

Advise^{IT} Water Leakage Management

Industrial^{IT} for Water Networks

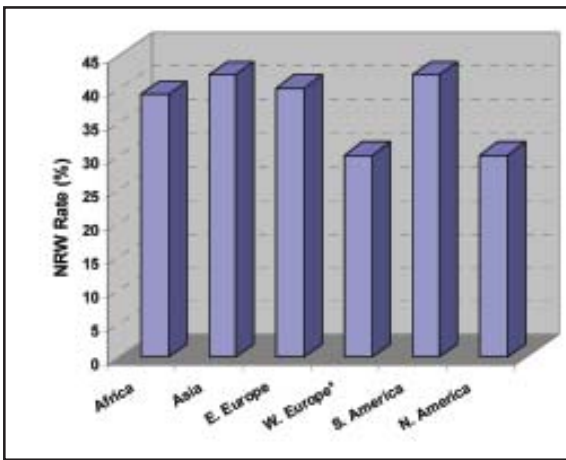


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ABB

Introduction

In many countries, Non-Revenue Water (NRW) losses are very high (see Figure 1). These values can vary widely in a single country, and even within a single water company. The high NRW means significant revenue losses and therefore a need for increased production levels. As a result, more water than needed is treated and more water treatment plants than necessary are built. By reducing water leakages, the water utilities can increase revenues and thus improve profits.



The Water Leakage Management (WLM) software comprises a set of programs for evaluating water loss and specific water network components, managing data acquisition and storage, handling alarms, data browsing, map navigation, analysis of loss components and trends, online repair monitoring, performance indicators, security, and customized user access privileges. Features such as web access and native language support are also provided.

The software is developed for utilities or consultants that are embarking on water leakage or NRW reduction projects. Performance indicators as recommended by the International Water Association are provided for effective progress monitoring. The software provides a well-integrated information management system that can be used for archiving data history and detailed analyses of data trends.

Benefits

The main benefits are:

- early detection of new bursts through analysis of regularly sampled flow and pressure data
- analysis of loss components enables user to differentiate between background leakage and bursts, hence develop appropriate repair strategies
- integrated data management reduces operating costs and supports fast response to users

The WLM software is implemented on ABB's Aspect Integrator Platform V2.1 and runs on Windows 2000 Server operating system.

Highlights

- Based on BABE (Bursts and Background Estimates) and IWA (International Water Association) methodologies
- Provides easy-to-use user interfaces and map navigation
- Use of functional structure to represent data by DMA districts and utility
- Security features using user access privileges
- Allows faster and more natural navigation than traditional spreadsheet based solutions
- Allows for easy repair monitoring, controlling, exception investigation, studying trends
- Integration of information providing higher operational efficiency

Helping various users

The WLM will provide data and analytical support to typical users, such as:

- **Project manager.** The project manager is responsible for the overall implementation of a NRW reduction strategy. The WLM will provide the project manager with information about current water losses and pressure profile. He can then measure their economic impacts such as cost to repair versus cost of lost water.
- **Field engineers.** They work in the field and perform all necessary engineering and operational tasks. The field engineers need to have access to field instrumentation and can access to leakage status in DMAs through the WLM system.
- **Operator in utility control center.** The operator in the utility control center can use the WLM system to aid in his day-to-day operation of leakage management.
- **External users.** The external user at a small or medium sized utility can send measurements and raw data via Internet to a WLM server and also access the WLM applications.

Water Leakage Evaluation Methodology

- BABE (Bursts and Background Estimates) methodology is used
- A NRW area is subdivided into DMA and districts.
- Analysis of loss components by background, reported and unreported leakage
- IWA (International Water Association) standard terminology is used
- Top-down analysis by Water Balance
- 95% Confidence limits estimation for Water Balance components
- Bottom-up approach by Night Flow analysis

Data Acquisition

- Batch mode – data may be batched up to 7 days
- 5 inlet/outlet points per DMA
- 8 pressure metering points per DMA

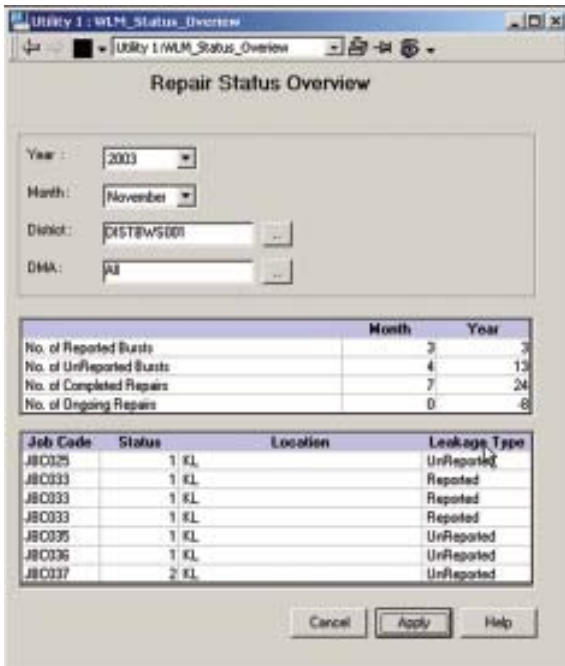


Data Storage

- Aspect directory for keeping configuration (static) data
- History log files for keeping historical data (hourly, daily, monthly and yearly depending on the aspect).
- SQL Server database for keeping repair job details, repair statistics, and aggregated district and utility data.

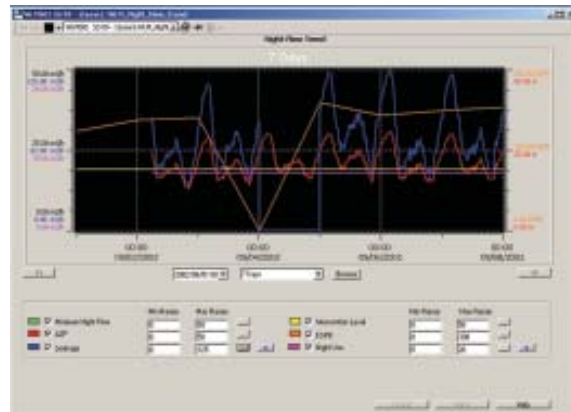
Alarms and Events

- Leakage out of defined range
- Inlet, AZP or Target pressure out of defined range
- Repair status
- Leakage levels



Data Trend Analysis

- Flow-pressure trends
- Demand profile
- Night flow trends
- Water balance trends



Online Repair Monitoring

- Job progress tracking
- Job costing
- Active leakage control tracking
- Repair statistics
- Physical loss components
- Flow and pressure trends for repair quality monitoring

Map Navigation

- Supports JPEG and other popular standard formats for pipe network maps
- Structured organization of maps by district and DMA
- Navigation by name or icons provides fast access to digital maps

Performance Indicators

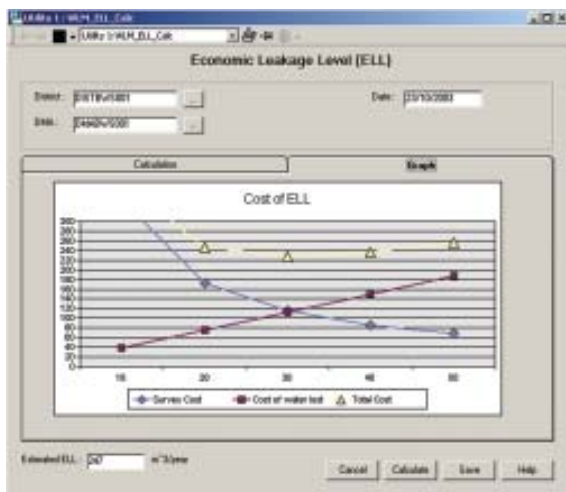
- Infrastructure Leakage Index
- Non-revenue water volume and as a percentage of system input volume
- Average pressure
- Real loss
- Other user defined indicator

Security and User Access Privileges

- Login user id and password
- Multiple user groups
- Read / write access to specific aspects for each user

Economic level of leakage (ELL)

- ELL calculation
- ELL scenario analysis
- DMA ELL monitoring



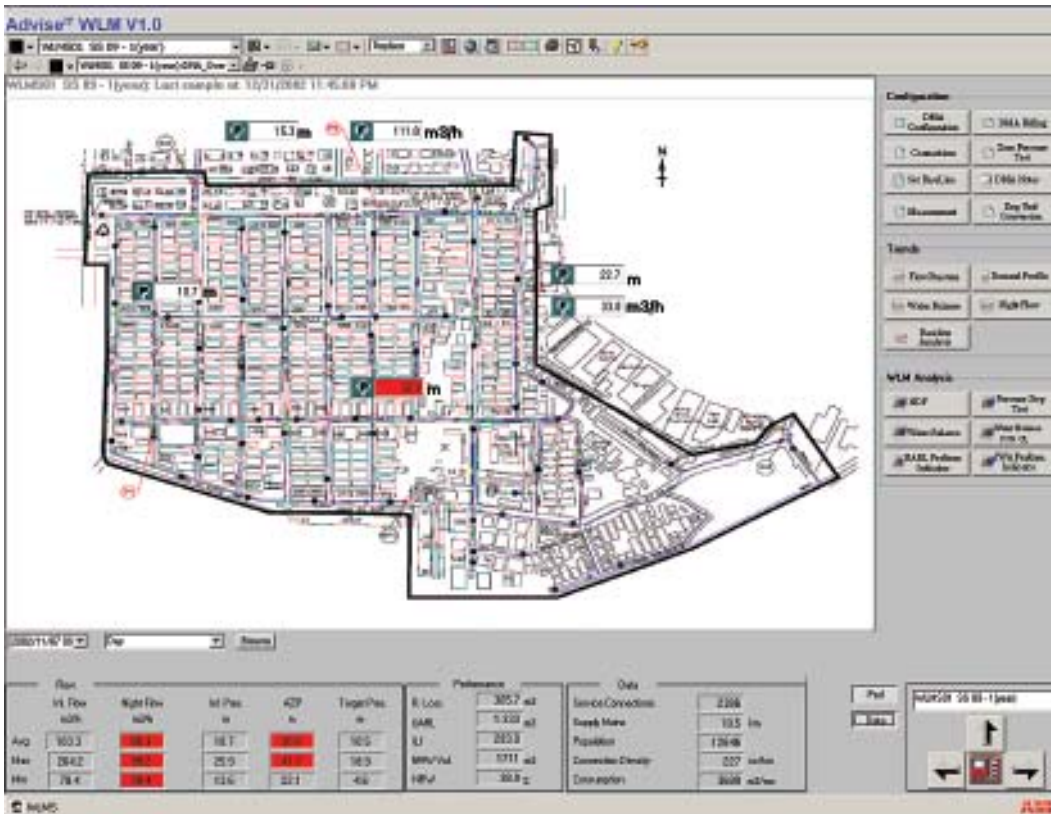
System Requirements

We recommend that the WLM application software be installed on an Intel-based server with the following minimum configuration :

Hardware	
CPU	Intel Pentium 4, 1.7Ghz or higher performance CPU
Harddisk	At least 40GB for WLM and other system software. Data storage requirement depends on the number of DMAs to be installed and the average history period to be archived. Please consult ABB Sales support on storage sizing.
Memory	2 GB (recommended)
Number of Servers	The minimum is one server for the application and system software. Some DMA log files may also reside on this server. For performance reasons, it is strongly recommended to distribute the history logs across a few servers. Please consult ABB sales support on server configuration.
Software	
Operating System	Windows 2000 Server
Industrial^{IT}	Aspect Integrator Platform (AIP) 2.1 or later versions
Development Tools	Visual Studio .Net
Database Management System	SQL Server 2000
Web Access	Citrix Metaframe (optional)

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