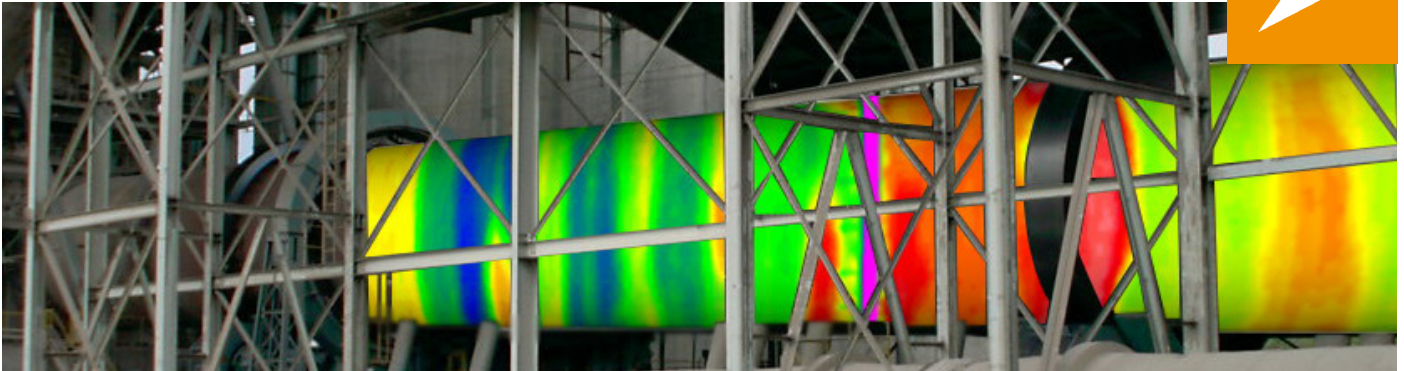


## ADAPTING TO COMPLEX CONFIGURATIONS



## OVERVIEW

**Customer:** ARM Cement Ltd's Kaloleni Plant near Mombasa in Kenya. ARM Cement Ltd is the second largest cement producer in Kenya with two plants currently and will be doubling its annual production capacity to about 5 million t over the next six years with the construction of new plants and a capacity increase.

**Challenge:** Accurately and reliably monitor the 45 m long rotary kiln to control the burning process and prevent any interruption in production caused by hot spots. The scanner would have to be set up at a very close distance, less than 10 m. away from the kiln shell to ensure that the entire surface of the rotary kiln was covered with a single sensor. Thus, the system had to be installed with a scan angle greater than 130°.

**Solution:** With a scan angle of 140°, a single HGH Infrared Systems' Kilnscan was able to provide the monitoring needed for this demanding and unique configuration.

**Results:** Maintenance operators at Kaloleni cement plant expressed their satisfaction following the installation of the new thermal monitoring system. Kilnscan effectively met ARM's need for a cost effective and trusted thermal monitoring system able to adapt well to the extremely limited space configurations.

**Conclusion:** HGH's Kilnscan was the ideal kiln shell monitoring solution for this cement plant, with the largest field of view on the market (140°) and its advanced spatial resolution and high thermal sensitivity, ensuring the plant's productivity and safe operations for years to come.

## CUSTOMER

ARM Cement Ltd is one of the major cement producers in East Africa with one plant in Kaloleni, north of Mombasa, and another in Athi River, close to the Kenyan capital of Nairobi. Upon completion of "Vision 2030", a development program being put forth in an effort to propel Kenya to become a hub of regional trade, significant economic growth has been forecasted in this region.

This development process includes a series of improvements to local infrastructure, such as the construction of new terminals at the Port of Mombasa, which will double the port's container handling capacity by 2020. ARM is determined to meet these growing needs and plans to double its annual production capacity to about 5 million t over the next six years through the construction of additional plants in Tanzania and a capacity increase in Rwanda. ARM produces Ordinary Portland Cement and Portland Pozzolana Cement, with a commitment to delivering the finest quality product with the best quality-to-cost ratio. Unlike many other cement companies in the region, ARM manufactures its own premium quality clinker, managing the full value chain of the manufacturing process for greater control of production costs, process efficiency and product quality.

## CHALLENGE

ARM needed to accurately and reliably monitor the 45 m long rotary kiln at the Kaloleni plant in order to prevent any interruption in production due to hot spots and control the burning process. While the kiln is relatively small, the configuration was difficult because the scanner had to be set up at a very close distance from the shell - at less than 10 m. In order to measure the temperature of the entire rotary kiln shell surface with a single sensor, the system had to be installed with a scan angle greater than 130°. At such a reduced distance from the shell, two traditional scanners with a FOV of 90° would have been necessary to provide complete thermal monitoring from the output of the preheater tower to the input of the cooler. HGH Infrared Systems can easily manage and integrate the additional task of having another scanner present, but obviously, the use of two systems implies additional costs and installation complications. Indeed, in the case of the Kaloleni kiln, with quite a large slope with respect to the ground, the scanner had to be tilted accordingly. This ensures that its line of sight is parallel to the rotation axis of the shell. The straightforward operation in the case of a single system becomes more complex when it comes to aligning multi-sensors; to allow for a thermal map display without impairment of the scanners' ability to be jointly aligned so that the measurement line is unique and undistorted. In addition, difficult operations in terms of image linearization and fusion have to be performed for an accurate representation of the temperature at the correct scale.

## SOLUTION

Kilnscan, from HGH Infrared Systems, with a wide scan angle of 140° perfectly met ARM's distinctive needs for a cost-effective thermal monitoring system to be adapted to the limited space between the scanner protection cabin and the shell. With over 1,000 Kilnscans in operation worldwide, the main priority is always to obtain reliable indicators on refractory bricks and kiln shell status as well as clinker quality. Maintenance of the kiln shell is an important contributor to the production costs and the consequences of an unplanned kiln shutdown can be detrimental to a plant, several days of lost production, money and time are a few examples, therefore, it is essential to have a reliable high-performance thermal scanner in place.

## RESULTS

Maintenance operators at ARM's Kaloleni plant expressed their satisfaction following the commissioning of their new thermal monitoring system from HGH Infrared Systems. Kilnscan is the benchmark thermal scanner, with the highest resolution and sensitivity, displaying the full temperature profile of the kiln, with a high frame rate. With a single refractory brick resolution, Kilnscan will warn of any hot spot at the earliest sign and go even further.

Thanks to advanced features, such as the unique thermal warp calculation and historical data management, Kilnscan provides the operator with the full picture to implement a predictive maintenance program. A rugged system, Kilnscan has been designed for demanding environments. Kilnscan adapts to any kiln configuration: long shell with limited free space around, kilns with multiple shadows generated by posts, etc. Kilnscan provides accurate and reliable thermal measurements, multiple alarms for early event detection, historical data to draw trends and schedule preventive maintenance operations, and advanced refractory management.

## CONCLUSION

When choosing a line scanner, Kilnscan brings the best combined spatial resolution and thermal sensitivity in the line scanner industry today. Its advanced and unique software features allow for unmatched monitoring. Kilnscan also offers the largest field of view available on the market (140°), which comes very handy when the line scanner has to be placed near the kiln at a challenging configuration; such was the case in the Kaloleni plant. As Kilnscan costs less than one day of lost production on average, it ensures that plants get the best return on their investment for years to come. With over 1,000 units installed all over the world, some of them still consistently operating after 20 years in use, Kilnscan remains the market leader of high performance line scanners.



*Founded in 1982, HGH Infrared Systems designs, develops, assembles and sells complete optronic systems for security, industrial and civil applications. Their specialized engineers in optics, mechanics, electronics and software enable HGH to master each development phase of their products and, when needed, put forward a dedicated solution to meet the customer's specific requirements.*

