



Higher National Unit Specification

General information

Unit title: Management of Bridge Operations (SCQF level 8)

Unit code: HR0H 35

Superclass: ZS

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Unit purpose

This unit will provide learners with a broad knowledge of the regulatory aspects of professional practice as required by the Standards of Training Certification and Watchkeeping Convention (STCW 95 as amended) at a management level.

The unit will enable the learner to identify sources of information that will contribute to the safe manning and safe navigation of a Merchant Vessel in all stages of its voyage. The unit will examine the factors that determine the manoeuvrability of a ship and how a ship can be handled in a wide range of situations both routine and emergency.

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

Outcomes

On completion of this unit the learner should be able to:

- 1 Establish watchkeeping arrangements and operational and safety procedures to comply with statutory and international requirements regarding navigation.
- 2 Explain how to manoeuvre and handle the ship in all conditions.
- 3 Analyse the principles of the operation and errors of a marine gyro compass.

Credit points and level

1.5 Higher National Unit credits at SCQF level 8: (12 SCQF credit points at SCQF level 8)

Higher National Unit Specification: General information (cont)

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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 successfully completed the following HN Units, *Bridge Watchkeeping* (SCQF level 7), *Celestial Navigation* (SCQF level 8), *Marine Emergency, Response and Communication* (SCQF level 7), *Navigational Mathematics and Science* (SCQF level 7)

Core Skills

There are opportunities to develop the following Core Skills in this unit, although there is no automatic certification of Core Skills or Core Skills components:

- ◆ *Communication*: Written (SCQF level 5)
- ◆ *Communication*: Oral (SCQF level 6)
- ◆ *Communication*: Reading (SCQF level 6)
- ◆ *Numeracy*: Using Graphical Information (SCQF level 6)
- ◆ *Information and Communication Technology* (SCQF level 5)
- ◆ *Problem Solving*: Critical Thinking (SCQF level 6)
- ◆ *Problem Solving*: Planning and Organising (SCQF level 6)
- ◆ *Problem Solving*: Reviewing and Evaluating (SCQF level 6)

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.

Higher National 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

Establish watchkeeping arrangements and operational and safety procedures to comply with statutory and international requirements regarding navigation

Knowledge and/or skills

- ◆ Statutory and international regulations regarding watchkeeping arrangements on board ship
- ◆ Masters standing and night orders and general watchkeeping duties
- ◆ Position fixing systems
- ◆ Master/pilot relationship
- ◆ Bridge procedures prior to arrival, departure, encountering heavy weather/ice, at sea and in port

Outcome 2

Explain how to manoeuvre and handle the ship in all conditions

Knowledge and/or skills

- ◆ Propulsion and steering systems
- ◆ Factors affecting manoeuvring
- ◆ Manoeuvring characteristics
- ◆ Berthing and unberthing manoeuvres
- ◆ Anchoring
- ◆ Routine and emergency manoeuvres

Outcome 3

Analyse the principles of the operation and errors of a marine gyro compass

Knowledge and/or skills

- ◆ The controlled gyroscope
- ◆ North settling gyroscope
- ◆ Gyrocompass errors
- ◆ Gyrocompass interfaces

Higher National Unit Specification: Statement of standards (cont)

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Evidence requirements for this unit

Written and/or recorded oral evidence is required for Outcomes 1 to 3 under closed-book assessment and supervised conditions. These outcomes can be assessed separately or in any combination each assessment lasting one hour. Alternatively all three assessments can be combined together lasting three hours.

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

Outcome 1

- 1 Analyse statutory and international regulations regarding watchkeeping arrangements on board ship from a sample of two of the following:
 - (a) Merchant Shipping Regulations concerning navigation and collision avoidance, radio and navigation equipment
 - (b) Navigation warnings, M-notices concerning navigation and navigation equipment
 - (c) Certificates related to navigation and navigation equipment
 - (d) Deck officer requirements including the number of certificated persons to be carried
 - (e) Guidelines for the management of safe ship operations and pollution prevention
 - (f) Qualifications and training of personnel with regard to STCW Conventions
 - (g) International safety management system
 - (h) Basic principles to be observed in keeping a navigational and radio watch
 - (i) National and international requirements regarding fitness to keep a watch
 - (j) IRPCS including annexes

- 2 Analyse the contents and use of any one of the following:
 - (a) Masters standing orders
 - (b) Masters night orders
 - (c) Bridge procedures guide
 - (d) STCW Convention and Code '78 (as amended) Chapter VIII, Regulation VIII/2 (with regard to watchkeeping arrangements)
 - (e) International Convention for the Safety of Life at Sea (as amended) (SOLAS) Chapter V (with regard to bridge watchkeeping)

Higher National Unit Specification: Statement of standards (cont)

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- 3 Evaluate the requirements for fixing the vessel's position from a sample of one of the following:
 - (a) Selection of appropriate primary and secondary position fixing methods depending on circumstances and conditions, including intervals between fixes
 - (b) Reliability of fixes, including use of systems for the continuous monitoring of position
 - (c) The construction, types of correction and limitations of electronic charts and datums
 - (d) Integrated bridge network systems
- 4 Evaluate the role of the pilot within the bridge team and the information that must be exchanged between the Master and a pilot.
- 5 Outline the bridge procedures to be adopted in a given situation from a sample of one of the following:
 - (a) Prior to arrival in port
 - (b) Prior to departure
 - (c) Prior to and during heavy weather
 - (d) Prior to and during navigation in ice
 - (e) At sea
 - (f) In port

Items which are not sampled must be covered in the alternative (resit) assessment

Outcome 2

- 1 Outline one propulsion system or one steering system commonly found on merchant ships.
- 2 Analyse the factors affecting a vessel's manoeuvrability from a sample of one of the following:
 - (a) Shallow water effects
 - (b) Bow and stern wave effects
 - (c) Interaction
 - (d) Weather and tidal condition
 - (e) Trim draught and list
- 3 Outline the requirement for data on manoeuvring characteristics on board ship.
- 4 Demonstrate manoeuvring procedures when berthing and unberthing, in all conditions of wind, current and tidal stream, with and without tugs from a sample of two of the following:
 - (a) At fixed pier, jetty and single or multi buoy moorings
 - (b) Entering and leaving locks and dry docks
 - (c) Warping along jetties
 - (d) Turning short round
 - (e) Berthing alongside other vessels including for lightening operations

A checklist should be used to capture the evidence from the above.

Items which are not sampled must be covered in the alternative (resit) assessment.

Higher National Unit Specification: Statement of standards (cont)

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- 5 Demonstrate the manoeuvring procedures when involved in anchor operations in any condition of wind and tide from a sample of one of the following:
 - (a) Use of anchor when berthing
 - (b) Turning on an anchor
 - (c) Single and multiple anchor operations
 - (d) Dragging anchor and countermeasures
 - (e) Weighing and leaving the anchorage

- 6 Outline the manoeuvring procedures to be followed from a sample of three of the following:
 - (a) In the vicinity of off-shore installations
 - (b) Picking up or dropping off a pilot
 - (c) Operating with tugs and small craft
 - (d) Operating with helicopters
 - (e) Heavy weather including a TR
 - (f) Narrow channels
 - (g) In or near ice
 - (h) When affected by ice accretion
 - (i) In or near VTS and TSS
 - (j) Launch and recovery of survival/rescue craft
 - (k) Fire, flooding, collision and shift of cargo
 - (l) Beaching
 - (m) Loss of propulsion and/or steering
 - (n) Emergency towing
 - (o) Use of anchor in emergency
 - (p) SAR situations
 - (q) Man overboard

Items which are not sampled must be covered in the alternative (resit) assessment

Outcome 3

- 1 Outline the principle of the operation of a controlled gyroscope
- 2 Outline the principle of the operation of a north settling gyroscope
- 3 Calculate the course, latitude and speed error of a gyrocompass
- 4 Analyse the interface of the ship's gyrocompass with other navigational equipment



Higher National Unit support notes

Unit title: Management of Bridge Operations (SCQF level 8)

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

The content of this unit forms part of the underpinning knowledge for a UK MCA Chief Mate Certificate of Competency and accordingly reflects the content of the International Maritime Organisation's Standards of Training Certification and Watchkeeping (STCW). The unit is primarily intended for learners:

- ◆ who are new entrants to the Merchant Navy via one of the Merchant Navy Training Board (MNTB) approved deck cadet training schemes who have already completed the HNC Nautical Science award or
- ◆ who are appearing for a Chief Mate Certificate of Competency who already hold an Officer of the Watch Certificate of Competency

Ideally learners would have already accrued some shipboard experience prior to attempting this unit, although this is not a prerequisite.

The knowledge and skills contained within the unit cover all the requirements as laid down by the Standards for Training and Certification of Watchkeepers (STCW '95) at management level aboard ship.

Completion of the unit will also ensure that the learner complies with all the requirements laid down by the UK Maritime and Coastguard Agency (MCA) for the issue of a Chief Mate 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 (C&D), 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

This outcome deals with the current legislation, both national and international, covering bridge watchkeeping arrangements.

The contents of various statutory instruments, merchant shipping notices, conventions and codes promulgated by the International Maritime Organisation will be explored, eg SOLAS, MARPOL STCW95.

Higher National Unit support notes (cont)

Unit title: Management of Bridge Operations (SCQF level 8)

The requirements for safe manning and proper utilisation of bridge and engine room personnel will be discussed. The contents of the Bridge Procedures Guide (BPG) with regard to guidance on the composition of watches will be explored and understanding of the role of the bridge team reinforced.

The need to ensure that seafarers comply with the Hours of Work regulations will be discussed with particular emphasis on the overall operation of the vessel. The use of navigational aids and the reliance to be put upon them will also be covered

Outcome 2

This outcome is concerned with the theoretical and practical aspects of shiphandling under all conditions of wind and tide.

Learners will be asked to demonstrate common shiphandling manoeuvres with the aid of ship models. This will enable them to use the basic theory to tackle ever more complex manoeuvring problems which are commonly encountered on ship.

The ability to analyse the problem before doing any manoeuvre will be encouraged as will the formulation of contingency plans should conditions change or vital pieces of equipment fail at the wrong time.

Berthing and unberthing problems plus anchoring problems will be demonstrated and routine and emergency manoeuvres will be discussed.

Centres with access to ship simulator facilities may use these to deliver the practical elements of the learning outcome.

Outcome 3

This outcome covers the higher theoretical aspects of the marine gyrocompass, which were first introduced in the HN Unit *Navigational Mathematics and Science*.

The basic theory behind a controlled gyroscope will be developed in order for learners to progress onto an example of a North settling instrument.

The errors involved in using gyrocompasses will be examined and learners will be shown how to calculate the course latitude and speed errors for a gyrocompass.

The various ways that the gyro interfaces with other bridge equipment will be explained.

Guidance on approaches to delivery of this unit

Learners will benefit most if this unit is delivered in conjunction with the following units:

- ◆ *Marine Passage Planning*
- ◆ *Applied Marine Meteorology*
- ◆ *Shipmaster's Business*

Higher National Unit support notes (cont)

Unit title: Management of Bridge Operations (SCQF level 8)

They should also be able to draw on the knowledge gained from the qualifications or units recommended as prior knowledge as well as experience gained from service at sea.

Outcome 2 may be delivered using ship simulator equipment if a centre has the facilities.

Guidance on approaches to assessment of this unit

Outcome 1–3 will be assessed by means of a closed-book assessment under supervised conditions. The assessment can be a question paper or a case study.

Outcome 2 will be assessed by means of a closed-book assessment under supervised conditions. This assessment includes practical activity accompanied by a checklist

Outcome 3 will be assessed by means of a closed-book assessment under supervised conditions. The assessment can be short answer question paper.

Outcomes 1, 2 and 3 can be combined for assessment lasting three hours or done as three separate assessments lasting one hour for each assessment.

All knowledge and skills will be assessed, however there is sampling within some of the knowledge and 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 provides learners with the opportunity to develop the Core Skill of *Communication: Reading and Oral* at SCQF level 6. Learners will have to read and understand complex legislation in Statutory Instruments and IMO Conventions to gain a full understanding of the unit.

Communication: Written at SCQF level 5 can be developed in the assessments in Outcome 3 when learners will have to express in concise terms the theory of the marine gyrocompass.

Numeracy: Using Graphical Information at SCQF level 6 can be developed by learners constructing a vessel turning circle from given numerical variables and then using said graphical data to discuss vessel manoeuvres.

Higher National Unit support notes (cont)

Unit title: Management of Bridge Operations (SCQF level 8)

Using Information Communication and Technology can be developed at SCQF level 5 by learners having to use electronic navigational equipment.

Problem Solving: Critical Thinking, Planning and Organising and Reviewing and Evaluating can be developed by learners performing complex ship handling manoeuvres with models where learners will have to think about the various factors that will come into play during the manoeuvre and plan strategies to overcome these. At the end they will be asked to evaluate how effective their strategy has been.

History of changes to unit

Version	Description of change	Date

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General information for learners

Unit title: Management of Bridge Operations (SCQF level 8) (cont.)

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.

You will be studying the principles that are internationally recognised for ensuring that bridge, engine and port watches are carried out safely at all times. The subject of appropriate manning levels to suit all likely eventualities will be discussed in detail along with the procedures to ensure compliance with legislation.

The duties of the Officer of the Watch will be examined in more detail, in particular the role of the Master in giving advice and support to Junior Officers.

Current guidance on watchkeeping routines and the use of navigational aids will also be covered in detail as well as the requirement for masters standing and night orders. The role of the Master and pilot will be examined and the pilot's contribution to the bridge team explained.

The factors affecting manoeuvring and ship handling will be examined and you will be encouraged to practise the various standard manoeuvres for yourself, explaining all your actions as they happen. This should prepare you for the MCA oral examination.

The last outcome explores the marine gyroscope in more detail than the earlier unit *Navigational Mathematics and Science*. The basic theories behind gravity control and damping will be examined in the case of the controlled and north seeking gyroscopes.

To successfully complete this unit, you will need to achieve a satisfactory level of achievement in each assessment. There are three outcomes. Assessment may be a question paper or a case study. Assessment will also include some practical activity which will be accompanied by a checklist. Wherever possible the concepts that you encounter in this unit will be related to the actual practice that you are likely to encounter on board the ship.

You will get the opportunity to develop your skills in *Problem Solving, Communication, Numeracy* and *Information and Communication Technology*.