



## *InSight Main Bearing Monitoring & Predictive Maintenance*

Solutions to improve wind turbine reliability and reduce maintenance costs

Outsource monitoring and enable predictive maintenance planning for your main bearings with Romax: to reduce O&M costs, increase reliability and reduce downtime. We offer you the most effective and technically advanced services available, helping offshore and onshore wind farms to run for longer and for more of the time.

O&M cost analysis for a wind farm with multi-megawatt class turbines showed cost savings of greater than 40% could be gained through predictive maintenance and monitoring of main bearings. Most savings resulted from better monitoring and detection, enabling more effective scheduling of main bearing maintenance and replacement.

As a trusted partner, we offer specific solutions and complete managed services to detect and mitigate the serious impacts of main bearing faults. On any given day, our systems and experts are monitoring over 40% of the UK's offshore wind turbines and over 2GW of turbines globally.

- Detect main bearing faults using CMS, vibration sweeps, SCADA analysis and inspections: giving you confidence and providing the longest possible lead times before a failure
- Practical solutions for main bearing life extension, including grease flushing
- "Remaining useful life models" for main bearings
- Failure root cause analysis and investigations

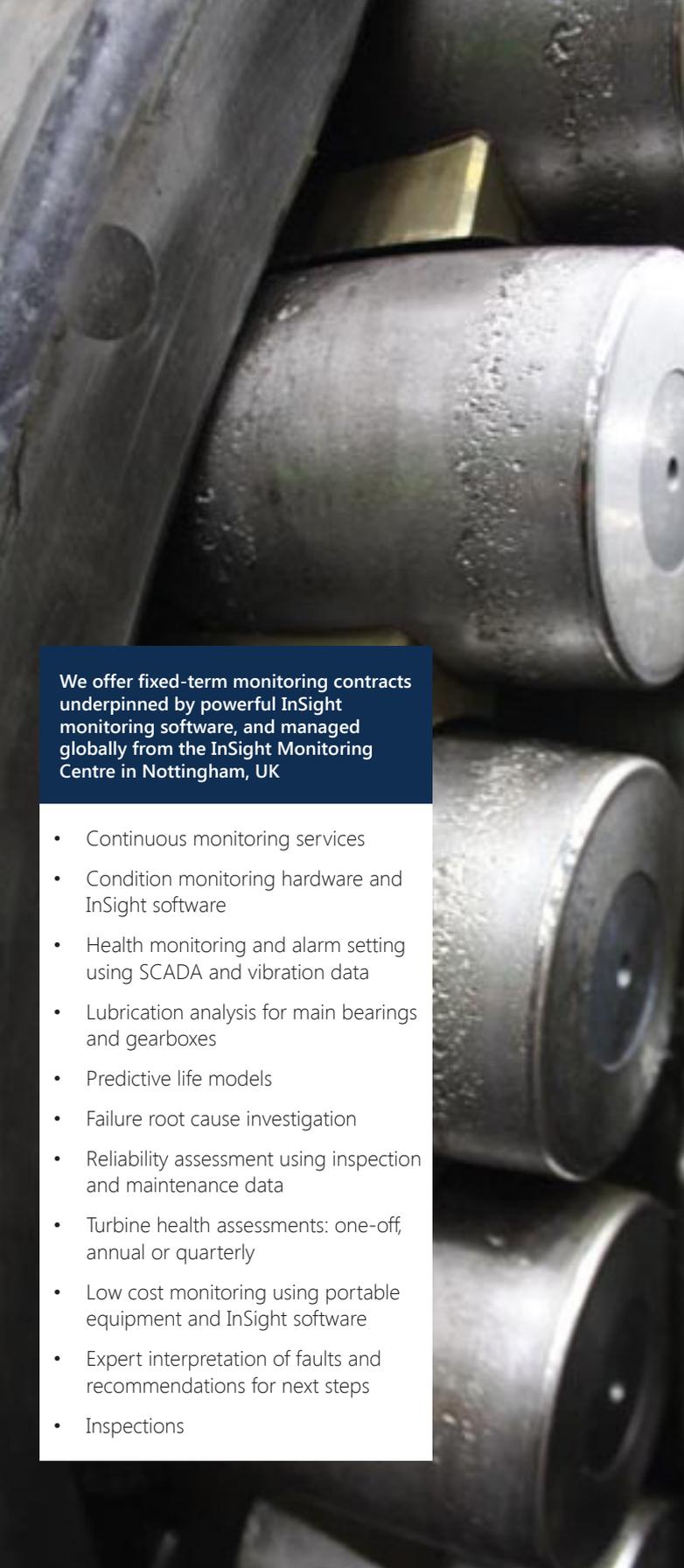
Helping operators, asset managers, O&M managers, site management and analysis teams focus on more strategic value-added activity, Romax customers include Centrica, Infigen and E.ON. We cover all major OEMs in Europe, North America and Asia and we work with CMS hardware from Gram & Juhl, SKF, Bruel & Kjaer and others.

### Why InSight?

Onshore and offshore operators around the world have reported that they regularly suffer main bearing failures, and these problems are not restricted to any single manufacturer, model or drivetrain configuration – with failure statistics and Weibull analysis and experience suggesting that these issues will continue. Operators want to improve detection, to quickly identify problems and so take preventative actions far earlier: a "bulletproof" strategy for managing main bearing condition and reducing costs. InSight solutions make that a reality, providing the opportunity to plan and execute inspections and maintenance activity in more timely, informed and cost-effective ways, to minimise any disruption to power generation and so avoid losses. Indeed, O&M costs show that the biggest source of potential cost savings comes from the ability to group maintenance events and schedule large crane operations on multiple turbines simultaneously.

### **We help you to operate and maintain your valuable wind farms more efficiently.**

- For offshore and onshore sites
- The most technically advanced approaches, with personnel and resources it would be difficult and costly to match in-house
- Expertise in multiple turbine types and diverse CMS and SCADA systems
- 100% independent of OEMs and operators



# How Romax helps

Few if any other providers can match our diverse background and deep engineering expertise in wind turbine drivetrains and predictive maintenance.

We can enable you to better understand the condition of your main bearings, to predict downtime and identify faults: thus improving maintenance planning and O&M budgeting, ongoing power generation and extending equipment lifespan. If you choose, we can deliver a complete managed service including condition monitoring, inspections, failure root cause analysis, unique technology for main bearing life extension, and models to predict remaining useful life.

## Bringing it all together

While other companies offer individual services such as life models or inspections, only Romax offers you an end-to-end approach to managing main bearings: a complex activity that requires many different skills, disciplines and tasks. *The value of these tasks combined and delivered by Romax is far greater than the sum of their individual parts.*

- Identifying, understanding, monitoring and mitigating drivetrain failure modes is a key area of Romax's expertise
- For turbines under warranty and out-of-warranty, we provide a flexible range of managed services and solutions for main bearings
- The breadth of our knowledge, experience and economies of scale mean Romax can deliver superior monitoring at lower cost than you could provision in-house
- Crucially, we are 100% independent of manufacturers and wind farm operators

## About Romax and InSight

A world-class engineering technology and services company, we have a deep understanding of the design and operations of wind turbines. This specialism and hands-on experience underpins our InSight software, services and personnel. Known globally for software simulation tools and consulting expertise, we have proven abilities to predict potential issues, understand failure modes, reveal root causes and recommend remedial action and proactive improvements. With 250 employees serving over 220 customers worldwide, we are headquartered in Nottingham, UK and operate 12 offices in Europe, the USA, Korea, Japan, China and India. We also engage in collaborative R&D programmes with the world's leading turbine manufacturers, operators and academic institutions.

We offer fixed-term monitoring contracts underpinned by powerful InSight monitoring software, and managed globally from the InSight Monitoring Centre in Nottingham, UK

- Continuous monitoring services
- Condition monitoring hardware and InSight software
- Health monitoring and alarm setting using SCADA and vibration data
- Lubrication analysis for main bearings and gearboxes
- Predictive life models
- Failure root cause investigation
- Reliability assessment using inspection and maintenance data
- Turbine health assessments: one-off, annual or quarterly
- Low cost monitoring using portable equipment and InSight software
- Expert interpretation of faults and recommendations for next steps
- Inspections



Solutions to drive business and sustainability

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