

Case Study

Fan Bearing Acceleration Trend & Demod Spectra

The plot shows a trend of peak acceleration (10 Hz – 12.8 kHz) from the drive-end bearing of a 2-pole motor powering a cooling air fan.

The bearings are sealed for life and could not be re-lubricated.

Early detection of the bearing problem allowed a replacement motor to be sourced and fitted without disrupting production for this un-spared, production critical asset, resulting in avoidance of production loss worth an estimated £12,050.

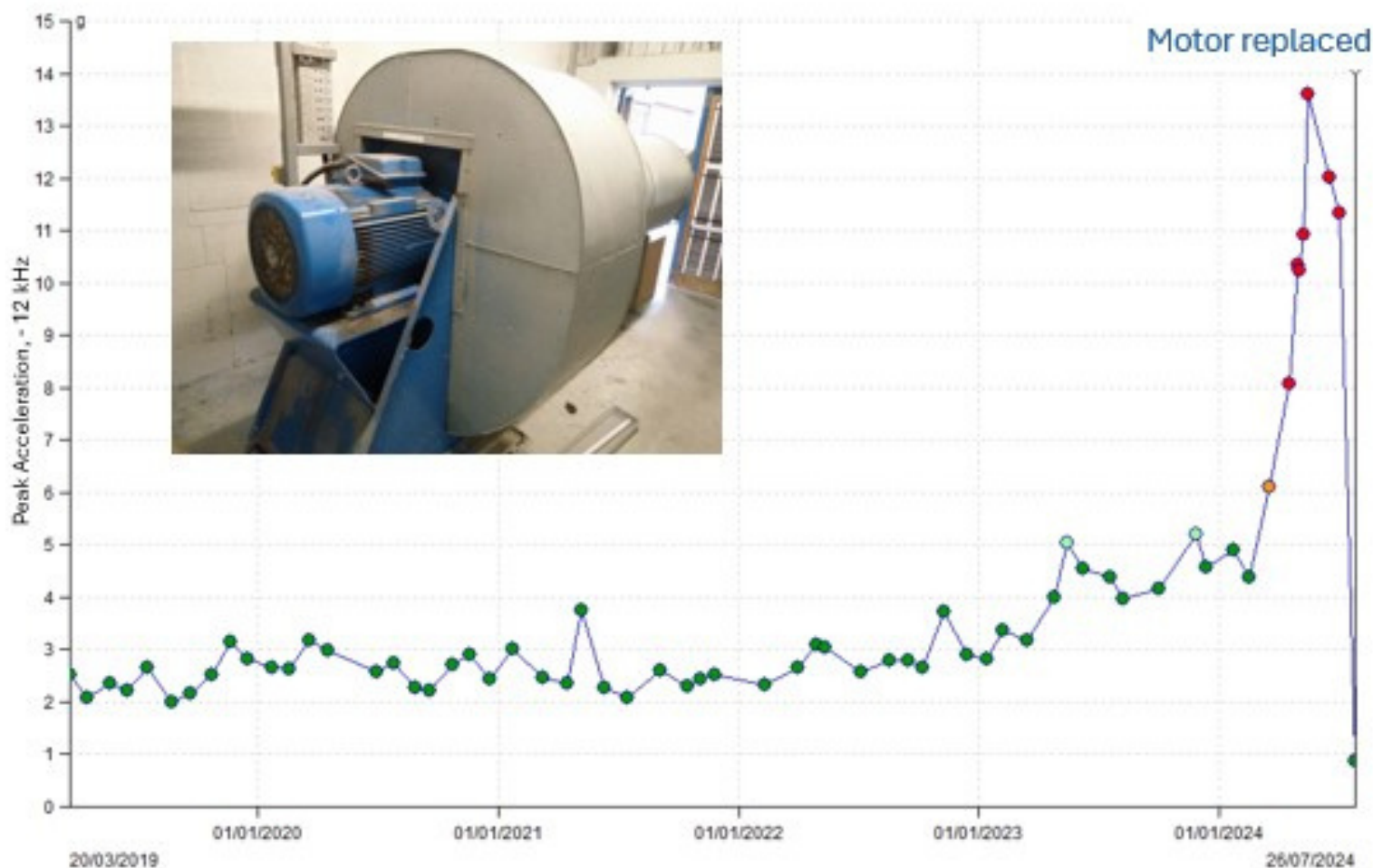


Figure 1 – Motor drive end horizontal overall peak acceleration trend

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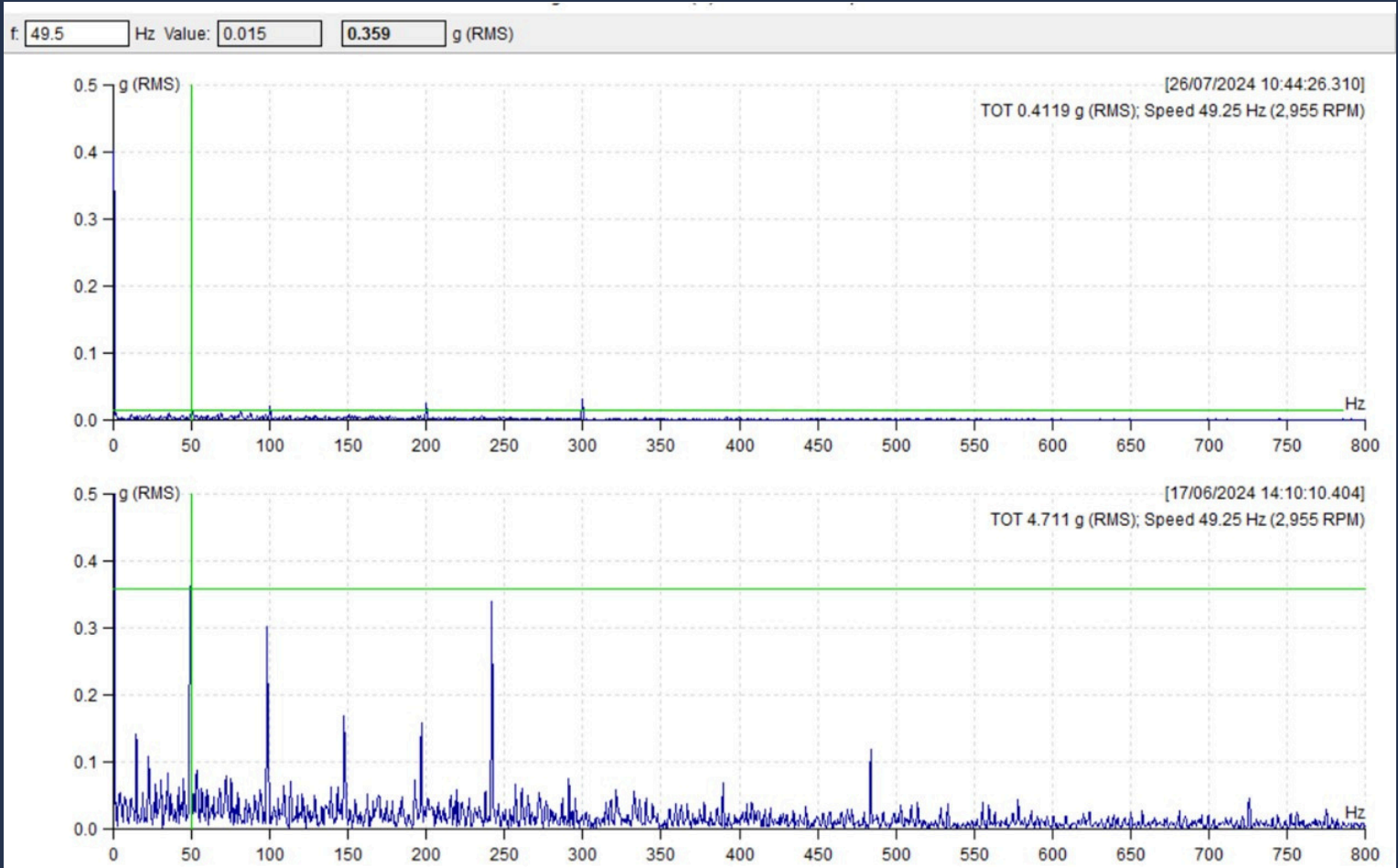


Figure 2 – Motor drive end demodulated acceleration spectrum before / after

The demodulated acceleration spectra show before (below) and after (above) replacement. The before plot shows a harmonic family of peaks with the fundamental at the running speed of the fan. This is consistent with excess clearance in the bearings and either the bearing beginning to move on the shaft or (more probably) in the bearing housing.

As vibration velocity levels had not begun to rise appreciably, we believed damage had not progressed too far. Early detection and replacement therefore avoided having to scrap or reclaim the shaft or housings, resulting in a significantly cheaper repair.

Looking at the trend we can see the fan had run reliably since monitoring commenced in 2019. At this point we believe the fan had been in service for around 5 years, so this fan motor, which was well balanced had a service life of 10 years.

A maintenance strategy of condition-based replacement or repair therefore provides a significantly more cost-effective approach than scheduled replacement of the bearings and an approach that maximises the useful life of assets.

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