In the context of a retrofitting pilot project, a classifier in a HeidelbergCement cement mill was equipped with new drive technology consisting of energy-efficient motors and the corresponding frequency inverters. The entire seamless drivetrain has optimum control and energy-consumption parameters.

Up-to-date cement mills

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ith about 52,000 employees at more than 2,500 sites, HeidelbergCement AG is one of the largest manufacturers of construction materials worldwide. A retrofitting pilot project involving classifiers was started in early 2013 at the factory in Lengfurt, Germany. The large drive motors of one fan and one classifier in one of the three cement mills dating from the 1980s were replaced by Simotics FD (Flexible Duty) asynchronous AC motors. These new motors impress with their high flexibility in terms of equipment and cooling and also have a high power density and overload capability.

Simple conversion to modern technology

Clinker bricks, plaster, and ground granulated slag are ground into cement in cement mill No. 7 in Lengfurt, a 16-m ball mill with a diameter of 4.4 m, and then transported upward with a bucket elevator. The mixture is classified via the rotary movement of the classifier together with the help of wind provided by a fan. This means that fine cement dust is separated out, while the larger particles drop down into the cement mill to be ground again.

The classifier and fan are moved by one 315-kW Simotics FD motor each. The factory owners chose to invest in new technology because both the frequency inverter and the motors were very old and no longer state of the art in terms of energy efficiency. “Energy efficiency is a topic that keeps coming up here,” explains Wolfgang Przyklenk, master electrician at HeidelbergCement’s Lengfurt factory. “That’s why we immediately opted for the highly efficient Simotic motors with Premium Efficiency.” The decision was made easier by the fact that the conversion could be accomplished effortlessly. The control cabinets containing the two Sinamics G150 frequency inverters were delivered completely assembled and connected – commissioning by the equipment supplier included.

“The entire retrofitting project was completed without any problems,” Przyklenk says.

Another advantage of the new motor series is its inverter-optimized design. The individual components were perfectly coordinated with Integrated Drive Systems (IDS), the comprehensive approach to the entire drivetrain from control to motor. For example, while analog signals were exchanged between the frequency inverter and the control system with the previous
solution, now a digital Profibus connection ensures optimum communication.

Detailed design solutions for rugged operating conditions

Przyklenk also sees advantages in the design of the new motor series compared to the drives that had been used previously. For one thing, the motors are cooled exactly where heat loss arises by using cooling fins in the active part. This enables efficient cooling by reducing heat transfer resistance. Furthermore, the cooling fins on the active part are protected from dust and dirt deposition when the motors are shut off. The motors are also equipped with temperature monitoring for the coils and bearings. The corresponding data are gathered and monitored using the Siemens control system at the Lengfurt factory. Additionally, for the entire one-year pilot phase, a condition monitoring system that records and evaluates all results has been installed. A further advantage of the new Simotics FD motors is the easy removal of old lubricants. During the routine regreasing of the bearings, any excess lubricant can be easily removed through the motor’s outlet.

Sustainability with seamless drive technology

The retrofitting pilot project at the Lengfurt factory of HeidelbergCement has proven to be a complete success in many ways. The investment in modern drive technology consisting of Simotics FD motors in combination with Sinamics G150 frequency inverters has shown that with the right technology, energy can be saved without requiring elaborate conversion work. Also, by perfectly coordinating the drivetrain in accordance with IDS, the drives can be easily adjusted to the underlying conditions with great precision and ease. Przyklenk sums up: “The new Simotics FD electric motors, together with the IDS strategy, are the perfect solution for our requirements when it comes to retrofitting our plants sustainably and easily to energy-efficient drive systems.”

Advantages

Simotics FD

- High flexibility due to the modular design, with different cooling methods and positioning possibilities for accessories and separately driven fans
- Usable in many applications in the processing industry (due among other things to explosion protection for Zones 2 or 22) and in the manufacturing industry
- Compact motor design through increased power density
- High overload capability due to an inverter-optimized design
- Broad range of options, including an industrial version for marine use
- Improved service offering
- Simplified retrofitting using the same dimensions of mounting-foot holes as the N-compact motor series

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