

To Study Optimization cost in Infrastructure Construction by Improving Construction Methods

Miss S.S. Chougule¹ Prof. A. S. Sajane²

Department of Civil Engineering,

Dr. J. J. Magdum College of Engineering, Jaysingpur.

Abstract- In construction industry the aim of project is to control the cost of the men, material and machineries and finish it on time, within the estimated budget. In the construction projects, cost and time are the main aspects to be considered in the planning of every project. It is a difficult task used by project managers in practice, which include evaluation of plans, corrective actions and constantly measuring progress should be taken whenever required. Cost optimization is an important issue in construction project management. It is mostly used by contractors and needs to carry out throughout the life of a construction project. A brief Questionnaire with a contractor, consultant, developer, Project manager found out that the contractor lack the knowledge of cost optimization system. Hence, a research is carried out to study the cost optimization method in a construction project, to identify the cost optimization method frequently used by contractor during the construction stage and to identify the problem faced by the contractor in optimizing the costs on site. The availability of qualified expertise is the main problem faced by contractor in optimizing the costs on site. The duration of the project and ever changing environment are the least problem faced by contractor in optimizing the costs on site.

Keywords: Cost, optimization, problem, management planning, questionnaire.

I. INTRODUCTION

Large scale development activities are taking place in Indian construction industry and it has assumed the proportion and responsibilities of a big business and is closely associated with nation's economy. A large number of building projects and new infrastructures are being built on a great scale which contributes to the economic growth of country. Apart from the economy aspect, the speed with which construction is carried out is also an important factor. Like other countries, India is also facing a serious issue of time and cost overruns in construction projects. The unfortunate part is that very few projects get delivered in time and on cost. Time and cost overruns have become the hallmark of construction projects in India. However, the magnitude and causes behind these time and cost overruns remain understudied.

➤ Causes of Delay and Cost Overrun in Construction Projects

The delay problem in the construction industry is a worldwide phenomenon. Delays occur in most construction projects, either simple or complex. In construction, delay can be defined as the extension of time in the completion of project. In short delay means failure to complete project in targeted time & budgeted cost as agreed in contract. The occurrence of delay is May concurrently with other delays and all of them can impact the project completion date.

II. METHODOLOGY

➤ Cost Reduction methods

So, there are various cost effective techniques of construction. Lots of them are also energy efficient and easily adoptable. Since India is a developing country, the economy has importance. There is a need for the adoption of strong, durable, environment friendly, ecologically appropriate, energy efficient and yet cost effective materials and appropriate technologies in construction.

In construction project optimization of cost can be achieved by some of the following Methods

- Value Engineering
- Material Management
- Budgetary Control
- Cost optimization Techniques
- Cost Reduction Techniques at site

The questionnaire was analyzed from different perspectives to identify the influencing factors; those are dependable for the time and cost escalation during construction phase. These factors were in various groups. In this way the most influential factors that caused project time and cost overruns were identified and decide the suitable construction method for optimization of cost.

III. Result & Discussion

Table No 3.1: Financing Related Cause Group

Sr. No	Note	Factor	(W)	(A)	(N)	Average	RII
1	F1	Owner Financial Problems/Client Finance/Economic Ability For The Project	33	5	10	3.3	0.66
2	F2	Payment Of Completed Work	29	5	10	2.9	0.58
3	F3	Delays In Contractors Progress Payment By Owner	31	5	10	3.1	0.62
4	F4	Partial Payments During Construction/Financing	24	5	10	2.4	0.48
5	F5	Delay In Honoring Payment Certificates	24	5	10	2.4	0.48
6	F6	Difficulty In Accessing Bank Credit	33	5	10	3.3	0.66
7	F7	Financing By Contractor During Construction	21	5	10	2.1	0.42
8	F8	Exchange Rate (Price) Fluctuation/Economic;	29	5	10	2.9	0.58
9	F9	Changing Of Bankers Policy;	28	5	10	2.8	0.56
10	F10	Cash- Flow Problems During Construction;	29	5	10	2.9	0.58
11	F11	Global Financial Crisis;	29	5	10	2.9	0.58
12	F12	Material And Labor Wage Escalation (Inflation)	22	5	10	2.2	0.44
13	F13	Financial Instability In Markets;	31	5	10	3.1	0.62
14	F14	Difficulty In Obtaining Materials At Official Current Prices;	29	5	10	2.9	0.58
15	F15	Late Payment To Subcontractor By The Main Contractor;	31	5	10	3.1	0.62

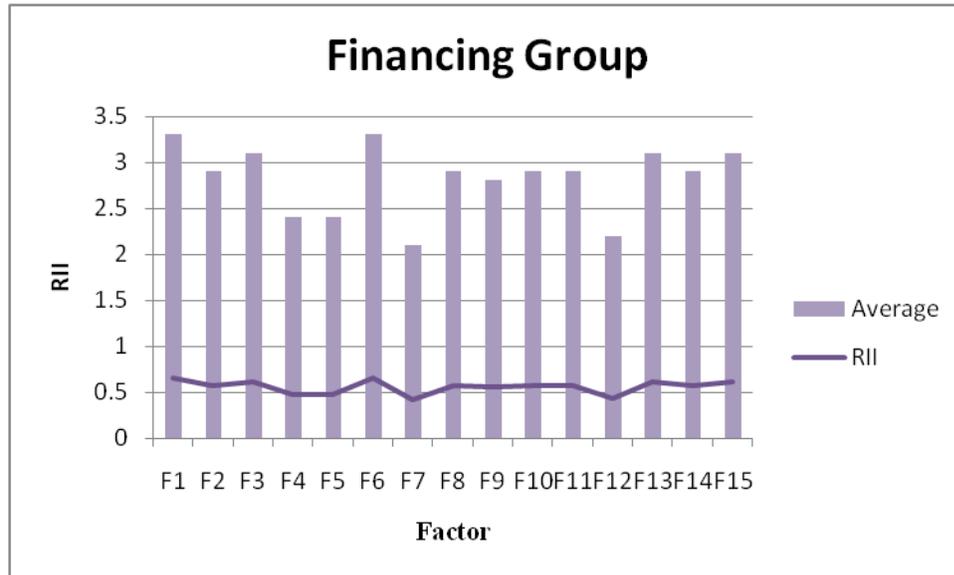


Figure No - 3.1: Financing Related Cause Group

Table No 3.2: Contractor Related Cause Group

Sr. No	Note	Factor	(W)	(A)	(N)	Average	RII
1	C1	Controlling Subcontractors By General Contractors In The Execution Of Work	25	5	10	2.5	0.5
2	C2	Poor Subcontractor Performance/Delays	37	5	10	3.7	0.74
3	C3	Often Change Of Subcontractors	26	5	10	2.6	0.52
4	C4	Construction Methods	23	5	10	2.3	0.46
5	C5	Rework Because Of Errors During Construction	30	5	10	3	0.6
6	C6	Unreliable Subcontractors	34	5	10	3.4	0.68
7	C7	Poor Site Management And Supervision By Contractor	28	5	10	2.8	0.56
8	C8	Delay In Site Mobilization By Contractor	34	5	10	3.4	0.68
9	C9	Poor Resource Management	32	5	10	3.2	0.64
10	C10	Incompetent Project Team	30	5	10	3	0.6
11	C11	Inadequate Contractor Experience (Work) Causing Error	31	5	10	3.1	0.62
12	C12	Non-Adherence Of Material Specifications Provided By Client	29	5	10	2.9	0.58
13	C13	Low Ability Of Contractor To Provide Imported Material	27	5	10	2.7	0.54
14	C14	Delay In Commencement	31	5	10	3.1	0.62
15	C15	Poor Qualification Of The Contractors Technical Staff	25	5	10	2.5	0.5
16	C16	Obsolete Technology	26	5	10	2.6	0.52
17	C17	Unstable Management Structure And Leadership	32	5	10	3.2	0.64

		Style Of Contractor					
18	C18	Lack Of Trade's Skill	26	5	10	2.6	0.52
19	C19	Defective Work	33	5	10	3.3	0.66
20	C20	Time Spent To Find Appropriate Subcontractors For Each Task	30	5	10	3	0.6

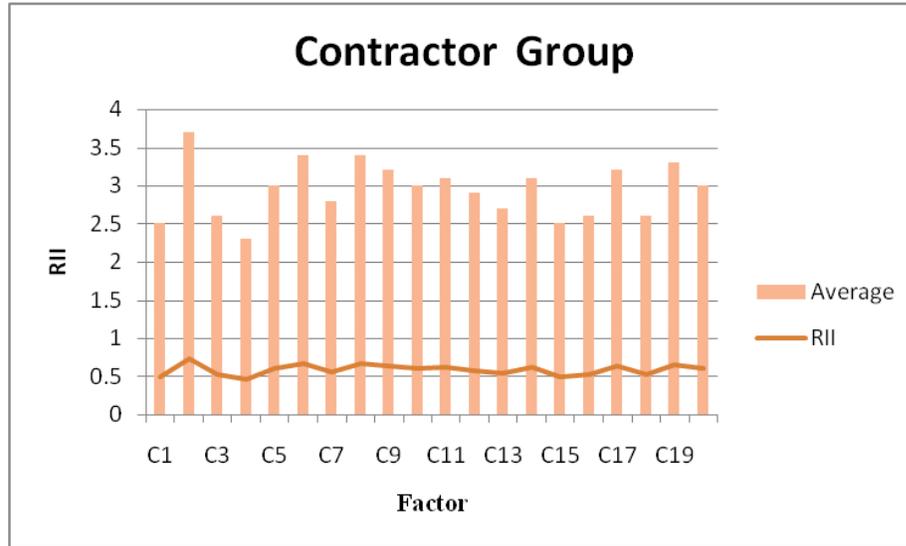


Figure No - 3.2: Contractor Related Cause Group

➤ **Change Indicator**

From the case study we compare the results of estimated cost and total cost of case study. Initially, there are performance indicators that are analyzed by using the actual cost of total project and the using MSP cost variance at site. Hence we calculate change cost factor of case study are explain below table.

Table No 3.3: Calculation For Changes Indicator

Description	Estimated Cost	Total Cost of Changes	Change Cost Factor
True Value Maruti Showroom	10687952.26	9878958.78	8.2%

Sample Calculations: Case 1

$$\text{Changes Cost Factor} = \frac{\text{Actual total project cost} - \text{Total project cost}}{\text{Total project cost}} \times 100$$

$$= \frac{10687952.26 - 9878958.78}{9878958.78} \times 100$$

= 8.2 %

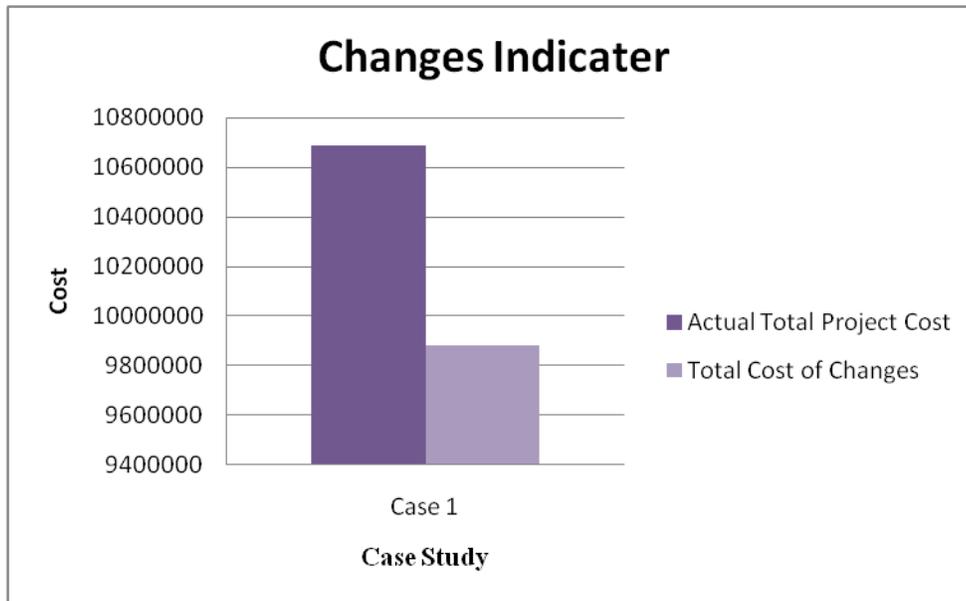


Figure No - 3.3: Result for Changes Indicator

Figure is shown that change indicator in case study. From the using the earned value analysis, result is observed total 8.2 % change factor between cost of changes and actual total project. The cost as well as time factor are reduce when whole project management with advance methods use and they are improving with proper management.

IV. CONCLUSION

The optimization method is used to select the desired design combination based on the cost for construction. Cost effective construction methods and materials during the execution of project plays important role in saving time as well as cost of construction. Thus, advance cost reduction method assures best cost and value over life cycle of the building or structure. In this project studied the advance construction methods and they have been shown to be following inherently advantageous in several major areas like Less Materials Waste, Less Site Disturbance, Safer Construction, Flexibility, Adaptability. From the analysis studies that main problem faced by contractor in optimizing the costs on site by the Shortages of material, labor or mechanical plant, Qualified expertise ,Duration of the project, Environment of construction work, Additional costs to carry out the cost optimization system.

V. REFERENCES

- 1) Devlal Sharma, Lecturer, TU, "Application of Cost Reduction Tools in Manufacturing Organizations at Pokhara" Janapriya Journal of Interdisciplinary Studies, Vol. 6, 2017.
- 2) Mr.Bhushan V and Tatar and Prof.Rahul S.Patil, "Time and Cost Optimization Techniques in Construction Project Management" International Journal of Latest Trends in Engineering and Technology, Vol.-7, Issue - 3, pp. 230-237, 2017.

- 3) Anuja Rajguru and Parag Mahatme, "Effective Techniques In Cost Optimization Of Construction Project: An Review" International Journal of Research in Engineering and Technology, Volume: 04 , Issue: 03,
- 4) S. Shanmugapriya¹, Dr. K. Subramanian, "Investigation of Significant Factors Influencing Time and Cost Overruns in Indian Construction Projects" International Journal of Emerging Technology and Advanced Engineering, Volume 3, Issue 10, October 2013.
- 5) Ashwini Arun Salunkhe and Rahul S. Patil, "Effect Of Construction Delays On Project Time Overrun: Indian Scenario" International Journal of Research in Engineering and Technology, Volume: 03 Issue: 01 | Jan-2014.
- 6) M. M. Tahir¹, Haron, N. A., Alias, A. H., Harun, A. N., I. B. Muhammad and D. L. Baba, "Improving Cost and Time Control in Construction Using Building Information Model (BIM): A Review" Pertanika J. Sci. & Technol., Vol.- 26 (1), Pp.No - 21 - 36 ,2018.
- 7) Mr. Umesh Kamble and Prof. Shashank U. Vanakudari, " Implementing Time And Cost Optimization In Commercial Building Using Project Management Techniques In Microsoft Project" International Research Journal of Engineering and Technology, Volume: 05 Issue: 06, 2018.
- 8) Akalya.K,Rex.L.K,Kamalnataraj.D, "Minimizing the Cost of Construction Materials through Optimization Techniques" IOSR Journal of Engineering, PP 29-33, 2018.
- 9) Urmila A Mahadik, "Cost Reduction in Construction Projects" International Journal of Engineering Technology, Management and Applied Sciences, Volume 3, Special Issue, ISSN 2349-4476, 2015.
- 10) C.I. Anyanwu, "Project Cost Control in the Nigerian Construction Industry" International Journal of Engineering Science Invention, Volume 2 Issue 12, PP.65-71, 2013.