



Do More with Digital:

Transforming the cement industry through digitalisation

By Michael Marti* and Sanjit Shewale**

The cement industry, a cornerstone of global infrastructure, has long been challenged by the complexities of balancing productivity with sustainability. With growing pressures to reduce carbon emissions, optimise energy use, and improve operational efficiency, the industry is at a pivotal point. Digitalisation, driven by initiatives like ABB's 'Do More with Digital' campaign, presents a power opportunity to transform cement manufacturing processes, making them more efficient, sustainable, and responsive to modern demands.

A traditionally energy and emission-intensive industry, cement production emits significant amounts of CO₂, contributing to global environmental challenges. Addressing these issues requires more than incremental changes, it demands a fundamental transformation of how cement is produced. Digitalisation offers the tools to achieve this transformation, enabling plants to optimise operations, enhance energy efficiency, and minimise emissions while maintaining, or even improving, productivity.

ABB's 'Do More with Digital' campaign is at the forefront of this transformation. This initiative aims to accelerate digital adoption across process industries, including the cement sector. By leveraging digital technologies, the campaign seeks to help companies

*Global Business Line Manager of Growth Industries, ABB

** Global Head of Business Line Digital, ABB

do more with less – reducing waste, cutting energy consumption, and achieving higher output with fewer resources.

Driving the digital transformation

At ABB, we are proud to play a role in guiding the cement industry through its digital transformation journey, providing advanced digital solutions designed to optimise every aspect of cement production, from raw material processing to the final product. One of the key tools in this process overhaul is the ABB Ability™ Expert Optimizer, a digital system that enhances process control and optimisation.

The Expert Optimizer integrates with existing plant systems to provide real-time data and analytics, enabling operators to make informed decisions that enhance efficiency and reduce emissions. For example, by optimising kiln and mill operations, plants can significantly reduce energy consumption, which not only lowers costs but also decreases the carbon footprint of the production process.

In addition to optimising individual processes, ABB's digital solutions facilitate the integration of various systems within a plant. This holistic approach allows for more coordinated and efficient operations, further amplifying the benefits of digitalisation.

Addressing challenges in energy, emissions, and optimisation

One of the most pressing challenges in the cement industry is the high energy demand and associated emissions, particularly from kiln operations. Kilns are central to the current cement production process, but they are also among the most energy-intensive components. The 'Do More with Digital' campaign addresses these challenges head-on by promoting the adoption of digital tools that optimise kiln performance.

By implementing solutions like the Expert Optimizer, cement plants can maintain optimal kiln conditions, leading to improved energy efficiency and reduced emissions. For instance, the system can monitor and adjust the Kiln's temperature and airflow in real-time, ensuring that the process is as energy efficient as possible while maintaining the required product quality.

Real-world impact

The effectiveness of ABB's digital solutions is demonstrated through several

real-world case studies. An example of this is the Tokuyama Cement Plant in Japan, where ABB's digital solutions were implemented to enhance productivity and reduce energy consumption. The results were significant, with the plant achieving better operational efficiency and lower carbon footprint, showcasing the tangible benefits of digitalisation.

Another example is the CEMEX plant in Germany, where ABB's digital solutions were employed to improve SO₂ emission control. This case highlights how digital tools can be specifically tailored to address environmental challenges, leading to more sustainable operations.

The future of the cement industry

As the cement industry continues to embrace digitalisation, it is poised to enter a new era defined by the integration of digital technologies with traditional manufacturing processes, Industry 4.0. ABB anticipates that the widespread adoption of digital tools will lead to enhanced operational efficiency, reduced environmental impact, and increased profitability.

The application of Industry 4.0 principles, such as predictive maintenance, real-time data analytics, and advanced automation, will enable cement plants to operate like their own intelligent ecosystem. In these environments, every component of the production process is interconnected and optimised for maximum efficiency. This not only improves productivity but also allows for more agile and responsive operations, capable of adapting to changing market conditions with minimal disruption.

The ideal future cement industry is one where digital technologies are fully integrated into every aspect of oper-

ations. Advanced automation systems manage routine tasks, freeing up human operations to focus on higher-level decision-making. Real-time data monitoring and predictive analytics ensure that potential issues are identified and addressed before they escalate, reducing downtime and maintaining consistent production quality.

In this scenario, cement plants are not just more efficient, they are also more sustainable. By minimising energy use and emissions, these digitalised plants contribute to global efforts to combat climate change while continuing to meet the world's demand for cement.

Embracing digitalisation

For cement companies considering the move towards digitalisation, a safe approach would be to start small but think big. Digitalisation does not require a complete overhaul of existing operations overnight. Instead, companies can begin with targeted projects that demonstrate the value of digital tools, gradually scaling up as they become more familiar with the technology.

By taking this approach, companies can minimise risks while reaping the benefits of digitalisation. Moreover, they can position themselves as leaders in the industry, setting the standard for what is possible when technology and tradition come together. Embracing digital transformation supports the enhancement of operations while simultaneously contributing to global sustainability objectives. ABB's 'Do More with Digital' campaign is just one of the roadmaps to achieving a digital future, offering the tools and expertise needed to navigate the journey. ■

