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FORECASTING AND RATE ANALYSIS OF COST ESCALATION FOR CONSTRUCTION INDUSTRY

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Abstract – *The construction industry is a vital sector in any economy and significantly contributes to the socio-economic growth of a country. Cost escalation is one of the consequential identified risks faced by construction industry. So the objective of the study is to intend new and modified theories so that the subject area inclines towards precision and perfection under the case study of building construction project. The study proposes new approaches and method such as Market Rate Method (MRM) that can be implemented in the field of cost escalation, so that different errors, complexities in the still used techniques could be removed. The results of study denotes that this new approach yields better results than the traditional method which are more widely utilized.*

Key words : *Construction industry, Cost Escalation, Whole Sale Price Index (WPI), Market Rate Method (MRM).*

1.INTRODUCTION

In general construction projects ranges from several months to several years. Therefore there is probability that the cost of labour and material increases, hence increases the cost of project. Escalation is a risk that can account for a substantial part of construction cost, especially in long term projects where the variability and uncertainty is greater. In multi-project programs, the effect of escalation can be the prime concern. Cost escalation in construction project refers to anticipated increase in cost of constructing a project over a period. Cost increase usually occur as a result of fluctuation of market forces and reflect increases in the cost of material/ labour and higher levels of construction activity. In developing country such as India cost escalation is one of the major phenomenon faced by the construction industry which has led to delay of several other projects associated with it. Thus there is need for more realistic approach towards the management of cost associated with the projects.

1.1 Literature Review

Escalation reflects change in productivity, technology, profit margins and market conditions such as high demand and so on. And complicating the situation Price escalation varies by region and procurement strategy [1]. Cost escalation is directly proportional to increase in Price of all the construction element of the original contract. Escalation in construction market has been extremely volatile and is expected to continue in the near future due to demand for resources, skilled workers and continuous strong growth [2]. Nine out of every ten construction projects experiences cost escalation and most occurs before construction begins. Escalation mainly attributes because of poor site management and supervision, low speed of decision making and client-initiated variations at the construction phase of the project [3]. Delay in projects are the universal phenomenon and construction projects are no exception. cost escalation can be categorized into two broad groups: uncontrollable and controllable factors [4]. Till now, many researchers have presented various risk management models and techniques to minimize risk of escalation. But the correlation among various risks associated with escalation and their interdependency is not yet reported. Therefore, the main objective of this study reflects methods by which participants in construction projects can both track the extent of escalation and work together to minimize the impact of cost escalation on the success of a project.

2. Case Study

"Ruparel Ariana" at Parel, Mumbai is taken as case study. A tender document, bill of quantities and abstract sheets provides necessary data for project cost and scheduling activities.

3. TRADITIONAL METHOD (WPI)

WPI is the Index that is used to measure the change in the average Pricelevel of goods traded in wholesale market. In India, a total of 676 commodities data on Price level is tracked through WPI which is an indicator of movement in prices of commodities in all trade and transactions. It is also the Price Index which is available on a weekly basis with the shortest possible time lag only two weeks. The Indian government has taken WPI as an indicator of the rate of inflation in the economy. WPI is a measure to monitor the movement of general level of prices in the economy. It is

widely used by Government, banks, industry and business circles.

3.1 Drawback of WPI

i) The main problem with WPI calculation is that more than 100 out of the 676 commodities included in the Index have ceased to be important from consumption point of view.
ii) India constituted the last WPI series of commodities in 2004-05, but has not updated and cannot be used as barometer to calculate escalation.
iii) Many developed countries have already migrated to the other policy to decide the key rate and we are still stuck up with using WPI.
iv) The WPI is based on collecting of almost 676 odd commodities and the latest collection of these items was done by 2003.It is indeed true that the Index still contain and weighs the items that are near obsolete and this doesn't make sense.

4. PROPOSED METHOD MARKET RATE METHOD (MRM)

There are many parameters involved in the calculation of any Price Index and due to so many drawbacks in calculation of indices, it is very difficult to develop indices which reflect the true picture of the variation in prices of different material. Due to various complications, it is not possible to obtain completely flawless values of the cost indices. Hence the objective of the study is to use a practical approach for calculation of cost escalation which eliminates the use of cost indices and still gives realistic results.

4.1 Values To Be Considered

i) The base Price of cement (i.e.) Market rate of cement is taken 28 days prior to date of release of tender.

ii) The current Price should be taken as the Price of the material in the month under consideration.

4.2 Advantages Of Market Rate Method

i) Adopting this methodology, all the area of indistinctness are eliminated. The MRM for computing the cost escalation can result into realistic result, if properly and thought fully adopted.
ii) It purges all the uncertainty related to various cost indices.

iii) By using the proposed Market Rate Method, more and more materials can be removed from this "other materials" category, since there is no want of indices in this method, which are otherwise unavailable for most of the materials.

4.3 Requirements of Market Rate Method

If an owner intends to utilize an actual cost based escalation provision, it is suggested that the arrangement include at least the following essential pieces:

i) Adequate documentation (e.g., supplier quotes and detailed bid breakdowns) establishing the base Pricefor the application of the escalation provision.

ii) Documentation (e.g., additional supplier quotes) establishing that the "base price" is, in fact, a reasonable price.

iii) A contractual obligation that the contractor and subcontractors immediately (within a specified timeframe after contract award) place orders for any material items subject to escalation.

iv) Sworn certification by the contractor of the accuracy of, and actual reliance on, the material Pricein the bid, and of the accuracy of contractor's representations regarding the actual material cost.

v) Prompt notice requirements.

vi) Exclusion of overhead and profit mark-up on the Priceescalation.

vii) Adequate assurance that the contractor's Pricedoes not include a hidden escalation contingency.

viii) A system for identifying, and tracking through the fabrication or delivery phases, the specific materials subject to escalation terms.

5. Data Analysis for Case Study

The Data analysis is done considering two major components used in the construction (i.e.) Steel And Cement. Both the components are calculated by using the traditional method Wholesale Price Index (WPI) and Market Rate Method (MRM) and the result obtained by both these methods are interpreted

Table 5.1 Shows the calculation of escalation using Wholesale Price Index (WPI) method usually practiced

QUARTER	MONTH & YEAR	CERTIFIED RATE	STEEL V_S= (0.85*Pc*R*(Si-So))/(100*So)			CEMENT Vc= (0.85*Pc*R*(Ci-Co))/(100*Co)		
				P_S	So =147.40		P_C	Co =134.70

		R (Rs in Cr)	Si	Y	Amount in Lac (V_S)	Ci	Y	Amount in Lac (V_C)
First	Sep-2009 Oct-2009 Nov-2009	-1.43	144.50	16	-0.45	149.30	10	1.55
Second	Dec-2009 Jan-2010 Feb-2010	3.16	140.03	16	-2.53	148.27	10	3.18
Third	March-2010 April-2010 May-2010	2.45	134.63	16	-3.39	151.67	10	3.08
Fourth	June-2010 July-2010 Aug-2010	2.53	133.70	16	-3.76	151.67	10	3.19
Fifth	Sep-2010 Oct-2010 Nov-2010	3.80	132.43	16	-6.20	148.10	10	3.22
Sixth	Dec-2010 Jan-2011 Feb-2011	1.63	132.60	16	-2.69	148.10	10	1.62
Seventh	March-2011 April -2011 May-2011	2.25	132.80	16	-3.71	148.10	10	2.24
Eighth	June-2011 July-2011 Aug-2011	0.36	132.80	16	-0.60	148.10	10	0.36
Ninth	Sep-2011 Oct-2011 Nov-2011	1.00	132.80	16	-1.65	148.10	10	0.99
Tenth	Dec-2012 Jan-2012 Feb-2012	0.61	132.20	16	-1.00	148.10	10	0.60
Total (Rs)		19.26			-26.03			20.08

Table 5.2 Shows the calculation of escalation using Market Rate Method (MRM). In this Approach, the escalation of the construction material has be obtained by applying market rates (i.e. market price) of purchase instead of the WPI and generalized Indexes. In case study, this new concept has been applied on the two major construction material (i.e. steel and cement)

Table 5.2 Shows the calculation of escalation using MRM (Market Rate Method) – Proposed Method

QUARTER	MONTH & YEAR	CERTIFIED RATE	STEEL Vs= (0.85*Pc*R*(Si - So))/(100*So)			CEMENT Vc= (0.85*Pc*R*(Ci-Co))/(100*Co)		
		R (Rs in Cr.)	Market Rate/Ton in Rs.	Ps	So =31270	Market Rate/Bag in Rs.	Pc	Co =210
			Si	Y	Amount in Lac (Vs)	Ci	Y	Amount in Lac (Vc)
First	Sep-2009 Oct -2009 Nov-2009	1.43	32180	16	0.56	240	10	1.74
Second	Dec-2009 Jan-2010 Feb-2010	3.16	31000	16	-0.37	237	10	3.45
Third	March-2010 April-2010 May-2010	2.45	31180	16	-0.09	244	10	3.37
Fourth	June-2010 July-2010 Aug-2010	2.53	32340	16	1.17	247	10	3.79
Fifth	Sep-2010 Oct-2010 Nov-2010	3.80	34700	16	5.68	240	10	4.62
Sixth	Dec-2010 Jan-2011 Feb-2011	1.63	33950	16	1.90	245	10	2.31
Seventh	March-2011 April-2011 May-2011	2.25	34500	16	3.16	265	10	5.01
Eighth	June-2011 July-	0.36	35220	16	0.63	298	10	1.31

	2011 Aug-2011							
Ninth	Sep-2011 Oct-2011 Nov-2011	1.00	34700	16	1.49	282	10	2.91
Tenth	Dec-2012 Jan-2012 Feb-2012	0.61	37600	16	1.68	296	10	2.12
Total (Rs)		19.26			15.83			30.68

5.1 Interpretation of Results

Table 5.3 shows the interpretation of results obtained by using the traditional Wholesale Price Index (WPI) and the proposed Market Rate Method (MRM). Based on the interpretation of results obtained it is observed that the traditional method do not yield a realistic value of escalation amount. The value obtained from traditional method is found to be much lower then the value incurred during the project. Hence, loss for the contractor, this action leads to unrealistic bid as the contractors add an extra lump sum amount of their own wish and apprehension, to their bid proposals during the bidding process for any construction project, in spite of the existence of escalations clauses in the tender documents. Hence, ambiguity for the client/bid evaluator as well as enhancement of the risk of loosing the bid for the bidding contractor is created, due to improbable and non-competent bid proposals

Table 5.3 Interpretation of Wholesale Price Index (WPI) and Market Rate Method (MRM) Results

	STEEL (Rs in Lac)	**CEMENT (Rs in Lac)**
Escalation obtained by MRM (Market Rate Method)	15.83	30.68
Escalation claimed by WPI (Wholesale price index)	-26.03	20.08
Difference	41.87	10.59
Percentage Difference	160.84%	52.77%

6. Conclusion

i) From the case study, it can be inferred that the Market Rate Method (MRM) used yielded better results than the results obtained from Traditional Wholesale Price Index (WPI) Method

ii) If the escalation working were done using the Market Rate Method, the project would have probably quoted 52.46 lakh and the percentage difference of cement is found to be 52.77% and whereas for steel it is found to be 160.84%. This is an enormous amount, which is entirely lost in the game of construction contractorship, just due to the existing impractical and vague techniques and traditional procedures

iii) The study, as a contribution to the development of the Indian construction industry, urges that it is high time for India to abscond the traditional hypothetical theories and adopt the pragmatic and pioneering new approaches of construction cost escalation working.

iv) As a part of the research work the study has evolved ground-breaking and new revolutionary methodology related to this subject that would purge the snags and hitches associated with cost escalation in construction industry.

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