



Manhole Grouting for I/I Abatement

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Manholes have been identified as the single highest contributor of inflow and infiltration in wastewater infrastructure. Improper fitting barrel joints, failed seals in the lifting holes in the corbel, poor fitting or lack of seals for the inlet and/or outlet pipes, leaking chimneys and mortar joint failures in brick manholes are the primary culprits for high infiltration. The challenge of developing a sealing system that stops infiltration without excavation has spawned numerous inventive methods.

Non-structural remedies for stopping and preventing infiltration have been in existence since the first wooden peg was hammer-driven to stop a leak. Various methods have surfaced through the years evolving from the peg, including hemp rope, clay or cement applied externally, internal application of lead wool, chemical grouts and various combinations of these methods. Many of these old remedies temporarily stopped the leak but did not seal

the cavity created on the outside of the manhole as a result of the leak. Hydrostatic pressure continued to build until the old remedy ultimately failed. Clay and cement injected externally stopped the existing leak, but more often than not, failed to seal the void and infiltration simply migrated to another weak area in the manhole. Whether performing structural or non-structural rehabilitation, infiltration should be stopped prior to “dressing” the interior of the manhole. Structural repairs to brick manholes often require partial rehabilitation to route the infiltration to a single point before injecting grout to stop the leak and completing the repair.

One of today's most popular and successful methods of grouting is injecting a chemical grout under pressure from inside the manhole. The grouts can be either single- or two-part hydrophilic foams and gels, hydrophobic foams or

chemically activated gels. All of these products require a pilot hole(s) drilled through the wall of the manhole. The chemical grout is then forced through the wall to the exterior cavity. The grout expands and provides a positive seal from the outside of the manhole. Generally, the hydrophilic foam or gel blends with and absorbs water, is flexible, with low viscosity (thinner consistency fills voids extremely well) and yields approximately 700 percent expansion. This grout works well in locations where expansion and contraction from structural movement or temperature variations occur. The hydrophobic foam repels water, has low viscosity and yields approximately 2000 percent expansion. This grout works well to fill voids and stop leaks in locations where there is little or no movement in the manhole or surrounding soils. It is a chemically activated, two-part product. Reaction time is determined by variances in component ratios.

Careful selection of a sealing system to meet specific conditions will ensure successful infiltration abatement, maintain collection and treatment system design capacity and prevent overflows.

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