

# Ultrasound in the IIOT: The Future of Condition Monitoring & Lubricating Bearings Remotely .



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UE SYSTEMS

**ue**  
SYSTEMS INC



# ABOUT UE SYSTEMS

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**Founded in 1973 in Elmsford  
New York,  
USA**

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**50+ Years Experience  
with Ultrasound**

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**Predictive Maintenance  
Solutions Based on Ultrasound  
Technology**

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# ABOUT UE SYSTEMS

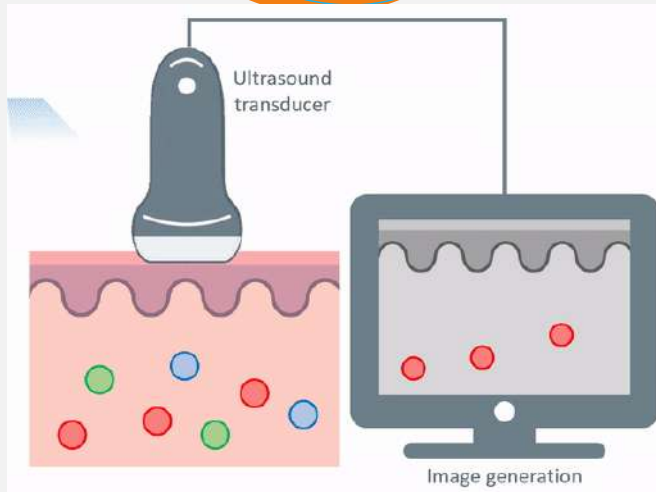
- <> UE Systems are the world market leader for **ultrasound instruments**
- <> Continuous **software development** to meet customer demand
- <> Training & support **category I, II & III IAW ISO 18436-8 certification**
- <> On-site / online **equipment & software technology implementation**
- <> Online **monitoring and lubrication** solutions
- <> **5 years manufacturer warranty** on products



# The Divisions of Ultrasound

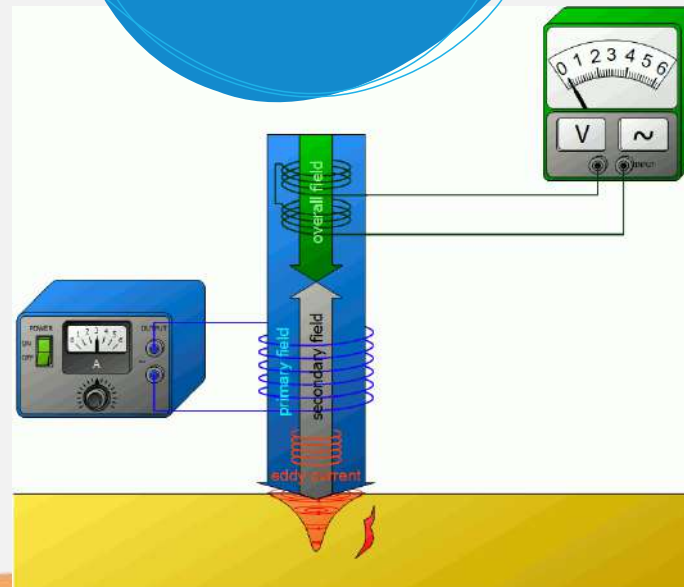
## Pulse & Echo Ultrasound

ENERGY IS EMITTED  
& RECEIVED



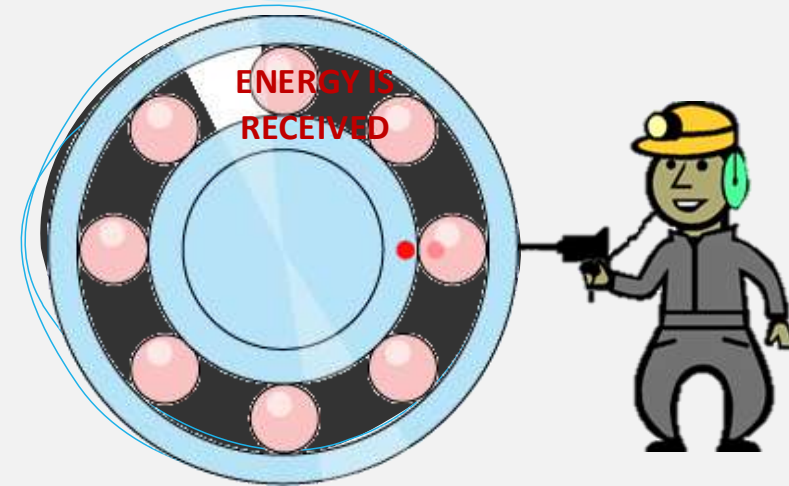
## Power Ultrasound

ENERGY IS EMITTED

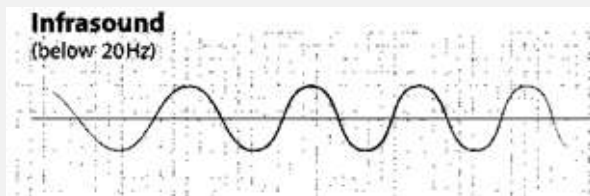


## Airborne / Structure Borne Ultrasound

ENERGY IS  
RECEIVED



# What Is Ultrasound?

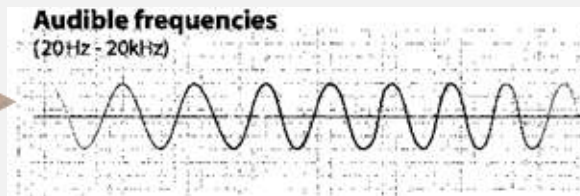


<20Hz



## INFRASONIC

Below the Human Hearing Capability - Ultra Low Frequency Sound

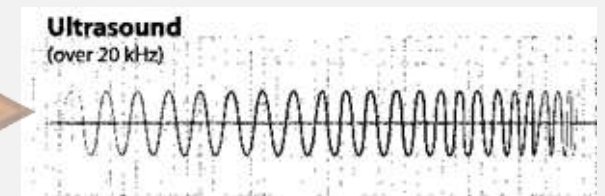


UPTO  
20kHz

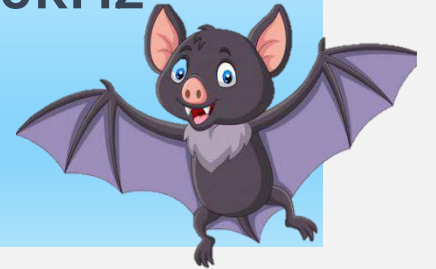


## SONIC

This is the Hearing Range of Humans - Low Frequency Sound



>20kHz



## ULTRASOUND

Above the Human Hearing Capability - High Frequency Sound



## HOW IT WORKS?

Ultrasound signals are detected by sensors and filtered at the selected frequency:

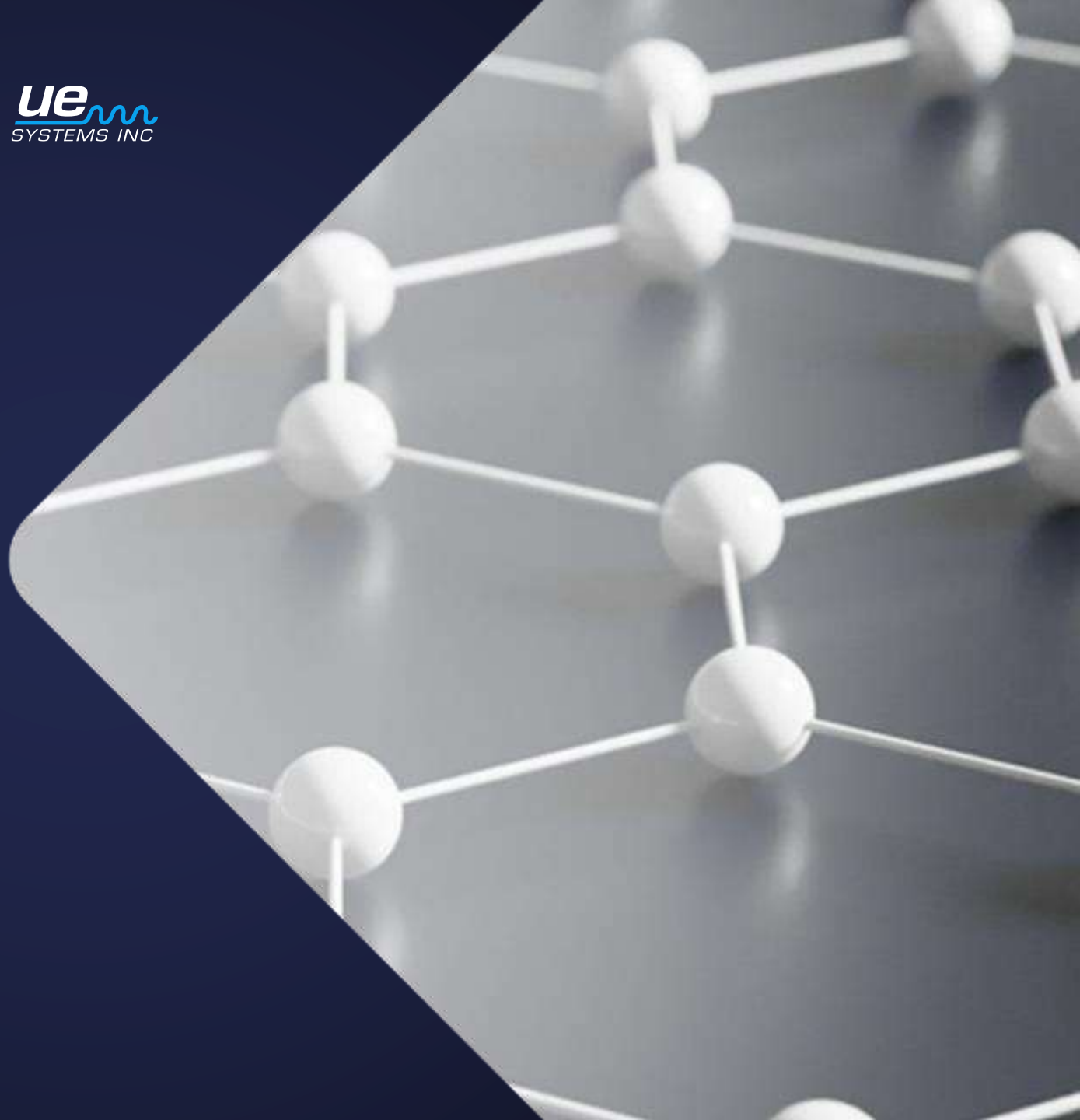
- <> UE instruments sense frequencies 20 kHz - 100 kHz
- <> Heterodyne / translate signal to audio sound so we can hear it via a headset.
- <> Deviations from the baseline indicate a need for corrective action, giving you time to stop the problem before you experience catastrophic failure or unplanned downtime.

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## RESULT:

We only hear sound at the selected frequency. Listen for the earliest symptoms of asset failure!

**APPLICATION  
AREAS  
WHERE IT  
CAN BE USED?**



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# TYPICAL APPLICATION AREAS

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## ULTRASONIC LEAK DETECTION

- <> Compressed air systems
- <> Compressed gas systems
- <> Vacuum systems
- <> Air & water tightness testing

## PARTIAL DISCHARGE DETECTION

Electrical Discharge detection on:

- <> High voltage systems
- <> Medium voltage systems
- <> Low voltage systems
- <> Handheld instruments & online monitoring systems

## STEAM TRAP & VALVE INSPECTION

- <> Valve leak detection
- <> Steam trap inspection
- <> Handheld instruments & online monitoring systems

## BEARING CONDITION MONITORING & LUBRICATION

- <> Condition monitoring of bearings
- <> Condition based lubrication
- <> Cavitation effect in pumps
- <> Conveyor belt systems
- <> Handheld instruments

## BEARING CONDITION MONITORING & LUBRICATION: ONLINE

- <> Monitoring & remote lubrication system
- <> Fixed sensors for valve monitoring
- <> Fixed sensors for bearing monitoring
- <> Ethernet compatible bearing monitoring systems

# BEARING CONDITION MONITORING & CONDITION-BASED LUBRICATION



# WHAT IS THE PROBLEM MY FRIEND ?

oh, you know the usual !!

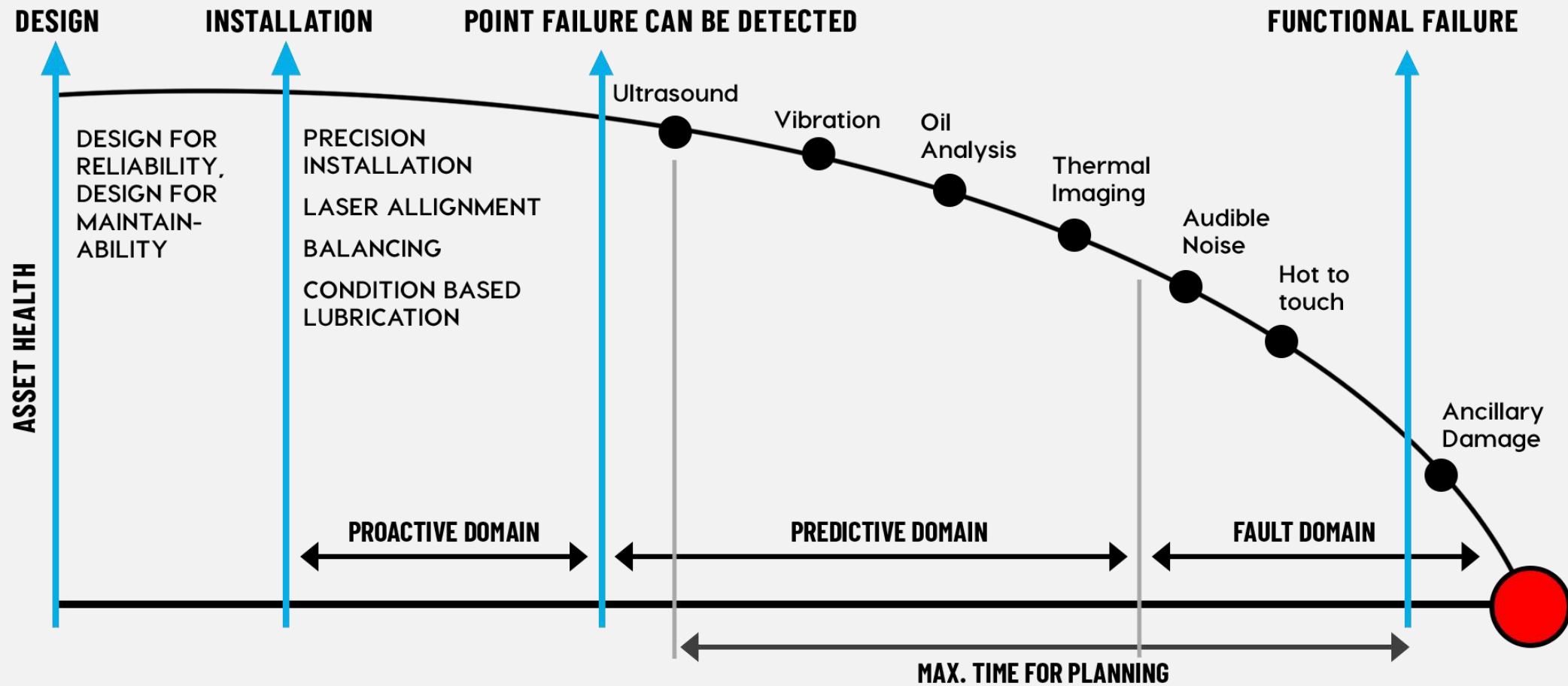
1 Unknown  
2 Misfeed  
3 Oil Leak

What's the problem Joe?

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*The ultrasound approach*



# PRINCIPLE OVERVIEW



# Bearings fail for many reasons !!



**Lubrication Failure → Bearing Failure → Breakdown**



## Main causes of premature bearing failures



### Poor fitting

Around 16% of all premature bearing failures are caused by poor fitting (usually brute force...) and maintenance personnel being unaware of the availability of the correct fitting tools. Individual installations may require mechanical, hydraulic or heat application methods for correct and efficient mounting or dismounting. SKF offers a complete range of tools and equipment to make these tasks easier, quicker and more cost effective, backed up by a wealth of service engineering know-how. Professional fitting, using specialised tools and techniques, is another positive step towards achieving maximum machine uptime.



### Poor lubrication

Although 'sealed-for-life' bearings can be fitted and forgotten, some 36% of premature bearing failures are caused by incorrect specification and inadequate application of the lubricant. Inevitably, any bearing deprived of proper lubrication will fail long before its normal service life. Because bearings are usually the least accessible components of machinery, neglected lubrication frequently compounds the problem. Wherever manual maintenance is not feasible, fully automatic lubrication systems can be specified by SKF for optimum lubrication. Effective lubrication and using only recommended SKF greases, tools and techniques helps to significantly reduce downtime.



### Contamination

A bearing is a precision component that will not operate efficiently unless both the bearing and its lubricants are isolated from contamination. And, since sealed-for-life bearings in ready-greased variants account for only a small proportion of all bearings in use, at least 14% of all premature bearing failures are attributed to contamination problems. SKF has an unrivalled bearing manufacturing and design capability and can tailor sealing solutions for the most arduous operating environments.



### Fatigue

Whenever machines are overloaded, incorrectly serviced or neglected, bearings suffer from the consequences, resulting in 34% of all premature bearing failures. Sudden or unexpected failure can be avoided, since neglected or overstressed bearings emit 'early warning' signals which can be detected and interpreted using SKF condition monitoring equipment. The SKF range includes hand-held instruments, hard-wired systems and data management software for periodic or continuous monitoring of key operating parameters.

SKF

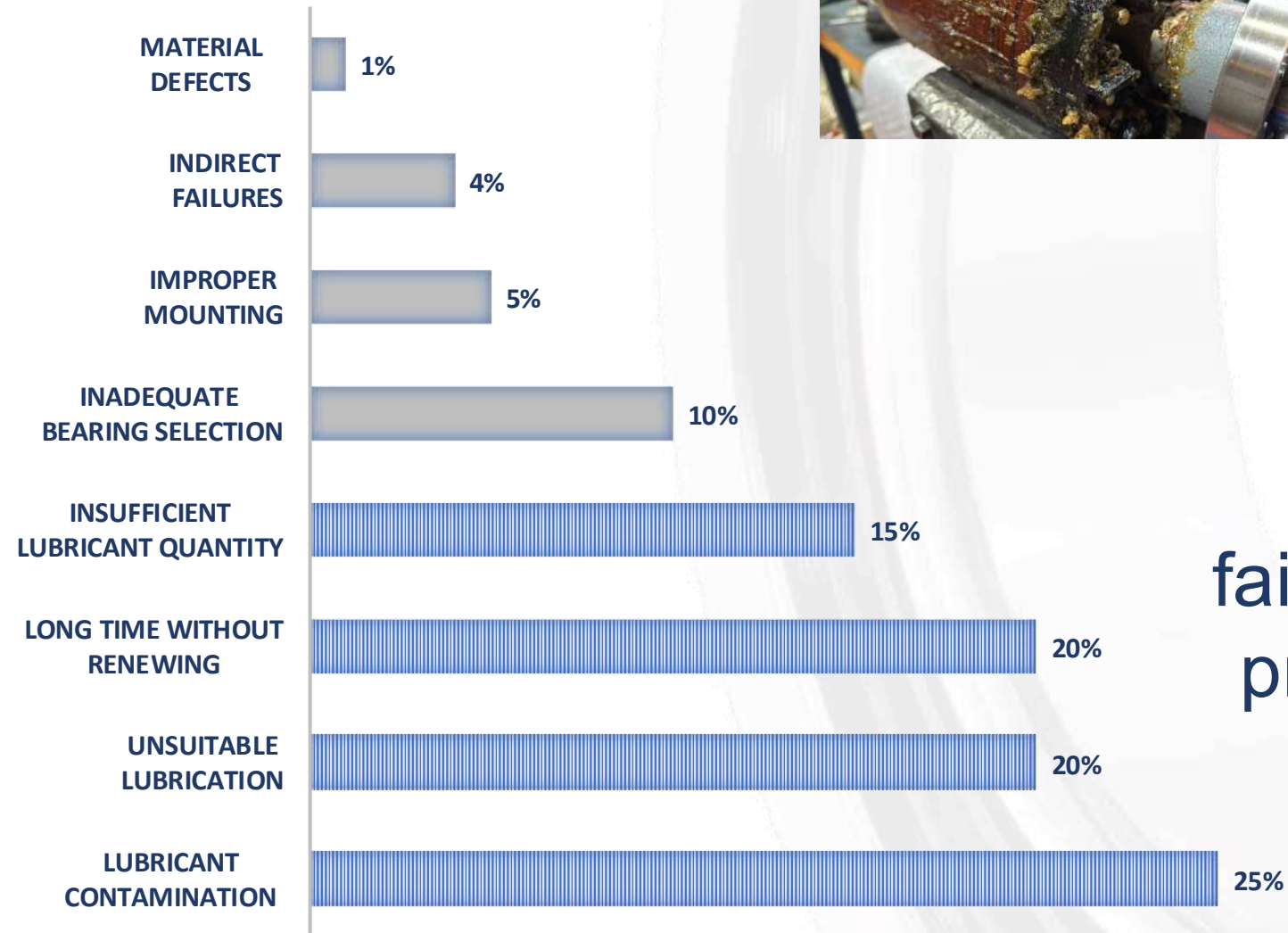


Up to

# 80%

of premature bearing failures can be traced to a problem with lubrication.

\* SKF Bearing Corporation, Bearing Failures and Their Causes



# Do you ever hear phrases like...

*We know we over lubricate our bearings.*

*We use way too much grease around here.*

*We don't know when the last time this thing was greased.*

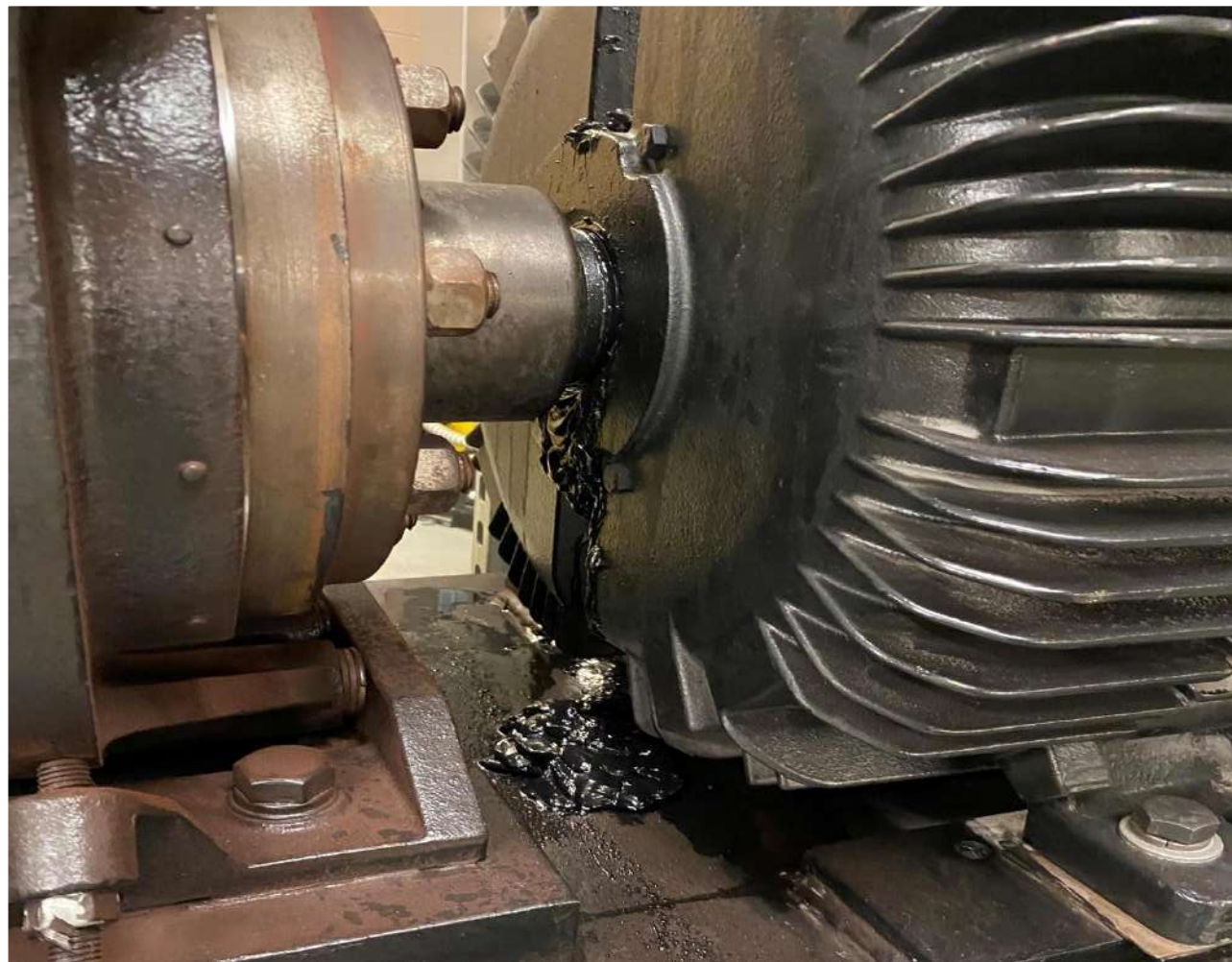
*Every motor we send out to be rebuilt is full of grease.*

*We have one person that's been greasing everything for the last 12 years, and he knows how much to put.*

*We've had too many failures due to over lubrication, so we just stopped greasing anything.*

*Most of the time, we just keep pumping grease until we see it, then we know it's enough.*

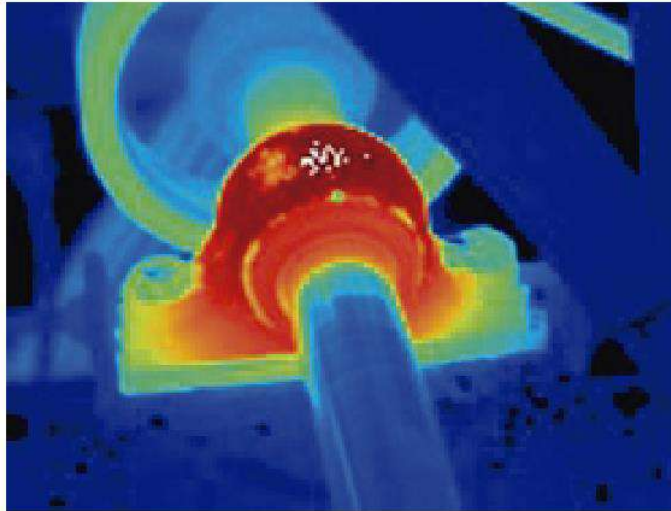
# WHICH OFTEN LEADS TO OVER LUBRICATION



**WHEN IT COMES TO  
REGREASING BEARINGS,  
MORE IS NOT ALWAYS  
THE BETTER OPTION AND  
ACTUALLY CAN BE A  
COSTLY MISTAKE.**

# Over Greasing & Lack of Greasing

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*The ultrasound approach*



# Time Based Lubrication !

## Time Based Lubrication Leads to ...?

Bearing companies have formulas for greasing volumes and frequencies.

Equipment suppliers often recommend lubrication schedules based on hours of operation.

These are subjective and often not efficient for long life of the bearing.

ARE YOU SURE? Adding The Right Amount? The Right Time?

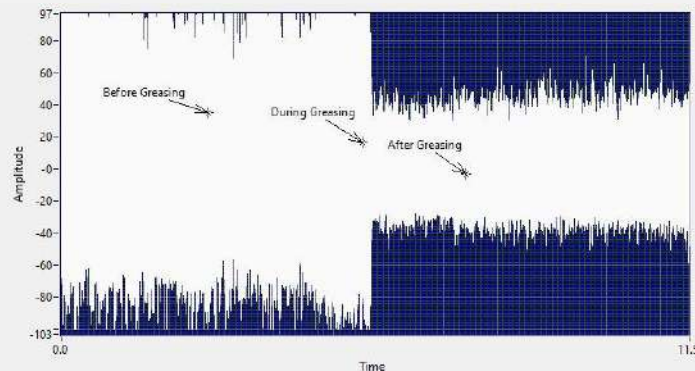
Is it better to:

**ASK YOUR TIME SHEET? OR ASK YOUR BEARINGS?**



# Condition Based Lubrication Best Practice...

- Only grease a motor while it is operating
- Keep the grease gun and connector clean
- Slowly add the grease to the bearing
- Use an ultrasonic Grease Cassy to listen to the bearing and decide if it needs lubricating. If it does need lubrication, add grease while continuing to listen.
- Ultrasound devices can let you know when and how much.
- Can tell you when the bearing needs grease.
- Can let you know how much is needed.
- Can let you know If the bearing is over greased



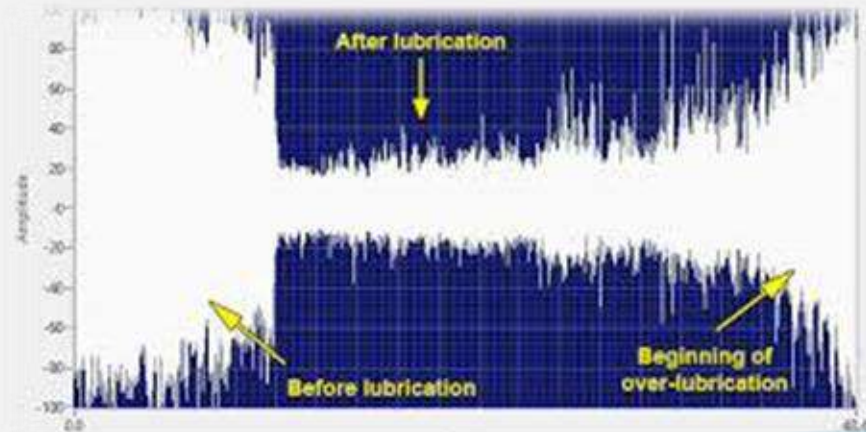
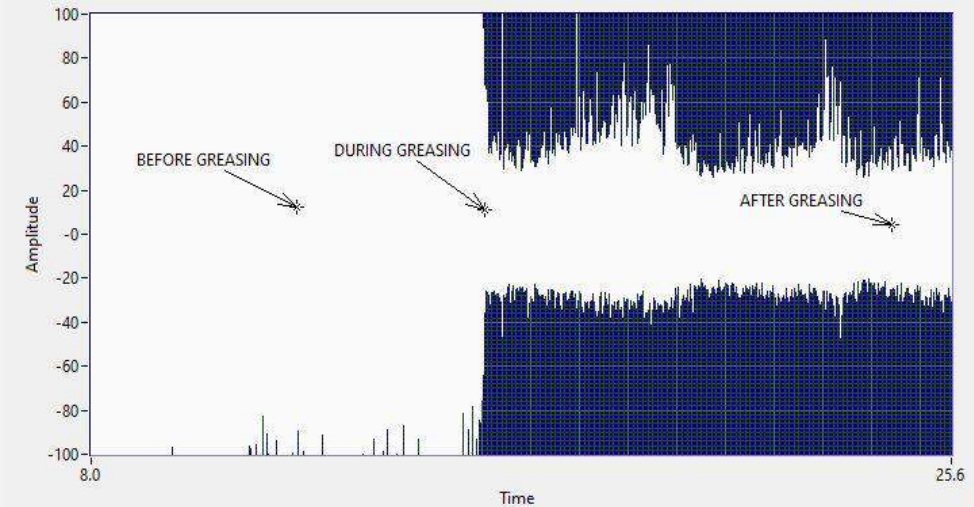
# CASE STUDY

## Case study:

### Motor bearing during lubrication.

- Equipment: Electric Motor
- Bearing: Anti Friction Bearing DGBB
- Strategy Used for Lubrication: TBL
- Amount of Grease As per the OEM: **20 Strokes every 3 months**
- Initial dB: 46
- Ended by: 39 dB with 7 strokes of grease only

Well lubricated



Over lubricated



- Equipment: Electric Motor
- Bearing: Anti Friction Bearing DGBB
- Strategy Used for Lubrication: TBL
- Amount of Grease As per the OEM: **15 Strokes every 1 months**
- Initial dB: 38
- Ended by: 42 dB with 12 strokes of grease

# Greasing before and after



# Time Based VS Condition Based Lubrication

## Time Based Lubrication

- 1- Over Lubrication May Occur
- 2- Lack of Lubrication May Occur
- 3- Lubrication Frequency as per the manufacture Recommendations
- 4- Lubricating Blindly
- 5- What if there are other problems wrong with the bearing that lubrication is not the solution for?



VS

## Condition Based Lubrication

- 1- Over lubrication will Give you a sign of dB increase
- 2- Lack of lubrication will increase friction = Higher dB level
- 3- Lubricating as per the bearings demand
- 4- Listening and monitoring friction levels during lubrication
- 5- Let us know if there are other problems with the bearing

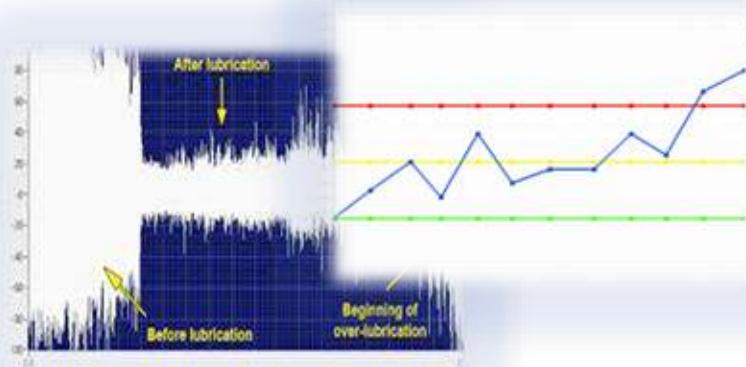
# What is the Ultrasound approach?

## Procedures

Setting a  
baseline



Follow Action  
Levels – CBL &  
Trending



Lubricate when  
required



# ROI Return on Investment

- Short Term ROI \$\$\$
- Long Term ROI \$\$\$



# Reporting, Documentation & ROI

Low Alarm

High Alarm

Hayes Street  
Bearing  
Mech. Room (13/3)  
Points Currently In  
MOTOR 1  
MOB (001)  
10/24/2016 9:31:14 AM  
11/23/2016 9:31:18 AM  
12/26/2016 9:31:21 AM  
1/20/2017 9:31:25 AM  
2/19/2017 9:31:29 AM  
3/19/2017 9:31:32 AM  
4/19/2017 9:31:35 AM  
5/25/2017 9:31:39 AM  
6/24/2017 9:31:42 AM  
7/23/2017 9:31:45 AM  
8/21/2017 9:31:48 AM  
9/25/2017 9:31:51 AM  
MIS (002)  
PIB (003)  
POB (004)  
Electrical  
Generic  
Leak  
Steam  
Valve

Record Information

Images

History

Chart

Alarms

Reports

Dashboards

Versions

Date/Time: 7/23/2017 9:31:45 AM

Module Type: SCM

Test Result: INP

dB: 40

Frequency: 30

Inspector ID:

Temperature: 0

Mode: Real Time

Sensitivity: 70

Meter Response: Fast

Info:

Offset: 0

Alarm: 39

Units: Standard

Type: NE

Location / Machine: MOTOR 1

Scale: Relative

RPM: 0

Point: MOB

Instrument:

Bearing Info:

Comments:

Serial Number:

Actual Strokes: 5

Planned Strokes: 8

Mass Per Stroke: 0.5

Cost Per Mass: 0.89

WAV File: <Not A Path>

Record Path: Hayes Street/Bearing/Mech. Room/MOTOR 1/MOB.1

Grease Gun Cal. Date: 8:40:21.409 AM 3/25/2020

Injected Mass: 2.5

Grease Type: Mineral Base

Grease Viscosity: 100

Injected Cost: 2.225

Baseline?

Open

Lubrication Specific Fields

Machine

Point

Date

Freq.

dB

Sens.

Low Alarm

High Alarm

Alarm Status

Grease Type

Grease Viscosity

Lubed

Planned Strokes

Actual Strokes

Mass Per Stroke

Cost Per Mass

Injected Mass

Planned Injected Cost

Actual Injected Cost

CBL Benefit

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The ultrasound approach

CBL Benefit Results

Year to Date

5550.0

247.0

6.4

\$ 90.44

\$ 4.02

\$ 86.40

Month

Planned Strokes

Actual Strokes

Injected Mass

Planned Injected Cost

Actual Injected Cost

CBL Benefit

Mar-17

5550

247

6.42

\$ 90.44

\$ 4.02

\$ 86.40

Report

March 2017

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# Phosphate Industry / CBL Using Ultrasound



Total Savings in Grease \$1,919.47

Short Term ROI \$\$\$

| Machine        | Point | Date                   | dB | Alarm Status | Planned Strokes | Actual Strokes | Mass Per Stroke | Cost Per Mass | Injected Mass | Planned Injected Cost | Actual Injected Cost | CBL Benefit |
|----------------|-------|------------------------|----|--------------|-----------------|----------------|-----------------|---------------|---------------|-----------------------|----------------------|-------------|
| 3 N CLEANUP    | ODE   | 12/21/2017 9:42:55 AM  | 22 | ok           | 78              | 12             | 0.03            | 0.63          | 0.31          | \$ 1.27               | \$ 0.20              | \$ 1.08     |
| 3 N CLEANUP    | DE    | 12/21/2017 9:43:51 AM  | 14 | ok           | 78              | 13             | 0.03            | 0.63          | 0.34          | \$ 1.27               | \$ 0.21              | \$ 1.06     |
| 1 DENSIFYING   | ODE   | 12/21/2017 9:45:10 AM  | 23 | ok           | 252             | 9              | 0.03            | 0.63          | 0.23          | \$ 4.11               | \$ 0.15              | \$ 3.96     |
| 1 DENSIFYING   | DE    | 12/21/2017 9:45:33 AM  | 17 | ok           | 252             | 0              | 0.03            | 0.63          | 0             | \$ 4.11               | \$ -                 | \$ 4.11     |
| 3 DENSIFYING   | ODE   | 12/21/2017 9:47:09 AM  | 26 | ok           | 252             | 10             | 0.03            | 0.63          | 0.26          | \$ 4.11               | \$ 0.16              | \$ 3.95     |
| 3 DENSIFYING   | DE    | 12/21/2017 9:47:33 AM  | 28 | ok           | 252             | 0              | 0.03            | 0.63          | 0             | \$ 4.11               | \$ -                 | \$ 4.11     |
| 1 S CLEANUP    | ODE   | 12/21/2017 9:48:04 AM  | 21 | ok           | 78              | 0              | 0.03            | 0.63          | 0             | \$ 1.27               | \$ -                 | \$ 1.27     |
| 1 S CLEANUP    | DE    | 12/21/2017 9:49:30 AM  | 25 | ok           | 78              | 30             | 0.03            | 0.63          | 0.78          | \$ 1.27               | \$ 0.49              | \$ 0.78     |
| 1 S FINE ROUGH | ODE   | 12/21/2017 9:54:53 AM  | 23 | ok           | 161             | 12             | 0.03            | 0.63          | 0.31          | \$ 2.62               | \$ 0.20              | \$ 2.43     |
|                |       | 12/21/2017 9:55:11 AM  | 26 | ok           | 161             | 0              | 0.03            | 0.63          | 0             | \$ 2.62               | \$ -                 | \$ 2.62     |
| 3 S CLEANUP    | ODE   | 12/21/2017 9:55:42 AM  | 27 | ok           | 78              | 0              | 0.03            | 0.63          | 0             | \$ 1.27               | \$ -                 | \$ 1.27     |
| 3 S CLEANUP    | DE    | 12/21/2017 9:55:50 AM  | 26 | ok           | 78              | 0              | 0.03            | 0.63          | 0             | \$ 1.27               | \$ -                 | \$ 1.27     |
| W GMT SEAL     | ODE   | 12/21/2017 9:56:16 AM  | 28 | ok           | 78              | 0              | 0.03            | 0.63          | 0             | \$ 1.27               | \$ -                 | \$ 1.27     |
| W GMT SEAL     | DE    | 12/21/2017 9:56:25 AM  | 31 | ok           | 78              | 0              | 0.03            | 0.63          | 0             | \$ 1.27               | \$ -                 | \$ 1.27     |
| E GMT SEAL     | ODE   | 12/21/2017 9:56:51 AM  | 37 | ok           | 78              | 0              | 0.03            | 0.63          | 0             | \$ 1.27               | \$ -                 | \$ 1.27     |
| E GMT SEAL     | DE    | 12/21/2017 9:56:59 AM  | 35 | ok           | 78              | 0              | 0.03            | 0.63          | 0             | \$ 1.27               | \$ -                 | \$ 1.27     |
| 2 S CLEANUP    | ODE   | 12/21/2017 9:58:06 AM  | 22 | ok           | 78              | 0              | 0.03            | 0.63          | 0             | \$ 1.27               | \$ -                 | \$ 1.27     |
| 2 S CLEANUP    | DE    | 12/21/2017 9:58:16 AM  | 0  | ok           | 78              | 0              | 0.03            | 0.63          | 0             | \$ 1.27               | \$ -                 | \$ 1.27     |
| S FINE ACID W  | ODE   | 12/21/2017 9:59:29 AM  | 26 | ok           | 78              | 0              | 0.03            | 0.63          | 0             | \$ 1.27               | \$ -                 | \$ 1.27     |
| S FINE ACID W  | DE    | 12/21/2017 9:59:45 AM  | 24 | ok           | 78              | 0              | 0.03            | 0.63          | 0             | \$ 1.27               | \$ -                 | \$ 1.27     |
| GMT            | ODE   | 12/21/2017 10:00:16 AM | 22 | ok           | 230             | 0              | 0.03            | 0.63          | 0             | \$ 3.75               | \$ -                 | \$ 3.75     |
| GMT            | DE    | 12/21/2017 10:00:46 AM | 14 | ok           | 230             | 0              | 0.03            | 0.63          | 0             | \$ 3.75               | \$ -                 | \$ 3.75     |
| N FINE ACID W  | ODE   | 12/21/2017 10:01:36 AM | 16 | ok           | 78              | 0              | 0.03            | 0.63          | 0             | \$ 1.27               | \$ -                 | \$ 1.27     |
| N FINE ACID W  | DE    | 12/21/2017 10:01:53 AM | 15 | ok           | 78              | 0              | 0.03            | 0.63          | 0             | \$ 1.27               | \$ -                 | \$ 1.27     |
| S AMINE CONC   | ODE   | 12/21/2017 10:02:50 AM | 17 | ok           | 252             | 0              | 0.03            | 0.63          | 0             | \$ 4.11               | \$ -                 | \$ 4.11     |
| S AMINE CONC   | DE    | 12/21/2017 10:03:35 AM | 29 | ok           | 252             | 0              | 0.03            | 0.63          | 0             | \$ 4.11               | \$ -                 | \$ 4.11     |
| N AMINE CONC   | ODE   | 12/21/2017 10:04:51 AM | 21 | ok           | 119             | 0              | 0.03            | 0.63          | 0             | \$ 1.94               | \$ -                 | \$ 1.94     |
| N AMINE CONC   | DE    | 12/21/2017 10:05:32 AM | 16 | ok           | 119             | 0              | 0.03            | 0.63          | 0             | \$ 1.94               | \$ -                 | \$ 1.94     |
| 2 N CLEANUP    | ODE   | 12/21/2017 10:06:31 AM | 21 | ok           | 78              | 0              | 0.03            | 0.63          | 0             | \$ 1.27               | \$ -                 | \$ 1.27     |
| 2 N CLEANUP    | DE    | 12/21/2017 10:06:40 AM | 25 | ok           | 78              | 0              | 0.03            | 0.63          | 0             | \$ 1.27               | \$ -                 | \$ 1.27     |
| S COARSE ACID  | ODE   | 12/21/2017 10:07:37 AM | 22 | ok           | 119             | 0              | 0.03            | 0.63          | 0             | \$ 1.94               | \$ -                 | \$ 1.94     |
| S COARSE ACID  | DE    | 12/21/2017 10:08:01 AM | 26 | ok           | 119             | 0              | 0.03            | 0.63          | 0             | \$ 1.94               | \$ -                 | \$ 1.94     |
| N COARSE ACID  | ODE   | 12/21/2017 10:08:42 AM | 9  | ok           | 119             | 0              | 0.03            | 0.63          | 0             | \$ 1.94               | \$ -                 | \$ 1.94     |
| N COARSE ACID  | DE    | 12/21/2017 10:09:10 AM | 14 | ok           | 119             | 0              | 0.03            | 0.63          | 0             | \$ 1.94               | \$ -                 | \$ 1.94     |

# Long Term ROI

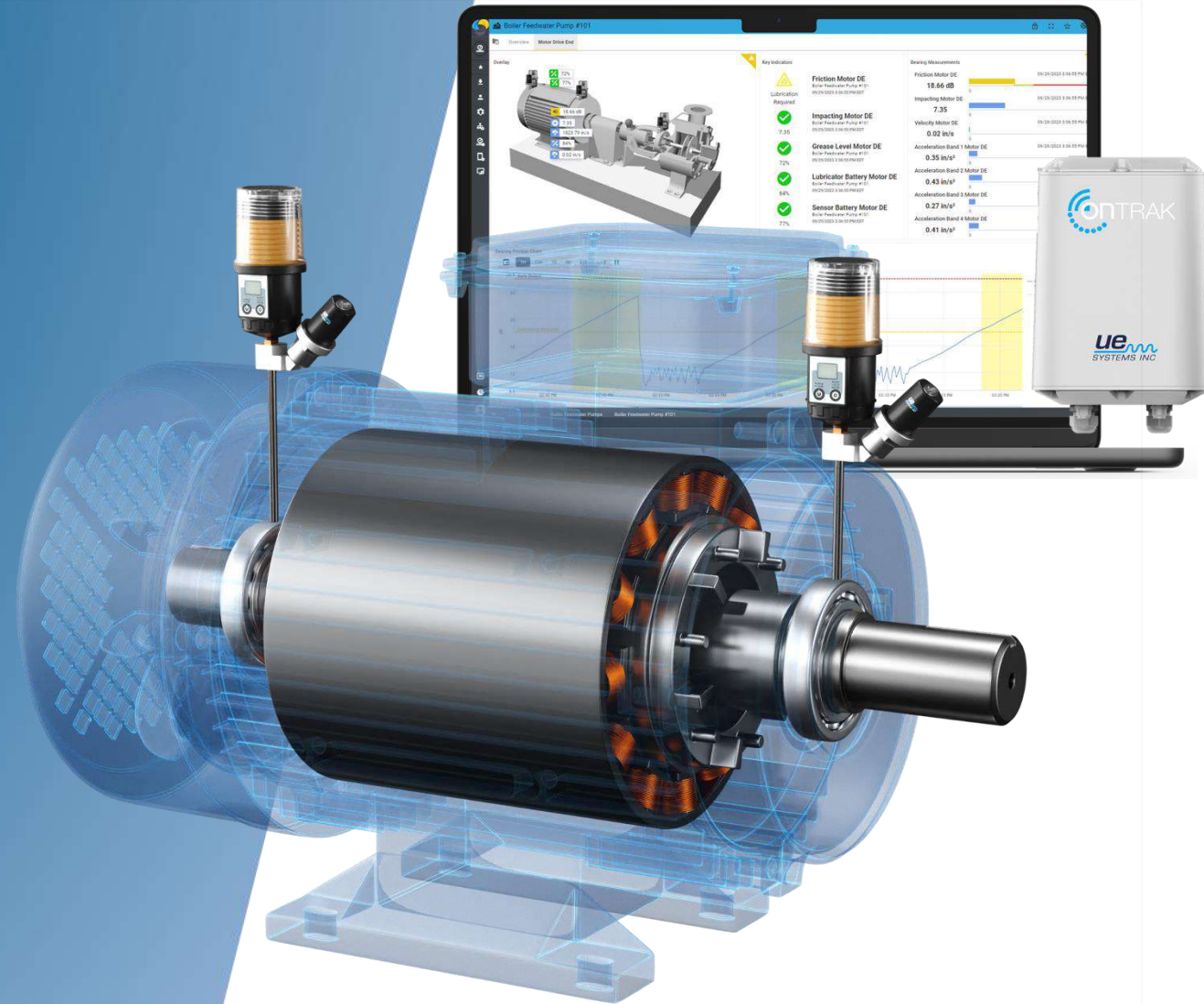
- 1000s of Man Hours Saved
- Long-term protection of equipment.
- Reduced maintenance costs.
- Increased profitability.
- Achieve Designed Asset Reliability
- Increased Asset Availability





# THIS CHANGES EVERYTHING AGAIN.

LET ONTRAK HANDLE THE LUBRICATION SO  
YOU CAN FOCUS ON WHAT TRULY MATTERS



# THE LEADER IN **CONDITION BASED LUBRICATION**

**70K+** Ultrasound Sensors Deployed Globally

**10B+** Bearing Data Points Analyzed Monthly

**1K+** Lubrications Events each Month

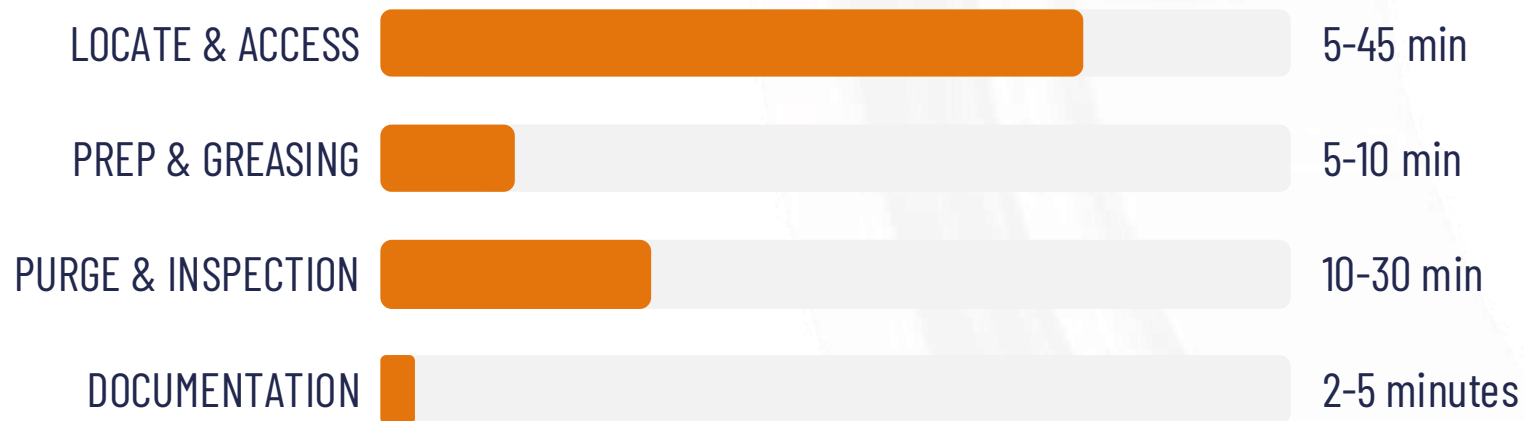
**3** Software Hosting & Deployment Options

**27+** Patented and Patents Pending

**1st** AI-powered lubrication assistant (LIA)



## TAKE CONTROL OF LUBRICATION, TAKE BACK YOUR TIME.



**Proper** manual lubrication of a bearing typically takes about

**15-30**

Minutes per bearing.

# VARIABILITY IS THE **ENEMY OF** LUBRICATION



If temperature rises by just 36°F, **grease life is cut in half**—double the temperature increase, and grease life drops to just 25%



High vibration and shock loads can squeeze grease out of a bearing, **requiring up to 3x more frequent lubrication**



A 10% increase in load can reduce bearing life by up to 50%, requiring more **frequent lubrication to compensate**

# ONTRAK WIRELESS OVERVIEW

## BT-UE

WIRELESS SINGLE POINT  
LUBRICATOR

## 950BT

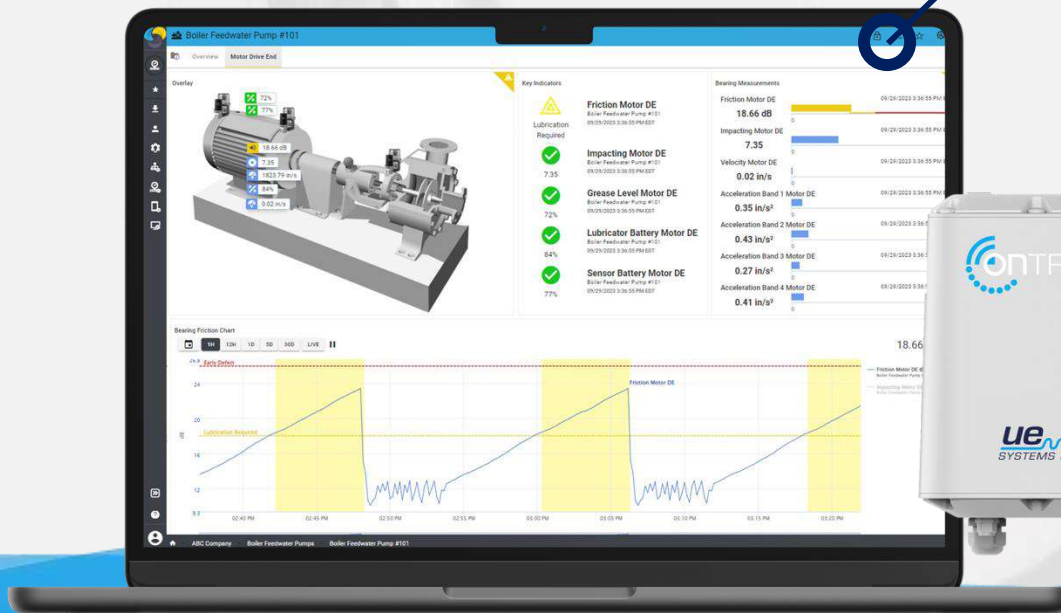
WIRELESS ULTRASOUND, VIBRATION,  
SPEED AND TEMPERATURE SENSOR

## UE INSIGHTS

CLOUD OR ON  
PREMISES DASHBOARD  
AND ALERTING  
PLATFORM

## ONTRAK BT

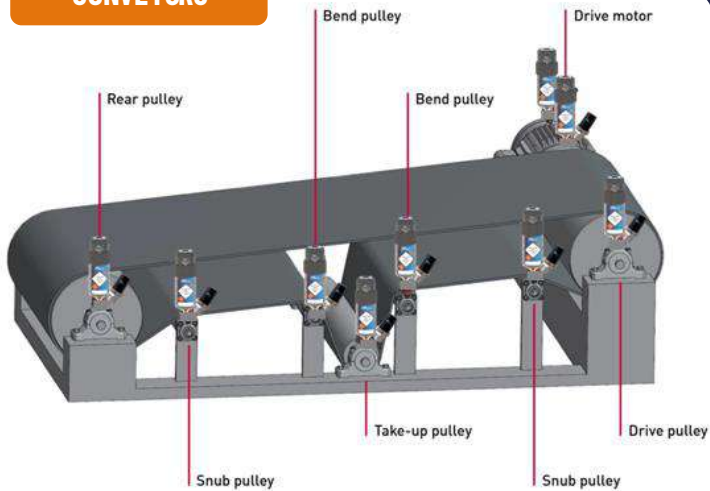
EDGE ANALYTIC  
GATEWAY





# PROVEN APPLICATIONS

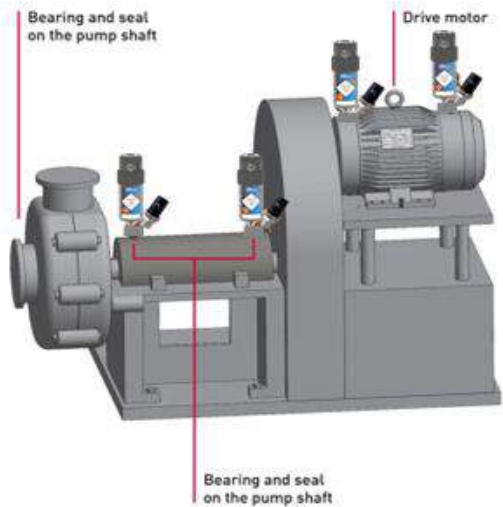
## CONVEYORS



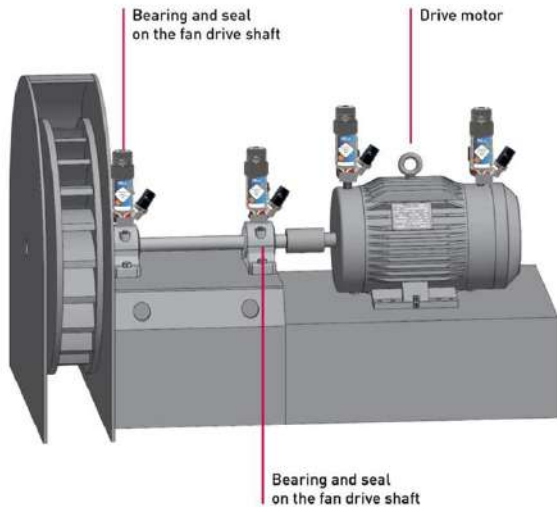
## ELECTRIC MOTORS

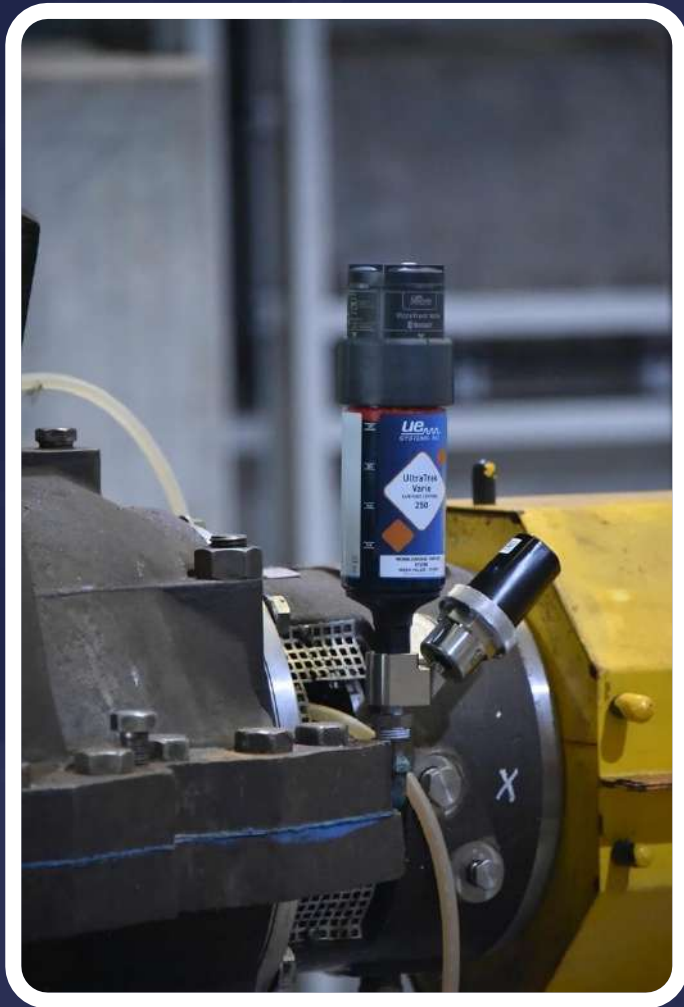


## PUMPS

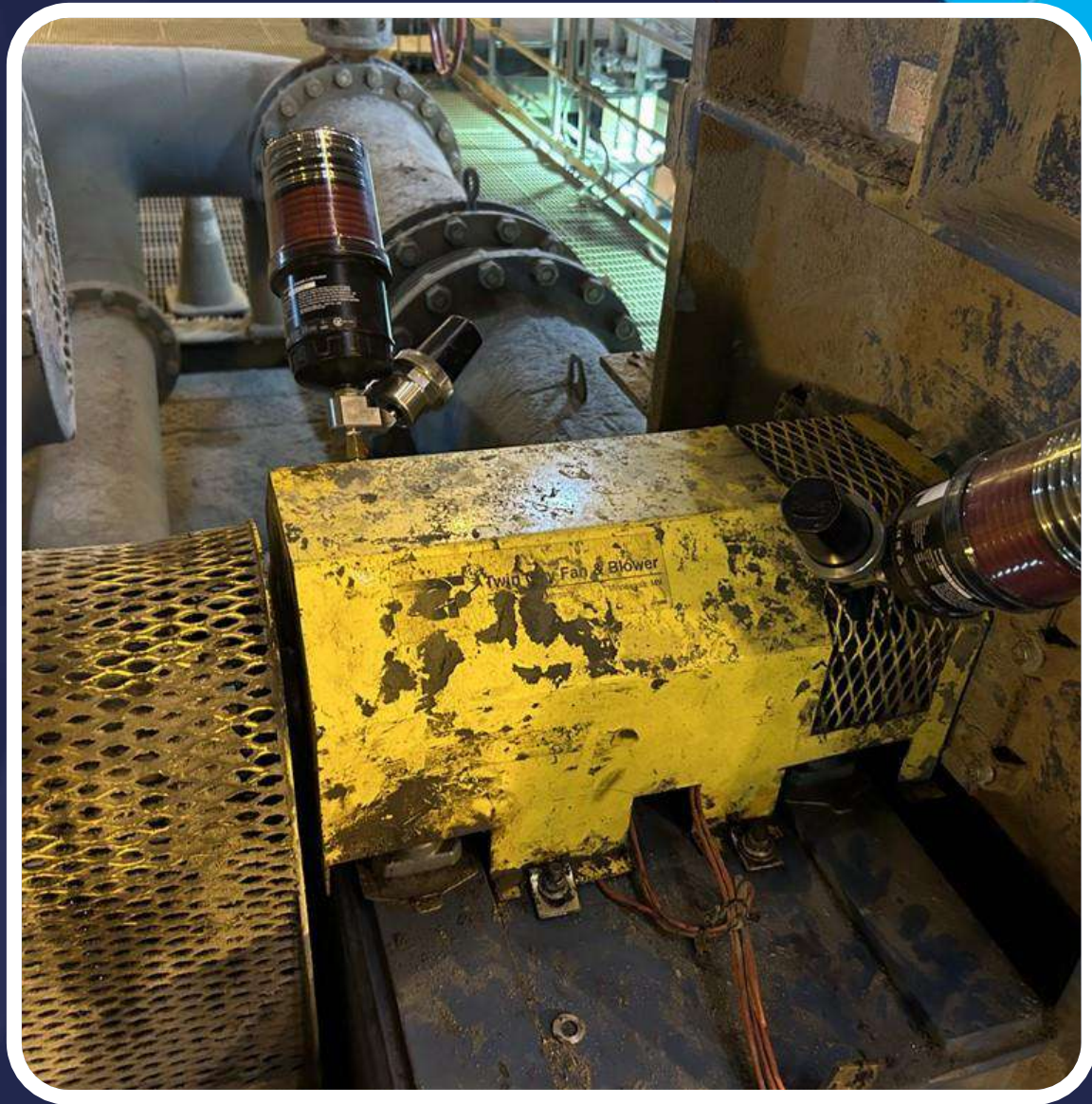
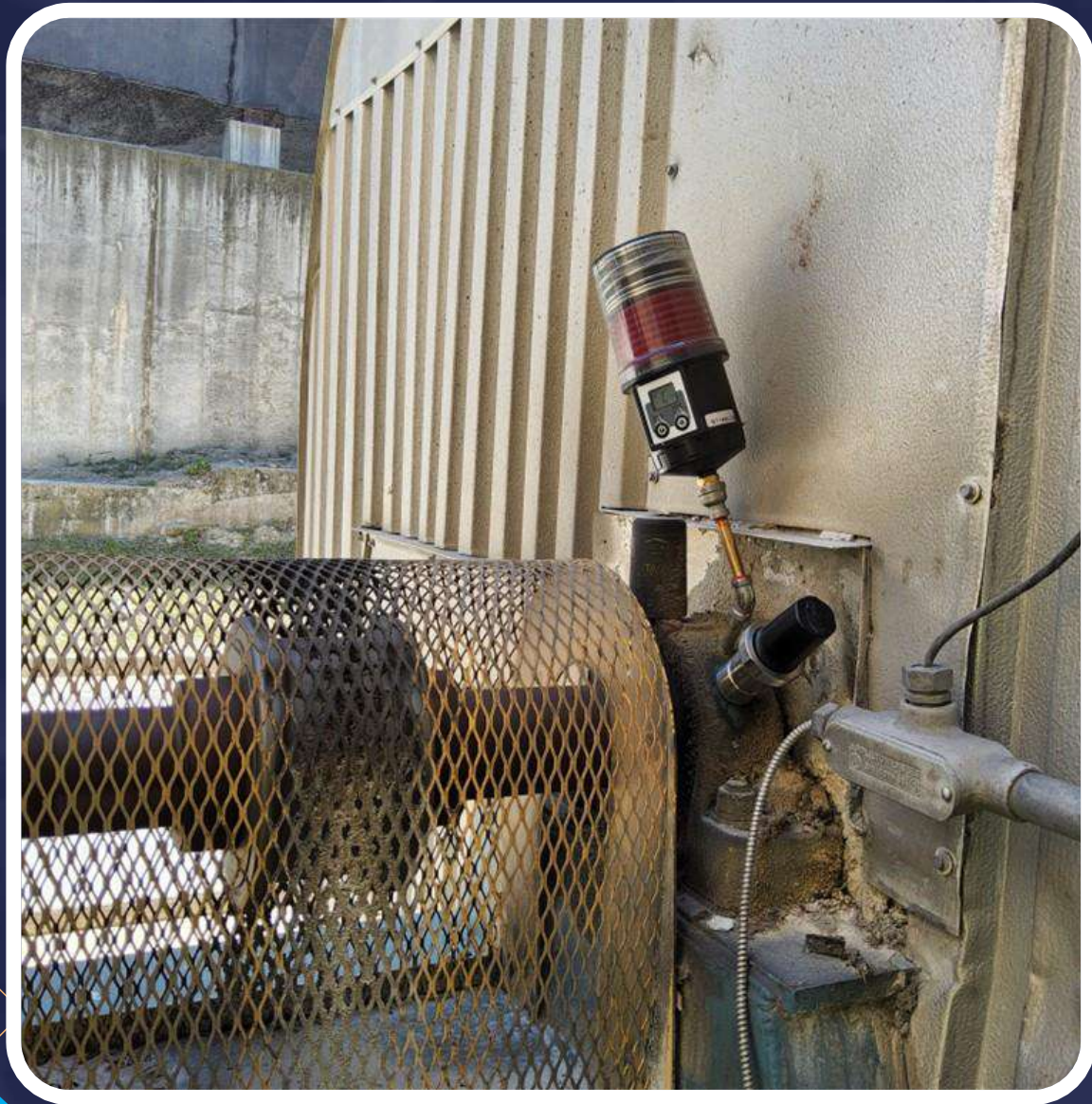


## BLOWERS & FANS









# UE INSIGHTS

## Priority Overview

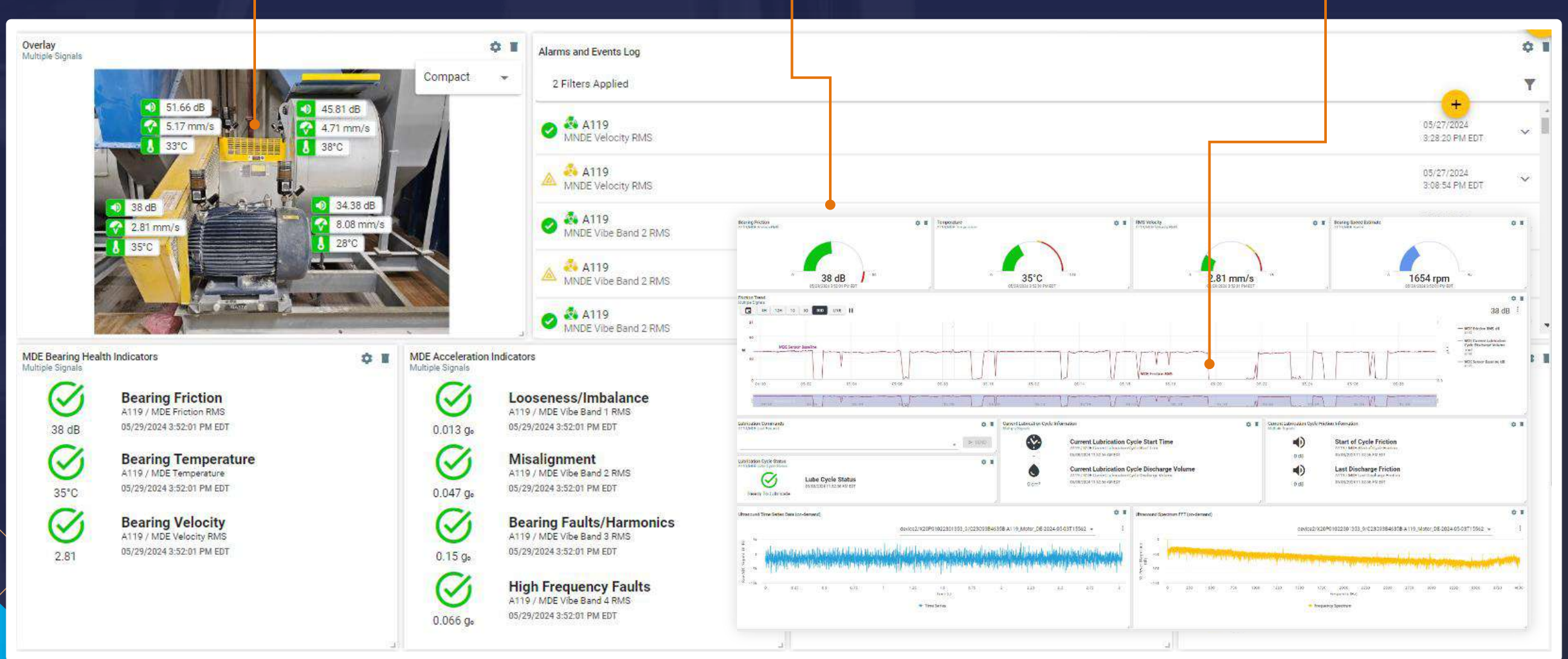
Highlight critical assets needing attention throughout your entire organization.

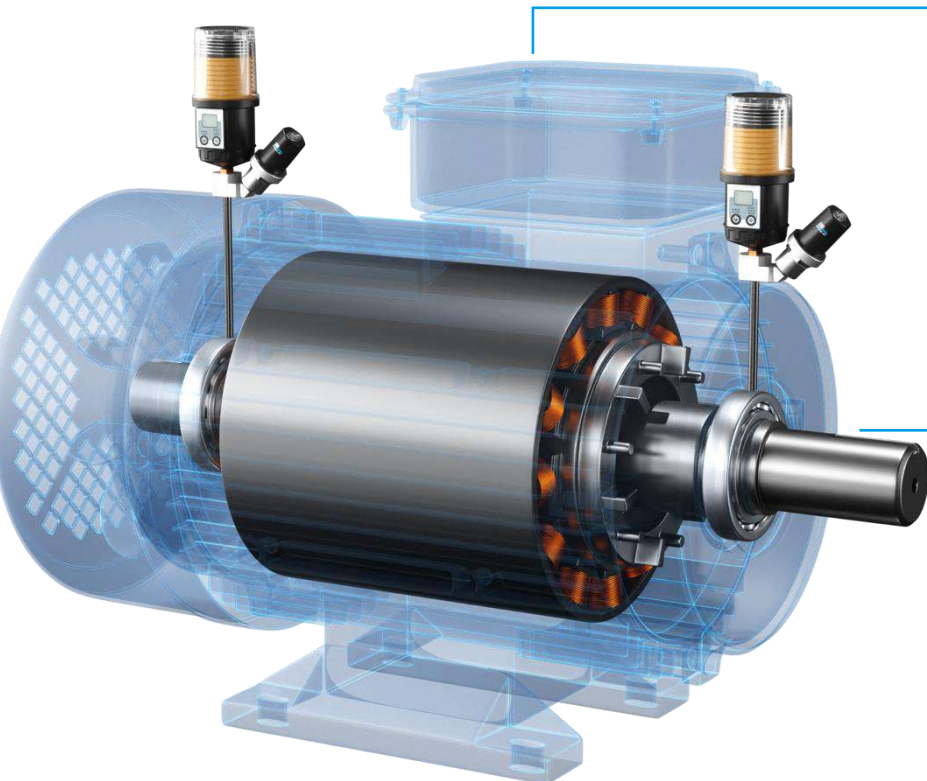
## Insightful Intelligence

Transforms raw data into comprehensible, actionable insights for a complete perspective.

## Interactive Guided Solutions

Receive suggested remediation actions and converse with experts.





### Operational Efficiency - 99% less time. Safer teams.

- Up to 99% reduction in manual lubrication labor
- 40-60% fewer technician exposures to hazardous tasks

#### 50HP Motor

\$390/year in labor savings

*Labor savings are based on 15 minutes per bearing, lubricated monthly, with an average fully burdened labor rate of \$65/hour. This reflects typical maintenance technician rates in industrial environments. Actual labor cost savings may vary based on plant layout, access time, and technician workflows.*

### Asset & Reliability Performance - Fewer failures. More uptime.

- 20-60% fewer bearing replacements
- 30-50% less unplanned downtime

#### 50HP Motor

\$1,272/year in reliability savings

*Bearing-related failures are estimated using a 3% annual failure rate per motor, based on industry data showing electric motor failure rates between 2-5% per year (EPRI, IEEE, NEMA), with bearings responsible for approximately 60% of those failures. Downtime costs assume \$2,000/hour and an average of 2 hours per failure event. Risk reduction is conservatively estimated at 30% through precision lubrication.*

### Energy & Environmental Impact - Less grease. Lower energy

- 3-8% lower energy use through friction reduction
- 30-50% less grease used, reducing cost and carbon footprint

#### 50HP Motor

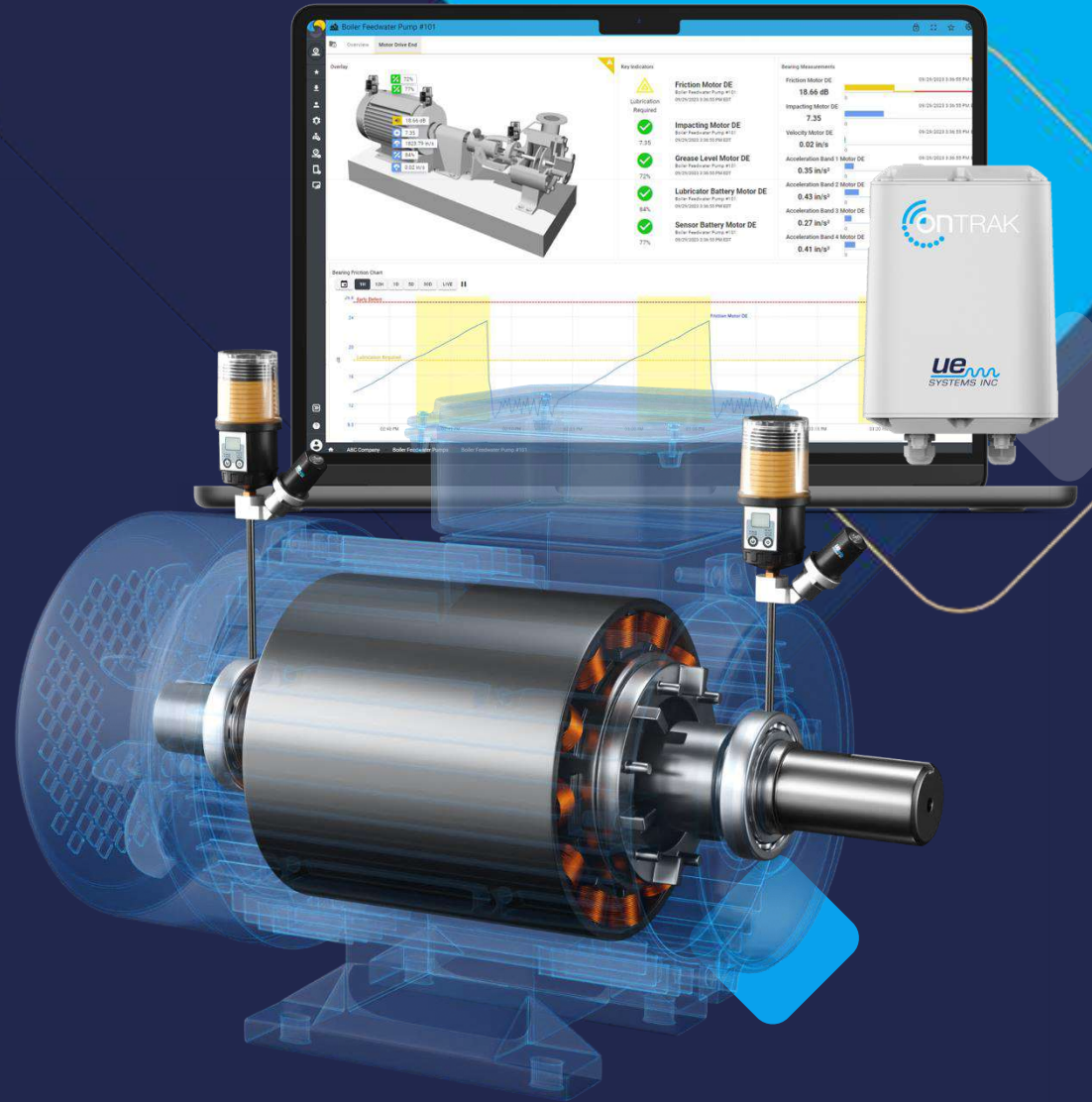
\$723/year in energy and grease savings

*Energy savings assume a 3% reduction in energy consumption for a 50 HP motor operating 8,000 hours/year (298,400 kWh), with energy cost at \$0.08/kWh. Grease savings assume a 25% reduction based on optimized grease use via condition-based lubrication. Environmental benefits may vary based on grease type, application, and local energy mix.*



# ONTRAK CASE STUDIES.

Take control of lubrication,  
take back your time.



# 30 DAYS TO SUCCESS: **DEBUNKING TIME-BASED LUBRICATION**

## **The Challenge: Time-Based Lubrication Falls Short**

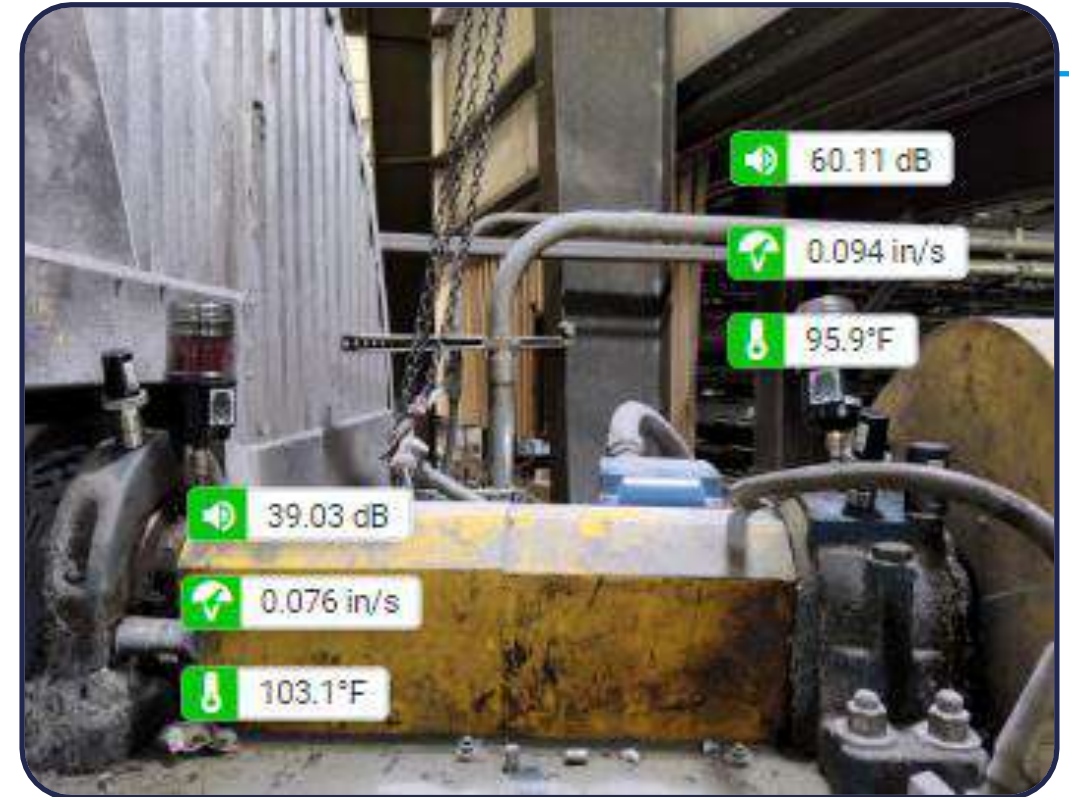
- A recirculation fan bearing needed lubrication a month early, but time-based schedules delayed intervention.
- Delayed lubrication increased wear, overheating, and failure risk.

## **The Solution: OnTrak Wireless Delivers Lubrication When Needed**

- Real-time friction monitoring detected the lubrication need.
- Automatically dispensed just 3cc of grease, restoring safe operation.

## **The Impact: Efficiency & Reliability**

- Prevented unnecessary wear by catching friction spikes early.
- Eliminated over-lubrication by dispensing only what was needed.
- Optimized maintenance schedules for precision lubrication.



# GREASE CONSUMPTION: A POWERFUL EARLY WARNING

## Challenge: Time-Based Lubrication Failures

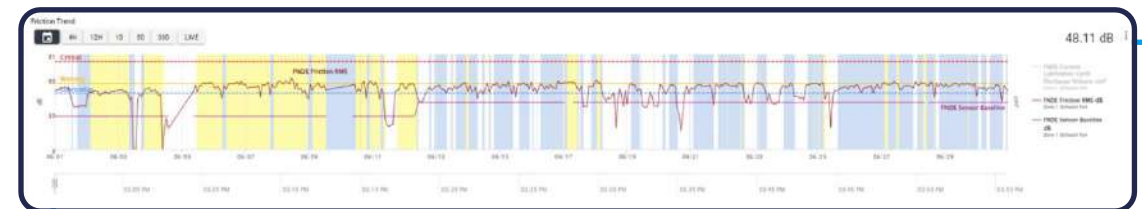
- Pillow block overhung fan bearings in extreme conditions suffered from over-lubrication, under-lubrication, and failures due to time-based auto lubricators.
- Lack of real-time data led to unplanned downtime and costly repairs.

## The Solution: Condition-Based Lubrication with OnTrak Wireless

- Real-time ultrasound monitoring determined the right amount of grease at the right time.
- Automated lubrication reduced failures and optimized grease consumption.

## The Impact: Early Detection & Increased Reliability

- Identified a struggling non-drive-end bearing consuming 22cc of grease vs. 2cc on the drive-end.
- Detected looseness before failure—something vibration monitoring missed.
- Reduced downtime and repair costs by preventing failures before they escalated.



# ENSURING RELIABILITY IN HARSH WINTER CONDITIONS

## Challenge

Extreme winter conditions made it difficult to access conveyor bearings, leading to missed lubrication and increased failure risk.

## Solution

OnTrak Wireless enabled remote lubrication, ensuring critical bearings received proper care without exposing workers to harsh conditions.

## Impact

- Eliminated the need for manual lubrication in extreme cold.
- Ensured consistent, precise lubrication for critical assets.
- Improved reliability while keeping workers safe and efficient.



# DETECTING BEARING FAULTS BEFORE DAMAGE OCCURS

## Challenge

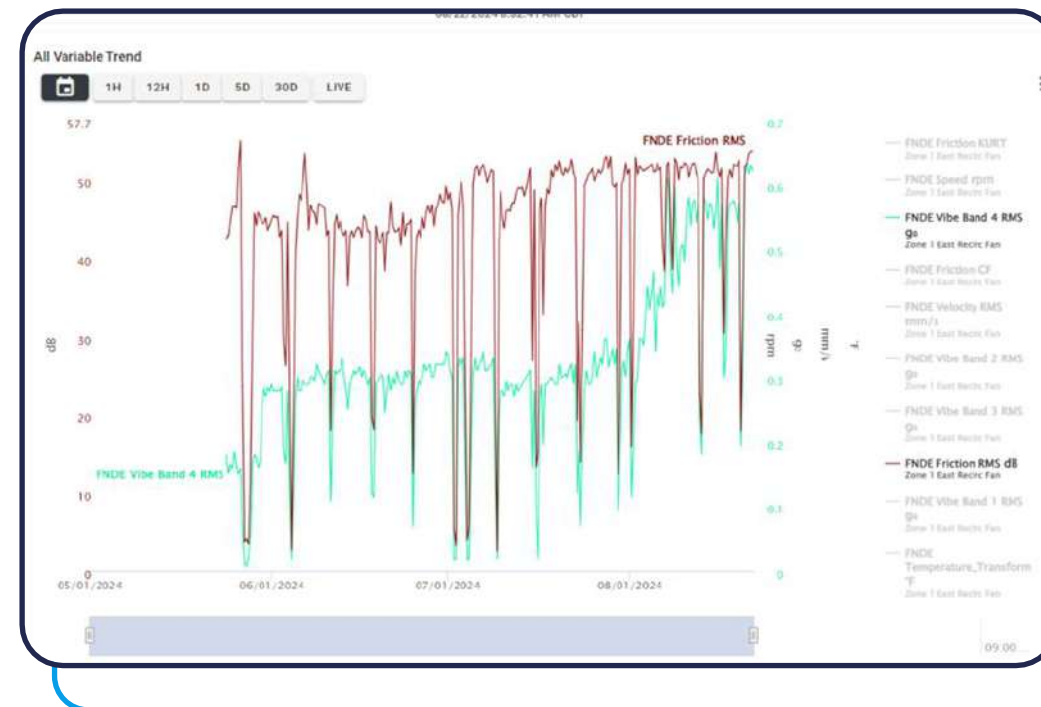
Rising friction in a recirculation fan's NDE bearing went undetected by vibration monitoring for a full month, allowing damage to progress.

## Solution

OnTrak Wireless identified the issue one month earlier by continuously tracking ultrasound friction levels, providing early warning before failure.

## Impact

- Allowed planned maintenance instead of unexpected failure.
- Ultrasound detected issues missed by vibration sensors, preventing hidden faults.
- Reduced unnecessary grease use with data-driven lubrication decisions.





# WHAT TYPE OF ENVIRONMENT ARE YOUR ASSETS LOCATED IN AND NEED TO BE MANAGED?



# EFFICIENCY UNLEASHED: SAVING TIME, GREASE, AND BEARING FAILURES

The OnTrak Wireless revolutionizes bearing monitoring and management. By eliminating 95% of manual lubrication tasks compared to traditional practices, OnTrak Wireless users often experience significant reductions in grease usage, all while prolonging the lifespan of their bearings



**30%**

Decrease in grease consumption



**95%**

Decrease in manual lubrication tasks

**65%**

Decrease in premature bearing failure



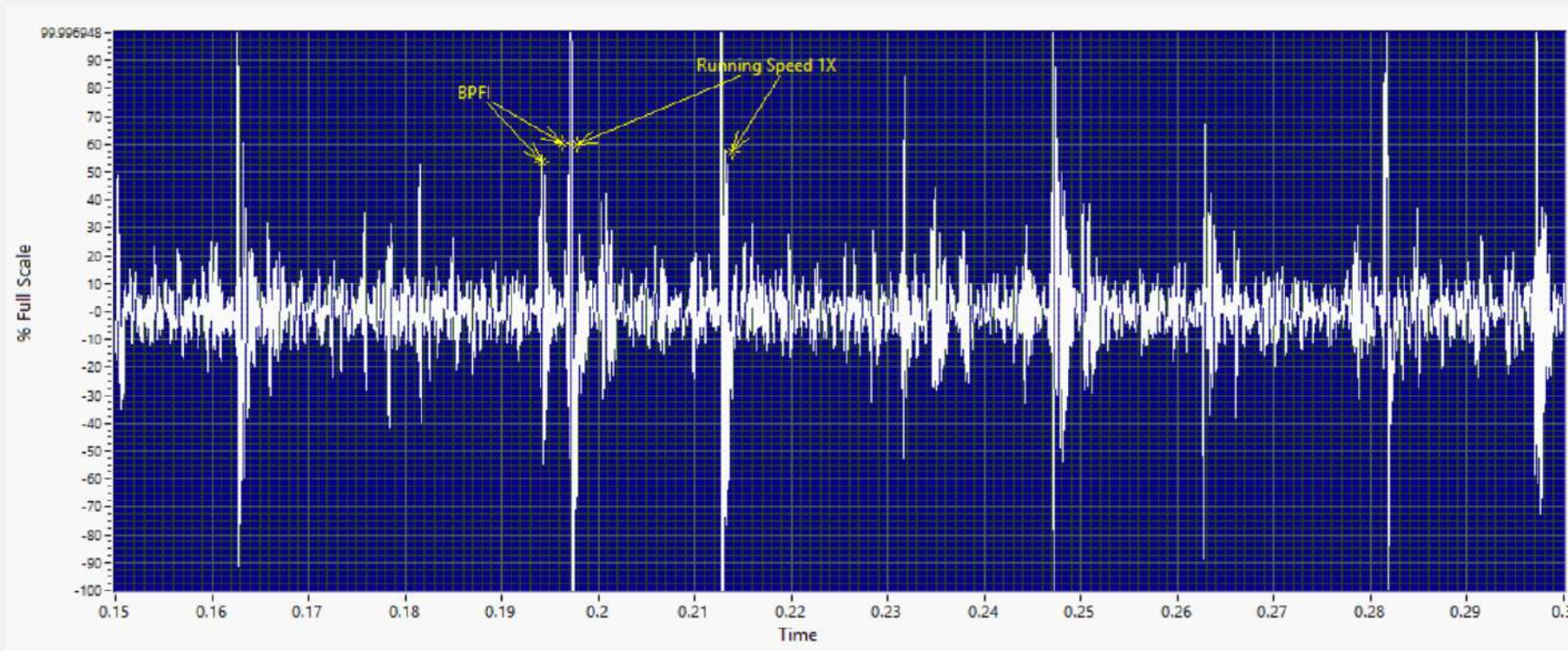
# #1 AIS aeration blower bearings – Petrochemical – Saudi A

- **Equipment: AIS Aeration Blower in Acrylic Acid Plant.**
- **At the time of the monthly routing inspection of the blower the inspector noticed unusual sound generated from the blower DE bearing.**
- **A sound file was recorded from the bearing for further analysis and comparison with the baseline sound file.**



# Analysis

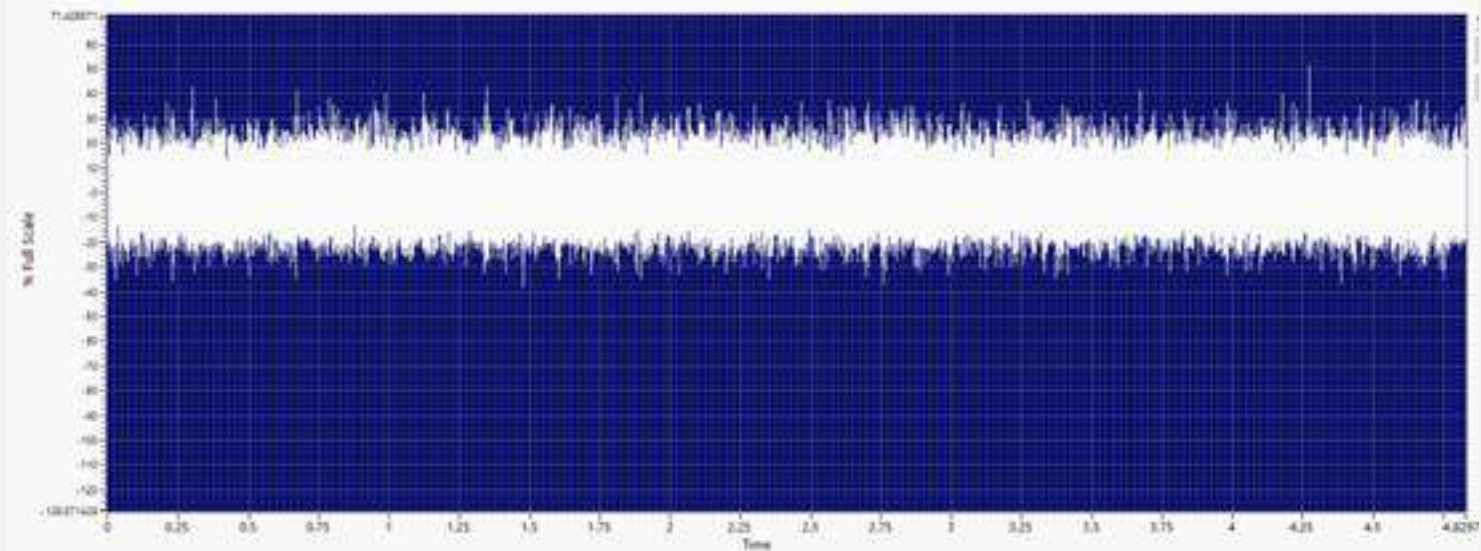
- Analyzing the time waveform, impacts at the inner race defect frequency (320 Hz) found modulated with the blower running speed frequency (1X). Also, every 1 revolution the impact is amplified when the defect enters the zone with the highest load.



# Recommendations and Findings

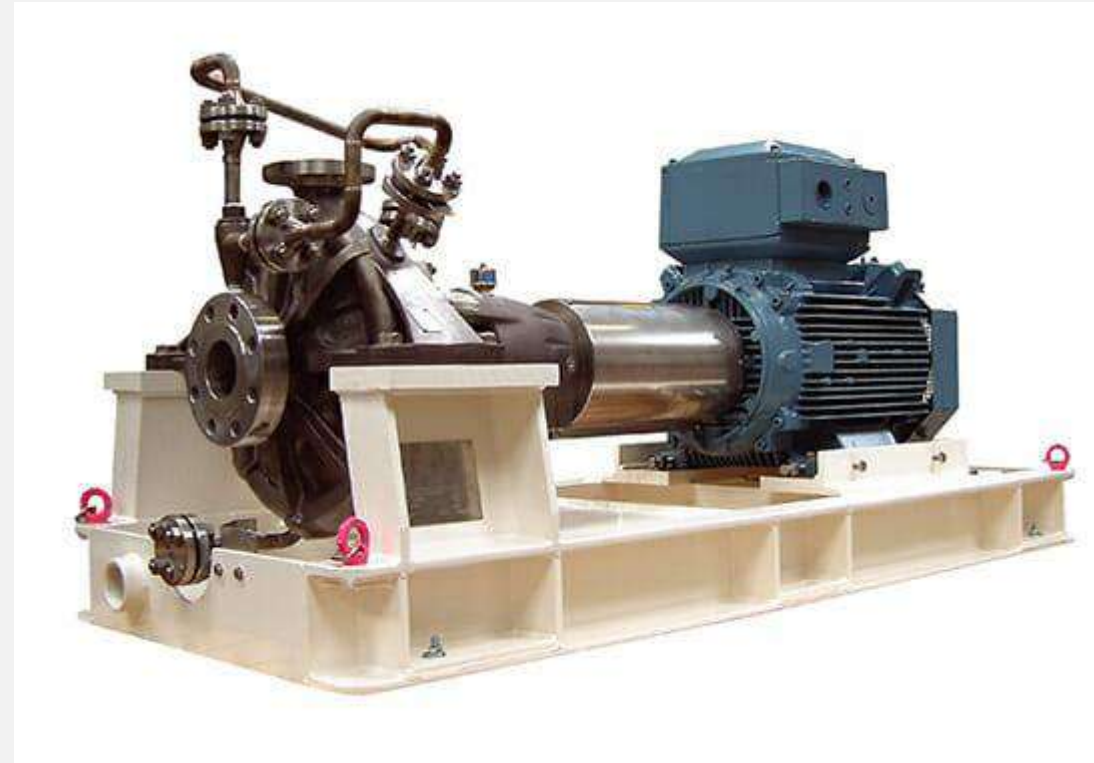
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- Upon inspecting the replaced bearing, a clear defect was found in the inner race.
- After the bearing replacement, measurements were recorded, and it was found that the bearing gained back its smooth rushing sound indicating its healthiness.



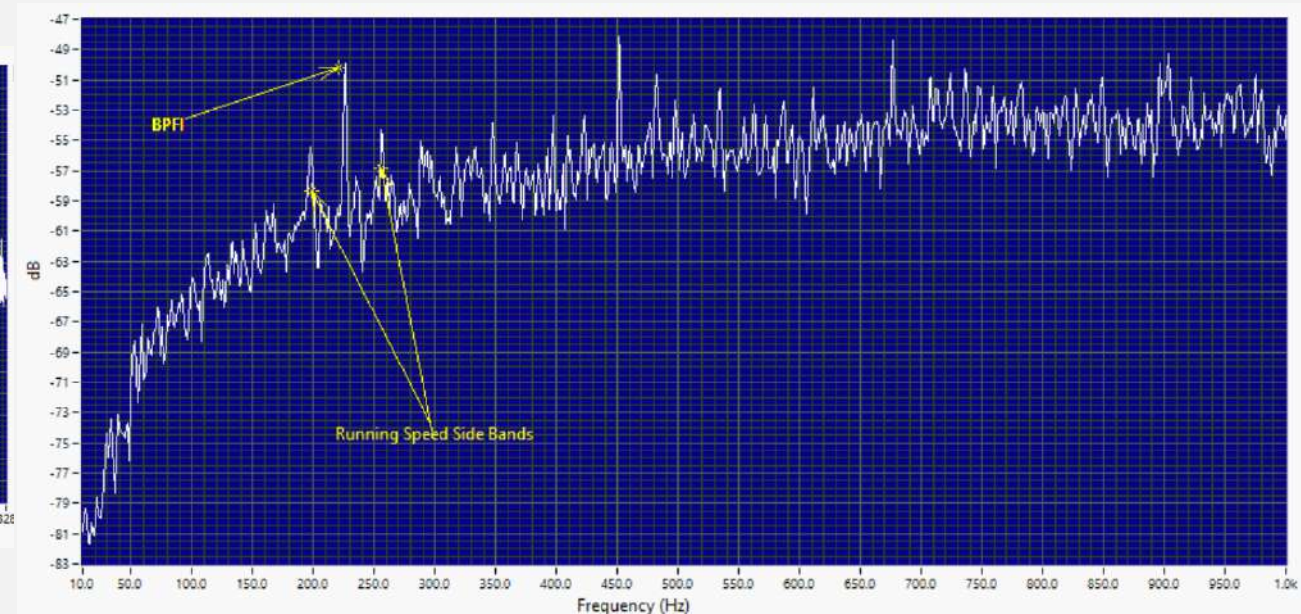
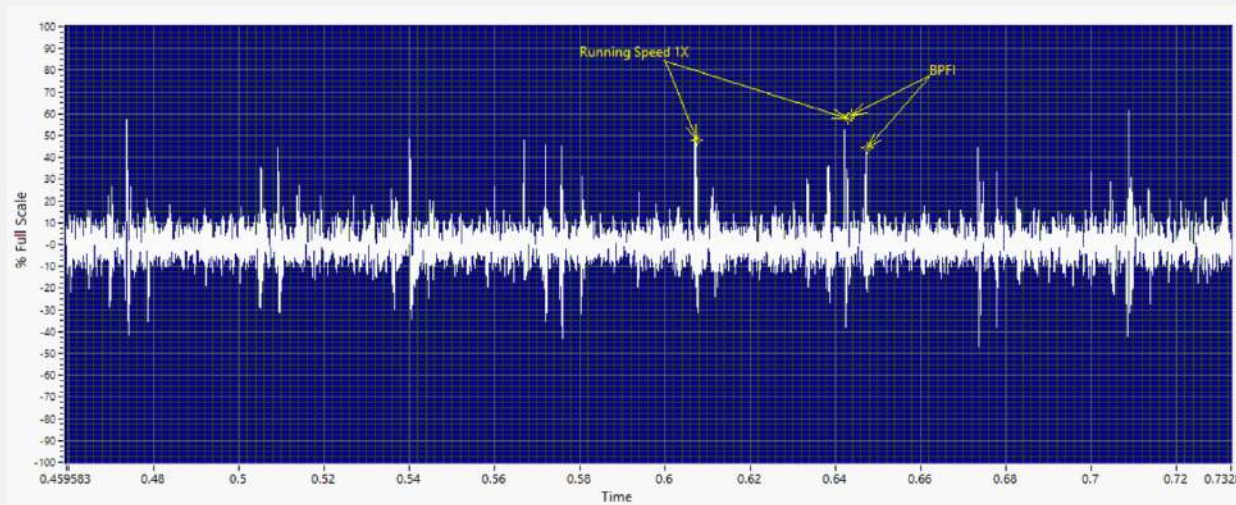
# #3 Reactor Outer Cooler Pump- Petrochemical – Saudi A

- **Equipment: Reactor Outer Cooler Pump in High density polyethylene plant.**
- **At the time of the monthly routing inspection of the pump the inspector noticed unusual sound generated from the pump DE bearing.**
- **A sound file was recorded from the bearing for further analysis and comparison with the baseline sound file.**



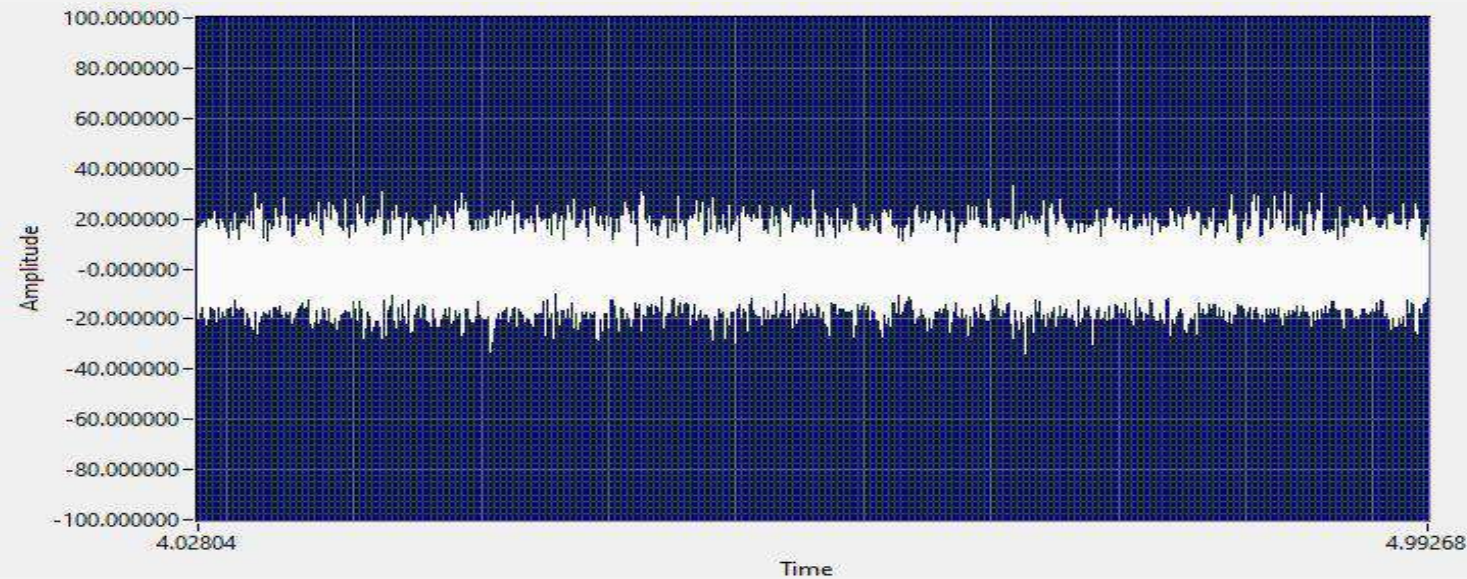
# Analysis

- Analyzing the time waveform, impacts at the inner race defect frequency (225 Hz) found modulated with the pump running speed frequency (1X).
- The spectrum was showing 225 Hz and harmonics surrounded with sidebands at 1X (30 Hz).



# Recommendations and Findings

- Upon inspecting the replaced bearing, a clear defect was found in the inner race. Also, the bearing clearance found higher than normal.
- The sound returned to its baseline state which is smooth rushing sound.



# Sample of Testimonials & Appreciation

Classification: **YASREF: Restricted**

Dear Ahmed,

On behalf of Yasref PdM team, I would like to thank you very much for the informative training sessions. You showed a great and thankful effort to deliver the training professionally on both theoretically and practically. You hope to see you again in your next visit.

Best regards

Classification: This message has been classified as **YASREF: Restricted** by Ahmed M. Alansari on

## Certificate Of Appreciation

Presented to

AHMED M. ABDELFATTAH

For the effective presentation that contributed towards the success of Energy Conservation and Equipment Reliability with Ultrasound Technology Workshop provided by Hawiyah Gas Plant Department – July 22<sup>nd</sup>- 23<sup>rd</sup>, 2019.

  
HESHAM S. AL-SALEEM, Manager (A)  
Hawiyah Gas Plant Department



ابن رشد  
ibn rushd

## CERTIFICATE OF APPRECIATION

Ibn Rushd is pleased to present this certificate to:

Ahmed Moataz

Ibn Rushd Reliability team would like to express their thanks and sincere appreciation for your valuable Cooperation & Support towards customer satisfaction.

  
Mohammed Al-Khateeb  
Manager, Training Equipment

A SABIC Affiliate

 SONPD Maintenance & Reliability Forum  
September 28, 2021

## certificate of appreciation

to

**Ahmed Moataz (UE System)**

Safaniya Onshore Producing Department (SONPD) would like to take this opportunity to express sincere thanks and appreciation for his presentation "Using Ultrasound technology to monitor rotating equipment".

  
FAISAL I. AL-CHAIIBANI, Manager  
Safaniya Onshore Producing Department

## certificate of appreciation

Presented to

Ahmed Hassan

For the effective participation that contributed towards the success of the "Fire Water System Enhancement" Technical Exchange Event, hosted by Shedgum Gas Plant Department - September 11th, 2019.

  
Bader S. Al-Saud  
ShGP Manager



ارامكو السعودية  
Saudi Aramco

## UDHAILIYAH POWER OPERATIONS DIVISION

### Certificate of Appreciation

TO  
**Ahmed M. Abdelfattah**

UE Systems Company

In recognition for his support and contribution to enhance our Power System Efficiency through presenting and demonstrating new technology in the market.

  
Khalid G. Al-Shammari, Superintendent  
Udhailiyah Power Operations Division



  
SYSTEMS INC  
The ultrasound approach

# Thank you

Ahmed Moataz

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