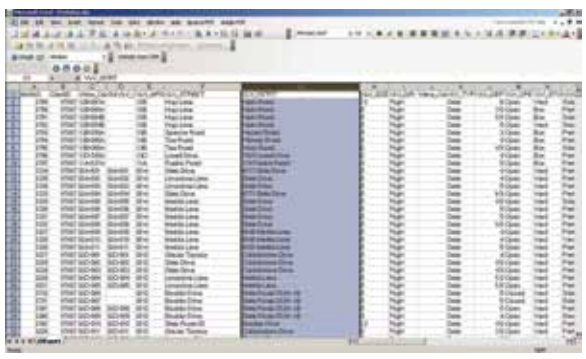
Valuing Valves

Before the valve program began, Carpentersville had to field-verify and line-locate water mains to gather basic information.

By Chris Settipani & Owen Keenan

Chicago suburb demonstrates the importance of a well documented valve program



Valve cards were not needed after the 1994 valve program when all documentation was transferred into a database.

ARTICLE SUMMARY

Challenge: Carpentersville, Ill., needed to improve its water distribution system.

Solution: The city implemented a valve program in 1994 that helped it prioritize and organize repairs and improvements.

Conclusion: A well-documented valve program is a best management practice for all water distribution systems.

The village of Carpentersville, Ill., knows that, as a water purveyor, it has a responsibility to supply its customers with quality water and to keep service outages as short and infrequent as possible. This requires properly functioning valves and the ability to locate them in a reasonable period of time to isolate any problem areas.

The purpose of a valve program is to exercise the valves so they will work when needed, and to document the location and all pertinent information about the valves so they can be accessed quickly and closed properly. The implementation of a well documented valve program should be considered a best management practice for all water distribution systems.

Water Distribution System Overview

The village of Carpentersville is a northwest suburb of Chicago. Its water distribution system has 120 miles of water main ranging from 4 to 20 in. in diameter. Approximately 70% of the mains are 4, 6 and 8 in. in diameter. The village's distribution system has 10,000 service connections, 1,600 hydrants and 1,600 valves. Of those valves, the majority are gate valves, with a few butterfly valves and several pressure-reducing valves.

Prior to the early 1990s, and primarily due to staffing levels, Carpentersville operated its distribution system on a reactive basis. With development on the uprise, the village decided to become more proactive and institute a valve program in order to keep operating costs to a minimum.

Valve Location & Documentation

One of the largest challenges Carpentersville faced when the valve program began in 1994 was its existing incorrect water atlas. There were water mains incorporated into the atlas from proposed plans that were never applied, and water mains that were found but were not on the atlas. To start the valve program, it was necessary to field-verify and line-locate water mains and magnetically sweep many areas to gather basic information.

Most of the village's original valves were installed using valve boxes. As with most water distribution systems, valve boxes tend to get paved over, filled with debris or damaged during road projects and plowing operations, making the valve difficult—if not impossible—to operate. The village now requires that newly installed valves be located in precast valve vaults for improved accessibility.

Valves were made accessible and exercised top to bottom a minimum of three times. All of the stiff areas were exercised until there was no further reduction in operating torque. Hydraulic valve operators were used on gate valves only. All butterfly valves were operated by hand. No hydraulic operators were used on butterfly valves because the butterfly valves were found to be in good operating condition.

Prior to 1994, valve information was kept on valve cards. In the 1994 valve program, all valve documentation was entered into a new database created by an outside firm. Over the years, the valve data has been supplemented with digital photos and GPS locations. A Trimble GeoXH receiver is now used to gather all pertinent information each time a valve is operated as part of the annual valve exercising program.

Many corrections were made to the water atlas based on information gathered from the valve program. During the mid- to late 1990s, paper records were field-verified and corrected. All water atlas data was incorporated using AutoCAD layers containing water mains, valve data and hydrant data, along with GPS information gathered during the valve program.

Program Benefits

The village strongly supports the continuation of its valve program, which has helped identify the value of scheduled replacements in lieu of emergency repairs. It also has reduced extended shutdowns that could impact schools, businesses and other consumers who expect and demand a reliable supply of water.

Future maintenance continues to rely heavily on the valve program in order to prioritize and schedule timely repairs and water main improvements and extensions. Last, but certainly not least, fire protection and water quality levels are at their maximum for the benefit and protection of Carpentersville water consumers. WWD

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