Leakage detection and management in water distribution systems

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Abstract

Water is a limited source that needs to be properly managed and distributed to the ever-growing population of the world. Rapid urbanization and development have increased the overall water demand of the world drastically. However, there is loss of billions of liters of water every year due to leakages in water distribution systems. Such water loss means significant financial loss for the utilities as well. World bank estimates a loss of $14 billion annually from wasted water.

To address these issues and for the development of efficient and reliable leakage management techniques, high efforts have been made by the researchers and engineers. Over the past decade, various techniques and technologies have been developed for leakage management and leak detection. These include ideas such as pressure management in water distribution networks, use of Advanced Metering Infrastructure, use of machine learning algorithms, etc. For leakage detection, techniques such as acoustic technique, and in recent yeats transient test-based techniques have become popular. Smart Water Grid uses two-way real time network monitoring by utilizing sensors and devices in the water distribution system. Hence, valuable real time data of the water distribution network can be collected.

Best results and outcomes may be produced by proper utilization of the collected data in unison with advanced detection and management techniques. Long term reduction in Non Revenue Water can be achieved by detecting, localizing and repairing leakages as quickly and as efficiently as possible. However, there are still numerous challenges to be met and future research works to be conducted in this field.

Keywords : Leak detection, Smart Water Grid, Transient test

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