Bystronic’s modern high-bay sheet metal storage facility (in the background) with the associated handling device (center) and the changeover table of the laser cutting machine (foreground) holding a processed sheet.
PC-based control enables the retrofit of a sheet metal warehouse for laser cutting system from Bystronic

Updated warehouse management system increases availability and simplifies maintenance of legacy facility

Peter Huber AG recently upgraded the sheet metal warehouse for a laser-cutting system at the Bystronic headquarters in Niederönz, Switzerland. Through the use of PC-based control, the facility now meets current requirements with improved availability and enhanced remote maintenance capabilities.
Roughly 10 meters tall, the sheet metal storage facility has two storage towers with a total of 83 bins.
Bystronic is one of the world’s leading providers of sheet metalworking solutions. The company’s portfolio includes laser cutting systems and press brakes along with associated automation and software solutions. Bystronic uses its machines in its own facilities, as Mario Duppenthaler, Head of Solution & Software Management, explains: “The recently updated high-bay racking system is part of our plant’s processing platform for a wide range of sheet metal components used for our own laser cutting systems. It consists of two storage towers that are 9.6 meters tall with a total of 83 bins, each measuring 3 by 1.5 meters. The maximum storage capacity is 249 tons. To remove items, a storage and retrieval device travels to the respective bin and transfers it to a Bystronic handling device, which removes the requested part and moves it via an automated transfer cart to the changeover table of the laser cutting machine – in this case a BySpring Fiber 3015.”

**Retrofit of legacy system pays off**

Since the sheet metal warehouse was first put into operation in 1998, upgrading it made a lot of sense, says Mario Duppenthaler: “Unlike the actual production machines, such storage systems are usually replaced in much longer intervals. Accordingly, their control and communication technology often does not keep up with other machinery. On the other hand, the importance of such storage systems should not be underestimated. After all, they form the backbone of the entire production facility – and therefore have a considerable impact on plant availability. In addition, a retrofit provides the ability to optimize process workflows and reduce non-productive times in order to catch up with the usually improved productivity of later-generation processing machinery.”

The Bystronic laser cutting system can be used to cut out parts from metal sheets with high precision.
The modernization project was handled by Peter Huber AG, located in the Swiss town of Alpnach. The full-service provider of control solutions for sheet metalworking, and a Beckhoff Solution Provider since 2010, employs PC-based control for new designs of machines and robotic systems as well as for retrofits. General Manager Erich Schumacher confirms the role that a smart retrofit can play in increasing overall production efficiency: “As equipment ages, the availability of the entire facility depends to a large extent on the availability of the individual control components. This is where the long-term availability of Beckhoff technology is essential, particularly with regard to the long-term usability of the entire facility. In this particular warehouse, for example, PC-based control replaced 20-year-old technology whose components are no longer available and whose Eprom-based software is no longer adaptable to today’s requirements. In addition, PC-based control technology finally enabled the use of modern remote maintenance capabilities. From an operator’s perspective, both aspects — component availability and remote maintenance — are actually even more important than the potential performance improvements that can be achieved by automating a legacy system.”

**PC-based control is ideal for retrofits**

For Erich Schumacher, openness and modularity are the main arguments for deploying PC-based control technology from Beckhoff, especially in retrofit projects: “With PC-based control, you can design the control and I/O systems precisely in accordance with the individual machine requirements. For example, the modular system of I/O terminals allows you to place small control boxes exactly where you need them if you want to keep using existing cable harnesses. This means that there is no need for expensive machine rewiring. We also appreciate the consistency of the system, because all Industrial PCs, from the smallest to the largest, run the same automation software. This simplifies our work considerably, particularly with retrofit projects, because the time to install these upgrades is often very limited since clients want to have their production up and running again as quickly as possible.”

At the center of the upgraded system that controls all storage workflows and the handling device is a Beckhoff CX5140 Embedded PC running TwinCAT NC PTP control software as well as TwinCAT PLC HMI software for visualizing workflows on a 12-inch CP2912 multi-touch Control Panel. The motors in the sheet metal storage system are controlled via two AX5118 Servo Drives with integrated AX5801 TwinSAFE cards for motion safety functions. The I/O system consists of four EtherCAT Couplers, two EK1122 EtherCAT junctions and

Two AX5118 Servo Drives ensure precision while integrated AX5801 TwinSAFE cards make sure that movements within the storage facility are executed with maximum safety.

A 12-inch CP2912 multi-touch Control Panel enables optimal visualization of the entire plant.
50 EtherCAT Terminals, including extremely compact EL1809 and EL2809 high-density digital terminals as well as EL1904 and EL2904 TwinSAFE input and output terminals respectively.

Having system-integrated safety technology is a particularly important aspect for Erich Schumacher: "The safety features must not be separate from the overall control system, because having a complete data-related overview of the total system is critical if problems arise. That's why all safety functions — such as emergency stop, safety gates and light barriers, as well as position monitoring of the two transfer carts between the handling device and the changeover table — are implemented via TwinSAFE terminals and the TwinSAFE cards in the servo drives." Mario Duppenthaler mentions yet another advantage of having an integrated system: "We plan to link the sheet storage facility more closely with the higher-level ERP system in the future. For example, we want to integrate the warehouse into the so-called cockpit, a live monitoring solution that will visualize all of our production data. We are also working on a detailed systems analysis of the sheet warehouse, which is particularly important for preventive maintenance. PC-based control is open enough to easily add such capabilities at a later date."

Further information:
www.bystronic.com
www.peterhuberag.ch
www.beckhoff.ch