Fire Sprinklers

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

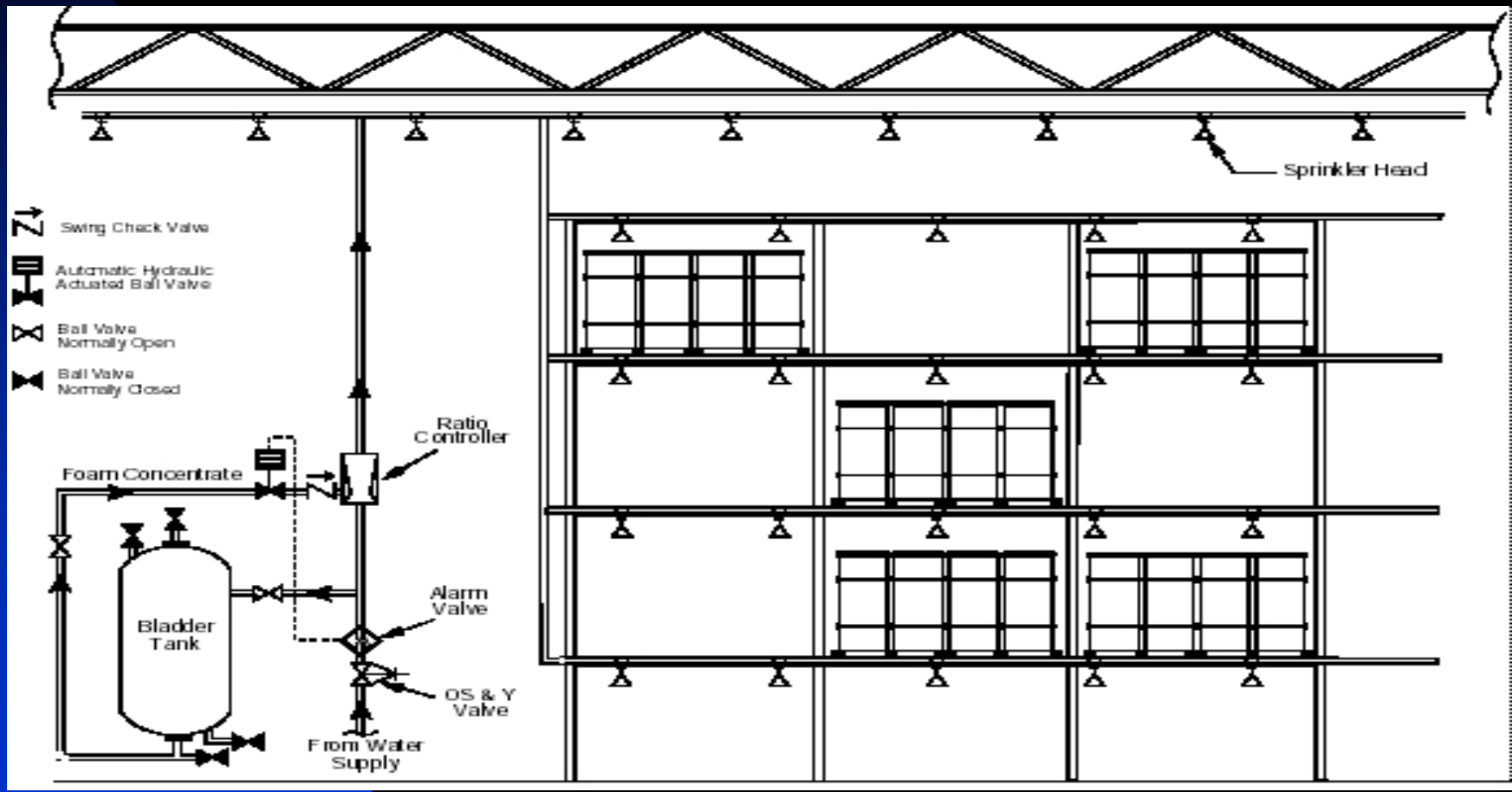
Parts of a Sprinkler System

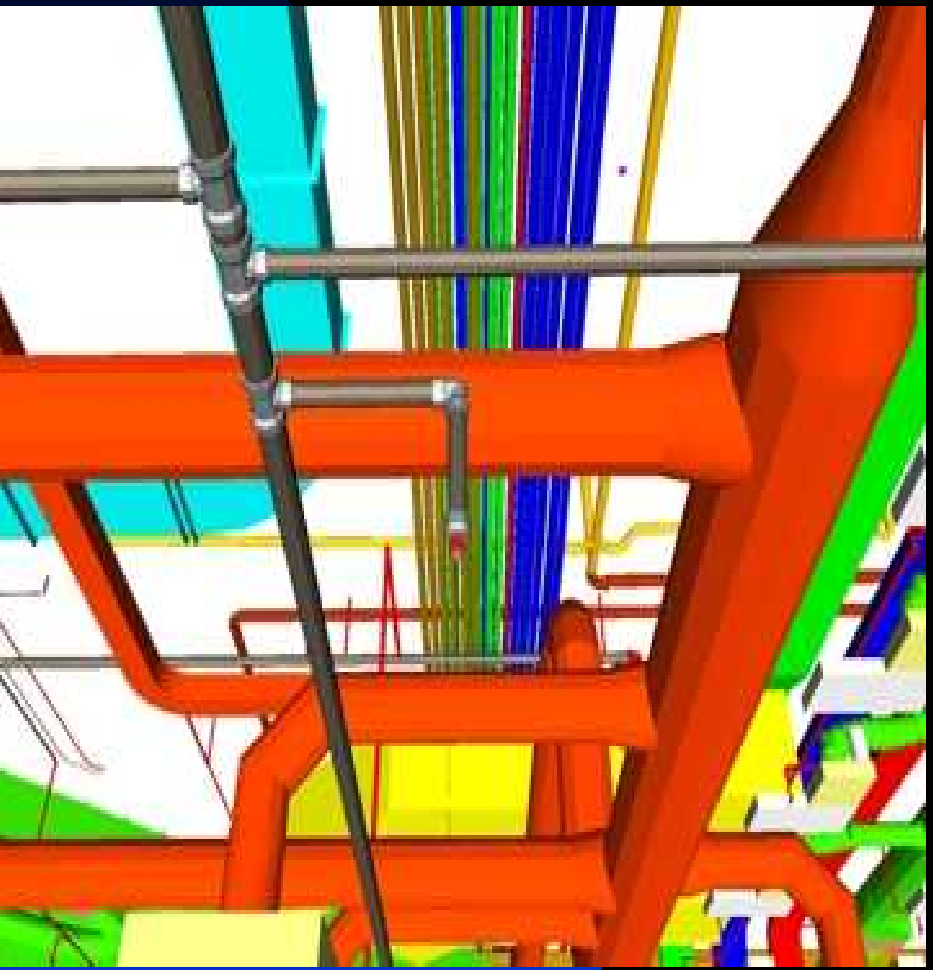
- OS&Y- Outside Stem and Yoke
- PIV- Post Indicator Valve
- Main Control Valve- Controls water for whole system
- Main Drain- Drains System
- Inspector Test- Tests system
- Alarms- Waterflow or Air Alarms

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 Riser
- 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


Sprinkler Head
Swing Check Valve
Automatic Hydraulic Actuated Ball Valve
Ball Valve Normally Open
Ball Valve Normally Closed
Ratio Controller
Foam Concentrate
Bladder Tank
Alarm Valve
OS & Y Valve
From Water Supply



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

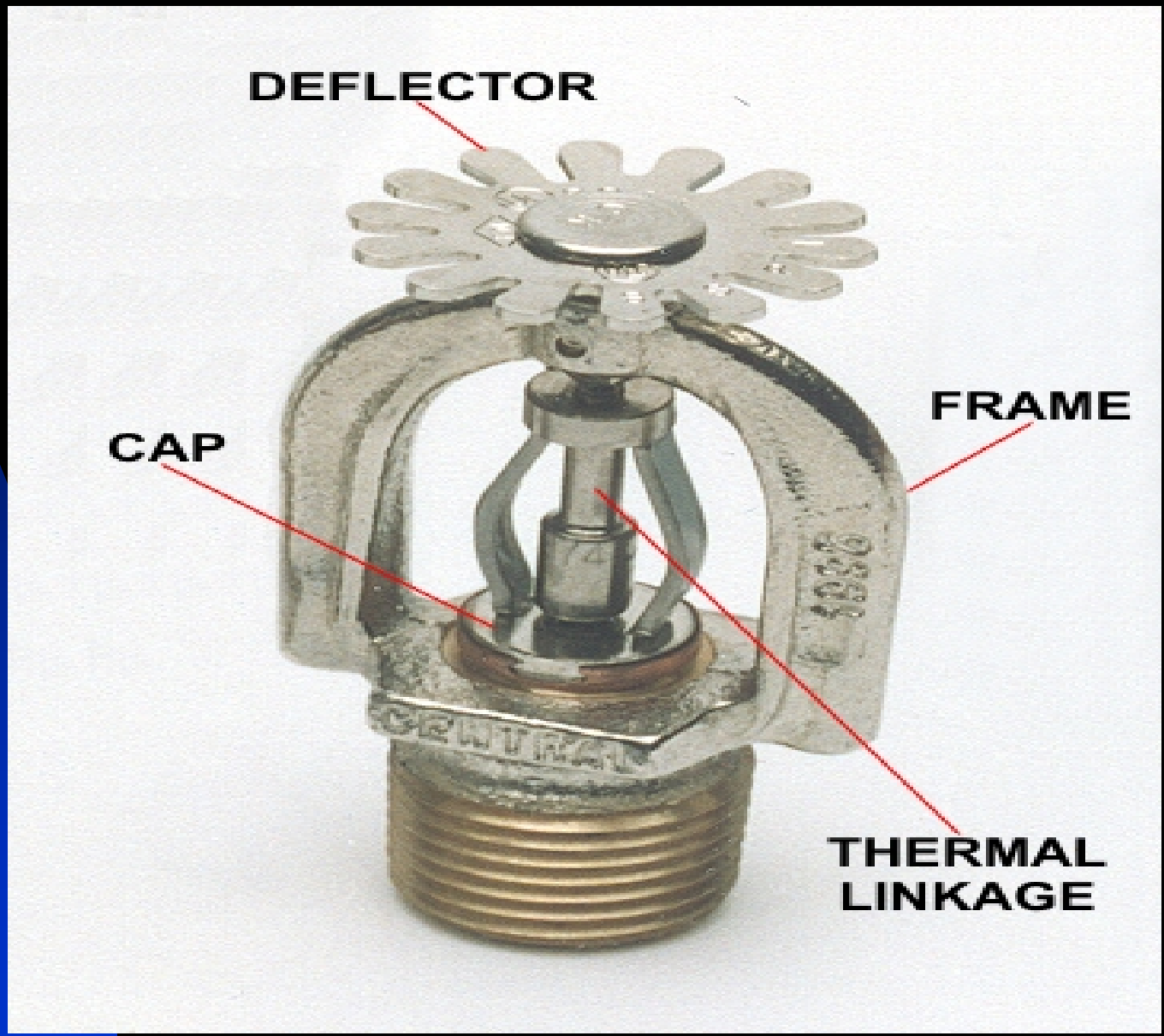
Deluge

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


DEFLECTOR
FRAME
CAP
THERMAL
LINKAGE

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

Town of Menasha Fire Department

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

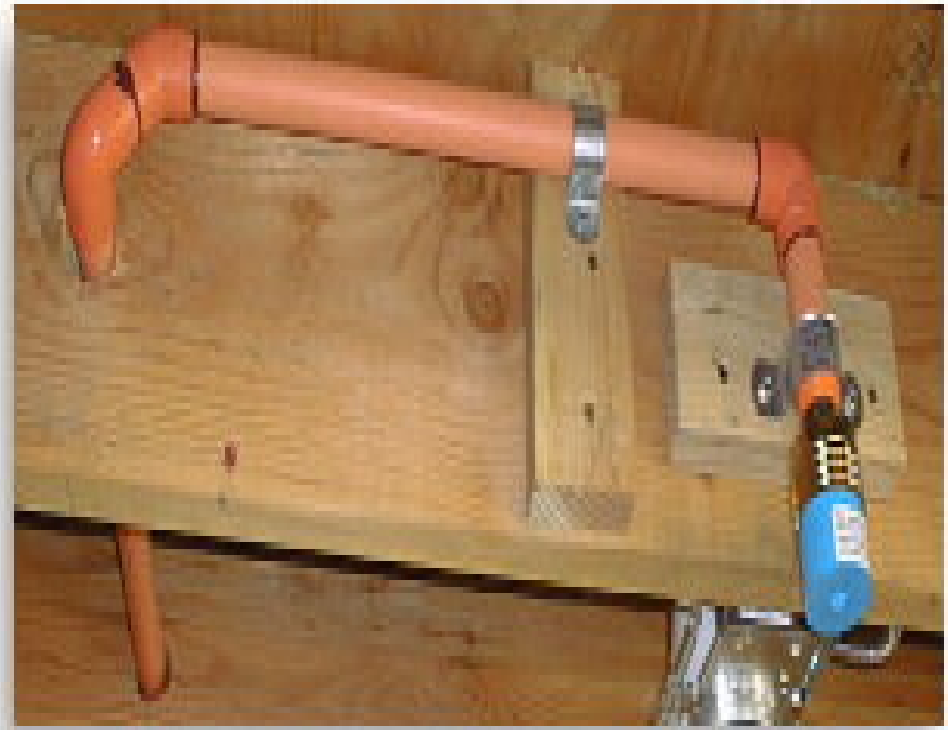
Special Heads

- 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


How Home
Fire Sprinklers
Work



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 then 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