One Stop
Fiberboard factory equipped throughout with large drives from Siemens

The fiberboard factory of Fiberboard GmbH in Baruth, Brandenburg equipped its production plants – especially with regard to high powers – with drive technology from one provider throughout. From the chip manufacture and grinding and drying to the forming and pressing, solutions are achieved which feature high efficiency and reliability. At its factory in Baruth, Fiberboard GmbH produces fiberboards in MDF (Medium Density Fiberboard-) and HDF (High Density Fiberboard) quality in thicknesses of 3 to 22 mm which serve as carrier material for laminate floors. Approximately 50 million square meters of fiberboards are produced annually. At peak times, 190 truckloads of pine logs from the Brandenburg March are loaded into the chopper.

During the planning of the factory, the future operators decided to buy the high-power drive technology from a single provider to benefit from a uniform operating concept and to simplify the training effort as well as the service and spare parts stocking. Fiberboard chose Siemens, the world’s number one provider of large drives.

Motors and converters for fixed speed and variable speed solutions

The first of these drives – a high-voltage motor of the H-compact Plus type with 1.6 MW power at an input voltage of 10 kV – is already used when the delivered logs are chopped up into chips in a large chopper. The very small dimensions of the motor and the resulting low space requirements not only reduce the costs for the entire system and the foundation but also the assembly effort. A variable speed operation is not necessary for the chopper motor because it also optimally meets the process requirements with a fixed speed.

However, in the following process steps the transport screws must adapt their rotation speed to the fluctuating volume and consistency of the chip material. Therefore, the discharge screws which transport the material from the foundation area of the chip store to the following drying steps are equipped with variable speed drive systems as is the large stuffing screw which compresses the chips with a 1.7 MW motor to press out the water. The motor speed is controlled in both cases by SINAMICS G150 frequency converters. These are designed for single drives with high power which require no mains feedback.

When the chips have reached a specific level of dryness they are fed into a refiner where they are ground into fibers by rotating discs. These grinding discs are driven by a high-voltage motor with a power of 10 MW on 10 kV. A special feature is that this 10 MW motor operates with a Siemens low-voltage motor as a so-called pony motor. This runs up the large refiner motor to the nominal speed of 1,500 rpm and then transfers it to the medium voltage network. In combination with a medium voltage soft starter, this solution causes no mains voltage interruptions at all during startup.

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Energy efficient drying

Having arrived from the refiner, the fibers are glued and fed into the blow line with the pre-drying and post-drying stages. To optimize the energy balance, the hot air produced in the pre-drying stage is fed back into the process and used in this case for the post-drying stage. The drive concept for the drying circuits is also aimed at maximum energy efficiency. The fans exhibit a very high energy saving potential. Drive systems with frequency converters adapt the speed and thus the energy consumption exactly to the current operating requirements, in this case the air current to the amount and moisture content of the entered wood fibers. The energy saving may be up to 70% in some cases.

Four such “energy-sensitive” fans are in operation in the pre-drying and post-drying stages. On the one hand, the two large fans on the pressure side of the circuit for the first drying stage; on the other hand, the two smaller fans on the suction side of the post-drying circuit. The motors for the large fans are two H-compact Plus motors in the low voltage version with a power of 2,400 kW, for the small fans, N-compact motors with a power of 560 kW. The speed of the fans is controlled by SINAMICS S120 converters of the Cabinet Modules type which can be assembled according to the modular principle for any drive task. Fiberboard has eight of these modules altogether – one each for the small fans and three each to operate one of the large fans with 2,400 kW. The communication between the power modules and the central control unit from which all axes are controlled takes place via the drive-internal DRIVE-CLiQ interface.

After the dried fiber material has been freed from contamination such as lumps of glue or scraps of metal in the sifter, it is fed to the forming line on which it is pressed into fiber boards. The presses are equipped with ten 135 kW servo motors which are controlled by a coordinated system of SINAMICS converters and adapted to each other during operation.

Integrated into the automation landscape

All high-power drive systems are integrated into a homogeneous automation landscape with SIMATIC S7-400 controllers as a basis from which the drive systems receive the nominal value specifications among other things. The products from the control technology, installation technology and sensor technology were selected in close cooperation with local Siemens Sales and its consultant experts. This intensive cooperation paid off especially in the planning and commissioning phase and opens up many possibilities for the use of further innovative Siemens technology in the future.
Technical highlights in the fiberboard factory

- Robust low voltage and high voltage motors ensure maximum reliability in the complete plant
- Variable speed drive concepts ensure high energy efficiency, especially in the drying process
- Exact drive control increases the productivity
- Consistent use of devices from the SINAMICS drive series enables a simple and uniform operating concept
- Fast, easy replacement of single modules and power components
- Smooth integration of the drive systems into the higher-level automation landscape with SIMATIC S7-400

The variable speed operation ensures a much lower energy requirement in comparison with fixed speed concepts especially in the fan drives of the drying system