

Mining Matters – Machine automation technology in mobile plant

This document summarises discussions from Mining Matters – Machine automation technology in mobile plant, the second webinar in the series, held on 8 September 2026. It was hosted by David Hynes and Andrew Ketchell from AUSMASA, with guest speakers Chris Davis, Training Manager at Caterpillar, Jeremy Manuel, Head of Learning and Development at WesTrac, and Charlie Douglas of Precision Plant Solutions, who also lectures in this field at TAFE NSW. This summary captures the consistent themes raised to inform training package reform and broader industry engagement.

Defining the technology spectrum

Panellists opened by separating the terminology. These layers usually sit on top of a base machine that is already electronically controlled.

- **Detection.** Sensors, cameras, radar and LIDAR that alert an operator to something in the working window, or arrest control and stop the machine.
- **Guidance and machine control.** High precision positioning in 3 dimensions, so a machine can locate itself and operate within millimetres of a predetermined sector.
- **Operator assist.** Mine model guidance showing where to cut and fill, and geofencing to keep a boom or counterweight clear of traffic and services.
- **Remote operation.** Still staffed, with the operator out of the vehicle at line of sight or anywhere from 500 metres to more than 1,500 kilometres away.
- **Semi-autonomous.** The operator runs part of the cycle and the system executes the rest.
- **Full autonomy.** One controller assigns and optimises many assets, deciding on fuel bay trips and vehicle interactions without human involvement.

A recurring point was that autonomy must be site enabled, with infrastructure and networks in place, rather than just buying an autonomous truck and expecting outcomes. Every asset, down to a light vehicle, needs a layer of technology and a communications network.

Mixed fleets and sequencing a rollout

- Almost every site runs a blended fleet. Autonomous haulage typically sits alongside staffed loading tools, graders, remote or staffed dozers, and light vehicles in the pit.
- A crawl, walk, run approach was described: a fleet system for assignments, location and production data, then collision avoidance, then terrain modelling, then autonomous solutions.
- Autonomous haulage offers the most scalable return, but a site with dozer rollover incidents may go to a remote dozer solution first.
- There is no single pathway. The starting point depends on what the operation is trying to fix.

The skills and training gap

This was the strongest theme of the session. Technology reaches the field before the training does, leaving industry to learn the product, train the trainers, then bring the workforce up to speed.

- The breadth asked of mobile plant technicians has expanded sharply, taking in Ethernet enabled machines, communication networks, GNSS receivers, LIDAR and radar.

- These technologies do not respect existing trade demarcations. The work spans mechanical, electrical, communications and geospatial disciplines.
- Survey and geospatial units are largely unavailable in the automotive VET ecosystem, so providers contextualise existing units across different contexts as a workaround. The result was described as close but not yet right of fit for purpose regarding MCG.
- Panellists cautioned against stacking more content onto an already full 4 year apprenticeship, consideration of the specialisation of MCG should be considered.

Charlie Douglas illustrated the gap through surveying. A surveyor works to roughly 20 mm in height and 50 mm in position using a rover on a pole. An MCG technician mounts that rover on a machine travelling a haul road at 6 to 7 kilometres an hour, using hydraulics to hold the same tolerance. The requirement is diagnostic breadth, not depth in every trade. An MCG technician is not expected to rebuild an engine, but must isolate whether a fault is mechanical, electrical, communications or survey related.

Workforce growth and qualifications

- WesTrac has built a workforce of upwards of 140 MCG technicians drawn from mobile plant and auto electrical trades, ex-Defence, communications and audio visual backgrounds.
- Reskilling existing trades sustains a business but produces no lasting qualification and does not grow the workforce.
- A direct entry pathway is needed, so people can qualify into this work rather than completing another trade first.
- There is no formal MCG qualification. In NSW, site access generally requires a certificate of proficiency, so MCG technicians are engaged under another trade banner.
- Any qualification needs to scale across mining, construction, quarrying and agriculture, where support models differ considerably.

Safety and the case for adoption

- Safety sits alongside productivity as a driver. Large dump trucks have poor close-in visibility, and technology gives the machine a perception of the whole site.
- Panellists recalled a run of WA fatalities in 2006 to 2008 from heavy equipment and light vehicle interactions.
- No lost time injuries were reported as a direct result of autonomous haulage across a global fleet of over 700 trucks, around 400 in WA.
- Remote and autonomous solutions remove the operator from high risk environments, including collapse zones underground and corrosive holds.
- A skilled operator may match the technology for an hour or two, but not across a 12 hour shift. Consistency of output is a core benefit.

Trust and change management

Adoption often begins with resistance before the benefits become apparent.

- Early responses include broken cameras, taped-over lights and cut alarm wires. Attitudes shift once people see the technology working.
- Nuisance alarms are always affective and can create workaround interferences. Systems must be hardened so an alert is credible.

- Trust is built by repetition, with scenario training asking learners to predict an outcome before it plays out.
- A remote dozer at WesTrac's Collie technology training centre moves operators from a staffed seat to a remote station away from production.
- People, process and technology intersect. Technology on a site with poor culture or weak processes produces an expensive site with poor culture and weak processes. Change management comes first.
- Tight tender tolerances on civil work leave no margin, so contractors rely on machine systems.

Operator and technician roles

- Expectations shift with a data-rich machine. Owners assume the system will identify the problem, so diagnosis is expected to be faster.
- Remote diagnosis is growing. Efficiency on fault detection through machine data could save a 300-kilometre trip to site.
- Technicians are moving from reliability metrics, mean time to failure and repair, into the production cycle, where the question becomes how technology is affecting production.

Audience questions

- **Cyber security.** Expected to become a growing constraint. Networks are largely closed today, but data ports are already being shut down in other industries and similar safeguards are likely.
- **Multi-OEM sites.** Baseline fleet, terrain and site awareness solutions are increasingly agnostic. Automating a truck is straightforward, but optimising a whole site requires integration across light vehicles and ancillary equipment.

Overall session summary

Key themes identified were:

- The technology spans detection through to full autonomy, and mixed fleets are the norm.
- Technology is outpacing the training system and does not align with existing trade demarcations.
- The widest gaps are in geospatial and survey skills, and in diagnostic breadth.
- Reskilling trades sustains businesses but does not grow the workforce. A direct entry pathway and nationally recognised training around the MCG interface, are needed.
- Safety is as strong driver of adoption as is productivity.
- Change management and site culture must integrate with technology investment.

AUSMASA's research team has released a preliminary task profile for the MCG technician role, with consultation open until Wednesday 16 September. These insights will help inform future training package reviews and workforce planning activities. [More information here.](#)

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.