

Delay Analysis

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Abstract: Construction delays can be defined as the late completion of works compared to the planned schedule or contract schedule. Construction delays can be minimized only when their causes are identified. The objective of this study is to identify the major causes of construction delays. This study is carried out based on literature review and a questionnaire survey. The questionnaire was designed based on the 32 factors of delays and 9 effects of delay targeting the contractors. The Likert's scale of five ordinal measures is used in this survey. The level of importance of each factor of delays is established by computing Relative Importance Indices (RII). The analysis is made using Microsoft Excel and SPSS Software.

Keywords: Delay factors, Delay effects, RII, SPSS

1. Introduction

In construction, the word —delay“ refers to something happening at a later time than planned, expected, specified in a contract or beyond the date that the parties agreed upon for the delivery of a project. Delay is the slowing down of work without stopping construction entirely and that can lead to time overrun either beyond the contract date or beyond the date that the parties have agreed upon for the delivery of the project. Delays classified into non-excusable delays, excusable non compensable delays, excusable compensable delays and concurrent delays.

Non-excusable delays are delays, which the contractor either causes or assumes the risk for. Excusable non-compensable delays are delays caused by factors that are not foreseeable, beyond the contractor's reasonable control and not attributable to the contractor's fault or negligence. Compensable excusable delays these are compensable delays are excusable delays, suspensions, or interruptions to all or part of the work caused by an act or failure to act by the owner resulting from owner's breach of an obligation, stated or implied, in the contract. Concurrent delays occur when both owner and the contractor are responsible for the delay.

1.2 Problem Statement

Many construction projects have faced various problems and delay of time is one of the major problems. The delay in dispute settlement has manifold effects such as it will give detrimental to the relationship between owner and contractor.

The contractor and the owner pay for the extra charge for the completion of the project due to delay in large construction projects. When the completion time of the construction project exceeds the agreed completion time, it is known as construction project delay. It is needed to conduct detailed investigation and identification of delay factors and then selecting the right actions to counter these delay factors within cost and maintaining quality. The faults and errors due

to the contractor cause delays and waste of capital and time.

1.3 Scope

1. Reduce delays in road projects
2. Help proper development of the country or a region.
3. Reduce the effects of factors that cause delays.
4. Timely completion of project.
5. Reduce cost overruns.
6. Leads to proper planning of projects regarding time.
7. Construction of Delay Model.

1.4 Objectives

1. To identify the factors that contributes to delay.
2. To rank and identify the severity of the factors.
3. To identify the effects of delays.
4. Construction of Delay model.

1.5 Advantages

1. Reduces the occurrence of delays in construction
2. Reduces cost over run
3. Helps in timely completion of the project
4. Helps in reducing delays and thereby enhance development of the country

1.6 Disadvantages

1. Complexity of delay analysis increases with increase in complexity of the project.
2. Maybe time consuming, depending upon the project.

1.7 Outline of the Thesis

Chapter 1: Introduction

Time delay is one of the biggest problems facing in many construction buildings in India. Completing projects on time is the key factor of the project, but the construction process is

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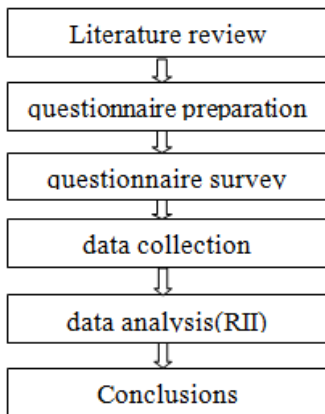
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subject to many variables and unpredictable factors, which result from many sources such as availability of resources, external factors, performance of parties and type of building. If there is a delay in project it leads to loss of productivity, increased cost, contract termination and disputes between contractor and owner.

Chapter 2: Literature Review

Literature survey is carried out for identifying factors and effects that causes delays in construction industry and are also responsible for the harmful effects on projects.

Chapter 3: Research Methodology



Chapter 4: Result and Discussion

The causes and effects of construction delays were ranked by using relative important index. The top affecting causes of delays are fluctuation of prices and bad weather conditions. The top effects of delay are cost overrun and loss of profit by the contractor.

Chapter 5: Conclusions

Data Analysis

The causes and effects were all examined and the ranking of their attributes was done using the Relative Importance Index (RII).

This helped to determine the proportionate contribution of each predictor in the formula and its incremental contribution when combined with other predictors. The relative importance index formula by was used to calculate the (RII) of the causes and effects. The relative importance index is given as:

$$RII = \frac{1n1+2n2+3n3+4n4+5n5}{5(n1+n2+n3+n4+n5)} \quad (1)$$

n1 = number of respondents who answered strongly disagree
 n2 = number of respondents who answered disagree
 n3 = number of respondents who answered neutral

n4 = number of respondents who answered agree, and
 n5 = number of respondents who answered strongly agree

Results

The perspectives of contractors on the 32 delay factors and 9 effects were analysed based on their relative importance index. The relative importance index and ranks of factors and effects of delay are presented in Tables 3.1 and 3.2.

Respondents ranked Fluctuation of prices as the most influential cause of delay with a relative importance index (RII) of 0.92. Fluctuation of prices has become a common problem. Fluctuation of prices surely affects the activities of the contractor.

Respondents identified Cost overrun as the most critical effect of delay with a relative importance index of 0.854.

Table 3.1 RII of delay factors

FACTORS	RII	RANK
Fluctuation of prices	0.92	1
Bad weather conditions	0.88	2
Discrepancy between design specification and standards	0.88	3
Breakdown of equipments	0.84	4
Necessary variations	0.84	5
Unusual conditions encountered on site	0.84	6
Underestimation of cost of projects	0.84	7
Construction methods	0.84	8
Delay in receiving payment certificates	0.8	9
Difficulty in accessing bank credit	0.8	10
Underestimation of complexity of projects	0.8	11
Inefficient communication between parties	0.76	12
Poor supervision	0.72	13
Mistakes with soil investigations	0.72	14
Legal disputes	0.72	15
Unfavourable Site conditions	0.64	16
Shortage of skilled labour	0.6	17
Shortage of materials	0.6	18
Underestimation time for completion by contractor	0.6	19
Late delivery of materials	0.6	20
Public holidays	0.56	21
Unskilled equipment operators	0.56	22
Delay by sub-contractors	0.52	23
Lack of programme of works	0.52	24
Contractor induced variations	0.48	25
Financial independence/solvency	0.44	26
Poor Site management	0.44	27
Accidents during construction	0.4	28
Delay in instructions from consultants	0.36	29
Shortage of unskilled labour	0.36	30
Poor Professional Management	0.32	31
Poor design	0.28	32

Table 3.2: RII of delay effects

EFFECTS	RII	RANK
Cost overrun	0.853333	1
Loss of profit by the contractor	0.82667	2
Abandonment of project	0.78667	3
Litigation	0.733333	4
Rescheduling	0.733333	5
Claims	0.72	6
Extension of Time (E.O.T)	0.68	7
Lost productivity and efficiency	0.64	8
Damage to company's reputation	0.28	9

Conclusion

It is found that fluctuation of prices is the most important delay factor while cost overrun is the important effect of delay.

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