

**INTRODUCING ENVIRONMENT MANAGEMENT SYSTEM WITHIN
CONSTRUCTION SITES**

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Especially dedicated to all my family and whom had gone through with me the most difficult times, all the way

What can I possibly say that will do justice to the experiences gained in completing the whole course throughout these years? ...

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ABSTRACT

Public awareness on the fragility of the environment and the increasing need to protect environmental quality has been growing in Malaysia since the Third Malaysian Plan. Thus, those involved in the development of many new projects (proponents, designers, constructors and operators) have to accept the responsibility along with the legal obligation for environmental management and actions. Additionally, the web of regulations woven in the last three decades have tended to increase the implementation of comprehensive environmental management to avoid costly mistakes, delays or even to the extent of project cancellation. The aim of the study is to introduce Environmental Management System (EMS) within construction sites. The basic concept of environmental management is explored and the detail site environmental management procedures are explained. The levels of awareness and understanding of EMS among the construction players are also investigated throughout of the study. Identification of the improvement and the action plans to reduce the impacts on the environment are established through the pattern shows by the questionnaire survey to the project engineers on construction sites. The survey components for the study are the project engineers of the construction projects in the Department of Irrigation and Drainage (DID) within year 1999 to 2003. Statistical analysis was performed on the data collected and the results were used to formulate the conclusion of the study. The study also highlights the findings that could be used to introduce environmental management system within construction sites. The study concludes that construction players should work towards introducing EMS within construction sites. The recommended approach and action plan listed are useful to construction practitioners to manage EMS processes and assess their performance towards continual environmental improvement while continuing project development with success.

ABSTRAK

Kesedaran umum tentang kepentingan penjagaan alam sekitar dan keperluan melindungi kualiti alam sekitar telah bermula di Malaysia sejak Rancangan Malaysia Ketiga (RMKe-3) lagi. Namun begitu, pihak yang terlibat dalam pembangunan kebanyakan projek baru harus menerima cabaran terhadap tanggungjawab dan tindakan undang-undang pengurusan alam sekitar. Tambahan pula, sejak tiga dekad yang lalu pembentukan undang-undang telah diintegrasikan kecenderungannya ke arah meningkatkan pelaksanaan kefahaman pengurusan alam sekitar bagi mengelakkan risiko kos, kelewatan ataupun mengakibatkan pembatalan projek. Objektif kajian ini adalah untuk memperkenalkan Sistem Pengurusan Alam Sekitar (EMS) di tapak pembinaan. Konsep asas pengurusan alam sekitar di tapak pembinaan dibincangkan secara terperinci dalam kajian ini. Tahap kesedaran dan kefahaman EMS di antara pihak yang terlibat dengan pembinaan juga dikenalpasti melalui kajian ini. Pengenalpastian bagi penambahbaikan dan juga pelan tindakan dalam mengurangkan impak kepada alam sekitar juga dinilai melalui kaji selidik yang diedarkan kepada jurutera-jurutera projek di tapak pembinaan. Komponen kaji selidik adalah terdiri daripada jurutera-jurutera projek bagi projek-projek pembinaan yang berada di bawah Jabatan Pengairan dan Saliran Malaysia (JPS) di Semenanjung Malaysia dari antara tahun 1999 sehingga 2003. Analisis statistik telah diperolehi daripada data yang telah dikumpul dan keputusan digunakan bagi menghasilkan kesimpulan pada akhir kajian. Kajian ini menitikberatkan keputusan dan penemuan yang boleh digunakan bagi memperkenalkan EMS di tapak pembinaan. Kajian juga menunjukkan bahawa pihak yang terlibat dalam industri pembinaan sepatutnya memberikan tumpuan ke arah memperkenalkan EMS di tapak pembinaan masing-masing. Cadangan bagi mengatasi masalah dan pelan tindakan telah disenaraikan dan amat berguna bagi pekerja terlatih dalam menguruskan alam sekitar dan menilai kemahiran terhadap penambahbaikan secara berterusan di samping pembangunan projek yang berjalan dengan lancar.

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LIST OF ABBREVIATIONS

EMS	-	Environmental Management System
NGOs	-	Non-Government Organisations
ASEAN	-	
EIA	-	Environmental Impact Assessment
DOE	-	Department of Environment
WHO	-	World Health Organisations
EMP	-	Environmental Management Plan
EC	-	European Committee for Standardisation
DSM	-	Department of Standard Malaysia
RI	-	Relative Index
EMAR	-	Environmental Monitoring and Audit Report
DPR	-	Development Proposal Report
CIDB	-	Construction Industry Development Board
SPSS	-	Statistical Package for Social Science
WCED	-	World Commission on Environment and Development
MOSTE	-	Ministry of Science, Technology and Environment
DID	-	Department of Irrigation and Drainage

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CHAPTER I

INTRODUCTION

1.1 Introduction

The Industrial Revolution sowed the seeds of today's major environmental problems, and 20th century developments fertilized them (Drobny, 1997). Awakening of the reality, action has been taken to gather commitment for conservation at international political level. Environmental Management System (EMS) comes into place.

Presently, Environmental Management System (EMS) is not compulsory within construction sites. Voluntarily implementing EMS is more important rather than pushing the construction players to comply. The environmental aspects will begin to play more significant roles in the overall planning of construction projects. EMS has to be implemented voluntarily by the project proponents of a development project. This voluntarily action has to be inculcated in oneself. Environmental management has often been resisted as being counterproductive since environmental issues may cause project delays or cancellation. Environmental management has shown a significant importance in improving productivity performance, reducing wastage and continual improvement within construction activities. The negative effects to the environment caused by construction sites will give very significant impact on the development if the environmental aspects are not properly managed by the management of every construction sites (Hendrickson et al, 2000).

Construction projects pose enormous challenges to not only completing within an owner's schedule and budget but to also eliminate and minimise harmful impacts to the environment. Construction has significant impacts on the natural environment. Even a minor effect, such as a small release or spill of a hazardous substance, can cause a health or environmental threat and lead to costly cleanup activities. In many instances, a project's effect can be attributed to the lack of an adequate EMS (Pun et al, 2001).

1.2 Background of the Problem

In order to minimise negative effects to the environment due to construction activities, the project requires of implementing an approach to manage environmental issues systematically and effectively within the site. Conflicting and nuisance in complying on environmental requirements are minimal if environmental management is integrated within the project development. However, failure to include environmental management and planning can be substantial effect for the whole project development cost (Zainudin, 2005). Nevertheless, many developing countries give top priority to socio-economic development rather than caring for the nature. Environment preservation is still considered as hindrance to faster and greater development. And yet, it is only seven (7) organisations out of 310 are the certified organisation in EMS ISO 14001 related to construction works, which mean that is only 2.3% out of the figure implement EMS within construction sites (Department of Standard Malaysia, 2004).

Organisations of many kinds, including the construction industry, are imposing harmful effects upon the environment from their activities. EMS encompasses those aspects of policy, strategy, procedure and practice that form an organisation's response to its environmental condition. Hence, sustainable development has three important pillars, which are mutually supportive of each other. These pillars are economic growth, social development and environmental protection (Siah B Y, 2005). Environmental protection is not a stand-alone issue. It cannot be addressed in a vacuum without giving due consideration to its impact to the economic and social development. But still, "Malaysia not able to find a balance

between development with the environment protection, this is the time for action on environment and hope that Experts and NGOs not just talk on this environmental issues but take the correct remedial approach on it”, says Prime Minister at the *Fifth Ministers’ Forum on Infrastructure Development in Asia-Pacific Region at Putrajaya on 25th January 2005*.

1.3 Statement of Needs

The development of the National Policy on the Environment marked the milestone in the history of environmental management in Malaysia, as it shows the commitment from nation’s leader embarking sustainable development. It is hence the will of the nation to extract, develop and use resources sustainably. It provides guidance to all federal and state agencies, industrial sector, local community and other stakeholders in ensuring that environment is clean, safe, healthy and productive. While envisioning sustainable growth, environment should be integrated in the development process. Negligence on the environment should be avoided as the price to remedy is tremendous.

The efforts to promote environmental consciousness could not be one-way, which is equivalent to dictatorship, for the dictatorship would not be long lasting or correct. As oppose to that, a democratic process involving many organizations would be the right move (Koh, 1997). In the light of that, the study looks into the potential on enhancing environmental consciousness and consequently achieving pollution control through a democratic process such as by adopting Environmental Management System (EMS).

1.4 Aims and Objective of the Study

EMS emerges as a tool to enable organisations systematically managing the environment that receives or possibly receives the impact from their conducts, through self commitment and provision of resources. These EMS implementers contribute to produce desirable results in pollution control, of which collectively may be significant in approaching the indefinite sustainable development.

The aim of the research is to study the overall concept of EMS within construction sites. To achieve this aim, the following objectives have been identified:

- (i) to investigate the awareness and understanding of EMS among the construction players;
- (ii) to identify the impact of environment when EMS is not implemented; and
- (iii) to identify and establish improvement/ action plan to reduce the impact on environment through EMS.

The acceptance of EMS among the construction players can be investigated through their understanding by doing survey in the form of questionnaire. Some questions related to awareness on EMS, management practices, legal compliance and dealing with authorities will be asked to the project proponents to assess their understanding towards on EMS.

The impacts on the environment can be identified if the construction players did not implement EMS within the construction sites, along with the difficulties in complying with the requirements as well as the strategies that might stimulate wider adoption of the voluntarily EMS.

And for the third goal, some recommendations on improvement to the current practices can be analysed from the feedbacks of the population that have been decided. This hopefully will reduce impacts on the environment by introducing and implementing EMS.

1.5 Scope of the Study

The study surveys only the project proponents of Department of Irrigation and Drainage Malaysia, which include their own experience in adopting EMS or their interaction with the external parties such as contractors or other agencies.

The study will confine to the following scopes:

- (i) the study will focus on introducing EMS within construction sites;
- (ii) concentrate on projects developed by Department of Irrigation and Drainage (DID) in Peninsular of Malaysia;
- (iii) surveys in the form of questionnaires will be conducted with the proponents of the referred projects; and
- (iv) the population taken is about 159 projects. Ten percent (10%) out of the figure is targeted as the sample. The population is separated into 4 areas which cover Northern, Central, Southern and East Coast region.

1.6 Importance of the Study

The awareness of how important EMS in the construction industry especially at construction sites is very rare. Since more construction players have shown concern on environmental management, the understanding on EMS in construction sites has become a necessity now. Their experience and feedback may answer people's curiosity on how important to implement the system and the negative effects to the environment caused by construction sites. The results of the study will contribute in terms of benefits in implementing EMS and provide guidelines and recommendations to improve current practices on site environmental management.

1.7 Research Methodology Framework

The study will provide descriptions and procedures of site environmental management practices in the construction industry. This will be obtained through literature review of journal papers, conference papers, books and web sites browsing. Besides that, the study will also be conducted through surveys in the form of questionnaires to understand how far the awareness of environmental management inculcated or implanted among construction site players. Figure 1.1 shows the schematic diagram of the survey. Theoretical framework using determined dependent and independent variables are important to design relevant questions to be asked in the process of carrying out the survey.

A SCHEMATIC DIAGRAM OF THE STUDY

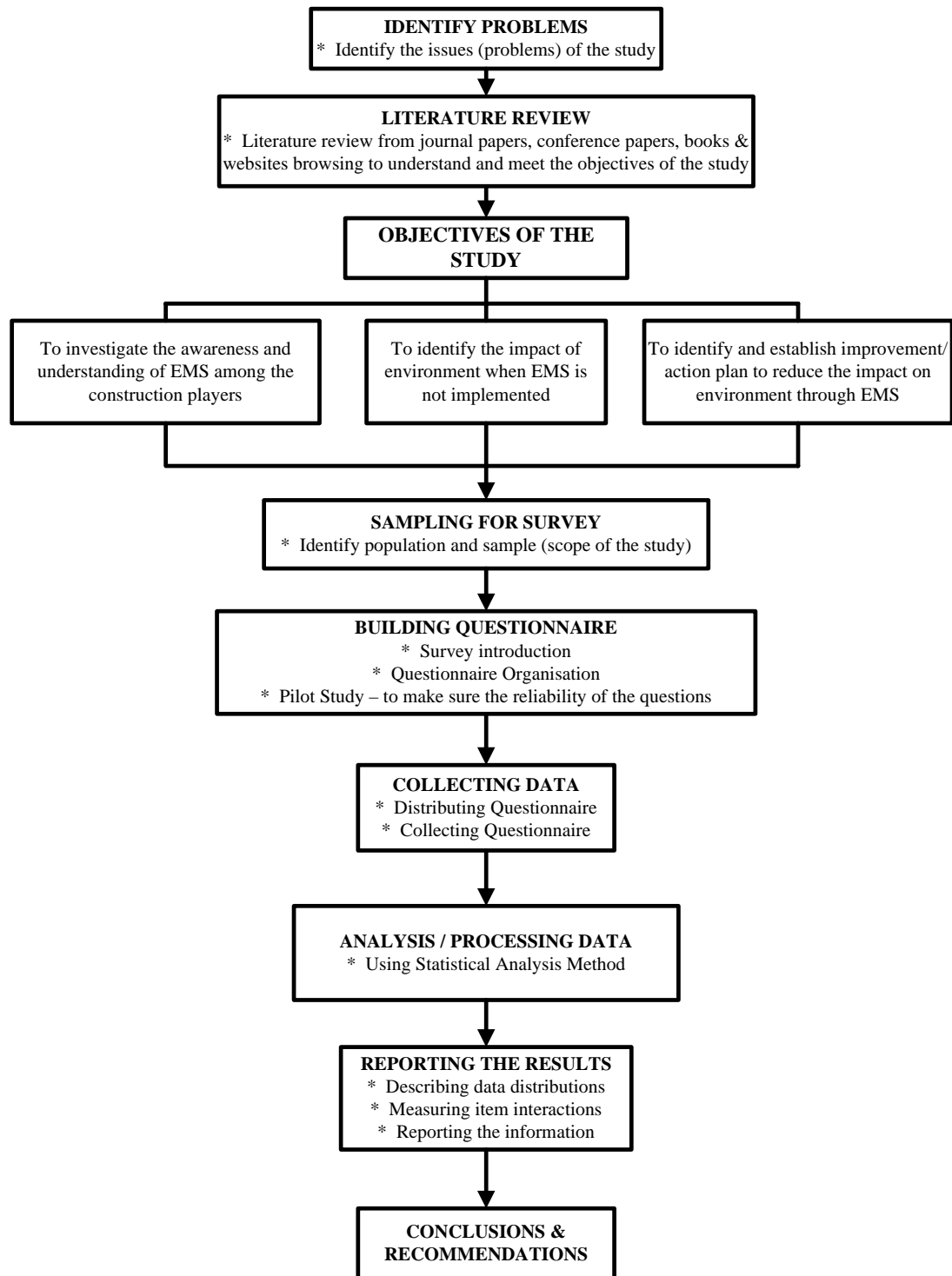


Figure 1.1: A Schematic Diagram of the Survey

1.8 Organisation of the Thesis

The thesis contains a total of seven (7) chapters and eight (8) appendices. In Chapter I entitled *Introduction* consists the introduction; background of the problem; statement of needs; aims and objective of the study; scope of the study; importance of the study; and research methodology framework of the study.

In Chapter II, a literature highlighted The engineering, Economics and Environment that discuss the issues on introduction of the topic, The Dilemma between Development and Environment; Roles of Engineers in Development and Environment; Challenges posed by Construction Industry; National Policy on the Environment; and also The Issues on Challenges of Sustainable Construction.

Chapter III discuss on the literature review of Environmental Management System. It is concentrated more on the brief history of environmental management; about EMS; the importance of EMS; introducing EMS; environmental issues; beyond compliance; and environmental legislations.

Chapter IV discuss on the literature review of Environmental Management System within Construction Sites. The chapter explained on the aim of environmental management within construction sites; environmental management within traditional procurement; and environmental management within non-traditional procurement.

Research Methodology is illustrated in Chapter V. Introduction and questionnaire study were the main topics. The other sub-topics are sampling, scope of sampling for the study. Development of survey components, data collection, data processing and questionnaire measure questionnaire were discussed as the main topics of this chapter.

Analysis and discussions of the study are explained in Chapter VI. Basically the main approach used to analysed the data is by using the Relative Index Technique.

Conclusions and recommendations are elaborated in Chapter VII. The content in the chapter includes partnership approach to environmental management; strategic action plan to promote a good environmental practices; strive for environmental friendly and sustainable process; and EMS framework and structure within organisation. Also some recommendations to the construction site as a contribution of the study.

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