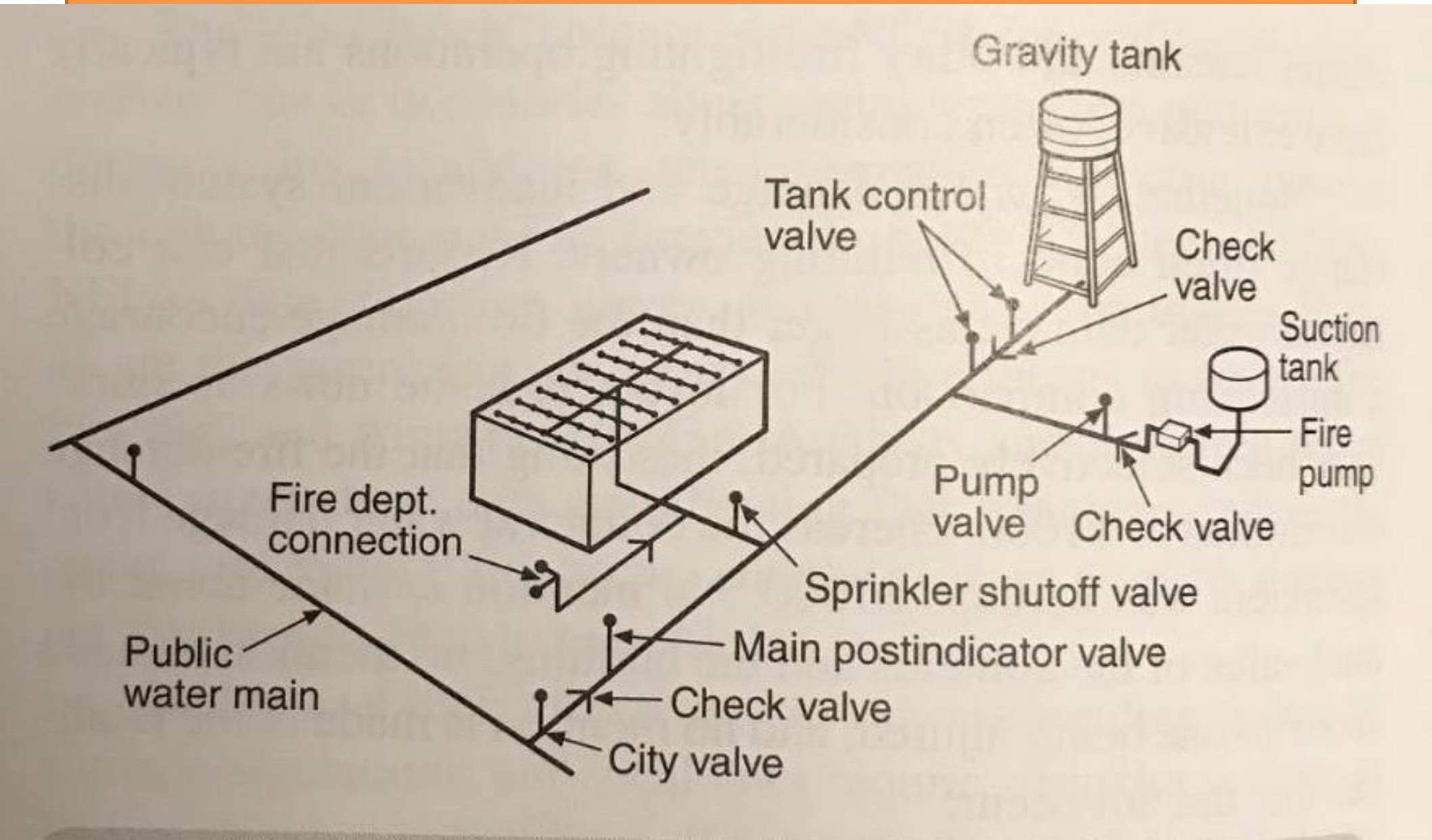
Sprinkler Systems

- Identify riser components
- Select the appropriate type of sprinkler system for a given situation
- Explain the design and maintenance of sprinkler systems

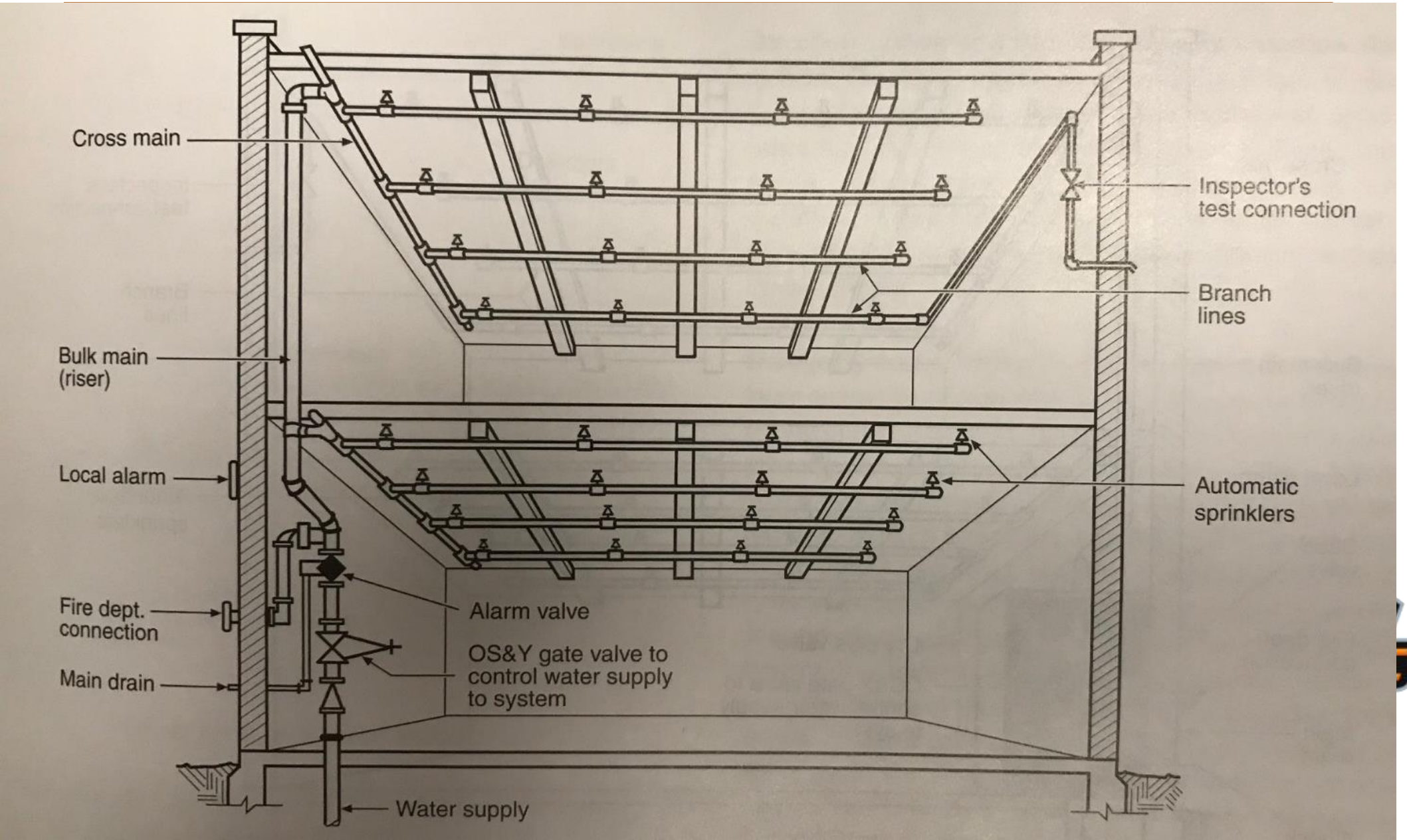
Water Supply



PIV

- Post Indicating Valve
  - Supervised
    - Electrical
    - Mechanical
  - Indicating

Typical System Components



Types of Sprinkler Systems

- Wet
- Dry
- Pre-action
- Deluge

Wet Pipe System

- Most preferred
- Easiest to design, install, and maintain
- Minimum temperature 40F
  - Why not 32F?

Dry Pipe System

- Pressurized air or nitrogen in pipes
  - No significant amount of water in cross mains and branch lines
- Most common in freezing conditions
  - Required where spaces are below 40F

Preaction System

- Water held back by a mechanical preaction valve

  Purpose is to keep water out of cross mains and branch lines

    Archival vaults, fine art storage rooms, rare book libraries and computer centers
- System equipped with a supplemental detection system
- Three types
  - Non-interlock
  - Single interlock
  - Double-interlock

Preaction System Interlocks

- Non-interlock
  - Sprinkler head activation **or** fire detection device will initiate water flow
- Single interlock

  Only a fire detection device initiates water flow

  Heat or smoke detector
- Double-interlock
  - Sprinkler head activation **and** fire detection device initiates water flow
    - Incorporates a dry pipe valve

Preaction Systems

- Cons
  - Higher installation and maintenance costs
    - More complex with several additional components
    - Must have fire detection system = more money
  - Difficult to modify
    - Specific size limitations may impact future modifications
    - System modifications must incorporate changes to the fire detection
  - Potential decreased reliability
    - Higher level of complexity increases chance that something may malfunction
    - Regular maintenance is essential

Deluge System

- Open sprinkler heads
- Protect against severe rapid fire growth
- Fire detection system detects fire and valve opens sending water throughout the entire system
  - Typically what you see on TV and in the movies

Design Considerations

- NFPA 13 *Standard for the Installation of Sprinkler Systems*
  - Addresses other issues such as:
    - Plan development
    - Hydraulic calculations
  - Covered more in depth in other FPST courses

ITM

- NFPA 25 *Standard For The Inspection, Testing And Maintenance Of Water-based Fire Protection Systems*
- Shut down preparations
  - Ensure least amount of hazards and least disruption
  - Follow established system impairment procedure
    - Consult with AHJ or fire insurance carrier
  - Firewatch may be required
    - Can use temporary charged hose
  - Establish a formal procedure

ITM

- Sprinklers
  - Test representative samples of installed sprinklers periodically to verify continued performance 1% of the total number of sprinklers installed
  - Seasonal testing might be necessary
    - Issue is to avoid freezing temperatures and ensure no damage from freezing
  - Foreign material on sprinklers
    - Accumulation is known as “loading“
    - Loading tends to retard sprinkler operation
    - Best practice is to replace loading sprinklers especially if they are painted

Loaded Sprinklers

ITM

- Care of components
  - Control valves are properly supervised
    - Should be sealed or locked open
  - Sprinkler and piping
    - Inspect for
      - Absence of sprinklers
      - Proper clearance for sprinklers
        - Minimum clearance of 18 inches below deflectors
      - Proper position of deflectors
      - Proper pitch of dry pipe systems
        - Water remaining in pockets causes corrosion and possible damage due to freezing
      - Proper support of piping
        - Don’t hang clothes
      - Proper sprinkler installation
    - Should have supply of extra sprinklers on hand
      - 1% of the total installed

ITM

- Wet Pipe System
  - Notify, Notify, Notify
    - FD
    - Occupants
    - Alarm company
  - Inspection
  - Alarm Test
  - Main control valve test
  - Valve assessment test (“main drain test”)
  - Notify, Notify, Notify

ITM

- Dry Pipe System
  - Notify, Notify, Notify
    - FD
    - Occupants
    - Alarm company
  - Inspection
  - Alarm Test
  - QOD Test
  - Valve trip test
  - Valve assessment test (“main drain test”)
  - Notify, Notify, Notify

ITM

- Deluge in Pre-action systems
  - Complete charts are furnished by the installing contractor showing in detail the proper method of operating in testing