

Managing the Wind-Driven Structure Fire Threat

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According to the National Institute of Science and Technology (NIST), wind speeds as low as 10 mph will cause extreme fire conditions on the interior of a structure fire, regardless if the structure is a high-rise building or a one-or-two story family dwelling.

What is a wind-driven structure fire you may ask? It is “a rapid developing fire that results from prevailing winds entering a fire-vented location of a structure, which pressurizes the interior, creating a deadly flow path of blowtorch effect flames and untenable temperatures when a secondary opening (vent point) is created” (Bowker’s definition)

In the past few months two major fires which have drawn national attention were affected by the prevailing wind. The massive lightweight wood frame apartment building fire in Houston, TX which trapped a construction worker on a fifth floor balcony, soon followed tragically by the Beacon Street Fire in Boston, MA which killed two firefighters.

According to retired Fire Captain William Mora, of the San Antonio Fire Dept., author of the landmark Firefighter Disorientation study, estimates that between 2002 and 2010 approximately 24 firefighters were killed in structure fires where wind was a factor.



According to a 2009 NIOSH fire investigation report two Houston firefighters were killed six minutes after making initial entry through the A side front door of this residence. Prior to entry fire was observed coming from the C side of the 4200 sq ft dwelling. Shortly after entering crews reported hearing a loud roar and being rapidly engulfed in a large volume of fire which swept through the structure from the C side and vented from the A side front door.



Here are seven critical factors to consider to help you better manage the wind-driven structure fire threat:

- Understand that wind-driven structure fires pose a special hazard. Failure to understand this results in lack of situational awareness, and inability to calculate and manage the risk.
- Obtain a daily weather report with expected wind conditions and communicate this your crews.
- Conduct a 360 at every structure fire otherwise your size-up is not complete. Consider the effects of wind. Determine if the structure is being pressurized from a fire vented location or will become pressurized if window/door/roof failure occurs. Winds that pressurized a structure fire can super-charge the fire and create “monster fire” conditions.
- When a wind driven condition is encountered, the situation must immediately be transmitted to all companies.
- Vent points must be controlled and coordinated.
- Advancing through a downwind opening from the unburned side, will create a wind trap which will place firefighters and victims in a dangerous flow path.
- Consider a transitional fire attack from the pressurized (windward) side to knock-down the main body of fire. If structurally sound, then enter from the pressurized side to conduct search/rescue and final fire control operations.

It is absolutely imperative that firefighters and officers alike understand the changing dynamics of wind and ventilation at today’s structure fire. Failure to do so places victims and firefighters at much greater risk.