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Vol.66, No.1 Abstracts

Finebar
-The Latest Refiner Plates-

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By worsening of electric power supply situation in recent years, Japanese industries are being required to increase efforts for energy saving. Though our paper industry had already reached high level of energy saving, still it is not exception. Historically, refining stage in stock preparation which needs especially big energy had been modified to reduce power consumption constantly. Now the time it should become the key point for energy saving, again. Also, from old term, it is well known that refining stage is the most important for defining character of paper. The refining technology had been evolved in accordance with the transition of stock resources and paper making technologies. And now the turning point has turned up to the refining stage, because not only waste paper fibers, but also main virgin fibers, had become shorter. In this paper, AIKAWA introduce “Finebar” - the latest refining plates which is the best for these days thus it brings upgrade for product by smaller power consumption. Please find out Finebar's feature, its revolutionary performance and its future possibilities.

Hachinohe Mill
-Learn from the Earthquake Disaster-

Yasufumi Kumagai
Mitsubishi Paper Mills Limited
Mikio Sasaki
Hachinohe Institute of Technology

The great east Japan earthquake disaster occurred on March 11 2011, and the Hachinohe Mill of Mitsubishi Paper Mills was hit by the earthquake of a seismic intensity “5-upper” and a tsunami of 8.4m in height.
There was minor damage caused by the earthquake to the mill, but the damage caused by the tsunami was quite severe. The mill is still on its way of reconstruction and revival. The damage of the mill by the earthquake and tsunami and geographical data of tsunami are presented together with the mills reconstruction and revival plan and its progress.

Ishinomaki Mill
-Meeting the Challenges Today for a Stronger Mill Tomorrow-

Yasuo Asano
Nippon Paper Industries Co., Ltd.

Our three mills in the Tohoku region were severely damaged by the 9.0-magnitude earthquake, which was the largest-ever recorded in Japan, occurred at 14:46 on March 11, 2011 and the massive tsunami afterward. We have established Disaster Recovery Division in the headquarters in order to achieve a prompt recovery from the severe damages.
In this report, we will report on the recovery progress we have achieved up until the present together with the actions toward rebuilding disaster-resistant mills including the framework.

Operating Experience of ECF Bleaching
-Application of Peroxymonosulfuric Acid Bleaching into Mill Scale-

Yasuhiro Ogawa
Tomioka Mill, Oji Paper Co., Ltd.

The Elementary Chlorine-Free (ECF) bleaching process for kraft pulp (KP) has prevailed. We faced the problem of discoloration of ECF bleached pulp. We have known that hexenuronic acid (HexA) in ECF bleached pulp plays an important role in brightness reversion (yellowing) of the pulp, and studied ways to remove HexA. We overcame many difficulties, and established industrial methods and equipment to produce peroxymonosulfuric acid in continuous ways. This method and equipment was first adopted in the world at Tomioka Mill.

In this paper, we introduce the introduction of MPS method and operating conditions.

Operating Experience of Blade Type Canvas Cleaning Facility

Yasuhide Hirota
Fuji Mill, Oji Paperboard Co., Ltd.

Oji paperboard Fuji PM10 produces corrugating medium 560 tons per day. The mill uses OCC for the furnish mainly, and Key issue is to remove foreign substance. Especially it's difficult to remove pitch and sticky substance completely in pulping process and then it gives various problems in whole paper making process. At dryer section the various measures has been executed to eliminate them because the dryer fabrics catch them up very easily. The super high pressure cleaner has been installed for single run dryer fabric at 1st dryer section and operating with good results. However this kind of cleaner is essential to keep clean with regular maintenance. Therefore first of all, easy maintenance cleaner was demanded when we plan to install second one. As a result, blade cleaning system (AOKI cleaner) was installed at 2.nd bottom dryer section in July 2010. We introduce the latest blade cleaning system and its effect operating.

An Operating Experience
-Retrofitting Carried Out to Reinforce Nip Pressure at PM7 No.2 Press Section-

Seiji Hazama
Yashio Mill, Rengo Co., Ltd.

As companies are expected to take environmental actions, Rengo established "Eco Challenge 020" as the company's environmental action plan and is strenuously working to reduce the carbon emissions by 32% in 2020 compared to 1990 levels.

Given the above background, retrofit was carried out at Yashio Mill PM7 (medium machine) with an aim of improving the productivity as well as reducing the steam consumption; nip load was increased from 1000kN/m to 1200kN/m in order to improve dewatering capability. The outline of the retrofit and an operating experience will be discussed in detail below.

Environment-friendly Corrugated Board Adhesive without Boron Compound

Takahiro Kanai
Oji Cornstarch Co., Ltd.

Boron compound (borax), one of the ingredients of adhesive used for corrugated cardboard has been major in manufacturing adhesive. However, it is reported that boron compound is likely to be harmful to the human body and its concerning substance is on the list of law REACH in Europe. We have found Sepiolite, alternative substance from natural mineral that can be used to adhesive for corrugated cardboard on some points of water retention and well-expressing viscosity (we believe that). This adhesive without boron compound retains physical properties of conventional laminatability and operation, also very environment-friendly.

Bottom Ash Recycle at Circulation Fluidzed Bed (CFB) Boiler

Kouhei　Higuchi
Akita Mill, Nippon Daishowa Paperboard Co., Ltd.

Nippon Daishowa Paperboard Co., Ltd. (NDB) has installed coal and wood chip co-firing circulating fluidized bed boiler at Akita Mill in 2008. After new power plant installation, oil boiler was stopped and used as a backup power.

NDB has reduced the energy cost by fuel switching from oil to coal, and also reduced the CO2 emission by utilizing wood chip as a fuel. However currently the cost of disposal ash generated from fuel combustion, and the cost of additional bed material are a cause of an increase in the total running cost.

In this paper, we introduce about the outline of the bottom ash recycle system installed in Aug 2010 to further reduce the running costs and actual operation experiences.

Development of Mass-propagation Method of New Tea Cultivar “Sun Rouge” Containing High Anthocyanin Content

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Through research and development of afforestation technology, Nippon Paper Group has cultivated a photoautotrophic culture technology for increasing cutting plantlets and seedling growth technology for healthy plantlets. To date, the Group has produced and marketed seedlings of horticultural crops (e.g., cherry trees and eucalyptus for flower arrangement) and vegetables (e.g., sweet potato), green teas. Reacently, Nippon Paper Group, in cooperation with the National Institute of Vegetable and Tea Science at the National Agriculture and Food Research Organization (NARO), has developed “Sun Rouge”, a new species of tea with high anthocyanin content. In this report, mass-propagation method of “Sun Rouge” is investigated.

Insect Control Activities Conducted at Katsuta PM1

Yoichi Matsumura
Kanto Mill (Katsuta), Hokuetsu Kishu Paper Co., Ltd.

Insect contamination of products is one of the most serious problems for paper manufacturers that causes complaint from customers and may lose confidence as company. We have performed various insect control activities at Katsuta PM1.

Generally, reducing negative air pressure inside the paper machine building is effective for insect control. Since November, 2010, we have done several works that include the change of air source of dryer air supply fans and the installation of building air supply fans.

As a result, these contributed to the reduction of negative air pressure that achieved the decrease of insects.

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Topics & Information

Introduction of Research Laboratories（８６）

Research Report （Original Paper）

Pulp and Paper Mills in Japan（３２）

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2012 February JAPAN TAPPI JOURNAL

Vol.66, No.2 Abstracts

Operating Experience of Nantong PM1 in China

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Oji paper has been progressing a project for construction of a large scale integrated pulp and paper mill in Nantong, China. Currently, first phase construction is finished, the No. 1 paper machine and coater began commercial operation, which have produced uncoated fine paper and coated paper A2 since January 2011.
In this paper, we report on the operating experiences through to commercial operation since commissioning.

The Ultra Thin Cartridge Dual Mechanical Seal

Hidekazu Takahashi
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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. We develop novel and compact ultra thin model cartridge seal that uses 2 mechanical seals. And then these seals are contributing on the trust inclination by water saving and energy conservation, backup function in a pulp & paper plant.

Automatic Steam Control System with the Maximum Boiler Efficiency under Any Operating Condition

Masahiko Murakami and Tomohiro Okubo
Miura Co., Ltd. Ishinomaki Mill

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 multiple boiler installation system by using each boiler’s most efficient operation point

Outline, Operational Experiences and Development of the Vertical Separator Washer “Vertical Z”

Minoru Ishikawa, Takefumi Ide and Kiyoshi Yoda
TAIZEN CO., LTD.

In Japan where we cannot expect much natural resources, the utilization of waste paper is quite active and various kinds of technology have been developed. On the other hand, the necessity of recycling the resources is widely urged due to the threat of global warming. Under the circumstances, the utilization of waste paper has been accelerated and now further advanced disintegrating technology to enable the usage of the waste paper which has been abandoned as waste before is keenly expected.
We, Taizen, have been developing the technology for the treatment of waste paper such as the disintegration of waste paper pulp and softening and resolving foreign materials in applying our own kneading technology.
And, recently, we have succeeded in the development of totally new model of vertical separator washer, “Vertical Z (Zekoo)”.
“Vertical Z (Zekoo)” has various unique functions in comparison with the conventional horizontal washing machine.

The pulp slurry to be washed theoretically moves from the lower side to the upper side, and the fiber and the impurities are separated efficiently through rotating cylindrical screen.
Installation space required for “Vertical Z (Zekoo)” is 1/9 only compared with the conventional horizontal washing machine. In addition, the area of the required screen surface can be reduced to 1/3, the volume of consumed water can be reduced to 1/4 and electric power can be reduced to 1/4.
Brightness of the pulp can be improved after washing by “Vertical Z (Zekoo)” and, in addition, the improvement of the yield can be achieved.
Furthermore, the screen of “Vertical Z (Zekoo)” has been used for approximately 9 years without replacement and the expenses for the maintenance can be minimized.
We will keep developing the original and unique technology.

Continuous Pressure Gap Forming for Linerboard Production - Shoe-Blade Pilot Machine Results -

Yuki Hashimoto
Paper Machine Sales Department, Kobayashi Engineering Works, Ltd.
V. J. Wildfong, C. Holmqvist, J. A. Shands and J. A. Ronning
Johnson Foils, Inc.

Current trends of decreasing basis weights for containerboard has led to increasing machine speeds, motivating the use of gap formers. Application of Shoe-Blade gap forming technology for containerboard grades is discussed and pilot paper machine results are reported on. Formation, equal or better than current commercial gap forming, at low SCT ratios which approach fourdrinier forming were found.

Improved Yankee Protection and Product Quality through New Crepe Control Concepts

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Development Team, Maintech Paper Tech Co., Ltd.

The demand of increased production and improved sheet quality tend to increase in recent years. But, simultaneously satisfy both requirements is difficult by using conventional creping control concepts. In particular, there are many cases will trade off sheet quality and productivity. For example, it is very difficult task to resolve once yankee protection and chatter prevention and sheet softness.
Maintech has developed crepe control agents based on a new original concept, a solution that various problems about creping process.
This report describes the concept and mechanism about YANKEEGUARDTM , DSL TM and SOFLEASE TM series, and introduces some interesting examples about chatter prevention and sheet quality improvement.

EVERLOY Spray Nozzles for Paper Mills

Takashi Nishiyama
Kyoritsu Gokin 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.

Reduction of Paperboard Grammage Concerning Paper Strength Properties

Takushi Sakaemura
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In packaging and papermaking industry, there is a tendency to reduce paperboard grammage from an environmental perspective. Paper strength properties generally tend to decrease as the basis weight is reduced. There is a need for reducing paperboard grammage and at the same time maintaining the strength properties. In order to solve this problem, it is essential to efficiently apply dry strength reagents such as acrylamide-based polymers and modified starches. We show the results of the experiments conducted in our laboratory;

1. Effects of basis weight of paper on the compressive and tensile strengths,
2. Efficiencies in strength improvement of dry strength reagents applied to paper by the internal and external application methods and by the combination of those methods,
3. Effectiveness of assistant reagents to retain fibers which have adsorbed the dry strength reagents.

The Design of Environment-Friendly High Performance Polymer

Kunihiko Kobayashi,　Nobuhiro Matsuda and Takanori Yamashita
Performance Polymer Research Laboratories, JSR Corporation

Recently, 3R (Reduce, Reuse, Recycle) has been promoted for resource saving. As a part of that, we have developed environment-friendly high performance polymer which can show enough strength of the coated layer with a small amount of polymer parts. In this paper, we will report about the design and the performance.

In coated paper, functionalized styrene-butadiene polymer latex is used. It is required to form a continuous film and to bind pigment in the coated layer. However, reducing the polymer parts leads to a decrease in the number of polymer particle and polymers can't form continuous films. As a result, we can't get enough strength of the coated layer. So, we tried to minimize the size of the polymer particle because the number increases when minimizing the size. We investigated the influence of the size to the strength of the coated layer and the problem against producing a small size polymer particle. We confirmed that a small size polymer particle showed enough strength of the coated layer, but it was too unstable and the viscosity of its aqueous dispersion was too high to provide commercial scale. As a solution to these problems, we controlled the functional group distribution to the aqueous phase; decreased the amount of water soluble polymers and increased the bound functional group to polymer particle. In this way, we developed an environment-friendly high performance polymer which can reduce the polymer parts in the coated layer by more than 10% compared with those currently in use.

Full Automatic De-Wrapping of Paper Reels

Toshio Aoki
Maruishi Co., Ltd.

Maruishi introduces a new technology of full automatic de-wrapping of paper reels by using special knife without damage the paper. In the beginning it was protected with timber and metal strap, today it is using the kraft liner and corrugated cardboard etc. for the wrapping style. For the converters and printers, it is necessary to reduce the load of operator and take away the wrapping in effective and safely.

The Behaviors of Inorganic Sulfur Compounds during Oxygen Bleaching

Iori Tomoda and Yosuke Uchida
Oji Paper Co., Ltd. Core Technology Laboratories
Emi Takakusagi
Oji Paper Co., Ltd. Functional Materials Laboratories

Oxidized white liquor is commonly used as alkali in oxygen delignification. This is the reason that using the oxidized white liquor in this stage helps to maintain the sodium and sulfur balance in the pulp mill. The most regularly, sulfide in white liquor is oxidized to thiosulfate with air in an open reactor. In previous perception, thiosulfate does not change during oxygen delignification. However, some researchers found that thiosulfate was oxidized to sulfate during oxygen delignification recently.

In the mill study, we found that thiosulfate was oxidized to sulfate during oxygen delignification. In the laboratory experiment, we confirmed that the existence of pulp was needed by oxidation of thiosulfate. Thiosulfate was oxidized by oxygen and this reaction was intermediated by lignin and pulp.

$$S2O32- + 2O2 + H2O \rightarrow 2SO42- + 2H+$$

This oxidation scheme suggested that, thiosulfate oxidation consumed not only oxygen but also alkali. That is, the oxidation of thiosulfate which was derived from oxidizing white liquor consumed by the addition of 15% of oxygen and by the addition of 20% of alkali.

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Process Control and Automation

Topics & Information

Research Report （Original Paper）

Pulp and Paper Mills in Japan（３３）

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Vol.66, No.2 Abstracts

Back to the Normal Operation after Disasters ---- Restoration is an Option

Koji Toritani
BELFOR Japan Co.,Ltd.

When factories encounter disasters such as fire, flood, Tsunami, chemical leak etc. , it seems like whole replacement of damaged equipment is the only way to go back to the normal operation. However depending on the cases, restoration would be the vest option because it would minimize the cost and especially down time.
Approximately 30 years ago Siemens and Munich Re jointly started restoration company in Germany, which was the precursor of BELFOR, to help such factories, building, public transportation, hospitals, stores and so on. In Japan BELFOR Japan started the service in 2004 and supported approximately 150 restoration projects including recent Tsunami in Tohoku and floods in Kii, Aichi area.

Approach for Electricity Demand Restraint of Oji Paper Group

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The government carried out electricity usage restrictions based on the Electricity Business Act Article 27 for large consumers to support the electricity shortage due to the Great East Japan Earthquake. Offices and mills of Oji paper group worked on electricity demand restraint according to a “joint usage limitation scheme” based on the act and introduced a new demand monitoring system in order to monitor real electricity demand in real time.

Installation of Saving Space Color Web-Inspection-System and Verification of System Performance

Hiroki Kondo
Hokkaido Mill, Nippon Paper Industries Co., Ltd.

The quality demand to paper is getting very severe, because of extension of the share of imported low price products in the domestic market and the fiercer competition between manufacturers by making of high performance paper. Therefore, the demand for the inspection performance of web-inspection system has risen day by day.
Shiraoi 8M/C is a paper machine of maximum speed 580m/min that produces the fine paper by 235t/day. However the performance of the web-inspection system is not sufficient, because it inspects only felt surface by transmission reflection combined method.It has become difficult to satisfy the quality requirements from users, so we improved the performance of Web-inspection system in May 2011.
To solve the problems of limited space that the conventional inspection system can not be installed we selected space-saving web-inspection system (Super NASP-SF) by OMRON as the first domestic machine. Besides, we could build a system to satisfy the quality requirements. In this paper, we report details and effect of installation.

Diagnostics Function of New QCS Experion MX

Junichi Masuda
Honeywell Japan Inc., ACS, HPS, P3 Sales Dept.

Honeywell has conducted numerous interviews of many users to understand how technology can contribute to what is the paper industry and announced the new QCS “Experion MX” developed to respond to needs of users. I introduce “concept of this QCS”, “Diagnostic features that enhance”, “Tool of the diagnostic” and “New remote service” in this paper.

Upon strengthen the functions of the Diagnostic; the process from the sensor measurement to the server is divided into three layer nodes, so as to perform self-check and more information on each node. This technology is essential EDAQ. “Three layer nodes”, “EDAQ”, “Online Diagnostics”, “Online Web Page” can show the detailed data collection and online documentation. It can be served as tools of prevention and made early resolution of proactively troubleshoot problems.

“Preventive maintenance support tool” is enabling to increase in efficiency of the periodic maintenance. Remote maintenance uses the feature of Experion MX and is enabling work which the Honeywell expert is checking from the remote place like at the site. Furthermore, remote service is equipped also with a process report, each control analysis, the power spectrum analysis, and the sensor analysis.
These features can be expected to contribute to long-term stability of systems and products.

№1 C/T Web Defect Inspection System, Sorting Control System Renewal

Tohru Ohmori
NIPPON DAISHOWA PAPERBOARD Co., Ltd.

The No.1 cutter defective detector and sorter control device which are for [of 50 M/C] white board products saw the 23rd year from installation, and accuracy maintenance and a maintenance suited their difficult state in having ended the maintenance contract.

Since the products of 50 M/C have much demand for medical treatment and food uses, in order to strengthen the quality control organization. As a result of introducing a color defective detector into No.2, 4, and 5 cutter surface from March-09, detection demonstrated the effect till then to the difficult light color defects (color spot etc.), felt depilation, and the escape prevention of the insect mixing article.

This time, strengthening of the further quality control organization and stabilization of operation were attained by a No.1 cutter defective detector and updating a sorter control device simultaneously collectively.

Here, the updating example about a color defective detector and a cutter sorter system introduced into No1 cutter is reported.

Hachinohe Mill : Restoration of Electric Instrumentations After Great Earthquake and Tsunami

Norio Matsukawa
Mitsubishi Paper Engineering Corporation

The great east Japan earthquake disaster occurred on March 11 2011, and the Hachinohe Mill of Mitsubishi Paper Mills was hit by the earthquake of a seismic intensity ”5-upper” and a tsunami of 8.4m in height.

There was minor damage caused by the earthquake to the mill, but the damage caused by the tsunami was quite severe. Especially, the damage to the electric instrumentations were quite heavy and required great efforts for their resumption.

In this report the damage in Hachinohe Mill is described together with (1) the restoration of power plants, transformers, power supply switch boxes, DCS, motors and local control equipments, electrical instrument rooms, control cabinets and equipments, (2) keys for the early restoration based on these experience, and (3) up-to-date resumption of the mill.

Equipment Cleaning Services in Support of Yokogawa Earthquake Recovery

Motokazu Kuremoto and Yoshimi Sakozono
Repair center, Yokogawa Field Engineering Service Corporation

We heartfelt sympathy to everyone affected by the earthquake was off the northeastern Pacific Ocean on March 11, 2011.
Realizing early recovery of the plant resumed production was affected in the earthquake damaged shutdown, as an example of one of the challenges manufacturers anticipation of cost savings and environmental protection were carried out in Nippon Paper Industries Ishinomaki Mill "Cleaning Equipment service "to introduce.
The tsunami earthquake by, first floor submerged plants for several days.
Approximately two weeks surrounded by debris and sludge in the plant water was banned.
Of the total loss seemed to the first floor equipment, we got down to cleaning equipment to remove the power of the FCS and cards.
Even when a few weeks later, the card did not contain electric kidney was confirmed by washing the normal operation.
Based on the facts of normal operation, we began the rescue operations were under water control devices.

Introduction of an Optimal Load Allocation Control System for Turbines

Kazuhisa Toyama
TOSHIBA MITSUBISHI-ELECTRIC INDUSTRIAL SYSYTEMS CORPORATION（TMEIC）

Various approaches are taken to energy-saving and CO2 reduction in pulp and paper industries which consume much energy.
This paper introduces an optimal load allocation control system for turbines which secures both requirement of manufacturing process and reducing such energy consumption as electric power and steam.

The Traceability System for Food Factories
—The Approach to Enhance the Quality Assurance Management—

Atsushi Toda and Yuichiro Numayama
Solution Department, Business Headquarters, Advance Automation Company, Yamatake Corporation

Consumers are becoming more and more conscious about safety and security for their food these days. That forces food manufactures to control the quality of their products to assure their safety by running some safety or quality assurance system like Hazard Analysis and Critical Control Point (HACCP) or ISO9001. Moreover, their brand can be continuously refined by realizing the traceability system, which assures the quality of the products from the materials, production processes and to their supply chain. In the food factories, the system can handles many different kinds of materials and should be able to applied to the variations of controlling materials including packaging materials that changes their characteristics due to the change in seasons, temperatures, smells from their environments. This work is to show how food factories can realize the traceability system by applying a Manufacturing Execution System (MES) and to lead the secure and efficient quality assurance management.

New Developments in Measuring Online Paper Structural Properties and Printability Prediction

Hisashi Tsuyuguchi, Markku Mäntylä, Marko Toskala and Jukka Sorsa
Metso Autonmation K.K.

The challenge of today's paper makers is to make a better or at least keep the same printable paper surface quality from less expensive raw materials and with less production costs.
Metso has invested during last years to develop camera based measurements technology for this purpose. This includes Web Inspection features, like formation measurements and online scanning optical and imaging based applications, like optical caliper, formation, fiber orientation and topography measurements.
Utilizing these new developments of measuring online paper structural properties, the printability can be predicted in a new better way, in order to eliminate or reduce the reclamations from the printing house.

Establishment of Acid-Free Technology for Coated Paper in Hachinohe Mill

Research team for acid-free paper technology in Hachinohe mill
Mitsubishi Paper Mills Ltd.

In recent years, most of the printing paper is acid-free paper produced in neutral or weakly basic condition, and it is more difficult to find the acidic paper in the market.
In addition, even newsprints read every morning are also becoming acid-free paper in Japan.
In 1980s, the deterioration of books in libraries gain the attention of the public worldwide, and minimization of the sulfate radical which made the printing paper deteriorated and shift to acid-free paper which have the excellent self life were required also in Japan.
At that point, some special paper had already been acid-free but most general printing paper was still in the predawn to acid-free in Japan.
Mitsubishi Paper Mills Ltd was not the first paper mill to start development of acid-free paper in the market. However, we combined acid-free paper making and high solid content coating as the project according to the beneficial information of experience and knowledge in both North America and Europe, and this combination could made the whole plant promptly converted to the acid-free system, and the project finalized. As the result, high-quality acid-free paper and coated acid-free paper could be quick commercialized in Nakagawa mill and in Hachinohe mill respectively.

Since approximately 30 years after the first mill trial of acid-free paper and more than 20 years after completion of acid-free system have passed, the background and technical approach on development of acid-free paper mainly for coated paper in Hachinohe mill at that point is here reported with the aim of technical succession and conservation.

Development of a Technique for Removal of Hexenuronic Acid in ECF-Bleached Pulp Using UV Irradiation

Shiho Tsuji(Katsukawa) , Shoichi Miyawaki, and Tomoaki Koyanagi
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The potential to degrade hexenuronic acid (HexA) of hardwood ECF-bleached kraft pulp using ultra violet (UV) irradiation was investigated. UV treatment of these pulps resulted in a significant reduction of HexA contents under the acidic conditions, and the most suitable wave length seemed to be 254 nm. The HexA contents of hardwood ECF-bleached (D-E/P-D, A*-D-E/P-D, Z-D-E/P-D) pulps could be lower than 1 mmol/kg using UV (254 nm) irradiation under pH 3, while the required irradiation time depended on the original HexA contents. Acid-sized papers made from UV-irradiated pulps showed inhibition of yellowing induced in the aging test, so that UV irradiation has a potential to be developed as a method for inhibiting the yellowing of acid-sized papers containing HexA.

Keywords：hexenuronic acid, UV irradiation, yellowing, acidic paper, hardwood kraft pulp

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Operation Experience of Regenerative Thermal Oxidizer for Solvent Based Silicone Coater Exhaust Air

Yukinobu Terada
Nakatsu Mill, Oji Specialty Paper Co., Ltd.

Nakatsu Mill produce silicone coated release paper by Solvent based silicone coaters, and the exhaust air from these coaters include Volatile Organic Compounds (VOC). So we have introduced Oxidizers, at first, “Direct combustion type”, and next, “Heat Regenerative type”. In this paper, we introduce the operation experience of Heat regenerative thermal oxidizer (comparison with Direct combustion type).

Specific Energy Reduction of TMP Refining with Energy Saving Plates

Yoshifumi Horisaki
Kushiro Mill, Nippon Paper Industries Co., Ltd.

TMP (Thermo Mechanical Pulp) has high specific energy because of consuming a lot of electricity at the refining stages. It is very important to focus patterns of the refining plates to achieve energy and cost savings. Kushiro Mill, Nippon Paper Industries, has been challenging specific energy reduction of TMP refining with many trials of installing energy saving plates. We have achieved more than 20% specific energy reduction after installing new energy saving plates produced by Andritz in 2009.

The Stabilization of the Pulping Process by Introducing the Pulp Machine

Keisuke Santoku
Kishu Mill, Hokuetsu Kishu Paper Co., Ltd.

The production of the pulping process (KP) in Kishu mill had depended on the pulp demand of the paper machines. So that the production had so much fluctuated because of grade change, shut down, paper break, and so on, and that given negative effects to the pulping process. In order to solve this issue, we installed the pulp machine. Now, this one works as a buffer. Thanks to the pulp machine, the pulping process is able to keep the constant production despite the pulp demand of the paper machines.
In this paper, we introduce the outline of the new pulp machine and the positive effect from that.

Innovative Glossy Newsprint － PremiumNews －

Hideyuki Yokouchi, Manabu Yamamoto, Kunihiko Watanabe and Yuichiro Ohtsu
Oji Paper Co., Ltd.

PremiumNews, an innovative product for newsprint, is the world’s first glossy newsprint paper for high speed web offset printing presses without dryers. Generally, coated papers and supercalendered papers are not applied to newsprint presses without dryers due to the slow drying of the ink, and it was thought to be impossible to achieve a glossy, clean print finish with newsprint. However, we started to develop the world’s first glossy newsprint in a joint project with Asahi Printech, Asahi Shimbun, and Sakata Inx. After overcoming many challenges, we finally found a way to manufacture glossy newsprint with a clean finish by optimizing both the coating (through pigment selection) and the base paper. In addition, Frequency-Modulation screening plates and high consistency ink contribute to further improve the clean finish by reducing the amount of ink required. Consequently we have succeeded in manufacturing glossy newsprint, “PremiumNews”, on a commercial basis.

Development of Ultra-Light Weight Coated Paper

－ New Entry into North American Market －

Masanori Kawashima and Fuminari Nonomura
Pulp and Paper Research Laboratory, Nippon Paper Industries Co., Ltd.

We aimed to enter into North American Market in the field of coated paper, especially in ultra-light weight coated paper. The target area is West Coast of North America, where there are very few competitional paper makers. We tried to make sales to major publishers in North America. These major publishers are said to have their severe quality demands against coated paper supplier. Because of this, once we started to make sales to major publishers after passing their demands in coated paper quality, it should be a powerful anouncement and advertising effects for other publishers and printers. During our new development of ultra-light weight coated paper, we found that basis weight, opacity and printabilty for high speed printing are the most important factors for this kind of paper. This report will introduce the outline of our development in ultra-light weight coated paper for new entry into North American Market.

FillerTEK Technology Offers New Approach to Increasing Filler Content in Papers

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FillerTEK technology from Nalco allows papermakers to increase the sheet ash content up to 5 points without compromising quality of their product and operations. At the same time, the drying energy is substantially reduced. This technology combines several aspects of chemical and mechanical approaches to make higher filler content achievable while maintaining strength and printability. Increased content of engineered filler substitutes expensive fiber furnish at a fraction of the cost, saves drying energy costs and increases a mill's profitability. FillerTEK technology is based on minimizing the interference with the fiber-to-fiber bonding strength network.
The technology is designed to work for calcium carbonate filler types used for wet end addition. Controlled size distribution and excellent stability of filler flocs provides strength, while other sheet and printing properties are well maintained.
The treatment of fresh filler is done directly in the process with no holding time required before use and with minimal adjustments to wet-end and paper making processes. This filler preflocculation technology has been successfully demonstrated in various pilot paper machine and commercial machine trials, resulting in several global references. In this paper, the results from a commercial application are presented.

Precise Design Retention System for Papermaking

Jiayi Chen, Takashi Saigusa, Yasuhiro Kagawa, Keiji Suruga and Toshihito Uchida
Kurita Water Industries Ltd.

It is a common subject to keep the balance between good formation and high level of first pass retention, especially first pass ash retention for cost down, energy and natural resource saving. To obtain a high performance of retention system, the actual conditions, such as types of paper machine, sorts of paper product should be considered. Not only characteristics of individual polymer, but also their combination is very important for design the system. This paper illustrates with examples, the relationship between the amount of cationic group in PAM and content of calcium carbonate in furnish etc. It also gives an assessment of different retention system by using DFS, DDA, and Flocky Tester. The results show that the newly developed retention system, which is consist of cationic PAM and anionic PAM, is both in high ash retention and low volume of Flocky Test, foresighted a good formation.

Introduction of the Power Offer Business through the Pulp and Paper Green Transformation Program in Canada

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（Contact Information）Nippon Paper Industries Co.,Ltd.

In June 2009, Canadian government announced “Pulp and Paper Green Transformation Program (PPGTP)” in order to bail out the pulp and paper companies under critical condition and to promote transformation to the green energy production. With the government subsidies funded under PPGTP, “Daishowa-Marubeni International (DMI)” will enter the power offer business in 2012.
This paper describes the outline of the PPGTP, the power market in western Canada and the power offer business of our mills.

Introduction to GS Paper & Packaging Sdn Bhd in Malaysia

Shin Kobayashi
GS Paper & Packaging Sdn Bhd
（Contact Information）Yuichiro Hayashi
Oji Paperboard Co.,Ltd.

GS Paper & Packaging Sdn Bhd (hereinafter called GSPP) was established by Genting Sanyen Group as one of its local businesses in 1990, and now has supplied high-quality corrugated paper and carton boxes with the greatest share in Malaysia. GSPP joined Oji Group in April 2010, and had become joint venture with Marubeni Co., Ltd. since August 2010.
GSPP has one paper mill and two packaging plants. The paper mill and one of the packaging plants are located near Kuala Lumpur International Airport. Another packaging plant is located in Penang, one of the states in northern Malaysia.
GSPP produces about 300,000 tons of board paper and 200,000,000 square meters of corrugated sheets per year.
This draft outlines the business and facilities of GSPP.

Establishment of Acid-Free Technology for Coated Paper in Hachinohe Mill －Latter Part－

Research team for acid-free paper technology in Hachinohe mill
Hachinohe Mill, Mitsubishi Paper Mills Ltd.

From First Part －
In recent years, most of the printing paper is acid-free paper produced in neutral or weakly basic condition, and it is more difficult to find the acidic paper in the market.
In addition, even newsprints read every morning are also becoming acid-free paper in Japan.
In 1980s, the deterioration of books in libraries gain the attention of the public worldwide, and minimization of the sulfate radical which made the printing paper deteriorated and shift to acid-free paper which have the excellent self life were required also in Japan.
At that point, some special paper had already been acid-free but most general printing paper was still in the predawn to acid-free in Japan.
Mitsubishi Paper Mills Ltd was not the first paper mill to start development of acid-free paper in the market. However, we combined acid-free paper making and high solid content coating as the project according to the beneficial information of experience and knowledge in both North America and Europe, and this combination could made the whole plant promptly converted to the acid-free system, and the project finalized. As the result, high-quality acid-free paper and coated acid-free paper could be quick commercialized in Nakagawa mill and in Hachinohe mill respectively.
Since approximately 30 years after the first mill trial of acid-free paper and more than 20 years after completion of acid-free system have passed, the background and technical approach on development of acid-free paper mainly for coated paper in Hachinohe mill at that point is here reported with the aim of technical succession and conservation.

Report on the Results of the Fiscal 2011 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 unit and fossil energy derived CO2 emission per unit 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, published its results compared with that in fiscal year 1990. This report shows the results for fiscal year 2010, the position of the pulp and paper industry in national energy consumption and CO2 emissions, revision of JPA's Action Plan for low-carbon society in response to the Great East Japan Earthquake, outline of the special measures bill on renewable energy, and current trend of the revision in Energy Saving Act.

A Report on 2011 TAPPI International Conference on Nanotechnology for Renewable Materials

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2011 TAPPI International Conference on Nanotechnology for Renewable Materials was held in Arlington, Virginia USA on 6-8 June, 2011 hosted by TAPPI. Total participants were about 190 people. And 76 oral presentations and 17 poster sessions were conducted with 6 key note presentations. Summaries of several presentations are described.

Individuality Evaluation for Paper Based Artifact-Metrics Using Infrared Transmitted Light Image

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Tsutomu Matsumoto
Graduate School of Environment and Information Sciences, Yokohama National University

Artifact-metrics is a technique to authenticate an artifact based on a measurable intrinsic characteristic made during the manufacturing process. The intrinsic physical feature can be hardly controlled and copied even for a legal manufacturer, so can be used as an anti-counterfeit feature in the artifact. One of the most important requirements for intrinsic characteristic for artifact-metrics is individuality. It requires that the intrinsic characteristic of each artifact sufficiently differs. It keeps the artifact-metric system resistant to brute force attack. A transmitted light image of paper can be used for artifact-metrics, since the fiber distribution of paper is random.
In this paper, we investigate FMR/FNMR curves as results for matching tests using several paper varieties and matching size of sample with the transmitted light image of paper. Through a matching method based on line segments for the test using sheets of recycled paper, we found estimated EER of under 10-20 of EER. It was conformed that the transmitted light image of recycled paper has a sufficient individuality for the artifact-metrics.

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Topics & Information

Research Report (Original Paper)

Pulp and Paper Mills in Japan (35)

2012年5月 紙パ技協誌
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Vol.66, No.5 Abstracts

Energy Conservation Effect by Grubbens Pulper of Cellwood Machinery AB

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Rebuilding existing pulper with Cellwood Grubbens rotor is considered as an effective approach of conserving energy. More than 2,500 of Grubbens Pulper have been installed for over 50 years worldwide and it has been continuously developed to meet particular market needs including pulping wet-strength paper qualities.

The project related to rebuilding of existing pulpers comprises 30-40% of overall project. These existing pulpers are rebuilt primarily due to the need for higher capacity or for breaking up of tougher material. Some rebuilds are done to reduce high maintenance costs of equipment.

In order to break up tough paper qualities efficiently, it is essential to provide effective circulation even at high consistency and generate friction in the pulp flow. Grubbens rotor unit enables to generate a specific turbulence at high consistency due to its design, so it can increase the operating consistency in pulper tub. It ensures to achieve energy saving by 30-50% comparing to the conventional pulper. This paper introduces the energy saving effect of rebuilding existing pulper with Cellwood Grubbens rotor.

Energy Saving by Upgrading DDR Refiner －Result from Splined Upgrade Technology－

Junichi Yano
Sales Department, Kawanoe Zoki Co., Ltd.

GL&V/Kawanoe Zoki has successfully completed the first existing DDR refiner's upgrading project for energy saving by the spline technology at a mill of one of the biggest leading paper company in Japan on this February. At present the rebuilt refiner is being operated achieving 12% energy saving compared to the condition before upgraded. In a short while of it second upgrading project the same as the first one was placed an order from the same mill to us. Startup of it is scheduled for this August. It can be expected that the next DDR refiner is successfully started up around the time this book is published. Until today the installation of the existing DDR upgraded project for energy saving by the GL&V spline technology is more than 700 in the world. Multi-disc refiner technology developed by former Beloit corp. in 1980's is the origin of the splined DDR refiner, this means that the GL&V spline technology has already more than 30 years of experience.

Refiner itself consumes quite a lot of energy among pulp and paper production process. Therefore 10 to 15% energy saving at refiner bring in huge profit to the mill. The number of DDR refiner occupies the majority whereas several type of refiners are installed. GL&V/Kawanoe Zoki are to contribute to the paper mills in terms of energy saving by our advanced DDR technologies.

Fast Flash Mixing of Retention Aids and Starch with Filler before Paper Machine Cuts Production Costs and Reduces Environmental Load

Mitsuhiro Yamazaki
MATSUBO Corporation
Jouni Matula
Wetend Technologies Ltd.

The latest outcome of the development project is flash mixing of starch or simultaneous flash mixing of starch and filler just before headbox feed pump and just before the stage where retention aid additives are mixed. The process is now in continuous production e.g. with the following results and savings: Reduced starch consumption 20%, reduced retention aid consumption 30-40%, Quality, formation, dewatering and strength properties better or unchanged. Total net efficiency increased.

ABC concept of mixing: The new starch and filler dosing system is combined with a mixing concepts for retention aid chemicals and sizing agents. This makes the complete wet-end process even more efficient, simple, and easier to manage.

The Application of the Multifunctional Cationic Polymers for Paper Chemicals

Naho Murata, Kenji Sakai, Hiroyuki Koshio, Shohei Mitsui and Yoshimi Yoshioka
Shonan Research Center, HYMO Corporation

As the paper-making environment becomes severe, it is important to take measures against pitch troubles such as holes and dirt. The cationic polymer coagulants are effective against the pitch troubles because they can fix micro-pitch onto pulp fibers before growing into a large-size pitch.

We have developed the multifunctional cationic polymers, Himoloc FR-701H, FR-801, MT-910 to improve the effect of pitch control and cope with various conditions. FR-701H is a multi-compound polymer having wide range of molecular weight and high charge density. FR-801 is also multi-compound polymer, but it differs from FR-701H in composition. MT-910 is an emulsion polymer having moderately controlled charge density, and its molecular weight is higher than general coagulant. These polymers have higher ability to fix pitch onto pulp fibers than that of conventional pitch control agents to each paper stock. In addition, these polymers have been found to show progress of the water drainage and the sizing agents effect.

In this report, we show the characteristics and the performances of these multifunctional cationic polymers.

Novel PAM Based Dry Strength Resins

Hiroshi Suzuki and Hideo Baraki
Chiba Laboratory, Paper Chemical Business Division, SEIKO PMC Corporation

Dry strength resin is known as multifunctional chemicals to enhance paper/paperboard strength, drainage and retention. Especially, polyacrylamide (PAM) based dry strength resin is used in various paper/paperboard grades in Japan, because of its great performance in dry strength enhancement, and controlling retention/drainage to reduce energy use for beating and dryer steam. But nowadays, performance of conventional PAM based dry strength resin has become unsatisfactory, because of the recent trends in papermaking industry toward the greater use of recycled pulp, progress for white water closed system and higher loading of fillers. In this report, novel PAM based dry strength resin with highly-branched structure, higher molecular weight and novel component, were investigated to enhance the performance of PAM under recent papermaking conditions.

Pigment Optimization in Double Coated Board

Chris Nutbeem and Tony Hirons
IMERYS Pigments for Paper & Packaging Europe
Tatsuya Narahara and Katsuhito Kawamitsu
IMERYS Minerals Japan K.K.

In today's multi-coated coated board applications controlling macro-roughness has become increasingly more important as carbonate levels in recipes have risen to all-time highs in most regions. This increases the demand for coating coverage from the remaining kaolin component in the recipe. As a result we now believe it can make more sense to use the functionality of kaolin in precoating rather than in topcoating. Modest amounts of kaolin combined with coarse carbonates in precoating can improve quality and give more degrees of freedom for reformulating the topcoat to control cost.

In this paper we show how low levels of kaolin addition to the precoat can improve coverage and evenness through pilot coater and laboratory evaluations on a recycled board basestock. We go on to explore the impact of precoat design on the finished board properties including optical evenness, print performance and varnish-ability. The impact of latex level in the topcoat is also investigated..

Start Up Report of Latest Machine for Art Paper Grade in Korea

Yasushi Tachikawa
Coating & Finishing Engineering Dept., Voith IHI Paper Technology Co., Ltd.

MPP (Moorim P&P Co., Ltd.) DH PM1, the largest paper machine for Art Paper Grade in Korea, started its operation in Mar, 2011, supplied by Voith Paper GmbH.

MPP is established as the company which Moorim Paper merged Donghae Pulp. Previously, Korean Art Paper Machines are using purchased (market) pulp. MPP Ulsan mill is the first mill which integrated pulp plant and paper machine. The start up of MPP DH PM1 biggest paper machine in Korea with state-of-the-art technology is remarkable news in the industry of paper business in Asia.

This paper will introduce the outline of project including the specification of Paper machine, installation and start-up phase.

Application of Thermal Spray for Boiler

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Tocalo Co., Ltd.

Thermal spray technologies are widely applied as one of the surface treatment technologies to obtain functions of abrasion resistance, electrical insulation properties, and corrosion resistance, etc. in various industrial worlds of steel, the industrial machinery, energy, and the liquid crystal and the semiconductor manufacture, etc.

Thermal spray technologies are high deposit rate, low heat-affected, good portability compared with other process. So, it is suitable also for a local repair of large-scale equipment.

A lot of our company also has the boiler for power generation and local construction results of the oil refining facility etc.

It introduces spraying examples to the pulverized coal boiler and the circulating fluidized bed boiler (CFBC) in this text.

Application of Screw Type Steam-powered Compact Generator for Medium Steam Pressure
— New STEAM STAR Model MSEG160M for 1.9MPaG Steam Use —

Kozo Moriyama
Energy System Department Machinery & IT Division, Shinsho Corporation

In small-sized steam plants, as an effective countermeasure for energy saving and reduction CO2 emissions, a screw type compact steam generator unit applying to 1MPaG steam pressure range, the “STEAM STAR” has been developed by KOBE STEEL, LTD. in 2006.

After two years, this machine has been improved power output, which is 132 & 160kW. At present time, as applying to 1.9MPaG steam pressure range, we delivered new model MSEG160M.

This machine has many excellent features same as conventional models which shows as bellow;

1) The generating efficiently is about 50% better than a axial flow turbine type.
(It can be generated efficiently with step less adapted for fluctuating steam flow rate.)
2) It has excellent pressure control characteristic comparing with pressure reducing valve.
3) The first time of all-in-one construction package generator in the industry.

In this paper, the details of above-mentioned features are introduced, and their application for steam systems and domestic credit system for CO2 emission are shown.

Development of Anisotropic Light Diffusion Sheet (Nano-Buckling Sheet) with LED Lighting

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New Business & Product Development Center, Oji Paper Co., Ltd.

Due to growing awareness of power-saving after great East Japan earthquake disaster on March 11th, 2011, LED lighting with LED elements has rapidly become popular because of its energy-saving features compared to conventional incandescent and fluorescent lamps.

Also, LEDs are well known as preventing insects from gathering compared to fluorescent lamps because they contain little ultraviolet rays.

For use as lighting applications, so the LED elements arranged in a straight line are used. Although it is necessary to convert the LED spot light sources to a line source or an area source by diffusing light in order to obtain the appearance similar to fluorescent lights, the traditional diffusion method has the problem of the reduction of illuminance.

Oji Paper succeeded in development of anisotropic light diffusion sheet（Nano-buckling sheet）, which can be replaced with the conventional light diffusing methods to achieve higher light extraction efficiency avoiding the reduction of illuminance .

This paper reports on features of anisotropic light diffusion sheet (Nano-buckling sheet) with LED Lighting.

Recent Developments in Patent Administration

Yoshihiro Fuji
Japan Patent Office

In this report, the recent developments in patent administration are briefly explained, based on the author's presentation given at the annual meeting between the Japan Technical Association of the Pulp and Paper Industry (TAPPI) and the Japan Patent Office (JPO) in February 2012. The report focuses on the current status of patent applications and examinations in Japan, the recent trend of patent applications in the world, and the JPO's user-friendly programs to meet the applicants' diversified demands, in particular for their globalized intellectual property activities.

The number of patent applications of Japanese applicants in Japan has declined in the late 2000's. However, the expenditure on R&D in Japan has gradually risen. It seems that the Japanese applicants have continuously made their efforts to develop new technologies, despite the economic downturn of Japan. Moreover, the global application rate and the number of PCT applications have been going up. It is assumed that they have turned their attentions towards the global market.

The JPO has offered a lot of user-friendly programs, in particular to encourage the Japanese applicants to compete in the globalized business fields. The JPO launched the Patent Prosecution Highway (PPH) with the United States Patent and Trademark Office (USPTO) in 2006 and has established the PPH network with 19 Patent Offices until February 2012. In addition, the JPO is now designing the global IP initiatives in order to guarantee that the Japanese applicants can expeditiously obtain secured patent rights all over the world.

It is expected that the report will help the members of the TAPPI design their own patent strategies and promote their international competitiveness.

Report of 2011 TAPPI PEERS Conference and International Pulp Bleaching Conference

Koki Kisara
Oji Paper Co., Ltd.
Tadafumi Hashimoto
Nippon Paper Chemicals Co., Ltd.

2011 TAPPI PEERS (Pulping, Engineering, Environmental, Recycling and Sustainability) Conference and IPBC (International Pulp Bleaching Conference) were held in Portland, OR, USA from October 2 to 7. The PEERS Conference included 62 oral presentations, 7 Panel sessions and 3 Workshops, and total participants were 450 people. The IPBC also conducted with 26 oral presentations including 3 plenary lectures and 9 poster presentations, and total attendees were 150 people. In this report, the review of these conferences and some presentations are presented.

Development of a New Cooking System Using Highly Concentrated Polysulfide (Ⅲ)
— Effect of Anthraquinone Addition on PS Cooking of Hardwoods —

Keigo Watanabe, Yasunori Nanri, Yasuhiro Okamoto and Masahiro Shimizu
Nippon Paper Industries Co., Ltd.
Hiroshi Ohi
Graduate School of Life and Environmental Science, University of Tsukuba

Polysulfide and anthraquinone methods are well-known technologies available today to increase pulp yields of kraft cooking. Since polysulfide is produced by oxidation of white liquor, Na2S concentration in the liquor decreases as the oxidation proceeds. This decrease of Na2S concentration sometimes causes increases of kappa numbers of pulp and screened rejects in polysulfide cooking. For developing highly concentrated polysulfide cooking, we investigate the effects of anthraquinone addition at various polysulfide and Na2S concentrations. Statistical analysis using the multivariate analysis of variance method was carried out to examine in detail the effects of polysulfide and anthraquinone, which have been reported to exert a probable a synergistic effect.

The result showed that the anthraquinone addition mainly reduced kappa numbers of pulp at a given active alkali charge without any decrease of pulp yields, and that the increase of polysulfide concentration raised screened pulp yields with a slight increase of kappa numbers. Thus, each anthraquinone and polysulfide contributed to the increase of pulp yields at given kappa numbers individually. There was no interaction between the effects of polysulfide and anthraquinone. It is considered that a synergistic effect of polysulfide and anthraquinone should be explained by the fact that anthraquinone can compensate for increases of kappa number and screened rejects caused by the lack of Na2S concentrations in polysulfide cooking. Therefore, anthraquinone addition is particularly effective for highly concentrated polysulfide cooking to obtain high pulp yields.

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Energy Saving I

Topics & Information

Introduction of Research Laboratories（88）

Research Report （Original Paper）

Pulp and Paper Mills in Japan（36）

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Vol.66, No.6 Abstracts

Solar Control Film
-Energy Efficiency Measures of Window Aperture-

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Due to the global warming occurring today, reduction of the greenhouse effect gas is crucial matter. Because of the operation of the revision for Rationalization in Energy Use Law filed in 2008, not only factory / office but also the company / the franchise chain such as convenience store starts to be subject to rigid control and required to reduce greenhouse effect gas by 1% per year. As a method of energy conservation, companies try to renew the air-conditioning equipment, install LED light / the photovoltaic facility. However, there is not much progress we can see today for energy conservation for architectural window application. By installing solar control film, it is possible to block the solar radiation heat and reduce CO2, achieving excellent effect in relatively short-term, by low cost. As the solar control film reduce 35% up to 85% of solar radiation heat, cooling performance can be improved. This report illustrates the detail of the performance and features about the solar control films.

Advanced Aeroderivative Gas Turbine

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Project Depr. Power System Div. Power System Operations IHI Corporation

Aeroderivative gas turbines possess certain technical features inherent in their design heritage, offering significant operational and economic advantages to the user.
This paper presents an overall description of feature of them and representative aeroderivative gas turbine LM2500 and LM6000 series. It also describes the latest DLE combustor and water spray inter-cooled system for power enhancement in hot condition.

Activities for Energy Saving in Kasugai Mill, Oji Paper Co., Ltd.

Keiichi Furikado
Kasugai Mill, Oji Paper Co., Ltd

At the Kasugai mill, the organization for promoting energy-saving was reconstructed and the method of saving energy has been improved from structure. This aims at continuing and advancing energy-saving.
It was inefficient although each section was advancing energy-saving independently till 2009. From September, 2009, the project team (six of eight members devote themselves) was established as extraordinary organization. This promoted energy saving by every place of the mill. The consulting company which makes energy-saving the speciality was utilized in 2010. We learned the enforcement method of new energy-saving from them. Since the method of our energy-saving had improved, the project team was ended. From April, 2011, the organization for energy-saving was newly founded. This is mainly constituted by the operation section.
Activity of the team is taken over to this organization now. This organization extends the range of activity to the whole mill, and is promoting energy-saving powerfully.

Automatic Tension Stretcher

-Reducing Steam Quantity and Improving Production Efficiency by Automatic Tension Stretcher -

Kazuki Hasegawa
KGK Engineering Corp.

Keen competition, falling price and increased energy costs make it more necessary than ever

to optimize all production processes. Now, almost Japanese paper mills are using the air cylinder to control of canvas tension. In case of the air cylinder, it cannot get the most suitable dry efficiency, because it is quite difficult for the air cylinder to control of canvas tension precisely. The amount of energy consumed in dryers is enormous. Automatic tension control is positively influence production efficiency, paper quality and manufacturing costs.

Introduction of Photovoltaic Power Generating System (1535kW) at Fukushima Yabuki Plant

Satoshi Mochizuki
Rengo Co.,Ltd.

Rengo Co., Ltd. has continued to work on environmental protection activities on a company-wide basis. Rengo recognizes that eco-friendly management is an essential for sustainable development of company.

We first installed a 400 kW photovoltaic power generating system at the Shin-Kyoto Plant in 2007. In 2010, we introduced a mega solar power generation system at the newly constructed Fukushima-Yabuki Plant. The system is designed to provide all the day-time electricity needs of this eco-friendly plant. Here we will introduce the state of installation of the photovoltaic power generating system and our challenges for the future.

Power Saving by LED Lighting
- Issues and Solutions -

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Recently, LED devices have become to emit white light efficiently, so, the LED lighting is used for power saving. Incandescent lamps are replaced with Self-ballasted LED lamps, but there are various problems to replace fluorescent lamps with tubular LED lamps. In this article, problems and solutions on LED lighting are expressed.

Energy Saving Case Studies of High Efficiency Slurry Pumps and New Progressing Cavity Pump with Direct Drive Technology

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Energy saving activity has been obliged to suppress global warming and to reduce carbon dioxide emissions, and improvement of pump efficiency is effective because total energy consumption by pumps is very large. Centrifugal slurry pumps are used in pulp and paper mills to deliver high viscosity fluid and corrosive slurry including abrasive solid particles, and the slurry pump efficiency should be improved. We have developed a new series of high efficiency slurry pumps. Some results of field tests for the high efficiency slurry pumps are reported in this paper.

On the other hand, a new progressing cavity pump is introduced in this paper. The new pump has a unique mechanism to drive an eccentric screwed rotor without universal joints used in traditional progressing cavity pumps. The pump size is very small compared to traditional one, and it has great performance to deliver very high viscosity fluid in high pressure.

Development of Light Materials for Planting Using Paper Sludge

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University of the Ryukyus
Yoshihiro Tokashiki
The NPO Corporation of China-Japan Resources and Development Association
Hiroyuki Tanaka
Chuetsu Pulp & Paper Co., Ltd.
Hideo Shiroma
Showa Paper Industry Co., Ltd.

The paper sludge has been treated as industrial waste in the final landfill site in Japan, although it is often incinerated, and the incinerated ash is used to a raw material of cement. Whenever the paper sludge is incinerating, CO2 is exhausted from both the combustion of the pulp and the pyrolysis of calcium carbonate. Since the pulp is a biomass, the CO2 exhausted from them are not counted because they are accounting to the carbon neutral. If the sludge is not incinerated, CO2 from calcium carbonate and the pulp would not return into the atmosphere. This act might be evaluated as a carbon sink (CO2 sink), if the carbon from the pulp in the sludge has kept in the sphere of ground for a long time.

We are studying the vailable usages of the paper sludge, which are such as gardening, rooftop gardening, and the plant factories. We think these usages are best for the paper sludge, from the viewpoint of global warming prevention. In this lecture, it reports on the outline.

Studies on Retention Behavior of Filler and Pigment in Sheets at the Wet End by Aluminum Sulfate Addition

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Okayama plant, National Printing Bureau
Takashi Okuda
Research Institute, National Printing Bureau
Akira Isogai
Department of Biomaterial Sciences, Graduate School of Agricultural and Life Sciences, The University of Tokyo

The effects of addition levels of aluminum sulfate to paper stock on retentions of TiO2 filler or red pigment (α-Fe2O3) in handsheets were investigated. The addition levels of aluminum sulfate to the blank and TiO2 filler- or red pigment-containing pulp slurries were set to 0-3% based on dry weight of the pulp, and retention ratios of Ti, Fe and Al originating from the filler, red pigment and aluminum sulfated added, respectively, were determined for the handsheets by inductively-coupled plasma emission spectrometry. Retention ratios of both TiO2 filler and red pigment in sheets increased with aluminum sulfate added; aluminum sulfate behaves as a retention aid for both these filler and pigment. However, retention mechanism and distribution of the additives in the sheets were different between the TiO2 filler- and red pigment-containing handsheets. The amounts of Al retained in sheets, zeta-potentials of pulp fibers in the slurries and SEM images of the handsheet surfaces were studies for fines-containing and fines-free pulps in terms of the addition level of aluminum sulfate. The zeta-potential of the original TiO2 filler was -41 mV, which was close to the pulp fiber used. However, the red pigment had a zeta-potential of -1.1 mV, and the zeta-potential distribution indicated that each red pigment particle had both positive and negative surface charge sites. This difference in zeta potential between the TiO2 filler and red pigment caused the different retention behavior, retention mechanism and distribution of these additives in the sheets. The obtained results show that fines fraction in beaten pulp plays a significant role in filler and pigment retentions in sheets at the wet-end.

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Energy Saving II

Topics & Information

Research Report （Original Paper）

Pulp and Paper Mills in Japan（37）

Vol.66, No.7 Abstracts

Approach to Energy Saving in Niigata Mill －Energy Saving at Kraft Pulping Process－

Ken Nozaki
Niigata Mill, Hokuetsu Kishu Paper Co., Ltd.

The influence of the big accident of an East Japan great earthquake and the first nuclear power plant of Fukushima of the Tokyo Electric Power which occurred on March 11, 2011 was anxious about the electric power shortage of summer, and the measure against electric power reduction was implemented also not only at a factory but at the home.

As a result of the industrial world, a home, and a community tackling together, rolling blackouts were avoided safely.

And also when promoting energy saving from now on, it became a big experience at the same time the importance of energy saving had been recognized anew.

At the Niigata Mill, the importance of energy saving has been recognized since 2009 and the project of energy-saving activities centering on a large-sized paper machine was started.

The energy-saving desired value was attained in December, 2010, the effect appeared gradually, and the activity has contributed to reduction of the amount of the energy used, and cost reduction greatly.

In this news, the contents of a measure and the example of the energy-saving activities at the Niigata Mill after large-sized paper machine energy-saving activities are introduced.

Energy Saving Introducing Vacuum Box instead of the Belt Drive Extractor

Kanichiro Kadoya
Kushiro Mill, Oji Paperboard Co., Ltd.

Oji Paperboard Kushiro Mill L-1 machine produces linerboard 1,370 ton per day. It is one of the largest linerboard machines in Japan. The paperboard produced in L-1 machine is composed of three layers. The type of former for back layer is Fourdrinier, for filler and top layers are Belbond-former. The belt drive extractor had been installed in the Fourdrinier since 1974.On average, 1.5 sets of rubber belts per year were used for this belt extractor.The belt is much expensive and it accounts for 10% of our budget for consumable equipment, additionally work load of replacement of the belt is too hard, so that the improvement of the cost and the work load was desired by renewing the equipment.

We installed the vacuum box with ceramic blade last May instead of the belt drive extractor at the same position.

As a result, the consumption of vacuum volume becomes less and we could save the energy by restructuring the vacuum system.

In this report, we introduce our investigation, the experience of the operation and the effect of the energy saving.

Increasing Refiner Efficiency by Spline Technology

Takamitsu Tanaka
Hokkaido Mill, Nippon Paper Industries Co., Ltd.

Recently most urgent task of humanity is to prevent global warming. And reducing carbon dioxide emissions is especially our main concern. So we are being required to increase efforts for energy saving in our mill. Though Refining stage in stock preparation which needs especially a great amount of energy had been modified to reduce power consumption constantly, still it is not exception.

At that time, we had known there is the spline technology to upgrade refiners by GL&V. The modification delivers a wide range of cost saving benefits (ex. reducing gross power consumption, improving fiber quality, extending plate life, and so on.). Results from hundreds of splined upgrade installations in foreign countries had proven the successful results. So we had decided to upgrade by GL&V's spline technology our refiner in 10PM stock preparation for the first time in Japan. The refiner had upgraded in Feb. 2011 and has been running for an annual. In this report, we introduce the energy saving modification in our mill, details of our achievements after modifying, and competitor's (ex. AIKAWA, Andritz) spline technology from a customer's standpoint.

Presentation of Underground Temperatures Renewal Type Geothermal Heat Pump System

- Increase of Geothermal Heat-Exchange Efficiency by Groundwater Forcible Flow of Shallow Layer Part-

Tadashi Tsunoda
Eco Power Co.,Ltd.

An underground temperatures renewal type geothermal heat pump system is a System which installs geothermal exchanger into the perpendicular hole excavated from surface of the earth to near 30 lower m, and extracts underground heat.
It sets up the interval of about 1-1.5m for the purpose of preventing between geothermal exchangers interfering in this System mutually with heat. When continuing taking heat from the underground between long times, geothermal efficiency falls. In that case, it operates the storage pump prepared near the geothermal exchanger, and make groundwater near the geothermal exchanger flow compulsorily.
If a coercive flow of groundwater takes place, the underground temperatures near geothermal exchanger will be improved and geothermal efficiency will go up.

Energy Saving Techniques for Paper Factory
-Managing both Economic and Environmental Efficiency for Effective Utilization of Energy-

Masaru Takaishi
Hitachi Plant Technologies, Ltd.

This year will be finished commitment period of Kyoto protocol. But it will be forecasted increase CO2, cause of Tohoku earthquake on March 11, 2011. We must save energy quickly. Especially we must reduce power quantity consumed at summer season. At first, we tried to energy saving at Semiconductor plant and LCD panel plant, so we improved our ability of energy saving techniques. They have big clean room. Recent year, we try to energy save at Food factory, Chemical plant and Automotive factory. Today, we explain at “Basic approach for Energy saving techniques”, “Report case of energy saving at a semiconductor plant”, “Report case of energy saving at the other plant” and “Report unique Energy saving techniques”.

Air Compressor Pursuing Energy Saving, Power Saving and CO2 Reduction

Tomohiro Kaneko and Yasukuni Tanaka
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;
・Features and energy-saving effects of the steam-driven air compressor with compression heat recovery unit

The Latest Technology of Metso Air System

Toru Takahashi
Project & Engineering, Paper Business Line, Metso Paper Japan Co., Ltd.

Air systems have a significant influence on the energy consumption of paper and board production via the drying process.
The role of air systems becomes even more important when once used energy is bound into the evaporated water and further into the exhaust air. Process air, water and, if needed, also machine hall heating can be done without primary energy just using heat recovery. There is energy saving potential in all the paper and board machines. The nearer to the optimum performance the machine is, the more challenging becomes the realization of an individual saving project. The solutions often have connections to several paper making sub-processes and energy production. The basis of the energy saving is to run the existing machinery properly. In most of the cases, this can be done without any or with minor investments.

Pulping Technologies for High Quality Pulp from Low Quality Waste Paper
- The Technologies of Andritz FibreFlow® Drum Pulper -

Toshio Okunishi
Andritz K.K.

Andritz's waste paper treatment technologies cover the whole system of DIP and OCC treatment process. Andritz has provided with many turn-key base systems, too. FibreFlow® Drum Pulper (FFD) has been a key technology in these systems. Pulping process is a first one in the waste paper treatment system. Employing FFD for the pulping process enables contaminant load to reduce greatly and as a result can make an excellent system with a good quality and high cost-efficiency. In other words, FFD can create high quality pulp from low quality waste pulp.

In this paper, a pulping principle and references of FFD, a situation of raw materials in Japan, advantages of FFD when FFD treats various kinds of raw materials and experiences of FFD are described.

Experion MX

Mikio Kojima
Honeywell Process Solutions, Pulp & Paper and Printing Sales Dept., Honeywell Japan Inc.

The papermaking business has undergone dramatic change over the past few years.

Honeywell has conducted many interviews with customer to understand how these changes are affecting papermakers and what they are looking for in paper machine automation to help address these new challenges. We found three themes dominating the wish lists of papermakers today.

- They are want better visibility into the papermaking process in order to improve quality.
- They are looking for equipment that it easy to operate service and maintain.
- They are looking to reduce total cost of ownership.

Honeywell has addressed these needs with Experion MX, its next generation of paper machine automation. Experion MX provides an integrated user interface that makes it easier for operators to view and control the process. New and enhanced measurements and advanced multivariable controls improve product quality and operational efficiency. The resulting reduction in service and maintenance costs, and unscheduled downtime, along with increased production and less waste provides the lowest total cost ownership.

Rapid Simultaneous Substance Identification in Pulp and Paper Mill Effluent by GCMS

Keiko Fujita, Hiro Iwata and Hitoshi Okada
Japan Pulp and Paper Research Institute, Inc.

The effluent from the pulp and paper mills contains various chemicals, most of which, including accidentally generated ones, are neither identified nor quantified. We have so far targeted mainly organic chloride substances that are easily identified and quantified; but we need an efficient method to identify more substances in the effluent.

Recently in the food industry, strict rules have been introduced to regulate the amount of pesticides remaining in the food. To measure them rapidly, new methods have been developed. One of them is Rapid Simultaneous Substance Identification by GCMS, using a database that covers hundreds of environment-related substances and pesticides. We utilized this method to analyze the effluent from the pulp and paper mills. In addition to the substance database already installed, we added some substances directly related to our own industry, such as Chloro-phenols and wood extracts.

As a result, we found that substances were present in the effluent only in trace amounts, and that in each case the concentration was far below the regulation limits for both inside and outside the country.

Prospect of Bio-Refinery Researches

Seiji Ohara
Forestry and Forest Products Research Institute

For the mitigation of global warming, the promotion of woody biomass utilization as energy and materials for the replacement of petroleum as well as the increase in the self-sufficiency rate of industrial wood is adopted as a policy of Japanese government. In this seminar, recent studies on the bio-refinery using steam explosion, alkaline cooking and ionic liquids are mentioned.

It is known that steam explosion is a good method for separation and conversion of a certain kinds of hard woods. Recently, it has also been made clear that this technique is applicable to the production of functional materials from un-utilized bamboo and multifunctional food fibers from bagasse. Alkali cooking method is an excellent bio-refinery technology not only for the bio-ethanol production but also for the lignin utilization. Ionic liquids as green solvent for chemical conversion have been focused recently, although bio-refinery using them is now at the basic stage. Several woody biomasses contain essential oils which have a biological activity for promoting man's health. Therefore, establishment of bio-refinery containing the vacuumed microwave steam distillation process for extracting them is promising.

Relationship between Hexenuronic Acid Content of Pulp and Brightness Stability in Accelerated Aging

Eiko Kuwabara, Xin Zhou, Mitsuko Homma, Shiho Takahashi, Mikio Kajiyama and Hiroshi Ohi
Graduate School of Life and Environmental Science, University of Tsukuba

Six types of pulps that were prepared under acidic or neutral papermaking conditions were investigated about behavior of yellowing or the others after accelerated aging tests. The relationship between the hexenuronic acid (HexA) content of pulps and yellowing was clarified for non-chlorine-bleached pulps (elemental chlorine-free (ECF) and totally chlorine-free (TCF) bleached pulps) prepared from hardwood oxygen-bleached kraft pulp (LOKP). A trial test of enzymatic removal of HexA from LOKP was attempted by treatment with a crude enzyme solution containing a new hexenuronidase.

The results indicated that the brightness reversion of LOKP that was prepared by acidic papermaking and underwent a humid accelerated aging test was greater than that of LOKP that underwent a dry accelerated aging test. On the other hand, the brightness of LOKP increased after sunlight exposure aging test. Under sunlight exposure, the structure of the lignin in bleached thermomechanical pulp (TMP) and bleached chemical thermomechanical pulp (BCTMP), which is similar to the lignin in wood, changed to coloring structures. However, the effect of this change on brightness reversion was minimal in acidic papermaking. Plain paper copier (PPC) paper and news printing (NP) paper, which are prepared by mixing used paper with secondary fibers, were assumed to consist of both chemical and mechanical pulps and therefore showed a relatively stable brightness in spite of accelerated aging conditions and pH in papermaking.

Under conditions of neutral papermaking, LOKP showed the least brightness reversion and the brightness of TCF and ECF pulps were similar to each other. On the other hand, the yellowing of TCF and ECF pulps prepared in acidic papermaking tended to increase with the increase in HexA content of the pulps. In addition, the pulps had the following order of good brightness stability: full-bleached TCF, full-bleached ECF, semi-bleached TCF, and LOKP.

HexA removal from LOKP with crude enzymes solution containing hexenuronidase (activity for Δ-X3: 2-O-(α-hexenuronic acid)-D-xylotriose) was optimum under the following treatment conditions: 0.24 U/g, pH 5.5, 40°C, and 6 h. It was shown that 40 mmol/kg of xylose was dissolved into the filtrate when 20 mmol/kg of HexA was removed from the pulp; however, the decrease in the pulp yield was minimal.

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Trends of the Printing Market and “SMATRIX2020”, a Vision for the Printing Industry

Wataru Oshima
Japan Federation of Printing Industries, Incorporated Association

The printing industry is facing unprecedented change in its operating environment. According to industrial statistics, the value of printing industry shipments has decreased from 8.3 trillion yen in 1990 to 8.1 trillion yen in 2000, 7 trillion yen in 2005, and then 6.9 trillion yen in 2008. The estimate for 2010 is that shipments were 6.4 trillion yen and the industry is fighting to maintain a level over 6 trillion yen. In particular, there was a significant year-on-year decrease of 8.4% in fiscal 2009. In addition to manufacturing, the printing industry should have the power to integrate and produce information through services, consulting, analysis, planning and development in order to overcome the adversity. This means that pushing forward with the creation of a foundation (MATRIX) for a new printing industry that can respond to a smart society is currently the most pressing issue. In other words, this is the construction of a SMATRIX. Based on this, it is necessary to consider the key issues for the evolution of the printing industry.

Trends in Coated Paper

Takehiro Yoshimatsu, Masanori Kawashima and Fuminari Nonomura
NPi Resarch Laboratory, Nippon Paper Industries CO.,LTD.

World annual production of paper and paperboard is estimated 390 million ton, and coated paper accounts for 20%, 80 million ton per year in 2008. Especially in Japan, the annual production of coated paper is estimated for 5 million ton, but imported coated paper from overseas is making an impact on the Japanese market year by year. The major exporting area of coated paper to Japan is Asia (58%) and Europe (34%). >From the view of coated paper grade, bitoko (LWC) occupied 58% of all imported and they were mainly from Europe (Sweden and Finland). A2 grade (WFC) showed the rest of 42% and mainly imported from China.
In this report, more than 10 samples are analyzed in paper sheet quality, printing quality and componential research. As a result, bitoko grade (LWC) shows high opacity, low brightness and almost the same print qualities compare to the domestic products. Meanwhile in A2 grade (WFC), the paper sheet quality of imported samples is the same as of domestic. It is characteristics that imported A2 grade shows heavy coat weights. Regarding domestic A2 grade in Japan, it is supposed that the overall trend will be weight saving and cost cutting for manufacturer. Japanese manufacturers recognize that it is necessary for competing in global market, to improve the matching performance between the world market and the suitable paper quality and to improve low cost manufacturing technology.

Extended Applications of Advanced Coating Technologies - ValSizer and OptiLayer -

Kousuke Tano
Metso Paper Japan Co., Ltd.

The author introduces two different coating technologies which are attracting special concerns of paper- and board-makers for different purposes respectively. One is ValSizer, and another is OptiLayer simultaneous multilayer curtain coater.
ValSizer is a rod-metering sizer, which achieves uniform film transfer to web and has a large operating window for starch and coating color applications. Production of linerboard and corrugating medium grades from recycled fiber often struggle with challenges to reach required strength properties due to increased fiber recycling rate. Starch can be used on the sizer to compensate for the lost raw material strength.
OptiLayer multilayer curtain coater is a low-impact premetered coating method for coated paper and paperboard, which achieves contour coating with good fiber coverage. The coater adds several different coating layers to the web at the same time in a non-contact operation with essentially no speed restrictions. This gives extremely high efficiency with respect to coating chemicals, machine runnability, drying efficiency and overall cost of the process.

Polyurethane Cover for Applicator Roll - High Top Roll -

Hiroya Shimazaki
YAMAUCHI CORP.

One of our products, High Top Roll, which is Polyurethane roll cover, has been used for Press Rolls and Applicator Rolls since it was first developed in 1963.We also developed High Top S series, which is the cover only for Applicator Rolls, in 1998 and we are keeping the top market share for domestic market thanks to its excellent performance.

Recently, the requirements for Applicator Roll Covers are becoming more critical due to the diversification of the chemicals, high temperature or high density of coating liquid especially for Rod Metering Size Press.

Yamauchi, as the leading company of roll covers, introduces the latest roll covers for Applicator Rolls, High Top SD series, which will take the place of the previous covers.

Operating Experience of PM N6 with On-Machine Coating

Masaki Akemura
Ishinomaki mill, Nippon Paper Industries Co., LTD.

Commencing commercial production on November 2007, Ishinomaki PM N6 has mainly produced LWC and MWC. Having a width of 9,450mm wet fabric and an operating speed of 1,600m/min, PM N6 has also equipped with both blade coaters and hot soft nip calendars as the on-line units. PM N6 now reaches its maximum speed of 1,600m/min, and we tried various techniques to obtain more stable operation of the on-machine coaters.

This report summarizes PM N6's latest equipment, and recent operating experiences in the rod metering size press and on-machine blade coater of PM N6.

Latest Technology Trend in Electrophotographic Copier, Printer and Its Quality Demand for the Paper

Koji Amemiya
OIP Device Technology Development Center, Canon Inc.
(Office Imaging Products Operation)

The copier of the photo-electrographic system has evolved corresponding with duties change by the immediate nature of image forming system that seeped from the copy making duties of documents in the office. Now the full color MFP (Multi Function Printer) becomes the necessary office business machine around a core of the various duties of the office. The below is the explanation for the office duties in conjunction with function of MFP.

MFP possesses the almost following functions. It has a function to copy, a function to print via network, a function to send FAX, function to store the scanned data to a folder on the network, a function to send by e-mail attachment.

Furthermore, the electrographic image forming system builds the position with an IJ printer as a digital printer in POD (Print On Demand) from the immediate nature. In this area, the characteristic technology are the print quality which is the equal of printing system and the paper feed technology to be able to use the same paper which is using for printing system.

Analysis of Defferent Premetering Techniques by Surface Sizing
- TWINTM Sizer, HSM and TWINTM Sizer, Gravure Developed by UMV Coating Systems AB -

Mitsuhiro Yamazaki
MATSUBO Corporation
Per Emilsson, UMV Coating Systems AB

UMV was founded in 1876 and became sister company with former BTG Coating Systems in 2002. The two companies were combined and got the name UMV Coating Systems in 2007. UMV Coating Systems is a supplier of coating machines since 1973 and the initial product was the Billblade coater, one of the most sold coaters in the world.

Cover Coat Materials for Coater Section

Kazuya Tange
MEIJI RUBBER & CHEMICAL CO., LTD.

Meiji has a lot of rubber cover materials for the paper manufacture roll, and we are supplying the cover material that is appropriate for each section.

We developed "PRES COAT" first as a cover material for Coater Backing roll that was the preparation the maintenance done by the customer.

Afterwards, we developed "MULTICHEM" that improved abrasion resistance, and these two kinds of cover materials are popular, and used by a lot of customers.

In addition, we develop the product corresponding to customer's needs, and developed two kinds of cover materials of an "EXCEL COAT" and "SUPER COAT" in recent years.

Especially, "SUPER COAT" has an excellent feature in abrasion resistance and the dirt-proof character.

Moreover, we developed "Justie Coat" as the newest cover material.

"Justie Coat" has the excellent character for dirt not to be attached easily and to be easy to remove dirt.

In this time, we introduce the background of the development of cover material for Coater Backing roll. And we introduce the feature and the material physical properties etc. of each cover material.

Moreover, it introduces the usage condition in the customer and the evaluation by the customer.

Operating Experience of PM N10

Tsuyoshi Ohkita
Mishima Mill, Daio Paper Corporation

The domestic market for coated paper is shifting to lighter products. In addition, the share of imported papers reached up to 22% in the domestic coated paper market. In this situation, we try to steadily supply users with our products which excel in both quality and cost competitiveness. This is why we constantly aim for stabilization in productivity while improving operation and equipment of our on or off-machine coaters.

The PM N10 that started commercial operation in September, 2007 is a high speed on machine coater which is adjusted to making lighter weight coated papers with a high percentage of recycled pulp. The machine has a roll coater and blade coaters in the coating section. In case of LWC grades, in which more importance is placed on high bulkiness and stiffness, the roll coater is used. In case of A3 grades, in which printing quality such as high gloss, reproductivity and so on are more important, we choose blade coaters which can create thicker and smoother film.

At present, we are challenging ourselves to make full use of the machine capacity to supply high quality products to more customers. In this report, we introduce several cases of operating improvements at the coating section experienced in the approach of increased speed.

Operation Experience of Blade Coater

Masaru Kaneko
Edogawa Mill ,Oji Paperboard Co. ,Ltd.

Oji paperboard Edogawa Mill is the only paper manufacturing mill in Tokyo. Edogawa Mill is located east of old Edogawa River and surrounded by residential quarter. In this mill, we produce white lined boards, taking advantage of collecting waste papers easily and the good location which is near consumption areas.

The #5 paper machine was constructed in May, 1971, as the first white lined board machine in Japan, with “High Speed Ultra Former” of Kobayashi Engineering Works., Ltd. The machine produces about 140,000 tons of white lined board a year today. The products are mainly used as paper containers. Up to today, we have advanced the quality improvement according to progress of printing technology and converting technology. In August, 2006, we changed the top coating method from “Air Knife Coater” to “Blade Coater” for the purpose of a further quality improvement.

In this report, we report the summary of the remodeling, the operating experience, and the effects of the introduction.

Paper Gloss Analysis by Specular Reflection Point Spread Function(Part I)

-Measurement Method for PSF of Paper on Specular Reflection Phenomenon-

Shinichi Inoue, Yukio Kotori and Masayuki Takishiro
Process Development Laboratory, Mitsubishi Paper Mills Limited

Glossiness is one of the major qualities of coated paper. For example, coated paper is categorized to glossy or matt. Glossiness can be most usually measured using a glossmeter. The standard units for measurement are "specular gloss".

However it is well known that the “specular gloss” values, in some cases, do not correspond to the glossiness by the visual inspection. In this paper, a new technique for measuring the specular reflection light of paper is proposed. We have developed the apparatus to measure the Point Spread Function (PSF) of specular reflection. A pinhole test pattern is projected to the sample paper, and the reflection light intensity distribution is measured by the two-dimensional CCD camera. The specular reflection PSFs of different type of paper were obtained.

Results showed that the specular reflection PSFs of paper meet well with the visual inspection glossiness. We discuss the physical meaning of the specular reflection PSF. The specular reflection PSF works as transfer function for specular reflection image, naturally. In future work, we will discuss paper gloss evaluation by using spatial frequency analysis.

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Latest Technology for Curtain Coating

Toshihiro Katano
Voith IHI Paper Technology Co., Ltd.

Curtain coating has been applied particularly to specialty paper, namely thermal paper, non carbon paper, information paper and so on. Nowadays, for further utilization of DF coater, Voith IHI has been developing it from two aspect; color and machinery. For example, until recently, it was the main stream to replace an air knife or a rod coater by a DF coater for specialty paper. However, now, Voith IHI is aiming to install a DF coater as an alternative coater for pigment coating.

Referring to this movement, this thesis will introduce an approach to the new area of DF board paper and its prospects.

Operation Experience of PM N9 with On-machine Coating

Junya Hosotsubo
No.7 Production Department, Niigata Mill, Hokuetsu Kishu Paper Co., Ltd.

Niigata N9 paper machine which has wide width and high speed has begun commercial operation from September 1st, 2008. N9 has overcome many difficulty, achieved 1,600 m/min operation, and produced over 1,100t a day for three and half years passes from commercial operation. The coating section of N9 which took over various operation experiences from Niigata N6, N7 and N8 machine has equipments that correspond to wider width and higher speed, has been operated smoothly without any big problems so far.

In this report, it introduces the outline of coating section equipment and the operation experience of coating section (Sizer and Blade Coater).

Blade Coating Technology
- Basic Theory of Blade Coating and Blade Design -

Seiichi Anzai
BTG Division, Spectris Co., Ltd.

Recently, a new coater machines has been built up as wider and faster one in the world wide, and such wider and faster machines has been already operated at Pulp & Paper fields in Japan, as well. Furthermore some of existing domestic coater machines has been modified as faster one for improving about its productivity. Even under such wider and faster operating conditions, there is always a requirement in Japan that the coated paper quality of paper product has to keep higher quality level. On the other hand, raw materials for making coated paper has been changing nowadays due to economical reasons, and generally it makes more difficult conditions to keep such higher quality level.

A coating blade directly takes an important function for realizing about such stable productivity and high coated paper quality at the coating operation, so we have to provide properly designed coating blade which has appropriate functional material to meet the customer's requirement.

This article explains about a basic theory of blade coating technology and a key issue for selecting proper blade design, and introduces to unique characteristic blade among our products, the SOFT TIP BLADE (DB-ST) type.

The Latest Rubber Cover－Backing Roll for Blade Coater

Hiromitsu Aoyama
Seibu Polymer Corporation

In recent years, a large number of paper making machines laying emphasis on coated paper were introduced into the market. Those machines are all on-machine coater with high speed and wide width, and they are aiming at strengthen its cost competitive position, by switching from “wide varieties-small quantity production” to “small varieties-large quantity production”.

Today, we would like to explain the details of development, the special features and evaluation on cover materials for backing roll installed on the latest coating machines.

Operating Experience of PM N1 with On-Machine Coating

Akihiko Yamamoto
Oji Paper Co.,Ltd.

PM N1 in Tomioka mill started the trial operation from November 2008 and has produced commercial paper since February 2009. We successfully achieved the continuous operation at 1,700mpm by now. At present, we are mainly producing ultra-coated paper with improving qualities. In addition, we are making an effort to improve productivities and cut production costs.

This report presents the outline of facilities, operation troubles we have experienced and the countermeasures at the coating section of PM N1.

E-Book and Digital Reading
－Paper Media and Digital Media－

Yashio Uemura
Senshu University
Hiroyuki Yaguchi
Tokyo Denki University

There are evidences of the decline by grade and end-use in the publication paper market. People prefer reading comic books on mobile phones. Sales of electronic dictionary have exceeded that of paper dictionary. Printed maps have been replaced with car navigations. Commuters depend on application software downloaded on mobile phones rather than on printed train schedules. Information magazines full of new movies and restaurants are impacted by internet. E-book reader is an exception. The size of the electronic book reader market does not grow at the rates experienced by other digital devices. The book serves many needs including education, information and leisure. Paper books have provided an easy-to-use, cost-effective, transportable medium that fulfills these end user needs.

Screen Baskets Utilizing Laminar Design Wedge Wire Technology

Morio Kuramochi
Metso Paper Japan Co., Ltd.
Jukka Virtanen
Metso Paper Oy

Using computer modeling has enabled Metso to develop a new Laminar Design Wire for screen baskets. The new wire shape optimizes flow at the screen boundary layer and reduces flow resistance through the slots, lessening thickening and thereby the load exerted on the screen. The decreased accept channel backflow leads to decreased pressure drop over the screen basket, especially at higher slot velocities. The result is much higher capacity accompanied by high efficiency. The laminar flow pattern after the slot not only ensures outstanding run ability without fiber blockage or stringing problems, it also contributes to a longer basket life.

Cleaning Device of Paper Making Machine Tools, POM/Wet End System, White Water Treatment Technology

Yoichiro Iwatani
Technical & Sales Dept., AIKAWA IRON WORKS CO., LTD.

In the quality improvement of the product and reduction in costs, it is important to wash the Paper making machine tools appropriately. And cleaning equipment is making progress more than before. Here we would introduce the feature of these cleaning equipments and the merit by the introduction.

And by Simplification of Wet End System, significant merits can be achieved in paper making process like stability, fast response during paper grade change, saving energy and reducing rate of discharged stock with small initial cost.

Space-Saving Web Inspection System that Used Sensor Fusion

Kazuaki Watanabe
Inspection Systems Business Div., Omron Corporation

As for the inspection of the quality paper such as coated papers, there are a lot of needs of two or more inspection policies of the inspection of a multi frame etc. The installation space might not be able to be secured because there are a lot of numbers of installations of the camera and source of light frame. Then, the inspection more than three frames was achieved by the number of space cameras of two frames this time, and "Super-NASP-SF" was put on the market. It introduces the technology that takes it by "Super-NASP-SF" in this text.

Some Examples on Abrasion- and Corrosion- Resistant Cladding for Boiler Panel

Taketoshi Goto and Hiroaki Fukumoto
Welding Alloys Japan Ltd.

Since 2004, crude oil prices are stable in high range, and the accidents at Fukushima No. 1 nuclear power plants forces government to rethink its traditional policy of promoting nuclear power generation. These changes of surrounding situations make importance of power generations with biomass boiler increase.

However, the problem due to corrosion and the wear that occurs in biomass boilers and the auxiliary equipment cause the decline in the operation rate and the extra cost. Welding Alloys Japan is trying to produce anti-corrosion and wear-preventing method for the biomass boiler based on our essential technology. Here we introduce our experience though some cases.

Application of the Optical Caliper Sensor to a White Coated Board Machine

Hirofumi Shimizu
Fuji Mill, Oji Paperboard Co., Ltd.

Oji Paperboard, Fuji Mill N2 machine has produced white coated board since October 2001.

We had the problem with the streaks and sheet breaks by conventional contacting calipaer sensor. Recently, QCS makers have released the online paper thickness measuring equipment which is applied the optical principle to. Then we installed the optical caliper sensor which is produced by Yokogawa Electric Corp. in N2 for the purpose of reducing the streaks and sheet breaks.

Manufacturing Facility Corresponding to Speed Up and Upsizing of Paper Machine

Masaki Tsuji and Shinichi Iwami
Production Technology Section, Nomura Plating Co., Ltd.

In late years speedup and upsizing of the paper machine are pushed forward for reasons of the production efficiency or the improvement of the international competitiveness in the paper industry.

With upsizing of the paper machine, the rollers installed there become larger and longer in size.

We hold the manufacturing facility corresponding to the large-sized roller ahead of the roller makers and came in response to the needs of the paper industry with the start-to-finish production of the roller from a design of roller to various surface treatment on it.

Now the roller of 4 meters in its diameter and 12 meters in its length is able to be manufactured.

In addition, we continue installing of various new facilities and developing the new technique in order to cope with further speedup and customer needs.

Our manufacturing facility and technique corresponding to the large and long rollers are shown in the following papers.

Identification of Filamentous Fungi in Paper Damaged by Tsunami of the Great East Japan Earthquake

Kenta Higashijima, Tomoko Wada, Kiyohiko Igarashi,
Toshiharu Enomae, Masahiro Samejima
and Akira Isogai
Graduate School of Agricultural and Life Sciences,
The University of Tokyo

We are developing a new easy-to-use method for rescuing flood-damaged paper by using salt water.

In this study, filamentous fungi in paper damaged by tsunami of the Great East Japan Earthquake were identified by the method which can detect sensitively filamentous fungi in a small sample and the results were discussed for practical use of the salt water method. No filamentous fungi were detected in tsunami-damaged paper without mud sampled in paper products storage in the Ishinomaki mill of Nippon Paper Industries Co., Ltd., but Penicillium fungi were mainly detected in paper undamaged by tsunami sampled in the same place. This suggests that the effect of salt water on the inhibition of fungal growth for osmotic pressure would appear after paper was wetted by tsunami until it dried.

On the other hand, various filamentous fungi were detected in tsunami-damaged paper with mud sampled in the same place. Tsunami-damaged paper with mud was likely to bring about fungal growth at high relative humidity, probably because numerous bacteria and fungi live in mud that is very rich in nutrition. This result shows mud on flood-damaged paper must be washed away with salt water or fresh water to remove fungi and nutrition. Alternaria fungi were mainly detected in paper damaged by tsunami and left for about 3 months outside the Hachinohe mill of Mitsubishi Paper Mills Limited. The salt amount in tsunami-damaged paper left outside was considered to decrease because the salt was removed by rain and dew condensation. So, the effect of salt water on preventing fungal growth was lost and fungi such as Alternaria fungi grew on tsunami-damaged paper left outside. This result shows that the decrease in the salt concentration must be avoided during the emergency conservation of flood-damaged paper with salt water.

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Chemistry of Delignification in Pulping and Bleaching

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Most of the principal delignification reactions in pulping and bleaching are described in various books related to wood chemistry and published by Japan TAPPI. In this report, these reactions are primarily reviewed, and several valuable reactions are described. Then, the recent results about pulping and oxygen bleaching obtained in our laboratory are introduced.

Cooking Technologies of Digesters for Producing Kraft Pulp

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With development of the theories for kraft pulping, a number of cooking technologies of digesters and cooking processes such as MCC, ITC, and BLI which based on the theory proposed in 1980s were developed. On the other hand, COMPACT COOKINGTM G1 and G2 cooking systems which based on the theory proposed in 1990s were also innovated. COMPACT COOKINGTM G2 system can meet the requirement to, (i) build a new fiber line both for hard wood and for soft wood, (ii) increase the capacity for the existing cooking system, (iii) modify the existing cooking system for the purposes of increasing cooking yield, bleaching ability, and pulp quality as well as for the purposes of reducing energy consumption and environmental load.

ADVANCED TMP - Enhancing Fiber Development at Reduced Energy Consumption

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Marc Sabourin
Andritz Inc, USA
Tamio Fukuzawa
Andritz K.K.

A method for producing well-bonded thermomechanical pulps, herein named ATMP, from several softwood species at significantly reduced energy consumption is presented using a combination of TMP sub-processes and targeted chemical treatments. The ATMP technology consists of unit operations formulated to better separate the defibration and fibrillation steps with the goal of improved pulp fiber bonding at the lowest possible energy consumption; targeted chemical treatment is an important subcomponent for maximizing the efficiency of this process. The sub-process of chemical treatment is presented from a series of pilot studies evaluating； i) sodium bisulfite treatment, ii) location of chemical application, iii) sodium bisulfite charge and iv) type of chemical agent applied. The impact of bisulfite pretreatment on alkaline peroxide bleaching is also presented. The results confirm that bisulfite is an effective chemical agent for enhancing the ATMP process, and its performance is optimized by both, the location of chemical treatment and charge on O.D. fiber.

Today's Subjects of Domestic DIP Plant and Its Solutions

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After the big earthquake, power shortage due to shut-down of the almost all of nuclear power plant is giving a serious damage to our pulp & paper industry. Again this summer, we have to survive in extreme environments. DIP is good for the ecology originally because using waste paper and not need much tree cutting. But now additionally it is required more direct contribution of reducing the electric power consumption as much as possible.
So far, AIKAWA Iron Works has developed a lot of the most-advanced DIP facilities and lower power consumption systems under cooperation with users. For examples; the combination system of HeliDisc high consistency pulper & Double Dumping Screen which has superior pulping action, coarse impurities removing and ink dispersion effects. Ultra low power consumption MaxFlow & GranFlow screens for coarse & fine stages. HyperCell which has all good points of past floatators. 4 shafts UV Breaker & ConiDisc hot dispersion system which required for high brightness.
In this report, we would try to introduce additional equipment and systems as the countermeasures to this crisis. i.e. Continuance high consistency pulping system, Fractionating DIP system, applications of Flexible cascade cleaner system & HyperCell, Advanced MAXWave screen cylinder and Ultra low intensity post refining system.

Operating Experience of Co-Firing of Petroleum Coke System in Lime Kiln

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Oji Paper Nichinan mill has two rotary lime kilns in recausticizing process of kraft pulp plant, No.1 lime kiln(ϕ 2.3m×50mL) and No.2 lime kiln(ϕ 2.1m×36.5mL). Since waste derived fuel boiler was installed in 2006, the lime kiln was the only process to use heavy oil in the mill. In order to reduce heavy oil consumption, we installed petroleum coke co-firing system on the lime kiln in 2008. Some troubles happened at the start-up, but now this system is running very well and has brought large economic effects.
This paper shows the operating experience of co-firing of petroleum coke system in lime kiln.

Operating Experience of Hyper-Cell Floatator

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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 floatation process for paper recycle. In order to improve DIP quality and promote further use of DIP, Aikawa iron works and Nippon Paper Industries developed the state-of-the-art floatator “Hyper-Cell floatator” and installed in Hokkaido Mill-Yufutsu. This report introduces our operating experience of Hyper-Cell floatator.

The Measure of a Bad Smell Improvement of Kraft Pulping Process

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Niigata Mill, Hokuetsu Kishu Paper Co., Ltd.

Since Niigata Mill, Hokuetsu Kishu Paper Co., Ltd is being located in the central part of Niigata, it is very sensitive to an environmental trouble. In response to past various environmental troubles, the environmental impact prevention regulation based on ISO14001 was enacted in August, 2011. In this news, the bad smell sensor employment method of the circumstances where it resulted in environmental impact prevention regulation establishment, or the Niigata factory, the environmental trouble example in KP process, and a bad smell measure example are introduced.

The Bamboo Pulp Production by Batch Digester

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Kagoshima Pref., where the Sendai Mill is located, has the largest bamboo forests area of 16,000ha in Japan, and typical species named Moso bamboo covers an area of 7,600ha.
Since well controlled bamboo forests produce a good quality of bamboo shoot, bamboo older than five years need to be trimmed every year in order to maintain the forest quality. However most of the trimmed bamboo has been left in the forest usually, it has been an issue how to utilize such abandoned bamboo.
Sendai mill has been utilizing such trimmed local bamboo since 1999 as raw material for paper production, in order to protect local forest environment and to contribute prevention of global warming. We upgraded the batch digester system pulp line for small lot production into ECF pulp production plant, and this upgraded line has started production in 2010 and the trimmed bamboo is utilized more effectively. We introduce our experiences on the bamboo pulp production.

Analysis and Countermeasures against Stickies Occurring at Deinked Pulp Process

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Hachinohe Mill, Mitsubishi Paper Mills Limited

In Hachinohe mill, deinked pulp (DIP) with high brightness is produced. The pulp is mainly made of sorted colored ledger. However, the procurement of sorted colored ledger has become difficult by the rising price of all over waste paper. Therefore, we are forced to use several types of waste paper such as waste magazine. With the increase of usage of waste magazine, quality trouble caused by stickies was increasing.
To reduce the stickies, we analyzed the DIP process and characteristic of the stickies. The stickies become small through the process not only by shearing force but also by chemical function. Much stickies was removed by screening than by floatation, but we recognized that the floatator was able to remove problematic stickies. As a result, improvement of removal of the stickies by floatation induced achievement of decrease of the quality trouble.

Chemical Pulp Fiber Line Optimization

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Metso Automation, Process Automation Systems

The purpose of this paper is to review the best available measuring equipment and controls for ECF and TCF bleach lines. The target for a complete chemical pulp bleaching line is to bring the Kappa number down to zero and to reach the final brightness target. However, to control a bleaching line, we have to look at each stage separately and decide what the objective is, how we will monitor the success of the stage, what we will control, and how.

Utilization of Lignin Obtained by Separation of Wood Components

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Research Faculty of Agriculture, Hokkaido University

To establish chemical biorefinery for woody biomass, it is very important to convert lignin into value-added materials in addition to its use as an energy source. In this report, I would like to introduce its conversion to several valuable, functional materials on the basis of our recent research.
The first example is lignin-based carbon fibers (CF). In their production, spinning is a first process. There are proposed two methods, melt spinning and electro-spinning. The latter method for lignin was reported in the last decade. The second process is thermostabilization. The resultant lignin fibers prepared by both methods have high thermal mobility, such as glass transition and thermal flow. Thereby, the fiber morphology is changed by direct carbonization. To prevent morphological change, the thermostabilization process is very important. However, it is a tedious and time-consuming process. We developed a novel type of lignin fibers, which was easily converted into thermally stable fibers by the treatment with concentrated hydrochloric acid for 2 hs. The final product, CF, prepared from the lignin fibers had comparable tensile strength to lignin-based CF reported previously.
The other example for lignin-based functional materials is amphiphilic lignin derivatives, which are obtained by the reaction of isolated lignins or kraft black liquor with epoxylated polyethylene glycol. When these lignin derivatives were added to a saccharification medium using cellulase, the enzymatic saccharification efficiency was improved and residual activity of cellulase was maintained at a higher level. In addition, one type of the amphiphilic lignin derivative also had a superior ability for the cement dispersion to commercially available lignosulfonate that is well known as a cement dispersant.

The Present and the Future in Paper Electronics Using Printed Technologies

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Recently, a low-environmental-load method called “printed electronics” has attracted much attention. By this method, electronic devices are manufactured on polymer substrates using high-volume and high-speed printing technology, similar to printing of newspapers or magazines. Since the electric components are mounted on flexible substrates, printed electronic devices are rather lightweight and flexible to be carried around, offering high mobility. Moreover, the method of printed electronics enables the production of electronic devices of various sizes—from a tiny palm-sized device to a large-area device meant to be put up on a building wall, for example, e-books, solar cells, organic light-emitting diode (OLED) lightings, digital signatures, RFID tags, and health care sensors. Cellulose nanofiber sheets or paper have great potential as PE substrates because they have high transparency (similar to glass and plastics), high thermal stability (similar to glass), and high foldability (similar to traditional paper). In this article, the author introduced some applications of cellulosic paper in the electronic devices.

A New Technology of Process Water Treatment Using Fluid-jet Cavitation

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A new technology using fluid-jet cavitation (CV-jet) has been developed in order to improve the quality of secondary fibers. CV-jet treatment was applied to process water in deinking. In this treatment, process water was injected into the reacting vessel by using a high-speed jet and cavitation bubbles were generated around the jet. The impact force produced by the collapse of the cavitation bubbles detached contaminants, such as ink and binder, from the surface of fines and ash particles. The effects of CV-jet treatments for process water in deinking were investigated in terms of the number of dirt speckles, the effective residual ink concentration (ERIC) and the brightness of the treated samples.

The results showed that CV-jet treatment decreased the average size of dirt speckles in the process water, and the treatment also facilitated ink detachment from the fines in the water. The number and average size of dirt speckles after CV-jet treatment were decreased by the subsequent flotation. And the degree of dirt reduction after CV-jet treatment was much higher than without the treatment. The brightness of the fines after CV-jet treatment was also improved by the subsequent flotation. Similarly, the brightness gain through the flotation after CV-jet treatment was much higher than without the treatment. These results indicated that CV-jet treatments improved the quality of the fines in the process water, which were difficult to be improved by conventional deinking devices. Therefore, the CV-jet technology has the potential to improve deinking process.

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The Prospects of Biomass Energy Industry
— Creation of Asia-Pacific Biomass Community —

Issei Sawa
Mitsubishi Corporation

Market of Biomass Energy has been growing as New field of Strategic Industry under Euro- American initiative and recently Oil Major & Grain Major participated in this industry. Despite of growing industry in overseas, Japan is left behind at this moment, because Japan does not pay much attention on Biomass Energy, although it is one of potential option among Renewable Energy as noticeable issue after 3.11. Under such circumstances, Japan has to establish effective measures for the promotion of Biomass Energy Industry, in a way that Japan will create sizable sound domestic market and proceed Biomass Refinery project in Asia-Pacific, utilizing abundant biomass natural resources in that region so that Biomass Energy / Chemicals / Materials can be partly consumed locally and exported to Japan to fulfill Japanese market demand (So-called “Creation of Asia-Pacific Biomass Community”).

To achieve the plan, Japanese Government and Private Co’s teamwork is required to make win-win relationship with the partners towards establishment of sustainable supply-chain of Biomass Energy Industry in Asia-Pacific region.

Direct Preparation of Bio-Levulinates by Acid Catalyzed Solvolysis of Papermaking Sludge

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Ehime Institute of Industrial Technology Paper Technology Center

A simple method of producing bio-levulinates, which were expected to be useful alternative liquid bio-fuel or fuel additives, was studied. Bio-levulinates are ester compounds derived from alcohols and levulinic acid that is prepared from cellulosic biomass. Butyl levulinate (4-oxo-pentanoic acid butyl ester, a typical bio-levulinate) was produced by a simple acid catalyzed solvolysis of papermaking sludge. The reaction was performed just by refluxing papermaking sludge with n-butanol containing sulfuric acid. Considerable amount of butyl levulinate was detected in this system (50-70%) based on hexose content of the papermaking sludge.

A Fundamental Study on Wet-Web Strength

Keiko Hashiguchi, Chieko Mashino and Yusuke Kondo
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Increasing the filler content in paper and paperboard is of great interest for reducing raw material and energy cost as well as improving product quality in such as optical properties. However, the substitution of cellulose fibers with fillers reduces the strength of the finished sheet and also never-dried web of paper in paper-making process, so called wet-web strength. Wet-web strength is one of the most important factors to prevent the web breaks after the couch or within the wet-press section, therefore it is important to know what influence wet-web strength for the production of high filler content paper. The purpose of this study is to investigate the influence of pulps, fillers and chemical additives which are commonly used for paper making on wet-web strength in detail with handsheet analysis.

We prepared many kinds of never-dried wet handsheet using a variety of pulps and chemical additives with changing filler content and evaluate the tensile strength with vertical tensile test apparatus. The results reveal that wet-web strength is steadily decrease with the increment of filler content, and hardwood kraft pulp, which can increase the dry strength, cannot effectively increase wet-web strength. And we also found some of chemical additives could effectively increase the wet-web strength.

Estimation of SAQ® Effects by the Analysis of Wood Chip

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In this report, pyrolysis-gas chromatography (Py-GC) was applied for the estimation of effects given by SAQ® (a cooking additive) on a kraft cook. As raw materials, 4 spices of hardwood s (eucalyptus, acacia and aspen) were used. Py-GC analyzing data using hardwood chip was compared with the measurement data using kraft pulp.

When a hardwood were analyzed by Py-GC, each 8 kinds of the guaiacyl type compounds (e.g. guaiacol) and the syringyl type compounds (e.g. syringol) were detected as the lignin-derived pyrolysis products. Then peak area ratios of syringyl type compounds to guaiacyl ones (S/G ratio) were evaluated. As a result, a moderately good correlation was observed between S/G ratios obtained by Py-GC analysis and the changes of delignification given by kraft-SAQ® cook. It indicates that SAQ® effect (kappa number reduction) can be evaluated by Py-GC analysis without a laboratory cook test.

Smart Sizer
— The Latest Designed Rod Metering Type Size Press —

Yasuhiro Kato
Kobayashi Engineering Works, Ltd.

“Smart Sizer” is a sophisticated development of rod metering type size press.
There are many factors that go into designing and operating a successful high-speed rod metering size press, and Paperchine created a quite new and unique technology as “Smart Sizer”.
The purpose of this paper is to highlight and evaluate the key areas for the equipment design and the process conditions. The development concept of “Smart Sizer” is based on “ 3C ”, that is, “ Compact design, Clean operation, and Cheap equipment ”
“ Smart Sizer ” are being used throughout the world to produce a variety of grades ranging from linerboard grades applying starch to high quality woodfree coated paper with high solids coating.

Recent Technical Trends and Applications for Rosin Sizes

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Rosin sizes are applied as one of major paper chemicals at paper and paperboard machines around the world. Harima Chemicals Inc. is one of major rosin suppliers in the world, and Harima group companies offer liquid sizes, anionic and cationic rosin dispersion sizes for customers in Japan, China, US and Brazil. They are applied in corresponding to each papermaking condition. In Japan, anionic rosin dispersion sizes are mainly used for many grades. On the other hands, cationic rosin dispersion sizes are typically applied at paperboard in the global market such as US and Brazil.

In this report, we introduce rosin market, Harima Chemicals group’s global network, rosin size market and the technical trends. In addition, characteristics, properties and sizing performances of rosin sizes for application and our current technical progress development of rosin sizes such as cationic rosin sizes.

Denatured Bentonite for Clean Up System

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Sales Division, Kanto Bentonite Mining Co., Ltd.

Bentonite is a name of the rock whose principal component is smectite clay. In papermaking industry Bentonite is used as draining and retention aid and pitch controlling aid, thereby equipment clean up is being possible. This paper introduces the cleanup systems of papermaking process using Bentonite.

In late years, paperboard industry is causing worsening of water quality due to increasing white-water closure. Bentonite adsorbs the causative agent of pitch troubles, and flocculant function improving drainage and retention response. By these effectiveness Bentonite enables reduction of additives, ultimately equipment clean up is being possible.

Latest Technology of Voith Paper Fabrics
— Paper Machine Clothing from Paper Machine Supplier —

Nobuaki Ajioka
Sales Dept. Fabric Group, Voith IHI Paper Technology Co., Ltd.

Voith IHI Paper Technology Co., Ltd. is a full line supplier in the paper business providing full paper machines and all kind of consumables as Paper Machine Clothing and Process belts. This combined approach in terms of business and technology is one of our biggest advantages. We have Manufacturing plants, Technical service and sales offices all over the world. And we also have world-wide network of R&D including Voith Paper's latest complete pilot machine. By optimizing our organization, We have been developing leading edge fabrics technology, for example, New generation SSB forming fabric "PrintForm/MultiForm I series", Advanced treated Press fabric "E-Flex", New designed Dryer Fabric " PrintTech/MultiTech PR" for Anti-contamination and Under Pressure Transmission.

Experiences in Operation of Renewable Fuel Boiler

Junichi Tashiro
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Oji paper group company is introducing renewable fuel boilers in order to contribute the mitigation of global warming and save fossil fuels. These boilers can utilize industrial waste fuels such as RPF (Refused Paper and Plastic Fuels) and TDF (Tire Derived Fuels) as well as a typical renewable fuel, such as Biomass fuels replaced from fossil fuels.

At our TOMIOKA Mill, a new boiler 320t/h, which can co-fire higher percentage of Fluff plastics, demolition woods, RPF, paper sludge and together with coal, was installed and started commercial operation in December 2008. The quality of these fuels is not stable because of fuel sources (waste). Higher percentage usage of those renewable fuels instead of coal indicates to bring higher chlorine and other harmful foreign materials into the furnace and makes longer stable operation difficult. In our boiler, corrosion of pressure parts and some parts in Bag filter were found in recent. A tube leak occurred in separator by a partially breaking of refractory.

By improvements of fuel management, maintenance, and repair methods in addition of a tighten operation checks reflecting the result of maintenance, planed 6 month periodic operation has been attained without major problems.

This paper reports the operational experience and trouble shooting of the new boiler.

Maruishi-Pzzolato Full Synchro Folio Sheeter

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Due to high demand of the sheeter of good quality with moderate price not only the Japanese market but also international market, Maruishi took over the original sheeter technology and know-how from Pizzolato, a 65 year wellknown company in Italy, in April 2010 thus added "Maruishi-Pizzolato high-speed Full Synchro Folio Sheeter" into Maruishi portfolio.

In the past, Maruishi only focused on those high-end machines. The supplement of Maruishi-Pizzolato sheeters fills in the gap for Maruishi to offer middle-level sheeters so that Maruishi can expand our spectrum of machine supply to cater for the needs of various customers both in the paper mills and also the converting companies.

New Lab Chemical Analyzer for Wet End Process on Paper Production
— History in Developing and Features & Benefits of System Zeta Potential/SZP10 & Particle Charge Detector/PCD04 —

Yoshio Ishitsu
BTG Division, Spectris Co., Ltd.

About 25 years ago, charge measurement was seldom practiced by the paper industry. The zeta potential had long been known to be measurable at the time, but its nature and benefits was still not widely spread among users. BTG is going on to develop some chemical analyzers for the wet end of paper making process for a long time.

PCD for dissolved charge and SZP for fiber charge can enable papermakers to optimize chemical additions, to improve paper quality and in the end increasing productivity.

As Easier, Smaller, Smarter, Lighter, latest type PCD04 and SZP10 live up to its tagline, combining exceptional ease of use with small size, lightweight design and high performance.

In-Situ Rebuilding of Vertical Mill by Hard-Facing

Hiroaki Fukumoto
Welding Alloys Japan Ltd.

Vertical mill (VM) is one of the most effective pulverizer for various materials in many sectors. In cement manufacturing sector, in coal-fired power station and in steel-making industries, these VMs are most widely used in Japan. The parts in grinding zone of VM are rebuilt by hardfacing or replaced with new ones at certain period of time.

To realize less-emission of CO2 gas, ecological cement which we call “Eco-cement” has started to be used and bio-mass fuel has also used in the field of paper and pulp manufacturing for bio-mass boiler in Japan. In pulverizing new material such as waste, wood chip, RPF and others, VM is apt to become more worn-out due to abrasion than before.

Welding Alloys Japan has been making rebuilding these VMs for more than 10 years and newly-developed technique by WA Japan is explained herein about “Smart welding”, “In-situ rebuilding” and the effect by these technologies.

A Report on 2012 TAPPI International Conference on Nanotechnology for Renewable Materials

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Advanced Technology Laboratories, Oji Holdings Co., Ltd.

The 2012 TAPPI International Conference on Nanotechnology for Renewable Materials was held in Montreal, Canada, from June 4th to 7th, 2012. Over 200 attendees, representing 20 countries, participated in the conference. It also featured a tour of the CelluForce’s nanocrystalline cellulose (NCC) manufacturing facility. This report is a review of the conference and some of the oral presentations.

A Report of an Overseas Japanese Engineer from Kanzan, Germany

Masaru Tahara
Research and Development, Kanzan Spezialpapiere GmbH

Kanzan Spezialpapiere GmbH, which is a member of Oji Group, was established in 1990. Up-to-date paper mill of Kanzan, Neumühl mill in D üren, Nordrhein-Westfalen in Germany, is historically derived from Mr. Rütger von Scheven, who established a paper mill here in 1710 and achieved starting paper industry. Now over the past 300 years there located many paper mills with related companies and the other industries in the city where even a paper museum was founded.

Current Neumühl mill is briefly introduced, as mill energy is generated by brown coal, which is a locally specialized source, and natural gas. And water supply is delivered from mill-adjacent river water, whose hardness is so-called middle soft. Working circumstances in Germany are noted, which is supposed to be quite different from that in Japan. Additionally trade exhibition for Kanzan is reported as an exhibitor or a visitor.

Development in Oji Imaging Media business as of today, especially related in direct thermal paper, become wide in overseas countries such as Germany as well as the U.S.A., Thailand, Brazil and China, where technology of Oji R&D has been integrated.

A Method to Characterize Coating Uniformity Using Confocal Laser Scanning Microscope

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Douglas W. Bousfield

The University of Maine

A new method on the coating layer uniformity was investigated. A method to characterize coating uniformity using a staining technique and a confocal laser scanning microscope (CLSM) was proposed. Burn out tests are compared to the CLSM technique in terms of coating layer evenness. The coating mass distribution was calculated using image analysis software from both methods.

A reasonable correlation was found between the burn out test and CLSM observation
when the fluorescent dye was not rinsed from the sample. The CLSM method made quantification of coating mass distribution more rapid than the burn out test.

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Environmental Problems of China as Viewed in the Power Transfer Period
-The future of Paper Industry as Related to Political Power & Environmental Governance Relationship-

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The shifting to "Reform & Liberalization Policy" by Deng Xiaoping in1978 is the turning point of contemporary China. After this period, Chinese economy has made remarkable progress and finally attained to be ranked as the second in GDP and the first in production & consumption of paper and paperboard in the world. However, since the environmental policies were ranked lower compared with the economic growth policies, and that due to the financial deficit, the deterioration of environment of China is serious and wide spread issue. After attending the UN Conference on the Human Environment in 1972, China has convened the 1st National Environmental Conference and started to bring forth administrative agencies for environment and to develop legal systems. Therefore, "environmental governance system" is officially existing to cope with environmental issues generated by a variety of mills in local area. However, the problem is that the local government is tend to favor economic growth of local area rather than environmental protection and hesitates to enforce legal actions against environmentally illegal mills. Furthermore, high authorities of the Chinese Communist Party and its lower subordinate organs have influential power for local government.

This paper is intended to analyze to what extent the power structure after the power transfer will affect the "environmental governance system" and the future of paper industry on the basis of 12th Five Year Plan and its underlying guiding ideologies of "Scientific Development Concept" and "Harmonious Society".

Practical Application and Fundamental Principle for Prevention of Noise and Low-Frequency Sound Problem

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Technical Division, INC Engineering Co.,Ltd.

These days, the subject of noise and low-frequency sound, such as a wind-power-generation and a residential heat pump water heater (Eco Cute), is taken up in mass media etc.

In the 2010 fiscal year, the noise complaints that were brought to local governments in japan were more than 15000 affairs, and the low-frequency sound complaints were only 250 affairs.

Although there are not many numbers of low-frequency sound complaints, the upward tendency is shown every year. In addition to those numbers, many unreported complaints may exist.

How to advance in an anti-noise measure has been changing from the conventional measure against symptomatic therapy to the measure against prevention recently, and the noise of a machine, a factory, etc. must be considered increasingly in a planning or a design phase.

Here, the foundation of noise and low-frequency sound, the target, standard and index of a measure, and investigation and measure, prevention technology, etc. are explained.

And, the practical use situation to the design example of a large-scale sound barrier, comparatively new active-noise-control technology for three-dimensional space noise, such as construction task noise, etc. are explained.

How to Use the Waste Water Treatment Chemicals

Tamotsu Ushiyama
KURITA WATER INDUSTRIES LTD.
Environmental chemicals technology department Chemical division

The technical knowledge of both the facility and the chemicals for the coagulation(flocculation) and settling system is required for the engineers and the plant manager of the waste water treatment plant in paper mill.

This is an introduction of basic technology and some application know-how for an effective operation of a waste water treatment plant.

Trouble of Activated Sludge
-Determine the Cause and Countermeasures-

Shinichi Tomizawa
Kitamen Limited company

Many processing obstacles have occurred in the liquid waste treatment by an activated sludge method.
It is pressing need to study the prime cause of these processing obstacles and to solve troubles.
There are the following two important elements.
・BOD load as a design problem
・DO (dissolved oxygen) as an operation management index
I think that BOD load evaluated by oxygen consumption for five days is not suitable.
Because, it is presumed that more than the BOD load evaluated by oxygen consumption for five days is applied to activated sludge.
A suspended substance (SS) is classified into minerals and an organic matter.
Furthermore, an organic matter is classified into a soluble substance and an undissolved substance.
Soluble SS begins to melt little by little in a processing cycle, and changes to BOD.
The sum total of the BOD load of the raw water which flows into an aeration tank (biological treatment tub), and the BOD load into which soluble SS began to melt is the load (source of nutrient) to a microbe.
Under the environment of an electrical overload, activated sludge carries out abnormal metabolism of the viscous substance (macromolecule polysaccharide).
Activated sludge stops taking in BOD and oxygen, and DO meter shows the measurement value that dissolved oxygen is left.
If it observes under a microscope, activated sludge has caused viscous bulking by an electrical overload in many cases.
The dissolved oxygen measured is not necessarily the amount of oxygen which was used for activated sludge and remained.
The ways of coping of the above-mentioned trouble are also explained.

The Strategy for the CRE, Corporate Real Estate, Concerned with the Soil Contamination

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After the Great East Japan Earthquake, Japanese company has to optimize the CRE, which is occupied greatly in the assets, to raise the cooperate value and for the growth strategy of the company. In developing the CRE strategy, it is very important to grasp the soil contamination risk and minimize the impact for the management and utilize the real estate property.
For this purpose, the survey which confirms the historical land use is applied as screening at first. And it is desirable to carry out the field survey as the gradual approach on site where the potential of the soil contamination risk is assumed to be high.
And the concept of a risk level matrix is introduced as a technique in the case of evaluating two or more offices or factories in parallel with a certain evaluation axis. This is distributed as the matrix using the two evaluation axis. One is the potential for the soil contamination and the other is the impact to the circumference.
Based on these concepts, the company has to do the screening the corporate real estate from a viewpoint of the soil contamination risk first of all, and do the detailed survey according to the progress of sale negotiation. Further, it is strongly desirable to consider the land use not only for sale but also for keeping and apply the on-site treatment which is cost effective if the soil contamination is found on the real estate.

Appropriate Disposal and Recycling of Wastes with "MLG･SUPERTM"

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Green Industrial Circles of Environmental, Specified Nonprofit Corporation
and Green World, Co., Ltd.

As a method to become harmless and to recycle the wastes such as the incineration ash and the dust, we introduce the chemical insolubilization process with the processing agents called MLG-SUPER, combined used the cement solidification. The processing changes harmful heavy metals into an insoluble compounds effectively, and carries out stable fixation. Much more effective detoxification is realizable by carrying out substitution fixation of the compound made insoluble into the solidification network structure formed of the hydration reaction of cement solidification. Because long-term stable detoxification is guaranteed, the processing thing formed by such a method is suitable for the recycling use.

The Situation in the Foreign Countries and the Introduction to Japan about WET (Whole Effluent Toxicity Testing)

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It is carried out Whole Effluent Toxicity (WET) system to regulate an effluent without identifying chemicals to use in vivo bioassay in the United States. It costs to determine concentration and toxicity of many chemicals are included in the effluent. Additionally, it is difficult to detect and calculate additive, synergistic and antagonistic effect of a chemical mixture.

The purpose of WET is to evaluate effect of the whole effluent by exposing organisms to the effluent directly. Toxicity reduction evaluation (TRE) and toxicity identification evaluation (TIE) must be conducted to reduce toxicity when judged that the effluent is noxious. It is also operated the regulation of effluent based on an acute and chronic bioassay in Canada, European countries, Australia and Korea. The Japan Ministry of the Environment started to investigate effective effluent regulation system using bioassay from 2009. The chronic test can determine the effect of reproduction and an early stage development contributing to maintenance of a species population and the ecosystem. Therefore, it is assumed that a short term chronic test is appropriate for evaluation/management of the effluent in Japan.

Preventive Countermeasures against Groundwater Pollution by the Revision of the Water Pollution Control Act

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In JAPAN, groundwater has been widely used as important fresh water resource, owing to its pure quality and stable temperature. Approximately a quarter of the nation's overall amount of water for drinking and industry is supplied from groundwater. Therefore, it is very important to keep high quality of groundwater for our daily life and environment. On the other hand, once groundwater is contaminated, we need many years to recover the quality of it.

Japanese Government, Ministry of the Environment has developed laws and ordinances to prevent groundwater contamination and to keep quality of groundwater. However, groundwater contamination has continuously been confirmed caused by leak of hazardous substance to underground from factories and plants. Therefore, Central Environment Council has discussed effective precautionary measures against possible groundwater contamination by hazardous substances from factories and plants

In keeping with the report of the Council submitted to the Minister, the Water Pollution Control Law was amended and went into effect on June 1st 2012. The major points of amendment are as follows.

1) Expanding the facilities subject to the regulation

Any person who establishes a facility for storing harmful substances ("Designated Facility for Storing Hazardous Substances") shall notify a prefectural governor, etc. of the structure, etc. of the facility in advance.

2) Compliance obligation on the standards of the structure, etc.

Any person who establishes a specific facility which use, produce or dispose hazardous substances ("Specific Facility for Use of Hazardous Substances") and/or a Designated Facility for Storing Hazardous Substances shall comply with the standards of the structure, etc. of the facility. In addition, a prefectural governor, etc. may, if necessary, give an order in this regard when the said facility has not complied with such standards.

3) Obligation on implementation of regular inspection and maintenance of records

Any person who establishes a Specific Facility for Use of Hazardous Substances and/or a Designated Facility for Storing Hazardous Substances shall inspect those facilities periodically, record and preserve the result.

Case Introduction of Environmental Communication Activities of the Oji Paper Group

Yushi Hibino

Kasugai Mill, Oji Paper Co., Ltd.

In the Oji group, the environmental charter was enacted in January, 1997 and eco management has been tackled.
The measure example of the Oji Paper Kasugai factory which is a city type factory which is tackling positively environmental communications, such as an information exchange with a local resident and philanthropy activities, is introduced.
The Oji Paper Kasugai factory is a comprehensive paper pulp mill which produces the prime coated paper, paper of fine quality, a medium quality paper, kraft, tissue, a disposable diaper, etc.
The Oji Paper Kasugai factory is located at the center in Kasugai with a population of 300,000 located in the northeast part of Nagoya.
A site including a company residence area is about 840,000m2, and occupies about a little less than 1% of the whole surface products of Kasugai.

Urbanization progressed quickly with development of the Nagoya suburbs, and the environment which surrounds a factory has changed a lot.

Environmental communication activities have the following.
(1) As an information exchange with a local resident, ① papermill surrounding area liaison committee, ② Shonai river maintenance problem study group, ③ environmental monitor meeting, ④ Kasugai environmental city planning partnership meeting.
(2) As a community activity, ① factory tour, ② Oji rose garden, ③ boys baseball convention,④ a cherry tree festival , a summer festival ⑤ Shonai river, and Jizou river cleaning, ⑥ the recycling activities of used half-split chopsticks, ⑦participation in an administration-sponsored event.
In the Oji group, "the ambient behavior target 2015" was newly held up as a measure target to the environment towards 2015 for the purpose of the further environmental improvement.

Improvement the Performance of Industrial Waste Water at Ashikaga Mill

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Ashikaga mill wanted to improve the performance of waste water, controlling the color in particular, also had the problem to course the anaerobic fermentation in residual sludge of secondary clarifier. Due to the unique structure of the secondary clarifier and the restriction of the dewatering capacity of the sludge from the secondary clarifier, the level of sludge in secondary clarifier was needed to maintain higher to avoid unstable consistency.
After the improvement of capacity of sludge, we repeated improvement in the process on operation, mainly to maintain stable the dewater ability of the sludge from the secondary clarifier and the efficiency on biological treatment.
Furthermore we also changed the combination of flocculent and coagulant in the process. As a result of these actions, we could produce BOD5 removal efficiency and improved color of waste water.

A Report on International Paper and Coating Chemistry Symposium & International Paper Physics Conference

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The International Paper and Coating Chemistry Symposium (IPCCS) and the International Paper Physics Conference (IPPC), which were both organized by Innventia and KTH, were held concurrently in Stockholm, Sweden, from June 10th to 14th, 2012. 400 people from 24 different countries participated in the conference and symposium, which included 15 sessions with at total of 138 oral presentations. This report is a review of the conference, the symposium, and some of the oral presentations.

Research Life at Laboratoire de Gé nie des Procé dé s Papetiers (LGP2) in Grenoble, France

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Laboratoire de Gé nie des Procé dé s Papetiers (LGP2; Laboratory of Pulp and Paper Science and Graphic Arts) is the only national laboratory for paper, pulp and printing sciences in France. LPG2 is located in Grenoble and has around a hundred members of professors, Ph.D. and post-doc students in addition to engineers and administrative staffs, half of whom were foreigners. LPG2 shares the same area with É cole internationale du papier, de la communication imprimé e et des biomaté riaux (Pagora) which is one of the largest engineering school exclusive for paper, pulp and printing sciences in Europe. This article will introduce LGP2 and a researcher's life in Grenoble on the basis of author's experiences.

Corporate Profile & Products Information (1)

NIPPON FELT CO., LTD.

Nippon Felt Co., Ltd was founded in 1917, and has been continued to expand since the dawn of Japanese paper industry. Press felts for papermaking need to meet high quality demands in preciseness and uniformity for high speed production of thin sheet of paper like 0.1mm in thickness without defect. Since each press felt for papermaking is made-to-order for each press position of paper machines, its design is very much diverse.

This article introduces the press-felt' production processes and products, as well as an outline of Nippon Felt Co., Ltd that has been answering the needs of times and producing the world class products.

Reduction of Pollutant from Bleached Kraft Pulp Mills by the Process Conversion to ECF Bleaching(Part Ⅲ)
- Reductions of Emission and Generation of Dioxins in Bleached Filtrates, Bleached Pulps and Whole Mill Effluents -

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We have reported effect of elemental chlorine free (ECF) bleaching for mill effluent in previous paper. As a result of change chemical substances for pulp bleach, the amounts of absorbable organic halogen (AOX) and extractable organic halogen (EOX) decrease to significant lower level when substitution of chlorine dioxide is used. A more recent survey for polychlorinated dioxins and dibenzofurans (Dioxins) are also studied.

Effects of ECF bleaching on reduction of dioxins were investigated for 14 bleached kraft pulp mills in Japan, which is a largest study in domestic. Dioxins concentrations in the bleached pulps, bleached filtrates, and whole mill effluents before and after the ECF conversions were measured and compared.

After the ECF bleaching process was introduced, the generation of dioxins was dramatically suppressed in all of the mills, and the dioxin levels were decreased by less than 1/50 after the ECF conversion. Similarly, the concentrations of dioxins of the bleached filtrates after the conversion also decreased by less than 1/20, strongly indicating that the shift of bleaching process to the ECF bleaching effectively suppresses the generation of dioxins.

The dioxin levels in the whole mill effluents after ECF conversion of the mills were below 1pg-TEQ/L that is the environmental standard in Japan. Furthermore, some isomers of dioxins specifically generated by chlorine bleaching process were not detected in the whole mill effluents, confirming that the ECF conversion effectively suppresses the emission of dioxins into the environment.

Already in two companies 14 mills, generation of dioxins from bleaching processes are not ditected. Further, most emissions of dioxins from effluents also became an excellent levels.

Paper Gloss Analysis by Specular Reflection Point Spread Function (Part Ⅱ)
-Spatial Frequency Analysis for Paper Gloss-

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It is known experientially that a feeling of gloss will be affected by sharpness of the reflected light image which is not only the amount of light. In image science, analysis technology is established as sharpness. The typical analysis technology of sharpness is the spatial frequency analysis using MTF (Modulation Transfer Function). However, MTF about specular reflection phenomenon is not well known.

Authors have proposed a concept for Point Spread Function of Specular Reflection (SR-PSF), and have developed this measuring apparatus. Measurement and its analysis of the SR-PSF have been reported (part I). In this study, a concept for Modulation Transfer Function of Specular Reflection (SR-MTF) is proposed, and the spatial frequency analysis of paper gloss by SR-MTF is reported. SR-MTFs of the printing paper are measured. The feature of SR-MTF has low resolution in the incidence direction of light and high resolution in a width direction. In the coated paper for printing, it became clear that SR-MTF has a value only up to spatial frequency about 1.0 (cycles/mm).

Image Clarity (JIS-K7374) and SR-MTF measure the same physical characteristic fundamentally. Because the range of the spatial frequency is too high in Image Clarity, so it is not fit for measurement of the printing paper which has a value only with low spatial frequency. Therefore, the spatial frequency analysis by SR-MTF is fit for paper gloss.

In this study, SR-PSF and SR-MTF of the specular reflection phenomenon were discussed. PSF and MTF are fundamental analysis tools in image science. By having introduced SR-PSF and SR-MTF, a specular reflection phenomenon can be physically analyzed. Moreover, I would like to examine a new reflection model and to apply it to computer graphics.