

*Adopts* the Recommendation on Steering Gear for Large Ships, the text of which appears at Annex to this Resolution,

*Invites* all governments concerned to take steps to give effect to the Recommendation as soon as possible.

ANNEX

RECOMMENDATION ON STEERING GEAR FOR  
LARGE SHIPS

Having regard to the possibility that a large ship proceeding at full speed with other ships in the vicinity can suddenly be deprived of the ability to operate the steering gear, it is recommended that arrangements should be made in all new ships over 70,000 tons gross tonnage to ensure to the satisfaction of the Administration that the navigating officer will at all times have adequate and direct control over the rudder movements even though in emergencies the full rate of movement may not necessarily be assured. This objective should be achieved by:

- (a) the duplication of the steering gear operating mechanism;
- (b) the provision of an alternative supply of power from the emergency generator; and
- (c) alternative control arrangements from the bridge to the steering gear.

Such alternative arrangements should come into operation, either automatically, or in respect of (c) only by a changeover device on the navigating bridge, in the event of the failure of the arrangements in use at the time. The Administration might further examine existing ships over 70,000 tons gross tonnage to implement these arrangements in so far as they are reasonable and practicable.

*12 October 1971*  
*Agenda item 8*

RESOLUTION A.211(VII)

RECOMMENDATION ON SAFETY MEASURES FOR PERIODICALLY  
UNATTENDED MACHINERY SPACES OF CARGO SHIPS ADDITIONAL  
TO THOSE NORMALLY CONSIDERED NECESSARY FOR AN  
ATTENDED MACHINERY SPACE

The Assembly,

*Noting* Article 16(i) of the Convention on the Inter-Governmental Maritime Consultative Organization concerning the functions of the Assembly,

*Recognizing* that the increasing application of automation in ships calls for the provision of special safety measures particularly for the protection of engine rooms against fire and unintended flooding,

*Having considered* the Recommendation by the Maritime Safety Committee at its twenty-third session,

*Adopts* the Recommendation on Safety Measures for Periodically Unattended Machinery Spaces of Cargo Ships additional to those normally considered necessary for an Attended Machinery Space, the text of which is given at Annex to this Resolution,

*Invites* all governments concerned to take appropriate steps to give effect to the Recommendation as soon as possible.

#### ANNEX

##### RECOMMENDATION ON SAFETY MEASURES FOR PERIODICALLY UNATTENDED MACHINERY SPACES OF CARGO SHIPS ADDITIONAL TO THOSE NORMALLY CONSIDERED NECESSARY FOR AN ATTENDED MACHINERY SPACE

#### 1. *General*

- 1.1 The following provisions, additional to the requirements of the International Convention for the Safety of Life at Sea, 1960 (hereinafter referred to as the Convention), are made for the protection of new cargo ships with periodically unattended machinery spaces. Passenger ships, whilst complying at least with this Recommendation, should be specially considered by Administrations as to whether additional requirements are necessary.
- 1.2 They should apply to new ships the keels of which are laid, and to existing ships the automation of which is commenced, on or after the date on which the Recommendation is adopted by the IMCO Assembly and Administrations should consider to what extent they are reasonable and practicable in respect of other existing ships and ships below the Convention lower limit of 500 tons gross tonnage.
- 1.3 An unattended machinery space should be considered to be one where the provision of automated alarm, control and instrumentation equipment compensates for the physical removal of the machinery space watchkeeper to a position where he is unable to directly employ his senses of sight, smell, touch and hearing to detect the onset of potentially hazardous conditions. Hence a space, operation of which is supervised from a control station, whether outside or adjacent to the machinery space, should be considered as an unattended space unless the control room has effective visual supervision over the space and the operating arrangements are such that the machinery is physically inspected at reasonable intervals during the watch.
- 1.4 The system and equipment provided in respect of unattended machinery spaces should comply with the relevant requirements of the Administration or of a classification society recognized by the Administration, and the monitoring, alarm, control and instrumentation arrangements provided should ensure so far as is reasonable and practicable that the safety of the ship is not reduced by removal of the watchkeeper from the machinery space. The following measures are based on the assumption that qualified personnel are available to answer alarms.

## 2. *Fire Safety*

In relation to fire safety, the requirements should at least comply with the following:

- 2.1 An efficient and effective fire detection system should be fitted in all machinery spaces. It should be designed to detect rapidly the onset of fire in any part of the space and under any normal condition of operation of the machinery, and variations of ventilation as required by the possible range of ambient temperatures. The detection system should be self-monitoring for faults, and on being activated should initiate both aural and visual alarms distinct in both respects from any other system in sufficient places to ensure its being heard and observed on the bridge and by a responsible engineer officer. When the bridge is unmanned in port the alarm should sound in the cargo control room or in some other place where a responsible officer will be on duty. After installation the system should be realistically tested with simulated smoke and/or flame sources under varying conditions of engine operation and ventilation requirements. The fire-detecting system fitted in machinery spaces should be fed automatically from an emergency source of power if the main source fails.
- 2.2 Where the Convention does not at present require it, an approved fixed fire-extinguishing system should be fitted in any of the spaces referred to above. The requirements for such a system should generally be as for systems required under the Convention.
- 2.3 Arrangements should be made to ensure immediate availability of water in the fire main at suitable pressure, either by permanent pressurization or by suitably placed remote starting arrangements, one of which should be on the bridge, for the fire pumps.
- 2.4 Whilst the fire-extinguishing appliances inside the machinery space should satisfy the Convention, other fire-extinguishing appliances (portable and fixed) may require to be positioned, having in mind the probability that a fire would be attacked from a position outside the space. Particular attention should be paid to the need to maintain the integrity of the machinery space and to restrict any fire to the space of origin. Machinery space doors should constitute an air lock, or be self-closing, so as to ensure adequate sealing of the space at all times and precautions should include the elimination of materials readily rendered ineffective by fire in doors, casings and skylights.
- 2.5 So far as is possible, the arrangements for any remote starting of fire pumps, closing arrangements, the shutting off of ventilation fans, fire-extinguishing system controls, and shut-off arrangements for fuel pumps and fuel tank valves subject to a pressure head should be centralized in one fire control station, together with at least one breathing apparatus and a supply of fire-fighting equipment.
- 2.6 Means should be provided to facilitate attack on a fire at a low level by fitting a protective screen on the tunnel side of the watertight door and at least one hydrant, supplied from the emergency fire pump, with a hose with a jet-spray nozzle (or angled diffuser) conveniently to hand. For engine rooms without a tunnel access those facilities should be provided by the provision of a protected access from a safe space to a position low in the machinery space except in small ships where the Administration considers the requirement unreasonable or impracticable.

- 2.7 Attention should be paid to the need to reduce the possibility of the formation of oil mist or of oil dripping or being sprayed onto hot surfaces or into air intakes, for example, the numbers of joints in pressure oil lines should be reduced to a minimum, and where necessary high pressure pipes such as fuel injection pipes should be screened against such mist or leakage. Where practicable, arrangements should be made so that leakage consequent on the failure of such pipes and joints should be taken to a collector tank fitted with a level alarm to give early warning of such leakage.

3. *Protection against flooding*

In relation to the protection against flooding the following measures should be taken:

- 3.1 In unattended machinery spaces, means should be provided to warn by alarm that water or other liquids are accumulating at an unusual rate or have reached an abnormal level in bilge wells.
- 3.1.1 Bilge wells should be located and monitored in such a way that such accumulation of liquids can be detected at normal angles of trim and heel, and generally should be made large enough to hold more than the normal drainage expected during the longest period of unattended operation.
- 3.1.2 In cases where the bilge pumps start automatically, means should be provided to indicate if the influx of liquid is greater than the pump capacity or if the pump is operating more frequently than would normally be expected. In these cases, smaller bilge wells to cover a reasonable period of time may be considered.
- 3.2 Where automatically controlled bilge pumps are provided, arrangements should be made in order to avoid contravention of the oil pollution prevention requirements.
- 3.3 The controls of any valve serving a sea inlet, a discharge below the waterline or a bilge injection system should be so sited as to allow adequate time for operation in case of influx of water to the space, having regard to the time which could be taken to reach and operate such controls. In respect of the larger valves, the level to which the space could become flooded with the ship in the fully loaded condition should be borne in mind and this may require that in some cases remote control or control from above the bulkhead deck would be required.

4. *Main engine bridge control*

- 4.1 The speed and direction of thrust of the propeller should be fully controllable from the bridge. Bridge manoeuvres should be indicated in the engine control room, or at the manoeuvring platform as appropriate.
- 4.2 Provision should be made for the possibility of remotely setting the required speed and direction of thrust of the propeller by one control device, with automatic performance of all associated services according to the preset programme.
- 4.3 At each remote control station an independent device for stopping the main engine in an emergency should be provided.

4.4 In case of failure of the remote automatic control system, an alarm should be given and the preset speed and direction of thrust of the propeller should be maintained until the moment when the local control is put in operation.

4.5 Indicators should be fitted on the bridge for:

- (a) propeller speed and direction
- (b) pitch position of a controllable pitch propeller.

## 5. *Communication*

A direct and independent means of communication should be provided between any control room, the bridge and the engineer officers' accommodation. Necessary alarm signals should be given on the navigating bridge, in the engine control room, and in the engineer officers' accommodation.

## 6. *Machinery and boilers*

6.1 A system of alarms should be provided which should indicate any fault which requires attention. In addition to the alarms, the system should be such that serious malfunctions in machinery or boiler operations should initiate the automatic shut-down of that part of the plant (e.g. loss of lubricating oil to essential machinery and low water level in boilers).

6.2 An arrangement for overriding the automatic protection for stopping the main engine is to be fitted at the bridge control station for emergency situations in accordance with relevant Administration regulations.

6.3 The need to avoid any increase in fire or other hazard above that of a manned machinery space requires that special attention should be paid to items such as the following:

6.3.1 In respect of main propulsion internal combustion type machinery, low pressure of lubricating oil, high temperature of cooling water and exhaust gas, and the need for the provision of crankcase oil mist detectors, or equivalent means of detecting conditions which might contribute to a crankcase explosion.

6.3.2 For main propulsion turbines: low pressure of lubricating oil, reserve supply of oil to prevent damage due to overrun of propeller in the event of failure of normal supply, high temperature of bearings including thrust bearings.

6.3.3 For main propulsion boilers: high and low water level (the latter preferably having independent detection arrangements operating alarm and oil shut-off respectively), flame failure, failure of air supply, high salinity in feed water, and an alarm should purging or re-ignition apparatus malfunction.

6.3.4 Oil supply arrangements: high and low level alarms in daily service tanks, malfunction of oil purifiers (these should preferably be placed in a special space reserved for purifiers and heaters).

6.3.5 For electrical system: excessive voltage or frequency variation, operation of load-shedding arrangements, loss of power in alarm system.

6.3.6 For auxiliary power units: boilers, turbines or internal combustion type machinery providing auxiliary power should be dealt with generally as for main machinery but small units should comply in so far as is reasonable and practicable.

7. *Miscellaneous*

- 7.1 It should be possible both to control essential machinery and to manoeuvre the main engine locally. Transfer of control between navigating bridge and engine room should be possible only from the engine room or engine control room. Provision is to be made at each control station for indication of the station which is in control of the main engine.
- 7.2 For generating sets the following should apply:
- 7.2.1 Where only one generating set is normally to be in operation, there should be provisions for automatic starting and connection to the main switchboard of a stand-by generator of sufficient capacity to permit propulsion and steering and ensure the safety of the ship in case of loss of the generating set in operation.
- 7.2.2 Where more than one generating set is normally to be simultaneously in parallel operation, there should be provisions (by load shedding for instance) to ensure that, in case of loss of one of these generating sets, the remaining ones are kept in operation without overload to permit propulsion and steering and ensure the safety of the ship.
- 7.2.3 When duplicated, other auxiliary machinery essential to propulsion and steering should be fitted with automatic change-over devices allowing transfer to a stand-by machine.
- 7.3 The number of automatic consecutive attempts which fail to produce a start should be limited to safeguard sufficient starting air pressure unless an alarm is provided to indicate low starting air pressure set at a level which would still permit main engine starting operations.
- 7.4 It should be possible to control the pressures and temperatures and liquid levels in the machinery manually in the event of failure of the automated arrangements.
- 7.5 Loss of pressure or electrical failure in the control and alarm system should be the occasion of alarm condition. The alarm system should function, such that more than one fault condition will be indicated at any one time and the acceptance of any alarm will not inhibit another alarm.
- 7.6 Any alarm condition which is relayed to the bridge should also indicate to the navigating officer that the alarm has been accepted and that the fault is being attended to.
- 7.7 In addition to the requirements of 7.2 and even where it is not required by the Convention, adequate emergency lighting should be provided in the machinery spaces. This emergency lighting should be switched on automatically in the event of failure of the normal source of supply.
- 7.8 When two electric or electro-hydraulic steering gear power units are provided, the normal control (start, stop and stand-by selection) of both steering units should be possible from the navigating bridge.

- 7.9 The engine control room should be provided with at least two widely separated means of escape.
- 7.10 When only one person is in the machinery space, means should be provided so that he can indicate his presence and his well-being to an attended station.
- 7.11 Suitable arrangements should be made during the initial operation of the ship to ensure that all essential equipment is functioning in a reliable manner and can be expected to continue to do so before the Administration agrees that the machinery space may be left unattended. Arrangements for systematic inspection, routine tests and adequate maintenance should be made so as to ensure so far as is possible continued reliability.
- 7.12 The Administration should ensure that sufficient personnel are carried, bearing in mind the proposed trade, for proper maintenance and so that manned operation can be effected should any essential item of alarm, control or instrumentation fail to function properly.

12 October 1971  
Agenda item 8

RESOLUTION A.212(VII)

CODE FOR THE CONSTRUCTION AND EQUIPMENT  
OF SHIPS CARRYING DANGEROUS CHEMICALS  
IN BULK

The Assembly,

*Noting* Article 16(i) of the Convention on the Inter-Governmental Maritime Consultative Organization concerning the functions of the Assembly,

*Recognizing* that the rapid increase in sea transport of hazardous or noxious chemicals in bulk gives rise to the need for international measures to ensure their safe carriage, with a view to minimizing the risk to ships' crews and the environment,

*Having considered* the Recommendation by the Maritime Safety Committee at its twenty-third session,

*Adopts* the Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk, the text of which is set out at Annex to this Resolution,

*Invites* all governments concerned to take appropriate steps to give effect to the Code as soon as possible,

*Recognizing* the need for further elaboration of the Code and in addition for extension of the Code or development of separate codes to cover the carriage of hazardous gases (compressed or liquefied) in bulk and non-propelled vessels engaged in international seagoing and inland water navigation,

*Requests* the Maritime Safety Committee to continue its study on this subject,

*Authorizes* the Maritime Safety Committee to amend the Code and draw up additional codes as necessary in the light of further studies.