## The Fourth Australiasian Ground Control in Mining Conference 2018

Paper Number: 16

## Analysis of premature failure of rockbolts and cable bolts failed in underground coal mines

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## ABSTRACT

Cable bolts manufactured from cold-drawn high-carbon steel wires are widely used in underground mine to stabilize rockmass. They have higher strength and can reach to a greater depth compare to conventional rockbolts. Failure of cable bolts due to Stress Corrosion Cracking (SCC) have been reported from several mines. Laboratory-based simulations found that the failure was driven by hydrogen embrittlement, i.e. Hydrogen Induced Stress Corrosion Cracking (HISCC). Herein, to validate the laboratory simulations, an insitu experiment was conducted in an underground coal mine in NSW, Australia. King wires from the same type of cable bolts failed in the mine, were obtained. They were loaded and installed in the mine, and then left exposed to the surrounding environment for about 200 days where previous failure have been reported. The majority of the specimens showed signs of SCC development and some severe cracks were observed. The fractographic analysis results showed distinctive characteristics of HISCC on the fracture surface that validated earlier laboratory simulations.