



AT BURGO GROUP - AVEZZANO PLANT - A JAGEMBERG VARI-ROLL REWINDER CONTROL SYSTEM WAS RENEWED. OVER THE AUGUST BRAKE THE TELESET, TELEBOCK AND PLR SYSTEMS WERE REPLACED BY THE LATEST AND EVOLUTED “WINDER-SAEL” ALREADY USED WITHIN BURGO PLANTS.

SAEL s.r.l. VARI ROLL Avezzano

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A SAEL challenge against the time. Without any risk a perfect job was possible in two weeks of production stop. But this was done in a third of time. Thanks to a long time experience on this specific revamping - Varidur, Variroll, Variplus, Variflex, Varitop, Varisoft Rewinders - SAEL built many “software packs” over the years. The right combination of those packs allows a perfect job without any start-up waste of time. This Vari-roll Rewinder mainly involved the old electrical equipment, the knife and counter-knife positioning management (TELESET group), the shoulder positioning equipment (TELEBOCK group) and the upgrade of the existing MMI - Man Machine Interface - (PLR group) already made by SAEL and developed over the years to a more flexible and friendly use interface. The mission was to get a perfect integration between the old existing AC/DC motor drives equipment and the newest one. Furthermore the system coordination by a S7 PLC for Profibus absolute encoder management - obsolete TWK absolute parallel encoder replacement - and re-using the existing stepper motors for the counter-knife positioning. The SAEL solution was “born and raised” according to the Altavilla Vicentina T&I Burgo’s team and coordinated by the Paper Mill technicians it selves. Actually this solution is a standard covered on many other applications. The Vari-roll complexity required a bunch of visits in the plant

before. Actually the right hardware structure, as much as the components placement or the system interconnections management are the milestones to achieve the customer targets like cost and time savings.

Bade on the assumption that the electro mechanic part to be replaced was dated 1976, many checks were necessary before the equipment change: every single adaptor, sensor, devise was checked. This definitively paid out by a quick re-start within the slot gave by the Burgo Management

The existing system was made by: TELESET-TELEBOCK-LDS equipment

(related to the PLR); General uses equipment; AC and periphery sensors equipment; knife rotation and paper-guides as much as knife and counter-knife positioning stepper motors equipment.

The elements interconnection, located in different places, were made by physical I/O signals through serial ports. The knife and shoulders positioning were calculated and settled by the PLR, while the positioning and the measuring were made by TELESET and TELEBOCK. Last but not least the machine physical movements and shifts were managed by the general use equipment - shoulders AC motors drive - and TELESET - knife and counter-knife



First Rise after 7 start up days



Old Teleset and Telebock system replaced by the new SAEL equipment, Intelligent Stepper Drive

stepper motors drive.

Interesting point is that after the modifications SAEL allowed to manage those operations in real time - which was never before - with a dramatic waste of time reduction.

The existing interface between the TELESET-TELEBOCK-LDS-PLR and the general using is made by a mix management of physical in-out and serial communications where the PLR is the core of this old process control. The mission is to bring the system to a next level using a modern PLC-SUPERVISOR integrated system who incorporates all the calculations

managed by the existing TELESET-TELEBOCK-LDS-PLR former logic.

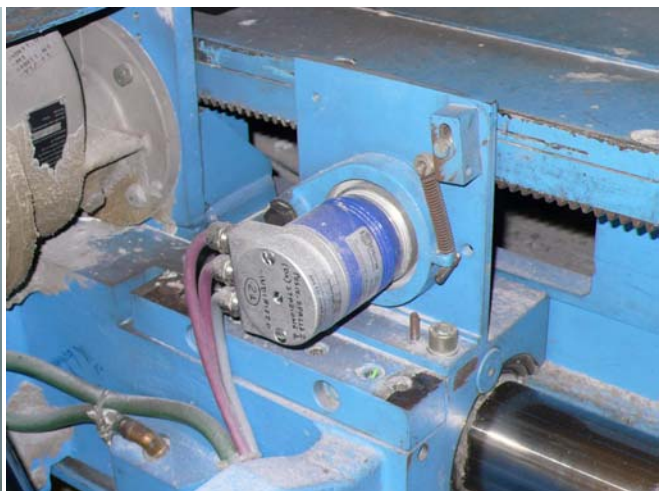
It was also mandatory to get the whole signal exchange between the old TELESET-TELEBOCK-LDS-PLR system and the General Uses as much as the DC motors equipment - this last was originally controlled by a Siemens S7 400 PLC via Profibus to the drive regulators -.

To do that a new S7 PLC in combination with a Scada/MMI Supervisor was used. A multiple function in one management. Better and more efficient by the latest technology in combination of the experienced Burgo people.

The new equipment as a substitute of the old Jagenberg system, and built with equivalent connections to the original hardware, will allow the wiring team to take in place the job in less than three days.

The new SAEL system architecture who will put in place later on is based on the new 24 nodes Profibus network managed by the S7 PLC - already used in other Burgo plants. This will enclose:

- q.ty 07 - Profibus absolute encoder for upper knives and lower counter-knives
- q.ty 12 - Profibus absolute encoder for paper roll holder shoulder positioning



Before and After the TWK encoder replacement by ELTRA - properly made on 2022



View of the Vari-Roll Drum, SAEL Intelligent Drive

- q.ty 01 - Local ET200M - To integrate some commands of the existing pupler
- q.ty 03 - Local ET200M - To integrate the old electromechanic commands with the new SAEL device "general uses"

Basically all the former system was totally electro mechanic and coordinated by 3 microprocessor racks - Each one for the TELESET, Teleblock and LDS zone. This has been replicated into the S7 PLC and managed by the "WINDER-SAEL" Supervisor: The perfect PLR evolution. To a steady and uniform management it was decided to keep the existing LDS section - to not upgrade by the new one available -.

Today the Vari-roll supervisor system encloses features like the Engineering Station for PLC programming too. Moreover the "IWSA" - Internet World Sael Assistance - allows a remote control of the plant in real-time and for each single zone: all over the world a SAEL technician can support any need.

From this station is possible to set all the drive parameters and the SAEL digital boards; developed or modify any PLC Software as much as keep monitoring all the plant.

The architecture is based on Windows environment using a standard SCADA. This will keep the system fully compatible to

anyone else who works on Teleset-Teleblock-PLR Jagemberg Vari-roll like:

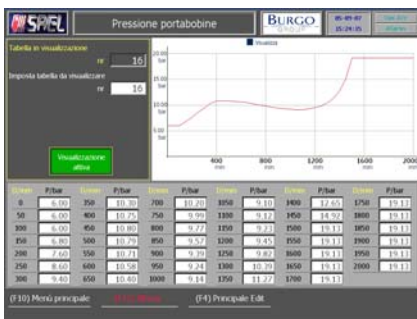
- Upper and Lower knives motor positioning calculation - automatically -.
- Shoulder stations positioning and speed changing - fast/slow - automatically-
- Machine overall supervision within full run.
- PLC devices linked settings
- I/O visualization
- Alarms visualization and storage - On line Helper for each alarm
- Hardening check of each winding through the paper roll holder presses positioning and the upper / lower presses.

Therefore the supervisor has a bunch of sophisticated functions who keeps the entire Rewinder management inside. The most important features are:

- For each Coil
 - . Speed trend storage; pull set-point;
 - . measured pull;
 - . sum of the linear forces and the contact press within a trend and two files parallel - also got in different times - by a double visual graph. This allows to keep control the winding set procedures matured along the way
- Make a tab of settings for the whole machine like:



New equipment - Replacement of the old electro mechanic part



- Cylinder pressure of the paper roll holder stations = f(Major Diameter Wrapped)
- Pressure of the internal press cylinders = f(Major Diameter Wrapped)
- Pressure of the external press cylinders = f(Major Diameter Wrapped)
- Pressure of the dampers = f(Major Diameter Wrapped)
- Pressure of the draw rolls or external press rolls = f(Major Diameter Wrapped)
- Pressure of the draw rolls or internal press rolls = f(Major Diameter Wrapped)



Vari-roll control desk revamped - Burgo Group Avezzano

- Pull coil = f(Major Diameter Wrapped)
 - Speed = f(Major Diameter Wrapped)

For each of those parameters is possible to edit, modify, store or recall in a simple way 99 work-tabs. Through those functions is possible to change the Rewinder asset on real time having different paper. The experienced T&I Burgo's Team allowed to test the benefit directly to the coils getting the best ratio of quality / speed / accuracy ever.

The same flexible philosophy is also applied to the knives, the counter-knife, the shoulder positioning as well. For each coil the system computes the best knife and the shoulders configuration but lets the people free to decide or modify the settings after the feasibility check out. The load and unload duty cycles are optimized as well. Over six paper roll holders are possible thanks to this flexibility - using all the knives, included the externals -.

The load and unload duty cycles have been optimized and the exchanging data has been analysed as well. Thanks to the Local Burgo's Team support the outcome has been awesome. From the organizational point of view all the steps were agreed with the Altavilla T&I team. Since the beginning this partnership gave confidence to the both sides allowing the testing phase in a short time.

The dismantling of the obsolete equipment

in combination to the new connection was coordinated by the SAEL local Service Point: INDEXA Italia 3 - Isola Del Liri - This efficient team quickly solved all the expected logistic problems like external and local workers coordination - electrical and mechanical people - getting the job done on time. The priority was gave to the starting sequences, stop and motors movements. Later on to the load and unload sequences and to the pneumatic last. During the load tests - with paper on - an awesome support was got from the local Burgo Team till to their Management - always available at any needs -.

The full T&I experience came up during the production phase: in that step was possible to optimize all the machine functions, any curve, any parameter till to the small trim detail within the full safety of the operators.

**“One Drive Platform”
born for PAPERMILL**