ACKCIO

Remote Monitoring Solutions for Railways

Rails are key in contributing to economic, social, and environmental benefits. Understanding the structural health of a rail site is critical for conducting proper maintenance, repairs, and rebuilds. Ackcio Beam fully automates this process and provides real-time data on key parameters such as load, stress, tilt, displacement, etc. Here's how that works.

01 MONITORING TOTAL PRESSURE

Ackcio **BEAM-AN-S1** (1 channel) Nodes automate the monitoring of a pressure cell which measures total earth pressure under the road.

02 ACKCIO MESH

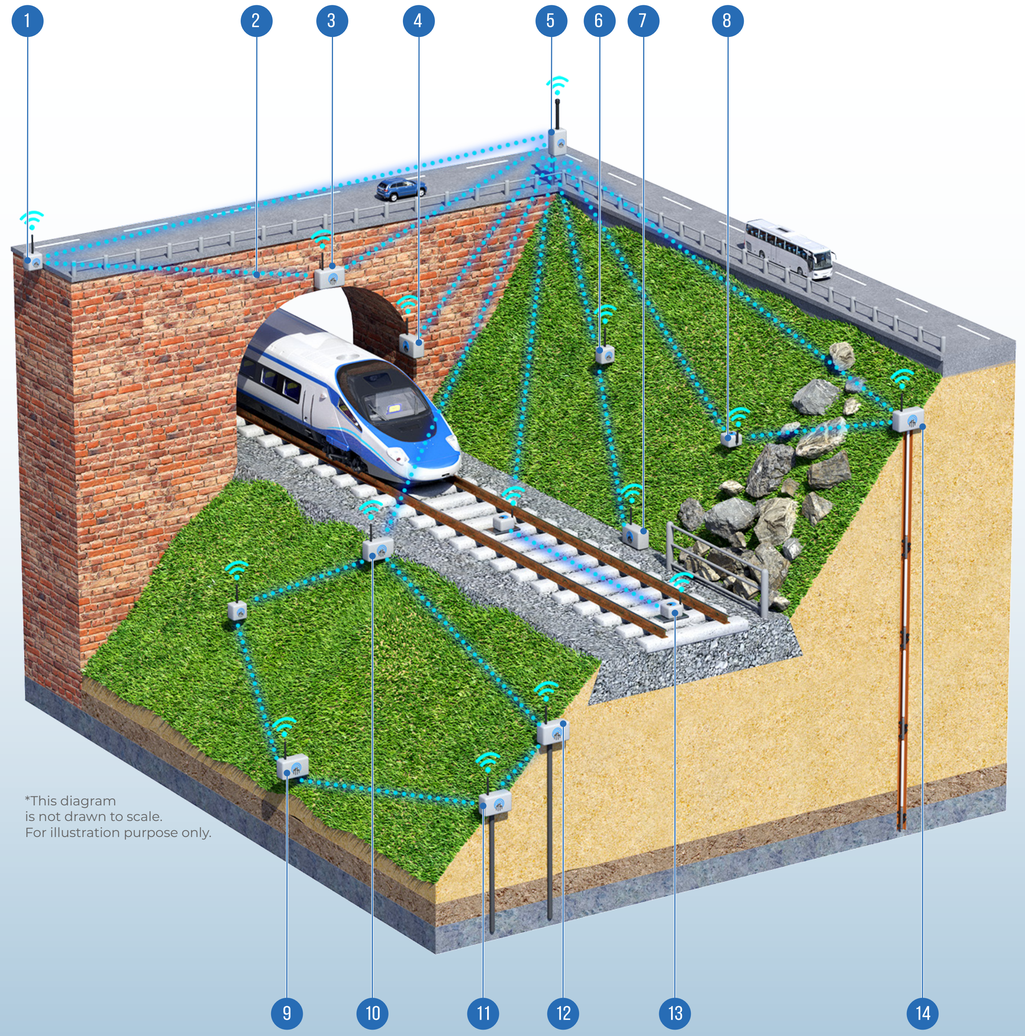
Ackcio's patented long-range wireless **MESH** network connects the Ackcio Nodes to the Ackcio Gateway. The mesh network is self-healing, enhancing the transmission reliability. The ability to 'hop' significantly increases the reliability in complex environments and offers the ability to increase aggregate range if required. The system is highly flexible and scaleable.

03 BRIDGE ARCH DISPLACEMENT MONITORING

Ackcio **BEAM-AN-S4** (4 channels) Nodes automate the monitoring of a multi-point in-line extensometer that measures vertical and horizontal deformation at the bridge arch.

04 MONITORING STRESS CHANGES

Ackcio **BEAM-VW-S8** (8 channels) Nodes automate the monitoring of a vibrating wire stressmeter in the bridge arch.



*This diagram
is not drawn to scale.
For illustration purpose only.

05 ACKCIO GATEWAY

The Ackcio **BEAM-GW** receives sensor data from the Nodes within the network. Ackcio's Snape software that runs on the Ackcio Gateway is used to configure and manage the project. It also provides the option to push the data via FTP/API to a selected server and/or software of your choice.

06 ACKCIO NODES

Each battery-operated Node acquires data from multiple sensors and transmits the sensor data wirelessly through the Ackcio Mesh network to the Ackcio Gateway.

07 DETECTING ROCK FALLOFF

Ackcio **BEAM-VW-S8** (8 channels) Nodes monitors rock falloff from the slope through connected to a rock fall detection system activited by vibration signal.

08 SLOPE STABILITY MONITORING

Ackcio **BEAM-TM** Nodes can be used to monitor the slope stability on and around the railway.

09 SLOPE HEALTH MONITORING - DISPLACEMENT

Ackcio **BEAM-AN-S1** (1 channel) and **BEAM-AN-S4** (4 channels) Nodes ensure real-time monitoring of displacement sensors to ensure the safety of the slope.

10 SUBSOIL SETTLEMENT DISPLACEMENT MONITORING

In-depth lateral displacements of the subsoil due to instability and/or presense of discontinuities can be monitored using a string of in-place inclinometers connected to Ackcio **BEAM-DG** Nodes.

11 GROUND SETTLEMENT MONITORING

Ackcio **BEAM-AN-S4** (4 channels) Nodes automate the monitoring of a multi-point borehole extensometer (MPBX) that measures vertical deformation at various depths.

12 MONITORING PORE WATER PRESSURE

Piezometers measuring the underground pore water pressure are monitored in real-time using Ackcio **BEAM-VW-S1** (1 channel) and **BEAM-VW-S8** (8 channels) Nodes.

13 TRACK MONITORING

Ackcio wireless tiltmeter **BEAM-TM** Nodes measure track conditions including rail cant, twist and height variation.

14 SETTLEMENT DISPLACEMENT MONITORING

Settlement/lateral displacement of the slope is monitored by leading brands of digital in-place-inclinometers (IPI's)/MPBX/extensometers/SAAs in real-time using Ackcio **BEAM-DG** Nodes.