

5. Vypanasenko, S. & Dreshpak, N. (2013). The features of energy efficiency measurement and control of production processes. Energy Efficiency Improvement of Geotechnical Systems - Proceedings of the International Forum on Energy Efficiency. Netherlands: CRC Press / Balkema, 71- 78.

6. Vypanasenko, S. (2008). Energy management systems of coal mines. Dnipropetrovs'k: National Mining University, 106 p.

DEVELOPMENT AND IMPLEMENTATION OF TECHNICAL AND ECONOMIC MODEL OF THE POTENTIAL OF OPERATION SCHEDULES OF COAL MINES

DEMCHENKO Yurii, SULAIEV Viktor & LAPKO Anastasiia
Dnipro University of Technology, Dnipro, Ukraine

Purpose is to determine parameters concerning development of the perspective time program to extract reserves providing complete predictability of the progress of mining operations within the sequent areas of a mine field.

Methodology. Algorithm, relying upon economic and mathematical model to determine values of basic parameters within the coordinate system of technical and economic potential of a mine, is the basis to form such an algorithm for the determination of a potential of operation schedule of a mine as well as strategic parameters of its implementation.

Findings. Analysis of functional relationships and correlation relationships between variables in the context of corresponding equations has helped determine new analytical dependences which, together with the available functional dependences between production characteristics of a mine, make it possible to develop a model to determine values of basic parameters of operation schedule of a mine. In this context, the obtained model is completed with additional restrictions, certain meanings of each variables and the problem solving is limited by Pareto set for the selected variables.

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Key words: operation schedules, production potential, economic indices, optimization model, Pareto rule

References

1. Mamaikin, O., Sotskov, V., Demchenko, Y., and Prykhorchuk, O. (2018). Productive flows control in coal mines under the condition of diversification of production. In E3S Web of Conferences (Vol. 60, p. 00008). EDP Sciences. doi.org/10.1051/e3sconf/20186000008

2. Sotskov, V.O., Demchenko, Y.I., Salli, S.V., and Dereviahina, N.I. (2017). Optimization of parameters of overworked mining gallery support while carrying

out long-wall face workings. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu*, (6), 34-40.

3. Demchenko, Y.I., Salli, S.V., and Mamaikin, A.R. (2017). The problems of operation schedule reliability improvement in mines. *Materials of the International Scientific & Practical Conference "Energy Efficiency and Energy Saving 2017"*; November 16-17, 2017, Ministry of Educ. & Science of Ukraine. National Mining University. Dnipro: NMU, 2017, 62 p.

4. Хорольський, А.О., Гріньов, В.Г. (2017). Системні принципи та оціночний критерій надійності при оптимізації технологічних схем вугільних родовищ. *Вісник Житомирського державного технологічного університету. Серія: «Технічні науки»*, 80 (2), 199-207. doi.org/10.26642/tn-2017-2(80)-225-233

5. Медяник, В.Ю., Нетеча, М.В., Демченко, Ю.І. (2015). Комплексний видобуток і використання корисних копалин. *Розробка родовищ*, (9), 93-100.

6. Russkikh, V., Demchenko, Y., Salli, S., and Shevchenko, O. (2013). New technical solutions during mining C5 coal seam under complex hydro-geological conditions of western Donbass. *Mining of Mineral Deposits*, 257-260.

7. Хорольський, А.А., Гринев, В.Г. (2017). Исследование структуры горно-шахтного оборудования с применением графов и сетевых моделей. «Сучасні інноваційні технології підготовки інженерних кадрів для гірничої промисловості і транспорту 2017», Дніпро: Національний гірничий університет, 72-82.

8. Сынков В.Г., Гринев, В.Г., Хорольский, А.А. (2016). Оценка уровня взаимосвязи очистного оборудования в составе механизированного комплекса. *Наукові праці Донецького національного технічного університету. Серія: «Інформатика, кібернетика, обчислювальна техніка»*, (22), 124-132.

9. Хорольський, А.О., Гріньов, В.Г., Каліущенко, О.П. (2017). Вдосконалення структури технологічних ланцюжків очисного обладнання на основі оптимізації мережевих моделей. *Форум гірників – 2017*. Дніпро: Національний гірничий університет, 55-62.

10. Хорольский, А.А., Гринев, В.Г., Сынков, В.Г. (2016). Обоснование возможности применения классической теории графов для выбора комплексов горного оборудования. *Сучасні інноваційні технології підготовки інженерних кадрів для гірничої промисловості і транспорту*, Національний гірничий університет, 57-64.

11. Salli, S., Mamaykin, O., and Smolanov, S. (2013). Inner potential of technological networks of coal mines. *Mining of Mineral Deposits*, 243-246.

12. Salli, S.V., Mamaykin, O.R., Ashcheulova, O.M., and Salieiev, I.A. (2014). On the Building a System of Reduction of Loss Ratio Level of Coal Mines. *Mining of Mineral Deposits*, 8(1), 41-47.

13. Salli, S., and Mamajkin, O. (2012). Ecological aspects of the quantitative assessment of productive streams of coal mines. *Geomechanical Processes during Underground Mining: School of Underground Mining 2012*, 115-118.

15. Salli, S., Pochepov, V., and Mamaykin, O. (2014). Theoretical aspects of the potential technological schemes evaluation and their susceptibility to innovations. In *Progressive Technologies of Coal, Coalbed Methane, and Ores Mining* (pp. 491-496).

16. Lapko, V., Fomychov, V., and Pochepov, V. (2015). Differential system of the rope bolts loading during extraction drift support. *New Developments in Mining Engineering 2015: Theoretical and Practical Solutions of Mineral Resources Mining*, 461-464.

PRINCIPLES OF DIVIDING AN ENTERPRISE INTO SUBSYSTEMS AND DETERMINING THE INDICATORS OF TECHNOLOGY PERFORMANCE

MALTSEV Dmytro, VLADYKO Oleksandr & POYMANOV Sergiy
Dnipro University of Technology, Dnipro, Ukraine

Purpose. The purpose is to identify sets of indicators for each technology and their subsystems while extracting minerals by two technologies within the same mining enterprise.

Methodology. To achieve the purpose, systems approach was used, which allows to take into account the internal factors of the enterprise operation under the influence of external factors. For this purpose, previous research and patent sources were analyzed and generalized; scientific and technical studies on dividing the enterprise into components, used for mining enterprises, are analyzed; sets of indicators that characterize the operation of mining enterprises are analyzed and defined.

Findings. The principle of division of a mining enterprise into technologies, that are currently working or ready for implementation, is considered; authors' own approach to the formation of subsystems within each technology is proposed. Two different technologies were selected to divide the enterprise into subsystems and define sets of indicators for each of them. It has been determined that the number of subsystems for each technology is the same, at the same time they have their sets of indicators and parameters that operate under external influence. There is determined an optimal way to obtain information for sets of indicators in the subsystem guaranteeing operation of the enterprise. For this purpose, there was conducted the analysis of research by scientists studying an adjacent subject and identifying their sources of information. The information obtained allowed us to form individual sets of indicators for each subsystem. On the example of two fundamentally different technologies for coal extraction, they have formed indicators that allow performing a better assessment of the state of subsystems and forming a complete information model of enterprise operations. The resulting sets of indicators can be used for mathematical modeling of the enterprise operations.