

SQA Advanced Unit Specification

General information for centres

Unit title: Marine Cargo Operations (SCQF level 7)

Unit code: HW6H 47

Superclass: ZS

Publication date: November 2017

Source: Scottish Qualifications Authority

Version: 01

Unit purpose

This unit is designed to provide learners with underpinning knowledge of a range of topics which will allow them to safely and efficiently carry out their duties as a Deck Officer of the Watch onboard a merchant vessel during cargo operations. It is primarily aimed at learners who intend seeking a career as a Deck Officer in the Merchant Navy. However, it could also be studied by someone with an interest in the subject area.

Outcomes

On successful completion of the unit the learner will be able to:

- 1 Explain the principles and safe working practices for the proper loading, stowage and carriage of dry cargoes and offshore vessel operations.
- 2 Explain the principles and safe methods of arranging for the proper loading, stowage and carriage of bulk liquid and chemical cargoes.
- 3 Explain the duties of the Officer of the Watch (OOW) whilst maintaining a deck cargo watch.
- 4 Explain the precautions and procedures to be taken to prevent pollution of the marine environment.

Credit points and level

1.5 SQA Credits at SCQF level 7: (12 SCQF credit points at SCQF level 7)

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Recommended entry to the unit

Access to this unit is at the discretion of the centre. However learners would benefit most from this unit if they have completed *Shipboard Operations: An Introduction (F7HB 12)*.

Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the support notes for this unit specification.

There is no automatic certification of Core Skills or Core Skill components in this unit.

Context for delivery

If this unit is delivered as part of a group award, it is recommended that it should be taught and assessed within the subject area of the group award to which it contributes.

Equality and inclusion

This unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

SQA Advanced Unit Specification: Statement of standards

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Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Where evidence for outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Learners should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Explain the principles and safe working practices for the proper loading, stowage and carriage of dry cargoes and offshore vessel operations.

Knowledge and/or skills

- ◆ Loading, discharging, securing and carriage of dry cargoes
- ◆ Relevant codes for carriage of cargoes
- ◆ Procedures to ensure efficient cargo operations
- ◆ Care and maintenance of cargo handling equipment
- ◆ Cargo calculations

Outcome 2

Explain the principles and safe methods of arranging for the proper loading, stowage and carriage of bulk liquid and chemical cargoes.

Knowledge and/or skills

- ◆ Loading, discharging, securing and carriage of bulk liquid cargoes
- ◆ Tank entry procedures
- ◆ Inert gas systems
- ◆ Crude oil washing and tank/pipeline cleaning
- ◆ Ballast management
- ◆ Single/multiple grade cargoes
- ◆ Liquid cargo calculations

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Outcome 3

Explain the duties of the Officer of the Watch (OOW) whilst maintaining a deck cargo watch.

Knowledge and/or skills

- ◆ Safety and security procedures.
- ◆ Legislative requirements for safe access as per COSWP
- ◆ Legislative requirements for lifting appliances as per COSWP
- ◆ Legislative requirement for cargo documentation and record keeping
- ◆ Code of safe working practice
- ◆ Pollution prevention measure during cargo watch
- ◆ Response to emergencies which may arise during a cargo watch

Outcome 4

Explain the precautions and procedures to be taken to prevent pollution of the marine environment.

Knowledge and/or skills

- ◆ International Convention for the Prevention of Pollution from Ships (MARPOL)
- ◆ Shipboard Marine Pollution Emergency Plans (SMPEP)
- ◆ Hazardous goods
- ◆ Bunkering operations

Evidence requirements for this unit

Learners will need to provide written and/or recorded oral evidence under closed-book and supervised conditions to demonstrate their knowledge and/or skills for Outcomes 1–4. Outcomes 1–4 may be assessed combined by a single assessment. Three hours' time should be allocated for the assessment.

All knowledge and skills will be assessed, however there is sampling within each of the knowledge and skills.

Outcome 1

Written and/or recorded oral evidence is required for this outcome. Where sampling is used a different sample should be used on each assessment occasion. Items which are not sampled must be covered in the alternative (resit) assessment.

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Learners will need to produce evidence to demonstrate their knowledge and/or skills by showing that they can:

- 1 Explain the loading, discharging and carriage requirements for a sample of two from the following:
 - (a) Containerised cargoes
 - (b) Timber cargoes
 - (c) General cargoes
 - (d) Deck cargoes
 - (e) Refrigerated cargoes
 - (f) Dry bulk cargoes
 - (g) Vehicular/roll on-roll off cargoes
 - (h) Offshore vessel operations.
- 2 Summarise the legislation regarding loading, discharging, carriage and securing of a sample of one from the following:
 - (a) Dangerous goods
 - (b) Timber deck cargoes
 - (c) Grain cargoes
 - (d) Vehicular cargoes
- 3 Explain watchkeeping procedures to ensure cargo operations progress in a safe and efficient manner and comply with current legislation.
- 4 Describe the use and maintenance of cargo handling equipment as per current legislation and guidance.
- 5 Perform basic cargo calculations.

Outcome 2

Written and/or recorded oral recorded evidence is required for this outcome. Where sampling is used a different sample should be used on each assessment occasion. Items which are not sampled must be covered in the alternative (resit) assessment.

Learners will need to produce evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ Describe the common pipeline systems found on tankers
- ◆ Explain the use, calibration and limitations of safety equipment used to test atmospheres within tanks and enclosed spaces
- ◆ Explain the procedures to be adopted for *either* routine *or* emergency tank entry situations
- ◆ Describe the main features of an inert gas system
- ◆ Learners will be required to produce a sketch showing the main components of an inert gas system and must explain the circumstances when the system must be used and explain the operation of alarms associated with the system.

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- ◆ Explain the procedures to be adopted during cargo operations, for one from the following sample:
 - (a) Crude oil cargoes
 - (b) Multi grade cargoes
 - (c) Gas cargoes
 - (d) Bulk chemical cargoes
- ◆ Perform basic cargo calculations

Outcome 3

Written and/or recorded oral evidence is required for this outcome. Where sampling is used a different sample should be used on each assessment occasion. Items which are not sampled must be covered in the alternative (resit) assessment.

Learner will need to produce evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ Explain from a sample of two of the following:
 - (a) The safety and security procedure to be observed when carrying out a deck watch
 - (b) The legislative requirements regarding safe access to the vessel as per COSWP
 - (c) As per COSWP through examination, inspection, marking and safe working load for lifting appliances
 - (d) The legislative requirement regarding cargo documentation and record keeping
- ◆ Explain the initial and subsequent actions for a sample of one of the following emergency situations which may arise during a cargo watch:
 - (a) Fire
 - (b) Cargo equipment emergencies
 - (c) Pollution emergencies
 - (d) Emergencies involving dangerous goods

Outcome 4

Written and/or recorded oral evidence is required for this outcome. Where sampling is used a different sample should be used on each assessment occasion. Items which are not sampled must be covered in the alternative (resit) assessment.

Learners will need to produce evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ Explain for a sample of one of the following:
 - (a) The requirements of the MARPOL Convention and current legislation with respect to preventing pollution of the marine environment
 - (b) Pro-active and re-active policies with respect to marine pollution as per SMPEP
- ◆ Explain the precautions and procedures to prevent pollution of the marine environment for a sample of one of the following:
 - (a) Carriage of hazardous substances on board
 - (b) Garbage and tank residue disposal
 - (c) Routine vessel operations.
 - (d) Bunkering

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SQA Advanced Unit support notes

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Unit support notes are offered as guidance and are not mandatory.

While the exact time allocated to this unit is at the discretion of the centre, the notional design length is 60 hours.

Guidance on the content and context for this unit

This unit introduces learners to the handling of the various categories of cargoes transported by sea. It is designed to enable learners to obtain the required underpinning knowledge of the subject to enable them to become competent in the role as a Deck Officer on board Merchant Vessels.

In Outcome 1, learners are introduced to the general principles of cargo handling at operational level. This will allow learners to build on the practical aspects that they will have previously been exposed to whilst serving on board merchant and offshore vessels. The unit introduces the statutes and international regulations which govern the carriage of goods at sea in addition to providing an in-depth knowledge of systems of management which are aimed at safe cargo handling. Learners are required to undertake calculations aimed at the allocation of space on board a vessel for items or parcels of cargo. This is closely aligned to the unit entitled ship stability: An introduction and certain outcomes of which could be delivered simultaneously with this outcome.

Outcome 2 investigates the carriage of liquefied oil, gas and chemical cargoes in bulk. Systems and procedures for the loading, carriage and discharge of these cargoes are covered with a high emphasis on safety, including the use of inert gas systems. Learners will understand the operation of instrumentation used to detect gases in compartments along with quantities of cargo present in tanks. Pollution control and prevention is included within this unit.

Outcome 3 is aimed at preparing learners for their chosen career as a Deck Officer by detailing the duties of the Officer of the Watch (OOW) during cargo operations. This includes certain activities and duties which do not directly concern the handling of cargo, such as security; effects of tide whilst alongside a berth; effects of other vessels passing close alongside in confined waters; safe access to the vessel. This builds on the prior experiential learning gained by learners whilst serving on board ship.

Outcome 4 concerns the procedures required to be followed by international legislation to prevent pollution of the sea and air by eliminating and reducing all emissions from the vessel. The contents of the International Convention for the Prevention of Pollution from Ships (MARPOL) are studied in depth to underpin the required knowledge of the legal requirements. The operation of the vessel is studied with emphasis on all aspects of the carriage of toxic and pollutant commodities in bulk; disposal of used ballast water; garbage control; acceptable levels of noise and emissions from the vessel.

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Guidance on approaches to delivery of this unit

When undertaking this unit it is expected that learners will have prior knowledge of cargo operations. Such knowledge will have been gained from practical experience of carrying cargoes on board vessels.

Learners will benefit most if this unit is delivered in conjunction with the unit *Ship Stability*. The knowledge and skills developed within the unit should be applied in the context that will be encountered aboard ship while maintaining cargo watch. This unit is ideally leading the learner towards the ability to be able to handle an emergency which may arise during deck cargo watch.

Learners will also benefit by learning relevant codes which are required for marine cargo operations. This will enhance learners' knowledge of safe loading, unloading and carriage of dry and liquid cargo.

Guidance on approaches to assessment of this unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

Assessment will be on a sample basis. Outcomes 1, 2, 3 and 4, which may be combined for assessment purposes, will be assessed by means of a closed-book assessment under supervised conditions consisting of a mixture of short answer/structured questions and cargo calculations.

Questions should be based on the relevance of the topic to the role of Merchant Navy Deck Officer at sea.

Three hours' time should be allocated for the assessment.

Authentication of the learners work is achieved by the action of double marking, a percentage of papers are double marked for authenticity. The learner can also ask for his work to be double marked at any time. The internal quality verification is carried out before each assessment to maintain the fairness of the assessment. On top of this internal verification should be carried out to ensure all assessments are verified to a fair standard.

Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the evidence requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at www.sqa.org.uk/e-assessment.

Opportunities for developing Core and other essential skills

There are opportunities to develop the following Core Skills in this unit.

Communication, across the range, at SCQF level 5. This can be achieved by learners having to read legislation and codes contained within statutory instruments and producing written evidence based on the above which will be required to be presented in a clear and logical manner.

Oral communication can be developed within the classroom session by use of interactive questioning aimed to allow learners to share their knowledge of particular types of cargoes with other learners who may have had no experience of carrying them.

Numeracy can be developed at SCQF level 4 by learners carrying out simple cargo calculations and using tabular and graphical information, commonly found on board ships to obtain information required in the calculation.

Information and Communication Technology at SCQF level 5 can be developed by learners using the internet to access resources and also by learners being shown the operation of state of the art cargo handling simulators.

Problem Solving across the range, at SCQF level 6, may be developed by having learners prepare cargo plans, from information supplied, such as type of cargo quantity to be loaded, and port of loading and discharge, to ensure that the cargo operation proceeds in a smooth and efficient manner. This requires the learners to consider numerous variables such as dangerous goods legislation, stability criteria, etc. Learners may also be asked to review and evaluate changes to the plan to meet operational requirements, eg a change in the port rotation order, a delay on arrival or departure, failure of critical cargo handling equipment.

Working with Others at SCQF level 6, can be developed by using group work within the classroom setting this allows learners to share experiences which other learners may not have had depending on the type of vessels they have been sailing on. For example a learner who has knowledge of container operations may work with a group of learners who only have tanker experience and vice-versa.

The group will have to collaborate to get the most out of the experience and decide how best to use this expertise to the benefit of all.

History of changes to unit

Version	Description of change	Date

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SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of SQA Advanced Qualifications.

FURTHER INFORMATION: Call SQA's Customer Contact Centre on 44 (0) 141 500 5030 or 0345 279 1000. Alternatively, complete our [Centre Feedback Form](#).

General information for learners

Unit title: Marine Cargo Operations (SCQF level 7)

This section will help you decide whether this is the unit for you by explaining what the unit is about, what you should know or be able to do before you start, what you will need to do during the unit and opportunities for further learning and employment.

This unit is designed to enable you to gain sufficient knowledge which will enable you to become a valued member of a vessel's Deck Officer Complement. The content of this unit is assessed within the centre at which you choose to study and you will undergo further assessment on the topics during your MCA Oral examination at the end of your course of studies. You are strongly advised during your study of the unit to use any relevant work experience that you may have in the subject.

The unit is divided into four main subject areas, each one of which is the subject of a separate outcome. Each of these outcomes contains elements which build on the prior experiential learning which you will have gained whilst serving on board ship.

- ◆ In Outcome 1, you will be introduced to the general principles of cargo handling at operational level. The unit introduces the statutes and international regulations which govern the carriage of goods at sea in addition to providing an in-depth knowledge of systems of management which are aimed at safe cargo handling. You will be required to undertake calculations aimed at the allocation of space on board a vessel for items or parcels of cargo. This is closely aligned to the unit entitled *Ship Stability 1* which you may also study as part of the group award.
- ◆ Outcome 2 investigates the carriage of liquid cargoes and liquefied gas in bulk. Systems of loading, carriage and discharge are covered, with a high emphasis on safety, including the use of inert gas systems. You will understand the operation of instrumentation used to detect gases in compartments along with quantities of cargo present in tanks. Pollution control and prevention is included within this unit.
- ◆ Outcome 3 is aimed at preparing you for your chosen career as a Deck Officer by detailing the duties of the OOW during cargo operations. This includes certain activities and duties which do not directly concern the handling of cargo, such as security; effects of tide whilst alongside a berth; effects of other vessels passing close alongside in confined waters; safe access to the vessel.
- ◆ Outcome 4 concerns the procedures required to be followed by international legislation to prevent pollution of the sea and air by eliminating and reducing all emissions from the vessel. The contents of the IMO Publication entitled MARPOL are studied in depth to underpin the required knowledge of the legal requirements. The operation of the vessel is studied with emphasis on all aspects of the carriage of toxic and pollutant commodities in bulk; disposal of used ballast water; garbage control; acceptable levels of noise and emissions from the vessel.

On successful completion of the unit you will be able to:

- 1 Explain the principles and safe working practices for the proper loading, stowage and carriage of dry cargoes and offshore vessel operations.
- 2 Explain the principles and safe methods of arranging for the proper loading, stowage and carriage of bulk liquid and chemical cargoes.
- 3 Explain the duties of the Officer of the Watch (OOW) whilst maintaining a deck cargo watch.
- 4 Explain the precautions and procedures to be taken to prevent pollution of the marine environment.

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You may be assessed by a single assessment event which takes place under closed-book supervised conditions.

You will be assessed by a mixture of short answer and structured response questions and cargo calculations.