

# Predictive Twin for Steel Bridge

Field-lab Moerdijk bridge

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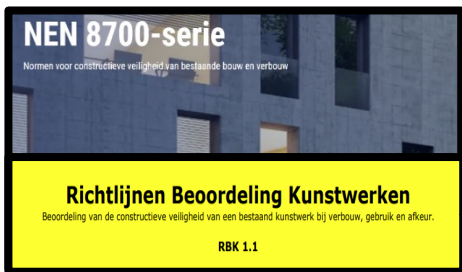
# Renovation and Replacement Program

- 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

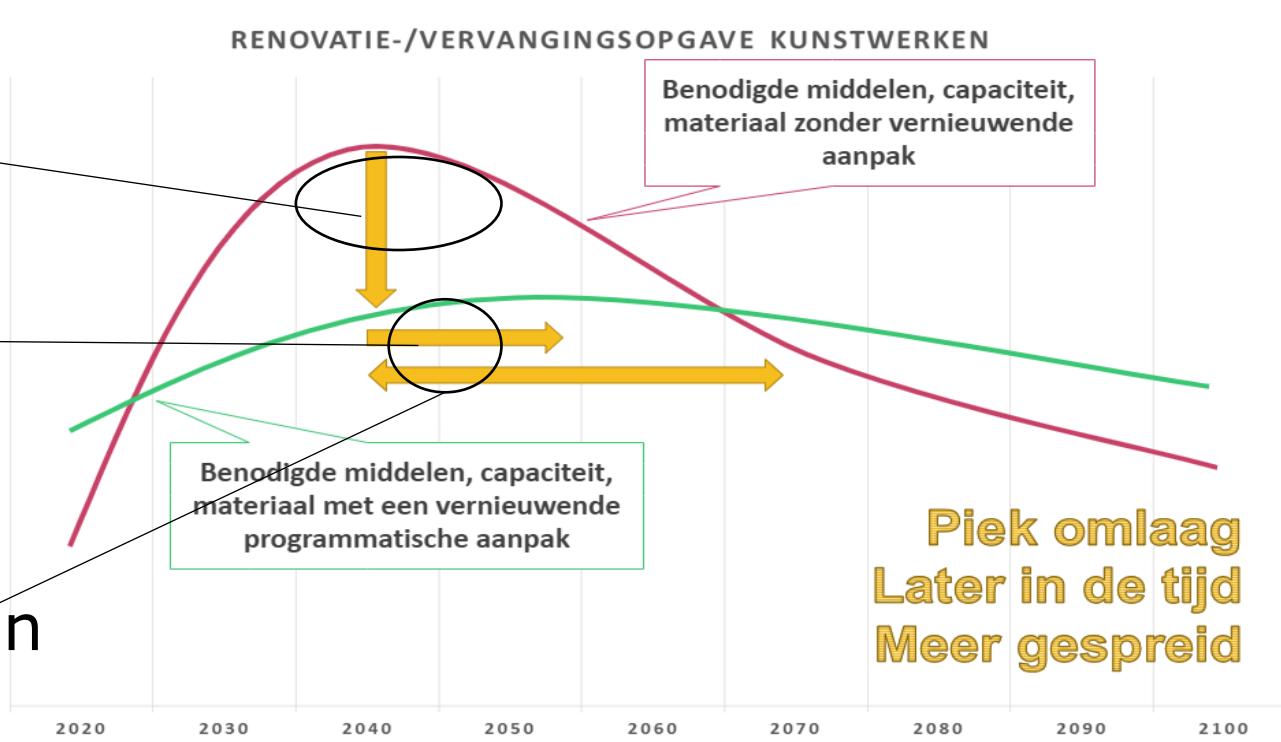
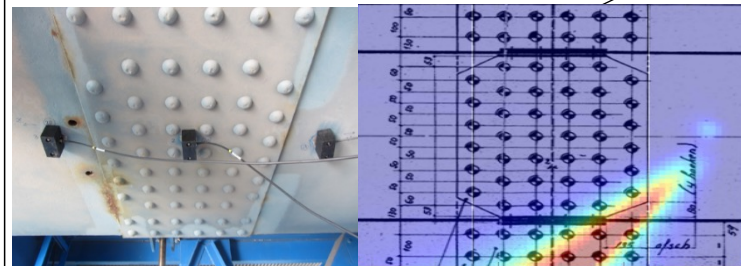
## More accurate standards



## Beter risk assesment



## Sensoring / Predictive Twin





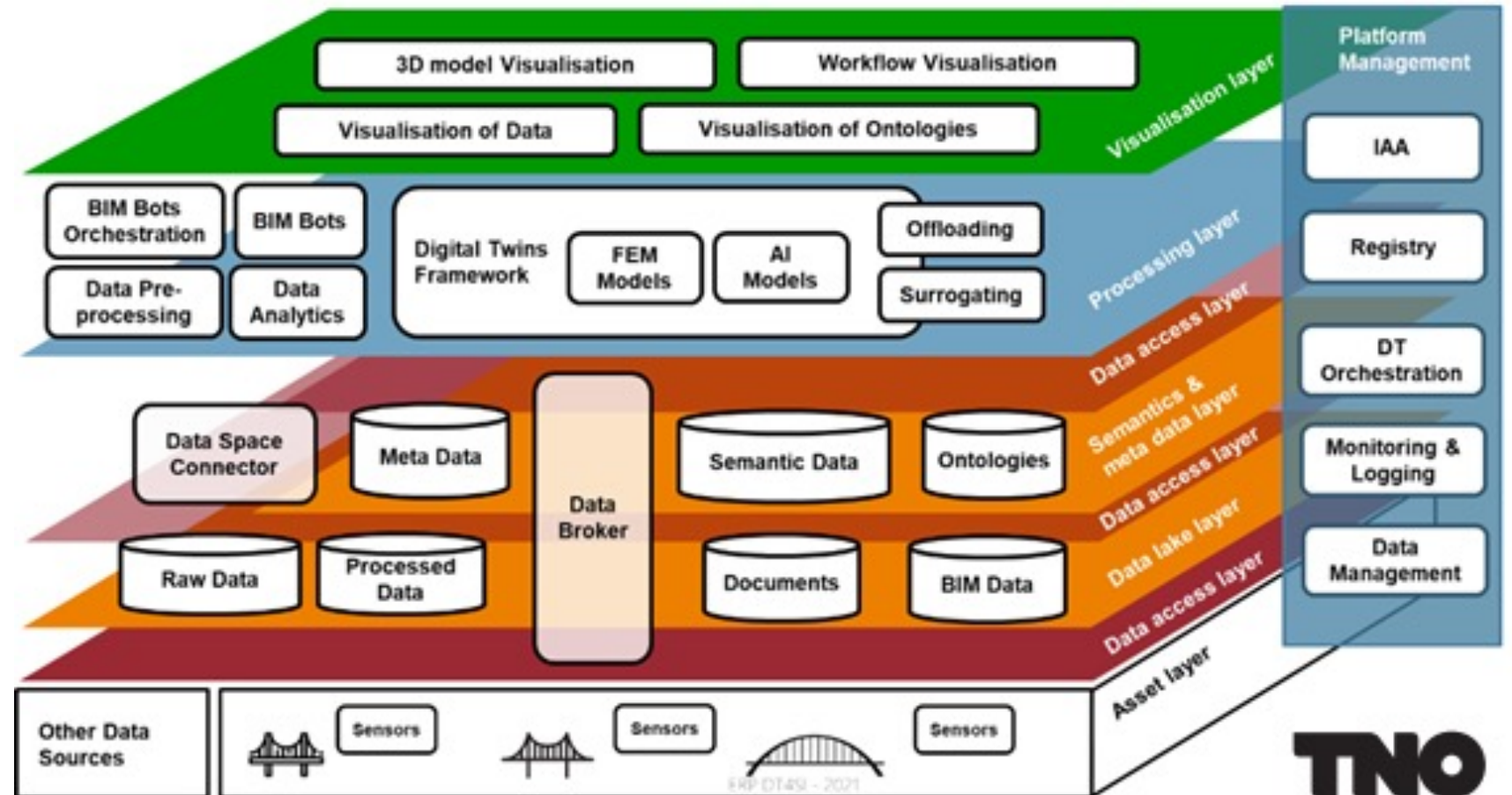
# Predictive Twin System Architecture

Visualisation layer

Processing layer

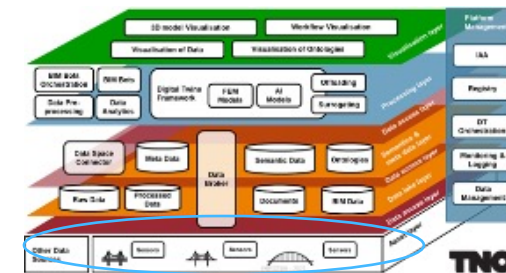
Data layer

Asset layer





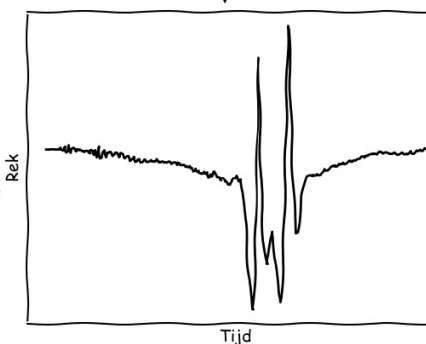
# Asset layer and sensors



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

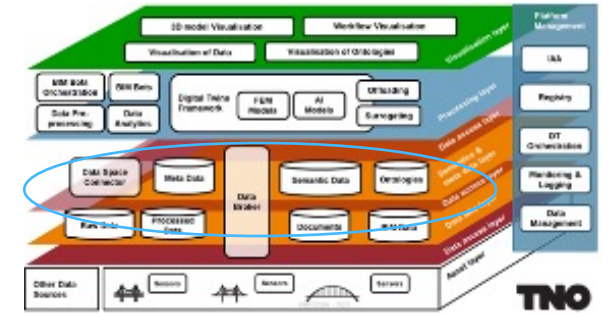


Belastingeffect

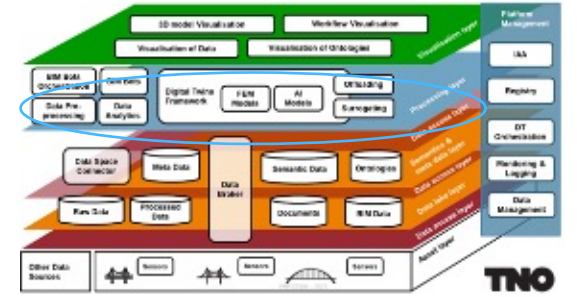




# Data layer



- Robust and efficient storage and handling large-scale time series datasets
- Single portal for registering various types of datasets, including metadata

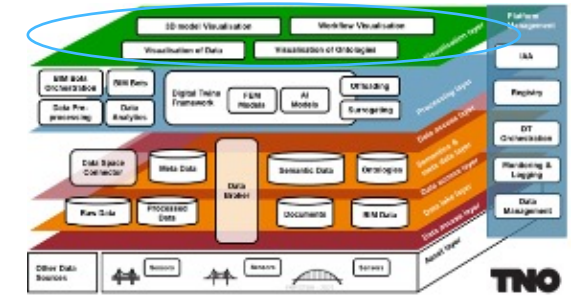


# Data processing: data-analysis tools

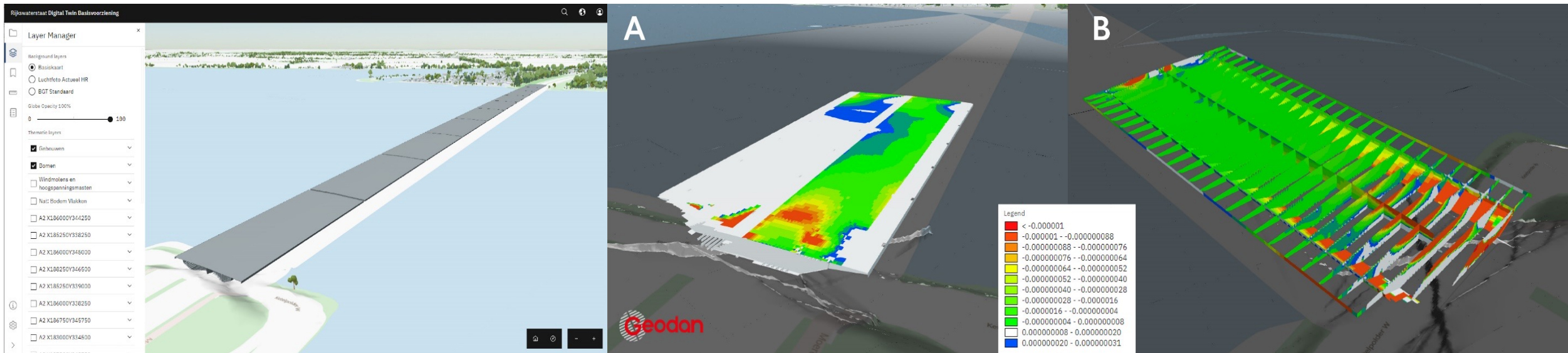
- Bridge Weight in Motion: extracts truck load parameters
- ProbEye: open-source tool to estimate parameters
- Continuous automated analysis: converts continuous monitoring data into interpretable parameters for assessing the structural safety of the bridge



# Visualisation layer (1)



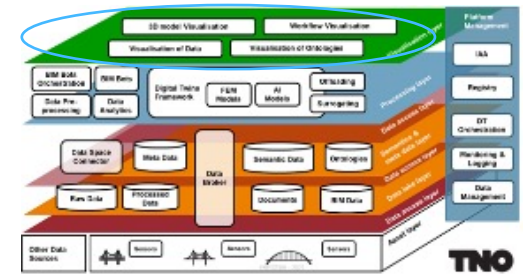
- Displaying geospatial data in a full 3D environment in a web browser



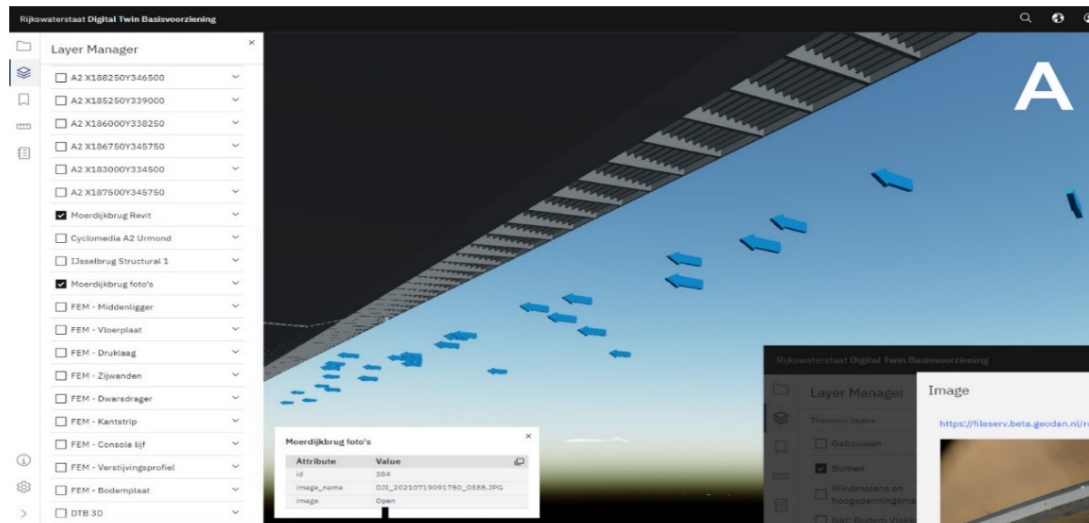




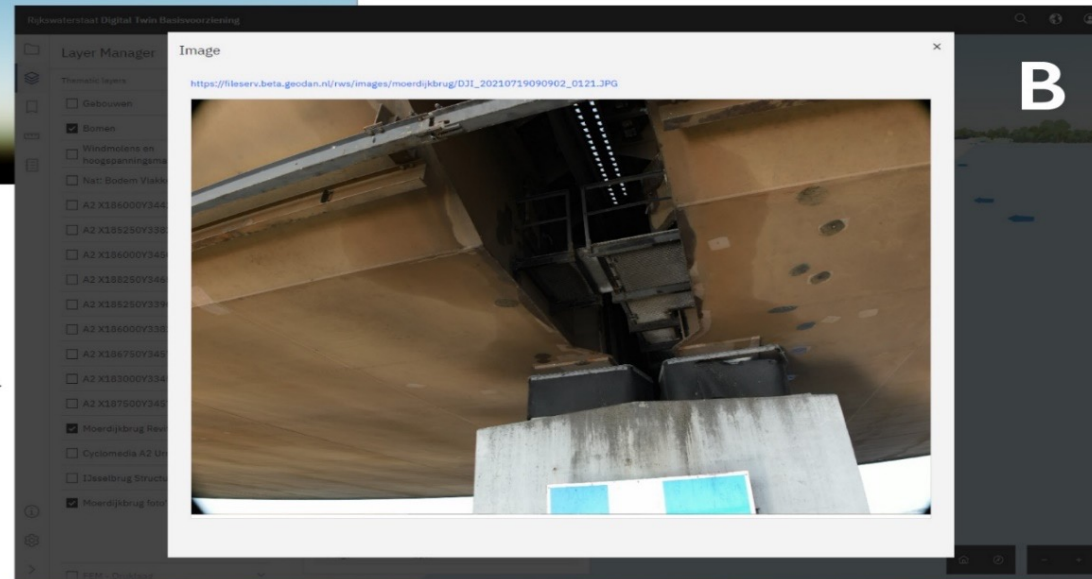
# Visualisation layer (2)



- Inspection photos (19.000 files) retrieved from the BIM



Geodan





# Cooperation Rijkswaterstaat, TNO en Geodan for life



Rijkswaterstaat  
Ministry of Infrastructure  
and Water Management

