

insulation level to earth and of giving an audible or visual indication of abnormally low insulation values shall be provided.

(10) All metal sheaths and armour of cables shall be electrically continuous and shall be earthed.

(11) All electric cables and wiring external to equipment shall be at least of a flame-retardant type and shall be so installed as not to impair their original flame-retarding properties. Where necessary for particular applications the Chief Surveyor may permit the use of special types of cables such as radio frequency cables, which do not comply with the foregoing.

(12) Cables and wiring serving essential or emergency power, lighting, internal communications or signals shall so far as practicable be routed clear of galleys, laundries, machinery spaces of category A and their casings and other high fire risk areas. Cables connecting fire pumps to the emergency switchboard shall be of a fire-resistant type where they pass through high fire risk areas. Where practicable all such cables should be run in such a manner as to preclude their being rendered unserviceable by heating of the bulkheads that may be caused by a fire in an adjacent space.

(13) Where cables which are installed in hazardous areas introduce the risk of fire or explosion in the event of an electrical fault in such areas, special precautions against such risks shall be taken to the satisfaction of the Chief Surveyor.

(14) Cables and wiring shall be installed and supported in such a manner as to avoid chafing or other damage.

(15) Terminations and joints in all conductors shall be so made as to retain the original electrical, mechanical, flame-retarding and, where necessary, fire-resisting properties of the cable.

(16) Each separate circuit shall be protected against short circuit and against overload, except as permitted in clauses 45 and 46 or where the Chief Surveyor may exceptionally otherwise permit.

(17) The rating or appropriate setting of the overload protective device for each circuit shall be permanently indicated at the location of the protective device.

(18) Lighting fittings shall be so arranged as to prevent temperature rises which could damage the cables and wiring, and to prevent surrounding material from becoming excessively hot.

(19) All lighting and power circuits terminating in a bunker or cargo space shall be provided with a multiple-pole switch outside the space for disconnecting such circuits.

(20) Accumulator batteries shall be suitably housed, and compartments used primarily for their accommodation shall be properly constructed and efficiently ventilated.

(21) Electrical or other equipment which may constitute a source of ignition of flammable vapours shall not be permitted in these compartments except as permitted in sub-clause (23) of this clause.

(22) Accumulator batteries shall not be located in sleeping quarters except where hermetically sealed to the satisfaction of the Chief Surveyor.

(23) No electrical equipment shall be installed in any space where flammable mixtures are liable to collect including those on board tankers or in compartments assigned principally to accumulator batteries, in paint lockers, acetylene stores or similar spaces, unless the Chief Surveyor is satisfied that such equipment is:

- (a) essential for operational purposes;
- (b) of a type which will not ignite the mixture concerned;
- (c) appropriate to the space concerned; and
- (d) appropriately certified for safe usage in the dusts, vapours or gases likely to be encountered.

(24) In a passenger ship, distribution systems shall be so arranged that fire in any main vertical zone will not interfere

with services essential for safety in any other such zone. This requirement will be met if main and emergency feeders passing through any such zone are separated both vertically and horizontally as widely as is practicable.

**67. Spare Parts and Tools**— Every ship shall be provided with an adequate quantity of replacements for those parts of the ship's electrical equipment and installations which, having regard to the intended service of the ship, it would be essential for the safety of the ship and of persons on board to replace in the event of failure while the ship is at sea, together with such tools as are necessary for the fitting of these replacements.

## **PART VII**

### **FIRE PROTECTION**

#### **Section A**

**68. Basic Principles**— The following basic principles underlie the requirements of this Part of the Code.

(a) division of ship into main vertical zones by thermal and structural boundaries;

(b) separation of accommodation spaces from the remainder of the ship by thermal and structural boundaries;

(c) restricted use of combustible materials;

(d) containment of fire in the space of origin.

#### **SECTION B—PASSENGER SHIPS**

**69. Structure**—(1) The hull, superstructure, structural bulkheads, decks and deckhouses shall be constructed of steel or other equivalent material. For the purpose of applying the definition of steel or other equivalent material the "applicable fire exposure" shall be according to the integrity and insulation standards given in the tables of clauses 72 and 73 of this Code. For example where divisions such as decks or sides and ends of deckhouses are permitted to have "B-0" fire integrity, the "applicable fire exposure" shall be half an hour.

(2) However, in cases where any part of the structure is of aluminium alloy, the following shall apply:

(a) The insulation of aluminium alloy components of "A" or "B" class divisions, except structure which, in the opinion of the Chief Surveyor, is non-load-bearing, shall be such that the temperature of the structural core does not rise more than 200°C above the ambient temperature at any time during the applicable fire exposure to the standard fire test.

(b) Special attention shall be given to the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, and "A" and "B" class divisions to ensure:

(i) that for such members supporting lifeboat and liferaft areas and "A" class divisions, the temperature rise limitation specified in sub-clause (2)(a) of this clause shall apply at the end of one hour; and

(ii) that for such members required to support "B" class divisions, the temperature rise limitation specified in sub-clause (2)(a) of this clause shall apply at the end of half an hour.

(3) Crowns and casings of machinery spaces of category A shall be of steel construction adequately insulated and openings therein, if any, shall be suitably arranged and protected to prevent the spread of fire.

**70. Main Vertical Zones and Horizontal Zones**—(1) For ships carrying more than 36 passengers, the hull, superstructure and deckhouses shall be subdivided into main vertical zones by "A" class divisions. Steps and recesses shall be kept to a minimum, but where they are necessary they shall also be "A" class divisions. These divisions shall have insulation values in accordance with tables in clause 72 of this Code.

(2) For ships carrying not more than 36 passengers, the hull, superstructure and deckhouses in way of accommodation and