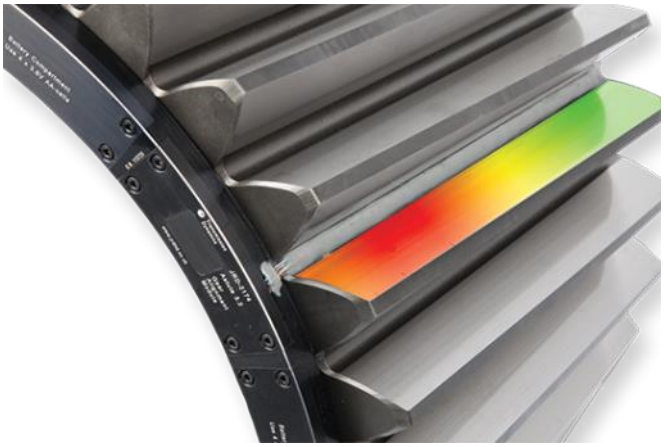
Transmission Dynamics

Astute Gear Alignment Module



Representation of measurements acquired

OVERVIEW

Correct alignment of gears is essential for reliable long-term operation. Misalignment results in part of the mesh being overloaded and can lead to premature tooth failure. Gear misalignment typically occurs as a result of bearing wear, manufacturing errors, incorrect design (microgeometry) or deflection of the gearbox casing under high loads.

Our Gear Alignment Module is a state-of-the-art battery or inductively powered miniature 8 channel system that can be installed inside a gearbox, mounted on rotating components.

Data to enable the evaluation of gear alignment in the form of the relative load intensity distribution factor, KHβ, as defined in Method A of ISO 6336, is transmitted wirelessly to a nearby transceiver. A remote transceiver is also available for automatic download during remote in-service load measurements.

With a user-definable intelligent sleep mode, the battery can be extended to several years. The module can be used during type approval testing or as an in-service condition monitoring tool.

Used on critical naval propulsion gearboxes

Used by ZF, Gamesa, Vestas, Moventas and others to evaluate alignment of gears for corrective regrinding

- machine dynamics, NVH, failure analysis, fatigue/accelerated life testing
- specialised instrumentation, data acquisition and analysis
- rotating machinery design and troubleshooting: gearboxes, shafts, bearings, couplings, belts and chains

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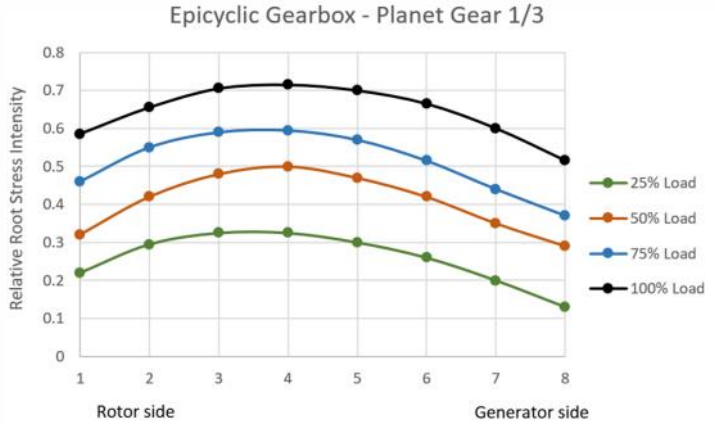
The Gear Alignment Module acquires simultaneous data from 8 strain gauges, installed along the gear face width, with typical sampling rates of 14 kHz per channel. Captured data can be analysed using bespoke supplied software or exported for external evaluation.

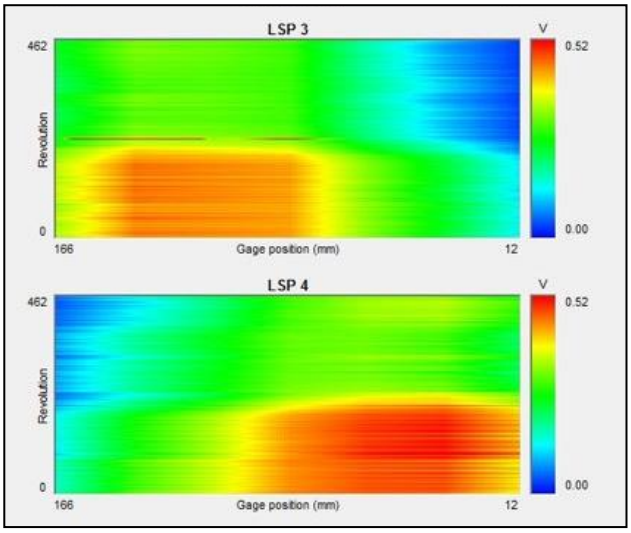
By evaluating the amplitude of transient events at all strain gauge positions, the relative load intensity can be plotted, as shown for a range of load conditions in the figure below.



The data can also be used to evaluate load sharing factor, Kγ, between multiple planets in epicyclic gearboxes.

Tacho input can be used to uniquely identify each mesh in question.

Planet gear fitted with Astute instrumentation



An example of remotely acquired data from double helical gear operating in Wind Turbine application