



Leveraging Remote Monitoring and Offshore Analytics Tools to Ensure Offshore Operational Excellence

EHI ATAGA

OPERATIONAL EXCELLENCE

Operational excellence is the vehicle to deliver top quartile performance

Operational Excellence Definition

Competent people, working together in teams with an 'Enterprise First' mindset, understanding where improvement areas exist and executing a plan that delivers results in a business where:

- there is no harm to people or the environment
- all Assets are safe, and we are confident about it
- every barrel is produced as economically as possible
- spend is only what it takes to ensure value is protected
- each individual contributes to their full capability

Predictive Monitoring and Surveillance concept

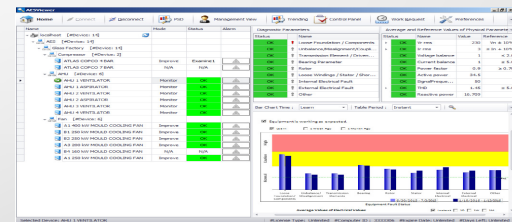
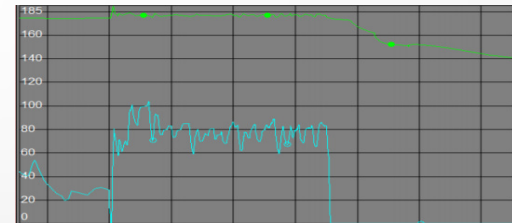
- Surveillance involves monitoring of **process** and **equipment** through the use of real time monitoring tools for early detection of threats.
- Process – Corrosion, Flow rates, Leaks, Temperature, Pressure, Level, Pump efficiency, Vibration.
- Equipment – Pumps, Compressors, Instrumentation, Vessels, Pipelines, Electric Motors, Turbines.
- The end goal is to monitor and understand deviations in observed performance from defined limits.
- Threats are deviations from performance and specified limits – operating envelope limits, IOW limits, user-defined limits.

Case for Predictive Monitoring

- Proactive approach to identify potential threats to offshore facilities availability and business targets.
- Predictive monitoring helps prevent process safety incidents.
- Identify opportunities to drive offshore asset performance improvement leading to improved reliability.
 - ✓ Minimal offshore facility trips.
- Identify opportunities to drive offshore asset performance improvement leading to higher profit margins.
 - ✓ Lower OPEX (maintenance costs)

Remote Monitoring and Analytic tools

- FAILURE PREDICTIVE ANALYTICS .
- REAL TIME LEAK DETECTION TOOLS.
- MACHINERY MONITORING SYSTEMS.
- REAL TIME PROCESS SURVEILLANCE TOOLS.
- REAL TIME OIL CONDITION MONITORING



AMS Tag	Count	Time	Severity	Description	Device Group	Plant Location	Status	Manufacture
TR001	1	9/28/2012 1:15	Abnormal	Device Not Recv.	1	Trailing Area/Trains	USRTC-COUGHL	Roomout
Ca_Te1	1	9/28/2012 11:36	HighSeverity	Panicle visible a...	1	Trailing Area/Trains	USRTC-COUGHL	Roomout
Ca_Te1	1	9/28/2012 12:20	HighSeverity	UPCEA Alarm-Gas...	1	Trailing Area/Trains	USRTC-COUGHL	Roomout
Ca_Te1	1	9/28/2012 2:17	Failure	Field device mal...	1	Trailing Area/Trains	USRTC-COUGHL	Roomout
Ca_Te1	1	9/28/2012 2:17	Failure	Sensor 1 Failed	1	Trailing Area/Trains	USRTC-COUGHL	Roomout
Ca_Te1	1	9/28/2012 2:17	Failure	Sensor 2 failed	1	Trailing Area/Trains	USRTC-COUGHL	Roomout

Remote Monitoring Examples – Predictive Analytic Applications

With Predictive Analytics, a model is "trained" to distinguish normal from abnormal behavior by showing it data from several hundred monitored variables over time

Predictive Analytics Techniques.

- Data mining
- Statistics
- Modelling
- Machine learning
- Artificial Intelligence

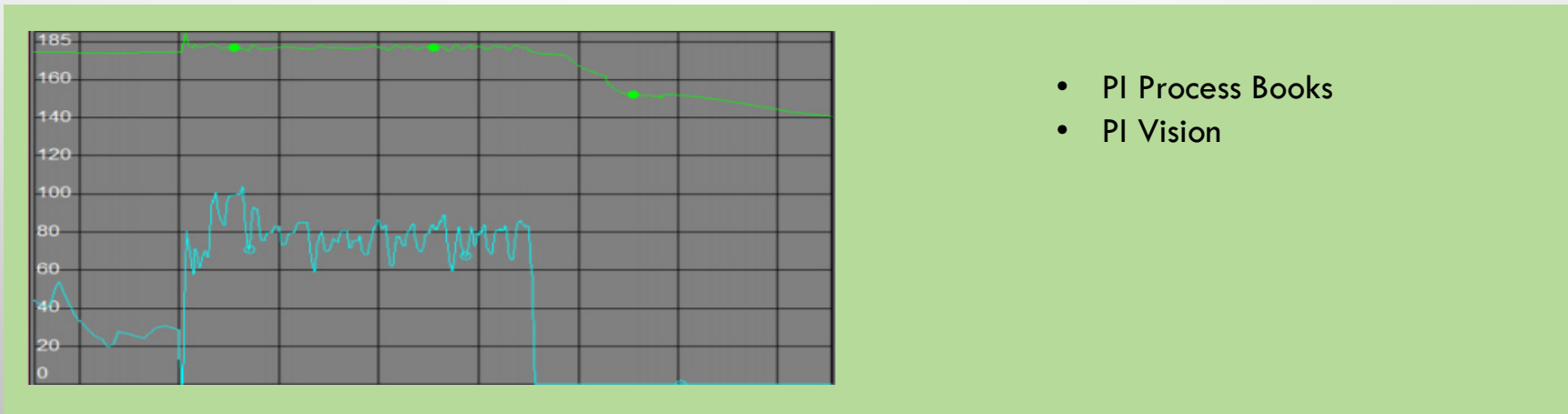
Applications

- Wellbore failure
- Compressor failure
- Control valve failure

Global demand in Predictive analytics by companies to gain competitive edge

Remote Monitoring Examples – Process Engineering

Monitoring of instrumented process variables for identifying sustainable and optimal operating envelopes, as well as emerging threats to utilization.



Remote Monitoring Examples – Process Control Engineering

Monitoring of process base layer control loops to see if they are working optimally or require tuning.

Loops in BL - HO CIPX									
Loop	CV	MV	Net Control Performance			Saturation			
			InService	Uptime	Comply	CV	MV	MVMin-MVMax	
0670-LCU612	1	1	100	100	50	1439	1439	-1~-1	
0010-PC112	1	1	100	100	100		1439	-1~-1	
0560-PC107	1	1	100	100	50	1438	1438	101~101	
0400-TC107	1	1	100	100	50	1438	1438	101~101	
0220-TC116	1	1	100	100	100		1438	-1~-1	
0270-LC130	1	1	100	100	100		903	-1~23.04	
0470-PC147	1	1	99	100	72	806	852	-1~27.47	
0190-TC102	1	1	100	100	75			-1~51.96	
0200-TC232	1	1	100	100	66			-0.97~101	
0350-TC131	1	1	100	100	80			-1~9.64	

- Process Control monitoring tools
- DCS surveillance tools
- Instrument Asset Management System

Remote Monitoring Examples – Rotating Equipment Engineering

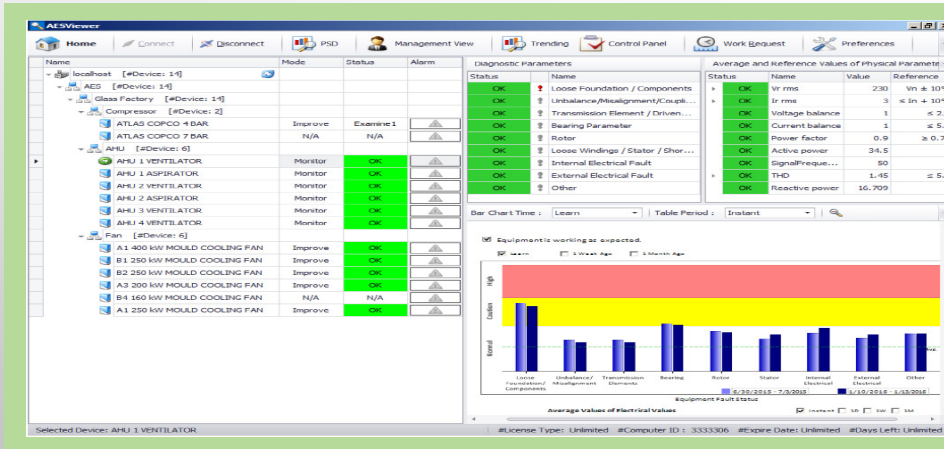
Monitoring of rotating equipment (pumps, compressors etc.) related data to ensure reliable operation, such as vibration data and pump efficiency



- Machinery Monitoring Systems
- Predictive Analytics Tools

Remote Monitoring Examples – Electrical Engineering

Monitoring of electrical parameters such as motor winding temperature, transformer oil level, electrical load and insulation resistance for identifying optimal operating envelopes of electrical equipment.




- Motor Condition Monitoring (MCM) Systems

Considerations in selecting remote monitoring systems

- Equipment Interface.
- Reliability.
- Human Interface – cloud-based interface; alerts via email, phone, text.
- Cost.
- Power requirements.
- Communication backbone.
- Customizable reports and data integration.


Benefits and Success Stories



- Prevention of process safety incidents and reduction of human exposure to hazards .



- Reduction of trips and improved plant availability.



- Reduction in OPEX (Maintenance cost savings)



- Improved profit margin

- Environmental protection

Opportunities for Improvement

- Investment in training and remote monitoring technological advancements.
- Embed collaboration across functional disciplines in the organization as well as with service providers that are already in the game.
- Resource technical capabilities for digitalization skill sets.
- Full understanding is required before any digital transformation project to derive maximum value from investment.

Summary

- A lot more can be gained from the correct use of data as a first step before predictive analytics. Better presentation of data can help us gain insights on our current performance and behaviors can help unlock latent potential.
- The FPSO world is going digital and the earlier we position ourselves for this drive, the more we will stay competitive.
- There are many remote operations capabilities around, to help to reduce personnel exposures in hazardous activities.
- Oil and Gas facilities are still lagging in adopting many of the technological advancements around.
- There are opportunities in technological advancement to tap in to in Project design that will help to save a lot of OPEX in future

A blue ballpoint pen is shown writing the words "Thank you!" in a cursive script on a white notepad. The pen is positioned at the end of the text, as if it has just finished writing. The notepad is set against a light gray background with a subtle grid pattern. The entire scene is framed by a decorative border of water droplets in the corners.

Thank you!