



Australian Government

NWPHYS003 Manage and analyse water levels and flows

Release: 1

NWPHY003 Manage and analyse water levels and flows

Modification History

Release 1. This is the first release of this unit of competency in the NWP National Water Training Package.

Application

This unit involves the skills and knowledge required to manage and analyse water levels and flows.

It includes applying the principles of water levels, explaining water level measurement methods and analysing water level data. It also includes explaining the process of water movement.

This unit supports the attainment of skills and knowledge required for leaders with responsibility for performing hydrographic surveying and may lead to certification as a hydrographic surveyor.

Pre-requisite Unit

Not applicable.

Competency Field

Hydrographic Surveyor

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Apply principles of water levels

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Analyse tidal characteristics in terms of tide raising forces and local and regional morphological features in hydrographic survey
- 1.2** Evaluate the effect of non-tidal influences on tidal water levels in hydrographic survey

	1.3	Evaluate the impact of sources of water level variations occurring in inland waters
2 Use water level measurement methods	2.1	Determine the appropriate type of electronic water level gauge when calculating water level measurements according to manufacturer instructions
	2.2	Configure electronic water level gauges for logging data, data communication, data download and for network operation with appropriate quality control measures
	2.3	Compute tidally based reference levels on the basis of tide time series
	2.4	Determine vertical reference levels in rivers and lakes according to workplace procedures
	2.5	Determine uncertainty in water levels to uncertainties in measurement, duration and distance from the electronic water level gauge according to workplace procedures
3 Analyse water level data	3.1	Obtain and interpret water level and flow data according to workplace procedures
	3.2	Use tidal information and vessel parameters to reduce soundings to a specified datum
	3.3	Configure and calibrate Global Navigation Satellite System (GNSS) to reduce soundings to a specified survey datum
4 Analyse water movement	4.1	Determine the forces behind currents, change in currents and tidal streams
	4.2	Calculate current measurement using appropriate techniques and methods for acquiring and displaying current data

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work

environment.

Unit Mapping Information

This is a new unit. No equivalent unit.

Links

Companion Volume Implementation Guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=26336bc0-04e5-49d9-8c31-46c49b6a0037>

Assessment Requirements for NWPHY003 Manage and analyse water levels and flows

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all the requirements of the elements and performance criteria on at least one occasion and includes:

- analysing and reporting on electronic water level gauge data and reducing to survey datum
- applying tide tables and using appropriate software to determine predicted water levels and tidal streams
- constructing a co-tidal chart
- installing, levelling and calibrating an electronic water level gauge
- portraying stream data

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all the requirements of the elements and performance criteria and includes knowledge of:

- aspects of a co-tidal chart
- changes in water level caused by:
 - atmospheric pressure
 - ocean temperature
 - precipitation
 - seiches
 - wind
- electronic water level gauge installation techniques, establishment and levelling of associated survey marks
- methods for measuring tidal streams and currents including:
 - acoustic doppler current profilers (ADCP)
 - current meters
 - drogues
- networks of electronic water level gauges
- operating principles of electronic water level gauges including:
 - acoustic sensors
 - atmospheric pressure including vented and unvented

- float
- GNSS buoys
- radar
- tide poles, boards and staffs
- methods for planning current and tidal stream surveys
- methods for reduction of survey data to a datum using:
 - GNSS observations
 - lever-arms and position reference point offsets
 - predicted tides versus measured tide reduction
 - rectilinear and rotary tidal streams
 - relationship between tidal stream and tides
 - vertical datums for sounding reduction
 - water level observations
- reference levels including mean sea level (MSL), chart datum, and mean high water
- river and lake datums
- surface current radar observations
- tidal fundamentals including:
 - amphidromic points and co-tidal charts
 - geomorphological influences on tidal characteristics
 - major harmonic constituents and different types of tide
 - tide generating forces, the equilibrium and real tides
- tidal information including:
 - current tables
 - tidal stream
 - tide table
 - tide prediction tools
- uncertainties associated with:
 - duration of observations
 - measurement devices
 - spatial separation of water level measurements
- vessel motion characteristics including:
 - draft
 - settlement
 - squat
- water level variations occurring in:
 - canals
 - estuaries
 - inland lakes
 - reservoirs
 - rivers

- wetlands

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in suitable workplace operational situations. Where this is not appropriate, assessment must occur in suitable simulated workplace operational situations reflecting actual workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- relevant and appropriate materials, tools, facilities, equipment and personal protective equipment currently used in industry
- applicable relevant documentation including workplace procedures, industry standards, equipment specifications, regulations, codes of practice, and operation manuals.

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