Wie lange hält die Spundwand wirklich?

Hydrographie als Werkzeug für die Restlebensdauer

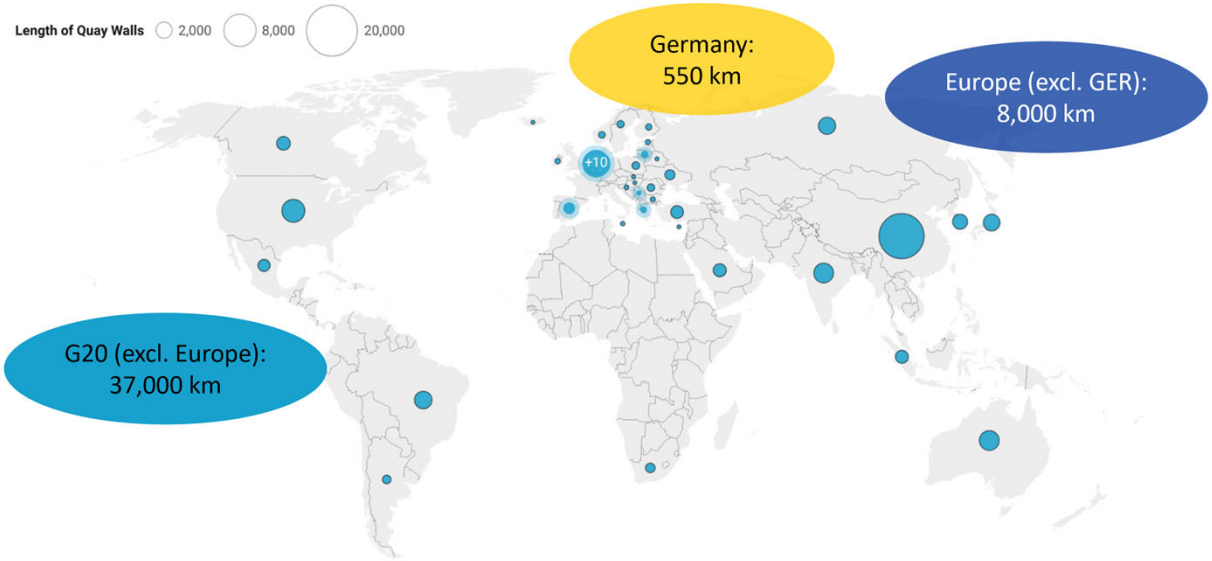
HydroMapper

Infrastructures Worldwide I

HydroMapper
make visible

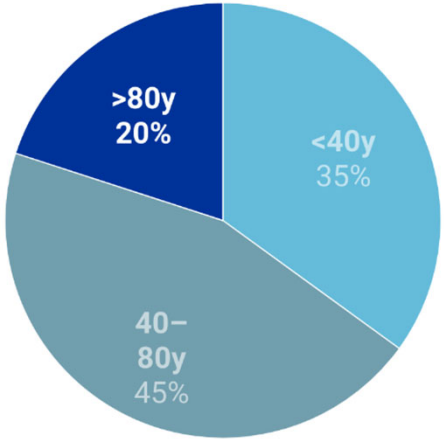
Infrastructures Worldwide II

HydroMapper
make visible



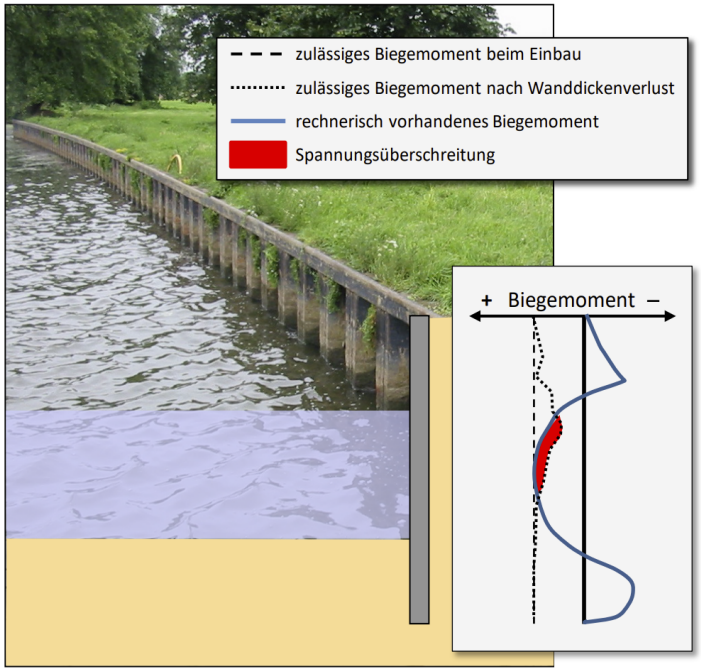
Quay walls + fortified banks ~ 500,000 km

Age structure of quay walls in Germany



Infrastructures Worldwide III

HydroMapper
make visible



Quelle: BAW Empfehlung Spundwanddickenmessungen in Häfen und an Wasserstraßen: Grundlagen, Planung, Durchführung, Auswertung und Interpretation (ESM) Ausgabe 2022

Standard procedure

HydroMapper
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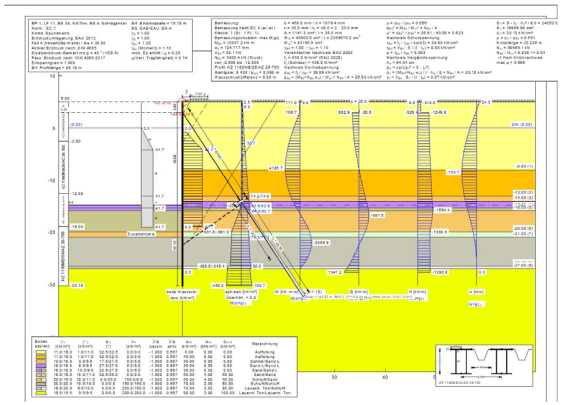


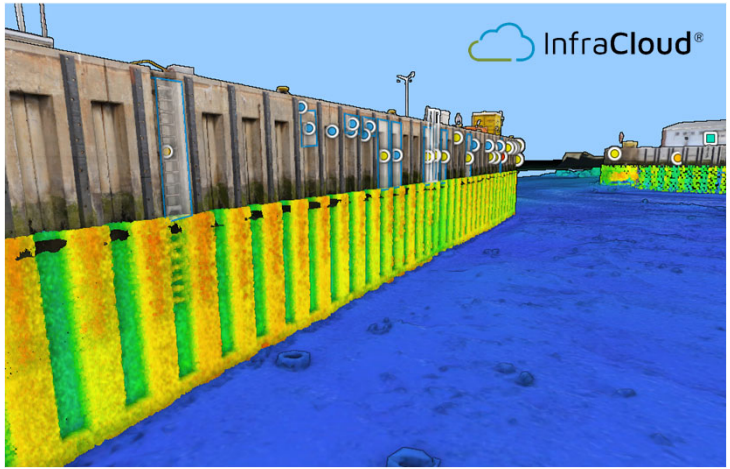
What we need to do: Face reality!

What HydroMapper Does

HydroMapper
make visible

1) High-Precision Reality Capture Services

Above and below water



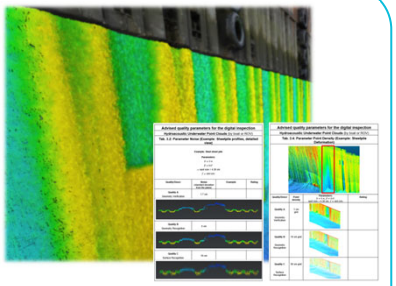
2) Cloud Platform InfraCloud

AI-Based Infrastructure Asset Management

We turn large-scale infrastructure into structured, usable digital assets.

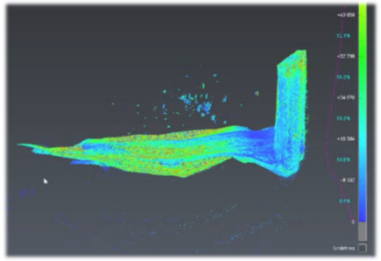
HM Value Creation Workflow

HydroMapper
make visible



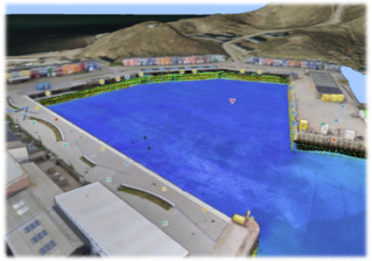
Surveying Expertise & QA Network

- 8 years of experience in surveying underwater structures
- EU & U.S. patents
- Proprietary QA standards
- Partner-enabled data acquisition



Automation & Data Processing

- Automated point cloud cleaning
- AI-based geometry deviation detection
- Scalable processing pipeline
- Front-loaded R&D, marginal processing cost



Data Analysis & InfraCloud

- Engineering-embedded workflows
- Lifecycle cost tools
- Residual service life analysis (steel sheet piles)
- SaaS for Engineering Planning Automations

Tried and tested experience (8+ years) in above and below water data acquisition as well as asset condition intelligence.

Proven in Real Projects

HydroMapper
make visible

Blueprint: Berlin Waterways Project

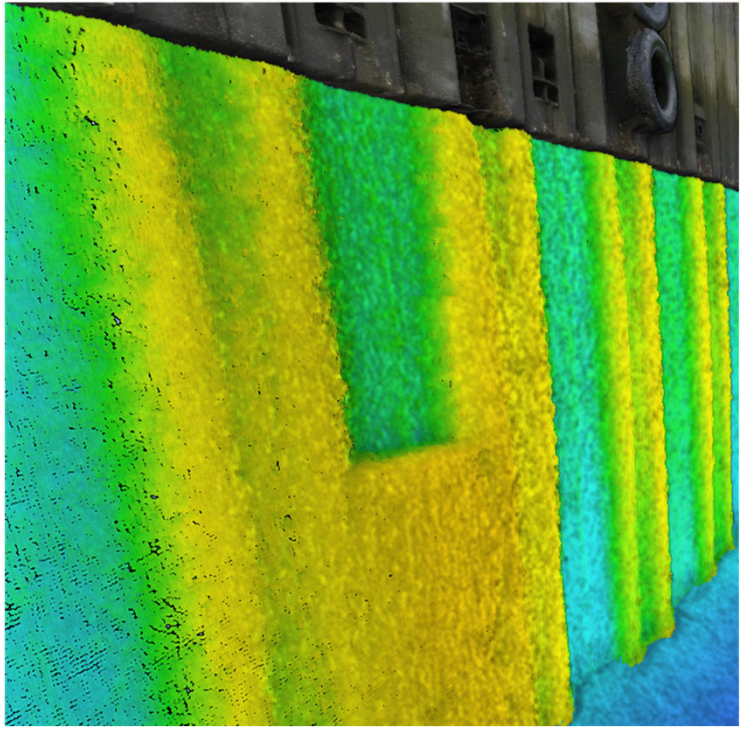
- Scope: 25 miles of waterfront facilities
- Surveying in ~20 days
- Instead of 400+ plans: One InfraCloud dataset

➢ **Platform deployed in real-world conditions**

➢ **Real usage by engineering teams and asset owners**

Quality Parameters for Digital Twins

HydroMapper
make visible



Advised quality parameters for the digital inspection

Hydroacoustic Underwater Point Clouds (by boat or ROV)

Tab. 3.2: Parameter Noise (Example: Sheetpile profiles, detailed view)

Example: Steel sheet pile

Parameters:

$D = 5\,m$

$\beta = 0.5°$

→ spot size = 4.36 cm

$f = 400\,kHz$

Quality/Descr	Noise (standard deviation from the plane)	Example	Rating
Quality A Geometry Verification	1.7 cm		
Quality B Geometry Recognition	5 cm		
Quality C Surface Recognition	10 cm		

Advised quality parameters for the digital inspection

Hydroacoustic Underwater Point Clouds (by boat or ROV)

Tab. 3.4: Parameter Point Density (Example: Sheetpile Deformation)

Quality/Descr	Point density	Parameters: $D = 5\,m$, $\beta = 0.5°$, spot size = 4.36 cm, $f = 400\,kHz$	Rating
Quality A Geometry Verification	1 cm grid		
Quality B Geometry Recognition	10 cm grid		
Quality C Surface Recognition	50 cm grid		

How it works: From Scan to Intelligent Digital Twin

HydroMapper
make visible

Stage 1: Data Collection
(Input)

HydroScan

Terrestrial scan

UAV

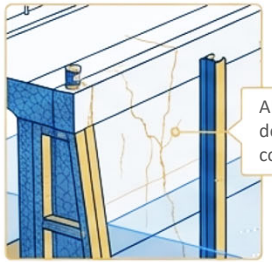
CAD/BIM

Open data

Stage 2: Processing
(InfraCloud Platform)

Infrastructure Digital Twin Engine

Stage 3: Analysis and Value Creation
(Output)



Damage classification according to catalog

- Class 1: Minor
- Class 2: Mediocre
- Class 3: Serious

Result:
Accurate condition assessments and predictive recommendations for action.

Proven in Real Projects (2004)

HydroMapper
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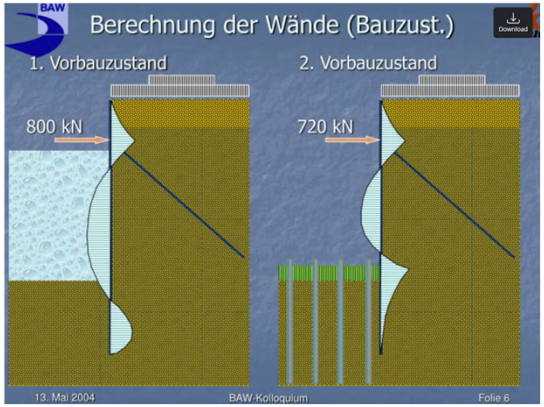

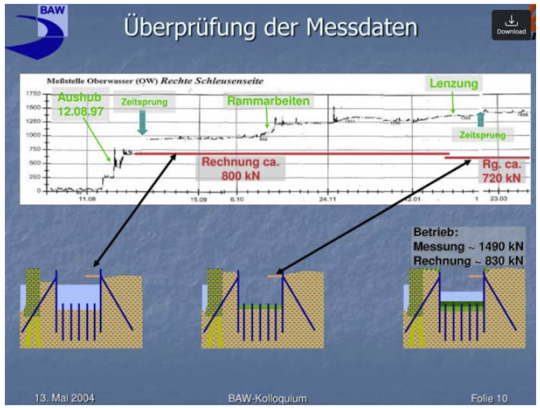

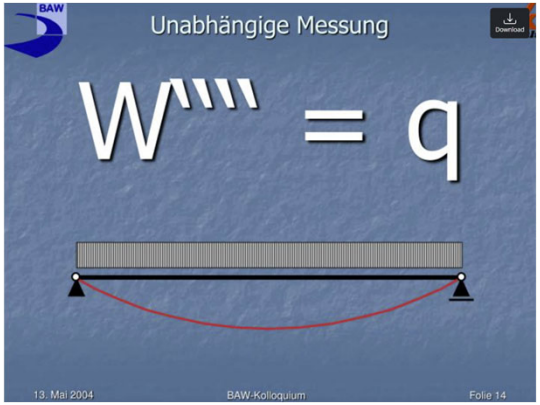

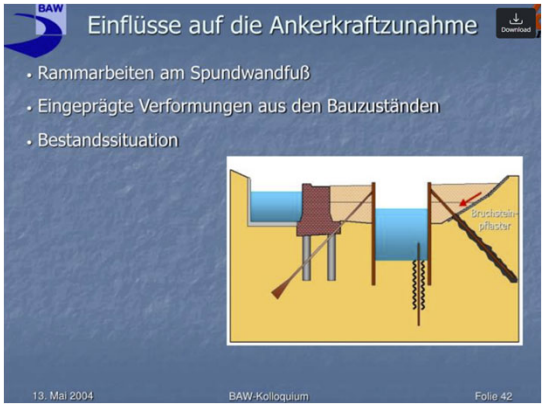

Proven in Real Projects (2024)

HydroMapper
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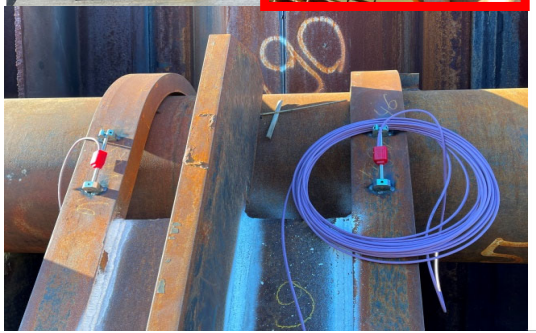
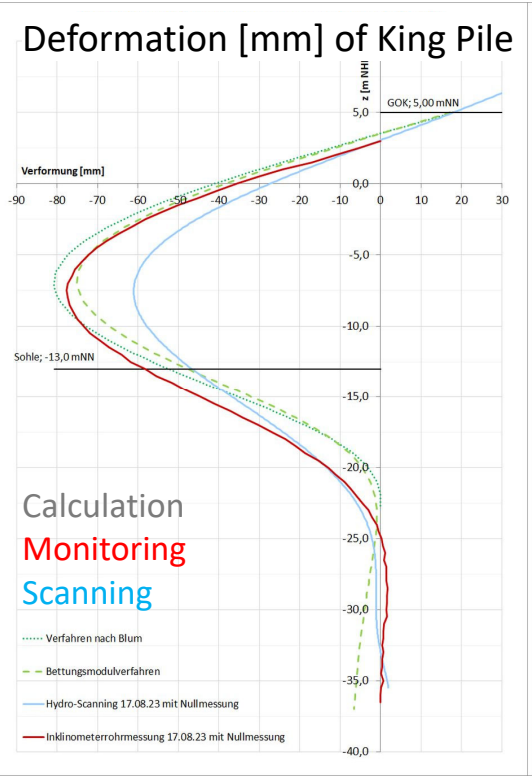
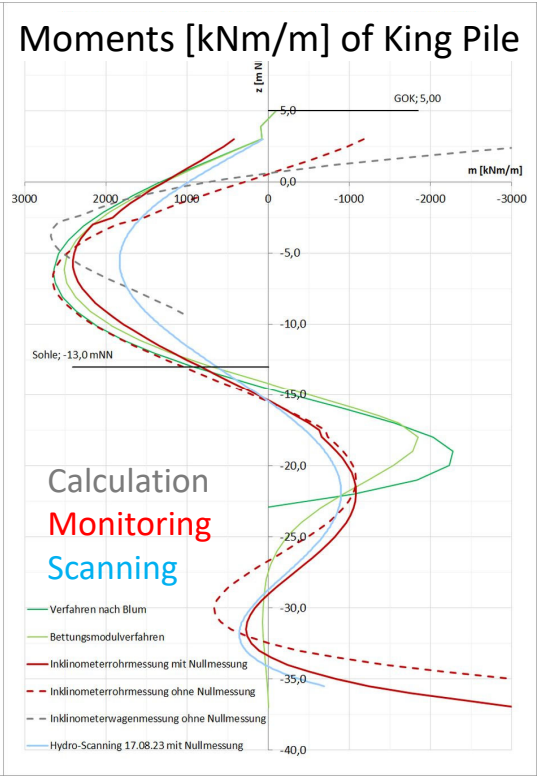


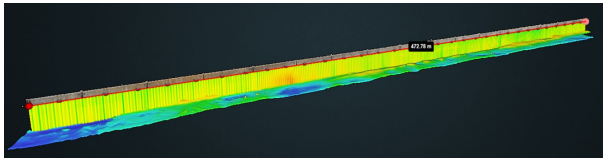


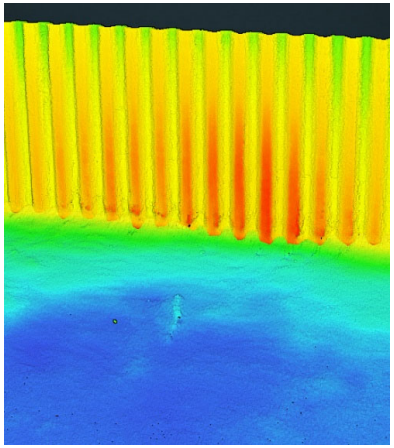


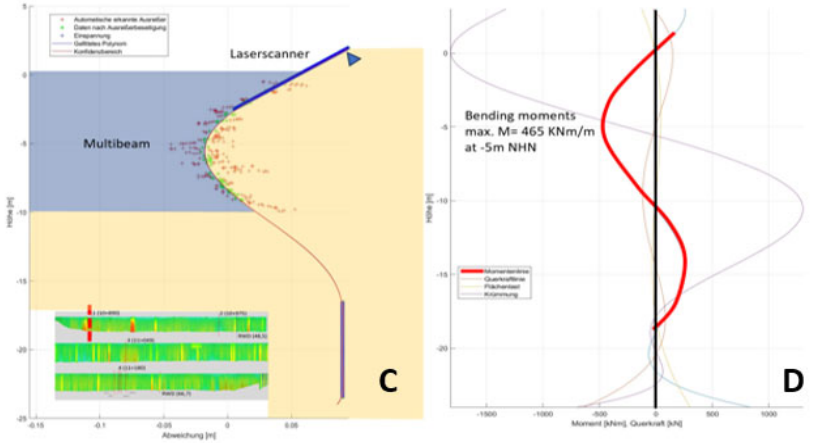
Briefing: Hydrography as the Basis for Condition Assessment

HydroMapper
make visible

Example: Deformation analysis of steel sheet pile walls enabling accurate remaining service life estimation

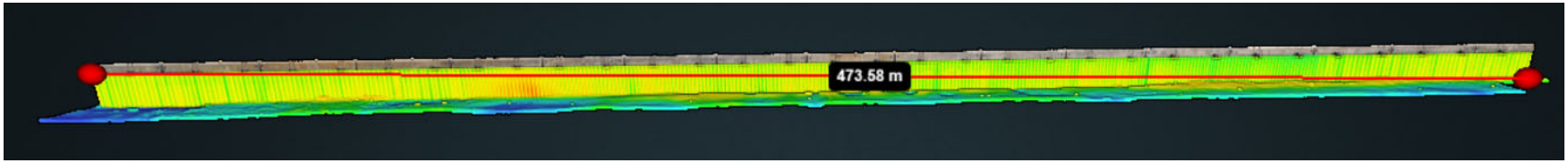


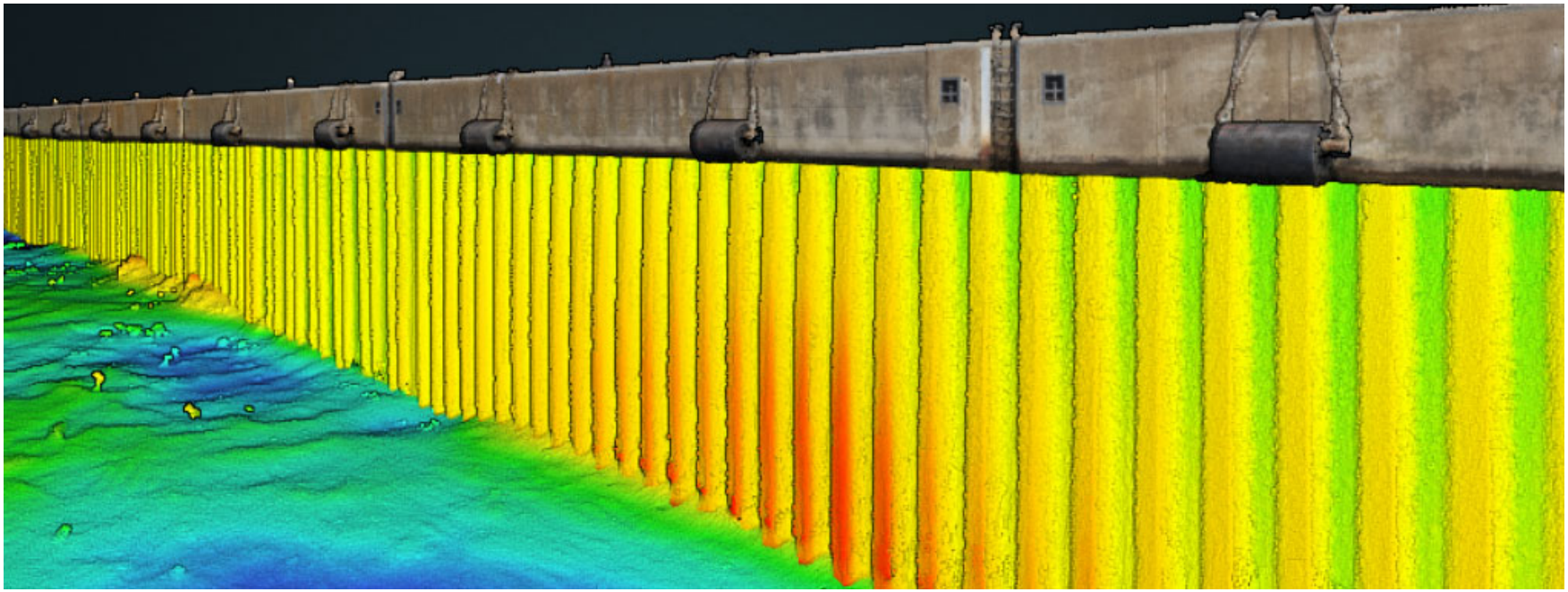




Reference I: Each Pile is a Test Load

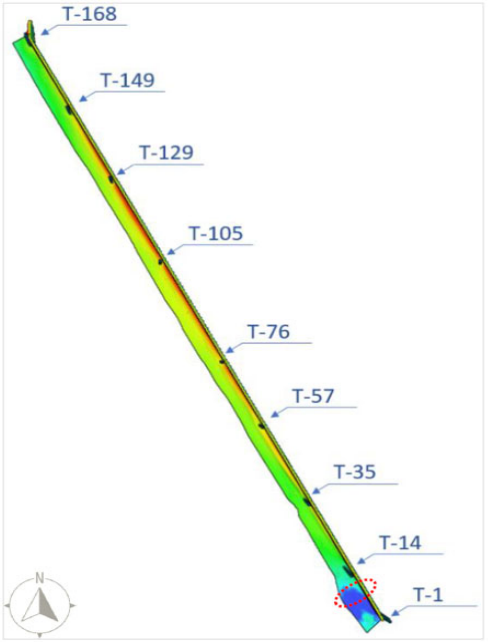
HydroMapper
make visible





Reference II: Build & Deformations

HydroMapper
make visible



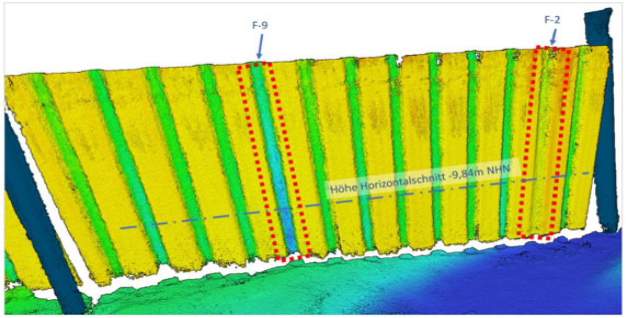
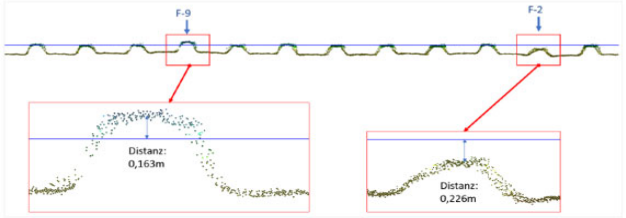


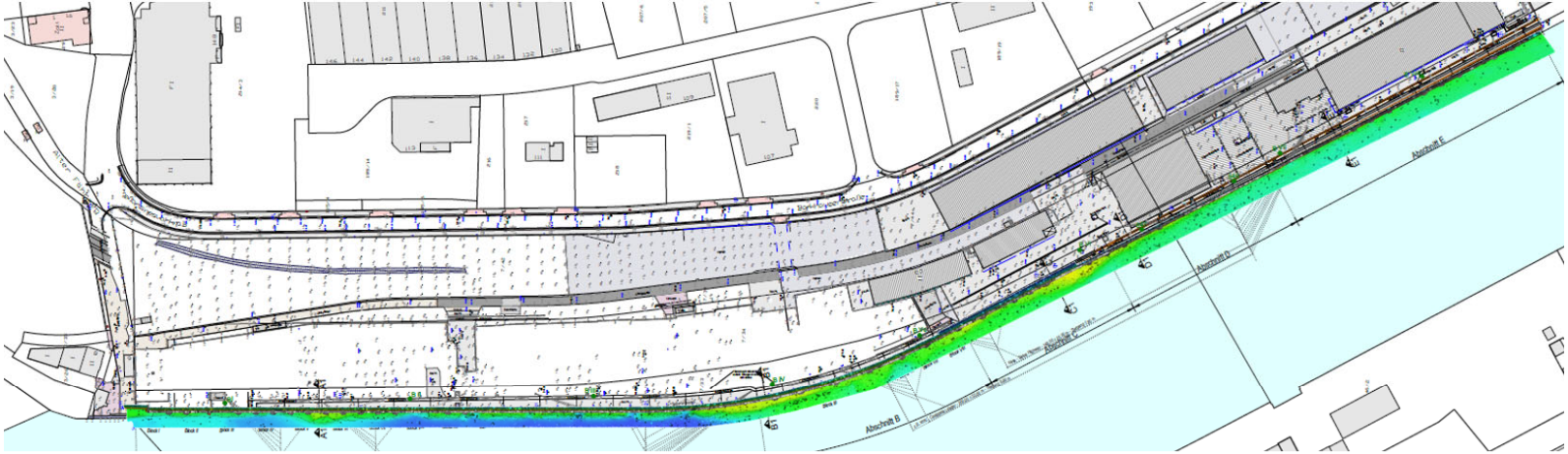
Abbildung 16: Schadensverdachtsstelle 2 – Detailansicht

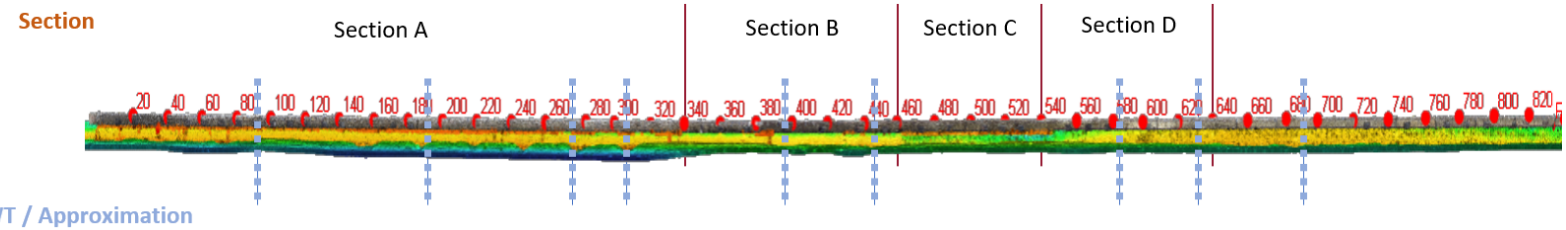


- King pile distance
- Verticality
- Sheet pile geometry
- Twisting of connectors (> 5°)
- POI for routine inspection

Reference III: Build & Deformations

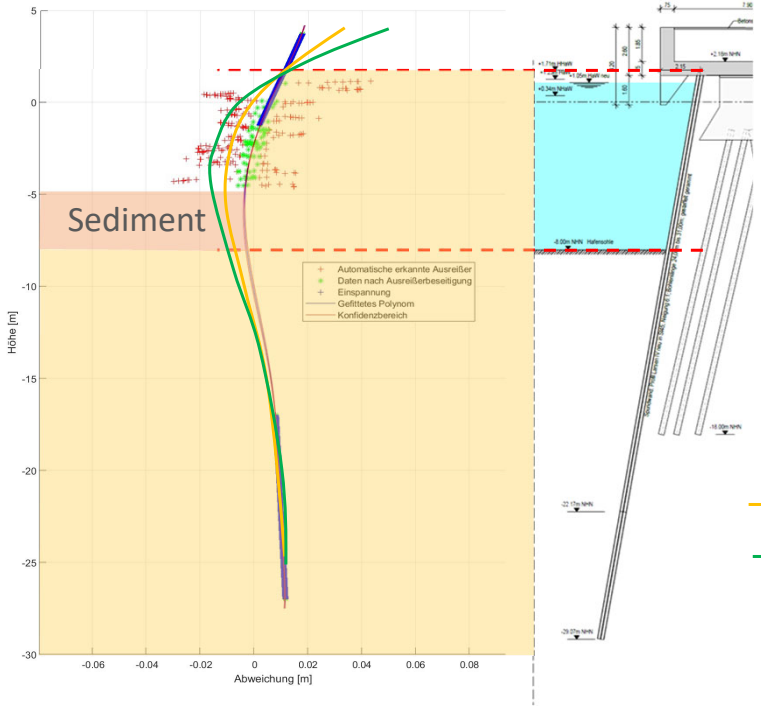
HydroMapper
make visible

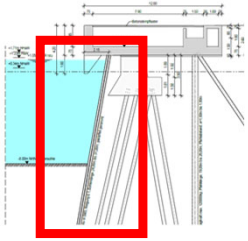




Ref. IV: Calibration & Calculation

HydroMapper
make visible

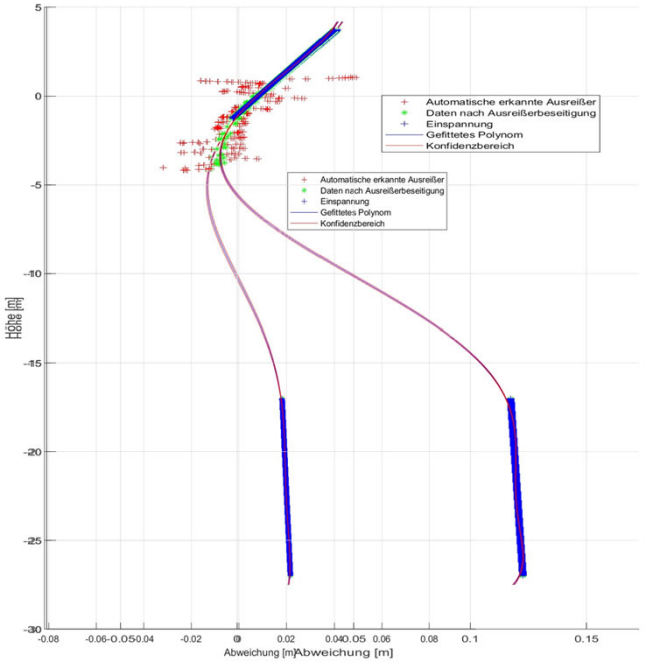




Av + 1 cm

Av + 2 cm (90%-Fraktile)

Sensitivity



Reference V: Results

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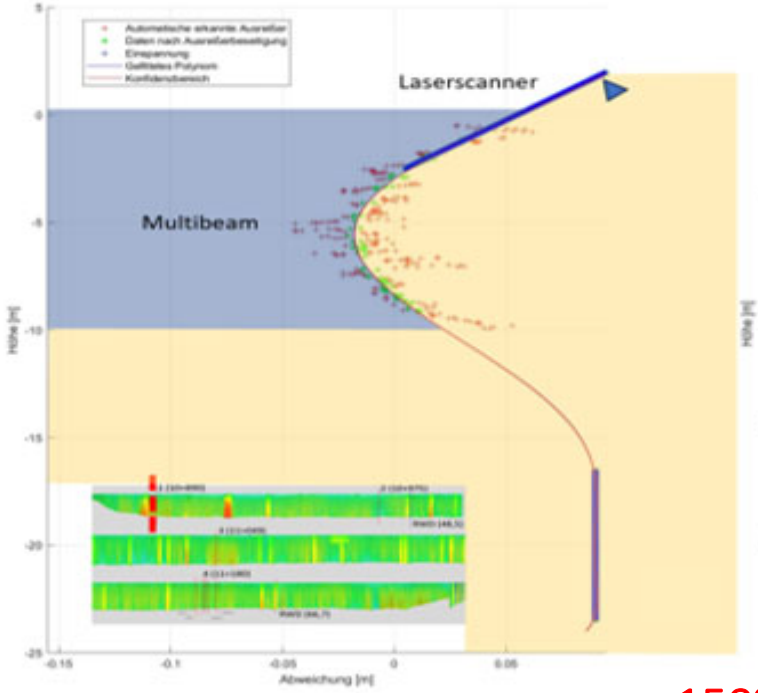
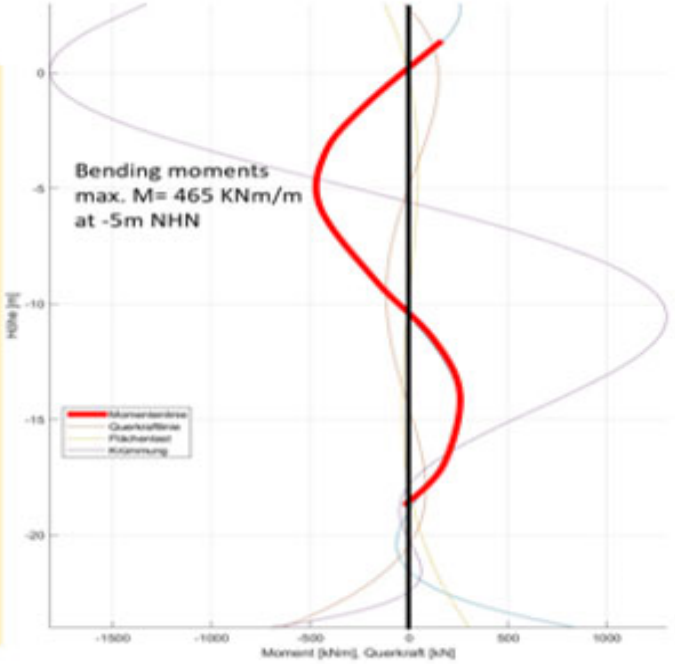


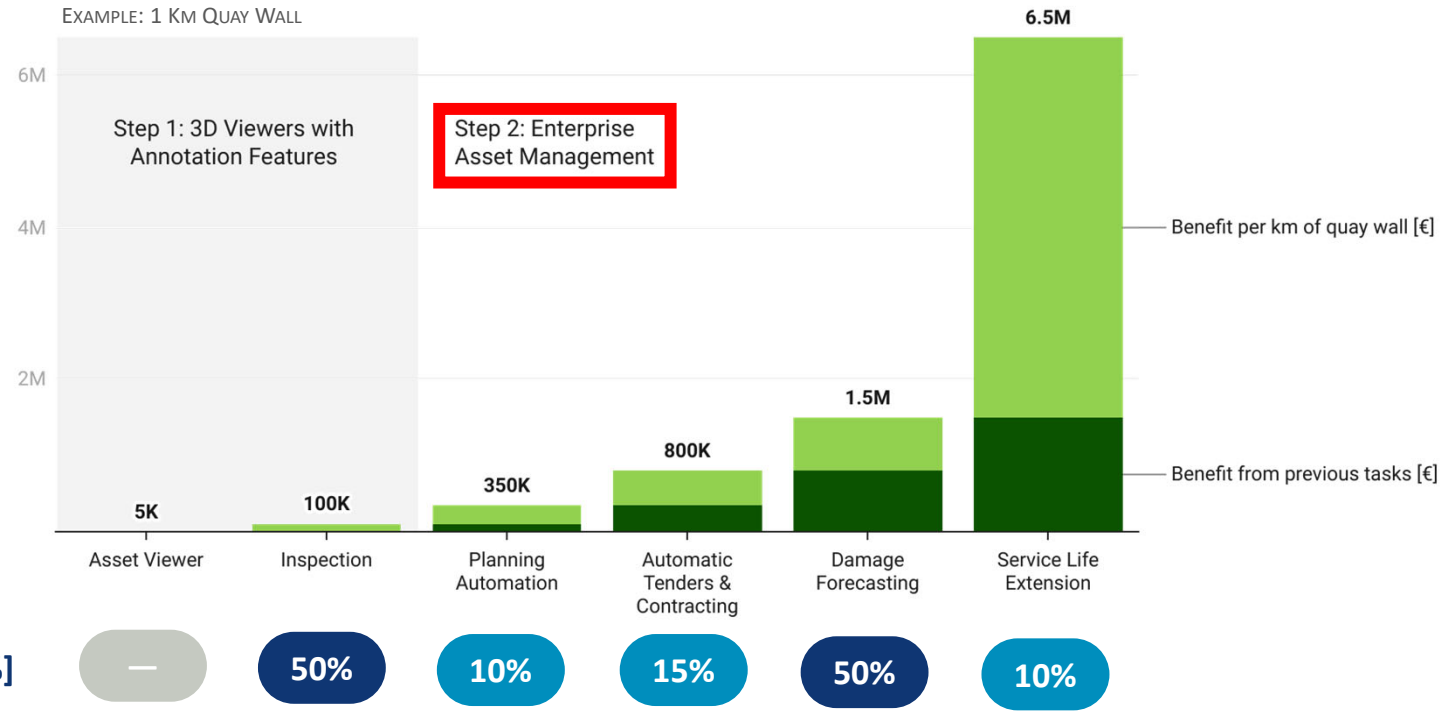


150% overload?

Approx. 70% load. 25 years of remaining service life!

Benefits of 3D Data Sets

HydroMapper
make visible



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