

JAGENBERG “VARISTEP” SAEL REBUILDS THE WINDER DRIVE AT BURGO SAREGO PAPER MILL



A great teamwork, through the years, between both companies, involving SAEL all over the Burgo plant. The Sectional Drive PM1, made in three different steps, the Winder Variroll, Roll wrapper, Supercalender Kleineweffers, Supercalender Bruderhaus, Sheeter Jagenberg Synchro, DCS and Stock preparation, DCS for Coating Celliers, DCS and Automation for automatic belts and rolls, DCS for Turbogas and Gas motors, DCS Demi. After years of mutual satisfaction being together, Burgo manages SAEL systems and own drives supporting the operators and having spare parts availability for systems installed 35 years ago (actually there are still 55 years old drives renewed by SAEL REEBORN).

by: **Paolo Andrighetti, BU paper**

Sael
automation electronic systems

A long-time profitable partnership: after 30 years of working together, Burgo Group assigned to SAEL the rebuilding of its Jagenberg winder VARI-STEP. Thanks to the new drive, the efficiency, speed and overall operation, have been increased by more than 30%, while the machine management got optimized by new configurations formerly unavailable.



“The spirit of improving” and “Customer first” have been rewarded by Burgo’s “T&I Technology and Investment” rebuilding the electrical cabinets and wiring of the **Varistep**. To get better performances and flexibility of the machine, the managers of Burgo assigned to SAEL this job. Despite the addition of several automations (roughly 750 machine I/O) the job was executed extremely fast and successfully. The experience of **SAEL technicians**, gained over 37 years with countless applications in the retrofitting of all types of drives in the paper industry, **made it** possible to carry out the rebuild of the Jagenberg rewriter **in record time with** the help of the **DCS WINDER-SAEL** winder control and supervision system. The scope of the delivery was, in addition to rebuilding the existing electrical wiring, old switchboards and pulpits, the need to be able to secure the machine while complying with the strict and current regulations. The result achieved delivered to the paper mill a very stable, flexible and precise system that immediately repaid the investment. Precisely because of the perfect adjustment of the drive that processes a mathematical model of the mechanics on a motor

regulating the tension (even without the regulation by load cell, +/- 3% accuracy is guaranteed) and the ductile load distribution between the winding drums, **the speed of 2,200 meters per minute was achieved without any modification on the existing installed power.**

Further task of the SAEL team, was to start up the Vari-step rewriter in the shortest possible time; due to the amount of activity and the complexity of the machine itself, it normally takes more than three working weeks of start up and fine tuning. On the other hand, the timeline imposed by the paper mill and related to the short shutdown of the plant that had already been planned for months and was subsequently modified due to the worsening situation of material availability, left no room for error in scheduling and conducting all the activities that were planned minute by minute throughout the shutdown. The careful analysis and reconnaissance carried out by the technical manager of the paper mill Mr. Alberto Cogliati and his team, allowed to reconstruct the existing situation of all the different utilities connected to the rewriter and to integrate them into the project by

also equipping them with machine diagnostics, previously not present. The integration of the new plant safety-a prerequisite of the reconstruction-followed the strict regulations required by a perfectly respected risk analysis. All of this was the cornerstone of the operation’s success; the schedule was adhered in timing, creating a high final quality of the system that allowed machine operators to start all activities at full operating speed and without a hitch. Constant attention in involving the paper mill staff in the final start-up and providing up-to-date programming tools created a synergy that, also at this mill, has been strengthened for 30 years. The paper mill technical staff, after continuous refresher courses conducted at SAEL, was able to intervene independently in all plc control loops, SAEL drives, and system automations; a great success for SAEL, which firmly believes in the paper mill training policy.

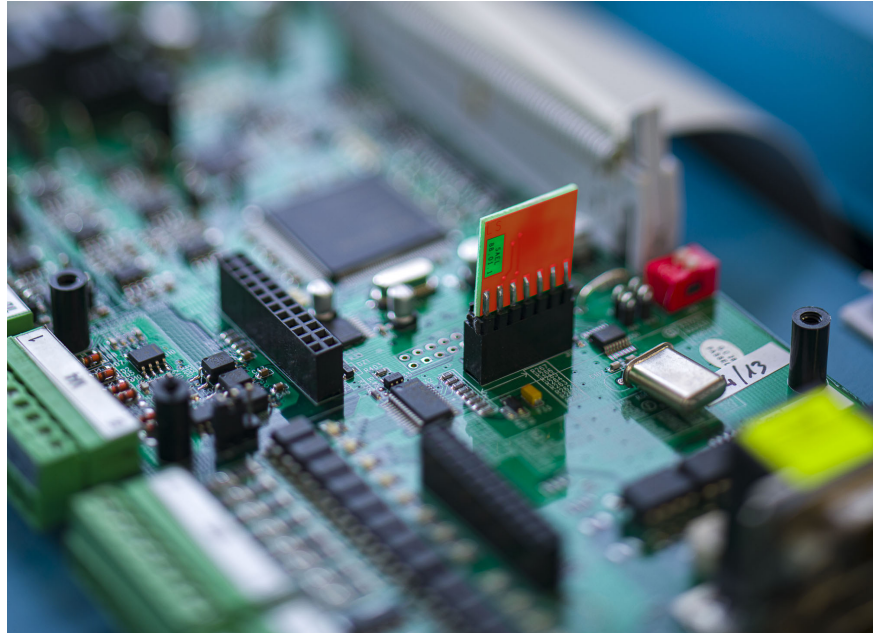
The modernization of the machine control involved the complete replacement of the existing switchboards with a single switchboard designed and manufactured in SAEL. The plant, which previously consisted of a sizable switchboard containing drives



VARISTEP Jagenberg - parent reel unwinding area

from the year 1987 had some problems related to cooling, reliability of older components, and the availability of spare parts, especially electronic components. The automation-which was previously operated with S5 PLCs and Siemens Drives-left several perplexities in dealing with certain anomalies; a peculiarity of its own generated by a system in which automation and drive regulation are combined in two heterogeneous systems. The first step of the realization involved the company in retrieving all the wiring diagrams with the first drafting in computer format, especially for the part related to the control desk and the electromechanics in it. At the same time, all cables were identified and initialed, since over the years and successive modifications this task had not been performed properly. At the same time, with the paper mill, the controls on the control desk were revised, redesigning the layout to keep it as compatible as possible with the old way of working of the operators, but at the same time updating it in the new operational features offered by the DCS WINDER SAEL.

The architecture of the rewinder system



The removable memory that equips each of our electronic boards allows quick replacements without any programming.

The architecture that was used in the application is the well-established **“WINDER sectional drive”**, which consists of a classic **S7 1500 File Safe PLC and a WINDER SAEL DCS for machine management with I.W.S.A.** (Internet World Sael Assistance) on site: the system now allows easy and direct management of the plant by machine

operators, simplifying all operations. The new control pulpit where the PC - monitors - keyboard - mouse has been placed, has undergone a radical transformation by integrating multiple functions directly on the monitor itself, eliminating several buttons that were previously necessary for operation. The on-screen control system enables process visualization, lifetime trends of all



After 7 days of start-up, the first lifting, immediately judged satisfactory - PLATFORM ONE DRIVE SAEL



offices or from any place in the world where the technicians are). The “DCS WINDER-SAEL” control system is a supervisory station that is offered as an engineering station for the operation of the most sophisticated Winders on the market today and accommodates numerous functional upgrades. The product is designed with simple navigation graphics supported by drawings and tables that manage to guide even the least experienced operator in their use. The system allows, in addition to machine management, to program and parameterize all the drives of the control as well as to program the PLC in the inserted control; finally, IWSA completes the product by allowing any software changes to be made directly via the Internet.

variables-electrical and system-and work setting supported by rich synoptic panels that ensure easy understanding and management of each function with which the rewinder is equipped. To generate this strong interaction between PLC and supervisor, various management utilities have been designed with simple and immediate masks for calibration of analog inputs and more. In fact, all PLC parameters are stored and managed as configuration

files in the machine supervisor, which allows, at any time in case of faults, a quick restart by guiding to their resolution. Also contributing to the maximum reduction of downtime due to any failure is the remote control system implemented IWSA (a standard always implemented since 2005 in all new or rebuilt equipment) that allows at any time the control of the systems in the field: DCS supervisory PC, PLC and drives (directly from the SAEL

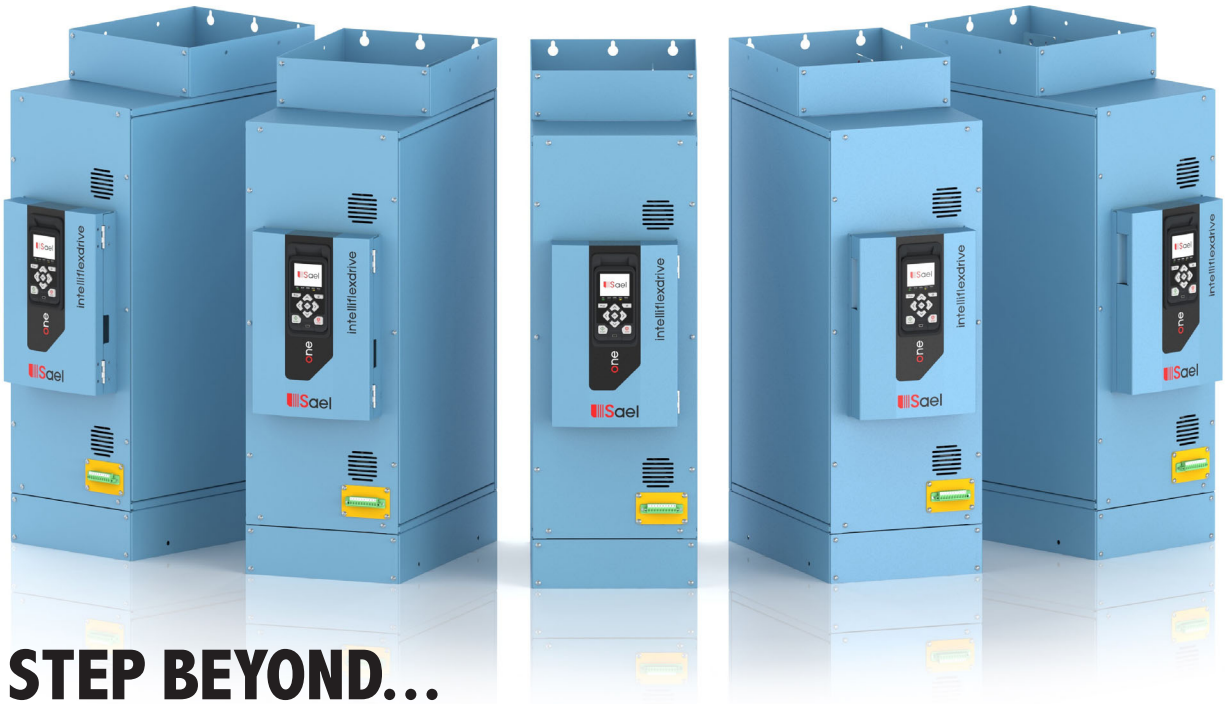
SAEL, unlike European competitors, has implemented in the DCS Winder-Sael, the important function related to real time trends that store all system variables and machine trends throughout its life and without time limit (with sampling every second). Of unparalleled flexibility and logical intuition are presets for the type of paper produced (light preset-medium preset-heavy preset). Depending on the presets required, the system autonomously goes and modifies the rider



UP and Down pictures:

**After 7 days
of start-up,
the first
lifting,
immediately
judged
satisfactory
- PLATFORM
ONE DRIVE
SAEL -**

VW WATER COOLED SERIES with Safety Torque Off



A STEP BEYOND...

6 years of great returns in “save energy” since the first implementation.... After equipping our inverters with film capacitors and a single “ONE” board for all sizes and types of drives, now and without delay liquid cooling has arrived. The great advantages: reduced space, elimination of all fans onl drive-arms and air-conditioned rooms, no dust and moisture contamination even in acid environment: they preserve electrical components while ensuring, at the same time, important energy savings.

lightening curve, the load distribution curve, the pull curve and the machine speed curve; the system allows machine operators to recall a previously made job/curve and transfer it to the machine without making the classic adjustments required for each type of job, grammage and material. The alarms, on the other hand, are as interesting as can be, being each one stored in hard disk from which the date and time of intervention and other important indications can be extracted, helping to carry out preventive maintenance and guiding directly to the resolution of the problem, such as opening the electrical diagrams and launching a movie (which can be done from camera or cell phone) to guide the operators to the recovery of anomalies in a very short time. The architecture was run in a Windows 10 environment using the Scalink DCS to make the system completely open and accessible to anyone.

Specifically, the main functions of the supervisor are:

- plant synoptics with visualization of all motors in the field by zone;
- display of all electrical quantities on graph and numerical bar;
- continuous diagnostics of plant alarms with storage and archive on hard disk;
- display of set points required for machine management with the possibility of changing their content;
- trending of all existing variables (one-second sampling) for the entire machine life;
- generation of counter weight, rider roll, speed, tension and load distribution curves for load-bearing rollers;
- work recipes with all stored machine set points, selected curves, production data with their immediate transfer into work from function key to facilitate less experienced operators with preset changes.

