HYDRAULIC ANALYSIS

Why?
Hydraulic calculations and thermal analysis are prerequisites for correct dimensioning of utility supply networks, for new schemes as well as for expansion or renewal of existing networks. The calculations ensure that pipeline dimensions are optimised both technically and economically. The hydraulic analysis is also a very important part of feasibility studies for investigating the potential for district heating or district cooling in different areas.

By periodically updating the calculations, for instance on an annual basis, potential bottlenecks in the network or problems related to existing pumps and/or production capacity issues can be detected before becoming critical.

Regarding pipe installation and renewal tasks, the hydraulic analysis provides an overview of potential issues associated with breakdowns/operational changes. In daily operation, real-time simulations offer support to operators for decisions related to temperature and pump optimisation.

Integration of GIS and hydraulic analysis provide a very powerful tool for maintenance and planning for upgrades and expansion as the GIS data from the pipeline registry can be quickly combined with impact analysis of the network regarding capacity, heat loss and price.

Extensive expertise and flexibility
Ramboll has a team of engineers who perform hydraulic analysis on a daily basis for clients with large and small schemes for both district heating and district cooling networks. Ramboll has extensive expertise in surge analysis/Transient hydraulics (water hammer analysis), i.e. calculation of pressure/flow conditions in case of pump failure, inadvertent valve closure, control response, cavitation etc.

Ramboll can help determine which calculation tool is the most suited for the task at hand, e.g. using Ramboll’s own calculation program SR2 or programs such as Termis.

This flexibility means that Ramboll can provide independent advice, and at the same time use the program preferred by the client.

SR2
SR2 is a powerful calculation tool for both stationary and dynamic hydraulic/thermal calculations for utility networks such as district heating, district cooling, water supply or firewater networks. The SR2 program suite has been developed over a period of more than 35 years. SR2 has a very strong and proven calculation engine which ensures quick, accurate and stable calculations.

The SR2 user interface is fully integrated with the GIS standard program ArcGIS, providing an easy and clear interface and optimal ways to present the results. Use of ArcGIS ensures full integration with the existing pipeline registration and consumer account systems, so that data does not need to be maintained in multiple systems. In addition, there are extensive illustrative possibilities, specially designed for analysis of district heating and cooling networks.

With an optimised hydraulic system, the pipeline dimensions can often be made smaller than in a system that is not optimised, without a loss of capacity. Reducing dimensions can save money in both capital and operating costs.

With a water hammer analysis using SR2 to design safety measures, it is possible to protect the network against major and expensive damage related to pump failure etc. in future operations.

Data from a SCADA system can be utilised in order to make real-time simulations for optimising the operation.

Together with our partners software specialised for planning and optimisation, SR2 gives our clients a complete package for planning and controlling their energy systems.

Termis
Termis is used in many plants and its strength is the online modelling, using SCADA data to simulate the current operation. Termis is GIS-based, thus providing a good overview of pipelines, consumer use and related results.

Termis can be used for real-time energy management and temperature optimisation.