

Higher National Unit Specification

General information for centres

Unit title: Management of Bridge Operations

Unit code: F0LW 35

Unit purpose: This Unit will introduce candidates to the current guidance regarding the management of bridge watchkeeping operations from the perspective required by the convention on Standards of Training Certification and Watchkeeping (STCW 95) at management level.

It will cover the requirements for manning levels in various situations on both the bridge and the engine room and the Master's responsibility to ensure that safe watchkeeping arrangements are maintained at all times in all weathers, whether on an ocean, coastal or pilotage passage. It will introduce the concepts required for the safe handling of the ship in terms of manoeuvring, mooring, anchoring and emergency situations. The theory of the Marine Gyro compass is also revisited in greater depth than the earlier HN Unit FOM0 34 *Navigational Mathematics and Science*.

It is primarily aimed at candidates who intend to seek sea going employment as a Merchant Navy Deck Officer. However it could also be studied by someone with an interest in the subject area.

On completion of this Unit the candidate 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 HN Credits at SCQF level 8: (12 SCQF credit points at SCQF level 8*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Recommended prior knowledge and skills: Access to this Unit is at the discretion of the centre. However candidates would benefit most from this Unit if they have successfully completed the following HN Units F0LR 34 *Bridge Watchkeeping*, F0LS 35 *Celestial Navigation*, F0LK 34 *Marine Emergency Response and Communication*.

General information for centres (cont)

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 at SCQF level 5

Communication: Oral at SCQF level 6

Communication: Reading at SCQF level 6

Numeracy: Using Graphical Information at SCQF level 6

Using Information Technology at SCQF level 5

Problem Solving: Critical Thinking at SCQF level 6

Problem Solving: Planning and Organising at SCQF level 6

Problem Solving: Reviewing and Evaluating at 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.

Assessment: Outcomes 1–3 should be assessed by a closed-book assessment under supervision.

Outcomes 1 and 2 may be combined as a single assessment event. This assessment may include a practical demonstration using ship models. Outcome 3 may be assessed as a separate assessment event.

Higher National Unit specification: statement of standards

Unit title: Management of Bridge Operations

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The sections of the Unit stating the Outcomes, knowledge and/or skills, and Evidence Requirements are mandatory.

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. Candidates 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

Evidence Requirements

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

- 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, radio and navigation equipment.
 - (b) Navigation warnings, M Notices concerning navigation and navigation equipment.
 - (c) Certificates concerning navigation and navigation equipment.
 - (d) Deck officer requirements. 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.

Higher National Unit specification: statement of standards (cont)

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- 2 Interpret from a sample of one of the following the contents and use of:
 - ◆ Masters Standing Orders
 - ◆ Masters Night orders
 - ◆ Bridge Procedures Guide
 - ◆ STCW 95 Chapter VIII, Section A (with regard to watchkeeping arrangements)
 - ◆ Convention on Safety of Life at Sea (SOLAS) Chapter V (with regard to bridge watchkeeping)
- 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. Intervals between fixes.
 - (b) Reliability of fixes. 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.

Assessment guidelines

Outcome 1 may be assessed by means of a closed-book assessment under supervised conditions consisting of short answer questions.

Higher National Unit specification: statement of standards (cont)

Unit title: Management of Bridge Operations

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

Evidence Requirements

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

- 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 conditions.
 - (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.

Higher National Unit specification: statement of standards (cont)

Unit title: Management of Bridge Operations

- 5 Demonstrate the manoeuvring procedures when involved in anchor operations in any condition of wind and tide from a sample of two 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 TRS.
 - (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.

Assessment guidelines

Elements 1, 3 and 6 of Outcome 2 may be assessed by means of a closed-book assessment under supervised conditions consisting of short answer questions. Elements 2, 4 and 5 above may be assessed by means of a practical demonstration using ship models.

Some elements of Outcomes 1 and 2 may be combined for assessment purposes.

Higher National Unit specification: statement of standards (cont)

Unit title: Management of Bridge Operations

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

Evidence Requirements

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

- ◆ outline the principle of the operation of a controlled gyroscope
- ◆ outline the principle of the operation of a North settling gyroscope
- ◆ calculate the course, latitude and speed error of a gyrocompass
- ◆ analyse the interface of the ship's gyrocompass with other navigational equipment

Assessment guidelines

Outcome 3 may be assessed by a closed-book assessment under supervised conditions.

Administrative Information

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Unit title: Management of Bridge Operations
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Version	Description of change	Date

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Higher National Unit specification: support notes

Unit title: Management of Bridge Operations

This part of the Unit specification is offered as guidance. The support notes 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 candidates:-

- ◆ 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 candidates 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 candidate 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 specification: support notes (cont)

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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 re-enforced.

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.

Candidates 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.

Outcome 3

This Outcome covers the higher theoretical aspects of the Marine Gyrocompass, which were first introduced in the HN Unit F0M0 34 *Navigational Mathematics and Science*.

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

The errors involved in using gyrocompasses will be examined and candidates 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.

Higher National Unit specification: support notes (cont)

Unit title: Management of Bridge Operations

Guidance on the delivery and assessment of this Unit

Candidates will benefit most if this Unit is delivered in conjunction with the following Units: FOLG 35 *Marine Passage Planning*, FOLP 35 *Applied Marine Meteorology*, FOLN 35 *Shipmaster's Business*. 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.

Opportunities for developing Core Skills

This Unit provides candidates with the opportunity to develop the Core Skill of Communication: Reading and Oral at SCQF level 6. Candidates 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 candidates 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 candidates constructing a vessel turning circle from given numerical variables and then using said graphical data to discuss vessel manoeuvres.

Using Information Technology can be developed at SCQF level 5 by candidates having to use Electronic navigational equipment.

Problem Solving: Critical Thinking, Planning and Organising and Reviewing and Evaluating can be developed by candidates performing complex ship handling manoeuvres with models where candidates 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.

Open learning

This Unit is not suited to delivery by distance learning because it requires candidates to be observed and questioned by a qualified practitioner to meet Statutory/professional body requirements.

Candidates with disabilities and/or additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative Outcomes for Units. For information on these, please refer to the SQA document *Guidance on Alternative Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs*, which is available on SQA's website: www.sqa.org.uk.

General information for candidates

Unit title: Management of Bridge Operations

This Unit is designed to reinforce the concepts covered in the earlier Unit F0LR 34 *Bridge Watchkeeping*.

You will be studying the principles, that are internationally recognised, for ensuring that bridge, engine and port watches are carried 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 that legislation is complied with in respect of the Working Time Directive.

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 shiphandling 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 well 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.

You may be assessed by two assessment events. One assessment may assess Outcomes 1 and 2 and the second event assess Outcome 3. Assessment may take place under closed-book supervised conditions.