RENEWABLE ASSETS

Structural condition.
A measured history.

A proposed monitoring application for wind turbine bolts, flanges and load-bearing steel structures.



Wind turbine load-bearing connection shown in the supplied technical presentation.

Build a repeatable baseline, compare indications across defined component populations and retain changes between inspections. Focus follow-up on locations that require engineering investigation.

Application concept
Periodic RMF screening and a proposed sensor-to-reporting architecture. Continuous monitoring requires a separately engineered and qualified project scope.

STRUCTURAL CONDITION MONITORING

Baseline. Repeat. Investigate.

Wind turbine bolts, flange connections and towers experience changing mechanical loads. A location-based measurement history may add information between conventional inspection events, subject to repeatability, environmental effects and correlation with verified findings.

Establish a baseline: Group components by material and geometry. Record instrument settings, positions, access and operating conditions.
Repeat consistently: Compare like-for-like measurements and investigate instrument drift, temperature, load and positional effects.
Prioritise follow-up: Review departures with the O&M; team and select appropriate conventional NDT or engineering checks.
Retain history: Link measurements to component IDs, dates, conditions and confirmed findings.

PROPOSED DIGITAL ARCHITECTURE

The supplied presentation outlines sensors, controllers, configuration records, event logs, stored measurement history and reporting. These describe a proposed architecture; they do not establish that a 24/7 cloud service is deployed or validated. Sampling, communications, power, cybersecurity and environmental protection must be specified for each installation.

VALIDATION & DECISION BOUNDARIES

The presentation includes a calibration example for M48 42CrMo bolts. This is not a universal calibration for other bolt sizes, grades or geometries. Illustrative stress-distribution plots do not provide general acceptance limits.

Magnetic indications alone do not establish crack absence, bolt preload, fatigue life or remaining service life. Predictive use requires longitudinal field correlation and demonstrated accuracy. The brief does not claim completed BROT renewable deployments or an independently validated remaining-life model.

Source: supplied Wind Turbine Bolts - Stressed State Control Equipment and Service presentation, attributed to Spector Sci-Tech / TritonMags.

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