

DELAY IN LARGE MARA CONSTRUCTION PROJECTS BASED ON PROJECT MANAGEMENT CONSULTANT PERSPECTIVE.

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Abstract— The construction industry is a major catalyst to the growth of the nation's socio economic development. The frequent delay of the large construction project has been a phenomenon and it effects the implementation of the strategic planning. This paper presents the findings of survey of dominant cause of delay in large MARA (Majlis Amanah Rakyat) construction project in the perspective of project management consultants (PMC). Respondents of this survey were personnel that work as PMC ranging from the executives, managerial and supporting groups. The result revealed that the five most significant delay causes as seen by PMC were cash flow and financial difficulties faced by contractors, contractor's poor site management, inadequate contractor experience, shortage of site workers and ineffective planning and scheduling by contractors. Hopefully, the findings of this study will at least shade some lights to the problems faced by MARA large construction project and effort can be taken to improve it.

Key words: Construction delay, MARA construction project

1.0 INTRODUCTION

MARA was formed on March 1, 1966 under the Rural and National Development Ministry and later placed under the Entrepreneur and Co-operation ministry. It plays a very important role in implementing the government policy where its core business is to aid, train, and guide Bumiputera (Malays and other indigenous Malaysians) in the areas of business and industry [1]. In implementing the policy, MARA is indirectly involved in construction industry. Some RM 12 billion were spent by MARA in its development since

its formation [1] and a portion of this allocation has been spent on construction. MARA has its own construction unit, Construction and maintenance unit (UBS) to manage the small construction project but engage PMC service for its large and complex construction project.

A project worth RM 5 million and above is considered as large construction project.

2.0 RELATED WORK

Many definitions were given to construction delays such as delays in progress compared to the baseline construction schedule [2], an event or a condition that results in work activity starting, or project completion, later than originally planned or an interruption or a hindrance to a planned program [3], the time overrun either beyond completion date specified in a contract, or beyond the date that the parties agreed upon for delivery of a project [4] and an act or event that extends the time required to perform the tasks under a contract [5]. Generally, a delay is a situation when the actual progress of the construction project is slower than the planned schedule.

2.1 TYPES OF CONSTRUCTION DELAY

[6] grouped delays into three types; *excusable delays* [compensable and non compensable delays] where contractor entitles to additional time to complete the work, due to reasons beyond the contractor's control, *non excusable delays* where contractors do not entitle for any compensation since the delay is due to their negligence and *concurrent delays* where contractor entitles only part of the compensation because the delay involves the combination of two or more excusable delay and non excusable delay.

2.2 MAJOR CAUSE OF CONSTRUCTION DELAY

In the past, extensive research works on construction delay had been carried-out throughout the world. Based on the previous study, the major causes of construction delays were identified and summarised as in **Table 1.0**. The location, policy or economic aspect of a country might influence the construction delay. It is interesting

to note that many countries shared common significant cause of delay although they are not in the same region such as Saudi Arabia, Jordan, Ghana and Malaysia where cash flow and financial difficulties to carry out with the project is one of the most significant cause of delay. While in Thailand, Saudi Arabia and Malaysia, that shortage of site workers is another significant cause of delay. The ineffective planning and scheduling by contractors is another important cause of delay in Saudi Arabia, Malaysia and Jordan. Some of the major delays are unique where it is applicable to a particular project or country only. **Table 2.0** further shows the frequency of the major causes of the delay. Based on **Table 2.0**, the most frequent major causes of delay is inadequate client's finance and payments for completed work where five out of ten research works specify this finding. The second most frequent major causes are frequent changes by owners, shortage of site workers, ineffective planning and scheduling by contractors and contractor's poor site management. The third most frequent is cash flow and financial difficulties faced by contractors, unforeseen ground condition and low speed of decision making. The fourth frequent is shortages of construction materials and inadequate contractor experience and the least frequent is the unique cause of delay where the cause is for that particular project only.

Table 1.0: Summary of research works findings on construction delay causes

Researchers & research work	Findings
	Significant Delay Causes
[8]- Thailand	<ul style="list-style-type: none"> •Shortages of construction materials. •Shortage of site workers •Frequent changes by owners.
[9] - Hong Kong	<ul style="list-style-type: none"> •Poor site management •Unforeseen ground condition •Low speed of decision making •Client-initiated variation •Necessary variations of works
[10] - Saudi Arabia	<ul style="list-style-type: none"> •Cash flow and financial difficulties •Difficulties in getting work permit •Practice of assigning contract to lowest bidder •Underestimate project duration •Effect of sub-surface condition •Changes in scope of projects •Ineffective planning and scheduling by contractors •Shortage of manpower
[11] - Jordan	<ul style="list-style-type: none"> •Inadequate contractor experience. •Owner interference •Finance and payments of completed work •Slow decision making by owners •Labor productivity
[12] -Ghana	<ul style="list-style-type: none"> •Monthly payment difficulties. •Poor contractor management. •Material procurement •Poor technical performances •Escalation of material prices
[13] - Vietnam	<ul style="list-style-type: none"> •Incompetent designers and contractors. •Poor estimation and change management. •Social and technological issues. •Site related issues. •Improper techniques and tools.

Table 1.0 : Continued

Researchers & research work	Findings
	Significant Delay Causes
[4]- Saudi Arabia	<ul style="list-style-type: none"> •Change order •Delay in progress payment •Ineffective planning and scheduling of project by contractor •Poor site management and supervision by contractor •Shortage of labors •Difficulties in financing project by contractor
[7]- Hong Kong	<ul style="list-style-type: none"> •Improper site co-ordination and management of the electrical and mechanical installation. •Lack of timely decision making of the client •Defects identified during the fire services inspection
[14]- Malaysia	<ul style="list-style-type: none"> •Contractor's improper planning. •Contractor's poor site management. •Inadequate contractor experience •Inadequate client's finance and payments for completed work •Problems with subcontractors •Shortage in materials •Labor supply •Equipment availability and failure •Lack of communication between parties •Mistakes during the construction stage
[15]- Jordan	<ul style="list-style-type: none"> •Financial difficulties faced by contractor •Too many change orders by owner •Poor planning and scheduling of the project by contractor.

Table 2.0: The frequency of main causes of construction delay

Significant cause of delay	[8]	[9]	[10]	[11]	[12]	[13]	[4]	[7]	[14]	[15]	Frequency
	Shortages of construction materials.	√								√	
Shortage of site workers	√		√				√		√		4
Frequent changes by owners.	√	√					√			√	4
Unforeseen ground condition			√	√		√					3
Low speed of decision making		√		√				√			3
Inadequate client's finance and payments for completed work				√	√	√	√		√		5
Necessary variations of works		√									1
Cash flow and financial difficulties faced by contractors				√			√			√	3
Difficulties in getting work permit				√							1
Practice of assigning contract to lowest bidder				√							1
Underestimate project duration				√							1
Changes in scope of projects				√							1
Ineffective planning and scheduling by contractors			√				√		√	√	4
Inadequate contractor experience.					√				√		2
Owner interference					√						1
Labour productivity					√						1
Material procurement						√					1

Table 2.0 : Continued

Significant cause of delay	[8]	[9]	[10]	[11]	[12]	[13]	[4]	[7]	[14]	[15]	Frequency
Poor technical performances					√						1
Escalation of material prices					√						1
Incompetent designers and contractors.						√					1
Poor estimation and change management.						√					1
Social and technological issues.						√					1
Improper techniques and tools.						√					1
Improper site co-ordination and management of the defects identified during the fire services inspection								√			1
Contractor's poor site management.		√			√		√		√		4
Problems with subcontractors									√		1
Equipment availability and failure									√		1
Lack of communication between parties									√		1
Mistakes during the construction stage									√		1

3.0 RESEARCH OBJECTIVE AND DESIGN

The objective of this research is to identify the dominant cause of delay in large MARA construction project from the viewpoint of PMC.

A survey questionnaire was developed after studying and analyzing the previous study and a preliminary study. A scale of 1 to 5 was adopted to assess the degree of agreement of each factor where 1 represented 'strongly disagree', 2 'disagree', 3 'moderately agree', 4 'agree' and 5 'strongly agree' of the causes. There is an open ended question at the end of the questionnaire for the respondent's opinion if there is any added information. Sensitive issues such as political and religious factor were omitted to avoid the prejudice response.

3.1 SURVEY METHODOLOGY

Twelve current large MARA construction project scattered throughout peninsular Malaysia were selected for the survey. The author visited the selected construction site and distributed the questionnaire to the PMC by hand [face to face method] and self collect it. Some of the questionnaire were sent by mail with stamped envelop to other respondents that were not at the site and followed up by phone. Interviews and recordings also had been carried out to clarify some issues and giving more freedom for the respondents to air their views.

Responses to the questionnaire were analyzed by using SPSS software.

4.0 DATA ANALYSIS

Forty five questionnaire were distributed to the respondents, thirty seven (82.2%) replied.

The demography of the respondents is shown in **Table 3.0**.

Table 3.0: Demography of respondents

	%
<i>Gender</i>	
Male	100
Female	0
<i>Age</i>	
>50	16.22
40-49	37.84
30-39	43.24
20-29	2.70
<i>Highest education</i>	
University[Diploma- 1st degree]	59.46
Pre-U[form 6 or equivalent]	21.62
Secondary school[form 1-5]	18.92
<i>Occupational level</i>	
Supporting	51.35
Managerial	45.95
Executive	2.70
<i>Working experience[years]</i>	
>10	81.08
6-10	18.92
<i>Field of specialization</i>	
Building	67.57
Others	13.51
Electrical	8.11
Infrastructure	5.41
Mechanical	5.41
<i>Largest project involved based on contract sum[mil RM]</i>	
RM 50000000>	86.49
RM 10000001-50000000	13.51

The data collected was analyzed by using SPSS software. Kendall's W test [16] has been carried out to determine the level of agreement of the ranked scores. The result is shown in **Table 4.0**. Based on the ranking, the five most significant cause of construction delay as perceived by PMC were: 1) Cash flow and financial difficulties faced by contractors (13.8), 2) Contractor's poor site management (12.74), 3) Inadequate contractor experience (12.61), 4) Shortage of site workers (12.36) and 5) Ineffective planning and scheduling by contractors (12.18).

Based on test statistics as in **Table 5.0**, the significant W and low p-value (less than 0.05) indicate that the respondents are applying essential the same standard in judging the importance of the factors and that they are in consensus .

Table 4.0: The ranking of the significant causes

Significant causes	Mean Rank	Rank
Cash flow and financial difficulties faced by contractors	13.80	1
Contractor's poor site management	12.74	2
Inadequate contractor experience	12.61	3
Shortage of site workers	12.36	4
Ineffective planning and scheduling by contractors	12.18	5
Escalation of material prices	11.27	6
Practice of assigning contract to lowest bidder	11.01	7
Problems with subcontractors	10.47	8
Lack of communication between parties	10.32	9
Poor estimation and change management	9.69	10
Material procurement	9.66	11
Incompetent designers and contractors	9.46	12
Underestimate project duration	8.07	13
Low speed of decision making	6.11	14
Unforeseen ground condition	6.00	15
Changes in scope of projects	5.93	16
Frequent changes by owners	5.00	17
Owner interference	4.31	18

Table 5.0 : Test Statistics

N	37.000
Kendall's W ^a	.364
Chi-Square	228.932
df	17.000
Asymp. Sig.	.000

Kendall's Coefficient of Concordance

5.0 DISCUSSION OF RESULT

The PMC believes that the significant cause of construction delays were contractor-related. Many contractors have more than one project at one time; therefore they have difficulties in financing and managing the projects. Contractors seem to switch the money from one project to another and vice-versa and when it ran out of money, the project slowed down and sometimes completely stopped.

The second significant cause, contractor's poor site management where contractors were unable to have a strong and reliable management team. The management staff and technical staff keep on changing and as a result, the management become weak and out of control

The third significant cause is inadequate contractor experience. Most of the contractor is class-A contractor where they are eligible to bid for large project but the problem arise when the contractor started employing the young and inexperience management and technical team due to cost cutting measure. These young employees have little experience in dealing with this kind of work and unable to handle the project properly.

The fourth significant cause is shortage of site workers. This is the 'spillover' effect of cash flow and financial difficulties faced by contractors. In order to control budget, the contractors reduced the number of workers resulting in shortage of workers.

Lastly, PMC also rated ineffective planning and scheduling by contractors as another significant cause of delay. Many contractors were unable to follow the planned schedule. They sometimes jumble up their work where they started work that suppose to be later but started earlier and vice-versa such as earthwork where it is suppose to work earlier, but due to certain circumstances, it was not done earlier. It is interesting to note that, the client-related factor is the least contribution to the delay in the PMC opinion as can be seen in the **Table 4** where it was ranked 16, 17 and 18.

6.0 CONCLUSION AND RECOMMENDATION

Although only PMC is involved in this study, the findings are significant enough for MARA to take note. It is concluded that the five most dominant cause of construction delay as seen by PMC is; cash flow and financial difficulties faced by contractors, contractor's poor site management, inadequate contractor experience, shortage of site workers and ineffective planning and scheduling by contractors.

It is recommended that MARA to pay more attention to the selection criteria of contractors. MARA should have a guideline so that the contractors must prove that they have sound financial standing, strong and solid management and technical team, have enough skill workers, have at least more than certain years of experience in the same environment and able to execute work according to the schedule. By referring to the past track record and recommendation from the professional, MARA should be able to determine the strength, ability and weaknesses of the contractors. Monitoring of the construction progress closely by PMC is very crucial because the problems arise during the construction can be addressed promptly and delay can be reduced or avoided.

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