



REBORN, HIGH TECH SAVINGS ... VALMET REWINDER REVAMPED IN 5 DAYS

THE RENOVATED VALMET REWINDER GOT STARTED BY THE SAEL REBORN SYSTEM WHO REUTILIZES ALL THE EXISTING ANSALDO DRIVES WITHIN THE ELECTRICAL CABINET. THE REVAMPING WAS NECESSARY TO GET OFF DIFFERENT PROBLEMS MAINLY CAUSED BY THE **TECNINT IN BUS-VME** BOARDS. AFTER THE LAST STOP DUE TO A BROKEN BOARD - WITH NO LONGER SPARE PARTS AVAILABLE - THE DRIVE REBUILDING CHALLENGE TOOK OFF

SAEL... Ribo VALMET Smurfit

by: **Paolo Andrighetti SAEL s.r.l.**

Se It was told since a while at **SMURFIT KAPPA ANIA Paper Mill**: countermeasure the continuous failure warnings from the VALMET PM.3 Rewinder Drive. Over the last year the standard Drive regulator made by ANSALDO caused a bunch of stops - This system manages the PLC sequences and the drive regulations through a rack with bus VME microprocessor boards and I/O

modules by TECNINT -. As per the old systems generation any failure was recorded, the logical implication after a fault was the board replacement. Moreover the unavailability of the spare parts in combination of a long stop in November did boost the need of a countermeasure. SAEL was defined as the perfect partner for that even the uncertainty of the global market situation and the dramatic crisis.

The decision made on November the 20th 2008 was directly linked to the production stop and the further restarting: within the 2nd of Jan 2009 the Rewinder had to produce over the 3 shifts at the full speed.

An hard challenge for SAEL. Once again the pre-work, the on site investigation and the accurate scheduling made with Mr. Marino Donati - Responsible of the Tech dept - was the key of the success. The TECNINT microprocessor rack and the VALMET systems communicate via a S5-155 PLC. The map of those communication and the reversing into the new S7 PLC and the SAEL Drive took a lot of time.

Before the SAEL REBORN device there were no chances to revump a Rewinder out of the complete Supervisor and PLC replacement.

This new SAEL device allows to share gain within a cost sensitive market because the entire system is not replaced.

To a better understanding of the job done a Drive VALMET architecture is described below.



SMURFIT KAPPA Paper Mill, VALMET REWINDER, SAEL Intelligent Drive

The VALMET control is based on a S5-155 and its remote I/O with periphery

stations on Profibus-DP ET200. All is linked to a Supervisor PC station. The S5 PLC is the core of the machine and gets the data via the field sensors. The sensors are redundant to the drive because a double feedback, modular and independent to the motor drives. Beside the rotary sensors placed on the main rolls, encoders and load cells are mounted on the tailstock to provide data of the paper tensioning, as much as load cells to get the rider pressure and vibration measurements of the coil during the rewinding phase.

The Supervisor allows settings on many parameters of the process. From the acceleration ramps up to the rider lighting curves or desired tailstock as well.

Over the main production other data are stored like the last 6 coils manufactured. The Supervisor is linked to the S5 PLC for real time data acquisition. The

industrial PC is mounted inside the electrical cabinet nearby the PLC and the supervision. By an extender it goes to the operator work places. The S5 PLC manages all the machine movements too. Due to the huge quantity of connections, and to dismantle the existing PLC without mistakes, other three days were necessary for the operations and the testing. Of course this is a sensible topic for this kind of customer, so it was mandatory to re-use



TECNINT Rack and dismantled regulation boards



The drive before the modernization

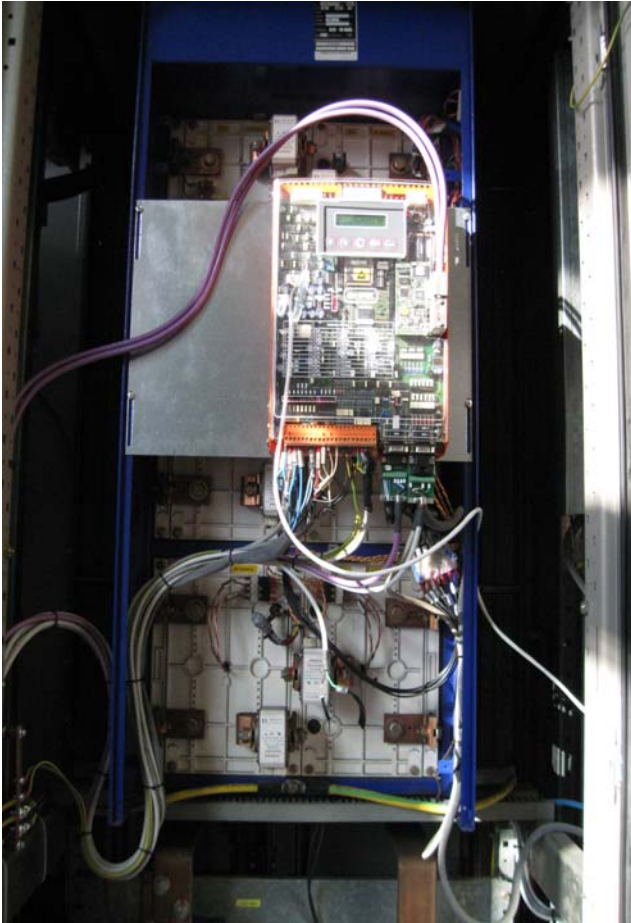
the Valmet Supervisor.

The existing Drive was linked to the S5 PLC via two TTY serials with 3964R protocol: One for the refs and the command words transmission; the other for the equipment readout - Alarms, Currents, Speeds, Torques, etc. -

To the safety and for direct paper tensioning load cell readout the Drive was getting some digital input. The load cell amplifier has three analogical output: Two of them are for the cells and directly linked to the S5 PLC - pull visualization at the transmission as much as the services side -; the third is the sum of the two cells and directly linked to TECNINT board the analogical input.

The main TECNINT rack had three CPU for the machine drive command: The first did manage the input communication - logical sequences -. The second was for the analogical data computing - Refs - and the data transmission to the S5 PLC. The last one was dedicated to the front panel for the direct Alarm state - to not be at the operators room, far away from the machine -.

The electrical equipment was settled on a modular base, repeating three times the same electrical schemes development. The modules were linked to the VME rack via serial by a remote I/O on TECNINT boards. The Drives input were coming from the digital releases and the Profibus-DP Refs to the CPU for the analogical data treatment.



Ansaldo Drive with the REBORN rack, Dec-2008

Also the longitudinal knife section had a simplified speared section - low power and dimension - The replacement of the drive logical had to solve the system reliability as much as the availability of the spare parts. Actually the machine had a lot of reliability problems causing too many production stops.

The job planned the total ANSALDO logical replacement and maintaining the main power of the drives and the electrical cabinets. The S5 CPU and the Valmet Supervisor were maintained as well.

The first phase was to replace the two TTY serial interfaces who could be the cause of reliability problems.

It was decided to implement the communication between the two systems with the Profibus interface: The S5-155 rack - as terminal point of the existing Profibus net -. Due that was added a DP/DP joint between the systems within the Valmet control getting the 24 Vdc as well. The advantage was to get a beat longer field

bus - 1 Mt only - having a much faster device for write/read information by the dual-port memory. During the start up preparation all the communication nets - for the drive parameters and the Profibus - were prepared on site while the machine was running. When the machine was stopped the VME rack and the TECNINT I/O boards were dismantled and replaced by the SAEL REBORN boards. The REBORN boards are directly connected to the SCR gates and the Drives TA connections as well. To fill the machine logical a 315-2DP

CPU is used - 64 input and 32 digital output over the same rack.

The wirings have been remote by multipoles cables and Siemens boards mounted in the same place of the old TECNINT boards.

Many wires were no longer used because the drives enabling were got via Profibus. This caused a dramatic cabinet clean up. To get a uniform job with the other existing sectionals, the regulation board substitution required the field controls replacement.

This is the main power replaced only. However the substitution did not caused



waste of time because the field control is made by a multipoles cable. As a last step all the emergencies chain was updated to the Safety regulations. The wiring activity was done by the SAEL service point SIMI - a long time experienced service point -.

Beside the ANSALDO equipment wiring, the Valmet Control interface preparation was done. - Interface preparation, CPU testing and the two systems communication test. After a double CPU backup and to process the new point, the Profibus board configuration was changed. The communication softer was optimized and implemented. After few days of production without faults the serial communication board was replaced.

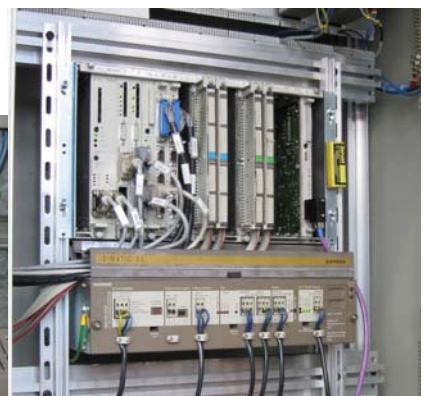
the aim of this last step was to carefully manage the shift made via software vs. the EPROM normally used.

After the wiring, the installation and the regulations, all the motors trims were settled for the no load tests. At the end of the I/O test and the global check out the unwinder servo diameter setting started with the working sequences and the coil production.

Few weeks later the new regulation highlighted a better performance and more accuracy on the paper regulation within different conditions like acceleration and deceleration with big diameter mother coils - this was an issue before -.

The new regulations and the new CPU allowed the target achievement: renew within the winter stop.

The coil process got a production increase with a dramatic reduction of



Dismantled I/O Remote boards. Valmet S5 PLC



REBORN rack testing after the take in place, Smurfit Kappa Ania

the pull variation - up to 60% - plus a software and hardware upgrade. Today the maintenance team can work on the S7 PLC setting the Drives.

The next step should be the S5 PLC and the Supervisor replacement as obsolete and no longer spare parts available. Everything should be integrated into the S7 PLC - already installed with enough capacity - and applied with the WINDER-SAEL Supervisor allowing a direct dialog with the installed architecture.

Once again SAEL REBORN was awarded as the simple and flexible system for Paper Mill revamping. The mission is to give full reliability within Old Drives, Calanders, Rewinders, Shearers revamping by the REBORN rack - who replaces any existing drive -.

The old regulation board is replaced by the SAEL "Intelligent Drive" using the existing main power (SCR bridge, Switches, fuses). After 8 years of applications the reliability of REBORN speaks by it self. OVER 45% SAVINGS GETTING HIGH TECH SOLUTION. The best value selling replay to the economical recession.



Valmet Rewinder control room view, Smurfit Kappa ania



First produciton, Smirfit Kappa Paper Mill, Dec-2008