

The paper examines 3 aspects of large caverns in hard rocks: (1) the orientation of the cavern axes based upon consideration of the rock mass parameters, (2) analytical evaluation of stress and strain in the surrounding rock mass, and (3) monitoring of the underground cavern wall position.

845217

Reproduction of natural stresses in the rock massif and the building technology by finite element method calculations (In French)

Christov, T N

In: Rock Mechanics: Caverns and Pressure Shafts (papers to the ISRM Symposium, Aachen, 26-28 May 1982) V1, P183-193. Publ Rotterdam: A. A. Balkema, 1982

The state of stresses, both in the rock massif surrounding a cavern and in the elements of a consolidating construction, largely depends on the preexisting natural stresses together with the methods and sequence of construction. It is suggested that the natural stresses should be calculated in advance using the finite element method. The new state of stress resulting from excavation or construction can then be calculated in steps. A numerical model is illustrated for the example of an underground hydro-electric station.

845218

Pressure tests in rock chambers

Keshan Zhu; Xiesheng Lie

Proc 5th Congress of the International Society for Rock Mechanics, Melbourne, 10-15 April 1983 V2, PD267-D269. Publ Rotterdam: A. A. Balkema, 1983

Three rock chamber tests were carried out in granodiorite and diorite where severe rock deformation and cracking of the linings had occurred in an underground hydroelectric powerhouse. Results are compared for the chambers: (1) shotcreted and irregularly shaped, (2) unlined and approximately square and (3) circular and lined with single and double layer reinforced concrete. It is concluded that there would be little difference in the cracking capacity and deformation behaviour of the reinforced concrete linings and the shotcrete if good care is taken to avoid cold joints.

845219

Shaft lining pressures during sinking through deep aquifer rocks

Altounyan, P F R; Shelton, P D; Hao, W

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Total and hydrostatic stresses, lining strains and temperatures were measured during the construction of cast-in-situ plain concrete linings through saturated Triassic and Coal Measures sandstones at depths up to 655m at Whitmoor, North Selby and Riccall Mines, Yorkshire, UK. After final grouting of the lining radial hydrostatic stresses were close to the full hydrostatic head and geostatic stresses were found to be negligible.

845220

Strata control in deep coal mines in Hokkaido - in-situ monitoring and interpretation of stress changes in coal seams

Fukuda, K; Ishijima, Y; Kinoshita, S

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Case studies of coal bumps in Hokkaido, Japan, showed their occurrence to be restricted to the zone around coal pillars which have a sandstone roof measuring more than four times the thickness of the coal seam. To clarify the mechanism, uniaxial compression tests were carried out on a double layered model,

stress changes in a coal seam were monitored and numerical analyses were performed. It was concluded that the most important conditions causing coal bumps were: (1) when coal fails, a sandstone roof supplies a large amount of energy to the coal seam compared to that composed of shale, and (2) the mode of energy release and the patterns of stress changes are remarkably disturbed when an irregular distribution of mechanical strength of coal appears in the coal seam.

845221

Application of the displacement discontinuity method to the planning of coal mine layouts

Wardle, L J; Enever, J R

Proc 5th Congress of the International Society for Rock Mechanics, Melbourne, 10-15 April 1983 V2, PE61-E69. Publ Rotterdam: A. A. Balkema, 1983

A three-dimensional displacement discontinuity method for stress analysis of practical mine layouts in a layered, anisotropic rock mass is described. The methods used to determine reliable estimates of input parameters are illustrated using Laleham No 1 Colliery, South Blackwater, Queensland, Australia as an example. Novel laboratory and field approaches used to obtain the stress-strain properties of the coal, the rock mass and caved waste material are described.

845222

Instrumentation system for the measurement and recording of transient geodynamics phenomena

Carrasco, J

Proc 5th Congress of the International Society for Rock Mechanics, Melbourne, 10-15 April 1983 V2, PE97-E99. Publ Rotterdam: A. A. Balkema, 1983

A measurement and recording system using strain gauge transducers has been developed to measure transient geodynamic phenomena in underground mines, eg rock bursts and stresses produced by blasting. The system has been used to determine the stresses in powered supports due to roof blastings in the Potasas de Navarra mines, Spain.

845223

Rock mechanics applied to the region near a wellbore

Bratli, R K; Horsrud, P; Risnes, R

Proc 5th Congress of the International Society for Rock Mechanics, Melbourne, 10-15 April 1983 V2, PF1-F17. Publ Rotterdam: A. A. Balkema, 1983

Analysis of stresses around a sand arch shows that a failure criterion exists. When a critical flow rate is reached the arch will collapse, leaving behind a greater cavity. Field test data can consistently be described by this theory. Extending the stress analysis to cylindrical wellbores shows that a plastically strained zone develops in poorly cemented rocks, when the well is drilled. During production this zone increases with the flow rate until the entire layer is fluidized. When injecting, fracture conditions may be reached before the material returns to an elastic state of stress. The stress analysis can be used to estimate the strength of the rock near the wellbore. Auth.

845224

Analysis of potential errors of interpretation of in-situ stress measurements in anisotropic rocks (In German)

Rahn, W

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Anisotropy of mechanical behaviour is a common feature of many crustal rocks. If this is neglected in the analysis of in situ stress measurements, considerable misinterpretations with respect to the magnitudes and directions of the principal stresses