

871288

Load response of modelled underground structures

Bakhtar, K; Black, A; Cameron, R

In: Research and Engineering Applications in Rock Masses (papers to the 26th US Symposium on Rock Mechanics, Rapid City, 26-28 June 1985) V2, P1255-1260. Publ Rotterdam: A. A. Balkema, 1985

Tests were carried out on instrumented scale model tunnels in a jointed tuff simulated rocklike material. The models were initially subjected to hydrostatic stressing before loading to failure in the axial direction. The observed stress-deformation characteristics and rise times of loading under quasi-static and dynamic conditions were used to predict the behaviour of a prototype tunnel.

Power plants

See also: 871142

871289

Design method for an underground power station at Maung, Indonesia

Bouvard, A; Esteulle, F; Isambert, F

Proc International Symposium on Large Rock Caverns, Helsinki, 25-28 August 1986 V1, P15-26. Publ Oxford: Pergamon Press, 1986

Design procedures for the underground power house are described. Geological investigation was undertaken to select the most favourable site, in tuff breccia. Empirical methods were used in design; rock mass classification methods, parametric analysis of stability, and the convergence confinement method. Finite element analysis was used to obtain stresses and deformations around the cavern and complete the previous work. Parameters of major importance were defined and have been a guideline for investigations currently underway, and will serve for the monitoring program during construction.

871290

Engineering practice and theoretical research of large rock caverns in hydroelectric power construction of China

Chen Zongliang; Fu Bingjun

Proc International Symposium on Large Rock Caverns, Helsinki, 25-28 August 1986 V1, P27-34. Publ Oxford: Pergamon Press, 1986

The development of and state-of-the-art of rock mechanics applied to large excavations in China are described. Topics include: laboratory and field methods of rock testing; field monitoring; stability analysis and model tests to predict or monitor stability; and advances in excavation and support methods. Some case studies and some current research topics are discussed.

871291

Experiences from large cavern excavation for Tarp

Cikanek, E M; Goyal, B B

Proc International Symposium on Large Rock Caverns, Helsinki, 25-28 August 1986 V1, P35-46. Publ Oxford: Pergamon Press, 1986

Two pumphouse caverns, 83.5m x 29.3m x 19.2m at depth 109m, and three smaller caverns, were excavated in dolomite in the pumping station complex for the Tunnel And Reservoir Plan (TARP), Greater Chicago, USA. Construction, support, grouting, and drainage are described. Conclusions are made concerning the extensive grouting program necessary to make this scheme a success.

871292

Monitoring and three-dimensional analysis of the Vilarinho power plant

Cunha, A P

Proc International Symposium on Large Rock Caverns, Helsinki, 25-28 August 1986 V1, P47-54. Publ Oxford: Pergamon Press, 1986

Installation of a second turbine at this Portuguese power plant necessitated the excavation of a 33m deep, 15.5m diameter shaft, only 8.5m from the existing generator. An extensive monitoring program measured the static and dynamic effects of the excavation. Three dimensional finite analysis was used to compute the deformations and displacements at this site of complex geology. Computed and monitored results agreed well, justifying both the model and the assumptions made.

871293

Edolo underground power station

Forzano, G; Frassoni, A; Moro, T; Rossi, P P; Vallino, G

Proc International Symposium on Large Rock Caverns, Helsinki, 25-28 August 1986 V1, P67-80. Publ Oxford: Pergamon Press, 1986

Three large caverns with parallel longitudinal axes were excavated in schistose rock for a pumped storage power plant. Geological studies, in situ stress measurement, and field and laboratory determination of geomechanical properties were carried out in the initial stages. A stability analysis by two dimensional finite element analysis was used as the basis of the design model. Displacements during excavation were monitored and compared with those predicted by the model, throughout the excavation process, in order to check the validity of the model.

871294

Kiambere hydro electric project cavern: rock mechanics aspects

Legge, T F H; Richards, L R; Pound, J B

Proc International Symposium on Large Rock Caverns, Helsinki, 25-28 August 1986 V1, P159-170. Publ Oxford: Pergamon Press, 1986

The rock mechanical properties, geology and in situ stress of the gneissic rock mass were evaluated during construction of access tunnels prior to cavern excavation, and demonstrated the high quality of the rock mass. A boundary element model was used to analyse the staged excavation of the cavern. Predicted and measured behaviour were in good agreement, indicating the validity of the analysis. The application of rock mechanical principles from the start of the project made it possible to reduce the support requirements as the project proceeded.

871295

Underground powerhouse of the Fortuna hydroelectric project -Panama; design and construction methods

Perdomo, D; Lee, R; Marchini, S; de Paoli, B

Proc International Symposium on Large Rock Caverns, Helsinki, 25-28 August 1986 V1, P183-194. Publ Oxford: Pergamon Press, 1986

Only three holes were drilled to decide the final location of the powerhouse, because of the great depth (440m). Initial surveys suggested excavation would be in good quality rock, about 85% andesite, 15% agglomerate, plus some tuff which deteriorated rapidly on exposure. Rock bolts and shotcrete support was specified. As excavation proceeded, it became obvious that significant amounts of tuff were present, and redesign was necessary. The final solution was soldier piles, horizontal steel walers and prestressed anchors.