



Australian Government

RIIARO406 Optimise automated haulage operations

Release: 1

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Modification History

Release 1	This version first released with RII Resources and Infrastructure Industry Training Package Version 9.0. Newly created unit.
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Application

This unit describes skills and knowledge required to optimise the performance of automated haulage operations to meet performance targets relating to quality, efficiency, and safety. It includes optimising automated haulage system performance, monitoring processes and outcomes, and responding to abnormal situations.

The unit applies to those who manage automated haulage operations from within a control centre environment.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Unit Sector

Coal mining

Metalliferous mining

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes	Performance criteria describe the performance needed to demonstrate achievement of the element
1. Optimise automated haulage system performance	1.1 Control access to work areas in accordance with entry and exit procedures to ensure the safety of people and efficiency of equipment operating in the vicinity of automated haulage equipment 1.2 Build, configure, update and/or validate spatial mine model and escalate when irregularities are identified 1.3 Optimise fleet management and interface between automated and manually operated vehicles to meet the mine shift plan 1.4 Monitor interface with plant operations to optimise productivity and manage contingencies in accordance with

ELEMENT	PERFORMANCE CRITERIA
	shift plan and organisational protocols
2. Monitor automated haulage processes and outcomes	2.1 Use control system data to maintain equipment performance within required parameters 2.2 Monitor machine performance to meet key performance indicators relating to dig rates, hang and queue times; and make adjustments as needed 2.3 Anticipate issues and plan for contingencies to minimise impact on the current plan by monitoring sensors, camera feeds and/or positional data 2.4 Monitor and direct equipment in the pit area and oversee the electronic boundaries/cables that protect personnel to ensure every piece of equipment and each person is situationally aware of autonomous operation status 2.5 Monitor implementation of safety controls relating to hazards to enable timely intervention when needed
3. Respond to abnormal situations	3.1 Prioritise and resolve alarms and warning system alerts in accordance with organisational procedures 3.2 Use real time and/or trend data to compensate for and adjust to actual or potential adverse situations within scope of own responsibility 3.3 Confirm integrity of data from obstacle or collision, and mechanical/electrical failure detection systems and request site personnel to investigate when required 3.4 Confirm and monitor adequate positive isolation of equipment when personnel are in proximity 3.5 Coordinate person/machine intervention to restart or recover stationary automated vehicles in line with recovery procedures 3.6 Respond to changed conditions in designated area/s of control in accordance with organisational escalation protocols

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	Interprets and uses a range of mathematical information relating to data generated during automated haulage operations

Unit Mapping Information

No equivalent unit. Newly created unit.

Links

Companion Volume Implementation Guide is found on VETNet -

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

Assessment Requirements for RIIARO406 Optimise automated haulage 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:

- optimise automated haulage operations, and/or aspects thereof, on at least 2 different occasions.

During the above, the candidate must:

- update and/or validate a spatial mine model
- interpret and execute mine shift plans and targets
- direct vehicles to dig units, plant interfaces, stockpile or waste dump
- control access to pit/s
- interpret system data, prioritise and resolve alarms, warning devices and systems
- respond to changed conditions in line with organisational protocols.

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:

- industry standards and guidelines relating to safety in own role, including or equivalent to:
 - IEC 61508 / AS 61508 Functional Safety of electrical/electronic/programmable electronic safety-related systems
 - ISO 17757 Earth moving machinery and mining – Autonomous and semi-autonomous machine system safety
- components of a spatial mine model relevant to productivity and safety
- fundamentals of automated haulage control system, including:
 - human-machine interface (HMI)
 - technological inputs, including:
 - wireless local area network (WLAN)
 - global positioning system (GPS)

- how and when to use electronic barriers/cables/geo fencing, safety bubbles and other safety features
- machine sensing, guidance and positioning systems
- obstacle and collision detection
- data integrity / delay accounting
- how humans interact around automated equipment
- levels of automation and related safety functions and levels relevant to operations in own work role
- capabilities, asset combinations, refuelling requirements, and fault identification of equipment, including:
 - automated vehicles
 - dig units
 - ancillary equipment, including dozers, graders, water trucks
- fleet management, including:
 - requirements of the mine shift plan of the day
 - using mobile fleet in best and safest way
 - directing trucks to available dig units
 - dig rates, hang time, queue time
 - decision making by automated systems in dynamic pit areas
- plant interface management, including:
 - plant capabilities
 - feed strategies
 - contingency planning
 - pit-plant interface
- safety systems and procedures, including:
 - electronic protection of people and mining equipment
 - functional safety requirements
 - personal protective equipment (PPE)
 - designated park-up areas for equipment fundamental stability
 - park-up requirements in non-designated park-up areas (flat grounds)
 - isolation procedures
- organisational safety controls for hazards, including:
 - personnel
 - hazardous materials
 - drop cuts/drop-ins
 - ground stability
 - dust
 - road conditions – tram lining, excessive/inadequate watering.

Assessment Conditions

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

- include access to:
 - PPE
 - automated haulage control system/s
 - communications technology
- be conducted in a safe environment; and,
- be assessed in the context of this sector's work environment; and,
- be assessed in compliance with legislative and regulatory requirements and using policies, procedures and processes directly related to the industry sector for which the unit 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:

- 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,	1	1 year

Industry sector/Unit sector	AQF indicator level	Required assessor or industry subject matter expert experience
Extractive (Quarrying) and Civil Infrastructure***	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.

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

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