



Photo 1: Utility congestion

The City of Port St. Lucie's programmatic approach to asbestos cement pipe bursting

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Introduction

The City of Port St. Lucie has been proactively replacing its potable water distribution mains for several years. Prior to 2014, the City utilized traditional open cut construction methods to replace mains. However, City staff sought innovative methods to replace the infrastructure with fewer social and environmental impacts. The City was satisfied with the construction of a pipe bursting project and pushed to build a programmatic approach to replacing their system.

The City provides water, wastewater and reclaimed water service to a

vibrant Treasure Coast community. The current utility system is comprised of approximately 65,000 active water connections and 46,000 active wastewater connections. In 2012-2013, the City had replaced 249,165 LF of AC pipe through traditional open cut construction. However, the City recognized pipe bursting as a suitable method to replace their existing system. In 2014, the City bid a traditional open cut construction project and allowed pipe bursting to be bid as an alternate. Pipe bursting was awarded the bid and City staff members have been very pleased with pipe bursting. The City recently

Only 15 linear feet of actual pipeline were replaced so the cost was \$3,470 per linear foot. It is clear that emergency replacement is simply not cost effective. Luckily, the City of Port St. Lucie had not experienced AC pipe failures that could be considered catastrophic. However, the potential for this to occur was not decreasing.

Literature review was conducted in an attempt to analyze the potential social, environmental and economic costs of catastrophic failure. Recent failure of a 93-year-old 30” steel potable water main was evaluated as a potential worse case scenario for the City of Los Angeles (see Photo 3). This failure attracted national news coverage and caused significant environmental, social and economic damage. It took four hours to shut off the main due to inoperable valves. Over 160 firefighters responded to the water main break to search over 200 cars. Flooding from lost water occurred in a

Failure #2				
Cost Item	Number	Quantity Per Number	Cost per hour	Total Cost
Service Worker	10	20	\$20	\$4,000
Service Truck	4	20	\$75	\$6,000
Backhoe	1	20	\$125	\$2,500
Vacuum Truck	1	6	\$125	\$750
Loader	1	10	\$100	\$1,000
Water Loss	30 minutes	2,500 GPM		\$225
Restoration				\$22,500
Social Costs				\$15,000
Total Cost				\$52,050
Total Cost per Linear Foot				\$3,470

historic basketball court. It was estimated that approximately 48 million gallons of water were released. The overall costs of failure are estimated in the table on p. 110. (Piratla, 2015).

It is assumed that only 75 linear feet of actual pipeline were replaced so the cost of replacement was \$481,333 per linear foot.

6WDWLFSLSHXUVWLJSURFHVV



Photo 3: UCLA 30" steel pipe failure

UCLA Catastrophic Failure Example Analysis

Date	July 2014
Pipe Size/Material	30" Steel
Pipeline Operating Pressure	200 psi
Time required to isolate water main	4 hours
Water loss	48 Million Gallons
Hours to complete repair	238 hours
Total Cost	\$36.1 Million
Total Cost per linear foot	\$481,333

Conclusion

The City of Port St. Lucie has switched from open cut construction to embrace pipe bursting, when appropriate, with great success. The City has recognized the social, environmental and economic benefits of pipe bursting versus traditional open cut and has taken steps to build a recurring program for potable water distribution pipe replacement. The City understands reacting to emergency repairs is not cost effective in comparison to proactive rehabilitation programs and is moving towards a programmatic approach to pipe rehabilitation.

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