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Authorized Dealer

Concrete Manhole

Category: Corrosion Protection

Customer: City of Portland, OR

Project: Protect concrete manhole from hydrogen sulphide attacks in sewer wastewater

Product: Rhino Extreme™

Problem

The city of Portland, OR was experiencing severe manhole concrete spalling from hydrogen sulphide corrosion and cracking from the effects of natural ground movement. The structure had been deteriorating over the past 10 years and the repair needed to be done in near 40° winter temperatures.

Because an entire section of the road needed to be shut down to implement the repairs and eroding concrete was causing a dangerous environmental hazard, the city required a fast turn-around time to complete the project.

Solution

The Iron Horse Group and Rhino Linings were chosen because of their experience and reputation for providing fast curing/return-to-service polyurea systems that offer superior elongation properties than slower curing and less flexible epoxy systems.

Rhino Linings primers and liner were used on the entire manhole surface area. **Primer 101 (epoxy)** was used as a moisture barrier to the concrete. **Primer 161 (polyurethane)** was chosen because of its high elongation, adhesion and bonding properties. **Rhino Extreme (polyurea)** liner was selected because of its ability to be sprayed in low temperatures, its excellent protection against impacts and abrasion, and its 450% elongation properties.

To ensure continued protection against future hydrogen sulphide attacks, the entire 200 Sq. feet of the manhole's walls, ceiling and benches were sprayed with Rhino Extreme at variable thicknesses ranging from 1/4" to 3/8", depending upon expected H₂S exposure levels.



Operationally, Iron Horse repaired the spalled concrete and smoothed out the cracks and holes caused by the hydrogen sulphide corrosion in one-half day. They applied the Rhino 101 and 161 primers and sprayed Rhino Extreme throughout the manhole in another day. The entire job was done at temperatures near 40° F with the inside humidity at 50% using a portable heater to cure the primers. Rhino Extreme provided a fast cure and quick return-to-service because of its moisture/temperature resistant properties.

Results

The Iron Horse Group's efficient site preparation application of Rhino Linings primers and polyurea lining successfully met the city of Portland's requirement for the repair of its concrete manhole. The city's future hydrogen sulphide corrosion and cracking from the effects of natural ground movement was resolved by the use of Rhino Extreme. The Iron Horse Group and Rhino Linings successfully provided the city with:

- Fast Turn around times (one day)
- Completion of the project in temperatures near 40°
- Solution offering superior elongation (450%), versus the less flexible epoxy systems

Rhino Extreme

- 100% Polyurea
- Stable from -50°F (-45°C) to 200°F (93°C)
- Excellent protection resistance against abrasion
- 100% solids, zero VOCs, no solvents
- Hardness (Shore): 90A ±5
- Tensile Strength (psi): 2600-2800
- Elongation %: 400-500
- Tear Resistance (pli) Die C: 300-330

Before Photos



After Photos



Industrial applications are highly specialized and specific consultation and training may be required to perform such applications. Rhino Linings® does not provide confined space training and/or expertise in this area. Product MSDS sheets and specific chemical properties should be evaluated before undertaking any application.



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