






REMOTE MONITORING FOR BRIDGES

Real-time structural stability
verification at your fingertips.



 Remote wireless monitoring technology with extremely long battery life that utilizes systems targeted to address specific problems and deliver usable information without boots on the ground.

 Event triggered monitoring for near real-time warning of structural or ground movement due to scour, landslide or impact damage – helping you minimize danger and disruption.

 Precise, reliable condition data for long-term performance assessment - helping you optimize maintenance and extend asset life.



How Monitoring Should Be

- Easy to install
- Easy to understand
- Minimal maintenance
- Automated alerts
- Near real-time information with photographic verification
- Rugged instruments for all-weather performance
- Flexible modular technology allowing you to build a system to collect the specific data required
- Ultra-long (10 to 15 years) life

The closest you are likely to get to a plug and play structural health monitoring system.





ADDRESSING YOUR BRIDGE CHALLENGES

With **ageing infrastructure**, **climate change**, **earthquake risk**, **budget constraints**, **increased traffic** and **safety concerns**, the need for early detection of faults, defects and deterioration is more important than ever. Engineers have trusted Senceive technology for more than a decade. It is designed and **built for the tough demands** of infrastructure applications and provides **precise, reliable structural and data** to help you address the unique pressures and challenges of your project.



Limited Time

Ideal where only short access windows are available

- Installed in minutes
- Works straight out of the box
- Battery life of 10-15 years



Limited Space & Difficult Access

Compact, autonomous sensors will not interfere with your operations

- Variety of brackets and mounts for easy installation
- Measure where it matters most
- No wires needed so less risk of damage



Tough Conditions

Long-life performance

- Rugged instruments proven in many infrastructure applications
- Withstands extremes of heat, cold, water and more
- Robust mesh networks can resist damage to elements without systematic loss of performance



Senceive solutions are used by asset owners, contractors, professional surveyors and engineers around the world. Approved, accredited, and proven in the field, the technology is the natural choice where long-term performance in critical applications is required. That's why **more than 30,000** of our **tilt sensors were installed in the last year.**



Changing Needs

Adapt the monitoring system as your project progresses

- Flexibility to move sensors to fit project needs
- Change settings without leaving your desk
- Share data with your whole team
- Combine Senceive and third party sensors; integrate structural and geotechnical measurement



Protect People & Infrastructure

Early warning of distress & defects without leaving your desk

- Trigger automated alarms when data thresholds are exceeded
- Early detection of structural instability
- Fewer site visits means reduced risk exposure



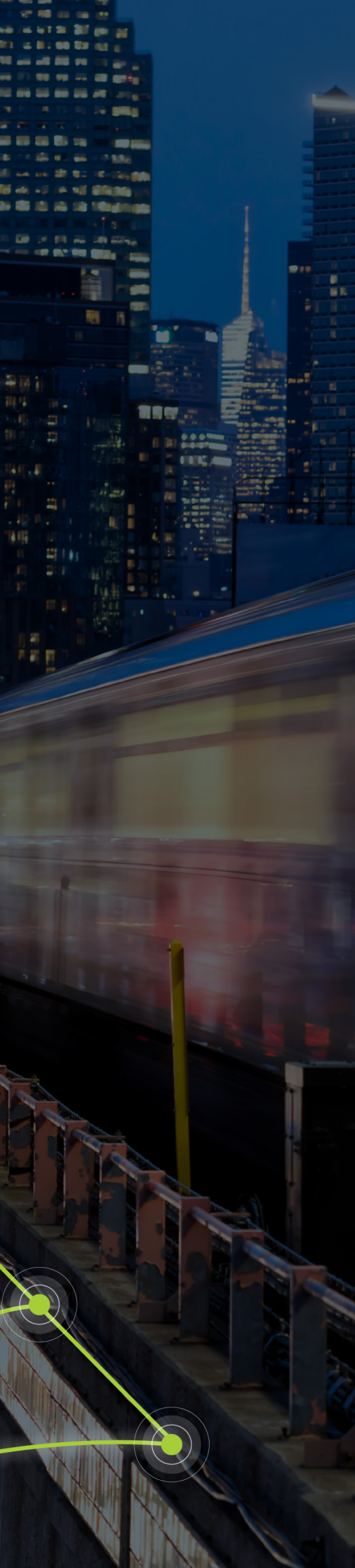
Stay on Budget

Make construction & maintenance cost-effective

- Save money through reduced site visits and enhanced long-life performance
- Increase confidence and productivity through reliable real-time data
- Optimise long-term maintenance - predict and prevent costs less than fail and fix
- Start small and add more sensors if needed later

APPLICATIONS





Extreme Event Warning

Deterioration Warning

Adjacent Construction Warning



Event warning

The leading causes of sudden failure in bridges are impacts and high-velocity water events. Our systems are designed with these in mind. Long-life rugged sensors monitor the structures periodically but are triggered by movement to record more frequently depending on the severity of the event. Our intelligent monitoring technology adapts to the conditions in real-time, giving you the information you need, with visual verification. Automated alerts and imagery enable you to act fast without needing boots on the ground.



Structural deterioration

The effects of ageing materials and increased loading combine to weaken many bridges, increasing their vulnerability to failure. Loss of integrity due to corrosion or chemical attack are often hard to see because they can take place in load-bearing cables, foundations, beams, or joints. Precise, robust wireless sensors can characterise patterns of behaviour and enable you to spot unusual movement and defects before they are visible. Use your monitoring data to target inspections and repairs more efficiently and extend the life of your bridge.



Adjacent activity

Whether your structure is affected by adjacent third party construction activity such as tunnelling, excavation or piling, or you are undertaking work such as a strengthening project, there are significant benefits to be had from remote condition monitoring. Not only will it help protect your structure, but also to protect your interests by providing objective and quantifiable data to defend any liability claims.

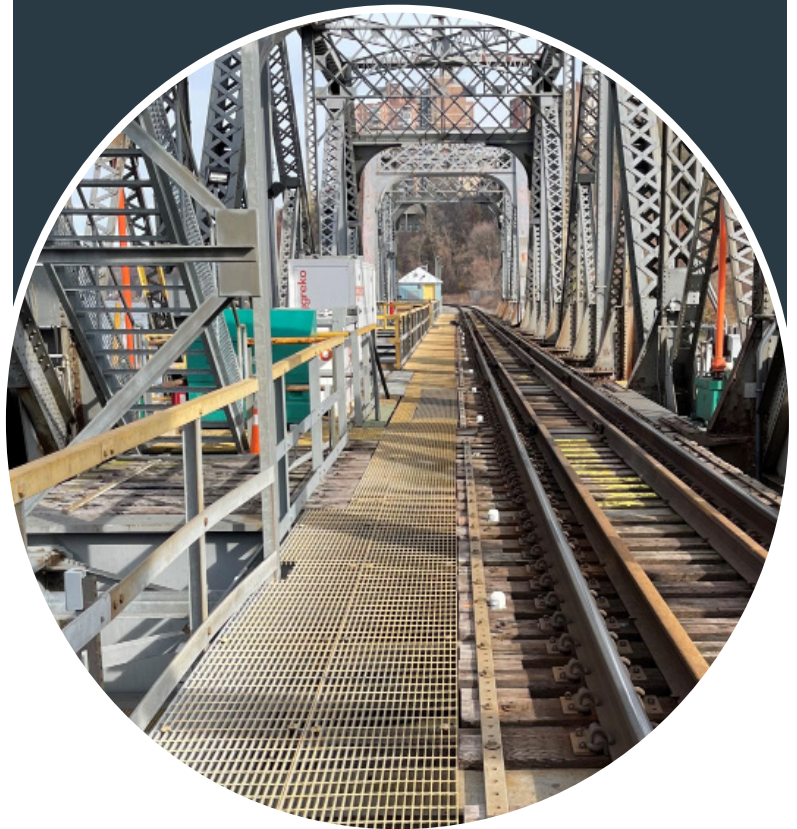
WIRELESS MONITORING FOR BRIDGES

Bridge monitoring – to prevent failure through structural health monitoring.

Identify problems earlier, increase asset lifespan, stretch limited resources and prioritise safety.

Use our tilt sensors on the structure, foundations and in the ground to increase the lifetime and safety of bridges.

With **easy to access, reliable** and **near-realtime** movement, structural and geotechnical **data**, our technology empowers bridge engineers to make critical decisions and plan responses to protect at-risk assets and their users.



Fewer inspections means reduced risk to engineers and cuts carbon emissions



Early warning and pinpointing of defects enables targeted, cost-effective intervention and improves safety for bridge users



High-frequency reporting from multiple positions enables smarter management – allowing you to extend the period between maintenance and extend the life of the asset



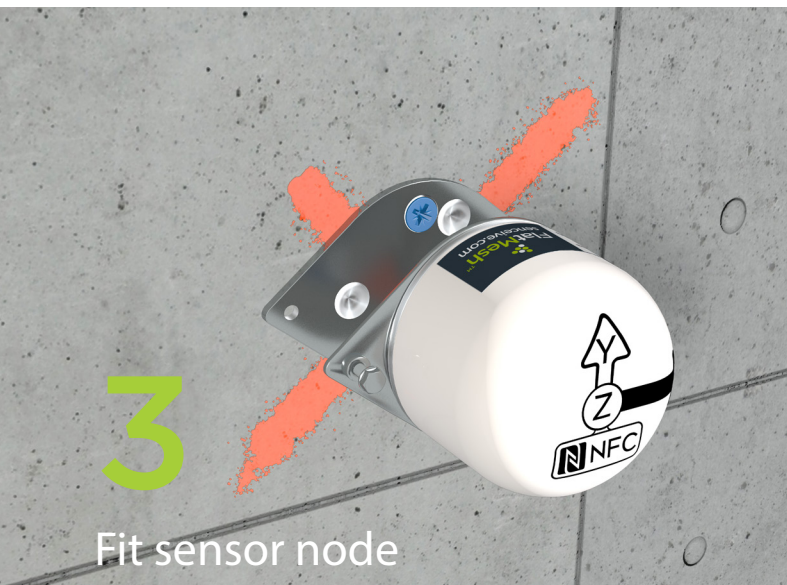
1

Open the box



2

Fix mounting bracket



3

Fit sensor node



4

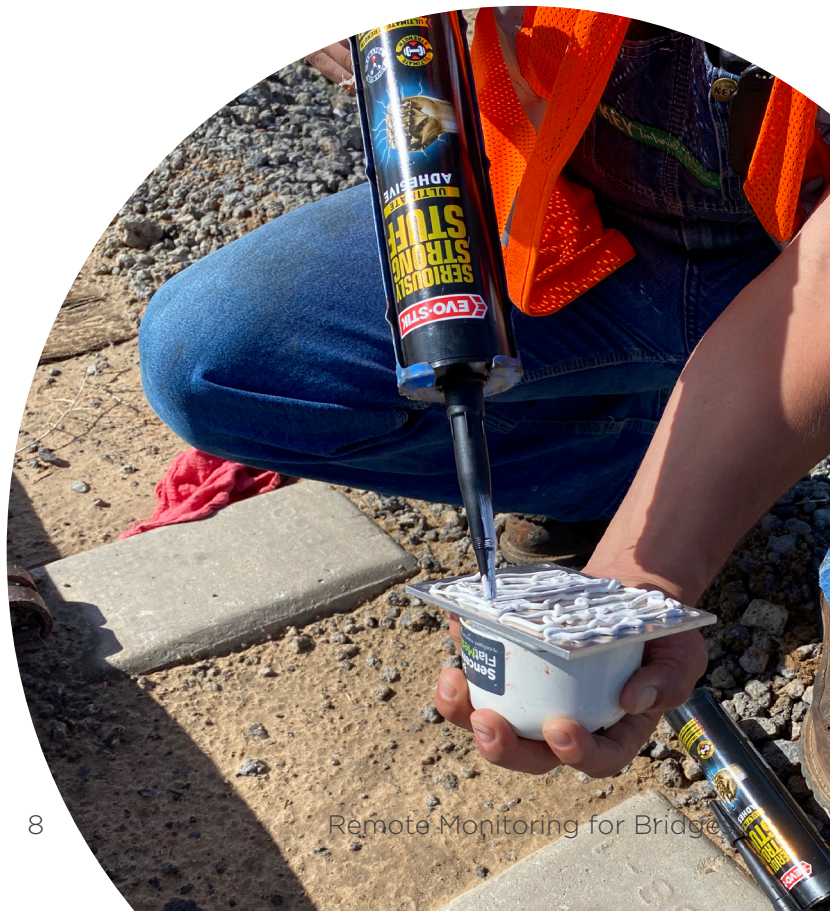
Check the data

EASE OF USE

We know that access windows are precious; that's why we've built our monitoring solutions to be:

- Fitted in minutes
- Reporting before you've left site
- Still reporting more than 10 years later

Precise, reliable instruments installed with no specialist skills required.





BRIDGE CONDITION DATA FOR INFORMED DECISION MAKING ON REAL-WORLD APPLICATIONS

We recognise that every project is unique. Our solutions are highly flexible and can be used with varying combinations of sensors and mounting brackets, so whether your structure is old or new, built of brick, stone or steel, and whether it is a minor culvert or a long-span river crossing, there will be a solution to fit. Here are just a few of the possible applications:

- Use our **Optical Displacement Sensors (ODS)** with combined tilt sensor and laser extensometer to **measure rotational and lateral movements** in supporting structures such as piers, abutments and retaining walls.
- Use a chain of **triaxial tilt sensors** on beams along the bridge deck to **measure relative settlement**, or use ODS sensors at the bottom of the deck and aim at a fixed location to check for **deflection**.
- **Measure arch deformation** using a **combination of ODS and triaxial tilt sensors** to measure **convergence/divergence** and check for **compression/decompression**.
- Make use of our **sensor interface range** to apply crack sensors or extensometers to ensure joints are **expanding and contracting** within acceptable limits.

GET THE RIGHT CONDITION DATA: MAKE THE RIGHT DECISIONS

Our technology is chosen by engineers throughout the **asset lifecycle**.

- During construction our range of robust, highly-portable sensors can safeguard the **structure being built** and manage risk to third parties.
- On **operational structures**, monitoring can support your asset management by identifying where significant movement is taking place and intervention is needed.
- It can also characterise **structural movement** that is within acceptable bounds and therefore prevent unnecessary intervention.





Rail Bridge, New York Area

Challenge

Safely move train traffic over a movable rail bridge during fender system rehabilitation while understanding the corresponding impact to track geometry.

Solution

Senceive's trackbed triaxial tilt sensor nodes on the FlatMesh™ wireless platform to remotely monitor track geometry measurements.

Outcome

Eliminated track access for traditional monitoring methods, allowing the railroad to operate without impact to schedule. Confidently allowed train flow during fender work, with remote insight on changes in cross-level, twist and dip. Continued bridge construction, while safely and continuously monitoring impact to existing structure.

Lake Pend Oreille, Idaho

Challenge

Monitor the impact of excavation and pile driving for new structure adjacent to the existing bridge for a three year period. System must withstand tough weather conditions and the impact of 60 heavy freight trains daily.

Solution

Wireless monitoring solution comprised of 536 Senceive tilt nodes, all installed on track ties at 10 ft spacing, to monitor cross-level, twist, and dip.

Outcome

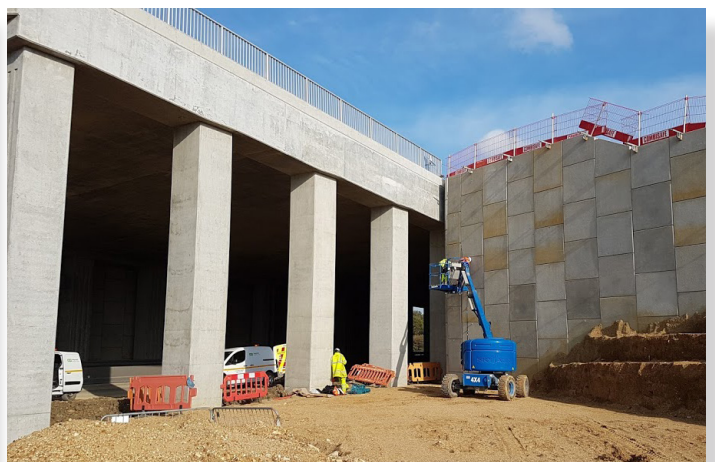
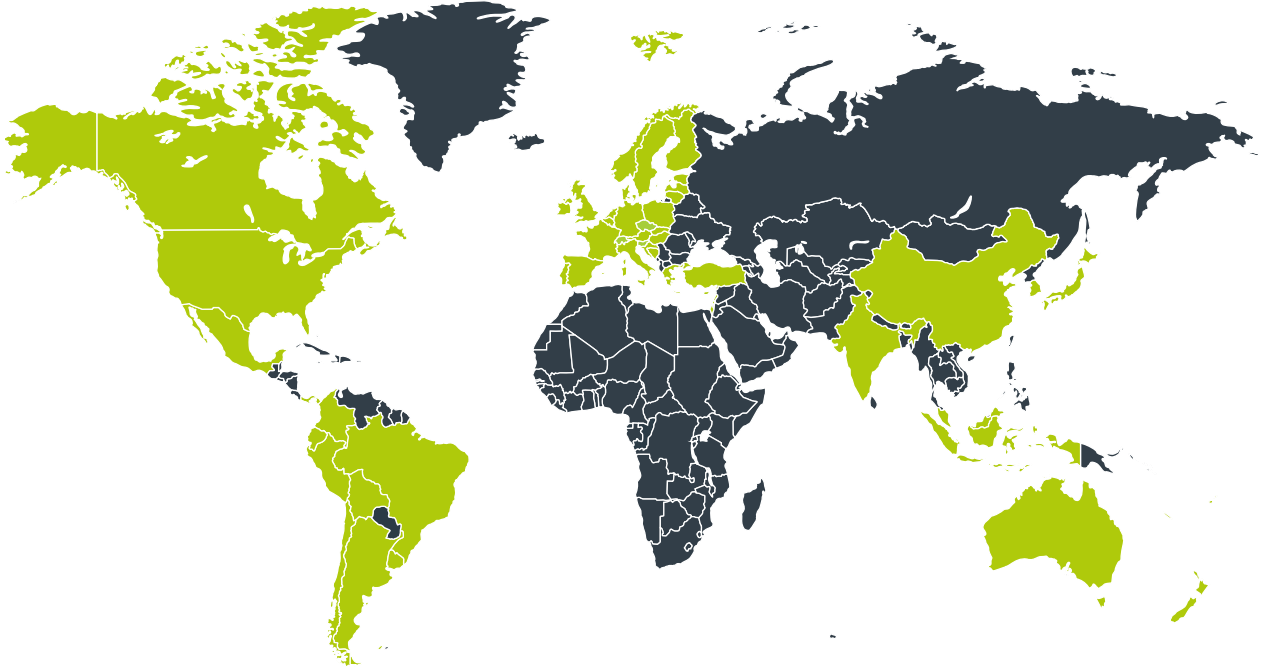
Thanks to the FlatMesh™ wireless platform, the tilt nodes provided continuous data without the need for cabling or frequent track access. Integrated the raw data, geometric calculations, and alerts on the client's visualization platform - hosted through an API.



TRUSTED WORLDWIDE

Helping you manage risk and extend the life of bridges

Senceive technology has been used on more than 200 bridges in 20 countries. Users include survey and monitoring specialists, consultants, contractors and infrastructure owners.





Harnessing intelligent
monitoring to keep people
and infrastructure safe