

924446

Numerical modelling of underground hydraulic structures in jointed rock

Popov, P V; Tchesnokov, S A

Proc International Conference on Mechanics of Jointed and Faulted Rock, Vienna, 18-20 April 1990 P599-602. Publ Rotterdam: A A Balkema, 1990

A displacement discontinuity approach to modelling the stress field around underground structures is presented. The foundation of the method is described and it is illustrated in evaluation of the failure zone extent around a power station cavern of complex geometry for the cases of intact and faulted rock masses.

Underground excavation failure mechanisms

See also: 924387

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Identifying probable failure modes for underground openings using a neural network

Lee, C; Sterling, R

Int J Rock Mech Min Sci V29, N1, Jan 1992, P49-67

The use of a neural network to identify probable failure modes of underground openings in complex geological environments on the basis of prior case history information is described. The structure of the neural network adopted is shown, and the learning algorithm which is used to obtain knowledge from case histories is described. The results of learning are then used to test the operational characteristics of the network. Experimental testing of the ability to infer failure modes, retrieve patterns from partial cues, and resistance to faulty input data is presented. Application to a tunnel design guidance system is demonstrated. Differences between neural network and knowledge based expert system approaches are examined.

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Stability of stopes by wall-closure measurements

Nagarajan, K S; Shringarputale, S B; Palani, N; Krishnamurthy, R

In: ROCKBURSTS, Global Experiences (Paper to the 5th Plenary Scientific Session of Working Group on Rockbursts of International Bureau of Strata Mechanics, Hyderabad, 2-3 February 1988) P99-120. Publ Rotterdam: A A Balkema, 1990

Two major ore shoots in the Champion Reef Mine, Kolar goldfields, which had suffered major rockburst damage were re-opened and rehabilitated for mining by the Stope Drive method, which uses cemented fill. Wall closure measurements were made regularly to assess rate of closure and consolidation of the fill, which allows estimate of stability on a day-to-day basis. Analysis of these measurements and their relations to rockburst events are discussed. Correlations of closure to monitored microseismic activity have so far proved inconclusive.

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Study on determination of the relaxed zone around an excavated tunnel

Kim, H; Lee, K; Mizuta, Y; Lee, H

Proc ISRM International Symposium on Static and Dynamic Considerations in Rock Engineering, Swaziland, 10-12 September 1990 P177-182. Publ Rotterdam: A A Balkema, 1990

In order to assess the behaviour of rocks around a tunnel, the boundary element method and field monitoring of displacement and convergence were employed. The dimensions of the relaxed zone calculated by the BEM using the Hoek-Brown failure criterion are in good agreement with those measured in situ. Anisotropy, discontinuities, and rheological affects are not taken into account but are assumed to be covered by the values of the constants of the failure criterion.

Tunnels

See also: 924308, 924313

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London's Docklands: ground conditions and tunnelling methods

Ferguson, P A S; Runacres, A J; Hill, N A

Inst Civ Engrs Proc V90, Pt1, Dec 1991, P1179-1201

New drainage and sewerage for the Docklands regeneration project were constructed mainly by tunnelling, because of physical constraints and hydraulic requirements. To date, 11.6km of tunnel of diameter 1.35-2.1m has been driven through Flood Plain Gravels, London Clay, Woolwich and Reading Beds, and Thanet Sands. A variety of tunnelling machines, face support methods and linings was employed, including hand shield with compressed air, EPB and slurry shields with pipejacking, and an EPB TBM. Unpredictability of ground conditions was a feature, and the importance of considering this at the design stage was evident.

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Performance assessment of tunnels in cohesionless soils

Wong, R C K; Kaiser, P K

J Geotech Engng Div ASCE V117, N12, Dec 1991, P1880-1901

Tunnelling involves relief of initial in situ stresses and the disturbed ground will displace until a new equilibrium condition is established. This is examined for a circular tunnel in cohesionless soil, considering initial elastic response, intermediate yielding, and ultimate collapse. Different modes of behaviour and the conditions for their occurrence are identified. Results compare well with those from finite element analysis, model tests, and field data. The ground convergence curve (GCC) concept is proposed as a rational tool to interpret tunnel performance. The validity and limitations of different lining design models are examined.

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Interaction of tunnel linings and soft ground

El-Nahas, F; El-Khadi, F; Ahmed, A

Tunnlg Underground Space Technol V7, N1, 1992, P33-43

In situ stresses are significantly altered during tunnelling, the effects being influenced by tunnel configuration, soil type, and construction technique. A method for lining design is proposed which takes into account tunnelling method and lining installation. Tunnel-ground interaction is analysed during excavation and lining installation. In the first stage, preliminary stresses and deformations are evaluated. In the interaction stage, the soil continuum, lining, and interface are