

19 LIFTING EQUIPMENT AND OPERATIONS

19.1 Introduction

19.1.1 The general principles on provision, care and use of work equipment, set out in Chapter 20, Work on machinery and power systems, are also applicable to lifting equipment. This guidance gives additional information specific to lifting. Where there is any overlap, the more stringent regulations apply.

19.1.2 ‘Lifting equipment’ means work equipment used for lifting or lowering loads and includes the attachments used for anchoring, fixing or supporting it.

19.1.3 ‘Loose gear’ means any gear by means of which a load can be attached to lifting equipment but which does not form an integral part of either the lifting equipment or the load.

19.2 General requirements

Lifting equipment

19.2.1 A valid certificate of testing and thorough examination by a competent person should be in force for every item of lifting equipment, accessory for lifting and loose gear. All items should be tested, and then thoroughly examined and certificated for use,

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- after manufacture or installation; or
- after any repair or modification that is likely to alter the safe working load (SWL) or affect the strength or stability of the equipment.

A certificate for a ship’s lifting equipment is valid for no more than five years.

The format for such certificates is shown in Annex 19.1.

19.2.2 In addition to the strength and stability of the lifting equipment, consideration should also be given to the stability, angle of heel and potential down-flooding of any vessel as a result of the use of a crane, davit, derrick or other lifting device fitted on it. This is especially important where a crane is to be fitted on a work boat or other small vessel, and it is recommended that advice should be sought from the crane manufacturer in such cases prior to the crane being fitted. Similarly, it is recommended that a check of the vessel’s stability should be carried out by a suitably qualified person prior to installation of a crane, and

following any modification to it, to ensure that the vessel is capable of operating safely with the crane fitted and in use. Failure to do this could have serious consequences for the safety of the vessel and the workers on it.

19.2.3 Any welding of material should be to an approved, acceptable standard because any fitting is only as strong as the weld that connects it to the vessel's structure.

19.2.4 If counterbalance weights are moveable, effective precautions should be taken to ensure that the lifting equipment is not used for lifting in an unstable condition. In particular, all weights should be correctly installed and positioned.

19.2.5 Lifting equipment with pneumatic tyres should not be used unless the tyres are in a safe condition and inflated to the correct pressures. Means to check this should be provided.

19.2.6 The operator should check safety devices fitted to lifting equipment before work starts and at regular intervals thereafter to ensure that they are working properly.

Accessories for lifting

19.2.7 When selecting accessories for lifting, the following should be taken into account:

- the loads to be handled;
- the gripping points;
- the loose gear for attaching the load, and for attaching the accessories to the lifting equipment;
- the atmospheric and environmental conditions;
- the mode and configuration of slinging;
- vessel motions;
- stability issues.

19.2.8 Accessories for lifting should be stored in conditions that will not result in damage or degradation.

Controls

19.2.9 Controls of lifting equipment should be permanently and legibly marked with their function and their operating directions shown by arrows or other simple means, indicating the position or direction of movement for hoisting or lowering, slewing or luffing, etc.

19.2.10 Makeshift extensions should not be fitted to controls nor any unauthorised alterations made to them. Foot-operated controls should have slip-resistant surfaces.

19.2.11 No lifting device should be used with any locking pawl, safety attachment or device rendered inoperative. If, exceptionally, limit switches need to be isolated in order to lower a crane to its stowage position, the utmost care should be taken to ensure the operation is completed safely.

19.3 Regular maintenance

19.3.1 In order to ensure that all parts of lifting equipment and related equipment are kept in good repair and working order, regular preventative maintenance should be carried out. Maintenance should include regular examinations by a competent person. Such examinations should be carried out as required by the Regulations but in any event at least once annually. Checks should look for general material defects such as cracks, distortion, corrosion and wear and tear that could affect SWL and overall strength.

19.3.2 When there is any suspicion that any lifting equipment or any part of that equipment may have been subjected to excessive loads, exceeding the SWL, or subjected to treatment likely to cause damage, it should be taken out of service until it can be subjected to a thorough examination by a competent person.

19.3.3 Listed below are some suggested maintenance items:

- Greasing should be thorough and frequent, because dry bearings impose additional loads that can lead to failure.
- The condition of all ropes, wires and chains should be checked regularly for wear, damage and corrosion and replaced as necessary. Particular care should be taken to examining ropes thoroughly including lengths that remain static in use, which may also be located in areas difficult to access.
- Shackles, links and rings should be renewed when wear or damage is evident.
- Structures should be examined frequently for corrosion, cracks, distortion and wear of bearings, securing points, etc.
- Hollow structures such as gantries or masts should be checked for water trapped inside. If water is found, the structure should be drained, appropriately treated and then sealed.
- Regular function tests of controls, stops, brakes, safety devices for hoisting gear, etc. should be carried out preferably before the start of operations.

This list is illustrative only and additional items may be appropriate dependent upon the equipment fitted to an individual vessel.

19.3.4 Any replacement parts must be in accordance with the manufacturer's instructions and of an equivalent construction to the original part. This is because replacement with incorrect parts or counterfeit parts of inferior quality can seriously affect the safety of a lifting equipment.

19.3.5 After any repairs or alterations are made to any lifting equipment, it should undergo a thorough examination and be retested if appropriate. This also applies if any significant changes are made or noticed to the general condition of the equipment.

19.4 Thorough examination and inspection

19.4.1 Where the safety of lifting equipment depends on the installation conditions, it should be inspected by a competent person before it is used for the first time. Such inspections should be undertaken on initial installation or after re-assembly at another location, to ensure that it has been installed correctly, in accordance with any manufacturer's instructions, and is safe for workers to operate as well as being able to function safely.

19.4.2 Any lifting equipment or accessory for lifting that is, or has been, exposed to conditions that could cause deterioration in its condition should be:

- thoroughly examined;
 - in the case of lifting equipment for lifting persons or an accessory for lifting, at least every six months;
 - in the case of other lifting equipment, at least every 12 months; or
 - in either case, in accordance with an examination scheme; and
 - whenever exceptional circumstances that are liable to jeopardise the safety of the lifting equipment have occurred; and
- where appropriate, inspected by a competent person at suitable intervals.

19.4.3 No accessories for lifting, other than that which is subject to section 19.5.2, first bullet point, should be used unless it has been thoroughly examined within the 12 months immediately prior to such use.

19.5 Defect reporting and testing: advice to competent persons

19.5.1 There is a legal requirement for lifting equipment to be tested every five years. This section provides advice to the competent person carrying out the test.

19.5.2 The requirements for testing a lifting equipment will be met if before use one of the following appropriate tests is carried out:

- Proof loading the equipment concerned.
- In appropriate cases, testing a sample to destruction.
- In the case of re-testing after repairs or modifications, such a test that satisfies the competent person who subsequently examines the equipment (the re-testing of a ship's lifting equipment may be effected by means of a static test, e.g. by dynamometer where appropriate).

19.5.3 Where proof loading is part of a test, the test load applied should exceed the SWL as specified in the relevant standard or, in other cases, by at least the following:

Proof load (tonnes)

SWL (tonnes)	Lifting equipment	Single-sheave cargo and pulley blocks	Multi-sheave cargo and pulley blocks	Lifting beams and frames, etc.	Other lifting gear
0–10	$SWL \times 1.25$	$SWL \times 4$	$SWL \times 2$	$SWL \times 2$	$SWL \times 2$
11–20	$SWL \times 1.25$	$SWL \times 4$	$SWL \times 2$	$SWL \times 1.04 + 9.6$	$SWL \times 2$
21–25	$SWL + 5$	$SWL \times 4$	$SWL \times 2$	$SWL \times 1.04 + 9.6$	$SWL \times 2$
26–50	$SWL + 5$	$SWL \times 4$	$SWL \times 0.933 + 27$	$SWL \times 1.04 + 9.6$	$SWL \times 1.22 + 20$
51–160	$SWL \times 1.1$	$SWL \times 4$	$SWL \times 0.933 + 27$	$SWL \times 1.04 + 9.6$	$SWL \times 1.22 + 20$
160+	$SWL \times 1.1$	$SWL \times 4$	$SWL \times 1.1$	$SWL \times 1.1$	$SWL \times 1.22 + 20$

Note: Where lifting equipment is normally used with a specific removable attachment and the weight of that attachment is not included in the marked SWL, then for the purposes of using the above table the SWL of that equipment should be taken as being the marked SWL plus the weight of the attachment.

19.5.4 Any defect found in any lifting equipment, including that provided by a shore authority, should be reported immediately to the master or to another responsible person who should take appropriate action.

19.5.5 Similar principles apply to cargo-securing devices as to lifting equipment. The crew and persons employed for the securing of cargoes should be instructed in the correct application and use of the cargo-securing gear on board the ship. For guidance on the securing of cargoes and handling of security devices, refer to the ship's approved cargo-securing manual.

19.6 Certificates

19.6.1 The Company is required to ensure that a certificate is obtained no later than 28 days after the carrying out of any test and thorough examination of any lifting equipment. Work should not proceed in the absence of a valid certificate.

19.7 Record of lifting equipment

19.7.1 All vessels are required to maintain records of manufacture, examination, inspection and testing of lifting equipment. Records and service history should be kept of equipment, of dates when and where it is brought into use, its safe working load, plus any repairs, modifications, tests and examinations carried out.

19.7.2 A form for the register of lifting appliances and loose gear used for cargo handling, based on the model recommended by the International Labour Organization, is given in Annex 19.2, Register of ship's lifting appliances and cargo-handling gear.

19.8 Positioning and installation

19.8.1 Permanently installed lifting equipment should not be used unless it has been positioned or installed in such a way as to minimise the risk of:

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- the equipment or a load striking a worker;
- a load drifting dangerously or falling freely; or
- a load being released unintentionally.

19.9 Lifting operations

19.9.1 Every lifting operation must be:

- subject to risk assessment;
- properly planned;
- appropriately supervised; and
- carried out in a safe manner.

19.9.2 No lifting operation should begin using equipment that is mobile or can be dismantled unless the Company is satisfied that the lifting equipment will remain stable during use under all foreseeable conditions, taking into account the nature of the surface on which it stands.

19.9.3 All lifting operations must be properly planned, appropriately supervised and carried out to protect the safety of workers. Whilst this applies to all vessels, it is particularly important when cranes are being used on work boats and other small vessels due to the impact on the stability of the vessel. Overloading of a crane, or attempting to lift at the wrong angle could, in some circumstances, result in the vessel sinking.

19.9.4 Weather conditions can play a significant part in lifting operations. High winds or wave action may cause suspended loads to swing dangerously or mobile equipment to topple. Consideration should be given to the effects of weather conditions on all lifting operations, whether inside the ship or outside on deck, and such operations should be suspended before conditions deteriorate to the extent that lifting becomes dangerous.

19.9.5 No person should be lifted except where the equipment is designed or specially adapted and equipped for that purpose, or for rescue or in emergencies.

19.9.6 Contact with bare ropes or warps with moving parts of the equipment should be minimised by the installation of appropriate protective devices.

19.9.7 Under no circumstances should personnel stand on, stand below or pass beneath a load that is being lifted. Loads should not be lifted over any access way.

19.9.8 All loads should be properly slung and properly attached to lifting gear, and all gear properly attached to equipment.

19.9.9 The use of lifting equipment to drag heavy loads with the fall at an angle to the vertical is inadvisable because of the friction and other factors involved, and should only take place in exceptional circumstances where the angle is small, there is ample margin between the loads handled and the SWL of the equipment, and particular care is taken. In all other cases, winches should be used instead. Derricks should never be used in union purchase for such work.

19.9.10 Any lifts by two or more appliances simultaneously can create hazardous situations and should only be carried out when unavoidable. They should be properly conducted under the close supervision of a responsible person, after thorough planning of the operation.

19.9.11 Lifting equipment should not be used in a manner likely to subject them to excessive overturning moments.

19.9.12 Ropes, chains and slings should not be knotted.

19.9.13 A thimble or loop splice in any wire rope should have at least three tucks, with a whole strand of rope and two tucks, with one half of the wires cut out of each strand. The strands in all cases should be tucked against the lay of the rope. Any other form of splice that can be shown as equivalent can also be used.

19.9.14 Lifting gear should not be passed around edges liable to cause damage, without appropriate packing.

19.9.15 Where a particular type of load is normally lifted by special gear, such as plate clamps, other arrangements should only be substituted if they are equally safe.

19.9.16 The manner of use of natural and man-made fibre ropes, magnetic and vacuum lifting devices and other gear should take proper account of the particular limitations of the gear and the nature of the load to be lifted.

19.9.17 Wire ropes should be regularly inspected and treated with suitable lubricants. These should be thoroughly applied so as to prevent internal corrosion as well as corrosion on the outside. The ropes should never be allowed to dry out.

19.9.18 Cargo-handling equipment that is lifted onto or off ships by crane or derrick should be provided with suitable points for the attachment of lifting gear, so designed as to be safe in use. The equipment should also be marked with its own gross weight and SWL.

19.9.19 Before any attempt is made to free equipment that has become jammed under load, every effort should first be made to take the load off safely. Precautions should be taken to

guard against sudden or unexpected freeing. Others not directly engaged in the operation should keep in safe or protected positions.

19.9.20 When machinery and, in particular, pistons are to be lifted by means of screw-in eye-bolts, the eye-bolts should be checked to ensure that they have collars, that the threads are in good condition and that the bolts are screwed hard down on to their collars. Screw holes for lifting bolts in piston heads should be cleaned and the threads checked to see that they are not wasted before the bolts are inserted.

19.10 Safe working load

19.10.1 A load greater than the SWL should not be lifted unless:

- a test is required by regulation; and
- the weight of the load is known and is the appropriate proof load; and
- the lift is a straight lift by a single appliance; and
- the lift is supervised by a competent person who would normally supervise a test and carry out a thorough inspection; and
- the competent person specifies in writing that the lift is appropriate in weight and other respects to act as a test of the equipment, and agrees to the detailed plan of the lift; and
- no person is exposed to danger thereby.

19.10.2 Any grab fitted to lifting equipment should be of an appropriate size, taking into account the SWL of the equipment, the additional stresses on the equipment likely to result from the operation and the material being lifted.

19.10.3 In the case of a single sheave block used in double purchase, the working load applied to the wire should be assumed to equal half the load suspended from the block.

19.10.4 The SWL of a lift truck means its actual lifting capacity, which in the case of a fork-lift truck, relates the load that can be lifted to, the distance from the centre of gravity of the load from the heels of the forks. It may also specify lower capacities in certain situations, e.g. for lifts beyond a certain height.

19.11 Operational safety measures

19.11.1 Powered lifting equipment should always have a person at the controls while it is in operation; it should never be left to run with a control secured in the 'ON' position.

19.11.2 If any powered lifting equipment is to be left unattended with the power on, loads should be taken off and controls put in a 'NEUTRAL' or 'OFF' position. Where practical, controls should be locked or otherwise inactivated to prevent accidental restarting. When work is completed, the power should be shut off.

19.11.3 The person operating any lifting equipment should have no other duties that might interfere with their primary task. They should be in a proper and protected position, facing the controls and, so far as is practicable, with a clear view of the whole operation.

19.11.4 Where the operator of the lifting equipment does not have a clear view of the whole of the path of travel of any load carried by that equipment, appropriate precautions should be taken to prevent danger. Generally this requirement should be met by the employment of a competent and properly trained signaller designated to give instructions to the operator. A signaller includes any person who gives directional instructions to an operator while they are moving a load, whether by manual signals, by radio or otherwise.

19.11.5 The signaller should have a clear view of the path of travel of the load where the operator of the lifting equipment cannot see it.

19.11.6 Where necessary, additional signallers should be employed to give instructions to the first signaller.

19.11.7 Every signaller should be in a position that is:

- safe; and
- in plain view of the person to whom they are signalling unless an effective system of radio or other contact is in use.

19.11.8 All signallers should be instructed in and should follow a clear code of signals, agreed in advance and understood by all concerned in the operation. Examples of hand signals recommended for use with lifting equipment on ships are shown in Annex 19.3, Code of hand signals.

19.11.9 If a load can be guided by fixed guides, or by electronic means, or in some other way, so that it is as safely moved as if it was being controlled by a competent team of driver and signallers, signallers will not be necessary.

Additional measures for small vessels

19.11.10 An inclinometer or other efficient device to display heel angle should be provided on board for guidance to the operator when controlling the lifting of items of unknown weight.

19.11.11 Consideration should be given to which openings below deck should be secured weather tight during lifting operations, and all personnel should be above deck before lifting operation commence. Information should be posted on or near the lifting equipment with this information.

19.12 Use of winches and cranes

19.12.1 The drum end of wire runners or falls should be secured to winch barrels or crane drums by proper clamps or U-bolts. The runner or fall should be long enough to leave at least three turns on the barrel or drum at maximum normal extension. Slack turns of wire or rope on a barrel or drum should be avoided because they are likely to pull out suddenly under load.

19.12.2 When a winch is changed from single to double gear or vice versa, any load should first be released and the clutch secured so that it cannot become disengaged when the winch is working.

19.12.3 Steam winches should be so maintained that the operator is not exposed to the risk of scalding by leaks of hot water and steam.

19.12.4 Before a steam winch is operated, the cylinders and steam pipes should be cleared of water by opening the appropriate drain cocks. The stop valve between winch and deck steam line should be kept unobstructed. Adequate measures should be taken to prevent steam obscuring the driver's vision in any part of a working area.

19.12.5 Ships' cranes should be properly operated and maintained in accordance with the manufacturers' instructions. The Company and the master, as appropriate, should ensure that sufficient technical information is available, including the following:

- length, size and SWL of falls and topping lifts;
- SWL of all fittings;
- boom lifting angles; and
- manufacturers' instructions for replacing wires, topping up hydraulics and other maintenance as appropriate.

19.12.6 Power-operated rail-mounted cranes should have the following facilities incorporated in their control systems:

- Facilities to prevent unauthorised start-up.
- An efficient braking mechanism that will arrest the motion along the rails and, where safety constraints require, emergency facilities operated by readily accessible controls or automatic systems for braking or stopping equipment in the event of failure of the main facility.
- Guards that reduce as far as possible the risk of the wheels running over people's feet, and which will remove loose materials from the rails.

19.12.7 When a travelling crane is moved, any necessary holding bolts or clamps should be replaced before operations are resumed.

19.12.8 Access to a crane should always be by the proper means provided. Cranes should be stationary while accessing.

19.13 Use of derricks

19.13.1 Ships' derricks should be properly rigged and the Company and the master should ensure that rigging plans are available that include information on the:

- position and size of deck eye-plates;
- position of inboard and outboard booms;
- maximum headroom, i.e. permissible height of cargo hook above hatch coaming;
- maximum angle between runners;
- position, size, and SWL of blocks;
- length, size and SWL of runners, topping lifts, guys and preventers;
- SWL of shackles;
- position of derricks producing maximum forces;
- optimum position for guy and preventers to resist maximum forces;
- combined load diagrams showing forces for a load of 1 tonne or the SWL; and
- guidance on the maintenance of the derrick rig.

19.13.2 The operational guidance in the remainder of this section applies generally to the conventional type of ship's derrick. For other types, such as the 'Hallen' and 'Stulken' derricks, manufacturers' instructions should be followed.

19.13.3 Runner guides should be fitted to all derricks so that when the runner is slack, the bight is not a hazard to persons walking along the decks. Where rollers are fitted to runner guides, they should rotate freely.

19.13.4 Before a derrick is raised or lowered, all persons on deck in the vicinity should be warned so that no person stands in, or is in danger from, bights of wire and other ropes. All necessary wires should be flaked out.

19.13.5 When a single span derrick is being raised, lowered or adjusted, the hauling part of the topping lift or bull wire (i.e. winch-end whip) should be adequately secured to the drum end.

19.13.6 The winch driver should raise or lower the derrick at a speed consistent with the safe handling of the guys.

19.13.7 Before a derrick is raised, lowered or adjusted with a topping lift purchase, the hauling part of the span should be flaked out for its entire length in a safe manner. Someone should be available to assist the person controlling the wire on the drum and keeping the wire clear of turns and in making fast to the bitts or cleats. Where the hauling part of a topping lift purchase is led to a derrick span winch, the bull wire should be handled in the same way.

19.13.8 To fasten the derrick in its final position, the topping lift purchase should be secured to bitts or cleats by first putting on three complete turns followed by four crossing turns and finally securing the whole with a lashing to prevent the turns jumping off due to the wire's natural springiness.

19.13.9 When a derrick is lowered on a topping lift purchase, someone should be detailed for lifting and holding the pawl bar, ready to release it should the need arise; the pawl should be fully engaged before the topping lift purchase or bull wire is released. The person employed on this duty should not attempt or be given any other task until this operation is complete; in no circumstances should the pawl bar be wedged or lashed up.

19.13.10 A derrick with a topping winch, and particularly one that is self-powered, should not be topped hard against the mast, table or clamp in such a way that the initial heave required to free the pawl bar prior to lowering the derrick cannot be achieved without putting an undue strain on the topping lift purchase and its attachments.

19.13.11 A heel block should be secured additionally by means of a chain or wire so that the block will be pulled into position under load but does not drop when the load is released.

19.13.12 The derrick should be lowered to the deck or crutch and properly secured whenever repairs or changes to the rig are to be carried out.

19.13.13 If heavy cargo is to be dragged under deck with a ship's winches, the runner should be led directly from the heel block to avoid overloading the derrick boom and rigging. Where a heavy load is to be removed, a snatch block or bull wire should be used to provide a fair-lead for the runner and to keep the load clear of obstructions.

19.14 Use of derricks in union purchase

19.14.1 When using union purchase, the following precautions should be strictly taken to avoid excessive tensions:

- The angle between the married runners should not normally exceed 90° and an angle of 120° should never be exceeded.
- The cargo sling should be kept as short as possible so as to clear the bulwarks without the angle between the runners exceeding 90° (or 120° in special circumstances).
- The derricks should be topped as high as practicable, consistent with safe working.
- The derricks should not be rigged further apart than is absolutely necessary.

19.14.2 The following examples will show how rapidly loads increase on derricks, runners and attachments as the angle between runners increases:

- At a 60° included angle, the tension in each runner would be just over half the load.
- At 90° , the tension would be nearly three-quarters of the load.
- At 195° , the tension would be nearly 12 times the load.

19.14.3 When using union purchase, winch operators should wind in and pay out in step; otherwise, dangerous tensions may develop in the rig.

19.14.4 An adequate preventer guy should always be rigged on the outboard side of each derrick when used in union purchase. The preventer guy should be looped over the head of the derrick, and as close to and parallel with the outboard guy as available fittings permit. Each guy should be secured to individual and adequate deck or other fastenings.

19.14.5 Narrow angles between derricks and outboard guys and between outboard guys and the vertical should be avoided in union purchase because these materially increase the loading on the guys. The angle between the outboard derrick and its outboard guy and preventer should not be too large and may cause the outboard derrick to jack-knife. In general, the inboard derrick guys and preventer should be secured as nearly as possible at an angle of 90° to the derrick.

19.15 Use of stoppers

19.15.1 Where fitted, mechanical topping lift stoppers should be used. Where chain stoppers are used, they should **always** be applied by two half-hitches in the form of a cow hitch, suitably spaced with the remaining chain and rope tail backed round the wire and held taut to the wire.

19.15.2 A chain stopper should be shackled as near as possible in line with the span downhaul and always to an eye-plate, not passed round on a bight, which would induce bending stresses similar to those in a knotted chain.

19.15.3 No stopper should be shackled to the same eye-plate as the lead block for the span downhaul; this is particularly hazardous when the lead block has to be turned to take the downhaul to the winch or secure it to bitts or cleats.

19.15.4 The span downhaul should always be eased to a stopper and the stopper should take the weight before turns are removed from the winch, bitts or cleats.

19.16 Overhaul of cargo gear

19.16.1 When a cargo block or shackle is replaced, care should be taken to ensure that the replacement is of the correct type, size and SWL necessary for its intended use.

19.16.2 All shackles should have their pins effectively secured or seized with wire.

19.16.3 A special check should be made on completion of the work to ensure that all the split pins in blocks, etc. have been replaced and secured.

19.16.4 On completion of the gear overhaul, all working places should be cleaned of oil or grease.

19.17 Trucks and other vehicles/appliances

19.17.1 Personnel other than the driver should not be carried on a truck unless it is constructed or adapted for the purpose. Riding on the forks of a fork-lift truck is particularly dangerous. The driver should be careful to keep all parts of the body within the limits of the width of the truck or load.

19.17.2 Trucks for lifting and transporting should be used only by competent persons and only when the ship is in still water; they should never be used when vessels are in a seaway.

19.17.3 Appliances powered by internal combustion engines should not be used in enclosed spaces unless the spaces are adequately ventilated. The engine should not be left running when the truck is idle.

19.17.4 When not in use or left unattended whilst the vessel is in port, trucks for lifting and transporting should be aligned along the length of the ship with brakes on, operating controls locked and, where applicable, the forks tilted forward flush with the deck and clear of the passageway. If the trucks are on an incline, their wheels should be chocked. If not to be used for some time, and at all times whilst at sea, appliances should be properly secured to prevent movement.

19.17.5 No attempt should be made to handle a heavy load by the simultaneous use of two trucks. A truck should not be used to handle a load greater than its marked capacity or to move insecure or unsafe loads.

19.17.6 Tank containers should not be lifted directly with the forks of fork-lift trucks, because of the risks of instability and of damaging the container with the ends of the forks. Tank containers may be lifted using fork-lift trucks fitted with suitably designed side or top lifting attachments but care should be exercised because of the risk of surge in partly filled tanks.

19.18 Personnel-lifting equipment, lifts and lift machinery

19.18.1 Except under the conditions required by paragraph 19.18.2, no lifting equipment shall be used for lifting persons unless it is designed for the purpose.

19.18.2 If in exceptional circumstances it is necessary to use lifting equipment, which has not been specifically designed for the purpose, to lift persons:

- the control position of the lifting equipment must be manned at all times; and

- the persons being lifted must have a reliable means of communication, whether direct or indirect, with the operator of the lifting equipment.

19.18.3 Lifting equipment that is designed for lifting persons must not be used for that purpose unless it has been constructed, maintained and operated such that a worker may use it or carry out work activities from the carrier without risk to their health and safety, and in particular that:

- the worker will not be crushed, trapped or struck, especially through inadvertent contact with objects;
- the lifting equipment is so designed or has suitable devices:
 - to prevent any carrier falling or, if that cannot be prevented for reasons inherent in the site and height differences, the carrier has an enhanced safety coefficient suspension rope or chain;
 - to prevent the risk of any person falling from the carrier; and
- any person trapped in the carrier in the event of an incident is not thereby exposed to danger and can be freed.

19.18.4 Any rope or chain provided under section 19.18.3, first part of second bullet point, is to be inspected by a competent person every working day.

19.18.5 Guidelines on the transfer of personnel is contained in Chapter 31, Ships serving offshore oil and gas installations, of this Code and in MGN 332(M+F).

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19.19 Maintenance and testing of lifts

19.19.1 Before a lift is put into normal service, it must be tested and examined by a competent person and a certificate or report issued.

19.19.2 Details of the tests and examinations required for the issue of a certificate are given in British Standards and other equivalent standards. ‘Thorough examination and testing of lifts: Simple guidance for lift owners’ (INDG339) is also available from the Health and Safety Executive (HSE).

19.19.3 Regular, thorough examination must be carried out by a competent person at least every six months, or in accordance with an examination scheme, and a certificate or report issued. More detailed examination and testing of parts of the lift installation must be carried

out by a third party, at periodic intervals determined by the manufacturer or their representative, or at least every 12 months.

19.19.4 A person chosen to act as a competent person must be over 18 years old and have such practical and theoretical knowledge and actual experience of the type of lift that they have to examine as will enable them to detect defects or weaknesses and to assess their importance in relation to the safety of the lift. Specialist lift maintenance courses are available and recommended.

19.19.5 Any work carried out on lifts must only be performed by authorised persons familiar with the work and the appropriate safe-working procedures. These procedures must include provision for the safety of persons working on a lift and others who may also be at risk.

19.19.6 An initial risk assessment must be made to identify hazards associated with work on each lift installation, including work requiring access to the lift trunk. Safe working procedures must be drawn up for each lift installation. Persons who are to be authorised to carry out work on or inspection of a lift installation must comply with these procedures.

19.19.7 The specific areas that the risk assessment should address should include, as appropriate:

- whether there are safe clearances above and below the car at the extent of its travel;
- whether a car-top control station is fitted and its means of operation; and
- the working conditions in the machine and pulley rooms.

19.19.8 Based on the findings of the risk assessment, a permit to work system should be used, as described in Chapter 14, Permit to work systems, when it is necessary for personnel to enter the lift trunk or to override the control safety systems. No person should work alone on lifts.

19.19.9 Appropriate safety signs must be prominently displayed in the area and also on control equipment such as call lift buttons. Barriers must be used when it is necessary for lift landing doors to remain open to the lift trunk.

19.19.10 Experience indicates that the most important single factor in minimising risk of accidents is the avoidance of misunderstandings between personnel. A means of communication to the authorising officer and between those involved in working on a lift

must be established and maintained at all times. This might be by telephone, portable hand-held radio or a person-to-person chain. Whatever the arrangement, action should only be taken as a result of the positive receipt of confirmation that the message is understood.

19.19.11 Before attempting to gain access to the trunk of a lift, the lift must be isolated. The mains switch should be locked in the OFF position (or alternatively the fuses should be withdrawn and retained in a safe place) and an appropriate safety sign positioned at the point of such isolation. This should include both main and emergency supplies. In addition, the landing doors should not be allowed to remain open longer than necessary; the machine room should be protected against unauthorised entry and, after completion of work, a check must be made to ensure that all equipment used in the operation has been cleared from the well.

19.19.12 When it is necessary for personnel to travel on top of a car, safety can be enhanced considerably by the use of the car-top control station (comprising a stopping device and an inspection switch/control device) required by British Standards or an equivalent standard. Account should be taken of the arrangement and location of the control station, i.e. whether the stopping device can be operated before stepping on to the car on top of the lift car if no stopping device is fitted.