

Managing an existing WDN and designing a new WDN means answering some crucial technical questions: □ *What is the most effective pipe sizing of the new WDN? Is the system able to supply the required demand? Is the minimum pressure met? What is the level of leakages in the network? How would system capacity change in the case of a pipe interruption? How does the system run over 24 hours under normal and abnormal conditions?*

*What is the best allocation of a limited number of isolation valves in the system?*

Engineers are asked to provide reliable answers and to provide optimal management solutions to ensure investment is allocated effectively. Their analysis is required to integrate WDN hydraulic simulation, identify key network elements (e.g. valves and pipe segments) and detect topological changes under abnormal functioning scenarios. Moreover, some optimization strategies have to find out optimal design alternatives according to hydraulic and economic criteria. Although such functionalities are available in separate software applications, they are rarely integrated in a single and consistent toolbox and/or compel the user to move from a well known software environment to newer ones.

This seminar is intended for practitioners and researchers and its objective is to provide some key ideas and tools for WDN analysis and design within a comprehensive and consistent framework using excel as interface. The problem of WDN hydraulic simulation will be tackled by using both a classic demand-driven approach and the most recent pressure-driven upgrades. Water leakages will be introduced in pressure-driven hydraulic simulation. The seminar will identify the association between isolation valves and pipe segments and the automatic detection of connected WDN topology, after valve shutdowns. The optimal design of pipe diameters and of a system of isolation valves in a WDN will be considered.

[WNetXL](#) offers a complete range of MS-Excel functions to analyse a Water Distribution Network

- WDN hydraulic simulation (Steady state)
- WDN extended period hydraulic simulation (EPS)
- Automatic identification of pipe segments for any set of isolation valves

