

FOR IMMEDIATE RELEASE

## September 25, 2014

**Headline: Robbins pioneers TBMs in Mines**

*Sub-Headline:Dual Mode TBM Technology digs for Australian Coal*

In August 2014, major progress was made at a coal mine in Queensland, Australia, when a Robbins Dual Mode EPB/Rock TBM was successfully rolled out from the first of two access tunnels. The specialized machine is the first TBM to be used at a coal mine in Queensland, and there are many aspects of both the TBM and project that make it unique.

The 8.0 m (26.2 ft) Robbins machine and continuous conveyor system were chosen by project owner Anglo American for the Grosvenor Decline Tunnel Project, where it began excavation in December 2013 for two tunnels consisting of sedimentary hard rock up to 120 MPa UCS, mixed ground of mainly sand and clay, and coal seams.

The TBM was chosen over the traditional roadheader method for several reasons including speed of excavation—the swift machine has proven to be about ten times faster than a roadheader. Another reason was maintenance: “The final tunnels need to remain intact for the life of the Grosvenor Mine [about 40 years], and be maintenance-free with cement linings,” said Adam Foulstone, Underground Construction Manager at Anglo American. “This was the biggest factor when determining our tunneling method.”

The machine is optimized towards hard rock (Single Shield) excavation, as only the first 300 m (984 ft) of each tunnel are in mixed ground. A two-stage, center mounted screw conveyor works in both hard and mixed ground conditions, and the cutterhead can be outfitted with back-loading cutters in hard rock mode, as well as knife bits and scrapers in EPB mode.

Additionally, the machine uses its EPB technology to deal with methane gas, a standard in coal mines. To ensure worker safety and avoid explosions, gas levels must be kept under 2% at all times. If any methane leakage is detected, a snuffing box evacuation system will draw the methane out of the screw conveyor and directly into the ventilation system. In the first tunnel, methane was detected within the first 300 m (984 ft). “The snuffing box was very useful,” said Foulstone. “It allowed us to monitor the tunnel face, plus a boundary sensor ensured we didn’t go above 0.5% methane content.”

The first tunnel is at a grade of 1:6 for men and materials; the other at 1:8 for conveyors. The approximate lengths of the tunnels are 1,100 m (0.7 mi) and 950 m (0.6 mi), respectively. Lengths of the tunnels are approximate and based on the location of the coal seam. “As soon as we see coal coming out of the conveyor, we conduct face inspection to verify. Once we have a coal seam taking up approximately 50% of the tunnel diameter, we know we’ve gone far enough,” said Foulstone.

Australian tunnels require constant ground support, and the TBM was customized with a Robbins-designed “Quick Removal System”, which allowed the machine to be removed from the initial tunnel and retracted from its outer shield bodies, leaving them behind to support the ground. At the second tunnel, a new set of shields will be assembled onto the machine. Upon completion of the second tunnel, these shields will also be left in place. In order to transport the machine to the next tunnel 2 km (1.2 mi) away, it had to be split into two sections and required a large 600 metric ton (661 US ton) lift. The machine is expected to begin boring the second tunnel in November 2014 following reassembly, and reach its final breakthrough in March 2015.

“This is the better methodology,” said Foulstone, when asked if he thought more TBMs would be used on mines in the future. “[Use of TBMs] opens up a new chapter not just with Anglo American, but with the whole coal industry in Australia. Now we can draw up a new coal mine in less than a year, compared with two to three years if we use roadheaders.” Foulstone also noted that there are few limitations for TBMs in mines. “Anywhere we need to get men and materials into an underground environment is an opportunity to use a TBM,” he said.

WORD COUNT: 675

Images Attached to Email. If you need a higher resolution image, please contact Desiree Willis.

Captions for Images:

**Image 1:**A Robbins Dual Mode EPB/Rock TBM is excavating two mine access tunnels for the Grosvenor Decline Tunnel Project in Queensland, Australia.

**Image 2:**The TBM was retracted from its first decline tunnel in August 2014 using a Robbins-designed Quick Removal System and transport dollies.

**Image 3:**The TBM was transported 2 km (1.2 mi) from one tunnel to the next by way of a 600 metric ton (661 US ton) lift that took the machine in two large sections.

**Image 4:**Two sets of outer shields are required for the TBM, as the machine retracted from its first set upon completion of the first tunnel. A new set will be assembled onto the machine at the second tunnel.

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