Fire Sprinklers

Town of Menasha Fire Department
Topics

- History of Fire Sprinklers
- Types of Sprinkler Systems
- Types of Sprinkler Heads
- Future of Fire Sprinklers
- Facts about Sprinkler Systems
History of Fire Sprinklers

- Officially developed and used by Henry Parmalee in 1874 to protect his piano factory
- Used clay and wood pipes with holes drilled into them
- A tank on the roof of the structure was drained during a fire and released the water into the pipes
- Winter was a problem, and making sure someone was watching at all times
Timeline

Fire Sprinkler System Time Line:
1806 - John Carey designs a system of perforated pipes, plungers, and burning strings.
1812 - Colonel William Congreve designs perforated pipes with valves.
1875 - Parmelee invents the first modern sprinkler. It consists of shell and soldered brass cap.
1882 - Grinnell invents an improved sprinkler that can withstand higher pressures and distributes water more evenly.
1896 - N.F.P.A. is officially formed and publishes codes for automatic sprinkler installation.
Types of Sprinkler Systems

- Wet Sprinkler System
- Dry Sprinkler System
- Deluge Sprinkler System
- Pre-Action Sprinkler System
Parts of a Sprinkler System

- OS&Y - Outside Stem and Yoke
- PIV - Post Indicator Valve
- Main Control Valve - Controls water for whole system
- Main Drain - Drains System
- Inspector Test - Tests system
- Alarms - Waterflow or Air Alarms
Components of a Sprinkler System

- Underground brings water from the City Mains to your building.
- Water is then sent through a backflow.
- All Systems usually require an FDC or Fire Department Connection to increase the water pressure during a fire.
- Enters either the fire pump where it is pumped to a certain pressure, or is released into the Risers.
- Risers “rise” vertically through the floors to feed the Branch Lines.
- Branch Lines then extend off the Risers and Mains horizontally to bring water to all the sprinkler heads.
Diagram
Wet Systems

- Water is in branch lines and at the sprinkler heads at all times
- Wet Systems cannot be in areas that may freeze
- Water pressure must be maintained at all times
- Water Pumps are put in place to keep water pressure at a certain PSI
- There is no delay in time that water is put on the fire
- Require the least amount of maintenance
Dry Sprinkler System

- Require Air Pressure instead of water in the Branch Lines
- The Air Pressure holds down a Clapper Valve, so that water can not be introduced into the system, unless the air pressure is lost
- Used in areas that may freeze
- An air compressor keeps a constant pressure in the system
- When a Fire releases a sprinkler head, the air is released from the piping, and stops holding down the valve that was holding the water back, and water is released
Dry Sprinkler Systems

- Standpipes are used in stairwells to have a water way established for hand lines
- These systems have a high maintenance cost, due to corrosion in the pipe with only air, and a little bit of water
- Might take up to 60 seconds to get water on the fire, depending on how big the system is
Deluge

- Deluge Valves are used in special areas
- Sprinkler heads are open at all times
- Used in High Hazard areas
- Deluge Valve opens during a smoke or heat detection
- Deluge systems are needed where high velocity suppression is necessary to prevent fire spread
Deluge
Pre-Action Systems

- Same as a Dry System
- Water is held back by an electronically operated valve
- Two things need to happen before water is released
- The detection system must identify that there is a problem with smoke or flame
- Water is then released into the piping
- Secondly the sprinkler heads must be activated and released to put water on the fire.
Types of Sprinkler Heads

- Pendants
- Uprights
- Sidewalls
- Special Coverage
Fire Sprinkler Colors

- 135-170 degrees = Red
- 175-225 degrees = Green
- 250-300 degrees = Blue
- 325-375 degrees = Purple
- 400-650 degrees = BLACK
Pendant Head

- Most common head
- Extends down from a ceiling
- Sprinkler sprays a stream downward onto a deflector
Upright Head

- Sits on top of the piping
- Sprays water up towards the deflector
- Can not be used as a pendant
Sidewall Head

- Comes out of a wall to protect hallways or small rooms
- Has a fan shaped deflector
- Used in Hallways or special areas that are not big enough for regular heads
Special Heads

- Sprinkler heads have been designed to protect everything from attics to window openings
- Attic head have special bends in them to throw water at certain angles
- Coatings for corrosive areas and heads to match décor of room even exist
- Dry Pendants are used to protect areas that freeze on wet systems
Types of Sprinkler Systems

- Residential- Just beginning to become popular
  - Piping is made of a special CPVC plastic

- Industrial- Heavy amounts of fire load require many heads.
  - Piping is usually made of metal
Future of Fire Sprinklers

- Home fire sprinklers are just beginning to be made more accessible
  - Insurance rate cuts
  - Better protection

Aqua-Flex Heads are easier to install, and cuts back on labor costs

More special area heads are being created and tested
Facts about Sprinklers

- Recognized as the single most effective method of controlling fires
- Chances of accidental discharge are remote
- Installation cost is about 1% of the building cost (Same as cost of new carpeting in a structure)
- Over 200 communities have residential fire sprinkler laws
- Records show that no more then 2 people have died in a fire where there was sprinklers
Facts about Sprinklers

- Damage in structures was 78% less than that of structures with no sprinklers.
- In Fresno, California, damage combined during a 10-year period was only $42,000 where residential sprinkler laws were in effect.