



ENGAGED ON PAPER ELECTRONIC AUTOMATION FIELD, SINCE EVER, SAEL HAS REBUILT THE 350-2150 DD2 SINCHRO JAGEMBERG SHEETER – DATED 1999 – AT PAPIERGARDA PLANT. THE OLD CABINETS HAVE BEEN RENEWED, AND THE THREE SHIFT PRODUCTION LINE RESTARTED WITHIN TEN WORKING DAYS. THE NEW SUPPLY HAS DRAMATICALLY INCREASED THE EFFICIENCY, THE CUT QUALITY AND THE PRODUCTION SPEED. THE TRANSFORMATION, TOGETHER WITH THE MECHANICAL MODIFICATIONS,

INCREASED THE MACHINE PERFORMANCES OF 20%. MOREOVER, THE PROCEDURE MANAGEMENT HAS BEEN OPTIMIZED, ALLOWING MANUFACTURING CONFIGURATIONS NEVER HAD BEFORE.

SAEL s.r.l. PAPIERGARDA

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

In the behalf of PAPIERGARDA, Sael rebuilt the 350-2150 dd2 sinchrojagemberg sheeter – dated 1999 – at Arco (TN) plant. At the beginning the project was oriented on old drives spare parts problem solving as well as some technical issues caused by the existing automation with uncontrolled production stops. Besides that, there was the need to optimize and automatize the unwinders production – actually, it was not possible to produce specific coils without losing too much time. Since the beginning Sael offered a solution matching the technical needs and the short commissioning time required.

Papier Garda was born on 1982 as a paper transforming and finishing Co. The management invested a lot on technical innovation, offering a high professional service and product. Specialized on coil cut on sheets, and small sizes, it works for

paper mills and paper transforming third parties. Moreover, it offers big and small paper packaging. Over 9.000m2 dedicated to the logistic and paper manufacturing; 70 people employed – working on three shifts – support any paper retailer or distributor. To provide a complete

service, they can also get back and/or deliver the goods worldwide.

The “turn a key” Sael supply, involved:

1. PLC S7 vs. S5 replacement, including all the new sheeter



Reconditioned SINCHRO 350-2150 DD2 JAGEMBERG Sheeter at Papiergarda



ONE DRIVE. Not a simple inverter, but an automation system integrated into the DRIVE

technological functions – today managed by Micromatick and Phoenix closed systems -

2. Substitution of the whole Micromatick cutting management;
3. Supply of SAEL Drives – on DCS Bus – vs. Micromatick, for the pull and the blades;
4. Replacement of the supervision - originally based on own PC and Jagemberg panels – using the newest Siemens Touch screen operator panel;
5. Phoenix Interbus I/O modules replacement with ET200S plc standard modules;
6. 12 incremental encoders for coil-holder arms - supply and mounting –
7. 3 absolute encoders for Palletomat - supply and mounting – vs. existing TKW;

8. 2 Festo electro-pneumatic isles – supply and mounting – vs. the original one with Interbus interface;
9. Capacitors supply based on our Sael Drive new technology;
10. Wiring of the entire electrical supply;

Originally, the machine functions, were made by the S5 PLC together with the Micromatik system. All those functions have been implemented into the new S7 PLS Siemens and some external hardware, eventually. By this process the machine has been modified and automatized - Equipped with 6 Favalessa's coil-holders (twin driven by 3 pulpers with Remote Interbus modules), arms handling, pneumatic braking



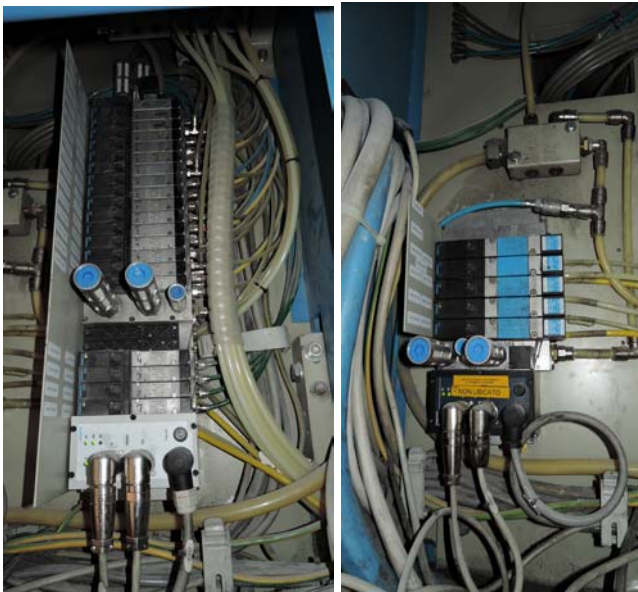
Global Jagemberg machine overview, completely reconditioned, Papiergarda.



by RE, and load cells replacement with RE equivalent/ compatible –

Main machine features:

- 6 coils, with automatic loading;
- 4 longitudinal knives, with automatic positioning;
- 1 sheets extractor carpet – after the blade;
- 1 Sheet rejecter unit;
- 1 impulsivesuction box;
- 1 slow overlapping carpet;
- 1 layboy platform;
- 1 automatic pallet changing system – Palettomat like;
- 1 automatic pallet board;



The main functions have been controlled by:

Siemens S7 PLC system supply vs. the former S5. We maintained the power section of the Micromatik cabinets and replaced the old inverters by our Sael One Drive – with integrated cutting functions for knives and pulley AC motors drive. All the others AC drive have been maintained, even managed by the new automatization system.

Main features managed:

- management of the automatic loading coils arms positioning;
- management of the detection and joints scrap;
- management of the regressive braking system for 6 coils, based on the pull value, settled by the operator;
- management of the automatic positioning for the 4 longitudinal knives, based on profile sizing;
- management of the main pull AC motor and the machine speed;



From top to bottom: Micromatik Rack, Interbus electro valves, Micromatik drives replaced and all the Interbus electronic eliminated (ET200 Siemens recycled only).



S7 300 Siemens PLC re-wired vs. the former S5 115 model

- management of the cutting AC motors with profile optimization based on profile sizing;
- management of the extraction carpet AC motor (spacer);
- management of the overlapping carpet AC motor;
- management of the stack positioning AC motor;
- management of the “Palettomat” pallet changing;
- management of the stack sheets counting;
- management of the cutting size and their speed limits;
- management of the speed and alarm visualization;
- management of the existing Interbus network interfacing;
- automatic detection of the coils working progress;
- management of the friction-braking for the stack transportation slow carpet;
- management of the belts emptying;
- synchronized control of the sheets rejecter units, and management function for:
 - operator manual recall
 - joints or defects detection, and scrap width setting – before and after the cut –



The existing Micromatik AC motors are driven by the SAEL ONE Drive Inverters

- impulsive suction box synchronizing control and automatic compensation based on sizing, speed, synchronization cell position and mechanical wasting times;
- management of the counting and sheets pre-selection for the stack changing and paper stack management;
- management of the pallet automatic changing sequences, at the pre-set sheets counting;
- management of the blowers;
- supervision implementation on PC with standard operating system;
- coils movement AC motors management, rectifiers, hydraulic pumps and blowers, pallets;
- pneumatic and hydraulic valves;
- Siemens touch-screen panel supervisor system

“IWSA” ASSISTANCE

IWSA (Internet SAEL World Assistance) is an integrated tool that ensures and allows a quick “on-line”

assistance in case of software faults and/or system upgrading, modifications with a direct access to the system: PLC; Supervisor, Drives. IWSA was used during the commissioning phase and linked to the system via Ethernet – to a plant hoist or other devices.

THE JOB AT THE PLANT

The supply was a “turn-a-key” package including the electrical cabinets and their wirings, the re-using of the existing cabinets and their re-wirings. Since the first start-up phases, the cutting quality, as well as the speed increase, was proving the short time R.O.I (return of investment). Along the engineering we encountered some issues that typically are managed between the mechanical machine builder and the electronic technician. Face to an existing and working Jagemberg machine, and thanks to its long experience, SAEL made an accurate analysis of the system and the regulations. In the

REMOTE

same time, we've got the opportunity to study, and solve, specific issues of the operators – cause of many scraps - . All the motors regulation, the control algorithms, and the machine sequences have been implemented into an S7 Siemens PLC together with a MP277-10 Siemens Hmi. The automaton is managed by a S7 CPU, with profibus network, directly linked to the Sael Drives and the remote I/O of the systems. The inverter used are the latest "INTELLIGENT DRIVE" series, equipped by CANBUS network communication with fast data transmission to the Pull, Knife, Belts and Rolls. This net is also used to manage the synchronization between the Pull and the Knife motors, allowing a perfect cut and a fast change. Our drives – with common platform either AC or DC – have been strategic for this specific job. Each inverter, linked to the PLC profibus net, expands the multitude of the PLC I/O – acting as a remote I/O - provides back and forth information too.

Our drives are unique. Actually, they are equipped by a common Board: either for AC or DC. It implies savings on spare parts for the customers.

To fulfil the market needs our engineers developed this unique series of drives.

Jus analyzing the structure of a paper mill drive, or a calendar or an unwinder made by the most known competitors, shows up an undeniable objective response: using the standard market drives, the high performances required cannot be achieved at the best. Using standard stand-alone drives, there are not system integrators who can reach the results of ABB or SIEMENS.

That's why we, at SAEL, developed our own drives: made for paper mill. Today our system, based on a "sectional Control" full digital drive, is the sole and first "Cascade MASTER elaborator less". The intelligence is exclusively incorporated into the AC or DC drive. Our solution is largely supported by the customers because fulfils any need for the modern paper mill and its application.

