FLEXIBLE VARIABLE COST BUDGETING OF METALLURGICAL PRODUCTION

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Abstract

This article focuses on the flexible variable cost budgeting of metallurgical production and its usage for valuation of actual variable cost. In case that this flexible budget is not available, it is not possible to identify the main influences that affect the total differences between the planned and actual values of variable cost. These main influences are: influence of production volume, influence of product mix, influence of consumption of variable inputs and influence of price of variable inputs. This article defines the procedure how to calculate the flexible budget of overhead variable cost based on its average planned consumption and prices. Part of this article is also a definition of the calculation of main influences that cause differences between the budget of variable cost and its actual value.

Keywords: Variable Cost; Flexible Budgeting; Metallurgical Production; Product Mix; Company Plans; BOM

1. INTRODUCTION

The purpose of company plans and budgets for metallurgical production is to define the objectives of the company as a whole in the form of quantifiable outputs. The backbone of the entire system is the budget that is mostly defined for the individual analytical cost and revenue accounts of individual production centres. The most important thing for flexible cost budgeting of metallurgical production is the methodology of calculating the direct costs budget and variable indirect costs budget. [1]

Direct cost budget is based on planned costing of metallurgical products which calculates such costs per production unit, i.e. as a product of specific consumption of direct inputs specified in BOM (bill of materials) and their planned prices. The total direct costs are then a product of such costs per production unit of the individual products and the planned quantity to be produced.

Variable indirect cost budget is based on the sum of products of a planned amount of such costs per production unit of the individual products and the planned quantity to be produced.

2. METHODOLOGICAL BASIS

In order to ensure the correct analysis of actual variable costs achieved against their budget using variances, a flexible variable costs budget needs to exist. Such flexible budget is generated after the financial statement for the evaluated period (month, quarter) and its calculation requires the use of planned costing of variable costs.

The merit of the methodology of flexible variable cost budgeting is that the planned amount of such costs per unit of quantity of the individual products is multiplied by the actual quantity produced in the evaluated period, and then such calculated variable costs of the individual products are added together. This is the way to calculate the value of the flexible variable cost budget for actual quantity and actual product mix while respecting the planned amount of variable costs per unit of quantity of the individual products. [2]

In case the flexible variable cost budget is not available, it is impossible to identify the values of the individual variance types which cause the total difference between the variable cost budget and its actual amount in the

evaluated period. In the case of direct costs, such total difference can be caused concurrently by four influences, which are the influences of the total quantity and mix of produced products, the influence of natural specific consumption of the individual inputs, and the influence of their pricing.

2.1. Methodology of flexible direct cost budgeting

Converted direct cost budgeting consists of the planned amount of natural specific consumption of direct inputs (materials) stated in the BOM of such products being multiplied by the achieved production quantity for the individual products in the evaluated period. This is the way to calculate the quantity of such inputs (materials) for the individual products produced in the evaluated period. Adding up such calculated quantity of the individual types of direct inputs for the individual products gives us the total quantity of such inputs (materials) for all products. Their valuation at planned prices is used to calculate the flexible direct cost budget for the individual types of inputs specified in BOM, which corresponds to the specific consumption of inputs specified in BOM, the planned prices of such inputs and the actual quantity and mix of products produced in the evaluated period.

2.2. Methodology of flexible variable indirect cost budgeting

Converted variable indirect cost budgeting consists of the planned value of individual types of variable indirect costs per unit of quantity of the individual products (e.g. in CZK per ton) to be multiplied by the actual produced quantity of such products for the evaluated period. This is the way to calculate the value of the individual types of variable indirect costs for the individual products produced in the evaluated period. Adding up such values gives us the flexible budget of the individual types of variable indirect costs for all products, which corresponds to the planned amount of such costs per unit of quantity of the individual products and the quantity of such products produced in the evaluated period. [3]

3. EXPERIMENT PART

Proper evaluation of the actual amount of variable costs achieved in the evaluated period using variances against the budget of such costs is done in two phases:

- In evaluation phase 1, the approved variable cost budget is compared with the calculated flexible budget of such costs, and the influence of the total production quantity and influence of the product mix on the actual amount of variable costs is determined.
- In evaluation phase 2, the calculated flexible variable cost budget is compared with the actual amount of such costs in the evaluated period, separately for the direct costs and separately for the variable indirect costs. In the area of direct costs, there are two influences calculated: in particular, the influence of variance of natural specific consumption of such costs and the influence of variance of price of natural direct costs on the actual amount of the direct variable costs. In the area of variable indirect costs, one total influence of variance of such costs per unit of quantity of produced products is determined.

3.1. Comparing approved and flexible variable cost budgets

The difference between an approved budget (HP) and a flexible budget (PP) of variable costs is given by the influence of the variance of the total production quantity and the influence of product mix on their amount. The influence of variance of the total production quantity is mostly determined first and the influence of product mix is then determined as the remaining value of the total difference between these budgets. (**Equation 1, 2, 3**) [4].

Total difference between approved and flexible variable costs:

$$\Delta VN_{(HP-PP)} = VN_{HP} - VN_{PP} \quad (1)$$

$\Delta VN_{(HP - PP)}$ - Total difference between approved and flexible variable cost budgets (CZK)
VN_{HP} - Total amount of variable costs in an approved budget (CZK)
VN_{PP} - Total amount of variable costs in a flexible budget (CZK)

Influence of variance of total production quantity on variable costs:

$$\Delta VN_Q = (Q_{SK} - Q_{PL}) * (VN_{HP}/Q_{PL}) \quad (2)$$

ΔVN_Q - Influence of variance of total production quantity on variable costs (CZK)
Q_{SK} - Total actual production quantity for all products in the evaluated period (tons)
Q_{PL} - Total planned production quantity of all products (tons)
VN_{HP} - Total amount of variable costs in an approved budget (CZK)

Influence of product mix on variable costs:

$$\Delta VN_S = \Delta VN_{(HP-PP)} - \Delta VN_Q \quad (3)$$

ΔVN_S - Influence of product mix on variable costs (CZK)
$\Delta VN_{(HP-PP)}$ - Total difference between approved and flexible variable cost budgets (CZK)
ΔVN_Q - Influence of variance of total production quantity on variable costs (CZK)

3.2. Comparing a flexible direct cost budget with its actual value

The difference between a flexible direct cost budget and its actual value achieved in the evaluated period is given by the influence of variance of specific consumption of direct inputs and the influence of variance of price of such inputs on their amount. It is easier to first determine the influence of prices, whereas the influence of specific consumption is then determined as the remaining value of the total difference. (**Equation 4, 5, 6**) [5]

Total difference between a flexible direct cost budget and its actual value:

$$\Delta VJN_{(PP-SK)} = VJN_{PP} - VJN_{SK} \quad (4)$$

$\Delta VJN_{(PP - SK)}$ - Total difference between a flexible budget of direct costs and their actual value (CZK)
VJN_{PP} - Total amount of direct costs in a flexible budget (CZK)
VJN_{SK} - Total actual amount of direct costs in the evaluated period (CZK)

Influence of price of direct input on direct costs:

$$\Delta VJN_C = (VJN_{CPP} - VJN_{CSK}) * VJN_{QSK} \quad (5)$$

ΔVJN_C - Influence of price of direct input on direct costs (CZK)
VJN_{CPP} - Planned direct input price (e.g. in CZK per ton)
$VJN_{PRICE\ SK}$ - Actual direct input price (e.g. in CZK per ton)
VJN_{QSK} - Actual consumed quantity of direct input for all products (e.g. in tons)

Influence of specific consumption of direct input on direct costs:

$$\Delta \mathrm{VJN}_{\mathrm{MS}} = \Delta \mathrm{VJN}_{(\mathrm{PP-SK})} - \Delta \mathrm{VJN}_{\mathrm{PRICE}} \quad (6)$$

ΔVJN_{MS} - Influence of specific consumption of direct input on direct costs (CZK)
$\Delta VJN_{(PP - SK)}$ - Total difference between a flexible direct cost budget and its actual value (CZK)
ΔVJN_{PRICE} - Influence of price of direct input on direct costs (CZK)

3.3. Comparing a flexible variable indirect cost budget with its actual value

The difference between a flexible variable indirect cost budget and its actual value in the evaluated period is based on the influence of variance of the average value of such costs on a production unit (e.g. in CZK per ton) and on total production quantity for all products.

Regarding the fact that it is one variance type, it is easier to determine the influence of this variance directly from the difference of the total value of variable indirect costs in the flexible budget and in the evaluated period. (**Equation 7**)

Total difference between a flexible variable indirect cost budget and its actual value:

$$\Delta VRN_{(PP-SK)} = VRN_{PP} - VRN_{SK} \quad (7)$$

$\Delta VRN_{(PP - SK)}$ - Total difference between a flexible variable indirect cost budget and its actual value in the evaluated period (CZK)
VRN_{PP} - Total value of variable indirect costs in a flexible budget (CZK)
VRN_{SK} - Total actual value of variable indirect costs in the evaluated period (CZK)

4. CONCLUSION

Use of a flexible variable cost budget is very important and advantageous for all operations not only of metallurgical production and the foundry industry, but for any repeated production using BOM (Bill of materials) in general. This is wherever we can talk about variable costs changing their amount based on a change of quantity of individual product types produced (direct costs) or total production quantity (variable indirect costs). [6]

If such flexible budget is not used, it is impossible to determine the values of the main influences contributing to the total difference between the planned and actual amount of variable costs. Such main influences include the influence of total production quantity, influence of product mix, influence of specific consumption of direct inputs and influence of variance of prices of such inputs between the flexible budget and the actual value achieved in the evaluated period. [7]

Besides the financial expression of the converted amount of variable costs to the actual amount and product mix, a properly generated flexible budget also contains the converted amount of direct inputs naturally expressed in units of consumption specified in BOM. And, it is such naturally expressed flexible budget that is a very important standard measure for comparing the actual consumption of direct inputs (costs) with consumption resulting from BOM. In addition, the performance of consumption of the direct inputs defined in BOM is the appropriate premium indicator for production personnel and management.

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