IMPELLER UNBALANCE IDENTIFIED THROUGH CONDITION MONITORING

WESTPOWER

MACHINE SENTRY®

Westpower and Machine Sentry® supported the site in maintaining reliable and predictable pump operation through routine vibration monitoring, enabling early detection of developing mechanical issues before failure or secondary damage occurred.

> ***The vibration data gave us clear direction. Even though the impeller looked perfect visually, the measurements didn't lie. Dynamic balancing confirmed the root cause and restored the pump to healthy operation.***
>
> - Westpower Reliability Engineer

THE CHALLENGE

The asset under monitoring was an OH2 style pump driven by a 300 HP electric motor.

As part of a critical process system, unexpected failure would have resulted in production disruption, unplanned maintenance costs, and potential damage to associated components.

During routine scheduled condition monitoring, a significant increase in vibration was identified at both the pump drive-end and non-drive-end horizontal locations.

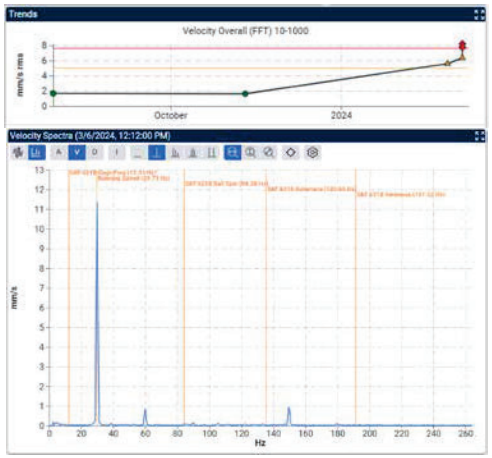
Vibration levels exceeded ISO 10816-7 alarm thresholds, indicating a risk of mechanical damage if left unaddressed.

THE APPROACH

The pump was monitored using the Machine Sentry® Mobile system as part of a structured condition monitoring programme. Data was collected during routine maintenance intervals and uploaded for remote review.

During monthly analysis, Westpower reliability engineers identified abnormal vibration trends and escalated the issue for further investigation. Detailed spectral analysis was conducted to determine the likely fault mechanism before any intrusive work was undertaken.

This approach ensured that maintenance actions were data-driven rather than reactive.



THE FINDINGS

Vibration spectra indicated a likely impeller unbalance condition. The amplitude levels and frequency characteristics aligned with unbalance signatures, prompting a recommendation for physical inspection.

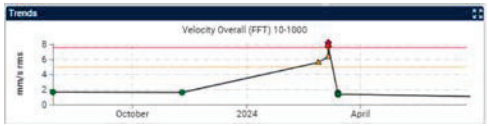
The pump was dismantled and the impeller visually inspected. It was found to be in excellent, near new condition, with no visible mechanical damage. Measured runouts were slightly above specification but insufficient to explain the elevated vibration levels.

Following collaborative discussions between Westpower reliability specialists and the site maintenance team, the decision was made to send the impeller to a local mechanical workshop for dynamic balancing to confirm or eliminate imbalance as the root cause.

THE SOLUTION

The mechanical workshop identified that the impeller was 90 grams out of balance. Dynamic balancing was carried out to correct the condition before the component was returned to site.

After reassembly and recommissioning, vibration levels reduced significantly from 7.8 mm/s RMS to 1.4 mm/s RMS, returning the asset to within acceptable ISO limits and close to its established baseline.



FOLLOW UP

Post-repair monitoring confirmed stable and satisfactory vibration levels. The intervention prevented prolonged operation under high vibration, which could have resulted in bearing damage, seal degradation, or reduced pump life.

This case demonstrates the value of combining skilled reliability engineering with structured vibration monitoring to validate root cause before corrective action is taken.

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