In-Station Training

TM 25-38 Residential Fire

Author

Chief Ed Hartin

Purpose

Resource constraints may result from the response system (e.g., on-duty versus on-call staffing) or from incident activity and resources being out of position. Both present a challenge to effective operations.

Learning Outcomes

Firefighters and officers perform an effective size-up, select an appropriate strategy, and implement tactics based on the strategic decision-making model.

Conducting the Drill

This incident involved a residential fire at 475 Dakota Drive, New Kensington, Pennsylvania on September 8, 2024, at 12:55 (Matto, 2025; WTAE-TV Pittsburgh, 2025; & Engel, 2025). Review the map and photos (Figures 1-5) to gain an understanding of the building and area involved.

Figure 1. Map of the Incident Area

Note: Adapted from Google. (2025a). [Map, 475 Dakota Drive, New Kensington, PA]. https://bit.ly/46zgffV.

The closest hydrant is on Dakota Drive to the north of the incident in front of 463 Dakota Drive, and a second hydrant is available to the south on Cleveland Drive at Dakota Drive as illustrated in Figure 1.

Figure 2. Aerial View

Note: Adapted from Google. (2025b). [Aerial view 475 Dakota Drive, New Kensington, PA]. https://bit.ly/462d5Bi.

There are no street view photos available for the main fire occupancy and the Bravo and Delta exposures.

Figure 3. Alpha/Bravo Corner

Note: Adapted from Google. (2025c). [3d aerial view 475 Dakota Drive, New Kensington, PA]. https://bit.ly/4piH6nS.

Figure 4. Side Charlie

Note: Adapted from Google. (2025d). [3d aerial view 475 Dakota Drive, New Kensington, PA]. https://bit.ly/460IWCj.

Figure 5. Charlie/Delta Corner

Note: Adapted from Google. (2025e). [3d aerial view 475 Dakota Drive, New Kensington, PA]. https://bit.ly/48dRkzK.

The temperature is currently 68° F with wind from the north at 5 mph (Weather Underground, 2025). **You are the company officer of an engine company**. It is Monday, September 8th, and you have been

dispatched along with two other engines, a ladder company, medic unit, and command officer to 2475 Dakota Drive at 12:55 for a residential fire. The engines and ladder have four-person staffing[1].

Time starts now! Answer the first eight questions within the next 10 minutes. Decide and put your answers in the form of communication you would have with your crew, other companies, and the first arriving command officer. Save discussion for after answering the first eight questions.

1. What critical factors would you consider when dispatched and during response? What conversations would you have with your crew during response?

You hear a command officer, two other engines, a ladder company, and an advanced life support ambulance go en route. While responding, dispatch provides an update that multiple callers are reporting a deck fire.

You will approach from the north on Dakota Drive and arrive first. The ladder company will arrive from the same direction **five minutes after you**. The second engine will arrive from the south on Dakota Drive **three minutes after the ladder company**. The command officer will arrive shortly after the second engine. All other units dispatched on the first alarm will arrive after the command officer. **Note that there is a significant delay before the arrival of additional resources!**

Watch the incident video (Matto, 2025) from 00:43 to 01:15 and examine Figures 6 and 7, illustrating conditions on arrival.

[1] If your first alarm deployment is different, use your own resource assignment and staffing with the first and second arriving resources typical for your agency (e.g., two engines vs. engine and ladder).

Figure 6. Conditions on Arrival-Alpha/Bravo Corner

Note: Adapted from Matto, S. (2025). *Structure fire (pre-arrival)-Lower Burrel, PA* [video]. https://bit.ly/4nwCOaU

Figure 7. Conditions on Arrival-Side Alpha

Note: Adapted from Matto, S. (2025). *Structure fire (pre-arrival)-Lower Burrel, PA* [video]. https://bit.ly/4nwCOaU

2. State your initial radio report (IRR) exactly as you would transmit it to dispatch.

3. What specific actions would you take (as the company officer) immediately upon arrival and exiting the apparatus and what task orders would you give your crew?

Watch the incident video (Matto, 2025) from 01:15 to 02:16 and examine Figure 8 illustrating conditions on Side Charlie.

Figure 8. Conditions on Side Charlie

Note: Adapted from Matto, S. (2025). *Structure fire (pre-arrival)-Lower Burrel, PA* [video]. https://bit.ly/4nwCOaU

4. Would you change the action you are taking or modify the assignments given to your crew? If so, what task orders would you provide?

5. State your update report exactly as you would transmit it to dispatch.

6. Ladder 1 arrives and advises that they are Level 1 on Chester Drive at Dakota Drive. State the tactical assignment you would give them exactly as you would transmit it.

7. Engine 2 arrives and reports that they are Level 1 on a hydrant to the north on Dakota Drive. State the tactical assignment you would give them exactly as you would transmit it.

8. Based on anticipated effectiveness of your tactical operations, state your conditions, actions, and needs (CAN) report that you would provide to the first arriving command officer as part of command transfer to IC #2.

Reflect on your strategic decision-making and responses to questions one through eight before answering the next six questions. Give some thought to what cues, patterns, or anomalies (differences from conditions that you would anticipate) inform your answers.

9. What was the problem?

10. What was getting in the way of achieving your tactical priorities?

11. Was there anything in this incident that could have hurt or killed you (right now)?

12. Was it reasonable to believe that the Main Fire Occupancy was occupied?

13. Was there searchable space?

14. If you believed it was reasonable that the building was occupied and there was searchable space, what could you do about it?

The first arriving company deployed a 2 ½" attack line to Side Charlie for fire control. Another company stretched a 1 ¾" attack line to Side Charlie and placed into operation to assist with fire control. Watch the incident video from 02:45 to 06:45 and examine Figure 9 before answering the next several questions.

Figure 9. Exterior Water Application from Side Charlie

Note: Adapted from Adapted from Matto, S. (2025). *Structure fire (pre-arrival)-Lower Burrel, PA* [video]. https://bit.ly/4nwCOaU

15. The 2 ½" attack line was effective in achieving knockdown, but how could the effectiveness of this line have been improved?

The attack lines (2 ½ and 1 ¾") on Side Charlie had an estimated flow rate of 400 gpm (250 gpm + 150 gpm) and flowed more than 1200 gallons of water before the nozzle firefighter shut the 2 ½" attack line down.

16. Given the size of the building and your perspective on the extent of fire involvement, what would be the necessary flow rate and volume of water to achieve knockdown (prior to transition to an interior attack)?

It is important to consider context! The time to deploy an effective response force can differ between a career staffed urban fire department and a respond from home volunteer staffed fire department. Company staffing and response time can vary considerably. When sufficient resources were on-scene, companies stretched two attack lines through Side Alpha for fire control on Floors 1 and 2.

Figure 10. Conditions on Side Alpha Post Knockdown

Note: Adapted from Adapted from Matto, S. (2025). *Structure fire (pre-arrival)-Lower Burrel, PA* [video]. https://bit.ly/4nwCOaU

17. Was the choice to stretch attack lines through Side Alpha consistent with your incident action plan (or did you stretch through Side Charlie after knockdown)? What would be the advantages and disadvantages of these two options?

Additional Learning: In most cases 1 ¾" attack lines have sufficient flow rate to quickly control fires in typical residential occupancies. When confronted with significant fire involvement, a 2 ½" attack line provides increased flow rate at the cost of decreased mobility. While there are methods that can be used to estimate required fire flow (e.g., National Fire Academy and Iowa Fire Flow Formulas), fire officers generally choose an attack option based on experience, rules of thumb, or in some cases default to the most used option (1 ¾" attack line) without much thought.

The Underwriter Laboratories Fire Safety Research Institute (UL FSRI) conducted multiple studies examining the use of interior and exterior streams and coordinated fire attack in full-scale structures in

the lab and using acquired structures. In all their experiments in single family dwellings, researchers used a 1 ¾" attack line with a flow rate of between 150 and 160 gpm.

Discuss the following excerpts from the tactical considerations identified in *Impact of Fire Attack Utilizing Interior and Exterior Streams on Firefighter Safety and Occupant Survival: Full Scale Experiments* (Zevotek, Stakes, & Willi, 2018) with your crew. These tactical considerations were developed based on full-scale lab experiments but were validated in the follow on study *Analysis of the Coordination of Suppression and Ventilation in Single-Family Homes* (Regan, Bryant, & Weinschenk, 2020) which was conducted using acquired structures.

> With all else being equal, the tactical choice on where to apply water from should be based more on the time it takes to knock back the fire and less on the position the water is being applied from. To have an impact on the fire, water must be applied to [involved compartments] (Zevotek, Stakes, & Willi, 2018, p. 184).

In the incident examined in this incident, the fire started on the deck and extended into the first floor and up to the second floor. The initial attack line was stretched to Side Charlie and operated directly into the area of most significant involvement on Floor 1. The large opening into the fire area provided significant ventilation but also provided ease of access for water application to some (but not all the involved areas). Some of the fire was shielded from direct application. What options are available to increase the effectiveness of exterior water application under these circumstances (particularly when faced with a resource driven delay in transition to the interior)?

> When dealing with a room and contents fire, the energy release rate is limited by the available oxygen (ventilation-limited). It does not take a large amount of water to absorb the energy being released and knock back the fire. Although less is not necessarily better, when a water supply has not been established, or in areas where no municipal supply exists, water application should not be delayed to establish a water supply. Even a 500-gallon supply tank can be sufficient to knock back two rooms of fire, if the attack crew can get the water where it needs to go (Zevotek, Stakes, & Willi, 2018, p. 186-187).

In this incident, the first arriving engine laid its own supply line (Broadcastify, 2025). What factors would influence the decision for the first arriving engine to establish their own continuous water supply, versus having a supply line laid by a later arriving engine? Remember that context matters!

> When a transitional attack is chosen and a single hose line is going to be utilized to complete the tactic, the crew should understand the importance of rapidly relocating the hoseline from its exterior position after the initial knock-back to the interior for complete suppression. The faster this can be accomplished, the less the temperatures will rebound. If regrowth is a significant concern, and resources permit, maintaining the initial suppression crew on the exterior position while a second hoseline and crew complete the interior suppression is an option to limit the re-growth (Zevotek, Stakes, & Willi, 2018, p. 195).

In this incident, there was a delay in transition to the interior based on limited resource availability early in the incident. Companies maintained water application from the exterior on Side Charlie until sufficient resources were available to initiate an interior attack. How would you coordinate this transition from exterior to interior?

> As with the initial water application, the method used for final suppression should be based on the time it takes to perform the tactic. During an exterior attack and often some interior attacks, for example hording conditions, it is often difficult to apply water under or behind obstructions such as beds, dressers, chairs, and sofas. After an initial water application from the exterior, if flames are visible the crew should attempt to place the nozzle in the ventilation opening and suppress the flames. If there are no obstructions, placing the nozzle through the opening on a half-open bale or narrow fog and moving it in two or three large circles will cool as many surfaces as possible (Zevotek, Stakes, & Willi, 2018, p. 193).

Given conditions in this incident, how might the methods of water application discussed in this tactical consideration have applied? Are these methods part of your task level "toolbox"?

References

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