

“To Identify and Correctify Delays in Construction Project by RII- Review”

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ABSTRACT: in India, construction delay is main problem in construction industry. Economy and development of country is mainly depend on agricultural, industrial sector and also depend on construction industry. In construction, delay can be defined as, completion of work compared with planned schedule. Delay in construction projects are unavoidable and may claims and disputes among different construction parties. For avoid or minimize of this type of delay, which needs to be classified and identified. We collect data from various construction parties such as Owner, Contractor, project Manager, Consultant, Junior or Junior Engineer by distributed questionnaire among them. Aim of this paper identified causes of delay in construction project and analyze by using relative importance index (RII).

Key Words: Construction Projects, Causes of Delay, Relative Importance Index.

I. INTRODUCTION

India is developing country, the construction industry is important sector for the progress and growth of India. The Construction projects is called as successful projects, which is completed within time, within budget and according to its specifications. Delay may be occurs due to various causes factors such as contractor related, owner related, consultant related, material and equipment related, external related, labor related. To avoid or minimize this kind of delay identified causes of delay is important. Method of Investigation of delay is called as ‘delay analysis technique’. There are various delay analysis technique but in this paper we discuss relative important index and artificial neural network technique. We conducted questionnaire survey to get data about causes of delay in construction industry among various parties by questionnaire sheet or by using Google form survey.

This paper on causes of delay factor and methodologies of RII.

1.1 OBJECTIVES

The main objective of this work is to identify various causes of delay in construction industry

- To identify causes of delay in construction project with the help of literature review.
- To observe main issue of delay in construction by data collection.
- To analyze data by RII.
- To suggest and Recommend new ideas.

II. LITERATURE SURVEY

[1] S. A. Asaf, S. Al-Hejji (2005) discussed in his paper topic on causes of delay in large construction project. This paper studied delay in construction projects in Saudi Arabia on the basis of field survey. It studied frequency, severity, importance of causes of delay in various construction project. On the field survey 73 causes of delay were identified. These causes were taken in 9 major groups. In this field survey included various construction parties such as contractor, owner and consultant. Each party gave rank to causes of delay. In this way on this field survey he identified frequency, severity and important causes of delay. He identified 10 rank individual parties and recommended it.

[2] Dinesh Kumar R: in this study discussed causes of delay in Indian construction project. The major reason behind all these causes is lack of commitment and coordination within the project participants. The commitment of the project participants drastically affects the quality and the progress of the project. Issue of delay in construction is common globally, but its causes & effects vary with respect to native, context and culture of the construction industry. Contractors should effectively plan and schedule the project in

advance by considering all possible risk factors with respect to the nature and culture of the locality. Commitment from top to bottom level management is more important in which periodic review and correction should be made in all aspects (safety, quality, material, equipment) to avoid unnecessary delays and cost overruns. Unskilled workers are inefficient, in which labors and supervisors should be well trained with effective training program to improve their knowledge. Delivery of construction materials should be dealt carefully with the vendors which affects the progress of the project utmost. Owner should be well aware about the effect of changing orders during construction and delay in progress payment, which affects the project completion on predefined time.

[3] Veera Vijay Devi, Surendra Kumar. P carried out study on analyzing delay factors in indian construction project. In this study identified delay based on questionnaire survey. It observed in his study, there are some common factors that are causing delay in projects. Those common delays are identified different two methods i.e. analytical network process and relative importance index. In questionnaire survey it distributed to the various 7 respondent parties with 70 delay factors. From respondent feedback data Analyzed by these two methods. All causes of delay gave rank by these two methods. By these two methods sort out first 15 rank separately. Found out important causes of delay and its major group by RII values and ANP values, it also discussed impacts on delay factors on construction project.

Relative importance index (RII):

Relative importance index is statistical method to determine the ranking of delay factors. From this methods identified relative importance of various causes of delays. It is depend on five point scale, ranking from 1 top 5 is adopted. 1 is very low important and 5 is very high important. RII were determine by following formula:

$$RII = \sum W / (A * N) \{0 \leq index \leq 5\}$$

Where,

RII is relative importance index.

W is weighting is given to each other by the respondent (ranging from 1 to 5).

A is highest weight.

N is total number of respondent.

[4] Alexey Minin, JASS 2006: in this study discussed about neural network introduction, type, learning process, data filters and overview. Artificial Neural Network is biological nervous system. An ANN is configured for a specific application, such as pattern recognition or data classification, through a learning process. ANN is used to make forecast. He conclude that best way to make forecast is to use Adaptive filters.

[5] Shruti Singh, Dr. M.K. Trivedi: This paper describes an application of fuzzy logic in analysis of delays in construction projects using Fuzzy toolbox of MATLAB Program Software. Delays in construction projects are inevitable and may result in claims and disputes among different construction parties. Delays in construction projects can be due to a number of causes, which need to be classified and identified. For the success of a construction project, estimation of likelihood of delay resulting from different factors is a must. Fuzzy logic provides a simple way to arrive at a definite conclusion based upon vague, imprecise or missing input information. Fuzzy logic is a form of many-valued logic; it deals with reasoning that is approximate rather than fixed and exact.

III. RESEARCH METHODOLOGY

3.1 General

The research methodology is a description of how the objective can be realized. The data collection can be found through distribute questionnaire or by Google form sheet. The data collection through these methods will be analyzed by RII and the result will be presented

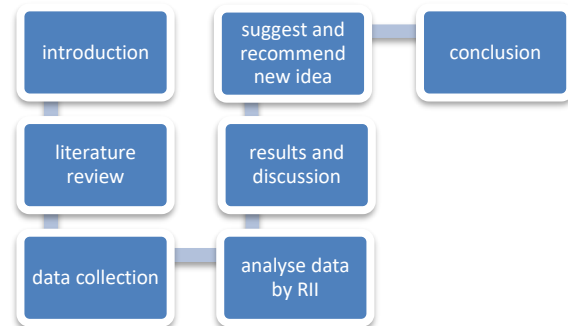


Figure 1: Flow of proposed research methodology

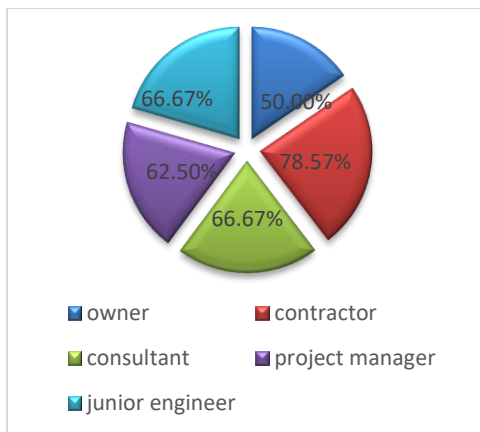
3.2 data collection

Collected data related to delay causes of construction industry to distribute questionnaire sheet among respondent such as owner, project manager,

contractor, consultant, junior and senior engineer by site visit or by using Google form survey. These questionnaire distributed in small, medium and large size company. The details of the questionnaire distributed and response received is briefly summarized in the following table.

Respondent	Questionnaire distributed	Questionnaire Response	Response percentage (%)
owner	10	5	50.0%
contractor	14	11	78.57%
consultant	12	8	66.67%
project manager	8	5	62.50%
junior engineer	18	12	66.67%

Table no 1: questionnaire distributed and response in percentage



Pie chart: questionnaire distributed and response in percentage

3.3 analyze data by RII

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A is highest weight.

N is total number of respondent.

IV. RESULTS AND DISCUSSIONS

Questionnaire distributed to targeted respondent such as owner, contractor, consultant, project manager, junior and senior engineer who is part of construction industry. Collected data from these respondents to identify the main causes of delay in construction. Questionnaire distributed in form of sheet or by using Google form. Questionnaire are used to gather information about respondent details and about causes of delay for the study. Questionnaires are sent 62 out of that 41 were returned. This data is used to identify main causes of delay by using Relative Importance index Method and ranking them. The details of the questionnaire distributed and response received is briefly summarized in the following table:

Sr no	Causes of delay factor	RII	RAN K
1	Delay in payments to contractor	.73	16
2	Owner financial problem	.79	8
3	Sow decision taken in continuous work	.72	17
4	Conflict between joint ownership of project	.53	42
5	Delay in permits and approvals from Govt. Authorities	.81	4
6	Change decision by owner during construction	.65	29
7	Poor communication and lack of co-ordination between other parties	.46	56
8	Delay in understanding Govt. rules and regulation	.40	63

9	Deliver the site to the contractor	.83	1
10	Delay in provide basic facilities on site by owner	.47	53
11	Owner interference in contractor work	.48	51
12	To give contract less experienced contractor	.47	54

Table no 1: Owner related factor

Sr no	Causes of delay factor	RII	RAN K
1	Lack of manpower	.8	6
2	Lack of Resources machinery, material, etc.	.76	11
3	Irregular payment to labor	.46	57
4	Poor site management & supervision by contractor	.82	3
5	Financial problem by contractor	.75	13
6	Difficulties due to unexpected changes in Govt. rules	.43	61
7	Poor communication with subcontractor or other parties	.53	43
8	Dispute with owner	.72	18
9	Rework due to mistake in construction stage	.6	33
10	Improper construction method implemented by contractor	.52	44
11	Improper planning and scheduling of project by contractor	.65	30
12	Delay in sub-contractor project	.58	35
13	Inaccurate time estimation	.62	32
14	Poor qualification of contractor technical staff	.71	19

Table no 2: Contractor related factor

Sr no	Causes of delay factor	RII	RAN K
1	Delay due to incomplete drawing	.71	20

2	Delay due to inaccurate drawing	.71	21
3	Slow response and inspection	.52	45
4	Delay due to performing inspection and testing by consultant	.45	59
5	Delay due to irregular visit to site	.57	36
6	Inadequate experience of consultant	.68	26
7	Poor quality control	.74	15
8	Poor communication and co-ordination between consultant and other parties	.68	27
9	Conflict between consultant and other parties	.60	34

Table no 3: consultant related factor

Sr no	Causes of delay factor	RII	RAN K
1	Shortage of construction material on market	.76	12
2	Late delivery of material	.56	38
3	Poor material management on site	.64	31
4	Suddenly rises of material prices in market	.52	46
5	Material store problem on site	.57	37
6	Poor quality of material	.67	28
7	Changes in material types during construction	.71	22
8	Sources of material far away from site	.5	49
9	Equipment distribution problem	.49	50
10	Lack of high technology equipment	.69	25
11	Low level of equipment operator skill	.75	14
12	Daily repair problem of material	.54	41
13	Insufficient availability of material	.79	9

Table no 4: Material/ equipment related factor

Sr no	Causes of delay factor	RII	RANK
1	Shortage of labor	.83	2
2	Shortage of skilled labor	.79	10
3	Bad habit of labor	.51	47
4	Labor injuries during construction	.4	64
5	Continuous absent due to payment issue	.81	5
6	Unexperienced labor	.71	23
7	Personal conflict among labor	.56	39
8	Different culture or language problem	.41	62
9	Wrong selection	.71	24
10	Labor strike	.39	66
11	Improper co-ordination between labor	.34	69

Table no 5: labor related factor

Sr no	Causes of delay factor	RII	RANK
1	Weather condition	.47	55
2	Changes in Govt. rules and regulation during construction	.37	68
3	Dispute with neighbor's	.51	48
4	Accident during construction	.48	52
5	Unexpected surface, subsurface drawing	.38	67
6	Disturb construction activities between rain	.45	60
7	Traffic problem near construction site	.46	58
8	Delay due to obtaining permission from Govt. authority	.56	40
9	Lack of necessary utilities on site (eg. light, water, etc)	.80	7
10	Problems with other parties	.40	65

Table no 6: external related factor

4.1 Sample calculation by RII:

Owner related factor: slower decision making

$$RII = \frac{\sum W}{(A * N)} \{0 \leq \text{index} \leq 1\}$$

Where,

RII is relative importance index.

W is weighting given to each other by the respondent (ranging from 1 to 5).

A is highest weight.

N is total number of respondent.

$$RII = \frac{1*3+2*4+3*9+4*13+5*12}{41*5} = .73$$

A =5; N = 41 (no of respondent)

4.3 important delay factors from RII

Sr no	Most important delay factor	Group of factor	RII	RANK
1	Deliver site to contractor	Owner related factor	.83	1
2	Shortage of labor	Labor related factor	.83	2
3	Poor site management and supervision by contractor	Contractor related factor	.82	3
4	Delay in permits and approval from Govt. Authorities	Owner related factor	.81	4
5	Continuous absent due to payment issue	Labor related factor	.81	5

4.3 recommendation

1. Before starting project owner must clarify he is satisfy or not to funding this project. He must sufficient to funding this project

2. Labor contractor should proper management about labor team. Hire good quality or skilled labor because labor plays key role in construction industry.

3. To give contract should be well experienced contractor because contractor plays main role in construction project



4. Before starting project owner must proper management about basic facilities such as light, water etc. because machinery dependent upon these facilities. Without these facilities it can't work

5. Contractor give regular payment to labor avoiding absent issue about labor.

V. CONCLUSIONS

In this paper causes of delay in construction project are discussed. It studies the importance of causes of delays. By using RII method it is observed that first 5 ranking factor are more important for delay point of view. These are, Deliver site to contractor, Shortage of labor, Poor site management and supervision by contractor, Delivery in payment and authority from Govt. Authorities, Continuous absent due to irregular payment. The highest impact is ranked as .83 which is mainly owner related factor and lowest impact is .34 which is improper co-ordination between labors i.e. not considered these factor for delay point of view. These highest 5 RII impact factor are identified and these factor controlled in the project for minimize or avoid delay in construction.

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