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Analysing Of Delay Factors In Multistorey Buildings

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ABSTRACT

Construction Projects are the only that's related to the mixture of diverse activities, which calls for a contribution from diverse parties. Hence there's a extra possibility of the prevalence of delays with inside the production. This delays in of entirety of production initiatives may be a chief hassle for contractor companies main to steeply-priced disputes and detrimental relationships among mission participants. so, via way of means of this record to give an explanation for the different factors main to put off this is the reasons of put off and their affects on unique production initiatives. Because each mission is specific in its perspective, even though each mission has its character reasons for the put off and the respective affects like time overrun and fee overrun. The purpose of this paper is to become aware of the reasons of put off elements on India production initiatives and analysing these elements with the relative critical index (RII) and Analytical Network Process (ANP). For this purpose, 70 unique delays elements had been diagnosed and labeled into 7 important companies thru designated literature overview and the assist of case study. A questionnaire survey became performed focused on 60 we obtained forty five respondents. Based in this reaction the relative significance and rating of those put off elements had been analyzed via way of means of RII and ANP. According to those outcomes the elements and companies contributing the maximum to delays and their affects had been mentioned and a few suggestions had been made to decrease and manage delays in production initiatives.

Keywords: Construction Projects, Relative Importance Index, Analytical Network Process, Causes of Delays

INTRODUCTION

Construction Industry has been one of the important supply of profits to many developing countries, so those delays and their influences on the development initiatives is a primary concerning problem some of the diverse enterprise professionals and intellectuals, so there may be a fantastic studies going on in recent times analysing the reasons of delays and theirs influences on creation initiatives.(Sunjka,2013)6 A mission could be referred to as as a a hit mission if it's miles completed inside or earlier than scheduled time, underneath or inside given a budget, on the identical time with the preferred exceptional and profitability to the owner. (Majid,2006)2 So, there could be plenty of expectancies whilst a creation goes to start, so maintaining all this in thoughts paintings need to carry via way of means of making plans every and each step carefully. Any deviation from the authentic deliberate time table or sports will cause put off ensuing in lack of productiveness and so on. (Sweis, 2007)3 As we all know, the development area is a area of engineering in which the exceptional and amount of output depend upon diverse unbiased and

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interdependent elements consisting of making plans, contractor's experience, professional labour, machinery, geographical conditions, fabric deliver and lots of more different elements. Coming to delays, delays could have an effect on the mission's value and time table additionally they could have an effect on the general mission productiveness and vital area operations to be employed. So, there may be a need to reduce the reasons of delays and hold a boom with inside the economy from the development enterprise to protect this area. Delays can be brought on via way of means of, the specialty of the mission, Speed of choice making, Poor or unrealistic scheduling, Lack of information, labour productiveness, Availability of resources, 1/3 birthday celebration dependences, Lack of finance, Site Conditions, and Weather (Mustafa,2013)five Some of the delays minimized via way of means of Detailed web page investigation, care complete tracking and normal meeting, Effective web page management, Collaborative operating and powerful coordination and Care complete scheduling. The intention of this paper is (1) To figuring out reasons of put off in creation initiatives primarily based totally on literature opinions and case study, (2) Categories this put off elements, (3)Analysis of this put off elements the usage of relative significance index (RII). And analytical community process (ANP), (Emre,2014)7(4) Identify important delays in creation mission bases on those evaluation and (five) Making idea in an effort to manage delays in creation initiatives.

Objectives

The objectives of this study are,

- To identify the uncertainty factors that influences the look and causes delays in construction projects in Indian scenario
- To rank uncertainty factors that causes delays by RII (relative importance Index) method and to seek out out the basis causes for these factors
- Categorize delay factors in construction project
- .Quantify relative importance of delay factors and to demonstrate the ranking of things and categories in line with their importance level on delays.

IMPORTANCE OF THE STUDY

- the development industry is that the tool through which a society achieves its goal of urban and rural development.
- it's one amongst the sectors that gives important ingredient for the event of an economy.
- Many construction projects have faced various problems thanks to the complexity of project, lack of management, improper planning & scheduling etc.
- 4.These all problems conclude with one in all the foremost problem delay of your time.
- In simplest the importance is that, both for owner & contractor time is money and for this construction schedule should be checked, analyzed & corrective actions should be taken during a timely manner to stop this problem.

LITERATURE REVIEW

S.M.Renuga and Balasubramanian Malathi (2013) they need identified the critical factors influencing delay and their impact on project completion. during this study they need concentrated in Resource (Manpower, Material and Equipment) related delay in construction projects. For this research, a questionnaire survey method was adopted to search out the impact of critical factors that ends up in resource related delays in construction projects. The survey leads to this literature they need identified top ten critical factors using Relative Importance Index (RII) in each of the categories (Manpower, Material and Equipment) and provided some recommendations to cut back the impact of the resource related delays in construction projects.

Shebob.A, Dawood.N and Xu.Q (2011**)** made a Comparative study b/w Libya and UK construction project through questionnaire survey. The delay factors were ranked using the frequency of occurrence and severity scale. The survey result exposed that the development projects within the developing countries suffers more delay than the

developed countries because of lack of technology within the developing countries.

Ahsan and Gunawan (2010) made a separate study comparing the performance of international development projects in India, China, Bangladesh, and Thailand, during which they reported that construction projects in India showed the worst schedule performance. The study found that in India average schedule overrun is that the highest (55% of actual schedule) compared to the opposite nations.

Majid (2006) stated that delays will be minimized when their causes are identified. Identification of the factors that contributed to the causes of delays has been studied by numerous researchers in several countries. Delay may be a situation when the contractor, consultant, and client jointly or severally contributed to the non-completion of the project within the initial or the stipulated or agreed contract period.

METHODOLOGY

Various literatures related to the projects are reviewed. Based on the review, the factors for delay of construction project are identified which helps to frame a questionnaire. Questionnaire survey is conducted among contractor, consultant and client of various multistory building project. These survey responses are analyzed using relative important index method. For the mean values, ranks are provided and this analysis gives the most significant delayfactors in construction.

Assessment Method

Five point scale

- strongly agree ,
- Agree ,
- moderate ,
- disagree ,
- strongly disagree.

RELATIVE IMPORTANT INDEX

Relative important index This method is employed to seek out the contractor , owner and labor perceptions of the relative important of the identified quality factors.

RII= ∑ W⁄ A*N Where,

RII - Relative Importance Index,

W - weighting given to every factor by the respondents (ranging from 1 to 5)

A - highest weight (i.e. 5)

N - total number of respondents.

IDENTIFIED FACTORS

The identified factors from the literature review are

- Client
- Contractor
- Consultant
- Material
- Labour
- Equipment
- Project related
- Finance related
- External related

RESULT AND DISSCUSSION

Aggrement Analysis

The degree of agreement reliable value done by using spearmans rank correlation method .which is often wont to estimate agreement analysis.the spearmans rank parametric statistic obtained for respondents.

Client and contractor	0.605
Client and consultant	0.551
Contractor and consultant	0.540

The value must be within the ranges of 0.3 to 1 if the information must be reliable. Hence during this analysis the info values are reliable.

Data Analysis

A Questionnaire survey is conducted through post and field survey. From this survey 55 responses were received. These data are analyzed using Relative Important Index method. Ranks are provided for the mean values analyzed using this method.

Table -1 gives the mean values and ranks provided for the analysis.

1. Strongly disagree, 2.Disagree, 3.Moderate, 4.Agree, 5.Strongly agree.

MAJOR FACTOR	SUB FACTOR	CONTRACTOR			CONSULTANT			OWNER		
		RII	MEAN	RANK	RII	MEAN	RANK	RII	MEAN	RANK
Contractor	Frequent change of sub contractor	0.56	0.55	8	0.43	0.53	8	0.52	0.69	2
	Inadequate contractor experience	0.43			0.65			0.67		
	Ineffective project planningand scheduling	0.61			0.32			0.63		
	Compatibility of contractor with new software	0.48			0.71			0.76		
	Poor communication	0.70			0.52			0.42		
equipment	Inadequate modern equipment	0.72	0.74	1	0.65	0.78	1	0.59	0.65	3
	Equipment allocation	0.85			0.73			0.61		
	Frequent equipment breakdown	0.62			0.86			0.72		
	Lack of safety	0.93			0.71			0.80		

	Shortage of recent technology equipment	0.57			0.93			0.44		
Material	Late delivery of material	0.67	0.65	5	0.56	0.56	7	0.34	0.55	7
	Damage of sorted material	0.48			0.49			0.48		
	Escalationof material prices	0.52			0.73			0.60		
	Shortageof material	0.83			0.61			0.58		
	Poormaterial management	0.75			0.43			0.69		
labour	absenteeism	0.82	0.69	3	0.66	0.49	9	0.39	0.57	6
	Low motivation & morale of labour	0.59			0.49			0.62		
	Low productivity of labour	0.62			0.55			0.77		
	Shortageof labour	0.52			0.41			0.65		
	Labour strike due to revolutions	0.89			0.33			0.41		
Project related	Traffic control at site	0.40	0.47	9	0.69	0.76	2	0.53	0.52	8
	Changes in site condition	0.63			0.77			0.74		
	Unforeseen ground condition	0.44			0.80			0.62		
	Insufficient data collection & survey	0.56			0.73			0.46		
	Restricted access	0			0			0		

		.33			.79			.52		
client	Change orders	0.86	0.70	2	0.44	0.58	6	0.38	0.60	5
	Conflicts between joint ownership	0.77			0.52			0.41		
	Delay in progress payment	0.65			0.68			0.65		
	Lack of owner experiencein construction project	0.57			0.88			0.81		
	Delayin approving design documents	0.63			0.39			0.76		
Consultant	Slownessin approving drawing & material samples by the consultant	0.51	0.66	4	0.42	0.60	5	0.29	0.46	9
	Total quality management by consultant	0.63			0.59			0.55		
	Mistakes in consultants drawing	0.79			0.67			0.49		
	Consultants less experience	0.81			0.70			0.35		
	Modification in contract	0.58			0.63			0.61		
Finance	Rapid changes in the national economy	0.72	0.59	7	0.74	0.69	3	0.83	0.76	1
	Inadequate support from banking sector	0.85			0.48			0.75		
	High inflation rate	0.62			0.59			0.69		
	High interest rate	0.93			0.86			0.93		

	Limited credited facilities	0.57			0.76			0.61		
External	Changes in government regulation and laws	0.65	0.63	6	0.66	0.67	4	0.53	0.62	4
	Accident during construction	0.89			0.56			0.68		
	Delayin obtaining permit from municipality	0.72			0.81			0.73		
	Unfavourable weather condition	0.46			0.72			0.85		
	Delay in providing servicefrom utilities(water,electricity)	0.55			0.60			0.33		

CONCLUSION

This report summarised the causes of delays within the industry and suggested some recommendations to mitigate the delays. It should be noted that the tiny sample size of 32 respondents to the questionnaire survey poses some limitations to the extent during which the results of the study can be generalised. thanks to this limitation, the survey might not have identified all the possible factors that might cause construction delays However, the study made a big attempt at identifying the main causes of delay factors within the construction project supported the limited data. Meanwhile, there are not any specific procedures to beat delays within the projects, but it depends mainly on the causes and appropriate actions taken. supported the delay factors identified during this research, discussions and suggestions are made to minimise their causes.

From the above list of most important factors causing delay within the construction, . Many literatures are reviewed and also the major delay factors of construction are identified. supported that questionnaire are prepared and distributed to the 43 companies and 32 were successfully received. From that data by using relative important index method RII is identified and ranking were provided to the foremost factors. From that result we conclude that the most important top 5 factors of delay in construction, within the view of respondents like contractor, consultant and owner are equipment, Financial problems, slowness in taking decision of clientcontractor, Problems in contractor side,and also labour side.

SUGGESTIONS

The results from the questionnaire are analysed in RII and ANP to get the foremost important causes of delays. Making suggestions for this results.

Owner related Delays

The most important causes of delay associated with the owner are

- Delivery site to the contractor.
- Delay in issue of drawing.
- Change orders by owner during construction.
- Slowness in decision-making.

The above four are the most causes leading to delay, resulting in further impacts like time overrun and price overrun. So below listed would be recommendations to the owner.

- The owner must be self-sufficient together with his funds and other financial matters before starting of project.
- The owner must even have a transparent perspective and quick decisions regarding final design so no change in design is requested once after the beginning of labor.
- Also, the owner must use caution at the time of selection of contractor/ consultant and make sure they are doing not have any previous record of illegitimate delays leading to a loss to the owner.

Contractor related delays

If the foremost important causes of delays associated with the contractor are to be summarized from the work, they might be:

- Delays in resource mobilization,
- Ineffective project planning and scheduling. These are main causes from the side of contractor ending up resulting in delays and further consequences.

Recommendations

- The contractor must hire an experienced staff supported the project requirement and timeline.
- The contractor must ensure whether the work goes as per schedule and under the proposed budget, also as per drawings to avoid re-work or any acceleration at the top which would lead to cost.
- The contractor must be self-sufficient with funds before the beginning of the project to avoid any delay in payments.
- The contractor must take Errors and Omissions (E&O) insurance betting on the requirement in order that within the case of any errors and re-work you would like not run the money. Along with above recommendations, contractors must make certain about the value and timeline before signing the contract, in order that there would be no future discrepancies (Assaf,2006)[1]

Consultant related delays

From the results thus far went on following listed are the foremost important causes of delay thanks to consultant:

- Approving major changes within the scope of labor.
- Late reviewing, approving design documents.

Recommendations

- Both the above causes would ensue to lack of proper design team, so to avoid that sort of issues the consultant firm must hire experienced and dedicated staffs who work on keeping the deadline in mind which was set by the owner.
- There must be no lagging within the collection of knowledge from the owner in order that design would be done appropriately obviously by owner and also the owner won't suggest from now on changes.
- They have to even be sure while hiring subcontractors in design also because in large design works main architects hire subcontractors for MEP works, so there should be no discrepancies while transferring information.
- Also within the case of huge projects if required they have to be aided with E&O insurance, to avoid any future problems.

labour and material related delays

Coming to labour and material related, it's a vital category where negligence can land into most frequent causes of delays like:

- Escalation of costs in material,
- Shortage of labour & material,
- Late delivery of fabric.

Recommendations

- take care at the time of signing the contract regarding labour issues and their work schedule whether it must be 5day- 10hour shifts or 6day-8hours shifts looking on the owner's requirement.
- Also, hire a labour supplier who got skilled workers and productive in nature, because labour plays a key role in influencing project productivity and overall completion of labor.
- Coming to material supply, if there's no deadline in starting a project then start the work a time when the market is free from inflation and when there are low material costs because at the end it makes a large difference if the prices of raw materials vary.
- Also, accumulate materials as per the need by carefully estimating the quantities of materials required for the project.
- Employ proper material handling and storing techniques in order that materials would be long lasting.
- Hire a decent material supplier keeping in mind his previous record of delivering materials on time.
- Always maintain good relations with material suppliers, if he's employed well it's good as an alternative hire a new local supplier by proper research

Sales and Third party related delays

The most common causes of delay thanks to sales & Third party related are

- Investment criteria at the present situation,
- Effect of subsurface conditions
- Price factor
- Delay in obtaining permits licenses from authorities

Recommendations

- Abide by regulations while constructing itself, in order that later you will avoid any penalties or re- work at the time of commissioning.
- Perform work following the foundations and regulations prescribed by the town board where the work is going on.
- As we cannot avoid causes like acts of god or tragedy incidents which don't seem to be in our hand, by avoiding these sorts of artificial mistakes, we might make sure that our part is completed well and that we aren't contributing to any delays.

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