

THE CAUSES OF DELAYS AND DISRUPTION AT CONSTRUCTION PROJECT IN SERDANG SELANGOR, MALAYSIA

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ABSTRACT

Construction industry has become one of the greatest income provider as it has contributed to the Gross Domestic Product (GDP) for Malaysia. However, construction sector has been much affected by unexpected situation such as construction delays and disruption. This research discusses the importance of studying the construction sector through the identification of gaps between theory and practice associated with delays in the completion of construction projects. The objectives of this research are; To identify the causes and factors contributing to delay and disruption in construction projects. To investigate the effect of delays and disruption in construction projects, to determine the methods that can be used to minimize delays and disruption in construction projects. These objectives achieved through viewing different research paper, articles from previous studies, by considering all viewpoint from various parties that are involved in construction process such as contractors, client, consultant, and others, the research identified the major factors, causes and effects that contributes to delays and disruption in Serdang, Malaysia. Questionnaires were distributed among respondents that are involved in construction project in Serdang. The process of data analysis was conducted by using descriptive statistic that ranked the mean value of the factors, causes and effects that contributes to delays and disruption in construction project. By using the ranking method, financial difficulties were recognized as the most significant factor while cost, time overrun and dispute were recognized as the most significant effects that caused delays and disruption in construction projects. Based on the results and findings a framework has been developed to be an effective tool to help all parties to avoid causes of delay and disruption in construction projects. Finally, recommendations have been developed for each of the contracting parties (owner, consultant, contractor), in order to minimize and avoid the delays causes and get projects completed within the planned schedule.

Keywords:

dyslexia, symptoms, visual dyslexia, dyslexic students, identification of dyslexia, level of learning

INTRODUCTION

There are a lot of construction project going on around the world, be it road construction or infrastructural construction, and a lot of the end users are experiencing delays at construction areas, and most of these areas contractors are now building alternative that are made to tackle congestion, moreover the construction project can as well create delay and congestion. According to Shehu et al. (2014) delay is a reoccurring incidence that can occur in almost every project carried out by any construction industry if appropriate project management knowledge is not employed. (Emeka 2016) claims that the competence of a construction industry or its project team can best be described by their ability to meet or complete the project on or before the project deadline.

Amoatey (2015) analyzed the major causes of delay and their influences on construction project. Their analysis was based on the numerous delay factors and effects on a project using two case studies Pakistan et al. (2014) delay may differ from project to project depending on the type and magnitude of the structure. Desai et al. (2013) mentioned that the view that project is generally associated with a complicated state of affairs in the course of execution. However, delay affect projects in many different ways. According to (Duodu 2016) Proper project management practice is also needed in trying to solve the causes and effect on escalation of cost in the construction project, delays in constructions is a universal problems and however a lot of countries around the world are facing this global fact.

PROBLEM STATEMENT

One of the biggest problems associated with most of the construction projects in the world today is the problem of delay and disruption at both pre-contract and post-contract stages of construction in building and civil engineering works. In Malaysia the construction industry constitutes a very high percentage of the economy contract, Johor for example is among one of the developing state in Malaysia and also among the main urban centers on the peninsular Malaysia, it is also one of the main contributors to the nation GDP in the country after Kuala Lumpur and Selangor (Department of Statistics Malaysia, 2009). For example, Selangor, some of the most delayed and disrupted projects includes:

The construction of a flyover and road upgrade at the junction of the Bukit Jalil Highway and the Serdang Raya main road, the project which started in December 2006 was halted in July 2007 because of land issues and was stopped again in March the following year as the contractor had claimed that the flyover design by PWD was incomplete.



Figure 1.1: Construction of flyover and road upgrade at the junction of the Bukit Jalil Highway and the Serdang Raya main road.

The project was announced in December 2011 and expected to be completed in May 2012, However, it was delayed for more than seven months. The delay would not have happened if the project had been properly planned. The contractor did not carry out discussions early with the affected agencies, such as Tenaga Nasional Bhd (TNB) and Syarikat Bekalan Air Selangor Sdn Bhd (Syabas), to relocate their lamp posts and underground piping. Because this procedure was not properly carried out, the delay caused a lot of inconvenience to traders and residents, as well as motorists who regularly ply the route.



Figure 1.2: One-way street in Serdang in limbo.

Identifying some of the causes and factors of delays and disruption usually the first stage when addressing the problem and then a corrective measure would be taken, hence it is very essential that the researcher will diagnose some of the main causes, factors and effects of delays and disruption. This is because the principle reasons for delays and disruption may diverse at different places (Ogunlana & Prokuntong, 2008). In addition to that, this research will determine the possible way to minimize delays and disruption in construction projects from the perspective of those involved in the construction industry like the clients, the contractors, and the consultants. Based on the findings from the analysis some recommendations that would be aimed at reducing the impacts of delays and disruption caused to the construction industry has been outlined, the study would also clarify and create awareness of the extent to which delays and disruption can affect project delivery.

RESEARCH OBJECTIVES

The research objectives allow the researcher to get an insight into a particular information of the topic in question. Research objective is also a clear and specific statements that identify what the researcher wishes to accomplish as a result of doing the research and also objective are mostly acceptable to the research community as proof of the researcher's clear sense of purpose and direction. The specific objective of this study are:

- A. To **identify** the causes and factors contributing to delay and disruption in construction projects.
- B. To **investigate** the effect of delays and disruption in construction projects.
- C. To **determine** the methods that can be used to minimize delays and disruption in construction projects.

RESEARCH QUESTION

The research question is one of the most critical part of research, it is important to develop some research question that the researcher is interested in, this research questions will help the researcher to focus completely on the research. The purpose of the Research question is to acquire and develop new information and knowledge from existing information on the topic of study with

the objective of formulating your findings to enable you complete your study on the topic. Choosing the proper question is important, questions that are neither too broad nor too narrow. This research work, intends to focus on the following question:

- A. What are the causes and factors contributing to delays and disruption in construction projects?
- B. What are the effects of delays and disruption in construction projects?
- C. What are the methods used to minimize delays and disruption in construction projects?

SCOPE OF WORK

The scope of this research will mainly be focused on location, main stakeholder, source of knowledge size and also literature review. This study is also needed to ascertain the level of understanding and knowledge whereby applying to delay and disruption, planning and field of operation while the questionnaire survey would be designed based on the effect and causes of delay and disruption in construction and also its effect on cost.

LITERATURE REVIEW

This chapter will be focused on literature review of the topics that are related to this study, which includes the importance of construction industry, the main factors and causes of construction delays and disruption and also the methods used to minimize delays and disruption in construction projects.

Delays and disruption in the construction industry is a global problem that is faced by many construction industries all around the world, for this reason the extent of risk and uncertainty is on the high raise in the construction industries to be compared to other industries (Shujaa 2014). However, the problems of construction delays are a reoccurring issue in the engineering practice (Emeka 2016). This occurs often in the entire projects life span leading to conflict and legal proceeding Marzouk et al (2014). According to (Nihal 2015) there are many negative aspects that result from delays and disruption in construction projects for example; mistrust, dispute, arbitration, adversarial etc. the study also seeks to mitigate and reduce these problems and also the consequent negative effects.

CONSTRUCTION DELAY AND DISRUPTION

Delays and disruption in construction is known to be the most widely hazardous and expensive problems that is being faced today in any construction project. Most projects in building are usually exposed to major threat on the time delay. Such kind of threat situations always lead to expansion of expense and time. Delays and disruption in construction projects may be caused by one or a mixed of few reasons which may begin with a basic reason and at the end lead to a great arrangement of an interrelated complex question in contract understanding.

SUCCESS FACTORS IN CONSTRUCTION PROJECT

The success of most construction project always depends on many factors such as the experience of the project manager, the stability of the project team and the level of each of the planning, supervision, monitoring, cash flow and also control of the project etc. many researchers will agree

that the fundamental properties of a successful project is always significantly associated with good administration and also good management which includes planning, control, monitoring, specific and clear target and also providing motivation for the project employees Junxiao Liu et al. (2015).

Junxiao Liu et al. (2015) said some of the success factors for construction projects must always have successful management that will help to achieve three main goals which are time, cost and quality, these goals can be interrelated and any change in one or any of them could affect others and also success factors can be achieve through.

Finishing the project at less period of time.

Finishing the project at less cost.

Finishing the project with high quality.

STAGES INVOLVED IN CONSTRUCTION PROJECT

Every construction project passes through different stages and levels during the period of construction, it is also an idea for the owner or client to know the stages until it reaches the time of operation. Construction project stage can vary from one project to another depending on the nature and size of the project, but also begin and end with the owner and client. Furthermore, the stages of any construction project are always definite and clear because any fault made in the early stages of the construction project will affect the later stages, and it may become very difficult and also complicated to either improve or even correct, if not impossible.

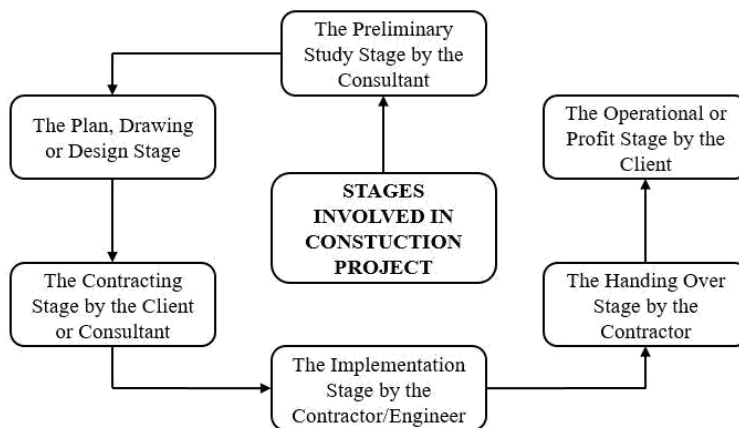


Figure 2.1 below shows the stages involves in construction project.

TYPES OF DELAYS

(Rodriguez 2018) & (Lepage 2017). It is however important to always understand the various types in which a delay falls into before trying to analyze construction delays. To further initiate the mitigation efforts and to convert it into a merit. The various types of delays are as follows:

Excusable delays

- Excusable with compensation

- Excusable without compensation Non-Excusable delay

Concurrent delays

Non-concurrent delay

Critical or non-critical delays

There is also a need to understand the assimilation between the various types of delays before determining the impact of delays on the project. Must determine whether or not the delay is critical or non-critical. All delays are either excusable or non-excusable. Both excusable and non-excusable delays can be defined as either concurrent or non-concurrent. Delays can be further broken down into compensable or non-compensable delays.

CAUSES AND FACTORS CONTRIBUTING TO CONSTRUCTION DELAY AND DISRUPTION

The causes of delays and disruption are factors or events that occurs during the process or before the process of construction that will affect the completion time of the project. And based on most research that has been done through journal, articles and some other reference. Project delay and disruption can be caused by many parties that involved in construction projects, which includes client, contractor, consultant, labor, material, equipment, financial, and some external causes.

Mohammad Saiful Islam et al. (2015) showed two types of factors that is caused by delay in construction project completion, these are internal and external causes. The internal causes are causes that are caused by one of the three main parties that are involved in the project (contractor, consultant and owner), and also the factors include: (administrative, technical, human and financial) factors etc. while the external factors are those factors caused by materials, government, political, weather condition. etc. there are also many reason that will lead to delays and disruption in construction project, which comes from various sources and cannot be counted, every project always has a special circumstances and environment that differentiate it from other projects such as the nature of work, total cost, contractors experience, flexibility in design, site condition and implementation.

EFFECTS OF DELAYS AND DISRUPTION

The effects of delays and disruption is one of the main problem in the construction industry which either occurs during the process or before the process of construction that always affect the completion time of the project. And based on most research that has been done. Project delay and disruption can be caused by a lot of seen and unforeseen problems which includes:

- A. Time Overrun
- B. Cost Overrun
- C. Dispute
- D. Arbitration
- E. Litigation
- F. Total Abandonment

METHODS OF MINIMIZING CONSTRUCTION DELAYS AND DISRUPTION

During construction phase of an ongoing project when delay occurs, the Owner suffers financially. However, the extent to which the Owner can recover back the losses of his or her income from the Contractor, and more importantly trying to minimize the risk of such delays occurring depends totally on how the construction contract document or agreement was written. But based on some studies carried out on the project success factors and rectification of delays in construction project.

Here are some important methods that have been identified in minimizing construction delays and disruption.

- A. Frequent progress meeting
- B. Use up-to-date technology utilization
- C. Use proper and modern construction equipment
- D. Use appropriate construction methods
- E. Effective strategic planning
- F. Proper material procurement
- G. Accurate initial cost estimates
- H. Clear information and communication channels
- I. Frequent coordination between the parties involved
- J. Proper emphases on past experience.
- K. Proper project planning and scheduling.
- L. Complete and proper design at the right time.
- M. Site management and supervision.
- N. Collaborative working in construction.
- O. Compressing construction durations.

RESEARCH METHODOLOGY

The methodology of this research will give a clear account of the approach used in the process of data collection and investigation in order to accomplish the objective of this research. It will also provide an explanation of the research design and approach, research strategy, study area and location, research population, techniques used, data collection processes and techniques employed for data analysis, design and development of questionnaires. This research methodology also provides a general understanding of how the research was coordinated.

STUDY POPULATION

The study population for data collection was focused mainly on construction companies, consulting firms, clients of various large buildings. The target professionals are the engineers, architects, surveyors and project managers from this construction companies and consulting firms. Professionals were considered in each of the organization that will be visited. Many of these companies and firms are member of various registered professional bodies like the Construction Industry Development Board (CIDB), Board of Engineers Malaysia (BEM), Malaysia Institute of Architects (PAM). The data collected from these sources will be centered on large building structures owned, supervised, or managed, by the mentioned stakeholders in these study. These structures include shopping complex, schools, hotels, office buildings, skyscrapers, large residential building, and estate. And will also be collected from both the long-time abandoned project and the one that is still under construction but may have suffered delay.

SAMPLING

Sampling technique is the relatively selection of a small number of individuals from which the researcher collects data from in order to enable him or her generalize about a larger body or group. Sampling techniques is relevant in research work most especially where it is not possible to survey the entire population due to time constraints or limited resources. According to (Saunders 2015), Population refers to the full set of elements or cases from which a sample is taken for investigation. The basic idea behind this is that the researcher selects some elements in a population by which he or she can draw conclusions about the entire population.

METHODOLOGY OF THIS STUDY

The methodology of this study used the questionnaire survey to collect data then analyze these data to achieve goals of this study, the approach questionnaire, as major tool for data collection on subject of study. In addition, a questionnaire was developed to study the causes and effects of delays and disruptions in construction projects.

ANALYSIS DISCUSSION

This will be focused on the data collected, analyzing the findings and presenting the results and discussion of questionnaire survey concerning the causes of delays and disruption in construction projects from architects, engineers, project managers, contractors, consultants and owner viewpoints in Serdang Selangor, Malaysia. The aim of this study is not only to assess the causes of delay and disruption in construction project but to also achieve the objects of this study in other to provide suitable solution to resolve or reduce the problems on delay in construction industry.

STRUCTURE OF DATA ANALYSIS AND FINDINGS

This is the analysis of data collected through questionnaire survey in this research work. The analysis was done using SPSS, tables and percentage were necessary. The questions in the questionnaire survey and the data collected are all of equal and great importance and will be well analyzed, some are tabulated for retrieving necessary information in order to achieve the research objectives. All the questions in the questionnaire survey where focused on the research objectives and research questions as stated in the methodology. In analyzing these data, both the primary and secondary data gotten are linked for better understanding and determining of the research question and objectives.

The questionnaire survey distributed were designed to find out:

The factors and causes contributing to delays in construction projects.

The effect of delays and disruption in construction projects.

Methods of minimizing delays and disruption in construction projects.

TOP CAUSES FOR CLIENT RELATED FACTOR

Table 4.1: shows the single rankings and means and also the overall cumulative average mean of the client related causes and factors that leads to delays and disruption in construction project.

		Change orders by owner during construction	Slowness in decision making process	Owner interference	Poor communication and coordination
N	Valid	72	72	72	72
	Ranking	1 st	2 nd	3 rd	4 th
	Mean	3.49	3.46	3.36	3.25

TOP CAUSES FOR CONTRACTOR RELATED FACTOR

Table 4.2: Shows the single rankings and mean and also the overall cumulative average mean of the contractor related causes and factors that leads to delays and disruption in construction project.

		Poor site management and supervision	Poor communication and coordination	Ineffective planning and scheduling of project	Conflicts between contractor and other parties	Inaccurate time estimation by contractor
N	Valid	72	72	72	72	72
	Ranking	1 st	2 nd	3 rd	4 th	5 th
	Mean	3.33	3.31	3.26	3.18	3.14

TOP CAUSES FOR CONSULTANT RELATED FACTOR

Table 4.3: Shows the single rankings and mean and also the overall cumulative average mean of the consultant related causes and factors that leads to delays and disruption in construction project.

		Delays in producing design documents	Mistakes and discrepancies in design documents	Poor communication and coordination	Unclear and inadequate details in drawings
N	Valid	72	72	72	72
	Ranking	1 st	2 nd	3 rd	4 th
	Mean	3.19	2.99	2.99	2.97

TOP CAUSES FOR MATERIAL RELATED FACTOR

Table 4.4: Shows the single rankings and mean and also the overall cumulative average mean of the material related causes and factors that leads to delays and disruption in construction project.

		Changes in material types during construction	Delay in manufacturing special building materials	Delay in material delivery	Late procurement of materials
N	Valid	72	72	72	72
	Ranking	1 st	2 nd	3 rd	4 th
	Mean	3.31	3.18	3.10	30.7

TOP CAUSES FOR EQUIPMENT RELATED FACTOR

Table 4.5: Shows the single rankings and mean and also the overall cumulative average mean of the equipment related causes and factors that leads to delays and disruption in construction project.

		Equipment breakdowns	Low productivity and efficiency of equipment	Low level of equipment operatr’s skill
N	Valid	72	72	72
	Ranking	1 st	2 nd	3 rd
	Mean	3.07	2.94	2.93

TOP CAUSES FOR LABOR RELATED FACTOR

Table 4.6: Shows the single rankings and mean and also the overall cumulative average mean of the labor related causes and factors that leads to delays and disruption in construction project

		Shortage of skilled labors	Working permit of labors	Shortage of labors
N	Valid	72	72	72
	Ranking	1 st	2 nd	3 rd
	Mean	3.26	3.26	3.25

TOP CAUSES FOR FINANCIAL RELATED FACTOR

Table 4.7: Shows the single rankings and mean and also the overall cumulative average mean of the financial related causes and factors that leads to delays and disruption in construction project.

		Delay payment to suppliers and subcontractors	Owners financial difficulties	Contractors financial difficulties
N	Valid	72	72	72
	Ranking	1 st	2 nd	3 rd
	Mean	3.54	3.36	3.36

TOP CAUSES FOR EXTERNAL RELATED FACTOR

Table 4.8: Shows the single rankings and mean and also the overall cumulative average mean of the external related causes and factors that leads to delays and disruption in construction project.

		Delay in obtaining permits from authority	Weather condition on construction activities	Effects of subsurface and ground conditions	Traffic control and restriction at job site
N	Valid	72	72	72	72
	Ranking	1 st	2 nd	3 rd	4 th
	Mean	3.44	3.29	3.11	3.00

ANALYSIS ON THE EFFECT OF DELAYS IN CONSTRUCTION PROJECTS

Analyzing the effect of delays and disruption in construction projects. It is divided into six sections, Time overrun, Cost Overrun, Dispute, Arbitration, Litigation and Total Abandonment. in other to be able to ascertain which of these effects are the most problems faced as a result for the project being delayed.

TOP EFFECT OF DELAYS IN CONSTRUCTION PROJECTS

Table 4.9: Shows the single rankings and mean and also the overall cumulative average mean of the effect of delays and disruption in construction projects.

		Time Overrun	Cost Overrun	Dispute	Arbitration
N	Valid	72	72	72	72
	Ranking	1 st	2 nd	3 rd	4 th
	Mean	3.76	3.74	3.13	2.78

METHODS OF MINIMIZING DELAYS AND DISRUPTION IN CONSTRUCTION PROJECTS

Analyzing the proposed methods for minimizing delays and disruption in construction projects. It is divided into fifteen sections; Frequent progress meeting, Use up-to-date technology utilization, Use proper and modern construction equipment, Use appropriate construction methods, Effective strategic planning, Proper material procurement, Accurate initial cost estimates, Clear information and communication channels, Frequent coordination between the parties involved, Proper emphases on past experience, Proper project planning and scheduling, Complete and proper design at the right time, Site management and supervision, Collaborative working in construction and Compressing construction durations. In other to be able to ascertain which of these are the most problems faced as a result for the project being delayed.

TOP METHODS OF MINIMIZING DELAYS AND DISRUPTION IN CONSTRUCTION PROJECTS

Table 4.10a: Shows the single rankings and mean and also the overall cumulative average mean of the proposed methods for minimizing delays and disruption in construction project.

		Site management and supervision	Proper project planning and scheduling	Complete and proper design at the right time	Effective strategic planning
N	Valid	72	72	72	72
	Ranking	1 st	2 nd	3 rd	4 th
	Mean	4.04	4.04	3.99	3.92

Table 4.10b: Shows the single rankings and mean and also the overall cumulative average mean of the proposed methods for minimizing delays and disruption in construction project.

	Use appropriate construction methods	Clear information and communication channels	Frequent coordination with the parties involved	Accurate initial cost estimates
N Valid	72	72	72	72
Ranking	5 th	6 th	7 th	8 th
Mean	3.72	3.72	3.72	3.69

Table 4.10c: Shows the single rankings and mean and also the overall cumulative average mean of the proposed methods for minimizing delays and disruption in construction project

	Collaborative working in construction	Use proper and modern construction equipment	Proper material procurement	Proper emphases on past experience
N Valid	72	72	72	72
Ranking	9 th	10 th	11 th	12 th
Mean	3.68	3.68	3.67	3.61

SUMMARY

The construction industry is one of the most important economic sectors in every country development and Malaysia is no exception, the researcher has closely outline some of the problems faced in the construction projects and also discussed the importance of studying the construction industry by identifying the gaps between theory and practice associated with delays and disruption in the completion of construction projects.

Projects pass through different stages during construction and can be summarized and categorized in the following four main stages and each stages involves three main steps.

- A. The preliminary study stage by the consultant:** Plan Development, Time and cost estimation and Resource management.
- B. The plan, drawing or design stage:** Have alternatives designs, Use of proper design systems and Monitoring and follow-up system.
- C. The contracting stage by the client or consultant:** Work by specialist, Preparing of contract documents and Available ethics and regulars.
- D. The implementation stage by the contractor or engineer:** Use of proper construction systems, Good management by using control and follow-up system and Using proper documentation system.

FUTURE STUDIES

For future studies, causes, effects and also financial difficulty of delays and disruption should be carried out or done in other states or cities of Malaysia. Another study can be done for a specific type of construction project.

- A. Another study should be carried out specifically on construction projects such as utility projects, highway construction projects, dam construction projects, water and sanitation projects, etc.
- B. Another study should be carried out to help evaluate the involvement and effect of a specific party or resource to the delays and disruption in construction projects.
- C. Another study should be done to investigate the effect of financial difficulty and cash flow problems from the client or contractor on delays and disruption in the construction projects.

RECOMMENDATION

Giving proper recommendations for every research work is very vital because it helps the researcher propose some workable solutions to the research problem. From the data analyzed and the findings gotten certain factors and causes were obtained as the causes of delays and disruption failures, cost and time overrun in the execution of construction projects in Serdang. These factors and causes are bound to continue except both the public and private sectors undertake adequate action to control these causes starting from the preliminary stage. Furthermore, some practical recommendations have been stated in order to minimize delays and disruption failures in construction project. These recommendations are to be adhered to by the construction industry both public and private sectors. They are;

- A. The need for project management awareness must be created in the construction industries and also made as a compulsory skill within the industry.
- B. Adequate training programs and seminars should be introduced at least quarterly, this will help equip the specialists with latest tools and its application.
- C. Well-developed mitigation strategies should be adopted and practiced by the construction industry.
- D. The government policies must be flexible enough to tackle crippling issues in the industry.
- E. Good contingency plans should be incorporated in every construction project executed.
- F. The contractors should be given close monitoring in the course of their project execution.
- G. There should be frequent progress meetings with stakeholders where issues affecting the industry can be addressed
- H. There should be proper site management, supervision and coordination between the clients and the contractors.
- I. The contractors should always ensure proper material procurement and commitment to every project assigned to them.
- J. All communication barriers between the project participants must be broken by ensuring information flows through the right channels and media.

CONCLUSION

The outcome from this research work can be said to be of great value and importance to the construction projects and the industry. Most of the respondents are fully involved in construction projects with good experience which means they have adequate knowledge that has supplied the vital information needed. Delays and failures in delivering project on time and on budget has been established to be the major virus eating up the construction projects and the industry. This has caused damages on the nation's economy. The construction industry ought to be the bedrock of economic growth of any nation. Furthermore, the causes of construction delays and failures in Serdang has been linked to various causes as listed in the previous chapter. These factors can be brought to the minimal through increased knowledge and competency level in project management by contractors, owner and consultant, high level of stakeholders' influence, effective government policies and above all a proposed solutions and procedures for solving and avoiding these causes.

Finally, projects pass through different stages during construction, it is very essential in monitoring work progress as well as the scope, cost and time. If this is adopted and strictly adhered to, it will be a desirable end to the delays and failures experienced in the construction industry. This would help generate achievable expectations and increase control on project delays in Serdang.

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