

A new level of quality and cost optimization
for Italian yarn processing OEM

PC Control in the textile industry

→ Italian company Val Lesina Spa with its head office in Andalo Valtellino, Italy, produces and develops new fibers for the textile industry, and also builds yarn processing machines. The extreme performance requirements for high-speed yarn processing systems is a major reason for Val Lesina to stay at the forefront of automation technology and ultimately convert their machines to PC-based control from Beckhoff.



As early as 1999 the company provided high-speed yarn processing systems that run 24 hours per day, 365 days per year.

Val Lesina Spa was established in 1973 and originally produced yarns and fibers for the textile industry. The need to increase production capacities and a desire to stay ahead of the competition was motivation for Val Lesina to diversify into development and construction of spinning machines. Even in the company's early days, conventional machines would not have been able to cope with the demanding productivity requirements. Val Lesina developed an innovative machine design, initially intended for in-house use, but the company soon started selling high-performance spinning machines to fiber producers worldwide. Today, the company, which merged with the Radici Group in 1989, offers a wide range of products, including smooth yarn and textured yarn for weaving, microfiber filling yarn, smooth yarn on warp beams for knitwear, and Poy-Hoy yarn. Val Lesina holds a patent for "Micrell" microdenier fiber.

Yarns are coated to increase their wear resistance for processing in weaving machines. Starting with the winding machine, the thread is subjected to a range of treatments for further processing by the weaving machine. Processing involves several steps: First of all the yarn is unwound with constant tension via two mo-



tors. Then the coating is applied to the thread. A further step involves slow drying to prevent fraying. Finally, the dry yarn is wound with controlled tension onto a beam installed at the head of the plant via a tensioning and winding motor.

New yarn processing machine exceeds challenging technical demands

The Val Lesina machine has an overall length of approximately 20 m. The original cable lengths between the control panel and the previous machine (measuring 30–40 m) no longer complied with modern technical standards.

The aim of the retrofitting was to eliminate excessively long cables with the aid of 1.5 Mbaud PROFIBUS technology. The overall system involves a network with a length of approximately 80 m, including 19 reference points or network devices. The control system consists of a Beckhoff CP7010 Control Panel attached to the machine and Beckhoff C6130 Industrial PCs and CP6502 Panel PCs with PROFIBUS master cards.

The Control Panel is connected with the Industrial PC via CP Link interface. Two additional Control Panels with integrated PROFIBUS interface deal with setting of a comb and stretching and applying the yarn coating.

Beckhoff Bus Terminals with BK3100 PROFIBUS Bus Couplers and BK9000 and BC9000 Ethernet Bus Couplers are used for I/O processing. These decentralized I/O stations form the basis of the control system and are equipped with digital, analog, thermocouple and serial Bus Terminals.

“The openness and fieldbus-independence of the peripheral modules and their flexibility were crucial factors for choosing Beckhoff products” said Pierluigi Olivari, managing director of Beckhoff Automation S.r.l. in Italy, who provided local support for the project. “The lack of I/O structure restrictions in terms of quantity, current and voltage values, and the option of using digital and analog signals, proved to be particularly advantageous,” Pierluigi Olivari continued.

The application software used includes visualization and control with Beckhoff TwinCAT. The “Super Flash” visualization software is coupled with TwinCAT via an OPC server. The operator enters the parameter and values required for the process on a screen with different menus. The data are either transferred to the machine via TwinCAT or directly to the respective drivers. All significant data can be accessed for monitoring purposes. In the Val Lesina application, PLC functionalities are programmed with TwinCAT PLC according to the IEC 61131-3 standard.



The starting point for the machine revision was the elimination of excessively long cables with the aid of 1.5 Mbaud PROFIBUS technology. The control system consists of C6130 and CP6502 (picture ahead) Industrial PCs and CP7010 Control Panels, all from Beckhoff.

Mission accomplished

Val Lesina’s goals for the project included higher process quality, better control of the different sections of the plant, appreciable reduction of the time required and the costs for wiring, but also the opportunity for quick updates and modifications without complex hardware changes. A further requirement was simple handling by the operator, since the machine is used for in-house production. The operator should be able to implement improvement and optimization measures at any time.

These goals have been achieved. Compared with the traditional approach, Val Lesina realized an equipment cost reduction of 15–20 percent. During more than one year of 24 hour operation, the plant hasn’t experienced a single shutdown. Furthermore, the design phase was made significantly more convenient and cost efficient, and fine-tuning of the plant machinery was optimized.