ENGINEERING YOUR SUCCESS.

AUTOMOTIVE INDUSTRY CASE STUDY

Preventing Process Disruptions in Automotive Production Facilities

Defective products or unexpected line shutdowns can be the first signs to an automotive manufacturing organization that processes have experienced a breakdown. Having little or no advanced warning of system failures can mean faulty products, undiagnosed machine issues and costly rework, not to mention downtime and delivery delays. With just-in-time inventory and downsized maintenance practices prevalent in today's automotive OEMs and Tier 1/Tier 2 Suppliers, production facilities need to be efficient with their use of time while keeping a close eye on process and machine health. Condition monitoring tools allow maintenance engineers to accomplish this dual challenge.

Condition Monitoring with SensoNODE and Voice of the Machine

Assessing machine and process health is the core of Parker's SensoNODE condition monitoring and Voice of the Machine™ Software. The Internet of Things (IoT) enabled wireless sensor system allows plant managers to easily monitor process parameters that reveal changes in machine health as they develop; giving them the time and information needed to prevent failures.

Sensors take readings automatically and unattended; contributing to higher productivity and safer operations. With access to more measurements, managers also get process histories that help them visualize upcoming issues. Trending situations are communicated via notifications and dashboards; allowing maintenance engineers to plan ahead of machine failures.

Common automotive applications include casting, metal forming and stamping operations, conveyance/material handling systems and automotive paint lines.

Metal Forming and Metal Stamping Operations

Challenges

Line failures in automotive stamping presses have costly upstream and downstream effects for OEMs and Tier 1/Tier 2 suppliers. Production issues often are traced back to the hydraulic power units (HPUs), which consist of pumps and motors supporting these operations.

Solutions

By using condition monitoring tools to follow one or more common risk areas, maintenance engineers may be able to detect and address issues earlier. For example:

- **Employing a liquid level sensor** to gauge the amount of hydraulic fluid in reservoirs eliminates the need for cumbersome manual inspections while still alerting maintenance engineers to the need for refills; preventing fluid-related shutdowns.
- **Monitoring fluid quality or ISO count** can alert managers to declining oil quality before it reaches an unacceptable condition.
- **Monitoring fluid quality or ISO particulate counts** can alert managers to declining oil quality before it reaches an unacceptable condition.
- **Monitoring hydraulic fluid temperatures** can prevent overheating conditions by allowing maintenance engineers to identify and troubleshoot changes earlier. This preserves oil efficacy and protects equipment from damage.
- **Monitoring hydraulic pressures** allows managers to be notified when there are worrisome changes known to precede faulty manufacturing operations.

Material Handling, Assembly and Conveyance

Challenges

With highly sequenced manufacturing schedules, conveyance and material handling processes depend on the constant movement of components and subassemblies; often driven by motors and pneumatics, which can fail without warning.

Solutions

By monitoring specific parameters of the HPUs, electrical motors and pneumatic systems that drive material handling, assembly and conveyance processes, facility managers have advanced notice of many system failures:

- **Vibration of motors or housings** can be an important indicator of deteriorating machine health. Monitoring for this condition change helps managers to spot and address issues before failures or equipment damage.
- **Monitoring humidity in pneumatic lines** prevents rusting, clogging and damage to equipment, as well as production defects.
- **Monitoring pneumatic system pressures** helps keep power tools operating at peak efficiency by indicating the pressure drops, which occur from leaks or are related to line reconfiguration.
- **Monitoring motor temperatures** illustrates declining equipment health and indicates the need to troubleshoot mechanical components of conveyance systems.

Paint Booths and Paint Lines

Challenges

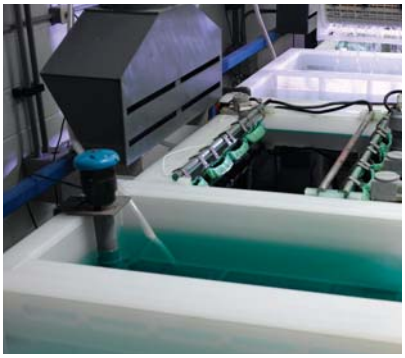
The quality of paint finishes and protective coatings on vehicles depends on the performance of air movement and filtration systems in paint booths. Poor filtration or humidity, for example, can lead to an increase in particulates or impair finish quality that will require rework.

Solutions

Using condition monitoring tools to gauge filter performance and air quality in paint booths frees up staff members and allows maintenance engineers to optimize their time:

- **Monitoring differential pressures** of multi-stage filtration processes can indicate the presence of clogs sooner, preventing overworked motors and production defects while maximizing filter life.
- **Monitoring air temperature and humidity** within paint booths alerts managers of the need for maintenance, to prevent damage to equipment or components, preserve finish quality and keep drying times consistent.

Additional Automotive Applications



Pressure, level, temperature and other condition monitoring sensors can be implemented throughout automotive production facilities to automate measurement-taking. They do so safely as well as providing early warnings of deteriorating process quality. Additional applications include:

- Injection molding temperatures and fluid level
- Adhesion system temperatures and pressures
- Plating operation parameters and chemistries
- Die casting gas detection
- Heat treating temperatures and chemistries
- Vacuum and cooling system efficiency

For details on these and other SensoNODE condition monitoring solutions in automotive manufacturing facilities, visit **parker.com/conditionmonitoring**

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