

# SIP020 - GUIDANCE ON WATER SAFETY AND USE OF BUOYANCY EQUIPMENT IN PORTS





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## CONTENTS

INTRODUCTION.....	1
1. REGULATORY FRAMEWORK AND GUIDANCE.....	3
2. HEALTH.....	4
3. RISK ASSESSMENT .....	5
4. CONSULTATION, COOPERATION AND COORDINATION .....	7
5. RISK OF WATER SAFETY INCIDENTS .....	8
6. FENCING OF DOCK EDGES.....	9
7. FENCED QUAY & PONTOON EDGES.....	10
8. UNFENCED QUAY & PONTOON EDGES.....	11
9. PONTOONS AND SHIP-TO-SHIP OPERATIONS.....	11
10. RESCUE FROM DROWNING .....	11
11. SELECTION OF BUOYANCY EQUIPMENT .....	14
12. BRITISH AND EUROPEAN STANDARDS.....	18
13. PPE AND OTHER CONSIDERATIONS .....	19
14. USING AND MAINTAINING BUOYANCY EQUIPMENT .....	19
15. MANAGING IDENTIFICATION AND WEARING OF EQUIPMENT .....	19
16. TRAINING .....	20
17. STORAGE .....	21

18.	INSPECTION AND MAINTENANCE.....	21
19.	SERVICING .....	22
	RELEVANT LEGISLATION AND GUIDANCE.....	24

# SIP020

## GUIDANCE ON WATER SAFETY AND USE OF BUOYANCY EQUIPMENT IN PORTS

### *INTRODUCTION*

The Health and Safety Executive provided support to Port Skills and Safety in producing this guidance, which is aimed at improvements within the Ports industry. This guidance may go further than the minimum you need to do to comply with the law with regard to health and safety.

It is for companies operating in the UK ports industry with responsibility for the safe design, construction, operation, management and maintenance of ports and terminal facilities and management of port and terminal activities. It will also be useful to employees and their representatives.

Following the guidance is not compulsory and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance. If the guidance goes beyond compliance, then this will be clearly identified.

Regulations in this document are referred to by title but not year, because they are amended from time to time and the reader should always seek the current version. Acts are given a year as they tend to change less frequently. The list of references at the end of this document however does include a year that was correct at the time of publication.

Guidance within these shaded areas of this document denotes that the contents go beyond statutory compliance and are industry recommended best practice. These guidelines are not mandatory, though the legislation referenced below is. Individual organisations have a duty of care to those who might be affected by their operations and are responsible for devising arrangements that meet their obligations.

This guidance document has been developed to cover:

- Facilities for rescue of persons from drowning within ports as a result of falling from the dockside and the provision of fencing of dock edges at operational port facilities
- The selection and use of lifejackets and buoyancy aids within the ports industry

However, much of the information on lifejackets and buoyancy aids is generic and is relevant for both inshore tidal waters as well as non-tidal waters, such as wet docks and canals. It is therefore anticipated that this guidance may prove useful for any person whether they are working on, near or over water or taking to the water for leisure purposes

Given the nature of dock premises, it is important to ensure that there are adequate and suitable provisions in place to facilitate the rescue of anyone who falls into the water from the quayside.

**Disused or redundant docks** - Although the Water Safety section in ACOP L148 Safety in Docks does not apply to disused or redundant docks, employers may have duties under section 3 of the HSW Act in respect of these.

The term 'buoyancy **equipment**' (also known as personal floatation devices) used in the following text refers to all types of buoyancy personal protective equipment, including immersion suits, buoyancy aid jackets and lifejackets. The term does not specifically refer to and must not be confused with reference to 'buoyancy **aids**' as defined in Section 12.4.



## 1. *REGULATORY FRAMEWORK AND GUIDANCE*

- 1.1. The two principal relevant pieces of law are the Health and Safety at Work etc. Act (HSWA) 1974, and the Management of Health and Safety at Work Regulations (MHSWR), which set out the basic requirements to ensure, so far as is reasonably practicable, the health, safety and welfare of all involved.
- 1.2. Port specific, Merchant Shipping and other legislation applies and should be referred to.
- 1.3. Approved Code of Practice (ACOP) L148 'Safety in Docks' was introduced on 6 April 2014: [www.hse.gov.uk/pubns/books/l148](http://www.hse.gov.uk/pubns/books/l148)
- 1.4. The PSS/HSE Safety in Ports guidance suite, available from the PSS website at: [www.portskillsandsafety.co.uk/resources](http://www.portskillsandsafety.co.uk/resources) is an important supplement to Safety in Docks ACOP L148.
- 1.5. The guidance is aimed at routine operations and does not cover some of the specialised and high-risk activities associated with handling dangerous goods and hazardous cargoes, or major hazards sites which are subject to the Control of Major Accident Hazards Regulations for which specialist advice may be required.
- 1.6. Reference can also be made to the International Labour Organisation's (ILO) Code of Practice on Safety and Health in Ports (ILO 152): [www.ilo.org/sector/activities/sectoral-meetings/WCMS\\_546257/lang--en](http://www.ilo.org/sector/activities/sectoral-meetings/WCMS_546257/lang--en)
- 1.7. The Health and Safety at Work etc. Act 1974 places a general duty on employers to ensure; so far as is reasonably practicable (SFAIRP), the health and safety of employees and of other persons who may be affected by work activities. As previously mentioned, employers will also have to carry out a risk assessment to identify any foreseeable hazard, assess the level of risk and identify measures necessary to prevent or adequately control the risks.
- 1.8. It is essential when assessing the hierarchy of controls to consider the elimination of the risk first, so initial consideration must be for collective measures such as enclosure, fencing or railings and in some circumstances, the use of harnesses and work restraint methods, ensuring persons cannot physically fall into water. Where a foreseeable risk of drowning cannot be controlled by these or similar means SFAIRP, suitable buoyancy equipment should be provided and worn. The Personal Protective Equipment at Work Regulations (as amended), detail general responsibilities concerning selecting, using and maintaining buoyancy equipment and guidance on these Regulations is provided in the HSE guidance, Personal Protective Equipment at Work (L25).
- 1.9. Self-employed persons will also be expected to provide and wear suitable buoyancy equipment, when required. Co-operation between different employers and/or the



self-employed is essential where the risk is shared. For example, contractors engaged to repair a link-span where the work involves a risk of falling into the water and drowning, must be notified of the risk and the need to provide to their employees and for them to wear suitable buoyancy equipment. Depending on the circumstances, a rescue boat may also be required.

- 1.10. CE Marking has been required since 1 July 1995 and buoyancy equipment has been required to be 'CE' marked in accordance with the requirements of the amended Personal Protective Equipment (EC Directive) Regulations. The CE mark signifies that the equipment satisfies the safety requirements of these Regulations. In most cases buoyancy equipment that is CE marked will be made to one of a series of harmonised European Standards entitled 'Life jackets and personal buoyancy aids'.
- 1.11. It has been illegal since 1 July 1995 for manufacturers to place any item of buoyancy equipment on the market that does not carry the CE mark. Non-CE-marked buoyancy equipment manufactured before 1 July 1995 that has been in regular use is now most likely to have come to the end of its useful service life and it is advisable to replace it with CE compliant equipment.
- 1.12. A further statutory duty towards visitors arises under the Occupiers Liability Act 1957. An occupier of premises (this includes quaysides, bridges, staging, lock gates etc) has a duty of care to any visitor using the premises for the purposes for which they are permitted or invited to be there.

## 2. *HEALTH*

- 2.1. The wide range of activities in ports can give rise to possible health risks such as exposure to dusty cargoes; back injuries, sprains and strains from lifting and handling, pushing and pulling; noise and vibration. There is specific legislation including the Control of Substances Hazardous to Health Regulations, the Control of Noise at Work Regulations, the Manual Handling Operations Regulations and Personal Protective Equipment at Work Regulations.
- 2.2. While there is reference to some specific health risks in these guidance documents, it is not possible to cover all the issues. Further information and guidance on the identification, assessment and reduction or avoidance of such risks can be found on the HSE website at:
  - Ports web pages: [www.hse.gov.uk/ports](http://www.hse.gov.uk/ports)
  - Control of Substances Hazardous to Health: [www.hse.gov.uk/coshh](http://www.hse.gov.uk/coshh)
  - HSE Whole Body Vibration in Ports Information Paper: [www.hse.gov.uk/vibration/wbv/ports.pdf](http://www.hse.gov.uk/vibration/wbv/ports.pdf)
  - Musculoskeletal disorders (MSDs): [www.hse.gov.uk/msd](http://www.hse.gov.uk/msd)



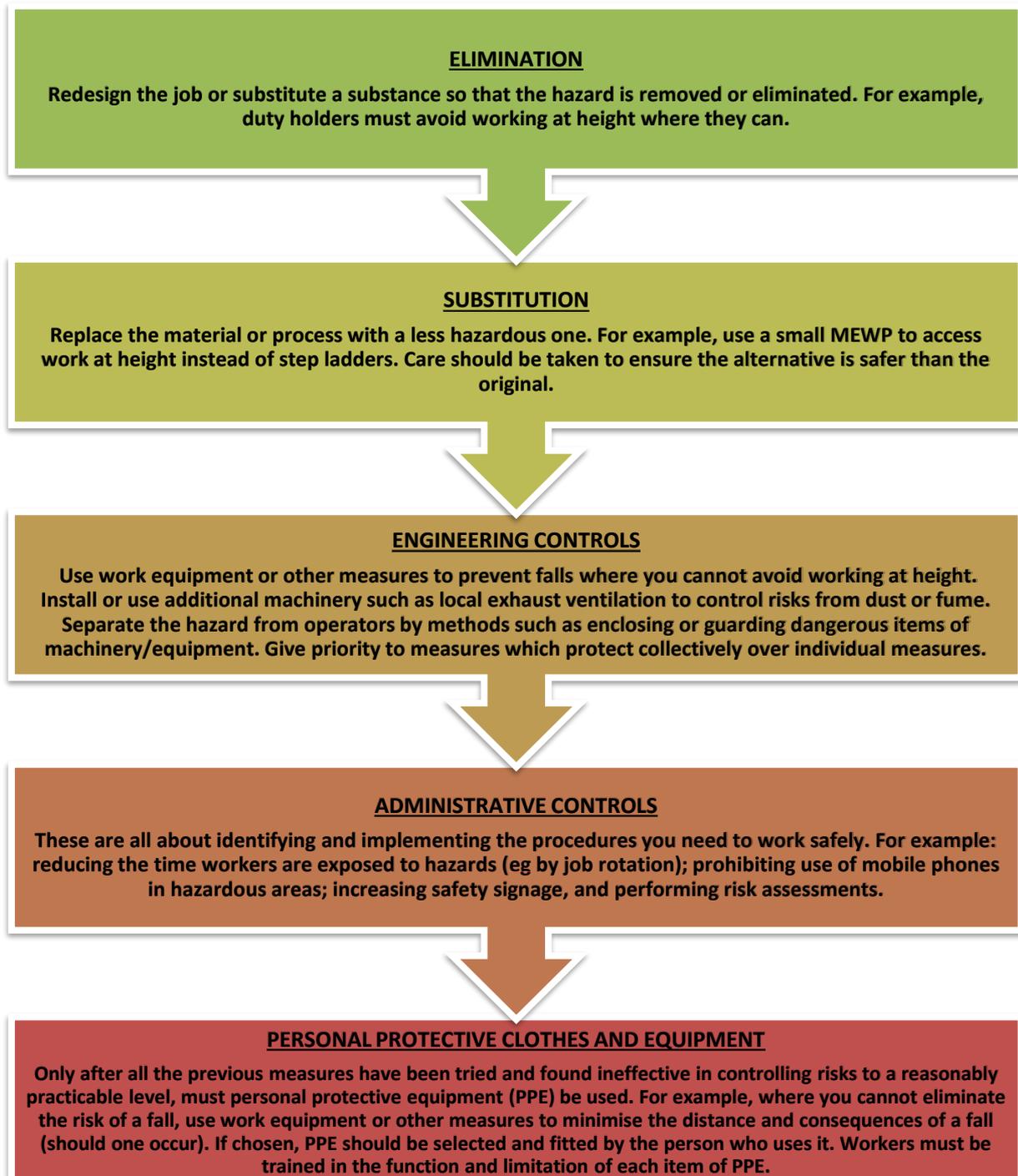
- Noise at Work: [www.hse.gov.uk/noise](http://www.hse.gov.uk/noise)
- Personal Protective Equipment: [www.hse.gov.uk/toolbox/ppe](http://www.hse.gov.uk/toolbox/ppe)
- Vibration at Work: [www.hse.gov.uk/vibration](http://www.hse.gov.uk/vibration)

### 3. *RISK ASSESSMENT*

- 3.1. Risk Assessments must be undertaken in accordance with the Management of Health and Safety at Work Regulations. The risk assessment must consider the risks, to everyone involved or affected by the activity. This includes but is not limited to non-permanent employees (MPE's), ship's crew, passengers and visitors. The appropriate control measures must be introduced and should consider collective measures before personal or individual measures.
- 3.2. Risks should be reduced to as low as is reasonably practicable by taking preventative measures in order of priority below. The diagram opposite sets out an ideal order to follow when planning to reduce risk.
- 3.3. Risk assessments must be reviewed:
  - regularly
  - immediately after any incident
  - when there are significant changes to the operation
- 3.4. Most accidents and near misses can be avoided if the risks from the work are suitably and sufficiently assessed and appropriate control measures adopted.
- 3.5. A risk assessment should record the significant hazards and risks of an operation together with the relevant control measures. In port operations, risk assessments should consider changes such as tidal changes, weather, trim, list, load/cargo and vessel dynamics.
- 3.6. Planning and work execution are discussed in HS(G) 177, Managing Health and Safety in Dockwork: [www.hse.gov.uk/pubns/books/hsg177](http://www.hse.gov.uk/pubns/books/hsg177)
- 3.7. The Health and Safety at Work Act 1974 applies on board a ship when shore-based workers are engaged in cargo handling or other tasks on board. Cargo handling may include, but is not limited to:
  - loading, unloading, stowing, unstowing, pouring, trimming, classifying, sizing, stacking, unstacking
  - composing and decomposing unit loads

- services in relation to cargo or goods such as tallying, weighing, measuring, cubing, checking, receiving, guarding, delivering, sampling and sealing, lashing and unlashng

## HIERACHY OF CONTROLS



Reference: HSE Leadership and Worker Involvement Toolkit. Available at [www.hse.gov.uk/construction/lwit/assets/downloads/hierarchy-risk-controls](http://www.hse.gov.uk/construction/lwit/assets/downloads/hierarchy-risk-controls)



3.8. The Health and Safety at Work Act 1974 applies to the Master and ship's crew when working with shore-based personnel on board ship.

3.9. A signed agreement or an agreed and recorded system of work with the master of each vessel is recommended. This is not a legal requirement but may help to ensure effective co-ordination with other parties.

3.10. Regulations made under the Health and Safety at Work Act 1974; such as:

- The Management of Health and Safety at Work Regulations
- The Lifting Operations and Lifting Equipment Regulations
- The Provision and Use of Work Equipment Regulations

do **not** apply to a master or crew of a ship, or any persons employing them, in relation to:

- safe access, plant and equipment which remain on board the ship
- any undertakings or work which are carried out on board ship solely by the master and the crew

Instead, the Merchant Shipping Act 1894 and related Merchant Shipping Regulations impose similar duties on board ship in UK territorial waters.

3.11. A ship's Master has duties under the Health and Safety at Work Act 1974 in relation to the ship's crew who are put ashore to perform their own tasks. For example, loading ship's stores or carrying out maintenance work on their ship. Those duties extend to plant and equipment (for example a forklift truck) under the Master's control being used ashore by ship's crew, or when used by shore-based workers ashore or on-board ship.

## 4. *CONSULTATION, COOPERATION AND COORDINATION*

4.1. **Consultation:** Employers have a duty to consult with their employees, or their representatives, on health and safety matters. By gaining worker involvement on health and safety through two-way communication, concerns can be raised and solved together, and views and information can be sought and exchanged in a timely manner.

See HSE pages: Consulting and involving your workers [www.hse.gov.uk/involvement](http://www.hse.gov.uk/involvement)

4.2. **Cooperation and Coordination:** Cooperation and coordination between shipside and landside employers is required. Employers must therefore carry out risk assessments and develop safe systems of work (in consultation with the workers involved) that all parties agree to, so that the respective employers can co-operate effectively with each other.



## 5. *RISK OF WATER SAFETY INCIDENTS*

- 5.1. According to statistics provided by the UK's National Water Safety Forum, which collects data from such organisation as the MCA, RNLI, RoSPA and the emergency services, 263 people lost their lives from being drowned as a result of accident or natural cause in 2018. Of the 263 deaths 11 occurred at sea, 21 in canals or aqueducts, 73 on the coast, shore or beach, and 13 within Harbour, docks or marina areas. See: [nationalwatersafety.org.uk/waid/reports-and-data](http://nationalwatersafety.org.uk/waid/reports-and-data)
- 5.2. From these statistics it can be concluded that falling into water and becoming injured or drowned poses a risk for those that work on, near or over water. Any person responsible for areas where people have access to water (such as employees or others) must consider water safety within the overall risk assessment process and ensure adequate controls are in place.
- 5.3. When assessing risk and implementing control measures, consideration should include but are not be limited to:
- Potential for people to unintentionally fall into port waters, and what reasonable protection or prevention measures might be local to a specific port
  - Awareness of the likely period of survival in the water for a given port and the typical capabilities of the people who frequent the port
  - Rescue equipment and methods for raising alarm; for example, contact telephone numbers displayed at various sites in the port
  - Who might attempt a rescue, whether designated or first person on scene, and what training and knowledge they may need
- 5.4. Deaths from drowning can usually be linked to one or more of the following potential factors:
- Failure to adequately prevent a person falling into water e.g. inadequate fencing and/or access equipment
  - lack of supervision
  - Unauthorised access
  - Disregard, ignorance, complacency or misjudgement of the water hazard by those unfamiliar with the port environment (e.g. Tombstoning)
  - Insufficient training and knowledge of individuals/ organisations
  - Unsafe behaviour
  - Failure to sufficiently assess and plan for emergency situations
  - Inability to cope in the water once a problem arises
  - Inadequate or inappropriate buoyancy equipment used
  - The absence of rescuers and rescue equipment
  - Failure of buoyancy equipment to operate correctly



- Failure to provide, or properly maintain buoyancy equipment
  - Failure to take account of adverse weather or tidal conditions
- 5.5. Rescue time needs to be as short as practicable. The survival time for a person in the water will vary based on a range of factors which can reduce the body temperature.
- 5.6. Falling into water whilst fully clothed or wearing bulky clothing/equipment can make swimming and co-operating with rescuers extremely difficult.
- 5.7. The effect of tidal streams and sea state can exhaust persons in the water to a greater or lesser extent. Tidal streams can also take the person away from the initial entry point and change where and how they need to be rescued.
- 5.8. Low water temperatures and strong currents are often experienced at UK ports, harbours and inland waterways. These can exacerbate the situation and even strong swimmers may experience problems. This is particularly the case if water temperatures are below 10°C as typically occur between October and March in the UK.
- 5.9. The colder the water temperature, the higher the risk of initial cold shock or of subsequent incapacity due to decline in core body temperature. A person who succumbs to cold shock may drown within minutes of initial immersion.
- 5.10. Where there is a risk of falling into the water and drowning, it is essential that a suitable and sufficient risk assessment is undertaken and considers all of the above factors. Where necessary, suitable buoyancy equipment should be provided.

## 6. *FENCING OF DOCK EDGES*

- 6.1. Except for straight and level quaysides, fencing should be provided at all dock, wharf, quay or jetty edges from which people may fall into water, and where they must pass within 1 m of the edge; or the configuration of the quay or the arrangement of walkways is such that they are more than ordinarily liable to fall over such an edge.
- 6.2. Secure and adequate fencing should be provided throughout every open side of narrow access way, whether the fall would be into water or not and in all cases where risk assessment has found this to be needed.
- 6.3. The requirement for fencing does not apply to areas where there is no work activity being undertaken, subject to any foreseeable risk to members of the public.
- 6.4. Depending on the activities, employers should consider in their risk assessment what if any control measures may be required, giving particular consideration to:
- every break, dangerous corner and other part or edge of a dock, wharf, jetty or quay



- open sides of a gangway, footway over a bridge, caisson or dock gate
  - any other place where someone working or passing might fall including lone workers
  - risks to members of the public where public access is possible or foreseeable, even if there is no dock work activity being undertaken (to comply with section 3 of the HSW Act)
- 6.5. So far as is reasonably practicable, secure fencing should consist of an upper rail and an intermediate rail. In certain circumstances, for example the presence of children, a higher standard of protection will be required. The rails may where necessary consist of taut wire, taut chain or other taut material.
- 6.6. Other forms of fencing may also be suitable. It is the duty holder's responsibility to assess the risks and apply appropriate control measures to prevent falls into the water.
- 6.7. Where an organisation has a duty to maintain, operate or test port infrastructure or equipment such as fencing, they should be aware of any Standards which may apply.
- 6.8. Where the work involves being within 1 m of an unprotected quay edge and there is no fall protection, it is industry best practice that people should wear suitable lifejackets or buoyancy aids.
- 6.9. Dock premises must be provided with adequate and suitable rescue and lifesaving equipment and means to escape from water or for others to safely rescue them. This may consist of handholds on the quayside at water level, ladders on quay walls and life-saving appliances.

## 7. *FENCED QUAY & PONTOON EDGES*

- 7.1. At jetties, pontoons or quays where the edges are fenced throughout in accordance with Fencing of dock edges (above), the provision of life-saving equipment alone is sufficient unless:
- the public has access to the quay edge
  - the duty holder is made aware of a risk of people falling over a fenced edge that is comparable to the risk of people falling over an unfenced edge (whether or not by means of risk assessment)

In these situations, additional measures will be required such as handholds and/or ladders.

- 7.2. A further consideration is the protection for vehicles at quay edges. For example; 'T' junctions to the quay, quay edges with changes in direction and where vehicles could manoeuvre. Suitable risk controls should be put into place to alert the driver about



the position of the quay edge. These may include but are not limited to: fog chains, fences and temporary barriers with signage.

## 8. *UNFENCED QUAY & PONTOON EDGES*

- 8.1. At jetties, pontoon and quay edges where the edges are unfenced and where reasonably practicable, the edge might be highlighted in some way. This may be little more than a painted line in a bright contrast colour, or different coloured or textured masonry.
- 8.2. In addition, there must be means provided to help people to rescue themselves from drowning, and provision made for other people to rescue those in danger without endangering themselves. Such means should include but are not limited to:
- handholds on the quayside at water level (at any state of the tide)
  - ladders on quay walls
  - life-saving equipment

## 9. *PONTOONS AND SHIP-TO-SHIP OPERATIONS*

- 9.1. Where a fixed quay is not involved, e.g. ship-to-ship operation or the use of pontoons, adequate and suitable lifesaving equipment should be provided.

See also 'Access between ships' in ACOP L148: [www.hse.gov.uk/pubns/books/l148](http://www.hse.gov.uk/pubns/books/l148).

## 10. *RESCUE FROM DROWNING*

### 10.1. **Handholds**

- 10.1.1. Handholds should be suitable for use and be protected where possible to avoid damage both to and from ships.
- 10.1.2. Duty holders must assess if handholds are adequate, taking into account that someone immersed in the water for even short periods of time is likely to be cold, shocked, exhausted and possibly injured.
- 10.1.3. Handholds can be provided in a variety of ways. For example, ropes can be strung between ship mooring bollards so as to reach the water. But where there is a substantial tidal range these may not provide an adequate handhold at all states of the tide. In this case, the handholds afforded by quayside ladders may be adequate at extreme states of the tide. Ropes, chains or tyres, for example can be suspended vertically from bollards and other suitable suspension points. Where smooth ropes are used, the addition of regular large knots will assist a person in the water. Equally, chains with rings inserted at regular intervals will provide a better grip.



Baulks of timber can be fixed to float at the water's edge. Where there are false quays in enclosed docks, ropes or chains should be strung across horizontally at water level so as to prevent a person being taken under the quay. In many cases it may be possible to use fenders.

10.1.4. In some cases, the quay structure can provide handholds.

## 10.2. Ladders on Quay Walls

10.2.1. Ladders should be provided on any structure at the water's edge from which persons may fall into deep water. This includes quays, wharves, river berths and jetties. Some large mooring buoys may need similar provision.

10.2.2. Ideally ladders should form part of the original construction and be fitted in a suitable recess in the face of the quay to protect them from damage by ships and small boats. Alternatively, they may be protected by timber baulks. The protected recess thus formed should be between 0.5m and 1m wide.

10.2.3. A handhold is needed on the quayside in front of the ladder. This handhold should be so designed that it does not form a tripping hazard, and such that it does not collect water, ice or dirt. Access is improved if the top rung is slightly 'stepped in'. In addition, the ladder should extend to 1 metre beneath the water level expected at the lowest foreseeable state of the tide, or to the sea/river/dock bed. All ladders should be properly maintained.

## 10.3. Positioning of Handholds and Ladders on Quay Walls

10.3.1. Quays constructed or reconstructed after 1 January 1989:

- handholds and ladders should each be at intervals not exceeding 30m, with handholds approximately midway between each pair of ladders, so that there is either a handhold or ladder at least every 15m

10.3.2. Quays constructed before 1 January 1989:

- where the design of the quay provides convenient protected positions for ladders, they should be installed at intervals which do not exceed 50m and intermediate handholds should provide a means of support at intervals not exceeding 25m
- where the quay is not so designed, ladders should be installed at intervals not exceeding 85 m and intermediate handholds should provide a means of support at intervals of approximately 30m
- where dock operations are not normally carried out, or only infrequently, and the quay is not equipped with ladders to the above standards, suitable portable ladders should be provided and securely placed fore and aft of each ship when it has moored to work.

## 10.4. Life-Saving Equipment

- 10.4.1. Life-saving equipment should be conspicuous, properly maintained and provided at appropriate intervals.
- 10.4.2. Lifesaving equipment such as lifebuoys, throwing lines or rescue poles should be provided at no greater than 100 metre intervals. Although risk assessment may determine shorter intervals. All such equipment should be kept readily accessible. A suitable lifeline of a length adequate for the location should be attached to each lifebuoy or a separate throwing line should be provided. The type of equipment provided should be determined by risk assessment.
- 10.4.3. Duty holders should take into account the particular circumstances of each berth such as but not limited to tidal effects, operations and personnel involved when deciding what level of equipment is to be provided. For example, where there is a strong tide or current, a throwing line may be appropriate either in addition to or in place of a conventional lifebuoy.
- 10.4.4. Instructions for the use of each piece of life-saving equipment should be given or displayed.
- 10.4.5. Draglines are not rescue equipment.
- 10.4.6. On some quays, e.g. container berths, there is no alternative to having the lifesaving appliances positioned on the quayside cranes. If in the normal course of events this means that the interval between appliances is less than



*Figure 1 - Where permanent installations are not possible or where operations move around a port, temporary lifesaving solutions can be utilised.*



100 m, additional precautions will not be required. However, on occasion, cranes bunch together on the quay and create gaps greater than 100 m. In such cases, additional mobile lifesaving appliances will be required. Alternative arrangements can include but are not limited to: appliances on dedicated posts, protected as necessary, or on movable blocks, frames, trailers or on vehicles, sited as work dictates.

## 11. *SELECTION OF BUOYANCY EQUIPMENT*

11.1. The primary aim of the buoyancy equipment is to ensure that where there is a risk of falling into water and drowning, it should provide sufficient buoyancy to keep the person safely afloat.

11.2. When selecting buoyancy equipment, consideration should be given to a number of factors including but not limited to:

- The proposed frequency of use
- Height of potential fall into water
- The person's ability to swim
- Size/weight of the person
- General clothing and protective clothing worn (in particular clothing used in case of foul weather and cold)
- The use of tool belts, back packs, or other loads which may restrict movement or add additional weight to the person
- Limitations of the buoyancy equipment
- Compatibility of the other equipment with the buoyancy equipment
- Expediency of rescue
- Likely weather/water conditions at site

11.3. Once the determination of need has been established, there are different types of buoyancy equipment available.

### 11.4. **Buoyancy Aids**

11.4.1. Examples of buoyancy aids include:

- Life rings
- Floats
- Life lines
- Long reach rescue poles

11.4.2. The primary aims of buoyancy aids are to:

- support the person in reasonable safety in the water provided that they are able to help themselves



- enable the person’s efforts to be expended in recovery, rather than in remaining afloat

11.4.3. Buoyancy aids are considerably inferior to lifejackets and will only provide support to a conscious person who is not suffering from serious physical injury and in situations where help is close to hand.

11.5. **Lifejackets**

11.5.1. The primary aims of wearing a lifejacket are to:

- support the person in reasonable safety in the water, particularly if that person is unable to swim, is exhausted, injured, unconscious or otherwise incapacitated. Some lifejackets will turn the body to ensure the head is out of the water. In the case of automatically operated lifejackets, to perform in this way without any intervention on the part of the person, except in initially donning the lifejacket
- enable the person to propel themselves in the water without it being an encumbrance
- support the person, enabling his efforts to be expended in recovery rather than in remaining afloat
- assist the recovery of the person

11.5.2. Lifejackets can be **inherently buoyant**, **manually inflated** or **automatic**. There are subsequently two different types of automatic lifejackets – **water activated** and **pressure activated**.

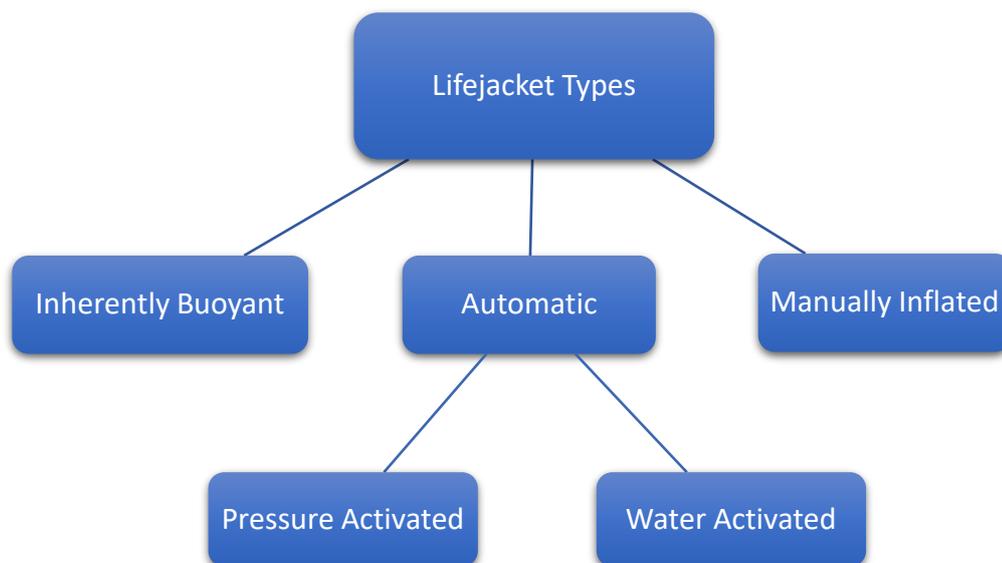


Figure 2 – Types of Lifejacket.



- **Manually inflated lifejackets** are operated by pulling a cord. This pushes a firing pin into a CO2 bottle, which inflates the lifejacket. Manual activation prevents the possibility of false activation, which can be caused by a damp automatic mechanism or the person being hit by a large wave. Manual activation will not work if the person is unconscious or suffering from the effects of cold-water shock. Manually inflated lifejackets should only be used where the risk assessment has determined that the person will have enough time and be capable of activating the jacket on entering the water.
  - Automatic - Water activated automatic lifejackets contain a firing head with a small pellet or bobbin that holds back a powerful spring. When the pellet/ bobbin contacts water it dissolves very rapidly, releasing the spring which pushes the firing pin into the gas bottle.
  - Automatic - Pressure activated lifejackets (also known as Hydrostatic lifejackets) work the same way as an automatic lifejacket but the pellet is protected by a case that only permits water in when it is a few centimetres under water. It is designed to only fire if fully submerged. This type of lifejacket is suitable when there is a possibility that the user may get regularly soaked by waves or excessive spray.
- 11.5.3. Both types of **automatic** lifejackets are suitable for activities where:
- there is potential to fall into the water unexpectedly
  - there is a risk of falling into water from height leading to potential concussion or becoming unconscious
  - the effects of cold-water shock are likely
- 11.5.4. Falling or jumping into water from height can project the lifejacket upwards towards the neck and the base of the skull.
- 11.5.5. Buoyancy equipment that relies on flotation material (e.g. foam), has the potential to project sharply upwards on impact with the water and cause injury or in some circumstances, unconsciousness. Such buoyancy equipment may not be suitable where there is a risk of accidental falling to water from height.
- 11.5.6. If deliberately jumping into water (e.g. during emergency evacuation) the upward action can be controlled by the person if they are trained.
- 11.5.7. In certain circumstances too much buoyancy may hinder escape, for example from an upturned craft. This should be considered when selecting buoyancy equipment for certain tasks.



- 11.5.8. It is recommended that automatic self-inflating lifejackets activated by water reacting bobbins are not worn in high speed craft, or elsewhere, where soaking is frequent.
- 11.5.9. Where a person is likely to:
- fall or jump from height
  - have to evacuate a high structure
  - encounter rough seas and strong currents might be encountered

In particular, if rescue is not likely to be imminent, then it is recommended that a crotch strap is included in the lifejacket specification and is worn at all times.

- 11.5.10. Where a crotch strap is not fitted or used, there is a risk that on impact with water or during sea swell, the lifejacket will rise up the torso. It may be ripped off the person in its entirety or may turn the person over resulting in the person floating face down in water.
- 11.5.11. Where a lifejacket has ridden up, there is an increased risk that the person will struggle to maintain their head out of the water, leading to potential exhaustion and drowning.
- 11.5.12. It is industry recommended good practice that all life jackets are fitted with crotch straps and they are worn.
- 11.5.13. If rough waters are likely to be encountered, then consideration should be given to the fitting of splash hoods. Splash hoods offer protection of the airways from sea spray and water whilst waiting for help. See the Maritime Coastguard Agency link 'Lifejackets Save Lives' in 'Other Web References' at the end of this document.
- 11.5.14. The provision of a lifejacket light, whistle and personal locator beacon (PLB) or automatic identification system (AIS) devices should be considered in the risk assessment where:
- there is a risk of entering the water in the dark
  - in areas where visibility may be limited
  - in fast flowing tidal waters where there is a risk of being rapidly carried away
  - rescue is not likely to be immediate
- 11.5.15. The use of a whistle and light is significantly more likely to attract the attention of a rescue party.
- 11.5.16. The decision on the design and level of buoyancy equipment needed in any given environment and the activities concerned will depend on the result of a suitable and sufficient risk assessment.

NOTE: Unless it is designed integrally, buoyancy equipment must be worn above jackets, harnesses or other items of clothing. Buoyancy equipment



worn underneath such items could be prevented from automatically inflating (for automatic lifejackets) or be restricted from fully inflating. It can also reduce its effectiveness in both providing buoyancy and in keeping a person upright and their head out of the water.

## 12. BRITISH AND EUROPEAN STANDARDS

12.1. Combined British and European Standards (BS ENs) exist for both buoyancy aids and lifejackets. Each Standard is intended to be suitable for different activities in various risk situations. Equipment needs to be selected from the appropriate standard, taking into account the factors mentioned in this document.

12.2. The Standards include:

- BS EN 12402-5:2006+A1:2010 Lifejackets and personal buoyancy aids: Buoyancy aid:50N. (Replaces BS EN 393 - 1994).

These have a buoyancy of no less than 50 Newtons for the average adult and are intended for use in sheltered waters when help is close at hand, the user is a swimmer and in circumstances where more bulky or buoyant devices would impair the user's activity or actually endanger them.

- BS EN 12402-4:2006+A1:2010 Lifejackets and personal buoyancy aids: Lifejackets:100N. (Replaces BS EN 395 – 1995).

These have a buoyancy of no less than 100 Newtons for the average adult and are intended for use in relatively sheltered waters when normal clothing is being worn.

- BS EN 12402-3:2006+A1:2010 Lifejackets and personal buoyancy aids: Lifejacket:150N. (Replaces BS EN 396 - 1994).

These have a buoyancy of no less than 150 Newtons for the average adult and are intended for use in tidal waters or when foul weather clothing is being used.

- BS EN 12402-2:2006+A1:2010 Lifejackets and personal buoyancy aids: Lifejacket:275N. (Replaces BS EN 399 - 1994).

These have a buoyancy of no less than 275 Newtons for the average adult and are intended for use in tidal waters in extreme conditions, when heavy protective clothing is being worn or loads such as tool belts are being carried.

- BS EN 12402-8:2006+A1:2011 Lifejackets and personal buoyancy aids: Additional items. (Replaces BS EN 394:1994).

This standard deals with the emergency lights, safety harnesses, protective covers etc. When deciding on the design of buoyancy equipment to be used, you need to consider whether to provide extra items.



## 13. *PPE AND OTHER CONSIDERATIONS*

- 13.1. The use of immersion suits should be considered as part of the overall risk assessment. Immersion suits reduce the risk of cold shock and delay the onset of hypothermia, therefore providing extended survival time in the water. They can make it easier to propel and get the person out of the water and where bright coloured suits are chosen, make the person easier to find to aid recovery. Suits may be already insulated, or insulation may be provided by an inflatable liner. Un-insulated suits may be provided with a removable inner garment or may require that specified clothing be worn to provide sufficient insulation to achieve expected survival times.
- 13.2. Where workers wear buoyancy equipment regularly and frequently, it is advisable to issue such equipment on a personal issue basis.
- 13.3. The final decision on the type of buoyancy equipment needed for any given activity will depend on the result of a suitable and sufficient risk assessment and this should only be made after consultation with the supplier or manufacturer and their product information sheets.

## 14. *USING AND MAINTAINING BUOYANCY EQUIPMENT*

- 14.1. Suitable policies and procedures need to be in place on the use, inspection, maintenance and storage of personal buoyancy equipment. This policy also needs to address the training needs of users. The manufacturer's maintenance procedures should be followed.
- 14.2. Permanently buoyant flotation material may only require regular visual checks to ensure the integrity of the outer cover, buoyancy material and fastenings, such as zips and buckles.
- 14.3. Manual or automatic CO<sub>2</sub> gas inflation equipment requires a higher level of inspection and maintenance. Damage to the inflation chamber(s), inflation mechanism or gas cylinder could result in total failure to provide buoyancy.
- 14.4. On all buoyancy equipment securing straps should be inspected for any tears, fraying or knots that may weaken the strap. Metal buckles and other metal components should be inspected for corrosion. Plastic buckles should be inspected for splits, fractures or distortion. The outer cover should be examined for tears, burns or chemical contamination.
- 14.5. ALWAYS refer to the manufacturer's instructions for inspection and maintenance.

## 15. *MANAGING IDENTIFICATION AND WEARING OF EQUIPMENT*



- 15.1. Employers have a duty to ensure equipment is identified and worn properly. Clear procedures need to be in place on the use, inspection, maintenance, storage of automatically inflated lifejackets and the training needs of lifejacket users and their supervisors.
- 15.2. Individuals allocated with their own equipment and having been adequately trained, may be responsible for carrying out pre-wear checks and reporting defects accordingly via management system procedures. This will help ensure correct inflation of the lifejackets is not jeopardised. Depending on the circumstances, it may be appropriate for periodic and spot check inspections to be carried out and documented by a suitable person other than the user, e.g. the supervisor. In either case, the person carrying out the periodic and spot check inspections will need to be suitably trained and competent. Spot checks are one of the ways in which the duty holder can ensure that policy on equipment, use, inspection and servicing is effective.

## 16. TRAINING

- 16.1. A suitable policy addressing the training needs of users of buoyancy equipment and/or aids, needs to be in place. All persons who use buoyancy equipment/aids need to be trained and competent in their care and use, including pre-wear checks and inspection procedures where appropriate. The type and amount of training provided will depend on the risk and the type of buoyancy equipment/aids used.
- 16.2. Appropriate training should be identified by risk assessment and an associated training needs analysis. However, industry practice is that general training for users of buoyancy equipment will cover as a minimum:
  - an explanation of the risks present and the need for buoyancy equipment/aids
  - operation, performance and limitations of the equipment/aids provided
  - instruction and practice on the selection, pre-wear checks, inspection, use (including correct wearing) and storage of the equipment/aids including use of lifejacket manual override lever and oral inflation tube (where applicable)
  - factors which can affect the correct operation of the buoyancy equipment/aids such as: working conditions, inadequate fitting, defects, damage and wear
  - how to recognise defects in buoyancy equipment/aids and arrangements for reporting loss or damage
  - refresher training requirements e.g. if the buoyancy equipment/aids are infrequently used or if a new type of equipment/aid is introduced etc.
- 16.3. For those who are regularly exposed to working on, near or next to tidal or coastal water where rescue may not be immediate, ports should consider an appropriate sea survival training courses for their employees.



## 17. STORAGE

- 17.1. Exposure to damp, humid conditions could lead to deterioration in the automatic inflation mechanism known as 'creepage'. This has the potential to lead to failure of the pin to pierce the CO2 gas cylinder.
- 17.2. Lifejackets need to be stored in suitable dry conditions. The following advice should be followed when storing lifejackets:
- Do not hang lifejackets up with wet immersion suits or other damp clothing
  - If the lifejacket is wet, unpack it and leave it to dry out on a hanger
  - Do not store lifejackets close to or directly above heat sources
  - Do not store lifejackets upside down, this is to prevent water getting in to the automatic inflation mechanism
  - Make sure there is enough space around the lifejacket, when it is stored, to allow the air to circulate

## 18. INSPECTION AND MAINTENANCE

- 18.1. As well as pre-wear checks, a more thorough inspection and testing programme needs to be carried out. The frequency and extent of checks should be carried out in conjunction with your risk assessment and manufacturer's recommendations. Factors to consider include but are not limited to:
- UV light and bird lime degradation
  - likelihood of damage and risk of vandalism, particularly in public areas.
- 18.2. Where lifejackets are worn frequently, the periods between inspections may need to be shorter than the quarterly inspection recommended by some manufacturers. For example, where lifejackets are used daily in a hostile environment, monthly inspections may be necessary.
- 18.3. Inspection and testing which may be performed in-house, needs to be carried out by those trained and competent in recognising defects in the lifejackets and the remedial action to be taken. Records need to be kept of all inspections and corrective actions made.
- 18.4. Testing the air tightness of the lifejacket will involve orally inflating the lifejacket and leaving it overnight (or submerging it in water) to check for leaks. The automatic inflation mechanism will need to be dismantled to make a detailed examination of its condition. In all circumstances the manufacturer's instructions must be followed when carrying out all inspections and testing.



- 18.5. A pre-wear check needs to be carried out each day the lifejacket is used. This should be carried out in accordance with manufacturers' instructions and will normally include visual checks to ensure:
- The firing mechanism has not been activated
  - The automatic firing capsule and gas cylinder are correctly screwed into place
  - There are no signs of corrosion, cracks or dents in gas cylinder or firing capsule
  - Unwanted movement within the firing mechanism ('creepage') has not occurred. Some automatic inflation mechanisms have indicators to show when compression in the spring has been lost. Examination of the piston or other visible component may also show whether 'creepage' has happened
  - The whistle (and light where fitted) is in position
  - The oral inflation tube is capped
  - The straps and main body of the jacket are not worn or damaged
  - The jacket is correctly packed in accordance with the manufacturer's instructions (ensuring that any Velcro is correctly fastened and the manual inflation lanyard/toggle is accessible)

## 19. *SERVICING*

- 19.1. In addition to the pre-wear checks, inflation test and inspections, manufacturers may recommend lifejackets are fully serviced on a specified frequency, either by themselves or by appointed service agents. However, where lifejackets are used frequently, then a more frequent service may be needed.
- 19.2. Where lifejackets rely on bobbins and gas cartridges to activate the inflation chambers, it is advisable that the manufacturer, or their recommended service agent, service these annually.
- 19.3. If any defects are found with either the gas cylinder or the automatic inflation mechanism, these parts must be replaced. Lights, CO2 cartridges and auto capsules have expiry dates which must be adhered to when certifying the lifejacket for a period of further use. The lifejacket itself does not expire and it should be inspected for damage by a competent person. If the lifejacket is in need of repair, it should be returned to the manufacturer. Repairs should only be carried out by those approved by the manufacturer.





## RELEVANT LEGISLATION AND GUIDANCE

Relevant legislation and guidance includes the following. Please note that these are the correct versions at the time of publishing, but the reader should always seek out the most current version.

The current versions of other PSS Safety in Ports Guidance documents can be found at: [www.portskillsandsafety.co.uk/resources](http://www.portskillsandsafety.co.uk/resources).

- BMC Public Health 2006 – Water incident related hospital activity: [www.biomedcentral.com/1471-2458/6/210](http://www.biomedcentral.com/1471-2458/6/210)
- British Standards Institution BS EN 12402 parts 1-10. (Paid Publication): [www.bsigroup.co.uk/](http://www.bsigroup.co.uk/). British, European and ISO Standards are available from the British Standards Institution, Customer Services Department, 389 Chiswick High Road, London W4 4AL, Tel: 0181 996 7000, Fax: 0181 996 7001
- European Standard EN 14144:2003, Lifebuoys – requirements and tests (Paid Publication): [shop.bsigroup.com](http://shop.bsigroup.com)
- Guidance on controlling risks from specific topics can be found in ‘The health and safety toolbox: How to control risks at work’: [www.hse.gov.uk/toolbox](http://www.hse.gov.uk/toolbox)
- Health and Safety (Safety Signs and Signals) Regulations 1996: [www.hse.gov.uk/pubns/books/l64](http://www.hse.gov.uk/pubns/books/l64)
- Health and Safety at Work etc. Act (HSWA) 1974: [www.hse.gov.uk/legislation/hswa](http://www.hse.gov.uk/legislation/hswa)
- Health and Safety in Ports and Docks: [www.hse.gov.uk/ports](http://www.hse.gov.uk/ports)
- Health and safety made simple – The basics for your business INDG449: [www.hse.gov.uk/pubns/indg449](http://www.hse.gov.uk/pubns/indg449)
- HSE; 1996 – Offshore Technical Report, OTO 95 038 – 1996. Review of probable survival times for immersion in the North sea: [www.hse.gov.uk/research/otopdf/1995/oto95038.pdf](http://www.hse.gov.uk/research/otopdf/1995/oto95038.pdf)
- International Convention for the Safety of Life at Sea (SOLAS), Chapter III ‘Lifesaving appliances and arrangements’ (Paid Publication): [www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Safety-of-Life-at-Sea-\(SOLAS\),-1974.aspx](http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Safety-of-Life-at-Sea-(SOLAS),-1974.aspx)
- International Labour Organization’s (ILO) Code of Practice on Safety and Health in Ports (ILO 152): [www.ilo.org/sector/activities/sectoral-meetings/WCMS\\_546257/lang--en](http://www.ilo.org/sector/activities/sectoral-meetings/WCMS_546257/lang--en)
- International Maritime Organization, Life-saving appliances, 2010 (Paid Publication): [www.imo.org/MediaCentre/PressBriefings/Pages/Life-Saving-Appliances-2010-Edition.aspx](http://www.imo.org/MediaCentre/PressBriefings/Pages/Life-Saving-Appliances-2010-Edition.aspx)
- Keeping Safe at the Coast: Lifejacket safety advice, Maritime and Coastguard Agency: [www.gov.uk/government/publications/keeping-safe-at-the-coast-lifejacket-safety-advice](http://www.gov.uk/government/publications/keeping-safe-at-the-coast-lifejacket-safety-advice)
- L148 “Safety in Docks” Approved Code of Practice and Guidance: [www.hse.gov.uk/pubns/books/l148](http://www.hse.gov.uk/pubns/books/l148)
- List of life saving appliance manufactures can be found at International Life-saving Appliance Manufacturers' Association (ILAMA): [www.ilama.org](http://www.ilama.org)
- Managing for Health and Safety: [www.hse.gov.uk/managing](http://www.hse.gov.uk/managing)

- Managing Health and Safety in Dockwork (HSG 177): [www.hse.gov.uk/pubns/books/hsg177](http://www.hse.gov.uk/pubns/books/hsg177)
- Merchant Shipping (Marine Equipment) Regulations 1999: [www.legislation.gov.uk/uksi/1999/1957](http://www.legislation.gov.uk/uksi/1999/1957)
- National Water Safety Forum: [www.nationalwatersafety.org.uk](http://www.nationalwatersafety.org.uk)
- Occupiers' Liability Act 1957: [www.legislation.gov.uk/ukpga/Eliz2/5-6/31/contents](http://www.legislation.gov.uk/ukpga/Eliz2/5-6/31/contents)
- Personal buoyancy equipment on inland and inshore waters - HSE -Agricultural Sheet No 1: [www.hse.gov.uk/pubns/ais1.pdf](http://www.hse.gov.uk/pubns/ais1.pdf)
- Personal Protective Equipment at Work (Third Edition): [www.hse.gov.uk/pubns/books/l25](http://www.hse.gov.uk/pubns/books/l25)
- Risk Assessment INDG163 (rev4) published by HSE: [www.hse.gov.uk/pubns/indg163.pdf](http://www.hse.gov.uk/pubns/indg163.pdf)
- Risk at Work - Personal Protective Equipment: [www.hse.gov.uk/toolbox/ppe](http://www.hse.gov.uk/toolbox/ppe)
- RoSPA 2005 - Royal Society for the Prevention of Accidents: [www.rospa.com](http://www.rospa.com)
- Working at Sea - Maritime & Coastguard Agency: [www.gov.uk/topic/working-sea](http://www.gov.uk/topic/working-sea)





Raising Standards in UK Ports

**FURTHER INFORMATION**

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