



Australian Government

RIIARO305 Build and maintain routes for autonomous operations

Release: 1

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Modification History

Release	Comments
Release 1	This version first released with RII Resources and Infrastructure Industry Training Package Version 7.0.

Application

This unit describes the skills and knowledge required to build and maintain routes for autonomous operations in the resources and infrastructure industries, including establishing, reviewing and adjusting travel paths for autonomous systems.

It applies to those working in site-based roles. They generally work under minimal supervision to undertake a broad range of tasks in varied work contexts, using some discretion and judgement in applying investigative and corrective actions.

Licensing, legislative and certification requirements that apply to this unit can vary between states, territories, and industry sectors. Users must check requirements with relevant body before applying the unit.

Unit Sector

Coal mining

Metalliferous mining

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Plan and prepare to build and maintain routes for autonomous operations	1.1 Obtain, interpret, confirm and clarify work instructions 1.2 Identify and confirm autonomous systems and components involved in work activity 1.3 Access, interpret and apply documentation required to build and maintain routes for autonomous operations and confirm work activity is compliant 1.4 Identify and confirm own role and responsibility in autonomous operations value chain according to organisational requirements

ELEMENT	PERFORMANCE CRITERIA
	1.5 Select and wear personal protective equipment according to site requirements 1.6 Select and obtain tools and equipment required for work activity in proximity to autonomous systems and components 1.7 Obtain permits and clearances according to job and site requirements 1.8 Identify potential risks and hazards, implement control measures within scope of own role, and escalate where required 1.9 Obtain and interpret emergency procedures and identify steps required to respond to emergencies 1.10 Coordinate and communicate planned activities with other personnel in work area according to site requirements
2. Establish and review routes for autonomous operations	2.1 Identify requirements for, and implement personal protective zone according to manufacturer specifications and site requirements 2.2 Visually inspect geology, survey site and document results and site parameters for planned autonomous operations according to manufacturer specifications and job and site requirements 2.3 Monitor risks and hazards, implement control measures within scope of own role, and escalate where required 2.4 Coordinate work activities within scope of own role and communicate to others 2.5 Establish travel path for autonomous system in consultation with required personnel according to manufacturer specifications and job and site requirements 2.6 Review autonomous system travel path design in consultation with required personnel, confirm virtual site parameters reflect physical site parameters, and adjust or escalate where required
3. Monitor and adjust routes for autonomous operations	3.1 Monitor operations on autonomous system travel path design according to manufacturer specifications, job, scope of own role and site requirements 3.2 Review safety, efficiency and effectiveness of autonomous system travel path and adjust design or escalate where required
4. Conduct housekeeping activities	4.1 Complete records and documentation according to site requirements 4.2 Report potential risks and hazards according to site requirements and escalate where required 4.3 Identify opportunities to optimise safety, efficiency and effectiveness of autonomous operations within scope of own role, and escalate where required

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.

SKILL	DESCRIPTION
Numeracy	Calculates basic measurements including mass and dimensions
Technology	Uses digital technologies and applications to access, organise and share information
Writing	Completes maintenance records using sector specific vocabulary, grammatical structures and conventions

Unit Mapping Information

No equivalent unit. New unit.

Links

Companion Volume implementation guides is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=88a61002-9a21-4386-aaf8-69c76e675272>

Assessment Requirements for RIIARO305 Build and maintain routes for autonomous operations

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Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- build and maintain routes for autonomous operations on at least two occasions.

During the above, the candidate must:

- locate and apply documentation, policies and procedures required to build and maintain routes for autonomous operations
- implement the requirements, procedures and techniques to build and maintain routes for autonomous operations, including:
 - interpreting and applying required documentation, including:
 - geological and survey data
 - manufacturer specifications
 - site and work plans
 - work health and safety requirements
 - monitoring and confirming safe interaction with autonomous systems and components
 - identifying, monitoring and reporting risks and hazards
 - responding to or reporting on monitoring systems and alarms
- work with others to build and maintain routes for autonomous operations in a way that meets required outcomes, including:
 - communicating with others to receive and clarify work instructions and convey work progress
 - coordinating work activity with others using multiple communication devices
 - planning and coordinating work activity with key operational, technical and supervisory personnel.

Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- legislation required to build and maintain routes for autonomous operations
- policies, procedures and documentation required to build and maintain routes for autonomous operations, including those relating to:
 - Australian and international standards for autonomous systems
 - autonomous system and component manufacturer specifications
 - hazard, incident and emergency response procedures
 - hierarchy road rules
 - workplace recording and reporting requirements
 - site safety signage, alarms and systems
 - work health and safety
 - obtaining permits and clearances
 - site requirements
- types, characteristics, technical capabilities and limitations of autonomous systems and components, including:
 - basic operating procedures
 - digital communications
 - emergency signals and procedures
 - exclusion zones
 - remote stop functionality
 - safe distances for work activity
 - system perception and control functionalities
 - braking and stopping distances, including for:
 - loaded and unloaded states
 - different environmental conditions
 - sensing modalities
- principles and techniques for risk and hazard management in autonomous environments, including those relating to:
 - adverse operating conditions for autonomous systems and components
 - geotechnical risks including slumping, cracking and highwall failures
 - limitations of electrical sensory and digital communication systems
- techniques for building and maintaining routes for autonomous operations, including those for:
 - interpreting and applying geological and survey data
 - reviewing virtual site parameters against physical site parameters
 - surveying and documenting site parameters
 - using global positioning systems

- roles and responsibilities of personnel in the autonomous environment value chain, including those relating to:
 - budget
 - product quality
 - productivity
 - safety
 - interdependencies with other roles
- key terminology for autonomous systems, components and operations, including those specific to relevant sector, organisation and manufacturer
- techniques for coordinating and communicating work activities with others.

Assessment Conditions

Mandatory conditions for assessment of this unit are stipulated below. The assessment must:

- include access to:
 - personal protective equipment
 - equipment required to build and maintain routes for autonomous operations
- be conducted in a safe environment; and,
- be assessed in the context of this sector's work environment; and,
- be assessed in compliance with relevant legislation/regulation and using policies, procedures and processes directly related to the industry sector for which it is being assessed; and,
- confirm consistent performance can be applied in a range of relevant workplace circumstances.

Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated work environment* provided it is realistic and sufficiently rigorous to cover all aspects of this sector's workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.

Assessor requirements

Assessors must be able to clearly demonstrate current and relevant industry knowledge and experience to satisfy the mandatory regulatory standards as set out in the Standards for Registered Training Organisations 2015/Australian Quality Training Framework mandatory requirements for assessors current at the time of assessment and any relevant licensing and certification requirements. This includes:

- vocational competencies at least to the level being delivered and assessed
- current industry skills directly relevant to the training and assessment being provided
- current knowledge and skills in vocational training and learning that informs their training and assessment
- formal relevant qualifications in training and assessment
- having knowledge of and/or experience using the latest techniques and processes
- possessing the required level of RII training product knowledge

- having an understanding and knowledge of legislation and regulations relevant to the industry and to employment and workplaces
- demonstrating the performance evidence, and knowledge evidence outlined in this unit of competency, and
- the minimum years of current** work experience after competency has been obtained as specified below in an industry sector relevant to the outcomes of the unit.

It is also acceptable for the appropriately qualified assessor to work with an industry expert to conduct assessment together and for the industry expert to be involved in the assessment judgement. The industry expert must have current industry skills directly relevant to the training and assessment being provided. This means the industry subject matter expert must demonstrate skills and knowledge from the minimum years of current work experience after competency has been obtained as specified below, including time spent in roles related to the unit being assessed:

Industry sector/Unit sector	AQF indicator level***	Required assessor or industry subject matter expert experience
Drilling, Metalliferous Mining, Coal Mining, Extractive (Quarrying) and Civil Infrastructure****	1	1 year
	2	2 years
Drilling, Coal Mining, Extractive (Quarrying), Metalliferous Mining and Civil Infrastructure****	3-6	3 years
Units coded 'RIIARO' (Autonomous and Remote Operations)	Given that this is an emerging industry area, assessors are required to demonstrate vocational competencies at least to the level being assessed, and current industry skills directly relevant to the assessment being provided.	
Other sectors	Where this unit is being assessed outside of the resources and infrastructure sectors assessor and/or industry subject matter expert experience should be in-line with industry standards for the sector in which it is being assessed and where no industry standard is specified should comply with any relevant regulation.	

*Guidance on simulated environments has been stipulated in the Companion Volume Implementation Guide located on VETNet.

**Assessors can demonstrate current work experience through employment within industry in a role relevant to the outcomes of the unit; or, for external assessors this can be demonstrated through exposure to industry by conducting a minimum number of site assessments as determined by the relevant industry sector, across various locations.

***While a unit of competency does not have an AQF level, where a unit is being delivered outside of a qualification the first numeric character in the unit code should be considered as the AQF indicator level for assessment purposes.

****Excluding units coded 'RIIARO' (Autonomous and Remote Operations).

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