

## The Truck Company Why We Do What We Do Jeff Ponds

Vertical Ventilation is an extremely effective, totally under-utilized and widely misunderstood fireground strategy. This article will be the first in a series of articles discussing some of the benefits, myths, and tactics behind vertical ventilation. Hopefully, by now you have viewed some of the videos found on <u>www.VentEnterSearch.com</u> that highlight some extremely effective uses of vertical ventilation. Two worth re-visiting are the ones titled "Amazing Video" from Tacoma Washington, and "Whatever it Takes" from Houston, Texas. This article uses some photos that also highlight the effectiveness of this valuable tactic. Vertical ventilation is not the cure all for every fire, and should not be used on all fires. Just like any other tactic, it should be a consideration for all command staff, company officers, and truck company members. All Pictures used with permission from Houston Fire Department Firehouse 68 website: <u>www.firehouse68.com</u>



This roof structure is a common lightweight engineered truss system with multiple peaks and valleys. In this type of construction, the 2nd story is commonly constructed of ordinary platform (stick) built construction techniques. Utilizing the windows as an indicator, the sill and inset typically indicate that the first floor is some sort of masonry construction. However, further observations (age of structure and lack of a bonding course every seventh row) may indicate a brick veneer finish covering the more common wood frame structure. Continuing our observations, the second floor likely includes bedrooms and at least one bathroom. This is apparent by the smaller, obscured indicator window located towards the front of the structure.



The vent crew makes the roof equipped with necessary equipment to perform the vertical vent. Extreme pitches indicate the need for a roof ladder to maintain safe and stable footing. Smoke conditions are beginning to develop in the attic space as is evidenced by the condition in the eaves. One common method of smoke, heat, and fire spreading is via AC closets that may be open into the attic space.

In balloon construction fire spreads rapidly to the attic via walls with no fire stops installed, a common trait in older construction techniques.

Judging by the first floor conditions, this fire is more than likely a second floor fire. Remember fire, smoke, and heat travel up and seek the path of least resistance.



The fire is obviously progressing as indicated by the heavier smoke that is developing on the second floor and the increased concentration of smoke showing from the eaves.



The thicker heavier smoke, and increased heat conditions are a sign of the progression of the fire. As the fire progresses and generates more heat and smoke, the "confined" fire causes a tremendous smoke pressure build up. If the building remains sealed, it can potentially smother the incipient stage fire, developing extreme heat, therefore creating a potential backdraft situation. When the smothered incipient fire finds a much needed air supply it will rapidly intensify and destroy everything in its path. The ceiling is stopping the natural upward movement of the products of combustion causing a continuation of the horizontal spread.

Let's evaluate another situation in comparison, a garden apartment. As a typical room and contents fire vents from the window, the upward movement of heat and smoke travels into the soffits and eaves from the outside. At this point the fire will continue to race upward until it meets resistance in the form of roof decking. Now the fire travels horizontally throughout the attic space until it finds the next path of least resistance in order to continue its upward movement (Vent hole or burn through.) If the fire reaches the end of the space or a firewall, it will relentlessly eat away at the building and all it contents. How many fires have you seen with the roof burned off yet it looks as if nothing has changed on the inside? You could possibly re-inhabit the untouched apartments, minus the roof of course.



The higher heat levels and denser smoke have begun to push smoke levels down to floor despite the horizontal ventilation efforts. To put this into perspective, consider how low the smoke can get during a car fire in a parking garage that is wide open on the sides. With these conditions, the search would be slow, risky and ineffective. The conditions quickly turn to near zero visibility and high heat conditions. The potential of flashover in the immediate fire area is becoming a risk.

It is interesting to note that no ladder has been thrown for VES or secondary means of egress. If horizontal ventilation has taken place it would indicate the possibility of venting by the interior search teams. Communication and timing are essential during any ventilation operation, particularly with the horizontal vent. If the horizontal vent is not timed properly, or if placed in the wrong location, it could potentially feed the fire with the much needed air and which can lead to vent point ignition, rapid uncontrolled fire spread, flashovers, ect. These conditions could trap both firefighters and occupants, leaving them only minutes to survive.

Take a moment to consider this: A typical residential window height is 32-36 inches at the bottom sill (44 inches max). The average bed height is roughly the same. At 3:00 A.M. When that bed is occupied, is the horizontal vent getting the smoke levels high enough to sustain or prolong the lives of those in bed?

# Before looking at the next picture take one last look at the preceding photos and ask yourself these few questions.

#### As A Fireman:

Which room would you rather be in?

Which room could you more effectively search?

Which room could you search quicker?

Which room are you less likely to be confronted with a flashover, smoke explosion or backdraft potential?

Which room are victims more likely to survive?

Which conditions simplify the locating, confining, and extinguishment of the fire?

Knowing the dangers faced with high heat conditions and zero visibility and with aggressive interior operations underway, which condition would you rather have your brothers under us working in? (Pictures before or after Venting has been established)

### As a family member, or friend:

Which room would you rather have your loved ones in?



After the vertical ventilation has been established, the heavy heat and smoke conditions now take advantage of the natural heat flow and exit through the giant chimney we just created. Have you ever seen a chimney with a 90 degree bend in it? Notice the smoke conditions in the same bedroom, the eaves, and the bathroom. Our experience tells us this operation can take from 2 to 3 minutes after arrival. In approximately 2 to 3 minutes, here is a just a few of the benefits we have accomplished which have led to an overall safer fire ground:

- 1. We have now increased the potential of victim survival by increasing good breathing air and allowing the heat and by products of combustion to release through the vent opening.
- 2. We have decreased the likelihood of a flashover once again by releasing the superheated gases previously building up within the structure.
- 3. We have reduced the potential for a backdraft. Since rookie school, we have been taught to eliminate the backdraft phenomenon by venting at the highest point of the structure to release these superheated gases.
- 4. We have increased the visibility for our members. This in-turn increases the speed in which we find the fire, and more importantly, our victims. We have also reduced the risk of our troops becoming lost and disoriented in zero visibility conditions
- 5. We have decreased the time it takes to begin our suppression efforts. We have now controlled the advancement and spread of fire giving crews more time to suppress as well as decrease further damage.

#### I know where I want my loved ones to be. Do you?



The roof team did a good job securing the saw on pitched roof. However, the middle of your path of egress is not the best option. All of our tools need to be secured so nothing falls on our members operating below, or becoming a trip hazard for our roof team. Roof hooks can be secured on the ladder, on the peak of the roof, or in the inspection cuts previously made. Another option would be to use the pick end of the halligan tool, buried into the decking with the saw hanging from the adz. It is a good idea to secure saws and equipment on the uncut side of the operation, out of the way, but within reach. Most fire department tools, including forcible entry tools, have many non-traditional uses. **Remember to think outside of the box!** 





Are these second floor conditions worth the 2 to 3 minutes of time it takes to accomplish? Given the conditions now on the second floor isn't this a safer environment for all of the victims as well as firemen who have entered to mount an aggressive interior attack?



During roof operations it is essential that we operate with a back-up man, especially during trench or strip operations. The importance of a back-up man cannot be overstated. The back-up man is responsible to watch the "big picture" including: the edge, the footing of the saw operator, and the roof and fire conditions during the cut. If inspection cuts were made, the back-up man must monitor them to verify the travel of fire and assure the safety of the roof team. This position cannot be under estimated in its importance or nor should it be taken lightly.



After the decking cut has been made, we must complete the vent by punching the ceilings utilizing the appropriate size hook (8 ft. +). If we fail to do so, we have not accomplished what we have set out to do, venting the fire and making the atmosphere below more tenable. Be prepared for the smoke column to light off, especially if we are operating right over the fire area. Taking a knee when punching the ceiling gives us the opportunity to react to the fire while maintaining our balance, and decreasing the risk of a fall.







The smoke now begins to transition to fire. **Remember, this is a good thing!** 



Like we mentioned, the vent lighting off is a good thing. It's nothing to get freaked out about. The horizontal fire progression has been slowed due to vertical travel out of the structure. The fire now finds the path of least resistance (up and out) and a significant decrease in the potential of horizontal fire spread has been made. At this point, cooler air begins to raise the smoke level in the occupied area, and the superheated gases that are now able to escape. The best part is now we know where the fire is and we no longer have to search and find it! In addition, we have provided a tremendous relief for the interior occupants and crews. With the attack team in place, a quick knock down is inevitable, a truly coordinated effort.



The vent crew now exits off of the structure. Get the vent and Get off!!!



Don't forget all of your equipment.



The way to a safer fire service is through basic and effective strategic decisions and tactical operations. Releasing dangerous by-products of combustion helps eliminate zero visibility atmospheres, backdraft, and flashover conditions, therefore making it safer for our brothers inside. Standing in the front yard, lobbing water in a window (or even worse flowing on a roof which is designed to repel water) from aerials after we burn a hole in the roof it is not the answer to make our job safer. By implementing sound basic strategies, along with effective and aggressive tactics, we control the destructiveness, location, and travel of fire. Being a fireman is without a doubt a very risky profession. There are times in everyone's career that they must face times of peril. It is how we act during these times, and how we train to prepare for these situations that set us apart from the rest. We can make this profession more dangerous by simply neglecting any attempt to make the fire ground a safer place. Gentlemen, this is **firefighting** and this is **why we** do, what we do. Let us not forget we are in the business of saving lives, property as well as controlling the fire and the building. We are not here to chase or play catch up making an already dangerous situation worse. We risk a lot to save a lot. Each and every member inside mounting an aggressive interior fire attack and every occupant and citizen is worth that risk. Remember Vent Early, Vent Often. Lives depend on it.

We leave you with one final thought... If it is not safe to be on, how is it safe to be under?