

NCDOT **Division One** Monthly Safety Trainer

Fire Prevention and Fire Extinguishers

(Reference SPP #1910.157 & SOP 10-7)

Fire Prevention

The hazards of fire are burning, smoke, release of noxious fumes, risk of explosion, etc.

For instance, some chemical fires, or fires that break out in areas that contain hazardous chemicals, can release into the air toxic vapors that pose a serious health risk. Sometimes the same things that cause fires can also cause explosions.

Remember that even a small fire can easily get out of hand. So the name of the game is to keep fires from starting.

Identifying Hazards

Fire develops from a mix of three components:

- Fuel (paper, oil, wood, etc.)
- Oxygen (present in the air)
- Heat (from flame, electricity, friction, or chemical reaction).

Fire prevention, then, means making sure that these three don't get together. Some of the specific fire hazards that you find in most workplaces are:

Electrical equipment is the #1 cause of workplace fires. They're the result of:

- Overloaded fuses, circuits, motors, or outlets
- Wiring with frayed or worn insulation
- Loose ground connections
- Lights or machinery coming in contact with combustible materials

Flammable liquids like oil, gas, kerosene, solvents, and many chemicals are a fire hazard mainly because of their invisible vapors. When these vapors come in contact with an ignition source, you have a fire.

Smoking is another cause of fire. Lit cigarettes or matches can easily ignite anything that is capable of burning, such as wood, paper, or flammable liquids.

Space heaters are another fire source—usually due to improper use.

Welding and cutting operations are a fire hazard because of the flames and sparks they create.

Spontaneous combustion is another cause of fire. That's the slow buildup of heat in flammable materials that eventually erupts into fire.

Chemicals that are not a major fire hazard alone may become one when they're mixed with an incompatible substance—air, water, heat, or other chemicals. This is known as reactivity.

Housekeeping

The topic of housekeeping is an important one in relation to fire prevention. Many fires start simply through carelessness, with debris, weeds, and other housekeeping factors contributing greatly to their ignition or continued combustion. In addition, lives are sometimes lost in fires where attempts to escape are hindered by improper storage of material, or blockage of access to exit by materials or debris.

Because of the importance of housekeeping factors in relation to fire prevention and protection, rules related to housekeeping to prevent fires are laid out in rules for open yard and indoor storage at construction sites. These rules can be found in Subpart F of the construction regulations, at 29 CFR 1926.151 (c) and (d).

These rules specify the following:

Outdoors

- Pile combustibles in stable piles no higher than 20 feet.
- Keep driveways between and around combustible storage piles at least 15 feet wide and maintained free from accumulation of rubbish, equipment, or other debris.
- Keep the entire storage site free from accumulation of unnecessary combustible materials. Keep weeds and grass under control and follow regular procedures provided for the periodic cleanup of the entire area.
- Don't store combustible or flammable materials where there is a danger of an underground fire.
- Pile materials in solid, orderly and regular piles. Don't store combustibles within 10 feet of a building or structure.
- Make sure that portable fire extinguishing equipment, suitable for the fire hazard involved, is provided at convenient, conspicuously accessible locations in the yard area.

Employee Responsibility

It is part of every employee's job to keep their eyes open for safety hazards. Employees are responsible for reporting fire hazards to their supervisors. **Actual fires will be reported immediately to the local fire department before any attempts are made to extinguish the fire. Employees will not attempt to extinguish fires beyond the incipient stage.**

NCDOT facilities will have fire protection equipment to minimize the results from fire hazards. When fire hazards exist that cannot be eliminated, then engineering practices, administrative practices, safe work practices, and proper training regarding Fire Protection will be implemented. These measures will be implemented to minimize those hazards to ensure the safety of employees and the public.

Portable Fire Extinguishers

NCDOT shall provide portable fire extinguishers that are:

- Consistent with the hazard
- Properly mounted and located
- Inspected, maintained, and tested

Portable fire extinguishers will be selected and distributed based on the classes of anticipated fires, and the size and degree of hazard. Most fires in NCDOT operations will include materials found in Classes A, B, and C.

Class A Fires

- Fires that involve ordinary combustible solids or “surface burning fires.” Examples of Class A fires include wood, clothing, plastics, paper, and asphalt.

Class B Fires

- Fires that involve gases, greases, and flammable combustible liquids. Examples of Class B Fires include gasoline, kerosene, alcohol, and lubricating oils and greases.

Class C Fires

- Fires that involve electrical circuits of electrical equipment or fires near such equipment. Examples of Class C fires include electrical motors, switch boxes, junction boxes, transformers, and energized or live wires.

Class D Fires

- Fires that involve combustible metals which require special fire tactics and extinguishing agents. Class D fires include metals such as magnesium, potassium, powdered aluminum, zinc, sodium, and titanium.

Portable fire extinguishers will be mounted conspicuously, located and identified so they are readily accessible. Extinguisher locations will be carefully selected to ensure extinguishers are adequately spaced and are not in danger of being damaged by vehicles, weather, or storage materials. The paths to fire extinguishers must remain clear to provide easy access. For related information, refer to [SPP# 1910.38, Emergency Evacuation and Fire Prevention Plans](#).

Portable fire extinguishers shall be visually inspected monthly to ensure they are charged and operable. They are to be recharged after use or pressure leakage. Fire extinguishers will be equipped with an inspection tag, and the inspector must initial and date the tag each month to document the inspection. Tags will be replaced when all lines are used or when tags are lost or removed. Any extinguisher that shows excessive wear, damage or unserviceable condition will be removed from service and replaced by an operable extinguisher.

Fire extinguisher maintenance will be performed at least annually by an approved contractor or trained NCDOT personnel.

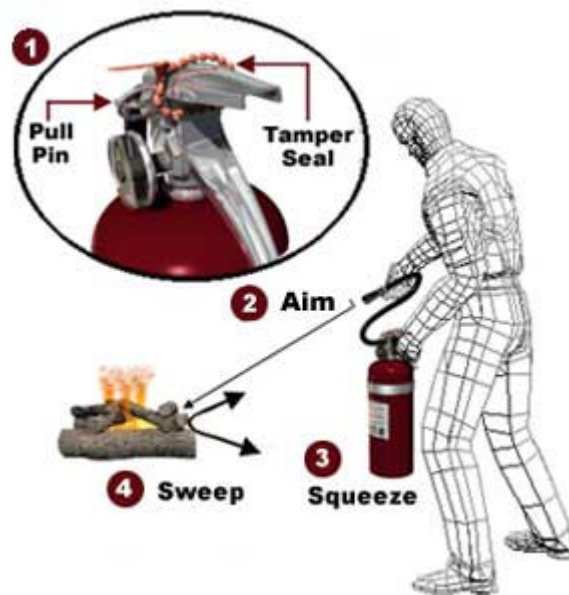
During any period when an extinguisher is removed from service for testing, another extinguisher must replace the extinguisher out for testing. Annual inspection records will be maintained for review by regulatory agencies and for internal audit purposes.

Always re Most fire extinguishers operate using the following P.A.S.S. technique:

1. **PULL...** Pull the pin. This will also break the tamper seal.
2. **AIM...** Aim low, pointing the extinguisher nozzle (or its horn or hose) at the base of the fire.

Note: Do not touch the plastic discharge horn on CO2 extinguishers, it gets very cold and may damage skin.

3. **SQUEEZE...** Squeeze the handle to release the extinguishing agent.
4. **SWEEP...** Sweep from side to side at the base of the fire until it appears to be out. Watch the area. If the fire re-ignites, repeat steps 2 - 4.



If you have the slightest doubt about your ability to fight a fire....EVACUATE IMMEDIATELY!

Remember that NCDOT does NOT require that you fight fires. If you are not comfortable with using an extinguisher, call 9-1-1- immediately.

Group Questions & Answers for Discussion

1. What are the hazards of fire?

ANSWER: burning, smoke, release of noxious fumes, risk of explosion, etc.

2. What three components must come together to form a fire?

ANSWER: fuel, oxygen, & heat

3. Name some fire hazards associated with your workplace:

ANSWER: Will vary. Examples can be: electrical, flammable materials, smoking, heaters, welding & cutting operations, chemical.

4. What can you do to reduce the hazards of fire?

ANSWER: Will vary, see page 2.

3. What are the different class of fire extinguishers that are most commonly used in NCDOT?

ANSWER: A,B, & C.

4. What are each of these class of fire extinguishers rate for?

ANSWER: A – ordinary combustible solids such as wood, clothing, plastics, etc.
B – gases, greases, & flammable combustible materials such as gasoline, kerosene, greases, etc.
C – electrical circuits such as electrical motors, junctions boxes, etc.

5. What is the PASS system?

ANSWER: A system to use when extinguishing fires.

Pull the pin.
Aim at the base of the fire.
Squeeze the trigger.
Sweep and cover the fire.