Cost Escalation in Construction Projects

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ABSTRACT
The changes, good and bad, in the domestic and global economies have far reaching ripple effects throughout the construction industry. Drastically, one of the most concerning impacts is the risk of Cost escalation. Cost Escalation is a major provision in the cost estimation process which yields values for increases in the cost of equipment, material, labour, etc. due to continuing price changes over the time. These unanticipated changes in cost can occur at any point, preconstruction, course of construction and post construction. This study throws light on the factors affecting Cost escalation. And it also sorts out the top five factors among them.

Keywords—Cost escalation, RII method, construction industry, cost over run

I. INTRODUCTION

‘Escalation’ is a term used in most countries, to indicate the extent of these changes from the commencement of a project through any point during its life. As equivalent terms, fluctuations’, ‘rise and fall’ and ‘contract price adjustment’ are used interchangeably. Cost escalation is defined as changes in the cost or price of specific goods or services in a given economy over a period of time. It refers to the increase in the amount of money required to construct a project over and above the original budgeted amount. Cost escalation occurs when actual costs exceed previously estimated values.

In order to measure or manage escalation on construction projects, it is first important to understand the driving forces behind it. This is especially critical in the current situation, where price fluctuations have been so volatile that it has been difficult to predict or estimate what bid prices might actually be correct. The most important factor is that construction must be viewed as a commodity in itself, not a collection of commodities. The selling price of a project is not the result of the sum of its inputs plus a profit, except in the very rare cases where all work, including subcontracts, is procured through a cost-plus contract. In all other cases, the selling price of a contract is determined by the bidders based on their opinion of the competition. At a very basic level, it simply needs to be Rs. 1 less than the next bidder. The sum of the input costs will provide a floor below which a bidder is normally unwilling to go, and so changes in input costs will influence bids to some degree. The ceiling is, however, set by the bidder's opinion of the competition: the key here being the word "opinion". The bidder must not only estimate their own costs, but must also estimate what the other players will do.

One further consideration is that of risk. Strictly speaking, this belongs on the input side of the equation, since it relates to how input costs might vary: Will materials be available at the estimated price? Will labour productivity match the estimate? Can I find sufficient labour? As risk increases so too does the floor below which bidders are unwilling to go. Risk is very difficult to estimate and few bidders do it systematically. Risk assessments are usually heavily influenced by short term perceptions based on the latest news, and as a result are often very inaccurate.

Escalation, therefore, comes from the interplay of changes real or anticipated, in input costs, perceptions of risk, and perceptions of the competition. In some cases it comes from real information, such as actual changes in the cost of critical materials like steel or cement. More often than not, however, it comes from the formation of market opinions, which may or may not have a basis in fact. Ultimately, the ability for contractors to raise price depends entirely on the market conditions, and the expectation that all bidders are increasing their prices. Increased input pricing and increased risk can influence that expectation, but cannot or their own increase prices. There is no such thing as a "pass through."

- Uncertainty of Materials & Labour prices.
- Longer Duration of Contract
- Inflation trends are uncertain etc.

II. METHODOLOGY
The research methodology for present study has adopted questionnaire survey to identify significant factors influencing cost overruns in construction projects. To identify cost overruns factors, literature reviews, discussion with experts were carried out. From existing literature on the construction industry it was possible to identify certain major effects of cost overrun on project delivery. A questionnaire was then drawn up. As the outcome of review 20 factors of cost overrun were identified.

These questionnaires were distributed to Owners and Contractors of construction Industry. The data from the questionnaire was analysed statistically. The perspective of owner and contractor has been analysed to rank the causes of cost overruns based on their Relative Important Index. Relative important index method was used for hierarchal assessment of factors and found out the top most significant factors of cost overruns.

The questionnaire was designed so that it is easy to read and responses are easy to fill in. An ordinal scale of measurement will be applied for data measurement in questionnaire survey. These sections were designed to obtain the responses on a ordinal scale that indicates the relative importance of various cost overrun.

The participants were asked to rate the factors from a scale of 1 to 5 based on what they think will be the impact of the factor on the delays occurring in a project with 1 being very less effect to 5 being severe effect.

The Relative Importance Index of these factors are then calculated using the weighted average method. This helps to rate which factor is considered the most severe in the group and on the whole list of factors. From these survey results we will get a greater understanding of severe in the group and on the whole list of factors. From existing literature on the construction industry it was possible to identify certain major effects of cost overrun on project delivery. A questionnaire was then drawn up. As the outcome of review 20 factors of cost overrun were identified.

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The Relative Importance Index of each of the factors are calculated using the following formula

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\text{Relative Importance Index} = \frac{(n1 \times 1) + (n2 \times 2) + (n3 \times 3) + (n4 \times 4) + (n5 \times 5)}{\text{Total Number of respondents}}
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n1: Number of respondents who checked “Very little effect”
n2: Number of respondents who checked “Little effect”
n3: Number of respondents who checked “Average effect”
n4: Number of respondents who checked “High effect”
n5: Number of respondents who checked “Very high effect”

III. PRIOR APPROACH

An extensive review of international cost escalation was conducted during the initial phase of the research effort. Previous research suggests that cost escalation is particularly subject to more cost escalation than other business activities because of its complexity; a construction project usually requires a multitude of people with different skills and interests and the coordination of a wide range of disparate, yet interrelated, activities. Such complexity is further compounded by the unique features of a project and many other external uncertainties. And also, in general, there is an absence of literature that has focused on the practices, results or development of cost escalation assessment and management techniques for Indian construction projects.

Bent Flyvbjerg, et al. (2004) had presented a paper on “What Causes Cost Overrun in Transport Infrastructure Project “The study is based on a sample of 258 rail, bridge, tunnel, and road project worth US$90 billion. The focus is on the dependence of cost escalation on (1) length of project implementation phase, (2) size of project and (3) type of project ownership. First it is found with very high statistical significance that cost escalation is strongly dependent on length of implementation phase because they translate into risks of substantial cost escalation. Second, it is found that project has grown larger over time and that for bridges and tunnel larger project have larger percentage cost escalation. Finally, by comparing cost escalation for three types of project ownership— private, state owned enterprises and other public ownership—it is shown that the often seen claim that public ownership is problematic and private ownership effective in curbing cost escalation is an oversimplification. Types of accountability appear to matter to the cost escalation than type of ownership.

Adnan Enhassi (2009) was found that Construction projects located in the Gaza Strip, Palestine suffer from many problems and complex issues such as unavailability of competent staff, late delivery of materials and equipment, material shortage, waste rate of materials, escalation and fluctuation of material prices, quality of equipment and raw material, delay in progress payment, cash flow of project, cost of variation order, differentiation of currency prices, cost of rework, cost control system, poor site management, poor communication and coordination by owner and other parties, conformance to specification, project complexity, absenteeism rate through project, planned time for construction, time needed to rectify defects, inadequate planning and scheduling, mistake and discrepancies in design documents, late in reviewing and approving design document by consultant and client.

Abtab Hameed Memon (2010) founded factors of cost over are lack of experience of contractor and subcontractor, Inaccurate time and cost estimate.

Yakubu Adisa Olawale (2010) founded cost overrun factor that are lack of software, Inaccurate time and cost estimate, cash flow of project, equipment breakdown, material shortage in his study on UK construction industry.
The survey indicated that the top risks affecting time overrun in road construction projects in Palestine are: financial status of the contractors, payment delays by the owner, the political situation and segmentation of the West Bank, poor communication between construction parties, lack of equipment efficiency and high competition in bids.

IV. OUR APPROACH

The general methodology of this study relies largely on the survey questionnaire which will be collected from the local building contractors of different sizes by mail or by personnel meeting. A thorough literature review was initially conducted to identify the cost escalation factors that affect the performance of construction industry as a whole.

Cost escalation factors for this study are:
1. Material and labour shortage
2. Inflation
3. Bad weather/ climatic condition
4. Strikes
5. Project condition/size
6. Schedule delay
7. Change of order
8. Delay payment of interim payment certificate
9. Poor technical performance
10. Poor communication between construction parties
11. Lack of equipment efficiency
12. Financial status of contractor
13. Labour availability
14. Lack of experience & knowledge of construction parties
15. Involvement of more no of parties (contractors) in single project
16. Lack of efficiency of contractor to achieve time goal of project
17. Availability of modern equipment and methods
18. Poor site management
19. Conflicts among project participants
20. Quality of equipment and material

V. RESULT AND DISCUSSION

The survey concludes that the cost escalation has been a major problem faced by the construction sector especially the projects having long durations. The responses regarding how the cost escalation affects the company are shown in Fig.1:
Results of questionnaire survey in Fig.1 showed that there were five major causes of cost escalations that predominantly affect the infrastructure construction projects. Inflation is the major factor that affects the cost. It was followed material shortage. Then financial status of contractor and poor site management. The others were schedule delay, project conditions, delayed payment of interim payment etc.

VI. CONCLUSION

Escalation in the construction market in recent years has been extremely volatile, and this trend is expected to continue in the near future due to competition for resources and skilled workers, as well as continued strong growth and excess work available. This situation has created a great deal of uncertainty and nervousness among project owners who have received bids that are significantly higher than budgets which were set prior to the recent market escalation. Project owners are faced with a limited number of choices, none of which are usually very palatable: putting their projects on hold in the hopes that the prices will eventually settle back down; going through a redesign process to bring the project back under previously established budgets; or somehow finding additional funding to cover the missing funds.

The survey revealed that the major causes of cost escalation are inflation, material shortage, financial status of contractor and poor site management, schedule delay and project conditions. From the survey it is clear that most of the company’s are not able to tackle to the effects of cost escalation and they are in need to improve the currently used escalation clauses.

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