



Australian Government

MARA018 Manage advanced chemical tanker cargo operations

Release: 1

MARAO18 Manage advanced chemical tanker cargo operations

Modification History

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

Application

This unit involves the skills and knowledge required to manage advanced chemical tanker cargo operations.

This unit applies to people working in the maritime industry in the capacity of:

- Chief Mate
- Deck Officers
- Engineering Officers
- Engineers
- Masters
- Ratings.

Licensing/Regulatory Information

This unit is equivalent to and delivers the objectives of the following STCW provisions:

- STCW Reg V/1-1 (5 and 6) and Code Section A-V/1-1 (3), Table A-V/1-1-3.

Legislative and regulatory requirements are applicable to this unit.

- This unit is one of the requirements to obtain Australian Maritime Safety Authority (AMSA) certification as a Chief Mate, Deck Officers, Engineering Officers, Engineers, Masters or Ratings for advanced operations on chemical tankers and to meet regulatory requirements this unit must be delivered consistent with Marine Orders and with the relevant sections of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
- Those regulatory requirements include STCW International Maritime Organization (IMO) model course competencies and areas of knowledge, understanding and proficiency, together with the estimated total hours required for lectures and practical exercises. Teaching staff should note that timings are suggestions only and should be adapted to suit individual groups of trainees depending on their experience, ability, equipment and staff available for training.

Pre-requisite Unit

Not applicable.

Competency Field

A - Handling Cargo and Vessel Stability

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Establish safe operating limits

PERFORMANCE CRITERIA

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

- 1.1** Communication with personnel is clear, concise and accurate and information is understood and acted upon
- 1.2** Cargo operations are planned, risk is managed and carried out in accordance with accepted principles and procedures to ensure safety of operations and avoid pollution of the marine environment
- 1.3** Potential non-compliance with cargo operation-related procedures are identified and rectified promptly
- 1.4** Cargo operations are carried out in a safe manner, taking into account chemical tanker designs, systems and equipment
- 1.5** Proper loading, stowage and unloading of cargo is undertaken to ensure that stability and stress conditions remain within safe limits at all times
- 1.6** Actions are taken and procedures followed and correctly applied, and the appropriate shipboard cargo-related equipment used
- 1.7** Calibration and use of monitoring and gas detection equipment are in compliance with operational practices and procedures
- 1.8** Procedures for monitoring and safety systems ensure that all alarms are detected promptly and acted upon in accordance with workplace emergency procedures
- 1.9** Personnel are allocated duties and informed of procedures and standards of work to be followed in a

		manner appropriate to the individuals concerned and in accordance with safe operational practices
2	Recognise physical and chemical properties of chemical cargoes	2.1 Information resources are used effectively to identify properties and characteristics of noxious liquid substances (NLS) and related gases and their impact on safety and environmental protection
		2.2 Information resources are used effectively to identify properties and characteristics of NLS and related gases and their impact on vessel operation
3	Take precautions to prevent hazards	3.1 Cargo-related hazards to the vessel are identified, risk assessed, and control measures are implemented
		3.2 Cargo-related hazards to personnel are correctly identified and proper control measures are taken
4	Apply work health and safety (WHS)/occupational health and safety (OHS) precautions	4.1 Procedures designed to safeguard personnel and the ship are observed at all times
		4.2 Safe working practices are observed, and appropriate safety and protective equipment is correctly used
		4.3 Working practices are in accordance with legislative requirements, codes of practice, permits to work and environmental concerns
		4.4 Breathing apparatus is used correctly by personnel
		4.5 Entry into enclosed spaces is undertaken in accordance with workplace procedures
5	Respond to emergencies	5.1 Type and impact of the emergency is promptly identified, and the response actions conform with workplace emergency procedures and contingency plans
		5.2 Order of priority, the levels and timescales of making reports and informing personnel, are undertaken relevant to the nature of the emergency and accurately reflect the urgency of the problem
		5.3 Evacuation, emergency shutdown (ESD) and isolation procedures are undertaken appropriate to the nature of the emergency and are implemented promptly

	5.4	Medical emergency procedures are identified and required actions taken in a medical emergency conform to current recognised first aid practices and international guidelines
6	Take precautions to prevent pollution of the environment	6.1 Operations are conducted in accordance with accepted principles and workplace procedures to prevent pollution of the atmosphere
	6.2	Operations are conducted in accordance with accepted principles and workplace procedures to prevent pollution of the environment
7	Monitor and control compliance with legislative requirements	7.1 Cargo handling is in compliance with relevant IMO instruments
	7.2	Cargo handling procedures are in compliance with industrial standards and codes of safe working practices
	7.3	Workplace documentation is completed in accordance with workplace procedures

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

Assessment Requirements for MARAO18 Manage advanced chemical tanker cargo operations

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:

- applying pump theory, characteristics and types of cargo pumps
- applying relevant international regulations, codes, industry guidelines, industry standards and port regulations
- applying safe work practices and risk assessments for personal and shipboard safety
- applying safe work practices following a collision, grounding and spillage
- applying safe work practices when entering enclosed spaces, hot and cold work, conducting electrical work, before and during repair work and maintenance work
- applying safety management system (SMS) and requirements
- calibrating and using monitoring and gas-detection systems, instruments and equipment
- communicating effectively with personnel and reporting authorities
- conducting cargo operations within acceptable safety limits, including stress limits at all times
- evaluating tanker design, systems and equipment and cargo to inform decision making during cargo operations
- identifying and evaluating design, characteristics of chemical tanker systems and equipment to inform decision making during cargo operations
- managing and supervising personnel with cargo-related responsibilities
- monitoring enclosed space rescue, medical emergency, fire, system failure or failure of services essential to cargo, collision, grounding and spillage emergencies
- monitoring loading, unloading, care and handling of chemical cargo
- performing cargo measurements and calculations
- using all checklists when conducting cargo operations relevant to allocated job duties, certification and level of authority
- using basic chemistry, physics and correct definitions to identify and evaluate physical and chemical properties of cargo
- using loading and unloading plans
- using safety data sheets (SDS)/material safety data sheets (MSDS)
- using personal protective equipment (PPE) and devices.

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:

- alarms and trips, including:
 - high-level alarms
 - low-level alarms
- calibration of monitoring and gas-detection systems, instruments and equipment
- cargo area venting and accommodation ventilation
- cargo measurements and calculations
- chemical cargo operations, including:
 - ballasting and deballasting
 - cargo compatibility and segregation
 - cargo residue operations
 - gas-freeing
 - heating and cooling requirements, including consequences to adjacent cargo
 - high-viscosity cargo
 - inerting
 - inhibition and stabilisation requirements
 - loading and unloading plans
 - operational tank entry
 - ship-to-ship transfers
 - tank atmosphere control
 - tank cleaning operations
- compliance requirements, including:
 - codes of safe working practices
 - environmental procedures
 - industrial standards
 - industry guidelines
 - International Bulk Chemical (IBC) Code
 - International Convention for the Prevention of Pollution from Ships (MARPOL)
 - permits to work
 - port regulations
 - International Convention for the Safety of Life at Sea (SOLAS)
- consequences, including dangers of non-compliance with relevant legislation and regulations
- development and application of cargo operation plans, procedures and checklists
- effect of bulk liquid cargoes on trim, stability and structural integrity
- emergency procedures, including:
 - cargo operations emergency shutdown (ESD)

- cargo reactivity
- collision
- ESD
- enclosed space rescue
- failure of services essential to cargo
- firefighting on chemical tankers
- grounding
- isolation
- jettisoning cargo
- medical
- ship emergency response plans
- spillage
- system failure and failure of services essential to cargo
- firefighting systems, including:
 - fire protection and extinguishing systems
 - fire-extinguishing agents, advantages and disadvantages
- hazards and control measures, including:
 - corrosivity
 - electrostatic hazards
 - explosion
 - flammability
 - health hazards
 - high-density cargo
 - inert gas composition
 - low boiling point cargoes
 - oxygen deficiency
 - polymerising cargo
 - reactivity
 - solidifying cargo
 - toxicity
- international regulations, codes, industry guidelines, industry standards and port regulations, including:
 - codes of safe working practice
 - environmental procedures
 - IBC Code
 - MARPOL
 - SOLAS
 - International Medical Guide for Ships
 - SDS/MSDS
 - Medical First Aid Guide (MFAG)

- medical first aid procedures
- permits to work
- workplace procedures
- loading and unloading plans
- loading, unloading, care and handling of cargo
- SDS/MSDS
- medical first aid procedures, including:
 - International Medical Guide for Ships
 - MFAG
- monitoring and safety systems, including the ESD system
- physical and chemical properties of cargo of noxious liquid substances (NLS), including:
 - chemical cargo categories, including:
 - corrosive
 - explosive
 - flammable
 - toxic
 - chemical groups and industrial usage
 - reactivity of cargo
- pollution prevention procedures, including:
 - controlled operational pollution at sea
 - pollution prevention requirements of ships construction and equipment
 - pollution prevention of the atmosphere and environment
- pressure systems, including:
 - tank and cargo pipeline pressure
 - temperature control systems and alarms
- pump theory and characteristics, including:
 - safe operation of cargo pumps
 - types of cargo pumps
- rationale, practical application and implications of ship design, systems and equipment, including:
 - impact on decision making in typical and emergency situations
 - location, positioning and segregation
 - operational advantages, disadvantages and limitations
- risk assessments
- safe operation of systems and equipment
- safe working practices, including precautions, risk assessment and personnel shipboard safety, including:
 - before and during repair and maintenance work
 - electrical safety
 - entering enclosed spaces

- hot and cold work
- selection and correct use of PPE, including personal monitors
- ship design, systems and equipment, including:
 - general arrangement and construction
 - pipeline and drainage systems
 - pumping arrangement and equipment
 - slop management
 - systems, including:
 - ballast systems
 - cargo area venting and accommodation ventilation
 - cargo heating and cooling systems
 - cargo-related electrical and electronic control systems
 - cargo tank environmental control systems
 - firefighting systems
 - gas detecting systems
 - gauging control systems and alarms
 - pipeline
 - pumping
 - tank and cargo pipeline pressure and temperature control systems and alarms
 - tank cleaning systems
 - tank, pipeline and fittings, material and coatings
 - vapour return/recovery systems
- tank construction and arrangement
- ship emergency response plans
- strategies for managing personnel and reporting bodies, including:
 - communicating urgency and nature of emergencies
 - confirming communication is clearly understood
 - delegating job tasks
 - level of authority
 - order of priority
 - timescales for reporting
- tank temperatures, impact of cargo on temperatures and typical settings
- tanker safety culture and implementation of SMS
- types, selection and correct use of different breathing apparatus
- using SDS/MSDS during operations and first aid
- work health and safety (WHS)/occupational health and safety (OHS) legislation and policies.

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:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

Links

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