



# Koherent Structural Health Monitoring (SHM) Solution Guide

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# SHM saves costs and improves public safety

As technology advances, Structural Health Monitoring (SHM) has become increasingly vital for infrastructure such as bridges, tall buildings, tunnels, wind turbines, and dams. The added value of the right SHM solution can be tremendous. Based on informed and timely decisions, you can reduce costs, extend the lifespan of your infrastructure, and improve public safety.

Looking to prolong the lifespan of assets, make better informed decisions and prioritise investments? Need to improve SHM quality cost-efficiently? Choosing the right SHM technology can make all the difference. This guide provides a few essential tips for finding the ideal SHM solution for your infrastructure needs.



# Five pain points in the SHM market today

We have identified a few pain points and challenges in the SHM of infrastructures. Are these familiar to you?

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—|— **Deployments** with existing SHM technologies are often **complex** and **expensive**. Technical challenges are prevalent.
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—|— **Reliable and accurate technology** to measure movements directly is **lacking**. The precision does not detect the earliest signs of structural problems, so immediate action can not be taken.
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—|— The **weather impacts** existing solutions, such as in foggy conditions with low or zero visibility. Most solutions do not work in harsh underground conditions.
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—|— **Internal damage cannot be revealed** with visual inspection.
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—|— **Life cycle management** of infrastructure, assets and investments is **challenging**.

# Why SHM is more critical than ever?

As infrastructure ages, detecting faults, cracks, and abnormal movements early is more important than ever. Due to climate change, budget constraints, and increased traffic and public safety concerns, asset owners and infrastructure engineers are actively looking for SHM solutions to provide accurate and reliable data for structures of all sizes.

Infrastructure contractors and owners can achieve substantial savings while extending the life cycle of bridges and other infrastructure by years or even decades.



# SHM offers you peace of mind

Enables detecting changes and providing automatic alerts of unexpected events, enabling timely intervention when the infrastructure requires attention.

Facilitates early response to structural changes and improves structural safety.

Enhances life cycle management of your assets and helps to prioritise your investments.

# Relevant criteria to identify the right SHM

## Fast and easy deployment

Is the solution designed for effortless deployment and installation into diverse infrastructures? Does the deployment take one day, one week, or even longer?

## Maintenance-free

Is device service or calibration needed after installation? How often is measurement drift expected over the years? A solution that demands frequent maintenance will increase costs and reduce efficiency.

## Relevant data in real-time

Can the solution provide accurate, real-time data that meets your specific needs? Timely insights are crucial for informed decision-making.

## Extreme accuracy

Does the solution provide down to sub-millimeter-precise measurements on distances up to hundreds of meters? Given the scale of most infrastructure, accuracy at long distances is a critical factor.

## Reliability 24/7 outdoors and indoors

Do the sensors operate reliably in all weather conditions, and does the solution provide automatic alerts if needed?



# What does Koherent provide?



We provide the world's most accurate measurement solution for Structural Health Monitoring, tailored for infrastructure such as bridges. Koherent's cutting-edge technology enables continuous, real-time structural measurements with sub-millimeter accuracy, operating 24/7 under any weather conditions.

## The Koherent Grid in a nutshell

The Koherent Grid measures relative distance between the sensor pairs at sub-mm accuracy — near and far — and translates the information into high resolution geometric displacements. See the datasheet for more technical details.

[Learn more](#)



## Unique benefits

- Direct measurement and monitoring of 3D movement via radio technology, with less than 1mm accuracy.
- Dynamic real-time measuring. Detecting changes with unmatched accuracy and reliability.
- Cost-efficient, easy deployment with no calibration.
- Capturing fast and slow motions, without drift.



We empower you to make informed, timely decisions to enhance safety and extend the lifespan of your assets.

## Key Components:

**Easy Integration:** We offer seamless integration of software and hardware with our Radio Units and Sensors, ensuring smooth data collection and processing through APIs (MQTT), CSV files, or other supported methods.

**Versatility:** Our solutions are designed to deliver adaptability and consistent performance across diverse conditions.

### End-to-End Efficiency:

- **Planning & Installation:** Ensuring a flawless setup of base stations and sensors for optimal performance.
- **Training:** Equipping partners and customers with the necessary skills to maximize the system's potential.
- **After-Sales Support:** Providing responsive and reliable customer service to address any post-installation needs.

# Success stories

## CASE: THE KIRJALANSALMI BRIDGE

[Watch case video](#)

**Challenge:** The Finnish Transport Infrastructure Agency (FTIA) is constructing a 600-meter-long cable-stayed bridge to replace the old Kirjalansalmi bridge, built in 1963.

**Solution:** The FTIA uses the Koherent system to monitor the structural health of the old Kirjalansalmi Bridge and ensure safety in its last years of operation.

**Results:** The Koherent Grid delivers safety-critical data on the movements and vibrations of the aging bridge with unmatched accuracy and reliability 24/7. Gradual movements and rapid vibrations can be studied in high detail.



## CASE: HELSINKI ENERGY OFFICE BUILDING

[Watch case video](#)

**Challenge:** The City of Helsinki wanted to obtain data about possible damages caused by the new construction project next door to the Helsinki Energy Office Building. Granlund's real estate management professionals turned to Koherent to measure the building's movements.

**Solution:** Koherent Grid sensors were deployed to three different locations indoors and outdoors. The system was used to monitor the displacements detected in the foundation and above-street levels of the building with sub-millimeter accuracy.

**Results:** Using Koherent's sensors, Granlund and the building owner can receive reliable information about structural changes. Granlund can then offer better building management services to its customer.

A long, multi-lane bridge spans across a wide body of water. The bridge has a series of concrete piers supporting its structure. The sky is overcast and hazy, and the water is calm with some ripples. The bridge recedes into the distance, creating a strong sense of perspective.

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Want to extend  
the lifespan of assets and  
make data driven decisions?

Contact us and our  
experts will help you  
get started!

[www.koherent.io](http://www.koherent.io)