The Search for a Better Way

Shortly after the extremely dangerous fire in the dress shop, I began to realize there must be a better way to deal with the myriad of dangers that plagued us as we made our trademark danger-be-damned swashbuckling interior fire attacks. Death lurked in that terrible smoky blackness as the flames raged unchecked deep in the interior ahead of us. I was aware of many stories of firemen who got lost in the blackness and were unable to escape as the fire overtook them. They died searching for a way out. Mercifully, some of them ran out of air, and lost consciousness as they perished from the silent killer, smoke asphyxiation. Most were not so lucky and burned to death as the fire consumed them while they lay huddled in the bunker gear that could not protect them from direct flame exposure.

Indeed, it was the zero visibility and the super-heated toxic air that formed the basis of our interior fire attack woes. It became apparent to me that the obvious solution to the problem was to devise a way to remove the smoke and other products of combustion from a fire area faster than they were being produced by the fire itself.

Certainly, I was not the first firefighter to realize this. That concept is at the very heart of the age-old practice of fireground ventilation. As we know, the trade definition of ventilation is "*the systematic removal of fire, heat, and smoke from an area or building."*

For the purposes of discussion, let's take a look at ventilation in its traditional form. Basic physics tells us that heat causes an increase in the atmospheric pressure of the vessel that heat is contained in. In the firefighter's world, a common vessel that can produce and contain heat is a building interior that is actively burning. Sometimes, it may be just one or two rooms in said building that are burning and creating that elevated pressure.

We can easily release that pressure by opening windows or doors in the fire-heated area and allowing the science of physics to do its magic. A commonly known principle of physics that applies here states that a gas in a vessel under a higher pressure than the air outside the vessel will tend to move to an area of lower pressure if given the opportunity to do so. Air, like any other fluid, must follow the laws of nature. As firefighters, we can put those natural laws to work for us.

Thus, opening a window in a bedroom that is on fire and pressurized (due to the expansion of heated air produced by the fire) will cause the heat and smoke to "*vent*" out the window. In doing so, the room becomes much cooler and safer.

We also know that hot air rises. That is because warm air is less dense than cool air. The basic force of gravity causes the cooler heavier air to settle while displacing the air at the lowest levels of a vessel. The displaced air rises to make room for the heavier cooler air. So it becomes

obvious that if we cut a hole in the ceiling of a room that has been on fire or is still actively burning, the hot air will naturally rise and travel out of the hole. It can do that simply from the difference in weight between cool air and warm air. As it rises and vents itself through the hole in the ceiling, more cool clean air rushes in from adjacent areas to take the place of the hot air that escaped. That is the very principle that causes smoke from your fireplace at home to rise up the chimney and go away.

And, so it is, that a very common way to traditionally vent a house on fire is to remove windows and cut holes in the roof. "*Traditional ventilation*" has been the firefighting norm for centuries. For any living creature inside a burning structure, the heat and the poisonous gases produced by the fire can and will kill them in very short order. To compound the issue, smoke can be very dense and black. It can build up very quickly to the point that visibility is cut to zero. The blackness inside a non-ventilated house fire can be completely impenetrable by light rays. In the most severe of circumstances, even a flashlight is virtually useless.

Understanding quite well the advantages of making interior attacks AFTER a fire has been ventilated, I became a student of the process called, *Fireground Ventilation.* Cadets in recruit academy study fireground ventilation as one of its core subjects.

Six years after the dangerous fire in the dress shop, I stumbled upon a well-kept secret method of a new way to ventilate. That was a major turning point in my career, both as a professional firefighter and a professional fire instructor.

Soon my ugly mug and my Texas voice would be seen and heard in training rooms all over the world as I introduced a revolutionary way of forcing fresh air into a building on fire.

That process is called Positive Pressure Ventilation.