

INTERNATIONAL MARITIME ORGANIZATION

4 ALBERT EMBANKMENT
LONDON SE1 7SR

Telephone: 0171-735 7611
Fax: 0171-587 3210
Telex: 23588 IMOLDN G



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Ref. T3/1.01

MSC/Circ.921
4 June 1999

**AMENDMENTS TO THE CODE OF SAFE PRACTICE FOR SOLID
BULK CARGOES (BC CODE)**

1 The Maritime Safety Committee, at its seventy-first session (19 to 28 May 1999), approved amendments to the Code of Safe Practice for Solid Bulk Cargoes, as set out in the annex to the present circular.

2 Member Governments are invited to bring these amendments to the attention of shipping companies, shipowners, ship operators, shippers, shipmasters and crews and all others concerned.

ANNEX**AMENDMENTS TO THE BC CODE****PEAT MOSS**

- 1 In Appendix A, A.3.4, the figure "65%" should be changed to "80%".
- 2 In Appendix B, under PEAT MOSS*, the words "with a moisture content of more than 65% by weight - fine to coarse fibrous structure" should be deleted.
- 3 In Appendix D, D.1.1.4.4, after the entry for Coal, add the following:

"Peat Moss

For all Peat Moss, determine the bulk density, using either the ASTM or CEN (20 litres) method.

Peat should be above or below 90 kg/cubic metres on a dry weight basis in order to obtain the correct TML.

As indicated in D.1.1.1, the following should be determined:

- (1) The moisture content of a sample of cargo (MC).
- (2) The flow moisture point (FMP).
- (3) The transportable moisture limit (TML). The TML will be determined as follows:
 - (a) for peat with a bulk density of greater than 90 kg/cubic metres on a dry weight is 85% of the FMP.
 - (b) for peat with a bulk density of 90 kg/cubic meters or less on a dry weight, the TML is 90% of the FMP."

BROWN COAL (LIGNITE) BRIQUETTES

- 4 In Appendix B, after the entry for BARIUM NITRATE, add the following new entry for BROWN COAL (LIGNITE) BRIQUETTES:

"BROWN COAL (LIGNITE) BRIQUETTES"

BC No.	IMO Class	MFAG table No.	Approximate stowage factor (m ³ /t)	EmS No.
002	MHB	311, 616 ⁺	0.70 to 0.80	B14

Properties and Characteristics

*For comprehensive information on transport of any material listed, refer to section 1-10 of this Code.

⁺Refer to paragraph 6.1.1 (Asphyxia) of the MFAG.

1 Brown coal (lignite) briquettes are manufactured by pressing dried coal particles into compressed blocks.

2 Briquettes are subject to oxidation, leading to depletion of oxygen and an increase in carbon dioxide in the cargo space (see also section 3 and Appendix F).

3 Brown coal briquettes are liable to self-heating that can lead to spontaneous combustion in the cargo space. If this occurs, flammable and toxic gases, including carbon monoxide, may be produced. Carbon monoxide is an odourless gas, slightly lighter than air, and has flammable limits in air of 12% to 75% by volume. It is toxic by inhalation, with an affinity for blood haemoglobin over 200 times that of oxygen.

4 Brown coal briquettes do not emit methane under normal stowage conditions.

Segregation and stowage requirements

1 Boundaries of cargo spaces where briquettes are carried should be resistant to fire and liquids.

2 Briquettes should be “separated from” goods of classes 1 (division 1.4), 2, 3, 4, and 5 in packaged form (see IMDG Code) and “separated from” solid bulk materials of classes 4 and 5.1.

3 Stowage of goods of class 5.1 in packaged form or solid bulk materials of class 5.1 above or below a briquette cargo should be prohibited.

4 Briquettes should be “separated longitudinally by an intervening complete compartment or hold from” goods of class 1 other than division 1.4.

Note: For interpretation of the segregation terms, see section 9, paragraph 9.3.3.

General requirements

1 Prior to loading, the shipper, or their appointed agent, should provide in writing to the master, the characteristics of the cargo and the recommended safe handling procedures for loading and transport of the cargo. As a minimum, the cargo’s contract specifications for moisture content, sulphur content and size should be stated.

2 It is recommended that briquettes be stored for 7 days prior to loading. This substantially reduces the risk of spontaneous combustion in subsequent transport, storage and handling.

3 Before loading briquettes the master should ensure the following:

- .1 weather deck closures to the cargo space should be inspected to ensure their integrity. Such closures should be closed and sealed before loading is commenced;
- .2 all cargo spaces and bilge wells should be cleaned and dry. Any residue of waste material or previous cargo should be removed, including removable cargo battens, before loading;
- .3 all electrical cables and components situated in cargo spaces and adjacent spaces should

be free from defects. Such cables and electrical components should be safe for use in a flammable and/or dusty atmosphere or positively isolated;

- .4 the briquette cargo should not be stowed adjacent to hot areas;
- .5 the ship should be suitably fitted and carry on board appropriate instruments for measuring the following without requiring entry into the cargo space:
 - .5.1 concentration of methane in the atmosphere above the cargo;
 - .5.2 concentration of oxygen in the atmosphere above the cargo;
 - .5.3 concentration of carbon monoxide in the atmosphere above the cargo; and
 - .5.4 pH value of cargo hold bilge samples.

These instruments should be regularly serviced and calibrated. Ship personnel should be trained in the use of such instruments. Details of gas monitoring procedures are given in Appendix G;

- .6 it is recommend that means be provided for monitoring the temperature of the cargo in the range of 0°C to 100°C. Such arrangements should enable the temperature of the briquettes cargo to be measured during the voyage without requiring entry into the cargo space; and
- .7 the ship should carry on board the self-contained breathing apparatus required by SOLAS regulation II-2/17. The self-contained breathing apparatus should be worn only by personnel trained in its use (see also section 3 and appendix F).

4 Loading the briquette cargo:

- .1 Smoking and the use of naked flames should not be permitted in the cargo areas and adjacent spaces and appropriate warning notices should be posted in conspicuous places. Burning, cutting, chipping, welding or other sources of ignition should not be permitted in the vicinity of cargo spaces or in other adjacent spaces.
- .2 Briquettes should not be dropped more than one metre during loading to minimise the production of dust and fines.
- .3 Individual cargo spaces should be loaded without interruption where possible. Hot spots can be expected to develop in a hold that has been kept open for more than six days (or less in weather over 30° Celsius).
- .4 Individual cargo spaces should be closed and sealed as soon as possible after each has been loaded. The hatch covers can also be additionally sealed with a suitable sealing tape.

- .5 Prior to departure, the master should be satisfied that the surface of the material has been trimmed reasonably level to the boundaries of the cargo space to avoid the formation of gas pockets and to prevent air from permeating the body of the briquettes. Casings leading into the cargo space should be adequately sealed. The shipper should ensure that the master receives the necessary co-operation from the loading terminal (see also section 5).
- 5 After loading, sealing the cargo space and during the voyage:
- .1 The master should ensure, as far as possible, that any gases which may be emitted from the cargo do not accumulate in adjacent enclosed spaces, e.g.. store-rooms, carpenter's shop, passage ways, tunnels, etc. Such spaces should be adequately ventilated and regularly monitored for methane, oxygen and carbon monoxide.
 - .2 Under no circumstances should the hatches be opened or the hold ventilated or entered during the voyage.
 - .3 The atmosphere in the space above the cargo in each cargo space should be regularly monitored for the presence of methane, oxygen and carbon monoxide.
 - .4 The frequency of the monitoring should depend upon the information provided by the shipper and the information obtained through the analysis of the atmosphere in the cargo space. The readings should be recorded at least daily and as close as practical to the same time of day. The shipper may request more frequent readings, particularly if there is evidence of significant self heating during the voyage.
 - .5 The oxygen level in the hold will fall from an initial 21% over a period of days to stabilise at levels of the order of 6-15% in a sealed hold. If the oxygen level does not fall below 20%, or rapidly increases after an initial fall, it is possible that the hold is inadequately sealed and is at risk of spontaneous combustion.
 - .6 Carbon monoxide levels will build up to concentrations which fluctuate in the 200-2000 parts per million (ppm) range in a safe, well sealed hold. A rapid increase of approximately 1000 ppm in carbon monoxide levels in a brown coal briquette cargo over a 24 hour period is a possible indicator of spontaneous combustion, particularly if accompanied by an increase in methane levels.
 - .7 The methane composition in briquette cargoes is normally low, less than 5 ppm and does not constitute a hazard. However, a sudden and continuing rise in methane levels, to concentrations above 10 ppm, is an indicator of the occurrence of spontaneous combustion in the hold.
 - .8 The temperature in a brown coal briquette cargo in a well sealed hold normally remains at 5-10°C above sea water temperature, the increase being due to normal diurnal breathing of small quantities of air into the hold. Checking of the hold seals to minimise air leakage is essential. A rapid increase in temperature of approximately 20°C over 24 hours is evidence of spontaneous combustion.

- .9 Regular hold bilge testing should be systematically carried out. If the pH monitoring indicates that a corrosion risk exists, the master should ensure that all bilges are kept dry during the voyage in order to avoid possible accumulation of acids on tank tops and in the bilge system.
 - .10 If the behaviour of the cargo during the voyage differs from that specified in the cargo declaration, the master should report such differences to the shipper. Such reports will enable the shipper to maintain records on the behaviour of the brown coal briquette cargoes, so that the information being provided to the master can be reviewed in the light of the transport experience.
- 6 Prior to, and during discharge:
- .1 Cargo spaces are to be opened immediately prior to the commencement of discharge of that space. The cargo can be sprayed with a fine water spray to reduce dust.
 - .2 Personnel are not to enter the cargo space without having tested the atmosphere above the cargo. If the atmosphere contains oxygen levels below 21%, self-contained breathing apparatus is to be worn. Carbon dioxide and carbon monoxide gas levels should also be tested. The recommended Threshold Limit Value (TLV) for carbon monoxide is 50 ppm.
 - .3 During the discharge, attention should be paid to the cargo for signs of hot spots (i.e. steaming). If a hot spot is detected, the area is to be sprayed with a fine water spray and the hot spot removed immediately to prevent spreading. The hot spot material is to be spread out on the wharf away from the remainder of the cargo.
 - .4 If the discharge is interrupted for more than eight hours, the hatch covers and all other ventilation should be closed.

Response to self-heating concern

If the ship's master is concerned that the cargo is showing any signs of self heating or spontaneous combustion, such as an increase in the concentration of methane, carbon monoxide or oxygen or an increase in temperature, as described above, the following actions should be taken:

- 1 The ship's agent at the loading port, and the person designated under the ISM Code who is responsible for the safety aspects of the ship's operation, should be advised immediately.
- 2 The ship personnel should immediately check if the hatches have been opened or the seals broken. If this is the case, they should immediately be closed and the cargo space re-sealed.
- 3 Personnel should not enter the cargo space and the hatches should not be opened, unless expressly instructed by the ship's agent or if the master considers access is critical to the safety of the ship or safety of life. In this situation, the personnel must wear self-contained breathing apparatus and this should be worn only by personnel trained in its use (see also section 3 and Appendix F). The cargo space must be re-sealed immediately after the personnel vacate the cargo space.

- 4 The frequency of monitoring the gas composition and temperature of the cargo should be increased.
 - 5 As soon as possible, the following information should be sent to the ship's owner or agent at the loading port to obtain expert advice:
 - .1 the number of holds involved;
 - .2 monitoring results of the carbon monoxide, methane and oxygen concentrations;
 - .3 if available, temperature of the cargo, location and method used to obtain results;
 - .4 the time the gas analyses were taken (monitoring routine);
 - .5 the quantity of briquettes in the hold(s) involved;
 - .6 the description of the cargo as per the shippers declaration, and any special precautions indicated on the declaration;
 - .7 the date of loading, and ETA at the intended discharge port (which should be specified); and
 - .8 any other comments or observations the ship's master may consider relevant."
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