

Topic: Air Track & Flow Path

Drill Number: 13-2

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Training Code:

### Aim

Firefighters apply understanding of burning regime (fuel or ventilation controlled), air track indicators, and flow path.

### References

Corrigan, S. (2013). *Horizontal ventilation*. Retrieved April 6, 2013 from <http://firetrainingtoolbox.com/corrhvent.pdf>

Hartin, E. (2011) *Reading the fire: Air track indicators*. Retrieved April 6, 2013 from <http://cfbt-us.com/wordpress/?p=745>

Hartin, E. (2013). *Ventilation controlled fires: 10-minute training 13-1*. Retrieved April 6, 2013 from [http://www.cfbt-us.com/pdfs/ventilation\\_controlled\\_fires.pdf](http://www.cfbt-us.com/pdfs/ventilation_controlled_fires.pdf)

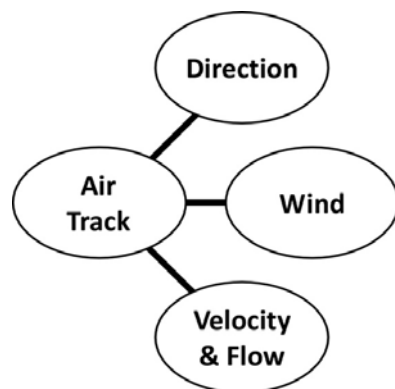
### Conducting the Drill

As always, don't simply hand out the 10-Minute Training to your crew. Use it as a guide to discussion and distribute copies after the drill. Have a look at the references and expand on this drill as necessary.

As discussed in [Ventilation Controlled Fires](#) and [Horizontal Ventilation](#), increasing ventilation to a ventilation controlled fire increases heat release rate (HRR). Reading the fire requires that firefighters consider look at all of the relevant B-SAHF (Building, Smoke, Air Track, Heat, and Flame) indicators holistically (not simply one or the other or as a simple list to check off). However, air track indicators are particularly relevant in recognizing ventilation controlled fires and understanding both existing and tactical ventilation.

**Air Track:** the movement of both smoke (generally out from the fire area) and air (generally in towards the fire area). This term applies to smoke and air movement in general and to specific, observable indicators. Air track is directly related to, but somewhat different than Flow Path. Ask your crew to identify the basic categories of air track indicators.

*Basic categories of air track indicators include wind speed and direction, direction of smoke and air movement, velocity, and flow (turbulent or laminar). Consider the implications of these categories of air track indicators when approaching your intended point of entry.*



**Flow Path:** Movement of air from an inlet (or inlets) to the fire and of smoke and flames from the fire to an exhaust opening. Understanding flow paths and potential flow paths is critical to firefighter safety and effective tactical ventilation.

Is the door open or closed? Remember at this point, a closed door is your friend! If it is open, close the door! Is the door locked or unlocked? What forcible entry may be required? How will you control the door if it needs to be forced? While considering these questions, it is essential to read the fire (holistic look at B-SAHF). For now consider the air track indicators.

- Is the wind blowing (in particular is wind velocity over 10 mph)? If so, what direction is it blowing in (most important to consider in relation to your point of entry and the known or suspected location of the fire)? Why might this be important?

*Wind over 10 mph indicates potential for a wind influenced or wind driven fire!*

- Is the smoke moving out the top of the door and air moving in at the bottom? What might this indicate?

*A bi-directional air track often is an indicator of a ventilation controlled fire. The access point is an exhaust and an inlet. After entry you will be working in the flow path (dangerous place).*

- Is air going in, but no smoke coming out? This might be an open door with an absence of smoke along with smoke exiting elsewhere. What might this indicate?

*Air in will likely increase HRR, control the air and control the fire. Consider the size and location of the fire and exhaust opening(s).*

- Is smoke exiting the door from top to bottom? What might this indicate?

*You intended access point is an exhaust opening; you will be in the flow path. This is an extremely dangerous position. Consider another way in.*

- Do you see smoke discharge from the door and then no smoke being discharged (e.g., a pulsing air track)? What might this indicate?

*A pulsing air track indicates and significantly ventilation controlled fire, potential for vent induced flashover or backdraft exists. Consider indirect attack and if vertical ventilation is an option (think about building construction and fire location here as this is not always possible).*

- Is the velocity of smoke discharge high (evidenced by turbulent flow) or low (evidenced by laminar flow)? What does the velocity of smoke discharge tell you? Is the velocity increasing or decreasing? What might be inferred by changes in velocity?

*Changes in velocity indicate changes in HRR and resulting temperature. Beware! Decreased velocity may simply indicate that the fire is becoming more ventilation controlled.*

**Knowing the answers to the questions is only the first step in developing the ability to apply this knowledge.** Use photos or video (even better) and have your crew look for air track indicators that provide important clues to flow path and potential changes in flow path based on ventilation (tactical or otherwise).

#### Feedback

Please forward your feedback on this 10-minute training to [Chief Ed Hartin](#)

