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Surviving The Strategic and Tactical Firefight: Fire Attack In The Structural Environment

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Fire Engineering

SURVING THE STRATEGICAL and TACTICAL FIREFIGHT: COORDINATED FIRE ATTACK IN THE STRUCTURAL ENVIRONMENT

By Lt. Mike Mason (Ret.) DGFD

By now firefighters should know that we are involved in several new concepts along with well established old school tactics that have challenged our abilities in dealing with the modern day firefight at residential structures. Firefighters in this so called new era of structural firefighting should be educating themselves on how fire is developing at structure fires especially enclosed structures relating to considerations of ventilation principles applied to a structure along with preexisting conditions that may reveal themselves on arrival. In order to save more lives including both civilian and ourselves firefighters should be investigating and applying principles that are now known to us through the recent studies provide by the research from UL and NIST to help our decisions and tactical applications at any given firefight.

Many fire departments and their training divisions by now we would hope are adhering strictly to the guidelines of NFPA 1403 for fixed facility burn buildings and/or acquired structures. The clear stated requirements of NFPA 1403 require us during live fire training exercises that only Class A combustibles are to be used within these structures which usually involve untreated wood and straw. Because of this we can never create the true nature of a real structure fire which includes lightweight construction along with furnishings that are made of plastics and various fuel forms not to mention the varied designed floor plans that include open areas and high ceilings. Firefighters need to recognize and remember that what can be attained through live fire training will never be the equivalent of the true nature of fire behavior in the modern day structural environment. What our live fire training can provide for us though is our abilities to conduct size-up procedures, visualize certain smoke conditions and movements, identify fire location and most importantly to help us understand and visualize flow paths in our efforts to perform coordinated fire attack along with search and rescue operations. Another important aspect and beneficial attribute of this type of training is learning to perform in environments of low to near zero visibility.

UL and NIST have provided us with a sound and clear understanding regarding the concepts of FIRE FLOW PATH. In simple terms it means that any opening created provides inlet air or oxygen as well as provides for outlet air that creates the movement of smoke and fire from high pressure areas to low pressure areas within a given structure whether these opening be a door, window, roof or a cut opening. Any openings created on arrival by our actions will allow air from the outside which can increase the fires growth. This is essentially the principle concept firefighters need to know. Of course there is a lot more to the studies provided by UL and NIST and firefighters should research these studies for even a better and more complete understanding of the concepts.

Unlike our efforts at training fires there is another aspect of the modern day structural environment that we cannot truly simulate and that is the presence of the conditions of a hidden fire that is ventilation deprived. This occurs many times because of structures being built more tightly than ever. Our arrival on the modern day structural residential fire may not reveal the truth depth or the nature of fire that may be developing rapidly on the inside. Deep seated fires with high heat release rates many times can be assumed when smoke conditions are velocity driven out of the building. During our arrival and preparing for the possible offensive firefight the oxygen levels within the structure are being consumed and now the velocity driven smoke that was pushing from the structure may now turn to nothing but a wispy light smoke while the fire is still present waiting for us to undo the ventilation limited condition that is present. So now we can realize that these tightly built structures may not reveal the true nature of fire versus a fire now that is waiting for us to enter. In the past fire would break through into a free burning state such as out a window which helped us recognize much better where the fire had been, where the fire was at and finally where the fire was going.

Suppression Considerations and Fire Flow Path

- **Never consider that you are pushing fire.**
- **Quick evaluation decisions based on fire and smoke and the affect it has on search and rescue efforts.**
- **Know where fire is at and its intended movement into the rest of the structure.**
- **Get water on the fire with an effective stream even from the outside before entering when necessary. Keeping other ventilation points such as doors or windows closed until ready to enter after exterior knock downs.**
- **Cooling fire retards heat conditions thus slowing the fires growth.**

- **Proceed with ventilation efforts through coordinated fire attack whether vertical ventilation or horizontal. Depending on certain conditions and fire travel vertical ventilation is preferred when possible.**
- **Remember that fire streams entrain air along with the movement or patterns created by the nozzle man. Unfocused streams such as fog patterns and wild movement of the stream can create fire gas disturbances into other areas of the building.**
- **Exterior streams for the purpose of knock downs before entry should be strait streams or smooth bore streams. Apply them as close as possible to the body of fire or the opening desired.**
- **Consider a two pronged attack by establishing a second line for the offensive advance when possible.**
- **When presented with heavy dark velocity driven smoke at the upper levels especially when deciding to go interior always apply effective straight streams into these areas.**

The above are just a few considerations when initiating a possible offensive firefight. Always remember that where we eventually choose to place our attack line for entry has other considerations. Try to let your size up preferably a 360 degree size up when possible before committing an attack line into a structure. The front door may not always be the answer just because we pulled up on the scene and it presents itself to the street. There are times when the layout or design of a residential structure will dictate others depended on our best advantage points relating to fire conditions. Try to recognize on what level the fire is at so you don't end up getting cut off from within the structure by unrecognized fire progressions such as by passing interior stairs or outback areas that may be present around the structure possibly putting your crew over fires emanating from below from lower levels.

Considerations of Tactical Control When Entering For Fire Suppression

- **Control the door. Limit the amount of airflow into the structure.**
- **Be prepared for possible flashover conditions if there is loss of door control.**
- **Suppression crews should ensure through sound communications or SOG's that window ventilation practices be curtailed to prevent unwanted additional flow paths inducing fire growth.**

- **If a search crew is performing procedures that may create horizontal ventilation induced conditions such as VEIS make sure they are controlling the doors in these areas. Suppression activities should provide for those same considerations.**
- **Suppression crews should consider their entry point as establishing a flow path for fire and to ensure the line advancement is quick and progressive.**

Even though UL and NIST have provided much insight regarding flow path and resulting fire growth we should still continue to coordinate our efforts in establishing vertical ventilation needs. A coordinated fire ground incorporates hose line advancement into interior areas of a structure along with communicated top side ventilation when possible. Weighing the options regarding producing flow paths within a structure and hesitating on vertical ventilation is not in this author's opinion a reason to withhold vertical ventilation. There nothing like getting relief from heat and fire gases when a critical hole is place on a roof along with interior penetration of the ceiling below by a truck company in helping interior extinguishment. While at the same time there will be instances in which ventilation especially horizontal can result in rapid fire growth putting interior companies in harm's way due to modern day furnishings the need for ventilation has been proven time and time again. It comes down to a firm coordinated attack that incorporates good size up and recognition the fire and its relationship to and within the building. Attempting any ventilation process whether vertical or horizontal when no hose line is present would more than likely incur rapid fire growth. Extinguishment crews entering into structures which have been prematurely ventilated to early may encounter extreme fire conditions forcing them to withdraw when a more coordinated attack would have accomplished the offensive decision versus ending up driven into a defensive position. The closer together the two elements of vertical or horizontal ventilation and hose line advancement into the fire are the more successful the outcome for companies on the fire ground.

There is another alarming aspect of fire attack and ventilation and that is fires that are located in below grade areas such as half grade and full grade below fires involving basements. Because these fires can build quite rapidly due to limited ventilation areas and the potential fuel loads found in basements firefighters should utilize tactics that provide for a safer approach to these types of fires. Countless firefighter injuries and death have been attributed to firefighters falling through floors from weaken floor joists along with rapidly building high heat and flashover conditions presenting themselves as they descend into these areas in their attempts to extinguish the fire. It used to be when I was trained and taught many years ago that getting into the building and locating the basement door along with descending down the stairs and getting below the heat as quickly as possible was the way to go. This is no longer an accepted practice and

should never be utilized at these fires even though most of these elements will eventually come into play once the proper tactic is put into place.

The proper strategies and tactics at these fires is very important and should include the following considerations and actions.

Below Grade Strategies and Tactics for Basement Fires

- **First-In Company's recognition of the existing basement fire.**
- **Has the fire ventilated through basement windows or has it been ventilation limited with windows still intact.**
- **Ventilate windows to allow trapped heat, flame and smoke to escape to the air. Remember this is considered a flow path.**
- **Provide a quick knock down from the exterior with a straight or smooth bore stream into the ceiling areas as well as direct hitting into basement windows.**
- **If the basement is a walkout and provides an exterior door or patio door apply the same technique as the window applications. For this application your entry point is on the same level as the fire.**
- **Once knock down from the exterior is accomplished then prepare the hose line to advance into the structure locating the basement stairs.**
- **Consider having an additional line ready at the entry door of the structure for this advance making sure that floor joist have not been compromised.**
- **Consider also sending in a search team to control the basement door by closing it if it has been found to be open and then continue their searches on the floors above. This will help the search and increase survivability from smoke and fire extension to the occupants above.**
- **Once the interior line has advanced to the basement stairs ensure that enough hose can be advanced around outward swinging doors.**
- **Upon opening the basement door provide a straight stream or smooth bore stream into any high heat and smoke conditions presented before descent.**
- **Try to ensure that the basement stairs are present and have not been compromised while descending.**
- **Once below focus and apply nozzle work into the ceiling and seat of the fire.**

As we can see from the above considerations is that the application of water from the outside windows into the fire area is the fasted way to deliver the blow while also providing earlier extinguishment than trying to go through the structure while moving line and locating the basement door. With well coordinated attacks on basement fires we can protect occupants and the search as well as fire extension that is producing high heat and smoke travel much more readily while increasing the safety and survival for all.