CHAPTER TWO

FIRE SAFETY

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Fire Safety

2.1. The Fire Triangle

Fire safety, at its most basic, is based upon the principle of keeping fuel sources and ignition sources separate. Three things together produce the chemical reaction that is fire. Take away any of these things and the fire will be extinguished. These three things must be present at the same time to produce fire:

• Enough OXYGEN to sustain combustion

• Enough HEAT to reach ignition temperature

• Some FUEL or combustible material

2.2. Fuel Classifications

Fires are classified according to the type of fuel that is burning, when the wrong type of fire extinguisher use on the wrong class of fire, that might make matters worse, so it is very important to understand the four different fire (fuel) classifications.

• Class A: Wood, paper, cloth, trash, plastics—solids that are not metals.

• Class B: Flammable liquids—gasoline, oil, grease, acetone. Includes flammable gases.

• Class C: Electrical energized electrical equipment. As long as it's "plugged in."

• Class D: Metals potassium, sodium, aluminum, magnesium. Requires Metal-X, foam, and other special extinguishing agents.

Most fire extinguishers will have a pictograph label telling that which types of fire the extinguisher is designed to fight.

2.3. Types of Fire Extinguishers

Different types of fire extinguishers are designed to fight different classes of fire. The 3 most common types of fire extinguishers are:

• Water (APW)

• Carbon Dioxide (CO2)

• Dry Chemical (ABC, BC, DC)

2.3.1. Water (APW) Fire Extinguishers

Large silver fire extinguishers that stand about 2 feet tall and weight about 25 pounds when full. APW stands for "Air-Pressurized Water." Filled with ordinary tap water and pressurized air, they are essentially large squirt guns. The characteristics of APWs are:

• Extinguish fire by taking away the "heat" element of the Fire Triangle.

• Designed for Class A fires only: wood, paper, cloth. Using water on a flammable liquid fire could cause the fire to spread. Using water on an electrical fire increases the risk of electrocution. If there have no choice but to use an APW on an electrical fire, electrical equipment must be un-plugged or de-energized.

• They will be found in older buildings, particularly in public hallways, as well as in residence halls, they will also be found in computer laboratories. It is important to remember, however, that computer equipment must be disconnected from its electrical source before using a water extinguisher on it.

2.3.2. Carbon Dioxide Fire Extinguisher

The pressure in a CO2 extinguisher is so great, bits of dry ice may shoot out of the horn. The characteristics of CO2 are:

• Their cylinders are red. They range in size from 5 lbs to 100 lbs or larger. On larger sizes, the horn will be at the end of a long, flexible hose.

• They are designed for Class B and C (Flammable Liquids and Electrical Sources) fires only.

• They will frequently be found in laboratories, mechanical rooms, kitchens, and flammable liquid storage areas.

• All CO2 extinguishers must undergo hydrostatic testing and recharge every 5 years. Carbon dioxide is a non-flammable gas that takes away the oxygen element of the fire triangle. Without oxygen, there is no.

• Very cold as it comes out of the extinguisher, so it cools the fuel as well.

• Ineffective in extinguishing a Class A fire because it may not be able to displace enough oxygen to successfully put the fire out. Class A materials may also smolder and re-ignite.

2.3.3. Dry Chemical (ABC) Fire Extinguishers

Dry chemical extinguishers calls (ABC) fire extinguishers depending on class A, B and C of fire. They put out fire by coating the fuel with a thin layer of dust. This separates the fuel from the oxygen in the air. The powder also works to interrupt the chemical reaction of fire. These extinguishers are very effective at putting out fire. ABC extinguishers are red. On campus, they range in size from 5 to 20 lbs. ABC fire extinguishers are filled with a fine yellow/white powder. The greatest portion of this powder is composed of monoammonium phosphate. The

extinguishers are pressurized with nitrogen. Dry chemical extinguishers come in a variety of types; DC (for “Dry Chemical”), ABC (can be used on Class A, B, or C fires) and BC (designed for use on Class B and C fires). It is extremely important to identify which types of dry chemical extinguishers are located in the design area; An “ABC” extinguisher will have a label, indicating it may be used on Class A, B and C fires. Dry chemical extinguishers with powder designed for Class B and C fires (“BC” extinguishers) may be located in places such as commercial kitchens and areas with flammable liquids. On campus, ABC’s can be found in public hallways of new buildings, in laboratories, break rooms, offices, chemical storage areas, mechanical rooms, University vehicles, etc [3].