

In-Station Training

TM 25-17-Residential Fire-Mayday



Author

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Purpose

A small percentage of maydays during structural firefighting occur a short time after arrival; 0.50% less than 10 minutes after arrival and 6.00% within 10-15 minutes after arrival (Abbott, 2022). However, maydays can occur any time that firefighters are in the hazard zone.

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 405 South Snider Street in Christopher, Illinois on Wednesday, April 2, 2025, at 08:00 (WISL News 3, 2025& Mulero, 2025; & Ruch & Kidd, 2025). Review the map and photos (Figures 1-6) to gain an understanding of the area and building involved.



Figure 1 Map of the Incident Area

Note: Adapted from Google. (2025a). [Map, 405 South Snider Street, Christopher, IL]. <u>https://bit.ly/4cfNAOc</u>.

The closest hydrants are at the intersection of South Snider Street and West 4th Street and South Snider Street and West 6th Street. Additional hydrants are in the area as illustrated in Figure 1.

Figure 2 Aerial View



Note: Adapted from Google. (2025b). [Aerial view 405 South Snider Street, Christopher, IL]. <u>https://bit.ly/3FQzoPy</u>.

Figure 3. Alpha/Delta Corner



Note: Adapted from Google. (2024a). [Street view 405 South Snider Street, Christopher, IL]. <u>https://bit.ly/43G1NSu</u>.

Figure 4. Side Alpha



Note: Adapted from Google. (2024b). [Street view 405 South Snider Street, Christopher, IL]. <u>https://bit.ly/3EbeH0j</u>.

Figure 5. Alpha/Bravo Corner



Note: Adapted from Google. (2024c). [Street view 405 South Snider Street, Christopher, IL]. <u>https://bit.ly/41Zt9li</u>.



Figure 6. Charlie/Delta Corner

Adapted from Google. (2024d). [Street view 405 South Snider Street, Christopher, IL]. https://bit.ly/4jg5UZR.

The temperature is currently 71° F with a moderate breeze from the north (Weather Underground, 2025 & National Weather Service, 2025). **You are the company officer of an engine company**. It is Wednesday, April 2 and you have been dispatched along with two other engines, a ladder company, medic unit, and command officer at 08:00 to 405 South Snider Street for a residential fire. The engines and ladder have four-person staffing¹.



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, the ladder company and an advanced life support ambulance go en route. You will arrive first, approaching from the north on Snider Street. The ladder company will arrive from the same direction three minutes after you. The second engine will arrive from

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).

the south several minutes after the ladder company. The command officer will arrive after the second engine. All other units dispatched on the first alarm will arrive after the command officer.

While responding, dispatch advises that a public works crew in the area notified the occupant of the house of the fire and assisted him leaving the building. Watch the first 00:08 of the <u>incident video</u> (WISL News 3, 2025) and examine Figure 7 illustrating conditions on arrival.



Figure 7. Conditions on Arrival

Note: Adapted from 310 Fire. (2025). Mulero, A. (2025). *Multiple crews battle large fire in Christopher*. <u>https://bit.ly/41WQeVF</u>

- 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?

Exiting the apparatus, you encounter the occupant who advises that there was no one else in the house. There is no appreciable smoke visible on Side Delta and flames are pushing from a window on Floor 2 Side Charlie.

The following questions are based on your crew stretching a line on Side Alpha while you are completing 360-degree reconnaissance. Watch the <u>incident video</u> (WISL News 3, 2025) from 00:08 to 00:20. The explosion occurred just as you completed your 360-degree reconnaissance. The porch roof on Side Alpha was pushed away from the building by the explosion and collapsed on top of a firefighter who was stretching an attack line on Side Alpha. Multiple police officers and bystanders are attempting to lift the porch roof off the firefighter.

- 4. What action would you take now? If so, what task orders would you provide?
- 5. State your update report exactly as you would transmit it to dispatch.
- 6. Ladder 1 advises that they are Level 1 at South Snider Street and West 6th Street. State the tactical assignment you would give them exactly as you would transmit it.

The police officers, bystanders and members of your crew were able to lift the porch roof off the firefighter, who is ambulatory and complaining of minor injuries.

- Engine 2 arrives and reports that they are Level 1 on a hydrant on South Snider at 6th Avenue. State the tactical assignment you would give them exactly as you would transmit it.
- 8. Based on the 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?

Watch the remainder of the incident video <u>incident video</u> (WISL News 3, 2025). Note that the resources and staffing level on-scene and initially responding to this incident were different than provided in this 10-Minute Training.

- 15. Describe the building, smoke, air track, heat, and flame (B-SAHF) indicators that you observed prior to the explosion. What fire conditions did you anticipate on Floors 1 and 2?
- 16. Was the occurrence of this explosion consistent with your anticipated progression of fire behavior? Why or why not? Based on your initial observations, what did you think was likely to happen over the next several seconds to minutes?

This building was a 1 ½ story house. A half story generally has knee walls, making the floor area of the second floor smaller than the first floor and providing void spaces that are often used for storage. The window on Floor 2, Side Alpha that is visible in the video is larger and the bottom of the window is lower than the window on Side Charlie (see Figure 8).



Figure 8. Building Construction and Ventilation Openings

Note Adapted from Google. (2024b, 2024d, & 2024e).[Street view 405 South Snider Street, Christopher, IL]. <u>https://bit.ly/3EbeH0j; https://bit.ly/4jg5UZR; & https://bit.ly/3XOOE5M</u>.

Examine Figure 9 illustrating fire progression over a timeframe of approximately 1.5 saeconds.

Figure 9. Fire Progression



Note: Adapted from WISL News 3. (2025). First responders worked a house fire in Christopher, IL, then an explosion happened...<u>https://bit.ly/4iV4hB1</u>.

Continued



Note: Adapted from WISL News 3. (2025). First responders worked a house fire in Christopher, IL, then an explosion happened.... Retrieved April 6, 2025, from <u>https://bit.ly/4iV4hB1</u>.

Figure 10. Post Collapse



Note: Adapted from WISL News 3. (2025). First responders worked a house fire in Christopher, IL, then an explosion happened.... <u>https://bit.ly/4iV4hB1</u>.

17. What type of fire behavior phenomena do you think occurred in this incident? What factors lead you to this conclusion?

Figure 9. Fire Progression (continued)

Additional Learning: Backdraft and smoke explosion are both fire behavior related explosions but are significantly different from one another. Review the following overview of these phenomena with your crew. For a deeper dive, see <u>Backdraft: Fire Science and Firefighting, A Literature Review</u> (Lambert, 2014) and watch for an upcoming series of Command Competence blog posts on Backdraft and Smoke Explosion.

Backdraft is a deflagration (explosion) resulting from increased ventilation of an enclosure containing a concentration of atmospheric oxygen that is too low to support significant flaming combustion and a high concentration of flammable products of combustion and unburned pyrolysis products (smoke) above their flammable range. Backdraft requires a change in ventilation. The deflagration begins inside the enclosure as mixing of smoke and air results in a mixture that is within the flammable range where the mixing is occurring.



Backdraft

It is important to note that increasing ventilation to a ventilation limited fire (absent application of water for fire control) will always result in an increase in heat release rate (HRR) but does not always result in a backdraft. In some cases, increased ventilation will result in a ventilation induced flashover and in other cases it simply will result in the fire becoming larger (increased HRR).

There are two related conditions required for the occurrence of a backdraft, a high concentration of flammable products of combustion and unburned pyrolysis products and a low concentration of oxygen (these two conditions are directly related). In addition, there needs to be a source of ignition, such as smoldering fuel that returns to flaming combustion as air flows into the room.

Recognizing potential for a backdraft is challenging. There are multiple indicators that may (or may not) indicate backdraft potential. Backdraft indicators include:

- A ventilation limited fire (necessary for production of a significant quantity of flammable products of combustion and unburned pyrolysis products)
- Pulsing air track (flow). Discharge of smoke followed by intake of air (absence of smoke discharge). The frequency of pulsation can vary considerably and there may be a significant delay between cycles.

- Condensed pyrolysis products on windows (brown, grey, or black are common colors for this condensate).
- No visible flames (this can be misleading as conditions can vary considerably in different areas of a building under fire conditions).
- Significant heat indicators (this is an indirect indicator, but significant heat is necessary to produce a high concentration of pyrolysis products).
- Backdrafts can occur with varied smoke colors (consider this indicator with caution). Yellowish brown smoke has traditionally been considered an indicator, but backdrafts have occurred with creamy whiteish, brown, and black smoke.
- High optical density (thickness) and the texture of smoke (looking like velvet) is consistent with extremely ventilation limited conditions and potential for backdraft.
- Whistling sounds resulting from high velocity smoke discharge (this may be a late indicator).
- High velocity intake of air when making an opening (remember that entry openings are also ventilation openings). This is a late indicator!

It is essential to consider all fire behavior indicators holistically and recognize patterns of interrelated indicators. The preceding list of indicators points to potential, not certainty of a backdraft.

Smoke explosion is a deflagration resulting from ignition of atmospheric oxygen, flammable products of combustion, and unburned pyrolysis products (smoke) that are within their flammable range. Smoke explosions most commonly occur in smoke logged compartments or void spaces remote from the fire. The ignition source may be extension of fire into the compartment or void space, or it may be unrelated to the fire. A flammable mixture of smoke and air may develop as smoke is mixed with air in uninvolved compartments or void spaces or it may develop as ventilation of uninvolved compartments or void spaces.



Smoke Explosion

One of the most concerning things about smoke explosions is a lack of distinct indicators for potential occurrence of this phenomenon. Other than the presence of smoke in areas remote from the fire, which is a normal condition during a structure fire there are no clearly distinct indicators of potential for a smoke explosion.

Potential indicators of a smoke explosion include:

- A ventilation limited fire (necessary for production of a significant quantity of flammable products of combustion and unburned pyrolysis products).
- Void spaces where smoke may accumulate remote from the fire (such as attics, cocklofts, suspended ceilings, and behind knee walls).
- Smoke travel to remote areas of the building or from the main fire occupancy into attached exposures.
- Potential for fire extension from areas currently involved into remote areas of void spaces.

As with indicators of potential backdraft, indicators of potential for a smoke explosion must be considered wholistically and recognize patterns of interrelated indicators.

References

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