Concrete Pressure Pipe Joints

By Rick Deremiah, P. E.

Concrete pressure pipe (CPP) has a strong track record, with thousands of miles in the ground and some lines as old as 70 or 80 years or more. But ensuring CPP’s longevity, as with any engineered structure, relies on quality installation from the start. Luckily, proper installation is not difficult, so issues can be easily avoided with proper training and techniques. One of the areas susceptible to human error is around the joints. Unlike the pipe itself, in which internal steel components are encased in protective concrete, portions of the steel joint rings are exposed and therefore require grouting on site during installation. Failure to grout properly—whether due to lack of training or efforts to save costs—could leave the steel joint rings vulnerable.

The Diapers

Properly grouting joints can help prevent maintenance issues

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Correctly sealing joints is key to the long-term performance of CPP. Grouting protects joints by creating a seal that prevents external fluids from leaking into the joint area and protects the steel joint rings from corrosive environments. The best way to ensure this is to use diapers and properly grout the joint on the outside. A diaper consists of a Typar synthetic fabric layer with a ⅛-in. thick closed-cell foam layer, which provides an additional layer of protection. It is important to ensure the diaper is properly placed against the outside surface of the pipe to ensure that it is flush, with no gaps or gatherings. The diaper must be centered against the pipe, lightly stretched so that it is flush, and then grouted.

The Pour

Carefully pour the mixed grout into the gap at the top of the diaper. The pour should look and pour like a thick cream. If the grout is too thick, it will not flow around the joint; if it is too thin, it may slip at the diaper or leak. Use multiples of clean sand with sufficient water to achieve a pourable consistency. The grout should be placed in several lifts. Each subsequent lift must be grouted and allowed to cure.

The Bedding Material

The bedding material does not have large rocks or debris that could mar the diaper or impact the nearby pipe. Over diameter pipes, placing the grout in several lifts is helpful. The grout is allowed to take an initial set before subsequent lifts are added.

The Post

Once the diaper is full and wet grout is puddling at the gap at the top, apply a stiffer mix (perhaps the consistency of wet cement) over the joint. Ensure that all metal joint components have at least 1 in. of coverage. Then fold the diaper flap over the gap and allow the grout to cure.

Backfilling operations can begin immediately after the diaper has been filled. When placing backfill, around the filled diaper, take care to avoid damage to or displacement of the diapers.

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