Extension of TransparantNL with a regression analysis

PWN

Client: PWN
Country: The Netherlands
Period: 2020

Case
Together with Dutch water utility PWN, Spatial Insight designed and built the TransparantNL pipe rehabilitation model. After the successful implementation the model was applied at three other Dutch drinking water utilities and a pressurized sewer utility in the last years. With years of hands-on experience, PWN requested further extension and optimization of the model. More insight in sensitivity of the knowledge input rules of the model was required as well as a prediction of the failure frequency in relation to the age of a pipe. Secondly, another issue was selected to be optimized. When part of a pipe is being repaired, the new situation is registered in the GIS database, the specific pipe turns from one into three pipes, ie. the two remaining parts and the new part. Historical and new leakages or bursts will no longer be recognized as an event on the original pipe but on one of the three 'new' pipes. As a consequence, the failure frequency seems less than prior to the partial replacement.

Approach and solution
The existing pipe rehabilitation model included a basic relation between the number of events (failures, leakages) and the expected failure behavior of the pipe. When looking at the long-term failure frequency, making a prediction in the age range up to circa 60 years' old, works quite well because the behavior is based on historic data. But how to deal with older pipes, that typically have the same or higher risk of failing, compared with younger pipes? We applied a regression analysis to make the relation between (sudden) increase of event on pipes and the expected failure behavior more robust.

Contribution to the organisation's strategy
The extension and optimization of PWN's rehab model has resulted in a more accurate failure prediction of pipes, but as important, it has contributed to an increased appreciation of the model. This trust is essential for the continuation of the use of the model in PWN's asset management approach. PWN holds the NEN-ISO 55001 certification that defines a structured and accountable asset management anatomy, to make sure most value is created with the available assets.

Customer review
Peter Horst, asset engineer at PWN: "The evolution of TransparantNL not only helps us to make more accurate and more acceptable predictions of which mains need to be replaced, but also how many mains needs to be replaced. Spatial Insight has profound knowledge of what is relevant for a distribution department".

More information
Arnoud Drevijn (arnoud.drevijn [@] spatial-insight.nl)