Proceedings of 7th International Congress on Deep and High Stress Mining, Sudbury, Canada, 16-18 September 2014

Has research and development contributed to improvements in safety and profitability of deep South African mines?

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Abstract

The remarkably rich and persistent gold and platinum deposits in South Africa stimulated the development of a deep mining industry. The challenges of mining laterally-extensive orebodies at depths as great as 4 km include high rock stress and temperature, and large vertical and horizontal distances over which personnel, materials and rock must be transported. Innovation was driven by entrepreneurial zeal, private-public partnerships, government regulation, and labour activism. Despite the development and widespread implementation of many technologies critical to successful deep mining, there has been a major decline in domestic research and development (R&D) activity and capacity during the past two decades. Nevertheless, there are some areas of research where South African researchers continue to break new ground, notably the application of reflection seismology in the hard rock environment, studies of rockburst mechanisms, and the development of systems to monitor the underground environment. Changes in the social, economic and political landscape since the advent of democracy in South Africa in 1994 have also had a major impact on the deep mining industry, and will most likely accelerate efforts to increase the level of mechanisation and automation.