Study of Cost Control Techniques Used in Construction Industry and Their Impact to Minimize Cost Overrun

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Abstract: Construction industry plays an important role for the development in any country. Individual project success depends on how it can achieve project objectives, which is to complete the project within the estimated budget, to the required quality within the pre-determined duration. For that planning of the project as well as the monitoring is essential. Cost overrun is a major problem encountered by many of the contractors which contribute to less secured profit for the contractor and many more problems for all the parties involved. To solve those problems, good practice of cost control techniques is essential. So identifying cost controlling techniques and their impact to minimize cost overrun is very important. This study was conducted through a questionnaire survey considering C1 to C5 grade contractors. Collected data were analyzed by converting those in to quantitative values using percentage analysis and weighted score analysis. The analyzed results show the frequently used cost controlling practices and importance of those practices to minimize the cost overrun. That is it leads to minimize over budget, overhead and profit margin. Finally it was suggested to CIDA(ICTAD) to promote contractors to use cost controlling techniques, by conducting training, awareness programme etc. In addition it was suggested to include some of the documents as mandatory documents.

Keywords: cost overrun, cost controlling techniques, impact to project budget.

1. INTRODUCTION

Project planning cannot be completed satisfactorily by only planning and scheduling. Project controlling which consists of project monitoring and updating, is the other important stage to be carried out to accommodate the dynamic nature of construction work. Without a proper control, even a well-planned and scheduled construction system can lead to problems, delays and cost overruns. In general most (if not all) construction projects experience time delays and cost overruns during their implementation phase. Cost overruns are considered as one of the most critical issues during the execution of construction projects.

Project control includes both progress control and cost control. This research mainly concentrates on cost control. There are various techniques available as cost control techniques that can be applied to construction projects. It is good to have knowledge of effectiveness of those cost control techniques to the contractors and how to use those techniques to minimize cost overruns.

The control of project cost is not an easy task and it requires knowledge of applying cost controlling techniques. Therefore professionals in the construction industry are required to have theoretical knowledge on cost controlling techniques. Also based on the selection of appropriate method, time of applying the technique, etc. are also important aspects that project manager/planning engineer or other related professionals should know. Therefore, use of proper project cost controlling mechanisms is a must in today’s construction industry. But the relevant bodies like ICTAD, Ministry of Construction etc. have not still make sufficient rules and regulations or include closure in the conditions of contract to overcome this problem. So this research topic is timely needed to address the above mentioned problem.

With this research, it is expected to provide immense help to government and other private sectors who do not follow good monitoring programs and cost controlling techniques.
With that background research objectives are to identify the cost controlling techniques frequently used by contractors in construction industry and to determine the impact of cost controlling techniques to minimize the cost overrun. Also the research scope was limited to C1 to C5 contractors in building projects.

1.1. Literature Review

There are three elements or processes of Cost Management; cost estimating, cost budgeting and cost controlling (Owens et al, 2007) and those are shown in Table 1.

<table>
<thead>
<tr>
<th>Table 1 Cost management elements</th>
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<tr>
<td><strong>Element</strong></td>
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<tr>
<td>Cost Estimating</td>
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<tr>
<td>Cost Budgeting</td>
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<tr>
<td>Cost Controlling</td>
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Having accurate project estimates and a project budget accordingly is essential to deliver the project within the project budget. That estimation and planning called the planning part. Without keeping an eye on the actual costs meanwhile the project is being preceded, the project can never be delivered on-budget (Sharma & Rupen, 2013).

There are some techniques as mention in the PMBOK (A Guide to the Project Management Body of Knowledge) used to control and monitor the cost of projects. Some of the advanced techniques are Earned Value Management, To-Complete Index, Forecasting, Variance Analysis, and Performance Reviews.

Among above techniques, earn value management is one of the main technique. Earn value system is firstly used by Department of Defence. There are some basic steps which should follow before apply this theory (Owens et al, 2007).

- Divide the project into manageable parts of authorized work for that there should be WBS.
- Ensure that the parts are defined in a manner so that each and every activity can be allocated duration of time to be complete and a cost to complete.
- Allocate cost and effort to all parts across the entire project. Essentially establishing a baseline.

Simply the cost overrun is defined as exceed the budgeted margin of the project. According to the researchers Nida & Azhar, (2008) there are 42 main factors effecting to the cost overrun in Pakistan construction industry. Some of them are, Prices fluctuation of raw materials, Mode of financing and payment for completed work, Frequent design changes, High cost of machineries, Improper planning, High interest rates charged by bankers on loans received by contractors, Unstable cost of manufacturing materials, and Long period between design & time of bidding/tendering.

According to the ICTAD (CIDA) there were several documents which should maintain records for controlling cost by comparing with the planned cost. Some of the published documents are;

- Unit cost sheet
- Weekly statement of direct labour cost
- Weekly statement of machinery hire cost
By referring those documents we have to identify what are the documents should be improved and what are the new techniques should be added to these documents.

2. METHODOLOGY

This research depends on both qualitative and quantitative information gathered from construction projects. The study focused on information gathered from 24 number of responses comprising project managers, site managers etc.

Mainly methodology was divided in to different stages. Those are preliminary survey using interviews and questionnaire, final questionnaire survey, data collection and data analysis.

Preliminary questionnaire was prepared based on the knowledge gain through the literatures reviewed. Preliminary survey was conducted as open-ended interview based on the preliminary questionnaire. It was helpful to fine tune our final questionnaire and get the involvement of the professionals in the construction site.

At present there are more than 1000 contractors registered form C1 grade to C 10 grade. The research scope was defined to get information only for C1 grade to C5 grade. Then the sample size was selected considering statistical approaches and it was decided as 24 contractors.

Questionnaires were distributed through interviews and Google forms. After gathering all required data, analysing part was done by using excel software. Graphs and bar charts have been drawn with respect to the data for each and every question. Normally most of the results were manipulated according to the percentages. Maximum percentage can be taken as the most accurate answers.

In some cases relative index methods were applied. Such as five no of responses were ranked 1 to 5 scale by considering their importance (very important-5 points, important-4 points, fairly important-3 points, less important-2 points, not important-1 points).Then relative index was calculated by considering the importance of responses and the total number of responses.

3. RESULTS AND DISCUSSION

Survey results show that most of the contractors are generally aware about the cost control techniques that are available in construction industry purposes but the proper usages of those techniques are minimum. Cost control techniques were identified as a tool of reducing cost overrun. MS project, Earn Value Management, and Daily material & labour controlling were identified as cost control techniques currently used by contactors. Figure 1 gives the summary of presently practiced cost control techniques.
Contractors agree that MS project and Earn value analysis are the most important techniques of cost controlling. Contractors who adopt these techniques have already said easy to monitor and user friendliness are the mostly influenced motives to use it. Also lack of practices and lack of expertise are the main barriers that contractors are prevented by using it. Same time contractors suggested ICTAD to conduct regular training on these techniques.

Awareness about ICTAD guidelines related to cost controlling is less than 50% and it was clear that most of contractors believe that important documents that mention as ICTAD guidelines at present should be included in condition of contract as a recommendation. Responses received for that is shown in Table 1.

<table>
<thead>
<tr>
<th>ICTAD(CIDA) Documents preferred</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Unit cost sheet</td>
<td>12.5</td>
</tr>
<tr>
<td>Weekly statement of direct labour cost</td>
<td>41.7</td>
</tr>
<tr>
<td>Weekly statements of machinery hire cost</td>
<td>41.7</td>
</tr>
<tr>
<td>Weekly statement of material cost</td>
<td>33.3</td>
</tr>
<tr>
<td>Weekly statement of labour subcontractor’s payments</td>
<td>33.3</td>
</tr>
<tr>
<td>Monthly statement of overhead cost</td>
<td>16.7</td>
</tr>
<tr>
<td>Monthly cost summery</td>
<td>58.3</td>
</tr>
<tr>
<td>Weekly statement of output of works (Value of work)</td>
<td>8.3</td>
</tr>
<tr>
<td>Contractor’s monthly cost control table</td>
<td>8.3</td>
</tr>
<tr>
<td>Contractor’s monthly cost control chart</td>
<td>12.5</td>
</tr>
</tbody>
</table>

Relative Index methods was use to find the most critical factors effecting to the cost overrun and it was identified that key factor is shortage of material, labour or mechanical plants and it was clear that problem can be overcome by using above mention ICTAD guidelines. Responses received regarding affected problems for cost overrun is shown in Figure 2.
Most of the contractors said their project cost is over budgeted by about 25% and for that one of the major reason is lack of regular project monitoring system. Results related to impact to over budgeting are shown in Figures 3, 4 and 5.
Also contractors believe that if proper cost controlling is used, project overhead can be reduced and they can go for less profit margin. With that contractors bid value can be reduced which may help to get the award. It may benefit to the client also.

4. CONCLUSION

According to responses received, although there are some techniques to minimize cost overrun contractors do not tend to implement it proper way as they have no forces to do such. Even though contractors have been provided guidelines from ICTAD (CIDA) majority do not follow them according to results.

As the contractors believed that some of they are very important. Hence authors of this report would like to suggest to include below mentioned documents as compulsory documents.

- Monthly cost summary sheet.
- Weekly statement of machinery hire cost sheet.
- Weekly statement of direct labor cost sheet.

As part of covering first objective most popular and most important cost controlling techniques were identified as

- Using MS project
- Daily material and labor controlling
- Using earn value management
It was already explained what are the barriers to implements those techniques and response of the population that how it overcome those barriers. Here the most important factors have been summarized to suggest to the ICTAD (Condition of contract) for the both techniques. Majority has asked for below mention points.

- Conduct awareness programs to give the importance about MS project and earn value management.
- Regular updates through the workshops, seminars, etc.
- Train the responsible professionals.

To verify the conclusion taken from this research, further research can be done considering other contractors from C6 to C11 and also focusing all project categories.

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