

# THREE PAPERS... ONE WINDER



***Tecno Paper from Lucca, - a flexible paper mill machine manufacturer - built a “multifunctional Winder” who manages either crepe or smooth papers on multiple sizes. As Tecno Paper partner, SAEL made the automation process and the drive: an high performing twin regulation system based on “DCS Scalink platform” and “ONE Drive platform”, awarded as “multifunctional innovative system”.***

## SAEL s.r.l. Tissue Winders

by: **Andrighetti - SAEL group**

**To** overcome the difficult economic scenario over the last years, the paper winders had to high perform offering flexibility as well. A clear sign to the market comes from Tecno Paper with a focused and innovative winder project. Based in Lucca Tecno Paper is a small company

full of technology skills fulfilling the paper mill needs: the management is always looking at service activities as much as revampings for the paper industry. Thanks to the winders export market needs an innovative “multifunctional” concept has been developed along the way: One Winder

who manages different papers - crepe to smooth - on multiple sizes - from 2700 mm up to 4400 mm -, fully automated. A great benefit to the customer who owns one machine instead of two! **Shorter R.O.I. and a multiple paper production who means flexibility at all.**



**The running machine at the Bulgarian Paper Mill**

## “PLATFORM ONE”

**The new LONG LIFE inverter series by SAEL - fit for Paper Mill**



The new Winder manages Tissue papers from 12 to 40 gr/m<sup>2</sup>; machine glazed papers from 14 to 40 gr/m<sup>2</sup> basis weight; and thin packing papers up to 75 gr/m<sup>2</sup>. Moreover it handles different coils coming from many paper machines with different sizes from 2700 mm up to 4400 mm. A fully automated machine driven by a PC who moves the unwinders and the suction trims system, as much as the broad parameters management - Spindles, Relieving, etc.;

As far as SAEL is concerned the commitment was the typical tissue paper winding action combined with all the winding settings for smooth paper - managing all the possible implications of that -.

Heaving the PLATFORM ONE - who encloses drive and dc - SAEL built an extremely flexible system who runs the AC motors and a powerful DCS useful to program and control every single coil. Following a bunch of details of the Bulgarian and Indonesian projects:

The base of the concept is the high accuracy as much as the flexible

settings of the “Platform ONE” AC Drives .

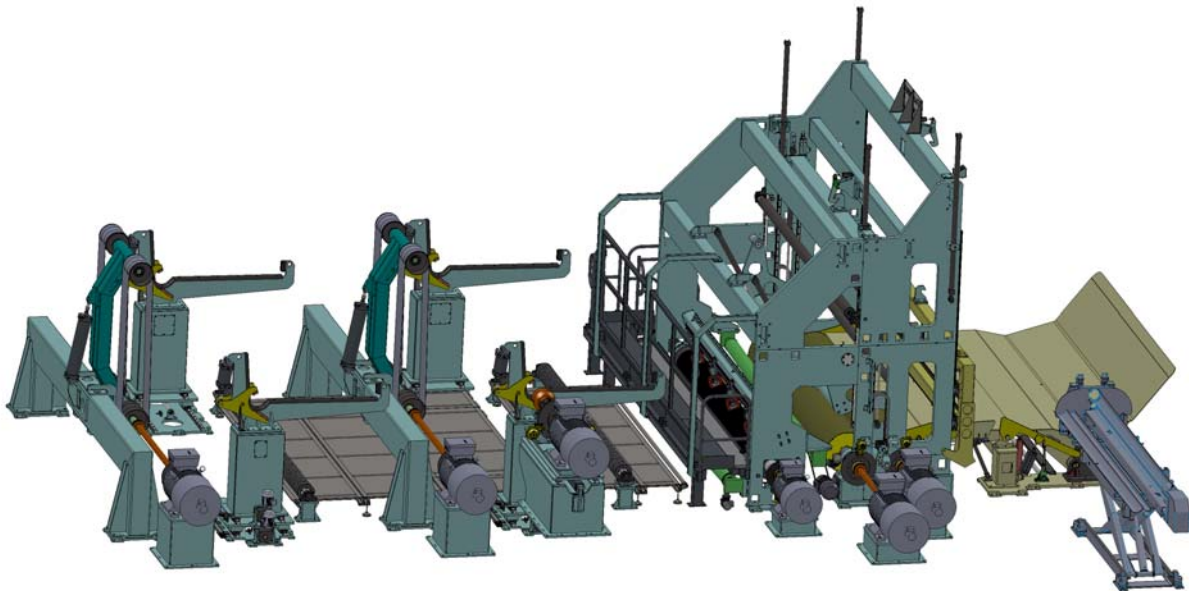
The command drive architecture only made by drives for the motors and a PLC who manages all the sensors and electro valves binary sequences, emphasises the high performance of our drives.

The TISSUE configuration is made on electrical link - all the cascade refs., the sliding, the electrical cascade - as much as the SMOOTH PAPER with servo diameter indirect pull, the load distribution for the main drums, tailstocks, rider roll - are managed without external system. All made within our Drives.

The SAEL WINDER system - which is the DCS plus the ONE DRIVE - allows high flexibility and a powerful control storing every variable for ever.

### GENERAL Description

The “WINDER SAEL” supervisor system, especially made for Tissue Winders, is a long way project experienced application by application, day by day.



**The 3D machine engineering has generated an accurate and complete sensors, electro valves, motor list linked to the SAEL system facilitating all the connections to the electrical cabinets. SIMI - the local SAEL service point based in Lucca - made all the wiring offering a complete solution to the customer.**



**The Winder building phases and the tests at SIMI in Lunata - LU.**

At the beginning the system got inspired by the "JagMatic" model - some basic functions are still in today - and was progressively updated by new technology solutions as much as the next software generation. The system has a PC with Windows 7 inside. The operator interacts via video interface -

22" Full HD Wide Screen -keyboard and mouse - or track-ball - or via Touch Screen panel as optional. The system can acquire data from multiple interfaces.

The supervisor develop and running program is named Scalink and involves a modular flexible structure fully

integrated with the operative system - who allows the full capabilities. All the pages made, all the customized functions, the protocol and graphic interface implementations have been developed by SAEL getting a "tailor made" MMI-SCADA system.

## **SOFTWARE ARCHITECTURE**

The system is based on a variety of data base dynamically accessed - in a real time - by the graphical interface. This is a typical module built in. The module choice for the supervisor composition is based on any specific customer need or line. This represents a common platform for all the lines jumping from the simple solutions - "low cost" likely - to an "high performing" up to the complex and most complete DCS system.

The single resources are modulated for each line which can be updated later on.

The benefit is to get a custom made solution at the best cost effect.



**From the 3D engineering to the assembly... And here is the complete machine ready for shipping. Main Control Desk with DCS WINDER SAEL system inside**

Moreover the supervisor displays multiple diagrams showing all the line zones - instead of the original mimic boards and/or synoptic controls -. The pages are structured by functions having a master page with a cascade multiple detail. Within the most complete configuration the graphic interface performs:

- Main machine synoptic (pic. 1)
- Page/Pages for the manual drive display (pic. 2)
- Page/Pages for the manual unwinder drives (pic. 3)
- Page/Pages for menu (opt - pic. 4)
- Page/Pages for real trends and coil done (opt - pic. 5)
- Page/Pages for historical trends (opt - pic. 6)
- Maintenance Page/Pages (pic. 7-8-9-10)
- Page/Pages for curves visualization (pic. 11-12)
- Page/Pages for coil curve generation (pic. 12)
- Report management Page/Pages (pic. 13)
- Page for the present and historical alarms (pic. 14)
- Page for alarms system management (pic. 15)
- Page for safety alarms management (opt - pic. 16)

**Hereafter are the images and a short description for each screenshot mentioned above**

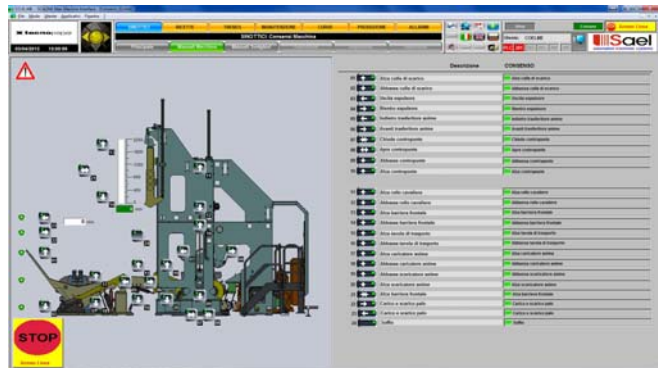
**Pic.1) MAIN MACHINE SYNOPTIC**

The main synoptic architecture - BMP drawing by the customer - displays all the AC/DC motors used. The values are beside each motor displayed. All the set point are displayed too - any changing with password are possible. Moreover the device shows all the speeds and currents from the motors: the speed line, the winder pull, the real coil diameter - winder / unwinder (see the pic. above)



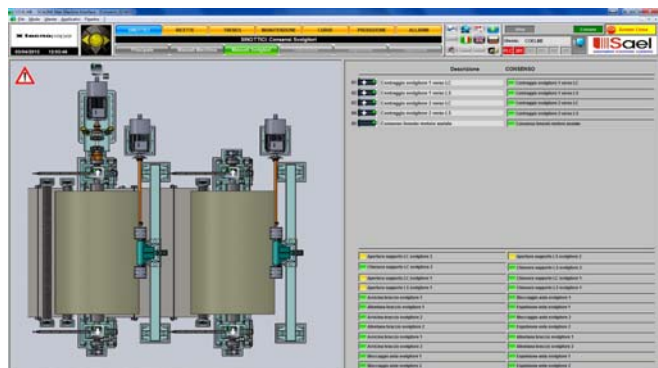
**Pic.2) MANUAL DRIVE DISPLAY**

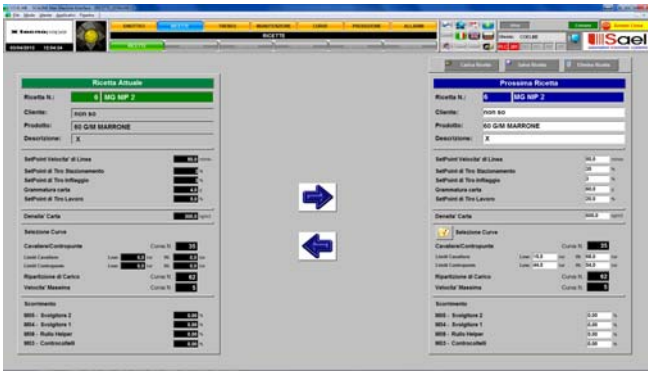
The synoptic display pages for manual drive operations allow to manage the machine on manual mode: all the drives are numbered in progression. Any enable possible by pressing icons on right and left of the screen.



**Pic.3) MANUAL UNWINDER DRIVES**

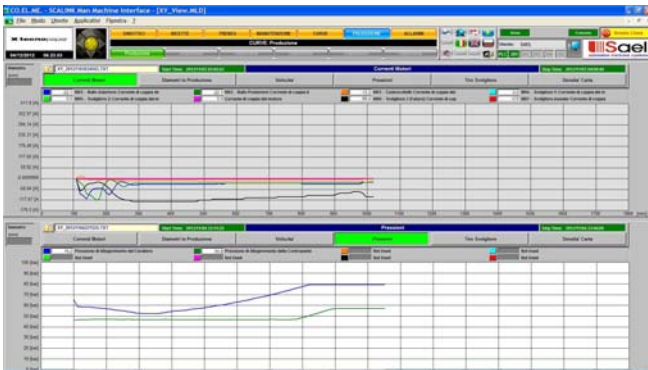
The unwinder manual drive synoptic pages allow to drive on manual mode. The management is made as mentioned above.





**Pic.4) MENU GENERATION(OPT)**

Get a former operation by a simple click only. This page encloses all the parameters, set points and curves. This is called: "Menu". It is possible to store the menu on hard disc as much as load and cancel. there are two sections in the page: one for local PC - as "NEXT MENU" - and one with PLC - named "PRESENT MENU".

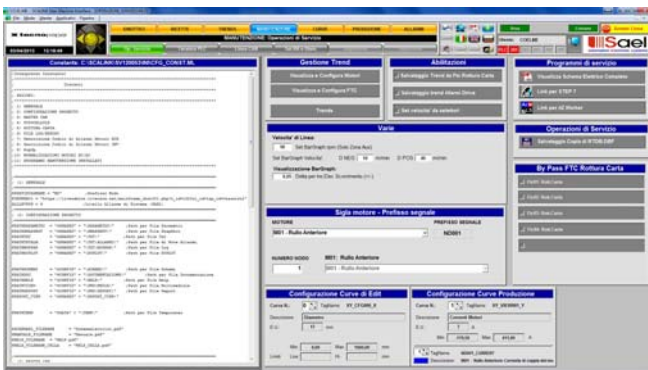


**Pic.5) REAL TRENDS AND COIL DONE**

The page displays the trends. The curves with all the stored values. All the motors speed are showed. Any added or deleted curve is allowed.

**HISTORICAL TRENDS**

Here are the historical trends of three different motors or two motors and one load cell - available on the central trend only - The choice - motors or motors + load cell - is made by a catalogue.



**Fig.7) SERVICE OPERATIONS**

For expert personnel only. All the supervisor settings are managed in this section. As long as some of the actions are "one shot" not all the modifications are enabled - to get them done the supervisor restart is necessary -.

Descrizione	PLC	Da	Fin	Descrizione	PLC	Da	Fin
Velocità di riferimento	4.2	4.2		Velocità di riferimento	4.2	4.2	
Velocità di riferimento	6.0	6.0		Velocità di riferimento	6.0	6.0	
Velocità di riferimento	8.0	8.0		Velocità di riferimento	8.0	8.0	
Velocità di riferimento	10.0	10.0		Velocità di riferimento	10.0	10.0	
Velocità di riferimento	12.0	12.0		Velocità di riferimento	12.0	12.0	
Velocità di riferimento	15.0	15.0		Velocità di riferimento	15.0	15.0	
Velocità di riferimento	20.0	20.0		Velocità di riferimento	20.0	20.0	
Velocità di riferimento	30.0	30.0		Velocità di riferimento	30.0	30.0	
Velocità di riferimento	40.0	40.0		Velocità di riferimento	40.0	40.0	
Velocità di riferimento	50.0	50.0		Velocità di riferimento	50.0	50.0	
Velocità di riferimento	60.0	60.0		Velocità di riferimento	60.0	60.0	
Velocità di riferimento	70.0	70.0		Velocità di riferimento	70.0	70.0	
Velocità di riferimento	80.0	80.0		Velocità di riferimento	80.0	80.0	
Velocità di riferimento	90.0	90.0		Velocità di riferimento	90.0	90.0	
Velocità di riferimento	100.0	100.0		Velocità di riferimento	100.0	100.0	
Velocità di riferimento	120.0	120.0		Velocità di riferimento	120.0	120.0	
Velocità di riferimento	150.0	150.0		Velocità di riferimento	150.0	150.0	
Velocità di riferimento	200.0	200.0		Velocità di riferimento	200.0	200.0	
Velocità di riferimento	300.0	300.0		Velocità di riferimento	300.0	300.0	
Velocità di riferimento	400.0	400.0		Velocità di riferimento	400.0	400.0	
Velocità di riferimento	500.0	500.0		Velocità di riferimento	500.0	500.0	
Velocità di riferimento	600.0	600.0		Velocità di riferimento	600.0	600.0	
Velocità di riferimento	700.0	700.0		Velocità di riferimento	700.0	700.0	
Velocità di riferimento	800.0	800.0		Velocità di riferimento	800.0	800.0	
Velocità di riferimento	900.0	900.0		Velocità di riferimento	900.0	900.0	
Velocità di riferimento	1000.0	1000.0		Velocità di riferimento	1000.0	1000.0	

**Pic.8) PARAMETERS AND PLC SETTINGS**

For expert personnel only. All the PLC settings are managed in this section. Here are the data exchanging between PLC and Supervisor.

Linea CAN	Stato	Descrizione
Linea 1	ON	Linea 1
Linea 2	ON	Linea 2
Linea 3	ON	Linea 3
Linea 4	ON	Linea 4
Linea 5	ON	Linea 5
Linea 6	ON	Linea 6
Linea 7	ON	Linea 7
Linea 8	ON	Linea 8
Linea 9	ON	Linea 9
Linea 10	ON	Linea 10
Linea 11	ON	Linea 11
Linea 12	ON	Linea 12
Linea 13	ON	Linea 13
Linea 14	ON	Linea 14
Linea 15	ON	Linea 15
Linea 16	ON	Linea 16
Linea 17	ON	Linea 17
Linea 18	ON	Linea 18
Linea 19	ON	Linea 19
Linea 20	ON	Linea 20
Linea 21	ON	Linea 21
Linea 22	ON	Linea 22
Linea 23	ON	Linea 23
Linea 24	ON	Linea 24
Linea 25	ON	Linea 25
Linea 26	ON	Linea 26
Linea 27	ON	Linea 27
Linea 28	ON	Linea 28
Linea 29	ON	Linea 29
Linea 30	ON	Linea 30
Linea 31	ON	Linea 31
Linea 32	ON	Linea 32

**Pic.9) CANBUS COMMUNICATION LINES**

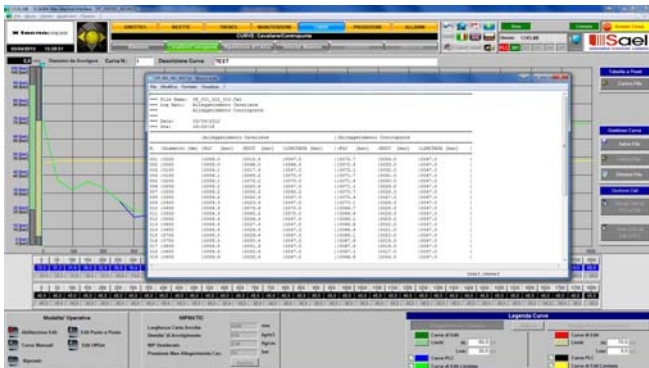
In this page the CAN-BUS communication line analysis can be done: speed ref, data exchange. Every CAN line has a maximum of 32 nodes for 5 lines. "ON" displays the ONLINE or OFFLINE node status. Any excluded node can't be ONLINE.



**Pic.10) RR SETTING AND DIAMETER**

For expert personnel only.

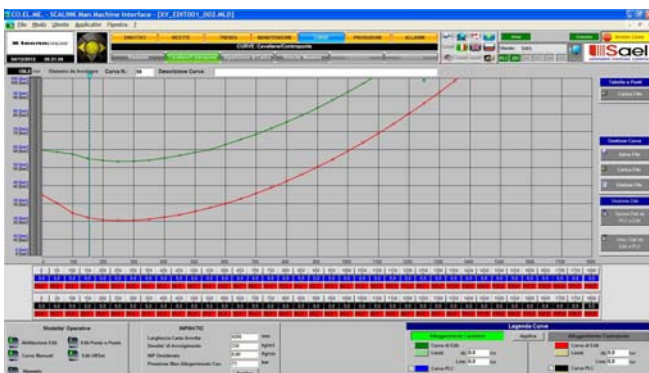
The gear motors and the diameter drums can be displayed in this section.



**Pic.11) CURVES VISUALIZATION**

It is possible to follow up all the working process: all the PLC set point curves are available. These are four and described hereafter:

Ride roll and Tailstock lighting; Load distribution; Max speed. In the working process a vertical bar moves along the window linked to the diameter increase. To the upper left angle there are the present values and the settled once.

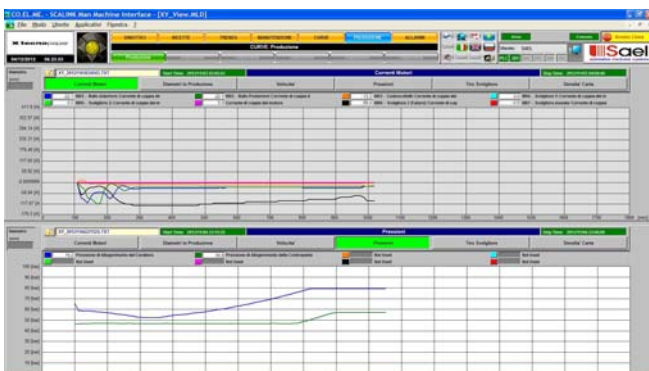


**Pic.12) TAILSTOCK AND RIDE ROLL CURVES**

Use this section for curve and diameter function settings.

For each curve there are three tracks:

To the high there the curve nr. and its description eventually, To the low there are the different modes.



**Pic.13) PRODUCTION REPORT**

Two production reports in the same time are displayed - within the automatically archived process -.

To recall the production record choice the selected by "Open"!.

The report files are archived on measurement family base: The selection allows to choice the curves within the mentioned below:

Motors current; Production diameters; Speed; Pressure cylinders

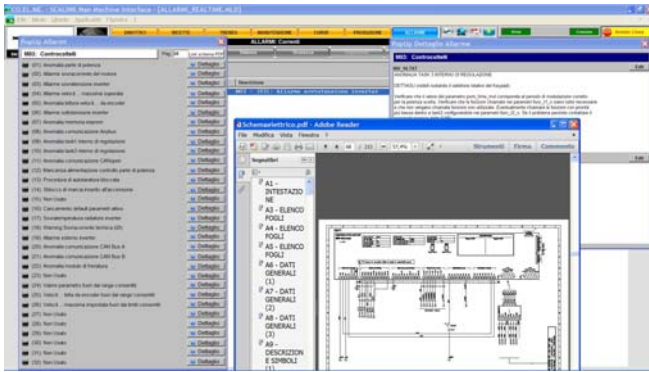
Unwinder, Paper consistency

It is possible to get a cursor - by vertical black line -: when the cursor touches the curve a value to the right is displayed.

**Pic.14) PRESENT AND HISTORICAL ALARMS**

The "present alarms" and the "historical alarms" pages are: HEAD - general drive -; ACKNOWLEDGMENT and FILTERS; ALARM VISUALIZATION

The Present Alarms are listed below:



▲ Active alarm not acknowledged yet    ▲ Active alarm acknowledged    ▲ Alarm aborted and not acknowledged yet  
 In case of event occurred out of the range mentioned above, it is automatically deleted: So that an active alarm is acknowledged and deleted whenever end. The historical alarms are listed in the “daily alarm list”. At the beginning it is possible to set the maximum length per day. The file stores all the alarms and the acknowledgements. To get an alarm popup, double click on an alarm row - described hereafter -. It enable the following functions:

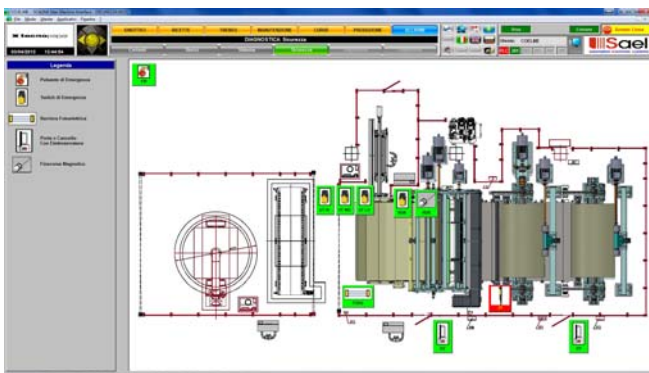
- ▲ Notes for alarm comments
- ▲ Electrical diagram link
- ▲ Movie link

Historical alarms: It is a file who encloses all the events occurred in a day. It is possible to set the nr. of days and the maximum length. The file stores all the alarms and the acknowledgements.



**Fig.15) SYSTEM ALARMS**

This is a visual page only. It shows all the safety devices belong to the PLC and the PC.



**Fig.16) SAFETY ALARMS**

This is a visual page only. It shows the safety devices state to the machine operator.

To the left there is a catalogue with all the symbols used. Note: All the pages described above have common functions available to the upper side. These are:

1. Data and Time.
2. Logos and Brands.
3. Navigator - arrows for supervisor.
4. Navigator - video buttons for supervisor.
5. Page title - for each page -.
6. Common function buttons - “Windows” likely: Print, WEB access for IWSA; Help; Pdf for manual/diagrams; Language exchange; Single user login; etc. -
7. Present user - multi level management and system administrator
8. Diagnosis and Alarm area - real time and historical alarms; operator comments; Helper Popups standard and custom -.
9. Dynamic Popup for help message display; alarms; motors data;

maintenance tables; etc. - These are Popup windows, automatic and not automatic, linkable each others and settable -.

**Other Functions Available -**

In case of MPI/ETH and S7 licensed, on line PLC modifications are possible. In this case the PC supervisor is a “work station” to master the PLC. In a standard base the system has a LAN and/or a WEB access point with Hardware and Software included. This allows any control as much as PLC program modification. Same case for the Supervisor, the Drives, the Master CAN. Everything can be managed via Web.

A Real time SAEL technical support: for diagnosis or adjustments. Problem solutions eventually.



**Control Desk of winder with our innovative DCS “WINDER SAEL”**