

Reduce kiln downtime with predictive maintenance

IIoT predictive maintenance improves kiln uptime

Cement factories face frequent kiln breakdowns due to the buildup and collapse of rings within the clinker crusher. Using IIoT predictive maintenance, repair teams can identify these ring buildups in advance, adjust the kiln settings to prevent ring formation and reduce overall kiln shutdowns.

At-a-glance

The client is one of the leading cement suppliers, headquartered in Europe, and as of 2018 was one of the top 5 largest providers in the world. With an estimated total capacity of upwards of 300 M ton/year for that year and over 200 integrated cement plants worldwide, the client is looking for ways to improve the efficiency of its kilns in order to improve customer experience, maximize its revenue, save on costs and maximize its cash flows.

The challenge

With that objective in mind, the client approached SKF's Enlight AI division to tackle a well-known problem that frequently causes unscheduled downtime in its factories: the buildup and collapse of rings of the rotary kiln.

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Once this ring collapses inside the kiln it then progresses forward into the crusher. The clinker crusher is immediately blocked and the kiln becomes inoperable until engineers have cleaned the clinker crusher.

On average, a typical cement factory experiences over 9 kiln breakdowns per year because of this issue, resulting in more than 3 days of production downtime in total and accruing high maintenance overtime costs.

To reduce the overall number of clinker-crusher stoppages, the client specifically wanted to be able to identify proactively when the rings were being formed in the kiln in real-time. Armed with this knowledge, plant engineers would be able to make changes to the oven's temperature, prevent the formation of further rings and avoid machine downtime altogether.

The solution

The client chose two reference factories to pilot the SKF Enlight AI predictive analytics model. During the trial period data

generated by dozens of sensors was streamed to SKF Enlight AI's cloud where it was processed by Enlight's advanced Automated Machine Learning algorithms (AutoML).

Based on detection of subtle anomalous and indicative behavioral patterns, the solution provided predictive alerts of evolving ring formations within the kiln.

The bottom line

SKF Enlight AI was able to accurately predict 94% of the formation of residual rings within the kilns, effectively enabling engineers to make the necessary modifications to stop more rings from materializing and to prevent crusher and process stoppages due to these rings.

Once SKF Enlight AI is fully deployed the plant expects to see a 30% reduction in unplanned downtime leading to annual savings of millions of Euros.