

Benchmarking leakage from water reticulation systems in South Africa

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Abstract

A project to assess the levels of leakage in 30 water utilities throughout South Africa was initiated by the Water Research Commission. The BENCHLEAK software was used to evaluate the water utilities and performance indicators calculated by the model were used to compare levels of non-revenue water. Results showed that utilities ranked differently according to the different indicators, and that the South African results are similar to world norms.

Feed back from the water utilities showed that some of the data requested were confusing and required clarity. The number of service connections, apparent losses and length of pipe between the street edge and the meter were looked at in more detail. Standard drawings were developed to assist water utilities in determining their number of service connections. A table is presented to assess the apparent losses of each water utility in a more pragmatic way.

Introduction

There is an increasing awareness in South Africa that water is limited and that careful management should be applied when dealing with this scarce resource. Water lost from potable water distribution systems remains a major issue when examining the overall water wasted throughout the country. The BENCHLEAK software was developed through the Water Research Commission to provide a simple yet pragmatic approach to the evaluation of leakage from potable water distribution systems. The model is used to assist water utilities to evaluate the levels of leakage and non-revenue water in their water distribution systems.

A project was previously initiated by the Water Research Commission in order to develop a standardised software package (BENCHLEAK) and undertake some initial evaluations on selected water utilities in South Africa. This first project did not allow for analysis and checking of the data and results that came from the water suppliers due to budget and time constraints and there were many anomalies which were identified but never corrected. As the software has now been available for sometime in South Africa, it was considered worthwhile to build on the previous work and to carry out a detailed analysis of leakage in selected water utilities. The project was then initiated to compare the levels of leakage of 30 water utilities in South Africa. The results will become part of a larger International Water Association (IWA) initiative to gather leakage information from around the world by creating an international data set which will allow comparisons to be made of leakage levels between various countries. A number of water utilities in South Africa were requested to provide data on their respective systems including length of mains, number of service connections, average operating pressure, systems input volume and the components of authorised consumption. The data were processed through

the BENCHLEAK model and the results carefully screened for errors.

While the main aim of the project was to gather a data set of water suppliers in South Africa and to determine the levels of leakage being experienced, it was also necessary to investigate certain issues in depth to ensure that a standard format was being used. Some confusion had been experienced by the water utilities in the previous project with regard to certain of the input parameters for the model, namely, the number of service connections and the estimation of apparent losses. It is of little value comparing water utilities if they have made their own assumptions with regard to key elements of the benchmarking calculation.

For this reason, standard drawings were developed to assist users in assessing the number of service connections in their systems as well as the levels of apparent losses. The apparent loss figure was previously very subjective and open to interpretation. In this project the apparent losses have been evaluated in a more detailed and pragmatic approach. The age of the meters and the number of illegal connections are the main factors influencing the apparent losses in South Africa. The apparent losses for each individual water utility have been assessed according to these factors.

This paper presents the main findings of the project. Results from the various water utilities included in the data set are presented and discussed. Standard approaches for dealing with various inputs required for the model have been developed and are presented.

The BENCHLEAK model

The BENCHLEAK model was developed through the Water Research Commission in order to facilitate the evaluation of leakage levels and, in particular, non-revenue water, in potable water distribution systems (McKenzie and Lambert, 2002). It is a simple, user-friendly model that is based on an excel spreadsheet and provides various performance indicators for non-revenue water and real losses. The model was used in the evaluation of 30 water utilities throughout South Africa, which were then compared to international water utilities. The input for the model was provided by the water utilities and a brief description of each follows.

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