Identifying Hazards in Agricultural Mechanics

OXYGEN is naturally present in almost every work environment. If fuel and heat are also present, a fire could result. It is important to be aware of the dangers of combustibles, flammable liquids, and combustible metals in the immediate area. You should also know the types of extinguishers used for the different types of fires, where to locate an extinguisher, and how to use it. The following information could save your life.

Objectives:

1. Identify the three conditions necessary for combustion.
2. Describe fire prevention techniques, the classes of fires, the types of extinguishers, and the proper use of extinguishers.
3. Describe the different types of burns that can occur in agricultural mechanics.

Key Terms:

combustible metals
fire triangle
flammable liquids
fuel
heat
ordinary combustibles
oxygen

Conditions for Combustion

To produce fire, three components must be present at the same time and location: fuel, heat, and oxygen, which are known as the **fire triangle**.

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FUEL

Fuel is any combustible material that will burn. Common fuels are gasoline, diesel fuel, wood, paper, and propane. Most materials will burn if they are made hot enough in the presence of oxygen.

HEAT

Heat is a type of energy that causes the temperature to rise. If the temperature of a room is changed from 50 to 70 degrees, it is done by using heat.

OXYGEN

Oxygen is a gas in the atmosphere. It is not a fuel, but it must be present for fuels to burn. Oxygen is nearly always present—except in airtight conditions. This fact is important to remember in fire safety and control.

FIGURE 1. Gasoline is extremely flammable, which is why smoking is prohibited at gas stations.

Understanding Fire: Prevention, Classes, and Extinguishers

FIRE PREVENTION

The prevention of fire goes hand in hand with the safe use of equipment and the efficient management of work areas. For instance, the proper storage of materials decreases the chance of fire and keeps materials readily available. Clean work areas also decrease the chance of a fire.

Basic Steps

If any one of the three components of the fire triangle is eliminated, fire will be prevented from starting, or it will be stopped if it has started. The basic steps in fire prevention and control are storing fuels in approved containers; storing fuels away from other materials that burn easily; storing materials in areas that are cooler than their combustion temperature; using fire only in safe surroundings; and putting out fires by removing one or more elements in the fire triangle.

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CLASSES OF FIRE

To put out a fire effectively and safely with an extinguisher, the class of fire must be known. Fire classification is based on how to safely extinguish each type of material. A firefighter can be electrocuted if the stream of water hits exposed electrical wires, plugs, or controls. In addition, water is not suitable on fires involving petroleum products because the fuel floats to the top of the water and continues to burn. The four fire classes are A, B, C, and D.

Class A

In Class A fires, **ordinary combustibles** (e.g., wood, papers, and trash) are involved. Class A combustibles do not include any item in the presence of electricity or any type of liquid.

Class B

Class B fires involve **flammable liquids** (e.g., fuels, greases, paints, and other liquids) as long as they are not in the presence of electricity.

Class C

Class C fires involve the presence of electricity.

FIGURE 2. An electrical fire is classified as a Class C fire.

Class D

Class D fires involve **combustible metals**, which are metals that burn. Burning metals are difficult to extinguish.

FIRE EXTINGUISHER TYPES

To extinguish a fire as quickly as possible, the proper fire extinguisher must be used immediately. It is important to be able to recognize extinguishers by their type and by the class of fire they extinguish. Water with a pump or gas pressure is used for Class A fires. Carbon dioxide gas is used for Class B and Class C fires. A dry chemical is used for fires in Classes A, B, and C. Only Class D extinguishers will work on Class D fires.

FIRE EXTINGUISHER USE

The safe and proper use of a fire extinguisher is simple and critical in controlling a fire.

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Basic Steps

The basic steps are:

- Hold the extinguisher upright and pull the blocking pin.
- Move within 6 to 10 feet of the fire.
- Aim the nozzle of the extinguisher toward the base of the fire.
- Squeeze the lever and discharge the contents, using a side-to-side sweeping motion.

Have extinguishers serviced after each use.

Inspections

A monthly inspection of all fire extinguishers should be made to ensure they are usable in case of an emergency. The extinguishers should be inspected and serviced annually by a qualified service technician.

Types of Burns

Sadly, burns are one of the most common injuries that occur in agricultural mechanics. Burns can be caused by ultraviolet light rays as well as by contact with hot materials. The infection risks are high with burns because of dead tissue. Burns are divided into three classifications, based on the degree of severity: first-degree, second-degree, and third-degree.

FIRST-DEGREE BURNS

With a first-degree burn, the surface of the skin is reddish in color. The area is tender and painful, but there is no broken skin. Treat this type of burn by placing the burn area under

BROADENING AWARENESS...

AMAZING ASPECTS: Fire Safety

Residential fires kill almost 500 people annually and injure approximately 2,300 more. Such fires may result from the misuse of appliances, overloaded circuits, improperly installed wiring, or frayed wires.

To decrease the risk of a fire in your home, keep combustible materials and items at least 3 feet away from heat sources. Do not overload circuits. Replace frayed wires. Keep electrical items away from wet floors and counters. Professionally replace lights that flicker and light switches that are hot to the touch. Replace any tool that overheats, short circuits, or emits smoke. In addition, routinely check your smoke detectors, and have a fire extinguisher located on every level of your home.

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cold water or by applying a cold compress. Then cover the area with non-fluffy sterile or clean bandages. Do not apply butter or grease, which will trap in the heat.

FIGURE 3. In the summer, people who do not wear sunscreen and monitor their time in the sun may end up with first-degree burns.

SECOND-DEGREE BURNS

With a second-degree burn, the surface of the skin is severely damaged, resulting in the formation of blisters and possible breaks in the skin. To treat a second-degree burn, put the burn area under cold water or apply a cold compress until the pain decreases. Then cover the dried area with a clean bandage to prevent infection. Seek medical attention. Do not apply ointments, sprays, antiseptics, or home remedies.

THIRD-DEGREE BURNS

A third-degree burn exists when the surface of the skin and possibly the tissue below the skin appear white or charred. Little pain is present because nerve endings have been destroyed. Do not remove any clothes stuck to the burn. Do not put ice water or ice on the burn. Do not apply ointments, sprays, antiseptics, or home remedies. Place a cool cloth or cool (not ice) water on the burn. Then cover the burned area with a thick, sterile dressing. Call for an ambulance immediately.

Summary:

To produce fire, three components must be present at the same time and location: fuel, heat, and oxygen—known as the fire triangle. Fuel is any combustible material that will burn. Heat is a type of energy that causes the temperature to rise. Oxygen is a gas in the atmosphere.

The four classes of fires are A, B, C, and D. To extinguish a fire as quickly as possible, the proper fire extinguisher must be used immediately. The basic steps are holding the extinguisher upright and pulling the blocking pin; moving within 6 to 10 feet of the fire; aiming the nozzle of the extinguisher toward the base of the fire; and squeezing the lever and to discharge the contents while using a side-to-side sweeping motion. Extinguishers should be serviced after each use.

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Burns are divided into three classifications, based on the degree of severity: first-degree, second-degree, and third-degree.

Checking Your Knowledge:

1. What three components make up the fire triangle?
2. What are the basic steps in fire prevention and control?
3. List and describe the four classes of fires.
4. What is the proper way to use a fire extinguisher?
5. List and describe the three types of burns.

Expanding Your Knowledge:

To improve your knowledge of fire prevention and control, contact your local fire department. Ask if it offers free movies, talks, or training sessions to help in fire prevention and proper fire extinguishing. If so, attend one and write about what you learned. If the department does not offer these aids, check out Web sites, such as http://firechief.com/technology/communications/cfd-youtube-041307/ and http://www.youtube.com/watch?v=ZCSms-jyOao to increase your knowledge of fire safety.

Web Links:

The Fire Triangle
http://ehs.sc.edu/training/Fire/01_triangle.htm

The Science of Wildfire
http://www.smokeybear.com/elements_triangle.asp

Flammable Liquids
http://web.princeton.edu/sites/ehs/hazardcommguide/7.htm

Flammable and Combustible Liquids
http://www.osha.gov/dte/library/flammable_liquids/flammable_liquids.html

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