

SQA Advanced Unit Specification

General information

Unit title: Marine Passage Planning (SCQF level 8)

Unit code: HW74 48

Superclass: XQ

Publication date: November 2017

Source: Scottish Qualifications Authority

Version: 01

Unit purpose

This unit is designed to provide learners' with knowledge of the principles of voyage and passage planning. It will develop the learners' navigational skills through the appraisal, planning, and evaluation of a passage plan. This will include contingency plans for emergency situations. Critical analysis and evaluation skills will be developed through the monitoring of the completed plan and the recording of any necessary changes or alterations to the plan.

This unit is primarily aimed at learners who intend to seek employment within the maritime industry. However it could also be studied by someone with an interest in the area.

Outcomes

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

- 1 Appraise the intended passage.
- 2 Plan and document a passage.
- 3 Evaluate a completed passage plan.
- 4 Implement and monitor appropriate solutions for situations which arise during a passage.
- 5 Perform calculations relating to a vessel's position.

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Credit points and level

1.5 SQA Credits at SCQF level 8: (12 SCQF credit points at SCQF level 8)

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 SQA Advanced Units:

- ◆ *Chartwork and Tides*
- ◆ *Celestial Navigation*
- ◆ *Navigational Mathematics and Science*
- ◆ *Marine Emergency Response and Communication*

Core Skills

Achievement of this unit gives automatic certification of the following:

Complete Core Skill	Problem Solving at SCQF level 6 Numeracy at SCQF level 6
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Core Skill component	None
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There are also opportunities to develop aspects of Core Skills which are highlighted in the support notes of the unit specification.

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.

SQA Advanced 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

Appraise the intended passage.

Knowledge and/or skills

- ◆ Principles of passage planning
- ◆ Passage planning legislation
- ◆ Charts and publications
- ◆ Sailings, great circle sailings and tidal calculations
- ◆ Availability of navigational aids
- ◆ Ship reporting and weather routeing
- ◆ Landfall and confined water procedures

Outcome 2

Prepare and document a passage plan.

Knowledge and/or skills

- ◆ Great circle, composite great circle and rhumb line routes
- ◆ Distance and courses on great circle, composite great circle and rhumb line route
- ◆ Tidal heights, times and streams to ensure the passage is made safely
- ◆ Co-tidal/co-range charts
- ◆ Landfall and port approaches
- ◆ No-go areas and navigational hazards
- ◆ Accuracy of position fixing
- ◆ Wheel over positions
- ◆ Document the passage plan

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Outcome 3

Evaluate a completed passage plan.

Knowledge and/or skills

- ◆ Factors affecting the execution of the passage plan including:
 - Tidal considerations for underkeel clearance
 - Traffic considerations
 - Navigational accuracy
 - Meteorological conditions
 - Condition of the vessel
 - Vessel traffic systems and reporting schemes
 - Monitoring the passage plan

Outcome 4

Implement and monitor appropriate solutions for situations which arise during a passage.

Knowledge and/or skills

- ◆ Contingency plans for critical navigational areas
- ◆ Adjustments to the passage plan for routine changes
- ◆ Adjustments required to the plan for adverse environmental conditions

Outcome 5

Perform calculations relating to a vessel's position.

Knowledge and/or skills

- ◆ Solution and evaluation of astronomical observations including resolution of the 'cocked hat' problem
- ◆ Adjustments required to the plan to comply with Search and Rescue (SAR) or medical emergencies

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Evidence requirements for this unit

Written and/or oral recorded evidence is required for Outcomes 1, 2 and 4 and will be assessed under supervised open-book conditions. Outcomes 1, 2 and 4 may be combined for a single assessment with access to extracts from admiralty sailing directions, mariner's handbook, ocean passages for the world, routeing charts, weather data extracts, nautical almanac, tide tables/current atlas, navigational charts and other relevant publications to appraise a coastal/ocean passage. SOLAS Chapter 5 should be consulted when identifying source materials for open-book assessments.

Written and/or oral evidence is required for Outcomes 3 and 5 and will be assessed under open-book supervised conditions. Outcome 3 and 5 may be combined for assessment and should last no longer than two hours.

All knowledge and skills are assessed, however there is sampling within some of the items within the knowledge and skills. When sampling takes place, a different sample should be used for each reassessment.

Outcome 1

Learners are required to produce written and/or oral recorded evidence to demonstrate their knowledge and/or skills by showing that they can:

- (a) Analyse and evaluate current legislation with regard to passage and voyage planning.
- (b) Utilise the principles of passage planning to make a complete appraisal of a proposed passage.
- (c) Analyse and evaluate the use of gnomonic charts, admiralty routeing charts and Ocean Passages of the World (OPOW) to appraise a proposed ocean passage.
- (d) Utilise navigational charts, admiralty sailing directions, tide tables and other relevant publications to appraise a coastal/pilotage passage.
- (e) Analyse and evaluate the availability, reliability, accuracy and coverage of navigational aids on a proposed passage.
- (f) Analyse and evaluate the availability and use of ship reporting and weather routeing advice for a proposed passage.
- (g) Appraise a passage for landfall positions and areas of confined water.

Outcome 2

Learners are required to produce written and/or recorded oral evidence to demonstrate their knowledge and/or skills by showing that they can:

- (a) Select appropriate great circle, composite great circle and rhumb line routes from information provided from OPOW extracts, admiralty routeing charts and gnomonic charts.
- (b) Calculate the courses and distance on passage for any of the routes mentioned above.
- (c) Utilise mercator and gnomonic charts to plan routes on trans-oceanic passages.
- (d) Calculate the height of tide at a given time, the time the tide will be at a certain height and determine tidal stream information for any part of the world, using admiralty tide tables/tidal stream information.
- (e) Use co-tidal/co-range charts to determine the height of tide at a position offshore.

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- (f) Plan appropriate strategies and contingency plans to deal with the following:
 - (i) Making landfall
 - (ii) Approaching a port/anchorage
 - (iii) No-go areas and navigational hazards
 - (iv) Position fixing accuracy in critical areas
 - (v) Areas where turning and manoeuvring are critical
- (g) Prepare a fully documented coastal passage plan as per the requirements of *SOLAS Chapter V, Annex 25 – Guidelines for Voyage Planning – IMO Resolution A/893(21)*

Outcome 3

Learners are required to produce written and/or recorded oral evidence to demonstrate their knowledge and/or skills by showing that they can:

- (a) Analyse and evaluate the factors which will affect the execution of the plan with particular reference to the following:
 - (i) Tidal considerations with respect to underkeel clearance
 - (ii) Expected traffic density
 - (iii) Reliability of celestial and terrestrial position fixing and associated errors
 - (iv) Expected meteorological conditions
 - (v) Condition of vessel including navigational equipment and vessel systems
 - (vi) Ship reporting requirements
 - (vii) Availability and type of navigational aids
- (b) Analyse and evaluate how the proposed plan can be monitored effectively to ensure that the vessel is not being put in danger.

Outcome 4

Learners are required to produce written and or/recorded oral evidence. In item (e) the learner should demonstrate their knowledge and/or skills from two of the items. Items which are not sampled in (e) must be covered in the alternative (resit) assessment.

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

- (a) Implement contingency plans to deal with emergency situations in areas critical to navigation from a sample of two of the following:
 - (i) Steering gear failure
 - (ii) Engine failure
 - (iii) Extreme weather conditions
 - (iv) Malfunction of navigational equipment
- (b) Select routes to take account of possible emergencies.
- (c) Determine safe water areas and emergency anchoring positions.
- (d) Indicate areas where actions taken to maximise searoom may be required.
- (e) Implement adjustments to the proposed plan to take account of a sample of two of the following:
 - (i) adverse weather conditions
 - (ii) requirements of ship's weather routing services
 - (iii) avoidance of tropical revolving storms
 - (iv) navigating in areas of ice or with ice suspected within the vicinity
 - (v) ice accumulation on board the vessel

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Outcome 5

Learners are required to produce written and/or oral evidence to demonstrate their knowledge and/or skills by showing that they can:

- (a) Evaluate the reliability of celestial observations and determine the Most Probable Position (MPP) from a series of three or more celestial observations.
- (b) Determine the optimum course and speed to make a rendezvous with another vessel in case of SAR or medical emergencies.

SQA Advanced Unit support notes

Unit title: Marine Passage Planning (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 Maritime and Coastguard Agency (MCA) Chief Mate/Masters Certificate of Competency and accordingly reflects the content of International Maritime Organisation's Standard of Training Certification and Watchkeeping (STCW).

The unit is primarily intended for learners who have an MCA Deck Officer of the Watch certificate of competency and wish to progress to a Chief Mates/Masters Certificate of Competency. The unit can also be utilised for learners who have entered via one of the Merchant Navy Training Board (MNTB) approved deck cadet training schemes. 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 STCW at Management level aboard ship.

Completion of this unit will also ensure that the learner complies with all the requirements laid down by the UK MCA for the issue of a Chief Mates and Masters Unlimited Certificate of Competency as a Deck Officer. The knowledge required 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

In this outcome learners will be introduced to the principles of passage planning and the current legislation, both national and international concerning the legal requirements for vessels to have a comprehensive passage plan prior to sailing. The four components of appraisal, planning, execution and monitoring will be discussed in detail and this outcome deals mainly with the process of appraisal of all the relevant information available to the mariner in order that the most comprehensive plan possible can be made. The process of appraisal and the sources of information that are available will be considered. The use of publications, charts, routeing and gnomonic charts will be investigated and demonstrated. The factors to be taken into account, when making an appraisal, will be examined and those which are of prime importance discussed.

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Outcome 2

This outcome deals with the process of preparing and documenting a passage plan. Using the information obtained in the appraisal process a learner will use charts and publications to plan coastal and ocean passages. These plans will comply with all current navigational regulations and industry best practice.

The use of great circle, composite great circle and rhumb line navigation will be demonstrated and the criteria used for selection of the most appropriate route discussed. The learner will demonstrate that they understand underkeel clearance and how to indicate no-go areas on the chart. They will be able to apply regulations concerning the safety of navigation in traffic separation schemes and port approaches. The learner will be able to demonstrate knowledge and application of tidal streams.

Outcome 3

This outcome deals with the execution of the proposed plan. The learner will use and evaluate data from a number of sources which may have an impact on the safe navigation of the vessel. These are variable factors including meteorological conditions such as reduced visibility, wind, etc. Analysis of factors which are critical to the safe navigation of the vessel such as traffic density and ship reporting requirements as well as the availability and type of navigational aids. This outcome also considers the means of monitoring the proposed plan and develop the ability of the learner to critically evaluate and formulate evidence-based solutions to problems and issues.

This unit is designed to be delivered without specialist ECDIS simulator equipment. However centres with approved facilities may incorporate their use in the delivery of this learning outcome.

Outcome 4

This outcome deals with the procedures to be adopted when adjustments to the passage plan are required when the vessel is en-route. Routine and emergency situations will be considered including failure of critical equipment and the onset of adverse weather or environmental conditions. The responsibility and planning procedures to be adopted in SAR situations will be discussed and methods of planning and executing SAR operations considered.

Outcome 5

This outcome develops the skills required to carry out calculations relating to astronomical and rendezvous problems.

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Guidance on approaches to delivery of this unit

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

- ◆ *Management of Bridge Operations*
- ◆ *Applied Marine Meteorology*

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

This unit covers all aspects of the passage planning process.

As the creation of a passage plan is an holistic process for teaching purposes the unit can be delivered in three sections:

- 1 Coastal planning
- 2 Ocean planning
- 3 Evaluation and management

Use of ship simulation facilities could be used in the delivery of elements of Outcome 3. Learners could produce a plan and then execute it in a simulation facility.

The content of this unit can be delivered through case study and/or assignment. The knowledge and skills for this unit can be delivered in the classroom. The students can generate evidence of their understanding by producing a body of work in the form of a completed passage plan.

Outcome 5 develops the skills required to carry out calculations relating to astronomical and rendezvous problems.

Guidance on approaches to assessment of this unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

Written and or/oral evidence is required for Outcomes 1, 2 and 4 and will be assessed under supervised open-book conditions. Outcomes 1, 2 and 4 should be combined for a single assessment with access to extracts from admiralty sailing directions, mariner's handbook, ocean passages for the world, routeing charts, weather data extracts, nautical almanac, tide tables/current atlas, navigational charts and other relevant publications to appraise a coastal/ocean passage. SOLAS Chapter 5 should be consulted when identifying source materials for open-book assessments.

Written and or/oral evidence is required for Outcomes 3 and 5 and will be assessed under open-book supervised conditions. Outcome 3 and 5 should be combined for assessment and should last no longer than two hours.

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All knowledge and skills are assessed, however there is sampling within some of the items within the knowledge and skills. When sampling takes place, a different sample should be used for each reassessment.

The assessment for Outcomes 1, 2 and 4 can be either a case study or an assignment. The assessment for Outcomes 3 and 5 could be a question paper.

Authentication of the learners work is achieved by the action of double marking, a percentage of papers are double marked for authenticity. The learner can also ask for his work to be double marked at any time. The internal quality verification is carried out before each assessment to maintain the fairness of the assessment. On top of this internal verification should be carried out to ensure all assessments are verified to a fair standard.

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 has the Core Skills of Problem Solving and Numeracy embedded in it, so when learners achieve this unit their Core Skills profile will be updated to show that they have achieved Problem Solving and Numeracy at SCQF Level 6.

Communication: Written at SCQF level 6 can be developed by learners in assessments and in preparing a clear and fully comprehensive passage plan.

Communication: Reading can be developed at SCQF level 6 as learners will have to read, interpret and apply written information from charts, and admiralty and other publications.

Information and Communication Technology at SCQF level 6 may be developed by learners accessing internet resources to obtain information regarding tidal problems and also sailing calculations.

History of changes to unit

Version	Description of change	Date

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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](#).

General information for learners

Unit title: Marine Passage Planning (SCQF level 8)

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.

This unit is designed to enable you to appraise, plan, execute and monitor a passage in either ocean, coastal or confined waters. It will cover the processes that are required to ensure that the vessel will at all times remain in safe water while complying with all regulations concerning the safety of navigation. It details the various factors that must be taken into account when considering whether the proposed plan requires adjustments and covers those situations where a change to the plan is unavoidable.

You will be required to prepare a fully documented coastal and ocean passage plan given an initial scenario. This will involve appraising extracts from both admiralty sailing directions and ocean passages of the world, admiralty tide tables and the admiralty list of radio signals. You will then have to take the information obtained from the appraisal and plan on one or more charts a viable passage plan between a start and end position. This will involve a coastal section plus a pilotage section and will involve you having to consider all the factors which affect the safety of the vessel. You will also be expected to make a record of the plan, in an acceptable format, such that it could be used by any navigating officer to execute your proposed plan. You will look at how emergency situations can be accommodated within a passage plan and what strategies are required to deal with these.

To successfully complete this unit, you will need to achieve a satisfactory level of performance in each assessment. Assessment may take the form of a case study and/or assignment. 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.

Successful completion of this unit will enable you to meet the requirements of the MCA's Chief Mate Unlimited Certificate of Competency. On completion of the unit you will be able to:

- 1 Appraise the intended passage.
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Communication: Reading can be developed at SCQF level 6 as learners will have to read, interpret and apply written information from charts, and admiralty and other publications.

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