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DEPENDENCE OF GROSS PROFIT AMROSIYIVSKOYI BRANCH PJSC «HEIDELBERGCEMENT UKRAINE» OF TECHNOLOGIES FOR PRODUCTION OF CEMENT BRANDS

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Introduction. Construction industry is one of the major industries of industrial production, which efficiency of functioning of all the system of menage in the country depends on. Construction complex supports protectability of country in the proper way, creates pre-conditions for growth of production in all industries of economy. The basis of this production is cement which not a single building will do without. Today Ukraine occupies the fifth place in the world after production of cement volumes, yielding to China, India, the USA and Japan. One of the leaders in this industry is PJSC «Heidelbergcement Ukraine», which is engaged in the production of cement, concrete and mixers in Ukraine. Research of dependence of gross profit of enterprise on technology of cement production was conducted on Amvrosiyivskoyi branch PJSC «Heidelbergcement Ukraine» which uses «wet» method of cement production.

There are three basic methods of making cement: «wet», «dry» and «combined». It is considered that «dry» method of making cement is a more advanced technology from positions of economy and ecological safety. Unfortunately, the basic technological method of making cement in Ukraine is the «wet» one. Today almost 80% of all domestic factories work on this method, whereas «dry» method of making cement prevails in the countries of Western Europe which is 90% of all its industrial production. In the nearest years wide introduction of «dry» method is being set in the cement industry of the country [1].

Basic material and results. To build optimization economic-mathematical model for determination of optimum gross output of products and maximal gross profit of Amvrosiyivskoyi branch PJSC «Heidelbergcement Ukraine» at the use of «wet» technology of making brands of cement.

Content of constituents of component of raw material in the different brands of cement and volumes of component supplies, which are kept in the storehouse, are known. The necessary volume of purchases of raw material is also known taking into account different risks and probabilities of large orders, that are necessary for realization of the set plan of production. It is possible to realize or use later for production the remains of the purchased raw material.

Next optimization economic-mathematical model of determination of optimum production volume for achievement of maximal gross profit.

Known parameters: i – raw material which enters into the composition of cement; j – brand of cement which is made; a_{ij} – necessary volume i - the type of raw material for making j - brand of cement; Z_i – supplies i - type of raw material; P_i – price of 1 tonne of i - raw material; P_j – price 1 1 tonne of j – brand of cement; N_E – norm of charges of electric power on the production of one tonne of products; P_E – cost of 1 kW electric power; N_T – a norm of charges of coal on the production of one tonne of products; P_T – cost of one tonne of coal.

Guided parameters: x_j – volume of output j - brands of cement.

Calculable sizes:

1) expense i - type of raw material, tonnes (1)

$$C_i = \sum_{j=1}^{m} \sum_{i=1}^{n} a_{ij} x_j ; \quad (1)$$

2) remains of i - type of raw material, tonnes (2)

$$V_i = Z_i - C_i ; \quad (2)$$

3) net profit, got from the production of goods, thousand of Uah (3)

$$D = \sum_{j=1}^{m} P_j x_j ; \quad (3)$$

4) cost of the used raw material, thousand of Uah (4)

$$p_i = \sum_{i=1}^{n} (C_i * P_i); \quad (4)$$

5) volume of the use of coal for milling, tonnes (5)

$$T_j = x_j * N_T. \quad (5)$$

On making of one tonne of cement it is necessary 300 kg of coal, that is N_T = 0,3 tonnes.

6) cost of the used coal, thousand of Uah (6)

$$p_T = \sum_{j=1}^{m} T_j * P_T. \quad (6)$$

One tonne of coal costs 1200 Uah, that is P_T =1,2 thousand of Uah.

7) expenses of electric power, kW (7)

$$E_j = x_j * N_E. \quad (7)$$

On making of one tonne of cement it is necessary 150 kW electric power, that is N_E = 150 kW.

8) outlaying electricity charges, kW (8)

$$p_E = \sum_{j=1}^{m} E_j * P_E; \quad (8)$$

One tonne of coal costs 1,8 Uah, that is P_E =0,0018 thousand of Uah.

9) production prime cost, thousand of Uah cost (9)

$$S = p_i + p_T + p_E. \quad (9)$$

Limitation of model:

1) the charges of raw material do not exceed possible supplies, tonnes (10)

$$C_i = \sum_{j=1}^{m} \sum_{i=1}^{n} a_{ij} x_j \le Z_i, i = \overline{1,n}; j = \overline{1,m}; \quad (10)$$

2) amount of products which is produced – a positive value, obligatory issue of every brand, compose 15000 tonnes for retail realization (11)

$$x_j \ge 15000 \quad j = \overline{1,m}; \quad (11)$$

3) amount of products which is produced – a positive value and maximal volume of output of every brand compose 400000 tonnes for retail realization (12)

$$x_j \le 400000 \quad j = \overline{1,m}; \tag{12}$$

4) x_j – a volume of output products is integer values for $j = \overline{1,m}$ (13).

$$x_j = цел. \tag{13}$$

The criterion is a gross profit from the issue of products which shows by itself the difference between the got net income from the issue of products and its prime price, it must be maximal (14):

$$W = D - S \to \max. \tag{14}$$

Optimization economic-mathematical model of optimum production volume is also built for achievement of maximal gross profit by dry-process of production, similar to the previous model. Those known and guided parameters of model are set. All calculable sizes are got accordingly by formulas (1–14), but the followings values of variables are set:

1) on making of one tonne of cement it is necessary 125 kg of coal, that is N_T = 0,125 tonnes.

2) one tonne of coal costs 1200 Uah, that is P_T =1,2 thousand Uah.

3) on making of one tonne of cement it is necessary 260 kW electric power, that is N_E = 260 kW.

4) one tonne of coal costs 1,8 Uah, that is P_E =0,0018 thousand Uah.

Limitation of model:

1) the charges of raw material do not exceed possible supplies, tonnes (15)

$$C_i = \sum_{j=1}^{m} \sum_{i=1}^{n} a_{ij} x_j \le Z_i, i = \overline{1,n}; j = \overline{1,m}; \tag{15}$$

2) amount of products, that is produced, a positive value and obligatory issue of every brand make 25000 tonnes for retail realization, tones (16)

$$x_j \ge 25000 \quad j = \overline{1,m}; \tag{16}$$

3) amount of products, that is produced, a positive value and maximal volume of output of every brand make 450000 tonnes for retail realization, tonnes (17)

$$x_j \le 450000 \quad j = \overline{1,m}; \tag{17}$$

4) x_j – a volume of output products is integer values for $j = \overline{1,m}$ (18).

$$x_j = цел. \tag{18}$$

The criterion is a gross profit from the issue of products which shows by itself the difference between the got net income from the issue of products and its prime price, it must be maximal (14).

Conclusion. 1. As a result of calculations optimum gross issue of products in the volume of 800043 tonnes has been estimated, maximal net profit, which made 1038855,06 thousand Uah, production prime cost, which makes 649530,3 thousand Uah and maximal gross profit of branch from the issue of products which makes 389324,8 thousand Uah.

2. As a result of calculations optimum gross issue of products in the volume of 1181028 t, a net profit from realization of which makes 1487386,32 thousand Uah. Production prime cost composes 988343,81 thousand Uah. The maximal gross profit of branch from the produced output makes 499042,51 thousand Uah.

3. Efficiency of transfer of production to the «dry» method is well-proven by the results of verification of terms of efficiency of work of the enterprise: the enterprise is cost-effective, as the coefficient of profitability is 0,47; the enterprise is profitable, as an index of profitability is 2,67; the production is cost-justifiable, an economic effect from transfer to the «dry» method of production makes 109717741 Uah, and coefficient of economic efficiency is 0,28; period of recoupment of transfer of production to the «dry» method, due to an economic effect from transfer, makes 5,1, which is a good index.

Literature:

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