

**Focus on reliability to improve availability,
profitability and safety.**



Prediction and Protection for Production Assets

Recognize business goals and achieve top-quartile reliability by implementing predictive intelligence and integrated protection technologies.

Prediction and Protection
for Production Assets



Unreliable equipment increases risk to both safety and profits

Unscheduled downtime caused by equipment failure eats into both the maintenance budget and production goals. Routine maintenance can help, but it doesn't reveal the developing issues that result in process slowdowns or shutdowns. You simply aren't able to avoid these preventable failures.

Introducing technology to monitor these assets sounds like the solution, but where do you start? The budget won't allow you to install the same monitoring system on every asset in the plant, so how would you choose what equipment to monitor and what equipment to ignore?

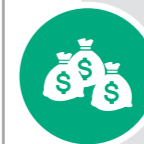
In addition, your critical assets are required to have API-certified protection systems so the equipment is tripped under unsafe operating conditions. But sometimes those trips aren't necessary – and again your production is shutdown while you determine the nature of the problem.

To keep your plant assets available and producing revenue, you need solutions that are custom to the criticality of the asset being monitored and that identify the assets at risk of failure.



A typical refining facility will spend **less than 10%** of its time in **transient operations**. However, **50%** of all process safety **incidents occur during this time**.

– Tame your Transient Operations,
Chemical Processing June 2010.



It costs approximately **50% more to repair** a failed asset than if the problem had been addressed prior to failure.

– U.S. National Response Center



Production capacity is lost to as much as **5% every year as a result of unplanned shutdowns**.

– Asdza Nadleehe,
“Engineering & Maintenance:
Prevention is Better Than Cure,”
Oil & Gas IQ, October 2011.

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EMERSON™

Focus on Reliability to Improve Availability, Profitability, and Safety

Improve Availability,
Profitability, and Safety



A key strategy to improving reliability is to monitor the condition of both production and automation assets in your plant. Emerson offers a variety of condition indicator technologies specific to the nature and criticality of those assets – portable handheld and asset management solutions, wireless transmitters, and online continuous monitoring systems that can include protection capabilities.

- Machinery Health Management combines condition monitoring technologies with predictive intelligence to reduce both scheduled and unscheduled downtime of your rotating equipment.
- Field Device Management utilizes configuration and calibration data to confirm your automation assets are operating effectively, thereby protecting the reliability of your production assets.



Click below for more information.

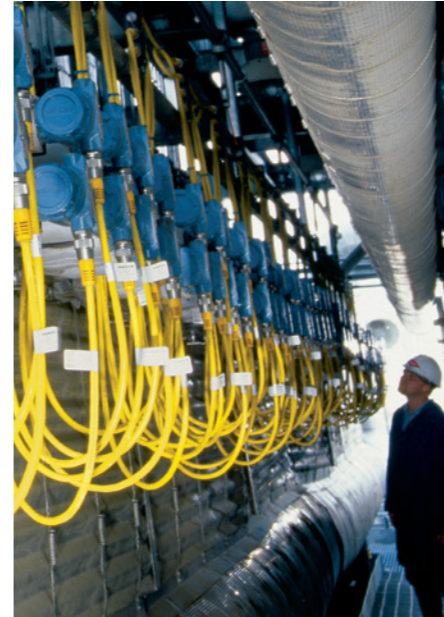
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Improve Asset Reliability Using Predictive Fields Diagnostics

In a perfect world, your process would be consistent, day in and day out. But the reality is that field device performance, like most things, can degrade over time. Variability is a natural occurrence that must be dealt with.

Predictive diagnostics from field devices help your maintenance team keep sensing devices configured, calibrated, and operating effectively. And the measurements and control from those devices protect the reliability of your production equipment. Emerson's AMS Device Manager provides real-time online access to intelligent instrument and valve diagnostics and alerts, delivering a view of device health and troubleshooting information when an issue is found. The AMS Trex Device Communicator and 475 Field Communicator allow your personnel to assess health and repair devices from the field. Whether online or offline, Emerson gives you the tools to ensure your field devices are performing as expected.



[Click below for more information.](#)

Improve Reliability Using Field Diagnostics 

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5%
Production Capacity Lost

What's your challenge?

Production capacity is lost to as much as 5% every year as a result of unplanned shutdowns.

*– Asdza Nadleehe,
“Engineering & Maintenance:
Prevention Is Better Than Cure,”
Oil & Gas IQ, October 2011.*



300k
Saved

What's your opportunity?

Even small fixes have big impact. While using AMS Device Manager, Braskem S.A. found a calibration error on a pressure control valve, causing the valve to open 3% when it was supposed to be closed. Fixing the calibration error saved the plant \$300,000 a year.

– Braskem S.A. in Brazil



Drive Success Using Predictive Intelligence


When your assets aren't reliable, you can't maintain your schedule or operate within budget. Your assets become the drivers of your success. But with predictive intelligence, you gain the insight necessary to schedule maintenance that supports your production goals. Emerson's technology for delivering predictive intelligence puts you back in the driver's seat.

Vibration data is the cornerstone of predictive intelligence. Emerson offers accurate, industry-proven technology for data collection and field analysis of vibration data on a wide range of rotating assets. Factors such as asset criticality and location determine whether the technology is applied periodically or continuously. Vibration data can be routed back to the control room where operators can easily leverage both asset condition and process data to make educated production decisions.

Emerson's vibration data collection technologies feature a unique methodology - PeakVue technology - to cut through the complexity of machinery analysis and provide a simple, reliable indication of equipment health that is easily understood by both operations and maintenance. PeakVue filters out traditional vibration signals to focus exclusively on impacting, a much better indicator of overall asset health on pumps, fans, motors, or any other type of gearbox or rolling element bearing machine.



[Click below for more information.](#)

Drive Success Using Predictive Intelligence 

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50%
MORE 
Repair Costs

What's your challenge?

It costs approximately 50% more to repair a failed asset than if the problem had been addressed prior to failure.

- U.S. National Response Center

5%

Reduction in maintenance cost

What's your opportunity?

Reduce repair expense. By making use of predictive data to improve the reliability of their rotating equipment, Saudi Aramco, Ras Tanura refinery, reported a total program savings of over \$10 million annually and a 9% reduction in maintenance costs.

*- Saudi Aramco, Winner
- Reliability Program of the Year 2015.*



Accomplish More with your Protection System


Safety regulations and often insurance requirements necessitate the installation of a shutdown system on your expensive and critical production assets to protect both lives and investments. But protection doesn't have to be just a necessary expense – the right protection system can be a path to integrating the predictive intelligence that allows you to avoid false or missed trips.

Through system integration and unique data access, Emerson protection systems allow you to confidently determine when critical assets can be allowed to continue running safely.

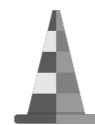
By recording data during equipment start-ups, coast downs, and other transient events, Emerson protection systems provide you the information necessary to make informed operational decisions. Systems are compliant to a variety of API standards and SIL environments, meeting the strict safety and insurance requirements such as those in the refining and petrochemical industries.



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Accomplish More with your Protection System 

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What's your challenge?

A typical refining facility will spend less than 10% of its time in transient operations. However, 50% of all process safety incidents occur during this time.

– Tame Your Transient Operations, Chemical Processing June 2010



What's your opportunity?

Operate safely during typically dangerous conditions. The startup and coastdown of turbo machinery is potentially the most dangerous operating state due to the rapidly changing conditions. Rather than just snapshots of data, Emerson delivers real-time data on multiple channels simultaneously for the most powerful, accurate diagnostics and safer operating conditions.



Implement IIoT in your Reliability Program

The Industrial Internet of Things (IIoT) has arrived. Technology advances make it easier than ever to stay on top of asset health and stay in touch with the personnel who care about their performance – no matter where they are. But implementing IIoT can be a daunting task – where do you start? How do you bring together the silos of data in your plant without inundating the team with hundreds of alerts? You need a solution that promotes collaboration while still streamlining decision-making when problem calls for quick action.



Plantweb Optics is a software application that aggregates data from multiple sources, but delivers persona-based alerts and KPIs for improving reliability of your rotating equipment, instruments and valves. With additional connectivity to CMMS, advanced analytical tools, and other predictive intelligence programs, you'll stay on top of developing issues that could impact production. Anywhere, anytime.

The Plantweb Optics Asset Viewer utility runs on laptops, tablets and smart phones to deliver the right information at the right time.

Click below for more information.


Implement IIoT in your Reliability Program



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 **60%**

*of global manufacturers used analytics data recorded from connected devices to analyze processes and identify optimization possibilities**

**IOT will lead to a*
 **15%**
productivity increase
in delivery and supply chain performance

**Source: IDC and SAP, as reported By Kelvin Claveria, 13 Stunning stats on the Internet of Things, Vision Critical blog, April 2017*


EMERSON™

One Source of Responsibility for the Entire Measurement Chain



When there is a problem with your data, where is the source – your sensor? Your collection system? When your tools come from multiple vendors, it can sometimes be difficult to pinpoint the responsibility and address the problem.

Emerson offers a full line of quality sensors to complement its prediction and protection systems. Working with a leading third-party sensor supplier, Emerson has introduced a variety of specialized sensors to improve the accuracy of the measurement as well as the ability to physically capture early stage asset failure data.



Click below for more information.



Eddy Current Measurement Made Simple

Historically the various elements of an eddy current measurement chain have been expensive to keep on hand for replacement or outage planning. Factory-required calibration of the converter meant dozens of spare parts or long lead times for replacements. The new AMS EZ 1000 sensor can be calibrated in the field for most applications with a simple button push. Converter calibration makes use of a USB interface back to Emerson's Machine Studio for a simple three-step configuration process.



Responsibility for the Entire Measurement Chain



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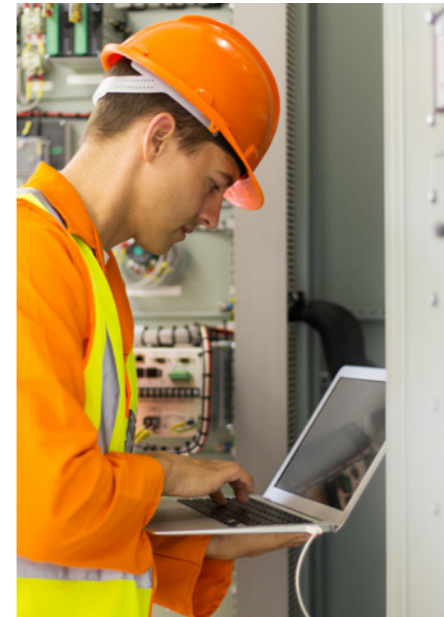


Protect and Expand the Value of Your Technology Investment

While many companies recognize a significant ROI following their technology implementation, companies that commit to maintaining their technology advantage reap the benefits for years to come.

Guardian Support Services

Improving reliability in the plant requires more than just acquiring the right monitoring and analysis technologies. You need to actively manage those investments and their lifecycle costs. Emerson offers Guardian Support services designed to optimize the reliability and performance of your machinery health products. It is designed to help improve your competitive advantage and bottom line business results through critical service and support information. Specific, critical information is matched to your system and proactively delivered to you through a secure dashboard portal available 24x7x365. Guardian Support also delivers incident management with access to experts to help you through critical issues. An accurate inventory of all system components and licensing combined with in-depth documentation and resources aids in your troubleshooting.



Emerson's Educational Services delivers knowledge using a variety of modern tools. The combination of these tools increases comprehension and retention of course material.

- Defined skill paths guide you to expertise across multiple technologies.
- Lab work provides hands-on opportunity in each course
- Certification testing is available for most technologies.
- Additional instruction is available through books, charts, pocket guides, and eLearning courses.

Protect the Value of Your Investment



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Educational Services

Companies today rely on fewer people to do more work. The need for training is more critical than ever to achieve and maintain cost effective maintenance programs. Emerson helps maximize the return on your investment in technology and people. Our goal is to provide you with the knowledge to keep your plant running smoothly.



Impacting the Bottom Line

Implementing predictive intelligence and protection technologies from Emerson will deliver positive results in reduced scheduled and unscheduled downtime. For companies pursuing top-quartile reliability, the return on investment is huge.

A study* of reliability practices measured maintenance costs as a function of the replacement value of the assets. If a top-performing site spends 10 million dollars per year on maintenance, a poor performing plant will spend 3 1/2 times more for the same size plant. Top-quartile plants also experience very little downtime as a result of equipment problems, while fourth quartile (poorest) performers experience disruptive levels of down time that is almost 15% greater than top performers.

Top-quartile performers also demonstrate an integrated set of elements shown in the Reliability Value Chain. Ultimately, the ability to achieve top performance status is dependent on the robustness of each element and, perhaps more importantly, on the effective connectedness of all of the elements into a continuous improvement cycle.



Partner with Emerson Reliability Consultants and Reliability Solution technologies to achieve top-quartile reliability results:

(Click bullets for more information)

Emerson is your partner for implementing the Reliability Value Chain by providing:

- Condition indicators and asset health analysis tools that drive information towards action.
- Consulting services to assist in the development of foundational data and enterprise-wide reliability management programs.

**2013 Solomon RAM Study, Solomon Associates, LLC.*



**43%
DOWNTIME**

As much as 43% of unplanned downtime is caused by equipment failure

-Large Property Damage Losses in the Hydrocarbon-Chemical Industries, 17th Edition.

**60-80% of the total
life cycle costs**

Operations and Maintenance costs are between 60-80% of the total life cycle costs for a given asset.

-Maintenance & Reliability Best Practices by Ramesh Gulati, 2012



Impacting the Bottom Line



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