Responding to technology challenges in mill equipment manufacture

by Roger Gilbert, Milling & Grain

Ocrim Spa has two factories in Cremona, Italy. One is in the centre of town and is the historic home of this milling equipment manufacturer, and a new factory complex outside the town, on the banks of the local river, where it has four manufacturing spaces connected by a wide corridor and a separate area of dispatch, beside a three-story office block.

This second site – referred to as its Port Factory - is expected to be enlarged further in the coming years and is reflecting the demands being placed on the milling industry's suppliers that it produces more efficiently and quicker with greater return on investment.

The 'Port Factory' is meeting that challenge.

It runs a two-shift system, with the expectation to move to three shifts in the future, to maximise production. It has already adopted a new industry approach, where one highly-qualified staff member operates three machines and takes responsibility for their maintenance.

"The market needs this approach," says Alan Castellucci, Ocrim's new Head of Production, who joined the company from an Italian agricultural machinery manufacturer, producing over 50,000 machines per year.

"We are being obliged to provide these changes to reduce our operational costs. This is my experience. I see this approach in Europe regarding custom production.

He says logistics in his previous industry cannot yet be replicated in the manufacture of milling machinery, but some aspects can be adopted. He also says the milling machinery industry should be looking towards using 3D printers, to provide specific components from metal, for example.

"This is happening in the automotive industries, where car parts are 'printed' as they are needed on the assembly line. Printed, not only in plastics, but also, now, in metals.

"In five years, this technology will be widespread, but it may take longer to reach our industry. Certainly, it will be here within 20 years. Future production will be this way," he adds.

25kg bags are 'shaped', before being passed to the polariser to be placed on the pellet. The palletising can be done mechanically or by using a robotic arm. The choice is the customers; however, the robotic arm saves space and is faster in moving the sacks. All are controlled by PLC

The 'Internet of Things' was developed for consumer use, but we now need an 'Industrial Internet of Things' to optimise sectors of a factory to meet the needs of companies such as Ocrim," he adds.

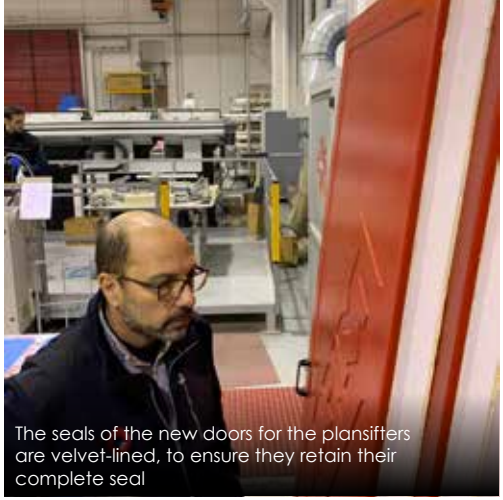
Ocrim employs some 280 people in its two Cremona factories. 154 are in production with 75 of those working at the Port Factory. It's likely that this number will double over the next five years with plans to double the size of its Port complex.

Rolls - Fitting, fluting, coating

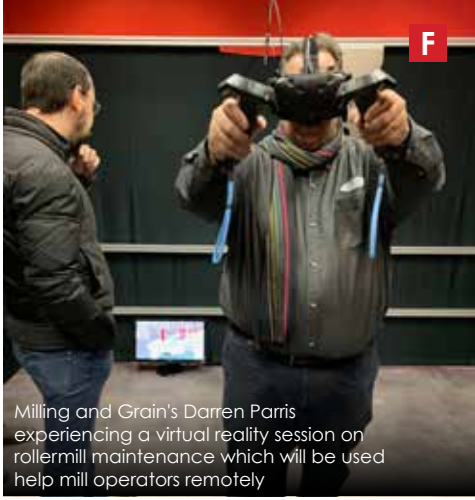
Following a walk-around the machinery floor and seeing the bays of three machines being operated by single workers, Mr Castellucci took us to the roller forming section, where rolls bought in from Balaguer, in Spain, as raw rolls, have their spindles inserted, prior to fluting.

Fitting the spindles in rolls "is the most critical part of the roll production process and to the roller mill," says Mr Castellucci.

"There are exact diameters of the opening recorded on each blank roll," he says, pointing to the number



The seals of the new doors for the plansifters are velvet-lined, to ensure they retain their complete seal



Milling and Grain's Darren Parris experiencing a virtual reality session on rollermill maintenance which will be used help mill operators remotely

Ocrim has made modifications in plansifters, to improve durability and to save space and weight

One employee works two of his three roll fluting machines

written on the end of the roll, "And their spindles have to be inserted precisely, using the same diameters, and within 0.010-0.012mm. We use nitrogen to shrink the metal spindles so that they fit perfectly. This ensures they are not stressed, and will not break up, over the years of use they will go through."

He says the company is moving to QR codes to replace the numbering system, to allow the process to be automated and to keep accurate records of each roll produced.

"It will also allow us to use sensors to record information such as temperature, speed and power used in the total process of manufacturing each roll. Already, operators have been specially trained to work with the chemicals involved in the process of titanium-plating rolls.

"Titanium will give rolls a significantly extended lifetime over expectations from classic rolls. Even existing rolls, when they come in for re-fluting, can be titanium hardened.

"The process takes 40 hours to coat a roll, and 10 rolls can be coated at a time. Currently, we are starting the coating on a Friday evening and removing the rolls from the chemical tanks on the Monday. This is a very special job, and operators can only operate the equipment if they are fully trained and have the necessary card for the machine."

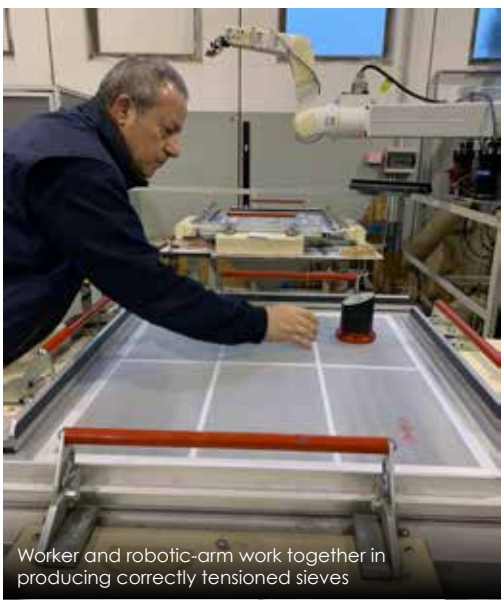
At present, this section of the factory has six fluting machines working automatically - four GFAs and two GFIs – with two operators.

The company also produces some 15-plus fluting machines for sale to customers each year.


A pet food production unit with two 80cm, heavy rolls is ready for shipment


Plansifters are produced in all shapes and sizes


This cut-away section of the new titanium roll shows the depth of hardening each rolls receives


Worker and robotic-arm work together in producing correctly tensioned sieves

Plansifters and sieves

One of the most labour-intensive sections of Ocrim Port factory is the manufacturer of plansifters and their sieves. This is where the company is slowly introducing anti-microbial materials, to help minimise the rise of contamination occurring during the milling process.

Plastics are used to provide sturdy, yet flexible, frames into which aluminium-framed sieves, with either nylon or stainless-steel screens, are fitted. The nylon screen cloth is moistened, before being stretched across the alloy frames, and tensioned to a pre-determined weight, prior to a robotic arm

Milling and Grain tours Ocrim's Port Factory (from left): Alan Castellucci, Gianluca Bolci, Eloisa Martino and Roger Gilbert and Darren Parris from Milling and Grain

applying fast-acting glue with fixer. The completed sieves are then heat-treated before final finishing.

Meanwhile, the sieve bases are heat-welded, and their side panels attached, before having the sieves inserted. They are then stacked, ready to be assembled with the plansifters.

In order to make plansifters more efficient in a mill environment, the company has moved away from steel frames of tradition plansifters, which have up to a third of their interior space taken up with motors and vibration units. Using independent and separate alloy-cabinets, which contain a between 26-to-30 sieves in each, which can be fitted around a single condensed motor/vibrator unit, means an increase in sieving capacity by one-fifth, compared to traditional planshifters.

"This is a relatively new concept and is working well," says Mr Castellucci. "The new plansifters reduce overall weight significantly, reduce transportation costs, arrive in better condition, takes up less floor space for the same amount of throughput, reduces the number of pipes and cabling required and can be assembled on site," he says.

End of the line

Other plans are for greater automation of production, with new machines connected to the cloud, so that operators can run the machines remotely.

In late 2017, Ocrim, following its policy to bring all manufacturing in-house, purchased FBC a company which had been supply it with end-of-line bag sack handling and palletising systems.

"Having this in-house gives us an advantage in how we develop this area of the business in future. We have to think by design, and for the benefit of our customers, if we want to stay competitive in the future," concludes Mr Castellucci, at the end of our visit.