How to Manage Competency for Welding on Mine Sites

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Summary

It can be very difficult to properly manage welding tradespeople on a mine site, but fundamentally it is simply because to date there have been no suitable competency assessment methods. Welding requires a mix of safety based VoC, technical competence across a range of different welding processes and repair scenarios, as well as managing compliance requirements to structural standards when needed. A Trade Certificate typically does not provide safety VoC for the range of typically used welding processes. There are no endorsed units in the RII or similar that can be used to determine competency either. Similarly, there are many problems with attempting to use welder qualifications for VoC and technical competency. Using a fabrication based assessment just isn't appropriate for maintenance welding. Appropriate technical competency is essential for productivity, reduced maintenance costs, and safe maintenance outcomes.

Furthermore, specialised knowledge is required for supervisors who are managing welding activities, specifically in relation to identifying hazards, and understanding technical and quality requirements. In QLD, in addition to meeting the requirements of the Coal Mining Safety Regulation, it is also necessary to comply with the requirements of RS11 and RS22. The SHMS must adequately inform and manage site TNA and competency requirements for welding from both a technical and safety perspective.

This paper firstly examines the current practices and tools available for welder competency management. It then examines what competency management for welders actually needs to provide in terms of safety and technical ability, as well as broader consideration of the needs of all stakeholders involved, and how these play an important role in the design, delivery and management of a welder competency program.

It is apparent that there is a distinct lack of a suitable means for the mining industry to adequately manage competency of welders while meeting legislative requirements, technical requirements and the needs of all stakeholders. However, there is a solution available in the form of the Mining Welder Competency, which meets all of the requirements and objectives outlined in this paper.

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Current practices

Although welding is an essential activity for maintenance, the mining industry generally has quite a poor understanding of welding. Unlike most other trades, there is a high level of complexity with specialist roles such as welding supervisors and welding engineers. Specialist technical knowledge is required for welding management. However, most mine sites do not have a subject matter expert in their maintenance team. The end result is that it is treated overly simplistically as “it’s just welding”, or there is overwhelm, complexity and confusion when attempting to manage maintenance welding the same as fabrication. In some cases, expert welding supervisor contractors are engaged for specific projects, but the large majority of maintenance welding is done with no technical supervision or instruction. Repair advice is often sought from OEM’s, but no guidance is provided regarding how to ensure the welder’s skill level required to carry out the work.

The welders working in the mining industry have generally learnt what they know informally from other welders,, or it’s just what they have figured out when told to “go repair those cracks”. As a result, there is large variation in the ability of welders, as currently there is no benchmarking of ability for welding maintenance of multi-million dollar mining equipment and critical assets.

In this section, we examine what the current practices are for welder competency management - specifically in terms of what is specified in site TNA’s (Training Needs Analysis) for a welder to be able to work on site.

Trade Certificate

The Certificate III Engineering (Fabrication) training package has changed significantly over the last few decades, so for simplicity this paper will just address the current curriculum design. There are 6 specialisations available for the Cert III Engineering (Fabrication). These are

- Welder
- Boilermaker
- Boilermaker/Welder
- Blacksmith
- Sheetmetal
- Surface Finishing

However, the term “boilermaker” is used ubiquitously in the mining industry in reference to any tradesperson that has a Cert II Engineering (Fabrication), regardless of their actual trade specialisation. For this reason, in this paper, the generic term “welder” will be used instead.

Competency management for welders in the mining industry currently is based almost entirely on a requirement for a trade certificate, which is a Cert III Engineering (Fabrication). Mine sites will typically specify this as the minimum TNA requirement for site access for welders.

Beyond this, certain sites may require a particular specialisation, or potentially exclude certain specialisations (such “Surface Finishing”). Going further, some may attempt to require specific units in an attempt to meet demonstrated VoC requirements. However, this is generally futile due to the large variation in what units are taught and the significant changes in the curriculum that

have occurred over the last few decades. More on this topic will be discussed in the Safety VoC section.

Welder Qualifications

It is well recognised in industry that a trade certificate provides no indication of the welder's skill or ability. For this reason, welder qualifications are sometimes also specified as a TNA requirement. Before going further, it is necessary to provide some explanation regarding what welder qualifications are. Put simply, a welder qualification is a skill test for whether a welder can follow the provided welding procedure to produce a sound weld. The test is done using prepared samples for a specific joint type, welding position, and welding process. There is no training or knowledge assessment. The purpose of a welder qualification is to provide confidence in a welder's ability as part of the overall risk management process for welding fabrication. The term "qualification" does not indicate a formal qualification in the VET sense, it is simply a descriptive term to imply that the welder has proven their ability and is thereby "qualified" to perform a certain type of work. In the mining industry, welder qualifications are simply used as an indication of a fundamental ability to produce a sound weld, but are not formally used as part of the maintenance management process. Unfortunately, welder qualifications are of very limited value or relevance for competency management and maintenance welding, as will be demonstrated in the following sections of this document.

Safety Training

In NSW, most mine sites now require welders to complete "MDG25 Training". This is a non-accredited VET course, based on the "TRG Hot Work (cutting and welding) at mines and petroleum sites" (formally called MDG25). There is a pervasive belief that welders who complete this course are somehow "safer", despite the fact that there is no regulation of the training course content, delivery or providers and that the TRG Hot Work is written for whole of site management (with a strong emphasis on site management systems and procedures and supervision) not specifically for welders.
In QLD, there is no industry based safety training at all, other than specific site based induction training covering the various SOP's and hot work procedures. In some cases, there are specific training modules that have typically been developed in response to serious incidents at a site/company.

Requirements for Competency of Welders

There are a number of factors that must be considered in relation to management of the competency of welders on mine site. It is important to recognise that beyond just the safety of the worker, we must also consider technical ability, compliance requirements and maintenance management. Furthermore, it is important to realise that there are also broader implications on the industry and community regarding the delivery of training and assessment, time and costs involved, and portability.

Part 1 - Safety VoC

In this section, we examine the requirements and objectives of TNA based welder competency in terms of what is actually needed to meet safety and legislative requirements. Specifically, it is necessary to have a task based Verification of Competency (VoC) process to ensure that workers can safely and correctly set-up, operate and shut down the various welding and allied processes that they will need to use for routine tasks on a mine site.

Legislative Requirements for Competency

All of the various WHS acts and regulations, including mining specific acts and regulations in all Australian States have specific requirements for worker competency. These are along the lines of the definition provided in the QLD Coal Mining Safety and Health Act 1999

> *" Competence for a task at a coal mine is the demonstrated skill and knowledge required to carry out the task to a standard necessary for the safety and health of persons"*

To better understand and consider this definition, we can break it down into three key parts

1) Demonstrated skill and knowledge
2) Required to carry out the task
3) To a standard necessary for the safety and health of persons

"Demonstrated skill and knowledge" fundamentally implies that there is a suitable assessment system for ensuring that this can be done correctly, consistently and fairly. Broadly speaking, the fundamental VET principles of assessment and rules of evidence should apply. Indeed, this is a requirement under QLD Recognised Standard 11.

"Required to carry out the task" implicitly means that the competency is directly linked to the task - i.e. the specific type and nature of work to be performed. The challenge is to consider whether the task should be defined at a high level (eg "hot work"), based on the nature of the task (eg the welding process being used), or specific to the activity (eg welding in a confined space). As part of site Health and Safety Management Systems, the hazards associated with the activity are managed by policies, permits and risk assessments. Each welding process has a specific set of hazards that must be managed, which requires the operator to have both a technical understanding of the process as well as basic skills for how to use it. Thus it becomes clear that the competency requirement is relevant to the welding process being used. For example, Carbon Arc Gouging, MMAW (Stick welding), FCAW (flux cored welding) and oxy-fuel cutting each require separate competency.

The third part of the definition of competency - "to a standard necessary for the safety and health of persons" provides the required context. Note that reference is only made to safety aspects. There are no "technical competency" requirements in the legislation. To make this distinction clear to the reader, this may mean that a worker is "competent" but does not do quality work. To put this in perspective for welding, the welder may do the work safely with no consideration of whether the weld is compliant or a crack repair is effective.

Recognised Standard 11 adds some further nuance to the definition of competence

> *"Personnel must have the appropriate knowledge and skills to perform their tasks effectively and safety"*

Note the inclusion of the words "appropriate" and "effectively". The word "appropriate" indicates that the knowledge and skills must be relevant to the task. The word "effectively" suggests that there are broader considerations of the efficiency and quality of the work done. Common sense says that this should be an obvious consideration for any business, beyond just the minimum safety requirements.

In RS11, the following is stated in section 6.3

> **6.3 Trade competencies**
> Competencies required by trades personnel should be identified and included in the Training Needs Analysis. Each site should have a system whereby trade competencies are confirmed prior to the individual conducting the work.

There are 2 key points in this statement.

1) Competencies must be included in the Training Needs Analysis (TNA)
2) Competencies must be confirmed prior to doing the work

So from this it is clear that the competency requirements must be clearly defined in the TNA, but also there needs to be a suitable means for confirming competency. Some competency is done on site by approved site personnel via training and/or Verification of Competency (VoC). However, it is not feasible for welders to be individually assessed on site via a VoC process - sites don't have personnel with the suitable training and logistically it would be impossible for contractor management. So there must be reliance on an external competency management system.

RS11 is explicit in requiring that the competency assessment process must meet Vocational Education and Training standards for the "Rules of Evidence" and "Principles of Assessment". These are summarised in the following graphics.

Principles of Assessment

Fairness	Individuals needs are taken into account, and reasonable adjustments are made if required
Flexibility	Draws on a range of assessment methods
Validity	Is based on suitable evidence covering a range of knowledge and skills, and is aligned with assessment requirements
Reliability	Evidence presented for assessment is consistently interpreted and assessment results are comparable irrespective of the assessor conducting the assessment.

Rules of Evidence

Valid	Is it relevant to the task?
Reliable	Did the person actually perform the task?
Authentic	Is it an original or a copy? Can it be verified?
Current	When was the last time the person performed the task?
Sufficient	Is there adequate evidence to demonstrate competency?
Endorsed	Is it endorsed from a previous organisation, RTO or company official?

Task Based Competency Requirements - Verification of Competency

Different welding processes have different hazards associated with their use. It is essential for a welder to be able to safely and correctly set-up, operate and shut-down the welding equipment to be used. Specific knowledge is required to be able to do this in terms of understanding the hazards and apply suitable controls for the welding equipment being used. This means that the welder must also have suitable experience to also know what to do in terms of inspection and safe usage. The table below shows a simplified summary of some of the key differences in the hazards present for the various welding and allied processes that are commonly used on mine sites. Additional hazards are present for specialised processes such as thermal lancing.

Hazards	GMAW & FCAW	Carbon Arc Gouging	MMAW	Oxy-Fuel Cutting	Flame Heating
Fuel gases				X	X
Inert gases	X				
Compressed Air		X			
Extreme noise and brightness		X			
Fume	X	X	X		
Higher Open Circuit Voltage		X	X		
Very high current		X			
Molten metal/slag	X	X	X	X	

From this, it is clear that someone who has only been trained in the use of GMAW/FCAW would not have demonstrated ability to safely use Carbon Arc Gouging or do Oxy-fuel cutting.

Furthermore, it is apparent there must be some form of VoC process that meets the rules of evidence of principles of assessment for demonstrating competency for each of the welding and allied processes.

How to do VoC?

It is clear that VoC is required for each of the welding processes to be used. So the question then, is how to do this, while also meeting the requirements for the rules of evidence and principles of assessment?
The assumption commonly made in industry is that having a trade certificate is a suitable way to demonstrate competence. Unfortunately, this is not the case.

The objective of a VoC process the various welding and allied process must be to ensure that the welder has the necessary knowledge and skill to be able to safely and correctly set-up, operate and shut down the equipment. This includes correctly using the necessary PPE and establishing a safe work zone based on the hazards associated with the welding process.

As mentioned previously, the term "boilermaker" is used ubiquitously in reference to any tradesperson that has a trade certificate. However, a welder may do one of the following 6 specialisations to obtain their trade certificate

- Welder
- Boilermaker
- Boilermaker/Welder
- Blacksmith
- Sheetmetal work
- Surface Finishing

There is often an assumption that everyone does the same curriculum in terms of the actual units that are included in the training and assessment. However, the reality is that each of the specialisations is based on their own group of elective units, and that typically less than 50% of the available unit points will be covered by the trade certificate. This is shown in the image below.
Furthermore, there is significant variation in the units taught based on the location of the RTO and also between RTO's, with further variation depending on the facilities of the RTO and the trainer skills/experience.

	Total Points Available	Fabricator	Boilermaker	Welder	Boilermaker/ Welder	Sheetmetal	Blacksmith	Surface Finishing
Core	33	100%	100%	100%	100%	100%	100%	100%
Elective A	135							
Elective B	89		45%					
Elective C	84	6%		48%				
Elective D	115				35%			
Elective E	77					52%		
Elective F	52						77%	
Elective G	80							50%
Elective H	348	7%	7%	7%	7%	7%	7%	7%

If we take a closer look at the Elective B group for Boilermaker, we see that a student must complete units worth 45% of the total 89 points available. Although there are units available for all welding processes, typically students will only do one or at most two of the welding processes.

The full list of units in Elective B group are shown in the table below.

Group B	**Boilermaking**	
Unit code	**Unit title**	**Points**
MEM05004	Perform routine oxy fuel gas welding	2
MEM05005	Carry out mechanical cutting	2
MEM05007	Perform manual heating and thermal cutting	2
MEM05009	Perform automated thermal cutting	2
MEM05010	Apply fabrication, forming and shaping techniques	8
MEM05089	Assemble fabricated components	8
MEM05012	Perform routine manual metal arc welding	2
MEM05037	Perform geometric development	6
MEM05049	Perform routine gas tungsten arc welding	2
MEM05050	Perform routine gas metal arc welding	2
MEM05052	Apply safe welding practices	4
MEM05056	Perform routine flux core arc welding	2
MEM05057	Perform routine submerged arc welding	2
MEM09011	Apply basic engineering design concepts	6
MEM12007	Mark off/out structural fabrications and shapes	4
MEM18055	Dismantle, replace and assemble engineering components	3
MEM05071	Perform advanced manual thermal cutting, gouging and shaping	2
MEM05085	Select welding processes	2
MEM05089	Assemble fabricated components	8
MEM05090	Weld using manual metal arc welding process	4
MEM05091	Weld using gas metal arc welding process	4
MEM05092	Weld using gas tungsten arc welding process	4
MEM05093	Weld using submerged arc welding process	4
MEM05094	Repair, replace and/or modify fabrications	4
MEM05096	Weld using flux core arc welding process	4
MEM05097	Weld using oxy fuel gas welding process	4

It is also worth noting that the titles of the units do not necessarily provide a meaningful description of what the unit actually covers or the skills assessed. For example, “MEM05071 Perform advanced manual thermal cutting, gouging and shaping” will typically be done using oxy-fuel only. Carbon Arc Gouging is rarely formally taught as part of this unit.

The result of this is that it is generally not possible to use a course transcript of units completed as a means of determining whether or not a welder is competent to use all of the commonly used welding and allied processes required for routine tasks on a mine site.

It is clear that a Cert III Engineering (Fabrication) does NOT provide evidence of competency for all of the welding and allied processes required for routine tasks on a mine site.

What about welder qualifications? Will they provide VoC? The simple answer is no.
This is because ;

1) They don't meet the necessary standards for assessment and evidence
2) The objective is technical only, being to confirm the welder knows how to manipulate the torch/electrode to deposit a sound weld by following a WPS.
3) There is no assessment of a welder's ability to demonstrate that they can correctly and safely set-up, operate and shutdown the welding process.

Welder qualifications are simply a tool used in the fabrication sector to meet quality compliance requirements to fabrication standards. They are part of a risk management framework for increasing confidence that the manufactured product will meet the design specifications.
They are typically overseen by a welding supervisor, who visually inspects the completed weld before testing of the coupon is performed to check the integrity of the weld.

Welder qualifications cannot be used for safety VOC.

Part 2 - Technical Competency

Understanding the objective

Although safety based VoC is the foundational competency requirement, there can be significant variation for what is deemed "competent". Barely competent or expert are both just called "competent". Would you want someone who is barely competent repairing critical assets or safety equipment? This could result in greater business risk due to rapid re-cracking or even mechanical failure. So considering certain skill sets or level of expertise required for the task is also important. Welders must have the necessary technical competency to achieve the performance objective for the work. For maintenance welding, the objective is to

"Achieve an effective repair that restores design integrity, safety and functionality"

In comparison, for fabrication welding, the objective is to;

"Comply with the quality assurance specification elements of AS/NZS 1554.1 in order to ensure the fabricated structure meets the design specification"

These are quite different objectives in terms of risk management, as well as the technical competencies required.

Fabrication vs Maintenance

Fabrication is the process of constructing plant and equipment. All of the weld joints are uniform and consistent. The welding sequence is planned so that most work can be done in the downhand position. All welding works are overseen by a welding supervisor, in accordance with a suitable weld procedure, with very little grinding or blending. The focus is on compliance to the specified design acceptance criteria.

In comparison, maintenance welding is typically of cracks in structures where there was no prior weld joint. The crack must firstly be removed by gouging and grinding to form a suitable weld preparation. The weld preparation will typically vary in depth, width and shape depending on the morphology of the prior cracking. Welding will typically need to be done in whatever position the defect is on the equipment. The cracking can be of many different types, with complex configurations. It is essential that suitable measures be taken to prevent fatigue cracking due to residual stresses and stress raisers. Fundamentally, a suitable methodology is required for maintenance welding, versus simply following a weld procedure for fabrication.

Fabrication	Maintenance
Uniform prepared joint	Gouge out crack then grind Variable preparation in terms of depth and geometry
Most welding in downhand position using GMAW	Welding in all positions using FCAW
Follow a WPS	WPS alone is insufficient Methodology is important based on the nature of the defect and its location
Minimal grinding	Grinding and blending is essential to restore the component and improve fatigue life

Therefore, when assessing technical competence, it is essential that it is related to the welders technical ability to do heavy equipment crack repairs.

Specific welder qualifications are relevant and necessary when compliance is required. Certain types of regulated plant and equipment - such as ROPS/FOPS, lifting equipment and stands all must be welded in full compliance with AS1554. Ideally, a welder competency system should also provide a range of approval so that welders can work on these and meet compliance requirements.

For lack of any other available guidance, many attempt to apply AS1554 Structural Welding for maintenance. This is simply not appropriate. AS1554 is a risk management framework for fabrication, under workshop conditions with the necessary welding expertise in place. Maintenance requires a different approach that is suitable for mine sites and meets maintenance objectives. Attempting to use AS1554 for maintenance introduces unnecessary complexity and difficult - particularly when attempting to specify a welding procedure specification (WPS) to a crack repair and then use welder qualifications as the basis for determining which welder can do the work. Specific technical compliance requirements and welder qualifications should be managed independently of any welder competency system.

It is not appropriate or feasible to attempt to use AS1554 for management of maintenance welding.

Assessing Technical Competence

Does a trade certificate provide indication of technical competence? Unfortunately no. A major problem is that welders are not taught about heavy equipment maintenance as part of their trade certificate training. Furthermore, there are no relevant RII or Cert III units that can be used to assess competence in maintenance welding.

Can we turn to using welder qualifications? Again, the answer is no. The fundamental problem with welder qualifications is that they do not fully simulate the repair process. There is no gouging and preparation element. Furthermore, it is important to assess the welders knowledge and understanding to be able to apply a suitable repair methodology. From a welding perspective, doing a uniform weld via a welder qualification is much simpler than doing a repair which has varying depth and requires consideration of suitable start/stop locations and run sequencing.
Lastly, something that is often overlooked is the fact that maintenance welding is often done with very little or no technical guidance or supervision. This means that the welder must have the necessary knowledge and skill, without relying on a welding supervisor to ensure they are doing things correctly.

A trade certificate does not provide evidence of technical competency.

Welder qualifications do not provide relevant evidence of technical competency for maintenance welding.

Skill Levels

It is a simple truth that not all welders are equal in terms of skill and ability. Similarly, there is massive variation in the skill level required to do different types of repairs. For example, a short partial thickness crack in a plate section is much easier to do than a full thickness repair in a hollow section (eg a chassis or boom), which ideally should be done using a single-sided open root approach rather than using backing material or having to access the internals to do back-gouging.

This means that there should not be a single technical “competency level”, and that the competency levels combine skill sets that are relevant to the typical types of work that will need to be done.

Part 3 - Personnel Management

Simplicity of Administration

Ideally, a welder competency system should have clearly defined processes and assessment outcomes such that a simple, single certificate of competency can be issued. This avoids a significant administrative burden and choke points due to many separate documents needing to be provided in order to demonstrate competency, which may be technically challenging for HST personnel to interpret and verity, and which may be out of date. The competency record should be valid for a suitable period of time, without any further updates or administration required/

This is another reason why welder qualification should not be specified in a site TNA. They are not standardised in format, can be complex to interpret whether they meet the requirements, and also they must be revalidated every 6 months to maintain currency.

Competency Assessment

An important consideration is who does the assessment process, how is it managed and by who? Because there are no endorsed VET units (eg RII package) which are relevant, it is essential that there is some form of standardised training and assessment package to ensure consistency of assessment outcomes. Furthermore, a robust framework must be used that meets the requirements for competency assessment. This is clearly not something that can or should be managed directly by mine sites. They do not have the subject matter expertise. Also, it generally won't be feasible for RTO's to deliver welder competency training and assessment. Industry must rely on existing welding expertise to provide this service. Therefore, it is essential that there is an independent governance body who maintains the competency training and assessment package, and ensures that the integrity of outcome is maintained - much like how ASQA relates to RTO's.

Maintenance Department

Welders are typically doing maintenance of equipment on mine sites. This work is managed by the Maintenance department, who need to be able to plan, assign and supervise welding maintenance tasks. Therefore, it is essential that any welder competency system should also meet the functional and performance requirements of the maintenance department.

Safety VoC should be provided for all commonly used welding processes, providing peace of mind to supervisors that workers are competent and understand how to suitablly manage the hazards involved with each welding process. The Supervisors should not need to be second guessing or needing welding expertise to manage safe work.

Generally, there are few if any personnel in the maintenance departments that have welding expertise. So technical competency management should be designed to package skills in a simple manner that directly relate to the nature of the work to be done, with minimal complications or interpretation required. The easiest way is to base this on the type of work to be done, and typical crack repair scenarios. For example, a Level 1 competency would be for static structural plant. A Level 2 welder could do most repairs on heavy plant and equipment, except for single sided open root repairs. Level 3 competency can do all repairs, including single-sided open root. This makes it simple for planners and supervisors to coordinate the right welder for the task

Hiring and Recruitment

When recruiting and hiring staff, it is generally very difficult to gauge a welder's ability and competence - for the reasons already outlined. Although prior experience may provide an indication, it is by no means a guarantee of capability or competency.
Ideally, a competency system would also provide a means of recruiting candidates that have the desired competencies, without any need for skills testing prior to hiring.

Part 4 - ESG

Mines and their service providers have social responsibilities to the broader industry and community - often referred to as Environment, Social and Governance (ESG).

Learning Pathways and Upskilling

There must be clearly defined competency levels that provide pathways for learning and upskilling. Not every welder has the same experience and opportunity in their work, so a competency system should be more than just a skills test. It should also provide industry benchmarks for skill and proficiency, with suitable training and skills development programs available to cater for upskilling. This is essential not just for existing welders in the industry, but also to address issues with shortages of skilled workers. Welders should be able to come from a manufacturing background or other industry and receive training and assessment to develop the necessary competency for maintenance welding of heavy equipment in the mining industry.

Sustainability

A welder competency system must also be sustainable for all stakeholders. It should not be exorbitantly expensive or time consuming, or excessively difficult to implement. Otherwise it will not be viable for all service providers to meet site TNA requirements for welder competency.

On this point, a good welder competency system should act as a “welder passport” and be recognised by all sites. This is essential to avoid fragmentation with different sites having different competency requirements, creating complexity, cost and confusion for everyone. Ideally, a welder competency system would also allow for transportability of competency records between employers. This would avoid having to do reassessment whenever a welder changed employers.

Industry Advancement

Beyond being industry recognised, the welder competency system should also be considered the benchmark for best practices. The goal must be to drive improvements in maintenance practices and achieve more effective repair outcomes. With more effective repair outcomes, assets can have a longer viable structural life, and total cost of ownership is reduced.

Recognising the Gap

As demonstrated in this paper, there is a clear gap between what is required by a welder competency system compared to current industry practices.

Safety VoC is a fundamental requirement. Safety VoC should be provided for all of the welding and allied processes typically used on mine sites. These are

- Oxy-fuel cutting and heating
- Carbon arc gouging
- GMAW/FMAW
- MMAW
- Flame heating

The reality is that a trade certificate is not a suitable basis for determining safety VoC. There is too much variation in what units have been covered. Welder qualifications also do not provide safety VoC, or meet competency standards.

There is also a need for technical competency. Technical competency is required to meet maintenance objectives and compliance requirements. A trade certificate does not provide any Indication of competency. Welder qualifications generally do not adequately assess the knowledge and skills required for maintenance welding either.

Technical competencies cover a broad range of skills relevant to the nature of the specific work. For these reasons, there must be clearly defined competency levels that cover specific skill sets relevant to typical maintenance activities. Competency levels are also essential for providing development pathways for welders.

Lastly, a welder competency system must meet the needs of all stakeholders involved. This includes maintenance departments, service providers, HST, training providers, as well the entire mining industry. The objective should be to use a best practice approach that provides consistency and harmony for all stakeholders, and that benefits mine sites by enabling achievement of the desired maintenance objectives.

The existing paradigm of simply specifying a trade certificate, and potentially welder qualifications, simply does not meet any of these objectives and requirements.

Mining Welder Competency (MWC)

The Mining Welder Competency (MWC) was developed over a number of years with extensive stakeholder engagement to provide a much needed solution for maintenance welding competency management in the mining industry. The MWC provides the resources sector with a means to ensure that welders have the necessary knowledge and proficiency to safely carry out effective weld repairs of cracking in mining and earthmoving equipment, as well as to maintain fixed plant.

The MWC is an industry based micro-credential for training, upskilling and assessing welders for heavy maintenance welding in the resources sector. **MWC meets all the requirements of RS11, and may simply be specified in a site TNA as one would any RII unit.**

There is a comprehensive VoC process that is part of the welder assessment, which covers all of the common welding and allied processes.

The MWC is designed to ensure welders have the necessary knowledge and skills to carry out effective weld repairs of cracking, and benchmark their competency at one of 3 levels.

- Level 1 is for fixed structures (eg CHPP, conveyors etc)
- Level 2 and 3 are for heavy and mobile equipment repairs. Level 2 covers most repairs, except for single sided repairs of hollow structures (such as chassis and boom), while Level 3 can do all types of repairs. This allows for differing levels of skill and experience, as well as providing a balanced work force in terms of competence and capability.

The MWC Program is independently managed and administered by a SME to ensure that the training and assessment process provides best practice outcomes. Suitable service providers are accredited to deliver the MWC program. These may be RTO's or suitably qualified welding experts. Competency assessment is based on evidence that is recorded by the assessor, which is supplied to MWC for review and grading. MWC issues all competency records, guaranteeing that there is minimal variation in assessment outcomes between different providers and assessors.

Full details about the MWC are available at www.miningweldercompetency.com