

BENEFITS OF CUSTOMIZED ROLL TECHNOLOGY AND BETTER ANALYTICS

A closer look at the way roll covers, spreader rolls, SMART™ technology and Resolve predictive analytics improve paper machine productivity, enhance product quality, and reduce operating costs

In October 2018, ANDRITZ and Xerium Technologies merged to form the ANDRITZ Fabrics and Rolls division. This new entity combines an extensive portfolio of pulp and paper machinery with the high-quality and customizable consumable products (such as machine clothing and roll technology) developed by Xerium. Creating a product-specific custom fit between machinery and the consumable products used by that machinery can generate tremendous value in the form of improved productivity, enhanced quality, and reduced operating costs. Now, with 30 global facilities producing customized roll and machine clothing technology solutions, ANDRITZ Fabrics and Rolls customers can equip their new or rebuilt machines for optimal performance more easily than ever before.

The influence these consumable products can have on the entire papermaking process may be surprising. After all, roll covers and machine clothing represent only 2-3% of a customer's cost per ton of paper or pulp produced. However, these components can have a dramatic impact on the overall performance and profitability of the machine. Some customers have realized annual gains in improved productivity and energy savings that total over 1 million USD from simply replacing conventional roll covers with custom-engineered roll covers, tailored specifically for their machine and the end-product it produces.

THE VALUE OF A CUSTOMIZED ROLL COVER

Roll covers are produced with a combination of sophisticated materials and chemical

formulations that are applied in layers to a metal core. The specific performance goals and engineering parameters of a roll cover depend upon the section of the machine in which it is installed. A roll cover in a press section has very different objectives and must function in different conditions when compared to roll covers located in calenders, coaters, and size presses.

At ANDRITZ Fabrics and Rolls, the specific materials and chemical formulations that comprise the various layers in the roll cover can be adjusted to create a customized solution that delivers very precise performance results. For example, controlled rates of dewatering and defined end-product characteristics can be achieved, while extending the reliability and life of the cover itself.



Polyurethane roll cover after rotational casting



View video footage of this report in our augmented reality App!

FOR FURTHER INFORMATION
SEE PAGE 3





Dave Pretty – President, Fabrics and Rolls, North America

Composite roll cover production



The venting pattern, i.e., holes and grooves, is another highly customizable feature of the cover's surface that plays a critical role in optimizing performance. Proprietary drilling and patented hole and groove patterns, originally developed by Xerium Technologies, are specially engineered to provide better and more consistent performance throughout the life of the cover.

While there are "off the shelf" roll covers available on the market, customized roll covers often deliver results that are truly astounding. One customer producing printing paper products recently documented benefits exceeding 750,000 USD per year simply through new roll cover

materials and a new proprietary venting pattern. Another customer producing pulp grades increased output by 7% and reduced energy consumption by nearly 18% by changing to newly recommended roll cover technology along with upgraded cover drilling and grooving pattern technology. The total benefit has been valued at several hundred thousand dollars per year.

THE VALUE OF HIGH-QUALITY ROLL REFURBISHMENT

ANDRITZ Fabrics and Rolls also provides comprehensive roll refurbishment services that include a full range of roll-related repairs and upgrades—complete suction roll and suction box repairs and overhauls;

vibration analysis; optical and laser alignment; bearing, journal, and housing inspections and repairs; and much more. In short, this means that customers can send in their used rolls that are old, damaged, corroded, or simply worn out and receive a reconditioned roll, and new customized cover, which will often perform better than the original.

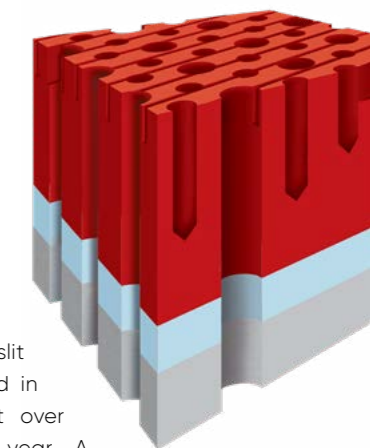
THE VALUE OF CUSTOMIZED SPREADER ROLLS

Spreader rolls, also referred to as bowed rolls and banana rolls, are designed to stabilize various types of webs, including paper, fabrics, and nonwoven materials as they run through the machine. They are often used to widen and remove

Rotational casting of polyurethane roll cover



Customized roll covers layered with specific drilling and grooving on surface

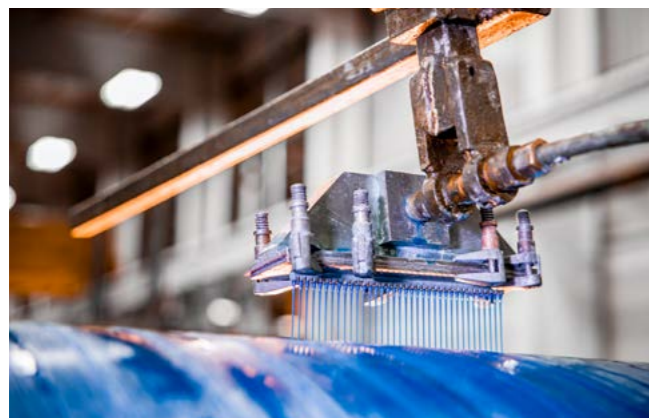


wrinkles from these webs throughout various stages of the manufacturing process. As with roll covers, the specific position in which the spreader roll is placed and the specific conditions to which it is subjected can be considered during the customization process to deliver a component that is tailored to perform reliably in even the most demanding positions. Spreader rolls can be customized to best accommodate a long list of important variables, including speed and operating temperature.

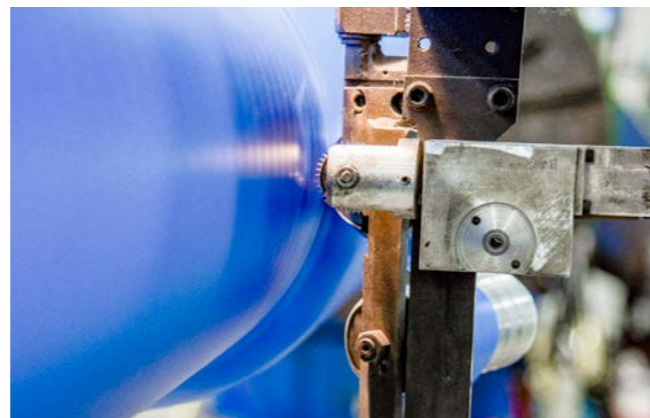
As the world's inventor and largest manufacturer of spreader rolls for nearly a century, offering the broadest range of solutions that include several roll types and sizes, fixed and variable

bowl controls, and an assortment of telemetry features and sleeve designs, ANDRITZ also engineers and custom manufactures components using the latest CNC machinery and steel plating technology. This unparalleled capability enables ANDRITZ experts to engineer the spreader roll to precisely match the needs of each customer, every time. One customer reported that through the implementation of ANDRITZ' advanced spreader roll telemetry (measuring vibration, temperature, RPM and more), they were able to save over 750,000 USD per year through improved reliability and roll life. Another customer replaced a competitive spreader roll with the ANDRITZ Uniform Slit Separation System and

eliminated sheet slit issues that resulted in savings valued at over 400,000 USD per year. A tissue customer reported over 75,000 USD annual savings with a new ANDRITZ spreader roll with an advanced sleeve (outer cover) along with upgraded lubrication technology in the bearings.



Composite roll cover production



Rubber roll cover production



Roll cover drilling process



Operator inspecting drilling quality

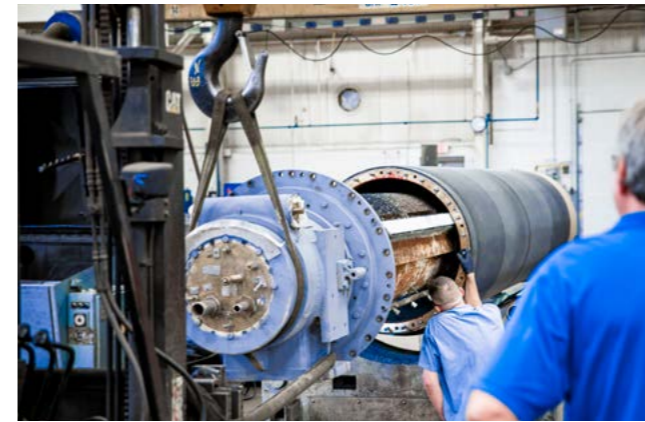
Suction box being removed from suction roll



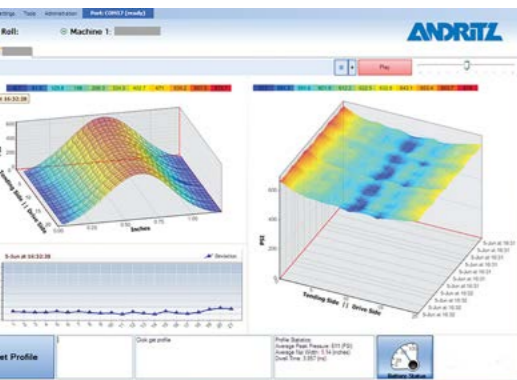
Suction roll shell



Suction box being removed from suction roll



Refurbished suction box



Operators can view critical, actionable nip data in real time

IMPROVE PERFORMANCE WITH BETTER, ACTIONABLE INFORMATION

Beyond customizing the consumable products to best meet the needs of the machine, based on the type of product being produced and the operational

objectives of the customer, ANDRITZ Fabrics and Rolls is creating solutions that will help customers continuously improve operations with better information and insight. The two innovations providing this unprecedented level of information and making actionable recommendations are SMART roll technology and Rezolve predictive analytics.

SMART roll technology, invented by ANDRITZ, is the only real-time 3D nip measurement system on the market. Using embedded sensors inside the roll cover, this technology continuously streams data that describes nip conditions in a high level of detail. This information offers operators extraordinary insight into the real-time performance of the machine, without costly downtime. With SMART technology, operators get continuous and actionable information enabling them to

optimize machine performance, while the machine is in full operation. SMART Connect technology enables customers to monitor their machines from any remotely connected device.

The Rezolve predictive analytics platform employs a concept called *machine learning* to help determine and eliminate a machine's barriers to achieving optimum performance. In order to identify any areas for improvement, Rezolve examines and evaluates over 400 machine and process variables to help prioritize the operational and equipment changes that would lead to higher performance levels, without machine downtime. Rezolve also receives data from the SMART technology system to evaluate and recommend new combinations of roll cover materials, venting patterns, and machine clothing to

adapt to changes in machine conditions and objectives.

Combining SMART technology and Rezolve produces impressive value for customers.

- A customer producing containerboard reported over 1 million USD in annual energy savings and additional productivity through a recommendation to modify a press roll cover venting pattern along with new press felt designs.
- Another customer documented over 700,000USD in annual raw material/fiber savings as a result of a machine optimization.
- Another customer eliminated over 750,000USD in annual product quality rejects due to a machine optimization.

FUTURE BENEFITS AND OPTIMIZATION

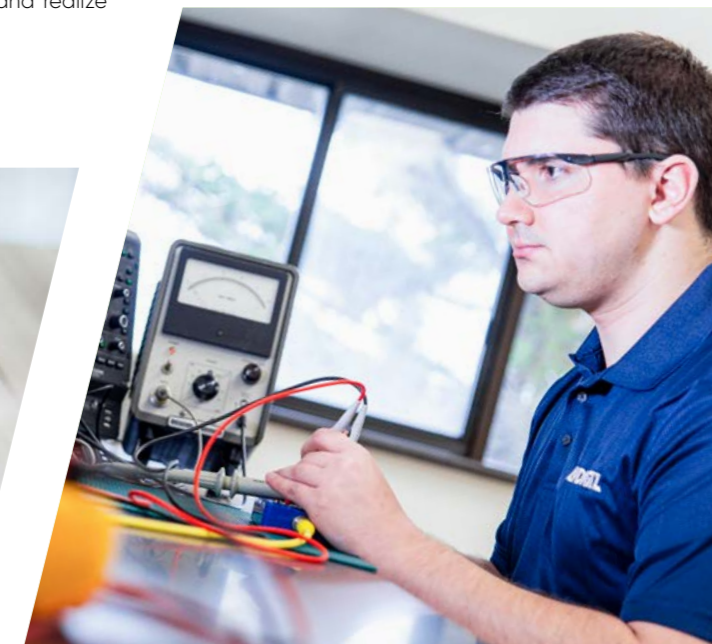
As separate entities, both ANDRITZ and Xerium were industry leaders. Xerium introduced the first rubber, polyurethane, and SMART technology roll covers to the market and pioneered the development of the spreader roll industry. Today, ANDRITZ Fabrics and Rolls is making it easier for customers to improve their operations by delivering critical insights that help achieve new performance goals in output, quality, efficiency, and profitability. Looking forward, the research and development of enhanced rolls technology, new chemical compounds, and next generation SMART components will advance the level of real-time detail and type of actionable data available to operators, which will help customers achieve increasingly aggressive operational goals and realize next-level performance.

"Fundamentally, ANDRITZ Fabrics and Rolls offers its customers greater value than just the rolls or clothing technology it provides because it is now able to offer an exclusive, comprehensive, and precisely tailored solution that is custom-fit for every customer. In the process of papermaking, that level of customization can deliver remarkable benefits to the bottom line," says David Pretty, President North America, ANDRITZ Fabrics and Rolls.

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Researcher developing and testing new advanced SMART roll functionality



Completed spreader roll in high-speed quality control station



All metal spreader roll during spool assembly



Custom engineered spreader roll components after CNC machining and nickel plating