

Austria

Refractory 4.0

RHI Magnesita focused at METEC 2019 on smart solutions for the refractory industry from mine to application of refractory products in the various user segments. The management team headed by Stefan Borgas explained the strategy to manage this remarkable changes by implementing new tools and train people to use them successfully.



Fig. CEO RHI Magnesita Stefan Borgas

"From mobile phones to cars all the way to our homes: Modern life would be impossible to imagine without the refractory industry. We reliably supply our customers with the high-quality refractory solutions they need to manufacture their products," explained Stefan Borgas, CEO RHI Magnesita, during the press conference at METEC 2019. "Thanks to the highest level of quality and excellent service, we are a reliable partner for customers around the world. And now it's time to usher in a new era – Refractory 4.0."

RHI Magnesita is digitalizing its value chain, which features an unparalleled level of backward integration. It ranges from the mining of the raw materials and the manufacturing of the products to the supply chain, the application and use at customers' sites to recycling.

"These innovations are the result of RHI Magnesita's intensive and highly successful research and development work. With over

270 employees spread out across five research sites all over the globe, our company has the biggest R & D unit in the entire industry. Every year, we invest EUR 70 million in innovation in order to constantly improve process security, efficiency, and sustainability," emphasised CTO Luis Rodolfo Bittencourt.

"Naturally, we strive to attract the very best talents and create a global and diverse atmosphere. Our employees are our driving force of innovation. That's why we offer a workplace, where they can optimally contribute along their strengths and develop their expertise," added Simone Oremovic, Executive Vice President People & Culture.

"Our customers directly benefit from the results of our product innovation. They depend on the efficiency and reliability of our entire value chain. With Refractory 4.0, we will lead the industry to a future, where we can not only reliably deliver what our customers need, but also predict their needs," said CSO Gustavo Franco.

Digitalization, automation, and robotics in mining

RHI Magnesita has the highest level of backward integration in the refractory industry, with unique raw material sources that ensure the best product quality. Thanks to the innovations of Refractory 4.0 and its global raw material network, the company will be able to smooth out demand volatility.

Digital twins of RHI Magnesita's deposits are created using 3D-mapping. The block models consist of real data and estimated data and are updated after each blast on a daily basis. Artificial intelligence generates the optimised mining plan, which enables the company to plan the raw material sourcing. 3D-mapping also allows the

company to monitor the entire site, perform retrospective analyses and take measurements throughout the mines to assist with quality control and extraction planning.

Automated drilling innovation in surface and underground drilling involves advances in automation that are moving the industry a big step forward with regard to safety. Electronic controls facilitate unattended drilling, allowing the rig to complete a rod run even if no drillers are present, for example during a shift change.

Smart factory

RHI Magnesita monitors its plants in real time using a process information management system. More than 500 main machines are connected and exchange information, creating around 75 000 tags per second.

The newest generation of ultrasonic testing allows fully automated testing of RHI Magnesita's MgC bricks. Cracks and loose bonding are detected by measuring impulse echo. The measuring and automated sort-out decision takes less than 10 s.

Smart supply chain – there when our customers need us

In 2018, 2,5 Mt of high-quality refractories from 35 sites were delivered around the globe. Sufficient forecasting is the backbone of RHI Magnesita's smart and successful supply chain. Simulation tools based on big data enable end-to-end optimisation from raw material flows to production capabilities to customer delivery. By measuring the interplay between the quantitative production forecast and quantitative sales forecast, operators are able to calculate a detailed raw material forecast for each plant.

This helps RHI Magnesita to keep the reliability of its supply at the highest possible level for its customers.

To avoid overcrowded parking areas, increased accident risks, and additional waiting time, RHI Magnesita has implemented the time slot management system from Transporeon. It reproduces the actual loading and unloading capacities and automatically adjusts the arrival times of the trucks to the available resources. Ramps and unloading resources are digitally reproduced, allocated, and managed by the system.

Advanced network planning of production capabilities results in reliable delivery performance and allows raw material supply issues to be balanced out. All these measures help to minimise CO₂ impacts.

Digitalization for RHI customers' plants

RHI Magnesita is developing solutions to replace the manual handling of slide gate systems in the ladle preparation area and other systems with fully automated processes involving robots, sensors, and manipulators. Another innovation that helps to minimise unsafe operations is "hot vision". This video analysis tool helps operators understand the process influences on gunning efficiency and optimise and control the quality of repair gunning. With this tool, RHI Magnesita is helping its customers to avoid inefficient gunning processes and material waste and will increase safety for the plant operators.

RHI Magnesita develops and manufactures measurement solutions for the iron and steel industries worldwide, like the Vision and Infrared Platform (VISIR) to increase yield, improve quality, reduce maintenance, and greatly enhance operational safety. RHI Magnesita also supplies innovative measurement solutions that enable increased automation and reduce bottlenecks in metal production. The Electromagnetic Level Indication (EMLI) platform offers solutions for level measurement, slag detection, safety, and quality assessment.

Automated process optimisation fosters a greater understanding of the correlation between steel production parameters, maintenance, and refractories by analysing data using artificial intelligence methods. With these technologies, RHI Magnesita helps its customers to avoid unforeseen downtimes, excessive maintenance, and casting interruptions.

Matching refractory cycles with plant cycles enables the better use of refractories and reduces refractory waste. It helps to optimise plant scheduling and saves energy costs.

"Our goal is not only to be the global market leader for refractory solutions, but also to drive the entire industry forward and to continuously push the limits of what's possible together with our customers. With these highly innovative products and technologies we have paved the way for the future of the refractory industry," said Stefan Borgas in closing.

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Nabaltec

Nabaltec AG
P.O. BOX 1860
92409 Schwandorf
Germany

Phone: +49 9431 53-0
sales@nabaltec.de
www.nabaltec.de