Ground support design of Northparkes E26 Lift 1 North block cave mine

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ABSTRACT

Northparkes is located 27 kilometres north of the township of Parkes in central New South Wales, Australia. The operations consist of underground block cave mines and an ore processing plant which produces high grade copper and gold concentrate. Production is currently sourced from the E48 Lift 1 block cave mine, E26 SLC and opencut stockpiles. Mining at Northparkes has been underway for over 20 years in various forms. Beginning with open pit mining and later progressing to block cave and sub-level cave mining methods, operations haven't been without their technical challenges. Northparkes is currently constructing its next block cave mine, which consists of 11 extraction drives and 184 draw points. The new E26 Lift 1 North block cave is next to the existing E26 Lift 1 cave.

This paper presents the challenges and methods used to design the ground support system during the feasibility study of E26 Lift 1 North block cave, adjoined to the existing E26 cave. Calibrated, numerical simulations were conducted to forecast the levels of rock mass damage and to assist the ground support design. Generally, low to moderate rock mass damage is forecast on the extraction and undercut levels. However, poor ground conditions are expected in sheared and preconditioned zones adjacent the existing E26 cave. This will result in difficult ground conditions during development, undercutting and drawbell establishment. Empirical assessments were conducted to make sure the ground support system is able to handle both the static and dynamic load demand, and to accommodate the deformation values. A safety factor of 1.5 was used for the designs to cover the unknown rock mass conditions and potential for larger seismic events. Learnings from the E26 SLC, also mining against the E26 cave, are incorporated into the design. Fibrecrete, mesh and resin bolts are the primary ground support system used, and cable bolts for intersections with a span of more than 6m. Following undercutting and during the operating life of the mine, secondary ground support and rehabilitation will be required.