Continuing Education for the Fire Fighter

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Tactical Ventilation
Module 1

Chapter 13

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LEARNING OBJECTIVES

- Describe reasons for tactical ventilation.
- Identify considerations that affect the decision to ventilate.
- Explain the critical fire behavior indicators present during tactical ventilation.
- Define horizontal and vertical ventilation.
- Explain the means for achieving horizontal and vertical ventilation.
- Describe the types of horizontal ventilation.

LEARNING OBJECTIVES

Describe the types of vertical ventilation.

Recognize other types of ventilation situations.

Explain the effects of building systems on tactical ventilation.

Ventilate using mechanical negative pressure in a window.

Ventilate using mechanical negative pressure in a doorway.

LEARNING OBJECTIVES

- Ventilate using mechanical positive pressure.
- Perform horizontal hydraulic ventilation.
- Demonstrate the procedure for sounding a roof.
- Ventilate using a rotary saw to cut an opening.
- Ventilate using an axe to cut an opening.
- Demonstrate the procedure for opening a flat roof.
- Perform the steps for opening pitched roofs.
- Demonstrate the procedure for making a trench cut using a rotary saw.

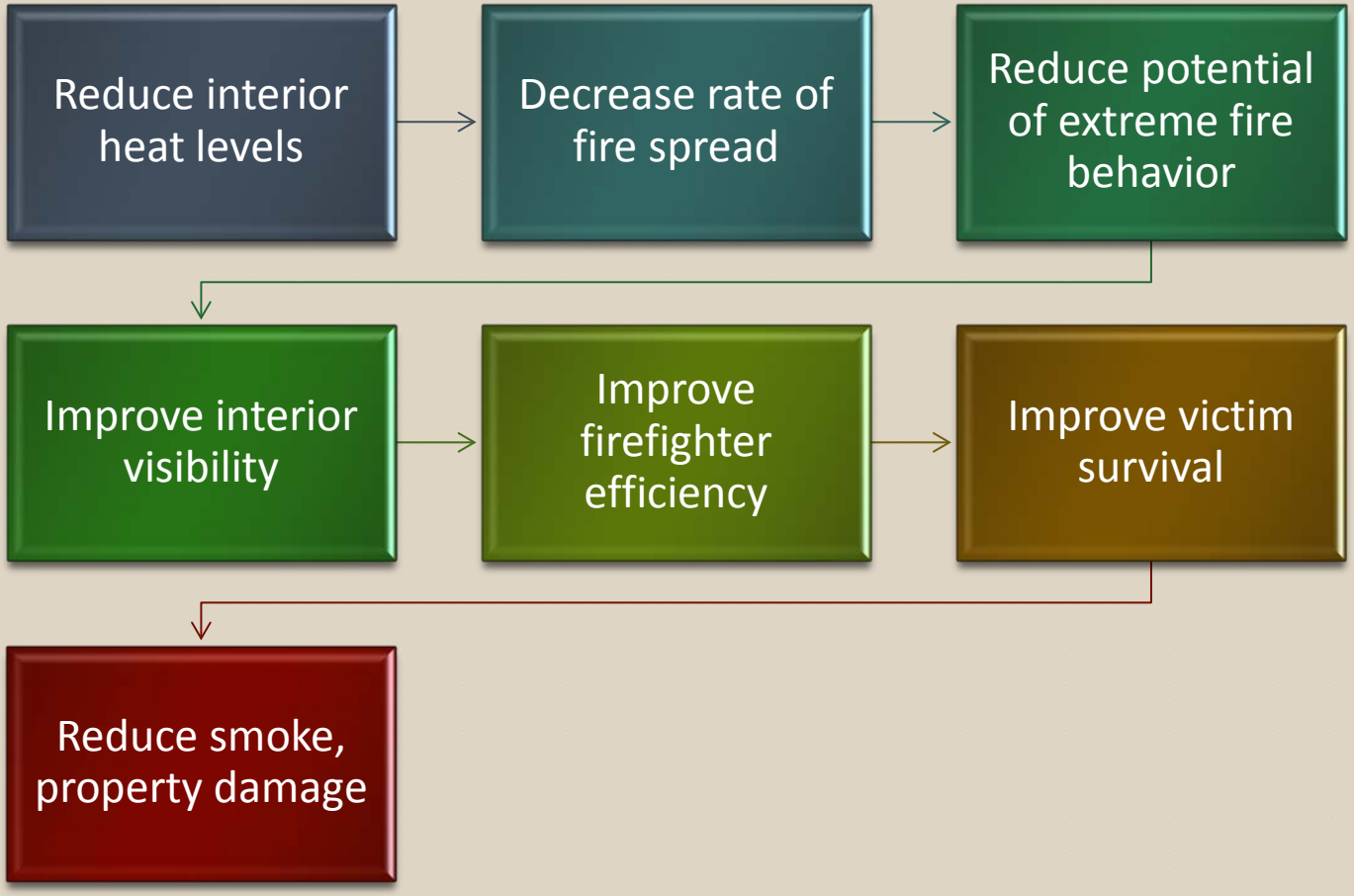
TACTICAL VENTILATION IS CAREFULLY PLANNED TO ACHIEVE THE BEST RESULTS.

Planned, systematic, coordinated removal	• Heated air • Smoke • Gases • Other airborne contaminants
Performed for	• Life safety • Incident stabilization • Property conservation
Performed only when fire attack hoselines, teams	• In place • Ready to attack

THE SUCCESS OF TACTICAL VENTILATION DEPENDS ON SEVERAL FACTORS.

Careful planning → Knowledge of building construction → Systematic application of procedures → Coordination with other activities

TACTICAL VENTILATION IS PERFORMED FOR SEVERAL GENERAL REASONS.



TACTICAL VENTILATION CAN BE EFFECTIVE WHEN CORRECTLY IMPLEMENTED.

Properly implemented

- Life safety
- Incident stabilization
- Property conservation

Improperly applied – Can impact

- Occupants
- Firefighters
- Physical structure

TACTICAL VENTILATION CAN IMPROVE LIFE SAFETY, THE HIGHEST INCIDENT PRIORITY.

- Increasing oxygen concentration
- Reducing concentration of toxic products
- Reducing temperature
- Increasing visibility
- Creating smoke-free paths of egress

INCIDENT STABILIZATION CAN BE ACCOMPLISHED THROUGH VENTILATION.

Stages to control, extinguish fire

- Locate
- Confine
- Extinguish

VENTILATION CAN INFLUENCE PROPERTY CONSERVATION.

- Can remove smoke, gases, heat and confine fire to specific area
- Salvage can begin outside of immediate fire area if enough personnel
- Ventilation can increase speed of fire extinguishment

BOTH OCCUPANTS AND FIREFIGHTERS ARE AT RISK DURING A STRUCTURAL FIRE.

Occupants – Life hazards

- Lower if awake
- Several possibilities if asleep

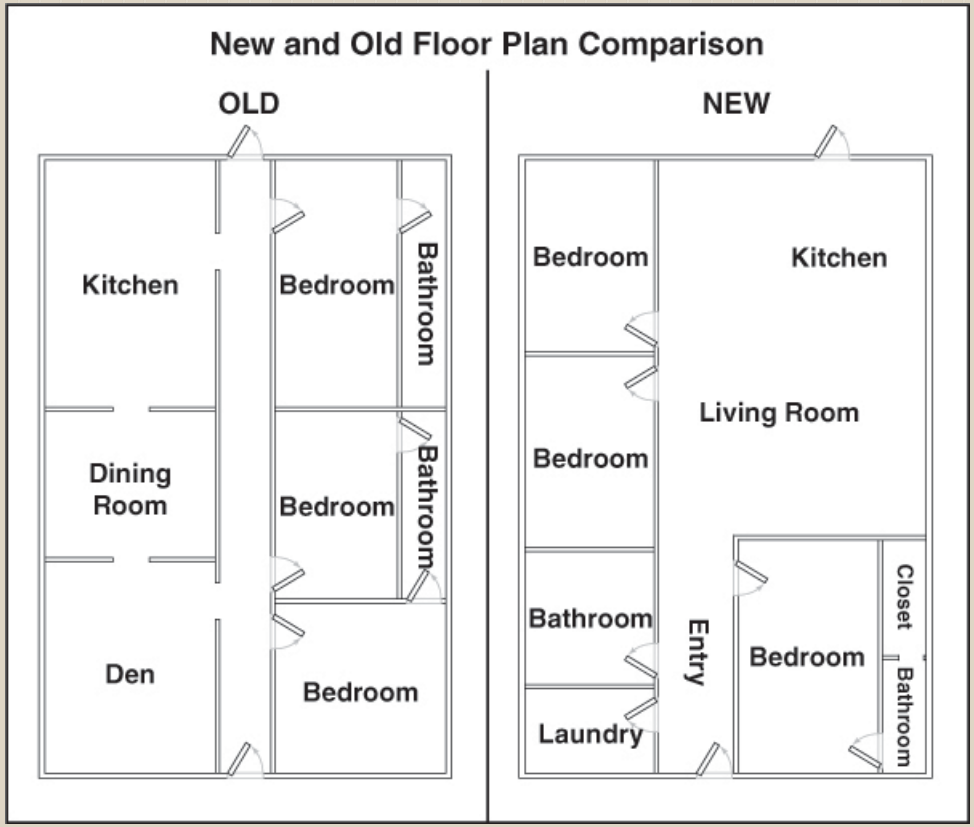
Firefighters – Expected hazards

- Visual impairment
- Lack of oxygen
- Presence of toxic, flammable gases
- Rapid fire development possible

CHANGES IN BUILDING CONSTRUCTION PRESENT DIFFERENT RISKS DURING FIRES.

- Residential structure and lot size differences
- Layout, construction material changes
- Energy conservation measures
- Open plan commercial structures
- Use of plastics, synthetic materials

KNOWLEDGE OF THE BUILDING CAN HELP MAKE DECISIONS CONCERNING VENTILATION.



VARIOUS BUILDING CHARACTERISTICS SHOULD BE CONSIDERED WHEN VENTILATING.

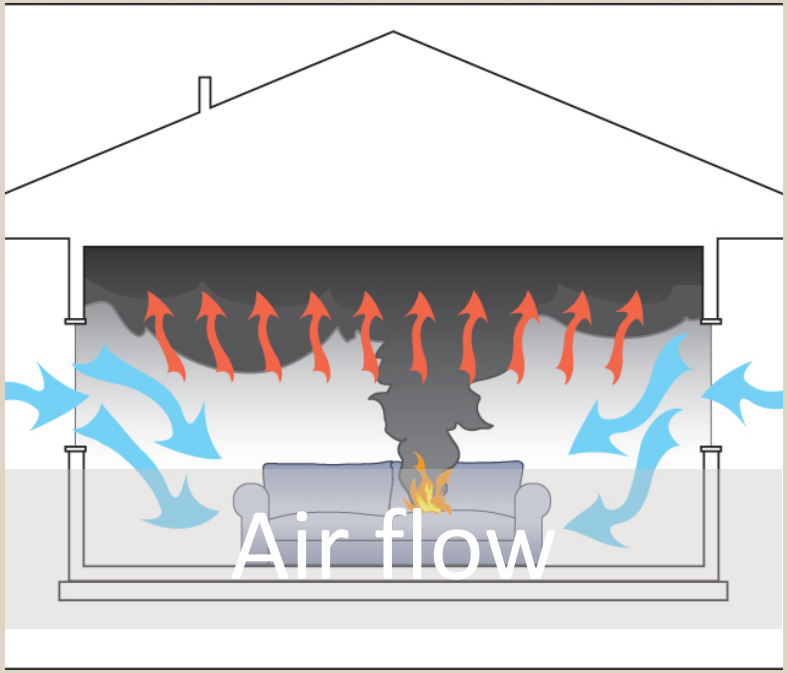
- Occupancy classification
- Construction type
- Floor area, compartmentation
- Ceiling height
- Number of stories
- Number, size of exterior windows, doors, other wall openings

VARIOUS BUILDING CHARACTERISTICS SHOULD BE CONSIDERED WHEN VENTILATING.

- Number, location of staircases, elevator shafts, dumbwaiters, ducts, roof openings
- External exposures
- Connection to adjoining structures
- Type, design of roof
- Type, location of fire protection systems
- Contents
- HVAC system

SEVERAL FIRE BEHAVIOR INDICATORS ALSO HELP WITH PLANNING FOR VENTILATION.

Courtesy of Bob Espositio



SEVERAL FIRE BEHAVIOR INDICATORS ALSO HELP WITH PLANNING FOR VENTILATION.

Courtesy of Mike Wieder

CAUTION

Do not rely solely on the presence or location of flames to assess an incident.

FIRST ARRIVING UNITS MUST DETERMINE SIZE, LOCATION, AND EXTENT OF THE FIRE.

Uncoordinated ventilation

- Can spread fire or cut off escape

Severity, extent of fire depends on several factors

Primary consideration

- Phase to which fire has progressed

THE TYPE OF VENTILATION USED WILL DEPEND ON SEVERAL FACTORS.

Coordination with other operations → Before orders are given → IC determines if necessary

Conditions upon arrival → Must be appropriate for situation → Must be capable of exhausting volume

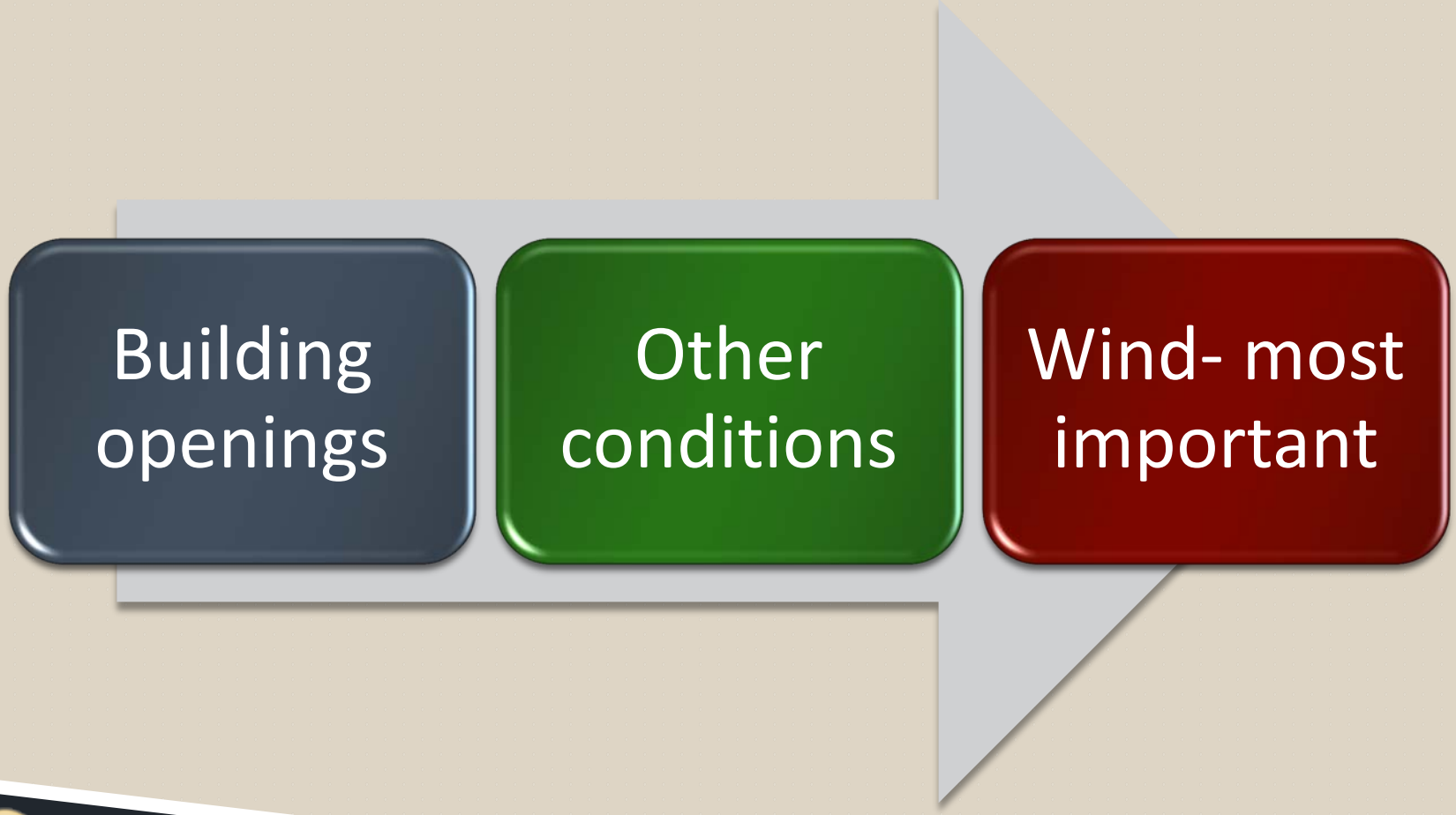
THE LOCATION FOR VENTILATION MUST BE SELECTED BASED ON SEVERAL FACTORS.

- Location of occupants
- Existing roof openings
- Desired air flow path
- Building construction
- Wind direction
- Extent of fire progress
- Condition of building, contents

THE LOCATION FOR VENTILATION MUST BE SELECTED BASED ON SEVERAL FACTORS.

- Potential structural collapse
- Effect on fire
- Effect on exposures
- Readiness of crew
- Ability to protect exposures
- Protecting means of egress, access

WEATHER CONDITIONS WILL AFFECT WHAT HAPPENS INSIDE A BUILDING AS WELL.



CAUTION

A strong wind can overpower the natural convective effect of a fire and drive the smoke and hot gases back into the building.

EXPOSURES SHOULD BE TAKEN INTO ACCOUNT WHEN PLANNING VENTILATION.

Internal

- Affected by routing of smoke
- Ventilation can create danger

External

- Affected by radiation, direct flame contact

STAFFING AND RESOURCES ARE BOTH REQUIREMENTS FOR VENTILATION.

Resources needed

- Forcible entry tools
- Power saws
- Fans or blowers
- Smoke ejectors
- Flexible ducts
- Stacking and hanging devices
- Other support systems
- Electrical power cords
- Generators

SUMMARY

Tactical ventilation of a burning building allows heat, smoke, and fire gases to escape to the atmosphere and also draws fresh air into the building.

Properly applied tactical ventilation allows firefighters to see better, locate victims more easily, and find the seat of the fire sooner.

Firefighters must understand fire behavior, know various ventilation methods and have knowledge of roof construction and know how to create exhaust openings in all types of roofs that have a variety of openings in order to perform ventilation correctly.