

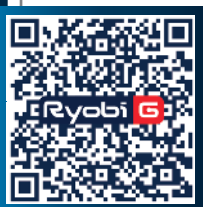
IOT MONITORING SYSTEM

Smarter Monitoring for Safer Infrastructure



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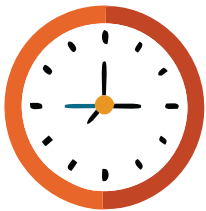
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REVOLUTIONIZING MONITORING WITH IOT

At Ryobi-G, we believe that smart infrastructure requires smart monitoring. Our IoT-enabled geotechnical monitoring system is designed to help engineers, contractors, and asset owners gain real-time visibility into ground and structural behavior — from surface movement and tunnel deformation to water pressure and slope stability.

CHALLENGES WE SOLVE



TIME-CONSUMING MANUAL MONITORING

Frequent site visits, manual downloads, and disconnected tools slow down response and increase labor cost.



DELAYED DETECTION OF GROUND MOVEMENT

Without real-time data, early signs of instability can go unnoticed — increasing safety risks and project delays.



SCATTERED DATA ACROSS MULTIPLE PLATFORMS

Traditional setups involve different systems for different sensors, making it difficult to view, manage, and act on data efficiently.



From traditional challenges to modern solutions — we make geotechnical monitoring easier, safer, and smarter.



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OUR IOT MONITORING FLOW

The Ryobi-G IoT Monitoring System connects field data to decision-makers through a fully integrated workflow. From sensor to cloud, every step is optimized for accuracy, automation, and remote accessibility.

START

SENSOR INSTALLATION

We start by installing various sensors on-site, such as total stations, inclinometers, vibrating wire (VW) sensors, depending on the monitoring requirements.



DATA LOGGING

These sensors are then connected to specialized data loggers which collect readings at set measurement intervals.



DATA PROCESSING & HOSTING

The incoming data is sent to a central Database Server for hosting, processing, and analysis. To maintain data integrity and prevent loss, all information is automatically backed up to a Secondary Server.

DATA TRANSMISSION

Once the data is collected, it is transmitted wirelessly using 3G, 4G, or 5G communication methods to ensure real-time or near real-time data transfer.



FINISH

DATA DISTRIBUTION & OUTPUT

The processed data is visualized via the WIRS Data Visual platform, pushed to users through a Data Push Facility, and monitored by a Health Check system to ensure all devices function properly. Users also receive real-time alerts for critical events, while all raw data is securely archived for future analysis.



OUR IOT LOGGERS TECHNOLOGY

At the heart of our IoT system are high-performance data loggers that collect, transmit, and safeguard your site data — automatically. Whether you need to monitor pore pressure, track surface movement, or capture deep inclinometer profiles, our logger options are built to match the job.

IN-HOUSE

ATMS

Automated Total Monitoring Systems

Integrates with automated total stations to monitor surface settlement and structural movement

ATVM

Automated Total Vibration Monitoring

Captures readings from vibrating wire sensors such as piezometers, strain gauges, and pressure cells.

VWIOT

Vibrating Wire Internet of Things

A compact, battery-powered logger optimized for vibrating wire instruments. Ideal for remote slope monitoring and tunnel applications.

VDIOT

Voltage Displacement IoT

An IoT-enabled logger designed for sensors that output voltage signals ideal for displacement transducers or any voltage-based measurement device.

3RD PARTY

LOADSENSING

LoadSensing (LoRa System)

Long-range, low-power logger suited for large-scale or remote monitoring sites.

ZC SENSOR

ZC sensor (NB-IoT)

Cellular-based logger that uses NB-IoT/4G networks — perfect for urban environments with stable

HUASI ADM

Flexible Inclinometer Logger

Supports flexible inclinometer installations to monitor deformation in deep excavations and tunnel linings.



SUPPORTED SENSOR TYPES

Ryobi-G's IoT monitoring platform effortlessly connects with a wide range of geotechnical and structural sensors — from shallow installations to deep tunnels, covering everything from static loads to real-time movement. Here are some of the key sensors we deploy in our projects.



INCLINOMETER

Detects horizontal ground movement by tracking tilt changes within a casing installed in boreholes. Essential for monitoring slope stability, landslide-prone areas, retaining walls, and deep basement excavations.



EXTENSOMETER

Used to measure displacement or separation between fixed anchor points—either in soil, rock, or structures. This helps assess internal deformation in embankments, tunnels, or foundations.



PIEZOMETER

Measures pore water pressure in soil and rock. This data is critical for understanding slope behavior, evaluating earth pressures, and assessing risk in deep excavations, retaining structures, or embankments.



VW CRACK METER

Monitors crack width variations in concrete, rock, or masonry over time. Ideal for assessing the structural integrity of dams, tunnels, bridges, and historical structures.



TILTMETER

Detects slight angular changes in structures or ground surfaces. Often deployed on retaining walls, slopes, or buildings to give early warning of potential instability or deformation.



PRECISE/DIGITAL LEVEL

Provides high-accuracy elevation readings to monitor settlement or heave of structures and ground surfaces. Often used in real-time systems for buildings, railways, and critical infrastructure.



AUTOMATED TOTAL STATION

An optical surveying instrument that delivers high-precision 3D measurements of point movements over time. Combined with prisms, it enables structural and deformation monitoring for bridges, buildings, and slopes.



PRISM

Mounted on structures or slopes and read by a total station to detect sub-millimeter displacement. Used for continuous or periodic deformation monitoring with high accuracy.



FIBER OPTIC SENSOR

Measure strain, temperature, or vibration using light signals in optical fibers. Ideal for long-distance, real-time monitoring with high accuracy and durability.



REAL TIME DASHBOARD ACCESS

Ryobi-G's cloud-based dashboard gives engineers, consultants, and clients full access to site data — in real-time, from any device, anywhere in the world. No more manual downloads or site visits. Just clear, organized, actionable insights.

Access What Matters—Wherever You Are



REAL-TIME DATA VISUALIZATION



View live sensor data in intuitive graphs, charts, and site maps for instant situational awareness.

SMART ALERTS & NOTIFICATIONS



Get notified via SMS or email when thresholds are exceeded or anomalies are detected.

HISTORICAL DATA TRENDS



Access past data to identify trends, analyze performance, and support engineering decisions.

MULTI-SENSOR INTEGRATION



Monitor multiple sensor types on a single platform — from piezometers to total stations.

USER-FRIENDLY INTERFACE



Designed for engineers and non-engineers alike, with easy navigation and quick access to key metrics.



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CASE STUDIES

IOT IN ACTION

From deep tunnels to airport taxiways, Ryobi-G's IoT monitoring solutions have been deployed across some of Singapore's most complex and sensitive infrastructure works. These case studies showcase how real-time data, automated alerts, and advanced sensor integration help clients achieve safer, smarter, and more efficient project outcomes.

TUNNEL STRUCTURAL HEALTH MONITORING

FIBER OPTIC MONITORING FOR DTSS PHASE 2 (TIMS CONTRACT)

PUB's DTSS Phase 2 is a key national infrastructure project designed to enable long-term, sustainable water management.

As part of this initiative, Ryobi-G was entrusted with the Tunnel Integrity Monitoring System (TIMS) – leveraging cutting-edge fiber optic technology to deliver continuous, real-time tunnel health monitoring.



MONITORING SCOPE & TECHNOLOGIES



COVERAGE

~36 km of deep tunnels



INSTALLATION

~150 km of fiber optic sensors laid longitudinally and transversely



TECHNOLOGY

BOFDA (Brillouin Optical Frequency Domain Analysis)



CAPABILITIES

Simultaneous strain and temperature sensing



INTEGRATION

Linked to PUB's AMANDA system for live alerts and data visualization

KEY CHALLENGES & SOLUTIONS



NON INTRUSIVE

Enabled non-intrusive tunnel monitoring with no need for physical entry



CONTINUOUS MONITORING

Enables continuous monitoring, especially during nearby construction or seismic activity



AUTOMATED DATA FEEDS

Supports proactive asset management through automated data feeds

EARLY DETECTION

OPERATIONAL EFFICIENCY

SAFETY & COMPLIANCE



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CASE STUDIES

IOT IN ACTION

URBAN GEOTECHNICAL & STRUCTURAL MONITORING

CROSS ISLAND LINE (CRL) – URBAN TUNNEL MONITORING

The Cross Island Line (CRL) is Singapore's longest underground MRT line, built through high-density urban areas and sensitive infrastructure.

Ryobi-G was selected to provide real-time geotechnical monitoring across several construction packages, helping ensure safe tunneling near live MRT tunnels, roads, and heritage sites.

MONITORING SCOPE & TECHNOLOGIES



INSTRUMENTS

Over 1000+ instruments installed



ZONES COVERED

MRT tunnels, TBM launch zones, buildings, roads, utilities



TECHNOLOGY

- Automated Total Stations (ATS)
- Wireless Tiltmeters and Vibration Meters
- Real-Time Piezometers, Standpipes, Rod Extensometers
- IoT Gateway & Cloud Dashboard



>99% SYSTEM UPTIME

INCIDENTS AVOIDED

EFFICIENCY GAINS

REGULATORY ASSURANCE

QUICK DECISION-MAKING

KEY CHALLENGES & SOLUTIONS



CONTINUOUS MONITORING

Enabled continuous monitoring under live MRT tunnels with zero disruption



HIGH-DENSITY DEPLOYMENT

Managed high sensor density in confined urban spaces



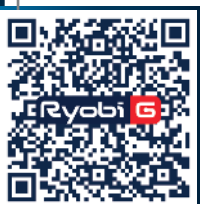
CENTRALIZED DATA INTEGRATION

Integrated data across multiple contracts for unified client visualization



REAL-TIME ALERTS

Real-time alerts for threshold breaches with automated escalation



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CASE STUDIES

IOT IN ACTION

AVIATION INFRASTRUCTURE MONITORING

CHANGI AIRPORT T5-T2 UNDERGROUND LINK MONITORING

To support future growth, CAG is constructing a 2.5 km underground link between Terminal 5 and Terminal 2. The corridor runs beneath active runways and taxiways, requiring a non-intrusive, real-time geotechnical monitoring solution.

Ryobi-G was engaged to deliver continuous oversight while maintaining full airport operational integrity.



MONITORING SCOPE & TECHNOLOGIES



SURFACE MONITORING

Reflectorless ATS for scanning runways, taxiways, and nearby structures



SUBSURFACE MONITORING

Rod Extensometers and Vibrating Wire Piezometers



DATA SYSTEM

- Wireless dataloggers with 4G transmission
- WIRS (Web Instrumentation Reporting System) with real-time dashboards, GIS maps, user roles, and auto-alerts

KEY CHALLENGES & SOLUTIONS



NON-INTRUSIVE DEPLOYMENT

Installed sensitive instruments in live aviation zones with no operational impact



PRECISION OVER LONG DISTANCES

Delivered accurate monitoring across a 2.5 km tunnel alignment



MULTI-STAKEHOLDER ACCESS

Provided real-time, role-based access to multiple stakeholders



REGULATORY COMPLIANCE

Ensured compliance with strict aviation safety standards

ZERO DISRUPTIONS

FAST RESPONSE

IMPROVED EFFICIENCY

COLLABORATIVE ACCESS

REGULATORY COMPLIANCE



INDUSTRIES WE SERVE

Our IoT monitoring platform supports a wide range of geotechnical and structural applications — from deep underground to densely populated urban zones.



TUNNELING & SHAFT MONITORING

Track strain, displacement, and deformation in deep tunnels and shafts throughout excavation and operation phases.



RAILWAY & MRT INFRASTRUCTURE

Ensure safe construction and operations near live rail systems through real-time monitoring of adjacent tunnels, stations, and utilities.



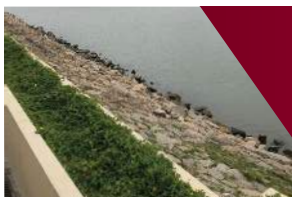
AIRPORTS & AVIATION ZONES

Deploy non-intrusive systems under runways and taxiways for underground works without disrupting airport operations.



URBAN DEVELOPMENT & STRUCTURAL

Safeguard surrounding structures, roads, and utilities in high-density areas during deep excavation or foundation works.



SLOPE & EMBANKMENT STABILITY

Detect early signs of ground movement or landslides in slope-prone areas with tilt and settlement monitoring.

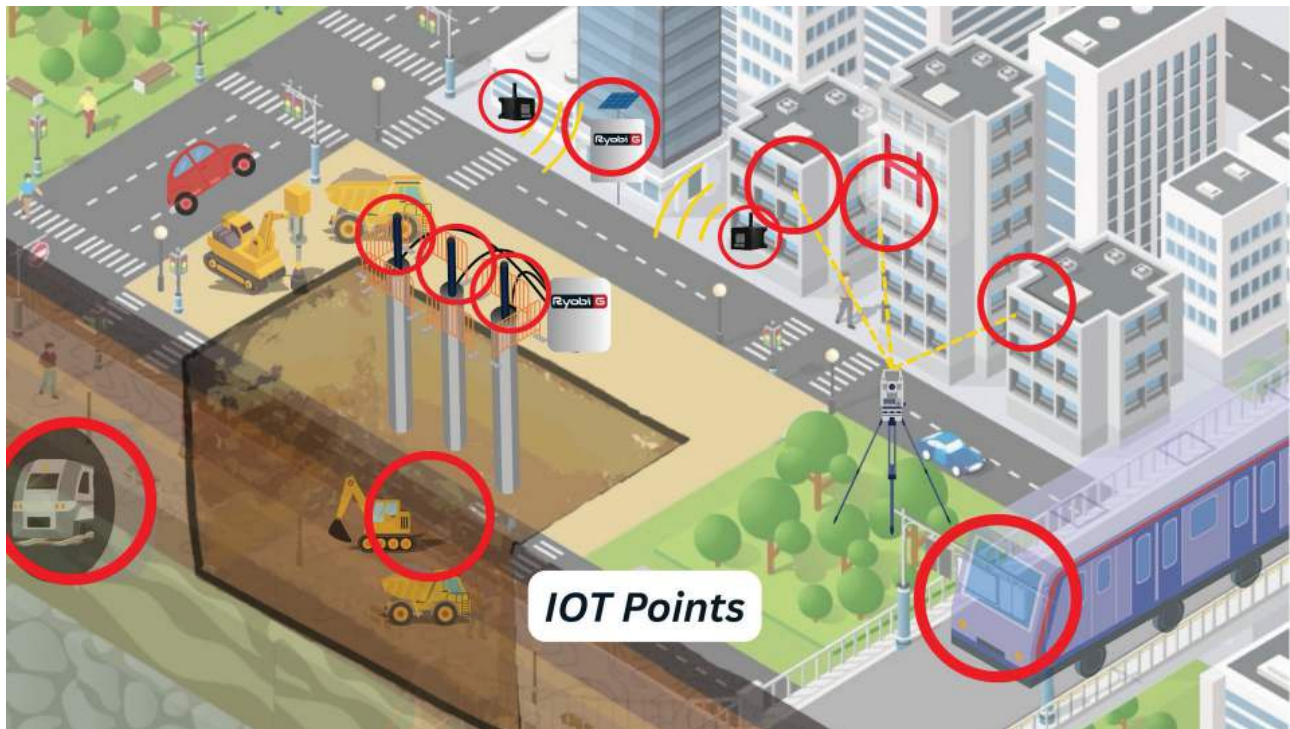


CAN'T FIND YOUR INDUSTRY?
TALK TO US!



INDUSTRIES WE SERVE

URBAN CONSTRUCTION MONITORING WITH IOT INTEGRATION



KEY HIGHLIGHTS



IoT sensors deployed across construction zones, vehicles, and infrastructure.



Real-time tracking of equipment, materials, and site activity



Integration with urban mobility systems (e.g., roads, rail).



Enhanced situational awareness for safety and project coordination



Scalable for complex, multi-phase urban developments

OVERVIEW

This dynamic urban environment showcases real-time connectivity through strategically placed IoT points—highlighted across machinery, vehicles, buildings, and infrastructure.

From the bustling construction pit to the surrounding streets and rail systems, every element is connected, monitored, and optimized for safety, efficiency, and sustainability.



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INDUSTRIES WE SERVE

PRECISION MONITORING FOR SMARTER CITIES



KEY HIGHLIGHTS



Wireless sensor network for structural and spatial data



Real-time distance and angle measurement



Integration with Ryobi G system for centralized data collection



High-precision monitoring for urban development



Scalable for large infrastructure and city planning projects.

OVERVIEW

This cityscape features an IoT-powered surveying system.

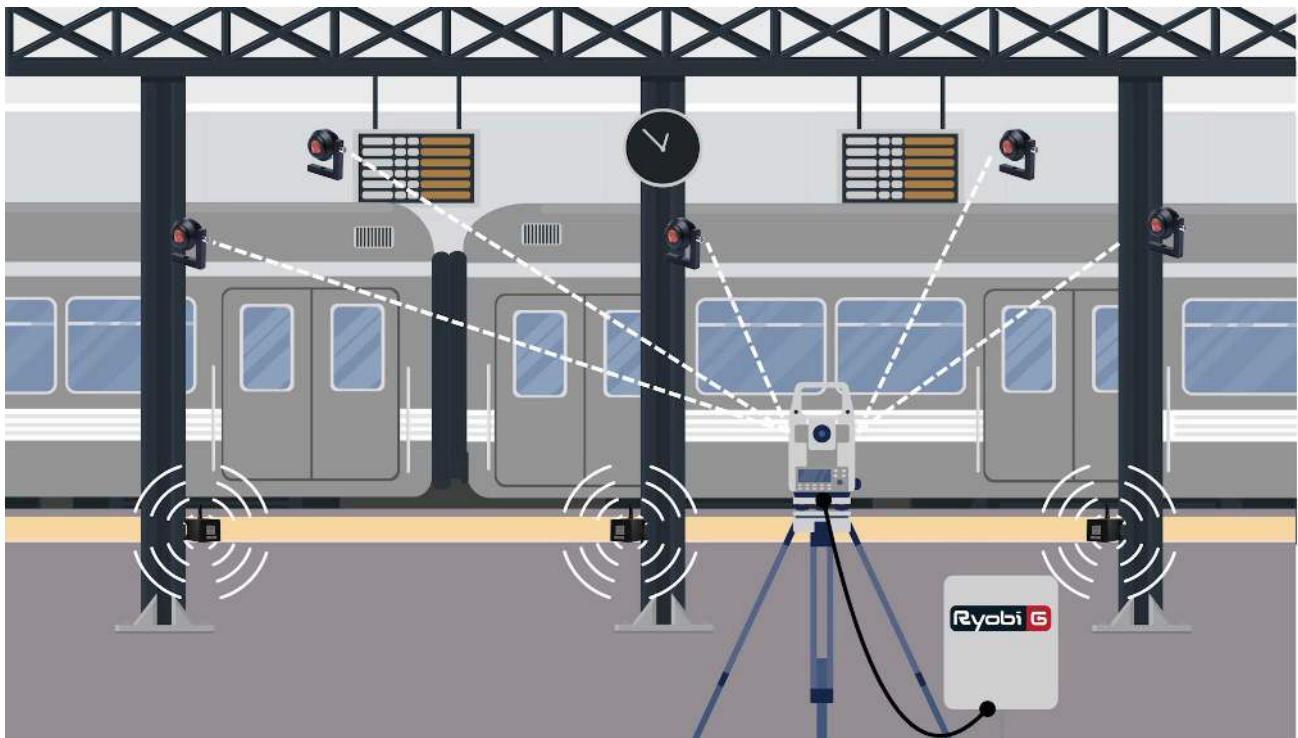
A smart instrument connects wirelessly to multiple sensors on buildings and the ground—including the Ryobi G device—capturing precise measurements for structural health, alignment, and urban development.



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INDUSTRIES WE SERVE

IOT MONITORING AT TRANSIT HUBS



KEY HIGHLIGHTS



Real-time monitoring of platform activity and crowd flow



IoT-based scanning for infrastructure and environmental data



Wireless data transmission for centralized analysis



Supports operational efficiency and safety compliance



Scalable for integration across transit networks

OVERVIEW

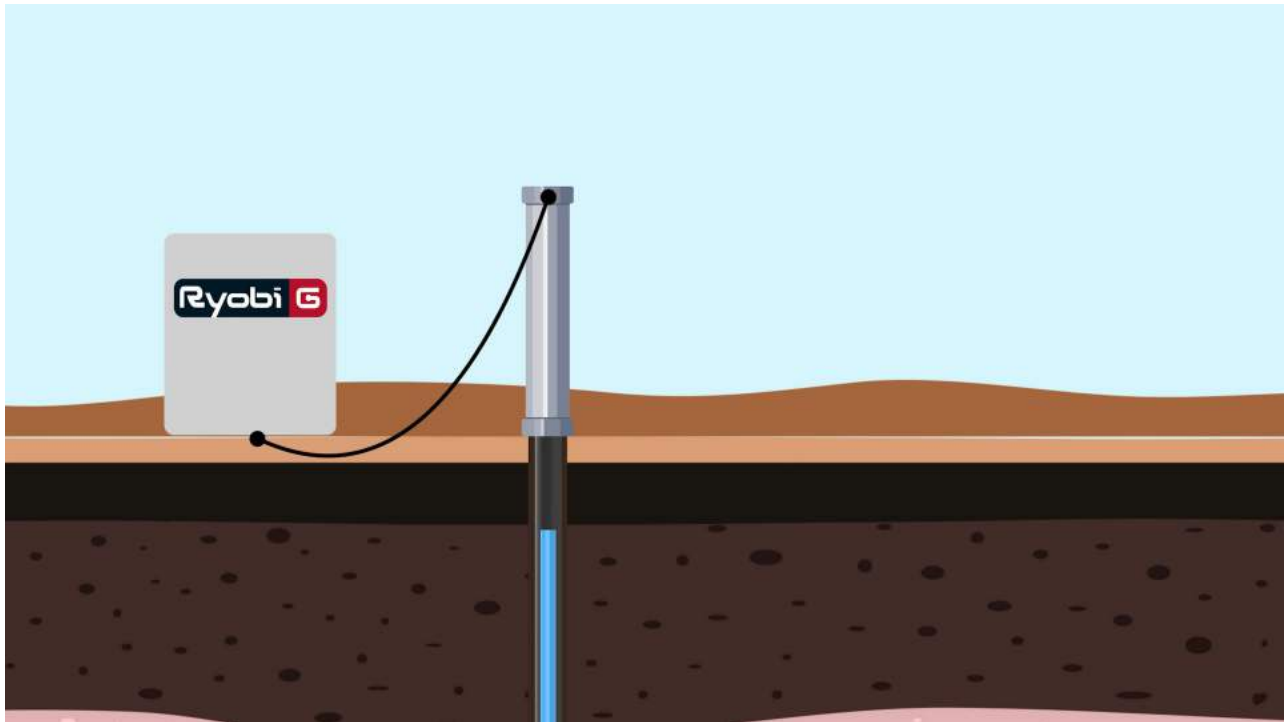
This train station platform features an IoT-enabled monitoring system. A Ryobi G scanning device actively scans the area, connecting to multiple points across the platform. The system enables real-time data collection for crowd flow, platform activity, and infrastructure conditions—supporting safer, more efficient transit operations through intelligent monitoring.



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INDUSTRIES WE SERVE

SUBSURFACE MONITORING WITH IOT SENSORS



KEY HIGHLIGHTS



Underground sensor for fluid or soil condition monitoring



Real-time data transmission to surface-level Ryobi G



Supports geotechnical and environmental applications



Enables predictive maintenance and risk alerts



Compact, cable-connected deployment for remote sites

OVERVIEW

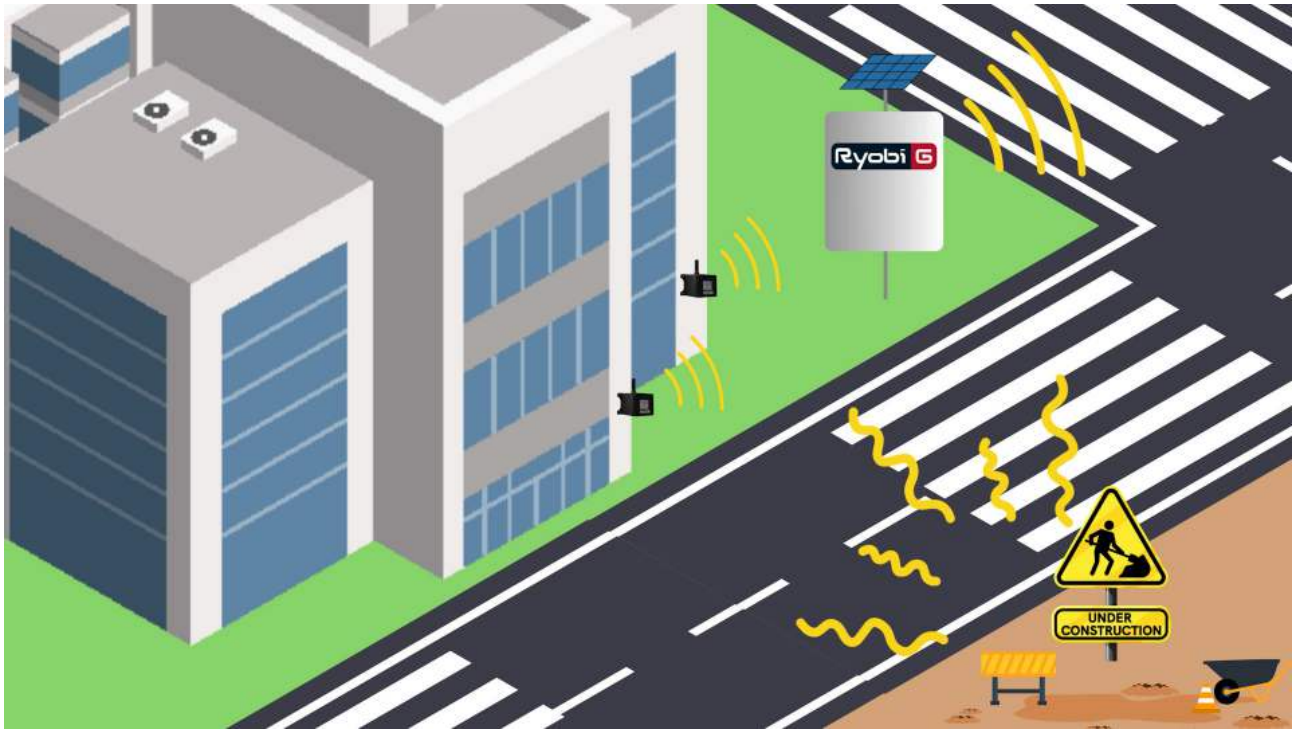
A sensor is embedded below ground, connected to a Ryobi G device at the surface. This setup enables continuous monitoring of subsurface conditions such as fluid levels or soil stability. Data is transmitted in real time, supporting proactive decision-making in construction, environmental, and geotechnical applications.



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INDUSTRIES WE SERVE

CONSTRUCTION ACTIVITY DETECTION IN RESIDENTIAL ZONES



KEY HIGHLIGHTS



Real-time detection of nearby construction activity



Solar-powered Ryobi G for sustainable monitoring



Alerts for noise, vibration, and movement



Integrated building and roadside monitoring



Designed for residential safety and compliance

OVERVIEW

A Ryobi G device, powered by a solar panel, monitors construction activity near residential buildings. The system detects environmental and structural changes—such as noise, vibration, and movement—triggered by nearby worksites. With integrated signal-based detection and real-time alerts, it helps ensure safety, compliance, and minimal disruption to the community.



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WHY CHOSE US

At Ryobi-G, we go beyond providing instruments — we deliver end-to-end monitoring solutions tailored to the unique demands of every project. From deep tunnels to airport runways, our systems are built for precision, reliability, and real-time responsiveness.



20+ YEARS
OF EXPERIENCE



530+ TEAM
MEMBERS



100+
ONGOING
PROJECTS



1050+
COMPLETED
PROJECTS



1000+
CALIBRATED
INSTRUMENTS



PROVEN TRACK RECORD

Trusted by leading public and private agencies, we've delivered reliable monitoring in complex, high-risk environments — with >99% system uptime and zero disruptions.



AUTOMATED, SCALABLE & WIRELESS

Our systems use LoRa, NB-IoT, or 4G to transmit data in real time — no manual downloads needed. Whether it's 5 sensors or 500, our platform scales to match your project, from compact sites to large infrastructure networks.



COMPLETE IOT MONITORING SOLUTION

We go beyond hardware. From sensor deployment to dashboard integration and alert setup, we deliver an end-to-end solution that ensures seamless performance and fewer headaches on-site, to large infrastructure networks.



ACTIONABLE INSIGHTS, INSTANTLY

Our secure cloud dashboard transforms raw data into meaningful visuals, trend reports, and smart alerts — empowering fast, informed decisions that keep projects safe and on track, large infrastructure networks.



The background of the main section is a photograph of a surveyor wearing a yellow hard hat and a blue shirt, operating a total station instrument. The image is overlaid with a dark, semi-transparent gradient.

EMPOWERING SAFER INFRASTRUCTURE THROUGH SMARTER MONITORING

Let's build smarter, safer infrastructure together.
Contact us to discuss how our monitoring solutions can support
your next project!

GET IN TOUCH



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