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Adventum Tech Monitoring Systems: Digital Wind

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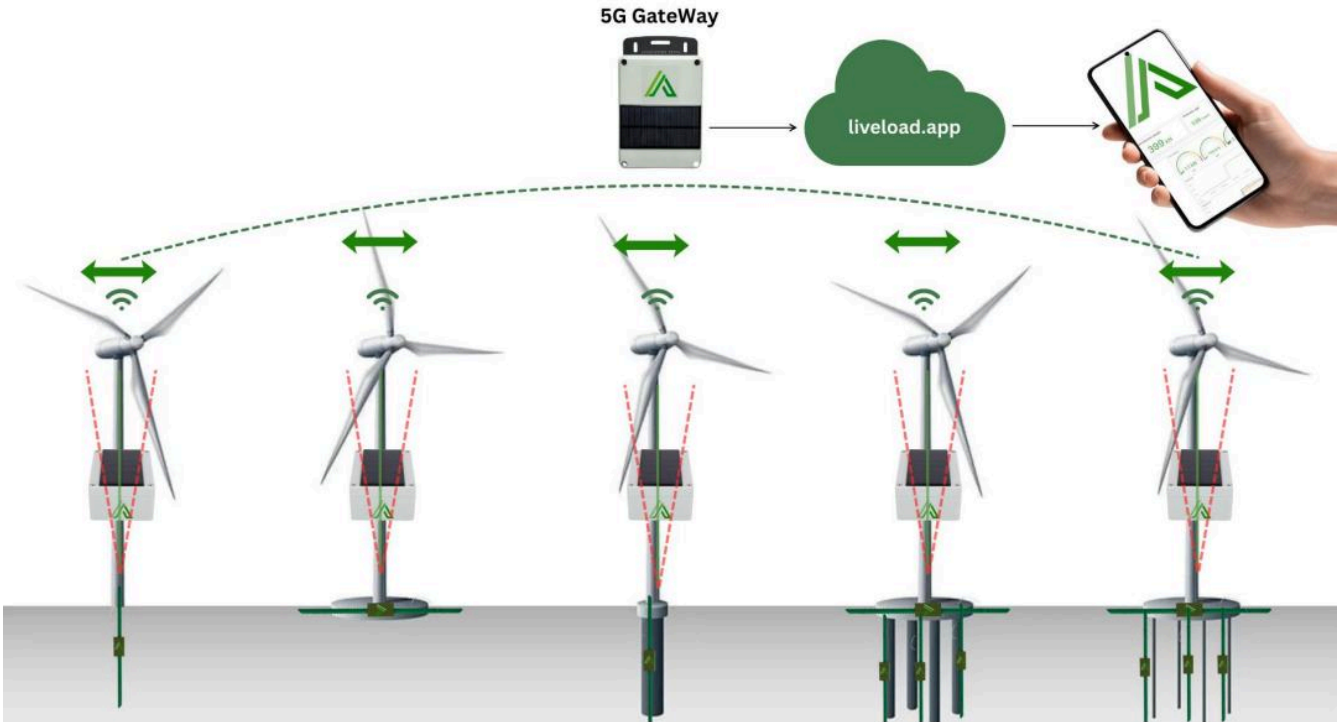
Introduction

Adventum Tech, founded in 2020 in Latvia, provides innovative, fully wireless structural monitoring solutions tailored for onshore wind turbine parks. Our flagship system SlabControl 5.0, supported by GroundControl and QuakeControl sensors, ensures accurate, real-time monitoring of turbine piles, foundations, pile caps, and steel towers.



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Sensor Solutions

SlabControl 5.0 – Load-Bearing Monitoring Sensors for Concrete Structures

SlabControl 5.0 is an advanced wireless real-time monitoring solution for reinforced concrete structures, including pile and foundation slab elements. It is specifically developed for dynamic infrastructure assets such as wind turbine foundations. The sensor measures vertical displacement, tilt, temperature, and load distribution, providing continuous insight into slab-soil interaction and structural performance. Its non-invasive installation and wireless design make it ideal for both construction and operational phases. SlabControl 5.0 helps extend structural lifespan, reduce maintenance costs, and optimize design based on real-world data. It is an essential tool for early warning systems, stability assessments, and long-term asset management.

GroundControl – 3-Axis Tilt and Displacement Sensor for Steel Towers

GroundControl is a high-precision triaxial inclinometer designed to monitor the tilt and displacement of load-bearing structural components, such as steel towers, bridges, and retaining walls. It delivers real-time data with exceptional accuracy, allowing engineers to detect even the smallest shifts before they become hazardous. Powered by long-life batteries and wirelessly connected, the sensor performs reliably even in challenging environmental conditions. GroundControl plays a key role in early warning systems, structural stability assessments, and long-term monitoring strategies.

QuakeControl – Vibration Sensor for Dynamic Loads

QuakeControl is a wireless sensor designed to capture and monitor vibrations caused by resonance, impact events, and prolonged dynamic loading on bridges, towers, and industrial structures. It measures multi-axis acceleration and analyzes the frequency spectrum to reveal critical insights into structural behavior under operational stress. With customizable alert thresholds and wireless transmission, QuakeControl is vital for fatigue analysis, risk management, and compliance with vibration regulations. It supports early detection, performance verification, and long-term safety assurance.

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Monitoring Scope

- Reinforced Concrete Piles and Foundations – SlabControl 5.0 Continuous control of bearing capacity, settlement, and deformation in piles and foundations.
- Steel Towers – GroundControl & QuakeControl: Monitoring tilt, resonance, and structural fatigue.

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Benefits

Real-time monitoring provided by Adventum Tech sensor systems is becoming an essential tool for engineers, owners and operations teams to improve the quality, safety and economic efficiency of the wind turbine. Unlike traditional methods, our solutions offer a continuous data flow on the actual behavior of the structure – from concrete hardening to long-term deformation monitoring. This information helps to make informed decisions on design, maintenance and investment planning, based on demonstrable data, not assumptions. This results in more efficient use of resources, reduced downtime risk and increased total asset value.

1. Validation and optimization of the technical solution:

Real-time data on loads and deformations allows to compare actual behavior parameters with the designed ones. This helps to check the compliance of project solutions with reality and optimize the design in future project. This will reduce the total construction costs, project implementation deadlines, as well as reduce the overall CO2 footprint of the projects with the potential to obtain carbon credits.

2. Risk management during construction and operation:

Dynamic loads (e.g. wind or traffic impacts) can cause invisible deformations. The presence of sensors provides early warnings, preventing potential damage or even collapse – which automatically improves operation and maintenance processes and eliminates the associated risks.

3. Improved operational monitoring:

Monitoring the condition of the structure allows owners to identify structural changes in time and take preventive measures instead of reacting to the consequences of damage. This improves the quality of maintenance and extends the service life, and it also allows operators to plan component replacement or maintenance based on behavioral data rather than assumptions.

Benefits

4. Extending the service life of a turbine or other structure

A constantly monitored structure is subject to less structural fatigue and is serviced more efficiently.

5. Streamlining planned maintenance

Data allows for behavior-based maintenance schedules, which means that unnecessary maintenance is not required, while at the same time ensuring a safe operational condition. This reduces unplanned downtime, unexpected budgets and additional costs.

6. Insurance benefits

Digital Wind system data serves as legal evidence to confirm structural health, which can reduce insurance premiums, and can also serve as supporting documentation when claiming compensation from insurers in cases of force majeure.

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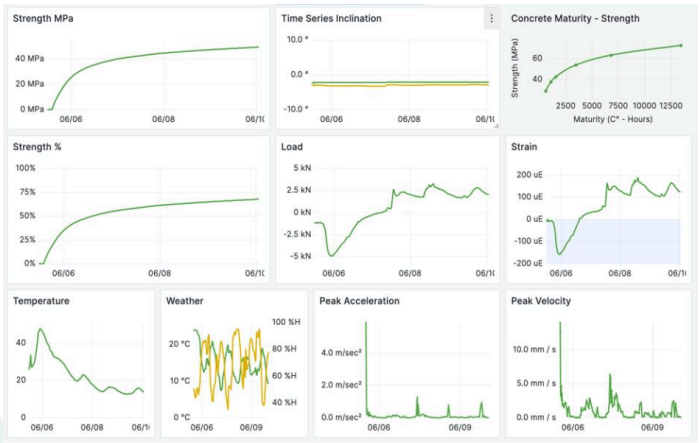
Wireless Gateway and LiveLoad.App Platform

1. A battery-powered 5G wireless gateway ensures cable-free cloud data transfer for up to two years. This means site visits for recharging are only required every 24 months.
2. The LiveLoad.App platform delivers real-time visualization, alerting, and integration with SCADA/BIM systems.
3. Adventum Tech sensor data is seamlessly integrated into LiveLoad.App, offering:
4. Real-time data visualization and analysis
5. Secure cloud storage
6. Project-specific dashboards
7. Exportable reporting for documentation
8. Compliance and trend monitoring



Contact Adventum Tech

For more details, custom configurations, or pilot projects:

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