# Unprecedented insights into rotating machines with Dragonfly®

The Challenge

In rotating machines, various components can generate shocks and vibrations making rotating machine monitoring a **complex task**. The main hurdle lies in extracting meaningful insights from traditional sensors for early wear detection and preventive maintenance.

This challenge is even greater for slow-moving machines, where minimal rotational shocks result in accelerometers **failing to capture useful information**. Instead, critical health indicators lie in the forces and stresses transmitted through machine components. However, until now, no readily available sensor existed to effectively **monitor these parameters**.
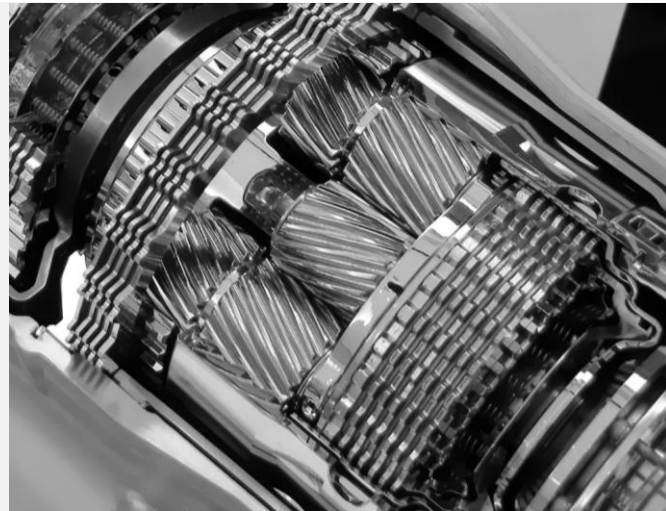
1 **Phenomenon discrimination**
Traditional condition-based maintenance relies on accelerometer-based measurement. It gives an image of **machine's overall displacement**, which can result from multiple solicitations acting simultaneously, making signal analysis challenging.

2 **Slow machines monitoring**
The lack of sensitivity of accelerometers at low frequency makes the diagnosis complicated on slow rotating machines. This can result **in undetected or missed failures.**

3 **Integration complexity**
Strain gauges complement and enhance vibration analysis thanks to their fast integration, low footprint, and interoperability, providing **genuine added value**.

Breaking Point

Currently, over **99% of vibration monitoring** for industrial assets relies on **accelerometers**, as they are the only available sensors on the market. However, many types of industrial equipment remain unmonitored because accelerometers **fail to capture relevant data**—this includes assembly lines, hydroelectric turbines, industrial mixers, and more. These are critical, high-value assets, and their failure can lead to **significant costs due** to production downtime during repairs.

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We asked **IFM**

What is the added value of Dragonfly® for rotating machines ?

"Dragonfly® has become an **essential ally** to accelerometers in certain complex vibration analyses, thanks to its **groundbreaking precision and sensitivity**."

Chakib Mouhoubi
RTM Project Leader

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The score Chakib gave Dragonfly®
for its outstanding **accuracy and reliability**

"We are glad to be part of the development and distribution of a product that adds significant value to **condition-based maintenance**, enhancing efficiency and reliability."

↓ See how **Dragonfly®** transforms rotating machines vibration testing

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The Solution

Dragonfly® is a revolutionary strain sensor that offers **1000x the resolution of traditional gauges**, allowing for the direct measurement of the minute forces generated by the moving parts of industrial machines during operation. At the same time, it is thin and flexible making it easy to be integrated anywhere.

1 Local stress
Strain measurement, providing a **direct representation** of the local stress on the instrumented component.

2 Quasistatic measurements
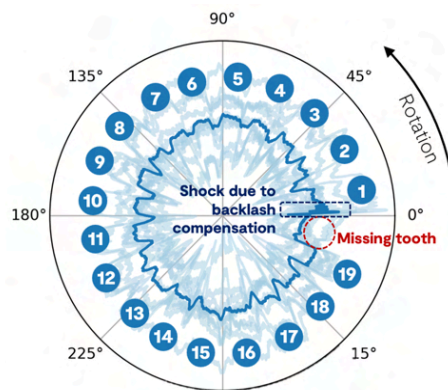Bandwidth from 0.02 Hz to over 100 kHz, enabling monitoring of **slow machines and phenomena.**

3 High resolution
x1000 times more sensitive than standard strain gauges, enabling it to detect even the smallest strains in **rigid components.**

Gearbox with **20 teeth rotating at 1Hz**.

The gearbox with **a missing tooth** is equipped with a Dragonfly® sensor, which measures the forces exerted by the gears as they rotate at low speed (1Hz).

The data is presented in a circular plot, with **360°** representing a full rotation of the gear. The polar plot offers detailed insights into the gear's condition, clearly highlighting the missing tooth and the **shock generated by backlash compensation** when the next tooth engages with the other gear.

This method can be applied to **any rotating machinery**, such as gearboxes, machining spindles, and turbines, to gather valuable and reliable information about the health of their internal components.

Dragonfly®'s versatility extends to numerous other fields.

Wind Turbines

Automotive

Infrastructures/Bridges

Transportation

and many more applications...

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About us

Wormsensing is at the forefront of **advanced sensing technology**, providing high-precision solutions for aerospace, defense, and high-performance industries. With a commitment to cutting-edge precision and sustainability

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