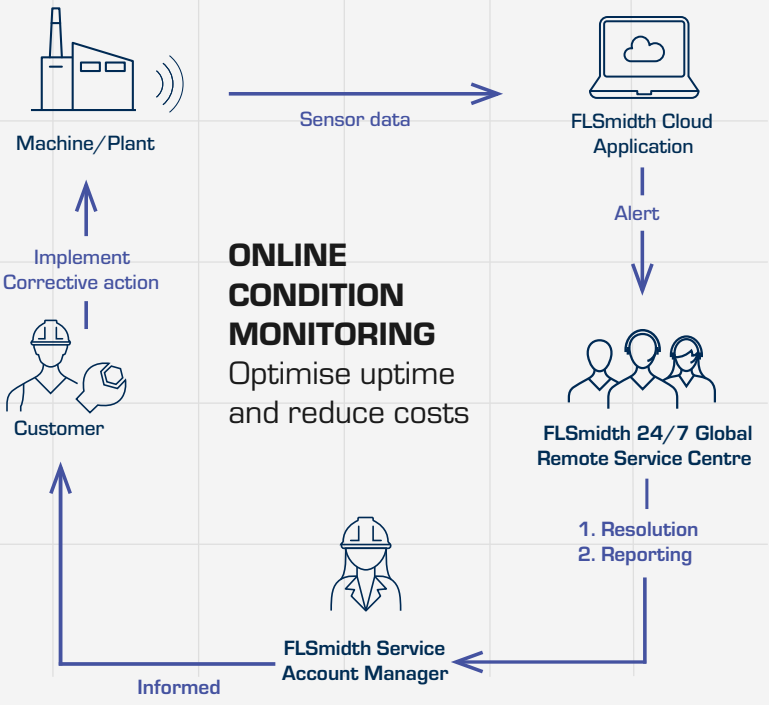
FLSMIDTH CEMENT

ONLINE CONDITION MONITORING SERVICES FOR THE FLSMIDTH CROSS-BAR® COOLER

Improve cooler reliability and extend cooler lifetime

The continuous operation of your FLSmidth Cross-Bar Cooler is integral to plant productivity – so how can you prevent downtime? Our online condition monitoring services give you the insights you need to predict problems before they become outages, so that you can act fast and reduce maintenance costs.

Signals from the monitors are sent to the cloud for analysis. Experts at our Global Remote Service Centre are notifi ed of all alarms/events, enabling them to further analyse the data and generate a report detailing our recommendations for corrective actions. Your Service Account Manager will keep you informed at all times, ensuring you have plenty of time to carry out our recommendations and avoid further problems.



EXPERT ANALYSIS MADE SIMPLE

An easy add-on with widespread impact

Online condition monitoring is a simple solution with far-reaching results. No special instrumentation is required – we simply connect to your existing cooler data via a datalogger and PC (provided as part of your subscription), and then we can keep an eye on the health of your Cross-Bar® cooler.

Data is sent to our Global Remote Service Centre team via a secure connection. It is analysed by our specially-developed algorithm, with any abnormal results going directly to our experts for further analysis and investigation. The Global Remote Service Centre team will report immediately on critical issues and will also provide regular reports on the condition of your cooler.

Catch problems before they escalate

Often, small changes in your cooler go undetected by inspections or other on-site maintenance. But it's these small changes that can develop into major problems, so early detection is beneficial. These irregularities can be seen in the data gathered from your equipment, which is why our continuous online condition monitoring services are so successful at reducing outages. Our experts have the experience to interpret the data, report critical events and, in regular reports, provide recommendations and solutions to help you optimise cooler reliability and performance.

For example, a leaking hydraulic cylinder seal would not be visible. However, the data we collect enables us to compare hydraulic pump performance against relevant KPIs, allowing our experts to identify the problem. Resolving such issues in a timely fashion can help you avoid catastrophic failure.

Data analysis enables us to predict failures that would not be picked up by other means until much later. Not only does this enable you to act quickly, it also often reduces the size of the repair, the length of the outage and the cost of maintenance. The hydraulic drive is a complex system that drives the cooler lanes to convey the clinker. It has crucial components, such as pumps, proportional valve, cylinders etc. Any abnormal condition in the hydraulic system that goes unnoticed or undetected can impact the productivity and maintenance cost.

For example, the online condition monitoring system helped us to identify the root cause of high-pressure operation in a customer's hydraulic system, as the system was operating at a higher pressure compared to the normal operation. By analysing the data not just as it happened but also in comparison with the historical trend, we were able to discover the source of the problem – the hydraulic system's natural frequency. We advised the plant to retune the system, which fixed the problem and reduced the stress on the hydraulic system and components, thereby extending their life. This would have been impossible without the availability of historical data, captured and analysed in the online condition monitoring system with the algorithm set forth by our experts.

Life-saving services

The main KPI of any cement plant is to continuously operate the kiln and cooler system >330 days/year. The online condition monitoring of the cooler is an easy add-on to help achieve this. When we're talking about equipment as critical as the Cross-Bar cooler, it's no exaggeration to say that a prompt response to cooler asset health issues and maintenance issue can save millions.

OPTIMISE COOLER RELIABILITY AND PERFORMANCE

What's included?

A 1-year subscription to our online condition monitoring services for Cross-Bar coolers includes:

- Data logger and PC with secure connection to our Global Remote Service Centre
- Continuous health monitoring and incident support
- Regular reports summarising alarms and recommendations
- Clear, actionable insights that will improve cooler reliability and performance

Key Benefits

- Minimise unplanned stoppages
- MInimise secondary damage to equipment
- Increase equipment lifetime, reliability and performance
- Lower OPEX and more productivity
- Achieve more sustainable operations

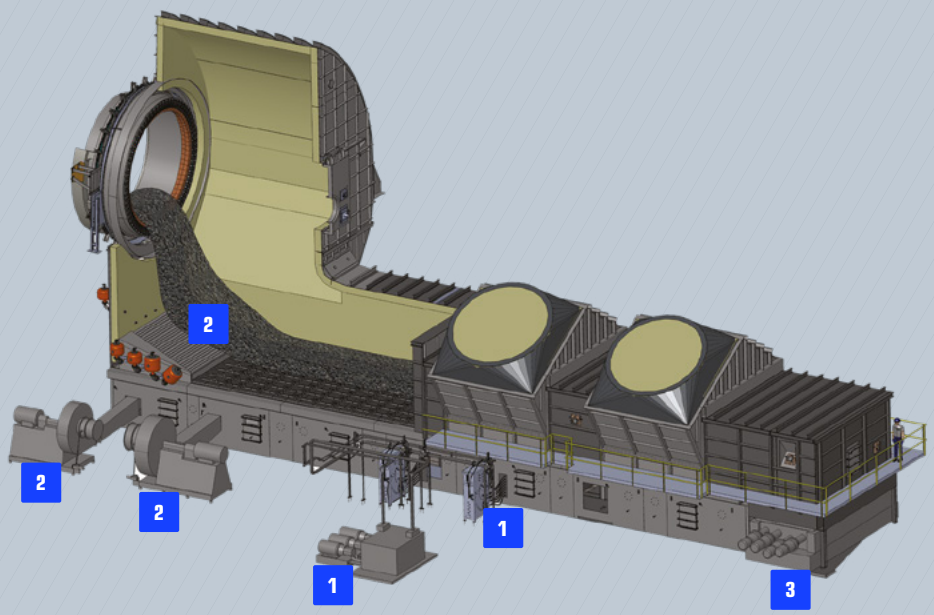
What's monitored?

With this package, we monitor the condition of your:

- Cooler hydraulic system, to evaluate the health and abnormalities of hydraulic pumps, cylinder seals and critical components by analysing:
  - Hydraulic drive force
  - Hydraulic pump utilisation factor
- ABC inlet and Cooler fans, to ensure the long lifetime of wear parts and cooler health by analysing:
  - Recuperation zone cooling air coefficient and pressure drop coefficient
- Heavy-duty Roller Breaker (HRB) , to monitor abnormalities and HRB health by analysing:
  - Roller torque, reversing frequency and bearing temperature

What's monitored?

1. Cooler hydraulic system
2. ABC inlet and cooler fans
3. Heavy-duty Roller Breaker (HRB)



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