Ground Support Case Studies

Grouting and Excavation Support in Doha—Simple, but Challenging – Thurner, R., Raja, S.U. and Kulmer, R.


Ground Support for Mining Through Weak Graphitic Faults at the Casa Berardi Mine, Quebec – Armatys, M. and Board, M.P.

Mining in Extreme Squeezing Conditions at the Henty Mine – Roache, B.

A numerical modelling case study - correlation of ground support instrumentation data with a three dimensional inelastic model – Sweby, G.J., Dight, P.M., Potvin, Y. and Sharrock G.

Tunnelling and Reinforcement in Heterogeneous Ground—A Case Study - Lope Alvarez, D., Sjöberg, J., Eriksson, M., Bertilsson, R. and Mas Ivars, D.

Ground Support Testing

Strain of Steel Rebar vs Rock Bolt Elongation on Laboratory Stand – Korzeniowski, W.B., Skrzypkowski, K. and Herezy, L.

A Follow up to the Behaviour of Cable Bolts in Shear; Experimental Study and Mathematical Modelling – Aziz, N., Mirza, A. and Nemcik, J.

Parametric study of cable bolt performance under axial loading in medium strength synthetic rock – Li, D., Hagan, P.C. and Saydam, S.

Drop Testing of Concrete Panels and Welded Wire Mesh at LKAB Kiirunavaara Mine – Swedberg, E. and Krutröök, B.

Critical embedment length of fully grouted rebar bolts – Li, C.C., Høien, A.H. and Kristjansson, G.

An optical sensor for capturing the three-dimensional bending of bolts – Forbes, B., Hyett, A.J., Vlachopoulos, N. and Diedrichs, M.S.

Numerical Modeling

The contact problem of the supported circular cylindrical underground opening in elastic rock – Exadaktylos, G.E. and Stavropoulou, M.S.

Advanced 3DEC bolt model for simulation of ground support performance in highly fractured and bulked rock masses – Bouzeran, L., Furtney, J., Hazzard, J., Lemos, J.V. and Pierce, M.


Discrete element modelling of steel wire mesh and rockbolt plate – Xu, C. and Tannant, D.D.


The use of elastic superposition as part of a multi-tiered probabilistic ground support design approach – Wesseloo, J.

Three dimensional numerical modelling of the deep Alborz tunnels with composite liners in squeezing condition – Molladavoodi, H. and Bazidenho, H.

Experimental and numerical analysis of face pressure in EPB shield in East-West lot of line 7, Tehran subway – Maboudi, V., Molaei, F., Siavoshi, H. and Rahimi, S.

Rock Slope Stabilization

A calculation model of fully grouted bolts in strength reduction FEM for slopes – Wei, L. and Liu, W.

An Analysis of the Effect of Freeze-Thaw Cycles on the Degradation of Mechanical Parameters and Slope Stability – Li, J., Zhou, K., Liu, W. and Zhang, Y.

Remediation of large scale structures in open pit mining – Bergman, A.

Building a structural model for assessing potential pit slope failure – a case of a Norwegian mine – Morales, M., Panthi, K.K., Botsialas, K. and Holmøy, K.H.

A proposed workflow for slope stabilization projects. The case of an open pit mine in Norway – Botsialas, K.

Photogrammetric calculation of JRC for rock slope support design – Sirkiä, J., Kallio, P., Lakovlev, D. and Uotinen, L.K.T.

Support and Reinforcement

Dynamic Twisted Rockbolt for Underground Excavation in Deep Mine Conditions – Pytel, W., Mertuszka, P. and Szeptun, K.

An experimental study to investigate the interaction of backfill and rock mass – Moser, A., Wallner, F., Wagner, H. and Ladinig, T.

Scale Effect of Thin Spray-on Liners for Pillar Reinforcement – Guner, D. and Ozturk, H.

Theoretical investigation of the effect of stress on the performance of support systems based on RMR support recommendations – Karakaplan, E., Basarir, H. and Wesseloo, J.

Fiber Reinforced Spray Concrete: Minimum Performance Requirement to Meet Safety Needs – De Rivaz, B.

Ground Support and Reinforcement System Remediation at the Cethana Power Station, Tasmania, Australia – Hills, P.B., Liang, M., Pennington, D. and Weller, J.

Seismic/Dynamic Issues

Rockburst mechanism related to accelerating creep of rock triggered by dynamic disturbance – Zhu, W., Wang, Q., Niu, L., Li, S. and Wei, J.

Integrating microseismic and 3D stress monitoring with numerical modeling to improve ground hazard assessment – Tonnelier, A., Bouffier, C., Renaud, V., Biggarre, P., Mozaffari, S., Nyström, A. and Fjellström, P.

Establishment of experimental sites in three Swedish mines to monitor the in-situ performance of ground support systems associated with mining-induced seismicity – Zhang, P., Dineva, S., Nordlund, E., Hansen-Haug, J., and Woldemedhin, B.

Scattering of SH-waves by a shallow circular lined tunnel with an imperfect interface – Yi, C., Johansson, D. and Nyberg, U.

Support Response

Sensor techniques to monitor installation and status of rock bolts – Gustafsson, L.K.K.A.

Production-blast-induced crosscut performance in a weak biotite schist: a comparison of three high-deformation bolt types – Jones, T.

Comparison between dynamic ground support methods (dynamic bolting) – Näsi, J. and Harju, H.

An instrumentation project to investigate the response of a ground support system to stopping induced deformation – Sweby, G.J., Dight, P.M. and Potvin, J.

Methodology for stability analysis of entry-type underground excavations – Burgos, L., Vallejos, J.A. and Delonca, A.

Support Design


A risk based approach to ground support design – Joughin, W., Muaka, J., Mpunzi, P., Sewnun, D., Wesseloo, J.

Roadways stability investigations in stratified rock – Malkowski, P., Niedbalski, Z. and Majcherczyk, T.

Optimisation of gateroad support at the depth more than 1000 m in hard coal mines – Lubosik, Z., Prusek, S., Walentek, A. and Wrana, A.

Selection of ground support for mining drives based on the Q-System – Potvin, J. and Hadjieorgiou, J.

Pipe Umbrella System– Dimensioning and Design – Strømsvik, H., Grøv, E. and Andersson, H.