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Roles of Retention and Drainage Aids in Papermaking Process

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In papermaking process, retention and drainage aids provide many benefits such as improving sheet quality, enhancing productivity, and extending life of fabric.

The roles of these aids have become more and more important because the rate of fines and filler in furnish has increased as the papermaking environment has changed.

Retention and drainage aids have ability to coagulate and flocculate pulp and filler through ionic interaction mainly. However, too large floc worsens the formation, paper strength and dewatering. Therefore, suitable chemicals and systems are required. Polyacrylamide, water-soluble synthetic polymer, is one of the typical chemicals because it can adjust the molecular weight, ionicity and charge density easily.

The technology of retention and drainage system made advanced to address acid-free papermaking, increasing speed of paper machines and reduction of fresh water. However, in recent years, more complicated and difficult issues in papermaking process have been increasing, for example deterioration of runnability caused by low-quality materials and demand for maintaining sheet quality despite the basis weight reduction. We have solved these problems by applying characteristic pitch control agent in combination with retention aid and new retention aid developed by our unique "selection-technology".

Tissue machine technology of Andritz -Stock preparation and Shoe press-

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In this report, described are three characteristic topics which Andritz has in its tissue machine technology. First the ShortFlow system, which can realize a concept "Paper is made in the stock preparation process" is made up of few numbers of equipment and verified control technology. It can improve reproductivity of the operation and make changes of paper grade and color smoother. Next we reviewed a basis of the refining theory and then two types of the Andritz refiner is presented, that is, Cylinder type refiner (Papillon refiner) and Disc type refiner (Twin flow refiner). Both can realize to improve fiber strength and fiber flexibility with keeping refining conditions constant during refining process. Last Andritz third generation shoe press is presented. Its load mechanism can make the cross direction line load perfectly even. It has also a flexible shoe design and edge control system. Therefore the shoe can follow the Yankee contour faithfully. It has both higher dryness mode and higher bulk mode and the mode adjustment can be made on the run.

Latest Technologies and grade conversions in overseas

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As we all know it the world is changing fast; the consumption of newsprint and printing/writing paper is decreasing. The consumption of packaging grades are increasing due to the increasing e-commerce and sustainability awareness. An old paper machine can be updated with a grade conversion rebuild to produce more profitable products like containerboards, cartonboards or special papers.

The main idea of this article is to discuss about considerations and things to look out for based on experiences from paper machine grade conversion projects. Formerly grade conversions have been conducted typically for higher value end products. Nowadays grade conversions are typically concentrated of converting printing grades to packaging grades or to specialty grades. Valmet has gained wide experience of grade conversions.

The change of paper and board making environment is greatly influencing in further development of production lines. Traditionally paper and board making lines have been more far away from each other. Higher production speeds due to light weighting of containerboard has brought these processes closer to each other. In addition, new technologies in wet end and sizing give wider production flexibility compared to conventional paper or board machines.

The successful grade conversion requires a market study and plans, how new raw materials are purchased. The concept selection and target dimensioning should take the current premises into account and a sufficient schedule for planning and conversion phases should be in place. The sufficient quality level of new end products is needed to be able to enter the markets and low enough production costs should be secured.

The new technologies enable wider possibilities to utilize existing premises with limited modifications and can give a great boost to show the potential along this development.

Introducing Inertial Shaking unit Allimand

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This paper introduces an inertial shaking device as a recent wire part technology in Allimand's technology.

It is known that the operation of the shaking device in the wire part of the Fourdrinier paper machine improves the increase in moisture passing from the fiber through the wire, the texture, and the improvement in the strength of the paper.

Allimand's inertial shaking device, combined with the Breast roll's sliding bearing mechanism, makes it possible to eliminate unwanted vibrations from the device, make it compact, and improve the ease of setting the Breast roll amplitude and frequency.

Development of Choi-Suki Kun series

-Challeng of sheeting technology for cellulose fibers and new materials-

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It has been over 200 years since fourdrinier machine was developed as continuous paper machine in 1798. After that, cylinder paper machine was developed and paper industry has achieved outstanding progress. In addition to wood pulp, animal origin: leather, feather, plastic origin: chemical fiber and mineral origin: mica have been used as raw materials. We developed many products such as Success Former and Ultra Former Series, and have been provided them to paper industry. Along with that, we have dealt with paper machine for friction material base-paper, battery separator and specialty paper for car, medical, aerospace and airline industries. In recent years, many industries including paper, have been specializing in new materials such as CNF (Cellulose Nano Fiber). Accordingly, we have received testing inquiries for making sheets of synthetic fibers mixed with these fibers, inorganic fibers and mixed these two materials.

In this paper, we introduce how the development of Choi-Suki Kun went, all sorts of testing machine, the results of testing and delivery cases.

“Reactive Polymer” of AXISZ system for Wet-end Optimization

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The ultra-high molecular weight type retention agent that we have introduced so far has achieved high retention properties and improved drainage on many papermaking machines. However, in recent years, when applying a retention agent to a paperboard machine, it is often required not only to improve the retention properties, but also to improve the fixability of paper chemicals and drying property and further reduce the paper defects. To solve these problems at the same time, we have developed a new concept, "Reactive Polymer Technology", which has an optimized polymer structure.

Since the retention effect of "Reactive Polymer" is sustained due to the share of screens, etc., it is possible to improve the formation and dryness of problems when an ultra-high molecular weight type retention agent is applied to a paperboard machine. In addition, as a function that conventional retention agents do not have, the action of the polymer after shearing improves the fixability of the pitch component and the internal additive. Therefore, papermaking can be performed with a small amount of internal additive, which is effective in reducing white water load and paper defects. Currently, as the next step, we are studying with the goal of introducing "reactive polymer" from the retention agent to the coagulant.

In this report, we will introduce application examples based on the test results of the new “Reactive Polymer”.

PCMC's approach to adapt to changing conditions

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PCMC's Forte Surface Rewinder has unique winding technology. It keeps the embossing even from the beginning to the end of the winding process, making it possible to produce high-quality rolled products such as toilet paper and kitchen paper. It is possible to produce from the standard small diameter products for the household to a large-diameter commercial product with one unit. Conventionally, different machines were required for each category, but by being able to use them together, it will save space and enable operations by a small number of operators.

It has an open design, good accessibility, and easy to understand the status of parts and operating status of each part, which brings clean and highly efficient work to the production site. In addition, rolls without a paper tube (coreless) can be produced, which not only expands the product lineup and promotes sales at the paper mill, but also contributes to environmental protection by reducing household waste. It can also be used for non-woven fabrics and can also produce bottles and center pulls (canister products).

In this article, I would like to introduce Forte's characteristic technology that allows it to continuously produce high-quality products with its simple and sophisticated design.

Polyacrylamide-based Pitch Control Agent for Pulp and Papermaking Process(II)

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Deposits of organic contaminants can cause serious problems on runnability or quality of paper. The contaminants come from natural wood (pitch) or synthetic resin from recycled fiber (stickies). They bring negative impact on the paper making process from pulp mills to paper mills.

Recently, there is an increase in usage of cheaper and lower quality wood in Kraft pulp process. This trend is bringing more wood contaminants in the system, resulting in more pitch troubles in pulping and paper making process. There is also increasing demand for the measures to solve these problems.

In Japan paper industry, the conscious for food safety and health have been growing. Paper chemicals including pitch control agents for food packaging materials need to be compliant with regulations for food contact materials in each country.

To solve these problems, we have developed FDA approved poly acrylamide-based pitch control agents, “AS series“ for both pulping and paper making process. In this report, we report the features, optimal condition for the chemical program, product lineup and trial results of AS series.

Revolutions in the history of civilization induced by paper

Part 9: Paper and Printing

Kiyoaki Iida

As paper became available, more copies of texts such as Buddhist scriptures were wanted. Then, printing was developed.

In Japan, one million miniature towers, 20 cm high, were fabricated in the 8th century and each contained a sheet of printed scripture, 5.4 cm wide, in it. They were the first printed products with the clear date in the world. The copying by hand, however, was being common, and temples occasionally published scriptures by woodblock printing for their believers. In the early Edo period, metal movable type printing was tried and in vain. So, the culture, prosperous in the Edo, was supported mostly by fine woodblock printing.

In Korea, Buddhist scriptures were frequently printed by woodblock in the 13th-15th centuries. In the 14th century, metal movable type was invented for printing, first in the world. Hangul was developed which was favorable for movable type in the 15th century. In spite of them, and partly by historical prohibition of Hangul use, the metal movable type printing could not be pervasive and was used only in privileged class.

In China, woodblock printing was in use in the 7th century, and got to its golden age in the 13th century. In the 15th century, many kinds of books were published by woodblock printing. As the need for copies increased, movable type printing was devised. The clay type was used in the 11th century, wooden type in the 14th century, and copper type was in the 15th century. A large number of Chinese characters, however, made it difficult to be pervasive..

The Islam got to know paper in the 8th century, and published books by hand copy as well as woodblock print, a number of which increased exponentially. In the 15th century, Italian printers mastered metal movable type printing, started to print Arabic texts and exported them to the Islam. The Islam, on the other hand, prohibited to print Arabic texts, accepting an advice from Koran copyists. It was a turning point for them to be left behind the advanced civilization they had once enjoyed.

An Essay on Methodology for Innovating “*JAPAN TAPPI JOURNAL*”

Part 16: Functions of Journals required as External Storage Devices of Human beings

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Emergence of writing materials had liberated human brains from memorizing a variety of daily happenings and informations. This historical fact led to the birth and evolution of human culture and civilization.

The sixteenth article of this series attempts to analyze the roles and functions of journals as human external storage or memory devices. Human-Journal system is regarded as an information eco-system. The overall contents are described as below.

1. Introduction
2. Complimentary and widening relationship between human-being and machine
3. Internal and external storage devices of human-being
4. Formation of micro-cosmos in a human brain as internal storage device
5. The roles of journals as external storage devices required for productivity enhancement and innovation
6. Combined and parallel usage of analogue and digital devices and equipments as external storage devices
7. The predominant characteristics of paper media reconsidered from media theories
8. Reframing the birth of the Digital Agency in September 2021
9. Epilogue