

AMSE19 STRUCTURAL FIRE SAFETY

UNIT-1 EFFECT OF TEMPERATURE ON THE PROPERTIES OF STRUCTURAL MATERIALS

- 1.1 Concrete, steel, masonry and wood;
- 1.2 Behavior of non-structural materials on fire- plastics, glass, textile fibers and other household materials;
- 1.3 Determination of combustibility by fire tube method;
- 1.4 Brief description on non-combustibility test and classification of flame spread rate of materials as per relevant standards (BIS).
- 1.5 Compartment fire factors controlling fire severity,
- 1.6 Ventilation controlled and fuel controlled fires;
- 1.7 Spread of fire in rooms, within building and between buildings.

UNIT-2 EXPERIMENTAL DETERMINATION OF FIRE RESISTANCE

- 2.1 Types of furnaces;
- 2.2 Approximate methods for calculating the fire resistance of structural elements Schematic diagrams, influencing factors;
- 2.3 Concept of static, thermal engineering and experimental methods for the calculation of fire resistance;
- 2.4 Principle of the calculation of the fire resistance limits of structures
- 2.5 Coefficient of fire resistance, fire duration;
- 2.6 Approximate calculation of the required fire resistance for a building.

UNIT-3 FIRE AREA

- 3.1 Calculation of building fire area,
- 3.2 Subdivision of fire areas in Industrial,
- 3.3 Residential and Public buildings;
- 3.4 Fire separation between building-
- 3.5 Principle of calculation of safe distance.
- 3.6 Design principles of fire resistant walls and ceilings;
- 3.7 Fire resistant screens-solid screens and water curtains;
- 3.8 Local barriers; Fire stopped areas-in roof, in fire areas and in connecting structures;
- 3.9 Fire doors- Low combustible, Non-combustible and Spark-proof doors;
- 3.10 Suspension of doors; Airtight sealing of doors;
- 3.11 Specification, test and performance criteria of Plate,
- 3.12 Metal covered and rolling type fire doors as per relevant standards (ISI).

UNIT-4 FABRICATED FIRE PROOF BOARDS

- 4.1 Calcium silicate, Gypsum,
- 4.2 Vermiculite, and Perlite boards;
- 4.3 Fire protection of structural elements-
- 4.4 Wooden, Steel, RCC, and Plastic structures;

- 4.5 Reparability of fire damaged structures- Assessment of fire severity,
- 4.6 Assessment of damage to concrete, steel, masonry and timber structures,
- 4.7 Assessment of feasibility of repair;
- 4.8 Repair techniques- repair methods to reinforced concrete Columns, beams and slabs,
- 4.9 Repair to steel structural members, Repair to masonry structures.

References Books:

1. Roytman M. Ya., “Principles of Fire Safety Standards for Building Construction”, Amerind Publishing Co. Pvt. Ltd., New Delhi, 1975
2. Smith E.E. and Harmathy T.Z. (Editors), “Design of Buildings for fire safety”, ASTM Special Publication 685, American Society for Testing and Materials, Boston, U.S.A., 1979.
3. E.Gorden Butcher E. G. and Parnell A. C., “Designing of fire safety”, John Wiley and Sons Ltd., New York, U.S.A., 1983
4. Marchant E.W., “A Complete Guide to Fire and Building”,
5. Adam and Charles Black, “Fire safety in Buildings”,

