

MOTION AMPLIFICATION FOR STRUCTURAL FAULT DIAGNOSIS

Excessive vibration was detected at the motor drive end of a membrane blower. To pinpoint the root cause, AVT Reliability® proposed a Motion Amplification™ survey to visualise the asset's dynamic behaviour and support root cause analysis.

THE CHALLENGE

The membrane blower plays a critical role in wastewater treatment by aerating sewage to promote biological breakdown. Unexpected failure would compromise treatment efficiency, lead to environmental compliance issues, and risk plant downtime.

Structural faults can significantly affect reliability and performance if not identified early.

MACHINE SENTRY MOBILE (MSM2)

MSM2 is a wireless sensor designed for efficient vibration and temperature data collection. Its compact and wireless design makes it ideal for hard-to-reach locations, such as behind guards or on large moving machinery.

With a tri-axial accelerometer and temperature sensor, plus a fourth channel for external input, MSM2 provides accurate, repeatable measurements. Bluetooth® connectivity enables remote data upload to the Machine Sentry® software from up to 100 metres away.

Available with ATEX, IECEx, and Hazloc certification for use in hazardous environments.



OUR FINDINGS

Initial vibration analysis showed high amplitude across all three planes, with a notable imbalance between the drive end (DE) and non-drive end (NDE), particularly in the horizontal and vertical planes. Spectral data revealed a dominant peak at 1X running speed (50Hz), indicative of a potential structural resonance or lack of mechanical support.

Using Motion Amplification™, AVT captured high-speed video footage to amplify and visualise movement. With a 50mm lens, motion analysis revealed a fractured weld on the support structure at the motor drive end. The root cause was confirmed to be a compromised structural weld, reducing system integrity and amplifying vibration levels. A full report was issued to site with recommendations.



OUR APPROACH

AVT Reliability® deployed a Consultant Engineer to site with a Motion Amplification™ camera system. A Machine Sentry® mobile sensor was initially used to log vibration trends and confirm elevated levels. Once excessive vibration was confirmed, Motion Amplification™ was used to capture and analyse high-speed video from multiple angles and lens sizes.

The objective was to visualise dynamic movement under load and identify potential structural issues contributing to the vibration. The final report included annotated video evidence and spectral data to support diagnosis, enabling the maintenance team to take targeted corrective action.

THE SOLUTION

While AVT Reliability® did not carry out the physical rectification, our findings enabled the customer to plan the following maintenance actions:

- Conduct NDT (non-destructive testing) on all structural welds in the motor support frame
- Remove and re-weld all defective joints
- Perform a realignment between the motor and gearbox after weld repairs

These steps are being carried out by the site's internal maintenance team to restore asset integrity and ensure long-term reliability.



SERVICE MATTERS

FOLLOW UP

AVT Reliability® was engaged for a one-off diagnostic survey and is not currently contracted for routine condition monitoring at this site.

However, we have advised that a follow-up survey be conducted after repairs to confirm vibration levels have returned to acceptable thresholds.

If left unresolved, the cracked weld could have led to structural failure, resulting in asset damage, costly downtime, and potential health and safety risks due to uncontrolled vibration or misalignment.

AT A GLANCE

LOCATION: Glasgow, Scotland

INDUSTRY: Water

PROCESS: Wastewater management

EQUIPMENT: Membrane air blower

PRODUCTS: Machine Sentry® Mobile sensor, Motion Amplification™ camera

SERVICES: One-off diagnostic survey using Motion Amplification™

Need help?

Contact our experts

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