Success story

Voith Paper

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Virtual sensors with a big impact: How Mondi SCP Ružomberok is optimizing the paper manufacturing process with OnEfficiency.Strength

Meeting the challenges of the paper industry with digital solutions

The price of raw material is forcing paper manufacturers to reduce production costs and further improve the efficiency of their production facilities. In this context, digitalization is the key technology for achieving efficiency increases and cutting costs, because new technologies in particular enable significant improvements in existing and new facilities. They allow better monitoring of all processes and therefore more precise production control, which in turn results in higher efficiency and better availability.

Reduced fiber consumption

Since fiber is a decisive cost factor in paper production, the goal of papermakers is to reduce fiber losses and minimize the amount of fiber as much as possible – without falling below the required quality level. However, optimization with conventional measures and tools has its limits, and in many cases, papermakers are faced with the situation that they simply cannot control important quality parameters such as strength in a closed loop. Digital solutions like OnEfficiency.Strength now offer the possibility to constantly keep track of key quality parameters to minimize the amount of fibers.

How Mondi SCP Ružomberok is optimizing fiber content

“We have been using OnEfficiency.Strength since 2018 to consistently meet quality requirements for stiffness and thickness and thus optimize the paper produced on the PM 18,” says Peter Chlepko, Manager of the PM 18 at Mondi SCP Ružomberok. “In the process we are also reducing our costs, because OnEfficiency.Strength provides optimum control of basis weight and ash content.”

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What is otherwise only possible using manual measurements in elaborate measuring processes and with considerable additional effort is now being done at Ružomberok with virtual sensors that calculate the data on bending stiffness. “This continuous condition monitoring of key quality parameters enables automated adjustment of the paper web’s fiber and ash content, whereas manual laboratory measurements can take up to 60 minutes to deliver results after sampling, and the parameters can only be adjusted by means of manual interventions,” says Dr. Julius Flitsch, Director Remote Operations Center at Voith Paper. “Thanks to the virtual sensors, strength values are available in real time, so fiber content and basis weight can be reduced without any time delays. The filler content, also known as ash content, can be increased to achieve the required strength values.”

“After we installed OnEfficiency.Strength, the basis weight and the ratio of fiber to ash improved substantially,” says Chlepko. “As a result of this advanced process control system, we could stabilize our paper manufacturing process and are now able to proactively control paper quality. This means we can achieve the required paper quality even with a higher ash content and lower basis weight, as confirmed by our laboratory measurements.”

Fig. 1 shows the process stabilization achieved at PM 18 in Ruzomberok through the installation of the OnEfficiency.Strength control system. Following an optimization phase, the basis weight was reduced by around 0.5%. At the same time, the ash content was increased by 0.3%, the ratio of fiber to ash optimized and the entire process stabilized, keeping the quality (stiffness) above the specified level.

The real-time prediction of quality parameters and the continuous optimization of the process not only prevents quality fluctuations. OnEfficiency.Strength also enables production costs to be reduced while reliably maintaining quality. “We reduced our costs because of better prediction and faster adjustment of ash content to changed process conditions, while maintaining all quality parameters,” says Chlepko. As a result, the use of OnEfficiency.Strength in the PM 18 allowed 2,800 metric tons of virgin fibers to be saved in the first year, while important quality parameters like bending stiffness and thickness remained within target values.

The OnEfficiency.Strength principle: visualize, stabilize, optimize
OnEfficiency.Strength combines three modules into one high-performance control system and heralds a new generation of advanced process control systems. The system includes virtual sensors, also known as soft sensors,

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the model predictive control unit (MPC) and the cost optimizer. A special feature of the virtual sensors is their high accuracy, as the prediction accuracy is typically over 90%. Moreover, the soft sensors are self-adapting and able to keep their prediction accuracy at a very high level.

The virtual sensors accurately predict important quality parameters. The real-time knowledge of these values allows the MPC to control the paper manufacturing process in such a way as to consistently achieve the targeted values by means of continuous adjustment. The cost optimizer then ensures that this is done at the lowest possible cost. In order to find the customer-specific cost optimum, actuators and control strategies can be individually selected and flexibly adapted.

Mondi SCP Ružomberok was impressed in particular by the high savings potential offered by OnEfficiency.Strength. This was calculated beforehand in the value-add assessment. “Before installing the product, we conduct a ‘value add assessment’ for our customers, which calculates the savings potential of OnEfficiency.Strength based on individual customer data,” says Dr. Flitsch of Voith. “We then guarantee the savings potential to our customer. In addition, we always individually define the parameters and actuators to be controlled depending on customer requirements and paper machine.”

Mondi SCP Ružomberok and Voith: a success story

Mondi and Voith have been writing their shared success story since as far back as 1991. The collaboration between the two companies began with an order for the new PM 18. In 2003, Voith rebuilt this production line to create an ultra-modern paper machine for office papers. “We have had a very good experience of working with Voith. Along with the construction of the PM 18, we also successfully completed numerous other projects together and were therefore able to continually improve our paper manufacturing process,” says Chlepko. “Our collaboration with Voith was always at a very high level and based on a spirit of partnership. During the OnEfficiency.Strength project phase, we engaged in a close, in-depth dialog. As a result, we were able to discuss potential problems and implement solutions promptly.”

“We are very proud to be able to look back on an intensive collaboration with Mondi based on a spirit of partnership,” says Andreas Zangl from the Voith sales team for Ružomberok. “The regular personal exchanges in particular are very important for both parties. With the introduction of a new generation of advanced process control systems for the PM 18, we have again stepped up these exchanges. OnEfficiency.Strength is an example

of how our customers are continuing to evolve and are able to benefit from the savings potential offered by our Papermaking 4.0 product range."

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About the Voith Group

The Voith Group is a global technology company. With its broad portfolio of systems, products, services and digital applications, Voith sets standards in the markets of energy, oil & gas, paper, raw materials and transport and automotive. Founded in 1867, the company today has more than 20,000 employees, sales of €4.2 billion and locations in more than 60 countries worldwide and is thus one of the larger family-owned companies in Europe.

The Group Division Voith Paper is part of the Voith Group. As the full-line supplier to the paper industry, it provides the largest range of technologies, services and products on the market and offers paper manufacturers holistic solutions from a single source. The company's continuous stream of innovations facilitates resource-conserving production and helps customers minimize their carbon footprint. With its leading automation products and digitalization solutions from the Papermaking 4.0 portfolio, Voith offers its customers state-of-the-art digital technologies to improve plant availability and efficiency for all sections of the production process.

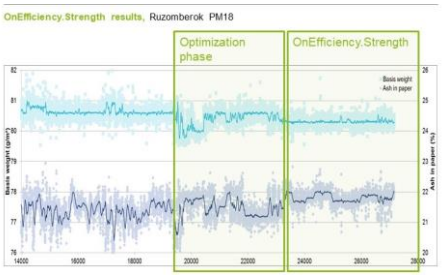

Fig. 1: Optimization of ash and basis weight ratio for the PM 18 in Ružomberok.

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Fig. 2: The use of OnEfficiency.Strength at PM 18 allowed 2,800 metric tons of virgin fibers to be saved in the first year, while important quality parameters like bending stiffness and thickness remained within target values.

Fig 3: OnEfficiency.Strength helps stabilize quality fluctuations and reduce costs.

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