



Sentinel AI™

AI-Driven Structural Health Monitoring (SHM) SaaS for Construction Engineering

PRODUCT SPECIFICATION

Reduce Risk of Structural Failures with Automated SHM

StructureIQ's AI-driven SHM Service

StructureIQ provides continuous Structural Health Monitoring (SHM) for construction engineering teams seeking real-time insight into structural performance.

Wireless Xnode sensors installed at critical locations measure acceleration, vibration, and tilt, capturing how structures respond to operational loads, environmental forces, and extreme events. Data is transmitted securely to the StructureIQ AI Cloud, where advanced analytics and AI models translate raw telemetry into engineering-relevant metrics such as modal behavior, stiffness changes, and drift trends. The system continuously evaluates performance to detect early signs of fatigue, stress accumulation, settlement, or abnormal response.

Results are delivered through a centralized SaaS dashboard offering real-time condition awareness, automated alerts, and trend analysis — enabling performance verification, condition-based maintenance, rapid post-event assessment, and proactive lifecycle risk management.

Sentinel AI™



Highlights

- **Continuous Structural Performance Monitoring** – Always-on measurement of structural response to verify design assumptions under real-world loads.
- **AI-Enabled Structural Diagnostics** – Move beyond periodic inspections with automated detection of stiffness changes, drift trends, vibration and other metrics.
- **Real-Time Event Notification** – Immediate engineering insight following seismic activity, impact, wind events, or overload conditions.
- **Multi-Project Oversight** – Centralized monitoring across multiple jobsites through a single engineering dashboard.
- **Rapid Post-Event Assessment** – Accelerate safety evaluations and occupancy decisions with objective structural performance data.

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PRODUCT SPECIFICATION: StructureIQ AI powered SHM Service

Sentinel AI - SaaS Architecture

Xnode Wireless Smart Sensors

StructureIQ's wireless smart sensors provide real-time structural health monitoring by precisely measuring vibration and tilt. These ruggedized devices utilize onboard edge AI to filter raw data, identifying critical events. Data is transmitted via low-power protocols to a wireless gateway, eliminating the need for invasive and costly cabling across infrastructure.

Gateway and Cellular data

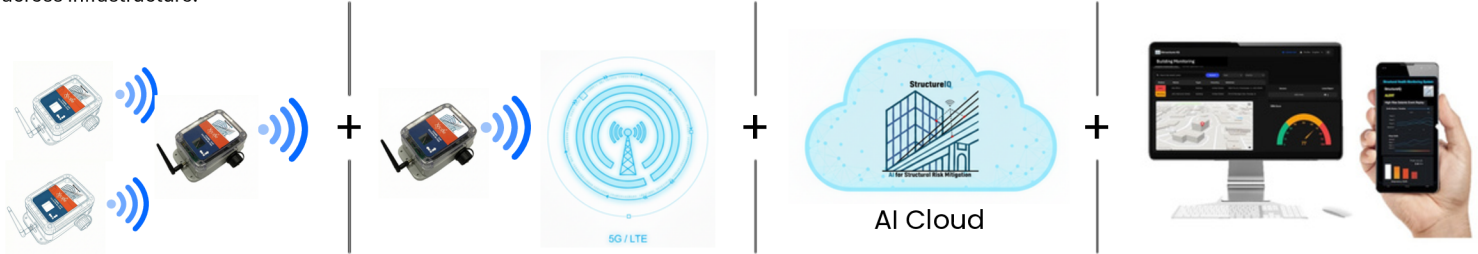
The StructureIQ Gateway acts as a secure bridge, collecting high-precision vibration and tilt data from wireless sensors via low-power protocols. After local verification and edge buffering, the gateway utilizes an encrypted 4G LTE/5G cellular uplink to transmit data through a private APN, ensuring cybersecurity.

AI Cloud & SHM Data Analysis

In the StructureIQ Data Cloud, AI algorithms de-serialize and normalize this time-series data. The engine then performs automated feature extraction to distinguish routine environmental noise from critical structural anomalies.

SHM data SaaS delivery

These insights generate real-time risk profiles and alerts, which are delivered directly to the secure SaaS dashboard for engineering and insurance assessment.



Core Capabilities

- Wireless smart sensor deployment – Rapid installation with minimal disruption
- Automated anomaly detection – Identifies deviations from established baselines
- Post-event structural assessment – Faster safety and occupancy decisions
- Secure cloud-based dashboard – Remote visibility anytime
- Secure SaaS delivery (no client IT infrastructure required)
- Scalable from single building to enterprise portfolio
- Subscription-based SaaS service model

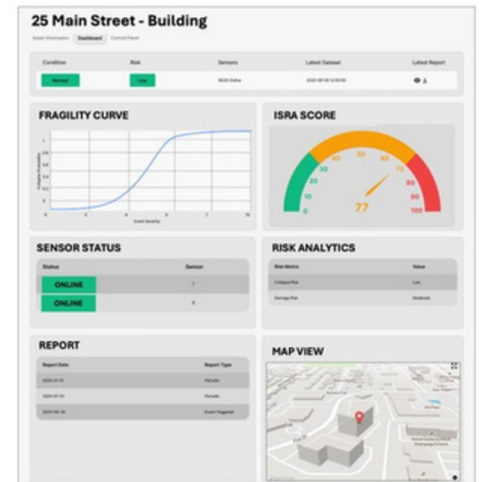
What Gets Monitored

- Vibration (Acceleration), Temperature
- Tilt – Settlement, drift, structural movement
- Impact Detection – Bridge and overpass vehicle strikes
- Cable Tension – Cable-supported structures
- Long-Term Trends – Deterioration and performance shifts

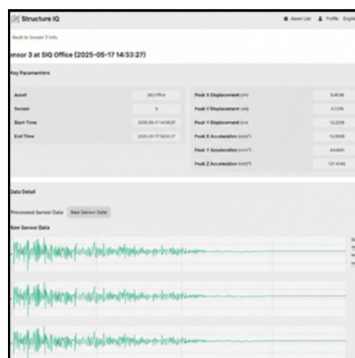
Platform Features

- Real-time alerts (SMS, email, dashboard)
- Automated event reports
- Structural health scoring
- Multi-asset portfolio dashboard

Asset Dashboard



Engineering dashboard



Management overview

