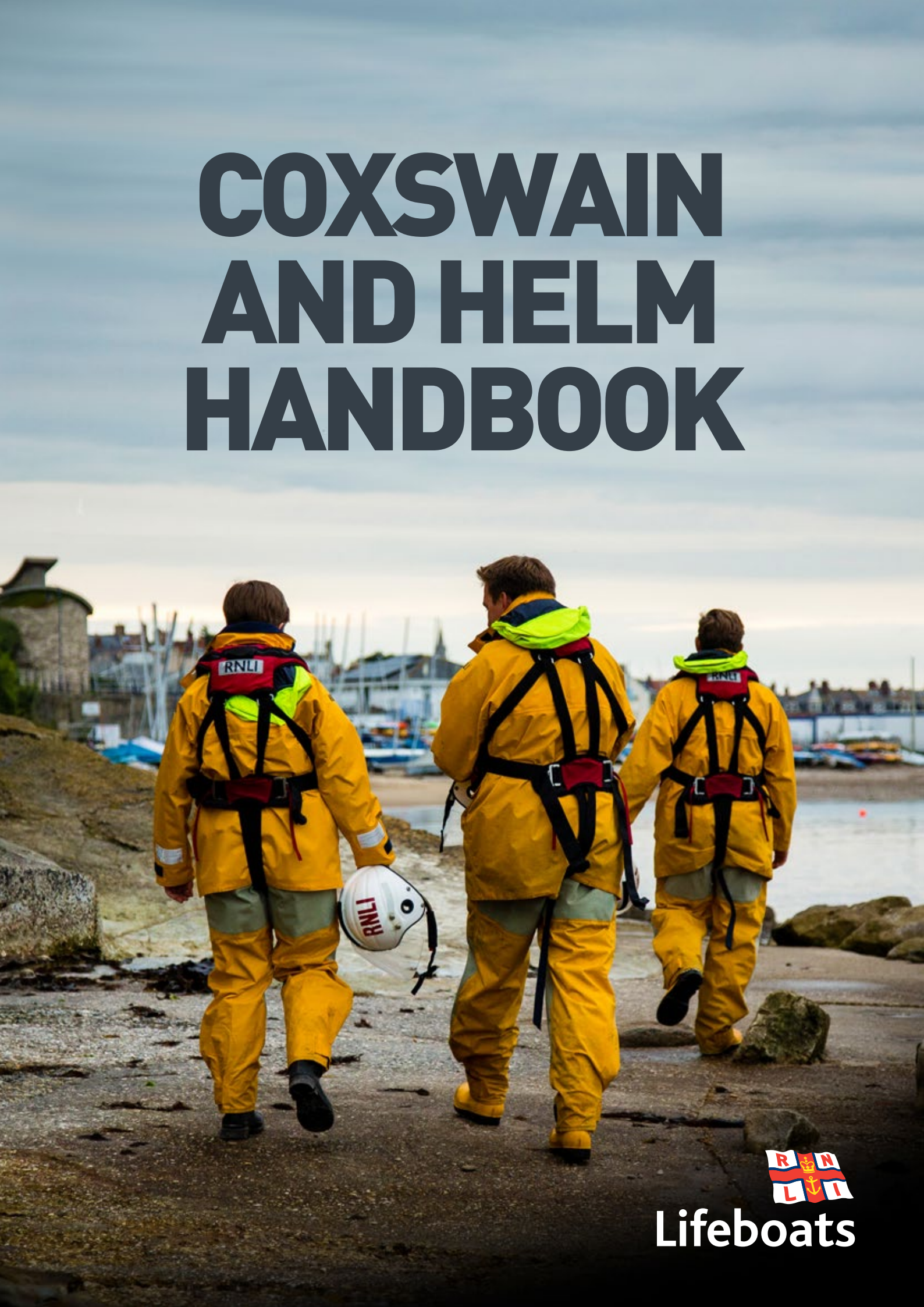
COXSWAIN AND HELM HANDBOOK



RNLI Lifeboats

COXSWAIN AND HELM HANDBOOK

This handbook is dedicated to
all those who strive to fulfil the purpose of the RNLI: **To save lives at sea**

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Welcome

It gives me great pleasure to welcome you to the role of ALB coxswain, ILB helm or IRH commander in the RNLI. These roles are of critical importance to the safe operation of our lifeboat rescue service. The responsibility that has been vested in you to carrying out your duties cannot be overstated.

You will not only be expected to look after your teams and plan safe and effective rescue operations. By now, you will also be considered a senior member of your RNLI team and will be helping guide and support the direction of this team and the wider RNLI community.

As well as providing leadership and support to your crews while afloat on service, exercise or on passages, you are integral to the RNLI's model of saving lives, not just through rescue but also through influence, supervision and education.

You will need to exercise your leadership skills in a range of very different circumstances, both at sea and ashore. Your diplomatic skills, experience and expertise will be called upon often, whether managing your crews or engaging with other SAR stakeholders and partners.

This handbook is designed to support the development of your RNLI progression as you move into different roles based on the competencies defined in your development plan. The training for the role can take place at the RNLI College and may also be delivered by members of your own supporting teams, other managers, and coastal staff in the community.

In addition to the information contained within this handbook a wide range of resources is also available on the RNLI online learning platform.

I hope that you will find this handbook helpful, providing the underpinning guidance for your role.

I wish you every success in this important and responsible position in the RNLI.

Leesa Harwood
Community Lifesaving Director

Dangers, Warnings, Cautions

Depending of the severity of harm associated with a person, craft or component, or to the environment, hazards are identified through the use of different labels. Starting with the highest severity first, you will see DANGER, WARNING and CAUTION labels throughout this handbook. An example of each is detailed below.

DANGER

Denotes that an extreme intrinsic hazard exists which would result in high probability of death or irreparable injury if proper precautions are not taken.

WARNING

Denotes that a hazard exists which can result in injury or death if proper precautions are not taken.

CAUTION

Denotes a reminder of safety practices or directs attention to unsafe practices which could result in personal injury or damage to the craft or components or to the environment.

Notes

General information notes will be shown as follows:

NOTE

Denotes a general information note.

Procedure labels

A list of emergency operating procedures (EOPs), standard operating procedures (SOPs) and local operating procedures (LOPs) can be found on the RNLI Intranet through Horizon. At various points through this handbook, you will find some of these labels that will give details on which procedure to reference on Horizon. An example of each type of procedure label is detailed below.

Emergency operating procedure

An emergency operating procedure (EOP) is a set of step-by-step instructions for RNLI personnel to carry out in the event of a situation that has potentially disastrous results.

Emergency operating procedure

Standard operating procedure

A standard operating procedure (SOP), is a set of step-by-step instructions for RNLI personnel to carry out routine operations. SOPs aim to achieve efficiency, quality output and uniformity of performance, while reducing miscommunication.

Standard operating procedure

Local operating procedure

A local operating procedure (LOP), is a set of step-by-step instructions for RNLI personnel to carry out routine operations specific to a locality. Examples of this could be a lifeboat station or a lifeguarding facility.

Local operating procedure.

Photo: RNLI/Nathan Williams

Safety, Health and Environment

Activity

1

Personal protective equipment (PPE)

PPE is defined as:

- All equipment (including clothing affording protection against the weather) which is intended to be worn by a person when undergoing specific duties of their volunteer or staff role, and which protects them against one or more risks to their health or safety, e.g. safety helmets, gloves, eye protection, high visibility clothing, safety footwear and safety harnesses.

PPE is the control measure of last resort. In general terms, regulations require that PPE:

- is properly assessed before use to ensure it is suitable
- is maintained and stored properly
- is provided with instructions/training on how to use it safely
- is used correctly and not tampered with
- is provided at no cost to staff, crew and other volunteers
- training is provided in the use, operation and maintenance of the PPE
- staff and volunteers are made aware of their responsibility to use the PPE issued to them
- all other personnel at the workplace, such as sub-contractors and visitors, must comply with the Institution's requirements with respect to the use of PPE.

PPE will be issued to you during your induction as appropriate.

Photo: RNLI/Simon Moss

The hazards and types of PPE

Generally, PPE can be grouped according to the area of the body that it protects:

Ear protection

Refer to the Noise at Work section of this document.

Eye protection

Hazards to the eyes can occur from:

- chemical or metal splashes
- radiation
- dust or gases
- impact damage from projectiles.

Protection is achieved through the use of goggles, safety glasses, visors, fixed or portable shields. Remember, the type of protection selected must be suitable for the particular role/work environment and fits the user properly.

Photo: RNLI/Nigel Millard

Head protection

Head injuries can occur from any of the following:

- falling objects
- falling from a height
- hitting a surface as a result of a trip or slip
- hitting a surface as a result of working in a confined area.

Wherever such hazards exist, safety headwear must be worn. Note that some safety helmets incorporate or can be fitted with specially-designed eye or hearing protection. Do not use head protection if it is damaged – replace it.

In some work processes, the danger exists from hair being caught in moving machinery. In such cases hair nets and/or caps should be worn.

Respiratory protection

Hazards to breathing/respiratory system can be caused by the following:

- dust
- vapour or gases
- oxygen deficient atmospheres.

Protection can be achieved through the use of disposable filtering facepiece or respirator, half or full-face respirators, air-fed helmets, and various breathing apparatus.

Hands and arms protection

Hazards to the hands and arms can be caused by the following:

- abrasions, cuts and punctures
- temperature extremes
- impact
- chemical or metal splashes.

Protection can be achieved through the use of gloves, gauntlets, mitts, wristcuffs, armlets. Note that wearing gloves for long periods can make the skin hot and sweaty, leading to skin problems; using separate cotton inner gloves can help prevent this. Be aware that some people may be allergic to materials used in gloves, e.g. latex.

Feet and legs protection

Hazards to feet and legs exist from:

- falling objects
- abrasion, cuts and punctures
- chemical and metal splashes
- wet surfaces/slipping.

Protection can be achieved through the use of safety boots and shoes with protective toe caps and penetration resistant midsole, non-slip footwear, gaiters, leggings and spats.

Footwear can have a variety of sole patterns and materials to help prevent slips in different conditions, including oil or chemical-resistant soles. It can also be anti-static, electrically conductive or thermally insulating. It is important that the appropriate footwear is selected for the risks identified.

Skin protection

Contact with certain substances can cause irritation of the skin resulting in an alergic reaction. This can range from a minor rash to swelling or blistering of the skin. Such irritants include:

- dust from fibreglass, cement, plaster etc
- solvents
- petrol and diesel
- grease.

Protective clothing will limit contact with these irritants. This includes conventional or disposable overalls, boiler suits and specialist protective clothing, such as chainmail aprons. Another common form of protection is barrier cream.

In addition to the risks posed by irritable substances, personnel should also be made aware of the dangers of over-exposure to sun light with the attendant risk of melanomas.

Whole body protection

This is linked to skin protection, but also includes such hazards as:

- risk of crush injury
- falling from a height
- temperature extremes and/or adverse weather.

Protection is achieved through the use of safety harnesses, high-visibility clothing, specialist clothing and clothing appropriate to the climactic conditions.

Specific PPE for RNLI personnel

The specific PPE provided by the RNLI includes, but is not limited to the following:

- floatation protection – lifejacket
- head protection – hard hats
- ear protection – ear defenders
- foot protection – provision of or an allowance for safety shoes
- eye protection – shatterproof spectacles or goggles
- hand protection – gloves
- body protection – foul weather protective clothing
- respiratory protection – masks.

Such protective clothing will be issued to RNLI staff, crew and other volunteers where the risks dictate. All protective clothing is to be used and maintained strictly in accordance with the manufacturer's instructions and requirements.

Those who require safety spectacles will be provided with them, as detailed in the RNLI Eye Care Policy, which can be found on Porthole under the Health and Welfare section of the HR Policy Zone, or contact your line manager.

Maintenance of PPE

All staff, crew and other volunteers issued with PPE have a duty to ensure that it is maintained correctly.

To this end, they must ensure that it is:

- well looked after and properly stored when it is not being used, for example in a dry, clean cupboard, or in the case of smaller items, such aseye protection, in a box or case
- kept clean and in good repair (follow the manufacturer's maintenance schedule, including recommended replacement periods and shelf lives). Simple maintenance can be carried out by the trained wearer, but more intricate repairs are only to be carried out by specialists
- report any loss or defect of the equipment.

Inspection of PPE

The following inspection tasks can be carried out by all staff, crew and other volunteers:

- dry suits – look for holes, cuts, nicks, general wear and tear. Inspect condition of zips, seams and seals (wrist, neck and boots). Inspect knee and elbow areas of dry suit due to high usage area. Check for bio-hazards due to patient care
- protective under clothing – check for holes, cuts, nicks general wear and tear. Inspect condition of zips, seams and seals
- helmet – check visor for cracks and scratches. Inspect condition of straps, padding and shell of helmet for cracks and general wear and tear

Any defects are to be reported and PPE replaced. Never wear defective PPE which may cause harm or not be effective.

Cleaning PPE

After use and before stowage all PPE must be cleaned:

- dry suits, wetsuits, buoyancy aids, rash vests (any PPE which comes into contact with the skin) is to be washed down thoroughly – use cleaning and sterilisation liquid
- follow manufacturer's guidelines
- biohazards cleaner – Chemgene
- wooly bear suits – wash in accordance with manufacturer's guidelines
- only use RNLI approved cleaning detergents
- wash/spray helmets down with fresh water. Rinse them in diluted biohazard solution as required.

Storage of PPE

All PPE must be stored in its designated stowage, additionally:

- dry suits – hang up in a warm dry area (where possible they should be hung upside down to help drain any excess water)
- lifejackets – hung separately away from heat due to gas canister
- helmets to be stowed off ground – check for wear
- VHF radios and headsets to be inspected, charged in their specific charging area and anti-corrosion grease applied to connections after drying
- do not hang PPE on radiators or heaters due to fire risk.

Defective or lost PPE

Where PPE has been damaged or lost:

- report defects/loss of PPE to the LOM/DLA and arrange for order of replacement.
- safety critical PPE to be reported immediately prior to going afloat or conducting duties/activities
- PPE to be replaced – never use damaged PPE.

Manual handling

Manual handling can be defined as the use of the human body to transport or support a load. This could be achieved by:

- lifting
- putting down
- pushing
- pulling
- carrying
- some other method of moving, such as throwing or intentionally dropping.

The human effort involved may be applied directly, such as using your hands to lift a load, or indirectly, such as pulling on a rope attached to a load.

Hazards

Typical hazards of manual handling include:

- lifting a load which is too heavy or too cumbersome, resulting in back injury
- poor posture during lifting or poor lifting techniques, resulting in back injury
- dropping a load, resulting in foot injury
- lifting sharp-edged or hot loads resulting in hand injuries.

Manual handling injuries

Over a quarter of all accidents reported each year are as a result of manual handling. The majority of these lead to an absence from work of more than three days through injury. Such injuries are not necessarily due to a single accident, but often occur from poor manual handling techniques over a period of time.

Whilst some people will recover quickly from these injuries, others may require a longer period of recovery. The more severe injuries can lead to permanent disability and/or back problems in later life. It is therefore important to know how to handle a load correctly and safely.

The most common injuries associated with poor manual handling techniques are all musculoskeletal in nature:

- Muscular sprains and strains – caused when muscular tissue (or ligament or tendon) is stretched beyond its normal capability leading to a weakening, bruising and painful inflammation of the area affected. Such injuries normally occur in the back or in the arms and wrists.
- Back injuries – include injuries to the discs situated between the spinal vertebrae (i.e. bones) and can lead to a very painful prolapsed disc lesion (commonly known as a slipped disc). This type of injury can lead to other conditions known as lumbago and sciatica (where pain travels down the leg).
- Trapped nerve – usually occurring in the back as a result of another injury but aggravated by manual handling.
- Hernia – this is a rupture of the body cavity wall in the lower abdomen, causing a protrusion of part of the intestine. This condition eventually requires surgery to repair the damage.
- Cuts, bruising and abrasions – caused by handling loads with unprotected sharp corners or edges.
- Fractures – normally of the feet due to the dropping of a load. Fractures of the hand also occur but are less common.
- Work-related upper limb disorders (WRULDs).
- Rheumatism – this is a chronic disorder involving severe pain in the joints. It has many causes, one of which is believed to be the muscular strains induced by poor manual handling lifting technique.

Safe weights

The maximum weight that can be lifted will depend on a number of factors:

Gender of the handler

In general, men can lift heavier objects than women. The average strength of women is about 60 per cent of that for men, so weights picked up by women should be about one third less than for men. Obviously there are wide natural variations and so it is important that the person carrying out the handling is aware of their own capabilities.

Position of load

If the load is at a high or low level, or is handled at arms' length, the stress placed on the lower back will increase, significantly reducing the capability to lift or lower.

Twisting

Twisting the body while handling a load should be avoided if at all possible. Where this is not possible the guideline maximum weights for lifting and lowering are reduced. If the handler twists to the side beyond 45°, then the weight should be reduced by about 10 per cent. If the twist is beyond 90°, then the weight should be reduced by 20 per cent.

Pushing and pulling

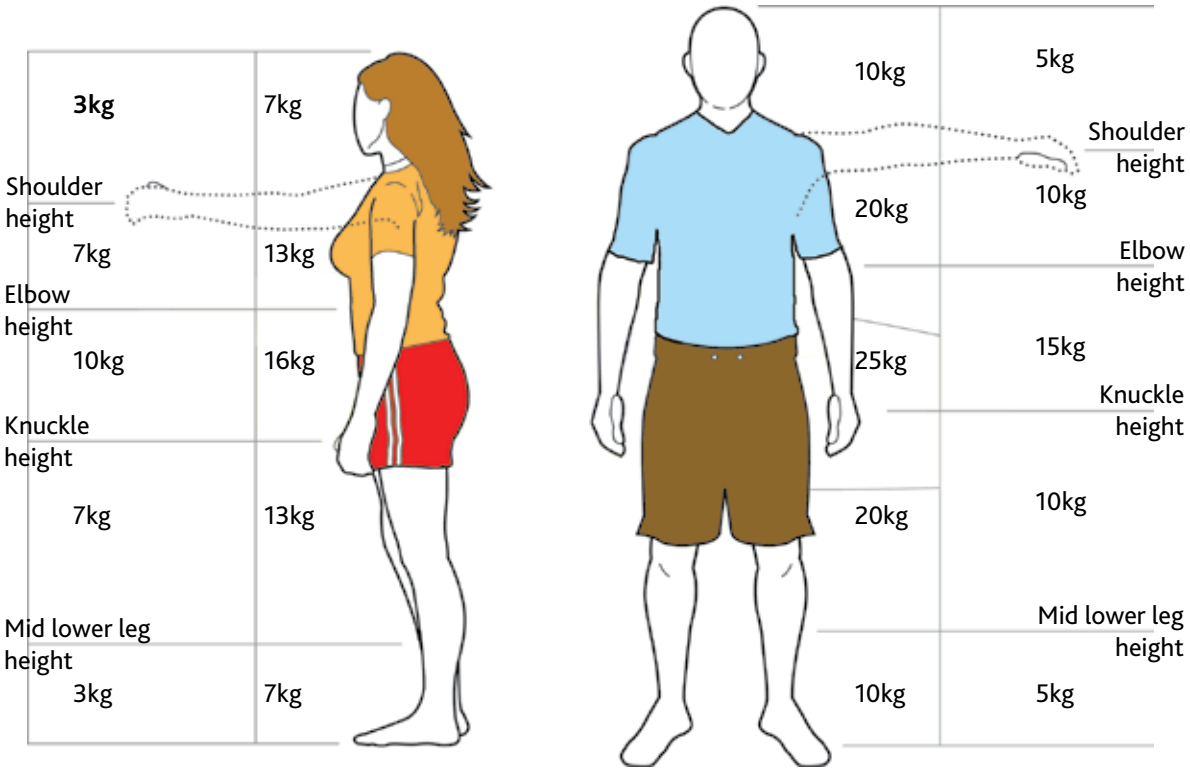
The table below shows the guideline figures for pushing and pulling a load, where the load is slid, rolled or supported on wheels. The figures assume:

- the hands are between knuckle and shoulder height
- the load is pushed or pulled for no more than 20m without a break.

As a general rule, the force required to move a load over a smooth, flat surface is 2 per cent of the weight of the load. If the surface is rough or slopes upwards, this figure will greatly increase.

The diagram below indicates the suggested maximum weights that can be lifted by a man and a woman at different heights. These will vary according to how close the weight is held to the body.

Guideline weights for lifting



Frequent lifting and lowering

Frequent lifting and/or lowering (more than 30 times an hour), will increase the risk of injury. To reduce the risk, the maximum weight figures should be reduced accordingly:

- by 30 per cent if repeated once or twice a minute
- by 50 per cent if repeated five to eight times a minute
- by 80 per cent if repeated more than twelve times a minute.

Handling while seated

The capability to lift or lower is greatly reduced if the handler is seated. In these circumstances, the guideline weights are 5kg for men and 3kg for women. This guidance is only applicable when the hands remain relatively close to the chest during handling and assumes there is no significant twisting or turning.

Reducing the risk

When considering how best to reduce the risk, there are three questions to ask:

- does the load need to be moved?
  - can the process be brought to the load?
- if the load has to be moved, can you avoid or minimise manual handling?
  - consider using a pallet truck, fork lift, etc
- if manual handling can not be avoided, have all practicable measures been taken to reduce the injury risk?
  - consider breaking the load into smaller, lighter components.

Photo: RNLI/Nigel Millard

When assessing a proposed handling operation, a rule-of-thumb is to keep it LITE:

- Load – consider weight, shape, size, centre of gravity
- Individual – consider the person's capability, experience, well-being
- Task – consider how far the load has to be moved, how many loads there are
- Environment – is the route clear, is it well lit, is there a good foothold?

A more detailed risk assessment will need to be made if there is any doubt, or if any of the following apply:

- when lifting and lowering
  - the assumed normal conditions for the operation are not met
  - the guideline weights are exceeded
  - the load is to be held away from the body during the operation
  - the handler has reduced capacity, such as a health problem etc.
- when pushing or pulling
  - the assumed normal conditions for the operation are not met
  - the guidance figures are exceeded
  - there are other risk factors such as uneven floors or ramps.

In all cases of manual handling be aware of your own capabilities. If you think you can't manage a load on your own, get assistance.

When two or more persons are lifting an object, this should be done in unison with one person issuing the following commands – "Ready, Brace, Lift" and "Ready, Brace, Lower".

CAUTION

Where appropriate, always use equipment that has been specifically provided for manual handling duties. Such equipment must be regularly inspected, and tested where necessary, to ensure that it is safe and fit for purpose.

Manual handling techniques

Once it has been determined that manual handling can not be avoided, the correct procedures for handling the load must be adopted.

Lifting a load

The commonest, correct method of lifting a load is known as the kinetic method:

- **adopt a stable position**

Stand close to the load (with the heaviest side closest to you), facing in the intended direction of travel. Feet should be placed apart and slightly angled outwards, with the leading leg placed as far forward as is comfortable to give a balanced and stable base for lifting.

- **adopt a good posture**

Lower yourself down towards the load by bending the knees whilst keeping the back straight. Do not bend the knees fully (squat position), or kneel down. Keep the shoulders level and facing in the same direction as the hips, to avoid twisting.

- **get a good grip**

Take a hold of the load with a firm, secure grip, holding it close to the body. Use the fingers and palms of the hands in a hook grip. Never grip with the fingertips alone. Try to keep the arms within the boundaries formed by the legs.

- **lift the load**

Raise the head and keep looking forwards, not down at the load. Lift the load smoothly, straightening the knees and using the legs to power the lift. Avoid jerking or snatching movements, or twisting the body.

Carrying a load

After lifting the load, walk forwards with smooth, controlled movements. Never rush. If you have to turn or change direction, do so using the feet so as to avoid twisting the body. Keep the load close to the body and ensure that you have a clear view over and around it. If you need to change your grip, put the load down, establish your grip and then lift it again with the new grip. Never change your grip whilst carrying a load.

Putting down a load

When putting the load down:

- adopt the correct posture – take the same care as for lifting the load, using the reverse of the lift procedure
- maintain a straight back with the head up and eyes forward and position the feet to maintain balance and stability
- position the load – lower the load by slowly bending the knees and taking the weight on the legs and keeping the load close to the body
- put down the load, taking care not to trap fingers or toes, release your grip and then stand up in the same position
- only adjust the position of the load once it has been put down.

Pushing or pulling a load

Pushing is preferable to pulling as the risks of injury through straining or twisting are reduced.

Take a firm grip of the handling aid, with the hands in a comfortable position. at a level between shoulder and waist height. Keep the back straight and the head in a stable position, making sure you have good visibility.

Start the pushing or pulling movement slowly and under control, powering from the legs. Once the load is moving, keep feet away from the load and maintain a steady walking pace. Never rush. At the destination, stop smoothly avoiding any sudden or jerking actions, and apply the brake on the aid if one is fitted.

Further details about manual handling can be found:

- RNLI Policy on Manual Handling
- Porthole
- Station posters/Health and Safety notice board
- Safety Health and Environment (SHE) – tool box talk and resources
- Online Delta learning systems.

Hazardous substances

Many people are exposed to a variety of substances at work (e.g. chemicals, fumes, dusts, fibres) which can, under some circumstances, have a harmful effect on their health. These are called hazardous substances. Legislation requires that employers control the use of substances that are hazardous to health.

The RNLI policy is that all substances hazardous to health must be identified, assessed for hazard in the circumstances of use and appropriate precautions taken for the protection of persons coming into contact with such substances.

Regulations prohibit any work if it would expose any RNLI staff, crew and other volunteers or other persons on RNLI premises to a health risk related to any substance being used in the course of RNLI activities.

Mechanisms of exposure

If exposure to a hazardous substance is not properly controlled it may cause ill health in a number of ways. There are various mechanisms of exposure:

- inhalation - once breathed in, some substances can attack the nose, throat or lungs while others get into the body through the lungs and harm other parts of the body, e.g. the liver.
- absorption, through skin contact – some substances damage skin, while others pass through it and damage other parts of the body. Skin can get contaminated:
  - by direct contact with the substance, e.g. if you touch it or dip your hands in it
  - by splashing
  - by substances landing on the skin, e.g. airborne dust
  - by contact with contaminated surfaces – this includes contact with contamination inside protective gloves
- absorption, through the eyes – some vapours, gases and dusts are irritating to eyes. Caustic fluid splashes can damage eyesight permanently
- ingestion – people transfer chemicals from their hands to their mouths by eating, smoking etc. without washing first
- injection – risks from skin puncture such as butchery or needle stick injuries are rare, but can involve infections or very harmful substances, e.g. drugs.

Workplace exposure limits (WELs)

Some illnesses caused by exposure to hazardous substances in the workplace (occupational diseases) may not appear until a long time after the first exposure. Therefore, it is important to know in advance how to protect the health of people working with hazardous substances and also of other people who may be affected by the work being carried out. WELs for hazardous substances at work are set by the Health and Safety Commission (HSC) on the recommendations of its Advisory Committee on Toxic Substances (ACTS) and published in EH40.

WELs are occupational exposure limits (OELs) set to help protect the health of workers. WELs are concentrations of hazardous substances in the air, averaged over a specified period of time referred to as a time-weighted average (TWA). Two time periods are used: long term (8 hours) and short term (15 minutes). Short-term exposure limits (STELs) are set to help prevent effects, such as eye irritation, which may occur following exposure for a few minutes.

NOTE

The HSE publication EH40 is referenced by HSA and is therefore relevant in all areas of RNLI jurisdiction.

Inhaled substances not assigned WELs

The absence of a substance from the list of WELs does not indicate that it is safe. For these substances, exposure should be controlled to a level to which nearly all the working population could be exposed, day after day at work, without adverse effects on health. As part of the assessment required by regulations, managers should determine their own working practices, and in-house standards for control. In some cases there may be sufficient information to set a self-imposed working standard, eg from manufacturers and suppliers of the substance, from publications of industry associations, occupational medicine and hygiene journals.

Identification of hazardous substances

All over the world there are different laws on how to identify the hazardous properties of chemicals (called 'classification') and how information about these hazards is then passed to users (through labels and safety data sheets for workers).

This can be confusing because the same chemical can have different hazard descriptions in different countries. For example, a chemical could be labelled as 'toxic' in one country but not in another. This also acts as a barrier to international trade.

The Earth Summit held in Rio de Janeiro in 1992 and the Word Summit held in Johannesburg in 2002 recognised this as an important global issue.

Given the expanding international market in chemical substances and mixtures, to help protect people and the environment, and to facilitate trade, the United Nations has therefore developed a 'Globally Harmonised System' (GHS) on classification and labelling.

Until the GHS becomes common place, there will be a period where you will come across a mixture of old and new versions of hazardous symbols.

These designations appear on substance labels and material safety data sheets if the substance has that hazard.

Information about the substance can be obtained from:

- material data safety sheets supplied with the product
- HSE/HSA website
- the manufacturer/supplier.

Globally Harmonised System (GHS)

The new hazardous symbols under the GHS are shown directly below. The bottom of this page and the following two pages compares the old European symbols and the new global symbols.

Dangerous to the environment

Toxic

Gas under pressure

Corrosive

Explosive

Flammable

Oxidising

Caution - used for less serious health hazards like skin irritation

Longer term health hazards such as carcinogenicity

Environmental hazards, new and old

Hazard classes and hazard categories*	NEW Label elements**			OLD Label elements		
Hazardous to the aquatic environment, acute, category 1 Hazardous to the aquatic environment, chronic, category 1		H400 H410	Warning		R50 R50/53	Dangerous for the environment
Hazardous to the aquatic environment, chronic, category 2		H411			R51/53	

* Based on Annex I Regulation (EC) No 1272/2008 for all hazard categories with GHS pictograms
** Based on the translation table of Annex VII Regulation (EC) No 1272/2008
*** Specific Target Organ Toxicity

Physical hazards, new and old

Hazard classes and hazard categories*	NEW Label elements**			OLD Label elements		
Explosives • Unstable explosives • Explosives, divisions 1.1 to 1.3 Self-reactive substances, mixtures, types A, B Organic peroxides, types A, B		H200 H201, H202, H203 H240, H241 H240, H241	Danger		(R2, R3)	Explosive
Explosives, division 1.4		H204	Warning	No classification		
Flammable gases, category 1 Flammable aerosols, category 1 Flammable liquids, category 1		H220 H222 H224	**Warning**/Danger		(R12) (R12) R12	Extremly flammable
Flammable liquids, category 2 Flammable solids, category 1 Flammable solids, category **2**		H225 H228 **H228**			R11 (R11) (R11)	Highly flammable
Flammable aerosols, category 2 Flammable liquids, category 3		H223 H226	Warning	No symbol No classification flashpoint 56-60°C	(R10) R10	Flammable
Pyrophoric liquids, category 1 Pyrophoric solids, category 1 Substances, mixtures which in in contact with water emit flammable gases, categories 1, 2 and category **3**		H250 H250 H260 H261 **H261**	**Warning**/Danger		R17 R17 (R15) (R15) (R15)	Highly flammable
Self-reactive substances, mixtures, type B Self-reactive substances, mixtures, types C, D and types **E, F** Self-heating substances, mixtures, category 1 and category **2**		H241 H242 **H242** H251 **H252**			R12 R12	Highly flammable
Organic peroxides, type B Organic peroxides, types C, D Organic peroxides, types **E, F**		H241 H242 **H242**			R7 R7	Oxidising
Oxidising gases, category 1 Oxidising liquids, categories 1, 2 and category **3** Oxidising solids, categories 1, 2 and category **3**		H270 H271, H272 **H272** H271, H272 **H272**	Danger/**Warning**		R8 R8, R9 R8, R9	Oxidising
Gases under pressure • Compressed gases • Liquefied gases • Refrigerated liquefied gases • Dissolved gases		H280 H280 H281 H280	Warning	No classification		
Corrosive to metals, category 1		H290	Warning	No classification		

* Based on Annex I Regulation (EC) No 1272/2008 for all hazard categories with GHS pictograms
** Based on the translation table of Annex VII Regulation (EC) No 1272/2008
*** Specific Target Organ Toxicity

Health hazards, new and old

Hazard classes and hazard categories*	NEW Label elements**			OLD Label elements		
Acute toxicity, categories 1, 2 • Oral • Dermal • Inhalation		H300 H310 H330	Danger		R28 R27 R26	Very toxic
Acute toxicity, category 3 • Oral • Dermal • Inhalation		H301 H311 H331			R25 R24 R23	Toxic
Germ cell mutagenicity, categories 1A, 1B Carcinogenicity, categories 1A, 1B Reproductive toxicity, categories 1A, 1B STOT***, single exposure, category 1 STOT***, repeated exposure, category 1		H340 H350 H360 H370 H372	Danger		R46 R45, R49 R60, R61 R39 R48	Toxic
Respiratory sensitisation, category 1 Aspiration hazard, category 1		H334 H304			R42 R65	Harmful
Germ cell mutagenicity, category 2 Carcinogenicity, category 2 Reproductive toxicity, category 2 STOT***, single exposure, category 2 STOT***, repeated exposure, category 2		H341 H351 H361 H371 H373	Warning		R68 R40 R62, R63 R68 R48	
Acute toxicity, category 4 • Oral • Dermal • Inhalation		H302 H312 H332	Warning		R22 R21 R20	
Skin corrosion, categories 1A, 1B, 1C		H314	Danger		R34, R35	Corrosive
Serious eye damage, category 1		H318			R41	Irritant
Skin irritation, category 2 Eye irritation, category 2 Skin sensitisation, category 1 STOT*** after single exposure, category 3 • Respiratory tract irritation		H315 H319 H317 H335	Warning		R38 R36 R43 R37	Irritant
• Narcotic effects		H336		No symbol	R67	

* Based on Annex I Regulation (EC) No 1272/2008 for all hazard categories with GHS pictograms
** Based on the translation table of Annex VII Regulation (EC) No 1272/2008
*** Specific Target Organ Toxicity

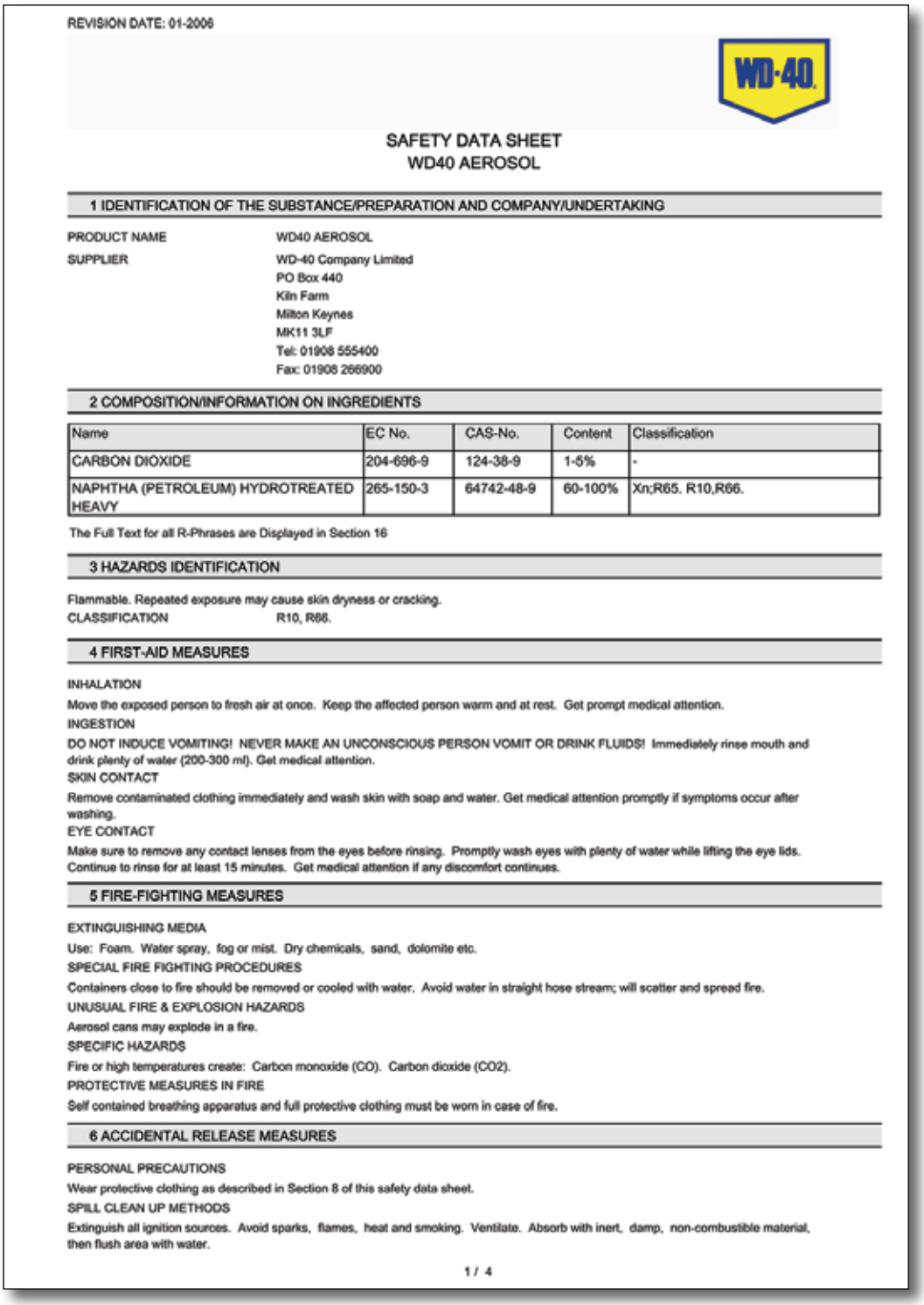
Material safety data sheet (MSDS)

A Material Safety Data Sheet (MSDS) is designed to provide personnel with the proper procedures for handling or working with a particular substance.

MSDSs include information such as physical data (melting point, boiling point, flash point and others), reactivity, storage, disposal, toxicity, protective equipment, spill/leak procedures, health effects and first aid. These are of particular use if a spill or other accident occurs.

In the event of an incident involving an occupationally hazardous substance, the MSDS is also useful to pass onto the emergency services to help them give the appropriate treatment.

The MSDS is provided for all employees and volunteers who may be exposed to occupational hazards.



REVISION DATE: 01-2006

SAFETY DATA SHEET
WD40 AEROSOL

1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

PRODUCT NAME WD40 AEROSOL

SUPPLIER WD-40 Company Limited
PO Box 440
Kiln Farm
Milton Keynes
MK11 3LF
Tel: 01908 555400
Fax: 01908 266900

2 COMPOSITION/INFORMATION ON INGREDIENTS

Name	EC No.	CAS-No.	Content	Classification
CARBON DIOXIDE	204-696-9	124-38-9	1-5%	-
NAPHTHA (PETROLEUM) HYDROTREATED HEAVY	265-150-3	64742-48-9	60-100%	Xn;R65. R10,R66.

The Full Text for all R-Phrases are Displayed in Section 16

3 HAZARDS IDENTIFICATION

Flammable. Repeated exposure may cause skin dryness or cracking.
CLASSIFICATION R10, R66.

4 FIRST-AID MEASURES

INHALATION
Move the exposed person to fresh air at once. Keep the affected person warm and at rest. Get prompt medical attention.
INGESTION
DO NOT INDUCE VOMITING! NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Immediately rinse mouth and drink plenty of water (200-300 ml). Get medical attention.
SKIN CONTACT
Remove contaminated clothing immediately and wash skin with soap and water. Get medical attention promptly if symptoms occur after washing.
EYE CONTACT
Make sure to remove any contact lenses from the eyes before rinsing. Promptly wash eyes with plenty of water while lifting the eye lids. Continue to rinse for at least 15 minutes. Get medical attention if any discomfort continues.

5 FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA
Use: Foam. Water spray, fog or mist. Dry chemicals, sand, dolomite etc.
SPECIAL FIRE FIGHTING PROCEDURES
Containers close to fire should be removed or cooled with water. Avoid water in straight hose stream; will scatter and spread fire.
UNUSUAL FIRE & EXPLOSION HAZARDS
Aerosol cans may explode in a fire.
SPECIFIC HAZARDS
Fire or high temperatures create: Carbon monoxide (CO). Carbon dioxide (CO2).
PROTECTIVE MEASURES IN FIRE
Self contained breathing apparatus and full protective clothing must be worn in case of fire.

6 ACCIDENTAL RELEASE MEASURES

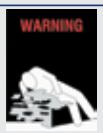
PERSONAL PRECAUTIONS
Wear protective clothing as described in Section 8 of this safety data sheet.
SPILL CLEAN UP METHODS
Extinguish all ignition sources. Avoid sparks, flames, heat and smoking. Ventilate. Absorb with inert, damp, non-combustible material, then flush area with water.

1 / 4

Hazardous/dangerous substance labelling

Hazard classes	Label elements
Class 1 Explosive substance or article	 Division 1.1, 1.2 and 1.3 · Division 1.4 · Division 1.5 · Division 1.6
Class 2 Gases	 Flammable gases · Non-flammable, non-toxic gases · Toxic gases
Class 3 Flammable liquids	
Class 4.1 Flammable solids, self-reactive and desensitised explosive	
Class 4.2 Substances liable to spontaneously combust	
Class 4.3 Substances which, in contact with water, emit flammable gases	
Class 5.1 Oxidizing substances	
Class 5.2 Organic peroxides	
Class 6.1 Toxic substances	
Class 6.2 Infectious substances	
Class 7 Radioactive material	
Class 8 Corrosive substances	

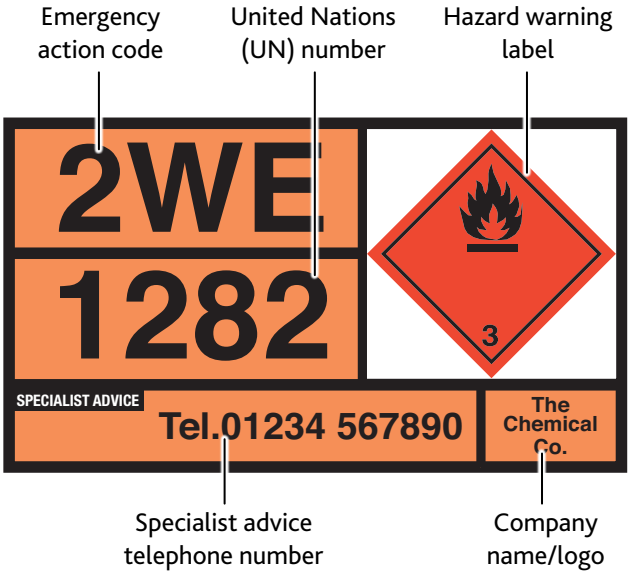
Hazardous/dangerous substance labelling (continued)

Hazard classes	Label elements
Elevated Temperature Substances	
Class 9 Miscellaneous dangerous substances and articles	
Environmentally hazardous/Marine Pollutant	
Dangerous goods packed in limited quantities	
Risk of Asphyxiation	
Fumigation warning sign	

Hazchem code

Containers of hazardous chemicals must display a label summarising the information relating to that chemical. This is known as the Hazchem code or guide.

The Hazchem code or Hazchem guide is designed to assist the emergency services in the first few minutes of dealing with a hazardous goods/substance incident.



Generally, it is designed for responding to bulk product incidents. It is not normally intended for goods carried in smaller quantities, although it is often used as an indicator of the measures that may be needed in such incidents. The label may also provide similar information to MSDS including:

- the fire extinguishing media to be used
- the level of PPE required
- whether the spillage should be contained or may be diluted
- whether there is a possibility of violent reaction
- whether the substance poses a public safety hazard.

Controlling the risk

The person responsible for specifying a substance that is potentially hazardous to health must (with the assistance of the purchasing department if necessary) obtain a copy of the manufacturer's material safety data sheet.

Data sheets for items held on computerised stock will be circulated by the materials database manager (MDM) to line managers of personnel who use or come into contact with the materials concerned.

For all other materials or equipment, especially where bought by the direct supply system, the originator of the request for the order to be placed is responsible for ensuring that material data sheets are obtained and a hazard assessment has been made and material is safe to use.

The person in charge of those persons who use any such substance is responsible for ensuring that risk assessments are carried out in accordance with the following guidelines:

- identify where substances are (or might be) used in the course of RNLI activities
- understand the nature of the substance and how, and in what form or in what quantities, it might cause harm
- understand the nature of the exposure to the substance, and by whom
- consider how different substances, used or stored together, might interact
- anticipate how things might go wrong in use (e.g. spillages, leakages, etc).

Wherever possible, activities should be organised to try and avoid the use of hazardous substances, or to substitute the substance with a new product that presents less or no hazard to health. Always consider the hierarchy of control effectiveness:

- eliminate the substance
- substitute the substance for one posing a lesser hazard
- change the method of working
- reduce the time exposed to the chemical
- provide information, training and instruction
- isolate and segregate
- use general ventilation or local exhaust ventilation
- provide PPE
- provide health surveillance
- monitor exposure
- hygiene methods.

Where control measures are put in place, there must also be systems in place to ensure that the controls are maintained. This will include visual checks, inspection, testing, preventative leak testing and remedial work.

Good practice for the control of exposure to substances hazardous to health are set out in the following principles:

- design and operate processes and activities to minimise emission, release and spread of substances hazardous to health
- take into account all relevant routes of exposure (inhalation, skin absorption and ingestion) when developing control measures
- control exposure by measures that are proportionate to the health risk
- choose the most effective and reliable control options which minimise the escape and spread of substances hazardous to health
- where adequate control of exposure cannot be achieved by other means, provide, in combination with other control measures, suitable personal protective equipment
- check and review regularly all elements of control measures for their continuing effectiveness
- inform and train all staff and volunteers on the hazards and risks from the substances with which they work and the use of control measures developed to minimise the risks
- use only designated receptacles for holding waste products and do not overfill them – inform a responsible person when additional containers are likely to be required
- report any leakage or overflow of waste from a waste container to a responsible person
- ensure that any spillage of substances at the workplace is cleared in an approved manner and that any materials used for clearing are properly disposed of
- ensure that the introduction of control measures does not increase the overall risk to health and safety.

If these principles are applied correctly, exposure should be below any relevant WEL. Control by personal protective equipment should only be used when other measures are not reasonably practicable. The list of WELs applies to concentrations of hazardous substances breathed in by the worker and are used to determine the adequacy of control measures.

Disposal of hazardous waste

WARNING

Controlled waste is not to be disposed of in a manner which is likely to cause harm to the environment or to human health.

This includes prevention of unintentional escape of waste and the arrangement of waste transportation and disposal by an authorised person.

An authorised person is:

- someone who is the holder of a waste management licence
- a local authority, which is a waste collection authority (or Scottish waste disposal authority)
- any person registered as a carrier of controlled waste in accordance with the Control of Pollution (Amendment) Act 1989.

Suitable arrangements are to be made for the disposal of hazardous waste in accordance with the following guidelines:

- the nature of the waste should be known and certificated and a copy of the certificate (Waste Transfer Note) given to the waste removal contractor and the local authority
- the waste removal contractor must be licensed to remove waste and have produced their licence
- the contractor must have stated in writing the disposal site or destination of the waste material
- the waste must be packed or contained in a manner that has been agreed with the waste contractor
- a consignment note must be used at each stage of disposal and signed at each transfer of the waste to the disposal site
- disposal preparation equipment and machinery is only to be used by those personnel trained and authorised to do so
- personnel involved in the disposal of hazardous substances must wear the appropriate PPE when handling such substances.

Arrangements for the removal of special waste, e.g. liquids, asbestos and other hazardous substances, must be made with an authorised and competent person. Liquid waste, other than normal effluent, must not be poured into the sewers – it an offence to discharge trade effluent into the sewer without the approval of the relevant water authority. Arrangements for disposal of liquid waste can be made with an authorised person.

Specific regulations apply to the disposal of explosives. Please consult the Operations Policy Department.

Waste disposal containers

Suitable receptacles for the collection of waste are to be provided throughout the workplace. Each container is to clearly display the type of waste that it is designed to hold. Waste products must only be placed into those receptacles that have been allocated for that purpose. Containers must be adequate to prevent the escape of waste.

Personal protective equipment

Crew will be supplied with any personal protective equipment necessary for the safe handling of waste materials.

Use of waste disposal equipment

Fully trained and competent personnel who have been authorised to carry out the work must only use equipment provided for the preparation of waste. Examples of waste preparation equipment include compactors, bailers, shredders and sluices.

Records

Regulations require that records of waste transfer and disposal arrangements are kept. A transfer note must be completed and handed to the carrier or authorised waste disposal body. Both parties must keep copies of a transfer note for a minimum of two years.

The regulations do not require every individual transfer to be independently documented. For example, regular collections of non-hazardous commercial waste or removal of a large quantity of waste by multiple vehicles can be included within a single transfer note, provided that the description and other details about the contents of the waste are covered in the original note.

In these instances, one transfer note would be valid for up to one year. Copies of special waste consignment notes should be kept for at least two years.

Records should be kept of correspondence between waste disposal authorities and approved recycling organisations as a demonstration that the company has complied with statutory requirements for making arrangements for disposal of waste.

Where the employer operates recycling schemes (paper, aluminium cans, etc) a record should be kept of the recycling company's authority to carry out the work along with details of the waste that is transferred.

Safeguarding

The RNLI runs an increasing number of activities involving children and vulnerable people. Vulnerable people have a legal right to be safe and secure in the activities that they, or their carers, choose. Carers have a right to know that the organisation to which they entrust a vulnerable person is safe.

The RNLI is committed to protecting the safety and wellbeing of children and vulnerable adults and expects all volunteers and staff to share this commitment and be aware of their own safeguarding responsibilities.

Vulnerable adults

A vulnerable adult is, or may be, in need of community care services by reason of mental health or other disability and who is, or may be, unable to take care of themselves, or unable to protect themselves against significant harm or exploitation.

Children

A child is anyone who has not reached their 18th birthday or age of majority. The fact that the child has become 16 and may be living independently does not change their entitlement to services or protection.

Historically, young people have regularly attended lifeboat stations as potential crew members. More recently, young people have been offered work experience placements. In each instance a full risk assessment must be carried out before any activity involving children can proceed.

Safeguarding good practice

As a representative of the RNLI you should always conduct yourself in such a way that promotes best practice. While physical contact with children and vulnerable adults may be appropriate as part of your normal duties (i.e. in a rescue situation, when administering first aid or when protecting a casualty) it should be avoided in any other situation. This also applies in a social or communication context where professional boundaries must be maintained at all times.

Safe behaviour

When interacting with children or vulnerable adults the following codes of behaviour must be observed. This is as much about protecting you as it is about protecting them:

- always put the safety and welfare of the child or vulnerable adult first
- always work in an open environment and avoid situations where you are on your own with a child or vulnerable adult – should such a situation be unavoidable this must be with the full knowledge and consent of your line manager and the parent/carer of the individual
- avoid transporting children or vulnerable adults alone in a vehicle without full consent from the above people
- treat all children and vulnerable adults equally, with respect and dignity and build balanced relationships, enabling them to share in any decision-making process
- ensure that if any form of physical support is required, this is done openly, according to guidelines and with the consent of the individual and their parent/carer
- be an excellent role model – this includes not smoking, drinking or using inappropriate language in front of children or vulnerable adults (this applies both within your working environment and in a social context)
- avoid communicating with children and vulnerable adults by phone, mobile, text, letter or email.

You should never:

- engage in rough, physical or sexually provocative games
- allow or engage in any form of inappropriate touching
- make sexually suggestive comments to a child or vulnerable adult
- take children/vulnerable adults to your home where they will be alone with you

If any of the following occur, you must report the incident immediately to the designated Safeguarding Coordinator and inform the parents/carer:

- if you accidentally hurt a child/vulnerable adult
- if a child/vulnerable adult seems distressed in anyway
- if a child/vulnerable adult appears to be sexually aroused by your actions
- if a child/vulnerable adult misunderstands or misinterprets something you have done.

Allegations, disclosures or concerns

If a child or vulnerable adult makes an allegation or disclosure of abuse to you, you have a responsibility to act:

- stay calm and reassure them that they were right to tell
- listen and indicate that you are taking what they say seriously
- keep questions to a minimum, do not lead or suggest words and ideas
- explain that you have to tell other people in order to stop what is happening
- if the child or vulnerable adult needs urgent medical attention call an ambulance and inform the doctors that it is a safeguarding situation
- report the incident to the designated Safeguarding Coordinator.

The safety of the vulnerable person is paramount, so if they need urgent medical attention/protection, call an Ambulance/Police, inform the Doctor/Officer of the concern and ensure that they are made aware that this is a safeguarding issue.

If you suspect that a child or vulnerable adult may be the subject of abuse, it is NOT your responsibility to decide if abuse has occurred/is occurring. BUT it is your duty to report your concern to the Safeguarding Coordinator.

Signs that abuse is occurring may include:

- unexplained/inconsistent or suspicious injuries such as bruising, cuts or burns on parts of the body not normally prone to such injuries
- another adult or child expresses concern about the welfare of the child/vulnerable adult
- unexplained changes in the behaviour of the child/ vulnerable adult, more withdrawn, sudden outburst of temper
- inappropriate sexual awareness and engagement in sexually explicit behaviour
- distrust of adults, particularly those with whom a close relationship would normally be expected
- difficulty in making friends and being prevented from socialising with others
- variations in eating patterns, including overeating or loss of appetite
- loss of weight for no apparent reason
- becoming increasingly dirty or unkempt
- an unexplained drop off in performance
- physical signs such as stomach/aches, headaches and damaged clothes
- shortage of money or frequent loss of possessions.

(This list is not exhaustive.)

NOTE

Please remember your safeguarding responsibility at all times.

Safeguarding coordinator

The RNLI's designated Safeguarding Coordinator is:

Senior Manager, People Services.
RNLI,
West Quay Road,
Poole,
Dorset, BH15 1HZ.

Tel: 01202 663198 during normal office hours.

In the absence of the Senior Manager, People Services, the People Advisor Team can be contacted and they will complete the incident report form and instigate appropriate action.

Outside normal office hours, contact:

Duty Officer, Central Operations, at the same address.

Tel: 08451 668222 who will pass the details to the Safeguarding Coordinator.

Further details can be found in the RNLI's Safeguarding Policy and Safeguarding Tips leaflet, both of which can be accessed on Porthole.

Dealing with violence and conflict

You may experience situations where people do not see eye-to-eye with you. This may happen for a variety of different reasons, some more justified than others! The best way of being able to deal with these situations is to put yourself in their situation. They probably don't know what they are doing wrong. They might think that the rules do not apply to them. Whatever the circumstance, approach is everything. Steaming in and getting involved is wrong on several levels.

Generally, there are three levels of conflict:

- complaints
- verbal abuse and angry people
- physical abuse and violence.

NOTE

Remember, the RNLI is not a law enforcement organisation. While your role involves public safety, your own safety is of paramount importance.

When approaching people or groups, consider their potential to create a confrontational situation. If a situation is getting tense, stay in control and try to calm the situation.

Complaints

The correct handling of complaints ensures that we:

- deliver a consistent approach to handling the public
- help stop further complaints
- maintain our professional reputation
- maintain a good public relations (PR) image.

The process for handling complaints:

- recognise the situation; make your colleagues aware
- investigate the details; listen carefully to their requests, question them yourself but stick to the facts
- decide what to do; interpret their answers and requests, prioritise, discuss with colleagues
- take action, be assertive, not aggressive and advise them on possible options
- monitor the situation – is it getting worse?
- record incident – who else needs to know?

In addition:

- think about how you would want to be treated
- be polite
- show respect
- be clear about the information you are providing
- show competence in your role.

Any complaint or comment, which is directly related towards the quality of service of RNLI volunteers or staff, should initially be directed toward an appropriate person. Complaints should always be dealt with in a confidential manner. If the complaint cannot be dealt with directly, the complainant should be advised to direct any comment or complaint to the address listed below:

Complaints Coordinator/Supporter Care Manager
RNLI, West Quay Road, Poole, Dorset, BH15 1HZ

It will assist the RNLI in dealing promptly with the complainant if they give the following information:

- name and address
- details of exactly what they are not satisfied with or wish to comment on
- if they disagree with a decision, why they think it is wrong or unfair
- the name of person who dealt with the complaint
- a daytime telephone number, if the complainant is happy for us to contact them by phone – this may help resolve the matter more efficiently.

Once a complaint or comment has been received, the following processes will be followed:

- a letter of complaint will be answered or acknowledged within 5 working days of receipt, a full reply within 10 working days, although this may take longer in more complex situations
- if confronted with an angry/aggressive person it should be entered onto the incident database
- if the complaint is upheld, we will give an explanation and apology and will rectify the situation where possible.

The RNLI will ensure that any comments/complaints are taken on board as part of the continuous development of the RNLI.

Verbal abuse and angry people

When someone becomes angry, they grow less rational. It's almost impossible to be reasonable with someone who is angry – they will demand the Moon and want heads to roll. General steps to take with angry people:

- calm the person
- don't try and reason
- let them talk
- let them know you are listening
- only when they are calm can you begin to deal with the issue.

Verbal aggression

Nobody likes being told what to do, even if it's going to save his or her life! If you are confronted with an aggressive person remember to **CHILL**.

- **C**ontrol
  - control your emotions, be friendly and calm
  - create some space between you and the aggressor and take them away from any audience and if possible remain within sight or if not ensure that an independent witness is present
  - create a calming atmosphere, sun glasses off, open body language.
- **H**elp
  - ask them for a moment while you call your line manager
  - always let someone know where you are and what's happening in case things escalate
  - assertiveness will help you, aggressiveness will not.
- **I**nformation
  - find out what the problem is – who, what, where, when, why, how?
- **L**isten
  - active listening – follow the argument, concentrate on what is being said, ask questions
  - let them vent their frustration; once they have they will generally calm down
  - let them know you are listening
  - nod and express concern
  - this will buy you time until help arrives and you can pass on the information
  - you have two ears and one mouth – use them in that proportion!
- **L**eave it!
  - don't get involved
  - don't lower yourself
  - don't meet aggression with aggression.

Remember your role. Be aware that if you get drawn in to an incident where your attention is being distracted, you may be neglecting your other responsibilities.

Assertiveness versus aggression

Assertiveness (win-win scenario) is when you insist that your views, feelings and needs are considered but without any undue emotions or blackmail.

Aggressiveness (win-lose scenario) is when you insist your views, feelings and needs are addressed regardless of anyone else's.

We can show assertiveness through our posture:

- face – upright, head firm
- eyes – direct, not staring
- voice – expression fits the words
- arms/hands – well modulated
- movement – relaxed, measured.

Traps to avoid:

- challenging the person can antagonise them
- blaming the person
- blaming others
- changing the subject – says to the person you're not interested
- making excuses; may gain sympathy but not satisfaction.

Physical abuse and violence

Violence is an incident in which a person is abused, threatened, or assaulted by a member of the public or fellow colleague during the course of their duties. This may not necessarily be when on duty, but related to those duties.

We all have an interest in eliminating violence. For anyone, violence can cause pain, suffering, and even disability or death. Physical attacks can be dangerous, but serious or persistent verbal abuse can also damage your health through stress.

NOTE

The RNLI has a zero tolerance policy on violence and aggression towards its personnel.

All acts of aggression, whether verbal or physical, should be reported to the Police and appropriate RNLI reporting systems..

Absconders and the non-compliant

An absconder is an individual who runs away and hides to avoid arrest or prosecution. Such a person may refuse rescue or treatment, attempt to run into hazardous circumstances, or even become violent in their desperation. Similarly, those attempting to self-harm and/or are suffering some form of mental health crisis can also be non-compliant i.e. aggressive and with the potential to become violent.

If someone is in danger of loss of life then the RNLI will take all necessary actions to rescue them – this includes the use of reasonable force when a person is non-compliant. But while your role involves public safety, your own safety is of paramount importance. RNLI personnel are not to put themselves or others in danger i.e. if the casualty is armed or physically aggressive; in these situations we must ask for back-up from the Police and standby i.e. waiting near to the casualty and provide what assistance we can e.g. throwing a lifeline.

Antisocial behaviour (ASB)

ASB is defined as:

Behaviour by a person which causes, or is likely to cause, harassment, alarm or distress to one or more persons not of the same household as the perpetrator.

ASB can stem from a variety of causal factors, such as:

- poor education
- joblessness
- ill health
- poverty and child development
- family problems.

ASB takes many forms, with just a few examples including:

- Lifeboat crew having bottles thrown at them from the foreshore/bridges
- drug/alcohol misuse leading to threatening and intimidating behaviour to RNLI personnel
- vandalism and damage to property such as lifeboat stations and beach lifeguard units
- rocks and other projectiles launched at lifeguards.

Managing confrontation

If you are faced with the threat of violence you may find the following approaches useful, depending on the circumstances:

- get yourself away from the situation where possible
- try not to leave yourself in a position where you are alone with the aggressor
- appear calm
- keep your distance
- take extra care to address people respectfully
- be aware of the tone of your voice, speak slowly and softly and avoid long sentences
- explain the reasons for your action; sometimes telling people why you are doing something helps them understand how they are doing something wrong
- do not touch anyone threatening you
- do not do anything that might intensify the situation and/or contribute to the aggression
- be aware of your posture and try to appear relaxed
- avoid prolonged eye contact and other provocative actions
- try to change the subject or distract the person in some other way
- listen – try to take the time to listen; the main problem may be poor communication
- negotiate – there is no harm in compromise.

In the short term if someone is becoming violent you must:

- inform your station management team
- ensure you are not alone
- ensure that someone knows of your location and situation.

You are part of a team; never let yourself become isolated from it. Even if your colleagues consider it trivial or joke about it but it has affected you in any way, it is important to discuss it. We all deal with these situations in different ways.

It is essential that all instances of violence are reported to your line manager immediately; this will enable the RNLI to take immediate action and take preventative measures. It also enables us to ensure that the situation can be avoided in other locations in the future. In the long term the following course of action should be pursued:

- find out if there is a problem – results shown on the returned incident reports will indicate if there are areas common to each location that appear to get more than their share of this type of behaviour. It is intended that the most severe of these cases will be assessed and action taken as a priority and this will be followed by the assessment of lesser cases and so on
- reporting of incidents – any physical or verbal abuse suffered by any RNLI personnel should be recorded on the incident database.

Conflict resolution and breakaway techniques

As per the RNLI's Personal Safety and Lone Working Policy, the RNLI will arrange for volunteers and employees to be trained, based on a risk assessed approach:

- in the skills required to manage and resolve conflict, disagreements and differences in their working environment
- in breakaway techniques to allow them to quickly and effectively create a window of opportunity in which to escape from an attacker.

Anticipating incidents

We can reduce the likelihood of conflict happening by anticipating incidents before they happen. This is done by:

- knowing our customers
- reading and identifying main social groups (groups of young males cause most problems)
- reading body language
- identifying types of conflicts and group situations.

Are there:

- large groups of young males frequently at your place of work, Lifeboat Station, beach, etc?
- pubs on or near your place of work?
- drug problems on or near your Lifeboat Station?
- incidents that have happened with a history of violent or threatening behaviour in the area?
- racial or political tensions on or near your Lifeboat Station that could potentially cause a violent reaction?

Any specific intelligence on known troublemakers received from the Police or other agencies must be kept safe and secure in accordance with the RNLI Data Protection Policy.

At all times be aware of your personal limitations. Are you able to deal with the situation confidently? Will you be putting yourself, your team and the public at risk? Can the conflict be resolved? Can an agreement be achieved or will it only get worse?

Mental health and wellbeing

The RNLI has a duty of care to ensure the wellbeing of all volunteers and staff. We recognise that the hazards and stressors (anything with the potential to cause stress) that may be encountered whilst carrying out RNLI activities may pose a risk to the psychological health of individuals as well as to their physical health.

To achieve a high level of health, wellbeing and organisational performance, the RNLI strives towards a culture where the risks from stressors are being effectively managed and controlled.

Stress

Stress is defined as:

> The adverse reaction people have to excessive pressures or other types of demands placed on them.

Pressure turns into stress when you feel unable to cope. People have different ways of reacting to stress, so a situation that feels stressful to one person may be motivating to someone else.

Causes of stress

A number of factors have been identified which can lead to stress when carrying out RNLI duties. The RNLI will be accountable to and will strive to meet the standards that the HSE/HSA has set in relation to these factors:

Factors	Standards
Demands	Ensuring individuals are able to cope with the demands of their role
Control	Making sure individuals have some say in the way they carry out their duties
Support	Providing individuals with adequate information and support
Relationships	Protecting individuals from unacceptable behaviours
Role	Ensuring individuals understand their role and responsibilities
Change	Keeping individuals informed during periods of organisational change

Although there is no definitive list of the causes of activity-related stress, research has identified the following aspects as those most likely to result in reports of stress:

- lack of personal control
- prolonged pressure to perform
- conflicting demands
- continuous threat of aggression
- harassment or bullying
- ill defined roles
- poor working relationships
- poor communication
- excessively long periods of activity
- monotonous activities
- changes in the procedures and processes
- difficulty with balancing the demands of home and volunteering requirements
- lack of recognition.

Additionally, external stressors must also be factored in, such as:

- a serious illness
- a family bereavement
- relationship issues
- major life events, such as moving house.

It is worth noting that stress might also be the result of the sheer volume or combination of pressures, rather than a single major cause, which would not be particularly troublesome alone, but taken as a whole, the individual can not cope.

There is, however, an important distinction between working under pressure and experiencing stress. Certain levels of pressure are acceptable and normal in every role. For example, the RNLI will at all times endeavour to ensure that volunteers and staff achieve and maintain a high standard in their roles. To this end it will ensure that standards are established, performance is monitored and all volunteers and staff are given appropriate training and support to meet these standards.

It is also worth remembering that since stress is a human perception, it is very individual. What might be stressful for one person may not be for another. We are all different, have different life experiences, different state of health and different levels of coping skills.

Prevention of stress

Stress can be prevented if you:

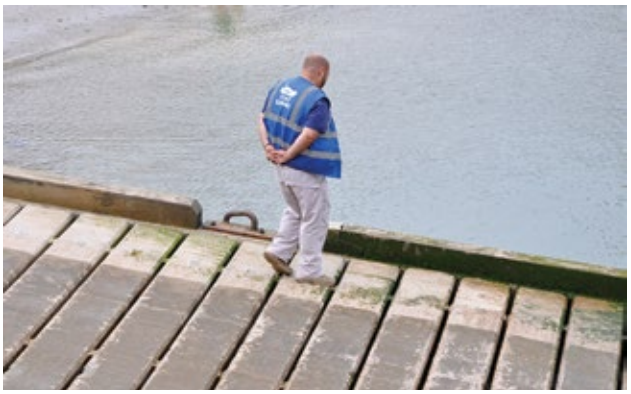
- talk to your station management team about your role and demands, ensuring that you are clear about your role and expectations
- manage your time effectively
- recognise and understand the limitations of your abilities and training – inform your management team if you are overloaded and ask for support
- ensure good communication with your colleagues and management team
- take initiative regarding your developmental needs and make use of training, support, and available resources
- support colleagues by providing appropriate information and sharing knowledge and resources
- ensure bullying and harassment is not tolerated.

Other things that can help prevent and alleviate stress in your daily routine include:

- rest breaks and relaxation – make time for breaks
- healthy diet – well nourished bodies are better prepared for stress, so try to have breakfast and keep your energy up with balanced meals throughout the day. Also cutting back on stimulants like caffeine and sugar and depressants like alcohol and nicotine will keep your blood sugar levels constant and help you to avoid mood swings
- positive thinking – try to adopt an outlook on life that stops you seeing external events as determining your happiness. Instead, see your thoughts as the determiner of your happiness. It takes practice, but if you can do this you'll reduce the negative tension that leads to much of the stress in your life

Photo: RNLI/Nigel Millard

Warning signs



People's reactions to stressful situations vary. Reactions may be physical, behavioural or emotional. Individuals should look out for and recognise the symptoms of stress not just in themselves but in colleagues and friends:

Physical symptoms	Behavioural symptoms	Emotional symptoms
headaches	absenteeism	anxiety
fatigue	increased smoking/ alcohol use	irritability
aching muscles	loss/increased appetite	low self-esteem
palpitations	indecision	poor sleep
high blood pressure	lack of concentration	depression
indigestion and nausea	erratic moods	withdrawal from colleagues

It may be helpful to draw their attention to the support services available within the RNLI. It may also be appropriate to suggest they speak to the station management team about any issues that are causing concern.

Sources of support

The RNLI takes wellbeing seriously and there are lots of support options available. If you feel comfortable talking to your line manager, they are your first point of call. Only once they're aware of any challenges you're facing can they work with you to help find practical solutions. This can start with an action plan that will:

- help set goals to work towards
- help decide on priorities
- demonstrate commitment (from both volunteer/staff member and manager)
- provide measureable objectives to evaluate and review against.

For the purpose of assessing an individual's level of perceived stress, the stress risk assessment toolkit available from HR Services department can be used as a template and guide for an initial assessment. It also identifies possible actions to be taken and can act as a precursor to trigger a referral for further support with the Occupational Health Team.

If you are worried about how to have that conversation with your manager and would prefer to talk to someone else within the organisation, the following people are here to help:

- your People adviser or Business Partner – if you don't know who to ask for, HR Services (x3301 or (+44) 1202663301) will connect you to the person who looks after your department
- Occupational Health x3567 (+44) 1202 663567
- Channel – contact your rep for support.

In addition to Occupational Health and local support in the form of Lifeboat Operations Managers, Coxswains, Mechanics, Senior Volunteers etc., guidance resource for volunteers and volunteer managers can be found on Porthole:

https://porthole.rnli2.org.uk/volunteer

and on the RNLI website:

www.rnli.org/volunteermanagerresources

These resources include:

- The Volunteer Manager's Handbook
- Safety induction checklist for Volunteers
- Volunteering in Safety Booklet
- Disability and Volunteering checklist and Disability Risk Assessment Template
- Managing Young Volunteers Guidelines and Young Volunteers Risk Assessment Template

Further guidance can be found on Safety, Health and Environment's Wellbeing page on Porthole, including:

- PTSD booklet and information
- stress fact sheet and support guide
- stress management policy
- management referral – guidelines on how to make a referral and the support available from Occupational Health
- wellbeing support directory – sources of specialist advice and support that cover personal finances and debt, gambling, relationships, family issues, depression, stress, anxiety, bereavement, physical wellbeing and health

A number of wellbeing resources are also available in the Learning Resources Centre as well as on Learning Zone, which cover dealing with stress, coping with change, confidence/positivity and modern life skills.

Independent support and advice can be obtained from:

- Support 24/7
- Mind
- NHS Moodzone
- Cruse Berevement Care
- Citizens Information
- Your Mental Health
- Support in Mind Scotland.

If the cause of an individual's stress is solely outside of the workplace, it may still be possible for the RNLI to provide support. This may include agreeing to more flexible working hours, or approved absence, or the provision of counselling services through Support 24/7. In the first instance the individual should speak with their line manager.

Support 24/7

Support 24/7 is provided by Workplace Options, an expert provider of support services that is completely independent from the RNLI.

They are experts in fields such as wellbeing, family matters, relationships, debt management, employment issues, consumer rights, and much more. They are bound by professional standards regarding confidentiality and the disclosure of details, ensuring complete confidentiality.

Support 24/7 is available to all RNLI operational volunteers and staff, and can be accessed through the Workplace Options website or by a phone call:

Operational volunteers
website: www.workplaceoptions.com
user name: RNLI
password: volunteer
telephone: 0800 116 4362 (UK)
1800 303 407 (ROI)

Staff
website: www.workplaceoptions.com
user name: RNLI
password: employee
telephone: 0800 042 0138 (UK)
1800 303 398 (ROI)

Mind

A charity that provides information, advice and support across England and Wales to anyone experiencing a mental health problem. The charity has a network of over 140 local Minds, each tailored to understand the needs of their community and provide appropriate services. These include:

- talking therapies
- peer support
- crisis care
- employment support
- housing support.

Mind can be contacted by:

telephone: in England 020 8519 2122
in Wales 029 2039 5123
email: contact@mind.org.uk
website: www.mind.org.uk

Additionally, Mind's Blue Light Infoline is dedicated to emergency services staff, volunteers and their families and can be contacted on:

telephone: 0300 303 5999

email: bluelightinfo@mind.org.uk

Mind, in conjunction with Rethink Mental Illness, also run an anti-stigma campaign; Time to Change. The campaign website can be accessed at:

website: www.time-to-change.org.uk

This site provides an abundance of information, including:

- contact details for numerous support organisations
- free downloadable resources – posters, tip cards, leaflets etc
- advice on providing support.

NHS Moodzone

Available through the NHS website, this has lots of practical guides and resources to help everyone take good care of their emotional health. If you're concerned about your mood, the self-assessment tool can provide some useful insight and guidance.

Many regions also offer NHS counselling services that can be accessed directly via self-referral (this programme is often referred to as IAPT). For more information about the services in your area, use the postcode search function or contact your GP for details.

Cruse Bereavement Care

A charity providing free bereavement support in England, Wales and Northern Ireland. Cruse is contactable through:

telephone: 0808 808 1677

email: helpline@cruse.org.uk

website: www.cruse.org.uk

For face-to-face support you can contact your local Cruse branch, details of which can be found on the Cruse website.

Citizens Information

The Citizens Information website provides information on public services and entitlements in Ireland. The website can be accessed at:

website: www.citizensinformation.ie

The website provides practical information and advice on a wide range of subjects as well as providing links to various public and voluntary organisations.

Your Mental Health

This website is provided by the Irish Health Service Executive (HSE), the National Office for Suicide Prevention and partner organisations across Ireland. It details information on mental health issues and provides links to various support services and useful tips on self-support and supporting others.

The website can be accessed at:

website: www.yourmentalhealth.ie

Support in Mind Scotland

A Scottish charity that supports those affected by mental health issues, including their families, carers and supporters.

Support is provided through:

- drop-in resource centres across Scotland
- group workshops
- one-to-one support
- information and guidance
- a national information service
- website.

The national information service can signpost you to the local support that best fits your needs. The service is available Tuesday to Thursday, 9am to 4.30pm, and is contactable by:

telephone: 0131 662 4359

email: info@supportinmindscotland

The website provides links to numerous resources and support information. It can be accessed at:

website: www.supportinmindscotland.org.uk

Post traumatic stress (PTS)

NOTE

Stress is a normal reaction to an abnormal event. It is a temporary situation, when factors causing it are greater than our coping response.

Provided we can increase our coping response, we are fine; if we are unable to, we become distressed..

Irrespective of our role, all of us will experience traumatic events, such as

- witnessing or being involved in an accident
- the death of a family member, close friend or work colleague
- a serious illness
- violent abuse or physical assault
- a capsize
- abandonment of a launch vehicle in water
- body recovery
- reading about, supporting or investigating traumatic events.

Such events are always distressing and we all experience resulting physical and psychological responses that may either be short-lived or persist for some time. Our responses may be mild or they may be intense. They might confuse or frighten us. We may deny it, but those close to us often see a change in the way we behave in our normal daily lives. What is clear is that it is entirely normal to respond emotionally to potential or actual life-threatening events.

What follows is a description of some of the more common reactions, along with advice on how to recognise and cope with them. This information is also designed for partners and colleagues to understand how those involved might react and how they can be helped.

Symptoms

There are numerous symptoms of post traumatic stress. You may only experience one or you may experience several. These include:

Re-experiencing the event

This is the most common symptom after being involved in, or witnessing, a traumatic event. Symptoms can include flashbacks where you 'see' the event again in your mind like a video. Such flashbacks can come out of the blue and push into your other thoughts when you do not expect them to. Certain sights, smells or sounds that your brain associates with the event can trigger flashbacks.

Sometimes a flashback provokes the same distressing and frightening emotions that you felt originally. If you have experienced a tragedy, you may relive memories of it when seeing television pictures or hearing news of another disaster. Dreams of the event may occur as can other frightening dreams that bear little relation to what was experienced. Nightmares may wake you up and unsettle you.

Sadness and helplessness

Tragedy frequently brings out much that is good in people but, despite the positives, it is also possible to experience deep feelings of sadness, particularly at death and crippling injury. Many of us feel overwhelmed at the scale of a disaster, particularly with catastrophic events, and become powerless and unable to help.

Numbness

Traumatic events often provoke feelings of emotional numbness. This may include a lack of ability to experience our feelings, feeling detached from other people and giving up previously significant activities. There may be gaps in our memory of significant parts of what happened.

Avoidance

You may find yourself avoiding memories of a traumatic event. You might similarly start avoiding any 'triggers', such as places or people that have links to the event, or film and TV programmes that portray similar events.

Reflection

Many people reflect excessively on the event or on questions relating to it, such as why it happened to them, how they could have avoided it, or how they could take revenge. 'What if?' thoughts are common.

Increased anxiety and jumpiness

You might experience increased anxiety and jumpiness, including increased vigilance for dangers, exaggerated responses when startled, irritability, difficulty in concentrating and sleep problems. Sometimes people become afraid of putting the light out at night as they are concerned that they may dream of the event.

Anger

You may experience deep feelings of anger at seemingly minor irritations. Relatives, friends and colleagues may comment on this and behaviour that is 'out of character' may be felt or remarked on. Persisting anger about the unfairness, the injustice or the senselessness of what occurred may also be experienced.

Disgust

One of the least recognised emotional symptoms is that of disgust, which motivates the person to create distance between themselves and the triggering stimulus. Disgust triggers are commonly experienced during trauma and include bodily fluids, wounds, death and diseases.

Guilt

Guilt is a common emotion and one that those involved in traumatic incidents may experience rather than being relieved at having survived where others didn't. Guilt may be quite inappropriate, such as feeling responsible for not being able to alter events. Some feel guilty for surviving.

Longing

You may find yourself longing for things to be as they were before the event took place, or wishing that you could experience feelings and emotions in the way that you used to.

Depression and anxiety

Many people who have experienced traumatic events become depressed and/or anxious.

Tiredness and exhaustion

Some of the responses previously described will lead, over time, to the individual experiencing physical symptoms. These may include tiredness and exhaustion but also headaches, stomach upsets, indigestion, palpitations, chest pain or other problems. Very often, investigation by a General Practitioner will find nothing amiss and it is important always to remember that such physical symptoms can stem from our psychological response to trauma.

Relationship issues

Relationships can suffer severely after traumatic events. The changes discussed above may lead to the affected person emotionally 'withdrawing' from their partner and this, along with anger, irritability, sleep disturbance and emotional numbing, may produce considerable strain. These problems can be compounded, for example, by an increased use of alcohol and by feelings of uniqueness ('nobody understands what I am going through').

It is important for the sufferer to recognise these symptoms and also to recognise that it may be the partner (or sometimes a parent) who will intervene and try to get help. For the sufferer it is important to realise that they are not unique, that they are experiencing what many have experienced before them. Withdrawal and isolation will make matters worse.

NOTE

PTS requires no medical intervention, unless symptoms are severe.

However, you may benefit from psychological healthcare support to prevent symptoms from worsening.

Time course of events

All of us will be distressed to some degree or other by traumatic events; this is entirely normal.

If the events are particularly shocking or drawn out, it will take the brain longer to process the information and memories of the event will persist. Usually, we settle down over a matter of a week or so and reactions fade away with time.

If the reactions do not fade away and you continue to be distressed, or those around you continue to be concerned about you, it is time to seek help.

THIS CAN HAPPEN TO ANYONE, IT IS NOT A SIGN OF WEAKNESS.

Early response to trauma

When we are involved in a life-threatening situation or other traumatic event we are all upset or shocked to some extent.

The early, acute, reaction may leave us feeling dazed, unaware of what is going on around us or unable to comprehend instructions. We may be, or feel, disorientated. These reactions are seen in the faces and responses of disaster victims in television news footage. All of us respond like this and it is why, in major disasters, effective help and organisation only really starts with the arrival of trained professionals from the outside.

Traumatic experiences may also make us feel anxious and agitated. They can make us withdraw into ourselves and 'see' events happening to us, as if we are observers. Some or all of these symptoms can appear within minutes of the stressful event and disappear within hours or over the next 2 – 3 days. These reactions are called acute stress reactions and are the visible signs of the brain processing the traumatic information that it has suddenly received.

Be aware, however, that reaction to trauma may be delayed – occurring years after the event – or may not subside. It is thought that the brain not processing the memory in its normal way causes this, leading to a variety of symptoms.

Post traumatic stress disorder (PTSD)

PTSD is a medically-diagnosed condition and should be treated by a clinician.

PTSD symptoms are similar to those for PTS but are more severe and persistent. They can affect your daily functioning, and can last for more than a month.

Most people suffering with PTS do not develop PTSD. It is also possible to develop PTSD without first having PTS.

Coping strategies

There are a number of ways in which we can help ourselves to cope with post traumatic stress:

Do not:

- bottle up feelings and memories about what has happened. Try and talk to others; you will probably be surprised to find out that they have felt what you have and you will be reassured both that you are normal and will heal
- turn to alcohol or recreational drugs as a means of coping. Alcohol and drugs make these kinds of problems worse and delay psychological healing.

Do:

- take time to reflect on the event and find ways to relax. Try to get enough rest and sleep
- express your emotions and let your family and friends share your grief. Explain your needs clearly to them
- be aware that your family, friends and colleagues experience similar feelings to yourself. Allow them to talk about their emotions and express themselves. They will also be trying to protect you, so you have to take the lead
- try to maintain existing routines and get on with life. Be aware that if you avoid doing things you previously did, such as hobbies or being an active lifeboat crew member, it might be an indication that you need help
- make sure you know what did happen rather than rely on what you think happened. The best way to do this is to talk about it, best of all with someone who was also there
- review the experience within yourself and with others. Allow yourself to be part of your normal group; it is the safest place to be. Talk to your colleagues and loved ones
- remain physically active. Burn off your adrenaline. Exercise also produces chemicals that make you feel happier
- continue to make plans for the future and help others.

Some of these ways of coping may seem to contradict one another but you should try and find a time and place for each. It will take time to come to terms with your experience, so try to be patient. These kinds of very frightening experiences can unsettle us all; no matter how tough we think we are. Remember that we need to heal from psychological injuries, just as we do from physical ones – and sometimes need help to do so.

NOTE

Be aware that when we are stressed and distracted, we are more likely to have accidents.

Be more careful at home, at work and while driving.

When to ask for help

Symptoms will normally fade with time. You should seek help if any of the following persist:

- re-experiencing flashbacks, nightmares, repetitive and distressing intrusive images or impressions
- avoidance of people, situations or circumstances resembling, or associated with, the event
- increased anxiety and 'jumpiness' such as vigilance for threats, feeling on edge, an exaggerated response when startled, sleep problems, irritability and difficulty concentrating
- emotional numbing such as a lack of ability to experience feelings, feeling detached from other people, giving up previously significant activities and memory gaps for significant parts of the event
- depression and anxiety
- drug or alcohol misuse
- anger
- unexplained physical symptoms resulting in repeated consultations with your GP.

NOTE

Do you feel that you are different from how you were before the event?

If, for instance, your work performance is affected, your relationships are suffering, or your eating, drinking and smoking habits have changed, then do seek help.

You do not need to suffer in silence.

Sources of help

If you have persistent symptoms for longer than a month, talk to your GP. If the symptoms arise from your operational activities, then talk to your Lifeboat Medical Adviser (LMA) or the RNLI's Occupational Health Manager (OHM) at Poole who will arrange help for you.

The RNLI has a back-up team of experienced professionals who can offer you prompt help and treatment. Your GP or LMA can contact the team at RNLI HQ in Poole. You can also contact the OHM directly if you feel more comfortable with this.

The OH team can be contacted during office hours by:

telephone: 01202 663567

email: OHServices@rnli.org.uk

Trauma Risk Management (TRiM)

Trauma Risk Management (TRiM) is an evidence-based peer-support system that helps organisations deal with the psychological aftermath from exposure to traumatic events.

It was first used by the Royal Marines and has since been deeply embedded in all UK armed forces as standard means of assessing combat personnel for signs of PTSD. TRiM is quickly becoming the industry standard for UK Emergency Services including the Police, Fire Service, NHS, Paramedics, MCA and other employers who expose their staff to operational stress.

TRiM is not a cure – it is an assessment of psychological risk after an incident and suggests appropriate management.

The TRiM process is actioned when:

- there is serious injury to self and others, particularly colleagues
- personnel have been disabled or disfigured
- the trauma involves death, particularly grotesque death
- the trauma is complex, long-lasting or multiple
- personnel have been involved in a potentially serious near miss
- personnel experience overwhelming distress after an event
- our experience deems it to be necessary
- TRiM is not intended to replace any existing Occupational Health Service or Support 24/7, but to complement it. For further information, visit the TRiM page on Horizon or contact TRIM@rnli.org.uk

Operational health hazards

The very nature of our operations means that personnel may come into contact with people, animals or environments that expose them to the risk of infectious diseases, such as:

- blood borne viruses (BBV) such as HIV, hepatitis B and hepatitis C.
- leptospirosis
- legionella
- cyanobacteria
- gastro-intestinal illness
- hepatitis A
- polio
- tetanus
- typhoid.

All blood and body fluids are potentially infectious and precautions are necessary to prevent exposure to them.

It is not always possible to identify people who may spread infection to others, therefore precautions to prevent the spread of infection must be followed at all times.

All animals, whatever their apparent state of health, should be regarded as potentially or actually capable of excreting, by the natural routes, agents infectious to humans, or transferring infections by biting or scratching.

Dung and urine may also contain disease-causing organisms. Therefore any person who is taken ill after dealing with an animal should seek medical advice as soon as possible.

Although we can never know in advance what health risks any rescue can present, it is possible to build up a reference resource for our individual area of operation. Such resources should provide information indicating:

- the sources of infection that may be encountered
- the symptoms of the disease
- how it is transmitted
- any relevant medical arrangements to be made
- any deployment implications.

When the source of an infectious disease is identified, the task(s) that potentially exposes volunteers and staff to contact with it must be risk assessed. Appropriate risk control measures must then be devised to avoid the disease transmission. This may sometimes require the expert advice from a Consultant occupational physician or even the Local Health Authority.

Information on local infectious diseases must be passed on to volunteers and staff who may be exposed to them. Managers must ensure that this information is included in local briefings.

Wherever reasonably practicable the numbers of volunteers and staff exposed to the source of an infectious disease, and the duration of the exposure, must be kept to a minimum. Where a risk is identified and can not be avoided:

- all volunteers and staff must receive adequate training on how to minimise exposure to the source of the infection where reasonably practicable
- appropriate PPE is supplied to volunteers and staff who must also be trained in its use and maintenance
- all volunteers and staff understand the importance of reporting incidents.

Should you be exposed to any infectious diseases, please refer to:

SOP **Prevention and Management of Occupational Exposure to Blood Borne Viruses**

Vaccination

Where the risk of exposure is considered high and the risk or frequency cannot be reduced or managed without significant risk remaining, hepatitis B vaccination should be offered. The Occupational Health Department maintains a database of individuals' immunisation status.

Volunteers and staff identified as being at significant risk from exposure to blood and bodily fluids should be offered hepatitis B vaccination. Hepatitis B vaccination courses involve the administration of three vaccines followed by a blood test, which will show whether any immunity has been established from this primary course of vaccine. Where immunity has been confirmed, a booster vaccine should be given in five years. A small minority of people will not produce antibodies and should be offered a second vaccination course.

When considering exposure of blood-borne virus to volunteers and staff, the level of risk associated to the activity known in that area of work and regularity of exposure should be taken into account. It is not sufficient to justify hepatitis B vaccination just for all volunteers and staff based on busy beaches or stations of high casualty incident and all risk assessments should reflect the type and level of individual risk exposure.

Volunteers and staff are not obliged to accept immunisation, and this has no impact on their fitness to work.

Please refer to the ***Prevention and Management of Occupational Exposure to Blood-borne Viruses*** policy for further details.

Control measures during casualty care

Close adherence to the control measures listed below is the best method of reducing the risk of contamination:

- **skin care**
  - cuts and abrasions can provide an entry/exit point for infective microbes and must be covered with waterproof dressings
- **gloves**
  - must be worn at all times when caring for casualties
  - if entering an environment where there is a possibility of gloves tearing/ripping then two pairs of gloves should be worn
  - once worn, gloves are to be disposed of as clinical waste
- **hand washing** – the single most important control measure for minimising cross infection
  - as soon as is possible after casualty care, even when gloves have been worn, wash hands with soap and water (ALB first aid kits have sea shampoo provided for this task)
  - always before preparing food, eating or drinking
  - detergent wipes (such as baby wipes) are also useful
- **alcohol gel**
  - once hands are clean and not soiled, alcohol gel can be applied.
  - alcohol gel is NOT effective on soiled hands
- **protective clothing** reduces the risk of substances contaminating you by placing a barrier between the substance and yourself
- **protect eyes**
  - wear eye protection such as helmet visors, safety glasses or sunglasses
  - remember that eye contact is a vital part of reassurance during casualty care and this can be lost if sunglasses are worn
- **resuscitation**
  - where possible always use pocket masks or bag valve masks for resuscitation

- **safe handling and disposal of sharps**
  - all used sharps must be disposed of or stored in containers that cannot be pierced by the sharp implement, particularly needles
  - sharps bins are to be provided where deemed necessary and comply with appropriate international standards
  - containers are properly stored to minimise the chance of unauthorised access
  - in the event of a volunteer or member of staff sustaining any injury whilst using sharps, first aid treatment should be given and where appropriate referred to the local hospital or GP
  - dispose of as clinical waste.
- **decontamination**
  - careful management of spills of body fluids, with decontamination of the area and equipment
- **clinical waste**
  - careful management and disposal of clinical waste
- **maintaining a safe and hygienic environment**
  - through decontamination and cleaning procedures.

Please refer to:

SOP **Prevention and Management of Occupational Exposure to Blood Borne Viruses**

Sharps and needle sticks

The term sharps and needle sticks covers broken glass/crockery and ampoules, needles, scalpels, sharp instruments, and blades. The use and disposal of sharps potentially exposes people to harm. Human bites and scratches, which draw blood, will also count, as a potential contamination or sharps injury. It is important to identify where such items are used in relation to RNLI activities.

Please refer to:

SOP **Sharps**

Post exposure protocol

If exposed to a potential BBV transmission, either from potentially infected body fluids or by failure of, or failure to use any of the control measures, then the following protocol must be actioned immediately following the incident:

- encourage bleeding from any wound by gently squeezing (do not suck the wound)
- wash any wound in soap and warm running water (do not scrub) or with disposable wipe if water is not available
- cover the wound with a dressing
- irrigate eye or mouth splashes with plenty of water
- if involved, dispose of any sharps safely
- report the incident to the SAR unit commander/LOM and the Central Operations at Poole HQ
- if the source of the injury is known, document the details of person(s) involved. If casualty is conscious, consider obtaining consent from them for BBV testing on arrival at A&E
- attend the nearest A&E department for risk assessment and possible preventative treatment (Post Exposure Prophylaxis or PEP), ideally within an hour if at all possible. Should the patient be evacuated by helicopter, accompany them to reduce transit time. PEP is unlikely to be given unless a substantial risk is identified
- following treatment enter details on the incident database and note the exposure in the service return/ lifeguard paperwork, to allow incidence monitoring. This information will be forwarded to the OH department who will contact you regarding the exposure
- if you have any additional concerns regarding the exposure individual support can be obtained by contacting your local genitourinary medicine (GUM) clinic – see contact details at the Lifeboat station.

Please refer to:

SOP **Prevention and Management of Occupational Exposure to Blood Borne Viruses**

Equipment or clothing decontamination/disposal

Certain items are designed for multi patient use, including but not limited to:

- ALB foul weather kit
- ILB dry suits
- helmets
- lifejackets
- kit bags and internal pouches
- defibrillators (known as AEDs)
- oxygen and entonox cylinders, entonox demand apparatus and face mask
- check cards
- stretchers and blankets.

Should these items come in contact with patient body fluids they need to be decontaminated as detailed in:

SOP **Equipment and Clothing Decontamination Using Chemgene 4DH, and Clinical Waste Disposal.**

Disposal of clinical waste

The majority of first aid equipment is designed for single use followed by disposal.

Once used it should be disposed of as clinical waste in the yellow bags provided in the casualty care kits as detailed in:

SOP **Equipment and Clothing Decontamination Using Chemgene 4DH, and Clinical Waste Disposal.**

Body recovery

The RNLI exists to save lives at sea. The recovery of bodies is not part of the Institution's remit but from time to time Lifeboat crews are faced with the task of recovering a body from the sea or foreshore. RNLI crews are under no obligation to recover bodies.

NOTE

A body is defined as:
A casualty that has been confirmed face down or submerged for greater than 90 minutes, or their body is damaged beyond salvation due to decomposition or severe trauma.

Crew should follow the protocol in the casualty care check cards to establish if the casualty can be considered deceased. Only a doctor can declare a person as such.

If a body is discovered it is imperative that that location and time are recorded with photographic documentation as appropriate, to be passed to the Police/Coroner's Officer at the earliest opportunity.

Evidence protection

The collection and preservation of evidence is vital to the identification of the deceased and the successful prosecution of offenders. Until otherwise established, every death at sea should be treated as having the potential to be suspicious.

Consideration should be given by those personnel recovering the body to the need to preserve as much as possible the integrity of the body and any items found on or with the body. This includes personal possessions, clothing, wreckage, etc. which may hold vital clues to the cause of death and identity of the deceased. However, such considerations remain secondary to the safety of personnel and any requirement to conduct an immediate search for other potential survivors.

If you arrive on scene and strongly suspect foul play i.e. a potential murder scene, contact the Coastguard immediately to advise the situation and check for prior knowledge or possible indicators of suspicious activity. Request Police support/supervision.

Body recovery procedure

For full details on the procedure for body recovery please refer to the relevant Body Recovery SOP.

Body recovery may lead to press/media interest. All such enquiries should be referred to the Police. In the event that the Press attend the Lifeboat Station all attempts should be made to maintain privacy. LPOs should be prepared to give a press statement.

Communication with official agencies

Once a body has been recovered RNLI personnel are to notify the Coastguard, advising of where the body will be landed. The Coastguard will inform the local police who will arrange for the SAR unit to be met by a Police Officer and/or Coroner's Officer.

Caution should be used when making any VHF calls as these may be monitored by the press or members of the public. Due sensitivity and dignity must be observed.

Once recovered, do not stay at sea with a body even if asked to unless there is significant probability of other casualties being found in the vicinity.

Subject to any requirement to conduct further searches for other survivors, the body should be landed as soon as possible and placed in the care of the Coroner or a Police Officer.

The person in command of the SAR unit should offer to provide a statement to the Police Officer/Coroner's Officer; this can be done whilst the SAR unit and equipment are being cleaned and de-contaminated. The statement should be factual and should include:

- time of launch
- time of body recovery
- position (Lat/Long from GPS) of body at recovery
- state of tide and weather
- any other items of interest such as wreckage nearby.

It is not expected that Police Officers will proceed to sea in RNLI SAR units, and SAR units will not delay launching to await a police officer. If a Police Officer requests to be taken to sea on the SAR unit, this should not be encouraged and operational management should be consulted before agreeing to this.

Equipment available to undertake a body recovery

If the senior RNLI person present, or any other RNLI personnel present have reservations of any kind concerning the body recovery, the operation is to be halted and reviewed with operational management. No set method can be prescribed; it is dependent on the geography, local conditions and environmental factors.

If the body is badly decomposed the person in command may decide to secure or suspend the body alongside rather than bringing it inboard. If this method is adopted, due care and consideration should be given to preserving the dignity of the deceased and shielding the body from on-lookers.

If possible, a body should be covered at all times. If the body is to be embarked, due care is to be given to the manual handling hazard associated with moving the body. Normally, three crew will be required to man handle a body into a SAR unit. The use of lifting equipment or par buckling techniques may be an alternative to man handling.

Once aboard place the body in a commercial body bag. Use of more than one body bag should be considered if the body is large or heavily decomposed. Once in a body bag the deceased can then be placed in an RNLI stretcher to facilitate manual handling. Avoid placing bodies directly into RNLI stretchers, including the Ambulance Pouch, due to kit contamination.

To assist in body handling, recovery and decontamination, the following items are available, via the Inspectorate to units who frequently undertake body recovery:

Items for handling/recovery	Suggested Quantity
Commercial body bag	2
Gloves – casualty care type	In casualty care kit
Thick rubber gloves	3
Safety glasses	3

Items for decontamination	Suggested quantity
Spray dispenser for Chemgene	1
Chemgene disinfectant	1
Sponge – disposable	
Brush	
Mop	
Bucket	

Health hazards associated with body handling

Bodies are a source of harmful bacteria and all precautions should be taken to avoid touching a body with your unprotected skin or with clothing that cannot be either disposed of or disinfected afterwards.

Cross-infection from vomit, body fluids or blood are real dangers; keep your face well away from the body at all times. Handling bodies should only be done when wearing suitable personal protective equipment. This will include rubber gloves, goggles/visored helmets and waterproof clothing such as a dry suit or ALB foul weather clothing. If the body is very decomposed or traumatised, then wearing first aid gloves under the thick rubber gloves adds to protection.

Should you have an accidental exposure to any body fluids whilst recovering a body, please refer to:

Accidental exposures are defined as:

- direct injection of the casualty's infected fluid into
- the casualty carer – usually caused by needle stick injuries, human bites or sharp bone ends on open fractures
- infected fluid splashing into broken skin, e.g. open wounds or cuts, on the casualty carer
- infected fluid splashing into the mucous membranes of the casualty carer's eyes
- swallowing infected fluid.

Decontamination of equipment and clothing

With the exception of the body bag, any equipment that comes into contact with the body is to be cleaned thoroughly or if heavily soiled, is to be disposed of as detailed in the relevant SOP.

Maintaining the dignity of the deceased

In the event of a body recovery, it is often required for RNLI teams to return the remains to an RNLI location or facility, or meet with other emergency services at a nominated point. In all cases, consideration should be given as to where the remains are placed and held in the interim. Where possible, remains should be rested pending handover to appropriate emergency service personnel:

- in a location and position that is respectful
- out of sight and covered with no access for members of the public
- out of sight and covered with no access for media teams
- out of sight and covered with measures in place to control access for the bereaved.

It is important that RNLI premises remain secured and that the public do not have free and easy access to the facility until such time as the local authorities arrive and take responsibility for them.

Dealing with the bereaved

People who have been bereaved may want to talk about the person who has died. One of the most helpful things you can do is simply listen and give them time and space to grieve. Offering specific practical help, not vague general offers, can also be very helpful.

Do:

- be there for the person who is grieving
- accept that everyone grieves in their own way, there is no normal way
- encourage the person to talk
- listen to the person
- create an environment in which the bereaved person can be themselves and show their feelings, rather than having to put on a front
- be aware that the grieving process can take a long time
- mention useful support agencies such as Cruse
- offer useful practical help.

Do not:

- avoid someone who has been bereaved
- use clichés such as 'I understand how you feel', 'You'll get over it', 'Time heals'
- tell them it's time to move on, they should be over it – how long a person needs to grieve is entirely individual
- be alarmed if the bereaved person doesn't want to talk or demonstrates anger
- underestimate how emotionally draining it can be when supporting a grieving person. Make sure you take care of yourself too.

Incident reporting

The reporting of incidents within the RNLI covers those relating to staff, crew, other volunteers and visitors. The following incident definitions are those used by the RNLI:

- Three-day reportable – an injury that is not 'major' but results in the injured person (IP) being unable to carry out their duties or unable to do the full range of their normal duties for more than three days. When calculating lost time any days the IP would not normally work, such as weekends or rest days should be included
- major injury:
  - fracture, other than to fingers, thumbs and toes
  - amputation
  - dislocation of the shoulder, hip, knee or spine
  - loss of sight (temporary or permanent)
  - chemical or hot metal burn to the eye or any penetrating injury to the eye
  - injury resulting from an electric shock or electrical burn leading to unconsciousness, or requiring resuscitation or admittance to hospital for more than 24 hours
  - any other injury leading to hypothermia, heat-induced illness or unconsciousness, or requiring resuscitation, or requiring admittance to hospital for more than 24 hours
  - unconsciousness caused by asphyxia or exposure to harmful substance or biological agent
  - acute illness requiring medical treatment, or loss of consciousness. Loss of consciousness arising from absorption of any substance by inhalation, ingestion or through the skin
  - acute illness requiring medical treatment where there is reason to believe that this resulted from exposure to a biological agent or its toxins or infected material.
- non reportable lost time – an injury requiring a person to remain away from work, to recover, for more than one day but less than three
- minor injuries – an injury requiring first aid treatment such as small bruise or laceration that requires a plaster or other treatment and the person can continue with their normal duties
- dangerous occurrence:
  - any significant occurrence involving failure of lifting machinery, pressure systems, electrical short circuit, diving operations, collapse of scaffolding, fire and explosion, and collapse of building or structure
- Lifeboat, IRB or Hovercraft capsizes.
- RTA, property or equipment damage, including damage to any RNLI owned property or equipment including road traffic incidents
- near miss – an incident, event or condition that does not cause harm but has the potential to do so
- industrial disease – a condition contracted whilst undertaking work on RNLI business:
  - conditions caused by physical agents (radiation, decompression, etc)
  - infections due to biological agents (hepatitis, Weils disease etc)
  - conditions due to substances (cancers, dermatitis, occupational asthma)
- environmental incident – damage to the environment from spills or emissions to land, water or air.

NOTE

It should be recognised that an accident/incident may occur in service. If this is the case the decision whether to continue with operations for lifesaving purposes is at the discretion of the person in command of the SAR unit.

The causes of accidents

There can be any number of causes of an accident. These can be identified as a chain of errors and/or failures that culminate in the accident. These causes can be classified as:

- immediate cause – the most obvious reason why the accident happened, e.g. the guard is missing, the person slipped etc. There may be several causes identified in any one accident
- underlying cause – the less obvious system or organisational reason for an accident happening e.g. machinery pre-start checks not being carried out, the hazard has not been adequately considered by a suitable and sufficient risk assessment etc
- root cause – an initiating event or failing from which all other causes or failings spring. Root causes are generally management, planning or organisational failings. Note that this may be remote in time and space from the accident.

To prevent an accident, effective risk control measures must be put in place that address all these causes.

Consequences of an accident

There are a number of consequences that can result from an accident. These include:

- fatal – work-related death
- major injury/ill health – includes fractures (other than fingers or toes), amputations, loss of sight, a burn or penetrating injury to the eye, any injury or acute illness resulting in unconsciousness, requiring resuscitation or requiring admittance to hospital for more than 24 hours
- serious injury/ill health – where the person affected is unfit to carry out their normal work for more than three consecutive days
- minor injury – all other injuries, where the person affected is unfit to carry out their normal work for less than three days
- damage only – damage to property, equipment, the environment or production losses.

Actions to be taken after an accident

- Emergency response:
  - carry out emergency actions pertinent to the event e.g. first aid, office evacuation etc
  - make the area safe – in some cases this may be the first action e.g. isolating an electrical supply for an electric shock victim.
- Initial report:
  - preserve the scene where practicable
  - record the names of all personnel involved, names of witnesses and any relevant information e.g. location, equipment etc
  - report the event to the person responsible for health and safety who will decide the course of any further action.
- Initial assessment and investigation response:
  - report the event to the regulatory authority as appropriate – the prompt notification of reportable events is a legal requirement
  - record details in the accident book.

RNLI online reporting

Serious incidents, those where immediate hospital treatment is required, must be reported immediately to Central Operations via telephone 08451 668222. Once reported the details must be recorded on the incident database.

All other incidents in particular near misses can be reported directly on the accident database within five days of an incident.

If you do not have access to the online incident database, complete a paper copy on the appropriate incident form and pass it to your line manager. Blank forms should be available on station, but can also be printed from the SHE section on Porthole.

Who to report to and when

Incidents involving RNLI staff, crew, other volunteers or members of the public on RNLI property or event

Method of Reporting

Serious incidents

Must be reported immediately to Central Operations via the LOM or manager of the location via telephone (08451 668222), followed by entering information onto the incident database.
A serious incident afloat should be notified to Central Operations and the LOM.

Outside office hours

The duty officer (Central Operations) will notify the duty safety officer who will notify the enforcing authorities.

Investigations

The HR manager and/or Operational Policy will be responsible for nominating investigating officer(s).

Non-serious incidents

A report must be entered onto the incident database within five days of the incident.

Outside office hours

Report to Central Operations via telephone (08451 668222). The duty officer (Central Operations) will notify the SHE team at the start of the next working day.

Further advice can be obtained outside office hours.

Call Central Operations on: 08451 668222.

NOTE

All fundraising event incidents need to be ratified by a member of the regional office prior to entering the data onto the incident database.

Reports to enforcement authorities

Certain serious incidents are required to be reported immediately by telephone to the enforcement authorities (Heath and Safety Executive/Authority, Local Authority Safety Officers, Marine Accident Investigation Board or Marine Casualty Investigation Board). This will be carried out by the Health and Safety Team upon notification from the LOM or manager concerned. These incidents are as follows:

- an accident involving a fatality
- a 3-day reportable, as previously described
- a major injury, as previously described
- a dangerous occurrence, as previously described
- industrial disease, as previously described
- environmental incident, as previously described
- violence at work.

In addition to the above, injuries that cause more that three consecutive days incapacity for work should be reported to the Health and Safety Team within five working days of the incident. It should be noted that in counting days, the day of the accident is not included.

It should also be noted that incapacity for work does not necessarily mean actual absence from work. If a person is incapable of doing the work they normally carry out this is also regarded as incapacity for work.

Subsequent death

If any member of staff, crew or other volunteer dies within one year as a result of an accident that is reportable, the Health and Safety Executive/Health and Safety Authority must be notified in writing. This will be carried out by the Health and Safety Team upon notification by the LOM or manager concerned. This applies whether or not the accident was reported at the time. There is no special form for this purpose but an e-mail or confirmed telephone message as detailed above will suffice.

Photo: RNLI/Nathan Williams

Risk assessment

The RNLI uses risk assessments to identify where risks exist. Through these assessments, measures to reduce risks to staff, crew, other volunteers and others who may be affected by any of our operations are introduced. It is important that you work with us in carrying out these measures.

When audits are carried out we will identify hazards and calculate any risks to you and others, taking remedial action to eliminate or reduce them to the lowest practicable level.

Types of risk assessment

There are several types of risk assessment that the RNLI uses:

- low-risk assessment
- matrix risk assessment
- generic risk assessment
- hazard-specific risk assessment
- occupational risk assessment, including CoSHH assessment
- dynamic risk assessment
- environmental risk assessment
- specialist RNLI risk assessment
  - engineering risk assessment
  - beach risk assessment.

Documentation

Blank risk assessment forms can be found on Porthole. Completed risk assessment forms are to be held on file at station. These must be reviewed at the following occasions:

- on the review date entered on the assessment form
- in the event of an incident
- whenever there is a change to procedure or equipment.

In addition, SOPs and LOPs provided details of any required control measures required for specific operations. The relevant SOP/LOP should be noted on the relevant risk assessment.

Risk assessments are to be referred to for all relevant training exercises and operational shouts.

NOTE

For detailed information on risk assessments, and how to carry them out, please refer to ***TP-SV-05-02 Guide to Risk Assessment***.

Severity and likelihood explained

Severity is the level of consequence of the hazardous event. Likelihood is a measure of the chance that the hazardous event will occur.

Severity	Level	Definition
Negligible	1	No injury
Low	2	Minor injury requiring first aid on site
Moderate	3	Statutory reportable incident
		Lost time injury more than 3 days in the Republic of Ireland
		Lost time injury of more than 7 days in the United Kingdom
High	4	Statutory reportable incident
		For example, RIDDOR specified injury, occupational disease, near miss, or dangerous occurrence
		Single fatality
Severe	5	Multiple serious injuries
		Multiple fatalities

Likelihood	Level	Definition
Rare	1	So unlikely that it is not expected to happen again
Unlikely	2	It is not expected to happen again in the foreseeable future
Possible	3	It may occure from time to time
Likely	4	It will occur but not as an everyday event
Almost Certain	5	It will happen again and soon

Noise

Noise can damage hearing in one of two ways:

- exposure to sounds of 140 dB(A), or above, will instantly damage the hearing mechanism, causing immediate deafness
- prolonged exposure to lower level sounds can cause gradual deterioration in hearing.

The length of exposure to the sound is also important. Short-term exposure to sounds of 85 dB(A) and above can cause a temporary loss of hearing sensitivity but this may be recovered without permanent damage. This is known as a temporary threshold shift.

Continued, or frequent, exposure to such noise levels can cause permanent loss of hearing sensitivity. This is known as permanent threshold shift and is incurable.

From the above, we can say that the two main factors that affect hearing damage are:

- the noise level
- the exposure time, both daily and over your working life.

Although loss of hearing is the most obvious effect of noise, there are other effects:

- tinnitus – ringing in the ears, typcally experienced after brief exposure to loud or high pitched sounds. Whilst this may pass after a short period of time, prolonged exposure may lead to a permanent condition.
- stress and tiredness – this can occur even when the noise level is not high enough to cause hearing damage, dependant upon the type of noise, the level of exposure and the work being undertaken.
- loss of balance
- loss of ability to concentrate.

Noise can also contribute to workplace accidents through an inability to hear warning sounds or spoken commands.

The aim of noise regulations is to ensure that people's hearing is protected from excessive noise at their place of work, which could cause them to lose their hearing and/or to suffer from tinnitus (permanent ringing in the ears).

Sources of noise hazards

There are several sources of noise hazard associated with our operations:

- SAR unit running machinery
- launch vehicle/plant running machinery
- high winds
- power tools used for maintenance.

Types of hearing protection

Where a noise hazard has been identified you will be issued with appropriate hearing protection. There are three main types of hearing protection:

Ear defenders

- These consist of cushions made of a soft sound-absorbing material, such as rubber or foam, and are enclosed in a hard plastic outer cup.
  - The ear defenders are worn over the ears such that they completely enclose the ear and form a seal against the head.
  - There are several types of ear defender. Some are held together by a connecting headband, some are fixed directly to a safety helmet, whilst others have built in transmitters to allow for communication between workers.

Earplugs

- These are inserted directly into the ear canal to form a seal. There are three main types of ear plug:
  - Disposable – made of a soft material, such as foam or soft silicone, which expand when inserted into the ear thereby forming a seal.
  - Reusable – usually pre-moulded and made from silicone, soft plastic or rubber. They are more hard-wearing and can be washed and reused.
  - Custom-made – made from a mould taken from the ear canal. As such, they are a better fit and so provide better sound reduction.

Semi-insert earplugs (canal caps)

- These seal the entrance to the ear canal without entering it. They are made of soft rubber or plastic and are attached by a head or chin band.

All types of hearing protection must carry the CE mark to show that they comply with the standards specified by the current legislation.

Correct use of hearing protection

Ear defenders

- In order to provide the correct level of protection, ear defenders must cover the ear completely, with the cushion seal fitting tightly to the side of the head. There should be no gaps between the head and the seal – ensure nothing is trapped under the ear defenders, such as hair, clothing or glasses.
- The headband should only be adjusted in accordance with the manufacturer's instructions in order to maintain the correct pressure on the head to maintain the seal. Do not stretch the headband.
- Ideally, ear defenders should not be shared between people. However, if they are re-used by another person they must be thoroughly cleaned before use.

Earplugs

- These need to be inserted carefully to ensure a good seal. With one hand, pull the ear upwards and outwards to open up and straighten the ear canal, and with the other hand gently push the plug into position. The plug should be a snug fit and should not work loose while in use.
- Because earplugs are inserted into the ear, good hygiene is essential. Ensure your hands are clean before inserting the plugs in order to prevent introducing bacteria or dirt into the ear canal. Earplugs are never to be shared, and if of the disposable type should not be re-used.

Maintenance of hearing protection

When checking ear defenders, ensure that:

- the seals are soft, clean and not torn or misshapen
- the cups are not damaged and can be correctly adjusted
- the headband has sufficient tension to ensure the ear cushions fit well against the head.

When checking reusable earplugs, ensure that:

- they are clean
- they are soft and are not split or torn.

Disposable earplugs require no maintenance, but must be checked before use to ensure they are clean and undamaged.

If any defects are found when checking your hearing protection, this should be reported immediately, or as soon as practicable, and a replacement obtained.

Vibration

Vibration is normally associated with running machinery and power tools and can expose volunteers to hand-arm vibration and/or whole-body vibration.

Hand-arm vibration (HAV)

Hand-arm vibration is the term given to vibration transmitted into the hands and arms, normally through the operation of vibrating tools or machinery. The three main sources of HAV are:

- hand-held power tools, such as angle grinders
- hand-guided machinery, such as pedestrian lawn mowers
- materials that are held whilst being worked on by a vibrating process, such as dressing a drill bit on a grinder.

Exposure to this type of vibration can, over time, cause a range of medical conditions, collectively known as hand-arm vibration syndrome (HAVS).

HAVS symptoms

HAVS symptoms and their associated medical conditions can be grouped according to which system of the body they effect:

- vascular – affecting the blood vessels
- neurological – affecting the nerves
- musculoskeletal – affecting the muscles and joints.

Vascular disorders

These generally occur as a result of damage to the blood vessels supplying the hands and fingers. An early indication is the fingertips turning white, or blanching. This is commonly known as vibration white finger.

Once the damage has occured, the blanching attacks can be triggered through exposure to cold or wet conditions. There are two stages to an attack:

- **Stage 1**
  - The fingers turn white (and then sometimes blue) as the blood vessels narrow and stop the flow of blood and oxygen to them. Numbness or pins and needles in the fingers will also be experienced.
- **Stage 2**
  - The fingers turn red as the blood vessels re-open and the blood flow returns. This is accompanied by a tingling, or throbbing sensation which can be very painful.

The attack can last from a few minutes to more than an hour.

Failure to take action to reduce the exposure to vibration may result in the symptoms becoming far worse. The blanching will spread further down the fingers and the attacks will become more frequent, with the slightest exposure to cold or wet conditions triggering further attacks.

Increased numbness during an attack will mean an eventual loss of sensitivity and movement in the fingers, reducing the ability to feel or pick up small objects. In extreme cases the numbness can become permanent resulting in gangrene, leading to amputation.

Neurological disorders

These generally occur as a result of damage to the nerves in the hands and lower arms. An early indication is a tingling or numbness in the fingers, which may be mild and occaisional at first, only affecting the fingertips.

Failure to take action to reduce the exposure to vibration may result in further damage to the nerves. The numbness will spread further along the fingers and may become permanent. This will affect sense of touch and temperature and cause a reduction in manual dexterity, making it difficult to handle small or delicate objects.

Exposure to hand-arm vibration can also increase the risk of carpal tunnel syndrome. This is where the median nerve in the wrist becomes trapped or squashed. The symptoms are tingling and numbness in parts of the hand, being worse at night and which may result in disturbed sleep. The hand may also feel weak and the ability to grip things is affected.

Musculoskeletal disorders

These can result in general discomfort and stiffness in the fingers, hands, wrists and arms. Any muscle damage may result in a loss of strength and grip when using the hands. There may also be an increased risk of osteoarthritis in the wrists and elbows.

NOTE

If you experience any symptoms of HAVS you must report this to the LOM.

Factors affecting the risk of HAV

Jobs that require regular use of tools and equipment that vibrate pose the greatest risk of HAV. Factors that can have an influence on the amount of risk posed to the operator include:

- how long and how often the tool/equipment is used – be aware that the greater the vibration level of a tool, the lower the exposure time required before there is a risk of HAVS
- how much force is required to grip, push or guide the tool/equipment
- how cold and wet the operator is when using the tool/equipment
- poor posture
- susceptibility to health problems.

Minimising the risk of HAV

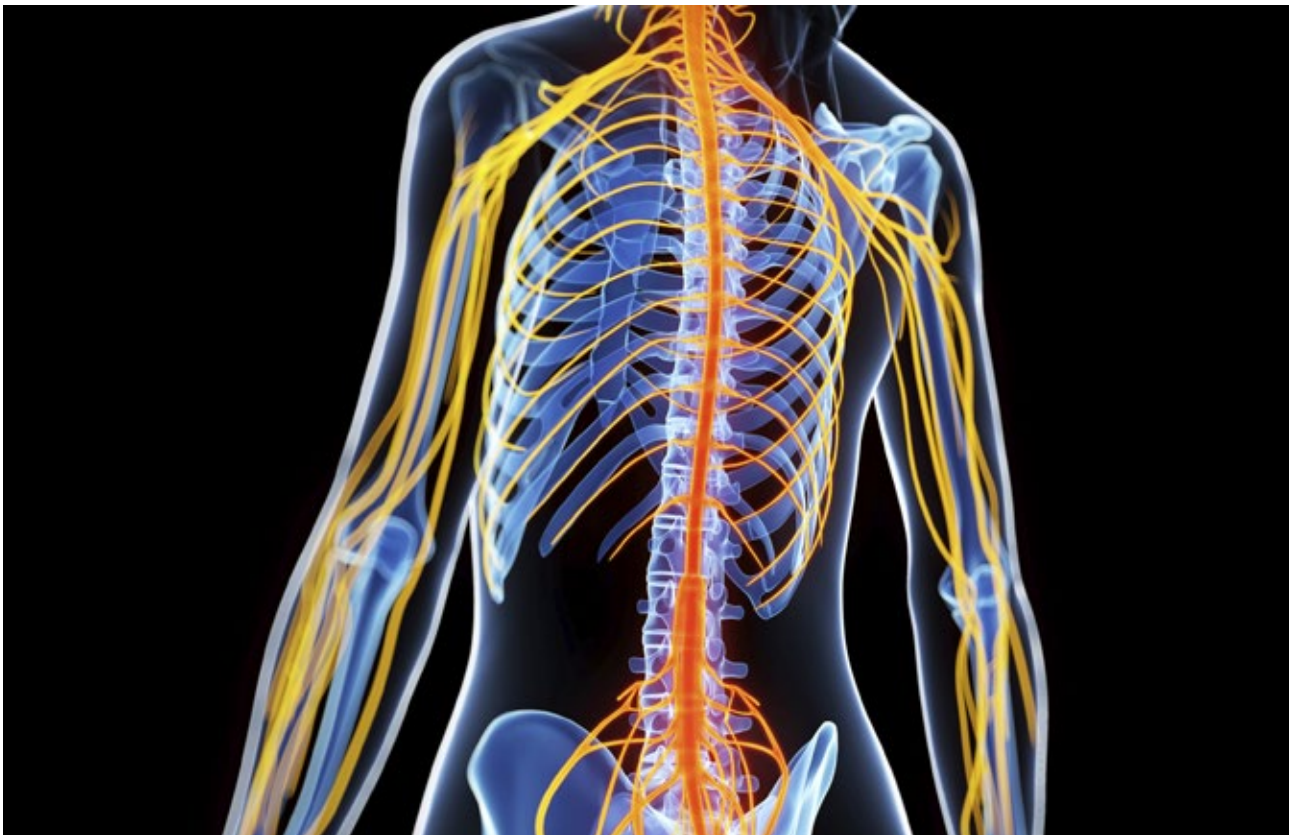
Once a risk of HAV has been identified the RNLI will implement the following control measures:

- provide information and training on the risks of HAV
- identify and implement alternative work methods that eliminate or reduce exposure to vibration wherever practicable
- mechanise or automate work wherever practicable
- provide tools that offer the lowest vibration levels, while remaining suitable and capable of doing the work efficiently
- limit the use of high-vibration tools wherever possible
- provide jigs and suspension systems to reduce the need to grip heavy tools tightly wherever practicable
- set in place appropriate equipment maintenance programmes to prevent avoidable increases in vibration – follow the manufacturer's recommendations where appropriate
- provide protective clothing when necessary to keep personnel warm and dry. This will encourage good blood circulation that should help protect them from developing vibration white finger.

RNLI personnel can help reduce the risk of HAV by:

- attending any training sessions for HAV
- only using tools designated for the job and that are in a good state of repair
- sharing the workload to reduce exposure time
- complying with all requirements of health surveillance.

Photo: RNLI/Nicholas Leach



Whole body vibration (WBV)

Whole-body vibration is the term given to vibration transmitted through a supporting surface to the whole of the body.This is typically from driven machines but can also be transmitted from large vibrating machines that are not necessarily driven. Other less obvious sources of WBV are helicopters and boats.

Exposure to WBV has the potential to cause many health problems, especially if there is prolonged or repeated exposure. Whilst the most common injuries are to the back, particularly the lower back, other injuries can be attributed to WBV:

- potential for physical damage to any part of the body, dependant upon the strength and direction of vibration
- reduced ability to use the human senses to their full extent (for example, blurred vision)
- reduced ability to think as quickly, or as clearly as normal
- general physical discomfort
- feelings of tiredness, fatigue and/or reduced motivation
- motion sickness, which may include sweating, nausea and vomiting.

It is not possible to state the exact length of time a person needs to be exposed to WBV to acquire any of the above symptoms. However, the longer or more frequent the exposure and the higher the severity, the greater the risk that any of these symptoms may develop.

Types of WBV

There are two types of WBV:

- severe or shock vibration – e.g. the sudden jolt experienced when conducting an emergency stop
- continuous vibration – this type of vibration tends to be present most of the time during the normal operation of a machine.

Both types of vibration can act on the body in any direction, which can be described as follows:

- **vertically** – vibration that travels up through the body
- **side to side** – where the body is unexpectedly thrown, or jolted to the side
- **forwards or backwards** – where the body is unexpectedly thrown, or jolted forwards or backwards.

In practice, WBV normally comprises a continually changing combination of all vibration types and directions.

Factors affecting the risk of WBV

The most obvious factor affecting the risk of WBV is the level of vibration but it should also be noted that other factors can contribute to health problems, particularly back injuries. These include:

- adopting a poor driving posture
- sudden or high risk movements of the body
- twisting or stretching the body awkwardly
- getting out of the cab to pick up or move heavy or awkward objects
- jumping from the cab/driving position instead of using the correct procedure
- a poor level of personal fitness.

Minimising the risk of WBV

Once a risk of WBV has been identified the RNLI will implement the following control measures:

- provide information and training on the risks of WBV
- implement a job rotation programme to minimise length of exposure to WBV
- set up a programme of health monitoring for those deemed at risk
- remove the risk by changing the work process where practicable
- provide a level roadway or track:
  - where practicable, repair any damage to the floor of the working area
  - ensure the route is clear of obstacles
  - select a more suitable route
- ensure proper vehicle selection – WBV can be reduced by using vehicles that are designed to minimise the transmission of vibration to the operator
- isolate the vibration – where a non-driven vibrating machine is operated, protection can be afforded by fixing the machine to its own bedplate and/or supporting the machine with shock absorbers or other damping mechanism

RNLI personnel can help reduce the risk of WBV by:

- attend any training sessions for WBV
- avoid poor posture:
  - when driving
  - when sat at a desk
- refrain from making unauthorised adjustments to any vibration damping mechanisms
- report any symptoms of WBV
- comply with all requirements of health surveillance.

Health surveillance

Health surveillance must be provided for all staff and volunteers who, despite action to control the risks of HAVS/WBV, are likely to be regularly exposed above the exposure limits or are considered to be at risk for any other reason. The purpose of health surveillance is to:

- identify anyone exposed or about to be exposed to HAV/WBV who may be at particular risk, for example people with blood circulatory diseases such as Raynaud's Disease
- identify any vibration related disease at an early stage
- help prevent disease progression and eventual disability
- help people stay in work
- check the effectiveness of vibration control measures.

Those members of staff and/or volunteers considered to be at risk from HAV/WBV will receive a health check when first starting in their role and annually thereafter. This consists of completing a short screening questionnaire.

If the answers to the questionnaire indicate possible early symptoms of HAVS/WBV a clinical assessment must be carried out by a qualified person, such as an occupational health nurse.

Although the clinical assessment may suggest a diagnosis of HAVS/WBV, a formal diagnosis can only be made by a doctor.

It is important that staff and volunteers understand that the aim of health surveillance is to protect them from developing advanced symptoms of ill health so that they can continue to work. If a member of staff or volunteer believes that they have any symptoms of HAVS/WBV, or that they have developed further, they should report this immediately to their line manager rather than wait for the next health check.

Fire safety

Under the Fire Reform Act (UK), the Fire Service Act (RoI) and the Fire Act (Scotland), the RNLI must ensure that its premises and company vehicles have a low risk of fire. Fire risk assessments have been completed for all RNLI premises. It is important that any instructions given to you regarding fire prevention and evacuations are followed. Below are guidelines that can be used in most environments:

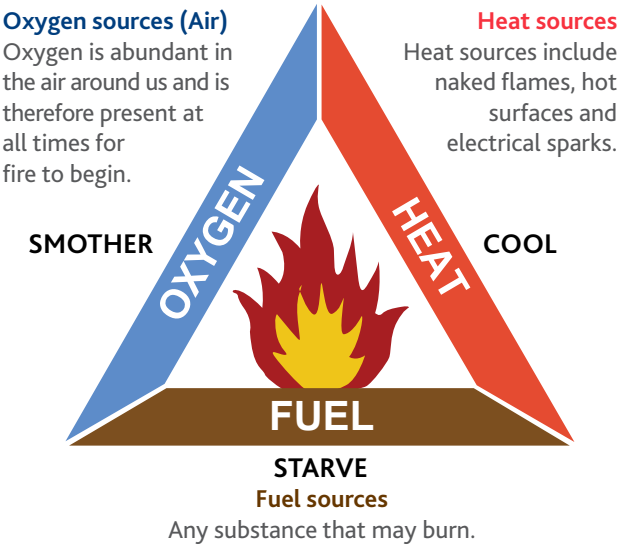
- check that you know what to do in case of fire
- know the sound of your fire alarm
- know your escape routes
- keep passages, corridors, stairways, fire doors and all escape routes clear and unobstructed
- don't obstruct access to fire extinguishers
- know the different types of fire extinguisher, their use and how they operate
- don't hang clothing over or near heating equipment
- don't let paper, oily rags or other rubbish accumulate
- only smoke in designated smoking areas
- use proper containers for flammable liquids
- handle flammable liquids at a safe distance from possible sources of ignition
- check for flammable material before using blowlamps and welding and cutting equipment – check afterwards for any embers, smouldering material or other fire hazards. Consider Hot Work Permits
- crucibles, soldering irons and gas rings must be on non-combustible stands
- switch off at the mains any electrical equipment not in use.

The fire triangle

Fire is a chemical reaction between oxygen in the atmosphere and a fuel source. A fire requires three elements to start:

- fuel – this is any combustible material, such as wood, oil, paper, etc.
- oxygen – abundant in the air around us
- heat – naked flames, hot surfaces, electrical sparks.

These links are graphically represented by the Fire Triangle below.



Fire will continue to burn for as long as the three elements, oxygen, fuel and heat, are present. Remove any one of the elements and the fire will go out.

However, before attempting to remove any one element, the nature of the fire must be understood. For instance, pouring water on a fire which involves burning metal, such as lithium, will actually cause more heat to be given off, sustaining the fire, and may even lead to explosion.

Consequently, different types of fires are assigned different classes and there are different types of fire extinguisher for each class of fire.

Types of fire

The different types of fire are classified as follows:

CLASS A

carbonaceous

for example:

wood, paper, textiles, charcoal

CLASS B

liquids, liquefiable solids

for example:

oils, petrol, diesel

CLASS C

gases, liquefiable gases

for example:

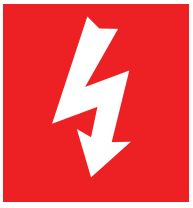
butane, methane, propane

CLASS D

metals, metal alloys

for example:

magnesium, lithium



ELECTRICAL (LIVE)

for example:

navigation equipment, radios, radar

CLASS F

cooking oils and fats

for example:

olive oil, maize oil, lard, butter

Each fire type presents different hazards, therefore they cannot all be treated in the same way.

Smoke and toxic gases

The primary cause of death in the event of a fire is not burning, but smoke inhalation. Often smoke incapacitates so quickly that people are overcome and cannot make it to an otherwise accessible exit. The synthetic materials commonplace in homes and work environments produce especially dangerous substances.

As a fire grows inside a building, it will often consume most of the available oxygen, slowing the burning process. This incomplete combustion results in toxic gases.

Smoke is made of components that can each be lethal in its own way:

- particles – unburned, partially burned, and completely burned substances can be so small they penetrate the respiratory system's protective filters, and lodge in the lungs. Some are actively toxic; others are irritating to the eyes and digestive system
- vapours – fog-like droplets of liquid can poison if inhaled or absorbed through the skin
- toxic gases:
  - carbon monoxide (CO), the most common, can be deadly even in small quantities as it replaces oxygen in the bloodstream
  - hydrogen cyanide (HCN) results from the burning of plastics such as PVC pipe and interferes with cellular respiration
  - phosgene (CCl_2O) is formed when household products, such as vinyl materials, are burned. At low levels, phosgene can cause itchy eyes and a sore throat; at higher levels it can cause pulmonary edema (an abnormal build-up of fluid in the air sacs of the lungs) and death.

In addition to producing smoke, fire can incapacitate or kill by reducing oxygen levels, either by consuming the oxygen, or by displacing it with other gases. Heat is also a respiratory hazard, as superheated gases burn the respiratory tract. When the air is hot enough, one breath can kill.

WARNING

Hot gas rises, so stay low to remain in the freshest possible environment and protect yourself from smoke inhalation.

Water – for class A fires

- Class A fires only.
- Aim at base of fire.
- **Do not use** on fires involving liquids or live electrical equipment.

Type: Water
Removes: Heat
Label: Red

Foam – for class A and B fires

- Class A and B fires.
- Use for a period, let the blanket form, then reapply if fire is not extinguished.

Type: Spray foam
Removes: Heat/Oxygen
Label: Cream

Wet Chemical – for class A and F fires

- Class A and F fires.
- Wet chemical knocks the flames out, cools burning oil and chemically reacts to form a soap-like solution, sealing the oil preventing reignition.

Type: Wet chemical
Removes: Heat/Oxygen
Label: Yellow

Dry Powder – for A, B, C, Live Electrical

- Class A, B, C and Live Electrical fires.
- Decreased visibility when used.
- Fuel may reignite.

Type: Powder
Removes: Oxygen – forms a vapour-tight seal blocking out the oxygen and chemically interrupts the fire chain.
Label: Light Blue

CO_2 - for class B and Live Electrical

- Class B and Live Electrical fires.
- Cold discharge/horn cylinder.
- Safe to use on electrical equipment that is live.

Type: Carbon dioxide
Removes: Oxygen
Label: Black

Portable firefighting appliances

You should be aware of the location and type of all the fire extinguishers and fire blankets around your lifeboat station and SAR unit. You must also be aware that for each classification of fire there is an extinguisher that is suitable for dealing with the type of material involved in that fire.

Every extinguisher incorporates a universal system of letters, colours and symbols to help ensure the correct extinguisher is chosen for the relevant class of fire.

Different types of extinguisher remove different elements from the Fire Triangle in order to put the fire out. Some types remove more than one element.

Fixed firefighting systems

Fixed firefighting systems are designed to tackle the type of fire expected in the location they are fitted.

Fixed firefighting systems can be anything from a sprinkler system in a building to a gas system in a sea-going vessel. All systems will be operated by the person controlling the responses to the fire.

Fixed firefighting systems, such as those fitted on a SAR unit, are reliant upon the space being sealed so that the extinguishing agent is contained and can smother the fire.

Fire alarms

Your lifeboat station and SAR unit will have a range of alarms. All personnel should be familiar with the various tones and alarms in and around your SAR environment. Upon hearing an alarm or finding a fire you should:

- shout 'FIRE, FIRE, FIRE'
- operate the nearest fire alarm
- evacuate to a safe location or nominated muster point, closing all doors behind you.

Decision to fight fire

RNLI SAR units and boathouses are not equipped and our crew are not trained to fight fires on any vessels or premises other than our own. On discovery of a fire, remember:

- our equipment is only there to aid escape and, unlike firefighters' personal protective equipment (PPE), our PPE is not fire resistant
- a person should only attack a fire when trained to do so and if it enhances the safety of others but does not involve too much personal risk
- an escape route needs to be maintained
- confined spaces should be treated with caution due to the risk of smoke inhalation, fumes and dangers from explosions.

Fire marshals

It is important to understand the role of fire marshal at your location.

A fire marshal's duties include, but are not limited to:

- staying current and practiced in evacuation procedures and fire safety
- promoting a fire safe work environment by removing identified hazards and promoting awareness
- carrying out weekly checks of all firefighting equipment identified hazards and raising awareness and testing the alarm and detection devices installed on site
- conducting weekly inspections of escape routes, fire brigade access, firefighting facilities and work areas
- organising fire drills for the premises
- reporting system faults and incidents.

In the event of a fire, fire marshals are responsible for:

- raising the alarm
- ensuring safe evacuation including any requirements of Personal Emergency Evacuation Plans (PEEPs) and assisting those who require it
- shepherding those on site whilst controlling and coordinating muster points
- shutting fire doors/windows
- liaising with the Emergency Services
- appointing or acting as senior fire marshal to coordinate a fire situation and liaise with the Fire Authority
- resetting the fire alarm after confirmation from the Fire Service that it is safe to do so.

Photo: RNLI/Nathan Williams

Photo: RNLI/Dave Cocks

Activity 2

Personal Competencies

Roles and responsibilities

Those in command must at all times, when in command of the SAR unit at sea, use their utmost endeavour to safeguard and rescue the lives of those in danger, having regard for the safety of their own crew. They must not allow consideration of property salvage to influence their actions when lives are in danger.

The role profiles (found on Porthole) provide more detail on the exact responsibilities for ALB coxswains, ILB helms and IRH commanders, and the RNLI Community Lifesaving Competence Standards (TP-COBT1-02-LB) provide details on the exact competence requirements and standards.

However, all of those in command need to be aware that once appointed they will only develop further knowledge and skills by gaining more experience. It is only experience that allows them to understand their limitations and is a culmination of an awareness of the experience/ability of their crew, the availability of other SAR units, the limitations of the SAR unit, situational awareness and an appreciation of hazards and their proximity. All of these are essential aspects that serve to inform good decision-making, a primary skill of the effective coxswain/helm/commander. This is explained in more detail in Activity 17, Command pass outs.

Photo: RNLI/Nigel Millard

No single person can, or should be expected to, provide availability to command the SAR unit 24/7; you are entitled and expected to have adequate quality time off and leave.

When the primary person providing command cover requires time off, the filling of this position should be seen by deputies as the community SAR unit requiring cover, NOT the individual requiring a 'personal favour'. There should be no difference if this person is retained OR full time.

An important part of 'command' is to encourage and enable your deputies to step up to the command position, allowing experience to be gained. This must be achieved by a team effort, with the operations team taking the lead, ensuring an acceptable level of quality time off and leave is taken, maintaining an acceptable work-life balance to ensure better wellbeing all-round.

The operations team

The primary function of the operations team, led by the lifeboat operations manager, is to ensure the safe and efficient dispatch of SAR units at the request of the coordinating authority, thus enabling the RNLI's primary function of saving life to be achieved.

The operations team mainly consists of the following roles:

- lifeboat operations manager
- deputy launching authority
- lifeboat training coordinator
- mechanic
- ALB coxswain
- ILB helm
- IRH commander.

Additional RNLI roles that often feed into this group include:

- lifeboat trainer assessor
- ILB mechanic
- lifeboat treasurer
- lifeboat medical adviser
- lifeboat administrative officer (where appointed)
- lifeboat boathouse manager (where appointed)
- lifeboat chaplain (where appointed)
- other RNLI representatives from within the local community area i.e. lifeguards.

And non-RNLI roles that can also feed into this group include:

- Local officer of coastguard
- Harbourmaster/marina manager (as appropriate)
- senior police officer
- senior fire officer
- senior ambulance officer
- fisheries officer
- customs officer

ALB coxswain, ILB helm, IRH commander

You are appointed to take command of SAR units when at sea. It is your duty to use your utmost endeavour to safeguard your crew, the vessel and rescue the lives of those in danger.

Lifeboat operations manager (LOM)

A key role at the station, the LOM is responsible for managing all operational activities at the lifeboat station, authorising the launch of a lifeboat and the day-to-day management of the station.

Deputy launching authority (DLA)

The DLA deputises for the LOM when the LOM is unavailable.

SAR unit crew

These are the volunteers who crew the SAR unit. Although designated as sea-going crew, they may also act as shore crew.

Shore crew

These are the volunteers who assist in the launch of the SAR unit. Working shore crew work directly around the SAR unit and launch vehicle, handling various strops and lines, whereas the marshals are tasked with ensuring no unauthorised persons enter the restriction zone around the SAR unit and launch vehicle when in operations.

Mechanic

The mechanic is responsible for the lifeboat engines and equipment whenever the SAR unit is at sea. They have a detailed programme of planned maintenance ensuring the lifeboats are always ready for service in first-class condition.

Head launcher

The head launcher, acting under the direction of the person in command, takes charge of operations connected with the launching and recovery of the SAR unit. They oversee a team of shore crew, which may include specialist skills such as vehicle drivers and plant operators.

Lifeboat training coordinator (LTC)

The role of the LTC is to ensure that the operations team at the station are aware of the training requirements and statuses as outlined in the Competence Framework. Working closely with the LOM and person in command, they support and promote training at station, arrange competence based training assessments and maintain the accuracy of competence training records.

Trainer assessor

The trainer assessor trains and assess lifeboat and shore crew. They update the competency management system at station level, providing regular feedback to area management. They are involved in centrally provided training and ensure that station personnel adhere to safe working practices and standard operating procedures at all time.

Lifeboat press officer (LPO)

The LPO maintains a good relationship with the lifeboat station and local press, radio and TV. They help to raise public awareness of the RNLI.

Launch and recovery plant operator

The plant operator's main role is the safe operation of all RNLI plant used during the launch and recovery of the SAR unit. This may be a vehicle, davit or winch.

Community safety officer (CSO)

The CSO is involved in the design and implementation of community lifesaving plans, liaising closely with the community incident reduction manager and the local lifeboat station. A community lifesaving plan is aimed at reducing fatalities and serious incidents by targeting particular "at risk" groups with specifically targeted interventions.

Public relations manager (PRM)

PRMs maximise media coverage and public awareness of the RNLI. They protect and promote the reputation of the RNLI, providing media relations advice and crisis management support to volunteers and staff. They publicise RNLI operational and fundraising activity.

Operational management

There are a number of people responsible for managing the operational efficiency and standards within the division and are also responsible for declaring the operational capability of search and rescue units therein. A number of these roles also conduct training and assessment activities including operational pass outs for certain parts of the competence framework.

Lifesaving manager

Provide strategic direction and leadership to ensure the sustainability of lifesaving delivery within RNLI communities and through external partners. Responsible for Area Lifesaving Managers and Regional Support Team Leaders.

Area lifesaving manager

Deliver the lifesaving plan for their designated area and managing the people within it to ensure an effective lifesaving service. Responsible for full-time coxswains, mechanics, station managers (where applicable), LOMs and lifeguard supervisors.

Assessor trainers

The Assessor trainers are responsible for training, supporting and confirming the competence of crews in accordance with the RNLI's competence framework to enable them to deliver the concept of operations. They contribute to the overall operation of communities through the coordination and the delivery of appropriate training and assessment as well as verification of locally delivered training and assessment activities.

Systems technicians (ST)

Conducting maintenance and repairs, system technicians are a regular visitor to lifeboat stations providing a full range of services that ensure all of your equipment and systems are operational, fixed and updated.

The appointment to the role of ALB coxswain, ILB helm or IRH commander is a privilege that brings with it significant responsibilities. In the eyes of the public, you are the custodian of the RNLI's reputation; your seamanship, decision-making, communication and general conduct will all serve to inform the public's perception of the RNLI as well as your crew members' perception of you.

Like any large operational organisation, the RNLI has many functions that happen quietly in the background but which provide critical support to enable operations to take place with the minimum of difficulty. From a command perspective, the first stage of this support is provided by the Regional Base.

Each Regional Base has representatives from other departments that support operational management in the provision of operational readiness, including technicians, shore works managers, media managers and, in some cases, fundraising staff.

The Regional Base is the first point of contact for lifeboat stations on a day-to-day basis during office hours. Out of hours, an 'on call' system is operated and duty staff can be contacted via Central Operations and RNLI Headquarters in Poole.

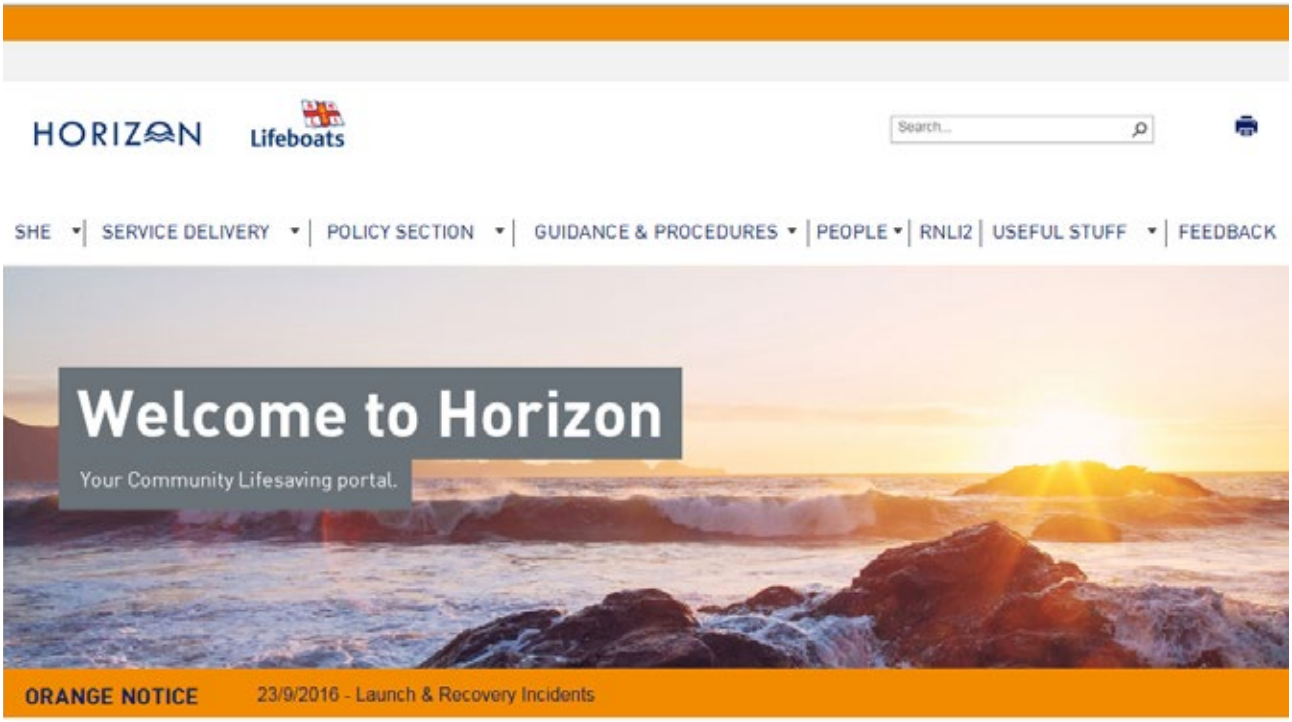
Central operations

Central operations in Community Lifesaving is manned 24 hours a day, with the duty officer acting as a first point of contact for all out of hours operational enquiries. Central operations can be contacted via email Watchkeeper@rnli.org.uk or telephone 08451 668222 and should be contacted in the event of any of the following situations:

- Death (RNLI personnel or public)
- Boat capsize/boat or vehicle off service
- Vehicle accident/serious Injury to RNLI personnel/ public caused through RNLI activity/vehicle bogging with damage or water ingress
- Passage reports
- Boat movements
- Chart requests/queries.

Photo: RNLI/Andrew Jamieson

Horizon



Horizon is the Community Lifesaving Intranet. The aim of Horizon is to provide a single place where everyone can go to access Community Lifesaving specific policies, procedures, training materials, SOPs, LOPs, risk assessments as well as more generic information such as how do I get to a regional office, what meeting rooms are available at these offices, where are we with a particular project such as COACS, how are we getting on with planning for our new way of working? etc.

Horizon was created to ensure that there is 'one version of the truth' in one place, so we do not have to think about where a piece of Community Lifesaving information might be held or whether it is the most up to date version.

There are four main types of content on Horizon:

- Policies: These are all numbered POXXXX (where XXXX represents a four-digit number)
- Procedures: These are numbered PRXXXX (where XXXX represents a four-digit number)
- Guidelines: These are numbered GUXXXX (where XXXX represents a four-digit number)
- General Information: These have no number and are referenced just by their name.

All the policies, procedures and guidelines on the site are formatted in exactly the same way and include information on:

- The content owner and manager, so that you know who to contact in case of a query
- When the information was published
- When the information is due to be next reviewed
- What is the reason for the policy?

For further information, please read Guidance page GU1040 'Horizon: Introduction to the CL Intranet' and GU1039 'Horizon: Guidance on Notices'.

Standard operating procedures (SOPs)

SOPs provide an organisation-wide procedure for the operation of individual pieces of equipment and the execution of specific evolutions. The SOP is deemed the safest and most effective known method of achieving the specified function. Therefore, it should only be deviated from on rare occasions, after careful consideration and following the completion of a dynamic risk assessment.

The outcome of any deviation from the SOP becomes the responsibility of those in command who took the decision to deviate from it. It goes without saying that it is an essential requirement for all those who take command to be full conversant with the full range of current SOPs relating to their SAR unit and its launch and recovery systems.

RNLI STANDARD OPERATING PROCEDURE

Capsize Procedure

Validation	
Prepared by	O. Mallinson – Operations Manager (Lifeboats)
Validated by	P. Dawes – Lifesaving Services Manager
ID Number	IB1-SOP-2.3-02
Last updated	April 2016
Review date	Annually
Pages	3

Objective

To ensure the correct procedures are carried out in the event of a D Class (IB1) capsizing.

Reference Documentation
CoBT 1
Crew Members Handbook
Mechanics Handbook

Checklist

- SOP communicated and understood by all?
- Appropriate PPE identified /specified?

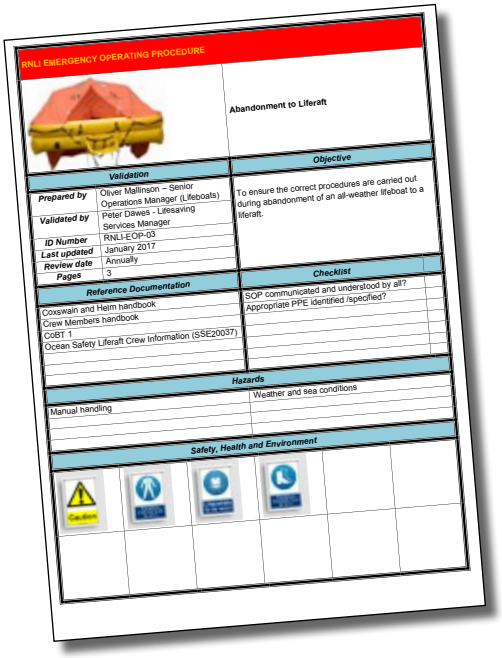
Hazards	
Manual Handling	Weather and sea conditions
Fuel	Entrapment

Safety, Health and Environment

- The 50hp engine has been modified to allow for easier restart after capsize. The engine is fitted with a drain valve system to allow for the easy expulsion of water; this is referred to as PIRS (Post immersion restart system)
- IB1 has its painter extended to allow it to be used for righting the boat and carries one handheld and

Emergency operating procedures (EOPs)

EOPs provide an organisation-wide procedure for emergency situations such as, abandonment to liferaft, stranding/grounding, collision, post capsize and SAR unit firefighting, there is a suite of EOPs.



RNLI EMERGENCY OPERATING PROCEDURE

Abandonment to Liferaft

Validation	
Prepared by	Oliver Mallinson – Senior Operations Manager (Lifeboats)
Validated by	Peter Dawes - Lifesaving Services Manager
ID Number	RNLI-EOP-03
Last updated	January 2017
Review date	Annually
Pages	3

Objective

To ensure the correct procedures are carried out during abandonment of an all-weather lifeboat to a liferaft.

Reference Documentation
Coxswain and Helm handbook
Crew Members handbook
CoBT 1
Ocean Safety Liferaft Crew Information (SSE20037)

Checklist

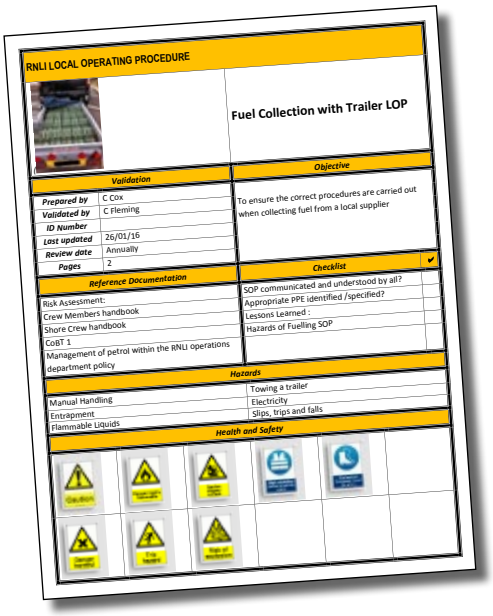
- SOP communicated and understood by all?
- Appropriate PPE identified /specified?

Hazards	
Manual handling	Weather and sea conditions

Safety, Health and Environment

Local operating procedures (LOPs)

Due to the unique circumstances of some individual locations, it has been agreed by the operational management that the SOP requires deviation from on a regular basis. Where this is the case, the SOP has been modified and from it a unique LOP has been created for that location. It is the LOP that should be followed as the normal procedure.



RNLI LOCAL OPERATING PROCEDURE

Fuel Collection with Trailer LOP

Validation	
Prepared by	C Cox
Validated by	C Fleming
ID Number	
Last updated	26/01/16
Review date	Annually
Pages	2

Objective

To ensure the correct procedures are carried out when collecting fuel from a local supplier

Reference Documentation
Risk Assessment:
Crew Members handbook
Shore Crew handbook
CoBT 1
Management of petrol within the RNLI operations department policy

Checklist ✔

- SOP communicated and understood by all?
- Appropriate PPE identified /specified?
- Lessons Learned :
- Hazards of Fuelling SOP

Hazards	
Manual Handling	Towing a trailer
Entrapment	Electricity
Flammable Liquids	Slips, trips and falls

Health and Safety

Situational awareness

Situational awareness is being aware of everything that is happening around oneself and the relative importance of everything observed — a constantly evolving picture of the state of the environment. Situational awareness can be described broadly as a person's state of knowledge or mental model of the situation around him or her.

Situational awareness is vital for effective decision making and performance in any complex and dynamic environment.

It was originally an aviation term used to describe awareness of tactical situations during aerial warfare. It has now been adopted throughout aviation, and increasingly in other dynamic, complex, situations requiring human control.

Levels of situational awareness

A general, widely applicable definition describes situational awareness as "the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning and the projection of their status in the near future" (Endsley, 1988).

- **Level 1 - PERCEPTION**
  Involves perceiving critical factors in the environment (Who/what is around me, where are they and what are they doing)
- **Level 2 - COMPREHENSION**
  Understanding what those factors mean, particularly when integrated together in relation to the decision maker's goals
  (What do I want to achieve and what affect will the environment have on me achieving the goals.)
- **Level 3 - PROJECTION**
  This is the highest level, an understanding of what will happen with the system in the near future
  (The effect of action taken by the decision maker will have on the environment).

These higher levels of situational awareness allow people to function in a timely and effective manner.

An individual's understanding and classification of the situation he or she is in forms the basis for all subsequent decision making and performance. Even the best trained people will perform poorly if their situational awareness is incorrect. One study of aircraft accidents found that as many as 88% of all accidents attributed to human error had an underlying problem with situational awareness (Endsley, 1995).

Other studies have found that a similarly high percentage of human error problems stem from poor situational awareness, which often results from deficiencies in the system capabilities or displays provided to their operators.

Factors (included but not limited to)

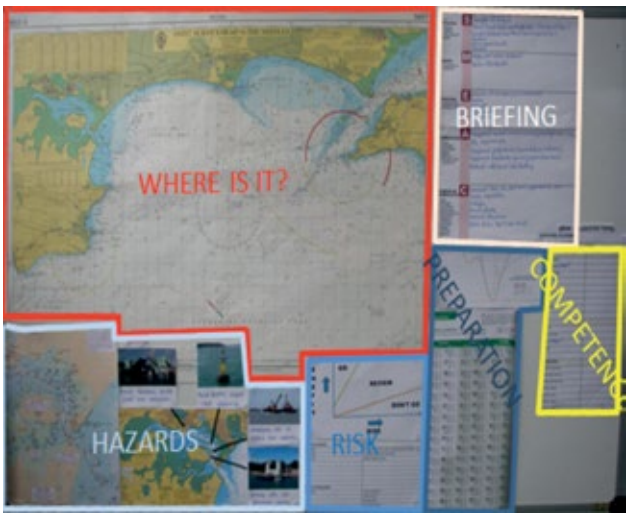
- Present and future weather
- Present and future sea state
- Present and future tide and tidal streams
- Correct position and route planning
- Other shipping
- Progress of task in hand
- Number of persons involved
- Health, welfare and ability of RNLI personnel
- Condition of equipment.

Operational briefing and debriefing

Whether the SAR unit is launching on a shout or on exercise, good communication is vital to the safe conduct of the operation. To this end a full brief and debrief must take place.

The RNLI employ a robust, tried and tested SMEAC briefing structure, not only in Lifeboat operations/training, but Flood and Lifeguard activity also. It is recognised and used by external agencies including Her Majesty's Coastguard.

The ability to receive, appreciate and issue good briefings requires practice, so individuals and teams should make the most of every training and exercise opportunity to hone briefing skills and become familiar with receiving briefings too.



Preparing to give a SMEAC briefing

To support the briefing format of SMEAC a number of preparatory actions can take place in order to collate as much relevant information as possible before any activity. The information can be collated in the form of:

- briefing boards
- briefing folders
- one page laminated briefing sheet i.e. enhanced pilotage plan.

The board below shows some of the things you might need to include in an event briefing board. In essence, this becomes a one stop shop for any relevant information that helps inform the crew to ensure efficient operations and emergency actions.

It is recognised that every location and environment is unique, so the exact format and layout cannot be dictated. Trials have demonstrated that a briefing 'folder' may be more relevant while other locations are more suited to a well located 'board'. Examples of the information to be captured include:

- Weather
  - shipping forecast
  - synoptic charts briefing board
  - inshore daily forecast folder
  - Wind Guru/BBC Weather/Magic Seaweed etc.
- PPE
  - Specific requirements.
- Navigation
  - daily tide info
  - monthly tide info
  - specific local issues.
- Defects
  - missing equipment
  - defects that affect capacity.
- Availability
  - fitness, injury, illness.
- Risks/hazards
  - training risk assessments
  - known physical hazards.
- Resources required
  - training equipment and Casualty Care etc.
  - food and drink
  - craft manuals and scenario cards.
- Lessons learnt
  - RNLI lessons learnt
  - local lessons and recent events.

Giving a SMEAC briefing

The briefing must be given concisely, clearly, confidently and in the correct sequence. They must provide the essential items of information including:

- what is to be done
- who is to do it
- how/where/when it will be done.

SMEAC is an acronym which breaks into the following headings:

S **Situation:**
A brief description of what is happening/happened.
• ground • hazards • weather • other agencies • event

M **Mission:**
What is the actual objective of the task?
The mission brief should be short, using simple language that everyone can understand.
• our mission is... • in order to...

E **Execution:**
Tasking: Assign jobs/roles and team allocation.
Equipment: The equipment required and allocated.
Limitations: The factors that may restrict options.
Emergency plan: The plan in the event of an emergency or non-standard operating.
• general outline • grouping/tasks

A **Administration and Logistics:**
What administrative arrangements and logistic support have been put in place.
• dress/ppe • equipment • food/water
• medical • transport
• casualty routine/evacuation

C **Command and Communications:**
Issue and clarify call-signs and radio frequencies and identify the chain of command and communication.
• type • call signs • lost comms • ops
• normal • coordinating authority
• questions

A well briefed team will not only carry out functions more effectively and be better at rescue activity, but also do so more safely. However, time is important and briefings need to be just that: brief! The situation has developed rapidly and unexpectedly, meaning action is required swiftly too, so bring out the important points by running quickly through the SMEAC headings.

Practice through routine exercises and training will mean the SMEAC model becomes second nature. It can be communicated quickly and effectively.

Debriefing

The power of any debrief should never be, but often is, underestimated. Debriefing helps us to:

- ensure the welfare of our team at the end of any service, training or exercise
- ensure the equipment is accounted for, operationally ready or defect reported
- ensure any lessons learnt from the event are captured
- develop the team involved to perform even better next time.

Some golden rules when debriefing:

- debriefs should be short and to the point
- debriefs should be key points only (2-3 points) when tired or time is short
- recognise there is a difference between personal 1-2-1 feedback and a team debrief
- record debrief key points on Return of Service where relevant.

Always approach the debrief in an open, inclusive manner that encourages two-way communication and an opportunity for all to speak up if needed. A debrief should be done in a timely manner after any event, but they are particularly effective after serious casualty care operations, technical rescues or novel 'one-off' events that the larger audience rarely encounter. People often need a period of reflection, so those leading any team need to communicate that the opportunity to return to the topic with them is open.

Debriefing structure

S Safety:
End to end, did we do it all safely? Did anybody see anything unsafe? Was it inherently unsafe due to the incident?

- travel there
- launching
- degree of risk
- risk assessment
- decision making

P People:
How are the team doing? Are they fit and well? Can you see any key indicators of stress?

- emotional wellbeing
- physical wellbeing
- illness
- injury
- competence

E Equipment:
What did we use? Did we follow the SOP? Is anything damaged?

- condition
- appropriateness
- defects
- injury
- missing/lost

P Performance:
Could we do it better, easier, safer, quicker next time? Lessons learnt from this incident?

- safety
- people
- equipment

Dynamic risk assessment

Due to the diversity of RNLI operating environments and to allow flexibility for lifesaving operations it is not common practice to produce formal risk assessments for seamanship evolutions carried out at sea. However it is essential that the operations teams, crews and those in command make an assessment of potential hazards and what controls can be put in place before putting to sea. These must be recorded (on exercises planning forms and for SMEAC board briefings) and communicated thoroughly to all involved with the activity, especially if any non-standard controls have been adopted for that occasion.

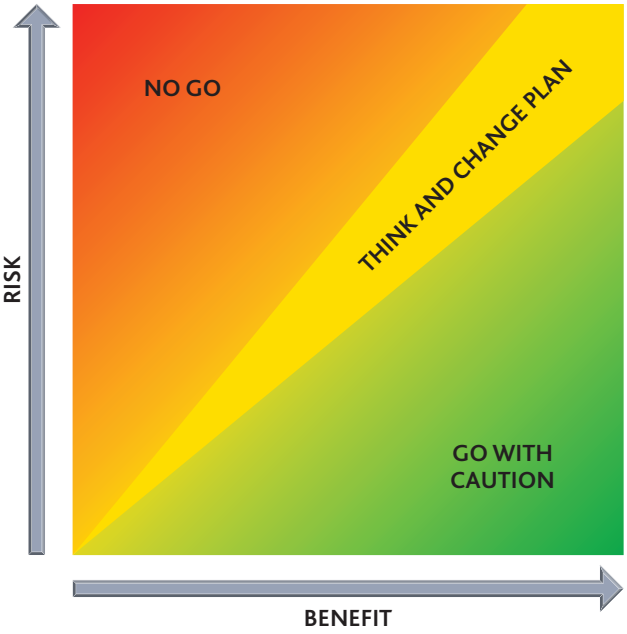
It is recognised that, depending on the operational circumstances or environment, a departure from the original brief, standard procedure or training evolution may be necessary. At such times reliance on the theory and practice of good seamanship, including an assessment of the hazards and consequential risk, is essential in identifying the safest and most efficient way of dealing with an unplanned, unexpected or new situation. We call this ad-hoc mental process a dynamic risk assessment

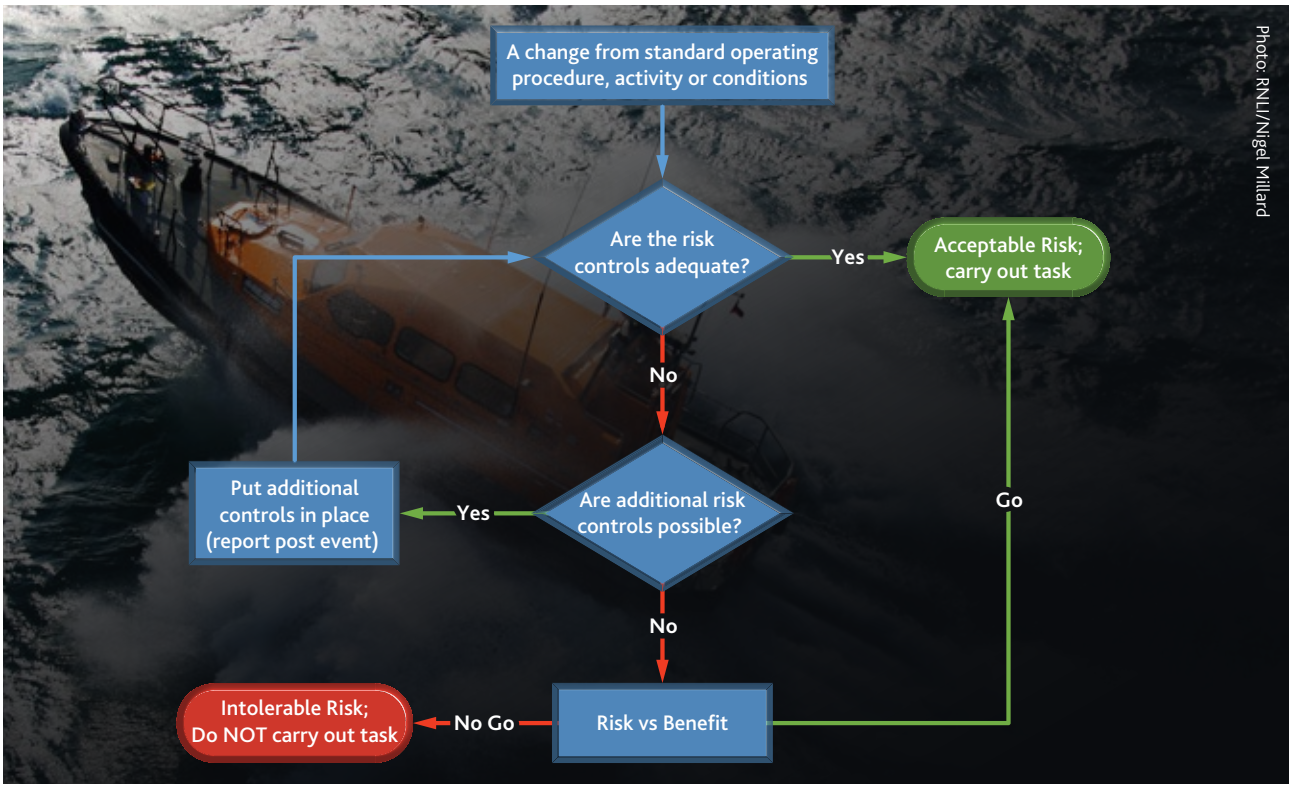
Dynamic risk assessment is the continuous process of identifying hazards, assessing risks taking action to eliminate or reduce risk, communicate, monitoring and reviewing, in the rapidly changing circumstances. This process is designed specifically for personnel in changing environments and it is conducted to ensure controls are adequate and/or to add to existing controls. These controls should be recorded and reported to a line manager for future reference and review.

Notwithstanding from the above, if there are hazards identified that cannot be controlled then a decision based on risk vs benefit must be made to decide if the activity has acceptable risk or intolerable risk. The benefit of completing the activity must be considered against the risk to all people and equipment.

If hazards cannot be controlled and there is particularly low benefit or high risk from activity then it should not be undertaken. With dynamic risk assessment, each circumstance must be judged on its own merits.

Think before you act rather than act before you think.





Pyrotechnics

Pyrotechnics, often referred to simply as flares, are an essential part of a vessel's safety equipment. Firing pyrotechnics is a simple method of indicating that vessel and/or persons are in distress, drawing attention to their position as an aid to search and rescue.

Hazards

Pyrotechnics are inherently dangerous if used incorrectly. They give off large amounts of intense heat and light and often involve a projectile flying many hundreds of metres. If possible, find a stable location to fire from: on a heaving vessel the stern would probably be the best option. Helmets with visors down should be worn.

Types of pyrotechnics and their uses

A SAR unit will carry the following types of pyrotechnic:

Red parachute rocket

The red parachute rocket is used to signal a distress situation. The rocket can be used during day and night. They should be fired in twos with a one to two minute gap between each flare.

All rocket-propelled pyrotechnics will seek the wind. In order for the rocket to reach its maximum height the operator should stand with their back to the wind angling the flare slightly downwind before firing. The parachute and red flare will deploy at approximately 300m and burn for about 40 seconds as it drifts down with the wind.

Red hand-held flare

The red hand-held flare is for short-range use and is ideal to signal distress and pinpoint location by day or night. These hand flares are self-oxygenating. This means once they have been activated they cannot be extinguished, even by placing in water.

They should be fired from the downwind side of a vessel, held at full arm's length and the operator should turn their face away from the burning flare.

The burn time will be approximately 60 seconds.

White parachute rocket

The designed purpose of a white rocket flare is for collision avoidance. It is also used by the rescue services to illuminate the sky at night to aid search and rescue. When used in this situation, due regard should be given to any helicopters operating in the vicinity.

When fired, the flare will reach a height of 300m and burn time will only be 30 seconds. However, it is three times as bright as a red flare.

Personal day/night flare

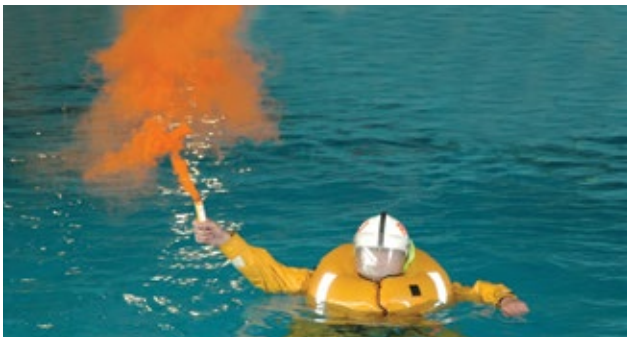
This small dual-purpose flare is stowed on your lifejacket and can be used for distress or signalling purposes.

Personal hand-held flares are designed to be used when you can see your would-be rescuers but they cannot see you! All SAR lifejackets have one handheld day/night flare fitted.

The flare is dual purpose in that it burns bright red from one end and gives off orange smoke from the other. Each end is independently activated, which means that after operating one end, the other will still be available for future use. Both burn for approximately 20 seconds.

Personal day (smoke)

While it is not designed for night-time use, as it is not visible to a searcher's eyes, the smoke is hot when it comes out so it is visible to a heat-detecting device found on many SAR helicopters.



During the day it is particularly useful for indicating wind direction to a helicopter.

Personal night (flare)

Burns bright red to indicate your position. This can be seen from a distance during the day if smoke has already been used.

Floating orange smoke canister (not carried on RNLI SAR units)

The orange smoke canister has the same function as the hand-held personal flare.

The canister is designed to float independently while giving off dense orange smoke. It is not designed for night-time use.

Line-throwing apparatus

Pyrotechnics are also used to pass lines from one vessel to another, from a vessel to the shore or from the shore to a vessel.

The line is normally 'thrown' by rocket. The unit contains approximately 275m of 4mm floating line, with a throwing range of approximately 250m. In addition to the manufacturer's instructions, please refer to the SOP on line-throwing apparatus for the required PPE, full step-by-step firing procedure and steps to take in the event of a misfire.

Points to remember

- all pyrotechnics have instructions clearly printed on the sides. If in doubt, read instructions fully before use. The correct use of PPE is essential; a helmet with visor down must be worn if available
- if a pyrotechnic does not operate it should continue to be treated as live until made safe
- batch number and manufacturing date must be recorded from all misfires, and details passed to RNLI Headquarters
- all time-expired pyrotechnics should be disposed of in accordance with the current procedure indicated by Horizon.

WARNING

In the event of a non-ignition misfire, the pyrotechnic must be kept pointing in a safe direction for at least one minute; it should then be placed in a bucket of water or disposed of overboard.

In the event of the pyrotechnic burning erratically or dangerously, it must be placed in a bucket of water of disposed of overboard.

For further information, please refer to the relevant SOPs.

Time expired pyrotechnics (TEPs) disposal in UK

Following the decision that the Ministry of Defence will no longer deal with the routine disposal of Time Expired Pyrotechnics (TEPs) the Department of Transport, through the Maritime and Coastguard Agency, has put in place alternative arrangement for the collection and disposal of TEPs. These arrangements ONLY apply to TEPs from recreational water users via MCA premises, and RNLI lifeboat stations and lifeguard units via Poole HQ.

In the first instance, with the exception of red distress flares, stations are encouraged to use all pyrotechnics for training during their last few weeks of life, to minimise the quantities requiring disposal.

TEPs will be uplifted from station by RNLI transport for return to the collection facility at Poole. In order to be able to do this within the regulations pertaining to the carriage and storage of explosives we will require you to notify your Regional Base as soon as you have TEPs for collection, even small quantities such as a pair of red parachute flares. They will need the quantity, type and lot number.

NOTE

On the Isle of Man, transport will collect TEPs and deliver them to Isle of Man Coastguard, who will dispose of them locally on the island.

Please do not build up large quantities before asking for a collection thinking that it will "make the trip worthwhile", as there are limits to what can be carried, and to what can be stored. Your Regional Base will advise the Transport office, which will in turn issue the necessary paperwork to the driver and advise you of the scheduled collection date. This may be a couple of transport runs away as other station's requirements may preclude collection from you immediately.

Under the terms of the contract we cannot accept TEPs from third parties at lifeboat stations, and so please do not do anybody a favour by adding their TEPs to those from the SAR unit; instead please refer people to HMCG. As TEPs will have to be recorded into the disposal facility in much the same way as they are recorded on receipt from the manufacturer we will know whether or not they were RNLI supply in the first instance.

In the event that any TEPs are found illegally dumped on RNLI premises then they must be assumed to be in a dangerous condition and should not be touched other than to possibly move them to a secluded corner away from flammable stores/materials and the areas used by personnel. Your local HM Coastguard Sector Manager should be requested to come and inspect the items and to remove them or arrange their disposal. If the Sector Manager is unable or unwilling to attend then the Police should be advised that unknown pyrotechnics have been found and request that they arrange for their removal via the MOD.

Time expired pyrotechnics (TEPs) disposal in RoI

Pyrotechnics in Ireland are supplied by C H Marine. TEPs are collected and returned to them by arrangement through RNLI Regional Office.

As in UK, with the exception of red distress flares, stations are encouraged to use all pyrotechnics for training during their last few weeks of life, to minimise the quantities requiring disposal.

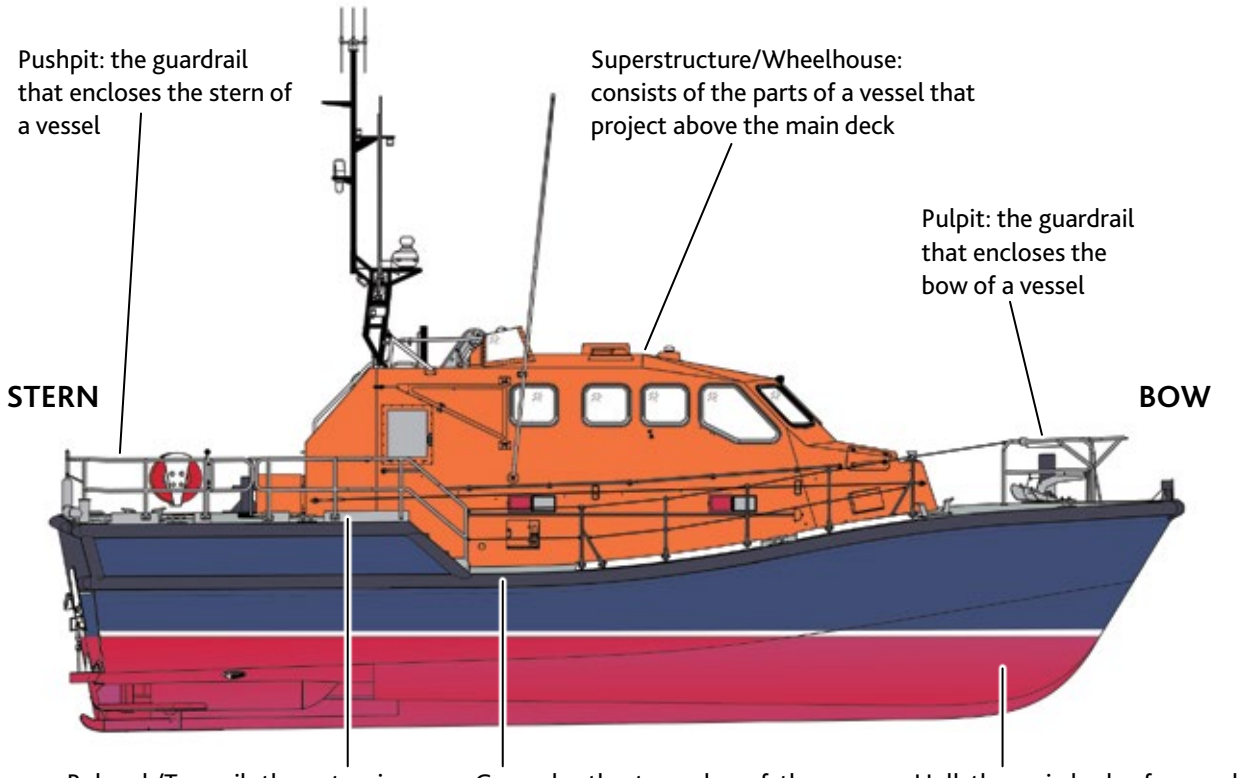
WARNING

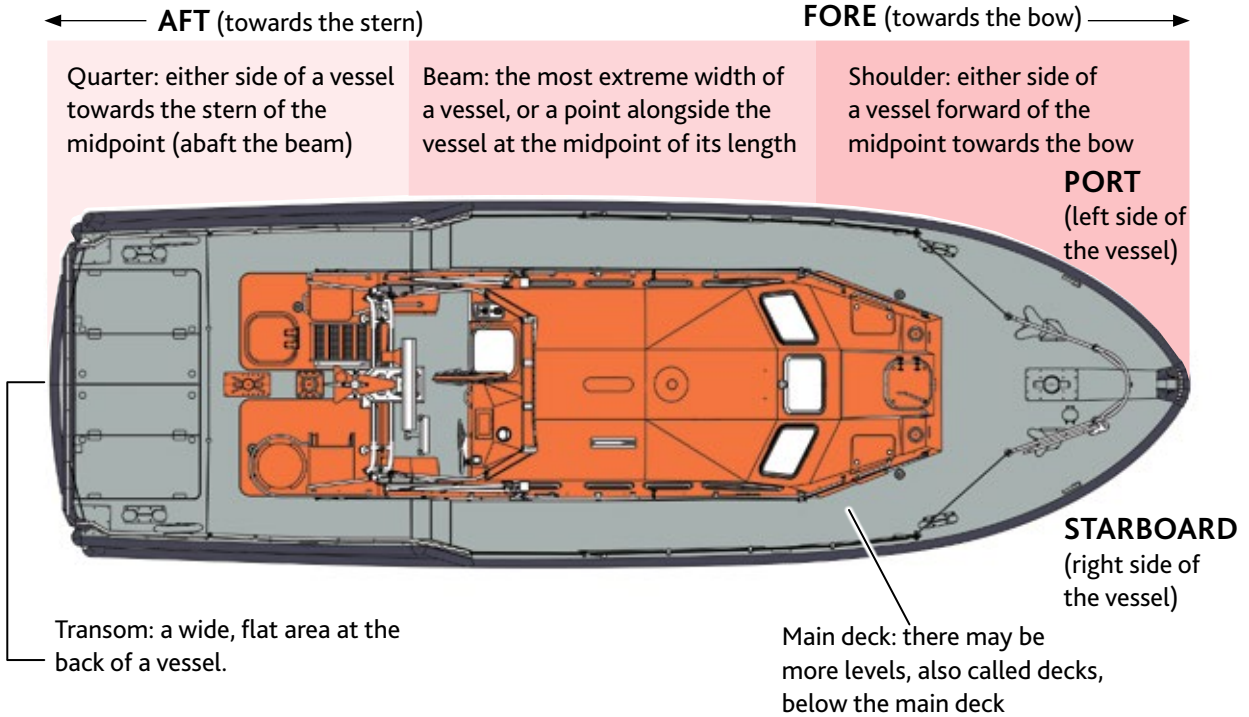
RNLI personnel MUST NOT accept TEPs from any third party.

SAR unit layout (example shown is a Tamar)

The language of the sea has evolved ever since people started using it and unsurprisingly parts of a boat and its associated equipment are called different things in different parts of the country. The RNLI has adopted a standard vocabulary and also provides an operational kit list for each class of SAR unit.

The following diagrams give an overview of general terminology:





Fittings

The following images show examples of the various fittings found on a lifeboat. Please note that the actual positions will differ between each class of SAR unit.

Bitts/staghorn/bollard

Usually metal, set vertically in the deck for the purpose of securing mooring lines and towing hawsers, often referred to as a bollard.

Cleat

A piece of metal/plastic/wood having two horns around which ropes may be made fast or belayed.

Anchor stowage

Secure on-deck stowage for the anchor ensuring it is available for use but remains in position during heavy weather.

Jack-stay

For clipping to when going forward.

Guardrail break

Guardrail break for temporary access.

Capstan

A capstan is a vertical-axled rotating machine used to apply force to ropes, cables, and hawsers. Generally used for taking load on a line.

Watertight hatch

When shut, maintains the watertight integrity of the compartment.

Fire flaps

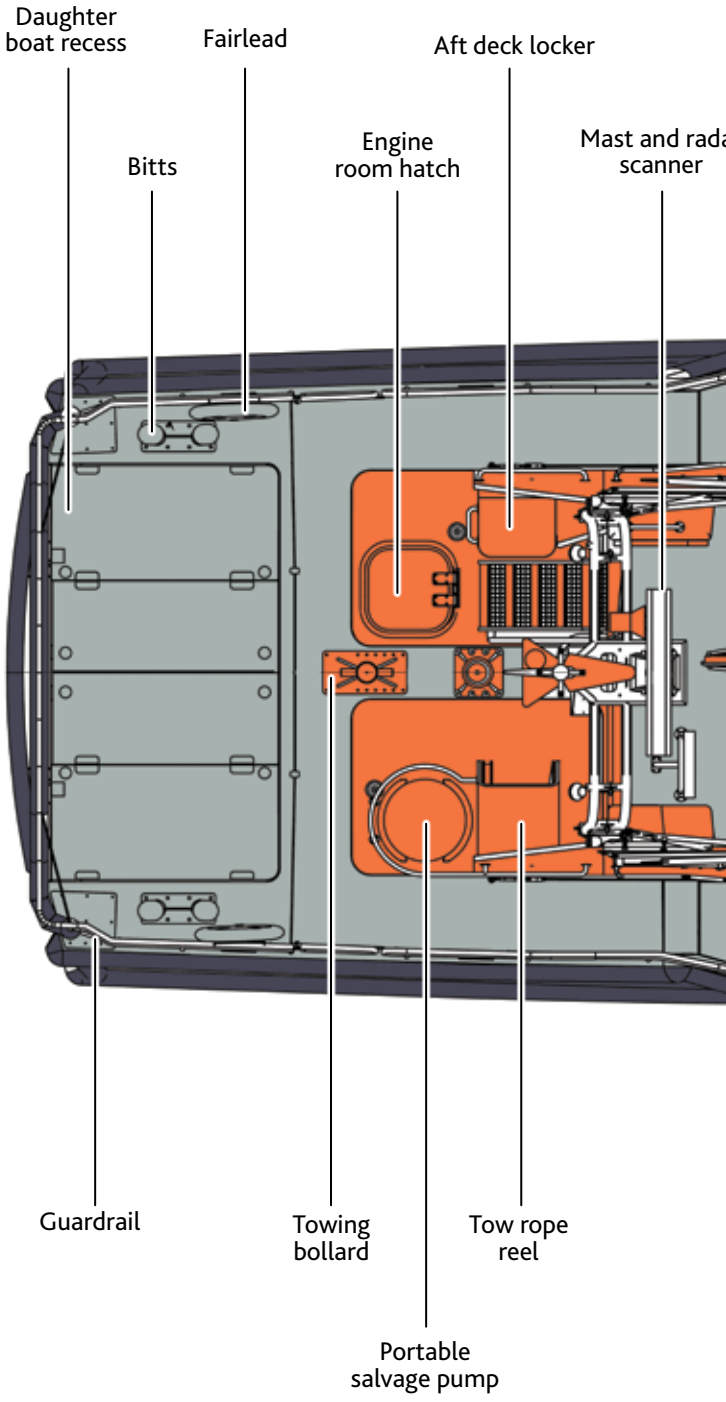
Used only in the event of a fire, the fire flaps are closed to seal off ventilation and air intakes for various compartments.

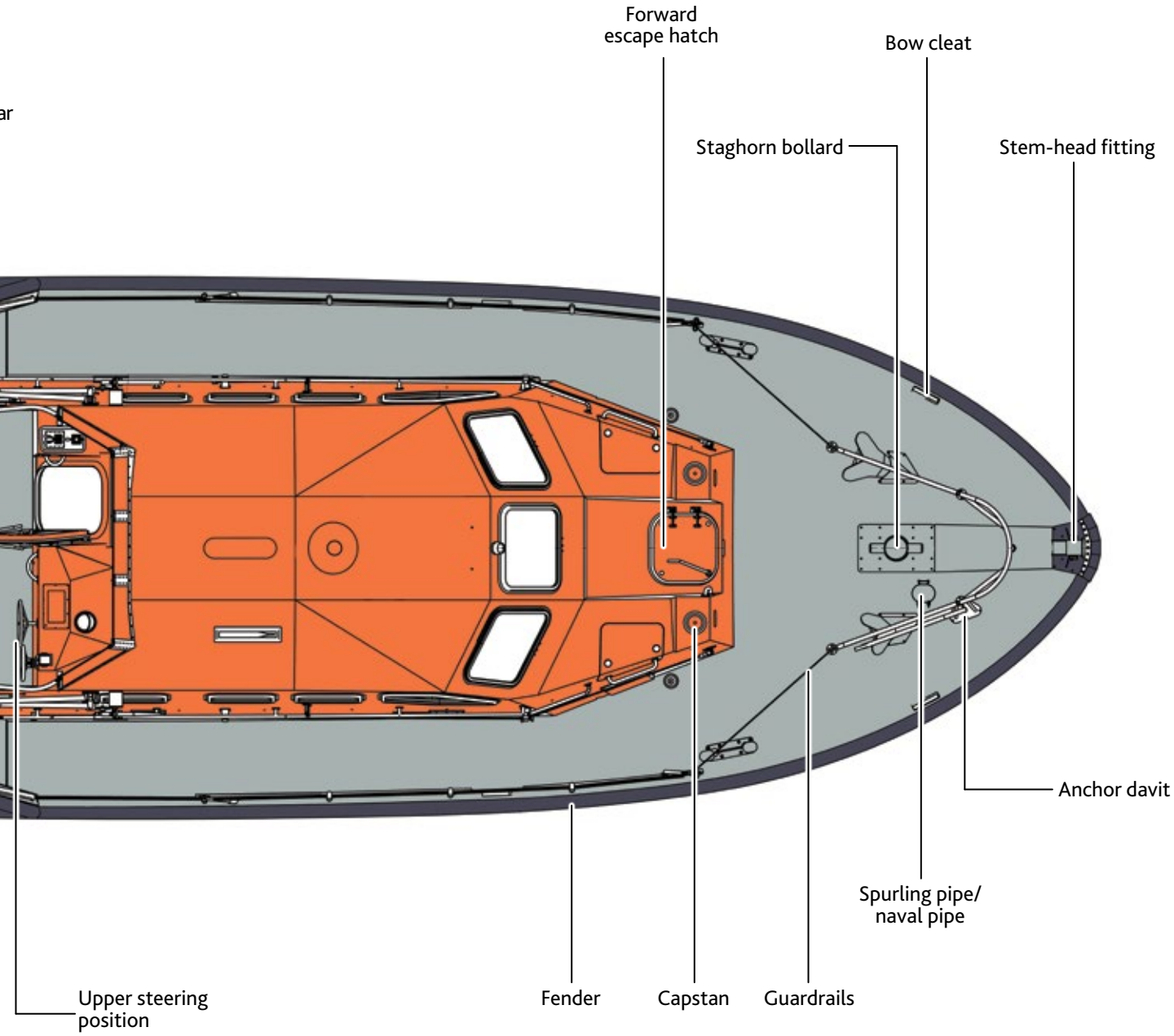
Stem-head fitting Fairlead

For running lines ashore, could be used for running a line if being towed. A fitting used to guide a line in a particular direction without chafing or damaging the vessel.

Tamar All-weather lifeboat (ALB) – plan view

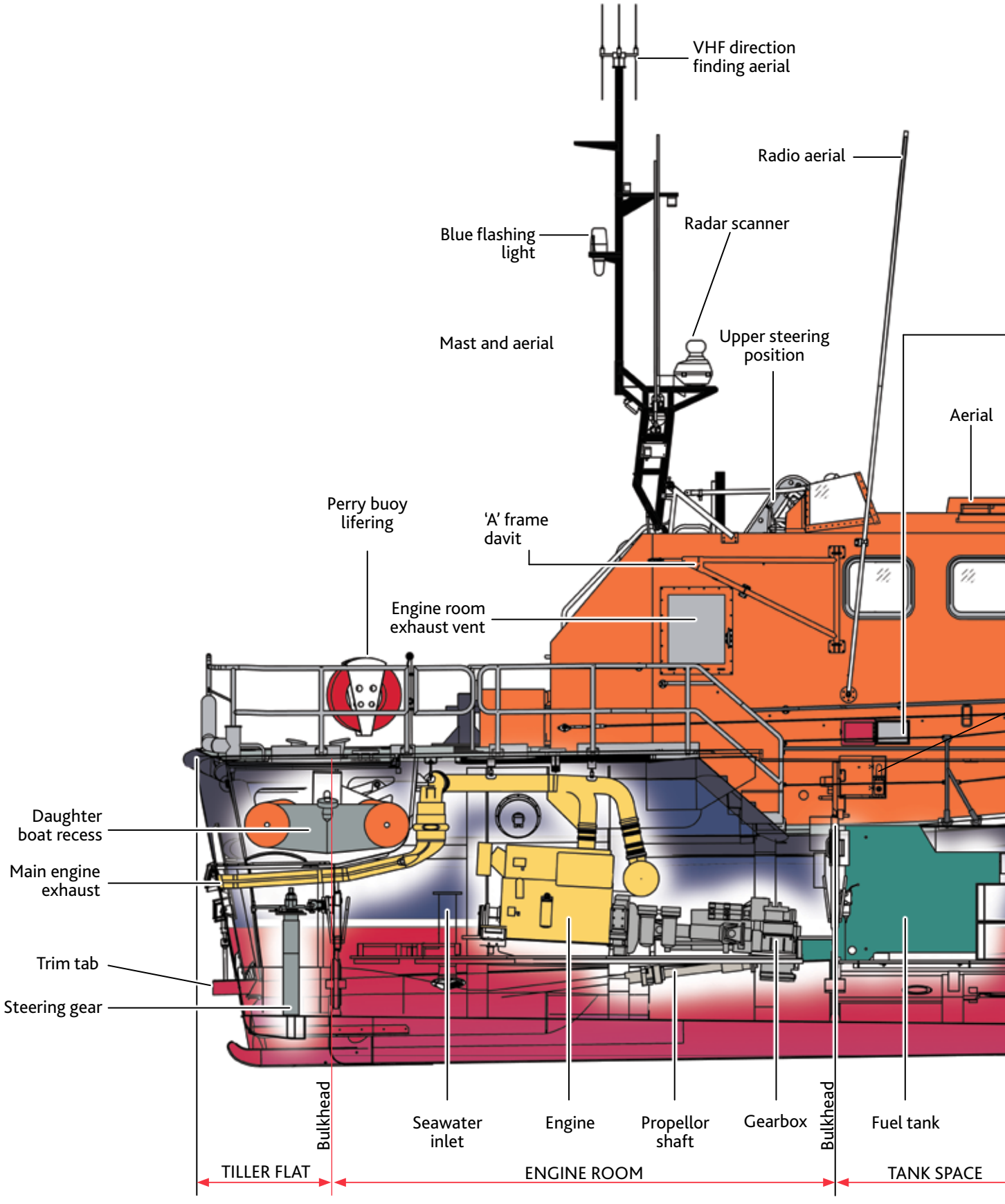
Please note that the actual positions of various fittings will differ between each class of SAR unit.

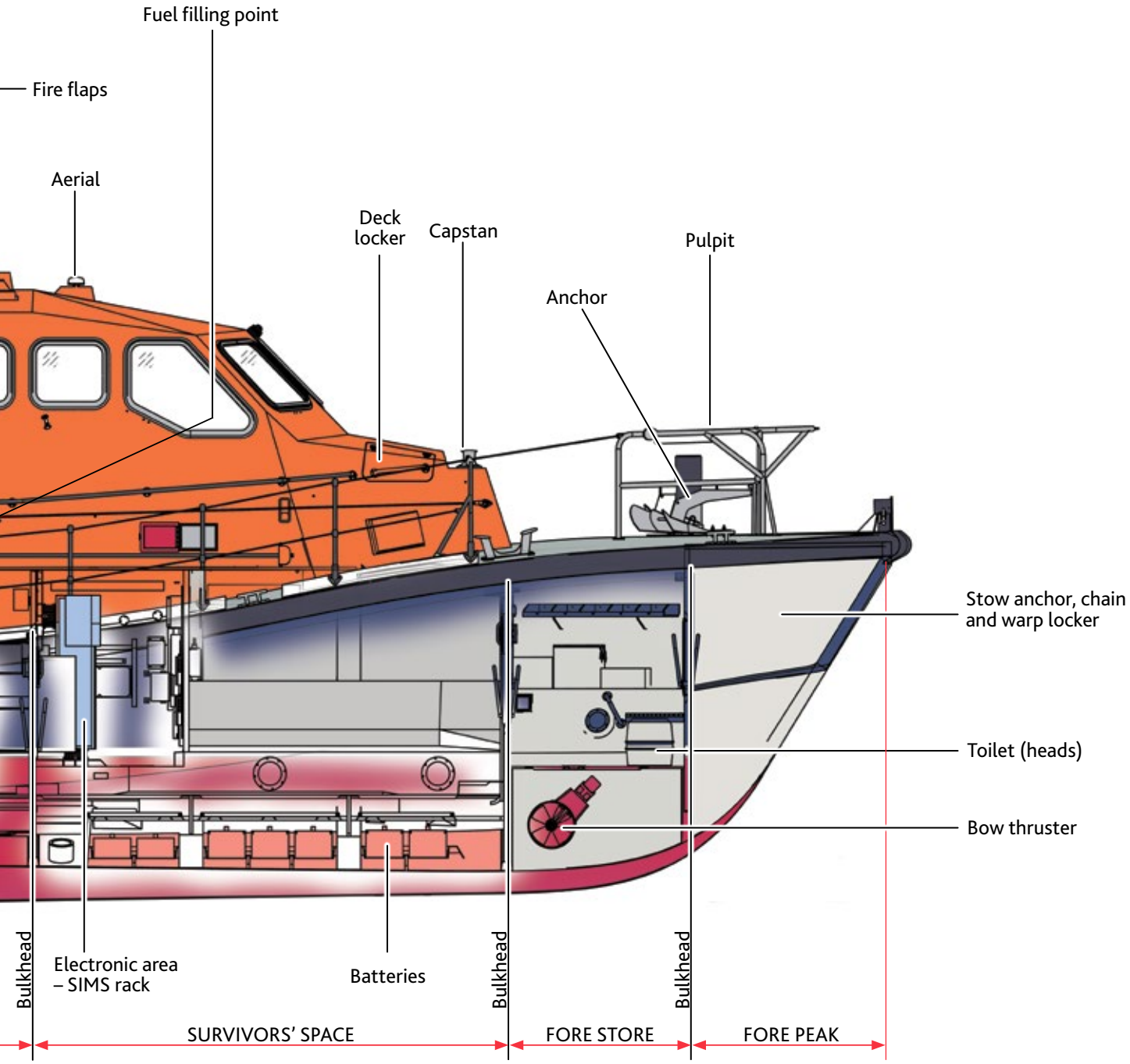



ar
Forward escape hatch
Bow cleat
Staghorn bollard
Stem-head fitting
Anchor davit
Spurling pipe/ naval pipe
Upper steering position
Fender
Capstan
Guardrails

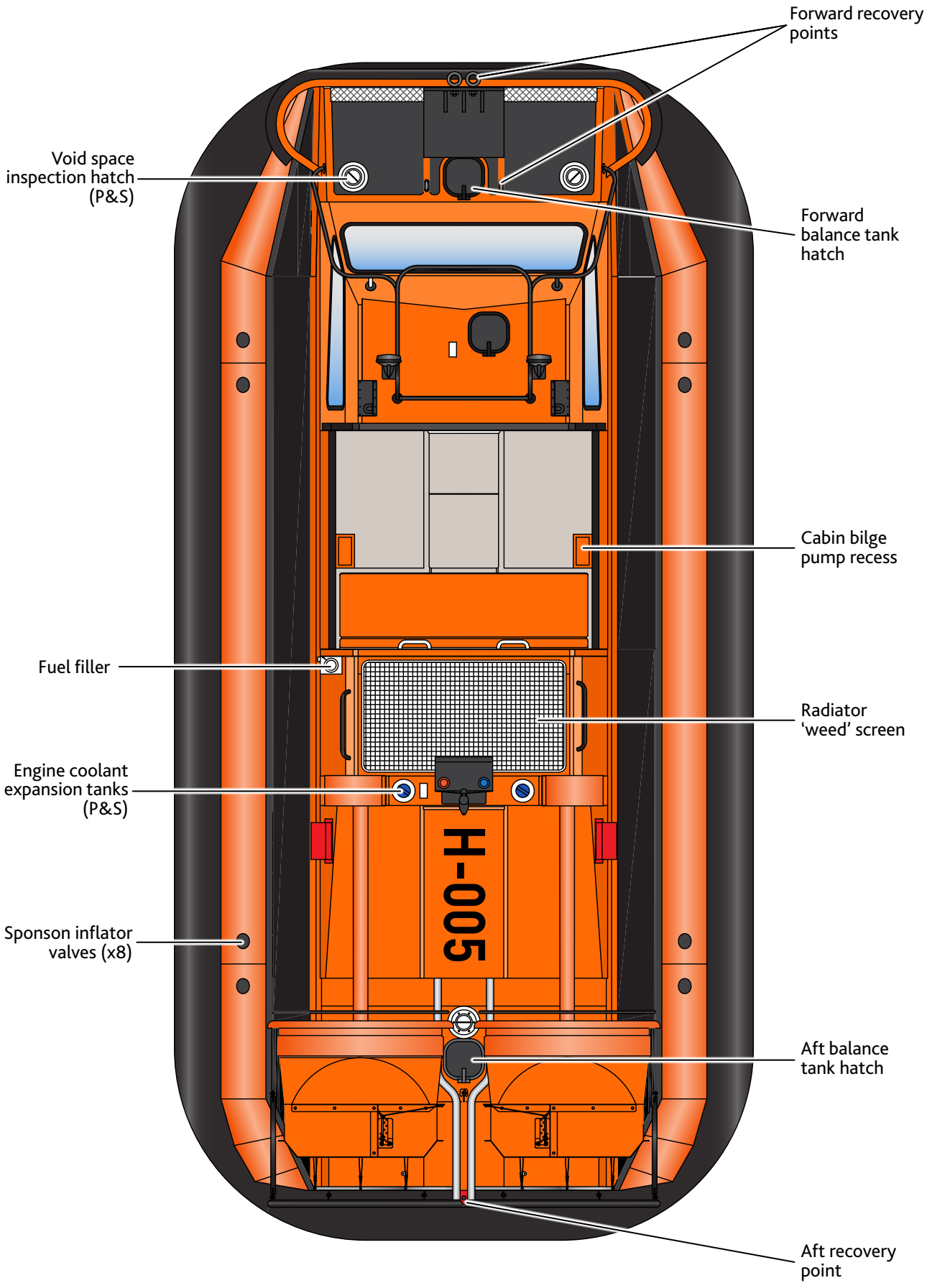
Tamar ALB – side elevation

Please note that the actual positions of various fittings will differ between each class of SAR unit.

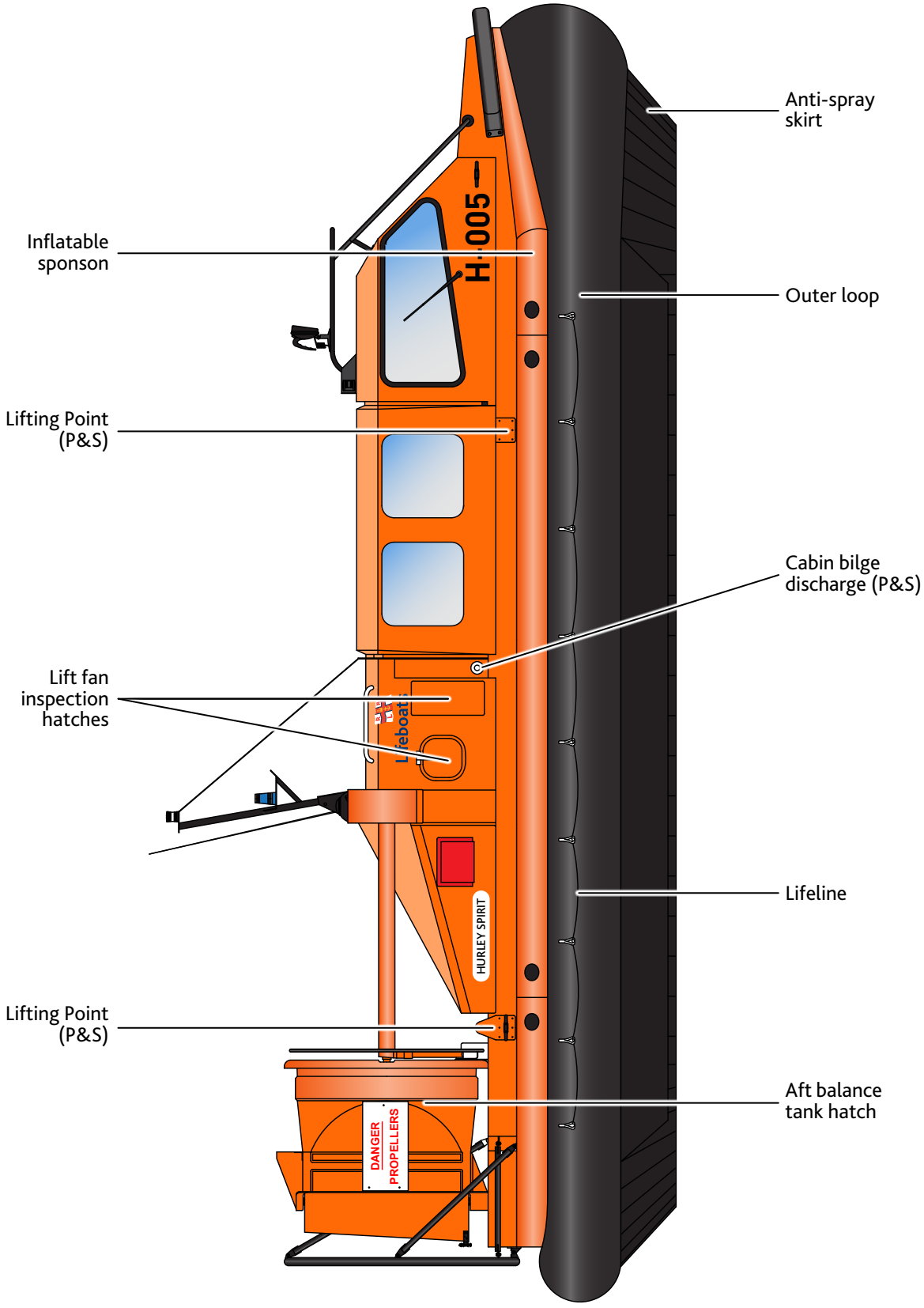



Fuel filling point
Fire flaps
Aerial
Deck locker
Capstan
Pulpit
Anchor
Stow anchor, chain and warp locker
Toilet (heads)
Bow thruster
Bulkhead
Electronic area – SIMS rack
Batteries
Bulkhead
Bulkhead
SURVIVORS' SPACE
FORE STORE
FORE PEAK

Inshore rescue hovercraft (IRH) - plan view

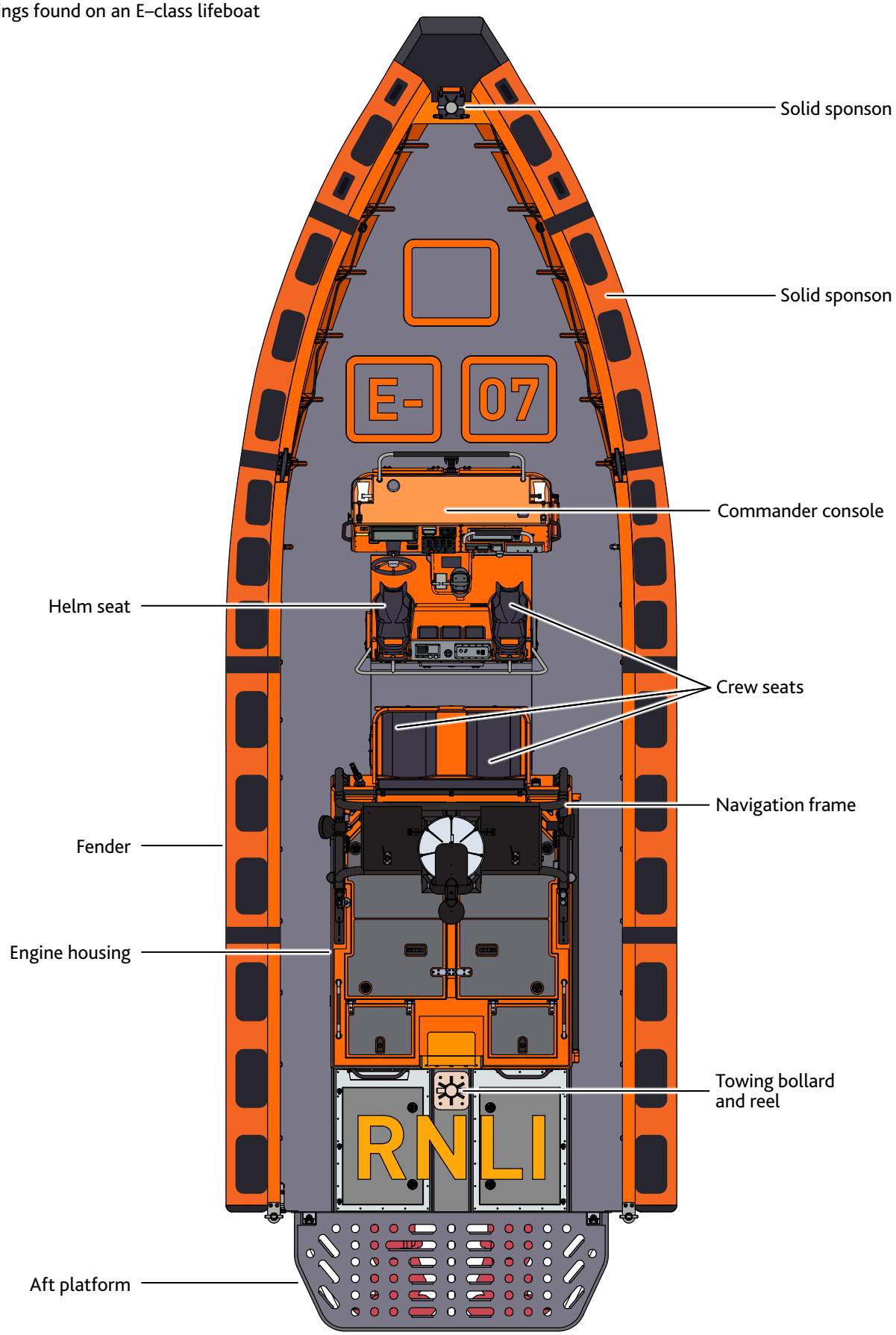


IRH - side elevation

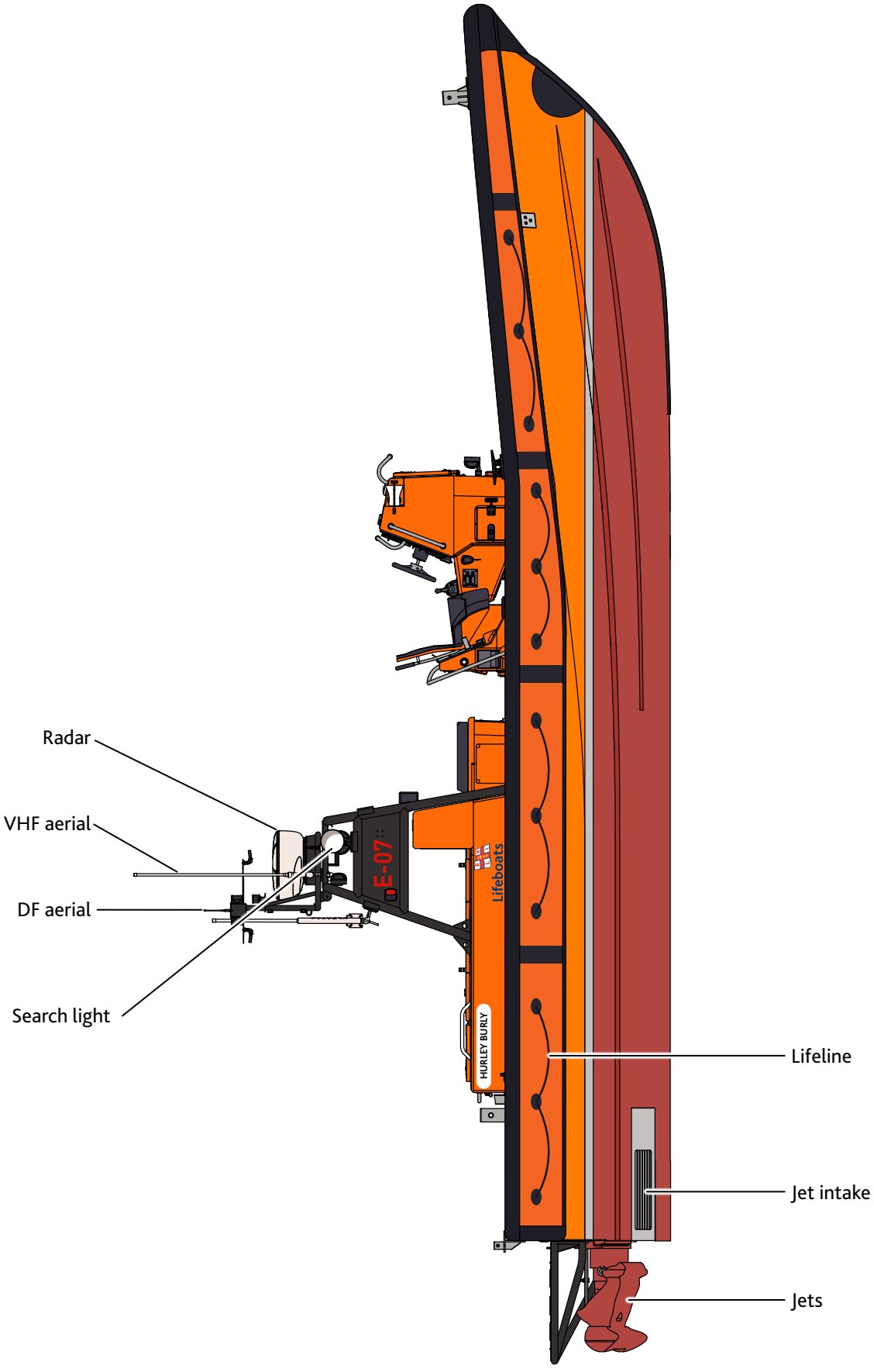


E-class inshore lifeboat (ILB) - plan view

The following two images show examples of the various fittings found on an E–class lifeboat

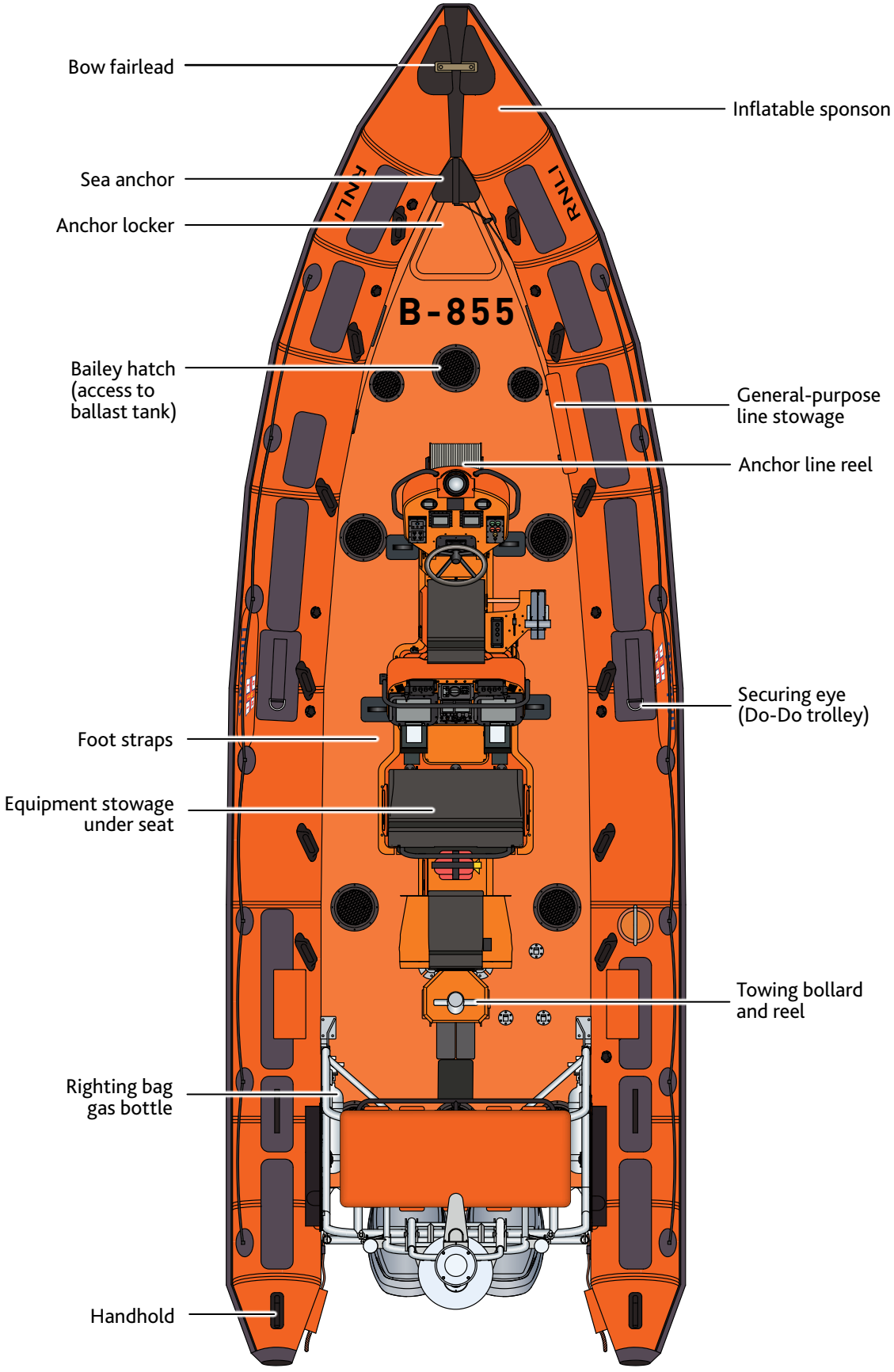


E-class ILB - side elevation

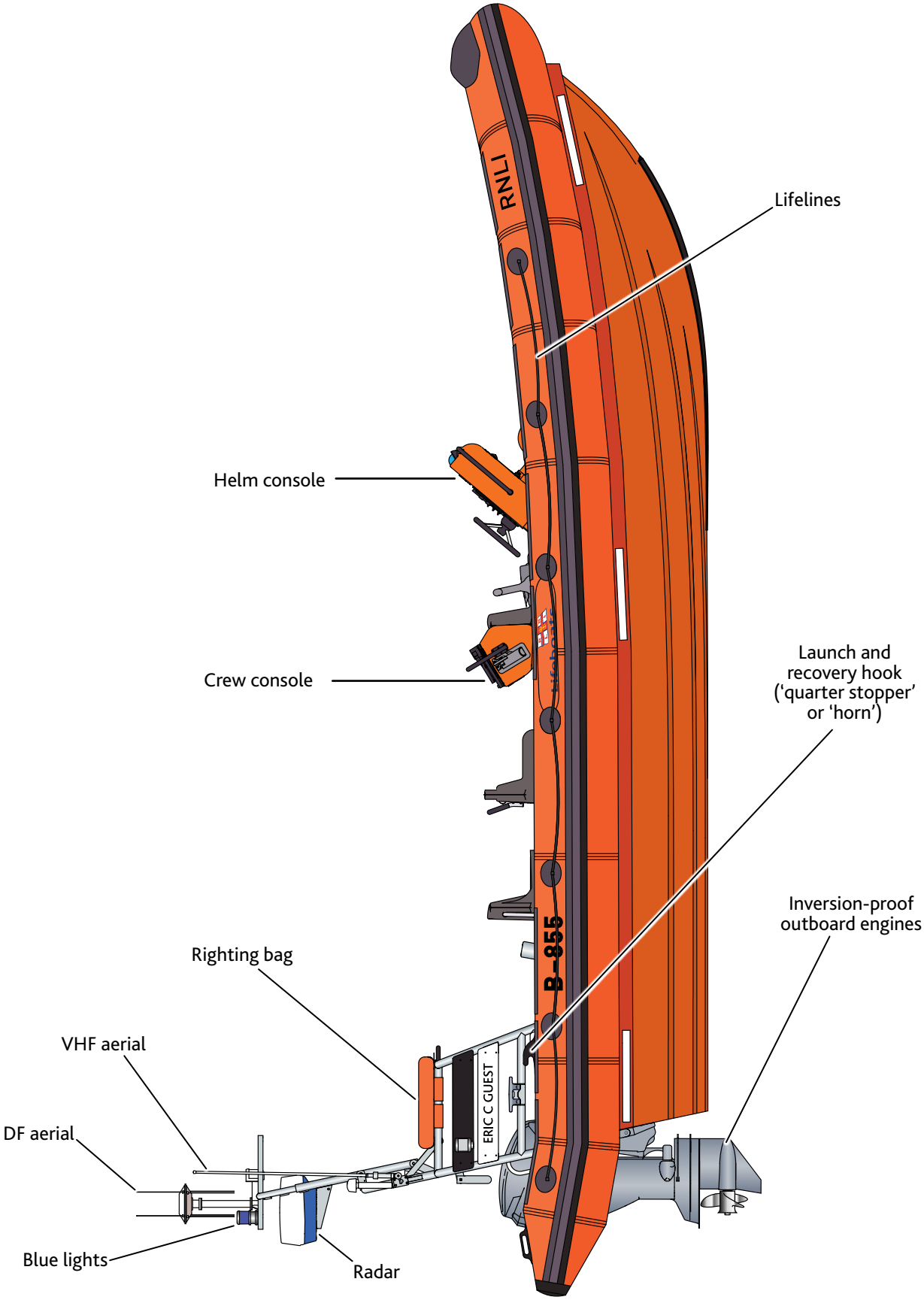


B-class inshore lifeboat (ILB) – plan view

The following two images show examples of the various fittings found on a B-class lifeboat

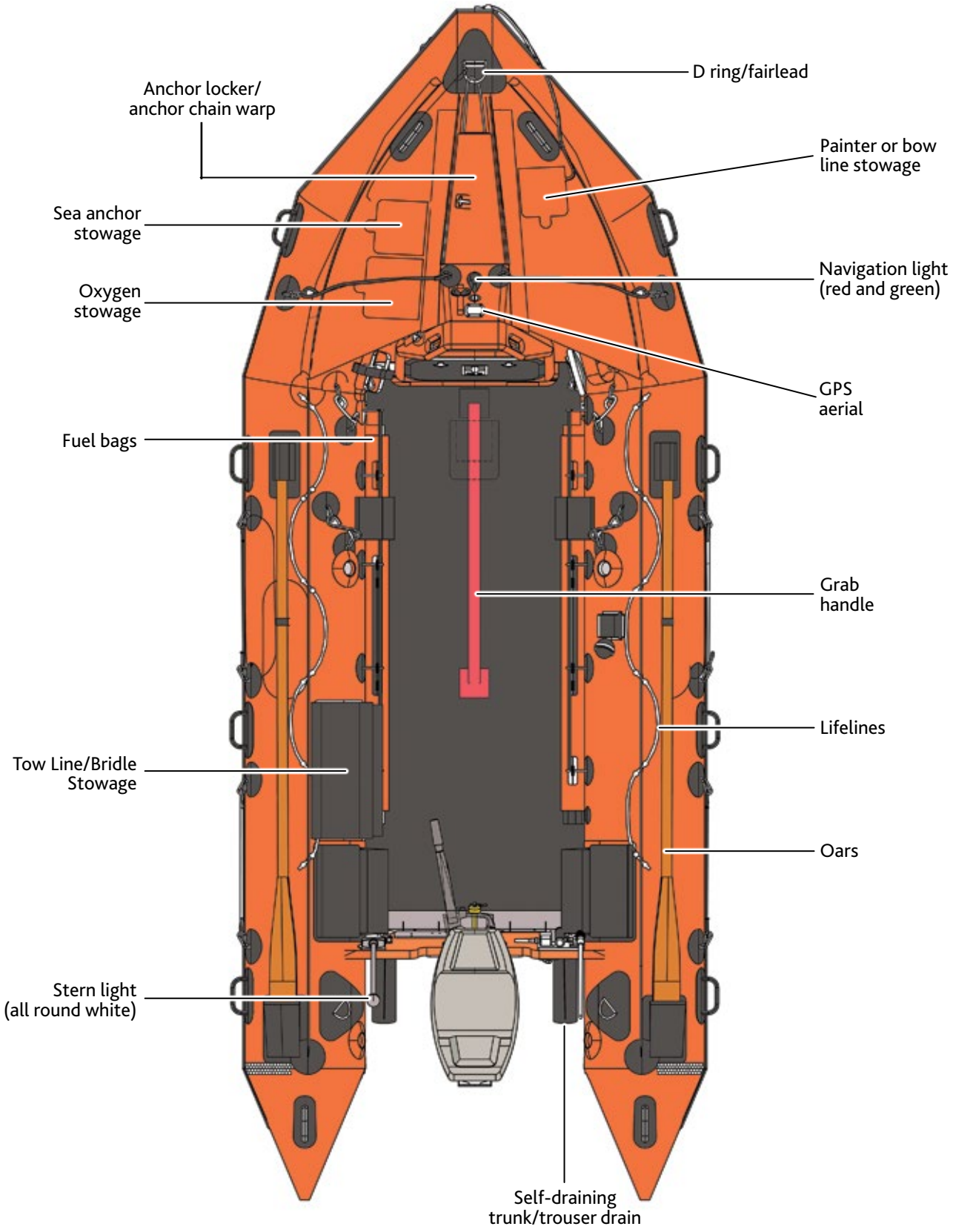


B-class ILB – side elevation

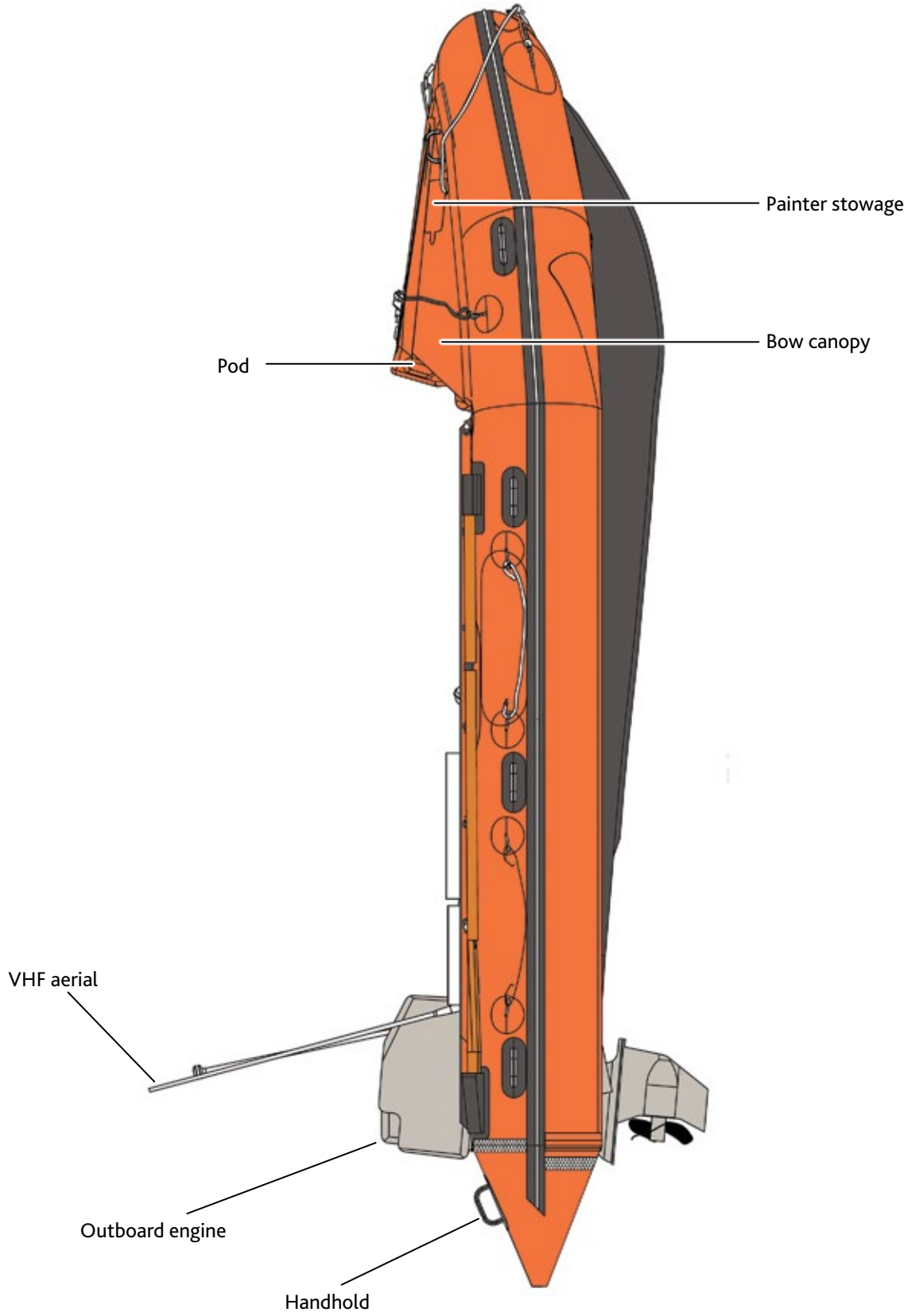


D-class inshore lifeboat (ILB) – plan view

The following two images show examples of the various fittings found on a D-class lifeboat



D class ILB – side elevation



Alarms

Those in command should be familiar with the different audible/visual alarms on the various SAR units, when activated. These include the following:

- engine
- bilge (flooding)
- fire
- MOB
- radio Alarms (DSC)
- navigation alarms.

Hazards

The marine environment and the nature of the work SAR units do can be hazardous. The risk of slips, trips and falls can be reduced by remaining seated when the SAR unit is underway. Before moving around, the person in command should be informed and if necessary speed should be reduced. Where fitted, lifelines and handholds should be used.

There are many other hazards present on a SAR unit, some of which include:

- **Radar** – transmits microwaves. While the units are always placed in such a way to negate this problem, nobody should be near the antenna when it is transmitting.
- **Aerials** – Medium Frequency (MF) radio aerials can produce high voltages when transmitting; never hold on to any aerial.
- **Overhead hazards** – hatches, deckheads and, on sailing boats, moving booms.
- **Liquids** – many harmful liquids are used onboard, fuel, oil, coolant etc. You should always know what you are working with and the hazards it poses before handling.

Kill cords

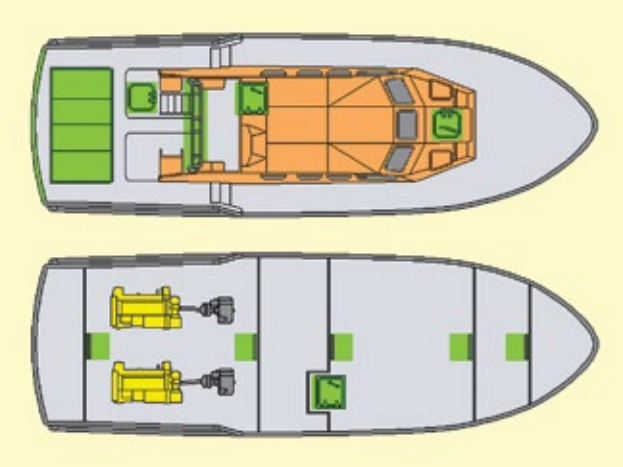
Where a kill switch is fitted, a kill cord must be worn by the helm on any RNLI vessel or watercraft when the engine is running. It is acknowledged that during a change of helm (or through other operational necessity) the kill cord will have to be disconnected and/or transferred, but only when it is safe to do so.

For further information on the use of electronic safety cut-out switches and kill cords, please read the relevant policy document on Horizon.

Watertight integrity

The watertight integrity of ALBs is maintained by ensuring that doors and hatches remain closed while at sea. This is important as it maintains the watertight integrity and self-righting capability of the vessel by stopping water ingress.

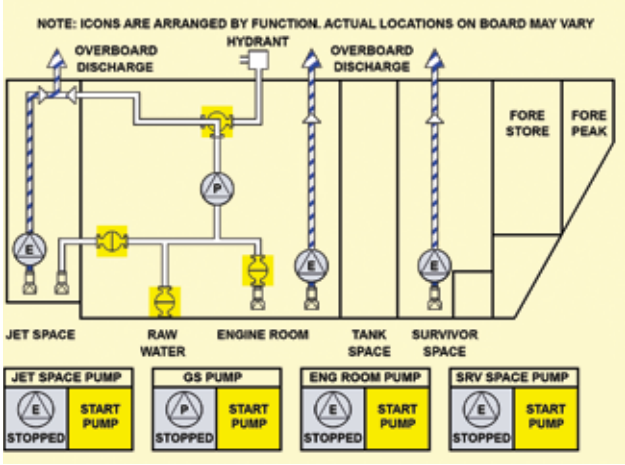
ALBs have differing methods of monitoring which doors and hatches are open and closed.



Tamar SIMS hatch screen

Bilge pumps

All ALB SAR units have a system to pump the bilges in the event of flooding. While this is mainly the responsibility of those in command, crew should be aware of the system used on their SAR units but should never enter the engine room without the express permission of the mechanic or coxswain. On certain SAR units there is remote switching to enable the bilge pumps to be run. On other types of RNLI SAR , the bilge pumps cannot be run without entering the engine room.



Shannon SIMS bilge screen

Manage emergency procedures – grounding, collision, flooding

A good level of situational awareness of the current situation, environment (comprehension) and future effect and required actions (projection) is key to avoid grounding, collision or flooding of the SAR unit. It is also important for good navigational practices to be maintained, the allocation of a crew member to oversee navigational procedures and competence in IRPCS and the application of the rules.

In the event of grounding, collision or flooding of the SAR unit, the current Emergency Operating Procedures (EOPs) must be followed. Immediate actions are shown in the table below.

Immediate Actions	Grounding*	Collision**	Flooding***
Sound the alarm and alert all crew	■	■	■
Close watertight doors (if fitted)	■	■	■
Maintain VHF watch on channels 16/0 and confirm SAR unit position	■	■	■
Contact the Coastguard using appropriate transmission (distress/urgency)	■	■	■
Sound bilges and tanks	■	■	■
Switch on deck lighting (at night)	■	■	
Check for hull damage	■		
Visually inspect the compartments where possible	■		
Sound around the SAR unit and determine which way deep water lies	■		
Determine the nature of the seabed and local tide information	■		
Reduce draught of the SAR unit (if possible/required)	■		
Manoeuvre the SAR unit so as to minimise the effects of collision		■	
Check for fire/damage		■	
Offer assistance to other vessel (if collision was with another vessel)		■	
Identify the location of incoming water			■
Cut off electrical supply running through the area (if possible)			■
Shore up the area to stem the flow – bungs/patches/improvised tools etc.			■
Check bilge pump for operations (if fitted/used)			■
Check auxiliary pumps for operation (if fitted/used)			■

* Attempt to refloat from grounded/stranded position if possible

** Priority is to prevent loss of life or injury

*** Priority is to prevent further flooding and loss of buoyancy and stability

Emergency procedures

When at sea, the movement of a vessel will always be unpredictable, particularly in heavy weather where the risk of personal injury, damage to the boat, knockdown or capsize increase significantly if the correct precautions are not taken to prepare for it.

Preparing for heavy weather

All loose items of equipment must be securely stowed to prevent them from flying about. All hatches and doors must also be closed to preserve the watertight integrity of the boat.

The crew should put on any additional protective equipment such as additional thermal layers, foul-weather gear, drysuits and helmets, preferably with visors down for ILBs. Crew should be seated, holding on correctly and properly restrained by seat belts and lifelines where available.

An overdue procedure should already be in place but consideration should be made to shortening the reporting times.

It is important for all crew to know the location of all equipment on their boat but it is helpful if a grab bag is available so useful items are at hand. These may include:

- portable VHF radio
- portable GPS
- first aid kit
- pyrotechnics
- torch
- food and water.

If crew members need to move around the vessel, the course and speed should be altered beforehand by the person in command to ensure the most comfortable motion possible. The crew should use lifelines where possible and should always hold on with at least one hand at all times. Crew should be monitored at all times to ensure a potentially dangerous situation, an injury or man overboard (MOB) situation, is identified immediately.

If attending a masted casualty vessel, have that vessel's crew confirm that the correct sails are set or have them reefed to ensure that the boat is not overpowered by the wind. Excess sails should be stowed below if possible and the decks kept clear.

Post knock-down or capsize

- Knock-down: where a vessel is turned onto its side through 90°
- Capsize: where a vessel turns fully upside down.

A knocked-down yacht

Photo: RNLI/Nathan Williams

D-Class capsize

WARNING

On an ALB SAR unit, the vessel is self-righting and will need no action from the crew to achieve the righting of the vessel.

However, on an ILB SAR unit, emergency actions from the crew need to take place to achieve the same result.

Post knock-down or capsize checks

Photo: RNLI/Nathan Williams

Following a knock-down or capsize do the following:

- account for everyone – make a head count to ensure all those who were onboard are present and none remain in the capsized vessel, have been lost overboard or have drifted away from the vessel
- check for injuries – immediate first aid should be given to anyone in serious life-threatening condition. As soon as they are stabilised they can be left, preferably to be monitored by another member of the crew
- check for damage – this means any damage likely to result in the vessel sinking. If emergency repairs are enough to ensure it remains afloat then this should be done, otherwise abandoning the vessel must be considered
- stay with the vessel – it is easier to locate a vessel than it is individuals in the water. All crew must stay with the vessel providing it is not in imminent danger of destruction or becoming an unacceptable risk to life. Where possible, all crew members should attempt to keep out of the water even if this means climbing onto an upturned hull
- If the vessel is badly damaged or disabled, a distress alert must be actioned. This might be in the form of VHF/ MF or DSC alert. Even if the vessel is not badly damaged, if you have suffered a knock down or capsize it is important to inform the Coastguard as required as soon as possible. During a capsize, aerials are particularly prone to damage, but all SAR units are equipped with emergency aerials. These need to be connected before any radio transmission can be sent.
- check engine(s) – all RNLI engines have been prepared for capsize; ALB engines go to neutral when inverted and ILB outboards stop as a safety precaution. Once the SAR unit has successfully re-righted, restarting or re-engaging the engine is a priority to ensure the continued safety of the crew and SAR unit. Before engaging the engine ensure all ropes and debris are clear of the propellers.
- deploy a sea anchor (ILB only) – post capsize, it may be useful or safer to deploy a sea anchor.

Sea anchor

A sea anchor is a parachute device for the sea, streamed from the bow of the boat. It stabilises the boat by keeping the bow head to sea and slowing drift when it is too deep to use a normal anchor.

A sea anchor can be used at any time but is particularly useful if you require time to:

- recover from a capsize or knockdown
- re-establish a loss of propulsion caused by engine failure, swamping or propeller damage
- maintain directional stability, head to sea during static helicopter transfers, while minimising drift caused by wind.

Abandonment

Quite often the best liferaft will be your own vessel. Abandoning a vessel is the last resort and should only be considered when:

- a vessel is about to sink
- where there is an uncontrollable fire
- when staying represents an unacceptable risk to life.

CAUTION

Remember, stay with your vessel as long as it is safe to do so and only abandon your vessel as a last resort.

Decision to abandon the vessel

The decision to abandon should only be made by the competent person in command. Abandonment could be made:

- to a helicopter
- to another vessel
- to a liferaft
- into the sea.

Before abandoning there are a number of tasks that need to be carried out:

- A plan for abandoning a vessel should be made – the plan will involve everyone onboard being told by the person in command exactly what is required of them.
- A position established and a mayday sent to ensure search and rescue are initiated.
- Move to an upwind area if abandoning due to fire.
- Aim to stay dry if at all possible.

Abandoning to a helicopter or another vessel may be regarded as a rescue. The commanders of the rescuing craft must then be regarded as the competent persons in command by those who have been rescued.

Abandoning to a liferaft or into the sea will require a survival plan to be implemented.

Survival procedures

The survival techniques required depend greatly on the type of abandonment.

Abandoning into a liferaft

Photo: RNLI/Nathan Williams

Immediate actions are:

- cut the painter
- stream the drogue
- close the entrance
- maintain the raft.

Other actions that will help your survival enormously are:

- aim to stay dry
- take your grab bag and record your current position (latitude and longitude)
- stabilise the raft by correctly distributing the crew within the liferaft
- take sea sickness tablets
- keep warm, awake, maintain morale
- deploy lookouts and if you have launched more than one liferaft, tie them together to make them more visible
- watch out for hazards and potential for rescue – when you think you may be detected, consider the use of pyrotechnics, electronic detection devices and anything else that may attract attention.

Abandoning into the sea

WARNING

Entering the water is only to be done as a last resort.

If you have to enter the water, by following a few basic rules your chances of survival will be greatly increased:

- Do up all wrist and ankle cuffs, zips, collar and hood, wear helmet with visor down if possible.
- Inflate your lifejacket fully and deploy the spray hood.
- Enter the water slowly to minimise the effects of cold-water shock – try not to swim until your breathing has stabilised.
- If alone, adopt the HELP (Heat Escape Lessening Position).

Photo: RNLI/Training

- If there is more than one of you, stay together and form a tight ring to conserve heat, maintain morale and look after any injured casualties – this also aids location as you are a bigger target.
- Only use pyrotechnics if you think you are close enough to land or shipping for them to be seen. Fire them in pairs in close succession.

Man overboard (MOB)

If an MOB is noticed the following actions should be taken:

- raise the alarm by shouting 'man overboard' and activate the MOB alarm
- deploy a lifering and light if available
- activate the MOB function on the electronic navigation equipment
- appoint a crew member to point at the MOB, ensure they never take their eyes off the MOB
- Communicate with the helm until the MOB is alongside

Further actions to be taken if the MOB is not in sight:

- send a mayday
- post lookouts with all available search equipment such as binoculars, searchlights, pyrotechnics and night-vision equipment
- reverse course and search back along your previous track, consider formulating a search pattern
- request other assets
- rig recovery equipment.

Photo: RNLI/Nigel Millard

Personal locator beacons (PLBs)

PLBs are issued as part of each RNLI lifejacket and will be pre-registered by RNLI HQ before issue. Each station is responsible for keeping their registration details up to date (through HQ Operations) and testing each PLB monthly.

NOTE

Registration helps to resolve false alerts and speeds up rescue in an emergency.

PLBs should be activated:

- When you are in a situation of grave and/or imminent danger
- When all means of self-rescue have been exhausted
- In the event of personal injury or loss of life.

Details on the controls, how to test PLBs, fitting PLBs to lifejackets, activating PLBs, using PLBs, turning PLBs off, preventing false alerts and general maintenance, service and repair can be found in the user guide for the devices on station.

CAUTION

Do not cover the GPS receiver with your hand and make sure you have a clear view to the sky to ensure GPS is downloaded.

Make sure the antenna is pointing towards the sky, out of the water. PLBs are not intended to operate in water.

SAR unit firefighting

A fire represents the largest threat to any vessel afloat. The decisions and actions taken by those in command can be the difference between saving or losing the vessel. This section highlights the types of fire fighting equipment/ systems fitted to SAR units as well as the considerations that will inform critical decisions should a fire occur aboard the SAR unit.

In the event of a fire there are many decisions that need to be taken in the first few minutes, these include if engines should be shut down, if normally enclosed spaces should be entered and if the fire should be tackled with fixed or portable extinguishers, or at all. To tackle fires successfully the actions and decisions must come naturally to the crew and person in command, therefore, while fire is rare, these actions should be practised regularly and thoroughly de-briefed afterwards. If these actions are etched in the memories of you and your crew, then even with the added pressure of the real situation, the actions will be carried out correctly with minimal direction form those in command.

Initial actions

The initial alarm may be raised by a crew member or automatically by fixed alarms linked to flame detectors; either way the first actions should be to:

- Decide if it is safe to shut down the engines.
- Decide if it is safe to and how to tackle the fire.

Slowing down rapidly takes control of the situation and means that you and your crew can concentrate on the immediate issue. Careful consideration must be given before deciding to open/enter any confined space to investigate the cause of the alarm. This includes entering the engine room as well as the removal of hatches or engine hoods. Initially, the use of the viewing windows fitted to watertight doors and the back of a hand to establish the warmth of hatches and hoods is the best way to investigate the fire. Only if these reveal nothing should the space be opened as this may cause an increase in the oxygen supply to the fire causing it to rapidly expand.

If it is confirmed that there is a fire then you must inform the Coastguard immediately. This protects the crew in case the situation escalates out of control.

The decision as to whether to shut down the engine(s) rests with the person in command of the SAR unit, in consultation with the mechanic (on an ALB). The person in command must consider the implications of being not under command (NUC). The SAR unit's proximity to shallow water, lee shores, the ability to anchor and location of other vessels are all important. In fair weather, being in shallow water on a sandy bottom may allow the person in command to safely beach the SAR unit, however in rough weather or close to rocks this may not be an option. Additional complications are caused if the SAR unit is transferring casualties, alongside other vessels, in large waves/surf or launching and recovering. This may necessitate the engines remaining available for a short period despite the fire. Regardless of the situation, the person in command needs to rapidly assess the severity and risk caused by the fire versus the likely outcome of having no power, again the dynamic risk assessment is vital.

Tackling the fire

All SAR units are fitted with a range of fire fighting appliances dependant upon there size and original design. These include portable fire extinguishers on inshore lifeboats and both portable and fixed fire systems on all weather lifeboats

Inshore lifeboats

In the event of a fire aboard an ILB the capacity to fight it is limited by the size of the extinguishers aboard. However, the limited size of the ILB should allow early identification of a fire and therefore hopefully it can be successfully dealt with. In the event of an engine fire the engine should be left running with the fuel line connected, this allows the extinguishing medium (CO_2) to be drawn in to the engine, stopping it, and prevents fuel from escaping out of the fuel connector on to the engine. The extinguisher should be discharged into the air intake on the back of the engine hood.

If a fire is suspected within the console or pod then the extinguisher should be discharged through one of the access panels and the panel should be replaced afterwards, if possible the power should be isolated.

All weather lifeboats

All decisions and actions relating to firefighting on an ALB must be authorised by the coxswain. If the fire is relatively small, it may be possible to tackle it with a portable appliance. In the case of an engine room fire this should allow at least one engine to be left running, keeping all systems available. The coxswain must ensure that the correct extinguisher is selected for the fire type and that the operator understands the dangers of asphyxiation, inhalation, frost burn and the limited capabilities associated with certain portable extinguishers. An escape route must be maintained at all times.

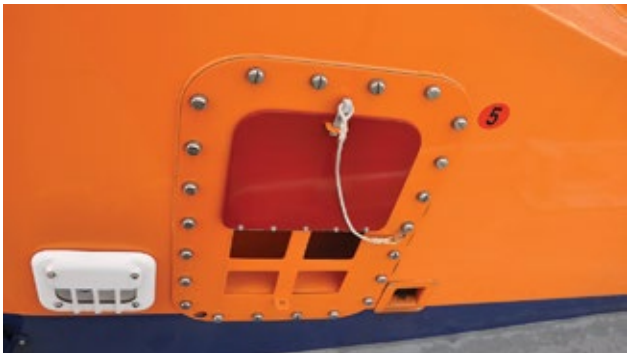
Areas of the SAR unit at risk of large fires are protected by fixed systems however, due to the ventilation and fuels contained in certain spaces there are a number of actions that must be completed prior to activating any fixed fire suppressing system. The exact method of achieving each of these actions will vary for each SAR unit, however the actions below must all be completed.

Shut down engines

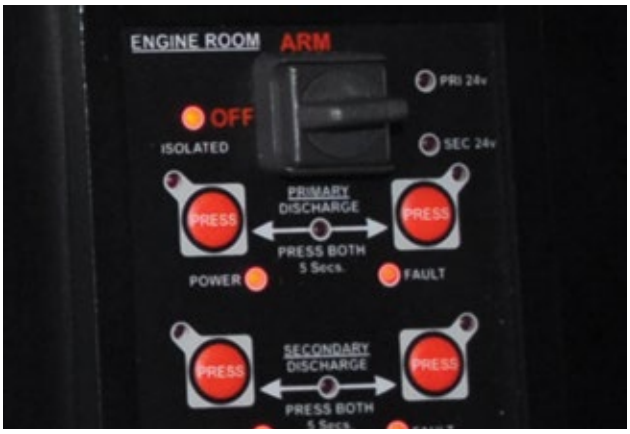
Shut down engine room fans

Isolate the fuel

Close fire flaps



Discharge primary fixed system



- check that the fire is extinguished – if not re-check all actions before discharging the secondary fixed system.

WARNING

Do not enter the compartment as an increase in oxygen in the compartment caused by opening a door may cause reignition.

As it cannot be assumed that the fixed firefighting systems will necessarily deal with the situation there are a number of actions that should be started by the crew in preparation for the situation worsening:

- Account for all crew.
- Inform the coastguard.
- Make ready a bucket/salvage pump for cooling the decks.
- Prepare a grab bag including flares and hand held VHF.
- If close in shore or on a lee shore prepare the anchor for deployment.

Hopefully none of this will be needed, however it is far better to have everything ready for use and have sent people below to release the anchor warp before the situation gets out of control. In the event that all the crew cannot be accounted for it is important that they are searched for (if safe to do so) and that their last known location is reported to the coastguard.

Should the fire continue, it may be necessary to cool parts of the SAR unit; this will ensure that SAR unit communications can be used and you do not have to abandon until absolutely necessary. The use of boundary cooling will both cool the decks and bulkheads as well as providing important information on hot spots within the SAR unit. However those in command need to consider carefully the potential effect upon the SAR unit's stability of large volumes of water entering the wheelhouse and hull, the free surface effect of even small amounts of water can be catastrophic when the vessel rolls and the water collects in one area.

RNLI policy on firefighting

The section has so far only looked at dealing with a fire onboard your own SAR unit. Those in command must understand the RNLI's policy regarding the fighting of fires and the carriage of firefighters and their equipment.

THE RNLI'S POLICY STATES

'It is the policy of the RNLI that the equipment carried aboard the various classes of lifeboat and in our other operational units is used solely for fighting fires aboard that vessel and RNLI property or equipment.

RNLI lifeboat crews and lifeguards are not trained or equipped to fight fires aboard other vessels, vehicles or facilities and since this is a highly specialised field, it MUST be left to those with relevant expertise in the Fire Service.'

For further information including guidance on the carriage of firefighting equipment and personnel on SAR units, please refer to the relevant Policy and Guidance documentation on Horizon.

Photo: RNLI/Stephen Duncombe

Launch and Recovery

Activity 3

Manage Launch and Recovery - Sea Going Functions

Ensuring the SAR unit is successfully launched to a casualty is a critical function of the person in command, where appointed, and crew members of the SAR unit. Equally important is the safe recovery to the boathouse.

Authority to launch

The authority to launch the SAR unit remains, under all circumstances, the prerogative of the RNLI and the responsibility for assembling the crew is normally vested in the launching authority. However, arrangements approved jointly by the respective operational managers of SAR units and coastguards mean that some coastguard stations are authorised to make radio-paging signals to assemble a SAR unit crew. The assembly signal is not in itself authority to launch.

The following personnel have the authority to initiate the launch of the SAR unit:

- Lifeboat Operations Manager (LOM)
- Deputy Launching Authority (DLA)
- ALB coxswain/ILB helm/IRH commander
  (If the LOM or DLA is not contactable and a delay in launching could result in the loss of life; also, if a pre-agreed method has been trained)

A launch may be authorised for any of the following reasons:

- Service or call out
- Training exercise
- Machinery trials after repair or replacement of equipment
- Passage
- Public Relations launch.

NOTE

Requests for the launching of SAR units for publicity purposes including filming, photography and any commercial purpose, must be channelled through the HQ media team for permission.

Self-launching

On occasion, you may receive information directly from the public that a life is in grave and imminent danger, for which an immediate response is required. To avoid delay, you may self-launch the SAR unit but the Coastguard and duty launching authority should be informed as soon as possible by any means available. Before a decision to self-launch is made, consideration must be given to weather conditions at both the launch site and the casualty position. A self-launch may also be a result of being afloat on exercise through the Coastguard.

Photo: RNLI/Nigel Millard

NOTE

For night-time ILB operations, the launch authority must attend the launch and recover site.

Crewing levels

All SAR units, by their design, have an optimum crewing number, plus a minimum and maximum. The person in command of the SAR unit, in consultation with the launch authority, has the final say to how many persons are aboard when launching.

When additional crew are onboard it must be in good weather conditions and required for the task to be carried out. Overcrewing has been shown to be a contributory factor in recent accidents, as individuals have not had access to secure seating. In poor weather conditions, numbers should be limited to those that can be seated and secured.

SAR unit type	Normal crewing	Min	Max	Extras on exercise
Severn	6	5	7	2
Tamar	6	5	7	2
Trent	6	5	7	2
Tyne	6	5	7	2
Carriage Mersey	6	6	7	2
Mersey	6	5	7	2
Shannon	6	5	7	2
B class 85	3	3	4	N/A*
B class 75	3	3	3	N/A*
D class	3	2	4	N/A*
E class	3	3	4	N/A*
Hovercraft	3	3	4	N/A*

NOTE

Additional crewing on ILBs is not normally permitted for exercise, but operational and training staff are exempt from this, provided that they properly risk assess the exercise in advance.

Launch and recovery sites

At times it either may not be possible to launch at the primary launch site, or it may be more suitable to launch from an alternative site. Stations should have identified these sites, obtained the necessary permissions and made a LOP and risk assessment prior to using them. The decision to launch from an alternative site should be made between yourself and launch authority. Where possible, the launch authority should attend the alternate launch site prior to the lifeboat launching, if the environmental conditions differ from primary site.

Normal launch and recovery site or alternative?

Lifeboat stations are strategically placed around the coast to afford the best coverage of our waters. Stations that have alternative launch sites may use them because of weather constraints, tidal conditions, reaction speed, works being carried out, equipment failure, public events etc. You and your launch authority should always discuss the use of an alternative launch site if the primary site is unsuitable and identify if one of the alternative sites is suitable under the prevailing conditions.

After deciding on the appropriate launch site and method, the SAR unit will proceed to sea (or not, if it has been deemed unsafe/inappropriate). Once returning for recovery you should brief the crew and head launcher on the recovery. In most cases this will be recovering at the primary launch and recovery site; however, due to conditions deteriorating, for example, this may not be possible. If in any doubt you should request information about the recovery site from the head launcher if the head launcher has not already been in contact, RNLI private channel VHF 31, to establish whether it is suitable prior to committing to an approach. If the standard recovery is not possible the SAR unit may have to stand off while an alternative method is prepared or they may decide to move to an alternative recovery site or wait until conditions improve to allow recovery.

Roles and responsibilities during launch and recovery

How and where to launch a SAR unit for service or exercise should ultimately be a joint decision between the:

- plant operator/launch vehicle driver
- ALB coxswain/ILB helm/IRH commander
- head launcher (if present).

Based on the SOP and LOP for the location, planning launch and recovery will be conducted during the initial briefing (SMEAC) stage of any operations. During the procedure, the responsibilities of each role are:

Plant operator

- Responsible for operating the plant.
- Responsible for the safety of passengers including those on any carriages and SAR units.
- Overall responsibility for safe transit to and from a launch site.

Head launcher

- Responsible for coordination of the shore crew.
- Responsible for preparing of launch and recovery equipment.
- Responsible for ensuring the area is clear and safe to operate.

Where no Head Launcher is present, the above is the responsibility of the Plant Operator.

ALB coxswain/ILB helm/IRH commander

- Responsible for ensuring the SAR unit is ready for launch and recovery.
- Responsible for commanding the procedure for launch and recovery including timing and crew tasks at the launch and recovery sites.

Managing launch and recovery

Having received a tasking, you should be satisfied that you have received all appropriate information available to you and that the right asset is being used.

All ILBs have an operational limit and certain conditions may preclude the safe launch of an ALB. If in any doubt whether a launch can be executed safely then a discussion with the launch authority should be held. Conditions to be considered include:

- Weather.
- Tidal conditions.
- Sea state.
- Day/Night.
- Casualty type and numbers.
  - When considering launch and recovery, having first considered the suitability of the SAR unit to launch, you should also consider what assistance is to be given to the casualty. For example, would it be more beneficial to delay launching and await a doctor or when recovering is there a more suitable location to land a casualty or to tow a casualty vessel taking on water to or would a 200T disabled FV benefit from a bigger SAR unit being tasked instead or to assist? You may need to request other SAR units launch due to high numbers of casualties.
- Availability of competent crew.
  - SOPs will dictate the minimum ashore and afloat personnel required for a launch and recovery operation.
  - When selecting appropriate crew, consider experience, physical ability task-specific competence, sea worthiness etc. all related to the task at hand.

You should always be aware of personnel, whether crew or otherwise, embarking or disembarking from a vessel, particularly important where sudden movement between a vessel and an object is possible. Any such people should be wearing the appropriate PPE (not only for protection, but also visibility and identification during operations) and should have been given the appropriate level of briefing first and warned of any potential hazards and no-go areas. Hazards include:

- slips, trips and falls
- entanglement
- height
- secure footing
- secure ladder at all times
- probationers/trainees depending on the task/situation.

Please refer to class specific SOP for embarkation and disembarkation points.

There will be a SOP relevant not only to your class of vessel, but also to the specific launch and recovery method at your location; in some places this may also include a LOP relevant to one location. Where relevant LOPs should have been created locally and approved in line with guidance on Horizon. LOPs should also be updated as required and reviewed at suitable intervals.

It is the responsibility of both the person in command and the head launcher to ensure the sea going and shore functions of launch and recovery procedures are carried out in a safe manner respectively.

NOTE

Safe navigation policy (found on Horizon) should be adhered to at all times and you should satisfy yourself that the SAR unit can be safely navigated from the chosen launch site to the casualty and return in the prevailing conditions.

The launch and recovery process is conducted in one of the most controlled environments we operate in, however it is also one of the most potentially dangerous parts of any exercise/service.

When recovering, particularly after a long service when people are tired and just want to get home, it is worth considering to pause before recovering and give an additional briefing however mundane the recovery may seem.

Some locations may be influenced to operational limitations such as tide, when launching this may require you to request an alternate launch and recovery site or require a delayed recovery. You must maintain situational awareness throughout; for more on situational awareness, read appropriate section. Also be aware of obligation or benefits of contacting VTS, Harbour Masters or local coastguard teams.

Many SAR units are launched from public areas, whether slipways, beaches, pontoons or otherwise. There may be a need to manage and control public access.

Other conditions to be mindful of include:

- weather
- tidal conditions
- sea state
- beach conditions.

Emergency procedures

Emergencies can occur before the SAR unit is launched and also during recovery. You and your crew must be prepared to deal with these from the moment crew are embarked until the SAR unit has been shut down and all crew disembarked.

Actions to be taken in an emergency

If any accident happens during launch and recovery, you will make the decision on what to do with appropriate liaison with the head launcher. This will most likely involve halting the launch and recovery if safe to do so and dealing with the accident before making the decision on whether to continue.

The coastguard should be made aware that you have halted the launch and for how long, but may also be the best way to request assistance if needed.

Your priority is always your safety and the safety of the crew; should an emergency occur involving fire the crew will take the appropriate action under your instruction. This will be almost identical to the reaction when the SAR unit is at sea; however you should consider, for example, that if the SAR unit is not yet in the water, you may not be able to use the GSPs or salvage pump to tackle any fire. Again, the coastguard should be informed so that they may offer assistance.

In the event of machinery failure or bog down you should discuss the appropriate course of action both short and long term with the head launcher and launch authority. The crew should not be asked to do anything that will put them at unacceptable risk and the coastguard should be informed so that they can assist and also if necessary task another asset if you were responding to an incident.

Any incidents should be reported using the appropriate means at the earliest viable opportunity.

NOTE

Only use recognised and authorised RNLI launch and recovery plant and equipment, to launch or recover the SAR unit.

Post recovery

Post recovery, the SAR unit and launch and recovery vehicles/equipment need to be made ready for service as they may be required again at a moment's notice. All equipment should be returned to its state of immediate readiness. This includes washing down the SAR unit, correctly re-stowing any used equipment, refuelling and reporting any defective equipment.

Refer to Planned Maintenance documentation for a full post recovery check list for each SAR unit and launch and recovery equipment. Ideally this should be completed by a Planned Maintenance competent person but with the assistance of any available crew. You should oversee the post recovery actions and satisfy yourself that all have been carried with due care.

This is a vital task in order to identify defects, maintain equipment and ensure preparedness for future services.

Personnel should report any hazards, near misses or incidents post recovery. for more information, refer to the operational debrief (SPEP) in Activity 2.

Photo: RNLI/Mark Gray

SAR unit Handling and Seamanship

Activity

4

Watchkeeping

Those in command of any vessel are required to have a thorough understanding of the International Regulations for the Prevention of Collisions at Sea (IRPCS or Coll Regs). Those in command of other vessels in your vicinity will be formulating their actions based on some pre-determined expectations about the actions of your vessel. It is therefore essential that, when applicable, these actions are taken correctly.

Photo: RNLI/Nathan Williams

The IRPCS form the basis for all decisions that those in command will make regarding their presence and conduct near to other vessels. It is a requirement that all taking command have a thorough understanding of the rules. Because the rules are complex it is only their regular use within the training environment that can help them become second nature with a routine understanding. This section provides an overview of the IRPCS but to aid understanding it is advised that those taking command should be familiar with the rules in their entirety.

Many of us will have an understanding of the basics from our time as crew members, however it is certain aspects of the rules contained within Part A that set the overall parameters for their application.

CAUTION

RNLI SAR units are NOT exempt from the following rules, they must adhere to them the same as every other seagoing vessel.

Rule 1 – Application

(a) **These rules shall apply to all vessels upon the high seas and in all waters connected there with navigable by seagoing vessels.**

This statement clearly defines that the rules apply to all vessels, section one is further expanded to highlight the authority of harbour authorities and states to implement special rules applicable to their area. It is the responsibility of those in command to ensure they are aware of local bylaws and rules especially when on passage in unfamiliar waters, this information is contained in the Admiralty Sailing Directions and in nautical almanacs.

Rule 2 – Responsibility

(a) **Nothing in these rules shall exonerate any vessel, or the owner, master or crew thereof, from the consequences of any neglect to comply with these rules or of the neglect of any precaution which may be required by the ordinary practice of good seamen, or by the special circumstances of the case.**

(b) **In construing and complying with these rules due regard shall be had to all dangers of navigation and collision and to any special circumstances, including the limitations of the vessels involved, which may make a departure from these rules necessary to avoid immediate danger.**

Examples of the ordinary practice of seamen would be that a vessel under way would be expected to keep clear of a vessel at anchor and a vessel anchoring should do so without endangering other vessels. A vessel under way but stopped should not rely on other vessels keeping out of her way. This rule also provides commanders with the ability to depart from the rules if sticking to them would result in a collision or grounding, for example, approaching a vessel head on with shallow water close to starboard or while being overtaken on the starboard side. A departure from the rules may not only be justified but expected in situations when avoiding immediate danger.

Rule 5 – Look out

Every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision.

All available means includes eyes, ears, binoculars, radar, radio and echo sounders. Posting a dedicated lookout forward on the upper deck may be the best way of achieving this especially in fog in addition to radar. Radar is not just for use in poor visibility though. The person in command should also pay attention to what is happening on his own vessel for instance monitoring steering to ensure the vessel is on course.

Rule 6 – Safe speed

Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions.

In determining a safe speed the following factors shall be among those taken into account:

(a) By all vessels:

i) the state of visibility
ii) the traffic density including concentrations of fishing vessels or any other vessels
iii) the manoeuvrability of the vessel with special reference to stopping distance and turning ability in the prevailing conditions
iv) at night the presence of background light such as from shore lights or from back scatter of her own lights
v) the state of wind, sea and current, and the proximity of navigational hazards
vi) the draught in relation to the available depth of water.

(b) Additionally, by vessels with operational radar:

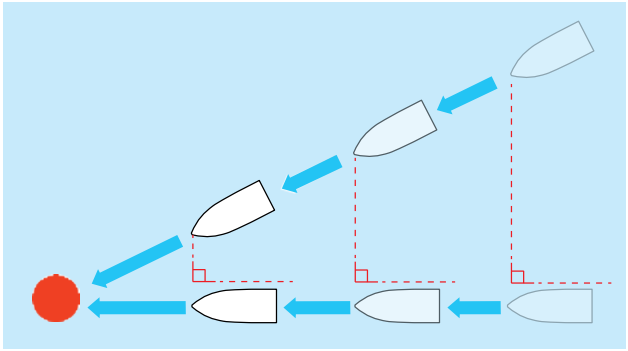
i) the characteristics, efficiency and limitations of the radar equipment
ii) any constraints imposed by the radar range scale in use
iii) the effect on radar detection of the sea state, weather and other sources of interference
iv) the possibility that small vessels, ice and other floating objects may not be detected by radar at an adequate range
v) the number, location and movement of vessels detected by radar
vi) the more exact assessment of the visibility that may be possible when radar is used to determine the range of vessels or other objects in the vicinity.

The rules provide a list of common sense factors which should be taken into account when determining a safe speed with additional ones for those vessels using radar. This does not mean that fast speeds are never appropriate but does require commanders to consider their surroundings when choosing what speed to proceed at and be ready to adapt quickly if conditions change. The most important aspect of this rule is to proceed at a speed that allows enough time to either stop or take action to avoid a collision – this is especially important in restricted visibility but this aspect is covered in more depth in rule 19 later.

Rule 7 – Risk of collision

Rule 7a states:

Every vessel shall use all available means appropriate to prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt such risk shall be deemed to exist.



If the relative compass bearing stays the same (or nearly the same) and the range is decreasing there is a risk of collision

Rule 7b states:

Proper use shall be made of radar equipment if fitted and operational including long- range scanning to obtain early warning of risk of collision.

Rule 7c states:

Assumption shall not be made on the basis of scant information especially scant radar information.

Rule 7d states:

In determining if a risk of collision exists the following considerations shall be among those taken into account:

i) such risk shall be deemed to exist if the compass bearing of an approaching vessel does not appreciably change
ii) such risk may sometimes exist even when an appreciably bearing change is evident, particularly when approaching a very large vessel or a tow or approaching a vessel at very close range.

The 'all available means' in this rule combines those used to keep a proper look out in rule 5 with taking true bearings and using systematic plotting on a radar to make an assessment of whether there is a risk of collision. To avoid making a decision based on scanty information regular monitoring of the situation should be undertaken by a competent person.

Rule 8 – Actions to avoid collision

(a) Any action taken to avoid collision shall be taken in accordance with the rules of this Part and, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship.

(b) Any alteration of course and/or speed to avoid collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing visually or by radar; a succession of small alterations of course and/or speed should be avoided.

(c) If there is sufficient sea room, alteration of course alone may be the most effective action to avoid a close-quarters situation provided that it is made in good time, is substantial and does not result in another close-quarters situation.

(d) Action taken to avoid collision with another vessel shall be such as to result in passing at a safe distance. The effectiveness of the action shall be carefully checked until the other vessel is finally past and clear.

(e) If necessary to avoid collision or allow more time to assess the situation, a vessel shall slacken her speed or take all way off by stopping or reversing her means of propulsion.

(f) (i) A vessel which, by any of these rules, is required not to impede the passage or safe passage of another vessel shall, when required by the circumstances of the case, take early action to allow sufficient sea room for the safe passage of the other vessel.

(ii) A vessel required not to impede the passage or safe passage of another vessel is not relieved of this obligation if approaching another vessel so as to involve a risk of collision and shall, when taking action, have full regard to the action which may be required by the rules of this Part.

(iii)A vessel the passage of which is not to be impeded remains fully obliged to comply with the rules of this Part when the two vessels are approaching one another so as to involve risk of collision.

At first glance this rule appears to be long and repetitive but can be broken down into a few key principles which apply to any vessel who is taking action to avoid collision.

The first principle is that action taken to avoid collision is taken in plenty of time so that commanders are not rushed into making a poor decision with limited information.

This rule gives permission to take action by change of course and/or speed or to even just slow down to allow a better look at the situation. The action taken should be large enough to be seen by another vessel (generally course alteration of greater than 10º) which means the stand-on vessel is left in no doubt that they have been noticed and should then maintain their own course and speed.

It stands to reason that any action taken should result in passing at a safe distance not just the bare minimum so as not to worry the stand-on vessel. The action should also not create a dangerous situation with a third vessel. Part f refers to situations that can develop between vessels in Narrow Channels, Traffic Separation Schemes and by the responsibilities outlined in rule 18 and addresses the difference between not impeding a vessel's passage and being the give way vessel. If you impede a vessel you would force it to take action.

Rule 9 – Narrow channels (where applicable)

(a) A vessel proceeding along the course of a narrow channel or fairway shall keep as near to the outer limit of the channel or fairway which lies on her starboard side as is safe and practicable.

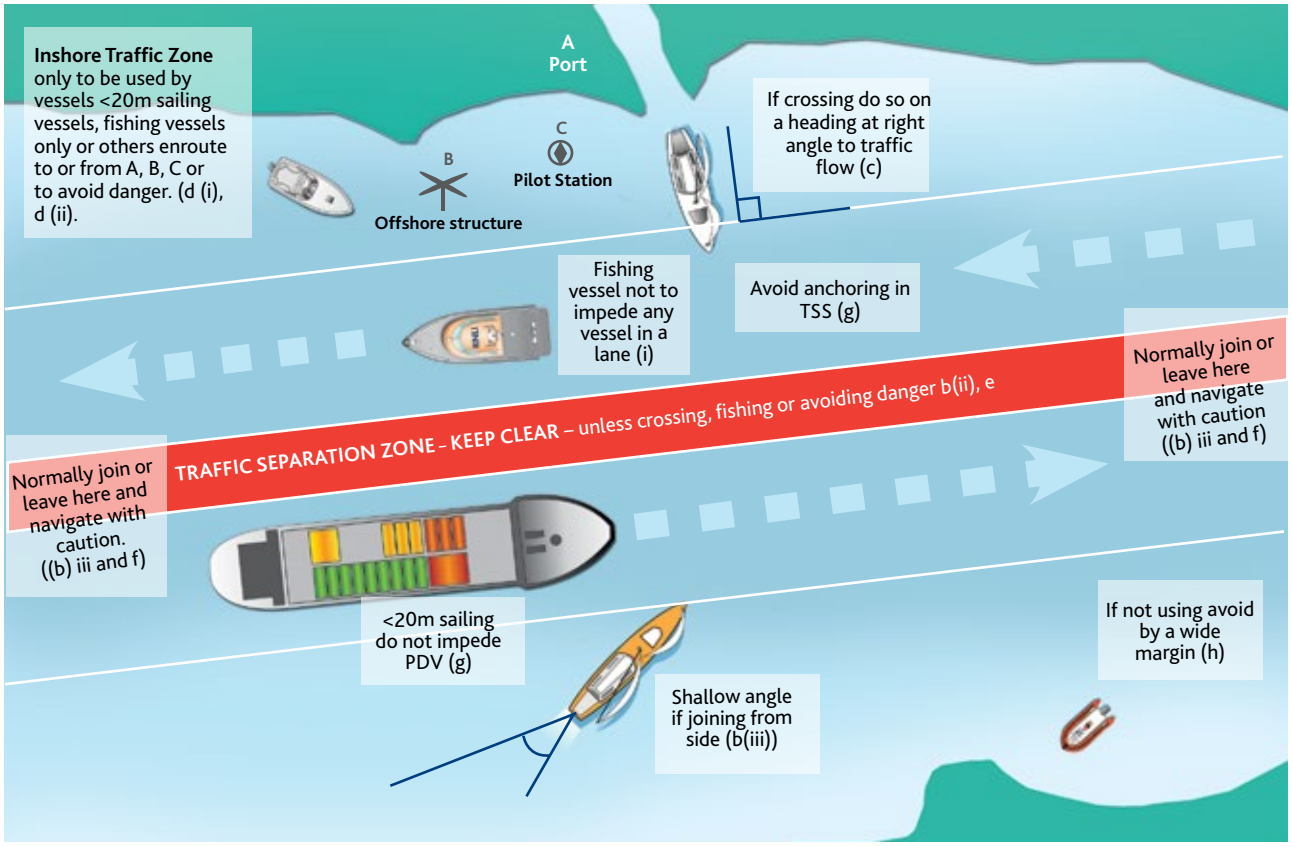
(b) A vessel of less than 20metres in length or a sailing vessel shall not impede the passage of a vessel which can safely navigate only within a narrow channel or fairway.

(c) A vessel engaged in fishing shall not impede the passage of any other vessel navigating within a narrow channel or fairway.

(d) A vessel shall not cross a narrow channel or fairway if such a crossing impedes the passage of a vessel which can safely navigate only within such a channel or fairway. The latter vessel may use the sound signal prescribed in rule 34(d) (Five or more short blasts) if in doubt as to the intention of the crossing vessel.

(e) (i) In a narrow channel or fairway when overtaking can take place only if the vessel to be overtaken has to take action to permit safe passing, the vessel intending to overtake shall indicate her intention by sounding the appropriate signal prescribed in rule 34. (See table for sound signals used in this exchange).

(ii) This rule does not relieve the overtaking vessel of her obligation under rule 13.



(f) A vessel nearing a bend or an area of a narrow channel or fairway where other vessels may be obscured shall navigate with particular alertness and caution and shall sound the appropriate signal prescribed in rule 34(e) (One prolonged blast)

(g) Any vessel, if the circumstances of the case admit, avoid anchoring in a narrow channel.

This rule applies to a stretch of water which is locally treated as a narrow channel e.g. between two piers, a dredged channel between buoys or a river connected to the sea. In general the following hierarchy of who shouldn't impede who applies in these areas:

- Vessel which can only navigate within the channel
- Vessel <20m, sailing vessel and crossing vessel
- Fishing Vessel

All vessels should keep to the starboard side of the channel and no vessel should anchor in a narrow channel unless it is unavoidable.

Rule 10 – Traffic separation schemes

(a) This rule applies to traffic separation schemes adopted by the Organization and does not relieve any vessel of her obligation under any other rule.

(b) A vessel using a traffic separation scheme shall:

(i) proceed in the appropriate traffic lane in the general direction of traffic flow for that lane;

(ii) so far as practicable keep clear of a traffic separation line or separation line or separation zone;

(iii)normally join or leave a traffic lane at the termination of the lane, but when joining or leaving from either side do so at as small an angle to the general direction of traffic flow as practicable.

(c) A vessel shall so far as practicable avoid crossing traffic lanes, but if obliged to do so shall cross on a heading as nearly as practicable at right angles to the general direction of traffic flow.

NOTE

It is worth noting that 'heading' is different to 'course over ground (COG)'.

(d) (i) A vessel shall not use an inshore traffic zone when she can safely use the appropriate traffic lane within the adjacent traffic separation scheme. However, vessels of less than 20 metres in length, sailing vessels and vessels engaged in fishing may use the inshore traffic zone.

(ii) Notwithstanding subparagraph d(i), a vessel may use an inshore traffic zone when en route to or from a port, offshore installation or structure, pilot station or any other place situated within the inshore traffic zone or to avoid immediate danger.

(e) A vessel other than a crossing vessel or a vessel joining or leaving a lane shall not normally enter a separation zone or cross a separation line except:

(i) in cases of emergency to avoid immediate danger;

(ii) to engage in fishing within a separation zone.

(f) A vessel navigating in areas near the terminations of traffic separation schemes shall do so with particular caution.

(g) A vessel shall so far as practicable avoid anchoring in a traffic separation scheme or in areas near its terminations.

(h) A vessel not using a traffic separation scheme shall avoid it by as wide a margin as practicable.

(i) A vessel engaged in fishing shall not impede the passage of any vessel following a traffic lane.

(j) A vessel of less than 20 metres in length or a sailing vessel shall not impede the safe passage of a power driven vessel following a traffic lane.

(k) A vessel restricted in her ability to manoeuvre when engaged in an operation for the maintenance of safety of navigation in a traffic separation scheme is exempted from complying with this rule to the extent necessary to carry out the operation.

(l) A vessel restricted in her ability to manoeuvre when engaged in an operation for the laying, servicing or picking up of a submarine cable, within a traffic separation scheme, is exempted from complying with this rule to the extent necessary to carry out the operation.

All the rules above (1-10) apply to vessels in any condition of visibility. Rules 11-18 only apply to vessels in sight of one another.

Rule 13 – Overtaking

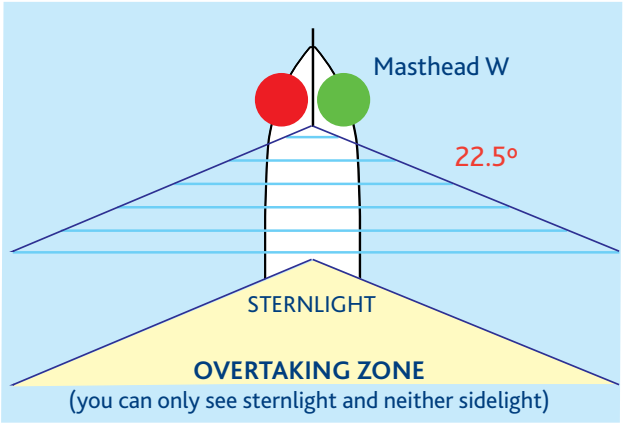
(a) Notwithstanding anything contained in the rules of Part B, Sections I and II (rules 4-18), any vessel overtaking any other shall keep out of the way of the vessel being overtaken.

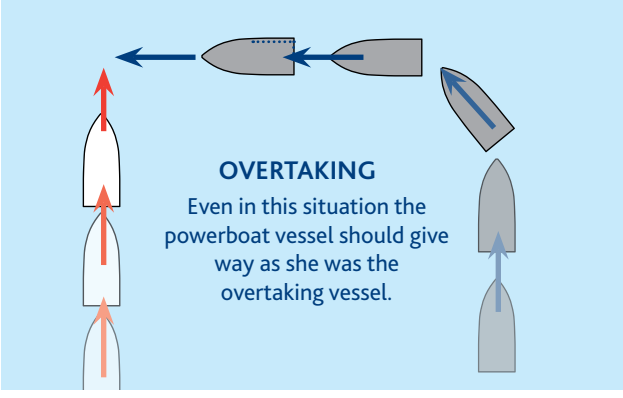
(b) A vessel shall be deemed to be overtaking when coming up with another vessel from a direction more than 22.5 degrees abaft her beam, that is, in such a position with reference to the vessel she is overtaking, that at night she would be able to see only the sternlight of that vessel but neither of her sidelights.

(c) When a vessel is in any doubt as to whether she is overtaking another, she shall assume that this is the case and act accordingly.

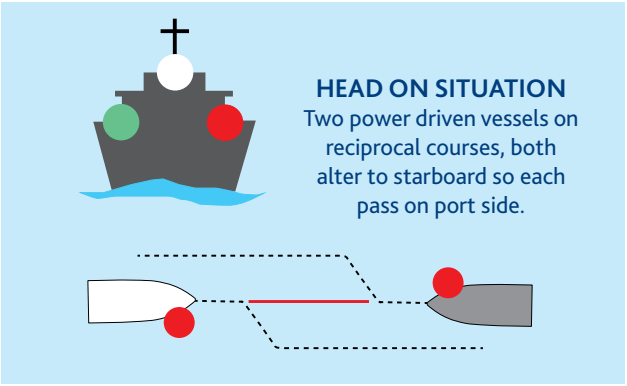
(d) Any subsequent alteration of the bearing between the two vessels shall not make the overtaking vessel a crossing vessel within the meaning of these rules or relieve her of the duty of keeping clear of the overtaken vessel until she is finally past and clear.

When a vessel is deemed to be overtaking. Please note that the vessel doing the overtaking can be any type e.g. sailing vessel, fishing vessel and due to the manoeuvre they have the obligation to keep clear whatever the type of vessel they are overtaking.





Rule 14 – Head On



(a) When two power driven vessels are meeting on reciprocal or nearly reciprocal courses so as to involve risk of collision each shall alter her course to starboard so that each shall pass on the port side of the other.

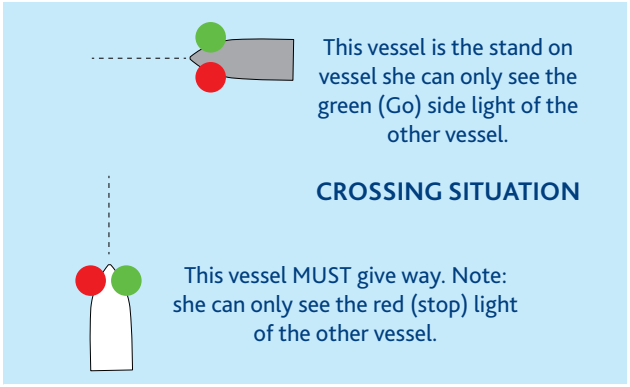
(b) Such a situation shall be deemed to exist when a vessel sees the other ahead or nearly ahead and by night she could see the masthead lights of the other in a line or nearly in a line and/ or both sidelights and by day she observes the corresponding aspect of the other vessel.

(c) When a vessel is in any doubt as to whether such a situation exists she shall assume that it does exist and act accordingly.

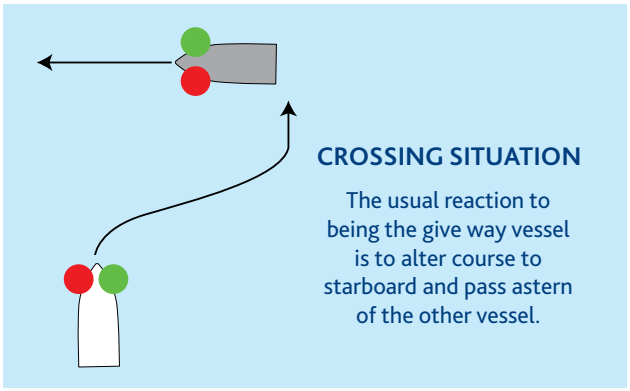
The salient points with this rule are that it must be two power driven vessels, you must be able to see each other and a risk of collision must exist. Both vessels then alter course to starboard. If in any doubt alter to starboard. This is what you should see looking forward from your own vessel.

Rule 15 – Crossing Situation

When two power driven vessels are crossing so as to involve risk of collision, the vessel which has the other on her own starboard side shall keep out of the way and shall, if the circumstances of the case admit, avoid crossing ahead of the other vessel.



Again this rule only applies to two power driven vessels which can see each other. This is one of the most commonly encountered shipping situations and your reactions should be instinctive.



Rule 16 – Action by Give-way Vessel

Every vessel which is directed to keep out of the way of another vessel shall, so far as possible, take early and substantial action to keep well clear.

Again in this rule we see that if you are deemed to be the give way vessel you should take action early with enough boldness that the other vessel is not worried and can see that you have taken action.

Rule 17 – Action by Stand-on vessel

(a) (i) Where one of two vessels is to keep out of the way the other shall keep her course and speed.

(ii) The latter vessel may however take action to avoid collision by her manoeuvre alone, as soon as it becomes apparent to her that the vessel required to keep out of the way is not taking appropriate action in compliance with these rules.

(b) When, from any cause, the vessel required to keep her course and speed finds herself so close that collision cannot be avoided by the action of the give-way vessel alone, she shall take such action as will best aid to avoid collision.

(c) A power-driven vessel which takes action in a crossing situation in accordance with sub-paragraph

(a) (ii) of this rule to avoid collision with another power-driven vessel shall, if the circumstances of the case admit, not alter course to port for a vessel on her own port side.

(d) This rule does not relieve the give-way vessel of her obligation to keep out of the way.

It is clear in this rule what the stand on vessel should do i.e. keep her course and speed which in turn enables the give-way vessel to make decisions about what to do based on a stable situation. Note that the stand on vessel does not have to maintain her course and speed if she cannot see the other vessel or if there is no risk of collision due to the distance between the vessels.

The important part of this rule is that it allows the stand-on vessel to change course if she thinks the give-way vessel is not doing what she should. The rule also tells the stand-on vessel that she has to take action when the risk of collision is such that even if the give-way vessel acted this would not be enough to prevent the collision. At this point it directs that a power driven vessel should not alter course to port for another power driven vessel on her port side.

Rule 18 – Responsibilities between vessels

Except where rules 9, 10 and 13 otherwise require:

(a) A power driven vessel underway shall keep out of the way of:

(i) a vessel not under command;

(ii) a vessel restricted in her ability to manoeuvre;

(iii) a vessel engaged in fishing;

(iv) a sailing vessel.

(b) A sailing vessel underway shall keep out of the way of:

(i) a vessel not under command;

(ii) a vessel restricted in her ability to manoeuvre;

(iii) a vessel engaged in fishing.

(c) A vessel engaged in fishing when underway shall, so far as possible, keep out of the way of:

(i) a vessel not under command;

(ii) a vessel restricted in her ability to manoeuvre.

(d) (i) Any vessel other than a vessel not under command or a vessel restricted in her ability to manoeuvre shall, if the circumstances of the case admit, avoid impeding the safe passage of a vessel constrained by her draught, exhibiting the signals in rule 28 (Three all round red lights or a cylinder).

(ii) A vessel constrained by her draught shall navigate with particular caution having full regard to her special condition.

(e) A seaplane on the water shall, in general, keep well clear of all vessels and avoid impeding their navigation. In circumstances, however, where risk of collision exists, she shall comply with the rules of this part.

(f) (i) A WIG (Wing In Ground) craft when taking-off, landing and in flight near the surface shall keep well clear of all other vessels and avoid impeding their navigation;

(ii) a WIG craft operating on the water surface shall comply with the rules of this part as a power-driven vessel.

Rule 18 can be summarised as a table of hierarchy, where the vessels at the top have higher precedent than those at the bottom.

Not Under Command
Restricted in Ability to Manoeuvre
Constrained by Draught
Vessel Engaged in Fishing
Sailing Vessel
Power Driven Vessel inc Hovercraft and WIG when operating on the surface
Seaplane
WIG taking off, landing and in flight

Rule 19 - Restricted Visibility

When operating in or near restricted visibility additional measures must be taken to ensure the safety of those operating on the water and rule 19 covers this situation. Importantly it refers it purely to vessels not in sight of one another. Note that you may be in good visibility but if you can't see the other vessel due to poor visibility then rule 19 applies. As soon as vessels are in sight of one another then rules 11 – 18 come into force e.g. overtaking, head-on and responsibilities between vessels.

(a) This rule applies to vessels not in sight of one another when navigating in or near an area of restricted visibility.

(b) Every vessel shall proceed at a safe speed adapted to the prevailing circumstances and conditions of restricted visibility. A power-driven vessel shall have her engines ready for immediate manoeuvre.

(c) Every vessel shall have due regard to the prevailing circumstances and conditions of restricted visibility when complying with the rules of Section I of this Part.

(d) A vessel which detects by radar alone the presence of another vessel shall determine if a close-quarters situation is developing and/or risk of collision exists. If so, she shall take avoiding action in ample time, provided that when such action consists of an alteration of course, so far as possible the following shall be avoided:

(i) an alteration of course to port for a vessel forward of the beam, other than for a vessel being overtaken;

(ii) an alteration of course towards a vessel abeam or abaft the beam.

(e) Except where it has been determined that a risk of collision does not exist, every vessel which hears apparently forward of her beam the fog signal of another vessel, or which cannot avoid a close quarters situation with another vessel forward of her beam, shall reduce her speed to the minimum at which she can be kept on her course. She shall if necessary take all her way off and in any event navigate with extreme caution until danger of collision is over.

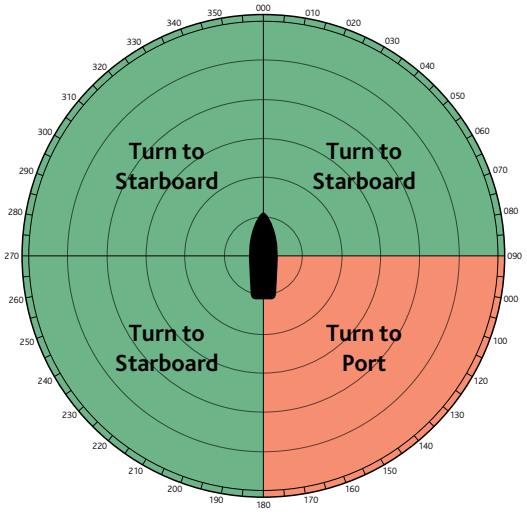
Although every vessel should already be going at a safe speed the conditions of reduced visibility may make it necessary to reduce this further so that those in command have the time and manoeuvrability to react when a situation develops. Note that for some larger vessels getting their engines ready for immediate manoeuvre can take a while to happen and may affect their fuel economy making them reluctant to do it.

This rule also brings home the importance of using lookouts on the upper deck and proper use of radar so that it can be determined if a sound signal is heard or a close quarters situation is developing. Again, those in command should be aiming to take action in ample time if they can and the rule specifies two courses of action which should be avoided:

1) Altering course to port for a vessel forward of the beam other than for a vessel being overtaken and

2) Altering course towards a vessel abeam or abaft the beam.

Remember that this rule applies when vessels cannot see each other and therefore can't determine whether this is a crossing or head-on situation.



Situational awareness

Please see Activity 2 for information on situational awareness .

Ropework

The effective control of ropes under load is an often overlooked skill that comes easily to those who have the knowledge but appears incredibly complex to an onlooker. Many frequently practiced and critical evolutions are only possible through the application of good rope skills. It should be remembered that any rope, line or wire under load has the potential to seriously injure or maim an individual if basic principles are not adhered to. This section covers these principles.

Cordage and usage

All ropes fall into two general categories: natural and man-made. While some older, more traditional vessels still use natural fibre cordage, most vessels now use man-made ropes because of their improved strength and durability.

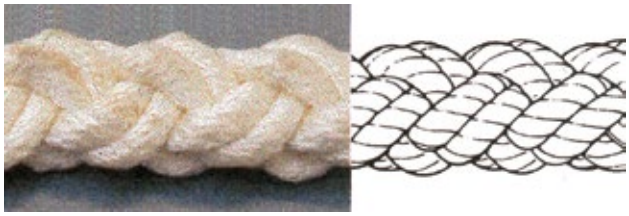
This section concentrates on the types and properties of man-made cordage that are typically found on SAR units.

Construction

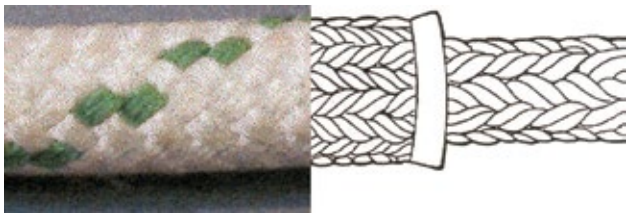
Man-made cordage is constructed in three different ways:

Hawser-laid: The rope is constructed in three strands laid-up generally with a right-handed twist.

Plaited: The rope is constructed of eight strands in four pairs; two pairs of right-hand lay and two left-handed.



Braided: Constructed by crossing and recrossing yarns or strands in 'maypole' fashion, such that each yarn or strand passes alternately under, then over one or more of the others to form a circular sheath, inside of which is an inner core. The rope is balanced so that the core and the sheath share the load equally. The advantages of this type of rope are its flexibility, ease of handling when wet or dry, it is non-rotating and will not kink.



While the main advantage of man-made rope over natural is that it is far stronger and more resistant to moisture, its main disadvantage is its relatively low melting point. Melting point temperatures can be easily reached due to friction, therefore great care should be taken to prevent chafing.

The size of a rope is determined by its diameter, measured in millimetres. A full coil of rope is 220m long. The rope may then be cut into certain lengths for specific purposes. These are then called lines or warps, for example, heaving line, anchor warp and mooring line.

Rope types and uses

Nylon (polyamide)

Properties of nylon rope

- nylon can be hawser-laid, plaited or braided
- nylon is white in colour with a smooth exterior
- nylon, used within its safe working load, can stretch to approximately 25% of its length and has excellent recovery
- nylon does not float
- nylon has excellent energy absorption properties that are retained to a great degree during repeated loading.

WARNING

Nylon will stretch almost half its length before parting but it gives little or no warning it is about to reach the limit of its stretch. When it parts it will recoil with great force with the potential risk of injury.

Applications of nylon rope

Mooring and berthing rope; anchor warp; tow rope; block and tackle purchase rope; casualty drogue tow rope; main boat's drogue; heaving lines; painter for small craft.

Main benefits of nylon rope

Stretch capabilities minimise snatching.

Polyester

Properties of polyester rope

- polyester can be hawser-laid, plaited or braided
- polyester is white, black or blue in colour with a smooth exterior
- polyester, used within its safe working load, can stretch approximately 14% of its length and has good recovery
- polyester will stretch approximately 36% before parting
- polyester does not float.

Applications of polyester rope

- A-frame topping lift; launch and recovery winch ropes; tail block rope for breeches buoy; safety ropes and guardrails.

Main benefits of polyester rope

- strength with minimum stretch, even when wet.

Polypropylene

Properties of polypropylene rope

- polypropylene can be hawser-laid or plaited
- polypropylene has a hairy exterior
- polypropylene, used within its safe working load, can stretch approximately 17% of its length
- polypropylene will stretch approximately 44% before parting
- polypropylene floats indefinitely in water.
- It retains its strength when wet and has low water absorption
- polypropylene ropes are not usually used as load-bearing ropes.

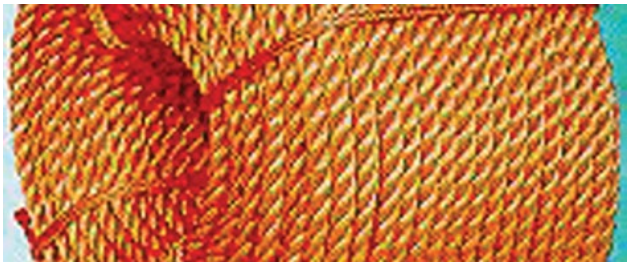
Applications of polypropylene rope

- rope stopper; messenger line; veering lines on breeches buoy; boat's drogue tow and tripping lines; fender lanyards; scrambling nets; quarter stoppers; grapnel line; breasting line; rescue strop.

Main benefits of polypropylene rope

- floating line, aids pick up and visibility
- cheap.

Polyethylene



Properties of polyethylene rope

- polyethylene is hawser-laid
- polyethylene is white or orange in colour with a smooth exterior
- polyethylene, used within its safe working load, can stretch approximately 14% of its length
- polyethylene will stretch approximately 33% before parting
- polyethylene floats indefinitely in water.

Applications of polyethylene rope

- quoit and line; lifering line.

Main benefits of polyethylene rope

- floating line, aids pick up and visibility.

Kevlar

Properties of Kevlar rope

- Kevlar core is yellow, cover can be any colour
- Kevlar is stronger than nylon of equivalent size
- Kevlar has poor ultra-violet and abrasion resistance
- the Kevlar core is sheathed for protection in braided polyester
- 95% of the rope's strength comes from its Kevlar core
- Kevlar ropes require no maintenance and are highly resistant to stretch.

Applications of Kevlar rope

- hauling strops; small craft tow rope.

Main benefit of Kevlar rope

- strength with minimal stretch.

HMPE (high-modulus polyethylene)

Properties of HMPE rope

- HMPE is made from high-modulus polyethylene
- HMPE is white in colour with smooth exterior, normally sheathed
- HMPE, size for size, is as strong as steel wire rope (SWR)
- HMPE is a very high strength, low stretch, fibre rope.

Applications of HMPE rope

- towing bridle; haul-up span; stoppers; winch ropes; quarter stoppers.

Main benefits of HMPE rope

- high strength; lightweight; no recoil.

NOTE

HMPE ropes are commonly referred to as Dynex or Dyneema ropes. Dynex® is the trade name of the manufacturer Dynex Dux. Dyneema® is the trade name of the manufacturer DSM Dyneema.

Knots

All crew members must become competent in their ability to tie and recognise knots. Although almost always referred to as knots, the correct seamanship terminology for knots is **bends** and **hitches**.

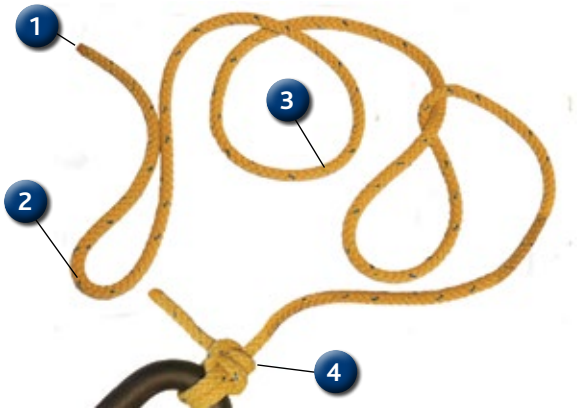
Bend

A method of temporarily joining two ropes.

Hitch

A method of temporarily joining a rope to a structure or ring.

Terms used when describing rope



1. running end/working end
2. bight
3. loop
4. standing part

Strength of knotted rope

All knots reduce the strength of a rope in the area where it is tied.

This reduction varies from **40%** to **60%** and this should be borne in mind when putting a load on a knotted rope.

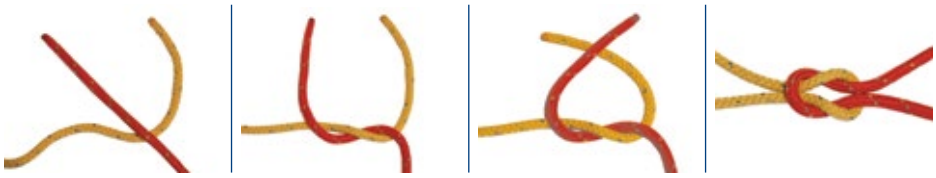
Types of knots and sequence of creating knots

Bowline

Appropriate uses for this knot:

- a temporary eye in rope of all sizes
- to use as a lifeline.

Reef knot



Appropriate uses for this knot:

- to join two ropes together of approximately equal thickness
- to tie the ends of a rope around an object, for example, sack, sail ties.

Figure of eight

Appropriate uses for this knot:

- to prevent a rope unreeving through a block (stopper knot)
- to mark the end of a rope.

Single sheet bend

Appropriate uses for this knot:

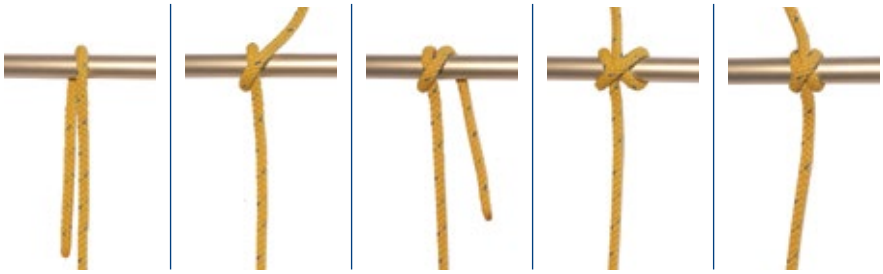
- to join two ropes together of unequal thickness
- to secure a rope's end to a small eye.

Double sheet bend

Appropriate uses for this knot:

- a more secure method of accomplishing the same purpose as a single sheet bend.

Clove hitch



Appropriate uses for this knot:

- to secure a rope to a spar, rail, ring, post or similar fitting.

Rolling hitch

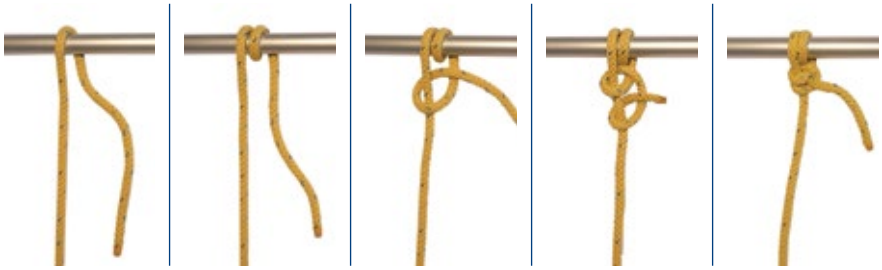
Pulled this way – the knot grips

Pulled this way – the knot slides

Appropriate uses for this knot:

- to secure a rope to a spar or rail when the pull is from one side or the other
- to attach a rope to another rope under load (attaching the rope stopper to the anchor warp onboard a vessel).

Round turn and two half hitches



Appropriate uses for this knot:

- to secure a rope under load to a spar, ring or shackle.

NOTE
This knot can be untied while under load.

Fisherman's bend

Appropriate uses for this knot:

- to tie a rope to the ring of an anchor.

NOTE
This knot will lock up under load.

Hazards of working with ropes

NEVER stand within a bight

NEVER in front of a leading block

NEVER stand within a coil stand

WARNING

If avoidable, NEVER stand below an object that is being hoisted or lowered.

- Working ropes contain a great deal of energy with the potential to part and recoil, giving serious risk of injury to unaware crew.
- **NEVER** stand on rope or in a bight or in the line of recoil.
- When slipping or undoing a rope under load, extreme caution must be taken to avoid the rope from running away out of control.
- When working with bitts, blocks, cleats, capstans or bollards, ensure constant vigilance is maintained in order to prevent hands from becoming trapped in the event of the rope slipping.
- The wearing of rings is strongly discouraged. Serious injury, including amputation, may result if a ring snags.
- Wearing gloves while handling rope and wires carries certain risks, for example, they can snag on a broken strand in a wire or become trapped in turns on a capstan. However, in certain circumstances these risks are outweighed by other dangers, for example, frostbite in very cold weather, or the inability to grip with bare hands on a greasy wire hawser. Therefore, the wearing of gloves is left to the discretion of the crew members.

CAUTION

A good seaman always thinks about the 'what ifs'. These areas (shown left) are all dangerous if the rope goes taut, parts or if the gear fails.

Throw bag

Throw bags are used in both open water and swift water environments to enable the rescuer to make contact with a casualty.

Most throw bags are constructed from polypropylene in a bright colour; this provides a high visibility rope that is soft to handle and floats well. They are not designed for use in hauling or high tension applications. Due to their low melting point they should only be used in conjunction with rope grabs and prusik knots with extreme caution.

Please refer to the manufacturer's instructions and relevant SOP for preparation, pre-inspection and use of throw bags.

Heaving line

The heaving line is a light, flexible line with a weighted 'monkey's fist' at one end that can be thrown between vessels or to the shore.

Heaving line uses

The heaving line can be used to:

- pass a tow rope to a casualty vessel or berthing rope to a jetty
- act as a messenger line between two vessels.

Preparing for throwing:

Prepare the heaving line for throwing by firstly checking it is free from knots and kinks. The heaving line also works better when wet.

NOTE
Before throwing a heaving line the standing part must be anchored..

- never secure the standing end to your wrist or on to guardrails. Either tie it to the tow rope or stand on the end of it
- it can be dangerous if the heaving line is thrown while the SAR unit or casualty vessel's propellers are turning.

Before throwing the heaving line the following should be taken into consideration:

- the weather conditions, especially the wind.
- the throwing position, which should be clear of personnel and snagging hazards, for example, guardrails.
- Many a good throw has been spoilt, and time wasted, by failure to have the line coiled down properly or forgetting to secure the standing end correctly.
- The heaving line is best thrown with the throwing arm straight.
- Allow the heaving line to run freely out of the non-throwing arm.

- Attach heaving line to main line with double sheet bend and coil heaving line neatly.
- Split coil into two with the weighted part in your throwing hand.

- Throw weighted part towards target allowing the rest of the rope to run freely from the other hand.

Securing, making fast or belaying a rope

Staghorn bollard

1. Take three turns around the base of the staghorn bollard in a clockwise direction.

2. To secure first take a figure-of-eight turn around the cross of the bollard, finish by ensuring a minimum total of three turns are used.

Using bitts

1. Lead the rope round the bollard farthest from the source of the load, from outboard to inboard as shown on the following image:

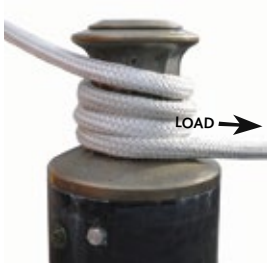
2. Then secure with a minimum of three figure-of-eight turns as shown on the following photograph:

3. If required this can then be finished with one or more clockwise turns around the bitts.

Using a capstan

Bring the rope to the capstan, make three turns around the capstan in a clockwise direction, avoiding overlapping.

The angle at which a line enters and exits from a capstan is vital for safe operation. This is known as the lead.



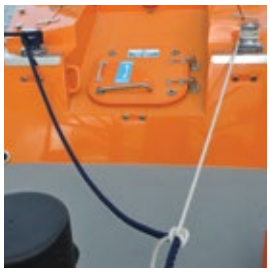
An example of a good lead.

An example of a bad lead.

Riding turns

When using a capstan, care must be taken to ensure a good lead, as illustrated previously.

A poor lead can result in the working end trapping the standing part, known as a riding turn. Weight on the working end makes a riding turn difficult to free.



To free a riding turn, a second line should be attached to the loaded line using a rolling hitch, this second line can then be hauled in and secured.

The standing part can then be freed off and the riding turn broken.

Single bollard, Samson post or capstan

1. To make fast, make three turns in clockwise direction around the bollard. Note that the first turn around the bollard must be as low down as possible.

2. To secure, pass a bight of rope under the load-bearing part.

3. Drop the bight over the bollard. Taking further turns around the bollard will give additional security. This method is known as a capstan or tugman's hitch.

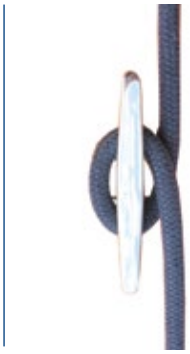
A capstan secured using the same procedure.

Coil rope and tie off to stow on a cleat

Securing a rope to a cleat

Before stowing a coil of rope on a cleat it will first be necessary to 'belay the rope' to the cleat. This is achieved as follows:

1. Bring the rope to the cleat.



2. Make a turn (once around).

3. Start making a figure of eight.

4. Continue building figures of eight.

5. Minimum of three figure of eights.

Cleating a rope

After belaying the rope to the cleat, proceed as follows:

1. Coil the remaining rope clockwise.

2. Pull your hand through the coil.

3. Pull back a loop.

4. Twist it twice.

5. Hang the twisted loop over the cleat.

6. Secure, neat and tidy.

Coiling large rope for storage

Nearly all rope is either braided or right-hand laid. Right-hand laid rope must always be coiled clockwise or it will kink and become tangled so to avoid confusion it is standard on lifeboats to coil all rope clockwise.

If it is being coiled into a locker, the coil should be such a size as to make best use of the space available and a figure-of-eight knot added to the end to make finding it easier.

If it is to be stored on deck, such as the end of a mooring line or one attached to a cleat, when coiled, the whole line should be turned over so the working end is on the top, ready for use.

Coiling small rope for storage

Providing the rope is not too large, for example a heaving line, it is possible to 'make up the line' for stowing. The following illustrations shows one recommended method that may be used.

The secret is to twist and coil the rope in a clockwise direction to stop it kinking. Finish with two or more turns and push the end through the loop.

1. Take the end of the rope in your left hand.

2. Twist the rope clockwise in your right hand and transfer the rope to your left hand.

3. Stretch the rope out with your right hand.

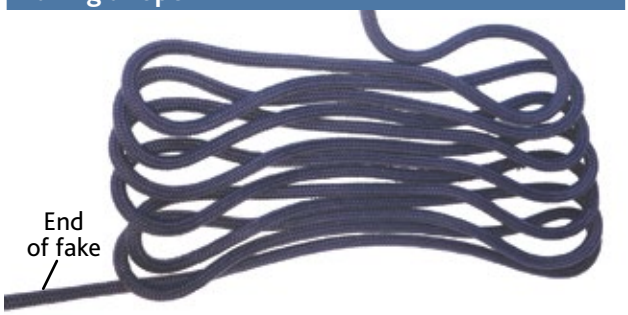
4. Repeat steps 2 and 3 several times.

5. After you've coiled the rope, take the working end around the coils.

6. Make several turns.

7. Put the working end through the loop and pull.

Faking a rope



A rope that may have to be paid out quickly, for example, the anchor warp or the towing hawser, should be faked down in as long fakes as space allows.

When faked, a rope does not acquire as many turns as when coiled, so, it will run out with less chance of becoming snarled.

When faking, care should be taken to ensure that each bight at the end of a fake is laid under the bight that immediately precedes it. This is to ensure a clear run.

Man-made rope

Care and maintenance

The following advice is provided for the care and maintenance of man-made fibre rope:

Exposure to sunlight

The use of inhibitors in the manufacturing process, especially of polypropylene, has largely overcome earlier experiences of deterioration through exposure to sunlight (ultra-violet light). Even so, man-made fibre ropes should not be exposed to sunlight unnecessarily.

Handling

The amount of wear and tear can be greatly reduced by correct handling of cordage. Ropes should not be dragged over sharp or rough edges and penetration by abrading particles must be avoided.

Stowage

Man-made fibre ropes are resistant to bacterial attack so can be stowed for long periods when wet. When coiled, man-made fibre ropes stowed in bins must have free circulation of air beneath, as well as around, the rope.

Care is to be taken with ropes that are stowed on reels, if they have been under tension, as they may crush the reel. Man-made ropes must be stowed away from direct sunlight.

Wear

Wear on the rope will show up as whiskering with some breaking of the outside fibres. The rope may also become discoloured in places.

Crow's footing

Crow's footing occurs in both man-made and natural fibre hawser-laid rope. It can occur when tension on the rope is suddenly released and the balance of the twist does not recover in time. It can also occur when kinks are forced out of the rope by pulling on the rope. Crow's footing appears as an imperfection or bump in the lay and causes severe weakening of the rope.

Chafing

Chafing is recognised by the tufted appearance along a given section of rope and is caused by the rope rubbing against an abrasive surface.

Stretching

The resistance of man-made fibre ropes to repeatedly being loaded is good. However, over time, there may be a progressive elongation of the rope that will result in a reduction of strength.

Rust

Rope that has been in contact with corroding steel shows signs of yellow or brownish-black stains. These can be removed with soapy water and will have no adverse effect on the rope. Those stains that cannot be removed will only distract from the appearance of the rope and not its function.

Heat

Man-made fibre ropes must not be stowed where there is excessive heat.

Fusion

Friction generates heat near to, or above, the melting point of the fibre. The heat partly melts the fibres and causes what is called fusion. Fusion is indicated by the presence of a hard layer of fused fibres on the surface of the rope.

Icing

Although man-made fibre ropes are virtually unaffected by very low temperatures, when a rope becomes iced it can become very brittle. The rope must, therefore, be thawed at a moderate temperature before being stowed.

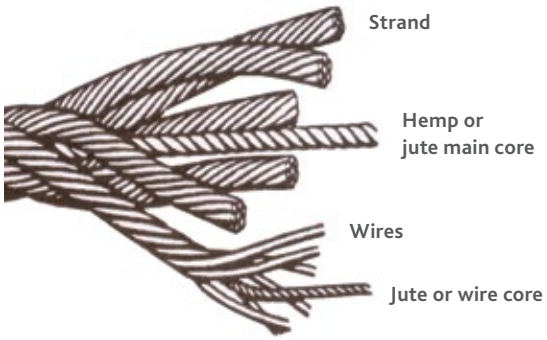
Contamination

Oil, grease and dirt contamination can be removed by scrubbing with a mild solution of soap and water. This should be followed by a thorough rinsing in fresh water. Strong detergent should not be used.

All cordage should be replaced when there is a sign of wear, deterioration or friction damage. Old ropes may appear thicker than new ones. This is due to ingression of salt.

NOTE

All ropes can be damaged if used incorrectly. Thought must be given to correct use of blocks, cleats, lead and knots. Remember that when a rope is knotted it is also weakened.



Steel wire rope

Use of steel wire rope

Steel wire ropes of various sizes are commonly used as jackstays (stainless steel), tractor pendants, winch wires, bow pendants and haul-up spans. The wires forming a strand are laid up left-handed around a jute or wire core. The strands forming the rope are laid up right-handed around a hemp or jute main core as shown on the diagram above.

Wire rope sizes

In practice, steel wire ropes are generally identified by quoting their size and construction. For example, 24mm, 6x24 SWR. This means a steel wire rope with a diameter of 24mm having 6 strands around a central fibre core with each strand being made up of 24 wires. SWR is the abbreviation for steel wire rope.

Wire rope strength

Wire rope is from four to seven times as strong as natural fibre rope of equal size. It has from one and a half to twice the strength of natural fibre rope of equal weight. Wire rope does not lose any strength when wet. In terms of elasticity, wire rope stretches very little before parting.

Care and maintenance

Wire rope is much less flexible and, therefore, much less yielding than cordage. It resists being bent and does not absorb turns readily so is, therefore, much more liable to kinking and snarling. It also has a tendency to spring out of a coil or off a drum or bollard. If handled correctly, however, wire rope can be used for most of the purposes for which cordage is used but bends and hitches should not be made in wire rope.

Wire life

When being reeled in or otherwise stowed, the surface of a wire rope should be washed with fresh water to remove the salt. The rope should then be dried using cloths before being lightly smeared with an appropriate lubricant. Wire brushes should not be used to clean steel wire rope. This will remove the galvanising from the wire, which will cause the wire to rust quickly.

Inspecting

Steel wire ropes must be inspected periodically in accordance with a relevant planned maintenance schedule.

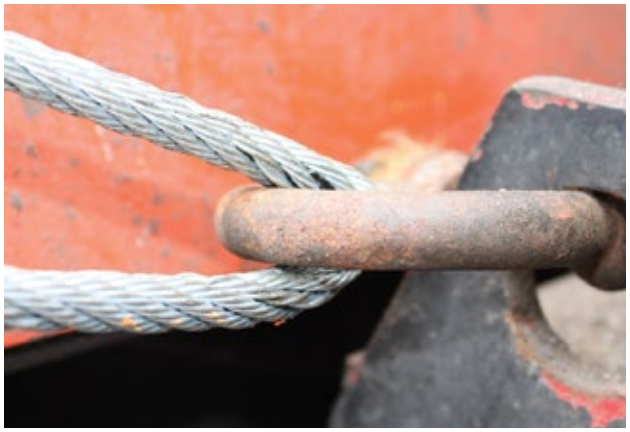
Lubrication

Wire ropes have a lubricant incorporated during manufacture. This serves a dual purpose: it provides corrosion protection while it also minimises internal friction. The lubricant applied during manufacture must be supplemented by regular lubrication while in service. Details for the maintenance of steel wire rope can be found in the relevant planned maintenance schedule.

NOTE
The loop or turn must be removed
AFTER any load on the rope has been removed.

Kinking

Any loop or turn in a wire rope can all too easily be pulled into a kink that will permanently damage the rope. If a kink is seen to be about to develop it should be removed as shown on the illustrations at the bottom of the page.



Crippling

If a wire rope is bent at too acute an angle, or led over a sharp edge, it will be seriously damaged by distortion of its strands. This may result in a permanent kink or even in the wire parting. A wire rope so led is said to form a 'bad nip'.

Distortion of strands

Distortion of strands is the result of damage by kinking, crushing, serious crippling round a bad nip or other mistreatment. If distortion is evident then the strength of the wire is considered to have been reduced by at least 30%. Should the distortion be sufficiently serious to cause the main core to protrude, the rope must be discarded.

Flattening

This refers to flattening of some of the outer wires by abrasion. The flats are easily seen because the abrasion gives the flattened wires a bright and polished appearance. They do not affect the strength of the wire rope unless they are very pronounced.

Broken wires

Broken wires are usually the result of fatigue or wear. To deal with a broken wire, grip the broken end with a pair of pliers and bend the wire backwards and forwards until the wire breaks inside the rope between the strands where it can do no harm. It is generally accepted that a wire rope is coming to the end of its useful life when one wire in any strand breaks.

Photo: RNLI/David Riley

Corrosion

Wire ropes can be corroded by:

- The action of damp on the wires from which the galvanising has worn off. If this occurs to the inner wires first it will cause rust to fall off the rope and is therefore easily detected.
- The action of fumes, that attack the outside wires. The effect of fumes becomes visible on inspection.
- Contact with acids, which soak into the centre attacking the inside wires. This is not always noticeable on the outside of the rope and can be one cause for the rope parting without warning.
- Lack of lubrication. A wire rope of outwardlygood appearance, but with a dry powdery centre or core, has not been properly maintained and should be treated with caution.

Icing

When subjected to extreme cold a wire rope may become brittle and lose its flexibility where an apparently sound rope may part without warning. The brittleness is not permanent and the rope will regain its resilience in a normal temperature but the potential for danger must always be remembered when working with wires in very cold climates.

WARNING

Whenever a line comes under tension there is a high risk due to the potential energy stored within. All personnel should be fully trained in the associated dangers and appropriate PPE must be worn.

Personnel must never stand too close, or in the known highlighted danger areas of a line under load.

If a line should part, stored energy will be released with potentially devastating power.

If a line suffers sudden loading this effect can be greatly increased.

Manage anchoring

The decision to anchor is made by the coxswain of an ALB and helm of an ILB.

Reasons for anchoring

Anchoring may be carried out in many circumstances, including:

- to take shelter
- to protect a vessel in an emergency, such as equipment failure
- a period of rest
- as part of a task, such as veering down (ILB only) or breeches buoy (ALB).

Safe anchorage

When looking for a suitable position to anchor a vessel, the person in command must take the following factors into consideration in order to determine the suitability of an anchorage:

- Wind: The strength and direction, both actual and forecast. The area may provide a lee while anchoring but within a few hours, it may be exposed.
- Shelter: The actual and forecast wind strength and direction, along with the exposure to swell and tide. The effects of swell and tide can often make lying at anchor uncomfortable.
- Depth of water: The rise and fall of the tides that allows for safe under-keel clearance for the duration of being anchored.
- Seabed: Good, firm beds to anchor in are soft chalk, clay, sand and heavy mud. Soft mud, shingle, shell and rock are to be avoided.

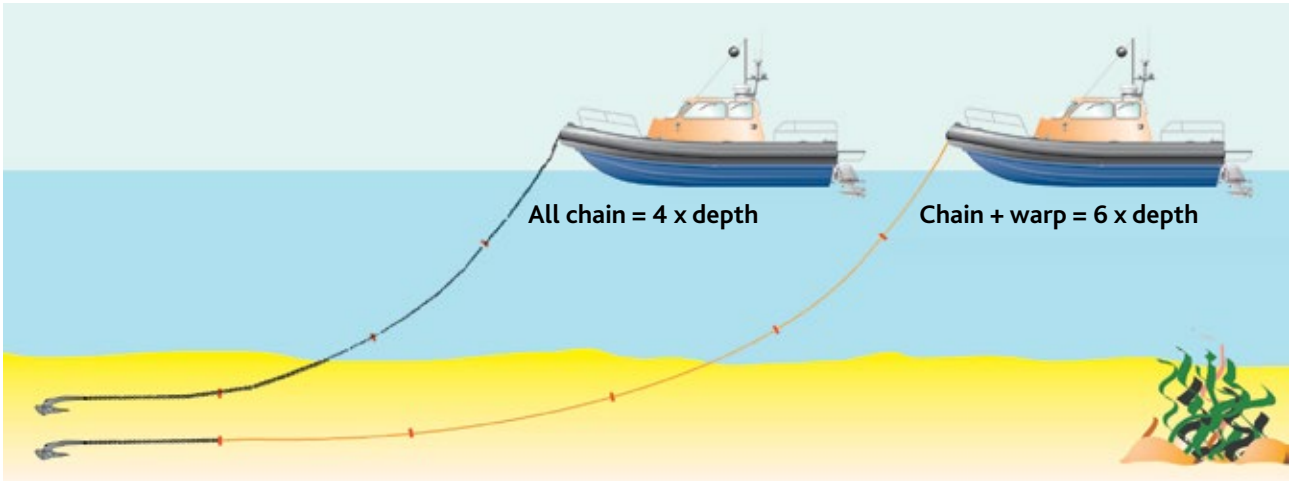
Additional considerations to be made in choosing an anchorage:

- Sea room: Allow sufficient space to manoeuvre should the anchor start to drag.
- Swinging room: It is essential that a safety swinging circle can be established. This is the distance a vessel can move around its anchor. Swinging room is important because if other vessels/objects are within a vessel's circle, they may collide.
- Other vessels: The swinging circle of these will be unknown. Light/flat-bottomed vessels will lie differently to deeper draught/low-windage vessels.
- Scope: In poor weather it is advisable to add extra scope to allow for the pitching of the vessel. This will ensure the warp's pull on the anchor remains horizontal along the sea bed.

Scope

The scope of chain or chain and warp needed will depend on the maximum depth of water.

- If using just chain, the length deployed should be at least 4 x the depth
- If using chain and warp, the length deployed should be at least 6 x the depth



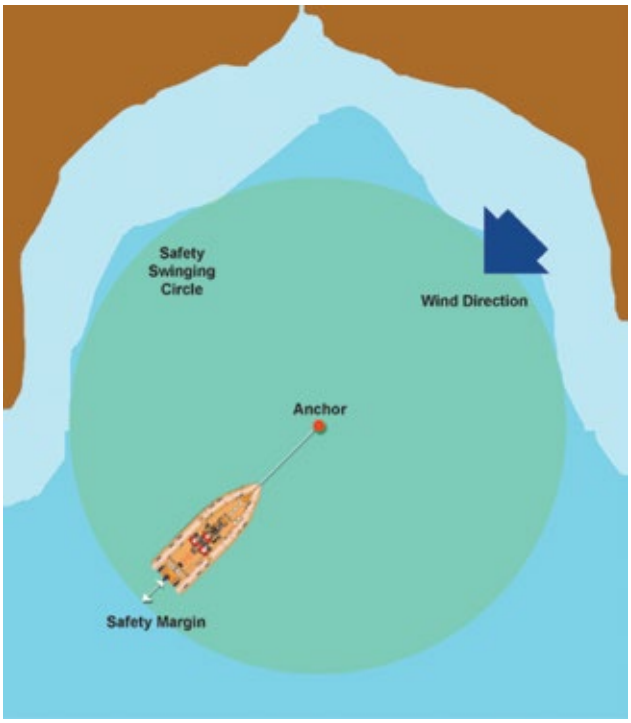
Swinging circle

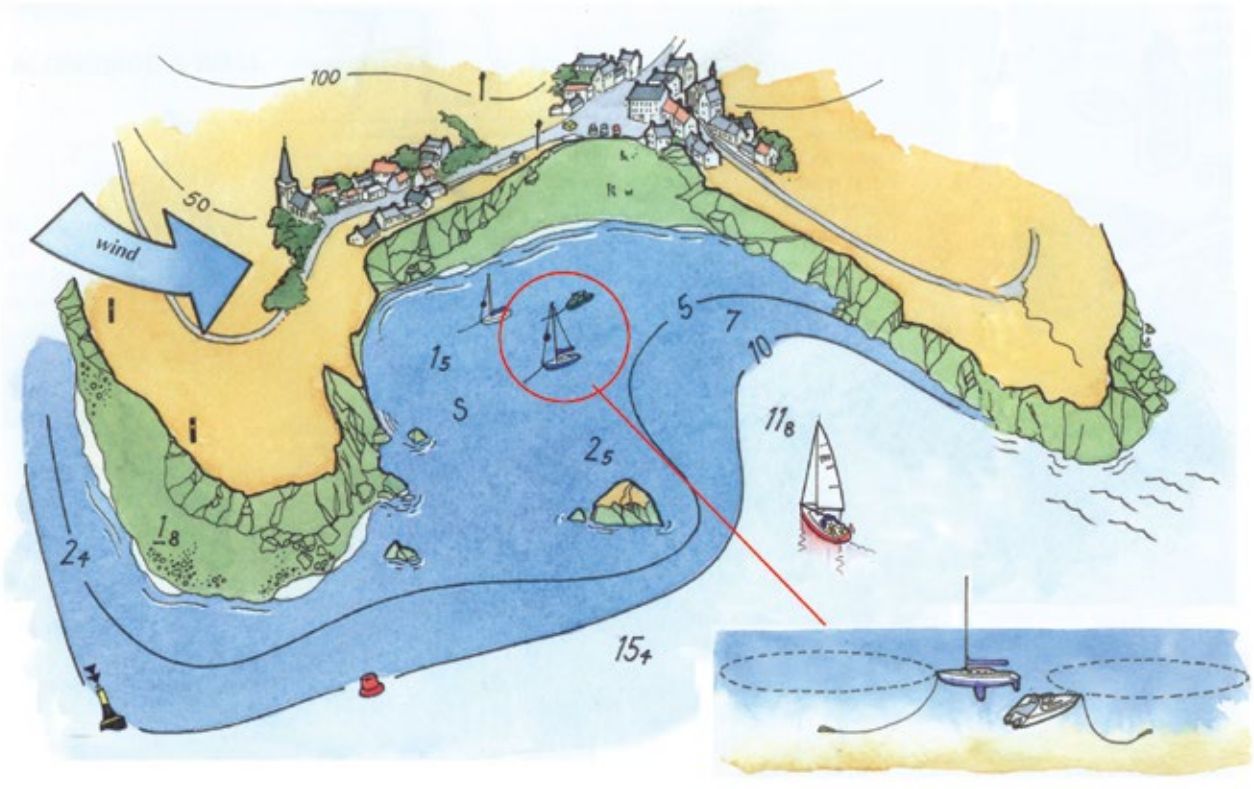
Before anchoring, it is essential that a safety swinging circle can be established. The swinging circle is the distance a vessel can move around its anchor. This is important because if other vessels or objects are within the circle, they may collide.

The size of the circle will depend on the scope of line that is deployed: the greater the scope, the larger the swinging circle. Always allow enough swinging room to account for wind, tide, other vessels at anchor and any underwater obstructions. Bear in mind that light/flat bottomed vessels will lie differently to deeper draft/low windage vessels.

CAUTION

At low tide the swinging circle will be greater than at high water





Charts can be used to identify safe and unsafe/prohibited anchorages. Below are a few examples:

S	Sand
Cy	Clay
Si	Silt
M	Mud
St	Stones
G	Gravel
R	Rock
Sh	Shell
fS.M.Sh	Mixed: fine Sand, Mud and Shell
25 Wk	Wreck over which the depth has been obtained by sounding
	Wreck, depth unknown
Masts	Wreck of which mast(s) are only visible at CD
#	Foul ground to be avoided by vessels anchoring
Obstn	Obstruction
	Submarine cable
	Supply pipeline
	Reported anchorage
	Anchorage area
	Anchoring prohibited

Deployment

The anchor is to be deployed in accordance with the current class SOP.

Once a suitable position has been found, before the deployment of the anchor, the person in command will have to give an initial brief to the crew. After the brief, all crew are to have a clear expectation of their role as this will avoid confusion and injury. The initial brief should consist of:

- Task allocation: Each crew member will need to know what their job is, whether it's attaching the catting line or flaking the anchor warp.
- Tools available: The crew will need to know what tools are available, ie: knife, spike etc.
- Scope expected: Once the anchor has been deployed, the crew will pay out the desired amount of scope.
- Safe positions: There is no need to be outboard side of the anchor, chain and warp while rigging. Crew to be reminded of safe zones.

Once the crew have confirmed that the anchor is ready, the person in command should check it is rigged correctly. They may decide to appoint a senior crewmember to oversee the preparation and to rectify any problems that may occur.

Two-way communication between the crew and person in command is vitally important. This will prevent accidents and injury. The communication will consist of:

- when ready
- when to let go
- direction of lead
- pay out/hold
- warp given
- make fast.

Anchor holding

Once the anchor has been deployed, immediate checks will have to be made to ensure the anchor is holding. This can be set into two categories, immediate and monitoring:

Immediate	Monitoring
Transits	Transits
Radar Ranges (if fitted)	Bearings
GPS	Radar Ranges (if fitted)
	Depth Alarms (if fitted)
	GPS

When satisfied that the anchor is holding, other vessels must be aware that you are at anchor. The shape, light and sound signals that are a requirement of IRPCS are:

- Anchor Ball: A vessel, when at anchor during the day, shall exhibit a black ball hoisted as far forward as possible.
- Anchor Light: A vessel (under 50 metres), when at anchor during the night, shall exhibit an all-round white light fitted at the top of the masthead.
- Anchor Bell: A vessel (over 12 metres), when at anchor in restricted visibility, shall at intervals of not more than one minute, ring a bell rapidly for approximately five seconds.

Extended stay

Should an extended stay be required, the following actions should be considered:

- Anchor watch: The anchor warp should be checked for security and signs of dragging.
- Chafe: The anchor warp should be checked for signs of chafe. Chafe preventers such as leathers or padding should be used.
- Weather forecast: Forecasts should be obtained to check whether the position is still suitable with the forecasted wind direction and speed.
- Rise/Fall if tide: The tidal information should be checked to make sure there is sufficient water below the keel at low water.
- Scope: The scope may need to be altered if the tides are increasing or decreasing.
- Swinging circle: Check if all vessels and objects are at a safe distance and will not interfere with the swinging circle.
- Day shape/light: It may be required to change your shape/light dependent on whether its day or night.

Anchor dragging

If the anchor fails to hold, the first action may be to pay out more warp to see if the anchor will reset and hold again. Otherwise, the anchor will have to be recovered and re-deployed.

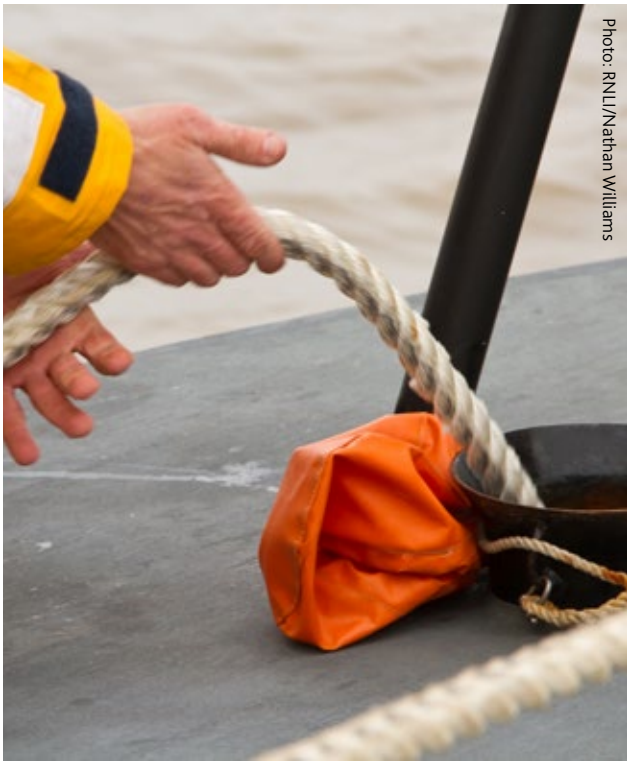


Photo: RNLI/Nathan Williams

Anchor recovery

The anchor is to be recovered in accordance with the current class of SOP.

Prior to recovering the anchor, the person in command will have to give an initial brief to the crew. After the brief, all crew are to have a clear expectation of their role as this will avoid confusion and injury. The initial brief should consist of:

- Task allocation: Each crew member will need to know what their job is, whether it's operating the capstan or pointing the lead of the warp.
- Securing the equipment: When and how to store the anchor, davit, chain and warp etc.
- Safe use of the capstan (if applicable): How to use the capstan, keeping hands well clear and to avoid riding turns.
- Safe positions: There is no need to be outboard side of the pulpit rails. Crew to be reminded of safe zones.

During the recovery, the person in command will need to keep good two way communication with the crew on the foredeck as the following information will needed:

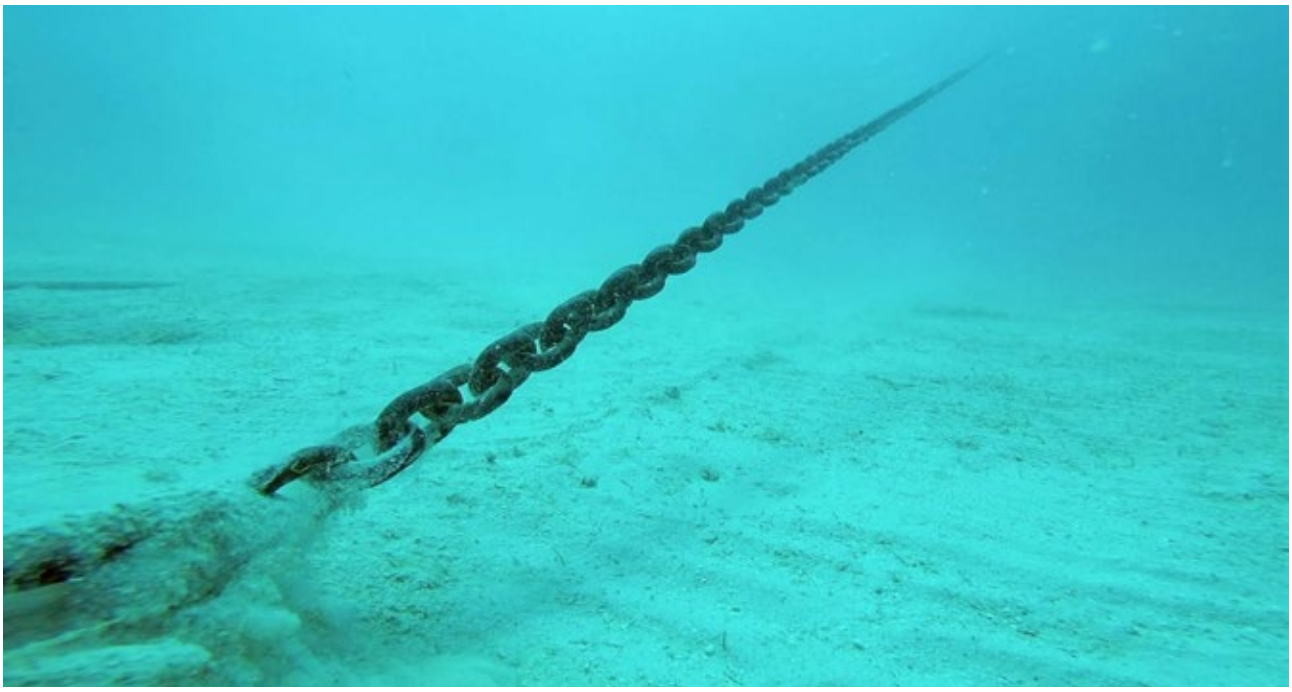
- when ready
- when to take weight on the stopper (if applicable)
- haul in/hold
- retrieve catting line (if applicable)
- direction of lead
- warp remaining
- when the chain is at the fairlead
- anchor/chain on board
- all stowed.

Post recovery

Before departing the anchorage, the foredeck must be inspected to confirm that all is secure. The person in command may decide to appoint a competent crew member to oversee the preparation and to rectify any problems that may occur. Checks should include: anchor, warps and lines stowed; tools secured and the foredeck is clear. Any equipment defects must be reported.

NOTE

As part of the manage anchoring unit, ILB crew (including the helm), are required to demonstrate the ability to recover 50m of anchor warp within 90 seconds.



Fouled anchor

When attempting to recover a fouled anchor, the person in command must perform a dynamic risk assessment. The crew and vessel safety must be the priority as the following hazards could now be evident:

- extra load on anchor warp
- parting of the anchor warp
- power cables
- use of capstan and fairleads.

A full brief must be given and ensure good two-way communication between the crew on the foredeck and the person in command.

An anchor could become fouled or caught on the seabed, for example, in heavy rock or a submerged wreck. You may be able to identify this if you are unable to retrieve the anchor and the warp is taut in an up-and-down position. The following technique should be used to attempt to recover the anchor:

1. With the anchor warp taut and in the up and down position, make off securely to a strong point.
2. Use the vessel's engines to come ahead, zig-zagging with caution, in an attempt to free the anchor.
3. Should this fail, pay out more anchor warp to alter the angle of pull and repeat step 2.

If the anchor remains fouled, you should attach a buoy (casualty lifejacket for ILBs) to the end of the anchor warp to mark it's position. A further attempt to recover can be made at a later date when conditions suit, for example at low water.

An anchor could become fouled on fishing gear or on another vessels mooring. You may be able to identify this if there is additional load on the warp while hauling or by visual indications. The following technique should be used to attempt to recover the anchor:

1. With the anchor warp taut and up-and-down, make off securely to a strong point.
2. Use a boat hook to free the anchor.
3. Should the anchor not be visible, use a grapnel hook. Lower the hook until it catches on the obstruction, and then make fast to a different strong point.
4. Pay out on the anchor warp, and use the vessel's engine to go astern.
5. Haul in the anchor to the surface.

The grapnel will remain fouled on the obstruction. The grapnel warp should be buoyed off and attempt to recover at a later date.

If an anchor becomes fouled on a submarine cable, attempts to recover should be made using the above techniques. Should the anchor remain fouled, the anchor warp should be buoyed off and abandoned.

If unable to recover a fouled anchor, once buoyed off, the position must be recorded. The recorded position may be passed on to the coordinating authority and the launch authority.

Photo: RNLI/Nigel Millard

Veering down

Veering down is a process of manoeuvring the SAR unit astern under anchor in order to maintain the vessel head to sea. It is used to maintain a safe position to affect a casualty rescue or transfer when accessing difficult to get to areas. It is identified as the safest and most stable method to reach a casualty.

The risks

There is a high risk factor when veering down, as it is often done when the SAR unit is operating in a dangerous area with confused seas, whether wind or swell. Crew operating warps and lines under tension and the proximity to additional hazards with limited manoeuvrability and potential for error are also many of the risks involved.

Managing veering down

Because of the high risks associated with veering down, the most important thing to consider first is if you actually need to do it at all. If veering down can be avoided, then do not do it. If veering down must be done, it should be in accordance with the current class specific SOP.

When managing, you must include:

- Brief: The crew must be aware of what the task is and of what is expected of them. The coordinating authority should also be made aware.
- Safety: The lines and warps will be under a large amount of tension. Ensure the crew are aware that hands/fingers must be kept well clear.
- Two-way communication: Loud and precise communication is very important. There will be a huge amount of background noise, such as the engine at two-thirds power and the surf/waves pounding the cliffs.
- Maintain the vessel's aspect: The vessel is to be kept head to sea. This will reduce the risk of capsize.

Recovering the anchor

The anchor is to be recovered in accordance with the current class of SOP.

Prior to recovering the anchor in adverse conditions, the helm should consider the following:

- crew brief
- crew safety
- clear communications
- coordinate hauling and manoeuvring
- stow warp.

If the recovery of the anchor is likely to compromise the safety of the crew/boat consider ''cut and run''. If the anchor is cut away, the boat must be driven out in a safe direction away from the warp that is left in the sea.

Working with a casualty

Most services will result in working with a casualty; whether it is a motorboat, sailing yacht, fishing boat or other craft, there are a few essential considerations that the person in command will need to make. There is always increased risk to the SAR unit and the crew when working with a casualty due to the unknown characteristics of it, for example its structure and composition, carriage of dangerous materials or stability.

As the person in command, you must satisfy yourself that the benefits are greater than the risks before working with a casualty; this can be done by using a dynamic risk assessment process (as detailed in Activity 2). Remember that one of the risks to crew may come from the people onboard. Those in command must remain vigilant at all times and report any suspicious, hostile or antisocial behaviour.

Working with a casualty should be done in accordance with the current SOP.

As the person in command, you must include the following steps.

Assessment

- Establish communications with the coastguard to get a full brief on incident.
- Establish communications with the casualty and other SAR units, if possible.
- Identify hazards on or around the casualty vessel, which could include:
  - overloaded with passengers
  - sensitive cargo
  - damaged rigging, working gear etc.
- Use a dynamic risk assessment and decide if the casualty is safe to board and work with.
- Request a helicopter or other assets from the coastguard, if appropriate.

Preparation

- Brief crew on approach, conditions, strong points and allocate tasks.
- Arrange fenders, roving fenders and lines (if applicable).
- Inspect the casualty vessel for hazards, damage or suspicious activity and report via radio to the coastguard.
- Use the onboard camera to document vessel and occupants if possible.
- Locate PPE, radio and other equipment to be used.

Escorting a vessel

- Keep a safe distance
- Communicate via VHF, use hand signals or loud hailer (ALB only).

Approach and embarkation

- Brief crew on plan.
- Ensure correct PPE is worn, including helmet.
- Post a lookout to communicate distance from casualty (if required).
- Make approach.
- Consider vessels interaction if both vessels are making way.
- Crew should only disembark the SAR unit on signal of the person in command.

CAUTION

When approaching a vessel overloaded with passengers, there is an increased risk of capsize, flooding or personal harm. Particular attention should be given to the direction of approach e.g. approaching a position of low gunwale or transom may increase the chance of flooding.

Photo: RNLI/Nathan Williams

Onboard the casualty vessel

- Always ensure personal safety when moving around the casualty vessel.
- Position yourself in a safe place onboard.
- Identify hazards:
  - boat – rigging, structure, slippery decks etc.
  - cargo – unsecured loads, dangerous goods etc.
  - people – unknown intentions, disease, aggressive behaviour etc.
- Make communication with the master of vessel.
- Make an assessment of the persons on board and the vessel, remembering casualty care precautions.
- Pass information to the SAR unit.

CAUTION

RNLI crew must never embark or enter a vessel that poses a serious risk to themselves e.g. going down below on a sinking vessel or embarking on an overloaded vessel.

Administration and communication

- Neither SAR unit crew nor coastguard teams have powers of detention; as a result, we cannot hold people against their will.
- With sensitive cargo a suitable landing site must be discussed with the coastguard as soon as possible to ensure that relevant law enforcement agencies can be present.
- The SAR unit must pass information about the casualty to the coastguard, including persons onboard, nationality, vulnerable people, medical conditions etc. via a private VHF channel.

Management of towing

Towing, by its very nature, can be a hazardous operation and the decision to tow should not be taken lightly; the casualty vessel's situation, the hazards involved and the safety of your crew will all need to be considered. Those in command must know the RNLI's towing and salvage policies, both of which can be found on Horizon.

The towing policy states:

"SAR units are permitted to tow other SAR units, but are not permitted to tow any other vessel unless:

- A direct request for tow is received by the coxswain of a SAR unit from the master/skipper of a casualty.
- A casualty abandoned by her crew might become a danger to navigation.
- The best method of saving life is to take a vessel in tow."

However, even if one of these situations does occur, the person in command must then decide if the towing operation is safe enough for the crew and SAR unit to engage in. Their top responsibility must always be to themselves, the crew and the SAR unit.

The policy also states that:

"The tow must not be a longer distance than is necessary to place her in a position of safety" i.e. a safe haven.

The RNLI's primary purpose is 'to Save Lives at Sea' and not to provide a 'free recovery service' so it is not advisable to tie the SAR unit and its crew up for any longer than necessary. Your aim should be to ensure a successful outcome and free up the SAR unit and crew for further tasking.

General details of towing can be found in the Crew Member Handbook.

NOTE

Those in command must not allow considerations of property salvage to influence their actions when lives are in danger.

Photo: RNLI/Paul Glatzel

Decision to tow

Once the towing policy has been considered, the person in command must decide if a tow is the most suitable option. Some of the factors that will need to be considered are:

- Is towing or removing the people the most suitable option? – if the vessel is taking on water then it may be prudent to remove the people and not worry about towing.
- Weather and sea conditions – the risk of towing will be significantly increased in poor weather; there is a greater risk of the tow line parting, of crew getting injured and the vessels getting damaged. The person in command must decide if the level of risk is acceptable before attempting a tow.
- Casualty type and size – some vessels will have numerous strong points and good lies for the tow line; other will not. The person in command – with the aid of the crew – must assess the vessel for suitable strong points otherwise damage is likely to occur. Some vessels will be lighter and have hull characteristics that make it easier to tow; it is necessary that the person in command has a thorough knowledge of leisure and commercial crafts so that the best possible assessment can be made.
- Draught of casualty – the draught of the casualty may be significantly more than the SAR unit. This information should be sought before deciding to tow and may affect the safe haven that is to be used.
- Distance to safe haven – the distance to the closest safe haven will also need to be considered in the decision to tow. Towing over long distances will increase the fuel consumption of the SAR unit, so it may also result in the SAR unit being away from its own patch for an extended period. The command decision should consider these points and consider flank station availability.

NOTE

Verbal consent should be sought from the owner/ skipper vessel before engaging in towing operations.

Assessment

- Establish communications with casualty vessel.
- Brief crew on type of tow, conditions, strong points onboard casualty vessel and allocate tasks to the crew.
- Remove equipment from stowage.
- Inspect casualty vessel for hazards and damage and report via radio to the Coastguard.
- Consider casualty drogue if applicable.

Photo: RNLI/Stephen Duncombe

Photo: RNLI/Bob Jeffery

Astern tow

- Prepare heaving lines (if available).
- Flake out enough tow rope to handle and pass to the casualty vessel.
- Secure tow rope to bollard so that it does not fall overboard.
- If needed, tie bridle or light weight tow line to main line with double sheet bend.
- The person in command will then position the boat and direct the crew when to pass the line.
- The crew will then instruct casualty vessel to haul in the line and secure the tow rope to a strong point on their vessel.
- Crew should manage the line and ensure a minimum amount falls in the water. It is very important to keep line away from SAR unit's drive system and steering.
- Pay out tow rope until desired length is reached; ensure there is a safe distance between vessels and the line is not tight or snatching.
- Carefully secure tow rope on bollard, keeping fingers clear. Do not use locking turns or knots.
- Set a chaffer and consider a 'stretcher' in the line if required.
- Maintain a visual inspection of the tow line throughout the operation.
- The line should be paid out at regular intervals to minimise chaff on the line.

CAUTION

All crew should be extra careful of the lines under load. The area around the bollard, aft deck and fairleads should be kept clear.

CAUTION

Extra vigilance should be held when operating in areas with known hazards, e.g. over falls or areas of dense traffic.

To shorten the tow line

- Brief the crew.
- Gradually reduce SAR unit speed, allowing the tow to slow also.
- In safe and sheltered water with ample sea room bring engines to neutral.
- Instruct crew to haul in line maintaining turns around bollard.
- If needed, gently apply astern gear, ensuring that the line is clear of propellers.
- Once desired length has been reached, make fast on bollard.
- Once secure, gradually move ahead and take up tension in the line.

To recover the tow line

- Brief crew and casualty.
- Instruct casualty to slip the tow line from their vessel.
- Instruct crew to haul tow line onboard.
- Stow the tow line.
- Recover and stow heaving lines, bridles and chaffer.

Alongside tow

- Decide what side the SAR unit will make fast to. This decision may depend on environmental conditions or a preference to alongside mooring for the casualty.
- Brief the crew and casualty.
- Prepare lines and fenders.
- Check casualty for damage or hazards and report via VHF to the Coastguard.
- On a large vessel, or if your view is obscured, you may wish to post lookouts to report distance and direction during the operation.
- Approach casualty and make fast bow line and bow spring. This allows for ahead way to be applied so collision avoidance can be achieved.
- Ensure the stern of the casualty is forward of the propellers of the SAR unit, enabling maximum steerage and control.
- Make fast the stern spring and stern line.
- Check lines and adjust as necessary.

If the tow needs to be released in an emergency, either:

- Use axe at base of bollard to cut line OR
- Untie line from bollard and let it run free; the line will sink once it has been paid out.

Berthing or mooring the casualty vessel

The casualty vessel's lines and fenders will need to be prepared prior to berthing.

Hopefully any support you requested for the casualties will be there ready to receive them such as:

- A shore side tender to ferry casualties ashore.
- A coastguard rescue team member to meet the casualties to provide initial support once landed ashore. This is especially apt if the casualties are traumatised, a long way from home, after hours at night and the casualties are concerned about what to do.
- The casualties to be met by another emergency service i.e. Ambulance, Police etc.

NOTE

While assistance may be given, the owner/person in charge of the casualty vessel is responsible for mooring/securing the casualty vessel. Once moored, prior to departure, the owner/person in charge should ensure the casualty vessel is safely secured.

Photo: RNLI/Stephen Duncombe

SAR unit buoyancy and stability

Buoyancy

A vessel placed on the water will exert a downward force on the water. This will displace a volume of water, creating an upwards force. This is known as buoyancy.

The difference between these two forces determines whether the vessel floats or sinks:

- if the downward force is greater, the vessel sinks
- if the upward force is greater, the vessel floats.

The volume of displaced water is equal to the volume of the submerged part of the vessel.

Stability refers to a vessel's ability to hold its upright position, or return to the upright position after deviation caused by an external force.

Stability

A vessel's inherent stability is determined by a number of factors:

- hull shape
- the mass of the vessel
- the position of the centre of gravity of the vessel
- the position of the centre of buoyancy.

While these can be addressed through design, it is only the hull shape that is really a constant (although this can change through damage).

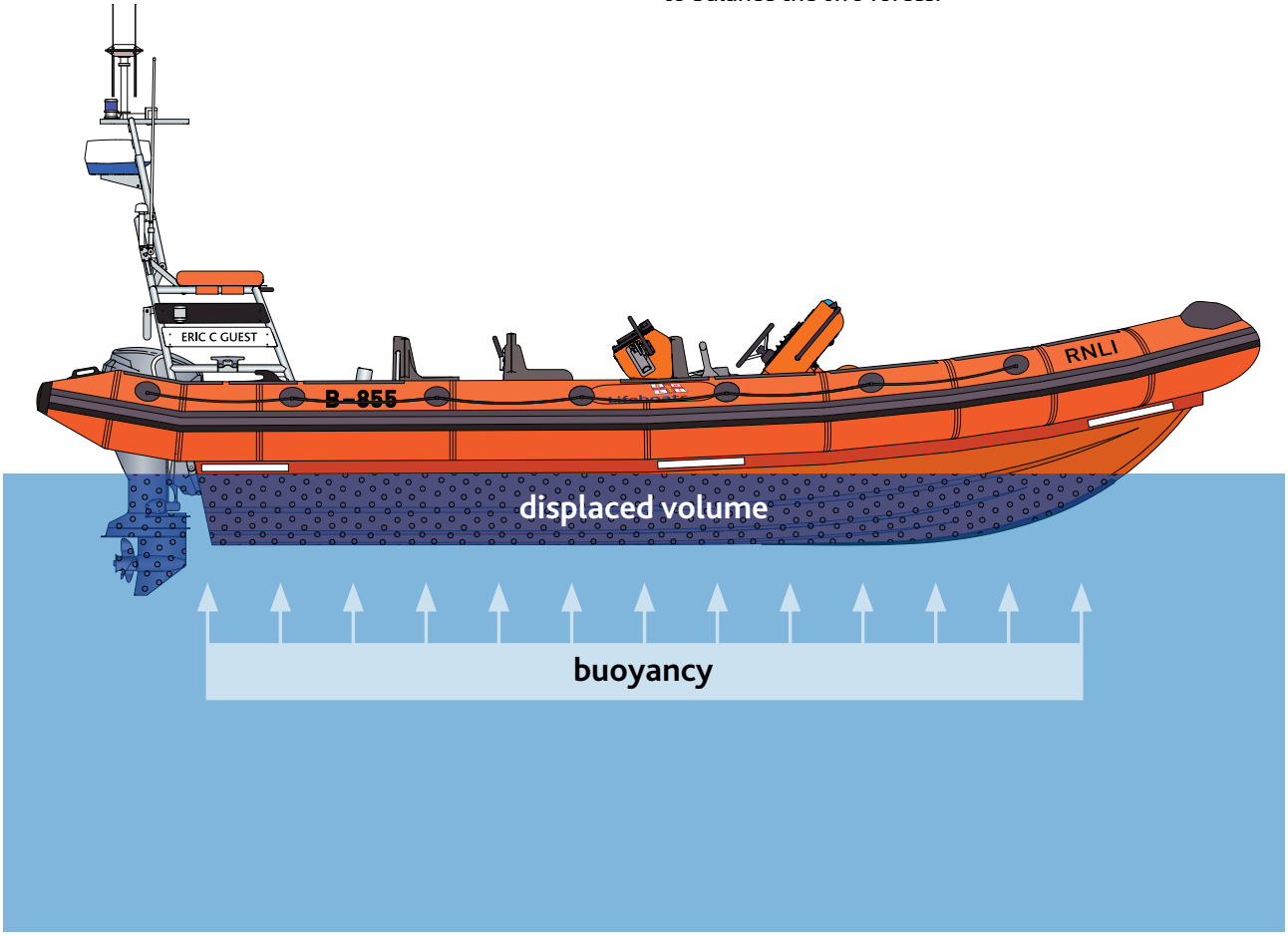
The vessel's mass will alter with loading:

- number of personnel on board
- fuel
- stores, etc.

This in turn will affect the centre of gravity and centre of buoyancy. The centre of buoyancy is further affected by:

- heel angle
- trim.

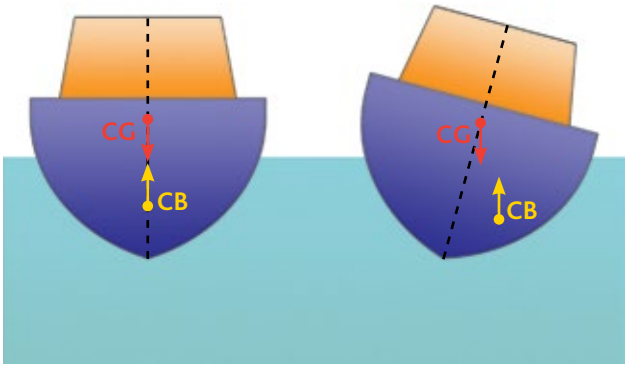
Assuming there is no change in the vessel's mass, its centre of gravity will remain constant. The centre of buoyancy, however, will move as the vessel heels and trims in order to balance the two forces.



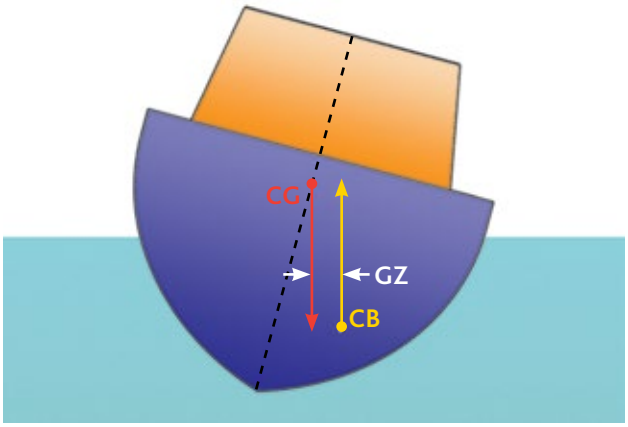
Righting force

In the upright position the centre of gravity (CG) and centre of buoyancy (CB) will be vertically in line (in most vessels, CG will be above CB) and so the two forces are in equilibrium.

As the vessel heels the underwater shape changes and CB will move towards the side that is lower in the water.



The horizontal distance between CG and CB is called the righting lever (GZ).



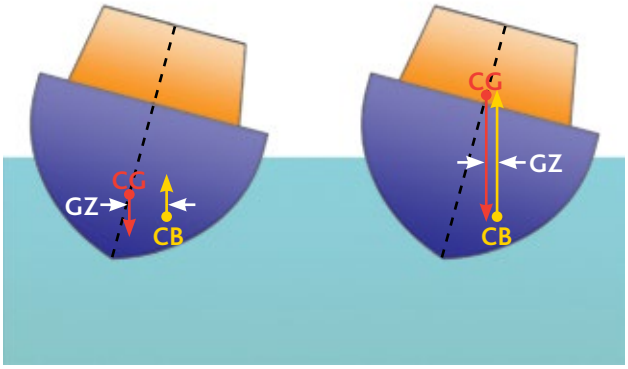
The weight of the vessel multiplied by GZ gives us the righting moment (RM). This is the force available to return the vessel to the upright position.

NOTE

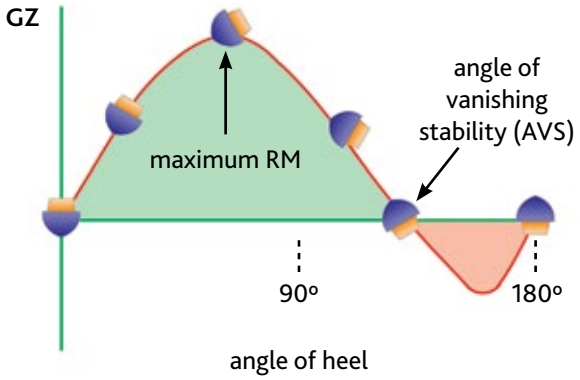
A typical vessel may maintain a stable position in a heeled condition, up to about 30° after which it becomes unstable.

Changing CG will change GZ and therefore change the available righting force:

- lowering CG will increase GZ, increasing RM
- raising CG will decrease GZ, decreasing RM.



This relationship between heel angle and GZ can be plotted on a graph known as a GZ curve:



The GZ curve provides the following information:

- angle at which GZ and RM are at maximum
- angle of vanishing stability (AVS) – the point at which the vessel will invert
- range of positive stability – the green shaded area
- range of negative stability – the red shaded area.

Additionally, the ratio of positive stability to negative stability gives a good indication of the vessel's ability to right itself after inversion. The greater the ratio, the more likely the chance of righting after inversion.

Causes of capsize

Capsize generally refers to the condition where a vessel heels to such an extent that it is unable to right itself, or gain a stable position, and turns over. There are numerous causes of capsize, including:

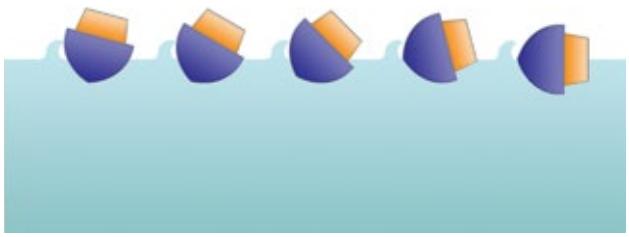
- windage – superstructure with a large surface area can act as a sail, catching the wind and heeling as a result
- waves – swamping the vessel or causing it to heel past AVS
- non-penetrative hull damage – changes to the hull form can affect the inherent stability
- grounding – if a vessel grounds off its centreline, a fall in water level causes a virtual rise in CG. Additionally, the vessel is at the mercy of the elements
- shifting mass – movement of cargo, personnel, fuel etc can change the position of CG
- blocked limber holes – typically found in bilges, limber holes are holes drilled through frames to allow fluids to drain to the lowest point of the bilge. Any blockages will prevent this drainage
- flooding
- synchronous rolling.

NOTE
All the above can also lead to sinking (loss of buoyancy).

Synchronous rolling

Every vessel has a natural rolling motion, the amount of roll being directly proportional to the beam of the vessel. Wave action will cause the vessel to roll and regain its position once the wave passes.

If, however, the vessel encounters a series of waves that match the frequency of the rolling motion, it will not be able to right itself before the next wave hits. This can lead to a capsize.



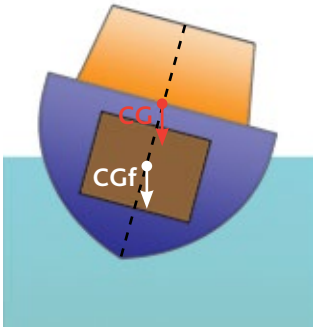
Flooding

Any type of flooding will reduce the vessel's buoyancy. If not corrected, this can result in capsize. Flooding can occur through any of the following:

- downflooding – caused by openings that allow water into the vessel e.g. doors, hatches etc.
- penetrative hull damage
- blocked weather deck drainage ports – effectively flooding the weather deck
- firefighting – if using hoses, large quantities of water can be quickly introduced to the vessel
- leaks from fluid systems.

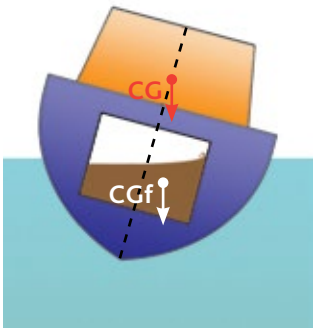
Free surface effect

Free surface effect refers to the tendency of a fluid to move in response to a change in attitude of a vessel.



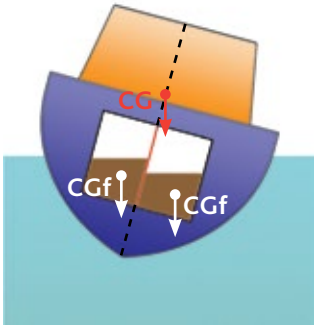
This can be demonstrated by the action of a fluid within a tank in a vessel. When the tank is full, the fluid acts as a solid mass and so its centre of gravity (CGf) will remain constant irrespective of the vessel's attitude.

With a partially filled tank, as the vessel heels the fluid moves in an attempt to remain parallel with the waterline. As it moves, CGf moves, thereby raising the overall CG of the vessel.



Additionally, as the vessel rights itself, the fluid moves in the opposite direction. This will repeat as the ship rolls, setting up a pendulum effect, further affecting the vessel's stability.

If the tank is divided into two equal halves separated by a watertight bulkhead, the movement of CGf is not as great, thereby reducing the adverse effect by as much as 75%.



Of course, free surface effect does not just happen in storage tanks; it can also happen anywhere throughout a vessel where flooding occurs, including weather decks.

To overcome this, vessels are constructed with watertight transverse bulkheads to break the vessel up into a number of compartments. Dwarf bulkheads installed in individual compartments will also help to disrupt the effects of free surface.

NOTE

Free surface effect is not restricted to liquids but can also occur with unbound, small, solid objects such as grain in a bulk carrier.

RNLI asset capability

The assessing and recording of all RNLI vessels' stability is done by Naval Architects within the RNLI Engineering Office based on stability trials undertaken by RNLI technical surveyors.

All RNLI ALBs are inherently self-righting (provided watertight integrity is intact i.e. doors and hatches are closed), with the exception of the Tyne class, which is aided by twin automatically inflating bags on the aft cabin roof. In the event of capsize on a B Class lifeboat, a crew member activates a gas bottle to inflate the self-righting bag and the lifeboat turns upright in a few seconds. The D Class post-capsize procedure is also manual, details of which lie within the relevant SOP.

With the exception of the Severn class lifeboat, any two compartments on an ALB can be flooded and the vessel remains afloat. In the case of the Severn, the engine room or two other compartments can be flooded and the boat will remain afloat.

Through-life support

During its service life, RNLI vessels will undergo modifications, equipment updates and repairs. These changes may cause the overall weight and centre of gravity to differ from the original design condition. Therefore, through-life stability checks, such as inclining experiments, are conducted by surveyors at regular intervals, following major repairs or modification to verify the vessel continues to meet the fleet wide stability profile.

Emergency flooding procedures

Water fills an inlet at a remarkable speed; sometimes bilge pumps cannot keep up and you must stop the water. On most commercial and private vessels, there are bungs the same size as the inlets nearby in case of emergencies. On RNLI vessels, we have sealed compartments, including, but not limited to:

- aft engine room bilge
- engine room bilge
- forward cabin
- steering gear flat
- tank space
- survivors' cabin.

You should make yourself aware of the relevant class-specific SOP and the details contained within on how to use the different pumps on board to pump out the various compartments.

Useful tools on board an ALB to utilise when tackling an emergency holed situation include:

- blankets and Woolly Bears
- emergency casualty and ILB lifejackets
- orange ambulance pouches
- buckets.

To stem the flow of water ingress in an emergency situation, you can weigh down the length of an ambulance pouch and use the boat hook and some rope to slide the pouch down the outside of the vessel, over the hole; the force of the water should keep it in place temporarily while the hole is tackled from the inside. Wrap casualty or ILB lifejackets in blankets, place in the hole and inflate, creating a makeshift bung. The lifejackets are wrapped in blankets to protect from sharp edges such as fibreglass and metalwork.

Maintain the engine room to keep the bilge pump running by ensuring watertight doors are shut. Should the engine room fail, there are still ways of pumping out most compartments by going through emergency hatches and using the salvage pump.

The person in command may need to make the command decision to change direction of travel or leave the environment, including heading to shallow water clear of channels and hazards.

SAR unit handling

Manoeuvring in confined areas

When manoeuvring the SAR unit in confined areas, ensure the crew are briefed beforehand. Allow for all appropriate external forces such as wind and tide, deploy fenders to protect the vessel and have an escape route planned as applicable. Consider the correct use of line assists with berthing and unberthing the SAR unit.

SAR unit handling in heavy weather

RNLI SAR unit restrictions and limitations when it comes to heavy weather are as follows:

SAR unit	Restriction
ALB	No weather restriction unless local conditions are unmanageable
B-Class	In daylight – rough sea state
	In darkness – slight to moderate sea state
D-Class	In daylight – moderate sea state
	In darkness – slight to moderate sea state
IRB/ RWC	No night capability
	Within 400 metres of the shore or within visual range of supporting lifeboat/shore unit
IRH	Force 5
	Wave height not in excess of 600mm
	Wind speed 25 knots

Care must be taken when manoeuvring the SAR unit in heavy weather to limit damage and prevent injury to the personnel on board. Maintain appropriate speed through use of helm and throttle, and consider alternative courses. Other actions include:

- avoiding overfalls
- adjusting trim
- positioning crew appropriately (please see appropriate class-specific SOP)
- ballast (if applicable).

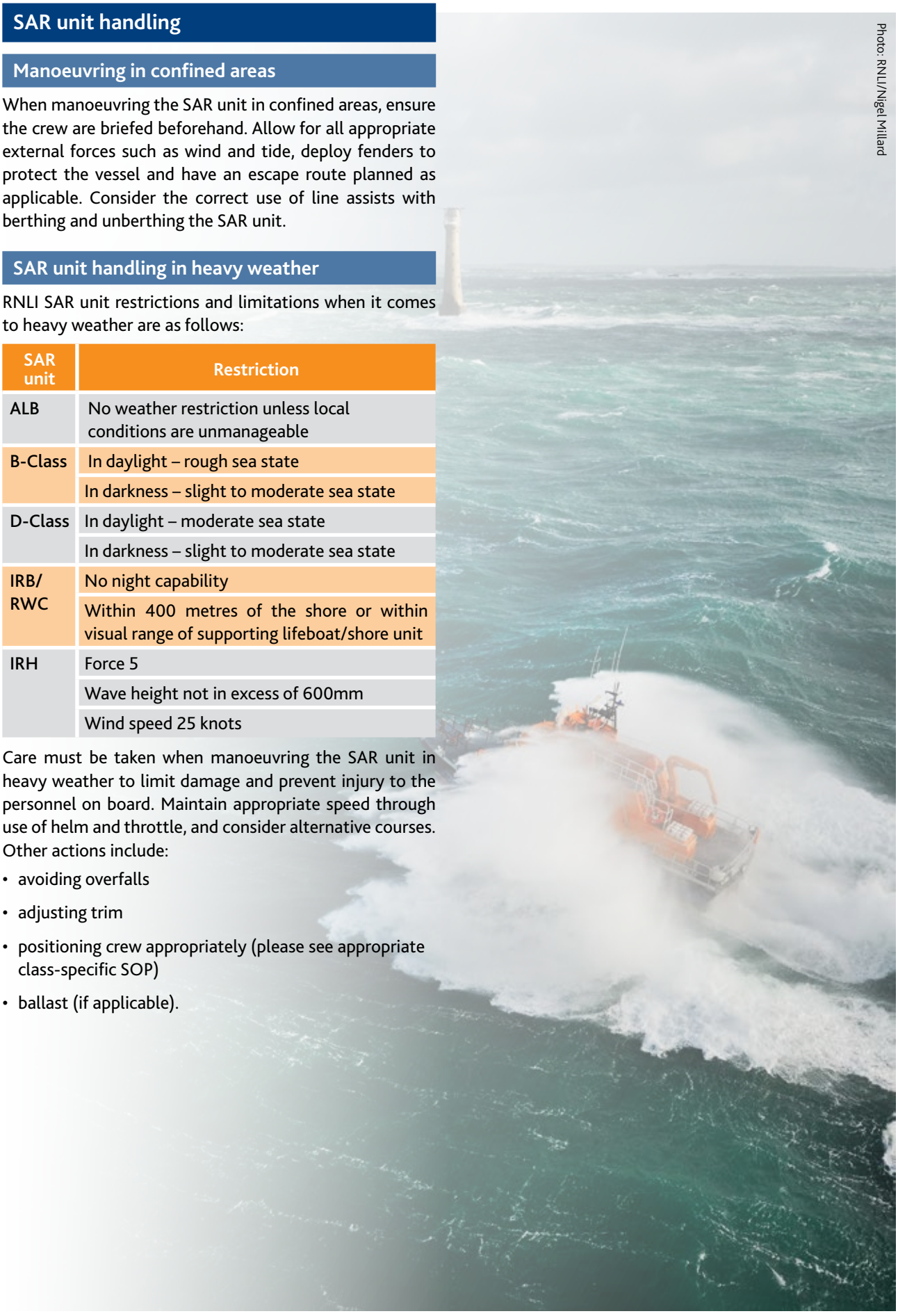


Photo: RNLI/Nigel Millard

What NOT TO DO in rough weather

The following series of diagrams illustrate the 'Pendulum Effect'. This effect is the result of a series of misjudgments made by the ILB helm and can be described as follows:

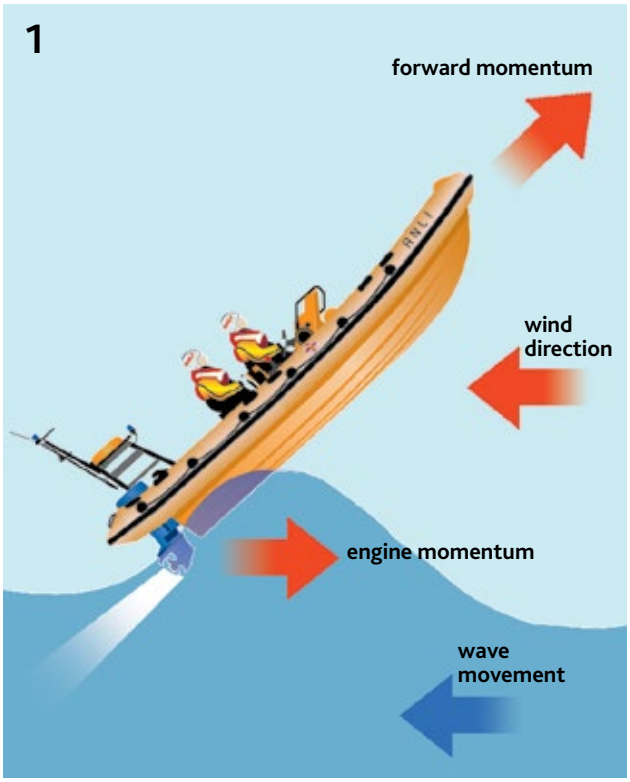


Diagram 1

A combination of the following three factors will result in the ILB flying from the top of the wave.

SPEED:
The ILB is being driven too fast for the prevailing conditions.

TRIM:
Incorrect trim position selected.

WAVE:
Poor judgement of sea state.

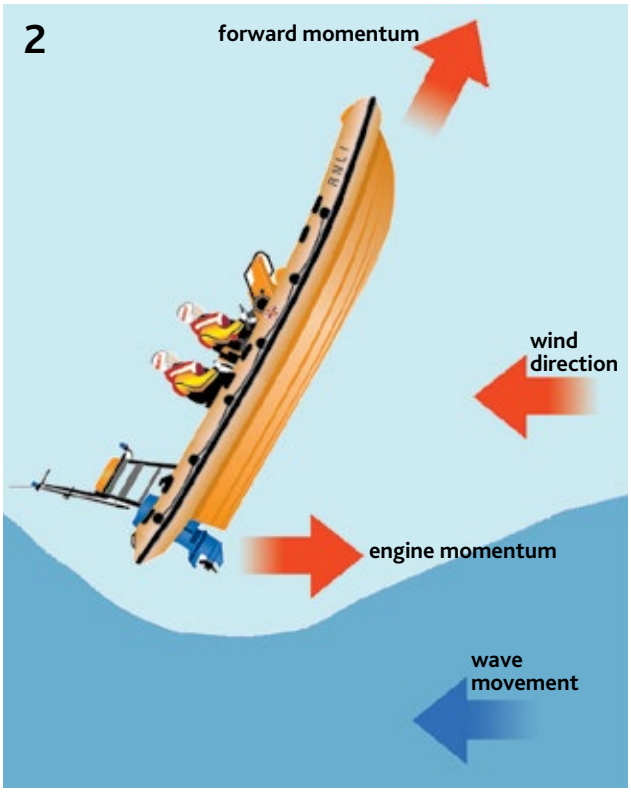


Diagram 2

Once free of the water, the ILB's forward momentum will continue to lift it further into the air. The wind will act upon the hull to hold it in the air while the weight and drive of the engines will cause the stern of the boat to move faster than the bow. This is the 'Pendulum Effect'.

NOTE

There is a difference in handling characteristics between the Atlantic and D class. The Atlantic having most of its weight located at the stern is more likely to pendulum when free of the water. The D Class has most of its weight in the bow area so is more able to punch through the waves.

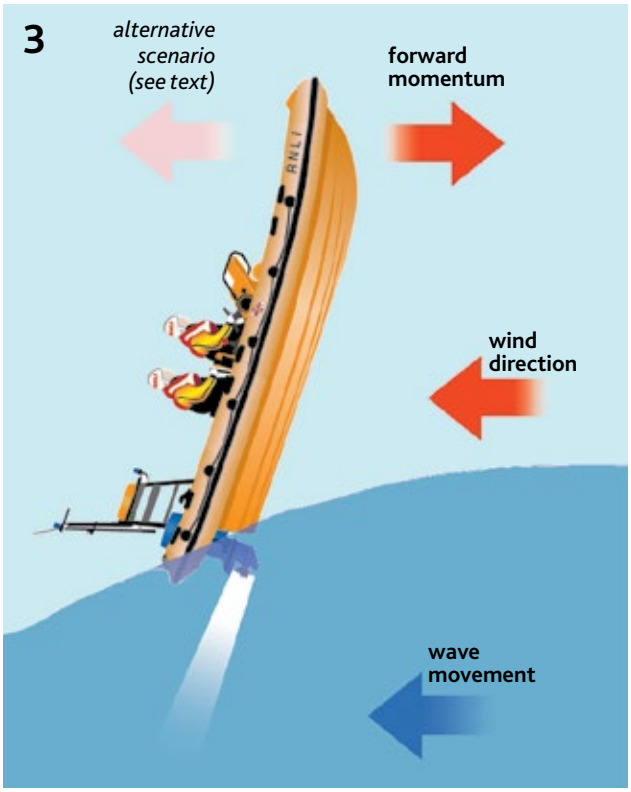


Diagram 3

The ILB continues to rotate until the stern makes contact with the water. This quickly slows the stern thereby causing the bow to pivot back down into contact with the water.

Alternatively

Rotation continues until the stern actually overtakes the bow. Were this to happen the likely outcome would be that the ILB would capsize bow over stern.

Diagram 4

If the engines leave the water after flying from a wave, as shown in diagram 2, it is important to increase the throttle. Increasing revs increases the exhaust pressure which is discharged from the centre of the propellor hub. This reduces the chance of exhaust gases backing, or water ingress causing the engine to stall or swamp. An engine will run for approximately ninety seconds without cooling water.

What TO DO in rough weather

In an UP SEA

The following series of diagrams illustrate the correct technique for handling a boat in 'UP SEA' conditions.

NOTE

The technique as described assumes the waves are not breaking and the ILB helm is therefore prepared to "take the wave on". In circumstances where the sea is breaking, and providing there is sufficient sea room, it is more likely that the ILB helm will choose to ease back on power and allow the wave to approach the boat so allowing the wave to slowly disperse its power. Alternatively, alter course and avoid the wave altogether - see 'Across Sea'.

Diagram 1

Prepare to "take on" the wave. Ensure the engines are trimmed IN which will help in keeping the bow down. If the ILB is fitted with a ballast tank, this should be FULL.

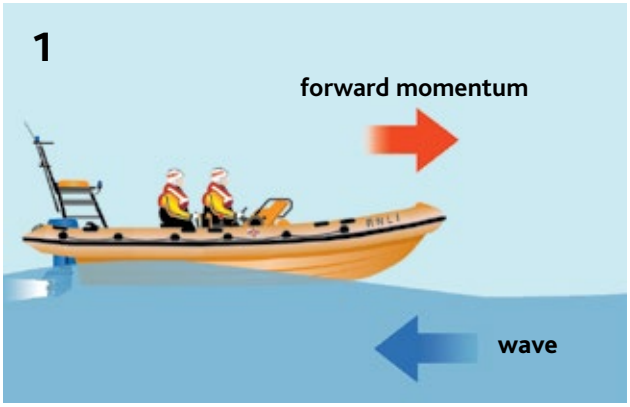
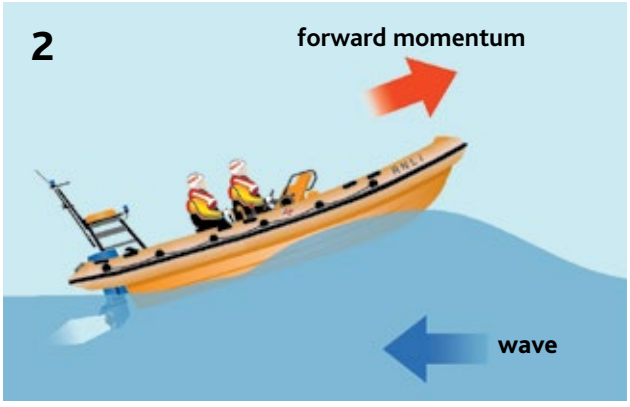


Diagram 2

Sufficient power should be applied to prevent the ILB from flying from the top of, or slipping back down the face of the wave.



NOTE

A good indication of sufficient power:-
Atlantic 85: The bow cleat is aligned with top of wave.
D Class: The canopy is through the wave.

If the boat does fly from the top of of a wave, increase the revs to reduce the chances of stalling or swamping the engines on landing. Once landed, immediately ease off the power to prevent flying off the next approaching wave.

Diagram 3

As the wave moves beneath the ILB the bow starts to drop into the following trough. Increase engine power to "soften" the landing.

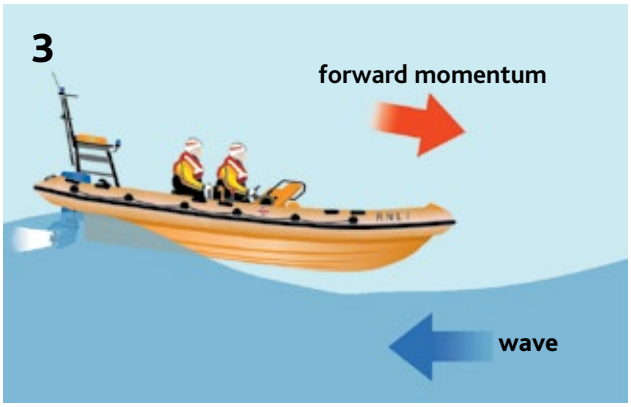
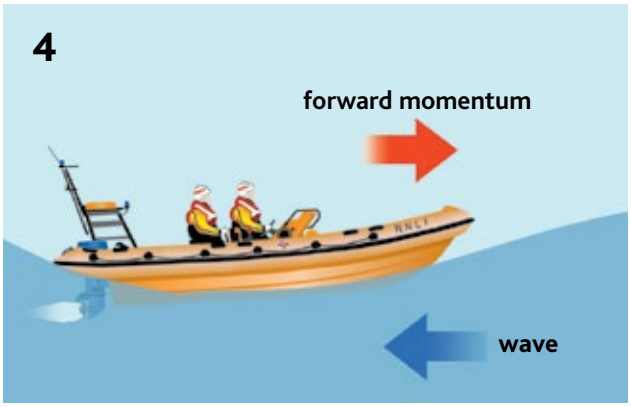


Diagram 4

On landing, ease off the power and assess the alternatives for dealing with the next wave.

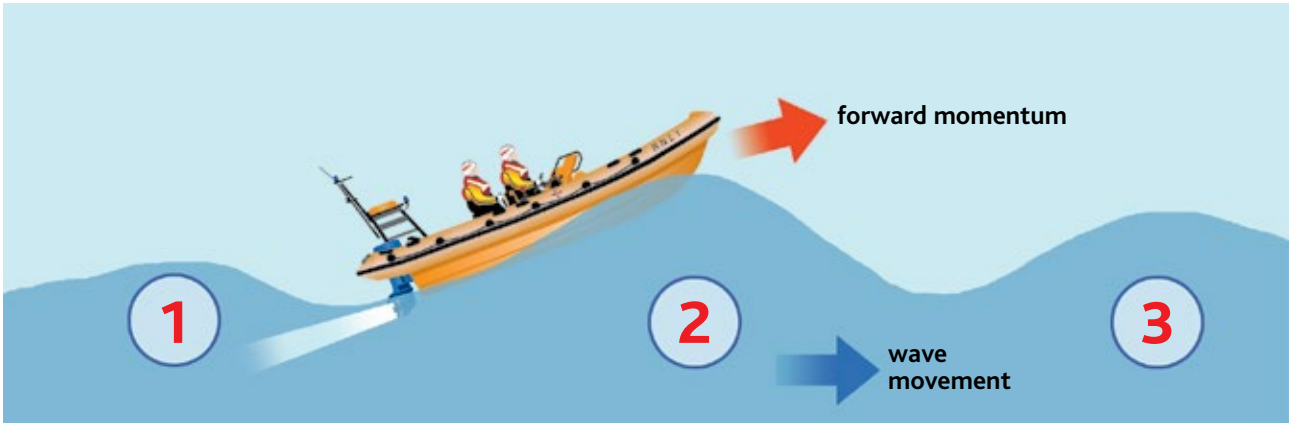


Alternative strategies

Turn Round: If there is sufficient sea room then turn round and "run". Be aware that in a high speed turn the engine will airate resulting in a loss of forward motion.

Alter Course: Alter course to prevent having to take on the larger section of the wave. Alter course to take on the broken water rather than the section of the wave which is about to break.

In a DOWN SEA



The diagram above shows a series of three waves. Their appearance is fairly representative of what you might expect within a typical wave set.

Things to consider before moving "down sea":

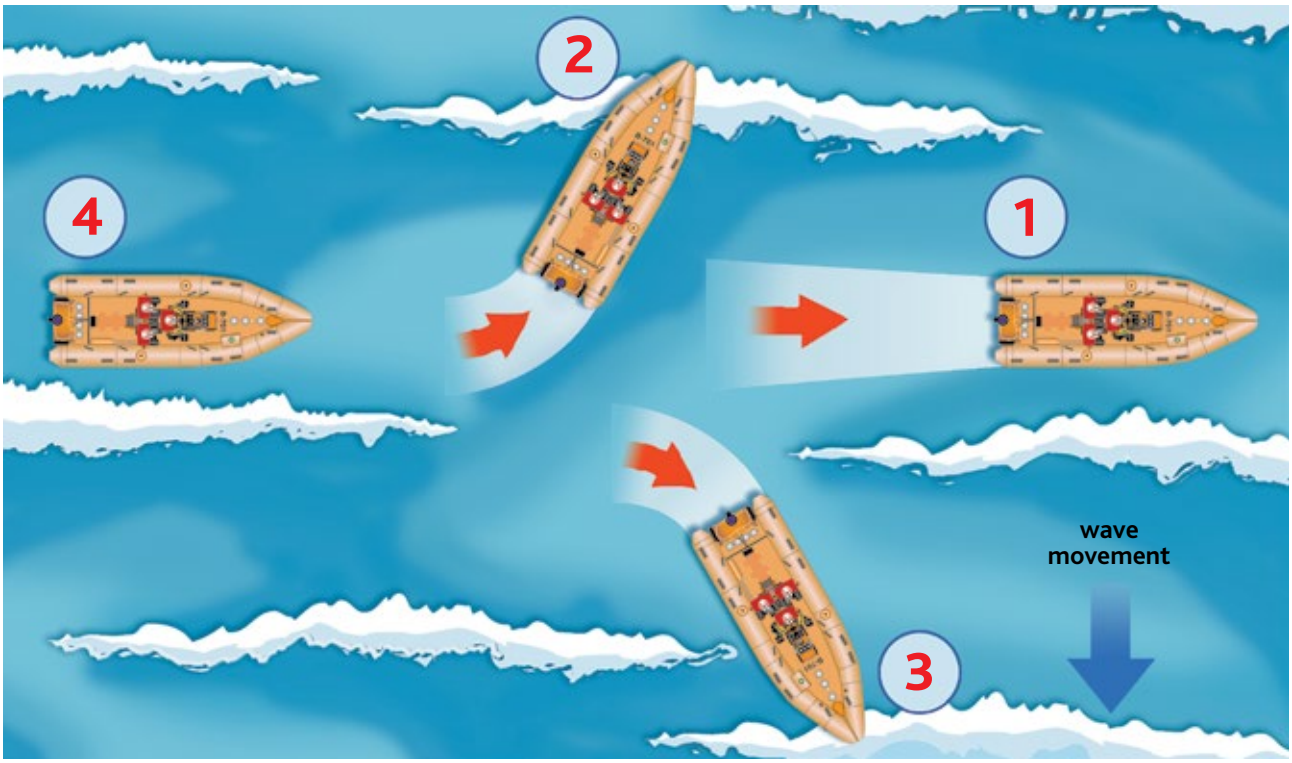
- The engines should be trimmed LEVEL (or slightly out) which will help in raising the bow.
- If the ILB is fitted with a ballast tank, this should be EMPTY.
- Choose the wave on which to position the ILB.

On the diagram this is represented by wave 2 and is chosen because:

- It is the largest wave and therefore affords the greatest height of eye.
- As it is the largest wave it presents the greatest danger. By keeping it beneath the ILB, it gives you a degree of control. The ILB helm should "ride" the wave to ensure the boat does not overtake, or slide back down the wave. Therefore the ILB helm must continually "feather" the throttles to ensure the speed of the ILB constantly matches the speed of the wave.
- The largest wave will take the ILB further up the beach in the event of an emergency beaching.
- If you are on the largest wave it is then likely that the next large wave, when you consider typical wave sets, will be further behind you.

Photo: RNLI/Nigel Millard

In an ACROSS SEA.



The diagram above shows four options for moving across sea.

Things to consider before moving "across sea":

- The engines should be trimmed LEVEL, this being the best set up to deal with variable sea conditions.
- If the ILB is fitted with a ballast tank the decision is down to the ILB helm, who must bear in mind the following: - if EMPTY it could prove a problem when turning to face large oncoming waves as the bow will be light - if FULL it means the boat will react more slowly and the engine would incline to airate in fast turns.
- **OPTION 1:** Use the ILB's speed and manoeuvrability to out-accelerate the wave. To use this option it will be necessary to have sufficient reserve power available to react quickly to changing conditions.
- **OPTION 2:** Turn through 90 degrees and take the wave on. (Refer to "UP SEA" described earlier.)
- **OPTION 3:** Turn through 90 degrees and go down sea. (Refer to "DOWN SEA" described earlier.)
- **OPTION 4:** Slow down and let the wave pass in front of the ILB .

Recovery of person from water

In order to return to the position where a man overboard has occurred, slow the vessel and turn onto a safe reciprocal course, taking into account the effect of the wind. Mark the position on a GPS and on a paper chart (if available) with time, then set DF radio to 121.5 MHz to hone in on the person's Personal Locator Beacon (PLB) and issue a DSC distress alert, then MAYDAY call.

Rig the searchlights and prepare white rocket illumination flares; prepare night vision kit if required. Be aware that operating night vision equipment in the direction of flares may cause it permanent damage. Muster all available crew as lookouts. The navigator calculates a datum position by assessing the tidal current and wind direction; on arrival at the datum position, if the person overboard is still not located, begin a datum search pattern.

If using illuminating flares please refer to the relevant SOP for safe operation.

Manoeuvre the vessel safely towards the person overboard in accordance with the current SOP.

Consider all safe options, allowing for wind and sea direction, minimising risk to man overboard and crew. Proceed dead slow, ideally upwind, to approach the person overboard. Stop propellor if safe to do so.

Photo: RNLI/Nigel Millard

Going alongside another vessel

Manoeuvre the SAR unit alongside another vessel using engine and helm movements, maintaining a minimum steerage speed of the target vessel. There are a number of risks associated with coming alongside another vessel for your crew, the SAR unit and the target vessel, including:

- injury/entrapment/MOB
- equipment overhanging the side of the target vessel
- size relationship between vessels
- sea state
- risk of collision
- propeller fouling
- damage to vessel
- hostile or antisocial persons.

Minimise risks with effective communications with the target vessel, briefing the crew, maintaining safe speed and fendering.

Interaction – the force between moving vessels – will have an effect on the SAR unit and the target vessel; bow and stern areas will push apart, while in-between will draw together. Another form of interaction is squat, where the vessel is drawn down in shallow water; the effects of squat can be reduced by reducing speed.

Hold station with the other vessel without making contact with it by using engine and helm movements.

When manoeuvring away from another vessel, it is important to remain vigilant and take care to reduce risk of injury to crew and casualty and avoid damage to either vessel. Consider weather, tide and sea state and consider a crew brief before carrying out the manoeuvre.

For specific details on the requirements and standards for Hovercraft manoeuvring in confined areas and handling at sea including carrying out an Emergency Stop in a straight line and a Displacement Turn, please see "IRH – Land Test Circuit".

Manage helicopter operations

Helicopter operations will either take the form of an exercise or a service. The person in command is responsible for deciding if the SAR unit is capable of undertaking winching operations in the condition and that the planned course and speed of the RNLI SAR unit will:

- provide the most stable platform
- ideally have the 'cone of downdraft' from the helicopter dropping astern of the RNLI SAR unit
- ensure safe navigation of the RNLI SAR unit and collision avoidance.

The pilot of the helicopter is responsible for the overall coordination of the operation and will assess the suitability of weather and sea state for helicopter operations. They will not commence winching until cleared to do so by the person in command. When winching, the crew member/ casualty MUST always take directions from the winchman.

Communications

Before commencing an exercise, communication is established over VHF with the helicopter.

Depending on the area the following call signs are to be used:

- 'COASTGUARD HELICOPTER' followed by three figures e.g. 'COASTGUARD HELICOPTER ONE ZERO FOUR'.
- Irish Coast guard helicopters use 'HELICOPTER' followed by three letters e.g. 'HELICOPTER MIKE ECHO SIERRA'.

During a service, communication is to be established on VHF with the helicopter using the call sign 'RESCUE' followed by the three figure call sign.

NOTE

HMCC/IRCG must be notified if the helicopter/ SAR unit has to depart with more or less crew than previously identified; as thus, the person in command may decide their SAR unit is unavailable for service.

Considerations for winching

When carrying out winching operations with a helicopter consideration must be given to the following:

- The pilot of the aircraft has only limited visibility of the vessel when a helicopter is hovering over an ALB. Over an ILB he has no visual contact whatsoever.
- Considerable concentration is required by the pilot of the aircraft when hovering low over an ALB. During winching the pilot must rely on positioning instructions from his winch operator.
- The height of hover above a RNLI SAR units will vary depending on the operator/aircraft in use and may vary from 20 - 50 feet depending on circumstances.
- Helicopter radius of operation and endurance.
- Weather conditions including visibility.
- Location of operation with regard to safe navigation and vessel capability.

Briefing

The person in command must brief the crew and all other necessary personnel on the type of operation and the preparations required.

The person in command must ensure the following is carried out before the helicopter arrives:

- All personnel involved in winching operation to be dressed in appropriate PPE including protective headgear properly.
- All loose gear and debris which could pose a threat to crew and helicopter must be removed or secure form the winching area.
- The MF Transmitter switched off (ALB only).
- The radar to be switched to standby.
- The whip aerials to be lowered (if required) – experience has shown that this is not always required; local liaison should ascertain individual helicopter flights' preferred method.
- A lookout to be posted.
- Flags to be prepared – some SAR units are equipped with red and green flags to aid with communications while the helicopter is close; green flag for 'continue' and red for 'cease operations immediately'.
- Hi-line handling equipment to be ready.
- Sea anchor to be prepared (if required).
- Appropriate lifejacket worn if crew being winched.
- Lifejackets.

If an ALB crew member is to be lifted into a SAR helicopter, the automatic capsule MUST be removed from the operating head of the lifejacket prior to winching and the disarmed tag displayed on the lifejacket. Once the winching operations are complete, the automatic capsule MUST be replaced immediately on re-boarding the SAR unit. With the automatic head disabled both stoles can still be inflated manually.

This procedure arises for the following reason, if an ALB crew member is winched up into the helicopter and should the helicopter be required to 'ditch' into the sea for any reason, the lifejacket will automatically inflate on hitting the water and the crew member will be unable to get out of the helicopter via the escape hatch because of its inflated bulk and unwanted buoyancy.

Crew who are to be winched during a pre-planned exercise should wear either an ALB lifejacket (with the automatic activating head removed) or an inflatable survivor's lifejacket. If crew are winched in unforeseen circumstances, they will be asked to change their ILB lifejacket for one of the helicopter's spare lifejackets while in the cab.

Winching method

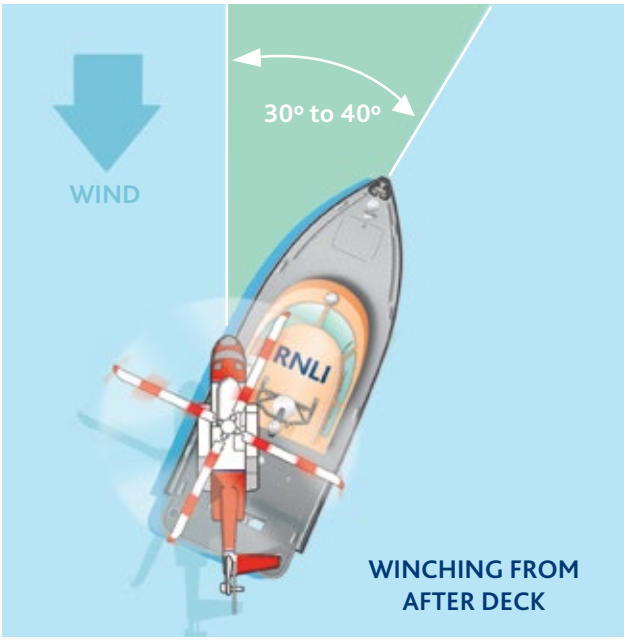
The person in command will agree with the helicopter pilot over the radio the safest procedure. Speed and course to steer is agreed, taking account the following:

- the existence of other traffic
- prevailing wind direction/speed
- the direction/height of the sea
- tidal stream effect
- the sea room available
- casualty requirements
- any other hazards which may exist.

When the helicopter arrives the RNLI SAR unit will steer the pre-arranged course and speed. The person in command must ensure that it is safe to commence winching from the deck of the RNLI SAR unit before proceeding.

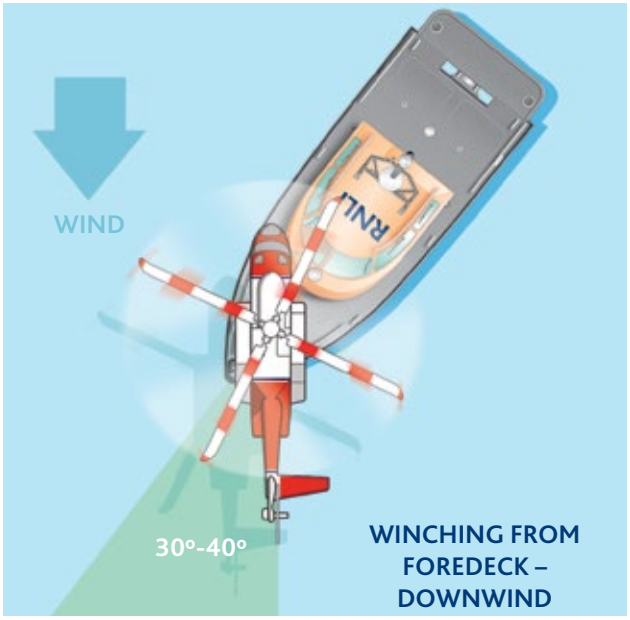
ALB procedures

Winching into the wind



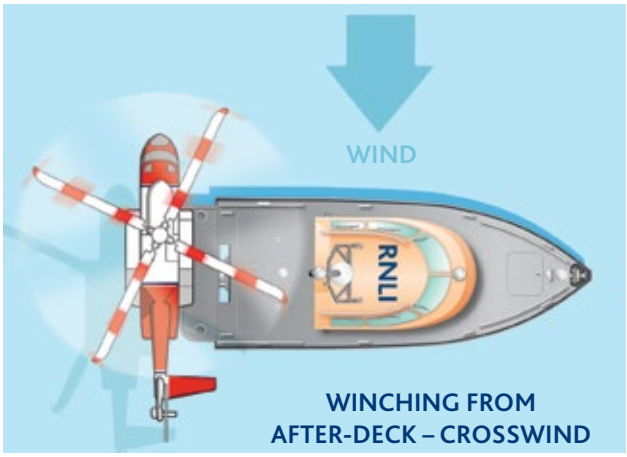
Winching into wind takes place from the after end of the ALB; this provides the pilot with a clear view of the ALB, enabling them to maintain an accurate position. The coxswain must ensure that the helm maintains a steady course and speed.

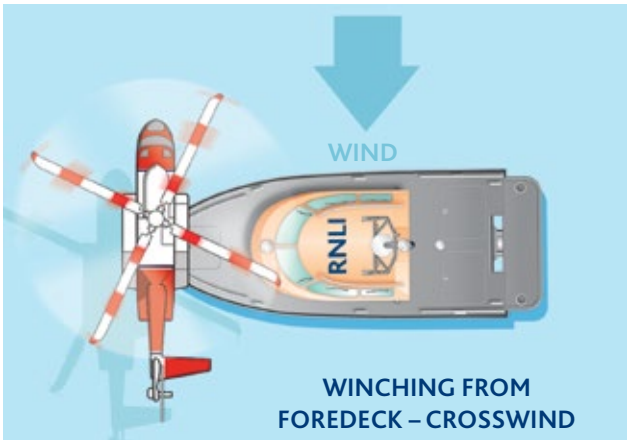
Downwind winching



Downwind winching takes place from the foredeck of the ALB; the helicopter may be flying backwards. If there is a chance of broaching, an alternative method of winching should be used. The ALB will be requested to reduce minimum steerage speed as the aircraft will be flying with a rearwards component.

Crosswind winching





If necessary, a helicopter can winch from an ALB with the wind on either the port or the starboard beam, in the latter case off the foredeck. The ALB may be requested to reduce minimum steerage speed as the aircraft may be flying sideways.

ILB procedures

ILB formatting on the helicopter

When winching is taking place the helicopter pilot cannot see the ILB and has to rely on their winch-operator to constantly narrate the progress of the procedure. This means that the helicopter crew and the ILB's crew, particularly the ILB helm, must be fully aware of the type of procedure to be used and the consequences of not abiding by the following guidance. Any unforeseen changes in speed or direction of the ILB when the winchman is on the hook at the critical stage of deployment or recovery can cause injury to the winchman and/or the ILB's crew.

The helicopter crew will, following consultation with the helm, decide which procedure is to be used to affect the lift after taking due note of the following limitations:

- sea state no greater than slight
- wind speed and direction
- ILB class
- sea room available
- condition of the casualty
- visibility (including but not limited to night, where vision is likely to be degraded by helicopter flood lights).

NOTE

This does not remove the helm's primary responsibility for safe navigation of the RNLI SAR unit. Any concerns should be raised with the helicopter crew prior to commencing winch operations.

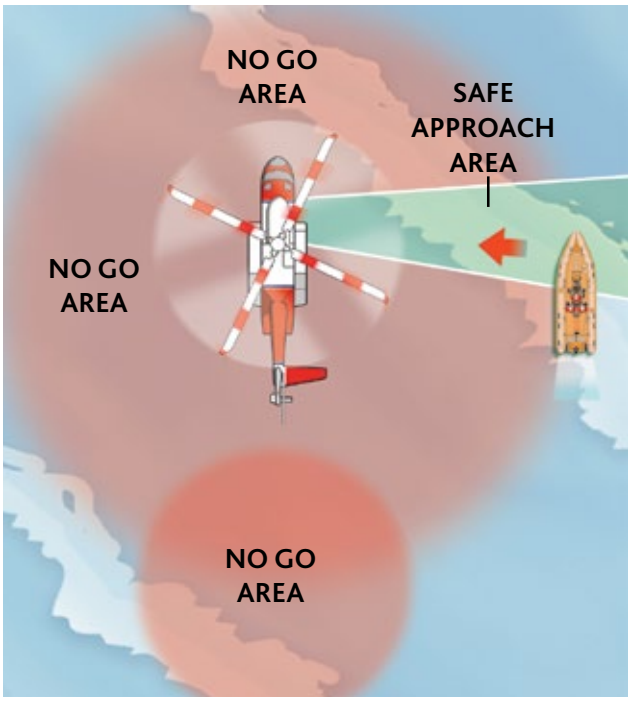
Sequence of events

Start position should be to the starboard side of the helicopter. In this position the helm will experience exactly the same sea conditions as when under the helicopter and can therefore ask the pilot to adjust his speed in order to:

- reduce slamming
- maintain good steerageway.

The ILB should remain clear of the winching position until the winchman is lowered to approximately 2 metres above the sea to reduce the chance of the winchman falling into the ILB or being run over should the cable break. The ILB should then move into the winching position.

Winching position must be to the helicopter's starboard side and remain so, allowing NO ERRORS to port. The ILB must not overshoot the winching position but should adjust speed to match the helicopter just to starboard of the underwinch position.



NOTE

Once the helm has positioned the ILB to receive the winchman or strop, it is essential that they concentrate on maintaining accurate station under the helicopter's winch and must not look at the winchman.

Once the winchman is in the ILB, they will immediately disconnect themselves from the hoist and hold the hook up in the air, clear of all obstructions, thus indicating to the winch operator that the hook can be winched clear of the ILB. The helm must maintain the station until such time as they receive a 'thumbs up' signal from the winchman. The helm should depart from the winching position to the 3 o'clock position.

NOTE

Significant downdraft will be experienced when working with the S92 helicopter.

Recovery of the winchman to the helicopter consists of the following:

- The winchman will advise both the helicopter and the ILB crew when they are ready to be recovered to the helicopter.
- The helm should then reposition the ILB to the start position (as above).
- The hoist hook is lowered to approximately two metres over the water.
- The helm then moves the ILB to the winching position (as above).
- The winchman connects themselves and/or the casualty to the hoist hook and gives the winch operator a 'thumbs up' signal when ready to lift; all the while, the helm must maintain the winching position.

Only when the winchman and the casualty have been lifted clear of the ILB can the helm breakaway; they must position the ILB to the three o'clock position, in full view of the helicopter. If further winching is anticipated the ILB should remain in full view of the helicopter, well clear to starboard until ready to move to the start position.

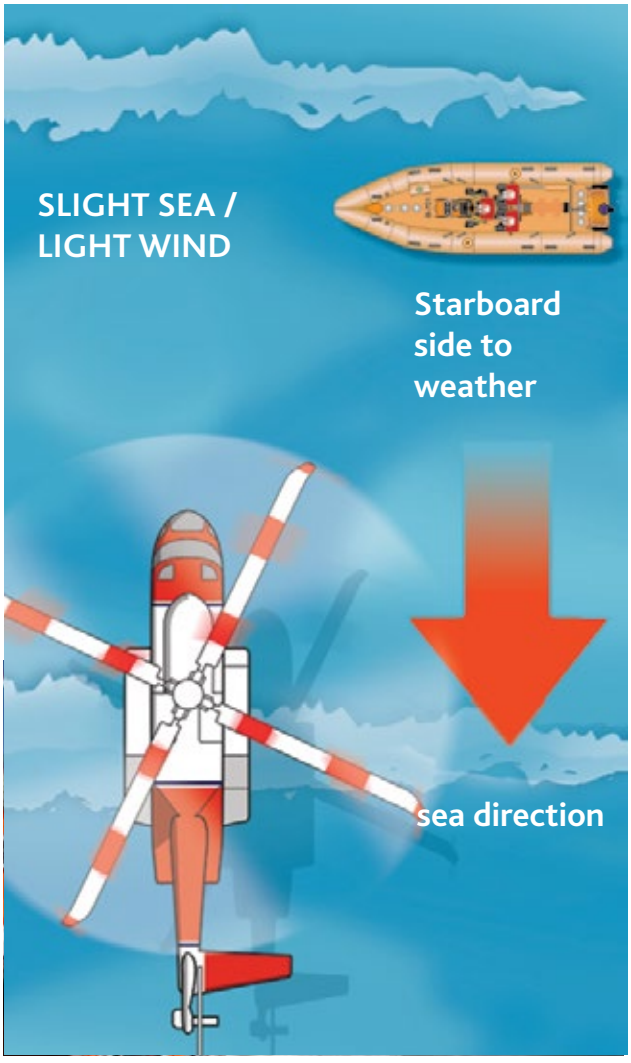
Stationary winching

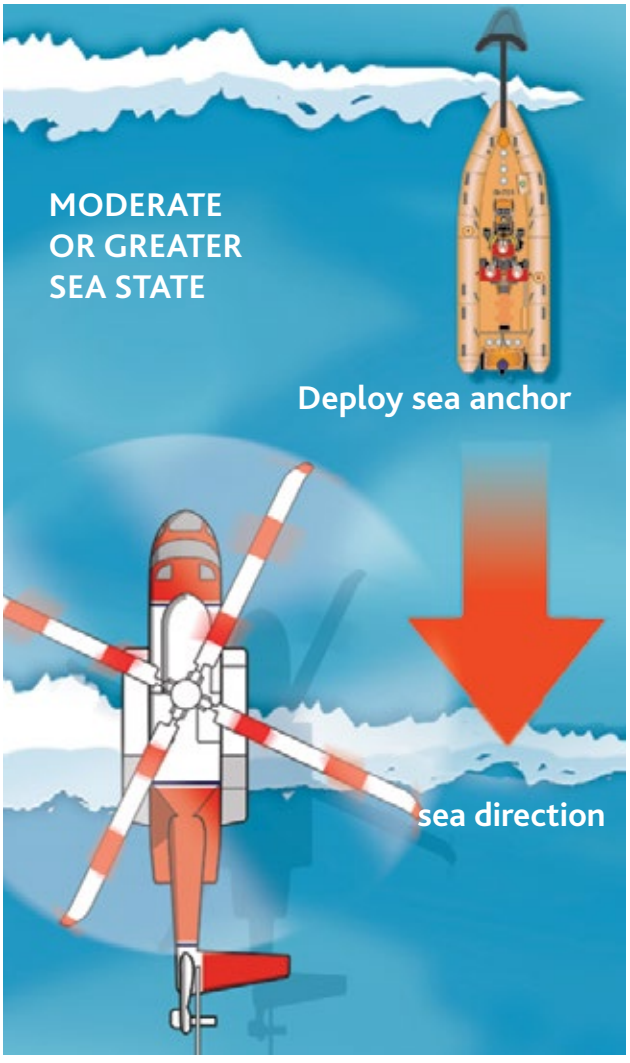
During stationary winching the ILB should be stopped in the water with the engines running but in neutral, and the positioning is carried out by the helicopter.

This method may be more appropriate in the following circumstances:

- ILB pitching could worsen casualty injuries
- high sea state
- where clear sea room is insufficient for transfers underway
- at night.

If concerned about sea state and wind velocity, the helm can deploy the sea anchor and engage astern gear at low revolutions so that the ILB lies head to sea. Consideration should also be given to undertaking a static lift from the shoreline as a more stable platform.





Managing hi-line transfer

The hi-line technique is used for multi persons or when the sea and wind conditions make it too difficult to lower a winchman directly on to the deck, or if there are potential hazards onboard the target vessel such as masts, rigging, fixed aerials etc.

The hi-line must never be made fast to the vessel and gloves must always be worn when handling the hi-line as not doing so could result in severe friction burns if the helicopter moves off station quickly.

Emergency procedures

'Break off' in an emergency

The 'break off' signal by radio or the display of the red flag by a SAR unit, should be authorised in emergency by the person in command. The red flag must be kept available for use in the transfer area where it can be seen by the helicopter winch operator. Provided it is safe, the helicopter will immediately recover the wire, ascend and move off to a safe distance. In the event of 'break off' in emergency, the SAR unit should turn to starboard, away from the helicopter.

A very heavy static charge can build up in all helicopter winch wires. At no time should the helicopter crewman, the strop or the winch wire be touched until they have been earthed, either by making contact with the sea or the RNLI SAR unit.

Helicopter emergency

If a helicopter suffers a major mechanical failure that forces the pilot to 'ditch' the aircraft then the pilot will always attempt to move the aircraft away to port prior to ditching in the sea. It is most important that at all times the sea area immediately to port of a helicopter is kept clear, especially while a helicopter is winching.

The no go area ahead is due to the helicopter's requirement to gain more lift in certain circumstances; this will involve a rapid reduction in altitude.

The area astern of the helicopter will contain the downdraft from the rotors and will change size and strength in relation to the helicopter's movements.

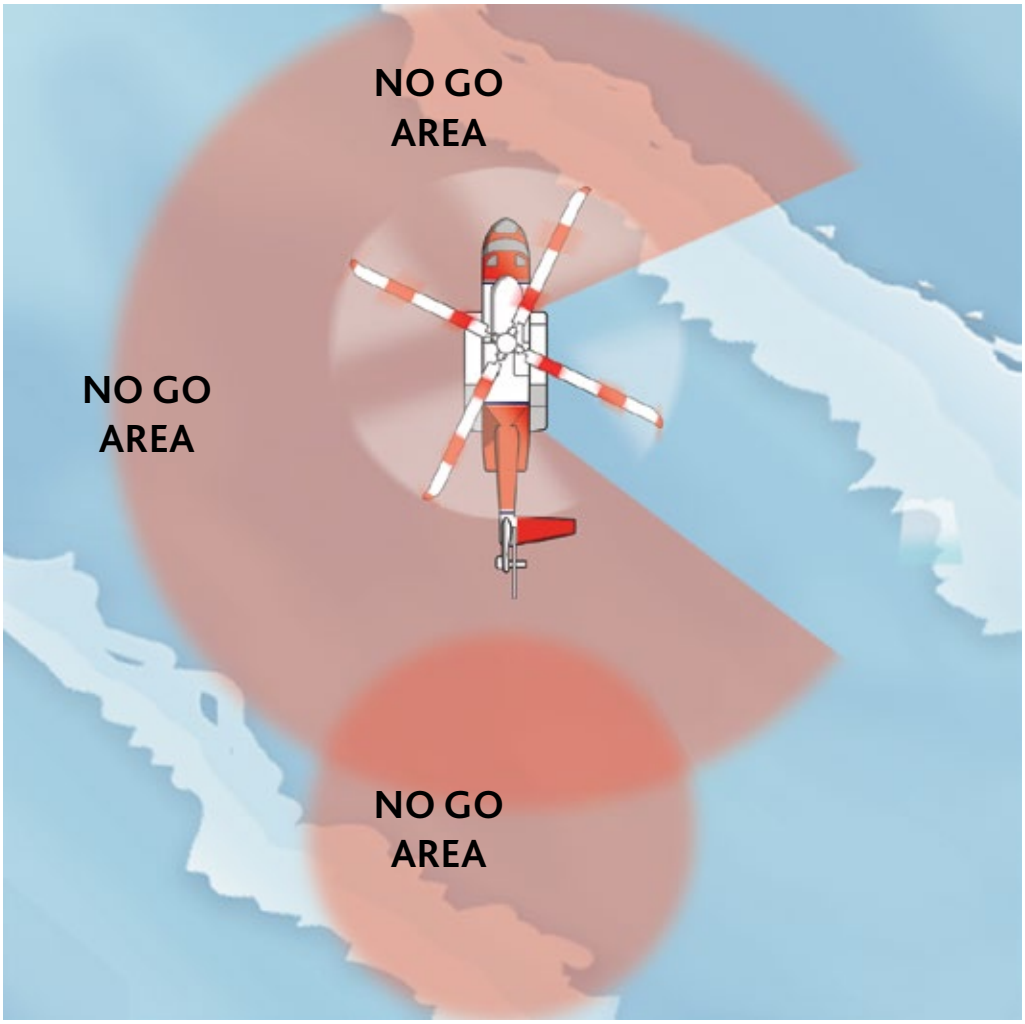


Photo: RNLI/Danielle Rush

Activity

5

Search and Rescue

Managing search and rescue

Once the authorisation to launch has been given, it is the responsibility of the person in command to safely and efficiently manage the rescue of the casualty.

How this is done will vary on each occasion as each situation is different but key principles will be the same.

Tasking information

Once the authority to launch has been received and the person in command of the SAR unit identified, they should contact the coordinating National Maritime Operations Centre (NMOC) for full tasking. This should be ideally done via Telephone (as per the relevant SOP) as a clear route of communication can be established and important questions can be raised.

Even if the Launch Authority is in attendance at the station this telephone dialogue should happen. This is to appraise the crew of any developments since the initial tasking.

There is critical information that any SAR unit on service should request prior to launch, so that a full appraisal of the situation can be made, and an informative SMEAC brief can be given to the crew.

Description of incident

A full account of events leading to the Launch of the SAR unit including why the SAR unit is required

Position of casualty

This will be provided as Latitude and Longitude, an OS Grid Reference, a range and Bearing from a known object, or a geographical location e.g. East Knoll Buoy. This position should be recorded so that it can be plotted on board the SAR unit to allow safe navigation to the casualty location. When this information is received a time should also be requested so that a timeline of events can be established.

Search target

A full detailed description of what the SAR unit is looking for. This should include type of vessel, length and colour of vessel. Numbers of persons on board, is the vessel stable, identifying features, means of communicating distress, and if they have lifejackets, life rafts etc

The more detail that can be found out about the casualty at this stage will enable the person in command of the SAR unit to formalise a plan to locate them more easily.

For example, being tasked to a white hulled yacht with white sails during a sailing regatta does not make the task easy.

Instructions from the coastguard

The coastguard is the coordinating authority in all maritime search and rescue, on occasion they may have specific instructions on how they would like the SAR unit to effect a rescue or a search. It is important that if specific instructions are passed to the SAR unit at any time, that these are followed. In the event of any disagreement by the person in command of the SAR unit with the coordinating authority, it is important that this disagreement is raised and the reasons for it explained. It is recognised by the NMOC that on occasion, the information they have available is different to what is being experienced by the SAR units in attendance of an incident.

All of this tasking information is prompted by using the SAR check cards that should be carried on each SAR unit. (***TP-ALB-133*** and ***TP-ILB-134***)

Risk versus benefit

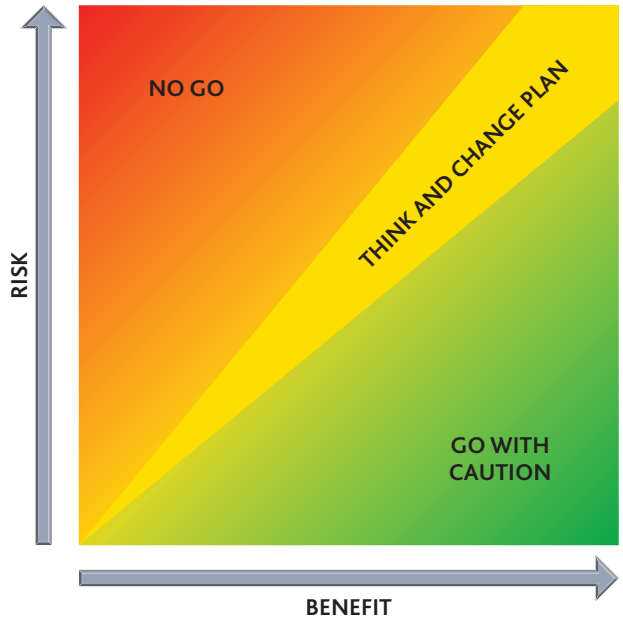
Once the SAR unit is tasked, the safety of the vessel and her crew now fall to the person in command of the SAR unit. It is up to them to safely manage the risk associated with launching, executing and returning from the Search and rescue mission.

Prior to briefing the crew, the person in command should identify the risks involved with service and consider if they outweigh the benefit to the casualty.

In the following examples consider the risk/ benefit of each situation and decide if you would launch or not:

- D Class. Moderate Sea. Onshore Force 5, Dark. Windsurfer reported overdue by 2 hours.
- B Class. Rough Sea Onshore Force 7 Dusk. Swimmer reported in difficulty near a pier.
- B Class. Calm Conditions. Offshore force 2. 2 children drifting in an inflatable.
- ALB. Calm Conditions High density of commercial and Leisure Traffic foggy. 15 ft. angling boat 1POB taking on water and unsure of position. 15 miles from station.

All search and rescue missions have some degree of risk. It is down to the person in command of that SAR unit to identify if the risk outweighs the benefits and make the difficult decision to not launch or to turn back.



Most of the risks that are encountered can be mitigated and control measures can be put in place to minimise the risk to the SAR unit and its crew. Such mitigations may include a choice of a more experienced crew, the launch of additional assets/flank station as a backup or a delay in launching the SAR unit until conditions change/improve.

Crew brief

All crew should be briefed on the incident prior to launching in the agreed formats (see Activity 2 for details on operational briefing and debriefing). The agreed format (SMEAC) is also how we receive the brief from the Coastguard when tasked. The brief should include:

- casualty description
- incident location
- conditions i.e. weather
- equipment required
- lookout positions, routine and rotation
- scanning techniques
- action on sighting the casualty.

Planning search and rescue

It is the responsibility of the designated coordinating authority to efficiently plan any search and rescue mission.

Lifeboat crews are required to have an understanding of this process to allow them in the absence of information to make an educated decision. The RNLI and the MCA have established Protocols (TRG-115) to ensure that common terminology is used.

SAR terminology

Drift start position (DSP)

A geographical location that is the origin of the incident. It is expected that a casualty when referenced to a DSP is drifting and has no ability to assist themselves.

Datum position

A position that has been recalculated by either the SAR unit or the coordinating authority as a more accurate position of the casualty to coincide usually with the ETA of the SAR unit on scene. Datum positions calculated for periods greater than one hour from the DSP are usually inaccurate as they only include tidal drift and leeway.

Divergence

Divergence is referenced as an angle relative to the true downwind drift of an object. Different objects will have different rates of divergence dependant on wind strength. RNLI SAR units do not carry divergence tables but it will be applied by the coordinating authority in prolonged search incidents.

Commence search position (CSP)

The position given to the SAR unit at which to start the search. This position should also be accompanied by the direction of the first leg, the length of first leg, direction of first turn, number of legs and the track spacing.

Track spacing

This is the distance between each leg of the search pattern. It is usually equal to the sweep width but may be changed only by the coordinating authority. A change to the track spacing will affect the probability of detection. For example a trcack spacing greater than the sweep width will reduce the probability of detection.

Probability of detection (POD)

The likelihood of SAR units finding the casualty. Usually expressed as a percentage, this will be a managed decision by the coordinating authority as to what is acceptable. RNLI SAR units cannot make decisions which will affect the POD.

Sweep width

A mathematical calculation that identifies the expected distance a search target can be seen for these figures are taken from the IAMSAR manual for Surface vessels up to 40 feet in length. It is recognised that this is a big category for all RNLI SAR units, and therefore an agreed adaptation has been made for SAR operations on ILBs.

On ALBs, sweep widths are published in their uncorrected form and it is the decision of the coxswain and the navigator to apply the required corrections when needed.

In the ILB check cards the sweep widths have already had corrections applied and are expressed as period of time at set speeds. The distance covered is then showed in brackets.

Plotting the casualty position

On launch, the person in command of the SAR unit should ensure that the casualty position is accurately plotted on electronic and if practical paper charts. The position plotted should be identified using annotations to show if it is the current position, the DSP or a datum position. A time should also be placed with his position to allow for further planning if required.

The casualty position will, once plotted, allow the SAR unit to provide to the coordinating authority an accurate ETA. The ETA should be given as a four figure time of day to enable accurate recording by the coastguard. This early identification of an arrival time will allow the creation of search instructions that can be passed to the coastguard.

The priority of those in charge of the SAR unit is the overall safety of the vessel and its crew. It is therefore critical that once the casualty position is plotted a safe route is then calculated from the launch site to the plotted position. This must be done before any other SAR planning is completed on board.

Photo: RNLI/Nigel Millard

Developing search plans

As the SAR unit is nearing the on-scene position, the coordinating authority should be notified, and informed that a situation report (SITREP) will follow.

If there is no clear visible or electronic contact with the casualty the coordinating authority should be contacted and a full appraisal of the on scene conditions should be given. This will include sea state, visibility, weather, tidal set and strength, wind speed and direction. The SAR check cards provide information on interpreting weather.

It may be necessary in the absence of any coordination or direction from the coordinating authority for the person in command of the SAR unit in conjunction with his crew to develop appropriate planning for searching.

On an ALB there may be a requirement for the person in command to oversee or to construct a datum position for the arrival time on scene.

The creation of a datum position is explained in the ALB SAR Check cards TRG-ALB-134 with a step by step guide on how to do it.

ILB Check cards do not contain this information so if required support of an ALB should be sought.

Caution should be exercised when creating a datum on any DSP that is greater than an hour old as the method shown does not include the use of divergence.

In the absence of direction from the coordinating authority, only a datum search should be conducted this is because of the quality of the information and that no divergence is accounted for.

The choice of either an expanding square or a sector search should be considered and a number of factors can be influential in making a decision:

- age and accuracy of the datum
- proximity to land or hazards
- sighting of debris confirmed to be from the casualty.

When tasked with a search by the coordinating authority, the information received will be in sequence as identified by the SAR check cards. This sequence is identified as being the order required by chart plotters as used by RNLI SAR units. The area search will be used for prolonged incidents or those where the accuracy of the DSP is questionable.

Area searches are developed by the coordinating authority using SARIS (a computer based modelling system) this will generate a search area based on information entered.

Photo: RNLI/Nigel Millard

Once the search plan has been passed to the SAR unit, it is the responsibility of the person in command of the SAR unit to ensure that the plan is appropriate for the conditions and all parts of it can be safely navigated.

Factors that will affect the appropriateness of the search plan include:

- position of the sun
- direction and size of sea state
- direction of tidal flow
- depth and obstructions within the search area.

Crew management

As the person in command of the SAR unit, it is your responsibility to manage the crew on board throughout the SAR mission. The main responsibilities are to manage an effective lookout this includes ensuring that crew are positioned on board so as to have a clear view through the whole of the sweep width but are also secure on the vessel.

It may be necessary to alter the crews positions based on safety and reduce the effectiveness of the lookout as a result.

On ILBs, those searching should be positioned in their normal positions and on ALBs consideration should be given to where the lookouts are paced and if they should be clipped on.

In prolonged search missions, the person in command of the SAR unit will need to manage crew resource. This is not only for effectiveness, but also to ensure their safety.

Not only will those in command make decisions on the most suitable crew to take based on the skills and experience of the responding crew, but they will also be required to manage them once on board. Decisions also need to be made on the best use of equipment to maximise the chances of locating the casualty. Different SAR units will carry different equipment and crew on board should be trained and remain competent in its use.

During the search it may be necessary to rotate crew through roles not only to combat the effects of fatigue and boredom caused by prolonged scanning of the horizon, but also to ensure that any that are feeling the effects of the weather or sea sate have opportunity to warm up.

Crew resource management.

See Activity 17.

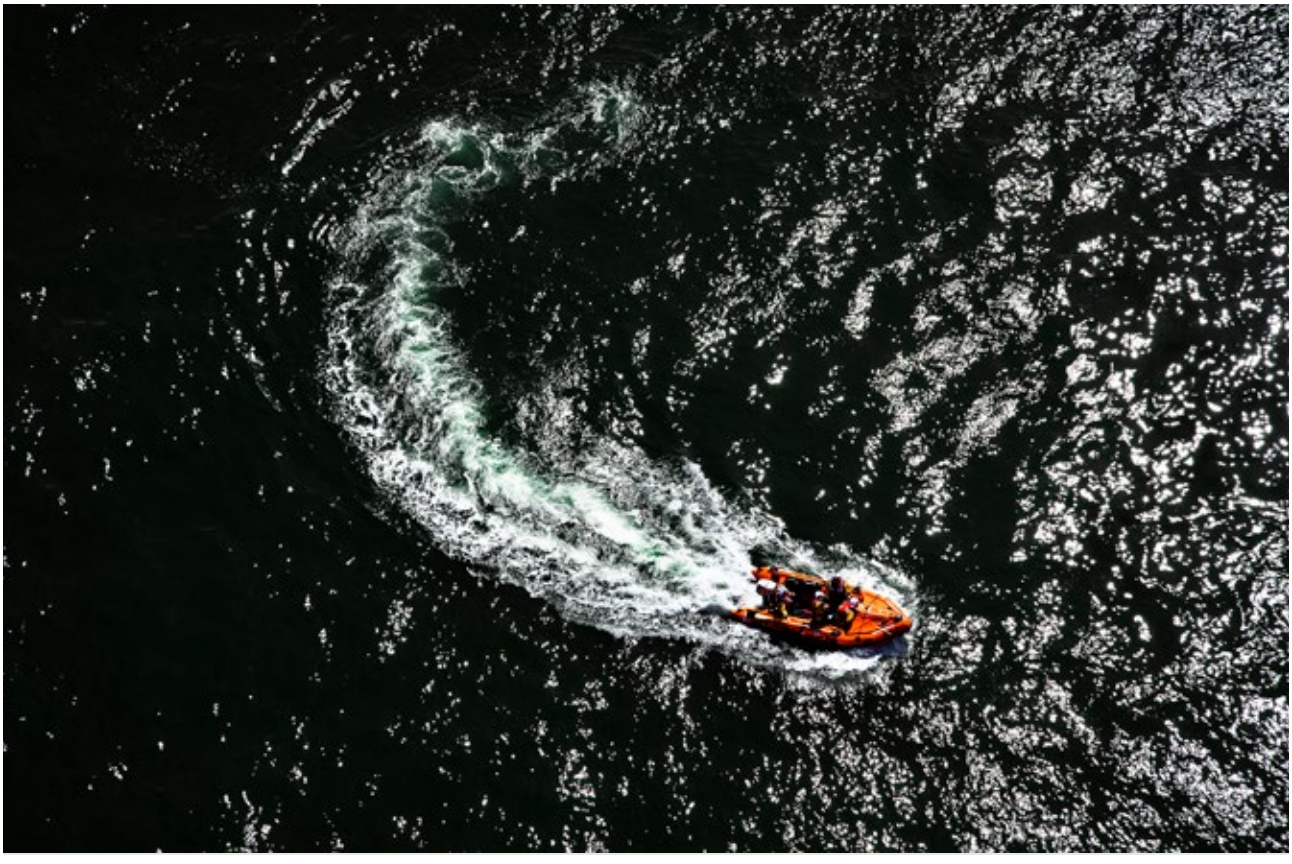


Photo: RNLI/Nigel Millard

On scene coordinator (OSC)

In multi-asset searches the coordinating authority may appoint one of the assets to act as an OSC.

The role of the OSC is to provide a communications link between all of the assets on scene and the coordinating authority. The OSC is not in command of any of the assets except for their own, but is to ensure that the assets under its coordination carry out the requests of the coordinating authority. The OSC can, however, identify if they feel that the request is inappropriate or unsuitable for the assets. For example, if the search has involved a ship and the area of search has moved more inshore.

The role of the OSC can be remembered using the acronym BEASTS:

- Brief other search units.
- Execute the SAR Plan and modify if required.
- Assume Operational Control.
- SITREPs to the SMC and record detailed notes.
- Task units to potential sightings.
- Sea and Weather conditions on scene.

The SAR check cards as carried by each RNLI SAR unit contain an aide memoire for those appointed in to an OSC role.

Usually it will be an ALB or larger that is appointed in to this role. However, it is possible for an ILB to be appointed. This may be due to a number of factors including the delayed arrival time of a larger asset, or the level of SAR knowledge of assets involved.

If the number of assets becomes unmanageable from an ILB due to limited space and/or weather conditions then a number of options can be considered.

Hand over the OSC duties to the larger asset and inform the SMC this has been done, explaining the reasons why. A comprehensive handover should be completed including assets involved, call signs being used, and current position of each asset, search instructions, and number of potential sightings. This brief should be completed in person and as such it may result in a delay in actioning the search plan while it is completed.

Move on to another vessel and continue in the SMC role. This can be done if there are no other assets with detailed SAR Knowledge.

If a person in command of a SAR unit chooses this option then they must ensure that they will have an improved working environment as well as not restricting the capabilities of their own SAR unit.

Management of casualties

On location of the search target, the coordinating authority must be informed immediately. A SITREP with fuller details can be passed shortly after.

Evaluation of casualties

The SITREP to the coastguard should include the following information:

- Number of casualties complete with medical conditions. This may be passed in individual casualty details or as groupings using the current casualty care triage protocols. Names of casualties should not be passed by VHF.
- Condition of casualty vessel. Is it seaworthy, anchored, stable etc.

Evacuation plan

How many casualties are being landed on to the SAR unit? If a large number of casualties are embarked. For example following an evacuation of a ferry, an accurate count must be made as they are brought on board and again once landed on shore. This allows for the Coastguard or OSC to ensure that all persons are accounted for.

When landing casualties, the maximum survivor carrying capacities for your class of SAR unit should not be exceeded. Please refer to the class-specific manual and/or lifeboat fact sheets on Horizon for SAR unit survivor carrying capacity.

For all rescues, the following information must be transmitted to the coastguard:

- Destination of landing; it is important that all casualties where possible are landed at the same point. All lifeboat stations should have designated landing sites that are known by those in charge of the SAR unit, the coastguard and if appropriate the harbour authority.
- Additional assets required. Will coastguard rescue teams be needed on site to assist landing, Ambulances to convey injured person, or additional rescue assets to facilitate recovering casualties from the scene? Depending on the number of injured casualties more than one ambulance may be required, so this should be stated.
- Intentions for the casualty vessel. Is the vessel being towed in? If so where will it be taken? Do arrangements need to be made for emergency lifts etc.? If being left on scene is it secured, is it listing, estimated drift rate?
- Estimated time of arrival back to the designated landing point.

NOTE

Consider recording the disembarkment with RNLI vessel camera for later reference.

Photo: RNLI/Nigel Millard

Photo: RNLI/Nigel Millard

Navigation

Activity

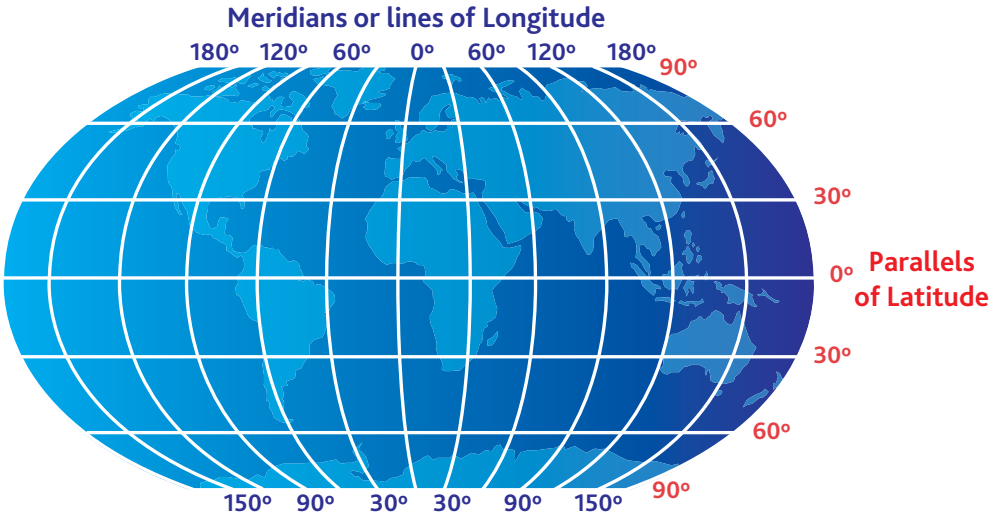
7

Basic navigation

Ever since early navigators discovered that the world was indeed round, they have been faced with a problem of how to accurately display the world on a piece of flat paper and how to know where they are.

Latitude and longitude

To express our position, early navigators divided the world into a grid. The lines joining the North and South Poles are called Meridians or lines of longitude – they are like the segments of an orange. The Greenwich Meridian is the start position (00), and each line is at 1º east or west of Greenwich around to 180º at the International Date Line on the other side of the world. Like segments of an orange they converge at the poles and are wider at the equator. The lines running horizontally around the world are the Parallels of Latitude. They are measured from the equator (0º), north and south, up to 90º at the poles.

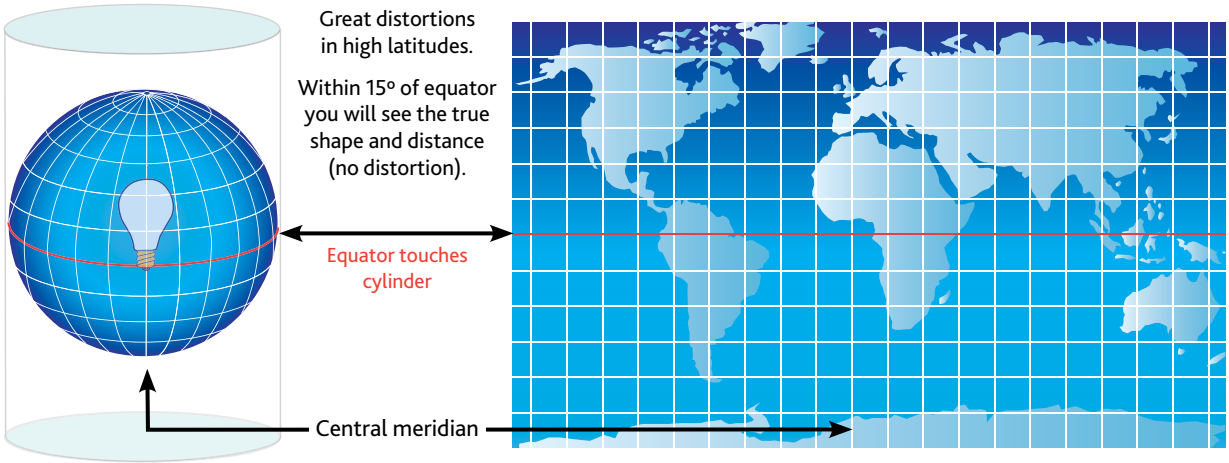


Projection

There are two common ways for displaying the world on paper as a map or chart. These are Mercator or Gnomonic. Mercator is the normal projection for coastal charts. While this method is excellent for coast work, think of them as charts that have been wrapped around the globe then laid flat.

It can be seen that the lines of longitude appear as parallel lines but we know they actually converge at the poles so there is some distortion. The parallels of latitude (horizontal lines) are much more accurate and for this reason, distance must always be measured on the side of the chart. Gnomonic charts are usually used for ocean passaging.

On the latitude scale, 1º is equal to 60 nautical miles. Each degree is split into 60 minutes so each minute (') is 1 nautical mile. The minutes are divided by 10, this is a cable (200 yards/183m).



Navigation tools

All vessels that go to sea are required by law to have charts and a means to navigate. A sensible mariner learns how to use them. All lifeboats carry a folio of local charts that graphically represent information above and below water. By learning some simple skills you are able to use these charts to help you navigate safely from A to B. In order to navigate safely, there are several tools you may need.

1 2B pencil or chinagraph and a soft eraser

A well-sharpened 2B soft lead pencil needs to be soft so it does not leave a mark on the chart after it has been rubbed out. An alternative to the pencil is a Chinagraph for use in wet conditions on laminated charts, check cards and publications. A clean gentle eraser and a pencil sharpener to keep your chart work accurate.

2 Drawing compass

Used to draw distances and arcs onto chart.

3 The Portland speed, time and distance calculator

The Portland speed, time and distance calculator is a slide rule used to calculate speed, time or distance.

4 Dividers

Dividers are an accurate measuring device used for measuring distances on a chart.

5 Stopwatch

A stopwatch can be used for measuring time taken to travel a certain distance or the elapsed time travelled.

6 Rib plot

The rib plot is a smaller version of the plotter with no moving parts.

7 Bearing compass

Uses the earth's magnetism to determine horizontal direction. A compass is often fixed to the boat (ship's compass) or can be hand held (a bearing compass).

8 Plotter

The plotter is used to plot bearings and distances onto your chart.

9 Parallel rules

Normally only found on ALBs or larger vessels where a large chart table is available. Used to transfer bearings and distances from one part of the chart to another.

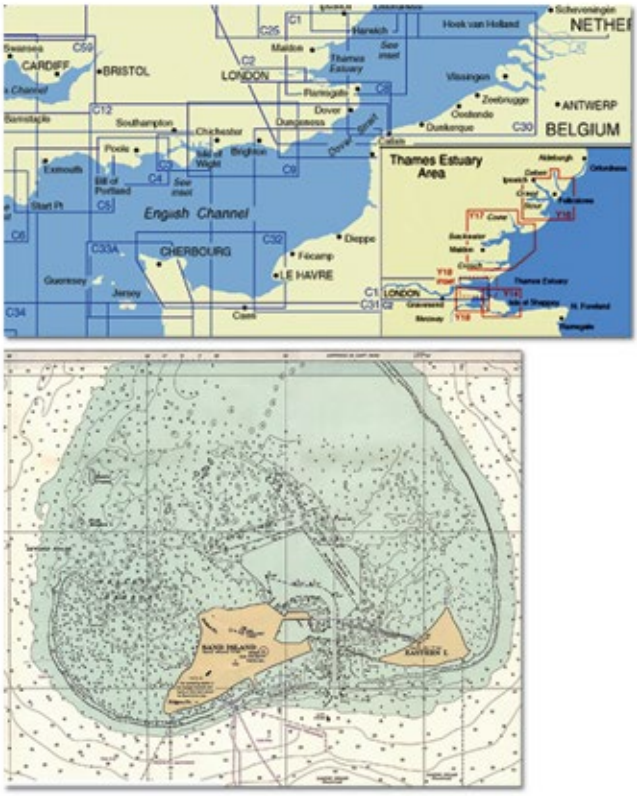
10 Notebook

A notebook to maintain records.

Charts

A chart is a navigator's map. Unlike a map, which gives a detailed representation of land features, a chart concentrates on the sea and coastal areas.

Types of chart



There are many different makes of charts available. The main differences between these charts are colours, paper, type of information displayed, scale and layout.

The RNLI uses UK Admiralty charts throughout its area of operations.

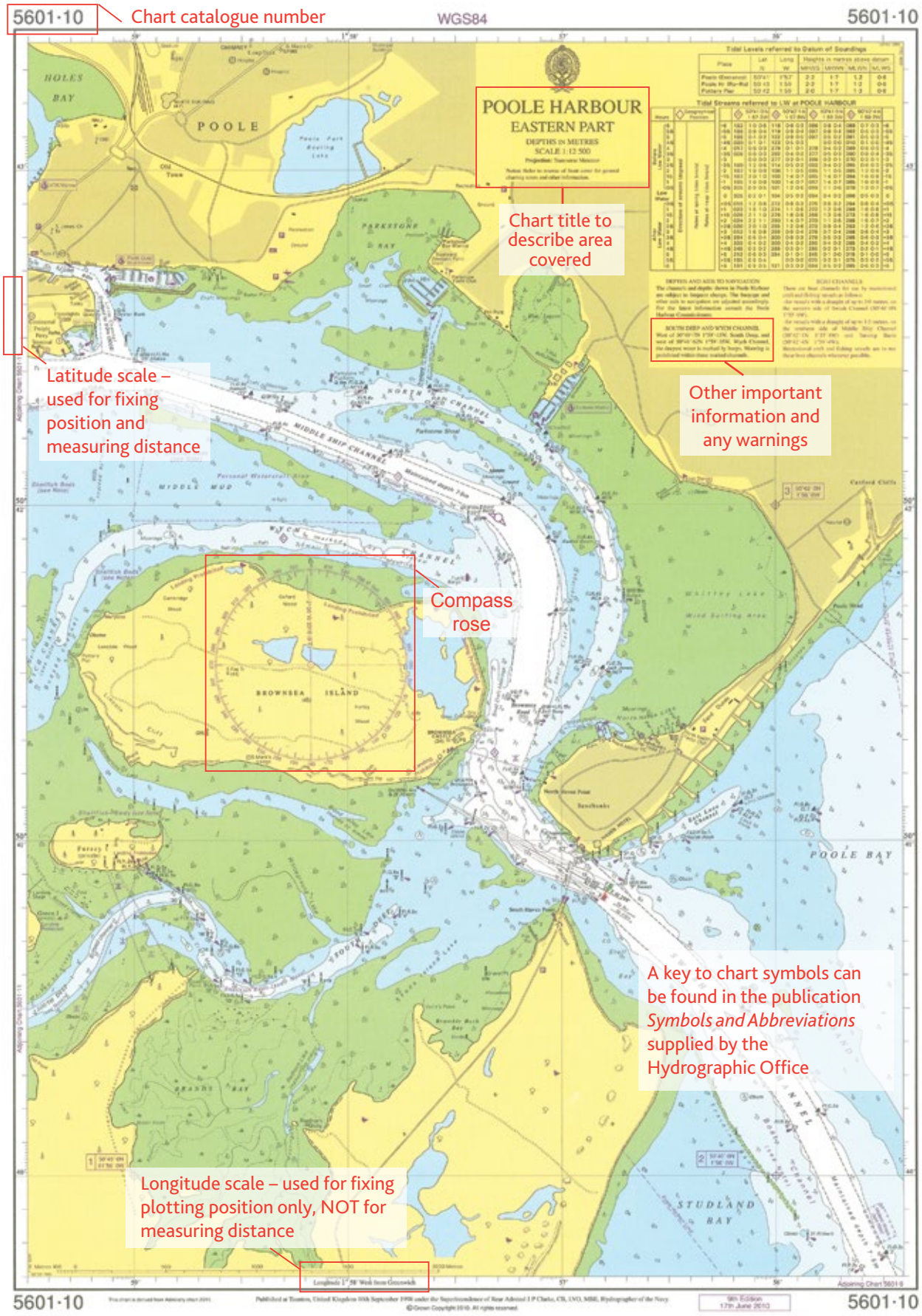
A chart shows the nature and form of the coast, the depths of the water and general character and configuration of the sea bottom, locations of dangers to navigation, the direction and rate of the tides, locations of man-made aids to navigation, and the characteristics of the earth's magnetism. The United Kingdom Hydrographic Office has been one of the main surveyors of the world's oceans since the time of Captain Cook and it remains one of the most highly regarded sources of this information.

Admiralty Charts, both large and small craft editions, are the most commonly used charts on SAR units but some also carry Ordnance Survey maps that give better land features. One thing common to all charts is that they are all prone to the information going out of date. Seabed features change, buoyage and lights change, occasionally wrecks are added to make navigation more interesting/challenging.

The Admiralty publish these corrections weekly in 'Notice to Mariners' and on the internet and the prudent mariner updates his chart folio regularly. These corrections, when done, should be noted using a magenta pen on the bottom left margin of the chart so that other users know when the chart is up to date. There are a huge number of charts to cover the world – each has a unique number to identify it. There are chart catalogues to help select the right one and it is important for the navigator to make sure they are using the best one for the area they are working in. A small-scale chart of the Western Approaches may be fine for passage planning but it does not have good enough detail to plan an approach to Newlyn in the dark – a larger scale chart will be needed for this.

All charts use symbols and colours to denote different things. A comprehensive list of these symbols can be found in the Admiralty publication Chart 5011 Symbols and Abbreviations Used on Admiralty Charts. Some charts print them on the reverse and some are in the Reeds Nautical Almanac.

Nearly all charts are compiled with north at the top but not all. All charts do, however, have a compass rose on them to allow the navigator to work out direction.

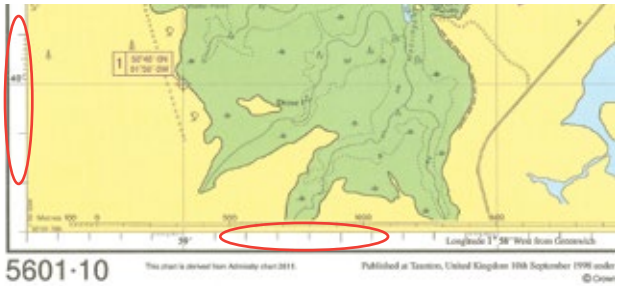


The chart above is reproduced with kind permission of The United Kingdom Hydrographic Office. (Crown Copyright 1998)

Compass rose

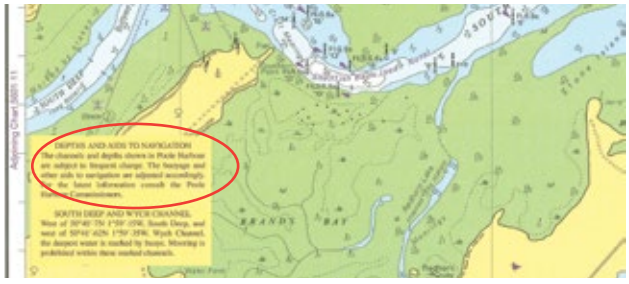
The compass rose is used to measure angles and to create headings for use with the compass. It also contains information on the difference between true and magnetic north at its location.

Latitude and longitude



The marked latitude and longitude scales appear at the edges of and at intervals across the chart and are used for finding/fixing position.

Local information



Local information that may affect navigation is included on the chart or in the chart pack. This could include prohibited zones, military practice firing areas, dredging zones, overfall areas.

Colours on charts

Various colours are used to differentiate between areas of the chart, such as land (yellow), drying heights (green), shallow water (blue) and deep water (white).

Tidal diamonds

Tidal diamonds may be situated at various positions on the chart. They tell the mariner that specific information regarding tidal direction and rates is available for that position. The tabulated information relating to these can be found elsewhere on the chart or in the chart pack.

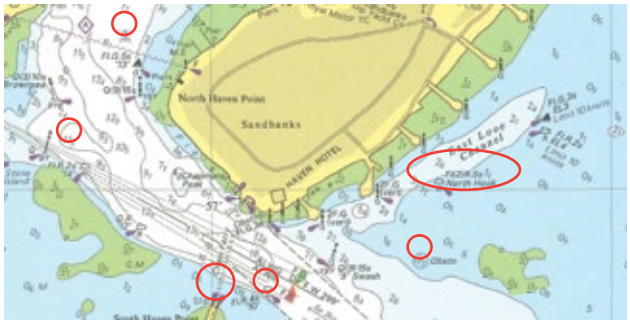
Tidal stream tables

Tidal Streams referred to HW at D

Hours		A 50°07·2N 5 49·5W		B 49°58·5N 5 48·5W		C 50°01·5N 5 27·6W		D 49°52·2N 5 10·9W		E 50°02·4N 5 02·3W		F
		Dir	Rate (kn) Sp Np	Dir	Rate (kn) Sp Np	Dir	Rate (kn) Sp Np	Dir	Rate (kn) Sp Np	Dir	Rate (kn) Sp Np	Dir
Before HW	6	332	0·4 0·2	311	1·7 0·8	280	0·9 0·5	256	1·8 0·9	201	1·0 0·5	215
	5	002	1·5 0·7	327	2·2 1·1	290	0·6 0·3	284	1·2 0·6	309	0·1 0·0	220
	4	009	2·4 1·2	336	2·0 1·0	329	0·3 0·2	234	0·4 0·2	006	1·0 0·5	293
	3	010	2·5 1·2	352	1·6 0·8	049	0·4 0·2	045	0·4 0·2	011	1·4 0·7	017
	2	009	1·6 0·8	023	1·1 0·5	065	0·6 0·3	054	1·0 0·5	015	1·5 0·8	029
	1	031	1·1 0·5	088	1·0 0·5	082	0·8 0·4	059	1·8 0·9	022	1·5 0·7	043
	HW	123	0·6 0·3	113	1·4 0·7	097	0·8 0·4	067	2·3 1·1	028	1·2 0·6	043
After HW	1	168	1·7 0·8	124	1·8 0·9	107	0·7 0·3	075	1·8 0·9	030	0·5 0·2	040
	2	181	2·5 1·2	137	1·9 0·9	124	0·4 0·2	082	0·8 0·4	202	0·4 0·2	
	3	194	2·5 1·3	166	1·8 0·9	201	0·3 0·2	203	0·4 0·2	196	1·2 0·6	214
	4	210	2·1 1·0	195	2·0 1·0	234	0·6 0·3	233	1·4 0·7	195	1·7 0·9	210
	5	223	1·1 0·6	232	1·6 0·8	263	0·8 0·4	247	2·3 1·1	197	1·6 0·8	213
	6	295	0·4 0·2	286	1·4 0·7	278	0·9 0·5	267	1·9 0·9	202	1·2 0·6	216

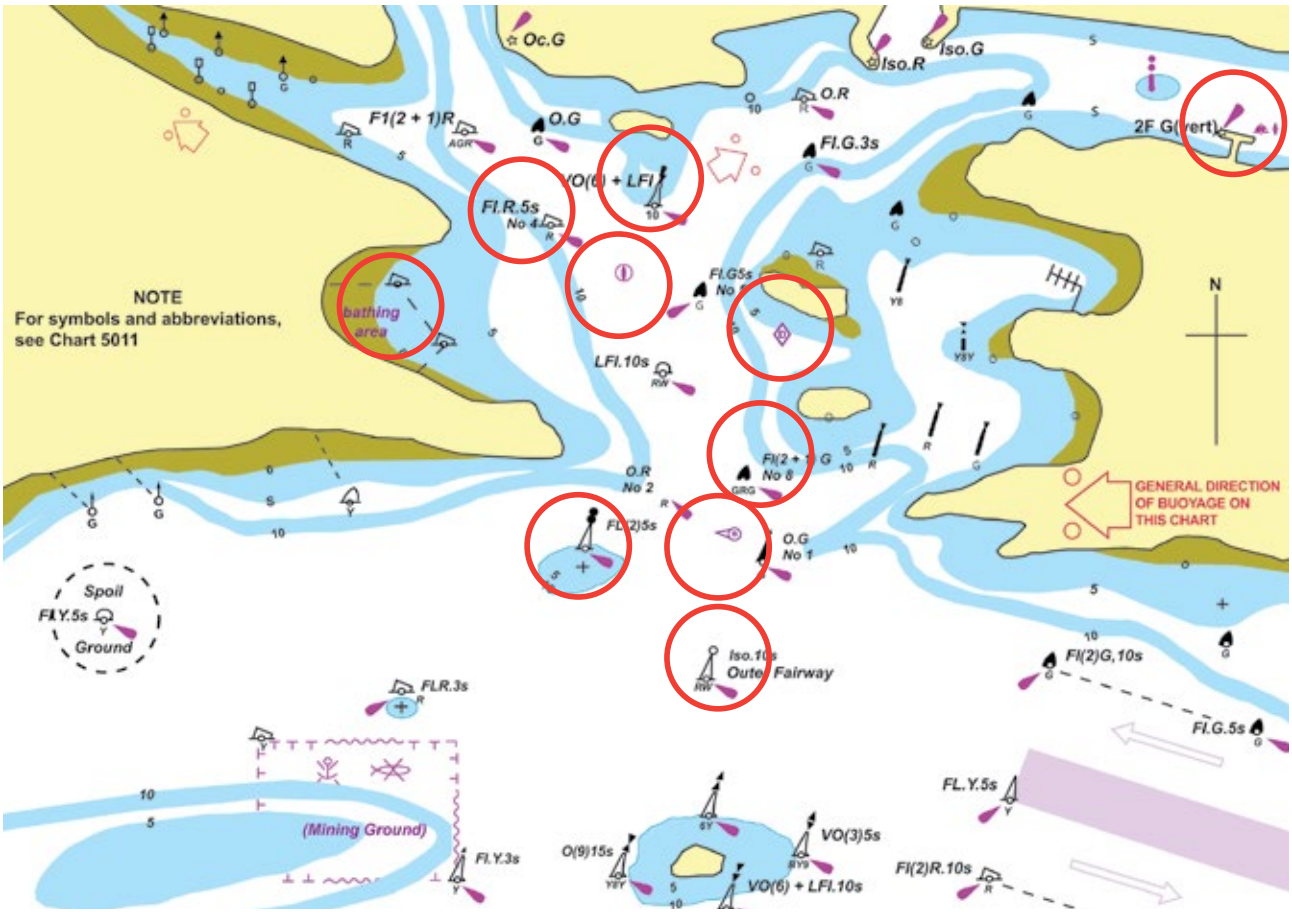
Tidal stream tables provide specific data on tide direction and speed for the position indicated by the tidal diamonds. This is tabulated in 1-hour intervals either side of high water and shows rates for both spring and neap tides.

Chart symbols

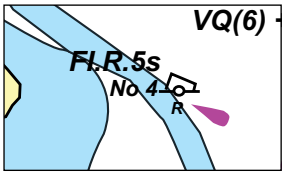


On nautical charts, symbols and abbreviations are used to convey a mass of navigational information to the mariner. Each symbol has only one meaning, but it is vital that these 'coded messages' are correctly interpreted as many of them warn of specific dangers to navigation. A complete list of symbols and abbreviations is provided in the Admiralty publication, Chart 5011. Some of the more common chart symbols are shown on the next pages.

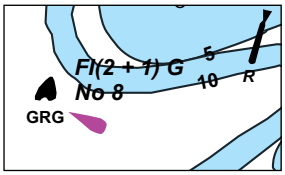
Common chart symbols



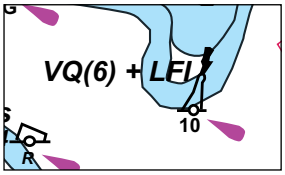
The diagram above is reproduced with kind permission of The United Kingdom Hydrographic Office to illustrate symbols and abbreviations used on Admiralty Charts. (Crown Copyright 1998)



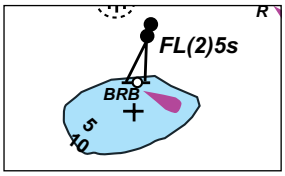
Lateral mark: Name: No 4. The symbol with the letter R denotes a red can buoy. Drawn at an angle, this indicates it is affected by the tide. The magenta teardrop indicates it has a light. The marked sequence on this buoy is a single red flash every 5 seconds.



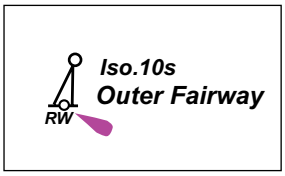
Preferred channel mark: Name: No 3. The symbol denotes a conical buoy with standard **starboard** preferred channel markings (green with a red band – GRG). The marked light sequence is group flashing (2+1) of a green light.



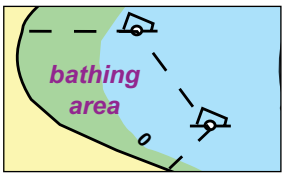
Cardinal mark: Unnamed. The symbol denotes a pillar buoy with standard **south cardinal** markings (yellow over black). The marked light sequence is 6 (very quick) flashes in a group followed by a single long flash of a white light.



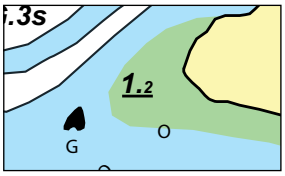
Isolated danger mark: Unnamed. The symbol denotes a pillar buoy with standard **isolated danger** markings (black with a red band). The marked light sequence is a group of 2 short flashes of a white light every 5 seconds.



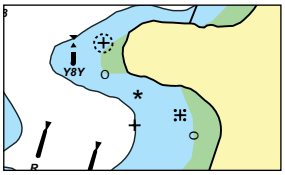
Safe water mark: Name: Outer Fairway. The symbol denotes a pillar buoy with standard **safe water** markings (red and white stripes). The light sequence is a 10-second isophase. (This means 5 seconds of light and 5 seconds of dark in a 10-second period).



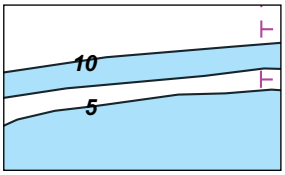
Special marks: Unnamed. The symbols denote two yellow can buoys. They have no top marks and no lights. The chart shows that they mark the outer limit of a designated bathing area.



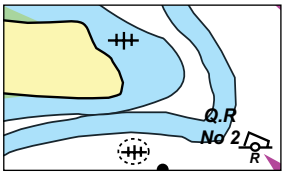
Drying height: An area that is covered at high water but uncovered at low water. Its height in metres above the lowest astronomical tide level is indicated by the underlined numbers.



Rocks: Rocks maybe covered, uncovered or awash at low tide.



Isobaths: Similar to height contours on land maps, they are lines drawn on a chart to join all places of the same depth below the water level.



Wrecks: These may include hazards to navigation.

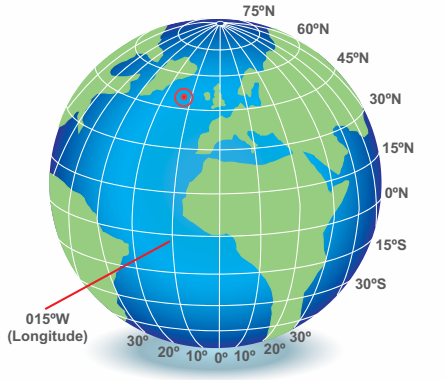
To plot latitude and longitude

Using a straight edge and a pencil it is easy to plot a latitude and longitude passed by a casualty or taken from a GPS. As previously highlighted, each position is expressed in degrees, minutes and decimals of minutes north or south of the equator and east or west of the prime meridian. They are written as below:

50°43'.35N 015°16'.6W

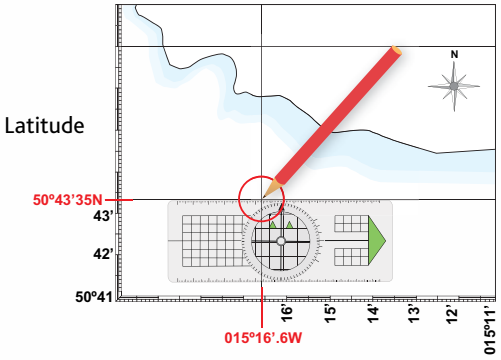
It can be seen that degrees of latitude have only two digits as the maximum possible position is 90° north or south, while the degrees of longitude have three digits as the maximum possible position is 180° east or west of the prime meridian (the opposite side of the world).

To plot position, place a straight edge perpendicular to the latitude scale on the sides of the chart, move the straight edge to the required number of minutes (and decimal of the minute) indicated on the scale and strike a line on the chart. Repeat this process using the longitude scale at the top and bottom of the chart. The point at which these two lines cross indicates the exact position of the latitude and longitude on the chart. In reverse, if you know where you are on the chart, you can find your latitude and longitude by reading across to the scales perpendicular to your position. Remember it is convention that latitude is always written before longitude.



The position is 50°43'.35N 015°16'.6W where the lines intersect

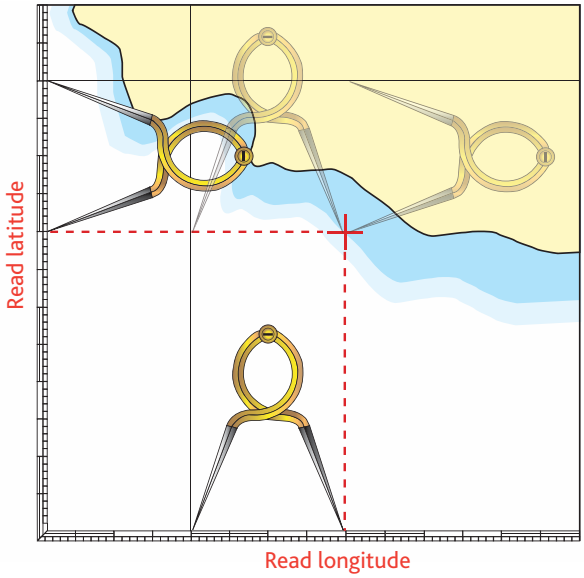
The position can then be transferred to the chart



Longitude

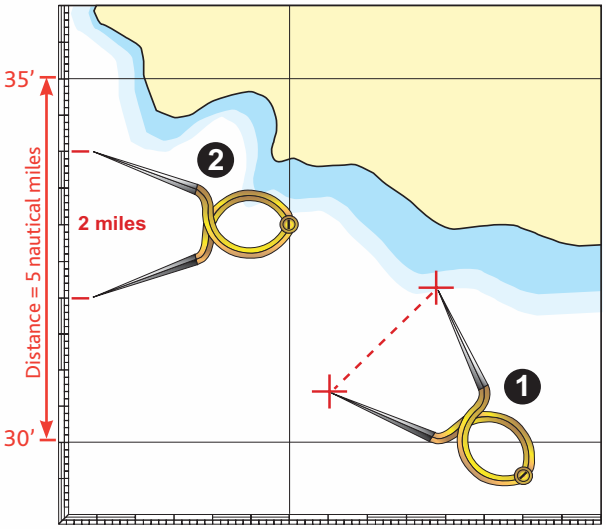
Dividers or drawing compass

The dividers or drawing compass can be used for working out a latitude or longitude position. This can be done by placing one point on the position and the other parallel to it, on a latitude or longitude line on the chart. This distance is then taken to the scale and the latitude and longitude can then be read.



Measuring distance on a chart

Due to the distortions that occur by projecting a chart it is important that distance is only measured using the latitude scale on the side of the chart. The distance between two points is measured using dividers, a straight edge or other technique. This is then transferred to the latitude scale to work out the distance in nautical miles.



Speed

Speed at sea is measured in knots:

1 knot (kt) is equal to 1 nautical mile (Nm) in 1 hour. 10kts is equal to 10Nm in 1 hour.

Remember:
1 minute (1') of latitude = 1 nautical mile

Distance (Nm) = Speed (kts) x Time (minutes)
60

Speed (kts) = Distance (Nm) x 60
Time (mins)

Time (mins) = Distance (Nm) x 60
Speed (kts)

This can be done with a mathematical calculator or the Portland speed, time and distance calculator.

If a calculator or speed ruler is not available all is not lost – there is a simple method of calculating distance or working out expected time of arrival (ETA) by using the simple 6-minute rule.

Simple 6-minute rule

As speed = distance in 1 hour (60 minutes)

10kts in 60 minutes = 10 nautical miles (Nm)

6 minutes = $^{1}/_{10}$ of 1 hour

10kts in 6 minutes = 1 Nm

6-minute rule examples:

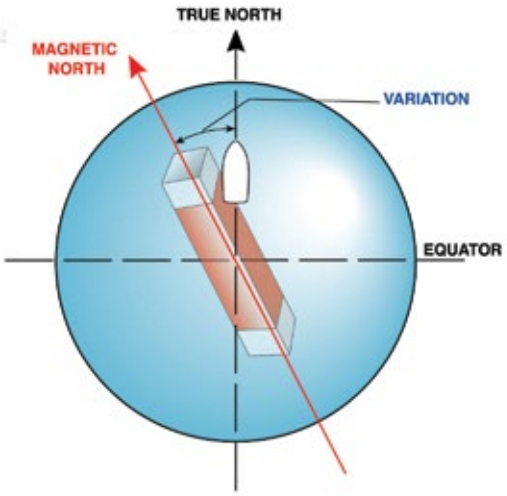
1. How long will it take to travel 3 nautical miles at 10kts?
   - 10 knots in 6 minutes = 1 nautical mile.
   - At 10 knots it will take **18 minutes** to travel 3 nautical miles.
2. How far will you travel in 24 minutes at 30 knots?
   - 30 knots in 6 minutes = 3 nautical miles.
   - At 30 knots in 24 minutes you will travel **12Nm**.
3. If you travel 2.5Nm for 6 minutes what speed will you be travelling at?
   - 10 knots in 6 minutes = 1 nautical mile.
   - In 6 minutes you will travel 2.5 nautical miles at a speed of **25 knots.**

Variation and deviation

On the chart, the lines of longitude are all drawn north–south. North on the chart is what we call True North.

If we draw a line on the chart between two points and measure it against the compass rose we can determine the True Bearing.

The navigator, however, has a problem: a magnetic compass does not point to True North! A large ferrous mass in the earth causes all magnetic compasses to be deflected to what is known as Magnetic North. This difference is known as Variation.

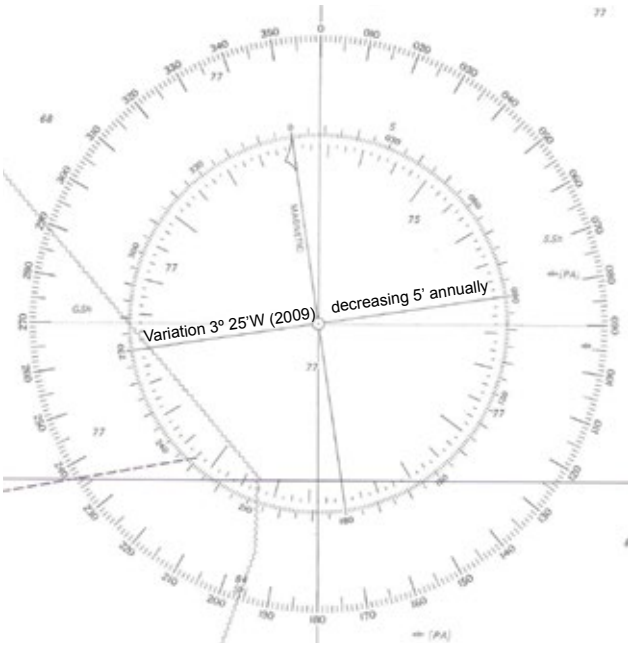


The magnetic compass can be further affected by items on the boat or the boat's magnetism itself. This effect is known as deviation. All SAR units' fixed steering compasses have a card indicating the error for each heading and the required correction.

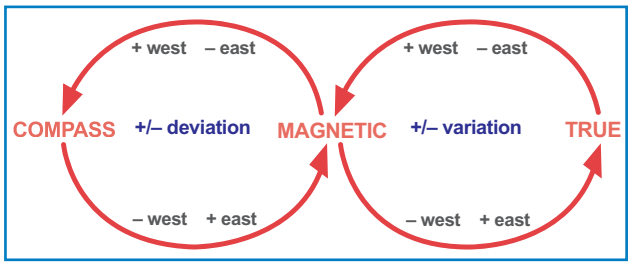
When both the variation and deviation are taken into account, the resultant is known as the Compass Bearing.

Depending on where you are in the world your magnetic compass will be deflected to the east (easterly variation) or the west (westerly variation). The good news is that the amount is measurable and has been written on the chart in the middle of the compass rose. Variation increases or decreases year by year but this amount is also calculated.

The compass rose (next diagram) states that in 2009 the variation at the point in the middle of the rose was measured at being 3°25'W of True North. It is decreasing by 5' annually so in 2010 the variation would be 3°20'W and in 2014 it will be 3°W.



When converting a true bearing (one taken from the chart) to a magnetic bearing, you need to add westerly or subtract easterly variation. When converting a magnetic bearing to a true bearing for plotting, it is the opposite: you add easterly variation and subtract westerly.



In 2011, using the compass rose above, if you measured a bearing on the chart (a true bearing) and want to convert it to magnetic so it can be used with the compass, take a bearing, for example, of 320° True:

True to Magnetic = +W
320° + 3°15' = 323°15'

To get a compass course to steer by, deviation should also be applied. This is done in exactly the same way as variation but needs to be added/subtracted to the corrected magnetic bearing calculated above. On a heading of 320° the deviation card states the error is 1°W:

Magnetic to Compass = +W
323°15' + 1°W = 324°15'

In reality, the course is rounded up to the nearest 5° so the course would be 325° Magnetic.

Although these amounts are sometimes only small, a few degrees, it should be remembered that over a distance of 60Nm – a 1° error will put you off course by 1 nautical mile – that can be significant.

Position fixing

There are many ways of finding position when at sea but whichever method is used, it is important to do this regularly and to always remember that because of the effects of wind and tide, unless a boat is secured to the land or the seabed, it is very unlikely to be stationary so good constant all-round situational awareness is necessary.

Electronic positioning

The most common way for the modern navigator to fix a position will be with electronics – the GPS (Global Positioning System). The GPS uses satellites in space to triangulate – as long as it can receive the signals it will give a very accurate position.

GPS receivers do go wrong though so it is vital that navigators have more than one method to help them.

Dead reckoning

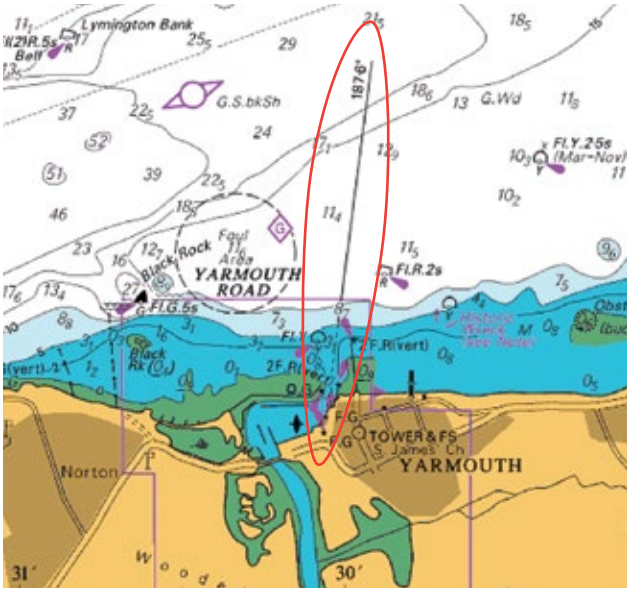
We can use course and distance to give a rough idea of our position. If you leave a boathouse and travel west down the road at 40mph for 1 hour you will be 40 miles west of the boathouse. This method can be used at sea but it is a rough guess because it does not take the effect of wind and tide into account – this is called Dead Reckoning.

Transits

When two objects are in alignment they are referred to as 'in transit'. When this is the case we know the vessel's position is somewhere along a line drawn through the two objects. If the objects are charted then they can be used to assist in fixing position on the chart.

The picture below the chart opposite indicates a lead transit for Yarmouth Harbour. This is shown as 187.6°T on the chart. The photograph shows the two lead marks for the transit, which are diamonds, as seen when approaching the harbour from seaward. It can be seen that the lower diamond is to starboard of the upper diamond, which this tells us that our position is to port of the transit. Our vessel should move to starboard to bring the diamonds in line (in transit).

Any two known charted objects can be used to fix position. As long as they are in transit they will give an accurate line along which the vessel must be. A secondary method such as depth or a bearing can be used to locate the distance the vessel is along this transit line.



Hand-bearing compass

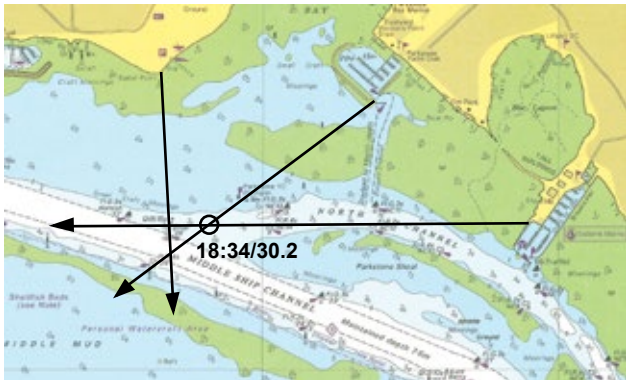
The SAR unit's position can also be determined by using a hand- bearing compass to take bearings of known charted objects.

When choosing objects, consideration must be given to their ease of identification and their positions relative to each other. To produce an accurate fix it is necessary to use three objects, which are ideally all within a 90° area of arc.

The order in which the bearings are taken will also affect the accuracy of the fix and therefore, if the boat is making way, those abeam of the vessel should be taken last as they will be changing most.

Once all three magnetic bearings have been taken, the time should be noted and the magnetic bearings should be converted to true bearings before plotting towards the object on the chart. By plotting all three bearings a small triangle or 'cocked hat' will result.

The SAR unit's position is somewhere within this triangle and should be plotted alongside the nearest point of danger. This is displayed as a circle with a dot inside it, the time and distance travelled (log reading) should be noted alongside.



Depth

All depths marked on the chart are at Chart Datum, the lowest astronomical or expected tide – if you know what height of tide you have and add this to the charted depth you can use the echo sounder to give an indication of position.

Advantages of this are that it can be used in poor visibility. When monitored it can be a good safety check and can sometimes be your only charted reference when out of sight of land. Disadvantages to using the echo sounder are that you are not looking ahead of the vessel so cannot see approaching obstructions, it is reliant on having a power supply, it can read erroneously and it can be difficult and timely to calculate expected depth. The symbol we should draw to show when you have followed a contour is shown below and it should be annotated with a four-figure time.

Maps

Compared to charts, maps provide a detailed representation of land features. Using a map, you can visualise in your mind what the area looks like that you are going to, and you can see what landmarks and features you will pass on the way to your destination. Maps mean you know what to expect, and they help you to know you are going in the right direction to arrive at your destination safely and quickly.

When agreed with HQ, the RNLI can utilise maps (i.e. Ordnance Survey) as these are often better for inland, as well as for other non-charted areas.

Ordnance Survey use different shapes, colours and symbols to show roads, buildings, boundaries, water features, tourist information and other features of note. Their maps come equipped with a key that explains the symbols and their meanings.

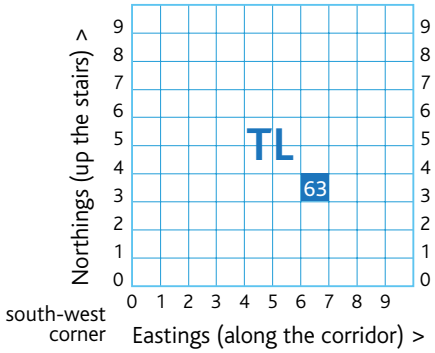
The scale of a map shows how much you would have to enlarge the map to get the actual size of the piece of land you are looking at. 1:50,000, for example, means that every centimetre on the map represents 50,000cm (500 metres). The 1:25,000 scale map is very useful for walking, whilst maps at 1:250,000 scale show lots more land but in far less detail.

Ordnance Survey maps are covered in a series of blue gridlines. These help pinpoint an exact location anywhere on the map by giving a unique number known as a grid reference. The vertical lines are called eastings, since they increase in value as you travel east on the map; the horizontal lines are called northings, since they increase in value as you travel north on the map.

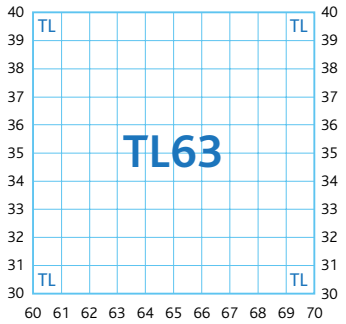
These are linked to the National Grid, which provides a unique reference system, and can be applied to all OS maps of Great Britain, at all scales. Great Britain is covered by grid squares measuring 100 kilometres across; each grid square is identified by two letters, as shown below:

				HO	HP			
				HT	HU			
		HW	HX	HY	HZ			
	NA	NB	NC	ND	NE			
	NF	NG	NH	NJ	NK			
	NL	NM	NN	NO	NP			
		NR	NS	NT	NU			
		NW	NX	NY	NZ	OV		
			SC	SD	SE	TA		
			SH	SJ	SK	TF	TG	
		SM	SN	SO	SP	TL	TM	
		SR	SS	ST	SU	TQ	TR	
	SV	SW	SX	SY	SZ	TV		

On OS maps, these squares are further divided into smaller squares by grid lines representing 10 kilometre spacing, each numbered from 0 to 9 from the southwest corner, in an easterly (left to right) and northerly (upwards) direction, as shown below:

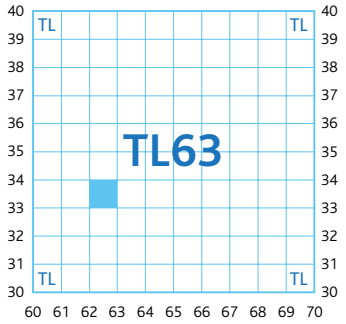


On an OS Landranger map, you can find the two main grid letters (in this case TL) on the legend or the corner squares of the map. The grid is further divided into 1 kilometre intervals, as shown below:



A four-figure grid reference is a handy way of identifying any square on a map. Grid references are easy if you can remember that you always have to go 'along the corridor' before you go 'up the stairs'.

To find the number of a square, first use the eastings to go along the corridor until you come to the bottom left-hand corner of the square you want. Write this two-figure number down. Then use the northing to go up the stairs until you find the same corner. Put this two-figure number after your first one and you will have the four-figure grid reference. The example below has the grid reference 6233:



For further guidance on inland navigation, please refer to www.ordnancesurvey.co.uk.

Passage planning

The RNLI follows the IMO "Guidelines for Voyage Planning" recommendations.

Appraisal

All sources of information must be consulted to establish an outline route from berth to berth e.g. charts, pilot books, tide tables, tidal stream atlases, notices to mariners, radio signal information, weather forecasts, distance tables, local warnings, crew competence and RNLI guidance and policy.

Planning

- When preparing a plan the following must be taken into account:
  - adequate underkeel clearance and safe distances from dangers
  - safe speeds along route allowing for possible restricted visibility
  - alter course positions that are easily recognisable by visual or radar means
  - predicted tidal information allowing for set and constraints to ETA
  - pilotage plans for safe harbour entry and exit
  - visibility of lights
  - contingency plans in case of accident or emergency
  - electronic navigation aids availability and limitations
  - margin of allowable error, safety clearing bearings and ranges
  - up to date charts and publications
  - manoeuvrability of vessel in relation to the depth of water
  - equipment status
  - local by-laws and local notice to mariners.
- Charts must be marked with limiting danger lines (no-go areas) reflective of the vessels draught and available depth of water.
- Transits, clearing lines and other visual aids should be planned along the route to ensure the vessel is kept on its intended track and not put in a position of danger.

Execution

- Immediately before departure:
  - calculate accurate tidal heights and tidal streams for duration of passage
  - give a briefing and allocate roles.
- Consider traffic density and calculate ETA.
- Verify correct operation of equipment e.g. radar, echo sounder, compass, plotter, AIS.

Monitoring

- The route must have close and continuous monitoring and position must be fixed on a chart at least every 20 minutes or ahead of a communications check. Frequency of fixing should increase when operating in restricted visibility, at night, in close proximity to navigational hazards or in shallow water.
- Monitor AIS and VHF channels for vessel movements and maritime safety information.
- Update ETAs.
- Keep and maintain a regular log.
- Assess other vessels for a potential risk of collision or close quarters manoeuvring.

Intentional deviations from the route must be communicated; unintentional deviations must be investigated and mitigated e.g. by amending the route and/or identifying faulty equipment or process.

Prior to a vessel launching

- Switch on radar and tune into most appropriate range scale (if available).
- Ensure all charts and publications are corrected, up to date and present on board.
- Ensure a safe route is saved in an electronic plotter.
- Check navigation lights, sound signalling apparatus and radios are fully operational.
- Check all aids to navigation are fully operational and up to date deviation card is on board.
- Set brilliance on electronic aids to reflect natural available light.

Aids to navigation are to be utilised fully as a matter of routine in conjunction with the charted plan to monitor the boats route through the water and any other vessel's approach to give early warning of any potential hazardous situation arising. The echo sounder must be monitored and a minimum expected depth is to be communicated to the helm. Any changes in prevailing conditions or physical environment must receive the full attention of the person in command and appropriate action must be taken.

Situational awareness must be maintained at all times. If situational awareness is impaired for whatever reason, the suitability of decision making will be affected.

Remember the three levels of mental activity in situational awareness are: Perception, comprehension, and projection. This process will enable informed decision making in dynamic environments.

While underway (in addition to above)

- Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid a collision and be stopped within a distance appropriate to the prevailing circumstances and conditions.
- Extra vigilance must be paid if a close quarters situation is developing or a risk of collision exists.
- Ensure vessel wash and wake does not hinder or negatively affect other vessels.
- Ensure crew wellbeing, especially establishing early warning signs of fatigue.
- Communications with relevant co-ordinating authority I.A.W. the current policy.
- In the absence of electronic chart plotting future projection e.g. dead-reckoning and estimated positions, must be plotted on charts.

Operating in darkness

- Use wheelhouse red lights at night (if available) and minimise exposure to white light.
- Set brilliance of electronics to a minimum level required for viewing.
- Do not proceed until passage plans have been finalised and are saved in plotter.
- Ensure radar is tuned and displays the most appropriate range scale.
- Switch on and ensure navigation lights are operational.
- Assign lookout(s).

Operating in restricted visibility

NOTE

The person in command must gauge the importance of the passage and justify its continuation.

- Maintain a radar watch and prepare MARPA or other plotting aids.
- Switch on and ensure navigation lights are operational.
- Post extra lookout(s).
- Fix position and if possible proceed away from or parallel to danger and/or traffic lanes.
- Sound prescribed sound signal.
- Prepare to reduce speed to a minimum or stop.

In or near areas of restricted visibility, when vessels are not in visual sight, every vessel must give way if a close quarters situation is developing or a risk of collision exists (IRPCS Rule 19).

Photo: RNLI/Nigel Millard

Safe navigation

In accordance with SOLAS V Regulation 34.1, the RNLI shall not prevent or restrict the person in command from taking or executing any decision which, in the person in command's professional judgment, is necessary for safety of life and protection of the marine environment.

RNLI SAR units must always be operated in accordance with appropriate legislation and the policies, processes and procedures of the RNLI. Nothing relieves the person in command or crew from the exercising of sound judgement when facing a situation not specifically addressed by policy, process and procedure, but where possible they should adhere to the intent of such procedures and their training.

While a SAR unit is underway its progress and the well-being of those aboard will be monitored by appropriate shore-side authorities/individuals.

RNLI SAR units are highly visible and recognisable as belonging to the RNLI. It is expected that the conduct and navigation of RNLI SAR units will be of the highest standard and in accordance with best practice, especially:

- In complying with the International Regulations for the Prevention of Collisions at Sea, specifically speed, lookout, situational awareness and response to developing situations such as risk of collision.
- Taking into account the effects of operating our SAR units in close proximity to other SAR units, water users and the shoreline.
- When operating in heavy weather.
- When operating in restricted visibility.
- When operating in areas of high traffic density.
- When operating close to the coast, in shoal or pilotage waters, or other hazards (including uncharted or poorly charted areas such as Solway Firth and Morecambe Bay).
- When operating at night.
- In complying with local by-laws and regulations.

RNLI SAR units must be fit for purpose for the intended task. They must:

- Be maintained and that maintenance be recorded in accordance with the RNLI's instructions for the class of SAR unit.
- Be fully equipped and stored for the intended task, with all equipment and hatches etc. correctly secured.
- Be crewed in accordance with RNLI rules and regulations. Those crewing the SAR unit must be fit, adequately rested, briefed, suitably qualified and appropriately competent in the operation of the SAR unit and in the operation of the onboard equipment. PPE regulations must be adhered to.
- Have available appropriate risk assessments, contingency plans and operating procedures.
- Appropriate documentation should be carried onboard where applicable.

The person in command must ensure that the SAR unit is appropriately and safely navigated especially with regard to:

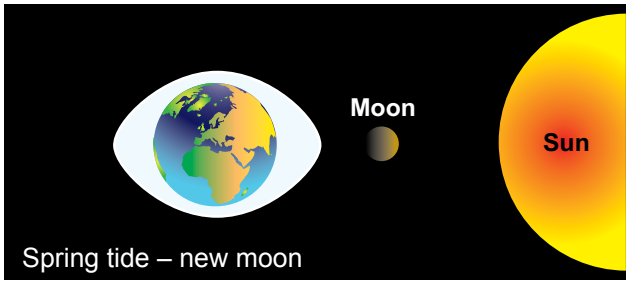
- Appropriate passage planning, passage conduct, anticipation of hazards, maintenance of records, navigation and awareness of safe havens [SOLAS V Regulation 34].
- Adherence to procedures.
- Position fixing.
- Resource management (including crew task rotation).
- Response to emergency situations.
- The technical and operational capabilities and limitations of the specific navigational equipment fitted to the SAR unit.
- Access to relevant navigational and safety information.
- Access to relevant environmental information.
- Up to date navigational charts and publications [SOLAS V Regulation 27].
- Use of dynamic risk assessments.
- Watchkeeping.
- Fatigue.
- Internal and external communications.
- Liaison with the responsible authorities ashore.

Tides

Tide is the term given to a movement of a body of water. It is caused by alignment of celestial bodies (the sun and the moon) and their gravitational pull on the earth. This pull has a greater effect on the water causing it to rise and fall and in turn flow in different directions. Due to the moon being closer to the earth than the sun it has a larger gravitational pull. However the sun still affects our tides.

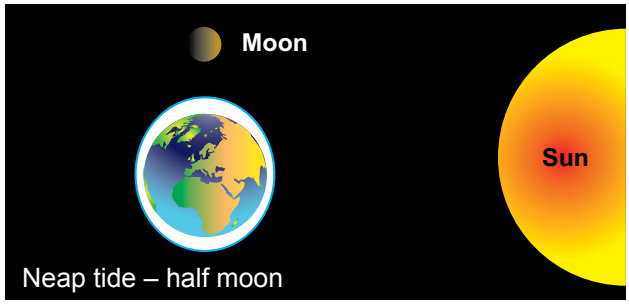
Spring tides

When the sun, moon and earth are aligned we get what is referred to as spring tides.

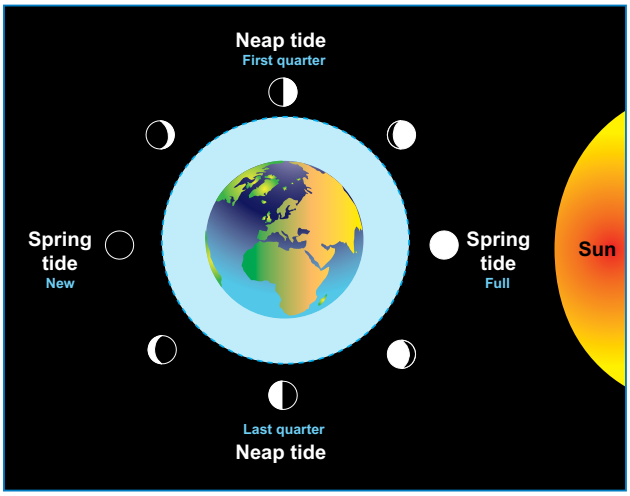


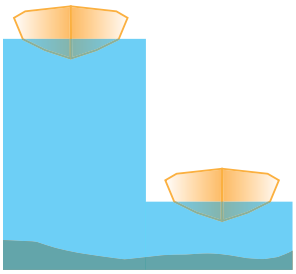
Neap tides

Conversely, when the sun and moon are at right angles to the earth we get what is referred to as neap tides. However, the most noticeable tidal effect may not occur on the same day as the particular lunar cycle.

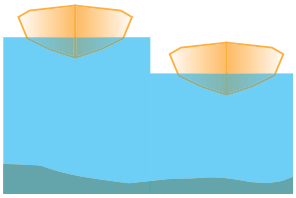


Lunar cycle





With spring tides we experience higher high waters and lower low waters.



With neap tides we experience lower high waters and higher low waters.

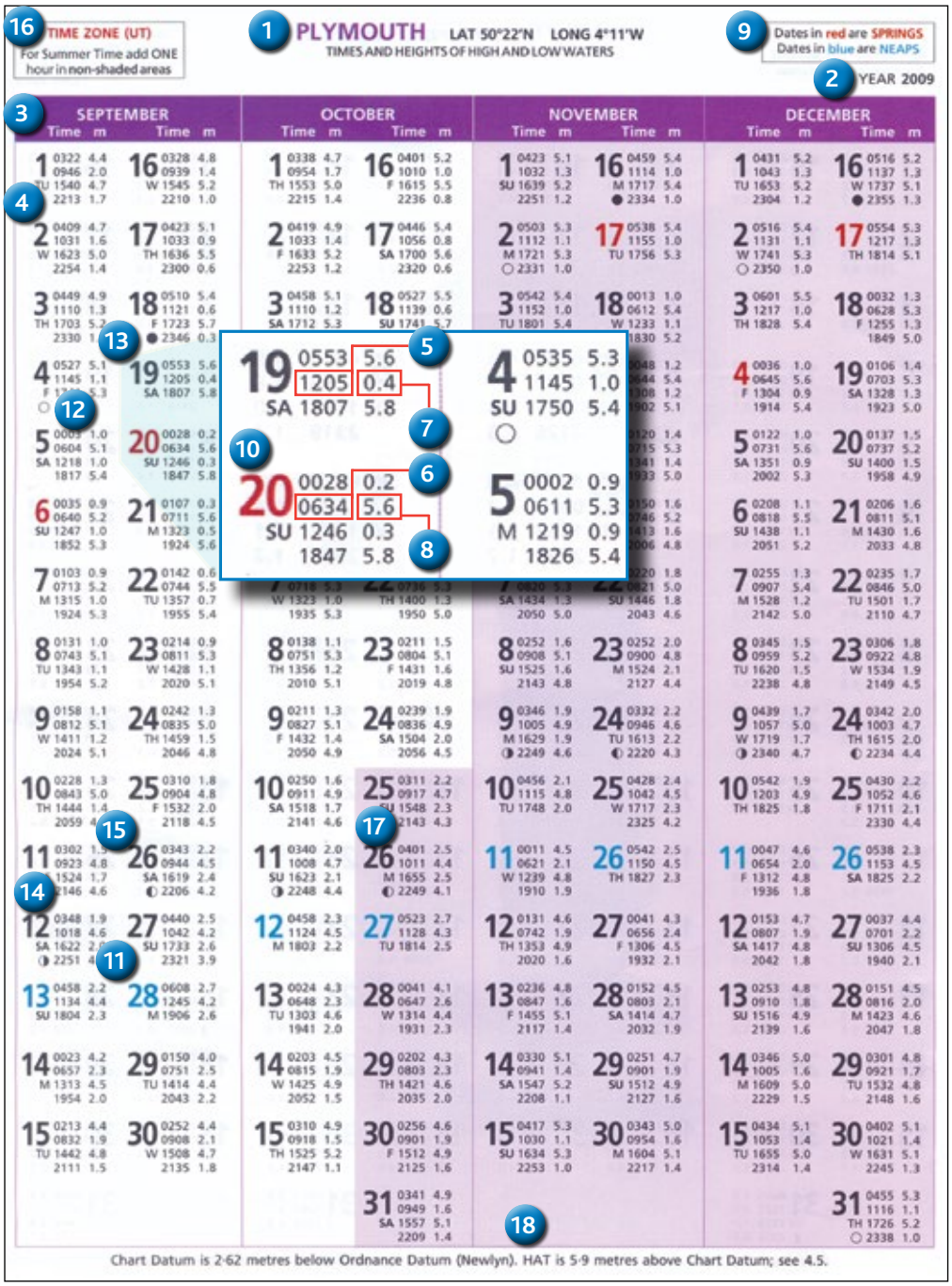
The tidal rise and fall also causes directional flow. This is referred to as a flood (rising) and ebb (dropping). The direction given for tidal flows is expressed as a direction towards which the tide is flowing unlike the directions given for wind. For example a westerly wind comes from the west towards the east, whereas a tide given as a bearing of 270° is travelling towards the west.

We are concerned about with the height of tide because we need to ensure we have enough depth of water to keep our vessel afloat at all times and need to know if and when we can cross shallow areas or enter restricted harbours. We are also concerned with the strength and direction of flow as this can push our vessel off course and potentially into danger.

Information regarding tides for specific areas can be found in many forms, including nautical almanacs, local tide tables, and in newspapers and on the internet.

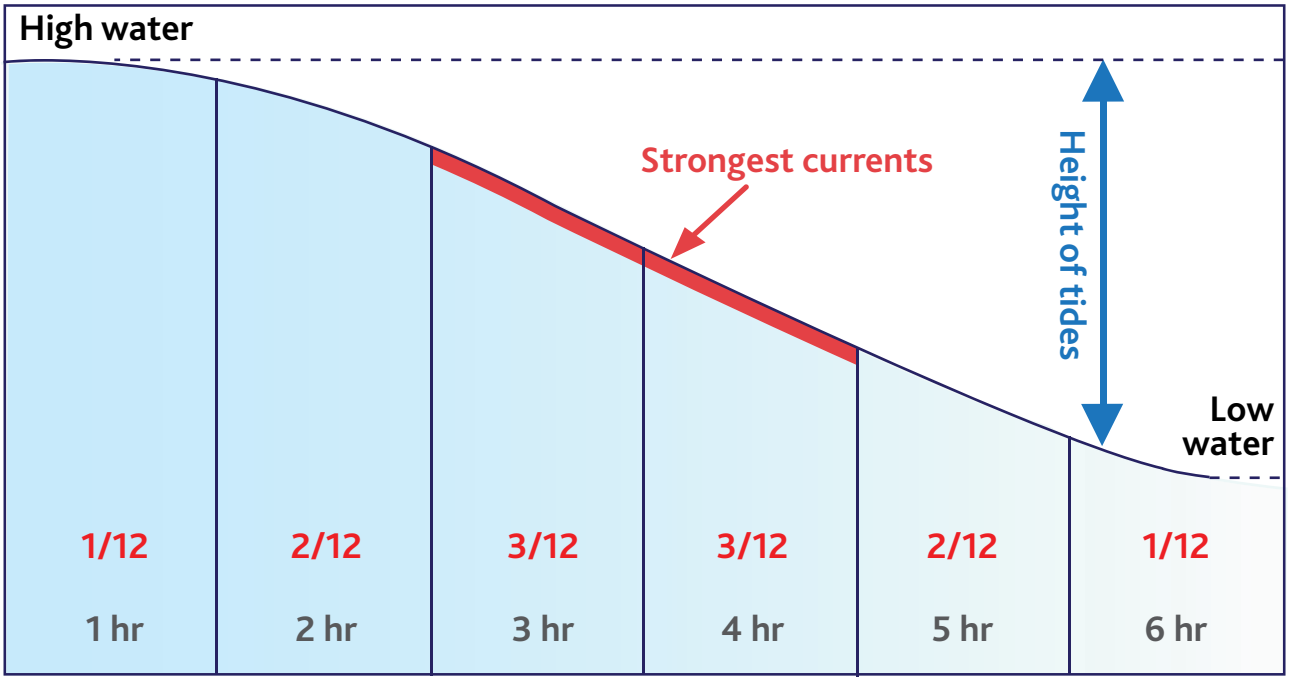
Tide table information

The information found in nautical almanac tide tables includes date, day, moon phase, spring or neap tides and times and heights of high and low waters. These times in some tables can be in Universal Time, Coordinated or UTC (which is the same as GMT). So for the Summer months, usually non shaded or a different colour, you must add 1 hour to convert to British Summer Time or BST. The key areas of information are shown below.



1. Port to which the tidal information refers.
2. Year of tidal table.
3. Month to which column refers.
4. Day and date.
5. Time of low water in UTC.
6. Time of high water in UTC.
7. Height of low water in metres.
8. Height of high water in metres.
9. Information regarding colouring of spring and neap dates.
10. Spring tide in red: this is the highest high water and lowest low water between the previous and following neap tides (generally a 14-day period).
11. Neap tide is in blue: this is the lowest high water and highest low water between the previous and following spring tides (generally a 14-day period).
12. Symbol to show full moon phase.
13. Symbol to show new moon phase.
14. Symbol to show last quarter moon phase.
15. Symbol to show first quarter moon phase.
16. Information relating to time zones used.
17. Change between shaded and non-shaded areas, the change from BST to UTC.
18. HAT (highest astronomical tide) information for this port.

Rule of twelfths



Once the tidal range has been calculated you are able to use the Rule of Twelfths to approximate the depth of water for any given time between high and low water.

A quick rule of thumb method of obtaining the height of tide is by using the Rule of Twelfths. This rule assumes that the tide rises or falls one twelfth of its range in the first hour, two twelfths in the second hour, three twelfths in the third and fourth hours, two twelfths in the fifth and one twelfth in the sixth hour. This is shown in the diagram above.

By subtracting the height of low water (LW) from that of high water (HW), the range of the tide can be calculated. Once the range is known, this figure can be divided by 12 to give $^{1}/_{12}$ figure. By using multiples of this the tidal drop can be calculated.

For example, using the tide table on the previous page, we can see that on the 2 September at Plymouth the late tide

HW 1623 at 5m LW 2254 at 1.4m

will be:

5.0m – 1.4m = 3.6m range

One twelfth of this range is therefore

$$\frac{3.6}{12} = 0.3\text{m}$$

By subtracting the LW height from the HW height we can

5.0m to 4.7m (5 – 0.3)

calculate the range of tide:

We now know that in hour 1 the tide will drop from:

5.0 – (0.3 + 0.6 + 0.9) = 3.2m

and by hour 3 the tide will have dropped from 5.0m to 3.2m:

However, it should be noted that this method can only be used where there is a linear tide. It does not work in areas such as Poole or Southampton as these areas experience extended periods of high water.

It can be seen that tides are a complex subject and there is significantly more information and detail required for coxswains, helms and commanders. The diagram overleaf illustrates the key terminology.

Tidal terminology

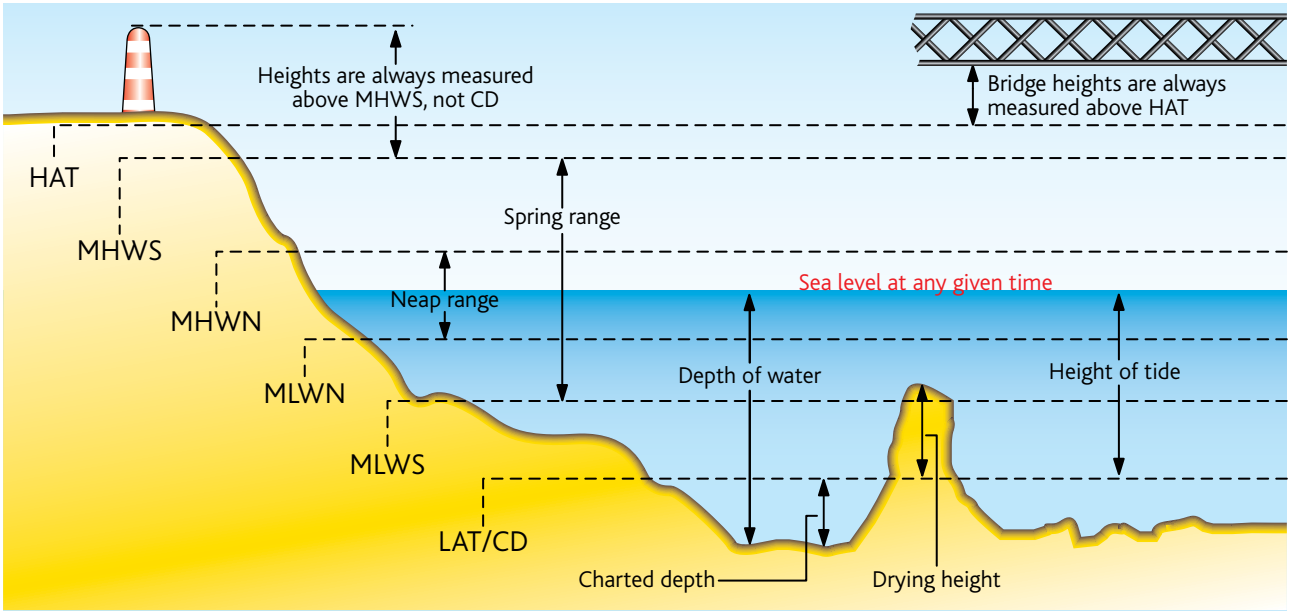


Chart Datum (CD): Is the reference point above which heights of tide are predicted and drying heights are measured and below which charted depths are measured. This point is usually lowest astronomical tide on Admiralty charts.

Lowest Astronomical Tide (LAT): Is the lowest predicted point to which a tide will fall, not allowing for any meteorological effects, such as high pressure weather systems. This is usually the chart datum reference point on Admiralty charts.

Charted depth: Is the depth of water below chart datum to the seabed. Shown on charts in metres. The decimal point is not shown on Admiralty charts for charted depths, so 22.3m would be shown as 22_{3}. This would appear in a light blue, dark blue or white area of an Admiralty chart.

Height of tide: Is the actual sea level at any given time. This is measured from chart datum in metres.

Depth of water: Is the combination of height of tide and a charted depth, or the combination of height of tide minus a drying height for any given time. This is measured in metres.

Drying height: Is the height above chart datum of a feature or area such as a rock or bank, which at times may be covered or uncovered by the sea. Shown on the chart and in the almanac in metres. The decimal point is not shown on Admiralty charts for drying heights and in addition they have an underlining, so 1.3m would be shown as $\underline{1_{3}}$. This would appear in a green area of an Admiralty chart.

Highest Astronomical Tide (HAT): Is the highest predicted point to which a tide will rise, not allowing for any meteorological effects, such as low pressure weather systems. This is measured from chart datum in metres. This is the point from which charted vertical clearances under overhead objects are measured.

Safe vertical clearance: Is the safe clearance under an overhead power cable allowing for safe vertical discharge depending on voltage. Shown on the chart in metres. This would appear on Admiralty charts in different formats. The decimal point would appear and this would be in magenta. For more information on Admiralty charts consult Admiralty Chart 5011.

Charted elevation: Is the height from MHWS to a light fitted on a fixed structure. Shown on the chart and in the almanac to the nearest metre. This would appear next to the light characteristic followed by a lower case 'm' so a lighthouse 22.8 metres above MHWS would show 23m.

Mean Low Water Neaps (MLWN): Is the average height of low water on a neap tide. This average is taken over an 18.6-year period. This is measured in metres above chart datum. This figure can differ for each location.

Mean High Water Neaps (MHWN): Is the average height of high water on a neap tide. This average is taken over an 18.6-year period. This is measured in metres above chart datum. This figure can differ for each location.

Mean Low Water Springs (MLWS): Is the average height of low water on a spring tide. This average is taken over an 18.6-year period. This is measured in metres above chart datum. This figure can differ for each location.

Mean High Water Springs (MHWS): Is the average height of high water on a spring tide. This average is taken over an 18.6-year period. This is measured in metres above chart datum. This figure can differ for each location.

Range: Is the vertical difference in height between successive high and low waters. This is achieved by subtracting low water height from the previous or subsequent high water height.

Spring range: Is the vertical difference between MLWS and MHWS for a given area. This is achieved by subtracting MLWS from MHWS. Shown in the almanac as mean range and written in red.

Neap range: Is the vertical difference between MLWN and MHWN for a given area. This is achieved by subtracting MLWN from MHWN. Shown in the almanac as mean range and written in blue.

High Water (HW): Is the highest point the tide will reach before it begins to fall again.

Low Water (LW): Is the lowest point the tide will reach before it begins to rise again.

Electronic navigation

SAR units are fitted with numerous electronic aids to navigation. They all work separately, but when combined they give us a host of tools to aid safe navigation.

Electronic navigation equipment

As with your computer at home the more familiar you are with it, the more you can achieve. All this equipment gives us large amounts of information and how we use that information is the difference between a good navigator and a mediocre one.

Global positioning system (GPS)

When people talk about a GPS, they usually mean a GPS receiver. The global positioning system (GPS) is actually a constellation of 27 earth-orbiting satellites (24 in operation and three extras in case a satellite fails). The US military developed and implemented this satellite network as a military navigation system but soon opened it up to everybody else. Rival systems are currently being developed by both Russia and the European Union.

Each of these solar-powered satellites circles the globe at an altitute of about 12,000 miles (19,300km), making two complete rotations every day. The orbits are arranged so that at any time, anywhere on earth, there are at least four satellites visible in the sky.

These satellites transmit data that indicate their location and the current time. All GPS satellites synchronise operations so that these repeating signals are transmitted at the same instant. The signals, moving at the speed of light, arrive at a GPS receiver at slightly different times because some satellites are farther away than others. The distance to the GPS satellites can be determined by estimating the amount of time it takes for their signals to reach the receiver. When the receiver estimates the distance to at least three GPS satellites, it can calculate its position.

GPS receivers require an unobstructed view of the sky, so care must be taken not to obstruct the aerial. The received signals are processed and the information displayed as latitude and longitude.

A GPS receiver is an incredibly capable piece of equipment, some of the information available to users include:

- accurate position
- bearing to other positions
- distances
- time
- estimated time of arrival (ETA) to a known position
- course over ground (COG)
- speed over ground (SOG).

All this information can be electronically passed to the radar and chart plotter.

Chart plotter

A chart plotter is simply an electronic form of the paper charts. The plotter has taken this information and displays it on a monitor. The chart plotter is linked to a GPS receiver, either internally or remote. Once your location is detected by the GPS, your current position will be shown on the screen. When moving, your position will be constantly updated indicating your direction and speed.

Electronic charts are used more and more frequently onboard SAR units, however care should be taken as they are not infallible and errors can happen. For this reason paper charts must still be utilised to confirm navigational accuracy.

There are two formats of electronic charts that are commonly used:

Raster charts

A raster chart is a direct copy or scan of an Admiralty paper chart. Raster charts look identical to paper charts. All information contained within the chart is shown directly on it. What you see is what you get. When zooming in and out of a raster chart everything on the chart grows larger or smaller. The major advantage of a raster chart is that when you wish to zoom in, it will only go to the largest scale chart made by the Admiralty. It remains as accurate as a paper chart.

Vector charts

A vector chart is a series of points and lines that make up the features on a chart. While the chart can be very detailed, in larger scales, vector charts look computer generated. They are built up in a series of layers so details on the chart can be turned on and off. Objects on the chart can be clicked on to learn more details. Depths can be monitored to warn before grounding. When zooming in and out of a vector chart only the geographical features grow larger or smaller where text keeps its same size.

Because it is computer generated, the chart can be zoomed in to much larger scales than the Admiralty paper charts. However this can give the navigator a false sense of security as the sea may not have been surveyed to that degree. This should be taken into consideration when zooming into vector charts.

Raster/Vector charts

More modern chart plotters are a mixture of both systems, giving the benefits of both. They use Admiralty charts and scales with layers of information on top.

Regardless of which system you are using, the options available are similar. Whatever the format, you can:

- see your position on the chart
- zoom in and out
- create a waypoint
- create a route
- navigate directly from the screen
- enter a 'man overboard' (MOB)
- night-time mode.

Depth sounder

When navigating, it is imperative that we know the depth of water below the SAR unit. Depth sounders use pulses of sound waves directed downwards to measure the distance to the bottom. Sound travels approximately 1.5 kilometres per second through the water. So by accurately measuring the time it takes for an echo to be detected we can calculate depth. The depth sounders system consists of a transmitter and receiver on the hull of the boat, and a display to indicate the received information.

On SAR units an offset has been applied to the readings so depth of water beneath the keel, or lowest part of the boat, is indicated.

Depth sounders need undisturbed clean water to read correctly. Poor sea state, going astern or heavy sedimented water can affect the accuracy of the equipment.

Radar

Radar on SAR units is used for navigation, collision avoidance and casualty detection. Radar detects boats, buoys and land masses and displays this to the operator. The radar set on most ALBs is equipped with what is called the MARPA (mini automatic radar plotting aid). When linked to a GPS receiver this allow ranges and bearings of targets to be monitored and possible collisions detected.

Log

Via a sensor fitted through the hull it is possible to measure the water flowing past. This information can be used to calculate both speed and distance travelled through the water.

Alarms

The electronic navigation equipment is there to aid safe navigation. These items have alarms fitted to alert the operator of possible hazards or dangers affecting the vessel if they have not been noticed by the operator. These alarms could include:

- shallow water
- waypoint proximity
- cross-track error (XTE)
- man overboard (MOB)
- lost GPS signal
- anchor watch.

Radar

A well-tuned radar, used by a competent operator, is an extremely useful piece of equipment, not only for collision avoidance but also for navigation and search and rescue. It takes time and effort to learn this skill. On the flip side, a badly used radar can be a danger.

The word radar is an acronym, which comes from the phrase, RAdio Detection And Ranging. Radar is an electronic device that measures the bearing and distance of solid objects and presents this information on a screen.

It has three main functions on a SAR unit:

- to act as an anti-collision aid
- for fixing the SAR unit's position
- to assist in casualty location.

Hazards posed by radar

There are some hazards from radar to be considered. They are:

- radiation
- high voltage
- rotating aerial
- misleading information due to incorrect settings.

How radar measures distance

Microwaves travel at great speed in straight lines. If a pulse hits an object it is reflected back. By measuring the time it takes for these pulses to travel out and bounce back, the radar is able to calculate the range to that object extremely accurately.

How radar measures direction

In principle, echoes will only be received from an object when the antenna is pointing at it – so if the radar knows which direction its scanner is pointing, it knows the direction of the object. All of this happens in a fraction of a second. Similar to the light beam emitted from a lighthouse, the microwave beam from the radar becomes wider the further out it travels. This means that a target's bearing, while still good, will not be quite as accurate as its range and is the reason why positions derived from radar are fixed using range and not bearing.

Start up

Switching on and setting up

There are many different makes and models of radar set, each with slightly different controls and operating procedures. Many of the more recent sets are highly automated and will work almost as soon as they are switched on. Some older sets, particularly those intended for commercial craft, may have more complex set-up procedures. Six controls are common to all marine radars, though in many modern sets they are buried in the menu system: Power on/off, Stand-by /Transmit, Brilliance, Gain, Tuning and Range.

Power on/off

Normally push button, the power on/off supplies power to the radar. When switched on the radar will carry out a short sequence of automated checks, before going through a warm-up phase. This procedure usually takes about two minutes, then the radar switches itself to stand-by.

Stand-by/transmit

In stand-by the radar is in a state of immediate readiness using very little power from the boat's batteries. With some sets the antenna will rotate but no radio waves will be transmitted. Because microwaves can be harmful, a radar should always be switched to stand-by when the vessel is berthed or alongside a quay or other vessel. The set should always be in stand-by or off when working with helicopters to stop the scanner and avoid possibility of snagging the winch wire.

Brilliance and contrast

The brilliance control is exactly the same as the brightness control on a TV set: it adjusts the brightness of the picture to suit ambient light and personal preference but does not make any difference to what is on screen.

Gain

Gain is the radar equivalent of the squelch control on VHF radio: it regulates the sensitivity of the receiver. If set too high, the screen will be filled with a mass of speckles caused by radio 'noise'. If it is set too low, real echoes will be missed. To adjust it, turn it up until the screen is filled with speckles, then turn it down until the speckles just disappear from most of the screen.

Tuning

A radar's receiver needs to be tuned to receive the particular frequency that is being transmitted. Although it is listening for echoes of its own transmissions, the frequency of those transmissions varies slightly, particularly as the radar warms up and cools down. Many modern radars have an auto-tune mode.

Range

The range control is used to adjust the area represented by the radar picture. If it is set to 16 miles, for instance, the outer ring of the picture represents a distance of 15 miles from the centre. Choosing a lower range reduces the area, but enlarges the image to show more detail and vice versa.

Use of VRM and EBL

The variable range marker (VRM) and its associated electronic bearing line (EBL) are used to determine the range and bearing (respectively) of objects detected by the radar. The EBL, like the VRM, is generally adjusted by a knob on the display, allowing the EBL to be moved to a target and to display the exact bearing relative to the direction of your boat's travel.

Adjustments

Weather and sea conditions

The radar picture is not a map and nor is it a bird's-eye-view. It is a diagrammatic representation of the echoes received from targets. Some things, particularly waves, rain and thunderclouds, produce unwanted echoes that are quite capable of masking the echoes from real targets. These unwanted echoes are called clutter. Modern radars have controls for adjusting these and they should be used to get the best picture possible.

Anti-clutter sea

Anti-clutter sea will reduce the effects of wave clutter at short range. Wave clutter is produced by energy being reflected from waves near the lifeboat and can mask the echoes from buoys and small craft.

The anti-clutter sea control reduces the sensitivity of the radar receiver and so hides the sea clutter. However, this effect can only be applied out to a maximum range of approximately 3–3.5 miles. At its maximum setting the radar will be so insensitive that genuine targets at close range will not be presented on the screen. The setting used should be sufficient to reduce the strength of these echoes until the sea clutter just starts to appear. It should still be possible to detect small targets within this area.

Anti-clutter rain

Anti-clutter rain has a similar effect to anti-clutter sea.

By reducing the size of the echo on the screen, large masses of echoes (due to rain, hail or snow) are broken up. This may make it possible for echoes of ships or other targets to be picked out amongst the clutter.

With the gain control at its normal setting, echoes from rain and snow may obscure the echo from a ship inside a squall or storm. A temporary reduction in gain will usually permit the stronger and more distinct ship's echo to be distinguished.

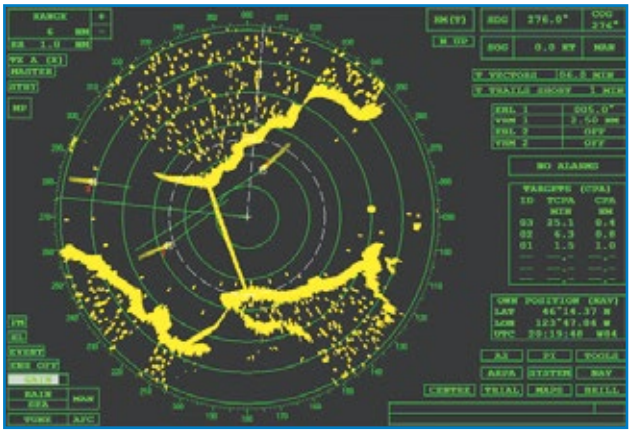
However, do not turn the gain down to such a point that the weakest echoes are lost.

NOTE

The gain, tune, sea and rain settings must be regularly checked and must be adjusted following any change of range. Prior to shutting down the set, the gain, sea and rain control should be set to a minimum, this prevents the next user inadvertently using the previous settings.

Position on display

A typical radar picture consists of a pattern of concentric circles, with a straight line extending outwards from the centre. Your own vessel is at the centre of the pattern.



Heading modes

On ILB installations, with no compass input, the heading mark points straight upwards. This is known as Head-up mode. It has an advantage that targets on the port side of the boat show up as contacts on the left-hand side of the screen, while those on the starboard side of the boat appear on the right-hand side of the screen, and so on. The disadvantage of head-up mode is that as the boat yaws, the picture yaws with it.

The other common heading mode is North up. This can only be used if there is a compass feed to the radar set. As suggested by the name, the radar picture is displayed with north at the top so the picture looks more like the chart.

It is usual to use the head up mode when close to land conducting pilotage and north up when in open water.

Additional controls

Trails

This facility shows the movement of targets on the screen by leaving a trail behind them. A choice of track lengths is normally available.

Off-centring

Off-centring the screen allows the SAR unit's position to be moved from the centre of the screen. It is most useful when operating in a restricted area, such as proceeding up a river or engaged in a search close to the shore.

Limitations - size

Essentially, the larger the object being sought, the larger the surface area so more echoes will be returned and therefore observed. The object must project above the radar horizon in order to produce echoes.

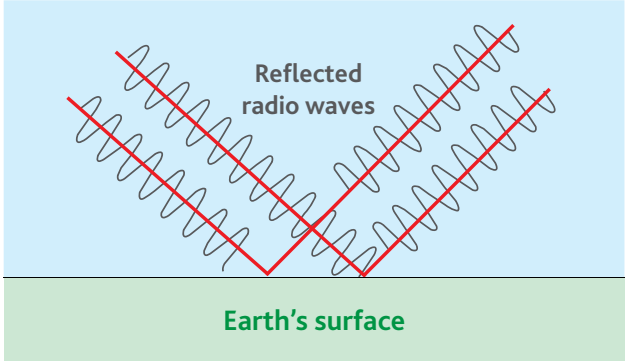
Factors affecting reflection

There are five factors that determine whether a target is a good reflector or not. They can be remembered by the acronym MASTS and are:

- material
- aspect
- size
- texture
- shape.

Anything that conducts electricity is likely to be a good reflector and anything that does not conduct electricity is likely to be a poor reflector.

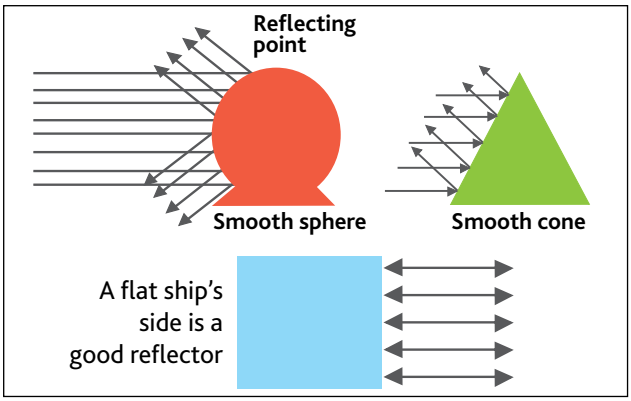
Flat surfaces act like mirrors, and radiate most of the reflected energy in one direction. So if the flat surface is not at exactly the right angle it may reflect the energy in the wrong direction. Flat surfaces are generally strong but unreliable reflectors. Curved surfaces scatter the energy. Surfaces that curve in two directions are the worst.



As far as the detection by radar is concerned the shape of a target is as important as the material from which it is made. Some shapes are difficult to detect as the radar signal is scattered or reflected away from the receiver.

Spherical buoys have almost none of their surface at right angles, resulting in a scattering of the radar energy with very little return. Radar energy is returned to the antenna when the beam hits the centre of the sphere. Conical buoys are often poor targets as they reflect a lot of the radar beam away. In practice, radar response is improved due to the rough surfaces of navigational buoys, and most have a radar reflector built in.

Land/water boundaries



Where cliffs and water border each other, clear echoes can be expected from several miles. The echoes from the boundaries of a river are often clearly depicted if the banks rise steeply.

Gently sloping beaches, mudbanks and bars do not often give a good echo, although sea clutter echoes formed by breaking water may be seen.

Radar horizon

Radar waves travel in almost straight lines, so distant objects may be hidden below the horizon, just like they are hidden from normal sight. Radar waves bend very slightly as they pass through the atmosphere, so they follow the curvature of the earth slightly better than light waves, making the radar horizon about 10% more distant than the visual horizon.

Weather

All radars are affected by day-to-day changes in the weather, but this is especially apparent in the low powered radar used by small craft. High pressure and dry conditions tend to increase detection ranges while wet conditions reduce detection ranges. Low pressure conditions can result in a reduction in detection range due to absorption of the radar energy by atmospheric water vapour and signal strength may further be reduced due to scattering of radar energy.

Rain

Rain squalls and showers appear on the radar picture as a 'woolly' mass. As they may be present in a region up to 5 miles in height they are easily detected at a distance. Continuous light rain may cause a reduction in range as some of the energy is reflected and scattered. This will be seen as light clutter on the radar picture. In heavy rain the radar picture will be completely degraded (mass echo). This mass echo will mask echoes from any targets within the rainfall area, including land echoes, and can cause a large shadow area beyond the rain clutter in which nothing will be seen. In some cases, detection range can be reduced by 80%. Use the gain and/or the anti-clutter controls to reduce the effect.

Hail

Large hailstones produce the same effect as rain. Smaller hailstones produce less effect. In either case, use the gain and/or anti-clutter controls to reduce their effect.

Sleet and snow

In Winter, hail, sleet and snow will cause adverse effects on the radar picture. Ice pellets inside the snow increases the echo strength.

The danger of snowfall is that it tends to give poor echoes from the object that it has covered. Radar energy penetrates snow to a certain extent but loses some of its power due to absorption. The result is that snow-covered coasts may produce poor echoes on the radar display and the vessel must approach the coastline with extreme caution.

Mist and fog

Radar often performs very well in reduced visibility caused by mist and fog. However, the operator must remember that the air tends to be much wetter in these conditions and this will reduce detection range.

Sunshine

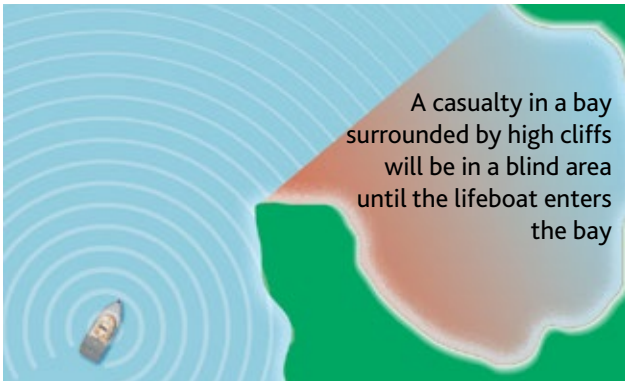
There is the odd day in the UK and RoI when the sun does shine, there is no wind and the sea is almost flat and smooth. These conditions allow the radar to detect the smallest of targets. Pot markers, tin cans, seagulls and lumps of drifting rubbish show up as echoes. Just a little wind to ruffle the surface is sufficient to cause these small objects to be hidden.

Shadow areas

Blind and shadow areas are caused by obstructions on land, another vessel close by or obstructions on your own vessel in the path of the radar beam.

- In a blind area the radar beam is completely cut off.
- In a shadow area the beam can bend slightly round ridges or small objects causing an area of reduced radar energy.

On a SAR unit, the blind and shadow areas are generally insignificant. Blind or shadow areas caused by land, or shadow areas caused by obstructions on land such as cliffs and high buildings, will create considerable differences between the radar picture and the chart. For example, a casualty in a bay surrounded by high cliffs will be in a blind area until the SAR unit enters the bay.

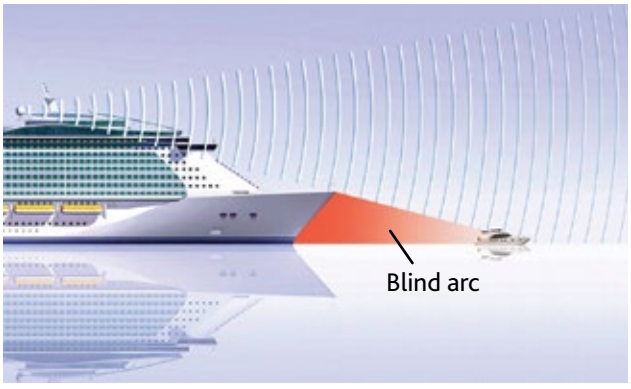


Blind or shadow areas caused by vessels

A large vessel close by will cause a blind area beyond itself. In this area the radar will detect no other targets.

Blind arcs

Permanent blind and shadow areas onboard large vessels are known as arcs as they cause dark sectors on the radar screen. The greatest danger exists when small craft are in a ship's blind arc.



Manage radar

The person in command of the SAR unit has a responsibility for its safe navigation. Identification of risk of collision early and maximising the ability to locate casualty vessels.

As the person in command of the SAR unit, the individual will have been assessed competent at crew level and if applicable navigator level. Therefore this chapter will focus primarily on the management of this equipment from a command perspective.

For fundamental training other resources should be used (TRG –04, TP-LB-01).

Set up

The person in command of the SAR unit must ensure that if radar is to be used that the operator has set the picture up appropriately. This includes satisfying themselves that the appropriate range is being used, and that the correct level of clutter has been applied. Their own experience and knowledge should be used to identify this.

It is now more common for RNLI Radars to have automatic set up controls and the person in command of the SAR unit must decide if they require the operator to set the picture up manually. If a manual set up is required time to do this must be factored in to the launch process.

Due consideration must be paid to the brilliance of the screen and should instruct their crew to reduce the backlighting if it is deemed appropriate based on the prevailing conditions.

Interpreting the picture

The person in command of the SAR unit should ensure that they regularly practice operating the radar so that they become fully aware of the expected picture while it is in use. It is not expected that an operator will be manually plotting each target that they observe, but a full understanding of true and relative motion is required to best appraise the picture.

Collision regulations and radar

Elsewhere in this command handbook, the International regulations for the prevention of collisions at sea have been outlined and laid out in detail. Therefore for full details on these you should refer to the relevant rules.

Rule 5 - Lookout

Every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a Full appraisal of the situation and of the risk of Collision.

It is the decision of the person in command of the SAR unit what he considers as appropriate means. It should be an obvious statement that the radar should be utilised in periods of darkness and restricted or poor visibility, however there will be other occasions where a clear radar picture will give the person in charge a clearer understanding of what objects are nearby and more importantly the relative track of them so as to better appraise risk of collision. There may be a consideration to use the radar in good visibility, where the intended track causes the vessel to have its vision obscured by a low bright sun or a nearby squally shower.

The radar picture is only as good as the individual who has been tasked to observe the radar, as well as their understanding of it. Therefore the person in command of the SAR unit should identify from their crew appropriate persons that are competent to utilise the radar to the full extent that it will be required. The person in command should then instruct parameters that they would like their radar observer to work to and encourage a continuous dialogue to ensure full appraisal of the situation around them.

Rule 6 – Safe speed

Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions.

There are a number of factors that may be applied by those in charge of a vessel in determining a safe speed. The rule is encouraging those in command to use the radar where fitted for the appraisal of safe speed and for those in command to be aware of how it can be used effectively as well the limitations of the equipment especially on small vessels.

Rule 7 – Risk of collision

Rule 7a states: Every vessel shall use all available means appropriate to prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt such risk shall be deemed to exist.

Rule 7b states: Proper use shall be made of radar equipment if fitted and operational including long- range scanning to obtain early warning of risk of collision.

Rule 7c states: Assumption shall not be made on the basis of scant information especially scant radar information.

Rule 7d states: In determining if a risk of collision exists the following considerations shall be among those taken into account:

i) such risk shall be deemed to exist if the compass bearing of an approaching vessel does not appreciably change

ii) such risk may sometimes exist even when an appreciably bearing change is evident, particularly when approaching a very large vessel or a tow or approaching a vessel at very close range.

It is the responsibility of the person in command of the SAR unit to identify, acknowledge and act upon any risks of collisions that they themselves identify or that are identified to them by their crew. The radar equipment fitted to an RNLI SAR unit has a number of functions that will help the user assess the risk of collision.

In addition to the Electronic Bearing Line (EBL) and the Variable Range Marker (VRM), RNLI radar is being equipped with Automatic Radar Plotting Aid (ARPA).

This will allow the user to appraise more easily the apparent risk of collision and inform those responsible for the safe navigation of the vessel crucial information including:

Closest Point of Approach (CPA). CPA will indicate how close a vessel will pass. This allows the responsible person to decide the risk of passing too close if sufficient sea room is available, taking into account the prevailing conditions. There will also be an indication of the time to elapse until the radar contact and your vessel are at this point.

Bow Cross Range (BCR). Additionally, the radar will also indicate when and how far a radar contact will pass in front of SAR unit. If this range is indicated as a negative number, it means that the echo will pass behind. The information provided by ARPA should not be wholly relied upon as the quality of the information is dependent on the standard and quality of the radar, and the reliability of information inputs such as electronic compasses and speed logs.

ARPA provides the information that the observer would ordinarily be able to obtain by completing a manual radar plot for each target observed.

If a SAR unit's radar is not equipped with a target monitoring system there is still an expectation under the collision avoidance rules that radar targets can be plotted to ascertain their true motion if the risk of collision presents itself.

Rule 8 – Actions to avoid collision

(a) Any action taken to avoid collision shall be taken in accordance with the Rules of this Part and, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship.

(b) Any alteration of course and/or speed to avoid collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing visually or by radar; a succession of small alterations of course and/or speed should be avoided.

If the person in command of the SAR unit recognises that there is a risk of collision and through their knowledge of the other aspects of the IRPCS identifies that an alteration of course of their own vessel is required then a full consideration of rule 8 is required. Under this rule it is not sufficient to alter course by a few degrees or simply enough to alter the aspect. If there is any possibility that the other vessel is monitoring the risk by radar then any alteration of course must be pronounced and prolonged enough to ensure that any radar monitoring tools identify an increasing closest point of approach. This may mean deviating from the intended track for a more prolonged period than would be done ordinarily and if this is the case the person in command of the SAR unit should satisfy themselves that the new track is safe and free from hazards.

If conducting a search pattern, then consideration should be given to the effect on the track spacing and therefore the effectiveness of the search pattern by the deviation in course.

A full situational appraisal should be made prior to the alteration of course to ensure that in the planned act to avoid one vessel a risk of collision with something else is not created.

Rule 19 – Conduct of vessels in restricted visibility

As explained in chapter 4, this rule applies when vessels are not in sight of one another operating in or near an area of restricted visibility. This may be due to rain squalls or any type of fog. An understanding of the weather forecast for the area is important to recognise if there is a possibility of restricted visibility at any point during the exercise, passage or service.

The radar will have been used to make an appraisal of the visibility and the SAR unit will be operating at a speed that is appropriate and safe. It is down to the discretion of the person in command of the SAR unit if they feel that rule 19 applies. If they do then in addition to the actions listed in the rule they should post additional lookouts and make appropriate sound signals as required in IRPCS.

The density of traffic should be considered when deciding if the rule should be applied, as not all vessels will be obscured from sight. For example, if an SAR unit is operating near the shore and the visibility is between 3 and 5 miles and the coastline is bathed in sunshine. The vessels that are operating near the coast are visible by eye as well as radar. Therefore the normal rules (11-18) apply. However, if due to the prevailing conditions there is a bank of sea fog that is four miles offshore with a number of large vessels transiting the area, the presence of these vessels is only known due to the information presented on radar. Therefore Rule 19 applies to these.

It is important to remember that when applying rule 19 that all the rules between 11 and 18 are not applicable and only sound signals for restricted visibility should be used to avoid confusion. Additionally if a risk of collision is identified it is the responsibility all vessels to avoid if identified and therefore there is no "stand on" Vessel.

Unlike within rules 11 – 18 which are prescriptive over what actions a vessel must take, rule 19 instead identifies what actions must not be taken in an effort to avoid a collision.

The main stay of the rule is to ensure that any action that is taken serves to increase the distance between two vessels where risk is identified regardless if both are visual to each other on radar or not.

(d) A vessel which detects by radar alone the presence of another vessel shall determine if a close-quarters situation is developing and/or risk of collision exists. If so, she shall take avoiding action in ample time, provided that when such action consists of an alteration of course, so far as possible the following shall be avoided:

(i) an alteration of course to port for a vessel forward of the beam, other than for a vessel being overtaken;

(ii) an alteration of course towards a vessel abeam or abaft the beam.

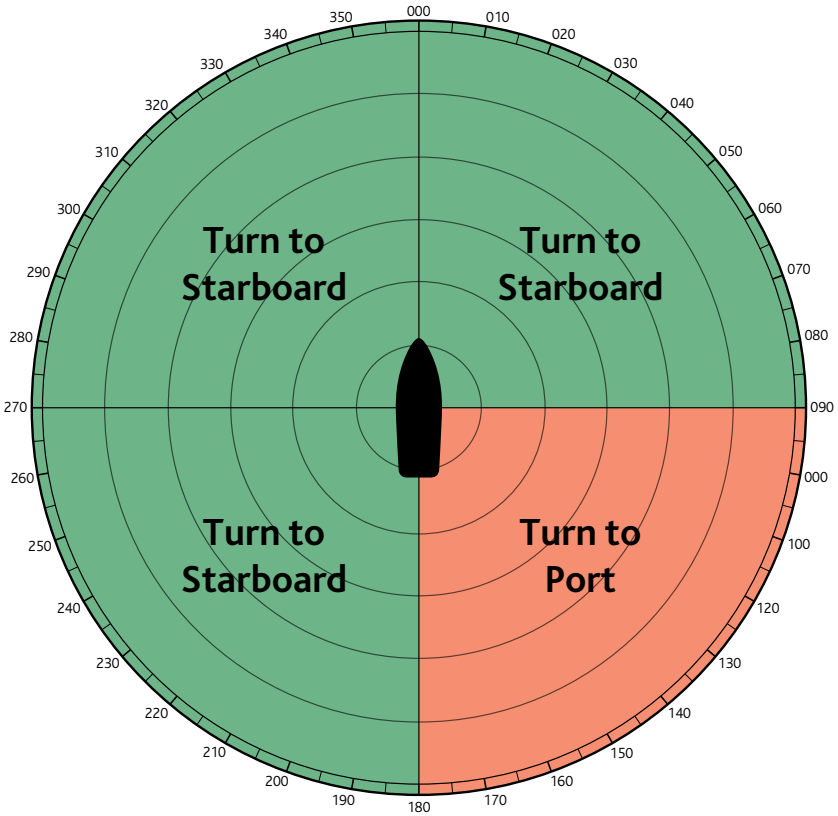
Paragraph d of rule 19 identifies the actions which must not be taken in an attempt to avoid collision.

There are as a result a number of options that can considered to effect collision avoidance under this rule.

These are:

- slow your vessel
- stop your vessel
- alter your vessel's course.

It must be remembered that for any of these actions that are considered to avoid the collision, it must be completed in plenty of time and be obvious to all other vessels.



A simple graphic to help understand Rule 19

Local knowledge – command

Local knowledge is the knowledge that is established over time and through experience from within a given community or unit. This knowledge is continually developed and adapted to local environments and is often passed on through successive generations. Local knowledge is part what keeps our people safe and quite often it aids situational awareness. Therefore it is necessary to have a way of collecting and measuring individuals' competency in relation to it.

The Local Operating Procedure (LOP) must be completed in accordance with operational management. Local information and regulations may be updated as a result of feed from HQ, national or local sources. It is vital the LOP be updated to reflect new and current information.

Those in command of a SAR unit must be aware of all relevant navigational aids and local geography relevant to ashore and afloat based activities, to a level where local knowledge can be used to plan effectively and safely in advance of operations. The operations team should feed into, and help write, LOPs.

Physical and environmental factors

The LOP should include details of, but not limited to:

- hazards
- local regulations and local harbour by-laws
- notice to mariners
- navigational aids
- geographical markers
- points of interest
- reference points
- casualty landing points
- exclusion zones and no-go areas
- access and egress information
- expected density of traffic levels
- other activities or users of the area
- topography details.

Review triggers

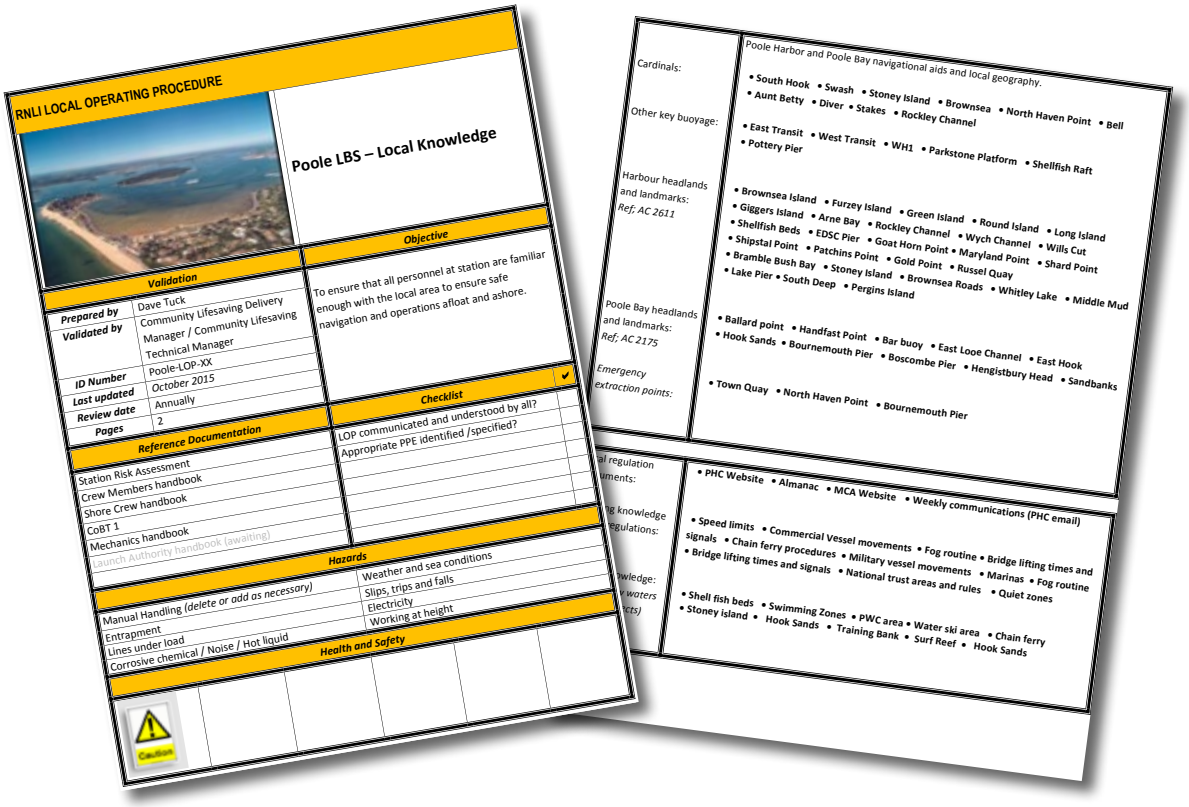
It should also have a section on suspected triggers for a review. It is known that some harbours have sandbars that move each season, some beaches will change gradient after a storm and some slipways will be more hazardous in certain conditions.

This section should note what these triggers are e.g. the harbour entrance will be buoyed each year indicating the safest channel for entry.

If no environmental factors are identified as review triggers then a time period for review should be applied.

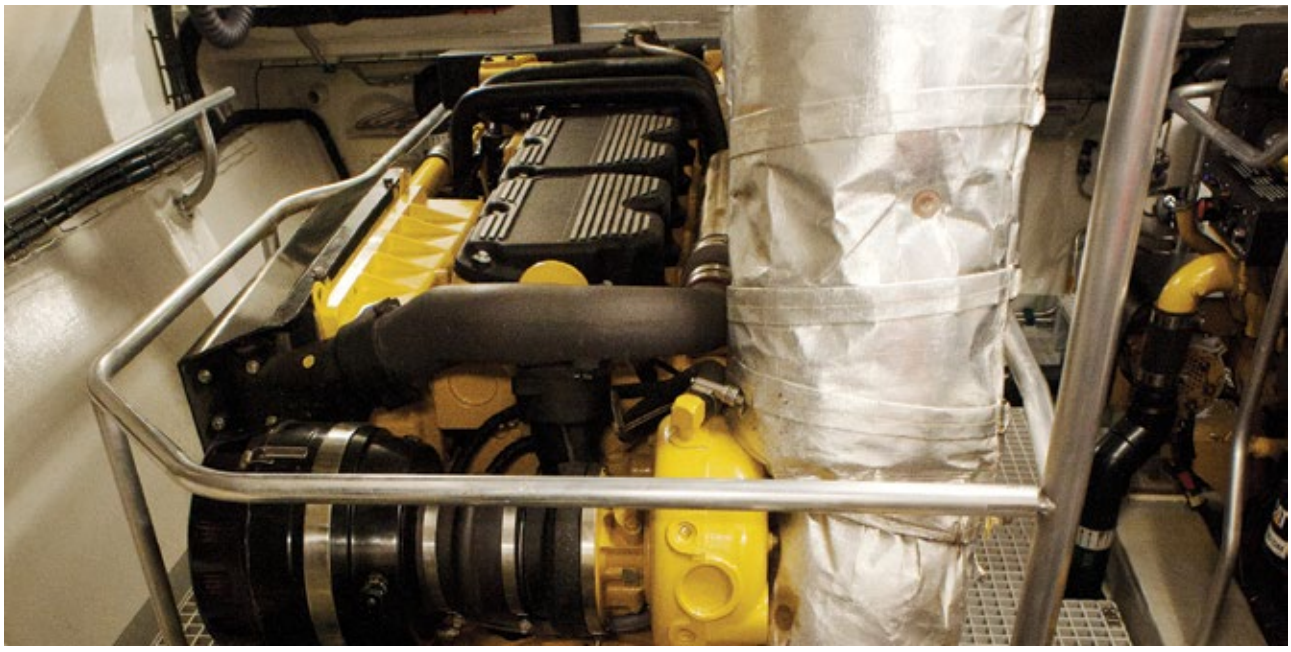
Warnings

Any specific local warning should be highlighted in this section.



Activity 9

Propulsion and Auxiliary Systems



Tamar class lifeboat engine room

Operate main machinery

While the maintenance and repair of the SAR unit's systems are specialist skills, it is essential that all crew members, including those in command, understand the normal operating limits enabling the early identification of potential problems.

The RNLI uses several types of engines to carry out its work. There are inboard diesel engines for the ALBs, which are also fitted to most launching vehicles and hovercraft, outboard petrol engines for the ILBs, inboard petrol engines on the rescue watercraft and all-terrain vehicles and both diesel and petrol salvage pumps.

All engines pose hazards to the unwary and it is vital that all crew have a basic understanding of how to use them and what to do in the event of a problem.

A comprehensive *Health and Safety Manual* is held at the boathouse along with risk assessments and Control of Substances Hazardous to Health (COSHH) data sheets. All crew who use engines and/or substances covered by COSHH, at station, need to be aware of this information.

All engines have the same basic needs: clean fuel and air. A petrol engine needs a spark to ignite the fuel and a diesel engine needs compression to squeeze the fuel, causing it to heat up to ignition point.

All engines give off dangerous gases in the form of exhaust and great care must be taken to ensure that there is adequate ventilation. A portable engine should never be run in a confined space as carbon – monoxide is odourless and can be deadly.

Engines get hot when in use, especially the exhaust area so care must be taken to ensure that engines are not run close to flammable materials or liquids. Portable engines pose a particular hazard: never touch the exhaust or engine body when the engine is running because of the risk of burns.

Inboard engines

Ashore, the vehicle driver is responsible for the engine of his vehicle during launch and recovery. Afloat, the mechanic on an ALB is in charge of the engines and should always be informed before they are started because all SAR units have comprehensive pre-start checks that include battery status, cooling water, fuel, shaft brakes and throttle settings that need to be completed prior to starting.

Immediately after starting, a visual check should be made to ensure that there is cooling water coming from the exhaust and there are no leaks on the engine.

WARNING

IRH machinery is not guarded and poses a serious risk of entrapment from exposed belts and pulleys. Although most of our machinery is guarded there may be an occasion when guards are removed. It is good practice to have this mind set when operating any kind of machinery.

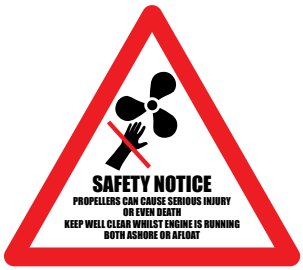
Outboard engines

The helm/boarding boat driver is responsible for the engines of an ILB, daughter craft or boarding boat and they should always be informed prior to starting engines. Again, outboard engines have a pre-start routine that includes priming the fuel bulb, checking the engine is in neutral, the throttle setting and steering.

All SAR unit outboard engines have the ability to be hand started by pulling the recoil cord. However, on our larger engines this can be very difficult so they have the luxury of electric start. Immediately after starting, a visual check should be made to ensure that there is cooling water coming from the tell-tale exhaust.

Propeller safety notice

Following a number of hazard observations regarding proximity of personnel to outboard propellers, especially during wash-down, from November 2016, a warning sticker must be fitted to every RNLI outboard engine.



Running checks

All engines need to be monitored while running. All outboard engines have a visual indicator of coolant water flow, being a jet of water, known as the 'tell tale' emitted from the back of the engine housing or leg. The more sophisticated engines have the ability to monitor the status of oil pressures, both engine and gear box, temperatures, charging and fuel flow. Where possible all of these should be monitored regularly to identify any problems early.

Many engines have audible and visual alarms. Crew should know what these alarms sound like, what they mean and what action should be taken on hearing them.

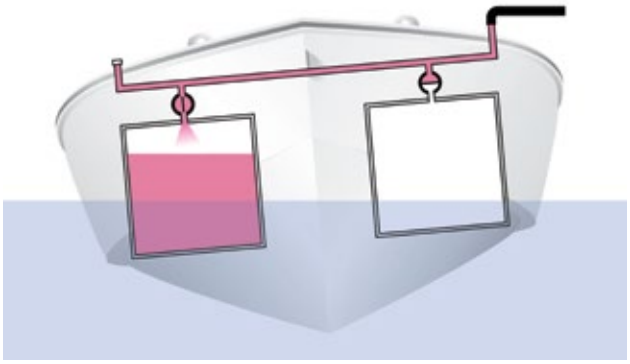
Stopping engines

Ideally all engines should be allowed to run at idle for a few minutes before closing down. This allows the cooling system to do its job and lowers the chance of heat build-up within the engine.

Engines should never be stopped without the express permission of the person in command. This ensures that the SAR unit is kept in as safe a position as possible at all times.

Once stopped and cooled, engines should be checked, cleaned and lubricated and made ready for service.

Fuelling



The RNLI always sources its fuel from reputable suppliers. If on passage, make every effort to fuel at lifeboat stations. If embarking fuel from another source make sure that you use a supplier that will provide good quality fuel.

Fuelling is to be carried out in accordance with the appropriate SOP/LOP.

When fuelling boats, fill one tank at a time. Check for contamination prior to filling the second tank. When refuelling an afloat boat, it is important to fill the tank furthest from the filling point first as this will induce a list, enabling the second tank to be filled easily.

If there are any fuel spillages, do the following:

- isolate source of spillage
- locate spill kit
- follow spill kit manufacturer's user instructions
- dispose of contaminated items in accordance with the RNLI waste management procedure.

Fire alarms

All ALBs and some boathouses have automatic fire alarms. These should be tested regularly to allow crew to practise the necessary procedures. LOMs should record when these tests are carried out ashore.

Operate ALB main machinery

ALB - fuelling

Although refuelling is part of the ALB mechanic's role it is essential that the coxswain be familiar with the fuelling process, PPE required and potential dangers involved and the precautions required in this activity.

Managing fuelling

- ALB must be securely tied up alongside
- open the fuel filler and breather (if applicable)
- turn on high level light alarm
- communicate with mechanic in order to agree fuel levels monitored
- shut filling valves after fuelling complete (if applicable)
- note the fuel taken and record in the station fuel log.

CAUTION

If refuelling at night adequate vapour proof lighting must be used.

Required PPE

- goggles (not a helmet visor)
- overalls
- apron
- disposable gloves.

Limiting fuel spillage

- ensure you do not overfill the fuel tanks
- spillage kit available.

Safety precautions to be taken when refuelling

- ensure high level alarms are on in order to alert if tank overflows
- spillage kit available
- foam fire extinguisher accessible
- all mobile phone in the vicinity are to be switched off
- no smoking on board or in the vicinity of the boat while the refuelling is taking place.

SOP – ALB refuelling

Pre start checks

The following pre-start checks must be carried out by the coxswain/mechanic before starting the ALB to prevent damage:

- check fluid levels – Low fluid levels and oil/water cause engine damage
- pumps unengaged – If left engaged pumps will burn out
- must take station to ensure gearbox is in neutral
- confirm with ALB mechanic that SAR unit is ready and fit for sea
- check for defects

Start engines

- take station at either the upper wheelhouse or engine room
- check gearbox is in neutral
- locate start button.

Running checks

- check cooling water is discharged from exhaust
- observe helm indicator to check steering function
- visually check engines for leaks
- monitor engine gauges for changes in performance.

Monitor engines

- refer to manufacturers manual for acceptable operating parameters of the engine
- previous recordings can be found in the ALB machinery log as a reference to check for changes in performance
- monitoring engines closely for changes in performance will provide you with an early indication of mechanical issues
- a machinery log is kept on board of all ALBs and should be completed every time the boat goes to sea. This will also include the noting of any defects.

Stop engines/emergency shutdown

- check vessel traffic, shore lines and shallows to ensure it is safe to stop engines
- allow the engines to run idle for a few minutes to cool down, this will prevent thermal shock
- press the relevant stop button on ALB.

Circumstances in which an ALB may require emergency shutdown

- fire
- flooding
- high engine temperature or exhaust
- low oil pressure
- abnormal noise or vibration.

SOP Refer to relevant SOP for ALB shut down procedure.

NOTE
Ensure it is safe to perform an emergency shut down.

Operate ILB main machinery

ILB fuelling

Managing fuelling

- switch off all engines/electrics prior to refuelling
- limit overfilling by dipping tanks prior to refuelling
- ensure correct fuel/oil mixture is used and mixed before filling the tanks
- a minimum of two persons are required for safe refuelling
- a lookout must be maintained at all times during fuelling to ensure public safety
- foam fire extinguisher to be kept on hand at all times when refuelling
- fuel caps to be secured immediately after refuelling is complete

CAUTION
When refuelling in warm weather, beware of gases escaping when opening the cap release.

Required PPE

- goggles (not a helmet visor)
- overalls
- apron
- disposable gloves.

Limiting fuel spillage

- ensure you do not overfill the fuel tanks
- spillage kit available.

Safety precautions to be taken when refuelling

- no smoking onboard or in the vicinity of the ILB while refuelling is taking place
- all mobiles in the vicinity are to be switched off
- refuelling is only to be carried out in well-ventilated areas due to the highly flammable/explosive nature of petrol and its fumes
- carry out refuelling in a well ventilated area.

CAUTION

A full petrol can is highly flammable. A used, empty petrol can could contain flammable gases.

SOP – ILB refuelling

Pre start checks

- disconnect shore power where applicable
- check it is in neutral
- check the fuel hose is attached.

NOTE

Fluid levels are not pre-checked

Start engines

- power is turned on
- trim engines down into the water
- using the start button, start one engine at a time where applicable
- once the engine have started check for a raw water coolant flow.

Running checks

- check raw water coolant flow
- listen for change in noise
- monitor for additional mechanical vibration
- sense for loss of power
- where applicable ensure visual display warning alarms are monitored.

Monitor engines

For normal operating parameters refer to the relevant SOP, LOP and service bulletins for ILB.

NOTE

By monitoring the engines regularly on an ILB, you will be alerted to a potential issue earlier which may avoid a potential breakdown

On returning to station and following the post recovery checks, the number of hours the engines have been running must be recorded. Fuel usage and any defects identified must also be noted.

Stop engines/emergency shutdown

- the person in command must determine if the ILB is in a safe location or securely tied up prior to stopping the engines

CAUTION

If turbo engines are fitted, ensure sufficient tick over time is given prior to engine shut down to prevent bearing wear.

Press the stop button on the ILB to shut down the engines during the following emergencies:

- abnormal noise or vibration
- observe a fuel leak
- observe a weal raw water coolant flow
- engine fire
- mechanical failure.

Operate IRH main machinery

IRH fuelling

Managing fuelling

- open the fuel filler
- observe fuel gauge to identify amount of fuel required
- refuel tank.

Required PPE

- goggles (not a helmet visor)
- overalls
- apron
- disposable gloves.

Limiting fuel spillage

- ensure you do not overfill the fuel tank by observing gauge
- spillage kit available.

Safety precautions to be taken when refuelling

- spillage kit available
- fire extinguisher accessible
- mobile phones in the vicinity are to be switched off
- no smoking on board or in the vicinity of the IRH while the refuelling is taking place
- warning signs, public access restricted could be added.

CAUTION

Diesel fuel is an irritant to skin, ensure no contact with skin.

Pre start checks

The following checks should be performed before starting the vessel:

- oil levels in both engines
- coolant level in both engines
- batteries are on
- fan drive belt tension and condition
- coolant/oil in bilges
- lift fans
- elevator and steering cables
- full steering function and complete operation of elevators
- doors/hatches are closed securely
- thrust propellers are not damaged
- foreign object debris.

Start engines

- ensure area surround the IRH is clear
- revs are low
- turn on amber flashing light
- start engines one at a time.

CAUTION

When starting an IRH ensure the area surrounding the craft is clear of other vessels and public.

Running checks

- check warning lights are extinguished
- check for abnormal vibration and noise
- ensure engines have full power.

NOTE

IRH crafts can be prone to defaulting into engine safe mode.

Monitor engines

For normal operating parameters refer to the relevant SOP, LOP and service bulletins for IRH.

NOTE

By monitoring the engines regularly on an IRH, you will be alerted to a potential issue earlier which may avoid a potential breakdown.

On returning to the station and following the post recovery checks, the number of hours the engines have been running must be recorded. Fuel usage and any defects identified must also be noted.

Stop engines/emergency shutdown

- ensure the IRH is in a safe position
- if appropriate, allow the engines to idle for a few minutes before shuting down
- turn off power key
- the engines can be stopped by the emergency stop cables if the key fails.

Photo: RNLI/Nigel Millard

Photo: RNLI/Adrian Don

Fitness Standards

Activity

13

Aerobic and strength testing

All enrolled seagoing crew, regardless of their role, are required to pass a fitness assessment to ensure they are fit enough to carry out their seagoing duties.

Aerobic fitness tests

The aerobic step test is included to ensure seagoing crew have the cardiovascular fitness to perform their duties safely and repeatedly. The test is three minutes long at a rate of 24 steps per minute. 30 second after completion, the resting heart rate will be recorded; the reading must be 62 beats or less measure over 30 seconds.

The test should be postponed if the individual has not adhered to the following instructions:

- no tea, soft drinks, alcohol or coffee two hours prior to the test
- no cigarettes or tobacco products two hours prior to the test
- wear appropriate clothing i.e. no tight jeans
- refrain from exercise or large meals for two hours prior to the test
- postpone the test if the individual is unwell
- remove wristwatch, bracelets etc. prior to the test.

For individuals who are taking drugs that alter their heart rate response to exercise (such as beta-blockers), or are not permitted to do the step test for other reasons, a six-minute walking test has been devised. The individual needs to demonstrate the ability to walk 600 metres in six minutes; this typically consists of walking a 25-metre course at a pace of 25 metres every 15 seconds for the total distance of 600 metres. There is no measurement of heart rate taken at the end of this test.

Grip strength

Grip strength is a good predictor of overall strength and therefore integral to the fitness assessment of both ALB and ILB crew.

Due to the differing nature of the tasks they undertake, the grip strength standards for ILB and IRH crew vary to those of ALB crew. For the specific grip strength standards, please refer to the Competency Standards.

Grip endurance (ALB only)

In addition to standard grip strength, ALB crew have been observed to require prolonged grip strength for some critical lifting and carrying tasks, as well as for MOB recovery. Therefore, the grip endurance test is only applicable for ALB crew.

Grip endurance should be assessed five minutes after the grip strength tests. There must also be five minutes of rest between the 10-second and 30-second grip endurance tests of the same hand. For the specific grip endurance standards, please refer to the Competency Standards.

Back strength

Back strength is important in a number of critical tasks associated with operating on a SAR unit. Due to the differing nature of the tasks they undertake, the back strength standards for ILB and IRH crew vary to those of ALB crew. For the specific back strength standards, please refer to the Competency Standards.

Photo: RNLI/Adrian Don

Photo: RNLI/Nicholas Leach

Behaviour, Commitment and Currency

Activity

14

Behaviour

All RNLI personnel are expected to display and uphold the core values and behaviours during all RNLI duties, as specified in volunteer and job role profiles.

Fundamentally, you may be the best in the organisation at the functions of your role, but if you carry it out in a way that is detrimental to those around you or is a risk to the organisation's reputation you can still have more of a negative effect than positive overall.

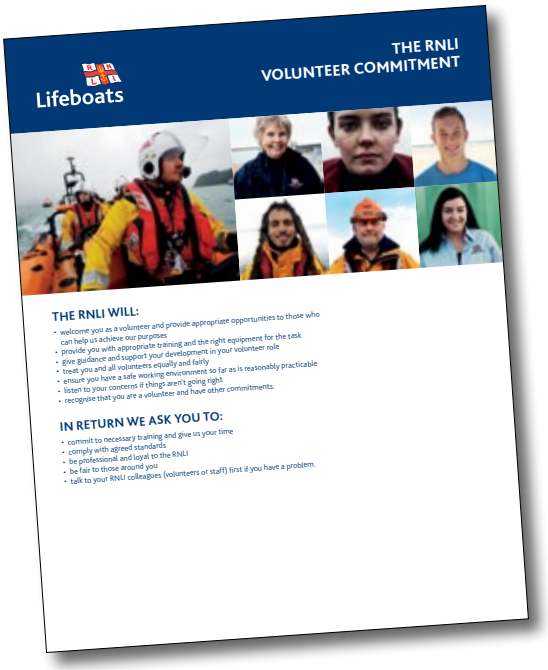
It is also a requirement for all volunteers and staff to uphold the core values of the RNLI and ensure we are all clear and working together towards our Purpose, Vision and Values:

- **Purpose** – To save lives at sea
- **Vision** – To end preventable loss of life at sea
- **Values** – Our work is based and driven by our values. Our volunteers and staff strive for excellence and are selfless, dependable, trustworthy and courageous.

Generally, how we expect all volunteers to conduct themselves is laid down in the Volunteer Code of Conduct.

It is a requirement for all volunteers and staff to continually display and uphold these core values and behaviours. Exactly what we expect from everyone in the RNLI is documented in a number of locations:

- RNLI Behaviours.
- Role and job profiles.
- Volunteer induction pack.
- Volunteer Commitment.
- Volunteer Code of Conduct.


Lifeboats

THE RNLI VOLUNTEER COMMITMENT

THE RNLI WILL:

- welcome you as a volunteer and provide appropriate opportunities to those who can help us achieve our purposes
- provide you with appropriate training and the right equipment for the task
- give guidance and support your development in your volunteer role
- treat you and all volunteers equally and fairly
- ensure you have a safe working environment so far as is reasonably practicable
- listen to your concerns if things aren't going right
- recognise that you are a volunteer and have other commitments.

IN RETURN WE ASK YOU TO:

- commit to necessary training and give us your time
- comply with agreed standards
- be professional and loyal to the RNLI
- be fair to those around you
- talk to your RNLI colleagues (volunteers or staff) first if you have a problem.

Commitment

Anyone fulfilling a volunteer role is expected to meet the requirements of the Volunteer Commitment and Volunteer Code of Conduct and this will be taken into consideration when conducting the 12-month probation process. Volunteers also need to demonstrate that competence has been attained in the core units for the role.

NOTE

The probation process only applies to the first volunteer role held in any period of continuous enrolment.

The RNLI asks volunteers to:

- Commit to necessary training and give us their time.
- Comply with agreed standards.
- Be professional and loyal to the RNLI.
- Be fair to those around them.
- Talk in the first instance to their RNLI colleagues, other volunteers and staff if they have a problem.

In return, the RNLI will:

- Welcome them as a volunteer and provide appropriate opportunities to those who can help us achieve the RNLI's purpose.
- Provide them with appropriate training and the right equipment for the task.
- Give guidance and support their development in their volunteer role.
- Treat all volunteers equally and fairly.
- Ensure they have a safe working environment as far as is reasonably practicable.
- Recognise that they are a volunteer and have other commitments.

For further details, please read up on ***RNLI Behaviours***, ***Volunteer Commitment*** and the ***Volunteer Code of Conduct***.

Evidencing the right behaviour

While we document and communicate what we expect of you, we more importantly need to see the evidence of RNLI volunteers and staff displaying and upholding the behaviour and commitment.

This is recorded through the competence framework and unit 14.1-1 Behaviour and Commitment.

Initially, we would expect volunteers to understand the broad behavioural standards and requirements of the RNLI and attain a competent status within the first year and as part of their probationary process (see below).

Once having evidenced and displayed competence in this unit, the unit will remain competent with no standard revalidation period and will transfer as a competent status across other development plans for additional roles if you expand your volunteer profile. Should you then need support or further training based on the requirements of this unit, operational management can adjust the competence status to recognise a support or training need.

Volunteer probation

When you first join the RNLI you will serve a probationary period. The overarching purpose of this is to give both parties – you and the RNLI – a period to ensure that there is a mutual fit and that the duties and requirements undertaken by the role are being undertaken to the required standard, or more likely, that good progress is being made towards being fully competent in all aspects of the role.

The probationary period does have an associated procedure laid down by the RNLI to support it and is led by the LOM or nominated mentor. This is then signed off and made competent by the operational management that oversees your location. While normally a period of 12 months for most roles and individuals, a probationary period can be adjusted to suit the local ways of working as well as availability and the progress any individual is making through the role.

Successful completion will be measured by:

- Demonstrated evidence of the requirements of the Behaviour and Commitment unit
- A competence status held in any Activity 1, 2 and 13 units of your development plan

Successful completion of the probationary period will be recorded through a competent status being recorded in your development plan in unit 14.1-1 with an accompanying comment if required.

Successful completion of any probationary period is separate to a 'Trainee' status moving to a full development plan, which is an indication of full competence in all aspects and duties of the role.

Photo: RNLI/Nathan Williams

Competence currency

Competence versus currency

There are a number of definitions for the above but the RNLI takes the following approach:

Competence is the process of an individual evidencing skill, knowledge or behaviour in relation to the requirements of their duties for the RNLI.

Currency is the process of ensuring that an individual remains competent over a period of time to account for any change.

Currency is important as individuals can become rusty or forget procedures, tasks, ways of thinking etc. Additionally, from time to time the RNLI introduces new equipment, the environment you operate in may change or the operating procedures are updated. Therefore, regular attendance at the lifeboat station is essential to ensure you stay practiced and fresh and can operate in a SAR environment with little or no notice when it matters the most, to save a life.

Attendance

The requirements for attendance for ALB coxswains/ILB helms/IRH commanders are:

- Confirmation of application of competencies through regular attendance on service and exercise.
- A minimum attendance guide is 12 attendances per year, per role and associated development.
- A minimum of eight of these are to be exercises and a minimum of four of these are to be in command.

One of the above exercises should be an exercise with an appropriate assessor or manager within the preceding three years with the individual acting in command. The assessor/manager exercise will likely be planned such that it covers the key elements of the individual's development plan including both practical and theoretical elements e.g. IRPCS, boat handling, command, situational awareness, navigation, search and rescue command.

Currency requirements

The competence currency requirements are therefore:

- Remaining competent in all elements of the development plan and meeting the requirements of revalidation periods that are associated with them.
- To meet the attendance requirements for the role.

This is assessed on a five-yearly basis by the operational management in consultation with the operations team and LOM at the station. While spikes and dips in availability and the occasional training session might be missed, it is expected that overall as an average the standards are met in this period.

Photo: RNLI/Nigel Millard

Photo: RNLI/Nigel Millard

The Media

Activity

15

Media awareness

Good PR enables us to highlight the positive and, when necessary, mitigate against and minimise the negative.

Positive Stories	Negative Stories
Interesting rescues	Rescues gone wrong
Human interest stories	Health and safety incidents
Landmarks or records	Public criticism of the RNLI
Celebrity involvement	
Major fundraising achievements	

The media provide prime opportunities to raise awareness of our lifesaving work. The media want to know what we are doing, but we have to ensure our news and messages reach them how and when appropriate.

Only those members of staff or volunteers authorised to speak to the media as part of their role should do so. All other personnel should contact their line manager, Public Relations Manager (PRM), volunteer Lifeboat Press Officer (LPO) or Duty Press Officer before interacting with the media. Ensure you have the support and guidance from a member of the Communications Team or LPO before media interaction.

Risk to reputation

The RNLI is a well-respected charity with a long history and a positive reputation as a leading, volunteer-based, lifesaving organisation. Although only a small number of staff and volunteers have direct responsibility for dealing with media, anyone connected to the RNLI should view themselves as an ambassador for our charity.

Rescues, especially in crisis situations, are often carried out in the public eye. This may result in our actions being photographed or filmed and our conversations recorded, sometimes without our knowledge. Every RNLI staff member or volunteer must therefore be aware of the potential for our actions or words to generate negative publicity.

Potential risks to the RNLI's reputation include:

- unprofessional behaviour
- high demonstration of risk
- judgemental/non-caring behaviour
- misuse of funds.

To avoid these risks, it is vital personnel carry out their roles in the way they were trained. This will ensure that all procedures are carried out correctly and that no unnecessary risks are taken.

Ensure the media and the general public are made aware of the key messages that best describe the RNLI. When talking externally about the RNLI, we should aim to use our key messages wherever possible.

Key messages

- The RNLI is the charity that saves lives at sea.
- Our lifesaving operation provides lifeboats, lifeguards, safety advice and inland flood rescue.
- The RNLI relies on volunteers to provide its lifesaving service.
- Our crews and lifeguards have saved over 140,000 lives since the RNLI was formed in 1824.
- We are independent of the Coastguard and separate from government.
- 92% of our total income comes from donations.
- On average, around three people die in UK coastal waters every week.

Photo: RNLI/Nigel Millard

Recording footage at incidents

The RNLI relies on good, visually accurate accounts of rescues and operations in order to raise awareness and generate vital public support. If we have footage of a rescue, we are much more likely to receive media coverage.

Identity protection – ethics

While we want to portray an accurate account of events in our video and images, this should not be at the expense of another person's grief or embarrassment. When filming, the following guidelines will help:

- do not show death, extreme pain or gore
- do not use indecent or candid images, even if meant in jest
- do not intrude on others' grief
- do not pass images directly to the media – check them with a member of the PR team first.

Identity protection – consent

For footage taken of adults, we are not required by law to obtain consent. However, use common sense – if the footage shows an individual in a distressing or embarrassing situation, consider that it would do more harm to our reputation to use these images without the consent of the individual involved. If you are unable to get consent, chose a picture or footage that does not show them (or edit around it).

For children, it is a legal requirement that we obtain consent from a parent or guardian. The best way to do this is to get verbal consent recorded on the camera itself. However, if the children are not identifiable (either physically or by their vessel/surroundings) you are safe to use the image without consent.

Footage must be uploaded to the RNLI Video Library and moderated by a member of the Communications Team before being issued to the media or shared on social media.

NOTE

Further guidance and operating information can be found in ***TRG 138, RNLI Camera Guide***.

Photo: Michael Mac Sweeney/Provision

Social media

Social media such as Facebook, Twitter, Instagram and YouTube is a powerful, cost-effective means of reaching many thousands of people with the lifesaving work and fundraising events of the RNLI. Our organisation has its own social media channels and encourages responsible social networking by its staff and volunteers, but always think about what you write and which images you post before doing so. Remember to credit the original photographer where appropriate.

You will probably be familiar with a few of the more popular social networks below:

Facebook is a social networking site that allows users to create profiles, upload photos and video, share messages and keep in touch with family and friends – in 2015, posts from our RNLI Facebook page (220K likes) were seen a total of 40 million times (including videos being watched 3.7 million times) and shared 116,000 times.

Twitter allows users to broadcast short posts (140 characters) and follow other users. It is popular for breaking news, building relationships and publicising events – in 2015, our RNLI Twitter account (99.3K followers) sent 6,500 tweets, seen a total of 4 million times and retweeted 40,000 times.

Instagram is a visual social networking app where users share photos and short videos – RNLI Instagram has over 20K followers and is currently our fastest growing social media channel (in 2015, we went from 2,000 to 14,000 followers).

YouTube is a video sharing service that allows users to upload videos and watch other video content that has been uploaded by other users – RNLI YouTube has over 8 million views.

Snapchat is an app which allows users to send and receive photos and video that 'disappears' after 20 seconds. Content on this network often has a light-hearted theme, graphics or illustrations.

Staff and volunteers must not act in any way that brings the RNLI into disrepute and that applies online too; doing so is taken extremely seriously. Social media is not a place to air complaints or talk about potentially sensitive or personal details of incidents or casualties.

What to avoid:

- live uploads/ videos
- Offensive or inappropriate content
- confidential/sensitive information
- criticism of those rescued
- criticism of other agencies/organisations
- pictures/footage showing incorrect operational practices
- pictures/footage of RNLI personnel behaving inappropriately in their capacity as RNLI representatives.

Photo: RNLI/Nathan Williams

If you have a great photo to share, you want some advice on social media or you have spotted something about the RNLI on a social media channel that you are concerned about, contact the RNLI Social Media Team on social@rnli.org.uk or your LPO. Please also read the Social Media Policy for further information.

Photo: RNLI/Nathan Williams

Command Pass Outs

Activity

17

Operational pass out

Regardless of technical skill it is the ability to make the best of those around you to achieve a defined outcome that separates the good leader from those who are just in charge. This section provides an insight into the management, command and communication skills that result in the open environment necessary for safe and efficient operations.

The operational pass out is the final assessment that appoints an individual and authorises them to take responsibility for certain key decisions. It is conducted by operational management and is for positions where individuals are not directly supervised and where their actions, if incorrectly carried out, could result in death, serious injury or major damage to equipment.

The operational pass out is designed not just to test technical understanding and skill, but also an individual's ability to communicate clearly, work well with the team, make decisions and react appropriately for the situation within which they are in.

An essential part of this is an individual's approach to leadership and how effective they are at communication.

Photo: RNLI/Nigel Millard

Leadership

There is much written about leadership and many models which can be followed, some of these are more prescriptive while others are much more flexible. The nature of SAR is dynamic and therefore those in command require a flexible approach to their leadership style.

The RNLI's methodology for operational leadership is based upon work conducted by Hersey and Blanchard in the 1960s, they were the early advocates of a more flexible and adaptable approach to leading.

In simple terms every situation has two variables which require consideration by the leader these are the task (what are we trying to achieve) and the people (the team available to make it happen).

By considering these two things it is easy to see how it is the leader who must adapt their style to suit the situation.

For example, if a coxswain uses highly detailed explanations in a situation where the task is routine and the people are trained and highly capable, the task will be completed but the team will be demotivated and unlikely to think for themselves.

Conversely, when faced with a challenging and complex task, which people feel is at the limit of their ability, if the coxswain is a very casual person who offers little guidance, then the task may well fail and the team feel responsible and let down.

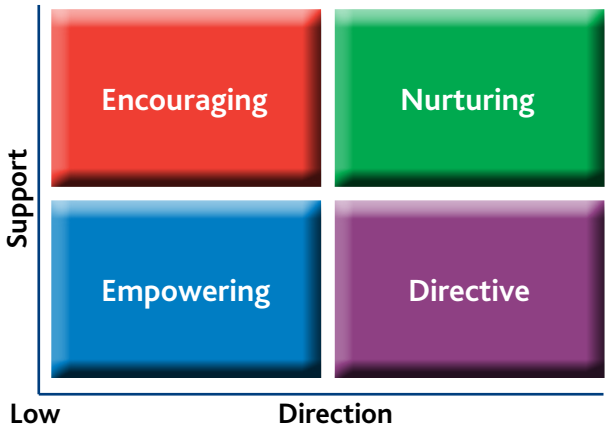
However, neither the traits of minutely controlling a situation or alternatively offering little guidance are wrong; it is their applicability to the situation that has to be correct. This also demonstrates that those in command must be able to conduct themselves in a way applicable to the task and the people.

Once we understand the importance of the task and the people in choosing our approach to leading it is much easier to decide the correct approach. The two things that the leader needs to consider are the level of direction (directive behaviour) and the level of support (supportive behaviour) that the team will require.

Directive behaviour: The leader organises the role and activities, clearly telling people what to do, when to do it, how to do it and where to do it and then closely supervising the execution.

Supportive behaviour: The leader engages in personal relationships with team members; the amount of emotional support for individuals- listening to people, providing support and encouragement and facilitating their involvement in problem solving and decision making.

This outcome of the differing levels of support and direction result in one of four choices of leadership behaviour. These are indicated in the diagram on the following page .



Directive

If people are unfamiliar with the task and unaware of its complexity, they will require a high level of direction from the leader, but little support. The reason for this is that they need clear instruction regarding the requirements, but require little support as they have so little appreciation of the task that they do not understand how difficult it actually is. This style of leadership will be appropriate to high risk situations where not everybody will necessarily appreciate the dangers. It will frequently be used when showing a new trainee a task for the first time.

Nurturing

When people are aware of the complexities of a task but are not yet entirely familiar with the details they will still require high levels of direction to complete it. However it is important to realise that they are now acutely aware of the complexities and know that in all likelihood they cannot complete it unaided. They will therefore need considerable support from the leader to reassure them that things are going well. It would be usual to adopt a nurturing style when repeating a training task for the second or third time.

Encouraging

As tasks become more familiar and routine people will require lower levels of direction in order to complete them successfully, however until the process is embedded in the subconscious that they will still require plenty of support that things are going well and that you are still aware and interested. Occasionally it should be expected that some low level direction will be required (more an indication of the next step rather than the detail).

Empowering

When the task is routine and the people are very familiar with its requirements then an empowering style can be adopted. Following minimal direction the team/individual can be left to get on with the task. It is important to remember though that to lead effectively still requires some monitoring and feedback. Empowering behaviour is about low support and low direction not no support or direction.

What is essential for all those in command to recognise is that as the situation changes it is likely that your leadership style will need to adapt. Similarly if the tasking is the same but the team is different then again you will have to change your style to reflect the needs of your team.

Inappropriate use of styles

The good news is that we all tend to have a preferred style that we are both good at and comfortable with; for those working with volunteers this tends to be either nurturing or encouraging. The bad news is that it will often be the same familiar style that we use most of the time and therefore choose wrongly in inappropriate circumstances. At some point all leaders will be presented with situations that require each, some or all of the aforementioned styles of leadership to be used in order to optimize their effectiveness. It is the ability to choose the correct style for the situation and remain flexible should a new set of circumstances arise that epitomises the good leader.

Even though it may be your favoured style, using it at the wrong time can result in poor performance the following four sections identify the negative aspects of the incorrect use of each style.

Dictator (poor use of directive behaviour)

Overly directive behaviour or directive behaviour used at the wrong time can lead to people thinking you always want to be in control. It will demotivate experienced crew and can result in them not bothering to think for themselves or not speaking up at critical times. You may feel important but others won't think you are. Only be directive when your team need direction.

Smothering (poor use of nurturing behaviour)

At some stage people need the latitude to experience things for themselves, you must support them in doing this without taking complete control. When the crew member can do the job, at least to some extent, then 'telling' them what to do may demotivate them or lead to resistance. Therefore explaining and clarifying decisions is essential.

The leader must spend time listening and advising and, where appropriate, helping the crew member to gain necessary skills through coaching.

Poor application of nurturing behaviour makes the team feel that you do no trust them.

Rescuer (poor use of encouraging behaviour)

When the follower can do the job, but is refusing to do it or otherwise showing insufficient commitment, the leader need not worry about showing them what to do, and instead is concerned with finding out why the person is refusing and thence persuading them to cooperate.

The poor application of supportive behaviour results in the leader 'rescuing' and taking on the task themselves, this does not help the team to take responsibility for the task and results in the leader doing everything ultimately becoming overloaded.

Abdicator (poor use of empowering behaviour)

It is easy to believe that a well developed team performing routine tasks requires little in terms of leadership. However it is key to remember that the team still requires some direction and support, even if it is only to reassure them that you have noticed their efforts and that they are pulling in the right direction. The poor application of empowering behaviour results in the leader abdicating their responsibility for the team resulting in inappropriate results and teams detached from their leadership.

Communication skills

'I know that you understand what you think I said, but I'm not sure if you realise that what you heard is not what I mean…'

Ask most people if they think that they are good communicators and they will tell you that, yes, they think they are.

Sadly for many reasons this is not the case. As human beings we suffer from many design faults that make us prone to making errors in how we communicate, both in our private and professional lives. In our private life that may only cause us to be late picking up the kids from school or cause an argument with our partner because we haven't been listening to them properly. In our professional lives out on a shout we could jeopardise the lives of our fellow crew members or ourselves because of poor communication skills.

The aim of this section is to provide you with an insight into how we communicate, provide you with some knowledge, some ideas and strategies, which may enable you to become a better communicator. This won't happen overnight and like most skills needs to be worked at constantly.

The aim of communication is to transfer the mental image in your head and ensure that the image is the same in the persons head with whom you are communicating. For this to be successful the message must be sent, received, understood, and vitally the meaning must be shared.

For example, a crew member positioned aft in the lifeboat sights a large fishing vessel approaching at high speed from the starboard side on a collision course with the lifeboat. The crew member reports to the coxswain, "have you seen the vessel to starboard" to which the coxswain replies "yes, I have seen the vessel to starboard thanks".

In this instance the message has been sent, received and understood but unfortunately the meaning has not been shared, the coxswain has visual on a small punt, obscured from the view of the crew, while the crew member is observing the large fishing vessel which is obscured to the coxswain by the supports between the wheelhouse windows.

Fortunately in this case the crew member continued observing and took further action to inform the coxswain that they were at risk of collision, but this demonstrates the importance of listening and the confirmation of understanding in effective communications.

Photo: RNLI/Nathan Williams

Listening

When we listen to others we also listen to our inner voice and combine what we hear with the picture we have in our mind. If you like, we understand the context of what is being said, not the detail. Sometimes we only actively process every 6th or 7th word said. So you can see that this process is at best prone to error. Combine with this the fact that our brain also spends time internally formulating a response to what is being said and you can see where errors occur.

At the same time, depending upon the environment we find ourselves in, the presence of danger, a threat, noise, stress and workload these factors also limit the amount of information we are able to process and communicate.

We are a single channel, so when the brain is trying to process information, and in particular when the brain is under stress, it blanks out ambient sound so that it can concentrate on what it thinks is important. The problem is that it is not selective about what it blanks out so if it blanks out a vital radio call or a warning from a crew member then it will not be heard.

You will have noticed that when someone starts to become overloaded the first thing that 'fails' is their hearing followed by their speech. The brain simply cannot process the information and formulate a reply, it doesn't have the capacity.

The following is a list of strategies which have been developed in order to try and combat this:

- Read back important messages. This helps the brain process the information and allows the person with whom you are communicating to check for understanding.
- "Think out loud". This forces the brain to slow down, increasing capacity and reducing error.
- Write down important information.
- Use checklists, they increase capacity and reduce error.

In aviation, many checklists require tactile confirmation that the action has been completed and in all critical areas of flight these checklists are challenged and responses noted.

These actions perform many beneficial functions. They slow things down, reducing error, they reinforce the procedure in the brain meaning that each time this particular routine is performed it is learned a little more each time.

Perception

We all perceive things differently; it has nothing to do with education, intellect, gender or culture, so in an information critical environment we can see that it is vital that everything is done to try and minimize the capacity for error due to this.

In the cockpit, it is quite acceptable to be looking at different images; on a lifeboat, as many as four people can each be looking at different images. The mental 'dialogue' is between the image and the brain. When you try and articulate that image, it is open and easy to misinterpretation.

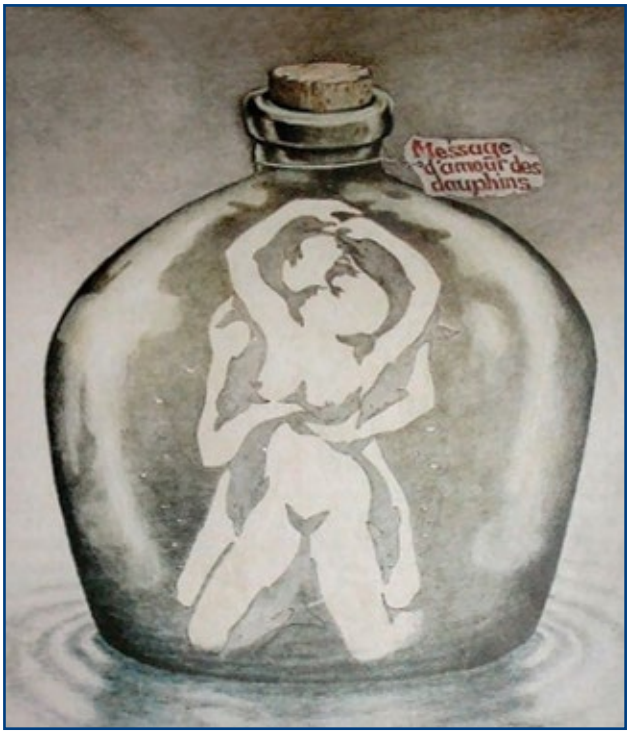
Even when people are looking at the same image (and they slip into verbal short-hand) they still don't appreciate how much they see things differently.

Old or Young?

These images have been included as a quick visual reminder of how easy it is to be looking at the same piece of information and see something completely different from your colleagues.

The answer is either, or for some people, both. The key thing to realise is that exactly the same information can be presented to two different people and due to their own background experience they will draw different conclusions.

In the next diagram your conditioning as an adult produces the image you see of two lovers; children have no perception of the image you see and instead their conditioning means that they see dolphins. Again, both have been presented with exactly the same information. The brain searches for a pattern it recognises from its previous experience.



In our professional world we use various protocols to help narrow the chances of multiple 'mental models' among a single crew.

We have a number of things going for us. Firstly, crew have all been trained a certain way, meaning that they will tend to see things in a similar way because of this training and a shared mind set. In order to further narrow the chances of misinterpretation we use standard operating procedures (SOP).

SOPs are very useful but they also come with a health warning. SOPs are only an asset if they are adhered to, understood and everyone knows them. It is frustrating for a new crew member joining, to find out that the SOPs they have diligently learned, bare little resemblance to the procedures in use onboard. The new crew member now has to think about each SOP and make a best guess at what the modified procedure actually means and what action they should take. This slows down their thought process reducing their mental capacity and massively increases the chances for error.

Well-written SOPs will:

- speed up communication
- reduce error
- increase mental capacity.
- help to avoid confusion over who does what (role clarification)
- provide an opportunity to fully utilise the expertise of all crew members
- ease the introduction of new crew members.

You will remember that the purpose of communication is to transfer that mental model in our brain to another person or persons as accurately as possible.

The problem is that humans don't have a message received and understood light on top of their head that blinks when we have received and understood the message we have just been given.

Remember, we all interpret things differently all the time. It is not a function of our background, our education our intellect or culture, its just they way things happen. It is even more likely when we are under stress or in a tight situation.

The brain is constantly looking for patterns, trying to make sense out of what it sees. Under stress it is even more likely to latch onto the first solution it sees. We therefore need to develop strategies to ensure that we communicate as accurately as possible.

When receiving critical information, if possible write it down. Writing down important information will boost retention by more than double. Ask questions, check for understanding. As long as you do it in an open and friendly manner you team will get used to this and over time you will notice that your good practice will spread through the crew.

Good human factors practice is about continually demonstrating to your crew that you are constantly striving to improve and adopt good practice yourself. Your crew will over time start to emulate your good efforts.

Communication is not just about words:

- 60% of human communication is non verbal
- About 33% is gathered from tone of voice
- And only 7% is from actual words.

This means that even though you may not be speaking, you are still communicating with your crew. It is also important to remember that one must guard against sending out the wrong message. There is nothing more confusing than when the body language does not match the words. We all do this, especially when under stress, it's just something to guard against.

Aids to good communication

Clear concise language goes without saying but so often we listen to briefs, which are anything but brief! The clue is in the name!

In aviation, language on the flight deck is very prescribed. This is for very good reason. It cuts down the number of words required and allows a large amount of information to be accurately transmitted in a short time.

Attentive listening

You were born with two ears and one mouth! Very often skilled operators fail to achieve their full potential because they have poor listening skills. It is not good enough to be able to deliver a fantastic, clear, concise brief with great body language if you fail to pick up on the fact that half your crew do not understand or have misinterpreted your instructions.

Attentive listening becomes even more important in tight situations or under stressful conditions. It is vital that as a senior member of the team you are able to take in all the information, which is being offered by your team.

Open environment

Setting an open environment in which other crew members will feel confident and able to speak up and ask questions or offer information is vital. If you fail to do this you are essentially operating on your own. History is littered with aviation and maritime accidents in which a number of crew members knew what the problem was while the commander did not.

Creating on an open environment is not always easy and has to be constantly worked at; however, if you do achieve this you will notice how much smoother the SAR unit will operate and how much more effective you become as a team.

Photo: RNLI/Nigel Millard

Barriers to good communication

Fatigue

Fatigue saps our ability to communicate; it also saps our ability to listen. If you sense that fatigue is becoming a problem be aware that communications will suffer. Try and generate conversation to keep your crew going.

Non SOP terminology

This will slow communications down and increase the chances of confusion. Worse still it will affect the SOP reliant crew member more than the 'old school, non SOP' coxswain with whom he is communicating. Our SOP crew member has to unravel the non SOP terminology and make a best guess about what is actually intended.

Lack of knowledge

It is very difficult to deliver a clear concise brief about something you know very little. As a senior crew member it is vital that you maintain your knowledge at the highest possible level. Apart from helping to improve your ability to communicate effectively, it will also set a good example to your crew.

Closed minded or belligerent attitude

This is probably the most dangerous attitude to adopt. it stifles any possibility of information flow in an information critical environment. Remember, if the most junior crew member thinks that every time he opens his mouth, he will get his head bitten off, he won't speak up. Then one dark and stormy night he may see something that you haven't, he may choose silence as the safe option.

The dangers

As human beings our communications skills are always vulnerable; however, they are never more vulnerable than when we are stressed.

Stress causes us to lose perspective; it saps our spare capacity and our ability to process information.

Learn to recognize the signs of a crew member becoming overloaded. This will inevitably lead to degradation in their ability to communicate.

Some things to think about

- At what stage can ineffective communication occur during lifeboat operations?
  - What can you do about it?
- At what point might you be vulnerable to lack of communication and by whom?
  - What can you do about it?
- When, who and how does failure to communicate occur?
  - What can you do about it?
- If you cannot improve the quality of communication with the coastguard, how could you confirm accuracy of understanding?
- If you cannot understand communication with the vessel in distress, how can you improve accuracy of understanding?
- If you are affected by ambient noise in the wheelhouse, what should you do about it?

Finally...

In the highly dynamic and often dangerous world you operate in, communications will always play a key part of your required human factors skills. You have seen that as humans we are not naturally good communicators. We don't listen very well and we tend to be quick to jump to conclusions without processing all the available information, especially when under stress or fatigued.

As the person in command of a SAR unit you have a great responsibility to your crew. To get the best from them, you need to set them the very best example you can. Your communications skills are right up there among the most important characteristics you need to demonstrate to be a superior operator. If you look back through history, some of the most notorious accidents have been majorly influenced by poor or failed communications.

It is of utmost importance that senior crew members and people in command of any SAR unit, maintain an open environment for communication between all of the crew. If the crew feel comfortable to speak freely and are able to offer input to the team, you will create a more aware and cohesive group of people who will have a higher level of situational awareness. This will ensure a safer environment for you and your crew, ultimately creating a more effective rescue service for any potential casualty.

Behaviour

When we achieve a position of responsibility we frequently assume that people will naturally do as we ask them because we are who we are. To an extent this is true, particularly initially after an appointment when there may be a 'honeymoon' period. We also assume that we would not have been given the appointment unless those who appointed us thought that we were good enough and we forget that we were appointed because we functioned well in our previous job and there is only the hope that we will function well in the new one.

It is also generally the case, particularly for first steps on the management ladder, that we get there because of our technical skills (a good seaman, a fine mechanic) and not because we are skilled at managing people. This second bit we have to learn. A few lucky individuals seem instinctively to 'get the hang of it', most muddle through, sometimes causing damage to themselves and others; a very few unlucky individuals never 'get it' and ultimately disappear off the scene to 'nurse their bruises'.

This is a very condensed guide to some of the principle problems and pitfalls. You will notice as you read through that familiar phrases are placed in 'quotes'. This is to 'highlight' that there is nothing new in what follows. Our language is full of quotations and idioms that reflect accumulated 'common sense'. Thinking about, and remembering, the meaning of everyday phrases can be a powerful learning tool.

There may appear to be a dauntingly large amount of information to take in, when using it, reflect on whether it applies to you as much as to anyone else.

A lot of what follows is modelled on the training given to Flight Crews in a major western airline. A number of years ago the airline industry realised that the majority of incidents and accidents were caused by people rather than technical failure. Unsurprisingly, the people problems had to do with how we communicated and behaved with each other.

There is one crucial difference between flying an airliner and being a part of a SAR unit crew. Flight crew frequently only meet when they arrive to fly a scheduled service. They have a need to communicate clearly and unambiguously and to have high levels of technical and procedural knowledge. Although they are trained, rigorously, to deal with emergencies, for the majority of the time what they undertake is highly routine and predictable. For SAR unit crews matters can be very different. Although much can be standardised, each 'shout' is different and can take place in hazardous conditions. Events can be psychologically distressing and, at the end of the shout, the crew return to live in the close knit community that surrounds the boathouse.

What do crew say they want from boat officers?

A few years ago a major airline undertook an interesting study. In order to better select candidates for their initial training programme the company asked their flight crews what were the most important, and appreciated, qualities pilots looked for in other pilots.

Nine characteristics dominated their responses:

- stable
- relaxed
- confident
- practical
- natural
- easy to get on with
- conscientious
- realistic
- spontaneous.

What is significant about this list is that it makes no reference to technical ability. When asked during their training, trainee RNLI boats officers respond slightly differently:

- competence/knowledge
- calmness under pressure/confident
- fairness
- integrity
- vision
- honesty
- selflessness
- concern about people as individuals
- collaboration.

Interestingly, both groups want people they can get along with and communicate easily with. SAR unit crews seem to want more, in that they want an individual that they can respect for their personal qualities, and that they want this person, who they respect, to notice them as an individual; this makes them feel good about themselves because they are being noticed by someone they respect.

People who are technically able and calm under pressure give us confidence. A good example of this is Chesley Sullenberger, the pilot who landed his Airbus A320 on the Hudson River in New York. He ticked all the boxes! But technical competence and calmness under pressure do not give us the whole story. They do not require us to be fair or to have integrity or honesty, yet people say that these are valued qualities. Why they are valued seems to relate to another aspect in that we feel 'psychologically' safe with people who have integrity and are fair and honest. Clearly, feeling safe with someone as well as trusting in their technical competence is hugely important for operations in hazardous environments.

Psychological contracts

When we interact with people we sometimes form 'contracts' with them. These contracts are unwritten and unspoken; they exist only in our mind. The jargon phrase is that they are 'psychological' contracts. They can operate at a very basic level even in our interaction with animals. My cat makes a contract with me that, in exchange for food and warmth, he will pretend to 'love' me and be pleased to see me when I come home. My dog's contract is slightly different in that as a very social animal he needs to be part of my pack and, although overjoyed when I come home he would much rather I was part of his 'scene' all the time. We form 'contracts' in our relationships with people; partners and families expect to be looked after and, at least on occasion, to have priority in your concerns. Sometimes we may unwittingly form these contracts. People we like we tend to favour. But this may give rise to the expectation in the favoured person that the favourable treatment will be maintained. This may be satisfactory if the favour able treatment can be objectively justified, but if it is only rooted in favouritism, it can sow discord in the unfavoured group. It can also create mayhem if the favoured person does not receive the expected reward.

Most of the problems that you will have to deal with, both in yourself and others, relate to behaviour and communication. Behaviour is an interesting and complex subject and it may help to define what we mean by it.

The Oxford English Dictionary (OED) defines behaviour as:

"How we act or conduct ourselves"

Psychologists define behaviour as:

"How we respond to a stimulus"

The OED definition is the one that we commonly use in language. He is well behaved vs. he is badly behaved. His behaviour was terrible etc.

The psychology definition is interesting because it indicates that we respond, in a particular way, to a trigger in our environment. How we respond depends on our previous experience, learning and inheritance. We can divide these responses into two types:

- Responses that are essentially rational and depend on being taught (recognition of navigation lights, how to drive a car, how to do arithmetic etc) and responses that are essentially emotional in origin.
- Beginning in childhood, people develop certain beliefs about themselves, their worlds and other people. The most central and deep beliefs that they develop are called 'core' beliefs and are perceived by people as 'absolute' truths. Some of these beliefs can be quite negative such as 'I have always found learning difficult, therefore I am 'thick'. This may not, in fact, be true. It may be that the individual experienced difficulty learning something that was genuinely difficult to learn and irrationally developed the view that because of this difficulty he had difficulty across the whole of learning. Thereafter, they selectively focused on information that confirmed this belief. This is summarised in diagram 1 across the page, which also indicates how emotions and body reactions related to these feelings arise.

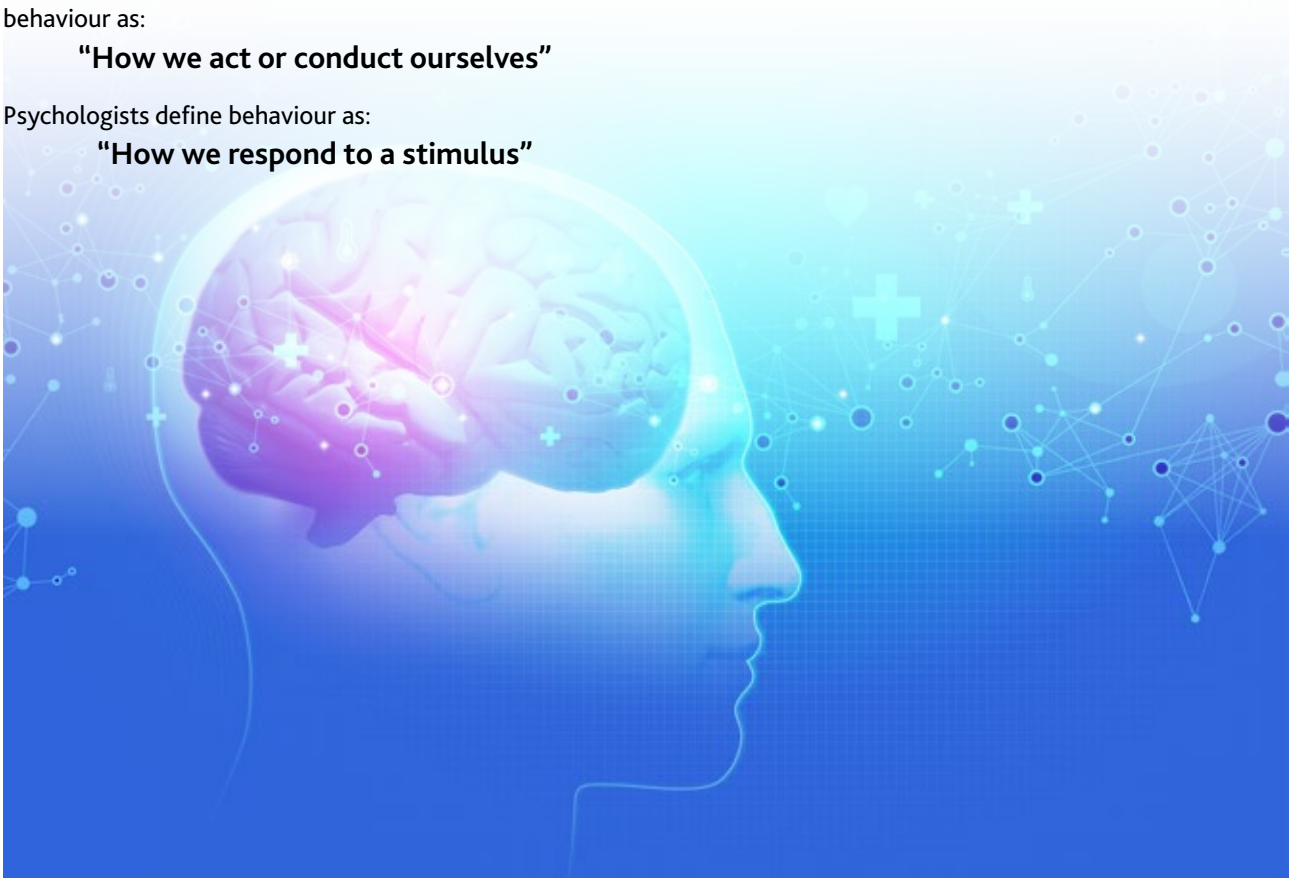
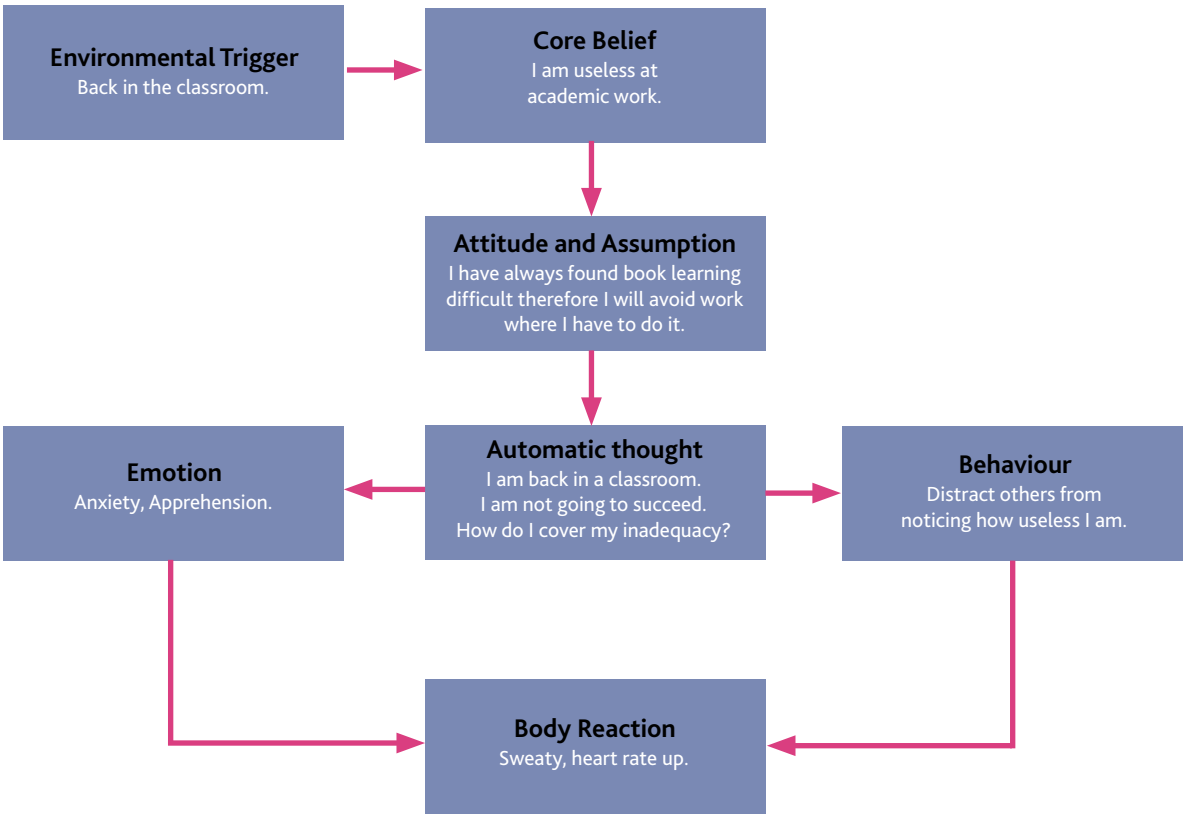


Diagram 1



The point to bear in mind is that a lot of the problematic core beliefs are negative, can be easily activated, and reflect poor self esteem.

Now consider how you felt when you first went to the lifeboat station as new crew. The older and senior people (they are now you) may well have seemed a bit 'scary' or 'God' like. That degree of awe can easily inhibit communication particularly if an inadvertent or unintended comment undermines the newcomer. You have to balance authority with encouragement and understanding to get the best out of them. There is some anecdotal evidence that suggests youngsters coming through behave differently to previous generations. They appear to be more confident and less deferential at the same time as, frequently, having less experience of boats and the sea. Their skill mix is different to yours (great with computer games, poor with knots) and it may take time and patience to bring them 'up to speed'. However, their basic psychology hasn't changed from yours and they will respond in the same ways to praise or negativity.

Important types of behaviours/interactions

Referring back to Diagram 1 we can see how behaviours arise. There are four particular behaviour patterns that we need to be aware of:

Aggressive

People with this pattern of behaviour:

- dominate in order to have their own way
- must 'win' regardless of consequences to others
- disregard others 'feelings' or rights
- behave in a manner that can humiliate, hurt or diminish.

Characteristic aggressive behaviour includes:

- insisting on own needs, ideas, feelings at the expense of others who tend to be ignored or trivialised
- tend to make choices, plans and decisions for others
- often come across as angry and self righteous.

When in conflict aggressive people:

- only consider one way 'my way'
- disregard the input of others
- will frequently attack the ideas of others as 'dumb'.

Aggressive people need to learn:

- that their personal position will not be compromised by using more open and considerate methods
- to listen
- to become a team player.

Passive

People with this pattern of behaviour:

- avoid conflict, usually because they want to be liked
- will abdicate their own ideas, position or sometimes even authority, to maintain peace.
- place their personal needs behind that of others (in order to win friends and/or approval).
- do not speak up or commit to what they want or think
- try to meet goals by indirect or devious means
- allow others to make choices.

Characteristic passive behaviour includes:

- not expressing personal feelings, ideas, needs
- allowing others to take advantage
- frequently appear inhibited, indirect, unwilling to commit, intellectually dishonest (will switch sides to be with the stronger)
- suffers anxiety, feelings of anger toward self, resentment 'if discovered' and denial.

When in conflict passive people will:

- side with the most dominant behaviour
- avoid commitment, minimise personal position
- try to win approval and friends
- will operate through others and overuse consensus to avoid taking responsibility.

Passive people need to learn:

- that they will NOT be liked more or less by taking a position
- that switching positions is confusing and indecisive
- That winning friends can come at the cost of being manipulated.

Passive aggressive

People with this pattern of behaviour:

- show manipulative behaviour that frequently operates on guilt ('I'll do it all myself thank you' even though you have promised your help)
- frequently manipulates through sulks or silences
- others do not know if they are guilty nor what of
- are not forthcoming when asked.

Characteristic passive aggressive behaviour includes:

- very indirect expression of feelings, ideas or needs
- trying to dominate in a manipulative manner
- use of mood swings to control others.
- behaviour based on hostility
- fluctuating between being angry and feeling like a victim, with some self righteousness
- harbouring resentments and trying to retaliate.

When in conflict passive aggressive people:

- will appear to be supportive or might try to avoid conflict and commitment
- can sound indignant and appear to be ready to act but ultimately do nothing.

Passive aggressive people need to learn:

- to be forthright
- that manipulation leads to rebellion.

Assertive

People with assertive behaviour:

- occupy the middle ground having elements of the best of aggression (directness, strength) and the best of passivity (the willingness to listen) without their negative characteristics
- allow open and direct communication without the desire to dominate or manipulate
- respect others rights and perceptions.

Characteristic assertive behaviour includes:

- being honest, direct, communicative and considerate
- respect for others and self.

When In conflict assertive people will:

- recognise differences and deal with the issues
- attempt to problem solve rather than dominate or capitulate
- actively seek and consider the input of others
- not lead with their ego.

From these four behaviours we can construct a Bill of rights.

Bill of rights

- To express your feelings and ideas.
- To be listened to and taken seriously.
- To ask for what you want.
- To be treated with respect.
- To say no and not feel guilty.
- To ask for information and receive it.
- To make mistakes.
- To be assertive.

It is important to understand that:

- Aggressive behaviour completely denies these rights in others.
- Passive behaviour gives up these rights for ourselves.
- Passive aggressive behaviour manipulates the rights of other people.

Behaviours have consequences

Remember the psychologists definition of behaviour: 'How we respond to a stimulus'. Specific behaviour therefore has a consequence. It is very helpful to consider what response a particular behaviour might elicit when considering what behaviour to use.

Aggressive Behaviour

The usual response to aggressive behaviour is either aggressive or passive. Other individuals develop resentment to aggressive behaviour and short term results will be offset by delayed retaliation. Others will want to avoid future contact with aggressive individuals as they do not like being made to feel dumb.

Aggressive behaviour puts you in to the situation where you always have to be in control and on top of all things all the time. This is ultimately exhausting and individuals begin to realise that they are avoided by others and possibly mistrusted as well.

Aggressive behaviour is an outlet for angry feelings at the expense of interaction. These individuals are seen as being on their own are seen as self reliant, make others resistant to their requests or solutions which can result in poor solutions or decisions

Aggressive individuals do not make team players and severely prejudice the functioning of the Boathouse.

Non-assertive behaviours

People normally respond to non assertive behaviour in either a neutral or passive way or with aggressive behaviour

Non-assertive individuals resent others but can resent themselves even more, suffering a loss of self respect, self confidence and self esteem. They often do not get what they want or need and have feelings of being under appreciated and misunderstood; they feel unheard and ignored and victim like.

Non-assertive behaviour reinforces feeling a victim and individuals sometimes, paradoxically, exhibit aggression ('the worm that turned') but it gets them nowhere as they cannot sustain it and they fall back to harbouring even more resentment.

Non-assertive behaviour helps one avoid responsibility for initiation and/or follow through of plans; it avoids conflict and removes the possibility of rejection (they didn't agree in the first place). A non-assertive person is seen as dependant and makes you seem heavily reliant on others. It brings isolation, powerlessness and may bring alienation from others.

Non-assertive behaviour risks poor decisions because information is not gathered or communicated.

Assertive behaviours

- assertive behaviour is the only way to defuse aggressive behaviour
- assertive behaviour lessens heavy feelings when dealing with passive people
- assertive behaviour develops the possibility of receiving assertive responses and helps you get what you want
- assertive behaviour increases a sense of self worth, self esteem and self confidence
- assertive individuals can share control and responsibility with others
- assertive individuals are respectful of others as well as themselves
- assertive individuals can make a strong impression without a negative impact on others (have you met so and so the coxswain of….. a quiet and thoughtful man who really commands respect, or have you met…. The coxswain of…….. a man of humour whose crew would follow him anywhere)
- assertive behaviour enables a person to deal with negative and passive responses
- assertive individuals can be seen as either independent (particularly when combined with a reputation for fairness and integrity) or dependent
- assertive individuals can rely on others without loss of authority or self esteem
- assertive individuals have better problem solving abilities as they are better at gathering and sharing information and views. They 'get' the bigger picture
- assertive individuals increase the probability of workable solutions and effective decisions
- assertive individuals produce more good ideas, opinions and feelings
- cues to the aggressive, non assertive and assertive behaviour are present in the language (which is verbal behaviour) that we use.

Aggressive verbal behaviour

- sarcasm
- putting down
- humiliation
- insults
- disregard of others feelings/ideas
- hostile over reactions
- curt/cryptic responses
- attacking questions
- 'loaded' words and statements
- 'you' messages.

Non-assertive verbal behaviour

- messages communicated indirectly
- excuses and alibis
- hesitancy, failure to come to the point
- supplicant behaviour
- accommodation of others needs at own expense.
- being a doormat
- refraining from expression of own opinion (silent verbal behaviour)
- self demeaning words
- self deprecating words
- inhibited behaviour
- apologetic words
- 'we' and 'they' messages (taking refuge in the group).

Assertive verbal behaviour

- direct statements of agreement or disagreement
- direct refusals or statements of 'no'
- non (as distinct from un) compromising behaviour
- direct statements of feelings
- direct expression of one's own wishes
- standing up for own rights without violating the rights of others
- statements which communicate what you mean 'I' messages.

Relief and passage coxswain pass out

Below are the command units for pass outs on specific classes of RNLI SAR unit:

17.2-1	Coxswain - Severn Class Lifeboat
17.3-1	Coxswain - Tamar Class Lifeboat
17.4-1	Coxswain - Shannon Class Lifeboat
17.5-1	Coxswain - Trent Class Lifeboat
17.6-1	Coxswain - Mersey Class Lifeboat
17.7-1	Coxswain - Tyne Class Lifeboat

Passage coxswain pass out

To be passed out as a passage coxswain, you must have full competence in all elements of a station coxswain development plan, logged a minimum of 20 hours as the coxswain of a lifeboat and have been competent for a period greater than 12 months.

A commercially endorsed Yachtmaster Offshore qualification (or equivalent) must also be held.

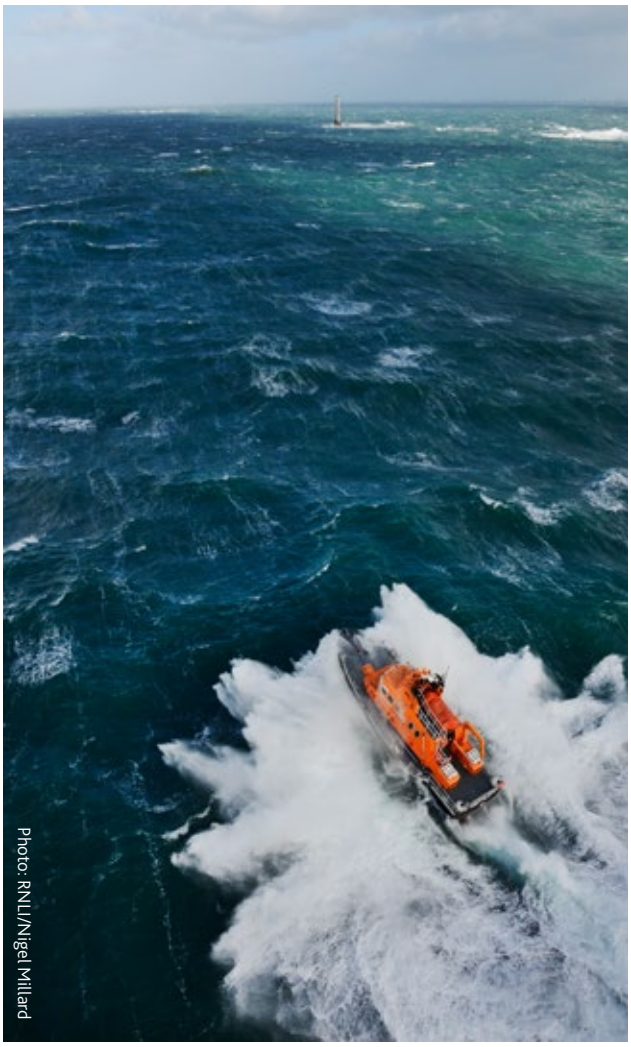


Photo: RNLI/Nigel Millard

Passage planning for passage coxswains

Passage coxswains need to demonstrate the production of a passage plan, including victuals, fuel, alternative ports, tidal information, secondary ports and weather. The use of charts, almanacs and local tides should inform the passage plan.

Any accommodation or travel, including the booking of hire vehicles, is to be booked through the appropriate Regional Base, in the first instance.

Before going to sea, crew should be briefed and tasks such as Watchkeeping delegated accordingly. Tactics for heavy weather and/or restricted visibility operations should be run through prior to departure.

The Coastguard and Central Operations need to be notified of vessel movements. Any defects that occur should be reported to Central Operations and logged on the appropriate defect-reporting system. Machinery defects have numerous effects on the vessel's performance and capability, including:

- power consumption
- battery charging
- forced air ventilation
- loss of throttles
- single engine manoeuvring.

When a relief boat is put on service at a station (and equally, when it has completed its relief duties at a station) the following equipment should be transferred:

- casualty care kit
- extra fenders
- PPE
- Entonox
- oxygen
- non-standard equipment
- SAR unit documents.

Passage payments are payable to volunteer crew to compensate for loss of earnings and are operated by an 'Opt In' scheme. Please see the current Passage Planning form for more details and the information required for planning a passage.

Relief coxswain pass out

To be passed out as a relief coxswain, you must have full competence in all elements of a station coxswain development plan, logged a minimum of 20 hours as the coxswain of a lifeboat and have been competent for a period greater than 12 months.

A commercially endorsed Yachtmaster Offshore qualification (or equivalent) must also be held.

Relief coxswains need to demonstrate:

- The use and limitations of systems fitted to the class of lifeboat and explain the SOPs and approved LOPs for all tasks including:
  - emergency procedures
  - berthing alongside
  - casualty recovery
  - picking up a buoy
  - launching the daughter craft
  - anchoring
  - towing.
- Manoeuvring the lifeboat:
  - in adverse weather conditions
  - in close proximity to other craft
  - in shallow water/squat
  - in a confined area
  - under the effects of interaction
  - single engines.
- Managing a range of emergency situations, such as:
  - fire on board
  - equipment failure
  - injury
  - MOB
  - capsize.
- The operation of electronic navigation aids as fitted:
  - chart plotter
  - radar
  - echo sounder
  - auto pilot
  - GPS
  - DF.

See the relevant class-specific SOPs and LOPs for details of the above for each class of lifeboat.

Thames helm pass outs

Below are the pass outs for the specific classes of RNLI SAR units on the River Thames.

17.11-1	Helm - E Class Lifeboat (Chiswick)
17.11-2	Helm - E Class Lifeboat (Tower)
17.11-3	Helm - E Class Lifeboat (Gravesend)
17.12-1	Helm - B Class Lifeboat (Chiswick)
17.12-2	Helm - B Class Lifeboat (Tower)
17.12-3	Helm - B Class Lifeboat (Gravesend)
17.13-1	Helm - D Class Lifeboat (Teddington)

Photo: RNLI/Nathan Williams

Photo: RNLI/Mike Lavis

Qualifications for Audit

Activity

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Command of vessel

Station coxswains are preferred, but not required to hold a commercially recognised certificate for command of vessels up to 24 metres. This may be:

- for use up to 20 nautical miles from a safe haven (coastal), or
- for use up to 60 nautical miles from a safe haven (offshore).

Please refer to the competence framework assessment guidelines for the minimum standard that covers these. Currently, the Royal Yachting Association (RYA) Yachtmaster Coastal and RYA Yachtmaster Offshore qualifications cover the minimum standards for the above respectively.

For relief duties, a coxswain will need at least the coastal certificate of up to 20 nautical miles from a safe haven. For passages and movements, the latter offshore certificate of up to 60 nautical miles is required.

Medical

Coxswains that hold a commercially endorsed Yachtmaster qualification are also required to hold ML5 (5-year validity) or ENG1 (2-year validity) medical certificates. Otherwise, they will hold a standard RNLI medical.

Other

Thames helms are required to hold a valid category B driving licence.

Photo: RNLI/Nigel Millard

Abbreviations

AED: Automated external defibrillator
ALB: All-weather lifeboat
ARPA: Automatic radar plotting aid
ASB: Antisocial behaviour
AVS: Angle of vanishing stability
BBV: Blood borne viruses
BCR: Bow cross range
BST: British summer time
CB: Centre of buoyancy
CG: Centre of gravity
COSHH: Control of substances hazardous to health
CPA: Closest point of approach
CSO: Community safety officer
CSP: Commence search position
DF: Direction finding
DLA: Deputy launching authority
DRA: Dynamic risk assessment
DSC: Digital selective calling
DSP: Drift start position
EBL: electronic bearing line
EOP: Emergency operating procedure
ETA: Estimated time of arrival
GHS: Globally Harmonised System
GMT: Greenwich Mean Time
GPS: Global positioning system
GUM: Genitourinary medicine
GZ: Righting lever
HAV: Hand-arm vibration
HAVS: Hand-arm vibration syndrome
HIV: Human immunodeficiency virus
HMPE: high-modulus polyethylene
HQ: Headquarters
HR: Human resources
HSA: Health and Safety Authority
HSE: Health and Safety Executive
IAPT: Improving Access to Psychological Therapies
IAW: In accordance with
ILB: Inshore lifeboat
IRB: Inshore rescue boat
IRH: Inshore rescue hovercraft
IRPCS: International Regulations for Preventing Collisions at Sea
LMA: Lifeboat medical adviser
LOM: Lifeboat operations manager
LOP: Local operating procedure
LPO: Lifeboat press officer
LTC: Lifeboat training coordinator
MCA: Maritime and Coastguard Agency
MDM: Materials database manager
MF: Medium frequency
MOB: Man overboard
MSDS: Material safety data sheet
NHS: National Health Service
NMOC: National Maritime Operations Centre
NUC: Not under command
OELs: Occupational exposure limits
OH: Occupational health
OHM: Occupational health manager
OSC: On scene coordinator
PEEP: Personal emergency evacuation plan
PEP: Post exposure prophylaxis
PLB: Personal locator beacon
POD: Probability of detection
PPE: Personal protective equipment
PRM: Public relations manager
PTS: Post traumatic stress
PTSD: Post traumatic stress disorder
RA: Risk assessment
RM: Righting moment
RNLI: Royal National Lifeboat Institution
RoI: Republic of Ireland
RWC: Rescue water craft
RYA: Royal Yaching Association
SAR: Search and rescue
SHE: Safety, health and environment
SMEAC: Situation, Mission, Execution, Administration, Command/Communications
SOLAS: Safety of lives at sea
SOP: Standard operating procedure
SPEP: Safety, People, Equipment, Performance
ST: Systems technician
STELs: Short-term exposure limits
SWR: Steel wire rope
TEPs: Time expired pyrotechnics
TRiM: Trauma Risk Management
TWA: Time-weighted average
UK: United kingdom
UTC: Coordinated Universal Time
VHF: Very high frequency
VRM: Variable range marker
WBV: Whole body vibration
WELs: Workplace exposure limits
WRULDs: work-related upper limb disorders

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