



Standard **Operating Guideline**

**The Importance of Valve Exercising**

When it comes to keeping the water moving, valves are a vital part of your system. The American Water Works Association (AWWA) recommends that all water utilities initiate a Valve Exercise Program that requires all valves (such as distribution and transmission valves, air valves, and blow-offs) to be inspected and operated regularly.

However, when they are left without maintenance for long periods, they can become a big part of a very serious problem, especially in an emergency when every moment counts.

By exercising the valves, or putting them through their range of motion regularly, you can make sure the valves will operate when they are needed for a repair on a section of line or turn off the water to a broken line. When valves do not work in these situations, you will need to hunt down the next valve up the line from the problem valve.

Each valve is operated through a full cycle and returned to its normal position. Valves are exercised on a regular cycle that is designed to prevent a buildup of rust in the pipes, because of corrosion or other mineral deposits that could render the valve inoperable or prevent a tight shutoff.

Below we have indicated the scope of work for a valve exercise program:

* Locating each valve to be exercised
* Providing required traffic control
* Verifying valve location with district maps
* Assigning an ID number for each valve
* Cleaning valve boxes and painting valve lids
* Documenting valve location (GIS), number of turns, size, turn direction, and depth
* Furnishing and input into a database
* Identifying valves that were inoperable, broken, leaking, etc.

While exercising each valve, it is essential that the location, make, type, size, turns, closed direction, and installation date of each valve is recorded by using the district’s GIS systems to provide a written record of valve location condition, maintenance, and inspection of each valve.

**This model form/template must be customized to meet your Agency’s needs.**

Now that we have the scope of work, what is the procedure to properly locate, operate, and determine the condition of the valves?

The first step in starting a Valve Maintenance Program is to prioritize the valves. Valves near critical customers such as hospitals are generally considered the most important. However, factors like the age of the valve, or its proximity to the main intersection must also come into consideration.

1. Once you have highlighted the most important valves in the distribution system, the next step is to exercise each valve according to the priorities you established.
2. Now we need to find and document the district’s valve locations, and for the hard to locate valves, use a metal detector. Ensure you take note of the location (use GPS equipment or your cell phone using Google Maps), and photograph the valve and surrounding area.
3. Operate the valve. Exercising the valve involves operating the valve at least one full cycle until the valve operates freely with little resistance. This may take several full cycles.
4. Record and maintain details for each valve. This includes mapping locations on as-built drawings or roadmaps.
5. Schedule and perform needed repairs. Valve boxes are often out of alignment, making it impossible to get the key onto the valve. Valves are regularly broken during the exercising program because they have not previously been used.
6. Repeat these steps on a routine basis.

We have attached a Standard Operating Guideline for Valve Exercising and Maintenance that may help your district.

By maintaining a regular schedule of valve exercise and maintenance, you can ensure that your valves will respond when you need them the most. The benefits of the Valve Exercising Program are exponential. The program accurately records detailed valve information, ensures valve reliability in the event of an emergency, allows staff the ability to immediately isolate water lines for main flushing and main breaks, extends valve life, and results in less overtime in dealing with emergency repairs. All these benefits contribute to less water loss and the least possible water service disruption time to customers.

Title: **Valve Exercising and Maintenance**

District Name:

Date Prepared: Date Revised:

OBJECTIVE

The American Water Works Association (AWWA) recommends that all water utilities initiate a Valve Exercise Program that requires all valves (such as distribution and transmission valves, air valves, and blow-offs) to be inspected and operated regularly. The objective of this SOG is to outline key elements of a comprehensive Valve Exercise Program to:

* Help agencies determine the effectiveness of existing Valve Exercise Programs
* Improve the efficiency and productivity of distribution crews
* Improve valve reliability
* Reduce water loss
* Identify critical valves on the distribution system
* Measure and document valve operation
* Develop trend analysis

RATIONALE/PURPOSE

An effective Valve Exercising Program is essential to:

* Improve customer service
* Ensure mission capability
* Ensure distribution system reliability
* Develop predictive maintenance programs
* Determine capital improvement budgeting
* Develop loss trend analysis
* Ensure system isolation capability
* Ensure water quality control

METHODS/PROCEDURES

According to AWWA, valve exercising is a procedure that verifies the proper location, operation, and material condition of valves, and initiates replacement, as necessary. The physical operation of a valve and the documentation of the actions and procedures necessary to do so are equally important. An asset management system may need to be developed to facilitate the Valve Exercise Program.

The following methods and procedures are recommendations that illustrate methods used by water agencies that have implemented a Valve Exercising Program.

* **Valve Exercising and Maintenance Program Assessment** (*AWWA “Water Distribution System Assessment Workbook”):*

1. Has a Valve Exercise Program been established?
2. Is there a standard operating procedure (SOP) for valve exercising?
3. Have specific goals been set for the number of valves (of all kinds) to be exercised in a week, month, and year?
4. Are measurements in place to verify exercise goals are met?
5. Is there a capital improvement program for the replacement of defective valves?
6. Are valve activation directions standardized, or are valve-turning directions (left and right-turn) adequately marked?

* **Procedures/Work Steps**

The following work steps are recommended:

1. Locate valve.
2. Notify owner (as required).
3. Photograph the location, identifying the condition of the site.
4. Check the area for potential hazards and implement needed controls.
5. Establish traffic control as necessary.
6. Pull cover.
7. Clean the riser as necessary to inspect the valve.
8. Exercise valve:
   1. Verify the direction for turning the valve to the ***Closed*** and ***Open*** positions.
   2. Assume valve is in the full ***Open*** position.
   3. Begin ***Closing Valve Slowly***, increasing torque as necessary to achieve movement (without exceeding the pre-determined *Maximum Torque*).
   4. Count the number of turns necessary to achieve the full ***Open Position***.
   5. Begin ***Opening Valve Slowly***, increasing torque as necessary to achieve movement (without exceeding the pre-determined *Maximum Torque*).
   6. Count the number of turns necessary to achieve the full ***Closed Position***.
   7. Repeat the Close/Open cycle a minimum of three (3) times, or until the number of turns necessary to open or close the valve does not change.
   8. Record the number of turns, cycles, and maximum torque applied.
   9. Frequency: annual, 2-3 years, 4-5 years, more than 5 years.
9. Photograph valve if possible.
10. Record the valve dimensions, condition of the valve, and other pertinent information.
11. Replace cover.
12. Before departing, evaluate the location for hazards to people, property, or environment, record findings.
13. Mitigate any hazards discovered and initiate the actions necessary to eliminate those hazards.
14. Photograph the site.

SAFETY CONSIDERATIONS

An effective Valve Exercising Program can help to prevent damage to property, environment, and injury to the public and employees by:

* Precluding distribution system damage
* Facilitating emergency response actions
* Facilitating operations and maintenance personnel safety
  + Personal Protective Equipment requirements
  + Lockout/Tag-out
  + Confined Space Entry
  + ACP Procedures
  + Traffic control
  + Identify safe work practices

COST BENEFIT

* Reduce revenue loss
* System failure prediction would reduce water loss system degradation
* Avoid costly liability and property losses
* Create a manageable capital improvement budget
* Enhance system reliability
* Strengthen customer confidence

SUMMARY

By regular surveying and valve exercising, you will have the detailed records you need to ensure the operability of your distribution system. Surveying helps identify the condition and location of all your valves. Knowing the condition of your valves and having an updated GIS system helps eliminate higher costs associated with water main breaks, lost time digging up buried valves, and congested traffic due to excavating roadways. When it comes to maintaining your valves, it is better to be proactive than reactive!

SAMPLE INSPECTION FORMS

VALVE NO. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ MAP PAGE NO.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

LOCATION: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

MANUFACTURER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

TYPE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ VALVE DEPTH: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SIZE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ OPENS: RIGHT\_\_\_\_\_\_\_ LEFT\_\_\_\_\_\_\_\_\_

DATE INSTALLED: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ TURNS TO OPEN: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

VALVE BOX TYPE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ NORMAL GATE POSITION: \_\_\_\_\_\_

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DATE** | **OPERATED** | **REPAIRED** | **COST** | **REMARKS** |
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|  |  |  |  |  |
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|  |  |  |  |  |

REFERENCES

* American Water Works Association *“Manual of Water Supply Practices – Distribution Valves: Selection, Installation, Field Testing, and Maintenance”* (AWWA M44)
* AWWA *“Water Distribution System Assessment Workbook”*
* AWWA Operating Guide to G200-09 *- “Distribution Systems Operation and Maintenance”*