

down in clause 25 of this Code show that the survival capability of the ship will not be impaired.

(2) At least three power pumps shall be fitted connected to the bilge main, one of which may be driven by the propulsion machinery. Where the criterion numeral is 30 or more, one additional independent power pump shall be provided.

(3) Where practicable, the power bilge pumps shall be placed in separate watertight compartments and so arranged or situated that these compartments will not be flooded by the same damage. If the main propulsion machinery, auxiliary machinery and boilers are in two or more watertight compartments, the pumps available for bilge service shall be distributed as far as is possible throughout these compartments.

(4) On a ship of 91.5m in length and upwards or having a criterion numeral of 30 or more, the arrangements shall be such that at least one power bilge pump shall be available for use in all flooding conditions which the ship is required to withstand, as follows:

(a) one of the required bilge pumps shall be an emergency pump of a reliable submersible type having a source of power situated above the bulkhead deck; or

(b) the bilge pumps and their sources of power shall be so distributed throughout the length of the ship that at least one pump in an undamaged compartment will be available.

(5) Every power bilge pump shall be capable of giving a speed of water of not less than 2 metres per second through the ship's main bilge pipe when its diameter is that determined by clause 28(4) of this Code. Every such pump shall have a direct suction from the space in which it is situated, but not more than 2 direct suction shall be required in any one space. Every such suction shall be of a diameter not less than that of the ship's main bilge pipe. The direct suction in the ship's machinery space shall be so arranged that water may be pumped from each side of the space through direct suction to independent bilge pumps.

(6) In addition to the direct bilge suction or suction required by sub-clause (5) of this clause a direct suction from the main circulating pump leading to the drainage level of the machinery space and fitted with a nonreturn valve shall be provided in the machinery space. The diameter of this direct suction pipe shall be at least two thirds of the diameter of the pump inlet in the case of steamships, and of the same diameter as the pump inlet in the case of motorships.

(7) Where in the opinion of the Chief Surveyor the main circulating pump is not suitable for this purpose, a direct emergency bilge suction shall be led from the largest available independent power driven pump to the drainage level of the machinery space; the suction shall be of the same diameter as the main inlet of the pump used. The capacity of the pump so connected shall exceed that of a required bilge pump by an amount deemed satisfactory by the Chief Surveyor.

(8) The spindles of the sea inlet and direct suction valves shall extend well above the engine-room platform.

(9) Provision shall be made to prevent the compartment served by any bilge suction pipe being flooded in the event of the pipe being severed or otherwise damaged by collision or grounding in any other compartment. For this purpose, where the pipe is at any part situated nearer the side of the ship than one fifth of the breadth of the ship (measured at right angles to the centreline at the level of the deepest subdivision load line), or is in a duct keel, a nonreturn valve shall be fitted to the pipe in the compartment containing the open end.

(10) Distribution boxes, cocks and valves in connection with the bilge pumping system shall be so arranged that, in the event of flooding, one of the bilge pumps may be operative on any compartment; in addition, damage to a pump or its pipe connecting to the bilge main outboard of a line drawn at one fifth of the breadth of the ship shall not put the bilge system

out of action. If there is only one system of pipes common to all the pumps the necessary valves for controlling the bilge suction must be capable of being operated from above the bulkhead deck. Where in addition to the main bilge pumping system an emergency bilge pumping system is provided, it shall be independent of the main system and so arranged that a pump is capable of operating on any compartment under flooding condition as specified in sub-clause (1) of this clause; in that case only the valves necessary for the operation of the emergency system need be capable of being operated from above the bulkhead deck.

(11) All cocks and valves referred to in sub-clause (10) which can be operated from above the bulkhead deck shall have their controls at their place of operation clearly marked and shall be provided with means to indicate whether they are open or closed. Operating rods for bilge suction valves or cocks shall be lead as directly as possible and those passing through a cargo space or coal-bunker space shall be protected against damage in such spaces.

30. Cargo Ships—(1) At least two power pumps connected to the main bilge system shall be provided, one of which may be driven by the propulsion machinery. If the Chief Surveyor is satisfied that the safety of the ship is not impaired, bilge pumping arrangements may be dispensed with in particular compartments.

PART V

MACHINERY INSTALLATIONS

Section A

31. General—(1) The machinery, boilers and other pressure vessels, associated piping systems and fittings shall be of a design and construction adequate for the service for which they are intended and shall be so installed and protected as to reduce to a minimum any danger to persons on board, due regard being paid to moving parts, hot surfaces and other hazards. The design shall have regard to materials used in construction, the purpose for which the equipment is intended, the working conditions to which it will be subjected and the environmental conditions on board.

(2) Special consideration will be given to the reliability of single essential propulsion components and the Chief Surveyor may require a separate source of propulsion power sufficient to give the ship a navigable speed, especially in the case of unconventional arrangements.

(3) Means shall be provided whereby normal operation of propulsion machinery can be sustained or restored even though one of the essential auxiliaries becomes inoperative. Special consideration shall be given to the malfunctioning of:

(a) a generating set which serves as a main source of electrical power;

(b) the sources of steam supply;

(c) the boiler feedwater systems;

(d) the fuel oil supply systems for boilers or engines;

(e) the sources of lubricating oil pressure;

(f) the sources of water pressure;

(g) a condensate pump and the arrangements to maintain vacuum in condensers;

(h) the mechanical air supply for boilers;

(i) an air compressor and receiver for starting or control purposes;

(j) the hydraulic, pneumatic or electrical means for control in main propulsion machinery including controllable pitch propellers.

However, the Chief Surveyor, having regard to overall safety considerations, may accept a partial reduction in propulsion capability from normal operation.

(4) Means shall be provided to ensure that the machinery can