



DHI TECHNOLOGY

# WATER SUPPLY AND DISTRIBUTION MODELLING

Analysis • Monitoring • Forecast

Access to safe, reliable, affordable, and sustainable supply and distribution of drinking water is a crucial aspect of developing and maintaining a good quality of life in any part of the world. Meeting these commitments embraces multiple challenges in urban areas. It also requires the right combination of skills, experience and technology. At DHI, we have all of this and more. We can evaluate your specific challenges related to water supply systems and find the appropriate solutions to best meet your needs. We cover all aspects including site-specific measurements, telemetry data collection and monitoring, and numerical model application. As such, we are your ideal partner for all services related to water supply and distribution.

## HYDRAULIC MODELING

We provide in-depth analyses of all water supply and water distribution system elements and their functionalities. This includes normal operations under controlled conditions, as well as during emergencies. The analyses are performed for both the existing state of the systems and for the planned system expansions in future.

Hydraulic models are often used to validate the design of new or rehabilitated pipelines. They are also used to verify the system capacity or to analyse the effect of modified infrastructure within the context of the entire water distribution system or its sub-system. Our hydraulic modelling expertise includes:

- steady-state analyses
- extended period analyses
- fire flow analyses
- hydraulic transient analyses
- water quality analyses
- development of scenarios
- pressure optimisation
- existing and future demand scenarios
- operational optimisation
- existing and emergency water supply analyses



*We provide hydraulic modelling for regional water supply systems as well as for water distribution networks in towns and cities*

## SUMMARY

### CLIENT

- Water Utilities
- Municipalities
- Network operators
- Consultants and contractors
- Emergency response companies

### CHALLENGE

- Getting maximum value from limited resources
- Intermittent water supply
- High water losses
- Water safety
- High energy losses

### SOLUTION

- Hydraulic and water quality modelling
- Monitoring at the site
- Real-time control and online modelling
- Leakage management
- Forecasting for network operations
- Pressure dependent modelling
- Emergency response systems
- Decision Support Systems

### VALUE

- Establishment of safe operations
- Reduced risk of delayed or failed operations
- Enhanced emergency response management
- Major cost savings, reduced downtime risk and increased safety
- Cost-efficient design of water supply and water distribution systems
- Optimal non-revenue water levels
- Improved operations

## CALIBRATION AND VERIFICATION

Model calibration and verification based on the observed data is required in order to establish the necessary level of accuracy of the hydraulic model. It is also necessary in order to develop trust in the ability of the model to represent what is currently happening in the system, and what can happen under future scenarios. The hydraulic model is typically calibrated and verified based on the flow and pressure measurements throughout the system. We can provide such monitoring services. DHI can also assist you in conducting the monitoring and processing the results (for example, fire flow tests and unidirectional flushing).

## NON-REVENUE WATER AND LEAKAGE MANAGEMENT

At DHI, we can assist in developing a water audit to locate, identify and characterise the major sources of leakage throughout the system. We then work with you to set up a leakage reduction plan involving:

- separating the network into district meter areas
- evaluating minimum night flows
- development of a leakage alert system
- establishment of operational protocols for pressure optimisation and control

## INTERMITTENT WATER SUPPLY

We provide modelling tools and services for intermittent water supply problems that are commonly experienced in many developing countries. Pressure-dependent analysis is opposite to demand driven analysis and is used to produce more accurate results. We work with you to develop strategies to improve water supply conditions and to move towards a 24/7 water supply system.

## REAL-TIME CONTROL AND ONLINE MODELING

We deliver comprehensive solutions for the online and real-time control of water supply and distribution networks. It provides system managers and operators with operational decision support, system forecasts, and automated simulations for standard and emergency operation and control of their system.

## WATER QUALITY ANALYSIS

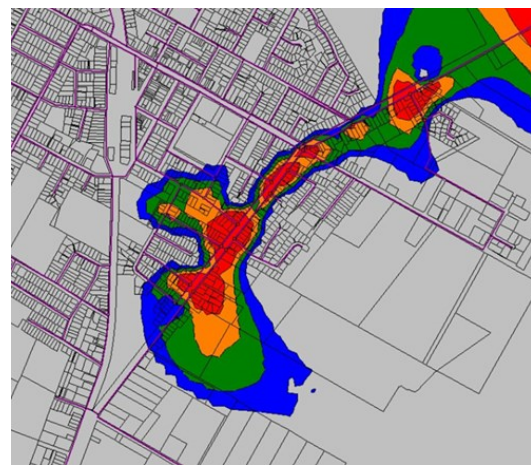
Water quality simulations support the water utility in maintaining the quality of drinking water. The water quality simulations often include:

- blending water from different sources
- age of water throughout a system
- loss of chlorine residuals
- growth of disinfection by-products

The simulations help optimise the quality of water.



*Detailed and accurate hydraulic models of water distribution systems are developed based on GIS, CAD, and SCADA data*



*Contamination spreading within the water distribution system*



*Hydraulic model of a regional water supply system operating in real-time mode*

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