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to the
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Effect of Aging Water Mains on Water Quality in Distribution Systems

Objectives

To study and quantify the impact of aging pipes on water quality, and to provide utility managers with a decision-support tool to help prioritize the renewal of water mains.

Background

A holistic decision-support tool for managing the rehabilitation and renewal of water mains would require the simultaneous consideration of their structural integrity, hydraulic capacity, and role in the deterioration of the quality of distributed water. However, previous research efforts have focused largely on the first two issues, and have ignored the effect of water quality on decision-making.

Progress to Date

- Developed a conceptual framework for prioritizing the rehabilitation and renewal of water mains using a fuzzy cognitive map, which may incorporate uncertain, subjective, and incomplete or missing data.
- Based on the conceptual framework, developed a prototype decision support tool, Q-WARP (water Quality - Water main Renewal Planner), to predict the potential occurrence of various mechanisms of water quality deterioration that lead to water quality failures in the distribution network. Q-WARP can also evaluate multiple strategies for reducing the risk of water quality failures, leading to better-informed decision-making. It can also perform sensitivity analysis to identify key input factors.

Work Remaining

Complete development of Q-WARP, and conduct case studies.

Expected Outcomes

The final report and the Q-WARP prototype software will be available through the American Water Works Association Research Foundation in early 2008.

Partners

American Water Works Association Research Foundation (AwwaRF)

Start/Expected Completion Dates

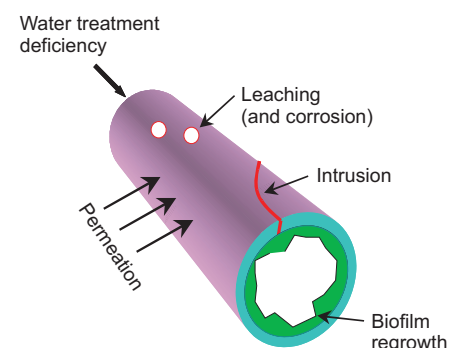
This project began in September 2003 and will be completed in September 2007.

Project Manager

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For more information, see http://irc.nrc-cnrc.gc.ca/ui/bu/agingwater_e.html

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Water quality deterioration pathways



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