Scientific Journal Impact Factor (SJIF) : 3.518
International Journal of Modern Trends in Engineering and Research
ISSN (ONLINE) : 2349 - 9745 ISSN (PRINT) : 2393 - 8161

ANALYSIS FOR CAUSE IDENTIFICATION FOR DELAY IN BUILDING CONSTRUCTION INDUSTRY

Suhas G. Awari[1], Raju Narwade[2] and Manisha Jamgade[3]
[1] *PG Student of Civil Engg. Dept, Pillai HOC College of Engineering and Technology, Rasayani, Panvel, Maharashtra, INDIA*
[2,3] *Asst. Professor of Civil Engg. Dept, Pillai HOC College of Engineering and Technology, Rasayani, Panvel, Maharashtra, INDIA*

Abstract- The Building Construction industry is one of the main parts that provide important factors for the development. In this paper to analysis the important factors of delay and method to minimizing delay in Building construction project in Mumbai city. Total 51 factors of delay were identified under 8 different groups. From the analysis of questionnaire major causes of delay were identified with the help of Relative Important Index and Spearmen rank co-relation. The overall result analysis indicate that poor management, wrong method of planning and scheduling of project, Disputes between various parties, Shortage of construction material, and Shortage of labour. This research was to identify the common effects of delays in construction projects. The result of analysis shown Time overrun and Cost overrun were two most effects of delays in building construction. This study was to identify the effective methods of minimizing delays in construction project has been successfully achieved. The most effective method minimizing delays include: Estimate initial project cost, frequent site meeting with all parties, effective planning, use of appropriate construction methods, proper project planning and scheduling and collaborative working.

Keyword- Building construction project, Cause of Delay, Relative important index

I. INTRODUCTION

Delay could be defined as the time overrun & cost overrun either beyond completion date specified in a contract or beyond the date that the parties agree upon for delivery of a project. Planned schedule and is considered as common problem in construction projects. Delay in construction project is considered one of the most common problems causing a multitude negative effect on the project and its participating parties.

Construction projects are composed of many interrelated elements of labour, cost, material, schedule and other resources, making it difficult to discern which factors were the main causes for delay on a given project. Companies would be able to avoid or minimize these delays if major contributing factors were identified and planned for in a timely manner. These factors are identified and their importance and contribution to the lateness of a typical project is measured. The objective of this research is to identify and rank the relative importance of factors perceived by owners, consultants, managers, engineers and contractors to cause delay in construction projects.

II. OBJECTIVES

a) To identify the causes of Building construction delay, effect of building construction delay and method minimizing building construction delay
b) Analysis causes of delay with the help of RII

III. LITERATURE REVIEW

M. E. Abd El-Razek, H. A. Bassioni, and A. M. Mobarak (2008), This paper aims to identify the main causes of delay in construction projects in Egypt from the point of view of contractors, consultants, and owners. The overall results indicated that the most important causes are: financing by contractor during construction, delays in contractor's payment by owner, design changes by

owner or his agent during construction, partial payments during construction, and non utilization of professional construction management.[1]

Towhid Pourrostam and Amiruddin Ismail (2012), A questionnaire survey was conducted to solicit the causes and effect of delay from consultants and contractors. The perspective of contractors and consultants has been analysed to rank the causes of delays based on their Relative Importance Index.[3]

Anup Wilfred, Muhamad Sharafudeen (2015), The major delay causes in Indian Construction Industry is identified through literature review and a questionnaire survey conducted among the Clients, Contractors and Consultants. These delay causes were then ranked using two techniques: Relative Importance Index and Importance Index based on degree of severity and frequency of occurrence.[7]

IV. RESEARCH METHODOLOGY

The methodology for this study contains two stages; literature review, interviews. The first stage involves Literature review. As the outcome of this review, 51 delay factors were identified suitable to the present study. These causes were then grouped under 8 different categories namely project related, client related, contractor related, RCC consultant related, construction design related, construction material related, machinery related, labour related factors and External factors depending on their nature and mode of occurrence.

The second stage involves the preparation of questionnaire based on Relative important index and Spearman rank correlation coefficient in the Importance index is calculated. The questionnaire divided into three part like causes of construction delay, effect of construction delay methods of minimizing construction delay.

A. Data Analysis Approach

Relative Important Index: The sample for this study is relatively small. As a result, analysis of delay factors (owner, Contractor and Consultant) in order to obtain significant results. Data was analysed by calculating Relative Important Index (RII) [3]:

$$RII = \frac{\sum W}{A*N}$$

Where,
RII is the Relative Importance Index,
W = weighting given to each factor (from 1 to 5)
A = Maximum weight (i.e. 5),
N = number of respondents.

B. Data Accuracy Check Approach

The correlation coefficient varies between +1 and -1, where +1 implies a perfect positive relationship (agreement), while -1 results from a perfect negative relationship (disagreement). The value near to zero indicates little or no correlation. In this research this correlation is used to find out the degree of agreement between parties.

$$r = 1-[(6\sum d^2) / (n^3-n)]$$ [8]

Where,
r = Spearman rank correlation coefficient
d = difference between ranks assigned
n = number of pairs of rank.

V. DATA ANALYSIS

A. Causes of delay

Total 60 questionnaires distributed through various groups involved in various building construction projects like owner, contractor, and consultant. In Mumbai and Navi Mumbai city out of which 36 responses received. From the questionnaire data analysis with the help of RII and found

that poor site management, Difficulties in financing project by contractor, Ineffective planning and scheduling etc.

Table No.1 Major cause of delay

Causes of Delay	RII	Rank
Original contract duration is too short	0.555	23
Legal disputes b/w various parties	0.765	4
Ineffective delay penalties	0.447	41
Effect of subsurface condition (e.g. soil, high water table, hard rock etc.)	0.566	20
Traffic control and restriction at job site	0.504	32
Unavailability of utilities in site (e.g. water)	0.622	14
Accident during construction	0.459	40
Type of project bidding & award (negotiation, lowest price)	0.417	44
Slow decision making	0.699	7
Delay in payments by owner	0.911	1
Delay to deliver the site to the contractor by owner	0.685	10
Delay in approving design documents by owner	0.661	12
Poor communication and coordination by owner & other parties	0.697	9
Unclear and inadequate details in drawings	0.534	28
Quality assurance/control	0.415	45
Delay in performing inspection and testing by consultant	0.428	43
Delay in approving major changes in the scope of work by consultant	0.553	24
Delay in reviewing and approving design documents by consultant	0.498	33
Poor scheduling of financing by contractor	0.617	15
Poor site management and supervision	0.743	5
Ineffective planning and scheduling of project	0.816	2
Rework due to errors during construction	0.572	18
Delay by sub-contractor work	0.559	22
Inadequate experience contractor	0.472	36
Improper construction methods implemented by contractor	0.459	39
Poor qualification & less experience of the contractor & his technical staff	0.447	42
Mistakes and discrepancies in design documents	0.516	30
Delays in producing design documents	0.559	21
Unclear and inadequate details in drawings	0.516	31
Insufficient data collection and survey before design	0.528	29
Misunderstanding of owner's requirements by design engineer	0.479	35
Shortage of construction material in market	0.698	8
Delay of material delivery	0.685	11
Changes of material types and specification during construction	0.572	19
Delay in manufacturing of special building materials	0.543	27
Shortage of labour, equipment	0.815	3
Unqualified workforce	0.465	37
Low productivity level of labour& equipment	0.466	38
Equipment availability and there failure	0.603	16

Wrong selection of Equipments	0.408	46
Weak motivation for Labour	0.327	50
Labour fatigue	0.328	49
Weather effect (hot, rain, etc.)	0.490	34
Environmental restrictions	0.385	47
Changes in government regulations, polices and law	0.573	17
Slow permits by government/local bodies	0.635	13
Delay in performing final inspection and certification by third party	0.548	25
Lack of communication between parties and public at large and electors member	0.710	6
Worker's strike	0.546	26
Corruption	0.333	48
Natural disasters (flood, landslides, …)	0.281	51

B. Effects of delay in construction

Due to major causes of delay in building construction project that affect cost overrun and time overrun of project. From questionnaires survey data analysis with help graph

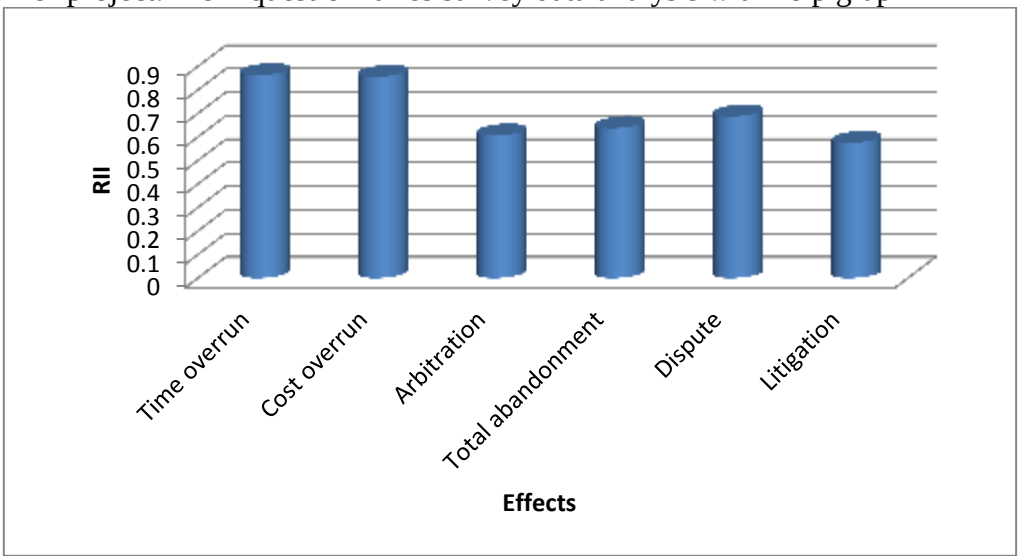

Figure No.1 Effects of delay in construction

C. Methods of minimizing delay in construction

From the questionnaires survey most important methods applicable for avoiding delay in construction project are site management and supervision, proper project planning and scheduling etc.

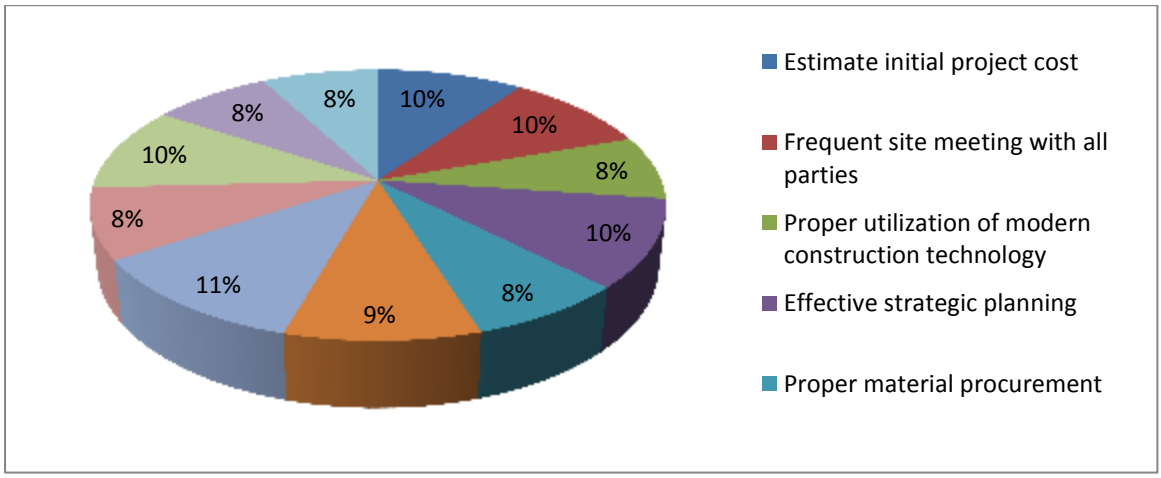

Figure No.2 Methods of minimizing delay in construction

VI. CONCLUSION

Present study outlines that the different causes of delay for building construction projects in Mumbai city. From literature survey and interviews of experts, 51 causes of delay in 8 different groups were evaluated. From the analysis of questionnaire major causes of delay were identified with the help of Relative Important Index. like poor management, difficulties in financing in project by owner to contractor, Ineffective planning and scheduling of construction project, Disputes between various parties, Shortage of construction material, and Shortage of labour. This research was to identify the common effects of delays in construction projects. The result of analysis showed Time overrun and cost overrun of building construction project were two most common effects of delays in construction project. This study was to identify the effective methods of minimizing delays in construction project has been successfully achieved. The most effective method minimizing delays include: Estimate initial project cost, frequent site meeting with all parties, Effective strategic planning, Use of appropriate construction methods, Proper project planning and scheduling and collaborative working in construction.

REFERENCES

[1] **M. E. Abd El-Razek, H. A. Bassioni, and A. M. Mobarak**, (2008) "Causes of Delay in Building Construction Projects in Egypt" Journal of Construction Engineering and Management © ASCE / November 2008

[2] **Geraldine John Kikwasi**, (2012) "Causes and Effects of Delays and Disruptions in Construction Projects in Tanzania" Australasian Journal of Construction Economics and Building Conference Series, 2012

[3] **Towhid Pourrostam and Amiruddin Ismail**, (2012) "Causes and Effects of Delay in Iranian Construction Projects" IACSIT International Journal of Engineering and Technology, Vol. 4, No. 5, October 2012

[4] **Megha Desai, Rajiv Bhatt**, (2013) "Critical Causes of Delay in Residential Construction Projects: Case Study of Central Gujarat Region of India" International Journal of Engineering Trends and Technology (IJETT) - Volume4Issue4- April 2013

[5] **Ghulam Abbas Niazai, Kassim Gidado**, (2014) "Causes of Project Delay in the Construction Industry in Afghanistan" International Journal of pure and applied research in engineering and technology, IJPRET, 201

[6] **Owolabi James D1, Amusan Lekan M, Oloke C. O, Olusanya O, Tunji- Olayeni P, OwolabiDele, PeterJoy, OmuhIgnatious**, (2104) "Causes and Effect of delay on Project construction Delivery Time" International Journal of Education and Research Vol. 2 No. 4 April 2014

[7] **Anup Wilfred, Muhamad Sharafudeen**, (2015) "A Methodology to Identify the Delays and Rank its Causative factors in Indian Construction Industry" International Research Journal of Engineering and Technology (IRJET) Volume: 02 Issue: 03 June-2015

[8] **Divya.R, S.Ramya**, (2015) "Causes, Effects and Minimization of Delays in Construction Projects" National Conference on Research Advances in Communication, Computation, Electrical Science and Structures (NCRACCESS-2015)

[9] **Nitin B. Vidhate, Dr. Ushadevi Patil**, (2015) "A methodology for identifying the different causes of delay in building construction projects". International Journal of pure and applied research in engineering and technology, Volume 3 (9): 211-218, IJPRET, 2015

[10] **P.M.Pethkar, Prof.B.V.birajdar**, (2015) "Literature review on causes of delay in Building construction projects" journal of information, knowledge and research in civil engineering issn: 0975 – 6744, Volume 3, Nov 14 to Oct 15

