MINIMIZING VARIATION ORDER ON CONSTRUCTION PROJECT DUE TO DESIGN CHANGE

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Specially Dedicated To…

My beloved mother:

Puan Hjh Saedah Hj. Khalid

My late father:

Allahyarham Hamdan Ibrahim

My supportive wife:

Ir. Erni Mawar Burhanuddin

My lovely daughters:

Alyssa Zahirah
Hani Amirah
Fatin Nabihah

My only son:

Muhammad Eusoff

Your support, your love, your cares and your attention inspired me to succeed…
Many thanks to all of you…
May Allah bless our journey here and thereafter…

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ABSTRACT

There are several issues frequently exist in the process of project implementation in Malaysia. Those issues typically affect the project performance through the occurrence of variation order during the construction phase and resulting in cost overrun and delays in project completion. Nowadays variation orders become a common phenomenon in our construction industry. Construction projects process known to be complex activities due to critical involvement of many human and non-human factors, time factor, high variability, various uncertainties and also complex relationships among the participants. In some cases, the issues on variation order become worst if both parties i.e. client and contractor have a conflict of understanding which leads to contract disputes and the project might end-up with arbitration, litigation or total abandonment. The objective of this research is to identify the causes of variation order in the construction project. The focus is on the causes which led to the weaknesses of implementation at the pre-construction stage. Further, the impacts to the project performance shall be determined and followed by the strategies to minimize the variation orders. The study process involved the literature review, gathering information from journals, questionnaires survey, analysis, conclusion and recommendation. Relative Importance Index (*I*) technique analysis is used to rank the identified factors. Based on the above analysis, the results shows that the most significant causes of variation order are design faulty/wrong technical data; duration for design phase too short; and communication breakdown & lack of coordination among consultants. For the most significant impact, the result shows that late completion (extension of time) and cost overrun were the highest rating. While the strategies for minimizing the variation orders based on highest rating was to select the competent & experience consultant company; and also appointment of experience and competent designer.

ABSTRAK

Terdapat beberapa isu yang sering wujud dalam proses perlaksanaan projek pembinaan di Malaysia. Isu-isu tersebut kebiasaannya member kesan kepada prestasi projek melalui kewujudan perintah ubahan semasa fasa pembinaan dan mengakibatkan peningkatan kos serta kelewatan penyiapan projek. Kini, perintah ubahan telah menjadi fenomena biasa dalam insudtri pembinaan. Projek pembinaan dikenali sebagai aktiviti yang kompleks kerana penglibatan kritikal oleh faktor manusia dan bukan manusia, faktor masa, kepelbagaian yang tinggi, pelbagai ketidaktentuan dan perhubungan yang kompleks antara yang terlibat. Dalam kes-kes tertentu, ianya boleh menjadi lebih serius sekiranya kedua-dua pihak iaitu klien dan kontraktor terlibat dalam konflik yang mengakibatkan pertikaian secara kontraktual sehingga projek dibawa ke penimbangtara, tindakan perundangan atau menjadi projek terbengkalai. Objektif kajian ini adalah untuk mengenalpasti punca masalah yang mengakibatkan perintah ubahan dalam projek pembinaan. Fokus adalah kepada punca yang mana disebabkan oleh kelemahan pelaksanaan semasa di peringkat pra-pembinaan. Seterusnya, kesan kepada prestasi projek dikenalpasti dan pengesyoran strategi bagi meminimakan perintah ubahan. Proses kajian akan melibatkan kajian secara literatur, pengumpulan maklumat melalui jurnal, proses soal selidik, analisa, penemuan dan pengesyoran. Teknik Indek relatif (*I*) digunakan untuk tujuan analisa bagi faktor yang telah dikenalpasti. Berdasarkan analisa, keputusan menunjukkan punca yang paling signifikan adalah kecacatan rekabentuk/kesalahan data teknikal; tempoh masa rekabentuk yang terlalu singkat; dan masalah komunikasi & koordinasi antara perunding. Bagi kesan yang paling signifikan, kelewatan penyiapan projek dan peningkatan kos memberikan perkadaran yang paling tinggi. Strategi untuk mengurangkan perintah ubahan, perkadaran yang paling signifikan adalah pemilihan syarikat perunding yang kompeten & berpengalaman; dan perlantikan perekabentuk yang kompeten dan berpengalaman.

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LIST OF ABBREVIATION

I	-	Relative Important Index
∑	-	Sum of
PWD	-	Public Work Department
PAM	-	Pertubuhan Arkitek Malaysia
DLP	-	Defect Liability Period
S.O	-	Superintendent Officer

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Nowadays, the construction industry facing a lot of issues starting from the conceptual design stage until project completion inclusive of the defect liability period (DLP) which was also specified in the document contract. All of the indicated issues will affect the project performance. The project performance can be measured from the cost, time, quality, productivity factor and etc. Successful management of variation orders and claims begin even before the start of construction (lbbs et. al., 2001)

Variation order is one of the crucial issues in the construction industry as it will gives impact mainly to the project cost and time. The objective of this research is to overcome those issues or at least to reduce it to the minimum or at the acceptable level.

In addition, those issues will give negative perspective to the respective profession such as Architects, Engineers, Quantity Surveyors and all parties that involve in the construction industry. To ensure the project performance remain as per specified in the contract, variation order should be avoided or reduce.

Nowadays variation orders have becomes a phenomenon in our construction industry. Variations are inevitable in any construction project (Mokhtar et al., 2000). Various factors can lead to the above mentioned issues and this research will focused

on the causes of variation orders which are classified as weaknesses in the pre-construction stage. The other negative impact that also relates with the above issues is quality deterioration and low productivity.

Construction projects are complex because they involve many human and non-human factors and variables usually have a long duration, various uncertainties and complex relationships among the participants (Faisal Manzoor Arain et al., 2009). Therefore, construction project management tools i.e. planning, communication, coordination, supervision, etc. need to be carried out properly to ensure the success of each projects. All parties involved in the design stage should be chosen among the competent personnel and entities. Communication and coordination among the project team members should be at the best level to ensure the document tender is well prepared to proceed to the next stage i.e. procurement process. Communication among these participants reduces the chance of project failure and other related performance problems (Jeffrey S. Russell et. al, 1994). Construction phase is crucial as project will be implemented directly from the document contract i.e. construction drawing, bill of quantities, specifications and condition of contract.

1.2 Background Study

Variation order is one of the major issues in our construction industry. Project delay and cost overrun are the most common impact that has occurred due to variation order. In view of the above, there are various causes could leads to those impacts and this research is to identify the cause of variation orders during the construction phase. Furthermore, it is to focus on those causes that are related to the weaknesses in the pre-construction phase. As there are a big number of parties that involves in these two phases, potential occurrence of variation order cannot be avoided however can be minimize with the support by those who is involve in the industry.

As mentioned above, there are many other factors that contributed to the variation order issues and could causes severe impact to the project i.e. project delay, cost overrun, low quality of workmanship, low productivity and probably non-compliance to the safety & health requirement. This study will focus on the common impacts which are project delay and cost overrun. In addition, strategies on how to minimize the occurrence of variation order during the pre-construction stage will be explored.

1.3 Problem Statement

Construction is a complex activity due to involvement of many human and non-human factors. Many uncertainties and inconsistencies during the construction process and occurrence of variation order might affect the project performance.

In order to maintain the project performance, occurrence of variation order must be avoided or reduced. To achieve the above, issuance of design change shouldn't happen during construction phase. The design change normally was due to agents of variation order i.e. clients, consultants, contractor, external factors, local authorities, and others due to various types of causes.

The original programme on site might be affected due to occurrences of variation order and the work programme need to be revised accordingly. Productivity is the amount of output over a unit of time. As the number of variation orders increases, more productivity losses encountered.

In conjunction to the revised work programme, the contractor should re-organize their resources and ensure the project is still timely completed. In order to rectify the delay and expedite the work on-site, contractor might tend to compromise on the quality of works intentionally or unintentionally. Therefore, occurrences of variation order could contribute to low quality of works.

Hence, the root cause of variation order should be determined whereby the activities and processes during the pre-construction phase should be focused and enhanced especially by the client and the appointed consultants. Based on the above, a study need to be carried out to determine the causes and strategies to minimize its impacts and it might assist the client to preserve and maintain work quality and at the same time to ensure project completed as per original schedule and within the contract amount.

1.4 Aim and Objectives of Study

The aim of this research is to identify the causes and impacts of variation orders in the construction project implementation and to propose strategies that could be considered to avoid those causes and subsequently identifying strategies to minimize the above impacts. In achieving the aim, three objectives have been outlined, as follows:

I. To identify causes of variation orders due to design changes;
II. To identify the impacts of the variation orders to the project performance; and
III. To determine strategies to minimize the impact of variation orders.

1.5 Scope of Study

The scope of the study for achieving the above aims is as follows:

I. The study is based on information gathered via literature reviews and questionnaire surveys. The main focus is to identify the causes of variation order which is classified as weaknesses of implementation at the pre-construction phase that lead to the occurrence of variation orders at construction phase.

II. Thereof, effective strategies and recommendation to minimize the number of variation order and its impacts to the project performance shall be presented.

III. The target group was among the construction industry player i.e. clients, consultants and contractors which involve with the project implementation in Selangor and Klang Valley. As the owner of the project, client plays a role as a decision maker and also as a paymaster. The consultant is empowered by the client through appointment as a representative to advise and manage the project during the pre-construction and construction stage while the contractor is a person or firm that builds the project physically as per the contract.

1.6 Research Methodology

The aim of this research is to identify causes of variation orders which can be classified as weakness of implementation at pre-construction phase and its impact followed by the proposed strategy to minimize the variation orders. To achieve this aim, the research methodology was conducted in two stages i.e. literature review and questionnaires survey.

Literature review is the stage to determine the research hypotheses and to get overall picture of the research study in order to achieve the conclusion and recommendation. Information also gathered through books, journal and other thesis and data will be collected and further analyzed as to enhance the findings of the research.

The most important mechanism is using the questionnaires survey which is to obtain professionals view and experiences with respect of variation orders and the relevant impacts. The construction industries player i.e. clients, architects, civil/structure engineering consultants, mechanical and electrical consultants, quantity surveyors, contractors are invited as the participant in the questionnaire.

The establishment of questionnaires are based on literature review as the principle survey method and divided into four sections. The first section requested information with regard of respondent profile, company profile and project description. The second section focus on the identified causes of variations orders while the third section requested respondent's opinion on the impacts of variation order. The last section is to gather strategies to minimize the impact listed under the third section. Their information and suggestion will be gathered and analyzed before conclusion can be made.

The methodology process of this research can be summarized as figure 1.1 as follows:

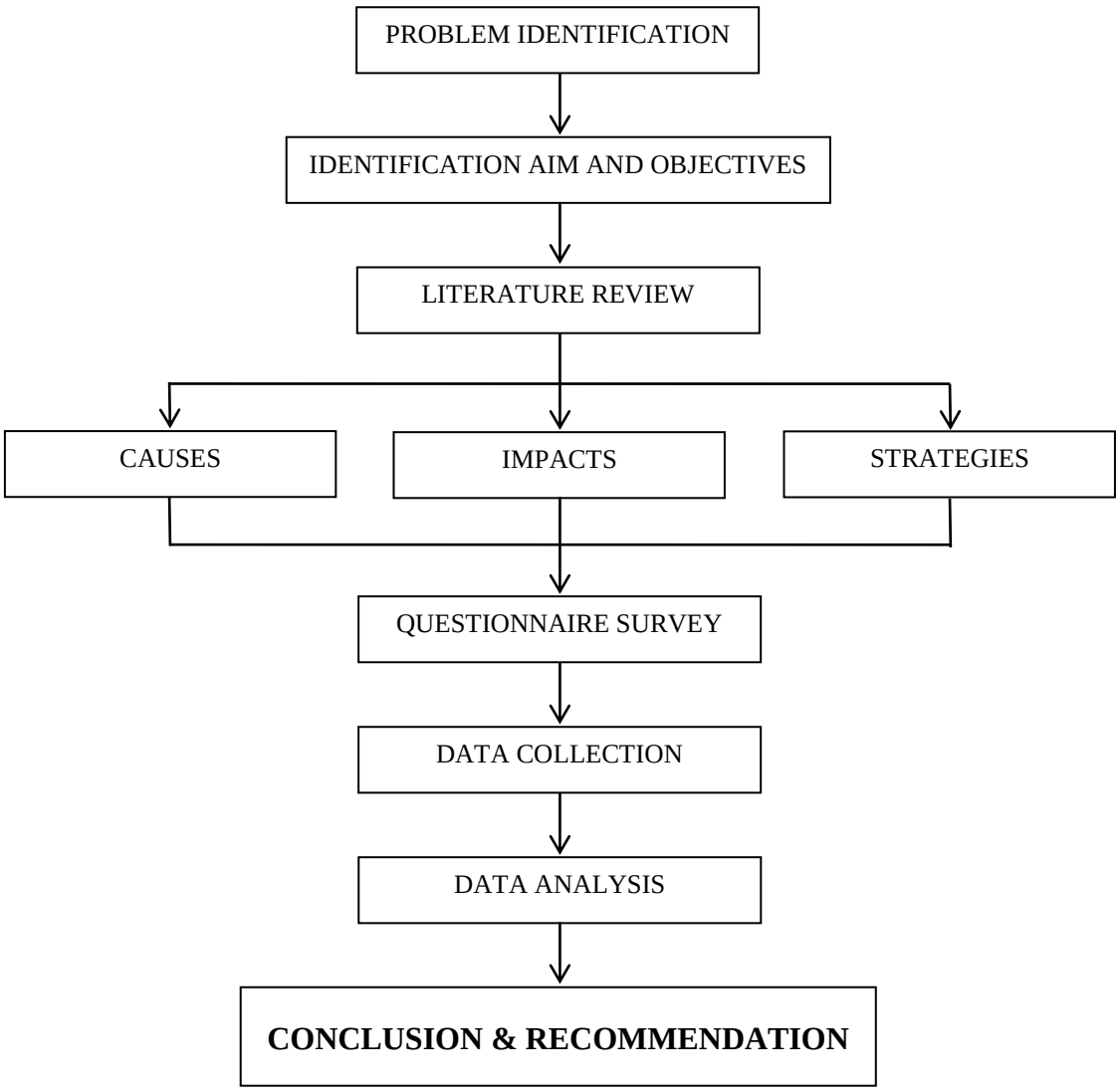

Figure 1.1 : Methodology Process

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