



University of Stuttgart
Germany

Department for Stochastic Simulation
and Safety Research for Hydrosystems (LS³)

Assessment of
water quality
failure risk index of
water distribution
pipes using
Bayesian Belief
Networks

M.Sc. Topic

Water distribution networks (WDNs) are infrastructures that transport drinking water from the source to consumers. WDNs may fail due to various factors such as hydraulic attributes of the network, structural properties of pipes or the water quality. This thesis will deal with water quality as an important factor for deterioration of pipes.

The parameters that build up the water quality risk index are many and correlated, which increases the complexity of the failure risk assessment of the investigated WDN pipes. Using Bayesian Belief Networks (BBNs) to that end is promising, since BBNs can easily handle and visualize the complex relationships between variables and cope with missing data and uncertainty.

The goal of this master thesis is to specify the causal relationship between water quality and pipe failure. Thesis work will involve setting up a comprehensive Bayesian Belief Network model on the water quality parameters (e.g. water age, turbidity, color) and experimenting it on a synthetic WDN.



Prospective Tasks

- Literature review on potential impacts of water quality risk index on WDN pipes
- Modelling a causal relationship between water quality and water pipe failure
- Implementing the causal relationship using Bayesian Belief Networks
- Applying the model on a synthetic network with known water quality properties

General Information

- Supervision by MSc. Gözde Köse and apl Prof. Dr.-Ing. Sergey Oladyskhin

Desireable Skills

- Introductory knowledge in drinking water quality and water supply systems
- Affinity to statistics
- Basic programming skills preferably in Python



Apply now!

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