Fire Safety Management

Walk Towards ‘ZERO’ Incident

Move Forward with Confidence

Fact Check

- The **Uphaar Cinema fire**, one of the worst fire tragedies in recent Indian history, occurred on Friday, 13 June 1997 at Uphaar Cinema, in Green Park, Delhi, during the 3-to-6 pm screening of the movie *Border*. Trapped inside, 59 people died, mostly due to suffocation, and 103 were seriously injured in the resulting stampede.
- On 24 May 2019, a fire occurred at a commercial complex in Sarthana area of **Surat in the Gujarat** state. 22 students died and others were injured in an academic coaching centre located on the building's terrace.
- The **Stephen Court fire** was a major fire in a historical building, Stephen Court, that occurred in March 2010 in Kolkata, West Bengal, India. 43 people died in the fire.
- The **2004 Kumbakonam school fire** accident happened in a school in the Thanjavur district of Tamil Nadu. A total of 94 students of the primary section of the Krishna English Medium School were burnt to death in their classroom as the thatched roof caught fire on 16 July 2004.
- The **2011 AMRI Hospital fire** was a major fire at a private hospital in Dhakuria, Calcutta, that occurred in the early morning of 9 December 2011.The fire claimed 89 victims.

➢ *According to NCRB, fire accidents were responsible for 1,193 injuries and 17,700 deaths in 2015.*

Financial Implication

- **Non-compliance** to safety norms in factories and high-rises, lack of institutionalized funding and under-equipped fire services in India, has led to an alarming number of accidents in the country. ‘Electric Short Circuits’ has been rated as the most significant threat under the risk category of Fire. The National Crime Records Bureau (NCRB) data recorded a total of **1,13,961 deaths** due to Fire Accidents between 2010 and 2014 at a startling average of **62 deaths** per day.
- While the Government and other regulatory bodies have prescribed norms and fire safety measures, implementation and vigilance continue to be a concern. The increasing gravity of the situation has resulted in the formation of citizen groups and corporate alliances to create awareness and improve fire safety in India. **Timely fire audits** backed with coercive mechanisms in case of dereliction of obligations can prove effective.
- The loss of assets due to fire is estimated to be almost **USD 100 billion** per year

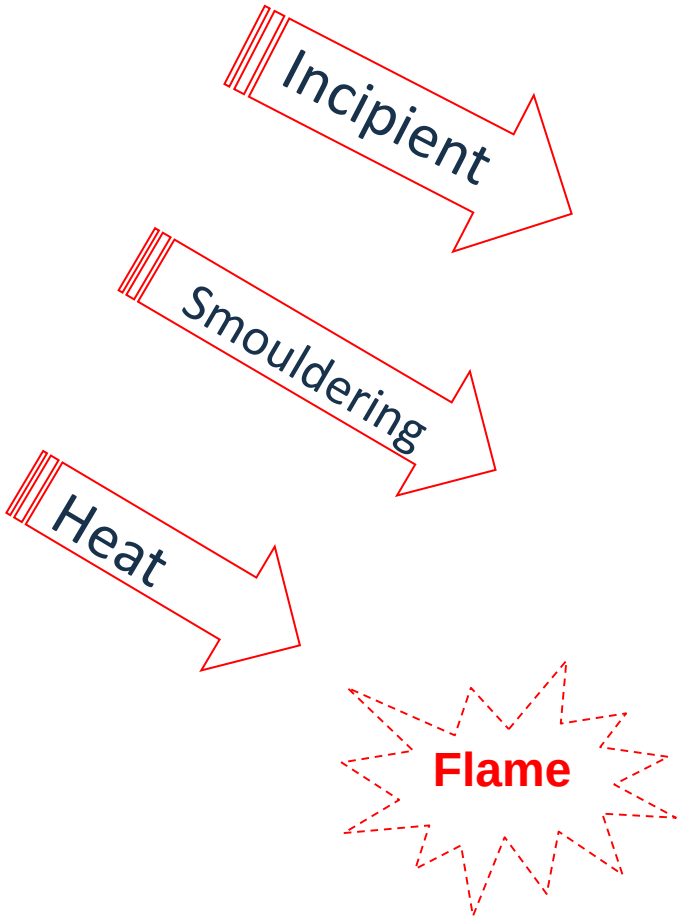
National Building Code

- Hazards such as **fire**, **smoke or fumes** & **panic** are to be focussed on.

- Fire prevention *(is based on the following)*
  - Occupancy
  - Fire zones
  - Types of construction
  - General requirement of all occupancies

- Life Safety
  - General Exit
  - Occupant Load
  - Smoke Control
  - Fire Detection

- Fire Protection
  - Fire Hydrant, Pump
  - Sprinkler & Pump
  - Storage tank etc.



Fire Prevention

- Electrical installation
  - ✓ Emergency power for fire and life safety system
  - ✓ Substation
  - ✓ Lightning protection
  - ✓ Escape lighting and exit signage
  - ✓ HVAC and smoke control
  - ✓ Glazing
  - ✓ Surface interior finish
  - ✓ Fire Command Centre

- Some Fire prevention Rules
  - ✓ Fire resistance rating of structural and non-structural elements updated
  - ✓ Fire resistance rating of service shaft and duct opening of 2 hours. Inspection door and duct opening should have same resistance rating of service shaft.
  - ✓ Facade protection and openable windows in facade shall have fire protection and smoke exhaust aspects

Fire Prevention

- ✓ Compartment criteria of different occupancies and fire separating wall & floor partitions are modified
- ✓ Provision of fire/smoke damper design more elaborated like provision of damper
  a. At the fire separation wall
  b. Where ducts/passage enter the vertical shaft
  c. Where the duct passes through floor
  d. At the inlet of supply air duct and return air duct of each compartment on every floor

Life safety is based on:

- General exit
- Occupant load
- Declaration of occupant load
- Egress components
- Smoke control of exit
- Compartmentation
- Smoke control above and below ground
- Gas supply
- Hazardous area
- Fire detection
- Fire drill

- To calculate the number of exit requirement with Density Factor
- Exit Layout for better understanding of various aspects of means of egress, corridor, passageways, stairways and exit
- Provision for access control door, electro magnetic door, revolving door and turnstile (conditions to be fulfilled)
- Provision of handrail at both sides of stairs and ramp width exceeding 1.5m
- Internal stair width of residential building increased to 1250 mm from 1000 mm
- External stairs width increased from 1250 mm to 1500 mm
- Each fire rated door shall have marking on the product of its certification. Door assembly parts like hinges, locks, panic bars, door closer and door viewer shall be certified.
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Life safety is based on

- Means of escape

  Means of escape can be defined as the structural means from where a safe route or routes are provided for persons to escape in case of fire from any point of the building to a place of safety by their own unaided efforts.
- Escape route design
  - Escape Route Planning
  - Escape Route Protection
  - Escape Route Recognition
  - Warning and Alarm System

➢ **Escape Route:** It is necessary to study each floor plan and consider the layout of each room or compartment.

It is necessary to understand the travel distance from the furthest point of that room or compartment to a place of safety (either comparative or ultimate) is less than the maximum travel distance.

Escape Route

- Four Stages of Escape:
  - Escape from the room or area of fire origin
  - Escape from the compartment of origin via the circulation route to a protected stairway or an adjoining compartment offering refuge
  - Escape from the floor of origin to the ground level
  - Escape at ground level, away from the building at a designated **assembly point**
- Some more factors to be considered:
  - Type of occupancy and nature of fire risk associated with materials, plant and process
  - The design and construction of the building whether fire or smoke could spread readily from floor to floor
  - Type of occupants of building (their age & mobility, that is, are they young or old)
  - The maximum number of people to be present at a particular point of time and duration of stay
  - How will people in the building know or are familiar with the escape routes

Life Safety

- Updated staircase pressurisation requirement (Smoke control of exit) for lobbies & corridors
- Smoke exhaust and pressurisation of area below the ground floor
- Requirement of smoke exhaust system having make up air system for the theatre and atrium
- Smoke exhaust fan in the mechanical ventilation system shall be fire rated of 250 degree centigrade for 2 hours (120 minutes)
- Provision of smoke barrier and sprinkler around the opening for escalator
- Requirement of display of occupancy load for assembly occupancy and call centre

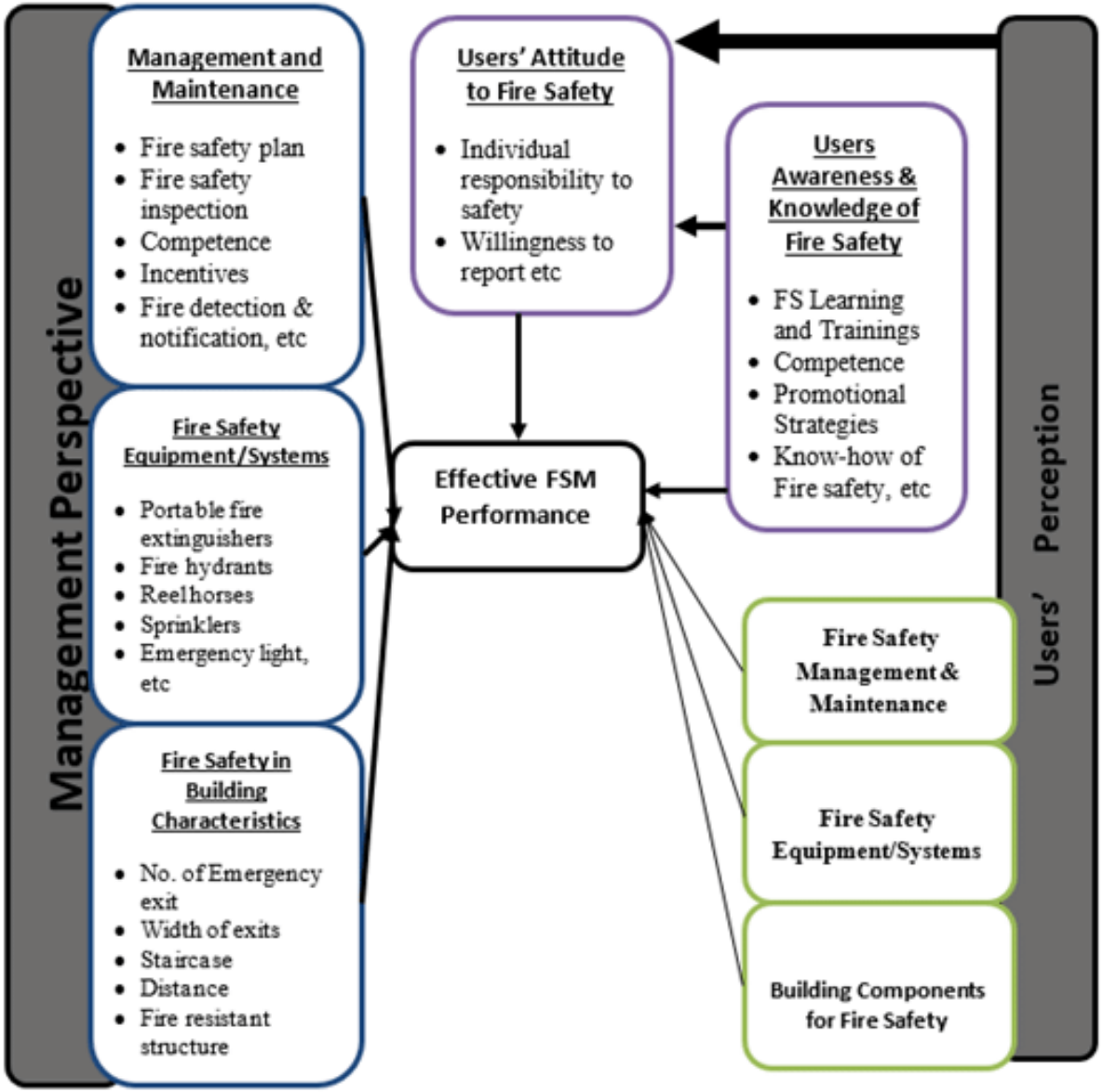
❑ Refuge area:

- Specification for super high rise residential, assembly occupancy and additional area consideration while calculating refuge area to accommodate wheelchair.

❑ Fire protection:

- Displayed in table 7 based on types of building in NBC
- Fire protection and firefighting system, storage tank and pump house, sprinkler system and special system

The Effective Fire Safety Management Conceptual Framework



The Effective Fire Safety Management Conceptual Framework

Fire Safety Management Best Practice Indicator

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