

Risk Management of Large-Diameter Water-Transmission Mains

Objective

This project was intended to help water utilities manage the risk of failure related to their large-diameter water-transmission mains.

Background

The failure of large-diameter water-transmission mains, while relatively rare, can have significant consequences including severe interruptions in service, cost of repair, water losses, and damage to adjacent infrastructure and buildings, as well as to the environment. Water utilities managers must minimize the probability of such failures—which increases as the mains age—while still controlling the costs of inspection and rehabilitation. This task is complicated by a scarcity of data and imprecision of inspection reports.

Outcomes

This project produced a research report: *Risk Management of Large-Diameter Water Transmission Mains*, available from the American Water Works Association, *AWWA Catalog No. 91087*. The report includes the *T-WARP* software, which incorporates a method to encode inspection data into condition ratings and a pipe deterioration model, both based on fuzzy mathematics techniques.

The report and software comprise a decision-support tool to help managers develop strategies to minimize the risk of failure in a cost-effective way. To use the software effectively, municipalities must perform at least one thorough inspection of the pipe, documenting all observed distress indicators. These distress indicators are rendered into a condition rating, which is subsequently used to calibrate the deterioration model. Once the deterioration rate is established, a reasonable prediction can be made about the future condition of the pipe and about its risk of failure, determined by both the likelihood of failure and its consequences.

Partners

The American Water Works Association Research Foundation (AwwaRF) and nine water utilities from the U.S., Canada and Australia

Start/Expected Completion Dates

This project began in 2002 and was completed in 2005.

Project Manager

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

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Failed cast iron transmission main