Dryer section doctors' rebuilding: benefits breakdown

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INTRODUCTION:

Dry your pulp up, not your budget: how a doctors' rebuilding in the dryer section may help improve overall performances without draining finances.

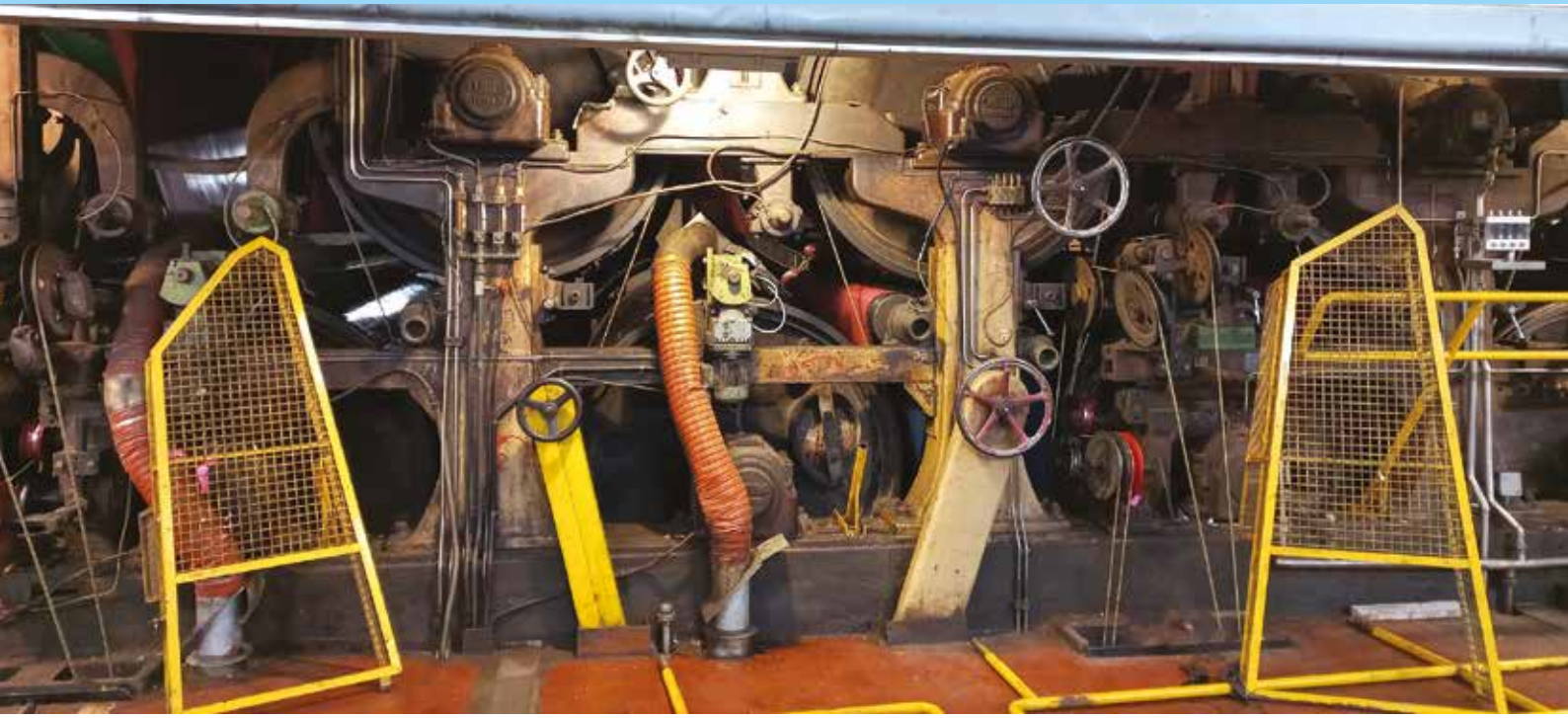


Figure 1: Dryer section (above) Figure 2: OraClean (right).

The dryer section: [1] of a paper machine removes between 1.1 and 1.3 kg of water per kg of paper; removing water at this production stage is significantly more expensive than in any other section of the machine: this easily explains why the dryer section is by far the largest consumer of thermal energy within the paper machine.

Often considered as something like a black box for the complexity of the paper drying process, the drying section is where the magic actually happens: thanks to heat transfer, evaporation, water removal, hoods and hot cylinders, the slurry pulp turns into paper with approx 90/95% of solid content.

That's why the operation of a dryer section must be optimized in terms of both heat transfer and water removal.

The silver lining is that energy efficiency can be improved with quite modest investments: enhancing doctoring may help mills boost cylinder drying capacity and runnability, while achieving better paper quality and higher production efficiency, reducing power consumption as well as operating costs.

When asked to improve the performance of the paper machine in the drying area, Oradoc carefully considers the critical positions in a drying section, i.e. the beginning and the end of the drying section, where doctors in some cases are also employed to detach the paper from the last drying cylinder and directing it either to the pulper tank or to the pope or size press. When poor performances go along with critical wear conditions, a complete doctors' rebuilding is often the wiser choice to ensure optimal cleaning performance even at higher machine speed.

Confronted with a customer request, who was trying to solve some issues in the dryer section, Oradoc proposed its well-known OraClean [2]: the rigid doctoring system to ensure correct and uniform cleaning of the dryer cylinder, with a simple construction that guarantees easy maintenance and easy replacement of the blade. The supply also included doctor back, supports, bearings and electro-mechanical or pneumatic oscillation system, which can be configured according to customer specifications, offering options of manual execution or via pneumatic cylinders.

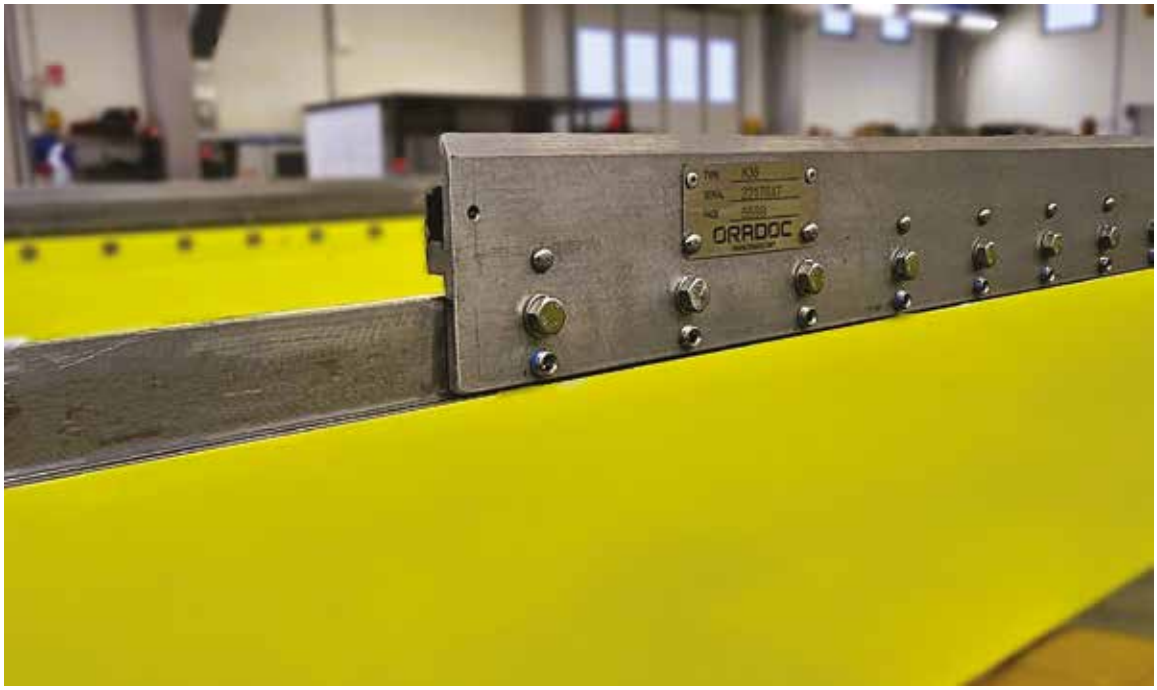


Figure 3: OraClean K35 detail.

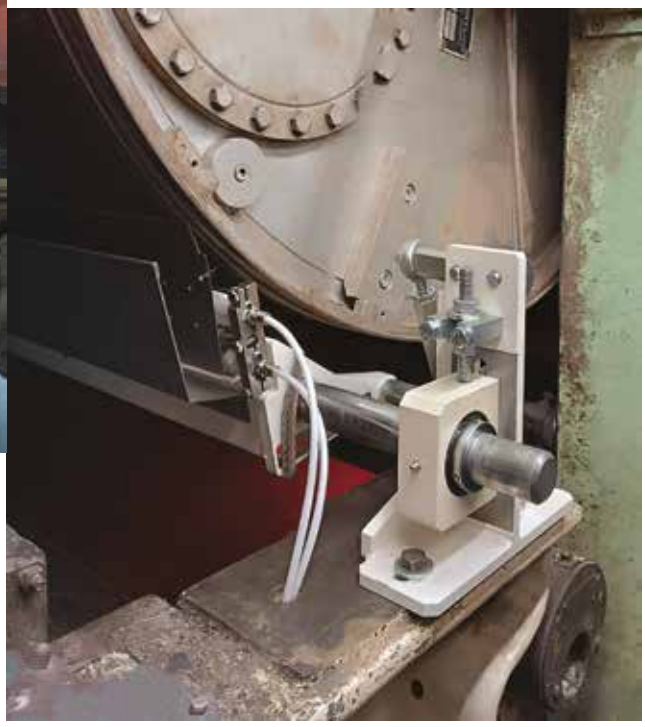
But which characteristics should a performing drying doctor have?

The rigid doctor back of OraClean has a simple geometry with minimal volume, ensuring the right working load on the dryer cylinder to obtain maximum cleanliness, while the electro-mechanical or pneumatic oscillation accounts for greater cleaning efficiency on the cylinder and correct operation even at the highest production speeds [3].

To optimize performance in the first and final position of the drying battery, Oradoc recommends to adopt a complete OraFlex flexible blade holder [4].

In this specific part of the drying section, a flexible solution is the most performing, as the OraFlex blade holder features special high-temperature pressure tubes that ensure an even load along the drying cylinder surface during work and it also allows an easier blade replacement during the rest phase [5].

Figure 4: OraFlex drying section (Left).
Figure 5: OraFlex drying section (Below).



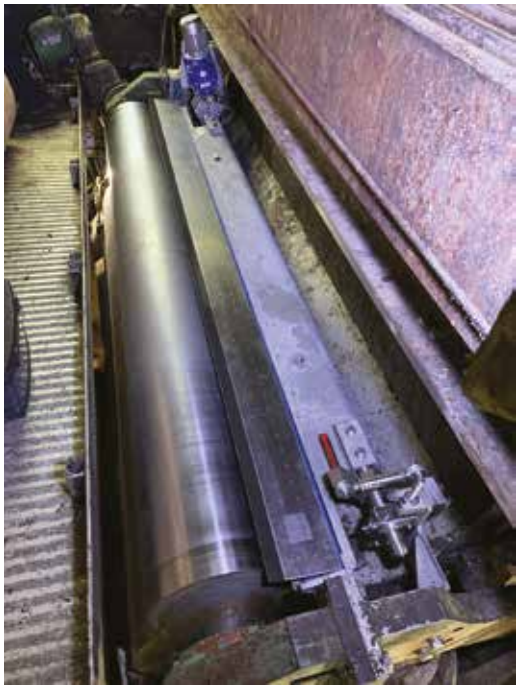


Figure 6: OraFlex press section.

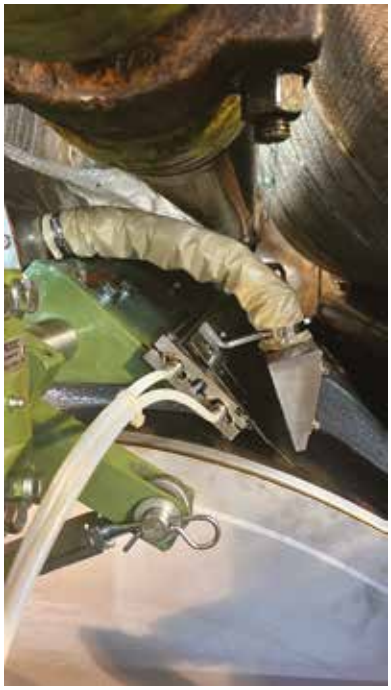


Figure 7: Dust removal system.

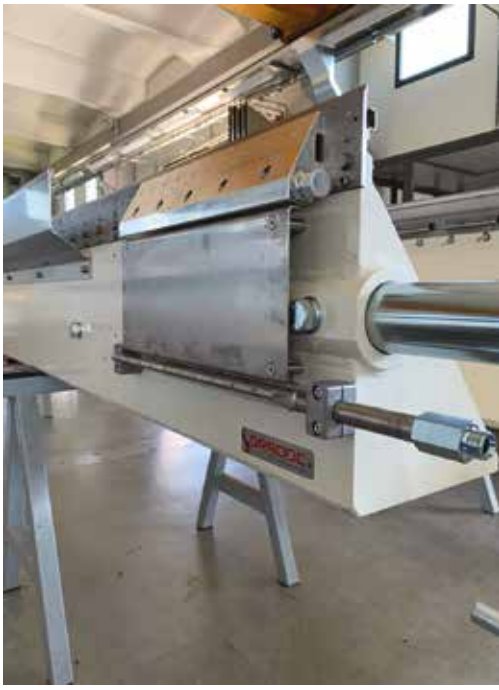


Figure 8: OraThread.

The rigid doctor back, complete with torque arms, maintains the correct working position and safeguards the right stability in case of paper break, while electro-mechanical or pneumatic oscillation helps improve cleaning efficiency on the cylinder and ensures correct operation even at the highest production speeds [6].

Another aspect that is usually underestimated but that could make a great difference in the drying area is a

device that could improve the overall drying process by avoiding paper dust and trims from causing problems: the brand-new version of our dust removal system [7] can be installed both on flexible and rigid blade holders, on all formats.

It consists of a suction box screwed directly on the body of the crossbeam and a suction nozzle on the blade holder, thus concentrating the suction where it is most needed, close to the blade, thanks to an adjustable front part that can be adapted to find the most performing position.

The adoption of the dust removal system does not affect the flexibility of the blade holder in any way and at the same time it guarantees high efficiency as it is specifically conceived to limit air leakages.

It can be equipped with electromechanical or pneumatic oscillating system, which in many paper mills is more appreciated in these positions where there are high temperatures.

Flexible hoses are always preferred for high temperatures as well, but the system can be provided with different hoses available for every type of installation.

Its compact and open structure allows for fewer maintenance issues and fewer product non-compliance issues, as it really guarantees an easier removal of dust and avoid contamination, thus entailing higher product quality.

In addition, all doctors of the drying area can be equipped with the OraThread or OraShoot systems, that allow threading the tail from one roll to another without the need for ropes, the most dangerous elements of paper machines [8] [9].

Air blows can be installed on OraClean rigid doctors or on OraFlex flexible doctors and they both offer significant benefits, including improved machine operator safety and superior efficiency in terms of time and energy saved, making the operation fully automated.

Figure 9: OraThread bottom roll installation.

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