

Enhancing Cement Plant Operations through Predictive Maintenance with ABB Condition Monitoring

A case study



Implementation of ABB's Condition Monitoring solution presents a strategic opportunity for the a cement plant to address the pressing need for minimizing CEMS analyzer downtime and enhancing operational reliability.

Measurement made easy

Introduction

A Colorado cement plant plays a pivotal role in supplying high-quality Portland Cement products to a vast geographic area encompassing Colorado, New Mexico, Kansas, Wyoming, Idaho, Texas, Utah, and Nebraska. However, like any industrial facility, it faces challenges in maintaining operational efficiency, particularly concerning the Continuous Emissions Monitoring Systems (CEMS) analyzers. Unforeseen downtime not only disrupts production schedules but also poses risks to overall plant performance and regulatory compliance.

To solve this urgent problem, a plan for predictive and reliability-centered maintenance was suggested, using ABB's Condition Monitoring technology, especially the ABB Ability Condition Monitoring system with Remote Assistance, so that the plant can improve analyzer availability, reducing unexpected shutdowns, and lessening related risks.

Customer Need / Challenge

The cement plant operates within a highly competitive market and serves a broad customer base spanning multiple states.

The demand for Portland Cement products, including Masonry N, Type HE, ASTM C-1157 GU, Type I/II LSA, Type I/II Low Alkali LSA, and Fly Ash Type IP, necessitates uninterrupted production processes.

The current challenge lies in the frequent downtime experienced by CEMS analyzers, adversely impacting operational efficiency and customer satisfaction.

The Solution

The proposed solution encompasses the deployment of ABB's comprehensive Measurement Care Agreement, integrating the ABB Ability Condition Monitoring system with Remote Assistance functionality for the ACF5000 unit (FN # 33675367). This solution offers the following key features:

1. **Real-time Equipment Monitoring:** The ABB Condition Monitoring MicroPC seamlessly connects to the customer's ACF5000 analyzer, capturing vital equipment condition data in real-time. This continuous monitoring capability enables early detection of potential issues, allowing for proactive intervention before they escalate into critical failures.
2. **Condition-based Maintenance:** By automatically transmitting equipment condition data to both the customer and ABB service experts, the system facilitates condition-based maintenance strategies. Rather than adhering to traditional scheduled maintenance routines, maintenance activities are dynamically scheduled based on the actual condition of the equipment, optimizing resource utilization and minimizing downtime.
3. **Remote Assistance:** The optional Remote Assistance feature provides direct cloud connectivity to the system via TeamViewer, enabling swift and efficient troubleshooting and support. Plant personnel can leverage remote assistance from ABB experts to diagnose issues, perform maintenance tasks, and optimize system performance without the need for on-site visits, thereby reducing response times and enhancing operational agility.

Benefits

The adoption of ABB's Condition Monitoring solution offers the following benefits to the cement plant:

1. **Increased Analyzer Availability:** Proactive monitoring and maintenance practices minimize unscheduled downtime, ensuring continuous operation of CEMS analyzers and uninterrupted production processes.
2. **Enhanced Operational Efficiency:** By optimizing maintenance schedules based on equipment condition, the plant can maximize resource utilization and minimize the impact of maintenance activities on production schedules.
3. **Risk Mitigation:** The proactive identification and resolution of potential equipment issues mitigate the risk of critical failures, safeguarding plant operations, regulatory compliance, and customer satisfaction.
4. **Cost Savings:** The reduction in unplanned downtime, coupled with optimized maintenance practices, translates into significant cost savings associated with lost production, emergency repairs, and regulatory penalties.

The proactive monitoring provided by the ABB Ability Condition Monitoring solution proved instrumental in averting potential downtime and operational disruptions. When the ACF5000 unit experienced a failure, the ABB service group was able to swiftly identify the issue through real-time data analysis. Specifically, the failure of the FID preamplifier board was detected, highlighting the power of continuous equipment monitoring in detecting anomalies before they escalate into critical failures.

What makes this scenario particularly noteworthy is the fact that the customer was unaware of the failure, primarily due to the KILN being off-line for an overhaul. Without the proactive notification from ABB, the failure could have gone unnoticed until the start-up phase, potentially resulting in costly delays and operational downtime.

However, thanks to the timely intervention enabled by the ABB Condition Monitoring solution, the customer was promptly notified of the failure. Consequently, they were able to replace the failed part prior to the start-up phase, ensuring seamless operations and preventing any disruptions to production schedules.

This incident underscores the tangible benefits of predictive maintenance in avoiding downtime and enhancing operational reliability. By leveraging advanced monitoring technologies and predictive analytics, industrial facilities can proactively identify and address potential equipment issues, minimizing the risk of unplanned downtime and optimizing overall operational efficiency.

Conclusion

In conclusion, the implementation of ABB's Condition Monitoring solution presents a strategic opportunity for this cement plant to address the pressing need for minimizing CEMS analyzer downtime and enhancing operational reliability. By embracing predictive and reliability-centered maintenance practices, supported by advanced monitoring technology and remote assistance capabilities, the plant can optimize its operational performance, mitigate risks, and maintain its competitive edge in the market.

By partnering with ABB and embracing innovation in maintenance practices, this facility can ensure the seamless supply of high-quality Portland Cement products to its diverse customer base across multiple states, driving sustainable growth and profitability in the long term.

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