

Remote Monitoring Solutions for Construction Sites

Construction sites are dynamic environments with complex requirements for monitoring to ensure safety, stability, and efficiency. 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 SETTLEMENT DISPLACEMENT MONITORING

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

02 REPEATER NODES

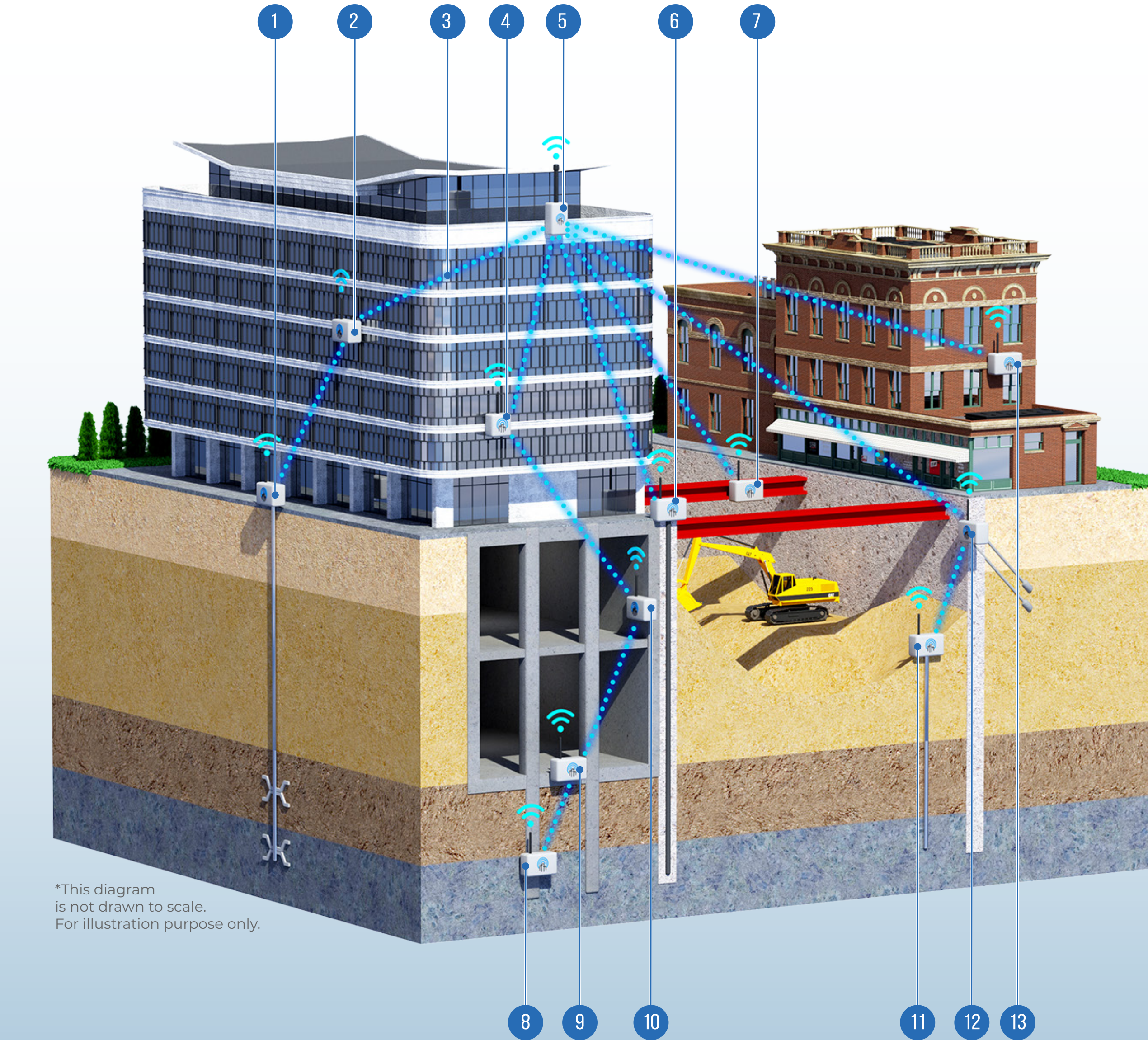
If deployment challenges reduce the range of Ackcio Nodes, Ackcio **BEAM-RN** Nodes assist in extending the wireless range of other Ackcio Nodes within the network.

03 ACKCIO MESH

Akcio'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.

04 TILT MONITORING

Akcio **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 surrounding buildings.



*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 and/or API server hosting a software (selected) of client's choice.

06 DIAPHRAGM WALL DISPLACEMENT MONITORING

In-depth lateral and vertical displacements of the diaphragm wall can be monitored using a string of in-place inclinometers connected to Ackcio **BEAM-DG** Nodes.

07 STRUTS MONITORING

Akcio **BEAM-VW-S1** (1 channel) and **BEAM-VW-S8** (8 channels) Nodes are used to connect to strain gauges to measure strain and stresses in the struts supporting the excavation site.

08 ACKCIO NODES

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

09 MONITORING TOTAL PRESSURE

Akcio **BEAM-AN-S1** (1 channel) Nodes automate the monitoring of a pressure cell which measures total earth pressure under the basement of the surrounding building.

10 SETTLEMENT MONITORING

Akcio **BEAM-AN-S4** (4 channels) Nodes are used to connect to liquid settlement array to measure settlement and heave or building response to excavation.

11 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.

12 GROUND ANCHOR MONITORING

Akcio **BEAM-VW-S1** (1 channel) and **BEAM-VW-S8** (8 channels) Nodes monitor strain gauges and load cells inserted in the soil nails/ground anchors, to monitor their tension and bending resistance in real time.

13 INTEGRITY OF SURROUNDING BUILDINGS

On nearby buildings, 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 surrounding infrastructure.