

Study on the Factors of Delay for New 3-Storey Building Project Owned by Road Transport Department (RTD) Muar

**Shahira Anuar¹, Hannifah Tami², Mohammad Hairi Osman³,
Hasniza Abu Bakar^{4*}**

^{1,2,3,4}Faculty of Civil Engineering and Built Environment,
Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Johor, MALAYSIA

*Corresponding Author Designation

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Abstract: Construction delays are defined as work that is completed later than expected or according to the contract timeline. Construction delays could be reduced by recognising the causes. The purposes of the research were to determine the key causes of construction delays and how Public Work Department (PWD) acts to solve the delayed as authority based on standards and procedure. The case study was involving the construction project of Road Transport Department Malaysia (RTD) in Muar. An interview and a questionnaire survey were used to conduct this research. The interview was held with RTD's engineer who involved in this project while the survey implied to main in charge persons such as contractors, architects and engineers. Based on a literature analysis, seven groups of causes for delay were identified as contributing to the construction delays and PWD's standard and process in handling delayed project. The groups mentioned were client, contractor, consultant, materials, equipment, labors and external factors. In conclusion, contractor-related delays were ranked as the most major causes of delays and followed by consultant-related delays.

Keywords: Contractors, Factors Delayed, Solution, PWD

1. Introduction

Due to more growing in construction, delays are common issue if happened. According to statistics, out of 359 projects in Malaysia, 79.5 percent of public projects were not finished within the time provided in the contract [1]. The delay in the project will have negative implications on the image of government agencies, especially the Public Works Department (JKR). Therefore, accurate time estimation is very important for all government -owned projects.

The scope of the study is construction project of new building owned by Road Transport Department (RTD) in Muar, Johor. This area was chosen because it was an abandoned project. This study's aim and objectives are to determine the main factors of delay in construction projects owned by

JPJ Muar and to identify the actions of PWD in resolving the problem of delays in accordance with procedures and standards.

2. Literature Review

Delay is widely recognised as the most common, costly, complex, and risky problem encountered in building projects [2]. Because time is so important to both the Owner and the Contractor (in terms of performance and money), it is a common source of conflicts and claims that lead to litigation. According to Theodore (2009), there are four fundamental approaches to categorise types of delays: (1) critical or noncritical; (2) excusable or non-excusable; (3) compensable or non-compensable; and (4) concurrent or non-concurrent.

Critical delays are those that effect project completion or, in some situations, a milestone date, while noncritical delays are those that do not affect project completion or a milestone date. All delays are either excusable or non-excusable. An excusable delay is one caused by an unforeseen occurrence outside the control of the contractor or subcontractor such an example, floods. On the other side, non-excusable delays, are circumstances that are between the contractor's control or that are predictable such as subcontractor performance that is late [3].

When a contractor is entitled to a time extension and additional compensation because of a delay, this is known as a compensable delay. Only excusable delays can be compensated, referring to the excusable and non-excusable delays. Non-compensable delays entail that, even though an excusable delay occurred, the contractor is not entitled to receive additional pay because of the delay. As part of various analyses of construction delays, concurrent delay has gained a lot of traction recently. The concurrency argument is made not just in terms of establishing the project's important delays, but also in terms of assigning blame for damages caused by delays on the critical path. Owners frequently cite concurrent contractor delays as a justification for granting a time extension without additional remuneration [4]. Contractors typically cite concurrent delays by the owner as a reason why liquidated damages should not be imposed for their delays.

3. Causes of delay

Several factors have contributed to building project delays. These include variables arising from the physical, social, and financial environment, as well as those inherent in technology and its administration. There are seven categories of reasons for building project delays: (1) delay causes by client, (2) delay causes by contractor, (3) delay causes by consultant, (4) delay causes by materials, (5) delay causes by equipment, (6) delay causes by labors, and (7) delay causes by labors [5].

Table 1: Seven category in causing delay in construction project

No.	Causes of Delay	Category
1	Owner's delay in making progress payments	Client
2	Delay in the site's completion and delivery	Client
3	Changing orders by client during construction	Client
4	Late in revising and approving design documents	Client
5	Design documentation are late in being revised and approved.	Client
6	Communication and coordination issues	Client
7	Decision-making takes a long time.	Client
8	Conflicts arising from the project's dual ownership	Client
9	Workplace suspension	Client
10	Contractor's difficulties in financing the project	Contractor
11	Conflicts in the schedules of subcontractors during project execution	Contractor
12	Errors in construction necessitated rework.	Contractor
13	Contractor and third-party disagreements (consultant and owner)	Contractor
14	Communication and coordination issues	Contractor
15	Project planning & scheduling are ineffective.	Contractor
16	Improper construction methods implement	Contractor
17	Delays in the work of sub-contractors	Contractor

18	Contractor's work is insufficient.	Contractor
19	Subcontractors are changed frequently.	Contractor
20	A lack of competence in the contractor's technical staff	Contractor
21	Delays in the mobilisation of the site	Contractor
22	Delay in approving substantial scope of work revisions	Consultant
23	Communication and coordination issues	Consultant
24	Consultant's lack of experience	Consultant
25	Design document errors and inconsistencies	Consultant
26	Delays in the creation of design documentation	Consultant
27	Drawings with unclear and insufficient details	Consultant
28	Inadequate data collecting and surveying prior to design	Consultant
29	Un-use of advanced engineering design software	Consultant
30	Shortage of construction materials in market	Material
31	Changes in material types and specifications during construction	Material
32	Delay in receiving materials	Material
33	Damage to sorted materials while they are urgently required	Material
34	Delays in the production of specialty building materials	Material
35	Materials were procured late.	Material
36	Breakdowns in equipment	Equipment
37	Equipment shortage	Equipment
38	Low level of the ability of the equipment-operator	Equipment
39	Low equipment productivity and efficiency	Equipment
40	A scarcity of high-tech mechanical equipment	Equipment
41	A labour shortage exists.	Labors
42	Laborers' permit to work	Labors
43	Low productivity level of labours	Labors
44	Personal issues between workers	Labors
45	Factors of subsurface conditions (e.g. soil, high water table, etc.)	External factors
46	Delay in obtaining permits from municipality	External factors
47	The impact of hot weather on construction projects	External factors
48	Traffic control and restrictions happen at the site project	External factors
49	Construction-related incident	External factors
50	Government policies and legislation are changing.	External factors
51	Utility services (such as water, electricity, and gas) are delayed.	External factors
52	Delay in obtaining a third-party final inspection and certification	External factors

4. Methodology

The methodology used in the study included: Fifty-two (52) causes of delay were discovered through a literature research and interview with PWD's representative who is handling the RTD's construction project. A questionnaire was developed to evaluate the importance of the highlighted factors and got responds from ten individuals who was participating in manage the project. The questionnaire contained two sections which were respondent background and factors that contributing to causes of construction delays. Data was collected through Likert Scale score which meant to allow the responders to describe their level of agreement or disagreement with the causes. Likert scales used in the survey were option of very important, important, moderately important, slightly important and not important. Next, the data obtained would be analyzed by using Relative Index. The relative index was calculated to prove the truth of the listed factors [6]. The causes were ranked for the top 10 of the most influenced causes. Thus, the interview session was about the action taken by PWD for chances given to the main contractor based on the standards to complete the construction project. Considering the study's findings, recommendations for avoiding next government's construction project delays were emphasised.

5. Results and Discussion

These findings of the study were derived from questionnaire survey and interview. The findings are summarised as easy-to-understand tables and graphs.

5.1 Questionnaire survey

The causes of delay were determined using a relative index and ranked based on the survey's findings. The following are the ten most important factors that contribute to project delays, as indicated in Table 2.

Table 2: List of 10 highest factors for delays in RTD building construction project.

Causes of delay	Relative Index	Ranking
Errors in construction necessitated rework	5.00	1
Improper construction methods implement	5.00	2
Design document errors and inconsistencies	5.00	3
Inadequate data collecting and surveying prior to design	5.00	4
Delays in the production of specialty building materials	5.00	5
Materials were procured late	5.00	6
Factors of subsurface circumstances	5.00	7
Contractor's difficulties in financing the project	4.70	8
A labour shortage exists	3.70	9
Delays in the mobilisation of the site	2.10	10

These factors are based on seven categories of causes of delay. The main cause which was errors in construction necessitated rework mostly because of mistake from design documentation and implementation of improper construction methods. Most of the causes were relatable to each other. The categories of delay factors were also arranged according to first to seventh positions. Table 3 shows the ranking according to importance for each delay factor.

Table 3: Ranking of the group of construction project delay factors

Category of delays factor	Ranking
Contractor	1
Consultant	2
Materials	3
External factors	4
Labours	5
Client	6
Materials	7

5.2 Interview

Interviewing with representative from PWD can be concluded as Figure 1 as below. The actions taken were based on PWD's standard guidelines and fair. This construction project which started on 15 December 2016 and was supposed to be fully completed on 17 October 2018 earned two Extensions of Time (EOT) granted to the responsible contractor. Both EOTs were granted based on clause 43 (e),

PWD 203A (Revised 2010). However, the application for the third EOT was not approved, and the contractor was given a fine to pay which is Liquidated and Ascertained Damages (LAD) based on clause 40, PWD 203A (Revised 2010) because the project has not been completed. This fine was imposed from April 5, 2019 until March 2, 2020.

On 3 March 2020, a notice of termination of the contractor's work was sent to Company X due to withdrawal from the contractor company. Two reasons were given namely no working capital and no manpower. Therefore, this matter falls under clause 51 (b), PWD 203A (Revised 2010). After that, the process of re-tendering the project is open to the Completing Contractor. The Completion Contractor will resume the stalled project until completion.

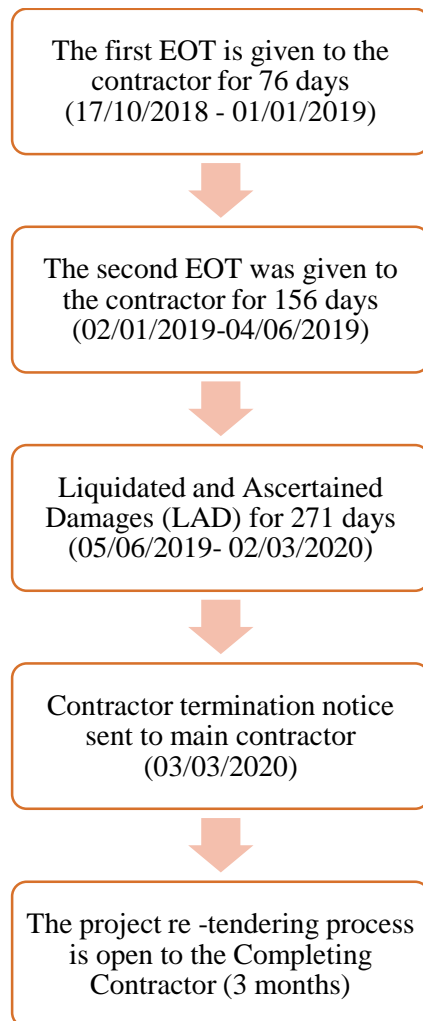


Figure 1: Flowchart of PWD actions in addressing the issue of project delays

6. Conclusion

The study's goal was to identify the most common reasons for project delays in RTD Muar construction project. The methodology used to achieve the objective was questionnaire survey which answered by the individuals who are responsible in handling the project. Based on the analysis and result, the most influenced category which caused the delay was contractor. For recommendation, the contractor must comply with the duration of a construction activity carried out in accordance with the existing schedule. Besides, the contractor must ensure that the survey and information gathering process before the construction activity is correct and sufficient so that there is no extension of time.

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