



PROJECT: Eliminating the Nuisance of Root Invasion in Manhole Rehabilitation
OWNER: Sewer District of Brunswick, ME
LOCATION: Brunswick, ME
DATE: July 2017
SYSTEM: CLADLINERTM

Eliminating the Nuisance of Root Invasion in Manhole Rehabilitation

Maintenance and rehabilitation of city manholes are a constant for public works departments across the United States. Deterioration of aging infrastructure due to acid attack and inflow and infiltration creates a continuous need to evaluate, rehabilitate, and protect these structures.

The Problem

The historic New England city of Brunswick, Maine, is no exception to these problems. The Sewer District of Brunswick identified two badly deteriorated manholes during routine inspections in early 2017. The manholes were constructed of poured concrete, cinder blocks, and precast barrels and they measured approximately four feet wide and five to six feet deep. Both structures demonstrated signs of severe deterioration in the cinder blocks and had extreme root intrusion.



In search of solutions to restore these manholes rather than replace them, a costly, time-consuming endeavor, Brunswick's Sewer District set out to find a solution that would eliminate the root invasion and restore the structural integrity of the manholes. PrimeLine Products, Inc., a full-service provider of products for the trenchless rehabilitation industry and a licensed distributor of CLADLINER, was contacted.

Product Selection

Selection of the right product is key to the successful completion of any manhole restoration project, especially when trying to factor in the challenges of meeting budgetary requirements. Typically, there have been two popular options in the manhole rehabilitation industry: concrete/cementitious coatings and epoxy coatings. Cementitious options are affordable and relatively reliable although not particularly resistant to highly corrosive environments. Epoxies have stronger acid and chemical resistance but can be more expensive. After careful consideration of the conditions of both Brunswick manholes, PrimeLine suggested CLADLINER. The product combines the simplicity and affordability of a cementitious liner with the performance of a high-build epoxy liner - a true hybrid epoxy solution. It can typically be used as a resurfacer and liner in a single, simple application. However, because of the severity of the deterioration in the case of these Brunswick manholes, an additional cementitious mortar was recommended to be applied prior to the protective liner. This restoring mortar is part of the CLADLINER system; CLADRESTORE provides the strength and

density necessary for aggressive environments and would ensure that the structural integrity was restored. CLADRESTORE also benefits the system by offering an economical, high-build restoring product that sets quickly and is compatible with the CLADLINER topcoat. The hybrid-epoxy topcoat would provide a layer of protection for years to come bringing the manholes to “like new” conditions. This CLADLINER system was agreed upon by all parties involved and the surface preparation and product application began shortly after.

Surface Preparation

As is necessary to avoid product failure in any rehabilitation project, the Brunswick Sewer District’s crew carefully began surface preparation. They used the jetter off a vac truck to initiate the process, then they manually removed the roots and loose material/debris, including dirt and grit attached to the bottom and walls of the manhole. To ensure adequate adhesion for the products, the crew finished the preparation by pressure washing to remove remaining oil, dust, grease, dirt, loose rust, and other foreign material.

Product Application

After surface preparation was complete, CLADRESTORE was trowel applied between ½” to 2” in thickness, depending on the conditions, to bring the surface up to a smooth finish. This industrial-grade, high-strength, high-density cementitious mortar was used as a repair material. It provided excellent resurfacing characteristics that allowed the manholes to be restored to their original build.



Application of the hybrid-epoxy topcoat began a few days later. The hybrid-epoxy topcoat can be applied over CLADRESTORE as soon as the surface is firm enough to accept a trowel application because it provides an extremely dense matrix and will accept coatings at earlier stages than typical Portland cement repair products. Full cure of CLADRESTORE is not necessary. In the case of these Brunswick manholes, however, because of the crew’s logistical reasons, the topcoat of one manhole was applied two days after the application of CLADRESTORE and two weeks after in the second manhole.

To begin the application process, CLADLINER was mixed using a variable-speed drill with a paddle mixer. CLADLINER comes conveniently packaged in a 5 gallon pail that can be used to mix all three components. First, Parts A and B are mixed until a consistent blue color is achieved. Then, Part C is slowly added, and the product is ready for application. The crew noticed that when CLADLINER is first mixed, it has a relatively low viscosity. If it is allowed additional time after mixing, it thickens and can be more easily applied to a higher build for areas such as the cone. If the hybrid-epoxy becomes too thick, it can be re-agitated with the mixer to lower the viscosity to the desired thickness.

Once the product was properly mixed, the Brunswick crew applied it to the manholes using a masonry brush. In only three to four hours, the product reaches its early cure state, and the manhole can be covered and returned to service.

A Final Look

The Brunswick crew was impressed with the simplicity of this hybrid-epoxy system. They noted that the product has the ease of use of any traditional mortar. It was also forgiving, making the application process easy.

PrimeLine's expertise in the protective coating industry brought the city of Brunswick a solution that has restored the lifespan of these two manholes. The hybrid-epoxy system was an economical solution that allowed the manholes to be rehabilitated and protected from chemical attack and the nuisance of root invasion. The simplicity of the application allowed the crew to complete the job in a timely manner, without any complications. The repair and protection of these two manholes proved to be a successful enhancement for the city of Brunswick, where the Sewer District prides itself on serving its community.



After application of CLADLINER System

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