



Australian Government

Assessment Requirements for MARL040

Apply advanced principles of marine mechanics

Release: 1

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Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

Performance Evidence

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

- assessing own work outcomes and maintaining knowledge of current codes, standards, regulations and industry practices
- identifying and applying relevant mathematical formulas and techniques to solve advanced problems related to marine mechanics
- identifying and interpreting numerical and graphical information, performing complex mathematical calculations, such as determining hoop stresses in rotating rings and stresses in compound bars and solving problems related to fluids
- identifying, collating and processing information required to perform complex calculations related to marine mechanics
- imparting knowledge and ideas through verbal, written and visual means
- reading and interpreting written information needed to perform complex calculations in marine mechanics
- solving problems using appropriate laws and principles
- using calculators to perform accurate, reliable and complex mathematical calculations.

Knowledge Evidence

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

- advanced principles of marine mechanics
- angular and linear motion
- beam theory
- Bows notation
- centre of gravity (CG)
- centrifugal governors
- conservation of energy theorem
- machine dangers, including:
 - catastrophic failure due to physical limitations of machines being exceeded as determined by their susceptibility and resistance to vibrations

- violent swaying motions
- different loads, including:
 - combined
 - concentrated
 - distributed
- factor of safety
- fluids
- force and forces, including:
 - balanced and unbalanced forces
 - conditions for equilibrium
 - definitions of matter, mass, weight, force, density and relative density
 - moments of couples
 - parallelogram and triangle of forces
- inertia force
- joint efficiency factor
- laws of motion
- mechanics and hydromechanics, including:
 - balancing
 - combined stress
 - fluid mechanics
 - simple harmonic motion
 - stress and strain
 - torsion
- momentum
- motion, including:
 - action and reaction
 - force, velocity and acceleration
 - linear and angular motion
 - Newton's laws of motion
- nature and laws of friction
- physical and chemical properties of fuel and lubricants, including:
 - shore side and shipboard sampling and testing
 - interpretation of test results
 - contaminants, including microbiological infection
 - treatment of fuel and lubricants, including storage, centrifuging, blending, pre-treatment and handling
- polygon of forces
- pressure vessels
- principle of moments
- principles of dynamics

- reactions
- relationship between torque and power
- simple harmonic motion (SHM)
- stress and strain, including:
 - direct stress and strain
 - Hooke's Law
 - load extension graphs
 - modulus of elasticity
 - shear stress and strain
- technology of material, including:
 - destructive and non-destructive testing of material
 - engineering processes used in construction and repair
- thin cylinder theory
- turning moment
- vector diagrams
- work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices.

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

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage.

Resources for assessment must include access to:

- relevant documentation, including workplace procedures, regulations, codes of practice and operation manuals
- tools, equipment, materials, and personal protective equipment (PPE) currently used in industry.

Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>