“Fight the Fire, Not the Building”
FDIC 2024
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Hopefully, you looked at the subject title and asked yourself, “what is he talking about?” which caused you to read on. I’ll be presenting this class at FDIC 2024 so come by and see precisely what I’m talking about. Please allow me to expound on the subject.

Commercial buildings offer many challenges for fire departments around the country. Presented is how to take advantage of the built-in active and passive fire protection features in a commercial building so you can complete your tasks effectively, efficiently and safely. Specific to safety, this ideal seems to fall in line with risk profiling, survivability profiling, risk assessment and fire ground accountability. It’s about working smarter not harder and perhaps doing great things with small numbers as most departments, career and volunteer alike contend with every day. By merely having an understanding of the building and what the owner, builder and codes provided for us, we’re more apt to be successful and to send everyone home after the job unscathed.

Taking a look at fire protection as a whole, many years of code battles have ensued in order to build the best buildings we can for the occupants and now under the newer codes, the firefighters who may have to enter that building to cause search & rescue and fire extinguishment activities. These systems are installed in the interest of life safety (civilians and ours), mitigation of risk, firefighter safety, conflagration control, firefighting efficiency and community economic stability. They also contribute to the durability of the structural environment, historic and cultural preservation and crime control (arson).

Passive Fire Protection Features:
Passive fire protection features are usually installed as part of the structure and simply remain in place until called upon to work during a fire. Some examples are fire doors, smoke doors, fire partitions, automatic fire

dampers in HVAC duct work, building set-backs, fire walls, fire rated assemblies, spray-on fire proofing or cement or dry wall encasement, fire stopping and draft curtains.

While most of us know that dry wall creates a fire barrier, let's further examine it from the firefighter's perspective. A wall built with two 5/8" sheets of sheet rock on studs will give us a one hour wall. If we needed a two hour wall, we'd simply double the sheet rock on each side of the studs. Part of the fire protection value is the layer of air inside the wall space. Some of us learned to breach a sheet rock wall as a means of emergency escape. Very few of us however have done it under fire conditions. In any event, this remains an option, however you need to know if the sheet rock is standard or not. Some drywall comes with Lexan or Plexiglass in it for durability purposes. Are these installed in your district?
Tactical Tip: Knowing what materials of construction are being used in your district and in your mutual aid districts is essential to safety and operational goals.

Many times a building is split in two parts or sectioned off by fire walls or fire partitions. These afford time for people to evacuate or get to an area of refuge and cuts fire loss potential. A simple example is taking refuge getting in a 2- hour rated stairwell. This type of construction also gives firefighters time to plan their fire attack and to possibly amass additional units or mutual aid companies as to be able to coordinate multiple operations. Note that "fire walls" generally go through the roof and by definition have their own foundation so if the building fell down the fire wall should still stand. Fire partitions on the other hand are usually rated for one hour and separate dwelling units, apartments, hotel rooms or offices and create corridors. In large buildings there may be entire floors or sections of floors with greater ratings. As an example, a multi-use building may have a surgical suite or a child care center within it. These may have a 2 hour rated enclosure to protect the patients and young children respectively.
Tactical Tip: Rated stairwells offer a safe haven for firefighters and often contain standpipes. These areas of refuge can be used buy time when discussing strategy, tactics and size-up prior to commencing operations.

Other passive fire protection features to consider are smoke barriers, fire door assemblies, smoke dampers in duct work, draft stops, draft curtains and curtain boards. As a side note, fire doors are installed to hold fire back so be careful which door you open and when you open it. In most cases, it's wise to leave the fire doors closed. If you have a fire in a warehouse with a 3 hour wall and rated doors down the middle, leave the interior fire doors in the fire wall closed and commit your resources on the "fire side" in order to contain the fire to that side of the building. If you send companies to the non-fire side, tell them to check for extension, however leave the fire doors closed. In some cases, you may need to deliver water through those doors for large areas of fire. Use caution when using opening these protectives. The fire can easily spread to the other side of the warehouse. *Tactical Tip: Get out in to your district and find these features. Understand their role and how you can use them to your advantage. Error on the side of keeping protectives closed.*

Active Fire Protection

Active fire protection systems have some form of motion. Sprinklers, standpipes and foam systems flow, alarms ring, clean agents and dry chemicals discharge. Below is a brief review of active systems.

<u>Sprinklers</u>

There are two types of systems. Wet and dry. Within the dry system world, there are three distinct types of systems that actuate (activate) a bit differently. We also put foam in sprinkler systems too. In all cases, these systems simply send water or foam (foam is water with its specific gravity re-arranged so it floats on top of hydrocarbons instead of sinking in them) to the location of the fire to control, confine and in some cases extinguish it. Remember that you still need people to rescue people and pull them out of harm's way. Sprinklers are simply a tool to protect property, in some cases life (residential) and assist the fire service with effective, efficient and safe operations. Sprinklers save firefighters lives too.

Wet: The pipes are filled with water right to the sprinklers themselves. Wet systems are the quickest most reliable sprinklers installed because of this arrangement. The only way to get water on the fire is for the fire itself to

actuate the individual sprinklers. Sprinklers have either a fusible link with a pre-determined melting point or a glass bulb with liquid in it designed to boil, expand and break the bulb. After melting or bursting, water is immediately delivered. The main riser and related equipment (known as “trim”) is where it all starts. The riser is connected to a water supply with a main control valve, main drain, alarm check, retard chamber, gauges, a fire department connection and a flow alarm. You will find wet systems in areas that are heated at all times and not subjected to freezing conditions. Some examples are malls, hotels, schools, office buildings, warehouses, factories, hospitals and industrial processing sites. Wet systems are also found in private homes. Unless there is a reason why a wet system should not be installed like having no or inadequate heat, water reactive chemical storage, etc., then most codes, standards and insurance companies require wet systems because of their speed and reliability.

Dry Pipe system: There is no water in the pipes. A compressor or other source of air or nitrogen holds back the dry pipe valve (a clapper) until the heat of the fire actuates the sprinklers. The air then rushes out of the sprinklers releasing the pressure on the dry pipe valve (clapper) and then water starts to flow. You will find these systems in buildings and areas of buildings where there is no heat such as refrigerated warehouses, outdoor sheds, loading docks, multi-level parking structures and attic areas in buildings. Similar to the wet system, the riser is connected to a water supply but the dry pipe valve takes the place of the alarm check. It will also send a water flow signal after it trips. Add a compressor or nitrogen supply to hold the clapper down. You’ll also find an air gauge on the up-stream side of the dry pipe. If it starts to bleed down, a signal will go to the fire alarm panel reporting a “low air alarm.”

Pre-action system: Also dry, but two distinct actions must take place in order for water to enter the occupancy. You will find pre-action sprinkler systems in places where an accidental water discharge could be catastrophic such as computer rooms, operating theaters in hospitals and museums. Because two distinct actions must take place to put water in the room, the mere action of snapping off of a sprinkler head by accident will not activate the system. Pre-action valves are *electronically* tripped in most cases through either heat or smoke detection and a pull station similar to a fire alarm pull station.

Deluge system-Like the previous two systems, deluge systems are dry. The main difference is that all *sprinkler heads are open with no fusible elements or glass bulbs*. These systems are actuated by detection, usually heat or flame detection and are mainly found in heavy industrial applications like around transformers, processing tanks, processing pads with large vessels, small flammable liquid storage tanks and similar places. They also require manual pull stations at the hazard site and in the riser room for instant actuation.

Any of these systems can be adapted to deliver foam solution. More often than not, the deluge type system is installed in a flammable liquid storage area protecting vessels, drums, processes, etc.

Tactical Tip: It is imperative that Incident Commanders send a firefighter to the valve room/riser room with a radio, upon arrival. Sprinkler valves should only be closed on the express order of the IC and in most cases will be, when ventilation and hose teams are in place and a coordinated fire attack is pending and upon finding the seat of the fire.

Fire Alarm Systems

Often looked upon as a fire service mystery, fire alarm systems are fairly easy to read and easy to operate. They have initiating devices such as pull stations and detectors that go to the panel (processor), notification devices such as horns and strobes which alert the occupants and auxiliary functions like closing fire doors and notifying emergency services through a central station connection.

Automatic and Manual systems: Automatic systems require no human intervention or action. They employ detection devices (heat, smoke, gas, UV & IR flame, etc.) which monitor the environment and report any changes in ambient conditions. Manual systems require some human intervention like pulling a pull station. Either action goes to a fire alarm panel which processes the signal, alerts the occupants and perhaps the fire department. The panel will show red for an alarm, yellow for a trouble or supervisory signal and green for normal conditions. Today's "addressable" LED read out panels give you the actual location of the alarm, e.g. "Smoke detector-Room 327, third floor NE corner."

Tactical Tip: Having knowledge of how these systems work and how to use them will assist with operations. Systems in high rise or large area buildings

often have a PA system. IC's should learn how to use them to not only give occupants instructions but to reach firefighters with poor radio reception or those without radios. Consider using this built-in tool for an emergency building evacuation for all fire personnel by simply getting on the PA system and repeating the order.

Specialty systems:

The code requires other types of specialty systems to be installed in buildings depending on height, area, occupancy and other a factors. These are noted below with some sample occupancies:

a. smoke control systems-high rises, malls, underground facilities
b. clean agent gas systems-computer rooms, museums
c. CO2 systems-computer rooms, museums, printing plants
d. dry chemical-industrial flammable liquid storage areas, service/gas stations
e. wet chemical-commercial cooking hoods
f. water mist sprinklers-computer rooms, areas where very little water can be used as an alternative to clean agent gas systems

Tactical Tip: For any of the above noted gas systems that are deemed "total flooding" (fills the entire space) SCBA must be worn in the space and in adjacent spaces whether the system has discharged or not. In some cases, the cylinders are in an adjacent room and may leak into that room upon discharge as well. Take extreme caution when working in or near total flooding CO2 systems.

Learn how to fight the fire, not the building.

Be safe,

Ronnie K

See bio on next page

Ron Kanterman is a 49-year veteran of the fire service and currently serves as the Executive Chief Inspector for the FDNY. He worked in industrial and municipal fire departments and was a Chief Officer for 24 of his 30 years on the line. He's contributed to *Fire Engineering* for over 37 years including the 7th edition of the Fire Chief's Handbook and the Hazardous Materials companion manual to the *Fire Engineering's* Firefighter I & II. His latest work is the "Fire Officer's Guide to Occupational Safety and Health" published in 2019. He produces a monthly program on *FireEngineering* Talk Radio "The Back Step Boys" and keeps "Chief Kanterman's Journal" on the FE website page under the "Commentary" heading. The Chief holds a bachelor's and two master degrees and has been teaching at colleges and universities for 35 years, and at the National Fire Academy and FDIC for 25 years.