



## MEDFORD FIRE-RESCUE FIRE & LIFE SAFETY DIVISION

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### Fire Marshal Retrofits House with Home Fire Sprinklers

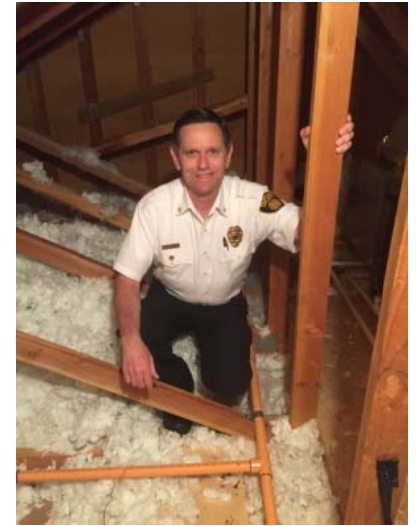
*By: Deputy Chief-Fire Marshal Greg Kleinberg*

While investigating home fires through the years, I have seen complete fire devastation all too often. I know how fast conditions become life-threatening inside a home. I have witnessed people losing everything in a home fire, their loved ones, their home, and their valued possessions. I have also observed too many close calls where people were seriously injured or people were just a few breaths or seconds away from perishing.

I always made sure there were multiple smoke alarms installed in my home and knew it was essential technology in giving one a greater chance of surviving a home fire; however, like seat belts without airbags, I know smoke alarms are not enough. A significant percentage of fatal fires occur each year in homes where there are verified working smoke alarms (40% of home fire deaths). Smoke alarms, as important as they are, also do nothing to control or extinguish a fire.

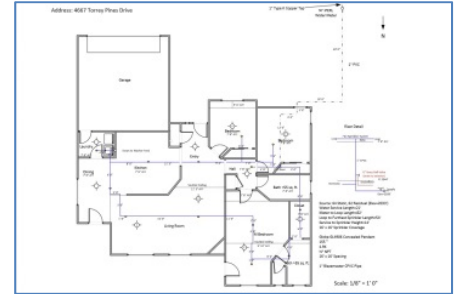
I also know the science of home fires and how the average safe evacuation time has decreased from 17 minutes in the 1970's to less than 3 minutes currently. This is because modern furnishings have much higher heat release rates caused by the synthetic materials (petroleum products) they are composed of. These furnishings produce much faster developing fires and pump toxic products of combustion that can kill in just a few breaths. Medford Fire-Rescue has conducted multiple side-by-side fire sprinkler/flashover demonstrations utilizing ordinary furnishings which consistently show complete fire devastation within a few minutes (flashover) on the unprotected side (unsprinklered) contrasted with barely visible fire damage on the protected side (fire sprinklered).

With my family's safety in mind, I decided to retrofit our home with a fire sprinkler system. A home fire sprinkler system is designed to prevent flashover and maintain a tenable environment inside of the living areas. Our home is a single-story 1,740 sq. ft. structure built in 1995. It is wood framed with a lightweight floor joist system and a roof truss system. The attic and underfloor areas are accessible.



Concealed Fire Sprinkler Head

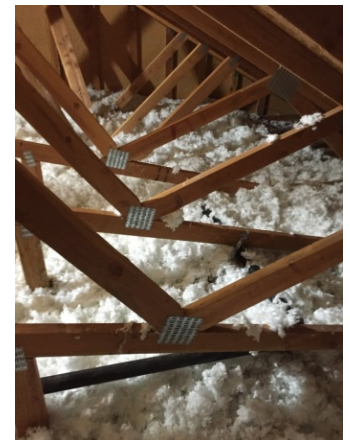
When began by planning the fire sprinkler system, I knew that we had 60 psi water pressure at the hose bibs and a 5/8" water meter. To avoid a backflow device requirement, I designed a looped flow-through system which ensures there is flow of fresh water through the fire sprinkler piping system to avoid any stagnant water concerns. I planned to use concealed fire sprinklers to make the system aesthetically pleasing. Fire sprinklers are required by the National Fire Protection Association (NFPA) 13D standard to be positioned only in certain living area locations, not in smaller closets, small bathrooms (under 55 sq. ft.), in garages, or in attics. I chose an extended coverage design, with each fire sprinkler covering up to a 16' x 16' area. After the plans were complete I submitted all the documentation for a permit and ordered the materials. I ordered a 3/4" water meter from our water purveyor. The meter was switched out for a cost of only \$35.



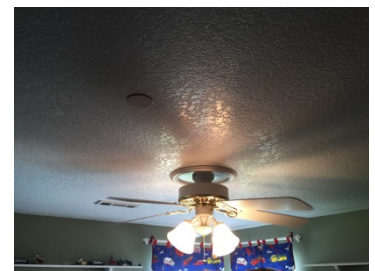
I started by marking the preferred locations in each required area. I used a stud-finder to mark the preliminary fire sprinkler head locations within the joist cavities to meet clearance requirements and then poked a nail through the sheetrock from below at each head location. After the nails were located in the attic, the insulation was cleared away from where the piping system and fire sprinklers were to be located.



My plan was to locate the riser (the pipe between the underfloor water supply line and the fire sprinkler line in the attic) in a small bedroom closet. From there I began gluing pipe and fittings. I was careful not to install the fire sprinkler heads until the glue in the fittings near the head locations hardened, as this is critical to avoid plugging up the sprinkler heads with excess glue. I then marked the final center point of the heads and bored a hole through the sheetrock from below. The sprinkler heads were installed and then I fastened the pipe to the ceiling framing with hangers.



After all of the piping and heads were installed, I pressurized the system with water at normal working pressure and checked for leaks. I had a few drips and tightened the fire sprinkler heads as needed. After the temporary pressure gauge no longer showed a pressure drop over time, I decided it was time to schedule a rough-in inspection. The inspection passed and then I was careful to insulate over the piping system with batt insulation to keep the piping system in the heated space. After the batt insulation was installed, I spread the blown-in insulation back over the batt insulation.



With the fire sprinkler piping system complete in the attic, I then began working under the house. I installed a 1" T-connection in underfloor water supply line. I then attached the fire sprinkler line to the T-connection. After this, I turned on the water at the water meter valve and checked for leaks. The last thing I did was ensure the underfloor insulation was put back in place.

The cost of the project was \$1,247 for the fire sprinkler system components, \$156 for batt insulation, \$92 for the permit and \$35 for the water meter upgrade. Each year we will be saving 5-10% on our annual homeowners insurance cost as our insurance company understands the risk benefit that home fire sprinklers provide. I spent approximately 45 hours on the project.

It is good to know my family is protected with this life-saving system. While it is true that retrofitting a house with a fire sprinkler system is more challenging than installing a fire sprinkler system in a new home, it was well worth the effort. It brings my family peace of mind to know that as we are sleeping, the fire sprinkler system is ready to activate if needed. It's like having a firefighter present and ready 24/7 to extinguish any unexpected fire.

