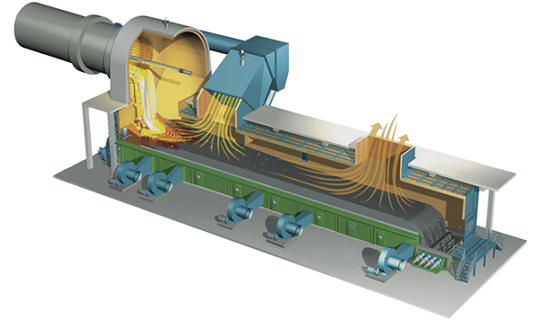


Early Detection and Diagnosis of KILN & Cooler Efficiency Loss in Cement Manufacturing Saves \$300,000 Annually.

Background: The Challenge

Physical inspection of assets though a need, can be a challenge because of today's centralized monitoring and limited workforce available at the manufacturing site. Here, a huge coating piece stuck on the grate resulted in higher cooler input fan pressure causing a drop in cooler efficiency.



Solution with UptimeAI Expert:

- Unlike Distributed Control System (DCS), which uses a threshold-based alarm, UptimeAI's "AI Expert" uses deep learning models and built-in failure modes to detect operational issues early before causing any losses. UptimeAI also seamlessly integrates with your current Operational Technology (OT) stack, including maintenance systems such as SAP PM, to assess issues holistically and identify the root cause.
- Often, changes in operating parameters are not too significant to be picked by a DCS or would take anywhere from a few hours to days before coming to the attention of plant operators. Further, quickly identifying the cause requires skilled technicians, sometimes at the plant, a challenge with the retiring workforce and remote employees. UptimeAI's solution quickly identified that the cooler input fans pressure was higher than the predicted estimate, while the grate speed kept fluctuating.
- Left unchecked, the high-pressure air would lower the recuperation air temperature, eventually lowering both the kiln and pre-calciner temperature, leading to high-temperature clinker discharge from the cooler. Increased power consumption by the clinker cooler for higher pressure would mean higher fuel energy consumption, lower margins/production, and slipping away from the enterprise's sustainability goals.
- UptimeAI uniquely combines AI and subject matter knowledge to mimic experts by continuously learning without manual rules and explaining complex problems to help mitigate issues. While deep learning techniques learn good vs. bad behaviour considering all the operating parameters, built-in fingerprints with failure modes, recommendations, and fault-tree analysis enable the solution to diagnose and explain the issues.

Summary

Estimated Savings
\$300,000 annually

Systems moduls
1

Deployment Time
2 Hours

Number of tags:
62

Fan Pressure



Grate Speed



Pyro Process

Failure Modes

1. Kiln efficiency loss (0.137)

Approve **Reject**

Nov 9, 2021 - Nov 14, 2021 Nov 15, 2021 - Nov 15, 2021

Nov 18, 2021 - Nov 23, 2021

Cyclone Efficiency Loss

Recommendations

- Monitor the current of the fan to track the changes due to blockages on clinker cooler. If the current is high and discharge pressure is also high, plan for Cooler purge.
- Monitor the air outlet temperature of the clinker cooler. If the cooler outlet temp is decreasing, check the flow of air and air DP across cooler to estimate the level of blockages.
- Track the changes in fuel consumption and ensure the fuel consumption is not increasing because of low air temperature.
- Check the clinker outlet temperature from the cooler to estimate the amount of energy lost.

Add Recommendation

Add

About UptimeAI:

UptimeAI uniquely combines Artificial Intelligence with Subject Matter Knowledge from 200+ years of cumulative experience to explain interrelations across upstream/downstream equipment, adapt to changes, identify problems, and give prescriptive diagnosis like a human expert would.

The UptimeAI Expert OEx Platform serves as a trusted Subject Matter Expert, empowering plant engineers to achieve operational excellence with minimal dependency.