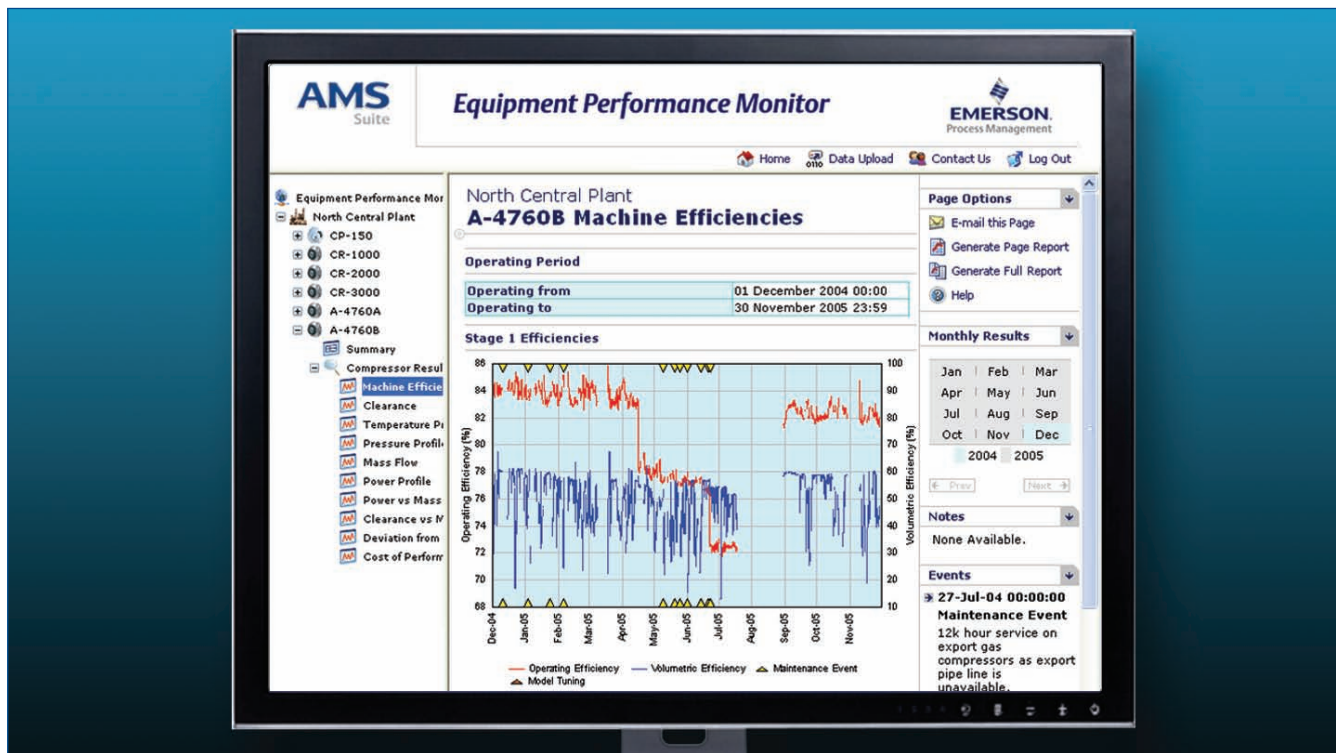


Performance Monitoring - Reciprocating Compressors



Volumetric and operating efficiency of a reciprocating compressor.

- Increase equipment throughput, availability, and reliability
- Determine optimal predictive maintenance strategy for operations
- Prevent unnecessary downtime and costly shutdowns
- Maximize compressor train or station potential with improved control
- Optimize load sharing strategy at multi-compressor sites
- Quantify financial implications of performance degradation
- Ensure plant production targets are met

Enable Predictive Maintenance

AMS Performance Monitor helps achieve peak performance of Reciprocating Compressors. It facilitates the move to predictive and proactive maintenance programs, maximizing equipment performance.

Success Stories

- Saved 2 days downtime every other month by streamlining required maintenance on a poorly performing stage.
- Identified the machine section and cylinder showing greatest degradation. On investigation, significant wear was found on the piston rings and rod.

- Quantified machine degradation following an increase in power consumption. Used to plan maintenance and calculate cost effectiveness.
- Identified failed instrumentation. Repair was scheduled to prevent decreased performance.

Capabilities

- Analyze performance according to manufacturer specifications.
- Quantify compressor performance to determine causes of performance loss.
- Determine inter stage factors on operation.
- Compare operation between individual stages and reciprocating compressor units.
- Validate and reconcile process data using rigorous mathematical routines.
- Diagnose the root cause of performance degradation and impending reciprocating compressor failure.
- Reduce costs by scheduling maintenance based on actual performance.
- Establish the effect of component wear on performance.

Key Performance Indicators (KPIs)

The following indicators are typically presented using ASME PTC 9 and 10 thermodynamic custom-built modeling techniques:

- **Machine Efficiency (operating and volumetric)** - Used to indicate the thermodynamic operation of the machine. The volumetric efficiency is the point where the exit valve is open in the compression cycle.
- **Clearance (% and volume)** - Used to show the clearance within a reciprocating compressor to vary the flow rate within the fixed speed machine.
- **Temperature Profile** - Trends of each stage showing the inlet 'uncontrolled' temperature and exit temperature (measured and model predicted values) that affects overall operation.
- **Pressure profile** - Stage-specific trends showing the inlet 'uncontrolled' pressure and exit pressure.
- **Mass Flow** - Trends of flow rate (model predicted values) for the nit and the individual stage flows.
- **Power Profile** - Power trends for the actual power consumption along with model predicted and design values.
- **Operating Envelope** - Graphical trends of Power vs Mass Flow and Clearance vs Mass Flow to show performance parameters relative to each other.
- **Deviation from Design** - Comparison of increased power consumption and decreased performance, relative to design.
- **Deviation Cost** - Track cost of performance degradation through lost production and increased operating cost — both current and cumulative.

Emerson Process Management

Asset Optimization

835 Innovation Drive
Knoxville, Tennessee 37932
T 1(865) 675-2400
F 1(865) 218-1401

©2011, Emerson Process Management.

The contents of this publication are presented for informational purposes only, and while every effort has been made to ensure their accuracy, they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described herein or their use or applicability. All sales are governed by our terms and conditions, which are available on request. We reserve the right to modify or improve the designs or specifications of our products at any time without notice.

All rights reserved. AMS is a mark of one of the Emerson Process Management group of companies. The Emerson logo is a trademark and service mark of Emerson Electric Co. All other marks are the property of their respective owners.