Taking Priority on Reliability-Centered Maintenance Solutions
Agenda

1. Facts & Figures

2. Advantages of Proactive Maintenance

3. Meeting The Demanding Needs of the Industry
1 | Facts & Figures
Industry Facts & Figures
Assets and Investments That Impacts You

70% of uptime failures are chronic

25% of unplanned outages are due to equipment failure
Source: Improve Reliability with Essential Asset Monitoring, Nikki Bishop, InTech, June 2012

8-12% of product costs are maintenance costs in a plant
Source: Constance E. Dyer, Quality Digest.
Industry Facts & Figures
Assets and Investments That Impacts You

$11,000 PER HOUR of downtime costs for a large natural gas power plant  

70% of maintenance costs are on valves, pumps, compressors, exchangers, piping, vessels and fired equipment  

50% HIGHER failed assets repair costs when not addressed early

Source: KCF Technologies Blog, March 2013  
Source: Improve Reliability with Essential Asset Monitoring, Nikki Bishop, InTech, June 2012  
Source: Improve Reliability with Essential Asset Monitoring, Nikki Bishop, InTech, June 2012
Reliability-centered Maintenance as a Top Priority
Taking a Toll on Assets and Investments

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March 30, 2018

Production (Uptime) Losses

70% Chronic Failures

30% Sporadic Failures

Non-stop operation needs increases the asset’s susceptibility to inefficiency and breakdowns.
Advantages of Proactive Maintenance
## Top Preventable Downtime Causes In Industrial Maintenance

<table>
<thead>
<tr>
<th>Cause</th>
<th>Cost Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fastener Loosening</td>
<td>$2025 per year per leak</td>
</tr>
<tr>
<td>Keyway Wallow</td>
<td>$842 per year per leak</td>
</tr>
<tr>
<td>Spun Bearings</td>
<td>$842 per year per leak</td>
</tr>
<tr>
<td>Fretting Corrosion</td>
<td>$842 per year per leak</td>
</tr>
<tr>
<td>Tape Fouled Valves</td>
<td>$842 per year per leak</td>
</tr>
<tr>
<td>Hydraulic Leaks</td>
<td>1 drop per second @ $5 per gallon = $2025 per year per leak</td>
</tr>
<tr>
<td>Air Leaks</td>
<td>1/16” 100 psi @ $0.065 per kWh = $842 per year per leak</td>
</tr>
<tr>
<td>Gasket Leakage</td>
<td>$842 per year per leak</td>
</tr>
<tr>
<td>Delayed Repairs</td>
<td>$842 per year per leak</td>
</tr>
<tr>
<td>Downtime + Replacement Parts</td>
<td></td>
</tr>
<tr>
<td>Downtime + Replacement Parts</td>
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<tr>
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<td></td>
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<tr>
<td>Downtime + System Flush</td>
<td></td>
</tr>
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</table>
Combat Unplanned Downtime
Putting a Proactive Plan in Place

By maintaining regular maintenance and accurate record of assets and equipment, companies can implement a 'plan of action' in case unexpected problems on the job site occur.

PREVENTATIVE
“Protect from Neglect”

PROACTIVE
“Prevent the Unpredictable”

REACTIVE
“Fix after failure”

PROACTIVE
“Replace prior to failure”

WORLD CLASS MANUFACTURING

30 March 2018
Proactive Plan Benefits
Mining Industry

**IMPACT OF UNPLANNED DOWNTIME**

- Poorly maintained concentrator increases energy and maintenance costs
- Lost production

**BENEFITS OF PROACTIVE MAINTENANCE**

- Increased stability
- Increased profitability = lower energy and maintenance costs

**$8M annually**
Productivity improvement spending per concentrator

Hydraulic power and belt drive failures cause up to 47% downtime cause in mining industry

**SOURCE:** The Power of GE Predictivity™, No Unplanned Downtime 2014
Proactive Plan Benefits
Power Generation Turbine and Generator

IMPACT OF UNPLANNED DOWNTIME

- Lost production
- Addition maintenance cycles

BENEFITS OF PROACTIVE MAINTENANCE

- Identifying parts that are starting to degrade
- Lower maintenance cost and improved availability and utilization

$1M per day
Lost revenue per power plant

For a utility, with average spark spread of $13.15/mwhr, the lost profit opportunity is $45k per day

SOURCE: The Power of GE Predictivity™, No Unplanned Downtime 2014
Proactive Plan Benefits
Reﬁnery Processing Technologies

IMPACT OF UNPLANNED DOWNTIME

Cost of repairs for unplanned events = 10 x planned maintenance costs

Interrupted production

Capital asset replacement

$800k per day
In lost proﬁt for a reﬁnery processing 200,000 barrels per day of crude

SOURCE: The Power of GE Predictivity™, No Unplanned Downtime 2014

BENEFITS OF PROACTIVE MAINTENANCE

Extended production runs

Minimized cost for cleaning and repairs

Taking Priority on Reliability Centered Maintenance Solutions
Proactive Plan Benefits
Railway Industry

IMPACT OF UNPLANNED DOWNTIME

- Lost train availability & crew costs
- Loss per train per year
- Customer order fulfillment misses
- Network congestion and failures

$400M per year
In reliability costs due to mainline failures

SOURCE: The Power of GE Predictivity™, No Unplanned Downtime 2014

BENEFITS OF PROACTIVE MAINTENANCE

- Improved network velocity and capacity
- Lower maintenance costs and improved availability and utilization

Taking Priority on Reliability Centered Maintenance Solutions 30 March 2018
Proactive Plan Benefits
Food Manufacturing

IMPACT OF UNPLANNED DOWNTIME

- Breakdown in packaging line
- Increased inventory and labor costs
- Lost production

$35 per minute for every minute a packaging line, running a product contributing 10c each at 350PPM, is stopped.

Ten minutes per day = $87,500 annually in lost profit = 40 hours in production loss

SOURCE: The Power of GE Predictivity™, No Unplanned Downtime 2014

BENEFITS OF PROACTIVE MAINTENANCE

- Reduced energy cost per unit
- Reduced maintenance cost
- Reduced labor cost
- Inventory reduction
- Improved overall equipment effectiveness

15%

30%
Increasing Reliability
The Number #1 Goal

“Cost reduction does not improve reliability. Improved reliability results in lower costs.”

-- Christer Idhammar, CEO Idcon.Inc.
Meeting the Demands of the Industry
Our MRO Coverage
Henkel Provides Complete Solution for Your Industry

Repair, rebuild, maintain and protect your assets with LOCTITE revolutionary solutions, reaching far beyond a single application.
Henkel Provides Complete Solution for Your Industry

Our solutions reduce cost and increase reliability.

- Thread Locking
- Thread Sealing
- Gasketing
- Retaining
- Anti-Seize Lubricants
- Instant Bonding
- Structural Bonding
- Primers and Activators
- Rust Treatment & Cleaning

Taking Priority on Reliability-Centered Maintenance Solutions

March 30, 2018
Henkel General Industry Maintenance, Repair and Overhaul (MRO)

MAINTAIN
MACHINERY ADHESIVES

REPAIR
BONDING & SEALING

REBUILD
REBUILD & WEAR COMPOSITES

PROTECT
COATINGS, LUBRICANTS & CLEANERS

POWER GENERATION
MINING
OIL AND GAS
STEEL
RAILWAY
WATER UTILITIES
PULP AND PAPER
FOOD PROCESSING

Taking Priority on Reliability-Centered Maintenance Solutions
March 30, 2018
Our Expertise
Our Expertise
See how LOCTITE has proven to be reliable to meet the demands

STANDING UP TO THE HARSHEST
Failure-free Weapon in Maintenance Toolbox

<table>
<thead>
<tr>
<th>CUSTOMER</th>
<th>TASK</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A mining company in North America</td>
<td>Machinery, subject to demanding conditions, has to be reliable and withstand running 24/7</td>
<td>LOCTITE 2047 the dual-function threadlocker fastener and lubricant can extend equipment life and withstand harsh environments</td>
</tr>
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Our Expertise
See how LOCTITE has proven to be reliable to meet the demands

**LEAK PREVENTION**
Fast, Reliable and Reduction of Downtime

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<tr>
<td>An oil &amp; gas company in Western Europe</td>
<td>To prevent the leakage at the flange of the gearbox housing</td>
<td><strong>LOCTITE 577 Thread Sealant</strong> was used to prevent the leakage and ensure a reliable seal</td>
</tr>
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Our Expertise
See how LOCTITE has proven to be reliable to meet the demands

WITHSTANDING CONSTANT HIGH IMPACT
Reducing Unscheduled Downtime and Repairs

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<td>A cement manufacturing plant in South Africa</td>
<td>A solution is needed to secure the crusher base to withstand continuous high impact vibration</td>
<td>LOCTITE Backing Compounds withstand crusher vibration and eliminate downtime due to constant repair of the crusher base</td>
</tr>
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Our Expertise
See how LOCTITE has proven to be reliable to meet the demands

WITHSTANDING EXTREME CHEMICAL CORROSION
Reliable Protection of Pipelines

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<tbody>
<tr>
<td>A leading steel mill</td>
<td>High costs of replacing pipes due to corrosion that leads to leakage</td>
<td>LOCTITE Polypoxy PS provides excellent UV resistant properties plus good adhesion to prevent corrosion</td>
</tr>
</tbody>
</table>
Our Expertise
See how LOCTITE has proven to be reliable to meet the demands

PREVENTION AND PROTECTION ARE KEY
Reliable Protection from High Temperatures

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<tbody>
<tr>
<td>A leading coal power plant</td>
<td>Prevent seizing of threaded fasteners of turbine casing subjected to high temperatures</td>
<td>LOCTITE Heavy Duty Anti-Seize prevents seizing and allows disassembly when needed</td>
</tr>
</tbody>
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Our Expertise
See how LOCTITE has proven to be reliable to meet the demands

PREVENT IMPACT AND DOWNTIME
Reliable Protection from High Frequency of Use

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<tr>
<td>A leading mining account</td>
<td>Nuts of the crusher must be disassembled for disarmed of equipment and could be seized</td>
<td>LOCTITE Nickel Anti-Seize prevents seizing and allows disassembly when needed</td>
</tr>
</tbody>
</table>
BENEFIT NOW

- Is the LOCTITE maintenance reliability solutions something you are interested in?
- If so, reach out to the email at the following slide and you will be contacted back.
- Schedule a plant survey.
- We will then join you in your efforts to make your plant more reliable, efficient and safe— with reduced costs!