

Efficient Paper Machine Dewatering

The most efficient and economical method of water removal in the press section is nip dewatering. When upgrading the vacuum system may bring the biggest energy savings, optimized dewatering with doctoring and save-alls provides often very good results with a small investment effort, and is an important step in optimizing the efficiency of the paper machine.

Dewatering and doctoring are not only related to energy consumption, but also play a big role in paper machine runnability, efficiency and profitability, as well as paper profiles. The increased dry solids content after the press improves web wet strength, making the web stronger and allowing it to withstand unstable conditions in the drying section. This, in turn, is directly related to dryer section runnability, since good tensile strength reduces web breaks and improves end product quality.

Runtech's tailor-made solution, RunDry significantly improves nip dewatering, energy saving and enables increased dryness after the press section. RunDry nip dewatering is a complete solution with the payback time typically under 1 year. It comprises of save-alls, doctoring including blade holders, carbon fiber doctor beams, double doctors and AirBlades, forming and dryer section cleaning systems as well as EcoFlow dewatering measurement system.



Save-alls result in higher dryness after press, better moisture profiles, less steam consumption and reduced draw from press to dryer. Save-alls are specially designed for AirBlades and EcoFlow dewatering measurement systems. They deliver reliable operation in all press and wire section positions and press section rebuild packages.

Save-alls with integrated doctoring

Well-designed and built save-alls with integrated doctoring are essential to get the full benefits from increased dewatering and ensure efficient water discharge with perfect rewet prevention. Correctly designed Save-Alls are capable of handling 100% nip dewatering without rewetting. Runtech save-alls are specially designed for AirBlades and EcoFlow dewatering measurement systems. They deliver reliable operation in all press and wire section positions and press section rebuild packages.



AirBlades are needed when increased nip dewatering leads rewetting, crushing, wrinkles, etc., there are roll cleanliness problems, uneven moisture profiles, and with soft rolls – a non-contacting option is a must.

Press section grooved rolls

Clean roll provides more dewatering, better runnability and better profiles



Grooved roll surface before RS AirBlade installation.



Grooved roll surface 2,5 years after RS AirBlade installation. Grooves are totally clean.

Doctoring - the key to a well-performing press section

A well-designed doctoring system is the key to a well-performing and energy-efficient press section. Optimized doctoring leads to increased dryness after the press section. Savings in dryer section steam usage are notable. Runtech's offering includes CompoAdapt, a hose loaded blade holder providing easy maintenance and trouble-free operation and CompoDoc carbon fiber doctor beams with excellent doctoring performance.

Double doctors provide optimal doctoring for suction couch and press rolls. AirBlades are air assisted doctor blades for the press rolls that enable high nip dewatering even with low machine speeds, help with roll cleanliness problems, improve moisture profiles and have a positive effect on machine speed.

At **Papelera de la Alquería**, a shoe press RSP AirBlade was installed as a part of the vacuum system rebuild project. The shoe press in question is the last nip before the dryer section where Uhle boxes were used before but there was no doctor. Runtech delivery included a new backing bar inside the shoe press roll, a doctor with the hose loaded CompoAdapt blade holder and a RSP AirBlade. After the AirBlade installation, the mill is able to run without Uhle boxes. 7% reduction in steam consumption and 11% increase in the average machine speed have been reported.

Another example of a press section doctoring rebuild is a delivery to a kraftliner machine (90 – 400 g/m²), which targeted to energy and steam

saving. Project included a new doctoring system for the press suction roll, the 1st press bottom roll, the 3rd press top roll and the 2nd pick up roll. Magnetic flowmeters were replaced by complete press section EcoFlow system.

Before the rebuild, a total of 10 liquid ring pumps and 8 Uhle boxes were used. Due to the improved doctoring the machine is now able to run with full nip dewatering. Thus, only 2 Uhle boxes are in use, which means stopped pumps, less load for

drives and less felt wear. There is no need to wash the felts during the entire felt life time resulting in less shutdowns and chemicals. The paper machine total steam consumption is significantly lower than before.

Now the paper machine operates 5-6 liquid ring pumps depending on the basis weight and speed. 10 GWh annual energy saving and production increase have guaranteed a short payback time.



CompoAdapt Blade Holder is the first full carbon composite tube loaded blade holder. It is easy to maintain and handle, including the blade changes and is trouble-free to operate. Composite construction makes it light and resistant to heat expansion, corrosion and chemicals.

Steady, reliable and more economical ride

Prior to the save-all and doctoring project the production manager of a **European fluting & testliner machine** explained the reasoning for the rebuild being similar to purchasing a cruise control for the car: "You won't drive faster, but your ride is more steady, reliable and ultimately more economical". The mill gained an average speed increase +10 m/min right from the beginning, and additional +10 m/min later on. Speed increased for all grades, and also top speed increased. One of the liquid ring pumps was switched off right from the beginning and another later. This was not originally planned but as it became possible, mill saves additional 100k€ annually. In addition, the operation is back to normal faster after felt change, e.g. bottom felt on target in 24h as it previously took 3 days and there is no or less felt washing needed.

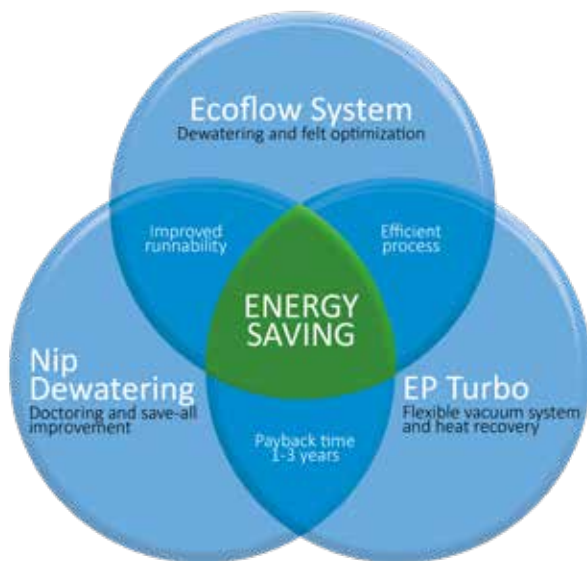
Delivery included a Save-All with top Catch Pan and two integrated blades for press suction roll, Double Doctor for 1st press bottom roll, splash wall after 1st press bottom roll and a full EcoFlow system for wire and press sections.

The main benefit for the mill is a much more controlled (more precise and faster) operation concerning dewatering and process stability. EcoFlow gives a good process transparency and allows setting the key parameters for the operators in a new and better way. Trouble operation, like problems with sheet edges, are avoided or solved much quicker than before.

Optimize vacuum levels

Combining dewatering improvement with vacuum system rebuild can bring the biggest benefits, especially if the mill is still using conventional vacuum pumps. At **Vege PM1 fine paper machine in Turkey** Runtech upgraded the vacuum system with a single-stage EP500 Turbo Blower, EcoDrop water separator and EcoFlow Multi dewatering measurement. Delivery included also Combi press save-all with RSE AirBlade and 3rd press bottom roll doctor with RSP AirBlade.

Improvement of the press section dewatering and optimizing the vacuum levels with EcoFlow made it possible for the mill to run only with one EP500 Turbo Blower. Seven liquid ring pumps were stopped, providing energy savings of 700kW and water savings of 60 000 m³ per year. Specific energy consumption decreased from 93 kWh/t to 21 kWh/t. Even with maximum nip dewatering there is minimum rewetting. Specific steam consumption was reduced by 10% and there are less sheet breaks.



Fit-for-purpose vacuum system and efficient doctoring and dewatering solutions for forming and press sections are the fundamental base for the good energy efficiency and low cost paper production.



EcoFlow is the only reliable and accurate online dewatering measurement system for water that contains lot of air. When you measure the water flow accurately, you can adjust the vacuum optimally and reach high energy efficiency.

Perfect fit for all needs

With the experience of thousands of vacuum system audits and dewatering studies at paper mills, we are able to benchmark the effectiveness of existing vacuum systems, dewatering equipment, suction elements, fabrics and felts. All information comes together in an often step-by-step rebuild or upgrade plan that results in minimized operational expenses coupled with a production increase and/or runnability improvements. Runtech's combined expertise of doctors, save-alls and vacuum system equipment enables us to provide a holistic view for improved paper machine dewatering and energy efficiency. With our solution portfolio, we can always find a perfect fit for our customers' demands, needs and budget.



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