

may result. This is demonstrated for the 'doorstopper' method by means of parametric studies, in which anisotropic stress concentration factors are used. Auth.

#### 845225

##### **Determination of the complete state of stress in rock with the flat jack method (In German)**

Balthasar, K.; Wenz, E

*Proc 5th Congress of the International Society for Rock Mechanics, Melbourne, 10-15 April 1983 V2, PF69-F74. Publ Rotterdam: A. A. Balkema, 1983*

In spite of the high state of development of the flat jack method, the measurements are still restricted to the surface of the rock. The application of the method for the determination of the complete state of stress in rock is demonstrated for a water overflow gallery in the Harz Mountains, Germany. The results are compared with the results of stress measurements in other areas of central Europe.

#### 845226

##### **Determination of the state of stress of rock masses by the small flat jack (SFJ) method**

Pinto, J L; Charrua-Graca, J G

*Proc 5th Congress of the International Society for Rock Mechanics, Melbourne, 10-15 April 1983 V2, PF79-F83. Publ Rotterdam: A. A. Balkema, 1983*

The application of the small flat jack method to the determination of the state of stress of rock masses is analysed for circular, square and elliptical galleries.

#### 845227

##### **Rock stress measurement by sleeve fracturing**

Stephansson, O

*Proc 5th Congress of the International Society for Rock Mechanics, Melbourne, 10-15 April 1983 V2, PF129-F137. Publ Rotterdam: A. A. Balkema, 1983*

A sleeve fracturing technique has been developed which determines rock mass deformability and rock stress in the same test. Axial borehole fractures are induced without fluid interaction with existing fractures and joints. The technique was tested in the laboratory using blocks and thick walled cylinders. Sleeve fracturing has also been used at several sites including in Pomona Basalt at the Hanford test site, Washington, USA. At this site the magnitude and direction of stress determined by sleeve fracturing were in agreement with results from overcoring and hydraulic fracturing techniques.

#### 845228

##### **State of stress in rock and methods of its determination**

Kuznetsov, S V; Bronnikov, D M; Parabuchev, I A;

Parphenov, V D; Aitmatov, I T; Markov, G A

*Proc 5th Congress of the International Society for Rock Mechanics, Melbourne, 10-15 April 1983 V2, PF139-F146. Publ Rotterdam: A. A. Balkema, 1983*

Increased exploitation of mineral deposits has led to progressively deeper mining resulting in higher rock pressure and its manifestations - eg rock bursts, caving. The approach to planning such an exploitation now involves: the mining system, forecast and control of high rock pressure phenomena and prevention measures. Methods to determine the state of stress in the rock mass are also examined.

## **Surface subsidence and caving**

#### 845229

##### **Surface strain over longwall coal mines: its relation to the subsidence trough curvature and to surface topography.**

##### **Technical note**

Ewy, R T; Hood, M

*Int J Rock Mech Min Sci V21, N3, June 1984, P155-160*

A Subsidence Analysis and Prediction computer program was used to determine the effects of topography on the surface strains and to define a characteristic pattern for those effects. For this purpose, a US longwall mine in rugged terrain was selected for study.

#### 845230

##### **Stopping of ground subsidences caused by cave-in applying rockbolts or hydraulic filling in shallow underground caverns**

Bobok, E; Somosvari, Z

*In: Rock Mechanics: Caverns and Pressure Shafts (papers to the ISRM Symposium, Aachen, 26-28 May 1982) V1, P171-175. Publ Rotterdam: A. A. Balkema, 1982*

Ground subsidence due to caving-in of an interconnecting network of tunnels and sewers built during the 17th and 18th centuries has become a problem in Eger, Hungary. Two remedial methods have been used: rock bolting which, though more expensive, allows further utilization of the reinforced cavern, and hydraulic filling which, though less expensive, eliminates the caverns.

#### 845231

##### **Linear models for predicting surface subsidence**

Salamon, M D G

*Proc 5th Congress of the International Society for Rock Mechanics, Melbourne, 10-15 April 1983 V2, PE107-E114. Publ Rotterdam: A. A. Balkema, 1983*

First, the notion of a preliminary screening of models is introduced using critical measures of surface movement. Next, exact elastic media are examined with attention focussed on the modelling of stratified rock masses using an equivalent medium. The Monte Carlo technique is employed to estimate from the properties of individual layers, which are treated as independent random variables, the moduli of the equivalent transversely isotropic mass. Finally, semi-empirical models are discussed and their application is illustrated by an example. Auth.

#### 845232

##### **Prediction of mine subsidence in eastern Australia by mathematical modelling**

Mikula, P A; Holt, G E

*Proc 5th Congress of the International Society for Rock Mechanics, Melbourne, 10-15 April 1983 V2, PE119-E126. Publ Rotterdam: A. A. Balkema, 1983*

Finite element modelling of subsidence due to coal extraction in Eastern Australia is described under certain limiting conditions. A systematic means of data acquisition and handling was developed to provide realistic input for the geotechnical model. The constant strain finite element program required large, carefully designed meshes and empirical reduction of laboratory strength properties. Anisotropy needed to be considered for coal measures strata. The inclusion of joint elements improved subsidence simulation but was not essential for generalised prediction. Examples of successful modelling at shallow depths are discussed. Auth.