Solution Mining Research Institute, Spring 2004 Technical Meeting
Wichita, Kansas, USA, 18-21 April 2004

Application of a Continuum Damage Model for Cavern Design Case Study : Atmospheric Pressure

Reinhard Rokahr, Kurt Staudtmeister and Dirk Zander-Schiebenhöfer

Institut für Unterirdisches Bauen (IUB)
Hannover University, Welfengarten1, D30167 Hannover, Germany

Abstract

In recent years the application of continuum damage models for the rock mechanical design and layout of storage caverns in rock salt mass has increased. Those models offer a possibility to quantitatively assess damage with respect to the rock mass affected over the time of cavern operation. But they strongly depend on the degree of knowledge of location specific material parameters.

One of the most obvious cases where damage at the near boundary wall region in the salt rock will occur is the case of the blow out of a gas storage cavern for which a proof of long term stability is claimed by the regulators e.g. in Germany.

The possibilities of the application of a continuum damage model (MDCF) are shown and will be compared with a rock mechanical model based on a conventional engineering approach. Both procedures will be evaluated in terms of safety aspects.

Keywords: Cavern Design, Rock Mechanics, Continuum Damage Model