

### New projector technique drills down drilling time

A portable projector, fitted with precision-drilled metal graticule which projects upon the rock-face the required drill pattern for tunnel sizes ranging from 10 m<sup>2</sup> to 40 m<sup>2</sup>, is creating interest at De Beers Finsch Diamond Mine in the Northern Cape.

The use of this projector has decreased the marking time of underground tunnel face by 80%, and is considerably more accurate than the conventional way of marking off a tunnel, says Richard Henshall, of Finsch Mine.

Used together with the mine's newly-developed B4 profiler, the Kwikspot projector, developed by Johannesburg-based businessman Charles Millett-Clay, has changed the way of marking off a development end to be drilled and blasted at Finsch Mine.

This robust, but lightweight, projector, powered by a 12 V, 15 A rechargeable battery, is mounted on a standard surveyor's tripod some eight to ten metres away from the rockface.

A tilt head enables quick and accurate levelling directed at the rockface.

The marking and drilling of the drill pattern then proceeds with high speed and consistency.

With the projector, the miner is required to transfer centre line as well as the grade line onto the face by using another Kwikmark instrument, the Kwikangle, before the pattern is projected.

To ensure accuracy, when the slide is manufactured, the centre line and grade line can be incorporated into the slide for ease of lining up the drill pattern. The round is then marked off. The lining up of the instrument and the marking off of the face takes less than five minutes, states Henshall.

"Each hole to be drilled is in the exact position, as close supervision of the drilling process is required to ensure the drilled boom is aligned with the direction lines provided by the miner," he adds.

This graticule (slide) can be rotated at an angle of 180° to ensure that the cut holes to be drilled on the next round are more than 150 mm away from the previous marked holes.

To monitor the results of each round blasted, Finsch Mine uses a locally-manufactured profiler, which is mounted on a survey tripod about 1,5 m away from the tunnel face.

The instrument, designed by De Beers Finsch Mine, but manufactured by Wynburg-based Connell Instruments, is aligned using a laser set up at the previous set of survey line pegs and grade pegs.

The paint lines on the hanging wall and sidewall are not used, as these could be incorrect.

The profiler consists of a laser-measuring device mounted on a vertical circle, allowing a 360° rotation angle, with a sequence of ten degrees and levelled by means of a bull's eye bubble, up to 36 readings can be taken in each profile.

Based on the readings, a profile is produced on microstation, which is then compared with the standard profile required.

The percentage deviation is then determined by adding the sum of the deviation of under-break as well as over-break and dividing this figure by the actual required area of the tunnel.

“We realised that the quality of our Kimberlite tunnels needed urgent attention, based on survey off-sets taken underground, indicating that the tunnel side walls after blasting were nowhere near what was planned,” says Henshall.

The aim is to profile each round blasted, and currently the results show an average ‘deviation from required’ of about eight per cent, which is a significant improvement from the 18% to 20% achieved a year ago when using conventional methods, enthuses Henshall.

According to Millett-Clay, the projector has made in-roads into the European market. “Not only have we supplied a number of projectors to the Platinum, Gold and Diamond Mines in South Africa, but also to the Maleevski mine project in Kazakhstan, Russia.

“We are currently negotiating with other local mines for the supply of the projector,” he concludes.