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Vol.67, No.1 Abstracts

Benefits of Introducing Optical Caliper Sensor

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Caliper measurement is unique from others in the sense that it pinches the paper web between the sensing planes for the measurement purpose although a paper quality control system is associated with various measurement functions. This has often become the issues in paper production process making holes and marks by sensing plane touching the paper. In order to solve these issues, non-contacting caliper sensors has been introduced applying measurement principles such as laser measurement. However, these sensors are yet to be utilized for the continuous measurement and control of production lines because they still have some essential technical issues have to be solved.

In such background, Yokogawa Electric Corporation started the development of Optical Caliper Sensor applying the confocal technology and a chromatic aberration for the measurement principle of the sensor. Since the Optical Caliper has actually been tested on line at one of paper mills in Japan during January 2008, increasing the number of customers has approved this sensor as the solution to solve their issues. Currently in Japan, all the Optical Caliper installed in Newsprint and White board Machines are utilized for the caliper profile control and have achieved zero-holes, zero-marking and zero-curl related sheet brake.

This paper introduces starting with the history of the caliper sensor, explains the measurement principle and tuning method of the Optical Caliper Sensor, and finalizing with the benefits of introducing this sensor in Newsprint and White Board applications.

High Dew Point Type of Totally Enclosed Hood System and Relative Equipments

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The Paper & Pulp Industry is obviously one of the most energy consuming one among all of the industries. It has been pursuing both recycling of waste paper and utilizing natural resources in various aspects. Especially, “How to save energy efficiently” is a vital target because of the recent rise of material cost and crude oil price.

Above all, energy consumption in dryer part in the paper production machine is the most focused whose consumption rate occupies more than half of the total energy consumed. Every paper manufacturing company is repeating its full efforts so that energy consumption rate may be minimized. Also they are pursuing longer life-time of their facilities as well as higher efficiency of maintenance and improvement of their environmental condition. Under such tendency, upsizing of machines with higher speed for wide papers has been widely promoted. Also, it sometimes required remolding of facilities such as hood system and ventilation equipment for reinforcement.

We, Shiratori Engineering, who has cultivated lots of technologies and know-how, have sufficient delivery experiences of the hood system to various customers. We herewith would like to explain the essence of “High Dew point type of Totally Enclosed Hood System and Relative Equipments”.

Technological Transition of Quality Control System

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QCS(Quality Control System) was developed in the end of 1960s, and it had come into wide use in Japan during 1970s through 1980s. Although QCS has started as a mere measuring instrument, its first installation has drastically changed the works related to the paper production. Therefore, in some cases, people even refers to QCS as, “The instrument that has altered the paper manufacturing procedure.” QCS has now become an indispensable system for manufacturing the paper in the modern days of paper production.

This report introduces technological transition of QCS focusing on recent 30 years after it has come into wide use, and also mentions on the origin and foresight of this equipment.

Technological Advance of Drive System for Paper Manufacturing Facilities

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There are a large number and a wide range of capacity of motors and drives applied to pulp and paper industries. Variable-speed drives are widely used for not only line-drive applications such as paper machine, winder and off-machine coater but also single-drive applications as boiler and paper machine auxiliary equipment. High performance and large-capacity variable-speed drives have been developed with advanced technology and innovation, changing from DC to AC, analog to digital control. This technological innovation includes digital technology with power device, main circuit and microprocessor, control technology with AC vector control and system network technology with high-speed communication.

This article describes the technological advance and history of drive system in the field of paper manufacturing facilities, introducing the latest AC drive system.

Kishu Mill: Reconstruction of Flood Damage from Typhoon No.12, September 2011

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On September 3rd of year 2011,the typhoon No.12 which landed on east of Kochi Pref. caused unpredictable amount of rain on Kii peninsula. The rain affected discharging of dam built upstream of Kumano River and record-breaking water level flooded the intake facility of industrial water, placed approximately 6km from the mill, and in house facilities such as KP, electric room and equipment of boiler. Mill had stopped its operation for 16 days.

In this report, we will put focus on restoration and countermeasure to the flood.

Power Supply Strategy of Nippon Paper Group

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The Nippon Paper group started the energy business promotion office for the purpose of using surplus electric power effectively in December, last year.

The strategy of the electric power business of the contents examined in order to promote the energy enterprise which harnessed the strong point of the group, and a group is introduced.

Outline of the Tomakomai Mill Hydropower Station

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Tomakomai Mill, Oji paper Co., Ltd.

Oji paper Tomakomai mill has nine hydropower stations in Hokkaido. Five of them are located in Chitose, two of them in Eniwa and other two of them in Niseko. The oldest one, Chitose No.1 power station was built as a power source of the Tomakomai mill in 1910. With expansion of the mill, other four power stations were added in downstream, in 1916 to 1941.

Even now these power plants are still working for power supply to the Tomakomai mill by executing careful maintenance. However, the plants have been deteriorating because they have been operated for 70-100 years. In order to intensify power generation business and contribute to low carbon society, Oji paper will refresh those hydropower stations in coming years.

The refresh construction includes renewal of control drive unit, inlet-valve, guide-vane and runner. In this report, we introduce outline of each power station and brief overview of the refresh construction.

A Summary and Operating Experience of Biomass Incinerator Plant

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With the aim of reducing CO2, saving energy and preserving the environment, we installed a biomass incineration plant within the Tonegawa Division in 2012.

At the former rotary kiln incinerator plant, waste heat from incinerating industrial wastes was not recovered and energy was not used efficiently. However, at the biomass incineration plant, energy is recovered by steam. This has allowed fuel (LNG) for boilers used as in-house power generators to be reduced and CO2 emissions to be cut significantly. After starting the operation of the biomass incineration plant, the volume of fly ash and bottom ash has increased, but total volume of industrial wastes has been reduced.

We intend to work hard to see to the safe operation of the plant.

Technology Development of Bioethanol Production from Woody Biomass

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Bioethanol Research Section, Oji Paper Co., Ltd.

Bioethanol produced from biomass is expected to become a sustainable energy source in the future since bioethanol has advantages over fossil fuels. Namely, bioethanol is a natural and renewable form of energy that does not increase atmospheric carbon dioxide levels, because burning biomass releases carbon dioxide that is largely balanced by the carbon dioxide absorbed in its own growth. In Brazil and the United States, bioethanol produced from sugarcane, corn and other crops is already being used as automobile fuel by blending with gasoline. Increase in bioethanol production may, however, leads to increase in food prices due to the competition with food production. For this reason, research on cellulosic bioethanol is being conducted, mainly in Europe and the United States, with the objective of realizing its production.

We report herein our company's research on development of bioethanol production technology with the combination of a mechanochemical pulping pretreatment technology, a simultaneous saccharification and fermentation technology using own heat tolerant yeast and an enzyme recycling technology, in which woody biomass (e.g., fast-growing trees and forestry residues) is used as a raw material to obviate competition with food production.

Development of Methane Fermentation Technology for Wastewater Treatment
-Investigation of Method to Prevent Flocculated Methanogens from Becoming Smaller by Addition of Starchy Wastewater-

Isao Onodera
NPI Research Lab., Nippon Paper Industries Co., Ltd.

Lately methane fermentation technology is widely applied in many industries because of the recent development in this technology has made wastewater treatment highly effective. One of the advantages of this technology is to recover energy as biogas from organic compounds in wastewater. This paper describes application of methane fermentation technology to KP mill evaporate condensate at Nippon Paper's two KP (kraft pulp) mills, the Yufutsu plant of Hokkaido mill and Iwakuni mill. Through the experience in actual operation of methane fermentation, it was recognized that there was a problem of overflowing granule from the reactor caused by upward flow in the reactor.

In order to look into the problem, we compared the properties of granule in Yufutsu plant with those in food mill which already established a stable process in methane fermentation treatment. As a result, filamentous acetic acid-degrading methanogens (Methanosaeta) was mainly observed in food mill's granule, while spherical methanol-degrading methanogens (Metanosarsina) was mainly observed in Yufutsu plant's granule. This difference of methanogen species, which was caused by methanol treatment, is presumed to weaken the cohesive force of granule, consequently making the granule remarkably fine. On the basis of the result of this investigation, we studied of method to prevent flocculated methanogens from becoming smaller by lab.-experiment. It was found that the addition of starchy wastewater was very effective. Trial at commercial plant showed that the addition of starchy wastewater increased Methanosaeta and granule became bigger and heavier.

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Characterization of Eucalypt Elite Trees for Pulp Production in Northern Brazil

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Amapa Florestal e Celulose S.A. (AMCEL), with the total area of 300,000 ha in Amapa state located in northern Brazil, operates eucalyptus plantation and wood chip production. AMCEL has outstanding features of flat and large bundled land, the distance to the chip mill and the port, abundant precipitation and warm climate. However, AMCEL could not make the most of these features because the growth of trees of plantation was not very good. After the purchase of AMCEL in December 2006, AMCEL has started the original selection and breeding program. As a result of continuous practice of the program, the growth of the trees was greatly improved.

The author stationed in AMCEL from 2009 to 2012 as a supervisor of Research Department and had been working on the improvement of tree growth and property through tree breeding program. In this report the business summary of AMCEL will be presented. Then the relationship between tree growth and the tree property of clonal forest, such as KP yield and wood basic density measured by rapid analyses method, will be discussed.

Optimization of the Condition in the Press Section

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In recent years, neutral papermaking, high-ash content of the printing paper and weight reduction in paperboard is in progress. At the same time, increase in the blending ratio of waste paper, closed water system, paper recycling rate, attributable to these trouble of deposit on the machine that has increased in the wet section, to pursue quality improvement and production efficiency and stability operations, has become a major issue.

Maintech has developed new "On-press®" and "Pitch guard®" series.

Release agent "On-press®" greatly improve the sheet release performance from press roll, especially Center Press Roll. Cleaning and prevention agent "Pitch guard®" significantly reduce stickies and other deposition in the wet section.

This report describes the concept and mechanism about "On-press®" and "Pitch guard®" series, and introduces actual case studies about pitch prevention, sheet, release improvement.

The Present Condition of the “AOKI CLEANER”in the Paper Manufacture Industry
-Blade Type Canvas Cleaner-

Narihiro Ohtaka
Aoki Machinery Co., Ltd.

In recent years the operation troubles of paper machine and its quality problems occur more frequently due to foreign materials including sticky pitch coming from increasing recycled paper usage. The sticky materials and pitch on canvas causes paper break at dryer, faulty spot, frequent splicing at winder, which decrease productivity.

Screening, pitch control chemical, high pressure water has been used to improve these situations, but these measures cannot solve the problems completely.

We, AOKI Machinery, has been developed “AOKI CLEANER”, an epoch-making blade type canvas cleaner. Let us introduce its mechanism and some operation facts.

Introduction of Raumaster Finishing System

Masashi Shibaki
Itochu Machine-Tehnos Corporation

Raumaster Paper was founded in 1984 in finland and one of the best company in paper and pulp finishing system. It has been over 20 and 30 years since current finishing system were started up in many paper and pulp mills in Japan and they are now facing the deterioration by long term use. Our company started the business with Raumaster Paper in 2012 in response to the market needs and would like to introduce Raumaster finishing system in this paper.

The Countermeasures for Reduction of the Fuel Consumption in Lime Kiln

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Over the past years, Taiheiyo Engineering Corporation (TEC), Tokyo has conducted numerous investigations in cement plants around the world for various clients who have process and operation problems or who are planning for innovations.

TEC have developed successful techniques to diagnose the existing cement plants and to overcome the existing process/operational problems and to reduce the fuel consumption and thus assuring stable kiln operation.

In the paper industry in Japan is implementing various measures to reduce the fuel consumption.
Although a certain improvement has been obtained, but not to the extent of large reduction of fuel consumption is obtained, so far.

Hence based on energy-saving technology adopted in cement plants, TEC has conducted extensive study in Lime Kiln operation achieved following successful results towards reduction of the fuel consumption.

1) Diagnosis of Lime Kiln : TEC have conducted a diagnosis study on existing Lime Kiln towards the existing process/operational problems and to found optimal countermeasures for reduction of the fuel consumption.
2) Replacement of existing Kiln Burner: By replacing the existing Kiln Burner with Taiheiyo's TMP Burner (Taiheiyo Multi-purpose Burner), TEC achieved improved burnability efficiency and reduction in the amount of primary air.
3) Adjustment of Lime Cooler: For the improvement of heat recovery efficiency of existing Lime Kiln Cooler, Grate Speed Control and Airflow Control was adopted to Lime Kiln Cooler, for better cooling efficiency.
4) Adjustment of Kiln Operation: TEC has reduced the amount of water at the Lime Kiln Inlet Housing, thus optimizing the O2 concentration control, and the raw meal filling ratio in the Lime Kiln.

As a result of adopting above mentioned countermeasures, TEC achieved a 13% to 15% reduction of the fuel consumption.

High-Efficiency and Power-Saving Closed Condensate Recovery System
-High Efficiency Control Method of Once-Through Boilers in Multiple Installation and Closed Condensate Recovery System for Small Once-Through Boilers-

Masahiko Murakami and Tomohiro Okubo
Miura Co., Ltd.

MIURA as a leading manufacturer of small once-through boilers has adopted “Plant infrastructure total solution” as a slogan and is promoting various eco-friendly proposal activities through water treatment devices for industrial water and compressors using in-plant process steam, and so on. This paper explains following technologies;

・Small once-through boilers with very high efficiency and quick response
・Closed condensate recovery system with high-efficiency and power-saving

Improvement of Existing Wastewater Treatment Facilities with Microbial Products and Chemicals to Control Offensive Odor

Kenji Hayashi
Mushugen Industries Co., Ltd.

Mushugen Industries Co., Ltd. is a manufacturer of microbial products and deodorants for waste water treatment. In the field of sewage treatment and disposal of human waste, we have different perspectives from other plant manufacturers. Using those perspectives, we have been working on the trouble of existing waste water treatment facilities and improving its function for long time. The microbial products and deodorants of technology cultivated in it, and the maintenance management know-how using these products.

Based on those, we have promoted the application in the field of pulp and paper waste water treatment from six years ago. In terms of functional improvement of the existing waste water treatment facilities, the needs of the current situation is met which is obtained certain results. In conjunction with knowledge about the characteristics and problems of the pulp and paper waste water treatment obtained so far, to introduce a summary of them.

SUCCESS FORMER Started-Up for 2Ply Lightweight Linerboard

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Although the growth rate has become slow down recently, Chinese paper industry still keeps higher level of its expansion. Our company continues supplying formers from the beginning of 1980, and we take pride in having supported the growth of industry. The occurrence which has deeply recognized us, is a remarkable progress of Lee & Man Paper Manufacturing Ltd. which acquired the 2nd place of paper and paperboard production in China. It was only a 100,000-ton /year with two paper machines until 1999, however, it has become the production capacity of 30 times or more in about ten years. The opportunity of employing the first Success Former for PM3 in 2000, may have become a landmark for the subsequent progress of Lee & Man Paper. Success Former features both high quality and productivity with excellent energy saving former operation. The results are four continuous repeat orders for PM5, PM10, PM11 and PM13, respectively. The forming sections of all above machine consist of three-ply Success Formers with sheet transfer felt systems.

In order to meet an industrial demand for producing light-weight linerboard, two-ply on top former with fourdrinier as a base-ply, was installed as PM16 in 2011. The top former is a Success Former which has received high reputation from the customer. This paper makes the introduction of the forming section of PM16, and reports the conditions of its successful start-up.

The New Internal Sizing Agent for Paperboard as an Alternative to Rosin Materials

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Arakawa Chemical Industries, Ltd.

In recent paperboard manufacturing, recycled paper is used as the main raw material. The recycled material involves deteriorated fiber and much filler such as calcium carbonate (CaCO3). Higher CaCO3 content in pulp slurry will increase pH, therefore acid additives such as alum will be neutralized and easily lose their ability. To make matter worse, Paper manufacturers will tend to avoid the addition of acidic compounds. Higher pH condition and lower addition level of Alum causes lower sizing degree, in particular the case of rosin size.

In neutral-alkaline papermaking condition, AKD or ASA is commonly used instead of rosin-Alum system. However, in the case of paperboard, slow speed in inducing sizing of AKD, paper slipperiness trouble, and deposit or poor machine runability trouble on ASA will be recognized. In this report, a new type sizing agent will be introduced. It must cover wide range pH of wet-end condition and can be possible to replace rosin-Alum system.

On-line Drainage Meter in the Forming Section -Introduction of “FiberScanFIX”-

Masaru Futaba
Nomura Shoji Co., Ltd.

Cristini in Italy released a portable drainage meter in the Forming Section with microwave technology in 2004 and it has become a standard tool for diagnosing the Forming Section because of its accuracy and wide range of measurement values. FiberScanFIX was developed as on-line system based on portable FiberScan.

In this article, the benefits of measuring with FiberScan FIX on-line drainage meter in the Forming section are introduced. Diagnosis of the Forming Section with FiberScan FIX enables the process optimization and saving costs.

Possibilities of Optical Sensors -Consideration on the Functions and Applications-

Keijiro Suzuki, Takuya Maekawa, Ryohei Watanabe and Yoshio Ishitsu
Spectris Co, Ltd.

BTG has been engaging to develop a number of solutions in Pulp and Paper process with the epoch-making brand-new technologies for more than 80 years. By the Tohoku earthquake and Tsunami, the Japanese Pulp and Paper industries faced the big difficulties and this forced us to find the new way of business. In this paper, we show the possibility of raising the productivity and profitability with BTG optical sensors.

Development of High Quality Porous Fillers (Part I)
-Study of the Effect of Particle Properties of Porous Fillers on Bulkiness and Opacity of Paper-

Manabu Yamamoto
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Hiroyuki Wakasa
Core Technology Laboratory, Oji Holdings Corporation
Hitoshi Okada
Japan Pulp & Paper Research Institute INC.

Due to their low specific gravity, porous fillers, including precipitating silica, have, in recent years, been increasingly used as additives (fillers) for the purpose of increasing paper bulkiness (reducing weight). The use of porous fillers has advantages such as continued utilization of existing equipment without the occurrence of discoloration problems inherent with mechanical pulps. However, problems such as degraded paper strength still remain to be solved. In view of this, we have conducted a study in an attempt to develop a high quality porous filler with superior bulkiness performance, excellent opacity and minimal degradation in paper strength.

This report reveals that a porous filler with minimized degradation in paper strength, high bulkiness performance, and excellent opacity has been obtained by optimizing the primary particle diameter and the secondary coagulation particle diameter.

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The Construction of TOKYO SKYTREE®
-The Challenge toward the World's Tallest Tower-

Hiroshi Takagi
Obayashi Corporation

TOKYO SKYTREE is the world's tallest broadcasting tower with the height of 634 m. This paper presents the unprecedented technical and engineering challenges of this project, such as: the extraordinary wall foundation that support the tower with a very small footprint, the unique vibration control system that depress the seismic shake of the tower by a half, "lift-up construction method" of the antenna spire that eliminated variety of problems associated with working at an extreme altitude, and the very rapid construction of the core column using "slip form method", to name a few. All those were indispensable for the successful completion of the project, ensuring the safety and quality while shortening the construction period.

Introduction of Color Web Inspection System that Used Three CCD Camera

Shuji Abe
Oita Mill, Oji Materia Co., Ltd.

In late years , the quality demand of white board from customer become very severe.
Especially for food and medical supplies , there is a demand which must avoid a red spot in order to image the color of blood . Also a performance of Web Inspection System is asked to detect color spot , with increasing quality demand .
Oita No.2 cutter produce white board . Web Inspection system of No.2 cutter saw the 20rd year from installation . we replace the Web Inspection System in September , this year.
In this paper , we would like to explain the details of deliberation and operating situation

Introduction of Automatic Control System for Fiber Orientation

Fumihiko Saito
Ishinomaki Mill, Nippon Paper Industries Co., Ltd.

7M/C at Ishinomaki mill was used to produce base stock for coated paper 380t/d before the tsunami impact of last year. But nowadays, 7M/C was remodeled to the copy paper machine to enter into copy paper business.
The domestic market for copy paper is very competitive because the share of the import paper has intensively expanded, due to strong yen. Copy paper requires copy aptitude qualitatively, and to control fiber orientation is important to improve curl quality.
This report introduces summary of the modification work carried out for the production of copy paper and a case study of the introduction of automatic control system for fiber orientation.

New Model QCS Installation Example

Takahiro Tachibana
Mishima Mill, Daio Paper Corporation

Fine coated printing paper is one of the main products produced a Daio Paper's coastal mill. The N7M/C,N8M/C,3C/M QCS Systems were updated to the new Honeywell QCS (Experion MX) last July in order to improve the quality at the coastal mill, and the (ProCoat) cross direction actuator was introduced to the 3C/M. The new QCS scanner frame has been redesigned, and a new generation of measurement performance specifications can be expected. In this report, We will introduce the features and operating experience with the new QCS system, and we are the first comparing with this unit in Japan.

Introduction and Deployment of Temperature Monitoring System for Wooden Chips Conveyor in Biomass Boiler Facilities

Makoto Kumakura
Kanto mill, Hokuetsu-Kishu Paper Ltd.

At Kanto factory in Hokuetsu Kishu Paper, Katsuta engineering department started commercial operation of wooden biomass generation boiler in September 2006, which utilizes wooden materials such as building wooden scraps, thinned wood and paper sludge as fuel.
In this boiler, conveyor belt facilities are deployed for transportation of the wooden chips which are used as main fuel. But some fire occurrences in these conveyer belt facilities are reported so far in other company. In order to prevent from such serious fire disaster, we installed fiber-optic conveyer temperature monitoring system in May 2012, for the purpose of fire detection in early stage, and of preventing from fire spreading.

Evolutionally-Advanced Web Inspection System with "Multi-Wave-Sensing" Technology

Jun Ikeuchi
Inspection Systems Business Div. Omron Corporation

Recently, Web Inspection System (WIS) has been expected to enhance the quality of paper production with the highest efficiency. Since OMRON delivered WIS in the market of paper production in 1965, we have developed the latest web inspection technology, such as CCD camera, recording of inspection images, and color-inspection. Moreover, higher and higher quality for paper productions such as functional sheet will be required. In order to meet these requirements, we have developed original next-generation inspection technology named "Multi Wave Sensing". Today, we would like to show you the backgrounds, features, and benefits of the technology, and share our perspective of advanced inspection with the technology.

Main Features and Field Cases of Color Surface Inspection System　(MaxEye.Color)

Masahiro Suzuki
FUTEC Inc.

A sheet surface inspection system, equipped with the monochrome line scan cameras, uses inspection object's contrast and shape data for defect classification. Therefore it makes difficult to classify the defects by color. Another reason for the difficulty of defect classification by color is that the conventional color line scan camera (drive frequency: 40MHz) is not capable of having enough MD resolution for clear image.

Now, FUTEC has developed a new surface color inspection system, "MaxEye.Color", using high-speed color line scan camera technology with a drive frequency of 80MHz. Three main features of this system are: (1) a clear color image of defect, (2) an intuitive color defect classification setting, (3) a real-time color defect classification .
This system enables operators to see sharp, clear color view of defects to determine the cause of defects in early stage of production. Furthermore, it carries out the automatic defect classification for color defects only by using real time processing function. This function contributes to the operation efficiency by supporting operators' checking process.

Next-Generation Inspection System

Atsushi Kurosaki
Surface Vision, COGNEX K.K.

Cognex has developed new inspection system “SmartView” and related products, “AWA”, a winder control system, and “SmartSystem”, an integrated system of SmartView” & “SmartAdvisor” a monitoring system for recent 10 years. We would like to review the progress of our inspection systems and to look the prospects for the future of inspection system.

Simple Environmental Water Quality Analyzer

Kiyoshi Ogawa
Sales Planning Dept., DKK-TOA CORPORATION

The environmental law regulates the upper limits of the concentrations of harmful substances in the discharge water. Every facilities will be imposed the penalties based on the law if depart from these standards, and also causes adverse impact to corporate image. To avoid these risks, continuous monitoring of the drainage is desired. The analysis of high accuracy is often time consuming. In order to take quick measures to the leakage of hazardous components, rapid detection of leakage is required. To prevent the leakage of hazardous components, rapid detection should take precedence over accuracy.

Simple and rapid water quality analyzers are used in many facilities. Some of them judge only ON-OFF of hazardous components in the sample. But many of them are able to obtain good correlation to legal method. Some examples of simple and rapid water quality monitoring instruments are shown below.

Smart Wireless Solutions Brings Great Success to the Many User's
-Success Story: NIPPON Paper and Other Industries-

Hitoshi Tsuruta and Kuniharu Imato
Plantweb Center, Emerson Process Management Process Systems & Solutions Center,
Emerson Process Management

This paper mentions about typical WirelessHART applications and how WirelessHART application users are starting and growing their networks.

Then we'll go into some of the technical details of the technology - focusing primarily on what makes Emerson's Smart Wireless different from WirelessHART solution from other vendor.

Introduction of Inspection System for Appearance Quality of Flat Sheet

Takayuki Ikeda
Engineering Center, JFE Electrical & Control Systems Co., Ltd.

JFE Electrical & Control Systems Co., Ltd. has developed an appearance inspection monitoring device with optical image sensors of the flat sheet for the finishing line of a paper mill. The inspection monitoring device detects defects on the surface of paper, such as sticking paper particle, paper folded and abnormal aligned. These are considered as one of the most important quality control index for the paper mill. Advanced technology for image processing has been applied to detect the defect with high accuracy.

Two monitors have been already installed and are in operation in the paper mill company, in addition another four monitoring devices with the same technology are being used for plain paper copier.

A Report on TAPPI PaperCon 2012
-April 22-25, 2012 at New Orleans, USA-

Kosuke Okamoto
Iwanuma Mill, Nippon Paper Industries Co., Ltd.
Ayaka Miyachi
NPi Research Laboratory, Nippon Paper Industries Co., Ltd.

PaperCon2012 was held in New Orleans, USA on April 22-25, 2012 hosted by TAPPI (Technical Association of Pulp and Paper Industry).Total participants were more than 1,500 people and exhibition was more than 100 associations. Summaries of several presentations were described.

Development of On-Line Moisture Sensor System

Shinichi Nagata and Hidetada Sawamoto
Technological Initiatives Research Laboratory,
Oji Holdings Corporation

In recent years, the paper or film products with new functionalities have been developed increasingly. We also have been developing new products with several functionalities. In the coating process, especially water-based coating, the control of moisture content after drying is very important to improve the product quality. At the beginning, we also introduced a moisture analyzer of infrared type to measure the little moisture content in the coated product. But it was found that the infrared type was not suitable for measuring the little moisture content because it was affected by the around heat source or the base materials' absorption and was not stable over a long period. So we started to develop the moisture sensor system by ourselves. Through trial and error, a new on-line moisture sensor system has been developed. The measurement principle is based on the dielectric loss of the water which is very large compared with those of other materials. We introduced the original microwave resonator to detect the dielectric loss of the water in the products. This sensor system is now necessary for producing the commercialized coated products in our mill.

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Biodiversity Initiatives at Nippon Paper Group

Keiko Watanabe
Nippon Paper Industries Co., Ltd.

Nippon Paper Group is a corporation closely connected with biodiversity. We utilizes trees, a renewable resource provided from ecosystem services, to provide society with products such as building materials, paper and chemical products and support people's lives and contribute to cultural development. The loss of forests would lead to a loss of our operating base. Continuing the stable supply of products that utilize forest resources by taking into account biodiversity and pursuing sustainable forest management is one of the Group's social responsibilities. For this reason, we have established "helping preserve the global environment over the long term and contributing to the development of a recycling-based society by carrying out corporate activities in recognition of the importance of biodiversity"as the philosophy of our Charter on the Environment and undertaken a variety of initiatives in this area.

This report focuses on the activities undertaken by Nippon Paper Group, whose operating base is forest resources, to ensure the continuity of its business. The report will introduce activities the Group has undertaken to preserve biodiversity from the dual perspectives of "initiatives through core business activities" and "initiatives utilizing in-house resources and technologies."

Application of Cellulose：Manufacturing Stronger and Lighter Bioplastic Combined Cellulose with Plastics

Soichi Takahashi, Hiroyuki Tanaka, Hiromi Hashiba and Kisaku Shimizu
Chuetsu Pulp & Paper Co., Ltd.
Wataru Mizuno
Toyama Industrial Technology Center

In recent years, because of increasing of interest in development of the low-carbon society, many researchers are studying to replace from petroleum-derived materials to eco-efficient plant derived "green" composites materials . Natural wood is the most sustainable and renewable resource and stockpile of natural wood on the earth will reach a trillion tons. Pulp mill has been living with the production and sale of pulp and paper as core business by using these natural woods.

Pulp is mainly consisted from cellulose fibers that have several ten micrometers diameter, the unit element in the fibers composition is cellulose (nano)fibrils that possess diameter ranging 1 to 100 nanometers with a high aspect ratios. These fibrils can be easliy dispersed in water by chemical modification (surface oxidation, acidic hydrolysis) or high pressure shearing, and the dispersed nanofibrils are called cellulose nanofibers (CNF).

We have produced various cellulose nanofibers from our own pulps and studied the composites containing CNF and polypropyrene (PP). As a result, it was confirmed that improvement of the mechanical properties by blending a few percent of CNF to PP resin. In addition, Interestingly, depending on the degree of fibrillation level of CNF, the composites were shown different mechanical properties for each. Improvement effect of CNF-composites shows a tendency to decrease in composite materials with CNF which has been too progressed fibrillation. Therefore, it was suggested that the optimum fibrillation-level of CNF for improvement of mechanical properties of composites might exist.

Operating Experience of Hyper-Cell Floatator

Hisashi Iwabuchi
Hokkaido Mill-Yufutsu, Nippon Paper Industries Co., Ltd.

In Japan, the utilization rate of recovered paper reached 63% in 2009. Except paper board, ONP is mainly used for recovered paper. Since news paper quality, such as ash content, has been changed, ash and microsticky removal is required, especially at the flotation process for paper recycle. In order to improve DIP quality and promote further use of DIP, AIKAWA Iron Works Co., LTD. and Nippon Paper Industries developed the state-of-the-art floatator “Hyper-Cell Floatator” and installed in Hokkaido Mill-Yufutsu in 2008. This report introduces our operating experience of Hyper-Cell Floatator.

Efficient Use of the Residue of Bio-Fuel Production
-Paper Production from Sweet Sorghum-

Atsushi Ohno and Shinichi Hara
Toho Tokushu Pulp Co., Ltd.
Youji Nitta , Fumitaka Shiotsu , Naomi Asagi and Takashi Homma
The College of Agriculture , Ibaraki University

When we get lack of energy, as the energy demand grows, there comes the time to research biomass energy. But the enthusiastic researches fade away, sooner the oil price gets down to be stable. It has been 20 years since they started research sweet sorghum as a bio-fuel at Ibaraki University. To make bio-fuel, sugar is extracted from sweet sorghum and fermented to be ethanol. They actually made success to run automobiles with the bio-fuel. It is a great progress. Here we suggest another point of view for sweet sorghum, to make pulp from the residue of bio-fuel. There remains a lot of cellulose after sugar extraction in the sweet sorghum. We found that it is possible to make pulp from the residue of sweet sorghum, and furthermore the strength of pulp is stronger than that of LBKP. We finally produced envelopes available for general use, enhanced the value to the residue of bio-fuel. Since it is true that it costs a lot to make pulp from the residue, reduction of pulping cost is the first problem to solve. Anyway, it is significant to contribute to study the biomass, not only for bio-fuel but for the residue to reduce waste or costs.

Energy Saving Strategy with Steam-Driven Compressor

Toru Mizutani
Tokai Mill, Oji F-Tex Co., Ltd.

At the Tokai mill of Oji F-Tex Co., Ltd, the steam generated by boilers is adjusted through reducing valves to a required pressure and supplied to each equipment. Although one of the ways to utilize the differential pressure is to generate electric power using a steam turbine, the Tokai mill does not adopt this kind of system because its differential pressure and steam consumption are not so high.

Meanwhile, a steam-driven compressor has been introduced to the Iwabuchi and Fujinomiya manufacturing sites. One of the reasons for adopting the compressor is that paper machines use a lot of compressed air.

The steam-driven compressor is operating smoothly, and therefore allows some electric compressors to be on standby. It has led to reducing both energy consumption and frequency of maintenance on the electric compressors.

This paper describes the introduction effects of the steam-driven compressor.

#5 Paper Machine Dryer: Energy Saving Introducing High Dew Point Enclosed Hood System

Zenji Motoyoshi
Edogawa Mill ,Oji Materia Co. ,Ltd.

Oji Materia Co., Ltd. Edogawa Mill is only one white board paper production plant in Tokyo metropolitan area that is located in the eastern end of this capital city. This plant has significant geographical advantages. It can be easily gathered abundant of waste paper and is also very close to the vast market. Miura Co., Ltd.

The Edogawa Mill is running to produce white board paper with company’s theme of “Living together with people & local communities there”. In this plant, #5 paper machine has started full production in May 1971 as specialized making white board paper. Current production is about130000 tons per year and the products are mainly delivered to the paper container industries.

The dryer part out of the whole paper production process is the most energy consuming section and considered it most effective for energy saving if it can be modified appropriately. However, such modification work for the dryer part including hood system had not been realized in the past due to possibly vast investment.

Now, we have carried out renewal of both the dryer hood and the air supply/exhaust equipment which has enabled to achieve the saving of steam and electricity. We would like to hereby explain an outline of the modification of the dryer hood system and also describe how energy saving effects was attained with it.

Efficacy of Energy Saving Project in Niigata Mill, Hokuetsu Kishu Paper Co,,Ltd.

Minoru Sakaue
Niigata Mill, Hokuetsu Kishu Paper Co., Ltd.

Recent years, the global warming is the one of the biggest issue for us. Especially, reducing carbon dioxide emissions which are well known as a greenhouse gas is our main concern. Because of these movements, we need to expedite both the reducing fossil fuel consumption and the saving other energy consumptions at the same time. In order to approach these issues, we have started the energy saving program at Niigata mill since 1980's and these works have brought great success. However, after we installed the new paper making machine PM9 and converted the other related processes such as the pulping, the bleaching and the chemical recovery facilities, the energy consumption surged and that cost put pressure on our profit.

In this report, we introduce the energy saving program at the Niigata mill and give the detail of our achievements after we installed and converted the new processes.

An Operating Experience of Partial Borate Autocausticizing

Tomofumi Kogawa
Technical group, Technical department, Hachinohe mill, Mitsubishi Paper Mills Limited

Partial borate autocausticizing (AC) is the patented technology from U. S. Borax Inc. which partially replaces lime causticizing with borate AC. In Hachinohe mill, we conducted partial borate AC by adding borate to recovery cycle from March 2010 until March 2011.

The AC level reached up to 10%. Partial borate AC made it possible to increase white liquor (WL) production without any equipment investments. The amounts of burnt lime and heavy oil required for producing every tons of WL were both decreased.

The cost of WL produced by borate AC was lower than the case which purchased lime was used for WL production.

Application of Biomarker Technologies for Afforestation

Nobuyuki Nishikubo
Forest Technology Laboratories, Research & Development Division, Oji Holdings Corporation

Oji paper have been expanding the oversea plantation area to 240,000 ha until 2012. These logged trees are utilizing to make lumber, plywood and wood chips. The selection of the appropriate tree to each plantation environment is required, because it is different weather and soil conditions between each plantation. The selected excellent trees propagate by cutting and plant as clonal plantation. Therefore restrict conservation of these selected trees are important for future production, wood quality and yield ratio of lumber.

To control production and quality, we developed identification method with SNP biomarkers. Using the SNP marker in E. pellita clonal trial and clone bank, we successfully identified and rearranged for more than 100 kinds of clones.

The Classification and Kind of Paperboard

Akihiro Yamamori and Taku Uchiumi
Oji Materia Co. ,Ltd.

The paper and pulp industry has mainly developed at the area of printing paper. The paperboard and high performance papers have been focused in recent years due to industrial structure change.

The production of the paper and paperboard fell off sharply after Lehman Shock in 2009 and has remained lower level in Japan. The consumption of printing paper has been decreasing year after year due to emerging of new digital device and depression. However, the consumption of paperboard has shown stable growth.

On the other hand, the production of the paper and paperboard in the world keeps higher growth rates because of economic growth of China, India and other Southeast Asia. The presence of the paperboard has been increasing in the paper and pulp industry.

We will describe the outline about the paperboard.

Molding of the Category of High Performance Papers
-The Technological Locus of High Performance Paper Society-

Yoshinari Kobayashi
Kagawa Prefectural Industrial Technology Center

In 1962 “High Performance Paper Society” was initially found as the name of “Chemical Fiber Paper Society” by researchers of Shikoku National Industrial Research Institute and Prefectural Paper Industry Technology Centers in Shikoku with challenging the targets of making paper from rayon and synthetic fibers. In 1982, with shift of industrial requirement the purpose of the Society was revised to research the science and technology for making papers by wet-laid from almost all kinds of short fibers, that is, natural, regenerated, synthetic, inorganic and metallic fibers. This meant enlarging the definition of paper. Reflecting on the 50 year history of the Society, the category of high performance papers was safely said to have been established for core industries in parallel with that of general use paper from plant fibers. The main accumulated technologies for high performance papers were chronologically overviewed by dividing decade years.

Report on the Results of the Fiscal 2012 Follow-up Survey on JPA's Committed Action Plan and Efforts against Global Warming in the Japanese Pulp and Paper Industry

Naoki Ikeda
Japan Paper Association

The Japan Paper Association (JPA) has been actively working to save energy since 1997 when it established its “Committed Action Plan on Environment”. JPA declares its policy of restraining CO2 emissions in the action plan, and is working toward the following targets revised in September 2007:

・On a five-year average basis from fiscal 2008 to fiscal 2012, reduce fossil energy consumption per ton of production and fossil energy derived CO2 emission per ton of production by 20% and 16% from the level of fiscal 1990, respectively

・By fiscal 2012, expand forest plantation area owned or managed by the industry at home and abroad to 700 thousand hectares.

Since fiscal year 1990, JPA has made a survey on the actual results of energy consumption in the year, and published its results compared with that in fiscal year 1990. This report shows the results for fiscal year 2011.

According to the fiscal 2012 survey, pulp and paper industry's fossil energy consumption per ton of paper production and f in fiscal 2011 was 25.4% lower than the level of fiscal 1990, which is almost the same level as previous year. This is mainly thanks to manufacturers’ continuous energy saving efforts and improved production efficiency through restructuring their production system, in spite of a significantly decreased production.

On the other hand fossil energy derived CO2 emission per ton of production was 20.1% lower than the level of fiscal 1990, a 2.6 points deterioration compared to the level of fiscal 2010, due to an increased in-house power generation to address electricity shortage caused by the Great East Japan Earthquake and change in fuel mix with production shift to unaffected mills from large mills damaged by the disaster.

In addition to the results of the follow-up survey, this report introduces the position of the pulp and paper industry in national energy consumption and CO2 emissions, and information such as JPA's Action Plan for low-carbon society and the impact of the raise in electricity prices on the industry.

What I've Learned from my Life in Germany

Satoshi Kano
Mitsubishi HiTec Paper Europe GmbH

Mitsubishi HiTec Paper Europe GmbH (MPE) belongs to Mitsubishi Paper Mills (MPM) in Japan. In 1999 MPM assumed the majority shares in both German special paper Production sites, which are Mitsubishi HiTec Paper Bielefeld GmbH and Mitsubishi HiTec Paper Flensburg GmbH. In 2010 the German companies in Flensburg and Bielefeld have been merged to MPE.

Two production sites of MPE operate in accordance with strict quality and environmental standards. Customers gain from the excellent Japanese research centers and internationally organized distribution network. MPE is known world-wide for its excellent quality of products, exceptional power of innovation and excellent service.

Development of High Quality Porous Fillers (Part2)
- Basic Study on Effect of Alkaline-Resistant Microparticles on Particle Properties and Paper Quality -

Manabu Yamamoto
Advanced Technology Laboratory, Oji Holdings Corporation
Hiroyuki Wakasa
Core Technology Laboratory, Oji Holdings Corporation
Hitoshi Okada
Japan Pulp & Paper Research Institute INC.

Due to their low specific gravity, porous fillers such as synthetic silica are being increasingly used as an additive to increase paper bulkiness. The use of porous fillers has advantages such as continued utilization of existing equipment with no requirement for the installation of new equipment such as a shoe calender. Porous fillers also prevent the discoloration problems inherent with mechanical pulps and the soiling of the paper machine that occurs with the use of a fatty acid derivative or special surface-activate agent as a bulking agent. However, there are still outstanding issues such as degraded paper strength, although the level of degradation is lower than with other paper-bulking techniques currently being applied. In view of this, we conducted a study in an attempt to develop a high-quality porous filler with superior bulkiness performance, excellent opacity and minimal degradation in paper strength. In the first report, we revealed that a porous filler with minimized degradation in paper strength, high bulkiness performance, and excellent opacity had been developed by optimizing the primary particle diameter and the secondary coagulation particle diameter.

This report reveals that a porous filler with minimized degradation in paper strength, high bulkiness performance, and excellent opacity was developed which uses alkaline-resistant
microparticles during the reaction. This enables control of primary particle diameter, secondary coagulation particle diameter, and particle size distribution.

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Integrated Solution for Resource Management and Cost Reduction in Fiber Lines

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In Japan, pulp production cost is one of the highest in the world mainly due to ever increasing cost of the imported wood chips. Given the variations in wood maturity and subsequent chips quality, it is always a challenging task to maintain smooth operations in the pulp mills. Hence to minimize this effect, it is necessary that more attention is given to cooking and washing operations for an optimal runnability of the fiber lines. The optimization of digester and brown stock washing operations will bring substantial improvements in bleaching and evaporator plants' operations together with higher pulp quality. As part of the digester optimization, the use of PenSurf Technology offers great benefits of improved production and in reducing and overall total cost of operations.
Further to minimize water borne issues, it is necessary to take the right steps to avoid scale formation in pipe lines and equipment particularly in the bleach plants. The drainage aid for the lime mud dewatering offers great advantages in not only increasing dry solids but also in minimizing the energy cost.
In addition to the process optimization, implementation of an integrated solution for specialty chemical management will not only achieve desired synergy for improved plant runnability and pulp quality but also set a new example of efficient resources (fiber, water and energy) management in pulp mills lower production cost and better environmental sustainability.

System Upgrade for Stock Preparation and Approach Flow

Masamori Tanaka
Paper Machine Eng. Dept., Voith IHI Paper Technology Co., Ltd.

Fiber recovery system is one of the most important parts not only for approach flow but also for all of paper making system. To recover fibers can gain better yield, and to make clearer filtrate helps reducing specific water consumption. Moreover, if the consistency of white water is decreased by Fiber recovery system, it saves the consumption of power and chemicals, and also size and number of machines in water treatment system dramatically. DiscfilterTM helps this solution with state-of-the-art technology as BaglessTM sectors and Filtrate valve. C-bar F basket is another solution which has less installation cost. These technologies will supply much more benefit for the environmental-related future.

New Board Machine Concept

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The global containerboard production is moving toward lighter basis weights [1]. While the basis weights have decreased, the use of recycled fiber as containerboard furnish has increased. This is especially so in Europe where strong testliner is made primarily from old corrugated containers (OCC) and other recovered paper grades.
The trend towards a more lightweight containerboard and a higher OCC content has opened the doors for high machine speeds through the use of a gap forming concept. Metso has utilized the long and extensive experience of efficient, fast-running paper machines when building fast containerboard machines.
Following machines are introduced in this paper.
Propapier PM 2 at Eisenhuttenstadt, Germany.
Fujian PM6 at Zhangzhou, China
Saica PM11 at Manchester, UK

Jian PM3 at Jiaxing, China

EVERLOY Spray Nozzles for Paper Mills

Shunsuke Makino
Everloy Shoji Co., Ltd.

Kyoritsu Gokin Co., Ltd. which is one of the leading manufactures of spray nozzles was founded in 1938 in Japan. The company brand : Everloy is well known especially in Japan. The more paper machines are large and speed is fast, the more demands for spray nozzle is increase. With such continuous demands, spray nozzles became indispensable high precision parts nowadays. EVERLOY will introduce Straight Jet and Flat Fan pattern nozzles for paper mills.

Formulations for High Speed Coated Inkjet Paper

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IMERYS Pigments for Paper & Packaging Europe
Tatsuya Narahara and Etsuya Misawa
IMERYS Minerals Japan K.K.

Within a global market for printing and writing that is at best flat, consumption of paper for coated reel-fed (high speed) inkjet is growing. Growth is driven by the potential to print on demand, reducing the need for high inventory of printed material and making it possible to personalise the content. The rate of growth and ultimate target market size is widely debated by analysts and commentators, with the key difference being whether coated inkjet can also take market share in coated magazines from traditional offset printed grades.

One of the most significant hurdles to delivering mass commercialisation of coated inkjet paper for magazines is the availability of a cost-effective paper substrate in a range of grades which has the look and feel of traditional magazine paper. This is because making good quality inkjet-compatible coated paper is challenging. In terms of mineral components, silica or surface modified mineral pigments are typically used to create a suitable pore structure that enables sufficient capillarity to give fast removal of the fluid components of the ink together with large pores to enable drainage of the ink volume. These types of mineral pigments are typically expensive compared to traditional coating pigments and inherently require low application solids which can prevent high speed coating. Other existing solutions are based on a cationically-charged formulation to help fix the ink close to the paper surface. This causes problems on paper machines that spend most of their time producing under anionic conditions. As a result, the papermaker must take great caution to avoid any contamination when switching between production runs.

IMERYS has been working to overcome these issues in order to assist the papermaker in bringing to market a formulation that could genuinely make mass adoption of coated inkjet paper a reality. Our philosophy has been to concentrate on more traditional mineral pigment types from our extensive portfolio of materials and grades to enable high application solids and to maintain anionic formulation chemistry, reducing the pressure on the papermaker who wants to produce in campaigns. To make this possible, it has been necessary to develop a full-formulation understanding for this concept.

In this paper we will expand on our view of the coated inkjet market, its size and technical needs. We will introduce the techniques that we have developed for characterising these papers and share application data of our proposed formulation concept, benchmarked against appropriate commercial grades.

The Non-Cooler Cartridge Mechanical Seal for the Hot Water Pumps

Hidekazu Takahashi
Engineering Div. , EAGLE BURGMANN JAPAN Co., Ltd.

In a pulp & paper plant, many numbers of varieties of pumps are utilized such as water pumps, pulp pumps and chemical pumps all through the production processes from digesting to painting. Recently, a mechanical seal has been selected as a standard sealing device for such pumps. A cartridge seals are coming into wide use for work improvement, for being easy to handle and for installing correctly. And then the cartridge seals are used not only non-flushing use but non-cooler use for hot water pumps in a plant. I will introduce the latest technology trend about the non-cooler cartridge mechanical seals for the hot water pumps.

Optimization of Paper Machine Wetend by Optical Consistency Sensor which can Measure Ash Consistency
-Switchover of Quality Control from Dryend to Wetend-

Ryohei Watanabe, Takuya Maekawa, Yoshio Ishitsu and Keijiro Suzuki
Spectris Co., Ltd.

BTG is a global market leader in measuring instruments for Pulp and Paper process and has been continuously developing the new innovative technologies.
After the earthquake in 2011, the import paper from China and Europe is increasing, and this has gave serious influence to the management of Japanese paper companies.
In this paper, BTG provides the way to improve the profitability of the paper machine by the optimization of the wetend and the stabilization of the basis weight with our optical consistency sensor.

Energy Saving by Reducing Water Content of Lime Mud Filter Cakes

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Kurita Water Industries Ltd.

In KP caustic recycle process, a large amount of heavy oil is used as fuel of lime calcinations in the rotary kiln. Reducing the water content in the lime mud is an effective way to reduce heat loss in the lime kiln, and save heavy oil.
This paper focused on a dewatering technology to increase the hydrophobic of the surface of CaCO3 particles by a new developed chemical. It is found that the lime slurry temperature is an important effect on dewatering aid. A new dewatering aid is developed by optimizing the hydrophobicity and its molecular weight. The new dewatering aid achieved 10% of heavy oil saving in a machine trial.

The Long Experience of Anaerobic Wastewater Treatment System for Pulp Mill Wastewater

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and Atsushi Nakano
Development and Analysis Center, Sumitomo Heavy Industries Environment Co., Ltd.

The EGSB anaerobic wastewater treatment system is a very competitive method compared with aerobic treatment system because of space and energy saving system. We constructed the Biobed EGSB system in Pulp Mill for the treatment of drain wastewater from KP evaporator and operated over five years.
The performance of EGSB system is good as for the removal rate of CODCr is about 80%, then we achieved the aimed energy-saving effect.

The Efficient Use of Paper Sludge Ash as a Soil Improvement Material

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The paper sludge (PS) ash of Nippon Paper Industries Co., Ltd. Yoshinaga Mill had been re-used only for cement, but we started the development of soil improvement material as other application of PS ash with Fujita Co.,, Ltd. . The results are followings.
1. The PS ash of Yoshinaga Mill is suitable for soil improvement material as it has
excellent absorption capacity comparing with another product.
2. The PS ash of Yoshinaga Mill doesn't include harmful components except the elution of fluorine.
3. The manufacturing of soil improvement materials could be realized by establishing the appropriate treatment to control the elution of fluorine.
4. It is possible to control the elution of heavy metal and bad smell of mud.
In this paper, we show the treatment method, fundamental properties of the improvement materials and report the results of application to some actual construction fields (dredging harbors and rivers and improving the illegal dumping spot). At present we examine the application for debris classification of the 2011 Off the Great East Japan Earthquake.

Carbon Credit Program in Alberta, Canada
- Carbon Offset Credit by Portable Chipping -

Kazuyoshi Noguchi and Takuya Yamamoto
Daishowa-Marubeni International Ltd.

With increasing dependence of U.S. oil imports on Canada, Canadian oil sands production is growing significantly. Oil sands deposits are found in Western Canada, mostly in Alberta.

Due to its unique nature, oil sands production requires significant amount of energy. In terms of greenhouse gas (GHG) emission, oil sands extraction, mining and upgrading are responsible for about 40% of Alberta's gas emission from industrial sector.

On the other hand the government of Alberta is constantly under pressure of reducing carbon foot prints throughout the province. GHG reporting program in 2003 requires major industrial facilities to submit annual reports on their GHG emissions. In 2007, GHG reduction program was put in effect. Alberta is the only jurisdiction in North America with mandatory GHG emission reduction targets for large emitters across all sectors. This program promoted renewable energy developments.

In this paper, outline of carbon credits in Alberta and offset credit awarded to portable chipping operation are described.

Structure-Control of Amphoteric Polyacrylamide and Its Performance as Dry Strength Resin

Hideo Baraki
Paper Chemical Business Division, Seiko PMC Co., Ltd.

Dry strength resin is known as multifunctional chemicals to enhance paper/paperboard strength, drainage and retention. Especially, polyacrylamide (PAM) based dry strength resin is widely used in various paper/paperboard grades in Japan. Linear, Low-branched, and high-branched PAM containing both anionic and cationic groups were obtained with free radical polymerization. Molecular weight and structure of PAM were determined by gel permeation chromatography coupled on line to a multi-angle laser light scattering detector (GPC-MALS). The higher degree of branching, the more compact a polymer chain, which leads to decrease in the viscosity of aqueous solution.

The effects of structure and molecular weight of amphoteric PAM on the performance of dry strength resin were investigated. The high-branched PAM with higher molecular weight showed greater performance in retention of PAM and paper strength. The zeta-potential of amphoteric PAM increased with the increasing of the degree of branching. The high-branched amphoteric PAM was able to form polyionic complexes in high salt concentration (electro conductivity, 650mS/m). The effective iconicity of amphoteric PAM could be controlled by changing the structure of polymer.

An Attempt to Produce Bio-Diesel from Pulping Byproducts
- In the Case of Tall Oil-

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State University of New York, College of Environmental Science & Forestry

Biodiesel is generally produced from food-related materials such as vegetable oil and animal fat (tallow). The most commonly used source is vegetable oil waste; however, its supply is limited. Should there be a shortage of vegetable oil waste, biodiesel production may turn to fresh vegetable oil as a source, with possible impacts on the food supply. Several non-food resources were investigated as prospective sources for biodiesel production, and pulping byproducts have shown potential. Tall oil was selected as a representative byproduct typical of the pulping process, and early trials showed that a reasonable amount of biodiesel yield was able to be produced. Initially, several issues were found which would limit the practicality of producing biodiesel from tall oil: reaction time, reaction temperature, reduction of chemical usages, the role of acetyl chloride, and the reduction of solvent consumption amount. Through experimentation, most of these potential issues were able to be mitigated, supporting the very real possibility of mass producing biodiesel from pulping byproducts.

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The Improvement of Boiler Efficiency on Our Pulverized Coal Fired Boiler
－ Introduction of Coal Additive to Control Clinker Generation to the Boiler －

Kazunobu Kawaharagi
Kushiro Mill, Nippon Paper Industries Co., Ltd.

This paper presents the energy saving effect which was gotten by introducing the Fe-based coal additive to prevent Clinker generation to solve troubles on our pulverized boiler.

Nippon Paper Industries installed the new pulverized boiler which called N1 boiler and the new steam turbine which called N1 turbine in Kushiro mill in 2004, and has begun electric power wholesale business with accumulated know-how to operate pulverized boilers.

After into commercial operation, we had been suffered from the following problems on the N1 boiler.

· Huge clinker growth which is over the furnace wall bottom. And peeling off of it had made unexpected halting the boiler operation due to the bottom ash conveyor trip.

· Plugging trouble on the heating element of the Ljungstrom type air preheater caused by ash and sticky acid ammonium sulfate (NH4HSO4) which was produced by ammonia leakage from the NOx removal reactor combined with SOx. And also the acid ammonium sulfate sticks discharge electrodes and collecting electrodes in the electrostatic precipitator that have possibility of making the precipitator trips due to short-circuit.

And we have thought that above problems has made reducing the boiler efficiency due to the insufficient heat exchange in the air preheater and the short supply of the combustion air. So, to solve the problems, we have started inject Fe-based coal additive with Clinker generation prevention effect. As a result, we achieved an enough problem solving and energy saving.

Heat Exchange Paint NeOCOAT

Yoshiyuki Fujioka
EcoloTec Corporation

NeOCOAT is a next generation eco-paint which consumes heat by converting thermal energy to kinetic energy using ‘heat-exchange molecules’ in paint. NeOCOAT can be applied to a wide range of surfaces including roofs, pathways, sports grounds, parking areas, indoor surfaces, and play equipment.

In addition, it is effective in reducing air-conditioning costs and controlling condensation.

Energy Conservation Examples of Initiatives Manufacturing Department Futatsuka

Tatsurou Okada
Takaoka Mill-Futatsuka, Chuetsu Pulp & Paper Co. Ltd.

In recent years, oil prices have been rising. Furthermore, after the Tohoku Earthquake (2011) , energy-saving is important challenge for not only at a company but at the home. A company must make an effort more by shortage of electric power supply.
Also, in the Manufactuaring department Futatsuka, the energy-saving committee was established in 1990, and we have been implementing energy saving activities every day.
And now, a large-scale investment is reduced and it is not expected improvements in equipment replacement. We are going to build up small results to achieve the target in the difficult situation.

This report introduces the contents of a measure and the examples in energy-saving activities.

Energy Saving Method by JBIC

Yasuhiko Shirota
JBIC:Japan Business Innovation Consulting Co., Ltd.

The important point of energy saving activities is constituted with the seven contents and explained that know-how.

1) Understanding how to catch energy losses.
2) To grasp the injection actual condition of energy. (Check the facts).
3) Consider the results of the analysis, and find losses item.
4) Create a theme in the management by objective according to phase, and the group way of thinking.
5) Examine a concrete method and clarify the formation evidence.
6) Makes a determination of compatibility organizationally.
7) Draw up an execution plan and establish the next activity.

Energy Saving by Stopping the Production Equipment Industrial Water in the Daytime

Youichi Usukubo
Osaka Mill, Hokuetsu Kishu Paper Co., Ltd.

The nuclear power plant disaster after the Tohoku Earthquake in 2011 had especially caused concern about power shortage in summer, and power saving & measures against power shortage had taken not only at factories but at home.
Among others, Kansai region (area) has highly relied on nuclear power generation and also any nuclear power plants in this area didn't operate in first half of 2012. Therefore, power shortage had been increasing serious problem.
Under the circumstances, as measures for energy saving, we're introducing our cases such as resuming operations of gas cogeneration facilities which had been halted in response to the power company's request, and energy saving activities at the industrial water facilities which showed the effect through steady efforts of small group movement.

The Optimal Operation and Business Improvement by BTG Management System -FEMS-

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Energy Systems Center, Mitsubishi Electric Corporation

Interest in FEMS (Factory Energy Management System) which performs energy optimization of the whole factory is increasing because of issue of global environment and electric power shortage. FEMS makes it possible to reduce energy and satisfy the demand of a factory. The past results show about 0.5～1% of fuel cost and greenhouse gas can be reduced by FEMS. The effect by FEMS is not only an economic aspect. It can be said that greenhouse gas was reduced, because the fuel to burn is reduced.

We developed FEMS in 2003. After that, we have suggested and supplied FEMS to many customers. We have continued development based on a customer's demand and improvement. As a result, FEMS became high-precision control and a system which has an attractive support function. This paper introduces the concept and System configuration of FEMS, the function of On-line FEMS and Off-line FEMS. After that, it explains some features of our specific technologies which are calculation method of cost merit and multi-objective particle swarm optimization method. Multi-objective particle swarm optimization method makes it possible to become cost optimization and Greenhouse gas minimization simultaneously.

Activities for Energy Saving in Yonago Mill

Koji Ishitoya
Yonago Mill, Oji Paper Co., Ltd.

At our YONAGO mill, all members are working on the target "1.5% reduction of the total energy of our mill".

However, it is becoming more and more difficult year by year to find new or drastic energy-saving matters.

In spite of this difficult situation, by focusing on several projects, we have been successful in reducing the energy consumption of our mill continuously.

This paper reports how we can achieve our target, and our energy-saving cases.

Corporate Profile & Product Information (2)

ARAKAWA CHEMICAL INDUSTRIES, LTD.

Arakawa Chemical was established as a natural medicine manufacture and wholesaler in 1876 in Osaka. For over 130 years, we have made continued efforts to take advantage of the most flexible thinking and state-of-the-art technology available at the time, to offer our customers the rosin-based chemical products commonly called pine chemicals.

Arakawa Chemical Industries, LTD. manufactures various paper chemicals including water-repellents, sizing agents that prevent printed matter from blurring and feathering, paper strengthening agents to increase the strength of paper and corrugated cardboard, and fortifying the water resistance of tissue or paper towels, and these chemicals in turn may facilitate the advancement or appearance of new papermaking technologies. Our company has the largest sales of paper chemicals in Japan, and it is steadily expanding into the Asian market especially China.

Basic Lecture of Paper Board (2)

Used Paper Recycling in the Pulping Process

Akihiro Yamamori and Taku Uchiumi
Oji Materia Co. , Ltd.

Used paper has been the main raw material for papermaking. In particular, the percentage of used paper accounts for more than 63% in Japan. Among a variety of used paper, by establishing the used paper processing technology in accordance with the application, we have attempted to increase in used paper utilization.

Used paper recycling in Japan has a long history as it can be found it in the recording of the Heian era. As raw material for paper, used paper came to be used in earnest, it is 1950's that began to blend the recycled newsprint into paperboard. Then we came to blend the used paper into newsprint paper and low grade printing paper from 1970's. In Japan, for the following reasons, it began to use large amount of the used paper. a) Preparing for the depletion of the wood resources in the future, b) Energy consumption for pulp production process and the cost of the raw material is lower than fresh pulp. Moreover, with the development of the ink removal techniques from used pulp, the amount of the used paper has grown rapidly. This time, we outlines how to process the used paper into pulp through pulping process and stock preparation process. I

Cellulose Nanofibers Prepared from Wood Pulps, Their Characteristics and Potential Applications

Akira Isogai
Department of Biomaterial Sciences, Graduate School of Agricultural and Life Sciences,
The University of Tokyo

Fundamental characteristics and potential applications of cellulose nanofibers prepared from wood bleached chemical pulps by TEMPO-mediated oxidation are reviewed based on the results obtained in our laboratory up to now and during collaboration studies with companies and university laboratories. Significant amounts of C6-sodium carboxylate groups can be formed selectively on crystalline cellulose microfibril surfaces in wood pulps by TEMPO-mediated oxidation in water at pH 10 within 2 h. The TEMPO-oxidized pulps with sufficient amounts of carboxyl groups are then convertible to highly crystalline nanofibers uniform 3-4 nm in width and > 1 μm in length, which are individually dispersed in water, by mild mechanical disintegration. Electrostatic repulsion and/or osmotic effect works well between anionically charged TEMPO-oxidized cellulose microfibrils (TOCNs) in water, thus resulting in the complete and efficient individualization of wood cellulose microfibrils. Transparent and flexible films with high strength, low oxygen permeability and low coefficient of thermal expansion are obtained by casting the TOCN/water dispersions on a plate. The TOCNs are expected to be used as new environmentally-compatible and bio-based nanofibers in the fields of high-performance packaging components and other high-tech devices.

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Energy Saving II

Topics & Information

Corporate Profile & Product information(3)

Research Report (Original Paper)

Pulp and Paper Mills in Japan (47)

Vol.67, No.7 Abstracts

Mechanism of the Feed in Tariff Scheme

Masato Yasuda
New and Renewable Energy Division, Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry

In our country which is a resource-poor country, face large introductory expansion of renewable energy against the background of rapid increase of the energy demand by newly emerging country, and the correspondence to a global warming.
Japan started feed-in tariff scheme in July, 2012. Under the feed-in tariff scheme, if a renewable energy producer requests an electric utility to sign a contract to purchase electricity at a fixed price and for a fixed period guaranteed by the government, the electric utility is obligated to accept this request.

Introduction of Energy-Saving Technology in the Industrial Thermal Power Plants

Toshi Ishimura
Power Systems Service Business Department Power Systems Headquarters
MITSUBISHI HEAVY INDUSTRIES, LTD.

Due to the background of recent social situation, it is considered that thermal power plants recently play an important role in stabilizing electricity supply. Thermal power plants, of course, use fossil fuels such as coal, LNG and petroleum which are almost all imported to Japan. The cost of fossil fuels is the most important problem in industries. This paper outlines energy saving technology so that the fuel cost will be reduced through various countermeasures.

Energy Saving for Approach System

Toshio Dousaka
Paper Machine Eng. Dept., Voith IHI Paper Technology Co., Ltd.

In recent paper industry situation, to enhance the production efficiency is one of the most important issues. Especially energy saving is the essential part of the production efficiency. The quality of waste paper, however, is getting worse for decades, and customers'demand of to keep or get better quality is increasing. Our technological development has been for their answer. For example, LP screen acquire dramatic energy saving and best screening efficiency, and IP pulper also get much better defibering efficiency with much less energy consumption. Both products perform their ability not only at their part but also in the whole system. This new concept will supply the solution of the paper industry, and we strongly believe it will be new standard in the future.
Both products as LP screen and IP pulper are for stock preparation system. Our technology also covers approach flow system, and have some solutions for the energy saving. For this article, our state-of-the-art technology will be introduced especially about stock mixing, low consistency cleaner, and approach screen.

Activities for Energy Saving in Team Teinenpi Yashio

Masahiro Shishido
Yashio Mill, Rengo Co., Ltd.

Rengo Co., Ltd. has set an environmental target aiming to reduce 32% of the corporate CO2 emission by 2020 compared to the 1990 base, followed by a higher objective of 50% reduction by 2050. From early on, Yashio Mill has been working on environmental load reduction including the fuel conversion from heavy oil C to natural gas, utilization of paper sludge as biomass fuel, and installation of high-efficiency equipment in the whole process.

Incidentally, a stricter local regulation has been in effect since 2011 in Saitama Prefecture where the mill is located, which requires us to reduce 15% of the CO2 emission during 2015 and 2019 relative to the average value from 2001 to 2004.

Under these circumstances, Yashio Mill launched a new energy-saving project team in March 2011 composed of members from various sections. With the aid of an external energy-saving consultant firm, the team named “TNP (meaning low-fuel consumption) Yashio” expands cross-sectional activities for further CO2 reduction.

Analysis of Energy Data toward the Optimizing Use of Energy

Yoshinori Urasawa
Energy Consulting Section Energy Consulting Dept. VPS Innovation Div., Yokogawa Electric Corporation
Kensaku Kawamura
Pulp＆Paper Engineering Gr. Account Sales Dept. Ⅰ Sales Div. Ⅱ., Yokogawa Electric Corporation

In Pulp and Paper industries, the cost of raw materials and energy will have major impact on the product prices.

For this reason, efforts such as energy-saving, plant optimization, high production rate improvement, are now being made to keep and increase profits.

Moreover, the designated energy management mill has fulfilled reducing the energy consumption rate at least 1% every year constantly. Efforts for energy reducing consumption are very important object in the mill.

It starts with current status analysis and realizes improving points.

To identify them, we need to analyze some manufacturing data and energy data. Here is our approach for the identification.

Efficient Application and Visualization of the Compressed Air

Noriyuki Mukaida
Gifu Mill, Oji Materia Co., Ltd.

Oji Materia Co., Ltd. had addressed the improvement for a purpose of efficient operation of compressors as part of energy saving project since 2009. The Project had been proceeded in 2 stages, as 1st stage we carried out the investigation of air leak and improvement in order to reduce the loss of air consumption, and succeeded to save the amount of air volume to 500,000Nm3/year.

We had achieved the introduction of visual inspection for power, pressure, blow and unify how many units are suitable for this mill by console made by MIWA Inc.

As a result of taking actions above, we had neduced not only basic wit of air 0.144kW/Nm3 to 0.104kW/ Nm3 but also power consumption 2.8MkW/year to 1.6MkW/year.

This result shows we have adviced 40% cost reduction as an environment effects.

In the meantime,

- To install the pressure monitoring alarm system,

Trend supervisions of air pressure, flow rate, power consumption

- To check the basic unit of air,

These operation gave a benefit below and we can find the facility abnormal promptly.

Abnormal situation of facility will be able to be recognized promptly.

As a 2nd stage, we had archived the optimized low pressure from 0.65MPa to 0.53MPa gives 130,000 kW/year cost merit.

Also in order to reduce the air consumption, we thought about purchasing devices to save energy in air blow line.

Energy Saving Solution for Paper Machine

Hidekatsu Sakurai
Paper Business Line, Metso Paper Japan Co., Ltd.

In addition to the raise of energy cost across the world, power shortage originally caused by the Great East Japan Earthquake in March 2011 has been squeezing earnings of paper making companies. As a result energy efficiency is expanding its influence in operational efficiency of paper and board making.

Metso has been seeking the possibilities to reduce energy cost, which generally accounts for 15-30% of total production cost and has continued making efforts for the realization. We believe that it is still possible to gain more energy saving in electric and steam consumption.

Metso's new paper making concept, OptiConcept M uses effective equipment to reduce the consumption of electricity and steam. This article introduces promising equipment and solutions that can be applied to existing paper machines to save energy.

Introduction of Latest DD®6000 Refiner
- Energy Saving by Highly Efficient Refining -

Yoshinori Ishikawa
Design Department, Kawanoe Zoki Co., Ltd.

GL&V/Kawanoe Zoki's latest double disc refiner "DD6000"achieves highly efficient refining by Equa-FloTM technology,one of the spline technology. Kawanoe Zoki has proposed to upgrade existing DDR with the Equa-FloTM technology, and high energy saving performance was successfully completed in the result.

DD6000 performs energy saving by 40% and capacity increase up to 50% compared with conventional refiner DD4000.

Above high performance is accomplished by its unique technologies. The Equa-FloTM technology is the only technology that has ports in the hub rather than in the rotor. This eliminates all forces on the rotor and results in the most balanced centering rotor. One high performance refiner plate has no area for bolts in refining area and this leads to more efficient refining performance. The other high performance refiner plate has zero degree draft and results in keeping constant refining performance throughout plate life time. Tangential inlet and outlet increase refiner capacity and tangential inlet saves energy consumption as well.

DD6000 would be one of the best solutions to save energy and reduce operating cost for your stock preparation system.

Magnus Simulation: Proposing the Optimal Refiner Plate for Each Applications
LemaxX Spiral — Nature Applied

Andritz K.K.
Kenichi Itoh
Andritz Inc.
Peter Antensteiner

Andritz is a leading supplier of refining technology in the world. Also Andritz supply wear parts for refining process. Andritz has 15,000 patterns or more of refiner plates and several new patterns developing every week. Also Andritz developed and upgraded a simulation program "MAGNUS". It is simulated the "Nature of Refining" theory. By using this program, Andritz developed the logarithmic Spiral Design refiner plates "LemaxX Spiral". The following description introduces the latest performance of "LemaxX Spiral " technology.

Screw Type Steam Compressor for Energy Saving and CO2 Reduction
- Saving Boiler Fuel by Compress Flash Steam and Reproduce Steam High Efficiently -

Toyoshi Kaito
Energy System Department Machinery & IT Division, Shinsho Corporation

Brand Name "Steam Star" has been developed as steam energy saving equipment since Kobe Steel Ltd. started business with screw type steam generator unit in 2007. On this paper we introduce New product "Micro Steam Recovery Compressor(MSRC)", which has the remarkable feature of high efficiency, wide range etc.

Issues and Solutions for Light Weighting on Paperboard

Yasuhide Yoshimoto and Kazuhide Yoshikawa
Paper Chemicals Development Section, Research & Development Center, Researh & Development Co.,Harima Chemicals, Inc.

In recent paper & paperboard industry, we focus on high efficient production, the technologies for saving resource, and saving energy to use energy effectively for environment on the earth. Regarding to paperboard making, there are some trends such as machine speed up to improve productivity, increasing calcium carbonate due to using magazine recycle-fiber, and closed papermaking system in corresponding to waste water for environmental issues. These trends cause lower retention of fibers and internal additives, decreasing of fiber strength by itself, scaling, and increasing electrical conductivity, temperature and chemicals dosage (per unit). In addition, the light-weighting is progressive for resolving environmental issues with saving resourcing. However, it is getting difficult to keep strength properties such as compression and burst strengths at the papermaking with conventional internal additives because compression and burst strengths depend on basis weight. We have suggested the total wet end system, total chemicals on wet end process with alum performance for quality improvement, and surface treatment with coating additives for the light-weighting at the annual meeting of 2005 and 2010. In this report, we introduce our technologies such as internal dry strength agent (PAM) and surface treatment with coating PAM, in addition to developed coating PAM and coating agent for cracking problems during creasing, on the issues and solutions for light-weighting on paperboard.

Corporate Profile & Product Information (3)
MIURA Co., Ltd.

The history of Miura began with the development of the Z boiler in 1959.
Our motto states,"Miura airms to be your best partner for energy, water and environment with our Tecno-service Revolution". Our competence is grounded in the expertise gaind as the market leader for small onse-throuth boilers in Japan.
Miura provides new products and services that satisfy the requirements of customers in the fields of heats energy, water treatment, and environmental solutions.
Today, as the leader in the fields of energy, water, and the environment, we aim to grow into a trusted global company.
Tecno-service means: To become the most respected and trusted name with cutting edge service and technology.

Development of High Quality Porous Fillers (Part3)
- Scale-Up Trials at Pilot and Mill Plant for High Quality Porous Fillers -

Precipitating silica which is also called porous fillers has a low specific gravity and has frequently been used as a filler to increase paper bulkiness. Uses of porous fillers do not cause problems such as discoloration which occur with machine pulps and staining paper machines which often occur when using fatty acid derivative and special surface-active agents as a bulking agent. Rather, they are advantageous in terms of cost such as that they reduce the drying load of paper machines by decreasing the amount of pulp to be used and decreasing the amount of pulp while maintaining the same paper thickness. However, they still have a problem of degrading paper strength. Therefore, we explored ways to develop high quality porous fillers which have high paper-bulking properties and great opacity. In the last report, we reported that having alkaline-resistant microparticles available during reactions enabled a control of primary particle diameter, secondary coagulation particle diameter, and particle size distributions which were particle properties, resulting in high quality porous fillers with a low level of paper strength degradation.
In this report, we studied a scale-up of this process and achieved low level of paper strength degradation with controlled particle properties in an industry level.

Synthesis of a Functional Clay Mineral from Paper Sludge Ash (PS ash) and Its Ability
of Removal for Dye

Satoru Fukugaichi
Ehime Institute of Industrial Technology

A functional clay mineral (Layered Double Hydroxide: LDH), whose main components were calcium and aluminum, was prepared by a co-precipitation method at 30 degree from PS ash. The resulting materials were investigated by XRD, SEM, EDX, TG-DTA and N2 adsorption observation and were used to remove an anionic dye (Remazol Violet 5R) from an aqueous solution at 30 degree. Adsorption isotherms showed convex upward and the adsorption data were fitted to Langmuir equation. LDH(8) ,which was synthesized under the condition of Ca/Al molar ratio=8, shows maximum adsorption ability of an anionic dye.

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Pulp

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Introduction of Research Laboratories(95)

Research Report (Original Paper)

Pulp and Paper Mills in Japan (48)

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Vol.67, No.8 Abstracts

Current State and View in the Future of Domestic Forest

Kusuo Akahori
Writer

In "Forest and forestry revitalization plan" that had been made public in December, 2009, the target to be going to raise rate of self-sufficiency to 50% within ten years in the future was set. As a result, various approaches to increase production of wood are examined in a domestic each home.
However, the rate of self-sufficiency of wood has stayed in the latter half of the level 20% now. In this report the current state and the prospect in the future of domestic forest are described.

Global Woodchip Demand and China Impact

Shoji Yabe
Paper Products & Material Department, ITOCHU Corporation

Generally speaking, woodchip used as raw materials for paper manufacturing is being produced locally for local consumption in many countries and woodchip imports trade has concentrated in Asia and parts of Europe.
Japan has been the leading country in woodchip import trade and it has recorded 14 million Bone Dry Tons (BDT) in 2008, their highest woodchip import volume ever but due to decline in Japanese economy and increase in paper imports into Japan after the 'Lehman shock'or Global Financial Crisis, this import volume is now around 80% of 2008 import level.
While we saw a large decline in woodchip imports into JPN, there has been a large increase in woodchip imports into China, increasing from about 1 million BDT in 2008 to 7 million BDT in 2012, and this is expected to reach 11 million BDT which is similar to Japan volume in the next few years.
We have also seen a sharp increase in woodchip export volume from Asia such as Vietnam & Thailand, going from 1 million BDT for Vietnam and 0.7 million BDT for Thailand in 2008 to 5.8 million BDT and 2.9 million BDT respectively. Woodchip export volume out of Vietnam and Thailand is now no.1 and no.3 in the world.
Due to these factors, demand for woodchip import which is focused on Hardwood to China is actually increasing in the Pacific Rim region and market share on woodchip trade held by Japanese Paper companies is said to drop to around 50% of total Asian woodchip import demand by 2015. There are fears that this will lead to weakening of influence Japanese Paper companies will have in woodchip price negotiation in the future.
Considering the demand by China and in recent years, India and alternate use of woodchip such as particle boards and wood based biomass by China & Korea, issues Japan will face would be effective utilisation of domestic resource and to secure resource in mid to long term.
Based on this situation, I will be trying to clarify current status of global woodchip supply & demand, as well as impact China will have in the future.

Andritz Biomass Technology for Cost Reduction and New Business

Kanji Hagiwara
Capital System Sales Group 1, Andritz K.K.

In worldwide, energy source has been moving from fossil energy to renewable energy due to the request of CO2 emission decrease. In addition to the request of CO2 emission decrease, we are also strongly moving to renewable energy due to the nuclear power plant issue in Japan. There are hydraulic power, solar power, wind power etc. as renewable energy. But biomass also is very important renewable energy source. And pulp & paper industry in Japan is looking for new business and cost reduction because of decrease of paper consumption and increase of material cost (i.e. chip, fossil fuel). This Paper presents Andritz technology for biomass handling and energy and dissolving pulp technology as new business.

TMP and CTMP Solution for a Sustainable Future

Akifumi Hatta
Sales & Marketing, Metso Paper Japan Co., Ltd.

TMP/CTMP production in the world is shrinking except in China. It is expected that hardwood CTMP production in China will increase in the future as well.

Challenging of TMP/CTMP is how to reduce refining energy from when this process was developed. One of the mills which Metso's process with new concept was applied succeeded to reduce main refining energy by 1400 kWh/adt comparing with conventional process and pulp is bleached with high efficiency by MC+HC 2-stage bleaching system. It is proven in some mills that higher production rate gives lower process energy consumption. Refiner segment with new concept is also developed for lower refining energy and higher quality. It is to combine different concepts into one pair of segments according to refining conditions and targets in each mill.

To develop utilization of TMP/CTMP by more energy saving and higher brightness up to more than 85% ISO is the challenge for the future of TMP/CTMP and machine/process suppliers.

Suggestions of Measures to Quality Losses of Recycled Waste-Paper

Kazumi Fujita
Technical & Engineering Department, AIKAWA IRON WORKS CO., LTD.

Recently, in Japan, the quality of the recycled waste-paper is lowering substantially. This appears to be influenced by (1) the globalization of the distribution for the board & paper market and recycled waste-paper market, (2) the generalization of the mail-order businesses that are delivering individual packages with plastic bags and polystyrene foam fillings, and (3) the decrease of the quantity for the writing-printing paper, news printing paper production and the excellent recycled waste paper, and this was brought by the economic downturn or increasing the internet and digital tools. On the other hand, the higher quality of the paper stock is becoming more and more important because the required basis weight would be lower and the required paper machine speed and stability would be higher. And also the visual quality and printing suitability becomes more and more important because for example the liner surface quality needs to be higher to suit the merchandise display with a shipping package box.

Of course, saving energy and reducing fiber loss as much as possible are permanent targets from the points of view of cost-wise and reducing emissions. Today it becomes more important task because the higher quality board and paper would be necessary due to the lower quality recycled waste-paper.

In this report, we, AIKAWA would like to introduce the measures to quality loss of recycled waste-paper by applying our newest technology to the existing stock preparation system (from pulper to the paper machine approach system).

The Approach to the Deteriorated Kraft Pulping Plant

Nakamura Wataru
Kasugai Mill, Oji Paper Co., Ltd.

Kasugai mill, Oji Paper, has started the operation in 1952, as fine paper making plant which introduced Japan's first commercial Kamyr-type continuous digester and multi stage bleach line. It has now taken the lead in Oji Paper as the integrated pulp and paper plant with producing several paper grades, through a couple of new installation, reinforcement, replacement and modification.

Recently, Japanese paper industry has been in a tough situation, since the domestic demand of paper has reduced and the imported paper has increased. In such a situation, the replacement including S&B has been severely restricted, and the maintenance on existing facilities has become the key in managing plant operation. In our mill, equipment failure led to production loss had been recently increased because numerous facilities might be deteriorated by long term operation.

The production losses by equipment failure and mistake in operation have not an impact on business productivity but also safety and environment aspect, so that a couple of countermeasure have been scheduled with based on analysis of production loss cases.

The five cases of deteriorated equipment failure are reported in this article with cause and solution.

Establishment of Kiln Calcination Capability Reinforcement Construction

and Its Operation Method

Tadashi Horiuchi
Iwakuni Mill, Nippon Paper Industries Co., Ltd.

At Iwakuni Mill and Otake Mill which locates next to it in Nippon Paper Industries, the production system of pulp and paper is needed to reconstruct for the purpose of earning recovery.

As one of the measure of this, we try to make more competitive Kraft Pulp by curtailing the production of pulp at Otake Mill indefinitely, consolidating production into Iwakuni Mill and providing Otake Mill with pulp.

For this reason, it becomes more important to produce pulp stably. To achieve this, there is priority issue - 'poor capacity of caustic process' to be solved. Especially lack of capacity of hot lime production in kiln is bottleneck in our caustic process when we make up enough white liquor for two digesters in full swing. Dealing with this problem from the aspect of improvement of facilities, usage of chemical an examination of operating condition, we achieve to produce sufficient white liquor by increasing hot lime production.

Quality Accident and Countermeasure Due to Pulp Equipment FRP Deterioration

Nobuo Oikawa
Kitakami Hitec Paper Corporation

For the first time, we experienced the trouble of the quality by degradation of the FRP material currently used for pulp equipment in the operation over many years. It was difficult to discover the place which dirt generated at the beginning. At last, it turned out that heat treatment changes it into yellow from white, and it has the feature which shows a fluorescent reaction. From the feature, we created the judgment method about the quantity of that, and conducted investigation about it. As a result, it became clear that it is based on degradation of the FRP material currently variously used at the pulp process. After that, the generating place of that was discovered, and as a result of performing various measures, generating of that will not take place.

This report describes progress from discovery of dirt to solution.

The Fire Measure at Wood Chip Handling Process

Shinpei Miyake
Niigata Mill, Hokuetsu Kishu Paper Co., Ltd.

We treat a lot of combustibles at the wood chip handling process, so it is always put to the risk of a fire. Actually, at conveyer for wood chip, many fire accidents have been reported. At wood chip handling process which is the uppermost part of a factory, an outbreak of fire has a serious influence on factory operation. That's why the fire prevention is strongly needed.

At Niigata Mill of Hokuetsu Kishu Paper, the fire measure at wood chip handling process is filled with much more power from around 2009. In this news, I'd like to introduce some measures against a fire, for example, improvement of operation and equipment, introduction of a temperature monitoring system, and so on. Those measures are introduced at the "Kvaerner line", with a larger production between two lines of the pulping process in Niigata Mill.

Lignocellulose
- Releasing of Environmental Factors and Sequential Functionalization -

Masamitsu Funaoka
Graduate School of Bioresources, Mie University

In order to achieve the cascade-type flow of lignocellulosic components as functional materials in human life, a novel conversion system has been developed and a new type of structure-controllable lignin-based polymers (lignophenols) has originally been designed. The originally designed process includes the phase-separative reaction system composed of phenol derivatives and concentrated acid. Through this process, native lignins are converted quantitatively to a new type of lignin-based polymer (lignophenols) composed mainly of 1,1-bis(aryl)propane type units. The selective grafting of monomeric phenol derivatives to C1-positions of propane units leads to the formation of new phenylpropane units between grafted phenolic units and lignin propane units, resulting in a dramatic change of the original lignin functions. The characteristic units in lignophenols, 1,1-bis(aryl) propane-2-O-aryl ethers, can be used as switching devices for the structural control. The separated carbohydrates include water-soluble monomers, oligomers, and polymers. These are easily converted to valuable chemicals such as alcohols, lactic acid, furfural, xylitol, etc. In order to create sustainable human society without petroleum, aliphatic and aromatic types of industrial raw materials must be derived sustainably from biomaterials (lignocellulosics). A new sustainable industrial network initiated from forests is designed.

Basic Lecture of Paper Board (3)
Used Paper Recycling in the Paper Making Process

Akihiro Yamamori and Taku Uchiumi
Oji Materia Co. ,Ltd.

The paper-machine is generally consisted of the headbox, the wire part, the press part, the drier part, the calendar, etc., and each part had simple structure once.

Moreover, since opration of the paper-machine depended on operator's experience, knowledge and intuition concerning about operation method of equipment, it was difficult to get the stable quality of paper and condition of the paper-machine.

However, various research and development and continuous progress of various equipment have caused the drastic improvement of the performance of a papermaking process.

We describe the outline of the structure and principle about each papermaking process.

Corporate Profile & Product Information (4)
TOKUDEN Co., LTD.

Tokuden Co., Ltd. was established in 1939, since then, Tokuden has been developing and
manufacturing the transformer and reactor. In 1965, Tokuden developed the worlds first Induction Heated Jacket Roll using electromagnetic induction and the heat-pipe principle and it has been used in thermal processes the laminating, coating, calendering, heat stretching of films & fibers and heat setting. This article introduces an outline of Tokuden Co., Ltd. and our products.

Research Report
Strength Properties of Wet-Combination Paper

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Paper Chemical Division, Arakawa Chemical Industries, Ltd.
Yamauchi Tatsuo
Graduate School of Agriculture, Kyoto University

The effect of wet-combination of paper plies on some basic strength properties was investigated by using a series of wet-combined papers from lightly and heavily beaten pulps. As the basic in-plane and out-of plane strength properties, tensile, compressive, and internal bond strength were measured. Microfailures which are detectable as acoustic emissions (AEs) and occurred during the tensile deforming process were further examined to investigate the effect of wet-combination of paper plies on in-plane tensile strength. The results showed that an increase in paper ply by wet-combination brought about an increase in the plastic deformation region, leading to higher strain at breakage and an increase in tensile strength as a result of the higher strain at breakage rather than that of the increase in fiber bonding. Compared with homogenous paper made by pulp mixing, the presence of a strong paper ply within paper layer by wet-combination, irrespective of its z-directional position, may increase the period of gradual increase in microfailures at the plastic deformation region and delay the acute occurrence of microfailures just before the maximum load. The increase in microfailures accompanying the increased period of the plastic deformation by wet combination had little effect on the origin of microfailures. Strong paper plies located at both outer sides could prevent the development of microfailures connecting to paper sheet failure, and eventually resulting in higher strain at breakage and an increased tensile strength. In contrast to tensile strength, compressive strength in the X-Y direction was simply determined by the content of highly beaten pulp, regardless of the manner of combination, i.e., wet-combination or pulp mixing. Tensile strength in the Z-direction, which is evaluated as internal bond strength, was determined by that of the weakest paper ply and wet combination brought about a further decrease in the Z-directional tensile strength.

Research Report

Development of Imaging Materials for Electronic Paper by Using I/O Values

Ryohei Nakazawa, Ryo Tanizaki, Motochika Yukawa and Shuichi Maeda
Optical and Imaging Science and Technology, Tokai University

Electronic paper plays an important role in information devices, principally due to readability under high ambient light and low power consumption. In electronic paper, microcapsule electrophoretic display is most preferable system because it has good readability which is close to that of conventional paper. Particles as display elements of an electrophoretic display are covered with polymer surfactants which prevent these particles from co-aggregation. The key technology in obtaining successful electrophoretic displays is utilizing appropriate surfactants for dispersing these particles. It generally takes long time and high cost to find such surfactants. To reduce the R&D time and cost, finding useful parameters for appropriate suitable surfactants is necessary. This paper focuses on the effect of I/O values as the parameter, particularly emphasizing use in surfactants and dispersion media. Model display units containing silicone oil as a media, titanium oxide and iron oxide particles covered with/without octyltriethoxy silane or fluoro silane were prepared in order to investigate the effect of I/O values. The motion of these particles in the display units were observed in the presence/absence of magnetic field. The separation and re-dispersion cycle can be observed repeatedly with the only display unit which contains both titanium oxide and iron oxide particles covered with octyltriethoxy silane in the silicone oil. The repeatability of separation and re-dispersion seems to come from the I/O value (=0.39) of particles covered with octyltriethoxy silane which is quite close to the I/O value (=0.40) of silicone oil. This repeatability is crucially important when considering applications such as electronic books. Through experimental works including above, we believe that I/O value is one of the useful parameters in order to develop appropriate surfactants for display elements of electrophoretic displays.

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Measures against Profit Improvement of Folio Sheet Cutter

Kenji Nakano
Nichinan Mill, Oji Paper Co., Ltd.

In the Folio sheet cutter of our factory, because jamming occurred when adsorption timing of sheet slipped off in a suction box part, we adjusted a timing at the change of dimension and change of shifts. Because products exhausted at this time, it became the factor of a decrease in product yield. In addition, because the jumping out of the sheet occurs to a product when we adjust a timing, it was necessary to sort a product. Therefore we installed an image processing device and worked on loss reduction.

Operating Experience of New Sheet Finishing Machines
- Sheet Cutter・ Ream Wrapping Machine・ Skid Wrapping Machine-

Shigeyoshi Tsutsui
Hokuetsu Kamiseisen Co. Ltd.

Japanese paper companies have to enhance the export with international competitiveness due to the decline of the domestic demand. According with the export strategy of Hokuetsu Kishu Paper, Hokuetsu Kamiseisen has built up the machinery. We target the export sheet paper that is in a good demand. Export sheet paper is relatively small, that affects the cut efficiency. In choosing the machines, strong wrapping that endures the marine shipment is also an important point. Machines we introduce are as follows, Pasaban-made 2 sheet cutter machines operated since 2013 spring, Maruishi-made 1 ream wrapping machine operated since 2012 autumn, JTEC-made 1 skid wrapping machine operated since 2012 spring. We report the operating experiences of new sheet finishing machines.

Latest DIENES Slitting Systems

Isamu Tobari
Engineering Depar., Mack 3 Enterprises, Inc.

Since 1913, Dienes Werke has meant outstanding quality, expertise and breakthrough innovations in the field of industrial slitting technology. Dienes is the worldwide leading supplier of circular and straight knives, knife holders and slitting systems as well as competent partner for all related services. Standard knife holders often do not meet varying customer requirements nor very special applications. The Dienes slitting laboratory will test cut materials with a variety of different holders and knife desings in order to determine the best solution for long term performance, functionality, and user friendness.

Recent Trends in Coating Pigment Use and Formulation Practice in Asia and Western Markets

Etsuya Misawa
IMERYS MINERALS JAPAN K.K.
Chris Nutbeem
IMERYS Minerals Ltd.

Pigment use and formulation practice in coated papers has seen marked changes in the past 40 years. In general the trend was for coatings to become increasingly more sophisticated in order to meet the advertising world's need for better visual image. That together with machinery advances had driven significant pigment developments up until the mid-2000's.

Now, however, the world has changed. The global downturn in 2008/9 together with ever increasing competition between print and digital media has fundamentally changed the global paper industry. It is clear that cost is now the main driver affecting coating recipe design and developments focused purely on improving quality are now largely a thing of the past.

In this paper we explore the changes in the global and Asian paper markets that have occurred since the peak in 2007 and how these changes have affected pigment demand, pigment use and formulation design.

We conclude by looking at what this could mean for future pigment demand and show how kaolin, which has declined recently in recipes, can still bring value to paper making.

Development in Strength Enhancement

Shintaro Nakayama, Patrik Simonson, Joakim Carlén
and Michael Persson
Pulp and Performance Chemicals Division, Akzonobel K.K.

With pulp prices being high, fine paper makers looking to reduce costs are constantly trying to increase the filler level in their paper. The optical properties will often benefit from increased filler content but the mechanical properties will deteriorate and the retention can be difficult to maintain. The reasons for a weaker paper sheet in a highly filled paper are fewer fibres per unit volume paper and filler particles interfering and disturbing the formation of fibre/fibre bonds plus the risk of filler particles creating defects in the paper material 1). Besides elevating fibre cost, the deteriorating quality of raw material has rapidly increase the need of strength enhancement additive .The amount of paper and board that is being recycled is increasing and therefore rapidly decreasing the amount of fresh fibre addition. Addition to the above mentioned strength deteriorating factor, the drive to decrease the basis weight of both paper and board has also directly impact on higher strength enhancement requirement.

In order to answer the needs of the paper and board industry on strength enhancement, our goal is to increase the in-plane and out-of-plane strength by 20 and 30% respectively or decreasing basis weight of packaging material by 10-15%.

To achieve higher filler levels and maintain or improve the quality of the paper a new concept has been developed, the so-called EcoFill™ system. EcoFill™ consists of a filler modification system, including an on-line filler treatment system, with charge control additives and an engineered cellulose additive. The engineered cellulose additive (ECA) improves the bonding at the interface between the filler particles and between the filler and fiber in the sheet. This gives significant internal bond improvements. The charge control components enable a good bonding between the filler and the ECA and secures that the wet-end conditions are stable for optimum performance of other wet-end additives such as sizing agents.

Moisture Measuring System by Dielectric Property

Shinichi Kitagawa
Group Technology Div., Oji Engineering Co. Ltd.

The infrared method is the most popular to measure the moisture content in the coated layer on the paper sheets or polymer films. But this method is not suitable for measuring only a little moisture content, for example less than 1 %, with high accuracy because of the influence of the disturbance such as heat source. It is also affected by the color of the sample in principle. In order to solve these problems, a new moisture analyzer using a microwave resonator has been developed. This is based on the difference of the dielectric loss between the water and the paper sheets or polymer films. This report describes the measurement principle, some data and a few applications of the new moisture analyzer.

Our Vision of Sophisticated Color-Web Inspection System for Paper Production

Jun Ikeuchi
Inspection Systems Business Div., Omron Corporation

Recently, Web Inspection System (WIS) has been expected to enhance the quality of paper production with the highest efficiency. OMRON has developed Color-WIS over the past 20 years. As a result, we are able to apply our Color-WIS in various kinds of paper. Today, we would like to show you our original solutions and values that Color-WIS can provide on site, and indicate an application possibility with our patent technology.

Improvement of Paper Properties and Reduction of Environmental Load by a New Starch Fixing Technology

Yuko Okusa, Chigusa Taguchi and Hiroyuki Suzuki
Kurita Water Industries Ltd.

Base weight reduction is a very useful way for many board manufactures to save natural resource, and reduce carbon dioxide emission. But in the mean time, the cost is increasing because more starch or other dry strength agent is needed for keeping the same sheet strength. This paper aimed at how to effectively use the starch resource in the raw material of old corrugated container, which is contented of several percent of corrugating adhesive starch. However, the starch is usually difficult to retentive and easily bio-degraded in the paper making process. It could be solved by a properly designed microbe control system and a new developed starch fixing agent. As a result of mill trial, not only improvement of the sheet strength but also a lower COD in the effluent was achieved.

Current Techniques for Pest Control in Paper Mills

Masahiko Konishi
Sales Department, Ikari Corporation

Recently, many paper mills have been monitored the abundance and distribution of insects as a part of pest control inside of each factory. The light traps with sticky sheets are often used in monitoring of insects. In generally, the sticky sheets are replaced approximately every one month, and collected insects are counted and identified by technician. Pest Control Operators (PCO) have been controlled the insects based on the results of monitoring and worked to maintain and improve the sanitation management of the production area. However, because of response to growing safety awareness of consumers from year to year, PCO are necessary to control the insects by more rapid and lower environmental impact.

In this paper, I elucidate the efficient original monitoring methods and effective original control methods in various manufacturing factories including paper mills.

European Patent with Unitary Effect and Unified Patent Court

Toshinao Yamazaki and Hiroshi Kawamata
Japan Patent Office
Atsuya Takeshita
Cabinet Plasseraud

The long-awaited legal framework to establish the European Patent with Unitary Effect and Unified Patent Court was concluded in February, 2013. The Unitary Patent package is composed of two EU Regulations for Unitary Patent and one Agreement for Unified Patent Court.

While some users look forward to the new patent system because it is believed to be more convenient and more effective than the current European patent system, some users are concerned about the complexity and uncertainty. In order for Japanese users to become more familiar with it, this article illustrates the background of the discussion and overview of the Unitary Patent package.

Unlike the classical European Patent, which is so-called "the bundle of national patents," the Unitary Patent will bring a unitary effect within the territory of all the participating member states and it seems to become an efficient tool if an applicant needs to acquire the patent protection in many states in Europe. However, the procedure of the Unitary Patent from filing to registration will be done before the European Patent Office, based on the European Patent Convention. Thus, the examination process of the Unitary Patent, basically, will not be different from that of the classical European Patent.

The Unified Patent Court is a new centralized patent litigation system in Europe and will have the exclusive jurisdiction for any infringement cases and revocation cases of both the Unitary Patent and the classical European Patents after the 7 years or 14 years of transitional period.

The Unitary Patent and Unified Patent Court are hoped to become one of the useful tools for Japanese users who run the business in broad areas in Europe as well as European users.

Corporate Profile & Product Information (5)

NOMURA SHOJI CO., LTD.

Nomurashoji was established in 1962, and have been chiefly handling the various testing equipment and tools, to be used for the quality improvement for the pulp and paper industry in Japan over half a century.

Our basic business strategy has been to provide not only the equipment itself but also extend the technical assistance including follow up service after the delivery is completed.

As the market environment of pulp and paper industry in Japan has been dramatically changed for the past decade, we endeavored to identify the market needs and made the necessary information available in the overseas countries for our customers.

We now would like to introduce ourselves with the brief company history and the current products line as below.

Research Report

Radical Trapping Mechanism of Mannitol in Fenton Reactions

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Forestry and Forest Products Research Institute

Mannitol is a well-known radical trapping reagent, though the trapping effect is difficult to confirm in a Fenton reaction. Under acidic conditions, mannitol was consumed during the Fenton reaction, as well as other substrates, such as vanillyl alcohol, veratryl alcohol and Methyl-β-D-glucopyranoside. Under alkaline conditions, however, only mannitol was consumed during the reaction.

When we investigated the solubility of iron (II) and (III), which work as catalysts to initiate the Fenton reaction, the addition of mannitol was found to help dissolve the iron compounds in alkaline solution, especially those exceeding pH 10, though iron compounds are not soluble under such alkaline conditions. Based on this result, mannitol is considered to form a complex with iron (II) and (III) ions under these conditions and the hydroxyl radical (HO・) generated by the reaction between hydrogen peroxide and iron (II) and (III) complex of mannitol will attack the mannitol because it is the compound nearest the site where the HO・ is generated.

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Maintenance Know-How Development in China and Southeast Asia

Junji Masunaga
Metso Paper Japan Co., Ltd.

Maintenance practices at Asian mills vary a lot like in the Western world. Some mills have only corrective maintenance and they run until failure and some mills have very sophisticated maintenance management methods and they employ latest available management and technical know-how. There is always room for improvement. Metso has developed many tools, methods and concepts in order to assist its customers to become more competitive.
This article introduces the way of the latest maintenance and the present situation and future in maintenance in China and Southeast Asia.

Introduction of Raumaster Finishing System

Masashi Shibaki
Itochu Machine-Tehnos Corporation

Raumaster Paper was founded in 1984 in finland and one of the best company in paper and pulp finishing system. It has been over 20 and 30 years since current finishing system were started up in many paper and pulp mills in Japan and they are now facing the deterioration by long term use. Our company started the business with Raumaster Paper in 2012 in response to the market needs. The products lineup of Raumaster Paper is wide range. Raumaster Paper is capable of supplying tottaly automatic system from winder to truck loading system as well as stretch film wrapping system, core cutting system. We are honored to introduce Raumaster finishing system in this paper.

A Case Study on the Implementation of the Manufacturing Execution System (MES) for Paper Mills

Yukitoshi Iwata
Fujitsu Limited

The current situation of the paper manufacturing industry, whose surrounding environment changes at a high pace, is that quick and innovative response in line with a business environment is an urgent necessity.
The issues facing the paper manufacturing industry are 1) consolidation of revenue base, 2) concentration of priority areas of profitability, 3) the acceleration and expansion of global businesses, and so on.
As the solution to deal with these issues, Fujitsu has developed the "SCM-Type Manufacturing Execution System for Paper Mills," which aims to turn effective, systematic production.
The author shows the circumstances behind the implementation of this Manufacturing Execution System, the brief overview of the system and its concept, etc.

The Paperboard Trend of Malaysia and Southeast Asia and the Experience of Paper Mill Operation

Shinji Matsuyama
Paper Division, GS Paper & Packaging Sdn Bhd

Recently,　The domestic paper industry is facing an unprecedented crisis, because paper demand has slumped due to a combination of factors such as advanced in ICT, the hollowing out of domestic industry accelerated by persistent yen appreciation, and an aging society with a low birth rate. In addition, imported paper has taken hold in an increasingly globalized market. Therefore, We have to expand our overseas business and corporate with oversea Oji group to adapt with those severe condition.
Oji Holdings has been expanding overseas business from the 1970s, We started new slogan " Pursuing Efficiency in Domestic Business" "Expansion to Overseas" in 2001 , and then , We are proceeding streamline our domestic production structure and reducing cost to stabilize our earnings base .

On the other hand, We are aggressively cultivate business in overseas in markets with growth potential such as Asian area. GSPP become Oji group in 2010.4 and We found Oji Paper Asia in 2010.10 in Malaysia. As a result, Malaysia is one of the most important area for us.
This draft outlines the paperboard trend of Malaysia and Southeast Asia and the experience of paper mill operation.

The Proposals for Cost Reduction of Paperboard Production

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Shonan Reserch Center, HYMO Corporation

In this paper, we propose cost reduction of paperboard by reducing pitch-troubles and improving the efficiency of wet-end additives.
FR-801, FR-701H, and MT-910 are cationic organic polymers whose molecular weight, charge density and composition are designed appropriately, therefore, they are very effective in reducing pitch troubles such as web breaks and pitch deposition on machinery. These polymers also have high ability to fix size on pulp effectively and to decrease consumption of size. Furthermore, these polymers can be used as a substitute for Alum.
In order to prevent the excess consumption of additives, selecting the most suitable drainage and retention aids (D-R aids) are important. The effects of D-R aids depend on the kinds of machine and paper, and are influenced by pH, electric conductivity, alum and paper strength agents. Therefore, we have been developing the different type of D-R aids with various charge density and flocculation ability. The polymers of these D-R aids have been designed as the contracted conformation in order to improve retention and drainage without the deterioration of dewatering, formation and paper strength. As the result, excess consumption of other additives is restrained.
Using these additives having high abilities can decrease the consumption of paper additives and improve runnability. And consequently, it is effective in reducing production cost.
KeyWords: pitch, size, retention, drainage, alum, paper strength agent, paperboard, cost reduction,

The Measure for the Dissolved and Colloidal Substances in Linerboard Papermaking

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Recently, in paper mills, white-water closed system by decreasing the usage of fresh water, increase of the usage rate of recycled pulp and reduction of basis weight of paper and paperboard are progressed. Under these circumstances, more contaminants tend to exist in papermaking systems. The contaminant is often called "anionic trash" and known that it is concerned to cause the lower productivity owing to the poor retention of pulp fiber and chemicals. However, there are few reports on qualitative and quantitative analyses on the contaminant.
So, we define all of the substance except water and pulp fiber existing in papermaking systems as DCS (Dissolved and Colloidal Substances) and carried out detailed analysis on DCS obtained from paperboard mills.
From the analytical results, we clarified that DCS in paperboard-making system mainly consists of calcium, sulfates, starches, small organic acids, etc. Because these components may cause the troubles such as poor retention, growth of pitch, scaling and a bad smell, measures for DCS are needed. It is considered that measures include retaining DSC on paper with coagulants and dosing chemicals hard to suffer from DCS. In this report, we introduce evaluation results of high performance coagulant for DCS "AC7314" and novel dry-strength agents hard to be affected by DCS.

Operating Experience of Lime Kiln with BrainWave-ACE System

Yasuyuki Sato
Ishinomaki Mill, Nippon Paper Industries Co., Ltd.

KP plant at Nippon Paper Ishinomaki mill has two sets of rotary kilns, No.1 lime kiln (3.36m 90mL) and No.2 lime kiln (3.20mΦ 70mL). Although lime kiln utilizes heavy oil as an energy source, the increase in manufacturing cost is remarkable due to a sharp rise in the price of heavy oil in recent years. After the startup of the biomass boiler in 2006, Oil usage of the lime kilns have come to account for almost half of the heavy oil usage of whole mill.
To reduce the amount of the kiln heavy oil used, we implemented the advanced control system "BrainWave-ACE" in 2010. In this paper, we report on operation experience of the kiln with BrainWave-Ace. Although this system has many installation records overseas, it is first installation in Japan.

ATMOS - The Sustainable Solution for Premium Tissue

Yukinori Takano
Paper Machine Eng. Dept., Voith IHI Paper Technology Co., Ltd.

This article gives readers a overview of our completely new technology development for premium tissue production. Voith Paper launched this innovative technology under the name “ATMOS (Advanced Tissue Molding System).

For more than 30 years, premium tissue was produced only by the largest tissue paper producers, using Through Air Drying (TAD) technology. Only they could afford the high capital investment involved and the high production cost mainly attributable to energy consumption. But the innovative Voith ATMOS technology has changed this situation. ATMOS technology was developed at the Voith Tissue Process technology Center in Sao Paulo, Brazil in close teamwork with Voith Paper Fabric division. Thanks to this development, premium tissue can be produced at much lower investment and energy costs, also saving fiber and even using 100% recovered paper furnish.

Chemical Structures and Their Properties of Wood Components

Toshiyuki Takano
Graduate School of Agriculture, Kyoto University

It is thought that wood components are produced by a tree for its survival, and have suitable chemical structures for the purpose. Then, the elucidation of relationship between chemical structures and their properties is one of the important approaches for new effective utilization of wood components. In this seminar, fundamental explanation for chemical structures of wood components and recent studies of wood components in our laboratory are mentioned.

Wood consists of main component (cellulose, hemicellulose, lignin) and minor component (extractives). Cellulose has a suitable chemical structure for crystallization (linear polymer with strictly regular structures), and is a construction material of cell walls. Hemicellulose has a suitable chemical structure as an amorphous material, and contributes to the formation of 3D structures of cell walls. Lignin is an aromatic polymer, and plays important roles for the formation of vascular bundle in a tree. Extractives are the important components for controlling the characteristic properties of each tree. As our recent studies, the new analysis method for Lignin-Carbohydrate Complex (LCC) and novel cellulose derivatives for photo-current generation system are also described.

Cellulose Nanofiber for Energy and Materials Production

Takashi Endo
Biomass Refinery Research Center, Advanced Industrial Science and Technology

In recent years, the development of utilization technology of woody biomass for energy and material has attracted much attention. The main component of wood is cellulose. The nature of cellulose in wood is an assembly of cellulose molecules called the cellulose microfibril. Cellulose nanofibers are bundles of cellulose microfibrils and have the feature of high strength and lightweight.

In this study, we have used cellulose nanofibers obtained from wood as a core material, and have developed the nanofiber reinforced composite and the pretreatment for enzymatic saccharification (bioethanol production). Cellulose nanofibers can be directly prepared from wood by the combined process of wet-milling and hydrothermal treatment (hydrothermal-mechanochemical treatment). The nanofibers have a very large surface area. Therefore, the enzyme readily accesses the cellulose molecules and saccharify.

In the production of nanofibers, water is essential. Thus, the drying process is required in the compounding of nanofiber with resin. However, the nanofibers tend to aggregate each other. We tried several methods to prevent aggregation of nanofibers in the composite. As a result, the masterbatch method was effective in dispersing of the nanofibers. The masterbatch was prepared by directly blending the nanofiber slurry into the low melting point polyolefin, evaporating water. The nanofiber-polypropylene composite containing just 1wt% nanofiber showed high strength and high elongation.

Activities for Energy Saving in Yonago Mill

Koji Ishitoya
Yonago Mill, Oji Paper Co., Ltd.

At our YONAGO mill, all members are working on the target "1.5% reduction of the total energy of our mill".
However, it is becoming more and more difficult year by year to find new or drastic energy-saving matters.
In spite of this difficult situation, by focusing on several projects, we have been successful in reducing the energy consumption of our mill continuously.
This paper reports how we can achieve our target, and our energy-saving cases.

Heat Exchange Paint NeOCOAT

Yoshiyuki Fujioka
EcoloTec Corporation

NeOCOAT is a next generation eco-paint which consumes heat by converting thermal energy to kinetic energy using ‘heat-exchange molecules' in paint. NeOCOAT can be applied to a wide range of surfaces including roofs, pathways, sports grounds, parking areas, indoor surfaces, and play equipment.
In addition, it is effective in reducing air-conditioning costs and controlling condensation.

The Efficient Energy Reduction Method by Fixed Orifice Type Trap

Masaki Kimura
Z Engineering Co., Ltd.

In paper pulp industry there are many processes of performing indirect heating by steam, and the steam which emitted heat is discharged from the steam trap as condensate. If a steam trap deteriorates, steam leaking will accrue, so the steam consumption of the whole factory tends to increase every year.
Although the steam leak rate from a steam trap is different with an operating condition, preservation frequency, etc. an average loss rate exceeding 10% has also been reported, therefore can say that to reduce steam leakage from steam trap is an important factor for energy saving. In order to reduce steam loss, it is necessary to perform check and replace of steam traps frequently. however, if it is a large-sized factory, thousands or much more steam traps are also installed, so it is easy to imagine that is considerably hard to do it from the point of view of the labor and cost. Therefore, the repair of the steam trap is carried out after a steam leak trouble is actualized. And the steam loss before the repair is ignored.
We propose the energy saving maintenance system using the "fixed orifice-type steam trap" which does not have a deterioration part unlike the steam trap as consumption part. This report introduces the introduction of the "fixed orifice-type steam trap" and the reduction of the steam leaking and maintenance cost by a new maintenance method.

Basic Lecture of Paper Board (4)
The Novel Needs and Future Trend

In recent years, the change of industrial structure has been caused the change of the mainstream from paper to paperboard in paper and pulp industry.
However, the demand of the paperboards in Japan hasn’t shown upward trend, but has maintained a flat.
Under these circumstances, the needs of customers for paperboard have shown several diversities in order to attain the cost reduction, and distinguish other’s products. We have been conducted research and development in order to deal with customer’s needs.
On the other hand, we strive to acquire the stable profit by raising the recovery rate and blending rate of the waste paper.
We will outline the future needs and trend of the paperboard, and introduce the countermeasure to take advantage of waste paper for cost reduction and meeting demand, trend and need.

Corporate Profile & Product Information (6)
Katayama Nalco Inc.

Katayama Nalco Inc. was established in 2004 as joint venture between Nalco Company and Katayama Chemical Co., Ltd. Katayama Nalco has over 80 years history as specialty chemical supplier. We provide process and water treatment chemical and services to various industries such as pulp and paper, primary metal, petro chemical, Automotive, food and beverage etc. Many pulp and paper makers declare openly reducing environmental impact while their manufacturing processes. We also focus on developing technology that provides not only economic but also environmental benefit to customer. Research and manufacturing network for pulp and paper is worldwide. We have wide range of product line that covers from digester to waste water treatment, all paper grades. Especially microbial treatment, retention and drainage, sizing, surfactant and cleaner are strengthen application. Nalco is a pioneer of emulsion polymer use. There is a best practice about polymer handling and feeding as mentioned below. In 2006 Nalco launched PARETOTM Mixing Technology to address polymer feeding issues. History was polymer and micro particle and development, in recently its application technology was considered. Today's requirements are suitable retention program for modern papermachine, addressing recycle fibre degradation, higher filler loading. Therefore we would release technology to solve those challenging.

Research Report
Performance Improvement of Activated Sludge

Masayuki Watanabe, Keiko Fujita, Miyuki Nakagawa, Hitomi Kimura and Hitoshi Okada
Japan Pulp and Paper Research Institute, lnc.

Recently, regulation for effluent standards has become stricter, due to enhanced awareness of the environmental preservation in Japan. In this situation, improvement of wastewater treatment is important for the pulp and paper industry. The Activated sludge (AS) process is one of main wastewater treatments and many paper mills use this process. However, it has been unclear how bacteria affect the performance of AS, and the operation of the AS process often depends on operator's experiences.

As a study of the development of higher performance AS, we have conducted investigations into the present situation of AS at several paper mills. As a result, we found out that the effluent from each mill was not always most effectively decomposed by the AS sample from the same mill. In the laboratory, we confirmed that high performance AS enabled us to improve degradability of wastewater which is resistant to decomposition. Based on the results of genetic analysis, bacteria of the order "Rhodocyclales" was likely to contribute to the performance of AS.

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Research Report (Original Paper)

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Development and Application of Cellgaia, the Pulp where Zeolite Crystalized Densely Inside of the Wood Pulp

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Central Laboratory, Rengo Co., Ltd.

Zeolites are a family of minerals known for their powerful deodorization and anti-bacterial effect that are supported by metals such as copper and silver. In recent years attention is also being paid to zeolites for their ability to absorb radioactive materials that are dissolved into water.

Despite this advanced function, until now there were no effective methods for affixing zeolites to materials such as paper or fabric, which has limited the fields in which they can be used.

Rengo has carried out research and development, including that related to paper manufacturing, for many years, and has successfully crystallized zeolite inside the wood pulp densely. Rengo has commercialized the resulting product as the high-performance pulp.

Cellgaia preserves all of zeolite's exemplary functions while maintaining the shape of the fibers. It can be applied to many types of fiber products such as paper, nonwovens, and cotton. The performance of this product can also be adjusted easily according to desired functions.

Polyacrylamide-Based Surface Strength Agents Appropriate for Low Basis Weight Paperboard

Shouko Sato
Paper Chemical Business Division, Seiko PMC, Co., Ltd.

Recently, the production of lower basis weight grades of paperboard is progressing for environmental impact reduction, energy saving, and cost reduction in papermaking industry. Paper strength properties generally tend to decrease as the basis weight is reduced. To compensate paper strength of low basis weight paperboard, dry strength agents are applied. The combination of internal and external application methods is needed to efficiently increase the compressive strength. Preventing buckling and reinforcing interfiber bonding were important factors for improving the compressive strength. The external application could be more effective to prevent buckling.

The simulation of relationship between penetration depth of PAM and bending stiffness of paper was carried out. The optimal penetration depth existed for maximum bending stiffness. To achieve the optimal penetration depth of PAM, molecular design of PAM for external (surface) application was conducted. PAM with the branched structure, high molecular weight, and low viscosity showed the best performance for compressive strength.

Toward Production of Bioethanol Using Pulp Rejects from Kraft Pulp Mills as Raw Materials

Masanori Kishino, Ken Orihashi and Akira Harada
Forest Products Research Institute, Hokkaido Research Organization

Qualities of 6 kinds of pulp rejects from kraft pulp mills in Hokkaido were investigated as raw materials for production of bioethanol. The rejects were found to contain more than 50% cellulose, which is very susceptible to enzymatic hydrolysis to glucose, and below 10% acid-insoluble lignin. Although 7-20% of the rejects, in particular with a big particle size, remained as residue, the rejects were hydrolyzed with cellulase to give glucose in over 50% as glucan on the rejects and over 90% on the glucan of rejects. The hydrolyzed solutions were fermented with yeast to give ethanol in more than 80% on theoretical yield.

In addition, the rejects were hydrolyzed with cellulase for each particle size. Although the rejects in 2-4 mm gave glucose in a 56% yield on the rejects for 72 h of hydrolysis, the rejects in below 2 mm gave glucose in a 60-70% yield on the rejects for 24h. This result suggested that the yield of glucose from the rejects increased by decreasing the particle size into bellow 2mm. The rejects as raw materials contained more than 50% of the rejects with a size of over 2 mm. Then, defibrillated rejects with laboratory blender, which contained less than 3% of the rejects with a size of over 2 mm, were prepared, and hydrolyzed with cellulase. As a result, the yield of glucose from the defibrillated rejects increased by over 10%, and its residue decreased by over 15% compared with those from untreated and washed rejects.

In conclusion, the pulp rejects from kraft pulp mills were suitable as raw materials for production of bioethanol.

The Deinking Agent and Other Chemicals for Pulp Recycling

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Research & Development Dept., Nissin Kagaku Kenkyusho Co., Ltd.

The technologies of recycling lower quality waste paper have been developed in recent years. As one of suppliers for deinking agent, we also has developed and functionalized the deinking agent to solve various problems. In this report, we describe the basic knowledge of deinking agent and other chemicals for pulp recycling, such as repulping promoter, fluorescence quencher, slime control agent, and pitch control agent.

The Latest Trend of Paper Technology in Southeast Asia

Kazunari Sato
Paper Machine Engineering Dept., Voith IHI Paper Technology Co., Ltd.

We report here the Latest Trend of Paper Technology in Southeast Asia, especially in Vietnam and Thailand, which market has very strong relation with Voith IHI Paper Technology Co., Ltd. In Vietnam,VKPC (Vina Kraft Paper Co., Ltd.) PM#1, the largest paper machine for liner and corrugating medium started its operation in Apr, 2009, supplied by Voith IHI Paper Technology Co., Ltd. At VKPC PM1, Sizer Project has just started in 2012 and this new project is in progress at the moment.

Besides, the paper machine Khon Kaen PM1 of Phoenix Pulp and Paper Co.,Ltd, which produce woodfree writing and printing papers and copy papers, have started up in Thailand in 2008. This paper will introduce these paper machines with state-of-art technology, machine layout and its design concept. Furthermore, the latest trend and forecast of paper business market in both Vietnam and Thailand is reported briefly with reference to the report of Vietnam Pulp and Paper Association, and Thai Pulp and Paper Industries Association.

Paper Business Revitalization Plan and Production System Restructuring Following the Great East Japan Earthquake

Jun Usami
Finishing department, Ai-mate Inc., Nippon Paper Group

Nippon Paper Industries' Ishinomaki Mill was in crisis due to complete devastation by the Great East Japan Earthquake of March 11, 2011. Following the company’s Paper Business Revitalization Plan, all six papermaking machines together with the two coating machines were in full operation within just one and half years.

Reconstruction began with debris removal, followed by reconnection of the power supply, and finally the restarting of the production line. No one had experience of rebuilding after such extensive damage, so clearing up, selecting which parts could be saved, or how equipment could be rescued, and dealing with components that had been immersed in sea water, all had to be done by trial and error.

When it came rebuilding the finishing section, in order to establish a more efficient process, it was possible to introduce procedures to minimize the need for paper defect inspection. Such a “No Screening” system has been a goal at the mill for more than ten years.

At the same time, in reconstructing the mill, PPC (plain paper copier) facilities were introduced as a new business at Ishinomaki mill, according to Nippon Paper Industries’ plan to downsize the domestic paper business to meet demand.

Inexperienced operators were trained at another mill for three months, and then, together with the experienced operators, on the new facilities when they were started.

However, even though reconstruction has been fully completed, we will continue to struggle with problems such as rust from seawater, land subsidence caused by the earthquake, further reconstruction of the finishing section for more efficient operation, and the early stabilization of the PPC facilities

LeanE ™ - New Approach toward Energy Saving

Masaharu Menjo and Akifumi Hatta
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Mechanical pulping requires huge amount of electricity during its operation. However, the pulp properties produced by mechanical pulping are attractive for several light weight paper products, e.g. newsprint. Paper mills have been always attempting to reduce energy consumption for the mechanical pulping and there are still requirements and expectations toward energy reduction from our customers. For utilizing the TMP lines with more efficiency, Metso Paper are providing a new approach toward energy saving, LeanE ™ concept; Experts from Metso Paper visit paper mills and audit whole TMP lines during their operation. By collecting and analyzing the actual production conditions, we finally propose the best solution for the energy saving to our customers.

LeanE ™ concept consists of newly designed and developed equipments, such as screw feeders, mechanical vapor separators, refiner segments and gap sensors. By replacing existing equipments with new ones, energy consumption can be reduced without deteriorating pulp quality. Some novel idea for energy saving (for example, refining with low consistency and increase of refiner number) are also included in LeanE ™ concept. Several paper mills already experienced LeanE ™ concept and they are satisfied with the results of energy reduction. Not only for TMP lines, LeanE ™ concept can be also applied to kraft-pulp production line and certain amount of energy consumption was successfully reduced at several paper mills. In this paper, the basic information and actual examples of LeanE ™ concept are to be introduced.

”Fiber to Print”, Optimizing Paper Process

Jarkko Ruonala and Jukka Nokelainen
Metso Automation Inc.
Kenichi Ishihara
Metso Automation K.K.

When quality control is concerned, the focus is often on the paper machine. However, the quality potential for a paper machine is always set before it in the pulp mill and stock preparation area. Correcting stock preparation upsets at paper machine is already too late. To put it simple, the paper machine merely forms the sheet and removes the water, whereas everything else is done at furnish preparation.

This paper will present the measurement and optimization possibilities in holistic quality management at paper machine and present an example case for end product quality management by means of optimizing stock preparation area.

DCS Evolution “The Next Generation DCS. Experion PKS”

Jun Fujii
Energy & Chemical Markets, Honeywell Japan Inc.

Competition among the process industries has become extreme, and to survive from such competition and to lead it to the 21st Century, it has become obviously necessary for business and control information to make rapid and exact decisions by rich experience and state of art technologies.

It is also inevitably required for DCS to have such functions as virtual security to protect system from hacking and virus, reducing alarms, integration with other systems and single windows, as evolving opened system and IT technologies.

Current issue on DCS is how to broad to perform operations safety and effectively as reducing load for each operator of the system.

In this article, Honeywell’s DCS of“Experion PKS” released in this June globally, is introduced, including its new functions.

Development Background and Field Cases of Color Surface Inspection System (MaxEye.Color)

Masahiro Suzuki
FUTEC Inc.

FUTEC has delivered over 7,200 sets of surface inspection systems to various markets including the plain sheet material markets such as paper and pulp, film, metal foil, non-woven fabric and printing markets such as offset printing, flexo printing and gravure printing since 1978.

A sheet surface inspection system, equipped with the monochrome line scan cameras, uses inspection object’s contrast and shape data for defect classification. Therefore it makes difficult to classify the defects by color.

Another reason for the difficulty of defect classification by color is that the
conventional color line scan camera (drive frequency: 40MHz) is not capable of having enough MD resolution for clear image.

Now, FUTEC has developed a new surface color inspection system,“MaxEye.Color”, using high-speed color line scan camera technology with a drive frequency of 80MHz.

Three main features of this system are: (1) a clear color image of defect, (2) an intuitive color defect classification setting, (3) a real-time color defect classification.

This system enables operators to see sharp, clear color view of defects to determine the cause of defects in early stage of production.

Furthermore, it carries out the automatic defect classification for color defects only by using real time processing function. This function contributes to the operation efficiency by supporting operators' checking process.

Some Characteristics of Corrosion- and Abrasion-Resistant Weld Metal in Water-Cooled Boiler Panels

Hiroaki Fukumoto and Taketoshi Goto
Welding alloys Japan Ltd.

Recently low quality fuel have been utilized in pulp and paper industry, in consideration of reducing CO2 emission policy and rising price of crude oil price. Low quality fuel has various problems respectively such as corrosion problem caused by sulfur and chloride content in it. Various conclusions for these problems are proposed about these problems.

Boiler panel cladding method has been recognized as a proven technology for water wall protection in U.S since 1990s. This article describes some characteristics of overlay material and the best practices applied to water wall panels.

From Rag to Wood: The Review of the Technologies of Producing Pulp from Wood (Part I)

Kiyoaki Iida

In Europe, rag was a main pulp source in paper making until the midst of the nineteenth century. As the demand of paper increased in the industrial revolution, new pulp source had to be developed, and some visionaries thought that wood would be able to be an alternative. So, the work to produce pulp from wood started, and major pulping processes, ground wood, alkaline (soda and kraft) and sulfite processes, were industrially established in such a short period as about 50 years. As pulp became affluently available, paper was widely used and helped develop intellectual and social activities. In some sense, the technology of producing pulp from wood is as important as the invention of paper 2000 years ago, and helped the cultural development of mankind in the twentieth century.

In the first half of this paper, the history of producing ground wood pulp, and soda and kraft pulp was reviewed. In the latter half of this paper that will appear in the next volume, sulfite process was reviewed. Then, how those technologies influenced the cultural development in the twentieth century was discussed.

Corporate Profile & Product Information (7)

Harima Chemicals Group, Inc.

Harima Chemicals Group, Inc. was established in 1947 in Kakogawa. We are a chemical manufacturer built on products developed using pine chemical resources. Our products are used in a wide range of fields from resin for chemicals for paper production, printing ink, paints and adhesives, to emulsifier for synthetic rubber, and solder used by electronic appliances. For paper chemicals, we offer a wide array of products including sizing agents for preventing (water-based) inks from bleeding, paper strengthening agents for structural fortification, and coating agents for improving and reinforcing paper surfaces.

Now with an international network spanning 32 manufacturing bases in 11 countries, we meet the needs of our customers all over the world.

Experience in Australian Paper as the First Representative

Mitsuhiro Sugino
Production Dept., Technical & Engineering Div., Nippon Paper Industries Co., Ltd.

In 2009, I was transferred to Australian Paper as a Nippon paper representative because Australian Paper (hereinafter referred to as AP) became a member of Nippon Paper Group. During my stay in Australia, I tried to introduce some of Nippon paper's ways into AP and most of them were accepted by AP management albeit, after much discussion and some minor modification to ensure alignment with their Australian culture.

In terms of the life in Australia, it was exciting for me because it provided me with an opportunity to experience another culture and to make many friends. I also had a chance to become a member of Latrobe International Exchange Committee and was in charge of Sister City Day Festival etc. From a globalization perspective, to know and understand another culture, their language and their way of thinking, was very important and rewarding for me and I believe this will be of benefit to me in my future roles with Nippon Paper.

Research Report

Characterization of Refractory Organic Matter in Pulp and Paper Mill Effluents

Masayuki Watanabe, Keiko Fujita, Hiro Iwata, Yutaka Nuruki, Kazuko Watanabe, Miyuki Nakagawaand Hitoshi Okada
Japan Pulp and Paper Research Institute, lnc.

The quality of wastewater from Japanese pulp and paper mills has been recently improved, due to regulation of effluent standards which has been stricter since the Water Pollution Control Law was enforced in 1972. However, it has not attained yet in some mills that the level of COD (Chemical Oxygen Demand) of the wastewater becomes below the environmental standard. Accumulation of refractory organic matter has been pointed out as a new problem especially for a part of the closed water area in spite of regulation of total emission. Japan Pulp and Paper Research Institute is researching this problem.

As the first step of this theme, the characterization of the refractory organic matter was studied. Dissolved organic matter in wastewater was fractionated into five fractions; hydrophobic acid, hydrophobic neutral, base, hydrophilic acid, hydrophilic neutral. Based on measurements of the degradation rates of the fractionated components, it was confirmed that the most refractory matter was fractionated into the hydrophobic acid.

Furthermore, we compared softwood and hardwood kraft pulp (KP) bleaching drainages. Softwood KP bleaching drainage was more resistant to decomposition than hardwood KP bleaching drainage, and contained the hydrophobic acid in a higher ratio. In addition, the hydrophobic acid in softwood in hardwood KP bleaching drainage.

In order to investigate the source of the hydrophobic acid, the each process drainage was fractionated as well. As a result, the maximum source of the hydrophobic acid was KP bleaching process. Pyrolysis GC-MS analysis of the hydrophobic acid of bleaching drainage indicated that lignin was a major composition of the refractory organic matter.

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2013 December JAPAN TAPPI JOURNAL
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Vol.67, No.12 Abstracts

Relationship between Paper and our Environment
-Aiming to the Noble Use of Woods-

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Paper is a material that supports our life and culture. The raw materials of paper are woods which are known for sustainable resources. Paper making companies in Japan have constructed a system to verify the legality and sustainability in utilizing woods. Taking the example of hardwood, using the hardwood from Satoyama as pulp for paper making contributes to the conservation of Satoyama. In addition, the use of plantation hardwood from overseas has increased forest area and promoted local employment.

Today, in order to activate the Japanese forests, it is necessary to increase the use of domestic woods. Japanese pulp and paper industry is the biggest forest-product industry in Japan, using about 40% of the domestic woods, and the forestry's base in Japan.

The Necessity of Continuous Measurement for Dust Concentration in Flue Gas in Paper Mill

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Tanaka electric laboratory Co., Ltd.

Dust density meter is not so popular but it will be becoming very important environmental instrument for CEMS in several industries such as paper mill.

We explain the necessity of dust density meter for paper mill facilities by existing model DDM-2001 and under developing new model for wet flue gas from FGD.

Fine Particulate Matter (PM2.5)
-Generation and Control-

Kazuhiko Sakamoto
Center for Environmental Science in Saitama

Ambient fine particulate matter (PM2.5) has an adverse effect not only on human health such as increase in the death rate, but also on quality of life by deteriorating level of visibility and spoiling scenery. An air quality standard for PM2.5 with diameter less than 2.5 μm has been newly constituted in September 2009 in Japan. Although PM2.5 concentration has been steadily decreasing, achievement of its air quality standard is not easy especially in urban area. PM2.5 consists mainly of primary particles emitted from various combustion sources and secondary particles generated from gaseous precursors in the atmosphere. In this report, the current state of PM2.5 in South-Kanto area and future researches required in order to reduce ambient PM2.5 concentration are described.

Evaluation and Countermeasure of the Low Frequnecy Noise Problem in a Factory

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At factory or plant, sometimes the low frequency noise, which has components less than 100Hz, becomes a serious problem together with the noise in ordinary frequency. It is known that the countermeasure of low frequency noise is more difficult than the noise in ordinary frequency. In this article, basic knowledge of the low frequency noise problem is summarized. Also the noise countermeasure techniques which are applicable for the low frequency noise problem are introduced.

Outline and Experience of Anaerobic Wastewater Treatment System

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Sumitomo Heavy Industries Environment Co., Ltd.

Anaerobic wastewater treatment system can make energy from organic pollutants contained in wastewater. In granular sludge bed, anaerobic bacteria convert organic matters into biogas composed from methane and CO2 in anaerobic environment. Heat or electric power is produced from methane. And also this system can reduce energy consumption and running costs compared with activated sludge system.
In this paper, basic mechanism of anaerobic digestion, and experiences of actual operation of anaerobic wastewater treatment system are described.

Recent Progress in Treatment of Low-Contaminated PCB Waste

Yo Osada
Japan Industrial Waste Management Foundation

Electrical machinery, such as transformers or capacitors, being contaminated by small amount of PCB was found in 2002 in Japan. The number of the units is estimated as almost 1.6 million. To promote the appropriate treatment of the PCB waste, the Ministry of Environment implemented a certification system for businesses detoxifying the waste using sophisticated technologies from 2009. At present, 10 operators being certificated under the system and one operator approved by a local authority are treating the waste by firing.
However, since the present capacity is still insufficient to the huge amount of the waste, effective measures are to be implemented to increase the facilities or to materialize new solutions like washing process.

Climate Change Mitigation Policy in East and Southeast Asia and Business Opportunities of Japanese Stakeholder in the Region

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The present paper comparatively analyzes climate change mitigation policy and the implementation thereof in four East and Southeast Asian countries, namely, Mongolia, Cambodia, Lao PDR and Vietnam. The paper also discusses international support mechanisms for nationally appropriate mitigation actions (NAMAs), which developing countries are encouraged to develop and implement within the framework of the United Nations Framework Convention on Climate Change (UNFCCC). In this context, the paper analyzes business opportunities of Japanese companies in the region, possibly with the use of the Joint Crediting Mechanism (JCM) of the Government of Japan.

POD Business Growth in Social Media Arena

Harunori Sugita
Production Services Sales and Marketing
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In the process of expanding Social Media Services in Japan, the value of POD services should be diversified into mainly two directions while retaining its basic concept “on demand time, on demand place and on demand volume”
The first direction should be super centralized POD services in line with Big Data management services expanding with SNS, in which POD services would be required highly integrated, seamless workflow with higher performance of inkjet or dry toner printing products.
The second one should be super decentralized POD services supporting community building businesses increasing with SNS, in which POD services support the same contents and expressions rather than variable information by people. There should be increasing demand on handy and small size of POD systems not only in printing services sites but also office copier printers and public print services such as convenience stores or city halls.
These two trends are important to view the future development of materials with POD and more spaces are existing to grow.
In this seminar I also touch on what we call “image recognition cloud sevices” that connect paper value with SNS easily. Fuji Xerox has just released “Sky Desk Media Switch” service which can connect virtual information such as home page or video clips with paper media through an image recognition service application uploaded into smart media terminals.

From Rag to Wood: The Review of the Technologies of Producing Pulp from Wood (Part II)

Kiyoaki Iida

Following the Part I, the development of sulfite pulp is reviewed. Though GP and alkaline pulp became available, rag pulp was still a main source for fine paper. Scientists and entrepreneurs were interested in sulfite process as an alternative, and research work was carried out worldwide in technologically developed countries like America, several European counties and England with frequent information exchanges among them. When the technology was commercially established, there was a case representing such operations in which a certain log producer in Canada bought the license and the technical support from England, imported lime and sulfur from Scotland and Spain respectively, exported his pulp to America and paid the royalty to England.
As sulfite pulp and GP were at hand, the amount of paper produced accelerated. The society, which was getting affluent after the industrial revolution, could afford to use it for exchanging information more efficiently, which further increased the demand of paper.
The technology of producing those types of pulp developed since the mist of the 19th century surely contributed to the development of human culture in the successive generations..

Corporate Profile & Products Information (8)

SEIKO PMC CORPORATION

SEIKO PMC CORPORATION was established in April 2003 by the merger of Japan PMC Corporation and Seiko Chemical Industries Co., Ltd., and produces paper making chemicals and resin products for inks and recording materials. Since the establishment, the two companies had been providing for Japanese paper or ink industries their indispensable materials by using their core technologies of emulsification, dispersion, and polymer synthesis. Since the merger, in addition to the above mentioned activities, we have established New business development division to explore new fields by applying our core technologies focusing on developing a) Electronics related and b) Renewable environmental-friendly materials. We also formed Overseas division to go into the rapidly emerging markets like China or South East Asia to get business chances.
In this article, we would like to introduce our corporate profile as well as the technical trend and the recent development of paper making chemicals.

VINA KRAFT PAPER CO., LTD. - Operating Experiences in Vietnam

Atsuhito Yoshizaki
VINA KRAFT PAPER Co., Ltd.

VINA KRAFT PAPER Co., Ltd. (hereinafter called VKPC) was incorporated in January 2007, and commenced commercial operation of the containerboard mill in April, 2009 near Ho Chi Minh City, Vietnam which has achieved sustainable economic growth. VKPC is a joint venture company between SCG Paper (Siam Cement Group), the biggest paper manufacturer in Thailand, and Rengo (Japan). VKPC, which is the biggest containerboard mill in Vietnam, produces linerboard and corrugating medium with one paper machine and has a capacity of 220,000 tons per year.
This report describes economic situation in Vietnam, general information of VKPC, and its operating experiences.

A Calculation Method to Evaluate the Control Effect by PLS Regression Analysis
− How Should We Evaluate the Real Control Effect? −

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In the pulp and paper manufacturing process, numbers of material properties and end product qualities are changing steadily with time. Therefore it is considerably difficult to judge the variance of the production cost or the improved effect etc. through the operation data properly and fairly, because of their disturbances, when they are so tiny amount.

This paper describes a new method to evaluate the effect of the production cost and control effect etc. more accurately when a new control function was introduced or when process operation methods were changed for some purpose in the production processes.

Here, as an example, a case of a pulp bleaching process was taken up.

The proposed method is follows:

At first, find out the reliable multiple linear regression equation by using statistic analysis PLS (Partial Least Squares) regression method, for example, between the production cost as dependent variable and some primary explaining variables relates to the bleaching process. As it is well known, because the PLS analysis result is superior to the common regression analysis by MLR (Multiple Linear Regression) method in the stability and reliability. Sometimes, the regression coefficients calculated by MLR are tending to be inappropriate by the effects of over fitting or their collinearity.

Next, to get rid of the random variance and disturbance effects, correct and compensate the targeted “production cost” appropriately by “approximate linear correction method” so as to equalize the manufacturing conditions and incoming and outgoing material properties, utilizing the regression coefficients that were obtained by PLS regression model in advance.

As a result, it become possible to judge the control effect fairly and acceptably, even if the variance of the production cost is tiny change or the each explaining variable’s operating condition levels were changing intricately with each other.