

# LESSON ONE

# FIREFIGHTER II

## Sprinklers

**DOMAIN:** COGNITIVE

**LEVEL OF LEARNING:** KNOWLEDGE /  
COMPREHENSION

### **MATERIALS**

IFSTA Essentials 5th edition or Jones and Bartlett Fundamentals of Fire Fighter Skills 2<sup>nd</sup> Edition or Delmar Firefighter's Handbook 3<sup>rd</sup> Edition. Overhead projector or laptop computer and multimedia projector; slide projector and screen; extension cord.

### **NFPA 1001 JPR, 2008 edition**

6.5.3 Prepare a pre-incident survey

#### **Junior Member Statement:**

Junior Member training activities should be supervised by qualified instructors to assure that the cognitive and psychomotor skills are completed in a safe and non-evasive manner. While it is critical that instructors be constantly aware of the capabilities of all students both mentally and physically to complete certain tasks safely and successfully, the instructor should take every opportunity to discuss with departmental leaders and students the maturity and job awareness each participant has for the hazards associated with fire and rescue training.

## **TERMINAL OBJECTIVE**

The Firefighter II candidate shall correctly describe in writing the performance reliability of automatic sprinkler systems and identify the reasons for sprinkler system failures.

## **ENABLING OBJECTIVES**

1. The Firefighter II candidate shall correctly describe in writing the performance reliability of automatic sprinkler systems.
2. The Firefighter II candidate shall correctly list in writing the reasons for unsatisfactory performance of sprinkler systems.

# LESSON ONE

## FIREFIGHTER II

### Sprinklers

#### MOTIVATION

It is important that each fire fighter understand the concept of automatic fire protection systems and how this concept affects not only the firefighter, but everyone who lives within the respective jurisdiction. Integral to the concept of automatic fire protection, is the reliability of the system. Automatic sprinkler systems have demonstrated a high degree of reliability, consistently since their initial development over 100 years ago. Sprinkler systems are still the most reliable form of fire protection available. The benefits gained from automatic sprinkler protection are enhanced safety for the firefighters, fewer civilian casualties, less personal and commercial property loss, and less loss of community jobs. In other words, life can resume normally after a fire because a potential disaster has been averted. Automatic sprinkler systems almost always contain and/or extinguish the fire. Firefighters need to be proactive in their community toward the use of automatic sprinkler systems. Firefighters that understand the concept of automatic fire protection systems will work towards keeping these systems on line and operational at all times. They should concentrate on learning how to work with the automatic sprinkler system and not against it.

**NOTE: "Fighting Fires in Sprinklered Buildings" is a handoff program that is available to all delivery agencies. This program can be very helpful to any instructor teaching sprinkler system operation and support.**

#### PRESENTATION

#### ENABLING OBJECTIVE #1

The Firefighter II candidate shall correctly describe in writing the performance reliability of automatic sprinkler systems.

1. Discuss the impact that sprinklers have had on reducing fire losses in some communities. Some examples that can be used are:
  - a) Fresno, California, 15 year survey. In 1964, the city adopted sprinkler requirements and more than 5.7 million square feet of buildings were equipped with sprinklers. In 1984, an in depth study was conducted to determine the impact of this sprinkler program. The results of this study are provided on an overhead transparency.
  - b) Disney World / Epcot Center, Florida 15 year survey. When Disney World and the Epcot Center were developed, sprinklers were installed in all buildings larger than 1,000 sq. ft. The results of this 15 year study are provided on an overhead transparency.
2. Ask how reliable are sprinkler systems?
  - a) Most automatic sprinkler systems are designed with the thought that a fire will be controlled by the operation of only a few heads.
3. Point out that 70-75% of all fires are controlled by 5 or fewer sprinklers; 95 % by 25 or less sprinklers.
4. Discuss performance of sprinkler systems for specific occupancies per the NFPA performance survey.
5. Discuss the superior performance of sprinkler systems in Australia. There was a 99.46% satisfactory performance, based on 9022 fires between December 21, 1886, and December 21, 1986.
6. Ask what makes sprinklers the best form of fire protection available?
  - a) Always ready.
  - b) Prompt action.
  - c) Operates over fire.
  - d) Sends alarm.
7. Point out that the past performance reliability of sprinkler systems should be used to encourage more sprinkler installations and help dispel many of the misconceptions about sprinklers.

Reference:

## **PRESENTATION**

### **ENABLING OBJECTIVE #2**

The Firefighter II candidate shall correctly list in writing the reasons for unsatisfactory performance of sprinkler systems.

1. Generate a discussion with the class to compile a list of reasons for sprinkler failures and list them on a flipchart or chalkboard.
2. After the class has identified a list, perform a comparison against the following list and discuss each point.
  - a) Partially or completely closed main water control.  
(Primary cause of failure)
  - b) Interruption to the municipal water supply.
  - c) Damaged or painted-over sprinklers.
  - d) Frozen or broken pipes.
  - e) Excess debris or sediment.
  - f) Failure of a secondary water supply.
3. Discuss deficiency areas of on site fire protection systems as identified by Cigna Insurance.

#### Reference:

Delmar Handbook 3<sup>rd</sup> edition pages 351  
IFSTA Essentials 5th edition, page 843

## **SUMMARY**

Reiterate that sprinklers are very dependable and it's rare that they fail to perform satisfactorily.

Emphasize that we should become familiar with as many reasons for sprinkler failures as we can. This familiarity should aid in recognizing and preventing future problems, at the local level, associated with failures.

# **LESSON TWO**

## **FIREFIGHTER II**

### **Sprinklers**

**DOMAIN:** COGNITIVE / PSYCHOMOTOR

**LEVEL OF LEARNING:** KNOWLEDGE / APPLICATION

#### **MATERIALS**

Slides, slide projector, and screen; overhead projector or laptop computer and multimedia projector; access to a sprinkler system lab or a sprinkler system simulator; IFSTA Essentials 5th edition or Jones and Bartlett Fundamentals of Fire Fighter Skills 2<sup>nd</sup> Edition or Delmar Firefighter's Handbook 3<sup>rd</sup> Edition.

#### **NFPA 1001 JPR, 2008 edition**

6.5.3 Prepare a pre-incident survey

#### **Junior Member Statement:**

Junior Member training activities should be supervised by qualified instructors to assure that the cognitive and psychomotor skills are completed in a safe and non-evasive manner. While it is critical that instructors be constantly aware of the capabilities of all students both mentally and physically to complete certain tasks safely and successfully, the instructor should take every opportunity to discuss with departmental leaders and students the maturity and job awareness each participant has for the hazards associated with fire and rescue training.

## **TERMINAL OBJECTIVE**

The Firefighter II candidate, when provided with slides or pictures of various types of sprinkler systems and their components, shall correctly identify each type and describe their operation and function.

## **ENABLING OBJECTIVES**

1. The Firefighter II candidate shall correctly identify in writing the sources of water supply for a sprinkler system.
2. The Firefighter II candidate, when given a schematic of a sprinkler system, shall correctly identify all components of the piping system (including underground piping), and describe each of the components function.
3. The Firefighter II candidate shall correctly define and describe in writing the operation and function of various types of sprinkler systems.

# LESSON TWO

## FIREFIGHTER II

### Sprinklers

#### MOTIVATION

Sprinkler systems are, for the most part, simplistically designed. Consisting of nothing more than a series of integrated above and below ground piping, equipped with necessary check and control valves, to get sufficient amounts of water where it is needed during a system activation. However, systems are sometimes equipped with some very sophisticated devices for special applications. Subsequently, it would require an in depth study for one to develop a good understanding of the intricate aspects of all automatic sprinkler systems. While, it is not necessary for a Firefighter II candidate to possess a comprehensive knowledge of all sprinkler system components, It is important that the candidate have a basic knowledge of typical systems and their components.

**NOTE: "Fighting Fires in Sprinklered Buildings" is a handoff program that is available to all delivery agencies. This program can be very helpful to any instructor teaching sprinkler system operation and support.**

#### PRESENTATION

##### ENABLING OBJECTIVE #1

The Firefighter II candidate shall correctly identify in writing the sources of water supplies for a sprinkler system.

1. Discuss the criteria for water supply sources for sprinkler systems.
  - a) Reliability.
  - b) Adequate volume.
  - c) Adequate pressure.
2. Discuss the types of water supply sources.

Reference:

Delmar Handbook 3<sup>rd</sup> edition pages 366-369

J&B Fundamentals 2<sup>nd</sup> edition, pages 956-957

IFSTA Essentials 5th edition, pages 850-851

## **PRESENTATION**

### **ENABLING OBJECTIVE #2**

The Firefighter II candidate, when given a schematic of a sprinkler system, shall correctly identify all components of the piping system (including under-ground piping), and describe each of the component's function.

1. Discuss the piping system and flow path of water through the sprinkler system.
  - a) Yard main.
  - b) Lead-in.
  - c) Riser.
  - d) Feed main.
  - e) Cross main.
  - f) Branch line.
2. Discuss the fact that sprinklers should extend to every area of the building, but in some installations they do not.
3. Examine the type of occupancies where partial protection may sometimes be found. Also, discuss the impact this may have on the integrity of the sprinkler system should a fire start in an unprotected area of the building.

**NOTE: Only the officer in charge may order the main control valve closed.**

4. Discuss the types of valves (control, main, and indicating), their placement, function, intricate parts, and operating techniques as well as fire department procedures to be followed at an incident.
  - a) Check valves.
  - b) OS&Y.
  - c) PIV.
  - d) WPIV.
  - e) PIVA.

- f) Underground / Key valves.
5. Discuss the fire department connection and yard hydrants. Be sure to emphasize that utilizing yard hydrants to supply hose streams may take needed water from the sprinkler system.
  6. Discuss the following points for both fire department connections and yard hydrants.
    - a) The purpose or function.
    - b) Types.
    - c) Typical locations.
    - d) Associated problems.

Reference:

Delmar Handbook 3<sup>rd</sup> edition pages 366-369

J&B Fundamentals 2<sup>nd</sup> edition, pages 954-957

IFSTA Essentials 5th edition, pages 842, 844, 848, 850-851

**NOTE: Factory Mutual's training program, "Fighting Fire In Sprinklered Buildings," offers an excellent set of slides that will aid the Instructor In helping the Firefighter II candidate to attain this enabling objective. The local community college should make these slides available for the Instructor. However, other graphics, slides, and OHTs can be substituted.**

## **PRESENTATION**

### **ENABLING OBJECTIVE #3**

The Firefighter II candidate shall correctly define and describe in writing the operation and function of various types of sprinkler systems.

1. List and briefly discuss the five types of sprinkler systems.
  - a) Wet-pipe.
  - b) Dry-pipe.
  - c) Pre-action.
  - d) Deluge.
  - e) Residential.
2. Discuss the types of occupancies for which each type of sprinkler system is best suited.

3. Discuss the trimmings and working parts of each of the five types of sprinkler systems.

Reference:

Delmar Handbook 3<sup>rd</sup> edition pages 361-366

J&B Fundamentals 2<sup>nd</sup> edition, pages 958-960

IFSTA Essentials 5th edition, pages 852-856

### **APPLICATION**

Provide students with access to a sprinkler system lab or a sprinkler system simulator to demonstrate their ability to identify, open and close a main drain, read and record the pressure on all gauges for both a wet-pipe and dry-pipe system. And if possible, take the class on a tour of a sprinklered facility. This tour should begin where the domestic water supply connects to the yard main and continue around the building, tracing the yard main, allowing students to observe the various water control valves. Continue tour into the building allowing the students to observe the various types of sprinkler systems.

### **SUMMARY**

Review the criteria for water supply to an automatic sprinkler system and the various types of supply sources that may be utilized.

Re-examine the piping system for automatic sprinkler systems and briefly discuss each component's function, be sure to include underground piping.

Review each of the five different types of automatic sprinkler systems and discuss those occupancies for which each is best suited.