



Australian Government

NWPHYS002 Interpret and analyse science principles for hydrographic surveying

Release: 1

NWPHY002 Interpret and analyse science principles for hydrographic surveying

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 interpret and analyse science principles for hydrographic surveying.

It includes performing mathematical calculations for a survey, detailing the fundamentals of physics and identifying the impact of geography and geology on the hydrographic survey.

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 Perform calculations for hydrographic survey

PERFORMANCE CRITERIA

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

- 1.1 Identify hydrographic survey dataset and observations according to workplace procedures
- 1.2 Apply relevant mathematical equations in hydrographic survey

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| | 1.3 | Apply the Theory of Errors to hydrographic survey observations |
| | 1.4 | Analyse error budget components, calculate using theory of errors and report on outcomes |
| 2 Interpret and use physics fundamentals for hydrographic survey | 2.1 | Evaluate the relationship between linear and rotational motions through acceleration and velocity |
| | 2.2 | Determine the impacts of gravity field of the earth in terms of acceleration and potential in relation to hydrographic survey |
| | 2.3 | Analyse differences between types of waves including generation and propagation |
| | 2.4 | Determine how medium parameters affect wave behaviour in hydrographic survey outcomes |
| 3 Identify the impact of geography and geology on hydrographic survey | 3.1 | Identify internal structure, physical characteristics and dynamics of the Earth relevant to hydrographic survey outcomes |
| | 3.2 | Determine the impact of substrate layers of the marine floor structure from the coast to deep ocean floor |
| | 3.3 | Identify common marine floor characteristics from inland rivers, through harbours and coast to deep ocean floor, and their impact relevant to hydrographic survey outcomes |

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 NWPHY002 Interpret and analyse science principles for hydrographic surveying

Modification History

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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:

- applying the variance propagation law to a linear observation equation and deriving a measurement uncertainty as a function of observable co-variances
- defining natural features and characteristics of the seafloor using graphical representation
- performing an a-priori error budget calculation for a hydrographic survey
- solving mathematical calculations and analysing results of a hydrographic dataset including the following:
 - mean
 - variance
 - standard deviation

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:

- characteristics of the following:
 - earthquakes zones
 - erosion and deposition
 - plate tectonics
 - rivers and estuaries
 - types of rocks
- characteristics of wave types including:
 - energy source
 - movement
- complex mathematical statistics including:
 - covariance and correlation
 - estimation of mean, variance and co-variance
 - mean
 - normal distribution

- random variables
- standard deviation
- variance
- contribution to the error budget of different components
- covariance propagation law
- describe a random variable
- equipotential surfaces
- gravity field of the earth
- linear observation equations
- mechanics of physics including:
 - accelerations, angular and linear velocities of kinematics
 - characteristics of the Coriolis effect
 - characteristics of Newton's Laws of Motion including forces, accelerations, energy
- medium parameters impacts on the following:
 - radiation, emission and absorption
 - reflection, refraction, diffraction
 - wave propagation
- ocean basin structure and major processes affecting coastal morphology affected by the following:
 - different types of rocks
 - earthquakes zones
 - erosion and deposition
 - plate tectonics
 - rivers and estuaries
- wave generation and propagation including:
 - radiation, emission and absorption
 - reflection, refraction, diffraction
 - Snell's Law
- wave types including:
 - electromagnetic
 - pressure
 - ocean

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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