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## **VENT-ENTER-SEARCH (VES)**

### **Three Words That Can Save Lives**

In 2002 there were 3,380 civilian fire deaths, averaging a death every 156 minutes in the United States. There were also 18,425 civilian fire injuries, however this estimate is considered to be low because of under reporting. Almost 80% of the deaths and injuries occur in residential structures. If we change our search technique at residential structure fires, would we be able to save more lives? The answer is yes, and the technique is called Vent-Enter-Search. Lieutenant Bob Pressler, Rescue Company 3 FDNY (ret) states, "After observing countless fire departments, I have concluded that responding fire departments can reduce the number of civilian casualties. Because of being understaffed, and in some cases, under-trained, most departments do not perform aggressive searches."

Most everyone in the fire service is familiar with the term Vent-Enter-Search (VES) whether they practice it or not. For those not familiar with the term, VES is when firefighters either create openings, or break windows to gain access from an exterior position to carry out a primary search in a high-risk area of a structure. VES is performed without the protection of a hose line and is usually performed away from the initial area of fire attack. It is a strategy that is hazardous, but in turn, may reap great rewards for the search team. VES is a "high anxiety" move, even for departments where it is a normal procedure. However, VES is a tactic that is widely becoming performed by many fire departments, and is the source of numerous classes every year at the Fire Department Instructor's Conference (FDIC). Many leaders in the fire service today advocate VES tactics. Battalion Commander Harry R. Carter, PhD of the Newark (NJ) Fire Department (ret) stated, "I always tried to use the vent, enter, and search tactics...." Lieutenant Pressler states, "VES is a tremendous way to put firefighters where the victim may be - especially at night."

This article will quote several references from the FDNY. The reason for that is the concept of VES was developed in the FDNY and has been successfully practiced numerous times there in the last fifteen years. It is a method that has literally been proven under fire. To understand the concept behind VES, it is important to again review the basics of ventilation. Venting actions should be based on the following three objectives:

- 1) Vent for Life
- 2) Vent for the Fire
- 3) Vent for Safety

The concept behind VES is simply meeting the primary objective for venting, which is to vent to rescue victims or make conditions more tenable for victims. Preservation of life is the main objective on the fireground. All other operations are designed to enable us to reach this objective. VES is not necessary at every fire, however it should be standard practice at a majority of fires to which we respond. VES should be used primarily at residential fires, both single story and multiple story dwellings. It should also be used at high-rise fires when there are multiple locations that need to be quickly searched for victims.

To begin to understand the concept of VES one must look at how they currently operate at residential fires. Most departments have the first due Truck Company perform vertical ventilation. As a truck company officer or incident commander you must evaluate how effective vertical ventilation has been at recent residential fires. Ask yourself these questions about the last ten fires to which you have responded:

1. Who requested ventilation? Was it an interior crew who needed immediate relief from heat? Was it the incident commander?
2. When you made the ventilation hole what came out? Was it fire or smoke that was “pushing” out under pressure or was it steam?
3. Did vertical ventilation prevent a potential for flashover or backdraft?

Here at the Charlotte Fire Department when the truck company arrives on scene, the captain and one firefighter begin an interior search, while the engineer and the second firefighter go to the roof to ventilate. As the captain on the interior, how many times in the last ten fires did vertical ventilation make a noticeable difference during your search? Odds are the answer is probably one time, or none at all.

Often times at fires the incident commander is going through a” mental checklist” and will request ventilation. Incident commanders must operate in methodical order at fires in order to ensure safety and timely completion of operations. We have operated traditionally with the first-due truck company going to the roof and opening up, although many times it was not critical to the success of the operation. As an incident commander ask yourself this, “Was this ventilation critical to the success of the operations or was it part of my mental checklist?” If it was not critical to the success of the operation then could the manpower have been utilized elsewhere in a more urgent role – that is, conducting an aggressive search?

Many of the fires to which we respond are room and contents. That is, they are fires that are typically extinguished with one hand line, utilizing less than 500 gallons and are extinguished with minutes of arrival. On these fires, when vertical ventilation is performed often times it is steam and not fire or smoke that is relieved with the ventilation. Is this a negative reflection on the truck companies? Absolutely not, instead it is a positive reflection on the engine companies who are quickly extinguishing the fires. Tom Brennan retired FDNY and author of the book

The Fire Chief's Handbook, Fifth Edition (Fire Engineering Books, 1995) and the editor of Fire Engineering states, "Venting of peaked-roof private dwellings immediately on arrival is a waste of time. Instead of venting, we need to try to reach any victims from inside the structure and from an opening to every room in which a human can survive from the outside...by VES or whatever mean possible."

If the first-due truck company is not needed for vertical ventilation at residential structure fires, then what should they be doing? The answer is simple- Vent, Enter, and Search. The primary responsibility of a truck company in the FDNY for structural fires is VES. They vent for fire and for life, and they enter to search and locate victims. In the FDNY manual for truck company operations "Ladders 4" it states, "...At residential structure fires there is no mention of the first-due truck company performing roof ventilation. This is a lower priority duty than life hazard. In practice, it is usually not needed and, if required, is assigned to additional personnel or a second arriving ladder company." Why does their policy state this? It states it because roof venting is not initially required, but horizontal venting greatly speeds the advance of the hose line. More importantly, by properly selecting a window to enter for VES, you have a very good chance of entering the location of any occupants that are not accounted for.

Before discussion on how to perform VES, it is critical to understand when to perform VES. VES should be implemented on fires where there is a high probability of life hazard. VES is ideal tactic that can be employed by first due companies who do not have water such as rescue companies or truck companies without pumps. If a rescue company arrived first on scene at a residential house with reports of subjects trapped, the company would size-up the structure, determine where the highest likelihood of viable occupants is, and then perform VES. VES is also a tactic that is ideal to employ with two-story residential structures when the fire has control of an interior stairwell. According to FDNY Battalion Chief Frank Montagna, he advises that when practicable, VES should always be initiated on the upper floors at residential fires. With knowledge of building construction, companies can assume that the majority of the bedrooms will be on the second floor.



*Photo 1: These windows on the second floor lead into bedrooms. The porch roof would give the firefighters an operating platform to perform VES. Photo by author*

While an engine company is attacking the fire on the ground floor, another company can be laddering the second floor windows and performing VES (*Photo 1*). Truck companies should search the areas of highest threat first, and then work to areas of lowest threat. Sleeping areas must also be given high priority, with consideration given to time of day.

*Photo 2: This house fire in New York also shows a great entry point for VES when there are reports of people trapped on the upper floor. Notice the light smoke condition coming from the upper left window indicating that it is an enclosed room and most likely has tenable conditions.*

[NY Fire Photos](#)



How is VES performed? When the truck company arrives, the captain and one firefighter begin a search immediately behind the hose line. This search will usually begin at the front door of the residence since the majority of the time that is our primary access into the structure. The engineer and second firefighter should walk around the house performing horizontal ventilation as they go. The venting and entry action, as with any tactical venting process, demands great precision (venting the correct windows); and anticipation of potential fire spread. Splitting the truck company into two teams is called the “Two-Team System”. The “inside/outside” team operation targeted to the Vent-Entry-Search procedure has several advantages. Two rooms may be searched right away, ventilation is provided, and two teams are making the maximum effort to rescue victims. This procedure represents a maximum effort by a limited number of personnel. Lieutenant Will Trezek with the Chicago Fire Department states that there are times when interior search and VES are done simultaneously as well as multiple-points-of-entry VES. It is important to remember that even when the first-due truck crew does not commit to vertical ventilation, the apparatus should always be spotted with the aerial placed to the roof for access by subsequent arriving personnel. If the structure is multi-story, the aerial operator must be cognizant of the potential for the aerial to be used as an escape route for upper floors.

Before the VES team enters the structure they must determine where the highest probability of a victim will be. This is determined based on two considerations: 1) Bystanders reports of where victims are trapped 2) The most likely place in the structure where a victim will be located. Where is the most likely place in the structure where we normally locate victims? Battalion Chief John Norman, FDNY (ret), states, “A very high priority must be placed on the search of bedrooms. Due to the fact that the area of highest life hazard, regardless of the time of day, is the bedroom. Statistics nationwide...bear this out and it is a factor that can be easily explained. An alert human being will flee a fire if physically able.”



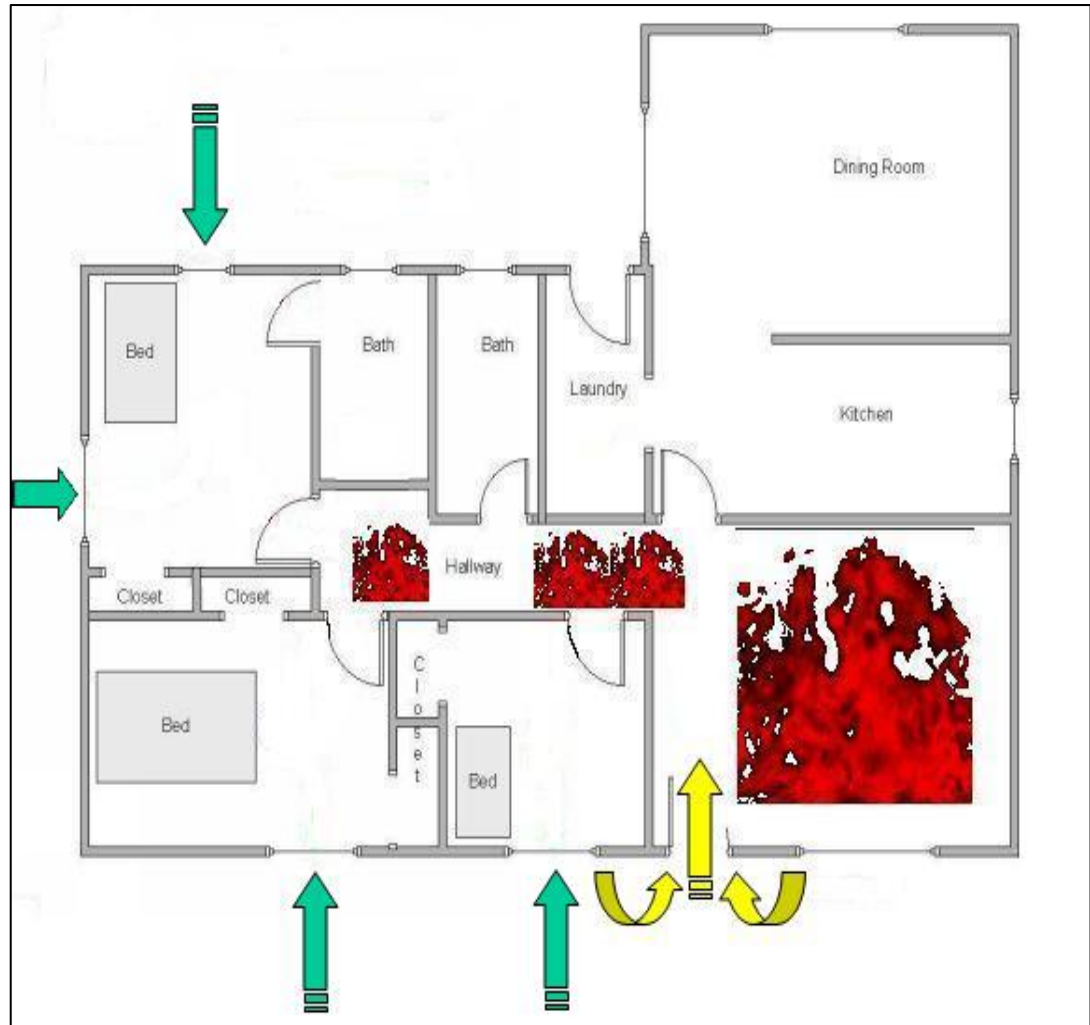
**Photo 3:** This photo shows where Ladder Company 1 of the Pontiac (MI) Fire Department performed VES to attempt to rescue children who were trapped upstairs. The bulk of the fire was on the ground floor. Six victims perished on the second floor including five children.

[Photo from Michigan Professional Firefighter's Union](#)

Frequently, the VES team will be operating in a room adjacent to the fire room. This is because the most hazardous area of the structure for the victim is that area near the fire. People have survived in areas immediately adjacent to the main fire area under terrible conditions. It is our job to reach this area as soon as possible. The VES team is first to get into the space within which the survivor has the least time to survive and then to search the area. This is where the victims will be in the most danger and where rescues most be affected immediately for there to be any chance for survival. However, firefighters must make a decision as to whether the victim can survive the conditions present. Rooms that are near flashover or post-flashover are simply un-survivable for victims. In these cases the risk versus benefit is not adequate for the firefighters to perform VES.

With VES the key to success is to “do an end run” around the fire instead of trying to charge through it (see Figure 1). At the majority of the fires, all of the companies enter the structure through the same entrance. This frequently causes a bottleneck of personnel and has firefighters duplicating search patterns while other areas do not get searched. By going around the exterior of the structure instead of through it, the firefighters are saving valuable time to get to the area of the structure that will most likely contains victims.

**Figure 1:** The floor plan of a one-story house shows where crews would possibly choose to VES with heavy fire in the living room and in the hallway. The green arrows point to windows that would be ideal entry locations. The yellow arrows indicate companies advancing through the front door of the structure. Notice how the VES firefighters would not have to “charge through” the fire nor would they have to contend with the bottleneck at the front door. Instead they would bypass this while another company advances a line on the fire.



Once the VES team determines the entry point, they will vent the window, enter the structure, control the door and then begin their search. Michael Dugan, a seventeen-year veteran and Captain of Ladder 123 in the FDNY teaches that when the VES team enters the room they need to go to the bedroom door and close it if it is open and if it is closed, the firefighters need to briefly open the door. There are two reasons for this. First, they need to assess fire conditions on the outside of the door to determine how long they will be able to operate without a hose line, and secondly to see if any victims are on the outside of the door. Victims will make every attempt to exit the house in the same way that they normally do. Some fire victims are found outside bedroom doors where they succumbed while trying to escape the fire.



*Photo 4: This photo shows a two-story commercial building with a restaurant on the ground floor and a residence on the second floor. With the low height on the roof in the rear, the windows would be ideal to perform VES to gain access to the residence.*

*Photo by author*

It is absolutely critical to the success of VES that the firefighters immediately find the door to the room and control it. Remember, this crew is operating without the protection of a charged line. Instead they must rely on their ability to quickly locate the door and close it to prevent fire and heat spread into that room while they conduct their search. By closing the door, the crews give themselves enough time to search the room quickly, even with heavy fire and heat conditions outside the door. Closing the door will also prevent the fire being drawn towards the VES crew because of the introduction of fresh oxygen. Basic building construction has taught us that in residential structures the door to a bedroom is usually directly across from the window. It is designed like this to facilitate ventilation in the house. When the VES team enters the window, they can proceed straight ahead into the room and will usually find the door to be there.

What tools should a VES team have with them? They need a radio (one per person), a six-foot hook, irons, water can, and ideally a thermal imager. All firefighters must be equipped with radios in order to monitor engine company progress and the fire's location. The days of allowing firefighters to enter burning structures without communications capabilities should be over by now. In his article in Firehouse Magazine, Captain Dugan instructs firefighters to place the six-foot hook on the inside of the bedroom window, with the hook stuck into the window sill and the handle inside the room. This will give the firefighters who are searching the bedroom a six-foot lifeline to assist them in finding the window if conditions rapidly deteriorate. It is important to note that the use of search ropes in residential structures is not recommended and can become a hindrance and there is a significant risk for the firefighter becoming entangled in the rope. The water-can will play an essential role for the firefighters who are searching remote from the hose line. Studies conducted show that a water-can will extinguish a fully involved room due to the steam production. At 212°F, two and a half gallons of water will produce 4250 gallons of steam (one gallon equals 1700 gallons of steam). The average residential bedroom is 120 ft<sup>2</sup>. Thus it is easy to see how much fire can actually be extinguished with a can.

However, these studies were conducted under ideal conditions (i.e. non-vented rooms). The thermal imager is used not only to assist in locating victims but also to benchmark heat signatures in the room. If the heat begins to rapidly build in the room then the room should be rapidly evacuated. Firefighters performing VES need to remember that this is a quick operation and is done one room at a time. The firefighter is entering one room, searching it, regressing out the window and then performing VES again if the situation requires.

With this much emphasis on search, would there ever be a time when the first arriving company should delay suppression to begin a search? The general rule is that there should not be a delay in suppression. Remember, rescuing a victim from a fire can happen one of two ways—remove the victim from the fire, or remove the fire from the victim. Many small fires have become conflagrations because of the delay in suppression for search and rescue operations. With a four-man company, VES can still be performed. The captain and one firefighter advance the line and extinguish the fire while the senior firefighter performs VES. Aggressive searching for salvageable victims cannot be done while manning an attack line. Indeed, search crews must operate without protection of a line. However, simply closing a door may buy the necessary time to complete a search and let the engine company engage the fire. The officer leading a primary search must have good situational awareness of the fire's location and intensity.

Is one-man VES acceptable? Yes it is, with a high level of training. The FDNY utilizes one-man VES at most fires. The firefighter who is assigned as the OV or Outside Ventman will horizontally vent the exterior of the structure. When he finishes this assignment he will VES the window of the area where the highest likelihood of victims will be. He maintains radio contact with his officer and tells him exactly where he is going to VES. This tactic goes against the mantra that we never do anything alone on the fireground. However, this one-man VES tactic has worked successfully for the FDNY and has resulted in numerous victims rescued from fires.

VES is an operation that is performed without the protection of a hose line. This in itself makes it more dangerous than those operations that take place with the line. One fire chief that I once worked for told me that VES was “ludicrous and stupid” and that no firefighter should ever be operating without the protection of a line. He told me that firefighters who perform VES are nothing more than “cowboys trying to be heroes”. To me, this opinion demonstrates a lack of knowledge of basic firefighting tactics and operations, and most sadly, it demonstrates complete lack of confidence in your firefighters. The solution to changing this mindset is to train. Train until you are confident that every member of your team could perform VES without hesitation.

The key to all fireground operations is to do the most efficient job that we can while being as safe as we can. VES is a tactic that is certainly not limited to truck companies, but can be utilized by any fire company during a fire attack. Is VES overly aggressive and putting our firefighters in to much danger? No, it is not, and if your firefighters are well trained they will be able to significantly limit the danger to which they are exposed. As Captain Mike Lombardo, a twenty-seven year veteran with the Buffalo (NY) Fire Department states, “The hallmark of a good fire department is an aggressive and thorough search. Most departments mention somewhere in their mission statements the tenet to save life and property. In reality, saving a life is really what firefighters are here for.”

David Baldwin of Ladder 6, Sacramento (CA) Fire Department states, “Getting to the rear (to perform VES) is a frame of mind. Getting to the rear is an attitude. You have to get away from the traditional thought process that you always go through the front. There are many benefits to taking the rear. One, you find a second way in (or out) to the structure. Two, you see more sides of the building thus revealing hidden dangers not seen from the front. Three, you put yourself in a better position to find and rescue a victim not otherwise found until after the engine knocks down the fire. There is an assumption of risk in the fire service. If we have a window of opportunity, we must take it. Yes, it's going to be hot, dangerous, and tiring. Remember, someday you may be trapped inside that burning building. You'll be the one hoping and praying the firefighters will take that risk!

Lastly, Lieutenant Pressler states this; “VES is a very dangerous position, so why do we go there? Because that is the people that we are! It is that simple. You have the proper gear, you are wearing an SCBA, and your victims have neither! Yes it is smoky, and yes it is hot; but that is what your equipment is for. Although searching aggressively is dangerous, so is almost everything on the fireground. Proper turnout gear coupled with good training makes for aggressive firefighters. And aggressive firefighters may just reduce the number of civilians killed in fires every year.”

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