28 DRY CARGO

Note: Chapters 10, Manual handling, 16, Hatch covers and access lids, and 19, Lifting equipment and operations, also have special relevance to work on dry cargo ships.

28.1 Stowage of cargo

28.1.1 This chapter concerns both packaged and dry bulk cargoes, with the exception of cargoes carried in roll-on/roll-off (ro-ro) ships, which are covered in Chapter 27, Roll-on/roll-off ferries.

28.1.2 All cargoes should be stowed and secured in a manner that will avoid exposing the ship and persons on board to unnecessary risk. The safe stowage and securing of cargo depends upon proper planning, execution and supervision by properly qualified and experienced personnel.

28.1.3 The planned procedures for the handling of cargo should be agreed with berth or terminal operators in advance of loading or unloading. In the case of dry bulk cargo (excluding grain), procedures should follow the International Maritime Organization (IMO) Code of Practice for the Safe Loading and Unloading of Bulk Carriers, with the associated IMO Ship/Shore Safety Checklist. For grain, there is more detailed guidance in the International Code for the Safe Carriage of Grain in Bulk.

28.1.4 Loading, stowage and securing of cargo other than bulk cargo is to be carried out in accordance with the ship's approved cargo-securing manual. Handling and safety instructions for securing devices are contained in sections 3.1 and/or 4.1 of the manual. Further guidance is contained in the IMO Code of Practice for Cargo Stowage and Securing (IMO Resolution A.714(17)). Cargo securing should be completed before the ship proceeds to sea.

S.I. 1999/336 and MGN 107(M)
IMO Resolution A.714(17)

28.1.5 All cargo should be stowed having due regard to the order of discharge at a port or number of ports. When planning the position of cargo and the order of loading and unloading, the effects that these operations will have upon access and the safety of personnel should be considered. The following points should be taken into account:

- Cargo information, including gross mass of the cargo or cargo units and any special properties detailed on board or in the shipping documents, should be recorded and used in planning.
- Wherever practicable, where more than one port is involved for loading or unloading, cargo should be loaded in layers rather than in tiers, so as to avoid the development of high vertical walls of cargo.
- Care should be taken not to overstow lighter cargoes with heavier cargoes, which may lead to a collapse of the stow.
- 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.
- The need to walk across or climb onto the deck cargo, where this may involve an approach to an unprotected edge with risk of falling, should be minimised.
- Care should be taken to avoid large gaps next to cargo where it is stacked against corrugated bulkheads.

28.1.6 Deck cargo should be stowed in accordance with the statutory requirements, and kept clear of hatch coamings to allow safe access. Access to safety equipment, firefighting equipment (particularly fire hydrants) and sounding pipes should also be kept clear. Any obstructions in the access way, such as lashings or securing points, should be painted white or other contrasting colour to make them more easily visible. Where this is impracticable and cargo is stowed against ship's rails or hatch coamings to such a height that the rails or coamings do not give effective protection to personnel from falling overboard or into the open hold, temporary fencing should be provided (see section 11.6, Guarding of openings).

S.I. 1998/2241

28.1.7 Timber cargo decks shall be loaded, stowed and secured throughout the voyage as per the Code of Safe Practice for Ships Carrying Timber Deck Cargoes 2011, known as the 2011 TDC Code.

The purpose of the 2011 TDC Code is to ensure that timber deck cargoes are loaded, stowed and secured to prevent, as far as practicable, throughout the voyage, damage or hazard to the ship and persons on board as well as loss of cargo overboard.

The 2011 TDC Code provides:

- practices for safe transportation;
- methodologies for safe stowage and securing;
- design principles for securing systems;
- guidance for developing procedures and instructions to be included in ships' cargo-securing manuals on safe stowage and securing; and
- sample checklists for safe stowage and securing.

28.1.8 Suitable safety nets or temporary fencing should be rigged where personnel have to walk or climb across built-up cargo, and are therefore at risk of falling.

28.1.9 When deck cargo is stowed against and above ship's rails or bulwarks, a wire rope pendant or a chain, extending from the ring bolts or other anchorage on the decks to the full height of the deck cargo, should be provided and used to save personnel having to go overside to attach derrick guys and preventers directly to the anchorages on the deck.

28.1.10 Where beams and hatch covers have to be removed at intermediate ports before surrounding deck cargo is unloaded, an access space at least 1 metre wide should be left adjacent to any part of the hatch or hatchway that is to be opened. If on deck this is impracticable, fencing or lifelines should be used to enable seafarers to remove and replace beams and hatch coverings in safety (see section 11.6).

28.1.11 In the 'tween decks, guidelines should be painted around 'tween deck hatchways at a distance of 1 metre from the coamings.

28.2 Dangerous goods and substances

S.I. No 2367, MGN 340(M)

28.2.1 Packaged dangerous goods are marked, labelled or placarded to indicate the contents and their hazardous or polluting properties, and this information should be used to assess any risk to seafarers and put in place necessary safety measures. Merchant shipping regulations lay down requirements for the carriage of dangerous substances and the provisions of the International Maritime Dangerous Goods (IMDG) Code, together with those contained in relevant merchant shipping notices, should be observed. The IMDG Code contains details of classification, documentation, marking and labelling, packaging, etc. and advice on such application as will meet requirements of the regulations. In particular, it lists and gives details of many dangerous substances.

28.2.2 The general introduction and the introductions to individual classes of dangerous goods in the IMDG Code contain many provisions to ensure the safe handling and carriage of dangerous goods, including requirements for electrical equipment and wiring, firefighting 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 Maritime and Coastguard Agency (MCA) or other competent authority.

Chapter 7.8 of the IMDG Code provides advice on special requirements in the event of an incident and fire precautions involving dangerous goods and this, in accordance with the ship's safety management system, should be followed in the event of spillage or other incidents.

28.2.3 Dangerous goods should be loaded or unloaded only under the supervision of a competent responsible officer and, if applicable, in accordance with the ship's document of compliance for the carriage of dangerous goods. Suitable precautions, such as the provision of special lifting gear as appropriate, should be taken to prevent damage to receptacles containing dangerous goods.

28.2.4 Dangerous substances in bulk should be loaded, stowed and carried in accordance with Appendix 1 of the International Maritime Solid Bulk Cargoes Code (IMSBC) published by IMO.

28.2.5 Emergency response procedures for the substances carried should be established, in accordance with the IMO's Emergency Procedures for Ships Carrying Dangerous Goods (EmS Guide), which should be consulted to ensure that appropriate emergency equipment is carried. The application of such measures is under the control of the master of the ship and will depend on the circumstances of the incident and the location of the ship. The equipment necessary for the execution of the emergency response should be immediately available and the crew trained and practised in its use. The Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG – MSC/Circ.857) should also be available.

MSN 1706(M)

28.2.6 These procedures should include:

- cases of accidental exposure (see section 28.2.9 below); and

- the possibility of fire.

28.2.7 Personnel who are required to handle consignments containing dangerous substances should be able to identify dangerous goods from the labelling and placarding and should be provided with and wear personal protective equipment (PPE) (including breathing apparatus, where necessary) appropriate to the hazard involved. More information on PPE when handling dangerous substances can be found in Chapter 8, Personal protective equipment.

MSN 1870(M+F)

28.2.8 Seafarers should promptly report any leakage, spillage or any other incident that occurs and involves exposure to dangerous substances. In the event of accidental exposure, reference should be made to the MFAG published by IMO.

28.2.9 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.

28.2.10 Where there is leakage or escape of dangerous gases or vapours from cargo, personnel should leave the danger area and the area should be treated as a dangerous (enclosed) space (see Chapter 15, Entering dangerous (enclosed) spaces). Personnel 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 8, Personal protective equipment).

28.2.11 Further guidance on the handling and stowage of dangerous goods is contained in the Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas published by IMO.

28.3 Carriage of containers

28.3.1 Containers are simply packages of pre-stowed cargo and sections of Chapters 16, Hatch covers and access lids, and 19, Lifting equipment and operations, may also be relevant to their safe working. Guidance is also published by the UK's Port Skills and Safety organisation in its Health and Safety in Ports series, *SIP Leaflet 008 – Guidance on the storage of dry bulk cargo* (see the Port Skills and Safety website).

28.3.2 Where a container holds dangerous goods, the relevant guidance contained in section 28.2 should be followed. For guidance on control of substances hazardous to health, refer to Chapter 21, Hazardous substances and mixtures.

28.3.3 Freight containers should comply with the International Convention for Safe Containers 1972 (CSC), under which they must carry a safety approval plate (CSC plate). Defective containers, or containers on which the CSC plate is missing, should be reported so that they can be taken out of service. Containers should not be loaded beyond the maximum net weight indicated on the CSC plate, and should be in a safe condition for handling and carriage.

28.3.4 The equipment used for lifting a container should be suitable for the load, and safely attached to the container. The container should be free to be lifted and should be lifted slowly to guard against the possibility of it swinging or some part of the lifting appliances failing, should the contents be poorly secured, unevenly loaded and poorly distributed or the weight of contents incorrectly declared. The process of loading and securing of goods into a container should follow the IMO/ILO/UN/ECE Guidelines for Packing of Cargo Transport Units (CTUs). Special care should be taken when lifting a container with a centre of gravity that is mobile, e.g. a tank container, bulk container or a container with contents that are hanging.

28.3.5 Safe means of access to the top of a container should be provided to release lifting gear and to fix lashings. Personnel so engaged should, where appropriate, be protected from falling by use of a properly secured safety harness or other suitable means.

28.3.6 All containers should be lashed individually by a competent person. Where containers are stacked, account should be taken of the appropriate strength features of the lashing and stacking-induced stress.

28.3.7 On ships not specially constructed or adapted for their carriage, containers should, wherever possible, be stowed fore and aft and securely lashed. Containers should not be stowed on decks or hatches unless it is known that the decks or hatches are of adequate overall and point load-bearing strength. Adequate dunnage should be used.

28.3.8 The system of work should be such as to limit the need to work on container tops. Where the design for securing containers and checking lashing makes access onto container tops necessary, it should be achieved by means of the ship's superstructure or by a purpose-

designed access platform or personnel cages using a suitable adapted lifting appliance. If this is not possible, an alternative safe system of work should be in place.

28.3.9 To allow access to the tops of over-height, soft-top or tank containers where necessary for securing or cargo-handling operations, solid top or 'closed containers' should be stowed between them whenever practicable.

28.3.10 Where the ship's electrical supply is used for refrigerated containers, the supply cables should be provided with proper connections for the power circuits and for earthing the container. Before use, the supply cables and connections should be inspected and any defects repaired and tested by a competent person. Supply cables should only be handled when the power is switched off. Where there is a need to monitor and repair refrigeration units during the voyage, account should be taken of the need to provide safe access in a seaway when stowing these containers.

28.3.11 Personnel should be aware that containers may have been fumigated at other points in the transport chain, and there may be a residual hazard from the substances used.

28.4 Working cargo

28.4.1 For regulations and guidance on lifting equipment and lifting operations, including examination and testing requirements, see Chapter 19, Lifting equipment and operations, of this Code.

MGN 157(M), including MSC/Circ.886 and MSC/Circ.888

28.4.2 Safety arrangements made prior to working cargo should ensure that adequate and suitable lifting equipment is available, in accordance with the register of lifting appliances and cargo gear, and that all plant and equipment and any special gear necessary is available and used. Cargo gear should be checked regularly throughout the cargo operation for damage or malfunction.

28.4.3 Repair or maintenance work, such as chipping, spray painting, shot blasting or welding, should not be undertaken in a space where cargo operations are in progress.

28.4.4 Loads being lowered or hoisted should not pass or remain over any person engaged in any work in the cargo space area, or over means of access. Personnel should take care when using access ladders in hatch squares whilst cargo operations are in progress.

28.4.5 Cargo information for goods should always provide the gross mass of the cargo or of the cargo units. Where loads of significant gross mass are not marked with their weight, the loads should be check-weighed unless accurate information is available, as provided by the shipper or packer of the goods.

28.4.6 A signaller should always be employed at a hatchway when cargo is being worked, unless the crane driver or winchman has a complete, unrestricted view of the load or total working area. The signaller should be in a position where they have a total view of the operation; where this is not possible, then additional signallers should be used to assist. Guidance for signallers is given in sections 19.11.5 to 19.11.9 and Annex 19.3.

28.4.7 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, the signaller should warn personnel in the way and ensure all are clear.

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

28.4.9 Hooks, slings and other lifting gear should not be loaded beyond their safe working loads. 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. Loads (sets) should be properly put together and properly slung before they are hoisted or lowered.

28.4.10 Before any heavy load is swung, it should be given a trial lift in order to test the effectiveness of the slinging.

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

- the bands, strops or other fastenings of packages of cargo, unless these fastenings have been specifically provided for lifting purposes; or
- the rims (chines) of barrels or drums for lifting purposes, unless the construction or condition of the barrels or drums is such as to permit lifting to be done safely with properly designed and constructed can hooks.

28.4.12 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.

28.4.13 When slings are used with barrel hooks or other 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.

28.4.14 The angle between the legs of the slings should not normally exceed 90°, because this reduces the safe working load of the sling. Where this is not reasonably practicable, the angle may be increased up to 120° provided that the slings have been designed to work at the greater angles. However, it should be noted that at 120° each sling leg is taking stress equivalent to the whole mass of the load.

28.4.15 Trays and pallets (unit loads) should be loaded using a pallet loader where available. If slings are used, the trays and pallets should be hoisted with four-legged slings and, where necessary, nets and other means should be used to prevent any part of the load falling.

28.4.16 Bundles of long metal goods, such as tubes, pipes and rails, should be slung with two slings or strops and, where necessary, a spreader. Slings or strops should be double wrapped and secured to prevent the sling coming loose. A suitable lanyard should also be attached, where necessary.

28.4.17 Logs should be loaded or discharged using wire-rope slings of adequate size; tongs should not be used except to break out loads.

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

28.4.19 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.

28.4.20 Loose goods such as small parcels, carboys and small drums should be loaded or discharged in suitable boxes or pallets with sufficiently high sides, and lifted using four-legged slings.

28.4.21 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 personnel and obstructions.

28.4.22 'One-trip slings' (i.e. slings that have not been used previously for lifting and are fitted to the load prior to loading) should not be taken back on board ship after the load is discharged at the end of the voyage but should be left on shore for disposal.

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

28.5 Lighting in cargo spaces

28.5.1 During cargo operations, cargo spaces should be adequately lit, avoiding strong contrasts of light and shadow or dazzle (see section 11.5). Open or naked lights should not be used. Portable lights should be adequately guarded, suitable for the task, and firmly secured in such a manner that they cannot be accidentally damaged. Portable lights should never be lowered or suspended by their electrical leads, and leads should be run so that they are clear of loads, running gear and moving equipment.

28.6 General precautions for personnel

28.6.1 Where crew are working alongside shore-based personnel in cargo operations, the same level of safety should be provided to both shore- and ship-side personnel. Each should be aware of the others' risk assessment and procedures to ensure common understanding.

28.6.2 Personnel undertaking duties in cargo spaces should move with caution over uneven surfaces or loose dunnage, and be alert to protrusions such as nails.

28.6.3 Where vessels have been built with corrugated bulkheads, precautions such as suitable rails, grids or nets should be erected to prevent cargo handlers or other personnel from falling into the space between the rear of the corrugation and the stowed cargo.

28.6.4 Where work is being undertaken on or near the cargo 'face', the face should be secured against collapse, especially where bagged cargo may be bleeding from damage. Where it is necessary to mount a face, a portable ladder should be used, properly secured against slipping or shifting sideways, or held in position by other personnel. When work is

undertaken in areas where there is a risk of falling, safety net(s) should be erected. Such nets should not be secured to hatch covers.

28.6.5 Personnel should be aware that cargoes may have been fumigated at other points in the transport chain, and there is a risk that toxic fumes may build up in enclosed spaces.

28.7 Moveable bulkheads in cargo holds

28.7.1 Moveable bulkheads are fitted in some small, multi-purpose vessels to allow more flexibility in the types of dry cargo carried from one voyage to the next.

28.7.2 There have been several serious accidents that have occurred when moving or carrying out maintenance on these types of bulkheads. Some of these accidents have led to the death of the seafarers involved. The procedures for the operation and maintenance of moveable bulkheads should be documented within the ship's safety management system.

28.7.3 Personnel undertaking duties that involve moving the position of the bulkhead or carrying out maintenance and hold cleaning should, prior to starting these duties, follow the risk assessment for these specific operations with these bulkheads.

28.7.4 Personnel carrying out these duties must be fully trained and competent in the moving operations associated with these bulkheads and, where required, with the jacking up of these bulkheads for hold-cleaning purposes. These personnel must be supervised at all times by an officer or other supervisor who is familiar with these types of bulkhead and competent to oversee such operations.

28.7.5 Seafarers must be given training prior to being given duties associated with these bulkheads.

28.7.6 Owing to the dangerous nature of the operations involved with these bulkheads, strong consideration should be given to the issuing of a permit to work for any duties associated with them.

28.7.7 In the operation of certain designs of moveable bulkhead, consideration should also be given, when jacking up these bulkheads for hold-cleaning purposes, or for inspection and maintenance purposes, to the use of additional temporary holding supports at the upper end, when the 'swing-over' wheel system for moving these bulkheads cannot be engaged.