

Fire Engineering

MARCH 2017

TRAINING THE FIRE SERVICE FOR 140 YEARS



Tactical Ventilation: Bridging the Gap Between Research and Reality

BY NICHOLAS PAPA

THE USE OF THE ADJECTIVE “TACTICAL” is commonplace throughout all facets of the fire service. More often, however, it is used so casually without any regard for its meaning, making it another buzzword to enhance the appeal of the latest concept or product. Dictionary.com defines “tactical” as follows: “of or relating to a maneuver or plan of action designed as an expedient toward gaining a desired end or temporary advantage.” The term is also characterized as being “prudent” or “calculated.” On digesting these descriptions, the significance of assigning the word “tactical” to ventilation becomes readily apparent. No other single action/event (intentional or otherwise) has the propensity to impact the growth and spread of fire, thus necessitating a more disciplined approach to ventilation.

The Need for Discipline

Ventilation is a vital fireground task intended to *systematically* remove the by-products of combustion (heat, smoke, and combustible gases) from a structure and replace them with fresh (cool) air. When executed appropriately, it greatly facilitates the two primary objectives of search and fire extinguishment. The continuous evolution of the fire environment—increased presence of hydrocarbon/synthetic materials and energy efficiency—has resulted in the following detriments: faster fire propagation (greater heat-release rates), decreased time to flashover, greater propensity to become vent-controlled, and increased volatility. Collectively, these conditions drastically diminish the margin for error when conducting ventilation operations, which is evident in the data collected from the recent fire dynamics research and the numerous near-miss and line-of-duty death reports. We must, therefore, place a greater emphasis on maintaining strict fireground discipline through the following:

- Vigilant situational awareness.

- Controlling the openings—managing the air track (flow path).
- Coordinating with extinguishment and search efforts.
- Communicating accurately and concisely.
- Operating proficiently.

These behaviors work in concert to ensure that operations are always directed toward accomplishing the mission—preserving life and property.



(1) Fire jets out of a vent hole after the ladder driver cuts and opens the roof to ventilate the attic. (Photos by author.)

The Research Findings

The recent Underwriters Laboratories and National Institute of Standards and Technology studies have detailed the nature of air movement within a structure (involved in fire) and the profound impact of ventilation. The test fires conclusively demonstrate that once ventilation takes place, conditions change rapidly. The research has shown that, without the application of water, ventilation can create an untenable environment in as little as one minute, 40 seconds in a single-story structure and

three minutes, 20 seconds in a two-story building. The reaction time is dictated by the following conditions: efficiency of the ventilation (rate of air exchange); the type of flow (unidirectional vs. bidirectional); the stage of development and temperature of the fire; and the location, number, and timing of the openings. Even a single element out of alignment has the potential to yield an adverse reaction, requiring the utmost diligence when engaging in ventilation activities.

An Operational Framework

Venting tactically is predicated on the following elements: the conditions, the life hazard, the desired outcome, and the progress of interior crews. Before initiating ventilation, account for these variables and take the necessary precautions. Ask, “Will this improve conditions or support the operation?” Adhering to the following set of fundamental tenets pertaining to ventilation will dramatically increase the chances of a successful outcome:

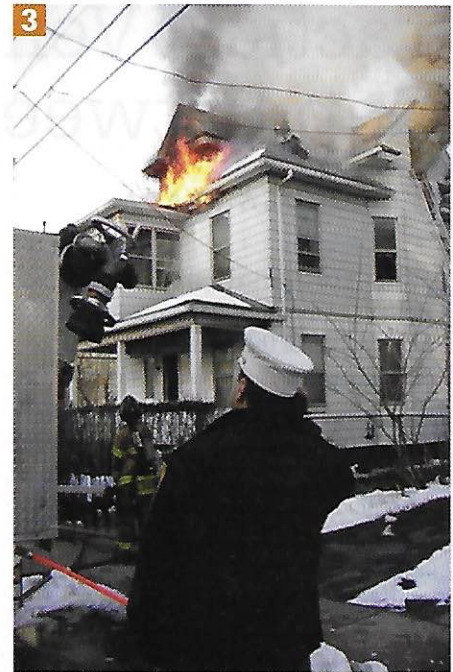


(2) Thick, dark smoke billows out of a dormer window after it is ventilated. The characteristics of the smoke indicate an advanced fire with high heat conditions.

- **Informed.** Fireground decision making comes with the inherent challenge of “attempting to make perfect decisions with imperfect information.” Intelligence gathering is the key to addressing these voids. Critical information is obtained through the following sources: an appropriate exterior (and interior) survey—the 360° walk-around (360°), reports from occupants and bystanders, continuous size-up, monitoring radio traffic, and direct

communication with the engine and ladder company officers as well as the incident commander.

- **Deliberate.** Since it is a supportive function, ventilation must be purposeful and aid in accomplishing a specific objective. The adage of “vent for life and vent for fire,” consequently, has been more aptly rephrased as “vent for search and vent for extinguishment,” reaffirming its task-oriented nature.
- **Coordinated.** The success of venti-



(3) Only white smoke is issuing from the vent hole, and the smoke from the dormer window is beginning to lighten up, evidence that the ventilation was effective and the engine company is making headway.

lation hinges predominantly on its timing and placement. Confirmation of the fire's location and the progress of interior crews is paramount. The initiation of ventilation must be synchronized with effective flow path management (door control) and fire extinguishment measures.

- **Controlled.** Ventilation must not result in undue fire spread or growth. Executing this tactic takes restraint and precision, ensuring that air flow into the building is limited until the fire attack can effectively begin.

These guiding principles serve as the very basis of tactical ventilation and give birth to a series of standard operating procedures, dubbed “The Six Commandments of Ventilation”:

- I. Thou shall communicate with the engine and ladder company officer prior to venting.
- II. Thou shall temporarily control the door to the area of involvement until a charged handline is in position to attack the fire.
- III. Thou shall not horizontally vent for extinguishment until fire attack is effectively underway; vent in the direction opposite to that in which the handline is advancing.

INSURANCE COMPANY CUTTING CORNERS?



It happens. The last call your crew went on resulted in a call to your insurance broker to replace gear. You never expected what you needed would not be covered enough to protect your crew properly. This is when you realize the right insurance partner with the right coverage really does matter.

We've been working with firehouses for a long, long time. And we have a reputation for fair claims coverage. That means we work to get you back to work, safely.

Experiencing hidden low coverage benefits?

CONTACT VFIS AND GET THAT FEELING OF COMPLETE COVERAGE AGAIN.

VISIT VFIS.COM TODAY.



A Division of Glatfelter Insurance Group

© 2017 VFIS

To request information go to fireeng.hotims.com

www.FireEngineering.com

- IV. Thou shall not horizontally ventilate for search until fire attack is effectively underway or the affected area can be isolated (until that time)—unless there is actionable intelligence of a *known* life hazard; the potential benefit must outweigh the consequences.
- V. Thou shall not vertically vent unless a charged hoseline is in position or the

the likelihood of success when executing ventilation operations.

Embracing the Mindset

Enhancing tactical prowess is an ongoing process that necessitates mental and physical preparation. Operators must constantly hone their skills and strive to master their craft through progressive training, education, and

tion to detail, ensuring that any actions they take are always directed toward a specific objective and achieving *the mission*. ■

BIBLIOGRAPHY

Fire Department of New York. (2013). *Probationary Firefighter's Manual*. New York, NY: FDNY Training Division.

Kerber, Steve (2011). The Impact of Ventilation on Fire Behavior in Legacy and Contemporary Residential Construction. Retrieved from <http://www.ul.com/global/documents/offerings/industries/buildingmaterialfireservice/ventilation/DHS%202008%20Grant%20Report%20Final.pdf>.

Terpak, M. and Woodworth, S. (2014). "We Have Not Been Doing It Wrong!" Fire Training Network, 18(12), 1-4, 14.

Enhancing tactical prowess is an ongoing process that necessitates mental and physical preparation.

affected area can be isolated (controlling the horizontal openings) until the handline's arrival.

- VI. Thou shall avoid venting/operating in a manner that may compromise your position or egress path and should identify/establish a secondary means.

When applied in conjunction with the four tenets, these commandments serve as a framework that greatly enhances

experience. Operating tactically is much more than a concept or cliché; it's a mindset.

The fireground is a hostile and rapidly changing environment layered with uncertainty. Every decision made will in some way directly impact the outcome of an incident. This is especially true when it comes to ventilation. Those engaging in such activities must exhibit the highest level of discipline and atten-

NICHOLAS PAPA is a lieutenant with the New Britain (CT) Fire Department. He is assigned to Engine Co. 1 and previously served in Ladder Co. 2 as a private. He has a BS degree in public safety administration and a MPA in emergency management.

Nicholas Papa will present "Tactical Ventilation: Bridging the Gap Between Research and Reality" at FDIC International in Indianapolis on Wednesday, April 26, 2017, 1:30 pm-3:15 pm.

LET US PROTECT YOU, WHILE YOU PROTECT US!
THE COMPLETE SAFETY SOLUTION

SAFE-T-SCOPE
360™
 360° SURROUND CAMERA SYSTEM




Emergency vehicle operating conditions demand the highest level of awareness by the operator. Safe-T-Scope360™ provides a surround view to increase awareness and help prevent collisions with Vulnerable Road Users (VRUs), objects and other vehicles.

DUAL-VISION XC4
 4 CHANNEL WINDSHIELD BASED CONTINUOUS HD VIDEO AND EVENT RECORDER



- 4+ Camera Capable
- Wi-Fi Capable
- 4G Cellular Capable

Rosco's Dual-Vision XC4 has the capacity to identify unsafe driving behavior through its ability to continuously record video and provide instant driver feedback when an event occurs.



FDIC BOOTH 9337

1-800-227-2095 • Info@Roscomirrors.com
www.roscovision.com • www.roscomirrors.com