FIRES IN OCCUPIED MULTIPLE DWELLINGS

CAPT. ZACH POLVINO – FEBRUARY 2022

Following the recent January fire in The Bronx, NY, which sadly claimed 19 lives and had many more saved by the heroic efforts of the New York City Fire Department, it's wise to look at our Occupied Multiple Dwellings, or OMD's. In addition to those in our district we need to be cognizant of those in our Mutual Aid coverage area, both in terms of Fire Atack, but also civilian rescue, and FAST Operations.

While we may not have the large, multi-story high rises of New York City, we still have a fair amount of large low and mid rise OMD's from the Daemen campus, Williamsville Suburban, Village Park Drive, Park Lane Court, South Union Terrace, and others including Hotels such as The Mosey, and Hyatt.

We cannot fall complacent to thinking something like what happened in The Bronx, New York couldn't happen here in Amherst. Our first due district along with our neighboring districts are gaining density, as real estate demand is up, and available land is being developed or redeveloped to meet the growing demand.

According to New York State, an Occupied Multiple Dwelling is defined as *"A "multiple dwelling" is a dwelling which is either rented, leased, let or hired out, to be occupied, or is occupied as the residence or home of three or more families living independently of each other."*

Exterior view of Type 5 Floor and Roof Truss Lightweight Wood Frame Apartment Building

The State further goes on to define other Multiple Dwelling types, but for our purposes, we'll leave it at this definition.

Looking at the tragic Bronx fire, this came in as an activated alarm and upgraded to a 10-77, or working fire in a High Rise Occupied Multiple Dwelling bringing additional resources. Ultimately, this fire went to 5 Alarms, not due to fire conditions but smoke conditions reported on multiple floors above the fire floor. As the adage goes, Expect Fire and Victims on every run.

Tactical and Strategic Considerations

Tactically, regardless of building construction type there are some common considerations we need to keep in mind. One of the keys is knowing our first-due district, and our Mutual Aid response areas including where we respond for FAST. We have to be ready to operate in an attack mode and as a FAST if requested. In addition to knowing our district, we have to be proficient in building and scene size-up - what do we have, what do we need. Part of this size-up is preforming ongoing assessments. Ongoing size up and ongoing scene assessment informs command of conditions allowing them to make decisions and priorities. Resource management is critical at every incident as multiple disciplines have to be done at once, from fire attack, to searching the fire floor and apartment to rescue operations. Additional resources are needed for ventilation.

Just like any fire or incident, initial scene size-up and continuing size-up is critical, especially in a rapidly evolving situation. Additionally, larger scale buildings can be deceptive, with smoke conditions varying from entry to the fire-room or fire-floor. An initial size-up from the street may vary greatly once inside, as crews make a push and provide CAN (Conditions-Actions-Needs) Reports to Command, additional crews coming in can start to prepare for what is needed or anticipate what will be needed. These reports may also give Command a better perspective of what is actually going on, as the structure size, construction type, and location of fire can vary from what it appears on the outside.

Communication and coordination is the key to a well executed, aggressive, fire-attack.

Command Priorities

As part of size-up, Command needs to prioritize resources and tasks such as Attack, Rescue, and Ventilation. Each situation presents differently, where some building may allow for more Shelter-In-Place versus needing direct rescue. Understanding the size and scope of the actual fire will impact decisions - Is it a small fire just producing a lot of smoke, or is it a well involved fire extending beyond a room and contents and into a structural fire? These updates will influence decisions on additional lines, and line placement. Building construction, fire location, and smoke conditions inside will dictate ventilation methods.

Additionally, command has to consider what resources are needed, such as additional alarms.
Getting water on the fire is critical, but so is establishing a water supply, and supplying building fire protection systems such as an FDC or Sprinkler System, if available. A good water supply will be critical to supply enough water to establish multiple attack and backup lines. This may take some outside-the-box thinking with establishing multiple feeds to an attack pumper, or multiple lines stretched form multiple pumpers depending on the building, fire location and resource availability.

Another consideration is hydrant location and water main size. Again, depending on the volume of fire, multiple hydrants may be needed to supply enough water.

Lightweight Wood Frame Construction

As our district and surrounding areas of the town grows in density, and more multiple dwellings are being built to accommodate the growth, more lightweight wood frame construction buildings are being erected. One such example is the development of 4-story wood frame apartments on California Dr in Williamsville, and wood frame apartments near the UB campus in Getzville. Of course these are just a few examples. It is not just in newer developed areas of the town, this construction is popping up all over.

Of course wood frame construction is not new, however what is newer is the use of advanced

Partially constructed open stairwell with OSB backer that will be behind finished drywall

engineered lumber products to build bigger. This is not about fear-mongering or demonizing engineered lumber, or the construction industry, it is about understanding how it will impact our operations as a Fire Department. As Francis Brannigan said, “Know your enemy” and that the building, is our enemy. The new wrinkle is that dimensional lumber has changed over time. Anybody who has been to Home Depot or Lowes looking at lumber knows how hard it is to find quality boards. Rough dimensions have changed, what used to be considered a 2x4 is different than what is a 2x4 now. The density of the wood has changed, and as lumber becomes less dense, burn rate increases meaning it is faster to ignite than “legacy” lumber.

In addition to using lightweight lumber, one of the other main characteristics of lightweight wood frame construction is use of engineered wood products, which again isn’t all that new. Products like ‘traditional’ plywood and Oriented Strand Board (OSB) have bene on the market or years and used in building construction and renovations.

Other products have gained in popularity over the years such as Laminated Veneer Lumber (LVL), which offers considerably straighter and stronger lumber. These units can be used to support loads above large spans of open space. LVL’s are only one form of engineered lumber, all of which have different strengths and weaknesses. Other forms of Engineered Lumber include wooden I-beams, and pre-fabricated wooden truss systems.

Having recently toured the new apartment complex on California Dr., these structures are all wood with the exception of the masonry built, centrally located, elevator shaft. One critical design element of these structures includes the use of OSB behind drywall in the common walls in the hallway, and party walls between apartments. These OSB sheets provide two main things, one structural stability as part fo the overall structural system, reinforcing the wood stud construction. The second is soundproofing and security from the common areas, and also reinforces the drywall wall in common areas and the stairwells.

Lightweight Wooden Truss Construction

Fire and Smoke Spread

One of the issues with fires in Multiple Dwelling, either apartment buildings or dormitory style buildings is the spread smoke and fire from the initial fire room or fire apartment. This primarily happens because of a door failure or for being left open from the fire-room. This allows the rapid spread of hot smoke and fire gasses, and untimely flames from he fire-room to a hallway or common area. As these fire gasses and unburned particulates that make up smoke reach the proper conditions for ignition with the right mixture of oxygen and air flow, fire occurs and can spread.

The design of these buildings promote the spread of smoke up though-out the upper floors of the building, this is known as the ***Stack Effect.*** This occurs when the outside atmosphere is cooler than the inside atmosphere, causing an increase in pressure. As the pressure rises, it causes the hot air, fire gasses and smoke to rise to the upper floors. Smoke will find any gap in the construction, open stairwells, or open elevator shafts will fill floors above the fire-floor with heat and smoke. While this is predominately seen in high-rise fires, it can be a factor in low and mid rise buildings as well. This is a major factor in overall building ventilation and potential rescue situations where residents can be overwhelmed by thick, toxic smoke.

Buildings Under Construction

While touring the California Rd construction site, a discussion point came up about overall construction and fire protection. The structural components of these buildings are obviously part of the fire-load. The danger is, with unprotected structural elements fire spread can be rapid, consuming and destroying wooden components and severely weakening the overall structural stability. Around the country, fires in building under construction have proven this, spreading quickly and failing, resulting in building collapse.

Complacency and Alarms

Finally, one major item that can never be ignored, is complacency. We have to expect complacency among residents but never the Fire Department. As more of these buildings start to appear, we'll likely see an increase in Alarm Activations, Meat on the Stove calls, and system malfunctions or accidental activations. We have a duty to respond, gear up, and investigate. We also have an obligation to help educate residents on fire safety, shelter in place, and evacuations.

We can't fall into the mindset that these fires won't or can't occur in our district or mutual-aid districts. If you look at the statistics on common causes of fires from the NFPA, the Top-10 causes include, Cooking Equipment, Overheated Electrical Cords, Heating Equipment, Careless Smoking, Electrical Equipment, Candles, Children, Flammable Liquids, and Holiday Decorations. All of these causes are multiplied in a multiple dwelling. Ultimately humans living in a physical environment cause fires, intentionally and unintentionally.

It's never a question of "If" but a matter of "When" these fires will occur. Understanding the building occupancy, construction type, strategy and tactics will all factor into our successful operation.