Mining and Automotive Skills Alliance

Mining Matters – Future Skills: Emerging Trades and Careers in Mining

This document provides a detailed summary of Mining Matters – Future Skills: Emerging Trades and Careers in Mining, the third webinar in the series, held on 8 October 2026. It was hosted by David Hynes and Andrew Ketchell from AUSMASA, with guest speaker Jarryd Townson, Queensland Engineering Coordinator, Training and Development at Glencore Coal Assets Australia. Aaron Sharp-Jones, Manager Service Operations at Emeco Group, was unable to attend and his responses were provided in advance and read on his behalf. This extended version is intended to give readers who did not attend a thorough brief on the discussion, the examples raised and the themes emerging to inform training package reform and industry engagement.

At a glance

- Future skills are largely about traditional trades becoming more technical, not about replacing them. The base trade stays; capability in high voltage, isolation, diagnostics, software, controls and digital technology is layered around it. *(Aaron Sharp-Jones)*
- The operational technology (OT) technician is the clearest new role on site, yet there is no agreed definition and no qualification that fits. Employers are combining existing qualifications to fill the gap. *(Jarryd Townson)*
- Glencore puts every apprentice through a dual qualification inside a standard 4 year apprenticeship, choosing the second qualification for future and transferable value rather than current site need. The second qualification is paid for by the employer. *(Jarryd Townson)*
- Battery electric and high voltage equipment changes the risk profile on site. Speakers called for a tiered competency structure and for licensing settings that let trades other than electricians work safely within a defined scope. *(Aaron Sharp-Jones; Jarryd Townson)*
- Equipment is arriving faster than workforce capability can be built. Developing people before the equipment becomes business as usual, and earlier information sharing by OEMs, were identified as the biggest opportunities. *(Aaron Sharp-Jones; Jarryd Townson)*
- School-level pathways, inconsistent Certificate II delivery and a limited understanding of modern trades among young people and their influencers were raised repeatedly as a weak point in the pipeline. *(Jarryd Townson; Andrew Ketchell)*
- Major operators and OEMs building their own training facilities was presented as a signal that RTOs need to become more agile and mining-contextualised, with funding settings a structural barrier. *(Jarryd Townson; Andrew Ketchell)*

About the speakers

- **Jarryd Townson, Glencore.** Oversees the Queensland apprenticeship program and supports engineering graduates across Queensland and New South Wales. A former diesel mechanic who completed his apprenticeship with BHP at Peak Downs Mine in the Bowen Basin, he later completed two degrees, worked with the Queensland Government in innovation, ran his own businesses and spent around 10 years building a not-for-profit innovation hub in Mackay (now Greater Whitsunday Innovation). Glencore's apprenticeship program was recognised as award-winning last year. He is also a member of AUSMASA's industry working group on technological advancement in mining.

- **Aaron Sharp-Jones, Emeco Group.** A former Army heavy diesel fitter with experience in surface and underground mining, supervision and RTO lecturing. He has recently been heavily involved in preparing the Emeco workforce to support new battery electric and high voltage mining equipment through a major OEM, including hybrid machines and the net zero transition.

What future skills actually means

The session opened by asking what a "future skills" job actually looks like on a mine site today, in plain terms.

- **Modernise the base trade.** Aaron Sharp-Jones said he would point to a technician working on battery electric or high voltage mobile equipment. That person may still be a fitter, electrician or auto electrician. What is changing is the capability around the base trade: high voltage systems, isolation, diagnostics, software and controls.
- **Trades become more technical, not obsolete.** Future skills were not framed as replacing traditional trades. Traditional trades are instead becoming more technical and specialised.
- **Refrigeration is an overlooked trade.** Refrigeration mechanics were raised as a trade being drawn in, depending on OEM design, by the thermal management and air conditioning systems in EV equipment. Andrew Ketchell noted that while discussion tends to focus on electrification, cooling systems are a large and under-discussed part of the change.
- **The Trade X concept.** Jarryd Townson described his Trade X concept, which asks what trades would be needed to work on a complex automated machine (a "robot" that need not look human) operating 100 metres away today. When he puts the question to people, the answer typically spans 4 or 5 trades, plus elements of some university or TAFE qualifications.
- **Generalists supported by specialists.** The proposed model is a person with enough working knowledge across those trades to keep equipment running, supported by specialists who are on site, attend site, or dial in from anywhere through mixed reality glasses when a task becomes too technical.
- **A familiar pattern at a larger scale.** He compared this to how sites already work: a diesel mechanic fixes most things on mobile equipment, including auto electrical work up to a point, then calls in the auto electrician when it gets too technical. As equipment adds more layers of complexity, nobody can be a specialist across every core trade involved, and staffing a specialist for each would require a very large workforce.
- **How much can one person hold?** Andrew Ketchell raised a caution that cuts both ways. A tradesperson expected to remember a base trade plus several specialisations may forget things, which becomes a safety risk. At the other extreme, over-specialisation means sending 4 or 5 trades to one job. The right balance is still being worked out across industry.

Emerging roles and the OT technician

- **No new job title yet at Emeco.** Aaron Sharp-Jones said the change in his team is not a new title but new capability within existing roles: people who can bridge traditional mechanical or electrical skills with high voltage, battery electric diagnostics and OEM technology. In his view industry may not need a completely new trade for everything, but must modernise the capability within existing trades.
- **Square pegs and round holes.** Jarryd Townson challenged the assumption that adapting existing trades is always the answer. Industry should ask whether the people in those trades

are the right fit for the new work. If the skill set and interests are different, “if we need a round peg, let’s create a round peg” rather than reshaping an existing trade to fit.

- **The OT technician is genuinely new.** Glencore has recruited 4 operational technology apprentices to start next year, a role that did not previously exist in the business. Even those working in the space only partly understand where the gap sits, and it will keep moving as equipment, systems and networks evolve.
- **No shared definition.** An OT technician means different things to different businesses. The work is variously described as automation, Industry 4.0 or operational technology, with “OT” gaining the most traction as a term.
- **Apprentices placed in the wrong trade.** When gathering letters of support for Trade X, Jarryd Townson found some employers had signed apprentices into the wrong trade because nothing fitted, then sent them to other small and medium businesses to gain the experience their own workplace could not provide.
- **“Frankensteining” qualifications.** With no fitting qualification, Glencore will put its OT apprentices through a Certificate III in Electronics and Communications (UEE package) combined with a Certificate III in Telecommunications Technology, drawing on radio communications and networking. The combination was modelled on what people already doing OT work on site had studied. Jarryd Townson was clear these are not exactly the right qualifications, but they are the best available, and industry cannot stand still waiting for them.
- **Cannibalising an already short trade.** Upskilling electricians into OT and similar roles adds to a long-running trade shortage. Radio technicians have been a common source of OT capability as radio work has gone digital, alongside electricians and auto electricians working on technology bolted onto mobile equipment. Andrew Ketchell noted radio technicians’ understanding of complex electrical systems is often underestimated.

Dual qualifications and the Glencore model

- **Every apprentice is dual qualified.** All Glencore apprentices complete a core qualification, usually a traditional trade, plus a second qualification to complement it. The second qualification is chosen to make them better and more employable tradespeople with skills transferable to other industries, not only to meet current site needs.
- **Auto electricians.** Auto electricians receive a restricted electrical licence. This would allow them to isolate and work on EVs if they moved to work in town, even though the site does not currently run EVs. Discussions on how this licence applies on site are continuing.
- **Electricians.** Electricians complete a Diploma of Applied Technologies covering PLC, SCADA and digital twins. Glencore is not an early adopter and does not yet run digital twins, but the reasoning is that these apprentices may be the people who bring that innovation into the business in future.
- **A pathway to engineering.** Every apprentice also has the opportunity to apply to become a trainee engineer at the end of their apprenticeship. The OT capability built into both electrical trades and the engineering pathway are the aspects applicants ask about most.
- **Getting ahead of blockers.** Asked whether some tradespeople lack the appetite to upskill, Jarryd Townson said apprentice cohorts respond well to extra qualifications and exposure. Building capability up front, before the business needs it, is one way to work around resistance in the existing workforce.
- **Reflecting the next generation.** Students are taught about AI, VR, mixed reality and additive manufacturing at school, then offered the same list of traditional trades on leaving. Jarryd Townson questioned whether young people will be passionate about roles they see as

antiquated, noting many are interested in areas such as game design and gaming, and recognise VR and AR from gaming but have not heard of digital twins.

High voltage and EV competency

- **Not a diesel machine with a battery in it.** Aaron Sharp-Jones's biggest lesson is that a battery electric machine cannot be treated as a diesel machine with a battery. The risk profile changes across isolation, stored energy, verification, access to high voltage components and emergency response.
- **Who can do what.** Competency levels need to be explicit: who needs awareness, who can isolate, who can diagnose, and who is both authorised and competent to perform high voltage work.
- **Authorised is not the same as competent.** A licence or course completed several years ago and not used since does not mean someone is competent today. This is why sites place heavy emphasis on verification of competency (VOC).
- **It reaches beyond electricians.** Fitters, supervisors, planners and others working around the equipment need an appropriate level of understanding. People can no longer simply climb into an engine bay, with high voltage cabling and electric wheel motors throughout. Understanding the stored energy present, and who can make a machine safe, is a major focus.
- **A societal shift, not only a workforce one.** Jarryd Townson, drawing on AUSMASA's Charge for Change event in Melbourne, noted that EV safety also involves owner education, crash response, charging practices and emergency services, not just the trades who maintain the equipment.
- **Legislation and licensing as the bigger constraint.** In what he described as a possibly controversial view, Jarryd Townson argued that expecting an electrician for everything electrical is not sustainable. Restricted electrical licences and data cabling licences (included in Glencore's OT qualification) show other trades can be trained and assessed as competent in areas relevant to them. Without change, industry risks running out of electricians and "out-licensing" itself.
- **Light vehicles are a case in point.** A light vehicle mechanic does not automatically become qualified to work on EVs simply because the fleet is changing, highlighting the gap between trade scope and the technology now in use.
- **A tiered competency structure.** Aaron Sharp-Jones does not believe every fitter or electrician needs to be a high voltage specialist. He proposed awareness at the first level, isolation and basic intervention at the second, and specialist high voltage diagnostics and repair above that. This would give industry a clearer development pathway, potentially beginning with Certificate I and II level exposure and component rebuild work at school, through trades assistants and base trades, up to high voltage licensing and machine control technicians.

Where electrification is heading

- **Complexity is the direction of travel.** Jarryd Townson expects electrification to drive demand for more minerals, metals and production, including to build renewable energy infrastructure, raising questions about how long resources can keep pace with demand for new technology.
- **Automation created roles as well as removing them.** When automation arrived, there were fears operators would lose their jobs. Instead, a single operator role may have become

5 technical roles across safety, trades, telemetry and coding. More complexity means more skills and more people.

- **Human checks remain essential.** Whether the technology is robotics or AI, there is still an input, an output, a sense check and safety elements. If a person cannot judge whether an output is correct, it may well be wrong.
- **Productivity matters.** David Hynes noted a recent economist's presentation on Australia's declining productivity, adding weight to the efficiency cost of licensing and workforce bottlenecks.

Building capability ahead of the equipment

- **Develop people before the equipment arrives.** Aaron Sharp-Jones's key message was that equipment can arrive much faster than capability can be developed. An experienced high voltage mining technician cannot be created because a fleet arrives next month; training, exposure, mentoring and experience all take time.
- **Broad foundations hedge technology risk.** Andrew Ketchell noted some employers are embedding electrical and mechanical systems knowledge into base learning or starting dual trades from day one. If the industry shifts to hydrogen rather than battery electric, for example, the workforce already has foundations to build on, then specialises as the direction becomes clear.
- **OEM secrecy slows readiness.** Jarryd Townson said industry is its own worst enemy. OEMs keep new technology quiet to stay ahead of competitors, which leaves operators and trainers unable to prepare. Sharing insight before technology arrives was identified as the clearest opportunity.
- **Red tape and exponential change.** Technological change is accelerating, yet regulatory and approval processes are becoming heavier. Faster ways to make new qualifications and roles operational are needed; at present no OT qualification exists and industry is "already behind".
- **Be honest about root causes.** Industry was challenged to ask what it actually needs and why, and where an existing product does not fit, to create something new rather than keep reshaping what exists.

Attracting people into emerging roles

- **The second qualification sparks interest.** When the dual qualification is explained, young people's "eyes light up" because it is not simply the trade their father and grandfather did. The prospect that an auto electrician could work on EVs in town is seen as real opportunity.
- **A different applicant profile.** Candidates increasingly come from interests in technology, networking and the Internet of Things, rather than the traditional cars-and-machinery pathway. At the other end, many school leavers think they want to be boilermakers simply because welding is the only trade skill they have tried.
- **Applicants often don't know the trade they applied for.** Glencore receives thousands of applications. In interviews, once hobbies and interests are discussed and roles such as OT are explained, many applicants change their trade preference. Andrew Ketchell added that modern trades are hard to describe in a few words, so applicants default to a simplified picture, such as a diesel mechanic who "fixes engines".
- **Influencers default to the familiar.** Young people are often told by parents to go to university or get a trade. Many simply want "an apprenticeship" without knowing which.

Influence tends to favour trades that have always existed, often from people who are less familiar with where technology is heading.

- **Internal development matters as much as recruitment.** Aaron Sharp-Jones noted that technology, diagnostics and new learning systems have raised the degree of difficulty compared with purely mechanical capability, and that continuously developing existing people is a critical part of the equation alongside recruitment.

Apprenticeships, schools and entry pathways

- **Earlier exposure.** Aaron Sharp-Jones would like apprentices exposed to new technology earlier. A strong base trade and the fundamentals remain essential, but awareness of high voltage, electrification, diagnostics and controls should become normal rather than something first met later in a career.
- **Higher foundational knowledge.** As work becomes more electrified and electronic, more maths and physics is involved. Electricians are already recruited from applicants with the strongest maths and physics results, so school-level preparation will need to lift.
- **Certificate II delivery is inconsistent.** Some applicants hold 4 or 5 school-delivered Certificate IIs, in some cases taken to avoid regular classes rather than out of genuine interest. Availability also varies by school: a student with a Certificate II in Electrotechnology may simply have attended a school that offered it, while a student elsewhere with the same interest has nothing to show.
- **Uneven tasters across trades.** Electrotechnology has a Certificate II that lets students test their interest; most other trades, mining and non-mining alike, do not have an equivalent.
- **Lost fundamentals.** Jarryd Townson pointed to the old school model of graphics, woodwork and metalwork as a broad grounding in tools, drawings and schematics, which has been eroded by narrower Certificate II specialisation.
- **The Glencore skills centre.** Every apprentice, regardless of trade (boilermakers aside, as their trade already covers much of this), completes hand and power tools, marking out, inductions and first aid, then theory and practical in fabrication and machining. They machine a self-actuating centre punch and a soft-faced hammer, fabricate an offset engineer's vice they keep for life, and this year built 3 Formula High School race cars. 32 apprentices were due to drive the cars they built at Lakeside the following week.
- **Restoring an understanding of manufacturing.** A parts exchange, "throwaway" culture means apprentices rarely strip and repair components such as alternators or starter motors. The skills centre restores an understanding of tolerances and what happens inside a component, and what may have gone wrong. With rebuilds increasingly done off site or by OEMs, this is already changing which trades are needed, where and how.
- **Engaging schools.** Glencore is working with the Formula High School organisation on how more schools can take part, as building and driving a car is a strong motivator into trades.

Collaboration with training providers

- **Define competency first.** Aaron Sharp-Jones said good collaboration means industry telling providers what people must be competent to do, rather than asking for "a course on EVs". Operators, OEMs, service providers, tradespeople and RTOs should define task risks and competency levels together, then build training around them, based on what people actually do in the field.

- **RTOs are on notice.** Jarryd Townson observed that Komatsu, Caterpillar and BHP have built their own training facilities or RTOs, and others are heading the same way. If major employers believe they can do it better, the question is what is broken and needs fixing.
- **Where collaboration fails.** Collaboration is a two-way street with joint outcomes. It falls over when providers lack the agility or risk appetite to move into unfamiliar areas, so they wait and industry moves on without them.
- **Mining contextualisation is the gap.** BHP's FutureFit Academy in Mackay was cited as one of the best mining-contextualised training facilities Jarryd Townson has seen. Most RTO equipment, in Queensland and elsewhere, is not mining-contextualised, so employers must provide that context on site because TAFE often lacks the space, facilities or capability.
- **Examples of good practice.** David Hynes and Andrew Ketchell pointed to FutureFit in Mackay and Perth, Fortescue partnering with local TAFEs to deliver electrification training at a purpose-built facility, and Kangan Institute in Melbourne involving light vehicle OEMs. Glencore's race car program also involves two RTOs: one owns the program and another delivers it.
- **Keeping pace.** Technology is developing faster than formal training products can keep up. Providers cannot build relevant content in isolation; industry and OEMs need to engage earlier and provide enough technical input for providers to understand where capability is heading.

Funding as a structural constraint

- Government subsidises an apprentice's first qualification only. Glencore pays fee for service for every second qualification and for its skills centre.
- The allocated electrical instrumentation dual trade is funded within the state training system but runs over 5 years. Glencore's model fits both qualifications inside 4 years, using two separate training contracts at its own cost.
- Large RTOs reliant on government funding struggle to invest in new areas, so facilities such as FutureFit have been funded by industry out of necessity. Andrew Ketchell noted the constraint is not only money but capacity, equipment, resources and subject matter experts.

Audience questions

- **Augmented reality.** Little effect on roles today. Jarryd Townson believes that had COVID not made QR codes mainstream, AR would have been the next widely adopted technology, as it can do much more. He described an AR art gallery built inside an empty illuminated tent for a local tourism event, where visitors viewed and voted on community artworks through their phones. The barriers are the cost per application and the practicality of execution, meaning how many people can engage and get a valid outcome. David Hynes compared it to the short-lived hologram trend.
- **Dual qualification duration.** With the right systems, structure and support, Glencore apprentices complete both qualifications within the standard 4 year apprenticeship. They are effectively enrolled part time in two trades and signed off early. The funded allocated electrical instrumentation dual trade takes 5 years.
- **Disappearing trades.** Jarryd Townson knows of only one blacksmith, and noted it is perhaps the only trade that has truly evolved over the last 100 years, from blacksmith to boilermaker to welder fabricator to robotic welding. Most trades have specialised and moved off site rather than disappeared. Fabrication and boilermaking are often contracted out or done off site, and many of the fitter machinists he learned from are now mobile plant

technicians. Remaining specialists increasingly control, operate or program equipment that does the work they once did by hand.

- **Australia compared with other countries.** Using his 1936 Dodge Roadster ute as an example, Jarryd Townson recalled when Australia required a share of vehicles to be built locally, creating jobs and capability. Today, inventors he has worked with often have to prototype offshore, facing language barriers, shutdowns such as Chinese New Year, and costly back-and-forth when parts arrive wrong. Australia has lost much of its rapid prototyping capability, including the "guy with a lathe in his backyard".
- **Rebuilding local capability.** The Mackay innovation hub identified two missing capabilities in the local ecosystem: a pick-and-place machine for printed circuit boards and injection moulding, the latter powered with support from a local solar provider. The aim was a shared network of engineering services so local inventors could prototype and then manufacture locally rather than offshore. Hodge Industries in Mackay, which designs sugar cane harvesting equipment with its farmers and exports it worldwide, was cited as an example of what local manufacturing can achieve.

Key quotes

- **Aaron Sharp-Jones:** "You can't treat a battery electric machine as simply a diesel machine with a battery in it."
- **Aaron Sharp-Jones:** "You can't suddenly create an experienced HV mining technician because the fleet is arriving next month."
- **Jarryd Townson:** "If we need a round peg, let's create a round peg."
- **Jarryd Townson:** "We're going to out-legislate ourselves and out-license ourselves."
- **Jarryd Townson:** "I think all RTOs are on notice."
- **Jarryd Townson:** "I just think complexity is where it's heading."

Quotes are lightly edited from the session transcript for readability.

Implications for training package reform and workforce planning

The following issues arise directly from the discussion and are noted for further consideration:

- **An OT technician qualification.** There is a clear gap for a recognised qualification or skill set for OT technicians, with an agreed definition of the role. Employers are currently combining UEE and telecommunications qualifications as a workaround.
- **Tiered high voltage competency.** A defined awareness, isolation and basic intervention, and specialist diagnostics and repair structure could be expressed through skill sets or units across mechanical, electrical and supervisory qualifications.
- **Licensing scope.** Regulators and licensing bodies may need to consider restricted or scoped licences that let trades other than electricians perform defined high voltage and electrical tasks safely.
- **Funding for dual and second qualifications.** Current subsidy settings favour single qualifications or longer allocated dual trades, placing the cost of future-proofing on employers.
- **School-level pathways.** More consistent, broader trade tasters and foundations at school, and better information for parents and careers advisers on modern trade roles, were consistently identified as priorities.
- **Earlier OEM and industry engagement.** Mechanisms for OEMs to share technical direction with training providers earlier would help training products keep pace with equipment.

- **Mining contextualisation.** Partnership models that give RTOs access to mining-contextualised equipment and subject matter expertise are needed if public providers are to remain relevant.

Overall session summary

Key themes identified were:

- Traditional trades are becoming more technical rather than being replaced, with the open question being how much capability one person can reasonably and safely hold.
- The OT technician is the clearest emerging role, with no agreed definition and no fitting qualification, leaving employers to assemble their own at the moment.
- Dual qualifications are being used to future-proof apprentices and broaden their transferable skills, at employer cost beyond the first trade (unless subsidised within state funding programs).
- High voltage competency needs a tiered structure, and licensing settings should allow trades other than electricians to work within their scope.
- Capability must be developed ahead of equipment arriving, which depends in part on OEMs sharing information earlier and on reducing red tape.
- Entry pathways starting at school were raised repeatedly as the area needing the most attention, including the consistency of Certificate II delivery and the influence of parents and schools.
- RTOs face pressure to become more agile and mining-contextualised as major employers build their own training capability.

Collaboration was described by the hosts as the key word of the session. Attendees were invited to suggest future topics and guests for the Mining Matters series, with school entry pathways and early career development proposed as a possible focus for a future session.

These insights will help inform future training package 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.