

Verdugo Fire Academy

Ventilation: Anatomy of an Opening

Part 4



CSFM Unit L
FFFS Chapter 14



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How to Ventilate

- Laddering
- Types of openings
 - Investigative openings
 - Offensive openings
 - Defensive opening
- Roof removal
 - Louver
 - J-hook
 - Pull back



Roof Operation Basic Equipment

The following equipment should be considered as the basic minimum necessary to accomplish most ventilation operations.

- Protective clothing and SCBA
- Pick head axe & scabbard
- Rubbish hook or other suitable tool
- Chain saw
- Communication



LADDERING



- Considerations
- Operations
- Locations
- Common Standards
- Overhead Obstructions
- Ground Obstructions
- Buildings

LADDERING Considerations

Size Up (Get 3 Sides)
Determine Type of Bldg
Determine Type of Roof
Ladder Length (16, 20, 24, 28, 35 and 50)

Error on Length
 Increase stability
 Increase visibility (for retreat)
 4-5 rungs over

Straight or Extension
Corners – generally strongest point

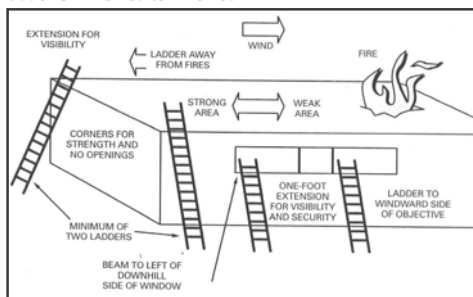


LADDERING Operations

Always throw 2 Ladders
 (opposite ends)
 (2 sides of fire)

2nd Ladder
 Safety & Escape
 Sound Before Getting Off !

Ladder Uninvolved to Involved



Work towards your Ladder

Ventilation cuts should start in the weakest portion of a roof (close to the fire) working away from the fire and toward the preplanned means of egress



Remember

- Minimum 2 F.F. to the roof on Residential
- Minimum 3 F.F. on commercial
- Keep wind to your back
- Min. 2 Ladders
- Use same area to exit roof that was used to walk onto the roof

5 Good Laddering Locations

1. Corners (2) Converging walls (& roof) tied together
2. Pilaster Used to strengthen & may support
3. Hips External angle in a roof (joining roof lines)
4. Valleys Meeting of (2) roof slopes
5. Ridges Where rafters meet ridge pole

Common Standards

Heights

Residential
9' (floor to floor)

Commercial 10ft
(floor to floor)

Window Sill 3ft
(above floor)

Angle

Climbing angle 70°
¼ working Height
from Base of Bldg



Overhead Obstructions



- Wires
- Cables
- Trees

Ground Obstructions



- Planters
- Cars
- Fences

Sounding

The use of the rubbish hook or other long tool by the lead or first person off the ladder to determine the structural stability of the roof as well as the location and direction of structural members.



Sounding

■ Sounding the roof with this tool in front of the path of travel will verify the roof's safety.

■ Sounding tool must be "sounding" approx 3 to 4 feet in front of firefighter to give early warning and provide maximum stability if a weak portion of roof is encountered

■ You are sounding for life. Sound and read that roof like your life depends on it.



ROOF OPENING CATEGORIES

1. **INVESTIGATIVE** – Openings used to determine smoke and/or fire conditions beneath the roof or roof construction.
2. **OFFENSIVE** – Openings used to evacuate heat, smoke and fire gases from a structure.
3. **DEFENSIVE** – Openings used to control the horizontal spread of heat, smoke and fire.

INVESTIGATIVE OPENINGS



Golden Rules of Chainsaw Work

- Always use full PPE.
 - This includes, being on air.
- Start the saw on the ground before taking it aloft.
 - It is generally recommended taking the saw up running to prevent it from being smoked out, use good climbing techniques.
- Full Throttle in and full throttle out.
- Leave the saw running until the fire is confirmed out or you are leaving the roof.
- Don't clean up your hole, cut it right the first time.

Plunge Cut

A cut made in a roof by sinking the saw blade or axe completely through the roofing material and decking to determine smoke/fire conditions in the attic.



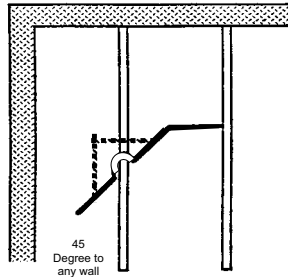
Indicator hole

A triangular hole created in a roof by intersecting three separate plunge cuts. As with the plunge cut, these holes are used to monitor smoke and fire conditions in the attic.



Inspection cut

An inspection cut is made by cutting at a 45 degree angle to any wall. Once a rafter is found and rolled over the saw man will then extend to the next rafter in order to size up the spacing between joist/rafters.



Inspection cut

A hole cut in the roof, should be out of the path of travel and used to determine the type/direction of roof structural members.



An inspection cut should be large enough to get a hand in the hole to inspect the construction but small enough not to let a foot fall through.

Inspection cut

Remember, don't trust your sight, you must get down and feel.



What it looks like...



Offensive openings

HEAT HOLES... Holes cut, as close as is safe, over the seat of the fire, for the purpose of ventilating smoke, heat and fire gases.



How it's done...

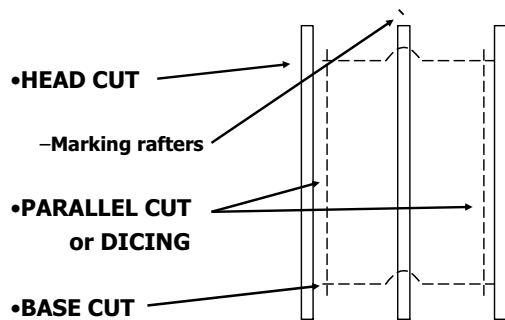


HEAT HOLE LOCATION

Proper heat hole location is imperative to effective ventilation. Determining proper heat hole location is accomplished through progressive steps:

1. During initial size-up of the involved structure.
2. Observation of smoke and fire conditions at windows and doors while on the roof.
3. Communication with interior engine crews.

Ventilation Terminology:



Head cut

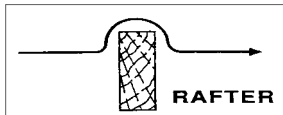
- Head cut should be as long as the anticipated opening is going to be; 4X4 foot minimum
- As a minimum you will mark your first two rafters

- Note:
Ideal hole
is 4X8



Rolling Rafters

- Saw operator should lift the chain saw nearly out of the decking and continue over the top of a structural member before returning to the same depth of cut



Marking Your Rafters

- Technique used when location of rafters is not obvious
- When rafter is rolled the tip of the chain is lifted out of the cut and a quick mark is made in the roof covering with tip of saw that marks location of rafter
- Tip of saw is immediately returned to the cut, continued to next rafter

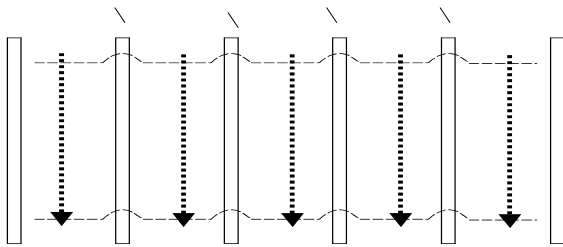
Marking Your Rafters

- Mark a minimum of the first two rafters



Dicing / Parallel Cuts

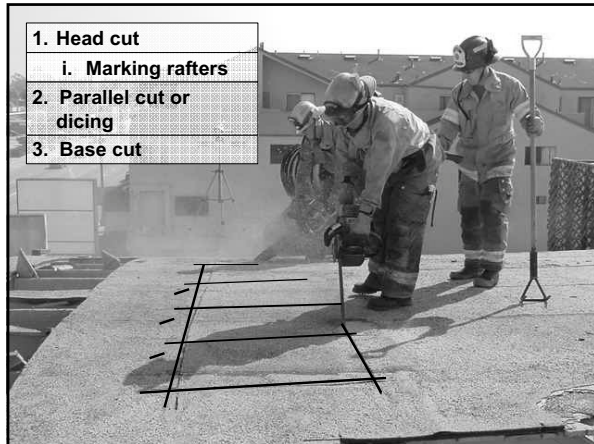
- A "series of cuts" between and parallel to the direction of rafters.



Dicing / Parallel Cuts

- Parallel or dice cuts should be as long as the shortest tool you have. Usually an AXE. This is why it is better to carry longer handled axes than shorter.





Decking

- **Base material**
 - Attached to structural members
- **Covering**
 - Top layer of decking material
- **IMPORTANT, make sure your cuts cross one another fully or you will not get the roofing off the roof**



Decking removal

There are 3 different methods used to remove the decking of the roof.

1. Louvering
2. J-hook
3. Pull back

This is hard
WORK



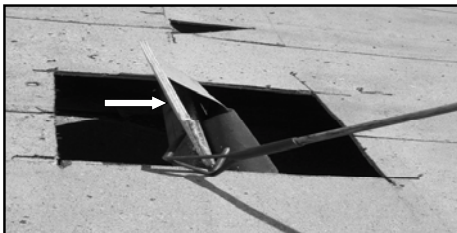
Louvering

•A cut section of roof decking that is hinged vertically on a single rafter to open a ventilation opening



Louvering

The hole, is approximately 4'x 4', where the section of plywood roof decking is left attached to a single, center rafter and louvered by the hook man to allow heat and smoke to ventilate. These are sometimes referred to as center rafter cuts.

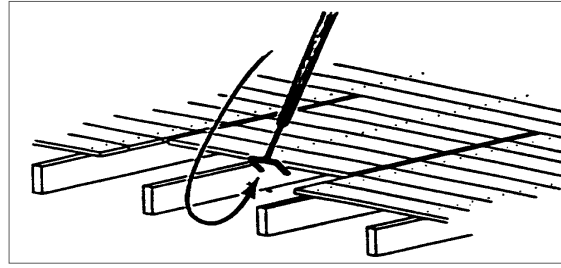


Louversing



J-Hook Motion

•The J-hook is a method of hooking the roof decking, pulling it away from the roof, used on conventional construction usually with sheeting. Hooking between the rafters/joists.

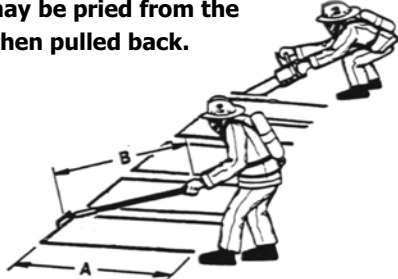


J-Hook



Pull Back

This technique is used to pull back the roofing, it can be used on small and large roof members. Usually a purchase is made on the rafter. It may be pried from the rafter and then pulled back.



Pull Back

This is the primary heat hole technique used on light weight, flat panelized roofs.



Pull Back

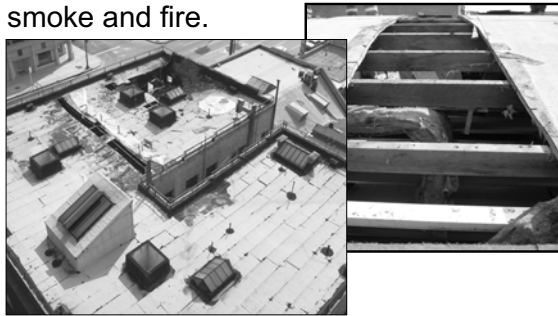


Pull Back two saw operation



DEFENSIVE OPENINGS

A defensive or directional cut used to prevent the horizontal spread of heat, smoke and fire.



Strip Ventilation...

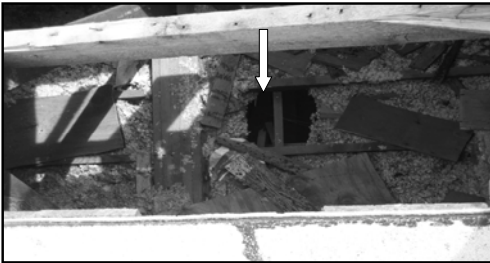


Punch Through The Ceiling



Punch Through The Ceiling

Once a ventilation opening is created in the roof, any ceiling between the roof and the area to be ventilated must also be opened.



Punch Through The Ceiling

- **Warning:** Do NOT under any circumstance look into the hole when you punch the ceiling.



Punch Through The Ceiling

VIDEO
Venting a Roof

Ventilation

Proper ventilation is worth it's weight in Gold. It takes time to master the skills and it/s hard work. Never get to the point that you feel comfortable on the roof.



Ventilation

End
