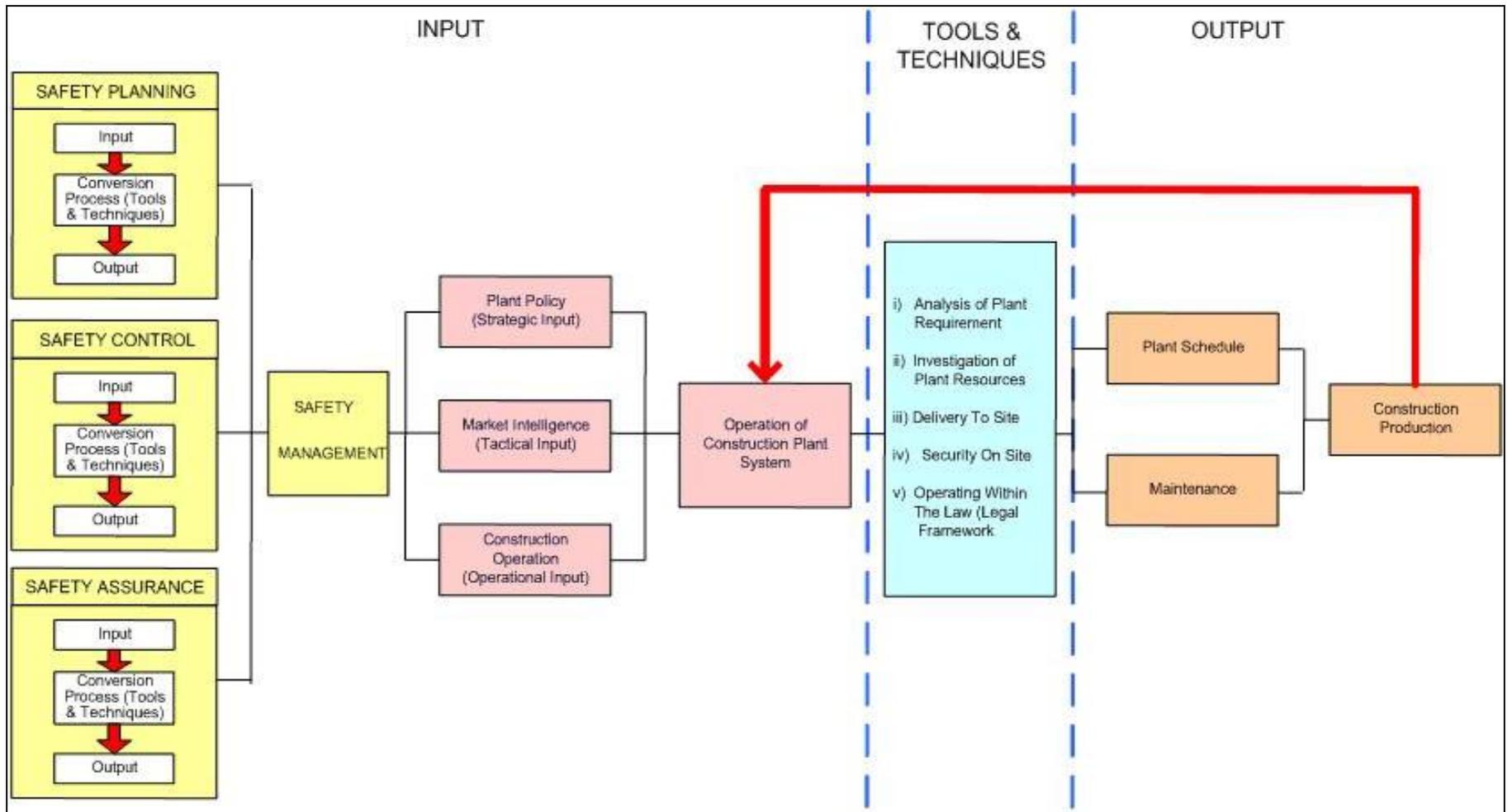


Figure 6: Final Development of the Application Model

## 7. Conclusion

The fact that OSH is still in its early development stage in Malaysia explains only selected guidelines and acts being regulated. The application model in fact is a substitute for the non-existence of compliant guidelines or requirements of construction plant and machinery. Since no other application models both for construction plant management and safety management have been produced except for those two theoretical diagrams, these models can be used as basis for the development of the application model. Based on the findings of the research, the provided information indicates that unsatisfactory safety culture and lack of responsibility towards safety in general are what happened in the real construction field in Malaysia. In relation to the research assumption, the current construction plant management system in Malaysia lacks effective management structure and partly fails to highlight the needs of safety aspects. Safety can only be assured by committed leadership on site and at the head office in parallel with an adequate safety management infrastructure.

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