Author:	P. Roberts	Revision #:	2
Approved By:	Walt Gray	Date Revised:	December 2015

SAFETY POLICY & PROCEDURE

Fire Protection SPP# 1910.157

Quick Reference

1.0 PURPOSE

The purpose of this safety policy and procedure is to establish the methods and accountability for fire protection and safety at North Carolina Department of Transportation (NCDOT) facilities.

2.0 SCOPE AND APPLICABILITY

This safety policy and procedure provides guidelines for implementing fire protection in the workplace. It includes training requirements, discussion on fire hazards, portable fire extinguisher, automatic systems such as water sprinklers, and system alarms.

This document also details the areas of responsibility for managers/unit heads, supervisors, and employees within NCDOT.

This safety policy and procedure applies to all employees.

3.0 REFERENCE

This safety policy and procedure is established in accordance with Occupational Safety and Health Standards for General Industry (29 CFR 1910.157).

4.0 POLICY

It is the policy of NCDOT to provide a place of employment that is free from recognized hazards that cause or are likely to cause death or serious physical harm to employees or the public. . When fire hazards cannot be eliminated, fire protection equipment, engineering practices, administrative practices, safe work practices, and proper training regarding fire protection will be used or implemented.

5.0 General Responsibilities

It is the responsibility of each employee to ensure this policy is implemented. Each NCDOT employee shall report immediately any unsafe act or condition to his or her supervisor and to become familiar with required fire prevention and protection measure including, as applicable, the use and location of fire-fighting equipment. Specific responsibilities are found in Section 6.3.

6.0 Procedure

This section provides applicable definitions, establishes general provisions, and identifies specific responsibilities required by NCDOT's policy on Fire Protection.

6.1 Definitions

Class A Fires

Fires involving ordinary combustible materials such as paper, wood, cloth, and some rubber and plastic materials.

Class B Fires
Fires involving flammable or combustible liquids, flammable gases, greases and similar materials, and some rubber and plastic materials.

Class C Fires
Fires involving energized electrical equipment where safety to the employee requires the use of electrically nonconductive extinguishing media

Class D Fires
Fires involving combustible metals such as magnesium, titanium, zirconium, sodium, lithium and potassium.

Class K Fires
Fires involving cooking oils, fats. and grease. Class K fires are typically a subclass of Class B fires and can be controlled by interrupting the fire's chemical reaction.

Fixed Extinguishing System
A permanently installed system that extinguishes or controls a fire by discharging a fire suppression agent, typically through a nozzle or spray head at or near the ceiling.

Halon
A colorless, odorless, or faintly sweet smelling, electrically nonconductive liquefied gas which inhibits a fire's chemical chain reaction. Halon extinguishers may be portable or may be part of a fixed extinguishing system

Hydrostatic Testing
Pressurized test performed on fire extinguisher cylinders to check the integrity of the cylinders.

Incipient Fires
Fires that are in the initial or beginning stage and which, typically, can be controlled or extinguished by portable fire extinguishers, or standpipe or small hose systems without the need for protective clothing or breathing apparatus.

Inspection
A visual check of fire protection systems and equipment to ensure that they are in place, charged, and ready for use in the event of fire.

Portable Fire Extinguisher
A hand-held cylindrical pressure vessel containing an agent which can be discharged to extinguish a fire. Portable fire extinguishers have a limited discharge distance and are only suitable against specific types of small incipient stage fires.

Sprinkler System
A system of piping designed in accordance with fire protection engineering standards and installed to control or extinguish fires. The system includes an adequate and reliable water supply, and a network of specially sized interconnected piping and sprinklers. The system also includes control valves and devices for actuating alarms when the system is in operation

6.2 General Provisions

This section details the provisions of this safety policy and procedure. The provisions adopted by NCDOT are: Training Requirements, Fire Hazards, Portable Fire Extinguishers, Fire Suppression Systems, and Fire Alarms and Alarm Systems

6.2.1 General Training Requirements

Employees will be trained on the general principles of fire protection upon initial employment and annually thereafter.

Training will consist of:

- The facility's Emergency Action Plan. Refer to SPP# 1910.38, Emergency Evacuation and Fire Prevention Plans.
- Types of Fire Hazards, recognition and control measures
- Classification and Performance of Portable Fire Extinguishers
- Requirements for the use of Fire Extinguishers
- Fire suppression systems
- Purpose and Typical Operations of Alarm Systems

In NCDOT facilities without portable fire extinguishers, employees will be trained on the facility's "Emergency Action Plan," and will evacuate without attempting to extinguish a fire.

In NCDOT facilities with portable fire extinguishers, employees may be trained on the use of portable fire extinguishers as specified by the Manager or Unit Head. Training is required for any employee authorized to use portable fire extinguishers.

6.2.2 Fire Hazards

Fire hazards include the five classes of fires defined above. Fire classifications are generally based on the types of fuel available. The exception is a Class C fire which is classified based on the ignition source. Once the power to live equipment is shut off a Class C fire becomes a Class A or B fire. Figure 1 depicts pictograms used to identify fire classes on fire extinguishers.

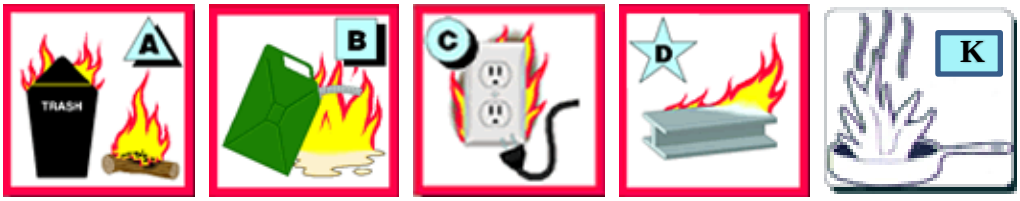

Figure 1 – pictograms used for identifying fire classes on fire extinguishers

Fuel sources: ordinary combustibles, combustible and flammable liquids, and combustible metals should be kept away from heat or ignition sources. Use good housekeeping to minimize the amount of combustible fuels and store them away from heat sources. Also, to prevent fire spread; do not store anything within 20 inches of the ceiling, or within 24 inches if the room doesn't have sprinklers.

Open flames from lighters, matches, welding, or soldering and hot metal filings from drilling or grinding are common ignition sources. Electrical appliances, particularly space heaters, heating pads, coffee makers, & toaster ovens, are common ignition sources in offices. Another common ignition source is the Daisy-Chaining or interconnecting power strips to each other because it can cause overheating of wiring.

To reduce heat loads, make sure electrical appliances do not overload cords and circuits. Never run electrical cords under doors, across hallways or thresholds, or through windows. If a power cord is hot to the touch, remove it from service. Keep electrical appliances in good repair and replace those with damaged or frayed cords or broken parts.

6.2.3 Portable Fire Extinguishers

NCDOT shall provide portable fire extinguishers that are:

- Appropriate for the hazard
- Properly mounted and located
- Inspected, maintained, and tested

Additionally, supervisors or designated employees will be trained in the selection, distribution, inspection, and maintenance of portable fire extinguishers.

Portable fire extinguishers will be selected and distributed based on the type and size of fire hazard. Below is a description of the different types of fire extinguishers.

- Water - pressurized canister with water and wetting agents. For use only on class A fires.
- Dry Chemical (various chemicals) for use on class A, B, or C fires. Note some Dry Chemical fire extinguishers are not effective against class A fires.
- Halogenated Agent halons and halocarbon agents sometimes called “clean agents” because they leave no residue. Decomposition products may be harmful. Effective against class A, B, & C fires
- CO2 (Carbon dioxide) for use on class B or C fires. CO2 is an asphyxiant
- AFFF or FFFP (Aqueous Film-Forming Foam or Film-Forming Fluoroprotein Foam). As the name suggests, these agents form an oxygen barrier on top of the liquid fuel. These are effective only against some Class B fires.
- Dry Powder (sodium chloride, granular graphite, “Met-L-X”) for combustible and reactive metals. Dry powder extinguishing agents are often distributed with a scoop from bulk containers. Dry powder is for use on Class D fires. Dry powder agents are only useful for specific metal fuels.
- Class K for use on oil and grease fires (Special liquid chemicals) which are effective on heated fuels in Class B fires.

Portable fire extinguishers will be mounted conspicuously, located and identified so they are readily accessible.

- Employees will be informed of the location of fire extinguishers. Extinguishers or wall markings indicating extinguisher locations will be visible from a distance of at least 25 feet and from all office travel aisles. Travel distance from any work location to a fire extinguisher may not exceed 75 ft. for class B fire hazards and 50 ft. for class A fire hazards.
- A clear unobstructed path to all fire extinguishers shall be maintained at all times. No materials shall be placed in front of or under any fire extinguisher. No storage of flammable or combustible materials is permitted within 3 ft. of a fire extinguisher.
- Fire extinguishers may not be used for any purpose other than firefighting and must be maintained in their mounted location.
- Portable fire extinguishers shall be visually inspected monthly to ensure they are present, 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, or loss of pressure will be removed from service and replaced.
- 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 for testing or service, a similar extinguisher must replace the out of service extinguisher.
- Annual inspection records will be maintained for review by regulatory agencies and for internal audit purposes. Appendix A presents the portable fire extinguisher hydrostatic testing schedule for NCDOT. In lieu of hydrostatic testing of existing fire extinguishers, new replacement fire extinguishers may be acquired prior to the portable fire extinguisher hydrostatic testing schedule in Appendix A.

6.2.3 Fire Suppression Systems

Water Sprinkler Systems:
Water sprinkler systems are used in areas requiring a higher degree of fire protection than is provided by portable fire extinguishers. Sprinkler heads are heat-activated and discharge water over the fire area. Water extinguishing systems will be inspected annually by an approved outside contractor to ensure their operation is sufficient.

Halogenated and Inerting Agent Systems:
Halogenated agent extinguishing systems are used in areas with equipment sensitive to water damage. CO2 and other inerting agent systems have similar applications. All of these types of systems produce hazardous atmospheres that can be harmful to

employees. Halogenated and inerting agent systems will be inspected annually by an approved outside contractor to ensure their operation is sufficient.

6.2.4 Fire Alarms and Alarms for Sprinkler Systems

Fixed extinguishing systems such as water sprinklers, when activated, will trigger an audible alarm designed to alert employees to evacuate.

Halogenated agent systems may also have a pre-discharge alarm allowing employees to evacuate prior to discharge of the system.

Alarms can be activated by heat or smoke detectors. "Pre-action" sprinkler systems may sound an evacuation alarm before the water is released to the sprinkler heads. NCDOT Facilities in areas where municipal fire departments are available may have a fire alarm system that notifies the fire department. Managers should address fire department notification in the Emergency Action Plan.

Alarms can be activated by heat or smoke detectors. "Pre-action" sprinkler systems may sound an evacuation alarm before the water is released to the sprinkler heads.

6.3 Specific Responsibilities

6.3.1 Managers & Unit Heads

Managers/Unit Heads are responsible for budgeting and ensuring that adequate funds are available for the purchase of portable fire extinguishers for their facilities. For NCDOT facilities with water and/or halon discharge systems, managers/unit heads will ensure service contracts are in place for the annual servicing of all fire protection systems, including fire suppression systems, alarm and alert systems, audible evacuation alarms, and fire department notification systems.

They will also be responsible for identifying the employees affected by this safety policy and procedure. Managers/Unit Heads will obtain and coordinate the required training for the affected employees.

Managers/Unit Heads will audit their fire protection program for compliance with this safety policy and procedure. Managers/Unit Heads should refer to SPP # 1910.38, Emergency Evacuation and Fire Prevention Plans, for related information on fire prevention.

6.3.2 Supervisors

Supervisors will ensure that employees are trained in the general principles of fire protection the function of, and if necessary, the use of various fire protection equipment. Additionally, they shall ensure that there are an adequate number of portable fire extinguishers for each work area. Supervisors should refer to SPP #1910.38, Emergency Evacuation and Fire Prevention Plans, for related information on fire prevention.

Supervisors will ensure that fire extinguishers are recharged or replaced after each use. They will also ensure that damaged or defective fire extinguishers are removed from service and replaced. Supervisors will ensure that monthly and annual testing and maintenance is performed on portable fire extinguishers. Records of inspections and testing shall be maintained by the supervisor.

6.3.2 Employees

Employees are responsible for reporting fire hazards to their supervisors.

Employees are responsible for activating emergency evacuation alarm systems in the event of a fire.

Employees are responsible to use fire extinguishers only if authorized and only according to the level of their training.

6.3.4 Safety & Risk Management

Safety and Risk Management will assist managers/unit heads, supervisors or others as necessary on any matter concerning this safety policy and procedure, including

- developing or securing required training
- selecting proper types, placement, and signage for portable fire extinguishers
- auditing the implementation of the policy and procedure

Safety and Risk Management will assist Purchasing and Central Material Management Unit in the selection of appropriate fire protection equipment.

6.3.4 Central Material Management Unit

Central Material Management Unit will maintain a supply of replacement portable fire extinguishers including those rated for types A, B, and C hazards. Class D extinguishers will be made available only after consultation with Safety and Risk Management.

Appendix A:

NCDOT Portable Fire Extinguisher Hydrostatic Testing Schedule

Types of extinguishers	Test interval (years)
Soda acid (stainless steel shell)	5
Cartridge operated water and/or antifreeze	5
Stored pressure water and/or antifreeze	5
Wetting agent	5
Foam (stainless steel shell)	5
Aqueous Film Forming Foam (AFFF)	5
Loaded stream	5
Dry chemical with stainless steel	5
Carbon Dioxide	5
Dry chemical, stored pressure, with mild steel, brazed brass or aluminum shells	12
Dry chemical, cartridge or cylinder operated; with mild steel shells	12
Halon 1211	12
Halon 1301	12
Dry powder, cartridge or cylinder operated with mild steel shells	12