Multiple-criteria decision analysis in urban water systems

Summary

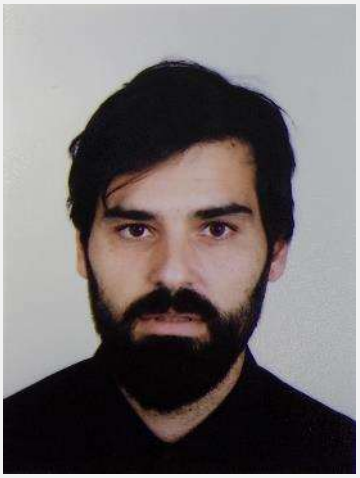
This research aims at developing and demonstrating the application of a novel two-step methodology for assisting decision-making on pipe rehabilitation in water distribution networks. Two methodological procedures are developed, being applied sequentially and in an integrated way: the establishment of rehabilitation units and the rehabilitation scheduling. Rehabilitation units are created by grouping pipes in coherent sets considering several condition assessment criteria and the available annual budgets, and using multi-objective combinatorial optimization.

The prioritization and scheduling of the rehabilitation units in mid and long-term is established through a multicriteria decision analysis approach and scenario planning, allowing to encompass the uncertainty related to the mid and long-term forecasts, integrating the time dimension. This two-step methodology allows a robust and better-supported decision on the pipe network rehabilitation, ensuring the sustainability and availability of the service to future generations and considering the multi-dimensional nature of the decision problem.

Keywords

Decision-making process, rehabilitation, multicriteria decision analysis, multi-objective combinatorial optimization.

Ageing of water distribution networks.



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