Desalination and Water Treatment
www.deswater.com
33 (2011) 97–106
September
1944-3994 / 1944-3986 © 2011 Desalination Publications. All rights reserved.
doi: 10.5004/dwt.2011.2631

Water pipe network reliability assessment using the DAC method

V. Kanakoudis[a], S. Tsitsifli[b]*

Department of Civil Engineering, Pedion Areos, University of Thessaly, 38334 Volos, Greece
[a]*Tel. +30 24210 74156; Fax +30 24210 74169; email: bkanakoud@civ.uth.gr*
[b]*Tel. +30 2410 531397; email: tsitsifli@civ.uth.gr*

Received 20 January 2010; Accepted in revised form 5 November 2010

ABSTRACT

The Discriminant Analysis and Classification (DAC) method has offered remarkable results regarding the prediction of failures in an oil or a gas pipe network, based on the network characteristics. The DAC method also proved its ability to identify the most crucial network parameters affecting its behavior. The present study attempts to check whether the DAC method can provide safe results regarding the reliability assessment of urban water networks too. The DAC method aims at classifying the network pipes in two groups (failures/successes), based on simple or/and dimensionless joint variables. Serious problems related to the quality, reliability and compatibility of the data provided by the Water Utilities were tackled using dummy variables based on field data. The distinction between the meanings of 'failure' and 'success', for a water pipe network, was also crucial. For the case study water pipe network of Larisa city, in Greece, the criterion used to define the meanings of 'failure' and 'success' was "the total water volume being lost" through a leak or a break in a pipe. The available pipe failure data records for Larisa city were poor and not fully compatible to the DAC method demands. The results showed that discrimination is good enough and would be even better if additional data (in line with the DAC standards) was available. Thus, overall, the DAC method proved to be a useful tool for pipe reliability prediction in urban water pipe networks.

Keywords: Water pipe networks; Reliability assessment; Discriminant analysis and classification

* Corresponding author.