

Variations in government contract in Malaysia

- ~ **Jaspal Singh Nachatar** (*Universiti Sains Malaysia*)
- ~ **Abdul Aziz Hussin** (*Universiti Sains Malaysia*)
- ~ **Abdelnaser Omran** (*Universiti Sains Malaysia*)

ABSTRACT: *The complexity of construction works means that it is hardly possible to complete a project without changes to the plans or the construction process itself. There can only be a minority of contracts of any size in which the subject matter when completed is identical in every respect with what was contemplated at the outset. As such, variations are inevitable in even the best-planned contracts. This study is attempted to examine the ways a variation was formed in law and project, in finding out whether the Standard Form of Contract used in Malaysia particularly the government Public Works Department (PWD) form has been utilized to the best level in variation cases. Additionally, this study examined the benefits of variations to parties in contract and also provides suggestions and assumptions in an effort to contribute solutions to issues and problem detected. The research methodology used in this study was an extensive review of relevant literature, case study, empirical questionnaires and structured interviews and general observations based on experience and surroundings. The academic study approach incorporated stages such as initial understanding, data and information gathering, analysis of data, findings and conclusion and general suggestions in the study. The major findings of this study, among others, revealed that the existences of variations are common in projects. The main cause of variations was due to client request because of inadequate project objectives for the designer to develop comprehensive design. Besides, the analysis pointed out that the government form of contract the Public Works Department (PWD) 203/203A can help in overcoming projects with variation because of the clear defined procedure. This study also found that proper planning and coordination at tender stage can minimize the risk of 'unwanted' variations. In conclusion, this study recommended that future research should be done in design and build based contract as such new information sharing can lead to an expansion to the body of knowledge of the construction industry in Malaysia.*

Keywords: Variation, government contract, variation order, Penang, Malaysia.

1. Introduction

Use of the word 'variations' in building contracts usually refers to a change in the works instructed by the architect, contract administrator or the employer as the case may be. Most standard forms of contract include a clause under which the employer or his representative is able to issue an instruction to the contractor to vary the works which are described in the contract. A change in shape of the scheme, the introduction of different materials, revised timing and sequence are all usually provided for by the variations clause. It will also usually include a mechanism for evaluating the financial effect of the variation and there is normally provision for adjusting the completion date. In the absence of such a clause the employer could be in a difficulty should a variation to the works be required and the contractor could not be compelled to vary the works and he could insist upon completing precisely the work and supplying precisely the material for which he has contracted. No power to order variations would be implied in such situation.

The complexity of construction works means that it is hardly possible to complete a project without changes to the plans or the construction process itself. Construction plans exist in form of designs, drawings, quantities and specifications earmarked for a specific construction site. Changes to the plans are effected by means of a variation order initiated by a consultant on behalf of the client or as raised by the contractor. Legal precedents, illustrate that variations date back to time in memorial. While their occurrence is no longer an inconceivable issue, it is their effect and subsequent management

that continues to challenge stakeholders of projects to this day. This happens against a background that over years, experience has been gained to handle variations in form of contract clauses and procedures, which define what constitutes a variation and how to manage them. They continue to cause undue uneasiness to the stakeholders because of their effect on the successful delivery of projects in terms of cost, time, quality and utility. Disputes and misunderstandings are still encountered when variations arise, often causing disruptions to the smooth running of projects. This study is attempted to examine the ways a variation was formed in law and project, in finding out whether the Standard Form of Contract used in Malaysia particularly the government PWD form has been utilized to the best level in variation cases. Additionally, this study examined the benefits of variations to parties in contract and also provides suggestions and assumptions in an effort to contribute solutions to issues and problem detected.

2. Variation in Government Contract

There is no single definition of what constitutes a variation. In general, the ever famous 'guru' of construction industry Prof. Vincent Powell-Smith ascribes the followings meaning to the term *variation*:

Any change to the works as detailed or described in the contract documents....

On a broad-brush approach, following the above mentioned definition, there is, prima facie, a variation every time there is a departure from the work stipulated in the

contract. Whether such a variation is in law strictly a variation with its attendant legal consequences has to be established in relation to the particular contract involved. Usually, each standard forms of building contract will contain a definition of a variation in terms of specific actions and activities. As for the PWD 203/203A (Rev. 2007) Condition of Contract, Clause 24.2 defines and stipulates that:

24.2 The term 'Variation' means a change in the Contract Document which necessitates the alteration or modification of the design, quality or quantity of the Works as described by or referred to therein and affects the Contract Sum, including:

- a) the addition, omission or substitution of any work;*
- b) the alteration of the kind or standard of any of the materials, goods to be used in the Works; or*
- c) the removal from the Site of any work executed or materials or goods brought thereon by the Contractor for the purposes of the Works other than work, materials or goods which are not in accordance with this Contract.*

Fong (2004) defines Clause 24.2 by explaining that the meaning of variation for the purpose of the Contract as the alteration or modification of the design, quality and quantity of Works shown upon the Contract Drawings, Bills of Quantities and/or the Specification. It also includes the addition, omission or substitution of any work, alteration of the kind or standard or any of the materials or goods to be used for the Works and the removal off the Site of any work, material or goods executed or brought to the site except if the work, material or goods are not in accordance with the Contract.

3. Variations and variation orders

Any deviation from an agreed well-defined scope and schedule can be called as variations. Stated in a different way, this is a change in any modification to the contractual guidance provided to the contractor by the owner or owner's representative. This includes changes to plans, specifications or any other contract documents. A variation order is the formal document that is used to modify the original contractual agreement and becomes part of project's documents (Fisk, 1997; O'Brien, 1998). Furthermore, a variation order is written order issued to the contractor after execution of the contract by the owner, which authorize a change in the work or an adjustment in the contract sum or even the contract time (Clough and Sears, 1994). For a variation to be tenable at law, it must be valid in the first place. Unless such a change meets the validity test, the contractual consequences ensuing thereof cannot arise and accordingly cannot be enforced. Therefore, the contractor cannot be compelled to comply with any variation order issued and he on his part may not be able to recover his contractual entitlements as to additional costs and/or time, for instance. It is hence apparent that the central issue of validity forms the essence of a contractually tenable and therefore enforceable variation; a matter that continues to generate disputes in many a contract in the engineering and construction industry. According to Harbans Singh (2002), when one classifies a variation as 'valid', the fundamental reference is in terms of posing the question: whether the change has been carried out in compliance with a valid variation order or not? The term variation order in turn has no magical meaning but its precise ambit

must be appreciated to ensure that the elements of validity are not compromised. Prof Vincent Powell-Smith in relation to engineering contracts which holds a 'variation order' to be:

An instruction of the engineer to effect a change to the works as defined in the contract documents, it is commonplace for a variation simply to be issued as an engineer's instruction; it being evident from the content that it is a variation. Alternatively, variations are issued separately on variation orders.

The principal elements of a valid variation order outlined by Harbans Singh (2002) are, a variation must be in the form of an 'instruction' in the formal/contractual sense. Secondly, the person issuing the instruction must be the contract administrator or the person empowered under the contract to issue such instruction. Third principle is the instruction must effect a change to the works and forth is the works being changed or varied must be spelt out or defined in the contract documents. Fong (2000) in 'Law and Practice of Construction Contract Claims' identifies two main factors determining the validity of a variation order. First, the legal nature of the proposed change, i.e. contract conditions governing variations and the common law rules governing the scope of change. Second the formalities governing the change, e.g. issue of the variation order by the designated person and the applicable procedural requirements. Fong (2000) explains further that under contract conditions governing variations, it is settled law that a contractually valid variation order can only be issued if there is a term in the contract permitting the same and strictly in accordance

with this term. Should there be no such term or that the provisions of an existing term be not complied with, any variation order thereupon issued may, for all intents and purposes, be invalid and therefore unenforceable. To cater for the eventuality of permitting such variations to be effected, most if not, all the standard forms of conditions of contract have incorporated express stipulations in the conditions of contract. In the rare situation of the absence of such an express stipulation in the contractor it being rendered invalid/unenforceable, the parties have only a number of alternatives available to them; one of these being to enter into a supplementary agreement to enable the varied work as envisaged to be carried out. To preclude such a situation from arising and to obviate its attendant complications, it is necessary for the parties to ensure that not only the relevant express provisions are included in their contract from the very outset but these are religiously adhered to in the implementation stage. Under the second factor of determining validity of a variation order, Fong (2000) explains, for a variation order to be upheld as contractually valid, one of the main requirements is that it must be issued by the person empowered under the contract to effect the same. Such a body or person might be:

- a) The employer himself; or
- b) The contract administrator; or
- c) Any other body or person designated in the contract or authorized expressly under the contract.

The body or person so designated can be either named in the contract or empowered through a formal letter of delegation of power issued after award of the contract during the currency of the contract. The above requirement is neatly summed up in the following words by Robinson and Lavers:

The employer, under all standard forms, is required to exercise his right to change the contractor's obligations, through the agency of the architect (or engineer or supervision officer). The contractor is generally under no obligation to accept instructions direct from the employer except under some governmental forms where such a right of direct communication is retained for reasons of national security. The use of the architect as agent in this context is necessary of course to ensure coordination of the design, to ensure standardized administrative procedures and because, in most cases, the initiator of the changes is the architect himself as his detailed design work progresses.

As can be distilled from the above extract, in most contracts, this power is delegated to the contract administrator, i.e. the Architect in the PAM Forms, Engineer in the IEM Forms, Employer's Representatives in the Putrajaya Forms, etc. It is pertinent to note that once the contract designates a specific person as the official who is empowered to vary the works or a specific person is delegated this duty, a variation order issued by any other person will not be contractually valid. Furthermore according to Robinson & Lavers (1988), in exercising this power, the contract administrator must ensure that the said power meets the following criteria:

- It covers the nature of the variation or change ordered;
- Covers the extent of the variation or change envisaged; and
- It meets any express time limit prescribed for exercising such powers, e.g. whether the contract permits variation orders to be issued after practical completion of work, etc.

The following characteristics and/or features of the power of the contract administrator to vary works should also be considered according to Harbans Singh (2002). The characteristics are, the employer may (either in the contract or the letter of delegation of powers) subject the exercise of the said power to certain procedural and/or financial limitations, e.g. in Public Works Contracts, the prior consent of the employer may be a prerequisite to the contract administrator's issuing any variation orders. Where the contract administrator is empowered under the contract to vary the works, his use of such power as the employer's agent is for the purpose of the contract purely discretionary: *Neodox Ltd v The Borough of Swinton & Pendlebury*. Second characteristics will be a person who is designated as the party empowered to issue variation orders is not obliged to exercise the said power 'fairly' as the said power is normally only for the benefit of the employer and the person exercising such power is acting as the latter's agent: *Davy Offshore v Emerald Field Contracting*. As an overview, the contract administrator must be mindful not to exceed his real or ostensible authority or act beyond the powers vested in him under the contract or in his professional services agreement. Should such an eventuality occasion, he may be culpable of acting *ultra vires* with such possible consequences of rendering any variation order issued invalid and/or exposing himself to claims of breach of contract or negligence by the employer. According to Fish (1997), there are two basic types of variations: directed and constructive changes, which are discussed in detail below:

I. Directed Changes

Directed changes are easy to identify. A directed change occurs when the client directs

the contractor to perform works that are different from the specified in the contract or an addition to the original scope of work. A directed change can also be deductive in nature, that is, it may reduce the scope of work called for in the contract. Disagreements tend to center on questions of financial compensation and the effect of the change on the construction schedule for directed changes.

II. Constructive Changes

A constructive change is an informal act authorizing or directing a modification to the contract caused by an act or failure to act. In contrast to the mutually recognized need for change, certain acts or failure to act by the client that increases the contractor's cost and/or time of performance may also be considered grounds for a variation order. This is termed as a constructive change and must be claimed in writing by the contractor within the time specified in the contract documents in order to be considered.

4. Evaluating the need of variation orders

The usage of a variation order is to effect a change in the contract. As mentioned previously, such changes should always be in writing to avoid unnecessary disputes among the owners and the contractors. The following are some of the purpose served by variation orders (Fisk, 1997):

1. To change contract plans or to specify the method and amount of payment and changes in contract time there from.
2. To change contract specifications, including changes in payment and contract time that may result from such changes.
3. To effect agreements concerning the order of the work, including any payment or changes in contract that may result.

4. For administrative purpose, to establish the method of extra work payment and funds for work already stipulates in the contract.

5. For administrative purposes, to authorize an increase in extra work funds necessary to complete previously authorized change.

6. To cover adjustments to contract unit prices for overruns and under runs, when required by the specifications.

7. To effect cost reduction incentive proposal (value engineering proposals).

8. To effect payment after settlement of claims.

A variation order is used in most instances when a written agreement by both parties to the contract is either necessary or desirable. Such use further serves the purpose of notifying a contractor of its right to file a protest if it fails to execute a variation order (Fisk, 1997). The absence of a variations clause undoubtedly makes it difficult to vary the terms of the contract but it is at least possible that the courts would imply a term allowing minor variations to be made. In any event, it would of course be most unusual for a contractor to attempt to refuse to carry out small changes and even less likely that the contractor would go to court over an attempt to impose them. By inserting a clause which allows for changes to be made to the works as they are being built, the employer, through the contract administrator, can alter the works as and when necessary. The purpose of the variation clauses is to allow such changes to be made, and also to permit any consequential changes to be made to the contract sum. Furthermore according to Murdoch & Hughes (1996), it is always

possible for a contract to include a clause that fixes express limits on the amount of variations. In any event, it must be borne in mind that the existence of a variation clause does not entitle the employer to make large scale and significant changes to the nature of the works, as these are defined in the recitals to the contract. In particular, variations which go to the root of the contract are not permissible. If the recitals state that 8 dwelling houses are to be built, then a variation altering this to 12 would possibly be constructed as going to the root of the contract. However, if the recitals state that the contract is for 1008 houses, then a variation changing this to 1012 would not go to the root of the contract, because it would be a minor change in quantity. If the quantity of work is not indicated in the recital, then the question does not arise in the same way. What is probably more important is that if the contract is for the erection of a swimming pool, a variation which attempts to change it to a house would clearly be beyond the scope of the contract. There are two classic cases to explain the above statement. The first case is in *Blue Circle Industries Plc v Holland Dredging Company (UK) Ltd* the parties entered into a contract under which the defendants were to dredge a channel which served the plaintiffs docks in Lough Larne, Eire. The dredged material was to be deposited in areas of Lough Larne to be notified by the local authority. When the plaintiffs instructed the defendants instead to use the dredged material so as to construct an artificial island, it was held that this could not be regarded as a variation. It was beyond the scope of the original contract altogether, and thus had to form a separate contract. In *McAlpine Humberoak Ltd v Mc Dermott International Inc*, on the other hand, the

plaintiffs entered into a sub-contract for the construction of part of the weather deck of a North Sea drilling platform. The documents on which the plaintiffs tendered include 22 engineers' drawings. However, when work began, a stream of design changes transformed the contract into one based on 161 drawings. The trial judge ruled that these changes were so significant as to amount to a new contract, but the Court of Appeal held that they could all be accommodated within the contractual variation clause.

5.0 Potential Effects of Variation Orders

Research on the effects of variation orders were done by many researchers (Clough and Sears, 1994; Thomas and Napolitan, 1995; Fisk, 1997; Ibbs, 1997; Veenendaal, 1998; Reichard and Norwood, 2001; Arain and Low, 2005; Moselhi et al., 2005). Changes that occur during construction will affect any project (Reichard and Norwood, 2001). Lewis (1991) indicated that change orders have its ripple effects as a contractor does not work in a vacuum; rather must properly allocate his limited resources within projects and between actual and potential projects. Thus, whenever a change occurs, a contractor must make adjustments to work under the contract and reallocate time, material and labour resources. Arain and Low (2005) identified 16 potential effects of variation orders on institutional building from the research they did in Singapore. The effects that were determined are discussed further below.

5.1 Progress is Affected but Without any Delay

Project progress and quality may be affected by variations (Arain and Low, 2005). During construction, time is of the essence.

However, according to Arain and Low (2005), only major variations during the project may affect the project completion time because the contractor would usually try to accommodate the variations by utilizing the free floats in the construction schedules. Therefore, variations will affect the project progress but without any delay in the project completion date.

5.2 Increases in Project Cost

During the construction phase, the most common effect of variations is the increase in project cost (CII, 1990). The increase in the project cost is caused by any major additions or modifications to the design (Clough and Sears, 1994). Therefore, contingency sum will usually be allocated in every construction project to cater for any possible variations in the project, while keeping the overall project cost intact.

5.3 Hiring New Professionals

CII (1995), variations often occur in complex technologies projects, this may be caused by something was overlooked by the architect/engineer during the design stage. Complex technologies projects need specialists to get the job done (Fisk, 1997). Depending on the nature, occasionally, new professional need to be hired or the entire project team is replaced to execute the variations (Arain and Low, 2005). Hiring the new professionals takes time and thus affecting the project progress.

5.4 Increases in Overhead Expense

Variations need to go through a few stages of processing procedures as mentioned earlier and require to be evaluated before they can even be implemented (O'Brien,

1998). Because of this, the overhead expense for all the parties involved will increase as there is a lot of work and paperwork need to be done. However, normally these overhead charges are provided for from the contingency fund allocated for the construction projects (Arain and Low, 2005).

5.5 Delays in Payment

Delay in payment occurred frequently due to variations in construction project (CII, 1990). CII (1995), variations may hinder the project progress as mentioned before thus leading to delays in the construction works done which will eventually affecting payments to the contractors. If the main contractor does not have enough funds to pay the subcontractors then this may cause severe problem to both the main contractor and the subcontractor as well. This can happen because some main contractor depends on the payment from client to pay the subcontractors.

5.6 Quality Degradation

Frequent variations may affect the quality of work adversely (Fisk, 1997). This may be because of frequent variations may cause the contractors to compensate their losses by cutting corners.

5.7 Productivity Degradation

Variation orders often associated with interruption, delays and modification of work do have a negative impact on labor productivity. Hester et al., (1991) feel that the productivity of workers was expected to be seriously affected in cases where they were required to work overtime for prolonged periods to compensate for schedule delays. Thomas and Napolitan (1995) concluded

from their research that variations normally led to disruptions and these disruptions' were reasonable for labor productivity degradation and on average, there is a 30 percent loss of efficiency when changes are being performed. Thomas and Napolitan (1995) also feel that the most significant types of disruptions were due to the shortage of materials and lack of information as well as the work out of sequence and these disruptions result in daily loss of efficiency in the range of 25 to 50 percent. Reichard and Norwood (2001) found out from their research that if variations reach 10 to 15 percent of the originally planned labor hours, productivity of the remaining unchanged work will decrease due to the extra labor hours spent on executing the variations. According to Moselhi et al., (2005) the few factors that were found to influence the impact of variation orders on labor productivity are as follows:

6.0 Research Methodology

Systematic research method is important to get good research result. Research system that is reliable has to be used so that the objectives that were lineout above will bare result.

6.1 Data Collection

Data collection was carried out through primary and secondary sources. As for primary data, the data shall be acquired through case study, questioners, observation, structured interviews (both contractor and clients). The scope of case study and questioner's distribution shall be confined to Penang. The secondary data shall be acquired from library, resource center, Government Departments, lectures, Internet and other sources. As an illustration, secondary data shall be obtained

from references books, newspaper, journals and other printed materials. This is important since appropriate and relevant data and information related to the study is necessary prior to a detailed analysis. For the purpose of this study, the researcher developed a structured interview-based questionnaire. The purpose of such method was primarily to gather data relating to the research objectives in this study. Among the relevant questions asked include the cause of variations in a project, the forms of contract involved and procedures or steps undertaken when there is a variation.

6.2 Questionnaire Design

The questionnaire in this study consisted of two segments; basically Segment A and Segment B. Segment A consisted of information related to the demographic data of the respondents. Among the variables in this section include, age, gender, years of experience and profession of the respondent. In Segment B, questions posed were related to the research paper, and included items on awareness in construction contract variation, the frequency of such variations, the cause of variations in a project and the procedures taken when there is a variation in a project. The questionnaire items, particularly related to the area of study, were formulated based on an extensive literature review and frequent discussions with the supervisor of the study. After some review and amendments, a final copy of the questionnaire was produced.

6.3 Questionnaire Distribution

A total of 50 questionnaire forms were distributed to selected respondents in the construction industry mainly operating in the northern state of Malaysia, Penang. The

method used by the researcher in the distribution was on a personal contract-basis. In this method, the researcher himself went to meet the respondents and provided them with a copy of the questionnaire. The technique used in data collection was a drop and pick-up technique. In this technique, respondents were given the questionnaire and told that the completed questionnaire shall be picked up the next day. The questionnaires in this study were distributed on 28th December 2009 to 28th January 2010. 15 of the respondents returned the completed questionnaire on the same day. There were a few cases when the researcher was informed that the completed questionnaire shall be returned the next day. However, this did not happen. Although the initial plan, as stated earlier, was to collect the questionnaires from the respondents the next day; however it was different in practice. Some 10 respondents took more than one day to send in their responses and another 5 respondents took 14 days to reply. Although the respondents were reminded via a telephone call and through personal contact, the researcher did not receive the completed questionnaire. Thus, most probably, either the respondent would have misplaced the questionnaire, or changed his (her) mind about participating in the study.

7. Results Analysis

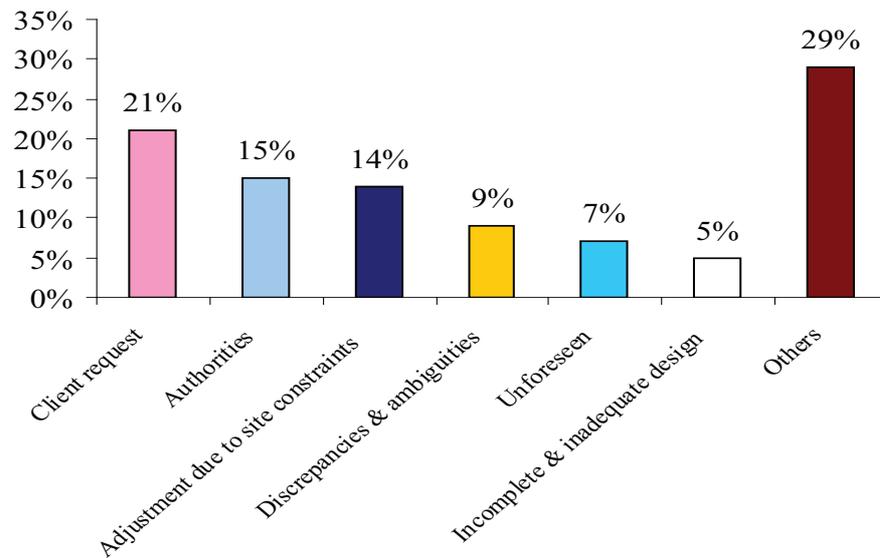
In analyzing the detailed information based on questionnaire in this study, it further reinforces the existences of variation as a common occurrence in a typical project. When the respondents in this study were asked if variation were common in projects thru their working experience, 97% of the

responders answered yes. This study confirms that the reasons of variation offered by respondents were in lined and seems to fit the literature review. From the many reasons or causes of variation the single most frequent cause of variation was client request (21%). Results from the questionnaire study seem to support the case study findings in the sense that the second highest contributor of variation for Balai Bomba Kepala Batas, Penang was due to client request. Example of variation due to client request is change of plan or scope of project, inadequate project objectives and many more. Under the case study of this research the reason of variation is due to inadequate project objectives that result in the designer unable to develop a comprehensive design which leads to numerous variations during the project construction phase. With reference to the procedures be taken when there is a variation in a project, it was observed among the procedures followed were checking with the relevant contract and drawings to establish and valid variation and then gather information to produce an estimate and brief clients on the financial impact of the variation, issue SO instruction to contractor for changes, verify estimated cost and whether cost is treated as variation (addition/omission) and finally owners approval for variation to be carried out. Basically, the procedures taken when there is a variation are relatively same in process. These procedures are affirmed in the researcher literature review by Harbans Singh (2002) explaining that most of the standard forms of construction contract provide some basis procedures or rule for variation works. The rules are often similar in principle. Either its private sector or government sector standard form

of contract the producers on how to identify a variation, measurement of variation,

valuation and also payment of varied work are outlined in detail in these forms.

Figure 1: What are causes of variations in a project?



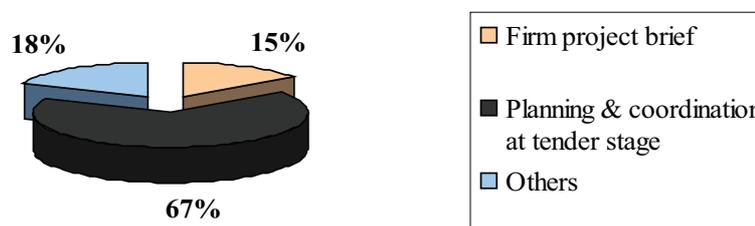
With reference to the second objective of this study, majority (87%) of respondents agreed that PWD standard form of contract can help them in overcoming a project that has variations. Some of the reasons outlined by respondents on how the standard form of contract helps in variation were, the variation clause clearly defines what variation is. Some respondents agreed that the PWD form provides a framework and spells out the necessary steps/ procedures needed for both parties (client and contractor) in terms of responsibilities, scope, obligations of the parties concerned. On the other hand, some respondents (13%) did not agree that PWD form of contract could help them in overcoming a project with variations. Among reasons given were, conditions are vague, incomplete and difficult to implement effectively. Some even argued that it does not overcome projects with variation but only provides good procedures and fair to both parties. Referring

to the case study, the form of contract used for the project was PWD 203A. Based on the researcher findings, the form of contract helped and gave an explicit guide to the contract administrator in deciding, valuating, issuing and even in rejecting some variation claimed by the project contractor. Undoubtedly PWD form of contract and its clauses has the clarity in dealing with variation procedures and this is an integral part of effective management of variation. The procedures in this form are clear to all parties and would help in reducing variations. Furthermore the comprehensive and balanced variation clauses in PWD form would help in improving coordination and reduce conflicts that can result in problems and misinterpretation. Generally, supported with the outcome and result of the study and observation by the researcher it can be concluded that PWD form can and does help in overcoming projects with variations. In discussing the ways towards, minimizing the

risk of 'unwanted' variations, the soundest proposal in this study is to have proper planning and coordination at tender stage. It is in tandem with the Japanese policy that 80% of effort and time should be in the planning stage and the other 20% in implementation stage. As contract documents and drawings

are the main source of reference and information, good coordination and involvement of all professional parties and even the client is important in developing creative and practical ideas that minimize discrepancies and resulting in reduced variation.

Figure 2: Minimize the Risk of 'Unwanted' Variations?



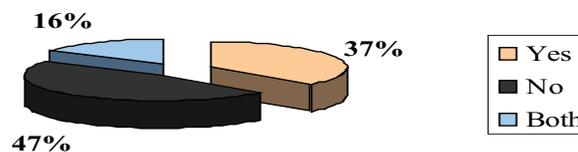
The involvement of the owner in the design phase would assist in clarifying the project objectives and in identifying the noncompliance with their requirements at an early stage. The controls for the errors and omissions in design, design discrepancies and frequent change in design, would be through detailing of design. Thorough detailing of design was perceived as one of the most effective controls for variation. This process would assist in identifying the errors and ambiguities in design and help in elevating variations. Involvement of professionals at initial stage can assist in developing better and practical designs. Another suggestion in minimizing the risk of 'unwanted' variation is to have clear and complete project brief. It helps in controlling variations as it helps in clarifying the project objectives to all parties. In my own view, variations must be kept to a minimum so that it is possible for all works to be completed by the original stipulated completion date. The study recorded a mixture of responses whether organization benefited

or not from variation. With 37% respondents agreeing it benefited them, where else 47% disagree variations can benefit and the balance 16% both agree and disagree depending on situation. In my observation, the question of benefit or not depends on what type of scenario does a variation incurred. Most contractors and consultants response was if it is an additional variation than it benefited them in terms of increase in contract sum and higher profits (for contractor) and higher percentage of fees for consultants but not beneficial if a variation resulted in an omission. In the researchers own point of view, variation is an instrument to facilitate change in a contract and it is not for any parties to misuse or make profits or even lose profits from it. Some of the views or comments expressed by respondents among others were, there is no such thing as a variation free contract and any attempt towards this phenomena is an exercise in complete futility. We all know variations are the necessary 'evil' in the construction industry that cannot be avoided but should be

managed or maybe minimized thus there is no such thing as a complete and perfect contract. Analysis of detailed information in the case study revealed that there were variation with additional cost and some variation with omission (reduction in cost). It was observed that variation is a normal and common scenario in any typical construction project as

supported by literature review. The primary reason for such a case study is to provide a practical and workable scenario closely related to variation. It can be concluded that the case study is in tandem and supports the literature review and questionnaire analysis done in this study.

Figure 3: Do you think your organization Get some benefits from variations?



8. Conclusions

As a conclusion, considering the fact that variations are common in all types of construction project, it is hoped that this research can be used as a guide by professionals to reduce and control variations in projects. Although variations are frequently unavoidable in the construction industry, 'unwanted' or negative variations are undesirable in projects as these would have an adverse impact on time, cost and quality. The study also suggests that the management of

variation must begin from the planning stage and continue through the end of the project. Finally, the overall objectives of this study, as set out in above have been successfully achieved. It is most important to research findings and information generated shared among professionals in the construction industry. Undoubtedly, such information sharing leads to an expansion to the body of knowledge in dealing with both theoretical and practical, the legal aspects and related areas of variation.

REFERENCES:

1. **Arian, F.M.** and **Low, S.P.** (2005). *Strategic management of variation orders for institutional buildings: Leveraging on information technology*. Project Management Institute. 36 (4), 27-41.
2. **CII.** (1990). *The impact of changes on construction cost and schedule*, Construction Industry Institute, University of Texas, Austin, USA.
3. **Clough, R.H.** and **Sears, G.A.** (1994). *Construction contracting, (6th edition)*, New York: John Wiley & Sons Inc.
4. **Fisk, E.R.** (1997). *Construction Project Administration, (5th edition)*, New Jersey: Prentice – Hall.
5. **Fong, C.K.** (2000). *Law & Practice of Construction Contract Claims*. Singapore: Longman.
6. **Fong, L.C.** (2004). *The Malaysian PWD Form of Construction Contract*. Malaysia: Sweet & Maxwell Asia.

7. **Harbans Singh, K.S.** (2002). *Engineering & Construction Contracts Management – Post Commencement Practice*. Malaysia: Lexis Nexis Asia.
8. **Hester, W., Kuprenas, J.A. and Chang, T.C.** (1991). *Construction changes and change orders: Their magnitude and impact*, University of California, Berkeley, CA.
9. **Ibbs, C.W.** (1997). *Quantitative impacts of project change: size issues*. *Journal of Construction Management and Engineering*, 123, (3), 308-311.
10. **Moselhi, O., Assem, I. and El-Rayes, K.** (2005). *Changes orders impact on labour productivity*. *Journal of Construction Engineering and Management*, ACSE, 131, (3), 354-359.
11. **Murdoch, J. & Hughes, W.** (1996). *Construction Contracts (Law & Management) 2nd Edition*. London: E & FN Spon.
12. **O'Brien, J.J.** (1998). *Construction change orders*. New York: McGraw- Hill.
13. Public Works Department (2007). PWD 203A/203 Standard Form of Contract.
14. **Rajoo, S.** (1999). *The Malaysian Standard Form of Building Contract (The PAM 1998 Form) 2nd Edition*. Malaysia: Lexis Nexis.
15. **Reichard, D.D. and Norwood, C.L.** (2001). *Analyzing the cumulative impact of changes*. AACE International Transactions.
16. **Robinson, N. M., & Lavers, A.P.** (1988). *Construction law in Singapore & Malaysia*. (Butterworth-1991). Pg. 46-56, pg.86-102.
17. **Thomas, H.R., and Napolitan, C.L.** *Quantitative effects of construction changes on labour productivity*. *Journal of Construction Engineering and Management*, 121, (3), 290-296, 1995.
18. **Veenendaal, J.A.** (1998). *Analyzing the impact of change orders on a schedule*. *Journal of Cost Engineering*, 40, (9), 33-39.