

HORIZONTAL VS VERTICAL VENTILATION

- Two considerations:
 1. **Vent for life**
Used to assist in the immediate rescue of victims. Removes heat and smoke as well as provides fresh air for breathing and improved visibility.
Cut over stairways and hallways.
 2. **Vent for fire**
Allows attack teams to enter and operate within a structure
- Both techniques can be accomplished by either horizontal or vertical ventilation
- You also have the options of mechanical or natural openings

Advantages of vertical ventilation

- Releases heat and smoke
- Minimizes the chance of flash over
- Minimizes the chance of back draft
- Helps firefighters locate victims
- Helps firefighters locate the seat of the fire
- Assists in self rescue for the occupants

If it is unsafe to put firefighters on the roof, it's unsafe to for firefighters to enter the structure. Keep in mind that lightweight roofs fail in as little as 8 – 10 minutes. Think defensive cuts on lightweight roofs.

- Factors which can influence choice of ventilation
 1. Size of the fire
 2. Location of the fire
 3. Construction of the building
 4. Effects of weather (wind, humidity, convection currents)

Three (3) basic types of openings

1. Natural openings
2. Heat openings (*offensive*)
3. Directional openings (*defensive*)

Two Distinct types of ventilation techniques:

Natural ventilation takes advantage of convection currents and wind. This is accomplished by opening doors, windows, and skylights

It is limited in its effectiveness by

- Proximity of the ventilation opening
- Number and size of the openings
- Direction of the wind
- Humidity

Mechanical ventilation can dramatically assist natural ventilation by utilizing blowers, hose lines, and ventilation systems

Exit through pre-selected or controlled openings
Overcome effects of humidity
Reduce time necessary to ventilate
Allow the use of ventilation openings remote from the contaminants to be removed

- Positive pressure ventilation can be useful tool in mechanical ventilation
- Removing screens off windows can increase efficiency by 50%
- Ventilators move 30% more air when left in place

Horizontal ventilation advantages

Quick to implement
Can be effective on a single family dwelling up to 1600 sq. ft
Can be effective in winds up to 25 mph
Can be effective in line for up to 1000 ft
Can be effective up to 25 floors in a high rise
Can take advantage of existing openings (doors, windows)
Tilt blower 20 to 30 degrees to enhance the ability to place a cone of air over the opening
Utilize blowers in line (larger in front)
Utilize blowers side by side

- Horizontal ventilation disadvantages
 - Need exhaust opening (3/4 to 1&3/4 the size of the opening)
 - Need hose lines in place for possible extension
 - Concerned with providing the fire with O₂
 - May need multiple fans inline or parallel depending on size of occupancy and openings
 - Need to check the attic space for extension***
- Decision to use Positive Pressure Ventilation should be based on the following factors
 1. Life hazard
 2. Location and extent of the fire
 3. The availability of hose lines
 4. The degree of confinement
 5. Environmental factors in the vicinity of the fan
 6. Available equipment

Vertical Ventilation

1. Needs to be a coordinated effort with fire attack crews
2. Hose lines in place
3. Correct number of personnel on the roof (min 2 for single family, 3 for commercial)
4. Need necessary tools and equipment
5. Two escape routes (ladders)
6. Identify roof construction (45 degree inspection cut)
7. Identify differences between light weight and conventional

Do not cut over lightweight construction

Cut as near to over the fire as possible

8. Read the roof
 - Fire walls, ventilators, skylights, vent pipes, sagging, bubbling
9. plan your cuts according to roof construction
 - Panelized, conventional, etc

The size of the ventilation opening should be governed by

1. Type (offensive vs. defensive)
2. Ease of removal
3. Location

Offensive vs. Defensive Vertical Ventilation

1. Heat hole
2. Strip Cut