



Australian Government

Department of Education, Employment and Workplace Relations

TDMMF1407B PLAN AND IMPLEMENT SPECIAL SAFETY, MAINTENANCE AND EMERGENCY PROCEDURES FOR LIQUEFIED GAS TANKERS

Release: 1

TDMMF1407B PLAN AND IMPLEMENT SPECIAL SAFETY, MAINTENANCE AND EMERGENCY PROCEDURES FOR LIQUEFIED GAS TANKERS

Modification History

Not applicable.

Unit Descriptor

UNIT DESCRIPTOR:

This unit involves the skills and knowledge required to plan and implement special safety, maintenance and emergency procedures for liquefied gas tankers, including developing vessel emergency plans, carrying out emergency shut down of gas cargo operations, operating cargo valve closing systems, taking special precautions when carrying out on-board maintenance operations, taking appropriate action in the event of failure of systems or services essential to gas cargo, and taking appropriate action following collision, stranding or envelopment of the vessel in toxic or flammable vapour.

Application of the Unit

Application of the unit	The unit has application within a supplementary Statement of Attainment for competencies required by a Master or Chief Mate on a liquefied gas tanker.
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Licensing/Regulatory Information

Licensing/legislative requirements	The unit is consistent with the relevant sections of STCW 95, the International Ship and Port Facility Security (ISPS) Code and Marine Orders under the Australian Navigation Act 1912
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Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

<i>Elements describe the essential outcomes of a unit of competency.</i>	<i>Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.</i>
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
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1 Develop and implement operational and emergency plans relevant to liquefied gas tankers	a Plans for tanker operations are prepared in accordance with operational orders, company procedures, the tanker's ISM Code safety management system, international and national codes, conventions and regulatory requirements, and company procedures b Correct procedures are followed when operating cargo valve closing systems c Safety and emergency procedures are planned and implemented in accordance with the tanker's ISM safety management plan, international and national codes, conventions and regulatory requirements and company procedures d Tests, inspections and repairs of tanker machinery and equipment and associated safety devices, control systems and alarms are conducted in accordance with safety regulations and company procedures e Action is taken in the event of machinery or equipment failure or emergency to secure the machinery and the tanker and maintain the safety of the tanker and persons involved and shipboard emergency, and contingency plans are followed f Correct emergency action is taken in the event of the failure of shipboard systems or services essential to the safe carriage, loading and discharge of liquefied gas cargo

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ELEMENT	PERFORMANCE CRITERIA
1 Develop and implement operational and emergency plans relevant to liquefied gas tankers (continued)	- g Emergency shut down of liquefied gas cargo operations is initiated upon identification of a defined emergency situation as per the tanker's ISM safety management plan, international and national codes, conventions and regulatory requirements, and company procedures - h Escape equipment, breathing apparatus, personal protective clothing and equipment, resuscitation equipment, and decontamination equipment are correctly used in emergency situations as per manufacturer's instructions, regulatory requirements and company procedures - i Appropriate action is taken following collision, stranding or envelopment of the vessel in toxic or flammable vapour as per the vessel's emergency plans and procedures and relevant international and national codes, conventions and regulatory requirements - j All emergency and safety incidents are reported and recorded as per the tanker's safety management system, regulatory requirements and company procedures
2 Take special precautions when carrying out maintenance operations on liquefied gas tankers	- a Special maintenance procedures are developed and implemented that take due account of the potential hazards that may occur during maintenance on a liquefied gas tanker - b Maintenance and repair hazards are identified and action is taken to minimise or eliminate risk to personnel, tanker and the environment - c Safety, hazard minimisation and pollution control procedures and national and international regulations are followed at all times during maintenance and repair operations - d Personal protective clothing and equipment are correctly

ELEMENT	PERFORMANCE CRITERIA
	used when carrying out maintenance work on a liquefied gas tanker
	e When required during maintenance operations, breathing apparatus is correctly used as per manufacturer's instructions, regulatory requirements and company procedures
	f Where relevant, procedures and precautions necessary for entry into a pump room, tanks or other confined spaces when carrying out maintenance operations on a liquefied gas tanker are correctly followed

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GAS TANKERS**

Required Skills and Knowledge

REQUIRED KNOWLEDGE

This describes the knowledge required for this unit.

- 1 Relevant sections of IMO STCW 95 Code and AMSA Marine Orders applicable for liquefied gas tankers, including the IGC
- 2 Relevant OH&S and pollution control legislation, codes of practice, policies and procedures
- 3 The basic principles and trends in liquefied gas tanker design and cargo containment and handling systems, including:
 - a types and design of liquefied gas tankers and their equipment
 - b cargo containment systems with special reference to rules, surveys, tank construction, materials, coatings, insulation and compatibility.
 - c cargo handling equipment, including pumps and pumping arrangements and vapour return systems, and piping systems and valves
 - d cargo conditioning systems, including warm up and cool down procedures
 - e tank atmosphere control systems, including the use of inert gas and nitrogen

REQUIRED KNOWLEDGE

- f instrumentation of cargo containment and handling systems, including that of gauging, sampling and temperature control and pressure monitoring systems
- 4 Safety procedures and regulatory requirements for loading, discharge, handling and condition monitoring of liquefied gas cargo, including:
 - a cargo loading and discharging preparations and procedures
 - b the purpose and use of checklists, including the vessel/shore checklist
 - c the importance of correct supervision and the use of monitoring equipment when handling liquefied gas cargoes
 - d cargo condition monitoring and maintenance on passage and in harbour
 - e liquefied gas cargo sampling procedures
 - f ballasting and deballasting procedures
 - g the warm up and gas freeing procedures
 - h the procedures for cool down of a gas-free system from ambient temperature and the safety precautions involved
- 5 Special safety precautions with respect to repair and maintenance work on a liquefied gas tanker, including:
 - a an understanding of the types of hazards and their causes
 - b safety and hazard minimisation procedures used on liquefied gas tankers
 - c the design features of the vessels which control the major hazards on a liquefied gas tanker

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- d health hazards of liquefied gas cargoes and the means to prevent related safety incidents
 - e basic toxicological terminology
 - f routes of entry of toxins to the human body

- d health hazards of liquefied gas cargoes and the means to prevent related safety incidents
 - g special first aid measures which may be required on a liquefied gas tanker, including administering antidotes when dealing with a safety incident involving liquefied gases
- 6 Principles and procedures for emergency operations on a liquefied gas tanker, including
- a the importance of developing vessel emergency plans
 - b techniques for emergency shut down of cargo operations on a liquefied gas tanker
 - c actions to be taken in the event of failure of services essential to liquefied gas cargo
 - d actions to be taken on a liquefied gas tanker following a collision, stranding, spillage or envelopment of the vessel in toxic or flammable vapour
 - e the correct procedures for the use of breathing apparatus, escape equipment, resuscitation equipment, rescue equipment and protective clothing and equipment
 - f procedures for entry into and effecting a rescue from enclosed spaces on a tanker
 - g importance of supervising personnel during potentially hazardous operations
 - h types and principles of certified safe electrical equipment and sources of ignition

- d health hazards of liquefied gas cargoes and the means to prevent related safety incidents
- 7 Maritime communication techniques as they are applied in the loading, discharge, handling and condition monitoring of oil cargo

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REQUIRED SKILLS

This describes the basic skills required for this unit.

- 1 Read and interpret instructions, regulations, procedures and information relevant to planning and implementing special safety, maintenance and emergency procedures for liquefied gas tankers
- 2 Communicate effectively with others when planning and implementing special safety, maintenance and emergency procedures for liquefied gas tankers
- 3 Provide leadership to others on matters related the planning and implementing special safety, maintenance and emergency procedures for liquefied gas tankers
- 4 Take appropriate initiatives related to the planning and implementing special safety, maintenance and emergency procedures for liquefied gas tankers
- 5 Interpret and apply security and safety practices and regulations when planning and implementing special safety, maintenance and emergency procedures for liquefied gas tankers
- 6 Modify activities dependent on differing workplace contingencies, risk situations and environments
- 7 Identify and solve problems associated with the planning and implementing special safety, maintenance and emergency procedures for liquefied gas tankers and take appropriate action based on available information
- 8 Monitor and anticipate problems and risks related to the special safety, maintenance and emergency procedures for liquefied gas tankers, and take appropriate action
- 9 Adapt to differing types of vessels, port facilities, oil cargoes and equipment
- 10 Monitor the use of equipment required for the planning and implementing special safety, maintenance and emergency procedures for liquefied gas tankers

Evidence Guide

Evidence Guide

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The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

1 Critical aspects of evidence required to demonstrate competency in this unit	Assessment must confirm appropriate knowledge and skills to: - a Plan and implement special safety, maintenance and emergency procedures on a liquefied gas tanker - b Identify typical safety, maintenance and emergency problems and hazards on a liquefied gas tanker and take appropriate action - c Apply relevant international conventions, IMO and national codes, tanker safety guides and port regulations related to liquefied gas tanker operations - d Communicate effectively with others when carrying out special safety, maintenance and emergency procedures on a liquefied gas tanker
2 Evidence required for demonstration of consistent performance	- a Performance is demonstrated consistently over a period of time and in a suitable range of contexts - b Consistently applies underpinning knowledge and skills when: 1 planning and implementing special safety, maintenance and emergency procedures for liquefied gas tankers 2 identifying and evaluating liquefied gas cargo safety, maintenance and emergency problems and hazards and determining appropriate courses of action 3 identifying and implementing improvements to liquefied

	gas cargo safety, maintenance and emergency procedures
c	Shows evidence of application of relevant workplace procedures, including: - relevant sections of IMO STCW Convention and Code and AMSA Marine Orders - OH&S and pollution control regulations and hazard prevention policies and procedures - ISM Code safety management system procedures and work instructions on the conduct of maintenance on liquefied gas tankers - pollution management processes
d	Action is taken promptly to report and/or rectify operational accidents and incidents in accordance with established procedures
e	Work is completed systematically with required attention to detail
f	Recognises and adapts appropriately to cultural differences in the workplace, including modes of behaviour and interactions among crew and others

Evidence Guide (continued)

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3 Context of assessment

- Assessment of competency must comply with the assessment requirements of the relevant maritime regulations
- Assessment of this unit must be undertaken within relevant marine authority approved and audited arrangements by a registered training organisation:
 - As a minimum, assessment of knowledge must be conducted through appropriate written/oral examinations
 - Appropriate practical assessment must occur:
 - at the registered training organisation; and/or

	ii on an appropriate working or training vessel
4 Specific resources required for assessment	Access is required to opportunities to: - a participate in a range of practical exercises, case studies and/or other exercises that demonstrate the skills and knowledge to plan and implement special safety, maintenance and emergency procedures for liquefied gas tankers; and/or - b plan and implement special safety, maintenance and emergency procedures on board an operational liquefied gas tanker

Range Statement

Range Statement

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The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

VARIABLE	SCOPE
1. GENERAL CONTEXT	
a. Work must be carried out:	1 in compliance with the relevant maritime regulations, tanker safety guides and port regulations related to liquefied gas tanker safety and operations
b. Work is performed:	1 relatively independently under broad operational requirements, with accountability and responsibility for self and others in achieving the prescribed outcomes

c. Work involves:	1 the application of special safety precautions, operational procedures and hazard minimisation strategies to the management of the operations, maintenance and emergency situations on a liquefied gas tanker. Contribution to the development of integrated safety management plan for a liquefied gas tanker is required and accountability and responsibility for self and others in achieving the outcomes is involved
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d. Work requires:	1 significant judgement in planning, technical and leadership functions related to the development and implementation of an ISM management plan for operations, maintenance activities and emergencies on a liquefied gas tanker
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2. WORKSITE ENVIRONMENT

a Vessel may include:	1 any Australian or international commercial liquefied gas tanker
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b Operational, maintenance and emergency procedures may be carried out:	1 by day or night in both normal and emergency situations 2 under any possible operational conditions 3 during loading and discharging of cargo 4 during ballasting and deballasting 5 during warm up and cool down procedures 6 during tank cleaning 7 during liquefied gas cargo condition maintenance 8 during liquefied gas cargo sampling
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Range Statement (continued)

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VARIABLE	SCOPE
c Operations on a liquefied gas tanker may include:	1 cool down of a gas-free system from ambient temperature 2 liquefied gas loading preparation and operations 3 maintenance operations during a loaded voyage 4 liquefied gas discharging preparation and operations 5 warm up and gas freeing operations 6 tank stripping and cleaning operations 7 ballasting operations and deballasting operations 8 maintenance operations during a ballast voyage
d Liquefied gas cargo handling systems and equipment may include:	1 pumps and pumping arrangements and vapour-return systems, piping systems and valves 2 filters and strainers 3 expansion devices 4 flame screens 5 commonly used inert gases 6 storage, generation and distribution systems 7 temperature and pressure monitoring systems 8 cargo vent systems 9 liquid recirculation and reliquefaction systems 10 cargo gauging, instrumentation systems and alarms

	11 CO₂ and gas detection and monitoring systems 12 cargo boil-off systems and auxiliary systems.
e Personal protection clothing and equipment may include:	1 masks, goggles and breathing apparatus 2 resuscitation equipment 3 protective clothing, including headgear, gloves and footwear 4 escape and rescue equipment
f Hazards associated with liquefied gas cargoes may include:	1 sources of ignition leading to explosion and fire 2 electrostatic generation leading to discharge 3 environmental hazards to air and water

Range Statement (continued)

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f Hazards associated with liquefied gas cargoes may include: (continued)	4 reactivity hazards, including effects of self-reaction, temperature and effects of air, water, impurities and other chemicals and reagents 5 release of toxic fluids, vapours and gases, involving skin contact, ingestion and inhalation 6 corrosion hazards to personnel, vessel structures and equipment 7 working in confined spaces
g Documentation /records may include:	1 safety management system plans, procedures, checklists and instructions 2 vessel's safety, maintenance and emergency procedures

	3 sections of the AMSA Marine Orders and the IMO STCW Convention and Code related to liquefied gas tankers 4 Liquefied Gas Handling Principles on Ships and in Terminals, SIGTTO 5 Tanker Safety Guide (Liquefied Gas), ICS 6 Ship to Ship Transfer Guide (Liquefied Gases), ICS/OCIMF 7 material safety data sheets 8 tanker manufacturer's instructions and recommended procedures 9 OH&S and pollution prevention procedures 10 instructions of relevant maritime authorities 11 relevant Australian and international standards
h Applicable procedures and codes may include:	1 IMO STCW 95 Convention and Code related to liquefied gas tankers 2 relevant sections of AMSA Marine Orders 3 International Regulations for Preventing Collisions at Sea 4 relevant international, Commonwealth, State and Territory OH&S and pollution control legislation

Unit Sector(s)

Not applicable.

Field

Field MF Operational Quality and Safety

Relationship to other units

Relationship to other units	The unit may be assessed in conjunction with the unit <i>TDMMA401B Manage procedures for the handling, loading and discharging of liquefied gas cargoes.</i>
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