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The Latest Winder Technology

Hideki Maeda
NAGAI TEKKO Co.,LTD

Nagai Tekko Co., Ltd. has responded to customers' requests by constructing a new factry in September 1993, while responding to the increasing size and precision of its paper machinery, with a focus on winder equipment. In recent years, the company has focused on improving the productivity and quality of Winder, as well as developing labor-saving and automation technologies, as shown below.

1993:Automatic Rollchange system that takes full advantage of the core taping and endroll taping devices with no loooseness of rolls.
2004:Web threading device above drumrolls that allows one person to thread web even a wide machine,
2005:NC slitter with simultaneous movement of all slitters and automatic core chuckpositioning" for dutytime reduction
2006:Device for Reduce dutytime of Rollchange process to improve productivity.
2011:"fully automatic coreless winder" for pulpmill that incorporates the world's only technology.
2013~2022: 4 automatic paper core cutting and feeding machines were introduced one after another.
2017:'Mother Rool Automatic Transfer System', 'Automatic Defect Repair System', 'Winder Monitoring System' for labor-saving .
2021: We developed 2200 mm wide new rewinder with original drive system.
2023: Operation of the winder monitoring support system started.

In August 2022, the fourth “automatic paper core cutting and feeding machines” was put into operation, and as a standard model, I would like to introduce the outline of the equipment and the outline of the winder monitoring support system that started operation in 2023.

SmoothRun / Active damping technology
-Reduce vibration during winding process-

Kanato Mizukoshi
Voith IHI Paper Technology Co., Ltd.

Winders are always expected to run full capacity especially the line installed only one winder. Capacity limit of winder directly connected to paper machine capacity. There could be many reasons that winder can not perform full capacity, such as vibration, winding quality, paper quality. Major cause is operation speed reduction or winding quality caused by vibration.

In conventional winders without special damping, vibrations can occur at higher production speeds for certain paper grades, and these vibrations can impair winding quality and production capacity. To minimize the disruptive effect of vibrations during the winding process, the production speed and accelerations rates are reduced below the maximum capability of the winder. Our solution is SmoothRun hydro-pneumatic damping bearings which can be effectively reduced the vibration even at high speeds. This mean winder can operate at high production speed constantly. At the same time, SmoothRun improves the winding results and reduces the overall mechanical stress on the machine.

The transition and latest trends of Roll Wrapping Machine.

Shinichiro Kaji
KAWANOE ZOKI CO.,LTD.

In the past, one winder and one wrapping machine used to be arranged to process paper produced by one paper machine. In recent years, however, control of production data by computer has made great progress, and now we are in an environment where production data of wound rolls as finished products can be rapidly processed online.

Therefore, we have been able to develop a wrapping machine with a large processing capacity, that can automatically process various types of wound rolls produced by more than one paper machine to save labor, space and energy required by wrapping at a mill.

Our wrapping machine consists of equipment such as bar code reader, printer, wrapping machine, marking device and labelling device. Even a non skilled worker will be able to operate our wrapping machine in a short time because each equipment is reliable and can stand continuous operation for a long time, and also because of features such as complete interlocking and easy input setting, changing and monitoring by touch panel, based on our wide experience and achievements.

Through the use of our wrapping machine, complete wrapping of wound products can be performed.

Sheeter Technology
-Challenges and Innovation for paper and board market-

Noboru Matsumoto
Horikawa Engineering Works Ltd.

Lorenzo Alba
Milltex S.p.A.

In this paper we overview market tendency of printing paper outside of Japan through a report of an Italian sheeter supplier, Milltex, who delivered more than 460 sheeters to 20 countries worldwide in the past 30 years. Because of vast expansion of e-commerce demand of digital printing paper is increasing while coated paper is reducing. We are going to introduce challenges of Milltex in energy saving and automation of sheeter lines. Also challenges to convert excessive paper to digital printing paper and on-line sheeter system for duplex board.

Examples of Improvement in Finishing Process

Shoichiro Kida
Kida Iron Works Co.,Ltd.

Kida Iron Works Co.,Ltd. was founded in Osaka in 1928 and started manufacturing machine parts. At the time when the textile industry was booming, Kida's self-developed humidifier was widely used in spinning mills in Japan, and later entered the recycling industry to meet the needs of the times. Later, the company began designing and developing labor-saving equipment for the printing industry, which continues to this day.

The New Turner series is the fully automatic system that turns sheets over, aligns sheets and removes dusts and powders by air blow. This series has been adopted by large and small printing companies throughout Japan, and currently hold the top share of the domestic market. The company also builds systems to solve users' problems based on its specialized know-how in the printing industry. The company is a typical "monozukuri" (manufacturing) company with its own integrated system from design to manufacturing, installation, and repair. The company's products include the "Turner Series" of paper reversing machines, the "Blanks Checker" of blanks inspection system, the "Mini-Piler Series" of paper alignment high stacking machines, FA, and many other custom-made products. The flexible systems and durability of the machinery built from many years of experience and know-how are well received.

Web Inspection System Technology Trends.

Shuichi Shoda
AMETEK Co., Ltd. SURFACE VISION

In recent years, the technology for image processing has greatly improved. Digital cameras have become higher in resolution and speed, and computers are now capable of faster processing, enabling the development of new features in defect inspection systems. In this article, we will introduce some of the newly functions in SmartView inspection systems. Normally defect inspection systems only stored image data of the detected defects, but the newly developed streaming video can display, save, and replay the entire length and width of the roll. Using this streaming video data, a virtual inspection function has also been added for re-inspection of the roll. One of the new technologies is camera signal multiplexing, which generates multiple camera signals (video data) from one camera and allows separate multiple inspections to be performed in a single camera frame. The adaptive thresholding that follows background fluctuations and adjust the thresholds. SmartLearn classification combines automatic, learning classification. To use both functions SmartView system strongly supports detecting and classifying defects. Integration with external systems has also been enhanced, allowing SmartView systems to incorporate data from other systems and display that data on the SmartView screen, or transfer defect images and feature data acquired by SmartView to external systems.

Ametek intends to continue to support customers in building the most suitable inspection system for their manufacturing sites, leveraging the strengths of the defect inspection system manufacturer.

The Key Points for Monitoring System to Achieve Efficient and Effective Pest Management

Takeo Ishizaki
Earth Environmental Service Co., Ltd

For efficient and effective pest management, the monitoring system (investigation using trapping tools such as light trap, wandering insect trap, and rat trap) plays an important role. Unless we establish the appropriate monitoring system, we can't get accurate information about insects or rats intrusion or inhabitation, leading the customer's complaints or the loss of products related to insects. On the other hand, there is also the possibility that excessive plan might lead to an increase the burden on the site. Therefore it is necessary to understand the importance and the role of the monitoring system in the whole managing system in order to select the right trapping tools or where to place them, based on the risk-based approach.

In this paper, several key points for monitoring systems to achieve efficient and effective pest management were mentioned. First of all, we have to understand the total structure of pest management (Pest management program),including annual plans, organization, the way of communication, inspection/investigation, countermeasures, and training. Monitoring system is a part of pest management program, related to other elements. The meaning of "monitoring" is to analyze the sampling data and to utilize it for the root cause analysis, corrective and preventive actions, and verification, therefore we need to choose the suitable monitoring method based on the possible risks (characteristics of insects/rats and the importance of the zone in the factories).

As for the selection of trapping tools toward flying insects, we have to select light trap model based on the properties of area and to make a decision for places of installation on the hypothesis that we suppose flying insects' pathways of intrusion, considering not only the effectiveness to trap flying insects, but also the risk for attracting insects more than necessary. While, we select types of wandering insect trap and rat trap based on the characteristics of insects/rats or the environment around the place of installation (e.g. the floor which got wet) , and we install them on the places where wandering insects/rats can intrude or inhabit. In this manuscript, several risk-based viewpoints were provided. In addition, I introduce the latest rat-monitoring on-line system called "Pescle", which we developed in partnership with Ryoden Trading Co.,Ltd. We can only get accurate information using our original AI techniques for Pescle in order to formulate a sustainable pest-control systems.)

Finally, several points to remember concerned with monitoring system, such as the interpretation of the monitoring data was provided here.

Control of foam on white water and improvement of operational efficiency by modeling a soft sensor

Yusaku Okura
Rengo Co., Ltd

Recently, the improvement of digital technology has made it possible to accumulate large amounts of process data that had not been fully utilized.

With advances in technology of data accumulation, it is being especially important to handle big data. By using these data, it is possible to predict the occurrence of machine error or defects in products. Papermaking process is getting to be automated by application of such technology, but it still remains many controls that are set manually by operators. Therefore, it is a significant issue for paper industry to advance further digital transformation.

In this paper, we introduce our efforts focusing on foam on white water during the papermaking at the Kanazu mill, which is our DX model plant.

In our case, we had a problem of occurring defects by foam from white water and these defects had generated paper shorts. We had tried to solve this problem by utilizing big data accumulated in the Plant Information Management System. We had made a soft sensor consisting of extracted features with data analysis by Python programming and had been automated the addition of defoamer with a constructed soft sensor.

This effort enabled us to reduce occurring of defects and improvement of operational efficiency.

Development of Refining Technology

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Engineering Division / Aikawa Iron Works Co., Ltd.

The importance of the refining process in the stock preparation system is well known. The refining process, which greatly affects the properties of the target paper, is also a process that consumes a lot of energy in the stock preparation system, so research has been continued from various points of views. Since the development of the first domestically produced continuous cone-type refiner "Super Refiner" in 1954, we have been challenging for ways to optimize the refining process from the perspective of a stock preparation equipment manufacturer.

In this report, we will look back on the background of the development of each refining equipment and the required functions while tracing the transition of refining equipment up to the present. It also introduces the refining mechanism and the general selection method of refining filling pattern.

-Foam control solutions that evolve day by day-
A permanent chemical approach to solving problems in the papermaking process

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Nissin Kagaku Kenkyusho Co., Ltd.

In papermaking processes, foam can cause a variety of problems everywhere. Foam problems not only hinder operation and productivity, but often have a negative impact on product quality, making foam control extremely important in solving problems in the papermaking process.

Since we started supplying papermaking chemicals to paper companies nationwide in 1948, we have been working together with our customers on foam control, and have developed a wide range of customized products for each customer process, and have become a chemical assistant for solving foam problems.

In recent years, the environment surrounding not only paper manufacturers but also chemical manufacturers has changed drastically due to a combination of factors such as a drastic disruption in the supply of raw materials caused by the global spread of the new coronavirus, soaring raw material prices due to inflation, and restrictions on raw material use due to various regulations aimed at environmental friendliness.

In this paper, we report on the latest trends in foam control measures that we have been working on in the midst of this rapid global situation.

Optimization of Wet-end Process by Slime Control Agent "CURECIDE" and Coagulant "REALIZER"

Saori Takesue and Koichi Tadaki
SOMAR Corporation

In recent years, there has been an increasing trend toward more paper making defects and paper breakage problems in paper machines. Paper making conditions are becoming more severe due to the decline in the quality of pulp and recovered paper raw materials and the accumulation of contaminants caused by the closed paper machines. The focus of this study was on the fact that, based on the results of analysis of paper making defects and paper machine tool deposits, there are many cases in which slime involving microorganisms, adhesive pitch consisting of vinyl acetate, styrene, and acrylates mixed in from recovered paper, and anion trashes form a complex foreign matter. To improve the operation of paper machines, it is essential to reduce paper defects and breaks, and many paper machines have similar problems.

In terms of paper quality, the dosage of additives such as sizing agents and paper strength agents added tends to increase in order to improve and maintain quality, and in some cases, the fixation of these additives is poor. If these unsettled additives circulate and accumulate in the system, they can cause paper making defects and trouble with stains on the paper machine tools. To improve the operation of the paper machine, such as to reduce the number of paper breakages and defects, it is important to optimize the dosage of various additives without degrading the quality of the paper.

We have applied the slime control agent "CURECIDE Series" and the multifunctional coagulant "REALIZER A Series" to various fields such as paper machines, paperboard machines, and household paper machines, and conducted tests to improve the operability and paper quality of paper machines using the optimum addition method and optimum addition amount. The results of the tests will be presented.

Visualize and Reduce Fiber Losses by OnView.MassBalance

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Voith is promoting the digitization of the papermaking process under the name of PM4.0. While increasing the number of digital products delivered to the papermaking process worldwide, we are also developing digital products for the raw material process as a full-line supplier. This article introduces a product called OnView.MassBalance that visualizes fiber loss in the OCC line.

Generally, fiber loss in the raw material process is known only on a monthly or weekly basis, and it is difficult to pinpoint the location of the process in which the loss occurs. By using OnView.MassBalance developed by Voith, the flow rate of feed, accept, and reject of each process is clearly displayed in a chart format called Sankey diagram, and it is possible to identify the place where fiber loss is high in real time.

Paper chemicals for environmental sustainability

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Sales, Paper Chemicals Company, Harima Chemicals, Inc.*2
Paper Chemicals Development, R&D Center, R&D Company, Harima Chemicals, Inc.

Global warming and climate change have become primary concerns for all countries and industries. Reducing greenhouse gas emission is critical to address the issues, but the paper industry is known as an“energy-intensive industry”, consuming large amounts of energy in the Kraft pulp and paper making processes.

In Japan, the paper industry has taken various approaches to achieve carbon neutrality by 2050 which is a long-term target for environmental sustainability announced by Japan Paper Association.

Under these circumstances, Harima Chemicals Group has been providing various solutions with its philosophy in mind, "Live a better life with what nature provides". Harima is a pine chemicals company providing products based on pine-derived raw materials, that are natural and renewable resources grown by sunlight and water. Harima produces pine chemicals such as tall oil rosin and tall oil fatty acid by distilling crude tall oil (CTO) extracted from the Kraft pulping process. Harima also generates green power using biomass fuel from by-products of the CTO distillation process.

In this presentation, Harima would like to introduce its sustainable business model, and eco-friendly paper chemicals as solutions for the achievement of sustainability in the paper industry. The paper chemicals include enzymes for better runnability and environmental response, and water-based barrier coating chemicals for plastic replacement and utilization of paper materials.