FlatMesh™

reliable | robust | precise

world leaders in
wireless condition monitoring
solutions

Senceive
Wireless condition monitoring

Building on 10 years' experience with 1000's of sensors deployed in UK Rail and Construction markets, Senceive's 3rd generation platform is a step change in performance for wireless Condition Monitoring...

It is now simply globally the 'Best-in-Class wireless RCM'.

Whether it be long, mid or short term track, embankment or bridge condition monitoring, to tunnel deformation assessment during external construction, repair or replacement, our **safety enhancing, easy to deploy, low/no maintenance, reliable and highly cost effective solutions** are explicitly designed for challenging deployments in Rail and Construction.

The **multi-award winning**, specified by leading consultants Senceive technology platform, built and deployed in the UK over 10 years, is based upon a proprietary wireless mesh-networked, intelligent sensor system. It consists of a collection of very **small, tough and easy to deploy** devices with specially patented fixings for any structure. The same nodes can be deployed and then **re-used on multiple applications** i.e. track beds, structures, earthworks or tunnels. This provides an unrivalled **low Life Time Cost** proposition.

They are equipped with extremely **high precision stable and repeatable geo-technical sensors** with communication and intelligent local computation capabilities. Our devices work co-operatively and intelligently ("they talk to each other") to allow **99.9% reliable data** generated even within complex and busy projects or difficult to access environments. With an unprecedented combination of precision and stability, there is **no need for data compensation or correction.** This minimizes or eliminates false alerts. Moreover, with our unique ability to provide **automatic triggering** of increased reporting rates **down to 15 secs** for individual or groups of nodes, based on extraordinary events or pre-set trigger levels of movement, decision making is easier and less prone to error. Data is available to display or download on easy to use web based remote visualization and with multi-level text and email alerts.

This **3rd generation** state of the art system with a **full range of geotechnical sensors** in **toughened, IP67 rated,** hardened aluminum enclosures, are **ultra-robust, proven and accredited** and have an **unprecedented 15 years of battery life** even at 15 min reporting.

Senceive is a **UK company** with focus on Rail/Construction industries and with strong roots in **customer focused innovation** as well as academia. Its ethos of Continuous Improvement, **relentless Customer Support** and practical market tested Innovation is at the core of the company's values.

We are proud to say that we have **never lost a client** and everyone who works with us does so again and again!

nce TUNNELLING & UNDERGROUND SPACE AWARDS 2015 WINNER

construction news awards 2014 FINALIST

GROUND ENGINEERING AWARDS 2014 FINALIST

BUILD Construction & Engineering Awards 2015 WINNER

nce ITA AITES INTERNATIONAL TUNNELLING AWARDS 2012 WINNER

Global Best-in-Class wireless RCM

Core Benefits:

Safety Enhancing
- Eliminating time on or near track / construction
- Easy to install, set-up and use
- Wire and mains power free

Minimal Whole Life Cost
- Same units re-usable for multiple applications
- Operational battery life of 10-15 years
- Maintenance and calibration free
- Reliable and proven over many years in field

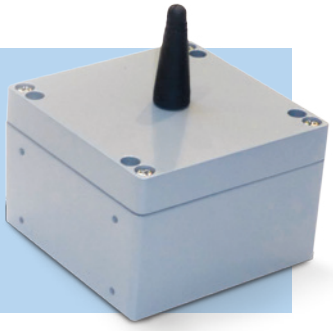
Accurate, high resolution, stable and repeatable
- High precision sensors
- Easy to use web based visualisation
- Multi-level text and email alerts

Innovation and Intelligence
- Innovate with / for clients
- Integrated imaging and wireless solutions
- Integrated intelligence supports decisions

Supporting Features
- UK based business – dedicated national technical support and PTS competent staff
- Product Accepted and Approved by NR and LUL / Tubelines + Link-up supplier
- Strong cross industry user support - Consultants to Contractors
- Range of 'plug and play' high precision geotechnical sensors
- All nodes have temperature sensor inbuilt
- Tough aluminium IP 67 rated enclosures
- Range of 300m+ (moving to 1km)
- Totally wire and mains power free solar/battery powered GSM data backhaul options
- Robust data backhaul solutions for any under / over ground environment
- Ability to interface with any user / client systems
- Industrial levels of data reliability / throughput @ 99.9%
- Remotely or locally adjustable 15 second reporting rates
- Remote firmware upgrade capability
- Remote gateway back-up and auto switchover

Application areas in rail & construction include:

- Trackbed: Cant and Twist, Longitudinal Settlement
- Tunnels: Deformation, Longitudinal Settlement / Heave, Strain, Roll, Crack
- Bridges, Walls, Piles and Structures: Movement, Tilt, Crack, Strain
- Earthworks: Slippage, Settlement



CASE STUDY

AECOM / Network Rail

Monitoring Brunel's Box Tunnel

AECOM

THE CHALLENGE

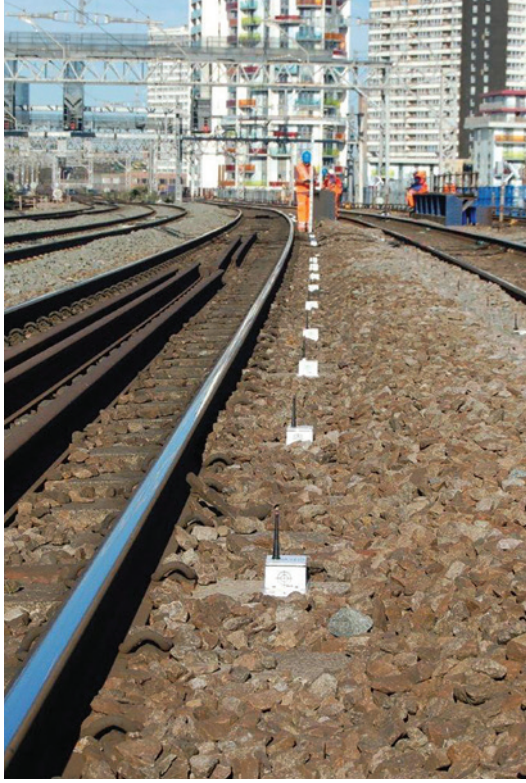
The Great Western Mainline is being electrified. It passes through Brunel's 3km Box Tunnel, bored through four distinct strata and two geological fault zones. It was completed in 1841 and subsequently lined due to structural instability. There is a complex and irregular geometry with 2km of brick lined sections, 350m of unlined sections and 464m of free standing brick arches. In order to achieve clearances for overhead lines, the track was lowered by up to 350mm. The key challenge was to implement an economical, industrially resilient and precise, **wire free monitoring solution over 3km** within a fully operational and congested construction site.

OUR SOLUTION

Senceive, using its third generation FlatMesh and working in close co-operation with AECOM, implemented a novel and **innovative totally wire and mains power free monitoring system of 250 sensors with a few gateways**. Precise and stable data sent every 20 minutes helped verify predicted structural movements, identifying trends before instability occurred over the 3km. Senceive's innovative, user friendly and easy to install FlatMesh monitoring system was chosen to achieve this.

THE OUTCOME

A highly successful and innovative project. Despite extremely limited and constrained access, the system operated throughout the engineering works. Data was collated by a small number of customised battery powered GPRS gateways, giving remote access in real time with triggers and text/email alerts for users in/outside of the tunnel, free of wires and power.



CASE STUDY

DLR / Network Rail / Morgan Sindall

Track Movement Monitoring

MORGAN SINDALL CONSTRUCTION INFRASTRUCTURE

THE CHALLENGE

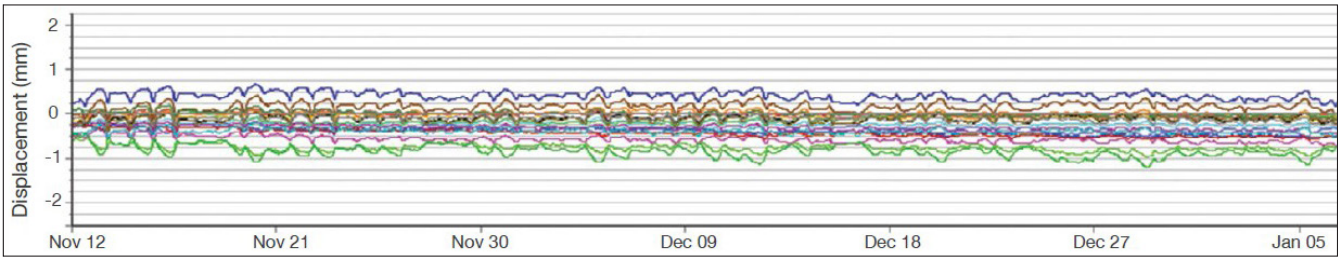
The Docklands Light Railway station at Pudding Mill Lane has been demolished and both the track and station are being moved to make way for the Crossrail tunnel that surfaces next to it. Morgan Sindall are responsible for the works, and are required to monitor the multiple rail tracks belonging to Network Rail, as well as the DLR tracks, to ensure that there is no significant movement whilst the works are in progress – for a period of some 2 years. Following issues with the use of optical monitoring, they sought an alternative solution for measuring track cant and twist with high precision, reliability and stability.

OUR SOLUTION

Working in close cooperation with the MS team, we installed c.700 of our standard wireless high precision tilt meters attached directly to the track on 5 DLR and NR lines. All the c.700 sensors communicate with our solar powered GPRS gateway. This means there is a totally mains power and wire free solution for the whole system. Data is sent back to our cloud server Webmonitor software and shows cant and twist in real time. There is no lag or delay in the data being available instantaneously. Furthermore the data is showing unprecedented stability and accuracy at below 0.1mm on a 1.435m track beam length (see below). Furthermore there are no spikes or false alerts or alarms.

THE OUTCOME

The response to the system and its ability to pick up tiny movements whilst providing stable and repeatable data with high precision has been outstanding. This has enabled it to pick up real movement at a very early stage and allowed the surveying team to respond rapidly. Local Crossrail engineers for example have remarked that it is a step change in monitoring. The fact that installation time was minimal and there is no need to go out on the track to clean prisms has improved safety and reduced on-going cost. It has led already to several other large track bed deployments with NR.



CASE STUDY

Bond St / Baker St - London Underground

Tunnel Lining Replacement Monitoring

THE CHALLENGE

A stretch of London Underground's Jubilee line between Bond St and Baker St require the concrete lining to be replaced with cast steel (SGI) segments. This extremely ambitious project involves two special machines replacing the lining shift by shift during engineering hours. Monitoring is required ahead of the works on temporary restraining rings, and immediately behind, as well as on the completed tunnel segments as the work progresses. Data is required for engineering review off site, and live monitoring during the shift.

OUR SOLUTION

Senceive's wireless tiltmeters are deployed ahead leapfrogging ring by ring, and further rings of sensors are deployed behind, some following the work as it progresses and some being left behind long term. The system has been further developed to serve this project, enabling the data to be accessed not only from the nearest platform at any time, as was originally required but also as identified during the initial trials, by the engineers on the train - this time using a wifi connected portable device.

THE OUTCOME

This project ran for 2.5 years. It was extremely successful and has won several engineering awards. The FlatMesh system has proven itself as a stable platform for monitoring in highly demanding environments and several large scale LU running tunnel monitoring works have followed as a result.

CASE STUDY

AMEY / Network Rail

Viaduct degradation Monitoring

THE CHALLENGE

The Network Rail structures team were concerned about the overall movement of a very old viaduct and were most particularly concerned about the potential propagation of a crack on the underside of one of its main arches.

Weekly visual inspections were both expensive and not able to provide sufficiently accurate data on movement over time. Setting up wired sensor solutions were regarded as too expensive and difficult to install given the demands of the location.

OUR SOLUTION

Senceive deployed a range of sensors across the bridge. These included a) crack potentiometers along the length of the crack b) a draw wire to assess movement across the full width of the arch and c) integrated tilt meters to assess movement on the sides of the spandrel wall. Temperature was also measured, which is standard in all nodes. Deployment was challenging due to the height of the arch, and the very limited accessibility from beneath. Full track possession was required, and limited to engineering hours at night. Specialist abseiling contractors were used to belay off the rails and access the underside of the arch. Standard FlatMesh sensors were supplemented by several repeater nodes to ensure data was relayed to the solar powered GPRS gateway which was situated a little way from the end of the bridge on top of the approach embankment. Data was monitored and viewed remotely using the Senceive Webmonitor software.

THE OUTCOME

The availability of web based data every 15 minutes provided a key level of critical information which informed the decision to carry out timely remedial work to repair the area in and around the crack. Selected nodes were left in place to ensure continued monitoring following the repair work. In all this was a very successful 18 month installation.

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For more information please call us on +44 (0)207 731 8269, email at info@senceive.com or visit our website

www.senceive.com

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