

Factor Affecting Construction Cost and Time in road project

Pavan pal¹, Dr. Mukesh Pandey²

1M.Tech. Student, Civil Engineering Department, ITM University, Gwalior, M.P, INDIA

2Professor and Head of Civil Engineering Department, ITM University, Gwalior, M.P, INDIA

Abstract - Most construction projects in developing countries are characterized by overruns in time and cost. This research is conducted in an attempt to identify major factors that are most responsible for affecting of construction cost and time. A descriptive study was carried out and two types of data were collected. The overrun variables were extracted from the literature and from a thorough examination of the questionnaire survey. The study is conducted with reference to existing theoretical literature, published and unpublished research. The study is mainly a literature review/survey on the affect of the time and cost on the road construction project. The primary findings emanating from the study revealed that empirical studies have identified a number of important factors which affected construction cost. There are fifty (50) factors are collected from the literature survey and divided into the seven group such as consultant related, material related, labor related, client related, equipment related, contractor related and external related group The factors are ranked according to the fuzzy method. 5 most significant factors come out by the ranking through the fuzzy method such as Late delivery of equipments , Effect of weather, High cost of labor, Shortage of site labor, High cost of machinery and its maintenance on site are the most affected factors .These factors are most important to avoiding the affect of construction cost and time.

Key Words: Analysis of the factors that affects the road construction projects.

1.INTRODUCTION

Cost and time affecting of the construction projects is the universal phenomenon that mostly occurs in the construction road projects. The critical result of the time and cost affecting is time and cost overruns. Factor affecting of the construction project have a debilitate impacts on parties (owner, contractor, consultant) to a contract in terms of failure of the contract and general feeling of unpleasant towards each other. In my study, there are two types of the data are collected first is one from literature survey and second is one from questionnaire survey.

The questionnaire survey completed by thesis related to the factors of the construction time and cost affecting and different publication journals. There are 50 common factors are collected from the literature survey and divided into the seven group in the guidance of guide such as group of consultant related , group of material related, group of labor

related, group of contractor related, group of client related, group of equipment related, and group of external related factor affected cost and time and the questionnaire survey have completed at the twenty two(22) number of construction road project site. The twenty two number of the questionnaire form filled up with the valuable opinion of the experts and according to this opinion the fuzzy methodology provided rank to each group and each factors of the construction time and cost affected. The fuzzy methodology is the most important techniques to find out the top rank of the factors. In my finding of my research, there are top three group out of seven group are group of equipment related, group of labor related and the group of client related. Each group have mostly four to Accurate estimation of construction costs is heavily dependent on the availability of quality historical cost data and the level of professional expertise, among other things. The limited information available at the early stages of a construction project may mean the quantity surveyor must make assumptions about the design details of a project, which may not eventuate as project design, planning and construction evolve (Liu and Zhu, 2007).

1.1 LITERATURE REVIEW

In this chapter the data is collected from the literature survey and find out the major factor affecting construction time and cost in the construction road project. In the literature survey we observed that the most of the project have cost and time affect and from these projects collected the fifty major factors of the construction cost and time affecting.

According to Rajakumar cost overruns are more common in infrastructure projects especially, more common in road construction activities. The impacts of cost overruns are very high in developing countries compared to developed countries. In fact 100% of projects are suffered by cost overruns in developing countries. (42)

According to Ibrahim Mahamid¹+1, Amund Bruland² this study is conducted to identify the cost overrun causes in road construction projects in the West Bank in Palestine from consultants' view. A questionnaire survey of 40 consultants from was performed. The survey included. (51) Suggested factors through literature review. The factors are ranked according to the degree of importance as assessed by the respondents. The findings reveal that the top five

affecting factors are: materials price fluctuation, insufficient time for estimate, experience in contracts, size of contract, and incomplete drawings. (45)

According to Abdullah Alhomidan the aim of this study is to identify the factors causing cost overrun in road construction projects in Saudi Arabia from contractors' viewpoint. The risk map of 41 factors considered in a survey indicates that the most factors affecting cost overrun in road construction projects are: internal administrative problems, payments delay, poor communication between construction parties, and delays in decision making. (34)

1.2 METHODOLOGY

Various literatures related to the projects are reviewed. Based on the review, the factors affecting cost and time are identified which helps to frame a questionnaire. Questionnaire survey is conducted among civil engineers of various road construction site. These survey responses are analysed using fuzzy method.

The data collected from the 22 construction site of the road and according to the valuable opinion of the experts, the fuzzy method is used to find out the most important factors that affected the construction cost and time. According to description of severity, the responses of the respondents are collected from the construction site of the road.

There are in total of twenty two (22) sets of survey questionnaire was distributed to the targeted in order to identify the most important factors of the factor affecting of construction road projects. The questionnaires survey were distributed to the construction profession who are take part in the construction road projects site and experience about this field. The questionnaire was completed by experienced persons who have specific experience in this area.

Group of the factors

- (1) Factor of consultant related
- (2) Factor of material related
- (3) Factor of labor related
- (4) Factor of contractor related
- (5) Factor of client related
- (6) Factor of equipment related
- (7) Factor of external related

The following method used establishing the normalized weight of the various factors that contribute to causes of construction delays. There are consist of following steps to analyzing the data.

- a) Convert the opinion of the experts into the linguistic numbers

N	U	P	L	A
0.0	0.1	0.5	0.6	0.8
0.0	0.2	0.6	0.7	0.9
0.1	0.3	0.7	0.8	1

Where

A=Always, L=Likely, P=Possible, U=Unlikely, N=Never

- b) Find out the average of the all linguistic numbers
- c) Calculate the defuzzyfied values
- d) Find out the weight of the all factors
- e) Provided the rank to the factor according to their normalized weight

Triangular fuzzy no is computed as

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

Here

- 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

2. Analysis of data

Table 1 Factor of consultant related

s n	factors	a	b	c	D	A	W	R
1	Frequent design changes	1.5 2	1.8 4	2.2 8	1.87	12. 9	0.14 4	3
2	Mistakes and errors in design	1.3 8	1.7 2	2.1 6	1.74 5		0.13 4	6
3	Unclear specifications	1.4	1.7 2	2.1 6	1.75		0.13 5	5
4	Late approval	1.3 4	1.6 4	2.0 8	1.67 5		0.12 9	7
5	Late design works	1.5 8	1.9 2	2.3 6	1.94 5		0.15	2

Level of Severity	Description
1	Never
2	Unlikely
3	Possible
4	Likely
5	Always

6	Late	1.7	2.1	2.5	2.16		0.16	1
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	inspection	8	4	8			6	
7	Late in reviewing and approving design document by consultant	1.4	1.7	2.1	1.79		0.13	4

Where

$$a=(N*0+U*0.1+P*0.5+L*0.6+A*0.8)/5$$

$$b=(N*0+U*0.2+P*0.6+L*0.7+A*0.9)/5$$

$$c=(N*0.1+U*0.3+P*0.7+L*0.8+A*1)/5$$

$$D.value=(a+2*b+c)/4$$

A=average of defuzzyfied value

$$Weight(w)=D.value/A.O.D$$

$$Rank=R$$

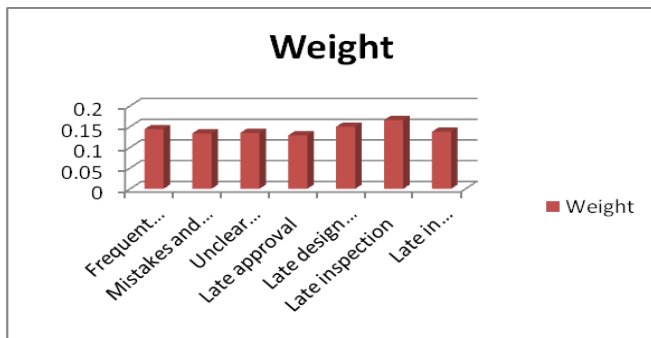


Figure 1 Factors of consultant related

Table 2 Overall ranking of the all factors

s.no	Factors	W	R
1	Late delivery of equipments	0.3	1
2	Effect of weather	0.26	2
3	High cost of labor	0.252	3
4	Shortage of site labor	0.246	4
5	High cost of machinery and its maintenance	0.246	5
6	Insufficient Numbers of equipment	0.229	6
7	Change orders.	0.223	7
8	Equipment availability and failure	0.223	8
9	Accident on site	0.221	9
10	Delay in progress payment by owner	0.21	10
11	Client requirements on quality	0.209	11
12	Labor absenteeism	0.204	12
13	Labor productivity	0.197	13
14	Owner interference	0.191	14
15	Late inspection	0.166	15
16	Financial difficulties of owner	0.165	16

17	Late design works	0.15	17
18	Unforeseen ground conditions	0.148	18
19	Shortage of materials	0.148	19
20	Wastage of the materials	0.147	20
21	Poor technical performance	0.146	21
22	Frequent design changes	0.144	22
23	Late in reviewing and approving design document by consultant	0.138	23
24	Fluctuation in prices of materials	0.137	24
25	Shortage of technical personnel(skilled labor)	0.135	25
26	Mistakes and errors in design	0.134	26
27	Late approval	0.129	27
28	Social and cultural impacts	0.12	28
29	Unavailable construction materials	0.109	29
30	Lack of raw materials sources	0.107	30
31	Government requirements	0.102	31
32	Late delivery of materials	0.1	32
33	Contractor's poor site management and supervision	0.094	33
34	Thefts of materials on site	0.093	34
35	Inadequate contractor experience	0.09	35
36	improper construction method	0.087	36
37	Rework from poor material quality	0.085	37
38	late issuing of approval documents	0.08	38
39	Incompetent subcontractors	0.078	39
40	Incorrect material take off from drawings and design document	0.075	40
41	Delay in materials procurement	0.074	41
42	Slow in making decisions	0.072	42
43	Incorrect planning and scheduling by contractors	0.068	43
44	late submission of nominated materials	0.066	44
45	undefined scope of working	0.063	45
46	Postponement of project	0.06	46
47	changes in management ways	0.055	47
48	Cash flow and financial difficulties faced by contractors	0.053	48
49	poor communication between construction parties	0.052	49
50	Shortage of technical personnel(skilled labor)	0.135	50

Table 3 Ranking of group of the factors that affect time and cost

s.n	Group of the factors	AVERAGE	R
1	factor of consultant related	0.1422	5
2	factor of material related	0.1111	6
3	factor of labor related	0.2068	2
4	factor of contractor related	0.0709	7
5	factor of client related	0.1996	3
6	factor of equipment related	0.2495	1
7	Factor of external related	0.1662	4

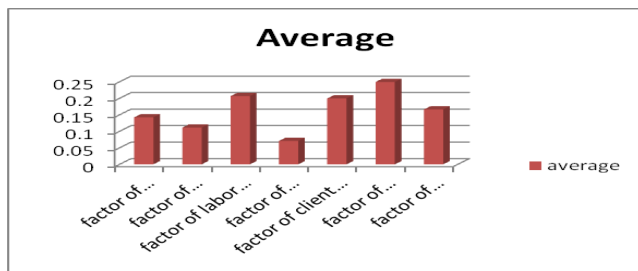


Figure 2 Ranking of group that affect time and cost

3. CONCLUSIONS

In the present time, the construction industries is biggest industries in India and it support to developing and attaining object of the society.

The main objective of this study which have been find out at the beginning of study was identifying the critical factor of the cost and time affecting in the construction road projects. These objectives were performed by the questionnaire survey that was designed with regard to the knowledge of Indian construction industries and their respond had a significant influence on this study. Also the during the process of filling questionnaire and oral interviews helped in realizing the good answer to the main factor of the construction time and cost affecting. During questionnaire survey, they gave their opinion related to construction time and cost affecting and according to these valuable opinions of the experts, find out the top most factors of The construction time and cost affecting using the fuzzy methodology. The fuzzy methodology is based on the human judgment or opinion. The result of the fuzzy methodology. According to weight that came out from the calculation provided the rank and this rank indicated the power of the factor. Those factors are the most important in construction industries to avoiding the construction time and cost affecting that factor have the highest weight. In my study, find out the top forth group of the factors out of seven group of the factors that most important to avoid or minimize the construction time and cost affecting in the road construction projects. The factor groups of equipment related have first rank, labor related have second rank and third rank have the client related .have forth rank external related. The fuzzy

method is applied data provided by different experts the top forth rank is came out in each group. The construction time and cost affecting may avoided by considering these factors. These factors have played very important role for occurring the construction time cost affecting in the construction industries because the most of the experts gave our opinion regarding these factors and he accepted that construction time and cost affecting can be avoided by considering these factors.

When consider the all fifty factor in a group and find out the rank according their normalized weight then top four factors are came out that have 1st, 2nd and 3rd 4th rank. The top most four factors are Late delivery of equipments, Effect of weather, High cost of labor, Shortage of site labor. These four factors belongs to group of the factor of equipment related, group of the labor related and group of the client related, means during the construction the management of the money, equipment and material are most important. Now a days, all the construction work is depend on the money, machinery and material so availability of money, machines and material are most important in the construction industries. To avoiding the construction cost and time, these factors should be consider in mind during the construction work. The contractor should be proper management in both labors and construction equipments to timely completion of the projects under the cost.

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