Ventilation Considerations

Preplan different buildings

Effective and safe roof operations are dependent upon training, knowledge, and an ability to utilize basic safety fundamentals. Other than actual fire ground conditions, nothing can replace the time and effort that is necessary (before the fire) in determining how you will accomplish various types of ventilation operations.

Construction Type and age of the building

What is the building used for? Residential apartments, commercial, industrial etc. What is the age of the building? 1930's masonry or 1988 lightweight tilt-up

Roof Style and covering of the roof

Is this an older roof (conventional)? Gable, arch, flat, etc. size=strength
Is this a newer roof (lightweight)? Trusses, 2X4s, panelized etc.
Evaluate the type of covering on the roof. Roof coverings such as tile will take more time to prepare the hole area. If the roof is lightweight and tiled strongly consider horizontal over vertical ventilation.
How thick is the roof decking material?

Location and extension of fire

- How long has the fire been burning?
- Where is it in relation to the building?
- Has it progressed into other portions of the building?
- Is it a content or structure fire?
- Is a defensive cut necessary to stop the horizontal spread?
- Are there any additional hazards in relation to the building? Check for exposures on all sides of the building.
- Is there a need for a charged hose line?

SAFETY

- Is the roof light-weight? If so are the structural members directly impinged by flame? If so strongly consider horizontal over vertical ventilation
- Is the fire over a garage? If so, open the garage door or utilizing horizontal ventilation instead of vertical.
  GENERALLY, PERFORMING VERTICAL VENTILATION OVER AN INVOLVED GARAGE IS UNNECESSARY.

Parapet Height

How high is the parapet? Will it require a roof ladder? You can check the height by looking at the depth of the scupper drains. Generally parapet walls higher that chest height should have a ladder placed on the roof side of the parapet.

Read the roof conditions

Is there fire showing through the roof? You need to assess the risk versus gain in determining if a ventilation hole will be effective.

Look for weak spots in the roof such as sagging or melting tarpaper. If the building is equipped with roof ventilators are they showing smoke or fire? Studies have shown that roof turbine ventilators are more efficient when left on rather than taken off. It is very important to look for time delays such as steep slopes, tile, and lightweight concrete. If the delays are too great, positive pressure ventilation may be a better option. **Prior to getting off the ladder for a roof top operation, the single most important factor in a safe operation is structural integrity.**

Sound your path of travel

Sounding on a roof can be very difficult. It can be accomplished with either a rubbish hook or pike pole. The rubbish hook is a better choice due to its wider surface area to feel construction members. A rubbish hook should be used for sounding with the two prongs pointing upward striking the roof as you walk towards the objective. Safe areas to be are the perimeter of the building, purlins, laminated beams, and ridge pole(for conventional only).

Minimum number of personnel needed

Residential ventilation assignments shall have a minimum of two personnel. Commercial/industrial ventilation assignments shall have a minimum of three personnel, one of which shall be a company officer.

Approach from uninvolved to involved area

This will place crews on strong portions of the roof working towards weaker portions.

On the roof

Crews should get on the roof, cut the hole, punch through the ceiling material. Once the ventilation hole is cleared and EVALUATED for EFFECTIVNESS, the crew should

communicate to interior crews to determine the need for further operations. Crews should not linger on the roof for safety reasons. After the initial hole is cut, Company Officers need to notify suppression crews prior to punching the ceiling then check to see if there was relief. If there was not enough relief, an extension of the first hole or another hole may be needed.
While on the roof, crews should be constantly evaluating the roof conditions.

Tools and equipment

Rubbish hooks should be used as the primary sounding tool. When the hooks are facing upwards, there is a greater surface area to feel construction members. It is also used to finish knocking out any ceiling material after the hole has been cut.

The pike pole can be used to pull material off the roof and also finish knocking any ceiling material after the hole has been cut.

The portable radio is necessary for communication to the interior crews. If there is no relief from heated smoke and gases, interior crews will need to communicate this for additional holes to be cut.

During night operations, hand lights become very useful. On certain roofs at night, you can set the light down and shine it across the roof to detect the direction of the members. Thermal imaging cameras are also very useful in assisting with identifying the direction of roof member.

Chainsaws are used to cut the holes. Most are equipped with a 20” bar and over 45cc in power. The Carbide or Bullet chains are used on the saws. Each chainsaw should be equipped with a chain brake, which shall be applied, while climbing up the ladder with the chainsaw. Chainsaws are operated at full speed or idle. Cuts with the saw should only be as deep as necessary in the decking material. Start all chain saws on the ground prior to climbing the ladder making sure that the chain brake is applied. The carrying strap shall be taken off during cutting operations. Operate all chain saws at full throttle. Never cut in line with your body. If your saw chokes out due to smoke sound your way to a clear area then try to restart the saw.

Residential Ventilation will require one chainsaw, whereas, commercial ventilation should require bringing at least two chainsaws to the roof.

The axe is used as a secondary cutting device in the event that the chainsaw is broken. The cutting blade should be sharp and clean at all times. It can be used as a footing tool with the pick end on steep roofs.

SCBA's must be donned and all members will be breathing air prior to ascending the ladder for residential and prior to reaching the area of involvement in commercial.

Aerial Ladders

During vertical ventilation operations, the aerial of a Truck Company should be spotted on corners, eight feet off corners, or in locations, which take into account a solid cut off point. Aerials should be kept ten feet from any electrical lines.

Sometimes the best advantage for spotting the aerial of the Truck Company isn't always in the front of the building.

Ground ladder placement

Ladder and approach from the uninvolved section of the building. Utilize two ladders for means of egress from the roof. Ladder placement is best 8 feet from the corners with at least five rungs extending over the roof. Remember, extend the ladder to the point where you will be able to see them through the smoke.

Avoid placing ladders over windows, metal roll-up doors, single doors, or any openings.

Caution should be used when placing ground ladders around power lines. A general guideline is to stay 10 feet away from power lines.

If the roof is to steep, roof ladders with the extension hooks may be used as footing.

When climbing, both hands shall be on the rungs or beams of the ladder. Straps may be used on chainsaws enabling crews to keep both hands on the rungs.

Equipment such as rubbish hooks and pike poles, may be hooked on the rungs of the ladders as you climb or slide them up the beams.

Generally, ladders placed one quarter of the working height from the base of the building will provide a 70-degree angle for climbing. This will allow crews to climb in the correct posture.

Some structures have tall parapets where it may be necessary to use a roof or attic ladder on the reverse side of the parapet.

The largest ladder, requiring the most people, should be raised first.