

Measuring and monitoring to understand and reduce the fall-of-ground risk

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Abstract

Although safety in South African mines has improved dramatically over the last ten years, falls-of-ground still constitute the single largest cause of fatalities. The data show that small falls of between 4 m² and 10 m², affecting single people, are the major cause of fatalities. The critical parameters that characterize the risk of rockfalls are: rock deformation; the rate of change of deformation; energy released in fracturing; differential change in temperature, and quantification of rock mass rating. The CSIR has developed instrumentation to measure some of the critical parameters that characterize the risk of rockfalls, including deformation; rate of change of deformation; energy released in fracturing; and differential change in temperature. An extensive array of stationary sensors in hard rock mines does not yet present a practical solution towards early warning of rockfall hazard, although a limited number of stationary sensors has proven to be highly effective in providing warning of the onset of goafing in coal. The sensing combination most likely to provide warning to hard-rock miners of potentially unstable rock is mobile: thermal imaging used in combination with acoustic sounding.