move SOLUTIONS

Maximize your **Construction site** safety

The complete solution for **Static SHM**, **Dynamic SHM** and **Geotechnical and Environmental monitoring**

Pre-construction • Temporary works • Excavation and foundations • Structural Health Monitoring • Pre-construction • Temporary works • Excavation and foundations

Nearby buildings stability

Settlement, inclination, deformation, cracking, and environmental factors

Nearby buildings vibrational analysis

Vibration velocity, frequency, amplitude, duration, direction, modal analysis, and acceleration

Excavation pit stability

Inclination, lateral pressure, deformation, and support forces

Ground deformation

Soil movement, groundwater level, strain, and settlement

www.movesolutions.it

✓ Enhance safety ✓ Increase productivity ✓ Improve quality

Smart Construction site monitoring with Dynamic and Static Wireless IoT sensors

ACCELEROMETER

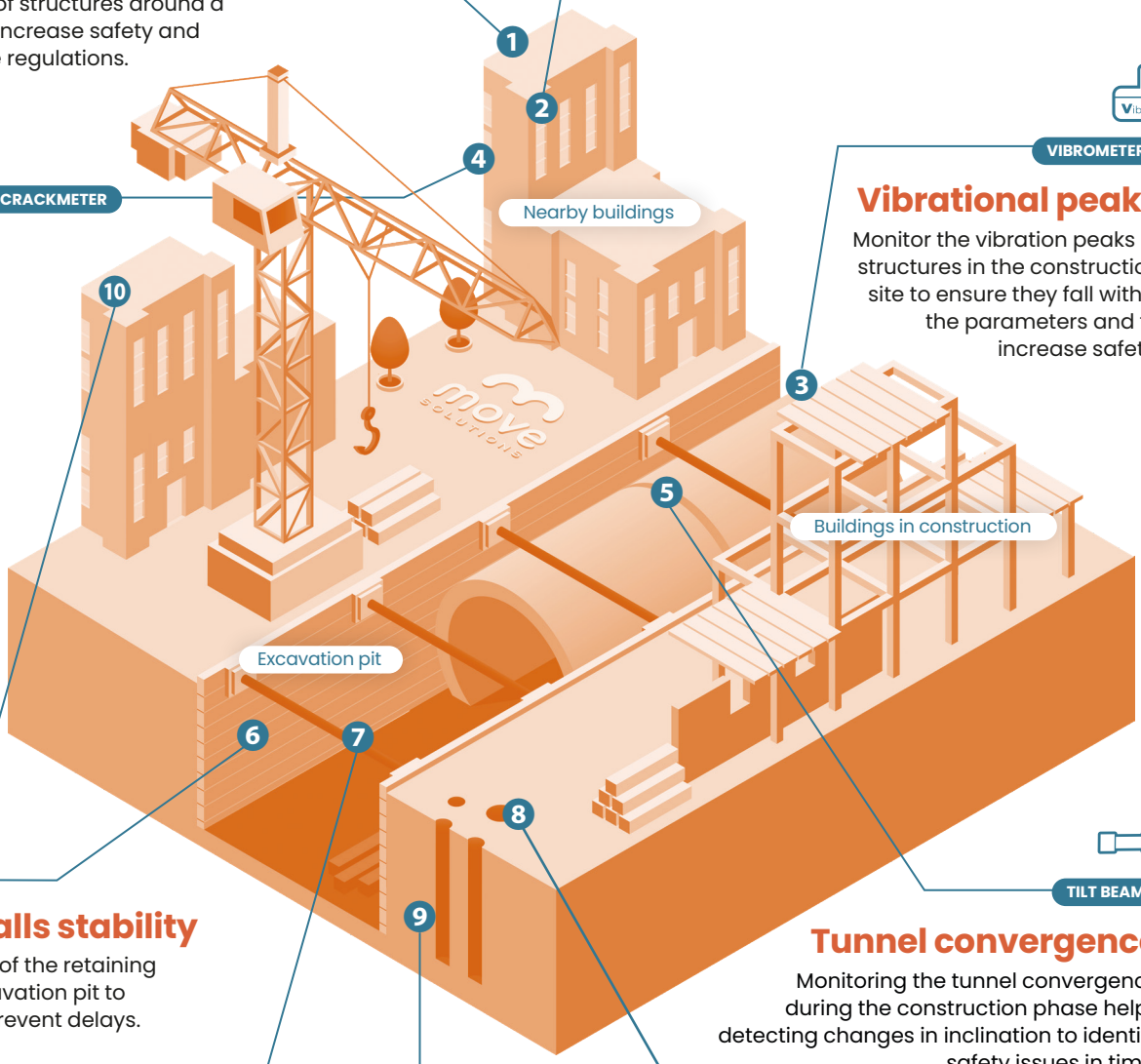
Frequencies and modal shapes

Carry out the Operational Modal Analysis (OMA) of the building by synchronizing Accelerometers to identify relevant vibration modes and their evolution over time.

VIBROMETER

Vibration analysis

Measure vibrations of structures around a construction site to increase safety and to comply with state regulations.



SINGLE CHANNEL NODE + CRACKMETER

Crack Monitoring

Measure the expansion and contraction of the fissure pattern and cracks that may occur as a result of strong vibrations.

VIBROMETER

Vibrational peaks

Monitor the vibration peaks of structures in the construction site to ensure they fall within the parameters and to increase safety.

GATEWAY

TILTMETER

Retaining walls stability

Monitor the stability of the retaining walls inside the excavation pit to ensure safety and prevent delays.

TILT BEAM

Tunnel convergence

Monitoring the tunnel convergence during the construction phase helps detecting changes in inclination to identify safety issues in time.

SINGLE CHANNEL NODE + STRAIN GAUGES

Steel struts deformations

Monitor the deformation of the steel reinforcement of the building under construction and the deformation of the underlying concrete floor.

SINGLE CHANNEL NODE + PIEZOMETER

Water Pressure and level

Monitor the interstitial water pressure and changes in groundwater level to optimize construction efficiency.

SINGLE CHANNEL NODE + INCLINOMETER TUBE

Rock and ground stability

Monitor the stability of the rock wall and surrounding ground at the excavation site, measuring slope to identify landslides, rockfall or settlements.

Wireless sensors for construction site monitoring

• Pre-construction • Temporary works • Excavation and foundations • Structural Health Monitoring

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ACCELEROMETER

It measures acceleration (*mg*) and frequency (*Hz*) on three axes, and it can be synchronised to other **Accelerometers** for **Modal analysis**.

1 3

VIBROMETER

It measures triaxial vibration parameters, providing a complete analysis of the speed (*mm/s* or *inch/s*), frequency and amplitude of the vibrations to **comply with regulations**.

6

TILTMETER

It measures triaxial tilt changes, with a resolution of 0.000015° (0.00027 *mm/m*) and the option to be synchronized to other **Tiltmeters**.

4 7 8 9

SINGLE CHANNEL NODE

It makes **geotechnical and environmental probes** suited for wireless communication, sending alarms when a certain **activation threshold** is exceeded.

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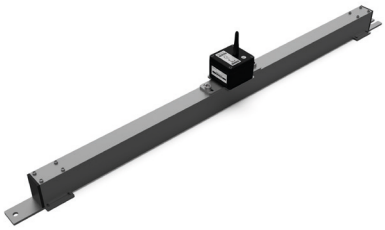
GATEWAY

It acts as an intermediary, using **LoRaWAN** communication to collect data measured by the sensors and transmitting them to the **Cloud Platform** where they can be processed and analyzed.



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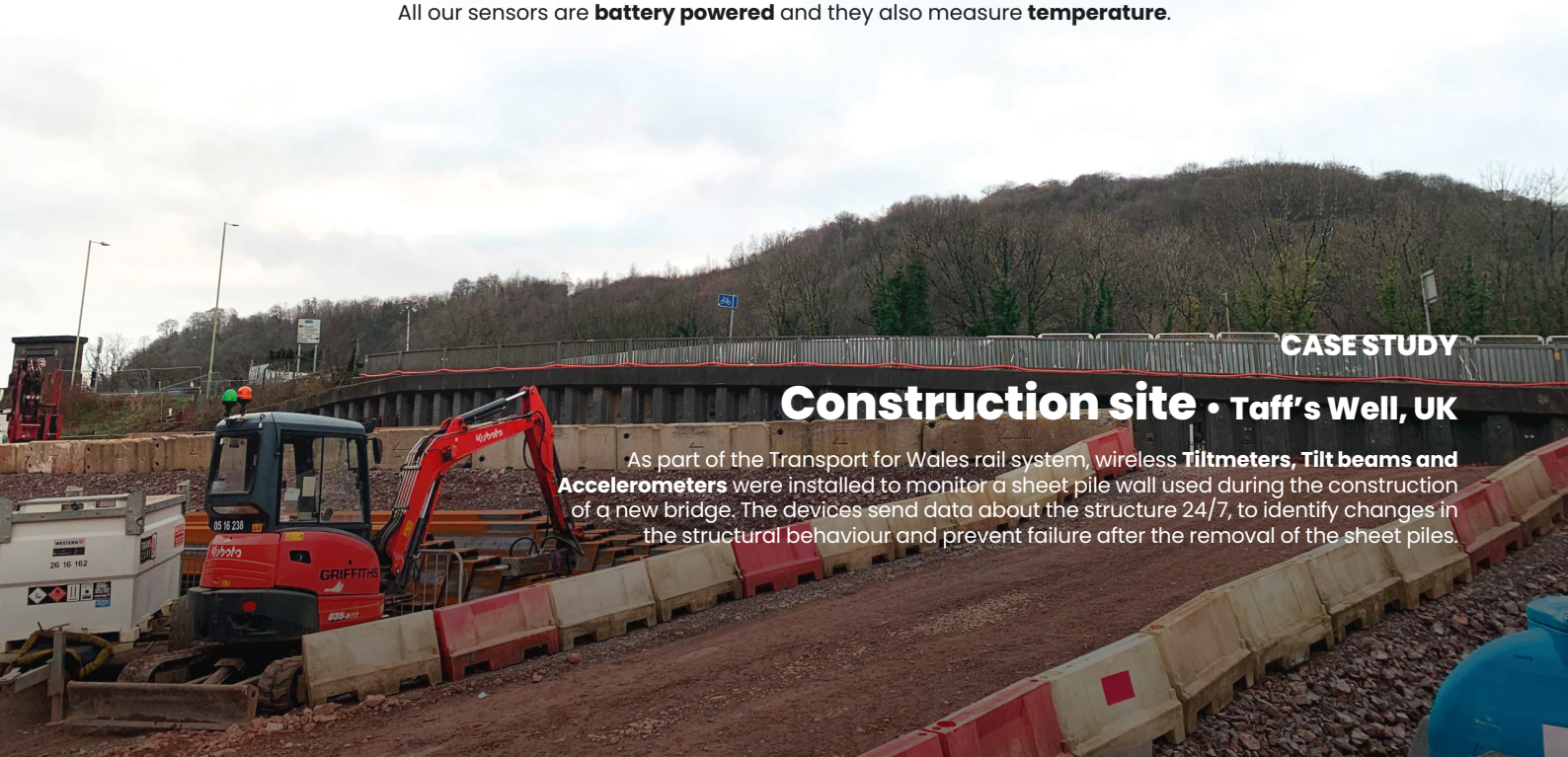
TILT BEAM

It consists of a series of wireless and battery-powered **Tiltmeters** attached to a bar, which is then affixed to the structure to measure the degree of slope or tilt over a large area.

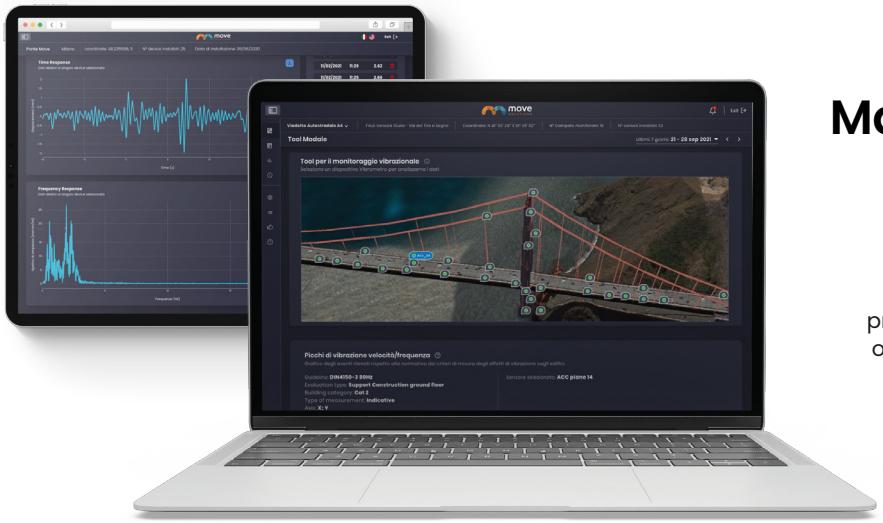
All our sensors are **battery powered** and they also measure **temperature**.



CASE STUDY

Construction site • Taff's Well, UK

As part of the Transport for Wales rail system, wireless **Tiltmeters, Tilt beams and Accelerometers** were installed to monitor a sheet pile wall used during the construction of a new bridge. The devices send data about the structure 24/7, to identify changes in the structural behaviour and prevent failure after the removal of the sheet piles.



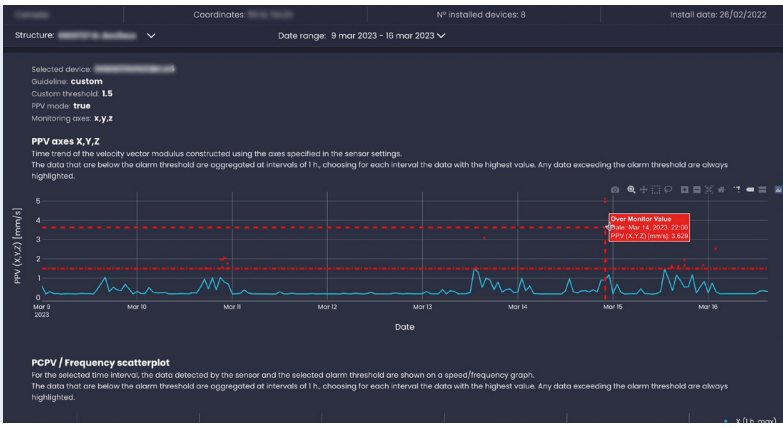
IoT data management

Make decisions based on clear information

The **Move Solutions IoT Platform** offers a single workspace to monitor and manage infrastructure project data. Automate the processing and diagnosis of data by receiving accurate and timely information about the health of a structure.

PPV - Peak Particle Velocity

The **PPV (Peak Particle Velocity)** is a measure of the maximum three-dimensional vibration velocity detected by the **vibrometer** sensor. The PPV is measured in millimeters per second (*mm/s*) and provides information about the magnitude of vibrations detected on the structure. It is computed as the modulus of the vector sum of x, y and z components.



PCPV - Frequency scatterplot

The **PCPV (Peak Component Particle Velocity) / Frequency scatterplot** is a graphical representation of data collected by the three axes of the sensor during a selected time interval. Each amplitude-frequency pair is compared to the alarm threshold selected by the user to establish whether an alarm is triggered or not.

Single Channel Node - Geotechnical and Environmental parameters

The graph shows the trend over time of data collected by any geotechnical probe connected to a communication node. The data collected by these probes typically include information about water pressure, temperature, soil deformation, and other factors affecting the stability of structures, foundations, and soil.

Learn more about all the tools of the **Move Solutions IoT Platform**
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move SOLUTIONS

Smart Structural Health Monitoring
A comprehensive solution

Our Smart Structural Health Monitoring (SHM) system offers a complete solution that helps detect potential issues before they become critical, ensuring the safety and longevity of structures.

Wireless system

Avoid expensive and complex installations thanks to battery-powered, LoRaWAN-based and long-lasting devices.

Remote monitoring

View all sensor-collected data on our IoT Platform, accessible from any computer at any time.

Threshold setting

Configure sensors according to your needs to receive automated alerts of threshold breaches.

Static SHM

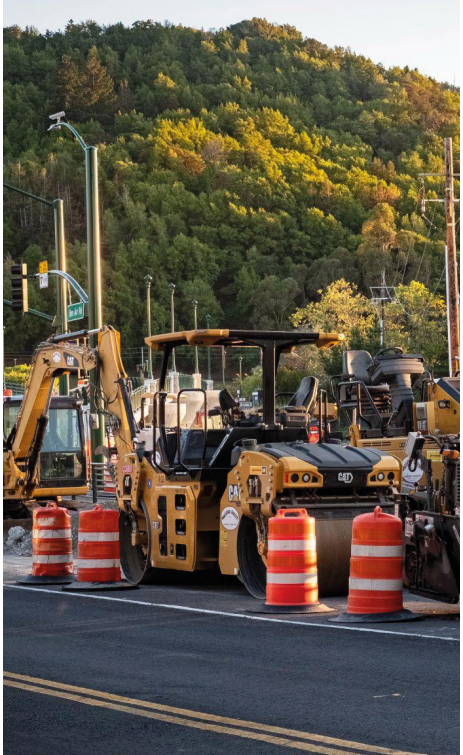
Static structural health monitoring measures slow-varying parameters over a long period of time, such as inclination, rotation, static displacement, and crack monitoring. This type of analysis is appropriate for structures that are subject to gradual load changes.

Dynamic SHM

Dynamic structural health monitoring is used to handle dynamic loading, such as frequencies, dynamic displacement, modal forms, vibrations and accelerations. This type of analysis is suitable for structures subject to fast impacts involving frequencies and vibrations.

Geotechnical & Environmental

The focus of geotechnical monitoring is on ground movement, settlement, slope stability, subsidence and any changes that may affect the stability of a structure. Environmental monitoring looks at factors like air quality, water level, soil contamination, wind speed and anything that can have an impact on the structure degradation.



SMART CONTSTRUCTION SITE MONITORING

✓ Enhance safety ✓ Increase productivity ✓ Improve quality

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