SEAFARERS TRAINING CENTER INC

PROFICIENCY IN FAST RESCUE BOATS

(Regulation VI/2, A-Section VI/2 Paragraph 7-12, Table A-VI/2-2)

AIMS

This course aims to provide the training for candidates to launch and take charge of a fast rescue boat, in accordance with Section A-VI/2 of the STCW Code adopted by the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers as amended, including the Manila amendments 2010.

OBJECTIVE

This syllabus covers requirements of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, as amended Chapter VI, Regulation VI/2, Section A-VI/2, Paragraph 7-12 and Table A-VI/2-2. On meeting the minimum standard of competence in fast rescue boats, a trainee will be competent to handle and take charge such boats during or after launch in adverse weather and sea conditions. They will also be able to operate a fast rescue boat engine.

ENTRY STANDARDS

For admission to the course seafarers must be medically fit and the holder of a certificate of proficiency in Survival Craft and Rescue Boats other than fast Rescue boats in accordance with regulation VI/2, paragraph 1 of STCW code and amended.

COURSE CERTIFICATE

On successful completion of the course and demonstration of competence, a certificate may be issued, in accordance with Regulation VI/2, paragraph 2, certifying that the holder has met the standard of competence specified in table A-VI/2-2 of STCW Code, as amended.

Such a certificate may be issued only by centers approved by the Administration.

COURSE INTAKE LIMITATIONS

The maximum number of trainees attending each session will depend on the availability of instructors, equipment and facilities available for conducting the training. It should not exceed the number of person which the fast rescue boats the used is permitted to carry, and should not, at any time exceed that which will allow sufficient opportunity for each trainee to have adequate practical instruction in procedures for the proper use of systems and equipment.

It is recommended that the number of trainees should not exceed 20 and practical training should be undertaken in small groups.

STAFF REQUIREMENTS

The instructor shall have appropriate training in instructional techniques and training methods (STCW Code A-I/6, para. 7).

All training and instruction should be given by properly qualified personnel. The instructors should have necessary knowledge, training and experience in preparation, embarkation, launching and operation of fast rescue boat with equipment which is used on board ships. Depending on the number being trained, assistant instructors may be needed to supervise groups of trainees during drills and to take charge of the fast rescue boats and standby rescue boat. All instructors should be qualified in first aid and resuscitation techniques.

TRAINING FACILITIES AND EQUIPMENT

Ordinary classroom facilities and an overhead projector are required for the lecturers. When making use of audiovisual material such as videos or slides, make sure the appropriate equipment is available.

A large table or benches on which equipment can be demonstrated should be provided. Showers, a changing room with lockers for trainee`s dry clothing and drying room for wet gear should be provided near the exercise area.

The practical lessons require access to open waters where a variety of sea states may be encountered.

The following items of equipment:

Agreement with PHOENIX MARINE SALVAGE S.A. ships company. Use their ships for practice.

1. One approved fast rescue boat complying with chapter V of the LSA Code.
2. One set of davit to house that fast rescue boat, sited so as to allow launching into the water;
3. One portable hoist unit suitable for recovery of the fast rescue boat;

4. One approved survival craft boat/rescue boat/fast rescue boat with inboard motor engine and a set of oars with a set of launching davits to house the boat and positioned so as to allow launching into the water.
5. One portable hoist unit suitable for recovery of boats;

6. Sufficient dry suits and wet suits; lifejackets for all trainees, instructors for survival craft and fast rescue boats, thermal protective aids, anti- exposure suit;

7. Three 2- way radiotelephones approved for use in the boats and by the shore rescue team;
8. One complete set of fast rescue boat`s equipment;

9. One complete set of equipment for boat listed in item 4 above.

10. One stretcher of suitable type for use in exercises; and

11. Safety/first aid equipment comprising;

- Standby rescue boat
- First aid kit
- Stretcher
- Resuscitation kit with oxygen/suction unit

TEACHING AIDS (A)

A1 Instructor Manual (Part D of the Course)
A2 Specimen muster list
A3 Specimen training and survival manual and on-board maintenance manual
A4 Videos

V1 Cold Water Casualty (Code No. 527)
V2 Man Overboard (Code No. 644)
V3 Search and Rescue Co-ordination (Code No. 574)
V4 Helicopter Assistance at Sea (Code No. 106)
V5 Personal Survival at Sea Series Part 1: Muster Lists, Drills & Helicopter Operation (Code No. 678)

Available From: Video Marine International Ltd
84 Newman Street London W1P
3LD, UK
Tel: +44(0)20 7299 1800
Fax: + 44(0)20 7299 1818

e-mail: mail videotelmail.com
URL: www.videotel.co.uk

Audio-visual examples listed above ay be substituted by other similar audio-visual Material at the discretion of the training provider and administration.

IMO REFERENCES (R)

R1 the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1995 (STCW 1995), 1998 edition (IMO Sales No. 938E)

R2 International Convention of the Safety Life at Sea, 1974 (SOLAS 1974), as Amended (IMO Sales No. 110E)

R3 IMO Live Saving Appliances Code (LSA Code) (IMO Sales No. 982E)

R4 International Aeronautical and Maritime Search and Rescue Manual (IAMSAR Manual) (IMO Sales No. 960E)

R5 Assembly resolution A. 656 (16)-Fast Rescue Boats

R6 Assembly resolution A.771 (18) - Training requirements for Crews for crews of fast boats

INTERNET WEBSITE REFERENCES

Further useful material to support the preparation of lessons, teaching and assessment may be found amongst the following websites:

W1 DNV-STCW 95 Training and Qualification Support
http://www.dnv.com/stcw/Rev 1

W2 USCG STCW Home Page
http://www.uscg.mil/STCW/index.htm

W3 USCG Exam Question Bank
http://www.uscg.mil/hq/g-m/marpers/examques/index.htm

W4 USCG NVICs published in the 90s
http://www.uscg.mil/hq/g-m/nvic/indexx90.htm

W5 ILO Sectoral Activities; Shipping
http://www.ilo.org/public/english/100secto-sectors/mariti.htm

W6 ILO Database of International Labour Standards
http://ilolex.ilo.ch:1567/public/english/50normes/infleg/iloeng/index.htm

W7 PC Maritime Ltd
http://www.pcmaritime.co.uk/comm/index.htm?/comm/products.htm

W8 MARINTEK-Information Technology
http://www.marintex.sintef.no/mt23doc/mitd/programme/b2-98m.html

TEXTBOOKS (T)

No specific textbooks are recommended for trainee use.

BIBLIOGRAPHY (B)

Since this is essentially a practical course, no textbook has been recommended for trainee use. Supplementary information, which may be of assistance to instructors in preparing lessons, is contained in the following publications

B1 C.H. Wright, Proficiency in Survival Craft Certificates (Glasgow, Brown, Son and Ferguson, 1988) (ISBN 0 851745555)

B2 D.J. House, Marine Survival and Rescue Systems (London, Witherby & Co. 19978) (ISBN 1 85609 127 9)

COURSE OUTLINE

COMPETENCE 1: Take charges of a fast rescue boat during and after launch

COURSE	APROXIMATE TIME (HOURS)
Knowledge, Understanding And Proficiency	Lecture, demonstration and practical work
Introduction and safety	0.5
1. Construction and outfit of fast rescue boats and individual 1.1 Construction and outfit of fast rescue boats 1.2 individual equipment	1.0
2. Particular characteristics and facilities of fast rescue boats	0.5

3. Navigational and safety equipment available in fast rescue boat 3.1 Boat equipment 3.2 Navigation equipment 3.3 Safety equipment 3.4 Emergency equipment	1.0
4. Safety precautions during launch and recovery of fast rescue boat 4.1 Launching arrangements 4.2 Launching and recovery 4.3 Launching and recovery in rough seas 4.4 Drills in launching and recovery of fast rescue boats	3.5
5. How handle a fast rescue boat in prevailing and adverse weather and sea conditions 5.1 Clearing the ship's side and coming alongside 5.2 Maneuvering at slow speed 5.3 Maneuvering at fast speed 5.4 Boat handling in adverse weather 5.5 Towing 5.6 Pacing and transfer 5.7 Helicopter operation 5.8 Drills in boat handling 5.9 Drills in towing 5.10 Drills in pacing and transfer	7.5
6. Procedures for righting capsized fast rescue boats 6.1 Capsize and righting 6.2 Drills and righting a capsize boat	2.5

COURSE	APROXIMATE TIME (HOURS)
Knowledge, Understanding And Proficiency	Lecture, demonstration and practical work
7. Search patterns and environmental factors affecting their execution 7.1 Initial information and action 7.2 Search pattern 7.3 Rescuing survivors from sea 7.4 Casualty care 7.5 Drills in search and rescue	4.5
8. Assessment of the readiness of fast rescue boats and related equipment for immediate use 8.1 Boat readiness 8.2 equipment readiness	0.5

9.Knowledge of maintenance, emergency repairs, normal inflation and deflation of buoyancy compartments of inflated fast rescue boats	0.5
10. Method of starling and operating a fast rescue boat engine and its accessories 10.1 Inboard motor engines 10.2 Outboard motor engines 10.3 Water jet propulsion 10.4 Drills in engine operation	1.5
TOTAL	23.5

COURSE TIMETABLE

PERIOD DAY	DAY 1	DAY 2	DAY 3	DAY 4
1st PERIOD (1.5 hours)	Introduction and Safety 1. Construction and outfit of fast rescue boats and individual Items of their equipment	4. Safety precaution during launch and recovery of fast rescue boats	5. How to handle a fast rescue boat in prevailing and adverse weather and sea conditions (Continued)	6. Procedures for righting a capsize fast rescue boat (continued) 7. Search patterns and environmental factors affecting their execution
2nd PERIOD (1.5 Hours)	2. Particular characteristics and facilities of fast rescue boats 3. Navigation and safety equipment in a fast rescue boats	4. Safety precaution during launch and recovery of fast rescue boats (continued) 5. How to handle a fast rescue boat in prevailing and adverse weather and sea conditions	5. How to handle a fast rescue boat in prevailing and adverse weather and sea conditions (Continued)	7. Search patterns and environmental factors affecting their execution (continued)
BREAK				
3rd PERIOD (1.5 HOURS)	1.0 Method of starting and operating and fast rescue boat engine and accessories	5. How to handle a fast rescue boat in prevailing and adverse weather and sea conditions (Continued)	5. How to handle a fast rescue boat in prevailing and adverse weather and sea conditions (Continued) 8. Assessment of readiness of fast rescue boats and related equipment for immediate use 9. Maintenance and repairs	7. Search patterns and environmental factors affecting their execution (continued)

4th PERIOD (1.5 HOURS)	4. Safety precaution during launch and recovery of fast rescue boats	5. How to handle a fast rescue boat in prevailing and adverse weather and sea conditions (Continued)	6. Procedures for righting a capsize fast rescue boat	7. Search patterns and environmental factors affecting their execution (continued)

INTRODUCTION AND SAFETY

Standard Training Certification and Watchkeping Code.

The minimum specification for the competences for Fast Rescue Boats can be found in Annex 9 Part A to the STCW Code: Table A-VI/2-2: (adopted on 18 May 2006)

- Understand the construction, maintenance, repair and outfitting of FAST RESCUE BOAT
- Take charge of the launching equipment and appliance, as commonly fitted during launch and recovery
- Take charge of the FAST RESCUE BOAT as commonly fitted during launch and recovery
- Take charge of a FAST RESCUE BOAT after launch
- Operate a FAST RESCUE BOAT engine

Specification for minimum knowledge and skills in Fast rescue boats: According to table A-VI/2-2 (adopted on 18 May 2006)

- Construction and equipment and outfit of FAST RESCUE BOAT and individual items of their equipment
- Knowledge of maintenance, emergency repairs of FAST RESCUE BOAT and the normal inflation and deflation of buoyancy compartment of inflated FAST RESCUE BOAT
- Assessment of readiness of launch equipment and launch appliance of FAST RESCUE BOAT for immediate launch and operation.
- Understanding the operation and limitations of winch, brakes, falls, painters, motion compensation and other equipment as commonly fitted
- Safety procedures during launching and recovery of FAST RESCUE BOAT
- Launching and recovery of FAST RESCUE BOAT in prevailing and adverse weather and sea conditions
- Assessment of readiness of FAST RESCUE BOAT and related equipment for immediate launch and operations
- Particular characteristic, facilities and limitations of FAST RESCUE BOAT
- Procedures for righting of a capsized FAST RESCUE BOAT
- How to handle a FAST RESCUE BOAT in prevailing and adverse weather conditions
- Navigational and safety equipment available in a FAST RESCUE BOAT
- Search patterns and environmental factors affecting their executions
- Method of starting and operating a FAST RESCUE BOAT engine and its accessories.

According the Guidelines on fast rescue boats (resolution A.656(16)); All items of fast rescue boat equipment, with the exception of boat-hooks which should be kept free for

fending off purposes, should be secured within the rescue boat by lashings, storage in lockers or compartments, storage in brackets or similar mounting arrangements, or other suitable means. The equipment should be secured in such a manner as not to interfere with any launching or recovery procedures.

1. CONSTRUCTION AND OUTFIT OF FAST RESCUE BOATS AND INDIVIDUAL ITEMS OF THEIR EQUIPMENT

1.1 Construction and outfit of fast rescue boats.

There are various types of FAST RESCUE BOAT boat, which differ in design and capabilities. The choice of FAST RESCUE BOAT will depend on the purpose for which the boat is to be deployed. However, they can be broken down into three versions, namely:

- Inflatable
- Rigid
- Rigid inflatable

All three boats have advantages and disadvantages in respect of one another. The inflatable FAST RESCUE BOAT generally consists of wooden or aluminium floor panels, held in position by air chambers. The inflatable boat is relatively small, as is the number of air chambers. The stern plate is extra strengthened, in order to suspend an outboard motor. Rescue lines are attached around the inflatable chambers, and the chambers also feature a number of handholds. There are strengthened lifting eyes fitted in the boat, to allow them to be lifted by three or four-point cradle.

Inflatable boat.

These boats are subject to additional requirements in respect of the air chambers, in the LSA code:

- An inflatable FAST RESCUE BOAT must be constructed in such a way that when lifted by a three or four-point cradle, the FAST RESCUE BOAT provides sufficient strength and rigidity to be launched and retrieved with full crew and equipment at 20 +/– 3°C, with overpressure valves not functioning; a strength test with a load test of 1.1; –30°C with overpressure valves operating.
- The inflatable boat must still be able to sail in various sea conditions, after 30 days on deck exposed to various weather conditions.

- The inflatable boat must be additionally equipped with serial number, the name of the maker, brand name and date of manufacture.

- The buoyancy of the inflatable shall consist of at least 5 separate chambers of equivalent volume.
- The floatation bodies must have sufficient residual buoyancy for the number of persons specified (average weight 75 kg) that in the event of the front compartment or floatation chambers on one side becoming punctured, there is still sufficient freeboard.
- Each floatation body must be equipped with a shut-off valve with non-return valve, for inflating or deflating the floatation bodies.
- On the bottom and other susceptible points, additional rubber strengthening must be applied.

Inflatable

Advantages of an inflatable FAST RESCUE BOAT are:

- The boat is not so expensive.
- There is plenty of space in the boat.
- The boat is casualty-friendly.
- The boat is light and easy to handle.
- The boat is maintenance-friendly.

Disadvantages of an inflatable FAST RESCUE BOAT are:

- Light-weight therefore can easily capsize.
- Low sitting position so poor view.
- Uncomfortable in short waves.

Rigid.

These boats may be produced from fire-retardant polyester or aluminium. These boats are built according to the “sandwich” principle. This means a double hull filled with foam which ensures the boat is unsinkable.

Advantages of a Rigid FAST RESCUE BOAT:

- A seaworthy boat (heavy).
- Unsinkable.

Disadvantages of a Rigid FAST RESCUE BOAT:

- A higher freeboard as compared with an inflatable FAST RESCUE BOAT.
- Expensive.
- Difficult to repair.
- Not casualty friendly.
- Heavy boat, so solid launching construction.
- Slower boat.

Rigid

Rigid Inflatable.

The combination of a hard hull and underside surrounded by air chambers is known as a "rigid inflatable" or RIB. By combining the best characteristics of the two types, the RIB is produced. The polyester / aluminium bottom is V-shaped, which is good for the sailing characteristics.

Advantages of an Rigid Inflatable.

- A fast boat.
- Manoeuvrable.
- Average weight.
- Crew-friendly.

- Casualty-friendly.

Disadvantages of an Rigid Inflatable.

- Major discrepancies in sailing characteristics of different RIB' s.
- Less seaworthy.
- Costly.

Rigid Inflatable.

1.2 Individual items of equipment

According to Life-saving appliance (LSA) Code, chapter V, regulation 5.1.2. the equipment must meet the following requirements. All equipment except the boat hooks must be placed in storage areas or in special holders on the boat. The equipment may not get in the way of launching and retrieving the FAST RESCUE BOAT. All items of equipment must be as small and light as possible. The equipment consists of:

- Floating oars to allow rowing in calm water.
- A floating bailer
- A compass with illumination

- A sea anchor with a line of at least 10 metres.
- A painter of sufficient length, attached to an uncoupling system
- A floating line of no less than 50 metres, for towing rafts.
- A waterproof torch for issuing Morse signals, plus spare batteries and bulb
- A whistle or horn
- A waterproof First Aid kit.
- Two rescue lines with rings, line at least 30 metres in length.
- A search light capable of illuminating an object at night at a distance of 180 metres, over a width of 18 metres The light must have an operating time of at least 6 hours, of which 3 hours uninterrupted.
- A good radar reflector.
- TPA' s (thermal protective aids) for 10% of the maximum number of occupants, or at least 2.
- Portable fire-extinguishing equipment of an approved type suitable for extinguishing oil fires.
- Handsfree and watertight VHF radio- communication set

Equipment

Equipment

RADAR REFLECTOR

Extra for rigid boats:

- A boat hook.
- A bucket
- A knife or axe

Extra for inflatables:

- A floating safety knife
- Two sponges
- A hand pump
- A repair set for minor damage
- A safety boat hook.

PAINTER RELEASE

Thermal Protective Aid TPA.

Emergency Steering

Fast rescue boats should be steered by a wheel at a helmsman's position remote from the tiller. An emergency steering system providing direct control of the rudder, water jet or outboard motor should also be provided.

2. PARTICULAR CHARACTERISTICS AND FACILITIES OF FAST RESCUE BOATS

The Fast Rescue Boat shall have a hull length of not less than 6 m and not more than 8.5 m, including inflated structures or fixed fenders.

RESOLUTION MSC.218(82) (adopted on 8 December 2006) AMENDMENTS TO THE INTERNATIONAL LIFE-SAVING APPLIANCE (LSA) CODE

Fast rescue boats shall be provided with sufficient fuel, suitable for use throughout the temperature range expected in the area in which the ship operates, and be capable of manoeuvring, for a period of at least 4 h, at a speed of at least 20 knots in calm water with a crew of 3 persons and at least 8 knots when loaded with its full complement of persons and equipment.

Fast rescue boats shall be self-righting or capable of being readily righted by not more than two of their crew.

water.

Fast rescue boats shall be self-bailing or be capable of being rapidly cleared of

Fast rescue boats shall be steered by a wheel at the helmsman's position remote from the tiller. An emergency steering system providing direct control of the rudder, water jet, or outboard motor shall also be provided.

Engines in fast rescue boats shall stop automatically or be stopped by the helmsman's emergency release switch, should the rescue boat capsize. When the rescue boat has righted, each engine or motor shall be capable of being restarted provided that the helmsman's emergency release, if fitted, has been reset. The design of the fuel and lubricating systems shall prevent the loss of more than 250 ml of fuel or lubricating oil from the propUlsion system, should the rescue boat capsize.

Fast rescue boats shall, if possible, be equipped with an easily and safely operated fixed single-point suspension arrangement or equivalent.

A rigid fast rescue boat shall be constructed in such a way that, when suspended by its lifting point, it is of sufficient strength to withstand a load of 4 times the mass of its full

complement of persons and equipment without residual deflection upon removal of the load.

The normal equipment of a fast rescue boat shall include a VHF radiocommunication set which is hands-free and watertight."

3. NAVIGATIONAL AND SAFETY EQUIPMENT AVAILABLE IN A FAST RESCUE BOAT

3.1 Boat Equipment

All items of fast rescue boat equipment should be as small and of as little mass as possible and should be packed in suitable and compact form.

The normal equipment of every fast rescue boat should consist of:

- sufficient buoyant oars or paddles to make headway in calm seas, and thole pins, crutches or equivalent arrangements which should be provided for each oar and be attached to the boat by lanyards or chains;
- a buoyant bailer;
- a binnacle containing an efficient compass which is luminous or provided with suitable means of illumination;
- a sea-anchor with a hawser of adequate strength not less than 10 m in length;
- a painter of sufficient length and strength, attached to the release device complying with the requirements of SOLAS Regulation III/41.7.7 and placed at the forward end of the rescue boat;
- one buoyant line, not less than 50 m in length, of sufficient strength to tow a liferaft as required by paragraph 1.7;
- one waterproof electric torch suitable for Morse signalling, together with one spare set of batteries and one spare bulb in a waterproof container;
- one whistle or equivalent sound signal;
- a first-aid outfit in a waterproof case capable of being closed tightly after use;
- two buoyant rescue quoits, attached to not less than 30 m of buoyant line;
- a searchlight capable of effectively illuminating a light-coloured object at night having a width of 18 m at a distance of 180 m for a total period of 6 hours and of working for at least 3 hours continuously;
- unless a radar transponder is stowed in the fast rescue boat, an efficient radar reflector;
- thermal protective aids complying with the requirements of SOLAS Regulation III/34 sufficient for 10% of the number of persons the rescue boat is permitted to accommodate or two, whichever is the greater.

In addition to the equipment required previously, the normal equipment of every rigid fast rescue boat should include:

- .1 a boat-hook;
- .2 a bucket;
- .3 a knife or hatchet.

In addition to the equipment required previously, the normal equipment of every rigid/inflated and every inflated fast rescue boat should consist of:

- .1 a buoyant safety knife;
- .2 two sponges;
- .3 an efficient manually-operated bellows or pump;
- .4 a repair kit in a suitable container for repairing punctures;
- .5 a safety boat-hook.

Fast rescue boat should, if possible, be equipped with an easily operated fixed single-point suspension arrangement or equivalent.

Hooks and fastening devices for lowering and hoisting fast rescue boats should be so designed as to have a safety factor of 6 on the ultimate strength in relation to the loads occurring in a fully loaded condition.

3.2 Navigation equipment

Two-way VHF radiotelephone apparatus

On board of survival crafts there are several means of communication. Probably the most effective and reliable is radio communication because it is possible to contact rescuers on a long distance. Not all the systems are permanently installed and should be brought to the lifeboats (and rafts) in case of an emergency the different systems presently in use are:

- VHF radio (Very High Frequency)
- EPIRB (Emergency Position Indicating Radio Beacon)
- SART (Search And Rescue Transponder)

Very high frequency radios

VHF installations come in two types, fixed and portable. Portable sets are used for communication on board the installation. The range and capacity of the batteries of these handsets are limited. In case of an emergency the handsets are used for communication between muster points and bridge, the handsets can be taken inside life boats- and rafts for communication.

The law requires the following channels to be installed:

- Channel 6 - Intershipl
- Channel 15 - Intership
- Channel 16 - Ship to ship
- Channel 17 - Intershipl
- Channel 67 - Search and rescue working
- Channel 70 - Digital Selective Calling DSC

The fixed installations are built into lifeboats and will generally have more channels to choose from, but will at least have the above mentioned. The range of a maritime VHF installation working on full power (25watt) will have maximum 30 –60 nautical miles, depending on weather conditions and antenna height.

In case of an emergency, channel 16 can be used to transmit a Mayday call; however this not anymore guarded for 24 hours. So use the digital selective calling frequencies instead. By a spoken message is case of an emergency we always use the Standard English Marine vocabulary. An emergency call will be send as:

- MAYDAY MAYDAY MAYDAY!
  This is: (name and call sign 3x)

- MAYDAY!
  This is: (name and call sign 1x) Our position is: (degrees/minutes or distance/bearing, name of installation or vessel)

Give necessary info:

- Nature of distress.
- What assistance is required.
- Amount of people involved.
- Other useful information.

DSC

With the implementation of the GMDSS convention we also changed from spoken emergency calls in DSC Digital Selective Calling. Sending in digital language is clearer and will be less disturbed by bad radio signals. For DSC special frequencies are appointed for use.

Emergency position-indicating radio beacons (EPIRBs)

Emergency Position Indication Radio Beacons are required on ships and offshore installations. The beacons are self-powered by means of batteries and transmit signals to satellites. These satellites are from the Compass/Sarsat system, an international co-operative search and rescue effort. The system ensures a global coverage, 24 hours a day and contributes to help saving lives of seaman in distress. The E.P.I.R.B., once operated, automatically transmits a signal that is recognized by the satellite as an emergency call. The satellite will determine the position of the beacon and will then pass the information through to an earth station. From here the information is transferred to the Rescue Co-ordination Centre, nearest to the emergency position of the beacon. From this center the SAR operation starts or the information is relayed to another SAR center. Additionally the EPIRB's will send a signal out that can be picked up by SAR helicopters and also vessels equipped with the necessary homing devices. The homing devices will send the searching party straight to the person or persons in distress.

Search and rescue transponder beacons (SARTs)

The Search and Rescue Transmitter SART is a transmitter which can be used to take with you in the lifeboat or life raft. It can also be possible that the life boat is equipped with a SART. This is by the way not a requirement. The Search and Rescue Transmitter SART is a passive beacon until interrogated by radar frequency. It will then automatically transmit series of pulses, which are displayed on the radar screen of passing aircraft or vessels. The pulses are very obvious and therefore easy to recognize by the radar operator. Once recognized the navigator can plot the emergency position, the system is only for short range.

3.3 Safety Equipment

Distress signals, signaling equipment and pyrotechnics

Pyrotechnics are part of the signaling equipment found in the inventory of lifeboats, life rafts, ships, aero planes and helicopters. They may play a vital part in locating persons in distress. Warning: All pyrotechnics should be handled with care. They can be dangerous when safety is disregarded. Since there are many different types of pyrotechnics and various manufactures, always make sure to read the operating instructions first. In order to ensure a safe way of activating the signal, even by people who do not know how to read the instructions are also depicted in so-called pictograms.

Rocket/parachute flare

A flare is a good pyrotechnics to attract attention over great distance. Useable during day or night, not with fog and low clouds. The visibility in clear weather is ranging from 30 to 40 sea miles. When a parachute flare is activated, a rocket is fired to a height of approximately 300 meters.

When the flare is ignited a bright light burns for about 1 minute, the parachute keeps the flare in the air as long as possible. During the ascent of the rocket, the wind influences the tail in such a manner that the rocket turns into the wind. The flare will drift over your position when hanging on the parachute, giving an indication of your location.

Never use flares when helicopters are nearby! They may damage the aircraft and interfere with your own rescue!

Hand Flares

Hand flares are used to pinpoint your position. Effective both day and night, not with foggy weather. The visibility is around 6 sea miles in clear weather. Never look into the flare. The light may damage your eyes. These flares provide their own oxygen when burning which means that splashing waves will not extinguish the flare. They will continue burning even when held under water. These hand-held flares burn for about 1 minute.

Smoke signals

The use of the smoke signal is to pinpoint your position and to indicate the wind direction. Effective only in daytime, not with foggy weather. The visibility depends on the wind force.

Visual and audible distress signals

Signal mirror or heliograph; it is possible to attract attention over long distances, up to 20 miles by reflecting the sun rays to a ship, aero plane or coastline. The limitations are that the sun must be shining and it doesn't work 360 degrees around.

Signaling torch. (Flash light); very valuable source of light inside your life raft/life boat. It can also be used to attract attention at close range for instance to contact other life rafts or lifeboats. Morse code can also be sent. The torch is waterproof and spare batteries are provided as well.

Whistle; in the inventory we also find a whistle, just like the ones we have on our life jackets or survival suits. Not very effective, since the sound of waves and wind will in most cases overrule the whistle.

Radar reflector; this will provide in a better reflection on the radar screen of a searching vessel, airplane or helicopter. It is important that the radar reflector is installed in a correct way. (Not to be used together with SART)

It is highly recommended that a minimum of three personal distress flares (type B) be carried by all crewmembers embarking on small SAR vessels during hours of darkness. Flares are normally carried in a pocket of the equipment vest, flotation jacket or dry suit or in a fanny pack with other items of personal safety gear. The type B distress flare

produces at least two red stars at intervals of not less than 15 seconds. The stars are projected to an altitude of not less than 90 m (300 ft.). The stars burn with a luminosity of not less than

5,000 candle for a period of not less than four seconds, and burn out before touching the sea. The type B distress signal may contain a firing device capable of throwing the stars automatically or may use a cartridge-firing device that requires loading for each star.

Warning: SAR crewmembers should not be asked to carry and use cartridge-fired devices as personal flares. Firing these devices by a crewmember in the water requires a degree of coordination and dexterity not needed for self-contained devices. Coordination and dexterity may be depressed by the effect of hypothermia, causing the act of firing the cartridge type to be very difficult. It is recommended that SAR crews use the compact type of flares to allow easy fitting and comfort in pockets of work suits and clothing. All SAR personnel should be well informed regarding the firing procedure for these flares. Seek training if necessary.

All distress flares approved for marine use in Canada have an expiry date of four years from the date of manufacture. Check the dates on your flares regularly and take steps to procure replacements before the expiry date.

Flares should be inspected weekly by the individual to whom they are issued, outside the vessel or buildings in an open area. Handle flares with care, and be particularly careful not to pull on the launch cord or chain while conducting the inspection.

- Check the manufacturing date on the flares to ascertain whether they are still within the four-year period of approval. If expired, replace the flares with fresh ones and dispose of the outdated flares in the manner approved for your region;
- Check the flares for splitting, cracking, loose caps or any signs of deterioration;
- Check the waterproof wrappings on your flares to ensure they are still watertight. If the wrapping is not watertight, replace it with a new zip-top bag;
- Replace the flares into their designated stowage pouch or pocket.

Whistle

The whistle is a sound-signalling device that can be heard at distances greater than 300 m at sea. It is an effective and inexpensive item of personal protective equipment that

has been instrumental in locating and saving many lives at sea. Yet, care and maintenance of this simple piece of equipment are often ignored.

A whistle should be attached to every crewmember's equipment vest zipper. Units that do not have equipment vests may attach the whistles to the zippers of PFDs, jackets and flotation suits.

Whistles should be of a type intended for marine use, such as standard life jacket whistles. Choose a unit that has no moving parts (peas), is compact and break-resistant and, above all, produces a loud piercing tone during use.

Whistles should be checked frequently for cracks, breaks, or deterioration. Ensure that the whistle remains securely fastened to the item of personal flotation and that it can be brought to the wearer's mouth without removing it. In addition, if the wearer is immersed in water, the whistle must reach his or her mouth without the need to put the face into the water. Test the whistle by blowing into it. Replace any whistle that fails the physical examination or fails to sound a loud shrill tone.

Heliograph

In addition to flares, strobe lights, and whistles, some SAR units issue an emergency-signalling mirror. The emergency signalling mirror is a compact unit that is used to attract the attention of passing aircraft or boats by reflecting light at them. The reflected light may be seen from two to four miles from the point of origin. The signaling mirror is used and maintained in accordance with the manufacturer's specifications. A weekly inspection of the mirror should be conducted to ensure that the surface is clean and polished, and the lanyard secure and in good condition.

Dye Marker

This device releases into the water a green dye that greatly increases visibility from the air.

Flashlight

A flashlight can be used to attract attention on the water and serve as an effective tool at night on the boat. Waterproof flashlights are preferable for obvious reasons. Check the batteries once a week and lubricate the o-rings with silicone grease or spray before closing the flashlight. Rinse your flashlight with fresh water after exposure to salt water.

Portable VHF Radio

Many crew are also carrying a waterproof portable VHF radio in their vest. The portable radio can be used to call for help when needed or anytime one crewmember gets separated from the rest of the crew. Note that some new models are compatible with GMDSS (a useful feature).

Knife

A knife is always handy. It is a good idea to have one in one of the pockets of the equipment vest. A lanyard should be used to keep the knife attached to the vest. Choose a blade that is designed to cut lines and that has good resistance to corrosion. Knives designed for scuba diving and kayaking often provide adequate resistance to corrosion. Always rinse your knife with fresh water after exposure to salt water. Dry your knife before putting it into storage. Keep your knife sharp and lubricate the blade once in a while with a fine layer of oil to increase resistance to corrosion.

3.4 Emergency equipment

To lend special attention to the problems or difficulties that are going away to present in the diverse situations of emergency. In case of fire that puts in danger the survival boats, that to put them afloat to protect them. If it is possible, the life rafts must move to a site surely on board or place them in the boats in their containers, so that they can be given back on board ready for his use in case that the abandon ship is necessary. The putting afloat and the inflation you would to be able to take place from the boat, in case outside necessary to abandon the ship.

Prudent crews consider the possibility of any emergency, and have a plan for dealing with it. Good coxswains drill their crews in procedures to be followed under various emergency situations.

Fire on Board

Use the following procedures when battling a fire that breaks out on your boat. When a crewmember becomes aware of an engine compartment fire:

- Shut off all engines, generators, and ventilation systems;

If the system is manually operated, energize it and check to ensure it is discharging;

- Initiate a mayday call to alert boats in the area of the situation;

- Have all crew members don PFDs (Personnel Floating Devices) and move to a smoke-free and flame-free area of the boat;
- If a life raft or dinghy is available, put it over the side and inflate it, if necessary;

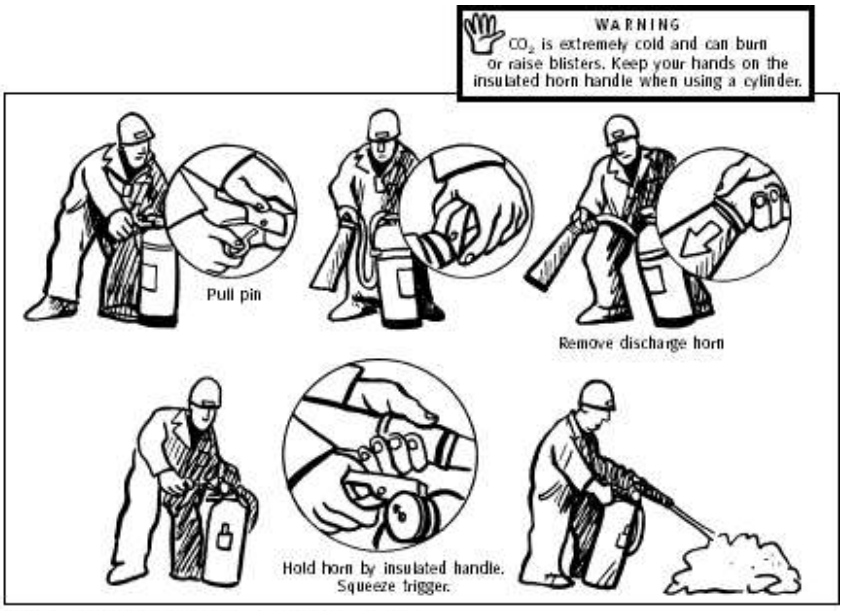


Figure 4.12: Operating the CO_2 extinguisher

the search and rescue task exposes crewmembers to a high risk of involuntarily entering the water. A person-overboard situation is one of the most serious occurrences aboard a vessel engaged in SAR. Every second counts, particularly in difficult or cold weather. Every crewmember must know the following procedures thoroughly. Even more important than knowing the procedures is training. Every crewmember must be able to carry out these procedures with instantaneous precision. The only way this level of skill can be achieved is by training and practice. Your life may depend on it.

4.Safety precautions during launch and recovery of a fast rescue boat.

4.1 Launching arrangements

On-Load Release systems were developed in the early 1980s and are mandatory under SOLAS regulations. They allow the lifeboat to be released with the load on the hooks when waterborne, unlike traditional hook-and-eye systems.

During a real abandon ship operation, a lifeboat would not normally return to the ship. However, during drills, the lifeboat has to be recovered from the water and returned to

the davits. It is this stage of the lifeboat drill that is the point of greatest risk and it provides the focus for the video.

Live action, library footage, graphics and animation are employed to illustrate the correct sequence of recovery and the precise operation of On-Load Release Gear during the critical stages of attaching the falls and the subsequent lifting operation.

Each component in the Release Gear is shown and its mode of operation illustrated in close-up. Checks and safety procedures are explained and the importance of correct maintenance emphasized. The operation of the Release Gear is then seen in the context of a complete drill, from start to finish.

On-Load Release gear if correctly used and maintained is a vital and reliable element of a ship's safety system. Incorrectly operated, or neglected, it can easily become a real danger to life.

4.2 Launching and recovery

The FRB is prepared for launch. The launching of an FRB boat depends on the launching installation used. The launching installation must comply with MSC./Circ. 809 and LSA Code. The systems have advantages and disadvantages over one another. SOLAS requirements: "SOLAS chapter III/26.3" lays down the requirements imposed on Fast rescue boats and their launching device. Also see SOLAS chapert III, regulation 12 launching stations.

Methods of Recovery

Two broad categories of recovery methods exist. Direct methods involve direct contact between the rescuers and the victim, while indirect methods involve the use of various devices to assist the recovery. Since direct methods are often more hazardous to the rescuers, indirect methods should be used first. When all indirect method has failed, use direct method to conclude the recovery. When you need to rely on a direct method, ensure that the crewmember attempting the recovery is familiar with possible hazards (panicked victim grabbing the rescuer, cold water, etc.) and have him or her properly dressed for the job (cold protection, fins, swimming goggles if necessary, etc.).

Indirect methods to recover persons in the water involve the use of various piece of equipment.

The usual methods of recovery generally involve the use of:

- Floating objects;
- Throwing bags;

- Life buoy;
- Any buoyant line.
- Rescue frames and Jason's ladders;
- Man Overboard Rescue System (inflatable platform);
- Ladders;
- Fishing nets;

Advantages of the deck crane:
The crane has more outreach, and can respond more quickly to waves / swell. The fast rescue boat and its launching appliances should be such as to enable it to be safely launched and retrieved under adverse weather and sea conditions and should be in accordance with MSC/Circ.809

Shipping launching arrangement

Offshore launching arrangement

Disadvantages of the deck crane:

A crane driver is required and this takes time.

A launching appliance shall not depend on any means other than gravity or stored mechanical power which is independent of the ship's power supplies to launch the survival craft or rescue boat it serves in the fully loaded and equipped condition and also in the light condition. A fixed launching installation is also far quicker. Below are a number of important points for launching:

- The team must work well together.
- Always use a painter line on a ship.
- On a MODU, use control lines.
- Be conversant with the hook system in use.
- During the launch, always remain as low as possible in the boat, to prevent falling out.
- Possibly wear work gloves and helmets with chin straps.
- The engine should be running before the boat enters the water; if necessary, stop above water level.
- The boat should release whilst at the top of a wave.
- Do not forget the painter line and do not sail over it.
- Using the engine, try to keep the boat moving against the sea's motion, as much as possible.

Painterline

The FRC may be equipped with a lifting frame or a four-point hook. The hook may be an "ON-LOAD" or an "OFF LOAD" system. Also a combination of both systems is possible. If it is an on load system, it must be locked to prevent unauthorised use. The advantage of an on load system is of course that when any force is applied to the launching cable, the FRC can still be disconnected. The ship can also lower the FRC boat into the water at a preset speed, and by using the painter line, the boat remains close to the hook, and will not turn.

On load schat Harding

Off Load Hendrikson

Off and On load Neddeck

4.3 launching and recovery in rough seas

For retrieving the FRB, it may be necessary to first reset the hook; if the hook is on the boat, this will first have to be carried out on board. With a hook attached to the lifting cable, this must be carried out on deck. In the case of a ship, the painter line should be attached first. Then, the moving vessel will position the FRC beneath the hook.
The hook should be located into the wind and against the current. With a water jet, the FRC is highly manoeuvrable. Also for retrieval, the same important points apply as above, but in reverse order. The launching and retrieval are always hazardous moments during the recovery/retrieving process.
It is also important, following an exercise or actual deployment, that the FRC once again be made ready for use. Remember the following points:

- Top up the tank.
- Complete equipment, safely secured.
- Wash down with fresh water.
- Check the engine and as necessary remove any salt.
- Subsequently the weekly and monthly inspections.

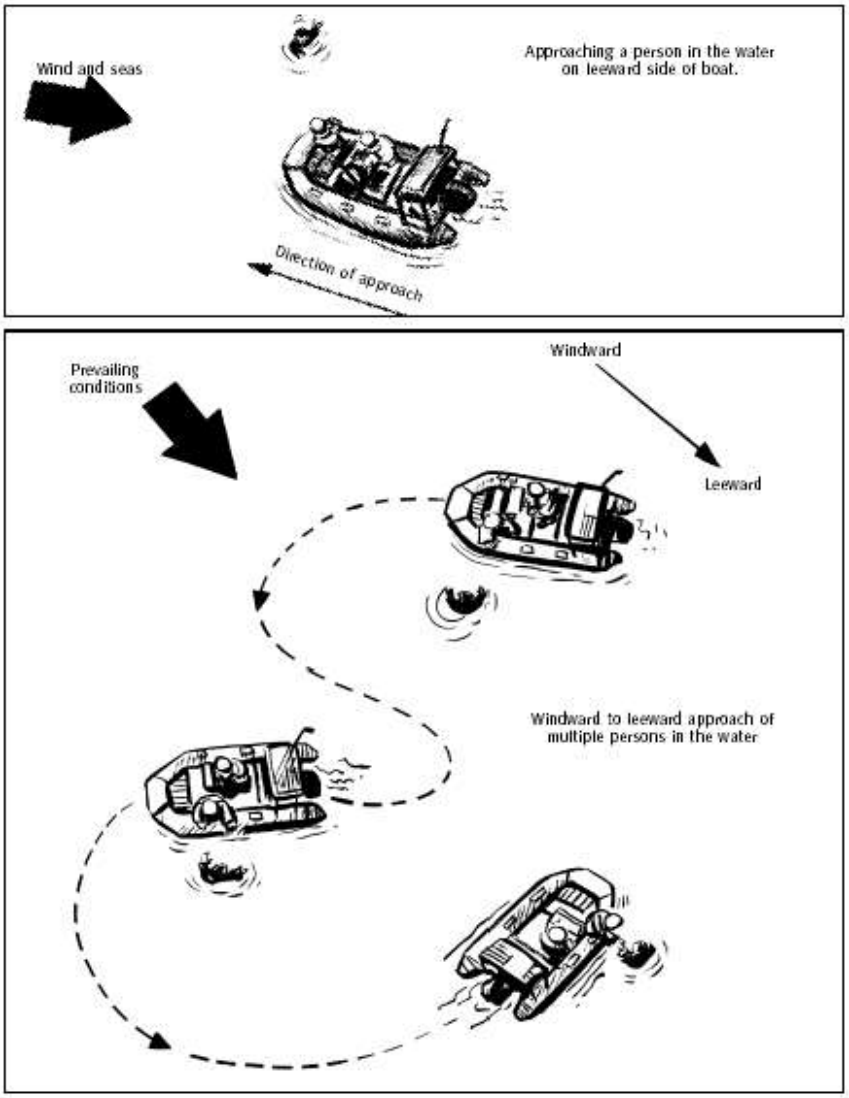


Figure 11.19: Approaching a person in the water

FRB RETRIEVAL

4.4 Drills in launching and recovery on fast rescue boats

The principles for the launching of lifeboats also apply to rescue boats and FRBs, i.e. where the boats are placed in a high position, they should be lowered and recovered without persons on board and, when it has been ascertained that this functions correctly, the boat is lowered with no more persons on board than what is necessary to operate the boat. The drill should take place only in calm weather in protected waters.

If, during a drill, the master assesses that a rescue boat or FRB has to be launched while the ship is making headway, the correct use of a painter is important. In such cases, the crew of rescue boat and FRB should wear immersion suits or anti-exposure suits during drills.

There is no requirement that the hook for boats launched by a single fall be fitted with an on-load release. Accordingly, a simple cargo hook with a safety latch is recommended for such boats.

5.How to handle a fast rescue boat in prevailing and adverse weather and sea conditions?

5.1 Clearing the ships side and coming alongside

Basic maneuvers

Occupants must enter the boat when the front and rear mooring lines are still fastened to the dock. One person steadies the vessel while the others board by stepping into the bottom of the boat and keeping their bodies as low as possible.

Follow the reverse procedure to get out of a boat.

To leave a dock in a motor boat demands some forethought. If other boats are nearby, the throttle bar (gas control handle) can be moved in the direction of the dock and the boat backed out in reverse. If the wind is blowing from the dock, greater force is required to clear the dock and avoid colliding with other boats.

The boat pulls away from the dock in reverse (throttle bar turned toward the dock). Once the boat is fully clear, it can head out in Forward provided the way is unobstructed

Docking

To land a boat, approach the dock at a 30-45 degree angle. Once near the dock, move the throttle bar toward the dock to clear the bow of the boat and take up a parallel position. Nearer the dock, move the bar to the other side, slow the throttle and for a instant the boat will back up, bringing the stern close to the dock. Once alongside the dock, moor the boat. If the wind is blowing toward the dock, it is best to approach from a wider angle. If the wind is blowing from the dock, approach at a narrower angle.

Launching from Shore

In fair weather, launching a boat from shore is relatively easy. With the motor raised, the boat is lifted and pushed into the water, front first. Once the boat is afloat, with the stern barely touching the shore, hold it at a 90-degree angle to the shore in order to board, first in the centre, and then at the bow. Lastly, the driver shoves the boat out into the water, walking alongside in the water, and boards at the stern. When launching, the person in the centre nudges the boat out into the water with an oar until the water is deep enough to start the motor. This person can also guide the boat in the desired direction. Then, after starting the motor, shift to Forward, gaining speed as the boat moves farther from shore.

Landing on Shore

To land on shore in fair weather, stop the motor where the water is still fairly deep and tilt it out of the water to prevent damaging the propeller. It is important for the driver to instinctively know the location of the stop mechanism and the tilting lever. To lighten the front end, any passengers in the bow of the boat will move to the centre and row to shore. On reaching the shore, one person sets foot on the ground and holds the boat steady while the other passengers step out. Once the boat is empty, it can be lifted and carried to the shore for mooring. Avoid pushing the boat ashore.

In poor weather, it is best to approach the shore backwards. This will prevent water from accumulating in the boat. With the motor running, turn the boat so that the stern is toward shore. The centre passenger holds this course with the oar. Then, stop the motor and tilt it out of the water. The waves will carry the boat to shore. To prevent

the stern from dipping into the trough of the waves as they strike the bow, the rower pulls gently on the oars.

Operating in Waves

In poor weather, to reduce the risk of capsizing or taking on water, waves must be crossed bow first. With a motor, the boat's speed can be quickly adjusted to synchronize its forward motion with the movement of the waves. In this way, the bow crosses the waves more easily.

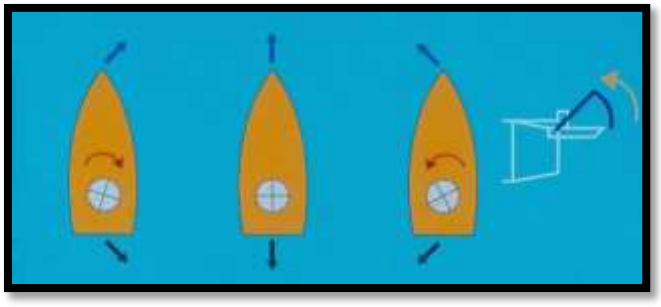
5.2 Manouvering at slow speed

Now the difference between manoeuvring with a water jet and a propeller drive. Here you see a proportion of the water jet with the deflector, or bucket. This also makes it possible to sail backwards. Below are the manoeuvring capabilities of the water jet:

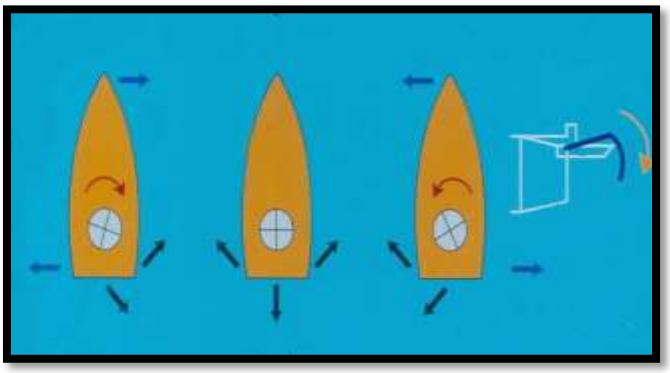
The first three pictures show that moving forwards with the steering wheel turned to the right, the boat also turns to the right (starboard). An on the right precisely the reverse.

The second series shows that with the valve it is possible to turn quickly. This can in fact be achieved on the same spot.

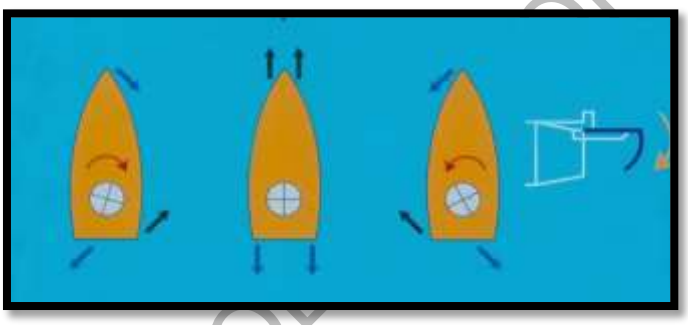
Finally, reversing is less easy because it is effectively not logical.



Manoeuvring forward.



Turning the FRB without moving forwards or backwards.



Manoeuvring backwards.

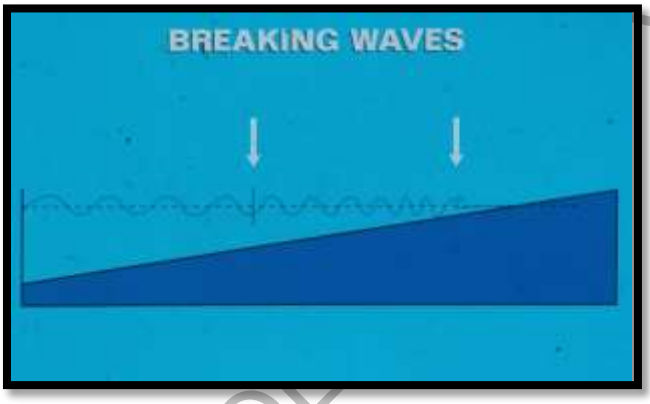
5.3 Manouvering at fast speed

Acceleration tends to make a boat leave the water and hydroplane on the surface; this movement is triggered by the wash of the motor. It lifts the boat by several degrees. This seriously diminishes the operator's visibility in front of the boat and makes it more difficult to effectively use the motor's propulsion force. To correct this situation, simply accelerate slightly to pass over the wave and regain a relatively horizontal trim.

5.4 boat handling in adverse weather

Whenever a water mass is moved, we refer to the term wave. In this definition, we refer to horizontal and vertical water movements. Horizontal: think of currents caused by high and low water. We will deal with these further in the next paragraph. Vertical: sea movement due to the wind present at that moment, or swell caused by the wind on previous days.

Wind is caused by differences in air pressure. The shifting of air masses causes wind, and that in turn causes the surface of the sea to move. When we talk about the size of the sea or swell, we are talking about: length of the waves; this is the distance between one peak and the rest. Height refers to the distance between the wave top and the trough. The difference between waves and swell is that with waves, the length of the waves is shorter than swell. It is therefore easier to sail in swell conditions. Eventually, swell settles down, too.
Sailing close to the coastline is a completely different matter. Here, the waves are reflected, and start to feel the land, which leads to shorter waves which eventually break. This then is the surf.



Sailing in different conditions and circumstances: Here, too, every ship is only as seaworthy as the crew is prepared for its task. It is vital that the helmsman under all circumstances keeps one hand on the tiller, and the other on the throttle so that if required, it is always possible to throttle back. Below we will discuss a range of sailing conditions, and the required response.

Calm sea:
Few problems with sailing; a good opportunity to get to know the boat. A calm sea could suggest a high pressure area, which may lead to fog.

Rough sea:

Wind and waves; risk of flap over. This means reducing speed before the top of the wave, but still maintaining sufficient power. Instead of sailing straight into the waves, follow a weaving pattern, and cut into the waves at an angle of between 45 and 60 degrees.

Wind and waves together:
Minor hazards; adjust speed so that the waves do not overtake the boat. Just before reaching the top of the wave, throttle back slightly to avoid surfing. When sailing down from the wave top, the FRC will pick up speed, and could break out, leading to a capsize.

Wave height:
You will soon loose your vision due to the deep wave troughs. So when at the wave top, maintain a clear view, for example for identifying the course or finding the casualty.

Steepness of the waves:
if waves are steep, phenomena and hazards occur more quickly. The waves themselves may in fact even break. Current and wind in opposite direction: the waves become steeper and higher, and may break. Shallow water: risk of running aground often observable by the breaking of the waves or water colour difference. What you should do is reduce speed, check your position and avoid damage**.**

Sailing the surf:

Surf is caused because waves start to feel the ground. If we head for the coast, try to stay on the back of a wave top. After the wave breaks, sail through the foaming mass, to shore. Be aware of ground flows and current. If heading away from the coast, always aim the vessel directly into the waves. Follow the correct start procedure, and sail through the wave once it has just broken. Move on quickly to the next wave, before it breaks. Once you have passed through the surf, continue sailing. If we wish to land on the coast, it depends on the coastal type. When landing on a sandy coast, sail on the surf towards the beach. Adjust your speed in time. Stop the water jet (Sand in pump). Use the pre-sling to pick up the boat. When landing on a steep coastline, immediately after the surf, turn the boat around, and float towards the coast, occasionally giving opposite throttle. Possibly reverse under power. It is also possible to use an anchor.

5.5 Towing

Certain rules of thumb can improve towing efficiency:

1. Towing is faster if the other boat is pulled rather than coupled alongside the towing boat. However, coupling is better when the boat being towed lacks maneuverability,

since the towing boat can steer it to some extent. This technique is also used when the boat being towed is unstable.

2. To tow a boat and its passengers, it must be stable and the towing boat operator must be warned of any problems immediately

3. The two boats must be aligned in the same direction.

4. The towing boat operator must constantly monitor the situation.

5. A canoe can be towed using a rope secured around the tip of the bow. Other types of vessels are equipped with rings used to secure a hitch (towing rope) to a towing boat.

Note: Sometimes, towing is the worst option. The first role of the rescuer is to save lives and reduce human suffering. When boating conditions prevent towing, specialized towing companies can be called in for assistance. The same applies when the boat will not stand up to towing (see manufacturer's recommended limits) or was not designed for towing (such as inflatable crafts).

To make the tow, Towing is more effective if the traction point is located in the rear centre of the towing boat. This is done simply if a ring or lug is installed at the centre of the stern. Otherwise, a V-shaped rope assembly can prevent sideways traction on the towing boat. A hitch attached to a V-assembly can slide from side to sided boat easier to maneuver, fasten the hitch fairly close to the waterline at the centre of the bow. Some boats have lugs or hooks for fastening a hitch.

In poor weather, the length of the tow line depends on the waves. To avoid collision, synchronize the speed of the two boats and their movement over the crest or trough of the waves.

It is extremely important that both vessels are cresting the waves at the same time. The length of towing rope should be adjusted to ensure that the vessels are properly spaced

Towing is more effective if the traction point is located in the rear centre of the towing boat. This is done simply if a ring or lug is installed at the centre of the stern. Otherwise, a V-shaped rope assembly can prevent sideways traction on the towing boat. A hitch attached to a V-assembly can slide from side to side.

The towing speed depends on the boat type, weight and means of propulsion. It must be adjusted to keep the towed boat steady. Where a motor boat is used, avoid placing excessive strain on the motor.

If possible, the hitch should be easy to cast off. The knots used in a hitch must be able to withstand considerable and variable strain. The bowline knot is the most commonly used. Round turn knot and two half hitches can be used for towing light loads. However, never use a square knot or a clove hitch for towing.

5.6 Pacing and Transfer

Occasionally during search and rescue operations a SAR vessel must come alongside a vessel underway and transfer gear, people, and/or patients. Some vessels such as tugs, cruise ships in confined waters or vessel in heavy chop must maintain some steerage way in order to be a stable platform for transfer. Rigid Hull Inflatables are best suited for this operation because of the tubes. But other vessels can do this with careful preparation and a smooth hand at the wheel. Boarding a vessel underway is not a task to be taken lightly. Only an experienced coxswain backed up by an experienced crew should perform this manoeuvre.

Critical Dangers The greatest dangers in this operation exist when the rescue vessel gets too close to the bow or loses power and is caught by the stern wave. This can result in a person falling overboard or the vessel broaching. The waves of different hull designs can vary. If the two waves are close together this can make the approach difficult and other options should be explored (e.g. do not approach). The coxswain will avoid getting too close to the bow or over top of the bow wake when close alongside. This can throw you into the bows. Never cross the bow of an oncoming vessel! The stern of the target vessel presents a danger, especially when it is moving fast. A large wake can be dangerous. If the propellers ventilate in the white water and lose thrust, your boat can be turned broadside to the wake and capsized. This can only occur if the stern wave is particularly steep. If you are coming alongside a large vessel, watch out for overboard discharges and any gear slung out the side of the vessel.

Stop and Assess (Pacing)

When pacing the target vessel, approach from behind on one side, while allowing for plenty of sea room. Move over the two wakes and move up alongside the vessel approximately twenty metres away. Carefully match the throttles so that the target vessel is not gaining or losing on your station. From this position the crew can perform a Stop Assess and Plan, the stop means to keep a relative station at a constant safe distance from the vessel. Often this position puts your vessel just ahead of the other's bow wake. Maintain this distance while the throttles are

matched. The coxswain should be carefully watching the target vessel's wake for grade.

Some things to note during the Assessment SAP:

➲ Wake properties

➲ Hull and deck shape

➲ Obstructions: overboard discharge, jagged ends or gear hanging

➲ Rail breaks and hand holds

➲ Vessel's heading is a clear path

➲ Number of people on board and their behaviour

➲ Vessel's handling behaviour and steady course line

Never cross the bow of an oncoming vessel!

Rescue

After the visual assessment the vessel must be contacted by VHF or verbally. The Rescue vessel will ask for permission to board and announce the side on which they are boarding. The driver of the vessel will be given instructions to maintain speed or adjust speed accordingly. The coxswain will also brief the operator of the target vessel on what action to take in the event of an emergency (MOB).

Plan Once the crew has declared all the scene features then the coxswain will call for planning input. The crew will suggest plans and then the coxswain will describe the plan and assign the tasks along with any emergency procedures. Each crewmember will repeat the tasks and confirm their roles. The coxswain will review any signals and commands before commencing the approach.

Suggested Signals and Commands

➲ Board the vessel

➲ Stand by

➲ Hold on (we are getting out of here)

➲ Initiate radio or verbal communications

➲ MOB

Approaching to Board

➥Maintain the 20-metre distance and drop back over the bow wave so you are between the two wakes ➥Work up between the wakes towards the boat. ➥Slowly ferry in towards the after quarter of the target vessel while keeping your vessel parallel (use short strokes of the wheel and move sideways) ➥Once inside the bow wake and a couple of feet away, stop and match the speed. Be aware of the wake current effect. You will feel a repelling force that will suddenly turn to a suction just before you make contact ➥Softly steer the bow into the gunwale of the target vessel (beware of sharp edges and rough surfaces on the target vessel) ➥As the bow touches the gunwale add helm and power to the outside engine to keep it there ➥While alongside keep using the throttles to maintain the position on the side of the vessel

Boarding The helm is responsible and will signal the boarding party to board when it is safe to do so. When boarding, people should move quickly on to the vessel and not hesitate once they have stepped off the SRU. The helm or lookout will keep a lookout for seas or objects approaching. If a big sea does come through, stop people from passing on or off the target vessel and beware of any sharp edges as the your vessel's fenders or tubes rub against the hull.

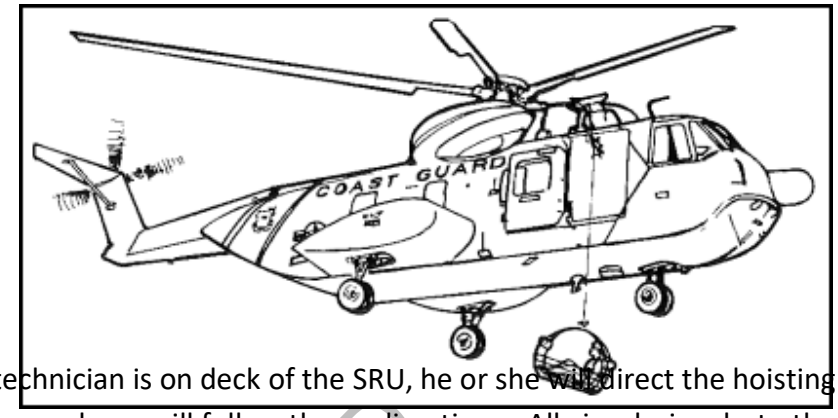
Departing When ready to pull away from the target vessel check behind you and your vessel path to ensure there is no traffic or obstructions. The driver should straighten out the wheel and add power to move the bow away. Do not turn away sharply until you have broken contact with the vessel. Then give a turn of the wheel and accelerate way from the vessel sideways. Stay well clear of the bow! (danger zone)

5.7 Helicopter operation

The wind developed by the helicopter rotor system can be over 70 knots. It is important to have all loose gear, on deck, securely tied down or stowed below decks. The rotor system could be destroyed if any loose objects are blown into the rotor during the hoist.

It is important to plan ahead because your voice cannot be heard over the noise made by the helicopter engine. Work out problems that may occur before the helicopter hovers

overhead. Do not forget to wear your life jacket! 10-142. A helicopter might be used to rescue survivors or evacuate injured mariners by rescue basket, rescue sling, and stokes litter (Figure below).



Once the military SAR technician is on deck of the SRU, he or she will direct the hoisting process, and SRU crewmembers will follow these directions. All visual signals to the aircraft commander will be given by the SAR technician.

Positioning of Vessel and Conduct of Normal Hoist Process

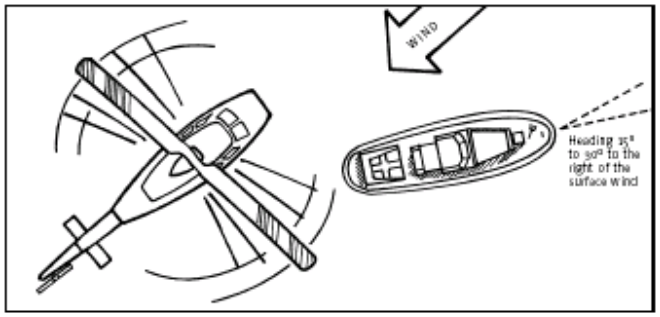


Figure 11.44: Positioning of vessel for hoist operation

Normally, the vessel will direct her heading 15° to 30° to the right of the surface wind, thus keeping the wind on her port bow. This allows the aircraft commander visual reference to the vessel and places the rescue hoist - which, like the pilot, is located in the starboard forward area of the aircraft - over the vessel's stern. Vessel speed should be five to eight knots. A military SAR technician will usually be lowered directly onto the stern of the vessel to take charge of preparing the person or item to be hoisted into the aircraft, with the assistance of the deck crew of the surface vessel. If the aircraft is unable to lower the SAR technician directly due to weather or sea conditions, a line will be lowered to the surface vessel from the aircraft. When this line has been "grounded"

electrically and is held by the surface vessel crew, the aircraft will take up a position clear of the vessel, but still attached to the line extending to the vessel. The SAR technician will then be lowered on the hoist and simultaneously pulled to the surface vessel manually by means of the line held by the vessel. This line will at no time be attached to the vessel.

Air Craft Engine Failure

In the event of aircraft engine failure, the aircraft will break away to the nearest safe area. If a person is on the hoist at this time, the aircraft commander will sever the hoist cable and drop the person into the sea, simultaneously making a decision as to whether to land the aircraft itself in the sea. If such a landing is made, the first priority for the surface vessel crew is to manoeuvre the vessel to avoid damage or injury from the helicopter rotors while picking up the person cut free from the hoist, and assisting the rest of the crew of the aircraft as required.

Aircraft Emergency Entry

Generally, the aircraft crew will carry out their own craft's abandonment if necessary, utilizing an on board 10-man inflatable raft for flotation. If assistance must be given by the crew of a surface vessel, do not approach the helicopter while the rotors are still turning. When alongside the aircraft, utilize the information indicated on the attached outline drawing of the Labrador helicopter to determine the best entry route. The entry of choice is the upper portion of the cabin main door indicated in Figure below. Use of this door should retain the watertight integrity of the aircraft, which may be lost if other emergency entrances are opened. However, if necessary, either the emergency exit door, or the escape window panels, may be released by means of external pull tapes. Either the pilot's or co- pilot's side windows in the cockpit, may be released by first pressing the button on the side window's external handle to activate the spring-loaded emergency release handle. Turn this handle to release the side window.

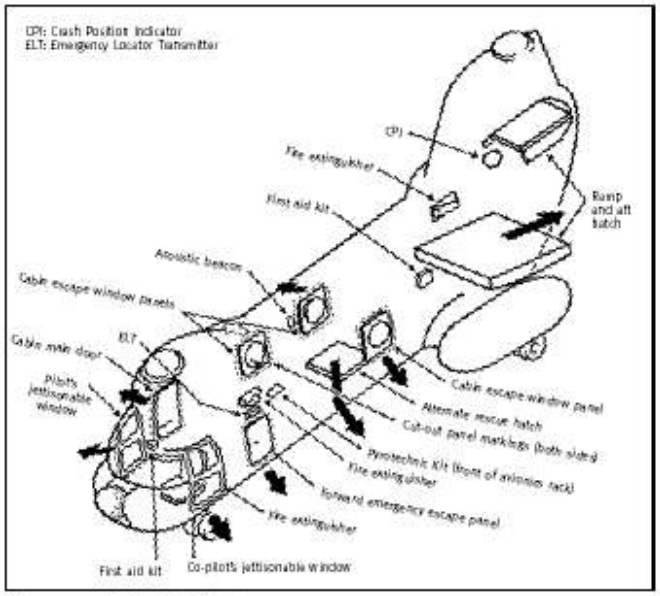


Figure 11.45: Labrador helicopter

Recovering Submerged Victims

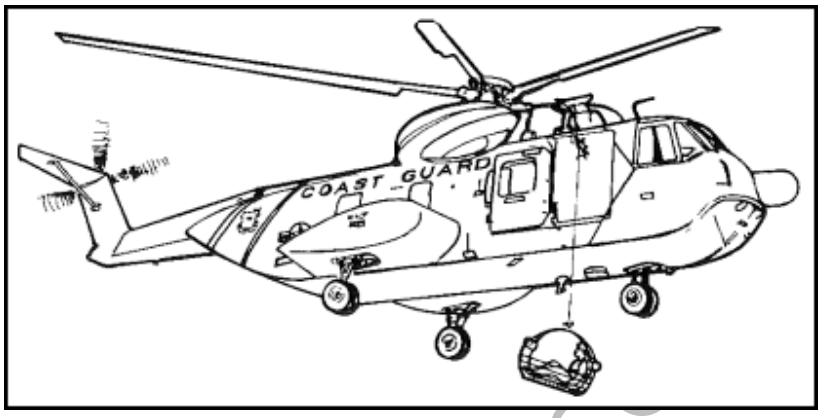
Recovery of submerged victims may be quite difficult and hazardous for the untrained rescuer. Under no circumstances should any untrained rescuer, including certified scuba diver, attempt to enter the water to recover a submerged victim. Statistics show that untrained rescuers attempting such recoveries often die or get injured in the process. Submerged victims quite often have very little chance of survival. It is not advisable to risk the life of a crewmember to rescue someone that may already be dead. In those situations, the only rescue actions available to you are those that can be performed from the deck of your unit.

Helicopter hoist procedures

The wind developed by the helicopter rotor system can be over 70 knots. It is important to have all loose gear, on deck, securely tied down or stowed below decks. The rotor system could be destroyed if any loose objects are blown into the rotor during the hoist.

It is important to plan ahead because your voice cannot be heard over the noise made by the helicopter engine. Work out problems that may occur before the helicopter hovers

overhead. Do not forget to wear your life jacket! 10-142. A helicopter might be used to rescue survivors or evacuate injured mariners by rescue basket, rescue sling, and stokes litter (Figure below).

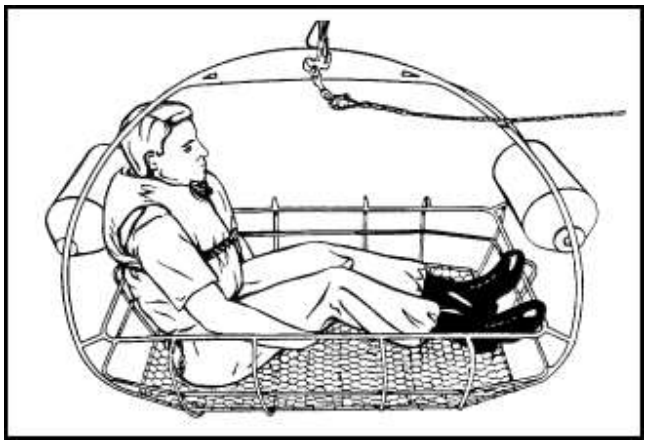


Rescue Basket Hoist

Rescue Basket

The US Coast Guard usually uses a rescue basket for survivors who can help themselves

(Figure below). The basket is very easy to use. Just climb into the basket after it touches the deck (to discharge static electricity), sit down, and keep hands and arms inside.



Rescue Basket

5.8 Drills in boat handling

Rescue from survival craft may involve dealing with life rafts, open lifeboats, enclosed lifeboats, or any of a number of types of survival capsules. Rescue and al characteristics of the survival craft. Modern, totally-enclosed survival craft are transfer of personnel may be complicated by the physical condition of the survivors and the physic designed to provide an optimum survival platform, and are often not conducive to sea-kindly riding and maneuvering. Many of the enclosed survival craft are very buoyant by nature of their construction, and have an extremely lively motion at sea. Each situation requires careful evaluation before approaching the survival craft to determine whether:

- Immediate removal of personnel is safe or required;
- Standby is required to await improvements in weather/sea conditions or removal by other means (such as helicopter); or
- towing the craft without removing personnel is safe and appropriate (e.g., enclosed survival craft).

There have been cases of survivors found safe in a survival craft only to be accidentally rammed in heavy seas by their would-be rescue ship trying to maneuver alongside. Modern enclosed survival craft can safely and effectively maintain survivors in relative protection for long periods of time. In some cases, there is no need for immediate removal of personnel from the craft.

Some survival craft are self-righting with all hatches sealed and all personnel strapped into their seats. These boats are capable of operating at full capacity and at six knots for a period of 24 hours. Boats for tanker vessels will have a self-contained breathing air supply together with water spray coverage for the exposed hull, and can operate in fire or a toxic atmosphere safely for a period of ten minutes. The hatches on these craft are very small in order to accommodate both the self-righting and fire survivability features. However, the small hatches also make transfer of personnel difficult. Transfer of injured or sick personnel may be extremely dangerous in even a moderate sea.

Approaching survival craft in a seaway may require the SRU to get close enough to remove personnel or to pass a line to the craft. The lee provided by a vessel is approximately triangular in shape and extends about one and one half ship lengths downwind at its farthest point. The exact size and shape of this lee will depend on the freeboard, length, and shape of the vessel's house works.

5.9 Drills in towing

The launching appliance shall be fitted with a device to dampen the forces due to interaction with the waves when the fast rescue boat is launched or recovered. The device shall include a flexible element to soften shock forces and a damping element to minimize oscillations.

The winch shall be fitted with an automatic high-speed tensioning device which prevents the wire from going slack in all sea state conditions in which the fast rescue boat is intended to operate.

The winch brake shall have a gradual action. When the fast rescue boat is lowered at full speed and the brake is applied sharply, the additional dynamic force induced in the wire due to retardation shall not exceed 0.5 times the working load of the launching appliance.

The lowering speed for a fast rescue boat with its full complement of persons and equipment shall not exceed I mls. a fast rescue boat launching appliance shall be capable of hoisting the fast rescue boat with 6 persons and its full complement of equipment at a speed of not less than 0.8 mls. The appliance shall also be capable of lifting the rescue boat with the maximum number of persons that can be accommodated in it.

One possibility we wish to explain below is providing assistance to a helicopter that has ditched in the sea. Important points to remember are:

- The rotor blades are close to the surface. Exercise extreme caution during approach.
- Be aware of the possibly activated sea anchor.
- When approaching, take care of casualties in the water.
- Do not damage the inflatable floats on the helicopter, which could turn over as a consequence.
- Be aware of the risk of fuel leak and explosion hazard; remember these aspects when approaching the helicopter.
- The helicopter has sharp protrusions so be cautious when approaching to avoid puncturing one of the tubes.
- Attach no lines to the helicopter.
- Try to communicate with the pilots.
- If life rafts have been launched, remain downwind to capture these life rafts and bring them together.

- Be cautious of floating objects that could damage the propeller or water jet intake.

5.10 Drills in pacing and transfer

A rescue sling is carried on board helicopters. Rescue helicopters from other countries, use the sling more often than by the US Coast Guard. The rescue sling is just a padded loop that is placed over the body and underneath the armpits. The arms are held around the sling as shown in Figure below.

Rescue Sling

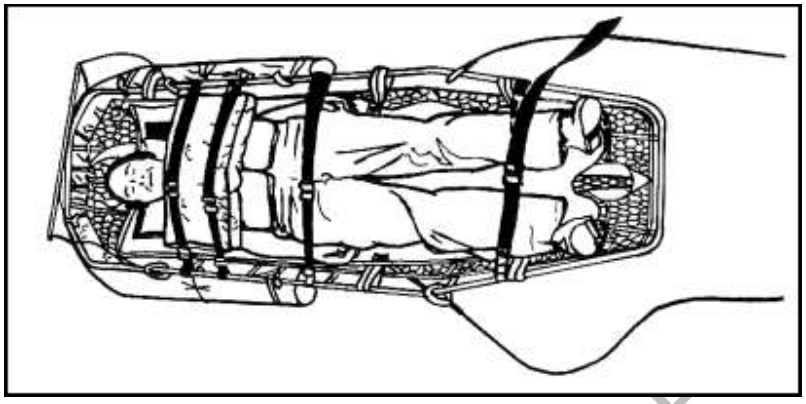
Stokes Litter

This type of litter will usually be used to hoist those who have serious injuries or illnesses or who are unable to walk. To use the litter, it is necessary to get help from other crew members. The straps must be disconnected and spread out. The blankets must be removed. The patient should be put in the litter and covered with the blanket. The straps are then snugly fastened with the pad on top of the chest as shown in Figure below.

If the litter has to be taken below decks to the patient, it must be unhooked from the cable. This hook must not be attached to any part of the vessel. There is always a possibility that there may be an emergency aboard the helicopter itself. The helicopter may have to move unexpectedly. To decrease this type of danger, the pilot may hover off to one side of the vessel while waiting.

If a steadying line is attached to the basket, horse collar, or litter, it must be tended. This will stop the rescue device from swinging too much. It is very important that the rescue device touches the vessel before anyone touches it. As soon as the object being

lowered touches the deck, static electricity (which builds up in the helicopter during flight) will be discharged. Never shine lights on the helicopter. It will blind the pilot.



Stokes Litter

Ready to Hoist

To signal the helicopter pilot that all is ready for hoisting, give him a thumbs-up signal, or if you are a patient, nod your head if you are able

6.Procedures for righting a capsized fast rescue boat.

6.1 Capsize and righting

To avoid capsizing, it is important to:

- Sail in a controlled manner with one hand on the tiller and the other always on the throttle.
- Train regularly to learn the characteristics of the boat, and to learn to read wave patterns.

There is always a risk of capsizing, so remain alert and think of the following points:

- Use the kill cord.
- How do I use the equipment, following a capsize.
- Instructing the crew on what to do following a capsize.

How can the boat be re-righted. Three methods:

1. The boat is self-righting.
2. Using a self-righting bag
3. By using your own weight. Think of re-righting a raft.

Inflatable righting bag

Fixed self righting system

6.2 Drills in righting a capsized boat

Capsizing – step by step:

At the moment of capsize:

- Lower your head as far as possible towards the deck, and lower the body.
- Take a deep breath of air.
- Keep tight hold of a grab point.
- The driver will attempt to pull the kill cord.

Flap over or capsize

Following capsize:

- Face upwards and breathe
- Check whether all crew members are present.
- Try to increase freedom of movement by releasing air from your suit, and when using an automatically-inflating lifejacket, vent some of the air.
- Try to move as little as possible.
- Look for equipment (see anchor/rescue line).
- Make an escape plan.

Capsize-escape

Escape:

- One at a time.
- On the upwind side.
- Maintain contact with the boat using the grab line.
- Try to avoid kicking of your legs while escaping the FRB
- Move towards the rear of the boat
- Again check that all crew members are present.

Re-righting: (assuming the boat has a self-righting bag)

- Attach a rescue line to the stern board, to which all crew and passengers can hold tight.
- The person closest to the board will use the draw cord to activate the CO2 bottle.
- Remain clear of the sides.
- Climb back on board (via the stern board and motor).
- Pull all lines on board and activate the sea anchor.

Try to start engine:

- Check the engine and compartments for water.
- Attach the kill cord.
- Try to start in neutral, at high engine speed.
- If the engine does not turn over, stop your attempts.
- Contact your base with the VHF or backup radio (if unavailable, use emergency signals).
- Leave the self-righting bag inflated.
- Pass on your position in respect of the base.

Capsize and re-righting

7.Search patterns and environmental factors affecting their execution.

7.1 Initial information and action

The first crewmember to realize that someone has gone overboard calls out "PERSON IN WATER (PIW)" and, if possible, indicates on which side of the boat the person went over. For example, if a person fell over the port side, the crew member would call "PERSON IN WATER, PORT SIDE!" In the case of a witnessed person-overboard situation, this crewmember keeps the person in the water in sight continuously, both while calling out the alarm and until rescue is achieved.

Treatment will depend on the condition of the survivor and the facilities available. In more serious cases, where the victim is semiconscious or unconscious, contact should be made immediately with a ship or shore medical facility for detailed information on the care and handling of the victim. Administer the following first aid while waiting for medical instructions:

- After removing the victim from the cold water, gently transfer him to a warm environment. Rough handling of the victim can cause further harm.

- Remove his clothes only if it can be done with a minimum of movement of the victim's body. Do not massage him.

- Lay the victim in a face up and slightly head down position, unless vomiting occurs.

This is important because a hypothermia victim has low blood pressure, and the head-down position ensures an adequate supply of blood to the brain.

If available, administer warm, humidified oxygen by means of a face mask. The oxygen will not only assist victims if they are having difficulty breathing or have a low respiratory rate, but it will also provide core rewarming. Mouth-to-mouth resuscitation is always advisable if the victim is having problems breathing and no other form of assistance is available.

7.2 search pattern

During an abandonment the coxswain will keep open communications with other life boats by means of VHF radio. If other survivors are in the water an attempt must be made to pick up the survivors.

Approaching survivors

1. Prepare pick up by asking the crew members in the lifeboat to assist.
2. Determine to open a hatch on one site.
3. Use equipment such as ladder, rescue line and boathook.
4. During approach keep the survivor(s) at the upwind side, to prevent drifting over the survivors.
5. Stop propeller to prevent injuries.
6. Get the survivors in backwards (panic) or use ladder.
7. Threat survivor injuries/hypothermia.

Arriving on Scene

When arriving on the scene:

- Advise RCC/MRSC of your arrival on scene;
- SAP (Stop, Assess and Plan):
- Persons in the water?
- Vessel's position;
- Direction of wind and current;
- Best approach angle;
- Lines in the water;
- Good securing points;
- Any obstructions on vessel;
- General condition of the vessel;
- Modify or adapt your short-term strategies if needed;
- Determine closest safe heaven;
- Assign duties to crewmembers.
- Recover all PIW;
- Board the vessel in the most appropriate manner:
- Instruct the crew of the vessel to don PFDs;
- Discuss your plans with the master of the vessel in need of assistance;
- Ask the master to sign the waiver.
- Advise RCC/MRSC of your intentions;
- Provide the required assistance.

7.3 Rescuing survivors from sea

What to do in a man overboard situation.

A person falls overboard. His colleague sees this happen and reacts as follows:

- First shout “MAN OVERBOARD” to attract help.
- Throw a floating object (rescue buoy smoke/ light)
- Do not loose sight of the person.
- Inform the bridge / control room.

How to respond rapidly:

The GPS Satellite navigation has an MOB button, which makes a waypoint of the last position.

An alarm must be issued (Man overboard alarm / PA system).

Captain to bridge or OIM to control room.

Somebody should be sent to the bridge or highest point with radio and binoculars.

PAN PAN PAN message to coastguard or nearby vessel.

The decision to launch the FRB boat is the responsibility of the captain or the Offshore Installation Manager. This will of course depend on weather conditions, and is reliant on good seamanship.

The ship will manoeuvre, and will have to reduce speed and attempt to come back onto the previous course, to approach the casualty directly.

Lifebouys with marker

INTERCOM

7.4Casualty care

In the case of a man overboard, there are two different possibilities:

Someone is witness to the casualty falling overboard.

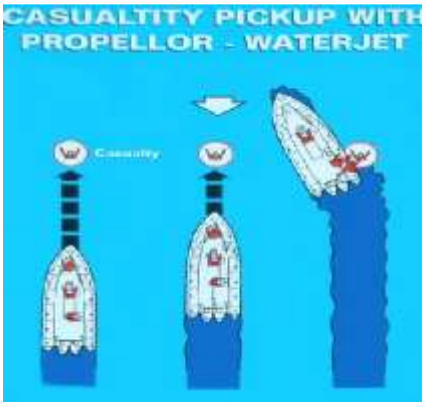
Someone is missed or lost from view.

The casualty enters the water, leading to the following response:

- A floating object is thrown to the casualty, preferably a rescue buoy.
- Call for help, sound the alarm.
- The casualty must not be lost from view. Use binoculars.
- Launch the FRC boat as quickly as possible.

MOB pickup using propeller:

- Keep the casualty in front.
- Select port or starboard.
- Identify the casualty.
- Helpers ready
- Approach slowly
- Casualty upwind
- Engine neutral.
- Halt FRC; reverse briefly, remembering the propeller.
- Bring the casualty on board.



MOB pick up with propellor-waterjet.

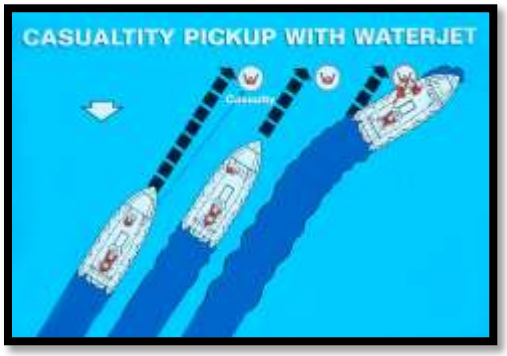
The casualty not immediately in front

- Point out the casualty.
- Helpers ready
- Approach slowly
- Select port or starboard
- Steer away
- Use valve to stop
- Ensure the casualty remains upwind

A person enters the water and this is discovered later or you loose sight of the casualty. By identifying the current, we can decide the possible direction of drift, and hence a search pattern. If the direction of drift is determined, select one of the following search patterns:

Parallel search

Creeping line search



MOB pick-up with waterjet.

Parallel search.

Parallel search.
This search pattern is used once the direction of drift has been identified. For example 360°. By making two parallel passes in the direction 090° and 270°, relying on your own compass, a search pattern is created. It is important to travel at a continuous speed. The distance between the passes can be determined by a preset time interval, which will again depend on the current weather conditions.

Creeping line search.
This search pattern can also be used once the direction of drift is determined. The advantage of this search pattern is that the travelling speed need not be kept constant, while time gains are achieved at the beginning. For example, let us assume the direction of drift is 015°. We take a search sector with an angle of 30°. The boundaries will therefore be 360° and 030°. The turning points at these boundary lines can be determined in one of three ways:

From the boat, by taking a counter reading (210°/180°); for this purpose, a good compass must be available. For example an extra directional compass.

Direction finding from the ship/MODU

Radar support.

In the latter two cases, good VHF communication is vital.

Square search.
If the direction of drift at the moment of falling overboard or loss is constantly shifting, another search pattern must be selected, namely the square search. Here we assume four directions, for example 360°/090°/180°/270°. Here, too, a constant speed must be maintained. The square search pattern is made constantly larger, by increasing the time after each two parts. The duration will depend on the current weather conditions. A disadvantage of this search pattern is that the search area shifts in relation to the solid ground, because the casualty is subject to drift.

Diamond butterfly search.

If after the casualty has fallen overboard, one or more rescue buoys are released to identify the casualty's location, the following search pattern can prove useful: Diamond butterfly search. This search pattern is used if a mark has been placed in the water, in this case a buoy. The casualty is close to the marker, and both are subject to the same flow influences. From the marker, a first stroke is made in the suspected direction of travel, for example360°. This again is subject to a set time interval, which will depend on the current weather condition, and must be travelled at a constant speed. Then change course 120°, and repeat the distance travelled. Then once again change course 120°. You should now return to the original marker. If not, make correction.

7.5 Drills in search and rescue

The training and you practice them intends to orient the people who would the ones in charge of the survival boats, and like so they are the people in charge that their crew familiarized with their obligations.

In such a way that the knowledge of the muster list and the putting in practice in drills, it is basic and essential element in the instruction.

Should have a manual training for this session, based, preferably, in the teams that is arranged in the training center or in the ship. The students access to a copy of the manual along of the course.

8. Assessment of the readiness of fast rescue boats and related equipment for immediate use.

8.1 Boat readiness

Weekly inspections and tests.

(1) Each survival craft, rescue boat, and launching appliance must be visually inspected to ensure its readiness for use.

(2) Each lifeboat engine and rescue boat engine must be run ahead and astern for a total of not less than 3 minutes, unless the ambient air temperature is below the minimum temperature required for starting the engine. During this time, demonstrations should indicate that the gear box and gear box train are engaging satisfactorily. If the special characteristics of an outboard motor fitted to a rescue boat would not allow the outboard motor to be run other than with its propeller

submerged for a period of 3 minutes, the outboard motor should be run for such period as prescribed in the manufacturer's handbook.

(3) The general alarm system must be tested.

(e)*Monthly inspections.*

(1) Each lifesaving appliance, including lifeboat equipment, must be inspected monthly .A report of the inspection, including a statement as to the condition of the equipment, must be recorded in the unit's official logbook.

(2) Each EPIRB and each SART other than an EPIRB or SART in an inflatable liferaft, must be tested monthly. The EPIRB must be tested using the integrated test circuit and output indicator to determine that it is operative.

(f)*Annual inspections.* Annual inspection and repair must include the following:

(1) Each survival craft, except for inflatable liferafts, must be stripped, cleaned, and thoroughly inspected and repaired, as needed, at least once in each year, including emptying and cleaning each fuel tank, and refilling it with fresh fuel.

(2) Each davit, winch, fall and other launching appliance must be thoroughly inspected and repaired, as needed, once in each year.

(3) Each item of survival equipment with an expiration date must be replaced during the annual inspection and repair, if the expiration date has passed.

(4) Each battery clearly marked with an expiration date, that is used in an item of survival equipment must be replaced during the annual inspection and repair, if the expiration date has passed.

(5) Except for a storage battery used in a lifeboat or rescue boat, each battery without an expiration date that is used in an item of survival equipment must be replaced during the annual inspection and repair.

(g)*Servicing of inflatable lifesaving appliances, inflated rescue boats, and marine evacuation systems.*

(1) Each inflatable lifesaving appliance and marine evacuation system must be serviced -

(i) Within 12 months of its initial packing; and

(ii) Within 12 months of each subsequent servicing, except when servicing is delayed until the next scheduled inspection of the unit, provided the delay does not exceed 5 months.

(2) Each inflatable lifejacket must be serviced in accordance with servicing procedures. Each hybrid inflatable lifejacket must be serviced in accordance with the owner's manual.

(h)*Periodic servicing of hydrostatic release units.* Each hydrostatic release unit, other than a disposable hydrostatic release unit, must be serviced -

(1) Within 12 months of its manufacture and within 12 months of each subsequent servicing, except when servicing is delayed until the next scheduled inspection of the unit, provided the delay does not exceed 5 months; and

(2) In accordance with repair and testing procedures

(i)*Periodic servicing of launching appliances and release gear.*

(1) Launching appliances must be serviced at the intervals recommended in the manufacturer's instructions, or as set out in the shipboard planned maintenance program.

(2) Launching appliances must be thoroughly examined at intervals not exceeding 5 years and upon completion of the examination, the launching appliance must be subjected to a dynamic test of the winch brake.

(3) Lifeboat and rescue boat release gear must be serviced at the intervals recommended in the manufacturer's instructions, or as set out in the planned maintenance program.

(4) Lifeboat and rescue boat release gear must be subjected to a thorough examination by properly trained personnel familiar with the system at each inspection for certification.

(5) Lifeboat and rescue boat release gear must be operationally tested under a load of 1.1 times the total mass of the lifeboat when loaded with its full complement of persons and equipment, whenever overhauled, or at least once every 5 years.

(j)*Maintenance of falls.*

(1) Each fall used in a launching appliance must be turned end-for-end at intervals of not more than 30 months and must be renewed when necessary due to deterioration or at intervals of not more than 5 years, whichever is earlier.

(2) each fall may be inspected annually and renewed whenever necessary due to deterioration or at intervals of not more than 4 years, whichever is earlier.

8.2 Equipment readiness

On Fast Rescue Craft, alongside the compass, in the Offshore industry and in rescue organisations, the use of other equipment for navigation or search is becoming more common. The image shows on the left the crewfinder and the PLB Personal Locator Beacon. Also on the right a GPS Global Positioning System is installed. Using the GPS,

you can navigate, and more importantly, you can always relocate the platform or approach any other platform, even in thick fog. Ships also have a GPS, which has an MOB function, and that is activated in a man overboard situation.
This system records the last position in relation to ground.

In the Offshore sector, employees on the North Sea are equipped as standard with a PLB or "personal locator beacon" .
These beacons are switched to automatic, and when entering the water, are activated.
On a number of platforms, receivers are located in the control room, which issue an alarm if someone enters the water.
On a computer in the control room, the location is identified, and the direction of travel and distance are automatically identified.
The PLB is compulsory during helicopter flights and during hazardous work above water.
This is often an obligation subject to the issued work permit.
To locate others or to locate you we have different equipment with different behaviours.

- EPIRB (Emergency Positioning Indicating Radio Beacon)
- SART (Search And Rescue Transponder)
- PLB (Personal Locator Beacon)
- VHF (Very High Frequency (radio))
- Pyrotechnics: Handflare, Smoke and Rocket

The importance of a good lookout cannot be overstated. Remember, when in a life raft, you are so small and the sea is so big that it is very easy for a search ship or plane to overlook you. An alert lookout will make the difference in survival. Once you have sighted a rescue ship or aircraft, use the following to attract their attention:

- Signaling mirrors. Read the instructions for the particular kind of signaling mirror in your survival equipment. Do not wait until you see a rescue craft to use the signaling mirror. When the sun is shining, flash the mirror all around the horizon. An

aircraft can spot the flash long before you would see the aircraft. The signaling mirror may save your life. Use it as long as the sun is shining.

- Whistles. In calm weather, your voice can be heard only a few undred yards away.

If you keep screaming, you will become hoarse and lose your voice. A whistle, on the other hand, can be heard up to 4 miles away in favorable weather conditions. It can come in handy when you are floating in the water trying to attract the attention of nearby rescuers. A whistle can be used over and over again. It can be used in fog, at night, or during the day.

- Pyrotechnics. These are signals such as rockets, flares, and smoke. Instructions for operating various brands of pyrotechnics are written by the manufacturers. Once you are settled in your survival craft, read the instructions on each type of pyrotechnic so you will know how to use them when a ship or aircraft is spotted. Keep the pyrotechnics close by for immediate use, so you can signal when necessary. Heed the following when using pyrotechnics:

- Be sure to fire the signals downwind on the lee side of the survival craft. When firing, hold them at a slight angle over the water. Pyrotechnics have burning particles that might fall, which may burn you or damage the raft.

- Only use smoke signals during the daytime. Smoke does not glow in the dark. Only use pyrotechnics when you can see a ship or plane. Do not waste smoke signals.

- Rockets should be used when a vessel is spotted far away on the horizon. A rocket will get the signal higher, where it can be seen from a greater distance.

- An aircraft directly overhead would be more likely to spot a hand flare than a flare covered with a parachute.

- Emergency Position Indicating Radio Beacons. Your ship may also have at least one EPIRB. There are different makes of EPIRBs. They all have the following things in common:

- EPIRBs float. They are stowed on the outside of the ship, so they will float free if the ship sinks.

- They are small (approximately 6 inches thick and 1 to 3 feet long).

- They transmit signals automatically on two international distress frequencies for military and civilian aircraft. These frequencies are 121.5 and 243 MHz.

- Most EPIRBs work on one-way automatic operation only and cannot be used for two-way communication.
- They transmit a continuous two-tone (hi/lo) signal.
- EPIRBs are easy to use.
- If your EPIRB is floated, tie it to the survival craft, so it will not drift away

9. Knowledge of the maintenance, emergency repairs, normal inflation and deflation of buoyancy compartements of inflated fast rescue boats.

The average FRB is exposed to wind and weather throughout the day. In addition, the FRB is exposed to a range of weather conditions. As a result, these boats must withstand a great deal, and therefore require preventive maintenance and inspections. After all, the crew must always be confident that the boat is ready for use, and will not experience problems, when travelling at sea in high winds. This chapter deals with inspections. A weekly, monthly and annual inspection of the FRB must be carried out on the ship or on board the MODU's. Points for attention during inspection are:

1. the air chambers
2. the hull
3. the launch and retrieval system
4. the self-righting system
5. the electrical equipment
6. appliances
7. steering
8. the fuel system
9. the motor

FAST RESCUE BOAT IN BAD CONDITIONS

The air chambers (sponsons) .
On RIBs and inflatable boats, these are of course vital. The material may consist of several layers, for example:

Hypalon synthetic rubber with a long useful life, high impact resistance, high resistance to penetration and chemical damage.

Very high-quality adhesion method to fibres.

Textile fibre with very high tear resistance.

Polychloroprene – synthetic rubber with a double seal, considerable flexibility and resistance to chemical damage and weather.

The inspection of air chambers consists of:

- The chambers must be at the correct pressure, as listed in the manual or indicated in the boat. Never fill the chambers with a compressor, since too much moisture will be pumped in. Every chamber has a filler opening and often an overpressure valve.
- Surface attachments, towing eyes or grabs must be correctly applied and may not work free at the corners.
- The seams of the various air chambers must be carefully sealed.
- The rubber bump strips must sufficiently protect the air chambers, or must be replaced.
- The connection between the air chambers and the fixed hull must be sound, and undamaged. Above all the stern plate must be carefully checked.
- The air chambers must also be checked for wear and damage.

The hull inspection consists of:

- Checking whether there is damage to the polyester.
- The various attachment points, e.g.:
- The suspension of the outboard motor
- The tube cover is well connected to the hull.
- The attachment points on the roll frame.
- The points at which the steering console, seats and motor are attached.
- The points where the lifting frame is attached.
- If a double hull is used, this must occasionally be drained.

DAVIT

Inspecting the launch and retrieval system:
On MODU's and ships, launching often takes place via a launch installation, known as a davit.
What types of davit are there:

- A life raft davit, which can launch both life rafts and the FRB.
- A drop davit / gravity davit consisting of a single arm.
- A drop davit / gravity davit consisting of two arms.
- A multiple-armed davit.

Single arm davit.

In the International Code for rescue equipment and facilities, in chapter VI we find the requirements imposed on davits:
It must also be possible to launch the FRB in poor conditions such as 10 degree head or rudder load, and at 20 degree list to port or starboard.

- It must also be possible to launch the FRB without power supply. Manual or hydraulic pressure.
- The davit must be easily maintainable by the crew.
- The launch installation must be tested with a static test load, with a factor 2.2 of the working load.
- For all eyes and hooks, a safety factor of 4.5 must be achieved.
- For cables and blocks, a safety factor of 6 must be achieved.
- This also applies for cold weather conditions.
- The FRB must be retrievable with full crew.
- With full crew, the FRB must be retrievable at a speed of 0.3 m/s
- Embarkation and debarkation must be carried out safely.
- It must be possible to launch the FRB from the boat itself, but also from the ship's deck, whereby the launching of the FRB must be clearly visible.
- The launching cables must consist of steel cables which are anti-corrosion and anti-twist.
- The winch and the launching installation must be sufficiently strong to withstand a static test load of 1.5 times the working load and a dynamic test load of 1.1 times the working load at maximum lowering speed.

SOLAS chapter III; Regulation 36 Instructions for on-board maintenance of life-saving appliances shall be easily understood, illustrated wherever possible, and, as appropriate, shall include the following for each appliance:

- A checklist for use when carrying out the inspections required by regulation 20.7;
- Maintenance and repair instructions;
- Schedule of periodic maintenance;
- Diagram of lubrication points with the recommended lubricants;
- List of replaceable parts;
- List of sources of spare parts; and
- Log for records of inspections and maintenance.

Weekly, monthly, yearly and five-yearly inspections are therefore described. The following aspects must be covered:

- Wear of cables and pulleys.
- Do all pulleys run smoothly.
- Attachment of the launching device to the deck.

- If a three or four-point system is used, this must also have a certificate, but still be checked for wear.
- With a fixed lifting frame, a certificate must also be present. Check attachment points.
- If fasteners are used these must be checked and lockable.

Inspection of the self-righting system consists of:

- Checking whether the self-righting bag is attached with rigging lines.
- Whether the self-righting bag cannot be prevented from inflating by objects getting in the way, such as aerials, radar reflector, etc.
- Checking whether the CO^2 bottle has not been pulled. Check for the green indicator on the bottle cap.
- Is the CO^2 bottle well attached with a bracket surrounded by anti-slip.
- Check the inspection date. This is after all a pressure vessel subject to corrosión.

Inspection of the electrical equipment consists of:

- Is the battery in good condition. Remember the useful life. Is the battery protected against water by a watertight battery compartment.
- Are all electrical components tight and slightly greased to prevent penetration by condensation water and seawater.
- Does the illumination of the navigation lights, searchlight, dials and compass work.
- Test the radio for transmission and reception.
- Do all switches work and do the meters issue a good indication.

Inspection of the steering arrangement consists of:

- Checking whether all connections of the steering arrangement are tight and smooth.
- Are all moving parts greased.
- Is there any play in the steering system.
- Check that the steering arrangement experiences no resistance or tight running.
- Is the steering wheel tightly connected and locked.

Inspection of the fuel system:

- Here we differentiate between the outboard motor and the diesel.
- The inspection of the fuel system for a petrol outboard motor consists of:
- Is the fuel tank fully secured.
- Check for leaky joints and correct tightness.

- Is the fuel tank full with the correct fuel.
- If the fuel is automatically mixed, the mixer tank must also be filled.
- Using the bellows system, remove any air from the system and apply pressure. Check again for leaks.
- If the tank cannot be pumped to a vacuum the vent is open.

Battery compartment

STEERING WHEEL

The inspection of the fuel system of a diesel motor consists of:

- Check the fuel volume and do not rely on the gauges.
- Fill the tank to prevent condensation in the tank, and seal the tank tightly.
- Check the pipes for leaks.
- If possible, check whether there is water in the tank. It is often possible to drain off any water.
- Before a frost period, the tank should be filled with winter diesel. Otherwise there is a risk of flocculation. If the diesel flocculates, you must replace all your filters. The diesel engine will not start with flocculated fuel.

DIESEL FUEL CAP.

Inspecting the engine: Here too we differentiate between a petrol outboard motor and a diesel engine. The inspection of the outboard motor consists of:

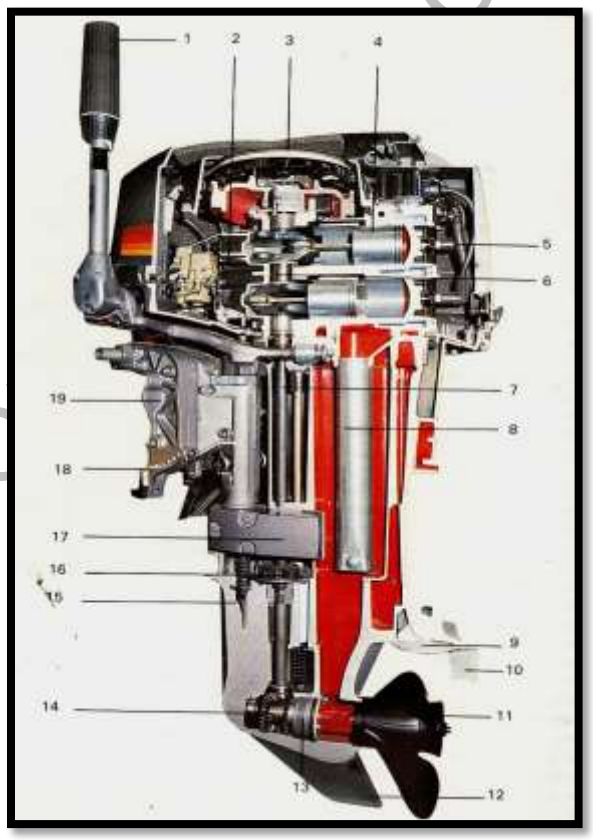
- Check whether the motor is correctly attached to the stern plate.
- Can the motor be tilted, and is it possible to lock the motor in this position.
- Check for any motor damage.
- Inspect the propeller.
- Remove the cover and inspect for damage and loose parts. Also check whether the motor is clean and that there are no salt deposits.
- Test the motor by starting according to the instructions.

1. Ensure water cooling by connecting a water hose to the motor.
2. Use the bellows to remove air from the fuel system.
3. Use the choke if the motor is cold. Do not flood the motor.
4. Apply throttle in idle condition (propeller uncoupled), attach the kill cord.
5. Start the motor by using the draw cord or with the electrical starter.
6. Allow the motor to reach operating temperature, but do not run at too high engine speed

- At low engine speed, allow the motor to reach operating temperature and stop the motor with the kill cord. This automatically testes this device, too.
- Replace the cover correctly, and the motor has been tested (do not forget the spare!).

A small outboard motor has the following appearance:
(only on small motors a tiller with rotary handle)
1) tiller with throttle
2) carburettor
3) flywheel
4) cylinder (x 2)

5) sparkplug
6) crankshaft
7) drive shaft
8) exhaust pipe
9) cavitation plate
10) trimming plate to counter wheel effect
11) exhaust via hub
12) propeller protection
13) propeller seal
14) reverse clutch
15) operating rod reverse clutch
16) cooling water pump
17) bottom bearing
18) holes and bolt for motor adjustment
19) tilting device with lock.



TWO STROKE PETROL OUTBOARD

Inspection of the diesel engine consists of:

- Is there sufficient coolant. If not, top up and carefully close the cap. This only applies for diesels with an internal cooling system. If no such system is fitted, the boat can only be started in the water.
- Check for sufficient oil. Otherwise top up.
- Test the engine by starting it according to the instructions.
- It is important to know how the cooling system operates. Can the engine operate for several minutes without cooling. Also consider the cooling water pump (impeller). This can burn out within seconds.
- Switch on the battery main switch.
- Attach the kill cord.
- Disconnect the propeller or water jet and apply the throttle slightly.
- Pre-glow if necessary.
- Start the engine.
- If the boat is being tested in the water, check whether the coolant exits the engine.
- Allow the engine to run at low speed to the required temperature, and then cool back down.
- Test the kill cord by stopping the engine.

10. METHOD OF STARTING AND OPERATING A FAST RESCUE BOAT ENGINE AND ITS ACCESSORIES

10.1 Inboard motor Engines.

The diesel engine has been specially designed for these boats. These motors are small and compact. The engines generate considerable power and a generally equipped with turbochargers to increase power.

Advantages of onboard diesel:

- Heavy motor offering extra stability.
- Reliable.
- Diesel is less inflammable.

Disadvantages of inboard diesel:

- Costly
- Considerable loss of space
- Boat useless if engine breaks down
- Noise
- Little space for repairs.

INBOARD MOTOR ENGINE

10.2 Outboard motor Engines.

The outboard motor Engines is to be found on light boats such as the inflatable and small RIBs. The power used depends on the size and rigidity of the boat. Most outboard engines nowadays are 4 stroke engines, but occasionally 2 stroke engines can still be found on board ships.
Besides petrol outboard engines, diesel outboard engines are on the market as well.

OUTBOARD MOTOR ENGINE

Advantages of outboard motors:

- Reasonably reliable.

- Cheap.
- Easy to replace.
- Underwater exhaust.
- Low noise.
- Direct steering.
- Considerable space left in the boat.

Disadvantages of outboard motors:

- Propeller is vulnerable.
- Propeller is casualty-unfriendly.
- Reversing is limited.
- Petrol is highly inflammable.
- Needs to be watercooled during use

10.3 Water jet propulsion

Propeller or water jet propulsion. This choice is made by setting advantages and disadvantages against one another. Although in certain countries, like Norway, the propeller is not permitted.

WATERJET

Advantages of water jet propulsion:

- No risk to casualty.
- Few protruding parts below the surface.
- Shallow draught.
- No risk of propeller damage.
- Handy for rapid manoeuvrability.

Disadvantages of water jet propulsion:

- Less power and loss of approx. 30 to 40%.
- The intake can become blocked.
- Objects may enter the pump.
- Less direct steering.

- More practice required.

The diesel engine with stern drive.

The advantage is that this engine has characteristics which also apply for an outboard motor, whilst the weight of the engine can be transferred forward. Disadvantage is that if damaged, the stern drive is extremely costly. What is the difference between the operation of a propeller and a water jet? The propeller works by directly pushing away the water, whilst the water jet ejects water, which then collides with the surrounding water. A sort action-reaction effect.

With a propeller, we must be aware whether it rotates clockwise or counter-clockwise, in order to recognise manoeuvring characteristics. Propulsion by propeller is better than with a jet, but there are advantages and disadvantages:

Advantages of a propeller:

- More power with lighter motor.
- Choice of propeller can be changed.

Disadvantages of a propeller:

- Casualty unfriendly.
- Damage to blades; susceptible.
- Less manoeuvrable

A propeller must be provided with a protective cage or prop guard which makes this system also casualty-friendly. For those on board or people who fall overboard, the risks of the propeller are also eradicated. However, such a system is limited, depending on power.

10.4 Drills in engine operation

In the event of engine trouble, we may be faced with the following problems:

- The engine will not start.

- The engine runs irregularly or falters.
- The engine runs briefly and then stops.
- The engine does not run well in neutral
- The engine runs faster than normal.
- The engine runs slower than normal.
- The boat does not achieve normal speed.
- The engine runs hot.

The failure of the engine to start may be due to:

- The engine is too cold. Use the choke or preglow.
- The kill cord is not attached or main switch is not switched on.
- Is there sufficient fuel, or is the fuel supply faulty.
- If the battery is in poor condition or empty, this will be clearly audible.
- If when starting the engine does not turn over, this may be due to the starter motor, or the engine has become blocked.

With an outboard motor, the motor may be flooded, or there may be a problem with the spark plugs.

The engine runs irregularly or falters:

- The first possible cause is the fuel system; if there is still enough fuel, is the engine receiving fuel? Is the filter blocked? or is there a leak causing air to enter the system?
- Wrong or poor quality fuel. Possibly flocculating diesel or a wrong mixture for an outboard engine.
- A poor spark plug or the ignition is incorrectly set.
- A spark plug cap may be loose.

The engine runs briefly and then stops:

- No more fuel.
- The fuel supply is interrupted due to a poor connection or a blocked filter.
- If the tank is loose, the vent may be closed or there may be a kink in the hose.
- There may be water in the tank.

The engine does not run well in neutral:

- The engine is still too cold.
- The fuel supply is faulty.
- The fuel is not well mixed.
- The wrong spark plugs are being used.

The engine runs faster than normal:

- The propeller is damaged.
- The angle of trim is incorrect.
- The weight distribution is wrong.
- The stern board is too high (outboard)
- The wrong propeller (pitch/diameter).

The engine runs slower than normal:

- The fuel supply is insufficient.
- Wrong fuel or poor mix.
- Spark plugs or ignition faulty.
- The cooling system is not operating correctly, so a thermal protection is slowing down the engine.
- The stern board is too low.
- The angle of trim is incorrect.
- Wrong weight distribution.

The boat does not achieve normal speed:

- The fuel supply is faulty.
- Incorrect fuel or problems with mixing.
- Spark plugs or ignition faulty.
- The cooling system is not operating correctly.
- Propeller damaged or with water jet, the filter may be blocked.
- The engine is attached differently.

The engine runs hot:

- The cooling pump is not working, or faulty. Consider the impeller.
- The cooling system is blocked.
- The intake is blocked.