OVERVIEW ON A NEW MODEL OF CALCULATION OF COSTRILOR IN MINING INDUSTRY

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Abstract

The methods of calculation used in the coal mining industry entities (global and per-phase), non-post-operative, and also as the main drawback of applying their lack of foresight and readiness. This makes the information in connection with the production process do not reach decision makers in time for them to take the most appropriate decision, on the one hand, and on the other hand, do not have the prospect of future development of the production process, so management accounting does not fulfill its role of managerial accounting.

In this vision, I propose the establishment of management of the production process that uses as its objective "the cost". Target calculation system is expected to be made up of a set of methods, techniques and means with which to accurately predict and programme production costs, to calculate the cost of an hour of activity, to register and to consider pre-emptive, operative and post operative expenses compared to the deviations of their standard or normed and, on this basis determine the actual cost of production at the end of each cycle of activity.

KEY WORDS: cost, managerial accounting, cost calculation, coal mining industry

1. INTRODUCTION

Starting from the idea that any economic entity is a structured hierarchical system, with entries and connections that can put on different States, with control and adjustment which tends to optimise the activities that takes place in the entity, which uses methods aim at "cost" is aimed at both the quantitative side of production, but also orients management towards quality issues, of efficiency.

In their individuality, their methods evolved through cost leadership presents certain limitations which requires concurrent use of multiple methods and techniques integrated in a system of leadership and management, to take from them what is essential and presents advantages for the entity that administers it.

In cost management of the units dealing with extraction of coal deposits has the objective of ensuring their management process with economic information necessary for decision-making. This involves knowing the maximum limit of costs relating to the cost of every size and period of comparison which demonstrated any differences, involving: forecast costs, which establishes in advance level and cost structure; control costs by comparing actual production costs with the projected establishment of irregularities, and appropriate measures are taken to correct the situation; determination of the responsibilities of every manager, as well as communication and coordination between various managers organizational units conducted; and motivation for controlling their activity and their classification in the planned costs in the budget.

Managers require analytical methods, techniques, tools, procedures and rules of conduct in the field of cost management, which would serve the planning, control and adjustment of activities conducted in the units of mining coal resources exploitation is subject to necessary improvement and diversification of methods of management accounting and the cost calculation by introducing new methods and processes to raise the quality of higher level cost information.

2. COST-VALUE RATIO, AN INSTRUMENT OF ENSURING THE PROFITABILITY OF THE ECONOMIC ENTITY

Economic science has its starting point in value theory, which attempts to explain how people recover belongings within the economic exchange.

The theory of value has its beginnings in the 18th century, when the school took the classic for the first time in the relationship between the basic factors that create value (land, capital, labor) and report application-market offer, proposing a theory of value thereafter based on the cost of production.

In some senses, the starting point of the theory of value is a paper published by Adam Smith (Wealth of Nations “”) in the year 1776 where he claims that determine the usefulness, but that, nevertheless, "the amount of labor used in common to produce a good is the only factor." Work is the source of the goods, and the size is determined by the amount of labor embodied in goods: "Objects contain a certain amount of work that we change the counter to what
we estimate that in that moment would contain a quantity of work of equal value". All Smith argues that "price is adjusted by the ratio of supply and demand," thus creating "the paradox of value".

The Explanatory Dictionary of the Romanian language, the concept of value assigned to several definitions, namely:

• "appropriation of goods, works, ideas, phenomena of the social necessities and ideals generated by these";
• "sum that give price of an object, a being, a phenomenon";
• "importance, significance, value, merit".

In the value data definitions over time, there are two main directions, namely: value means work-case where the production process and the role of producer and utility value is-in which case the emphasis is on process and the role of the consumer.

Professor Paul Bran defines value as "the result of the transformations taking place within the framework of the economic processes (at least) is trained human activity", processes including: production, distribution, Exchange, consumption.[1] in researching the phenomenon of economic value shall take account of the existence of specific science processes as a whole but also the economic domain.

Among the processes used in the value study included:[1]

• "passage in the other sciences" or "broadening" involves identification of research and the use of the information obtained during the field review by us;
• "mergerea into the depths" what is considering identifying the causes that have generated the phenomenon under study, as well as finding justifications for events at the surface of reality and possibilities for influencing economic activity in directions that we consider useful and effective.

In accounting, the concept of "value" appeared much later, and he should not be confused with the concept of "cost", even if the value is often measured by cost.

Obtaining reliable information with accounting, its main base is in the process of decision-making by various users and mainly managers.

Bringing into question the accounting value problem we cannot reflect the organic relationship between cost and value, the relationship has been defined by Smith which said about the value that it represents sometimes the utility of an object (the value of), and sometimes expresses the faculty gives possession of the good to allow the purchase of other goods (replacement value).

From the perspective of accounting, optimisation of cost-value relationship involves the ability of units to achieve required product with desired characteristics, taking into account the projected costs, however, and of course getting a profit. Seen from another point of view the above mentioned relationship optimization may take place by using the methods and techniques used by the engineering value (value analysis).

This method is practiced routinely in developed countries, while the US received official recognition in 1976 when the then Government approved a program called "special Programme for the application of the generalized to the whole economy of value Analysis in order to increase economic efficiency of production and reduce production costs."

Analysis of the value does not have the characteristics of a science. It is a working method, a set of techniques and processes inspired by or assimilated from other disciplines, addressing the functions of products they have and through that acquired some utilities necessary for society. The value in the sense of value, is the ratio of the usefulness of the product and the cost of its production.

Value analysis technique is used during the production process and is aimed at the estimated costs in pursuit of design that must not be exceeded during manufacturing.

The value can be defined as the amount that the customer is willing to pay to have a product or service; She having no relation to the costs involved in the manufacture and sale of the property but to the way in which it meets the needs of consumers. [4] the creation of value is considering increasing the value for the consumer, reducing the cost to manufacture the product, optimizing the value chain of a product through reduction of profit margins or by eliminating intermediaries in the chain of value, etc.

Analysis of coal mining enterprise is considering taking the next steps:

• determination of the amount of money that customers are willing to pay for a ton of coal;
• determine how you should supply the production cost obtained;
• investigate where are born, how costs can be reduced and how it can be improved, and how value rationality of the value-creation chain by changing his or by inserting or removing some of its elements.

The concept of specialists (Crum L.W.) "value engineering consists of a series of systematic processes, geared towards the attainment of the functions you need with minimal cost, without neglecting the quality, reliability, performance and delivery. In essence, it is a process that unfolds in stages, involving the application of a uniform combinations of new techniques with traditional techniques ". Through the techniques and methods used to value engineering aims at placing on the market of a product that caters to an extent as high demand users with minimum costs. It can be said that "value engineering is a method of improving the value of the product by improving the relationship between the technical and social functions of a product and its cost." [3] a permanent control of the value is a practice often used by enterprise managers to ensure a continuing concern in order to reduce costs, their effectiveness is the process that determines the appropriate means of obtaining profits through the use of the resources available.
In view of the general definitions of value engineering, the quality and reliability of the product should not be affected by the cost reduction, we can say that in contrast to the usual methods of cost reduction, value engineering, however reductions does not allow product characteristics.

In order to ensure the profitability of any enterprise and obviously mining exploitations, value engineering aims to establish an optimal ratio between the use of the asset and production costs they generate, report that can be expressed as follows:

\[
\frac{V}{C} = \max
\]

where:
- \(V\) - usage value;
- \(C\) - costs of use value.

It is considered that the value of the report above is optimal if you get as a result of the optimization of all the reports of the values use and costs, according to the relationship:

\[
\frac{\sum V}{\sum C} = \max
\]

To achieve the objectives analysis of operating on the basis of the following principles: [5]

- **the principle of maximizing the ratio between amount of use and the cost** is establish an optimum ratio between the functions of the product and the costs of implementation. In other words, the product must be designed and manufactured so as to have a value of as high as obtained with the minimum costs;

- **standard bookkeeping functions** that takes into account the two dimensions of the product's functions, namely the technical dimension that characterizes the level of performance and economic dimension expressed in cost. Thus the cost function is related to a particular quality of the product and not in a physical body, and the total of all costs of functions represents the total cost of the product;

- **the principle of functional analysis** is the basic feature of the method, according to which goods or services are studied based on the duties they have to perform. The constructive design of the product is established as a result of the solutions adopted for the materialization of each functions;

- **the principle of systemic approach of usage value or principle of integrated concept** implies that the object of study of the method to be the product as a whole and not any part of it, but making an exception to the application of the principle products made out of a single element.

Considering the classic methods of cost reduction, value engineering is considering finding solutions without regard to the current situation, during which direct links between property and functions necessary for his costs. In practice, the size of the value in value engineering studies will be determined by the cost of producing the record.

An important step towards optimizing value and hence of coal enterprise in order to obtain profit, is considered to be the moment when the unjustified costs are understood and recognised to be diminished as evidenced by the following definition of value analysis is “a process of systematic economic analysis, the Elimination of unjustified costs to any product or service”. [3]

### 3. THE BASIC PRINCIPLES OF THE MODEL S.M.C.O.A.

Starting from the idea that any economic entity is a structured hierarchical system, with entries and connections that can put on different States, with control and adjustment which tends to optimise the activities that takes place in the entity, which uses methods that COST objective shall cover both quantitative aspects of the production, but also orients to the aspects of quality management, of efficiency.

In essence, evolved methods of cost management through responsible economic management requirements because they integrate the three phases of the process of leadership and management through the Organization of a mutual and permanent stream of information that allows the immediate knowledge of all the activities generating costs and their orientation on line high efficiency. In their individuality but evolved methods of management through costs presents certain limitations which requires concurrent use of multiple methods and techniques integrated in a system of leadership and management, to take from them what is essential and presents advantages for the entity that administers it.

In this vision, we propose the implementation of a management system of production process that uses the objective COST.

As I pointed out earlier, the Mining Act, a series of factors (natural, such as technological and organisational and technical) that are interwoven and mutually inter-conditioning,, thus leading to the differentiation between the major mining units and their organizational structures, which is reflected in the cost of production.
However, there are sufficient similarities between mining, we believe that research and experiments that I conducted in order to make use of methods by which to harmonize the objectives continually with the resources, even if they originally had in mind only a particular mining, may be adapted and generalized in all occupations within the coal industry. In this context, our research has as reference model Mining Jit.

**Calculation system that you intend to depart from the general content of the management methods, unified framework in which each of them shall be carried out using suitable tools and means of stemming more relevant characteristics:**

- objectives (i.e. the norm to be achieved);
- concrete methods used to achieve the objectives (different tools, processes, techniques, etc.);
- items aimed at motivating staff contributor to the achievement of results;
- activity programmes;
- Organization information system-making method, to ensure the efficient use of staff and to make it possible to achieve predetermined objectives.

In this context, the system of calculation envisaged is expected to be constituted a set of methods, techniques and means with which to accurately predict and programme production costs, to calculate the cost of an hour of activity, to register and to consider pre-emptive, operative and post operative expenses compared to the deviations of their standard or standardised and on this basis, to determine the actual cost of production at the end of each cycle of activity.

Modeling system of the production process, using the "cost", more precisely the cost of an hour of activity-called S.M.C.O.A.-blends so organically more management and management methods by generating the potentiating effect of each method in part at the same time possibly eliminating their disadvantages when used separately.

**Basically, S.M.C.O.A. combines:**

- cost standard or normal method from which it takes the technique and tools for tracking irregularities;
- T.H.M. method from which the technique of establishing production centers and activities and the cost per hour of activity;
- direct costing method from which the technique of determining the breakeven for determining resource requirements and production volume in order to ensure maximum returns of the enterprise;
- management method through exceptions for selective information of managers at different hierarchical levels, constituting a system-based programming costs by budgeting expenditure.

We have focused on the possibility of achieving such integration based on the particularity of the objects of extractive industries in coal field and the factors of influence involving a certain structure of cost of production.

In view of the stated, emerges the idea that S.M.C.O.A. is based on a series of principles, depending on the setting of its techniques and tools, including:

- the location in the center of attention driving factor for calculating the cost of an hour of activity;
- optimisation of cost accounting of production centers and activities;
- develop budgets for direct and indirect expenses at the level of the enterprise and the breakdown of their production centers and activities;
- determination of the optimum level of activity at the level of the enterprise and of each production center;
- pursuing systematic analysis of operative and deviations from the estimated cost and normed standard or budgeted;
- the use of cost-time-indicator activity as an indicator of quality of material counteresare.

We believe that the proposed system contributes to widening the scope of the principles of calculation of costs as the cost of production-especially in the mining industry being subjected to the influence of a-complex variable and random factors (treatable and uncontrollable) they should consider increasingly determine the forecast cost of employing marketing economy of natural resources.

However, the practical use of S.M.C.O.A. requires certain preparatory actions required to implement its conditions, such as:

- scientific basis of budget indicators which relate to costs since they will represent the ultimate objectives to be reached;
- rigorous normalization of expenditures for materials and labour;
- defining optimal budget centres within the enterprise, the subsystems that allow highlighting product, process or operation of sections, all expenditures in a given subsystem;
- rationalization of the information system.

Without training measures enunciated cannot achieve the implementation of the proposed system and enterprise management, instead of using scientific methods, will implement a filing system based only on experience, intuition or circumstances.

We do this because the aim of the underscore is to present a model of a principle.
Having regard to the basic principles of the system, appear necessary a number of techniques and tools in the following order of succession: dividing the cost calculation of production centres and activities; determination of objectives (production tasks) on production centers and activities and on the total enterprise, expressed in hours-part-time; drawing up the general budget total cost undertaking and its breakdown on production and activity centres; the allocation activity centers and establishing cost-time-level activity; the correlation between the price-cost analysis-volume of activity; determination and analysis of stock monitoring, residuals from standard or regulated costs; actual cost calculation.

Thus, in the sequel, we try a brief presentation of all these stages, as we believe that we should succeed in operations to use a system of calculation of costs to rise higher on the qualitative information provided to managers.

A) Calculation of dividing the costs of the production and activities centers.

Emphasizing contemporary technical and technological progress has entailed an increase in the importance of the machines, equipment and installations, and intercondiționându the production flow, and the organisation became an increasingly complex production. Under these circumstances, "the machine" becomes a fundamental cost-generating unit, irrespective of whether the production time is used or not.

The location in the center of attention, time factor management of time, lead to the establishment of the economic cost of operating hours on the types of equipment, the only way to pursue the task of spending control in correlation with the scheduled production.

To create traceability of how concrete is used during work is needed on the cost calculation dividing the production centres and activities in the framework of which it consumes awarded enterprise and production tasks are carried out.

Optimisation cost calculation of production centres in the extractive industry is not a problem given the organizational structure of them. Specifically, mines, quarries or mining which is as technical and organizational entities and separate economic can be considered production centers or places of spending. But, limiting cost calculation sectorizării only at that level would not change the current vision.

Therefore, it is necessary to deepen the sectorizării calculation of costs of production centres and sections of the production process or operations taking into account primarily the possibility of determining responsibilities. Thus, the centres of production (farms, mines or quarries) can be sectorize to turn on activity centers due to technological flow that takes place, as well as a number of criteria, including essential: the capacity of machines, the number of service personnel, machine, type the number of hours worked annually to the machine, the number of exchanges in which they are used, etc., the name given by the centres of operations that runeither the name of the machine that makes up the heart.

Unlike other branches of activity in mining should be set up so the productive activity centres and centres of business related (e.g. underground talk of building activity, asecare, surface transport, etc.), without which there can be conditions of the normal production process. Whereas the existence of these activities represent a sine-quanon, even if the work of these centres is not completed in a concrete result, the material must be assigned responsibilities, more so with how these activities involve a large volume of equipment and machinery that generates costs.

B) Determination of objectives (tasks) at the level of production and activity centres

Considering the fact that the centres of activity are production and generating activities, but also resource intensive which are evaluated by the production costs, to determine the extent of the cost in the production, the passage is necessary to establish the tasks of production centers.

The starting point is the production schedule in physical units on the total enterprise and production centers, but such an appointment is considering only the degree of direct involvement of the human factor neglecting a number of technical aspects and organization that can impeta the production programme. For these reasons it is necessary with annual production schedule-part-time hours for comparison with the number of hours available to the production centers and activities and take appropriate measures.

C) Drawing up the general budget total cost undertaking and its breakdown by production centers

Considering the fact that the goal of any enterprise, and those that operate in the field of extracting coal, mineral resources aims at maintaining balance relationship between revenue and expenditure, the problem faced by the management of the companies is finding those methods which allow the sizing and control of this type of relationship. For this purpose it shall draw up a document of financial forecasting, namely "the budget of revenue and expenditure", emerged as "an instrument of harmonization and improvement of the relationship between revenue and expenditure"
D) The allocation activity centers and determining the level of the index of cost per hour of activity

For the common costs of the centres of activity is necessary to establish a system of criteria for rational allocation.

This process starts with analyzing the specifics of each type of expenditure to be allocated with the objective analysis the identification of characteristic quantities of all activity centres/equipment on the basis of which it will build the system of coefficients of distribution, providing the causal link between the proposed criteria and shared expenses. Based on an objective analysis of the career we can identify a number of key sizes that will be used in determining the allocation coefficients, respectively: the book value of the machinery, working time planned, number of workers, production capacity, installed power, gross wages on the Center.

E) Analysis of correlation between price-cost-volume of activity

Moving the center of gravity of the calculation of costs of production centres and activities, on the one hand involves enhancing the role and capacity of the calculation in the information management of enterprise's efficient activity, on the other hand, the promotion of wider-scale the principle of accountability in the management of the enterprise.

In the coal mining industry, effective management, in order to obtain optimal results, considering the rational decisions both at the level of companies and at the level of individual careers. Development decisions must be based on information on fixed and variable costs-which is in a permanent relationship with the volume of coal extracted, with utilization of production capacity, and not least with the selling price of coal per tonne. This correlation can be expressed using the following indicators: the point of equilibrium (break-even, the critical point or neutral), coverage factor and coefficient of dynamic safety.

F) Determination and analysis of stock monitoring, residuals from the predicted costs

In the operative phase, a well-organized leadership process requires a rapid and continuous information bound to the tasks incumbent on each production and activity center within the budgeted cost levels. Quick information on the residuals allows the management to adopt and prompt action to be taken in order to reduce the volume of losses incurred or for extending performance-positive-i.e. reducing deviation of consumption.

It follows, therefore, that the governing bodies will only track deviations-positive and negative-as submitted by their selective frequency and importance of residuals. In this context, the efficiency refers both to the time of finding irregularities, as well as the time in which the specific information is transmitted to the various levels of leadership and exploited by them.

G) Actual cost calculation

Highlighting the efforts of production and activity centres in achieving production as being a basic principle of the model S.M.C.O.A., involves the determination of the final stage-the actual cost.

The combination of two operative methods to organic cost share costing-standard and cost.-requires T.H.M and a certain specific way of organizing the synthetic and analytical records of the production costs and the calculation of the actual cost. The whole concept of organizing the records of expenditure must be made subject to a general model for calculating the actual cost.

5. CONCLUSIONS

The method of calculation of the costs (S.M.C.O.A.), proposed by us to be used in the coal mining exploitation, requires an adequate system for tracking and control of production costs, and, respectively, comparing actual indicators with the plan.

Towards methods of calculation of costs, currently used in the coal mining exploitation, the method S.M.C.O.A. is meant to solve a number of important issues such as:

- use as low-efficient through a follow-up in the first place, to be used at full capacity;
- identification of those machines that are not sufficiently loaded, or who have a low profitability;
- full use of the time available;
- effective use of labour available;
technical staff orientation, economic and leadership on jobs generating machine production expenses that become objects of management accounting, thus resulting in a reduction of their operation costs and thereby reduce the total cost for per tonne of coal;
allocation of the correct costs as indirect, what can be done with the help of selected base on the principle of causality, thus ensuring a realistic grounding in cost and price per tonne of ore mined;
creation of favorable conditions for determining the profitability of machines and production centres;
determining how judicious the residuals from the planned costs.

For an effective use of the results of the cost calculation method is proposed, it is necessary to use a computer system integrated into the computer system of accounting. Such a computer system ensures the collection of information on costs both in management accounting and financial accounting and management. It also reduces the process of collecting-processing-reporting-decision.

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