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ACTIVITY BASED COSTING: A WAY TO DRIVE SUPERIOR PERFORMANCE IN POLYURETHANE FOAM MANUFACTURING INDUSTRY

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ABSTRACT

During globalization and industrial revolution pricing of the product is one of the difficult decisions for the organization. Each organization focuses systematic allocation of overheads and also wants to determine true cost of the product. To achieve this object, many organizations shift their focus from traditional costing system to an increasingly popular Activity- Based Costing (ABC) system. The aim of this analytical study to observe the implementation of ABC model in manufacturing unit, which would like to increase the sales due to increased demand. This manufacturing unit, produces various products of Polyurethane (PU) foam. In this study it is observed that ABC costing system effectively reduces cost with increased volume or output of the product in a Polyurethane foam manufacturing unit. It also illustrates traditional costing system fails to calculate accurate cost in the production large volume of quantity and it also helps to eliminate the deficiency of the traditional costing system.

KEYWORDS: Activity – Based Costing, Polyurethane foam (PU Foam), traditional costing, activity centers, resources

INTRODUCTION

Due to mechanizations, manufacturing process has become more flexible, integrated and highly mechanized and it increases its productivity at reduced cost. It is difficult to select a proper and accurate product costing system for manufacturing units. Costing system is the basic root of the accounting system which assists to determine their cost which is related to the revenue of a product. Usually two costing models are used to determine the cost of product i.e. traditional costing and activity-based costing.

Traditional costing allocates manufacturing overhead based on the volume of a cost driver whereas ABC allocates cost of operations through the various activities needed to produce the product. ABC model is introduced to eliminate the shortages of the traditional costing.

LITERATURE REVIEW

Akyol D.E. et al.(2007) demonstrated that the application of ABC Model in manufacturing system would provide more accurate cost information for decision making and reflected the relationships between products and the resources.

Boris Popesko (2010) focused on necessary steps and methodology required of implementing an Activity-Based Costing system in manufacturing units. This article analyzed how ABC system applications in manufacturing industries in order together the data and information necessary to define application and allocation principles.

SHIL Nikhil Chandra (2012) analyzed that ABC costing system could assist in cost estimation and feasibility assessment in textiles and garments companies to improve the quality, timeliness, and efficiency of the activities they perform, and to understand accurately the cost of the individual department.

Guo Lingling presented the relation between the activity-based cost and cost driver, which is higher than that between the original cost and cost driver so activity-based cost was preferred in oil industry.

Kumar Nitin & Mahto Dalgobind (2013) applied an ABC Model for determining true costs and shown a comparative analysis of application of ABC method with traditional cost accounting (TCA) method in an automobile parts manufacturing company.

Dwivedi Rishi and Chakraborty Shankar (2016) elucidated the way in which ABC approach could assist in a department of an Indian steel plant in providing reliable , strategic information and meaningful cost information as well as helped in monitoring various activities of the department in order to take decisions by management. It also helped to formulate specific strategies for each type of material to minimize the associated costs.

ACTIVITY-BASED COSTING (ABC)

Activity – Based Costing would provide more strategic information than the traditional costing system in manufacturing units. ABC allocates costs to activities using multiple cost drivers. Cost drivers are often measures of the activities performed such as number of units produced, labor hours, set up time, number of orders received etc. It shows the relationships among various products and various

resources used in their manufacturing product. ABC can decompose activities into departmental level and further make it simple which helps in accurate measurement of cost accounting and control. This lays foundation of cost control and optimum profit in a competitive environment. ABC model provides a more accurate view of product cost. It provides a framework of decision making for economic analysis in manufacturing unit.

ABC IN POLYURETHANE FOAM (PU) MANUFACTURING UNIT: ANALYTICAL STUDY

Activity-based costing helps in tracing costs of products according to the activities performed by manufacturing unit. It focuses on manufacturing strategy, product design and better and improved operating activities. Volume-unrelated activities are common in many manufacturing settings, and include setups and re-engineering of the processes. In the presence of proper information, managers can control their spending, overheads, maintain quality, survive in competition, reduce burden on staff and enhance customer satisfaction.

The present paper focused on an analytical study to explain the role of ABC system in PU Foam manufacturing unit. This unit produced different densities of Polyurethane foams in various batches.

ABC model at PU Foam can be explained with the help of following figure

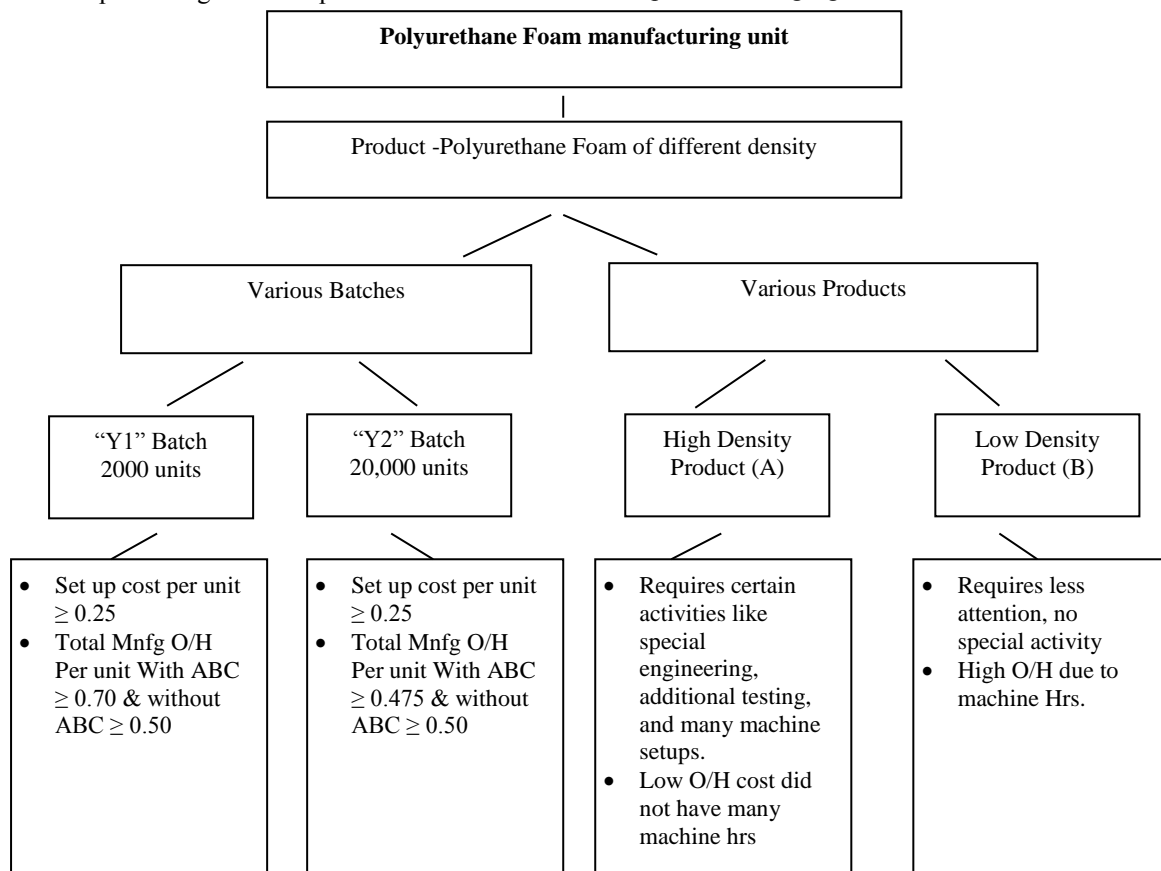


Fig 1 - ABC in Polyurethane Foam manufacturing unit

This study is based on two products, Product A and Product B of PU Foam.

Product A - is high density PU Foam, produced in low volume and requires certain activities such as special engineering, additional testing and many machine setups. Product B – is medium density PU Foam, produced in a high volume in a continuous flow process which requires less attention since it has no special activities. If product A absorbs their overhead on the basis of number of machine hours consumed as per traditional method. This will result very low overhead cost to the product A because it consumes very less machine hours. However, it requires lots of activities like re-engineering, various testing and machine setups. When product B absorbs high overhead cost (due to all those machine hours), but it requires less overhead activity. Thus traditional method will not be focused on true cost of each product in this situation.

Hence activity based costing will help to overcome this shortcoming by assigning overhead on more than one activity. It recognizes special engineering, special testing, machine setup, and other activities which are associated with manufacturing cost. In this case, product A belongs to high density product. It will be assigned

manufacturing overheads on the basis of special engineering, special testing, and machine setup. Product (B) belongs to low density product. It will be assigned only a small amount of machine setup instead of special engineering or special testing.

This paper demonstrates the concept of activity based costing by looking at two common manufacturing activities i.e. with setups of machine and without setups of machine. It has been assumed that a manufacturing unit has annual manufacturing overhead costs of Rs. 25,00,000 – of which Rs. 2,50,000 is directly involved in setting up the production machine. During the year the company expects to perform 500-machine setups. Let’s also assume that the batch sizes vary considerably, but the setup efforts for machine are similar.

If batch “Y1” consists of 2000 units of product, the set up cost per unit is 0.25(Rs 500 divided by 2000 units). If batch “Y2” is 20,000 units, the cost per unit for set up will be Rs 0.025(Rs 500 divided by 20000 units). For the study, let’s assume due to various production activities, manufacturing unit consumes Rs 22,50,000 as overhead which is directly associated with the 100,000 machine hours.

The allocation rates of manufacturing overhead are as shown below in table 1:

Table 1: Allocation rates of Manufacturing Overheads

| Particular | With ABC | Without ABC |
|---|-----------------|----------------|
| (A) Manufacturing overhead costs assigned to set ups | Rs 2,50,000 | Rs 0 |
| Number of setups | 500 | Not applicable |
| Manufacturing overhead costs per set up | Rs 500 | Rs 0 |
| (B) Total manufacturing overhead costs | Rs 25,00,000 | Rs 25,00,000 |
| Less: cost traced to machine set up (A) | 2,50,000 | 0 |
| Manufacturing overhead costs allocated on machine hours | Rs 22,50,000 | Rs 25,00,000 |
| Machine hours(MH) | 1,00,000 | 1,00,000 |
| Manufacturing overhead Costs per MH | RS 22.5 | Rs 25 |

If manufacturing unit produces a batch of 2000 units and it consumes 50 units per machine hours, the manufacturing overhead cost will be:

Table 2: Manufacturing Overhead cost with batch size 2000 units

| Particulars | With ABC | Without ABC |
|---|----------------|----------------|
| Manufacturing overhead for setting up machine | Rs 500 | Rs 0 |
| Number of units in batch | 2000 | Not applicable |
| Manufacturing overhead caused by Set up- Per unit (A) | Rs 0.25 | Not applicable |
| Manufacturing overhead costs per machine hour | Rs 22.5 | Rs 25 |
| Number of units produced per machine hour | 50 | 50 |
| Manufacturing overhead caused by Production - per unit (B) | Rs 0.45 | Rs 0.5 |
| Total manufacturing overhead allocated - per unit (A+B) | Rs 0.7 | Rs 0.5 |

When manufacturing unit produces a batch of 20,000 units and if it consumes 50 units per machine hours then the manufacturing overhead cost would be as follows:

Table 3: Manufacturing Overhead costs with batch size 20,000 units

| Particular | With ABC | Without ABC |
|--|-----------------|----------------|
| Manufacturing overhead for setting up machine | Rs 500 | Rs 0 |
| Number of units in batch | 20,000 | Not applicable |
| Manufacturing overhead caused by Set up- Per unit(A) | Rs 0.025 | Not applicable |
| Manufacturing overhead costs per machine hour | Rs 22.5 | Rs 25 |
| Number of units produced per machine hour | 50 | 50 |
| Manufacturing overhead caused by Production - per unit(B) | Rs 0.45 | Rs 0.5 |
| Total manufacturing overhead allocated- per unit (A+B) | Rs 0.475 | Rs 0.5 |

This study discloses that if we use Activity Based Costing model the cost per unit decreases from Rs 0.70 to Rs 0.475 because the cost of the set up activity is spread over 20,000 units instead of 2000 units, whereas after apply traditional method the cost per unit is Rs 0.50 regardless of the number of units in each batch.

Thus it is concluded that if manufacturing unit producing small quantity of production then it should use traditional method. While for large volume of quantity of production ABC model is better choice for overhead allocation.

CONCLUSION

ABC presents a roadmap to the complex operations of a manufacturing unit. The case example of a Polyurethane foam manufacturing unit described in this article has proved that ABC is a strategic weapon in the on-going quest for competitive position in manufacturing. ABC system is like a blueprint which guides managers to decide on which activities is adding value to the product and which activities should be eliminated to reduce wastage of limited resources & cost. The real cost determination in ABC system - plays an important role in strategic decision-making. In a nutshell, this system clearly indicates that it can help management to understand where the costs are, what drives them to occur, and which costs may be low value-added to the cost object.

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