

CONDITION MONITORING SOLUTION FOR A MUNICIPAL WATER TREATMENT PLANT

Project: Municipal Water & Wastewater Distribution System

Community Population: 35,000

Number of Assets Monitored: 50

Asset Types: All Pumps, Motors, Fire Pumps



The Power of Prevention

Traditionally, condition monitoring solutions have been too costly and too complex for small-to-mid-sized municipalities. In towns and cities with dedicated water distribution and wastewater treatment facilities, the public relies on the municipality for safe, reliable, and uninterrupted service.



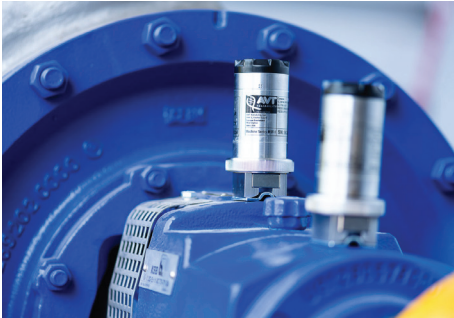
The Challenge:

When an Alberta town of 35,000 was searching for an affordable monitoring system to protect against critical failure of rotating equipment in its water treatment and distribution plant – they approached Westpower for an integrated solution. Without a water tower, it was imperative that the fire pumps would not fail in an emergency.

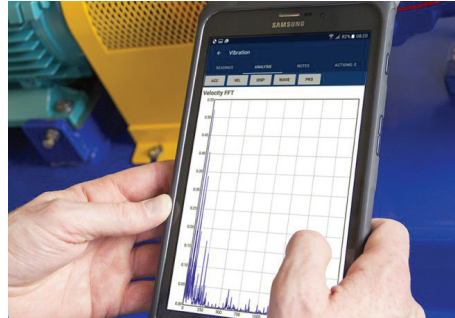
“They knew they needed to do more. But they didn’t know what.”
Matt Flannagan, RSE, VCATII - Field Service Millwright | Westpower

The Westpower Solution:

Westpower recommended a state-of-the-art wireless condition monitoring system from Machine Sentry®. Machine Sentry® is a unique asset reliability management solution that integrates and organizes data from all our products and condition monitoring techniques, enabling effective maintenance planning and management reporting. System hardware included:



Machine Sentry Mobile, and Fixed Sensors (3-Axis vibration and temperature monitoring)



Machine Sentry® Mobile Tablet



Machine Sentry® Online Cloud Monitoring Platform

Services Provided: Hardware & Software Supply | Database Set Up | Initial/On-Going Data Collection Training | Ongoing Monitoring and Analysis | Equipment Installation support | Repairs and Maintenance Support (all rotating equipment)

“This is the same technology our industrial clients depend on to prevent mission-critical shutdowns that can cost upwards of \$100,000/day.”
Austin Hunter, P.Eng. - Operations Lead | Westpower Reliability

KEY ADVANTAGES OF THE WESTPOWER SOLUTION:

- An easy, highly intuitive app-based monitoring platform
- Ability to proactively schedule and prioritize maintenance
- Wireless monitoring for vibration and temperature
- Helps avoid emergency repair (overtime) and hotshot fees
- Anytime, anywhere remote access and alerts
- Lower upfront and continuous monitoring costs
- Initial diagnosis via Automated Diagnostic Assistant (ADA™)
- Enhanced expert diagnosis and maintenance planning from Westpower

Four Years – 22 Major Issues Averted

Within the first four years of operation, Westpower’s condition monitoring system and analysis pre-emptively identified 22 high-priority actions requiring attention... saving the town untold costs and problems. The system has successfully identified concerns ranging from lubrication issues to bearing failures and severe misalignment.

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FIRE PUMP BOOSTER

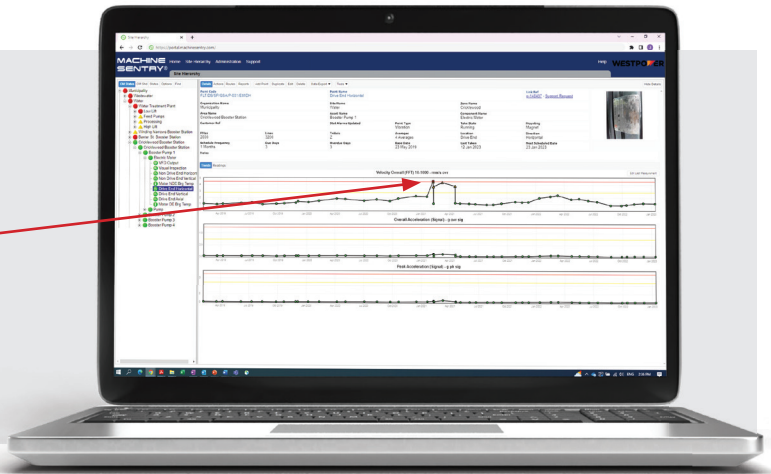
Repair or replace Fire Booster Pump gear drive.
Complete failure is imminent.

Avoid Unexpected Shutdowns | Reduce Repair & Maintenance Costs | Extend Product Life

IDENTIFIED CONCERN	CORRECTIVE ACTION	EFFECT LEFT UNCORRECTED
STRUCTURAL LOOSENESS AND/OR SOFT FOOT	Tighten bolts	Fatigue of equipment
PUMP OUT OF ALIGNMENT	Align	Seal damage, Bearing fault, Increased forces and fatigue
PUMP UNBALANCED	Field or shop balance	Bearing fault, Increased bearing wear
COMPLETE FAILURE IMMINENT	Refurbish or replace	Complete failure imminent
INADEQUATE LUBRICATION	Grease or lubricate	Bearing fault
TRANSIENT JUMP IN VIBRATION	Further analysis	
PUMP OPERATING OFF DESIGN POINT	Inspect impeller or volute for blockage	Increased wear, Increased temperature, Lower efficiency
EARLY STAGE BEARING FAULT	Increase monitoring frequency	Late stage bearing fault
LATE STAGE BEARING FAULT	Pull for overhaul	Bearing failure, Unplanned downtime, Collateral damage (seal, etc.)

All above can result in lower Mean Time Between Repair (MTBR)

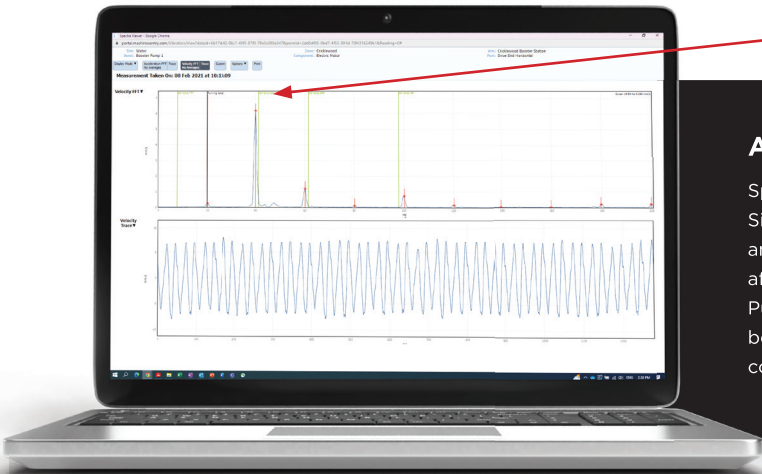
In February 2021, the Booster Pump 1 overall vibration levels jumped into alarm.



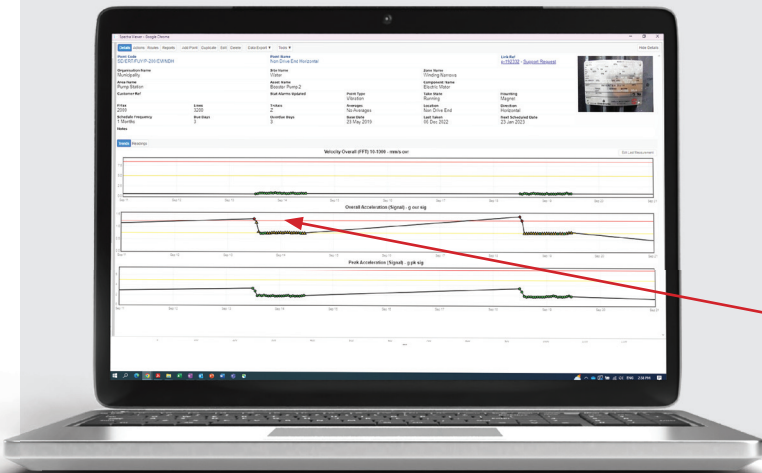
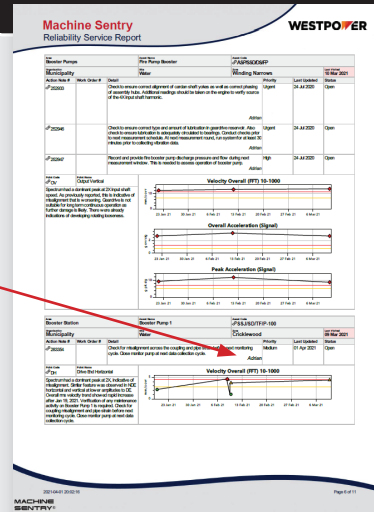
Analysis of the spectral data indicated possible misalignment.

ANALYSIS

Spectrum has a dominant peak at 2X, indicative of misalignment. Similar feature was observed in NDE horizontal and vertical at lower amplitudes to DE. Overall RMS velocity trend showed rapid increase after Jan 19, 2021. Verification of any maintenance activity on Booster Pump 1 is required. Check for coupling misalignment and pipe strain before next monitoring cycle. Close monitor pump at next data collection cycle.



An action was opened for the maintenance team in Machine Sentry.



PROBLEM

Operators were receiving spurious high vibration trips on a vertical turbine booster pump.

SOLUTION

Machine Sentry Fixed (MSF-2) Sensors were installed with magnet mounts on the problem pumps. They were set to collect data every 60 minutes with running detection. The issue was pin-pointed to pump startup and vibration data captured at this time was further analyzed.

A Detailed Process for Greater Control and Accountability

Knowing there is a sound process in place is vital to our municipal clients. Westpower guided our client through a rigorous, step-by-step process to provide the optimal solution.



STEP 1:
CONDITION MONITORING
PROGRAM CONSULTATION



STEP 2:
ASSET & COMPONENT
IDENTIFICATION



STEP 3:
SENSOR INSTALLATION &
SOFTWARE PLATFORM
CONFIGURATION



STEP 4:
TEAM TRAINING



STEP 5:
REGULAR DATA ANALYSIS
& ONGOING PROGRAM
MAINTENANCE

Support beyond the data.

Westpower's experienced team of rotating equipment engineers, millwrights and reliability specialists provide ongoing support for your team.

World-Class Performance on a Budget-Friendly Platform

By deploying the Machine Sentry® platform, Westpower was able to offer our municipal client a world-class industrial solution at a fraction of the cost of more complex alternatives. Ask us for a quote.

Contact Westpower to Discuss Your Condition Monitoring Needs

Full-turnkey solutions for water and wastewater plants of all sizes.

☎ 403.720.3300 ✉ reliability@westpowergroup.com westpowergroup.com

WESTPOWER HELPS YOU REALIZE YOUR POTENTIAL.

At Westpower, our goal is to help you lower your total cost of ownership. We've provided industry-leading rotating equipment solutions to municipal and industrial clients across North America for over 25 years. Our team supports you at every step of the equipment lifecycle through our comprehensive service offering.

New Equipment | Fabricated Process Systems | Installment & Commissioning | Equipment Diagnostics | Repair and Field Services | Operations Optimization