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**VOLUNTARY STRUCTURAL GUIDELINES FOR NEW SHIPS
CARRYING LIQUIDS IN BULK CONTAINING BENZENE**

1 The Maritime Safety Committee, at its seventy-seventh session (28 May to 6 June 2003), noting that the diseases caused by the exposure to vapours emanating from benzene were still a source of great concern, approved Revised minimum safety standards for ships carrying liquids in bulk containing benzene, as set out in the annex to MSC/Circ.1095.

2 Member Governments were invited to apply the Revised minimum safety standards for ships carrying liquids in bulk containing benzene, including precautions to be taken by the crew in connection with loading and gas-freeing operations appended thereto, as soon as possible.

3 The Committee, at its eighty-second session, 29 November to 8 December 2006, desiring to protect the health of seafarers, recognized that, whilst the aforementioned recommendations were aimed at the shipping community, other measures of a structural nature were needed, and approved the Voluntary structural guidelines for new ships carrying liquids in bulk containing benzene, set out in the annex.

4 Member Governments are invited to bring the annexed Voluntary structural guidelines to the attention of shipowners, ship builders, designers and other parties concerned.

ANNEX**VOLUNTARY STRUCTURAL GUIDELINES FOR NEW SHIPS
CARRYING LIQUIDS IN BULK CONTAINING BENZENE****1 GENERAL**

The aim of these Guidelines is to introduce some technical improvements for further consideration in the design and equipment of tankers to reduce the exposure of seafarers to benzene vapours, be it on deck, in the engine-room or in the accommodation, in particular during loading and gas-freeing. Further use of closed cycle loading and unloading is also encouraged for cargoes other than those required by the IBC Code. Other technical solutions such as vapour recovery or vapour filtering that may be developed in the future should also be taken into account.

2 VENTILATION IN THE ACCOMMODATION

In accordance with standard operational procedures, ventilation should be closed down or shut down during loading and gas-freeing, all internal and external doors should be kept closed and passage through doors to open deck should be restricted to a minimum. Nevertheless, experience has shown that it has proven impossible to keep the measured vapour concentrations below acceptable levels. Some restricted ventilation will also have to be maintained in certain areas such as the galley and bathrooms.

2.1 Air intake

Consideration should be given to the location of the air intakes to minimize the entry of harmful vapours. Traditionally, these are normally located on the boat deck connected to the engine-room casing or in the exhaust stack. Bearing in mind that vapours are normally heavier than air, other higher locations may be considered to avoid the vapour envelope around the tanker.

2.2 Air filtering and monitoring

A chemical or mechanical filter where the incoming air is continuously monitored for its concentration of harmful vapours should be provided.

3 VENTILATION IN THE ENGINE-ROOM**3.1 Special air ducts**

Combustion engines require large volumes of atmospheric air. Therefore, most engine-rooms are provided with overpressure in relation to the accommodation. To reduce the overpressure and, thereby, the risk of harmful vapours entering the accommodation, special air-ducts could be fitted to the air intake for combustion engines and boilers.

3.2 Other ventilation

Apart from the air intakes to the engines, additional ventilation in the engine-room is also required to remove heat and to avoid the risk of explosion. Therefore, the presence of harmful vapours cannot be completely avoided. The presence of personnel in the engine-room during loading and gas-freeing should therefore be kept to a minimum. In the engine control room and engine workshops the same ventilation principle as in the accommodation should be applied.

4 AIRLOCKS

Airlocks should be provided to allow crew members to pass from contaminated areas (such as the engine-room and open deck) to the accommodation through a double set of doors where one must be closed before the next can be opened. The space between these doors should be supplied with filtered air with a slight overpressure. One airlock between the open deck and accommodation and one between the engine-room and accommodation is considered acceptable.

5 WASHING AND CHANGING FACILITIES

Washing and changing facilities and toilets should be located with a possibility for the crew to enter directly from the cargo area without passing through any other part of the accommodation. Preferably it should be arranged in such a manner that passage to the accommodation can only take place from the changing room for soiled work clothes through the washing facilities and through the changing room for clean clothes. Lockers and washing machines for soiled working clothes should as well be located separate from the accommodation.

6 WORK ON DECK

6.1 Spill trays

In new tankers, the design of spill trays should be such that the surface of any liquid in the spill tray is reduced to the minimum extent possible and thus the evaporation minimized. One way of achieving this could be by designing spill trays with sloping sides. Other constructions with similar effect may also be acceptable. Drainage facilities for the spill trays and the disposal of their content should be installed (e.g., slop tanks and disposal arrangements).

6.2 Purging air capability

There should be adequate purging air capacity to ensure efficient and complete purging of all pipes and hoses used for cargo handling to the terminal after unloading. Whether compressed air or inert gas should be used for purging purposes depends on the carriage and unloading requirements of the cargo.

7 CARGO MEASUREMENTS AND SAMPLING

To allow all cargo related measurements, including ullage, temperature measurements and sampling to be carried out in a closed mode, permanently fitted equipment should be installed.

8 GAS-FREEING

Gas-freeing should be undertaken using permanently fixed blowers with a piping system, which fits closely to the cargo tank hatches. Each blower should have sufficient capacity and pressure to ensure that the expelled vapours are let with sufficient velocity well clear of the ship through adequate riser arrangements.

9 TANK WASHING AND STRIPPING

Tank washing machines should be permanently mounted in the cargo tanks. Efficient stripping arrangements to drain the suction wells as much as possible should be provided.

10 CONTROLLED TANK VENTING SYSTEM

Whenever a vapour emission control system is available ashore, vapours displaced from the tank during loading should be returned to that system (vapour return). Ships should therefore be fitted with piping systems suitable for vapour return.
