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Managing the Delayed Completion on Construction Project

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Abstract – *Construction delay is a common situation in every construction project. Delay happens in all construction projects, whether it is a simple or a complex project. When the projects are delayed, they will invite to the additional cost. Therefore, managing project delay is important. The aim of this project is to examine the management of the delayed completion on construction projects and the objectives of this study are to evaluate the degree of delay on construction projects, to identify the notification of delay on construction projects and to investigate the respondent's actions when rectifying the delayed completion. To achieve these objectives, questionnaire surveys were distributed to thirty respondents. The result of the study shows that the more complex project, the less likely it is to complete on time, therefore, more liabilities (Extension of Time and compensation) have been imposed for complex projects. The study also reveals that the delay is only identified when the schedule is updated and reissued while by working overtime, it is said that it was the most preferred action to be taken to rectify the delay.*

Keywords: Delay, Extension of time, Compensation, Delay notice, Delay rectification

1.0 INTRODUCTION

The construction sector represents one of the most dynamic and complex industrial environments. Malaysia construction industry is essential for development of the nation as it plays an important role in generating the nation's economy and the quality of life for Malaysian. It is among the top three of the major economic sectors besides manufacturing and agriculture. As one of the major economic sectors, the construction industry is one of the industries that cannot run from problems or challenges. There are many challenges faced by the Malaysia construction industry. One of them is project delay. The construction industry has a very poor reputation in coping with delays [1, 2]. As a result, many major projects fail to meet schedule deadlines [1]. The time allowed for construction project performance is usually an important consideration for both the project owner and the project contractor. Often, the most troublesome construction disputes involve delays and failure to complete the work in a timely manner. The time delay is a very frequent phenomenon and almost associated with nearly all constructing projects [2]. The more complex the project, the less likely it is to be completed on time [3].

A project consists of collections of activities. An activity's completion may be delayed due to a delayed start or extended activity duration. While an activity's start may be delayed due to certain reasons, its duration may be extended due to some other reasons. An activity's delayed completion may cause delays in the succeeding activities, which in turn can cause a delay in

the project completion [4]. Delay is acknowledged as the most common, costly, complex and risky problem encountered in construction projects. When the projects are delayed, they will invite the additional cost. A research conducted by the Chartered Institute of Building (CIOB) state that the quality of time management of construction project is generally poor. This makes the manager unable to measure the impact of delay or imposed changes to the work. Hence, they were unable to manage the effect of the delay on project completion, except intuitively [3]. When saying about the notification of delay, one may think about the administration of delay that has been stated in the contract. In this research, it focuses on the management on how respondents manage the delay notice such as when the delay to progress is notified, when the notice of delay being distributed, what medium it was distributed, who responsible upon receiving the notice of delay and so on. CIOB indicates that delays were not being recognized until the schedule had been updated. It may seem not important and some people might take it lightly. How important are these matters to the respondents need to be known as it is part of the steps in managing the risk of delayed completion of a project.

There are many researches talking about the causes of delay and it has been a common topic when research on delay being conducted. But, when the project is delayed, what should we do? How people manage and rectify the delay events or project and get it back on track? The need to know the techniques used by the construction expertise is important as it will lead to list out the best techniques that can be done. The aim of this project is to examine the management of the delayed completion on construction project and the objectives of this study are to evaluate the degree of delay on construction project; to identify the notification of delay on construction project and to investigate the respondent's actions when rectifying the delayed completion.

For many years, the issue of delay in Malaysia construction projects has been phenomenal. Its impacts were so significant that it tends to decelerate the implementation of Malaysia Plans [5]. Therefore, the essence of the study is to understand project performance by evaluating the degree of project completion and also the liability being imposed due to delay completion of construction projects. This assessment of delay is valuable to project managers because it becomes a basis for financial calculations to determine penalties or other damages. Besides that, the study has also helped the project manager to administer the delay more effectively by managing the notice of delay. This study is also significant to assist the project manager in construction to manage time in construction works by identifying the best solution to get the delayed project get back on track. Throughout this study, the construction organization can raise their awareness of delay issues and hence increasing the understanding of implementing a good project control techniques. Consequently, this study can be used as the guideline for future development to reduce the risk of delayed project in construction.

1.1 Literature Review

1.1.1 Definition of Delay

Construction delay is a situation when the actual progress of a construction project is slower than the planned schedule or late completion of the projects [5]. Delay is acknowledged as the most common, costly, complex and risky problem encountered in construction projects [6]. Construction delay is defined as a time overrun either beyond the contract date or beyond the date that the parties have agreed upon for the delivery of the project [7]. Time is the essence of a construction contract. When a contractor fails to complete the project within the contract period, the delay becomes the reality of the project. According to contractual frameworks, construction delays can be grouped in four broad categories: (1) non-excusable delays are ones

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that the contractor either causes or assumes their risks, and thus is not relieved of their consequences; (2) non-compensable excusable delays are caused by factors that are not foreseeable, beyond the contractor's reasonable control, not attributable to the contractor's fault or negligence, and thus while the Contractor will not receive compensation for the cost of delay, he will be entitled for an additional time to complete his work and is relieved from any contractually imposed liquidated damages for the period of delay (3) compensable excusable delays include suspensions and/or interruptions to all or part of the work caused by an act or failure to act by the owner resulting from non-compliance and/or breach of an obligation, stated or implied, in the contract, and thus the contractor is entitled not only to an extension of time but also to an adjustment for any increase in costs caused by the delay; and (4) concurrent delays that occur when both owner and the contractor are responsible for the delay [8,9,10].

1.1.2 Project Performance

Evaluating the performance of the completed projects will help establish benchmarks of high performance projects for cross-learning and identify inefficiencies of low performance projects for potential improvement [11,12,13]. A study conducted by [3] shows that the more complex the project, the less likely it is that it will be completed either on time or shortly after the completion date, using traditional management methods. Low-rise hospital, clinic and health-related buildings, prisons and security buildings, stadia and sports-related buildings and railway stations are the types of projects that currently are most likely to be substantially delayed in their completion. High rise building projects and complex engineering projects also have a low chance of being finished on or before the completion date, and the majority reported upon were likely to be substantially delayed in their completion.

1.1.3 Liabilities

Most construction contracts deal with project delays and disruptions by providing in the contract that the contractor may submit claims for extension of time and recovery of costs after appropriate notice that events encountered are "likely to," or "are causing," or "have caused" delay to completion [14, 15]. Failure to achieve: targeted time, budgeted cost and specified quality result in various unexpected negative effects on the projects. Usually, when the projects are delayed, they are either extended or accelerated the time and therefore, invite to the additional cost [16, 17]. Almost all contracts have a time extension clause that entitles a contractor to a time extension for delays that are outside their control. Aibinu [18, 19], in his study list out three categories of events that could give rise to extension of time claims and/or compensation (if provided in the contract) which are (1) Owners Breach of Contract. These are events relating to a project owner's breach of contractual obligations and which affects the contractor's progress. As for example, late issuance of instruction by the owner or the owner's representative or agent and late response to a contractor's request for information regarding discrepancies between two or more contract documents. (2) Owners Directed Changes. These are project owners or the project owner representative's or the owner agent's directive or instruction to the contractor ordering a change (addition or omission) to the contract, and which disrupts the contractor's pace of work thus causing delays to the project. (3) Risk Events. These are delays and disruption arising from risk events that are beyond the control of both parties. This may include inclement weather, Act of God, Wars, and unforeseen site conditions (relevant events in this category would depend on the contract). Delays are the major causes and consequences of construction claims. Claims could be due to three types of delay, namely: excusable, inexcusable, and compensable delays. It is important to document all the causes in a proper way to obtain the claims approved [20,21].

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1.1.4 Delay Notice

A contractor's notice of delays is a form of communication. It is an advice to the owner or owner's representative (contract administrator) or agent that something has happened or is likely to happen that may affect the progress of work and would entitle the contractor to an extension of time and/or compensation [22]. The contractor's notice would enable the owner consider the financial consequences [23]. It would allow the owner to consider cancellation of any directed changes causing the delay or consider alternative instruction so as to mitigate the consequential impact on the project. Thus a contractor's notice is an alert to the owner about the problem at hand. It gives the owner opportunity to investigate and mitigate the effects of the delays event under the particular circumstances. The purpose of a contractor's notice is to inform the owner or the contract administrator that a problem exists, which could entitle the contractor to an extension of time claims [24] and/or compensation (if it is provided for by the contract). A contractor's notice ensures that the owner is aware of the problem. It gives the owner opportunity to take appropriate technical steps to remedy the problem [25]. Where a delay event is unavoidable, a contractor's timely notification of the event would, potentially, enable the contract administrator to conduct early and contemporaneous assessment of the contractor's claims and its basis rather than an after-the-fact assessment. In some standard forms of construction contract, a contractor's notice of delay and claims is, expressly, a condition precedent to the contractor's claims for extension of time (EoT) and compensation (if it is allowed in the contract) so that a contractor's failure to comply with the written notice requirement within the time limit stipulated in the contract would bar the contractor from entitlements to EoT and/or compensation [26].

1.1.5 Delay Rectification

A research by Abdul-Rahman et al., [27] found that about 29.2% of the respondents recommended the increase of productivity by working overtime hours or work by shifts, 24% chose request for extension of time; this is possible if delay was excusable or compensable [28]. Two procedures pointed out by 13.5% recommended the execution of delayed activities by subcontractors and ask for more site meetings with all functional groups. About 9.4% of the respondents selected asking top management for more executive authorities to the project manager and 4.2% of the respondent would change the construction method or use different technology. The other procedures had less frequency but the choice of method is always subject to the overriding safety and quality factors. One of the respondents comments on using mixed construction methods to cut down the cost, save time, and upgrade the building quality like using cast in situ for main sections, precast for architecture portions, or using the conventional way for narrow and irregular sections. In summary the recommended procedures to mitigate or even recover the delays are as follows: (1) Ask for extension of time, (2) Ask for change in design, (3) Increase the productivity by working overtime hours, shifts, etc., (4) Execute the delayed activities by subcontractors, (5)Ask for more site meetings with all functional groups, (6) Ask top management for more executive authorities to project manager, (7) Change construction method/use different technique (e.g., using precast unit), (8) More flexible work method (e.g., accept wider range, early striking, etc.). Doloi [29] in his research state that, when project is delay, extension of time should be requested. His study found that seventy-eight percent of the supervisors said that the contractor should request an extension of time, while of the contractor responses, 60% said that the contractor should claim for an extension of time. Rahman et al. [27], have listed out ten ways to get slipping project back on track. They are (1)Worl Overtime, (2) Reallocate resources, (3) Double check all dependencies, (4) Check

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time-constraint activities, (5) Swap resources, (6) Crash the schedule, (7) Fast track it, (8) Prevent all scope changes, (9) Improve processes, and (10) Scale back the scope of work.

2.0 METHODOLOGY

The methodology used in this study is distribution of questionnaire survey. The questionnaires were distributed in order to meet all the three objective of the study. Thirty sets of questionnaires were distributed. The questionnaire consists of four sections. Section A is the general information on the organization. Section B is to obtain information on the degree of delay on construction project, section C is to obtain the information on the notification of delay on construction project and section D is to obtain the information on the delay rectification. The distribution of the questionnaire was conducted via e-mail and by hand.

The questions provided are based on the Likert Scale of five ordinal measures of agreement towards each statement. The data obtained from questionnaire survey were analyzed using average index. This index computed as:

$$\text{Average Index} = \frac{\sum a_i x_i}{\sum N} \quad (1)$$

where, a_i = constant expressing the weight given to i
x_i = variable expressing the frequency of response for i= 1, 2, 3, 4, 5
N = number of respondents

In order to determine the level of agreement towards the delay rectifications, the classification of the rating scales are $1.0 \leq$ Average Index ≤ 1.50 (least agree); $1.5 <$Average Index ≤ 2.50 (slightly agree); $2.5 <$ Average Index ≤ 3.50 (moderately agree); $3.5 <$ Average Index ≤ 4.50 (agree) and $4.5 <$ Average Index ≤ 5.00 (Strongly agree) [30].

3.0 RESULTS AND DISCUSSION

This study was conducted to examine the management of the delayed completion on construction project. Questionnaires sets were distributed to 30 respondents. The results from the questionnaire obtained are discussed below based on the objectives of the study. The result is divided into three parts.

3.1 Degree of Delay on Construction Project

Objective one was conducted to evaluate the degree of delay on construction project in Malaysia. The result to answer for this objective is divided into three parts. Part A is on the company's project performance. Based on 30 sets of data collected from the surveys, table 1 are the results on the project performance. From the result, it can be seen that most of the low-rise building completed on time than high-rise building. Therefore, the more complex the project, the less likely it is to be completed on time.

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Table 1: Project Success for Low-Rise Building, High-Rise Building and Engineering Project.

	Percentage of Project Success			
	On or before completion date	1-3 months late	4-6 months late	More than 6 months late
Low-Rise Building	48.1	40.7	7.4	3.7
High-Rise Building	32.0	44.0	16	8.0
Engineering Project	41.9	45.2	12.9	0.0

Part B is on the extension of time (EoT) that has been granted throughout the project that the respondent had been involved so far. Based on the data collected, Figure 1 shows the Extension of Time (EoT) entitled for the delay completion. It can be seen that, low-rise building have mostly been granted no EoT. Therefore, it can be said that the less complex project, the less it is to be grated extension of time.

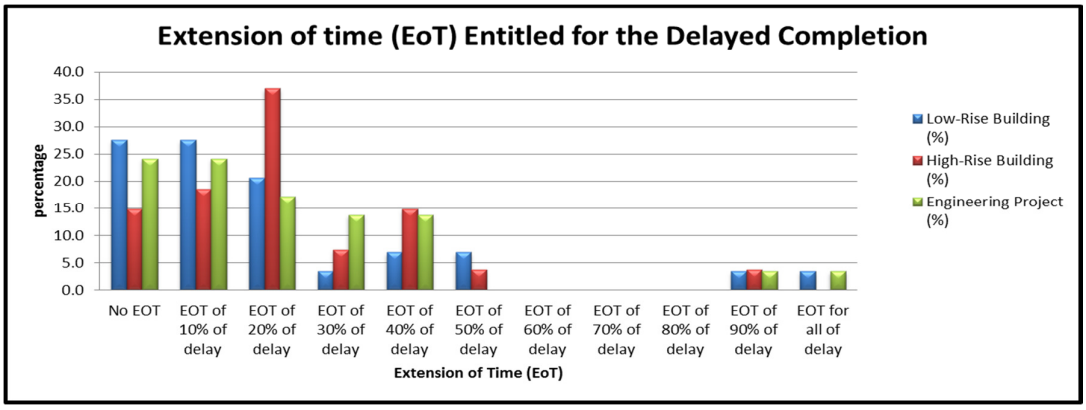


Figure 1: The extension of time (EoT) that entitled for the delayed completion of project.

Part C is on the compensation that had been imposed throughout the project that the respondent had been involved so far. Based on the data collected, Figure 2 shows the time-related costs (Compensation) imposed for the delayed completion. It can be seen that low-rise buildings have mostly been imposed with no compensation. Therefore, it can be said that the simple the project, the less likely it is to be imposed with cost liability.

3.2 Notification of Delay on Construction Project

Objective two was conducted in order to know how the notifications of delay being handle. The result to answer the objective is divided into six parts. Part A is on what occasion the delay to progress is notified. The result is shown in Figure 3a Based on the result, 57.5% of the respondent said that the occasion for the delay to progress is notified is when the progress is estimated and their consequence is predicted. Part B is on how the respondent identified the delay to progress. The result is shown in Figure 3b. The result shows that the delay to progress

is identified when the schedule is updated and reissued with 41.2%. Part C is on the reasons for failing promptly to notify delay to progress. Based on Figure 4a, 46.7% of the respondents said that the reason for not notify the delay to progress promptly is because they do not wait to upset the client. Part D is on the parties that usually being given the notice of delay to progress. Figure 4b shows that the parties that usually being given the notice of delay are the contractor site management, contractor board management and the client with the percentage of 26.9%, 25.4% and 28.4% respectively. Part E is on the form of delay notice being provided. Based on Figure 5, 29% of the respondents said that the notice of delay usually being provide in form of standard letter. Part F is on the people who usually identify the causative events of delay. Based on Figure 6, most of the cause of delay is being identified by the project manager with the percentage of 25.3%.

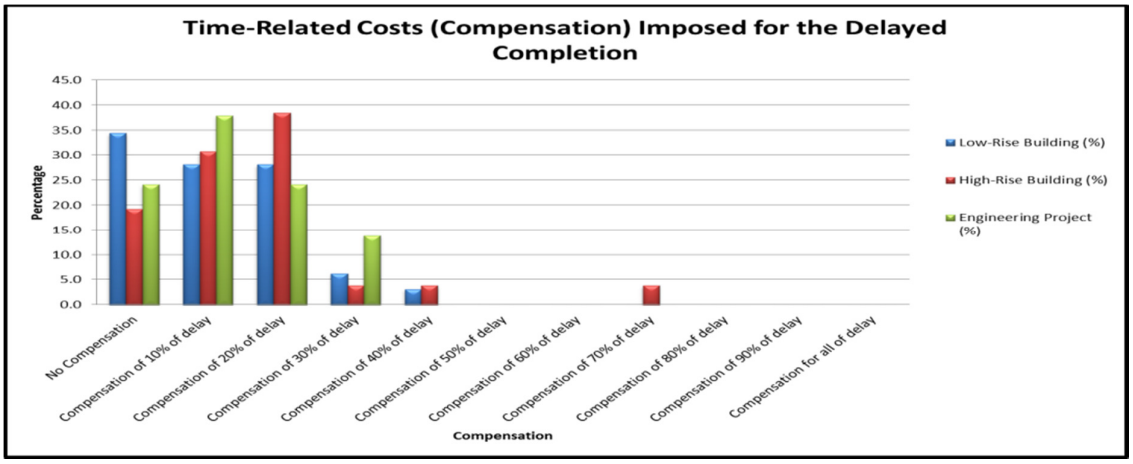
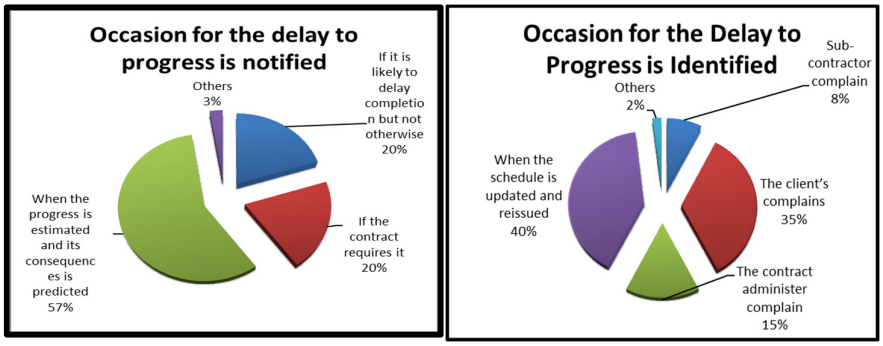


Figure 2: The liability for time-related costs (compensation) imposed for the delayed completion of project



(a) (b)

Figure 3: Occasion for the delay to progress is (a) notified; (b) identified

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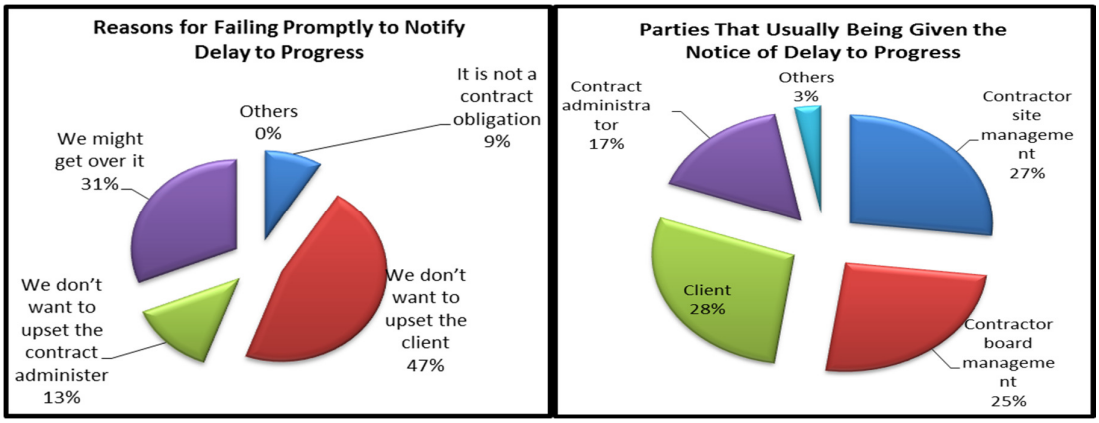

(a) (b)

Figure 4: Notice of delay to progress (a) Reasons for failing promptly; (b) Parties that usually given the notice.

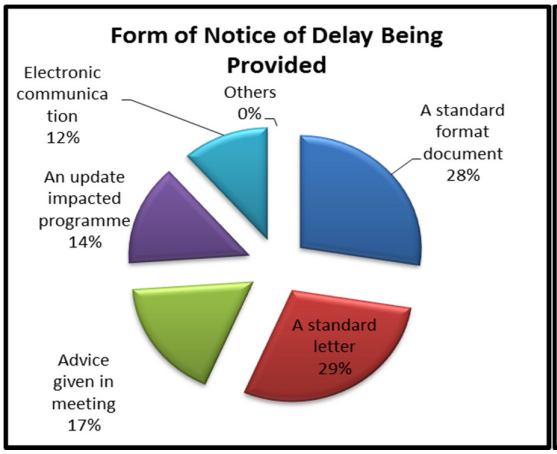

Figure 5: Form of notice of delay being provided.

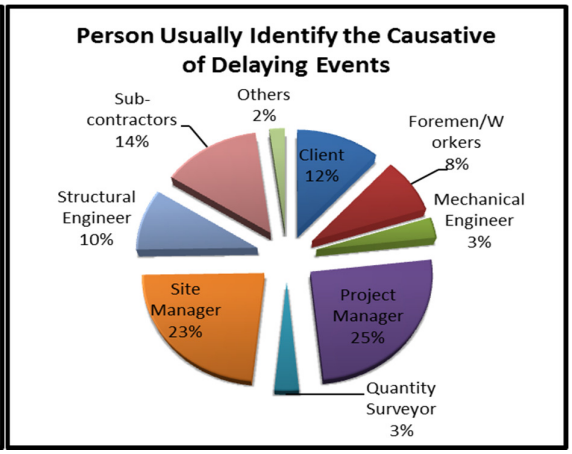

Figure 6: Person usually identifies the causative of delaying events.

3.3 Respondent Actions When Rectifying the Delayed Completion.

Objective three was conducted in order to know the respondent action when rectifying the delay activity or delay project. The result is shown in Table 2. Based on the result obtained, all the respondents agreed that in order to rectify the delayed completion of a project, working overtime, working the task on multiple shifts and adding more workers are the most preferred action to be taken. All in all, the respondents agreed to all the action listed can be taken to rectify the delay completion.

4.0 CONCLUSSION

The first objective of this study has been achieved through questionnaire survey by analysing the respondent's project performance, the Extension of Time (EoT) been entitled as well as the compensation been imposed. From the result, it shows that the more complex the project, the less likely it is to be completed on time. The second objective of this study has been achieved through questionnaire survey by analysing the notification of delayed progress. From the

survey, it shows that the form of delay notice being use is a standard formal letter. And it reveals that the delayed progress is notified when the progress is estimated and their consequence is predicted and it is being identified when the schedule is updated and reissued. The delay to progress was not being reported promptly because they do not want to upset the client. Contractor site management, contractor board management and the client are the persons who usually being given the notice of delay while the cause of delay is usually being identified by project manager. The third objective of this study has been achieved through the questionnaire survey by analysing the level of agreement on the actions taken to rectify the delayed completion. The survey result reveals that working overtime, working by multiple shifts, adding more workers, working by extended days and check time-constraint activities are the most preferable action to be taken in rectifying the delayed completion of project.

Table 2: Delay Rectification.

Item No:	Delay Rectification									
		1	2	3	4	5	Total	Mean	Agreement	Rank
1	Working overtime	0	0	2	7	21	30	4.63	Strongly Agree	1
2	Working the tasks on multiple shift	0	0	3	10	17	30	4.47	Agree	2
3	Working by extended days	0	0	5	9	16	30	4.37	Agree	4
4	Request for extension of time	3	1	9	3	14	30	3.80	Agree	14
5	Execution of delayed activities by subcontractors	0	1	5	14	10	30	4.10	Agree	7
6	Holding a site meeting with all functional groups	0	2	6	7	15	30	4.17	Agree	6
7	Asking top management for more executive authorities to the project manager	1	3	9	9	8	30	3.67	Agree	17
8	Change the construction method	0	4	5	12	9	30	3.87	Agree	13
9	Use different technologies	0	1	12	9	8	30	3.80	Agree	15
10	Use more than one construction method	2	0	6	10	12	30	4.00	Agree	10
11	Bringing larger equipment or additional equipment onto the jobsite	0	3	4	12	11	30	4.03	Agree	9
12	Reallocate resources	0	1	5	14	10	30	4.10	Agree	8
13	Putting more men on the job/ add more workers	0	0	3	10	17	30	4.47	Agree	3
14	Using more costly, but more quickly installed materials	1	4	11	8	6	30	3.47	Agree	19
15	Double check all dependencies	0	1	8	14	7	30	3.90	Agree	11
16	Scale back the scope of work	1	2	7	15	5	30	3.70	Agree	16
17	Check time-constraint activities	0	1	2	17	10	30	4.20	Agree	5
18	Prevent all scope changes	0	2	15	8	5	30	3.53	Agree	18
19	Avoid design changes	1	3	8	4	14	30	3.90	Agree	12

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