As soon as we got the third, we also got the the fourth PM drive liquid cooled in Sonoco Greece.

After having equipped the inverters with film capacitors, and the "ONE" main control board, from 2007, now it's time for the liquid cooled drives. The main advantages are: smallest spaces; no more fans mounted into the drives; no air-conditioned areas; no dust and humidity on acid environment. Higher efficiency and longer life of the electrical components.
At Sael we're used to say: "*from today on, place the cabinets wherever you want, and start to cash back every year*".

SAEL srl. FORNACI papermill

by: **Paolo Andrighetti, BU paper, SAEL**

Cartiera Fornaci rebuilt it's PM1 machine, using the liquid cooled drives engineered and produced by SAEL. Actually, it is the third application in Europe, with liquid cooling, for Paper Mill. The most innovative solution by far: almost 40 years of experience, which perfectly fits in Paper Mill application providing high efficiency, spaces saving, as well as cost effectiveness.

Born in Fagnano Olona – Varese - on 1960, **Cartiera Fornaci** has been producing high quality paper for over 50 years, investing on technical and innovative solutions in the respect of the environment. Since the beginning, the respect of the environment is a must for the ownership! Its water purification and recycling plant, together with the storage and disposal of the production waste, guarantee a very low social impact in the geographic area. The way to market of Cartiera Fornaci, is the typical Italian family approach where tradition, passion and commitment, drives the business. The Paper Mill produces recycled cardboard within the following variations: Grey, White/Gray and White/White. Upon demand they also offer other special cardboard like Tubes, Angular, Hives Avana Color, too. The range and the weight are huge: from 350 to 1000 gr/m2.

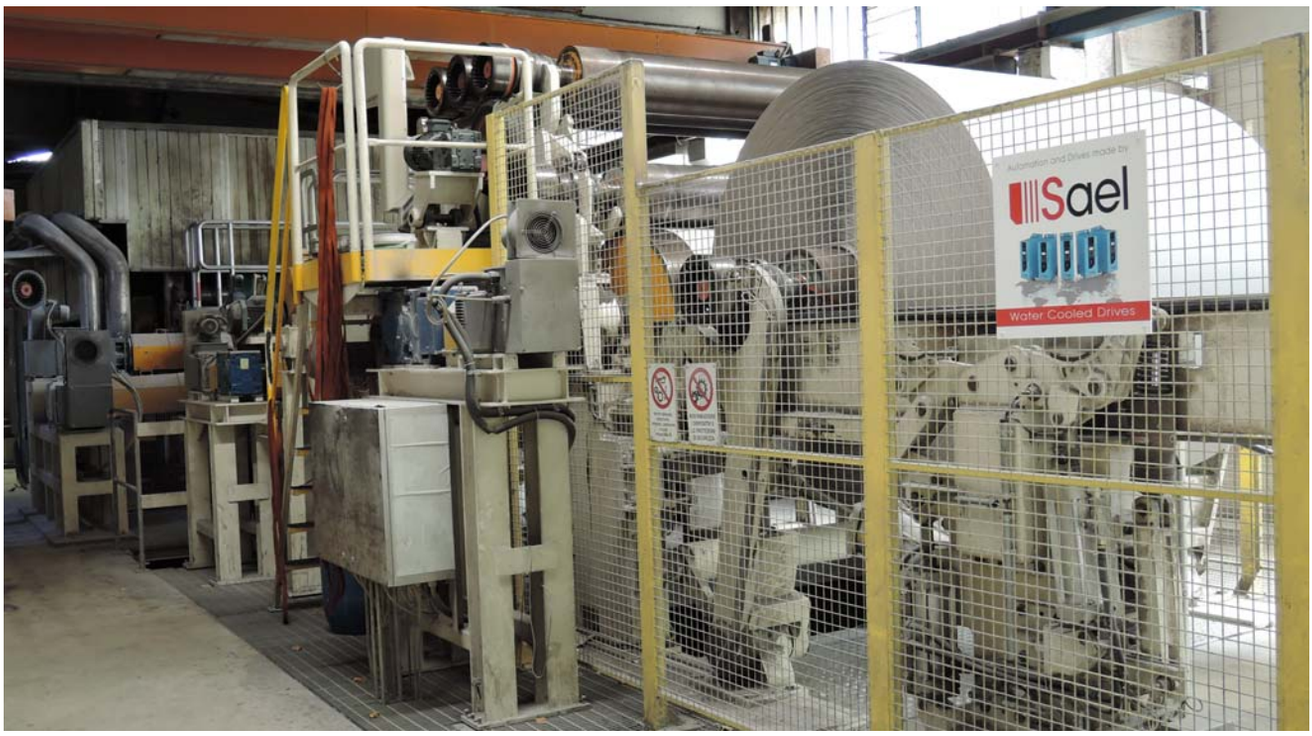
The Paper Mill experts are always available for any need.

SAEL AND THE INNOVATION; THE TECHNOLOGICAL GAP: PLATFORM ONE WITH LIQUID COOLING SYSTEM

The liquid cooled drives, practically without tangential fans (one each inverter), allowed to remove all the ventilation normally mounted on every door of the electrical cabinet. The new electrical cabinets, where our panels are installed, today become normal rooms, since the system becomes independently cooled.

The double-sided electrical panels, where the inverters are mounted, have closed air recirculation ensuring no contamination of dust, humidity and air acidity; they preserve over time, and in a perfect manner, electronic, electromechanical and other various components. The long-time experience acquired, supported by the good results achieved, allows important energy savings every year: Zero costs in term of air-conditioners maintenance, filters, fan ventilators as much as recyclable water for the stock preparation; for the winter season, especially. For this reason, and the system achievements, Cartiera Fornaci started the third liquid cooled Machine in Europe.

The SAEL Team during the start-up week in the Fornaci paper mill



CALANDER AND POPE DRY AREA, ALL THE AC MOTORS OF THE CONTROL HAVE BEEN RE-USED

Thanks to the Teamworking – SAEL and Cartiera Fornaci – we started the Machine in 6 days using the existing motors. The job involved 23AC motors (up to 1Mw installed) controlled by the SAEL DCS in drive and its *Platform One*.

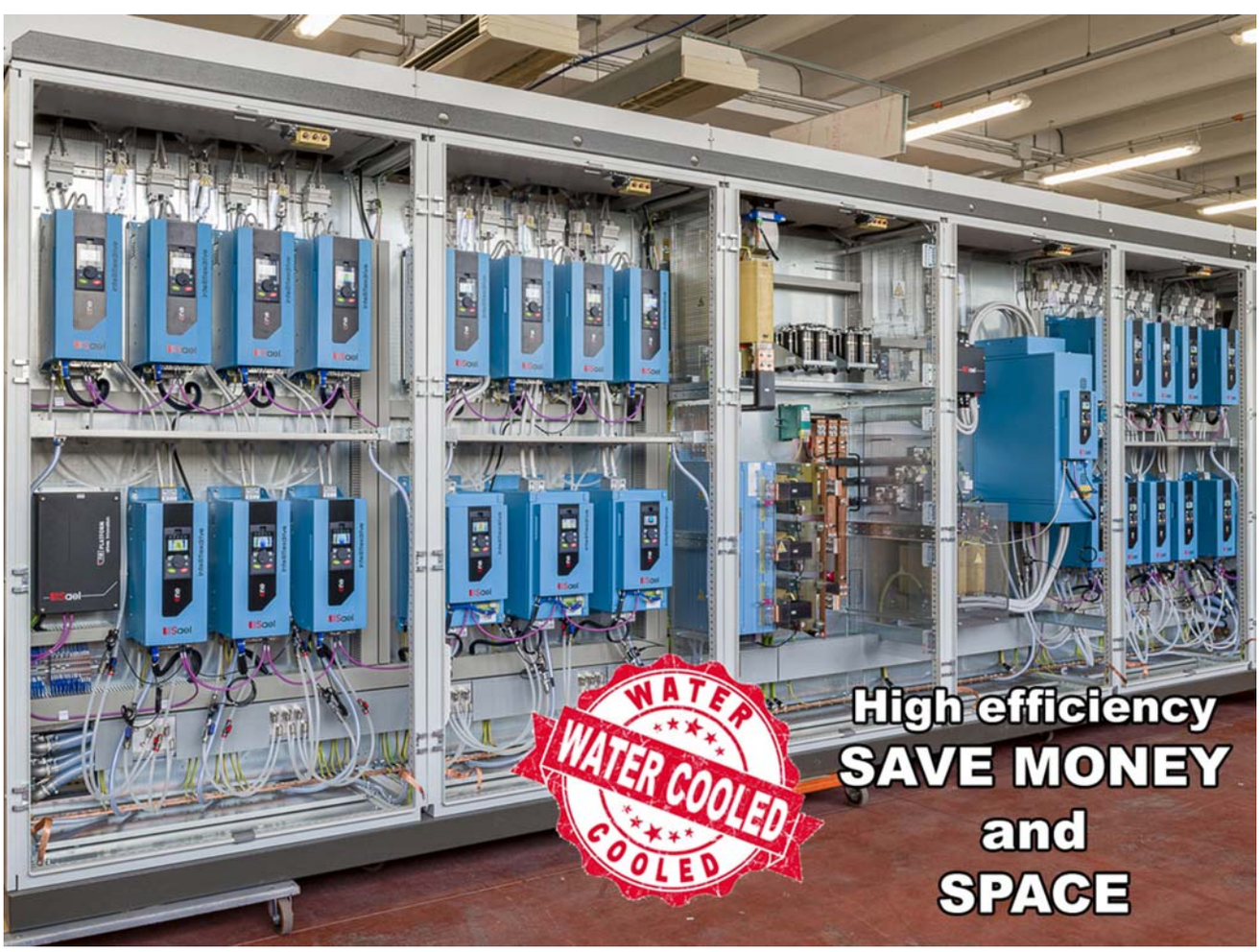
THE PM1 JOB: INSIGHTS

Due to the lack of efficiency and technical issues, the PM1 originally equipped by inverters of an international group 12 years ago, has been rebuilt. The Paper Mill maintenance team was unable to get spare parts and the technical issues progressively raised up. Doctor Cattaneo and Edoardo Caprioli decided to move forward, looking for a problem-solving Company for those issues – SAEL, actually –

Electric control panel with double front wired inverters and water cooling and ONE CARD

Detail of the WATER COOLING series inverters, SAEL's exclusive "PLATFORM ONE" series

After rebuilding the electrical cabinets and the control desks, the global efficiency increased almost by 3%, just in one month! The technical department, together with SAEL, developed an upgrading plan for this big PM1 machine. A mission with two main targets: higher efficiency and safety strictly compliance to the rules. The old electrical cabinets have been replaced. For the driving pulpits, they adopted the SAEL DOP-Touch 7inch digital operator panel; and



Wet area and shoe press of continuous machine, FORNACI paper mill

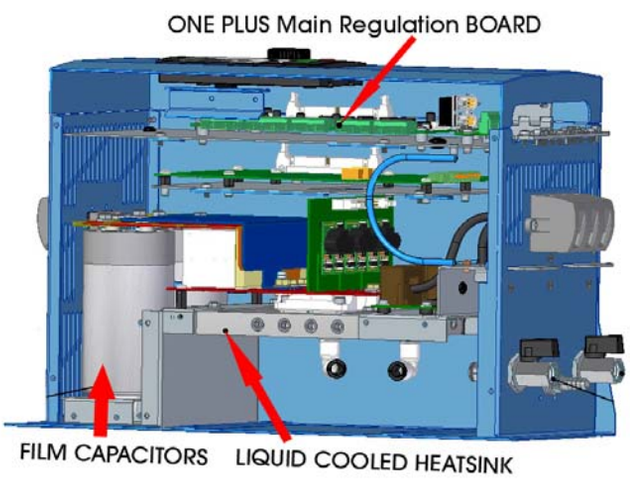
From the director in the POPE area: -considerable increase in efficiency and runnability-

the two DCS stations – with active redundancy – have been implemented using the SAEL "*DCS in Drive*" for the inverters control. The core of the "*Platform One Drive"*architecture is the powerful microcontroller "*DCS in DRIVE*" – version 2021 – that stores and visualizes any operation, machine status and variable, as a trend. Those functions are managed in the drive itself. It is a real engineering power station that drives the machine and controls/sets any parameter of the single drive as well as existing hardware and PLC within the network. Since the beginning the customer got the footprint of this incredible system that records every single bit made by the operators.

Edoardo Caprioli - technical director – said: "*The new drive control – Water ONE integrated into the DCS in Drive by SAEL – improved the machine efficiency, significantly. The fine tuning of the Sael operators allowed the mechanical lacks compensation, and the system perfectly copies the paper production fitting with the existing machine parts. The excellent job done, in terms of preparation and execution, allowed us to save 2 days vs. the plan. The Pope insertion worked perfectly. The DCS in Drive permits to store and compare the values either on site or in a remote way by the IWSA –*

PLATFORM ONE – "WATER ONE" Drives equipped with the ONE Regulation Board (One board fits all the applications: DC-AC and REEBORN) and Long Life Film Capacitors.

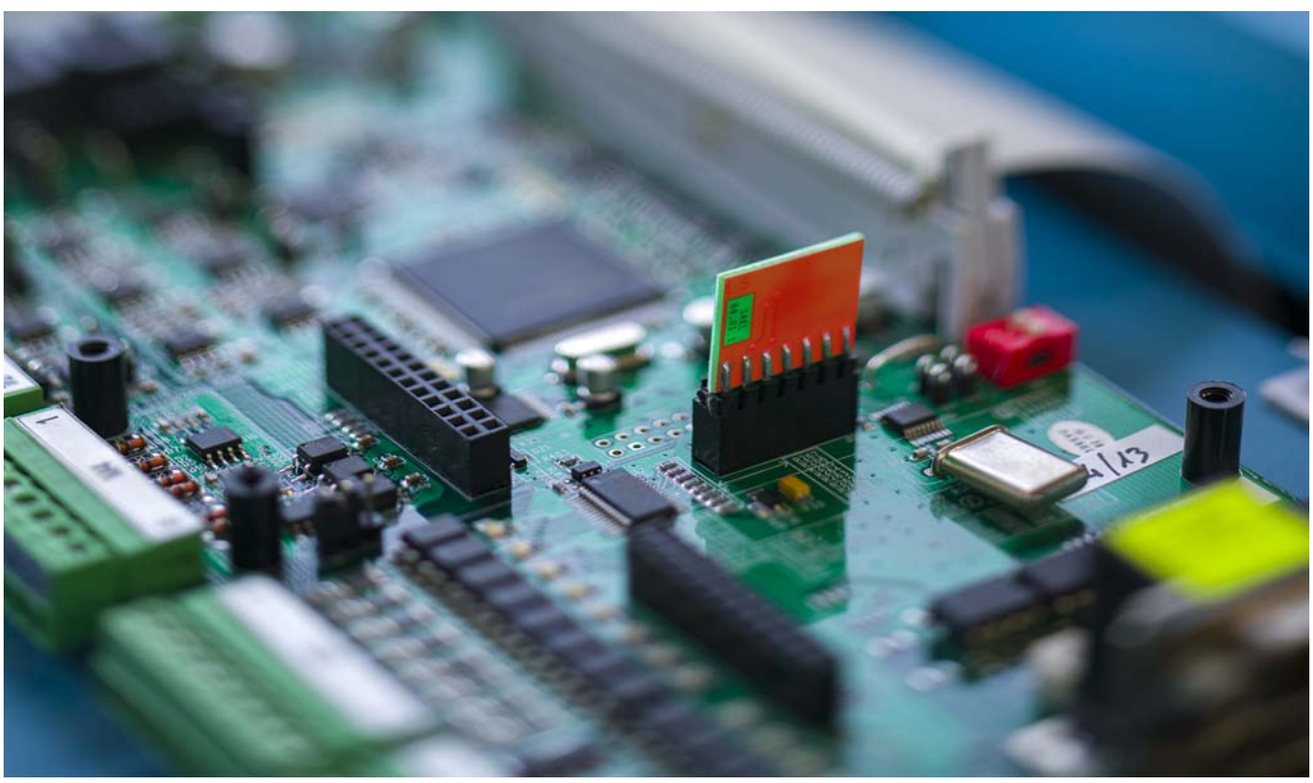
Internet World Sael Assistance. Let me thank the ownership of the Company who supported this project; the Sael Team for its competence and flexibility and, last but not least, the Paper Mill operators who worked hard for this important upgrade.



Liquid-Cooling Drive WATER ONE Drive Series – Details

ALL OUR SAEL DRIVES HAVE BEEN EQUIPPED WITH FILM CAPACITORS SINCE 2007.

BELOW: the extractable memory that equips each of our electronic boards, allows quick replacements without any programming.



SAEL BOX:

Paper Mill specializations:

Born in 1987, Sael offers Integrated Systems and Process Controls for Industrial Automation. Within our mission, **Customers First.**

SAEL was awarded the title of tailor maker for any automation system. SAEL is now a leader in the Paper Industry.

The big technical imprinting allows us to offer custom solutions: from Heavy Duty up to the General Purpose. For the Paper Mill Industry, especially, SAEL offers highly sophisticated and innovative technical solutions.

Hardware and Software custom solutions for any customer needs. Beside the complete new equipment production, there is a focused Team who works on re-engineering – most of the time saving a lot of existing components like the original power section or electro mechanic parts and so on. The main application they are working on are: Sectional Drives with DC, AC and Mixed Technology; Motors implementations; In-line / Off-line Coating machines; Analogical to Digital cascades conversion; Stock preparation by PLC or SAEL technologies; Rewinders and Slitters with cutting units and frame position; Winders and Unwinders; DCS and QCS controls, close our experience in paper Industry

The "PLATFORM ONE DRIVE" Inverter is made for Paper Mill Industry. They are the most innovative solution in the market. Their mission is the long life, and easy to be repaired; flexible and easy to drive. All our drives are equipped by the ONE Card – A Single board fits all the drives: DC, AC, Brushless and Reborn -, Film capacitors for a long life inverter.