



ABC TECHNIQUE FOR CONSTRUCTION BUILDING

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Abstract - Construction projects require a range of inputs, from labour to various types of materials and tools. Identifying the exact cost of all inputs for specific jobs can be challenging. Costing techniques in construction management require input, workers on the job and solid record keeping. The activity-based costing can be useful for construction project managers to keep track of their total job expenses. In this project we have implemented a proposed theoretical model for effective utilization of Activity Based Costing to get optimum duration and cost. Activity-Based Costing (ABC) prevents cost distortions and provides a process view which traditional cost accounting cannot provide. This project shows how activity-based costing concepts can be adapted to measure quality-related costs. The main goal of this study is to find out the optimum duration for the completion of project. The data is collected from the construction project. The expected time for the completion of project is finding out by using the grant chart and by software. The collected data is analyzed and find out the optimum duration and cost. The outcome of the project is to shown the effective application of Activity Based Costing.

Keywords—Activity Based Costing, Grant chart, Duration, Direct cost, Indirect cost

I. INTRODUCTION

Costing systems are information systems. They require a specific type of information such as direct labour hour and unit product produced, to be of value. It is from the input data that product cost and other information are determined according to the specific costing system defined methodology. The result obtained would depend on the costing system used, since the same input data could in used in different ways. A costing system should provide information to help minimize waste, but should not be wasteful in itself. Traditional cost accounting system has been criticized for cost distortion and lack of relevance during the last 20 years (Johnson and Kaplan 1987). A traditional system reports what money is spent on and by whom, but fails to report the cost of activities and processes (Miller 1996).

Activity-Based Costing (ABC) is that costing in which costs begin with tracing of activities and then to producing the product. In other words, it is the process of costing system which focuses on activities performed to produce products. This system assumes that activities are responsible for the incurrence of costs and products creates the demand for activities. Costs are charged to products based on individual product's use of each activity. There are two purposes of activity-based costing. The first purpose is to prevent cost distortion. Cost distortion occurs because traditional costing combines all indirect costs into a single cost pool. This pool is allocated on the basis of some resource common to all of the company's products, typically direct labor. Cost distortion is prevented in ABC by adopting multiple cost pools (activities) and cost drivers. The second purpose is to minimize waste or non-value-adding activities by providing a process view. This objective can be achieved by activity analysis with multiple cost pools (activities) and cost drivers.

Different Stages in Activity-Based Costing:

There are different activities in ABC costing. The following are the important stages of Activity Based Costing:

- (1) Identify the different activities within the organization.
- (2) Relate the overhead cost to the activities.
- (3) Support activities are then spread across the primary activities.
- (4) Determine the activity cost drivers.
- (5) Calculate the activity cost drivers rate, i.e., the quantity of cost driver used by each product.

Objectives of the Study



1. To study the concept of activity based costing in construction projects.
2. Identifying the sources of activities using software base & compare with actual project on site.
3. To give the discussion and suggestion for effective activity based costing management for construction project.

Advantage of Using ABC

1. The expenses are analyzed with greater detail than the traditional methods where the expenses are only categorized as direct and indirect.
2. While traditional cost methods group the (Overhead Cost) in the general cost-centers such as those of Production, Administration, Disposal, Services and Research and then, distribute them to the products; Activity- Based Costing categories them according to the activities that consume them.
3. Activity-Based Costing analyses all the activities, providing information to the administration of those activities that contribute less, or, cost more than they should, letting the managers abolish some of them.
4. Detailed Activity and cost analysis present a great help for creating better budgets.

II. LITERATURE REVIEW

Abhishek C Ayachit. (2014), suggested that there are so many approaches have been used for repetitive construction projects towards optimizing time and cost. In his paper he has implemented a proposed theoretical model for effective utilization of Activity Based Costing to get optimum duration and cost. Generally critical path method is used for repetitive type of construction but in his paper he use activity based costing grant chart to find the duration of project. The goal of any construction project is to complete the project within the estimated time and with minimum cost. The delay in a construction projects affects both owner and contractor. The main goal of this study is to find out the optimum duration for the completion of project. The expected time for the completion of project is finding out by using the grant chart and by software. The outcomes of his paper shows that there still have rooms for construction process improvements with the application of Activity Based Costing.

Fayek A.R. (2000), suggested the linking of the job-costing model with activity-based costing. He conceived a schedule activity as an activity in ABC. He proposed that costing each schedule activity and job is activity-based costing. However, a schedule activity in construction differs from an activity in activity-based costing because each schedule activity is a task or service that a contractor or crew is supposed to provide, as opposed one of several process steps involved in its execution or production. The „activity“ in ABC refers to the production process. The „activity“ in „schedule activity“ refers to the product of production processes, but neglects the processes themselves. Therefore, assigning costs to schedule activities in construction projects is not equivalent to activity-based costing.

Yang Jianyun (2000), discussed about the lacking of effective information, the traditional cost management of construction project changes into cost calculation at present. Through comparison of activity-based cost management and traditional cost management, the paper proposes that using activity-based cost management and strict process system of traditional cost management can solve the actual problem of construction project. The paper provides an activity-based cost management application mode and concludes that the mode's key point is first-phase preparation

Yong-Woo and Glen Ballard. (2001), suggested that Activity-Based Costing (ABC) prevents cost distortions and provides a process view which traditional cost accounting cannot provide. Activity-Based Costing is based on a “flow view” in production theory in that ABC adopts two-staged costing, i.e., resources are assigned to activities and activities are assigned to cost objects. Lean construction comes from recognizing the limitations of current project management and applying “lean production” to the construction industry. This paper presents an application of ABC and an example of applying ABC to construction, exploring the relationship between activity-based costing and lean construction. It shows that lean project control can encompass cost control by adopting an activity-based costing system.

III. APPLICATION OF ACTIVITY BASED COSTING IN CONSTRUCTION BUILDING

At initial stage the project will be studied from Details drawings obtained from construction site. Planning of all the activities will be done and scheduling will be done depending upon the number of activities in Software. The data is collected from the apartment construction project. The data is based on the apartment building consisting of Ground and First Floor. The following data is collected from the construction site i.e various activities of the construction work, rate details of the resources involved in the apartment building, Quantity of work for each activity, expected skilled and unskilled labor required for completion project etc. Analyze the above collected information and prepare a result. In the analysis to minimize the overall project duration in the construction projects by activity based and spread sheet are used to prepare optimum scheduling for the effective utilization of the project on the basis of data collected from housing project. To outcome of this will be feasibility of the project before execution, during execution and after execution can be analyzed.

Steps Involved in ABC

1. Write a list of all resource and materials that go into performing each activity on a specific job. Example of resources for a construction project include: Materials such as tilting and timber, Fixtures such as sinks and toilets and Items such as nails and screws
2. Write down the cost for each resource. We consult the purchase receipts to determine the specific job or calculate an average cost based on purchase receipts for a specific job, or calculate an average cost based on purchase receipts for a specific period of time.
3. Choose a common, measurable unit of each resource and calculate the cost per unit. Example: if a box of nails holds 100 nails and costs Rs.100, the per-unit cost of nails would be Rs.2 if you consider one unit to be a single nails.
4. Write a list of the activities performed in the each job, and determine exactly how much of each resource is consumed by each activity. Multiply the per-unit cost of each material by the amount of each material by used in the job to determine the total cost of materials.
5. Add expenses for direct labour and overhead to determine the total job cost. Overhead consists of all rents, machinery payments, office salaries and other cost that do not directly contribute to completing a job.

Classification of Activities

In the first stage of the Activity-Based Costing activities are identified and classified into different categories or segments of the production process. The grouping of activities is preferably done using the different levels at which activities are performed. Broadly, activities are classified into:

- (1) **Unit Level Activities:** Unit Level Activities are those activities which are performed each time a single product or unit is produced. These activities are repetitive in nature. For example, direct labour hours, machine hours, powers etc. are the activities used for each time for producing a single unit. Direct materials and direct labour activities are also unit level activities, although they do not overhead costs. Cost of unit level activity vary with the number of units produced.
- (2) **Batch Level Activity:** These activities which are performed each time a batch of products or group of identical products are produced. All the units of a particular batch are uniform in nature and in size. The cost of batch level activities vary with the number of batches are ascertained. Machine setups, inspections, production scheduling, materials handling are examples of batch level activities which are related to batches.
- (3) **Product Level Activities:** These activities which are performed to support the production of each different type of product. Maintenance of equipment, engineering charges, testing routines, maintaining bills of materials etc. are the few examples of product level activities.
- (4) **Facility Level Activities:** Facility Level Activities are those which are needed to sustain a factory's general manufacturing process. These activities are common to a variety of products and are most difficult to link to product specific activities. Factory management, maintenance, security, plant depreciation are the few examples of facility level activities.

Table. 1: Allocation bases for traditional method and ABC

S.NO.	INDIRECT COST	ACTIVITY-BASED COSTING	TRADITIONAL
1	Production Control	No. of process Operations	Direct labour hours
2	Inspection	No. of inspections	Direct labour hours
3	Warehousing Stores	Receipts and issues	Direct labour hours
4	Purchasing	Purchase orders	Direct labour hours

Cost Driver of ABC

The cost driver is at the heart of activity-based costing. A cost driver in ABC is defined more specifically as an allocation base of costs to activities. The major distinction between traditional cost accounting and ABC is that ABC uses multiple cost drivers to assign activity costs to products or services. The final output of an activity-based costing is cost driver information. Understanding the causal relationship between an activity and its cost driver enables management to focus improvement efforts on those areas that will produce the best results. Because causal relationship can change according to situation, cost driver for an activity can change. Therefore it is required to check and update the activity data to make sure that appropriate cost drivers are being used.

IV. APPLICATION OF ACTIVITY BASED COSTING BY SOFTWARE

1. From the data collected from Construction site, the activities are allocated and as per the activity the planning will be done and executed on site.
 2. The site consist of an apartment Building of G+ FL
 3. The data is taken from site and planning is done in software and Grant Chart is prepared showing activities and their resources.
 4. Initially the data collected from site the activities are allocated and cost of each activity allocated as per data given by site engineer.
 5. The activities are placed in software (Microsoft Project Planning) and accordingly the duration is allotted along with the resources.
 6. From the activities placed in software the entire cost of project is calculated as per planning.
 7. The duration difference by actual planning & by traditional method is calculated and with that difference the cost is also worked out.
 8. From Microsoft Project Planning initially WBS (Work Break Down) structure is made and for each activity tentative days are allocated by knowing experience of the contractor.
 9. The estimate is prepared for each items that is included in construction work.
 10. The cost is allotted for each activity depending upon the quantity of work.
 11. The total quantity of work is calculated and then planning and scheduling is done for entire project.
- The allocation of materials is done on site for each activity and accordingly planning is done.

Result Analysis

Since in Activity Based Costing the cost are assigned to every cost pools of the construction work, the cost distortion can be prevented in the work and the wastage can be minimized. The work progression can be carried out properly according to the grant chart and the cost distribution of the each activity.

Conclusion

This paper is analyzed for the initial implementation of ABC technique for the construction Building. The initial procedures including the various activities in the apartment building are developed and the duration details are obtained from the Contractors with their experience. The various resources are included for each activity which includes the material, direct and indirect labours according to the actual consumption of the each activity. The schedule for ABC project is created by the Microsoft Project Software with the Grant chat. With the Scheduled grant chart the working process of the building can be kept in process and tracking of each activity can be made with the actual working progress. The pervious researches on ABC techniques shows that there is a vast space in the application of ABC in the construction projects. Hence the study related to ABC technique should be improved in the field of Construction Projects.

References

1. Abhishek C Ayachit., (2014), "Activity Based Costing In Construction Projects", International Journal of Advanced Engineering Research and Studies. Oct.-Dec 2014/09/14.
2. Athanasios Vazakidis, Ioannis Karagiannis and Anthi Tsiaila., (2010), "Activity-Based Costing in the Public Sector", Journal of Social Sciences 6 (3), pp 376-382.
3. Fayek, A. R., (2000). "An Activity-Based Data Acquisition and Job Costing Modeling", Proceedings of the Construction Congress IV: building together for a better tomorrow in an increasingly complex world, Walsh, K.D.(editor), ASCE, Orlando, FL, 30-35.
4. Maurice Gosselin., (2007), "A Review of Activity-Based Costing: Technique, Implementation, and Consequences", Handbook of Management Accounting Research, Edited by Christopher S. Chapman, Anthony G. Hopwood and Michael D. Shields.
5. Yang Jianyun., (2000), "Study on Application of ABCM to Construction Project", Proceedings of the 8th International Conference on Innovation & Management, pp 594-598.
6. Yong-Woo and Glen Ballard., (2001), "Activity-Based Costing and its Application to Lean Construction", Accepted for inclusion in the proceedings of the 9th annual conference of the Int'l. Group for Lean Construct ion, National University of Singapore, August, 2001. pp 1-13
7. P.Peariyasamy, "A Textbook of Financial Cost and Management Accounting", Himalaya Publishing House. pp 512-521.