

4.12 Mechanical fastenings should not be used in lieu of splices on man-made fibre ropes because strands may be damaged during application of the mechanical fastening and the grip of the fastenings may be much affected by slight unavoidable fluctuations in the diameter of strands.

## 5 Portable ladders

5.1 A portable ladder should have a clear width of at least 255 mm (10 inches), be soundly constructed and have adequate strength for the purpose for which it is used. A ladder should not be used if any part is defective, for example if any rung depends for support solely on nails, spikes or similar improvisations.

5.2 All ladders should be inspected at regular intervals and maintained in sound condition. Wooden ladders should not be painted nor treated so as to hide cracks and defects.

5.3 When not in use, portable ladders should be stowed in a dry ventilated space away from heat.

5.4 A ladder in use should rise to a height of at least 1 metre (39 inches) above the top landing place unless there are other suitable handholds.

5.5 A portable ladder, whether rope or rigid type, must be adequately secured against displacement as near as possible to its upper resting place.

5.6 There should be a clearance of at least 150 mm behind all rungs.

5.7 Rigid portable ladders should be pitched at a safe angle between 65° and 70° to the horizontal (ie a slope of about one horizontal for four vertical). They should stand on a firm base and be lashed in position.

5.8 Planks should not be supported on the rungs of portable ladders to be used as a staging, nor should ladders be used horizontally for the same purpose.

5.9 A man negotiating a ladder needs both hands free; he should not attempt to carry tools or equipment in his hands. If he is wearing gloves or his hands are greasy, he must take extra care.

5.10 Working from ladders should be avoided as far as practicable since there is a risk of overbalancing and falling. Where it is necessary, a safety harness with a lifeline secured above the position of work should be worn when working at a height in excess of 2 metres (6½ feet) (see section 1.3).

# Anchoring, mooring and casting off

## 1 Anchoring

1.1 Before anchors are let go, a check should be made that there are no small craft or obstacles under the bow.

1.2 The man operating the brake and others in the vicinity should wear safety goggles and safety helmets to avoid the risk of injuries from dirt and rust particles and debris thrown off as the chain pays out.

1.3 Instructions given by portable transceivers (walkie-talkies) should always be identified with the ship, preferably by including her name in the instruction.

1.4 Seamen engaged in stowing an anchor cable into the locker should stand in a protected position and as far as practicable should keep in constant communication with the windlass operator.

1.5 Anchors housed and not required should be properly secured to guard against accidents or damage should the windlass brake be released inadvertently.

## 2 Characteristics of man-made fibre ropes

2.1 Safe handling of man-made fibre ropes requires techniques which differ from those for handling natural fibre ropes.

2.2 Man-made fibre ropes are relatively stronger than those of natural fibre and so for any given breaking strain have appreciably smaller circumferences, but wear or damage will diminish strength to a greater extent than would the same amount of wear or damage on a natural fibre rope. Recommendations for substitution

of natural fibre ropes by man-made fibre ropes are given in the following table:

| Manila |      | Polyamide<br>(Nylon) etc |      | Polyester<br>(Terylene etc) |      | Polypropylene |      |
|--------|------|--------------------------|------|-----------------------------|------|---------------|------|
| Dia    | Size | Dia                      | Size | Dia                         | Size | Dia           | Size |
| 48 mm  | (6)  | 48 mm                    | (6)  | 48 mm                       | (6)  | 48 mm         | (6)  |
| 56 mm  | (7)  | 48 mm                    | (6)  | 48 mm                       | (6)  | 52 mm         | (6½) |
| 64 mm  | (8)  | 52 mm                    | (6½) | 52 mm                       | (6½) | 56 mm         | (7)  |
| 72 mm  | (9)  | 60 mm                    | (7½) | 60 mm                       | (7½) | 64 mm         | (8)  |
| 80 mm  | (10) | 64 mm                    | (8)  | 64 mm                       | (8)  | 72 mm         | (9)  |
| 88 mm  | (11) | 72 mm                    | (9)  | 72 mm                       | (9)  | 80 mm         | (10) |
| 96 mm  | (12) | 80 mm                    | (10) | 80 mm                       | (10) | 88 mm         | (11) |
| 112 mm | (14) | 88 mm                    | (11) | 88 mm                       | (11) | 96 mm         | (12) |

Diameter given for 3-strand, size no for 8-strand plaited.

Polyamide (nylon) or polyester ropes are recommended for mooring tails and should have a minimum finished length of 11 metres (6 fathoms) in order to provide the necessary elasticity. The strength of the tail when new should be approximately 25 per cent greater than that of the mooring rope or wire.

2.3 Man-made fibre ropes have high durability and low water absorption and are very resistant to rot or mildew but should not be left unduly long exposed to sunlight when not in use. They should be covered by tarpaulins or, if the ship is on a long voyage, stowed away.

2.4 Ropes should be kept free of contamination by chemicals (rust removers and paint strippers may be particularly damaging) and not stowed close to any source of heat. Any accidental contamination should be reported immediately for cleansing or other action to be taken (see also Chapter 15, section 4).

2.5 Careful inspection of man-made fibre ropes for wear externally and internally is necessary. A high degree of powdering observed between strands indicates excessive wear and reduced strength. Ropes with high stretch suffer greater interstrand wear than others. Hardness and stiffness in some ropes, polyamide (nylon) in particular, may also indicate overworking.

2.6 Man-made fibre stoppers of like material (but not polyamide) should be used on man-made fibre mooring lines, preferably using the 'West Country' method (double and reverse stoppering).

2.7 Unlike natural fibre ropes, man-made fibre ropes give little or no audible warning of approaching breaking-point.

2.8 Stretch imparted to man-made fibre ropes, which may be up to double that of natural fibre rope, is usually recovered almost instantaneously when tension is released. A break in the rope may therefore result in a dangerous back-lash and an item of running gear breaking loose may be projected with lethal force. Snatching of such ropes should be avoided; where it may occur inadvertently, personnel should stand well clear of the danger areas. The possibility of a mooring or towing rope parting under load is reduced by proper care, inspection and maintenance and by its proper use in service.

2.9 Man-made fibre ropes may easily be damaged by melting if frictional heat is generated during use. Too much friction on a warping drum may fuse the rope with consequential sticking and jumping of turns, which can be dangerous. Polypropylene is more liable to soften than other material. To avoid fusing, ropes should not be surged unnecessarily on winch barrels. For this reason, a minimum of turns should be used on the winch barrel; three turns are usually enough but on whelped drums one or two extra turns may be needed to ensure a good grip; these should be removed as soon as practicable.

2.10 The method of making eye splices in ropes of man-made fibres should be chosen according to the material of the rope:

(a) polyamide (nylon) and polyester fibre ropes need four full tucks in the splice each with the completed strands of the rope followed by two tapered tucks for which the strands are halved and quartered for one tuck each respectively. The length of the splicing tail protruding from the finished splice should be equal to at least three rope diameters. The portions of the splice containing the tucks with reduced number of filaments should be securely wrapped with adhesive-tape or other suitable material;

(b) polypropylene ropes should have at least three but not more than four full tucks in the splice. The protruding spliced tails should be equal to three rope diameters at least;

(c) polyethylene ropes should have four full tucks in the splice with protruding tails of three rope diameters at least.

### 3 Mooring

3.1 Surfaces of fairleads, bollards, bitts and drum ends should be kept clean and maintained in good condition. Rollers and fairleads should turn smoothly and a visual check made that corrosion has not weakened them.

3.2 Mooring decks should have anti-slip surfaces provided by fixed treads or by treatment with anti-slip paint.

3.3 A mooring rope should be examined frequently throughout its length for both external wear and wear between strands. Splices should be intact.

3.4 Wire ropes should be regularly treated with suitable lubricants.

3.5 New rope, 3-strand fibre rope and wire should be taken out of a coil in such fashion as to avoid disturbing the lay of the rope.

3.6 When wire is joined to a natural or man-made fibre rope, a thimble or other device should be inserted in the eye of the fibre rope; both wire and rope should have the same direction of lay.

3.7 A wire rope should not be used directly from a reel, unless designed for the purpose, because if the wire fouls the reel, both the reel and frame may be torn from the deck and cause injuries. Sufficient slack rope should be taken off a reel to cover all contingencies of use and be flaked out on deck in a safe manner. If there is doubt of the amount required, then the complete wire should be removed from the reel. Paying out of the wire rope should be controlled by turns round bitts or drum ends.

3.8 When cargo winches are used for handling springs on the main deck, suitable leads should be provided. If it is necessary to use a snatch block, precautions should be taken against its breaking loose.

3.9 A watchman, rigger or boatman should normally be employed to heave mooring ropes ashore. No seaman should go ashore other than by safe means.

3.10 A sufficient number of men must always be available at each end of the ship during mooring operations.

3.11 A seaman should not in any circumstances stand in a bight of rope nor, whenever avoidable, in the bight formed between the drum and the fairlead.

3.12 An experienced seaman should be at the winch controls throughout the whole time of the mooring operation.

3.13 When ropes and wires are under strain, as in towing, all persons should remain in positions of safety to the fullest possible extent.

3.14 Immediate action should be taken to reduce the load should any part of the system appear to be under excessive strain.

3.15 The safe method of heaving by means of turns on a drum is for one man to be stationed at the drum end with a second man backing and coiling down the slack as it is taken in.

3.16 Sharp-angled leads of rope or wire should always be avoided.

3.17 A wire should never be led across a fibre rope on a bollard. Wires and ropes should be kept in separate fairleads or bollards.

3.18 Wire on the drum end of a winch should not be used as a check wire.

3.19 When a wire is used as a slip wire, the eyes should be seized.

3.20 Chain stoppers should be used for stoppering off wire mooring ropes. They should be applied with two half-hitches in the form of a cow hitch suitably spaced with the tail backed against the lay of the wire to ensure that the chain neither jams nor opens up the lay of the wire.

#### 4 Mooring to buoys

4.1 Where mooring to buoys is undertaken from a ship's launch or boat, seamen engaged in the operation should wear lifejackets and a lifebuoy with attached lifeline should be kept readily available in the boat.

4.2 Means should be provided to enable a man who has fallen into the water to climb back on board the launch or boat. If a boarding ladder with flexible sides is used, it should be weighted so that the lower rungs remain below the surface.

4.3 Where mooring to buoys is undertaken directly from the ship, a lifebuoy with attached line of sufficient length should be available for immediate use.

4.4 When slip wires are used for mooring to buoys or dolphins, the eyes of the wires should never be put over the bitts.

#### 5 Casting off

5.1 A sufficient number of men should always be available at each end of the ship during casting off.

5.2 When no mooring gangs are available, a slip wire or mooring rope on the bight should be utilised for letting go.

5.3 Tow lines should be let go in a controlled fashion and seamen should keep well clear of the eyes of tow ropes.



# Lifting and mechanical handling appliances

## 1 General

1.1 All appliances and gear used for lifting, lowering and handling loads on a ship should be inspected, examined and, where necessary, tested at regular intervals. Particulars of inspections, examinations and tests carried out should always be kept up to date. Inspections, examinations and tests should be carried out by a competent person.

1.2 Appliances and gear should be marked where appropriate with their safe working loads.

1.3 Any lifting or handling appliance or gear that has not been subject to regular inspection, examination or test, or is in any way defective, should not be used at any time. Any defects arising in the course of use should be reported promptly and operations suspended.

1.4 Inexperienced seamen and those less than 18 years of age should not be in sole charge of any powered lifting or handling appliance. If under instruction, they should be closely supervised by a competent person for the whole time.

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

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

1.7 No lifting appliance 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.

1.8 A powered appliance should always have a man at the controls while it is in operation; it should never be left to run with a control secured in the ON position.

1.9 If any powered appliance is to be left unattended with the power on, loads should be taken off and controls put in 'neutral' or 'off' positions. Where practical, controls should be locked or otherwise inactivated to prevent accidental restarting. When work is completed, power should be shut off.

1.10 The person operating any lifting or handling appliance should have no other duties which might interfere with his primary task. He should be in a proper and protected position, facing controls and, so far as is practicable, with a clear view of the whole operation.

1.11 If the operator of a lifting or handling device does not have a full unobstructed view of the operation, a signaller should be posted having no other duties. He should be an experienced seaman and not less than 18 years of age. No other person should give signals.

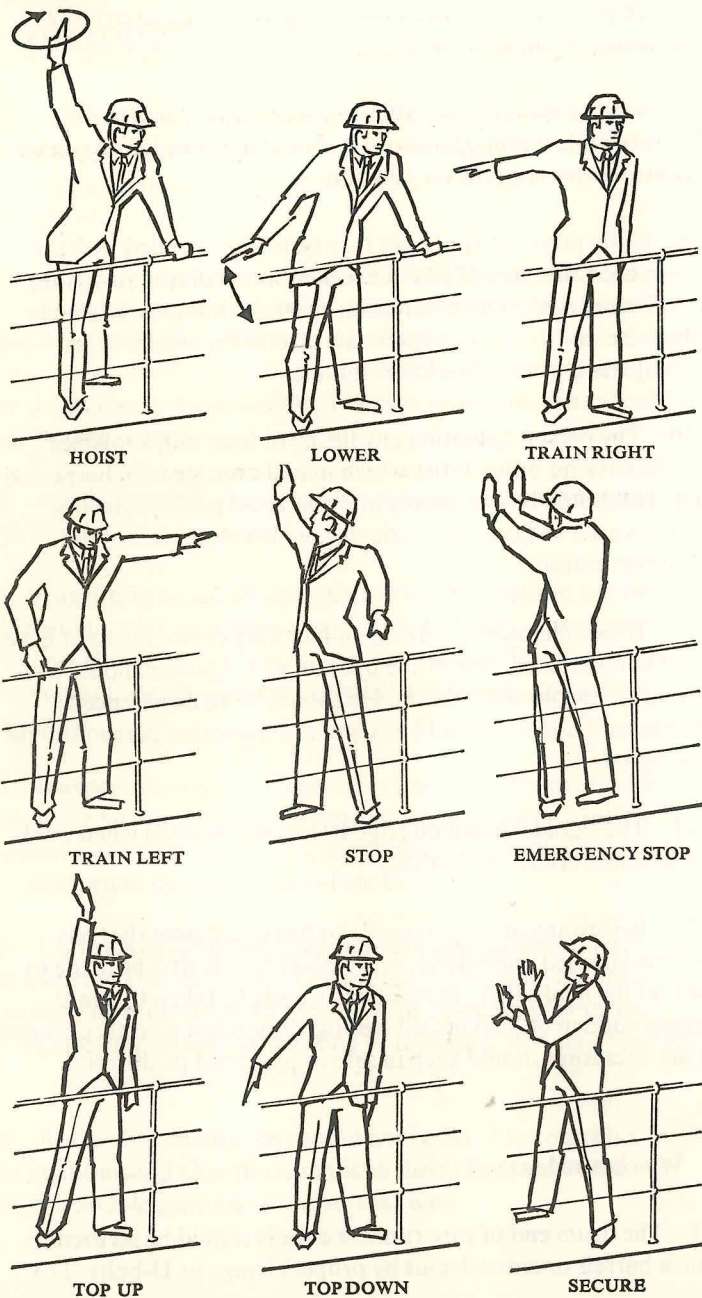
1.12 The signals shown on page 100 should be used when working winches, cranes or derricks.

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

## 2 Winches and cranes

2.1 The drum end of wire runners or falls should be secured to winch barrels or crane drums by proper clamps or U-bolts. The

**Code of hand signals  
when working winches,  
cranes or derricks.**



runner or fall should be long enough to leave at least 3 turns on the barrel or drum at maximum normal extension.

2.2 Slack turns of wire or rope on a barrel or drum should be avoided as they are likely to pull out suddenly under load.

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

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

2.5 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.

2.6 When a travelling crane is moved, any necessary holding bolts or clamps should be replaced before the crane is operated in its new position.

2.7 Access to a crane should be always by the proper means provided.

### 3 Derricks

3.1 This section applies generally to the conventional type of ship's derrick. For other types, such as the 'Hallen' and 'Stulken' derricks, the manufacturer's instructions should be followed.

3.2 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.

3.3 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.

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

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

3.6 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. A seaman should back up to assist the man controlling the wire on the drum and by 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.

3.7 To secure 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.

3.8 When a derrick is lowered on a topping lift purchase, a seaman 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. While employed on this duty the seaman should not attempt or be given any other task; in no circumstances should the pawl bar be wedged or lashed up.

3.9 A derrick having 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 in complete safety, that is, without putting an undue strain on the topping lift purchase and its attachments.

3.10 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.

3.11 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.

3.12 Cranes or derricks should not be used to drag heavy loads from under deck; where necessary winches should be used for such work. This does not apply to the normal working of general cargo when the angle is small and when there is an ample margin between the loads handled and the safe working load of the crane or derrick.

3.13 If heavy cargo is to be dragged under deck with 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 moved, 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.

#### 4 Union purchase

4.1 Where derricks have not been marked with the safe working load in union purchase they should not be used for loads in excess of one-third of the SWL of the derrick (or of the lower rated derrick where there are unequal ratings). It must be remembered that in general it is the SWL of the single runner and NOT that of the derrick which will determine the SWL of the union purchase.

4.2 The following precautions should be strictly taken to avoid excessive tensions:

(a) the angle between the married runners should not normally exceed  $90^\circ$  and an angle of  $120^\circ$  should never be exceeded;

(b) the cargo sling should be kept as short as possible so as to clear the bulwarks without the angle between the runners exceeding  $90^\circ$  (or  $120^\circ$  in special circumstances);

(c) derricks should be topped as high as practicable consistent with safe working;

(d) the derricks should not be rigged further apart than is absolutely necessary.

4.3 The following examples will show how rapidly excessive loads may be put on derricks, runners and attachments as the angle between runners increases:  
At  $60^\circ$  included angle, the tension in each runner would be just over half the load; at  $90^\circ$  the tension would be nearly three-quarters of the load; at  $120^\circ$  the tension would be equal to the load; and at  $175^\circ$  the tension would be nearly 12 times the load.

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

4.5 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.

4.6 Narrow angles between derricks and outboard guys and between outboard guys and the vertical should be avoided in union purchase as 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 as this 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.

## 5 Stoppers

5.1 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.

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

5.3 No stopper should be shackled to the same eyeplate 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.

5.4 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.

## 6 Overhaul of cargo gear

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

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

6.3 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.

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

## 7 Mechanical handling appliances

7.1 Mechanical handling appliances such as fork lift trucks, etc, carried on board to assist in the handling of cargo should be periodically inspected, examined and tested as specified in section 1.1, and properly maintained. Appliances used for explosives should be approved for the purpose.

7.2 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 since the vehicles cannot be adequately controlled when the vessel is pitching and rolling.

7.3 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.

7.4 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.

7.5 Before a truck is used, it should be checked to ensure that it is in a safe condition, that horns, brakes and controls are in good working order and, in particular, that pneumatic tyres where fitted are inflated to the correct pressure.

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

7.7 When the forward vision of the operator is obscured by the load, the appliance should be driven in reverse. Where this is impracticable, a signaller should be placed to control the movement.

7.8 Persons other than the driver should not be carried on a truck. Riding on the forks of a truck is particularly dangerous.

7.9 The driver should be careful to keep all parts of his body within the limits of the width of the truck or load.

## Hatches

### 1 General

1.1 Weather deck hatch covers and their securing arrangements should be inspected at regular intervals while the ship is at sea.

1.2 Beams and hatch covers should be properly maintained.

1.3 Broken, split, poorly-fitting or otherwise defective wooden hatch covers should be repaired or replaced as soon as possible.

1.4 Hatch covers should not be used for any other purpose.

1.5 When hatches are opened, the area around the openings should be adequately illuminated. Such illumination should be maintained for as long as the hatches remain open where there may be a risk of a person falling into the space.

1.6 Unless hatches are fitted with coamings to a height of at least 760mm (30 inches) they should be securely covered or fenced to a height of 1 metre (39 inches) when not in use for the passage of cargo.

1.7 Work should not be done nor loads imposed over any section of wooden hatchboards unless all supporting beams are in place, and a competent person should satisfy himself that the hatch cover can safely support any load to be placed on it.

### 2 Handling and stowage of non-mechanical hatch covers and beams

2.1 When hauling tarpaulins seamen should walk forwards and NOT backwards so that they can see where they are walking.

2.2 Hatch covers and beams should not be removed or replaced while work is going on below them.

2.3 Hatch covers should not be handled manually unless they can be easily lifted by two men. One man should not attempt to handle hatchboards unaided.

2.4 Four-legged slings should be used for lifting pontoons, slab hatches etc.

2.5 Beam slings should be of adequate length to reach the lifting points of the beams without forming enclosed angles in excess of 120°. They should be secure against accidental dislodgement.

2.6 Each leg of all beam and pontoon slings should be fitted with a suitable rope lanyard at least 3 metres (10 feet) long to control swinging.

2.7 When removing hatchboards, seamen should work from the centre towards the sides and, when replacing them, from the sides towards the centre.

2.8 Beams remaining in position in a partly opened hatchway should be secured against accidental displacement. If that cannot be done, they should be removed.

2.9 Immediately before beams are to be removed, a check should be made that pins or other locking devices have been freed.

2.10 The head of a crane or derrick being used to lift beams should be directly over them to avoid swing when beams clear their sockets.

2.11 When beams, pontoons and slab hatches are being lifted mechanically, one man alone should be responsible for directing the winch operator.

2.12 Beams that have become jammed at an angle should be freed with care.

2.13 No one should walk out on a beam for any purpose whatsoever.

2.14 Hatch covers, beams, pontoons and tarpaulins which have been removed should be properly stacked and secured or placed in such a manner that they cannot fall or otherwise cause danger. Where practicable a space of at least 1 metre (39 inches) should be left between them and the hatchway.

2.15 Where practicable, hatch covers should be arranged in neat piles away from the hatchway or laid singly on deck with no gaps between them. They should be properly handled and not thrown.

2.16 Beams and hatch boards, unless made to be interchangeable, should be replaced in proper order according to hatch, deck and section marked on them.

2.17 Each beam and hatch board should be properly seated.

2.18 A marline spike, or something similar, should be used to test the alignment of the pinholes for securing beams. Fingers should not be used for this purpose.

2.19 When covering a hatch, a check should be made to ensure that the hatch boards completely cover the hatch or hatch section for which they are intended so that no dangerous gaps are left.

2.20 Before covers of a hatch are replaced a check should be made that all persons are out of the hold or clear of the hatchway.

### 3 Mechanical hatch covers

3.1 Instructions for the safe operation of mechanical hatch covers should be posted up in a prominent position. In all cases, these instructions should be followed and those engaged in the work should be aware of any potential dangers accompanying the operation. Only the jacks or other means provided by the manufacturers should be used for raising or lowering the covers.

3.2 All types of mechanical hatch cover should be opened and closed with due care and attention under the direct supervision of a ship's officer or experienced petty officer. All persons should keep clear of the hatch and stowage position during the operation of the covers. The area should be clear of guys, dunnage, runners etc which might foul the covers.

3.3 No one should climb on to closed or stowed hatch covers without checking that they are properly secured. No person should remain on or near the covers when they are being moved or when they are partially open.

3.4 Mechanical hatch covers in the open position should be secured against movement using chain preventers or other suitable means.

## Work in cargo spaces

### 1 Access

1.1 Cargo spaces should always be well ventilated before entry is made. Should it be necessary to enter a hold with a suspect atmosphere, the operation should be continuously supervised and the procedures set out in Chapter 10 'Entry into enclosed spaces' followed.

1.2 Whenever practicable, the permanent means of access should be used. In other cases, portable rigid ladders should be used (see Chapter 15, section 5). When necessary, lifelines and safety harness should be available and used.

1.3 Should it be necessary to remove injured persons from a hold, the best available method should be adopted but where practicable all access openings should be opened and the following equipment used where available:

- (a) a manually-operated davit, suitably secured over the access opening;
- (b) a cage or stretcher fitted with controlling lines at the lower end.

1.4 When hatches are opened, there should be ample clearance for any loads which may have to be raised or lowered.

### 2 Lighting in cargo spaces

2.1 Cargo spaces in which work has to be undertaken should be adequately lit. Dazzle and strong contrasts of light and shadow should be avoided.

2.2 Open or naked lights should not be used. Portable lights, when used, should be adequately guarded and suitable for the intended purpose.

2.3 Portable lights should not be lowered nor suspended by their cables. Leads for portable lights should be kept clear of loads, running gear and moving equipment.

2.4 Portable lights should be properly secured against accidental displacement.

2.5 Lights should not be switched off nor removed before it has been ascertained that all seamen are clear of the compartment or hold.

### 3 Fencing

3.1 Before work is done in cargo spaces, all openings through which a person may fall should be adequately guarded or fenced (see Chapter 9, section 5).

3.2 Guard rails should be tight with stanchions secured in position, and properly maintained.

3.3 Partly opened unguarded hatches should never be covered with tarpaulins; this would present a very dangerous situation which would not be apparent to a person walking across the hatch.

### 4 General precautions

4.1 Care should be taken when walking over dunnage which is loosely stowed or from which nails may be protruding.

4.2 When work is to be done near a tall stack of cargo, the cargo should be secured to prevent it falling. If the stack is of bagged cargo, damage to the bags may cause bleeding and subsequent collapse of the stow.

4.3 Where it is necessary to mount the face of a stow, a portable ladder should be used.

4.4 When work is being done on a tall stack of cargo or in places where there is a risk of falling, a safety net should be erected. It should not be secured to hatch covers.

## Work in machinery spaces

### 1 General

1.1 Every dangerous part of any machinery should be securely fenced unless it is in such a position or of such construction as to be safe to all crew.

1.2 All steam pipes, exhaust pipes and fittings which by their location and temperature present a hazard, should be adequately lagged or otherwise shielded. The insulation of heated surfaces should be properly maintained, particularly in the vicinity of oil systems.

1.3 Personnel required to work in machinery spaces which have high noise levels should wear suitable hearing protectors (see Chapter 5, section 3).

1.4 Where high noise level in a machinery space or the wearing of hearing protectors may mask an audible alarm, a visual alarm of suitable intensity should be provided, where practicable, to attract attention and indicate that an audible alarm is sounding. This should preferably take the form of a light or lights with rotating reflectors.

1.5 The source of any oil leakage should be located and repaired as soon as practicable.

1.6 Waste oil should not be allowed to accumulate in the bilges or on tank tops. Any accumulation should be disposed of in accordance with Oil Pollution Regulations at the earliest opportunity. Tank tops and bilges should, wherever practicable, be painted a light colour and kept clean and well-illuminated in the vicinity of pressure oil pipes so that leaks may be readily located.

1.7 Great caution is required when filling any settling or other oil tank to prevent it overflowing, especially in an engine room where exhaust pipes or other hot surfaces are directly below.

1.8 Particular care should be taken when filling tanks which have their sounding pipes in the machinery spaces to ensure that weighted cocks are closed. In no case should a weighted cock on a fuel or lubricating oil tank sounding pipe or on a fuel or lubricating oil tank gauge be secured in the open position.

1.9 Engine room bilges should at all times be kept clear of rubbish and other substances so that mud-boxes are not blocked and the bilges may be readily and easily pumped.

1.10 Remote controls fitted for stopping machinery or pumps or for operating oil-settling tank quick-closing valves in the event of fire, should be tested regularly to ensure that they are functioning satisfactorily.

### 2 Boilers

2.1 A notice should be displayed at each boiler setting out operating instructions. Information provided by the manufacturers of the oil-burning equipment should be displayed in the boiler room.

2.2 To avoid the danger of a blowback when lighting boilers, the correct flashing up procedure should always be followed:

- (a) there should be no loose oil on the furnace floor;
- (b) the oil should be at the correct temperature for the grade of oil being used; if not, the temperature of the oil must be regulated before lighting is attempted;
- (c) the furnace should be blown through with air to clear any oil vapour;
- (d) the torch, specially provided for the purpose, should always be used for lighting a burner unless an adjacent burner in the same furnace is already lit; other means of ignition, such as introducing loose burning material into the furnace, should not be used. An explosion may result from attempts to relight a burner from the hot brickwork of the furnace;
- (e) if all is in order, the operator should stand to one side, and the lighted torch inserted and fuel turned on. Care should be

taken that there is not too much oil on the torch which could drip and possibly cause a fire;

(f) if the oil does not light immediately, the fuel supply should be turned off and the furnace ventilated by allowing air to blow through for two or three minutes to clear any oil vapour before a second attempt to light is made. During this interval the burner should be removed and the atomiser and tip inspected to verify that they are in good order;

(g) if, while the burner is alight, there is a total flame failure in the furnace, the fuel supply should be turned off.

2.3 The avenues of escape from the boiler fronts and firing spaces should be kept clear.

2.4 Where required to be fitted, the gauge glass cover should always be in place when the glass is under pressure. If a gauge glass or cover needs to be replaced or repaired, the gauge should be shut off and drained before the cover is removed.

### 3 Unmanned machinery spaces

3.1 A seafarer should never enter or remain in an unmanned machinery space alone, unless he has received permission from, or been instructed by the engineer officer in charge at the time. Before entering the space, at regular intervals whilst in the space, and on having finally left the space, he must report by telephone, or other means provided, to the duty deck officer. The foregoing also applies to the engineer officer in charge. A seafarer may only be instructed to enter an unmanned machinery space alone by the designated engineer officer in charge and then he may only be sent to carry out a specific task which he may be expected to complete in a comparatively short time. Before he enters the space the method of reporting should be clearly explained and should follow the lines indicated above. On leaving the space he must also report in person to the designated engineer officer in charge. Consideration should be given in appropriate instances to using a 'permit-to-work' (see Chapter 7).

3.2 Notices of safety precautions to be observed by persons working in unmanned machinery spaces should be clearly displayed at all entrances to the space. Warning should be given that

in unmanned machinery spaces there is a likelihood of machinery suddenly starting up.

3.3 Unmanned machinery spaces should be adequately illuminated at all times.

3.4 When machinery is under bridge control, the bridge should always be advised when a change in machinery setting is contemplated by the engine room staff, and before a reversion to engine room control of the machinery.

### 4 Refrigeration machinery

4.1 Adequate information should be available on each vessel, laying down the operating and maintenance safeguards of the refrigeration plant, the particular properties of the refrigerant and the precautions for its safe handling.

4.2 No one should enter a refrigerated compartment without first informing a responsible officer.

4.3 The compartment or flat in which refrigeration machinery is fitted should be adequately ventilated and illuminated. Where ventilation cannot be carried out efficiently by natural means, mechanical ventilation should be employed as necessary, arranged so that the machines are situated between inlets and outlets and that the air is exhausted from both the top and bottom of the compartment. Refrigerating machinery spaces within crew accommodation to which the *Merchant Shipping (Crew Accommodation) Regulations 1978* apply are required to be ventilated by at least two ventilators to the open air, one of which must be fitted with an exhaust fan and have its inlet near the bottom of the space.

4.4 Where fitted, both the supply and exhaust fans to and from compartments in which refrigeration machinery is situated should be kept running at all times. Inlets and outlets should be kept unobstructed. When there is any doubt as to the adequacy of the ventilation, a portable fan or other suitable means should be used to assist in the removal of toxic gases from the immediate vicinity of the machine.

4.5 Should it be known or suspected that the refrigerant has leaked into any compartments, no attempt should be made to enter those compartments until a responsible officer has been advised of the situation. If it is necessary to enter the space, it should be ventilated to the fullest extent practicable and the person entering should wear approved breathing apparatus. A man should be stationed in constant attendance outside the space, also with breathing apparatus (see Chapter 10).

## CHAPTER 21

# Hydraulic and pneumatic equipment

### 1 General

1.1 Personnel using hydraulic and pneumatic equipment should be fully conversant with the proper procedures for its safe operation. Operating instructions should be followed at all times.

1.2 Operators should ensure that the system operating pressure shown on the pressure gauge is at the level recommended.

1.3 The equipment should not be operated if it is in any way faulty or when a safety device is missing, incorrectly adjusted or defective.

1.4 The equipment, if defective in any respect, should be effectively immobilised pending adjustment or repair. Only authorised personnel should undertake repairs to the equipment or adjustment of the pressure settings of safety devices (see Chapter 22, section 12).

1.5 Prior to a hydraulic system being activated and when it is being closed down, the recommended checks should be made to ensure that there are no pockets of air or trapped pressure in the system and that there are no external leaks. Air pockets trapped in the system cause erratic action which can lead to injury or to damage to the installations or equipment.

1.6 Only the correct grade of hydraulic fluid should be used for topping up a hydraulic system.

1.7 Any spillage of hydraulic fluid should be cleared up immediately. Some fluids are based on mineral oils and any such fluid on the skin should be thoroughly washed off (see Chapter 1, section 2.8).

1.8 Where flexible hose assemblies are used, the application of a line of light coloured paint overlapping the junction of ferrule and hose will enable movement between the two to be readily noticed in advance of a failure.

1.9 When the equipment is in use, operators should never reach through a linkage of any hydraulically operated mechanism to set, adjust or operate the controls.

1.10 Before pressure is released from a system, any load on it should, where necessary, be adequately supported by other means. The operator should ensure that all pressures have been released before disconnecting any line, plug, valve or other component.

## 2 Hydraulic jacks

2.1 Jacks should be inspected before use to ensure that they are in a sound condition and that the oil in the reservoir reaches the minimum recommended level.

2.2 Before a jack is operated, care should be taken to ensure that it has an adequate lifting capability for the work for which it is to be used and that its foundation is level and of adequate strength.

2.3 Jacks should be applied only to the recommended or safe jacking points on equipment.

2.4 Equipment under which personnel are required to work should be properly supported with chocks, wedges or by other safe means – never by jacks alone.

2.5 Jack operating handles should be removed if possible when not required to be in position for raising or lowering the jack.

## CHAPTER 22

# Overhaul of machinery

## 1 General

1.1 Before any repair or maintenance work is commenced, care should be taken to ensure that all measures and precautions necessary for the safety of those concerned have been taken (see Chapter 7 on 'permit-to-work' systems).

1.2 No maintenance work or repair which might affect the supply of water to the fire main or sprinkler system should be started without the prior permission of the Master and Chief Engineer.

1.3 No alarm system should be isolated without the permission of the Chief Engineer.

1.4 Before machinery is serviced or repaired, measures should be taken to prevent turning or inadvertent starting as may occur with automatic or remote control systems.

1.5 Electrically-operated machinery should be isolated from the power supply.

1.6 Steam-operated machinery should have both steam and exhaust valves securely closed and, where possible, locked off.

1.7 In all cases, warning notices should be posted at or near the controls giving warning that the machinery concerned is not to be used.

1.8 When valves or filter covers have to be removed or similar operations have to be performed on pressurised systems, that part of the system should be isolated by closing the appropriate valves. Drain cocks should be opened to ensure that pressure is off the system.



1.9 When joints of pipes, fittings etc are being broken, the fastenings should not be completely removed until the joint has been broken and it has been established that no pressure remains within.

1.10 Before a section of the steam pipe system is opened to the steam supply, all drains should be opened. Steam should be admitted very slowly and the drains kept open until all the water has been expelled.

1.11 The officer in charge should give careful consideration to the hazards involved before allowing maintenance or repairs to, or immediately adjacent to, moving machinery. This should be permitted only in circumstances where no danger exists or where it is impracticable for the machinery to be stopped. The person who is to carry out the work should wear close-fitting clothing. Long hair should be covered (see Chapter 5, section 2.5). The officer in charge should consider whether it is necessary in the interests of safety for a second person to be in close attendance whilst the work is being carried out.

1.12 Heavy parts of dismantled machinery temporarily put aside should be firmly secured against movement in a seaway and, as far as practicable, be clear of walkways. Sharp projections on them should be covered when reasonably practicable.

1.13 Means of access to fire fighting equipment, emergency escape routes and watertight doors should never be obstructed.

1.14 Spare gear, tools and other equipment or material should never be left lying around, especially near to stabiliser or steering gear rams and switchboards.

1.15 A marline spike, steel rod, or other suitable device should be used to align holes in machinery being reassembled or mounted; fingers should never be used.

1.16 When guards or other safety devices have been removed from machinery to facilitate the overhaul, they should be replaced immediately the work is completed and before the machinery or equipment is tested.

1.17 An approved safety lamp should always be used for illuminating spaces where oil or oil vapour is present. Vapour should be dispersed by ventilation before work is done.

## 2 Protective clothing and equipment

2.1 Safety helmets should be worn by those engaged in the overhaul of engineroom machinery where there is a risk of head injury and by others necessarily working in the area who might be struck by falling objects.

2.2 Seafarers required to work in machinery spaces which have high noise levels should wear suitable hearing protection.

2.3 Suitable eye protection should always be worn by those handling chemicals or welding, grinding, scaling, hammering, using a cold chisel or doing any other work of a similar nature.

2.4 If essential maintenance or repair work necessitates the removal of asbestos lagging, the precautions set out in Chapter 1, section 2.19 should be adopted.

2.5 Spilled oil should always be cleared up immediately as a matter of habit, but floor plates will still become slippery making footholds insecure. This should be kept in mind during any work in machinery spaces where a lurch or fall could cause injury and particularly when heavy items of machinery are being handled. Risks are reduced by the wearing of suitable safety footwear with slip-resistant soles.

2.6 Protective clothing and equipment are described in Chapter 5.

## 3 Lifting

3.1 Where practicable, all items of lifting gear should be marked with safe working loads and not intentionally subjected to loads in excess of the rating. Lifting appliances which are not marked with their safe working load, should not be used (see Chapter 17, section 1).

3.2 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.

#### 4 Floor plates and hand rails

4.1 Where provided, lifting handles should be used when a floor plate is removed or replaced. When lifting handles are not available, the plate should be levered up with a suitable tool and a chock inserted before lifting. On no account should fingers be used to prise up the edges.

4.2 Whenever floor plates or handrails are removed, warning notices should be posted, the openings should be effectively fenced or guarded and the area well-illuminated.

#### 5 Working aloft or over bottom platforms

5.1 A stage or ladder should always be used when working beyond normal reach (see Chapter 15.).

5.2 When work is done at a level above the bottom platform, precautions should be taken against heavy objects such as tools or parts of machinery falling on a person below. A firmly secured bucket or box should be used to hold tools and loose parts of machinery.

#### 6 Boilers

6.1 Boilers should be opened only under the direction of an engineer officer. Care should be taken to check, after emptying, that the vacuum is broken before manhole doors are removed. Even if an air cock has been opened to break the vacuum, the practice should always be to loosen the manhole door nuts and break the joint before the removal of the dogs and knocking in the doors. The top manhole doors should be removed first.

Personnel should stand clear of hot vapour when doors are opened.

6.2 No person should enter any boiler, boiler furnace or boiler flue until it has cooled sufficiently to make work in such places safe.

6.3 Before entry is permitted to a boiler which is part of a range of two or more boilers, the engineer officer in charge should ensure that either:

(a) all inlets through which steam or water might enter the boiler from any other part of the range have been disconnected, drained and left open to atmosphere; or, where that is not practicable;

(b) all valves or cocks, including blowdown valves controlling entry of steam or water, have been closed and securely locked, and notices posted to prevent them being opened again until authorisation is given.

The above precautions should be maintained whilst personnel remain in the boiler.

6.4 Every boiler, boiler furnace or boiler flue, should be adequately ventilated before anyone enters and while persons remain inside. An attendant should always be standing by outside while persons remain inside the boiler.

6.5 Men cleaning tubes, scaling boilers, and cleaning backends, should wear appropriate protective clothing and equipment including goggles and respirators.

6.6 Special care should be exercised before a boiler is entered which has not been in use for some time or where chemicals have been used to prevent rust forming. The atmosphere may be deficient in oxygen and tests should be carried out before any person is allowed to enter. See Chapter 10 for advice on entering enclosed spaces.

#### 7 Auxiliary machinery and equipment

7.1 Before work is started on an electric generator or auxiliary machine, the machine should be stopped and the starting air valve or similar device should be secured so that it cannot be operated.

A notice should be posted warning that the machine is not to be started nor the turning gear used. To avoid the danger of motoring and electric shock to any person working on the machine, it should be isolated electrically from the switchboard or starter before work is commenced. The circuit-breaker should be opened and a notice posted at the switchboard warning personnel that the breaker is not to be closed. Where practicable, the circuit-breaker should be locked open.

7.2 No attempt should be made to start a diesel engine without first barring round with the indicator cocks open. The barring gear should then be disengaged before starting the engine.

7.3 Oily deposits or flammable material should never be allowed to be present in way of diesel engine relief valves, crankcase explosion doors or scavenge belt safety discs.

7.4 Flammable coatings should never be applied to the internal surfaces of air starting reservoirs.

7.5 Care should be taken to prevent the jets from a diesel engine fuel injector impinging on the skin during testing. Leakage from other high pressure parts of injection equipment is similarly dangerous.

7.6 Oxygen should on no account be used for starting engines. To do so would probably cause a violent explosion.

## 8 Main engines

8.1 Where necessary, suitable staging, adequately secured, should be used to provide a working platform.

8.2 Before anyone is allowed to enter or work in the main engine crankcase or gear case, the turning gear should be engaged and a warning notice posted at the starting position.

8.3 Before the main engine turning gear is used, a check should be made to ensure that all personnel are clear of the crankcase and of any moving part of the main engine and that the duty deck officer has confirmed that the propeller is clear.

8.4 If a hot bearing has been detected in a closed crankcase, the crankcase should not be opened until sufficient time has been allowed for the bearing to cool down, otherwise the entry of air could create an explosive air/oil vapour mixture.

8.5 The opened crankcase or gear case should be well-ventilated to expel all flammable gases before any source of ignition, such as a portable lamp (unless of an approved safety type) is brought near to it.

8.6 Before the main engine is restarted, a responsible engineer officer should check that the shaft is clear and inform the duty deck officer who should confirm that the propeller is clear.

## 9 Electrical equipment

9.1 The risks of electric shock are much greater on board ship than they are normally ashore because the conditions of wetness, high humidity and high temperature (inducing sweating) reduce the contact resistance of the body. In those conditions, severe and even fatal shocks may be caused at voltages as low as 60V.

9.2 A notice of instructions on the treatment for electric shock should be posted in every space containing electrical equipment and switchgear. Immediate on the spot treatment of an unconscious patient is essential.

9.3 Before any work is done on electrical equipment, fuses should be removed or circuit breakers opened to ensure that all related circuits are dead. If possible, switches and circuit-breakers should be locked open or, alternatively, a 'not to be closed' notice attached (see 7.1). Where a fuse has been removed, it should be retained by the man working on the equipment until the job is finished. A check should be made that any interlocks or other safety devices are operative.

9.4 Flammable materials should never be left or stored near switchboards.

9.5 Carbon tetrachloride should not be used for cleaning electrical equipment because of the high toxicity of its vapours. Other safer cleaning solvents such as 1:1:1 trichloroethane are

available but, even with these, the area of use should be well-ventilated. Solvents should always be used in accordance with manufacturers' instructions.

9.6 Work on or near live equipment should be avoided if possible but when it is essential for the safety of the ship or for testing purposes, the following precautions should be taken.

9.7 A second man, who should be competent in the treatment of electric shock, should be continually in attendance.

9.8 The working position adopted should be safe and secure to avoid possible fatal contact with live parts arising from a slip or stumble or the movement of the vessel. Insulated gloves should be worn where practicable.

9.9 Contact with the deck, particularly if it is wet, should be avoided. Footwear if damp or with metal studs or rivets may give inadequate insulation. The use of a dry insulating mat at all times is recommended.

9.10 Contact with bare metal should be avoided. A hand-to-hand shock is especially dangerous. To minimise the risk of a second contact should the working hand accidentally touch a live part, one hand should be kept in a trouser pocket whenever practicable.

9.11 Wrist watches, metal identity bracelets and rings should be removed. They provide low resistance contacts with the skin. Metal fittings on clothing and footwear are also dangerous.

9.12 Meter probes should have only minimum amounts of metal exposed and insulation of both probes should be in good condition. Care should be taken that the probes do not short circuit adjacent connections. In measuring voltages greater than 250V the probe should be attached and removed with the circuit dead.

## 10 Refrigeration machinery and refrigerated compartments

10.1 No one should enter a refrigerated chamber without first informing a responsible officer (see Chapter 20, section 4).

10.2 Personnel charging or repairing refrigeration plants should fully understand the precautions to be observed when handling the refrigerant.

10.3 Should it be known or suspected that the refrigerant has leaked into any compartment, no attempt should be made to enter that compartment without appropriate precautions being taken (see Chapter 10).

10.4 When refrigerant plants are being charged through a charging connection in the compressor suction line, it is sometimes the practice to heat the cylinder to evaporate the last of the liquid refrigerant. This should be done only by placing the cylinder in hot water or some similar indirect method and never by heating the cylinder directly with a blowlamp or other flame. Advice on the handling and storage of gas cylinders is given in Chapter 12, section 7.

10.5 When repair or maintenance necessitates the application of heat to vessels containing refrigerant, which form component parts of the refrigeration system, it should be ensured that appropriate valves are opened to prevent build-up of pressure within the vessels.

## 11 Steering gear

11.1 Generally, work should not be done on steering gear when a ship is under way. If it is necessary to work on steering gear when the vessel is at sea, the ship should be stopped and suitable steps taken to immobilise the rudder by closing the valves on the hydraulic cylinders or by other appropriate and effective means.

## 12 Hydraulic and pneumatic equipment

12.1 Before repairs to or maintenance of hydraulic and pneumatic equipment is undertaken, all pressure within the system should be released and the part being worked upon should be isolated from the power source. A warning notice should be displayed at the isolating valve.

12.2 Precautions should be taken against the possibility of residual pressure being released when unions or joints are broken.

12.3 Absolute cleanliness is essential to the proper and safe operation of hydraulic and pneumatic systems; the working area and tools, as well as the system and its components, should be kept clean during servicing work. Care should also be taken to ensure that replacement units are clean and free from any contamination, especially fluid passages.

12.4 Only those replacement components which comply with manufacturers' recommendations should be used.

12.5 Since vapours from hydraulic fluid may be flammable, naked lights should be kept away from hydraulic equipment being tested or serviced.

12.6 Any renewed or replacement item of equipment should be properly inspected or tested before being put into operation within the system.

12.7 A jet of hydraulic fluid under pressure should never be allowed to impinge upon the skin. Any hydraulic fluid spilt on the skin should be thoroughly washed off.

12.8 All equipment should be in a safe condition before the system is brought into operation.

## Servicing radio and associated electronic equipment

### 1 General

1.1 Exposure to dangerous levels of microwave radiation should be avoided by strict adherence to instructions about special precautions contained in manufacturers' handbooks. Radar sets should not be operated with wave guides disconnected unless it is necessary for servicing purposes, when special precautions should be taken.

1.2 Work should not be undertaken within the marked safety radius of Satellite Terminal Antennae unless its transmitter has been rendered inoperative.

1.3 Eyes are particularly vulnerable to microwave and ultra-violet radiation. Care should be taken to avoid looking directly into a radar aerial or waveguide while it is in operation or where arcing or sparking is likely to occur.

1.4 Exposure to dangerous levels of X-ray radiation may occur in the vicinity of faulty high voltage valves. Care should be exercised when fault tracing in the modulator circuits of radar equipment. An open circuited heater of such valves can lead to X-ray radiation where the anode voltage is in excess of 5000V.

1.5 Vapours of some solvents used for degreasing are toxic, particularly carbon tetrachloride which should never be used. Great care should be exercised when using solvents particularly in confined spaces; there should be no smoking. Manufacturers' instructions should be followed.

1.6 Some dry recorder papers used in echo sounders and facsimile recorders give off toxic fumes in use. The equipment should be well-ventilated to avoid inhalation of the fumes.

1.7 Radio transmitters and radar equipment should not be operated when men are working in the vicinity of aerials; the equipment should be isolated from mains supply and radio transmitters earthed. When equipment has been isolated, warning notices should be placed on transmitting and radar equipment and at the mains supply point, to prevent apparatus being switched on until clearance has been received from those concerned that they have finished the outside work.

1.8 Aerials should be rigged out of reach of persons standing at normal deck level or mounting easily accessible parts of the superstructure. If that is impracticable, safety screens should be erected.

1.9 Notices warning of the danger of high voltage should be displayed near radio transmitter aerials and lead-through insulators.

## 2 Electrical hazards

2.1 Conditions on board ship often create greater than normal risks of electric shock (see Chapter 22, section 9). It should also be borne in mind that cuts and abrasions significantly reduce skin resistance.

2.2 Fuses should be removed from equipment before work is begun, and retained while the work is proceeding.

2.3 Where accumulators are used they should be disconnected at source; otherwise precautions should be taken to avoid short circuiting the accumulator terminals with consequent risk of burns.

2.4 Live chassis connected to one side of the mains are usually marked appropriately and should be handled with caution. Where the mains are AC and a transformer is interposed, the chassis is usually connected to the earth side of the supply, but this should be verified using an appropriate meter.

2.5 When some types of equipment are switched off but the mains switches are left on, some parts may remain live; power should always be cut off at the mains.

2.6 Modern equipment often embodies a master crystal enclosed in an oven; the supply to the oven is taken from an independent source and is not disconnected when the transmitter is switched off and the mains switch is off. Mains voltage will be present inside the transmitter, and care should be taken.

2.7 Before work is begun on the EHT section of a transmitter or other HT apparatus, with the mains switched off, all HT capacitors should be discharged using an insulated jumper, inserting a resistor in the circuit to slow the rate of discharge. This precaution should be taken even where the capacitors have permanent discharge resistors fitted.

2.8 An electrolytic capacitor that is suspect, or shows blistering, should be replaced, since it is liable to explode when electrical supply is on. There is a similar risk when an electrolytic capacitor is discharged by a short circuit.

2.9 Work at or near live equipment should be avoided if possible but where it is essential for the safety of the ship or for testing purposes then the additional precautions described in Chapter 22, section 9.6-12 should be taken.

## 3 Valves and semi-conductor devices

3.1 Valves being removed from equipment which has recently been operating should be grasped with a heat resistant cloth; in case of large valves, eg power amplifier, OP and modulators, which reach a high temperature in operation, cooling down time should be allowed before they are removed. Severe burns can result if they touch bare skin.

3.2 Cathode ray tubes and large thermionic valves should be handled with care; although they implode when broken, there is still a risk of severe cuts from sharp-edged glass fragments. Some special purpose devices contain vapour or gas at high pressure, for example Trigatron, but these are usually covered with a protective fibre network to contain the glass should they explode.

3.3 Beryllia (beryllium oxide) dust is very dangerous if inhaled or if it penetrates the skin through a cut or abrasion. It may be present in some electronic components. Cathode ray tubes, power

transistors, diodes and thyristors containing it will be usually identified by the manufacturers' information provided, but lack of such information should not be taken as a positive indication of its absence. Those heat sink washers which contain it are highly polished and look like dark brass. These items should be carefully stored in their original packings until required.

3.4 Physical damage to components of this kind whether they are new or defective is likely to produce dangerous dust; abrasion should be avoided, they should not be worked by tools and encapsulations should be left intact. Excessive heat can be dangerous, but normal soldering with thermal shunt is safe. Damaged or broken parts should be separately and securely packed, following the manufacturer's instructions for return or disposal.

3.5 Persons handling parts containing beryllia should wear protective clothing, including gloves, to prevent beryllia coming into contact with the skin. Tweezers should be used where practicable. If the skin does become contaminated with the dust, affected parts, particularly any cuts, should be cleaned without delay.

#### 4 Work on apparatus on extension runners or on the bench

4.1 Chassis on extension runners should be firmly fixed, either by self-locking devices or by use of chocks, before any work is done.

4.2 Where units are awkward or heavy for one person to handle easily, assistance should be sought (see Chapter 11). Strain, rupture or a slipped disc can result from a lone effort.

4.3 Any chassis on the bench should be firmly wedged or otherwise secured to prevent it overbalancing or moving. Should a live chassis overbalance, no attempt should be made to grab it.

4.4 Sharp edges and tag connectors on a chassis can cause cuts. Should the tag be alive and the skin is pierced, the shock experienced will be out of proportion to the voltage.

4.5 Temporary connections should be soundly made. Flexible extension cables should have good insulation and adequate current carrying capacity.

## Storage batteries

### 1 General

1.1 When a battery is being charged it 'gases', giving off both hydrogen and oxygen. Because hydrogen is easily ignited in concentrations ranging from 4 per cent to 75 per cent in air, battery containers and compartments should be kept adequately ventilated to prevent an accumulation of dangerous gas.

1.2 Smoking and any type of open flame should be prohibited in a battery compartment. A conspicuous notice to this effect should be displayed at the entrance to the compartment.

1.3 Lighting fittings in battery compartments should be properly maintained at all times, with protective glasses in position and properly tightened. If cracked or broken glasses cannot be replaced immediately, the electric circuit should be isolated until replacements are obtained.

1.4 No unauthorised modifications or additions should be made to electrical equipment (including lighting fittings) in battery compartments.

1.5 Portable electric lamps and tools, and other portable power tools which might give rise to sparks should not be used in battery compartments.

1.6 The battery compartment should not be used as a store for any materials or gear not associated with the batteries.

1.7 A short circuit of even one cell may produce an arc or sparks which may cause an explosion of any hydrogen present. Additionally, the very heavy current which can flow in the short circuiting wire or tool may cause burns due to rapid overheating of the metal.

1.8 Insulation and/or guarding of cables in battery compartments should be maintained in good condition.

1.9 All battery connections should be kept clean and tight to avoid sparking and overheating. Temporary clip-on connections should never be used as they may work loose due to vibration and cause a spark or short circuit.

1.10 Metal tools, such as wrenches and spanners, should never be placed on top of batteries as they may cause sparks or short circuits. The use of insulated tools is recommended.

1.11 Jewellery, watches and rings etc should be removed when working on batteries. A short circuit through any of these items will heat it rapidly and may cause a severe skin burn. If rings cannot be removed, they should be heavily taped in insulating material.

1.12 All circuits fed by the battery should be switched off when leads are being connected or disconnected. If a battery is in sections, it may be possible to reduce the voltage between cells in the work area, and hence the severity of an accidental short circuit or electric shock, by removing the jumper leads between sections before work is begun. It should be appreciated that whilst individual cell voltages may not present a shock risk, dangerous voltages can exist where numbers of cells are connected together in series. A lethal shock needs a current of only a few tens of milliamps and particular care should be exercised where the voltage exceeds 50V.

1.13 Battery cell vent plugs should be screwed tight while connections are being made or broken.

1.14 The ventilation tubes of battery boxes should be examined regularly to ensure that they are free from obstruction.

1.15 Lids of battery boxes should be fastened while open for servicing and properly secured again when the work is finished.

1.16 Batteries should be kept battened in position to prevent shifting in rough weather.

1.17 Alkaline and lead-acid batteries should be kept in separate compartments. Where both lead-acid and alkaline batteries are in use, great care should be exercised to keep apart the materials and tools used in servicing each type, as contamination of the electrolyte may cause deterioration of battery performance and mixing of the two electrolytes produces a vigorous chemical reaction which could be very dangerous.

1.18 Both acid and alkaline electrolytes are highly corrosive. Immediate remedial action should be taken to wash off any accidental splashes on the person or on equipment. Hands should always be washed as soon as the work has finished.

1.19 Batteries should always be transported in the upright position to avoid spillage of electrolyte. A sufficient number of men should be employed since the batteries are heavy and painful strains or injury can otherwise easily result (see Chapter 11).

## 2 Lead-acid batteries

2.1 When the electrolyte is being prepared, the concentrated sulphuric acid should be added SLOWLY to the water. IF WATER IS ADDED TO THE ACID, THE HEAT GENERATED MAY CAUSE AN EXPLOSION OF STEAM, SPATTERING ACID OVER THE PERSON HANDLING IT.

2.2 Goggles, rubber gloves and protective apron should be worn when acid is handled.

2.3 To neutralise acid on skin or clothes, copious quantities of clean fresh water should be used.

2.4 An eyewash bottle should be to hand in the compartment for immediate use on the eyes in case of accident. This bottle should be clearly distinguishable by touch from acid or other containers, so that it may be easily located by a person who is temporarily blinded.

2.5 The corrosion products which form round the terminals of batteries are injurious to skin and eyes. They should be removed by brushing, away from the body. Terminals should be protected with petroleum jelly.



2.6 An excessive charging rate causes acid mist to be carried out of the vents onto adjacent surfaces. This should be cleaned off with diluted ammonia water or soda solution, and affected areas then dried.

### 3 Alkaline batteries

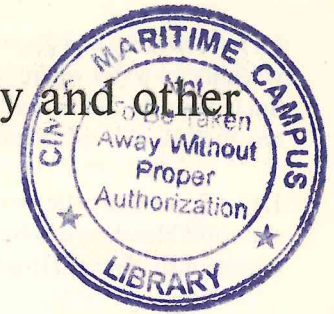
3.1 The general safety precautions with this type of battery are the same as for the lead-acid batteries with the following exceptions.

3.2 The electrolyte in these batteries is alkaline but is similarly corrosive. It should not be allowed to come into contact with the skin or clothing. In the case of contact with the skin, the affected parts should be washed with copious quantities of clean fresh water, but if burns ensue, boracic powder or a saturated solution of boracic powder should be applied. Eyes should be washed out thoroughly with plenty of clean fresh water followed immediately with a solution of boracic powder (at the rate of one teaspoonful to  $\frac{1}{2}$  litre or 1 pint of water). This solution should be always readily accessible when the electrolyte is handled.

3.3 Unlike lead-acid batteries, metal cases of alkaline batteries remain live at all times and care should be taken not to touch them or to allow metal tools to come into contact with them.

## CHAPTER 25

# Work in galley, pantry and other food handling areas



### 1 Health and hygiene

1.1 Catering staff have a responsibility for ensuring that high standards of personal hygiene and cleanliness of the galley, pantry and mess rooms are always maintained.

1.2 Hands and fingernails should be washed and cleaned before food is handled. This is most important after visiting the toilet.

1.3 All cuts, however small, should be reported immediately and receive first aid attention to prevent infection.

1.4 An open cut, burn or abrasion should be covered with a waterproof dressing.

1.5 Illness, rashes or spots should be reported immediately the symptoms appear.

1.6 A person suffering from dysentery or diarrhoea should not work in the galley, pantry or other food handling areas.

1.7 Catering staff should wear clean clothing when handling food and preparing meals. A supply of clean, hot, running water, clean towels and soap should be available.

1.8 Cleanliness of all food, crockery, cutlery, linen, utensils, equipment and storage is vital. Cracked or chipped crockery and glassware should be destroyed.

1.9 Foodstuffs which may have come into contact with broken glass or broken crockery should be thrown away.

1.10 There should be no smoking in galleys, pantries, store rooms or other places where food is prepared.

1.11 Crockery and glassware should not be left submerged in washing up water where it may easily be broken and cause injury. Such items should be washed up individually as should knives and any utensils or implements with sharp edges.

1.12 Some domestic cleaning substances, for example caustic soda and bleaches, can burn the skin. They may also react dangerously if mixed together (see also Chapter 1, section 2).

## 2 Slips, falls and tripping hazards

2.1 A large proportion of injuries to catering staff arise from slips and falls caused by wearing unsuitable footwear; 'flip-flops', sandals, plimsolls etc are especially dangerous on greasy decks and they afford no protection to the feet from burns or scalds if hot or boiling liquids are spilt. Suitable footwear, preferably with slip-resistant soles, should be worn at all times.

2.2 Decks and gratings should be kept free of grease, rubbish and ice etc to obviate slipping which may result in serious injuries especially when hot liquids or glass and crockery are being carried. Any spillage should be cleared up immediately.

2.3 Broken glass or crockery should be cleared away with a brush and pan – never with bare hands.

2.4 The area of deck immediately outside the entrance to refrigerated rooms should have an anti-slip surface.

2.5 Care should be taken when using stairs and companionways; one hand should always be kept free to grasp the handrail.

2.6 Trays, crates, cartons etc should not be carried in such fashion that sills, storm steps or other obstructions in the path are obscured from view.

## 3 Galley stoves and steam boilers

3.1 Care should be taken in lighting oil-fired galley stoves. The following procedures should always be adopted:

(a) the inside of the furnace should be checked to see that there

is no oil in it and air should be blown through to clear any oil vapour; a blowback may occur if an attempt is made to light the burner with oil or oil vapour in the furnace;

(b) the oil should be at the correct temperature for the grade of oil being used; if not, the temperature of the oil should be regulated before lighting is attempted;

(c) the torch specially provided for the purpose should always be used for lighting a burner; other means of ignition, eg by the introduction of loose burning material into the stove, should not be used. An attempt to relight a burner from the hot brickwork of the stove may result in an explosion;

(d) if all is in order, the operator should stand to one side, the lighted torch should be inserted and the fuel turned on. Care should be taken that there is not too much oil on the torch, which could drip and possibly cause a fire;

(e) if the oil does not light immediately, the fuel supply should be turned off and the furnace ventilated by allowing air to blow through for two or three minutes to clear any oil vapour before a second attempt to light. During this interval, the burner should be removed and the atomiser and tip inspected to verify that they are in good order;

(f) if while the burner is alight there is a total flame failure in the furnace the fuel supply should be completely closed off.

3.2 Catering staff should not attempt to repair electric or oil-fired ranges. Defects should always be reported so that proper repairs may be made. The equipment should be taken out of use until repaired.

3.3 The indiscriminate use of water in hosing down and washing equipment in the galley can be very dangerous, particularly where there are electrical installations. Whenever the galley deck is washed down, power to an electric range and all electric equipment should be switched off and isolated from the supply and water kept from contact with the electrical equipment.

3.4 Range guard rails should be used in rough weather. Pots and pans should never be filled to the extent that the contents slop over when the ship rolls.

3.5 Dry cloths or pot holders should always be used to handle hot pans and dishes. Wet cloths conduct heat quickly and may scald the hands.

3.6 No one should be directly in front of an oven when the door is opened – the initial heat blast can cause burns.

3.7 The steam supply to pressure cookers, steamers and boilers should be turned off and pressure released before their lids are opened.

3.8 Fat should not be rendered down in ovens. If forgotten, it may overheat and catch fire. A thermostatically-controlled frier may be used for the purpose but fat is best rendered down with a little water in a deep heavy-bottomed pot.

3.9 Water should never be poured into hot fat; the water turns into steam, throwing the fat considerable distances. This may cause severe burns to personnel, and possibly start a fire.

3.10 If fat catches fire in a container, the flames should be smothered if practicable and the container removed from the source of heat. Otherwise a suitable fire extinguisher should be used. In no circumstances should water be used.

#### 4 Catering equipment

4.1 Except under the supervision of an experienced person, no one should use catering equipment unless trained in its use and fully instructed in the precautions to be observed.

4.2 Dangerous parts of catering machines should be properly guarded and the guards kept in position whenever the machine is in use.

4.3 Any machine or equipment that is defective in its parts, guards or safety devices should be reported and taken out of service, with power disconnected, until repaired.

4.4 When a power-operated machine has to be cleaned or a blockage in it removed, it should be switched off and isolated from the power supply. Some machines will continue to run down for a while thereafter, and care should be taken to see that dangerous parts have come to rest before cleaning is begun.

4.5 A safe procedure for cleaning all machines should be established and carefully followed. Every precaution should be taken when cutting edges, for example on slicing machines, are exposed by the necessary removal of guards to allow thorough cleaning. Guards should be properly and securely replaced immediately the job is done.

4.6 Unless properly supervised, a person under eighteen years of age should not clean any power operated or manually driven machine with dangerous parts which may move during the cleaning operation.

4.7 Appropriate implements, not fingers, should be used to feed materials into processing machines.

4.8 Electrical equipment should not be used with wet hands.

#### 5 Knives, saws, choppers etc

5.1 Sharp implements should be treated with respect and handled with care at all times. They should not be left lying around working areas where someone may accidentally cut themselves. They should not be mixed in with other items for washing up but cleaned individually and should be stored in a safe place.

5.2 Knives should be kept tidily in a drawer or rack when not in use.

5.3 The handles of knives, saws, choppers etc should be securely fixed and kept clean and free from grease. The cutting edges should be kept clean and sharp.

5.4 Proper can openers should be used to open cans; improvisations are dangerous and may leave jagged edges on the can.

5.5 Chopping meat requires undivided attention. The chopping block must be firm, the cutting area of the meat well on the block and hands and body clear of the line of strike. There must be adequate room for movement and no obstructions in the way of the cutting stroke. Particular care is required when the vessel is moving in a seaway.

5.6 Foodstuffs being chopped with a knife should not be fed towards the blade with outstretched fingers. Finger tips should be bent inwards towards the palm of the hand with the thumb overlapped by the forefinger. The knife blade should be angled away from the work and so away from the fingers.

5.7 A falling knife should be left to fall, not grabbed.

5.8 A meat saw should be guided by the forefinger of the free hand over the top of the blade. The use of firm even strokes will allow the blade to feel its way; if forced, the saw may jump possibly causing injury.

## 6 Refrigerated rooms and store rooms

6.1 All refrigerated room doors should be fitted with means both of opening the door and of sounding an alarm from the inside.

6.2 A routine testing of the alarm bell and checking of the door clasps and inside release should be carried out regularly, at least at weekly intervals.

6.3 Those using the refrigerated room should make themselves familiar with the operation, in darkness, of the inside release for the door and the location of the alarm button.

6.4 All refrigerated room doors should be fitted with an arrangement of adequate strength to hold the door open in a seaway and should be secured open while stores are being handled. These doors are extremely heavy and can cause serious injury to a person caught between the door and the jamb.

6.5 Anyone going into a refrigerated room should take the padlock, if any, inside with him. Another person should be informed.

6.6 Cold stores or refrigerated rooms should not be entered if it is suspected that there has been a leakage of refrigerant. A warning notice to this effect should be posted outside the doors.

6.7 All stores and crates should be stowed securely so they do not shift or move in a seaway.

6.8 When wooden boxes or crates are opened, protruding fastenings should be removed or made safe.

6.9 Where a metal strip secures the lid of a tea chest it should be completely removed or made safe, otherwise its jagged edge may cause injury.

6.10 Meat hooks not in use should be stowed in a special container provided for the purpose. Where hooks cannot be removed they should be kept clear.

# Work in ships' laundries

## 1 General

1.1 Many of the general hazards found in the ship's laundry are similar to those elsewhere on the ship; strains can be caused by improper handling of awkward or heavy loads, equipment and washing left in gangways can cause falls and defective or improperly used machinery can cause injuries. There are also specific hazards in laundries which require particular attention.

1.2 Floors in laundry spaces can become extremely slippery when wet, especially where soap solutions are used. Constant care is needed and suitable footwear should be worn (see Chapter 5, section 6 and Chapter 9, sections 1, 2 and 7).

## 2 Burns and scalds

2.1 Many accidents in laundries involve scalding by steam or hot liquids or burns from hot surfaces. Every hot vessel or machine and every container of scalding liquid should be regarded as a potential danger, capable of causing injury and adequate precautions should be taken.

2.2 Good ventilation should be maintained to reduce heat and humidity in the working environment.

2.3 Where high pressure steam is used to heat water, the supply pressure should be regulated to ensure excessive steam cannot be applied to any machine.

## 3 Machinery and equipment

3.1 All personnel required to work in the laundry or use any part of the equipment there should be fully instructed on the proper operation of the machinery. A person under 18 years of age should not work on industrial washing machines, hydro-extractors, calenders or garment presses unless he is fully instructed as to precautions to be observed, and has received sufficient training in work at the machine or is under close supervision by a suitably experienced person.

3.2 Equipment should be inspected before use for faults and damage. Particular attention should be paid to the automatic cut-off or interlocking arrangements on washing machines, hydro-extractors etc and the guards and emergency stops on presses, calenders, mangling and wringing machines. Any defect or irregularity found during inspection, or apparent during operation of the equipment, should be reported immediately and the use of the machine discontinued until such time as any necessary repairs or adjustments have been carried out. A notice warning against use should be displayed prominently on the defective machine.

3.3 Frequent and regular inspection and thorough checking of all electrical equipment and apparatus are also necessary to ensure the standard of maintenance essential under the conditions which prevail in laundries.

3.4 Machines should not be overloaded and loads should be distributed uniformly.

3.5 Reliance should not be placed entirely on interlocking or cut-off arrangements on the doors of washing machines, hydro-extractors and drying tumblers etc; doors should not be opened until all movement has ceased.

## 4 Dry-cleaning operations

4.1 The principal hazard presented by a dry-cleaning solvent is that it is highly volatile, producing a vapour which is anaesthetic. The vapour is capable of inducing drowsiness, followed by unconsciousness and eventually death if the concentration is high enough and the affected person is not quickly removed to fresh

air. Effective mechanical ventilation should therefore be provided in any compartment containing dry-cleaning plant. The purpose of such ventilation is to ensure that the vapour concentration never exceeds the 'threshold limit value' which is the airborne concentration of vapour to which it is believed that nearly all persons may be repeatedly exposed without adverse effects.

4.2 Another hazard is that the vapour, if allowed to contact naked flames or red-hot surfaces, decomposes into toxic and corrosive substances which are dangers to health. Smoking should therefore be prohibited in compartments where the solvent is present.

4.3 The vapour is heavier than air, and may therefore build up in the bottom of a compartment.

4.4 Dry cleaning solvent is also a potential cause of de-fatting of the skin, which may lead to cracking of the skin with the resultant possibility of infection from other sources. Suitable impermeable, cotton-lined PVC gloves should therefore be worn when handling it.

4.5 An officer should be appointed to take overall responsibility for the security and operation of the dry-cleaning plant. The responsible officer should ensure that the plant compartment is locked at all times when the plant is not in use, and that only the operator and himself normally has access to it.

4.6 The responsible officer should be satisfied that the plant operator is fully aware of:

(a) the operating and maintenance procedures as laid down in the manufacturer's instruction manual, a copy of which should be kept on board the ship;

(b) action necessary in the event of malfunctions of the plant, in the interests of personal safety;

(c) the precautions to be taken in handling the solvent, and dealing with spillages;

(d) the inherent dangers of excessive concentrations of solvent vapour;

(e) the meaning of cautionary notices displayed in the plant compartment.

Appropriate protective clothing should be made available, and a second person should be present in case of emergency.

4.7 Warning notices appropriate to the particular solvent used should be displayed prominently and permanently in the plant compartment. Such notices should be obtained from the solvent manufacturer, and should include instructions in first aid for persons overcome by solvent vapour.

4.8 Where separate compartments are provided for the storage of solvent, the same general precautions as above should be observed, including the provision of suitable warning notices and the instructions in first aid.

4.9 Solvent being transferred manually from the store to the plant compartment should be carried in a closed container.

4.10 Thick and padded articles, such as sleeping bags and quilts, should not be dry-cleaned. They are very retentive of the dry-cleaning solvent from which it is extremely difficult to free them, and body warmth when the articles are put into use again is likely to cause vapours to be emitted from the trapped residues.

4.11 Articles which have been dry-cleaned should be aired very thoroughly on the ventilated rack provided, to remove any solvent fumes.

## 5 Fire prevention

5.1 Hand pressing irons should not be left standing on materials likely to be combustible.

5.2 Clothing should be left to dry only in the designated places. It should not be put to dry in any machinery space or on or close to electric heaters, radiators, etc in accommodation spaces.

## General cargo ships

*Note:* Chapters 11, 17, 18 and 19 have special relevance to work on general cargo ships.

### 1 Stowage of cargo

1.1 Cargo should be stowed in 'tween decks with due regard to the order of discharging, so that when beams and hatches have to be removed with cargo remaining in the 'tween deck, there will be a space of at least 1 metre (39 inches) between the hatch coaming and the cargo at the sides and ends of the hatchway or section of hatchway to be worked. Guidelines should be painted on 'tween decks on all sides of the hatch coamings.

1.2 Wherever practicable, cargo should be stowed so as to leave safe clearance behind the rungs of hold ladders and to allow safe access as may be necessary at sea.

1.3 Deck cargo should be stowed in accordance with the relevant provisions of the *Merchant Shipping (Load Line) (Deck Cargo) Regulations 1968*, clear of hatch coamings to leave safe access for seamen. Obstructions in the access way such as lashings or securing points should be painted white to make them more easily visible. Where this is impracticable and cargo is stowed against ships' rails or hatch coamings to such a height that the rails or coamings do not give effective protection to the crew from falling overboard or into the open hold, temporary fencing should be provided (see Chapter 9, section 5).

1.4 When deck cargo is stowed against and above ships' rails or bulwarks, a wire rope pendant or a chain, extending from the ring bolts or other anchorage on the deck to the full height of the deck cargo, should be provided to obviate seamen having to go overside

to attach derrick guys and preventers directly to the anchorages on the deck.

1.5 Where hatches will have to be opened at intermediate ports before deck cargo is unloaded, it should be stowed leaving a clear space of at least 1 metre (39 inches) around the coamings or around the part of the hatch that is to be opened. If this is impracticable, provision should be made by fencing or life-lines, to enable seamen to remove and replace beams and hatch coverings in safety.

### 2 Dangerous goods and substances

2.1 Regulations concerning the carriage of dangerous substances are contained in the current Merchant Shipping (Dangerous Goods) Rules (and any amending Rules), reproduced in the current edition of the *Report of the Department of Trade Standing Advisory Committee on the Carriage of Dangerous Goods in Ships* (the 'Blue Book'). The 'Blue Book' together with the *International Maritime Dangerous Goods Code* (IMDG Code) lists many substances regarded as dangerous and recommends how they should be classified, packed, labelled and stowed in order to comply with the Rules.

2.2 The general introduction and the introductions to individual classes of both the 'Blue Book' and the IMDG Code contain many provisions to ensure the safe handling and carriage of dangerous goods including requirements for electrical equipment and wiring, fire fighting equipment, ventilation, smoking, repair work, provision and availability of special equipment etc, some of which are general for all classes and others particular to certain classes only. It is important that reference should be made to this information before handling dangerous goods. Some of the requirements are highlighted in subsequent paragraphs. Where any doubts exist, advice should be sought from the Department of Trade or other competent authority.

2.3 Dangerous substances should be loaded or unloaded only under the supervision of a responsible officer.

2.4 Dangerous substances should not be loaded unless they have been packed and labelled in compliance with the 'Blue Book' or

IMDG Code. In the case of dangerous substances shipped in bulk, where labelling may not be required, their identity and the hazards to which they give rise should be checked against the dangerous cargo booking list.

2.5 When seamen are required to handle consignments containing dangerous substances, adequate information should be available as to the nature of such substances and any special precautions to be observed. In the event of accidental exposure to dangerous substances, reference should be made to the IMDG Medical Guide for remedial action.

2.6 Suitable precautions, such as the provision of special lifting gear, should be taken to prevent damage to receptacles containing dangerous substances.

2.7 In compartments containing cargo having an explosion or fire risk (for example, explosives and flammable liquids), all electrical circuits and equipment should meet the recommendations of the 'Blue Book'. When loading or unloading such cargo, firefighting equipment should be rigged ready for immediate use. Smoking should be prohibited while cargo handling is in progress, except in authorised places.

2.8 Where necessary, seamen loading, unloading or otherwise handling dangerous substances should wear appropriate protective clothing and personal protective equipment, including respiratory equipment (see Chapter 5).

2.9 Appropriate measures should be taken promptly to render harmless any spillage of dangerous substances. Particular care should be taken when dangerous substances are carried in refrigerated spaces where any spillage may be absorbed by the insulating material. Insulation affected in this way should be inspected and renewed if necessary.

2.10 Where there is leakage or escape of dangerous gases or vapours from the cargo, seamen should leave the danger area. The area should be ventilated and tested, if possible, to verify that the concentration of gases or vapours in the atmosphere is not high enough to be dangerous, before personnel are allowed to enter the area again. Seamen required to deal with spillages or to remove defective packages should be provided with and wear suitable

breathing apparatus and protective clothing as the circumstances dictate. Suitable rescue and resuscitation equipment should be readily available in case of an emergency (see Chapter 10).

### 3 Working cargo

3.1 No other work such as chipping, caulking, spray painting, shotblasting or welding etc, should be carried out in a space where cargo working is in progress if it thereby gives rise to a hazard to persons working in the space.

3.2 Loads being lowered or hoisted should not pass or remain over any person engaged in loading or unloading or performing other work in the vicinity.

3.3 Care should be taken when using ladders in the square of the hatch while cargo is being worked.

3.4 A signaller should always be employed at a hatchway when cargo is being loaded or discharged unless the crane driver or winchman has a complete unrestricted view of the load. The signals set out in Chapter 17 should be used.

3.5 The signaller should be in a position where he can best follow the work and be seen by the winchman; his view should be clear and unobstructed.

3.6 Before giving a signal to hoist, the signaller should receive clearance from the person making up the load that it is secure, and should ascertain that no one else would be endangered by the hoist. Before giving the signal to lower, he should warn persons in the way and ensure all are clear.

3.7 When a load does not ride properly after being hoisted, the signaller should immediately give warning of danger and the load should be lowered and adjusted as necessary.

3.8 Hooks, slings and other gear should not be loaded beyond their safe working loads.

3.9 Loads should be raised and lowered smoothly, avoiding sudden jerks or 'snatching' loads.



3.10 Strops and slings should be of sufficient size and length to enable them to be used safely and be so applied and pulled sufficiently tight to prevent the load or any part of the load from slipping and falling.

3.11 Loads (sets) should be properly put together and properly slung before they are hoisted or lowered.

3.12 Before heavy loads such as long lengths of steel sections, tubes, lumber, etc are swung, the load should be given a trial lift in order to test the efficacy of the slinging.

3.13 Except for the purpose of breaking out or making up slings, lifting hooks should not be attached to:

(a) the bands, strops or other fastenings of packages of cargo, unless these fastenings have been specifically provided for lifting purposes;

(b) the rims (chines) of barrels or drums for lifting purposes, unless the construction and condition of the barrels or drums is such as to permit lifting to be done safely with properly designed and constructed can hooks.

3.14 Suitable precautions, such as the use of packing or chafing pieces, should be taken to prevent chains, wire and fibre ropes from being damaged by the sharp edges of loads.

3.15 When slings are used with barrel hooks or similar holding devices where the weight of the load holds the hooks in place, the sling should be led down through the egg or eye link and through the eye of each hook in turn so that the horizontal part of the sling draws the hooks together.

3.16 The angle between the legs of slings should not normally exceed 90°. Where this is not reasonably practicable, the angle may be extended up to 120° provided that the slings have been designed to work at the greater angles.

3.17 Trays and pallets should be hoisted with four-legged slings and where necessary nets or other means should be used to prevent any part of the load falling.

3.18 When bundles of long metal goods such as tubes, pipes and rails are being hoisted, two slings should be used and, where

necessary, a spreader. A suitable lanyard should also be attached, where necessary.

3.19 Wire rope slings of adequate size should be used for loading and discharging logs; tongs should not be used except to break out loads.

3.20 Cargo buckets, tubs and similar appliances should be carefully filled so that there is no risk of the contents falling out and be securely attached to the hoist (for example, by a shackle) to prevent tipping and displacement during hoisting and lowering.

3.21 Shackles should be used for slinging thick sheet metal, if there are suitable holes in the material; otherwise suitable clamps on an endless sling should be used.

3.22 Bricks and other loose goods of similar shape, carboys, small drums, canisters, etc should be loaded or discharged in suitable boxes or pallets with sufficiently high sides, lifted by four-legged slings.

3.23 Slings or chains being returned to the loading position should be securely hooked on the cargo hook before the signaller gives the signal to hoist. Hooks or claws should be attached to the egg link or shackle of the cargo hook, not allowed to hang loose. The cargo hook should be kept high enough to keep slings or chains clear of persons and obstructions.

3.24 When work is interrupted or has ceased for the time being, the hatch should be left in a safe condition, with either guard rails or the hatch covers in position.

## Carriage of containers

- 1 To the extent that containers are simply large packages of pre-stowed cargo, many of the provisions of Chapters 17, 18, 19 and 27 are relevant to the safe working of containers.
- 2 A container may hold dangerous goods. Before loading begins, the dangerous cargo booking list should be scrutinised to ensure that the containers (which should be appropriately marked) may be correctly stowed.
- 3 In handling containers, care should be taken against the possibility of uneven loading and poor distribution of weight of the contents.
- 4 Containers carried on deck should be properly secured in such a manner as to take account of the appropriate strength features of the container and the stresses caused by the stacking of one or more upon the other.
- 5 Heavy items of machinery or plant and bagged bulk products which are stored on flats, may need to be further secured by additional lashings.
- 6 On ships not specially constructed or adapted for their carriage, containers should, whenever possible, be stowed fore and aft and should be securely lashed. Containers should not be stowed over hatches unless it is known that the hatches are of the requisite overall and point load-bearing strength.
- 7 Safe means should be provided for access to the top of a container to check lashings etc. Persons so engaged should, where appropriate, be protected from falling by use of a safety harness properly secured or by other suitable arrangements.
- 8 Deck lashing points which obtrude on walkways should be painted white, and warning notices displayed.

## Tankers and bulk product carriers

### 1 General

- 1.1 Personnel joining a tanker or similar vessel for the first time should receive a basic safety induction to the main hazards associated with the vessel, either before or on joining the ship.
- 1.2 Training in emergency procedures and in the use of any special emergency equipment should be given as appropriate to members of the crew at regular intervals. The instruction should include personal first aid measures for dealing with accidental contact with harmful substances in the cargo being carried and inhalation of dangerous gases or fumes.
- 1.3 Because of the risks of ill effects from contamination by cargoes carried in these ships, especially chemical tankers and carriers, personnel should maintain very high standards of personal cleanliness and particularly so when they have been engaged in cargo handling or tank cleaning. Hands should be thoroughly washed before breaks for smoking or meals. Shower baths and changes of clothing after each duty period are advisable. Dirty clothing should not be stowed in cabins.
- 1.4 Only 'certified safe' electrical equipment of approved design should be allowed in the cargo areas. The safety of this equipment depends on maintenance of a high order which should be carried out only by competent persons. Unauthorised personnel should not interfere with such equipment. Any faults observed, such as loose or missing fastenings or covers, severe corrosion, cracked or broken lamp glasses etc should be reported immediately.

## 2 Oil and bulk ore/oil carriers

2.1 Tankers and other ships carrying petroleum or petroleum products in bulk, or in ballast after carrying those cargoes, are at risk from fire or explosion arising from ignition of vapours from the cargo which may in some circumstances penetrate into any part of the ship.

2.2 Additionally, vapours may be toxic, some in very low concentrations, and some liquid products, especially petrol (gasoline) treated with tetra-ethyl or tetra-methyl-lead, are harmful in contact with the skin.

2.3 Guidance on the general precautions which should be taken is given in publications of the International Chamber of Shipping:

(a) *International Safety Guide for Oil Tankers and Terminals*

(b) *Safety in Oil Tankers, a handbook for crew members.*

Companies may additionally issue their own safety regulations. These publications should be available on board and the guidance conscientiously followed.

2.4 Those on board responsible for the safe loading and carriage of the cargo should have all relevant information about its nature and character before it is loaded and about the precautions which need to be observed during the voyage. The remainder of the crew should be advised of any precautions which they too should observe.

2.5 High fire risks require the strict observance of rules restricting smoking and the carriage of matches or cigarette lighters.

2.6 Spillages and leakages of cargo should be attended to promptly. Oil-soaked rags should not be discarded carelessly where they may be a fire hazard or possibly ignite spontaneously. Other combustible rubbish should not be allowed to accumulate.

2.7 Cargo handling equipment, testing instruments, automatic and other alarm systems and personal protective equipment should be maintained to a very high standard of efficiency at all times.

2.8 Work about the ship which might cause sparking or which involves heat should not be undertaken unless authorised after the

work area has been tested and found gas-free, or its safety is otherwise assured.

2.9 Where any enclosed space has to be entered, the precautions given in Chapter 10 should be strictly observed. Dangerous gases may be released or leak from adjoining spaces while work is in progress and frequent testing of the atmosphere should be undertaken.

2.10 'Permit-to-work' procedures should be adopted unless the work to be carried out presents no undue hazard (see Chapter 7).

## 3 Liquefied gas carriers

3.1 Guidance on the general precautions which should be taken on these vessels is given in the *Tanker Safety Guide (Liquefied Gas)* published by the International Chamber of Shipping and in the publications mentioned in section 2.3. The IMCO recommended *Code for the Construction and Equipment of Ships Carrying Liquefied Gas in Bulk* also contains guidance on operational needs. These publications should be available on board liquefied gas carriers together with any special safety regulations issued by the company.

3.2 The provisions in paras 2.4 to 2.10 of the preceding section also apply.

3.3 In addition, it should be noted that cargo pipes, valves and connections and any point of leakage of the gas cargo may be intensely cold. Contact may cause severe cold burns.

3.4 Pressure should be carefully reduced and liquid cargo drained from any part of the cargo transfer system, including discharge lines, before any opening up or disconnecting is begun.

3.5 Some cargoes such as ammonia have a very pungent, suffocating odour that even in very small quantities may cause eye irritation and disorientation together with chemical burns. Seafarers should take this into account when moving about the vessel, and especially when climbing ladders and gangways. The means of access to the vessel should be such that it can be closely supervised and is sited as far away from the manifold area as

possible. Crew members should be aware of the location of eye wash and safety showers.

#### 4 Chemical carriers

4.1 Bulk chemical carriers may be specialised to particular products or may have a number of tanks each of which may carry a different product. In any case, equipment for cargo carrying and handling, which may be complex, requires high standards of care in its maintenance and operation.

4.2 Guidance on general precautions which should be taken is given in the *Tanker Safety Guide (Chemicals)* and the booklet *Safety in Chemical Tankers*, both published by the International Chamber of Shipping. The IMCO recommended *Code for the Construction and Equipment of Ships Carrying Dangerous Liquid Chemicals in Bulk*, also contains guidance on operational needs. These publications should be available on board together with any special safety regulations issued by the company.

4.3 The appropriate provisions of section 2.4–2.10 and 3.5 should also be followed where applicable.

4.4 Where the cargo comprises or includes dangerous substances, the provisions of Chapter 27, section 2 apply.

4.5 Bulk chemical carriers often carry vegetable oils which require crew members to enter the tank and sweep the cargo to the tank suction and this often leads to cargo being brought up on to the deck on seaboots and clothing. This, added to the frequent sampling during loading and before discharge, causes the decks to become very slippery. Care should be taken to minimise the amount of cargo reaching the deck, but the dangers of slipping and falling should always be borne in mind when moving about the deck.

4.6 Many cargoes carried on this type of vessel are loosely referred to as alcohols. It should be emphasised that drinking these could lead to serious injury and death. Strict control should be exercised when carrying such cargoes in order to prevent pilferage.

4.7 Samples of chemical cargoes carried are often retained on board for long periods. These samples should be stowed in a special store and kept under lock and key. Where work is required to be carried out in these spaces, this should be closely monitored.

# Ferries, ro/ro carriers and car carriers

## 1 General

- 1.1 Seamen working on vehicle decks and in close proximity to moving vehicles should wear safety helmets and clothing of high visibility, such as fluorescent 'slip-overs'.
- 1.2 Suitable footwear should be worn to avoid risk of injury from securing gear.
- 1.3 Where no other means of access is provided, care should be taken by personnel using loading ramps for access while vehicles are moving on or off the ship.
- 1.4 Jacks, trestles and lashing equipment should not obstruct walkways, doorways or emergency escapes.
- 1.5 Ship's stores should not be stowed on any part of the parking area for vehicles.
- 1.6 A lifebuoy with self-activating light and line of suitable length should be available close to the vehicle deck access doors.
- 1.7 All decks should be kept free of water, oil and any other substance which might be conducive to a vehicle or cargo unit sliding.
- 1.8 Any spillage of petrol, oil or cargo should be cleaned up immediately; sand boxes, drip trays and equipment should be provided for such use on each vehicle deck.
- 1.9 There should be no smoking or use of naked lights on vehicle decks.

1.10 Notices setting out the precautions to be observed in handling and stowing vehicles should be prominently displayed in all vehicle spaces.

1.11 Any damage to electric lights and fittings should be repaired as soon as practicable.

1.12 A very high standard of crew fire drill is essential. A patrol should be maintained on vehicle decks during the passage.

## 2 Stowage of vehicles

- 2.1 All vehicles should be stowed in a fore and aft direction as far as practicable.
- 2.2 Any vehicle stowed athwartships should be securely lashed.
- 2.3 Vehicles should not be stowed across a water spray fire curtain.
- 2.4 Special care should be taken in positioning and securing a vehicle or cargo unit when decks are sparsely loaded to minimise the damage which would be caused by the vehicle breaking free into unrestricted space.
- 2.5 Vehicles containing dangerous cargoes should be handled in accordance with the *Code for portable tanks and road tank vehicles for the carriage of liquid dangerous goods in ships* or otherwise as directed in the 'Blue Book' and the *International Maritime Dangerous Goods Code* (IMDG Code). If tanks are found to be leaking or having evidence of possible leakage or otherwise significantly damaged so as to possibly affect the integrity of the tank, the vehicle should not be accepted for shipment. When the vehicle carries a transport emergency card (Tremcard) for its load, the card should be lodged with the Master for reference in case leaks should develop during the voyage.
- 2.6 Any vehicle carrying dangerous goods should be segregated from other cargo, accommodation, machinery openings and animals, in accordance with the 'Blue Book'. It should be readily accessible to an emergency party and, whenever practicable,

located in a position convenient to fire-fighting services and drainage scuppers.

2.7 Personnel should not stand behind or between vehicles when these are manoeuvring.

2.8 Personnel should not attempt to secure a vehicle until the brakes have been applied and the engine switched off.

2.9 Lashing and securing of vehicles and cargo units should be carried out by men trained and experienced in the task.

2.10 There should be an adequate supply of efficient securing and lashing equipment which should be properly maintained and regularly inspected.

2.11 All lashings should have suitable tightening arrangements.

2.12 Lashings should be tightened to ensure that they are secure but not overtightened so that unnecessary strain is thrown upon the lashing. Care should be taken to equalise as far as practicable the tensions of the several lashings of a vehicle etc.

2.13 Personnel should not remain on internal deck ramps which are being raised or lowered.

### 3 Ventilation

3.1 Ventilation systems serving the vehicle decks should be in operation during loading and unloading and as may be necessary on passage to avoid the accumulation of flammable and toxic vapours.

3.2 Connecting doors between car-decks and machinery, service and accommodation spaces should be kept closed while the ship is at sea.

3.3 Conspicuous notices should be posted warning against the starting of vehicle engines before doors leading to ramps are opened and before the vehicle is required to move.

3.4 Any refrigerated vehicle needing to run its refrigeration plant during the voyage should utilise the ship's electrical supply where practicable, in preference to running its engine.

### 4 Portable car decks

4.1 Frequent inspections should be made of the equipment and associated gear used for raising, lowering and suspending portable decks.

4.2 Seamen should stand clear while portable decks are being raised or lowered. Should jamming occur, care should be taken in case of sudden release of the jam.

4.3 Portable stanchions and hand rails should always be in position when portable decks are in use.

4.4 Care should be taken to ensure that portable decks are properly stowed and secured when not in use.

4.5 When portable decks are in the stowed position, access doors should be secured.

# Ships serving offshore gas and oil installations

## 1 General

1.1 Ships serving offshore gas and oil installations often have to operate in adverse weather conditions. Work on deck in such conditions should be avoided if the movement of the ship would create special hazards.

1.2 The Master of the vessel has the final responsibility for ensuring that any operation is carried on with proper regard to the safety of all those on board and that measures are taken to minimise risks.

1.3 Where a vessel has open stern and deck gangway doors and a low freeboard, particular care should be taken against loss of watertight integrity by ensuring that scuttles, deadlights, hatches and ventilators are securely closed. Freeing ports should be kept clear and unobstructed to ensure the rapid drainage of water trapped on the deck.

1.4 While work is being done on deck, the vessel should be made as sea-kindly as practicable. A look-out should be posted to give warning of imminent oncoming, quartering or following seas.

1.5 At all times work is being done on deck, there should be an efficient means of communication between bridge and crew. This may be provided by the use of a portable 'talk-back' speaker which can be plugged into circuit points provided at working areas.

1.6 During hours of darkness, sufficient lighting should be provided at access ways and at any work location, to ensure that obstructions are clearly visible and that the operation may be carried out safely.

1.7 Lighting should be so placed that it does not dazzle the navigational watch and does not interfere with prescribed navigation lights.

1.8 During bad weather, lifelines should be rigged on the working deck to facilitate safe movement. Decks should as far as practicable be kept free from ice, slush and any substance or loose material likely to cause slips or falls.

1.9 Men working in cold and wet conditions should wear waterproof garments over warm clothing. The need to avoid undue exhaustion and hands and limbs becoming numbed should be taken into account when making the necessary arrangements for relief at suitable intervals.

1.10 Whenever there is a risk of falling, or being swept, overboard the seaman should wear some form of personal buoyancy of a type which would not unduly hamper or impede working movements. If it is necessary for a man to work in an exposed position he should, where practicable, wear a safety harness and lifeline.

1.11 Safety helmets should be worn during work on deck.

1.12 Advice on mooring and casting off is given in Chapter 16. Arrangements should be made to receive mooring lines, so as to avoid the necessity for seamen to jump ashore, a dangerous practice which has caused many accidents.

## 2 Carriage of cargo on deck

2.1 The safe securing of all deck cargoes should be checked by a competent person before the vessel proceeds on passage. To aid unloading at sea to be carried out safely, independent cargo units should, as far as practicable, be individually lashed. Lashings should, where practicable, be of a type that can be easily released and maintained (see also Chapter 27, section 1).

2.2 All lashings should be checked at least once during each watch whilst at sea. Personnel engaged in the operation should be closely supervised from the bridge, particularly in adverse weather conditions. At night in bad weather, an Aldis lamp or searchlight

should be used to aid remote checking of lashings to avoid placing men at risk.

2.3 Discarded rope and damaged and unserviceable equipment and cargo should not be jettisoned at sea but retained for disposal ashore. Such materials and articles can foul propellers or cause damage to fishing gear.

### 3 Lifting, hauling and towing gear

3.1 All fixed and running gear should be carefully maintained in good order and regularly inspected to detect wear, damage and corrosion as recommended in Chapter 17. More frequent inspections should be made where gear has hard usage or is much exposed to sea and weather.

3.2 In all operations which may impose large loads or shock strains upon the gear, precautions should be taken against sudden failure which may cause injury to personnel. To the extent practicable, the system should be so designed that the weakest element is at a point where failure is likely to cause least danger.

3.3 While gear is under load, men essential for the operation should keep in protected positions to the greatest practicable extent. Others not engaged in the operations should keep clear of the working area.

### 4 Approaching rig and cargo handling at rig

4.1 Personnel should never stand forward of the windlass when letting go anchors at the rig. This is particularly important in vessels of this type because of the length of the chain and the loads thus imposed. Care should be taken when stowing the anchor cable in the locker (see Chapter 16).

4.2 In bad weather and under certain conditions of trim, considerable amounts of water may be shipped over the after-deck when the vessel is approaching a rig stern-on under power. Seamen should be alert to this possibility and seek positions of shelter and safety.

4.3 Care should be taken to keep clear when spring ropes are being lowered from the rig by crane.

4.4 Life-saving equipment, including lifebuoy, boathook and heaving line, should be readily available at a suitable position on the stern and other points of particular danger when mooring and while cargo handling is in progress.

4.5 In applying the recommendations of Chapter 17 to cargo handling, it should be borne in mind that transfer of cargo at sea is at any time a difficult operation and the risks are greatly increased when heavy or bulk items are being handled from a confined deck space in a seaway.

4.6 When cargo is being unloaded at the rig, the lashings of each individual item of cargo should not be released until the item is about to be lifted; there are grave risks if all cargo lashings are removed before unloading operations are begun.

4.7 Once unlashed prior to lifting, cargo should be secured against movement as much as possible by the use of large wooden wedges, sandbags or other effective means.

4.8 Personnel should be at all times alert to the danger of being hit or crushed should items of cargo swing during a lift or become dislodged through sudden movement of the ship. For this reason, all personnel should seek positions of safety as far as practicable during the lifting and lowering of cargo. If, in some circumstances, cargo hooks have to be held until the strain is taken, as when pipes are to be unloaded, crew members thus engaged should immediately move to a safe position before the actual lift is effected.

4.9 Lifts should be speedily effected to hoist the load well off the deck and swung clear of the ship as quickly as possible.

4.10 If any back-loading has to take place from the rig during off-loading of cargo from the vessel, care should be taken to ensure that the cargo taken on board is immediately secured against movement until it can be properly stowed.

4.11 It is essential that an efficient means of communication, preferably by radio link, is established between the rig crane



operator and the working deck officer, who should at all times be in visual contact with each other.

## 5 Transfer of personnel from ship to rig by 'personnel baskets'

5.1 The following procedures should be observed for the transference of personnel from ship to rig by 'personnel baskets':

- (a) two seamen should steady the equipment when it is lowered to the deck;
- (b) luggage should be secured within the net of the basket;
- (c) personnel to be transferred should wear lifejackets;
- (d) personnel transferring should be evenly distributed around the base board to ensure maximum stability;
- (e) personnel should stand outside the basket with feet apart on the board and the basket securely gripped with both arms looped through;
- (f) when the officer in charge is satisfied that all is ready, and at an appropriate moment having regard to the movement of the ship in a seaway, the basket should be lifted clear of the vessel and then swung up and out as quickly as possible before being carefully hoisted up to the rig;
- (g) throughout the operation, a lifebuoy, boathook and heaving line should be kept immediately available on board the vessel for use in case of emergencies;

## 6 Transfer of personnel by boat

6.1 The Master of the ship providing the boat should be responsible for the operation. Due consideration should be given to the effect of prevailing conditions on the safety of the transfer.

6.2 The boat should be reliably powered.

6.3 The boat should be crewed by not less than two experienced persons, at least one of whom should be experienced in handling the boat. Lifejackets and, if necessary, suitable protective clothing, should be worn by the crew and by the personnel carried.

6.4 A safety rope should be provided for all personnel ascending or descending overside by ship's ladder.

6.5 Boarding and disembarkation should be carried out in an orderly manner under the coxswain's direction.

6.6 The boat's coxswain should ensure an even and safe distribution of passengers. Passengers should not stand up or change their positions during the passage between ships save under instructions from the coxswain.

6.7 The parent vessel should establish communication with the receiving vessel prior to the commencement of the operation and should maintain continuous visual contact with the boat concerned throughout the transfer. It is recommended that the boat should carry a VHF radio.

6.8 If the transfer of personnel involves a stand-by vessel, the Master should bear in mind that his vessel must at all times be ready to fulfill its stand-by vessel duties.

## 7 Anchor handling

7.1 Handling rig anchors at sea can be a particularly hazardous and arduous task. The vessel should be controlled in such a manner to minimise the risks concerned, in particular, to avoid as far as possible an anchor wire under heavy load whipping from quarter to quarter across the deck.

7.2 The provisions of section 3.3 on the need for crew members to keep to protected positions are particularly important during the handling of anchors and anchor buoys.

7.3 Anchor buoys being lifted aboard should be kept clear of the working area and lashed immediately upon landing to prevent movement.

7.4 Care should be taken when stoppering off wires.

7.5 When anchors are let go over the stern, all personnel should be well forward of the stern and in protected positions.

## Standards

The British Standard Specifications extant at 31 December 1977 which are relevant to recommendations in the Code are listed below. Work on revising and developing standards proceeds continuously and, where it is found that a listed standard has been superseded, the most up-to-date version should be adopted. Generally, a British Standard closely corresponds with an International Standard where one exists, and the references of corresponding ISO (International Standards Organisation) standards are given for guidance where equipment has to be obtained in foreign ports.

## CHAPTER 1 General

## 3 Working clothes

BS 5426: 1976 *Specifications for work wear*

## CHAPTER 5 Protective clothing and equipment

## 1 Head protection

BS 4033: 1966 *Industrial scalp protectors (light duty)*

BS 5240: 1975 *General purpose industrial safety helmets*

## 2 Eye protection

BS 2092: 1967 *Industrial eye protectors*

## 3 Respiratory protective equipment

BS 4275: 1974 *Recommendations for the selection, use and maintenance of respiratory protective equipment*

## (a) Respirators

BS 2091: 1969 *Respirators for protection against harmful dust, gases and scheduled agricultural chemicals*

BS 4555: 1970 *High efficiency dust respirators*

BS 4558: 1970 *Positive pressure, powered dust respirators*

## (b) Breathing apparatus

BS 4667: Part 1: 1974 *Closed-circuit breathing apparatus*

BS 4667: Part 2: 1974 *Open-circuit breathing apparatus*

BS 4667: Part 3: 1974 *Fresh air hose and compressed air line breathing apparatus*

BS 4667: Part 4: 1975 *Escape breathing apparatus*

## 4 Gloves

BS 1651: 1966 *Industrial gloves*

BS 697: 1960 *Rubber gloves for electrical purposes* (see Chapters 22 and 23)

## 5 Footwear

BS 1870: Part 1: 1970 *Safety boots and shoes other than all-rubber types*

BS 1870: Part 2: 1976 *Lined rubber safety boots*

## 6 Safety belts and harnesses

BS 1397: 1967 *Industrial safety belts and harnesses*

## 7 Rubber mats (see Chapters 22 and 23)

BS 921: 1976 *Rubber mats for electrical purposes*

## CHAPTER 6 Signs, notices and colour codes

## 1 Safety signs, colour codes

BS 5378: 1976 *Safety colours and safety signs* (partially agrees with ISO/DIS 3864)

## 2 Fire extinguishers

BS 5423: 1971 *Portable fire extinguishers*

## 3 Gas cylinders

BS 349: 1973 *Identification of contents of industrial gas containers* (incorporates ISO/R 448)

BS 1319: 1976 *Medical gas cylinders, valves and yoke connections* (agrees with ISO/R 32 and ISO/R 407)

## 4 Pipelines

BS 1710: 1975 *Identification of pipelines* (substantially agrees with ISO/R 508)

## CHAPTER 8 Accommodation ladders, gangways and other means of access

BS MA 78: 1977 *Shipbuilding specification of aluminium shore gangways*

BS 3913: 1973 *Industrial safety nets*

SIS 7 (Shipbuilding Industry Standard) *Weatherdeck ladders (bulwark)*

## CHAPTER 9 Movement about the ship

BS MA 40: Part 20: 1975 (Marine Series) *Gates and portable guardrail sections for merchant ships (excluding passenger ships)*

## CHAPTER 12 Tools and materials

BS 6500: 1975 *Insulated flexible cords* (partially agrees with IEC 227 and 245)

## CHAPTER 13 Welding and flamecutting

BS 638: 1966 *Arc welding plant, equipment and accessories*

BS 697: 1959 *Filters for use during welding and similar industrial operations*

BS 1542: 1960 *Equipment for eye, face and neck protection against radiation arising during welding and similar operations*

BS 2653: 1955 *Protective clothing for welders*

## CHAPTERS 15 and 16 Ropes

BS 365: 1968 *Galvanised steel wire ropes for ships*

BS 2052: 1965 *Ropes made from coir, hemp, manila and sisal*

BS 4128: 1967 *Recommendations for the selection, use and care of man-made ropes in marine applications*

BS 4928: Part 1: 1973 *Polypropylene ropes 13-strand hawser laid and 8-strand plaited* (agrees with ISO/R 1346)

BS 4928: Part 2: 1974 *Polyamide (nylon), polyester and polyethylene filament ropes* (agrees with ISO/R 1140, R 1141 and R 1969)

SIS 23 (Shipbuilding Industry Standard) *Stoppers for mooring ropes*

## CHAPTER 18 Hatches

BS 4263: 1967 *Marking of hatchway beams* (based on ISO/R 151)

BS 4268: 1967 *Marking of wooden hatchway covers* (based on ISO/R 152)

## APPENDIX 2

# Bibliography

### 1 HMSO publications

(available from HMSO bookshops and agents, or if asterisked \* direct from the Enquiry Point, Health and Safety Executive, Baynards House, 1-13 Chepstow Place, London W2 4TF)

#### (a) Health and Safety at Work Booklets

No 4 *Safety in the Use of Abrasive Wheels*

No 18 *Industrial Dermatitis - Precautionary Measures*

No 19 *Safety in Laundries*

No 20 *Drilling Machines - Guarding of Spindles and Attachments*

No 25 *Noise and the Worker*

No 31 *Safety in Electrical Testing*

No 35 *Basic Rules for Safety and Health at Work*

No 44 *Asbestos: Health Precautions in Industry*

No 50 *Welding and Flame-cutting using Compressed Gases*

#### (b) Advisory Publications

##### (i) Safety and Health at Work Leaflets

SHW 25\* *Safe use of ladders*

SHW 264\* *Abrasive Wheels - Safety in Installation and Use*

##### (ii) Advisory Leaflets

IAL1\* *Fires and Explosions due to the misuse of oxygen*

MS(A)3\* *Asbestos and you*

##### (iii) Cautionary Cards

MS(B)3\* *Anthrax*

MS(B)6\* *Occupational (Industrial) Dermatitis*

#### (c) Guidance Notes from the Health & Safety Executive

##### (i) General Series

GS 1 *Fumigation using methyl bromide (bromomethane)*

GS 5 *Entry into confined spaces*

##### (ii) Chemical Series

CS 1 *Industrial use of flammable gas detectors*

(iii) Environmental Hygiene Series

EH 13 *Beryllium – health and safety precautions*

EH 15 *Threshold limit values for 1976*

(iv) Medical Series

MS 2 *Anthrax*

MS 7 *Colour vision*

(d) Certificates of Approval

F2486 *Certificate of Approval (Respiratory Protective Equipment) 1977*

(e) *Carriage of Dangerous Goods in Ships* – Report of the Standing Advisory Committee (the 'Blue Book')

(f) Department of Trade *Code of Practice on Noise Levels in Ships*

(g) *Ship Captain's Medical Guide*

**2 International Chamber of Shipping (ICS) Publications**

(produced by the International Chamber of Shipping, 30/32 St Mary Axe, London EC3A 8ET)

*International Safety Guide for Oil Tankers and Terminals*

*Tanker Safety Guide (Chemicals)*

*Tanker Safety Guide (Liquefied Gas)*

*Safety in Oil Tankers (handbook for crew members)*

*Safety in Chemical Tankers (handbook for crew members)*

*Guide to Helicopter/Tanker Operations*

**3 Other Publications**

*International Maritime Dangerous Goods Code (IMDG Code)*, (published by the Intergovernmental Maritime Consultative Organization (IMCO), 101 Piccadilly, London W1)

*IMDG Medical Guide* (published by IMCO as above)

*Reference Book of Protective Equipment* (published by the Industrial Safety (Protective Equipment) Manufacturers Association, 69 Cannon Street, London EC4)

*Code of Practice for the Safe Carriage of Dangerous Goods in Freight Containers* (published by the General Council of British Shipping, 30/32 St Mary Axe, London EC3A 8ET)

*Accident prevention on board ship at sea and in port* (Code of Practice) (published by the International Labour Office (ILO), Geneva and available from the ILO London office, 87 New Bond Street, London W1)

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