SQA Advanced Unit Specification

General information for centres

Unit title: Bridge Watchkeeping (SCQF level 7)

Unit code: HW6G 47

Superclass: ZS

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Version: 01

Unit purpose

This unit provides the learner with the tools to maintain a safe and effective watch on the bridge. This includes the application of regulations (ie the International Regulations for Preventing Collisions at Sea (IRPCS) and the International Association of Lighthouse Authorities (IALA) buoyage systems), the use of standard procedures and the safe manoeuvring of a vessel.

This unit is primarily aimed at learners who intend to seek employment within the maritime industry.

Outcomes

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

1 Interpret and apply regulations and systems for the safe movement of vessels.
2 Describe operational and emergency bridge watchkeeping procedures.
3 Explain how to manoeuvre a vessel in a safe and controlled manner.

Credit points and level

1 SQA Credit at SCQF level 7: (8 SCQF credit points at SCQF level 7)

Recommended entry to the unit

Access to this unit is at the discretion of the centre. However, it would beneficial if the learner had completed *Bridge Watchkeeping: An Introduction (F7HK 11)* or equivalent.

Core Skills

Achievement of this unit gives automatic certification of the following Core Skills component:

Complete Core Skill None

Core Skill component Critical Thinking at SCQF level 6

There are also opportunities to develop aspects of Core Skills which are highlighted in the support notes of this unit specification.

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

Interpret and apply regulations and systems for the safe movement of vessels.

Knowledge and/or skills

- Application and Interpretation of the IRPCS
- Application and Interpretation of the IALA Buoyage systems

Outcome 2

Describe operational and emergency bridge watchkeeping procedures.

Knowledge and/or skills

- Bridge watchkeeping procedures itemised in:
  - current national regulations
  - international regulations
  - international and national guidelines
  - The International Chamber of Shipping (ICS) Bridge Procedures Guide (BPG)
- Communications between bridge and engine personnel
- Requirement to call the Master to the bridge
- Failure of bridge and engine room equipment
- Emergency situations at sea

Outcome 3

Explain how to manoeuvre a vessel in a safe and controlled manner.

Knowledge and/or skills

- Factors which have an effect on manoeuvres, turning circles, and stopping distances
- Manoeuvring a vessel

Evidence requirements for this unit

Learners will need to provide written and/or recorded oral evidence to demonstrate their knowledge and/or skills across all outcomes under supervised closed-book conditions.

Outcomes 1, 2 and 3 will be combined for assessment.

All knowledge and skills are assessed, however there is sampling within each of the knowledge and skills. A different sample should be used on each assessment occasion.

Outcome 1

Learners will need to provide written/and or recorded oral evidence to demonstrate their knowledge and/or skills by showing that they can interpret and identify the lights, shapes and sound signals exhibited by a sample of four of the following:

- vessels not under command
- vessels engaged in fishing
- vessels engaged in trawling
- sailing vessels
- pilot vessels
- vessels restricted in their ability to manoeuvre
- vessels at anchor
- vessels aground
- vessels engaged in towing
- power driven vessels

The learner should be advised that their own vessel is a power driven vessel.

- Interpret and apply the IALA system of buoyage, systems A & B.

Identify a sample of four from the following:

- Any of the four cardinal marks
- Safe water marks
- Isolated danger marks
- Any of the three special marks
- Port hand marks (Both system A & B)
- Starboard (stbd) hand marks (Both system A & B)
- Preferred channel to port marks (Both system A & B)
- Preferred channel to stbd marks (Both system A & B)

For each of the buoys, in the chosen sample, learners must describe the light characteristics, shape, colour and top mark of the buoy. Learners must also be able to describe the action to be taken when encountering each of the above buoys, to ensure that the vessel remains in safe water.

Outcome 2

Learners will need to provide written/and or recorded oral evidence to demonstrate their knowledge and/or skills by showing that they can:

Describe, from a sample of one of the following:

- procedures for maintaining an effective lookout
- when to call the Master
- proper use of electronic navigation equipment found on the bridge, including the checks which are required to be carried out and the action to be taken in the event of failure of equipment
- precautions required for protection of the marine environment
- effective use of the main engine and steering controls
- the basic principles of passage planning
- contents of m-notices relevant to bridge operations
- procedures to be followed when the vessel is under pilotage
- procedures to be followed in heavy weather
- action to be taken on sighting dangerous ice
- procedures to be followed in emergency situations
- procedures for maintaining a deck watch in port

Describe, from a sample of one of the following:

- the procedures for communicating with the engine room
- the procedures to be taken in the event of main engine or steering gear failure
- the correct procedures for altering the vessels speed or heading
- the action to be taken when engine room alarms are activated
- when to call the duty engineer
- the preparations to be carried out when the vessel is entering and leaving port

Explain the emergency action to be taken by the Officer of the Watch (OOW) from a sample of one of the following shipboard emergency situations:

(a) Failure of critical navigational aid equipment on the bridge
(b) Failures of bridge control equipment
(c) Failure of the vessel's navigation lights
(d) Failure of the vessel's autopilot and steering systems
(e) Failure of the vessel's propulsion systems
(f) Failure of the vessel's alarm systems

Explain the emergency action to be taken by the OOW from a sample of one of the following emergency situations:

(a) Man overboard
(b) Fire
(c) Collision
(d) Stranding or grounding
(e) Flooding and stability emergencies
(f) Cargo/passenger emergencies
(g) Emergencies in port or at anchor
(h) Piracy
(i) Abandon ship
(j) Incidents harmful to the marine environment

On each assessment occasion, learners should cover the following points:

- the immediate action to be taken
- the subsequent action to be taken
- any communications which may be required and any signals which must be exhibited
- procedures to be followed to ensure the safety of the crew, vessel and environment

Outcome 3

Learners will need to provide written and/or recorded oral evidence to demonstrate their knowledge and/or skills by showing that they can:

- Explain the factors which affect manoeuvring characteristics and stopping distances from a sample of one of the following:
  - Deadweight
  - Draught and trim
  - Speed and rudder angle
  - Transverse thrust
  - Single, twin and controllable and fixed pitch propellers
  - Underkeel clearance
  - Working with tugs and the danger of girding
  - Dangers of pitching, pounding, rolling, synchronous rolling, racing, and broaching
  - Interaction with the sea bed, banks and shoals and other vessels
- Explain how to make manoeuvres from a sample of one of the following:
  - Turning short round
  - Emergency stop: crash stop, high frequency and low frequency cycling
  - Man overboard manoeuvres: Williamson, Scharnow and Anderson turns
  - Manoeuvre to minimise collision damage
  - Turning in heavy weather

SQA Advanced Unit support notes

Unit title: Bridge Watchkeeping (SCQF level 7)

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 40 hours.

Guidance on the content and context for this unit

The knowledge and skills contained within the unit cover all the requirements as laid down by Standards for Training and Certification of Watchkeepers (STCW) at the operational level aboard ship.

Completion of the unit will also ensure that the learner complies with the requirements laid down by the UK Maritime and Coastguard Agency (MCA) for the issue of an Officer of the Watch Unlimited Certificate of Competency as a Deck Officer. The required knowledge and skills for MCA certification can be found in a document detailing the requirements for the issue of an Education and Training Certificate (A&B), which is available from the MNTB.

The following notes give additional information on the knowledge and skills for each of the four outcomes.

Outcome 1

The content and context of the International Regulations for the Prevention of Collisions at Sea (IRPCS) will be thoroughly explored and the criteria to ensure the correct identification of vessels by day and night and in restricted visibility explained. The contents of the rules of sections A and B of the IRPCS will be examined and their application discussed. Learners will be encouraged to discuss these topics in light of their own shipboard experience, when keeping bridge watches under supervision.

The correct action to be taken when encountering vessels such that a developing risk of collision or a close quarters situation is safely resolved will be explained and demonstrated using model ships and multimedia presentations.

On each assessment occasion the learner should be given the opportunity to demonstrate that they can apply the IRPCS for both daylight, night time and restricted visibility encounters with other vessels.

The IALA system of buoyage will be examined and the differences between systems A and B explained. The characteristics of each type of buoy (light, shape, colour and topmark) will be discussed and their use and deployment for the safety of navigation explained.

Outcome 2

This outcome deals with nationally and internationally recognised procedures for ensuring that learners are competent to be in charge of a bridge or deck watch on board ship. The outcome will include discussion of appropriate actions in both operational and emergency scenarios. Extensive reference will be made to the contents of Chapter 8 in Section A of STCW and also current national regulations promulgated in M-notices and statutory instruments, including Chapter 5 of the convention on the Safety of Life at Sea (SOLAS). The role of the bridge procedures guide will be examined and the recommendations it contains,

with regard to watchkeeping, use of electronic navigational aids, prevention of pollution and the roles of the crew, officers and Master in ensuring the safety of navigation discussed.

Wherever possible the content of this outcome should be related to the learner's own experience aboard ship.

Outcome 3

This introduces learners to the principles behind the art of shiphandling and the factors that affect manoeuvrability of a vessel in all situations. The design features of the vessel which affect its performance will be investigated as well as the environmental and hydrodynamic factors which are likely to be encountered. The ability to recognise when these factors are in play and the necessary action to be taken will be discussed with a view to maintaining the safe navigation of the vessel.

Simple manoeuvres, likely to be executed by the Officer of the Watch will be demonstrated and emergency manoeuvres which may be required discussed, with particular reference to the safety of the vessel, crew, cargo and environment.

Guidance on approaches to delivery of this unit

It is suggested that this unit should be delivered concurrently with the units *Celestial Navigation*, *Navigational Mathematics and Science* and *Chartwork and Tides*.

The use of simulated scenarios within the delivery will be encouraged to prepare the learner for the application of their knowledge at sea. For example, models and multimedia presentations will be used extensively to ensure that learners are thoroughly familiar with all buoys and vessel types that they are likely to encounter.

Delivery may also include a range of case study based table top exercises, focussing on analysis of the actions taken and the application of recognised procedures.

The use of practical demonstration within the delivery will ensure that the learner has a clear picture of the application of the concepts. For example, the use of model ships to demonstrate and discuss manoeuvres.

The knowledge and skills acquired in this unit will be practised extensively at sea so that the experience gained can be utilised in the units *Marine Passage Planning*, *Management of Bridge Operations* and *Shipboard Management* which feature in the later stages of the SQA Advanced Diploma in Nautical Science.

Guidance on approaches to assessment of this unit

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.

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.

The three outcomes will be assessed in a combined written and/or recorded oral assessment. The assessment will be under supervised, closed-book conditions.

The assessor should make use of images and/or models within the assessment.

When assessing IRPCS, each situation the learner must identify the type of vessel from the lights, shapes or sound signal exhibited. They must also give a clear explanation, with respect the rules of sections A and B of the IRPCS, of the action that their own vessel must take in order that the IRPCS are complied with in each situation. An assessor must ensure that a mixture of daylight, night time and restricted visibility situations be used on each assessment occasion.

For each of the buoys, in the chosen sample, learners must describe the light characteristics, shape, colour and top mark of the buoy. Learners must also be able to describe the action to be taken when encountering each of the above buoys, to ensure that the vessel remains in safe water.

When assessing emergency procedures, the learner must be able to discuss the immediate action to be taken, subsequent actions to be taken and procedures to be followed to ensure the safety of the crew, vessel and environment.

The assessor may choose to generate a scenario which requires the learner to address a number of situations, generated by the evidence requirements. The learner's responses and decisions would provide evidence of their knowledge and/or skills.

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

This unit has the Critical Thinking component of Problem Solving embedded in it. This means that when learners achieve the unit, their Core Skills profile will also be updated to show they have achieved Critical Thinking at SCQF level 6.

The unit also provides learners with the opportunity to develop the Core Skill of *Communication:* Writing and Reading at SCQF level 5. Learners will develop the use of both by having to read and understand complex legislation found in Statutory Instruments and will have to present this in plain English in a written assessment.

The Core Skill of *Communication:* Oral at SCQF level 6 can be developed through the learner having to explain the complexity of vessel design and other factors which affect the manoeuvring characteristics of a vessel.

Numeracy: Graphical Information at SCQF level 5 may be developed by the learner analysing and explaining the manoeuvring diagrams of a vessel.

Information Technology at SCQF level 5 may be developed by learners using the internet to source legislation and articles relevant to bridge watchkeeping procedures and ship handling.

The Core Skill of *Working with Others* at SCQF level 5 can be developed by the use of group work when discussing watchkeeping procedures and using the experience of others in the class to broaden their experience of problems encountered on different ship types.

History of changes to unit

Version	Description of change	Date

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: Bridge Watchkeeping (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 provide you with the knowledge and skills required to take charge of a bridge or deck watch and be able to deal with common problems that are likely to arise at an operational level. This means that the skills being developed focus on identifying situations and taking the most effective action, as guided by the relevant legislation.

It discusses the recommended procedures that can be utilised to ensure that your watchkeeping competence meets the requirements under STCW 95. Extensive use will be made of current regulations and guidance available from a variety of sources and you will be required to utilise the internet to source some of this material.

Wherever possible you will be encouraged to discuss and evaluate the watchkeeping procedures that you have experienced on board ship and share this experience with your classmates. Particular emphasis will be placed on ensuring that you have a thorough comprehension of the International Regulations for the Prevention of Collisions at Sea and also the IALA buoyage system. You should relate your own shipboard experience to the application of the Rules and those of others who may have been on different types of vessels. This will also provide an opportunity to improve core skills, such as working with others and problem solving.

You will investigate the basic principles involved in ensuring that proper watchkeeping procedures are established and that these take account of the guidance that is contained in STCW and other MCA guidelines currently in force. The role of senior officers and crew members in maintaining a safe watch will be explained and the limitations of the OOW discussed with relation to his role.

The various watchkeeping strategies to be employed in differing situations will be examined and the action to be taken in the event of shipboard emergencies outlined. The importance of pollution and protection of the marine environment will be highlighted. Extensive reference will be made to the ICS Bridge Procedures Guide and its contents and you will be expected to be thoroughly familiar with this publication by the end of the unit.

The basic principles of ship manoeuvring will be discussed and in particular you will be expected to recognise the possibility of dangerous situations arising and the necessary action to be taken to ensure the safety of the vessel. Use of electronic resources also provides an opportunity to improve your technology based core skills.

Simple ship manoeuvres will be demonstrated and you will be expected to demonstrate how to carry out these manoeuvres using model ships. You will be required to explain in detail what the actions of the OOW should be whilst these manoeuvres are being executed.

The relationship between the bridge and the engine room will also be explained in sufficient detail for the operational level at STCW.

The unit culminates in an assessment designed to assess your ability to analyse situations and determine a suitable response, in accordance with internationally recognised procedures.

This unit has the Critical Thinking component of Problem Solving embedded in it. This means that when you achieve the unit, your Core Skills profile will also be updated to show you have achieved Critical Thinking at SCQF level 6.