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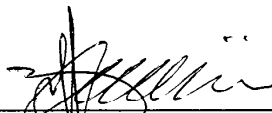
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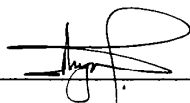
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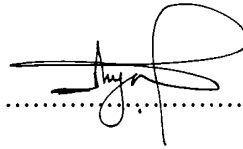
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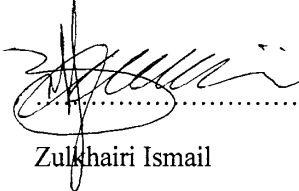
ZULKHAIRI BIN ISMAIL

**A project report submitted in partial fulfillment of requirement
for the award of the degree of
Master of Science (Construction Management)**

**Faculty of Civil Engineering
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APRIL 2010

“I declare that this final project report entitled “*Techniques for Valuation of Variation Works*” is the result of my own research except as cited in the references. This report has not been accepted for any degree and is not concurrently submitted in candidature of any degree”

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For my beloved parents,
my lovely family,
my lecturers,
my friends and colleagues.

*Curious always! For knowledge
will not acquire you: you must acquire it.*

*The beginning of knowledge is the discovery of
something we do not understand.*

*An investment in knowledge always
pays the best interest.*

*As we acquire more knowledge, things do not
become more comprehensible but more mysterious*

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ABSTRACT

Construction industry in Malaysia is typically considered as fragmented. Lack of integration tends to incur additional costs from rework. The variations arise in the contract need to be valued accordingly depend upon the nature of the variations. The valuation of variations has long been recognized as one of the commonest sources of disputes in the construction industry. The main reason for the disputes is the claims from contractor which frequently do not represent the true value of the works. The techniques for the valuation of variations need to be assessed to determine whether the rules for valuation of variations in the standard forms of contract are adequate and appropriate to reduce the disputes. The objectives of this study is firstly to study the techniques for the valuation of variations and problems associated with it, secondly, to investigate the relevant legal cases of contract law in relation to the valuation of variations and finally to identify the feasible solution of minimizing the disputes in valuation of variations. The scope of this study is limited to the public sector construction contract and the methodology of this study based on the secondary and primary data analysis. The study assumes that different types of project contracts adopt a different method of valuing the variation works. Each contract has stipulated the valuation rules, but it is a need to properly select the most adequate and appropriate techniques of valuing the variations through a right selection of contracts. Historically, disputes in valuation are occurred as many related legal cases have been recorded. The tendency of disputes can be reduced if a project uses the contracts that contain the most effective techniques for valuing the variation claims. The study shows that in Malaysia despite the fact that valuation is a factor contribute to disputes, nowadays it has no longer a major problem in public sector's contract management. Disputes related to claims of variation works can be avoided by overcoming the problems of the disputes. This can be achieved through the proper selection of type of contracts which contain the most effective methods of valuing the variation claims.

ABSTRAK

Industri pembinaan di Malaysia secara tipikal boleh dipertimbangkan sebagai bersifat berasingan. Kekurangan integrasi menjuruskan kepada berlakunya kos tambahan kepada kerja-kerja yang dilaksanakan semula. Perubahan kerja yang timbul dalam kontrak perlu dinilai secara munasabah mengikut keadaan perubahan kerja. Penilaian perubahan kerja telah sekian lama dikenalpasti sebagai salah satu punca terhadap pertikaian dalam industri pembinaan. Sebab utama pertikaian ialah tuntutan daripada pihak Kontraktor yang seringkali tidak menunjukkan nilai kerja-kerja yang sebenar. Teknik-teknik untuk menilai perubahan kerja perlu dikaji atau dinilai untuk menentukan samada peraturan untuk menilai perubahan kerja di dalam borang kontrak piawai adalah cukup dan berpatutan untuk mengurangkan pertikaian. Objektif kajian ini adalah pertama sekali untuk mengkaji teknik-teknik penilaian perubahan kerja dan masalah-masalah yang berkaitan dengannya, kedua ialah untuk menyiasat kes-kes dalam perundangan kontrak yang berkaitan dengan penilaian perubahan kerja dan akhir sekali untuk mengenalpasti cara penyelesaian yang boleh dilaksana bagi mengurangkan pertikaian dalam penilaian perubahan kerja. Skop kajian ini adalah terhad kepada kontrak projek pembinaan di sektor kerajaan dan kaedah kajian berdasarkan kepada analisa data utama dan sekunder. Hipotesis kajian ini ialah kontrak projek yang berlainan menggunakan kaedah berbeza dalam penilaian perubahan kerja. Setiap kontrak telah menetapkan peraturan-peraturan bagi penilaian, tetapi adalah satu keperluan untuk memilih dengan betul teknik-teknik yang paling lengkap dan berpatutan melalui pemilihan jenis kontrak yang betul dan tepat. Dari segi sejarah, pertikaian dalam penilaian perubahan kerja pernah berlaku sepertimana banyak kes-kes perundangan yang berkaitan telah direkodkan. Kecenderungan bagi pertikaian boleh dikurangkan sekiranya sesuatu projek menggunakan jenis kontrak yang mengandungi teknik-teknik penilaian tuntutan bagi perubahan kerja yang paling berkesan. Kajian ini menunjukkan di Malaysia, sungguh pun fakta menunjukkan bahawa penilaian adalah satu faktor berlakunya pertikaian, kini ianya tidak lagi menjadi satu permasalahan besar dalam pengurusan kontrak di sektor awam. Pertikaian berkaitan tuntutan perubahan kerja boleh dielak dengan mengatasi masalah-masalah pertikaian. Ini dapat dicapai melalui pemilihan jenis kontrak yang bertepatan yang mengandungi teknik-teknik penilaian tuntutan perubahan yang lebih berkesan.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

In Malaysia, the construction industry is often typified as fragmented. Traditionally, the construction process involves players that are disconnected from each other and work in isolation resulting in inefficiencies. As a result of the lack of integration in the industry the construction process tends to incur additional costs from rework stemming from quality issues, disputes, and slower building times. This issue is not only prevalent in this country but also in other part of the world as well¹.

In the design and construction of a development project, management and coordination of the team involved towards the achievement of the client's objectives in terms of time, cost and quality. Construction management is the coordination of a team consists of all consultants (Architects, C&S Engineers, M&E Engineers, Quantity Surveyors etc.), Builders and Client to ensure a higher standard of quality construction. The activities involve from the inception stage to the completion and handing over stage includes cost control

¹ Construction Industry Master Plan Malaysia 2006-2015

techniques, time control programming, contracts documentation and reporting procedures, building audits and all work involving advice on contract, calling for tenders, negotiation with contractors, valuation of work in progress, assessing cost of variations and settlement of final accounts.

In all types of development projects especially in most of government projects, variation work is inevitable part of a construction project. Variation orders involve additions, omissions, alterations and substitutions in terms of quality, quantity and schedule of works. There are classification of categories/types rework revealed the causes or the circumstances under which variation orders could be initiated as design change, design errors, design omission, construction changes and errors, construction omission and also damage. Various studies have revealed that variation orders contribute to construction cost overruns. The more the variation orders, the more they affect the overall construction delivery cost. If the well-structured schedule of works is properly followed, the maximum project performance would be achieved if the work invariably flows smoothly within time limits and anticipated budget. However, it is rare that projects perform precisely to their original schedule due to various reasons as mentioned earlier.

The occurrence of variation orders has an adverse impact on project performance including cost overruns, time overruns/delay, quality degradation, health and safety issues and professional relations. In our country, most of construction projects especially government projects are commonly delayed which contribute to the criticism among the clients or stakeholders/end-users because of the poor performance. Recently, as an effort of the government to overcome this issue in relation to variation the Ministry of Work has estimated about RM1 billion in compensation payments

to contractors for the variation of prices (VOP) of projects arising from higher cost of building materials which involved 1,311 projects all over the nation. In fact, amounting to RM44.2 million has paid out for 270 projects. This compensation payment was to reduce the losses suffered by the contractors and to ensure that projects under the Ninth Malaysia Plan (9MP) could be implemented without delay².

1.2 Problem Statement

The valuation of variation orders has long been recognized as one of the main reasons for conflicts and disputes in construction management³. There has been much evidence that valuing variations in construction projects can lead to conflict and disputes leading to loss of time, efficiency and productivity. The negative impacts of the variations on the labour productivity in construction projects have been reported and quantified in several researches (Thomas and Napolitan 1995; Hanna *et al* 1999a; Hanna *et al* 1999b). Additional cost incurred from the delays and claims is also another disadvantage of this issue.

It is a norm in the construction industry where one of the contracting parties disagrees about the valuation of work done. The disagreement may cause delay in certifying the amount of work executed on site. This problem can be avoided if adjudication provision is provided in the standard form of contract. If there was an adjudication provision in place, the aggrieved party can take

² The Star, Friday January 23 2009

³ Sutrisna, M., Potts, K., & Buckley, K., An Expert System As A Potential Decision-Making Tool In The Valuation Of Variations. Journal of Proceeding of The RICS Foundation Construction and Building Research Conference, COBRA (2003), 314-323

his dissatisfaction about the certified value to a neutral third party who can decide based on materials submitted to him. Thus, the contractor's cash flow will not be disrupted. Disagreement on the valuation of work done has been ranked second and third major cause of late payment and non-payment respectively⁴.

The valuation of variations is near daily task on large construction contracts. The standard form of building and civil engineering contracts contain a variety of complex mechanisms for valuing variations, often referring to the use of 'reasonable' rates or a 'reasonable' basis of valuation. Those responsible for applying such provisions have adopted sometimes diverse approaches, assisted by little relevant case law (Lovells, 1999).

In Malaysia, currently there are various Standards Forms of Construction Contracts such as PAM 2006/1998, PWD 203/203A, IEM 1989 and CIDB 2000 which contain relevant provisions where variation claims may be applicable⁵. Despite the fact that there are adequate mechanism provided in many standard forms of construction contracts, yet delay in closing the project especially at the stage of final account settlement are still occur in our country specifically for government projects. The issue is that what is the mechanism or techniques of valuation is currently applied. As mentioned earlier, disagreements of the valuation of variations among the parties involved in the contract is a factor of the delay. This may be another issue that can be highlighted as what are the causes of the disagreements between contractors and clients which contribute to the delay in the certification of variation works. Delay in payments will definitely affect the cash flow position of contractors.

⁴ Muhammad Ehsan.C.M, (2006) Thesis, *Payment Woes Among Malaysian Contractors*, UTM.

⁵ Master Builders, 3rd Quarter, 2007.

Many measures have been recommended to be taken by the government to overcome this problem in order to improve the cash flow position of contractors and one of the measures is to expedite the processing of variation order and final account on the part the government so that payment could be made to contractors⁶. All the actions that have been agreed to must be implemented without any undue delay. A heightened sense of urgency should prevail. Taking decisive action and implementing the decisions decisively and with the minimum amount of delay must be an integral part of the national Economic Recovery Plan. Delays in implementation will lead to delays in the recovery. This must be avoided at all costs. In implementing the decisions some unanticipated problems may surface. These problems must be overcome with the minimum amount of delay too. The problems must not be allowed to accumulate and fester⁷.

According to the literature reviews and discussion with the contract administrator from technical departments which handling contract administration on projects development, it was mentioned that in settling the variation of works, they are practicing the rule for valuing the variations as provided in the standard form of building contract traditionally being practiced in this country such as CIDB2000, PAM2006/1998, IEM1989 and also JKR 203A for government projects. Currently, the rule for valuation of variations can be classified into three categories as follows:

- i. Work of similar character in similar conditions, use BQ rate to determine proportionally valued rates (pro-rata rates).

⁶ National Economic Recovery Plan, Chapter 7, Economic Planning Unit, Prime Ministers Department, July 1998.

⁷ National Economic Recovery Plan, Chapter 8, Economic Planning Unit, Prime Ministers Department, July 1998.

- ii. Work of dissimilar character or executed under dissimilar conditions, use BQ rates as far as reasonable (pro-rata rates) or make a fair valuation.
- iii. Work that cannot be properly measured or valued, use daywork, which is written evidence of time spent and materials used to carry out variation work. The information is recorded on standard daywork sheets, which are signed by the clerk of works.

Although there are rules for valuing the valuation provided but the effectiveness of these rules toward the reduction or settlement of the disputes and conflicts in construction management is still been discussed over the years. Variations in construction projects create a considerable number of managerial and legal problems⁸. The approach has been to set out the circumstances in which variations occur, the reasons why they occur, and what industry believes is the reason for their occurrence. Then, to consider in detail the mechanisms to be adopted for issuing instructions to contractors under various contract forms, to consider which instructions constitute variations and how such variations are valued and how the valuation can contribute to dispute and conflicts.

1.3 Aim and Objectives of Study

The aim of this study is to assess the adequacy and appropriateness of techniques of valuing the variations as provided in the various standard forms of construction contracts as to minimize disputes related to claims for variation works in the government projects and the related law cases in

⁸ Hibberd, Peter R. *Variations In Construction Contracts*, 1986.

construction projects management. In order to achieve this aim, the following objectives have been identified:

1. To study the techniques for the valuation of variations and problems associated with it.
2. To investigate the relevant cases of contract law in relation to the valuation of variations.
3. To identify the feasible solution of minimizing the disputes in valuation of variations.

1.4 Scope of the study

Previously, many studies were conducted on variations. These studies were mostly in regards to the causes and effects of variation orders in UTM construction projects (*Norhayati, 2006*), Designer's Liability For Variation Order (*Ezlina, 2005*), Variation Orders In TNB Projects (*Baharuddin, 2005*), problems of Variation works by the client during construction stage (*Wan Razali, 2003*), analysis on the implications of the instruction to variations on the cost and time for the design and build contract (*Asmawan, 2004*) and managing the variation orders in MARA projects and methods on minimizing the variations (*Syarifah Ruzana, 2009*). However, the mechanisms for the valuation of the variations and its contribution to the conflicts and disputes were not comprehensively discussed in detail in the previous studies.

Thus, this study will extend the findings on variations particularly in valuation of variations. The scope of this study is mainly on the mechanism or techniques in accordance to the provisions in the standard forms of

construction contracts in valuing the variations and will be supported by the related contract law cases with associated problems in relation to valuation of variation orders.

This study will be focusing on the construction projects using the conventional standard forms of construction contracts for government projects in this country. Nevertheless, comparative study is also will be discussed on other standard forms of contracts which have been practicing in private projects in this country with regards to the valuation of variation orders.

1.5 Significance of Study

As highlighted, the valuation of variation orders has been admitted as one of the main causes for conflict and disputes in construction management. A mechanism is required to accommodate the process of the changes in order to derive a more objective decision-making. An appropriate mechanism should be identified as a potential feasible solution for modeling the decision making process in the valuation of variation.

Thus, through the findings of this study it is hoped that the government generally and most importantly all the technical departments specifically such as Public Works Department (JKR), Department of Irrigation and Drainage (JPS), National Housing Department (JPN) and other technical agencies which involve in the implementation of many construction projects development in this country, will have a more conceptualized frameworks in the process of valuing the variations.

It is also hoped that this study will assist the government and all the technical agencies to adopt and implement the most appropriate mechanism or techniques in order to minimize conflicts and disputes from the valuation of variations. Eventually, the delay of construction projects due to disagreement on valuation of variation orders can be avoided.

1.6 Research Methodology

In order to achieve the aim and objectives of this study, the approaches being taken towards the collection of the data and information are based on the following steps:-

- 1.6.1. Based on the research, study and discussion on the topic of this study, identify the problem statement for the topic and this is achievable through literature review on articles, journal, books, conference papers and the like.
- 1.6.2. Having collecting all the information and data as a secondary information, the aim and objectives of this study are identified.
- 1.6.3. To support the secondary information, primary information will be collected. This will be conducted through interviews, discussion, observation and investigation with the related government department and other technical agencies as well on the mechanism used for the valuation of variations.
- 1.6.4. Analysis on the data and primary information will be done so that the findings of this study can be concluded.

The following is the research methodology flow chart.

