

Prioritization of rehabilitation interventions for urban water assets using multiple criteria decision-aid

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Abstract

The aim of this paper is to compare sorting and ranking methods for prioritization of rehabilitation interventions of sewers, taking into account risk, performance and cost. For that purpose multiple criteria decision-aid (MCDA) methods such as ELECTRE TRI for sorting and ELECTRE III for ranking are applied in a real case-study and the results obtained compared. The case study is a small sanitary sewer system from a Portuguese utility located in the metropolitan area of Lisbon. The problem to investigate is the prioritisation of the network sewers candidate to rehabilitation. The decision-maker (a panel group of specialists) has chosen five assessment metrics: water level and maximum flow velocity (hydraulic performance indices), sewer importance and failure repair cost (collapse-related consequences of failure) and the risk of collapse. The results show that the outcomes from ELECTRE III are easier to understand than those from ELECTRE TRI method. Two different sets of weights were used and the sorting and ranking results from both methods were found to be sensitive to them. ELECTRE TRI method is more difficult to use since it involves more technical parameters that are difficult to define, such as reference profiles and cut levels.

Keywords: Cost, MCDA, Performance, Prioritization, Rehabilitation Plan, Risk