

Dynamic test of flexi-bolts reinforcement system and its performance in hard rock underground mining

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ABSTRACT

The Yielding Flexi-bolt reinforcement system was introduced at one of the deep to ultradeep mechanised gold mine in the year 2011. Two types of the Yielding Flexi-bolts reinforcement system were implemented: un-grouted and grouted (cement grout) Yielding Flexi-bolts. Un-grouted Yielding Flexi-bolts were then replaced by grouted Yielding Flexi-bolts. This paper aims to evaluate the effectiveness of the cement grouted Yielding Flexi-bolts. To achieve the objective of the research, both surface tests and Underground tests were conducted in order to understand the behavior and performance of Yielding Flexi-bolts. The results of the study showed that tensioning, grouting, angle of installation and corrosion were the common factors that influence the failure of Yielding Flexi-bolts. The dynamic drop test results were ranging from 50–80 kN and energy absorption ranging from 27.7–33.1 kJ. The surface pull test indicated a maximum load of 140 kN, while the underground pull test was found to range from 170–200 kN.