THE PARTICULARITIES OF PRODUCT COST CALCULATION AT THE ENTERPRISES WITH SEASONAL ACTIVITY

Professor PhD Viorel Țurcanu, Academy of Economic Studies of Moldova,
e-mail: vturcanu@ase.md
Lecturer PhD Viorica Zaporojan, Academy of Economic Studies of Moldova,
e-mail: vioricazaporojan@yahoo.com

ABSTRACT: This article comprehends the problems of cost calculation at the enterprises with seasonal activity. The practical recommendations are based on organizational and technological features corresponding to peculiarities of the seasonal production. Here we can mention: the creation and the accounting of provisions for certain types of costs for raw materials, for reparation of assets; calculation of depreciation of productive assets by the method of production using the recalculation of planned volume to factual volume of production; the reciprocal method using the proceeding of proper factual unit cost of the service department etc.

Keywords: cost, calculation of cost, correlation coefficient, services of interdependent sections, distribution basis, and method of cost calculation.

JEL Codes: M 41

Currently the management accounting represents not just a tool for recording data referring to the consumptions but also a tool for optimization of the production that makes it possible to maximize the profit. Thus the role of the management accounting is found in planning, evidence, analysis and the control of the utilization of resources, the calculation of the cost, the adoption of effective managerial decisions. However in the centre of attention is the cost, which directly represents a source of information that can ensure the economic balance at the enterprise.

The economic category of cost is used to evaluate the majority of assets: the cost of fixed means, the cost of materials, and the cost of products, of goods and of services. This explains the importance of the cost as a quality indicator of the performance of the enterprise. So the cost expresses the essence of the entire system of relationships on the line of production and circulation, which are established in an objective mode between economic agents, entrepreneurs and customers after a time.

Thus, the enterprises of production accord an important attention to the cost of production. In accordance with the provisions of the National Accounting Standard 2 "The stock of goods and inventories", the cost is composed of direct consumptions of materials, of direct consumptions concerning the remuneration of labour and indirect consumptions of production. The given definition, essentially, is not different from that presented by the IAS 2 "Inventories", where the costs of conversion of inventories (the cost of production) are determined by the total of the direct expenses with a share of indirect expenses of production, fixed and variables, occasioned by the transformation of raw materials into finished products.

Since at the base of efficiency, the most simple and convenient criterion of application is the cost, it results that the ruling objective of management accounting is the calculation of costs. The calculation of costs means the process of gathering, processing, grouping, allocation and distribution of consumptions and of analysis the final results on the cost units and cost centres, based on certain pre-established methods and techniques. The stages of the product cost calculation process are shown in the Figure 1.

Of those mentioned above result that the accounting of consumptions is integrated part of the process of calculation of the production cost. Both on the organization mode of accounting of consumptions and on the cost calculation of production influence a series of factors, such as: the particularities of the technological process, the type of production and its organization mode, the size and the degree of profiling and specialization of the enterprise, the organizational structure, the methods and techniques adopted by the management, the existence of a seasonal nature, the type of raw material used, the specific of the structure of production process (uninterrupted and short), the manufacture of finished production in accordance with the succession of processing of raw material on phases, stages and technological limits, the mass production, the assortment and the varied nomenclature of finished products etc.
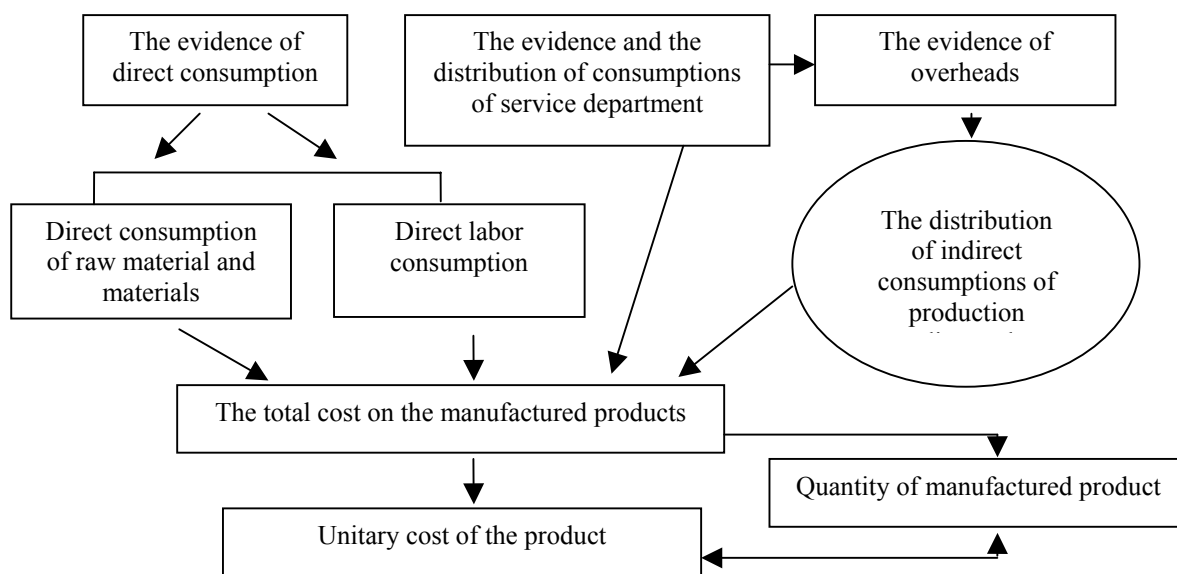

Fig. no. 1 – The stages of the product cost calculation process

The following of obtaining truthful, operational and relevant information about the cost of production, referring to the assurance of the analysis and the adoption of effective management decisions, imposes the organization of the production consumptions' accounting on the centers of responsibility. In this context, first of all, it must be solved the problem of division of consumptions in verified and none verified. This fact permits the evidence of consumptions of production verified in the centers of responsibility on the responsible persons.

The product cost calculation process begins with the determination of the consumptions' elements, which directly depend of the factors mentioned above and which vary from enterprise to another.

The mode of organization the product cost calculation process the process of the calculation of production cost at the enterprises with seasonal activity showed some specific aspects. Further are represented the particularities of the calculation of production cost at the seasonal enterprises, following the stages shown in Figure 1.

At the first stage it will be allocated the direct consumptions of production: the consumptions of raw materials and of materials and the consumptions of labour remuneration.

Direct consumptions of raw material and materials represent consumptions mostly controlled. Therefore, at the enterprises with seasonal production, their evidence must begin at the moment of provisioning with the evidence of responsible persons. This fact will permit to follow the movement of raw material and of materials on various stages starting with the purchase and finishing with the obtaining of finished production. Also, in the case of appearance of deviations

from the pre-established standards of consumption, it will know the person responsible and instantly can be adopted the necessary decisions to remove them.

Another specific aspect afferent to accounting of these consumptions is the determination of the cost of purchase of raw material, which depends of the ways of provisioning existing at the enterprise (directly from physics or legal persons, through the intermediation of collection departments, from the own plantations of the production enterprises, etc.).

According to the national and international accounting stipulations, in the cost of purchase of raw material should be included also the consumptions of transport-provisioning, the consumptions related to the quality control, the consumptions referring to the process of keeping of raw material, the rate of consumptions supported by the collection departments etc.

A problem referring to the evaluation of raw material to seasonal enterprises is that the size of some consumptions, such as the maintenance the vehicle for raw material, the porter salary etc., is known only at the end of exercise (of month), while the raw material is transmitted in production at the time of provisioning. In this case it is necessary to know her cost of purchase at this time. To resolve this problem we suggest the creation a provision for the provisioning consumptions, keeping account of the size of respective consumptions in previous periods.

Those mentioned above are presented by an example, where the consumptions necessary to be included in the cost of purchase of raw material at the time of the purchase are valued to 61419.84 lei (Table 1).

Table no.1

The distribution of planed consumptions of transport-provisioning afferent to the raw material purchased in June 200X

Denomination of raw material	Quantity, tons	Coefficient of distribution, lei/ton	Total consumptions of transport-provisioning, lei
Green pea	235,6	143,27	33754,41
Cherries	124,2	143,27	17794,13
Sweet cherries	45,5	143,27	6518,78
Gooseberries	2,1	143,27	300,87
Cucumbers	21,3	143,27	3051,65
Total	428,7	X	61419,84

(Source: elaborated by the authors)

To the value of consumptions of transport-provisioning at the time of purchase of raw material will be made the accounting formula:

+A	+D	lei
Raw material =	Provisions for consumptions of transport-provisioning	61419,84

Also we note that for the current evidence of raw material, is an advantage to use FIFO formula of evaluating stocks. The applying of this formula excludes the following shortcomings specific to the weighted average cost formula, used currently by the enterprises with seasonal nature:

- in evidence is not keeping account of the direction of raw material utilization depending on its quality;

- the cost of the raw material of a higher quality, used in certain types of products is lower and vice versa;

- the information obtained and used distorts the decisions regarding the management of consumptions.

In which concerns the organization of accounting of **direct labor consumptions,** at these enterprises, we consider that it must keep an operative evidence (daily and to the shifts) of working time, with the indication of production volume produced by each shift separately.

Such kind of evidence of direct labor consumptions can be achieved by:

- keeping the places of occurrence and the centers of responsibility;
- the presentation of the information referring at the number of worked hours by the workers of shift and the quantity produced to the accountant responsible for the calculation of salary;
- the daily calculation of workers directly involved in the production process, which is motivated at the moment of use of an automated system.

Seasonal activity and the particularities of production processes require a series of features referring to the evidence of **the production overheads,** the most essential being the costs afferent to the exploitation of the productive equipments (their repair, their maintenance, their amortization, etc.).

The repair of the productive equipments used in the manufacture of seasonal production, represents a consumer that can be attributed to the category of current consumptions so that to those anticipated or preliminaries. Also, at the organization of the evidence of those consumptions an importance has and the moment when a decision is taken for making a repair.

Of the category to which are assigned the repair consumptions depends their evidence mode and the method of allocation in the indirect consumptions. For example: in the case when the decision to repair an asset is taken at the beginning of the financial year, but the period of the making the repair will be after the end of season of mass production, then these consumptions must be attributed to the preliminary category, and those reflection will be effectuated through the account of provisions.

Another specific aspect is to choose the depreciation method. At present at the seasonal enterprises is used the straight-line method. But this method not reproduces the economic essence of the concept of depreciation. More rational, it is used the units-of-production depreciation method, but its application in the case of seasonal activity creates some difficulties. These are determined by the fact that the planning of production volume over the useful life assets is difficult to achieve. The solution of this problem can be achieved by the application of combination of straight-line method (for the calculation of annual depreciation) with the units-of-production depreciation method in accordance with the budgeting process and recalculated to the factual volume.

Those exposed above can be presented based in a concrete example. At a tins factory the cost of purchase (vi) of the technological line is 400 000 lei, the useful life (DFU) - 8 years, the residual value (VPR) - 1 000 lei.

At the beginning it must to calculate the annual amortization (AA) in accordance with the straight-line method:

$$Aa = \frac{Vi - VPR}{DFU} = \frac{400000 - 1000}{8} = 49875,00 \; lei \quad (1),$$

After that, it must to distribute the annual amount of amortization on the working (Table 2).

Also, the overheads include the consumptions of service departments. The attribution of these consumptions follows primarily the analysis of relations between the service departments. The allocation of consumptions of the interdepartmental services is realized in accordance with one of the proceeding afferent to the following methods: direct method, the step method, and the reciprocal method. The algebraic process of the reciprocal method gives the possibility to obtain the most relevant information. But its application at the production enterprises is complicated where there are more than two service departments.

Table no.2

The calculation of the monthly depreciation for the year 200X

Month	Planed volume of products, tons	Factual volume of products, tons	The depreciation monthly related to the straight-line method, lei	The units-of-production depreciation method with the apply of recalculation at the factual volume (the proposed method)	
				Coefficient of distribution of the monthly depreciation	The monthly depreciation recalculated, lei
1	2	3	4=Aa / 12	5=Aa / total col. 2	6=5*3
01	4,2	3,1	4156,25	598,02	1853,87
02	2,1	2,3	4156,25		1375,45
03	1,2	0	4156,25		0,00
04	0	0	4156,25		0,00
05	0	1,1	4156,25		657,82
06	2,7	2,9	4156,25		1734,26
07	6,5	7	4156,25		4186,15
08	10,7	8,7	4156,25		5202,79
09	20,5	17,8	4156,25		10644,78
10	21,5	19,3	4156,25		11541,82
11	8,4	10,2	4156,25		6099,82
12	5,6	4,1	4156,25		2451,89
Total	**83,4**	**76,5**	**49875**	**x**	**45748,65**

Source: elaborated by the authors

Therefore, it was concluded that the necessity of applying a new proceeding of reciprocal method - *the proceeding of proper factual unit cost of the service departments*. The conclusions are based on the data of an enterprise assigned for the manufacturing of fruits and vegetables tins (Table 3).

Table no.3

The comparison of results of the methods of allocation of services between the interdependent sections distributed to the tins section on August 200X

Service departments	Applied methods				
	Direct method	*Step method*	*Step method, with the reiteration principle*	*Reciprocal method, the algebraic proceeding*	*Reciprocal method, the proceeding of proper factual unit cost of the service departments*
Section of transport	29579,16	28622,62	29805,58	30167,8	29284,84
Section of reparation	7823,62	11297,72	8111,99	8167,61	9051,25
Total	**37402,78**	**39920,34**	**37617,57**	**38335,41**	**38336,09**

Source: elaborated by the authors

The next stage of the product cost calculation process, after the evidence of all overheads, is the distribution and the allocation of them on the cost units. Taking into account the provisions of IAS 2 "Inventories", the overheads should be distributed in variables and constants. The speciality literature presents a set of applicable methods, such as: the technical-industrial method, the method

of accounting classification, the analytical method, and statistical methods. With a high precision of grouping are considered the statistical methods: the graphic method, the maximum and minimum point's method, the least-squares method, the method based on the correlation coefficient.

The application of graphic method involves the acceptance of some approximations of the behavior of consumptions and becomes subjective to draw the line of assessment of consumptions, as being constant at their intersection point with the straight line drawn. At the seasonal enterprises because of the inexistence in certain periods of manufactured product, and in others at a high level, the application of this method is insufficient and with a high degree of subjectivity. The maximum and minimum point's method, as well as the least-squares method, presents deficiencies in the application, because the first takes into account the maximum and minimum level of consumptions and respectively the volume of production from this period, but the second involves the adjustment of consumptions during the entire period, which is not typical to seasonal enterprises, because in the case where doesn't exist production in a month, consumptions however exist.

Therefore, for seasonal enterprises, we propose the statistical method based on the correlation coefficient, which determines the correlation of each item of overheads with the production volume. In the case where it can not be used this method from various reasons, such as the emergence of a new type of consumer, will use the analytical method, as being more simple and less expensive.

Simultaneous to allocate the indirect consumptions of production on the cost units, it is necessary to choose a base of their distribution. The use of some reasonably bases of distribution constitute a problem which remains permanently in actuality due to the factors such as:
- the trend of extension of the utilization area, which accompanies the processes of industrial development and of diversification of methods of calculation;
- the stressed increase of production volume that is distributed additionally;
- the complex nature of consumptions that needs a distribution etc.

If a category of consumptions destined to the additional distribution has a more complex nature, that it is more difficult to find a base of distribution fairly for all the elements that constitute the entire complex.

We consider that a base of distribution is selected correctly if between it and indirect consumptions of production exists a higher connection of correlation, which can be demonstrated by applying the correlation coefficient, which is calculated as follows:

$$r = \frac{\sum_{i=1}^{n} (x_i - \bar{x}) * (y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n} (x_i - \bar{x})^2 * (y_i - \bar{y})^2}} \ (2),$$

where:
r - the coefficient of correlation;
i - the analysis period;
x - the indirect consumptions of production;
$\bar{x}$ - the indirect medium consumptions of production, related to the analyzed period;
y - the base of distribution;
$\bar{y}$ - the medium value of the base of distribution, afferent to the analyzed period.

It should be noted that the following the stages of the product cost calculation process is realized in a close connection with the method of calculation, which is chosen at the beginning of this process and which orients and determines the organization mode of accounts codification of

production consumptions' accounts. Thus, the implementation of the method of calculation, adopted in accordance with the above mentioned factors, involves:

- the establishment of the cost units, which is made both in accordance with the natural form of presentation of production and with its nomenclature, with the type of production etc., so and with the demands of the method of calculation. If it exists more cost units it is more complicated the organization of the calculation;

- the establishment of sectors of consumptions, which is effectuated, also, compared with the demands of the method of calculation and the management of production, which serves for the deepen of the analytical nature of costs accounting;

- the adoption of the system of documents that are necessary for identifying, collecting and processing of the data concerning the consumptions, including those related to the calculation, analysis and the reference of deviations from the budgets. The cost calculation, organized under the leadership of a distinct department, takes on the one hand, from the department of planning the documents concerning the planning of production costs, and on the other hand, from the department of book-keeping the documents used to pursuit the consumptions of production. Although many of these documents served for other purposes, it is necessary to examine them from the point of view of costs, in order to establish a structure which will facilitate the execution of stages of calculation with automated accounting programs.

The last stage of cost calculation is the determination of the cost per unit. After the finalization of process of cost calculation it resorts to analyze the results obtained comparing with those forecasted, to detect the deviances obtained and to present the responsible persons in case of their apparition at the checked consumptions, to adopt the managerial decisions. The effective correlation of these activities makes in a highlight first of all, the specific features of certain types of production activities and demands the connection of those to the achievement of the main goal of the management accounting: the presentation of relevant, timely, clear and truthful information about the cost of production for adopting the effective management decisions.

References
1. S.N.C. 2 - *Stocurile de mărfuri şi materiale,* Monitorul Oficial al Republicii Moldova nr.88-91 din 30 decembrie 1997.
2. *Standardele Internaţionale de Raportare Financiară,* coord. Hennie Van Greuning, Printing House Irexon, Bucureşti, 2007, p. 566.
3. Briciu, S. – *Sistem informaţional privind contabilitatea de gestiune şi calculaţia costurilor în industria de încălţăminte* (teză de doctorat), ASE Bucureşti, 1999, p.307.
4. Diaconu, P. (coord.) – *Contabilitatea managerială aprofundată*, Ed. Economică, Bucureşti, 2003, p. 326.
5. Ristea, M. – *Calculaţia şi managementul costurilor*, Ed. Teora, Bucureşti, 2001, p.390;
6. Ţurcanu, V. – *Calculaţia costurilor*, Ed. ASEM, Chişinău, 2001, p.115;
7. Drury, C. – *Management Accounting for Business Decisions*, Thomson, United Kingdom, 2002, p. 505.