MSc. Duong Duc Hai

Ph.D. Thesis Abstract:

„Method to improve the productivity of mining thick coal seams with seam dip up to 35° in the underground coal mines of Quang Ninh coalfield"

This thesis presents the results of research on increasing coal mining productivity in underground mines in Vietnam. Productivity is a decisive indicator in improving the competitiveness of the economy and each enterprise, including mining enterprises. Due to the specific geotechnical conditions of underground coal mines, the development of appropriate methods to improve productivity is more difficult than in the case of other enterprises.

The primary objective of this research was to develop a method for measuring and improving the productivity of mining thick coal seams with a seam dip up to 35° in the underground coal mines of Quang Ninh coalfield.

The following research methodologies are used in the thesis: a studies literature review on productivity in general and in the coal mining industry; survey research and interviews with experts in the mining industry aimed at identifying key parameters influencing coal mining productivity in underground mines of Quang Ninh coalfield, including the analysis of research results using statistical methods and the SPSS statistical software; Data Envelopment Analysis (DEA) method to determine the synthetic indicator of coal mining productivity; analysis and evaluation of the productivity mining thick coal seams with a seam dip up to 35°. The research was carried out in 13 underground coal mines of Quang Ninh coalfield, where coal resources are be located mainly in thick seams with a slope up to 35°. The research focused on a detailed analysis of the coal mining productivity of 11 mechanized longwalls, which were and are exploited in five underground mines in 2015–2020. Statistical regression and principal factor analysis were performed to determine the relationships between factors affecting coal mining productivity.

The most significant results of this research included improvement understanding of the definitions related to productivity, as well as its indicator and method for evaluation of mining efficiency in underground coal mines; development of new productivity indicator for assessment and control of the efficiency of mining thick coal seams with a seam dip up to 35°. This is of great importance in the evaluation, forecast and comparison of coal mining productivity, both in the entire Vietnamese coal industry and in individual underground mines of Quang Ninh coalfield. In addition, the study has proposed ways to improve productivity, as well as safety for extraction of thick coal seams with a seam dip up to 35°, which play an important role in increasing Vietnam coal production in the coming time.