

The use of face perpendicular preconditioning technique to destress a dyke located 60 m ahead of mining faces

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ABSTRACT

Face perpendicular preconditioning technique has become a useful tool for destressing geological structures such as dykes that are located 20 m and more away from the mining faces. In this study, a trial on destressing a dyke that was located 60 m ahead of mining faces was conducted through drilling face perpendicular preconditioning holes that intersected and passed the dyke with two meters. Drilled cores were taken for laboratory testing to confirm the stiffness and strength of the dyke. The results from laboratory tests indicated high stiffness and strength of the dyke material. From the results of the superior stiffness of the dyke, it was noted that stresses were concentrated on the dyke. When the strength of the dyke material is exceeded, the violent bursting of the dyke material may occur resulting in seismicity along the feature. A sticky emulsion (Ug101 s) with the density of 1.1 g/cc, charging a mass of 30.4 kg, powder factor of 1.3 kg/tonne, with gassing gap and 5 m long tamping material was used to destress the dyke. After detonating the holes, a small seismic magnitude was noted. However, as mining progressed towards the dyke and passing through the dyke, good ground conditions were observed. Less face, sidewall and hangingwall damage were noted due to the good ground conditions as compared to the previous situations. Numerical modelling was also conducted to simulate Rate of Energy Release (RER) and it was found that RER gradually reduce after preconditioning the dyke.