

Prioritising alternatives for maintenance of water distribution networks: A group decision approach

Flavio Trojan and Danielle Costa Morais*

Federal University of Pernambuco, Av. Prof. Moraes Rego, 1235, Cidade Universitária, 50670-901 Recife, PE, Brazil

Abstract

Difficulties related to the group decision-making process in the water supply sector, such as physical and economic losses, irrational use of water and maintenance costs, highlight the need to develop procedures to support decisions, reducing unnecessary water use and wastage. This study focused on the rational use of water resources and reduction of water losses, based on the assumption that it is far more economical to develop and improve existing systems rather than build new systems in parallel to the existing one. This study aimed to support a group decision-making process in the maintenance section of a water supply company. A model is proposed consisting of 2 phases, which aggregates individual preferences to achieve a group decision. The first phase is based on the ELECTRE II method, analysing individual preferences, while the second is based on the COPELAND method to aggregate individual preferences. From this model, we developed a software program to prioritise alternatives, simultaneously taking into account subjective and objective criteria, and thereby giving decision makers a clear and comprehensive overview of alternatives, indicating the most suitable alternative based on the preferences of group members from different areas.

Keywords: group decision; multi-criteria; maintenance; water networks