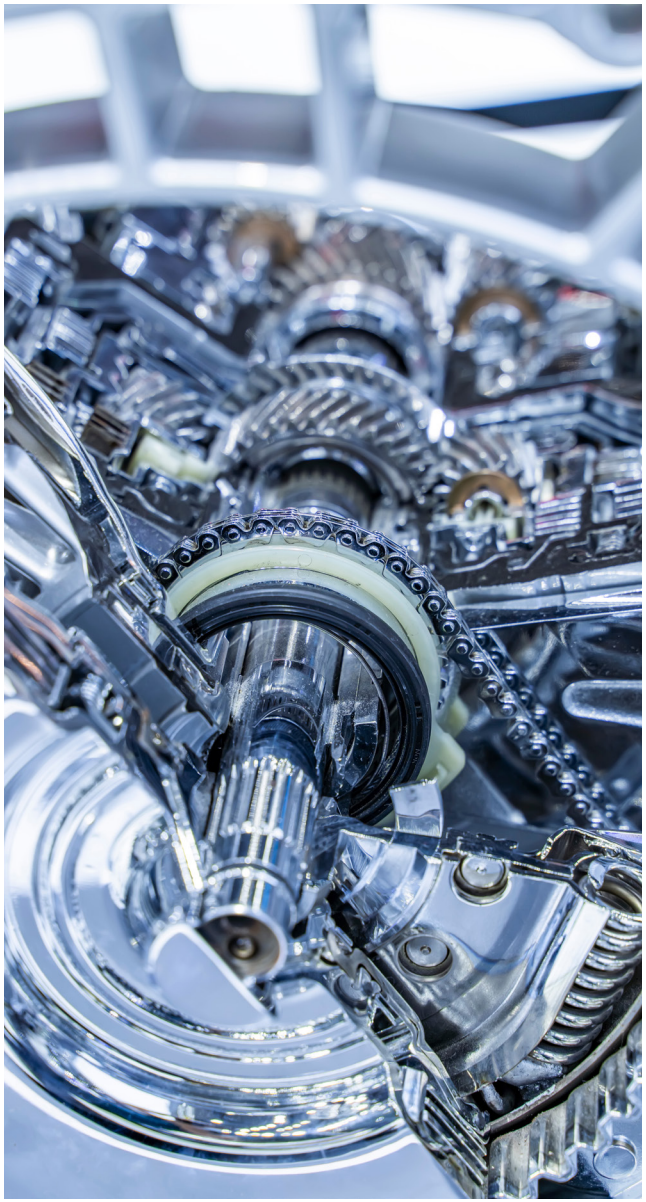
Machinery Diagnostics Institute

Mini Case Study: Gearbox Damage



Introduction

Gearboxes play a critical role in industrial machinery, but they are also prone to wear, misalignment, and other defects. As a result, regular condition monitoring is essential to determine early signs of wear and tear and ensure operational uptime.

Analysis

MDI was commissioned to perform a typical route-based data collection and noticed some warning signs on the gearbox.

MDI utilized the following hardware for this analysis:

- CTC's **AC216**, a popular magnet mount accelerometer specially engineered for route-based measurements.
- CTC's **MH214-3A**, a multipurpose two-rail mounting magnet.
- CTC's **CB104-C555-006-K2C-SF**, an Emerson/CSI compatible cable and connector assembly.

Utilizing a cable with a breakaway safety feature for portable data collection (as shown here) is extremely important for analyst safety while collecting data on large operating machinery

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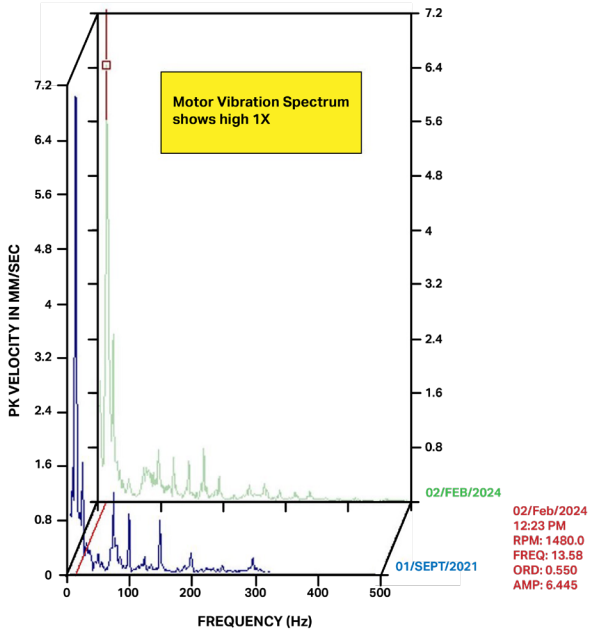
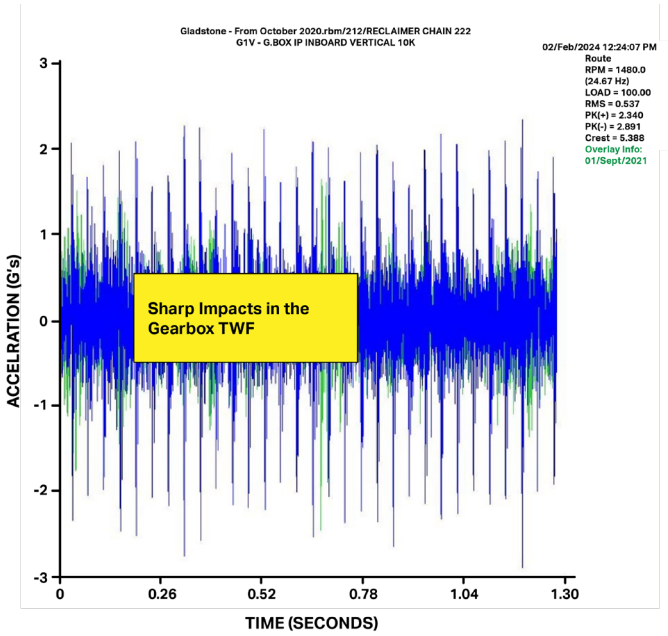
Findings

- The motor shows acceptable but high (moderate) vibration levels according to the ISO Standards 20816-3 as per machine class and type.
- The motor shows elevated vibration at the running speed component 1X (13.56 Hz) with an amplitude of (6.4 mm/s rms) indicative of a few causes such as structure looseness and excessive clearance.
- The gearbox also shows elevated vibration at the running (input) speed, in addition to impacts on the TWF which could be an indication of internal damage in the gearbox.

Data Collected by MDI





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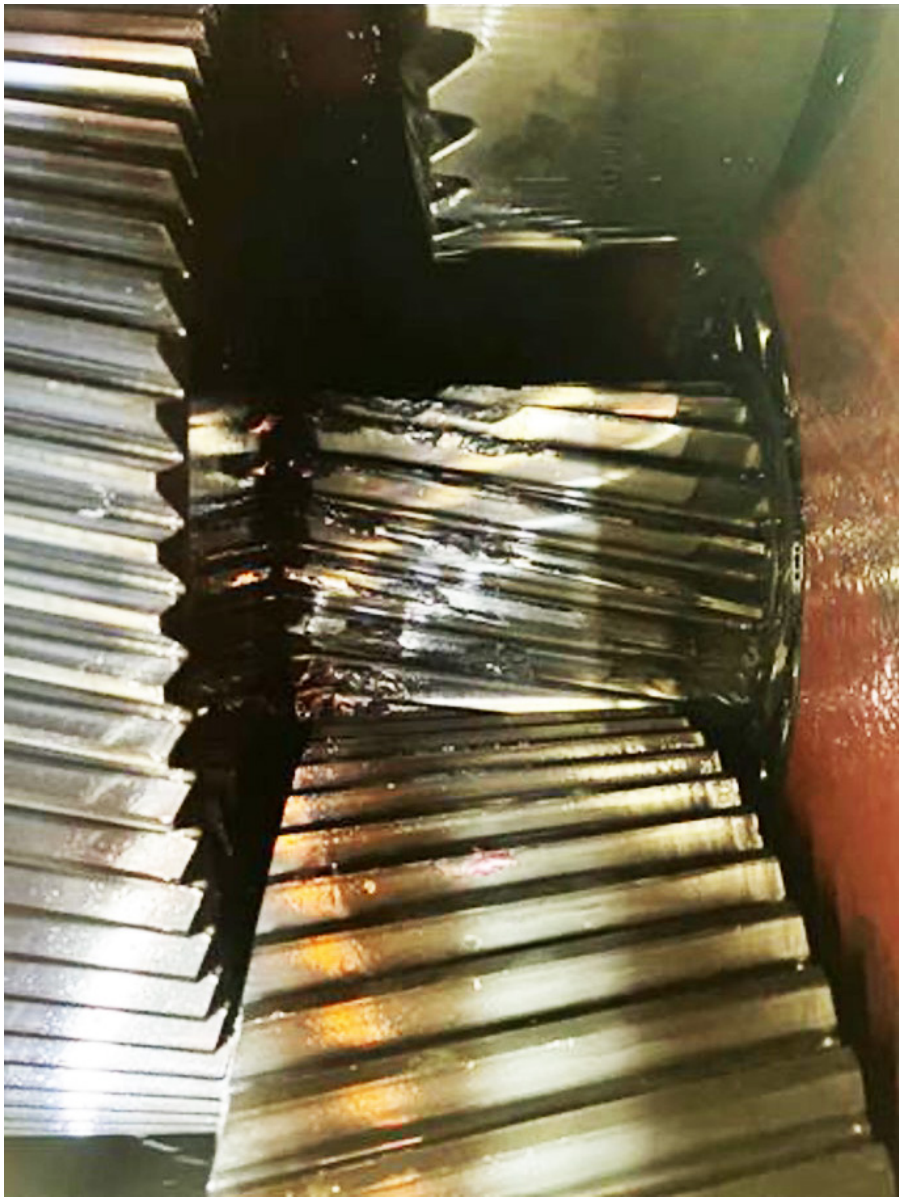

Conclusion

As a result, MDI requested a borescope inspection to confirm the condition of the gearbox. Utilizing a borescope to validate some early warning signs allows technicians to identify defects, wear, or damage in inaccessible spaces without disassembling machinery or structures.

Following the borescope examination, damage consistent with the vibration data was validated as depicted in the photo to the left.