

Gloving of roof bolts

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Mine type

All underground mines

Incident

East Mine in New Zealand has highlighted a problem of roof bolt gloving. Roof bolts recovered from a minor fall of ground revealed 600mm of gloved and unmixed resin. On further investigation, all bolts recovered were found to be extensively gloved and unmixed over around 600mm from the up-hole tip of the bolt down.

Equipment

Hand Held Roof Bolters, Joy 12cm30 Bolter Miner.

Hazard

Fall of ground through gloving of roof bolts.

Cause

A mechanism for gloving seen on the recovered bolts is proposed to be that the resin cartridge expands under the pressure from 24mm manufactured diameter to either the diameter of the hole or until rupture occurs. This allows the 24mm bolt to be inserted into the expanded resin cartridge annulus with out making sufficient contact with either the resin cartridge or hardener tube to shred either component.

Comments and recommendations

There are two issues that have been identified. The first one is the gloving of the roof bolt anchorage which occurs when the plastic wrapping is not fully shredded. The second being where the spinning has failed to break the hardener sheath leaving the top 600mm unmixed. Although there has been no reported cases of gloving in Queensland in recent years, the findings at East Mine are concerning. The only known reports of gloving have been due to incorrect hole diameter or poor bolt installation. The exact cause of the gloving effect at East Mine is still under investigation.

The investigation into the cause of the gloving is still under way. The Mine has developed a program to help try and identify the cause and identify a solution to prevent a reoccurrence.

It is recommended that Mines make specific visual inspections of exposed bolts in either goafed areas of longwall operations or at any falls of ground. Mines should also ensure that as part of their Strata Control Management System, a regular audit is carried of its roof bolt installation.

Authorised by Michael Downs - Regional Inspector of Mines, Central Contact:

