Higher National Unit Specification

General information for centres

Unit title: Marine Vessels: Structures and Maintenance

Unit code: F0LY 35

Unit purpose: This Unit introduces candidates to the legislative requirements regarding the construction of vessels, including the structural requirements for vessels with respect to the handling and carriage of cargo. It covers the ship construction features and systems that may be used to limit damage as well as the properties, construction and maintenance of materials. It also covers the methods of maintaining ship's equipment/fittings and preparing for statutory surveys. 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 the Unit the candidate should be able to:

1 Analyse the structural requirements and features of a vessel.
2. Analyse maintenance requirements, methods and procedures.
3. Explain how to prepare for dry dock and for the survey of hull, fittings and equipment.

Credit points and level: 1 HN Credit at SCQF level 8: (8 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 it would be beneficial if candidates had achieved either a UK MCA 'Officer of the Watch' Certificate or equivalent, or the HNC Nautical Science, or the HN Unit F0LF 34 Naval Architecture: Ship Construction.

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: Oral at SCQF level 5
Communication: Written at SCQF level 6

General information for centres (cont)

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: All Outcomes will be assessed by means of a closed-book assessment under supervised conditions.

Higher National Unit specification: statement of standards

Unit title: Marine Vessels: Structures and Maintenance

Unit code: F0LY 35

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

Analyse the structural requirements and features of a vessel

Knowledge and/or skills

- Structural requirements for vessels with respect to:
  (a) Assignment of Loadlines
  (b) Requirements and codes for the construction of specialised vessels
- Ship construction features and systems that may be used to limit damage
- Fire protection, fire detection and fire extinction on ships

Evidence Requirements

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

- Analyse and explain the factors affecting the Assignment of a Loadline to any vessel

  This can be achieved by sampling two from the following:

  (a) Conditions of Assignment:
    (i) definitions
    (ii) principles
    (iii) requirements
    (iv) freeboard calculation process

- Analyse the structural requirements and interpret codes for the construction of specialised vessels as contained in the following:

  (b) (i) International Code for the Construction and Equipment of ships carrying Dangerous Chemicals in Bulk.
    (ii) International Code for the Construction and Equipment of ships carrying Liquified Gases in Bulk.

  For each of the above codes one of the following must be sampled:

(i) definitions with regard to structural features of the type of vessel or
(ii) the damage assumptions which they must be capable of surviving

A different sample must be used for each code.

- Identify and explain the construction features and systems used to limit damage to ships

- Analyse and explain legislation with regard to structural fire protection on board ships

Assessment guidelines

Outcome 1 will be assessed on a sample basis by means of a closed-book assessment under supervised conditions consisting of a mixture of structured and short answer questions covering the assignment of loadlines, construction of specialised vessels, structural features which resist and limit damage and fire protection regulations. Outcome 1 may be combined with Outcomes 2 and 3 for assessment purposes.

Outcome 2

Analyse maintenance requirements, methods and procedures

Knowledge and/or skills

- Properties of materials
- Steelwork processes
- Corrosion and material failure
- Planned maintenance systems
- Safe use of maintenance equipment and materials

Evidence Requirements

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

- Analyse the properties of materials used in ship construction

  This can be achieved by sampling three the following:

  Ship building materials: stresses
  strains
  properties
  advantages
  disadvantages
  production processes

- Analyse the steelwork processes used in ship construction

  This can be achieved by sampling one from the following:

Processes:	principle of welding preparation for welding faults associated with welding

- Analyse the causes of corrosion and material failure

  This can be achieved by sampling one from the following:

  (i) Non destructive testing
  (ii) Causes of corrosion
  (iii) Prevention of corrosion
  (iv) Material failure due to creep
  (v) Material failure due to fatigue

- Explain the use of planned maintenance systems

  This can be achieved by sampling one of the following:

Planned Maintenance	(i)	rationale
	(ii)	preventative
	(iii)	predictive

- Safe use of maintenance equipment and materials

  This can be achieved by sampling one from the following:

  (i) Preparations for painting
  (ii) Composition and properties of paints
  (iii) Paint systems and schedules
  (iv) Control of Substances Hazardous to Health Regulations

Where sampling is used a different sample must be used on each assessment occasion.

Assessment guidelines

Outcome 2 will be assessed on a sample basis by means of closed-book assessment under supervised conditions. Outcome 2 may be combined with Outcomes 1 and 3 for assessment purposes.

Higher National Unit specification: statement of standards (cont)

Unit title: Marine Vessels: Structures and Maintenance

Outcome 3

Explain how to prepare for dry dock and for the survey of hull, fittings and equipment

Knowledge and/or skills

- Ships plans
- Ship dry-docking requirements
- Survey requirements

Evidence Requirements

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

- Identify and describe ships' plans from a sample of one from the following:

  (i) Shell Expansion Plan
  (ii) General Arrangement Plan
  (iii) Fire Arrangement Plan
  (iv) Capacity Plan
  (v) Rigging Plan
  (vi) Piping Arrangement Plan
  (vii) Plug Plan
  (viii) Dry Dock Plan

- Outline the procedures involved in dry-docking a vessel for a sample of one from the following:

  (i) Reasons
  (ii) Documentation
  (iii) Specification
  (iv) Preparation
  (v) Required facilities
  (vi) Shipboard management

- Analyse the preparations required for surveys of hull and fittings for in and out of water surveys for a sample of one from the following surveys:

  (i) Loadline
  (ii) Hull and machinery
  (iii) Lifting appliances
  (iv) Safety construction
  (v) Safety equipment

Where sampling is used a different sample must be used on each assessment occasion.

Assessment guidelines

Outcome 3 will be assessed on a sample basis by means of a closed-book assessment under supervised conditions. Outcome 3 may be combined with Outcomes 1 and 2 for assessment purposes.

Administrative Information

Unit code: F0LY 35

Unit title: Marine Vessels: Structures and Maintenance

Superclass category: XQ

Original date of publication: August 2006

Version: 01

History of Changes:

Version	Description of change	Date

Source: SQA

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

Higher National Unit specification: support notes

Unit title: Marine Vessels: Structures and Maintenance

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 40 hours.

Guidance on the content and context for this Unit

The content of this Unit forms part of the underpinning knowledge for an UK MCA Chief Mate Certificate of Competency and accordingly reflects the content of International Maritime Organisation's Standards of Training Certification and Watchkeeping (STCW).

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

The following notes give additional information on the knowledge and skills for each of the three Outcomes.

Outcome 1

Candidates will understand the considerations and requirements of the ship's assigned freeboard and the procedure for calculating the assigned freeboard.

The candidate will also understand the structural considerations and factors that are incorporated into the ship to withstand and limit damage.

Outcome 2

Candidates will understand the properties of materials and the processes used in shipbuilding. They will be able to ensure the correct and safe methods of maintaining the ship's structure are applied. The candidate will appreciate the importance of an effective planned maintenance system on board the ship to maintain the ship's structure and to comply with legislation pertaining to the ship's structure.

Outcome 3

The candidate will understand the use and contents of ships' plans and their function pertaining to readiness for drydocking. The candidate will understand other considerations regarding the preparation for a drydocking and the considerations whilst in drydock.

The candidate will also consider the preparations regarding required surveys on board ship.

Guidance on the delivery and assessment of this Unit

Candidates will benefit most if this Unit is delivered in conjunction with the HN Units F0LC 35 *Ship Stability: Theory and Practical Application* and F0LX 35 *Management of Vessel Operations.* 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.

Assessment will be on a sample basis with Outcomes 1 to 3 being assessed by means of a mixture of structured and short answer questions in a closed-book assessment under supervised conditions.

Opportunities for developing Core Skills

This Unit provides the candidate with opportunities to develop Core Skills in oral and written communication.

Communication: Oral at SCQF level 5 will be developed by the candidate taking part in classroom discussions and presenting facts and conveying basic information and opinions in short, informal communications, relating to the structure of ships of which he has knowledge, whilst interacting with other candidates as appropriate.

Communication: Written at SCQF level 6 will be developed by further reading of and analysing information contained within relevant publications relating to the structural requirements of ship building. Additionally, the requirement of the written assessment will develop the candidates' communication skills.

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: Marine Vessels: Structures and Maintenance

This Unit is about the structural requirements for vessels with respect to the handling and carriage of cargo. It covers the ship construction features and systems that may be used to limit damage and the properties, construction and maintenance of materials. It also covers the methods of maintaining ship's equipment/fittings and preparing for statutory surveys.

On completion of this Unit you should be able to:

1 Analyse the structural requirements and features of a vessel.
2 Analyse maintenance requirements, methods and procedures.
3 Explain how to prepare for dry dock and for the survey of hull, fittings and equipment.

You will develop the Core Skill of Communication by actively participating in classroom discussions.

Assessment will be on a sample basis with Outcomes 1 to 3 being assessed by means of written questions under supervised conditions. Outcomes 1–3 may be combined for assessment purposes.