

## Higher National Unit Specification

### General information for centres

**Unit title:** Naval Architecture: Ship Construction

**Unit code:** FOLF 34

**Unit purpose:** This Unit will introduce the candidate to the significant features of a ship's structure and the salient features of a range of ship types. It also covers the location, cause, effect and means to counteract internal and external forces exerted on a ship and introduces the learner to the use of ship's stress-calculating equipment for monitoring structural loads. 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 Identify the significant features of a ship's structure.
- 2 Describe the salient features of a range of ship types.
- 3 Explain ship stresses and use ship stress calculating equipment.

**Credit points and level:** 1 HN Credit at SCQF level 7: (8 SCQF credit points at SCQF level 7\*)

*\*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 *Marine Induction Course* associated with the HNC/D Nautical Science.

**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: Writing at SCQF level 4

Communication: Reading at SCQF level 4

**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, 2 and 3 may be assessed individually by means of closed-book assessments under supervised conditions or they could be combined for assessment purposes.

## Higher National Unit specification: statement of standards

**Unit title:** Naval Architecture: Ship Construction

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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

Identify the significant features of a ship's structure

#### Knowledge and/or skills

- ◆ Standard terminology pertaining to ship construction
- ◆ Framing systems
- ◆ Structural features with regard to keel, side shell and decks
- ◆ Structural features with regard to holds, cargo, double bottom and peak tanks
- ◆ Structural arrangements to ensure the vessel's watertight integrity
- ◆ Structural arrangements in areas liable to damage in heavy weather
- ◆ Structural arrangements with regard to openings in the hull or deck
- ◆ Structural arrangements to ensure continuity of strength
- ◆ Piping and pumping systems

#### Evidence Requirements

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

- (a) Define with the aid of a sketch, four standard structural terms from the following:

Displacement, deadweight, Length over All (LOA), Length Between Perpendiculars (LBP), waterline length, Lloyd's length, moulded breadth and depth, camber, sheer, rise of floor, beam flare and rake.

- (b) Explain with the aid of a sketch, the identifying characteristics of one framing system from the following sample:

- ◆ Longitudinal Framing Systems
- ◆ Transverse Framing Systems
- ◆ Combined Framing Systems

Candidates should state the advantages and disadvantages of each system and describe the salient features that identify the system.

## Higher National Unit specification: statement of standards (cont)

### Unit title: Naval Architecture: Ship Construction

- (c) Explain, with the aid of sketches, the structural features of two items from the following:
- Hatchways and coamings, bulwarks, bilge keels, hatchcovers, weathertight doors, watertight doors, open floors, plate floors, duct keels, side shell doors, water tight bulkhead.
- (d) Produce a fully labelled sketch of a transverse section through a cargo hold of one of the following:
- (i) a container vessel
  - (ii) a Ro-Ro vessel
  - (iii) a Bulk Carrier
  - (iv) a general cargo vessel
  - (v) a tanker

Where sampling is used a different sample should be used on each assessment occasion. Assessments must take place under supervised conditions.

### Assessment guidelines

Outcome 1 may be assessed using sampling either by means of a closed-book assessment under supervised conditions or by an assignment/project.

The use of pre-printed diagrams of various structural features, where the candidate has to name identified structural items, may be used. However any assessment should involve the candidate physically drawing at least one structural feature.

Drawings need not be to scale but should be in proportion and of sufficient clarity to allow the assessor to confirm that the candidate has met the Evidence Requirements.

Outcomes 1, 2 and 3 can be combined for assessment purposes.

### Outcome 2

Describe the salient features of a range of ship types

#### Knowledge and/or skills

- (a) Tankers (Oil, Gas and Chemical Tanker)
- (b) Cargo Ships (General Cargo, Ro-Ro, Container, Bulk Carrier)
- (c) Passenger Ships
- (d) Support Vessels (Supply, Stand-by vessel and Tugs)
- (e) Specialist Vessels (Surface effect vessels, High Speed Craft)

#### Evidence Requirements

To achieve this Outcome, candidates must produce evidence to demonstrate their knowledge by showing that they can:

## **Higher National Unit specification: statement of standards (cont)**

### **Unit title:** Naval Architecture: Ship Construction

Describe the roles, functions and general layout of a sample of two of the ship types given in (a)–(e) above.

Candidates should differentiate between the various features specific to each ship type.

#### **Assessment guidelines**

Outcome 2 will be sample assessed either by means of a closed-book assessment under supervised conditions or by an assignment/project.

In the case of a closed-book assessment the use of pre-printed diagrams of the side elevation of the vessel's features, where the candidate has to name identified structural items and explain their significance may be used.

Alternatively the instrument of assessment could require the candidate to draw a labelled side elevation of each vessel, indicating all accommodation, cargo and machinery spaces. Candidates should also identify all cargo gear, bunker spaces and fore and aft peak compartments.

Outcome 2 may be combined with Outcomes 1 and 3 for assessment purposes.

### **Outcome 3**

Explain ship stresses and use ship stress calculating equipment

#### **Knowledge and/or skills**

- ◆ Causes and effect of stresses in still water
- ◆ Causes and effect of stresses in a seaway
- ◆ Structural features to resist shearing and bending
- ◆ Stress calculating machines

#### **Evidence Requirements**

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

- (a) Explain how stresses arise in a vessel in still water. Candidates should produce evidence for a sample of three situations from the following:
  - ◆ Racking Forces
  - ◆ Centre Loading
  - ◆ Wing Loading
  - ◆ Drydocking
  - ◆ Alternate hatch loading
  - ◆ Hogging
  - ◆ Sagging

On each assessment occasion the candidate should identify features which resist the stresses selected and a different sample must be used on each occasion.

## **Higher National Unit specification: statement of standards (cont)**

## **Unit title:** Naval Architecture: Ship Construction

- (b) Explain how stresses arise in a vessel operating in a seaway. Evidence should be generated by sampling one of the following:
- ◆ Panting
  - ◆ Pounding
  - ◆ Hogging
  - ◆ Sagging
  - ◆ Torsional Bending
  - ◆ Logitudinal Bending

On each assessment occasion the candidate should identify features which resist the stresses selected and a different sample must be used on each occasion.

- (c) Candidates will be required to explain how stress calculating equipment is used on board ship and demonstrate how this helps to monitor and control stresses during loading/unloading operations and whilst at sea. They should have a clear understanding of the maximum permissible stress limits in harbour and at sea and why the seagoing condition has a more onerous requirement than the harbour condition.

### **Assessment guidelines**

Elements (a) and (b) of the evidence requirements for Outcome 3 will be sample assessed either by means of a closed-book assessment under supervised conditions or by an assignment/project. For both assessment methods, the following guideline may be used:

- 1 Candidates should be able to explain with the help of a labelled sketch the following with respect to location, cause, effect and means (both the structural and operational) to counteract them:
  - (a) Panting
  - (b) Pounding
  - (c) Hogging
  - (d) Sagging

Evidence for element (c) of the Evidence Requirements can be obtained by candidates carrying out a practical exercise using a proprietary software package for stress calculation.

Outcomes 1, 2 and 3 can be combined for assessment purposes. However, the use of ship stress-calculating equipment should be assessed separately by an assignment.

## Administrative Information

**Unit code:** F0LF 34

**Unit title:** Naval Architecture: Ship Construction

**Superclass category:** XQ

**Original date of publication:** August 2006

**Version:** 01

### History of Changes:

Version	Description of change	Date

**Source:** SQA

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## **Higher National Unit specification: support notes**

**Unit title:** Naval Architecture: Ship Construction

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 the level 3 SVQ Marine Vessel Operations and reflects the content of International Maritime Organisation's Standards of Training Certification and Watchkeeping (STCW 95).

### **Guidance on the delivery and assessment of this Unit**

Ideally this Unit should be delivered at the same time as HN Unit FOLD 34 *Ship Stability: An Introduction*.

The knowledge and skills acquired in this Unit will be underpinned extensively at sea so that the experience gained can be utilised in HN Units FOLY 35 *Marine Vessels: Structures and Maintenance* and FOLC 35 *Ship Stability: Theory and Practical Application*, which feature in the later stages of the HND Nautical Science.

#### ***Opportunities for developing Core Skills***

The Core Skill of Communication: Reading and Written at SCQF level 5 may be developed in this Unit as the candidate will have to deal with legislation regarding the structural arrangements on board. This can be quite complex and candidates will need to be able to summarise and paraphrase this information in assessments.

### **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 the criteria for the award of a Certificate of Competency.

### **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](http://www.sqa.org.uk).

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On completion of the Unit you should be able to:

- 1 Identify the significant features of a ship's structure.
- 2 Describe the salient features of a range of ship types.
- 3 Explain ship stresses and use ship calculating equipment.

Outcomes 1, 2 and 3 could be assessed by means of a closed-book assessment for each Outcome under supervised conditions. Alternately, they could be combined for assessment purpose with one closed-book assessment for all three Outcomes.

The closed-book assessment(s) may be replaced altogether by an assignment/project which is based on a sample of significant structural features, ships types and descriptions of structural loading. Whether the assessment is by closed-book assessment or by assignment/project, the use of ship stress-calculating equipment will be assessed separately by a time-constrained assignment.