

UNIVERSITI TEKNOLOGI MALAYSIA

BORANG PENGESAHAN STATUS TESIS ♦

JUDUL : VARIATION ORDERS IN UNIVERSITI TEKNOLOGI MALAYSIA
(UTM) CONSTRUCTION PROJECTS

SESI PENGAJIAN: 2006/2007

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**VARIATION ORDERS IN UNIVERSITI TEKNOLOGI MALAYSIA
(UTM) CONSTRUCTION PROJECTS**

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DEDICATION

For my beloved parents,
my family,
my lecturers,
my friends
and
to all Muslims,

**“And do not stretch your eyes after that with
which We have provided different classes of them,
(of) the splendour of this world’s life,
that We may thereby try them,
and the sustenance (given) by your Lord
is better and more abiding”**

[Surah Ta-Ha, verse 131]

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ABSTRACT

The project holder have to believe that no construction method or for that matter the project, is free of variation and it's afterward activity of claims. A document review was done for 18 numbers of construction contract documentation projects in Universiti Teknologi Malaysia (UTM) during the period of the Seventh Malaysian Plan from 1996 to 2000 with the total value of all projects in the excess RM100 million. The client, consultant and contractor become the main respondent target. In general, UTM's construction projects of building works, renovation works and infrastructure works during Seventh Malaysian Plan are not impervious to variation orders. Every project of building works an average of RM 2.08 million is expend on variation orders and about RM 0.31 million is spent for every variation orders occurred in renovation and infrastructure works. All these have impacted the cost and the completion time of projects. This study has concluded the most numerous cause of variation orders in UTM construction projects which is inadequate consideration of design. Meanwhile, the top five of the effects of these variation orders are listed as followed; increase in project cost; delay in payment; procurement delay; logistic delay; completion schedule delay. The findings of this study also points out that the involvement of profession in the design phase and continuous coordination and direct communication are the two most considered factors to minimizing the happening of variation orders.

ABSTRAK

Industri pembinaan seolah-olah sudah tidak mampu mengelak dari terlibat dengan sebarang perubahan kerja terutamanya ketika berlangsungnya projek yang kemudiannya disusuli pula oleh pelbagai tuntutan. Ulangkaji dokumentasi pembinaan telah dilaksanakan terhadap 18 buah dokumen kontrak pembinaan Universiti Teknologi Malaysia (UTM) di dalam tempoh Rancangan Malaysia Ketujuh iaitu dari tahun 1996 hingga 2000 yang melebihi nilai RM 100 juta. Sasaran responden utama adalah terdiri dari klien, kontraktor dan perunding. Umumnya, keseluruhan projek pembinaan UTM ketika tempoh Rancangan Malaysia Ketujuh samada kerja-kerja yang melibatkan kerja-kerja bangunan, kerja ubahsuai dan kerja infrastruktur semuanya ada perubahan kerja. Mengikut anggaran, sebanyak RM2.05 juta akan dibelanjakan bagi perubahan kerja yang terlibat di setiap kerja bangunan, manakala lebih kurang RM0.31 juta pula dibelanjakan setiap kali perubahan kerja pada kerja-kerja ubahsuai dan infrastruktur. Semua ini sudah tentu menjejaskan kos dan tempoh siap kerja bagi setiap projek yang terlibat. Kajian yang dilakukan telah menunjukkan punca utama yang mendorong berlakunya perubahan kerja adalah kerana pertimbangan yang kurang jitu ketika fasa rekabentuk. Sementara itu, lima (5) kesan besar yang timbul setelah berlakunya perubahan kerja disenaraikan sebagaimana berikut; meningkatnya kos projek; melambatkan proses bayaran; melambatkan pelaksanaan; mlambatkan logistik; dan melambatkan/menjejaskan jadual pelaksanaan. Dua (2) langkah telah dikenalpasti di dalam kajian ini yang mana berkemungkinan mampu untuk mengurangkan berlaku perubahan kerja di dalam sesebuah projek iaitu; penglibatan semua profesion ketika fasa rekabentuk dan penyelenggaraan yang berterusan dan komunikasi langsung antara pihak yang terlibat.

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CHAPTER I

INTRODUCTION

1.1 Introduction

The construction industry has been consistently criticized for poor performance in attaining its client's requirements. Time and cost overruns were predominately common and were well documented. The incidence and magnitude of variations was identified as a major cause and a focus of much of the criticism. Variation issued during the construction period are time consuming and costly. Thus accepted as an inevitable part of construction, variations are a major cause of disruption, delay and disputes and generate significant cost impact (Ibbs et al, 2001).

Delay is generally acknowledged as the most common, costly, complex and risky problem encountered in Malaysian construction projects. Many of the problems were originated from the lack of knowledge and skills needed (Azhan, 2004). Most of the construction projects are often plagued with delays and cost overruns, revealing this shows that most of the construction of Government School Projects initiated by Ministry of Educations especially for the School Computer Laboratory Projects, were totally delays and Housing Quarters for Teachers only 412 units completed out of 1900 units targeted in the Seventh Malaysian's Plan from 1996-2000 (Berita, March

2002). Yet no empirical method or tool, quantitative or otherwise, is available for managing or controlling them.

By that, the conventional approach is to include a percentage of the project cost as contingency in the pre-contract budget for their occurrences. The allocated contingency based on this method is largely judgmental and arbitrarily allocated. However, construction projects are unique; as they may have distinctive set of objectives, require the application of new technology or technical approaches to achieve the required result, or even duplicate a given set of results in an entirely different environment. This uniqueness makes the conventional method based wholly on the project manager/supervisors' experience and intuition in danger of overly simplistic and unrealistic. The objectives of the contingency allocation are to ensure that the budget set aside for the project is realistic and sufficient enough to contain the risk of unforeseen cost increases. Therefore any realistic contingency must serve as a basis for decision making concerning financial viability of the variations, and a baseline for their control. The problem could become worse when there is a series of variations, when the programmed is affected and when the time spent by the contractor's head office staff becomes totally disproportionate to the value of the contract.

There are many reasons why variations occur. They may be due to extra work caused by subsurface conditions, errors in contract documents, additional quantities of works or materials, reduction of work, or lack of proper communication between the parties. There is room for improvement in present practices for keeping track of variations. Therefore, proposing some strategies to minimize the variation orders can be valuable.

1.2 Background of the problem

Variations are inevitable in any construction project (Ibbs et al, 2001). Needs of the owner may change in the course of design or construction, market conditions may impose changes to the parameters of the project, and technological developments may alter the design and the choice of the engineer. The engineer's review of the design may bring about changes to improve or optimize the design and hence the operations of the project. Furthermore, errors and omissions in engineering or construction may force a change. All these factors and many others necessitate changes that are costly and generally un-welcomed by all parties.

Variations in drawings and contract documents usually lead to a change in contract price or contract schedule. Variations also increase the possibility of contractual disputes (O'Brien, 1998). Typically, variations present problems to all the parties involved in the construction process. Variations can be originated from numerous factors pertinent to the construction projects. Development in the education sector and the new modes of teaching and learning advanced the need for renovation or extension of existing academic institutions. The change of space in academic institutions is required to cater for the new technology used. The construction of an institutional building poses risks common to any other large projects (Faizal, 2005)

The construction process can be influenced by highly changing variables and unpredictable factors that could result from different sources. These sources include the performance of construction parties, availability of resources, environmental conditions, involvement of other parties and contractual relations. As a consequence of these sources, the construction of projects may face variations that could cause delay in the project completion time (Clough and Sears, 1994).

Kumaraswamy et al (1998) studied claims for extension of time due to excusable delays in Hong Kong's civil engineering projects. Their findings suggested

that 15-20 percent time over run was caused mainly by inclement weather. A total of 50 percent of the projects surveyed were delayed because of variations. The institutional projects would also experience similar delays due to variations and inclement weather as Malaysia is in the tropical zone.

Kaming et al (1997) studied the factors influencing construction time and cost over runs for high-rise projects in Indonesia where 31 project managers working in high-rise buildings were surveyed. Kaming et al (1997) pointed out that the major factors influencing cost over run were material cost increase due to inflation, inaccurate material estimating and the degree of project complexity. In the case of time over run, the most important factors that caused delays were design changes, poor labour productivity, inadequate planning, and resource shortage.

The magnitude of average schedule slippage due to variations was reported as 18 percent (CII, 1990; Zeitoun and Oberlender, 1993). The deviation (variation) cost amounted to an average of 14 percent of the total cost of the project. Although there have been cases where variation cost accounted for as high as 100 percent of the budgeted funds, the industry norm was about 10 percent. The impact of variations varies from one project to another. However, it is generally accepted that variations can affect construction projects with unpalatable consequences in time and cost (Hester et al, 1991; Ibbs et al, 2001).

Variations are of two types, namely beneficial variations and detrimental variations. Beneficial variations are those that actually help to improve quality, reduce cost, schedule, or degree of difficulty in the project. Detrimental variations are those that reduce owner value or have a negative impact on a project. The project team should be able to take advantage of beneficial variations when the opportunity arises. The need to make changes on a construction project is a matter of practical reality. Even the most thoughtfully planned project may necessitate changes due to various factors. The variations can be minimized when the problem is studied collectively as

early as possible, since the problems can be identified and beneficial variations can be made (CII, 1994).

Variations are familiar in all types of construction projects. Variations in construction projects can cause substantial adjustment to the contract duration, total direct and indirect cost, or both. The variations and variation orders can be deleterious in any project, if not considered collectively by all participants. Most of University Teknologi Malaysia (UTM) construction projects were delayed with certain amount of variation order increasing from the original value of the contract sum. The focus of this study would be on the total value of all projects in the excess RM100 million with 18 numbers of projects received during the period of the Seventh Malaysian's Plan from 1996-2000. Due to general background of the problems in the construction industry and the specific problems within the UTM construction scope, there is a cause for a study to be made on causes and effects of variation orders in UTM construction projects.

1.3 Objective of study

The aim of this study is to identify and analyze the potential effects of variation orders in Malaysian construction projects. To achieve the above aim, the following objectives have been identified.

1. To identify contribution factors of variation orders.
2. To study the effects of variation orders in construction projects.
3. To propose strategies to minimize the adverse impact of variation orders.

1.4 Scope of study

The scope of the study is focused on government projects. The imperative of the study would be reflected on the total value of all projects in the excess RM100 million with the projects reviewed during the time of the Seventh Malaysian Plan from 1996-2000, where most of the UTM construction projects were implemented during this period.

1.5 Significance of study

As variation orders can have numerous negative effects to projects cost and schedule, this study is carried out to identify the major causes that contribute to variation orders and to study the effects of variation orders during the implementation of construction projects, which will be supportive for construction professionals in assessing and taking proactive measures for reducing the adverse impact of that. Noted that the Government had allocated for the five (5) years development about RM103.56 billion, and RM 20.19 billion from that amount were for education and training sector development. From RM145 million that had been allotted to UTM construction projects, about RM108 million had been laid out from RM105 million (original contract). This amendment occurred because of variation order. Reflecting to variation order, almost RM3 million could be saved if variation order can be controlled and this was one of the adverse effects that rise from variation order. The summaries of these situations are shown in Table 1.1.

Table 1.1: The Summaries of Government Allocation and Expenditure for Such Development within Seventh Malaysian Plan, 1996-2000.

Subject	Allocation (RM)	Expenditure (RM)
By Sector : Education And Training	20.19 Billion	19.72 Billion
UTM	145 Million	108 Million

(Source: Harta Bina, UTM; RMK7, 1996-2000)

1.7 Research methodology

The method used in conducting this study started with literature review. This followed with the document study, that are study, review and analyze of contract documents and final accounts that is related to variation orders. The document contract are treated as forbidden document and restricted therefore digital photo study are required to be employed where the document are not to be brought out from the particular area. The digital photo study of the contract document will be prepared similarly to the document study. Vital aspects of variation orders in the contract document will be identified and tabulated accordingly to their considerable.

The focus of the research mainly concentrated at the client organization as the primary respondent where the contract document originated. Structured interviews are to be conducted with the professionals in the client organization who are involved in the construction process and contract administration. This will reveal the facts for the second objective that is the effects of variation orders in construction projects. In order to strengthen the data for the secondary respondent, telephone interview with the contractor and the consultant parties will be conducted. After the telephone interview, if the secondary respondents are cooperative and supportive, postal questionnaire will be sent to them for a better detailed exploration. Further structured interviews are deliberate for the secondary respondent where possible.

Finally, matching methods were in use as in preceding step by performing structured interview and questionnaire in the client organization and telephone survey with the consultants and contractor to recognize strategies to minimize the adverse effects of variation orders. Advance analysis and synthesis of the documents will be prepared to identify the strategies that can be done. The proposed strategies to minimize the adverse impact of variation orders expose as a result.

The summaries of research methodology are shown in figure below.

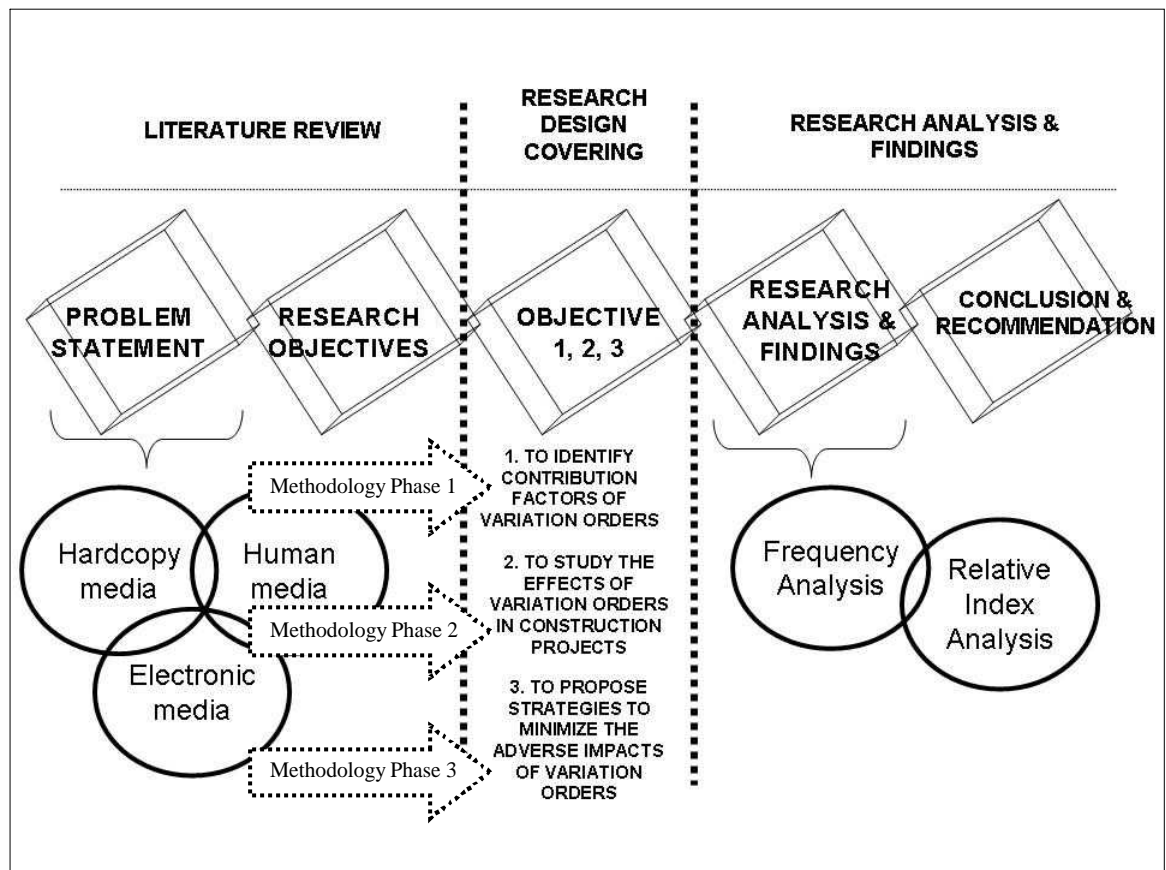


Figure 1.1: Research Methodology