WATER ONLINE

Article | May 22, 2019

12 Installation Tips for Challenging Pipeline Repairs

Source: JCM Industries, Inc.

Having to repair old, worn, broken, or leaking pipes is bad enough.
Having to revisit the repair location a second time to refurbish the original fix is doubly frustrating. Here are some guidelines for getting the best results from pipeline repair efforts and enhancing the durability of the repair effort to match the anticipated service life of the pipeline itself.

"It's Only Temporary..."

The rationalization that "It's only temporary" is one of the most misleading pitfalls of repair fittings — unless, of course, 50 years is considered "temporary." Why risk potentially thousands of dollars invested in equipment and labor to excavate the problem area, replace the part, and refill the trench, by using anything less than a solution that equals the remaining pipe lifespan? With that in mind, here are a dozen guidelines for minimizing potential headaches of having to rework a recent pipeline repair.

Start with Better Choices

1. **Fitting Selection.** Many pipeline fitting failures can be traced back to improper fitting selection. Work with an experienced supplier who can explain the performance considerations behind each design option. For example, fittings that do not have enough gasket-loading capability to cope with the higher forces of larger pipe and/or higher line pressures can ultimately fail. Large-diameter pipe with high operating pressures (~300 psi) and a compact leak will do better with a service saddle and outlet gasket (Figure 1A) than a wraparound repair clamp (Figure 1B) that might not be able to exert adequate pressure throughout the entire cross-section of the clamp.

Figures 1A and 1B. *As pipeline size and pressure increase, a tapping sleeve or repair sleeve with a thicker body and a contained outlet gasket seal (left) can provide better mechanical alternatives for increased pipe support, added hoop strength for the pipe, and increased pressure-holding capability than a fitting with a full circumferential gasket and a thinner, more flexible body (right).*

2. **Gasket Type.** Repair fittings can vary by gasket type — from a fully encompassing circumferential gasket, to an outlet seal gasket, to a circular end gasket. Be sure to evaluate the ability of the fitting, gasket, and bolt pattern to ensure a complete seal in the intended application and that the gasket material is compatible with the application environment in which it will be used.

3. **Hoop Strength.** Ensure that the design of the repair part meets or exceeds the hoop strength of the pipe it patches or replaces. In aging cast iron pipe repairs,look for a fitting that will spread the load forces evenly over a broader area to avoid potentially cracking or crushing the existing pipe section.

4. **Good Alignment.** In repair instances where the buried pipe configuration is already in a misaligned position, look for fitting designs that can accommodatethe specific misalignment.

5. **Reinforcement.** Support the pipe repair fitting and the horizontal axis of the pipe, making sure it is sufficient to withstand the strain of the installation and the process of backfilling around the repair.

Complete the Job with Better Follow-Through

Once a proper fitting has been selected for the job at hand, install it with these guidelines in mind:

6. **Challenging Conditions.** Older piping can create installation issues if it is so brittle that it can crack if repair fittings do not distribute gripping pressure evenly around the circumference of the pipe. Even structurally sound piping that is pitted, corroded, or slightly out-of-round can prevent a fitting from forming a smooth, tight gasket seal. Also, instability at the repair site — caused by shifting sandy soils or marshlands/wetlands that are not appropriately dewatered before repair work —can generate stresses if newly installed repair fittings are not properly supported.

7. **High Pressure.** High pipeline pressure can be the result of normal operating settings, extreme elevation changes, trying to pump a greater volume of water through small-diameter pipe, or water

hammer caused by closing hydrant valves too rapidly. These conditions might require a heavier duty fitting design (Figure 2) to bolster the hoop strength of the pipe, or higher bolt strength to form a good mechanical fit.

Figure 2. *Full encapsulation of the original problem and the temporary repair clamp can provide peace of mind for the remainder of a pipeline's life expectancy.*

8. **Accessibility.** Make sure that the trench around the repair provides enough space for the fitting and for worker access around the full perimeter of the fitting. Difficulty in installing, hand-tightening, or final-tightening bolts can lead to improper fit.

9. **Pipe Preparation.** Confirm that the repair location of the pipe is thoroughly clean and prepared for the repair installation so that both the fittings and the gaskets conform evenly to the surface and shape of the pipe.

10. **Gasket Fit.** Look for surface deformities in the gasket that might impair properfit — e.g., flat spots, indentations, ridges, or being out-of-round. Lubricate gaskets according to manufacturer recommendations to assure proper seating. Many manufacturers recommend soapy water rather than grease. Using a lubricant that is incompatible with the gasket material can lead to poor sealing or perhaps eventual gasket deterioration. When installing a full circumferential gasket, be sure to tuck the taper in place and rotate the clamp only in the direction of its arrow to smooth the tapered gasket flap.

11. **Proper Assembly.** Read manufacturer installation directions in their entirety before beginning to install a fitting. Even the best fittings can fail to perform according to spec if improperly installed. Keep bolt threads clean. When working in a dirty trench, especially one splashed with mud due to a leak under pressure, grit in the threads can interfere with appropriate bolt tightening and lead to a poorly clinched fit.

12. **Precise Torque.** After finger-tightening mounting bolts, follow the manufacturer's directions for final tightening. Some manufacturers recommend starting the tightening sequence from the outer edges of the fitting, to allow the gasket to form a tight perimeter seal. Tightening the interior bolts first can create a wrinkle in the gasket inside the fitting that can exaggerate the deformation as it works its way to the periphery.

    Finish tightening to the ***manufacturer-specified torque setting, using a properly calibrated torque wrench***. It is amazing how much variance (and leakage) there can be with under-torqued bolts that were tightened according to the "feel" of maintenance personnel.

    Finally, let a tightened fitting set for at least 15 minutes to allow the gasket material to equalize under pressure before making a final torque reading.