

# 17 REGULATIONS FOR SPECIAL STRUCTURES

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## 17.1 SPECIAL STRUCTURE

Regulations for Cinemas, theatres, meeting halls, lecture halls and town-halls

In addition to the requirements specified under Building Regulations, the following regulations shall also be applicable.

**(a) Location :** The building for the above purpose shall be located directly on a road of 18 mts. or more in width either existing or proposed subject to other regulations.

**(b) Open Spaces :** In case of above uses, open spaces shall be provided as under :

(i) Front open spaces of 12 mts. width from the side abutting on the road shall be provided. Such open space may be permitted to be covered up to 6mts. from the building line with a projected cantilever structure at a height of not less than 3.00 mts. from the ground level.

Sides and rear open spaces of 6mts. width shall be provided. In addition to the above, the Bombay Cinema Rules adopted by the State Govt. for cinemas and Janta theatres as amended from time to time, will also be applicable.

**(c) Minimum Requirements :** The following requirement shall be provided:

(i) The aggregate area of foyer exclusive of all passages shall be provided at every sitting-level at the rate of 0.1 sq.mt. per seat at that level, subject to minimum foyer width of 4.5 mts.

(ii) Entry and exit passages of minimum 3 meters width shall be provided.

(iii) Water-room and snack-bar shall be provided.

(iv) The booking-office shall always be so located that intending purchasers of tickets have not to queue up in open space.

**(d) Plinth :** The plinth shall be measured at the foyer level and it shall not be less than 45 cms.

**(e) Corridor :** No landing lobby corridor or passage not being an internal passage between and/or across rows of seats, intended for use as an exit, shall be less than 3 meters in width and there shall be no recess or projections in the walls of such passages or corridors within 1.8mts. of the ground.

**(f) Doors :** The auditorium doors shall be provided at the rate of not less than one door of a dimension of 1.5 meters in width and 2.1 meters in clear height for every 150 seats or part thereof. All outside doors for the use of the public shall be made to open outwards and in such manner that when opened, they shall not obstruct any gangway, passage, stairway or landing. These doors shall be provided in such a way that they open in aisles or cross-aisles provided under these Regulations.

**(g) Balcony, its height, floor of an auditorium and arrangement of seats :**

(i) The height of the bottom balcony of the gallery shall not be less than 3 meters from the floor of the auditorium.

(ii) The clear distance between the backs of two successive rows shall not be less than 100 cms. but for seats with rocking backs it may be 90 cms.

(iii) The minimum width of balcony steps shall be 80 cms. provided that for the front and rear steps this distance shall be 90 cms.

(iv) The minimum height of the roof or ceiling at the highest steps of the balcony shall be 3.0 meters and at no place the distance between the nodding and lowest projection ray shall be less than 2.4 meters.

(v) The minimum width of the seat shall be 50 cms. provided that 25 percent of the total seats may be permitted upto the width of 45 cms. to adjust the staggering of the seats. The width of the seats shall be measured from centre to centre of hand rails or arm rests.

**(h) Aisles :** Clear aisles not less than 1.2 meters in width shall be formed at right angles to the

line of seating in such number and manner that no seat shall be more than 3.8 meters away from any aisles measured in the line of seating. Where all these aisles do not directly meet the exit doors. cross aisles shall be provided in such number and manner that no row of seats shall be more than 7 meters away from cross-aisles. The width of cross aisles shall be 1.2 meters.

Provided further that in computing the number of cross-aisles the door connecting the aisles with foyer shall be considered as cross-aisles.

Explanation : The first cross-aisles in such a case shall be provided after the fourteen rows from the door.

**(i) Sanitary Accommodations :**

- (i) Water closet at the rate of one for 100 seats or part thereof and urinals at the rate of two for 75 seats or part thereof at each seating level shall be provided.
- (ii) One wash-basin for every 200 seats or part thereof shall be provided.
- (iii) The above conveniences shall be suitably apportioned between two sexes.
- (iv) Such water-closet and urinals shall be in accessible location and shall be provided with signs plainly indicating their purpose and the sex for which they are meant.

**(j) Visibility Requirement :**

- (1) The seat nearest to the screen shall not be nearer than the effective width of the normal picture (ratio 1:1.33). This distance shall be 3.4 in case of cinema scope and other wide angles techniques and one half in case of 70 mm presentations.
- (2) The elevation of the balcony seats shall be such that line of sight is not inclined more than 30° to the horizontal.
- (3) The seats should preferably be staggered side-ways in relation to those in front. so that a spectator in any rows is not looking directly over the head of the person immediately in front of him.
- (4) The position and height of the screen shall be regulated in such a way that the maximum angle of the line of vision from the front seat to the top of the screen shall not exceed 50.

**(k) Ventilation :** Every auditorium shall be lighted and ventilated by doors, ventilators and windows abutting on an interior or exterior open air space which shall not be less than 1.5th of the total floor area provided that if exhaust fans are installed or if the auditorium is air-conditioned the requirement of this clause may be suitably relaxed by competent authority.

**(l) Minimum Requirement of Stairs :**

- (i) Except where otherwise provided under these Regulations bye-laws the minimum clear width of all the stairs shall be 1.5 Mts.
- (ii) No stair-case shall have a flight of more than 15 steps or less than 3 steps and width of the landing between such flights shall be of the same width of the stair-case. The tread of the step shall not be less than 30 cms. The riser shall not be higher than 10 cms.
- (iii) No space less than 2.4 Mts. in height shall be allowed under the floor of auditorium.
- (iv) Except for a double-decker-cinema or theater. the access to the auditorium from the ground floor, if it is on upper floor or on stilts shall be provided by not less than three stairs: two of which shall be exit stairs. The clear width of these next stairs shall not be less than 2 meters.
- (v) The access to balcony floor from auditorium floor shall be provided by not less than three stairs. two of which shall be exit stairs.

Provided that if one exit stair is to be provided instead of two. its minimum width shall be 2.4 Mts.

(vi) In case of double-decker-cinema or theater :

- (a) The access to upper class auditorium from ground floor shall be provided by at least three stairs out of which two shall be exit stairs with minimum clear width of 2 Mts.
- (b) The access to lower class auditorium from ground floor shall be provided by at least two stairs. one of which shall be exit stair.

**(m)**No permission shall be given for converting existing air-conditioned cinema theatre into non-air-conditioned cinema theater.

**(n) AIR-CONDITION**

The auditorium or the cinema should be air conditioned as per following general specifications :-

- [1] Temperature range 72° F to 80° F
- [2] Change of Air per hour-approximate 10 times.
- [3] Relative Humidity 50 p.c. to 60 p.c.
- [4] Fresh air requirements. 7.5 C.F.M. per person approximately.

**17.2 FIRE PROTECTION REQUIREMENTS**

(1) **GENERAL :-** The planning design and construction of any building shall be such as to ensure safety from fire For this purpose unless otherwise specified in these Regulations. the provisions of Part IV: Fire Protection Chapter. National Building Code. shall apply. For multi-storied. high-rise and special building. additional provisions relating to fire protection shall also apply The approach to the building and open spaces on all sides upto 6 m. width and their layout shall conform to the requirements of the Chief Fire Officer. They shall be capable to taking the weight of a fire engine weighing upto 18 tones. These open spaces shall be free of any obstruction and shall be motorable.

(2) **EXITS :-** Every building meant for human occupancy shall be provided with exits sufficient to permit safe escape of its occupants in case of fire or other emergency for which the exits shall conform to the following.

**(i) TYPES :-** Exits should be horizontal or vertical. A horizontal exit may be a door-way a corridor. a passage-way to an internal or external stairway or to an adjoining building a ramp. a verandah or a terrace which has access to the street or to the roof of a building A vertical exit may be a staircase or a ramp but not a lift.

**(ii) GENERAL REQUIREMENTS :-** Exits from all the part of the building except those not accessible for general public use. shall-

- (a) provide continuous egress to the exterior of the building or to an exterior open space leading to the street:
- (b) be so arranged that except in a residential building they can be reached without having to cross another occupied unit:
- (c) be free of obstruction:
- (d) be adequately illuminated:
- (e) be clearly visible with the routes reaching them clearly marked and signs posted to guide any person to the floor concerned:
- (f) be fitted if necessary with fire fighting equipment suitably located but not as to obstruct the passage. clearly marked and with its location clearly indicated on both

sides of the exit way:

- (g) be fitted with a fire alarm device, if it is either a multi-storied, high-rise or a special building so as to ensure its prompt evacuation:
- (h) remain unaffected by any alteration of any part of the building so far as their number, width, capacity and protection thereof is concerned:
- (i) be so located that the travel distance on the floor does not exceed the following limits.
  - (i) Residential, educational, institutional and hazardous occupancies : 22.5m.
  - (ii) Assembly, business, mercantile, industrial and storage buildings: 30 m.

**Note :-** The travel distance to an exit from the dead end of a corridor shall not exceed half the distance specified above.

When more than one exit is required on a floor the exits shall be as remote from each other as possible.

Provided that for all multi-storied high rise and special building a minimum of two enclosed type staircases shall be provided, at least one of them opening directly to the exterior to an interior, open space or to any open place of safety.

### **17.3 REQUIREMENTS OF INDIVIDUAL EXITS AT EACH FLOOR :**

The detailed requirements of individual exits at each floor are given below :-

#### **(1) CORRIDORS :-**

- (a) Exit corridors shall be of a width not less than the total required width of exit doorways leading from them in the direction of travel to the exterior stairway.
- (b) Where stairways discharge through corridors, the height of the corridors shall not be less than 2.4 m.
- (c) Where there is more than one staircase serving a building, there shall be at least one smoke-stop door in between the staircases.

#### **(2) DOORWAYS :-**

- (a) Every exit doorway shall open into an enclosed stairway, a horizontal exit or a corridor or passageway providing continuous and protected means of egress.
- (b) An exit door shall not open outwards i.e. away from the room, but shall not obstruct the travel along any exit. No door, when opened, shall reduce the required width of a stairway or landing to less than 90 cm.
- (c) An exit door shall not open immediately upon a flight of stairs, a landing equal to at least the width of the door shall be provided in the stairway at each doorway: the level of the landing shall be the same as that of the floor which it serves.
- (d) Exit doorways shall be openable from the side which they serve, without the use of a key.

#### **(3) REVOLVING DOORS :-**

- (a) Revolving doors shall not be used as required exits except in residential, business and mercantile occupancies: they shall not constitute more than half the total required door width.
- (b) When revolving doors are considered as required exit ways-
  - (i) The multiplier in Table 18.1 shall be increased by 33.1.3 percent, and revolving doors shall not be located at the foot of a discharge through a lobby or

foyer.

**(4) INTERNAL STAIRWAYS :-**

- (a) Stairway shall be constructed of non-combustible materials throughout.
- (b) Any interior staircase shall be constructed as a self-contained unit with at least one side adjacent to an external wall and shall be completely closed.
- (c) A staircase shall not be arranged around a lift unless the latter is entirely enclosed by a material of fire resistance rating as that for type of construction itself. For multi-storied, high rise and special buildings, the staircase location shall be to the satisfaction of the Chief Fire Officer.
- (d) In multi-storied/high rise and special building, access to main staircases shall be gained through at least half-an-hour fire-resisting automatic closing doors placed in the enclosing walls of the staircases. They shall swing type doors opening in the direction of the escape.
- (e) No living space, store or other space, involving fire risk, shall open directly into a staircase.
- (f) The external exit door of a staircase enclosure at ground level shall open directly to the open space or should be accessible without passing through any door other than a door provided to from a draught lobby.
- (g) In multi-storied/high rise and special building, exit signs with arrows indicating the escape route shall be provided at a height of 1.5 m. from the floor level on the wall and shall be painted with fluorescent paint. All exit way signs should be flush with the wall and so designed that no mechanical damage to them can result from the moving of furniture or other heavy equipment.
- (h) Where a building has a single staircase, it shall terminate at the ground floor level, and the access to the basement shall be by a separate staircase. Where the building is served by more than one staircase, one of the staircases may lead to the basement level by either a ventilated lobby or a cut-off screen wall without opening, having a fire resistance of not less than 2 hours with discharge point at two different ends or through enclosures. It shall also be cut-off from the basement area at various basement levels by a protected and ventilated lobbies.

**(5) FIRE ESCAPE OR EXTERNAL STAIRS :-**

Multi-storied/high rise and special buildings shall be provided with fire escape stairs, which will be free of F.S.I. and they should conform to the following :-

- (a) They shall not be taken into account in calculating the evacuation time of a building.
- (b) All of them shall be directly connected to the ground.
- (c) Entrance to them shall be separate and remote from the internal staircase.
- (d) Routes to the fire escape shall be free of obstruction at all times, except for a doorway leading to the fire escape, which shall have the required fire resistance.
- (e) They shall be constructed of non-combustible materials.
- (f) They shall have a straight flight not less than 75 cm. wide with 15cm. treads and risers, not more than 19 cm. The number of risers shall be limited to 16 per flight.
- (g) They shall be provided with handrails at a height not less than 90 cm. above the tread.

**(6) RAMP :-**

- (a) All the requirements of sub regulation (4) of this Regulation shall apply to any ramps as

they apply to a staircase.

- (b) Ramps shall lead directly to outside open spaces at ground level or courtyards or other safe places.
- (c) In a multistoried, high rise and special building, access to ramps from any floor shall be through a smoke-stop door.

#### **(7) REFUGE AREA**

- (a) In multi-storied and high-rise buildings, at least one refuge area shall be provided on the floor immediately above every 18 mts. of building height.
- (b) Such space should abut on external walls.
- (c) It shall have a minimum area of 1.5 sq. mts. and a minimum width of 0.75 mt.

### **17.4 STRUCTURAL SAFETY AND SERVICES**

#### **(1) STRUCTURAL DESIGN**

The structural design of foundations, elements made of masonry, timber, plain concrete, reinforced concrete, pre-stressed concrete and structural steel shall conform to the provisions of part VI Structural Design Section-1 Loads, Section-2 Foundation, Section-3 Wood, Section-4 Masonry, Section-5 Concrete, Section-6 Steel, National Building Code of India, taking into consideration the Indian Standards and Guidelines for hazard safety as given below :

##### a) For Earthquake Protection

1. IS:1893-1984 "Criteria for Earthquake Resistant Design of Structures (Fourth Revision)"
2. IS:13920-1993 "Ductile Detailing of Reinforced Concrete Structures subjected to Seismic Forces-Code of Practice"
3. IS:4326-1993 "Earthquake Resistant Design and Construction of Buildings - Code of Practice (Second Revision)"
4. IS:13828-1993 "Improving Earthquake Resistance of Low Strength Masonry Buildings - Guidelines"
5. IS:13827-1993 "Improving Earthquake Resistance of Earthen Buildings Guidelines"
6. IS:13935-1993 "Repair and Seismic Strengthening of Buildings - Guidelines"
7. "Improving Earthquake Resistance of Buildings - Guideline" by Expert Group, Government of India, Ministry of Urban Affairs & Employment, published by Building Materials and Technology Promotion Council, 1998.

##### b) For Cyclone Wind Storm Protection

8. IS : 875 (3) - 1987 "Code of practice for Design Loads (other than Earthquake) for Buildings and Structures, Part 3, Wind Loads"
9. "Improving Wind/Cyclone Resistance of Buildings-Guideline". by Expert Group, Government of India, Ministry of Urban Affairs & Employment, published by Building Materials and Technology Promotion Council, 1998

Note: Wherever an Indian Standard including those referred in the National Building Code or the National Building Code is referred, the latest version of the same shall be followed.

- (1) In pursuance of the above, a certificate as indicated in Form-2(C) shall be submitted along with building plans/drawings and other building information schedule annexed thereto.

#### **(2) QUALITY CONTROL REQUIREMENTS**

- (i) The quality of all materials and workmanship shall conform to accepted standards and Indian Standard Specifications and Code as included in Part V Building Materials and Part VII Constructional Practices and Safety, National Building Code

of India.

- (ii) All borrow pits dug in the course of construction and repair of buildings, embankment etc. shall be deep and connected with each other in the formation of a drain directed towards the lowest level and properly stepped for discharge into a river, stream, channel or drain, and no person shall create any isolated borrow pit which is likely to cause accumulation of water that may breed mosquitoes.
- (iii) Alternative materials, method of design and construction and tests :-  
The provisions of the Regulations are not intended to prevent the use of any material or method of design of construction not specifically alternative prescribed in them provided any such alternative has been approved. Nothing of the provisions of these Regulations is intended to prevent the adoption or architectural planning and layout conceived as an integrated development scheme. The Competent authority may approve any such alternative if it conforms to the provisions of the relevant parts of the National Building Code, regarding material, design and construction, and the material, method, or work offered is, for the purpose intended, at least equivalent to that prescribed in these Regulations in quality, strength, compatibility, effectiveness, fire and water resistance, durability and safety.
- (iv) All buildings shall be constructed on a quality control requirements.
- (v) in case of existing building under construction based on approved building permission, structural safety requirements shall have to be observed. However, due to such structural work of strengthening/retrofitting if certain setbacks and margin get reduced, special permission may be granted on case to case basis.

### **(3) TESTS :**

Whenever there is insufficient evidence of compliance with the provisions of the Regulations or evidence that any material or method of design or construction does not conform to the requirements of the Regulations, in order to substantiate claims for alternative materials, design or methods of construction, the Competent Authority may require tests, sufficiently in advance, as proof of compliance. These tests shall be made by an approved agency at the expense of the owner as follows:-

- (i) **TEST METHODS :-** Test methods shall be as specified by the Regulations for the materials or design or construction in question. If there are no appropriate test methods specified in the Regulations, the Competent Authority shall determine the test procedure For methods or tests for building materials, reference shall be made to the relevant Indian Standards as given in the National Building Code of India published by the Bureau of Indian Standards.
- (ii) **TEST RESULT TO BE PRESERVED :-** Copies of the result of all such tests shall be retained by the Competent Authority for not less than two years after the acceptance of the alternative material.

The testing of the materials as per Indian Standards shall be carried out by laboratories approved by the competent authority on this behalf.

The laboratory agency shall work out in consultation with the construction agency a testing programme of materials such as cement, steel and quality of concrete including its mixing, laying and strength at site as well as in the laboratory.

This should cover various stages of construction from foundation to completion as per Regulation. The laboratory shall maintain a duly authenticated report in a bound register, copy of which will be submitted to the construction agency.

which will in turn forward the testing report to the competent authority.

(5) Structural Stability and Fire Safety of Existing Buildings

- i. The Competent Authority shall have the assessment of structural and/or fire safety of an existing building structure damaged/undamaged carried out at stipulated periodical intervals through expert(s) chosen from a panel of experts identified by the Competent Authority.
- ii. The owner/developer/occupant on advise of such expert(s) shall carry out such repair restoration and strengthening/retrofitting of the building found necessary so as to comply with the safety standards laid down in the National Building Code and the Indian Standards as specified.

In case the owner developer occupant does not carry out such action. the competent authority or any agency authorized by the competent authority may carry out such action at the cost of owner developer/ occupant.

- iii. The Competent Authority shall specify the period within which such compliance is to be carried out.
- iv. The Competent Authority may also direct the owner developer occupant. whether the building could be occupied or not during the period of compliance.
- v. In case of existing building under construction based on approved building permission. structural safety requirements shall have to be observed. However. due to such structural work of strengthening retrofitting if certain setbacks and margin get reduced. special permission.

## 17.5 BUILDING SERVICES

**(1) ELECTRICAL INSTALLATIONS :** The planning. design and installation of electrical installation. air-conditioning and heating work shall conform to the provisions of Part VIII Building Services. Section 2- Electrical Installations. Section 3- Air-conditioning and Heating. National Building Code of India.

**(2) LIFT :**

**(a) PLANNING AND DESIGN :**

The planning and design of lifts including their number. type and capacity depending on the occupancy of the building the population on each floor based on the occupant load and the building height shall be in accordance with Section 5- Installation of Lifts and Escalators. National Building Code of India.

**(b) MAINTENANCE :**

- (i) The lift installation should receive regular cleaning lubrication adjustment and adequate servicing by authorised competent persons at such intervals as the type of equipment and frequency of service demand. In order that the lift installation is maintained at all times in a safe condition. a proper maintenance schedule shall be drawn up in consultation with the lift manufacturer and rigidly followed. A log book to record all items relating to general servicing and inspection shall be maintained. The electrical circuit diagram of the lift with the sequence of operation of different components and parts shall be kept readily available for reference by persons responsible for the maintenance and replacement. where necessary. to the satisfaction of the competent authority.
- (ii) Any accident arising out of operation of maintenance of the lifts shall be duly reported to the competent authority.