Causes and Effects of Delays in Construction Industry

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Keywords: Consequence assessment; pipeline failure; corrosion; reputation loss.

Abstract. Delay is something that causes troubling in any construction project. The parties that involved ensuring the success of a construction project are clients, contractors and consultants. Construction delays will lead to bad relations between these parties and the cost of a construction project will be increased along the addition of the time given. Delays generally regarded as the most common problem, complex, risky and frequently encountered in a construction project. The objective of this study was to identify the causes of delays and the effects of delays in construction industry. Next, the correlation between the causes and effects of delays will be made. The data obtained from the survey will use a Likert Scale and analysed using Relative Important Index (RII). The study found that the three highest ranking causes of the delay by overall respondents are sub-contractors, site management and owner interference. While the effects of the delays in declaring the three highest effects are time overrun, cost overrun and total abandonment. It is expected that this study can help the studies that will be done in the future.

Introduction

Delays in a construction project can be such a problem and a very serious issue for the parties involved such as client, consultants and contractors. There are many adverse effects that can occur as the results of the delays. To reduce this problem from occurring, site management should be made carefully.

Since Malaysia is advancing towards industrialisation, the role of the construction industry is greatly enhanced. When project is delayed, the client or user will have an impact not only the building cannot be used, but they had to postpone their early planning in addition to bear the cost overruns that will increase. This issue is a major problem in the construction industry not only in Malaysia but the phenomenon is a global problem for the construction industry worldwide [1].

This study was conducted as the result of a various problems that arise in along with the delays in construction. There are different procedures to be observed by all parties so that unwanted things will not happen. Delays in construction projects are of the utmost priority. Delay is something that causes troubling in construction project. The parties that involved ensuring the success of a construction project are clients, contractors and consultants. Construction delays will lead to bad relations between these parties and the cost of a construction project will be increased along the addition of the time given.

According to research by [2], delays generally regarded as the most common problem, complex, risky and frequently encountered in a construction project. The importance of time is very important for both parties, namely the owner or client (in terms of performance) and contractors (in terms of money) and often disputed and loss can lead to legal action.

Since delays are things that need to be know so the objectives is made for this study. Study will be conducted to review and identify the causes of delay in the construction industry and also the effects due to the delays. After both of these objectives are identified, then the correlation between these two objectives will be made.

The aim of this study is to determine the causes and effects of delays in construction project. In order to achieve the aims, the study is conducted based on the following objectives which are to identify the causes of delay in construction industry, to identify the effects of delay in construction

industry and to identify the correlation between the causes and effects of the delay in construction industry.

This study is concerned about delays in construction projects. The scope of this study is different from the findings of previous studies because it only focuses on the construction industry in Skudai, Johor. This study will focus on the views of the consultants and contractors only. The findings of this study obtained from questionnaires that being distributed to the firms. Information and data obtained are based on the literature and research methods of questionnaires.

Previous Studies

According to the survey conducted by [3], there are various type of delays that can be taken into account during the period of construction. Delays can be categorized as non-excusable delay, non-compensable excusable delay, compensable excusable delay and concurrent delay. To be simply explained, non-excusable delay is cause by the contractor and the risk borne by the contractor. While non-compensable excusable delay means delay in receiving compensation beyond the control of the contractor parties and not caused by them. Compensable excusable delay is for example a reasonable delay, suspension or interruption occurs in any part of the work, which had come from the client project itself. Lastly the concurrent delay which can be said as the delays that occur concurrently or simultaneously if the client and the contractor responsible for the delay.

There are various factors that contribute to the delay of construction project whether it comes from the management problem or the technology that is less robust than others. According to the research by [2] the cause of delay is divided into two sections which are internal causes and external causes. Internal causes involve four parties that involved in the projects such as clients, designer (architect), consultants and contractors. Other than this, the delay will be considered as external causes such as government, suppliers and even the weather.

[4] summarised some of the causes of delay in the construction of project under the client, consultant and the contractor. This summary is based on some of the findings made. The study finds that there are 10 causes under clients, 13 causes under consultants and 26 causes under contractors.

Through studies conducted by [5] there are 28 causes of delays that were analysed and the result showed 5 causes viewed by the clients are improper planning by the contractor, site management by the contractor, inadequate contractor experience, shortage of labour supply and sub-contractors. From the views of consultants, the 5 selected causes are improper planning by the contractor, site management by the contractor, shortage in material, inadequate contractor experience and finance and payments of the completed work by the clients. While from the views of the contractors, the 5 causes are the site management by the contractor, finance and payments of the completed work by the clients, sub-contractors, inadequate contractor experience and equipment availability and failure.

According to the study by [6] delays will raise an issue on that construction projects such as the change in the original schedule that has been made, financial problems, labour problems and problems on the materials. In Pakistan construction industry, there are many factors that lead to delays in the construction whether it is the responsibility and are also liable under the client itself. The causes of the delays is mostly seen will lead to the causes of disputes, negotiations, lawsuits, desertion problems, litigation and lastly the causes of the abandonment of the project site [7]

According to the study by [5] they organize the feedback by the ranking using RII and from there they identify that the effects and it showed that the respondent choose time overrun and cost overrun as the most important choice. On behalf of the government, taxes do not bring any advantage as a result of these cost overruns. Similarly to the contractor, they will suffer losses and there are times when they will experience cash flow crisis. For the consultant, it will affect their reputation while client will lose confidence in their implementation plan [8].

Research done by [9] on the construction of roads by the government stated that the questionnaire that was carried out to find out about the effects of the construction delay and it

indicates that the loss of cost and waste of time is the most influential effects compared to disputes, litigation, arbitration and total abandonment

Based on the research by [10], shows several methods of minimising construction delays analysing by using Relative Importance Index (RII) and the 5 upmost methods are provide efficient project manager, ensure the necessary resources are available and sufficient, efficient and discipline project team, make sure the availability of the resource and give full commitment to the project.

Through research done by [11] about the analysis of the delay in construction project, the last part of the survey was on measures to be taken on how to avoid delays in construction projects and the results shows that the 5 highest ranking are conduct meeting to monitor progress more often, latest technology should be used, using modern construction equipment that works well, use appropriate construction methods and have a strategic and effective planning.

Methodology

The research methodology is a description of how the objectives can be realised. The data collection can be found through qualitative and quantitative methods. The data collection through these methods will be analysed and the results will be presented.

In this study, a questionnaire was developed to assess the perceptions of consultants and contractors on the relative importance of causes and effects of delays in construction industry in Skudai, Johor. The questionnaire was divided into three parts. The first part requested background information about the respondents.

The second part of the questionnaire focused on causes of construction delay. The respondents were asked to indicate their response category on 32 well-organised construction delay factors adopted by [5] Sambasivan and Soon (2007) and [12] Odeh and Battaineh (2002) and some other additional causes from the literature review that is suitable. This study is based on traditional contract only. These causes were categorised into the following eight major groups:

1. Client related factors: finance and payments of completed work, owner interference, slow decision making, unrealistic contract duration and requirements imposed and permits from municipality.
2. Contractor related factors: sub-contractors, site management, construction methods, improper planning, mistakes during construction stage, inadequate contractor experience, financing by contractor during construction and mistakes in preliminary stage (soil investigation).
3. Consultant related factors: contract management, preparation and approval of drawings, quality assurance and waiting time for approval of test and inspection.
4. Material related factors: quality of material and shortage in material.
5. Labour and equipment related factors: labour supply, labour productivity and equipment availability and failure.
6. Contract related causes: change orders and mistakes and discrepancies in contract document.
7. Contract relationship related causes: major disputes and negotiations, inappropriate overall organisational structure linking to the project and lack of communication between the parties.
8. External factors: weather condition, regulatory changes, problems with neighbours, unforeseen site condition and accidents during construction.

This part of the questionnaire focused on effects of construction delay in construction industry. The six effects of construction delay identified were: times overrun cost overrun, dispute, arbitration, litigation and total abandonment.

A five point Likert Scale range from 1 (not important) to 5 (extremely important) was adopted to capture the importance of causes and effects of delays.

The sampling method used in this study is based on previous research by Sambasivan and Soon (2007) which have 150 respondents. With confidence level of 95% and confidence of interval is

8.5%, the sample size is 70. The questionnaire was distributed by hand directly to the respondents that are in consultant and contractors firms in Skudai. From the 70 sets of questionnaire, 35 sets are distributed to the consultants and another 35 sets to the contractors. Of the 70 questionnaire only 44 (63%) sets were returned and there were 21 sets from consultants and 23 sets from contractors.

Calculation of Relative Importance Index (RII) [13] Kometa et al. (2008), [14] Aibinu & Jagboro (2002) and [15] Faridah Binti Hasbullah (2014) used the relative importance index (RII) method in their research. The same method was adopted in this study for analysis of objective 1 and objective 2 within various groups (overall, consultants and contractors). The five point scale ranged from 1 (not important) to 5 (extremely important) was transformed to relative importance index (RII) for each factor as follows:

$$\text{RII} = \frac{\sum W}{A \times N}$$

Where W is weighting given to each factor by the respondents (ranging from 1 to 5), A is the highest weight (in this case is 5) and N is the total number of respondents.

The RII value is range from 0 to 1 which the higher the value of RII, the more important was the cause and effect of delays. The RII was used to rank the different causes. The RII is then being classified based on the RII classification table as shows in Table 1.The discussion will be made when the RII was classified as most preferred causes and effects of delay only.

Table 1: Classification of RII

Scale	Level of Preference	RII
1	Not preferred at all	$0.0 \leq \text{RII} \leq 0.2$
2	Slightly preferred	$0.2 < \text{RII} \leq 0.4$
3	Moderately preferred	$0.4 < \text{RII} \leq 0.6$
4	Preferred	$0.6 < \text{RII} \leq 0.8$
5	Most Preferred	$0.8 < \text{RII} \leq 1.0$

Correlation analysis The method of analysing for objective 3 is by using correlation analysis using Microsoft Excel. The correlation is to see whether the two variables are linear to each other (negatively and positively correlated) using Pearson Product-Moment Correlation (PPMC) Coefficient Table of Critical Value [16]

Data Analysis

The demographic characteristics of respondents are given in Table 2.

Table 2: Demographic characteristics of respondents

Demographic Characteristic	Frequency	Percentage
Sex		
Male	26	59
Female	18	41
Age		
≤ 20 years old	0	0
21 – 29 years old	17	38
30 – 39 years old	21	48
≥ 50 years old	6	14
Education		
Lower Secondary (F1 – F3)	0	0
Upper Secondary (F4 – F5)	3	7
Pre-University (F6)	0	0
University	38	86
Post-graduate	3	7

Organisation		
Consultants	21	48
Contractors	23	52
Occupational Level		
Non-executive	8	18
Executive	24	55
Management	12	27
Number of Years Working Experience		
≤ 2 years	11	25
3 – 5 years	18	41
6 – 10 years	8	18
≥ 11 years	7	16
Fields of Specialisation		
Building and Infrastructure	44	100
Mechanical and Electrical	0	0
Others	0	0

Cronbach Alpha Reliability Test In a statistical test, Cronbach Alpha was used as an estimation of the reliability of psychometric test. In statistics, Cronbach's Alpha [17] is a coefficient of internal consistency. It is commonly used as an estimate of the reliability of a psychometric test for a sample of examinees. It was first named alpha by Lee Cronbach in 1951, as he had intended to continue with further coefficients. Standard Cronbach Alpha formula is

$$\alpha = \frac{k\, r'}{(1 + (k-1)r')}$$

Where k is the number of respondents and r' is average correlation

Table 3: Internal consistency of Cronbach Alpha [18]

Cronbach Alpha, α	Internal Consistency
0.9 ≤ α	Excellent (High Stakes Testing)
0.7 ≤ α< 0.9	Good (Low Stakes Testing)
0.6 ≤α < 0.7	Acceptable
0.5 ≤ α< 0.6	Poor
α< 0.5	Unacceptable

Reliability Test on Causes of Delay $\alpha = \frac{32(0.595)}{(1+(32-1)0.595)} = 0.97$ or 97%

Reliability Test on Effects of Delays $\alpha = \frac{6\ (0.477)}{(1+(6-1)0.477)} = 0.85$ or 85%

This indicates that 97% of the causes answered by the respondents have excellent reliability and 85% of the effects answered by the respondents are good reliability.

Causes of Delay The primary data collected from the second part of the questionnaire was analysed from the perspective of consultants and contractors. Each individual cause's RII perceived by all respondents was computed for overall analysis. The RII was computed for each cause to identify the most significant causes. The causes then discussed based on the RII classification class. From the RII value, 0.8 to 1.0 is the most preferred level of preference and being the most important causes as the results.

Based on the level of preference in class 5 which classified as most preferred factor as perceived by consultant, there are 5 causes can be found which is sub-contractor (RII=0.876), site management (RII=0.829), improper planning (RII=0.829), mistakes during construction stage

(RII=0.829) and inadequate contractor experience (RII=0.829). The causes as perceived by contractor that can be found is, sub-contractor (RII=0.904) and site management (RII=0.852)

Table 4: The ranking of causes of delay based on consultant and contractor's view

Causes of Delays	Consultant		Contractor	
	RII	Rank	RII	Rank
Client Related Factor				
Finance and payments of completed work.	0.676	14	0.713	10
Owner interference.	0.781	6	0.783	3
Slow decision making.	0.648	21	0.609	25
Unrealistic contract duration and requirements imposed.	0.610	27	0.722	9
Obtaining permits from municipality.	0.629	25	0.643	19
Consultant Related Factor				
Contract management.	0.590	29	0.583	26
Preparation and approval of drawings.	0.600	28	0.661	17
Quality assurance.	0.638	23	0.730	6
Waiting time for approval of drawings.	0.657	17	0.661	17
Contractor Related Factor				
Sub-contractor.	0.876	1	0.904	1
Site management.	0.829	2	0.852	2
Construction methods.	0.781	6	0.635	20
Preparation and approval of drawings.	0.829	2	0.617	23
Mistakes during construction stage.	0.829	2	0.539	30
Inadequate contractor experience.	0.829	2	0.539	30
Mistakes in preliminary stage (soil investigation).	0.648	21	0.670	16
Financing by contractor during construction.	0.781	6	0.678	15
Material Factor				
Quality in material.	0.752	10	0.557	27
Shortage in material.	0.714	12	0.757	5
Labour and Equipment Related Factor				
Labour supply.	0.762	9	0.730	6
Labour productivity.	0.743	11	0.696	13
Equipment availability and failure.	0.667	16	0.713	10
Contract Related Factor				
Change orders.	0.695	13	0.617	23
Mistakes and discrepancies in contract document.	0.638	23	0.730	6
Contract Relationship Related Factor				
Major disputes and negotiations.	0.657	17	0.704	12
Inappropriate overall organisation structure linking to the project.	0.619	26	0.548	28
Lack of communication between parties.	0.657	17	0.696	13
External factor				
Weather condition.	0.676	14	0.783	3
Regulatory changes.	0.571	30	0.635	20
Problem with neighbours.	0.514	32	0.452	32
Unforeseen site condition.	0.657	17	0.548	28
Accidents during construction.	0.552	31	0.635	20

This is interesting to compare the causes as perceived by consultants and contractors. Most often, one party were blaming the other. Two of the top causes perceived common between consultants and contractors are: sub-contractor and site management. The consultants blaming contractor's improper planning, contractor's mistakes and contractor's experience as the important causes of delay.

Table 5: The ranking of causes of delay based on overall's view

Causes of Delay	Percentage of Respondent					RII	Rank
	1	2	3	4	5		
Client Related Factor							
Finance and payments of completed work.	0.0	6.8	52.3	27.3	13.6	0.695	11
Owner interference.	0.0	9.1	18.2	45.5	27.3	0.782	3
Slow decision making.	4.5	22.7	40.9	18.2	13.6	0.627	26
Unrealistic contract duration and requirements imposed.	2.3	20.5	31.8	31.8	13.6	0.668	19
Obtaining permits from municipality.	0.0	25.0	38.6	29.5	6.8	0.636	24
Consultant Related Factor							
Contract management.	0.0	22.7	61.4	15.9	0.0	0.586	30
Preparation and approval of drawings.	0.0	22.7	50.0	15.9	11.4	0.632	25
Quality assurance.	2.3	11.4	43.2	27.3	15.9	0.686	13
Waiting time for approval of drawings.	6.8	15.9	29.5	36.4	11.4	0.659	20
Contractor Related Factor							
Sub-contractor.	0.0	0.0	11.4	31.8	56.8	0.891	1
Site management.	0.0	0.0	11.4	56.8	31.8	0.841	2
Construction methods.	4.5	15.9	22.7	36.8	20.5	0.705	10
Preparation and approval of drawings.	6.8	11.4	22.7	34.1	25.0	0.718	8
Mistakes during construction stage.	0.0	0.0	29.5	31.8	38.6	0.677	16
Inadequate contractor experience.	11.4	13.6	15.9	43.2	15.9	0.677	16
Mistakes in preliminary stage (soil investigation).	0.0	20.5	43.2	22.7	13.6	0.659	20
Financing by contractor during construction.	0.0	13.6	25.0	45.5	15.9	0.727	7
Material Factor							
Quality in material.	6.8	22.7	18.2	43.2	9.1	0.650	23
Shortage in material.	0.0	13.6	29.5	31.8	25.0	0.736	6
Labour and Equipment Related Factor							
Labour supply.	0.0	6.8	25.0	56.8	11.4	0.745	5
Labour productivity.	0.0	11.4	29.5	47.7	11.4	0.718	8
Equipment availability and failure.	13.6	9.1	20.5	31.8	25.0	0.691	12
Contract Related Factor							
Change orders.	6.8	9.1	40.9	36.4	6.8	0.655	22
Mistakes and discrepancies in contract	2.3	18.2	25.0	43.2	11.4	0.686	13
Contract Relationship Related Factor							
Major disputes and negotiations.	0.0	13.6	40.9	36.4	9.1	0.682	15
Inappropriate overall organisation structure linking to the project.	11.4	22.7	38.6	18.2	9.1	0.582	31
Lack of communication between parties.	4.5	11.4	34.1	40.9	9.1	0.677	16
External Factor							
Weather condition.	0.0	6.8	31.8	38.6	22.7	0.755	4
Regulatory changes.	9.1	22.7	31.8	29.5	6.8	0.605	27
Problem with neighbours.	11.4	47.7	29.5	11.4	0.0	0.482	32
Unforeseen site condition.	6.8	15.9	50.0	25.0	2.3	0.600	28
Accidents during construction.	0.0	25.0	59.1	9.1	6.8	0.595	29

Table 6 will summarise the factor according to the category that perceived by consultants and contractors.

Table 6: The ranking of categories of causes of delay

Category	Consultant		Contractor		Overall	
	RII	Rank	RII	Rank	RII	Rank
Client Related Factors	0.669	4	0.694	3	0.682	4
Consultant Related Factors	0.621	7	0.659	5	0.641	7
Contractor Related Factors	0.805	1	0.709	2	0.755	1
Material Related Factors	0.733	2	0.657	6	0.693	3
Labour and Equipment Related Factors	0.724	3	0.713	1	0.718	2

Contract Related Factors	0.667	5	0.674	4	0.670	5
Contract Relationship Related Factors	0.644	6	0.649	7	0.647	6
External Factors	0.604	8	0.610	8	0.607	8

Contractor related factor (RII=0.805) is the most preferred causes as perceived by consultant that need to be considered in construction delay. From the views of contractors, there are no factors that can be classified as most preferred factors of delays in construction industry based on this study.

Effects of Delays The primary data that collected from the third part of the questionnaire was analysed from the perspective of consultants and contractors. The calculation of RII and ranking were done like previous section. Based on the RII, the value that classified as most preferred effects are in range 0.8 to 1.0 and the result we found shows that there is 1 effects of delays that perceived by consultants which is time overrun (RII=0.886) and 2 effects of delays that perceived by contractors which are time overrun (RII=0.913) and cost overrun (RII=0.896)

Table 7: The Ranking of effects based on consultant and contractor's view

Category	Consultant		Contractor		Overall	
	RII	Rank	RII	Rank	RII	Rank
Time Overrun	0.886	1	0.913	1	0.900	1
Cost Overrun	0.771	2	0.896	2	0.836	2
Dispute	0.676	6	0.687	5	0.682	5
Arbitration	0.686	4	0.696	4	0.691	4
Litigation	0.686	4	0.539	6	0.609	6
Total Abandonment	0.771	2	0.704	3	0.736	3

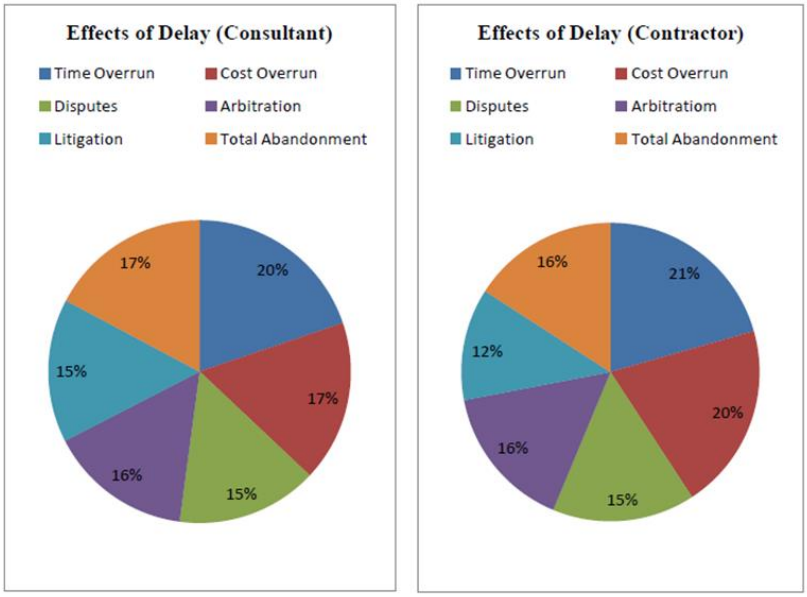


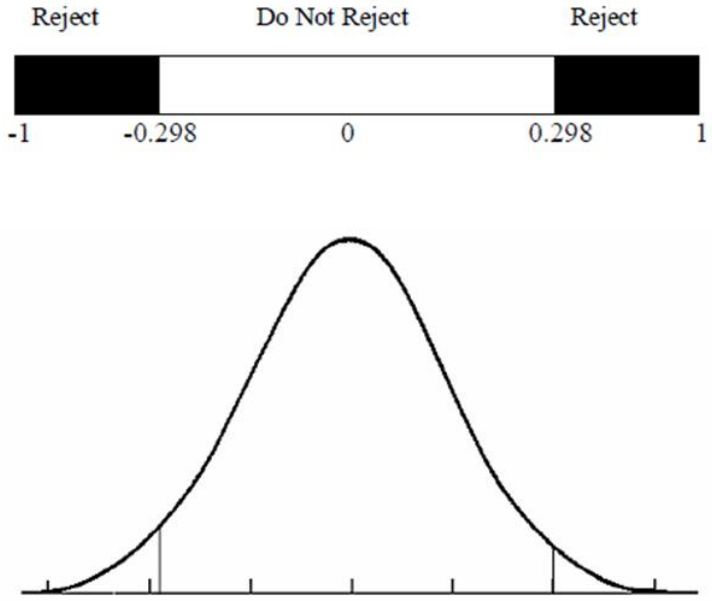
Figure 1: Pie chart on effects of delay by consultant and contractor

Correlation between Categories of Causes and Effects of Delays The next analysis was to identify the empirical relationship between the causes and the effects. In short, empirical relationship attempt to describe, explain and make prediction through observation. In this research, relationship between causes and effects through observable data were successfully attempted. Since the data that been collected through survey is based on Likert Scale, it can be considered as interval data. Therefore, a correlation analysis was done to study the empirical relationship between the

categories of causes and effects of delay. Table 5 gives the result of analysis. Highlighted coefficient shows the coefficients are significant at 0.05 significance level.

Table 8: Correlation between the categories of causes and effects of delays

	Client Related	Consultant Related	Contractor Related	Material Related	Labour and Equipment Related	Contract Related	Contract Relationship Related	External
Time Overrun	0.116	-0.136	0.669	0.268	0.301	0.011	-0.098	-0.307
Cost Overrun	0.399	0.081	0.918	0.626	0.708	0.430	0.253	-0.087
Disputes	0.919	0.756	0.748	0.965	0.881	0.955	0.903	0.754
Arbitration	0.673	0.498	0.805	0.611	0.532	0.457	0.469	0.360
Litigation	0.829	0.776	0.433	0.802	0.671	0.863	0.873	0.850
Total Abandonment	0.832	0.760	0.753	0.612	0.622	0.662	0.729	0.603



For example the correlation coefficient is 0.116 does not fall into the reject region, so there isn't enough evidence to state a strong linear relationship exists in the data.

Discussion

Causes of Delay. The result above show that the causes of delays that can be classified as most preferred causes are subcontractor (RII=0.891) and site management (RII=0.841)

Subcontractor. Sub-contractors failure is a clear problem. One of subcontractor mistakes that need to know is they deferring all decision to the main contractor. While it's possible that the contractor we hired may be indecisive by nature, we can minimise this problem by creating rules that the subcontractors can use whenever they're hesitant to make decision.

Contractor's poor site management. Contractor's poor site management is one of the most significant causes in causing the construction delay. The results of this research find that site

management is an important factor to make the project run smoothly. Usually this problem might happen to contractor that is still new in this field. Poor site management will causes negative impact on the overall work progress.

Effects of Delay. The most preferred effects of delay perceived by all the respondents were time overrun (RII=0.900), and cost overrun (RII=0.836)

Time overrun. Contractor related, material related, labour equipment related and external related factors have impact on time overrun. Out of the most important causes of delay discussed earlier, the causes are belonging to the contractor factors. When we see the RII that classified as preferred causes in class 4, we can see the causes are from the factors that stated above. Factors such as problem with subcontractor, management in site and delay in payments are most affected causes of delay in construction project and cause time overrun.

Cost overrun. Usually factors that related to cost overrun is the contract that been made early before the construction starts. Client related, contractor related, material related and labour equipment related factors also lead to cost overrun. Mistakes and discrepancies in the contract document may come from the resources available, payment terms and project duration. If there is discrepancies happen, then cost overrun will occur. Time overrun leads to cost overrun.

Correlation between causes of delays and effects of delays. Table 8 shows the correlation between the causes of delays by category with the effects of delay. Most of the causes and effects are correlates linearly to each other. From the results, we can say that the effects of delays happen in the project site have linear relationship with the causes of delays, for example the higher the causes by the contractor, the higher time overrun happen on the construction site.

Prescription to reduce delays. The prescription will be divided into three groups which is (1) prescription for clients (2) prescription for consultants and (3) prescription for contractors.

Prescription for clients. We know that clients usually select the contractors which give lowest bid. But to prevent any problem that might happen in future, clients should select contractors that have sufficient experience, enough technical and financial capability and have sufficient manpower to make sure the project run smoothly. Secondly, client should not frequently interfere during the project for example keep making changes about the requirement. This can interrupt contractor's productivity of work. Thirdly, client should have enough money to pay the contractors just in time. Client should work carefully so that bank or any finance institution will released the payment on schedule.

Prescription for consultants. Consultant should work on drawing carefully and on time. Consultants also should monitor the work done by the contractor closely and making inspection time to time. Contractors also should include the duration and the solution to settle disputes during the making of the contract between the clients and consultants in early stage.

Prescription for contractors. The most important thing is contractor should take the project that they have expertise on it only. Secondly, contractors should have enough money based on the cash flow to start the project in order to run the project smoothly. Third, contractors should provide proper planning and schedule to the clients and they also have to make sure the subcontractors, materials, labour and equipment is sufficient enough to start the project.

Conclusion

Through this study, the construction industry is still facing the delay in project and this study come out with the causes and effects of the delays. A questionnaire is designed and distributed among the contractors and consultants firm in Skudai, Johor. This study identified that most preferred causes of delay in construction industry are (1) subcontractors (RII=0.891) and (2) contractor's poor site management (RII=0.841).

This study come out with the most preferred effects of construction delay which is (1) time overrun (RII=0.900) and (2) cost overrun (RII=0.836). As an important contribution, this study comes out with empirical relationship between causes and effects of delays as the third objective as discussed in the discussion above. Hope that this study can be a help to the practitioners (clients, consultants and contractors) and also academicians to a better understand about the project management and make efforts to reduce the construction delays.

Limitation There are several limitation in this study which is the questionnaire that been produced not represent all the causes and effect of construction industry around the world. That may be a small portion of causes and effect that being find during this study. The questionnaire also being distributed in Skudai area only due to time lack during the study

Recommendation The recommendation will be on how to improve the questionnaire production which researcher should have read more journal, thesis and books in order to get many ideas of the questions that we want to ask. Secondly, the method of analysing should be added so that the results produced are more detailed.

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