



# S A F E T Y B U L L E T I N

## SCALING AND ROCK BOLTING IN LARGE STOPE AND DEVELOPMENT HEADINGS

### THE PROBLEM

The introduction of large scale mechanised mining underground has reduced the risks associated with some hazards which the underground face miner is exposed to, but has introduced new hazards, and so potentially greater risks exist if the work systems and equipment used are not suitable or not properly managed.

In small sized development and stope headings the miner was more immediately exposed at the face during drilling and mucking out. However the size of headings (with lesser roof spans) allowed ready access to check and scale the back and sides, and any falling loose material had less distance to fall and was typically less massive, reducing the potential for traumatic injury.

Operating with large equipment in headings which are now typically four to five times the cross sectional area, and more than twice the height and span of smaller development, creates a potentially hazardous environment for the miner exposed in the face or in the stope, without the substantial protection afforded by the FOPS canopy on a jumbo or a loader.

Close quarter inspection and manual scaling of back and sides (other than from the muck pile following blasting), can be done effectively only from mechanical equipment or from staging. The effectiveness of the former approach is often limited by consideration of safe access, height and the spread and uniformity of the muck pile.

Scaling in large headings presents a difficulty, and a practice still widely resorted to is “rattling the backs” (and often **not** the side walls) with the drill jumbo steel. The drill jumbo is not designed for this purpose and the length of boom feeds prevents this sub-standard practice from being used effectively on the side walls in most headings. Damage to booms, slides and fitments is a regular result.

Unless close quarter inspection and scaling then takes place, working from secured ground, there remains a high risk of loosened material falling subsequently.

Moreover, in rock bolting work using a development drilling jumbo rather than a purpose built rock bolting unit, the operator who goes under the freshly drilled and unsecured back to place bolts or to carry out other tasks, is at risk.

A further drawback is that the length of the jumbo drill feeds and drill steel is such that it is often not possible to drill and place long rock bolts in an effective orientation.

### REMEDIAL ACTION

There are several courses of action to reduce hazards and control or eliminate risks in carrying out these critical tasks.

## 1. **Drilling and Blasting**

Proper attention to perimeter blasting greatly minimises damage to the back and sides and thus reduces the potential for rockfall. (Refer **Regulation 10.28(2)(b)**)

## 2. **Mechanised Scaling**

The use of purpose built equipment for this function is more effective than misuse of a drill jumbo for the purpose. Destruction of jumbo booms due to substantial rockfalls occurs regularly.

The design of purpose built scaling machines allows for a complete traverse of the heading, including side walls.

## 3. **Purpose Built Access Equipment**

The use of purpose built access equipment of a suitable robust design is essential for safely carrying out close quarter inspection, sounding and manual scaling with a pinch bar.

## 4. **Purpose Built Rock Bolting Jumbos**

The use of purpose built bolting jumbos vastly reduces the potential for injury to operators.

The bolting operation is done by the single operator entirely from within the security of the jumbo cabin, and bolts are placed as holes are drilled.

Moreover the placing of bolts in the correct geometry can be done effectively due to the boom configuration and feed length. Similar or modified units can also place long cable bolts in the same safe fashion, where the use of these is dictated by the ground conditions or the mining system in use.

It is disturbing to note how few purpose built rock bolting units are in use in underground mines in Western Australia.

In the light of the “duty of care” obligations in the Act, and the need to maintain the use of current best practice and technology when dealing with high hazard-high risk operations in particular, principal employers, registered managers and mining contractor employers **should review carefully and fully whether these obligations are being met, and whether equipment and practices employed are defensible.**

J M Torlach  
STATE MINING ENGINEER

27 June 1996