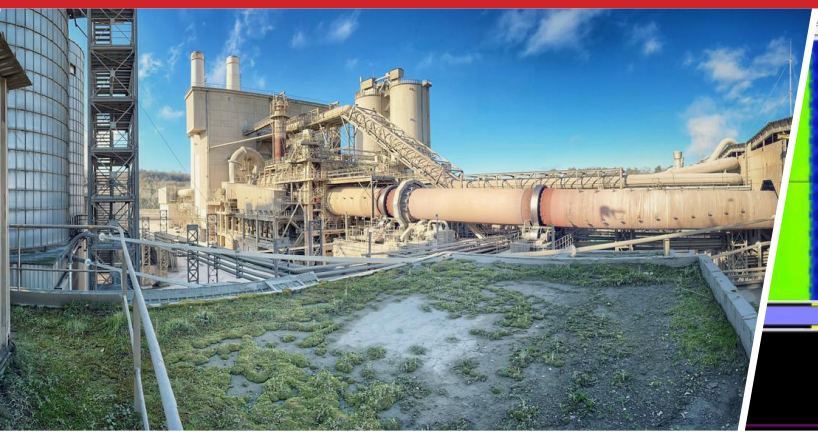
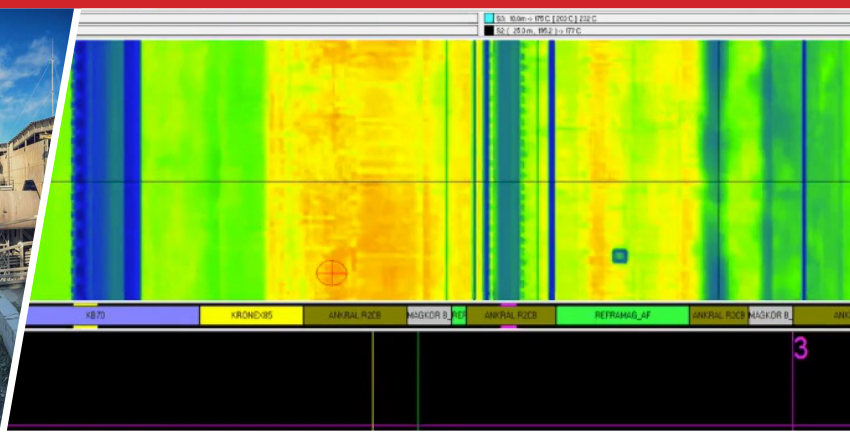
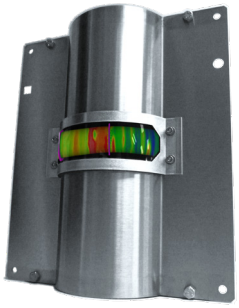
Advanced shell temperature monitoring in complex Malaysian cement plant





In cement production, rotary kilns are widely used to convert raw materials into cement clinker. The use of high temperatures to initiate the chemical and physical reactions in the material can cause significant damages to the kiln. Hence protecting the shell is paramount to prolonging the life of the equipment and avoid a major repair. Thermography imaging systems such as line scanners are used to monitor in real time the temperature of the shell ensuring maximum plant operating reliability.



BACKGROUND

The temperature measurement principle involves an infrared line scanner located approximately at half the kiln length distance and measuring the temperature of one line along the kiln at the high scanning speed of 25 lines per second. Synchronized with the kiln rotation, an accurate thermal image of the full kiln shell is obtained.

Tasek cement plant in Malaysia aims to monitor the overall temperature of their 500 tpd rotary kiln no 3 to prevent any interruption in production due to hot spots. The cement plant shows a **complex layout including many posts and pillars masking the shell.** A portion of the kiln is also located under a building.

These obstructions prevent the IR scanner from seeing the entire kiln shell and generate shadows. The plant has hence to find a solution to ensure temperature monitoring even in difficult to see areas on kiln.

A customized IR scanners configuration was studied providing **full kiln temperature monitoring,** along with the **elimination of shadows** thanks to advanced thermal images recombination feature.

Whilst the choice is large in terms of IR scanners, the HGH's Kilnscan perfectly meets the client's requirements in terms of accurate temperature measurement over the entire length of the kiln shell, one brick resolution hot spot detection, its unique 140-degree field of view and easy-to-use software.

Recognized as the **leader in Infrared technology** with more than 1500 IR line scanners installed worldwide, HGH Kilnscan also has demonstrated exceptional long-term reliability and stability.

Tasek Cement Plant, Malaysia

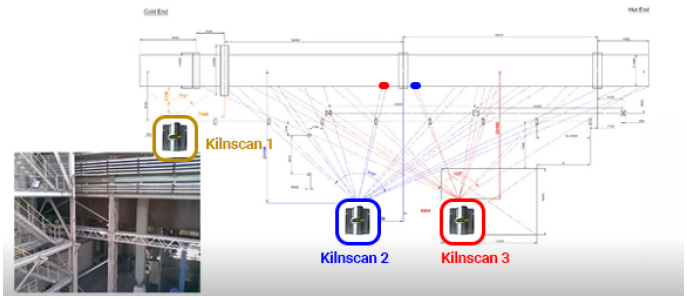
SOLUTION

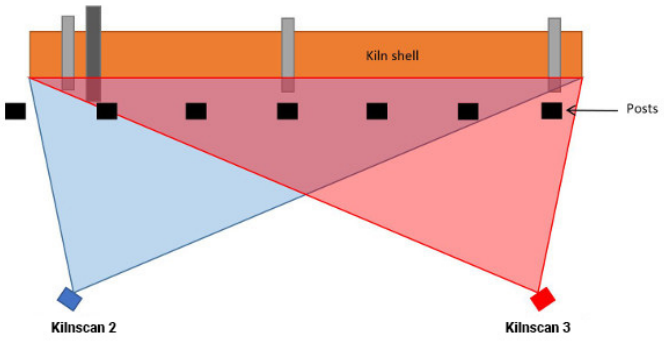
For the Tasek cement plant, the best recommended thermal monitoring solution involves 3 Kilnscan scanners, each with a l**arge field of view of 140°**.

Shadow Area Monitoring

The first Kilnscan with the yellow field of view measures the temperature of the portion of the kiln located inside the building. One can note that the distance between the scanner and the kiln shell is 4.3m only. **This short aiming distance constraint is achieved thanks to the 140° field of view scanner.**
The second and third scanners aim to scan the same portion of the shell and especially address the concern of shadowed areas that stretch along this part of the kiln. The thermal image is then reconstructed by combining the data from these two scanners, eliminating shadows for a perfect full monitoring of the shell.

Temperature data for areas “shadowed” from the scanner N°2 is provided by the scanner N°3 and vice versa. An example is illustrated below with the blue and red areas, each of them obstructed by a post. Data are then seamlessly integrated into one complete 3D thermal image. This enables **100% elimination of the shadows** caused by the existing structures to completely view the entire kiln.



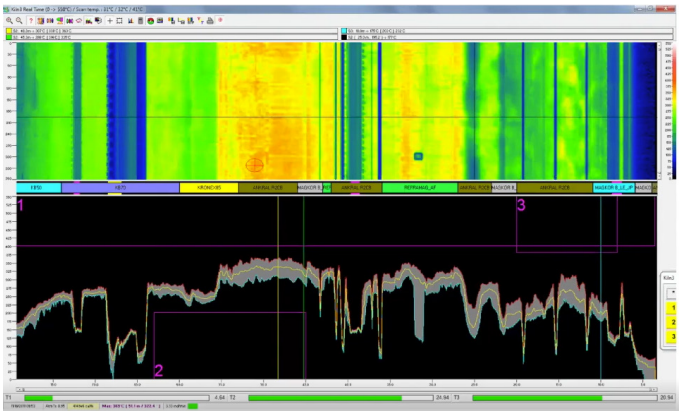


Two thermal scanners configuration with FOV overlapping

User-Friendly Software

SIRCIM is a user-friendly software allowing operators to remotely monitor the temperature of the kiln 24/7. An **integrated interface displays all relevant thermal features** such as 3D thermal profile, brick and coating thickness, refractory management, kiln rotating speed, tyre slip monitoring, heat loss calculation and more. The software has been designed to maximize user experience providing simple set up and use. It provides accurate alarms on critical parameters such as hot spots detection and brick and coating thicknesses.

Thanks to the **historical data management**, operators can follow up temperature trends, predict the lifetime of refractory material and schedule replacements with minimal downtime.



"HGH Kilnscan is the ideal kiln shell scanner providing high performance and flexibility to technically demanding cement plants.", said Catherine Barrat, Industrial Thermography BU Director.

CONCLUSION

Kiln shell temperatures are successfully monitored along the entire length of the kiln providing an essential indication of the health of the refractory material and shell distortion. Robust and highly flexible, Kilnscan is designed to fit any kiln configuration, including multiple shadows, long kiln and free space limited. It is part of the **must-have temperature monitoring equipment of any cement plants.**

About HGH: HGH has been an expert in infrared technology for over 35 years. Since 1982, HGH develops and sells leading-edge optoelectronic and infrared systems for surveillance applications, test & measurement and industrial thermography. In particular, HGH offers a range of panoramic detection systems, the SPYNEL series, for wide area surveillance applications in the security, defense, oil & gas and energy industries.

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