HOW TO MAINTAIN PIPE INTEGRITY

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Water and wastewater infrastructure is deteriorating due a lack of investment and funding. This means that municipalities and utilities are looking to maintain their systems' integrity at a minimal cost. What can utility managers do to keep water and wastewater systems durable without replacing pipes, an expensive and time-consuming investment that also causes disruptions?

Here are three repair strategies that managers can use to boost the durability of water and wastewater systems.

1. RESTRAIN PIPE WHERE NECESSARY

Restraining techniques ensure piping stays connected and help prevent costly repairs that can shut down a water or wastewater system. Connections such as 45s, 90s, end caps, and hydrant connections are common points of restraint since this is where water flow is increased making the connection a potential weak link. Restraints are also used in connections within wells, wastewater lift stations, and treatment plants. When considering pipe restraint techniques, it's important to examine factors that may affect the chances of pipe movement and separation. Criteria to consider include the nature of the piping system, ground movement, and other ground stresses.

Proper lighting is a must for night time repairs to ensure a safe work site. Backhoe or excavator lights are not enough.

THE NATURE OF THE PIPING SYSTEM

The first consideration is the design of the piping system itself. In a pressurized buried pipeline, such as a water main or wastewater force main, axial thrust forces act on the pipe based on changes in fluid velocity, pipe size, or pipeline direction. This generally happens at fittings such as plugs, caps, valves, tees, bends, or reducers. Such hot spots definitely need to be restrained.

The HYMAX features continuous dynamic deflection, which helps with absorbing ground movement post-installation over time and minimize future pipe breaks.

GROUND MOVEMENT

Earthquakes and ground movement can cause connection failure, beam or shear breaks, and cracks along the length of a pipe. A region's geographic phenomena can greatly determine how much the ground moves. Some regions regularly experience ground movement, whereas others are relatively stable.

Ground movement can also be caused by seasonal weather changes, especially during winter and spring. The ground freezes in the winter, and ice melts in the ground during the spring; both cause major ground shifts. Ground movement is also correlated to extreme weather changes.

OTHER GROUND STRESSES

Pipe also can be affected by the ground in a variety of other ways. The amount of ledge or rock in the ground can negatively affect piping. If a high level of ledge is in the ground, even slight movements caused by traffic or weather can cause piping to break. Conversely, swampy areas with ground that is moist and spongy moves easily and can also stress pipes. There's also a long list of other environments that lead to pipes uncoupling, including tidal areas, bridge crossings, and pipes running under water. For these circumstances, it's best to consult with engineers on how to evaluate the risks associated with a distribution system's environment.

Several techniques are available to restrain pipes including rodding, thrust blocks and mechanical restraint devices and sleeves. Coupling restraint products are relatively new to ▶▶▶

the market and can be very helpful. Such couplings use a mechanism to grip the pipes to restrain them. The products have been shown to be effective with relatively low cost, as the restraining technology is within the coupling itself.

Offered in a wide range of diameters, coupling restraints can be useful in situations where utility lines either cross or run parallel to water and wastewater pipes. Such close pipe-to-pipe proximity makes it difficult—if not impossible—to install thrust blocks and rodding.

The HYMAX GRIP is a coupling restrain that uses a mechanism to grip the pipes to restrain them.

2. ALLOW FOR SHOCK ABSORBERS WITHIN THE PIPING SYSTEM

Shifting ground is one of the key reasons why pipes crack or break near where pipes are connected with couplings. This is especially prevalent in the spring when the ground thaws as cold winter temperatures give way to warmer spring weather. To minimize the effect of ground movement, make sure to use repair couplings that allows for angular deflection during installation (i.e. accept pipes which are positioned at a small angle), as well as continuous dynamic deflection, which helps with absorbing ground movement post-installation over time and minimize future pipe breaks.

In one coupling solution, a specially-designed hydraulic gasket self-inflates using existing water pressure – as water pressure rises in the pipe, water enters the gasket that self-inflates and allows for dynamic deflection of the pipes while maintaining a perfect seal.

3. MAKE REPAIRS THE RIGHT WAY

It's common for installation crews to try to take short cuts with pipe repairs as they want to complete projects as quickly as possible and municipalities try to maintain their water infrastructure with increasingly tight budgets. While there is great temptation to take shortcuts, these "savings" cost time, money and worker safety.

Pipe repair shortcuts never last, tremendously boosting costs. When repairs have to be redone, communities are left to deal with additional repair costs, service interruptions, and restricted traffic due to road closures and detours. Not only that, when a crew enters a repair site a second time, the ground is less stable which can increase the chances of the ditch caving in. Add it all up, and shortcuts are a bad idea.

Be sure to take the time to measure the pipe OD before to ensure the right sized repair product and ensure a strong pipe connection that will last. For night time repairs, use proper lighting to illuminate work areas and not simply backhoe or excavator lights which are not strong enough and can compromise safety. Finally, use quality parts. You cannot afford to purchase products that will fail early, requiring another repair, and no utility can afford the cost of making a second repair at the same location. Couplings and clamps that are easy to install can also make repair jobs more efficient, save time and help eliminate installation errors.

Maintaining the integrity of water and wastewater infrastructure is a challenge with municipal budgets being stretched in many cases. By using these strategies, utility managers can help ensure their piping infrastructure remains stable without the expensive step of replacing pipes.

About the Author
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