JPIASource

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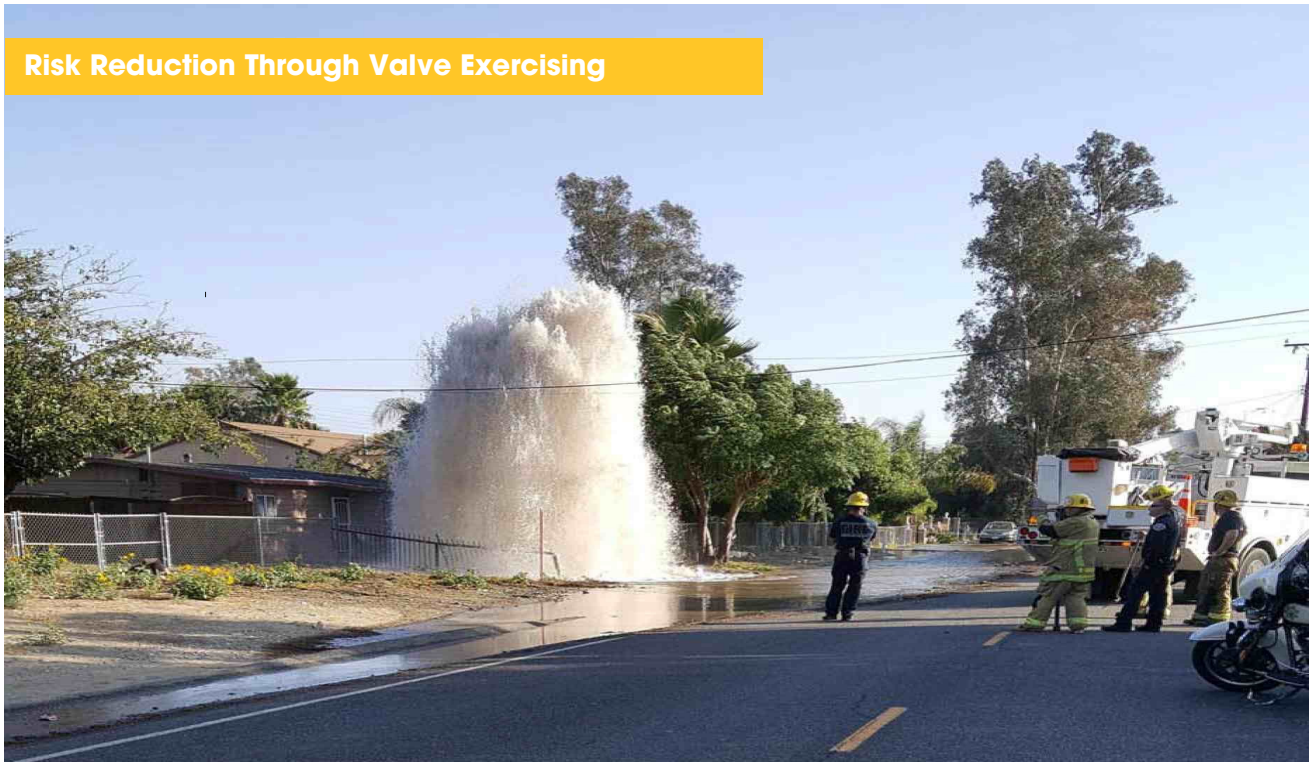
Risk Reduction Through Valve Exercising

A member received a report of a hit hydrant at 3:30 p.m. and was able to respond to the scene within ten minutes. Complicating matters, water was spraying into the air into the nearby electrical lines. According to the system map, the hydrant valve was shown being near the hydrant; however, the responding operator had difficulty locating it. It wasn't until 6 p.m. when a vacuum truck was able to uncover the buried valve and close it. In the end, there were six inches of standing water covering driveways, front and back yards.

Are your system valves maintained, marked, and easy to find? What tools have been provided to aid staff in operating system valves?



Introduction

Valves in a distribution system are standard, but an essential component of any system. These devices help regulate, start, or stop the flow within the system. Valves are at increased risk of failure due to paving over by third parties, age, outdated maps, and improper maintenance. Failures may manifest as frozen valves that will not turn, operating nut failure, or valves that will not close due to build up. To ensure proper valve function, the American Water Works Association (AWWA) http://www.awwa.org recommends that all water utilities initiate a valve exercise program that requires all valves to be inspected and operated regularly. Implementing a valve exercise program has the added benefit of reducing a district's risk of liability, property, and workers' compensation losses.

Liability and Property Risk

Between the 2014 – 2019 policy years, there were 433 infrastructure/break claims resulting in $16.56 million in losses and averaging over $38,000 per claim. The ability to respond promptly to a leak is one of the most significant factors in reducing these potential losses.

Two things are needed to facilitate a prompt response:

- Knowing the location of the valves
- Having properly functioning valves

Locating Valves

The practice of recording valve locations has been accomplished through the use of third party asset management programs or listing valve information on a spreadsheet. Both methods enable recording the location of valves within the system, along with other useful data. However, these solutions are not always readably accessible to field crews. Therefore solutions that utilize Global Positioning Systems (GPS) have been growing in use.

The JPIA Commitment to Excellence Program lists the best practice of establishing a Geographic Information System (GIS) Mapping System for infrastructure, including X-Y coordinates, depth, and elevation under the asset identification section. GIS software can provide valve location via GPS coordinates, type, number of turns, last maintenance date, and various other custom data points.

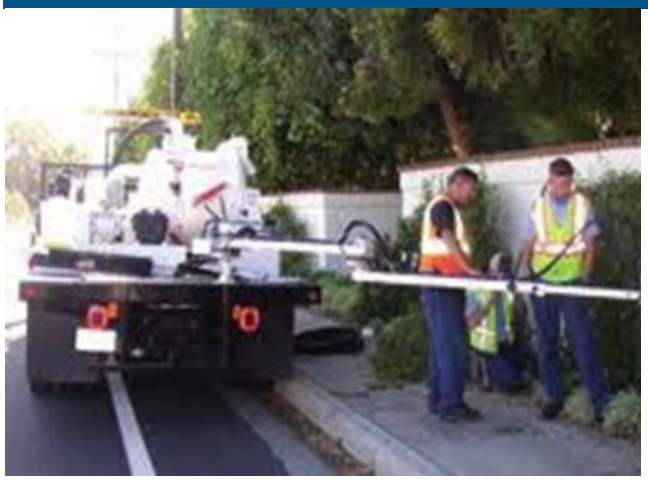
Good - Adjustable Manual Valve Turning Tools

The operator adjusts the length of the tool to place the handle within their “power zone.” The “power zone” is defined as the space between the shoulder and the waist, providing the greatest strength and balance. Manual tools, however, do not eliminate the potential torque or repetitive movement the operator may experience. Fortunately, districts can further reduce risks by adopting an administrative control practice were two operators alternate turning the valve

Better - Handheld Powered or Hydraulic Valve Turning Tools

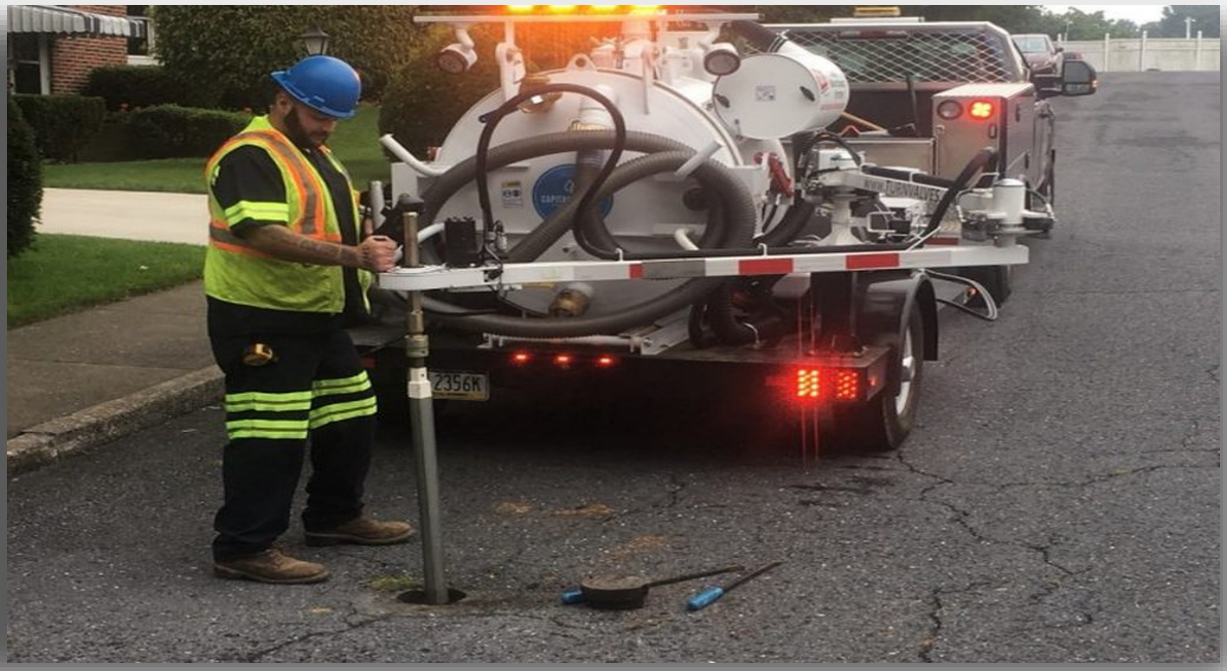
Like the manual valve turning tools, the operator can adjust the length to place the tool within the “power zone.” Handheld powered or hydraulic tools can eliminate the repetitive nature of turning a valve. One shortcoming of these tools can be the torque required to operate the valve initially and can be transferred from the device to the operator. This risk can be reduced by having two operators simultaneously use the same power tool to operate the valve. Also, some power tool manufacturers try to mitigate torque transfer to the operator by including an integrated clutch.

Best - Vehicle-Mounted Valve Turning Equipment



Similar to the handheld powered or hydraulic valve turning tools, vehicle-mounted equipment eliminates the repetitive motion of turning the valve. Additionally, the torque required to operate the valve is transferred to the vehicle and not the operator.

A potential downside to vehicle-mounted valve turning equipment is reduced access. Most setups are limited to where the vehicle can be parked and the reach of the arm. Therefore, a handheld manual or power tool should be kept as a backup for situations when the mounted equipment cannot be used.



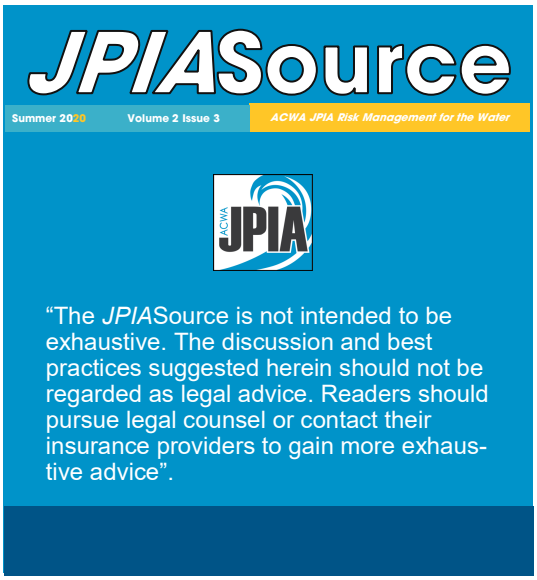
However, the cost of the GIS system can make it prohibitive for some districts and, thus, pose a challenge for adoption. A district may have the option to evaluate geolocation services offered by web or mobile services (i.e., Google Map, MapQuest, Bing Maps, etc.). Although these solutions do not have the same robust capabilities of a GIS system, they can record similar data. Both solutions provide a written digital record, and lend themselves to mobile use in the field where it is most often needed.

Valve Function

The best time to learn if a valve needs service is during planned maintenance, not through an emergency when functionality is crucial. The proper function of the valve is achieved through regularly scheduled preventative maintenance and exercising the valves (putting them through their full range of motion). The frequency of exercising a valve is dependent on its priority within the system, the system size, and available staff. While some valves will see regular operation in a given year, others may not be operated or serviced for years. Therefore, districts should adopt a plan that sets weekly, monthly, and yearly goals of valve exercising. Ideally, all valves are exercised within a given year, but should not exceed three to five years.

Ergonomic Risk

Operating valves can place staff at risk to shoulders and back injuries. The contributing factors to these injuries are excessive force, repetitive motion, and poor posture. Excessive force manifests as the torque to operate the valve, repetitive motion as turning the valve, and poor posture as tool design. The best way to mitigate these ergonomic risks are through a combination of engineering and administrative controls.



Photos: JPIA Property Claim (2)
2017-09-00 Valve Exercising from an industry site