Pragmatic Solutions for Structural Health Monitoring (SHM) – From Planning to Evaluation

MSE North America supports operators and owners of bridges, tunnels, and other civil engineering structures to objectively assess the condition of their concrete or steel structures. We offer practical monitoring solutions- from developing an appropriate measurement concept, system implementation on the structure itself- to the evaluation of measurement results.

We are combining proven measurement technology with modern sensor systems, particularly fiber-optic measurement technology. The goal is to generate reliable measurement data that supports everyday operation and enables informed decisions.

Our Services Include:

- Monitoring of bridges, tunnels, and other civil engineering structures
- Use of proven and advanced sensor technology, such as Rayleigh Strain Sensing (RSS) fiber optic technology
- Clear measurement concepts, precise implementation, and understandable results

What We Enable

Structure owners and operators face challenging questions every day:

- What is the current condition of my structure?
- Is this condition changing, and if so, how quickly?
- Where is immediate action required, and where is my structure in a healthy condition?

MSE North America's solutions provide objective measurement data that allows the transparent assessment of a structure's condition.

Changes in a structure's condition are recorded over time and clearly categorized and quantified.

Our Technology Enables:

- Early detection and assessment of cracks, including a systematic crack map where every relevant crack is identified, located, and monitored over time
- Clear representation of condition changes and damage progression
- Derivation of stress and loads on individual components, based on real measurements
- Measurement data as a reliable basis for maintenance and repair decisions
- Use of measurement data for extended verifications

Thus, measurements become a tool for specific technical and economic decisions – not an end in themselves.

Why Fiber Optics

Fiber optic measurement technology has proven to be a particularly powerful tool in structural health monitoring in recent years. A single fiber can measure continuously along an entire structure, comparable to thousands of strain gauges permanently installed.

Advantages of Fiber Optics:

- Continuous measurement over large component lengths or the entire structure
- Very high spatial resolution with robust and durable installation
- Suitable for steel and reinforced concrete structures
- Proven to identify issues such as fatigue, crack formation, and unknown load paths
- Applicable in both new construction and existing structures

Added Value for the Owner or Operator:

- Fewer individual measuring points and cabling
- Much better overview of the overall behavior of the structure
- Damage and changes detected early
- React earlier instead of later with costly repairs

When applied appropriately, fiber optics sensing is not a "high-end gadget," but a cost-effective monitoring tool.

Our Services

Clear, Simple, & Implementation-Oriented:

1. Monitoring Concept

We start with the development of a suitable measurement concept. We select appropriate measurement methods and define sensor type, quantity, and position, based on the structure owner's or operator's specific needs.

2. Implementation on the Structure

If desired, we handle installation of the measurement technology directly on the structure, including any logistical and safety planning and measures. After installation, we perform a comprehensive functionality check.

3. Measurement Operations

Depending on Requirements, We Perform:

- One-time measurements
- Periodic measurement reports
- Continuous monitoring (24/7)

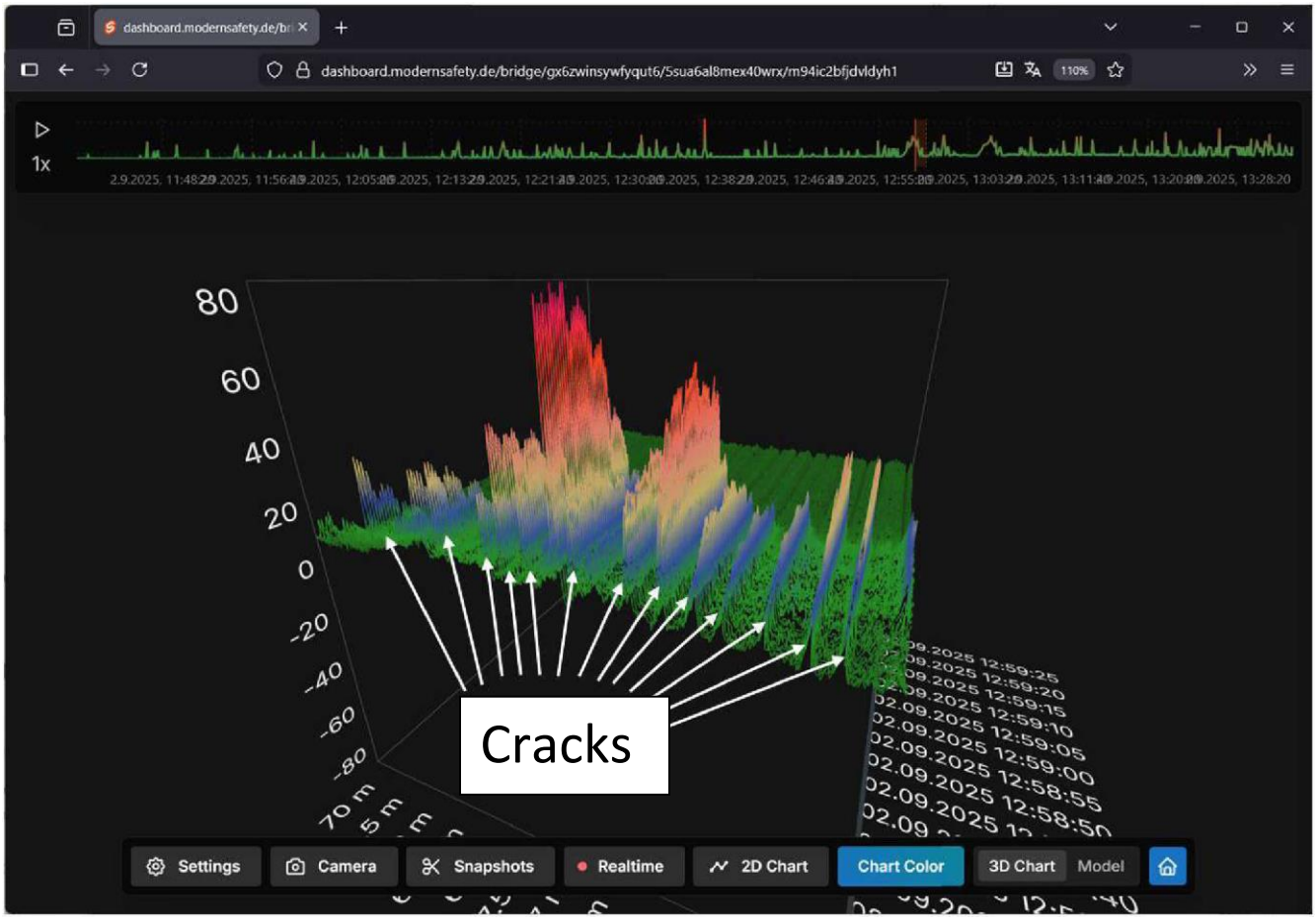
Measurements can be carried out under normal traffic or defined load cases.

4. Evaluation & Results

Data is processed and presented clearly. We deliver easy-to-read graphics, meaningful key figures, and structured reports. If required, we are setting up trigger tolerances, thresholds, and automatic alerts.

MSEnse® Software – Only What Matters

For data analysis and management, we have developed our own proprietary software platform, MSEnse®. MSEnse® is a browser-based software platform designed for large data volumes generated by modern structural monitoring.

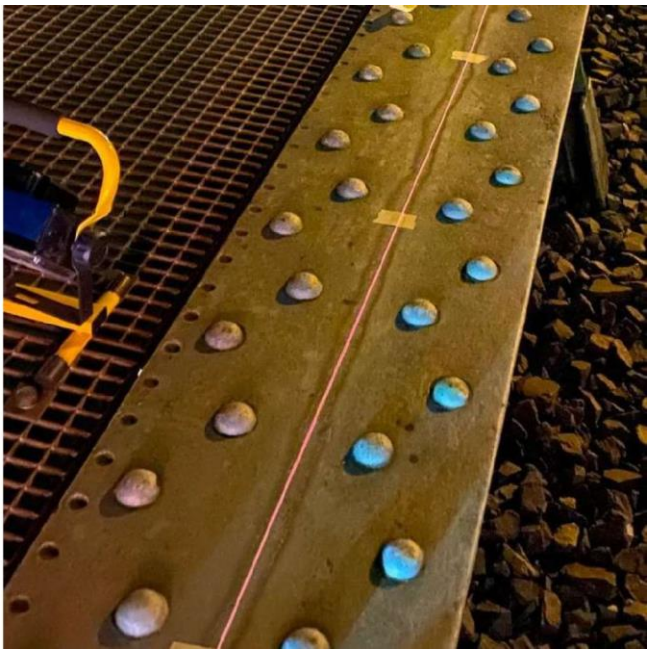


MSEnse® enables:

- Access from anywhere without local installation
- Central management of large datasets
- Visualization of measurement data in 2D and 3D formats
- Project management for multiple structures within one system
- Automatic alerts and standardized reports

The focus is on clarity, comprehensibility, and practical usability.

Case Studies



Fatigue investigation of a steel bridge under real traffic – determination of actual stresses in the existing structure.

Crack detection and monitoring of crack development – assessment of condition changes over time.

Our Commitment

MSE North America stands for practical monitoring solutions that are technically sound and economically sensible. Our methods are cost-efficient, not unnecessarily complex, and tailored to operators' real needs.

Monitoring that simplifies decisions – not complicates them.

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