JM Eagle™

Building essentials for a better tomorrow™

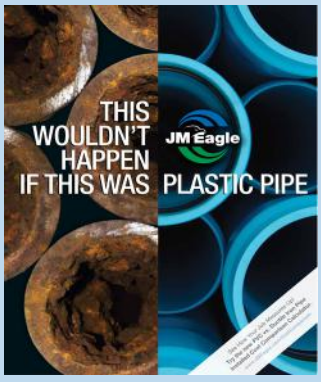
Customer Connection

August 2012

DUCTILE-IRON FAILURES: THE QUESTIONS AND ANSWERS

When it comes to understanding why ductile-iron pipe fails, the DI industry still struggles to come up with explanations and solutions. The Uni-Bell PVC Pipe Association at its annual conference aimed to separate the unproven theories over the years from the actual science.

The Claims	The Facts
Ductile-iron pipe is inherently stronger than its predecessor, cast-iron pipe, so the pipe's wall thickness can be reduced.	The industry fails to recognize the different ways in which corrosion destroys CIP and DIP. CIP suffers widespread graphitic corrosion, while **DIP experiences pitting corrosion**, which **causes it to fail faster.**
Polyethylene encasement can control corrosion.	The encasement, a loose wrap of PE sheeting or tubing attached to the pipe with duct tape during installation, **routinely folds and tears, exposing it to corrosive agents.**
More durable PE encasement and more duct tape can help.	The new material and duct table placement remain vulnerable to tears and folds during installation. The folds and tears allow **water and soil to accumulate** under the PE encasement, **resulting in corrosion** both at the tears and under intact PE.
The installers are doing it wrong.	Even if the contractor were able to install the polywrap without folds and tears, the weight of the **full water or sewer main on the PE sheeting** that is up against stone backfill **ultimately results in penetrations in the plastic**.
If water does enter the void between the encasement and the pipe wall, it could not get out. When initial corrosion exhausts the oxygen supply, corrosion will stop.	Groundwater will enter and exit as its level changes, and it will flow almost constantly through the stone backfill, through the PE, and from one penetration to the other. This movement of water will constantly **replenish the oxygen and allow corrosion to proceed.**
Mill scale, which forms when DIP is produced, protects against corrosion.	Routine handling and installation **damages the mill scale** and may actually **significantly contribute to corrosion** on DIP.
External bonded coatings can prevent corrosion.	Since the early 2000s, DIP manufacturers have elected to **stop supplying DIP with external bonded coating**, most likely due to cost.
Cathodic protection with PE encasement can prevent corrosion.	PE encasement shields pipe from the protective current, and effective cathodic protection happens only at the tears and rips in the PE. "Disbonded" (formally bonded) **coating will shield pipe from the cathodic protection.**
Since cathodic protection raises the pH of the environment immediately adjacent to the protected structure, the pH of any water and soil beneath the PE encasement increases to levels that will prevent corrosion.	The inevitable **presence of gaps in the water and soil between the wrap and the pipe** prevents the increase in pH. Failures of cathodically protected DIP with PE encasement have occurred and test pit excavations have specifically revealed **corrosion under the wrap**.
Random excavations of DIP mains shows the pipe experiences little or no corrosion.	**Random test pits are not useful** in locating corrosion because pipe-to-earth and cell-to-cell potential measurements are needed along a DIP main to find the corrosion.



For information about how ductile-iron pipe stands up against plastic pipe, click here.