

Fire Hydrant Installation and Maintenance



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Topics of Discussion

- History
- Installation
- Operation
- Maintenance
- Troubleshooting Problems
- Application

History

- 17th – 18th Centuries (Larger Cities)
 - Society required more advanced fire protection systems.
- Piping systems put in place.
 - Hollowed out wooden logs.
 - Dug down, split the wood, repaired with a “Fire Plug”
- Canvas cisterns were used to fuel bucket brigades.

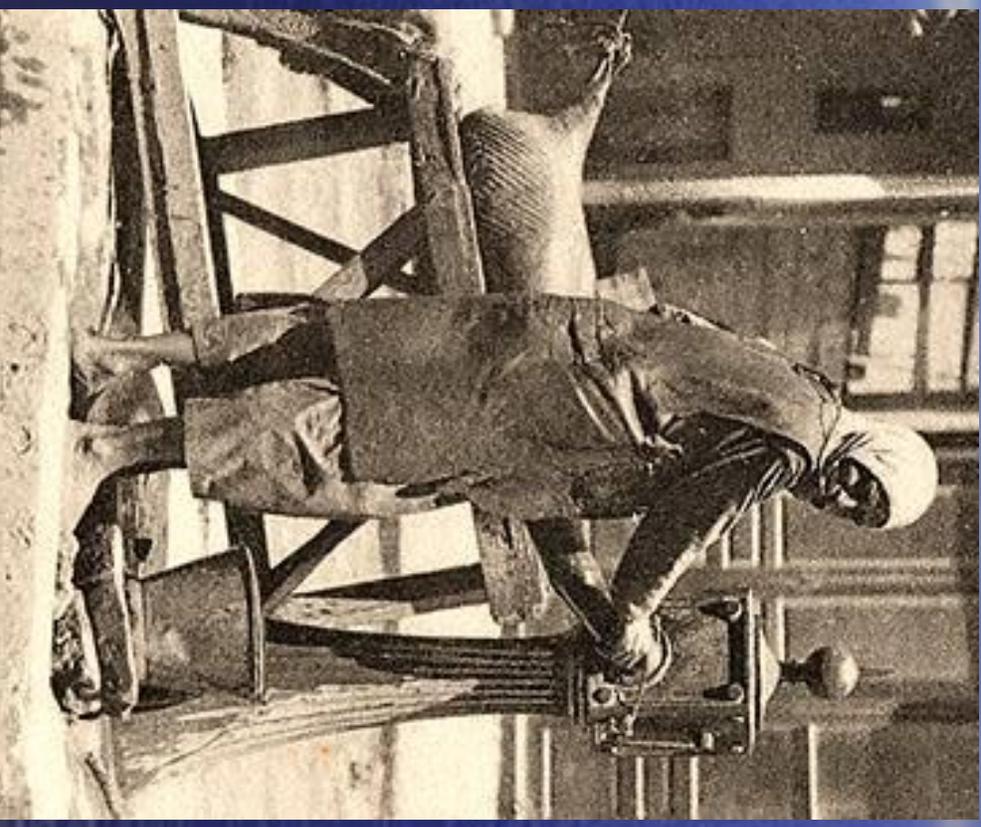


Old School Foundry Work!!



Fire Protection as used Today.

- Stand Pipes Become the Norm.
 - Allowed access to existing valves.
 - Stronger than previous designs.
- First Fire Fighters
 - Paid by insurance companies
 - “First come, First Served”
 - Easier to claim single stand pipe.
 - Different threads and nozzles.
- Main Valve Openings and Sizes
 - Minimal pressure in the beginning
 - Steam-driven pumps
 - Standards are developed:
 - 6” pipe; 4½” , 5¼” main valve



Wet Barrel and Flush Hydrants

- Wet Barrel
 - Used in warm climates
 - Water is readily available in barrel.
- Flush
 - Connection is below ground surface.
 - Used at airports, city streets, parking lots.



The Dry Barrel Hydrant

- Need for a Dry Barrel Hydrant?
 - Tough to see flush hydrant covers
 - Northern cities have harsh climates.
 - Freezing could crack the cast iron.
- Specifics
 - Valve in a “shoe” opens with or against pressure.
 - Valve is below the frost line
 - Drains or weep holes are clear of obstructions. (gravel packing)



New(er) Types of Hydrants

- Traffic Style
 - Used when there is risk of collision. Breaks off above the main valve.
 - Most common style used in Today's Market.



Inspection of Material

- At time of delivery
- Specifications
- Size and shape of operating nut
- Direction of opening
- Depth of bury
- Size and type of inlet connection
- Size of main valve

More Inspection

- Nozzle sizes and configuration/Thread size
- Pressure bolting/Can loosen during shipping. Especially with SS N/B
 - Manufactured in Iowa, shipped by truck across country.
- Hydrants are made by humans
- Specs are written by humans
 - Mistakes can be made once in a while
 - Customer service and specific instructions are vital.

Installation

- Auxiliary valve
 - Valve controlling flow from main line.
- Provide Thrust Block
 - Hard surface to stabilize shoe.
- Backfill with Gravel



Proper Installation

- Proper thrust blocking should be in place.
 - This allows water to flow without any shifting of the piping.
- Hydrants should be 18" minimum from nozzles to ground.
 - Wrench must be able to move freely.



* Note the lack of proper thrust blocking around the shoe.

Improper Installation

- Without proper blocking and back fill, many problems can occur.
 - Shifting in the line.
 - Cracking in the line.
 - Extra strain placed on connections.
 - Fractured end connections.

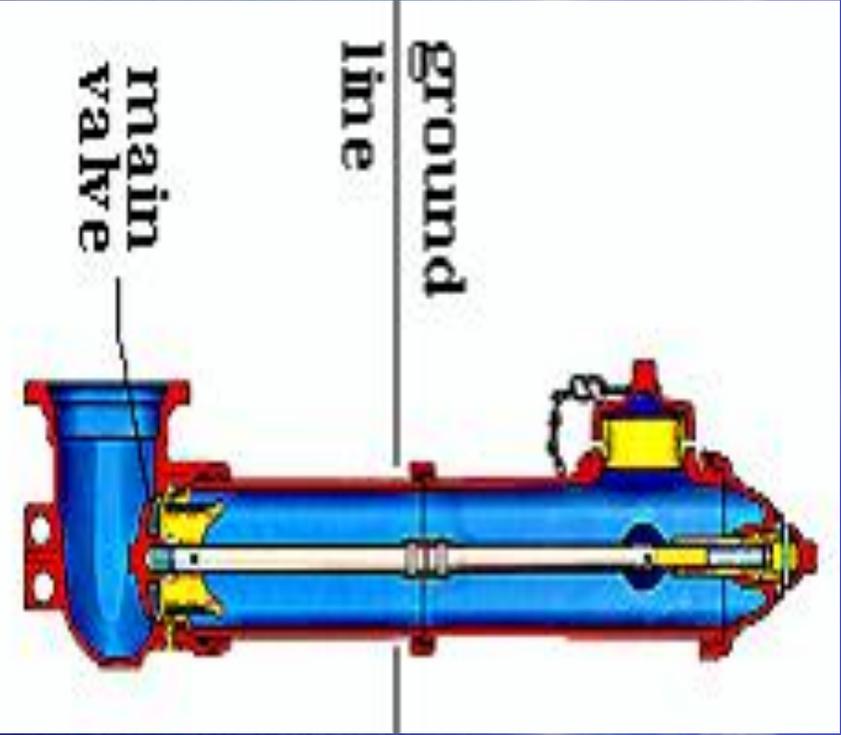


Proper Installation can Help Prevent Possible Damages from Automobiles.

- Hydrants should be a minimum of 2' off the face of the curb.
 - Allows for overcorrections from cars.
 - Ease of access for Firefighters.

Install Hydrant Guard Posts





Depth of Bury Very Important!

Improper Installation

- Depth of bury is very important.



Test for Drainage

- Following the pressure test, close the hydrant main valve
- Remove the outlet nozzle cap and place the palm of the hand over the outlet nozzle opening
- Drainage should be sufficiently rapid to create a noticeable suction

Maintenance

- Inspected regularly
- Fall and Spring Inspections
- Inspect after each use
- Check hydrants appearance
- Check hydrant to see if it needs to be raised
- Check for valve leakage



Maintenance

- Check nozzle caps
- Lubricate threads and caps
- Check chains for free action
 - Protects against pressure blowing off the cap.
- Check for lubrication of operating nut threads
 - Allows for prolonged ease of use.

Maintenance

- Open hydrant fully
- Check for leakage around flanges and seals
- As you begin to close the hydrant, the drain holes will be exposed
- Close hydrant completely, back off operating nut to take pressure off thrust bearing and packing



- Over torqueing can:
 - Break the Coupling
 - Strip the threads in the Op Nut
 - Bend the Upper Stem
 - Crack the shoe

- **DO NOT over torque in the open position!!**

- **Actually, either position.**

- Upper Valve plate can break
- Stem can bend/twist.



Whew!! I need
that cheater bar!!

Maintenance

- Record Keeping
- Location
- Manufacturer [Model]
- Date of installation
- Forms are available



Fire Hydrant Troubleshooting

Problem...Pulsation or chatter during operation

Cause

Loose condition in stem at lower valve plate

Repair

Tighten lower valve plate

Cause

Loose condition in stem caused by more than one extension being used

Repair

Replace extensions with single unit

Cause

Excessively loose safety coupling from over tightening or open and close cycles

Repair

Replace safety coupling and pins



Troubleshooting

- Problem....leakage into the upper barrel
when hydrant is closed

Cause Damaged main valve

Repair Replace main valve seat

Cause Incorrect extension stem

Repair Replace with correct length stem



Troubleshooting

- Problem.....Hydrant is open but will not close

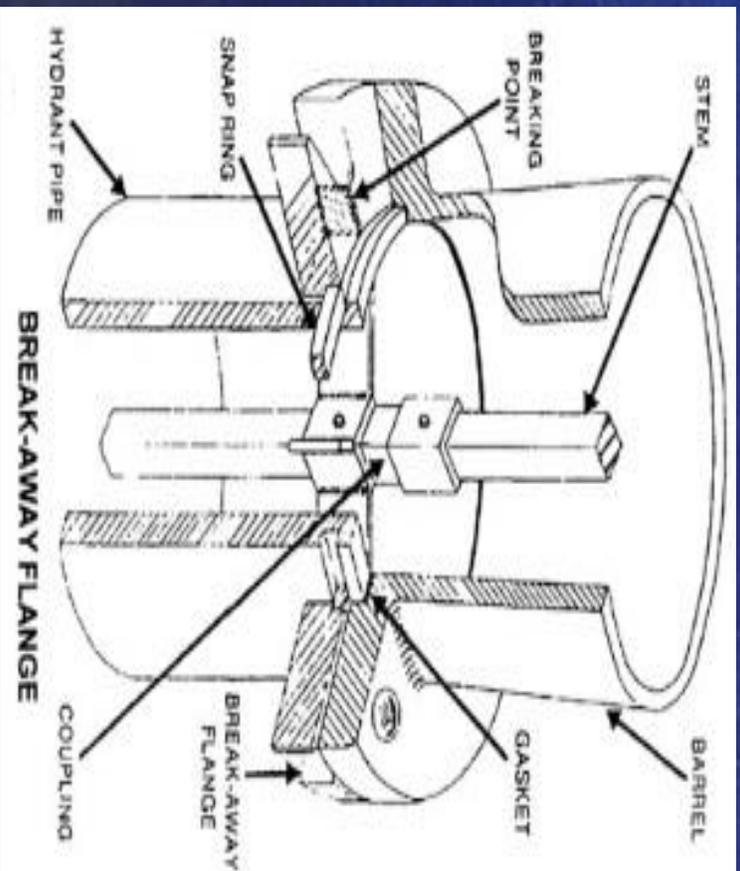
Repair Safety coupling is broken or loose. Remove bonnet and upper barrel and replace coupling.



Troubleshooting

- Problem....Hydrant won't close after extension added

Repair Inspect for proper placement of extension and safety coupling. Relocate to correct position



In relation to the street, what direction should the pumper nozzle be pointed?

- The pumper should always be pointed toward the street so that the firefighter(s) can connect to the pumper truck.



Beemer—\$28,000
Fire hose—\$300
Knocking the glass out of this
Idiot's car—PRICELESS!!

Why is the speed at which hydrants are operated important?

- Hydrants should be opened and closed slowly in order to prevent pressure surges (water hammer) in the mains



Figure #1

Cast Iron Pipe Broken from Water Hammer

Let's Ask Questions

- How should bury depth be measured?
 - Trench depth (also known as bury depth) is measured from the "foot" of the "shoe," to the ground line.
 - The bottom of the flange should be 2½" above the ground line.
- How much Pressure will there be in the hydrant?
 - Pressure flow is dependent upon the user's system, not the Hydrant.
 - The pressure will vary depending upon the system and can be dependent upon the placement of the hydrant in the line.
- Will the Pressure always be constant?
 - Static pressure does not confirm actual flow, residual pressure does.
 - Flow can be dependent upon the size and power of pump, as well as the diameter of the hose/pipe.
- What color denotes pressure of the line? (Bonnet and Nozzle Caps)
 - Class AA- Light Blue (1500 or Greater GPM)
 - Class A- Green (1000-1400 GPM)
 - Class B- Orange (500-900 GPM)
 - Class C- Red (Less than 500 GPM)