

# SIP010 - GUIDANCE ON RO-RO AND STO-RO OPERATIONS





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# SIP010

## GUIDANCE ON RO-RO AND STO-RO OPERATIONS

### *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 regarding 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 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. If you 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. 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 Document mainly considers the workplace transport aspects of Roll-On/Roll-Off (Ro-Ro) and Stow-On/Roll-Off (Sto-Ro) operations and does address some specific aspects of lifting and handling associated with Ro-Ro and Sto-Ro. See also ***SIP001 Port and Terminal Planning***, including trailer park and route planning/design. For lifting planning and operations in general please consult ***SIP002 General Cargo***.





## 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. Including those 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)

## 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)



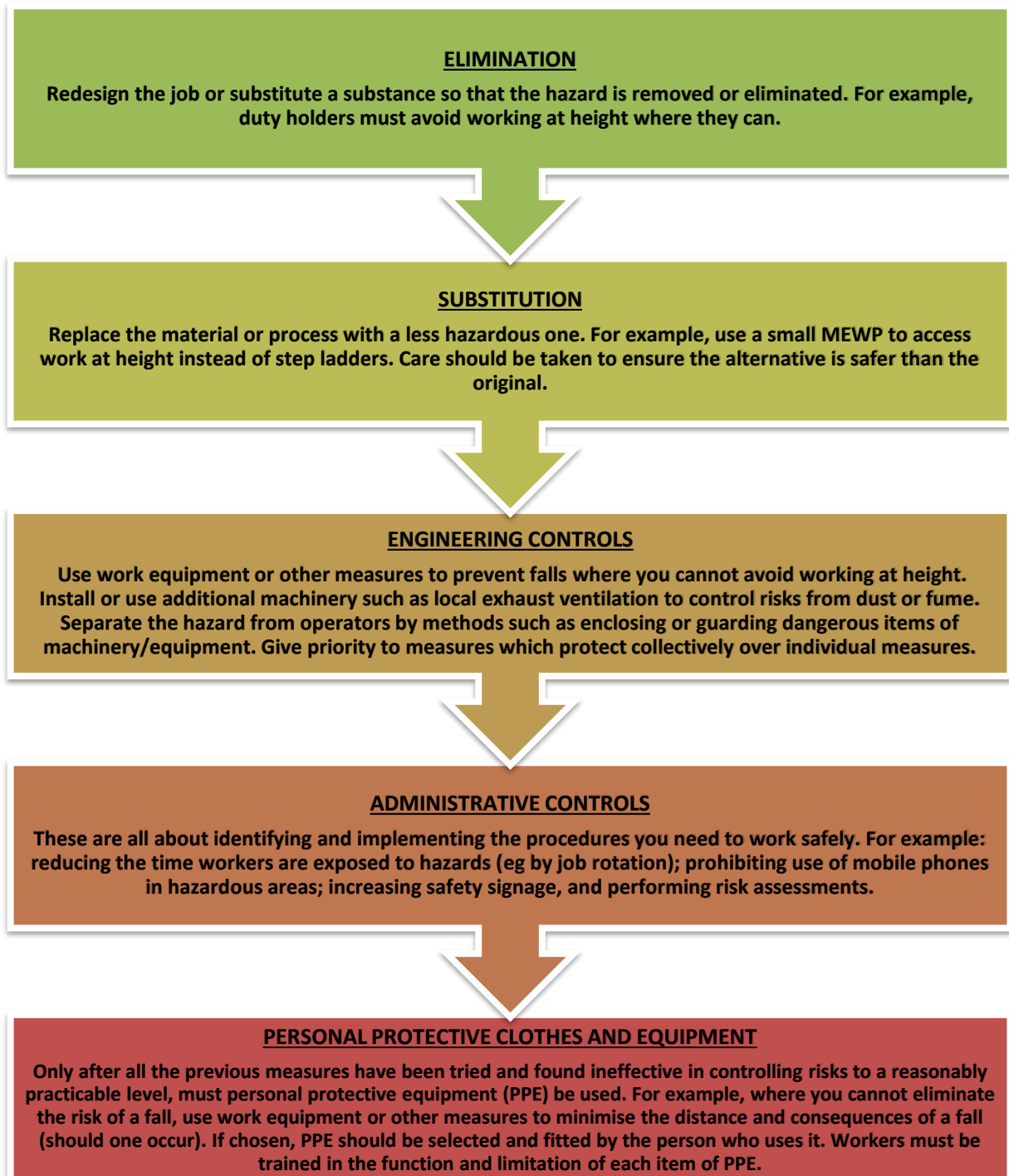
- Musculoskeletal disorders (MSDs): [www.hse.gov.uk/msd](http://www.hse.gov.uk/msd)
- Noise at Work: [www.hse.gov.uk/noise](http://www.hse.gov.uk/noise)
- Personal Protective Equipment: [www.hse.gov.uk/toolbox/ppe](http://www.hse.gov.uk/toolbox/ppe)
- Vibration at Work: [www.hse.gov.uk/vibration](http://www.hse.gov.uk/vibration)

### 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. *SLINGING AND LIFTING OPERATIONS - GENERAL*

- 5.1. 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).
- 5.2. 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
- 5.3. In the port industry accessories for lifting are sometimes referred to as 'lifting accessories' and are not to be confused with securing equipment such as twist locks. Securing equipment should not be used for lifting.
- 5.4. In Ro-Ro and Sto-Ro operations examples of lifting equipment include but are not limited to; vehicle lifts, side port cargo lifts, hanging car decks and ramps.
- 5.5. Operations which include the use of ship's lifting equipment or plant must be planned and executed safely. Duty holders should make pre-use checks concerning the safety of the plant, so far as it is within their control. Before any employer of shore workers authorises their employees to use ships lifting equipment and accessories, they should arrange for it to be checked before use and check any associated certificates of test or of thorough examination.
- 5.6. 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.pdf](http://www.hse.gov.uk/pubns/indg290.pdf) and the references at the end of this document.

## 6. *HAZARDS ASSOCIATED WITH RO-RO AND STO-RO*

- 6.1. Hazards associated with Ro-Ro and Sto-Ro operations (including on the quay, shore ramp and/or linkspan) include but are not limited to:
- 6.1.1. being struck by moving vehicles and plant
  - 6.1.2. being struck by lashings that may spring back when being applied, tightened, released or loosened
  - 6.1.3. being crushed against a fixed object such as a ship's structure or between moving vehicles (e.g. between cargo transport units)
  - 6.1.4. trapping and crushing from the lowering and lifting of cargo such as between trestles and trailers or 'Mafi' units and the deck
  - 6.1.5. slips, trips or falls while working on surfaces which may be:



- uneven (e.g. due to deck lashing points, frames or deck gratings)
- unstable or slippery (e.g. due to the presence of substances such as cargo residue, spilt oil and loose lashing gear)

6.1.6. falls from height:

- when working or passing near to unprotected edges such as lift shafts, voids, deck openings and ships internal access ladders
- due to a failure to provide and maintain a safe means of access/egress to/from and on board the ship

6.1.7. handling and storage of fuel

6.1.8. leakage of hazardous cargo

6.1.9. hazards associated with breakdowns and jump starts

6.1.10. electrical hazards related to plug in units

6.1.11. temperature

6.1.12. fatigue

6.1.13. musculoskeletal injury from the handling of trestles and lashing gear

6.1.14. noise and vibration from operating plant and equipment on board the vessel

6.1.15. fumes from vehicles operating within the vessel and generated by the vessel

6.2. In Sto-Ro operations additional hazards may include but are not limited to:

- intense movement of cargo handling equipment on the freight decks, such as forklift trucks, and container handlers
- movement of unsecured loads
- collapsed or unstable stows
- additional numbers of personnel involved in the operations
- build-up of fumes on freight decks
- potentially reduced lighting levels
- use of cargo lifts, side ports and vessel movement when working from side ports
- lifting of handling equipment (e.g. clamp truck, forklift truck) by use of cargo lifts.

## 7. *PLANNING FOR SAFE LOADING AND DISCHARGE*

7.1. Effective planning is one of the key elements of safe loading/discharge operations. Most accidents and near misses which occur could be avoided. Risks from the work should be considered and plans for safe handling 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.



- 7.2. Ro-Ro and Sto-Ro operations should be planned and executed in a way that minimises risks to those involved in the operation. Including direct employees, non-permanent employees (NPEs), ship's crew and anyone else that may be affected. While the handling of various types of cargo is to a great extent routine, unique or unusual situations with additional or specific hazards may be encountered. In these situations, an additional or more detailed risk assessment will be required.
- 7.3. Planning of these operations should include co-ordinating the interface between vehicle movements and any personnel required to be on freight decks such as lashers and ship's crew.
- 7.4. A cargo stowage plan should include a record of the positioning of any dangerous cargo. Such cargo should be segregated and stowed in accordance with the requirements of the International Maritime Dangerous Goods Code (IMDG).
- 7.5. Plans should be in place to deal with emergency situations such as rescue of personnel, leakage of hazardous cargoes and any other reasonably foreseeable event.
- 7.6. Machinery selection at the planning stage should ensure that the correct machine is procured for the job. This needs to consider, for example issues of forklift truck, tug/internal movement vehicle (4WD or 2WD) and crane lifting capacity. Requirements for driver training and assessments could also be considered at this stage.

## 8. *VESSEL ACCESS*

- 8.1. All ships must provide a safe means of access. Providing safe access to a ship is considered to be an integral part of ensuring a safe working environment on board. As required by the Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations. Refer to MGN 53 3 (M) Means of Access:  
[www.gov.uk/government/publications/mgn-533-m-means-of-access](http://www.gov.uk/government/publications/mgn-533-m-means-of-access).
- 8.2. Requirements for safe access to and on vessels are also included in ACOP Safety in docks (L148) and *SIP014 Safe Access and Egress*.
- 8.3. No persons, other than those specifically engaged in the manoeuvring of plant or vehicles, including self-drive traffic, should be allowed on the linkspan or ramp during cargo movements.
- 8.4. Any measures adopted for the control of vehicle traffic on vessel ramps or linkspans, particularly single lane linkspans, must be strictly observed.
- 8.5. Ramps used by vehicles should not also be used for pedestrian access unless there is suitable segregation of vehicles and pedestrians. This could be by providing a suitable protected walkway or by ensuring that pedestrians and vehicles do not use the ramp at the same time.
- 8.6. Linkspans, ramps and associated equipment should be safe and fit for purpose and be routinely inspected and maintained. Links to material of potential relevance include:
  - MAIB report: Ben-My-Chree:  
[www.maib.gov.uk/publications/investigation\\_reports/2010/ben\\_my\\_chree.cfm](http://www.maib.gov.uk/publications/investigation_reports/2010/ben_my_chree.cfm)



- HSE guidance on Linkspans and Walkways:  
[www.hse.gov.uk/ports/linkspans-walkways](http://www.hse.gov.uk/ports/linkspans-walkways)

8.7. Ramps should not be used at a slope greater than that for which they were designed.

8.8. It is industry general practice that no plant or other heavy vehicle should use a ramp with a slope of no more than 10%. Unless a competent person is satisfied that the vehicle can safely be moved on that ramp. If necessary, the surface of the ramp should be suitably treated to provide sufficient grip.

8.9. A system must be in place to safely manage the movement of vehicles on gradients. Paying special attention to un-braked units and taking into consideration speed, load configuration, angle and trailer weight based on tractor and equipment specifications. Where Mafi and gooseneck attachments do not offer an interlock, they should never be used on gradients.

## 9. *CARGO DECK LIFTS*

9.1. Persons on foot should be prohibited from using a ship's cargo lift, unless there is no alternative safe means of access. A suitable and sufficient risk assessment must be undertaken.

9.2. If drivers are required to stay with their vehicles on cargo lifts, then they must remain in their cab with the handbrake applied.

9.3. Edge protection should be erected around lift and ramp openings where there is a risk of persons or vehicles falling.

9.4. All lifts should be protected by gates or barriers and these should be interlocked with the lift control system. Visual and audible warning devices should be fitted and used to warn people of lift ramp and ramp lid movements.

## 10. *WORKING ON FREIGHT DECKS – PERSONNEL SAFETY*

10.1. All operatives involved in loading and discharging of Ro-Ro and Sto-Ro vessels must wear high visibility clothing, safety footwear and other items of approved personal protective clothing and equipment as identified by risk assessment.

10.2. Ro-Ro decks often have potential trip hazards. Operatives must be aware of these. They could include but are not limited to; essential deck fittings, treads, lashing points, ribs or deck gratings, lashings, chains and trip/slip hazards on the deck such as oil or water.

10.3. Noise levels on freight decks may be excessive, therefore a noise assessment should be carried out to determine noise exposure levels and appropriate control measure. Care should be taken, where personal hearing protection is used to ensure that communications, such as whistle signals and vehicle horns are not blocked out.

10.4. Operatives undertaking lashing should not take up a position adjacent to trailers that are being coupled, uncoupled or moved that might put them in a position of risk of being struck, crushed or trapped.



- 10.5. Operatives engaged in lashing and unlashng cargo on board ship should always work in pairs (buddy system) or in sight of one another.
- 10.6. During Sto-Ro operations, additional controls may be required to deal with other operatives and third parties that may also be working or accessing the operational area.
- 10.7. All operatives should have a means to stop a vehicle in an emergency or attract attention in a potential accident situation, e.g. whistles.

## 11. *VENTILATION*

- 11.1. Prior to the start of enclosed deck operations, it is essential that the ships ventilation system is operating. If in doubt, then this should be reported immediately to the Ship's Officer.
- 11.2. Operations should be organised to minimise the number of vehicles with engines running on the vessel at any one time. On car decks, engines should not be started or left running until the vehicle is ready for discharge. Attention should also be given to the use of ventilation fans on vehicle decks as fumes from vehicles can very quickly build up to levels that may be of concern.
- 11.3. When monitoring atmospheres on freight decks for noxious substances the levels indicated in EH40 Workplace exposure limits should be used when conducting COSHH assessments. A COSHH assessment should be completed for diesel engine exhaust emissions. Control of exposure is deemed adequate only if principles of good practice are applied and workplace exposure limits are not exceeded and in the case of certain identified substances exposure is reduced to as low as reasonably practicable.
  - Further guidance on Diesel Engine Exhaust Emissions is available at: [www.hse.gov.uk/pubns/indg286](http://www.hse.gov.uk/pubns/indg286)
  - HSE COSHH web pages: [www.hse.gov.uk/coshh](http://www.hse.gov.uk/coshh)

## 12. *DUST*

- 12.1. Dust can be an issue on some Ro-Ro decks. It generally consists of soiling from vehicles, rust from the ships' deck or dusty cargos. Procedures for the reduction and control of dust should include but are not limited to; Decks being damped down and swept, and vehicles being washed. COSHH assessments should be carried out where there is potential exposure to hazardous substances including dusts.
- 12.2. Exposure limits for dusts can be found in EH40 Workplace Exposure Limits.

## 13. *VEHICLE MOVEMENTS ON VESSELS*

- 13.1. A system must be in place to safely manage the movement of vehicles on freight decks and ramps. Taking into consideration factors such as: speed, restricted driver visibility, lighting, noise, availability of visual aids and warning devices, safe stowage or positioning and any other activities being carried out at the same time.

- 13.2. Where a banksman is required, they need to be:
- 13.2.1. Clearly identified to drivers (this could be at the start of the shift via toolbox talk for example or by other means such as distinctive clothing).
  - 13.2.2. Wearing appropriate high visibility clothing, such as a reflective vest.
  - 13.2.3. Visible to drivers at all times.
- 13.3. The banksman needs to stand in a safe position where they can guide manoeuvring vehicles and be visible to the driver at all times. If a driver loses sight of a banksman they should stop immediately. In some circumstances, portable radios or similar communication systems can be helpful. Although the banksman should still be visible to the driver there may be occasions where this is not possible due to trailers or ship structure. In such cases the safe system of work should ensure that they stop the vehicle, position themselves clear of the vehicle/trailer movement and away from the risk of being trapped or crushed. Before the driver is instructed to proceed, they must ensure it is safe to do so.
- 13.4. Signals for guiding drivers should be agreed and understood. Normally a loud long blast on a whistle or the hand signal below indicates emergency stop (Figure 1.) For further information, see also: Safety signs and signals. The Health and Safety (Safety Signs and Signals) Regulations HSE web page: [www.hse.gov.uk/pubns/books/l64](http://www.hse.gov.uk/pubns/books/l64).



Figure 1. Emergency Stop Signal

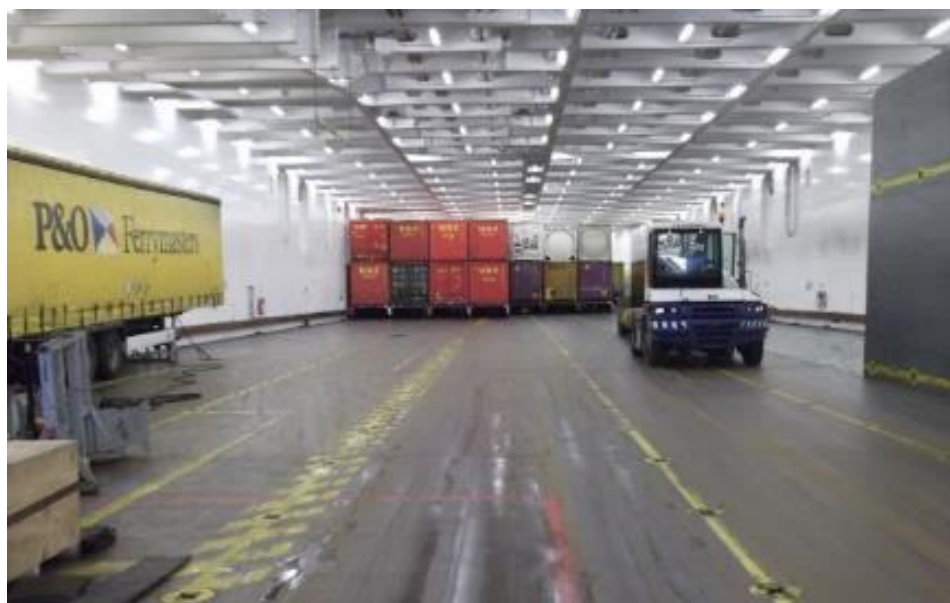
## 14. *USE OF CASSETTES AND TRANS-LIFTERS*

- 14.1. Cassettes are a type of trailer designed for use with a tractor unit and trans-lifter. They can be used to transport any type of cargo but are often used to transport containers and tanks, frequently double stacked (two containers double stacked and locked together). Their main purpose is to be able to be stacked (two containers double stacked and locked together) and maximise the payload on board Ro-Ro vessels.





- 14.2. Cassettes can be blocked stowed across the deck of a vessel and because of their stability do not always require any securing (this would be determined in conjunction with the vessel Master and the vessel specific securing requirements).



- 14.3. If accessing decks via ships ramps, then as with Roll trailers they would generally be pushed up ramps and pulled down. However, weather deck stowage may require some empty double stack containers to be pulled up in order to get into position. This should be considered as part of the risk assessment.
- 14.4. If transporting double stacked containers or tanks, then it is important to ensure that the greater weight is on the bottom to ensure stability. Trans-lifters should be high enough to avoid bottoming out on ramps but low enough to ensure stability. Routes to storage areas should be designed to reduce sharp turning and take into account any adverse camber and be free from overhead obstructions. Speed should always be reduced during cornering to avoid roll over (also see section on double stack containers below).



- 14.5. Hazards associated with the use of cassettes & Translifters include but are not limited to:
- Length of unit and turning circle
  - Height restrictions on vessels
  - Turnover due to inappropriate speed
  - Poor stability and weight distribution (top heavy)
  - Poor visibility when pushing
  - Bottoming out when coming off steep ramps
  - Failure to centralise causing the trans-lifter to crab
  - Poor ground conditions

- Additional hazards when transporting double stack container & tanks
- Adverse weather conditions

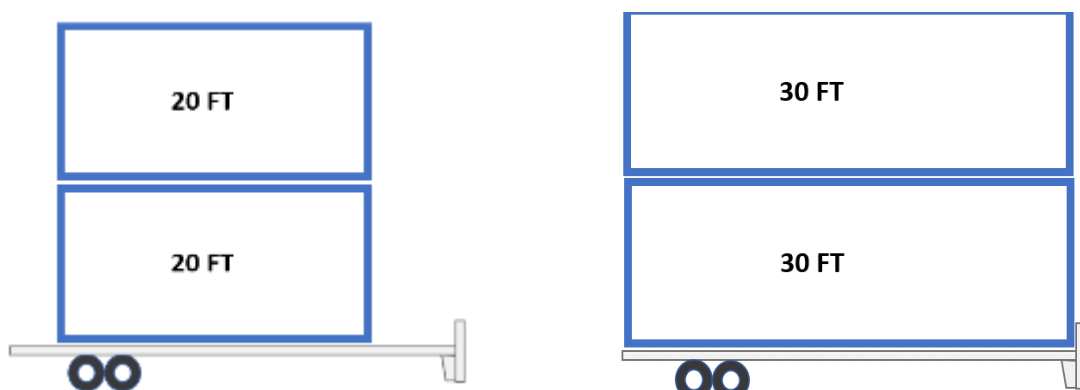
## 15. *DOUBLE STACK CONTAINERS*

15.1. Double stack container operations may be conducted at some terminals and over speeding appears to be a factor in many overturning incidents. Control measures should be put in place to ensure these operations are safely managed, the controls include but are not limited to:

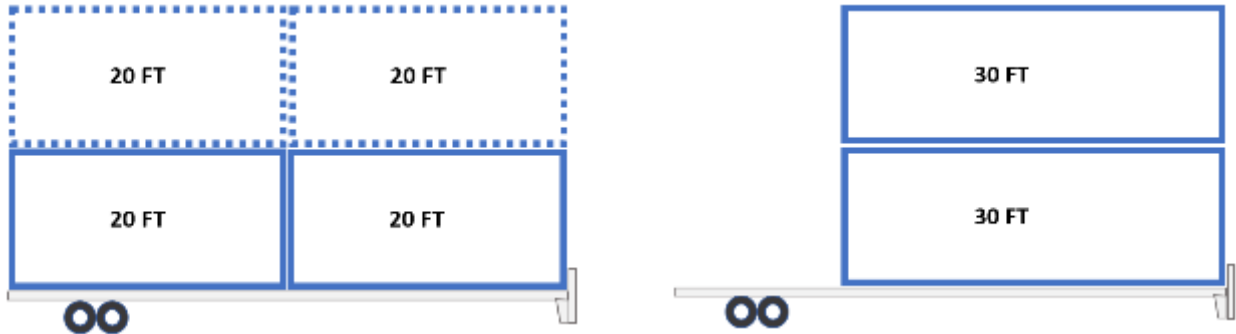
- Routes should be planned and communicated in advance, taking into consideration height restrictions and other features such as tight turning and road camber
- Speed limits should be determined by risk assessment taking into consideration the equipment manufacturer’s guidelines and are suitably enforced.
- All container weights should be gross container weight
- Mafi’s/ cassettes should not be loaded above the SWL
- The top container must not be heavier than the bottom container
- Risk assessments will determine the configuration of containers loaded on Mafi’s/ Cassettes for examples see section below
- Due to the extra height, caution is needed when driving on Ro/ Ro bridges and vessels to ensure that there is headroom available
- Twistlocks must be locked prior to movement

15.2. Examples of double stack containers configuration (list for illustrative purposes only and is non exhaustive).

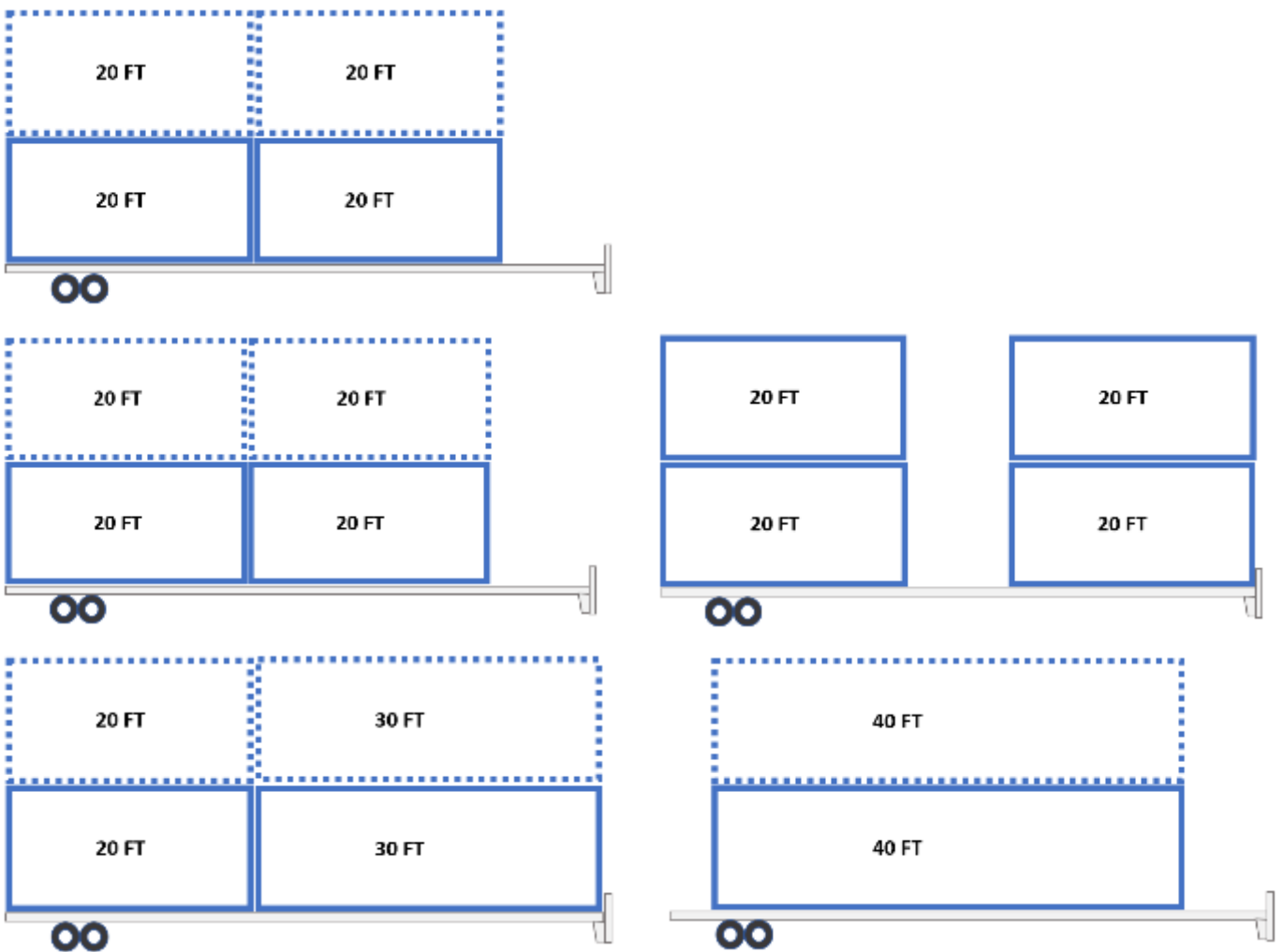
### 15.2.1. Double Axle Loading Scheme for 30 Feet Trailer



15.2.2. Double Axle Loading Scheme for 40 Feet Trailer



15.2.3. Double Axle Loading Scheme for 50 Feet Trailer





## 16. *HANDLING TRESTLES AND LASHING EQUIPMENT*

- 16.1. The handling of trestles on both vessels and landside operations, as well as the use of lashing equipment present several manual handling and trapping issues and therefore a specific risk assessment may be required for these parts of the operation.
- 16.2. Considerations when developing safe systems for handling trestles and lashing operations include but are not limited to:
  - 16.2.1. the requirements of the ship's cargo securing manual.
  - 16.2.2. all cargo should be secured in accordance with the ship's cargo securing manual and agreed with the ship's Master.
  - 16.2.3. the condition, weight and size of trestles.
  - 16.2.4. when moving trestles consider the deck obstructions, lashing equipment, space restrictions.
  - 16.2.5. when positioning and removing trestles under trailers consider trapping of hands and feet, ensure communication with driver to avoid entrapment.
  - 16.2.6. the release of air on trailer suspension systems.
  - 16.2.7. use of suitable lashing points on the ships freight deck and CTU's.
  - 16.2.8. type of lashing equipment in use, use of hand tools and use of compressed air equipment.
  - 16.2.9. applying and releasing lashings.
  - 16.2.10. lashing and unlashings of Sto-Ro cargoes, including use of nets, access and egress to lashing points on the ship.
  - 16.2.11. movement of vehicles and cargo near where lashing/unlashing is undertaken.
  - 16.2.12. procedure for lashing/unlashing cargo on inclines, including the use of wheel chocks, internal movement vehicle and unit brakes and co-ordinated release/application of lashings.
  - 16.2.13. double stacked containers including safe access and work at height.
  - 16.2.14. stowage of units on freight decks including matters such as the number of lashings, use of wheel chocks, use of unit park brakes if fitted, stowage position on board particularly if containing dangerous goods, and the type of unit, should be in line with the vessels cargo securing manual and operators risk assessments and if appropriate, the provisions of the IMDG Code.
- 16.3. A system must be in place to manage faulty or defective equipment. In the event that defective equipment is found during work, operatives should report this, and the equipment be removed from use until it has been repaired.
- 16.4. Additional advice on securing vehicles can be found at:
  - MAIB investigation report on Ro-Ro Cargo Ferry 'Stena Voyager' incident:  
[www.maib.gov.uk/publications/investigation\\_reports/2009/stena\\_voyager.cfm](http://www.maib.gov.uk/publications/investigation_reports/2009/stena_voyager.cfm).

- MCA guidance on securing of vehicles - the MGN produced following the ‘Stena Voyager’ incident. MGN 418 Roll-on/roll-off ships stowage and securing of vehicles: [www.gov.uk/government/publications/mgn-418-roll-onroll-off-ships-stowage-and-securing-of-vehicles](http://www.gov.uk/government/publications/mgn-418-roll-onroll-off-ships-stowage-and-securing-of-vehicles)
- MGN 341 Ro-ro ships' vehicle decks: accidents and access: [www.gov.uk/government/publications/mgn-341-ro-ro-ships-vehicle-decks-accidents-and-access](http://www.gov.uk/government/publications/mgn-341-ro-ro-ships-vehicle-decks-accidents-and-access)
- IMO guidance on: “Code of Safe Practice for Cargo Stowage and Securing” (CSS Code).

## 17. SEMI-AUTOMATIC LOCKING TRESTLES

- 17.1. There are two main types of Semi-Automatic locking Trestles (SAT’s) in use, ones that sit on top of the deck and those that have twist locks that lock into the deck of the vessel.
- 17.2. Both types of SAT lock onto the fifth wheel pin of the trailer and have a fifth wheel pin of their own which then locks into the Ro-Ro tractor allowing both trestle and trailer to be moved around together.
- 17.3. This type of trestle helps to remove some of the hazards associated with somebody having to locate/position traditional trestles underneath trailers when they have been drawn into position and many of the manual handling issues associated with traditional trestles.



Figure 2. A traditional trestle being positioned

Connector which locks/unlocks the trestle into the deck



Figure 3. A SAT in place

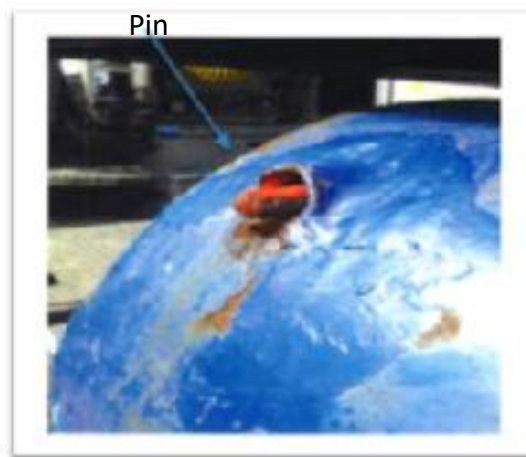
17.4. The use of SAT's does however introduce some additional hazards which need to be taken into consideration:

- Reduces the gap between trailers, increasing the potential risk of crushing
- The need for someone to go down the side of the Ro-Ro tractor to put on the Connector – increasing the human/machine interface.

17.5. When picking up a trestle with a SAT:

- ensure you have the right type of Ro-Ro tractor
- complete a surge check to ensure you are fully locked on

17.6. Several types of SAT, when connected correctly, the pin on the side pops out as in the photo below:



17.7. When picking up/dropping of trailers on the vessel, when using SAT with locking twistlocks, before attaching the connector to the trestle the Ro-Ro tractor should be in position with the air-lines connected and the park brake on.



Figure 4. The picture above shows the connector being fitted to the SAT

17.8. Other variations of SATs are available and manufacturers guidelines should be followed.

- 17.9. In order to reduce the number of people being exposed to potential crush, struck and trapping injuries from inadvertent movement of the Ro-Ro tractor when the connector is being attached/detached this operation is often carried out by the Ro-Ro tractor operative.
- 17.10. A suitable storage area for SATs, which prevent them from being knocked over when being picked-up should be provided. Drivers should not attempt to connect to free standing SATs as they are likely to fall over. They should be safely positioned in the storage location before being picked up.



Figure 5. The pictures above show a purpose-built SAT storage area

## 18. COUPLING /UNCOUPLING TRAILER PARKING

- 18.1. The cargo handler should undertake a comprehensive assessment of the risks of the activity to ensure that adequate control measures are in place. Where fitted, trailer parking brakes must be used unless there are circumstances where the application of the brake may increase the risk of injury to dock staff and collecting/delivering drivers. If the parking brakes are not applied, collecting drivers should be informed of this. Key points to consider in coupling/ uncoupling operations include but are not limited to:
- design of trailer park (layout, surface condition, gradient, size of bays, backstops)



- instructions to workers and visiting drivers
- control of pedestrians
- general site rules

See also:

- **SIP001 – Port and Terminal Planning**
- HSE guidance on coupling and uncoupling:  
[www.hse.gov.uk/workplacetransport/information/coupling](http://www.hse.gov.uk/workplacetransport/information/coupling).

## 19. HYDRAULIC GOOSE NECK TRAILERS



- 19.1. Equipment commonly supplied on-board Ro-Ro vessels include trailers for the transport of containers, Roll Trailers with an integral hydraulic gooseneck.

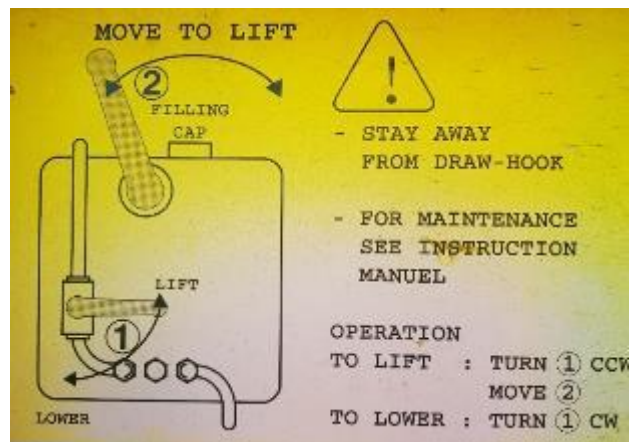


Figure 6. Example of typical equipment used



- 19.2. The main additional risk associated with the hydraulic equipment is entrapment in the hydraulic mechanism and employees operating such equipment should be trained in their use. Controls include but are not limited to:
- When operating the hydraulic gooseneck, ensure that only the person operating the hydraulic system is stood in close proximity to the gooseneck.
  - Ensure the person operating the hydraulic system keeps clear of the mechanism while operating.
  - When working in Ro-Ro decks, ensure that all vehicle drivers in the proximity have been instructed to stop, and that they are made aware that lashing personnel are working in front of the trailer.
  - When lowering the gooseneck, gradually open the hydraulic valve to slowly lower the gooseneck while under control.
- 19.3. **Skeletal Trailers with separate rubber feet** - When positioning the rubber feet for parking or stowing this type of trailer, it is important that the feet are placed correctly to ensure the trailer remains stable. These types of trailers require firm and level surfaces for parking.

## 20. MISCELLANEOUS CARGO

- 20.1. In addition to CTU's, Ro-Ro vessels may carry any type of cargo on wheels or tracks capable of being rolled on or off the ship. In addition, Sto-Ro ships may carry any cargo that can be carried onto the ship on a Mafi/trailer and then loaded to the ships deck (for example casework and steel). The loading and unloading of this type of cargo when handled should be included in the operator's risk assessments and all personnel involved in the operation should be conversant with the safe system of work.
- 20.2. When transporting empty trailers that have been stacked together, they must be made safe. This may require but is not limited to:
- locking
  - lashing
  - stanchions
- 20.3. The loading and unloading of mobile plant which is cargo often requires terminal operatives to drive the equipment on/off the vessel. It is impossible for a terminal handling this type of equipment to have operators fully trained in operating all these different types and pieces of equipment. However, operatives required to load/unload this equipment from the ship must be familiar with the equipment concerned and be able to safely move the equipment on/off the ship's ramp and freight decks. Such familiarisation should be documented.
- 20.4. Mobile plant, which is cargo required to be driven on/off the vessel by port operatives should be parked and stored in a safe and secure area. This area should not obstruct traffic or pedestrians' routes.



- 20.5. When such equipment is being moved or stowed on board the vessel, personnel should be kept well clear of the operation until it is safely positioned/stowed, turned off and ready to be secured.
- 20.6. A safe procedure for dealing with non-starters and breakdowns should be adopted and agreed with the ship's Master. This should include but is not limited to:
- safe arrangements for refuelling vehicles, particularly on freight decks or in ships' holds. For example, petroleum or liquefied petroleum gas (LPG) powered vehicles should be refuelled in a safe well-ventilated area and not in a confined space.
  - towing operations
  - punctures and wheel changes
  - jump starting/safe use of batteries. See HSE Guidance on Using electric storage batteries safely (INDG 139) [www.hse.gov.uk/pubns/indg139.pdf](http://www.hse.gov.uk/pubns/indg139.pdf)
- 20.7. Consideration should be given to tracked units having difficulty manoeuvring and securing on the ships decks due to the steel on steel with tracks and ships ramps/freight decks. Rubber mats for stowage and old mooring ropes for driving on are often employed to reduce this risk.
- 20.8. With Sto-Ro general cargo (for example casework and steel). Consideration should be given but is not limited to:
- how the load can be safely (un)secured
  - type of equipment to be used
  - the condition and security of the load when moving on Mafi/trailer
  - how material will be safely handled and (un)stowed on freight decks
- 20.9. For some items of mobile plant & equipment additional expert mechanical assistance and risk assessment may be required in the event of breakdowns.

## 21. *TRADE CARS FOR IMPORT/EXPORT*

- 21.1. Cars, vans and trucks whether carried on pure car carriers (PCC), pure car and truck carriers (PCTC) or on conventional Ro-Ro's should be the subject of a suitable & sufficient risk assessment and where possible segregated from and handled in isolation from, all other cargo to ensure the operation is safe.
- 21.2. Due consideration must be given to the need for potentially large numbers of drivers walking to and from vehicles on the vehicle decks. Operators must also ensure the safe movement of drivers between both the ship and storage areas by controlling the speed of vehicles, both on the vessel and when driving to and from vehicle compounds within the port/terminal area.
- 21.3. Operators should also consider how vehicles are safely stowed on the ship or broken out during discharge.



- 21.4. Consideration must also be given to the securing and un-securing of vehicles and the need for significant manual handling involved in this operation. In many cases the securing or un-securing is undertaken by the ship's crew. Where this takes place a clear understanding of responsibilities of each party should be established and if possible documented.
- 21.5. A safe procedure for dealing with non-starters and breakdowns should be adopted. See also section on Miscellaneous cargo within this guidance.

## 22. *DANGEROUS GOODS*

- 22.1. The requirements of the Dangerous Goods in Harbour Areas Regulations (DGHAR), the International Maritime Dangerous Goods Code, International Maritime Dangerous Goods Code (IMDG), and other relevant legislation which may apply to the transport, storage or handling of the cargo, must be taken into account.
- 22.2. All dangerous goods should be labelled, handled, stowed and segregated in line with the requirements set out in the IMDG code.
- 22.3. Procedures should be in place for dealing with spillages/leaking of dangerous goods and all such incidents should be reported and recorded as required.
- 22.4. 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.
- 22.5. All personnel involved in the handling of dangerous goods should receive training appropriate to their role in the transport chain, in line with the requirements of the IMDG Code.

## 23. *SECURING FOR STO- RO LOAD/DISCHARGE*

- 23.1. Where cargo is moved from the loading position to a safe area nearby in the dock to be adequately secured, the control measures necessary to ensure the safety of workers and other affected parties in the vicinity should be identified through risk assessment.
- 23.2. All parties involved in the loading of vehicles should co-operate to ensure that the load is safe to be moved from the loading position.
- 23.3. It is important to differentiate between the two stages of a journey:
- 23.3.1. the initial transfer of a load (i.e. from the loading/unloading position to a safe area nearby for proper securing); and
  - 23.3.2. the onward journey from that safe area (e.g. a road journey for delivery or to storage).



- 23.4. No matter how short a journey to/from the quayside, the load must be appropriately secure. However, it is recognised that there is a risk associated with personnel having to strap loads and apply twistlocks in cargo handling areas. The extent to which the load needs to be secured for the initial transfer stage along with other control measures required should be determined through an assessment of the risks.
- 23.5. Factors to consider when identifying the extent to which the load needs to be secured for the initial transfer include but are not limited to:
- type of load (e.g. bulk, bundled)
  - stability of load
  - method of stacking
  - type of vehicle
  - length of journey
  - road surface
  - vehicle speed
  - weather conditions
- 23.6. Control measures may include but are not limited to:
- containment of the load using stanchions, chocks, or blocks
  - controlling pedestrian access to the vicinity
- 23.7. All parties involved in the loading and unloading of vehicles should co-operate to ensure that foreseeable risks are identified, and appropriate control measures are identified and used.
- 23.8. For the onward journey the load should be properly secured to the lorry or trailer.

## 24. *INFORMATION, INSTRUCTION, TRAINING AND SUPERVISION*

- 24.1. 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.
- 24.2. All persons involved in operations must be provided with adequate information, instruction, training and supervision. All persons involved in operations must know who is in control of the operation. This is particularly important where Non-permanent employees (NPEs) are utilised who may be generally competent but have limited experience of the particular operation, vessel or equipment.
- 24.3. Supervisors should be trained, competent and experienced in the areas of work that they are supervising and/or have access to relevant competent advice and assistance.
- 24.4. Industry Best practice is that persons must have their fitness for work assessed against the requirements for the task being performed.

Consideration should be given to the requirement for a drug and alcohol monitoring system to be in place.



## *RELEVANT LEGISLATION AND GUIDANCE*

Relevant legislation and guidance include 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).

- Code of Safe Working Practices for Merchant Seafarers (COSWP): [www.gov.uk/government/publications/code-of-safe-working-practices-for-merchant-seafarers](http://www.gov.uk/government/publications/code-of-safe-working-practices-for-merchant-seafarers)
- Confined Spaces Regulations 1997: [www.hse.gov.uk/confinedspace](http://www.hse.gov.uk/confinedspace)
- Control of Major Accident Hazards Regulations (COMAH) 2015: [www.hse.gov.uk/comah](http://www.hse.gov.uk/comah)
- Control of Substances Hazardous to Health Regulations (COSHH) 2002: [www.hse.gov.uk/coshh](http://www.hse.gov.uk/coshh)
- Control of Vibration at Work Regulations 2005: [www.hse.gov.uk/vibration/wbv/regulations](http://www.hse.gov.uk/vibration/wbv/regulations).
- Dangerous Goods in Harbour Areas Regulations 2016: [www.hse.gov.uk/pubns/books/l155](http://www.hse.gov.uk/pubns/books/l155).
- Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002: [www.hse.gov.uk/fireandexplosion/dsear](http://www.hse.gov.uk/fireandexplosion/dsear).
- EH40 “Workplace exposure limits”: [www.hse.gov.uk/pubns/books/eh40](http://www.hse.gov.uk/pubns/books/eh40).
- 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).
- HSE guidance on Coupling and Uncoupling: [www.hse.gov.uk/workplacetransport/information/coupling](http://www.hse.gov.uk/workplacetransport/information/coupling).
- HSE guidance on Diesel Engine Exhaust Emissions is available at: [www.hse.gov.uk/pubns/indg286](http://www.hse.gov.uk/pubns/indg286).
- HSE Guidance on Using electric storage batteries safely (INDG 139): [www.hse.gov.uk/pubns/indg139.pdf](http://www.hse.gov.uk/pubns/indg139.pdf)
- 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)
- IMO guidance on: “Code of Safe Practice for Cargo Stowage and Securing” [CSS Code]
- 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).

- International Maritime Dangerous Goods Code (IMDG): [www.imo.org/en/Publications/IMDGCode](http://www.imo.org/en/Publications/IMDGCode)
- Load Security HSE web page: [www.hse.gov.uk/logistics/load-security](http://www.hse.gov.uk/logistics/load-security).
- Maintaining portable and transportable electrical equipment HSG107: [www.hse.gov.uk/pubns/books/hsg107](http://www.hse.gov.uk/pubns/books/hsg107).
- Management of Health and Safety at Work Regulations 1999: [www.hse.gov.uk/managing](http://www.hse.gov.uk/managing).
- Managing Health and Safety in Dockwork HS(G) 177: [www.hse.gov.uk/pubns/books/hsg177](http://www.hse.gov.uk/pubns/books/hsg177).
- Merchant Shipping (Hatches and Lifting Plant) Regulations 1988: [www.opsi.gov.uk/si/si1988/Uksi\\_19881639\\_en\\_1](http://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](http://www.opsi.gov.uk/si/si1988/Uksi_19882274_en_1).
- Merchant Shipping and Fishing Vessel (Provision and Use of Work Equipment) Regulations (PUWER) 2006: [195.99.1.70/si/si2006/20062183](http://195.99.1.70/si/si2006/20062183).
- MGN 341 Ro-ro ships' vehicle decks: accidents and access: [www.gov.uk/government/publications/mgn-341-ro-ro-ships-vehicle-decks-accidents-and-access](http://www.gov.uk/government/publications/mgn-341-ro-ro-ships-vehicle-decks-accidents-and-access)
- MGN 418 Roll-on/roll-off ships stowage and securing of vehicles: [www.gov.uk/government/publications/mgn-418-roll-onroll-off-ships-stowage-and-securing-of-vehicles](http://www.gov.uk/government/publications/mgn-418-roll-onroll-off-ships-stowage-and-securing-of-vehicles)
- MGN 533 (M) Means of access: [www.gov.uk/government/publications/mgn-533-m-means-of-access](http://www.gov.uk/government/publications/mgn-533-m-means-of-access)
- 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).
- Ports web pages: [www.hse.gov.uk/ports](http://www.hse.gov.uk/ports).
- Provision and Use of Work Equipment Regulations (PUWER) 1998: [www.hse.gov.uk/work-equipment-machinery/puwer](http://www.hse.gov.uk/work-equipment-machinery/puwer).
- Risk assessment A brief guide to controlling risks in the workplace: [www.hse.gov.uk/pubns/indg163.pdf](http://www.hse.gov.uk/pubns/indg163.pdf)
- Safety in Docks ACOP L148: [www.hse.gov.uk/pubns/books/l148](http://www.hse.gov.uk/pubns/books/l148).
- The Electricity at Work Regulations 1989 and guidance on electrical safety: [www.hse.gov.uk/electricity](http://www.hse.gov.uk/electricity).



- Vehicles at Work: [www.hse.gov.uk/workplacetransport](http://www.hse.gov.uk/workplacetransport).
- Vibration at Work: [www.hse.gov.uk/vibration](http://www.hse.gov.uk/vibration)
- Work at Height Regulations 2005: [www.hse.gov.uk/work-at-height](http://www.hse.gov.uk/work-at-height).
- Workplace Transport Safety HSG 136: [www.hse.gov.uk/pubns/books/hsg136](http://www.hse.gov.uk/pubns/books/hsg136).







Raising Standards in UK Ports

**FURTHER INFORMATION**

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