Assessment And Evaluation Of Delay Factors For Highway Construction Project By Relative Importance Index Method

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Abstract:

For the construction business, delays are a perennial concern. Most studies have examined why projects go behind schedule during the execution phase, but far less attention has been paid to the causes of snags in the earlier stages of planning and design. Thus, the purpose of this article is to investigate the factors that caused project schedule to fall behind during the planning, design, and implementation phases, throughout the Era of Terror. Engineers working in both the public and commercial sectors of the building business have been handed a questionnaire detailing the causes of delay throughout all three stages. The findings of the legitimate replies have been verified using the the Relative Importance Index (RII), which display the average repeat of delay occurrence. According to the findings, a lack of access to primary data is directly responsible for most delays occurring during the planning stage. A study of questionnaires used during the design phase of projects revealed that owner financial difficulties were the main cause of delay. Terrorist actions and severed roadways are also the primary cause of implementation delays.

Keywords: Causes of Delay, Effects of Delay, Highway Construction Project, Engineers, Contractors, Construction Project Delays, Relative Importance Index, Impacts on Delays, Mitigate Delays

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1. Introduction

The basic purpose of roads is to facilitate movement and access.Since a well-maintained road system is an investment in the country's future economy and prosperity, road construction projects have been prioritized in the country's budget. Meeting the pressing demands of stakeholders requires road projects to be completed on time. Unfortunately, construction professionals face a huge challenge when road construction projects are delayed for various reasons. A delay occurs when the expected completion date of the project is later than the

contract date or the date agreed upon by the parties. Timely completion of projects is a testament to efficiency, yet there are many causes of uncertainty in the construction process. One of the main problems that have caused the Department of Highways to worry about highway construction is the occurrence of delays during the construction process. For this reason, the investigation of building delays was essential to the objectives of this study. Insight into what causes highway construction delays can help find solutions to avoid or work around the problem. The objective of this study is to determine what factors contribute to delays in highway construction.

The construction industry faces a significant challenge in the form of delays in road construction projects. Failure to complete projects on time and within financial plan has proven to be a worldwide problem. While the explanations for delays are really stable across all agricultural countries, certain components are apparently related to neighbourhood businesses, the financial environment, social considerations, and entrepreneurial idiosyncrasies such as land conflicts and highway right-of-way difficulties. The community already has to deal with the negative impacts of road construction projects, such as increased traffic and the risk of accidents, and now project workers also have to worry about the consequences of project failure, reduced profits and reduced public confidence in the government-funded initiative. Therefore, it is of utmost importance that the road project is completed on schedule.

2. Objectives

a) To list out several important delays that can occur in highway construction.

b) To determine and rank various delays in highway construction.

c) To investigate and assess the various delays in highway construction.

Abstraction is primarily focused on the involvement of several delays in a construction project. The RII method, which is a quantitative tool, is used to analyse and classify delays based on their severity in a project. Delays of higher severity are ranked higher and less serious delays will be ranked below. Higher to lower delay is ranked in ascending order. This assessment will help in effective planning and performance excellence.

3. Methodology

Several important delays were listed out and based on them, a questionnaire survey was made ranging from Very Low to Very high-risk basis. The questionnaire survey was conducted on 50

people and the respective data was collected. This data analysis is done using the RII method. Once the analysis was done the various delays were ranked based on their severity of impact on the highway project. RII was calculated for the probability, impact, and priority.

After that, Top five rank and last five rank of delay cause from RII rank.

Relative Importance Index = ΣW / (A*N)

3.1. DELAY IDENTIFICATION AND CLASSIFICATION

Many writers have attempted to categorise the causes of highway and expressway building delays, however the underlying causes shared by most of these categories are similar. Even though they've been shown to be different sorts in different investigations, they've been shown to be connected in some way. In the following arguments, I expand on this category.

Delays are most noticeable in the four primary areas described below: -

1. Critical and Non-Critical
2. Excusable and Non-Excusable
3. Compensable and Non-Compensable
4. Concurrent and Non-Concurrent.

3.2. DATA COLLECTION

Data were collected through a questionnaire. Data were collected from Contractor, Owner and Consultant. As part of sample-level data collection, a total of 50 surveys were distributed and 31 comments were Collected from them. Returned after delivery, Contractors provided 19 responses, Consultant provided 8 responses and the Owners gave 4 answers out of the total.

Table 1 Data Collection Details

No.	Respondent	Sample Distributed	Sample Received Back	Percentage of Response
1	Contractor	26	19	73.08%
2	Consultant	15	8	53.33%
3	Owners	9	4	44.44%

4. Analysis Of Delay

The required information obtained from the questionnaire survey is made available and ranked using an index of relative importance, which is a quantitative method. The obtained data is mathematically summed and sorted using this general RII formula.

Relative Importance Index = ΣW / (A*N)

Where,

W = Weighting given to each factor by the respondents (ranging from 1 to 4),

A = Highest weight,

N = Total number of respondents

In accordance with the RII, Several types of delays are ranked. If the RII value is high, then the delay is serious and must be prioritized. If the value is RII is low, then the delay is low or moderate.

The Six Categories of Delay are:

1. Causes related to Contractor
2. Causes related to Owner
3. Cases related to Consultant
4. Cases related to Services and Utilities
5. Causes related to Government Regulations
6. Causes related to External Environment

Table 2 Delay Analysis Using RII

No.	Delay Category Related To	Cause of Delay	Weighted Average Index	Weighted Average Rank	RII	RII Rank
1	Contractor	Inappropriate method	4.07	8	0.814	8
2		Payment problems	3.93	10	0.786	10
3		Rework due to errors	3.48	17	0.695	17
4		Improper planning	4.25	6	0.849	6
5		Shortage of manpower	4.18	7	0.835	7
6		Shortage of equipment	4.46	3	0.891	3
7		Poor site management	3.83	11	0.765	11
8		Delay in progress payment	4.0	9	0.80	9

9	Owner	Budget availability	2.6	25	0.52	25
10		Delay approving document	3.51	16	0.702	16
11		Change of project scope	3.69	13	0.737	13
12	Consultant	Solving design problems	3.55	15	0.709	15
13		Poor cost estimation	2.88	22	0.576	22
14		Improper drawing	4.32	5	0.863	5
15		Poor communication	4.35	4	0.87	4
16		Testing and inspection performance	3.65	14	0.73	14
17	Service and Utility	Utility location not clear	3.44	18	0.688	18
18		Delay in relocation	2.71	24	0.541	24
19		Slow response by utilities	3.3	20	0.66	20
20	Government regulation	Obtaining in work orders	3.76	12	0.751	12
21		Land acquisition	4.6	1	0.919	1
22		Change in government rules	3.37	19	0.674	19
23		Summer restriction work	2.25	29	0.450	29
24	External Environment	Traffic diversion	2.95	21	0.59	21
25		Weather effect on activity	2.5	26	0.499	26
26		Materials shortage	4.53	2	0.905	2
27		Accident on site	2.81	23	0.562	23
28		Effect of social and cultural conditions	2.46	27	0.492	27
29		Political Situation	2.36	28	0.471	28

5. Result And Discussions

The Delay ranks and importance are attained from the analysis done by using Relative Importance Index (RII). This is based on the obtained responses via the questionnaire survey. The ranks of the delays are based on how much harm they can cause to the project. The importance of the delays is based on the obtained ranks.

According to the survey done, the obtained top five major delays are 6, 14, 15, 21, 26- bar analysis shown in (Fig. 1) and the five least delays to the project are 9, 23, 25, 28, 29 -bar analysis shown in (Fig. 2).

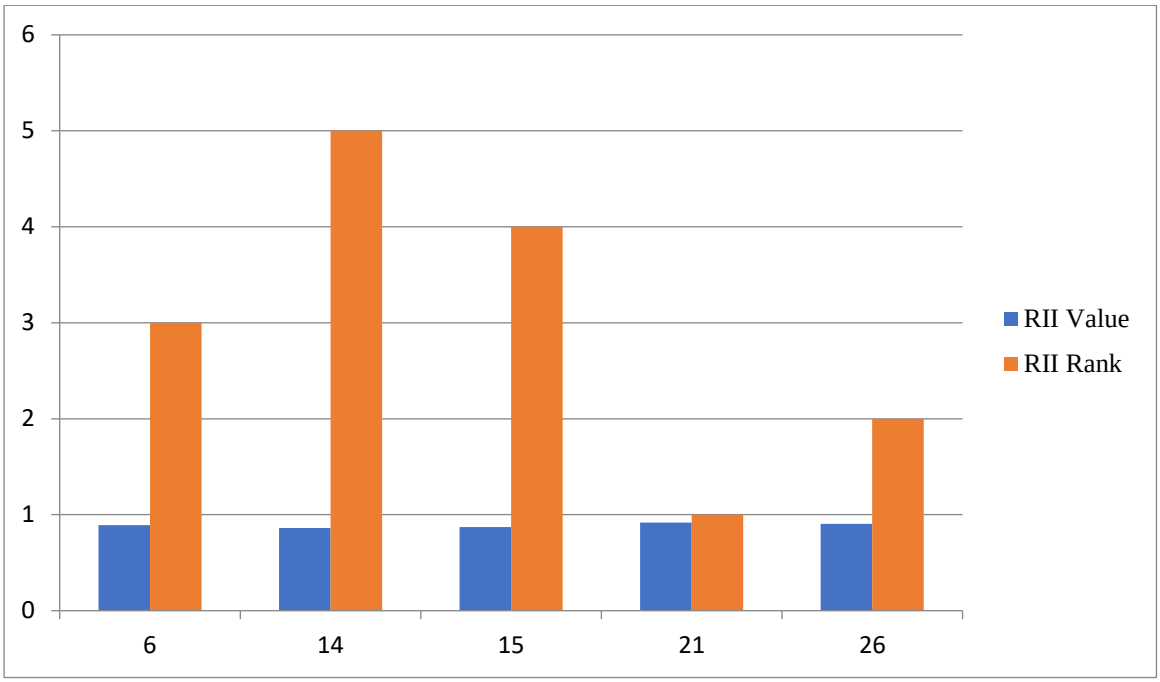

Figure 1 Bar chart Analysis of top five obtained major delays

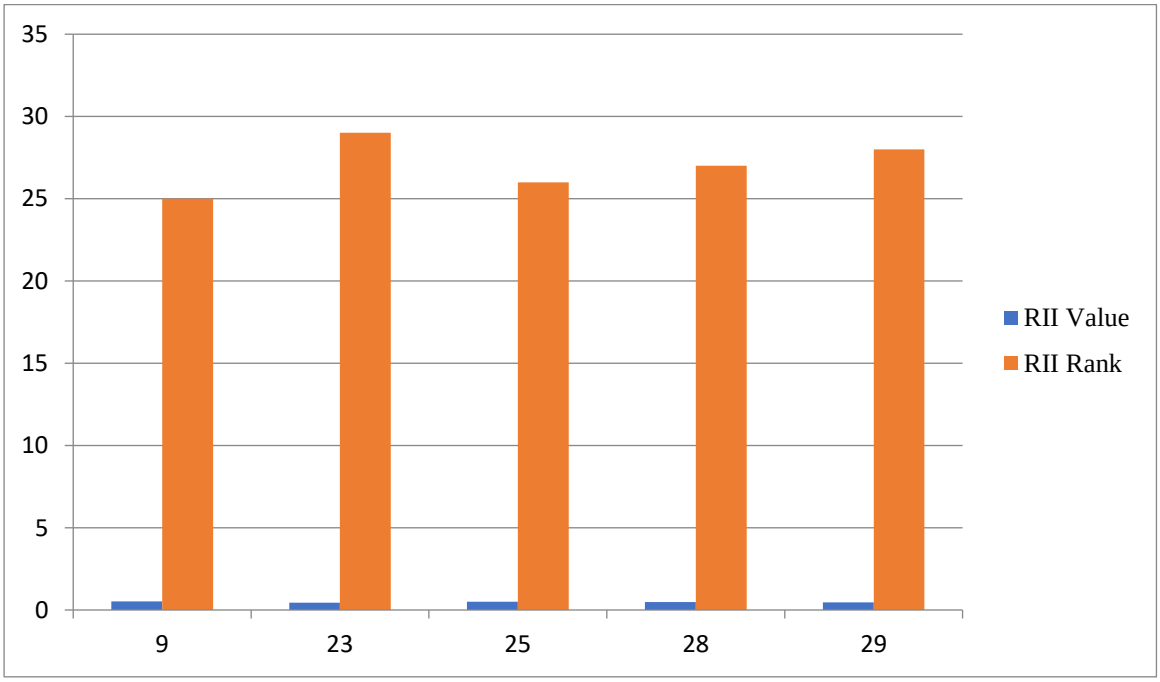

Figure 2 Bar chart Analysis of least five obtained delays

6. Conclusions And Recommendations

Delay Assessment is a crucial task which is to be conducted to avoid harmful effects that could pop-up, while initiation of Highway project construction. This study is conducted to obtain

better knowledge on Delay Assessment and how important it is for a project to run smooth. Delay assessment will help in better understanding consequences that could occur in the highway construction period. It helps avoid certain disasters by decision making and plan for preventive measures. With Delay assessment, there will be certain performance improvements in the project. In this study, it was made clear that mainly Land acquisition, Materials shortage, Shortage of equipment, Poor communication and Improper drawings are the top five major delays in the highway construction project. Knowing these major delays will help in developing preventive mechanism, so there will be negligible problems, less time lost and better budget planning while execution of the construction project.

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