ACARP matters because it

boosts roadway development productivity

In 2005 the Australian coal industry identified an emerging longwall sustainability challenge – longwall production was doubling every 10 years or so while development rates remained static. The Roadway Development Task Group (RDTG) was subsequently established to improve roadway development performance through targeted R&D. The RDTG has nine member companies and represents 90 per cent of Australia's longwall production.

The task group's CM2010 Roadway Development R&D Strategy focused on development of the key enabling technologies required for a high-capacity roadway development system, one capable of a sustained, continuous production rate of 10 metres per operating hour (MPOH), 20 hours per day.

In 2013 the RDTG began a strategic review to incorporate the learnings gained through the CM2010 process and to also reflect the changed industry circumstances now evident. This has reinforced the RDTG's focus on industry sustainability and productivity, and the need to pursue automation as a means of removing exposure of persons to hazards associated with the roadway development process.

Industry target

- The development of a safe, high-capacity, integrated roadway development system capable of sustaining a mine's longwall operation with a single gateroad development unit.

Industry investment

- ACARP: $12.2 million, plus extensive industry support
- More than 15 roadway development related R&D projects undertaken since 2005

Results

- Identification of roadway development best practice in Australia
- 10 roadway development operators' workshops conducted in the Hunter Valley, southern/western New South Wales and central Queensland mining regions to share best practice, communicate developments in R&D, and provide networking opportunities for development personnel
- Desktop review of relevant technologies utilised in metalliferous mining and civil tunnelling sectors
- Development of a dynamic simulation system, RoadSIM, to enable evaluation of changes in equipment configuration, panel dimensions, and operational procedures on performance indicators such as cycle times, delays and pillar advance rates
- Development of self-drilling bolts - Novobolt now being commercialised by Orica
- Development of an alternative skin reinforcement and containment system, ToughSkin, which improves skin confinement while minimising manual handling and installation through elimination of roof and rib mesh – expected to be submitted for regulatory approval in late 2014 (subject to continuing project support)
- Development of a first generation automated roof and rib bolt and mesh handling system with cycle times consistent with those required to support high capacity longwall mines – the system will undergo field trials in August 2013

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A field trial of the continuous miner guidance system at Ebenezer mine

- Development of a practical continuous miner guidance system, combining high performance inertial sensors with custom-developed radar – a key step in automating continuous miners. The system includes a mine-to-plan software tool that provides a practical user interface for remote set up and monitoring of the self-steering continuous miner. Extensive field trials were completed using a simulated two-heading layout at the Ebenezer mine in 2012 with 99.96 per cent accuracy.
- Identification of technologies that could potentially be utilised to develop a small profile 10 MPOH continuous haulage system suitable for gateroad development, with support provided to three researchers to further explore the suitability of their technologies – has resulted in one of the major OEMs now taking an active interest in developing such a system
- One of the additional benefits of this improved understanding of the roadway development process is the identification of the need to develop an integrated, fit-for-purpose, roadway development system, one which utilises automation to remove hazards from the development process rather than continuing to rely on restrictive engineering and administrative control to manage those risks.

Return on investment

Most of these research projects remain in progress.

Roadway development statistics for 2011/12 show that more than 75 per cent of mines utilised three or more development units to sustain current longwall performance, putting the estimated annual spend on roadway development in Australian longwall mines between $1.5 billion and $2 billion per annum.

The successful development of a high-capacity roadway development system has significant potential to improve development costs, achieve longwall continuity, and ensure the industry's sustainability.