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4 ADDITIONAL ADVICE ON THE PACKING AND SECURING OF DANGEROUS CARGOES

4.1 General

4.1.1 The advice of this section applies to CTUs in which dangerous cargoes are packed. It should be followed in addition to the advice given elsewhere in these Guidelines.

4.1.2 International (and often national) transport of dangerous cargoes may be subject to several dangerous cargoes transport regulations, depending on the final destination and the modes of transport used.

4.1.3 For combined transport, involving several modes of transport other than by sea, the rules and regulations applicable depend on whether it is a national movement or international transport or transport within a political or economic union or trading zone, such as the European Union.

4.1.4 International transport of dangerous cargoes by road, rail or inland waterways is subject to the following Agreements in Europe:

European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR);

Regulations concerning the International Carriage of Dangerous Goods by Rail (RID); and

Regulations for the Carriage of Dangerous Substances on the Rhine (ADNR) based on the provisions contained in the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN).

4.1.5 The provisions of ADR, RID, ADNR and ADN are harmonized. Most national and international regulations are based on the United Nations Recommendations on the Transport of Dangerous Goods (Orange Book). However, national rules, applicable to domestic transport, may differ from international regulations.

4.1.6 For maritime transport, the provisions of the International Maritime Dangerous Goods (IMDG) Code apply. The IMDG Code provides detailed guidance on all aspects of the transport of packaged dangerous goods by sea. Special attention is drawn to part 5 (consignment procedures) of the IMDG Code, which comprises the following chapters:

chapter 5.1 General provisions;

chapter 5.2 Marking and labelling of packages including IBCs;

chapter 5.3 Placarding and marking of cargo transport units;

chapter 5.4 Documentation; and

chapter 5.5 Special provisions.

4.1.7 Dangerous goods are divided into the following classes:

Class 1 - Explosives

Class 1 is divided into six divisions:

Division 1.1: Substances and articles which have a mass explosion hazard

Division 1.2: Substances and articles which have a projection hazard but not a mass explosion hazard

Division 1.3: Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard

Division 1.4: Substances and articles which present no significant hazard

Division 1.5: Very insensitive substances which have a mass explosion hazard

Division 1.6: Extremely insensitive articles which do not have a mass explosion hazard

Class 2 - Gases: compressed, liquefied or dissolved under pressure

Class 2.1: Flammable* gases

Class 2.2: Non-flammable, non-toxic gases

Class 2.3: Toxic** gases

* Inflammable has the same meaning as flammable.

** Poisonous has the same meaning as toxic.

Class 3 - Flammable liquids

Class 4 - Flammable solids, substances liable to spontaneous combustion, substances which in contact with water emit flammable gases

Class 4.1 - Readily combustible solids and solids which may cause fire through friction; Self-reactive (solids and liquids) and related substances; Desensitized explosives.

Class 4.2 - Substances liable to spontaneous combustion

Class 4.3 - Substances which, in contact with water, emit flammable gases

Class 5 - Oxidizing substances (agents) and organic peroxides

Class 5.1: Oxidizing substances (agents)

Class 5.2: Organic peroxides

Class 6 - Toxic and infectious substances

Class 6.1: Toxic substances

Class 6.2: Infectious substances

Class 7 - Radioactive material

Class 8 - Corrosive substances

Class 9 - Miscellaneous dangerous substances and articles

Class 9 comprises:

.1 Substances and articles not covered by other classes which experience has shown, or may show, to be of such a dangerous character that the provisions of part A of chapter VII of SOLAS, 1974, as amended, shall apply; these include substances that are transported or offered for transport at temperatures equal to, or exceeding 100°C in a liquid state, and solids that are transported or offered for transport at temperatures equal to or exceeding 240°C; and

.2 Substances not subject to the provisions of part A of chapter VII of the aforementioned Convention, but to which the provisions of Annex III of MARPOL 73/78, as amended, apply. The properties or characteristics of each substance are given in the Dangerous Goods List in chapter 3.2 pertaining to the substance or article,

4.2 Before packing

4.2.1 Information should be provided by the shipper about the properties of the dangerous cargoes to be handled and their quantities. The basic items of information necessary for each dangerous substance, material or article to be transported by any mode of transport are the following:

the Proper Shipping Name (correct technical name);

the class and/or division (and the compatibility group letter for cargo of class 1);

the UN Number and the packing/packaging group; and

the total quantity of dangerous cargoes (by volume or mass, and for explosives the net explosive content).

Other items of information may be required, depending on the mode of transport (flashpoint for transport by sea, instructions to be followed in case of incident for road transport under the ADR regime, special certificates, e.g. for radioactive materials, etc.). The various items of information required under each regulation and applicable during combined transport operations should be provided so that appropriate documentation may be prepared for each shipment.

4.2.2 The shipper should also ensure that dangerous cargoes are packaged, packed, marked, labelled, placarded and provided with the required signs, in accordance with the applicable regulations. A declaration that this has been carried out is normally required. Such a declaration may be incorporated into or attached to the transport documents.

4.2.3 The shipper should also ensure that the cargoes to be transported are authorized for transport by the modes to be used during the transport operation. For example, self-reacting substances and organic peroxides requiring temperature control are not authorized for transport by rail under the RID regime. Certain types of dangerous cargoes are not authorized to be transported on board passenger ships and therefore the requirements of the IMDG Code should be carefully studied, particularly before the consolidation of several shipments of dangerous cargoes in a CTU which may need to be segregated 'away from' each other. These shipments may only be carried in the same unit with the approval of the competent authority concerned.

4.2.4 Current versions of all applicable regulations (IMDG Code, ADR, RID, ADN and ADNRR) should be easily accessible during packing to ensure appropriate checking.

4.2.5 Dangerous cargoes should only be handled, packed and secured under direct and identifiable supervision of a responsible person who is familiar with the legal requirements and the risks involved and who knows the measures that should be taken in an emergency.

4.2.6 Suitable measures to prevent fires should be taken, including the prohibition of smoking in the vicinity of dangerous cargoes.

4.2.7 Packages of dangerous cargoes should be examined and any found to be damaged, leaking or sifting should not be packed into a CTU. Packages showing evidence of staining, etc. should not be packed without first determining that it is safe and acceptable to do so. Water, snow, ice or other matter adhering to packages should be removed before packing. Liquids that have accumulated on drum heads should initially be treated with caution in case they are the result of leakage of contents. If pallets have been contaminated by spilt dangerous cargoes they should be destroyed by appropriate disposal methods to prevent use at a later date.

4.2.8 If dangerous cargoes are palletised or otherwise unitised they should be compacted so as to be regularly shaped, with approximately vertical sides and level at the top. They should be secured in a manner unlikely to damage the individual packages comprising the unit load. The materials used to bond a unit load together should be compatible with the substances unitised and retain their efficiency when exposed to moisture, extremes of temperature and sunlight.

4.2.9 The packing and method of securing of dangerous cargoes in a CTU should be planned before packing is started.

4.3 Packing and securing

4.3.1 Special care should be taken during handling to avoid damage to packages. However, if a package containing dangerous cargoes is damaged during handling so that the contents leak out, the immediate area should be evacuated until the hazard potential can be assessed. The damaged package should not be shipped. It should be moved to a safe place in accordance with instructions given by a responsible person who is familiar with the risks involved and knows the measures that should be taken* in an emergency.

* The Emergency Procedures for Ships Carrying Dangerous Goods (Ems) and the Medical First Aid Guide for Use in Accidents involving Dangerous Goods (MFAG) in the Supplement of the IMDG Code give further useful advice, but it should be borne in mind that the former may not be appropriate for use on land. Emergency response handbooks, giving emergency response information cross-referenced to the substance's United Nations identification number (UN number), are usually available at the national level.

4.3.2 If a leakage of dangerous cargoes presents safety or health hazards such as explosion, spontaneous combustion, poisoning or similar danger, personnel should immediately be moved to a safe place and the Emergency Response Organization notified.

4.3.3 Dangerous cargoes should not be packed in the same CTU with incompatible cargoes. In some instances even cargoes of the same class are incompatible with each other and should not be packed in the same unit. The requirements of the IMDG Code concerning the segregation of dangerous cargoes inside CTUs are usually more stringent than those for road and rail transport. Whenever a combined transport operation does not include transport by sea, compliance with the respective inland transport regulations, such as ADR, RID, ADN and ADNRR, may be sufficient. However, if it cannot be guaranteed that no part of the transport operation will be by sea, the segregation requirements of the IMDG Code should be strictly complied with.

4.3.4 When dangerous cargoes are being handled, the consumption of food and drink should be prohibited.

4.3.5 Vented packages should be packed with the vents in an upright position and in such a way that the vents will not be blocked.

4.3.6 Drums containing dangerous cargoes should always be stowed in an upright position unless otherwise authorized by the competent authority.

4.3.7 Dangerous cargoes consignments which form only part of the load of a CTU should, whenever possible, be packed adjacent to the doors with markings and labels visible. Particular attention is drawn to 3.3.1 concerning the securing of cargo by the doors of a unit.

4.4 On completion of packing

4.4.1 Placarding

4.4.1.1 Placards (enlarged labels) (minimum size 250 mm x 250 mm) and, if applicable for maritime transport, 'MARINE POLLUTANT' marks (minimum size of a side 250 mm) and other signs

should be affixed to the exterior surfaces of a CTU or unit load or overpack to provide a warning that the contents of the unit are dangerous cargoes and present risks, unless the labels, marks or signs affixed to the packages are clearly visible from the exterior of the unit.

4.4.1.2 CTUs containing dangerous cargoes or residues of dangerous cargoes should clearly display placards and, if applicable for maritime transport, 'MARINE POLLUTANT' marks or other signs as follows:

- .1 a cargo transport unit, semi-trailer or portable tank, one on each side and one on each end of the unit;
- .2 a railway wagon, at least one on each side;
- .3 a multiple-compartment tank containing more than one dangerous substance or their residues: along each side at the positions of the relevant compartments; and
- .4 any other cargo transport unit, at least one on both sides and on the back of the unit.

Placards on the sides of a CTU should be affixed in such a position that they are not obscured when the unit doors are opened. For international road transport under the ADR regime, the display of enlarged labels on vehicles is only required for transport in bulk.

4.4.1.3 Whenever dangerous cargoes present several risks, subsidiary risk placards should be displayed in addition to primary risk placards. CTUs containing cargoes of more than one class, however, need not bear a subsidiary risk placard if the hazard represented is already indicated by the primary risk placard.

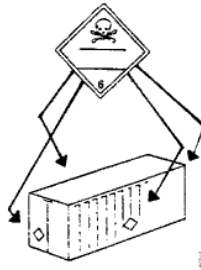


Figure 36 - Placards on a container

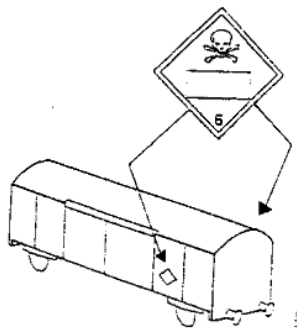


Figure 37 - Placards on a railway wagon

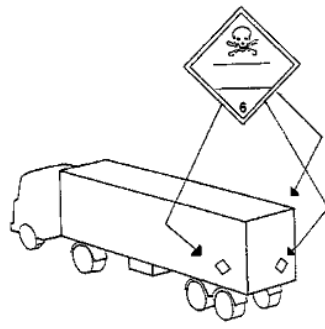


Figure 38 - Placards on a trailer

4.4.1.4 Where individual schedules in the IMDG Code indicate that no hazard label or class marking is necessary on individual packages, then no placard or class marking is required on the CTU, provided the UN Number is displayed on the unit in accordance with 4.4.1.6.

4.4.1.5 For maritime cargo, any CTU containing packaged dangerous cargoes of a single commodity which constitute a full load and for which no placard is required should be durably marked with the Proper Shipping Name of the contents.

4.4.1.6 Consignments of packaged dangerous cargoes of a single commodity, other than cargoes of class 1, which constitute a full load for the CTU should have the UN Number for the commodity displayed in black digits not less than 65mm high either against a white background in the lower half of the class placard or on an orange rectangular panel not less than 120mm high and 300mm wide, with a 10mm black border, to be placed immediately adjacent to the placard or Marine Pollutant mark (see section 5.3.2.1 of the IMDG Code). In those cases the UN number should be displayed immediately adjacent to the Proper Shipping Name.

4.4.1.7 For radioactive materials special requirements apply (see, for example, section 5.3.1.2.2 of the IMDG Code).

4.4.1.8 When solid carbon dioxide (CO₂ - dry ice) or other expendable refrigerant is used for cooling purposes, a warning sign should be affixed to the outside of the doors so that it is clearly visible to any person operating the doors. The sign should warn of the possibility of an asphyxiating atmosphere. An example of such a warning sign is given in annex 2.

4.4.1.9 As CTUs offered for shipment under fumigation may require special precautions, they should only be accepted with the agreement of the carrier and they should be identified to him prior to loading. CTUs under fumigation are now included in class 9 of the IMDG Code.

4.4.1.10 When a closed CTU or its contents has been fumigated and is to be shipped under fumigation, a warning sign should be affixed to the outside of the doors so that it is clearly visible to any person operating the doors. An example of such a warning sign is given in annex 2. The sign should state the fumigant, the method of fumigation employed and the date and time when it took place. The sign should only be removed when the unit has been ventilated after fumigation, to ensure that no harmful concentration of gas remains.

4.4.2 Certification

4.4.2.1 For transport by sea, regulation 4 of chapter VII of SOLAS 1974, as amended, requires that the person responsible for the packing of dangerous cargoes into a container or road vehicle shall provide a signed Container Packing Certificate or Vehicle Declaration stating that the cargo in the unit has been properly packed and secured and that all applicable transport requirements are met.

4.4.2.2 The IMDG Code states the following declaration:

- .1 The container/vehicle was clean, dry and apparently fit to receive the goods;
- .2 Packages which need to be segregated in accordance with applicable segregation requirements have not been packed together onto or in the container/vehicle (unless approved by the competent authority concerned in accordance with 7.2.2.3);

.3 All packages have been externally inspected for damage, and only sound packages have been loaded;

.4 Drums have been stowed in an upright position, unless otherwise authorized by the competent authority, and all goods have been properly loaded and, where necessary, adequately braced with securing material to suit the mode(s) of transport for the intended journey;

.5 Goods loaded in bulk have been evenly distributed within the container/vehicle;

.6 For consignments including goods of class 1 other than division 1.4, the container/vehicle is structurally serviceable in accordance with 7.4.6;

.7 The container/vehicle and packages are properly marked, labelled and placarded, as appropriate;

.8 When solid carbon dioxide (CO₂ - dry ice) is used for cooling purposes, the container/vehicle is externally marked or labelled in a conspicuous place, such as, at the door end, with the words: "DANGEROUS CO₂ (DRY ICE) INSIDE. VENTILATE THOROUGHLY BEFORE ENTERING"; and

.9 A dangerous goods transport document, as indicated in 5.4.1, has been received for each dangerous goods consignment loaded in the container/vehicle.

NOTE: The container/vehicle packing certificate is not required for tanks.

4.4.2.3 A Container Packing Certificate/Vehicle Declaration is not required under the RID, ADR, ADN or ADNR regimes, even though they may be required for inland domestic transport in certain countries. However, such certificates will be needed if the transport operation includes sea voyages. They will then need to be provided prior to loading, as port authorities, berth operators and shipmasters may wish to sight them (or a copy) before accepting containers or vehicles packed with dangerous cargoes into their premises or aboard their ship.

4.4.2.4 For international road transport under the ADR regime, when several items of dangerous cargoes are packed together in a single CTU, the shipper should declare that such mixed packing is not prohibited.

4.4.2.5 The functions of the dangerous goods declaration (see 4.2.2) and of the Container Packing Certificate/Vehicle Declaration may be incorporated into a single document; if not, these documents should be attached one to the other. If these functions are incorporated into a single document, e.g. a Dangerous Goods Declaration, a shipping note, etc., the inclusion of a phrase such as 'it is declared that the packing of the cargoes into the vehicle or freight container has been carried out in accordance with the applicable provisions' (see section 5.4.2.2 of the IMDG Code) may suffice. Where both declarations are included in a single document, separate signatures are required for the two declarations.

4.4.3 If the doors of containers or vehicles are locked, the means of locking should be of such a construction that, in case of emergency, the doors can be opened without delay.

4.4.4 Where dangerous cargoes are kept in combined transport terminals in port areas, reference should be made to the IMO Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas.

4.4.5 CTUs packed with dangerous cargoes should only be collected from terminals by a driver who has been properly trained and instructed. The driver should possess a driver training certificate proving that he is allowed to drive a vehicle carrying dangerous cargoes of the classes contained in the unit. Before departure, he should be provided with all relevant documentation for the dangerous cargoes, as well as with written instructions on the action to be taken in the case of incidents involving the dangerous cargoes.