



COMPARISON OF OWNER AND CONTRACTOR PERSPECTIVES IN ESTABLISHING COST CONTROL STRUCTURE

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Cost control is a part of cost management which is carried out by the project owner and the contractor throughout a project. However, the structures of the control function developed by each party generally differ since the purpose of the function and the level of the structure are not exactly the same. Contractors have several advantages while building a cost control system such as more detailed information about the project, more background, more dedicated personnel, specifically developed software etc. Therefore, contractors have a broader vision on the issue. Owners need to utilize cost control systems not only for common reasons but also due to some specific necessities. Unlike contractors, owners have to capitalize projects just before they put their investments into operation. This paper intends to focus the necessities prioritized by the owners and contractors on the issue. A comparison will be made to distinguish the differences between the cost perspectives of project owners and contractors. An assessment will be done of the matters that owners pay attention while establishing a cost control structure in light of the experiences practiced in oil and gas projects. Thus, the important points which should be better to consider by the owners' project control teams will be advised.

Keywords: Cost management, Budget compliance, Cost breakdown structure, Capitalization, Project control team.

1 INTRODUCTION

Cost management is simply defined as “the processes involved in planning, estimating, budgeting and controlling costs so that the project can be completed within the approved budget” (PMI PMBOK 2008). Following, the definition is enhanced to include financing, funding and managing processes (PMI PMBOK 2013). Herein, the cost control part of the cost management will be reviewed regarding the necessities prioritized by the owners and contractors.

Cost control refers to project procedures which are applied to monitor actual expenditures against the progress and compute deviations from the approved budget to allow effective measures to be taken to achieve minimum costs (AACE 10S-90 2017). This perception is valid for all parties involved in a project since the value of money has been increased in the recent decades. Contractors' profit margins have been reduced considerably due to increased competition in the construction industry, because of which they have greater cost-consciousness to be able to compensate possible losses (Ashworth *et al.* 2015). Thus, owners and contractors are highly motivated to follow a cost control process. In the absence of a control system, projects proceed without an adequate oversight and a clear understanding of status, so an analytic action

plan cannot be implemented to bring the project back on track in case of a deviation (Venkatamaran and Pinto 2008).

On the other hand, outputs of cost control process could provide valuable data for further projects. This data could be used as a library during cost estimating if recorded and classified in a proper way. A cost control system can also be established to cooperate with the accounting system, so those records could be organized to allow the owner complete capitalization of the project with ease.

Project stakeholders should set up a cost control system which satisfies their expectations and necessities. That system should be built up on a project breakdown structure which specifically called as cost breakdown structure (CBS). CBS has a similar frame as work breakdown structure (WBS) however indicative factor is the cost monitoring philosophy. It allocates the project several levels beginning from project overall to final cost elements required to be followed. With this hierarchical breakdown, occurred cost could be addressed to cost elements which enables project parties to roll up project costs to each cost level of CBS systematically (Er and Komurlu 2017). Such kind of methods are also used to calculate the physical progress of projects. (Komurlu and Er 2018a).

This paper intends to compare cost perspectives of owners and contractors. Since, there are limited number of research studies analyzing owner procedures on the subject, a CBS is studied to introduce owners' point of view to readers.

2 COST PERSPECTIVES OF OWNERS AND CONTRACTORS

The main objective of cost control is to measure variances from the approved budget. The quality of the budget depends on the accuracy of cost estimates, while the accuracy of estimates is directly related to the level of information at hand.

On the owner's side, it is necessary to realize some project development steps to reach a maturity level, where the project owner can reckon a more reliable cost estimation and decide whether to invest or not. However, even at this stage, many details may not be clear yet. Therefore, cost estimation of owners generally could be done with high level cost elements. It also includes a certain level of contingency. Typically, project is divided into three main phases i.e. engineering, procurement and construction. Project budget mainly stands on those phases.

However, previous experiences of authors show that on the contractor's side, project budgets are generally built up on two main categories; direct costs and indirect costs. Since the contract price is fixed, any cost increase results with a loss of profit. That reality motivates the contractors to establish an apparent and easily traceable cost structure as given in Table 1. It is much more detailed and CBS level of cost elements are lower compared to the owners' cost structure.

Regarding the project life cycles owners' ability to influence project expenditures rapidly decreases after the final approval of the investment decision. However, on the contractors' side, it is much more dynamic. Lower level of cost elements allows contractors to focus on and analyze each work item in detail. For example, in a proper cost control structure a work item like concrete pouring can be deeply analyzed. The occurred cost of one cubic meter of concrete can be compared with budget unit price and total variance in the total cost of concrete pouring can be calculated. Moreover, root cause of unit cost variance could be determined (such as material, labor etc.) or cost and quantity variance amounts in the total variance could be calculated. Thus, a well-designed and controllable cost control system allows contractors to take effective actions to achieve minimum costs. That system necessarily contains three main components;

- i) a proper cost control structure based on an accepted cost control method,
- ii) sufficient information to reckon budget costs as per requirements of the structure,

iii) sufficient organization to monitor and control the actual data.

Table 1. Direct and Indirect Costs of Project Budgets on the Contractor’s Side.

| Direct Costs | Indirect Costs |
|--|---|
| Personnel Costs <ul style="list-style-type: none"> • Direct Personnel | Personnel Costs <ul style="list-style-type: none"> • Indirect Personnel • Head Office Personnel |
| Equipment and Materials <ul style="list-style-type: none"> • Direct Equipment • Direct Materials | Equipment and Materials <ul style="list-style-type: none"> • Indirect Equipment • Construction Machinery |
| Subcontractor Costs | Administration Costs <ul style="list-style-type: none"> • Facilities <ul style="list-style-type: none"> ○ Site Facilities ○ Camp Facilities • Site Running Costs |
| | Financial Costs |
| | Insurance Costs |
| | Taxes and Duties |

Owners experience difficulties to gather detailed cost information at the beginning of the project because the detailed design is rarely completed at that stage. Therefore, to set up a higher level of CBS is an obligation rather than a preference for owners. In parallel, they set up more compact but effective cost control organizations.

Contractors have much more information at the beginning of the project since they have a complete organization dealing with engineering, procurement and construction specifically. They have in-house data due to their experience and a steady cost control system which was improved during previous projects. Therefore, good implementations of tailor-made or packaged cost control software at contractors’ organizations are quite common. Generally, Earned Value methodology is the basis for these systems, because this method provides an objective measurement, earlier identification of problems, and fast feedback on any corrective action taken (Gerson 2013).

3 A CBS PROPOSAL REGARDING OWNERS’ REQUIREMENTS

Main objective of owners for cost control is to prevent deficits in the budget, and maintain consistency of the feasibility regarding cost part. Second, they would like to have a reliable cost register for their future investments. Third, they would like to separate the investment cost in a compatible way to help the capitalization process.

Uniform accounting system requests owners to record their investment expenditures in “construction work in progress” account. They have to classify and transfer those expenditures below capital asset accounts just before putting them into operation.

- Land
- Buildings
- Infrastructure
- Equipment and Furniture
- Intangible Assets
- Other Fixed Assets

This process is called capitalization which is the final step of recording of a cost as an asset rather than an expense. Since capitalization regulations stipulate specific rules while registering costs at the inventory, collaboration between owners’ project and financial affairs teams becomes an inevitable necessity. A proper cost breakdown structure, which divides the project costs into agreed components, enables financial affairs teams to apply requirements of capitalization with ease.

In Table 2., a cost breakdown structure of a plant project is presented as an example considering an oil and gas project. This structure is recommended by taking into account various experiences of the authors in different investment projects built in the TUPRAS refineries.

Table 2. Cost Breakdown Structure of a Plant Project.

| Level 0 | Level 1 | Level 2 | Level 3 | Level 4 | | |
|-----------------|---------|---------------|-------------------------|-----------------|--|--|
| PROJECT | UNITS | PHASES | SUB-PHASES | UNIQUE ELEMENTS | | |
| Project Overall | Unit 1 | Engineering | Basic Engineering | | | |
| | | | Detailed Engineering | | | |
| | | | Procurement Engineering | | | |
| | | Procurement | Equipment | Equipment – 1 | | |
| | | | | Equipment – 2 | | |
| | | | ... | | | |
| | | Bulk Material | | | | |
| | | Construction | | | | |
| | | Others | Consultancy | | | |
| | | | Freight & Insurance | | | |
| | | | Financial Costs | | | |
| | | | Services | | | |
| | | | Utilities | | | |
| | | | Other Fixed Assets | Inventory – 1 | | |
| | | | | Inventory – 2 | | |
| | | | | ... | | |
| | | | Intangible Assets | Asset – 1 | | |
| | | | | Asset – 2 | | |
| | | ... | | | | |
| | | Others | | | | |
| Unit 2 | | | | | | |
| ... | | | | | | |

The logic behind the structure is as follows: Firstly, the project is divided into units. Those units will be the cost centers in the accounting system during the operation phase. For the following level, main cost categories such as engineering, procurement, construction etc. could be defined. By that way, total cost of main phases could be calculated and recorded.

Equipment is the most important cost element of the structure since it will be the base of capitalization. Maintenance or replacement costs should be addressed to equipment during operation. Additionally, each equipment may have different depreciation periods which directly affect the company's annual financial statement. Therefore, each itemized equipment should be considered in the lower level of equipment and their cost shall be assigned to those cost elements. Each equipment also has engineering, construction, freight, customs etc. costs. However, it is difficult to determine them equipment by equipment. Therefore, those costs could be recorded at their specific categories. Financial groups can distribute those costs to each equipment proportionally by calculating the weight of the equipment in the total equipment cost, while implementing the capitalization process.

Buildings, tanks, infrastructure and interconnecting lines are also other important structures required to be followed preferably as a separate unit. If the owner assigns some personnel specifically for the management of the project, expenditures of those personnel could also be accepted as a part of the project cost.

4 CONCLUSIONS

In the light of the practices experienced in both owner and contractor organizations, it is concluded that cost control perspectives of owners and contractors generally differ since their purpose and cost control levels are not exactly the same. Listed below are the similar and different cost perspectives of owners and contractors:

- i) Owners generally set their budget on project phases, whereas contractors prefer to focus on direct and indirect costs.
- ii) Contractors have much more detailed project information and experience than owners, so that they can build up more detailed cost control structures.
- iii) Project organizations of contractors consist of more personnel dedicated to cost control, so that they can monitor actual costs in details. As a result, contractors can set up more complex cost control systems and use Earned Value methodology more efficiently.
- iv) Both parties utilize cost control systems to measure variance from approved budgets and allow effective action to be taken to achieve minimum costs.
- v) Both parties record cost data for future projects.
- vi) Unlike contractors, owners, using a cost control system, would like to separate the investment cost in a compatible way to help the capitalization process.

Considering the limited number of research studies analyzing owner procedures on the subject, a CBS is recommended to convey authors' approach to readers who work as a cost controller at owner organizations. The example is selected from an oil and gas project, however the approach could be utilized in several types of industrial projects. Main idea is to divide project into levels corresponding to units, phases, sub-phases, unique elements respectively, and form a structure not only useful for cost control but also for capitalization process of financial affairs departments. In addition, such kind of CBS could be utilized by estimation teams during open book cost estimate (OBCE) period of EPC convertible contracts (Komurlu and Er 2018b) which allows to calculate project cost within a systematic and traceable structure.

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