Fire safety in India

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The risk of fire in urban areas has increased over the years and the rising cost of fire losses are increasing at a greater rate than the measures devised to control them. Human negligence also plays a key role in such accidents. The proper laws should be in place to tackle the issue. As the country is facing many hazards like biological, chemical, knowing about fire incidents and fire safety is important from UPSC mains point of view.

In news: Fire incidents are on a high in the country.
Placing it in syllabus: Geography
Static dimensions

1. Salient features of Fire Decision Support System (FDSS)
2. GIS based Fire Hazard and Risk Analysis

Current dimensions

1. Present status of fire accidents in India
2. Major Laws in India governing Fire Safety and Governance
3. The Problems in the Current Structure
4. Fire safety audit

Content:

Present status of fire accidents in India:

- Every year, in India, about 25,000 persons die due to fires and related causes.
- **Female accounts for about 66% of those killed in fire accidents**.
- However, no comprehensive data is available in India on the economic losses suffered on account of fires.
- According to one estimate, the major losses reported by the Indian Insurance Companies in the year 2007-2008

indicate that about 45% of the claims are due to fire losses.

- Fire losses are reported **both in industrial and non-industrial premise**s like hospitals, commercial complexes, educational institutions, assembly halls, hotels, residential buildings, etc…
- According to **Fire Risk Survey (FRS) 2013,** carried out by Federation of Indian Chambers and Industry in India, fire accounted for 8.45% of the overall ranking of risks.
- According to **National Crime Records Bureau (NCRB)** figures 17,700 Indians died and 48 people every day due to fire accidents in 2015.
- **Maharashtra and Gujarat,** the two most highly urbanised states, account for about 30% of the country's fire accident deaths.
- According to **India Risk Surveys 2018,** outbreak of fire poses risks to business continuity and operations and ranks **India at 3rd position in fire incidents,** especially in Northern and Western regions of India.
- According to the **Accidental Deaths and Suicides in India report of 2015,** residential buildings are most prone to fire outbreaks.
- Past incidents show that most fire accidents take place due to **three major reasons:** *electrical short circuit and gas cyclinder/stove bursts, human negligence, and ill-formed habits.*

Major laws in India governing Fire Safety and Governance:

National Building Code (NBC):

The National Building Code is **published by the Bureau of Indian Standards (BIS).** It is the basic model code in India on matters relating to building construction and fire safety. The first edition of NBC was published in 1970.

The second edition of NBC was published in 2005 and the recent edition of the NBC was published in 2016 which is the third one. As **fire prevention and fire protection is a state subject**, rules for fire prevention and fire protection are laid in the form of State Regulations or Municipal By-Laws.

The NBC classify the buildings into the following **9 groups:**

- Residential
- Educational
- Institutional
- Assembly
- Business
- Mercantile
- Industrial
- Storage
- Hazardous

The code broadly **covers the following areas:**

Fire prevention: This covers aspects of fire prevention pertaining to the design and construction of buildings. It also describes the various types of buildings materials and their fire rating.

Life Safety: This covers life safety provisions in the event of fire and similar emergencies, also addressing construction and occupancy features that are necessary to minimise danger to life from fire, smoke, fumes or panic.

Fire Protection: Covers significant accessories and their related components and guidelines for selecting the correct type of equipment and installations meant for fire protection depending upon the classifications and type of building.

The **guidelines for fire drills and evacuations for high-rise buildings are also specified.** It mandates the appointment of a qualified fire officer and trained staff for significant land uses.

Oil Industry Safety Directorate (OISD) under the Ministry of Petroleum and Natural Gas formulates and coordinates the implementation of a series of self-regulatory measures aimed at enhancing the safety in the oil & gas industry in India.
Procedure followed:

The fire safety norms as per NBC states that **buildings above 15 metre in height would require a NoC from the fire safety department.**

The procedure involves two stages mainly:

- Prior to construction of a building wherein building plans are approved and fire safety recommendations are issued.
- After the construction of the building before commencing occupancy, when all the recommended fire and life safety measures have been provided.

Fire Safety Certificate (FSC) needs to be issued after verification. The FSC's are to be renewed after a period of 5 years for residential buildings and 3 years for non-residential buildings including hotels.

The Model Building ByeLaws, 2003:

- In 2003, the **Union Ministry of Urban Development** desired that the Model Building ByeLaws (MBBL) be prepared, in view of the Bhuj Earthquake that had occurred in 2001, to lay focus on the safety of buildings and for the guidance of state governments.

Under the MBBL-

- Point-specific responsibility for all fire-related clearance rests with the **Chief Fire Officer.**
- The concerned Development Authority shall refer the building plans to the Chief Fire Officer for obtaining clearance in respect of buildings.
- The Chief Fire Officer shall issue the 'No Objection

Certificate' from the viewpoint of fire safety and means of escape, after satisfying himself that all the fire protection measures have been implemented and are functional as per approved plans.

The Chief Fire Officer shall renew the fire clearance in respect of the following buildings on an annual basis:

1) Public entertainment and assembly

2) Hospitals

3) Hotels

4) Underground shopping complex

The Problems in the current structure:

- **Majority of the buildings lack NoC from the fire department** and continue to sustain huge populations at the risk of their lives.
- **Poorly enforced regulations** lead to thousands of deaths in fires across India every year.
- **Many residential area**s in metropolitan cities like Delhi, Kolkata, Chennai and Bangalore are **no longer distinguishable from planned industrial areas.**
- The municipal corporations and local bodies are responsible for providing fire services in many states, but due to **lack of resources,** fire services are ill equipped in providing adequate fire safety cover to the population.
- According to the Ministry of Home Affairs, in 144 towns with a population over 1 lakh, there is a **huge deficiency of fire fighting infrastructure.**
- Laxity in following fire safety measures caused many major fires in various occupancies and some of them even resulted in catastrophes.
- There are many offices, high rise buildings and religious places having **firefighting equipment** installed

but **hardly any person has the knowledge of using them.**

- The **lack of maintenance** makes the equipment dysfunctional.

Fire safety audit:

- Fire Safety Audit (FSA) is found to be an effective tool for assessing fire Safety standards of an organization or an occupancy.
- It is **aimed to assess the building for compliance with the NBC**, relevant Indian Standards and the legislations enacted by State Governments and Local Bodies, on fire prevention, fire protection and life safety measures.
- A **comprehensive fire safety audit can address the inherent fire hazards associated with the day to day activities in an occupancy** and recommend measures to reduce the potential fire hazards.
- NBC of India recommends for periodical fire safety inspection by the key personnel of the occupants of the building to ensure fire safety standards.
- In case of industrial buildings, the statutory authorities insist for **fire safety audit by external agencies depending on the type of activity** and the nature of the materials handled in the building.
- **Maharashtra Fire Prevention and Life Safety Measures Rules, 2009, made it mandatory for building owners and residents to conduct half-yearly fire safety audits** and submit the report to the fire department.

Issues:

- However, there are no clear cut provisions in any of the safety legislations in India regarding the scope, objectives, methodology and periodicity of a fire safety audit.
- The "licensed agencies" who conduct fire audit has also been entrusted with the work of "installations" and "maintenance" of firefighting systems and this has

resulted in diluting the scope and methodology of the audit.

- It is also doubtful whether the so called "licensed agencies" have the required calibre / expertise in conducting an effective fire safety audit.

As FSA is found to be an effective tool to assess fire safety standards of an organisation or an occupancy, it should be made mandatory all over India at least once in a year by independent agencies.

Salient features of Fire Decision Support System (FDSS):

FDSS is a **dynamic web-based application** aimed at supporting decision makers to take optimal decisions on complex tasks, such as resource prepositioning, gap analysis, prioritization, and resource optimization along with the day-to-day tasks. It **enables the apex fire management authority to provide the entire country's fire agencies information on a single platform.**

The **salient features** of the FDSS platform include:

- Web based application built using **.NET Framework 3.5 utilizing the GIS capabilities** of an open source GIS Platform.
- **Multi-tier system architecture** that follows the Object Oriented Programming model with the following **objectives:** *Loose coupling between the various tiers – presentation, business and data, Ease of development and deployment*
- Ability to **navigate, query and render the spatial data**
- Ability to **view and query the outputs in a tabular format**
- A **powerful reporting engine** that enables a set of pre-formatted reports that provide various views of the outputs from the model

- A **thematic map generator** that uses the underlying GIS platform to depict the outputs from the model as pre-designed thematic maps.

GIS based Fire Hazard and Risk Analysis:

- Geographic Information System (GIS) is a **computer- based system to aid in the collection, maintenance, storage, analysis, output and distribution of spatial data information.**
- GIS technologies have been used in fire analysis related to the optimum location of Fire Stations.
- Unlike a flat paper map, a **GIS-generated map can represent many layers of different information** which provides a unique way of thinking about geographic space.
- By linking map databases, GIS enables users to visualize, manipulate, analyze and display spatial data.
- GIS technology based approach is cost-effective and provides accurate solutions in an expanding range of applications.
- Hence the following approach is used for fire risk analysis in many Indian States.
- The GIS layers used as base administrative layers and other dependant layers that have been used in GIS based fire risk analyses are:

1. State administrative boundary layers
2. District administrative boundary layers
3. Rail network
4. Major (highways) and main road networks
5. Minor roads/ street road networks
6. Locations of cities, and major towns with their names
7. State level Land use land cover maps
8. Demarcation of residential, commercial and industrial built-up areas
9. Census population data 2011
10. Geographical locations (latitude, longitude) of

operational Fire Stations

GIS maps for administrative boundary layers such as State, and district are based on published Census 2011 data. Currently, Census 2011 has published only district level demographic data. Classified land use and land cover data is the backbone in fire hazard and risk analysis.

The use of smoke detectors, fire alarms, automatic sprinklers, water mist systems, clean agent suppression system should be encouraged, especially in high rise buildings. Passive fire protection systems should have a major role in fire protection.

Mould your thought:

1. How effective is the fire fighting system in India? Discuss the features of Fire Decision Support System (FDSS).

Approach to the answer:

- Write the status of fire accidents in India
- Write about the codes and bylaws used
- Write the features of FDSS
- Brief about fire safety audit as a measure to reduce fire incidents and conclude.