CONSTRUCTION PROJECTS COST CONTROL

Ashish D. Patre[1], Ashish B. Ugale[2], Dr. A. R. Mundhada[3]

[1] *Student of Master of Engineering, Department of Civil Engineering, Prof. Ram Meghe College of Engineering & Management, Badnera-Amravati, Maharashtra, India.*

[2] *Assistant Professor, Department of Civil Engineering, Prof Ram Meghe College of Engineering & Management, Badnera-Amravati, Maharashtra, India.*

[3] *Professor, Department of Civil Engineering, Prof. Ram Meghe College of Engineering & Management, Badnera-Amravati, Maharashtra, India.*

Abstract

Construction sector is one of the important sector in the country like India on which economy of the country is very much dependent. Also, it is one of the uncertain sectors because it is dependent on multiple factors like availability manpower, machineries, whether condition, geotechnical condition of the site. Considering the current scenario of tough competition among the construction company/contractor, it very difficult to earn good profit. Profit of the contractors more dependent on controlling & monitoring the expenses required for the project. All the projects need to be drive & monitored right from start of the project in order to receive the required and expected profit at the end of the project. It is the project manager & team that is responsible for the project and most importantly the project manager that needs to be able to carry out effective controlling of the costs. There are many techniques that can be used for cost control purpose. Construction cost control helps project managers avoid cost overruns by providing guidelines for estimates and forecasts of resource requirement, and overhead costs. The aim of a cost control plan is to ensure the project will delivered on time, within scope, and on budget. The objective of this article is to study the project cost control parameter and cost control techniques.

Key Words: Cost Baseline, Earn Value, schedule performance index, schedule performance index

----------***----------

1. INTRODUCION

Construction cost control helps project managers avoid cost overruns by monitoring estimates and forecasts of labor, material, and overhead costs. The aim of a cost control plan is to ensure the project will delivered on time, within scope, and on budget. Cost reporting is particularly based on factors such as future cash flows i.e. cost to complete, anticipated final costs i.e. final projected cost, and current actual project costs. Cost control is related with imoroportant factors which create changes to the cost baseline.

Cost control includes:

• Monitoring cost performance to trace variances from baseline plan.

• Ensuring that all appropriate and small changes are recorded accurately and properly in the cost baseline.

• Avoiding incorrect, inappropriate, or unapproved changes from being included in the cost baseline.

• Informing appropriate stakeholders of authorized changes

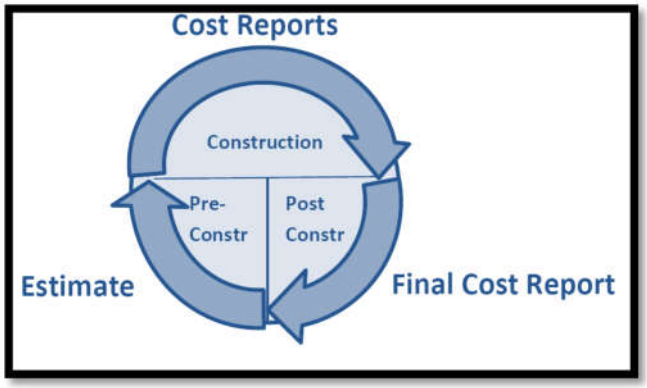

Figure 1.1 Cost Control Cycle

Cost control includes searching out positive and negative changes against baseline. It must be totally integrated with the other control processes (scope of work change control, schedule control, quality control). For example, inappropriate/unapproved responses to cost variances can

cause quality or schedule problems or produce an unacceptable level of risk later in the project.

The objective of this article is to study the project cost control and cost control techniques.

2. INPUTS TO COST CONTROL

Cost control required certain inputs which guide project manager & team which area as below:

1. Cost Baselines Schedule

The cost baseline schedule is a time-oriented budget that will be used to measure and monitor cost performance of the project. It is developed by addition of estimated costs by period and is usually displayed in the form of an S-curve, as illustrated in Figure 2.1.

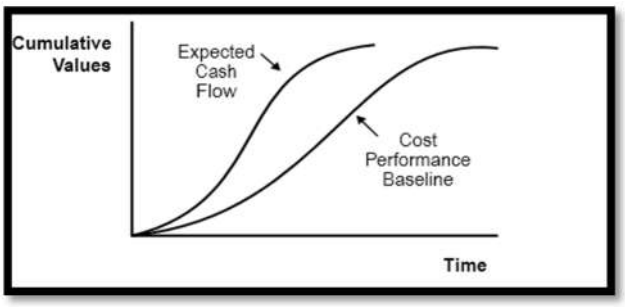

Figure 2.1 Cost S-Curve

A project has multiple cost baselines to measure different parameter of cost performance. For instant, cash flow forecast is a cost baseline for measuring cost.

2. Performance reports

Performance reports like cost to complete/estimate to complete provides information on cost performance such as which budgets have been met and which have not. Performance reports can alert the project team to issues which may cause trouble in the future.

3. Change requests

Change requests may take places in many formats—oral or written, direct or indirect, externally or internally initiated, and legally mandated or optional. Changes may leads to increase in the budget or may allow decreasing it.

4. Cost Management Plan

The cost management plan describes how cost budget variances can be managed (e.g., type of responses to major problems than to minor ones). A cost management plan may differ based on requirement of stakeholders such as formal or informal, highly detailed or broadly framed cost management plan. It is a important element of the overall project plan.

3. COST CONTROL TECHNIQUES

Following are some techniques to be used for project cost control:

1. Planning the Project Budget

One would need to ideally make a budget at initial phase of the project. It is this budget that project team would have to help project team for all expenses that need to be made and costs that you will incur during the project life cycle. The preparation of budget therefore entails a lot of research, forecasting and thinking.
Like any other budget, project team would always have to buffer for adjustments as the costs may not remain the same right through the period of the project. However, Adhering to the project budget throughout the project duration is key to the profit from project.

2. Keeping a Track of Costs

Keeping track & monitoring of all actual costs is equally important as any other technique. Hence it is good practice to prepare a budget that is time-based. This will help project team to keep track on the budget of a project in each of its phases. The actual costs will have to be tracked against the periodic targets that have been fixed in the budget. These targets could be on a monthly or even yearly if the project will go on for long.
This is much effective to control project cost with rather than having one complete budget for the entire period of the project. If any new scope of work is required to be execute, project team would need to estimate for this and see if it can be accommodated with the final amount in the budget. If not, then project manager may have to work on necessary communication and approval for 'Change Requests', where the client will pay for the new scope of work or the changes.

3. Effective Time Management

Another effective technique would be effective time management. This technique does apply to all department of project, it is very important with regard to project cost control.
The cost of project could keep rising if project manager & team are unable to meet the project's milestone deadlines; the longer the project is dragged on for, the higher the direct & indirect costs incurred which effectively means that the budget will be exceeded.
The project team would need to constantly monitor the important deadlines of the project in order to ensure that work is completed within time.

4. Project Change Control

Project change control is yet another important technique. Change control systems are essential to track any potential changes that could occur during time frame of the project.
Each changes to the scope of the work of project will have an impact on the deadlines of the deliverables, so the changes may increase project direct & indirect cost due to additional effort needed for the project.

5. Use of Earned Value

Similarly, in order to identify the value of the work that has been executed so far, it is very helpful to use the accounting technique commonly known as 'Earned Value'.
This is particularly helpful for all projects and will guide project manager to make any immediate changes that are very essential for the successfully completion of the project.

Calculating Earned Value:

Earned Value Management measures progress against a baseline budget. It help in calculating three key parameter for each activity in each WBS:

The Planned Value (PV) — The planned value is planned budgeted cost of each activity during entire project.

The Actual Cost (AC) — The total of the costs incurred in accomplishing work on all activities during entire project duration. This Actual Cost must parallel to whatever was budgeted for the Planned Value and the Earned Value (e.g. direct and indirect costs).

The Earned Value (EV) — The value of each activity as actual.

These above three values are used to determine whether work is being accomplished as planned by following measure.

The commonly used measures are as below:

Cost variance:

Cost Variance (CV) = EV - AC

Schedule variance:

Schedule Variance (SV) = EV – PV

A negative schedule variance (SV) indicates project is behind schedule, while a negative cost variance (CV) means the project is over the budget.
Cost & schedule variance values can be converted to efficiency indicators to reflect the cost and schedule performance of the project. Cost performance index (CPI) is one of the most commonly used indicators for cost performance.

It can be calculated by following parameter:

CPI = EV / AC

The sum of all individual EV budgets divided by the sum of all individual AC's is known as the cumulative CPI and is generally used to forecast the cost to complete a project.

The schedule performance index (SPI), calculated thus:
SPI = EV / PV

is often used with the CPI to forecast overall project completion cost.

If CPI or SPI are more than 1.0, indicates project is going better-than-planned project performance, while CPI or SPI less than 1.0 indicates project is performing poor than planned project performance. The formulas used to calculate the CPI and SPI indices are generally based on total project costs.

4. OUTPUT TO COST CONTROL

1. Revised cost estimates

Revised cost estimates are modifications/update to the cost information used to manage the project. Appropriate stakeholders must be informed as needed. However it is advisable to avoid revise cost estimates.

2. Budget updates

Budget revision/updates are a one of the parameters of revised cost estimates. Budget updates are revision and modification to an approved cost baseline as per actual project condition. These budget amounts are generally revised only in response to change in scope of work. In some cases, change of scope may be so severe that “re baseline” is needed in order to provide measure to performance.

3. Corrective action

Corrective action against changes is method to bring expected future project performance on track and in line with the project plan.

4. Learnings

The reasons of changes in scope, the reasoning behind the corrective action chosen, and other types of lessons learned from cost control should be documented so that they become part of the historical database for both current project and other projects of the organization.

5. CONCLUSIONS

Cost control plans are a one of the most essential part of planning a construction project. They can be the determining factor of whether a contractor can make a profit on the project well in advance. Having an accurate cost control plan and development budget is necessary for successful completion of project. Essentially, using cost control procedures is very important to ensure a project is delivered on time, within approved scope, and on budget.

6. REFERENCES

1. Joe Orczyk, - Construction Project Cost Control May 2018.
2. Karim Eldash – Construction Cost Management January 2012
3. Successful Control of Major Project Budgets, Academic Editor: Ole Jonny Klakegg , 15 March 2016; Accepted: 29 June 2016; Published: 8 July 2016
4. Cost Estimation: Concepts and Methodology, John L. Sorrels, Thomas G. Walton
5. Case study of budget of “Construction of Fire Tender Ramp Poject at Thane”