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IMPACT OF DELAYNESS ON CONSTRUCTION PROJECTS

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ABSTRACT – Delay is unique one in every of the biggest region construction companies are facing this time. This research paper deals with causes of delayness & evaluation of causes by RII & IMPI technique which are extremely effect on construction projects of buildings in India.

Thus, Compressive study on the causes of step-down of delay factors of construction comes is extremely necessary. This study contained evaluation, ranking of factors of delayness and also comparison among three groups (i.e, Owner, Contractor & consultant) . Total 38 causes are identified under 8 major groups. Total 35 stakeholders included in this research i.e, 9 owners, 12 contractors and 14 consultants which are ready to participate in this field survey This disseration advise the simplest way to seek out out ranking of causes of delay issue by 2 completely different methodology: Relative importance index and Importance index depend on Importance of cause, severity(how much cause impacts on project) and frequency(occurrence of cause) After determining results of all attributes of delayness is that out of prime ten factors total five factors are common in ranking by each ways. They are shortage of labours , delay in delivery of fabric on web site , make over because of errors on web site , delay current payment by owner , poor web site management and direction by contractor.

It is expect that these findings of the paper will help the personnel to act on critical causes also after it try to minimize delay of their projects. Owners, Contractors & consultants are selected for questionnaire survey to evulate the factors of delayness in this study.

Key Words- Delay Factors, Survey, Relative important index (RII),Importance index (IMPI).

1. INTODUCTION

The delay in construction work department can also be said as the project does not deliver on the date of completion of project and also the expansion in the estimated cost project as compare to actual cost of project, it means the project is delay due to delay in time and values overruns. The Project delays with compare to planning & scheduling and is taken as common problem in the construction of multi-stories buildings projects in India Toward the owner of the project delay suggests that price overruns attributable to lack of production and rentable area. Toward the contractor delay implies that higher overhead price attributable to enlargement in time of project, high material price, machinery and labour price increment.. The processor of execution of construction project is subjected to various and unwanted factors which result from many sources. These sources contained availability of resources on site, environment condition, performance of various parties, Role of other parties and contractual relationship It is terribly seldom happen that project completed within the nominal period. Delay means more activities are pending which mentioned within the contract duration of project. For various parties definition of delayness in construction field is different such as for owner delay means low income in more time, for consultant delay means more work remaining in less time period etc. so because of delay project cost, material cost, government charges and overall cost are increase. All these factors are related to causes if delay so we can realize the attributes of delayness in construction to extend the performance of project. For any construction projects requirement of work is very high so, owner needs planning at which time and price of project is satisfy. This can be listed out by proper -scheduling and by identification of causes of delay. .

0BJECTIVES

- To study and evulating the chief causes of delayness and to minimize it.
- To determine order of the causes of delayness Relative importance index technique(RII)and Importance index technique (IMPI).

2. LITERATURE

The number of studies have been taken out to recognise the critical factors of delayness in construction work. Hemanta Doloi, Anil Sawhney,K.C.Iyer,Sameer Rentala (2012) [1] were surveying for list out the critical factors of delayness cause delays in Construction of building projects in Indian construction sector. A questionnaire prepare to conduct for analysing of 45 factors of cause delays and also rank by RII method contained 77 stakeholders involved in construction work in Indian projects. These delay factors were distributed into six major categories. The results of this investigation is that one of the most critical cause in construction department are the lack of commitment, Again work due to mistake, meagre site management and lack of general training of site engineers.

3. RESEARCH METHODOLOGY

In order to evaluate and analyse the chief of delay in multi-story building construction projects. Firstly, detailed study of similar researches in the central East countries such as Turkey, Iran, Iraq, Nigeria, Malaysia and Saudi Arab. A little range personnel involved in this research .personnel were randomly selected from various private construction companies and also government department Effective causes of your time delay and value overruns of building construction comes were known and classified. finally, considering project time delay no. of causes were ranked by both RII technique& IMPI technique .In the next step, agreement of three parties owner, contractor and consultant was evaluated by spearman's co-relation coefficient and after it comparison between relative importance index and importance index method also finally last step is providing appropriate suggestions for the improvement and minimization of postponement to execute the construction projects.

4. Data Collection Approach

The aimed population involved civil engineering, private buildings construction firms and government department of north zone or region of Gwalior(M.P) in India. The consultants, contractors and Owners of north zone of Gwalior were targeted for survey. The details of various stakeholders and total numbers of population of Gwalior collected through internet and also communication with various private building construction companies about their model mass of population. These details were taken as mass of population to evulate formula shown in Eq. (1) was used (Hogg & Tannis 2009)

$$n = \frac{m}{m-1} \qquad 1 + N \qquad (1)$$

where n, m, and N = the model mass of the limited, unlimited, and available population, respectively. m is calculated by Eq. (2):

$$m = \frac{z2*p*(1-p)}{\varepsilon^2} \qquad (2)$$

Here, z = the statistic value for the confidence level used, i.e.,1.645,1.96 and 2.575, for 90%, 95%, and 99% confidence levels, respectively; p = the value that is being calculated of the population ratio and ε = the sampling error of the point estimate Effective causes of your time delay and value overruns of building construction comes were known and classified Because the worth of p is unknown, advocate a conservative price of 0.50 be used so a model mass that's a minimum of as massive as needed be obtained., the unlimited model mass of the population, m, is approximate calculated by considering a 90% confidence level, i.e., 10% significance level.

$$m = \frac{1.645^2 *0.5*(1-0.5)}{(0.1)^2}$$

$$= 67$$

Accordingly, for the overall number of personnel's based on detail available through internet and also interview with various private & govt. building construction companies , i.e., N = 983 approx., the representative model mass of the population required, is determined as shown below:

$$n = \frac{67}{1+\frac{67-1}{983}}$$

$$= 62.78$$

As the response rate is always very low, this questionnaire survey was conducted for field Survey at site on requesting to various respondents of Gwalior region for giving response to some questions which responsible for delays. This study contained 35 responses in which 9 Owners,12 Contractors,14 Consultants. Which is considered as very good for this type of investigation.

5. DATA ANALYSIS APPROCH

The following two varieties of technique ought to be used for knowledge analysis.

(i). Relative Importance Index technique:

By exploitation the Relative Importance Index technique to the ranking of causes of delay is easy with compare to alternative The same method is taken in the present study within three groups which are clients, consultants or contractors. The grading of five-point scale 1 for (very low importance) to 5 for very high importance) is considered and converted into relative importance indices (RII) for each factor as follows:

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

Where:
W – is the response weight given to each attribute by the personnel and range vary from 1 to 5, (where "1" is "very low importance" and "5" is "very high importance");
A – is the highest weight (i.e. 5 in this case) and;
N – is the overall number of stakeholders.

The RII was accustomed ranking (R) of the assorted vital factors of delay. it's additionally doable that by RII technique every separately cause's RII known by all respondents ought to be accustomed calculate the final And overall rankings so as to offer an overall read of the causes of construction delays in Indian construction field

(ii).Importance Index technique:

In this technique, For each cause/attribute two questions were asked: What is the frequency or occurrence for this cause? And what is the degree of severity of this cause on project delay? Both frequency of occurrence and severity were graded on a five-point scale. Frequency of occurrence is graded as follows: very rarely, rarely, sometimes, often and always (on 1 to 5 point scale). Similarly, degree of severity was categorized as follows: very little, little, moderate, great and extreme (on 1 to 5 point scale).

1) Frequency index: A formula is used to rank factors of delay based on occurrence of it as estimated by the personnel.

$$\text{Frequency Index (F.I.) (\%)} = \sum a\ (n/N)^* 100/5 \quad (4)$$

Where, a is the constant expressing weighting given to each response (ranges from 1 for very rarely up to 5 for always), n is the frequency of the responses, and N is total number of responses.

2) Severity index: A formula is used for ranking of causes of delay based on severity or effect of it on project as estimated by the personnel.

$$\text{Severity Index (S.I.) (\%)} = \sum a\ (n/N) * 100/5 \quad (5)$$

Where a is the constant expressing weighting given to each response (ranges from 1 for very little up to 5 for extreme), n is the frequency of the responses, and N is total number of responses.

3) Importance index: The importance index of each factor or attribute is calculated as a function of both frequency and severity indices, as follows:

$$\text{Importance Index (IMP.I.)(\%)} = [\text{F.I.(\%)}^* \text{ S.I.(\%)}]/100 \quad (6)$$

(iii). Data accuracy checks:

Always it is compulsory to check accuracy of collected data by statistical methods. In this research, ranking of criteria by various groups was checked as per Spearman's rank correlation coefficient. In order to test the relation agreement between the stakeholders from different groups (i.e, contractors , owners and consultants) the ranks of the identified RII weights corresponding to the factors of delay were analysed using the Spearman's rank correlation method. Rank correlation coefficient is a measure of correlation that exists between the two sets of ranks. It is a measure of association that is based on the ranks of the observations and not on the numerical value of the data. The value of Spearman's rank correlation coefficient will vary between "+1" to "-1". "+1" indicates a perfect strong correlation and "-1" indicates perfect low correlation between two variables. It was worked out by following equation:

$$r = 1 - \frac{6 \sum d^2}{n^3 - n} \quad (7)$$

where, "r" is spearman's rank correlation coefficient between two parties, "d" is difference between ranks assigned to variables for each cause (owner-contractor, owner-consultant, contractor-consultant). , "n" is number of parameter being rank. The value of Spearman's rank co-relation coefficient between owner and contractor is 0.95, owner and consultant is 0.98, contractor and consultant is 0.97. This shows that there is very marginal difference in opinion of experts' for weighting of criteria and they all exhibit strongly positive correlation.

6. RESULTS PART–1 RII

Top ten causes hierarchical by Relative Importance Index (RII) technique the relative importance index, RII, was computed for every cause to spot the foremost important causes. The causes were hierarchical supported RII values.

From the ranking appointed to every explanation for delays, it absolutely was potential to spot the foremost vital factors

or causes of delays in Indian industry. Based on the ranking, the 10 most important causes of material management by RII were:

Table -1: significant Causes of delay by RII Method

No.	Critical Cause of delay	RII
1	Rework due to errors during construction	0.851
2	Inadequate planning and scheduling of project by contractor	0.846
3	Original contract duration is too short	0.811
4	Delay in material delivery	0.794
5	Shortage of labor	0.789
6	Poor site management and supervision by the contractor	0.777
7	Inadequate contractor's work experience	0.771
8	Difficulties in financing project by contractor	0.766
9	Delay in progress payment by owner	0.754
10	Shortage of equipment	0.743

PART-2

IMPI Results Top 10 causes ranked by Importance Index (IMPI) technique.

Table -2: Critical Causes of delay by IMPI Method

S.No.	Critical Causes of delay	FI (%)	SI(%)	IMPI(%)
1	Delay in material delivery	74.737	63.684	47.595
2	Rework due to errors during construction	72.632	65.263	47.401
3	Ineffective planning and scheduling of project by contractor	74.211	62.632	46.479
4	Poor site management and supervision by the contractor	67.895	67.895	46.096
5	Slowness in taking decision by owner	68.947	64.737	44.634
6	Equipment Breakdowns	63.158	70.526	44.542
7	Delay in progress payment by owner	70.00	62.632	43.842
8	Shortage of labor	73.684	59.474	43.822
9	Shortage of equipment	67.895	62.105	42.1662
10	frequent Change in orders by owner during construction	69.474	60.00	41.684

7. CONCLUSION

Delays can be minimized and reduced, Before it researcher should properly know that how many causes are effecting on multi-stories building projects in the India. The major principle of this research is determing of delay' causes and trying to minimize it, which are extremely effect on cost-overruns & delay in time on multi-stories building projects in Gwalior (M.P) , since delays are taken to be a highly effectable factor on construction field in the India. According to the contractors and consultants, mostly time-overruns due to inadequate findings while owners based poor site management and supervision by contractor is taken as most significant factor, there is strong agreement among three parties is checked by spearman's co-relation on construction site, then what is different reason of having delayness in project .Finally some points can be suggested for minimization of delays:

- Advance arrangement of equipment's should be done or equipment should purchase on rent.
- Adequate management on site and supervision should be done on individual task on site. Separate worker should be higher for make urgent needing to complete the project within specified time while advising require quality and estimated cost.
- Design documents should be approved on timely, ever since it could hold up the performance of work. Progress payments should be deliver on time to contractor to finance the work.

8. REFRENCES

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APPENDIX :

1. Questionnaire
2. Survey Data .