

Remote Monitoring Solutions for Bridge

Bridges are key in contributing to economic, social, and environmental benefits. Monitoring the structural health of a bridge 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, crack, nearby slopes movements and other geotechnical parameters in the influence zone. Here's how that works.

01 CABLE TENSION MONITORING

Load cells measuring the tension force on stay cables are connected to Ackcio **BEAM-VW** Nodes for real-time monitoring.

02 ACKCIO GATEWAY

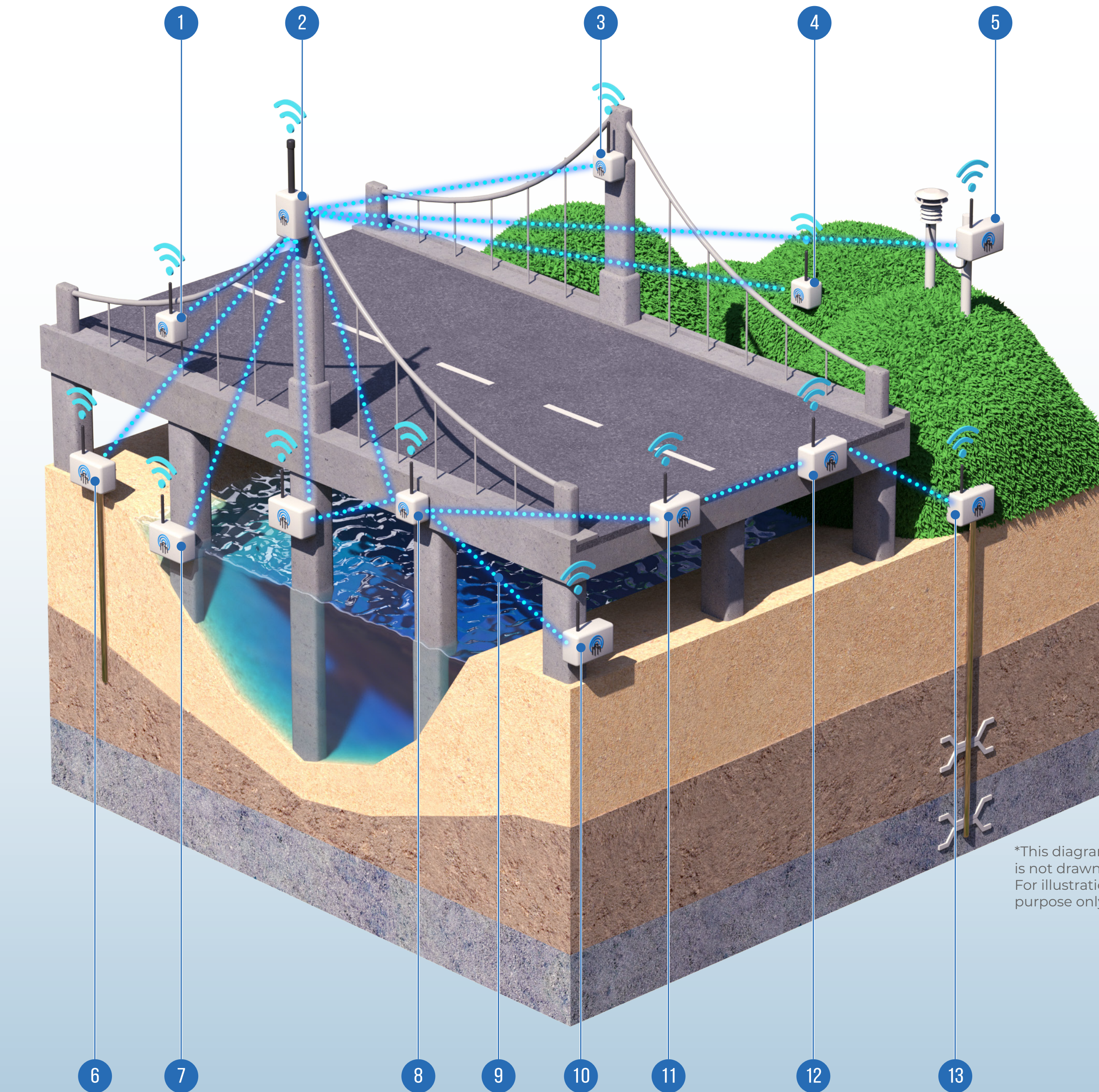
The Ackcio **BEAM-GW** receives sensor data from the Nodes within the network. Ackcio's Snape software that runs on the Ackcio Gateway is used to configure and manage the project. It also provides the option to push the data via FTP and/or API server hosting a software (selected) of client's choice.

03 TILT MONITORING

Ackcio **BEAM-TM** Nodes bundle Ackcio's long-range wireless mesh technology with Sisgeo's trusted bi-axial self-compensated MEMS inclinometer, measuring the horizontal and vertical movement of the bridge.

04 SLOPE STABILITY MONITORING

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



05 WEATHER STATION MONITORING

Ackcio **BEAM-DG** node connects to a weather station to monitor temperature, atmospheric pressure, humidity, wind speed, wind direction, and precipitation amounts.

06 PORE WATER PRESSURE MONITORING

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.

07 WATER LEVEL MONITORING

Ackcio **BEAM-DG** Nodes bundle Ackcio's long-range wireless mesh technology with leading brands of water level meters, monitoring the water level under the bridge.

08 REPEATER NODES

If deployment challenges reduce the range of Ackcio Nodes, Ackcio **BEAM-RN** Nodes assist in extending the wireless range of other Ackcio Nodes within the network.

09 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' up to 12 times significantly increases the reliability in complex environments and offers the ability to increase aggregate range if required. The system is highly flexible and scalable.

10 DISPLACEMENT AND CRACKS MONITORING

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

11 BRIDGE STRESS MONITORING

Ackcio **BEAM-VW-S1** (1 channel) and **BEAM-VW-S8** (8 channels) Nodes monitor strain gauges and load cells embedded in the bridge, to monitor their tension and bending resistance in real time.

12 TEMPERATURE MONITORING

Ackcio **BEAM-DG** nodes connect to thermometers monitoring temperature variation within the bridge, detecting potential cracks in real-time.

13 SETTLEMENT DISPLACEMENT MONITORING

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