In-Station Training

TM 26-16 Residential Fire

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Purpose

Many factors influence the effectiveness of initial incident operations including apparatus positioning, attack positioning, and selection of attack line or other water application methods (e.g., master stream).

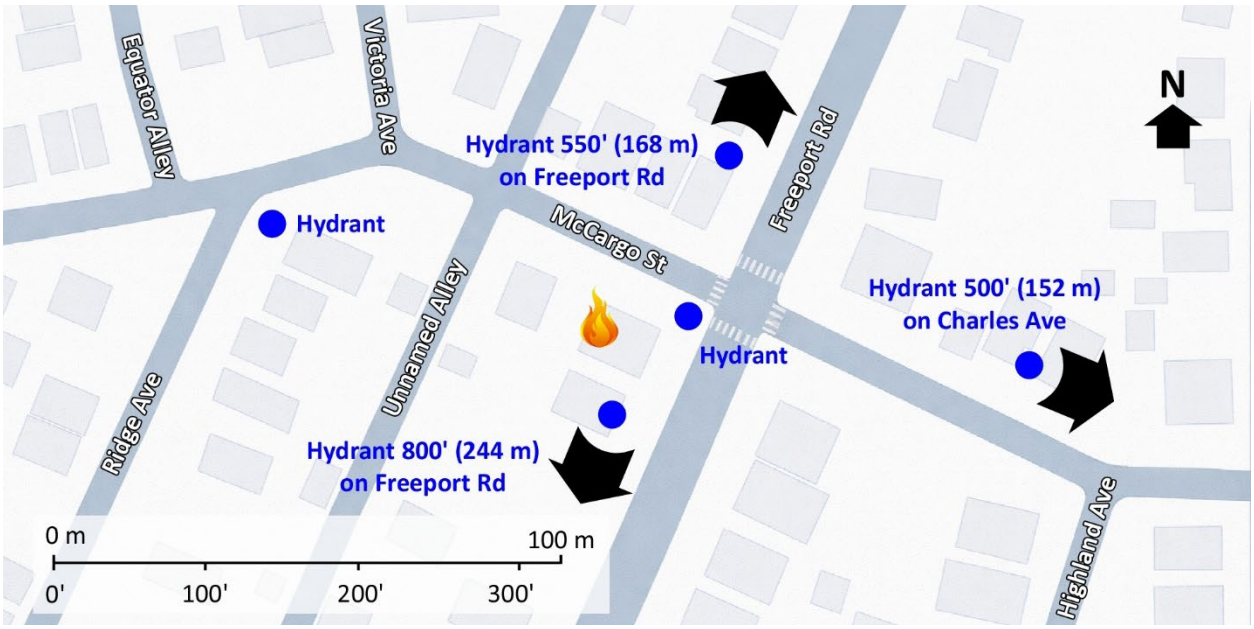
Learning Outcomes

Initial incident commanders 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 495 McCargo Street/265 Freeport Road (duplex addressed of intersecting streets) in New Kensington, Pennsylvania on Sunday, March 29, 2026, at 07:58 (Matto, 2026a & 2026b; Napsha, 2026; Matoney & Scott, 2026; Broadcastify, 2026a & 2026b). Review the map and photos (Figures 1-6) to gain an understanding of the building and area involved.

Figure 1. Map of the Incident Area



Note: Adapted from Google. (2026a). [Map, 495 McCargo Street, New Kensington, PA]. Map data ©2026 Google. https://bit.ly/3OcNWxB.

The closest hydrant is on the Alpha/Bravo corner of the Main Fire Occupancy and the Bravo 1 Exposure at the intersection of McCargo Street and Freeport Road as illustrated in Figures 1 and 2. Other hydrants in the area are illustrated in Figure 1.

Figure 2. Aerial View

Note: Adapted from Google. (2026b). [Aerial view 495 McCargo Street, New Kensington, PA]. Imagery © Google, Imagery © Airbus Maxar Technologies, Map Data © 2026. https://bit.ly/4chLXjB.

Figure 3. Alpha/Delta Corner

Note: Adapted from Google. (2025a). [Street view 495 McCargo Street, New Kensington, PA]. ©2026 Google. https://bit.ly/4md07qA.

Figure 4. Side Alpha

Note: Adapted from Google. (2025b). [Street view 495 McCargo Street, New Kensington, PA]. ©2026 Google. https://bit.ly/3PVXGgk.

Figure 5. Alpha/Bravo Corner

Note: Adapted from Google. (2025c). [Street view 495 McCargo Street, New Kensington, PA]. ©2026 Google. https://bit.ly/4mjcT7c.

Figure 6, Bravo/Charlie Corner

Note: Adapted from Google. (2025d). [Street view 495 McCargo Street, New Kensington, PA]. ©2026 Google. https://bit.ly/4tActf8.

The incident is in a small-city residential neighborhood with closely spaced housing and proximity to former industrial corridors. The surrounding area consists primarily of older detached single-family homes, duplexes, and small multifamily structures, many constructed between the early 1900s and 1950s, reflecting historic industrial-era development. The community has a mix of owner- and renter-occupied housing, with owner occupancy still common but with a notable rental presence. The population reflects generally stable, long-term residency with some turnover in rental units. The predominant language is English with a small percentage of households speaking other languages. (Open AI, 2026). Fire and emergency medical call volume in this area is typical of other areas of the community.

The temperature is currently 34° F (1° C) with wind from the south at 5 mph (8 kph). (Weather Underground, 2026). It is Sunday, March 29th and you are dispatched to a **residential fire with entrapment** at 495 McCargo Street along with two other engines, a ladder company, medic unit, and command officer at 07:58. The engines and ladder have four-person staffing[1]. **You are the officer of the first arriving engine company**.

Time starts now! Answer the first nine questions within the next 10 minutes. Save discussion until after you have answered these questions.

[1] If your first alarm deployment is different, use your own resource assignment and staffing.

While responding, dispatch provides an update that there are **multiple calls and that callers are reporting "there is a fire downstairs with multiple children trapped on the roof"**. You hear the other engines, ladder, medic unit, and command officer go enroute.

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

2. Based on the dispatch information and what you know about this occupancy and response area, what do you anticipate finding on arrival?

Important! Answer questions three through nine in the form of communication you would have with your crew, dispatch, other companies, and the first arriving command officer. State the communications exactly as you would say them face-to-face or over the radio. Save explanation or discussion until after you have completed these questions.

You anticipate the ladder company will arrive several minutes after you, followed by the second arriving engine, medic unit, and command officer. The third arriving engine will arrive after the command officer. As you arrive, **dispatch reports that law enforcement advises that "the children are out".** Medic 1 arrives just before you and reports that they have multiple patients on the opposite side of the street from the fire.

Watch the incident video (Matto, 2026) from 00:30 to 01:00 and examine Figure 7 illustrating conditions on arrival. Click the link above or scan the QR code to access the video.

Figure 7. Conditions on Arrival

Note: Adapted from Matto, S. (2026a). *Structure fire multiple entrapment (pre-arrival) – New Kensington* [video]. https://bit.ly/47IIp8E

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

4. 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?

There is dark grey smoke pushing from the eaves of the Bravo 1 Exposure and conditions on Side Charlie are consistent with those observed from Side Alpha with a large volume of dark grey to black smoke pushing from Floor 2 of the Main Fire Occupancy. Medic 1 reports face to face that they have five patients, an adult male and three children with smoke inhalation and an adult female with smoke inhalation and a leg fracture. **The medic reports that the adult male occupant stated that they were the only ones in the house and that everyone is out.** You have no information about occupants in the Bravo 1 Exposure.

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

6. State your follow up report exactly as you would transmit it to dispatch.

7. Ladder 1 arrives and reports that they are Level 1 at McCargo Street and Victoria Ave. State the tactical assignment you would give them exactly as you would transmit it.

8. Engine 2 arrives and reports that they are Level 1 on a hydrant to the south on Freeport Road. State the tactical assignment you would give them exactly as you would transmit it.

9. 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 nine before answering the next eight questions. Think about what cues, patterns, or anomalies (differences from conditions that you would anticipate) informed your answers.

10. What information most influenced your expectations?

11. Did anything in the incident post-arrival challenge your initial expectations?

12. What was the actual problem once you arrived?

13. What were your tactical priorities and what was getting in the way of achieving them?

14. During initial operations, was there an immediate threat of serious injury or death to you, your crew, or other companies?

15. Was it reasonable to believe that the Main Fire Occupancy or Exposure Bravo 1 was occupied?

16. Was there searchable space?

17. If you believed it was reasonable that there was searchable space, what could you do about it?

In this incident, the first arriving engine stopped short of the Main Fire Occupancy, on McCargo Street, deployed a portable master stream on Side Alpha and an attack line through Side Bravo into the Bravo 1 Exposure and then repositioned to Side Alpha of the Main Fire Occupancy. 100' of 5" hose was hand stretched to the hydrant on the corner of McCargo Street and Freeport Road.

The first arriving truck was positioned on McCargo Street behind the engine and the second arriving engine positioned on Freeport Road and stretched an attack line through Side Bravo into the Bravo 1 Exposure. Watch the incident video (Matto, 2026) from 01:25 to 09:00 before answering the remaining questions. Click the link above or scan the QR code to access the video.

18. How would the effectiveness and efficiency of initial operations have been impacted if the first arriving engine had been positioned on the hydrant at the corner of McCargo Street and Freeport Road?

19. What factors influenced the effectiveness of initial water application? Flow rate (approximately 250 gpm (946 LPM)[2]? Position of the master stream and resulting distribution of water that was applied?

[2] The portable master stream flowed water for approximately 01:30 from an engine with a 750 gallon (2,839 L) tank making the flow rate from the portable master stream approximately 250 gpm 946 LPM.

20. Given the conditions in this incident, what were the advantages and disadvantages of using a portable master stream rather than a large (2 ½" (64 mm) or small (1 ½" - 1 ¾" (38 mm-45 mm) attack line for exterior fire control.

Additional Learning

There are two opportunities for additional learning; examining effective fire flow and companion 10-Minute Training tactical decision game (TDG) 26-16a that provides an opportunity to engage with this incident as IC #2.

Estimating Effective Fire Flow: How do you and the members of your crew choose an attack line or master stream and related flow rate?

There are several methods for determining an effective flow rate for fire control; these include (but are certainly not limited to) the National Fire Academy (NFA) Fire Flow Formula, the Iowa Fire Flow Formula, and Paul Grimwood's Fire Flow Formula. The NFA and Iowa Formula are based on US units of measure (feet and gallons per minute), while Grimwood's Formula is based on SI units of measure (meters and liters per minute). See Estimating Required Fire Flow: The National Fire Academy Formula (Hartin, 2009a) and Estimating Required Fire Flow: The Iowa Formula (Hartin, 2009b) for a deeper dive into fire flow estimation.

Table 1. Basic Fire Flow Formula

Formula	US Units of Measure	SI Units of Measure
NFA	$\frac{L \times W}{3} = GPM$	
Iowa	$\frac{L \times W \times H}{100} = GPM$	
Grimwood		$(L \times W) \times 6 = LPM$

One important consideration when examining these methods for estimating effective fire flow is that the NFA formula identifies the flow rate for attack lines and backup lines (combined flow rate) and applies a 25% increase in flow rate for each exposure (not shown in Table 1). The NFA method can be divided in half to identify an effective flow rate for fire control (excluding backup lines and exposure protection).

Discussion of these methods is often in terms of "required flow rate" but that is not actually correct as they all overestimate the flow that is necessary. This is not necessarily a bad thing as they provide a margin for error.

Interestingly, over the course of my career, I have not found anyone that uses these formula on the fireground to determine what size line or flow rate that they will use for fire control. In most cases, firefighters and fire officers will say they choose based on experience. But what if they don't have much experience or an incident is outside the range of their experience? This choice is often a default (this is what we always do) or a gut reaction (this looks like a big fire so we will use a 2 ½" (64 mm) line or a master stream (often with whatever the tip size or flow rate setting that it is set on).

One way to build an understanding of effective flow rate or tactical flow rate is to compare these methods using the same example. Use this incident to examine the differences between each of these methods for estimating effective flow rates. First think about the initial attack line you selected and its flow rate? Did you choose a 1 ½" (38 mm), 1 ¾" (45 mm), 2 ½" (64 mm) attack line, or use a master stream device (portable or apparatus mounted)? What flow rate did you use?

The main fire occupancy in the incident examined in this 10-Minute Training was approximately 21' (6.4 m) x 31' (9.5 m) was two-stories, resulting in a floor area of approximately 1,302 ft^2 (60.8 m^2) Based on the era that this house was likely constructed (early to mid-1900s), the ceiling height could be 10' (3 m).

Table 2. Estimated Effective Flow Rate for 495 McCargo Street

Formula	US Units of Measure	SI Units of Measure
NFA	$\left(\frac{21' \times 31'}{3}\right) \div 2 = 108\ GPM$	411 LPM
Iowa	$\frac{21' \times 31 \times 10}{100} = 130\ GPM$	492 LPM
Grimwood	96 GPM	$(6.4\ m \times 9.5\ m) \times 6 = 364\ LPM$

How do these long standing fire flow estimation methods compare with the flow rate you selected for this incident? Using a higher flow rate will result in faster knockdown (to a point), but if dramatically higher than needed will result in an increase in the total amount of water (gallons or liters) used.

Command Officer's Perspective: Working through tactical decision games (TDGs) for command officers is not only good practice for chiefs. Company officers working through TDGs for command officers help build perspective and improve skills as IC #1 as well. 10-Minute Training 26-16a provides an opportunity to work as a command officer arriving after the first several companies have arrived and gone to work. The additional learning in this command officer tactical decision game focuses on communication and command presence.

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