The machine experts from Klagenfurt, Austria, achieve perfectly harmonized motor speeds for their coating machines using SINAMICS.

For 134 years, the name Zimmer stands for high-tech textile machines. Today, this company has approximately 340 employees in its two factories: 140 of these employees develop and produce digital printing machines in the Kufstein factory – the other 200 are mainly engaged in rotary screen printing and coating machines in the Klagenfurt facility. The personnel in Klagenfurt have specialized on magnoroll machines that are based on a magnet-roll system used in screen printing and coating technology that the company has developed. Product Manager Gert Scheriau reported that recently, customers have been increasingly demanding that complete plants and systems are supplied: “As a consequence, for three or four years now, we have been more actively engaged in plant and system construction. This meant a transition for us at the beginning, because as a machine construction facility, we produce as many parts as possible in our own company – on one hand, to keep delivery times short, and on the other hand, to be able to guarantee quality through our own production. We purchase parts and components where it doesn’t make sense for us to manufacture them ourselves. This is the reason that for our coating machines and dryers, we can assume a vertical range of manufacture of 70%.” In doing so, the modular design is a main issue. Modules for four different widths – from 500 mm up to about 6,000 mm – form the grid basis for all the systems that we can supply.

Rotary printing machine for non-woven materials

A rotary printing machine for nonwoven materials was recently shipped from our Klagenfurt plant to the Freudenberg Company based in the US, a daughter company of the large German company having the same name. The machine with a working width of 2,200 mm produces non-woven materials at a rate of up to 50 meters per minute. After the unwinding equipment, the non-woven material passes through the following stations: a splice table to automatically establish a thermal connection with the next roll, a viewing table for the first optical check, a metal detector to track needles that may have remained in the material after production on the needle loom and a subsequent buffer zone. This is then followed by a cleaning machine before the material passes through a material guide device, which optimally positions the material before the actual printing process.

“The main machine in this plant is our magnoroll printing machine”, explained Product Manager Scheriau. “There are two magnet systems inside the printing cylinder that are used to operate two rotary screens. This means that two-color coatings can be realized in just one operation – this is a unique feature that other manufacturers do not have. The material then passes through our drying system, which is at a temperature between 160 and 180 degrees, and in this particular case is over 36 meters long. This is where the printing ink is dried and fixed.”
From unwind to wind

Just like other non-woven products, this type of felt is extremely sensitive to expansion when it is warm. This is the reason that after drying, it is cooled down in a controlled fashion in a cold-air cooling duct. It then reaches the so-called “J-Box”. If a bale is changed while the finished product is being rolled, then the material is first buffered in this box until a new product has been fed and rolling can continue with the edges correctly aligned.

“Our scope of supply extends from the unwind operation up to the wind operation and therefore naturally includes all control cabinets as well as washing equipment for the printing screens. From what has already been stated, it is clear that all of the various roll mechanisms of the plant must be precisely controlled so that they perfectly interact with one another”, explained Scheriau about the essential features of the process.

Successful cooperation with Siemens

“When all is said and done, customers also have their say when selecting suppliers. We are more than willing to accept this as long as customers don’t start to specify “no-name products”. On the other hand, in plant construction worldwide, it can be clearly seen that if you work with Siemens, then you are certainly on the winner’s side. It is all about service, availability, and subsequent support.”

In the case of the large coating system for Freudenberg, the partnership with Siemens went far beyond the normal customer support on a partnership basis: “Siemens gave us a level of on-site support that was quite exceptional. Our electrical technicians and Siemens experts met at least once or twice a week. The next project phase was discussed, every participant was allocated his specific tasks – and then the next week, the results were combined and incorporated in the program. This also meant that we could use this contract to simultaneously train our personnel.”

Intelligent SINAMICS drive technology

Martin Hafner, Drive Technology Consultant and Siemens expert on site, provided the technical details: “The drive system itself is a SINAMICS S120 multi-axis system that controls 14 drives. The connection is realized through PROFIBUS. The multi-axis system uses four coordinated CU320 control units that control several drives.” These units are logically structured: The first unit handles the unwinder, the closed-loop dancer control and the material buffer. The next unit controls the four drives of the magnoroll. What is especially important in this case is that the rotary screens must move in angular synchronism to the magnet roll. The third unit controls the feeding system, fan and upper or lower belt of the mechanisms in the dryer – and the fourth is responsible for the two drives in the J-Box and the winder. The intelligent drive system controls the angular synchronism, which ensures that the angle of the rolls with respect to one another and the peripheral velocities of the rolls, which are in contact with the material web, always remain the same. Further, the drive controls the complete winding and unwinding functions as well as the closed-loop dancer roll control. These types of functions can be easily programmed in the drive using DCC (Drive Control Chart). The PLC, a SIMATIC S7/317 F, only outputs the setpoint, the drives orientate themselves to the magnet roll. All of the drives are equipped with safety functions. In the case of an emergency stop, the system must come to a standstill within two seconds. This emergency stop can either be manually initiated or using integrated repeater rolls and pressure sensors. This sophisticated safety system was especially important for the US client. When asked about installing the system in the US, Scheriau, the Product Manager, responded by saying that commissioning will be performed together with the personnel who will later be the machine operators. And added: “If things do get a little difficult, then we can also contact Siemens locally – perfect support and cooperation will certainly be available from there.”