



Deterioration forecasts for sewer systems

Sewers are important infrastructures of our cities, which must be maintained in substance and value. With SEMAplus, we provide innovative, sustainable and – last but not least – cost-saving solutions to respond to this challenge.



© Berliner Wasserbetriebe / Joachim Donath

Do you require **information** about the **current condition** of your **complete sewer network** as well as a **rehabilitation plan for the decades to come**?

SEMAplus can provide you with **rapid** and **accurate** information, and offers you the basis for **short-term maintenance** as well as **long-term investment planning**. To achieve this, SEMAplus requires your inspection data, information on materials, age and, if available, data on other ageing-relevant pipe properties and environmental factors. This **saves you resources, costs and time**. At the same time, SEMAplus enables **efficient communication between decision-makers** thanks to transparent and easy-to-understand results.

SEMAplus Simulators

With only a limited amount of inspection data, the **SEMAplus Pipe Simulator** determines the current condition or asset value of your sewer pipes and helps you to localise urgent rehabilitation needs.

The **SEMAplus Strategy Simulator** forecasts the long-term condition or asset value development of your complete network over several decades, taking all preventive measures into account.

The forecasts are based on the data collected about the inventory and condition and/or on the asset condition of your sewer network.

How does SEMAplus work?

SEMAplus uses statistical methods as well as machine learning techniques. The forecasts are based on the data collected about the inventory and condition of your sewer network. By simulating different rehabilitation strategies and their effect on the network condition of the sewer, a customised and optimised rehabilitation concept can be created according to your individual requirements.

Stand-out features:

- **Precision** – even with incomplete data, the models deliver reliable results.
- **Transparency** – with SEMAplus, we focus on maximum transparency, and following training, enable you to carry out and adjust the aging forecasts independently. Key information can also be communicated more efficiently and more easily between the responsible individuals as a basis for the decision-making.
- **SEMAplus Community** – we offer you the opportunity to join a growing community which develops and optimises the tools on a collaborative basis, including free upgrades. This community includes the Berliner Wasserbetriebe, the largest municipal water supply and wastewater disposal company in Germany.

SEMAplus was developed for direct practical application by the Berlin Centre of Competence for Water in close cooperation with Berliner Wasserbetriebe, and has been operational in Berlin since 2019. In the first year of its pilot phase, SEMAplus was awarded the highly-acclaimed Prize for Innovation of the German Association of Municipal Companies.

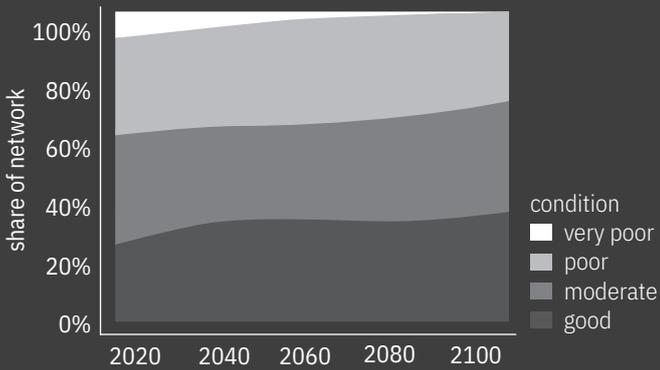
SEMAplus Pipe Simulator (example)

Focal points for inspections on the basis of the forecasted rehabilitation needs

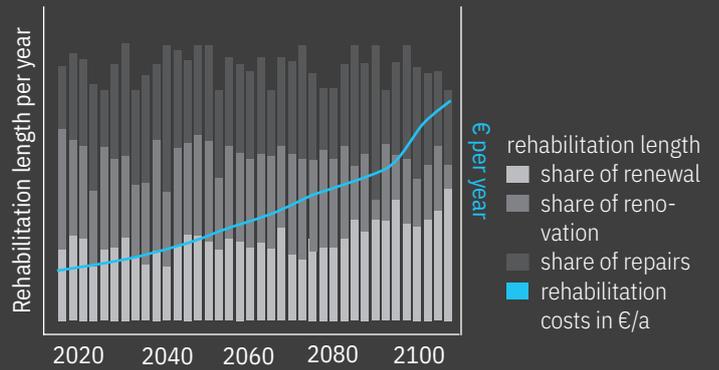


SEMAplus Strategy Simulator (example)

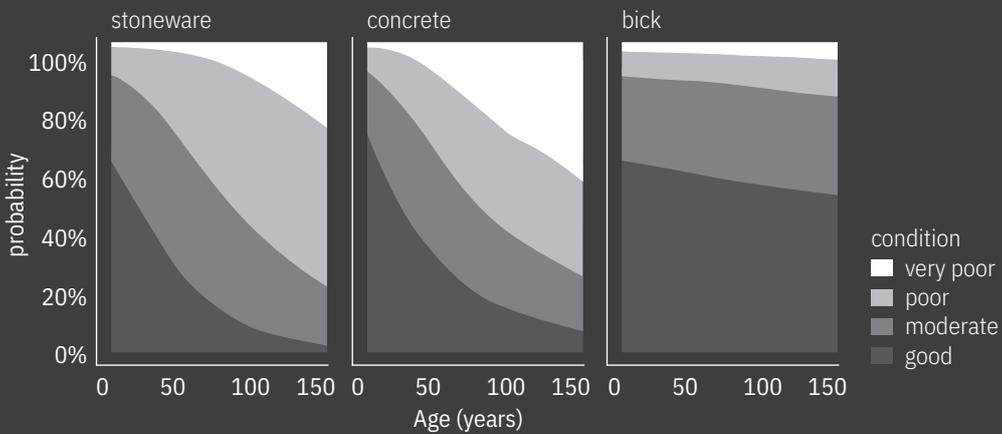
Network development (condition or asset-related)



rehabilitation requirement



Material-specific deterioration forecasts (without rehabilitation)





Benefit from our know-how!

Our SEMAplus service package contains various modules which can be adapted individually to the particular challenge presented by your sewer network.

SEMAplus Pipe Simulator

Calculates the probability of defect to sections of sewer pipes and locates the hotspots that are in need of rehabilitation.

SEMAplus Strategy Simulator

Forecasts the state of sewer networks over long periods of time, taking various rehabilitation scenarios into account.

Optional:
Individual model adjustment

Consideration of additional customer-specific data to increase the forecasting quality.

- + Quality testing of the status survey
- + Consideration of additional data from the geographical area of the sewer pipes with influence on the development of their condition to increase forecasting accuracy when searching for sewer pipes which require rehabilitation
- + Harmonisation of different coding systems
- + If the condition of the pipe-network is partially unknown: selection of parts of the network to be inspected in order to map the condition of the entire network
- + If the current condition of the network is unknown with incomplete logging data: statistical calculation of the condition of the complete network without further need for inspection
- + Support with the optimisation of the inspection strategy and in the selection of rehabilitation measures

Optional:
Filling gaps in the data

Where gaps in the data exist, information on the year of construction and the material of the pipes which is required for the simulators can be supplemented using modelling techniques.

SEMAplus community

Participation in a SEMAplus platform of all users:

- Moderated technical discussions
- Optimising tool use
- Exclusive use of upgrades

Improves forecasts, allows for regular discussions and keeps you up to date from the technical perspective.

Who we are

Berlin Centre of Competence for Water is a non-profit research organisation which was launched in 2001 and which develops practical solutions to the challenges surrounding water management in the form of research projects. Berliner Wasserbetriebe is the largest municipal water supply and wastewater disposal company in Germany.

Through the close cooperation between our experts and the direct use of knowledge from the latest research and technology, we offer customised solutions for the management of sewer systems which have been tried and tested at the practical level.



in cooperation with

