C H A P T E R I I - 1 E

Construction – subdivision and stability, machinery and electrical installations

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Part D Additional requirements for periodically unattended machinery spaces

Special consideration (R 54)

NEW CLASS B, C AND D AND EXISTING CLASS B SHIPS:

All new ships of class B, C and D and existing class B ships shall be specially considered by the Administration of the flag State as to whether or not their machinery spaces may be periodically unattended and if so whether additional requirements to those stipulated in these regulations are necessary to achieve equivalent safety to that of normally attended machinery spaces.

Regulation 1 General (R 46)

NEW CLASS B, C AND D AND EXISTING CLASS B SHIPS:

.1 The arrangements provided shall be such as to ensure that the safety of the ship in all sailing conditions, including manoeuvring is equivalent to that of a ship having the machinery spaces manned.

.2 Measures shall be taken to ensure that the equipment is functioning in a reliable manner and that satisfactory arrangements are made for regular inspections and routine tests to ensure continuous reliable operation.

.3 Every ship shall be provided with documentary evidence of its fitness to operate with periodically unattended machinery spaces.

Regulation 2 Fire precautions (R 47)

NEW CLASS B, C AND D SHIPS:

.1 Means shall be provided to detect and give alarms at an early stage in case of fires:

  .1 in boiler air supply casings and exhausts (uptakes); and

  .2 in scavenging air belts of propulsion machinery, unless it is considered to be unnecessary in a particular case.

.2 Internal combustion engines of 2,250 kW and above or having cylinders of more than 300 mm bore shall be provided with crankcase oil mist detectors or engine bearing temperature monitors or equivalent devices.

Regulation 3 Protection against flooding (R 48)

NEW CLASS B, C AND D AND EXISTING CLASS B SHIPS:

.1 Bilge wells in periodically unattended machinery spaces shall be located and monitored in such a way that the accumulation of liquids is detected at normal angles of trim and heel, and

shall be large enough to accommodate easily the normal drainage during the unattended period.

.2 Where the bilge pumps are capable of being started automatically, means shall be provided to indicate when the influx of liquid is greater than the pump capacity or when 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 permitted. Where automatically controlled bilge pumps are provided, special attention shall be given to oil pollution prevention requirements.

.3 The location of the controls of any valve serving a sea inlet, a discharge below the waterline or a bilge injection system shall be so sited as to allow adequate time for operation in case of influx of water to the space, having regard to the time likely to be required in order to reach and operate such controls. If the level to which the space could become flooded with the ship in the fully loaded condition so requires, arrangements shall be made to operate the controls from a position above such level.

.1 In periodically unattended machinery spaces, it shall be possible to operate each sea inlet from an easily accessible place above the machinery floor or gratings to which free access is provided from above.

.2 The floor or gratings from where the valves are to be operated shall be located in a position that is so high that, in case of a pipe fracture at the greatest sea inlet, the water will not reach their height within ten minutes from the time when the flooding alarm or alarm indicating a falling pressure in the system has been received.

.3 Operating handles shall be fitted with a conspicuous indication showing whether the valve is in the open or closed position. Where there is doubt as to whether the valves have been fitted in a sufficiently high position above the tank top, it shall be possible to demonstrate that the requirement has been met by means of a calculation of the water influx.

Regulation 4 Control of machinery from the navigating bridge (R 49)

NEW CLASS B, C AND D SHIPS:

.1 Under all sailing conditions, including manoeuvring, the speed, direction of thrust and, if applicable, the pitch of the propeller shall be fully controllable from the navigating bridge.

.1 Such remote control shall be performed by a separate control device for each independent propeller, with automatic performance of all associated services, including, where necessary, means of preventing overload of the propulsion machinery.

.2 The main propulsion machinery shall be provided with an emergency stopping device on the navigating bridge which shall be independent of the navigating bridge control system.

.2 Propulsion machinery orders from the navigating bridge shall be indicated in the main machinery control room or at the propulsion machinery control position as appropriate.

.3 Remote control of the propulsion machinery shall be possible only from one location at a time; at such locations interconnected control positions are permitted. At each location there shall be an indicator showing which location is in control of the propulsion machinery. The transfer of control between the navigating bridge and machinery spaces shall be possible only in the main machinery space or in the main machinery control room. The system shall include means to prevent the propelling thrust from altering significantly when transferring control from one location to another.

.4 It shall be possible for all machinery essential for the safe operation of the ship in new class B and new class C and D ships with a length of 24 metres and above to be controlled from a local position, even in the case of failure in any part of the automatic or remote control systems.

.5 The design of the remote automatic control system shall be such that in case of its failure an alarm will be given. Unless it is considered impracticable, the preset speed and direction of thrust of the propeller shall be maintained until local control is in operation.

.6 Indicators shall be fitted on the navigating bridge for:

.1 propeller speed and direction of rotation in the case of fixed pitch propellers; or

.2 propeller speed and pitch position in the case of controllable pitch propellers.

.7 The number of consecutive automatic attempts which fail to produce a start shall be limited to safeguard sufficient starting air pressure. An alarm shall be provided to indicate low starting air pressure set at a level which still permits starting operations of the propulsion machinery.

Regulation 5 Communication (R 50)

NEW AND EXISTING CLASS B SHIPS AND NEW CLASS C AND D SHIPS OF 24 METRES IN LENGTH AND ABOVE:

A reliable means of vocal communication shall be provided between the main machinery control room or the propulsion machinery control position as appropriate, the navigating bridge and the engineer officers' accommodation.

Regulation 6 Alarm system (R 51)

NEW CLASS B, C AND D AND EXISTING CLASS B SHIPS:

.1 An alarm system shall be provided indicating any fault requiring attention and shall:

.1 be capable of sounding an audible alarm in the main machinery control room or at the propulsion machinery control position, and indicate visually each separate alarm function at a suitable position;

.2 have a connection to the engineers' public rooms and to each of the engineers' cabins through a selector switch, to ensure connection to at least one of those cabins.

Alternative arrangements may be permitted if they are considered to be equivalents;

.3 activate an audible and visual alarm on the navigating bridge for any situation which requires action by or attention of the officer on watch;

.4 as far as is practicable be designed on the fail-to-safety principle; and

.5 activate the engineers' alarm required by regulation II-1/C/9 if an alarm function has not received attention locally within a limited time.

.2.1 The alarm system shall be continuously powered and shall have an automatic changeover to a stand-by power supply in case of loss of normal power supply.

.2.2 Failure of the normal power supply of the alarm system shall be indicated by an alarm.

.3.1 The alarm system shall be able to indicate at the same time more than one fault and the acceptance of any alarm shall not inhibit another alarm.

.3.2 Acceptance at the position referred to in paragraph .1 of any alarm condition shall be indicated at the positions where it was shown. Alarms shall be maintained until they are accepted and the visual indications of individual alarms shall remain until the fault has been corrected, when the alarm system shall automatically reset to the normal operating condition.

Regulation 7 Safety systems (R 52)

NEW CLASS B, C AND D AND EXISTING CLASS B SHIPS:

A safety system shall be provided to ensure that serious malfunction in machinery or boiler operations, which presents an immediate danger, shall initiate the automatic shutdown of that part of the plant and that an alarm shall be given. Shutdown of the propulsion system shall not be automatically activated except in cases which could lead to serious damage, complete breakdown, or explosion. Where arrangements for overriding the shutdown of the main propelling machinery are fitted, these shall be such as to preclude inadvertent operation. Visual means shall be provided to indicate when the override has been activated. Automatic machinery safety shut down and slow down controls should be separated from the alarm installation.

Regulation 8 Special requirements for machinery, boiler and electrical installations (R 53)

NEW CLASS B, C AND D AND EXISTING CLASS B SHIPS:

.1 The main source of electrical power shall comply with the following:

.1 Where the electrical power can normally be supplied by one generator, suitable load-shedding arrangements shall be provided to ensure the integrity of supplies to services required for propulsion and steering as well as the safety of the ship. In the case of loss of the generator in operation, adequate provision shall be made for automatic starting and connecting to the main switchboard of a stand-by generator of sufficient capacity to permit propulsion and steering and to ensure the safety

of the ship with automatic restarting of the essential auxiliaries including, where necessary, sequential operations;

.2 if the electrical power is normally supplied by more than one generator simultaneously in parallel operation, provision shall be made, for instance by load shedding, 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 to ensure the safety of the ship.

.2 Where stand-by machines are required for other auxiliary machinery essential to propulsion, automatic changeover devices shall be provided.

Regulation 9 Automatic control and alarm system (R 53.4)

NEW CLASS B, C AND EXISTING CLASS B SHIPS:

.1 The control system shall be such that the services needed for the operation of the main propulsion machinery and its auxiliaries are ensured through the necessary automatic arrangements.

.2 An alarm shall be given on the automatic changeover.

.3 An alarm system complying with regulation 6 shall be provided for all important pressures, temperatures and fluid levels and other essential parameters.

.4 A centralised control position shall be arranged with the necessary alarm panels and instrumentation indicating any alarm.

.5 Means shall be provided to keep the starting air pressure at the required level where internal combustion engines essential for main propulsion are started by compressed air.