

Analysis of Production Costs Using Activity Based Costing "ABC" Method in PT. Supratama Aneka Industri

Anang Winardi

Abstract - PT. Supratama Aneka Industri is a manufacturing company engaged in the plastic industry. The company uses traditional methods in calculating the cost of production. Traditional method calculations have a weakness in charging factory overhead costs, where overhead costs are charged equally to each product produced. Therefore it is necessary to analyze using the activity based costing method to provide more accurate production costs.

Purpose - Evaluating the production cost calculation system at PT. Supratama Aneka Industri to find out the distortion of the cost of production from traditional methods.

Design / Methodology / Approach – Case Study. The object used in the research was the system of calculating the cost of production of the company. Primary data in the form of interviews with the accounting, production, human resource and maintenance departments, carried out in the field, while secondary data in the form of financial statements of PT. Supratama Aneka Industri for the 2015 and 2016 periods. In this study data processing will mostly be done using Microsoft Excel applications and then analysed.

Results - This study shows that products A, B and D are overstated where the calculation of cost of production by the activity based costing method gives a smaller value than the traditional method. Whereas otherwise products C, E and F experience understated.

Keywords: activity based costing, distortion, overstated, understated.

1 INTRODUCTION

The plastic industry in Indonesia continues to grow. Based on Ministry of Industry data, from 2012 to 2015 the plastic industry has a growth trend of 5.78%. While the growth of plastic demand on average each year continues to increase by 7% (Chrisbiyanto, 2016). The number of plastic industries until the end of 2016 reached 925 companies with the production of various types of plastic, such as rigid packaging, soft packaging, and thermoforming and extrusion products. The total plastic production in 2016 was 4.68 million tons (Ministry of Industry, 2016).

One of the obstacles to the growth of the plastic industry in Indonesia is the source of raw materials, where our country still has to import polyethylene and polypropylene to meet domestic needs. The tighter competition in the plastics industry and raw material costs that cannot be reduced, makes company management must take into account the production costs appropriately because the purpose of calculating production costs will be used as a reference in determining product selling prices and other strategic decisions.

Some plastic-producing companies still use traditional cost systems, where the system has a deviation from the calculation of the cost of production with the actual cost of production. To avoid any deviation from these calculations, management must perform calculations with other methods that provide more accurate results compared to traditional methods. One of them is the method of "Activity Based Costing".

Activity Based Costing method can provide more accurate results compared to traditional cost calculation methods. This method imposes overhead not based on product volume, but

based on activities that trigger costs. The initial step is to identify all significant activities and allocate overhead costs for each activity in accordance with the proportion of resources used. The next step, identifying the cost driver that matches each activity and then allocating overhead for each product.

Research on the application of Activity Based Costing methods in determining the cost of goods manufactured has been carried out. However, the contribution of research in this case is the level of accuracy of overhead loading through the application of conventional methods compared to the Activity Based Costing method, as a reference in determining the calculation of cost of production.

Based on the problem of allocating these overhead costs, which will affect the accuracy of the calculation of the cost of production costs, this research will be conducted at PT. Supratama Aneka Industri. Where the company is engaged in manufacturing, especially the plastic industry. PT. Supratama Aneka Industri has 4 different types of production processes, namely thermoforming, injection, sheeting and blowing, with considerable product diversity.

By considering the condition of determining the dominant overhead costs and multiproducts, this study was conducted to compare the calculation of the cost of production with the Activity Based Costing method to obtain accuracy in determining the cost of production of each product line. In addition, after obtaining the cost of production from each method, an analysis of the company's gross profit from each method will be analyzed to determine the extent to which the gross profit from each method is used.

The purpose of this study is to find out how companies charge factory overhead costs that occur. More specifically, this research aims to evaluate the production cost calculation system at PT. Supratama Aneka Industri, knows the obstacles to applying the ABC method to PT. Supratama Aneka Industri, as well as knowing the factors that cause differences between traditional cost calculation methods and ABC methods.

This research will be conducted by taking financial data of PT. Supratama Aneka Industri in 2015 and 2016. In addition, it was conducted as well as interviews with the Head of Production to find out the production process at PT. Supratama Aneka Industri. After all the data needed is obtained, an analysis is carried out using the activity based costing method. From the results of the analysis, the cost of production will be obtained, then compared to the traditional method to determine the extent of the distortion that occurs and compare the gross profit of the two methods.

2 LITERATURE REVIEW

2.1 Traditional Cost Accounting (TCA)

Gunadi (2003) explains that traditional cost accounting (TCA) is a cost calculation system based on mass production of a stable machine / technology. This system also imposes factory overhead costs on products based on the production quantity of the product. This system is usually called a volume-based system. In this method, factory overhead is usually considered proportional to the number of units produced. This results in product cost information that contains a distortion quantity, because indirectly the costs are charged to the product using an imperfect basis and not proportional to the actual consumption of the product.

Martusa and Mariam (2012) explain that there are two factors that cause overhead costs to not occur properly, namely: charged overhead costs are not related to the unit and the level of product diversity.

2.2 Activity-Based Costing System (ABC)

Kumar and Mahto (2013) explained that activity-based costing (ABC) in general is a cost accounting system where costs are allocated to products based on the resources consumed by the product. Many resources consumed by each product are determined by the activities carried out in the process to produce the product until it reaches the customer's hands. This system first traces costs for activities and then to products and other cost objects. The underlying assumption is that activities consume resources, and products and other cost objects consume activity.

Hansen and Mowen (2006) state that in designing the ABC system, there are six important steps that must be done, namely: Identify, define, and classify key activities and attributes; Set the cost of resources for activities; Set costs of secondary activity to primary activity; Identify the cost object and determine the amount of each activity consumed by certain cost objects; Calculate the main activity level; Set the activity costs to the cost object.

2.3 Cost Driver

Horngren, Datar, and Rajan (2015) state that cost drivers are variables, such as activity levels or volumes, which causally af-

fect costs over a certain period of time. The cost driver of variable costs is the level of activity or volume whose changes cause proportional changes in variable costs.

Cokins (2010) explains that in terms of the level of indirect cost allocation, there are three types of cost drivers: the resource level, activity level and cost object level. Resource drivers measure consumption of work activities on resources (for example, salaries, inventory). Activity drivers are defined according to a particular unit, reflecting activities consumed by output. That is, the activity driver measures the consumption of cost objects at the cost of activity. Cost object drivers represent the number of combinations of other final cost object calculations (for example, customer costs consume a mixture and the volume of product costs purchased by each customer).

Cokins (2010) also explains that the most important advantages of applying contemporary cost driver concepts are as follows: Improve company performance; Increase awareness of employees and managers; Periodically review costs; Controlling costs with better calculations; Eliminating costs for activities that do not provide added value; Provide actual costs for total product costs.

3 METHODOLOGY

This study uses descriptive research methods. This method is a method of research conducted by collecting, providing and analyzing data of a company based on existing data or facts and examining the causes of an event that can occur (Umar, 2001).

The type of data used in this study are primary data and secondary data. Primary data in the form of interviews with the accounting, production, human resource and maintenance departments, carried out in the field. In addition, this data is also obtained from literature or reading references related to the same problem as the author's research. Secondary data in the form of financial statements of PT. Supratama Aneka Industri for the 2015 and 2016 periods.

The design of this study was carried out with a case study approach, which is a research technique that intensively examines one or several situations related to real problems faced by the company. Intended to study the background, environmental conditions and past data on the object of research (Wibisono, 2000).

The object used in the research is the system of calculating the cost of production of the company, which still uses conventional or traditional methods. Then compared to the new calculation system, namely Activity Based Costing.

In this study data processing will mostly be done using Microsoft Excel applications by using references from the literature for analysis of Activity Based Costing methods. After analyzing the results, they are presented again in table form so that they are easy to understand.

4 RESULTS

PT. Supratama Aneka Industri is a manufacturing company engaged in the plastic industry. This company was founded in 1991 with the name of PT. Poly excelled as holding company and in 1995 broke away from the holding company. PT. Supratama Aneka Industri has 2 marketing offices in Jakarta and Surabaya, and 2 factories located in Tangerang and Solo.

PT. Supratama Aneka Industri uses 5 types of thermoplastics as the main raw material to carry out its production. The types of thermoplastic materials used at PT. Supratama Aneka Industri, namely polyethylene (PE), polypropylene (PP), Polyethylene Terephthalate (PET), Polyvinyl Chloride (PVC), and Polystyrene (PS).

PT. Supratama Aneka Industri uses 6 processing processes in producing their various products. The production process used by PT. Supratama Aneka Industri, namely Extrusion Sheet, Injection Molding, Blow Molding, Thermoforming or Vacuum Forming, Printing and In Mold Labeling.

4.1 Calculation of Cost of Production with Traditional Methods

Management of PT. Supratama Aneka Industri uses traditional methods in calculating the cost of production of their products. Cost of production consists of direct raw material costs, direct labor costs and factory overhead costs. This method imposes factory overhead on all products produced. All factory overhead costs will be divided by the amount of production in 2016 to obtain factory overhead for each product.

TABLE 1

DIRECT LABOR COSTS OF PT. SUPRATAMA ANEKA INDUSTRI IN 2016

| Types of products | Number of Workers | Working hours | Proportion | Total Direct Labor Costs |
|-------------------|-------------------|---------------|------------|--------------------------|
| Thermoforming | 68 | 142,800 | 35.42% | 2,820,495,575 |
| Sheeting | 29 | 60,900 | 15.10% | 1,186,173,575 |
| Injection | 55 | 115,500 | 28.65% | 2,295,252,165 |
| Printing | 25 | 52,500 | 13.02% | 1,049,076,990 |
| Blowing | 8 | 16,800 | 4.17% | 347,104,200 |
| IML | 7 | 14,700 | 3.65% | 250,492,600 |
| Total | 192 | 403,200 | | 7,948,595,105 |

TABLE 2

Unit Production of PT. Supratama Aneka Industri in 2016

| Types of products | Total Production | Unit | Finished products | Raw Material |
|-------------------|------------------|------|-------------------|--------------|
| Thermoforming | 235,981,334 | Pcs | 116,131,734 | 119,849,600 |
| Sheeting | 280,360,221 | Pcs | 44,378,887 | 235,981,334 |
| Injection | 136,899,415 | Pcs | 133,878,655 | 3,020,760 |
| Printing | 102,125,480 | Pcs | 102,125,480 | - |
| Blowing | 2,769,200 | Pcs | 2,769,200 | - |
| IML | 21,738,800 | Pcs | 21,738,800 | - |
| Total | 779,874,450 | Pcs | 421,022,756 | 358,851,694 |

TABLE 3

Factory overhead costs of PT. Supratama Aneka Industri in 2016

| Biaya Overhead | Tangerang | Solo | Jumlah Biaya |
|--------------------------|----------------|---------------|----------------|
| Listrik, telepon dan air | 9,207,511,738 | 2,637,944,593 | 11,845,456,331 |
| Gaji dan tunjangan | 6,045,026,783 | 355,896,845 | 6,400,923,628 |
| Penyusutan | 3,597,317,658 | 950,675,517 | 4,547,993,175 |
| Pemeliharaan dan perbe | 4,000,535,795 | 424,541,546 | 4,425,077,341 |
| Sewa | 1,466,600,000 | 308,750,000 | 1,775,350,000 |
| Asuransi | 139,414,947 | 27,706,621 | 167,121,568 |
| Lain-lain | 1,854,685,691 | 72,869,892 | 1,927,555,583 |
| Total | 26,311,092,611 | 4,778,385,015 | 31,089,477,626 |

Factory overhead for each product unit is obtained from the distribution of all overhead costs in table 3 with the total production unit in table 2. Factory overhead costs for each product are Rp. 62.49. This fee will be charged to each type of product in calculating the cost of production.

PT. Supratama Aneka Industri has 6 main types of products sold to all consumers, these types of products are as follows:

Product A : Products from the sheeting process are directly sold to consumers.

Product B : Products from the thermoforming process, where the production process of this product is through the sheeting and thermoforming stages.

Product C : Product from the printing process, where the production process of this product is through the stages of sheeting, thermoforming and printing.

Product D : Products from the injection process are directly sold to consumers.

Product E : Product from the blowing process, where the production process of this product is through the injection and blowing stage.

Product F : Products from the IML process are directly sold to consumers.

Of all the data above, the cost of production can be calculated with traditional methods and the results can be seen in table 4.

TABLE 4

Calculation of Cost of Production by Traditional Methods (In Millions of Rupiah except COGS / unit)

| | Product A | Product B | Product C | Product D | Product E | Product F |
|----------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Raw Material | 4,152.07 | 10,865.24 | 11,213.09 | 12,525.64 | 282.62 | 2,033.87 |
| Direct Labor | 187.76 | 1,879.37 | 2,988.61 | 2,244.61 | 397.75 | 250.49 |
| FOH | | | | | | |
| 62.49 x 44.38 | 2,773.38 | | | | | |
| 62.49 x 116.13 | | 7,257.45 | | | | |
| 62.49 x 102.13 | | | 6,382.16 | | | |
| 62.49 x 133.88 | | | | 8,366.52 | | |
| 62.49 x 2.77 | | | | | 173.06 | |
| 62.49 x 21.74 | | | | | | 1,358.53 |
| Total COGS | 7,113.22 | 20,002.07 | 20,583.86 | 23,136.76 | 853.43 | 3,642.90 |
| COGS/unit | 160.28 | 172.24 | 201.55 | 172.82 | 308.19 | 167.58 |

4.2 Calculation of Cost of Production with Activity Based Costing Method

In calculating the cost of production using the activity based costing method, there are 3 main steps that need to be done, namely:

1. Identify the main activities and resources used.

There are 6 activities that are determined to be the main activities where the activity is a trigger for the emergence of overhead costs. The main activities are 6 types of production processes, namely Extrusion Sheet, Injection Molding, Blow Molding, Thermoforming or Vacuum Forming, Printing and In Mold Labeling. While the resources consumed by the main activities can be seen in table 5.

2. Charges all overhead costs for each activity.

The next step after all the main production activities and overhead costs have been identified and classified is to impose factory overhead costs into 6 main activities based on a predetermined cost driver. This aims to find out the resources consumed by each activity. The allocation of factory overhead costs for each activity can be seen in table 6. But there are overhead costs that cannot be

TABLE 5
Overhead Classification of PT. Supratama Aneka Industri

| No | Cost Type | Cost Driver | Amount of Costs |
|-------|----------------------------------|-----------------------|-----------------|
| 1 | Indirect labor | Indirect labor hours | 6,045,026,783 |
| 2 | Electricity, telephone and water | Amount of Kwh | 9,207,511,738 |
| 3 | Depreciation | Number of machines | 3,597,317,658 |
| 4 | Insurance | Purchase price | 139,414,947 |
| 5 | Maintenance and repair | Number of machines | 4,000,535,795 |
| 6 | Building Rent | Machine working hours | 1,466,600,000 |
| 7 | Etc | Area | 1,854,685,691 |
| | | - | |
| Total | | | 26,311,092,611 |

charged directly to the production process, namely other costs and warehouse costs. Because it cannot be allocated, these costs will be deducted as other factory overhead costs.

TABLE 6
Total Factory Overhead Allocation (In Millions of Rupiah)

| Resources | THERMO | SHEETING | INJECTION | PRINTING | BLOWING | IML |
|----------------------------------|-----------------|-----------------|-----------------|-----------------|---------------|-----------------|
| Indirect Labor | 902.77 | 1,176.46 | 757.12 | 393.32 | 247.26 | 275.15 |
| Electricity, telephone and water | 4,255.11 | 2,250.26 | 1,236.43 | 308.81 | 328.40 | 828.51 |
| Depreciation | 399.06 | 328.50 | 570.47 | 853.10 | 133.31 | 1,312.88 |
| Insurance | 30.80 | 24.14 | 23.21 | 38.76 | 4.31 | 18.20 |
| Maintenance and repair | 954.27 | 1,630.84 | 1,563.03 | 1,038.34 | 115.58 | 53.38 |
| Building Rent | 340.54 | 683.00 | 220.13 | 139.92 | 64.82 | 18.19 |
| Total | 6,882.56 | 6,093.21 | 4,370.39 | 2,772.25 | 893.68 | 2,506.31 |

TABLE 7
Overhead Rate and Overhead per Unit

| Activities | Factory Overhead | Total Production Unit | Production Time / Unit (minutes) | Actual Machine Working Hours (minutes) | Overhead Rate (ABC) | Overhead per Unit |
|---------------|------------------|-----------------------|----------------------------------|--|---------------------|-------------------|
| THERMOFORMING | 6,882,555,942 | 235,981,334 | 0.0040705 | 960,568 | 7,165.09 | 29.17 |
| SHEETING | 6,093,207,134 | 280,360,221 | 0.0058553 | 1,641,600 | 3,711.75 | 21.73 |
| INJECTION | 4,370,386,307 | 136,899,415 | 0.0114927 | 1,573,344 | 2,777.77 | 31.92 |
| PRINTING | 2,772,248,446 | 102,125,480 | 0.0102344 | 1,045,189 | 2,652.39 | 27.15 |
| BLOWING | 893,678,224 | 2,769,200 | 0.0420142 | 116,346 | 7,681.23 | 322.72 |
| IML | 2,506,309,470 | 21,738,800 | 0.0024717 | 53,731 | 46,645.69 | 115.29 |
| Total | 23,518,385,523 | 779,874,450 | | 5,390,778 | | |

3. Charges activity costs to cost objects.

Factory overhead costs that have been charged to each production activity, will then be borne by the cost object to find out the factory overhead costs of each product. The first thing to do is to look for an overhead rate per minute by dividing the total factory overhead for each activity with the engine working hours for each activity. And unit overhead costs are obtained by multiplying the time needed to produce one unit of product with an overhead rate. The

calculation results can be seen in table 7.

TABLE 8
Calculation of Cost of Production by Activity Based Costing Method (In Millions of Rupiah except COGS / unit)

| | Produk A | Produk B | Produk C | Produk D | Produk E | Produk F |
|------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Raw Material | 4,152.07 | 10,865.24 | 11,213.09 | 12,525.64 | 282.62 | 2,033.87 |
| Direct Labor | 187.76 | 1,879.37 | 2,988.61 | 2,244.61 | 397.75 | 250.49 |
| FOH | | | | | | |
| Sheeting | 964.52 | 2,523.98 | 2,604.78 | | | |
| Thermoforming | | 3,387.09 | 3,495.53 | | | |
| Printing | | | 2,772.27 | | | |
| Injection | | | | 4,273.79 | 96.43 | |
| Blowing | | | | | 893.68 | |
| IML | | | | | | 2,506.31 |
| Total COGS | 5,304.35 | 18,655.68 | 23,074.28 | 19,044.04 | 1,670.48 | 4,790.68 |
| COGS/unit | 119.52 | 160.64 | 225.94 | 142.25 | 603.24 | 220.37 |

After obtaining factory overhead costs for each activity, calculation of production costs can be carried out for each product by adding up the cost of raw materials, direct labor costs and factory overhead costs. The calculation results can be seen in table 8.

4.3 Comparison of Cost of Production of Traditional Methods and Activity Based Costing Method

From the calculation of the cost of production using the traditional method and the activity based costing method that has been carried out, we can compare the two calculations to show the extent to which the distortion generated from the calculation uses the traditional method.

TABLE 9
Comparison of The Cost of Production of Traditional Methods and ABC Methods

| Types of Products | Traditional Methods (Rp) | ABC Methods (Rp) | Distortion (Rp) | Percentage Distortion | Total Distortion (Rp) |
|-------------------|--------------------------|------------------|-----------------|-----------------------|-----------------------|
| Product A | 160.28 | 119.52 | 40.76 | 25.43% | 1,808,862,622 |
| Product B | 172.24 | 160.64 | 11.59 | 6.73% | 1,346,384,627 |
| Product C | 201.55 | 225.94 | (24.39) | -12.10% | (2,490,424,694) |
| Product D | 172.82 | 142.25 | 30.57 | 17.69% | 4,092,724,513 |
| Product E | 308.19 | 603.24 | (295.05) | -95.74% | (817,053,884) |
| Product F | 167.58 | 220.37 | (52.80) | -31.51% | (1,147,786,094) |

TABLE 10
Comparison of Factory Overhead of Traditional Methods and ABC Methods

| Types of Products | Traditional Methods (Rp) | ABC Methods (Rp) | Distortion (Rp) |
|-------------------|--------------------------|------------------|-----------------|
| Product A | 62.49 | 21.73 | 40.76 |
| Product B | 62.49 | 50.90 | 11.59 |
| Product C | 62.49 | 86.88 | (24.39) |
| Product D | 62.49 | 31.92 | 30.57 |
| Product E | 62.49 | 357.54 | (295.05) |
| Product F | 62.49 | 115.29 | (52.80) |

From table 9 it can be seen that there is a considerable distortion for each type of product. Where products A, B and D are overstated and products C, E and F are understated. Product D is the product that has the largest total overstated, which is Rp

4,092,724,513. Where this shows that product D provides cross subsidies to other products to finance the production process. While product C is the largest total understated product, which is Rp 2,490,424,694. Where this shows that product C receives cross subsidies from other products to carry out the production process.

It can be seen that the traditional method provides different cost of production compared to the ABC method. The basic thing that causes this difference is the allocation of factory overhead to the ABC method, where this method provides different overhead loads for each product, while the traditional method provides the same overhead for each product. Allocation of factory overhead can be seen in table 10.

4.4 Comparison of Gross Profit of Traditional Methods and Activity Based Costing Method

After obtaining the cost of production for all products from the traditional method and the activity based costing method, it can be calculated the gross profit of each method by knowing the margin target of each product. Management provides different margin targets for each product. Where the margin target for product A is 15%, product B is 15%, product C is 39%, product D is 15%, product E 30% and product F 30%.

TABLE 11
Comparison of Gross Profit of Traditional Methods and ABC Methods (In millions of rupiah unless stated)

| Production Unit | Product A | Product B | Product C | Product D | Product E | Product F |
|---------------------|-----------|-----------|------------------|-----------|-----------|-----------|
| (million units) | 44.38 | 116.13 | 102.13 | 133.88 | 2.77 | 21.74 |
| COGS/unit (Rupiah) | | | | | | |
| Traditional Methods | 160.28 | 172.24 | 201.55 | 172.82 | 308.19 | 167.58 |
| ABC Methods | 119.52 | 160.64 | 225.94 | 142.25 | 603.24 | 220.37 |
| Profit Margin on | | | | | | |
| COGS | 15% | 15% | 39% | 15% | 30% | 30% |
| Gross Profit Before | | | | | | |
| Other Overheads | | | | | | |
| Traditional Methods | 1,066.98 | 3,000.31 | 8,067.36 | 3,470.51 | 256.03 | 1,092.87 |
| ABC Methods | 795.65 | 2,798.35 | 9,043.42 | 2,856.61 | 501.14 | 1,437.20 |
| Other Overhead | | | | | | |
| Traditional Methods | | | 0 | | | |
| ABC Methods | | | 2,792.71 | | | |
| Gross Profit | | | | | | |
| Traditional Methods | | | 16,954.06 | | | |
| ABC Methods | | | 14,639.68 | | | |

Can be seen in table 11, the calculation of gross profit with the activity based costing method produces gross profit before other overhead is greater than the traditional method. Whereas for final gross profit, the activity based costing method produces gross profit smaller than traditional methods. This is because for the calculation of the activity based costing method there are factory overhead costs that cannot be traced so that they cannot be charged to the cost of production of each product and are used as deductions at the end.

5 CONCLUSION

1. PT. Supratama Aneka Industri is still using traditional methods to calculate the cost of production of each product. Where the overhead costs charged to each product have the same value. This causes considerable distortion for each type of product. From the calculation of the activity based costing method, it was found that products A, B

and D were overstated where the calculation of the cost of production by the activity based costing method gave a smaller value than the traditional method. Whereas other-wise products C, E and F experience understated.

- Based on the profit margin data, the gross profit calculation for the traditional method and the activity based costing method is calculated. The calculation of gross profit before the reduction of other overhead traditional methods is smaller than the activity based costing method, but the final gross profit of the traditional method is greater than the activity based costing method. This is because there are other costs that cannot be charged to activities because these costs cannot be traced.
- There are several obstacles to implementing the calculation of the cost of production using the activity based costing method at PT. Supratama Aneka Industri, such as too much product diversity, requires more time to do calculations, there are some costs that are difficult to trace in detail.

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