SQA Advanced Unit Specification

General information for centres

Unit title: Shipbuilding Principles: Planning, Production and Assembly

Unit code: HV40 47

Unit purpose: This Unit is designed to enable candidates to develop knowledge and understanding and apply shipbuilding principles within the areas of planning and production control. The Unit also provides candidates with an insight into modern shipbuilding construction, applying and appraising the principles of modern hull construction and launching techniques.

On completion of the Unit the candidate will be able to:

1 Outline the principles of shipbuilding planning and production control.
2 Describe the principles of modern hull construction.
3 Outline the methods of launching large hull vessels.

Credit points and level: 1 SQA 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 National 1 to Doctorates.*

Recommended prior knowledge and skills: It would be an advantage for candidates to have a knowledge and understanding of the shipbuilding environment. This may be evidenced by possession of appropriate units or by previous experience.

Core Skills: There may be opportunities to gather evidence towards the Core Skills of Communication and Problem Solving in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

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: Outcome 1 should be a written assessment in which the candidate produces a network from information and parameters supplied. Additional charts should be produced as necessary to solve the problems posed. These will be set in the form of structured questions relating to networks. Outcome 2 should be a written assessment on typical shipyard layouts highlighting the main areas and indicating the flow of materials through the different stages of the production process. Outcome 3 should be a written assessment involving questions with accompanying diagrams highlighting the main considerations throughout the launching process. The total time for assessment should be 2 hours.

Assessment should be conducted under controlled and supervised conditions.

SQA Advanced Unit specification: statement of standards

Unit title: Shipbuilding Principles: Planning, Production and Assembly

Unit code: HV40 47

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

Outline the principles of shipbuilding planning and production control

Knowledge and/or skills

- Planning methods
- Manufacturing policies
- Production control
- Network and critical path analysis

Evidence Requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. The evidence may be provided in response to specific questions. Each candidate will need to demonstrate that they can answer questions based on a sample of the items shown above. In any assessment of this Outcome at least 60% of the knowledge and/or skills items should be sampled.

Outcome 2

Describe the principles of modern hull construction

Knowledge and/or skills

- Ship construction principles
- Plate and section stockyard procedures
- Steelwork preparation and processing
- Steelwork assembly methods
- Build sequence

Evidence Requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. The evidence may be provided in response to specific questions. Each candidate will need to demonstrate that they can answer questions based on a sample of the items shown above. In any assessment of this Outcome at least 60% of the knowledge and/or skills items should be sampled.

A different sample question should be asked each time the Outcome is assessed. Candidates must provide a satisfactory response to assessed questions.

Outcome 3

Outline the methods of launching large hull vessels

Knowledge and/or skills

- Launch strategies
- Launch methods

Evidence Requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. The evidence may be provided in response to specific questions. Each candidate will need to demonstrate that they can answer questions based on a sample of the items shown above. In any assessment of this Outcome at least 60% of the knowledge and/or skills items should be sampled.

A different sample question should be asked each time the Outcome is assessed. Candidates must provide a satisfactory response to assessed questions.

Administrative Information

Unit code: HV40 47

Unit title: Shipbuilding Principles: Planning, Production and Assembly

Superclass category: XQ

Date of publication: November 2017

Version: 01

Source: SQA

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.

SQA Advanced Unit specification: support notes

Unit title: Shipbuilding Principles: Planning, Production and Assembly

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

This Unit has been written in order to allow the candidates to develop knowledge, understanding and skills in the following areas:

1 Principles of shipbuilding, planning and production control.

- principles of planning production control in a practical shipbuilding situation
- the principles and techniques of planning methods
- planning and manufacturing policies (short, mid and long term)
- planning, production control (advantages and disadvantages) factors that can simplify or make complex a system (formulating, scheduling, loading and dispatching)
- planning, production control chart construction to show resource allocation (Bar and Gannt)
- network analysis and critical path
- the basic elements involved in network analysis
- the critical paths and steps taken in applying network analysis
- the terms relating to 'events, activities, float and critical'
- the correct procedure for drawing a network from given information
- solve given problems on production networks and identify critical paths
- the use of computers in network analysis and use where appropriate. Draw comparisons between manual electronic practices and presentations
- consider advances and benefits from the computer generated data and information and 'what if' analysis

2 Principles of modern hull construction.

- Modern ship construction principles in terms of the end product and build strategy, limitations and constraints relating to local production sites.

- The main features and procedures adopted in a plate and section stockyard. This should include site requirements, stowage methods, material handling and identification processes. Consideration of computer tracking and monitoring programmes.

- The functions of basic steelwork preparation and processing equipment (eg. mangle, shot blaster, paint spray, guillotine, profile burner, heavy press, roller and planer, restoring or establishing identification). Further consideration of computer tracking and monitoring software.

- The main stages of steelwork assembly from preparation of plates and sections to sub-assemblies and main unit/block construction. These should also include handling and transportation equipment, buffer storage areas, work stations, modular methods and processes.

- Build sequence and constrictions of unit/block size and mass. Computer progress monitoring, mass computations. Digital and laser alignment procedures and practices.

2 Methods of launching large hull vessels.

- The various methods of launching large hull vessels.

- The advantages and limitations of various launch methods

- The constraints that influence the choice of build/launch strategy such as costs, efficiency, environmental or economical factors.

Guidance on the delivery and assessment of this Unit

This Unit should be delivered using group exposition, with the lecturer reviewing candidate understanding of planning and modern hull construction. Introducing content with the use of notes and sketches, OHP, video, digital projection presentation media, computer planning software and other appropriate material. Organised visits to local industry to view and discuss specific planning and build techniques in practice. Invited guest speakers from senior production management in local yards. These visits should place a particular emphasis on the current trends and computer hardware and software being used throughout the production process.

Whilst the assessment strategies for Outcome 1–3 are designed to be specific to each Outcome and provide clear evidence of the candidate's understanding of the topics covered, it is suggested that the themes of Production, Planning and Assembly and the approaches to modern hull construction are integrated with the associated launching method to be adopted, to transfer the vessel being constructed into the water to complete the building process.

The assessor will normally assume the role of the client and key reporting, progress summaries, milestones and timescales will be negotiated with the candidate undertaking the assessment. Alternatively an industrial mentor, supervisor or manager can be agreed if all parties are agreeable to this arrangement. The assessing centre would require a copy of the final submission for verification and quality evaluation purposes.

Opportunities for developing Core Skills

There may be opportunities to gather evidence towards the Core Skills of Communication and Problem Solving in this Unit.

Open learning

This Unit could be delivered on an open learning basis. However, the centre would have to ensure that the written assessment was carried out under controlled and supervised conditions.

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.

General information for candidates

Unit title: Shipbuilding Principles: Planning, Production and Assembly

This Unit has been designed to allow you to develop an understanding of the principles involved in modern shipbuilding. The Unit covers the various techniques employed from marshalling materials production control through to the final launch of large hull vessels.

Outcome 1 initially looks at planning and production control, covering principles, techniques and planning methods. Basic elements involved with network analysis are outlined and the use of computers in critical path analysis is also developed and considered.

Outcome 2 focuses on modern hull construction and reviews traditional methods against modern hull/block construction. Build sequence and limitations are highlighted with suggested yard layouts to meet future trends.

Outcome 3 draws on a wide range of methods employed with the launching of large hull vessels. Limitations and advantages for each process are reviewed with consideration given to the economic and environmental issues.

Assessment styles used throughout this Unit are practical and written, which also allows you to research, evaluate and reflect on the views of other production personnel as well as your own experiences of modern ship construction.