

# LESSON ONE

# FIREFIGHTER II

## Ventilation

**DOMAIN:** COGNITIVE

**LEVEL OF LEARNING:** COMPREHENSION /  
APPLICATION

### **MATERIALS**

Overhead projector or laptop computer and multimedia projector; projection screen; VCR/DVD and monitor; 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**

6.3.2 Coordinate an interior attack line team's accomplishment of an assignment in a structure fire

#### **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 identify the manual and automatic venting devices found within structures.

## **ENABLING OBJECTIVE**

1. The Firefighter II candidate shall correctly identify and describe in writing the use of the following types of fixed ventilation devices:
  - a) Curtain boards.
  - b) Roof monitors.
  - c) Continuous gravity vents.
  - d) Unit type vents.
  - e) Automatic heat and smoke vents.
  - f) Saw-tooth roof skylights.
  - g) Exterior wall openings.

# LESSON ONE

# FIREFIGHTER II

## Ventilation

### MOTIVATION

In order to maximize resources and capabilities, firefighters should take advantage of fixed devices to expedite the ventilation process. There is often no need to re-invent the wheel. During the pre-fire analysis, information should be noted concerning the location of ventilation devices that may be used to channel smoke and heat to the outside. After arriving to an actual fire, these systems should be used to save both time and manpower. Since these systems can be opened quickly, the safety margin for those personnel working on the roof is significantly enhanced.

### PRESENTATION

#### ENABLING OBJECTIVE #1

The Firefighter II candidate shall correctly identify and describe in writing the use of the following types of fixed ventilation devices:

- a) Curtain boards.
  - b) Roof monitors.
  - c) Continuous gravity vents.
  - d) Unit type vents.
  - e) Automatic heat and smoke vents.
  - f) Saw-tooth roof skylights.
  - g) Exterior wall openings.
1. Describe the purpose and use of curtain boards during fire conditions.
  2. .Discuss the purpose and use of roof monitors.
  3. Describe the purpose and use of continuous gravity vents.
  4. Describe the purpose and use of unit type vents.

5. Describe the purpose and use of automatic heat and smoke vents.
6. Describe the purpose and use of saw-tooth roof skylights.
7. Discuss the purpose and use of exterior wall openings.

Reference:

IFSTA Essentials 5th edition, pages 560-561

## **APPLICATION**

Prior to delivering this lesson, survey the fire district or talk with the chief and ascertain as many different buildings as possible that contain one or more of the preceding ventilation types. Divide the class into even groups. Assign each group one or more of the buildings and have them identify the type system on or in that building and how it may impact the ventilation operation on that occupancy. Again, using an overlay or a slide, show at least one example of each type ventilation device. Have the students list the correct name and describe the function of each.

## **SUMMARY**

Review the uses for the following types of fixed ventilation systems such as curtain boards, roof monitors, continuous gravity vents, unit type vents, automatic heat and smoke vents, saw-tooth roof skylights, and exterior wall openings.

# LESSON TWO

## FIREFIGHTER II

### Ventilation

**DOMAIN:** COGNITIVE

**LEVEL OF LEARNING:** COMPREHENSION /  
APPLICATION

#### **MATERIALS**

Overhead projector or laptop computer and multimedia projector; projection screen; VCR/DVD and monitor, IFSTA Ventilation 7th edition; 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**

6.3.2 Coordinate an interior attack line team's accomplishment of an assignment in a structure fire

#### **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 identify the location of the opening, the method to be used, and the precautions to be taken when ventilating a basement.

## **ENABLING OBJECTIVES**

1. The Firefighter II shall correctly describe in writing the location of ventilation openings for basement fires.
2. The Firefighter II shall correctly describe in writing the types of ventilation that can be employed in basement fires.
3. The Firefighter II shall correctly describe in writing the precautions to be taken while ventilating basements.

# LESSON TWO

## FIREFIGHTER II

### Ventilation

#### MOTIVATION

Basement fires present one of the greater challenges to firefighters. In order to be successful, timely and proper ventilation is a must. Improper or ill-timed ventilation operations may lead to unnecessary fire extension and physical punishment to the attack crew. Safety is of the utmost concern when working with a basement or below ground fire. Due to the location of the fire and exposed critical structural support members, safety is a great concern. Basement fire operations require precision in all facets of operation in order to maintain the necessary working margin of safety.

#### PRESENTATION

##### ENABLING OBJECTIVE #1

The Firefighter II shall correctly describe in writing the location of ventilation openings for basement fires.

1. Discuss using given openings wherever possible, such as windows and doors.
2. Explain how to use interior stairways, laundry chutes, etc. to channel heat and smoke.
3. Describe the procedure for cutting a ventilation hole in an interior floor near a doorway or window.

Reference:

Delmar Handbook 3<sup>rd</sup> edition, pages 655-656

**J&B Fundamentals 2<sup>nd</sup> edition, pages 411-415,  
434-435**

IFSTA Essentials 5th edition, pages 567

## **PRESENTATION**

### **ENABLING OBJECTIVE #2**

The Firefighter II shall correctly describe in writing the types of ventilation that can be employed in basement fires.

**NOTE: Explain that in the case of a basement fire, cutting a hole in the floor near a ground level door or window should only be done as a last resort.**

1. Explain why vertical ventilation is the most desirable way to ventilate a basement fire.
2. Discuss the use of horizontal ventilation and how it can be effectively used.
3. Explain how positive pressure ventilation can be successfully incorporated in a basement fire.

Reference:

J&B Fundamentals 2<sup>nd</sup> edition, page 434

IFSTA Essentials 5th edition, pages 556, 570, 575-578

## **PRESENTATION**

### **ENABLING OBJECTIVE #3**

The Firefighter II shall correctly describe in writing the precautions to be taken while ventilating basements.

1. Discuss the possibility of weakened floors above the fire area.
2. Point the fact that it is often necessary to access the fire through primary ventilation openings.
3. Describe how fire travel through walls may have extended fire to upper levels, especially in balloon construction.
4. Explain how cutting ventilation holes in upper floors can present a serious safety threat.

Reference:

J&B Fundamentals 2<sup>nd</sup> edition, page 434  
IFSTA Essentials 5th edition, pages 548, 553

## **APPLICATION**

Use drawings or overheads and place several different basement fires before the class. Initiate a tactical discussion. Be sure that you stress the Where, How and Why.

**NOTE: The Firefighter II will be required to actually extinguish a below grade fire as a part of Firefighter II, Fire Control. This should also be used as a measurement of these enabling objectives at the same time as the Fire Control lesson plan is delivered.**

## **SUMMARY**

Review the factors for determining the location of ventilation openings for basement fires.

Restate the types of Ventilation that can be employed.

Summarize the precautions to be taken when ventilating basement fires.

# LESSON THREE

# FIREFIGHTER II

## Ventilation

**DOMAIN:** COGNITIVE / PSYCHOMOTOR

**LEVEL OF LEARNING:** COMPREHENSION /  
APPLICATION

### **MATERIALS**

Overhead projector or laptop computer and multimedia projector; projection screen; VCR/DVD and monitor, IFSTA Ventilation 7th edition; 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**

6.3.2 Coordinate an interior attack line team's accomplishment of an assignment in a structure fire

#### **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 identify in writing fire ground situations where forced ventilation procedures may be required.

## **ENABLING OBJECTIVES**

1. The Firefighter II candidate shall accurately define in writing the term 'forced ventilation.'
2. The Firefighter II candidate shall be able to accurately list in writing the advantages and disadvantages of each type of forced ventilation.
3. The Firefighter II candidate when given a smoke ejector shall correctly demonstrate removing smoke from a structure using both positive and negative pressure methods.
4. The Firefighter II candidate when given a blower shall correctly demonstrate removing smoke from a structure.
5. The Firefighter II candidate when given a charged hose line shall correctly demonstrate removing smoke from a structure.

# **LESSON THREE**

# **FIREFIGHTER II**

## **Ventilation**

### **MOTIVATION**

The ability to perform forced ventilation has been around for some time. It is used on occasions where smoke has contaminated a structure. However, many times it is used improperly and the desired results are not obtained. Technology has brought about improved ways of ventilating structures using positive pressure from high volume, high-pressure gasoline powered blowers. The use of blowers however does not override the need for smoke ejectors. There are situations that will require both the independent use and concerted use of both to accomplish the task at hand. It is imperative that the firefighter develops a basic knowledge in the use of forced ventilation. When it is used correctly it is a godsend, when it is used incorrectly it becomes a nightmare.

### **PRESENTATION**

#### **ENABLING OBJECTIVE #1**

The Firefighter II candidate shall accurately define in writing the term 'forced ventilation.'

1. Define the term 'forced ventilation.'
2. Explain the three methods of forced Ventilation and point out that HVAC systems can be considered forced Ventilation however, extreme caution should be used when attempting to vent an active fire with a building's HVAC system.
  - a) HVAC systems.
  - b) Blowers (PPV fans) and smoke ejectors.
  - c) Fog streams.
3. Explain why forced ventilation is used.

Reference:

Delmar Handbook 3<sup>rd</sup> edition, pages 643-644  
J&B Fundamentals 2<sup>nd</sup> edition, pages 415-419  
IFSTA Essentials 5th edition, pages 573, 579

## **PRESENTATION**

### **ENABLING OBJECTIVE #2**

The Firefighter II candidate shall correctly list in writing two advantages and disadvantages of each type of forced ventilation.

1. Define the term 'negative pressure' ventilation.
2. Explain the advantages and disadvantages of negative pressure ventilation.
3. Define the term 'positive pressure' ventilation.
4. Explain the advantages and disadvantages of positive pressure ventilation.
5. Explain the difference between mechanical ventilation and hydraulic ventilation.
6. Discuss the advantages of mechanical and hydraulic ventilation.

Reference:

Delmar Handbook 3<sup>rd</sup> edition, pages 643-646, 652-655  
J&B Fundamentals 2<sup>nd</sup> edition, pages 415-419  
IFSTA Essentials 5th edition, pages 574-578

## **PRESENTATION**

### **ENABLING OBJECTIVE #3**

The Firefighter II candidate when given a smoke ejector shall correctly demonstrate removing smoke from a structure using both positive and negative pressure methods.

1. Discuss the advantages of smoke ejectors.
2. Point out the disadvantages of smoke ejectors.

3. Explain placement and positioning for desired results from smoke ejectors.

Reference:

Delmar Handbook 3<sup>rd</sup> edition, pages 654-655

J&B Fundamentals 2<sup>nd</sup> edition, pages 415-417

IFSTA Essentials 5th edition, page 574

## **PRESENTATION**

### **ENABLING OBJECTIVE #4**

The Firefighter II candidate when given a blower shall correctly demonstrate removing smoke from a structure.

1. Discuss the advantages of blowers or PPV fans.
2. Discuss the disadvantages of blowers or PPV fans.
3. Explain placement and positioning for desired results from blowers.
4. Discuss exhausting smoke through a predetermined opening to channel fire and smoke.

Reference:

Delmar Handbook 3<sup>rd</sup> edition, pages 653-655

J&B Fundamentals 2<sup>nd</sup> edition, pages 416-418

IFSTA Essentials 5th edition, pages 575-578

## **PRESENTATION**

### **ENABLING OBJECTIVE #5**

The Firefighter II candidate when given a charged hose line shall correctly demonstrate removing smoke from a structure.

1. Discuss the advantages of hydraulic ventilation.
2. Discuss the disadvantages of hydraulic ventilation.
3. Explain placement and positioning for desired results from hydraulic ventilation.

Reference:

Delmar Handbook 3<sup>rd</sup> edition, pages 646-647  
J&B Fundamentals 2<sup>nd</sup> edition, pages 418-419  
IFSTA Essentials 5th edition, page 578

## **APPLICATION**

A suitable building with all windows and doors intact or patched sufficiently to be airtight should be used for practicing hydraulic ventilation. Practicing with smoke ejectors and blowers can be done in any building where permission is granted.

**NOTE: All evolutions requiring smoke should be performed with imitation smoke.**

With the building charged with smoke, have the candidates perform ventilation using:

- a. Smoke ejectors in a negative pressure manner.
- b. Smoke ejectors in a positive pressure manner.
- c. Blowers in a positive pressure manner.
- d. Blowers and smoke ejectors together.
- e. Hydraulic ventilation using a charged hose line.

## **SUMMARY**

Restate the definition of ventilation.

Summarize the advantages and disadvantages of forced ventilation.

Summarize advantages and disadvantages of smoke ejectors, blowers and hose lines.

# **LESSON FOUR**

## **FIREFIGHTER II**

### **Ventilation**

**DOMAIN:** COGNITIVE

**LEVEL OF LEARNING:** COMPREHENSION /  
APPLICATION

#### **MATERIALS**

Overhead projector or laptop computer and multimedia projector; projection screen; IFSTA Ventilation 7th edition; 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**

6.3.2 Coordinate an interior attack line team's accomplishment of an assignment in a structure fire

#### **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 the operations and considerations necessary to control the spread of smoke and fire through duct systems, including determining the location and routing of ducts, shutting down systems to prevent spread of heat and smoke, examining a duct system after thorough Ventilation checking false ceilings or the framing enclosing duct systems, checking duct system outlets, and determining if a duct system has openings, smoke dampers, or smoke detectors.

## **ENABLING OBJECTIVES**

1. The Firefighter II candidate shall accurately describe in writing the components of the HVAC system and its importance to the ventilation operation.
2. The Firefighter II candidate shall correctly demonstrate ways of determining the location, routing and the outlets of ductwork.
3. The Firefighter II candidate shall accurately list in writing the ways of determining if the system has smoke dampers, or detectors.
4. The Firefighter II candidate shall correctly list in writing two reasons for shutting down the HVAC system, and accurately describe how and why the duct system should be checked after ventilation.

# LESSON FOUR

## FIREFIGHTER II

### Ventilation

#### MOTIVATION

When confronted with large buildings under fire and/or smoke conditions, knowledge of the HVAC system is a necessity. When used correctly the HVAC system can reduce the workload of firefighters by assisting in the removal of heat, smoke and toxic gases. However, if used under the wrong circumstances it could lead to fire spread and unnecessary damage. More importantly, improper use could trap firefighters in other remote areas of the building. Great care must be exercised when employing the HVAC system for ventilation operations; safety demands it.

#### PRESENTATION

##### ENABLING OBJECTIVE #1

The Firefighter II candidate shall accurately describe in writing the components of the HVAC system and its importance to the ventilation operation.

1. Define the terms "HVAC" and "duct work."
2. Explain the use of air conditioning or air handling systems in removing smoke from structures.

Reference:

Delmar Handbook 3<sup>rd</sup> edition, page 644  
J&B Fundamentals 2<sup>nd</sup> edition, page 415  
IFSTA Essentials 5th edition, page 579

#### PRESENTATION

##### ENABLING OBJECTIVE #2

The Firefighter II candidate shall correctly demonstrate ways of determining the location, routing and the outlets of ductwork.

1. Describe or show the different types of ductwork that may be encountered. Also explain that HVAC systems may need to be shut down manually during fire situations.
2. Explain the importance of knowing the location, routing and outlet(s) of ductwork.
3. Explain two ways of identifying the location, routing and outlet(s) of the duct system.
4. Point out how duct systems can contribute to the stack effect in high-rise buildings.

Reference:

IFSTA Essentials 5th edition, pages 550-551

**NOTE: In order to effectively deliver this portion and to correctly perform the application step, it shall be necessary for the instructor to contact a local HVAC company or the local Community College (Drafting or Mechanical Drawings section) and obtain a set of drawings depicting the ductwork routing. Sufficient copies should be obtained for four (4) groups.**

## **APPLICATION**

Divide the class into equal groups. Using a set of mechanical drawings, have the groups identify the location and routing of the ductwork.

Additionally, take the class to a smaller and a larger occupancy. Under the premise of a pre-incident analysis, have them identify and chart the routing of the ductwork system.

## **PRESENTATION**

### **ENABLING OBJECTIVE #3**

The Firefighter II candidate shall accurately list in writing the ways of determining if the system has smoke dampers, or detectors.

1. Show or describe a smoke damper and explain its use.

2. Explain the need to verify, as soon as possible, if smoke dampers operated correctly.
3. Show or describe the types of smoke detectors used in duct work and explain its use.
4. Tell students the ways of determining if a building has any of the above systems.

## **APPLICATION**

Get permission to conduct an inspection of a business within the fire district that you know has one or both of the previously mentioned systems. Have students conduct an inspection and chart the location of each.

## **PRESENTATION**

### **ENABLING OBJECTIVE #4**

The Firefighter II candidate shall list two reasons for shutting down the HVAC system and accurately describe how and why the duct system should be checked after ventilation.

1. Restate that heat, smoke and possibly fire can transfer through the duct system.
2. Discuss utilizing interior crews to determine if extension is occurring.
3. Explain how HVAC may introduce fresh air into the fire area.
4. Stress the need to have a maintenance person on site to correctly operate the system.
5. Explain the ways of utilizing inspection ports, filter placements and exhaust ports to determine spot fires.

Reference:

J&B Fundamentals 2<sup>nd</sup> edition, page 415  
IFSTA Essentials 5th edition, page 579

## **APPLICATION**

Using the information gained from onsite inspections, and if possible, mechanical drawings, divide the class into equal groups and have them perform the following:

- a) Identify if the HVAC system could supplement the smoke removal process.
- b) What problems might the HVAC system present to the overall operation in the event of a fire?
- c) Identify where and how the system would be inspected for spot fires.

## **SUMMARY**

Summarize the application of the HVAC system and it's components to the ventilation operation.

Review the possible methods of determining location and routing of ductwork.

Summarize ways of determining if a system has smoke dampers or detectors.

Restate how to properly check the HVAC systems after a fire.

# **LESSON FIVE**

## **FIREFIGHTER II**

### **Ventilation**

**DOMAIN:** COGNITIVE

**LEVEL OF LEARNING:** COMPREHENSION /  
APPLICATION

#### **MATERIALS**

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#### **NFPA 1001 JPR, 2008 EDITION**

6.3.2 Coordinate an interior attack line team's accomplishment of an assignment in a structure fire

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## **TERMINAL OBJECTIVE**

The Firefighter II candidate shall correctly list considerations for determining the location and size of a ventilation opening.

## **ENABLING OBJECTIVES**

1. The Firefighter II candidate shall correctly list in writing two considerations of building construction and conditions of the building that may impact ventilation operations.
2. The Firefighter II candidate shall correctly list in writing the ways that smoke conditions will assist in determining ventilation.
3. The Firefighter II candidate shall accurately describe in writing the need to know the fire location, its progress and the need to provide fire control prior to performing ventilation.
4. The Firefighter II candidate shall correctly list in writing three reasons why consideration for wind direction and exposures should be made prior to ventilation.
5. The Firefighter II candidate shall correctly describe in writing advantages of natural ventilation openings vs. man-made, and large openings vs. small openings.

# **LESSON FIVE**

# **FIREFIGHTER II**

## **Ventilation**

### **MOTIVATION**

In order to make the right decisions on type and method of Ventilation it is important to understand the factors that impact upon the finished opening. When performing size-up on a building under fire conditions, it is incumbent on that officer to note the factors that may adversely affect ventilation and those factors that may assist ventilation. Understanding the impact of the location and method of ventilation on the overall operation is of prime importance. These decisions will directly affect the resulting outcome of the incident.

### **PRESENTATION**

#### **ENABLING OBJECTIVE #1**

The Firefighter II candidate shall correctly list in writing two considerations of building construction and conditions of the building that may impact ventilation operations.

1. Discuss the differences between conventional and lightweight construction.
2. Discuss identifying whether the structure is energy efficient or of typical construction, and point out natural ventilation openings such as scuttle hatches, skylights, and monitors.
3. Explain the need to determine whether the building has been structurally damaged prior to beginning ventilation.
4. Illustrate the aspects of the decision-making process for Ventilation do ventilation openings already exist or do we need to create an opening?

Reference:  
Delmar Handbook 3<sup>rd</sup> edition, pages 665-671

J&B Fundamentals 2<sup>nd</sup> edition, pages 422-425  
IFSTA Essentials 5th edition, pages 547-548

## **PRESENTATION**

### **ENABLING OBJECTIVE #2**

The Firefighter II candidate shall correctly list in writing the ways that smoke conditions will assist in determining ventilation.

1. Discuss mushrooming.
2. Discuss the difference between smoke quality, quantity and speed in an incipient fire and a working fire.
3. Discuss where and how smoke is escaping in relation to the building.
4. Describe how a prevailing wind may mislead a decision on fire location.
5. Discuss the color and odor of smoke.

Reference:

J&B Fundamentals 2<sup>nd</sup> edition, pages 142-146, 403-407  
IFSTA Essentials 5th edition, pages 544, 548-549

## **PRESENTATION**

### **ENABLING OBJECTIVE #3**

The Firefighter II candidate shall accurately describe in writing the need to know the fire location, its progress and the need to provide fire control prior to performing ventilation.

1. Discuss the necessity to make an accurate and timely size-up.
2. Discuss determining how long the fire has been burning and if the fire can be localized.
3. Go over the concepts of fire behavior and how fire burns and travels. Emphasize the chimney effect to localize the fire.

4. Discuss the need to have a charged hose line in place before opening the building.
5. Explain how to use interior crews, checking inspection holes and feeling out the building to assess fire spread.
6. Discuss using pre-fire plans to support decisions and the need to continually size-up the incident.

Reference:

J&B Fundamentals 2<sup>nd</sup> edition, pages 128-140, 282, 403-407  
IFSTA Essentials 5th edition, pages 543, 548, 556

## **PRESENTATION**

### **ENABLING OBJECTIVE #4**

The Firefighter II candidate shall correctly list in writing three reasons why consideration for wind direction and exposures should be made prior to ventilation.

1. Define the terms "Windward" and "Leeward."
2. Give examples of what are considered to be exposures.
3. Give examples of how ventilation openings could negatively affect exposures.
4. Discuss and give examples of how wind conditions and/or ventilation openings could positively impact an incident.
5. Discuss the effect of wind on vertical ventilation openings.
6. Discuss the effect of wind on horizontal ventilation openings.

Reference:

J&B Fundamentals 2<sup>nd</sup> edition, page 407  
IFSTA Essentials 5th edition, pages 570-571

## **PRESENTATION**

## **ENABLING OBJECTIVE #5**

The Firefighter II candidate shall correctly describe in writing advantages of natural ventilation openings vs. man-made; and large openings vs. small openings.

1. Discuss the different types of natural roof openings.
2. Discuss time and energy on natural openings vs. having to cut a hole.
3. Give examples of determining which roof vents to open.
4. Stress that opening the wrong vents may spread the fire.
5. Discuss size of ventilation hole and point out the fact that doubling the size of the ventilation opening will allow four times the flow of smoke and heated gases.
6. Discuss reading the ventilation and determining additional needs.
7. Explain types of cuts and reasons for them.

Reference:

Delmar Handbook 3<sup>rd</sup> edition, pages 668-673

J&B Fundamentals 2<sup>nd</sup> edition, pages 424-433

IFSTA Essentials 5th edition, page 560

**NOTE: Inform the students before cutting an opening in a roof, they should first check for existing openings.**

## **APPLICATION**

Divide class into equal groups. Utilizing the building overlays or elevation drawings from Firefighter 1, have your groups make reports of scenarios that you have given them. Each group should be given at least the following particulars about their fire:

1. Time of day.
2. Type of construction.
3. Type of occupancy.
4. Natural openings.
5. Location of fire.

6. Wind direction and temperature.
7. Exposures.

A complete report should be given by a spokesperson and this report should include reasons for ventilating, the type that was chosen, the location chosen, expected fire reaction and impact on the overall operation. Solicit comments from other groups.

## **SUMMARY**

Review the use of natural openings for ventilation.

Re-emphasize the importance of determining the location of the fire.

Review the considerations as to the direction the fire will be drawn after ventilating the structure.

Restate the significance of the type of building construction when determining ventilation procedures.

Review the importance of wind direction when establishing Ventilation especially in relation to potential exposures.

Re-emphasize the importance of ascertaining the true progress of the fire.

Review those considerations concerning the condition of the building.

Reiterate the problems posed by potential obstructions to ventilation.

Summarize the aspects of the relative efficiency of a large ventilation opening as opposed to a small opening.