Blind boring
THE SAFER SOLUTION
for ventilation shafts

The blind boring shaft construction method exposes workers to far less safety risks than conventional drill and blast shaft construction.

When a mine needs a vertical shaft to ventilate underground workings, blind boring is increasingly the construction method of choice. The method offers safe, predictable performance, without interrupting underground mine workings, Abergeldie Mining explains the process.

BLIND BORING IS A ROTARY DRILLING TECHNIQUE that works from the surface downward. A heavily weighted drilling assembly, suspended from above, provides the vertical thrust to a hard rock cutter head equipped with disc type tools, as found on hard rock tunnel boring machines. The disc cutters grind concentric grooves, fragmenting the rock between the cutter paths into relatively large pieces. The weight of the drill-head itself provides all the downward pressure required. It is supported at two points to control deviation to within half a per cent of depth in horizontally-bedded strata. In less regularly bedded strata, a pilot hole can be drilled for enhanced deviation control.

The entire shaft is kept full of water throughout the drilling and later lining process. The rock fragments are transported from the working face to the surface by a strong flow of water directed around the cutter head and piped up through the centre of the drill rods. At surface level, the water-borne spoil is discharged into a sedimentation pond.

The drill assembly is suspended from a large A-frame rig and powerful winch at ground level. As depth increases, more drill rod and pipe is added to the load supported by the A-frame. The larger the diameter of the shaft to be drilled, the larger will be the diameter and consequent weight of the drill head required. The load-bearing capacity of the A-frame therefore becomes the limiting factor on the diameter and depth that can be bored. The largest rigs in Australia, owned and operated by Abergeldie Mining, have 450 tonne and 500 tonne A-frame capacities, which is at least 50 per cent greater than any others in the world. For these big rigs, shafts of 500 meters deep with 6.5 meter diameter are readily achievable. Deeper depths can be bored at smaller diameters.In some situations, keeping the hole filled with water eliminates the need for grouting treatments that might otherwise be required prior to the start of shaft construction.

The water provides a counter pressure to contain naturally occurring aquifers, oil and gas that might be encountered in the strata, and reduces the risk of problems with sidewall stability. The water also means that permanent shaft linings (generally prefabricated in sections from steel or concrete) can be installed and grouted under pressure: a balance or slight overbalance with the naturally occurring pressures in the ground eliminates water flow from the strata into the shaft, which could otherwise wash out the cement grout.

The blind boring shaft construction method exposes workers to far less safety risks than conventional drill and blast shaft construction. At no time during construction is any worker required to enter the shaft. The shaft construction is also carried out in complete isolation from underground mine workings. There is no interruption to normal mine operations and no risk exposure to underground mine workers. ■

For more information go to **www.abergeldie.com**