International Gas Processing Plant Reduces Failures in O_2 Compressors by Combining Protection, Prediction, and Prescriptive Analytics

RESULTS

- Savings of $2M in averted production losses
- Reduced costs of $1.5M by prevention of repeated failures
- Material savings of $1.5M by avoiding replacement of compressors and vibration switches

APPLICATION

Gas processing includes air separation units (ASU) where air from the atmosphere is converted into oxygen, hydrogen, and nitrogen. Each gas is then compressed.

CUSTOMER

An international gas processor manufactures over 35K sq. ft. liquid air at its Houston, Texas site.

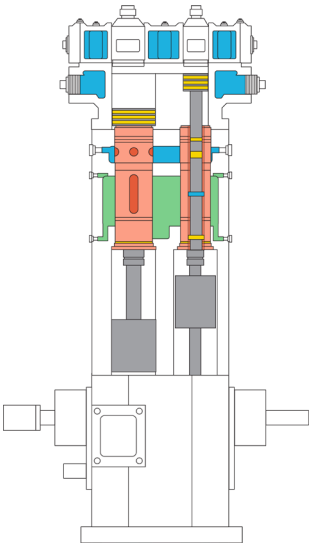
CHALLENGE

As part of its manufacturing process, the company operates multiple O_2 compressors. Vibration switches on the compressors were part of the ASUs, but there were no sensors or vibration monitoring systems, and no data was captured. The gas processor had analytics software from another vendor, but the mechanical integrity models needed real-time vibration data.

Failures in compressors caused vibration monitoring to rise in importance to preserve the production schedule and ensure personnel safety. Multiple sites needed condition monitoring and analysis to enable the team to predict issues and address them early.

"As part of our asset management initiative, we are gathering, storing, and analyzing data to inform our actions and improve safety across multiple sites."

SME
Rotating Machinery



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SOLUTION

To avoid future equipment failures, the gas processor requested that Emerson and Puffer Sweiven, Emerson's impact partner, create a vibration condition monitoring solution for three two-cylinder vertical oxygen reciprocating compressors.

To each compressor, the engineering team added six accelerometers to pick up impact forces and an eddy current phase probe to measure the compressor speed — an indicator of the trend in vibration severity. These seven sensors delivered data to an AMS 6500 ATG machinery protection system with prediction capabilities. Output was then sent to DeltaV™ distributed control system (DCS) via MODBUS, to AMS Machine Works machinery condition monitoring software via OPC-UA, to the OSI PI Historian, and to an external prescriptive analytics package.

Providing single-source data access to contributors throughout the organization via multiple tools reduces failures as experts can help find issues, design solutions, and learn from other teams' insights. Emerson's ATG View mobile app, an important piece of the solution, enables analysts to view the information on a mobile device from any location. The long-term goal is to bring all compressor data to the Enterprise Monitoring Center in Houston.

PeakVue technology, a part of AMS Machine Works, enables personnel to see trends in data well before vibration becomes a critical issue, since PeakVue is the leading indicator of developing impact forces. In fact, operators can see trend data as they work at a DeltaV DCS station and have early warning that something might be amiss. PeakVue simplifies the data interpretation so that operators, not experts in vibration analysis, can understand what the machinery vibration could require — from lubrication to bearing replacement.

The protection system and the DCS were designed by Emerson from the start to work together seamlessly using the same communication card on AMS 6500 ATG. In the future, the solution can be improved by adding wireless vibration monitoring, which is currently under engineering review with the customer to be piloted soon. This will reduce costs as well as effort. In addition, the benefits of vibration monitoring can extend to the balance of the plant.

> ***"Having access to the data in real time means we can address issues before they cause failures."***
>
> **SME**
> Instrumentation and Controls

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