Predictive Twin for Steel Bridge

Field-lab Moerdijk bridge

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• Rijkswaterstaat manages and develops the main road and waterway network, including 178 steel bridges

• Majority of these objects reached their designed lifespan: replacement or renovation is needed the upcoming decades

• Timing of measures is essential: not too late and not too early

• Research program on optimal order of measures, using sensor data and predictive twin techniques
Flatten the curve

More accurate standards

Beter risk assessment

Sensoring / Predictive Twin
Predictive Twin System Architecture

Visualisation layer

Processing layer

Data layer

Asset layer
Asset layer and sensors

- Continuous monitoring dynamic strains resulting from trucks
- Controlled load experiment
Data layer

- Robust and efficient storage and handling large-scale time series datasets

- Single portal for registering various types of datasets, including metadata
Data processing: data-analysis tools

• Bridge Weight in Motion: extracts truck load parameters

• ProbEye: open-source tool to estimate parameters

• Continuous automated analysis: converts continuous monitoring data into interpretable parameters for assessing the structural safety of the bridge
Visualisation layer (1)

• Displaying geospatial data in a full 3D environment in a web browser
Visualisation layer (2)

- Inspection photos (19,000 files) retrieved from the BIM
Cooperation Rijkswaterstaat, TNO en Geodan

Rijkswaterstaat
Ministry of Infrastructure
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