

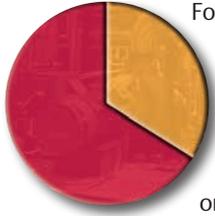
# Protect Your Pumps, Production, and People

## Pump Health Monitoring



# Looking to Keep Pumps from Threatening Production?

Industry averages suggest that roughly 5% of production capacity is lost each year due to unplanned downtime. Perhaps more than any other cause, equipment failures are the most common culprit...often exceeding 40% of unplanned outages.

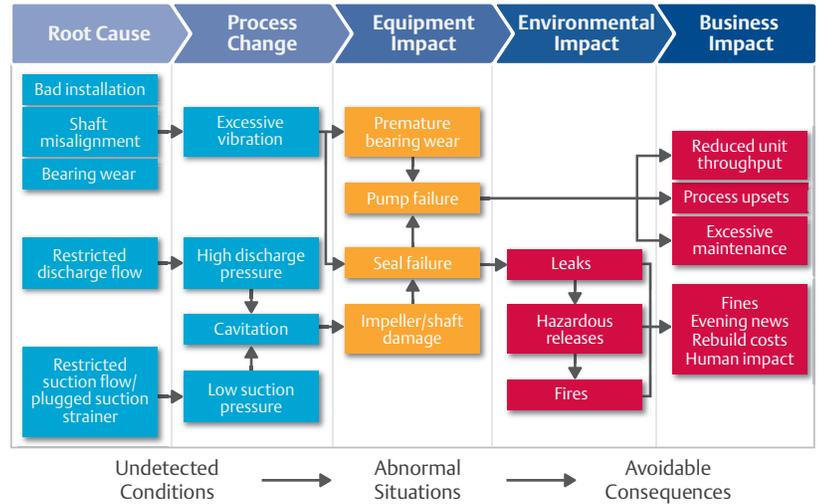


For critical equipment and machinery, you monitor them with expensive OEM monitoring solutions. Take pumps, for example: A typical approach is to dynamically monitor the most critical and expensive pumps. That might mean only 20-30% are monitored in real-time.

The remainder of your pumps are “monitored” through clipboard walk-arounds and periodic handheld measurement and monitoring devices. This results in pumps running blind most of the time, increasing your risk of pump failures, leaks, fires or other dangerous situations.

What would it mean to your bottom line and your operational risks if you could adapt existing pumps and other essential assets with a low-cost, scalable and easy-to-integrate dynamic monitoring solution?

## Anatomy of a Pump Failure



## Common Threats to Pump Health



### RESTRICTION

A restriction of the pump's suction can result in cavitation of the pump. Root causes can include a plugged suction strainer, loss of level in the suction drum or a possible valve issue.



### CAVITATION

As liquid pressure falls below its vapor pressure, bubbles form and implode on impellers and interior surfaces, damaging pump internals, disrupting flow and leading to seal failure.



### LEAKAGE

Leaks caused by mechanical failures can be catastrophic. Early detection of abnormal conditions such as cavitation, pressure imbalance or excess vibration can help avoid leaks and their consequences.



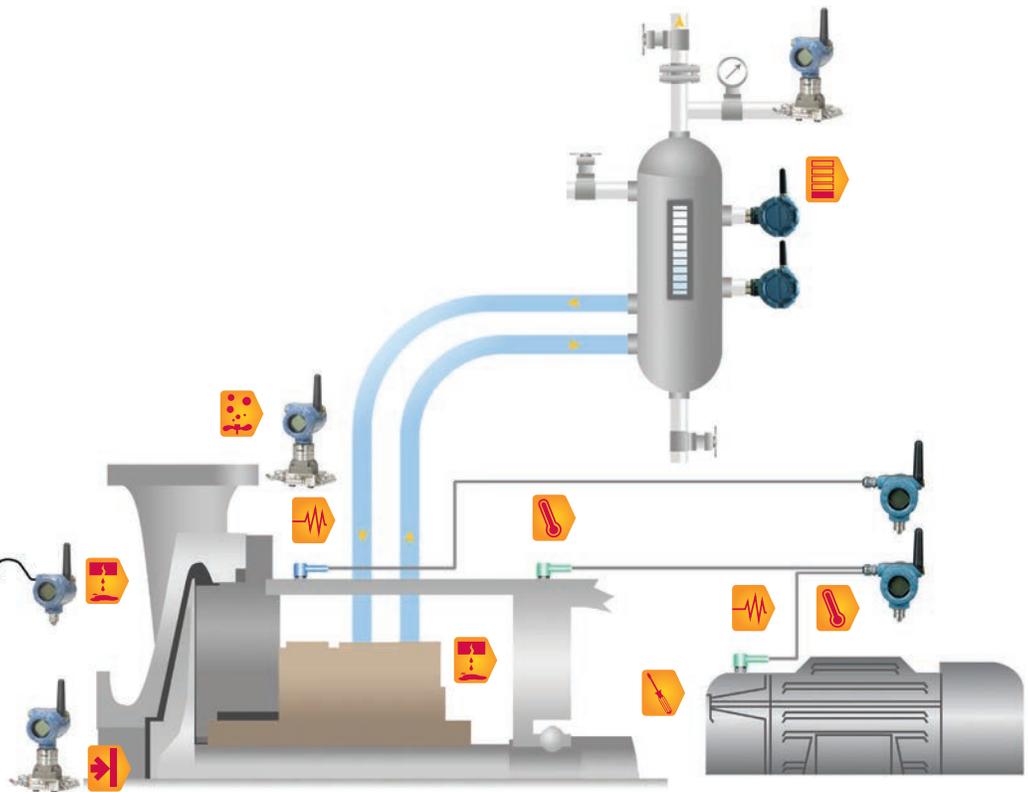
### LEVEL

Inadequate monitoring of Auxiliary Seal Flush levels can result in missed low level conditions, indicating a loss of flush or high level conditions, indicating mechanical seal leakage and eventual flaring.



### VIBRATION

Several detectable root causes for vibration can damage seals or internals and cause pump failure.



### TEMPERATURE RISK

Blocked-in discharge can result in fluid stagnation, causing a spike in temperature. This can also result in cavitation, damaging pump internals and seal failure. Inadequate monitoring of standby pump temperature can result in damage when a cold pump is put into hot service.



### INSTALLATION

Improper installation can lead to shaft misalignment, excessive vibration leading to pump damage and possible failure.

## What if you had a cost effective, easy to apply solution for monitoring these pumps 24/7?

Being able to detect changes in process variables and equipment condition are the keys to avoiding pump damage, environmental incidents and negative business impact. But not all pumps traditionally met the cost threshold for investing in these kinds of monitoring systems.

Now, thanks to Emerson's Smart Wireless technologies and integrated approach to equipment protection, the engineering requirement and cost of applying predictive technologies is no longer an obstacle. Without wires, trenching or complex engineering diagrams, having the protection you need is now affordable for nearly all of your pumps.

Scalable and flexible, Emerson's integrated approach to Pump Health Monitoring lets you monitor the conditions you are most concerned about and retrofit existing equipment with ease. For example, if you have pumps which have experienced cavitation previously, your Pump Health Monitoring kit from Emerson might include Differential Pressure and Vibration detection sensors, letting you identify conditions with time to correct. You could expand your kit to include leak detection or level measurement, making it possible to spot seal failures.



Get Started Today at  
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### Pump Health Monitoring Solution

Using Emerson's pump health monitoring solution, you can avoid pump damage and lost production from unplanned downtime, but without the complex engineering that typically made wired monitoring too expensive to implement.

Instead of relying on infrequent manual rounds, your operators can detect process and equipment condition changes in real-time with Smart Wireless technologies. As a result, you can reduce installation costs, manual rounds, pump maintenance, and lost production.



### Learn More

Visit the Emerson Process Management website to learn more.



Scan this code or visit  
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## Increasing your profit

Industry experts suggest that pump failure and shutdowns account for 0.6% of lost production capacity. Care to get that back?

### INPUT

a. Plant capacity in tons per day	1,700
b. Plant net margin per ton	\$200
c. Operating time in days per year	365
d. Capacity utilization	0.93
e. Plant total annual maintenance spend, excluding turnarounds	\$40,000,000
f. % of production capacity lost due to pump failure	0.60%
g. % of plant total annual maintenance attributable to pumps	4%

### OPERATIONAL BENEFITS

h. % reduction in lost production with pump monitoring	30%
<b>Annual Net Profit Improvement (= a x b x c x d x f x h)</b>	<b>\$207,743</b>

### MAINTENANCE BENEFITS

i. % anticipated reduction in pump maintenance cost with diagnostics	30%
<b>Annual Maintenance Savings (= e x g x i)</b>	<b>\$480,000</b>

### TOTAL ANNUAL IMPROVEMENT

**\$687,743**

#### Notes

This is an example of an olefin plant.

# Emerson Pump Health Monitoring Products

## SOFTWARE INTERFACE



### AMS SUITE: ASSET GRAPHICS FOR OPERATIONS

Alerts operators of abnormal operation or imminent failure in an integrated, real-time environment using a pre-engineered algorithm. Graphically displays equipment and key process parameters for easy detection of issues.



## NETWORK INTERFACE



### SMART WIRELESS GATEWAY

Connects IEC 62591 (WirelessHART®) self-organizing networks with any host systems and data applications.



## DEVICES



### CSI WIRELESS VIBRATION TRANSMITTER

Measures overall vibration levels as well as stress waves and bearing temperature to detect the earliest signs of bearing and gear wear. When paired with AMS Suite, delivers root cause analysis and corrective action guidance.



### ROSEMOUNT WIRELESS PRESSURE TRANSMITTER

Detects fluctuations in discharge pressure to prevent cavitation and impeller damage. Provides early warning of suction strainer plugging, which can lead to cavitation, impeller damage and seal failure. Detects increased seal flush reservoir pressure, indicating possible inboard seal failure, fluid vaporization, and flaring.

## ADDITIONAL OPTIONS



### ROSEMOUNT WIRELESS VIBRATING FORK LEVEL SWITCH

Provides detection of low fluid levels, indicating possible seal failure and conditions that require normal fluid service.



### ROSEMOUNT WIRELESS DISCRETE TRANSMITTER with TraceTek option

Discrete sensors for hydrocarbon leak detection, providing warning of hazardous leaks before they become catastrophic.



### AMS SUITE FOR MAINTENANCE

Allows Maintenance to diagnose equipment problems using predictive diagnostics. Early warning enables planned maintenance practices and reduces downtime.

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