1-1-2007

SprayWall, Cured-In-Placed Method for Manhole Rehabilitation

Purdue ECT Team
Purdue University, ectinfo@ecn.purdue.edu

DOI: 10.5703/1288284315812

Follow this and additional works at: <https://docs.lib.purdue.edu/ectfs>

Part of the [Civil Engineering Commons](#), and the [Construction Engineering and Management Commons](#)

Recommended Citation

ECT Team, Purdue, "SprayWall, Cured-In-Placed Method for Manhole Rehabilitation" (2007). *ECT Fact Sheets*. Paper 103.
<http://dx.doi.org/10.5703/1288284315812>

This document has been made available through Purdue e-Pubs, a service of the Purdue University Libraries.
Please contact epubs@purdue.edu for additional information.

SPRAYWALL, CURED-IN-PLACED METHOD FOR MANHOLE REHABILITATION

THE NEED

Manholes and other underground structures commonly account for 25-30 % of infiltration and up to 70% of inflow in sanitary sewer collection systems. These will cause sewer overflow and endanger the nearby environment. The deteriorated manholes can be caused by a number of factors, including structural fatigue, infiltration, acid attack, and corrosive gasses. There are a number of techniques that can address some of these problems, but there are only a few that can address all manhole problems.

FIGURE 1 DETERIORATED MANHOLE

THE TECHNOLOGY

Some of the trenchless manhole rehabilitation techniques are intended to replace the deteriorated manholes, such as spot repairs, cementitious coating, chemical coating and structural form repair. Structural form repairs are used to rehabilitate severely deteriorated manholes. A new manhole is constructed within the existing manhole either by insertion or construction. These techniques will restore the structural integrity of the manhole with no surface disruption. Structural performance is required, particularly in cases where manholes are exposed to groundwater pressure and are leaking. Any material used to reconstruct manholes must be able to resist attack from acids, corrosives, root, vibration etc.

FIGURE 2 REPAIRED MANHOLE

SprayWall is a spray-applied, cured-in-place method of construction and is primarily used in manholes. It uses urethane material that provides excellent corrosion resistance. SprayWall is structural and can withstand ground water loads on a long-term basis. To determine the thickness of the structure, the design is based on a well-known, widely accepted cure-in-place design principle. The "Modified Timoshenko" equation is used as a design formula to determine the material thickness that must be applied to withstand the groundwater pressure.

FIGURE 3 INSTALLING SPRAYWALL

The pre-installation of the manhole typically involves washing with pressure the interior of the manhole and temporary stopping active leaks. SprayWall uses an uniquely formulated, two-part, urethane that is applied using state-of-the-art plural component equipment. A trained installer applies material to the manhole wall in a continuous fashion, building up the thickness that the design requires. SprayWall's unique urethane formula begins to cure in eight seconds, allowing the required thickness to be applied

without multiple layers. The spraying of a typical manhole is completed in about half an hour. As soon as the spraying operation is complete, the manhole can be returned to service, so by-pass pumping is seldom required.

THE BENEFITS

Installation of SprayWall is fast, providing minimum downtime, and since it is a trenchless technology, it will minimize disruption. It will also eliminate the need for multiple crew mobilizations.

STATUS

SprayWall has been widely used since 1991 in thousands of manholes around the world, with no reported design failure. SprayWall was the primary method utilized in the Jefferson County, Alabama, rehabilitation project.

BARRIERS

Since SprayWall uses cured-in-place (CIP) method, insufficient knowledge is a major barrier for this type of rehabilitation. Some concepts in CIP, such as flexural modulus and creep, are less well known with regard to many manhole rehabilitation techniques.

POINTS OF CONTACT

Long, William, Sprayroq, Inc.

REVIEWERS

Peer reviewed as an emerging construction technology

DISCLAIMER

Purdue University does not endorse this technology or represents that the information presented can be relied upon without further investigation.

PUBLISHER

Emerging Construction Technologies, Division of Construction Engineering and Management, Purdue University, West Lafayette, Indiana