The Assessment of Applications for Extension of Time Claims in Malaysian Construction Industry

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***Abstract*—Extension of time (EOT) has become a common construction activity in many construction projects, particularly when standard forms of contract is applied; and it has been treated as an excusable delay in ordinary construction contract. Contractor and supervising engineer often spend substantial time to verify and assess the delays. A variety of techniques have been employed for such assessments. However, the effectiveness of techniques adopted has been a critical factor in attracting multinational organisation for their participations in construction industry in Malaysia. The purpose of the study was therefore to analyze different EOT evaluation techniques used in Malaysia, and to probe reasons for delays in the submission and assessment of EOT. Issues such as treatment of float time and concurrent delay, agreed programmes, scheduling software and late payment had also been pointed out. Conclusions and findings on the suitability of different techniques used were obtained from the analysis of literature review and questionnaire survey from a consolidation of practitioners. The outcome of the study provides recommendations for solution for EOT related issues as well as improving the contractual procedures.**

***Index Terms*—Claims; evaluation; extensions of time; malaysia.**

I. Introduction

Completion date is one of the most important issues in construction management. A client usually requests its appointed contractor to provide assurance on the completion date of the project managed, as well as date of handing over the completed project. To complete a project on time has always been a critical indicator measuring project success [1].

Nevertheless, with its nature of unpredictable, full of uncertainty and endless changing environment, delay has become a norm in construction field. When delay happen, contractors would be penalized and is eligible to pay the liquidated damages (LAD) amount as agreed in the contract. In order to avoid this loss, contractors often seek for opportunities to claim for EOT. Therefore, effectively managing EOT will be vital to help contractor to escape from LAD.

Contractor is bounded to meet the due date stated in the contract document and will be liable for losses derived from the delays. Even though the delay penalty is tremendous, it is still often for projects to complete later than the agreed time [2].

Procedures for dealing with time extensions are established in the general conditions of the contract. Claims for EOT must be based on delays that are caused by the owner or the owner's agents, or on delay due to acts of God or based on the provision clauses in the form of contract. Contractor has to submit supporting documents and prove the exact time affected by the causes. This becomes a burden to the contractor and it is not easy to identify the delay. Despite the application of EOT period is approved or reduced, contractor still has to complete the job within the granted EOT.

In construction industry, it is customary to incorporate provisions for EOT in the contract. When such a provision exists, the architect or other designated person will grant an extension on the contractual date for completion in the liability of the contractor on the consequent effect of liquidated damages.

The procedures to claim for EOT are closely related to the type of contract used between client and contractor. Different clauses in various forms of contracts would affect the EOT application and approval processes. In Malaysia, PAM/ISM 1969 Form were first issued in 1969 by Malaysian Institute of Architects (PAM) and the Institution of Surveyors of Malaysia (ISM). Later, other forms of contract including PAM 98, PAM 2006, Public Work Department (PWD) 203 and PWD 203A, Institution of Engineers Malaysia (IEM), and Construction Industry Development Board (CIDB) 2000 were introduced to cater for various types of conditions. Just like most of the Commonwealth countries such as Hong Kong and Singapore, these contracts carry the same offshoots and derivatives from the Joint Contracts Tribunal Ltd (JCT) contracts originated from United Kingdom [3].

II. Problem Statement & Research Objectives

In recent decades, projects have tended to become more time-constrained and ability to deliver a project on-time has becoming an increasingly important element in winning a bid. There is an increasing emphasis on tight contracts by using prime contractorship to pass time-risk onto the contractor, frequently with heavy liquidated damages (LADs) for lateness [5].

Delays are a major source of claims and disputes in construction projects [6-8] and have even been cited as the most common and costly causes of problems [9-10]. In construction industry, there are a lot of causes that may cause delay and some are unpreventable [11]. Therefore it is worthwhile to develop a guideline to justify which event is entitled to EOT and which are not qualified for the

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entitlement.

Thus, it is important for a contractor, particularly when facing delays which incurred by the client, in determining his eligibility in EOT and entitlement of suitable EOT in his contractual finish-date. Otherwise the contractor will find himself subject to Liquidated Damages (LAD) for reasons within the client's control, but not within his own control. Therefore EOT claims do happen, and they are often very difficult to prepare, both conceptually and practically [5].

Planning techniques are frequently used on a project for anticipating the possibility of EOT. There are many problems inherent in it [9]. The problems are possibly incurred due to the inability of the techniques in conducting retrospective analysis as well as adoption of inappropriate technique. Therefore, a more scientific approach is needed in evaluating the EOT in a reasonable model. It can help in avoiding unnecessary dispute or breach contract, cause by the doubtful in the process of claiming extension of time.

Furthermore, in Malaysia, local practice is doubtful in the process of claiming and assessing the extension of time. There is no standardized procedure or protocol for both contractors and clients. Therefore, it is essential to reveal the local practice on EOT before any recommendation of methods to reduce EOT claim.

The objective of this study is to identify the major reasons of applying EOT in construction project, to review and identify the most preferred technique used to substantiate and evaluate the EOT, and to identify the alternatives solution beside granted EOT.

III. EOT Evaluation Techniques

However, subcontractor related problems are still quoted as one of the main risk of construction project globally [9, 17-23]. The same applies to Malaysia, problems with subcontractors have been identified as one of the important causes contributing to delays in Malaysian construction industry. Subcontractor was quoted as one of the common causes of construction delays in Malaysian construction industry [24-25].

Several techniques are used to evaluate EOT application, namely 'Global Impact Technique', 'Net Impact Technique', 'But For Technique', 'Time Impact Technique' 'Snapshot Technique', and 'Adjusted As-Built CPM Technique'. Below are the summary of these six commonly used techniques [5,7]:

A. Global Impact Technique

All the delays are plotted on a summary bar chart. Total delay of project is assumed to be the total durations of all individual activities delayed without making allowance for concurrent delays in parallel activities.

B. Net Impact Technique

Measures the net effect of all delays including concurrent delays. It is plotted on a bar chart based on the as-built schedule. However, this method does not use network programmes and hence may misinterpret the real effect of a delayed activity on overall completion.

C. Adjusted As-Built CPM Technique

In projects where Critical Path Method (CPM) format is used to develop an as-built schedule. Delays caused will be inserted in CPM without distinguishing between different causes of delay.

D. But For Technique

Inserted all delays that happened due to reasons allowable by contract into as-built schedule. Using CPM network-scheduling format, a new project completion date will be calculated. Difference between the new schedule and the as-planned schedule is the result of delay. Different parties' 'but for' might generate different adjusted schedule, e.g. for contractor, their 'but for' is caused by owner/consultant; for consultant, their 'but for' might be due to owner/contractor.

E. Time Impact Technique

Impact of each delay or delaying event on the schedule is determined at the relevant construction stage. A 'stop action picture' of the project would be produced based on the impacts of before and/or after major delays. An additional duration required due to the delay will be added in after the 'stop action'. The difference between the projected completion dates at these two stages is considered as the delay to the project that occurred during the period. In other words, when something happened, we assume the activities are being stopped. The following activities can only be continued after taking into consideration the delaying event. Total delay in the project is the sum of all delays occur during the execution of the project.

F. 'Snapshot Technique'

Similar to 'Time Impact Technique', but this technique will consider the relationship between activities. Total project duration is divided into a number of time periods, or snapshots. When delay happened, the extra time between snapshots will be studied. The accuracy of this technique is increased by having more snapshots.

All the techniques discussed above were listed in the survey questionnaires to obtain the respondents' feedback on adopting them in substantiation and assessment of claim for EOT. In order to ensure respondents understanding on the academic terms used in the questionnaires, short definitions were provided for each technique listed.

IV. Data Collection

A structured questionnaire was used to gather data. Questionnaires were less expensive to gather data from a large number of respondents. Often this is the most feasible way to reach a large number of reviewers to ensure validity and reliability of the results. A well designed questionnaire also enables effective data gathering on both the overall performance of the test system as well as information on specific components of the system.

The questions in the questionnaire are designed in a respondent-friendly multiple choices format with a few open-ended questions at the end. The use of multiple choices is due to the natures of the construction industry itself, most of the respondents probably have no or little time to answer open-ended questions. Open-ended questions however enable a better exploration for those respondents who wish to share more. The questionnaires were pilot tested by 3

carefully selected project managers with more than 15 years of experience in managing construction projects. The questionnaire was revised according to the comments and discussion made before mailed with a self addressed stamped envelope.

A total of 70 sets of questionnaires had been sent to numerous companies includes architecture firms, consultant firms, developer, contractors and also some government bodies. These 70 respondents were carefully selected following advice of the experts involved in the pilot study. Out of 70 respondents, 36 of them responded, which account for 51.4% response rate. This fulfilled the requirement of at least 30% response rate as recommended by Enns [12]. The respondents were civil engineers (28), quantity surveyors (5) and architects (3). They represented consulting engineers (19), contractors (13) and developers (4).

The questionnaire was divided into three sections, Section A (Respondent Background), Section B (Issues of EOT) and Section C (Substantiation & Assessment of Claims for EOT). Section A would provide the respondents' background such as occupation position, type of firm attached to, year(s) of working experience and some other contact information like company name, address, phone number and email address. These information are useful for comparison of data between different groups of respondents, for instance comparing the difference of perception on EOT among contractors, consultants and developers.

Section B would gathered information about current practice of EOT, opinion of respondents on issues like float time, who should own the float time, concurrent delay by both parties, contractual requirement on approved programme, use of scheduling software between developer and contractor were disclosed in this section. These could provide information on the EOT.

In Section C, respondents are required to state their agreement on the matter of substantiation and assessment of claims for EOT. Likert scale of 1 – 5, with 1 indicating strongly disagree and 5 indicating strongly agree was used for respondents to rate their opinions. The questions covered time of claim submission, reason for delay in submission, time of assessment the claim, reason for delay in assessing the claim, major reason used to claim extension of time, late payment issue, related substantiation documents, and the technique used in substantiation and assessment the extension of time.

TABLE I: PERFORMANCE CATEGORIES

0.00 < Mean Value < 1.50	Strongly Disagree
1.50 < Mean Value < 2.50	Disagree
2.50 < Mean Value < 3.50	Neither Agree Nor Disagree
3.50 < Mean Value < 4.50	Agree
4.50 < Mean Value < 5.00	Strongly Agree

Data from Section C were analyzed through mean value analysis [13]. Formula of mean value is as shown below. The mean values were classified according to Table I.

$$Mean = \frac{\sum n1x1 + n2x2 + \ldots}{\sum n} \quad (1)$$

*n = Frequency of item, x = Likert Scale for item

V. RESULTS AND DISCUSSIONS

Respondents were asked to rate their opinion on the suitable time to submit claims for EOT. The response summary is shown in Table II. Three different timing of submitting claims for EOT were provided, 'within 28 days of the event occurrence', 'at the end of the original construction period', and 'within reasonable time'. The respondents were classified into three categories, namely developer, consultant and contractor to represent opinions of different parties. All parties agree on 'within reasonable time', with mean rating of more than 3.70. Obviously, to submit claims for EOT within 28 days is too rush. Preparation of supporting documents could involve various parties and is time consuming. Nevertheless, to submit at the end of the original construction period, might lead to misplace of supporting documents.

TABLE II: TIMING OF SUBMISSION OF DETAILS OF CLAIMS FOR EXTENSION OF TIME

Representing	Mean Score		
	Within 28 days of the event occurrence	At the end of original construction period	Within Reasonable time
Developer	3.00	3.25	3.75
Consultant	3.37	2.63	3.95
Contractor	3.38	3.00	3.77
Total	3.33	2.83	3.86

The respondents were requested to identify the reasons for delays in submissions of details of EOT claims, and these were ranked based on the mean value. Reasons for delays in submissions were ranked in Table III. Comparison with the previous researcher who did the similar research in Hong Kong [7] was also presented.

'Site staff inexperienced in contract procedures and task undertaken by head office expert who needs time to understand claim situation' were rated as the main reason for delay in submitting the details of EOT. Often, documentation works are prepared by staff in head office which has limited knowledge on real site phenomenon. Miscommunication between the site staff and staff in head office might further delay the preparation process. However, the same reason was ranked at the 9th position in Hong Kong [7].

The following reasons ranked at second and third place are 'If the claim is related to inclement weather usually prompt action is taken' and 'Engineer requests excessive details'. Similarly, these two reasons are ranked at the 9th position in study conducted by Kumaraswamy and Yogeswaran [7]. In Hong Kong, inability to identify the full extent of the delay at the beginning of the event causing the delay was the top reasons for delay in submitting details of EOT. Nevertheless, these reasons were at the second last in Malaysia's construction industry. This could be caused by different culture of management practiced in these two countries. Further, the procedure of submitting claims for EOT might differ due to the different types of contract used.

TABLE III: REASONS FOR DELAYS IN SUBMITTING THE DETAILS OF CLAIMS FOR EXTENSION OF TIME

Reasons of delays	Mean Score		
	Mean	M'sia's Rank	HK's Rank
Site staff inexperienced in contract procedures and task undertaken by head office expert who needs time to understand claim situation	3.31	1	9
If the claim is related to inclement weather usually prompt action is taken	3.25	2	9
Engineer requests excessive details	3.19	3	9
Poor paperwork control by the contractor	3.17	4	6
Contractor wants to know exactly the amount of extension of time required such that their risk to liquidated damages can be removed	3.17	4	6
Policy to submit global claims can cause delayed submissions	3.14	6	9
Lack of contractor's management resources	3.06	7	3
Overall delay cannot be ascertained/actual delay could not be determined until end of delay or construction	3.03	8	1
General lack of details	3.00	9	3
Benefit of hindsight (choose events that attracts money)	2.89	10	9
The effects are not known/could not foresee that an event would cause a delay until the delay occurred	2.67	11	5
Focus on progress of work and not on claim/contractor's staff too busy on other tasks/lack of staff (in contractor's organisation) to deal with EOT claims	2.58	12	2
Contractor does not want to cause friction or offend the employer	2.50	13	6

Change order by consultants was rated as the main reason used to claim for EOT. Late issuance of construction drawing and material shortage at project site were rated as second and third reasons used. In Malaysian's construction industry, change order is very common. Whenever instruction for change order is issued, contractors will need to make necessary adjustment to the original scheduled work operation. This will certainly affect the planned finish date of the project.

Most of the time, construction drawings are based on preliminary design and this design is usually based on previous design experience and seldom include the crucial analysis or referred to the actual environment of the proposed site. During construction period, actual environment constraints will arise and raise ought to modify the design. This will create variation order and also additional works. Thus, late issuance of construction drawing was identified as one of the famous reason for EOT.

The respondents were also asked to identify the common techniques used in assessment of claims for EOT. It was found that contractors prefer Time Impact technique, while the consulting engineers often apply Net Impact Technique. The difference in technique applied may cause argument between the contractors and consulting engineers in the issue of duration of EOT.

The respondents have also been requested to suggest some alternatives solution besides granted the EOT. Developers suggested that contractors shall be provided incentive for their timely completion. Whilst from the viewpoint of consultants, they also agreed to compensate time with money value through acceleration claim. Meanwhile contractors also suggested that EOT should be priced into the contract before submission of a tender; therefore the loss can be taken care of if delay occurs.

TABLE IV: REASONS USED TO CLAIM FOR EXTENSION OF TI

Reasons Used	Mean Score
Change order by consultants causing project delay	4.44
Late issuance of construction drawing	4.19
Material shortage at project site	3.97
Incapability of contractor's site management to organise site activities	3.86
Late issuance of progress payment by client to contractor Material shortage at project site	3.81
Non-payment (financial problem) to suppliers causing the stoppage of material delivery to site	3.72
Late supply of materials in the market	3.58
Lack of foreign and local workers in the market	3.50
Coordination problem with subcontractor	3.14
Equipment shortage	3.03

TABLE V: PREFERRED TECHNIQUE USED IN ASSESSING CLAIMS FOR EXTENSION OF TIME

Representing	Mean Score					
	Global Impact	Net Impact	Adjusted as-built CPM	But for	Time Impact	Snapshot
Developer	3.67	3.33	3.67	3.00	3.67	3.33
Consultant	3.83	4.17	3.50	3.17	3.83	3.22
Contractor	3.75	3.50	3.75	3.27	3.92	3.58
Total	3.79	3.85	3.61	3.15	3.85	3.36

VI. CONCLUSION

A study that investigated on the assessment of contractual claims for EOT in construction industry in Malaysia has been conducted. The findings of this study provide recommendations that may help in minimizing the delays in submissions and assessment of EOT. It is recommended that each construction organization should develop its own policies, strategies and procedures to expedite an efficient and reliable EOT substantiation and evaluation. The following are the conclusions that may answer the objectives of this study:

1. EOT is one of the provision clauses in the standard contract form. The purpose is to preserve an employer's right in liquidated damages. In the circumstances that the delays are caused by inevitable reason, EOT allows contractor to set an agreed completion date.

2. The most common reason used to claim for EOT is change order by consultants causing project delay. The reasons for delay in substantial and assessment the extension of time is the inexperienced in contract procedures of the site staff and the head office expert will need time to understand the claim situation when the task is undertaken by head office and delays in submissions of details by the claimant; lack of information and clarity in substantiation respectively.

3. Time Impact technique is the most preferable technique

used to evaluate time extension, where early assessments are particularly useful.

4. Respondents' suggestion for alternatives solution except granted the EOT is to priced it into the contract, therefore if the event happened, the loss can be taken care of by compensating the time with monetary value.

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