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CAUSES OF THE TIME DELAY IN CONSTRUCTION HOUSING PROJECTS IN GWALIOR DIVISION

Pawan Hari[1], Dr. Mukesh Pandey[2]

[1]M.Tech. Student, Civil Engineering Department, ITM University, Gwalior

[2]Professor and Head of Civil Engineering Department, ITM University, Gwalior

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Abstract - *Construction time delays may be defined as the late completion of work compared to the planned schedule or contract schedule. If the cause of the construction time delays are identified the construction delays can be minimized. The objective of this thesis is to find out the major and critical causes of construction delays in construction housing projects in Gwalior division. This study is based on the literature review and a questionnaire survey. The cause of construction delay were contributed to the seven group of the factors. The questionnaire survey was distributed on the construction housing project's site in the Gwalior division. The objectives of the research were successfully got. The top most important factors that contributed to the causes of delay were factor of client related, factor of contractor related, factor of consultant related, factor of material related, factor of labor related, factor of equipment related and factor of external related. The factor of client related have first rank according to the RII and fuzzy method. This group of the factor is most responsible for occurring the construction time delay and group of the contractor related have the second rank. The third rank have group of the consultant related delay that most important group that contribute to the causes of construction time delay in construction housing projects in Gwalior division. While overall ranking of the factors, the top most rank are lack of high-technology mechanical equipment, rework due to errors during construction, low productivity and efficiency of equipment ,personal conflicts among labors. These factors also important to avoiding the construction time delay in the construction housing projects.*

Key Words*: *Construction Project Delays; Causes of Delay

1. INTRODUCTION

Delay of the construction projects is the universal phenomenon. They almost always including by time and cost overruns. Delays of the construction project have a debilitate impacts on parties (owner, contractor, consultant) to a contract in terms of a and a general feeling of unpleasant towards each other.

Delay occurs by the client such Slowness in process of decision making, poor communication and poor coordination, delay in payments, late in reduplication and design approving documents, suspension of work by owner, and change orders by client during construction. Delays contractor related causes may generally be contributed to the rework in the construction projects, poor communication and coordination, inadequate contractor work difficulties in the financing projects, improper method of construction implement, contractor's poor qualification technical staff and other group of the factors such as construction related delay, labor related delay, equipment related delay, delay of external related that attributed to causes of the construction time delay to the construction housing projects in the Gwalior division. Empirical studies to find out the causes of the time delay in the construction housing project have been carried out.

Delays are insidious often resulting in time overrun, cost overrun, disputes, litigation, and complete abandonment of projects (samebasivan and soon)[1] Many projects are of such a nature that the client will suffer hardship, expense, or loss of revenue if the work is delayed beyond the time specified in the contract (Mr.Salim S. Mulla, Prof. Ashish P. Waghmare, 2015)[2]. Then again, delay has costconsequences for the contractor: standby costs of non-productive workers, supervisors, and equipment, expenses caused by disrupted construction and material delivery schedules and additional overhead costs.

2. AIM AND OBJECTIVES OF THE STUDY

Aim of this study to identifying the causes of construction delay in construction housing projects in Gwalior division. To obtain the aims objectives have been identify the following To recognize the main factor of construction delay of time in construction housing project in the Gwalior division.

3. LITERATURE REVIEW

Naikwadi Sumaiyya R, Khare Pranay R [3] stated that delay can be minimize when their causes are identify. Identification of the factors that contributed to the causes of the delay have been finding by numerous researchers in several countries. Delay is a situations when the contractor consultants and client jointly or severally give to incompletion housing project with in the original or the stipulated or agreed contracts period. Shaikh Asif Abdus saeed [4] classified delay into non compensable delay, excusable, non excusable, compensable delay and concurrent delay. Non excusable delay are delay, which the contractor either couses or suppose the risk for excusable delay, non compensable delay are delay causes by factor that are not predicable, behind reasonable monitoring of the contractor and not attributable to the contractor fault or negligence. Kang Sik Wei[5] discussed sixty reason of delay in public water and sewage projects. He concluded that delay occurred frequent in medium and large size projects, and consideration severe in small projects. There are more important reason of delay related to client involvement, contractor performance, the planning and design of the project, financial problems, variation in the design and scope. Ali S Alnuimi and Mommed A Al Mohsin [6] excusable delay are divided into compensable and non compensable delay. Compensable delay are cause by the owner or the owner against. Meanwhile non compensable delay are causes by third party or incident behind the control of both the client and the contractor. This delay commonly called " act of god" because they are not the responsibility or defect of any particular party. Mohamed Babikir Ibrahiem Mohamed[7] states excusable delays are divided into compensable and non-compensable delays. Compensable delays are can lead to the client or the owner's agents. Meanwhile, non compensable delays can lead to third parties or event beyond the control of both the client and the contractor. These delays are mostly called "acts of God" because they are not the responsible or default of any particular party.

4. DATA COLLECTION

The primary data which obtained from the various construction housing projects site in the Gwalior division through the questionnaire survey in which we collected the many different types of causes of construction time delay and response regarding causes of the construction time delay while secondary data collected from literature survey.

5. DATA ANALYSIS BY RII METHOD

This data analysis was determined to establishing the relative importance of the various factors that contribute to causes of construction delays.

5.1 Relative Important Index

$$RII = \frac{5(n5)+4(n4)+3(n3)+2(n2)+1(n1)}{5(n1+n2+n3+n4+n5)}$$

Where

n1 = total no of respondent who ticked for strongly disagree

n2 = total no of respondent who ticked for disagree

n3 = total no of respondent who ticked for moderately agree (undecided)

n4 = total no of respondent who ticked for agree

n5 = total no of respondent who ticked for strongly agree

Table -1: Ranking the over all factors by RII method

sno	Group	Factors	RII	Group rank	Over all rank
1	client	Late in revising and approving design documents	0.76	3	11
2		Change orders by owner during construction	0.73	6	16
3		Poor communication and coordination	0.79	1	4
4		Suspension of work by owner	0.74	4	14
5		Delay in progress payments	0.76	2	8
6		Slowness in decision making process	0.74	5	15
7	contractor	Inadequate contractor's work	0.76	3	12
8		Improper construction methods implement	0.7	5	21
9		Rework due to errors during construction	0.82	1	1
10		Difficulties in financing project	0.7	4	20
11		Poor qualification of the contractor's technical staff	0.65	6	28
12		Poor communication and coordination	0.76	2	10
13	consultant	Mistakes and discrepancies in design documents	0.68	4	24
14		Delays in producing design documents	0.71	2	18
15		Insufficient data collection and survey before design	0.63	5	32
16		Poor communication and coordination	0.75	1	13
17		Inadequate experience of consultant	0.71	3	19
18		Delay in approving major changes in the scope of work	0.63	6	33
19	material	Delay in material delivery	0.53	5	40
20		Shortage of construction materials in market	0.61	3	36
21		Changes in material types during construction	0.48	6	41
22		Delay in manufacturing special building materials	0.56	4	39
23		Late procurement of materials	0.67	2	26
24		Damage of sorted material while they are needed urgently	o.69	1	22
25	labor	Shortage of labors	0.66	4	27
26		Low productivity level of labors	0.77	2	7
27		Working permit of labors	0.64	5	31
28		Low strength level labors	0.76	3	9
29		Personal conflicts among labors	0.81	1	2
30	Equipment	Lack of high-technology mechanical equipment	0.79	2	5
31		Low productivity and efficiency of equipment	0.80	1	3
32		Low level of equipment-operator's skill	0.48	5	42
33		Shortage of equipment	0.61	3	37
34		Equipment breakdowns	0.60	4	38

35	Ext ern al	Effects of subsurface and ground conditions	0.73	2	17
36		Weather effect on construction activities	0.64	6	30
37		Delay in providing services from utilities	0.78	1	6
38		Delay in obtaining permits from municipality	0.65	5	29
39		Traffic control and restriction at job site	0.62	6	35
40		Changes in government regulations and laws	0.68	4	25
41		Delay in performing final inspection and certification	0.69	3	23
42		Accident during construction	0.63	7	34

6. DATA ANALYSIS BY FUZZY METHOD

This data analysis was determined to establishing the normalized weight of the various factors that contribute to causes of construction delays.

6.1Triangular fuzzy no

Triangular fuzzy no is computed as

$$e = \frac{(a + 2b + c)}{4}$$

Where

e = defuzzyfied value

a = average of first linguistic no of the all opinion for a particular factor,

b = average of second linguistic no of the all opinion for a particular factor

c = average of third linguistic no of the all opinion for a particular factor

Table -1: Ranking the over all factors by fuzzy method

sno	Group	Factors	Weight	Group rank	Over all rank
1	clie nt	Late in revising and approving design documents	o.168	3	21
2		Change orders by owner during construction	o.158	6	26
3		Poor communication and coordination	0.167	4	10
4		Suspension of work by owner	0.162	5	23
5		Delay in progress payments	0.169	2	19
6		Slowness in decision making process	0.176	1	16
7	con trac tor	Inadequate contractor's work	0.175	3	17
8		Improper construction methods implement	159	4	24
9		Rework due to errors during construction	0.191	1	9
10		Difficulties in financing project	0.158	5	27
11		Poor qualification of the contractor's technical staff	0.139	6	32
12		Poor communication and coordination	0.178	2	14
13	con sult ant	Mistakes and discrepancies in design documents	0.159	4	25
14		Delays in producing design documents	0.179	3	12
15		Insufficient data collection and survey before design	0.144	6	30
16		Poor communication and coordination	0.191	1	22
17		Inadequate experience of consultant			
18		Delay in approving major changes in the scope of work	0.179	2	13
19	mat eria l	Delay in material delivery	0.149	5	29
20		Shortage of construction materials in market	0.143	5	31
21		Changes in material types during construction	0.172	3	18
22		Delay in manufacturing special building materials	0.111	6	41
23		Late procurement of materials	0.151	4	28
24		Damage of sorted material while they are needed urgently	0.208	2	8
25	labo r	Shortage of labors	0.216	1	4
26		Low productivity level of labors	0.177	4	15
27		Working permit of labors	0.215	2	5
28		Low strength level labors	0.169	5	20
29		Personal conflicts among labors	0.210	3	7
30	Equ ipm ent	Lack of high-technology mechanical equipment	0.228	1	3
31		Low productivity and efficiency of equipment	0.256	1	1
32		Low level of equipment-operator's skill	0.245	2	2
33		Shortage of equipment	0.106	5	42
34		Equipment breakdowns	0.212	4	6
35	Ext ern al	Effects of subsurface and ground conditions	0.133	4	36
36		Weather effect on construction activities	0.117	5	37
37		Delay in providing services from utilities	0.138	1	33
38		Delay in obtaining permits from municipality	0.112	7	39
39		Traffic control and restriction at job site	0.112	8	40
40		Changes in government regulations and laws	0.136	2	34
41		Delay in performing final inspection and certification	0.133	3	35
42		Accident during construction	0.117	6	38

7. SUMMARY

In this study forty two factor are collected from the literature survey and on the basis of these factors questionnaire form is prepared and got opinion from the construction site in the Gwalior division. According to opinion of the experts find out the RII values of the factors. On the basis of the RII values of factors and provided the rank highest to lowest means, first rank to the highest value factor. Based on the above description, total forty two factors that contribute to the causes of the delay in construction housing project were identified, analyzed and ranked. The most important factor in each group that contribute the causes of the construction time delay are as "poor communication and coordination in the group of client related delay, rework due to errors during construction in the group of contractor related delay, poor communication and coordination in the group of the consultant related delay, damage of sorted material while they are needed urgently in the group of the material related delay, personal conflicts among labors in the group of the labor related delay, low productivity and efficiency of equipment in the group of equipment related delay and delay in providing services from utilities in the group of the external related delay". These factors have first rank in all group of the factors. According to my study, that factor are come out by the RII methodology is most important for the

occurring construction time delay because all study is based on the human judgment.

The second rank is to "the delay in progress payments in the group of the client related delay, Poor communication and coordination in the group of the contractor related delay, delays in producing design documents in the group of the consultant related delay, late procurement of materials in the group of the material related delay, low productivity level of labors in the group of the labor related delay, lack of high-technology mechanical equipment in group of the equipment related delay and effects of subsurface and ground conditions in the group of the external related".

Third rank is to "the late in revising and approving design documents in the group of the client related delay, Inadequate contractor's work in the group of the contractor related delay, Inadequate experience of consultant in the group of the consultant related delay, shortage of construction materials in market in the group of the material related delay, Low strength level labors in the group of the labor related delay, Shortage of equipment in group of the equipment related delay, delay in performing final inspection and certification in the group of the external related."

When the ranking of the all group according to average of RII values, the first rank is to "the factor of client related delays, second rank is to the factors of contractor related delays and third rank is to the factor of labor related Delay", In the seven group of the factors these three group is also most important for avoiding the construction time delay

While according to fuzzy methodology, the opinion of the experts convert into the linguistic number and calculate the average, dfuzzyfied values and weight of the all factors. On the basis of the weight of factors provided the rank highest to lowest, means first rank to the highest value factor. Based on the above description, total forty two factors that contribute to the causes of the delay in construction project in the housing project were identified, analyzed and ranked. The most important factor in each group that contribute the causes of the construction time delay.

According to the fuzzy method the first rank is provided to "slowness in decision making process in factor of client related, rework due to errors during construction in factor of contractor related, poor communication and coordination in factor of consultant related, damage of sorted material while they are needed urgently in factor of material related, personal conflicts among labors in factor of labor related, Lack of high-technology mechanical equipment in factor of equipment related, delay in providing services from utilities in factor of equipment related".

Second rank is provided to "delay in progress payments in client related delay, poor communication and coordination in contractor related delay, Inadequate experience of consultant in consultant related delay, Late procurement of materials in material related delay, low productivity level of labors in labor related delay, low productivity and efficiency of equipment in equipment related delay, changes in government regulations and laws in external related delay".

Third rank is provided to "late in revising and approving design documents in client related delay, inadequate contractor's work in contractor related delay, delays in producing design documents in consultant related delay, shortage of construction materials in market in material related delay, low strength level labors in labor related delay, equipment breakdowns in equipment related, delay in performing final inspection and certification in external related delay."

In overall ranking of the factors, these factors have first and second rank belongs to group of the equipment related factor but that factor have third rank belongs to group of labor related factor. Those factor have first, second and third rank is most important to the construction project. If these factors considered in mind during the construction then it may be avoided the construction time delay.

8. REFFERENCE

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