Water Network Design and Hydraulic Analysis with Computer Tools Course

8 – 12 February 2027
Addis Ababa

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Training Center

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Ref: 1669_225587 **Date:** 8 – 12 February 2027 **Location:** Addis Ababa **Fees:** 6000 Euro

Overview

Water Network Design and Hydraulic Analysis with Computer Tools Course is a one-week course for water network engineers, hydraulic modelers, utility engineers, design teams, operations teams and technical supervisors, who leave with a Water Network Model and Analysis Report. The course connects water distribution network modeling, hydraulic analysis, demand allocation, pressure and velocity analysis, model calibration and leakage analysis. Participants turn network data into traceable scenarios and decisions. Agile Leaders Training Center develops practical water network modeling capability.

Who Should Attend

- Teams responsible for water network planning and design
- Teams responsible for hydraulic models and data quality
- Teams responsible for utility operations and pressure performance
- Teams responsible for pumps, tanks, valves and controls
- Teams responsible for water-loss analysis and technical reporting

The course assumes participants work with network drawings, asset data, demand data or operating results and leaves out vendor certification, country-specific regulation and software programming.

Departments and Industries

The course supports departments and industries that plan, design, operate or assess pressurized water distribution networks.

- Water utilities and municipal services
- Engineering design and infrastructure consulting
- Industrial and campus utility systems
- Operations, maintenance and asset management
- Planning, capital projects and performance analysis

Learning Objectives

By the end of this course, participants will be able to:

- Build a connected pipe-and-node network model
- Apply demand allocation and hydraulic settings
- Analyze pressure, flow, velocity and headloss
- Evaluate pumps, tanks, controls and scenarios
- Use field evidence to calibrate a model
- Build a water network model and analysis report

Course Agenda

Day 1: Network Data and Model Structure

- Water Network Data Inventory and Quality Register
- Pipe Node Reservoir and Tank Object Model
- Network Topology and Connectivity Validation Map
- Demand Allocation and Pattern Assignment Sheet
- Model Assumption and Coordinate Reference Log

Day 2: Hydraulic Simulation and Results

- Steady-State Flow and Pressure Simulation
- Headloss Method and Roughness Selection Matrix
- Pressure Velocity and Critical Node Dashboard
- Extended-Period Demand and Storage Scenario
- Hydraulic Warning and Convergence Diagnostic Check

Day 3: Pumps, Tanks and Operating Scenarios

- Pump Curve and Operating Point Model
- Tank Level and Storage Balance Profile
- Valve Control and Pressure Zone Logic
- Operating Rule and Time-Control Schedule
- Scenario Comparison and Sensitivity Grid

Day 4: Calibration, Loss and Reporting

- Field Measurement and Calibration Evidence Plan
- Observed-versus-Modeled Performance Plot
- Parameter Adjustment and Calibration Decision Log
- District Flow and Water-Loss Analysis Sheet
- Network Map Table and Technical Report Pack

Day 5: Water Network Modeling Practice

- Exercise: Validate a Pipe-and-Node Model
- Exercise: Run Pressure and Velocity Scenarios
- Exercise: Evaluate Pump and Tank Operations
- Exercise: Calibrate and Diagnose Model Results
- Capstone: Water Network Model and Analysis Report

Practical Exercises

Suggested activities use utility, industrial, campus and growing-demand water-network scenarios.

- Suggested activity: clean asset and demand data, then resolve disconnected nodes and inconsistent pipe properties
- Suggested activity: compare pressure, velocity and headloss under baseline and peak-demand scenarios
- Suggested activity: test pump curves, tank levels, valve settings and operating controls across a simulation period
- Suggested activity: compare model outputs with field observations and document calibrated parameters and remaining uncertainty

FAQs

Who should take water network design and hydraulic analysis training, and what does it assume?

Water network design and hydraulic analysis training suits teams that work with drawings, asset records, demand data, operating information or model results and can apply basic hydraulic calculations.

How does water distribution network modeling differ from general pipe design training?

Water distribution network modeling connects many pipes, nodes, demands, pumps, tanks and controls across operating scenarios; general pipe design training often focuses on individual lines, materials and mechanical sizing.

How does demand allocation affect water network hydraulic analysis?

Demand allocation affects water network hydraulic analysis by placing consumption at model nodes and assigning time patterns, which changes calculated flows, pressures, storage behavior and pump duties.

Why is water network model calibration necessary?

Water network model calibration compares calculated results with field evidence, then adjusts defensible parameters so the model better represents observed system behavior without hiding data gaps.

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How can a hydraulic model support water-loss analysis?

A hydraulic model can support water-loss analysis by organizing district inflows, demand estimates, pressure patterns and abnormal results so teams can prioritize investigation and test operating scenarios.

Conclusion

Participants take back a Water Network Model and Analysis Report containing data checks, demand assignments, hydraulic scenarios, pump and tank models, calibration evidence, loss analysis and result displays. The report makes assumptions, uncertainty and operating impacts visible. It helps design, planning and operations teams coordinate model-based water-network decisions.