

REAL-TIME MANAGEMENT OF PRESSURE IN WATER DISTRIBUTION NETWORKS.

Dossaji, Aliasger; Munishi, Subira & Shagega Frank

Water Resources Engineering Department, University of Dar es Salaam, P.O Box 35131, Dar es Salaam, Tanzania

Project Summary

A major challenge facing most water utilities across the Sub-Saharan Africa and also in Tanzania is the enormous amount of water lost in pipe network prior to reaching the consumer. This is commonly known as Non-Revenue Water (NRW). Research has proven over the years that a greater proportion of NRW originates from leakage in the distribution system. One of the major factors that influence pipe leakage rate is the pressure in the distribution system. With adequate pressure management, it was noted that leakage rate can be reduced by 30% and therefore potentially save DAWASA about \$2.26 million (Tsh 5.2 billion) annually. This decreases the cost of producing NRW which as of 2009/2010 fiscal report, was amounting to about \$5.64 million (Tsh 12.965 billion). This particular study addresses this problem mainly, by implementing a pressure management system in the supply network so as to reduce the amount of Non-Revenue Water.

Project Rationale.

This project intends to contribute to reducing the NRW in the much-aged pipe network that greatly suffers water losses on a continuous basis. Particularly, the primary contribution is on piloting a practical engineering method that seeks to provide appropriate and adequate pressure management in water distribution networks by keeping the pressure within a safe allowable range so as to reduce the amount of NRW and increase life span of the infrastructure.

This project has three main objectives, namely, the analysis of the existing water distribution network system in a selected piloted area for hydraulic analysis. Secondly, the project then proposes an updated schematic network with supplementary tools/devices which can be used at site to automatically manage pressure in real world. Lastly the project is now engaged in making a prototype model to demonstrate pressure regulation in the network.

Method

This project made use of several approaches including desk reviews, field visits and other tools like EPANET Software for hydraulic analysis. Initially, a schematic of the Water Distribution Network WDN of the pilot area was generated, followed by Identification of a Critical Node (CN) using a hydraulic analysis of the entire network and pressure Management in the EPANET software using Pressure Reducing Valves (PRVs). Finally the project embarked on designing of an electronic pressure sensor, building and assembling of first iteration of the prototype model for demonstration.