

F.No.VIII-11011/03/2017-DGCD(F)
Ministry of Home Affairs
Directorate General Fire Service, Civil Defence & Home Guards
(Fire Cell)

East Block-VII, Level-VII,
R.K. Puram, New Delhi-110066
Dated : 31.08.2017

All the Chief Secretaries in the States/UTs.

Subject : Fire and Life Safety Audits in the High Rise Buildings located in Urban Areas.

Fire incidents in the high rise buildings, hospitals, hotels etc. are increasing. Recent fire incidents in Delhi (Dilshad Garden and Lok Nayak Bhawan), Mumbai. (Bank of India, Air India Building, Worli High Rise, Lotus Bhawan, Kalba Devi), Kolkata (AMRI, Bara Bazar), Bhubaneswar (Sun Hospital) etc. have reported huge loss of property and life in 2015-2017 in India. These fire incidents have highlighted the need to take effective fire prevention measures in addition to protection in urban areas in accordance with the existing Building bye-laws and National Building Code of India.

Government of India, MHA is issuing instructions/guidelines regularly based on the recommendations of the Standing Fire Advisory Council, an apex body of Govt. of India on fire related matters, for regular inspection and re-inspection of high rise buildings, hospitals, hotels and other structures as per the local building bye-laws and National Building Code of India to reduce the recurrence of fire accidents.

On 15.05.2017 Government of India, Ministry of Consumer Affairs has published the National Building Code of India 2016. Part IV of the NBC is focused on "Fire and Life Safety." National Building Code (Part IV-Fire & Life Safety, Annexure E, Para E-7) has suggested for Fire & Life Safety Audit as under:-

- (a) Fire and Life Safety Audit shall be carried out for all buildings having a height of more than 15 meters
- (b) Such audit shall preferably be conducted by a third party auditor having requisite experience in fire and life safety inspections.
- (c) Frequency of such audits shall be once in two years.

11/9/2017

4. Para 2, Asset and Facility Management, Para 15) has also suggested for "Maintenance of Fire Fighting System" including Fire Drill as per details given in Annexure 'A'.

You are requested to issue necessary directions to the concerned authorities to conduct safety audit inspection in these premises on regular basis as per the guidelines of National Building Code of India and issue instructions to the owner/occupier of the building to install Fire Fighting System in addition to practice Fire Drills.

Action Taken Report may be forwarded to this office within two months.


Yours faithfully,



(Prakash Mishra)

Director General (FS, CD & HC)

Tel: 26712851



Copy to:

1. All Heads of Fire Services in States/UTs for necessary action.

2. Director (DM-III), MHA with your letter No I-4500/17/16-CD
dt 26.02.17 for information.

1/5/17

1/5/17

15. MAINTENANCE OF FIRE FIGHTING SYSTEMS

15.1 Maintenance of fire detection and suppression systems in any public facility is a very important task, for the safety of the community. All owners shall arrange to deploy a sufficient number of trained people to man the systems and to ensure adequate budgetary support to enable proper maintenance and upkeep of the systems.

15.2 Regularly maintaining all systems, such as fire detectors, sprinklers, test and fire equipment, yard water tanks, fire tanks, fire pumps, etc., it is imperative that all fire exits and staircases are kept free from any source of obstruction to allow easy egress of occupants in case of any fire incident.

15.3 At the time of commissioning of any facility proper testing of all fire detection and suppression systems shall be done in accordance with relevant Indian Standards and proper record of same shall be maintained. Whenever lift lobbies, staircases, lift wells or any other such location has been designed to remain under pressure from firefighting point of view it is imperative that necessary pressure fans, etc., are kept properly maintained so that there is no failure in this regard. Security guards/lift operators shall be guided to ensure that, wherever doors have been provided to maintain differential pressures are closed to ensure proper functioning.

15.4 Similarly smoke extraction fans, fire dampers in lift shaft systems shall be periodically (at least a monthly check is desirable) run and tested to ensure that they function properly in case of any emergency.

15.5 The facility manager shall hold regular mock fire fighting drills so that people are made aware of the system installed, the location of nearest exits, etc.

15.6 Maintenance of fire extinguishers shall be carried out in accordance with the good practice [12(6)]. Periodic inspection, testing and refilling shall be got done from competent and trained persons as per provisions given in the above mentioned good practice and as per recommendations of the manufacturers. Proper records of this activity shall be maintained. All fire detection systems shall be strictly maintained in accordance with the good practice [12(7)]. Facility manager shall ensure that during any fit out or refurbishment, no detector is subjected to any interior decoration treatment such as painting, alteration of detector cover to conform to the environment.

15.7 A log book should be maintained for recording details, including causes of all the alarms (genuine, test or false), faults, service tests and routine inspections, repairs/replacements, etc., as and when done. Period of fire detection non operation should also be shown.

15.8 Checks shall be made every day to ascertain that the fire panel indicates normal operation and if not, then any fault indicated should be recorded in a log book and corrective action taken and record of that should also be maintained. It shall be ensured that any fault warning recorded the previous day has received attention. The control panel shall be manned regularly so that in case of any incident, immediate action can be initiated.

15.9 Success of any firefighting system will depend upon timely and proper functioning of the fire pumps. Regular maintenance of these pumps shall be done in accordance with the good practice [12(8)]. Checking of jockey pumps shall be a daily exercise. Adequate stock of diesel shall be maintained in a safe location to ensure that pumps can be operated for design duration.

15.10 Other fire installations such as external fire hydrants, hose reels, etc., shall be checked periodically and shall be maintained. External fire hydrants shall be inspected, checked and maintained in accordance with the good practice [12(9)]. Internal fire hydrants and hose reels on premises shall be maintained in accordance with the good practice [12(10)]. Automatic sprinkler system shall be maintained in accordance with the good practice [12(11)].

15.11 Fire Water Reservoirs/Tank

It shall be ensured that fire water tank reservoirs are always full and free from any foreign materials. The water level shall be recorded weekly. Reservoirs shall be cleaned at least once in a year or more frequently depending upon quality of water and sludge formation shall be prevented.

Records of inspection, testing and maintenance operations and reports of hydraulic pressure tests of extinguishers and other equipment shall be maintained as per history sheet.

15.12 All maintenance operations shall be carried out as a well-planned exercise to ensure that the facility is not subjected to unnecessary risk.

a) In case of planned shut down:

- 1) Authorities shall be kept informed before shutting of the installation for any reason, whatsoever.
- 2) A thorough assessment of the risk shall be undertaken before a part or total shut down to ensure that there is no incident of fire during shut down.
- 3) The heads of all the departments, tenants, RWAs shall be notified in writing that the installation shall remain inoperative and they shall exercise abundant caution during the period.

in case of unplanned shut down When the installation is rendered inoperative as a matter of emergency or by accident, the measures stated above for planned shutdown shall be implemented with least possible delay.

15.13 Fire Drills

Carrying out regular and periodic fire drills, at intervals to be prescribed, is essential to ensure preparedness of personnel and testing of equipment to ensure that all systems function smoothly in case of an emergency.

15.13.1 All assets used for firefighting and fire prevention shall be equipped with sensors. These sensors shall be used for monitoring the health of the equipment. Sensors should log the status and send to the central monitoring station or BMS, where provided.

15.13.1.1 Stairways, fire exits, refuge areas, passages, open surroundings inside or outside the premises should be kept clear of goods.

16. ROADS AND PATHWAYS MAINTENANCE AND UPKEEP

16.1 General

For other facilities, great care in planning and construction stage is very important for roads/footpaths for their subsequent maintenance and upkeep. It is to be ensured that the roads are well planned and foot paths/pavements provided are at a standard height (usually 150 mm) above the road surface so that they do not cause obstruction to the vehicles and are easily manoeuvrable. All services required at the time of construction including those anticipated in future should be taken care of in the planning stage itself and adequate provisions shall be made for them from the very beginning. This will ensure that the roads are not required to be dug/cut time and again for laying of such services and also the laying of services will be efficient and economical once these are thought of and incorporated well in advance.

16.1 External Services

Special attention needs to be paid to the drainage of the area as storm water drains, more often than not, remain unplanned in the early stages of any project and the areas get inundated during rains causing inconvenience to the users. Proper survey and outlets for the rain water shall be ensured while taking up the work of the residential or commercial complexes. Need for rainwater harvesting systems has already been explained and emphasized (see 11.7). These provisions have to be taken into account while designing roads/pavements and paths. All external services should be planned and coordinated before execution. Care has to

be taken to ensure that the sewer lines do not run above water lines and also do not cross potable water lines as far as possible.

16.2.1 Ease of Movement

While laying out foot paths/walk ways and cycle tracks traffic studies shall be carried out, junctions and crossings shall be well planned. It should be ensured that foot paths/walkways are easily approachable and are user-friendly especially to elderly people and persons with physical disabilities. A simple test for the same can be to make a person walk with a trolley and he should be able to move around without having to lift the trolley at any point.

Action at design stage should be taken to develop a safe and effective network of cycle paths. Footpaths and cycle paths are provided to assist the community with walking and cycling activities. Walking and cycling need to be encouraged as modes of transport as they,

- enhance fitness, health and general life enjoyment;
- reduce traffic congestion;
- reduce greenhouse gas emissions; and
- reduce public expenditure on new roads and car parking facilities.

Damage to paths mainly arise from aging infrastructure, vehicle overrun or through tree roots lifting the paths.

16.3 Maintenance Requirements

Materials used for footpaths and walkways need not be very costly but should be of good quality and durable so that the maintenance needs remain minimal. Attention needs to be paid to regular cleaning of drains and walkways for which the time schedule can be drawn up depending upon the usage and expectations.

All roads present maintenance problems in varying degrees depending upon the specifications and standard of execution at construction, change in traffic intensity/pattern, climatic conditions natural calamities. In the case of concrete roads, the repairs to the roads are more or less as those applied to any other concrete works.

Road layouts indicating location of culverts, cross drainage and other underground services shall be prepared and kept available with the facility manager and exhibited in office. Different types of roads like gravel, bituminous, or concrete roads should be indicated along with length of the each stretch. A register of roads indicating total length of different types of roads shall be maintained. Similarly, a register of drains/culverts and cross drainage works shall also be maintained indicating type, length/span, etc.

operation is rendered imperative as a matter of urgency or by accident, the measures stated above for planned shutdown shall be implemented with least possible delay.

15.11 Fire Drills

Carrying out regular and periodic fire drills, at intervals that may be prescribed, is essential to ensure preparedness of personnel and testing of equipment to ensure that all systems function smoothly in case of any emergency.

15.11.1 All assets used for firefighting and fire prevention shall be equipped with sensors. These sensors shall be capable of monitoring the health of the equipment. A system should log the status and send to the central database or monitoring station or BMS, where provided.

15.11.2 Staircases, fire exits, refuge areas, passages, open surroundings inside or outside the premises should be kept clear of goods.

16. ROADS AND PATHWAYS MAINTENANCE AND UPKEEP

16.1 General

Like other facilities, great care in planning and construction stage is very important for roads/pavements/paths for their subsequent maintenance and upkeep. It is to be ensured that the roads are well planned and foot paths/pavements provided are at a standard height (usually 150 mm) above the road surface so that they do not cause obstruction to the vehicles and are easily manoeuvrable. All services required at the time of construction including those anticipated in future should be taken care of in the planning stage itself and adequate provisions shall be made for them from the very beginning. This will ensure that the roads are not required to be dug/cut time and again for laying of such services and also the laying of services will be efficient and economical once these are thought of and incorporated well in advance.

16.2 External Services

Special attention needs to be paid to the drainage of the area as storm water drains, more often than not, remain unplanned in the early stages of any project and the areas get inundated during rains causing inconvenience to the users. Proper survey and outlets for the rain water shall be ensured while taking up the work of the residential or commercial complexes. Need for rainwater harvesting systems has already been explained and emphasized (see 11.7). These provisions have to be taken into account while designing roads/pavements and paths. All external services should be planned and coordinated before execution. Care has to

water lines and also do not cross paths as far as possible.

16.2.1 Ease of Movement

While laying out foot paths/walk ways and cycle tracks traffic studies shall be carried out, junctions and crossings shall be well planned. It should be ensured that foot paths/walkways are easily approachable and are user-friendly especially to elderly people and persons with physical disabilities. A simple test for the same can be to make a person walk with a trolley and he should be able to move around without having to lift the trolley at any point.

Action at design stage should be taken to develop a safe and effective network of cycle paths. Footpaths and cycle paths are provided to assist the community with walking and cycling activities. Walking and cycling need to be encouraged as modes of transport as they,

- enhance fitness, health and general life enjoyment;
- reduce traffic congestion;
- reduce greenhouse gas emissions; and
- reduce public expenditure on new roads and car parking facilities.

Damage to paths mainly arise from aging infrastructure, vehicle overrun or through tree roots lifting the paths.

16.3 Maintenance Requirements

Materials used for footpaths and walkways need not be very costly but should be of good quality and durable so that the maintenance needs remain minimal. Attention needs to be paid to regular cleaning of drains and walkways for which the time schedule can be drawn up depending upon the usage and expectations.

All roads present maintenance problems in varying degrees depending upon the specifications and standard of execution at construction, change in traffic intensity/pattern, climatic conditions natural calamities. In the case of concrete roads, the repairs to the roads are more or less as those applied to any other concrete works.

Road layouts indicating location of culverts, cross drainage and other underground services shall be prepared and kept available with the facility manager and exhibited in office. Different types of roads like gravel, bituminous, or concrete roads should be indicated along with length of the each stretch. A register of roads indicating total length of different types of roads shall be maintained. Similarly, a register of drains/culverts and cross drainage works shall also be maintained indicating type, length/span, etc.

IF YOU DISCOVER A FIRE

- 1) Break the glass of the nearest push button fire alarm and push the button.
- 2) Attack the fire with extinguishers provided on your floor. Take guidance from your Wardens.
- 3) Evacuate, if your Warden asks you to do so.

IF YOU HEAR EVACUATION INSTRUCTIONS

- 1) Leave the floor immediately by the nearest staircase as directed.

- 2) Report to your Warden, at your predetermined assembly point outside the building.
- 3) Do not try to use lifts.
- 4) Do not go to cloakroom.
- 5) Do not run or shout.
- 6) Do not stop to collect personal belongings.
- 7) Keep the lift lobby and staircase doors shut.

YOUR ASSEMBLY POINT IS

ANNEX E

(Clauses 5.1.4 and 6)

ADDITIONAL REQUIREMENTS FOR HIGH RISE BUILDINGS

E-1 GENERAL

High rise buildings (15 m and above in height) shall receive special attention with respect to fire and life safety particularly with regard to planning, design, execution, maintenance and training so that the intended provisions of this Code are well implemented. These get further accentuated as the buildings go taller; some of the key aspects are as follows:

- a) Staging and evacuation requirements of occupants.
- b) Stack effect posing challenges towards pressurization and smoke exhaust.
- c) Zoning of firefighting system to meet functional requirements of hydraulic pressure and flow.
- d) Challenges experienced by fire personnel in reaching the place of fire and towards evacuation.

Aspects to mitigate these challenges require innovative approach, interaction with local fire authorities and meaningful strategic planning towards maintenance and fire drills.

E-2 EGRESS AND EVACUATION STRATEGY

One firefighting shaft shall be planned for each residential building/tower, in an educational building/block, and for each compartment of institutional, assembly, business and mercantile occupancy types. For other occupancy types, requirement of firefighting shaft shall be ascertained in consultation with the local fire

authority. The firefighting shaft shall necessarily have connectivity directly to exit discharge or through exit passageway (having 120 min fire resistance walls) to exit discharge.

Staircase and fire lift lobby of a firefighting shaft shall be smoke controlled as per 4.4.2.5 and Table 6.

It is recommended that the pressurization requirement for staircase in firefighting shaft and for other fire exit staircases in buildings greater than 60 m in height be evaluated to limit the force required to operate the door assembly (in the direction of door opening) to not more than 133 N to set the door leaf in motion. The aspect of pressurization, door area/width and door closure shall be planned in consideration to the above.

E-3 FIRE SAFETY REQUIREMENTS FOR LIFTS

The provisions as given in 7.1 to 7.2.4 under fire safety requirements of lifts in high rise buildings in Part 8 'Building Services, Section 5 Installation of Lifts, Escalators and Moving Walks, Subsection 5A Lifts' of the Code shall be applicable.

E-4 HORIZONTAL EXITS/REFUGE AREA

A horizontal exit shall be through a fire door of 120 min rating in a fire resistant wall. Horizontal exit require separation with the refuge area or adjoining compartment through 120 min fire barrier. The adjoining compartment of the horizontal exit should allow unlocked and ease of egress and exits for the occupants using defend in place strategy.

Requirements of horizontal exits are as under:

- (a) Width of horizontal exit doorway shall be suitable to meet the occupant load factor for exits.
- (b) Doors in horizontal exits shall be openable at all times from both sides.
- (c) All doors shall swing in the direction of exit travel. For horizontal exits, if a double leaf door is used, the right hand door leaf shall swing in the direction of exit travel.
- (d) Refuge area shall be provided in buildings of height more than 24 m. Refuge area provided shall be planned to accommodate the occupants of two consecutive floors (this shall consider occupants of the floor where refuge is provided and occupants of floor above) by considering area of 0.3 m² per person for the calculated number of occupants and shall include additionally to accommodate one wheelchair space of an area of 0.9 m² for every 100 occupants, portion thereof, based on the occupant load served by the area of refuge or a minimum of 15 m², whichever is higher, shall be provided as under:

- 1) The refuge area shall be provided on the periphery of the floor and open to air at least on one side protected with suitable railings.
- 2) Refuge area(s) shall be provided at/or immediately above 24 m and thereafter at every 15 m or so.

The above refuge area requirement for D-6 occupancy requirement shall however be in accordance with 6.4.2.2.

- 6.4 A prominent sign bearing the words 'REFUGE AREA' shall be installed at the entry of the refuge area, having height of letters of minimum 75 mm and also containing information about the location of refuge areas on the floors above and below this floor. The same signage shall also be conspicuously located within the refuge area.
- (f) Each refuge area shall be ventilated and provided with first aid box, fire extinguishers, public address speaker, fire man talk back, and adequate emergency lighting as well as drinking water facility.
- (g) Refuge areas shall be approachable from the space they serve by an accessible means of egress.
- (h) Refuge areas shall connect to firefighting shaft (comprising fireman's lift, lobby and staircase) without having the occupants requiring to return to the building spaces through which travel to the area of refuge occurred.

- (i) The refuge area shall always be kept clear. No storage of combustible products and materials, electrical and mechanical equipment, etc shall be allowed in such areas.
- (k) Refuge area shall be provided with adequate drainage facility to maintain efficient storm water disposal.
- (m) Entire refuge area shall be provided with sprinklers.
- (n) Where there is a difference in level between connected areas for horizontal exits, ramps of slope not steeper than 1 in 12 shall be provided (and steps should be avoided).

NOTE - Refuge area provided in excess of the requirements shall be counted towards FAR.

High rise apartment buildings with apartments having balcony, need not be provided with refuge area, however apartment buildings without balcony shall provide refuge area as given above. Refuge areas for apartment buildings of height above 60 m while having balconies shall be provided at 60 m and thereafter at every 30 m. The refuge area shall be an area equivalent to 0.3 m² per person for accommodating occupants of two consecutive floors, where occupant load shall be derived on basis of 12.5 m² of gross floor area and additionally 0.9 m² for accommodating wheel chair requirement or shall be 15 m², whichever is higher.

E-5 ELECTRICAL SERVICES

The specific requirements for electrical installations in multi-storeyed buildings given in Part 8 'Building Services, Section 2 Electrical and Allied Installations' of the Code and Section 7 of National Electrical Code 2011 shall be followed.

Wherever transformers are planned at higher floors, the HT cables shall be routed through a separate shaft having its own fire resistance rating of 120 min. Wherever HT generators are planned centrally at ground or first basement level, redundant transformers and HT cables shall be planned for buildings above 60 m in height.

E-6 FIRE PROTECTION

For residential occupancies above 120 m in height and other occupancies above 60 m in height, the sprinklers shall be fed from the main and an alternate/standby riser with suitable isolation valves. The entire sprinkler system shall be designed in accordance with good practice [4(20)].

Where the height of the building exceeds 150 m to 175 m, fire water static storage and pumps shall be required to be provided at 160 m to 180 m and thereafter at intermediate floors at higher levels enabling efficient and functional firefighting installations. The static fire

water storage tanks located at such levels shall have capacity at minimum half of the storage of underground static water storage tank prescribed in Table 7. Such tanks shall be supplemented with water supplies through one working and one standby pump of capacity 7500 litre/min with two risers at alternate locations leading to such fire water static storage tanks. The fire pump's requirement and capacity shall also be derived for occupancy type as per Table 7 substituting the diesel pump with electrical pump. The fire pump room at such level shall have dedicated connectivity through passage-way (with 120 mm integrity) from the firefighting shaft. Such fire pump room shall have 1 hr fire resisting wall and provided with adequate ventilation with full back connectivity to the main fire pump room and Fire Command Centre.

For high rise buildings, seismic bracings shall be considered for firefighting installations depending on

seismic vulnerability of the region and the type of occupancy.

E-7 FIRE AND LIFE SAFETY AUDIT

- Fire and life safety audit shall be carried out for all buildings having a height of more than 15 m.
- Such audits shall preferably be conducted by a third party auditor having requisite experience in fire and life safety inspections.
- Frequency of such audits shall be once in two years.

E-8 HELIPAD

For high rise buildings above 200 m in height, provision for helipad is recommended for specific requirements like landing of fire equipment, and support facilities or other emergencies.

ANNEX F

(Clause 6)

ATRIUM

F-1 ATRIUM REQUIREMENTS

- In order for an atrium to be permitted in buildings, the following shall be complied:
 - Atrium shall be permitted in buildings of Type 1 and Type 2 construction only.
 - The use of combustible furnishings and decorations on the floor of the atrium shall be limited and sparsely distributed.
- Smoke detectors shall be provided on the underside of each floor protruding into the atrium, at the atrium roof and adjacent to each return air intake from the atrium. Within atrium space, beam type or aspirating type smoke detectors shall be used to ensure detection of smoke, considering factors such as stratification of smoke.
- Where the ceiling of the atrium is more than 17 m above the floor, water based protection (automatic sprinklers) at the ceiling of atrium is not required.
- Hydrants shall be available at the floor of

the atrium and also at the adjoining upper spaces/floors of the atrium.

Sprinklers are required to be installed for coverage of glass areas of retail, tenant and other areas adjoining the exit access corridor and atrium. Sprinklers shall be at a distance of 450 mm to 600 mm enabling cooling of such glass and limiting the extent of fire and smoke to the atrium (see Fig. 16). This provision does not allow similar sprinkler installation arrangement to offset fire compartmentation requirements, in which case fire barrier is required as per relevant provisions of this Part.

- Atrium in business occupancy shall be planned with 6 air changes per hour (ACPH) while atrium in hotels and assembly occupancy shall be planned with 8 ACPH smoke extraction system.
- Such air changes shall be planned in atrium for a height of 15 m from the top.
- Smoke exhaust fans shall be capable of operating effectively at 250°C for 120 min.