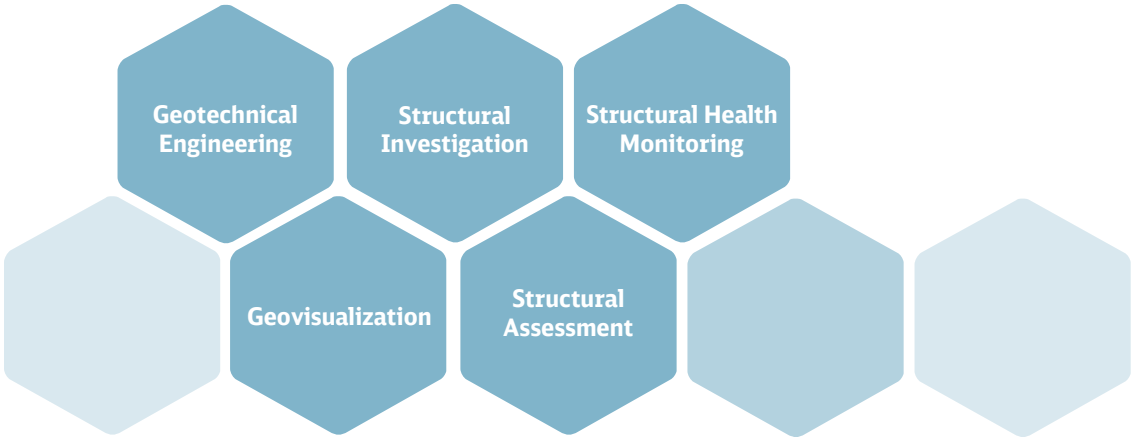
Structure 360°

Complete insight. Total safety.



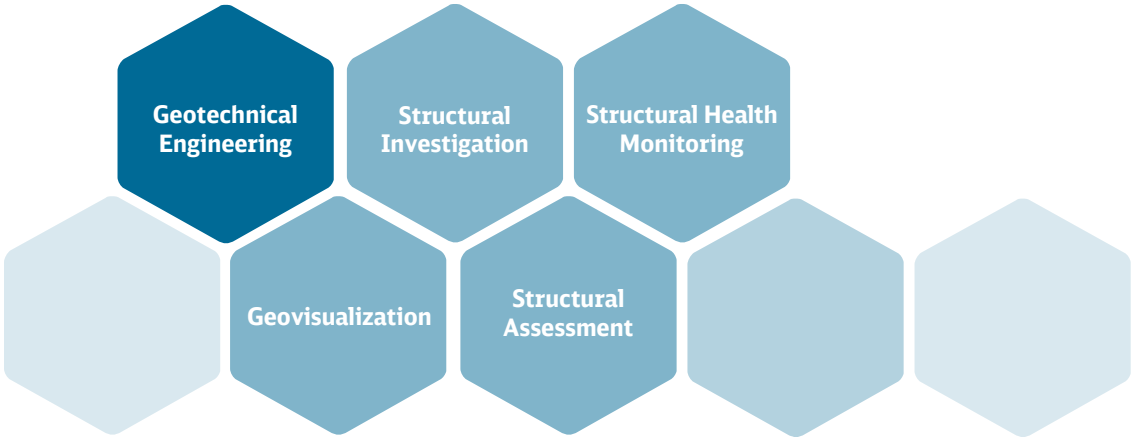
With Structure 360°, **risks** can be **minimized** and the **service life** of structures can be **extended**.

Our cutting-edge building analysis and monitoring service – **Structure 360°: Complete insight. Total safety.** – delivers a **holistic, forward-thinking solution** for infrastructure clients, setting a new benchmark with deep **in-house expertise**, seamless **real-time data integration**, and full transparency for proactive **maintenance scheduling.**

We enable confident infrastructure decisions through continuous monitoring and long-term asset protection.

Geotechnical Engineering (1/2)

Our services at a glance



- **Geotechnical investigation** and geotechnical laboratory testing
- Waste classification of **excavated materials**
- Structural analysis of geotechnical structures and rock mechanics
- Ground-penetrating radar surveys
- **Planning and design of refurbishment**
- Testing services, **building evaluation** and construction supervision by certified inspectors.

Geotechnical Engineering (2/2)

We get to the bottom of things

What geotechnical engineering does:

- Analysis of subsoil conditions
- Track foundation recommendations for refurbishment sections
- Collection of existing data, such as structure backfills, foundation depths and subgrade protection layer
- Investigation of foundation-related damage

PSV Services:

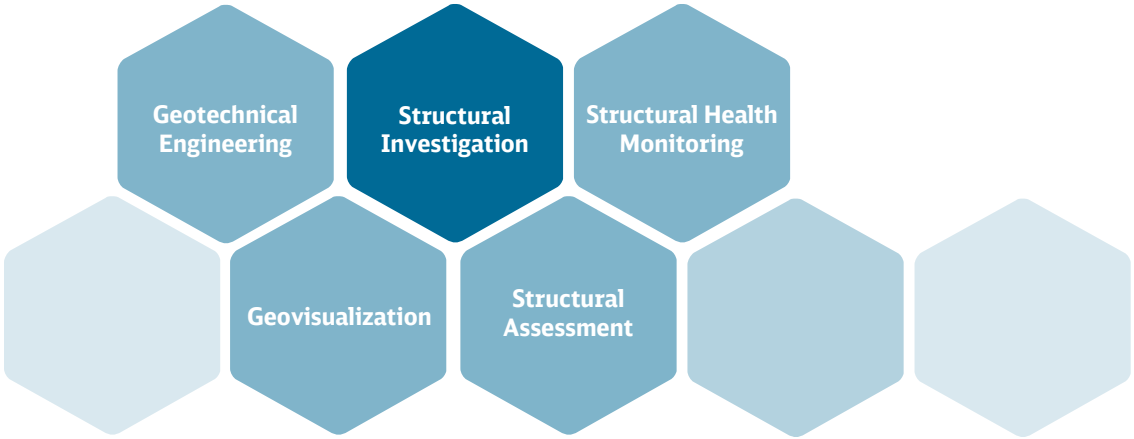
Certified technical expert services including structural assessment, review of planning designs and approvals, and independent advisory services

Investigation methods:

- Small-scale drilling, pile drive probing, manual and excavator trenches performed in-house with our own inspection teams
- (Rotary) core drilling, conversion into groundwater monitoring points and in-borehole testing in collaboration with qualified subcontractors
- Laboratory testing of soil and rock mechanics
- Use of ground-penetrating radar (GPR) to identify mud pits, depressions and soil layers with increased clay content
- Use of GPR to differentiate geotechnical areas and optimize borehole placement

Structural Investigation (1/2)

Our services at a glance



- **Assessment** of existing structures and recommendations
- **Object-specific investigation** (destructive and non-destructive)
- Alkali-silica reaction **(ASR) testing and analysis**
- Condition **surveys** and expert reports on structures and components
- **Damage mapping** and detailed analysis
- Recommendations for **refurbishment**

Source: Sophie Weikert / DB E&C, Hellbrookstrasse railroad overpass project, Hamburg 2024. © DB E&C

Structural Investigation (2/2)

Maintain or rebuild? We identify a clear path forward

Applications:

- Maintenance and renovation of civil engineering structures
- Demolition of structures

Materials:

- Concrete
- Reinforced concrete
- Brick masonry
- Natural stone masonry
- Steel
- Cast iron

Destructive testing:

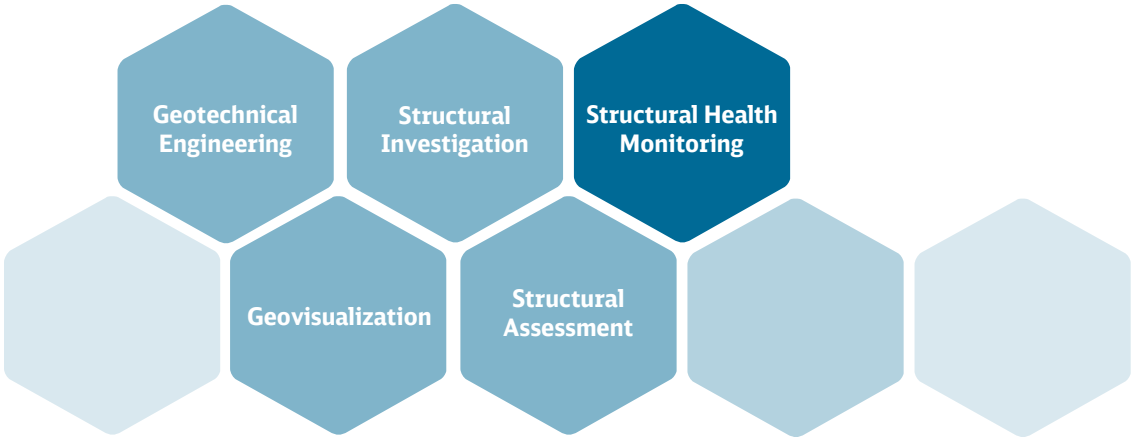
- Core drilling on all materials
- Drill cutting collection
- Chipping points

Non-destructive testing:

- Damage mapping and photo documentation
- Surface condition assessment
- Evaluation of corrosion protection coatings
- Assessment of corrosion potential using potential mapping
- Rebar location and concrete cover detection with inductive and/or electromagnetic methods
- Compressive strength class using a rebound hammer
- Camera inspections
- Moisture detection
- Thickness determination, wall thickness determination
- Mobile hardness testing on steel components

Structural Health Monitoring (1/2)

Our services at a glance



- **Continuous real-time monitoring** of structures (new construction, structural condition of existing structures)
- Data acquisition on **structural responses** of structures to **impacts** and **loads**
- **Real-time evaluation** of measurement data, with integrated alert concepts
- **Live data visualization** through online dashboards
- Developed in line with proven German engineering standards and established **best practices in monitoring of bridges**

Source: DB E&C, Brücke Süd project, Munich, 2025. © DB E&C

Structural Health Monitoring (2/2)

Data-driven understanding of structures

What is structural health monitoring?

- Structural health monitoring provides cost-effective, reliable and continuous monitoring of assets throughout the planning, construction, and commissioning phases using geodetic sensors.

What can structural health monitoring do?

- Structural health monitoring involves the continuous observation and analysis of structures, helping to minimize risk, enhance infrastructure performance and optimize process efficiency in various areas.
- Sensors are leveraged to gather real-time data, significantly improving lifecycle planning for structures.
- Early detection of damage allows for more efficient maintenance planning, ultimately extending the lifespan of assets.

Portfolio:

- 3D real-time monitoring of structures (new builds, existing structures, and construction phases)
- 3D real-time visualization, analysis, and presentation in dashboards, with integration of BIM models
- Measurement of settlement, tilt, vibration, acceleration, strain, displacement, and crack monitoring
- Tailored monitoring concepts, detailed design for measurement systems, installation and operation

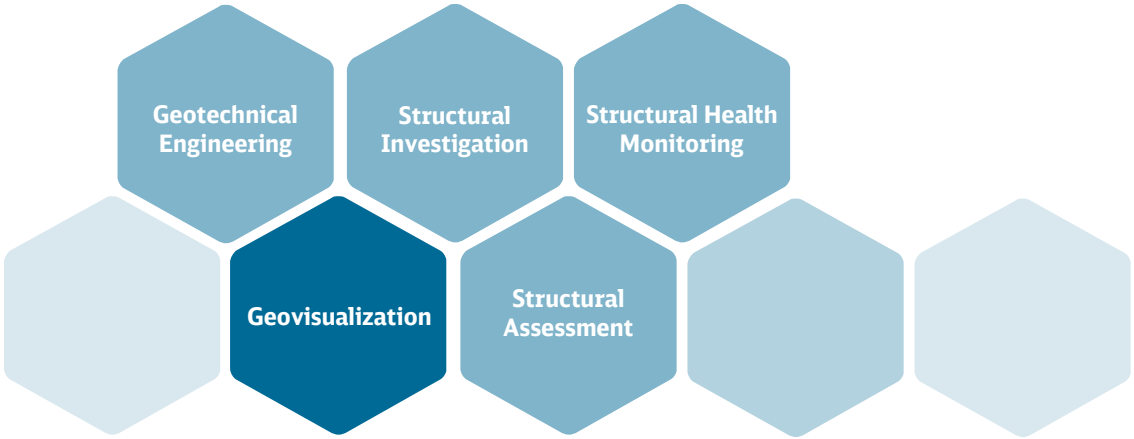
Our sensors:

- Water level gauges
- Inclinometers
- Potentiometers
- Tachymeters
- Laser distance meters
- Inductive displacement measurement
- Accelerometers
- Fiber optic measuring systems
- Atmospheric measurement sensors
- Snow-load gauge
- Camera systems

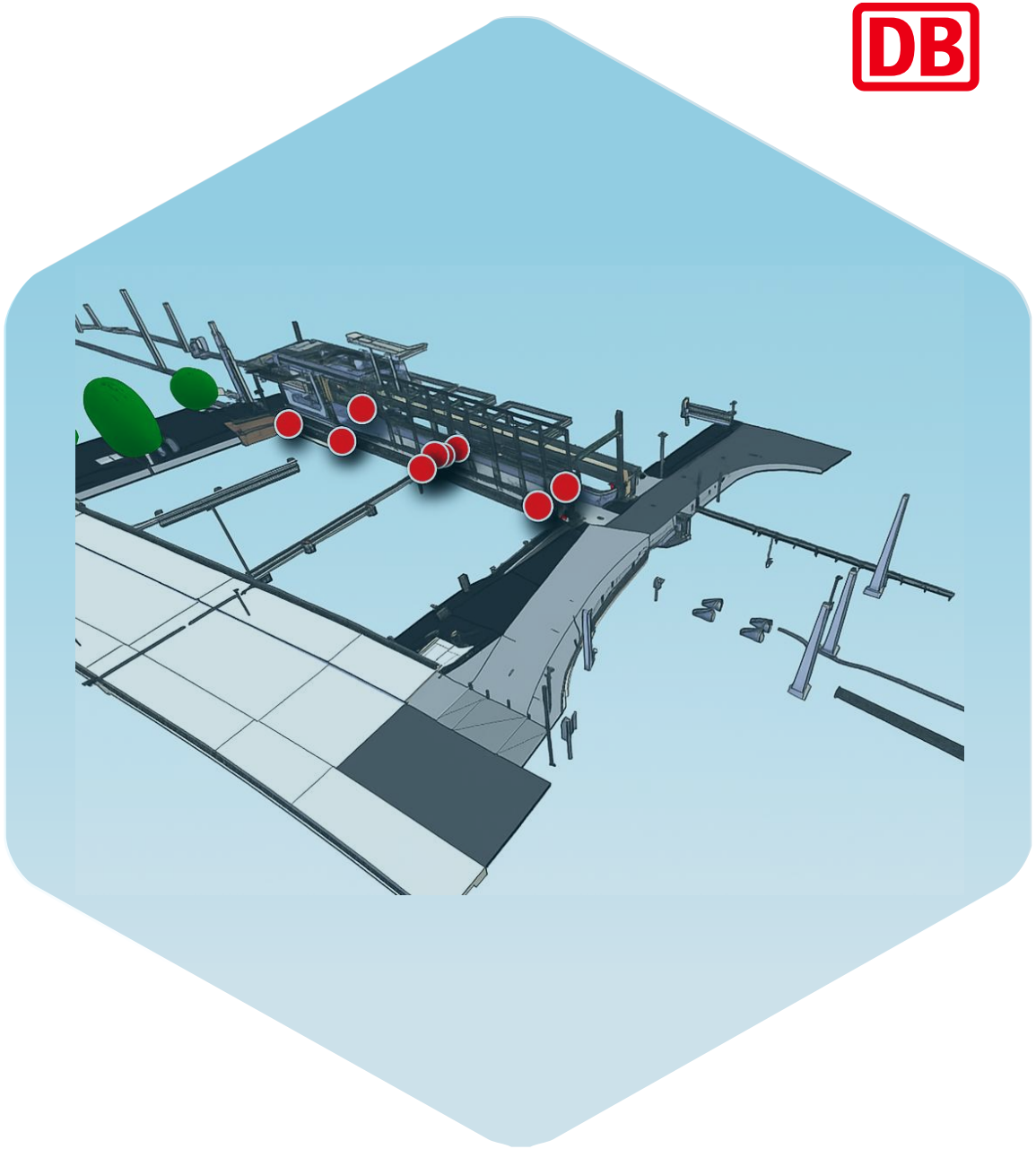
See our website for more information

Geovisualization (1/2)

Our services at a glance



- **Visualization models** of existing structures
- Digital **data acquisition**
- Generation of **point clouds**
- Sensor mapping **within** visualizations



Source: Jens-Peter Ertel, DB E&C, Emden, Saarbrücken bascule bridge project, 2025 © DB E&C

Geovisualization (2/2)

Translating data into smart and useful visuals

Intuitive understanding of data:

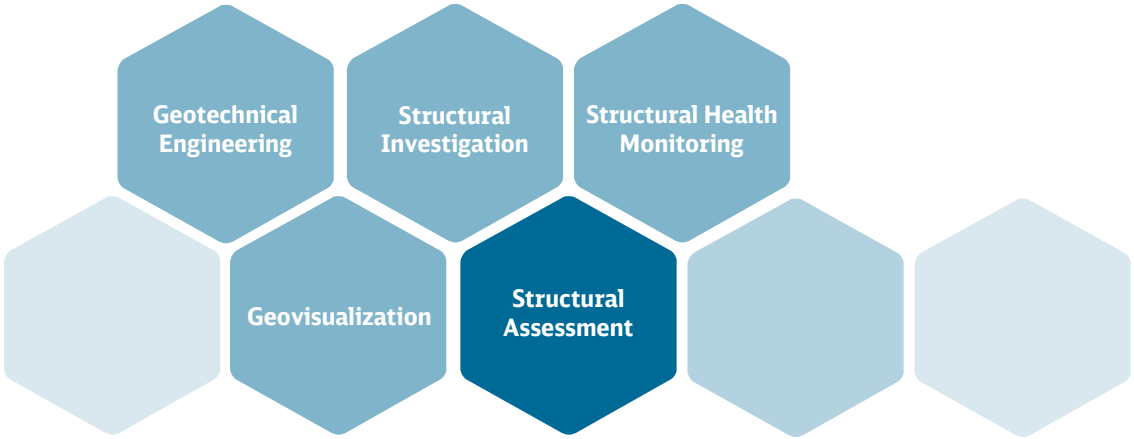
- Geovisualization makes complex information easy to understand and use efficiently
- Geovisualization supports the maintenance of track systems, stations and other infrastructure by providing a clear spatial representation by sensors.

Visualization:

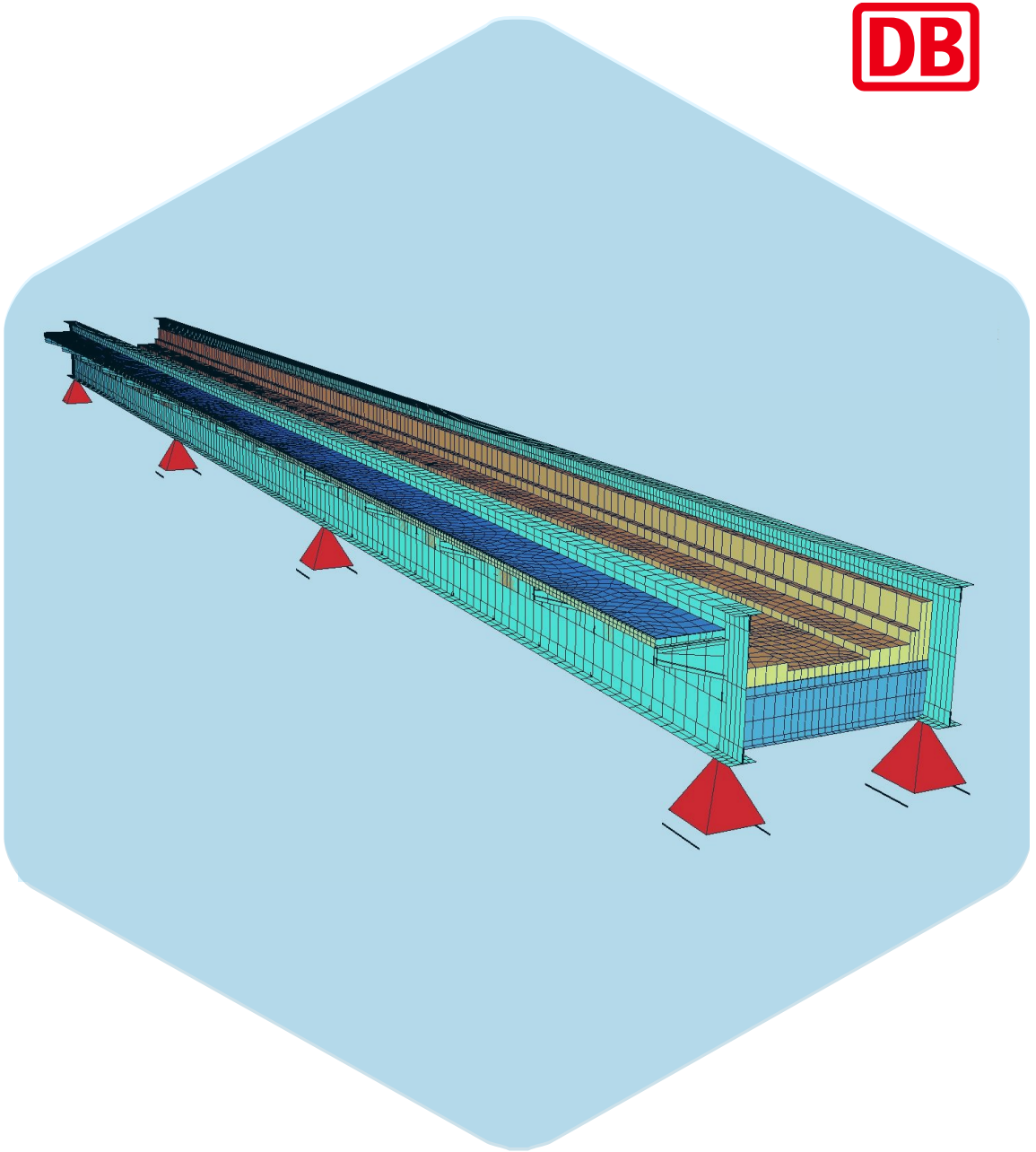
- Various types of data can be displayed in our X2BIM platform, including multicopter aerial surveys, laser scanning point clouds, mobile mapping data, IFC models and plan data.
- Visually processing spatial data makes connections, trends and opportunities more easily and quickly identifiable than ever before.

Structural Assessment (1/2)

Our services at a glance



- Review and evaluation of **as-built documentation**
- Assessment of **structural conditions** for re-evaluation
- **Reassessment** of steel and reinforced concrete structures
- Determination of the **remaining service life**
- **Planning and design of refurbishment**
- Coordination of the **authorization process**



Source: Athanasios Gakis, DB E&C Brehmbach railroad overpass project, line 4920, km 6,984, created in 2025

Structural Assessment (2/2)

Unlocking your structure’s true load-bearing capacity

Analytical assessment of current condition:

- Structural damage can reduce the load-bearing capacity of assets.
- The remaining safety margin is determined through a re-evaluation, which can be carried out in multiple stages depending on complexity and requirements.

Determination of remaining service life:

- The ageing process of structures depends on both the magnitude and frequency of loads.
- In many cases, the actual load has increased since the structure was originally commissioned.
- Built on proven German engineering expertise and aligned with established structural assessment principles, our approach enables a data-driven evaluation of structural fatigue under real load conditions and provides a reliable basis for estimating the remaining service life, supporting sound long-term investment decisions.

Structural rehabilitation:

- Structures and structural components are subject to wear and tear and may develop damage over time.
- With timely and professionally executed rehabilitation measures, further deterioration can often be contained, and costly measures can be postponed while maintaining safety standards.
- The planning and implementation of rehabilitation projects require specialized expertise. We are ready to support you with our technical know-how and expertise.

Impact:

- Assessing the remaining load-bearing capacity of structures will become increasingly important in the future.
- The safety of transport infrastructure remains our top priority.
- Early and professionally executed rehabilitation not only preserves asset value but also reduces long-term costs and supports a more sustainable infrastructure strategy.

Structure 360° - Contact

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