

The Future of Predictive Maintenance

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A bearing tells you a lot more than whether it's working or failing.

As industrial systems become increasingly connected, smart bearings are opening up new ways to monitor equipment health. Tracking vibration, temperature, rotational speed, and load gives you real visibility into changing conditions while equipment is running.

For reliability engineers, OEMs, and manufacturers, that's a real step forward in predictive maintenance. At IBSCO, we see it as part of a broader shift toward more informed equipment decisions. But the data is only as good as the bearing it's coming from, performance still starts with selecting the right one for the application.

What Are Smart Bearings?

Smart bearings combine conventional bearing functionality with sensors capable of collecting information during operation. Depending on the design, sensor technology can track vibration, temperature, speed, load, or other conditions that provide insight into equipment health.

Instead of relying exclusively on scheduled inspections or responding after a problem occurs, condition monitoring gives teams additional information about how equipment is performing over time. When connected through IoT systems, this data can be analyzed alongside other equipment information to identify changes and inform service decisions.

Smart bearings are not necessary for every application. Their development does, however, demonstrate how bearing technology is becoming increasingly connected to the systems around it.

Why Predictive Maintenance Is Evolving

Traditional preventive programs typically rely on predetermined service intervals. Predictive maintenance adds another layer by using condition data to determine when equipment may require attention.

This approach gives organizations an opportunity to identify changes earlier and make decisions based on actual equipment behavior rather than time alone. For operations where unplanned downtime can disrupt production, greater visibility into component conditions can be particularly valuable.

As connected manufacturing technologies continue to advance, the ability to collect and interpret information directly from equipment is creating new possibilities for asset management and long-term planning.

How Smart Bearings Support Condition Monitoring

The value of sensor-equipped bearings comes from the information they can provide while equipment remains in operation. Different sensor configurations offer different capabilities, but several measurements are particularly relevant to condition monitoring.

Vibration Monitoring

Changes in vibration can provide insight into developing mechanical conditions. Tracking vibration patterns over time allows reliability teams to recognize changes that may warrant further evaluation.

Temperature Monitoring

Temperature is another useful indicator of operating condition. Continuous measurement can help teams recognize abnormal changes and compare current performance with established operating patterns.

Speed and Load Monitoring

Depending on the sensor configuration, smart bearings may also provide information about rotational speed or load. Combined with other measurements, this data can offer a more complete view of how equipment is operating.

Connected Data

IoT connectivity extends condition monitoring beyond the individual component. Sensor information can be transmitted to broader monitoring platforms, giving teams access to equipment data that can be reviewed, compared, and incorporated into operational planning.

Together, these capabilities move bearing monitoring beyond periodic observation toward a more continuous understanding of component condition.

Where Smart Bearing Technology Is Headed

The future of smart bearings extends beyond collecting individual measurements. As connected manufacturing systems become more sophisticated, the value will increasingly come from how information is interpreted and used.

Greater connectivity can allow bearing data to become part of a larger picture of equipment health. Instead of evaluating a single component in isolation, reliability teams can combine information from multiple sources to identify trends, evaluate performance, and make more informed decisions.

Sensor technology will continue to evolve, but adoption will depend on the needs of the application. Not every bearing requires continuous monitoring, and additional technology does not eliminate the importance of proper component selection.

What Technology Cannot Replace

Better data starts with a bearing properly matched to the application.

Load, speed, operating environment, lubrication, materials, precision, and other technical requirements remain fundamental considerations when selecting a bearing. Sensor technology may provide greater visibility into how a component performs, but the bearing itself must still be appropriate for the conditions in which it operates.

This is where application expertise remains valuable. Understanding equipment requirements before selecting a component helps engineers evaluate available bearing types, materials, precision levels, and specialized configurations based on the demands of the application.

How IBSCO Supports Informed Bearing Decisions

IBSCO's role is focused on helping customers identify the right bearing solution rather than providing IoT monitoring technology.

Our application consulting services support custom and specialized bearing requirements across aerospace, defense, medical, industrial, and other demanding markets. IBSCO offers bearings in a wide range of types, materials, and precision levels and works with customers to identify catalog products, modified designs, or custom solutions based on specific application needs.

Those capabilities are supported by factory-authorized manufacturer relationships and value-added services including ISO Class 6 cleanroom relubrication, specialized lubrication, custom configurations, packaging, and inventory programs.

As bearing technology becomes more connected, having access to experienced application support remains an important part of making informed component decisions.

Technology Changes. The Fundamentals Remain.

Smart bearings and IoT sensors provide a glimpse into the future of predictive maintenance. Greater access to condition data can help organizations understand how equipment is performing and identify changes that

deserve attention before they become larger operational issues.

The technology surrounding bearings will continue to advance, but dependable performance still starts with the component itself. Selecting the appropriate bearing for the application remains the foundation for everything that follows.

If your team is evaluating bearing requirements for a new or existing application, talk with IBSCO about the products, configurations, and services available to support your operation.

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