



# Fire Protection Training

Procedures Handbook 4300

STRUCTURE FIRES

**TOPIC:** Ventilation - Horizontal

**TIME FRAME:** 1 Hour

**LEVEL OF INSTRUCTION:**

**BEHAVIORAL OBJECTIVE:**

*Condition:* A written quiz

*Behavior:* The student will list and describe the operations required to properly utilize horizontal ventilation.

*Standard:* With a minimum of 70% accuracy

**MATERIALS NEEDED:**

- Appropriate visual aids
- Audio visual equipment

**REFERENCES:**

- IFSTA, Essentials of Fire Fighting, 2nd Edition, Chapter 11
- IFSTA, Fire Ventilation Practices, 6th Edition, Chapter 4

**PREPARATION:** Horizontal ventilation is relatively easy to accomplish and is extremely effective by itself or in conjunction with mechanical ejectors and blowers.



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VENTILATION-HORIZONTAL

PRESENTATION	APPLICATION
<p><b>I. HORIZONTAL VENTILATION</b></p> <p>A. A Process Whereby a Channel is Created from the Seat of the Fire to the Exterior of the Building on the Same Level or Floor</p> <p>B. Takes Advantage of the Fact that as Substances Heat Up Their Molecular Activity Increases and Expands. As This Expansion Occurs in a Confined Space the Pressure Within that Space also Increases. When an Opening is Created to the Outside of the Building the Internal and External Pressures Strive for Equilibrium Thereby Forcing Combustion Byproducts from the Building.</p> <ol style="list-style-type: none"><li>1. Effectiveness can be maximized by utilizing natural cross winds or mechanical ventilation.</li><li>2. The objective is to create a channel from the seat of the fire to the exterior of the structure without involving the attic or upper floors.</li></ol> <p>C. Horizontal Ventilation is Preferred Method in the Following Situations</p> <ol style="list-style-type: none"><li>1. In single story residential structure where attic is not involved</li><li>2. In two story residential structure and second story is not involved</li><li>3. In high rise occupancy and floor other than top floor is involved</li><li>4. In any situation where interior operations must be commenced immediately and adequate staffing is not available for vertical ventilation.</li><li>5. Any situation where ability of the roof to withstand roof top ventilation is in question</li></ol> <p>D. Use Existing Openings if Appropriate</p>	



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VENTILATION-HORIZONTAL

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>1. Windows</li><li>2. Doors</li><li>3. Vents</li></ul> <p>E. Procedure for Horizontal Ventilation</p> <ul style="list-style-type: none"><li>1. Determine need for horizontal ventilation<ul style="list-style-type: none"><li>a. High smoke concentration</li><li>b. High heat concentration</li><li>c. High toxic gas concentration</li><li>d. Redirect fire spread/direction</li><li>e. Reduce chance of vertical extension</li></ul></li><li>2. Determine ventilation locations<ul style="list-style-type: none"><li>a. Make exhaust opening first<ul style="list-style-type: none"><li>(1) Downwind or leeward side</li><li>(2) Existing window or door<ul style="list-style-type: none"><li>(a) Open as high as possible</li><li>(b) Remove all glass, screens, drapes, blinds and curtains</li></ul></li><li>(3) May have to create an exhaust opening if the existing openings are not in proper position or of adequate size.</li><li>(4) As near seat of fire as possible</li><li>(5) Located to draw by- products of combustion away from uninvolved areas</li></ul></li></ul></li></ul>	



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PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>(6) Thermoplastic windows (e.g., lexan or plexiglas)<ul style="list-style-type: none"><li>(a) Cut with power saw and medium tooth blade</li><li>(b) Strike in center with sledge to dislodge from its keepers</li></ul></li><li>b. Make upwind or windward opening last<ul style="list-style-type: none"><li>(1) As low as possible</li><li>(2) May use blower to maximize efficiency of operation</li><li>(3) Use existing openings if possible<ul style="list-style-type: none"><li>(a) Remove screens, drapes, curtains, blinds and glass as necessary</li></ul></li><li>(4) Locate so as to push by- products of combustion out of uninvolved areas.</li></ul></li><li>3. Plan ventilation channels carefully taking into account:<ul style="list-style-type: none"><li>a. Only breach firewalls when necessary</li><li>b. Stacked material/merchandise may adversely affect ventilation<ul style="list-style-type: none"><li>(1) Inventory</li><li>(2) Salvage groupings</li></ul></li><li>c. Difficulty of effectively ventilating if many rooms are involved</li><li>d. If wind coming from "wrong" direction may not be possible horizontally.</li></ul></li></ul>	

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<ul style="list-style-type: none"><li>e. Existence of internal and external exposures</li><li>f. Do not channel smoke where occupants and fire fighters will be entering or exiting</li><li>g. Try opening windows prior to breaking them</li><li>h. During ventilation assessment ensure that your operations do not counteract existing and effective ventilation channels or equipment.<ul style="list-style-type: none"><li>(1) Example: Multi story building with automatic smoke venting system working properly.</li></ul></li><li>i. Interior teams may be in best position to determine ventilation needs and may be allowed to vent as they go.</li></ul> <p>F. Safety Precautions</p> <ul style="list-style-type: none"><li>1. Ventilation team in full structural protective clothing and S.C.B.A.</li><li>2. Coordinate carefully with any interior teams.<ul style="list-style-type: none"><li>a. May draw fire at them while in a vulnerable position</li><li>b. May dramatically intensify the fire.</li><li>c. Do not apply water through ventilation opening from exterior of structure.<ul style="list-style-type: none"><li>(1) Steam victims and firefighters</li><li>(2) Disrupt ventilation operations</li></ul></li></ul></li><li>3. If windows need to be broken:</li></ul>	



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VENTILATION-HORIZONTAL

PRESENTATION	APPLICATION
<ul style="list-style-type: none"><li>a. Start at top of window</li><li>b. Work with hands and arms above tool used to break windows</li><li>c. Stay clear of falling shards</li><li>d. Keep face shield down</li><li>e. Use long handled tool</li><li>f. Clear all glass fragments from sash<ul style="list-style-type: none"><li>(1) Prevents cuts</li><li>(2) Increases effectiveness of ventilation operations</li></ul></li></ul>	

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## **SUMMARY:**

Horizontal ventilation can be advantageous for certain fire conditions. Building types, design and occupancy characteristics will help to determine the best method to use. Generally horizontal ventilation works well in residential structure fires. Weather conditions, exposures, and construction features all need to be considered prior to starting ventilation operations.

## **EVALUATION:**

A written quiz.

## **ASSIGNMENT:**

To be determined by instructor(s).