

29-2. CAUSES AND EFFECTS OF FIRE

Following are the chief causes of fire in order of the toll or victims taken:

- (i) smoking in unauthorised places and disregarding carelessly the lighted ends of cigarettes and matches;
- (ii) faulty workmanship with respect to the electrical wiring;
- (iii) heating and cooking equipment;
- (iv) children playing with matches;
- (v) open flames and sparks;
- (vi) flammable liquids;
- (vii) suspected arson;
- (viii) chimneys and flues;
- (ix) lighting; and
- (x) spontaneous combustion.

The home contains various different materials and they produce different gases when ignited by fire. The effects of these gases are as follows:

(1) **Carbon monoxide:** This gas hampers oxygen from reaching the brain. It is the most abundant of fire gases. It is invisible and odourless.

(2) **Carbon dioxide:** This gas overstimulates the rate of breathing and it is thus responsible for increasing the intake of other toxic gases.

(3) **Hydrogen sulphide:** This gas affects the nervous system and it causes dizziness and pain in the respiratory system.

(4) **Nitrogen dioxide:** This gas is extremely toxic and it numbs or deadens the throat.

The human body can withstand temperatures of only between 65°C and 120°C . The smoke hampers vision and gases impair rational thought. In many cases, a fire victim loses consciousness before he has a chance to plan out an effective route to safety and thus, many people have been killed by lack of clear thought rather than flames.

The content of oxygen is normally 21 per cent in air. If it falls below 17 per cent during a fire, rational thought and muscle control become extremely difficult. When the oxygen level falls below 6 per cent, the breathing stops and after about 4 minutes to 6 minutes without oxygen, the brain death occurs.

Following are some of the precautionary measures which can be taken to avoid or to minimize the dangers of a fire:

- (i) Be sure that the cigarettes and matches are thoroughly extinguished before throwing them in rubbish.
- (ii) Entrust the work of wiring and electrical installations to an expert.
- (iii) Evacuate your home as soon as possible. Do not allow toxic fumes to take control of your mind.
- (iv) Feel each door before you open it. If the handle of door is hot or if smoke is seen coming from its bottom or sides, do not open the door. There are all the chances of meeting with a blast of fire in such cases.
- (v) If there is smoke, crawl on your hands and knees to safety. Heat rises to the ceiling and there is roughly a safety zone between 300 mm off the floor and approximately height of the door knob.
- (vi) If your clothes catch on fire, drop to the floor and roll to extinguish the flames.
- (vii) Never smoke in bed. A cigarette will continue to burn for about 24 minutes, if it is ignited and left alone. It takes only 10 minutes or 12 minutes, however, for sofa or beds to ignite, if a cigarette is left carelessly on them to burn.
- (viii) Prepare the line of moving through the fire affected area and as you proceed with your evacuation plan, close every door behind you.
- (ix) Train your family members or staff members for fighting a fire and acquaint them with the fire preventive measures.

29-3. FIRE HAZARDS

The fire hazards are of the following *three* types:

- (1) Exposure hazard
- (2) Internal hazard
- (3) Personal hazard.

Each of the above type of fire hazard will now be briefly described.

(1) **Exposure hazard:** Sometimes a fire spreads into a building through the open air from fire in other adjacent buildings or from across a road or other divisions of the same building. The risk involved in such fire spreading is known as the exposure hazard.

(2) **Internal hazard:** This type of hazard concerns damage or destruction of the building itself and it is directly related to the fire-load which, in turn, enables the building to be graded when considered along with the duration of fire.

(3) **Personal hazard:** The possibility of loss or damage to the life is referred to as the personal hazard and naturally it is of permanent importance. The fire safety provisions should be liberally provided for this type of hazard and safe fire-proof exits should be suitably accommodated in the design of buildings having more than one storey.