Towards a Systematic Selection of Hazard Assessment Methods in the Romanian Coal Mines Closure Process

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ABSTRACT

The objective of mine closure is to prevent or minimize long-term environmental damage, and to create a self-sustaining natural ecosystem or other land use based on an agreed set of objectives. The Romanian mine closure legislation should be enforced in the coming years for taking best follow up actions and management of post mining closure. The mine closure is a process which should begins during the pre-feasibility phase of a project and continues through operations to lease relinquishment. The closure of mining operations does not lead to the complete and permanent elimination of risks and harmful effects are likely to affect the surface within the geographical limits of the old mine workings. Therefore, during the period following the extraction, traditionally known as the „post-mining" period, several kinds of problems may develop, sometimes just after the closure process but also, much later. These phenomena may generate major consequences for people, ground, water, atmosphere and infrastructure. They are also likely to have a major influence on regional development in mining areas. Therefore the elaboration of evaluation methods able to identify and assess the residual risks that may affect people and properties after closure is of great interest. Emphasizing the basics and benchmarks specific for post-mining hazard assessment process the paper develops a primary classification of applicable methods, with respect to main methods selection parameters such as data availability, economic considerations and regulatory considerations. The criteria for selecting the best adapted hazard assessment methods for the specific conditions of Romanian collieries are also outlined in the paper.

Keywords: hazard assessment, mine closure, coal, systematic

OBJECTIVES IN POST-MINING HAZARD ASSESSMENT

The majority of experts agree on the definition of a hazard. Generically, a hazard corresponds to a condition that has a potential for causing an undesirable consequence.

A specific hazard can be defined by the possibility of its occurrence and on the possibility of a specific magnitude at a specific location. Considering surface instabilities, it may for example be characterized by diameter of a crater, horizontal deformations along a subsidence though, volume of unstable rock mass. Predicting a-priori, the specific magnitude of a hazard, even from well-defined data, may be difficult. However, the types of failure mechanisms and their geometrical occurrences are well defined. Given a site's discontinuity feature and shallow working geometry and depth, the nature and the magnitude of a particular failure mechanism can be identified. This narrows considerably the range of probability values for specific magnitudes and simplifies the identification of the worst case. In some cases there can be only one failure mechanism. The specific failure mechanism case studies would be helpful for a practical understanding of the different site behaviors.

The probability of occurrence, reflecting a site's sensitivity to be affected by any of the events analyzed, is generally more difficult to quantify than the magnitude [7]. No matter what type of events are feared, the complexity of the mechanisms involved, the heterogeneous environment and the very partial available data that it is generally very difficult to assess quantitative probabilities (x % risk of a given event during a defined time period).