GroundProbe®

CASE STUDY:

Leigh Creek Coal Mine

MAKING MINING SAFER

ACHIEVING HUGE PRODUCTION GAINS USING SSR

"The proven benefits of the SSR give us confidence that we are maximising production potential and improving safety on site."

Ben Ploughman, Geotechnical Engineer, Leigh Creek Coal Mine.

Leigh Creek is a coal-mining town in the north of South Australia. On the edge of the desert, to the west of the northern Flinders Ranges, the current town is 13 km further south than the original town—it was moved in 1982 to allow the expansion of the mine. The area was named Leigh's Creek after its first settler, Harry Leigh, in 1856.

Coal was discovered and small quantities mined from 1888. However, the coal was not mined in a significant commercial manner until 1943 in an effort to make South Australia more self-sufficient for its energy needs, with less dependence on New South Wales.

Production at the Leigh Creek coal mine over the last 5 years has continued at near record levels, with approximately 3 million tonnes of coal produced per annum. All coal is transported to the Northern and Playford power stations at Port Augusta where it is used to generate approximately 40% of the state's electricity.

Due to it's the age, ongoing mining, and the brittle unstable nature of the aging coal mine at Leigh Creek, there is considerable wall instability. This often results in areas of the mine being deemed to dangerous to work. Safety decisions are taken by the mine management team upon recommendations from Ben Ploughman, the mine Geotechnical Engineer.

Slope stability in Leigh Creek coal mine presents an ongoing concern for the Geotechnical team. Leigh Creek Coal Mine currently employs a number of technologies to measure and assess the stability of the mine slopes. Prisms and two GroundProbe Slope Stability Radar (SSR™) are deployed across terraces on the east and west mine walls.

The two SSR systems are used to actively monitor mine slope movement over both short periods of time and also over extended periods. Leigh Creek employ a full time GroundProbe Technical Specialist to provide daily analysis and reports on SSR data to help support the geotechnical team.

In 2011 a production plan for a 9-month period covering terrace 17 was at serious risk due to ongoing instability, particularly in the west wall. The level of instability had been compounded by the extreme weather conditions Australia endured in early 2011. The geotechnical team, including Ben and the GroundProbe SSR Technical Specialist, assessed all available data and defined a slope-monitoring program to maximize production whilst effectively managing risk. Ben describes the objective for the program:

"Often large areas of the mine are deemed too dangerous to work, which translates to thousands of tones of high quality coal being rendered unrecoverable. However, with SSR's aimed at problem areas we can immediately monitor wall stability, define the level of risk of excavation works, and therefore maximize production."

Ben pre-defined thresholds and subsequent geotechnical alarming over three levels based on historical deformation patterns provided by the SSR. For the east wall, geotechnical alarms are set trigger if the SSR detects 25mm of deformation within a six hour period. The more unstable west wall is set to alarm if more than 25mm of deformation is detected within a two-hour period. An urgent alarm across all areas is also set to trigger if 10mm is detected within a six hour period.

After a nine month of monitoring selected areas under these conditions Ben and the team at Leigh Creek reviewed production across the challenging terrace 17. The result was 95% of the production plan was achieved which translated to around 2.5 million tones of coal.

GroundProbe is a market-leading Australian company that develops and supplies measurement systems and services to mining and infrastructure organisations for the management of risk. Since the launch of the revolutionary Slope Stability Radar (SSR™) in 2003 GroundProbe have been providing high value information to mines around the globe making mining safer and more profitable. GroundProbe holds internationally valid patents in key areas of the technology and was the first company globally to introduce slope monitoring radar to the mining industry.

GroundProbe continues to shape safety innovation in the mining industry by pioneering groundbreaking product GroundProbe remains committed to meeting today's complex challenges in the mining industry by providing systems and services that address the need for safer working environments and maximized productivity.

With the SSR and the WAM, GroundProbe provides the most suitable systems to measure short and long-term mine wall movements. Many slope failures have been successfully captured using groundprobe's systems, providing sufficient warning for the safe evacuation of people and equipment. With the experience of having deployed hundreds of SSR systems around the globe, with millions of hours of operation, GroundProbe achieves world-class standards in reliability and has an unrivalled understanding of slope stability in open pit mining.