Using Data to Improve Mine Safety

Kevin Li — September 14, 2020

When commercial mining first started in Australia in <u>1799</u> (ABS), the concept of safety didn't even extend as far as having a canary in the mine to alert those working underground of impending danger. That particular workplace health and safety measure didn't <u>start until 1911</u> (<u>Smithsonian Magazine</u>) before being stamped out in 1986.

It's fair to say we have come a very long way since then.

At Cartledge Mining and Geotechnics (CM&G) we have spent years developing cost-effective geotechnical solutions which improve safety at mine sites by collecting, analysing and interpreting data.

This allows us to develop a thorough understanding of subsurface conditions and the risk profile allowing us to establish a comprehensive risk management plan and practical Trigger Action Response Plan (TARP) managing pit wall instability to improve the overall safety of mine sites for mine workers.

Case Study

Recently working on a site-supporting role with a large multi-national mining company on a Queensland coal project, we successfully utilised radar monitoring technology to accurately predict a wall failure prior to collapse allowing the safe evacuation of personnel from the work area.

On site, we realised there was insufficient geotechnical monitoring tools being used to track what had been identified as a hazardous area.

We started with a geotechnical risk assessment and critical monitoring while working under unstable slopes, which was a necessity to the site, given the complex ground conditions.

Once completed, we developed and implemented a risk management plan including critical and predictive monitoring techniques which allowed mining to continue in the hazard area, while minimising impact to the mine schedule.

The monitoring techniques allowed us to predict the wall failure with sufficient accuracy for the area to be evacuated of personnel and machinery while minimising delays to the mine schedule.

Radar monitoring data was critical in providing risk profiles of the impending hazard through its capability to setup alarms which can be triggered once a displacement or velocity threshold has been triggered.

This radar capability provided the team with adequate time to process data and forecast a time for the failure, preventing the site recording a High Potential Incident (HPI).

In addition to the radar monitoring methodology, we also developed and implemented a new geotechnical hazard alert reporting format and geotechnical hazard register, which have improved clarity of hazard management and instil confidence of staff on site in the management of geotechnical hazards.

These systems have also enabled us to collect valuable geotechnical data to develop a comprehensive database to capture critical information on any geotechnical hazards or failures as they arise.

In turn, the database now facilitates additional analysis of different geotechnical hazards and evaluates mining performance in managing geotechnical risk profiles.

The tools are there, so use them

There is still reluctance among some in the mining community to adopt tools such as radar monitoring out of fear they will not be cost-efficient or effective. Yet the data and information these help to collect and interpret has, time and again, proven invaluable.

I would argue that not using the tools available is in fact a false economy. Wall failures and HPIs form a clear path to catastrophic failure which can cost lives and cause investors to lose confidence.

It is a lot like having the metaphorical canary at your disposal and placing it in the break room.