

## 27 ROLL-ON/ROLL-OFF FERRIES

### 27.1 Introduction

27.1.1 This section gives general advice for the safety of personnel working on the vehicle decks of roll-on/roll-off (ro-ro) ferries. Where other documents or chapters of this Code apply, these are cross-referenced and should be read in conjunction with this chapter.

## 27.2 General

27.2.1 The movement, stowage and securing of vehicles on vehicle decks and ramps should be supervised by a responsible ship's officer, assisted by at least one competent person.

27.2.2 Smoking and naked flames should not be permitted on any vehicle decks. Conspicuous 'no smoking' or 'no smoking/naked lights' signs should be displayed.

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27.2.3 There should be no unauthorised persons on vehicle decks at any time, and there should be no entry to vehicle decks when the vessel is at sea, unless specifically permitted.

27.2.4 Passengers and drivers should not be permitted to remain on vehicle decks without the express authority of a responsible ship's officer. The period prior to disembarkation when passengers and drivers are requested to return to their vehicles should be kept to a minimum.

27.2.5 Where closed-circuit television (CCTV) cameras are fitted, they should, where practicable, have an uninterrupted view of the vehicle deck. The use of CCTV for continuous watch does not necessarily preclude the need for car-deck patrols, e.g. coupled with fire patrols of passenger accommodation.

## 27.3 Ventilation

27.3.1 Vehicle decks should have adequate ventilation at all times, with special regard to hazardous substances.

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27.3.2 On passenger vessels, ventilation fans in closed ro-ro spaces must normally be run continuously whenever vehicles are on board. An increased number of air changes may be required when vehicles are being loaded or unloaded, or where flammable gases or liquids are stowed in a closed ro-ro space. Merchant shipping regulations specify the special requirements for cargo space ventilation.

27.3.3 To reduce the accumulation of fumes, drivers should be instructed to stop their engines as soon as practicable after embarking and to avoid starting up prior to departure until instructed to do so. During loading and discharging, ventilation may be improved by keeping both bow and stern doors open, provided that there is adequate freeboard at these openings. When there is doubt about the freshness of the atmosphere, arrangements should be made for

testing to ensure the maintenance of 20% oxygen and a carbon monoxide content below 30 ppm in the atmosphere of the space.

#### 27.4 Fire safety/prevention

27.4.1 Fire-detection systems should be switched on whenever vehicle decks are unattended. Deck and engine crew should be trained in the use of the drencher systems and their operation. Continuous monitoring of vehicle decks by CCTV or regular fire patrols should also be in place.

27.4.2 All fire doors should be kept closed on vehicle decks when the vessel is at sea.

#### 27.5 Noise

27.5.1 Personnel working on vehicle decks should not be exposed to the equivalent of 85 dB(A) or greater when averaged over an eight-hour day. Hearing protection should be available for use when the noise level is equivalent to or exceeds 80 dB(A) averaged over an eight-hour day, and should be worn when it is equivalent to or exceeds 85 dB(A) averaged over an eight-hour day. For further guidance on noise levels, see Chapter 12, Noise, vibration and other physical agents, of this Code and the *Code of Practice for Controlling Risks due to Noise on Ships* (revised 2009).

#### 27.6 Safe movement

27.6.1 Pedestrians should be warned of vehicle movements when entering or crossing car or vehicle decks and keep to walkways when moving about the ship.

27.6.2 As far as possible, routes used by vehicles should be separated from pedestrian passageways, and the use of ship's ramps for pedestrian access should be avoided. Ramps that are used by vehicles should not be used for pedestrian access unless there is suitable segregation of vehicles and pedestrians. Segregation can be achieved through the provision of a suitably protected walkway, or by ensuring that pedestrians and vehicles do not use the ramp at the same time (see the *Code of Practice on the Stowage and Securing of Vehicles on Roll-on/Roll-off Ships*, section 2.6).

27.6.3 Crew members should exercise great care when supervising the driving, marshalling and stowing of vehicles to ensure that no person is put at risk. The following precautions should be taken:

- Crew should be easily identifiable by passengers. Personnel required to be on the vehicle decks should wear appropriate personal protective equipment, including high-visibility clothing.
- Communications between deck officers and ratings should be clear and concise to maintain the safety of passengers and vehicles.
- There should be suitable traffic-control arrangements, including speed limits and, where appropriate, the use of signallers. Collaboration may be necessary with shore-side management where they also control vehicle movements on board ship.
- Hand signals used by loading supervisors and personnel directing vehicles should be unambiguous.
- Adequate illumination should be provided.
- Personnel directing vehicles should keep out of the way of moving vehicles, particularly those that are reversing, by standing to the side, and where possible should remain within the driver's line of sight. Extra care should be taken at the 'ends' of the deck where vehicles may converge from both sides of the ship.
- Crew members should be wary that vehicles may lose control on ramps and sloping decks, especially when wet, and that vehicles on ramps with steep inclines may be susceptible to damage. Ramps should have a suitable slip-resistant surface.
- Where fitted, audible alarms should be sounded by vehicles that are reversing.
- Safe systems of work should be provided in order to ensure that all vehicle movements are directed by a competent person.

## 27.7 Use of work equipment

27.7.1 Ships' ramps, car platforms, retractable car decks and similar equipment should be operated only by competent persons authorised by a responsible ship's officer, in accordance with the Company's work instructions. Safe systems of work should be provided to ensure that the health and safety of crew or passengers is not put at risk. Ramps, etc. should not be operated unless the deck and ramp can be seen to be clear of people and if any person appears on the deck while the ramp is moving, the operation should be stopped immediately. Where possible, such ramps and decks should be fitted with audio and visual alarms.

27.7.2 Training in the use of such equipment should consist of theoretical instruction enabling the trainee to appreciate the factors affecting the safe operation of the plant, and supervised practical work.

27.7.3 Moveable deck ramps should be kept clear of passengers when being raised or lowered. When cars are lowered on the ramps of moveable decks, they should be suitably chocked. If the operator cannot clearly see the whole operation from the control station, then a lookout should be posted to ensure ramp and landing areas remain clear throughout the operation.

27.7.4 No person should be lifted by ramps, retractable car decks or lifting appliances, except where the equipment has been designed or especially adapted for that purpose.

27.7.5 Retractable car decks and lifting appliances should be securely locked when in the stowed position.

27.7.6 After all vehicles have been loaded, the car-deck hydraulics should be isolated so that they cannot be accidentally activated during the voyage, and the bridge should be informed.

27.7.7 The ship's mobile handling equipment, which is not fixed to the ship, should be secured in its stowage position before the ship proceeds to sea.

## 27.8 Inspection of vehicles

27.8.1 Before being accepted for shipment, every freight vehicle should be inspected externally by a competent and responsible person or persons to check that it is in a satisfactory condition for shipment, for example:

- it is suitable for securing to the ship in accordance with the approved cargo-securing manual (see also section 28.1.4);
- where practicable, the load is secured to the vehicle;
- the deck or doorway is high enough for vehicles to pass through and vehicles have adequate clearance for ramps with steep inclines; and
- any labels, placards and marks that would indicate the carriage of dangerous goods are properly displayed.

27.8.2 It is important to ensure, so far as is reasonably practicable, that on each vehicle the fuel tank is not so full as to create a possibility of spillage. No vehicle showing visual signs of an overfilled tank should be loaded.

27.8.3 Seafarers should be aware of hazardous units as detailed on the stowage plan and indicated by labels, placards and marks, and should be on guard against the carriage of undeclared dangerous goods.

## 27.9 Stowage

27.9.1 Shippers' special advice or guidelines regarding handling and stowage of individual vehicles should be observed.

27.9.2 Vehicles should:

- so far as possible, be aligned in a fore and aft direction;
- be closely stowed athwartships so that, in the event of any failure in the securing arrangements or from any other cause, the transverse movement is restricted. However, sufficient distance should be provided between vehicles to permit safe access for the crew and for passengers getting into and out of vehicles, and going to and from accesses serving vehicle spaces; and
- be so loaded that there are no excessive lists or trims likely to cause damage to the vessel or shore structures.

27.9.3 Vehicles should not:

- be parked on permanent walkways;
- be parked so as to obstruct the operating controls of bow and stern doors, entrances to accommodation spaces, ladders, stairways, companionways or access hatches, firefighting equipment, controls to deck scupper valves or controls to fire dampers in ventilation trunks; or
- be stowed across water spray fire curtains, if these are installed.

27.9.4 Safe means of access to securing arrangements, safety equipment and operational controls should be properly maintained. Stairways and escape routes from spaces below the vehicle deck should be clearly marked with yellow paint and kept free from obstruction at all times.

27.9.5 The parking brakes of each vehicle or each element of a vehicle, where provided, should be applied and the vehicle should, where possible, be left in gear.

27.9.6 Semi-trailers should not be supported on their landing legs during sea transport unless the landing legs are specially designed for that purpose and so marked, and the deck plating has adequate strength for the point loadings.

27.9.7 Uncoupled semi-trailers should be supported by trestles or similar devices placed in the immediate area of the drawplates so that the connection of the fifth-wheel to the kingpin is not restricted.

27.9.8 Drums, canisters and similar thin-walled packaging are susceptible to damage if vehicles break adrift in adverse weather, and should not be stowed on the vehicle deck without adequate protection.

27.9.9 Depending on the area of operation, the predominant weather conditions and the characteristics of the ship, freight vehicles should be stowed so that the chassis are kept as static as possible by not allowing free play in the suspension. This can be done by securing the vehicles to the deck as tightly as the lashing tensioning device will permit. Care should be taken to ensure lashings are not over-tightened. Only designed tensioning arrangements should be used and no additional extensions should be used to increase tightening force. Alternatively, the freight vehicle chassis may be jacked up prior to securing.

27.9.10 Because compressed air suspension systems may lose air, adequate arrangements should be made to prevent the slackening off of lashings as a result of air leakage during the voyage. Such arrangements may include the jacking up of a vehicle or the release of air from the suspension system where this facility is provided.

## 27.10 Securing of cargo

27.10.1 Securing operations should be completed before the ship proceeds to sea.

27.10.2 Within the constraints laid down in the approved cargo-securing manual, the master has the authority to decide on the application of securings and lashings and the suitability of the vehicles to be carried. In making this decision, due regard shall be given to the principles of good seamanship, experience in stowage, good practice and the International Maritime Organization (IMO) Code for Cargo Stowage and Securing (CSS Code).

27.10.3 Seafarers appointed to carry out the task of securing vehicles should be trained in the use of the equipment to be used and in the most effective methods for securing different types of vehicles.

27.10.4 Securing operations should be supervised by competent persons who are conversant with the contents of the cargo-securing manual. Freight vehicles of more than 3.5 tonnes should be secured in all circumstances where the expected conditions for the intended voyage are such that movement of the vehicles relative to the ship could be expected.

27.10.5 During the voyage, the lashings should be regularly inspected to ensure that vehicles remain safely secured. Seafarers inspecting vehicle spaces during a voyage should exercise caution in order to avoid being injured by moving or swaying vehicles. If necessary, the ship's course should be altered to reduce movement or dangerous sway when lashings are being adjusted. The officer of the watch should always be notified when an inspection of the vehicle deck is being made.

27.10.6 When wheel chocks are being used to restrain a semi-trailer, they should remain in place until the semi-trailer is properly secured to the semi-trailer towing vehicle.

27.10.7 No attempt should be made to secure a vehicle until it is parked, the brakes (where applicable) have been applied and the engine has been switched off.

27.10.8 When vehicles are being stowed on an inclined deck, the wheels should be chocked before lashing commences.

- The tug driver should not leave the cab to disconnect or connect the trailer brake lines. A second person should do this.
- The parking brake on the tug should be engaged and in good working condition.
- As well as wheel chocks, at least two lashings holding the unit against the incline should be left in place until the trailer's braking system is charged and operating correctly.

27.10.9 Where seafarers are working in shadow areas or have to go under vehicles to secure lashings, hand lamps and torches should be available for use.

27.10.10 Seafarers engaged in the securing of vehicles should take care to avoid injury from projections on the underside of the vehicles. An agreed method of signalling between the



driver and the lashing crew should be established, preferably by the use of a whistle or other distinct sound signal.

27.10.11 Wherever possible, lashings should be attached to specially designed securing points on vehicles, and only one lashing should be attached to any one aperture, loop or lashing ring at each securing point.

27.10.12 When tightening lashings, care should be exercised to ensure that they are securely attached to the deck and to the securing points of the vehicle.

27.10.13 Hooks and other devices that are used for attaching a lashing to a securing point should be applied in a manner that prevents them from becoming detached if the lashing slackens during the voyage.

27.10.14 Lashings should be so attached that, provided there is safe access, it is possible to tighten them if they become slack.

27.10.15 Lashings on a vehicle should be under equal tension.

27.10.16 Where practicable, the arrangement of lashings on both sides of a vehicle should be the same, and angled to provide some fore and aft restraint, with an equal number pulling forward as are pulling aft.

27.10.17 The lashings are most effective on a vehicle when they make an angle with the deck of between 30° and 60°. When these optimum angles cannot be achieved, additional lashings may be required.

27.10.18 Where practicable, crossed lashings should not be used for securing freight vehicles because this arrangement provides no restraint against tipping over at moderate angles of roll of the ship. Lashings should pass from a securing point on the vehicle to a deck-securing point adjacent to the same side of the vehicle. Where there is concern about the possibility of low coefficients of friction on vehicles such as solid-wheeled trailers, additional crossed lashings may be used to restrain sliding. The use of rubber mats should be considered.

27.10.19 Lashings should not be released for unloading, before the ship is secured at the berth, without the master's express permission.

27.10.20 Seafarers should release lashings with care to reduce the risk of injury when the tension is released.

27.10.21 To avoid damage during loading and unloading, all unused securing equipment should be kept clear of moving vehicles on the vehicle deck.

27.10.22 A competent person should inspect securing equipment to ensure that it is in sound condition at least once every six months and on any occasion when it is suspected that lashings have experienced loads above those predicted for the voyage. Defective equipment should be taken out of service immediately and disposed of or placed where it cannot be used inadvertently. Unused lashing equipment should be securely stowed away from the vehicle deck.

## 27.11 Dangerous goods

27.11.1 This section should be read in conjunction with Chapter 21, Hazardous substances and mixtures. For guidance on dealing with emergencies involving dangerous goods, see Chapter 4, Emergency drills and procedures, and the International Maritime Dangerous Goods (IMDG) Code.

27.11.2 Prior to loading, freight vehicles carrying dangerous goods should be examined externally for damage and signs of leakage or shifting of contents. Any freight vehicle found to be damaged, leaking or with shifting contents should not be accepted for shipment. If a freight vehicle is found to be leaking after loading, a ship's officer should be informed and personnel kept well clear until it is ascertained that no danger to personnel persists.

27.11.3 Freight vehicles carrying dangerous goods and adjacent vehicles should always be secured.

27.11.4 Tank vehicles and tank containers on flat-bed trailers containing products declared as dangerous goods should be given special attention. (For heated tanks, see marine guidance note MGN 59(M).) Pre-voyage booking procedures should ascertain that tanks have been approved for the carriage of their contents by sea.

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## 27.12 Specialised vehicles

27.12.1 Gas cylinders used for the operation and business of vehicles such as caravans should be adequately secured against movement of the ship, with the gas supply cut off for the

duration of the voyage. Leaking and inadequately secured or connected cylinders should be refused for shipment.

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27.12.2 The following vehicles, trailers and loads should be given special consideration:

- Tank vehicles or tank containers containing liquids not classified as dangerous goods. These may be sensitive to penetration damage and may act as a lubricant. These vehicles must always be secured.
- Tracked vehicles and other loads making metal-to-metal contact with the deck; where possible, rubber mats or dunnage should be used.
- Loads on flat-bed trailers.
- Vehicles with hanging loads, such as chilled meat or floated glass.
- Partially filled tank vehicles.

27.12.3 Freight vehicles carrying livestock require special attention to ensure that they are properly secured, adequately ventilated and stowed so that access to the animals is possible. Further guidance is contained in the Department of the Environment, Food and Rural Affairs (Defra) regulation on the *Welfare of Animals During Transport: New rules for transporting animals* (see Appendix 2, Other sources of information).

27.12.4 Where vehicles are connected to electrical plug-in facilities, personnel should take the appropriate precautions as described in Chapter 18, Provision, care and use of work equipment, of this Code for working with any electrical equipment.

## 27.13 Housekeeping

27.13.1 All walkways should be kept clear.

27.13.2 All vehicle decks, ships' ramps and lifting appliances should, so far as is reasonably practicable, be kept free of water, oil, grease or any liquid that might cause a person to slip or that might act as a lubricant to a shifting load. Any spillage of such liquid should be quickly cleaned up; sand boxes, drip trays and mopping-up equipment should be available for use on each vehicle deck.

27.13.3 All vehicle decks, ships' ramps and lifting appliances should be kept free of obstructions and loose items such as stores and refuse.

27.13.4 Seafarers should be careful to avoid electrical points and fittings when washing down vehicle decks.

27.13.5 All scuppers should be kept clear of lashing equipment, dunnage, etc.