In-Station Training

TM 25-31 Residential Fire

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Purpose

Lightning strikes can ignite structure fires as well as fires in the wildland environment. Severe thunderstorms can result in challenging incidents and in some cases, multiple incidents within a short period of time which can tax fire service deployment. Lightning related structure fires can also intersect with other aspects of the built environment resulting in significant hazards to operating personnel.

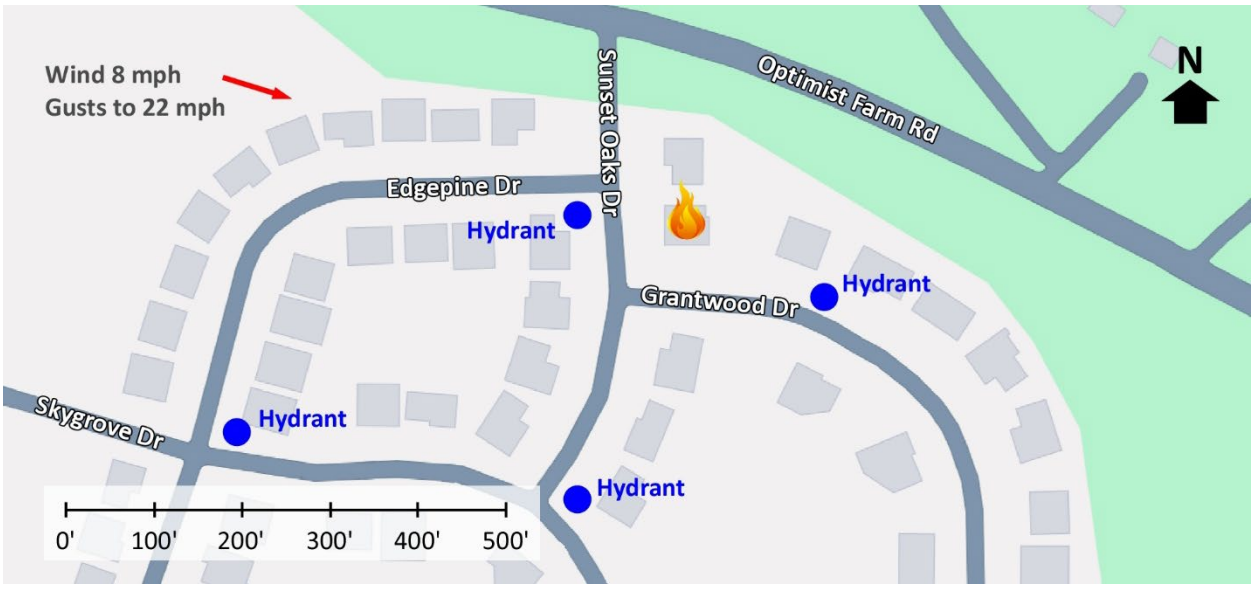
Learning Outcomes

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 105 Sunset Oaks Drive, Holly Springs, North Carolina on Saturday, July 19, 2025, at 22:00 (JPope537, 2025; Overton, 2025; WRAL, 2025; & Legeros, 2025). Review the map and photos (Figures 1-7) to gain an understanding of the building and area involved.

Figure 1. Map of the Incident Area



Note: Adapted from Google. (2025a). [Map, 105 Sunset Oaks Drive, Holly Springs, NC]. https://bit.ly/4obn2Dt.

Figure 2. Aerial View

Note: Adapted from Google. (2025b). [Aerial view 105 Sunset Oaks Drive, Holly Springs, NC]. https://bit.ly/3GNHwkZ.

The closest hydrant is at the intersection of Edgepine Drive and Sunset Oaks Drive. In addition, there are additional hydrants on Grantwood Drive and Skygrove Drive as illustrated in Figure 1.

Figure 3. Alpha/Bravo Corner

Note: Adapted from Google. (2025c). [Street view 105 Sunset Oaks Drive, Holly Springs, NC]. https://bit.ly/46xQ3ml.

Figure 4. Side Alpha

Note: Adapted from Google. (2025d). [Street view 105 Sunset Oaks Drive, Holly Springs, NC]. https://bit.ly/3U6UmO6.

Figure 5. Side Delta

Note: Adapted from Google. (2025e). [Street view 105 Sunset Oaks Drive, Holly Springs, NC]. https://bit.ly/4mCMgJt.

Figure 6. Charlie/Delta Corner

Note: Adapted from Google. (2025f). [Street view 105 Sunset Oaks Drive, Holly Springs, NC]. https://bit.ly/4lSfXpV.

Figure 7. Bravo/Charlie Corner

Note: Adapted from Google. (2025g). [3d aerial view 105 Sunset Oaks Drive, Holly Springs, NC]. https://bit.ly/4lSfXpV.

The temperature is currently 78° F with wind from the west northwest at 5 mph with heavy rain, thunder, and lightning (Weather Underground, 2025 & Overton, 2025). **You are the company officer of an engine company**. It is Saturday, July 19th, and you have been dispatched along with two other

engines, a ladder company, medic unit, and command officer to 105 Sunset Grove Drive at 22:00 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 the caller reports his house was struck by lightning and is now completely burning. A short time later, dispatch provides a corrected address: 105 Sunset Oaks Drive (just over 3 miles away from the original reported address).

You will arrive first, approaching from the north on Sunset Oaks Drive. The ladder company will arrive from the same direction shortly after you. The second engine will arrive from the north several 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.

Watch the first 00:10 of the incident video (JPope537, 2025) and examine Figure 8, 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 8. Conditions on Arrival

Note: Adapted from Jpope537. (2025). **Pre arrival** Holly Springs residential structure fire 7-19-25. https://bit.ly/4faK0Gy.

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 (JPope537, 2025) from 00:30 to 01:05 and examine Figure 9 illustrating conditions on Side Delta when you arrive. Conditions on Sides Bravo and Charlie are consistent with those observed on Sides Alpha and Delta with gray smoke from the eaves and attic.

Figure 9. Conditions on Side Delta

Note: Adapted from Jpope537. (2025). **Pre arrival** Holly Springs residential structure fire 7-19-25. https://bit.ly/4faK0Gy.

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 Sunset Oaks Drive at Edgepine 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 at Sunset Oaks Drive and Edgepine Drive. State the tactical assignment you would give them exactly as you would transmit it.

8. Based on observed and 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?

Review Figures 3-6 and watch the incident video (JPope537, 2025) from 01:05 to 02:30 before answering the next two questions.

15. Did you identify this building as a 2 ½ story house? What are the implications of a “half story”? Do you think that the “attic” was unfinished or a finished living space? How do you think the attic could be accessed for fire control (e.g., up a stairway, scuttle opening, or by pulling ceilings)?

16. The first arriving engine stretched an attack line through Side Alpha to Floor 2 or the Attic. Was this consistent with your initial attack position? What factors influenced your choice of initial attack position (e.g., exterior on Side Delta or on Floor 2 or in the Attic)?

Watch the incident video from 02:30 to 04:00 before answering the next several questions.

17. A second line was stretched to Side Delta and applied water from the exterior at ground level into the attic. Was this water application effective? Why or why not? If not, how could effectiveness of this exterior stream have been improved?

18. The exterior line was operated while interior crews were stretching to Floor 2 or the Attic for fire control. Do you think that the exterior stream had (or could have) a positive or negative impact on the interior crew? Why? How could the operation of these two lines be coordinated?

Additional Learning: Structure fires caused by lightning present several challenges that may be different than structure fires resulting from other causes.

> When lightning discharges to a structure, its energy seeks all available paths to ground. Therefore, lightning damage can be located in multiple apparently unrelated locations throughout a home. These paths often involve continuous conductive systems such as electrical wires, plumbing pipes, and ventilation ducts. As the electrical energy travels to the electrical ground, it can also jump across significant air gaps between adjacent conductors, and break down insulation (Ellison, Morse, & Kytomaa, 2012, p. 217)

Fires may be caused by lightning striking the roof of a structure or roof penetration such as a chimney or vent pipe. In other cases, lightning strikes outside the structure and electrical current travels into the structure, resulting in ignition of combustibles. One of the challenges presented by lightning caused structure fires is the potential for ignition in multiple locations (and often in void spaces). For a deep dive from a fire investigation perspective (but there are excellent lessons to be learned by firefighters and fire officers from a suppression perspective), read *Lightning Related Structure Fires* (Ellison, Morse, & Kytomaa, 2012).

Structure fires caused by lightning can also intersect with other hazards in the built environment. In 2018 and 2021, lightning caused residential fires involving corrugated stainless-steel tubing (CSST) resulted in the line of duty deaths of Firefighter Nathan Flynn and Captain Joshua Laird. Take the time and review the *Death in the Line of Duty Reports F2018-13* (NIOSH, 2025) and *F2021-14* (NIOSH, 2022), the Howard County Fire and Rescue *Line of Duty Investigative Report* (HCFR, 2019), the *Analysis of the*

Line of Duty Death of Firefighter Nathan Flynn Utilizing Fire Dynamics Simulator, Fire Testing and Electronic Data Sources (St John, 2023) and watch the *ATF Video Timeline LODD Analysis of Firefighter Nathan Flynn | 7005 Woodscape Drive, MD (CSST Fire)* (ATF, 2023) on this incident.

Note: Both Firefighter Nathan Flynn and Captain Joshua Laird were promoted posthumously (some reports refer to their rank at the time of the incident and others to their posthumous rank.

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