

CAUSES AND EFFECTS OF DELAYS IN ACEH CONSTRUCTION INDUSTRY

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Especially dedicated to :
my beloved wife, Liza Shalawati;
my dear sons, Muhammad Zhafran and Muhammad Naufal;
my dear daughter, Siti Sarah Shafira.

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ABSTRACT

One of the most common problems in the construction project is delays. Delays of a construction project can be defined as the late completion of works as compared to the planned schedule or contract schedule. Projects can be delayed due to number of reasons that may be due to the client, the contractor, acts of God, or a third party. They may occur early or later in the project development, alone, or with other delays. Delays can be minimized only when their cause are identified. The objective of this study was to identify the major causes of delays, the effects of delays, and methods of minimizing delays in construction project. This study was carried out based on literature review and a questionnaire survey. A total of fifty seven factors and eight groups that contributed to the causes of delay, the six factors that effects delays and thirty five methods of minimizing construction delays were identified based on literature review. The questionnaire survey was distributed to the targeted respondent in Aceh, Indonesia construction industry. The objectives of the study have been successfully achieved. The top ten most important factors that contributed to the causes of delays, i.e., insufficient numbers of equipment; inaccurate time estimate; monthly payment difficulties; changes orders; inaccurate cost estimate; poor site management and supervision; inadequate modern equipment; shortage of construction materials; incompetent project team; improper project planning and scheduling; and contractor's financial difficulties. Contractor-related delays was ranked the most significant groups that cause delays, followed by equipment-related delay, client-related delays, material-related delays, finance-related delays, consultant-related delays, external-related delays, and labor related delays. Time and cost overrun were the common effects of delays in construction projects. To minimize delays in construction projects it has been identified that the top ten most effective methods of minimizing construction delays includes: ensure adequate and available source of finance until project completion; competent project manager; availability of resources; frequent progress meeting; awarding bids to the

right/experience consultant and contractor; use of experienced subcontractors and suppliers; multidisciplinary/competent project team; accurate initial cost estimates; competent and capable of clients representative; use of appropriate construction methods; performs a preconstruction planning of project task and resources needs; and project management assistance.

ABSTRAK

Salah satu masalah yang paling umum berlaku dalam projek pembinaan adalah kelewatan. Kelewatan projek pembinaan boleh didefinisikan sebagai lewat siap kerja dibandingkan dengan jadual perancangan atau jadual kontrak. Kelewatan projek boleh disebabkan oleh beberapa sebab diantaranya adalah sebab pemilik projek, kontraktor, takdir Allah, dan pihak ketiga. Ini boleh terjadi pada awal atau di akhir pembangunan projek secara tersendiri atau bersamasama dengan kelewatan yang lain. Kelewatan boleh diminimalkan hanya apabila sebabnya dikenal pasti. Objektif kajian ini adalah untuk mengenal pasti sebab utama kelewatan, kesan kelewatan, dan tatacara bagi mengurangkan kelewatan projek pembinaan. Kajian ini dijalankan berdasarkan kajian literatur dan pengumpulan maklumat menggunakan borang borang soal selidik. . Sejumlah lima puluh tujuh faktor dan lapan kumpulan yang telah menyumbang kepada sebab kelewatan, enam jenis kesan kelewatan, dan tiga puluh lima tatacara bagi mengurangkan kelewatan pembinaan telah dikenal pasti berdasarkan kajian ini. Kajian borang soal selidik telah diedarkan kepada sasaran responden pada industri pembinaan di Aceh, Indonesia. Objektif kajian telah diperolehi dengan jayanya. Sepuluh teratas faktor utama yang menyumbang kepada sebab kelewatan adalah: kekurangan bilangan peralatan; ketidaktepatan anggaran masa; kesusahan dalam bayaran bulanan; arahan perubahan; ketidaktepatan anggaran kos; pasukan projek yang tak berkebolehan; perancangan dan penjadualan projek yang salah; dan kesusahan kewangan kontraktor. Kelewatan berkaitan kumpulan kontraktor telah ditarafkan sebagai kumpulan yang paling penting yang menyebabkan kelewatan., diikuti oleh kelewatan berkaitan peralatan, kelewatan berkaitan pemilik projek, kelewatan berkaitan material, kelewatan berkaitan kewangan, kelewatan berkaitan perunding, kelewatan berkaitan faktor luaran, dan kelewatan berkaitan faktor pekerja. Lebihan masa dan kos adalah kesan yang paling

umum berlaku daripada kelewatan di projek pembinaan. Bagi mengurangkan kelewatan di projek pembinaan, telah dikenal pasti sepuluh tatacara yang paling berkesan iaitu: memastikan kecukupan dan perolehan sumber kewangan sehingga siap projek; pengurus projek yang berkebolehan; terdapatnya/perolehan sumber; mensyuarat kemajuan kerja yang kerap; pemberian tender kepada kontraktor dan perunding yang berpengalaman; subkontraktor dan pembekal yang berpengalaman; pasukan projek yang berkebolehan; anggaran kos permulaan yang tepat; wakil pemilik projek yang berkebolehan dan berpengetahuan; penggunaan tatacara pembinaan yang betul; menjalankan perancangan pra pembinaan projek bagi aktiviti kerja dan keperluan sumber, dan bantuan pengurusan projek.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	TITLE	i
	DECLARATION	ii
	DEDICATION	iii
	ACKNOWLEDGEMENT	iv
	ABSTRACT	v
	ABSTRAK	vii
	TABLE OF CONTENTS	ix
	LIST OF TABLES	xiii
	LIST OF FIGURES	xv
	LIST OF SYMBOLS	xvi
	LIST OF APPENDICES	xvii
1	INTRODUCTION	
	1.1 Introduction	1
	1.2 Background of the Study	2
	1.3 Problem Statement	5
	1.4 Aim and Objectives of the Study	5
	1.5 Scope of the Study	6
	1.6 Research Methodology	6
2	CAUSES OF CONSTRUCTION DELAYS	
	2.1 Introduction	8
	2.2 Type of Delays	9
	2.2.1 Excusable Delays	10
	2.2.2 Non-Excusable Delays	10

	2.2.3 Concurrent Delays	11
2.3	Causes of Delays	12
2.4	Identify Factors and Groups of Causes of Delays	17
	2.4.1 Factors of Material Related Delays	18
	2.4.2 Factors of Labor Related Delays	20
	2.4.3 Factors of Equipment Related Delays	21
	2.4.4 Factors of Finance Related Delays	23
	2.4.5 Factors of Contractor Related Delays	24
	2.4.6 Factors of Client Related Delays	26
	2.4.7 Factors of Consultant Related Delays	27
	2.4.8 Factors of External Related Delays	29
	2.4.9 Groups and Factors that Causes Delays	30
2.5	Summary	32
3	EFFECTS AND MINIMIZING CONSTRUCTION DELAYS	
3.1	Introduction	34
3.2	Effects of Delays	35
3.3	Minimizing Construction Delays	36
3.4	Identify the Factors and Methods	37
3.5	Summary	39
4	RESEARCH METHODOLOGY	
4.1	Introduction	40
4.2	Literature Review	40
4.3	Data Collection	41
4.4	Questionnaire Design	41
	4.4.1 Section A: Company and Respondent Profile	41
	4.4.2 Section B: Causes of Delays	42
	4.4.3 Section C: Effects of Delays	42
	4.4.4 Section D: Methods of Minimizing Delays	43
	4.5 Questionnaire Distribution	44
4.6	Data Analysis	44
	4.6.1 Relative Importance Index	44

4.6.2	The Spearman's Rank Correlation Coefficient	45
4.7	Summary	46

5 ANALYSIS AND DISCUSSIONS

5.1	Introduction	47
5.2	Data Collection	47
5.3	Analysis of Results	48
5.3.1	Factors and Groups that Causes Delays	48
5.3.1.1	Factors of Material Related Delays	49
5.3.1.2	Factors of Labor Related Delays	50
5.3.1.3	Factors of Equipment Related Delays	51
5.3.1.4	Factors of Finance Related Delays	52
5.3.1.5	Factors of Contractor Related Delays	53
5.3.1.6	Factors of Client Related Delays	55
5.3.1.7	Factors of Consultant Related Delays	56
5.3.1.8	Factors of External Related Delays	57
5.3.1.9	Groups of Causes of Delays	58
5.3.1.10	Ranking of Factors that Causes Delays	59
5.3.2	Effects of Delays	62
5.3.3	Minimizing Construction Delays	63
5.4	Identify the Major Causes of Delays	65
5.4.1	Contractor Related Delays	67
5.4.2	Equipment Related Delays	68
5.4.3	Client Related Delays	68
5.4.4	Material Related Delays	69
5.4.5	Finance Related Delays	70
5.4.6	Consultant Related Delays	70
5.4.7	External Factor Related Delays	71
5.4.8	Labor Related Delays	71
5.5	The Most Important Factors that Causes Delays	72
5.6	The Common Effects of Delays	74

5.7	The Effective Methods of Minimizing Construction Delays	76
5.8	Summary	78
6	CONCLUSIONS AND RECOMMENDATION	
6.1	Introduction	79
6.2	Conclusions	79
6.2.1	The Major Causes of Delays	79
6.2.2	The Common Effects of Delays	80
6.2.3	The Effective Methods of Minimizing of Construction Delays	80
6.3	Recommendation	81
	REFERENCES	82
	APPENDICES	85

LIST OF TABLES

TABLE NO	TITLE	PAGE
2.1	Factors of material related delays	19
2.2	Factors of labor related delays	21
2.3	Factors of equipment related delays	22
2.4	Factors of finance related delays	24
2.5	Factors of contractor related delays	25
2.6	Factors of client related delays	27
2.7	Factors of consultant related delays	29
2.8	Factors of external related delays	30
2.9	Groups and factors that causes delays	32
3.1	The effects of delays	35
3.2	Methods of minimizing construction delays	38
5.1	Questionnaire distribution and responses	48
5.2	The result of factors of material related delays	50
5.3	The result of factors of labor related delays	51
5.4	The result of factors of equipment related delays	52
5.5	The result of factors of finance related delays	53
5.6	The result of factors of contractor related delays	54
5.7	The result of factors of client related delays	55
5.8	The result of factors of consultant related delays	56

5.9	The result of factors of external related delays	57
5.10	The result of major delays groups	58
5.11	Ranking of factors that causes delays	59
5.12	The results of effect of delays	63
5.13	The Result of methods of minimizing Construction Delays	64
5.14	Ranking of major delays groups	66
5.15	Ranking of the top twenty most important factors that causes delays	73
5.16	Ranking of the common effects of delays	74
5.17	Ranking of the top fifteen effective methods of minimizing construction delays	77

LIST OF FIGURES

FIGURE NO	TITLE	PAGE
1.1	Flowchart of Research Methodology	7
2.1	Breakdown of factors of material related delays	18
2.2	Breakdown of factors of labor related delays	20
2.3.	Breakdown of factors of equipment related delays	22
2.4	Breakdown of factors of finance related delays	23
2.5	Breakdown of factors of contractor related delays	24
2.6	Breakdown of factors of client related delays	26
2.7	Breakdown of factors of consultant related delays	28
2.8	Breakdown of factors of external related delays	29
2.9	The Ishikawa Diagram of factors that contributed to the causes delays	31
5.1	The major delays groups that causes delays	66
5.2	The common effects of delays	75

LIST OF SYMBOLS

I	-	Relative Importance Index
W_i	-	Weight assigned to i th response.
X_i	-	Frequency of the i th response given as percentage of the total responses for each factors.
i	-	Response category index = 1,2,3,4,5.
\sum	-	Sum of
r_s	-	The Spearman's rank correlation coefficient
d	-	The difference in ranking between the contractors and consultants
N	-	The number of variables.
Z	-	Significant value
H_0	-	The null hypothesis
H_1	-	Alternative hypothesis

LIST OF APPENDICES

APPENDIX	TITLE	PAGE
A	Questionnaire Form	85

CHAPTER 1

INTRODUCTION

1.1. Introduction

A construction project is commonly acknowledged as successful, when it is completed on time, within budget, in accordance with the specifications and to stakeholders' satisfaction. Functionality, profitability to contractors, absence of claims and court proceeding and "fitness for purpose" for occupiers have also been used as measures of project success.

One of the most important problems in the construction project is delays. Delays occur in every construction project and the magnitude of these delays varies considerably from project to project. Some projects are only a few days behind the schedule: some are delayed over a year. So it is essential to define the actual causes of delays in order to minimize and avoid the delays in any construction projects.

Delay is a situation when the contractor, consultant, and client jointly or severally contribute to the non-completion of the project within the original or the stipulated or agreed contract period. Delays give rise to disruption of work and loss of productivity, late completion of project, increased time related cost, and third party claims and abandonment or termination of contract. It is important that general management keep track of project progress to minimize the possibility of delay occurrence or identify it at early stages.

1.2. Background of the Study

Numerous researchers have also examined and identified the causes of delays in construction project. Assaf, et al. (1995), for example, studied the causes of delays in large building construction projects in Saudi Arabia. They identified that the most important causes of delay included are the approval of shop drawings, delays in payment to contractors and the resulting cash problems during construction, design changes, conflicts in work schedules of subcontractors, slow decision making and executive bureaucracy in owner's organizations, design errors, labor shortage and inadequate labor skills. Ogunlana, et al. (1996) studied the delays in building project in Thailand, as an example of problem faced by the developing economies. They concluded that the problems of the construction industry in developing economies can be nested in three layers: problem of shortages or inadequacies in industry infrastructure, mainly supply of resources; problems caused by clients and consultants; and problems caused by incompetence of contractors.

Chan and Kumaraswamy (1996) surveyed and classified the causes of construction delays in Hongkong as seen by clients, contractor and consultants, and examined the factors affecting productivity. The results of their research indicate that the five principal and common causes of delays are: poor site management and supervision; unforeseen ground condition; low speed of decision making involving all projects team; client initiated variations; and necessary variation of works. Mezher and Tawil (1998) conducted the survey of the causes of delays in the construction industry in Lebanon from the viewpoint of owners, contractors and architectural/engineering firms. It was found that owners had more concerns with regard to financial issues, contractors regarded contractual relationship the most important, while consultants considered project management issues to be the most important causes of delays.

A comprehensive classification of causes of construction delays has also been recommended by Abd. Majid and McCaffer (1998). They studied factors of non-excusable delays that influence contractors' performance. The classification the main

causes of non-excusable delays according to the sources of occurrence, then identified the factors contributing to those causes. It is assumed that the client has more control over the compensable delays and can take action to prevent them. The contractor is expected to have control over the non-excusable delays and, presumably, do more prevent them. Al-Momani (2000) conducted a quantitative analysis of construction delays by examining the records of 130 public building projects constructed in Jordan during the period of 1990-1997. The researcher presented regression models of the relationship between actual and planned project duration for different causes of delays. The researcher concluded that the main causes of delays in construction projects relate to designers, user changes, weather, site conditions, late deliveries, economic conditions, and increase in quantities.

Odeh and Battaineh (2002) studied causes of construction delay in Jordan. In their study presents the results of the survey which indicate that contractors and consultants have agreed that the owner interference, inadequate contractor experience, financing and payments, labor productivity, slow decision making, improper planning, and subcontractors are among the top ten most important factors. Frimpong, et al. (2003) studied the factors contributing to delay and cost overruns in Ghana groundwater construction projects. The results of the study revealed the main causes of delay and cost overrun in construction of groundwater projects includes: monthly payment difficulties from agencies; poor contractor management; material procurement; poor technical performances; and escalation of material prices. Long, et al (2004), studied the problems on large construction projects in developing countries, a case study from Vietnam. They revealed that the problems could be grouped under five major factors; incompetent designers/contractors; poor estimation and change management; social and technological issues; site related issues; and improper techniques and tools.

Koushki, et al. (2005) conducted a survey of the time-delay and cost-increase associated with the construction of private residential projects in the state of Kuwait. They identified three main causes of time-delays includes: changing orders; owners' financial constraints; and owners' lack of experience in the construction business.

Regarding cost overruns, the three main causes were identified as contractor related problems, material-related problems, and owners' financial constraints. Wiguna and Scott (2005) studied on the risks affecting construction delays and cost overruns in building projects in Surabaya and Denpasar, Indonesia. They identified the most critical factors are: high inflation/increased material price; design change by client; defective design; weather conditions; delayed payment on contracts and defective construction work.

Studies the effects of delays in construction projects have been undertaken by numerous researchers. Albinu and Jagboro (2002) identified the six effects of delays were time overrun, cost overrun, dispute, arbitration, total abandonment, and litigation. The results of their studied about the effects of construction delays on project delivery in Nigerian construction industry, shows time overrun and cost overrun were the frequent effects of delays in construction projects. Koushki and Kartam (2004) studied on the impact of construction materials in construction project in Kuwait. They obtained that time and cost overrun were the impact of the material selection time, their availability in the local market, and the presence of the supervising engineer.

Several studies have been studied and recommended the methods of minimizing delays in construction projects. Nguyen, et al (2004), identified five critical success factors could be applied to reduce the effects of delays includes: competent project manager; adequate funding until project completion; multidisciplinary/competent project team; commitment to projects; and availability of resources. Aibinu and Jagboro (2002) in their study also identified two methods to reduce or if possible eliminate time overrun were acceleration of site activities, and contingency allowance.

A comprehensive study to improve the situation of construction project also has been recommended by Odeh and Battaineh (2002). They recommended four methods includes: developing human resources in the construction industry through proper training and classification of craftsman; adopting a new approach to contract

award procedure by giving less weight to prices and more weight to the capabilities and past performance of contractors; and adopting new approaches to contracting, such as design-build and construction management (CM) type of contracts.

1.3 Problem Statement

Construction projects can be delayed for a large number of reasons. Differences categories of delays and different types of delays found on construction projects. Delay has significant effect on completion cost and time of construction project. Delays can be minimized when their causes are identified. Knowing the cause of any particular delay in a construction project would help avoiding the same.

Although various studies have been undertaken to identify the factors affecting the causes of delays, since the problems are rather contextual, the studies need to focus on specific geographical area, country or region. A major criticism of the Aceh, Indonesia construction industry is due to the growing rate of delays in project delivery. In Aceh, Indonesia most public work projects, including any construction projects under government authority or under state owned companies, are awarded on a competitive basis using the traditional approach. The consultants and contractors are engaged in separate contracts. The contractors usually would be involved until the designs have been completed.

1.4 Aim and Objective of the Study

This research was therefore, aimed at identifying the major causes of delays, effects of delays and methods of minimizing delays in construction projects in Aceh, Indonesia construction industry. To achieve this aims the following objectives have been identified:

- To identify the major causes of delays in construction project;
- To identify the effects of delays in construction project; and
- To identify the methods of minimizing construction delays.

1.5 Scope of the Study

The scope of the research was mainly focus on literature review and a questionnaire survey. Projects investigated in this research included office and administration buildings, school building, medical center, communication facilities and civil engineering projects. The survey was conducted in Aceh, Indonesia.

The questionnaire survey was designed based on factors identified from literature review that contributed to causes of delays, effects of delays and methods to minimize delays. A questionnaire was developed to assess the perceptions of contractors and consultants of the relative importance of the causes and the effects of construction delays. The developed survey questionnaire was distributed to the targeted respondent in Aceh, Indonesia.

1.6 Research Methodology

The methodology of this study started from identifying the problem statement, literature review, collecting data, analysis of results, discussion of results, conclusions and recommendations. Figure 1.1 shows a flowchart of the research methodology in order to achieve the objectives of the study.

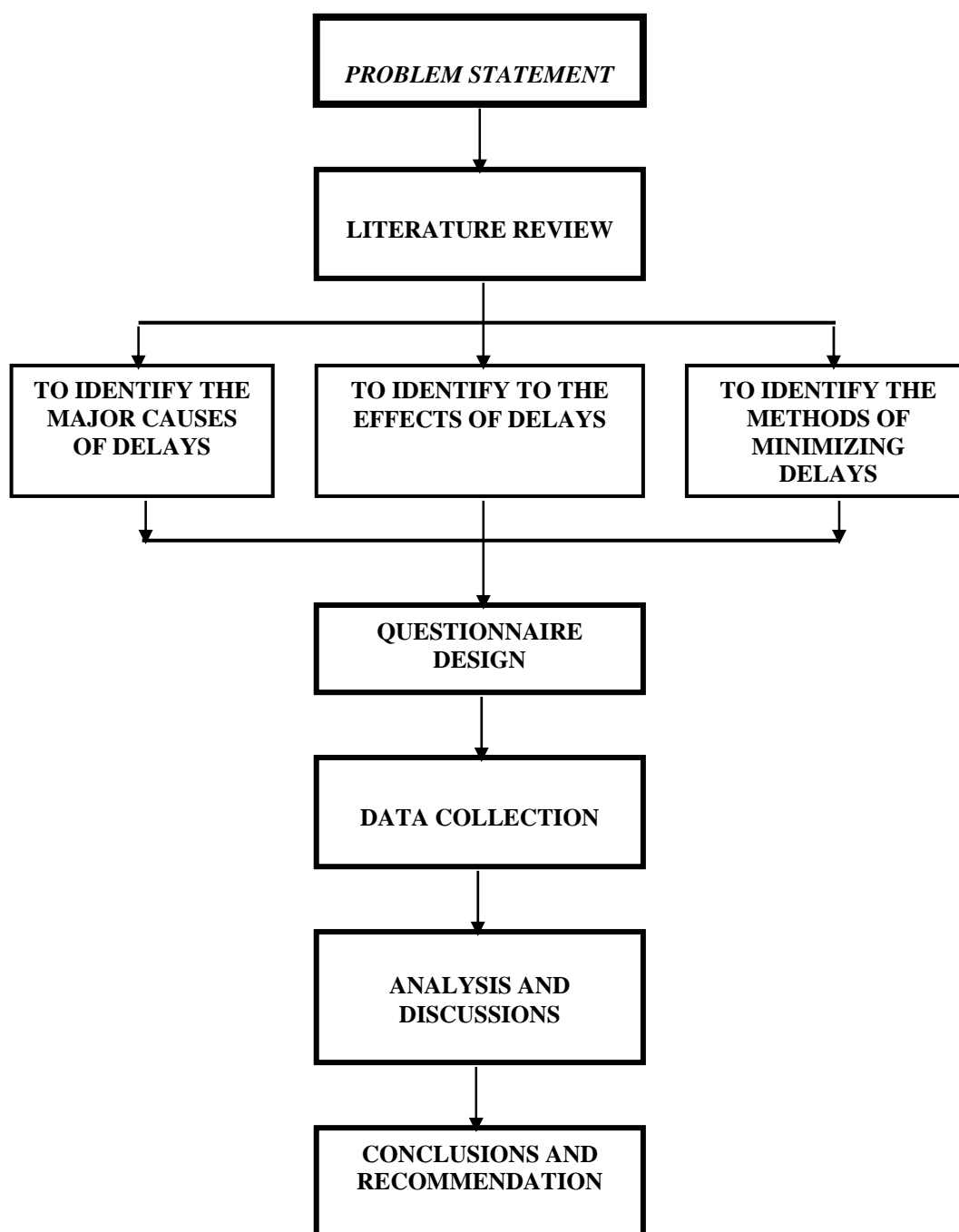


Figure 1.1 Flowchart of Research Methodology

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