PARTICULARITIES OF ORGANIZING MANAGEMENT ACCOUNTING IN THE CASE OF COAL EXTRACTION UNITS

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Abstract
Given that the organization of accounting at the level of any economic unit, as well as that of coal mining units, is based mainly on the specific activity and on the necessities of each proper unit, the current paper aims at analyzing the manner of organizing managerial accountability at the level of the coal extraction societies staring from a succinct presentation of the particularities of the process of production and continuing with analyzing the actual method of cost calculation.

Keywords: accountability, costs, expenses, coal mining

JEL Cod: L72,M11, M41, O13, P42, Q30

1. Introduction
The complexity of economic life in terms of competition, imposed by the market economy, increases the role of information in decision making. But its quality depends on current and future quality of decisions taken and implicitly their performance.

Mining managers know that the effectiveness of a decision is determined by two major criteria, namely: decision quality and commitment of those who must implement it - as a decision which is not implemented properly comes to be ineffective.

In this sense, knowledge of costs is one of the basic imperatives of any decision taken in the coal mining companies. Indeed, financial accounting, called general ledger, provides a list of expenses, without indicating the cause of their appearance, regardless of economic laws which they are subject to, or of the aims to which they should be reported. However, one of the main objectives of management accounting, also called managerial accounting is to help managers to manage costs and create a mood in companies enabling knowledge and mastery of total costs per unit of a product or service work.

Relevance of cost is to draw it at the right time according to the decision maker and not least with a satisfactory precision for it.

To improve and diversify the methods of calculation of mining one must focus, in addition to efficiency, foresight and responsibility, on reducing, where possible, the workload required to obtain information on costs of production and costs, and on the possibility of a complex of information obtained. This requirement aims to release specialists of a series of works of simple registration based on routine tasks, creating the opportunity to devote more time on analysis, interpretation and full enhancement when adopting decisions.

2. Particularities of natural, technological and organizational conditions of the coal mining industry

Seen in terms of specific features, coal mining industry can not be surpassed by any other branch of activity, its features being but poorly researched and brought to light as to the organization management process. Specific issues from a technological side come from that mining is a constant struggle with nature, to derive the useful from a reservoir, transportation and any preparation and (or) its industrialization.

Main features, overlapping the mode of use and / or recovery of the resulting mining products – coal, mainly determines the economic specificity which is based on the organizational and psychological features.

Enhancement of mineral resources from the production process determine the specifics of the technological process thus influencing, in a particular manner, the extraction of coal’s content and production cost structure.

The most important features of this type concern especially territorial location and size extraction units influenced by position and amount of natural resources and production organization and outcomes related to geological conditions of the deposit and surrounding rocks.

Besides the main factors influencing coal mining within the unit, we can also note a number of secondary factors such as the need for specific works like draining, ensuring aeration of waste water and providing jobs presence...
of dust and gas, insurance, at the level of each extraction, with their auxiliary departments aimed at water and energy, transportation of the ore extracted and of the staff etc. Specificity of extraction technology in turn determines organizational peculiarities.

The determining factor of the production process organization and by default of the organization of management accounting in coal mining is the simplicity and homogeneous character of production by obtaining a single product.

Compared to other fields where the production process is more complex, the currently analyzed production cycle comprises two main processes, namely: the basic process of the actual extraction of coal and several auxiliary processes aimed at carrying out under appropriate conditions the basic process. The number of auxiliary processes is determined by the size of the mine and its organizational level.

For the rational organization of production process and to establish concrete places of expenses used in costing, production division cycle into basic processes and auxiliary processes has important practical significance which is reflected mainly in the development of primary documents and the circuits that they go through.

The essential role in organizing the production process is taken from the need to continue moving the labor force and material means to carry out the extraction in optimal conditions, taking into account that the area from which coal is extracted is not fixed. In essence, it is actually a continuous flow of inputs from one job to another.

For carrying out the normal process of mining coal, it is necessary that it be done with other specific processes such as transport of the mineral substance extracted, maintenance of mining equipment, lighting, sterile dumps etc.

Given the territorial location of the extracted deposits, found in specific landscapes and affecting human settlements and economic activities, optimum industrial production activity entails some forms of investment of expenditure. These are intended to ensure access to areas to be exploited, increasing of housing and administrative offices near the quarries, to transport employees to work and connect careers and administrative units to utilities such as water, energy, etc.

Besides the previously mentioned characteristics economic peculiarities also make their presence felt, arising from the mass character of production, nomenclature of the products of mining units being characterized by stability. A failure of the work of mining enterprises means effective closure of the unit, without the possibility of reorientation as the recovery premises for facilities and equipment is almost impossible. In these conditions, the need for efficiency in a market dominated by demand, which because of its uniqueness also requires a certain price level, aims to control as closely as possible all investments and costs.

Psychological factors that put their stamp on the production process and thus on the production cost consider the peculiarity of mining activity, which usually takes place underground, where strict laws of nature not only prevail, but also have specific influence on the human psyche.

Given the high risk of labor in mining, compared with other professions, the miner must be equipped than the worker on the surface. He has to face the feeling of isolation, to react promptly to the processes taking place in the mine, to have adequate capacity for rapid and lucid reactions in an emergency, to adapt to change and have a developed sense of solidarity. To this end he must be not only equipped but also educated. To educate means to train the miner according to his profession and teach safe work methods, to encourage him to deepen his general culture.

Psychology particular to the mining industry is due to the fact that underground production sectors in jobs where they operate most of the workers, are of quite poor ergonomic conditions. Only to a small extent and with great financial efforts can they be adapted to the needs human environment.

This situation creates cracks in the integration into work of staff, which leads to a state of latent fluctuation and requires managers to implement measures to ensure that this does not become effective fluctuation.

Effects of the critical period for the integration in the collective of new workers on economic outcomes such as labor productivity and wages made are very difficult to observe and to determine in mining, as newcomers are absorbed by teams working together with older workers without the possibility of a certain highlighting of each individual's results.

Problems with mood and behavior of staff, acquires special meanings in view of the following:

- historical trend of change (worsening) the conditions in which the extraction takes place (mining depth increased, the thickness of increasingly lower layers of coal, increased maintenance, etc.) that worsens working conditions also;
- the number and severity of human and technical accidents caused by behavior of personnel;
- promoting technical progress in mining does not have an impact so as to witness an attrition of professional labor to facilitate its rapid integration and qualification;
- having in view the specifics of mine work and its required severe discipline, mining units’ managers must strive in terms of organizational and financial education to adapt the staff to new conditions of labor;
- due to the location of mines in areas usually isolated and the nature of work in the mine, mines can not offer enough jobs for female family members of miners, a problem whose solution is left on society to deal with.

Also as a psychological feature emerges the fact that there is no possibility to highlight each individual performance. Special psychological mood, staff behavior are factors which determine not only the results but also
individual and collective security of the forces of production used and requires very careful selection not only of personnel management and working staff but especially in some key trades or functions (rescue, extraction machinists, miners, artificers, gas measurements, etc.).

Errors in mining have important consequences. Lack of attitude is often paid for with one’s life, which is why mining was one of the first activities which applied psycho-technical selection tests.

It is true that in mining, there are no two identical jobs, compartments, or units, but there are enough similarities to detect key features for organizing the production and management. Considering the weight, size and complexity of employment issues, we can say that the personnel policy is the most important issue for managers in mining, as they must show great care to ensure the miners with conditions for short-work periods, and provide important material and moral incentives.

Among the main factors influencing the production organization at the level of coal mining, is the type of work duties that consist of deposits to be mined only after the operation and with some work consumption, becomes a raw material for different industries.

Given that in the extraction phase, on the one hand does not use raw materials, and on the other auxiliary materials used are not in the product, it creates some specific situations with important implications on the forecasting process. In this respect standardization material consumption should consider the following aspects:

- since the materials are not found as such in substance extracted is not possible to forecast the articles and any subsequent verification of their very precise;
- depending on the context to be used, materials can vary from one situation to another even within the same unit;
- fairly frequent occurrence of unforeseen circumstances that lead to undesirable situation of supply.

Given the fact that the periods of analysis and forecast corrections are even shorter with the higher probability in the initial forecast, business managers need to consider periodic updating of technical studies underlying economic development programs of mines and a continuous surveillance of their enlargement.

Summarizing the above, we can say that the organization of coal mining units should consider the following specific factors:

- establishment of exploitation is a result of costly and lengthy exploration and exploitation which have been identified coal reserves large enough quantity;
- investment in the operation of mines are expensive and last long periods of time;
- continual adaptation of means of production and labor;
- diversity of natural conditions, which are reflected differently on economic efficiency of the mining companies;
- adopting rather expensive measures, for safety.

All these specific issues on mining organization have their support a complex of situations:

- the production process is often different from one job to another;
- places where the activity is limited spatially and can not concentrate manpower and equipment than in a limited number and size;
- due to the geological conditions, layers of coal can not be operated before the covering (overburden) and extraction activity takes place on large tracts, both horizontally and vertically;
- the complexity of the production process requires a diversely specialized executive staff;
- working arrangements in several exchanges involves the proper organization of the production process itself and the departments in charge of supervision, control and direction of it;
- domestic transport is considering supplying materials, equipment, tools, etc., from the deposits in the workplace and vice versa;
- continuous movement of jobs depending on the advance operation, working together with all equipment, installations and service means.

Given the above, we can say that the specific production process strongly leaves its mark on the content and cost of production structures.

3. Organization of management accounting in the coal mining industry

According to the specific process used in production technology and its organization (simple production in which the finished product - coal - is obtained from successive operations, in a continuous flow, and a stable nomenclature of production) the coal mining industry uses phase method, with some features, aspect otherwise notified by other authors.

In principle, development and operations phases of the production process should aim at creating the conditions necessary for the final regular basis of economic analysis on the development of production costs, the formation of documentary basis for budgeting expenditure and to mobilize categories of reserves that occur during the development of productive activity.
Detailed the steps and operations must not exceed the limits and possibilities of sharing knowledge and of accurate and documented expenses. For these reasons, the mining of lignite uses the following phases and tasks:

- for underground mining: training mining stopes (including backfill) transportation, operating equipment (depreciation, maintenance, repairs including workshops conducted surface) mining construction (depreciation, maintenance, repair), directing underground (ventilation, exhaust water, lighting, incidental repairs, etc.)
- for surface mining (quarrying) uncovered (excavation, transport and stockpiles sterile), excavation substance useful, useful substance transport.

The analytical character of the calculation method used involves using two categories of cost carriers, namely: an intermediary one that identifies only the direct costs of production and a final one to calculate the unit cost and total.

Homogeneity of the production process and product nomenclature creates the possibility of using a stable simple calculation unit, in a natural expression, namely the "ton", thereby offering the great advantage of the widespread use of indicators in physical units with the values.

Management accounting in the mining units, both within SNLO and those operating in the Jiu Valley is organized as a career / mine, as organized and financial accounting, which provides the necessary information delimitation spending direct, indirect, sales and management careers in the day, and grouped by activities for coal mining.

In view of registering in the management accounting the expenses made at the level of the Jilt Mining Unit, these are classified according to the following criteria:

- depending on the nature of the work expenses are divided into: core activity costs (coal and tailings), expenses of auxiliary activities (workshops: mechanical, electrical mining), general administrative expenses, geological expenses, selling expenses;
- depending on the workplace into exploitation costs, sectors, divisions workshops or other components of the unit;
- depending on the distribution of the cost of products in direct costs and indirect costs.

Since the Jilt coal mine is profiled on getting a single product (lignite career), there is no question the distribution of indirect costs on several products. But due to the specific production process, these units require an allocation of indirect costs as:

- depending on the specific technological process a range of equipment (excavators, BRS's, conveyor belts, etc.) Working alternately excavating coal and tailings (both regarded as the base), is necessary distribution costs for the use, maintenance and repair them on the two activities;
- in the career there are also supporting equipment (bulldozers, drying pumps, carved channels, etc.) that contribute to the smooth running of both activities and whose maintenance and repair costs should be distributed over two phases: overburden and coal production;
- general administrative and selling expenses must also be distributed on core activities.
- depending on the economic content it is divided into: material expenses (auxiliary materials, fuel, energy and water, inventory, cost of work performed by third parties, depreciation and reserves geological findings) and living labor costs (wages, social security contributions, lunch, social protection, taxes, etc.);
- based on dependency output in fixed costs (depreciation of fixed assets, selling expenses, etc.) and variable costs (fuel, energy technology).

Based on these criteria for the classification of expenses and the trial balance of financial accounts and reports for each department, division, workshop, mine at Jilt Northern Career two situations are completed, namely: "Determination of costs based on activities" and "The picture of transposing internal accounting management costs" on which development occurs in the accounts management accounting notes.

Next I will try an overview of the main content of the accounted expenditure items, namely:

- auxiliary materials are an expense item common to both activities (coal and tailings) and includes all the materials and parts (rubber mat, rollers, chains, gears, bucket teeth, electric cables) used for maintenance and operation of all equipment and means of transport of basic and auxiliary sectors. Distribution of this item of expenditure on the two activities is based on primary documents (bills of consumption) and work directly identifiable materials according to the actual weight of coal tailings that the total volume excavated in the calculation for the remaining materials can not be identified directly on activities. We believe that the breakdown of material costs, together with work in workshops and third party services, related to annual repairs and capital should follow the arrangements for the preliminary expenses.
- electricity is a common item of expense that includes both core activities and energy consumption required to operate equipment and vehicles in the main and auxiliary sections (excavators, conveyors, water pumps, etc.). As auxiliary materials, distribution on the two activities is based on actual weight of coal tailings that the total volume excavated in computing and supporting documents for electricity consumption can be identified directly on the machines.
amortization includes depreciation on all fixed equipment and vehicles productive sections (excavators, conveyors, BRS’s, drainage pumps, tractors, bulldozers, lathes, mills, etc..) It is an item of expenditure for two activities - coal and sterile - 's distribution is made as to the two previous expenditure items;

wages and social security contributions, are items of expenditure common to both activities and include staff salaries, bonuses and social benefits are paid from funds related to production and pay related social insurance contributions. Distribution of wages on core activities is the same principles as the previous item of expenditure.

revisions and repairs costs are computed as the sum of such expenditures in all departments of the enterprise (basic and auxiliary), using both machines working in the coal and overburden. Given this, it follows that this type of expenditure is allocated coal activities and instruments on the actual share of coal tailings that the total volume excavated in the calculation and documentation for repairs that can be identified directly in the machines.

As I said, I think that the amount of costs related to annual revisions and repairs of machinery and basic transportation vehicles (excavators, BRS’s, conveyor belts, etc.) must be included in the cost, spread over the entire period of the planned year. To achieve this goal, one should follow these steps:

- determining the monthly values planned to be introduced in the 12 months costs by dividing the value of that annual planned repairs;
- from the month of January in the plan, to include monthly costs, planned rate, until the month of their effective remedy;
- this month, a new monthly rate is established, to be included in costs by the end of the plan. This new rate is determined by subtracting the actual amount of annual repair costs to the amounts included in the repairs that took place, and then dividing the value obtained from the number of months remaining from the date of repair by the end of the plan.

For example, I consider that the value of planned annual repair of an excavator is lei 1,456,234.50 and the actual amount of repairs that took place in July is 1,390,578.40 lei. Staggering the cost will be as follows:

1. Establishing monthly quota as planned:
   \[ C_{ip} = \frac{1,456,234.50}{12} = 121,352.88 \text{ lei} \]

2. by June (inclusive) the following value will be included in the costs:
   \[ 121,352.88 \times 6 = 728,117.28 \text{ lei} \]

3. remaining value included in cost until the end of the year is:
   \[ 1,390,578.40 - 728,117.28 = 662,461.12 \text{ lei} \]

4. new monthly rate to be included in costs will be:
   \[ C_{le} = \frac{662,461.12}{6} = 110,410.19 \text{ lei} \]

Thus, in the costs were included 1,390,578.40 lei, the actual amount of annual repair:

\[ 121,352.88 \times 6 + 110,410.19 \times 6 = 1,390,578.40 \text{ lei} \]

Based on the particularity of the production process that for the discovery of coal reserves, it is necessary, first, to perform works with uncovered expenses (excavation, transport and sterile stockpiles), which follows the principle of anticipated costs, I think that they should be separated and cover the cost of production periodically depending on the amount of coal extracted during thereon with a new expense item called "uncovered expense recoveries".

The procedure of determination the values of this item could be highlighted as follows:

<table>
<thead>
<tr>
<th>Explanations</th>
<th>Quantities - thousands of tons</th>
<th>Lei/to</th>
<th>Values - thousands lei</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncovered coal reserves balance at beginning of period</td>
<td>A</td>
<td>( \frac{C}{A} )</td>
<td>Cheltuielile efectuate cu descopererea rezervei aflate in sold la inceputul perioadei – ( C )</td>
</tr>
<tr>
<td>Discovered during the period</td>
<td>B</td>
<td>( \frac{D}{B} )</td>
<td>Expenses made during the period - ( D )</td>
</tr>
<tr>
<td>TOTAL</td>
<td>A+B</td>
<td>( \frac{C+D}{A+B} )</td>
<td>( C+D )</td>
</tr>
<tr>
<td>Included in the cost of production in that period</td>
<td>( C+D )</td>
<td>( \frac{A}{A+B} )</td>
<td>Expenses included in the expense article – recovery of expenses for the discovery (Rcd)</td>
</tr>
<tr>
<td>Balance at end of period</td>
<td>( A+B-C )</td>
<td>( \frac{(A+B-C) \times C+D}{A+B} )</td>
<td>Expenses made with the coal reserve found in balance at the end of the period</td>
</tr>
</tbody>
</table>

Table no. 1. Manner of calculating the expenses made with the discovery
According to table no. 1 and some random data we make a distribution of actual expenditures discovered in Table 2.

<table>
<thead>
<tr>
<th>Explanations</th>
<th>Quantities -thousands of tons-</th>
<th>Lei/to</th>
<th>Values -thousands lei</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncovered coal reserves balance at beginning of period</td>
<td>1,245,567,00</td>
<td>17,45</td>
<td>21,731,632,00</td>
</tr>
<tr>
<td>Uncovered during the period</td>
<td>350,000,00</td>
<td>15,52</td>
<td>5,432,908,67</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1,595,567,00</strong></td>
<td><strong>17,03</strong></td>
<td><strong>27,164,540,67</strong></td>
</tr>
<tr>
<td>Included in cost of production for the period</td>
<td>368,000,00</td>
<td>17,03</td>
<td>6,265,202,88</td>
</tr>
<tr>
<td>Balance at the end of the period</td>
<td>1,227,567,00</td>
<td>17,03</td>
<td>20,899,337,79</td>
</tr>
</tbody>
</table>

Table no. 2. Actual allocation of costs uncovered

**Note:** Data for uncovered coal reserves are obtained from departments dealing with geological survey of the career.

In the Northern Jilt Coal Mine, accounts with which is achieved accounting by production and expenditure calculation are **costing management accounts** that are meant to take over operating expenses of financial accounting where they recorded their nature, order them by function to calculate the actual cost of production obtained, the settlement of this production and the actual costs of establishing deviations from the pre to exercise budgetary control over costs. Thus is achieved the independence of the financial accounting towards management accounting.

In the plan’s accounts, these accounts are included in Class 9 - **Management accounts** and they have as characteristic the fact that at the end of the financial year they do not appear on the balance sheet as data and information that reflects their already recording in the financial accounting which is used to prepare the balance sheet.

Also, it is worth mentioning that these accounts have more flexible accounting functions in terms of their debit and credit whereas the organization of management accounting is up to each mining unit. That is why the characterization of the accounts and calculation models presented will not meet strict methodological rules of accounts, being several possible variants of operation of those accounts.

Using data obtained from the accounting of EMC Jilt for December, we present how the retrieval of expenditure management accounting functions.

- Collecting expenses:
  \[ % = 901 \]
  \[ 921.1 \]
  „Costs of core activity - coal”
  \[ 921.2 \]
  „Costs of core activity - sterile”
  \[ 922.1 \]
  „Costs of auxiliary activities-workshop”
  \[ 922.2 \]
  „Costs of auxiliary activities – electric workshop”
  \[ 922.4 \]
  „Costs of auxiliary activities - mining workshop”
  \[ 923 \]
  „Indirect production costs -geology”
  \[ 924 \]
  „General administration expenses”
  \[ 925 \]
  „Selling expenses”

- recording expenditure of basic activities incurred on auxiliary activities expenses, and indirect sales:
  \[ % = 922.1 \]
  \[ 921.1 \]
  „Costs of core activity – coal”
  \[ 922.1 \]
  „Costs of auxiliary activities-workshop”
  \[ 923 \]
  „Indirect production costs -geology”
  \[ 924 \]
  „General administration expenses”
  \[ 925 \]
  „Selling expenses”
The costs of the core activity – coal are 641,145.49 lei.

The costs of auxiliary activities – electric workshop are 688,264.59 lei.

The costs of auxiliary activities – mining workshop are 641,145.49 lei.

The registration of the production cost obtained by default is as follows:

\[
\text{Cost of obtained production} = \frac{\text{Internal settlement of obtained production}}{\text{Budgeted unit price}} = \frac{11,853,940.00}{52.22} = 227,000
\]

where:
- \( Q \) - production obtained in December 2010
- \( P_s \) - budgeted unit price

The registration of the actual cost of the obtained production is:

\[
\text{Internal settlements of obtained production} = \frac{\text{Cost of obtained production}}{\text{Budgeted unit price}} = \frac{11,853,940.00}{641,145.49} = 18.41
\]

The calculation and recording of the differences between standard and effective costs are:

\[
\text{Internal settlements concerning price differences} = \frac{\text{Effective cost}}{\text{Standard cost}} = \frac{12,595,151.51}{6,300,786} = 741,211.51
\]

The settlement of the effective cost of production obtained is:

\[
\text{Internal settlements concerning expenses} = \frac{\text{Effective cost}}{\text{Standard cost}} = \frac{11,853,940.00}{6,300,786} = 18.86
\]

The calculation of the unitary production cost is as follows:

\[
C_{\text{up}} = \frac{\text{\( Ch_{\text{ab}} \) + \( Ch_{\text{aa}} \) + \( Ch_{\text{ag}} \)}}{\text{\( Q \)}} = \frac{8,671,561.8 + 2,219,622.84 + 94,886.00}{227,000} = 49.40 \text{ lei/ton}
\]

where:
- \( C_{\text{up}} \) – unitary production cost;
- \( Ch_{\text{ab}} \) – costs of core activities;
- \( Ch_{\text{aa}} \) – costs of auxiliary activities (mechanical, electric, mining workshop);
Ch_{ug} – costs of geological activity;
Q – quantity of coal extracted.

II. Calculation of unitary indirect production cost:

\[ C_{ui} = \frac{Ch_i}{Q} = \frac{Ch_{ug} + Ch_d}{Q} = \frac{764.334.38 + 844.747.00}{227.000} = \frac{1.609.081.38}{227.000} = 7.09 \text{ lei} \]

where:
C_{ui} – unitary production cost;
Ch_i – indirect coal mine costs;
Ch_{ga} – general administration expenses;
Ch_d – selling expenses;
Q – quantity of coal extracted.

III. Calculation of complete unitary cost:

\[ C_{uc} = C_{ud} + C_{ui} = 48.48 + 7.09 = 55.49 \text{ lei} \]

Thus, from the calculations made, the full unit cost of coal mined in the month of December 2010 is 55.49 lei.

4. Conclusions

Given the complexity of the manufacturing process in mining, traditional costing methods used, do not provide information necessary for a detailed analysis of the activity itself.

Effective management of economic activity requires modern methods which do not wait to see the results of the activity (effective costs), information not specifically refer to past periods, whereas they do not serve too much of a dynamic leadership and its effectiveness is inversely proportional to the length of time in which they are provided.

To facilitate the collection of spendings both for accounts as well as activities, we propose that in the future we create, in financial accounting, analytical accounts of expenditure related to unit activities, the proposal being feasible only with a computer program to group spending on both accounts and activities.

It is therefore necessary to shift from the current vision of cost calculation on management periods, to the calculation of costs on the production cycle achieved at the level of production sectors and even workplaces, the organizational structure and identification of manners of expenses at the level of these organizational links offering such a possibility.

5. Bibliography: