FLUKE® Reliability

Best Practices Webinar: Simplify Your Maintenance Strategy: Connected Reliability in Action

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Meet the Speaker

Dr. Leslie Moyo

Director, Optimal

- Over two decades of experience driving operational excellence in Asset Management across energy, oil & gas, mining and manufacturing sectors
- Doctorate from Strathclyde Business School, MBA from Robert Gordon University and MSc in Safety, Risk and Reliability Engineering from Heriot Watt University
- Bsc (Hons) in Mechanical Engineering
- IAM Diploma in Advanced Asset Management

Industry Challenges & Opportunities

Predictive maintenance can enable a **10-20% reduction in OPEX**

Asset failures

82%

82% of asset failures are random*

Unscheduled downtime avoidance

USD$25K - 500k

Average cost of industrial asset downtime/hour *

Safety risk management

Major accident hazards

Failure to address major accident hazards leads to injury, loss of profits and reputational damage

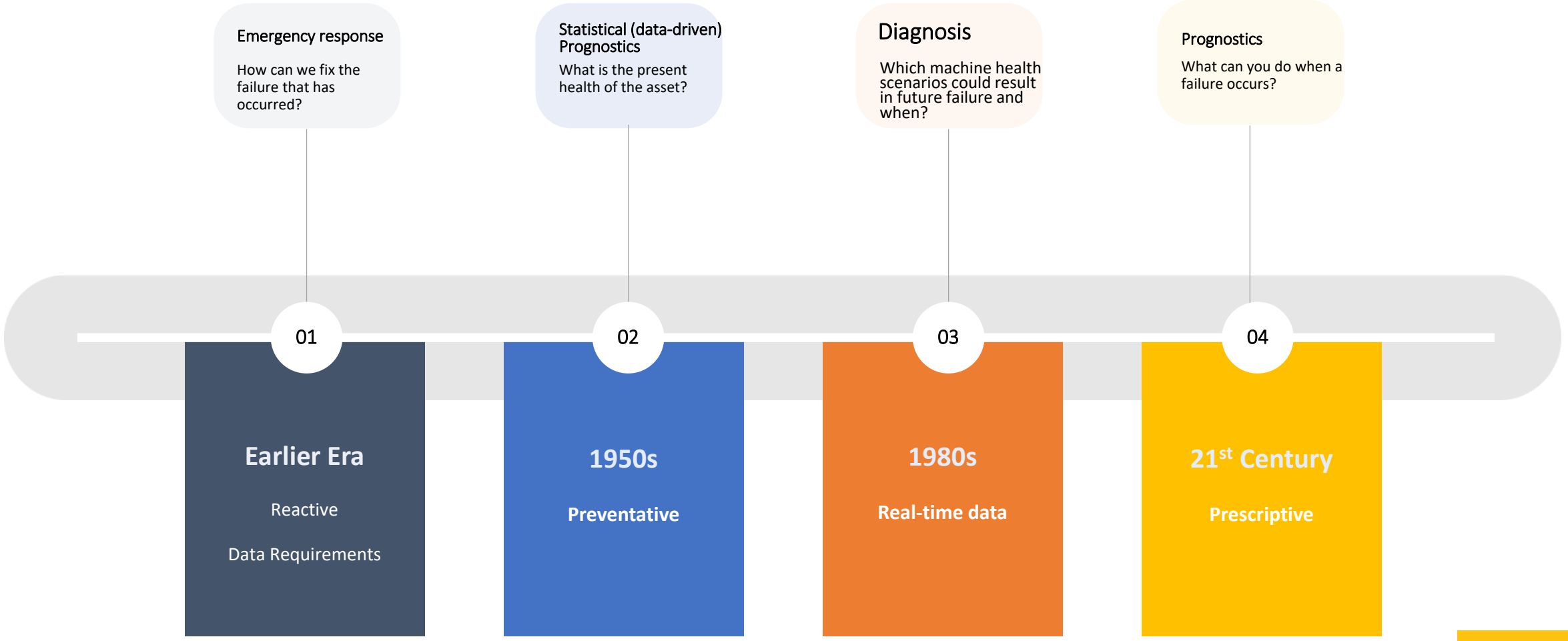
Maintenance and performance optimisation Cost / Benefit

25:1 to 50:1

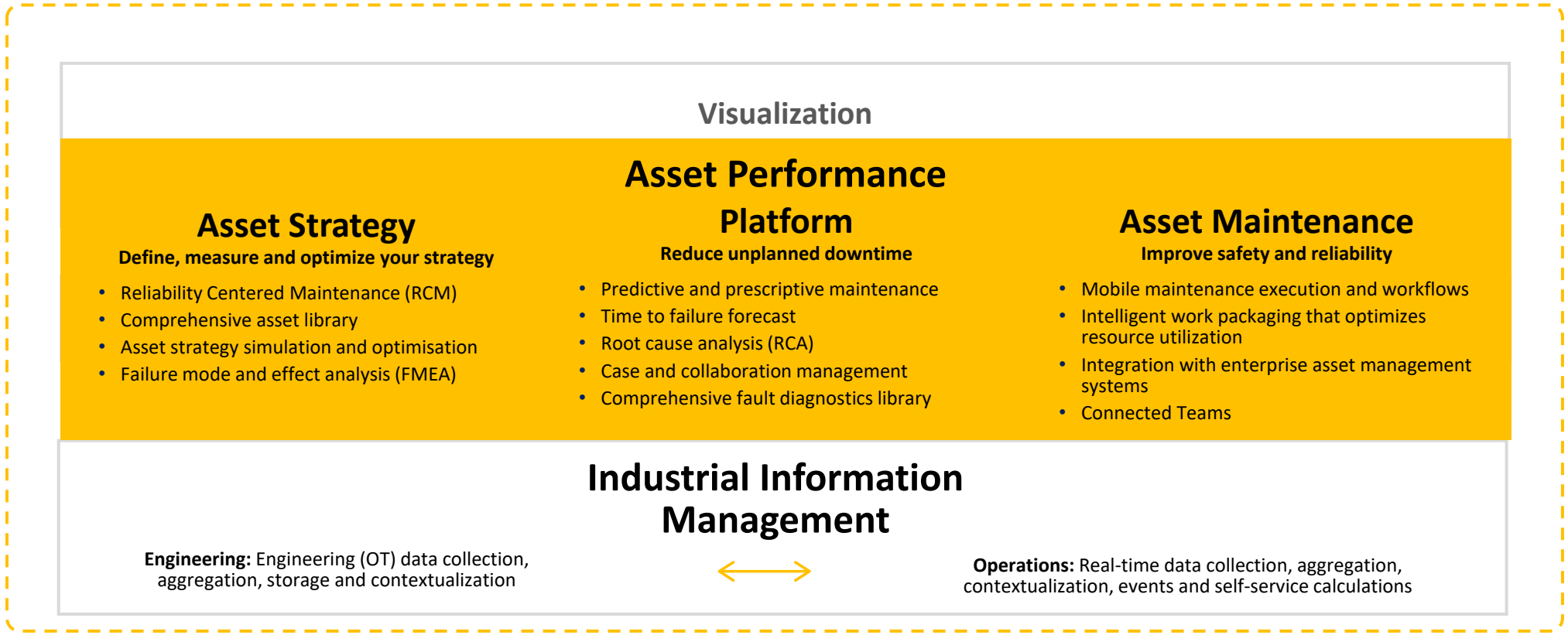
An implementations requiring a $10,000 to $20,000 investment in condition-based maintenance which translate into approximately $500,000 in savings *

**Contact us for source list*

Contemporary Maintenance Evolution



Connected Reliability In Practice



Asset Reliability Library

The Optimal Asset Library contains RCM-based equipment failure data and preventive maintenance for the most commonly found asset types in asset-intensive industries

Combines OREDA data, SAE standards and ISO 14224 refined through RCM studies

- ~ 750 Equipment Items
- 35 000+ **Maintainable Items**

- 25 000+ Defined **Equipment Functions**

- 10 000+ **Failure Causes**
- 28 000+ **Failure Modes**

- Maintenance Strategy tasks; Preventative Fixed Time tasks with Limits

- Fault Find intervals & Condition Based tasks
- Materials required for typical tasks

- Associated Labour & Durations to complete tasks

Maintenance Strategy Development & Optimization

Asset Hierarchy

- Master Equipment List (MEL) to derive the equipment functional hierarchy

Failure Mode Definition

- Identify the failure modes which maintenance should address

FMECA

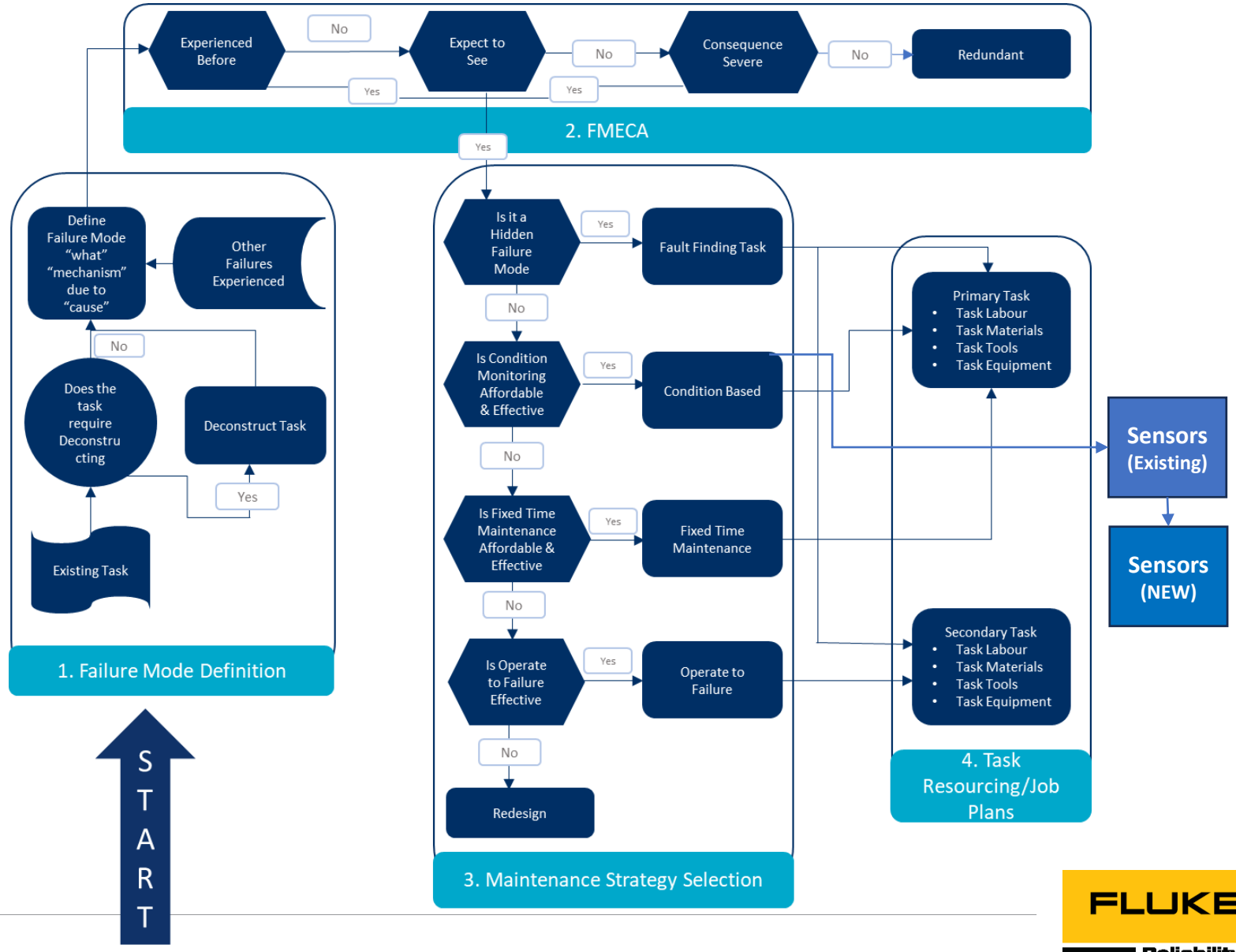
- Understand the impact of failure (criticality analysis)
- How to detect the failure

Create new maintenance plans & tasks

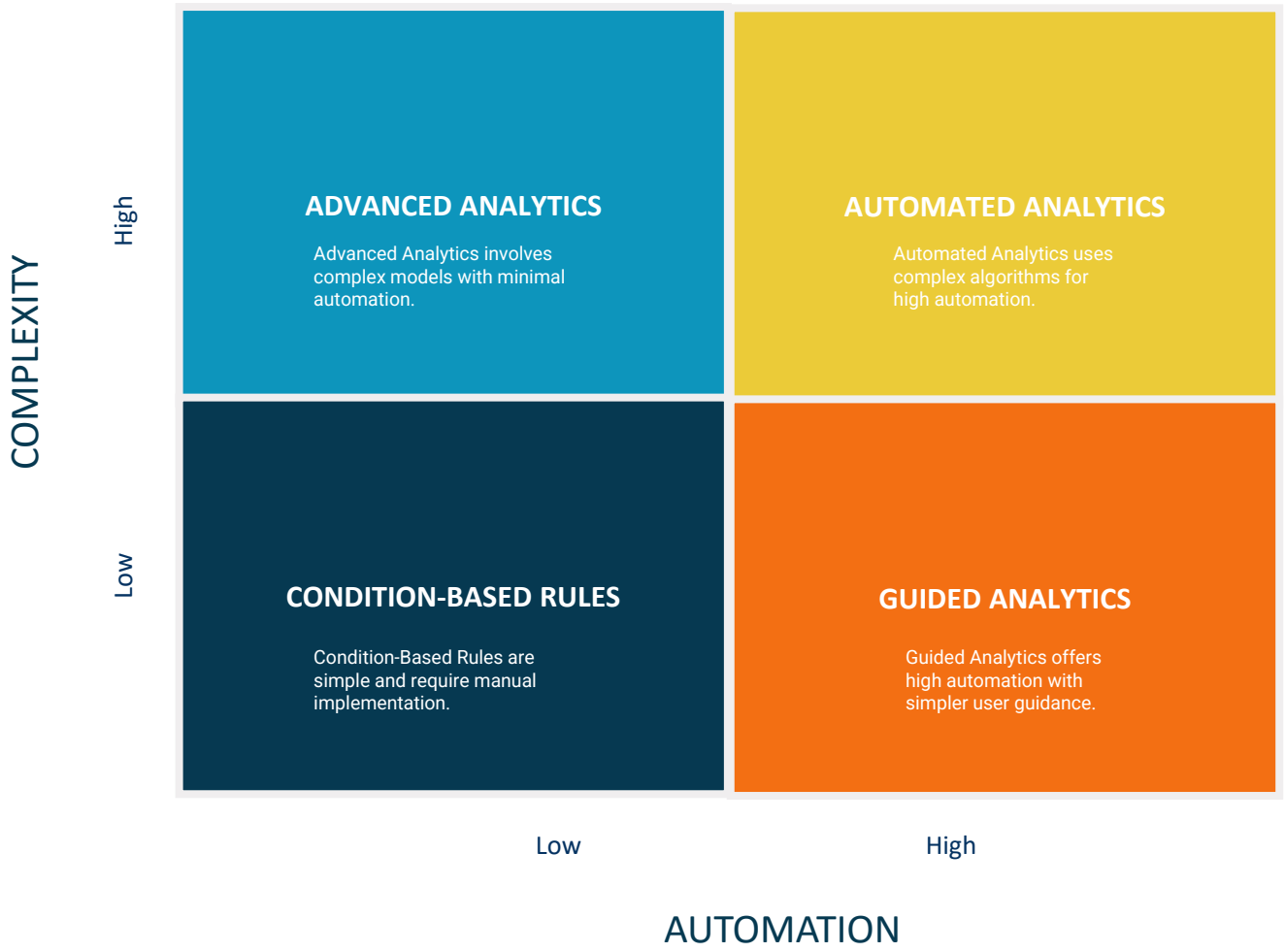
- Tactic selection for each failure mode
- Task derivation for each failure mode

Task Resourcing

- Identification of all maintenance resources
- Traceability of maintenance costs



Predictive Maintenance Analytics Approaches



Meet the Speaker

Zulfikar Umar

Fluke Reliability Systems Manager, Africa

- Seasoned Vibration Analyst with over 25 years field experience in Predictive Maintenance and Asset Efficiency Optimization on rotating equipment
- Focus on Connected Technologies and Remote Diagnostics and Cloud based solutions
- Passionate about the product, software and services that drive the Connected Reliability Journey towards operational success.
- BTech Mech Eng, VA CAT3, IR CAT2

5 Steps to running an effective condition monitoring program

- Reviewing Your Asset List
- Identifying The Right Technology
- Defining The Need
- Commercial Motivation
- Show Casing Success

Innovative Software Solutions

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Purpose-built Tools

AZIMA DLI

PRÜFTECHNIK

Connected Reliability Ecosystem

Asset and Condition Knowledge

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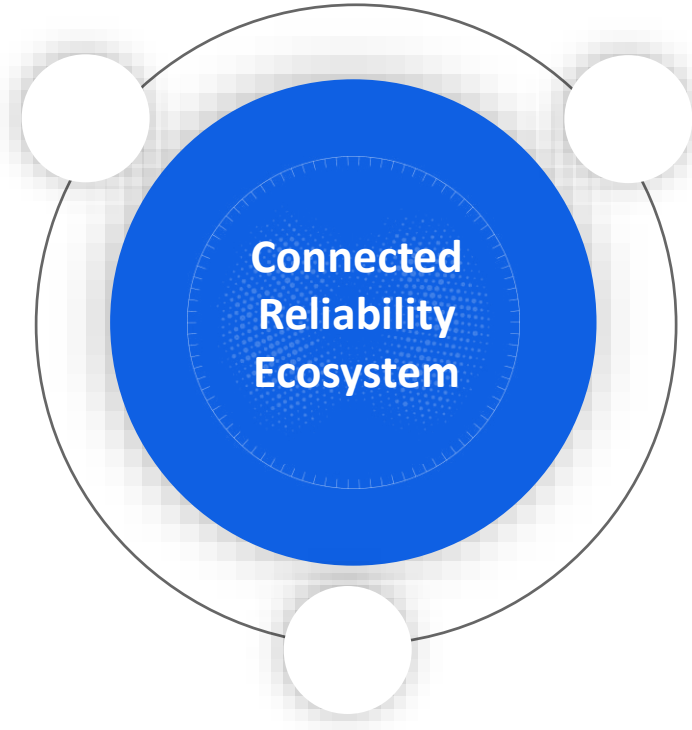
The question on every maintenance managers mind

How to do it ?

"For a program to be successful, it needs to be
- easy to implement,
- simple to manage,
- affordable,
- and effective"

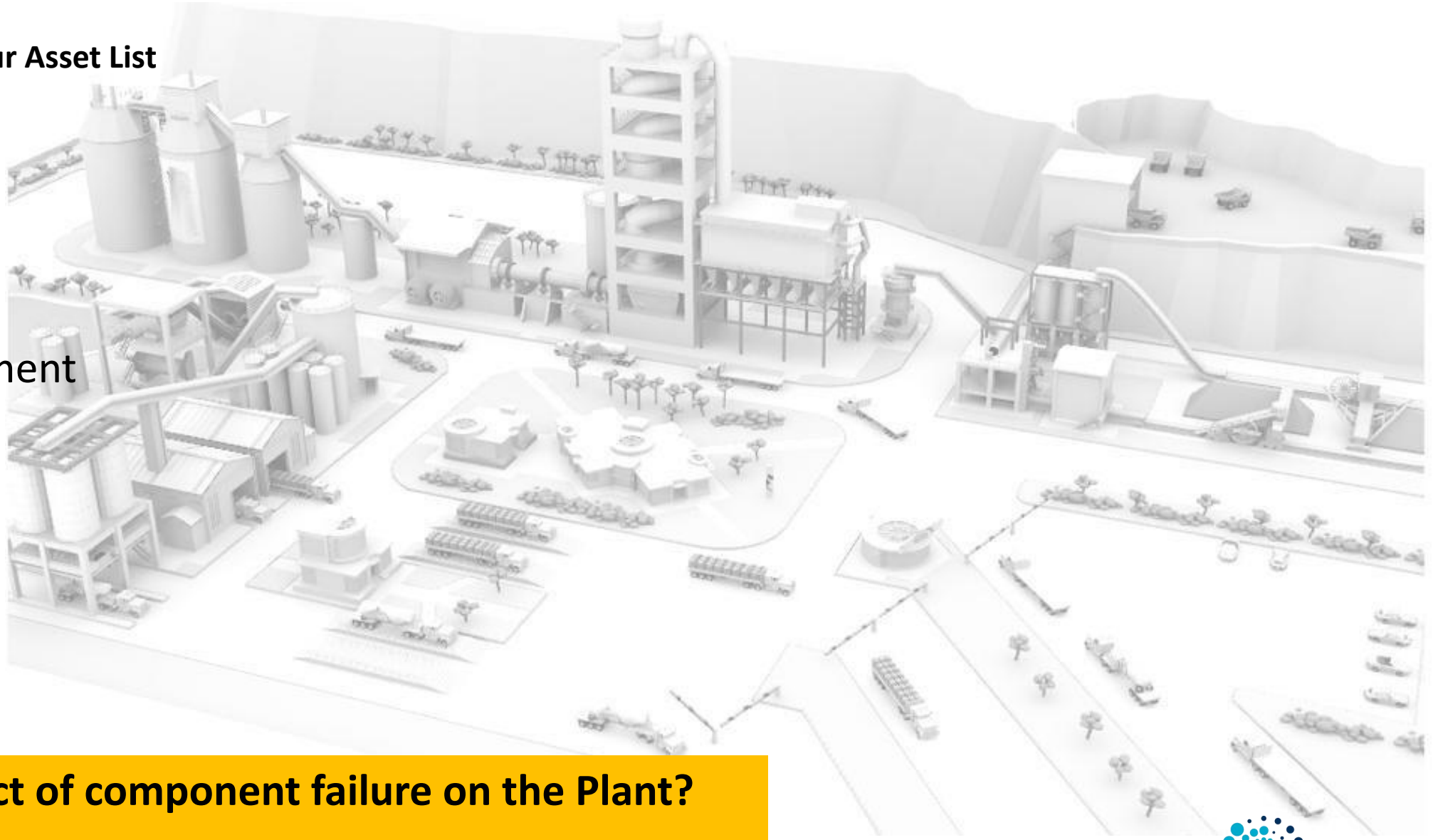
Innovative Software Solutions

Purpose-built Tools



Asset and Condition Knowledge

1. Reviewing Your Asset List



Know your Plant

- Type of equipment
- Classification
  - Simple
  - Complex
- Criticality

What is the impact of component failure on the Plant?

2. Identifying The Right Technology

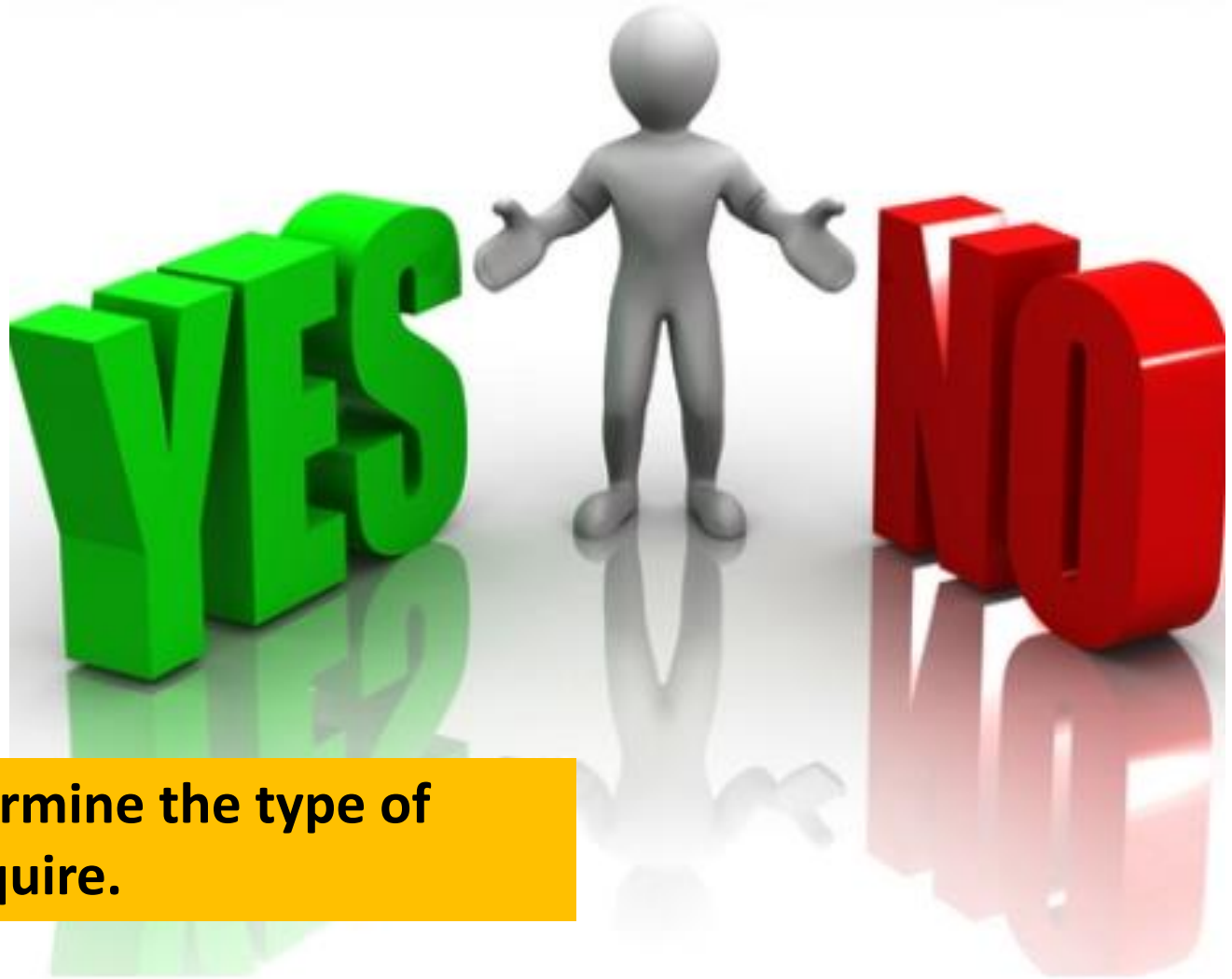
- Infrared Thermography
- Acoustic Imaging
- Oil Sampling
- Vibration Analysis

Typically, a mix of these technologies will be needed on most plants and manufacturing facilities.

3. Defining The Need

Does your team have the skillset to use the technology?

Does your team have the ability to analyse the data and provide meaningful recommended actions?



These two questions will ultimately determine the type of condition monitoring equipment you acquire.

4. Commercial Motivation

Determine the Impact of failure on the business

- Cost of unplanned stoppage
- Quantify cost of spare part inventory
- Outsourced repair or maintenance cost
- Production losses

“Purchase equipment that meets your need and is upgradeable and include upskilling of the team to your plan”

5. Show Casing Your Success

Implement the routine religiously and act on your findings

- Track your hit rate
- Assign impact of failure
- Close the gap
- Quantify averted failures
- Reassess your goals and improve

Work with the right Reliability Partner for your business needs

Case Study

Meet the Speaker

Shalom Ndlovu

Principal Consultant: Optimal

- Principal Consultant with over a decade of experience in Asset Management and Reliability Engineering
- Track record of improving asset performance across mining, energy, and industrial operations
- Skilled in developing maintenance strategies, operational readiness plans, and implementing ISO 55000 frameworks
- Currently pursuing a Master's in Engineering Management, specializing in Asset Management
- Holds an Bachelor of Engineering (Honours) in Industrial and Manufacturing Engineering

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Case Study: High-Resolution Wireless Vibration Solution at a Municipal Water Processing Plant.

Client Overview

•Bulk water supplier in Limpopo, South Africa
•Expanding mandate into North West Province
•Mission: Ensure water reliability and infrastructure health
•Challenge: Frequent unplanned downtime due to equipment failure

Problem Statement

•**Reactive maintenance culture** leading to:
- Unexpected equipment failures
- High maintenance costs
- Lost production time

•**Lack of visibility** into real-time equipment health
•**No predictive capability** to detect degradation early

Objectives

•Detect anomalies using real-time and historical data
•Enable early warnings of asset failure
•Deliver user-friendly dashboards and actionable alerts
•Prove return on investment via value tracking

The Shift to Connected Reliability

Software: Azima DLI
Hardware: Watchman AIR sensors and gateways
Features:
- **Watchman AIR™**: Wireless vibration sensors
- **ExpertALERT™**: Automated diagnostics
- **Watchman 360™**: Web-based insights, reporting, and analysis
- Real-time anomaly detection, 6,000+ diagnostic rules
- Machine learning fault prediction
- Online access via cloud portal
- Integration with CMMS and Historian

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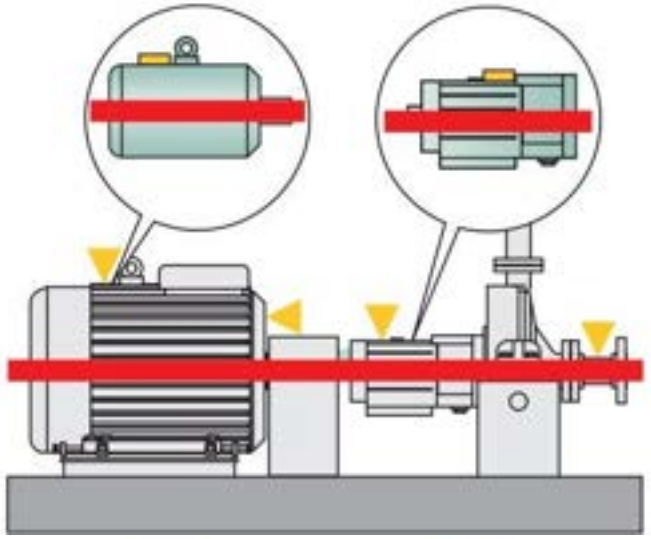
System Architecture

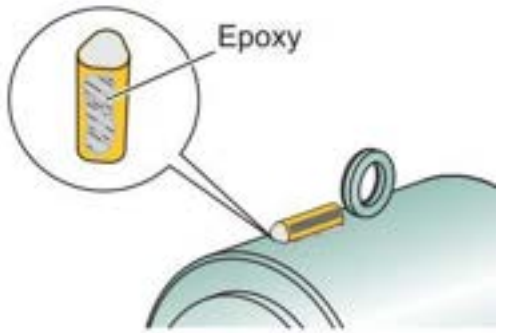
Accel 360 wireless sensors
Mesh network
- Self-healing and adaptive
- More reliable than many Wi-Fi sensors

Accel Gateway
Cloud-ready
- Wi-Fi, LAN, ethernet
- Cellular LTE
- Standard or industrial IP-66/67

Alert 5 diagnostic software
Automated diagnostic engine
- Fully automated fault detection
- 6,000+ diagnostic rules
- 1,200+ component fault types

PredictivePortal™
User portal
- Alerts and notifications
- Asset, plant, corporate health score
- Cloud-based fault diagnosis, fault severity
- Prioritized repair actions





High-resolution vibration

Long battery life

Mesh network

Wireless vibration

Accel 310

Frequency range: 10Hz to 10kHz
High range, with FFT to 10KHz provides most common component and fault feature identification.

Sample rate: 26.7 kHz
Best sample rate to support proprietary Impact Demod early bearing fault detection.

Max input range: +/-16 G
Capture higher quality data from more assets with a wide dynamic input range.

Max FFT resolution: 0.24 Hz
Resolve spectra down to 0.24 Hz with Fmax of 386 Hz at 1600 lines to best identify frequencies of interest.

Asset Dashboard

KSB Pump 4 Dashboard

Showing Data for:
Europe/London, UTC+00:00

Health Score

75%
18 Apr 2025, 06:31 AM
0 100
-2 Compared to 17 Apr 2025, 06:03 AM

Asset Info

Scalar Values

View Details →

Alarms Summary

	Critical	Warning	OK
Velocity	0	0	3
Temp.	0	0	3

Active / Total Locations : 3 / 3

Last Collection **18 Apr 2025, 10:33 PM**

Latest Diagnostic Result

View Historic Diagnostic Results →

Apr 18, 2025, 06:31 AM

Identified Problems

- MODERATE — Motor Bearing Wear
- MODERATE — No data available from test position(s) 3.
- SLIGHT — Pump Free End Roller Bearing Wear

Recommended Actions

- DESIRABLE — Retest All Machine Components
  ALRT-23579 - **OPEN**
- DESIRABLE — Increase Monitoring to Trend for Increased Vibration
  ALRT-23580 - **OPEN**

OK **Confidence**

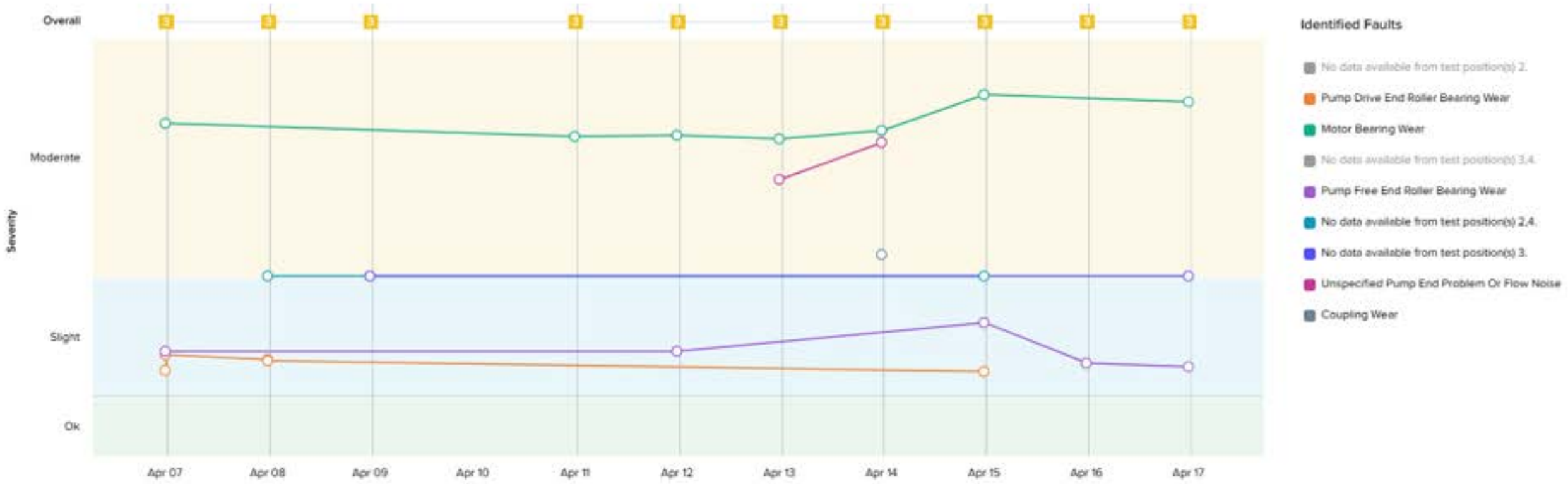
45% **Completion Profile**
Needs Motor Bars, Pump Vanes, more averages

Analyst Comments
–

Cited Peaks
Click here to view cited peaks

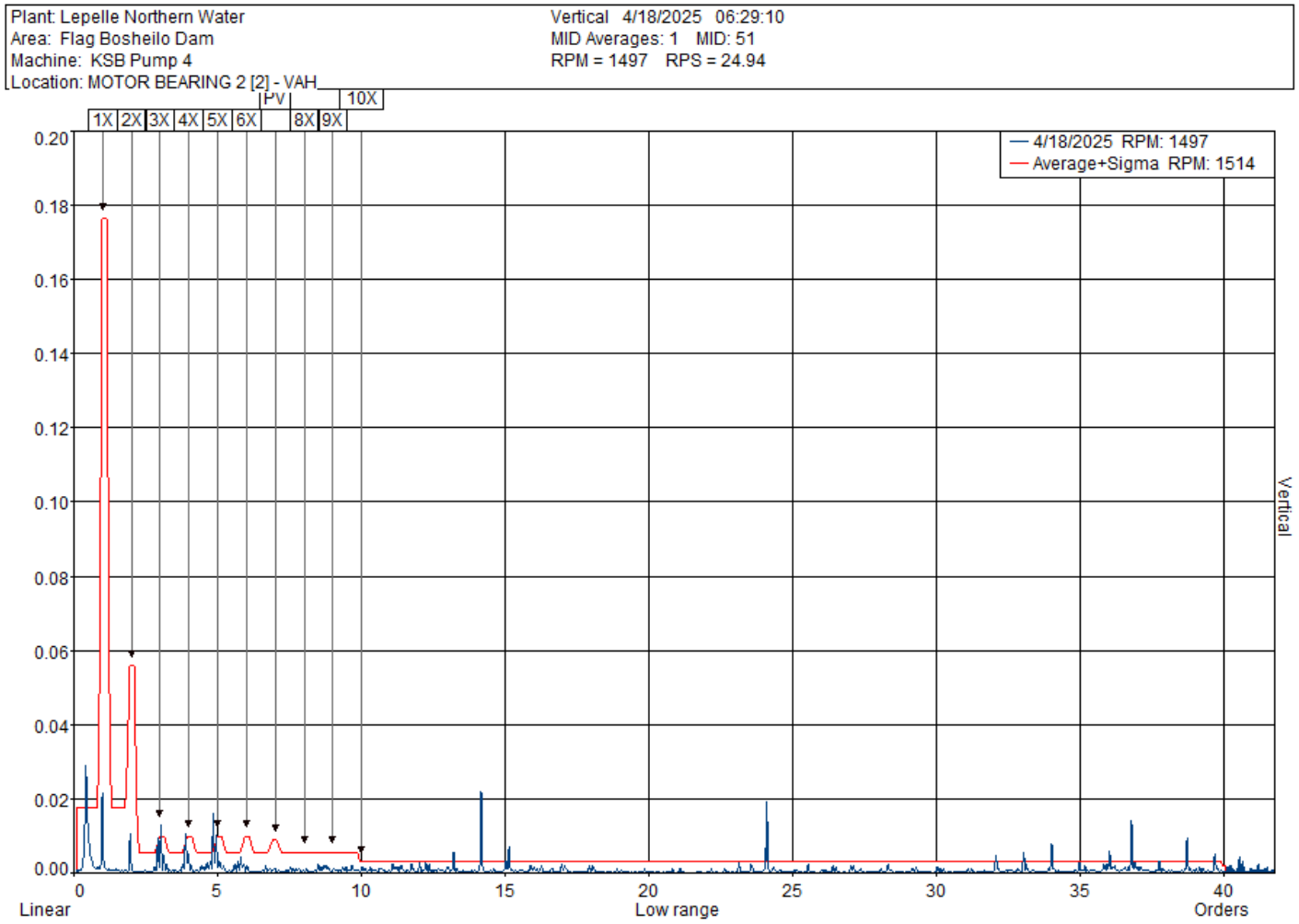
Analyst
Nitin Jadhav

Asset Severity Trend



Diagnostics Graphs

MOTOR BEARING 2 | Spectra | Single | Low Range | Vertical | 18 Apr 2025 06:31 AM



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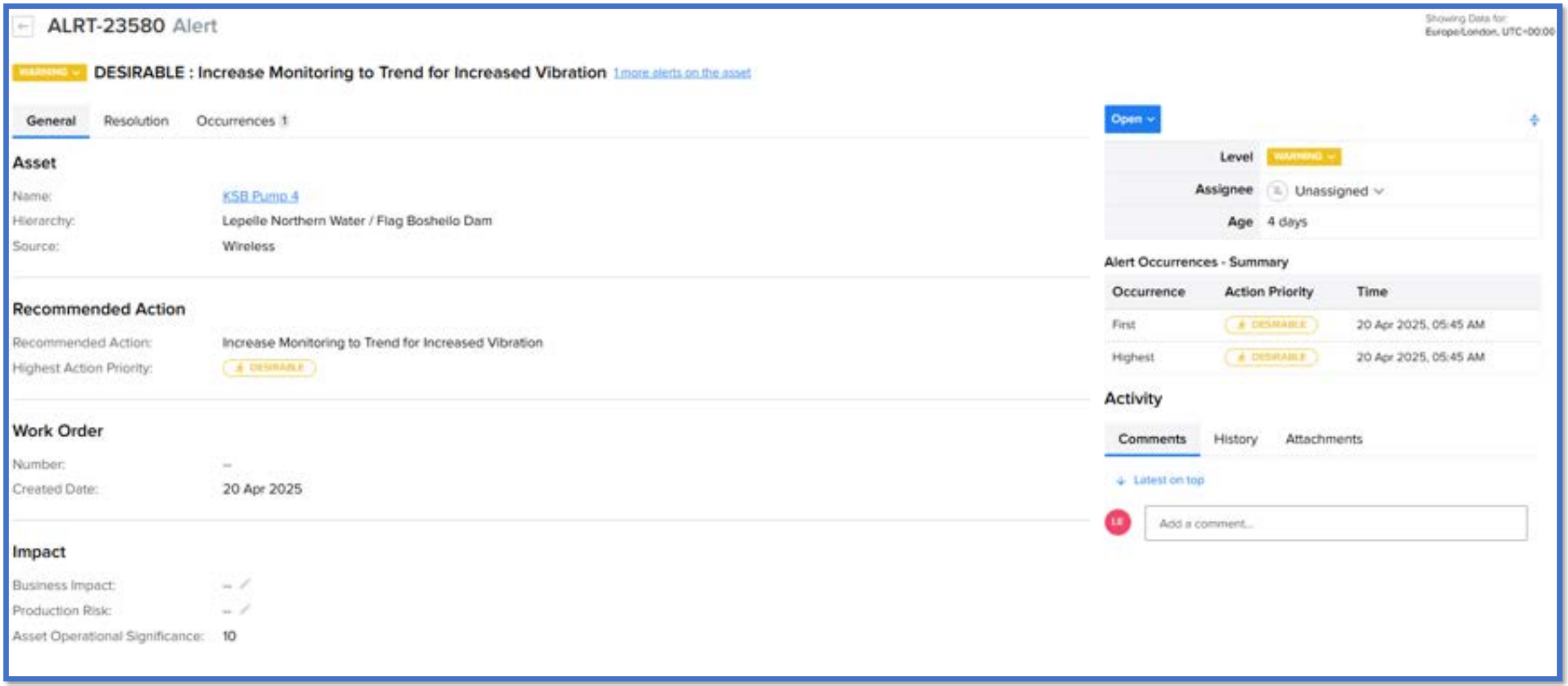
Alert Management



Real Results – Benefits Already Gained

Early wins from the deployment:

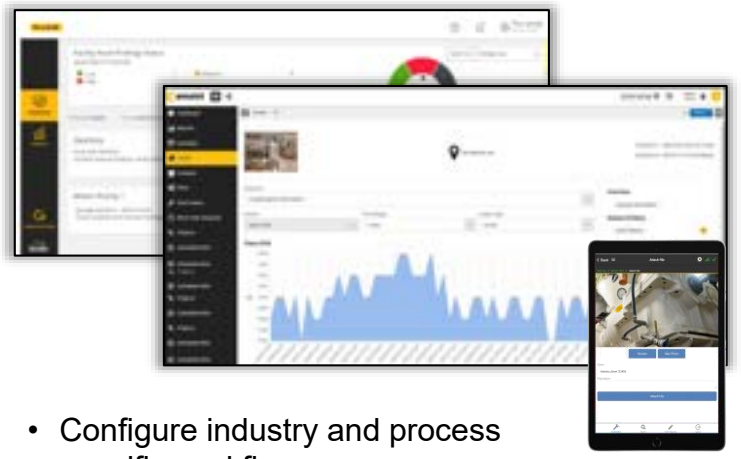
- **Critical issues already detected:**
  The system has already picked up emerging faults on key pump and motor assets.
- **Real-time alerts enabled proactive maintenance:**
  Engineers were able to intervene before failures, preventing costly downtime.
- **Ongoing co-monitoring in place:**
  Anomalies are being tracked and reviewed weekly, building trust in the system.
- **Improved decision-making:**
  Maintenance teams are prioritizing work based on fault severity and equipment risk.
- **No additional IT burden**:
  Cloud-based platform required minimal IT involvement—fast setup, fast results.
- **Scalable foundation**:
  The solution has proven effective and is ready to be rolled out to more assets.

"We're no longer reacting—we're anticipating. That's a major mindset shift."

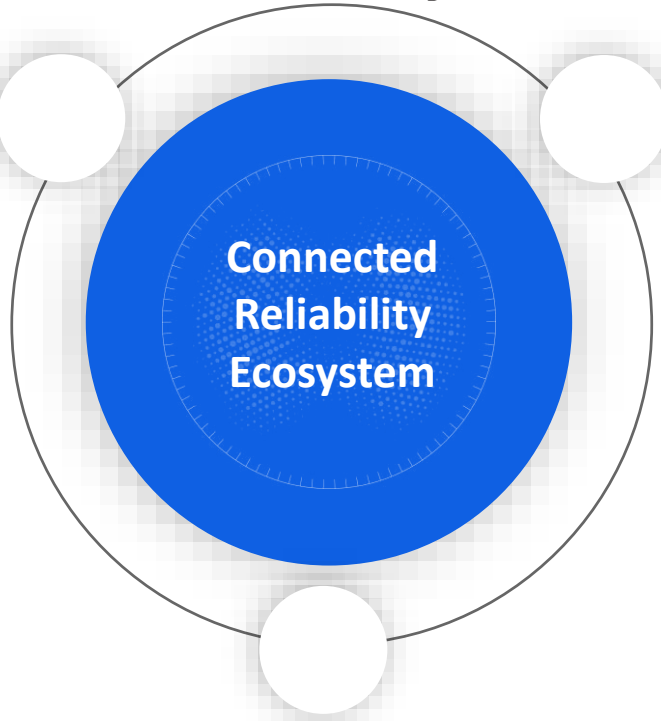
Fluke Capabilities

Building a Connected Reliability Ecosystem

Innovative Software Solutions



- Configure industry and process specific workflows
- Open solution/ integration capabilities
- In-depth analysis, issue tracking, predictive maintenance



Asset and Condition Knowledge

In-house/onsite expertise

Remote expertise

AI analysis

Purpose-built Tools

Continuous / periodic vibration monitoring

Route-based or incident-based data collection and analysis for vibration and balancing

Mitigate alignment related issues during Install/ Refurbish/ Repair

Other modalities like acoustic, thermal and power condition

Innovative Software Solutions

CMMS, Auto Diagnostic & Software
eMaint CMMS System
Expert Alert Diagnostic
Omnitrend Centre
Fluke Connect

Service Solutions

Field Service & Remote Diagnostics
Centralign
Levalign
Paralign
Vibration Assessment
Turbine Assessment & Balancing
Asset Reliability Practioner Cat1, Cat2
Product Repair & Calibration
Remote Diagnostic

Asset and Condition Knowledge

Mobius Certification Training
Vibration Analysis Cat 1, Cat2, Cat3, Cat4
Asset Reliability Practioner Cat1, Cat2

Product Training
Laser Alignment 1,2,
Vibration Seminar Level1,2,3
Machine diagnostic
Field Balancing
Roller Bearing Diagnostics
Gearbox Diagnostics
VibXpert & Omnitrend Centre
VibScanner & Omnitrend Centre

Purpose-built Tools

Laser Alignment Tools
Shaftalign Touch
Optalign Touch
Rotalign Touch / Rotalign Touch EX

Pullalign
Levalign Expert

Vibration Analysis & Balancing
Fluke 805 FC/ES
VibScanner 2 / VibScanner 2 EX
VibXpert 2
VibXpert 3 Balancer
Vibguard Compact
Vibguard IIOT
Vibrotector
Vibrex
Azima Accel 310

Poll

POLL QUESTION No. 1

What data are you currently collecting from your equipment, and what additional monitoring capabilities would be required?

Multiple choice with multiple answers (allows attendees to select all that apply)

- Basic operational data (run hours, production counts)
- Condition monitoring data (vibration, temperature, acoustics)
- Oil/fluid analysis metrics
- Energy consumption patterns
- Equipment performance metrics (OEE, throughput)
- Real-time IoT sensor data
- Visual/thermal inspection data
- Failure history and maintenance records
- No structured data collection currently in place
- Other (can be discussed in Q&A)

POLL QUESTION No. 2

Would you like to undertake a Connected Reliability assessment?

(Click only one answer)

- Yes
- No

Questions

QUESTIONS?

Thank you!

Speaker name

Speaker email

Website

Other resources

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DEMO

Visit Accelix.com for a free demo of our Connected Reliability Framework.

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THANK YOU!