

SIP003 - GUIDANCE ON CONTAINER HANDLING





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SIP003

GUIDANCE ON CONTAINER HANDLING

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.

This document uses the term Container to mean a 'Cargo Transport Unit (CTU)' or Freight Container as identified in UK and international law. It includes various forms of container including tanks, flats etc. In the UK, freight containers used at a place of work are required to be:

- I. **Approved** Freight containers and their derivatives must have their design, specification and construction approved by an organisation appointed by HSE to carry out this work. Those needing to have their containers approved should approach one of the appointed organisations directly.
- II. **Periodically** Examined by a competent person and in accordance with arrangements approved by HSE to determine whether the container is fit for use and to verify satisfactory maintenance
- III. **Maintained** Freight containers must be maintained in efficient working order and good repair. The Regulations imply more than merely repairing defects as they become apparent through failure or examination – routine inspections should include systematic preventative maintenance to ensure the container is safe for continued use.

- IV. **Plated** with a permanently affixed safety approval plate, giving information on its status and design parameters. This includes the reference number of the organisation that approved the container, the identification number of the container, its maximum gross operation weight and details of the examination arrangements.
- V. **Marked** so that any maximum operating gross weight shown on the body of the container is consistent with the marking on its safety approval plate.

This document addresses Container handling from/to vessels in ports. It includes safe access to the vessel, hazards associated with container handling, use of container lifting equipment and accessories, twist lock operations, lashing work at height and dangerous Maintained Freight containers must be maintained in efficient working order and good repair. The Regulations imply more than merely repairing defects as they become apparent through failure or examination – routine inspections should include systematic preventative maintenance to ensure the container is safe for continued use.



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.
- 1.4. The PSS/HSE Safety in Ports guidance suite, available from the PSS website at: 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.

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
 - Control of Substances Hazardous to Health: www.hse.gov.uk/coshh
 - HSE Whole Body Vibration in Ports Information Paper: www.hse.gov.uk/vibration/wbv/ports
 - Musculoskeletal disorders (MSDs): www.hse.gov.uk/msd
 - Noise at Work: www.hse.gov.uk/noise
 - Personal Protective Equipment: www.hse.gov.uk/toolbox/ppe
 - Vibration at Work: www.hse.gov.uk/vibration



- Freight Container Safety: www.hse.gov.uk/ports/containers

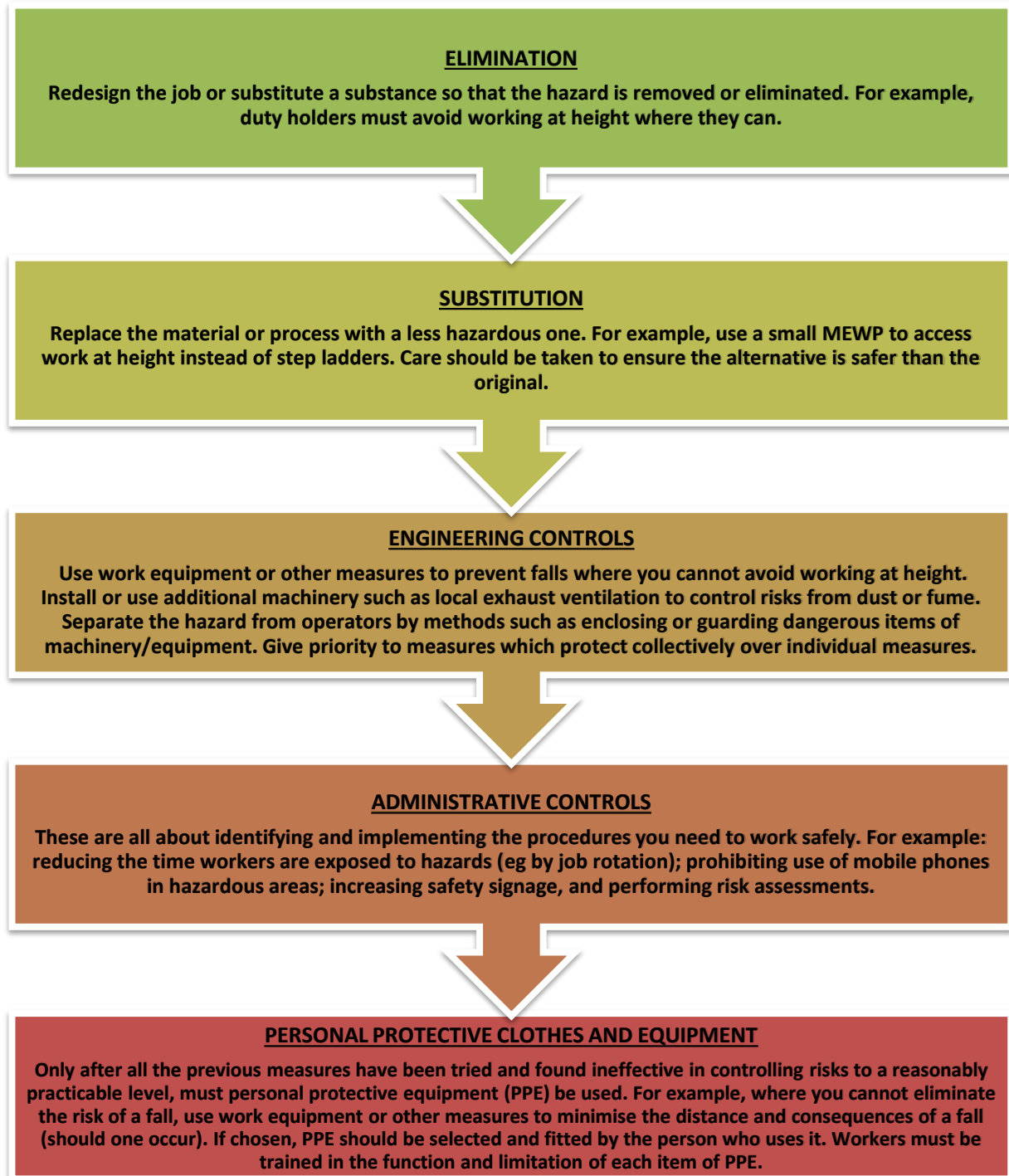
There are particular Musculoskeletal disorders risks in the ports and docks industry associated with lashing of containers: www.hse.gov.uk/msd.

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 – not only to permanent employees but also to others including non-permanent employees (NPE's), ship's crew, passengers and visitors that may be affected by the activity. The appropriate control measures must be introduced and should consider collective measures ahead of 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 in the Hierachy of Controls diagram on the following page. The Hierachy of Controls sets out an ideal order to follow when planning to reduce risk.
- 3.3. Risk assessments must be reviewed regularly and immediately after any incident or when there are significant changes to the operation. Most accidents and near misses can be avoided if the risks from the work are suitably and sufficiently assessed and appropriate control methods are adopted.
- 3.4. The risk assessment should record the significant hazards and the risks of the operation together with the relevant control measures. In port operations risk assessments should take into account changes such as tidal changes, weather, trim, list, load/cargo and vessel dynamics.
- 3.5. Planning and work execution is discussed in HS(G) 177, Managing Health and Safety in Dockwork: www.hse.gov.uk/pubns/books/hsg177.
- 3.6. 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 as well as composing and decomposing unit loads; and also, services in relation to cargo or goods such as tallying, weighing, measuring, cubing, checking, receiving, guarding, delivering, sampling and sealing, lashing and unlashng.
- 3.7. The Health and Safety at Work Act 1974 also applies to the Master and ship's crew when working with shore-based personnel on board ship.
- 3.8. 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.

- 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.

HIERACHY OF CONTROLS



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



- 3.10. The 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 and 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 and for 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 also extend to plant and equipment (for example a forklift truck) which is under the master's control that is used ashore by ship's crew, or when used by shore based workers ashore or on-board ship.

4. *RECORD KEEPING*

- 4.1. The risk assessment should record the significant hazards of the operation together with the risk and the proposed relevant control measures.

5. *CONSULTATION, COOPERATION AND COORDINATION*

- 5.1. 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.

- 5.2. 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.

6. *VESSEL ACCESS*

- 6.1. The requirements for safe access to and on vessels are contained within the ACOP Safety in docks (L148) and *SIP014 Safe Access and Egress*.
- 6.2. In general access onto the vessel should be provided by the ship's accommodation ladder or by the ship's gangway. This should be properly rigged and if over water include a safety net. Safe access and egress to the ladder should be maintained shore-side throughout the working of the vessel.



- 6.3. The Supervisor should check that access to/from the vessel and to/from the ships hold or onto deck cargo is in good repair, correctly positioned and in working order before commencement of the operation.

7. *SLINGING AND LIFTING OPERATIONS - GENERAL*

- 7.1. All lifting operations in ports are subject to specific legislation including: The Lifting Operations & Lifting Equipment Regulations (LOLER), The Provision & Use of Work Equipment Regulations (PUWER), The Merchant Shipping and Fishing Vessel (Lifting Operations & Lifting Equipment) Regulations (MSLOLER), and The Merchant Shipping & Fishing Vessels (Provision and Use of Work Equipment) Regulations (MSPUWER).
- 7.2. So as not to cause confusion with the different terms used to describe lifting equipment, LOLER clearly uses the following definitions:
- "lifting equipment" means work equipment for lifting or lowering loads and includes its attachments used for anchoring, fixing or supporting it
 - "accessory for lifting" means work equipment for attaching loads to machinery for lifting
- 7.3. In the port industry accessories for lifting are sometimes referred to as 'lifting accessories'.
- 7.4. The Regulations aim to reduce risks to people's health and safety from lifting equipment provided for use at work. Generally, the Regulations require that lifting equipment provided for use at work is:
- strong and stable enough for the particular use and marked to indicate safe working loads
 - positioned and installed to minimise any risks
 - used safely, i.e. the work is planned, organised and performed by competent people
 - subject to ongoing thorough examination and, where appropriate, inspection by competent people
- 7.5. Equipment and accessories that are exposed to conditions that can cause deterioration and that could lead to dangerous situations must:
- be thoroughly examined
 - in the case of lifting equipment for lifting persons, or an accessory for lifting, at least every 6 months [note: this also applies to ship's lifting equipment]
 - in the case of other lifting equipment, at least every 12 months
 - in either case, in accordance with an examination scheme; and each time that exceptional circumstances which are liable to jeopardise the safety of the lifting equipment have occurred
 - if appropriate for the purpose, be inspected by a competent person at suitable intervals between thorough examinations.



- 7.6. It is essential to identify that all lifting equipment and lifting accessories are within the correct inspection (thorough examination) period. One way of doing this is by using a system of colour coding.
- 7.7. All equipment should be checked by a competent person before use. If there is any doubt as to the suitability of lifting equipment and lifting accessories, they must be removed from use.
- 7.8. The term 'load' within LOLER includes lifting a person. Equipment used for lifting people must be designed for such use and checked prior to lifting any personnel. If using ship's equipment for lifting people, the certification and condition of the equipment must be checked by a competent person prior to use as is the case with landside equipment.
- 7.9. Always have lifting equipment thoroughly examined following 'exceptional circumstances', e.g. if it is damaged or fails, is out of use for long periods, or if there is a major change in how it is used which is likely to affect its integrity.
- 7.10. The frequency of inspection might need to be increased for other reasons for example environmental factors, high frequency of use, etc. This should be identified as part of the risk assessment.
- 7.11. Hired equipment should be received with all maintenance and inspection records up-to-date. Where the length of hire extends past the inspection date, the individual responsible for the hiring should be responsible for ensuring inspections are completed and recorded.
- 7.12. Further general advice and guidance can be found on the HSE and MCA web pages – see Lifting equipment at work - A brief guide to the law www.hse.gov.uk/pubns/indg290 and the references at the end of this document.

8. *HAZARDS*

- 8.1. Hazards associated with the loading and unloading of general cargo include but are not limited to:
- being struck by work equipment involved in the operation such as lifting equipment, moving cargo, or moving vehicles
 - being crushed against a fixed object such as a ship's bulkhead, a deck support pillar or the cargo stow itself by shifting/falling cargo or moving vehicles
 - slips, trips or falls while working on surfaces which may be uneven, unstable or slippery due to the presence of substances such as cargo residue, oils, ice, water, or protective wrapping
 - access/egress to and from deck and hold cargo
 - falls from height:
 - during ship or cargo access/egress
 - through gaps between adjacent cargo stows



- from cargo stows at varying heights
- when working near the edge of cargo stows
- falls on the same level into voids between cargo and bulkheads or wells formed in the cargo stowage
- collapse or shifting of the cargo stow, either before or during handling
- poor or potentially dangerous atmosphere affecting the air quality caused by, for example, carbon monoxide, oxygen deficiency, dust, fumes from machinery or cargo
See also **SIP015 - Confined Spaces in Ports**
- potential explosive or hazardous atmospheres
- contact with chemicals or other substances hazardous to health
- being struck by falling objects such as “dunnage” or the cargo itself
- lifting, carrying, handling
- temperature, noise, vibration
- fatigue

8.2. Additional assessments may be required during discharge to take into account things such as damaged or moved cargo, changes in the quality of lifting strops or any other previously unseen condition. Changes to, or further control measures may then be required.

9. **PLANNING FOR SAFE LOADING AND DISCHARGE**

- 9.1. Effective planning is one of the key elements of safe loading/discharge operations. Most accidents and near misses which occur could be avoided if the risks from the work are considered and plans for safe handling are made at an early stage, ideally the first time that a new cargo is consigned to a port. The shipping operator and the port handling company should agree on the equipment and systems that will be used to ensure the load is handled safely. Both parties should keep each other informed of any significant changes that may introduce new risks.
- 9.2. Specific sections of the Approved Code of Practice L148 Safety in Docks address “Planning and Organising of Lifting Operations” and should be consulted. Further information on planning and managing dock operations can also be found in Managing Health & Safety in Dockwork (HSG 177)
- 9.3. A written record should be made for each ship visit including: the ship stowage plan; landside stowage arrangements; personnel, plant and equipment involved; any specific traffic routes and any associated hazards. This information needs to be cascaded down to all those involved, preferably in written form to the supervisor who will then in turn pass this down to the operatives, enabling all activities to be co-ordinated, it should also clarify the interface between ship and shore based personnel. This can be achieved by a pre-shift briefing or toolbox-talk.



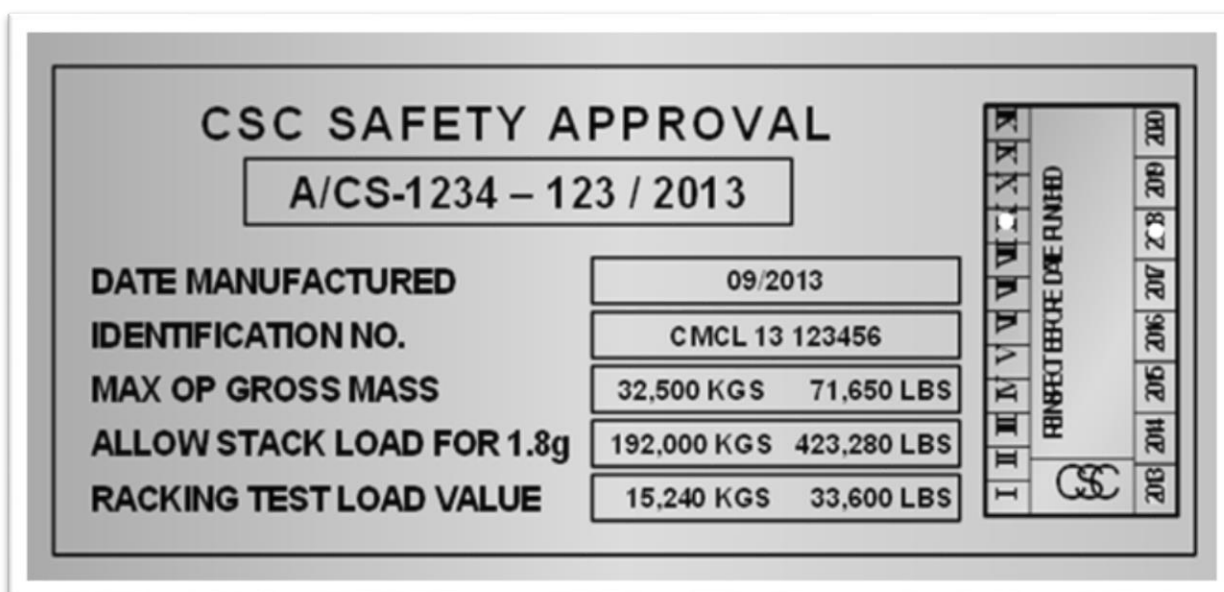
10. VESSEL LOADING/DISCHARGE PLAN

- 10.1. A vessel loading/discharge plan should be available for all but the simplest of loading operations. Plans are usually prepared in consultation with the Master or Chief Officer of the ship and/or the cargo handling supervisor. The plan should be communicated to all personnel involved in the loading operation. This can be done as part of the toolbox talk.
- 10.2. A vessel loading/discharge plan should consider but not be limited to:
- the risks to the health and safety of personnel involved in the cargo handling operation including the risks associated with cargo securing or un-securing in the loading and discharge ports
 - safe means of access and egress to and from the ship's holds at all stages of loading; i.e. there may only be hold ladders fitted at one end of the hold and the load plan should therefore be designed to ensure that access to it does not become restricted or blocked during the cargo handling operation
 - safe means of access and egress to and from the top of cargo stows
 - walking on the top of cargo stows and the transfer of personnel from one stow to another
 - the safety of third party personnel not involved in the cargo handling operation including the safety of the ship's crew
 - safe means of access and egress for lashing/rigging gangs
 - safe means of access and egress for cargo surveyors or inspectors
 - all cargo has known weight
 - the stability requirements of the vessel
 - whether it may be necessary to temporarily remove other cargo from the vessel in order to make the operation safer
- 10.3. It is good practice to consider how the cargo will be discharged in the receiving port. It may be necessary to provide a "key", so that cargo handlers at the port of discharge can break into the stow. This is often a section of cargo that has been "pre-slung" to facilitate safe "breaking in".
- 10.4. The pre-stowage plan should be reviewed and amended as appropriate throughout the operation to reflect possible changes/additions to the cargo or vessel or conditions.

11. FREIGHT CONTAINER SAFETY

- 11.1. Under the International Convention for Safe Containers (CSC), it is the responsibility of the container owner to ensure that containers are properly maintained and subject to periodic examination in accordance with procedures approved by the government of the relevant contracting state to the Convention. In the UK, the requirements of the Convention are covered in legislation by the Freight Containers (Safety Convention) Regulations.

- 11.2. Under the Convention and these regulations, each freight container is required to display a Safety Approval Plate (CSC plate), detailing relevant safety information including country of approval, date of manufacture and maximum operating gross weight (Photograph 1). The plate may also display the date of the next periodic examination, unless the container is under an Approved Continuous Examination Programme (ACEP) in which case details of the ACEP registration are displayed and there is no requirement to display an examination due date.
- 11.3. Defective containers or containers where the CSC plate is missing should be quarantined and brought to the attention of the appropriate person



CSC plate with ACEP registration details and details of periodic examinations

12. LOADING CONTAINERS WITH CRANES

- 12.1. Quayside cranes, ship’s cranes or derricks and mobile cranes are commonly used to load and unload freight containers, as well as hatch lids covering the holds of container vessels. Additional HSE guidance is available in “Handling Containers with Slewing Cranes”: www.hse.gov.uk/foi/internalops/sims/cactus/5_05_09
- 12.2. The following items should be considered but is not limited to within any risk assessment associated with the lifting operation:
 - the safe working load (SWL) of the equipment being used
 - pedestrian walkways over which containers will be lifted
 - traffic routes to and from the crane
 - the possibility of a vessel moving along or away from the quay (ranging) during cargo operations



- the trim and list of the vessel - this can cause crane spreaders to become stuck in cell guides
- weather conditions
- position of operatives on board ship
- others such as the ship's crew who may be required to be present
- the centre of gravity of loads secured to flat racks, and the security / suitability of devices locking 'bundles' of flat racks together
- problems associated with over height or over width cargo

12.3. The procedures to be followed for the selection, interchange and use of suitable lifting equipment to safely lift containers should also be considered. Lifting equipment includes but is not limited to:

- over height frames
- equipment for use with slightly distorted containers ('pots')
- top lifting attachments
- bottom lifting attachments
- manual spreaders
- powered spreaders
- twin and quad lift spreaders

12.4. Specialist training and/or advice may be required for certain lifting operations, including:

- overweight containers
- eccentric weight containers
- damaged containers
- jammed containers
- jammed twistlocks
- crane spreaders jammed in cell guides

13. *VESSEL LIFTING EQUIPMENT AND ACCESSORIES*

13.1. The merchant shipping version of LOLER applies to all British registered vessels and all foreign registered vessels whilst in UK territorial waters, therefore similar standards as stated above are imposed on all vessels in UK ports.

13.2. Before using ships' lifting equipment or accessories, the ships' documentation must be checked to confirm that thorough examination, inspection and testing of the lifting equipment and accessories concerned complies with LOLER. It is also prudent for a competent person to undertake a visual examination of ship lifting equipment and accessories where possible.

13.3. Employers should make pre-use checks concerning the safety of the ships lifting equipment so far as it is within their control.

- 13.4. Where appropriate there should be a period of familiarisation on the specific equipment concerned before putting into use.

14. SPREADER CONFIGURATIONS

- 14.1. In order to increase operational efficiency crane spreaders have evolved to handle more than one container per lift cycle. Such configurations include:

- single lift spreaders
- twin lift spreaders
- tandem lift spreaders



Twin lift spreader



Quad lift spreader

- 14.2. Hazards associated with these spreaders include:

- being crushed between containers as the units close up
- being struck by a damaged spreader component, for example, a 'flipper' falling as the spreader is being landed on or is removed from a container.

15. VERTICAL TANDEM LIFTING (NOT considered safe practice by UK port industry)

- 15.1. Vertical tandem lifting is NOT considered safe practice by UK port industry.

- 15.2. Vertical tandem lifting is where two containers locked one above the other are lifted in one operation (as can be seen on page 14).



15.3. For clarity, there is no UK regulation that prevents this type of operation and vertical tandem lifting is being carried out in a number of countries. However, the prevailing UK industry view is that this method of operation is not safe because:

- The safety of a vertical tandem lift is dependent on the integrity of the twistlocks between the two containers, and twistlocks may not be certified lifting equipment
- Containers themselves may not be subject to the same level of inspection and testing as other lifting equipment
- Containers and twistlocks are subject to potential damage in transit

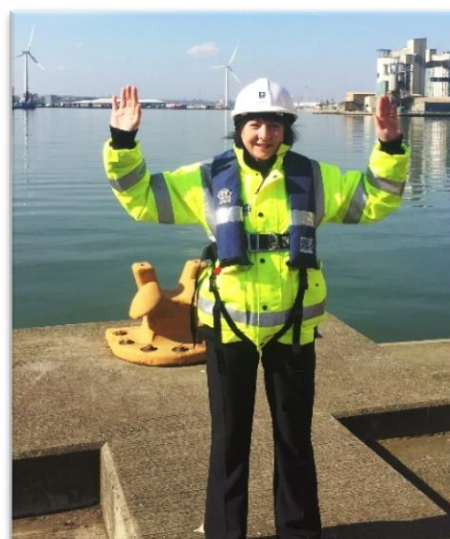
16. *COMMUNICATION*

16.1. Clear lines of communication must be established and maintained between all those involved in the lifting operation. Visual and/or voice communications from the person directing the lifting operation (usually known in the port industry as the banksman, signaller or hatchway man) to the crane operator must be clear, agreed and understood. Where voice communication cannot be established then an agreed system for the use of hand signals must be followed, see Health and Safety (Safety Signs and Signals) Regulations – schedule 1.

16.2. Guidance on crane signals can be found in BS 7121 – “Code of Practice for Safe Use of Cranes – Part 1, General”. The banksman should stand in a secure position, where he can see the path of the load and also be in a position, wherever possible, where he can be clearly seen by the crane operator, especially in situations where the lifting operation requires the use of hand signals. In situations where the banksman cannot be seen, radio communications or two banksmen should be used.

16.3. Where a banksman is actively involved in slinging/unslinging it is important that during the actual lift the banksman is focused solely on the lifting operation. The banksman should be clearly identified to the crane operator so there is no doubt as to who is providing the instructions.

16.4. The crane driver should normally only accept instructions from the banksman, whether by voice or through hand signals. The exception to this rule is the stop signal, which any operative may give at any time to override the previous signal.



Emergency Stop signal

17. SECURING CONTAINERS IN VESSEL HOLDS

17.1. Most modern container vessels are equipped with cell guides below deck – these vertical guide rails assist the crane driver in lowering containers into the cells in the hold and secure the container stacks below deck. However, modern container vessels have the capability to stow either 40ft containers in a hold, or two 20ft containers end to end in the same space. Or a combination of the two arrangements with 20ft containers below 40ft containers. Where 20ft containers are stowed in a 40ft hold, the ends of the containers away from the hold bulkheads are not secured by any cell guide structure. Under deck stacking cones are therefore fitted in the bottom corner castings of the container, prior to it being loaded and are utilised to secure the containers. These are generally fitted by personnel on the quayside. In the absence of cell guides, containers should be properly secured in accordance with shipping requirements.



Under deck stacking cone

18. SECURING CONTAINERS ON DECK – TWISTLOCKS

18.1. A variety of equipment is also used to secure containers on the deck of a vessel. The most common device is the twistlock, of which there are principally three different types as follows:

- 18.2. Manual twistlocks – these are often used to secure containers to the deck of the vessel. When used above the first tier, manual twistlocks are fitted at height into top corner castings prior to the next container being loaded onto the stow. They are then locked or unlocked and removed before discharge of the next container from the vessel. Methods of access are discussed further in Section 25 ‘Working at Height’.
- 18.3. The twistlock is locked / unlocked by means of pushing a lever from one side to the other. Depending on type, the twistlock may be either left or right-handed in its operation. Additionally, at the top of the stow, bridge fittings connected at height between adjacent tiers of containers may be required to be fitted to prevent separation of container stacks during sea passage
- 18.4. Semi-automatic twistlocks - these twistlocks are unlocked by operating wire toggle(s) or a handle on the unit and lock automatically when a container is landed onto it or the container



Manual Twistlocks



Handle operated semi-automatic twistlock



Single toggle semi-automatic twistlock



Double toggle semi-automatic twistlock

in which it is inserted is landed onto a container stow. Semi-automatic twistlocks should not be used inverted unless specifically designed to be used in that manner safely.

- 18.5. Fully automatic twistlocks - may be encountered on some container vessels. These twistlocks remain in the bottom corner castings of a container being discharged and do not require unlocking prior to unloading. Fitting of these twistlocks is undertaken prior to loading.
- 18.6. Both semi-automatic and fully automatic twistlocks are fitted prior to loading and removed before the container is landed – this operation may take place on board the vessel, but more typically occurs on the quayside, either at the crane or at a 'station' remote from the crane.
- 18.7. Twistlocks are generally stored in bins on dedicated low height containers (gear boxes) which can be moved/discharged from the vessel using conventional container handling equipment. Some gear boxes may have higher sides making access hazardous – this can be mitigated by removal of the individual gear bins from the gear box using a fork lift. The integrity of gear bins and frames can be in doubt and additional control measures may be required when lifting such as, an initial visual inspection, conducting a test lift and exclusion zone around the lifting area etc



*Twistlocks gear box
containing gear bins*

- 18.8. It should be noted that while twistlocks are rated, they may not be certified pieces of lifting equipment, and therefore should not be used as such.
- 18.9. Midlocks (sometimes called hooks) are increasingly being used to save space on deck by allowing pairs of 20' containers to be loaded closer together, and improving productivity as they do not require unlocking.



Photo of a Midlock

18.10. However, some types of midlock are vulnerable to falling out, and careful control of twinpick lifting operations is required. In particular:

- All hatches with midlocks should be identified on relevant paperwork, plans and work documentation
- When twin-picking, only spreader frames with 'floating' centre twistlocks may be used, to ensure that the containers can be pulled apart once lifted and allow the midlocks to be safely removed at quay level
- Ports may wish to consider deploying additional personnel to assist crane drivers in safely discharging containers with midlocks

19. *TWISTLOCK HAZARDS – UNLOCKING, FITTING AND REMOVAL*

19.1. The main hazards to stevedores associated with the unlocking of twistlocks are, but are not limited to:

- musculoskeletal injury resulting from carrying and using unlocking poles
- being struck by falling twistlocks or other objects
- falls from height when working or passing near to unprotected edges
- falls from height when unlocking twistlocks from above
- slips, trips and falls whilst working on surfaces which may be uneven, unstable or slippery due to the presence of substances such as leaking cargo residues, oils, ice or water
- electrical hazards from damaged power cables to refrigerated containers
- pinches, cuts, skin abrasions and bruising when assembling multi-part unlocking poles

19.2. The main hazards to stevedores associated with handling container fittings (twistlocks etc.) are, but are not limited to:

- personnel being struck by mobile plant / equipment, including quay cranes
- musculoskeletal injury resulting from handling twistlocks
- being struck by falling equipment or other objects



- slips, trips and falls whilst working on surfaces which may be uneven, unstable or slippery due to the presence of substances such as leaking cargo residues, oils, ice or water
- crush injuries between suspended container and gear box / bin, or between containers on board ship, or between closing twin lift container spreaders
- cuts / skin abrasions from handling twistlocks
- when handling container fittings under deck, falls from height when working or passing near to unprotected edges
- collision between mobile plant / equipment utilised to remove / replace gear bins
- when working from personnel carrying cages/ gondolas
 - contact / entrapment between cage and container stow
 - falls from height

20. *TWISTLOCK OPERATIONS – SYSTEMS OF WORK*

20.1. The following should be taken into consideration when developing systems of work in relation to twistlock operations on the quay (the list is not exhaustive):

- safe positioning of stevedores handling twistlocks on the quay from vehicular traffic flows
- position of personnel in relation to suspended loads
- techniques for safe handling / fitting / removal of twistlocks, including procedures for removing defective twistlocks and isolating them from further use
- personal protective equipment requirements
- safe access to storage of twistlocks within gear boxes / bins
- interaction between mobile plant / equipment when removing / replacing gear bins from gear boxes
- traffic control systems, i.e. hand signals for stop / go

20.2. Automated systems have been developed for the removal and insertion of twistlocks – however, these still require a degree of manual intervention in their operation, and do not eliminate the hazards detailed previously and must be assessed accordingly.

21. *JAMMED TWISTLOCKS*

21.1. Defective twistlocks or twistlocks that have not been fitted correctly may 'jam' such that they do not release correctly. Any system of work for freeing of jammed container fittings must take into account the additional hazards of tension being built up in the crane hoist system due to vessel or tidal movements, and the potential for the jammed fitting to 'free' without warning.

21.2. Procedures must therefore take into account issues such as:



- communication between all parties involved in the operation
- access to assess the situation
- removal of all tension in the crane system
- means to free the problem fitting, for example by use of limited crane power, hand tools, or by 'burning out'

21.3. If heat is to be applied to a fitting to release it, prior approval must be obtained from the vessel's master and/or the port. Permit to Work (PTW) systems are often implemented for the safety of hot work tasks and take into account factors such as:

- the location and nature of the hot work
- the nature / hazards of the cargo within the container and any adjacent containers that may also be affected by the application of heat
- the proposed time and duration of the work
- the limits of time for which the permit is valid
- the means to prevent / extinguish any fire
- the person in direct control of the work.

21.4. Some vessels may supply twistlock 'clamps', which are attached between each of the bottom corner castings of the container to be discharged and the top corner castings of the container to which it is jammed. While such devices are advantageous in lowering the problem unit for ease of access, these clamps should only be used if they are marked with a safe working load (SWL), and an 'in date' certification can be supplied.

22. *LASHING OF FREIGHT CONTAINERS - INTRODUCTION*

22.1. Freight containers in the lower tiers on deck, on board container vessels are required to be secured to the vessel's structure to ensure the stability of the cargo during the ship's voyage. Typically these freight containers are arranged either lengthwise in a fore or aft stowage arrangement, or stowed athwartships (at 90 degrees to the vessel), and, rarely, a combination of the two.

22.2. The process of securing containers in this manner is generally known as 'lashing', and is achieved by the use of metal lashing bars or rods hooked into the corner casting of the freight container, which are then connected to a threaded turn buckle or bottle screw attached to the vessel's structure. Tension can then be introduced into the lashing by way of rotating the turn buckle, thereby securing the container to the ship. Lashing bars are typically between 2.4 metres (one high bar) and 4.5 metres (three high bar) in length and 13.5kgs to 20kgs in weight respectively. On some container vessels, lashing chains are suitably tensioned to secure containers to the vessel structure.

22.3. Lashing requirements may vary between different classes of container vessel. Lashing arrangements may be as little as the use of one high bars only in a cross fashion across the deck of the ship, to double cross of one high bars and use of three high bars across the deck. The individual requirements for lashing on board a ship are laid down in the cargo securing manual for the vessel, and in some cases posted in weather deck walkways or other locations near to the container stows to which they apply. These requirements must be adhered to at all times.

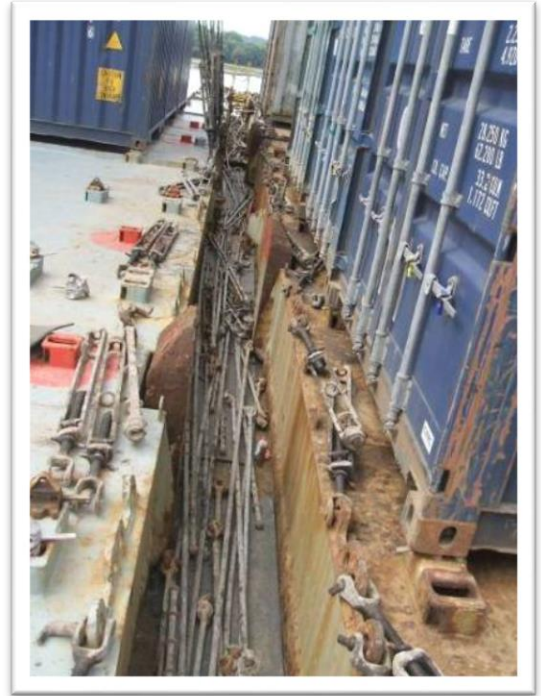


Lashing arrangement – double lashing with one high bars and three high bars in outboard cell

22.4. Lashing is undertaken from walkways between container stows, either at or below the level of the hatch cover, or from raised lashing gantries accessed via ladder. Lashing is also undertaken between 20' containers on deck in 'combination bays' where either one 40ft or two 20ft containers may be stowed.



Lashing from gantry

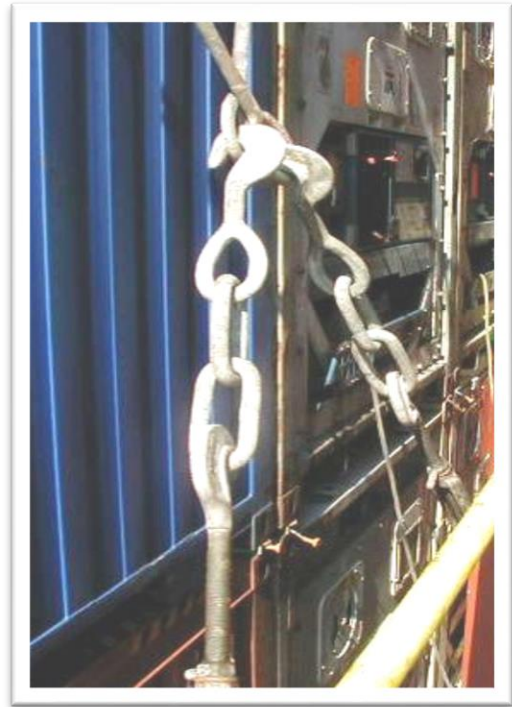


Lashing from walkway between hatch lids

22.5. Lashing gear is typically designed for the stowage of 8'6 high containers. However, the use of 9'6 high 'hi-cube' containers is becoming more prevalent. For this reason, lashing bars

may be of insufficient length to reach the turn buckle, and in such cases lashing bar extension pieces are used to bridge the gap.

- 22.6. Where lashing bars are too short, stevedores should never stand on handrails or bypass fall protection in order to complete lashing activities.
- 22.7. Lashing gear may be stowed in designated storage bins / racks in walkways or lashing gantries between the container stows on board, or in storage bins in weather deck walkways. However, some older vessels have no facilities for lashing gear storage, with unused gear remaining in walkways.



Lashing bar extension pieces

23. LASHING HAZARDS

- 23.1. The main hazards to stevedores associated with lashing activities include, but are not limited to:
- musculoskeletal injury and fall from height resulting from lifting/manipulating heavy/long lashing bars, often in awkward positions. This risk could be exacerbated when using lashing bar extension tubes.
 - being struck by falling lashing equipment or other objects
 - falls from height when working or passing near to unprotected edges
 - slips, trips and falls whilst working on surfaces which may be uneven, unstable or slippery due to the presence of substances such as leaking cargo residues, oils, ice or water
 - electrical hazards from damaged power cables to refrigerated containers
 - personnel on the quay being struck by lashing gear falling from the vessel

24. LASHING – GENERAL PRINCIPLES

- 24.1. When developing safe systems of work for lashing/unlashing operations, the following should be taken into consideration (this list is not exhaustive):

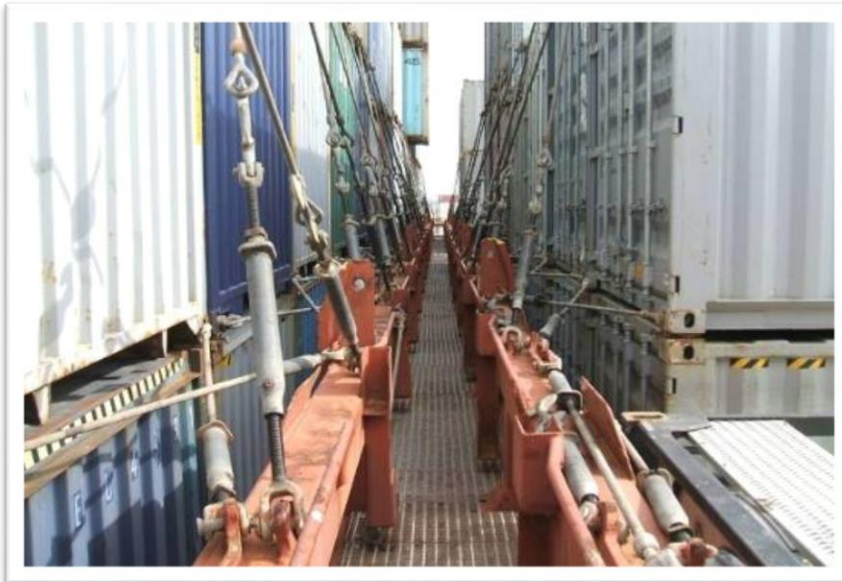


- personnel requirements – typically, the task of lashing / unlashng will be undertaken by two operatives with one handling the lashing bar and one operating the turn buckle. Consideration should be given to the personnel requirements to complete lashing duties across the vessel(s), the type and condition of the lashing gear, size of the work area, vessel lashing requirements and the number of containers across the vessel to be lashed
- personal protective equipment requirements
- positions of personnel in relation to moving equipment and suspended loads. When discharging, containers should be unlashng from the quayside of the vessel first, working to seaward. This ensures that suspended loads do not pass over or in proximity to lashers. The opposite should be applied for lashing when containers are being loaded
- When using lashing bars and in particular extended bars, risk assessments should take into consideration factors such as the physical capabilities of the personnel, risks from work at height, manual handling, the requirements of the operations and the general working environment.
- The use of lashing bar extension tubes is not recommended because of the increased risks
- procedures for safe handling and operation of lashing equipment
- stowage of unused lashing equipment, and safe transfer of lashing gear from storage areas to areas of use
- required measures to be in place to protect stevedores from falls from height
- alternative strategies for protecting workers from falls from height if physical protection is not available from the ship. For example, a container held flush against the side of a vessel can provide adequate fall protection for stevedore's undertaking lashing duties at outboard positions. The use of fall restraint (or fall arrest) equipment could be considered
- arrangements to ensure sufficient lighting is available for safe lashing operations systems to be followed in the event that a lashing bar is jammed in the container corner casting and cannot be freed by the lashing gang. For example, the container may be discharged from the vessel with the lashing bar in situ and the problem resolved on the quay, so long as all involved in the operation (crane driver, personnel on board ship and on the quay) are made aware of the operation.

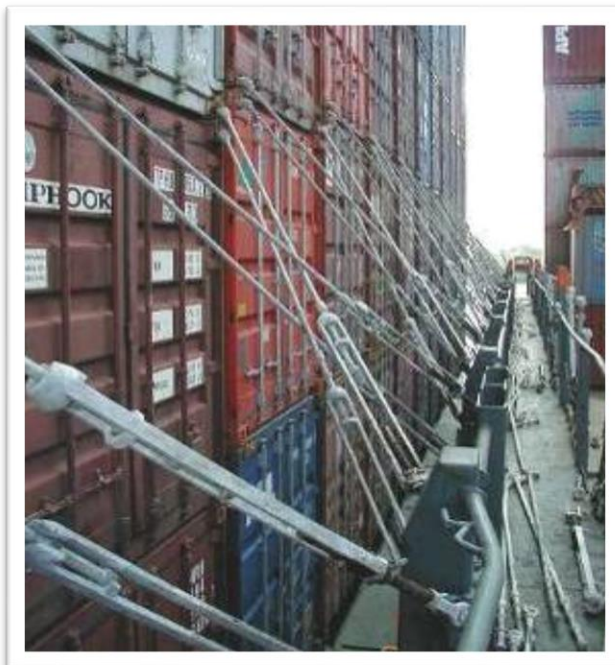
25. LASHING OF CONTAINERS STOWED IN 45' BAYS

- 25.1. Some container vessels have been designed to accommodate containers that are 45' in length. However, both two 20' and single 40' containers may also be stowed in such locations, resulting in increased distance of the end of the container from any lashing gantry. This results in exacerbated risk of manual handling injury due to the greater outreach

required to locate/remove lashing bars, or through handling of horizontal lashings between the lashing gantry and the container corner castings. These aspects should be addressed by risk assessment and fitness for work and systems of work developed accordingly to mitigate the risks so far as is reasonably practicable.



Horizontal lashing bar



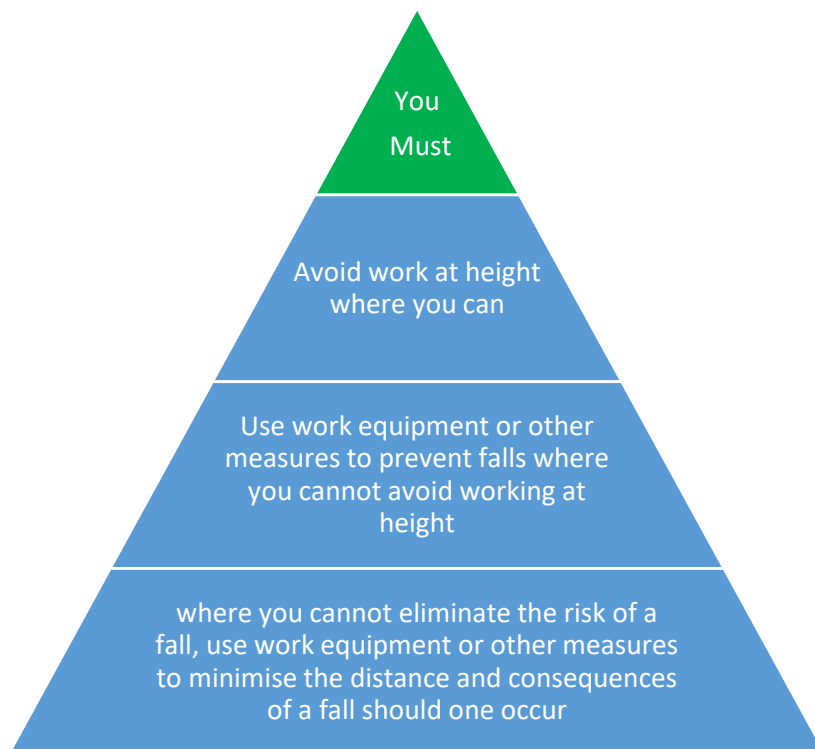
Lashing of 40' containers in 45' bay

26. WORK AT HEIGHT HIERARCHY OF CONTROLS

- 26.1. Comprehensive guidance on reducing risks from work at height, the hierarchy of controls and the use of personal protective equipment such as work restraint systems (fall arrest, fall

prevention or work positioning systems) can be found on the HSE website at: www.hse.gov.uk/toolbox/height and in the brief guide to the Regulations www.hse.gov.uk/pubns/indg401, also refer to ACOP Safety in Docks (L148).

- 26.2. The Regulations set out a simple hierarchy for managing and selecting equipment for work at height and for determining how to work at height safely. The hierarchy has to be followed systematically and only when one level is not reasonably practicable may the next level be considered. It is not acceptable to select work equipment from lower down the hierarchy (e.g. personal fall arrest, such as harnesses and lanyards) in the first instance.



- 26.3. Duty holders must:

- avoid work at height where they can
- use work equipment or other measures to prevent falls where they cannot avoid working at height
- where they cannot eliminate the risk of a fall, use work equipment or other measures to minimise the distance and consequences of a fall should one occur
- devise a suitable rescue plan

- 26.4. Give consideration to minimise the amount of exposure time and the number of people exposed to work at height.

- 26.5. **Planning:** discussions with customers and ships' agents at the early planning stage can often reduce or eliminate the risks from working at height. Consideration should be given to the type, shape and size of vessel, the configuration of cargo stows at point of loading, splicing cargo to eliminate gaps at the end of stows.



27. The ship should be loaded or discharged in such a manner to reduce the risk of falls to the lowest level reasonably practicable. It should be borne in mind that the height and configuration of the cargo stow is constantly changing and therefore so is the risk. When loading, consideration should be given to aid safe discharge at the next port.

28. USE OF WORK EQUIPMENT FOR WORK AT HEIGHT

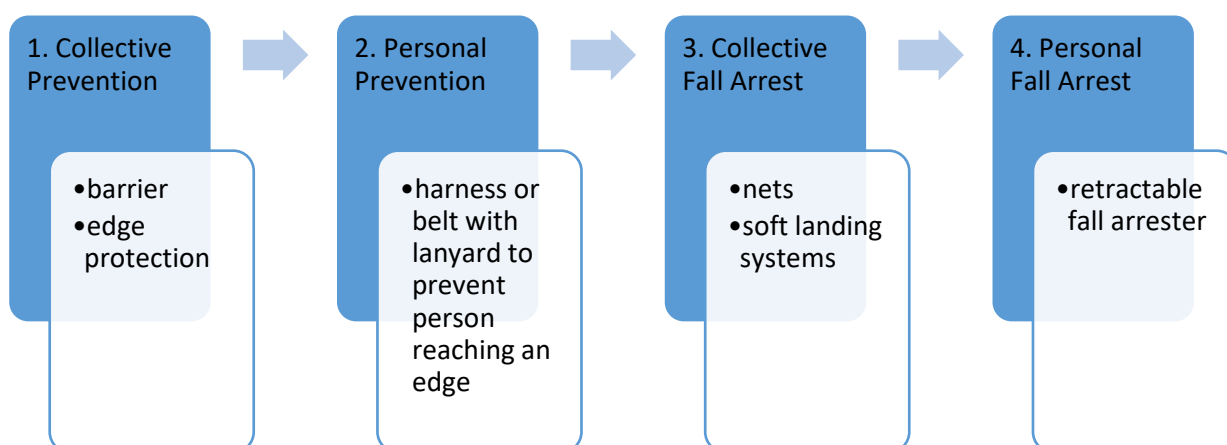
28.1. Where work at height cannot be avoided, for example stows for load or discharge with one or multiple sheer drops, the next level in the hierarchy of controls is use of work equipment or other measures to prevent falls. The risks associated with working at height must be assessed and:

- fall prevention should be applied in preference to fall arrest
- collective control measures such as physical barriers or other types of edge protection should be used in preference to personal control measures

28.2. Where collective prevention is not reasonably practicable, consider personal methods of preventing falls, such as a harness or belt in conjunction with lanyard of fixed or adjustable length, which prevent a person from reaching an unprotected edge.

28.3. If access to the edge cannot be prevented then fall **arrest** systems must be considered, with priority given to collective measures such as soft landing systems and nets before retractable personal fall arresters.

28.4. Order of consideration when using work equipment or other measures to prevent falls where work at height cannot be avoided:



28.5. All fall prevention/arrest systems and equipment should be adequately maintained in line with the manufacturer’s recommendations and inspected before use, including soft landing systems.



- 28.6. Users of personal fall prevention/arrest systems and equipment require higher levels of training and appropriate close supervision. Refer to HSE and manufacturers' guidance on selecting, using and maintaining personal fall protection equipment to ensure that the right type of fall protection equipment is used.

29. *COLLECTIVE FALL ARREST MEASURES*

- 29.1. Where it has been necessary to provide fall arrest measures priority should be given to collective methods, such as nets/soft landing bags, over personal arrest methods. It may be appropriate to leave these measures in place to assist the safe discharge of the cargo at the discharge port. Where you are the discharge port then the documentation for the fall arrest equipment should be checked and an appropriate examination of its condition and anchorage points should be undertaken by a competent person before discharge commences.

30. *PERSONAL FALL ARREST SYSTEMS*

- 30.1. Many retractable type fall arresters are only designed to work in the vertical plane, where the anchor point is directly above the user. Any force on the fall arrester then acts in a direct vertical line between the user and the anchor point.
- 30.2. If a vertical plane device is used in a plane other than vertical there is a risk of:
- the braking mechanism not working
 - the anchor line passing over an angular or sharp edge that could cause the line to part (break)
- 30.3. Where there is a risk of a fall arrest line parting as result of a fall over an edge, additional controls must be considered, for example protecting the edges and lines themselves.
- 30.4. Some retractable type fall arresters may be suitable for use in non-vertical planes (where the anchor point is not directly above the user). It is the responsibility of the duty-holder to ensure that the equipment is suitable for use. In case of doubt the manufacturer should be consulted.
- 30.5. Fall arrest blocks **do not** act as a safe means of restraint and will not prevent a fall over an edge unless they are at their full extension. If using this technique, careful consideration should be given to the dimensions of the workplace so that a fall cannot occur. Remember that in the hierarchy of controls means of fall prevention, such as a fixed and suitable length lanyard to prevent a fall, are preferred over fall arrest.
- 30.6. Other hazards and risks apply to the use of anchor line and harnesses in association with fall arrest systems including:



- hitting the ground in the event of a fall if the lanyard is too long for the height being worked.
- swinging from side to side after a fall (sometimes known as the pendulum effect); hitting the side of an object or lifting equipment causing impact injuries. The longer the length of the fully extended anchor line, the greater the risk of the pendulum effect occurring.
- injury may be sustained through an incorrectly fitted and adjusted harness.
- being left suspended in mid-air following a fall can affect blood circulation and can be fatal. For more information, please visit: www.HSE.gov.uk/firstaid/whats-new/harness.

30.7. A suitable onsite rescue plan covering emergency measures must be in place to ensure a prompt response to a fall situation. The plan should not solely rely on the Emergency services. Ensure that those involved in the rescue are not put at risk. See also SIP016 Emergency Planning in Ports.

31. *SAFE BY POSITION*

31.1. The Work at Height Regulations do not set a minimum safe distance from an open edge where there is a risk of persons falling.

31.2. Systems of work where an employee is simply instructed to stay away from an edge sit at the bottom of the hierarchy of controls. This should only be considered where there is a foreseeable risk of a person falling from height and if other control measures are not reasonably practicable, in such cases further measures such as additional supervisory control, instruction and training may be required. If employing this method of control, you must be able to robustly demonstrate that the risk has been fully assessed and that the implementation of no other method of control further up the hierarchy is reasonably practicable or necessary.

31.3. If you are using 'safe by position' as part of your system of work, you should consider:

- the distance that work will be carried out from the open edge
- limiting the duration of exposure
- limiting the number of people being exposed
- environmental conditions, such as wind, ice, fog, etc.
- nature of the work, e.g. uneven cargo stowage
- increasing the level of supervision
- human factors

31.4. Human factors research has found that people cannot concentrate on any task for 100% of the time and that during those lapses in concentration they can inadvertently encroach too close to an open edge with the risk of falling.

- 31.5. All personnel involved in working at height are required to be competent. This means that they need to have the necessary knowledge, skills and experience to do the work. This should include adequate instruction and training in how to work safely at height and in the selection and use of appropriate control measures. Training should be a combination of theoretical and on the job training.

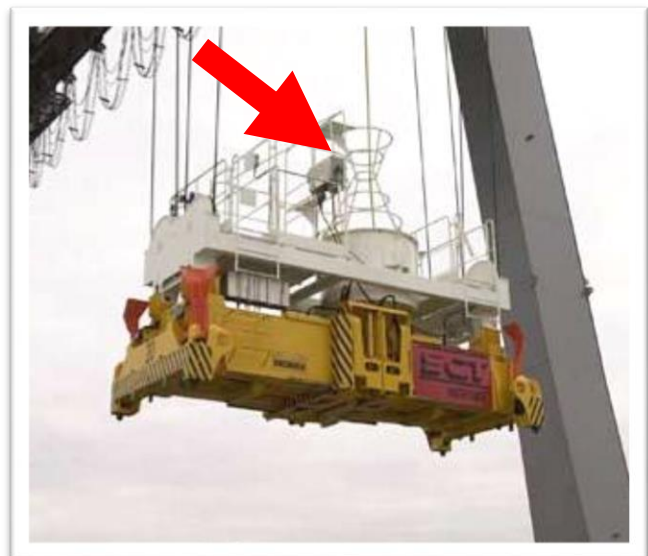
32. PERSONNEL CARRYING CAGES AS MEANS OF ACCESS

- 32.1. The risk of personnel falling from height should be eliminated where practicable. If there is no other suitable safe means of access, consideration should be given, (subject to a suitable and sufficient risk assessment and in accordance with the Work at Height Regulations) to the provision and use of alternative access arrangements. Access arrangements may include the use of:

- a personnel carrying cage suspended from the crane spreader above the container stow
- a gondola suspended from one end of the crane spreader passing between the container stows
- a personnel carrying basket fitted to the container crane head block



Gondola



Head block personnel carrying basket

- 32.2. Personnel carrying cages, gondolas and baskets must be suitably rated and secured in accordance with the requirements of Lifting Operations and Lifting Equipment Regulations. Where personnel carrying cages or gondolas are employed a full assessment for their use should be conducted, considerations include (but not limited to):

- use of suitably rated secondary securing chains/mechanisms and attachment points to the crane
- supervision of those within the personnel carrying cage / gondola



- communications between those in the personnel carrying cage / gondola
- communication between the personnel carrying cage / gondola and the crane driver
- the use of mesh to reduce the potential of entrapment or fall from access equipment
- the use of fall restraint to prevent a fall from access equipment

32.3. Personnel working on board ships may be presented with situations where access via a personnel carrying cage or gondola is not possible. Where these situations do arise the risks associated with working at heights must be suitably risk assessed. Examples of control measures available to mitigate the risks associated with working at heights may include the use of safety harnesses in conjunction with fall restraint or fall arrest systems. Fall restraint is preferred. Where fall arrest is used, ensure that there is sufficient clearance for the deployment of the fall arrest equipment and the suspended person. Where these controls are employed consideration should be given to the rescue of a person who may fall and become suspended from the securing point.

33. *DANGEROUS GOODS*

- 33.1. The requirements of the Dangerous Goods in Harbour Areas Regulations (DGHAR), the International Maritime Dangerous Goods Code, and other relevant legislation, which may apply to the transport, storage or handling of the cargo, must be taken into account.
- 33.2. For certain cargoes it will be necessary to have specifically trained personnel available to advise on the safe systems of work to follow. Examples of these include Explosive Security Officers, Radiation Protection Advisor/Supervisors and Dangerous Goods Safety Advisors.

34. *INFORMATION, INSTRUCTION, TRAINING AND SUPERVISION*

- 34.1. All persons engaged in work must be trained and assessed as competent for the role that they are required to perform by a competent person. These persons must have their fitness for work assessed against the requirements for each task being performed and consideration should be given to the requirement for a drug and alcohol monitoring system to be in place.
- 34.2. All persons involved in container operations must: be provided with adequate information, instruction, training and supervision. This is particularly important where Non-permanent employees (NPEs) are utilised who may be generally competent but have limited experience of the particular lifting operation or type of cargo to be handled.
- 34.3. All persons involved in port working must know who is in control of the operation. This is particularly important where NPEs are working alongside permanent employees.
- 34.4. The banksman is a crucial role within any lifting and slinging operation, it is important that they are trained, knowledgeable, have a thorough understanding of the task and activity to be deemed competent. The banksman should not be engaged in any other activities during any part of the lifting operations.



- 34.5. Supervisors should be trained, competent and experienced in the areas of work that they are supervising (for example safe lifting and slinging practices associated with the loads to be handled) and/or have access to relevant competent advice and assistance.
- 34.6. For routine [lifting] operations the planning of each individual lifting operation will usually be a matter for the people using the lifting equipment such as the slinger or equipment operator. The person carrying out this part of the planning exercise should have appropriate knowledge and expertise.
- 34.7. The “Load Handler” or “Slinger” should have the necessary competence to select suitable accessories. They should receive adequate information and have practical experience on the principles of:
- selection, use, care and maintenance of lifting accessories
 - limitations of use
 - methods of slinging loads
 - methods of rating multi legged slings
 - interpretation of markings on lifting accessories
 - de-rating of lifting accessories for particular weather conditions

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

- Code of Safe Working Practices for Merchant Seafarers (COSWP); www.gov.uk/government/publications/code-of-safe-working-practices-for-merchant-seafarers-coswp
- Confined Spaces Regulations 1997: www.hse.gov.uk/confinedspace
- Control of Major Accident Hazards Regulations (COMAH) 2015: www.hse.gov.uk/comah
- Control of Substances Hazardous to Health Regulations (COSHH) 2002: www.hse.gov.uk/coshh
- Dangerous Goods in Harbour Areas Regulations 2016: www.hse.gov.uk/pubns/books/l155
- Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002: www.hse.gov.uk/fireandexplosion/dsear
- Electricity at Work Regulations 1989 and guidance on electrical safety: www.hse.gov.uk/electricity
- Freight Containers (Safety Convention) Regulations 1984 (Results of HSE consultation on these regulations are pending at the time of this SiP review): www.legislation.gov.uk/uksi/1984/1890/contents/made
- Guidance On The Application Of Merchant Shipping And Fishing Vessels (Provision And Use Of Work Equipment) Regulations 2006 And The Merchant Shipping And Fishing Vessels (Lifting Operations And Lifting Equipment Regulations) 2006 To Fishing Vessels (MCA): www.gov.uk/government/publications/guidance-applying-vessel-equipment-regulations-loler-and-puwer
- Health and Safety (Safety Signs and Signals) Regulations 1996: www.hse.gov.uk/pubns/books/l64
- Health and Safety at Work etc. Act (HSWA) 1974: www.hse.gov.uk/legislation/hswa
- HSE Docks Information sheet - DIS 1: Freeing of Jammed Containers and Container Fittings on Ships: www.hse.gov.uk/ports/publications
- HSE Docks Information sheet no 6 – Hot Work in Docks: www.hse.gov.uk/pubns/dis6
- HSE guidance on Handling Containers with Slewing Cranes: www.hse.gov.uk/foi/internalops/sims/cactus/5_05_09

- HSE SIM 05/2008/05 – Container Top Safety Frames:
www.hse.gov.uk/foi/internalops/sims/cactus/5_08_05
- HSE Whole Body Vibration in Ports Information Paper:
www.hse.gov.uk/vibration/wbv/ports
- HSE Whole Body Vibration in Ports Information Paper:
www.hse.gov.uk/vibration/wbv/ports
- 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
- International Maritime Dangerous Goods Code (IMDG):
www.imo.org/en/Publications/IMDGCode/Pages/Default.aspx
- Lifting Equipment at Work: www.hse.gov.uk/pubns/indg290
- Lifting Operations and Lifting Equipment Regulations (LOLER) 1998:
www.hse.gov.uk/work-equipment-machinery/loler
- Load Security HSE web page: www.hse.gov.uk/logistics/load-security
- Management of Health and Safety at Work Regulations 1999:
www.hse.gov.uk/managing
- Managing Health and Safety in Dockwork HS(G) 177:
www.hse.gov.uk/pubns/books/hsg177
- Maritime Coastguard Agency (MCA) MGN 533 (M) Means of access:
www.gov.uk/government/publications/mgn-533-m-means-of-access
- Maritime Coastguard Agency (MCA) Working at Sea: www.gov.uk/topic/working-sea
- Merchant Shipping (Hatches and Lifting Plant) Regulations 1988:
www.opsi.gov.uk/si/si1988/Uksi_19881639_en_1
- Merchant Shipping (Safety at Work) (non UK Ships) Regulations 1988:
www.opsi.gov.uk/si/si1988/Uksi_19882274_en_1
- Merchant Shipping and Fishing Vessel (Lifting Operations and Lifting Equipment) Regulations (LOLER) 2006: www.opsi.gov.uk/si/si2006/20062184
- Musculoskeletal disorders (MSDs): www.hse.gov.uk/msd
- Musculoskeletal disorders (MSDs) in the ports and docks industry:
www.hse.gov.uk/ports/msd
- Noise at Work: www.hse.gov.uk/noise/
- Personal Protective Equipment: www.hse.gov.uk/toolbox/ppe
- Port Marine Safety Code (PMSC):
www.gov.uk/government/uploads/system/uploads/attachment_data/file/564723/port-marine-safety-code
- Ports web pages: www.hse.gov.uk/ports
- Provision and Use of Work Equipment Regulations (PUWER) 1998:
www.hse.gov.uk/work-equipment-machinery/puwer

- Safety in Docks ACOP L148: www.hse.gov.uk/pubns/books/l148
- Vibration at Work: www.hse.gov.uk/vibration/
- Work at Height Regulations 2005: www.hse.gov.uk/work-at-height



Raising Standards in UK Ports

FURTHER INFORMATION

For further information, please contact:

Port Skills and Safety Limited, First Floor, 30 Park Street, London SE1 9EQ

Tel: 020 7260 1790 Email: info@portskillsandsafety.co.uk

www.PortSkillsandSafety.co.uk