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Coal Cargo (Bulk)

Precautions Prior to Loading & During Voyage

IMO Class: MHB (Material hazardous only in Bulk)

BC No. 010

Prior to loading, the shipper or his 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, and especially whether the cargo may be liable to emit methane or self-heat.

The Master should be satisfied that he has received such information prior to accepting the cargo.

Methane levels of between 5% and 16% in air constitute an atmosphere which can be readily ignited and explode.

The main consideration to keep in mind with coal is that it emits methane, an odourless, flammable gas which is less dense than air. This gas is emitted particularly if the coal has been freshly mined or if it is dropped into the hold when loading, causing it to break up. Thus, a risk of fire and explosion is always present on a ship carrying coal.

Coals may be subject to oxidation, leading to depletion of oxygen and an increase in carbon dioxide in the cargo space.

Many classes of coal, including anthracite, are liable to spontaneous combustion if allowed to heat excessively.



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.

Some coals may be liable to react with water and produce acids which may cause corrosion. Flammable and toxic gases, including hydrogen, may be produced. Hydrogen is an odourless gas, much lighter than air, and has flammable limits in air of 4% by 75% by volume.

Spaces in which coal is to be stowed should be carefully cleaned, ensuring that all traces of oil or grease and of previous coal cargoes are removed. The vessel should be suitably equipped with appropriate instruments for measuring of the following without requiring entry in the cargo space:

- ☞ concentration of methane in the atmosphere;
- ☞ concentration of oxygen in the atmosphere;
- ☞ concentration of carbon monoxide in the atmosphere; and
- ☞ pH value of cargo hold bilge samples.

Sulphur is one of the components in Coal. When sulphur, moisture / water and oxygen are combined, it will form sulphuric acid, which attacks metal / steel in the cargo holds and will cause severe / excessive corrosion to the bulkheads. Some potential problem areas are shown in the Figure 1 below.

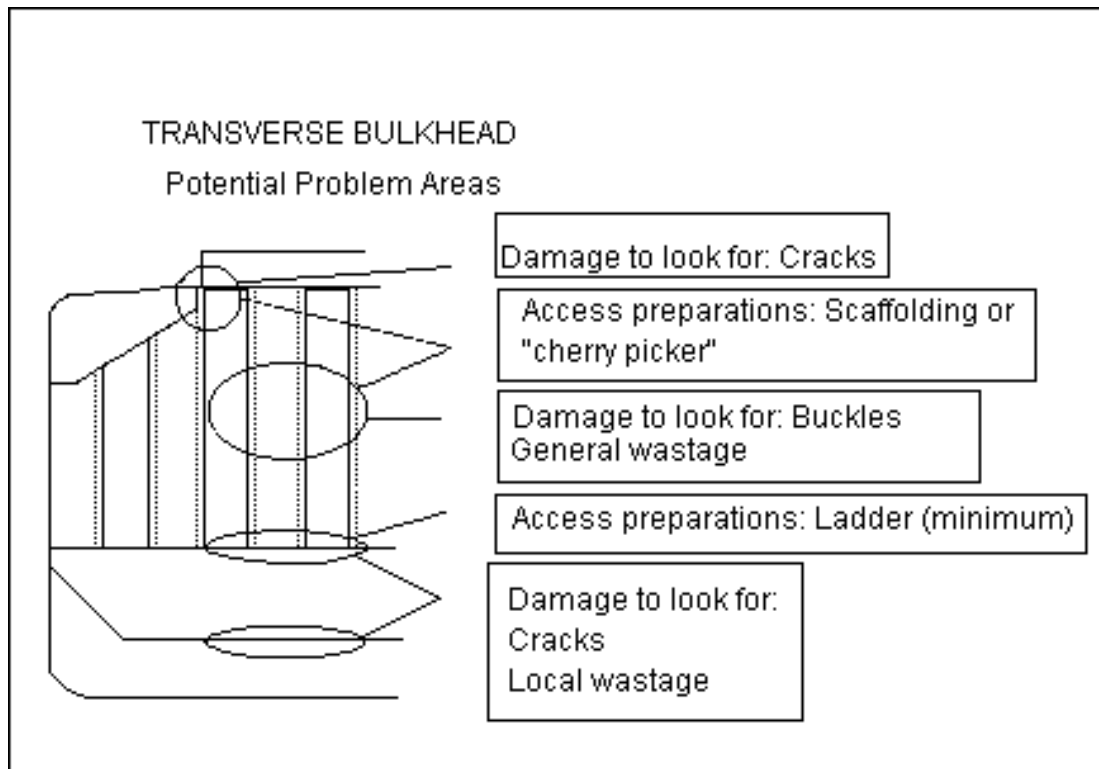


Figure 1

Bilges and scuppers must be tested and in working order and electrical wiring in the compartment disconnected or sheathed in heavy gauge screwed steel conduit.

Fire fighting, life saving and smoke detection equipment must be carefully examined and tested. The fire fighting equipment should be available for immediate use at all times when loading and on passage. The smoke detection equipment must be continuously operated and monitored regularly. The ship should carry on board the self-contained breathing apparatus required by SOLAS regulation 11-2/ 17. The self-contained breathing apparatus should be worn only by personnel trained in its use

Arrangements should be made before loading to enable temperatures to be taken at the ends of compartments and in the bottom of the stow via suitable pipes from the deck, to ensure rapid detection of a temperature rise. It is recommended that means be provided for measuring the temperature of the cargo in the range 0°C to 100°C. Such arrangements should enable the temperature of the coal to be measured while being loaded and during the voyage without requiring entry into the cargo space.

When loading in the hatch square using chutes, extra boards should be provided in the hold to prevent damage to the tank top plating.



Bulkheads between coal carrying compartments and accommodation or machinery spaces must be gas tight.

Deck houses and other compartments on deck may collect methane and must be well ventilated at all times.

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No naked lights or smoking must be allowed in or near a coal carrying compartment. Care must be taken not to create sparks as a result of impacts of steel on steel.

The absorption of oxygen from the air by the coal leads to oxidation and the evolution of more methane and heat generation. The cargo must therefore not receive through ventilation, but generous surface ventilation must be provided to quickly remove any evolved gas and keep the cargo cool. Hatch covers may be opened during suitable weather to assist this.

If the temperature of the coal is found to rise too much, it may be necessary to cool the adjacent bulkhead by directing hoses at it and removing the water via the bilge pumps.

Only intrinsically safe torches and other equipment may be used in or near coal compartments.

Coal must be segregated from any other cargo liable to spontaneous heating and must be kept clear of warm bulkheads.

During loading, the coal should be carefully trimmed into the wings and ends of compartments to achieve a level stow, preventing any shifting and also the accumulation of pockets of methane above the stow.

If a coal fire breaks out when on passage, steam injection must not be used to extinguish the fire, and it should be controlled using CO₂, inert gas or high expansion foam, which should be injected into the compartment. The vessel should head for the nearest port and keep the hatches sealed until specialist advice is obtained.

Entry into a coal compartment must only be attempted by personnel wearing breathing apparatus and having adequate back-up personnel to render assistance standing by on deck. Thorough ventilation of the space must be provided before entry is attempted and during the time that crew members are in the space.



Best regards,
Members of CJA Marine Loss Prevention & Risk Management Committee
For and On Behalf Of
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P.S: We welcome any comments or suggestion with regard to the above. Kindly e-mail to the writer at raj@cjamarine.com

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