

Condition Assessment of a 60-inch PCCP Water Line - Asset Management Priorities for City of Houston -

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The City of Houston maintains hundreds of miles of large diameter water transmission lines, many of which are approaching or have past their original design life expectancy, which provide 350 MGD of surface water throughout the City. Over the last few years, the City of Houston has experienced failures of various large diameter water lines. Some of the most notable have involved 42 and 60-inch Prestressed Concrete Pipe (PCCP), and 24-inch Cast Iron Pipe. The City is taking steps to manage their water infrastructure through a structured program of maintenance, inspections, rehabilitation and replacement.

The Asset Management program starts by prioritizing the water infrastructure for evaluation under a Condition Assessment program. Existing lines are prioritized on the likelihood that they may have distress and the risk of property damage or water outages if a failure were to occur, based on criteria such as age, material of construction, past operation, maintenance history and redundancy, and organized into a GIS database. Each of these criteria is assigned a weighted value used to estimate the condition of the line.

Physical inspections and testing of the lines can then be scheduled based on their theoretical condition. This type of planning helps the City to prepare for long-duration water shut downs for inspections, testing and maintenance to reduce the impact to customers. Being able to plan ahead for internal inspections allows the City to construct necessary improvements and change system operations in order to minimize water outages to customers and allow for safe entry into the pipe lines.

This paper will describe the City's Asset Management program, and the selection of criteria used to analyze and prioritize their Condition Assessment program and some of the issues and constraints faced to fully inspect existing pipe lines, and will describe some of the technologies available for inspecting the lines.

The "South 60-inch Water Line" is a major transmission line carrying treated surface water from the East Water Purification plant in east Houston to Sims Bayou Pump Station in southwest Houston, and was ranked #1 on the priority list. Because this line was a critical feed to supply surface water to southwest Houston, nearly two years of planning and construction of new transmissions lines was needed prior to a long-term shut down.

The line is currently undergoing inspections and testing, however to date, seven pipe sections have been identified with signs of distress. Of those seven sections, one pipe section was removed and replaced, two sections were reinforced in place, and four sections were determined to be within the pressure-handling capacity requirements of the line and will be monitored in the future.

The case study will highlight the planning process for assessment of the South 60-inch water line, and explain the inspection methods, findings and rehabilitation methods used to extend the useful service life of this critical water line.