

## Project description

A key challenge to overcome when introducing autonomous systems in mining is the perception that this introduction will reduce jobs. The industry, however, has clear examples of autonomous system implementations that result in skills migration rather than job losses. To achieve the desired operating efficiency and productivity benefits of an autonomous operation, companies require resources with a different skillset from what is required from the typical mining equipment operator. This project aims to develop case studies from organizations that have successfully implemented autonomous systems to help companies successfully create a workforce that will enable autonomous mining.

## The value of the project

Case studies provide an opportunity to make comparison with other organizations, industries, and stakeholders, helping the industry as a whole and broadening its understanding of best practices. While they promote education, they can also help build confidence in new technology and help companies to be proactive and provide a positive experience. They are also effective communication tools that can be used across the industry, helping organisations to mitigate risks and optimize their operations.

Key Challenges that affect skills migration			Example skill migrations
<p><i>People/ organizations</i></p> <ul style="list-style-type: none"> <li>→ Change management</li> <li>→ Labour unions</li> <li>→ Attracting talent to mining</li> <li>→ Business cultures</li> <li>→ Clear communications</li> <li>→ Reskilling</li> <li>→ Lack of incentives for learning new skills</li> <li>→ Many skills development options but not a lot of clarity on what to choose</li> <li>→ Alignment of industrial relations</li> <li>→ How to make rosters family-friendly</li> <li>→ Traditional organization models being resistant to change</li> <li>→ Increase of remote work can impact on face-to-face training (exacerbated by COVID-19 crisis)</li> </ul>	<p><i>Operations</i></p> <ul style="list-style-type: none"> <li>→ Site safety</li> <li>→ Cross-functional mine process</li> <li>→ Segregation between autonomous and non-autonomous vehicles</li> <li>→ Operational visibility</li> <li>→ Governance and control on decision making</li> <li>→ Process change</li> <li>→ Challenges with the supply chains, specifically for training, resources, and skills development</li> <li>→ Reduction of workers at site</li> </ul>	<p><i>Technology</i></p> <ul style="list-style-type: none"> <li>→ Trust in artificial intelligence and reliance on cybersecurity</li> <li>→ Access to suitable testbeds</li> <li>→ Data literacy</li> <li>→ More need for human-machine integration</li> <li>→ The speed of change</li> </ul>	<ul style="list-style-type: none"> <li>→ Driller to remote automated drill controller</li> <li>→ Maintenance technician to remote maintenance controller</li> <li>→ Truck operator to fleet operator, mine planner, pit controller / technician, or control room operator</li> </ul>

## What should be in the case study?

### Identify:

- What was the role being transitioned (what did you do) and what were the new target roles?
- What was the skill development/training strategy?
- Which practices would you keep and what would you do differently?
- Were internal resources used or was a third-party facilitator/enabling service leveraged?
- Who is the target audience (industry, government, labour groups, education institutions, etc.)
- Who was involved (e.g. OEM, consultants, technology start-ups, etc.)
- What was the communication method and strategy?

### Training:

- Was it employer-trained or through education system or other public skill development programs?
  - If education system, where were the courses available and what were the education requirements? Were the courses industry accredited?
  - If employer-trained, where did the trainers come from (work and education backgrounds)?
- Was training conducted traditionally or virtually?
- Which training programs are best? (online learning, VR based training, simulation training, etc.)

### Skills shift:

- Were the current roles upskilled or was there new role development?
- Was the shift internal to the organisation or external?
- Was the role transitioned, or were new roles created to replace outdated ones?
- What didn't work, and how was the problem resolved?

### Careers:

- What was the recruitment strategy?
- What are the new potential career paths or opportunities?