

Assignment to 5.2.3 - Solution -

For a process of continuous batch production the following data have been determined:

$C = 260400$ Cost of manufacturing

The output was:

$x_1 = 280000$ Quantity of product 1

$x_2 = 240000$ Quantity of product 2

$x_3 = 180000$ Quantity of product 3

$x_4 = 120000$ Quantity of product 4

The manufacturing cost per unit of each product type, c_1 , c_2 , c_3 , c_4 , cannot be ascertained without further information.

Nevertheless, the following equation is valid:

$$C = c_1 \cdot x_1 + c_2 \cdot x_2 + c_3 \cdot x_3 + c_4 \cdot x_4$$

Now the company assumes that there are firm relations between the costs per unit of each product. These relationships may be expressed by

$$c_1 = a_1 \cdot c_1$$

$$c_2 = a_2 \cdot c_1$$

$$c_3 = a_3 \cdot c_1$$

$$c_4 = a_4 \cdot c_1$$

Substituting these equations into the equation of total manufacturing cost yields:

$$C = c_1 \cdot (a_1 \cdot x_1 + a_2 \cdot x_2 + a_3 \cdot x_3 + a_4 \cdot x_4)$$

From this follows:

$$c_1 = \frac{C}{a_1 \cdot x_1 + a_2 \cdot x_2 + a_3 \cdot x_3 + a_4 \cdot x_4}$$

The relationships a_1 , a_2 , a_3 , a_4 are denoted as equivalence coefficients. The values are as follows:

$$a_1 = 1$$

$$a_2 = 0.8$$

$$a_3 = 1.4$$

$$a_4 = 1.2$$

Using these values, which are the manufacturing costs per unit c_1 , c_2 , c_3 and c_4 ?

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$$c_1 = \frac{C}{a_1 \cdot x_1 + a_2 \cdot x_2 + a_3 \cdot x_3 + a_4 \cdot x_4}$$

$$c_1 = 0.3$$

$$c_2 = a_2 \cdot c_1$$

$$c_2 = 0.24$$

$$c_3 = a_3 \cdot c_1$$

$$c_3 = 0.42$$

$$c_4 = a_4 \cdot c_1$$

$$c_4 = 0.36$$