JAPAN TAPPI JOURNAL
10
October 2025
Vol. 79, No. 10

CONTENTS

Papermaking Technology Ⅱ

Topics & Information

Introduction of Research Laboratories（165）

Pulp and Paper Mills in Japan（113）

2025October JAPAN TAPPI JOURNAL
Vol.79, No.10 Abstracts

Optimization of Wet End with Coagulant and Retention Aids - Improvement of Paper Machine Operation by Application of REALIZER Series -

Koichi Tadaki
SOMAR Corporation

In recent years, paper machines have changed to an environment where it is difficult to demonstrate the effect of each wet end chemical due to the high content of fillers and recovered paper. In addition, the condition of the wet end is becoming more severe year by year due to the decrease in the coagulation effect of the sulfate band caused by the neutralization of the paper machine and the accumulation of contaminants caused by the closed paper machine. From the viewpoints of environmental load reduction and cost reduction, reduction of paper loss and dryer load has become a very important issue. “Reactive Polymer Technology” which we have newly introduced for coagulants and yield agents, is effective in solving these issues, and the number of applications has been increasing significantly in recent years. Here, we introduce examples of application of the multifunctional coagulant “REALIZER A series” to improve the fixation of additives and to reduce the number of paper making defects and stains on paper machine tools. In addition, the application of the high-performance yield agents “REALIZER R and FX Series” has reduced the amount of yield agent added and improved the drying performance of the paper.

Basics and management of “Lubricant” and “Grease”

Takashi Honda
ENEOS cooperation, Lubricants R&D department

Industrial machinery has been downsized and its output has been increasing to operate at high efficiency. As a result, the load on lubricants and greases, which are indispensable for the operation of industrial machinery, has been increasing year by year. Consequently, proper machine maintenance through the management of lubricants and greases is becoming increasingly important. It is necessary to understand their components and performance correctly for the effective management.
This paper discusses base oils, which greatly influence the performance of lubricants and greases, and introduces parameters and their standard values for the management of lubricants and greases.

Instruments for Press Section and the latest technology for efficiency

Yumi Sekine
Paper Machine Engineering Department, Voith IHI Paper Technology Co., Ltd.

Demand for paper is decreasing and decreasing, and raw material prices and electricity prices are also getting high. It is hard to realize big projects of build or rebuild paper machines as old days. The most important thing is to operate existing machines with less energy.

Nowadays, it got difficult to transfer know-how of paper making.

In this article, describe general equipment of Press Section, and ‘FilmLube’, ‘CleanLine Excell’and ‘HydroSeal’ from Voith Paper, which can save water and energy by small investment and rebuild.

Fundamentals and Recent Trends in Press Felt and Shoe Press Belt

Akira Onikubo
Technical Department, Ichikawa Co.,Ltd.
Shintaro Yamazaki
Research & Development Department, Ichikawa Co.,Ltd.

This paper outlines the technological evolution and recent trends of press felts, shoe press belts, and transfer belts used in paper machines. Press felts have evolved from traditional woven felts to multi-layered needle felts, further evolving into advanced types such as the Zimo series, which offer both excellent dewatering performance and durability. Seam felts, developed to improve operational efficiency, have also become widely adopted. Shoe press belts have seen improvements in dewatering efficiency as well as in wear and crack resistance, contributing to more stable paper quality when used in combination with transfer belts. Transfer belts are now being used in tissue machines, where increasing demands for high functionality and consistent quality are driving further developments. These developments have contributed significantly to energy savings and the realization of more sustainable papermaking processes. Our company continues to develop products that meet the diverse needs of our customers, while balancing environmental responsibility and productivity improvements.

Pneumatic Shoe Press Roll（ANDRITZ Prime Press XT Evo）

Tomohiro Hanada
Capital Sales 2, Andritz K.K.

Currently, energy-saving is one of the most important tasks for all paper manufacturers. There are many energy-saving devices for paper machines, but one of them is 1% dewatering in the press section (head box to press roll) of the paper machine, which is equivalent to 4% dewatering in the dry section of the paper machine. Therefore, it is important to install equipment that further improves dryness in the press section. This paper introduces the shoe press roll that solves this problem.

Doctor structure and maintenance

Tsuyoshi Yoshino
AIKAWA Iron Works Co.Ltd.

It has been about 60 years since we started selling doctor equipment in 1965, and we have delivered more than 8,300 units to date. More than 95% of these have been to paper mills, with more than 3,100 units delivered to the wet part, earning us a great deal of trust and building a solid track record. Many doctor equipment is still in use today, but some are 30 to 40 years old and showing significant deterioration, and are still in use with regular maintenance. This article introduces doctor equipment for the wire part and press part only, and suggests maintenance methods for them.

Solution for Production Improvement by Felt Cleaning and Passivation Technology "FeltKeeper"

Tomonori Muroya
Maintech Paper Tech Co., Ltd. Fuji Offices

Press felt is essential in the process in paper-making, but deposit from old paper can cause clogging and a decrease in press felt dewatering efficiency. While using high-pressure water showers is a common method for felt cleaning, increasing the water pressure to enhance cleaning effectiveness can lead to wear on the felt. We have developed a felt cleaning device called "FeltKeeper" that can achieve high cleaning effectiveness while minimizing wear on the felt. This report presents the concept and an overview of the FeltKeeper, along with the results from testing.

Diagnostic services using a predictive model for defects and other issues in paper products based on water quality data

Yasuhiro Toyooka
Digital Promotion Department, Kurita Water Industries Ltd,

In recent years, the paper manufacturing industry has undergone significant transformations. Challenges such as workforce retirements and the utilization of low-quality waste paper materials have necessitated efficient operations under increasingly complex conditions. To address these issues, we have introduced Kuri-smart™, a next-generation service leveraging advanced information processing technology based on data science.

The predictive model within Kuri-smart™ anticipates defect occurrences and quality issues using plant operation data, with a focus on water quality. It not only predicts these issues but also estimates their root causes, providing real-time insights to support operational decisions. Beyond predictive analysis, Kuri-smart™ offers comprehensive solutions centered around water treatment and wet-end processing, serving as a one-stop service for addressing the identified causes.

The Kuri-smart™ service unfolds in three phases. First, it visualizes water quality and fluctuations using S.sensing®. Second, it constructs a defect prediction model through offline data analysis, combining our extensive knowledge of water treatment and wet-end processing with data science techniques. Finally, in Phase 3, the predictive model is implemented online, allowing users to access the latest predictions. Quantitative displays of parameters influencing predicted values further enhance operational decision-making.

An illustrative application of the Kuri-smart™ prediction model involved forecasting defects 12 hours ahead and implementing the model in an online system. Following the model's recommendations, improvements were made to wet-end processing, resulting in a significant reduction in defects compared to the previous year. We continue to explore broader applications, including addressing paper breaks and steam volume, and aim to collaborate with peripheral water treatment technologies, such as wastewater treatment, in the future.

Deposit control and profit improvement by Depocide® continuous white water treatment

Makoto Terumoto
Business Development Team,Business Development Pulp and Paper Service,KATAYAMA NALCO INC.

The global movement to reduce fresh water consumption (SDGs) has led to a trend toward closed white water loop system in pulp and paper mills. In particular, plants where furnish is recycled, are mainly using machine white water, and fresh water is rarely used. The temperature in the system is 40-50°C, which facilitates the growth of bacteria, and the number of bacteria in the system is saturated at 106-8 CFU/ml.

The main negative effect of bacterial growth is deposits caused by the formation of biofilm. Katayama Nalco have provided the solution to this by adding a biocontrol agent by batch to the location where the biofilm is generated. However, it is now known that organic acids and reducing substances, which are metabolites of bacteria, are causing lower pulp quality, adverse effects on wet ends, and product defects than expected.

Many paper making customers that uses recycled furnish have determined that following problems are largely due to bacterial growth.

(1) Product strength does not increase during the summer time, resulting in an increase in the amount of internal paper strength agent.

(2) Pitch problems tend to increase during summer.

We have confirmed that continuous treatment of the recycled pulp process and the machine process with our Depocide® (inorganic biocide) can improve pulp quality, wet end, and reduce product defects.

Beyond the Freeness
-Refiner control based on direct fiber morphology measurement-

Hiromichi Yoda
Division manager, Process Industry Division, ABB K.K.

Currently, industry got strong pressure from the market because Japan government announced carbon neutral industry by 2050. In Japanese industry, especially material industry, there are several serious potential issues like lack of human resource due to less attractiveness for young people, retirement of baby boomer and the technical transfer. On the other hand, there are bright future in paper industry because paper is excellent material for plastic reduction and new functional material, Cellulose Nano Fiber.

ABB started following four approaches to cooperate with customer to solve facing issues.

1) Reliable and high performance online measurement for Refiner, Wet end control
2) Cutting-edge fiber analyzer for new material development
3) Speedy, Safety and high precise paper testing machine
4) High speed, high precise and reliable automated paper testing machine

In the paper, 2) Cutting-edge fiber analyzer for new material development is described. You can understand how to optical fiber analysis method is useful to understand refining status and it helps your refining process optimization for quality control.

Solution of stickies issues from recycled pulp
-The latest stickies control with "Surface-Treated Talc"-

Yusuke Aikawa
Artemyn Minerals Japan Co., Ltd. / Artemyn Specialities Japan Co., Ltd.

Technology of pitch control by Talc powder with specific morphology, micro-crystalline structure, was introduced into Japan in 1974 when Nihon Mistron Co. Ltd. was established in Suzuka City. This unique solution was rapidly implemented among Kraft Pulp Mills in Japan, then the reference was expanded to Mechanical Pulp and Recycled Pulp in Newsprint Mills.

Pitch control Talc is made from special crystalline of crude ore, ground and classified by proprietary process, therefore, it has completely different functions from macro-crystalline Talc for filler for paper and plastics which is rather widely known.

Nihon Mistron was succeeded by Imerys group in 2011 then, Artemyn group as from July 2024, and this pitch control Talc enjoys a high reputation with excellent performance for various types of pulp for five decades, which is contributing over 70% of kraft pulp mills in Japan.

In Japan, Artemyn Talc's reference for the Board Mills is limited, because of some historical and group-strategic reasons, but there are significant references for DIP, GP, TMP in the Newsprint Mills, and the technology should be applied to Board Mills, too.

Surface-Treated Talc for intensive pitch control, in the global point of view, is not necessarily a new technology through the former organizations, but it is the first time to introduce into Japan combined with the high level engineering approach for a more efficient and economical solution for recycled pulp, as well as any other paper manufacturers suffering from nasty pitch problems from any pulps and processes which have not ever been satisfied with the current methods.

Advancing environmental harmony with Harima's latest paper strengthening system.

Yoshihiro Aikawa
Paper Chemicals Development, R&D Center, R&D Company, Harima Chemicals, Inc.

Paper companies are now setting targets to cut down CO_2 emissions across their operations, including activities beyond their direct control like raw material sourcing, logistics, product use, and disposal. At the same time, there's a pressing 2024 logistics challenge in the transportation sector, focusing on improving working conditions. In this paper, Harima introduces our new Harmide, a PAM (polyacrylamide)-based paper strengthening agent. We highlight how it contributes to environmental goals and addresses social issues. Our innovation includes a system combining Harmide with a new fixing agent and an enzymatic fibrillation agent. We have developed a higher concentration Harmide, now at 25 %, up from the standard 20 %. Field tests confirm its superior performance, reducing the need for transportation and thereby cutting CO_2 emissions. Additionally, SB-01, a novel fixing agent, and Refinase®, an enzymatic fibrillation agent, were evaluated as part of a system to enhance paper strength, drainage, and pulp retention. This approach not only improves environmental impact but also reduces chemical usage and associated CO_2 emissions. Furthermore, it enhances drying efficiency, reduces steam energy consumption, and boosts productivity. In summary, our new Harmide-based system offers significant environmental benefits and contributes to solving pressing social challenges in the paper industry.

ASA Sizing Technology based on high shear homogenizer system
-Combining chemistry, equipment and papermaking to improve sizing performance-

Jinho Lee
Kemira Chemicals Korea Corporation

Keisuke Iriyama
Kemira Japan Co.,Ltd

As with most processes in the paper industry, ASA performance is dependent not only on the chemistry of the product but also relies on robust equipment to develop the full potential of performance of the additive and applications expertise to minimize the unwanted interactions and accentuate the positive effects. Kemira has designed and manufactured Fennosize AS 1-series ASA, to meet the sizing needs of the paper industry exclusively. We developed and patented the manufacturing process to make this molecule with as little residual olefin and oligomeric material as possible. A more robust emulsifying system was necessary to fully develop the sizing performance build into the products. On our way we were able to assess other key factors related to the papermaking process that would have a beneficial or negative effect on product performance. Finally, we applied our global sales, application, and R&D expertise making the Fennosize AS 1-series sizing program the best possible program for our customers. The details of the Chemistry, Application Knowledge and Service are discussed in detail in the following paper.