

# IT IS FINDING SOLUTIONS TO THE MANAGEMENT OF COAL BURSTS IN UNDERGROUND MINES

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**A coal burst is a sudden release of energy that causes dynamic failure or displacement of intact coal. It results in material being expelled into the mine openings at high velocity and it places people, equipment and mine productivity at risk.**

Coal burst is new to the Australian coal industry. The first formally recorded event was in 2014 and there have been subsequent events reported in development and longwall panels. Although relatively rare in Australia, it is possible that more coal burst events could occur as mining operations move into deeper, more technically challenging environments.

Coal burst is a highly complex phenomenon. Appropriate and effective control techniques and their implementation under different mining and geological conditions require research.

### Industry target

- Improve the safety of underground workers
- Develop an improved understanding of the mechanisms of coal burst
- Improve understanding of burst proneness, forecasting and assessment
- Develop of state-of-the-art monitoring and detection technologies
- Develop effective burst mitigation and control strategies
- Develop a coal burst risk management strategy that is applicable to Australian coal mines.

### ACARP industry investment

- \$4.73 million
- 18 projects including ongoing research

### Industry approach

- Establishment of a focussed Coal Burst Task Group
- Appointment of Research Coordinator to support the task group
- Advancement of a coordinated and comprehensive research program
- Development of a coal burst risk management strategy applicable to Australian coal mines and based on the research outcomes. The strategy will guide the development of site-based management plans.

### Research results

Two coal burst projects were completed in 2018.

- The first project focused on establishing the scope of future research and identified four main research categories: coal burst mechanisms (both direct and indirect); coal burst triggers; prediction and identification of coal burst risk domains; and controls to mitigate or eliminate coal burst risk.
- In the second project, an extensive review of international coal burst management and control strategies was conducted. The results highlighted that:
  - Coal burst occurs under the effects of complex environments of geology, stress and mining conditions.
  - There is no one set of defining characteristics that is responsible for this phenomenon.

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- The industry is required to engineer new coal burst control strategies that are in line with Australian regulations, mining conditions, design and operational practices.
- A clear understanding of the driving geological and geotechnical factors and the underlying mechanisms is required before coal burst controls are implemented.
- There are four sources of energy within rock masses – strain, gas expansion, seismic and strain transfer – and these are being quantified in current projects.
- In 2019, ACARP will host a workshop with leading international coal burst practitioners, (where the prevalence of deep coal mining and occurrence of events is more common) along with Australian experts, to share learnings and direct existing and future research.

### Return on investment

- Ability to keep people safe
- Delivery of scientific research that contributes to the development of the industry's coal burst management strategy
- Delivery of industry-led solutions to a priority hazard ahead of prescriptive regulation
- Ability to further develop underground coal deposits safely.

### Importance of ACARP

- Enables Australian coal producers to work collaboratively to address high-risk, high-priority hazards facing the industry
- Can quickly mobilise world's best researchers to work with industry to address new and emerging challenges, such as the management of coal burst
- Ensures an integrated and holistic approach to coal burst research, thereby providing solutions applicable across the industry.