TOPIC: Ventilation - Vertical

TIME FRAME: 1 Hour

LEVEL OF INSTRUCTION: Level II

BEHAVIORAL OBJECTIVE:

Condition: A written quiz

Behavior: The student will list and describe the principles and procedures for vertical ventilation.

Standard: With a minimum of 70% accuracy

MATERIALS NEEDED:

- Appropriate visual aids
- Audio visual equipment

REFERENCES:

- IFSTA, Essentials of Fire Fighting, 4th Edition, Chapter 10
- IFSTA, Fire Ventilation Practices, 6th Edition, Chapter 4

PREPARATION: Vertical ventilation takes advantage of the convective action of smoke and super heated gases to remove them from the fire building and introduce cool air. If done properly this operation can assist in accomplishing every other fire fighting operation. If done improperly the results can cause severe danger to both life and property.

PRESENTATION	APPLICATION

I. VERTICAL VENTILATION

A. A Process Whereby a Channel is Created from the Seat of the Fire Through the Ceiling and Roof and Out to the Exterior of the Building

B. Takes Advantage of the Convective Column to Move the Byproducts of the Combustion Process (Smoke, Heat, Toxic Gases and Vapors) Out of the Structure and Cooler Air in

C. The Object Is to Locate or Create Holes in the Ceiling and Roof Directly Above the Seat of the Fire if Safe to do so

D. Use Existing Roof Openings if Appropriate

1. Remove skylights
2. Open hatches
3. Open penthouse or stairwell door
4. Remove sides of evaporative coolers
5. Check for automatic heat and smoke vents

E. Procedure for Opening Roofs

1. Wear full structural protective clothing and S.C.B.A.
2. Operate in teams of two
3. Have communications with I.C. and interior attack teams
4. Take a charged 1 1/2" or larger hose line to the roof
5. Ladder the building

a. Corners generally strongest point

PRESENTATION	APPLICATION

b. Minimum of two ladders on diagonal corners as escape routes

c. At least three rungs above roof to maximize ladder visibility

d. Clear of any overhead obstructions especially power lines

6. Visually check roof before stepping onto it for signs of structural weakness

a. Roof material sagging with joists showing as ridges

b. Discoloration of roof material

c. Bubbling, curling or warping of roof surfaces

d. Pronounced roof sagging

7. When proceeding to ventilation site on roof

a. Step carefully off ladder onto roof

b. Extend roof ladder

(1) Distribute weight on flat roof

(2) Provide secure footing on pitched roof

c. Sound roof to locate roof support system and walk on the support members

(1) Rubbish hook

(2) Pike pole

(3) Fireman's axe

PRESENTATION	APPLICATION

d. On large flat roofs make ventilation inspection cuts to help monitor fire extension below

8. Roof opening should be at least 10% the size of the area to be ventilated or 4' x 4' whichever is greater

   a. Make highest roof openings first

   b. Work from weakest point of each cut back toward ladder or strongest point

   c. Don't make cut so large that you can't pull it

   d. Opening must be on downwind or leeward side of building

   e. Do not make cut near heavy roof mounted machinery

   f. If smoke and gases continue to vent from building under pressure for a period after opening it indicates the opening is too small

   g. Large opening better than series of small openings

9. Making roof cut

   a. Mark cut on roof

   b. Remove roof covering

   c. Cut adjacent to supports

      (1) Maximize size of opening

      (2) Eliminates tool bounce

   d. Do not cut any roof supports

PRESENTATION	APPLICATION

e. Pull cut material

f. Punch hole in ceiling

(1) Size equal to roof opening

(2) Use blunt object

F. Vertical Ventilation Safety Precautions

1. Always wear full structural protective clothing and SCBA

2. Coordinate carefully with I.C. and interior attack crews

3. Team must have at least 2 members

4. Keep excess personnel off roof

5. Have two escape routes

6. Take charged 1 1/2" hoseline aloft for protection

7. Do not attack fire through vent opening

8. Walk on strongest part of the roof usually the edges and the ridge

9. Sound roof on every trip

10. Work with wind to your back

11. Remove ventilation team as soon as task is completed

12. Continuously monitor structural integrity of the roof.

13. Tie personnel off if roof is

a. Steep

PRESENTATION	APPLICATION
b. Slick	
c. Deteriorated	
14. Fire may intensify dramatically as opening is completed and personnel on roof are in as much jeopardy as interior attack teams	
15. Beware of all overhead obstructions	
16. If using power tools	
a. Start and warm up on the ground	
b. Do not carry tool while it is running	
c. Cut away from body if possible	
17. Rooftop ventilation operations should not be undertaken in following circumstances:	
a. Inadequate resources	
b. Fire has already vented through roof	
c. Building fully involved	
d. Structural integrity of roof/building is questionable	
e. Small residential fire	
G. Types of roof openings	Information sheet #1, 2, 3
1. Pull back	
2. Louvre	
3. Trench or strip	
4. Drop through	

SUMMARY:

In many cases vertical ventilation must be completed before fire fighting crews can attack the fire. If ventilation is to be successful, the proper procedures and safety precautions must be adhered to. Always have a charged line ready, use SCBA's, work in teams, know the signs of structural weakness and maintain constant communication with the officer in charge.

EVALUATION:

A written quiz.

ASSIGNMENT:

To be determined by instructor(s).