Question & Answers

Was that hole made or self-vented?

Since this was a burn down after a live burn exercise the hole was cut during a previous evolution.

Is that what they refer to as vent point ignition? not enough O2 in attic? would it have lit up quicker if the front door was opened with a pathway?

Sort of. Normally for vent point ignition the smoke/fuel mixture would self-ignite. In this case you can see the column bend from the wind making contact with other flame causing ignition. My read is that the column didn't self-ignite sooner because it was to-rich to burn!

Any keys/suggestions to a new IC regarding reading smoke from the command post?

The primary key for an IC from the ICP is to perform your initial read, make mental projections about what you expect from the fire and your suppression efforts. Intermittently check on the progress of the firefight and the smoke read based on what you expected to occur. Keep or change the plan accordingly. Another tactic is to have an idea of what you expect the first reports from inside to sound like. They should match the read from outside or you should be able to project why they are different. Consistency in matching projections to reality is good. Divergence is bad. It's not always that easy but it's a start.

If you were to vent the roof ( if you could) would the smoke still be as aggressive and hot coming out?

If the smoke was venting this aggressively I would stop ventilating until I made some inquiries about what was going on relative to water application. Ventilation increases fire behavior in the absence of water. Once water is being applied, either by radio message or what you see at the vent point (on the roof in this example) vent aggressively to support improved visibiity for search.

Can you make a generalization that this is mainly contents burning, not the actual structure?

For this video, I'd project a combination. Since the fire obviously has access to the attic there is definitely fire impacting the roof structure at a minimum. Likely there is other impact on the structure, but I think the majority is from contents.

Love the term ‘cool fuel’. Teaching our fireground leaders, particularly our Truck Officers, that vent operations should focus on removal of cold smoke not hot smoke (post knock-down vs pre-Knick down)."

Agree. The SOG in my department indicates to select the tactic to apply water to the fire as fast as possible.

Already well vented, need large volume of water quickly

Agree with this statement. See previous answer relative to roof operations.

What was the delay with water?

It's hard to say whether there is an actual delay or just the perception of a delay based on the video. Without knowing the response model, SOP's for supply, staffing, and other details specific to the jurisdiction and the incident it seems imprudent to comment. For the purposes of learning from the video project the fire behavior for YOUR fire department, response time, and then the operational pace for your crew to stretch, charge, and operate the first line. Compare that to fire growth to make the right line choice for the fire that will exist when you are ready to operate rather than the fire that exists when you arrive. "

Why are they on the roof

This is later in the incident and the primary attack line would already have been in the fire room extinguishing the fire. In this case, the pin that secures the bale to the valve in the nozzle broke. Therefore, no fire attack. Had it gone as planned vertical ventilation would likely have been perfectly timed with suppression. The focus here is on Reading the Smoke to understand the New Normal for fire behavior.

You can hear the expansion by breaking glass

A great cue that the ventilation profile is changing. When you hear this happening on the fireground make sure the boss knows.

What was the point in vertically ventilating the second video? and placing the ladder in front of a window with smoke coming out of it?

See answer #13

The first video seems like it could have benefited from a blitz fire attack. 10-30 seconds with the deck gun?

Maybe. Depends on the access to the fire building relative to potential apparatus placement. Certainly, something to consider if the layout of the situation permits.

What is your thought about ""hitting it from the yard"" to knock the fire in the first video down. Do you think that would have saved that building?

Beginning with external application of water is an effective tactic for many fires. The key is determining the fastest method of applying water to the seat of the fire. In this case it's likely external application would be necessary regardless. Operating through and into the apartment door for fire attack.

Proper PPE reinforcement there. Guy getting on ladder in second video wasn't wearing structural fire gloves and got hands burnt because of poor ladder placement (over window that vented).

See answer #13

Both situations became worse, possibly due to the combustibles inside the home. Furniture uses more inorganic material. Items burn faster versus before when furniture used to be made with organic wood material.

Think about this as the 'new normal'!! What you say is true for these two fires and also true for every fire in the modern era.

Did wind contribute to the growth of either of those fires?

Likely for the residential. I don't see wind indicators for the apartment fire. Always important to consider the impact of wind when we are determining the tactical approach.

Can you explain on a science level the theory that fires are not burning hotter now but faster? We here it’s the HRR that’s a lot of the issue with the modern fuels but if it has a Faster HRR I don’t understand why it’s not also hotter

I could offer an opinion. If by 'hotter' you mean a higher temperature, then I believe there is an increase over previous generations. The difference, in the data I have seen however, is marginal. Does it make much of a difference if it is 1100 versus 1200 degrees? Does that impact your fire attack? Likely not a determining factor either way. The heat release rate (HRR) however? That is a big difference and is why I am talking about this behavior as 'the new normal' rather than extreme or violent or whatever. This fire behavior is what you, and every other firefighter, should expect to occur. Don't spend to much time worrying about whether the fire will be 1100 or 1200 degrees. Use water to ensure it stays below 400-500 degrees to protect any victims and prevent fire growth.

The fact that the smoke is going straight out shows a large velocity at first?

Yes. Great understanding of how to translate what you see into VVDC!

"Volume, Velocity, Color, Density which is most important to an IC"

Sometimes I represent VVDC as vVDc with Velocity and Density as primary indicators (the cake) and volume/color as supporting (the icing). All have something to add but Velocity and Density are the best predictors of the immediate future.

What would've happened if they left the door closed?

Unknown if/when it was opened. Firefighters would have to open it for fire attack. Anytime there is not water available doors should remain closed. This is why ULFRTI has the 'close before you doze' campaign.

Could you use a hose on a fog pattern to cool the inside of the building instead of trying to run in the door and put the fire out?

Please consult the ULFRTI studies on external water application. The fog pattern generally is not effective for external application and can, in fact, cause deterioration of conditions inside the fire building. External application of water should be smooth bore or straight stream, focused on the top of the window opening, and directed to coat the inside surfaces of the room with water to cool them and stop the off-gassing (pyrolisis) happening inside. Again, PLEASE consult the ULFRTI which you can see some of here: firefightersafety.org/posts/tactical-considerations-web-series-ep-4.html

Not Sure Chief, but I think it is important to point out that heat increases pressure which increases the velocity of the smoke and at the same time increases the temperature by itself.

Yes, that is true and important. If I didn't make that clear in the webcast please forgive me the oversight with the time restrictions.

Velocity equals presser?

Generally, this is true. Caveat also depends on the restrictions of the exhaust point. Consider the pressure, and attendant velocity, from a restricted opening like a closed window or door versus the open window or door. Visual cue = highest velocity from most restricted opening is closer to the seat of the fire.

After watching the last video i was seeing slow moving smoke but the fire was not ""deep seated"" did i hear something wrong?

The slow moving smoke is coming from areas that are remote from the fire location. There was higher velocity smoke closer to the fire. Review the first video and discussion in the presentation I discussed the signs of a deep-seated fire. The same color/velocity smoke coming from multiple cracks/seams with the same velocity indicates a deep-seated fire likely in closed compartments or structural spaces. That's not what you are seeing here where there are significant differences in velocities, colors, and densities from different areas.

Wondering what caused it to be so filtered?

Filtering takes place either through material (cracks and seams, insulation, etc) or distance (the end of a long hallway or stairwell for example) as the 'sticky' black parts of the smoke (soot, fuel oil) separate from the smoke column with a light grey to white color.

Did it light off after the FF at first floor opened the door?

Since the engine was just arriving it is unlikely firefighters opened the door to the unit. Though I can't know for certain, since I wasn't there, it is likely that fire growth increased temperature to allow vent point ignition as the fuel/smoke mixes with air outside the structure.

Do you know if that apartment door was open?

See answer #30

I’m sorry, can you remind me via message of ""bi-directional flow""? is this referencing pathflow?

The exchange of air is bidirectional when there is a single vent opening. Yes, re flowpath.

Are there any cases where it would expand horizontally versus vertically?

Extension goes to the path of least resistance recognizing that vertical is easier than horizontal with the same underlying conditions. For example, the fire would extend horizontally through an open door versus an intact sheetrock ceiling. Fire also seeks oxygen so extension to areas where oxygen is available are the most likely extension. Generally, fire does not extend into 'dead end' areas (bedrooms etc) when there is not ventilation available. Smoke will spread and the oxygen level will decrease as oxygen is consumed by the fire. This makes the areas untenable for civilians but, technically, not on fire.

Is this a building that was preplanned to see if the was built with fire walls? I wouldn't necessarily worry about the amount of fire, but the spread may be a problem

Don't know about a pre-plan though that is always a plus. Where the smoke spreads the fire will follow. The timing will depend on a lot of factors including how efficient the fire department is.

Did the stairwell acts as a chimney?

Stairwell will act as chimneys if there is an opening at the top.

Could the evacuation have caused the fire to possibly spread easier due to there no being doors being opened?

Possible. The thing to focus on when evacuating is to keep doors closed as much as possible. Make that a training emphasis to confine the fire, prevent smoke spread, and protect civilians and firefighter from fire growth.

Can you send us the videos that were presented here today?

The presentation is available for you to watch and recommend. Video is available for the learning at sites such as YouTube. There is plenty to learn in practicing reading smoke. I watch fire video every day!

I'm sure we can apply this process to high rises as well, but is there anything different we need to consider due to the 10 or more stories we may be facing?

As discussed in the presentation high-rise smoke conditions are highly dependent on a lot of factors and will most likely be read from inside the building by the companies arriving at the fire floor and above. Understanding how to read smoke in the hallway, stretching wet versus dry, etc. were not well covered in the webcast due to time limitations.

In the last video is there a fire wall between apartments? If so, would that keep it from going from one to another?

There should be, in my opinion, and based on my understanding of building construction. That is why it is surprising that the fire extends to the Delta so quickly. Recognizing the extension is counter to my expectations is the 'Reading Smoke' payoff and lets me respond quickly to the deterioration that I did not anticipate on first arrival.

Do you have more advanced classes on reading smoke?

Yes. Please visit my website, www.ignitionpointtraining.com or contact me at phil@ignitionpointtraining.com for additional class options. I love to get out and teach in person.

Earlier suggestion was made to cool environments to avoid flashover of rooms. Just to confirm, we are talking about at the seat of the fire, correct? Our department is big on never opening up lines on smoke...only on the seat of the fire. The information I had learned in my studies is that maintaining thermal balance by withholding water aided in search visibility. What are your thoughts?

This is a tough question because it deals specifically with local practice, policy, and training. In my experience I cannot advocate an approach that allows firefighters to be 'swimming in hot fuel'. When we discuss thermal balance there is a difference between smoke 1-2 feet from the top and 1-2 feet from the bottom. Is it staying put or flowing over you? Is it lighting off intermittently? A firefighter in full PPE will begin to experience heat through the gear at approximately 450f. At the point a firefighter is feeling the heat at the 2-3 foot levels that means anywhere from that point to the seat of the fire is hotter. How much heat can a civilian take for how long? In general the evidence indicates that an aggressive attack with a smooth bore or straight stream at adequate flow rates (>150gpm) will produce gas cooling in excess of steam production. There is a tendency in training to put a small amount of water into a large volume of heat producing searing steam expansion. That's bad. What I advocate is applying copious volumes of water to bring ambient temperatures below 200f thereby eliminating steam conversion. Evidence, both scientific and anecdotal, support this approach. Water helps. The flow rate from a closed nozzle is zero. Teach, and learn, to flow and move rapidly cooling the environment and extinguishing the fire providing rapid increases in victim survivability and rapid access and visibility for searching.

Are there any keys in smoke that would indicate arson caused using flammable liquids?

Probably only multiple fires separated from each other. My experience is that the investigation always takes place as a post fire occurrence, so I haven't thought to apply reading smoke to fire investigation. Interesting idea though.

Will getting proficient in Positive Pressure Attack be of any help?

Based on the current research and my experience I believe, as a general rule, that ventilation should be limited until water application is achieved. PPA provides vent before water application. I was a very big advocate of PPA and have used it plenty. The potential for problems with coordination and the attendant fire growth that is possible have led me to advocate for aggressive post knock down ventilation to include aggressive use of post knock down PPV.

Why not a transitional attack to reset room and then interior ops

Beginning with external application of water is an effective tactic for many fires. The key is determining the fastest method of applying water to the seat of the fire. In this case it's likely external application would be effective in slowing the spread during the time it takes to stretch to floor 3.