



Rate Analysis and Mitigation of Cost Overrun by Forecasting Escalation

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Abstract: Over the past few years the construction industry has been facing several problems due to rapid increase in the price of construction materials, labour, interest charges and equipment cost. Rate escalation is defined as changes in the cost or price of specific goods or services in a given economy over a period. In order to cope up with the sudden price changes the provisions regarding contract price escalation should be rearranged systemically. This paper focuses on the obtaining the rate of Cost escalation in Infrastructure for past years and forecasting escalated cost for various building materials and labour for the upcoming years This project includes a research regarding rate analysis of reasons behind cost escalation and the measures to mitigate it.

Keywords: Cost escalation, contract, construction

1. Introduction

Construction sector largely depends upon resources such as materials, machinery and labour which are the major cost drivers of construction projects and also their prices subject to escalation. If a business proposal gets delayed due to reasons like arrangement of funds/raw material, manpower shortage, licensing and legal formalities, it results in project cost overruns. Indian government has attached high priority to construction and therefore needs significant investment in the infrastructure sector. 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 and Price escalation produces delays in construction projects. During the life of the project there is a great probability that the cost of the labour and material gets fluctuated. Thus, at the time of sudden rise of international raw materials or exchange rates under a lump sum or fixed price contract, the contractors want to bear considerable damage.

2. Objective

The objective of the proposed work is to compare the cost escalation in construction for different building materials and labours for past three years. Also, to study and rate the various parameters that influences the escalation in construction cost, its effects and the measures to mitigate it. It also aims in forecasting the percentage increase in cost of construction materials, labour and equipments.

3. Scope

Construction includes building and civil engineering projects including work by contractors, by individual, by public sector direct labor or owner account organizations and by construction units in commercial or industrial organizations that are recorded to other industries. The inventory can be stored knowing the future rate of escalation at the starting of a project. High quality output can be obtained and time can be saved if money and materials are previously stocked. Forecasting of cost escalation is a cost effective method.

4. Need for the study

Price escalations have been affecting construction industry during the last year causing many problems and caused many developers to re think of projects. Price escalation produces delays in construction projects, reduced scope projects or projects being cancelled. Escalation clauses could also impact public projects adversely due to the fact that prices being submitted are not being guaranteed during long period of time. Because of escalation fears, owners are finding fewer bidders for their projects, some projects need to find alternatives funding sources or canceling the project if additional money is not available. Contractor and supplier fears regarding potential, future price escalation, and the absence of price escalation clauses in most construction contracts, often leads to higher contract prices and larger project costs. Due to increase in the cost of fuel, transportation, electricity, lending rate for various small scale industrial sectors, power cuts, and value added taxes and service taxes the overall cost of Construction has escalated.

5. Related works

Ashitha Babu says that her survey revealed that the major causes of cost escalation is inflation are inflation, strikes, schedule delay, bad weather, poor technical performance, project conditions and delayed

payment . From the survey it was clear that most of the companies are not able to tackle to the effects of cost escalation and they are in need to improve the currently used escalation clauses. From the study conducted by K.Vamsidhari et.al, it is found that the price of steel, cement, aggregate, bricks, composite materials, equipments and labour cost were escalated by 138%, 36%, 60%, 115%, 55%, 63%, & 140% for the past six years from 2008 to 2013. Labour cost plays a major role in cost escalation which has been escalated by 140% during this period. Mikhail Chester et.al says that Construction projects are often delayed by unforeseen conditions and poor management practices. The paper presented by W. J. Campbell et.al says that escalation can account for a substantial part of construction costs, and therefore forecasts of the amount of escalation are required for budgetary and bidding purposes. Also, the application of time series methods, their limitations, and their effect on the risk of cost escalation are demonstrated and evaluated. The analytical methods available are only useful in forecasting for short construction projects in stable conditions. Dr. K.N. Agrawal et.al explains that the project Cost varies with time due to escalation and influence of inflationary and other conditions like demand, supply, growth, availability etc. He also says that any business decision taken today has far reaching effects on the profitability of the project cost and thereby the viability of the organization. Various mathematical models using Time Series Methods like Linear Prediction, Trend Estimation and Causal Methods like Regression Analysis with both Linear and Non-Linear Multiple regressions were developed. Recommendations suggested by Mukaila Afolayan et.al for reducing cost escalation effects are the pattern of building item should be analysed from time to time in order to avoid the scarcity of building. Then government should find a way of establishing more building industries especially cement plant to avoid the building scarcity. The working class should plan ahead to have their own housing in order to avoid problem of house scarcity. According to Ahmed et al., delays on construction projects are a universal phenomenon and construction projects are no exception. These will adversely affect in the relationship between the clients, contractors, and consultants.

6. Methodology

Surveys will be made to find the factors causing cost escalation in construction. The survey will be conducted with the various stakeholders of the construction projects to get a deeper insight into the factors and reasons for the escalation. Data collected from the survey is to be analyzed using descriptive statistical techniques. An advanced and accurate analysis method is needed to arrange the large body of data in a systematic, fast and reliable way. For this purpose the computer SPSS is chosen as the best options available. The respondents were asked to rate

the causes cost escalation with respect to their frequency and severity Weight. The mitigation measures of escalated construction cost are be obtained and analysed. Forecasting of cost escalation is to be performed with the obtained datas of year and cost. The input datas to be provided is year and the cost. The datas of escalated cost for various construction materials have be collected and the most cost escalated material are to be identified. The cost escalation for future three years is to be estimated using the software. A data model is created with the software.

7. Mitigation measures

7.1 Prequalification

Financial Prequalification is critical to insulating a contractor's projects from the impact of cost escalation on subcontractors. If subcontractors bear this risk – and most do – financial analysis becomes an even more important component of a contractor's overall prequalification effort, allowing greater assurance that they can absorb the cost of an anomaly in escalation on a given project. Subcontractors' financial ratios, especially days of cash, pipeline and their WIP can speak volumes about their enterprise risk.

7.2 Schedule

Construction schedules also present potential to reduce escalation exposure, or mitigate its impact. To reduce the time exposure on a project, and therefore potential exposure to many forces contributing to escalation, contractors may wish to examine their schedule for potential acceleration, or stacking of activities, which can reduce its overall duration and therefore exposure to potential escalation. Alternatively, any time saved by compressing the schedule may increase the float to allow for situations that would potentially lead to cost escalation. Again, time is money, and if contractors have some time, they may be able to save some money.

7.3 Purchasing

To remove some exposure to escalation, it often makes sense to put effort into identifying key scopes with potential for it, collaborate to get the related design documents early, and expedite buying these scopes to lock in pricing as early as possible. Focused, phased bidding may allow a contractor to do this in a more aggressive fashion, as the need to wait for complete documents for all scopes prior to bidding and procurement is eliminated for the most concerning scopes. There is some downside here, as later scopes are perhaps more exposed to escalation if the time frame for procurement overall stretches out, so a contractor's approach should be very strategic in nature, if used.

7.4 Material Pre purchase

As builders, contractors have options related to the procurement of materials when they know that a cost escalation is likely. They may wish to have a strategic delivery/product storage plan to enable them to have materials purchased and staged in advance of need. Strategies could include contractors purchasing materials in advance or paying subcontractors to do so via payment for stored materials. Both approaches have potential issues to work through, including cost, contract, insurance and a variety of logistical implications.

7.5 Value Engineering and alternatives

Subcontractors are on the front line, and they have the advantage of proximity to suppliers and labor to see emerging escalation potential, whether from manpower issues or supply chain dynamics. Working with subs to identify value engineering and alternatives when a specified material exposes a construction firm to potential escalation can be invaluable.

7.6. Awareness of safety certification requirements

It is necessary to consider both internal and external factors to ensure that this type of escalation is controlled. If a construction company's protocols (internal) or OSHA requirements (external) for safety measures change, it's important for estimating to consider those additional costs as well and/or ensure that subcontractors have them included in their bids. Compliance with these requirements can cause internal or external cost escalation, and must be accounted for in some way.

7.7. Project management office

PMO consist of experienced managers and subject matter specialist of the company. It help in timely identification of issues related to cost and schedule overrun. Educational institutes in India are not giving much importance to the project management curriculum and in comparison to other countries very few institutions in India offer project management degree programs.

8. Results and Discussion

The causes of cost escalation were also found out by studies after conducting a survey among the companies. Poor contract management is the major factor that affects the cost which scored 100%. It was followed by Inflation, and schedule delay which scored 87% and 81.4%. Sub-contractors and nominated suppliers and project conditions scored 62.5% and 56.9%. Strikes scored 44.3%. The others were changes in site conditions and inaccurate estimates which scored 25%. The major parameters that influence the cost escalation in construction industry are steel, cement, aggregate, bricks, equipments and labour costs are found. Details of cost of items are collected for four years and the rate of increase is calculated. From the study, it is found that the price of steel, cement, aggregate, bricks, equipments and

labour cost were escalated by 21.4%, 4%, 10.5%, 20% & 27% for the past three years from 2013 to 2016. Labour cost plays a major role in cost escalation which has been escalated by 27% during this period.

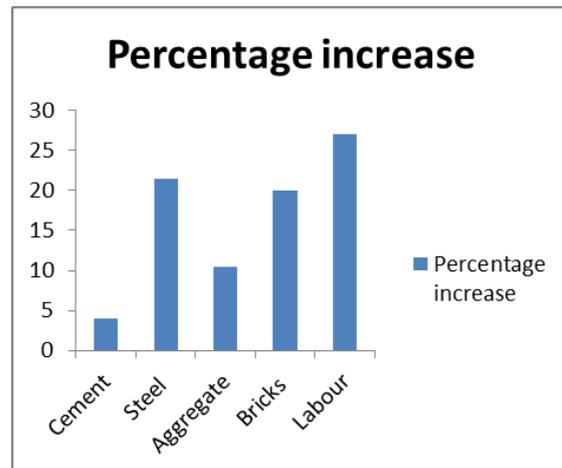


Figure 1 Percentage increase in cost

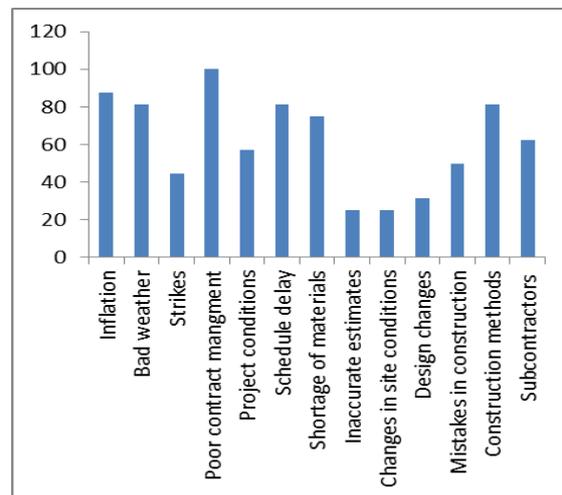


Figure 2 Factors affecting escalation

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