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P100 HEADING MACHINE COMPETITIVENESS ANALYSIS

Coal is one of the most important sources of energy which Ukraine has in volumes sufficient for full maintenance of its own needs. It is the significant factor of the power safety guarantee of the country.

Over the last ten years application of worn out and low productive equipment defines the low labour productivity in the mining industry: output per manshift is 1.5 times less than ten years ago and is still decreasing. For Germany, these figures are 5-6 times more. The heading machine P110 of the new generation has been made at «NKMZ», the Novokramatorskyi machine-building plant.

The average monthly driving by the heading machine P110 1.9-2.3 times exceeds the driving by the corresponding heading machine 1GPKS made at Kopeiskyi machine-building plant, and the heading machine 4PP-2M made at Jasinovatskyi machine-building plant.

Labour productivity for P110 reaches 4.2-5.2 m^3 per a miner. It corresponds to the labour productivity for the heading machine in Germany (4.8 m^3 /miner).

The analysis of coal mining industry in the Russian Federation shows that in 2008 they have extracted 225 million tones. The forecast for 2011 was 370 million tones from which 36% (81 million tones) were extracted by the underground method.

314 heading machines work in the Russian Federation, from which 273 (87%) are 1GPKS. The other ones include AM 75 (Austria), ET 120 (Germany) and JOY (the USA). There are no competitors for the poor quality heading machines made at Kopeiskyi machine-building plant in Russia. The machines made abroad are very expensive and are not taken for analysis.

Research. The purpose of this study is estimation of competitiveness of the heading machine P110 and its introduction on the market of the mining equipment.

Results. Competitiveness analysis of the equipment described above has been carried out. The main competitors are:

- Jasinovatskyi machine-building plant (Ukraine), which is the basic supplier

of the heading machines for mines in Ukraine and Russia and has a broad assortment of machines (from light KSP-22 to heavy KSP-32).

- Kopeiskyi machine-building plant (Russia) specializes on manufacture of light heading machines which produce 1GPKS and KP25 heading machines, loading machines and coal cutters for potash and salt extraction.

4PP-2M heading machine made at Jasinovatskyi machine-building plant is compared with P110 made at the Novokramatorskyi machine building plant.

1. Competitiveness is calculated taking into account standard, technical, economic and organizational parameters:

$$K = J_{g.i.} \cdot \frac{J_{t.p.}}{J_{e.p.}};$$

2. The group index on standard parameters is defined by the equation:

$$J_{g.i.} = \prod_{i=1}^p q_i = 1;$$

3. The group index on technical parameters is defined by the equation:

$$J_{t.p.} = \sum_{i=1}^N q_i \cdot \alpha_i;$$

4. The index of quality is presented by the equation:

$$q_{it.p} = \frac{P_{ia}}{P_{ic}} \quad \text{or} \quad q_{it.p.} = \frac{P_{ia}}{P_{ic}};$$

5. The importance of the parameters for consumers was defined by the equation:

$$\alpha_i = \frac{F_i}{\sum_{i=1}^n F_i};$$

Using the data obtained we can calculate the group index on technical parameters, that is $J_{t.p.} = 1,14$. We make a conclusion that P110 heading machine has better technical characteristics than its competitor's ($J_{t.p.} > 1$) by 14%.

6. The group index on economic parameters is defined by the equation:

$$J_{e.p.} = \frac{P_{r.p.}^a + O_{o.c.}^a}{P_{r.p.}^c + O_{o.c.}^c};$$

where $J_{e.p.} = 0,8088$.

We can make a conclusion that P110 heading machine is cheaper.

Using the first equation we can define the competitiveness of P110 heading machine, I means that $K = 1,41$. The results show that P110 heading machine is highly competitive on the market exceeding its competitors by 41 %.