

Mining Matters – Simulation Training: Best Practice Applications to Enhance Training Outcomes in Mining

This document summarises discussions from Mining Matters – Simulation Training: Best Practice Applications to Enhance Training Outcomes in Mining, held on 25 August 2026. The session was hosted by David Hynes and Andrew Ketchell from AUSMASA, with guest speakers Graeme Bradshaw, Managing Director of Mining Skills Australia, and Bradley Hansen, Simulation Trainer at Mineral Resources Limited. This summary captures the consistent themes raised to inform training within simulated technology.

Where Simulation Delivers the Greatest Value

Panellists agreed the strongest gains come from familiarisation and safe exposure to risk before a trainee reaches a live site.

- Accessibility. Training no longer needs a machine taken out of production or a trainer in the room. Trainers are delivering to learners interstate and overseas at a falling price point.
- Safe exposure to hazards. Scenarios replicate events that cannot be staged safely on site, including wet weather operation and a rear wheel lock-up on a fully loaded haul truck.
- Muscle memory and orientation. Trainees arrive on site already familiar with the machine and its functionality, so attention can shift to the safety aspects of the task.
- Objective data. Curriculum parameters are drawn from OEM specifications and site procedures, and reports allow trainers to debrief and repeat until the trainee is competent within a safe supportive setting.

Choosing the Right Application

The clearest message of the session was that the learning outcome should drive the technology choice, not the reverse.

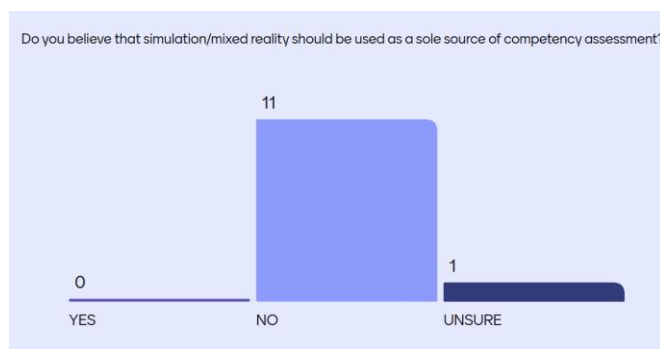
- Define what the organisation is trying to achieve, whether knowledge, skills, competency or proficiency, before selecting hardware.
- Treat simulation and mixed reality as a resource that enhances training capability, not a product that replaces a training department.
- Match the platform to the task. Motion base suits graders and dozers, static base suits dump truck cab familiarisation, and mixed reality suits pre-start checks and component level work.
- Consider the cohort and the barriers to participation within it.

Mineral Resources reviewed its existing training, the evidence it needed and the criteria it was training to, then assessed the market. Where nothing met the requirement, it built its own, including a road train simulator developed from the ground up, contextualised to site specifications. Scope is set with workshop, safety and site-based trainers.

Where Simulation Is Overused

- As a single point of learning. One site with 7 simulators put trainees through simulation alone because of the size of the investment, at the cost of learning quality.
- As the sole validation of a learning outcome. A pass in a simulator does not always reflect conditions on site at that point in time.
- Beyond the point of readiness. Once a trainee is across the machine they need seat time in the real one.

Both panellists were clear that simulation will not replace pedal time at this stage. An audience poll on whether it should be a sole source of competency assessment returned an overwhelming no from 11 responses.



Learning Barriers and Engagement

Graeme Bradshaw framed the discussion around 3 long-standing barriers to participation in learning.

- **Institutional.** Whether the organisation creates an environment people want to learn in. A PowerPoint slide and an OEM manual do not make training interesting.
- **Dispositional.** How learners see themselves. Language, literacy and numeracy anxiety can stop people engaging or attending at all.
- **Situational.** Whether learners can access the real machine and its components. Entire fleets are now modelled to the last bolt and washer, allowing trainees to pull a component apart in mixed reality.

Both panellists noted that written theory assessment creates anxiety for learners with language and literacy needs, and that the same knowledge can now be assessed in the cab or a virtual environment. The controlled setting also builds confidence for trainees who struggle in a live pit.

Real Time Feedback

- Trainers stay inside the process rather than handing over a headset, observing and prompting as the learner works through the task.
- The technology supports the trainer where they are not across a particular make or model, flagging when performance criteria have not been met.
- Simulators flag unsafe slope, excessive throttle or heavy braking, but do not teach the task step by step. Technique remains the trainer's role.

Return on Investment

Panellists measured return in both tangible and intangible terms.

- Reduced live plant exposure hours and lower wear on machines, particularly at abrasive lithium sites.
- Mineral Resources applies a conservative ratio of 1 simulator hour to 4 hours in a real machine, against the 1 to 6 commonly claimed by manufacturers.
- Production is not held up while a trainee is brought to proficiency.
- Lower fuel burn, tyre wear and ground engaging tool wear, and safer transitions between OEM control layouts.
- Safety statistics, incident rates and productivity measures.
- Travel and accommodation costs, and improved accessibility for dispersed workforces.
- Applications that measure operator performance against machine data after training.

Accreditation and Competency

- Mining Skills Australia maps every product to a competency standard, in whole or in part, and holds RTO registration.
- No single technology constitutes total competency on its own.
- Clear regulatory guidance on integrating simulation with competency standards is not yet available, leaving providers to interpret the requirements and await audit.
- The panel called for industry, associations and regulators to work through this together.

Access for Smaller Operators and RTOs

- Development cost was historically the barrier. Content now exists and can be reached through subscription or partnership, as the Australian Drilling Industry Association has done for drilling.
- Collaboration avoids every trainer rebuilding the same content on every site.
- RTOs and industry are increasingly partnering where space, equipment or trainers are not available in-house.
- Mineral Resources keeps its simulators centralised rather than on site, citing maintenance, dust, technical support and training being pushed back by production or weather.

Motion Sickness

Motion sickness affects individuals unpredictably across static and motion base platforms. Mitigations include disabling the motion base or stereoscopic glasses, and shorter sessions.

Overall Session Summary

The session reinforced that simulation and mixed reality are accessible, effective tools for building capability before a worker reaches a live site, but that they sit within a broader training process.

Key themes identified were:

- Simulation accelerates familiarisation and exposes learners to hazards safely.
- Learning outcomes should determine the technology, not the other way around.

- Simulation complements live plant experience and trainer expertise rather than replacing either.
- Return on investment is measurable across safety, productivity, maintenance and travel.
- Clearer guidance is needed on how simulation integrates with competency standards.
- Falling costs and shared content are opening access for smaller operators and RTOs.
- Hardware is moving toward wearables faster than industry bodies and regulators are keeping pace.

These insights will help inform future training reviews and workforce planning activities.

The views, claims, and recommendations in this summary are drawn from what was discussed during the Mining Matters webinar and do not necessarily reflect the official position of AUSMASA. They are presented to capture industry feedback and inform further discussion, not as AUSMASA policy.