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Time Driven Activity Based Costing (TDABC) Model for Cost Estimation of Assembly for a SSI

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ABSTRACT

Costing is an important issue in a competitive world. Many companies had adopted TDABC for better cost visibility. Assembly is very common activity in the small scale industries (SSI). In a SSI, many operations like riveting, drilling, fastening, loosening and tightening, hammering, labeling, aligning, etc. are carried out at the time of assembly. Also the sequence and the time of the operating vary for each product. Therefore, it is difficult to estimate the cost of complex assembly. This paper proposed a time driven activity based costing (TDABC) model to estimate the cost of assembly for SSI. TDABC uses time equations to estimate the time required for an activity. A new approach to develop the time equation using maynard operation sequence technique (MOST) is presented. This paper also presents the modification in the time equation to handle the complexity of the activity. The application of the model is presented with the case study. The cost analysis helps to identify the opportunities for low cost assembly solution.

KEYWORDS

Cost Estimation, Maynard Operation Sequence Technique, MOST, TDABC, Time Driven Activity Based Costing, Time Equation

INTRODUCTION

In this era of intense global competition on price and quality of products, there is a need for accurate cost information. The continual search for a better costing system ushered in the TDABC and has been used in most manufacturing organizations and found to be useful. TDABC requires only two parameters i.e. unit cost of supplying capacity and time required to perform an activity (Demeere, Stouthuysen, & Roodhooft, 2009). The time required to perform an activity is estimated using time equations.

An assembly is the most common activity in SSI. Assembly in the manufacturing process consists of putting together all the component parts and subassemblies of a given product. Assembly lines are common methods of assembling complex items in big industries. There it is easy to separate workstations and activities. But, for SSIs it is not possible to setup assembly line. In SSIs, the assembly includes many activities like fastening, performing inspections and functional tests, labeling, separating good assemblies from bad etc. Therefore it is difficult to formulate the time equation.

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Maynard operation sequence technique (MOST) is a work measurement technique. It is a predetermined motion time system that is used primarily in industrial settings to get the standard time in which a worker should perform a task (Mishra, Agnihotri, & Mahindru, 2014). Therefore, it is employed to analyze each activity to determine associated standard time.

The aim of this paper is to present a model to estimate the cost assembly activity using TDABC and the use MOST for formulating time equations. Initially, a theoretical background of TDABC and MOST is discussed. Then, model along with the case study is presented. Thereafter, the use of TDABC information in decision making is described. At the end concluding remarks are presented in the conclusion section.

THEORETICAL BACKGROUND

ABC was first designed for manufacturing processes (Wegmann, 2010). Using ABC can lead to classifying activities as value-added and non-value-added and allow for the elimination of the non-value-added activities (Gunasekaran & Sarhadi, 1998). Therefore, ABC is a cost accounting system from the perspective of operational process. According to Hilton (2005), "ABC is a two stage procedure used to assign overhead cost to products and services produces". In the first stage, costs are assigned to an activity based on a cost driver. In the second stage, costs are allocated from the activity to a product based on the product's consumption of the activities. Therefore, many authors (Merchant & Shields, 1993; Roztocki & Needy, 1999; Cohen, Venieris, & Kaimenaki, 2005) have said that ABC provides more accurately cost data and information about the origin of data. Kaplan (1998) claimed that, if ABC was not successful in an organization, it could simply be explained by poor management of the ABC project. But Kaplan & Anderson (2003) agreed that because of high implementation costs and employees were irritated many organizations were abandoning their ABC model. Many researches (Carli, Canavari, & Grandi, 2014; Herath, Wickramasinghe, & Indrani, 2010) found that ABC is more complicated and requires more efforts for implementation. Further Gosselin (2006) have given following reasons for failure of ABC:

- High implementation cost
- Information technology inadequacy
- Difficulties in linking cost drivers to individual products
- Amount of work involved in comparison to the benefits resulting from ABC
- Difficulty of collecting quantitative information on cost drivers

Therefore, ABC adoption rates as a percentage of organizations actually using ABC relative to all organizations have often been less than 30% (Askarany, Brierley, & Yazdifar, 2012). Hence, Kaplan & Anderson (2003) proposed TDABC in order to overcome the difficulties.

Time Driven Activity Based Costing (TDABC)

TDABC method was presented as a revolutionary method in the field of determined costs (Meddaoui & Bouami, 2014; En–nhaili, Meddaoui, & Bouami, 2015). A TDABC model can be estimated and installed quickly as estimates of only two parameters are required: (1) the unit cost of activity and (2) the time required to perform a transaction or an activity (Demeere, Stouthuysen, & Roodhooft, 2009). The cost of activity consumed by product = unit cost of activity x time required to perform an activity. The breakthrough of TDABC lies in the use of time equations to estimate the time spent on each activity (Everaert, Bruggeman, Sarens, Anderson, & Levant, 2008). Through the inclusion of multiple time drivers, the TDABC approach can capture the complexities of organizations. Hence, TDABC seemingly provides many opportunities to design cost models in environments with complex activities. The time required by the activity is obtained from the time equations. But, Chiarini (2014)