

## Predicting Switch Failures in Rail

### CHALLENGE

- There was a challenge in how to predict where switches would fail based on electrical currents which run through an engine that is responsible for flipping the switch.
- There are few exchange failures per switch and this makes it difficult to make a good model per switch. Therefore, possibilities were explored to make a generic model, by grouping multiple, similar switches and the corresponding failures.

### SOLUTION

- Arcadis was asked by Asset Rail in The Netherlands to produce a predictive model, that could predict switch failures based on measuring electrical currents.
- Machine Learning was used to train the model with data of electrical currents of ten switches before 2016. With data from 2017, the model could be put to the test to validate if it would be predictive.
- A pilot was done covering 10 railway switches, using 8 years of data.
- An automated model was made that shifts accordingly with the seasons (because temperature affects the model).
- The model is optimized to achieve a maximum business case. This was done in close collaboration with the client.

### IMPACT

- The model predicts 40% of the failures, with an accuracy of more than 20%.
- Machine learning can take a large amount of variables into account, this creates a model that can achieve near-human performance.
- It is clear and efficient approach, which makes it faster and cost efficient.
- Visuals that are generated give clients a clear understanding of the predictions.