

# FIREHOUSE®

## Weekly Drill

### DRILL #72: VENTILATION PART 2

#### Introduction

In Ventilation Part 1, we discussed horizontal and vertical ventilation, but little was said about the movement of the smoke and heat other than that it left the structure naturally...hence the term “natural ventilation.” Natural ventilation works on the heat energy within the structure. As we know, heat rises until it reaches an object such as the ceiling or the underside of the attic roof. In addition to this, heat pressure is also building. Once a ventilation opening is created, this pressure, along with the air being brought in at the lower level, moves the heat and gases out of the structure. Depending on wind conditions at the time – which will assist the movement – fresh air will blow in open windows, pushing the heat and smoke ahead of it out the ventilation opening.

#### Negative-Pressure Ventilation

In this lesson, we are going to look at some additional means for assisting the movement of air currents when natural means are not sufficient. One such method is mechanical ventilation. The use of smoke ejector fans is one form of mechanical ventilation. The most common use of fans is that of exhausting smoke and heat to the outside by placing them in windows. Generally, this is not as efficient as it sounds, as fans never fit the opening correctly. When used, they should be placed in the windows on the leeward side of the structure, this allows fresh air to come in through open windows on the opposite side of the structure.

Another form of mechanical ventilation is the use of the fog nozzle out a window or some other opening. This is sometimes called hydraulic ventilation. In using the fog nozzle, it is important that the fog pattern encompass as much of the opening as possible; making sure it is exiting the opening. If performed improperly, and the fog cone does not exit the opening, ventilation will not occur. However, when performed correctly, this method will remove more smoke than a smoke fan. A 30-35% angle on the fog pattern works best. All of these forms of ventilation are also known as negative pressure ventilation.

#### Positive-Pressure Ventilation

Another form of ventilation using fans is that of positive-pressure ventilation (PPV). But using this form



of ventilation has some precautions we need to be aware of, one being any fire that may be smoldering can flare up into a serious situation. Therefore, when using PPV, have a charged hose line in place.

In any event, when PPV is used, it needs to be very closely supervised. The fan is set up outside the structure some 8 to 10 feet from the door being used, permitting the air flow to cover the opening and charge the structure with positive pressure. Then, to be effective, the proper opening and closing of doors and windows is essential; this needs to be managed very closely.

The process is to set the fan in position, charging the structure with fresh air. The movement of this air is then controlled by firefighters. Start out by closing doors, except for the room you wish to ventilate. The windows in this room then should be opened, allowing contaminated air to be pushed out the window opening and replaced by fresh air. Once this room is clear of smoke, shut the door and move on to the next room. Repeat the process until all rooms have been ventilated.

Keep in mind that any fire in void spaces can feed off this fresh air and advance the fire considerably.

–Prepared by Russell Merrick