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Using Activity Based Costing Method to Development Accounting System in Tinplate Packaging Manufacturer in Indonesia

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Abstract: The purpose of this research is to analyze and evaluate the calculation of production cost in tinplate packaging manufacturing company in Indonesia then design the new calculation using Activity Based Costing (ABC) in order to produce more accurate calculation. The accounting information systems that support the ABC Method is designed to support the business processes, so that the need of reports and documents can be met. The method used in designing is Object Oriented Analysis and Design (OOAD) which refer to the modeling and design requirements discipline based on the Satzinger theory. While the design of application systems used Visual Basic. ET and Microsoft SQL server. Analysis of business processes carried out based on accounting information systems for production process theory. The result is desktop-based application that supports documenting the transaction data and generating reports needed by the company. It can be concluded that the ABC Method produce the more precise and detailed assessment of overhead, so the production cost is more accurate as well as the existence of accounting information system that support the method can guarantee the availability of information with more timely and accurate.

Key words: System, accounting information system, production process, activity based costing, OOAD

INTRODUCTION

Indonesian economy is undergoing a fundamental transformation. The transformation was triggered by the issue of the ASEAN free trade area in 2015 is which is making the markets between countries are open alias-free, so it will form a tighter competitiveness not only between organizations in the country but competition is also taking place between organizations abroad. In order to increase competitive advantage, every organization will continue to improve various important factors related to the sustainability of its business, one of them is information technology. It is also disclosed by Moorthy *et al*. (2012) that "IT made the future of any organization to Compete in the global economy and IT provides the competitive advantage to reach customers anywhere in the globe".

Information technology which has been growing very rapidly, pushing the organization to engage and apply it to supports the activities of the organization include the decision-making activities. Information technology is considered as one of the things that support the organization in improving the effectiveness and efficiency. Improvement, change and innovation is the key important application of information technology in organizations. As stated by Rosli and Sidek (2013) that "In theory, it can not be denied that the innovation would Enhance firm performance. Practically, those who did experience better innovation performance. This is good for firms under the present competitive environment".

Similarly, perceived by the organization or company engaged in manufacturing. The presence of technology in manufacturing industry is needed to support the operational performance of production and performance management in making a decision related to the sustainability of the company. The number of Indonesian manufacturing industry is quite a lot. Manufacturing companies that produce products such as packaging, especially packaging made of tinplate is also experiencing very high volatility of competition. Competition is demanding an improvement, change and innovation, among others by utilizing the latest technology in order to increase the volume of production and benefit from it. But besides that the company also recommended to do an efficiency way recording and calculating the cost of production. Most manufacturing companies implement the calculation of production costs by using the traditional system where the cost of production is only affected by the volume of production.

Companies that perform calculation traditionally have special characteristics, the basis for allocating overhead costs is the unit produced, so that the traditional system is also called the system based on the unit (the unit cost system). This calculation resulted in the selling price can be set higher or lower than it should be. As the result, the

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traditional method is not an accurate calculation. All manufacturing companies want a method that is really represented costs of each product that reflects the cost of the resources used to manufacture the product. Carter (2009) Activity Based Costing (ABC) is defined as a method of cost calculation in which the overhead pooled of >1 allocated using a base that includes one or more factors that are not associated with the volume (non-volume-related factors).

MATERIALS AND METHODS

By changing the method from traditional to activity based costing, the cost of product can be more effectively and efficiently, the overhead is charged not only based on the volume of production but also charged with other considerations that contributed, so overhead costs can be allocated appropriately. As well as stated by Chea (2011) that "ABC can be used as a tool for determining the true costs and help firms make better decisions based on more accurate costing information. ABC can assign activity costs to service or customer that consumes resources in order to measure profitability and provide cost-effective and timely information better than traditional accounting system. ABC enables managers to better understand profitability. Making decisions related to profitability without isolating the factors accounting for profits is like playing poke without looking at one's cards".

Therefore, we recommend tinplate packaging manufacturer in Indonesia to implements cost calculations using activity based costing in order to sell products at an accurate prices and could compete in the market competition. Implementing the calculation of production costs using activity based costing must also be balanced with the existence of a system to support the process of recording and making the report.

In this research, writer found several problems that occurred in the company in terms of their costing method and information system.

The inaccuracies in the calculation of the cost of production of each product. In calculating, the cost of production, the company uses traditional methods where only the overhead costs charged by the single factors which is production volume. This led to the production costs are not calculated apccurately.

RESULTS AND DISCUSSION

Activity based costing: Allocation of overhead costs by using traditional method can leads into a distortion of costs due to the use of single cost driver, i.e., the volume of production. While the method of Activity Based Costing (ABC) allocates overhead costs to look at and considering the other cost driving factors such as machine hours, direct labor hours and factory area. In Activity Based Costing (ABC) the calculation is based on activities seen on any process that causes, so that the allocation of overhead costs will be more accurate. This can leads to better decision-making, especially decisions in the sale price. The costs incurred in the company obtained after direct observation of the production activities and presented in the report production activities undertaken by the company for the entire type of product produced. Report production activities are presented in Table 1.

Implementation of Activity Based Costing system (ABC) in the company will be done step by step in accordance with the steps described by Garrison *et al.* (2003):

- Defining activities, activity cost pool and level of activity shown Table 2
- Charge to cost pool cost (cost pool) activity Table 3
- Calculating activity rates shown in Table 4
- Imposing overhead costs to cost objects using rates shown in Table 5
- Preparing management reports shown in Fig. 1

Cost pool 1:						
Overhead related with machine hours						
Rp	272,910.59	x	64,800	hours	Rp	17,684,606,480.84
Cost pool 2:						
Overhead related with direct labor hours						
Rp	767.10	x	62,520	hours	Rp	47,958,959.81
Cost pool 3:						
Overhead related with production volume						
Rp	628.05	x	73,728,000	unit	Rp	46,305,183,307.18
Cost pool 4:						
Overhead related with numbers of product						
Rp	772.20	x	1	product	Rp	772.20
Cost pool 5:						
Overhead related with factory area						
Rp	28,127.58	x	7,218	m2	Rp	203,024,841.92
Total Overhead for Product A					Rp	**64,240,774,361.95**

Fig. 1: Overhead cost product A

Table 1: Production activity report

Keterangan	Product A	Product B	Product C	Product D	Product E	Product F	Product G	Product H
Volume produksi (unit)	73,728,000	65,617,920	59,996,160	48,107,520	48,545,280	28,224,000	23,328,000	17,100,000
Jam mesin	64,800	57,672	52,731	42,282	42,066	24,306	26,503	21,029
Jam tenaga kerja langsung	62,520	55,643	50,876	40,794	41,265	24,033	24,782	19,500
Laus pabrik (m^2)	7,218	7,218	7,218	7,218	7,218	7,218	7,218	7,218

Accounting information system: Analysis and designing process resulting some design of accounting information system that described with UML as a tool to explained it. A use case diagram at its simplest is a representation of a user's interaction with the system and depicting the specifications of a use case. A use case diagram can portray the different types of users of a system and the various ways that they interact with the system (Fig. 2).

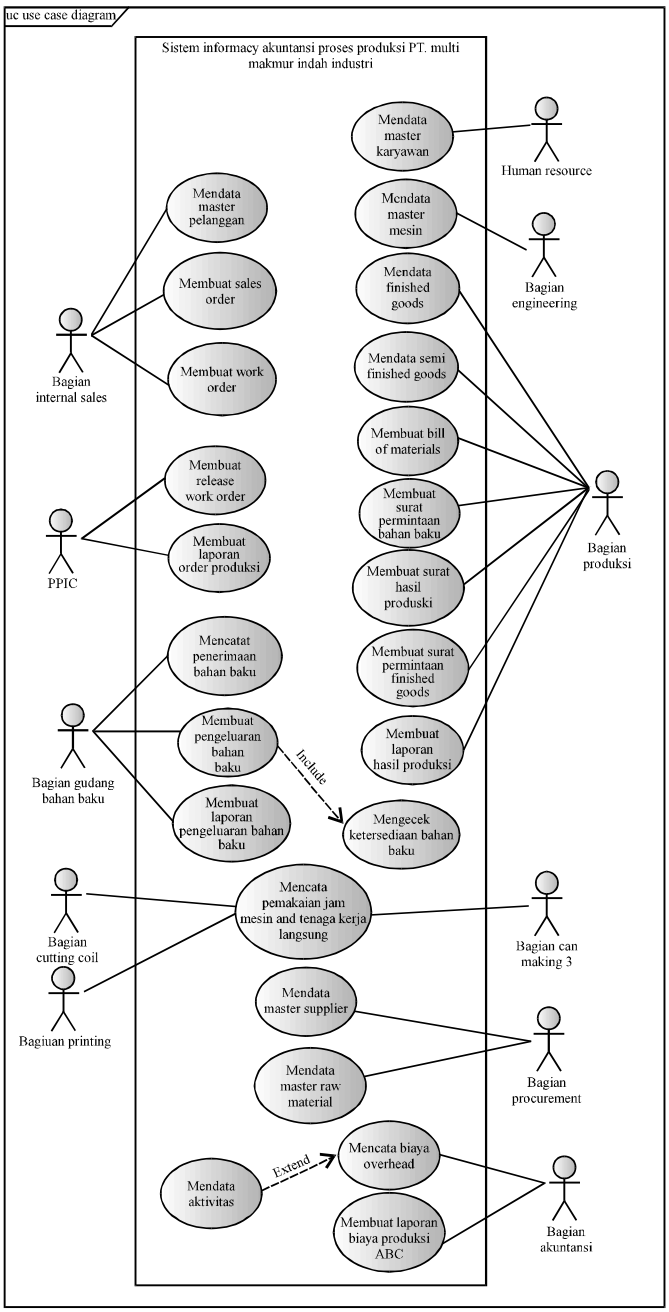

Fig. 2: Use case diagram

Table 2: Activity cost pool

Activities	Activity level	Cost driver
Cost pool 1		
Machine depreciation activity	Unit	Machine hours
Gas consumption activity	Unit	Machine hours

Table 2: Continue

Activities	Activity level	Cost driver
Machine maintenance activity	Unit	Machine hours
Power consumption activity	Unit	Machine hour
Cutting coil activity	Unit	Machine hours
Slitting activity	Unit	Machine hours
BONFI test activity	Unit	Machine hours
Water test activity	Unit	Machine hours
Machine setting activity	Batch	Machine hours
Cost pool 2		
Inspection/QC tinplate sheet activity	Unit	Direct labor hours
Inspection/QC printed sheet activity	Unit	Direct labor hours
Inpection/QC body activity	Unit	Direct labor hours
Inspection/QC aerosol activity	Unit	Direct labor hours
RM warehouse security activity	Facility	Direct labor hours
FG warehouse security activity	Facility	Direct labor hours
Cost pool 3		
Coating activity	Unit	Production volume
Printing activity	Unit	Production volume
Press (lateks) activity	Unit	Production volume
Welding activity	Unit	Production volume
Packaging activity	Unit	Production volume
Cost pool 4		
Proof activity	Product	No. of product
Cost pool 5		
Factory maintenance activity	Facility	Factory area

Table 3: Cost pool charged

Activities	(In rupiah)
Cost pool 1 (Overhead related with machine hours)	
Machine depreciation activity	358,518,335.68
Gas consumption activity	65,421,659,858.15
Machine maintenance activity	86,160,480.00
Power consumption activity	769,336,548.13
Cutting coil activity	11,424,647,739.73
Slitting activity	4,569,859,095.89
Seamer activity	6,093,145,461.19
BONFI test activity	1,523,286,365.30
Water test activity	190,410,795.66
Machine setting activity	2,544,102.34
Total cost pool 1	90,439,568,782.08
Cost pool 2 (Overhead related with direct labor hours)	
Inspection/QC tinplate sheet activity	28,301,351.38
Inspection/QC printed sheet activity	53,064,503.18
Inspection/QC body activity	67,211,004.71
Inspection/QC aerosol activity	45,984,177.70
RM warehouse security activity	25,230,000.00
FG warehouse security activity	25,230,000.00
Total cost pool 2	245,021,036.96
Cost pool 3 (Overhead related with production volume)	
Coating activity	161,206,279,821.42
Printed activity	4,068,142,807.09
Press (lateks) activity	4,577,162,092.70
Welding activity	59,162,962,260.80
Packaging activity	3,473,590.79
Total cost pool 3	229,018,020,572.80
Cost pool 4 (overhead related with No. of product)	
Proof activity	6,177.59
Total cost pool 4	6,177.59
Cost pool 5 (Overhead related with factory area)	
Factory maintenance activity	203,024,841.92
Total cost pool 5	203,024,841.92

Table 4: Activity rates

Cost pool	In rupiah
Cost pool 1	
Total cost pool 1	90,439,568,782.08
Machine hours	331,389
Overhead rate for cost pool 1	272.910.59
Cost pool 2	
Total cost pool 2	245,021,036.96
Direct labor hours	319,413
Overhead rate for cost pool 2	767.10
Cost pool 3	
Total cost pool 3	229,018,020,572.80
Production volume (units)	364,646,880
Overhead rate for cost pool 3	628.05
Cost pool 4	
Total cost pool 4	6,177.59
No. of product (units)	8
Cost pool 5	
Total cost pool 5	203,024,841.92
Factory area	7,218 m^2
Overhead rate for cost pool 5	28,127.58

Table 5: Management report product A

Description	Product A
Direct material (Rp)	41,120,013,680.64
Direct labor (Rp)	7,173,284,659.20
Factory overhead (Rp)	62,240,774,361.95
Total production cost (Rp)	112,534,072,701.79
Production volume (unit)	73,728,000
Production cost per unit (Rp)	1,526.34

The user interface is one of the most important parts of any program because it determines how easily you can make the program do what you want. An interface is a set of commands or menus through which a user communicates with a program.

The goal of user interface design is to make the user's interaction as simple and efficient as possible in terms of accomplishing user goals (Fig. 3-6).

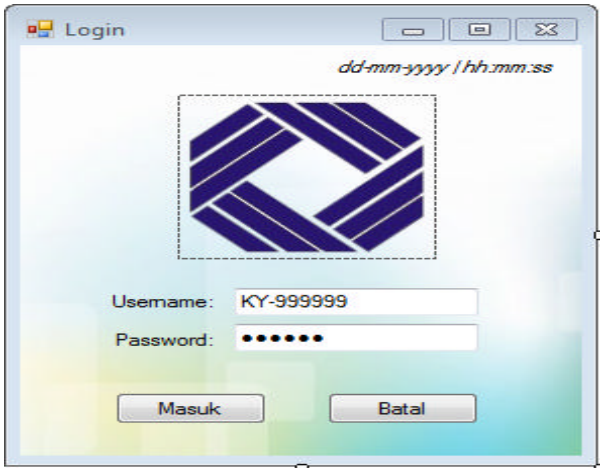

Fig. 3: User interface login

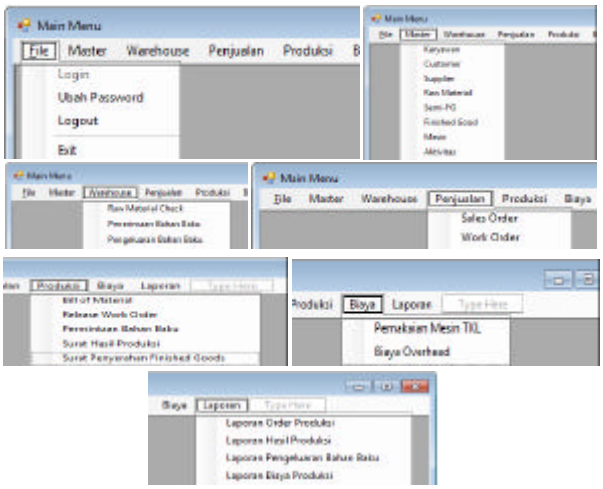

Fig. 4: User interface main menu

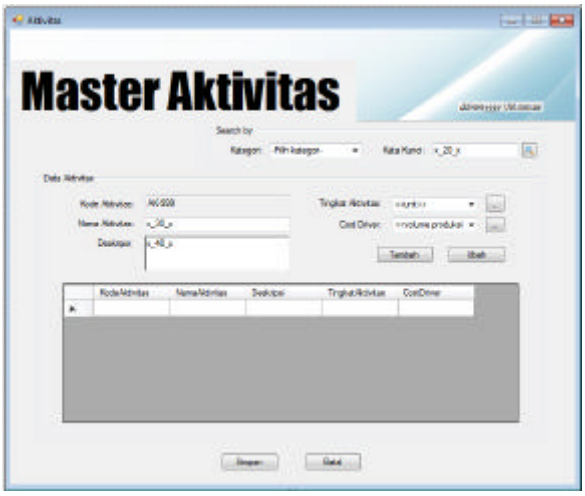

Fig. 5: User interface activity form

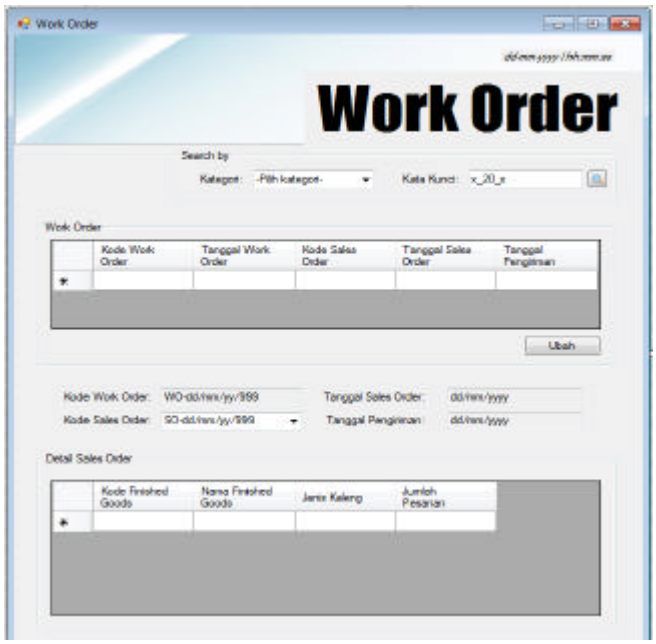

Fig. 6: User interface work order

CONCLUSION

After the analysis and design of accounting information systems over the production process using activity based costing in Indonesia's tinplate packaging manufacturer, it can be concluded as follows.

Activity Based Costing (ABC) would produce different calculation of production costs which compared to traditional method. The difference could be higher or lower, it based on the cost of each product.

Implementing the calculation of the cost of production with Activity Based Costing (ABC) requires the existence of an accounting information system that supports the method. The company requires a computerized and integrated accounting information system that can perform data processing related activities and their production costs incurred as a result to produce an information reflected on a production cost report by the method of activity based costing where the report can help the company management in better decision-making process.

With regard to the management of raw materials in and out of the warehouse, company currently has procedures and controls. It was very often found problems regarding the availability of raw materials, such as not knowing exactly how the quantity of raw materials as well as entry and exit transactions of raw materials on the other hand information about the availability of raw materials are needed by the company. This can be supported by the making of the documents or evidence which records the raw materials in and out. At the end of the period, raw materials report should be made. This is also about internal control where the head of raw materials warehouse will be able to evaluate the activities of the expenditure of raw materials from the warehouse during a specified period. Report and the letter can also be used as supporting documentation in conducting physical checks or the audit process.

RECOMMENDATIONS

In calculating the cost of production, the company should be using Activity Based Costing (ABC) where the overhead costs will be allocated according to each activity, so that the cost resulting in more accurate and reflect actual costs. When compared with traditional cost accounting, ABC represents the implementation of a more comprehensive cost tracking and detailed.

The lack of a system that supports cost accounting records, especially on the cost of production by using Activity Based Costing (ABC). Therefore, at this time the company is not using Activity Based Costing (ABC) in calculating the production cost, the availability of systems that support it is not exist. Meanwhile, the successful implementation of the ABC Method will be greatly assisted by the system which has a function that can cover it.

IMPLEMENTATIONS

There needs to be an accounting information system that supports the implementation of production process activity based costing.

There is a problem that the records of the quantities of raw materials in the warehouse at this time are not reliable.

At the current procedure, the activities of raw material in and out do not have good enough control. The Company does not emphasize on recording the in and out of raw materials and its report, on the other hand, it is important for a company to find out exactly how the raw materials held. In and out reports of raw materials that exist today are made manually by using Microsoft Office 2007, where data integrity is not really good.

There needs to be an accounting information system of the production process which has the function of recording transactions on the in and out of raw materials and its report, so that the quantity of raw material can be precisely known and more than justified.

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