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CASE STUDY

DataMind AI™ Detects Compressor Gearbox Deterioration Minimizing Shutdown Time

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Introduction

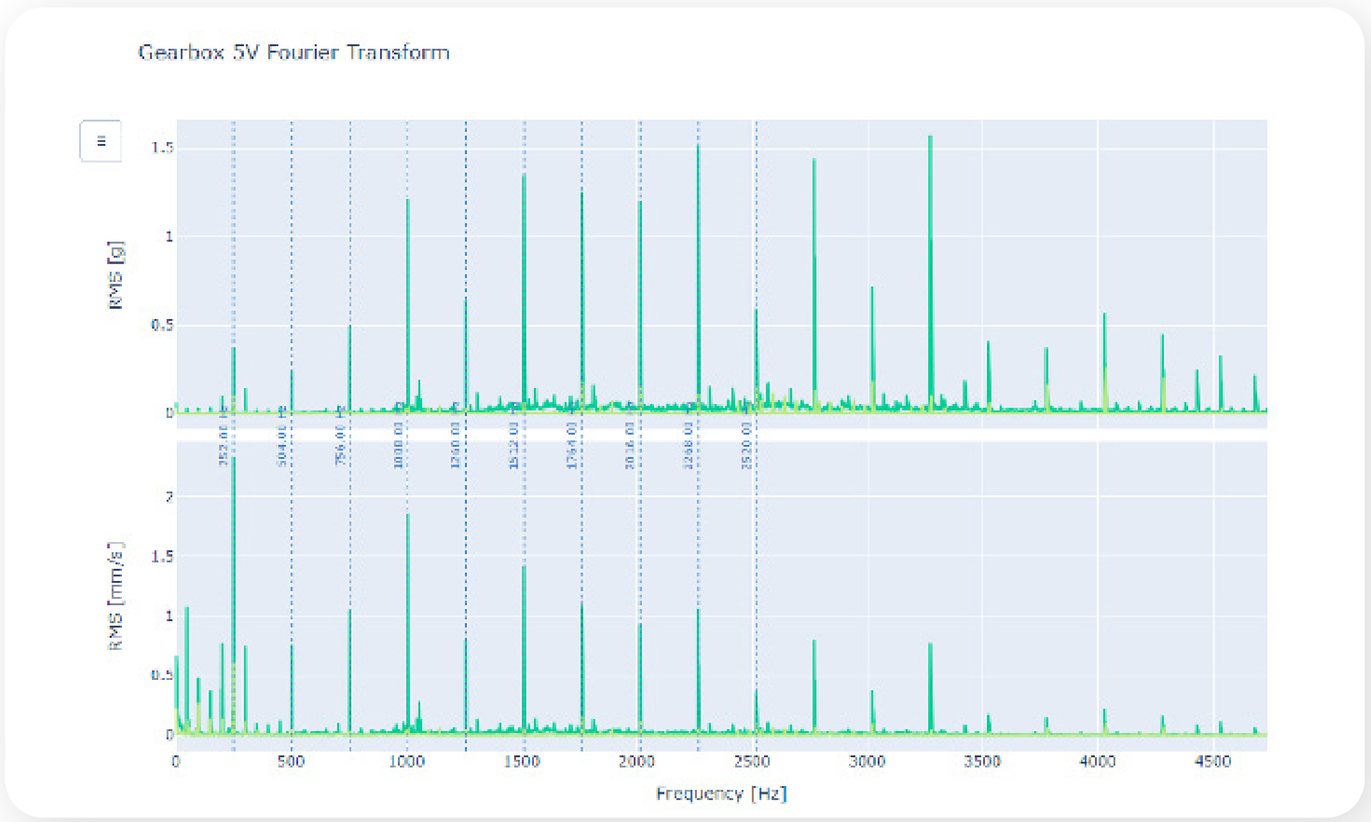
DataMind AI™ is a robust maintenance and diagnostic solution that offers automated failure detection, diagnosis, and prescriptive actions. Deployed at a vanadium ore production site, DataMind AI™ monitors multiple machines, including the compressor gearbox.

This case study details the identification, progression, and management of a gearbox deterioration incident from December 20 to December 31, 2023. It highlights how DataMind AI™'s unique spectral trend, cleaned by operation mode isolation, plays a crucial role in the early identification of mechanical issues.

DataMind AI™ Identifies Significant Gearbox Deterioration

Early indications of an issue with the gearbox were detected on 20 December 2023.

DataMind AI™ detected increased amplitude at the gearbox output shaft running speed (252 Hz). This spectral pattern was diagnosed as "mechanical looseness in the output shaft," attributed to high workloads. The gearbox status was changed from **Healthy** to **Monitor**.



The Value

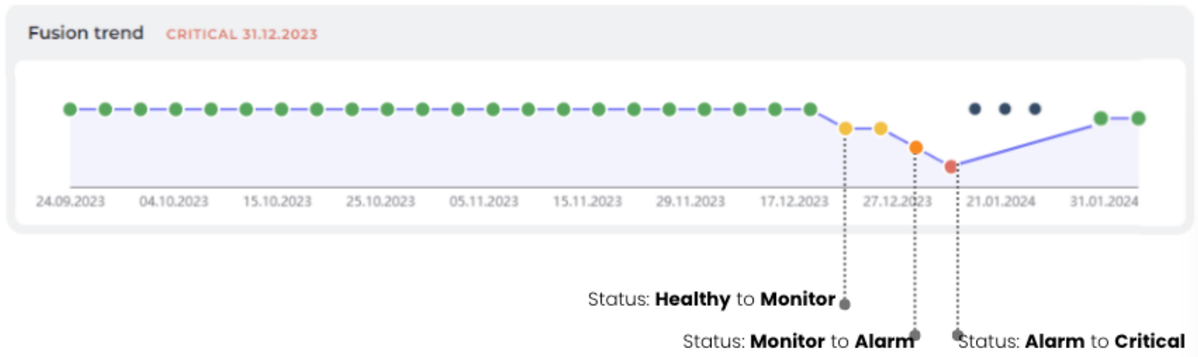
30
Hours

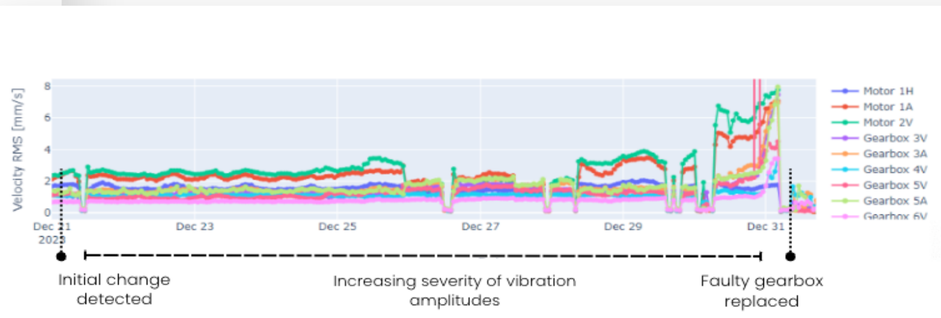
$18,000
per hour

~$540,000
saved

DataMind AI™ compares spectral signatures during constant machine load, using motor current as a load indicator.

In this case, it isolated times when the motor current was in the nominal range of 73-75 Amperes, confirming that the vibration signature deterioration was due to mechanical wear and not operational changes.



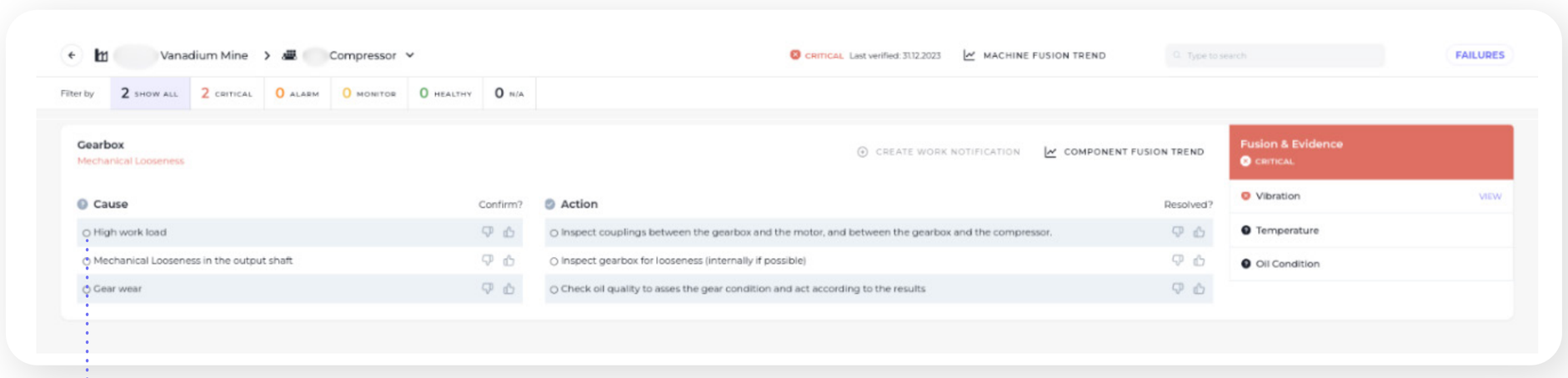


1 Detection

Within a week, further significant deterioration was identified; patterns present in two sensors indicated extreme vibration increases due to gear friction, high workloads, and mechanical looseness. The gearbox status was switched from **Monitor** to **Alarm**.

The customer took action to remediate the issue; however, the gearbox status further declined.

On 31 December 2023, the gearbox health status switched to **Critical**.

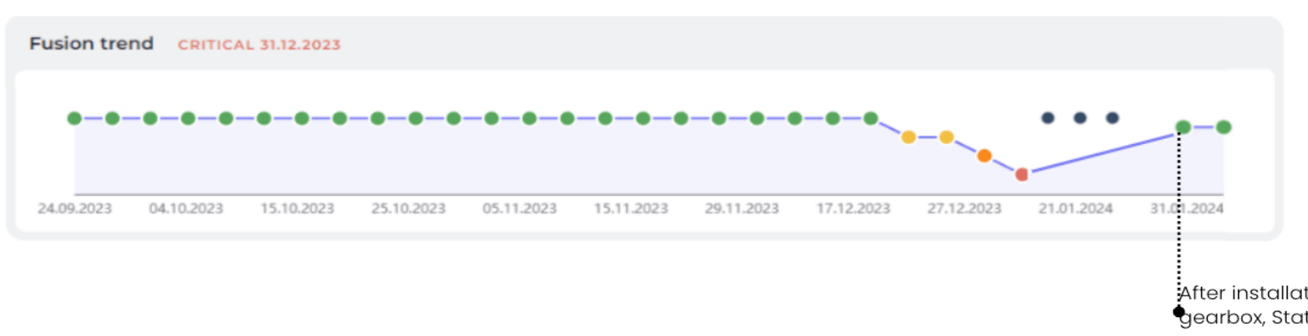


2 Real-time insights & Prescriptive Actions

DataMind AI™ provided real-time insights that pinpointed the exact failure mode and location, along with prescriptive actions.

3 Resolution

A planned 24-hour shutdown on December 31, 2023, was utilized to replace the gearbox. Following the shutdown, sensor readings indicated a return to normal activity, confirming the issue was correctly identified and resolved.



Conclusion

DataMind AI™ enables proactive decisions that reduce operational losses.

In this case, an unplanned shutdown and extended delay were averted through strategic data-driven actions.

The pre-ordered new gearbox was on-site when the old one reached critical functioning, ensuring a timely and effective replacement that restored operational stability