SER No	CONTENT
	LESSON PLAN : DM 3 **FIRE FIGHTING** Period - One Type - Lecture Code - DM 3 Term - II (SD/SW)
	Training Aids 1. Computer Slides, Charts, Pointer, Black Board & Chalk. **Time Plan** 2. (a) Introduction - 05 Min (b) Causes and Prevention of Fire - 10 Min (c) Fire Fighting - 20 Min (d) Conclusion - 05 Min **INTRODUCTION** 3. Fire is a major cause for destruction of property / lives these days. Due to increase in the standard of living, electrical goods, air conditioners and cooking gas are found in most of the houses. Also, due to the influx of multinational companies, most offices, shopping malls and hospitals have air conditioners. With the influx of these electrical gadgets and cooking gas, occurrences of fire incidents have increased manifold, especially during winters and summers. It is therefore essential that everyone should be aware of how to prevent fire hazards or to provide assistance in firefighting. **AIM** 4. To acquaint the NCC Cadets about the Fire Services and Fire Fighting. **PREVIEW** 5. The lecture will be conducted in following parts :- (a) Part I - Causes and Prevention of Fire. (b) Part II - Fire Fighting.
(a)	**PART I : CAUSES AND PREVENTION OF FIRE** **What is Fire** 6. Fire is the outcome of either heating or over heating of a combustible substance to the required temperature or igniting an inflammable material. The following three elements are essential for creation of fire and its continuation:- (a) Oxygen (b) Sufficient heat to raise the temperature of fuel to its burning point or ignition. (c) Combustible or burnable material (Solid, Liquid or Gas).

7. It should, therefore, be remembered that three things or conditions are necessary to start a fire and to sustain it. Fuel (Combustible Material), Oxygen (Air) and Sufficient Heat to raise the temperature ofthe fuel to its burning point, must be present at the same place and time.

Modes of Spread

8. The fire spreads by the transmission of heat in one or any combination of the following four ways:-

(a) **Conduction**. Transfer of heat by the intermediary material. Many materials which will not burn easily particularly metals are good conductors for transmitting heat. These materials when overheated or heated by the fire, may ignite other combustible material with which these may be in contact eg short circuiting of electrical wires due to overloading.

(b) **Convection**. Transfer of heat through gases or smoke. Gases tend to rise until ceiling or roof is reached after which they spread sideways in a mushroom manner and ignite combustible materials located at higher levels than the original fire e.g. fire spreading onto top floor. The best method to check this is to remove or cool the combustible materials.

(c) **Radiation**. Radiation means transfer of heat from the source of fire, without heating the midway media e.g. air. The effect of radiation can be countered by forming a ‗water curtain' between the fire and the object to be protected or the object may be removed or cooled.

(d) **Direct Burning**. This phenomenon is self-explanatory. Direct burning is often due to a combination of the above two or three factors viz, conduction, convection and radiation.

Prevention of Fire

9. The following measures must be taken to prevent occurrence of fire incidents:-

(a) **Domestic Fires.**

(i) **Kitchen Fires.** These fires can be prevented by following measures:-

(aa) Don't keep any inflammable material like petrol, kerosene or clothing near the fire or the gas.

(ab) Always check the gas cylinder, gas pipe for leakage. Keep the kitchen well ventilated to prevent leaking gas accumulation. Switch off the regulator when the gas is not in use.

(ac) Before lighting the gas, ensure there is no gas leakage.

(ad) Keep children away from gas or fire or stoves.

(ae) Before leaving the kitchen, ensure that the gas and kero stoves are switched off and there are no burning embers in the ‗Chula'.

(ii) **Other Fires.**

(aa) Ensure that no electrical circuit is ‗overloaded'.

(ab) Ensure that good quality electrical items are used.

(ac) Ensure that all electrical gadgets are switched off when not in use, eg TV, AC, room heater or

iron.

(ad) Ensure that smokers do not leave any burning cigarettes or stubs in ashtrays near inflammable material.

(ae) Don‘t ignite any fire cracker inside the house.

(b) **Fire in Public Places.**

(i) Ensure that smokers do not leave any burning cigarettes or stubs in public dustbins or near inflammable material in closed AC offices, shopping malls or cinema halls.

(ii) Don‘t ignite any fire cracker near petrol pumps, in crowded markets, near inflammable material or inside malls.

(b) **PART II : FIRE FIGHTING**

Fire Fighting

10. Fire can be extinguished if any one or more of the three main constituents are removed from the scene of fire. The fire can thus be extinguished by:-

(a) **Starvation**. Starvation means removal of fuel combustible material and it can be achieved by either segregation of fire and un-burnt fuel by removing either of them e.g. removing un-burnt combustible materials from a room on fire with the help of hook or otherwise or division of a large fire into several smaller ones to prevent the radiated heat from setting alight combustible material at some distance.

(b) **Cooling**. Cooling implies the removal of heat to lower the temperature of burning material to a point below its ignition point. This is usually achieved by water. When water is poured over a burning material, it absorbs heat, becomes hot and flows away or is converted into steam. The burning substance loses heat to the water and its temperature comes down to below its ignition temperature and so the fire is extinguished.

(c) **Smothering**. Smothering means ‗Choking‘ or restricting the supply of Oxygen (Air) to the burning material. This is also called ‗blanketing‘ and is achieved by sealing all the burning material from Oxygen (Air) by covering it with sand/dry earth/ foam or by creating an atmosphere over the fire of heavier than air inert gas.

Fire Fighting Parties

11. To carryout the above methods, the fire services and fire parties are organized at the level of every city, town and important establishments.

12. **House Fire Parties.** It consists of four persons who carry stirrup pumps and water buckets.

They act as fire watchers and work under the orders of the wardens. They carry one stirrup pump, two buckets, one torch and one hand axe. One steel helmet and one whistle per member is envisaged as personal equipment.

13. **Auxiliary Fire Services**. This consists of eight persons with Trailer Pump which can throw water at the fire from a distance. The members of this Service are drawn from the Home Guards.

Fire Fighting Equipment

14. Fire Fighting Equipment can be divided into the following four categories:-
(a) Fire Extinguishers.
(b) Stirrup Pumps.
(c) Buckets.
(d) Fire Beaters and Hooks.

15. **Fire Extinguishers.** For the convenience of study, these could be grouped as under:-
(a) **Soda Acid Extinguishers.** These fire extinguishers are used for extinguishing fires involving ordinary combustible material, where the cooling effect is achieved by water or solution containing large percentage of water. Such extinguishers are conical /cylindrical in shape.

(b) **Foam Type or Dry Chemical Powder Extinguishers.**Thesefire extinguishers contain dry chemicals or solution and are exclusively meant for extinguishing fires involving inflammable liquids such as oils, fats, or grease,where blanketing the fire to isolate it from Oxygen (Air) is required.

(c) **CTC Carbon dioxide and Dry Chemical Extinguishers**. These fire extinguishers contain chemicals, either liquid, gas or dry, and are mainly used to fight fires involving ‗Live' electrical equipment etc. where, the use of an electrically non-conductive extinguishing agent is of most importance.
Soda Acid Fire Extinguisher Foam Fire Extinguisher .

(d) The main advantages of these extinguishers are:-
(i) They are easy to operate.
(ii) They need only one man to operate and carriage to another place.
(iii) They are very useful in the initial stage of fire.
(e) The disadvantages of these extinguishers are:-
(i) The use is limited as the duration of the working of the extinguishers is approximately one to two minutes.

(ii) The cost of these extinguishers is prohibitive.
(iii) These extinguishers require constant care and careful maintenance.

16. **Stirrup Pumps** . The stirrup pump is an excellent piece of first aid firefighting equipment designed for use on small fire. It is very useful in localising and controlling fires with limited water supplies. Water spray from this equipment may be used on small fires for cooling the combustible material or the surrounding of scene of fire. It is generally operated by a team of four members but in an emergency a team of two members can also operate it effectively. The water jet produced by this pump can hit the ground at a distance not less than 9 meters from the nozzle. The consumption of water is about 1 to 1-1/2 gallons per minute. The spray produced by this pump can reach 15 to 20 feet away from the nozzle with water consumption ¾ gallons per minute.

17. **Bucket .**Buckets are ideal for storing water and sand for fighting small fires. They could be easily carried by one person, from one place to another.

18. **Fire Beaters/Hooks.** Beaters made of wire net in a rectangular shape and hooks made of iron fitted on bamboo poles are ideal for separating the burning and unburnt combustible material, and extinguishing by beating the small fires.

CONCLUSION

19. It therefore extremely essential for all to be aware of the causes of fires and how to prevent fires or carryout firefighting in homes and public places.