



JPS Reliability

A Reliable Plant is a Profitable Plant

Case Studies #2

Reality towards Theory

Working with MIRCE Science

PROfessional services for PROactive maintenance



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INTRODUCTION

- ➞ This presentation is to showcase a selection of engineering issues from various clients we have worked with to determine the **Failure; Cause, Mechanism** and **Mode** in order to envision the elimination of common preventable failures
- ➞ Reliability Engineers and Maintenance Engineers/Teams have historically been separate entities and for a facility to be truly profitable there must be a science that links them
- ➞ We have been working with **MIRCE Akademy** to integrate the observed **Reality** and established **Theory**
- ➞ MIRCE Science is where the Theory is and the Reality is what the Maintenance and Condition Monitoring Teams observe daily in practice



CASE STUDIES #2



The integration of the **MIRCE Science Theory** and **JPS Reliability Reality** is illustrated through the following 6 case studies:

- Electrical Motor Terminal Connection Defect
 - **Standby Fan Motor Defect**
 - Variable Frequency Drive Deterioration
 - Vibrating Screen Gearbox Bearing Defect
 - 4 Point Contact Bearing 23RPM Defect
 - Dynamic Vibration Absorber
-
- Each slide we will discuss how the defect was detected and what actions were/were not put in place to protect the functionality of the system



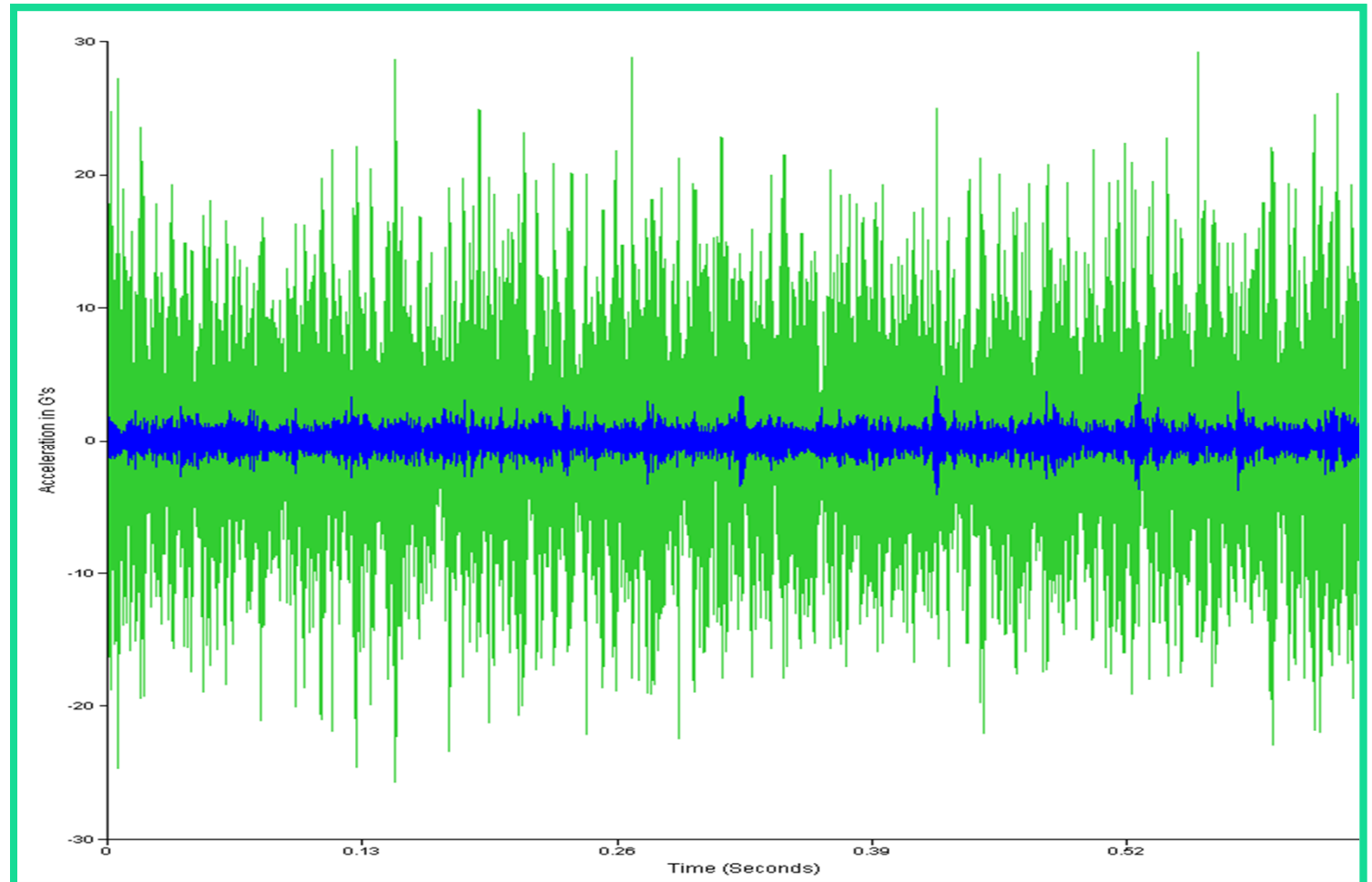
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CASE 2

FAN MOTOR – ACCELERATION

- ➞ This overlay comparison of Acceleration Time data (in blue) and Fan 2 data (in green)
- ➞ This highlights the very high destructive levels at the drive end bearing, on Fan 2 and that it was close to failure



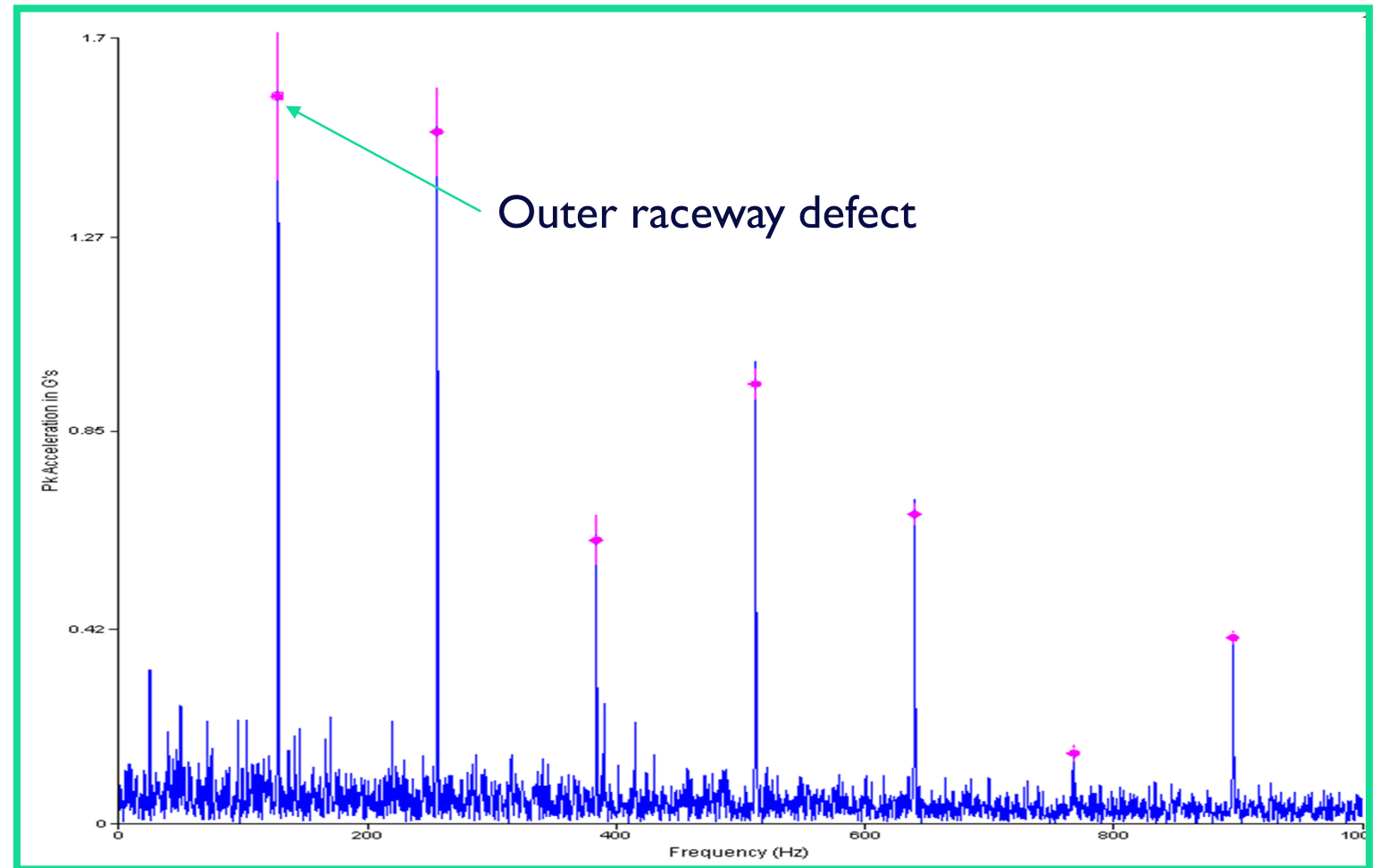


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CASE 2

FAN MOTOR - PEAKVUE

- ➞ The PeakVue spectrum confirmed that this activity was a periodic non-synchronous signal
- ➞ This is at the calculated order frequency for an outer raceway defect

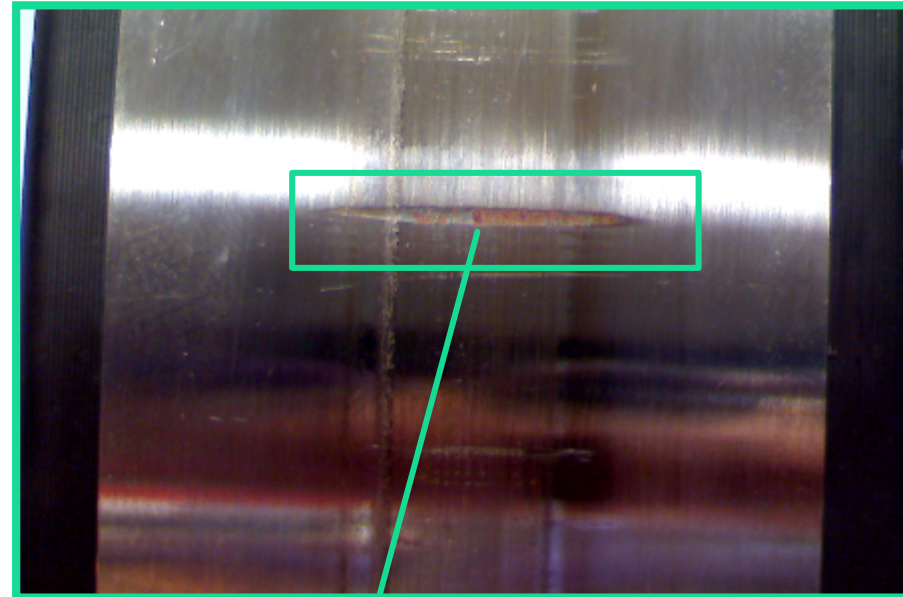




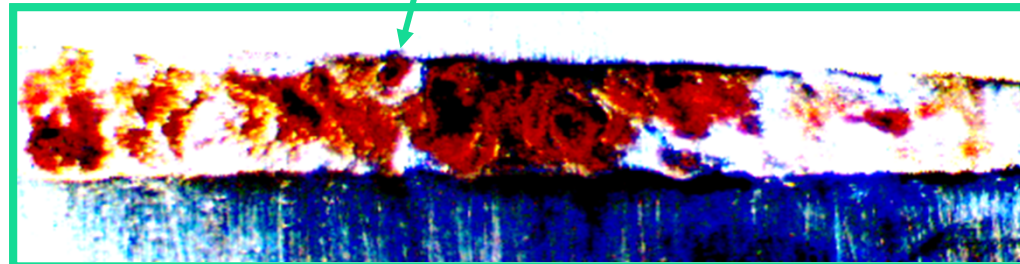
CASE 2

FAN MOTOR - FINDINGS

- ☞ The left image shows the grease in a poor condition and the right image shows image false Brinelling indetention on the inner raceway



- ☞ Rust at the bottom of the depressions. This is caused by oxidation of the detached particles





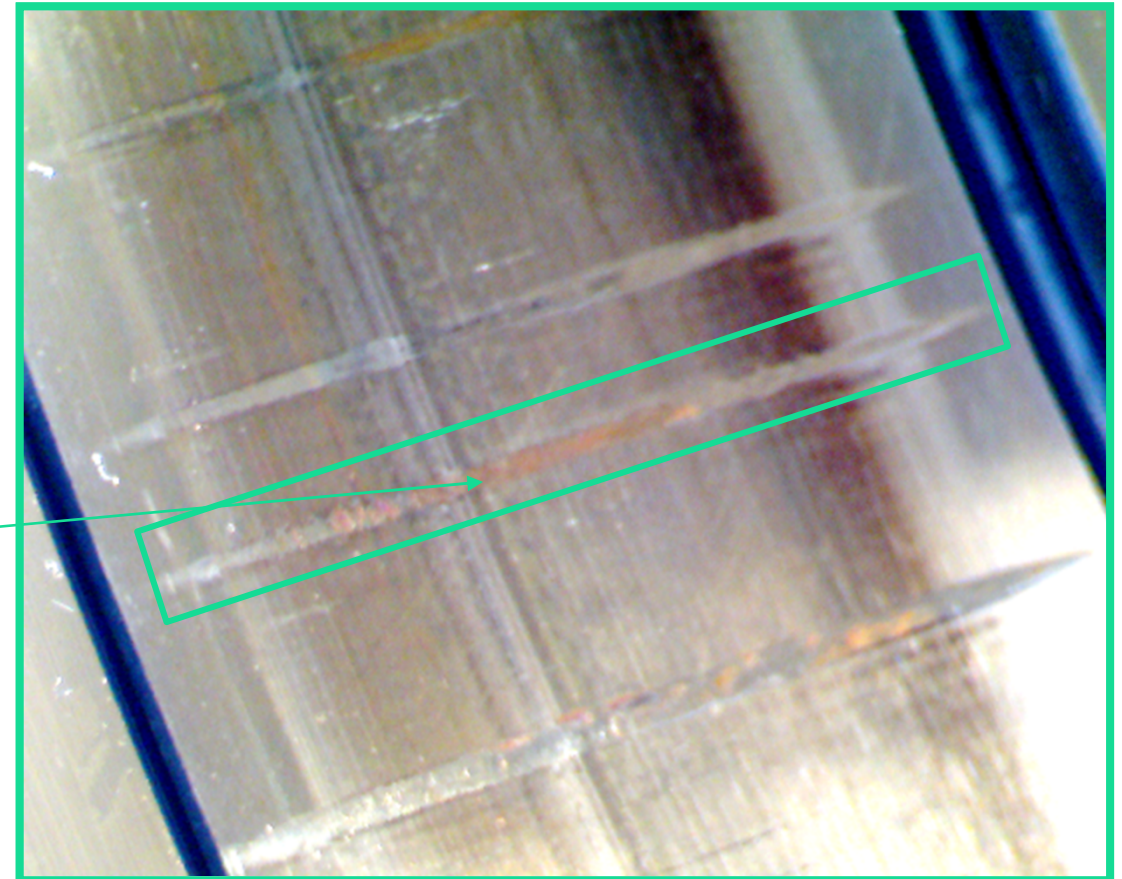
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CASE 2

FAN MOTOR - FINDINGS

- Below is an image of the outer raceway in the load zone showing the false Brinelling. This is only present in the load zone, and a more dominant defect than the inner raceway defect
- Rust at the bottom of the depressions. This is caused by oxidation of the detached particles





CASE 2

MIRCE EVALUATION

- ➞ The **Failure Cause** was **Insufficient isolation of external vibration sources**
- ➞ The **Mechanism of Failure** was **False Brinelling**
- ➞ The **Failure Mode** was **Vibration**

Summary:

Transfer of the load/stress through the factory foundation generated the mechanism of false brinelling, that was manifested through vibration as the mode of failure

This was detected and a negative functionality event was prevented by controlled replacement of the bearings



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HOW WE CAN HELP



When a business requires support with or development of Health Based Maintenance we work in partnership in;

Upskill your team with Practical Mentoring in

- Ultrasound Airborne and Structural Borne
- Infrared Thermography-Low Voltage, Mechanical and Process
- Vibration Analysis
- General Maintenance Practices
- Practical Reliability Engineering

Contracted Reliability Services

- Contemporary Condition Monitoring consultancy to assist clients with the management of their Health Based Maintenance program



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TECHNOLOGIES AND SERVICES

Vibration Analysis

Unbalance
Looseness
Resonance
Pump issues
Gear faults/wear
Inadequate lubrication
Bearings
Steam traps/valves

Lubrication

Gear faults/wear
Wrong oil/mixed
Oil degradation
Contamination
Fuel dilution
Leaking seals
Bearings
Overheating

Thermography

Bearings
Overheating
Steam traps/valves
Flammable gas leaks
HV issues
Electrical wiring faults
Heat exchanger blockage
Refractory applications

Ultrasound

Inadequate lubrication
Steam traps/valves
Bearings
Flammable gas / air leaks
HV issues
Corona discharge arcing
Heat exchanger tubes/plate



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ABOUT JPS RELIABILITY

Over 40 years' combined experience in the fields of Condition Monitoring, Practical Reliability Engineering and Maintenance Practices.

Worked with many of the Blue-Chip companies in the UK and Australia.

Our experiences ranges from Lubrication, Thermal Imaging, Vibration Analysis, Ultrasound, NDT, Maintenance Planning, Maintenance Improvements, Project Management and Mechanical Maintenance including on-site Dynamic Balancing and Laser Alignment.

We are qualified to ISO 18436-2 VA Level 3, ISO 18436-4 LM Level 2, ASNT-SN-TC-IA IRT Level 2, ASNT-SN-TC-IA UT Airborne Level I & Asset Reliability Practitioner Category I (ARP).

Registered with Engineers Australia in the Mechanical College, Engineering Council UK as Engineering Technician and with the British Institute for Non-Destructive Testing as an Associate Member.

Author of “ [Enhanced System Reliability Through Vibration Technology](#)” ISBN 978-1-5272-5386-5.



MIRCE SCIENCE APPROACH

The MIRCE Akademy is an independent institution engaged in scientific, educational, literary and professional endeavours to advance and apply the knowledge of MIRCE Science. Our contribution to engineering and management professions is the body of knowledge that is essential for designing and managing the life of working systems in a manner that delivers the maximum reliability and effectiveness, with the least possible investment in resources and impact on the environment.

MIRCE Science comprises of mathematical axioms, equations and methods that enable predictions of expected functionability performance of the future functionability system type to be done, based on the complex, time-dependent, interactions between physical properties of consisting components and applied functionability rules regarding operation, maintenance and support processes.

Dr Jezdimir Knezevic, Founder and President.

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