

# THE REAL MEANING OF MONOLITHIC LINING

In the world of trenchless rehabilitation technologies, the term 'monolithic lining of manholes' is used alternatively for repairing the manhole structurally, sealing it from corrosion, stopping infiltration, or a combination of these reasons. The definition of 'monolithic' is: consisting of one piece, unbroken or uninterrupted; total uniformity; and invulnerability. So when 'monolithic manhole lining' is specified in a project being bid, the specification should be interpreted to mean that the manhole lining will be installed from the lowest point of the manhole, the invert, to the top, the frame.

All too often when monolithic lining of the manholes is specified, engineers, municipalities, and contractors think that the inverts do not need to be lined. Why is this?

The most common reasons stated are that inverts do not need to be lined because inverts never leak; it is impossible to line the invert; and/or the cost of bypassing the flow would not make lining the inverts cost-effective. All these reasons are FALSE.

First, groundwater migrates hundreds of feet when it is sealed from entering the collection system. Groundwater searches out the closest weak point in the collection system. It is commonly known that when a pipeline is lined it is beneficial to seal the service lateral connections to stop the infiltration from reentering the system. For the same reason, it is necessary to rehabilitate and seal the manholes when lining the pipelines to prevent the migration of groundwater. The manhole may not leak immediately, but it will eventually. If the manhole is brick the minimum work should be pumping grout to encapsulate the exterior of the manhole. Monolithic lining of the manhole with cementitious or epoxy material is even a better, more permanent fix. Precast concrete manholes may require injecting grout around the joints, pipe connections, and invert. The precast manhole may require monolithic lining if the structure is being corroded from the presence of hydrogen sulfide.

If the invert is not lined or sealed, the manhole is not monolithic, and the invert becomes the weak point of the collection



Running infiltration from invert & bench interface.

system thus potentially allowing infiltration to enter the system. How many times have you seen infiltration running and gushing into the manhole through the invert, especially around the pipe connections, or at the invert to bench interface? The invert is a source of infiltration that needs to be sealed. A lined invert also provides better flow characteristics through the manhole.

Secondly, inverts are not impossible to line. Lining inverts takes time and will slightly increase the unit cost for the monolithic lining of manholes. When the inverts are lined you know the manhole is completely sealed. Several epoxy suppliers have kits that were developed to be used in lining inverts. The material is quick-setting to reduce the time that the flow needs to be 'jumped' or bypassed. The question needs to be asked, why spend monies to line manholes if you are going to do only a portion of the work? Why not spend a few extra dollars to monolithically line the manhole and vacuum-test it to ensure that quality work has been achieved, and that the manhole is sealed and impervious to infiltration.

The third and final point is that bypass pumping is not always required to line the manhole inverts. A pneumatic flow-through plug with an attached hose typically can be used to jump the flow across the manhole allowing the contractor to line the invert. Once the epoxy has set according to the manufacturers' instructions, the plug is released and normal flows continue. In larger-diameter pipes and heavy flow areas, bypass pumping may be needed. If this is the case, the lining of manhole inverts should be coordinated so that the inverts can be lined systematically if the manholes are in the same line. This will reduce the time required for bypass pumping.

When specifying monolithic lining of manholes, state that the inverts are to be lined. Do not think that it cannot be done or is too expensive. Line the manholes monolithically and vacuum-test them for a complete and quality project. This will save you time and money in the future.

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Monolithic lined manhole.