

Abstract of Doctoral Thesis

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Technical-Economic Criteria for Selection of Underground Access to Polymetallic Orebody Characterized with Limited Geological Data, Exemplified with the Victoria Project in Canada

The presented dissertation discusses the problem of searching for algorithm supporting decision-making processes. The algorithm shall utilize technical and economic criteria for selection of underground access to the deep and not satisfyingly documented orebody. The algorithm constructed in such a manner is expected to enable simulation of different alternative scenarios and leads to the one that best satisfies investor's requirements. Dissertation contains seven chapters divided into two separate parts. The first part is theoretical and includes four chapters in which current achievements related to selection of underground access to the deposit are presented. Then, the mathematical concept of fuzzy logic is briefly explained. Lastly, the overall framework of proposed Fuzzy Decision-Making Algorithm is outlined. The second part of this dissertation contains three chapters and illustrates application of constructed algorithm to real problem regarding searching for the most optimal underground access to the deposit at The Victoria Project in Ontario, Canada, which is KGHM International asset, wholly owned subsidiary of KGHM Polska Miedź S.A.

Simulations that were carried out demonstrate that Fuzzy Decision-Making Algorithm is capable of utilizing contradictive preferences by multiple stakeholders and then, using formal mathematical apparatus of Fuzzy Sets Theory, algorithm can aggregate weights applied to hierarchical preference structure in order to effectively obtain non-fuzzy performance matrix for each alternative considered.