

And what do we need tomorrow?

"If we could answer this question, we would be unbeatable," explains Dr. Haider, the manager of the Austrian machine manufacturer SML. As so often proven in the demanding field of machine manufacturing - we will need a little bit more tomorrow than is feasible today. In the end, this is what drives every successful company. The bar must constantly be raised with regards to economic feasibility in order to gain the competitive edge. This process of continuous development is especially clear when looking at the example of thin plastic foil production systems used by SML, a company from the Starlinger Group. Cooperation built on the partnership between machine manufacturing and automation is a significant factor for the successful development of SML. The individual steps leading to continual growth were not entirely predictable. Nonetheless, they were a logical consequence of determined working mutual cooperation for the benefit of the end customer.

Today, thin plastic foil production lines are in a position to produce more than 110,000 m² of foil per hour. In only three minutes, one system can make enough plastic foil to cover an entire soccer field. If you take a closer look at the assembly line, the sheet winder is frequently the element which slows the speed of production. Switching rolls represents a cyclic interruption in an otherwise continuous extrusion process. Reducing the line speed corresponds to a fall in productivity. However, each change in speed also causes a marked change in the open-loop control system on the extruder. These types of disturbances have to be corrected or fluctuations in the quality of the end product are caused along with unwanted waste. In order to get ahead in this technologically demanding market, the Winder 2000 project was started in 1995. The main goal of this project was to increase winding speed to 350 meters/minute and to switch spools while the line was running at full speed.

In this way, the system operates continuously at maximum production speed without generating any excess waste.

The technological demands when wrapping thin sheets can be optimally implemented using the B&R System 2000 by enforcing exact time stability and high-quality automatic closed-loop control for the winding, mounting force, and the sheet angle. The ambitious goal of switching the spool without slowing down the line speed represents a giant mechanronic challenge. To do so, four servo drives have to work together with precision using harmoniously coupled

cam profiles. In a fraction of a second, the sheet is separated from the full spool and begins winding cleanly on the empty core. Highly consistent timing and, therefore, reproducibility, as well as exact axes coordination and close cooperation with the spooling procedure are decisive. The development results confirm that the concept and the goal have been reached straightaway. The revolutionary Winder 2000 was singled out and given an award by Austria (Austrian Staatspreis).

This innovation had barely reached the marketplace when new applications began to arise. Winding speed – therefore,



production speed – began to increase further. Switching spools can now take place at a line speed of 600 meters/minute. At these production speeds, moving the finished products becomes a highly demanding task. About every 80 seconds, a full spool is released and removed. While winding takes place on a different spool, another empty spool is clamped down. Because all advancements could be implemented in the existing system



Dipl.-Ing. Dr. Bruno Haider,
CEO SML

concept, there are enormous advantages in developing, documenting, and servicing this system.

A further intermediate step in the project was the adaptation for smaller systems. Compatibility with the solution which has already been developed makes this change possible with very little problems for the application.

To further increase the flexibility and innovative force of the production line, a decision was made in 2001 to outfit the entire line with a uniform automation system. The system was selected because of the way the spools cooperated with one another, something which had been proven over a number of years. Its flexibility in meeting new demands, as well as its modular product palette combined with a uniform programming system, also played a role in its selection.


The programming system uses a multitasking operating system which supports clear structuring of the program and clear representation of complex data structures and parameters.

Only software which is organized transparently is able to meet future demands and guarantee further dynamic developments. Communication between the individual automation devices is regulated using standardized and efficient interfaces. Remote service and diagnosis of a device is possible from one access point. This opens many possibilities for vertical integration of the system in the area of production operation without incurring additional development costs or extra effort. These interfaces can be used for standardized access to production and process data without

having to change or edit system software.

Because of complete integration, the heating and cooling regulators in the extruder controller, as well as the servo drives in the spool controller, all relevant system components can be configured and programmed using one tool.

After a few months of development effort, the first line could be put into full operation. The advantages of this uniformly coordinated solution became clear.

Winder 2000 is integrated more efficiently in the total system; ease of system operation and service has been considerably improved. Further reserves in the dynamic and additional advantages in engineering and service were brought about by simultaneously converting the drive technology in the spooler to digital servo axes from the ACOPOS series. This high-performance, overall concept has prepared SML for new end customer applications and has already met many of the demands in advance. 

Efficient production methods constantly open new markets. This allows our systems to manufacture breathable plastic foil very efficiently. These liquid-tight, vapor-permeable sheets find applications in the building materials, sport clothing, and even baby diaper industries. These increasing application areas result in new demands on the system. We can only guess at what we will need tomorrow. A central point of our efforts is to continually guarantee that we can handle the technically feasible, and that we can convert to the economically feasible in a timely fashion. That is a huge challenge for mechanics and electronics. It is impossible to know what we will need tomorrow, but a good starting point is knowing beforehand that we can do it if we need to. The technical and economic advantages of a uniform, homogeneous solution are obvious. The modular control system and the uniform programming system were the central reasons why we decided on the System 2000 controller series from B&R. Proximity to the manufacturer, as well as the excellent support we have received, have already proven to be a huge advantage. We are convinced that advantages for all parties will result from close cooperation if machine manufacturing expertise and automation are united in an optimal manner. In this way, future-oriented solutions are developed at the highest possible technical level.