

Hampton Roads “Sticks” with Polyurethane



36" Ductile Iron Force Main

Hampton Roads Sanitation District (HRSD), headquartered in Virginia Beach, Virginia, was one of the first utilities in North America to use Madison's polyurethane coating to protect ductile iron pipe internals against aggressive sewage and microbial induced corrosion (MIC). Since the first project in 1988, the district has been, and continues to be, one of the largest municipal users of Madison polyurethanes with over 20 miles of coated ductile iron pipe installed in sizes ranging from 12" to 48".

The population served by Hampton Roads has developed rapidly since the 1940s, becoming the 28th largest metropolitan area in the United States with a population of approximately 1.5 million people.

The District has met this challenge admirably and now operates nine wastewater treatment plants and over 380 miles of interceptor line. The growth continues with over 25 miles of new lines completed within the last two years and more than 15 miles currently under design.

High sulfate content of the wastewater plus flat geography results in increases of H_2S (hydrogen sulfide) production and low flow rates. Those two conditions allow the thiobacillus bacteria to produce H_2SO_4 (sulfuric acid) that aggressively attacks the crown areas of the pipe. Experience has shown that unprotected ductile iron pipes can corrode through in less than 3 years under these conditions. Approximately 20% of the typical force main in the HRSD system requires some sort of internal corrosion protection.

The District staff recognized these problems at the early stages and chose Madison's polyurethane as their main weapon in the corrosion fight.

The primary evaluation tool is to immerse an internally coated sample of ductile iron pipe in a solution of 20% sulfuric acid (H_2SO_4) and monitor it for undercutting and deterioration. HRSD reports that the Madison polyurethanes resists the acid with no problems.

Early in the evaluation of the polyurethane, HRSD made a standard 2" tap into the side of a three foot long piece of 8" ductile that had been lined with Madison's polyurethane. The tap was not repaired before the pipe was suspended into a manhole known for its extremely corrosive conditions. After 6 months, the pipe was removed and the coating inspected. While there was some minor corrosion right at the saw cut, there was very little evidence of any undercutting or loss of adhesion around the unrepaired area.

HRSD reports no problems or difficulties whatsoever with any of their over 20 miles of polyurethane lined pipe in operation. They continue to specify the material wherever they expect to come across aggressive sewage conditions.



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