Demonstrate knowledge of signalling systems in a rail environment

Level 3
Credits 4

Purpose People credited with this unit standard are able to demonstrate knowledge of: track circuits; cables and overhead lines; signalling equipment; and interlocked points.

Subfield Rail Transport
Domain Rail Infrastructure
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Standard setting body (SSB) Competenz

Accreditation and Moderation Action Plan (AMAP) reference 0013
This AMAP can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Special notes

1 Assessment against this unit standard is to be carried out within the context of an organisation operating under a current, valid Rail Licence issued in accordance with the provisions of the Railways Act 2005. The organisation’s operating rules, codes, and instructions, referred to in this unit standard, are those the organisation has in place to meet the requirements of the Rail Licence.

2 Definitions
Organisational procedures refer to documents that include: worksite rules, codes, and practices; equipment operating instructions; documented quality management systems; and health and safety requirements.

Signalling equipment refers to signals/indicators, level crossing alarms, and locations.

Location refers to signal shelters, signal boxes, track disconnection boxes, and track tuning unit boxes.
Elements and performance criteria

Element 1

Demonstrate knowledge of track circuits.

Performance criteria

1.1 Role of track circuits is described in terms of train detection for signalling and level crossing alarms.

1.2 Key components of track circuits are identified in terms of placement.
   Range rail, bonds, bootlegs, track leads, insulations, track circuit interrupters.

1.3 Functions of insulated joints are described in terms of use in track circuits.
   Range preventing short-circuits, defining limits/boundaries of a track circuit.

1.4 Effect of rail removal is described in terms of potential disruption to track circuits.
   Range traction area, non-traction area.

1.5 Interrupting track circuit current is described in terms of causes.
   Range evidence of two causes is required.

1.6 Interrupting track circuit current is described in terms of disruptions or hazards to rail network.
   Range evidence of two disruptions or hazards are required.

1.7 Permission system for interfering with track circuits is described in accordance with organisational procedures.

1.8 Actions to take in the event of damage to track circuits are described in accordance with organisational procedures.
   Range may include but is not limited to – setting up protection, speed restrictions, reporting to relevant personnel.
Element 2

Demonstrate knowledge of cables and overhead lines.

Performance criteria

2.1 Cable routes and placements are identified in accordance with organisational procedures.

Range underground, attached to sleeper, in plow line, within mast, within hose.

2.2 Examples of conditions that cause cable and overhead line damage are given.

Range evidence of three conditions is required.

2.3 Effects of damaged cables and overhead lines are described in terms of potential hazards on rail network.

Range evidence of three effects is required.

2.4 Actions to take in the event of damage to cables and overhead lines are described in accordance with organisational procedures.

Range may include but is not limited to – securing site, setting up protection, speed restrictions, reporting to relevant personnel.

Element 3

Demonstrate knowledge of signalling equipment.

Performance criteria

3.1 Key components of signalling equipment are identified in terms of placement.

Range location – foundation, structure, security devices; signal/indicator – base, mast, head/s, ladder; level crossing alarm – base, mast, head/s, bells, barriers.

3.2 Effects of damaged signalling equipment are described in terms of disruptions or hazards to rail network.

Range evidence of three effects is required.

3.3 Permission system for taking manual control of level crossing alarms is described in accordance with organisational procedures.

3.4 Actions to take in the event of damage to signalling equipment are described in accordance with organisational procedures.

Range may include but is not limited to – setting up protection, speed restrictions, reporting to relevant personnel.
Element 4

Demonstrate knowledge of interlocked points.

Performance criteria

4.1 Purpose of points is described in terms of the effect on the movement of rail traffic.

4.2 Key components of points are identified in terms of placement.

Range switchblades, drive rod, locking device, crank handle, mechanism, lever, tie plates, spreaders, rodding run.

4.3 Identification system used on points is described in accordance with organisational procedures.

4.4 Examples of conditions that cause points damage are given.

Range may include but is not limited to – dragging brake gear, bond chains, loose tarpaulins/ropes, open container doors, run-through, movement of equipment; evidence of three is required.

4.5 Points faults are identified and actions to take are described in accordance with organisational procedures.

Range faults – switchblades sitting open, component above rail level, bent/broken component, loose/missing component; actions may include but are not limited to – emergency security, setting up protection, speed restrictions, reporting to relevant personnel.

4.6 Permission system for operating or working on points is described in accordance with organisational procedures.

Please note

Providers must be accredited by NZQA, or an inter-institutional body with delegated authority for quality assurance, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be accredited by NZQA before they can register credits from assessment against unit standards.

Accredited providers and Industry Training Organisations assessing against unit standards must engage with the moderation system that applies to those standards.
Accreditation requirements and an outline of the moderation system that applies to this standard are outlined in the Accreditation and Moderation Action Plan (AMAP). The AMAP also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

Comments on this unit standard

Please contact Competenz qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.