

Title	Demonstrate specialist underground survey techniques		
Level	6	Credits	15

Purpose	People credited with this unit standard are able to: transfer bearings, position and levels into a mine; establish directional control in mine tunnelling; profile underground openings; and monitor movement in the mine.
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Classification	Extractive Industries > Underground Extraction
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Available grade	Achieved
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Guidance Information

- 1 Legislation, regulations and/or industry standards relevant to this unit standard include but are not limited to:
- Health and Safety at Work Act 2015 (HSW);
 - Health and Safety at Work (General Risk and Workplace Management) Regulations 2016;
 - Health and Safety at Work (Worker Engagement, Participation, and Representation) Regulations 2016;
 - Health and Safety at Work (Mining Operations and Quarrying Operations) Regulations 2022;
 - Health and Safety at Work (Hazardous Substances) Regulations 2017 and related Safe Work Instruments (SWIs) published by WorkSafe NZ; approved codes of practice issued pursuant to the HSW Act available at <http://www.worksafe.govt.nz/worksafe/information-guidance/approved-codes-of-practice-acops>.

Any new, amended, or replacement Acts, regulations, standards, codes of practice, guidelines, or authority requirements or conditions affecting this unit standard will take precedence for assessment purposes, pending review of this unit standard.

- 2 Definitions
- Company procedures* mean the documented methods for performing work activities and include health and safety, operational, environmental, and quality management requirements. They may refer to legislation, regulations, guidelines, standard operating procedures, manuals, codes of practice, or policy statements.
- Industry good practices* are approved codes of practice and standardised procedures accepted by the wider mining industry as examples of good practice. They may be documented in management plans, control plans, company procedures, managers' rules, occupational health and safety policy, industry guidelines, codes of practice, manufacturers' instructions, and safe working and/or job procedures (or equivalent).
- Mine* refers to all types of underground mines and tunnels.

3 Assessment information

Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with applicable industry good practices, worksite documentation and legislative requirements. This includes the knowledge and use of suitable tools and equipment.

Outcomes and performance criteria

Outcome 1

Transfer bearings, position and level into a mine.

Range includes – shaft, drive.

Performance criteria

- 1.1 The bearing transfer is observed by one method and verified by a second method or independent observation to tolerance in accordance with industry good practice.
- 1.2 The coordinate transfer is defined and verified to tolerances in accordance with industry good practice.
- 1.3 The level transfer is observed, calculated, and closed in accordance with the tolerance and industry good practice.

Outcome 2

Establish directional control in mine tunnelling.

Range directional control may include but are not limited to – Sight Lines and Pegs, Laser Technology, Gyroscopic Instruments, Global Positioning System (GPS), Inertial Navigation Systems (INS).

Performance criteria

- 2.1 Establish directional references to ensure accurate tunnelling direction.
- 2.2 Direction lines are established in alignment with the mine design plan.
- 2.3 Verify the accuracy of directional indicators.

Outcome 3

Profile underground openings.

Range includes – stopes, drives, caverns.

Performance criteria

- 3.1 Total station and void scanner/cavity monitoring system (CMS) profiles are carried out in accordance with the mine specifications.
- 3.2 Profile plans and digital data sets are updated and prepared in accordance with mine specifications.
- 3.3 Volume calculations are determined and checked in accordance with profile design considering lining thickness.

Outcome 4

Monitor movement in the mine.

Range includes – subsidence, convergence.

Performance criteria

- 4.1 Convergence of walls, roof and rings are determined as required in accordance with company procedures.
- 4.2 Results of convergence analysis are presented in accordance with company procedures.
- 4.3 The topographical surface subsidence is determined as required in accordance with company procedures.
- 4.4 Results of subsidence analysis are presented in accordance with company procedures and industry good practice.

Planned review date	31 December 2029
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	25 November 2000	31 December 2017
Review	2	24 November 2005	31 December 2017
Rollover and Revision	3	16 July 2010	31 December 2017
Review	4	20 August 2015	31 December 2026
Rollover and Revision	5	25 January 2018	31 December 2026
Review	6	30 January 2025	N/A

Consent and Moderation Requirements (CMR) reference	0114
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact Hanga-Aro-Rau Manufacturing, Engineering and Logistics Workforce Development Council qualifications@hangaarorau.nz if you wish to suggest changes to the content of this unit standard.