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Ships and marine technology — Service personnel for the maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear —

Part 3: Level 1 technical training

Navires et technologie maritime — Personnel de maintenance pour l'entretien, l'examen approfondi, la mise à l'essai en cours d'exploitation, la révision et la réparation des embarcations de sauvetage et des canots de secours, des engins de mise à l'eau et des dispositifs de largage —

Partie 3: Formation technique de niveau 1

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 1, *Maritime safety.*

This first edition cancels and replaces ISO/PAS 23678-3:2020, which has been technically revised.

The main changes are as follows:

— text has been editorially revised in accordance with the ISO/IEC Directives, Part 2, 2021.

A list of all parts in the ISO 23678 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

A major objective of the maritime industry is to prevent accidents and incidents from occurring. A global network of competent personnel employed by authorized service providers is vital for lifesaving appliances to remain fit for purpose, sustaining crew confidence and contributing to the prevention of incidents and accidents.

The need to develop an International Standard for this objective is evident from the new requirements in IMO Resolution MSC.402 (96)[5], entitled "requirements for maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances, and release gear" (henceforth referred to as the "IMO Requirements") adopted 19 May 2016 and entering into force 1 January 2020, as per paragraph 7.1.1.

This document and the associated documents ISO 23678-1, ISO 23678-2 and ISO 23678-4 have been developed to achieve three key objectives:

— develop training documents that would support the IMO Requirements, section 7, paragraph 7.1.1;

— provide a consistent, reliable, and standardized approach to training and provide a clear auditable trail for interested parties to grant authorization supporting the IMO Requirements, section 3, to service providers;

— establish a competency framework that would enable personnel certified by service providers to develop and maintain competencies identified by industry experts to a level that enables them to competently work unsupervised on equipment covered by this document.

This document has been developed by identifying training objectives in relation to survival craft, davits, winches and release gear makes and types for which service is to be provided. This has been achieved by conducting professional discussions with disciplined experts, to obtain the appropriate information to develop a training programme that is fit for purpose. Successfully completing the service technician training in ISO 23678-1, ISO 23678-2 and ISO 23678-4 enables personnel certified by an authorized service provider to meet the IMO Requirements, section 7, paragraph 7.1.1, and section 8.

Ships and marine technology — Service personnel for the maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear —

Part 3: Level 1 technical training

1 Scope

This document establishes a uniform, safe and consistent approach to the technical training of personnel for the maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear.

It also provides the necessary information for interested parties to grant authorization, effectively evaluate and audit training, supporting the IMO Requirements, section 3[5].

It specifies the training requirements for the level 1 controlled environment education and technical training for personnel certified by a manufacturer or an authorized service provider to carry out maintenance, thorough examination, operational testing, overhaul and repair of lifeboats (including free-fall lifeboats) and rescue boats (including fast rescue boats), launching appliances and release gear.

The level 1 training is split into two stages, both covered in this document:

— stage 1 service technician technical controlled environment education and training has five modules that consist of classroom-based theory followed by practical sessions. The five modules encompass the scope and range of technical knowledge and skills required to assume type-specific design coverage of survival craft, release systems, davits and winches. The modules focus on supporting the requirements in the IMO Requirements, section 8, paragraphs 8.1, 8.2.1.1 to 8.2.1.6, 8.2.2, and 8.2.3.

— stage 2 service technician technical controlled environment experience and assessment requires candidates to undertake a minimum of four supervised scenarios-based practical exercises assessments covering the range of type specific complete systems for which they will be certified.

This document is intended to be used in conjunction with ISO 23678-1, ISO 23678-2 and ISO 23678-4.

This document is applicable to the following types of lifeboats (including free-fall lifeboats), rescue boats (including fast rescue boats), launching appliances and release gear.

Survival craft types:

a) single fall totally enclosed lifeboats with sprinkler and air systems;

b) twin fall totally enclosed lifeboats with sprinkler and air systems;

c) partially enclosed lifeboats;

d) tender lifeboats;

e) freefall lifeboats;

f) open lifeboat;

g) inflatable rescue boats;

h) rigid rescue boats;

i) semi-ridged inflatable rescue boats;

j) rigid fast rescue boats;

k) rigid inflatable fast rescue boats.

Survival craft propulsion system types:

a) inboard diesel engines;

b) outboard engines;

c) propeller drives;

d) jet drives.

Davit types:

a) gravity single and twin fall outrigger;

b) hydraulic single pivoting/luffing;

c) hydraulic multi pivot/luffing;

d) telescopic;

e) gravity roller track;

f) gravity free fall primary;

g) free fall hydraulic secondary;

h) A-frame hydraulic;

i) single arm slewing (manual, electric);

j) davits with stored power systems.

Winch types:

a) twin drum;

b) single drum;

c) gravity-lowering, electric hoisting;

d) gravity-lowering hydraulic hoisting;

e) hydraulic hoisting and lowering.

Hook release system types:

a) on-load/off load (load not over centre);

b) on-load/offload (load over centre);

c) off load;

d) freefall hydraulic;

e) automatic off load.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 23678-1, *Service personnel for the maintenance, thorough examination, operational testing, overhaul and repair of lifeboats and rescue boats, launching appliances and release gear — General requirements for training providers*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 23678-1 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Level 1 service technician stage 1 technical training

4.1 General

This programme is designed to meet the technical controlled environment training and assessment requirements for all prospective service technicians. The level 1 service technician training document explains how competence shall be assessed and certified.

4.2 Candidate pre-requisites

Candidates shall:

a) hold or be working towards a nationally recognized qualification in engineering or mechanics, but not unduly excluding similar qualifications; and

b) hold a valid initial service technician certificate.

4.3 Aims and objectives

4.3.1 Aim

This programme is designed for individuals who have completed the initial service technician training and need to gain the technical theoretical and practical knowledge to enable them to carry out maintenance thorough examination, operational testing, repair and overhaul of lifeboats (including free-fall lifeboats), rescue boats (including fast rescue boats), launching appliances and on-load release gear under supervision.

4.3.2 Key objectives

The key objectives of the training programme are to ensure candidates:

a) can interpret technical documentation developed by the manufacturers and apply the information to their role;

b) can identify, interpret and apply to their role key legislation, industry guidelines, rules, regulations and conventions;

c) have the required technical underpinning knowledge and practical skills to carry out maintenance thorough examination, operational testing, repair and overhaul of lifeboats (including free-fall lifeboats), rescue boats (including fast rescue boats), launching appliances and on-load release gear, as applicable;

d) can write reports and complete associated documentation;

e) can demonstrate in their working environment basic safety and awareness.

5 Learning outcomes of level 1 service technician stage 1 technical training

5.1 General

During the training programme, candidates shall be required to demonstrate they have the skills and understanding required to be deemed competent in relation to the training outcomes.

5.2 Theory learning outcomes

5.2.1 Module 1 — Work, health and safety issues while conducting activities on board

To successfully complete the service technician level 1 stage 1 training programme, candidates shall be able to:

a) identify the people who shall be informed and the documentation that needs to be checked, verified and completed before commencing work;

b) explain the safety checks that need to be considered before commencing work on lifeboats (including free fall lifeboats), rescue boats (including fast rescue boats), launching appliances and release gear;

c) explain specialized equipment requirements including personal protective equipment (PPE);

d) explain which documents need to be consulted, interpreted, applied and completed to inspect, maintain, thoroughly examine, operationally test, overhaul and repair lifeboats (including free fall lifeboats), rescue boats (including fast rescue boats), launching appliances and release gear.

5.2.2 Module 2 — Survival craft

To successfully complete the level 1 training programme, candidates shall be able to:

a) identify and explain the function of the individual components related to lifeboats (including free fall lifeboats), rescue boats (including fast rescue boats);

b) identify and explain the specific lubricant requirements for lifeboats (including free fall lifeboats) and rescue boats (including fast rescue boats);

c) explain the specific procedures that apply to the inspection, maintenance, thorough examination, operational testing, overhaul and repair of lifeboats (including free fall lifeboats), rescue boats (including fast rescue boat), supporting the IMO Requirements, section 6, paragraph 6.2.3[5].

5.2.3 Module 3 — Release gear

To successfully complete the level 1 training programme, candidates shall be able to:

a) explain the specific design and construction features of distinct various makes and types of release gears;

b) identify and explain the function of the individual components that make up the distinct designs associated with specific makes and types of release gears;

c) explain the common faults that can occur and potential solutions to resolve them in relation to the distinct designs associated with specific makes and types of release gears;

d) identify and explain the generic maintenance and examination criteria in relation to release gears;

e) identify and explain the specific procedures to carry out maintenance thorough examination, operational testing, repair and overhaul, in relation to the distinct designs associated with specific makes and types of release gears found in lifeboats (including free-fall lifeboats) and rescue boats (including fast rescue boats).

5.2.4 Module 4 — Davits

To successfully complete the level 1 training programme, candidates shall be able to:

a) explain the various design and construction features of davits;

b) explain the common faults that can occur and potential solutions to resolve them in relation to the specific designs of davits;

c) explain how to carry out non-destructive tests on davit components to check for cracks and the integrity of welds;

d) identify and explain the function of the individual davit components used for launching lifeboats (including free-fall lifeboats), rescue boats (including fast rescue boats) and davit-launched liferafts;

e) identify and explain the specific procedures to carry out maintenance thorough examination, operational testing, repair and overhaul of specific makes and types of davits used to launch lifeboats (including free-fall lifeboats) and rescue boats (including fast rescue boats).

5.2.5 Module 5 — Winches

To successfully complete the level 1 training programme, candidates shall be able to:

a) explain the specific design and construction features of the various specific makes and types of winches;

b) explain the common faults that can occur and potential solutions to resolve them in relation to the specific designs of winches;

c) identify and explain the function of specific individual components associated with specific makes and types of winches used to launch lifeboats (including free-fall lifeboats), rescue boats (including fast rescue boats) and davit-launched life rafts;

d) identify and explain the specific procedures to carry out maintenance thorough examination, operational testing, repair and overhaul, in relation to the distinct designs associated with specific makes and types of winches used to launch lifeboats (including free-fall lifeboats) and rescue boats (including fast rescue boats);

e) explain the construction of wire ropes;

f) explain the specific procedures that apply to the inspection, maintenance, thorough examination, exchange and discard of wire ropes.

5.3 Practical learning outcomes

5.3.1 Module 1 — Work, health and safety issues while conducting activities on-board

To successfully complete the level 1 training programme, candidates shall be able demonstrate:

a) safety checks that need be completed prior to commencing work on lifeboats (including free fall lifeboats) rescue boats (including fast rescue boats), launching appliances and release gear;

b) how to interpret and apply the relevant documentation for the maintenance, thorough examination, operational testing, overhaul and repair of lifeboats (including freefall lifeboats), rescue boats (including fast rescue boats), launching appliances and release gear;

c) how to complete checklists and compile reports;

d) how to carry out the required safety checks and attach maintenance/hanging off pendants and secondary safety devices.

5.3.2 Module 2 — Survival craft

To successfully complete the level 1 training programme, candidates shall be able demonstrate how to maintain, thoroughly examine and check for satisfactory condition and operation of specific makes and types of survival craft (see Table A.1), supporting the IMO Requirements, section 6, paragraph 6.2.3[5], and the manufacturer's technical documentation, including:

a) structure of the boat, including fixed and loose equipment;

b) the external boundaries of the internal void spaces as far as practicable;

c) inboard engines and gearbox;

d) outboard engines;

e) engine bed and mounts;

f) primary and secondary start systems;

g) exhaust system;

h) propulsion system, stern tubes, stern glands;

i) lifeboats sprinkler system;

j) lifeboats air supply;

k) manoeuvring system;

l) power supply;

m) bailing system;

n) fender and skate arrangements;

o) lifeboat inflatable righting/anti-entrapment equipment;

p) rescue boat (including fast) righting system.

5.3.3 Module 3 — Release gear

5.3.3.1 Operation and tooling

To successfully complete the level 1 training programme, candidates shall be able to demonstrate:

a) how to correctly operate release gear for lifeboats (including free-fall lifeboats), rescue boats (including fast rescue boats) and davit-launched life rafts;

b) the ability to use specialized tooling and apply the correct lubricants to the applicable components.

5.3.3.2 Annual thorough examination and operational test

To successfully complete the level 1 training programme, candidates shall be able to demonstrate how to thoroughly examine and check for satisfactory condition and operation of specific makes and types of release systems (see Table A.1), supporting the IMO requirements, section 6, paragraphs 6.2.4 to 6.2.8[5], and the manufacturer's technical documentation including:

a) central release units;

b) hydrostatic interlock systems with diaphragms;

c) hydrostatic interlock systems with floats;

d) cables for control and release;

e) hook assemblies with fastening/locking devices with flat to flat cams;

f) hook assemblies with fastening/locking devices with curve to curve cams;

g) hook assemblies with fastenings/locking devices with curve to flat cams;

h) hook assemblies with fastenings/locking devices with up and down pins;

i) hook assemblies with fastenings/locking devices with amplification arms, intermediary hooks, arresting levers;

j) free fall hydraulic hook assemblies;

k) automatic hook assemblies;

l) how to check excessive free play and tolerances of release gear against the specifications of the manufacturer's technical documentation;

m) how to carry out the annual operational tests of davit-launched lifeboats and rescue boats on-load release function with a simulated load;

n) how to carry out the operational test of the davit-launched liferaft automatic release function.

5.3.3.3 Five-year thorough examination, overhaul and overload operational test

To successfully complete the level 1 training programme, candidates shall be able to demonstrate how to overhaul, thoroughly examine and check for satisfactory condition and operation of specific makes and types of release systems (see Table A.1), supporting the IMO Requirements, section 6, paragraph 6.3.3, and the manufacturer's technical documentation. This includes how to:

a) dismantle and re-assemble specific makes and types of hook assemblies with fastening/locking devices with flat to flat cams, curve to curve cams, curve to flat cams, up and down pins, amplification arms, intermediary hooks and arresting levers;

b) dismantle and re-assemble specific makes and types of central release units;

c) dismantle and re-assemble specific makes and types of hydrostatic units;

d) carry out examinations with regards to tolerances and design requirements of specific makes and types of release gear as specified by the manufacturer;

e) adjust specific makes and types of release gear systems after assembly to operate correctly;

f) identify and rectify the faults that can occur related to specific makes and types of release gear;

g) replace service exchange release gear;

h) examine vital parts with regards to defects and cracks; and

i) carry out the five-yearly overload operational test of davit-launched lifeboats and rescue boats using a simulated load.

5.3.4 Module 4 — Davits

To successfully complete the level 1 training programme, candidates shall be able to demonstrate how to overhaul, thoroughly examine and check for satisfactory condition and operation of specific makes and types of davits (see Table A.1), supporting the IMO Requirements, section 6, paragraphs 6.2.9.1 to 6.2.9.4[5], and the manufacturer's technical documentation, including:

a) carry out the necessary safety checks prior to approaching davits;

b) safely operate specific makes and types of davits;

c) davit or other launching structures, with regards to corrosion, misalignments, deformation and excessive free play;

d) sheaves, rollers, floating blocks for wear, corrosion and excessive free play;

e) fall wires for kinks, damage, corrosion and lubrication;

f) the function of limit switches;

g) mechanical restraints;

h) hydraulic systems;

i) stored power systems; and

j) electrical systems.

5.3.5 Module 5 — Winches

To successfully complete the level 1 training programme, candidates shall be able to demonstrate how to overhaul, thoroughly examine and check for satisfactory condition and operation of specific makes and types of winches (see Table A.1), supporting the IMO Requirements, section 6, paragraphs 6.2.9. and 6.3[5], and the manufacturer's technical documentation, including:

a) winch foundations;

b) remote-control systems, electrical, operating cables, pulleys;

c) power supply systems;

d) lubricants;

e) multiple disc holding/static brake;

f) holding/static brakes with brake bands;

g) holding/static brakes with friction pads;

h) centrifugal brakes with friction pads;

i) lowering brakes with hydraulic pumps;

j) drum, bearings, gearing, pinions, chains;

k) sprag clutches, overrunning clutches;

l) hydraulic systems;

m) wire ropes, corrosion, damage, replacement;

and is applicable to the following procedures:

n) the annual operational test;

o) the five-yearly operational test.

6 Candidate performance assessment level 1 service technician stage 1 technical training — Candidate performance assessment

6.1 General

6.1.1 Candidates attending level 1 service technician stage 1 technical training shall be given a series of explanations and demonstrations identifying what they are expected to know and do. This shall be followed by practical exercises allowing them to demonstrate their knowledge and understanding of the course content. Assessment of the candidates' performance shall be against the stated training outcomes. Candidates shall have a 100 % course attendance of the recommended contact time (see 7.2).

6.1.2 Assessment of candidates shall be a summation of the following components:

a) continuous assessment;

b) final assessment by an assessor.

6.2 Continuous assessment

6.2.1 The purpose of the continuous assessment is to ensure candidates are acquiring the necessary skills, knowledge, and understanding of the subject matter covered. This shall be achieved by direct observation of practical work and oral/written questioning. The training provider shall ensure they have procedures within their quality management system to deal with absence and demonstration of competence.

6.2.2 Any candidate failing to meet the expected outcomes as the course progresses can be given additional training. However, it should be clear that time to do this within the contact time is limited, and the candidate must show, through repeating tests and practice sessions, that they have bridged the gap in their knowledge and understanding and can demonstrate competence. The training provider shall ensure they have procedures within their quality management system to deal with absence and demonstration of competence.

6.3 Final assessment

6.3.1 The final assessment shall be conducted by an assessor who may also be involved in the delivery of the training programme. It shall take the form of direct observation. Documentary evidence for the continuous assessment shall be provided for the final assessment.

6.3.2 If a candidate is deemed "not yet competent" (NYC), in the opinion of the trainer/assessor after reasonable tuition, and is unable to meet the learning outcomes of any individual module, only the training outcomes that the candidate has not been able to achieve competence in needs be repeated.

6.3.3 All candidate assessment forms and test documentation shall be retained for audit purposes. See Tables B.1 to B.12 for examples of assessment checklists.

7 Duration and timing of level 1 service technician stage 1 technical training

7.1 General

7.1.1 The modules can be delivered individually if necessary. If the course modules are delivered individually, the training programme shall be completed in full within 18 months of commencement of the first module.

7.1.2 If the modules are not completed within the 18 months period, the training programme shall be undertaken again.

7.2 Contact time

7.2.1 The optimum recommended contact time for the complete training programme is 160 h. Contact time includes instruction and assessment activities. Contact time does not include course administration, lunch and refreshment breaks.

7.2.2 The optimum recommended contact time for the individual modules are as follows:

a) module 1: incorporated into modules 2 to 5;

b) module 2: 40 h;

c) module 3: 40 h;

d) module 4: 40 h;

e) module 5: 40 h.

7.2.3 It is suggested that a ratio of 20 % theory to 80 % practical is appropriate.

8 Level 1 service technician stage 1 technical training programme

8.1 General

The training programme is designed to help candidates achieve the stated learning outcomes specified in Clause 5. To make efficient use of time and ensure effective learning, there should be, wherever practicable, an integration of the three phases of explanation, demonstration, and practise. Full use should be made of visual aids and course handout material and training equipment.

Candidates shall be issued with course notes relevant to the level 1 service technician, stage 1 technical training. These notes shall be suitable for use as a reference manual during the course.

All training shall be supporting the applicable sections of the IMO Requirements[5] and the manufacturer's technical documentation.

8.2 Overview of training modules

8.2.1 General

Prior to the start of each module, the following shall be included as part of the introduction by training staff:

a) aim – the main purpose of the module;

b) learning outcomes – what the candidates are expected to learn and how the learning outcomes shall be achieved;

c) timetable – training module duration and timing;

d) assessment – how candidates shall be assessed and what they shall be assessed against;

e) staff – who shall be delivering the training and carrying out the assessments and the roles of training and support staff.

The level 1 service technician, stage 1 technical training programme comprises the modules and elements given in 8.2.2 to 8.2.6.

8.2.2 Module 1 — Work, health and safety issues while conducting activities on board

a) element 1.1 – intervention communications and documentation;

b) element 1.2– onboard safety.

8.2.3 Module 2 — Survival craft

a) element 2.1 – annual general inspection, examination and maintenance requirements for lifeboats (including free-fall lifeboats), rescue boats (including fast rescue boats);

b) element 2.2 – additional specific inspection, examination and maintenance and overhaul requirements for lifeboats (including free-fall lifeboats);

c) element 2.3 – additional specific inspection, examination and maintenance and overhaul requirements for rescue boats (including fast rescue boats).

8.2.4 Module 3 — Release gear

a) element 3.1 – specific rules and regulations requirements relating to release gear;

b) element 3.2 – release gear specialized tooling and lubricant requirements;

c) element 3.4 – cables for control and release;

d) element 3.5 – design and construction of release gear;

e) element 3.6 – annual maintenance thorough examination, inspection repair and overhaul and operational test of release gear;

f) element 3.7 – five-year thorough examination, overhaul and overload operational test.

8.2.5 Module 4 — Davits

a) element 4.1 – specific rules and regulations requirements relating to launching appliances;

b) element 4.2 – design and construction of davits;

c) element 4.3 – annual thorough examination and operational test of davits.

8.2.6 Module 5 — Winches

a) element 5.1 – specific rules and regulations requirements relating to winches;

b) element 5.2 – design and construction of winches;

c) element 5.3 – annual thorough examination and operational test of winches;

d) element 5.4 – five-year thorough examination, overhaul and overload operational test of winches.

8.3 Module 1 — Work, health and safety issues while conducting activities on board

8.3.1 Element 1 — Intervention communications and documentation

8.3.1.1 Training staff shall give an overview of the procedures to address the appropriate persons in relation to the scope of the intervention, such as:

a) intervention brief;

b) discussing and liaising the scope of work with appropriate persons:

   1) ships superintendent,

   2) master or person in charge,

   3) recognized organization surveyor.

8.3.1.2 Training staff shall explain and allow candidates to practice the application of using the documents that shall be checked, verified, interpreted and completed during interventions, such as:

a) appropriate documentation for the scope of work, including:

   1) toolbox talks,

   2) work permits;

b) documents that need to be verified, consulted, interpreted and applied to inspect, maintain, thoroughly examine, operationally test, overhaul and repair lifeboat (including free fall lifeboats) rescue boats (including fast rescue boats), launching appliances and release gear, which are:

   1) records of inspections and routine on-board maintenance carried out by the ship's crew, checklists for the weekly/monthly inspections, covered in SOLAS Regulations III/20.6 and III/20.7[7],

   2) risk assessments,

   3) method statements,

   4) manufacturer's technical documentation,

   5) company procedures,

   6) rules and regulations,

   7) equipment certification;

c) checklists and reports.

8.3.2 Element 1.2 — On-board safety

8.3.2.1 Training staff shall explain the safety checks that need to be carried out prior to commencing work, including:

a) specialized equipment requirements, including PPE;

b) exterior visual checks for hazards, corrosion, security, alignment:

   1) decks, gratings and handrails,

   2) davit structure, foundations, sheaves, pad eyes,

   3) mechanical restraints, gripe wires, tricing pendants, browsing in tackle,

   4) winch foundations, static brake status;

c) the importance of establishing the crew's competency in relation to turning out of the lifeboat.

8.3.2.2 Training staff shall explain the equipment that needs removing and attaching prior to commencing work, including:

a) removing:

   1) gripe wire,

   2) bowsing in tackle,

   3) harbour pins;

b) attaching:

   1) maintenance pendants,

   2) secondary safety devices,

   3) tricing pendants.

8.4 Module 2 — Survival craft

8.4.1 Element 2.1 — Annual general inspection, examination and maintenance requirements for lifeboats, rescue boat with inboard engines

8.4.1.1 Training staff shall explain the design, construction and function of the individual components that are found in a range of specific makes and types of lifeboats (including free-fall lifeboat) and rescue boats (including fast rescue boats). See Table A.1.

8.4.1.2 Training staff shall ensure the practical sessions include the required work health and safety procedures candidates shall follow.

8.4.1.3 Training staff shall explain and demonstrate, and then allow candidates to practice, how to maintain, thoroughly examine, and check for satisfactory condition and operation (supporting the IMO Requirements, section 6, paragraph 6.2.3[5]), of the following:

a) hull:

   1) keel shoe,

2) counter plate;

b) external and internal equipment and fittings;

c) external boundaries of the internal void spaces as far as practicable;

d) inboard engines:

1) bed and feet,

2) primary and secondary start systems,

3) fuel systems,

4) gauges,

5) controls,

6) cooling system,

7) belts,

8) exhaust systems,

9) gear box,

10) filter changes,

11) alternator,

12) wiring loom;

e) propulsion systems:

1) couplings,

2) shafts,

3) stern tube,

4) propeller,

5) bearings;

f) manoeuvring system:

1) control cables,

2) rudder, pintles and skegs,

3) emergency tiller,

4) hydraulics;

g) power supply;

h) bailing system;

i) fender and skate arrangements;

j) specific lubricant requirements and replacement:

1) greases,

2) engine oils,

3) hydraulic fluids,

4) gear box oils.

8.4.2 Element 2.2 — Additional specific inspection examination, maintenance and overhaul requirements for totally enclosed lifeboats

Training staff shall explain and demonstrate, and then allow candidates to practice, how to maintain, thoroughly examine, and overhaul check for satisfactory condition and operation of specific makes and types of lifeboats (see Table A.1), including:

a) enclosures and canopies:

1) entrance doors including seals,

2) non-access hatches including seals;

b) sprinkler systems:

1) pumps,

2) belts,

3) valves,

4) pipe work,

5) sea water intake;

c) air supply:

1) cylinders,

2) hoses, connections, fittings,

3) valves and regulators,

4) gauges,

5) security;

d) lifeboat inflatable righting/anti-entrapment equipment.

8.4.3 Element 2.3 — Additional specific inspection examination maintenance and overhaul requirements for rescue boats (including fast rescue boats)

Training staff shall explain and demonstrate, and then allow candidates to practice, how to maintain, thoroughly examine, and overhaul check for satisfactory condition and operation, in accordance with the manufacturer's technical documentation regarding, specific makes and types of rescue boats (including fast rescue boats) (see Table A.1), such as:

a) lifting bridle strong points;

b) lifting yokes including foundation bolts;

c) inflatable sponsons;

d) outboard engines:

1) fuel systems,

2) gauges,

3) controls,

4) cooling system,

5) gear box,

6) filters,

7) charging systems,

8) electrical systems;

e) propulsion systems:

1) jet unit housing and impellor;

f) righting systems:

1) A-frame,

2) righting bag,

3) cylinders, hoses, connections, fittings,

4) inflation system.

8.5 Module 3 — Release gear

8.5.1 Element 3.1 — Specific rules and regulations requirements relating to release gear

Training staff shall explain the procedures for inspection, maintenance, thorough examination, operational testing overhaul and repair of release gear in accordance with the manufacturer's technical documentation, including:

a) SOLAS Regulation III/20.11[7];

b) the IMO Requirements, section 6, paragraphs 6.2.4, 6.2.5, 6.2.6, 6.2.7, 6.2.8 and 6.3.3[5].

8.5.2 Element 3.2 — Release gear specialized tooling and lubricant requirements

Training staff shall identify the tooling and lubricant requirements to carry out inspection, maintenance, thorough examination, operational testing, overhaul and repair of release gear in accordance with manufacturer's technical documentation, including:

a) measuring tools and gauges;

b) specialized tools;

c) hydraulic hook test tools;

d) specific lubricants.

8.5.3 Element 3.4 — Cables for control and release

Training staff shall give an overview of the various types of cables used to operate release gear, including:

a) types;

b) stroke;

c) fittings and fixings;

d) routing;

e) maintenance requirements.

8.5.4 Element 3.5 — Design and construction of release gear

Training staff shall explain the design, construction and function of the individual components that are found in a range of specific types of release gear (see Table A.1) in accordance with manufacturer's technical documentation, including:

a) hook assemblies;

b) central release units;

c) hydrostatic units.

8.5.5 Element 3.6 — Annual thorough examination and operational test of release gear

8.5.5.1 Visual examinations

Training staff shall explain, demonstrate, and then allow candidates to practice the visual examinations to evaluate the satisfactory condition and operation of the individual components that make up specific types of release gear (see Table A.1), including:

a) wear;

b) corrosion;

c) damage;

d) freedom of movement;

e) alignment;

f) deformation.

8.5.5.2 Tolerance, measurements and free play

Training staff shall explain the specific tolerances, measurements, and free play in relation to the applicable individual components that are found in a range of specific types of release gear (see Table A.1) in accordance with manufacturer's technical documentation.

8.5.5.3 Hook assembly thorough examination

Training staff shall demonstrate, and then allow candidates to practice, how to thoroughly examine, verify measurements and tolerances, clean and lubricate (where required) a range of specific types of release gear (see Table A.1) in accordance with manufacturer's technical documentation. This includes, as a minimum, but not limited to, the following components:

a) moveable hook:

   1) fulcrum pins,

   2) bushes,

   3) locking pins;

b) hook body;

c) hook mousing plate, retainers, safety latches;

d) legs:

   1) keel shoes,

2) keel pins;

e) on-load lift not over centre hook fastening locking devices:

1) rotating cams forward; flat to flat,

2) rotating cams forward or reverse; curve to curve,

3) rotating cams forward or reverse curve to flat,

4) torsion cups,

5) up and down pins,

6) intermediary hooks,

7) amplification arms,

8) arresting levers,

9) hook lock indictors,

10) torsion springs;

f) cables for release;

g) trouble shooting.

8.5.5.4 Devices for activating release thorough examination

Training staff shall demonstrate, and then allow candidates to practice, how to thoroughly examine, clean, lubricate, verify measurements and tolerances (where required) to a range of devices for activating release (see Table A.1) in accordance with manufacturer's technical documentation. This should be done as a minimum, but not limited to, for the following components:

a) release handle/lever;

b) hydrostatic locking levers;

c) locking lever indicators;

d) operating quadrants;

e) locking pins;

f) hydrostatic overrides;

g) cables for control and release;

h) hydrostatic units with:

1) diaphragms,

2) floats,

3) electronic sensors;

i) hydraulic systems:

1) primary means of release,

2) secondary emergency means of release;

j) trouble shooting.

8.5.5.5 Annual operational test of release gear

Training staff shall demonstrate, and then allow candidates to practice, how to carry out the annual operational function test on a range of release gear types (see Table A.1) in accordance with manufacturer's technical documentation. This includes but is not limited to:

a) on-load release gear: the use of appropriate test equipment to simulate the lifeboat, rescue boat and fast rescue boat in the light condition, supporting the IMO Requirements, section 6, paragraphs 6.2.5 and 6.2.7[5], including:

   1) procedures,

   2) safety considerations, and

   3) load calculations;

b) offload release gear operational function test, supporting the IMO Requirements, section 6, paragraph 6.2.6;

c) automatic release hook function test, supporting the IMO Requirements, section 6, paragraph 6.2.8, including:

   1) operational test of offload release function,

   2) operational test of on-load release function,

   3) measurement of trip forces, and

   4) measurement of closing force;

d) free-fall hydraulic release gear operational function test, supporting the IMO Requirements, section 6, paragraph 6.2.7;

e) examination of release gear and hook fastenings to ensure that the hook is completely reset, and no damage has occurred;

f) complete reports and check lists.

8.5.6 Element 3.7 — Five-year thorough examination, overhaul and overload operational test of release gear in accordance with manufacturer's service technical documentation

8.5.6.1 Five-year thorough examination and overhaul

Training staff shall demonstrate, and then allow candidates to practice, how to dismantle and reassemble, clean and lubricate, thoroughly examine, overhaul, verify measurements and tolerances against design requirements for a range of release gear (see Table A.1). This includes, as a minimum, but not be limited to, the components listed in 8.5.5.3 and 8.5.5.4.

8.5.6.2 Release gear adjustment

Training staff shall demonstrate, and then allow candidates to practice, how to adjust release gear systems after assembly to operate correctly, including:

a) establishing simultaneous release;

b) trouble shooting.

8.5.6.3 Overload operational test

Training staff shall demonstrate, and then allow candidates to practice, how to carry out the five-year overload test of release gear (see Table A.1) with a load equal to 1,1 times the mass of the survival craft and its full complement of persons and equipment, including:

a) on-load release gear: use appropriate test equipment to simulate the operational tests, supporting the IMO Requirements, section 6, paragraph 6.2.5[5], as applicable, but with a load equal to 1,1 times the mass of the survival craft or rescue boat and its full complement of persons and equipment:

   1) procedures,

   2) load calculations,

   3) safety considerations;

b) offload release gear: carry out the operational test stated in the IMO Requirements, section 6, paragraph 6.2.6;

c) free fall hydraulic: carry out the operational test stated in the IMO Requirements, section 6, paragraph 6.2.7;

d) automatic: carry out the operational test stated in the IMO Requirements, section 6, paragraph 6.2.8;

e) examine vital parts with regards to defects and cracks.

8.6 Module 4 — Davits

8.6.1 Element 4.1 — Specific rules and regulations requirements relating to davits

Training staff shall explain the procedures in accordance with manufacturer's technical documentation for inspection, maintenance, thorough examination, operational testing, overhaul and repair of davits, including:

a) SOLAS Regulation III/20.11[7];

b) IMO Requirements, section 6, paragraph 6.2.9[5].

8.6.2 Element 4.2 — Design and construction of davits

Training staff shall explain the design, construction and function of components that are found in the range of specific types of davits (see Table A.1), including, but not limited to:

a) foundations;

b) structure;

c) arms;

d) gearing;

e) hydraulic systems;

f) stored power systems;

g) electrical systems.

8.6.3 Element 4.3 — Annual thorough examination and operational test of davits

8.6.3.1 Training staff shall explain, demonstrate, and then allow candidates to practice, how to safely operate a range of davits to carry out a function test (see Table A.1) in accordance with manufacturer's technical documentation.

8.6.3.2 Training staff shall explain, demonstrate, and then allow candidates to practice, how to carry out the annual thorough examination for a range of specific types of davits (see Table A.1) to confirm the davit operates correctly and is in a satisfactory condition, in accordance with manufacturer's technical documentation. The examination shall include visual and physical examinations, as applicable, to evaluate corrosion, misalignments, deformation, cracks, wear, and excessive free play. Routine maintenance requirements shall also be carried out. This includes but is not limited to:

a) foundation bolts;

b) structure:

   1) frames,

   2) pedestals/columns,

   3) tracks,

   4) ramps;

c) arms:

   1) rollers,

   2) sheaves,

   3) hydraulic rams,

   4) luffing cylinders,

   5) pivots;

d) gearing:

   1) slewing gears,

   2) worm gears;

e) fall wires:

   1) floating blocks,

   2) master links,

   3) turnbuckles,

   4) shackles;

f) hydraulic power packs:

   1) oil and filters,

   2) hoses and ferrules,

   3) pipes and clamps,

   4) valves,

   5) gauges,

6) pump,

7) reservoir;

g) stored power systems:

1) cylinders,

2) pipework,

3) hoses and connections,

4) gauges,

5) accumulator pre-charge and final pressures;

h) electrical systems:

1) starter box,

2) limit switches,

3) wiring,

4) motors;

i) mechanical restraints:

1) gripes wires,

2) harbour pins,

3) bowsing systems,

4) tricing systems;

j) remote controls.

8.7 Module 5 — Winches

8.7.1 Element 5.1 — Specific rules and regulations requirements relating to winches

Training staff shall explain the procedures for inspection, maintenance, thorough examination, operational testing, overhaul and repair of winches in accordance with manufacturer's technical documentation, including:

a) SOLAS Regulation III/20.11.1[7];

b) IMO Requirements, section 6, paragraphs 6.2.9.5, 6.2.10, 6.3.1[5].

8.7.2 Element 5.2 — Design and construction of winches

Training staff shall explain the design, construction and function of the individual components that are found in a range of specific types of winches (see Table A.1), including:

a) braking systems;

b) manual raise/payout;

c) gearing;

d) electrical systems;

e) hydraulic systems.

8.7.3 Element 5.3 — Annual thorough examination and operational test of winches

8.7.3.1 Tolerances measurements and free play

Training staff shall explain the specific tolerances, measurements and free play in relation to the applicable individual components that are found in a range of specific types of winches (see Table A.1).

8.7.3.2 Thorough examinations

Training staff shall explain, demonstrate, and then allow candidates to practice, how to carry out the annual thorough examination for a range of specific types of winches (see Table A.1) to confirm the winch operates correctly and is in a satisfactory condition. The examination shall include visual and physical examinations, as applicable, to evaluate corrosion, misalignments, deformation, cracks, wear and excessive free play. Routine maintenance requirements shall also be carried out. As a minimum, this includes:

a) tooling requirements;

b) strip down and reassembly sequence of the brake housing;

c) cleaning and lubricating of components;

d) winch foundation and fixing bolts;

e) mechanical static/holding brake systems:

   1) brake arm,

   2) pads with friction material,

   3) bands with friction material,

   4) multiple disks with friction material;

f) hydraulic static/holding brake systems:

   1) brake arm,

   2) hydraulic operating levers,

   3) pipework and fittings,

   4) multiple disks with friction material;

g) centrifugal brake with:

   1) friction pads,

   2) hydraulic pumps;

h) clutches:

   1) overrunning,

   2) freewheel,

   3) sprags;

i) gearing:

   1) spur and pinions,

2) reduction gearing,

3) planetary gearing,

4) chains;

j) remote control systems;

k) power supply systems;

l) hydraulic systems:

1) accumulators,

2) hoses,

3) fixtures and fittings;

m) trouble shooting.

8.7.3.3 Annual operational test

Training staff shall explain, demonstrate, and then allow candidates to practice, how to safely operate a specific range of winches (see Table A.1) and carry out the annual function test using the following methods and configuration of load:

a) load calculations using load cells;

b) load calculations using water or another suitable load mass;

c) annual operational test stated in the IMO Requirements, section 6, paragraph 6.2.10[5], using an equivalent load mass to a survival craft;

d) following the tests, the stressed structural parts shall be re-inspected where the structure permits the re-inspection.

8.7.4 Element 5.4 — Five-year thorough examination, overhaul and overload operational test of winches

8.7.4.1 Thorough examinations

Training staff shall demonstrate, and then allow candidates to practice, how to dismantle and reassemble specific applicable components, to thoroughly examine, overhaul, verify measurements and tolerances against design requirements, clean, lubricate and replace parts (where required) for a range of winches (see Table A.1). This shall include as a minimum, but not be limited to, the applicable components listed in 8.7.3.2.

8.7.4.2 Overhaul

Training staff shall demonstrate, and then allow candidates to practice, how to carry out the overhaul requirements for a specific range of winches (see Table A.1), including but not limited to:

a) wire rope:

1) twin fall,

2) single fall;

b) clutch;

c) brake pads;

d) lubricants.

8.7.4.3 Overload operational test

Training staff shall explain, demonstrate, and then allow candidates to practice, how to safely operate and carry out the five-year overload test on a specific range winches (see Table A.1) by the following method and load configuration:

a) five-year operational test of the winches of the launching appliances stated in the IMO Requirements, section 6, paragraph 6.3.1[5];

b) following these tests, the stressed structural parts shall be reinspected where the structure permits the re-inspection.

9 Level 1 service technician stage 2 controlled environment experience and assessment

9.1 General

The purpose of the level 1 service technician stage 2 controlled environment experience and assessment is to holistically assess the knowledge and skills obtained by candidates throughout the initial and level 1 stage 1 technical training on a complete system.

The level 1 service technician stage 2 controlled environment experience and assessment is designed to support the training and assessment in the IMO Requirements, section 8 paragraphs 8.2.1.4 to 8.2.1.7[5]. This shall be achieved by scenario-based exercises that shall allow the candidates to be assessed in a simulated work environment under controlled conditions. Successful candidates shall be awarded a level 1 certificate.

9.2 Candidate pre-requisites

Candidates shall:

a) hold a valid Initial Service Technician certificate;

b) have successfully completed level 1, stage 1 training.

9.3 Aims and objectives

9.3.1 Aim

This experience and assessment gives candidates the opportunity to demonstrate competence by carrying out annual and five- yearly interventions on complete systems.

9.3.2 Objectives

The objectives are to ensure candidates:

a) can interpret technical documentation developed by the manufacturers and apply the information to their role;

b) can identify, interpret and apply to their role key legislation, industry guidelines, rules, regulations and conventions;

c) can identify, interpret and apply to their role the procedures for maintenance, thorough examination, operational testing, repair and overhaul on a range of lifeboats (including free-fall lifeboats), rescue boats (including fast rescue boats), launching appliances and on-load release gear;

d) have the required underpinning knowledge and practical skills to carry out maintenance, thorough examination, operational testing, repair and overhaul on a range of lifeboats (including free-fall lifeboats), rescue boats (including fast rescue boats), launching appliances and on-load release gear;

e) can write reports and complete associated documentation;

f) can demonstrate in their working environment basic safety and awareness.

10 Learning outcomes of level 1 service technician stage 2 controlled environment experience and assessment

10.1 General

During the scenario exercises, the candidates shall be required to demonstrate their skills and understanding in key areas.

See Tables C.1 and C.2 for examples of assessment checklists.

10.2 Practical learning outcomes

To successfully complete the level 1 service technician stage 2 controlled environment experience and assessment, candidates shall be able to demonstrate:

a) ability to liaise and brief the appropriate persons in relation to the scope of work;

b) ability to identify, verify, interpret and apply the documents required to carry out maintenance, thorough examination, operational testing, repair and overhaul of lifeboat (including free-fall lifeboats), rescue boats (including fast rescue boats), launching appliances and on-load release gear, as applicable;

c) how to interpret technical documentation developed by the manufacturers and apply the information to their role;

d) how to carry out an annual thorough examination and operational test for a complete system that includes outrigger davit with a gravity-lowering electric hoisting winch, totally enclosed lifeboat with a sprinkler and air system, and on-load release gear;

e) how to carry out an annual thorough examination and operational test for a complete system that includes roller or pivoting or luffing davit with a gravity-lowering electric hoisting winch, open or partially enclosed lifeboat with offload release gear;

f) how to carry out an annual thorough examination and operational test of a free fall "A" frame davit with a hydraulic hoisting and lowering winch;

g) how to carry out an annual thorough examination and operational test of a complete system that includes a "A" frame or single arm slewing davit with a gravity-lowering electric hoisting winch, fast rescue boat with inflating self-righting system;

h) how to carry out a five-year thorough examination, overhaul and overload operational test on a complete system;

i) basic safety and awareness in their working environment;

j) the ability to write accurate reports and complete associated documentation in order to issue a statement of fitness for purpose based on the IMO Requirements, paragraph 5.3 [5].

11 Duration and timing of level 1 service technician stage 2 controlled environment experience and assessment

The optimum recommended contact time for the assessments is 20 h. Contact time does not include course administration, lunch and refreshment breaks.

Annex A
(informative)

Equipment covered by the training

Table A.1 — Exercise assessment system type breakdown

Survival craft types	Davit types	Winch types	Release gear types
Lifeboat a) with sprinkler and air system **Lifeboat** a) Single fall or b) Twin fall or c) Free fall **Lifeboat** a) Open or b) Partially enclosed **Rescue boats** a) Single fall rescue boat or b) Fast rescue boat	a) Fixed outrigger b) Free fall ramp c) Free fall A-frame d) Roller track gravity e) Hydraulic/luffing gravity-lowering f) Single arm slewing	**Twin drum** a) Gravity-lowering/ electric hoisting 1) Holding/static brakes with friction pads 2) Holding/static brakes with mechanically operated multiple disks. 3) Holding/static brakes, multiple disks, hydraulically operated 4) Hydraulic pump lowering brake 5) Centrifugal brakes with friction pads b) Gravity-lowering hydraulic hoisting **Single drum** a) Gravity-lowering/ Electric hoisting 1) Holding/Static brakes with friction pads 2) Centrifugal brakes with friction pads b) Hydraulic lowering and hoisting	**Hook assemblies** a) Off load/On-load – lift not over centre release gear 1) Flat to flat rotating cams 2) Forward or reverse curve to curve rotating cams 3) Curve to flat rotating cams 4) Up and down pins b) On-load/Off load – lift over centre release gear c) Free fall hydraulic d) Automatic – lift over centre e) Off load – lift over centre **Devices for activating release** a) Central release units. b) Hydrostatic interlock with diaphragm c) Hydrostatic interlock with float d) Electronic sensors

Annex B
(informative)

Assessment checklist — Level 1 service technician stage 1 technical training

NOTE Trade names or trademarks of products given in this annex are examples of suitable products available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of these products.

Table B.1 — Assessment checklist — Module 1

CANDIDATE NAME:				
COMPANY NAME:				
START DATE:			**END DATE:**	
Module 1 – Work, health and safety issues while conduction activities on board			Assessment results	
ASSESSMENT CRITERIA		On completion of this training, the candidate should be able to:	Check mark initials	Evidence source[a]
1	Identify the people who should be informed and the documentation that need to be checked, verified and completed before commencing work.			VQ /WT
2	Explain the safety checks that need to be considered before commencing work on lifeboat (including free fall lifeboats) rescue and fast rescue boats, launching appliances and release gear.			VQ /WT
3	Explain specialized equipment requirements including PPE.			VQ /WT
4	Explain which documents that need to be completed, consulted, interpreted and applied, and to inspect, maintain, thoroughly examine, operationally test, overhaul and repair lifeboat (including free fall lifeboats) rescue and fast rescue boats, launching appliances and release gear.			VQ /WT
[a] Source of evidence: O = observation; S = simulation; VQ = verbal questioning; WT = written questions.				
√ = COMPETENT IN RELEVANT CRITERIA **O = NOT YET COMPETENT IN RELEVANT CRITERIA**. This may be overwritten with a √ if the candidate/s, following additional training, subsequently become competent in those particular criteria.				
INSTRUCTOR/ASSESSOR COMMENTS				

Table B.2 — Assessment checklist — Module 2

Module 2 – Survival Craft		Assessment results	
ASSESSMENT CRITERIA	On completion of this training, the candidate should be able to:	Check mark initials	Evidence source [a]
5	Identify and explain the function of the individual components related to lifeboats, rescue boats including fast rescue boats.		VQ /WT
6	Identify and explain the specific lubricant requirements for lifeboats, rescue boats and fast rescue boats.		

Table B.2 *(continued)*

7	Explain the specific procedures that apply to the inspection, maintenance, thorough examination, operational testing, overhaul and repair of lifeboats (including free fall lifeboats), rescue boat including fast rescue boat supporting IMO Resolution MSC.402 (96), paragraph 6.2.3		VQ /WT
[a] Source of evidence: O = observation; S = simulation; VQ = verbal questioning; WT = written questions.			
√ = COMPETENT IN RELEVANT CRITERIA **O = NOT YET COMPETENT IN RELEVANT CRITERIA**. This may be overwritten with a √ if the candidate/s, following additional training, subsequently become competent in those particular criteria.			
INSTRUCTOR/ASSESSOR COMMENTS a) **Types:** Twin fall, totally enclosed lifeboats with sprinkler and air system, such as: **Make:** xxx; **Model: xxx; series** b) **Type**: Single fall totally enclosed lifeboats with sprinkler and air system such as; **Make:** xxx; **Model: xxx; series** c) **Type:** Twin fall partially enclosed lifeboat such as: **Make:** xxx; **Model: xxx; series** d) **Type:** single fall rescue boats, fast rescue boats such as: **Make:** xxx; **Model: xxx; series**			

Table B.3 — Assessment checklist — Module 3

Module 3 – Release gear **On load**.		Assessment results	
ASSESSMENT CRITERIA	On completion of this training, the candidate should be able to:	Check mark initials	Evidence source [a]
8	Explain the specific design and construction features of the specific various makes and types of release gear.		VQ /WT
9	Identify and explain the function of specific individual components that make up the distinct designs associated with the common makes and types of release gear.		VQ /WT
10	Explain the common faults that can occur and potential solutions to resolve them in relation to the specific common designs of makes and types of release gear.		VQ /WT
11	Identify and explain the generic maintenance and examination criteria in relation to release gear.		VQ /WT
12	Identify and explain the specific procedures to carry out; maintenance thorough examination, operational testing, repair and overhaul that cover the specific designs associated with the common makes and types of release gear found in lifeboats (including free-fall lifeboats), rescue and fast rescue boats.		VQ /WT
[a] source of evidence: O = observation; S = simulation; VQ = verbal questioning; WT = written questions.			
√ = COMPETENT IN RELEVANT CRITERIA **O = NOT YET COMPETENT IN RELEVANT CRITERIA**. This may be overwritten with a √ if the candidate/s, following additional training, subsequently become competent in those particular criteria.			

Table B.3 *(continued)*

Module 3
INSTRUCTOR/ASSESSOR COMMENTS
a) **Type**: On-load lift not over centre such as **Make:** William Mills **Model:** Titan series,
b) **Type**: Lift-over-centre such as **Makes**; SSI: **Model**; Triple 5 **series**
c) **Type**: Offload such as; **Make** xxx: **Model** xxx, **series**
d) **Type**: Free fall hydraulic such as; **Make** xxx: **Model** xxx, **series**
e) **Type**: Automatic such as; **Make** xxx: **Model** xxx, **series**

Table B.4 — Assessment checklist — Module 4

Module 4 – Davits			Assessment results	
ASSESSMENT CRITERIA		On completion of this training, the candidate should be able to:	Check mark initials	Evidence source [a]
13	Explain the various design and construction features of davits.			VQ /WT
14	Explain the common faults that can occur and potential solutions to resolve them in relation to the specific designs of davits.			VQ /WT
15	Explain how to carry out non-destructive tests on davit components to check for cracks and the integrity of welds.			VQ /WT
16	Identify and explain the function of the individual components of davits used for launching lifeboats, rescue boats and davit-launched liferafts.			VQ /WT
17	Identify and explain the specific procedures to carry out; maintenance thorough examination, operational testing, repair and overhaul of specific makes and types of davits used to launch lifeboats (including free-fall lifeboats), rescue and fast rescue boats.			VQ/WT
[a] Source of evidence: O = observation; S = simulation; VQ = verbal questioning; WT = written questions.				
√ = COMPETENT IN RELEVANT CRITERIA **O = NOT YET COMPETENT IN RELEVANT CRITERIA**. This may be overwritten with a √ if the candidate/s, following additional training, subsequently become competent in those particular criteria.				
INSTRUCTOR/ASSESSOR COMMENTS **Type:** Fixed outrigger such as; **Make** xxx:**Model** xxx, **series** **Type:** gravity roller track such as; **Make** xxx:**Model** xxx, **series** **Type:** hydraulic pivoting/luffing such as; **Make** xxx:**Model** xxx, **series** **Type:** single arm slewing such as; **Make** xxx:**Model** xxx, **series** **Type:** A-frame such as; **Make** xxx:**Model** xxx, **series** **Type:** free fall such as; **Make** xxx:**Model** xxx, **series**				

Table B.5 — Assessment checklist — Module 5

Module 5 – Winches			Assessment results	
ASSESSMENT CRITERIA		On completion of this training, the candidate should be able to **explain**:	Check mark initials	Evidence source [a]
18	Explain the specific design and construction features of the various common makes and types of winches.			VQ/WT /O
19	Explain the common faults that can occur and potential solutions to resolve them in relation to the specific designs of winches.			VQ /WT

Table B.5 *(continued)*

20	Identify and explain the function of specific individual components associated with specific makes and types of winches used to launch lifeboats, rescue boats and davit-launched liferafts.		VQ /WT
22	Identify and explain the specific procedures to carry out; maintenance thorough examination, operational testing, repair and overhaul, in relation to the distinct designs associated with specific makes and types of winches used to launch lifeboats (including free-fall lifeboats), rescue and fast rescue boats.		VQ /WT
22	Explain the construction of wire ropes.		VQ /WT
23	Explain the specific procedures that apply to the inspection, maintenance, thorough examination, exchange and discard of wire ropes.		VQ /WT
[a] Source of evidence: O = observation; S = simulation; VQ = verbal questioning; WT = written questions.			
√ = COMPETENT IN RELEVANT CRITERIA **O = NOT YET COMPETENT IN RELEVANT CRITERIA**. This may be overwritten with a √ if the candidate/s, following additional training, subsequently become competent in those particular criteria.			
Module 5 **INSTRUCTOR/ASSESSOR COMMENTS** a) **Type**: Twin drum, Gravity-lowering, electric hoisting such as; **Make**: Palfinger: **Model** W series, b) **Type:** Single drum such as; **Make**: SSI **Model** W 5000 series c) **Type**: Gravity-lowering hydraulic hoisting such as; **Make**: xxx **Model** xxx series d) **Type**: Hydraulic Hoisting and lowering such as; **Make**: xxx **Model** xxx series			

Table B.6 — Assessment checklist 2 — Module 1

Module 1 – Work, health and safety issues while conduction activities on board			Assessment results	
ASSESSMENT CRITERIA		On completion of this training, the candidate should be able to **demonstrate**:	Check mark initials	Evidence source [a]
1	The safety checks that need completing prior to commencing work on lifeboats (including free fall lifeboats) rescue and fast rescue boats, launching appliances and release gear.			O/VQ
2	How to interpret and apply the relevant documentation for the maintenance, thorough examination, operational testing, overhaul and repair of lifeboats (including freefall lifeboats) rescue boats (including fast rescue boat), launching appliances and release gear.			O /VQ
3	How to complete manufacturer's checklist and compile reports.			O/VQ
4	How to carry out the required safety checks and attach maintenance/hanging off pendants, secondary safety and fall prevention devices.			O/VQ
[a] Source of evidence: O = observation; S = simulation; VQ = verbal questioning; WT = written questions.				
√ = COMPETENT IN RELEVANT CRITERIA **O = NOT YET COMPETENT IN RELEVANT CRITERIA**. This may be overwritten with a √ if the candidate/s, following additional training, subsequently become competent in those particular criteria.				
Module 1 **INSTRUCTOR/ASSESSOR COMMENTS**				