

The improvement of the quality management by the activity-based costing

J. Michalska^{*}, D. Szewieczek

Division of Materials Processing Technology, Management and Computer Techniques in Materials Science, Institute of Engineering Materials and Biomaterials, Silesian University of Technology, ul. Konarskiego 18a, 44-100 Gliwice, Poland

^{*} Corresponding author: E-mail address: joanna.michalska@polsl.pl

Received 30.10.2006; accepted in revised form 15.11.2006

Industrial management and organisation

ABSTRACT

Purpose: The aim of this paper is showing the activity-based costing. In this paper it was introduced the new method of analysing the costs.

Design/methodology/approach: In the frames of own research it has been analysed the costs in the production process by using the method of the activity-based costing.

Findings: On the basis of the own research it can be stated, that realization of activity-based costing permits on very detailed acquaintance with costs of undertaken activities in a company.

Research limitations/implications: Method of activity-based costing permits on more efficient monitoring of costs which are carried by a company on producing a product and on the quality management system, than the traditional methods of costs' analysis.

Practical implications: Own research clearly showed, that very essential is breaking activities' costs as detailed as possible. Essential thing is to divide activities first on more general, and then on more and more detailed.

Originality/value: Activity-based costing permits to eliminate these places in organization where carried costs are useless or do not give the desirable effect. This method can be used in all companies. Activity-based costing can be used with success to carry on the quality costs' account.

Keywords: Quality management; Costs; Activity-based costing

1. Introduction

At present, in every company the most important criterion of activity's estimation is profit, it means the relation of costs, which the company carried to produce the goods or to execute the services to the price, which was obtained for offered goods or services [1]. So more and more attention is taken to the most precise calculations of costs in every branch of a company, and also quality costs. Thanks to correct recognition and naming of costs it is carried out the detailed analyze of a company, which makes possible taking the wide range of the improvement and preventive activities. This analyze permits to detect in the enterprise the places, where are carried the costs, which don't have the influence on the effectiveness and the quality of the whole enterprise. It also makes possible the identification of

places where the enlargement of outlays can significantly raise the effectiveness. Managements of the enterprises more and more often and effectively use the cost improvement and monitoring of their own quality management systems. One from such methods, which permits on qualification of costs in a company, and then their analyzing is the activity-based costing [1,2].

2. Activity-based costing

Activity-based costing is not a popular method of costs' calculation in Poland yet. Up to now, a large part of firms only use the traditional costs' systems e.g. generic system, as demand the obligatory reporting. Companies create additional accounts, so called beyond balance sheet on which they register selected costs

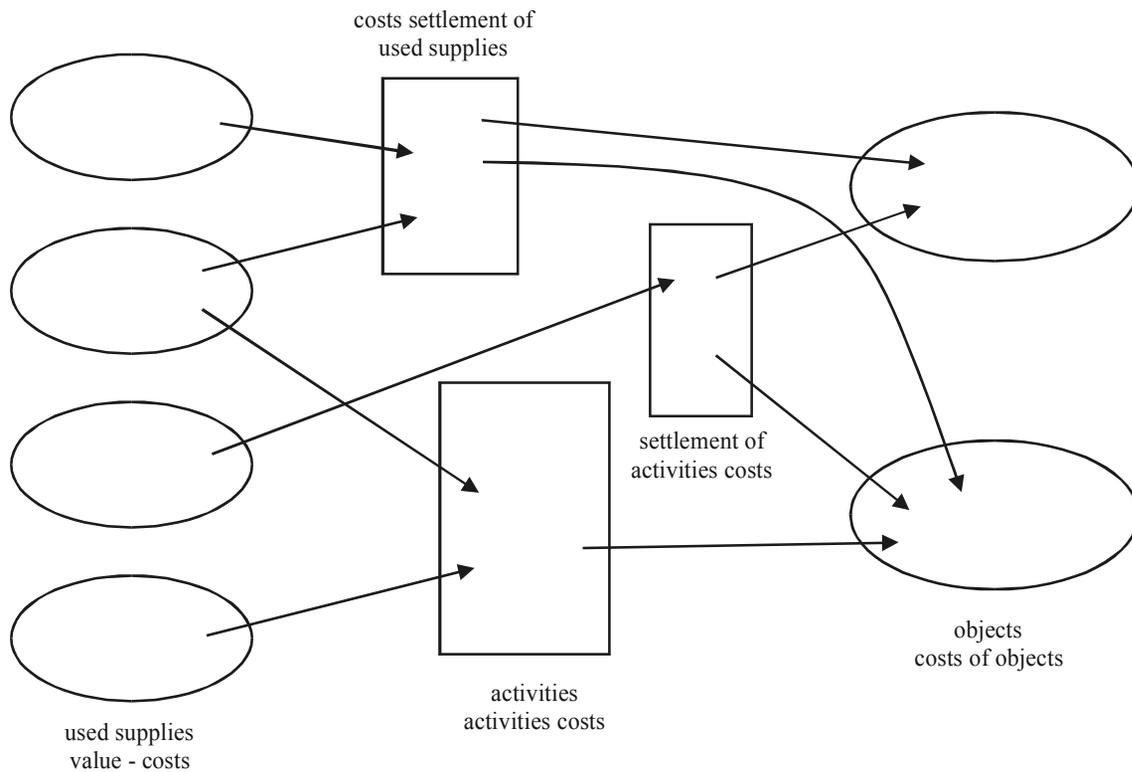


Fig. 1. Costs settlement in the activity-based costing [3]

according to their needs, and calculation reduces to using the little precise keys of partition. Activity-based costing has special usage to calculation of real cost of individual product. Activity-based costing can also be used with success to carry on the quality costs' account [4].

Activity-based costing is different from the traditional cost system.

The essence of activity-based costing in contrast to traditional methods of accountancy is analysis which processes and activities take place in a company, from which supplies they profit (it means what causes occurrence of activity and consumption of supplies) and how many activities and supplies are used up by each cost objects (products, customers, distribution channels, functions). However, activity-based costing through delivering the information about customers' costs, distribution channels and first of all processes' costs running in a firm can become the modern management system, management system based on processes, not on traditional perspective of hierarchical functional areas, departments and organizational cells [5,6].

Activity-based costing (ABC) method concentrates attention on activities and processes, so on the basic element of organizational reality. The enterprise receives from the environment different supplies and in result of executed activities transforms the supplies in products (services), which delivers to the environment, in return obtaining definite funds. So the enterprise can not realize even the easiest activities without utilization of supplies, so without carrying on expenses.

Simultaneously, having limited supplies, one from elementary and the most important criterions of undertaking the decision should be obtaining the maximum effects at minimum carried costs. In the face of this, the basic manner of rational management is lowering carried costs, and this aim can not be realized without the suitable costs account. Standard costs' account calculates indirect costs on production by contractual accounting keys, basing as a rule on one of components of direct costs (eg. man-hours or machine-hours). Depending on accepted key the same indirect costs can be added to each product in different proportions, and it is received the different individual costs for the same product. Basing on the same given data, activity-based costing (ABC) treats the total costs in different manner. Executed in the enterprise activities, but not produced products or services, are direct factor causing occurrence of costs. Only by activities, cost objects of firms can be correctly fixed the price. These objects can be: products (services), also customers, distribution channels, market segments. Resources (costs) are assigned to the definite activities, and activities' costs are calculated on products or services or other cost objects proportional to utilizations of activities (fig.1) [3].

So, according to foundations of activity-based costing [7-9]:

- activity of every firm should be understood as the set of activities,
- the basic reasons of realization of activities are the customers of the enterprise – the activities are undertaken in the aim of satisfaction their needs. Satisfaction of demand, notified by buyers, demand the realizations of definite

activities in the aim of production and delivering the products on the market.

- costs in the company come into being in the result of realization of activities. Costs are recognized as the result of executed activities, not their reason.

3. Activity-based costing model

Model of activity-based costing is built on two basic perspectives: costs' perspective, and processes' perspective. In the centre of attention are executed activities.

Basic categories in the model of activity-based costing (ABC) are the following terms [4,10-13]:

- costs' objects. Cost object should be understood as something, why costs are gathered and counted. Costs' objects can be any customers, products, services, contracts, undertakings or other individual work, which cost we want to determine. Standard costs' objects are products and services. Carriers of activities' costs serve to assign activities' costs to costs' objects. The most important cost's object in activity-based costing is a product. The manner of defining costs' objects depends on the aims, which of realization serves the activity-based costing. And for example for realization of strategic aims, costs' objects are defined on the level of products' groups, which farther can be differentiated regarding kind of customers or area on which they are sold. For needs of costs' reduction and enlargement of effectivity of economic activities, the attention of the enterprise should concentrate on activities, because then they are the basic costs' objects.
- activity. Costs of activities are qualified by attribution of supplies to activities by means of carriers of supplies' costs. Activity should be understood as repeatable, homogeneous or similar event and activities executed in aim of realization of definite economic function and causing rising of costs.
- process, should be understood as sequence of activities realized in aim of receipt the definite final effect.
- supplies. Qualification of supplies is defined as economic component used or used up during realization of activities. Salaries and materials can be example of supplies used to realization of activities.
- carriers of supplies' costs. Qualification of costs executed in a company's activities, takes place through assigning to specified activities the definite supplies, according to degree of demand of activities on supplies. Relations among activities and supplies are so-called carriers of supplies' costs, called also accounting keys of the first degree. Carrier of supplies' costs is a measure of quantity of supplies used by a given activity. It simply expresses the degree of activities on concrete supplies. Carrier of supplies' costs permits to allocate each kind of supplies, expressed with suitable costs according to kind, among activities. In this manner for every activity is created so called pool of costs. Pool of activity's costs cumulates all components of generic costs carried at its realization and expresses entire cost of activity.
- carriers of activities' costs. Fixing of costs of objects' costs, determining one of the basic aims of using the activity-

based costing system (ABC) in a company, takes place in a way of carrying the suitable part of pool of activities' costs on specified costs' objects. It has been executed by means of carriers of activities' costs, also called as accounting keys of the second degree. Carrier of activities' costs is a measure of degree of demand of costs' objects on realization of the definite activities. At a choice of parameters, which become recognized for carriers of activities' costs, it should remember about realization of several basic conditions [3]:

- carrier of costs of given activities should be the size of the most strongly correlate with its costs (it means with the pool of costs),
- carrier of activities' costs should express the degree of demand of the concrete costs' object on a given activity,
- carrier of activities' costs should explain the reason of costs' formation,
- carrier of activities' costs should be understood and easy to measure. In identifying and choosing the carriers of activities' costs, it should be qualified the place of activity in hierarchy of activities, which describes, in which manner activity is used by costs' object or other action. Some hierarchies of activities describe costs' object, which uses activity, and also character of its utilization.

4. Own research

Own research were carried out in one of the coal mines in the Silesian Region. Investigations contain the analysis of costs by means of activity-based costing method (ABC) on the base of basic costs and one of basic processes it means mechanical processing of coal. Thanks to this method it can be executed the estimation of activities in the face of costs, what permits on improvement of processes occurred in the company and minimalizing of costs occurred during production.

Investigations in the selected coal mine contained analysis of costs by means of activity-based costing method (ABC) on the base of statistics of basic costs and one of basic processes it means - mechanical processing of coal.

To do the activity-based costing in a good way it should be proceed like this, that in the first place it should determine basic activities having influence on the realization of product, and in the second place to break basic activities on more detailed. It gives 18 of basic activities having direct and indirect influence on the extraction of raw material, which is coal. The unit determining the scale of these activities on costs carried by mines is a price in polish zloty for one ton (PLN/t).

Having definite costs of basic activities we can pass to detailed analysis of activities which are part of them. The essential basic activity is mechanical processing of coal. It can be divided on 15 activities which are part of it.

Every activity undertaken during the mechanical processing of coal contains in own cost such supplies as:

- salaries,
- materials,
- energy,
- amortization,
- repairs,
- other costs.

Thanks to breaking up the activities on supplies, it can be executed more detailed analysis of all activities occurred in this process and carried out costs. It can be compared the usage of supplies in dependence on activities which are undertaken, what is very helpful in detecting the useless costs. Such breaking of costs on activities, and then on supplies is the most detailed analysis of costs, and the most exact and reliable.

Method of activity-based costing is a method considerably more exact and more efficient than traditional costs account. Method of activity-based costing treats activities' costs in more detailed manner, what permits on their exact analysis. While traditional costs account is very general approach, what in such a big company as selected coal mine does not permit on efficient using of this method.

To carry out the analysis more exactly one of the basic processes, which is mechanical processing of coal became divided to detailed activities and supplies necessary to realization of these activities. It made possible the introduction with all process of coal extraction. It permits also on detection the places, in which organization carries the useless costs and permits on detection the activities, which have the most essential influence on a quality and cost of extraction.

5. Conclusions

Realization of activity-based costing permits on very detailed acquaintance with costs of undertaken activities in a company. It makes possible monitoring of carried costs and estimation their influence on all production process. It permits to eliminate these places in organization where carried costs are useless or do not give the desirable effect [14].

Own research clearly showed, that very essential is breaking activities' costs as detailed as possible. Essential thing is to divide activities first on more general, and then on more and more detailed. Amount of costs carried on activities univocally showed, which are very essential for all process of coal extraction, and which are less essential, but simultaneously pointed, that there are big reserves for elimination of costs.

Method of activity-based costing permits on more efficient monitoring of costs which are carried by a company on producing a product and on the quality management system, than the traditional methods of costs' analysis [15].

References

- [1] RS. Kaplan, R. Cooper, Costs and effectiveness management, ABC, Cracow, 2000, (in Polish).
- [2] J. Michalska, Quality costs in the production process, Journal of Achievements in Materials and Manufacturing Engineering, Vol. 17, Issue 1-2 (2006) 425-428.
- [3] R. Piechota, Designing the activity-based costing, Difin, Warsaw, 2005 (in Polish).
- [4] J. Miller, K. Pniewski, M. Polakowski, Finance and company: Management with activities' costs, Whig – Press, Warsaw, 2000, (in Polish).
- [5] W. Urban, Quality costs basing on activity-based costing, Quality Problems, 2 (2001) 26-29 (in Polish).
- [6] J. Michalska, The usage of the quality – cost analysis in a production process, Journal of Achievements in Materials and Manufacturing Engineering, Vol.16, (2006) 190-198.
- [7] J. Michalska, Factors creating the quality management in the enterprise, Proceedings of the Scientific International Conference „The intellectual capital as a chance on improvement of the quality management in the conditions of globalisation” INTELLECT'2005, Kazimierz Dolny, 2005, 187-191, (in Polish).
- [8] Z. Zymonik, Quality and productiveness in the enterprise's management, Economy and Organization of the Enterprise, 5 (1998) 6-8, (in Polish).
- [9] B. Czyżewski, Quality assurance during realization of a technological processes, Quality Problems, 8 (1999) 12-20, (in Polish).
- [10] A. Hernas, The bases of the quality engineering, WPŚI., Gliwice, 2004, (in Polish).
- [11] S. Tkaczyk, J. Michalska, Cost - quality (CQA) analysis, Proceedings of the 10th Scientific International Conference „Achievements in Mechanical and Materials Engineering” AMME'2001, Gliwice-Zakopane, 2001, 593-596.
- [12] J. Michalska, S. Tkaczyk, Analysis of Polish enterprises' activity in the area of quality costs, Proceedings of the 11th Scientific International Conference „Achievements in Mechanical and Materials Engineering” AMME'2002, Gliwice-Zakopane, 2002, 541-544.
- [13] J. Michalska, Quality costs as the tool of the quality improvement, Proceedings of the VIIth International Conference „The conditioning of enterprise's success in the economy based on the knowledge” SUCCESS'2004, Kazimierz Dolny, UMCS, Lublin, 2004, 99-102, (in Polish).
- [14] J. Michalska, The usage of the quality – cost analysis in a production process, Proceedings of the 11th Scientific International Conference on the Contemporary Achievements in Mechanics, Manufacturing and Materials Science CAM³S'2005 Gliwice-Zakopane, 2005, 666-673.
- [15] J. Michalska, The usage of The Balanced Scorecard to the estimation of the enterprise's effectiveness, Journal of Materials Processing Technology „Elsevier” 162-163 (2005) 751-758.