UptimeAI

CASE STUDY

CUSTOMER PROFILE

Industry
Cement Manufacturing

Enterprise Scale
196.76 MTPA across 20 sites (Overall)

Plant Output
7,000 TPD

Asset Monitored
Coal Mill Bag House

Failure Mode Detected
Filter bag choking from displaced purging pipes

Verified Savings (This Catch)
$50K I 12 hours breakdown avoidance

LEADING CEMENT ENTERPRISE PREVENTS $50K COAL MILL BAG HOUSE FAILURE BY UNLOCKING EXPERT DECISION CAPACITY

Coal Mill Reliability Is the Kiln's Energy Lifeline

In cement manufacturing, the rotary kiln is the heart of production—but the coal mill is its fuel supply. Accounting for 60–70% of total thermal energy input, coal quality, consistency, and continuous availability are non-negotiable to clinker formation, kiln flame stability, and heat consumption targets. When the coal mill runs well, the kiln runs well. When it doesn't, everything downstream suffers.

The coal mill bag house sits at the boundary between safe operation and environmental compliance. Its fabric filters capture fine coal particulate from the mill exhaust, maintaining air quality standards and the clean operating environment the mill requires. When differential pressure across the bag house climbs—indicating clogged or malfunctioning filter bags—consequences spread quickly: induced draft fans are forced to work harder, power consumption rises, and left unaddressed, the filter bags themselves deteriorate or fail.

A filter bag replacement is not a quick fix. At this production scale, disruption of the kiln's fuel supply means 12 or more hours of unplanned downtime. The compounding cost of lost production, increased power draw, and emergency maintenance makes early detection and diagnosis not just operationally valuable, but financially essential.

Threshold Alarms Miss the Early Warning Window

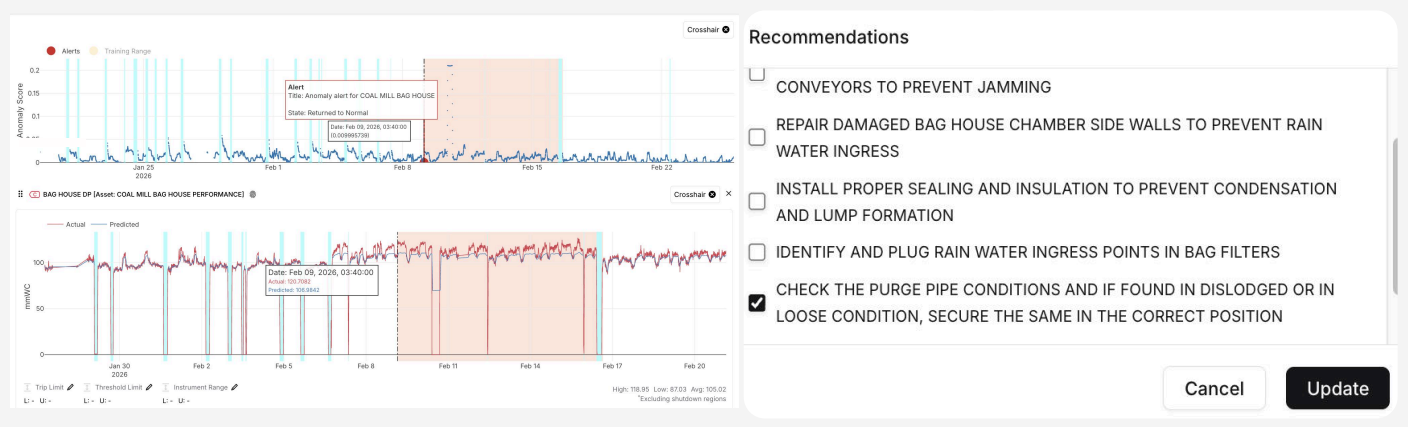
The challenge with bag house differential pressure is that it rarely fails in a single, alarm-triggering step. It drifts—gradually, across days—while conventional static threshold systems remain silent. By the time a single-parameter alarm fires, the bag house has already degraded, options for planned intervention have narrowed, and what began as a routine maintenance task has become an emergency response.

For an enterprise with 20 production lines missing this type of developing fault can be a big margin sink. But the type of single-parameter monitoring of coal mill bag house dP provided by legacy industrial software would have missed this. The purging pipe displacement that caused filter bag choking did not manifest as a dramatic spike. It showed up as a sustained, widening gap between actual and predicted differential pressure—a signal only visible through dynamic baseline comparison, not threshold logic.

The Catch: 30 Displaced Purging Pipes Found Before Filter Bag Failure

UptimeAI flagged a developing anomaly in coal mill bag house performance—not because a threshold had been breached, but because actual differential pressure had diverged measurably from predicted behavior under current operating conditions with other parameters like compressor air pressure, Coal feed rate and bag house fan speed remains normal.

CASE STUDY



The system surfaced the anomaly with ranked recommendations, including a targeted directive: inspect purging pipe conditions and check for displacement or loosening. The operating team acted on the recommendation. During physical inspection, 30 bag house purging pipes were found displaced from their correct positions across multiple chambers.

The purging mechanism—responsible for cleaning filter bags through periodic compressed air pulses—had been compromised. All 30 affected pipes were realigned and securely fixed. The system returned to normal operating conditions.

No filter bag replacement. No emergency shutdown. No 12-hour production halt.

The customer confirmed above 12 hours of breakdown time avoidance and $50K in avoided maintenance repair costs from both the (prevented) filter bag replacement and the fan power overconsumption that would have persisted throughout the fault.

Scaling Operational Excellence to 20 Sites

Achieved Downtime Savings of 827 Hours in 1 year

Quantifiable Gains

- $50K in avoided costs from early detection of coal mill bag house DP anomaly
- 5 hours of breakdown time avoidance preventing unplanned filter bag replacement shutdown
- Eliminated increased carbon footprint from excess fan power consumption during the fault window
- 827 hours of downtime savings achieved across 20 production lines in Year 1
- 365 actionable catches with confirmed downtime savings across the enterprise

Transformational Results

- Earlier, reduced DP alert volume through dynamic baseline modeling, not threshold alarms
- Specific root causes automatically suggested by multivariate AI linking equipment and process signals
- Actionable recommendations reduce investigation time from days to hours
- Continuously improving model adapts to changing operating regimes and operator feedback

What's Next?

With 20 production lines live and 827 hours of downtime savings delivered in Year 1, this leading cement enterprise is now extending UptimeAI's capabilities beyond equipment reliability—into process optimization, energy management, and product quality improvement. Each confirmed catch, including this coal mill bag house intervention, builds a growing body of enterprise intelligence that informs not just maintenance decisions, but operational and investment strategy.

About UptimeAI

UptimeAI provides AI reasoning agents that help industrial operations teams make goal-oriented, real-time optimal decisions. Our solutions achieve 90%+ pilot-to-production success rates and are trusted by leading companies in cement, oil & gas, power generation, chemicals, and metals industries. Backed by industry leaders including ABB, Yokogawa, and Mitsubishi.

Learn more: www.uptimeai.com | info@uptimeai.com