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2008年1月　紙パ技協誌
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JAPAN TAPPI JOURNAL Vol.62 No.1

January 2008 Abstracts

Development of Ceramic Blade with Sensor and the Effect of Spectra Foil Sensor System for Paper Making

Takeshi Shirao
Strategic Planning Dept., Technology Div., Oji Paper Co., Ltd.
Kenji Yamauchi
Sales Engineering Dept., Horikawa Engineering Works Ltd.
Satoshi Nakamura
HPS, Asia Pacific, Pulp & Paper Marketing, Honeywell Japan Inc.

SpectraFoil System was introduced to the paper industry in the late 1990s. SpectraFoil is a unique technology, able to measure the drainage rate on-line in the wire part of a paper machine.

Japanese paper manufacturers assessed the original technology, however they were concerned with the potential of sensor wear and possible damage the forming fabrics.

The original sensor from Honeywell consisted of a polymer sensor housing with a stainless steel electrode. Honeywell Japan, Horikawa Engineering and Oji Paper developed a new sensor using special material as conductive ceramics, “Cermet” and it can be build into a ceramic foil blade. This foil blade can be replaced one foil blade of “Cerasert”. With this design change, SpectraFoil achieved the original design concept combined with reliable performance. Oji Paper has installed SpectraFoil Systems on 8 paper machines recognizing great economic benefits from reduction of sheet breaks and energy savings.

The Current Technology of Ink Marking System for Sheeter

Kazuo Matsuura
Hokuetsu Kamiseisen Co., Ltd.
Seiichi Hayashi
Electronic & Instrument Department, HOKUETSU ENGINEERING Co., Ltd.
Masayoshi Hasegawa
Corporate Planning Department,　DAITO INDUSTORY Co., Ltd.

There are two types of ream marking system during sheet cutting process: One is paper strip marker (ticket inserter), and another is ink marker. Normally, ticket inserter is common in Japanese finishing process because inserting equipment is simple and accurate. On the other hand, ink marking controlling is difficult because the marking has to be done before cross cutting and a marking location on the slitting edge changes by the line speed of sheeter. Hokuetsu Kamiseisen mainly adopted “Inkmarker” and has been developed for many years. The disadvantages of marking with ink are solved by improving control method that is followed by developed component devices, and nowadays many cutting operators regard Inkmarker as the most reliable equipment. Inkmarker is installed not only Hokuetsu Kamiseisen sheeters but also other paper finishers and evaluation from them are extremely high. This report describes the overview of Inkmarker system and the operating experience.

The Operating Experience of PM7 after the Rebuild at Ishinomaki Mill

Yuji Nakagawa
Ishinomaki Mill, Nippon Paper Industries Co., Ltd.

Ishinomaki mill locates east part of Miyagi Prefecture, adjacent to the Kitakami River. The mill produces approximately nine hundred seventy thousand-ton of papers annually and has three coaters, ten paper machines including No7 paper machine, which is introduced in this paper. No7 paper machine started in 1960 producing a newsprint paper and then converted to the coat based paper machine in 1981. The paper machine is rebuilt to improve the paper quality in 2006.

This paper reports the facility and effect from the rebuild.

The Experience of Fiberline Plant Operation

Fumiaki Kimura
Ohe Mill, Marusumi Paper Co., Ltd.

Marusumi Paper New Fiberline Project was completed in May 2007. Because of renewing our old fashioned KP plant at Kawanoe Mill, New Fiberline was constructed at Ohe mill.

The fiberline with 700t/d of hardwood bleached plant construction includes Recausticizing Plant with lime Kiln, Recovery Boiler, Bleaching chemical preparation plant, Chip handling and Pulp Sheet Machine. And also New Systems are introduced for this project such as Turbo-Feed system, Ozone base ECF Bleaching system.

New Fiberline shows good performance for pulp bleaching, energy saving and decreasing the level of environment load.

The Study on Deinking of Old Newspaper

Hiroyuki Nagatani
Pulp and Paper Research Laboratory, Oji Paper Co., Ltd.

The difficulty of Old Newspaper deinking is not the same. The relationship between the quality of old newspaper and the difficulty of deinking was investigated. Our study shows that the difficulty of deinking depends on the type of the papermaking chemicals. In addition, the degree of ink-penetration into paper influences on the deinking property.

Our new generation newspaper "Plus News" consists of new technologies which keep ink on the surface of the paper. So it gives extreme printing quality, and much better deinking property. It is important that paper-manufacturing companies should consider not only the quality of products, but also the deinking property regarding product recycling.

Operating Experience of High Speed Refiner

Keisuke Irikawa
Iwanuma Mill, Nippon Paper Industries Co., Ltd.
Mitsuhiro Sugino
Technical & Engineering Div., Nippon Paper Industries Co., Ltd.

Nippon Paper Industries Iwanuma Mill produces Refiner Groundwood Pulp (RGP) as mechanical pulp for High-quality newsprint, which is one of our company's strategic products. RGP process consumes much energy compared to DIP or KP process. The energy consumption of RGP is equivalent to 10% of energy used in whole mill. The energy is supplied by mill's own boilers and turbines. Since one of the boilers is heavy oil boiler, recent steep rise of oil price made a serious impact on RGP production cost. Under these circumstances we introduced High-speed refiner made by Andritz K.K., for the first time in Japan to reduce primary refining energy consumption. This High-speed refiner had been already introduced to several TMP process (RTSTM) outside Japan and they are successful in saving energy. However, there was no precedent installation in Japan, no knowledge about resulting RGP properties were available. Therefore pilot scale trial at Andritz K.K. pilot plant was conducted. The result showed that saving energy while maintaining pulp properties were possible. According to these results we decided to introduce this refiner. The installed High-speed refiner is single disk refiner, which has distinctive rotational speed of 2,150rpm. Specific energy was reduced from 1,200kWh/t to 680kWh/t with same pulp properties.

This report shows operation experience of High-speed refiner in saving energy of RGP process compared to former refiner.

Operating Experience of High-consistency Ozone Bleaching

Ai Van Tran and Shuji Morita
Mishima Mill, Daio Paper Corporation

The bleach plant of kraft pulp at Mishima mill is composed of three lines. One multistage line has been producing ECF bleached softwood kraft pulp (NBKP) using chlorine dioxide from April 2004. The other two bleaching lines produce bleached hardwood kraft pulp (LBKP) and encompass one displacement tower and one multistage line. Whereas the former was practicing chlorine bleaching up until early March 2007 when it started high-consistency ozone-based ECF bleaching, the latter was already making chlorine dioxide-based ECF-LBKP in April 2004 and has been converting to high-consistency ozone bleaching since April this year. Thus, all the kraft pulps at our Mishima mill are now completely and fully ECF bleached. Compared to the chlorine-bleached pulp, the breaking length and burst factor of the ozone-bleached LBKP are somewhat lower but the tear factor is almost equal. The COD, color and chloroform loads of the bleach plant's raw effluents are decreased considerably. The AOX and color loads of the treated mill effluent discharged into surrounding receiving water bodies are also reduced, but to a smaller extent.

A Paper on Use of a New Energy Boiler

Shingo Obata
Takaoka Mill (Futatsuka), Chuetsu Pulp and Paper Co., Ltd.

Takaoka Mill (Futatsuka) in Toyama Takaoka is one of main factory of Chuetsu Pulp and Paper along the west side of Sho River which is always full of beautiful clean water, and products papers for news papers and publication papers. Electric power is supplied by two sets of power plants with purchased from the grid.

At the same time of replacement one boiler because of its lifetime, New boiler was planned to use renewable energy such as waste tire derived fuels (TDF) with radial wires and the biomass (demolition wood) as main fuels with considerations of Global warming (CO2 reduction) and operational cost reduction. The first ignition of new boiler was in June 2006, and started in operation in November 2006.

The features and operation experience of new boiler are reported here.

Boiler Fuel Conversion by Installation of LNG Satellite Facilities

Tadashi Arifuku
Tonegawa Mill, Rengo Co., Ltd.

In line with increasing social demands on environmental conservation, Rengo has established Eco Challenge 009, a document setting forth our environmental vision, and is implementing resource and energy savings activities.
As part of our efforts, Rengo targets to achieve 12% reduction of CO2 emissions from the 1990 level by 2009.

This paper will introduce LNG satellite facility installed at Rengo, Tonegawa Division as an example of boiler fuel conversion from Bunker C to LNG.? The effect of fuel conversion, such as reduction of CO2 emissions, will also be examined.

Operating Experience of New System Sheeter

Takumi Akasaka
Hachinohe Shigyo Co., Ltd.

We are Hachinohe Shigyo in where located Mitsubishi Paper Hachinohe mill. There are about 550 employees and we are handling paper products with 75,000 (T/Month) by supercalender, winder, cutter and wrapper. Besides above, we carry out upon the delivery job in the mill.

The name of this time cutter is 35 cutter that is developed by E.C.H.WILL GmbH in Germany. This machine has the latest technology and might be the top level in the market as the output capacity and also the sheeting quality side. We are starting to make the sellable products from September in 2006 and then output are increasing, we achieved the target output in this March.

I want to speech about this new cutter feature and operating experience.

2008年2月　紙パ技協誌
[プリント用ページ]
JAPAN TAPPI JOURNAL February 2008

Vol.62 No.2 CONTENTS

2008年2月　紙パ技協誌
[プリント用ページ]
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Vol.62 No.2 Abstracts

Point of Paper Container Processing Technology

Hiroshi Katayama
Technical Headquarters Development Department,　Kyodo Printing Co., Ltd.

Abstract

We are developing a new package technology. The paper container is a packaging material that is from of old. The paper container is made from the paperboard and has some features as a thing that contents can be defended from a strong impact from the outside and a beautiful print are possible etc. Moreover, it starts receiving the fair wind like a noteworthy rise to recent environmental problems and the revisions of the container recycling law, etc. and it entering a new stage. It wants to look back on the processing technology of the paper container, and to clarify the function of the paperboard requested from the paper container processing. And, I want to tie to the development of a new package.

A Skit Packer and Finish Facilities

Hideyuki Watanabe
Designing Dept., JTEC Co.

Abstract

A finishing machine to wrap with recyclable paper in the paper industry world is reviewed by global environmental protection and utilization activity of resources. Own way company sells a design and production of an industrial machine making a paper manufacture finishing machine main, mainly. It is thought that packing with paper is disadvantageous in a tear and absorbency of packing in comparison with stretch packing and shrink packing of film system a little. However, sale number of packing facilities increases from development of damp proofing paper of paper manufacture maker, improvement of quality and stability of a packing process of packer maker surely year by year. It is own way company, but inquiries about a skit packer increase and the delivery results increase recently, too. It is thought that possibility of skit packer sales promotion is big, even if I think from a share only for Japanese soil. Therefore I'd like to explain a skit packer and the finish that original, own company.

Operating Experience of Semi-automatic Ream Feeding System

Tsukasa Futo
Finishing charge Finishing section P-com. Co., Ltd.

Abstract

P-com. Co., Ltd. is in charge of sheet finishing operations such as roll wrapping, sheet cutting and wrapping of paper sheets for Nippon Daishowa Paperboard Tohoku Co., Ltd. In the sheet finishing process, a ream feeding work by hand is very hard and there are many kinds of works. Although it is difficult to mechanize the process of a ream feeding, an automatic ream feeding has been required for cost reduction in this process. So we have solved such problems by development of semi-automatic ream feeding.

In this paper, an operating experience and a development of Semi-automatic Ream Feeding System are introduced. After installing the system, we have been released from hard works and engaged in observing the sheet finishing process.

The Semi-automatic Ream Feeding System was developed by Nippon Daishowa Paperboard Tohoku Co., Ltd., P-com. Co., Ltd. and SERVOARM Co., Ltd.

Introduction of Updated Roll Wrapping and Handling System

Masashi Shibaki
Itochu Sanki Corporation

Abstract
Recently, the demand for roll wrapping and handling are becoming tough and diversified, not only for protection against humidity, tear up, dirt but also for operating efficiency, small lot and various kind. In order to satisfy those requirements, RCS (Roll Care System) has been specializing in only roll wrapping and handling for more than 35 years. This article mentions the latest roll wrapping and handling system through RCS technologies and products.

Operating Experience of Automatic Coil Wrapping Machine

Masayuki Saito
Nakoso Jujo Paper Industrial Corporation

Abstract
CCP (Carbonless Copying Paper), produced in Nippon Paper Industries' Nakoso mill, is sensitive to pressure. Because of this, rolls of CCP had been manually packed in corrugated cardboard boxes to protect them from the bruises in the transportation. As the production volume grows, manual packing is no longer efficient. Therefore the semi-automatic wrapping machine using plastic stretch film was adopted. With the raising concern over environmental issues, recently our customers have a serious problem with the disposal of the plastic film used for CCP packing. We have developed the new original wrapping paper to eliminate this problem. The features of this wrapping paper are as follows: using no plastic film, recyclable, shock absorbing, damp proof, etc. With this new wrapping paper we have started the exceptional full-automatic wrapping machine for CCP, which has an automatic labeler, a palletizing robot, etc.
In this report the characteristics of our new original wrapping paper and our operation experience of the full-automatic wrapping machine are presented.

An Application of AS/RS to Paper Mills

Tsukasa Oohashi and Yousuke Suga
Ishikawajima-Harima Heavy Industries Co., Ltd.

Abstract
AS/RS systems enable to reduce the handling work, to improve the efficiency of storage and to computerize the stock control. These characteristics can automate the intermediate buffer storage between two processes as well as store the products before delivery.
This paper presents the examples of AS/RS applied to finishing process of paper mills.

GL&V/Kawanoe Zoki-Innovative Cooperation
-Pulp Processing Equipment (Celleco, Impco, etc), BTF Headbox System-

Junichi Yano, Kozo Kishida and Seiichiro Utatsu
KAWANOE ZOKI CO., LTD.

Abstract
The delivery record of BTF dilution system has been delivered to a total of 8 systems since Kawanoe Zoki started to manufacture and sell it under license from GL&V in Japan. All those are BTF system retrofit to the existing headbox without any rebuilding. The results are notable improvement in paper quality such as CD-BD profile and contributing to productivity enhancement such as wider sheet width and shorter grade change time than that of before.
Kawanoe Zoki deals in not only Paper machine technology but also technology in chemical pulping. We introduce Celleco Twister cleaner developed for energy saving and world-renowned Impco Hi-Q Knotter and Screen. In addition we show Compact Press and the relational equipment from our new business line of chemical pulping line which is consist of cooking, washing, oxygen delignification and bleaching, which have been developed by former Kvaerner.

Effects of the Air in Stock at Paper Production and On-line Air Content Analyzer

Takeshi Hanaoka
Savcor Japan K.K.
Matti Hakkinen
Savcor Process Oy

Abstract
Increasing production rate and requirement for quality, efficiency and environmental load make higher attention on entrained air and its detrimental effects on the paper making process.
The air content measurement principle introduced here is based on attenuation of ultrasound by air bubbles. This ultrasound method is a continuous, on-line measurement which can provide optimal control of de aeration, trouble shooting as well as process development.

Retention Aid for Fillers Using in the Process of Deinked Pulp Manufacturing

Kazushige Inaoka
Research & Development Dept., Paper Chemicals Division, Harima Chemicals, Inc.

Abstract
An inorganic particle called filler is added to printing paper for the purpose of improving optical characteristics and printability of the paper. However, the most of fillers are detached from pulp to water in the process of deinked pulp manufacturing, and it becomes the industrial waste in drainage process.
In such a situation, we started our research based on a concept to reduce the amount of waste in the drainage process, and developed “retention aid for fillers using in the process of deinked pulp manufacturing”. We think that this development could improve the retention of fillers dramatically compared with other coagulant and flocculant due to a formation of ionic macromolecule and an improvement of the interaction between this chemical and fibers, fines and fillers.
In this report, we introduce a characteristic and an effect of this chemical with showing application results at the actual machine.

The Cartridge Mechanical Seal for Pulp & Paper Plants

Hidekazu Takahashi
Customer Service Dept., EAGLE INDUSTRY Co., Ltd.

Abstract
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 seal is coming into wide use for work improvement, for being easy to handle and for installing correctly. And then the cartridge seal is used not only non-flushing use but non-cooling use in a plant. Additionally, the cartridge seal with emergency seal is developed for pulp pumps. When a mechanical seal doesn’t work and leakage starts, the emergency seal installed in the cartridge seal works and can use for a certain period. I will introduce the latest technology trend about the cartridge mechanical seal for the pulp &paper plant.

Performance and Function Requested for the Flaw Inspection System
- MaxEye. Next and MaxEye. REVO -

Yoshinobu Sugino
Strategic Planning Group, FUTEC INC.

Abstract
FUTEC INC. has sold around 5,500 Inspection Systems to such Paper Pulp Industry, Film Industry, Nonferrous Metal Industry, Non-woven Fabric Industry and Printing Industries, etc. for 30 years. FUTEC INC. developed two of the new Inspection Systems based on the know-how that has been cultivated and the needs/ wishes obtained from the market. One is MaxEye. next which is possible to correspond to the lines of various specifications flexibly. Another is MaxEye. REVO which the detection ability of faint line irregularity/unevenness was strengthened. FUTEC INC. makes the best proposal by two models to satisfy the demand of the diversified customers.

kajaaniWEM & kajaaniRM3
- The Most Modern Solutions for Paper Making Process -

Jukka Nokelainen and Takeshi Sato
Process Automation Systems Division, Metso Automation

Abstract
This paper introduces two lately launched superior tools for wet end management: modular multi talent analyzer and consistency sensor. The consistency sensor is stand-alone device that performs continuous measurements from one sample point. It is ideal for applications that require continuous total and true ash consistency measurement and automatic control. The new analyser is first in the world that provides papermakers with all the right and relevant wet end measurements. Here we describe by several living examples of charge, redox, pH, conductivity, temperature and consistency measurements, how to get comprehensive understanding over paper making and point out process problem areas and find right actions to correct them.

Estimation of Timber Volume in Eucalyptus Plantations Using Satellite Images

Toru Katsura
Corporate Planning Department, Mitsubishi Paper Mills Ltd.
Pranab J. Baruah, Takahiro Endo and Yoshifumi Yasuoka
Institute of Industrial Science (IIS), The University of Tokyo

Abstracts
Accurate estimation of timber volume in commercial plantation can serve the industry as well as the environment than sustains them. A robust estimation methodology will help the plantation industry to efficiently manage this costly and long term investment to get the utmost return. Here, we investigated an approach to estimate timber volume in several Eucalyptus globulus plantation plots of varying ages in Chile.
Empirical relationships between temporal satellite imageries (Landsat ETM+) derived spectral feature and timber volume were investigated. A total of 12 Landsat ETM+ scenes, both radiometrically and geometrically corrected, were selected to match with the dates of ground truth allometry data. Landsat ETM+ has a ground resolution of 30 meters with a swath width of 185 km and visits the same position of the earth every 16 days making it suitable for monitoring plantations throughout a longer period of time with reasonable costs. Allometry data from a total of 8 plots spanning over four years (1999 ～2004) were used. The area of the plots ranged from 30 to 150 ha and trees were planted between year 1992 and year 2000. Allometry data included diameter at breast height (DBH), height of tree (H) of individual trees at selected subplots (0.02 ha) within each plot, collected by plantation management staff.
Mid-IR band 5 of ETM+ followed by the green band of ETM+ has the strongest correlation with timber volume for our study area. Out of several vegetation indices, Specific Leaf Area Vegetation Index (SLAVI), which uses mid-IR band 5, showed strongest linear relationship with volume. The best relationship was used to estimate total volume in each plantation plot and to produce spatial volume map. Comparison between total estimated volume and actual observed volume at each plot showed the estimation accuracy was considered satisfactory. Spatial maps could be of importance for efficient forest management.

Keywords: plantation, timber volume, satellite, Landsat, vegetation index

TOF-SIMS Analysis of the Bleeding of Organic Compounds to Pulp Fiber Surface

Hiroto Higashi, Toko Nakamura and Masayuki Omatsu
Material Analysis Center, Oji Paper Co., Ltd.

Abstract
It was commonly found that the aging and the manufacturing conditions were influenced on the surface properties of the paper. We assumed that the change of the surface properties was caused by the bleeding of the low-molecular-mass compounds to pulp fiber surface. In order to confirm this assumption we carried out the surface analysis of handsheets using XPS and TOF-SIMS.
A handsheet was prepared from a hardwood pulp. TOF-SIMS and XPS analysis showed that the bleedable compounds, such as C-C chemical bonds increase on the surface of the sheet at high temperature.

Keywords: bleeding, pulp, surface analysis, TOF-SIMS, XPS

2008年3月　紙パ技協誌
[プリント用ページ]
JAPAN TAPPI JOURNAL March 2008

Vol.62 No.3 CONTENTS

2008年3月　紙パ技協誌
[プリント用ページ]
JAPAN TAPPI JOURNAL March 2008

Vol.62 No.3 Abstracts

Recent Trend of Information Technology

Seiichi Shin
The University of Electro-Communications

Abstract
IT (Information Technology) is developed in the former Century, as G Hz processing, G bps communication, and G B storage. Ability of machines with computer have been already overwhelming human beings. How to use IT, is a key factor in factories of the 21st Century. Utilization of IT is introduced here and a future of IT is forecasted as integration of material, energy, and information.

Law and Regulation Trend for Machinery Safety and Safety Measures for Production Facilities

Takahiko Arai
OMRON Corporation, Industrial Automation Company, Business Promotion Section, Safety Devices Sales Dept., Sales & Marketing Division HQ

Abstract
For the domestic manufacturing industry, it is important management subject to ensure Machinery Safety in a production activity. There are two reasons. First reason is the change of law or international standards for Machinery Safety. Second reason is change of social concern of machine safety. As background, accidents occur frequently in our daily life such as train, elevator, and revolving door and so on. So safety is increasingly treated as a general problem. In the case of the manufacturing industry, we have avoided the danger by means of a telepathic communication. The reason for having functioned well is all workers were well-trained and many experts were in factory. However, part-timers or temporary workers are increasing in recent production line.
From these change, it is very important to take measures of preventing accidents in factory.
In addition, revised Industrial Safety and Health Law was enforced in April, 2006. Changing of regulation and social concern, we need to take suitable machine safety method.

Development of Field Operation Assistance for Oil Refineries

Go Suzuki, Youichi Nishi, Michitaka Kosuge and Hodaka Nishiyama
Toyo Engineering Corporation

Abstract
In these years, industry accidents are unfortunately increasing and a social request to prevent these accidents are increased. We have developed a system to assist field operator's operational activities and to find out their operational know-how by which we could educate operators effectively. The system consists of an explosion proof wireless wearable device, which are a camera on a helmet, acceleration sensor, battery and radio, and database and data analysis systems, which find out the information recognized the attended situation of the work position / posture / scene of the field operator by human behavior analysis algorithm. We could extract scenes in which characteristic of operator behavior were different from the daily work, since we could store observed data automatically and search them using the results from the human behavior analysis algorithm.

An Example of Applying the Model Driven PID Control for a Boiler Control

Michihiro Fujiyama
Yatsushiro Mill, Nippon Paper Industries Co., Ltd.

Abstract
PID control is the most typical algorithm for process controls. Since the time of pneumatic instrumentation, it is familiar control algorithm that has wide adaptability until today. And it also will be used in many processes for the future. On the other hand the Advanced PID control has been generalization with the development of digital control and computer technology like a DCS. It is more useful technology for the making stable operation and increase efficiency by using the new control concept or improved PID control. Nowaday many control algorithm has been developed.
In this paper we show the result of improving turbine efficiency and reduced the energy by installing the Model Driven PID (MD-PID) Control for the main steam pressure and main steam temperature control of a coal boiler in Yatsushiro mill.

Introduction of Non-contact Caliper Sensor

Hiroaki Sakaguchi
Yonago Mill, Oji Engineering Co., Ltd.

Abstract
There has been a large demand of the improvement in the thickness measurement for coated paper for many years. Especially for the higher grade white coated board, the contact caliper sensor is not a best fit due to its marking problem on the coat surface.
The improvement of the contact which physically contacts with paper has been struggled to avoid marking on the paper by changing the contact materials and/or contact pressure. But they deteriorated measurement accuracy and finally have not become the solution.
In May 2006, upgrade of QCS from Honeywell MXOpen to the latest DaVinci system was done for 3M/C in Yonago Mill. At that timing, Honeywell had just announced the release of non-contact caliper sensor and we decided to apply this in this upgrade.
Honeywell's non-contact caliper sensor is the technology using laser to measure the thickness without contact and best fit for the sensitive paper surface. The caliper measurements for the grades for which have not been done before due to the marking would bring large benefit and effect.
In this article, the actual application of Honeywell's laser caliper sensor would be reported with measuring data.

Introduction of Non-contact Caliper Sensor

Naohiro Kosugi
Takaoka Mill (Nohmachi), Chuetsu Pulp & Paper Co., Ltd.

Abstract
The measurement of the paper thickness is one of the most important factors for paper quality. According to the progress of the paper manufacturing technology, evolution of sensor technology becomes to be required. For example, the operating condition of the contact caliper sensor becomes more severe due to higher speed machine and higher temperature in calendar.　The problems of the contact caliper sensor are making flaw on the paper surface and the shorter life time. So the non-contact caliper sensor has been expected, which eliminates these problems.
For N1 machine in Takaoka Mill, the old QCS (Vision 2002 UT) provided by Honeywell was upgraded to their latest model of DaVinci QCS in May 2006. Honeywell started the development of non-contact caliper sensor using laser beam more than 10 years ago and the complete laser caliper sensor developed was released in June 2006. So in November 2006, we decided to apply this new laser caliper sensor to Honeywell DaVinci QCS with expectation of the eliminating the problems of the flaw on the paper surface, abrasion of sensor contact surface and accumulation of the pitch on the sensor contact surface.
We would therefore like introduce the results of this application which is the first experience for the uncoated paper and the challenges for the future application.

Selection of Web Defect Inspection System for a Board Machine

Kenji Nishimura
Nippon Daishowa Paperboard Yoshinaga Co., Ltd.

Abstract

Yoshinaga Mill 50m/c produces mainly white lined chipboard (WLC). (White lined chipboard (WLC) is called "coat white ball" in Japan). About 80% of the Products are used for Food and Medicine Packaging. So, DefectLesson the web is one of the most important qualities. Recently User's demand for the quality was more and more severe than before. And some users point out "present inspection systems on board machines can't find any Particular kinds of defect"

Therefore we studied some new inspection systems and we selected the one among them, renewed an old system. We present the details of the study and selection.

Operation Experience of Mobile DCS and Its Future Development

Akihito Takahashi
Nayoro Mill, Oji Paperboard Co., Ltd.

Abstract

At Nayoro Mill, there are two paper machines and three pulp production lines. In each line of operation has been carried out by YOKOGAWA ELECTRIC DCS "CENTUM CS3000 Small and CS1000".

During Mill shutdown from late 2006 to early 2007, pulp division was reorganized for the sake of labor-saving. To curry out mutual support for each pulp production line, three of pulp DCS and DCS for 2M/C Stock Preparation were completely integrated. At the same time, Mobile DCS system was newly added on the integrated DCS.

Using Mobile DCS, an operator bringing mobile PC can operate process wherever possible outside of Central Control Room. At Nayoro Mill, four wireless LAN terminals and twenty Access Point have been installed. From the beginning of introducing Mobile DCS, it is really effective for checking control loop and monitoring. At this time Mobile DCS is essential tool for Grade Change and other action for process troubles.

This article reports introducing process and the effect in service of Mobile DCS, and remarks about its future development.

The Introduction of On-line Dirt Analyzer for Recycled Fiber Process

Satoshi Tanaka
Hokuetsu Paper Mills, Ltd., Niigata Mill

Abstract

Hokuetsu Paper Niigata Mill has two recycled fiber processes. The A-line, started up in 1991, was rebuilt several times to receive increasing recycled fiber utilization. In addition, B-line started up in 2004.

The key of recycled fiber quality is dirt and brightness. Especially for dirt analysis, fiber samples must be picked up every hour before B-line startup and that was heavy task for operator. Therefore, on-line dirt analyzer was required for new recycled fiber process and examined the best type for the B-line. As a result, the on-line dirt analyzer the type of which makes pulp sheet was adopted.

This report describes the process of studying analyzer and analyzing condition at work.

The New High Precision Gamma-ray Density Meter PH-1000: Certificated by MEXT

Hiraku Miyashita
Nanogray Inc.

Abstract

Before 2005 exemption level of sealed gamma-ray(-ray) source activities is 3.7MBq in Japan. Radiation protection regulation of Japan was changed and the exemption level was reduced in 2005. At that time, new certification system was started by MEXT. The certificated equipments can be used without any license and controlled area. All products of our -ray density meters, -ray level gauges and -ray level switches had the certifications from MEXT.

Nanogray Inc. introduces brand-new certificated -ray density meter PH-1000 and PM-300. PH-1000 is precise and has only 0.2～0.28% error @ 2. PM-300 is light (6kg), tiny and can be changed applied pipe size in a moment. Density meter PH-1000, PM-1000 and PM-300 can be applied density measurement of black liquor, green liquor, lime mud, calcium carbonate, and white carbon etc.

Advanced Winder Adviser Controlling to a Winder Operation

Noriyuki Watanabe
Cognex K.K.

Abstract
The quality and process improvements associated with the SmartView Paper Web Inspection System and Advanced Winder Advisor (AWA) package are highlighted. AWA can control to a winder accurately, using inspection data and synchronization by SmartView Paper web Inspection system. The results are (1) Stopping at desired defects within ±10 cm, (2) Reduce winder operation time.
SmartView and Advanced Winder Advisor package allow users to have best performance of inspection and winder operation.

Drainage Meter in the Forming Section
- Introduction of "Fiber Scan Mk II" -

Yoshiyuki Kawabata
Customer Service, NOMURA SHOJI Co., Ltd.

Abstract
CRISTINI invested three years in the development of a new measuring instrument called FiberScanTM that utilizes innovative measuring qualities. FiberScanTM is a new measuring method based on microwave technology for drainage measurements in forming section.
Through this method it is possible to find out very quickly the periodical variations (pulsations) in forming section. With this instrument it is possible to make pulsation studies very quickly and uncomplicated.

Relationships between Macroscopic Paper Structure and Water-Absorption Behavior

Kuntinee Suvarnakich
Department of Imaging and Printing Technology, Faculty of Science, Chulalongkorn University, Bangkok, Thailand
Toshiharu Enomae and Akira Isogai
Graduate School of Agricultural and Life Sciences, The University of Tokyo

Abstract

Macroscopic structure of paper influences how paper behaves in many ways. In this research, the relationship between macroscopic paper structure and water absorption behavior was investigated. The structure of the handsheets made from commercial hardwood pulp was modified by varying basis weight, beating levels and wet press levels. The structural properties as well as the water absorption properties were measured. The results from contact angle measurement showed the same trend as the results from the automatic scanning absorptometer. Water absorption behavior greatly depends on surface structure. Smooth surface results in easy spread of a water drop and an increase in contact area. Any factors that change the paper surface structure will likely result in changes of its water absorption behavior as well. For surface chemistry, an increase in basis weight produced sheets with higher sizing agent (AKD) retention, thus causing higher contact angle of a water drop.

Keywords: Automatic scanning absorptometer, beating, contact angle, water absorption, wetpress

Analysis of Oil Stain on Paper by Charged Aerosol Detector

Masayuki Omatsu
Material Analysis Center, Oji Paper Co., Ltd.

Abstract
Recently developed Charged Aerosol Detector (CAD) for HPLC is useful as an universal detector for analysis of non-volatile, pyrolysis, polar compounds, as well as no UV・VIS absorption compounds. In case of analyzing of oil stain on paper samples, the origin of stain could not be specified even if standard oil samples were available in some cases. In this paper, a new method for analysis of oil stain on paper using the CAD will be reviewed.

Keywords: Charged Aerosol Detector (CAD), HPLC

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Vol.62 No.4 Abstracts

Mass Production of Eucalyptus globulus Elite Trees in Western Australia

Keiichi Shimizu
Forestry Science Research Laboratory, Nippon Paper Industries Co., Ltd.

Abstract

Nippon Paper Industries has developed the clonal propagation technology of E. globulus by tissue culture to supply a high yield, quality, survival rate and uniformity for plantation purposes. Selection of E. globulus tree, which were excellent in growth and tolerance to aridity, was performed in Western Australia. Trial mass production was done by using these elite trees and elite tree candidates.

In tissue culture, red light by the Cold Cathode Fluorescent Lamp was used as a new light that changed into current fluorescent lamp. The rooting term and the growth term were shortened by using this.

For the difference of growth by the quality of the soil and the planting density, trial plantations of clones were started in Western Australia.

Development of Reforest Technology Giving Environmental Stress Tolerance to Tree

Takayuki Asada
Forestry Research Institute, Oji Paper Co., Ltd.

Abstract

This theme aim at the development of the afforestation technology that reforest the region where the environmental stress is severe by the method of the environmental stress tolerance handily given to the tree according to fertilizing and/or chemical spray. Cytochrome P450 inhibitor such as Uniconazole-P gave the environmental stress tolerance to the eucalyptus. Uniconazole-P that showed the environmental stress tolerance giving action inhibited the metabolic speed of the abscisic acid which controls the environmental stress response. Uniconazole-P processed (0.025mg/plant) eucalyptus showed the stress tolerance, and the amount of initial (3.5 months) growth (dry weight) of plant under strong light environment increased to 1.5-2.3 times that of the control experiment. Uniconazole-P is a compound with high safety, which is registered as an agricultural chemical in Australia, and immediate effect for practical use would be expected.

Development of Energy-saving Flotator

Shintaro Sasada
Pulp Division, Tomakomai Mill, Oji Paper Co., Ltd.

Abstract

The rate of using waste paper exceeds 60% in 2003, and in order to raise it continually, we should expand the utilization of paper instead of board. Therefore, it is important to improve quality of deinked pulp and to save energy of deinking system. A flotator is one of the major deinking processes, which spends a lot of energy. In this presentation, the development of new flotator with reduced energy consumption is reported.

One of the features of the conventional OK-flotator is its cell structure enabling high efficiency of deinking. On the basis of this cell structure, we focused on two important factors of deinking to reduce energy consumption; the contact of bubbles and pulp slurry, and the separation between bubbles and pulp slurry. The new flotator has structure which enables pulp slurry to contact with plenty of bubbles that are filled in a particular area, and stabilizes both upper region of slurry and froth layer. And it has three rooms to increase the contact and the separation. As a result, this new flotator realizes the 60% reduction of both the energy consumption and the volume, compared to the conventional OK-flotator.

Liner Machine Operational Experience of Octopus CP Control

Takaaki Abe
Kitakami Paper Co., Ltd.

Abstract
We introduced an Octopus System of Kobayashi Engineering Works, Ltd. as 1st. practical system in Japan for the purpose of improving the basis weight profile in cross direction and shortening the adjustment time required. All system is excellently running at present. We report the operational experience of this system since the start-up.

Combustion Improvement of Recovery Boiler

Kenji Nozaki
Ebetsu Mill, Oji Specialty Paper Co., Ltd.

Abstract
No.5 boiler of Oji Specialty Paper, Ebetsu Mill, Japan is a main recovery boiler in the mill, and was modified for Performance improvement since its construction of 1972.
For the reason of high cost of oil these years, further energy conservation becomes urgent top priority subject for us.
We installed well proven Stacked Air System (SAS) of Anthony Ross (USA) to our No.5 Boiler in Oct. 2006 for combustion improvement and energy saving, which was the first trial in Japan.
The result was to our full satisfaction in the various respect such as Economical merit, Increase of Through put, Reduction of Carry over Rate, Excess O2 Reduction, Improvement of Thermal Efficiency, Improvement of Steam production/Black liquor Ratio, Reduction of Air Heater Steam, Reduction of Soot Blower Steam Consumption, Improvement of Chemical Reduction Efficiency, Reduction of Burnable Gas, Less Emission/TRS and Prolonging of Run time.
The installation work could be completed within the shut down time of 11days. We would like to introduce our experience about the combustion improvement work with SAS, including the economical effect and the outline of the modification of the system.

Operating Experience of Biomass Power Plant

Norikazu Baba
Kanto Mill (Katsuta), Hokuetsu Paper Mills, Ltd.

Abstract
Our Kanto Mill Katsuta division is located in the north in Ibaraki prefecture.
Number 1 power plant of the fuel oil use which is being operated since factory establishment up to now was doing energy supply by only one system. Introduction of new equipment was also urgent business as a production cost measure in addition to shake from production activities of CO2 reduction and fossil fuel dependence.
Necessity in the energy plant where more correspondence to working old replacement of facility and the use energy with the factory production amount rise increase is tight and new than the factory establishment time has occurred.
The form of "thermal recycling" for which a demolition wood is utilized as fuel as well as the "material recycling" which uses a recycled paper for a cardboard raw material from the past are complete by this biomass power plant, and the value as the resource circulation type factory is going to rise more.
It's introduced about experience from introduction to commercial operation.

Energy Saving Case of Waste Water Treatment Facility

Eiichi Aisa
Fuji Mill, Oji Paperboard Co., Ltd.

Abstract
Nowadays, environmental destruction, especially the global warming caused by the increase of CO2 emissions, has been one of the biggest problems in the world, and to make proactive energy-saving efforts is the important issue for paper industry as a heavy energy-consumer.

While active and effective measures has been taken for production line and power generating unit where large amount of energy is required, adequate measures has not been taken for effluent treatment facility.
There were aeration route blowers for bio-treatment installed in the effluent treatment facility, however, route blowers had problems of high electric power consumption, noise, and vibration, and countermeasures to improve such circumstance were required urgently.

I would like to introduce how we achieved to save electric power and to reduce environmental load by replacing the route blowers with K-TURBO's HIGH-EFFICIENT TURBO BLOWER.

Development of New Generation Newspaper, "PlusNews"

Hiroshi Shimase
Tomakomai Mill, Oji Paper Co., Ltd.

Abstract

New media such as Internet have significant impact upon Japanese newspaper industry these days. Newspaper publishing companies are trying to increase color pages in their newspaper to secure more customers who expect the greater effect in their advertisement. Oji paper has moved forward to R & D with a rapid improvement on color printing quality compared with standard newspaper.

A couple of novel technologies, such as "Super White Carbon" and "Fine Plus Coat" have successfully developed. White Carbon (Hydrous Silicic Acid) is an effective filler which prevents print through. "Super White carbon", manufactured in controlled conditions, has superior performance to the conventional one with less addition ratio. "Fine Plus Coat" remains ink on the surface of the paper and is able to obtain greater printing quality compared with standard newspaper.

New generation newspaper "PlusNews" consists of these two key technologies to achieve extreme printing quality and was brought to market officially last fall. Half of the production of Oji's newspaper has already been replaced from conventional newspaper to "PlusNews" as of June 2007, and replacement would be completed by the end of this year.

Development of Lightweight Coated Paper for On-demand Printing

Hisahiro Omote
Nippon Paper Industries Co., Ltd.

Abstract

The market of on-demand printing in printing industry is expanding these several years. In recent years, with high speed on-demand printing machine of electrophotography that utilizes flat sheet, the opportunity to print on coated paper is increasing. Furthermore, the requirement for lighter coated paper is getting stronger.

However, coated paper, especially light coated paper with low stiffness, led problem of poor runnability because coated paper was easy to stick to toner transferring part and toner fixing part within printing machine compared with wood-free paper.

In order to solve this problem, light weight coated paper for on-demand printing was developed by mixing a new stiffness improving reagent (Polyacrylamide) with good coating aptitude to coating color. This light weight paper for on-demand printing combines the good on-demand printability (printing quality, runnability) with the excellent offset printability, and is also designed to provide the easy-of-use by operator.

Development of Hydrothermal Reaction Solidification of Paper Sludge Ash

Hirotoshi Takeya, Toshiyuki Nago and Masahiro Sasaki
Kushiro Mill, Nippon Paper Industries Co., Ltd.

Abstract

Paper sludge is mainly the waste of de-ink pulping plant and is burned in sludge boiler to recover energy and to reduce its volume. Sludge boiler ash is utilized as the raw material to produce cement, but the amount of sludge boiler ash increases due to the increase in the capacity of de-ink pulping plant. Therefore it becomes more and more important to develop other processes using sludge boiler ash as raw material.

Recently, we have developed a harmless product by hydrothermal reaction solidification of boiler ash and have been making an effort to enlarge the usage of this new product.

A Report on 2007 TAPPI Engineering, Pulping & Environmental Conference (2007 EPE Conference)

Iori Tomoda*1, Shinichi Onogi*2 and Hiroshi Araki*3
*1Oji Paper Co., Ltd.
*2Nippon Paper Industries Co., Ltd.
*3Japan Pulp and Paper Research Institute, Inc.

Abstract
The 2007 Tappi EPE Conference was held on October 21-24, 2007 in Jacksonville, FL, USA. The 435 people from 17 countries including Japan, Sweden, Finland, Brazil, China, Canada and USA, participated in the conference. The 101 papers including two Japanese papers were presented in 51 sessions. The topics of engineering, puling and environmental divisions of the conference were reviewed in this report.

Effects of Cooking Conditions on the Bleachability of Bamboo Kraft Pulp

M. Sarwar Jahan, D. A. Nasima Chowdhury and M. Khalidul Islam
Pulp and Paper Research Division, BCSIR Laboratories

Abstract
The bleachability of kraft pulp from wood has been the subject of several reports, but little effort has been made to assess the bleachability of nonwood pulp. This study evaluated the cooking conditions, such as active alkali charge, cooking time and sulphidity on the bleachability of bamboo kraft pulp. We cooked bamboo chips to kappa number around 20 by alternating cooking variables. We then quantified pulp yield, and evaluated pulp quality through measuring unbleached brightness, viscosity, pentosan, ?-cellulose and phenolic hydroxyl group (PhOH) content in the residual lignin of pulp. Pulp produced at higher active alkali charge and sulphidity had higher pulp yield, higher ?-cellulose, viscosity and lower pentosan in pulp and higher PhOH content in the residual lignin. After oxygen delignifying the pulp, bleaching was done by DED or QPP sequence. Degree of oxygen delignification had no relationship with the cooking conditions. The bleachability of pulps was determined by measuring consumption of chlorine dioxide to attain 80 % brightness level. The bleachability of pulp was improved when pulping was done in higher active alkali charge and sulphidity. The bleachability of bamboo kraft pulp showed a direct relationship with PhOH content in the residual lignin.

Keywords: Bamboo pulp, active alkali, Suphidity, Bleachability, Brightness, Phenolic hydroxyl group

Development of Manufacturing Process for High Quality Calcium Carbonate by Causticizing Process in a Kraft Pulp Mill (Part4)
- Investigation of Continuous Reaction for Rice-like Particles -

Yasunori Nanri,　Haruo Konno and Hideyuki Goto
Pulp and Paper Research Laboratory, Nippon Paper Industries Co., Ltd.
Yasuhiro Okamoto
Ishinomaki Mill, Nippon Paper Industries Co., Ltd.
Kazuto Takahashi
Gotsu Mill, Nippon Paper Chemicals Co., Ltd.

Abstract
Precipitated calcium carbonate is produced as a by-product in the causticizing process of the kraft pulping process. There are many advantages to use this by-product, causticizing calcium carbonate (CCC), as filler and coating pigment in paper. By using this CCC for paper materials, lime-kiln operation would be reduced or eliminated, resulting in the reduction of fuel oil for calcination of calcium carbonate. Furthermore, accumulated impurities in the lime cycle can be removed constantly. In our previous reports, we showed that CCC particles with a various kind of morphology were obtained by separating and precisely controlling the two reactions of slaking and causticizing in the causticizing process. Among these morphologies, rice-like particles can be produced with the least process modification. Thus, the production trial of rice-like particles at mill scale was done and then the industrial production of the rice-like CCC was succeeded.　However, this production process was based on the batch reaction. Continuous reaction is preferable compared to batch reaction in industrial process. Therefore, in this report the production trial of rice-like particle by continuous reaction at laboratory and mill scale plant are carried out. We found that rice-like particle with low wire abrasion ratio can be produced at mill scale plant by controlling the residence time of slaked lime slurry and green liquor at first causticizing tank.　Moreover, filtration properties of CCC are also improved by the additional feeding of slaked lime slurry and green liquor to #3 tank.

Keywords: Causticizing reaction, calcium carbonate, continuous reaction, mill trial

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Biorefinery in the Pulp and Paper Industry

Keiichi Nakamata
Technical & Development Div., Hokuetsu Paper Mills, Ltd.

Abstract

Technological development of biorefinery is being proceeded all over the world. Biorefinery is the technology which creates bioethanol and plastic from biomass as the raw materials, and it aims for an action to oil resources drying up and global warming prevention. Raw materials of biorefinery are mainly sugar, corn, cellulose-based material and so on. The use of cellulose-based material as a biomass is dominant in order to avoid competition with provisions.

Technology of the pulp and paper industry is applicable to cellulose-based biorefinery.

Energy Saving by “Intensa Pulper” of Stock Preparation System

Takeshi Murakami
Research & Development Dept., Voith IHI Paper Technology Co., Ltd.

Abstract

In recent years, various technical innovation was achieved in the field of secondary fiber system. As result, power consumption of the secondary fiber system has been reduced to 100 to 130kWh/T from 200kWh/T of more than ten years before. Such improvement has been mostly derived from progress of the screen technology, particularly the LP Screen that was developed by Voith IHI Paper Technology (VIPT) is significantly contributing to the progress.

Regarding the low consistency pulper which will be most important machine as well as the screen in the secondary fiber system, there have been few technical innovation for about 30 years. However, the Intensa Pulper which has been developed and released by VIPT is really innovative machine and might change the design concept of the secondary fiber system from now on. Energy consumption of the OCC treatment system is now going to be reduced to 50kWh/T by application of the Intensa Pulper.

Steam Saving by Waste Heat Recovery from Machine White Water

Tomoyuki Sakashita
Mitsubishi Paper Engineering Co., Ltd.

Abstract

We have taken measures to reduce the energy consumption as one of the environmental improvement plan based on ISO 14001 standard in the Hachinohe mill of the Mitsubishi Paper Mills, Ltd. Company since 2001.　And the target of the plan is to reduce the ratio of steam and electricity consumption to the paper production in the mill at the rate of 1 % every year.

Therefore we investigated the actual conditions of processes in the mill and made a plan to save water from the point of view of decreasing the amount of heat loss in waste water from the mill in order to reduce steam consumption. Based on the plan, some measures have been carried out since 2002.

In this paper we describe the way to make the best use of hot water from machine white water and how to make compact of a filter plant which is for recycling white water from paper making process.

Introduction of Latest Energy-saving System for Waste Paper Treatment
-Possibility of Energy-saving for Pulper, Screen and Refiner-

Kazuo Aoshima
Aikawa Iron Works Co., Ltd.

Abstract
Recently saving energy is most important target in the pulp and paper industry in Japan because of CO2 exhaust amount reduction. There are many machines to use big power at stock preparation. Therefore we would introduce a result of energy saving by our new technology for Pulper, Screen and Refiner.

Energy Saving by Installing the New Model of Refining Plate

Tsutomu Otani
Ishinomaki Mill, Nippon Paper Industries Co., Ltd.

Abstract
In the pulp refining process, generally double disk refiners (DDR) are installed.
Pulp refining needs much energy, so that to develop energy saving technology of pulp refining is one of the most important objectives. However, energy saving technologies of pulp refining sometimes causes pulp strength declining, so that the balance between energy saving and pulp strength is very important.
Recently, the new model of refining plates "FineBar (Aikawa Iron Works Co., Ltd.)", which is made by stainless steel and has 1mm-width blade, was installed into our DDR for bleached hardwood kraft pulp. This installation results power consunpution is decresed even though pulp strength is maintained.
In this report, we introduce a case of saving energy by installing the new model of refining plate.

Energy Saving and CO2 Reduction Case in Power Plant
-Boiler Fuel Conversion by Installation of LNG Satellite Facilities and Installation of High Efficiency Steam Turbine-

Tadashi Arifuku
Tonegawa Mill, Rengo Co., Ltd.

Abstract
In line with increasing social demands on environmental conservation, Rengo has established Eco Challenge 009, a document setting forth our environmental vision, and is implementing resource and energy savings activities. As part of our efforts, Rengo targets to achieve 12% reduction of CO2 emissions from the 1990 level by 2009.
This paper will introduce LNG satellite facility and high efficiency steam turbine installed at Rengo Tonegawa Division. The effect of fuel conversion and high efficiency turbine installation, such as reduction of CO2 emissions, will also be examined.

Steam Saving by Pre-evaporator System

Tomoya Kujime
Takaoka Mill (Noumachi), Chuetsu Pulp & Paper Co., Ltd.

Abstract
The necessity for energy-saving is increasing increasingly with the jump of the fuel cost not stopping. With the exception, there is also no pulp and paper industry and it is tackling each company energy-saving. As one of many of the energy-saving measures, pre-evaporator was installed at the Takaoka mill in May, 2007, and it is working formally from June.
A main subject reports the energy merit by steam saving by it. This system installs 3 stages plate-type evaporator, a vacuum pump, and a condenser after flush cyclones.
Black liquor extracted from digester repeats a self-flush by three steps of flush cyclones, and is led to pre-evaporator. Then, it is condensed about 2 percent by the solid base, and is sent to main evaporator. The vapor condensate from the flush cyclone is separated into the high B.O.D. liquor and the low one：therefore this system makes processing of the foul odor water the minimum.

Energy Saving by Changing Operation Range of Sootblowing Extracted from Steam Turbine

Takehiro Tanaka
Niigata Mill, Hokuetsu Paper Mills, Ltd.

Abstract
The prevention global warming and the saving energy are increasing their importance. In recent years, the attempt for saving energy such like reducing the consumption and improving the cost due to rising prices of fossil fuel have became an important issue. Hokuetsu Paper has actively worked on improving resource and saving energy based on the fundamental philosophy and principle in “Hokuetsu Paper Environmental Charter”.

In April 2005, for the purpose of reducing the environmental load and highly effective operation, No.8 power generator was built. The power generator consists of soda recovery boiler which has the biggest black liqueur solid resolve capacity in Japan and an 85Mw steam turbine. In February 2007, No.3 biomass boiler which burn the paper sludge, the RPF and the waste wood chip was built, which works more on reducing fossil fuel and minimizing environmental load. In changing the plant operation, effective management and saving energy in power supply section is the biggest issue in all over companies.

In this study, increasing extracted steam power generation by expanding the operation range of first extracted steam in No. 8 steam turbine and energy saving examination which reducing sootblower steam flow are introduced.

Development of High Performance De-inking Agent
-LIPOBRIGHT Series-

Tomoyuki Nogawa and Takashi Tanaka
Paper & Pulp Group, Specialty Chemical R&D Department,
Research & Development Division, NICCA CHEMICAL CO., LTD.

Abstract
It is important to use regenerated pulp not only to protect forest resources but also to prevent global warming by control of carbon dioxide exhaustion. In paper manufacturing industry, technologies of recycle paper have progressed and high quality regenerated pulp is produced a lot with user’s specific needs. Such recycling resources have become important more and more. On the other hand, profits of the used paper decrease because of sudden rise of oil price and increase of export amount to China. Therefore, development of high performance and high efficiency de-inking agents is strongly demanded. We have developed LIPOBRIGHT DP-100 series recently. Those have so high de-inking property that realizes reduction of the usage compare to conventional de-inking agents. Those impart stable de-inking operations because of less sensibility of temperature changes at flotation stage. We report herein newly developed LIPOBRIGHT DP-100 series.

Material Retention: A Novel Approach to Performance of Pigment Coating Colors

Ken McKenzie, Anne Rutanen, Jukka Lehtovuori, Jaana Ahtikari and Teuvo Piilola CP Kelco Oy

Abstract
Continually increasing machine coating speeds together with new coating color components have put more emphasis on the importance of the correct rheology and water retention of the coating colors to achieve good runnability and end product quality.
In the coating process, some penetration of the aqueous phase, to the base paper or board must occur to anchor the pre-coating to the base or the topcoat to the pre-coat. The aqueous phase acts as a vehicle not only for the binder, but also for the other components. If this water or material penetration is not controlled, there will be excessive material shift from the coating color to the base, before immobilization of the coating color will stop this migration. This can result in poor machine runnability, unstable system and uneven coating layer, impacting print quality.

Rheology modifiers or thickeners have tended to be evaluated on the performance of the coating color by the term, “water retention”. This simple term is not sufficient to explain performance changes during coating. In this paper we are introducing a new concept of “material retention” considering the control of all of the movable material including water in the coating color. Controlled material retention leads to uniform z-directional distribution of coating color components. The changes that can be made to z-directional uniformity will have positive effects on print quality as measured by ink setting properties, ink gloss, mottling tendency, surface strength, optical properties, such as light scattering, whiteness and light fastness delivery should be improved.

Endless Challenge for Longer Bearing Life

Kunio Osaki
Schaeffler Japan Co., Ltd.

Abstract

General speaking, all bearing manufacturer has been trying to improve bearing life time. In these 4-3 years, after integration of INA and FAG, Schaeffler has been trying to improve bearing life time based on surface modification, and successfully improved bearing life time by 50% - 70% as a result of combining INA/FAG production technology. Schaeffler would like to report about contents of longer life(X-Life) version.

Case Study of Energy Saving Using OSIsoft PI System -Energy Management System Using the RtPM Platform-

Shizuo Itoh
OSIsoft Japan KK

Abstract

In recent years the efficient management of the energy usage is becoming increasing critical to company profitability. Industry leaders are looking for methods to gather and analyze energy usage data in real-time rather than just tracking energy costs versus production on periodic basic.

Using the RtPM (Real-time Performance Management) platform from OSIsoft, several industry leaders are building cost effective energy management systems for automatically gathering, analyzing and reporting data on energy consumption and costs in real-time.

The PI system has become one of the most successful and widely used RtPM platforms in the pulp and paper industry. This paper introduces about outlines of PI and case studies of energy saving application using PI.

A Report on the 8th Research Forum on Recycling

Shisei Goto
Nippon Paper Industries Co., Ltd.
Junsuke Kawana
Oji Paper Co., Ltd.

Abstract

The conference, “the 8th Research Forum on Recycling” was held in Niagara-Falls, September 23-27, 2007. The forum was jointly organized by PAPTAC and TAPPI and continued its history of cutting-edge research results on recycle fiber. There were approximately 150 attendees from around the world including 4 delegates from Japan. The programs had 13 sessions featuring 34 oral presentations including 2 panel discussions, one workshop regarding stickies, and two mill tours. The trends of presentations were summarized and notable researches were cited in this report.

A Study on Quantitative Determination of Fluorescent Brightening Agent Contained in Paper

Maiko Kaji, Toshiharu Enomae and Akira Isogai
Graduate School of Agricultural and Life Sciences, The University of Tokyo

Abstract

It is prohibited under the Food Sanitation Law to add fluorescent brightening agent (FBA) to paperboard for food packaging. However, a certain amount of FBA inevitably comes to be mixed in paperboard produced mainly from recycled pulp. For adequate decomposition or removal, quantitative determination of FBA was investigated. Logarithm of the fluorescence intensity measured by fluorescence spectrophotometer was almost proportional to the logarithm of the concentration in the range between 10 ppb and 10 ppm. Filter paper was dyed at pH 3 with FBA extracted at pH 9 from a recycled pulp. Fluorescence images of the dyed filter paper were acquired with a CCD camera. The logarithmic gray level of the images and the logarithmic concentration of the FBA solutions showed a linear relationship. With regard to FBA removal, although alkaline treatment up to pH 13.0 did not remove much of it, hypochlorite at 1 ppm was found to lower fluorescence intensity from 1000 ppb to approximately 1ppb as a corresponding FBA concentration. In the method of extracting FBA with superfluid CO2 followed by quantitative determination by high performance liquid chromatography, FBA was extracted almost completely in the alkaline condition in which water and organic base were added to superfluid CO2 as modifiers.

Keywords：Fluorescence spectrophotometer, food packaging, hypochlorite, stilbene, superfluid CO2

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Vol.62 No.6 Contents

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[プリント用ページ]
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Vol.62 No.6 Abstracts

Results of the Fiscal Year 2007 Follow-up to JPA's Voluntary Action Plan and Report of Energy Situation in the Pulp and Paper Industry in Japan

Osamu Inada
Japan Paper Association

Abstract

The Japan Paper Association (JPA) has been actively working to save energy since 1997 when it established its "Voluntary Action Plan on Environmental Issues". JPA declared its policy of restraining CO2 emissions as one of the actions: By fiscal year 2010, reduce fossil energy consumption per product unit for paper products by 13% from that of fiscal year1990 level, CO2 emission per product unit for paper products by 10%. By 2010, the in-and-outside country afforestation area owned or managed expand to 600,000 ha.

Since fiscal year 1990, JPA has been following through on the actual results of the unit of energy in the year, and has been publishing its results compared with that in fiscal year 1990. This report shows the results for fiscal year 2006 and the change of the targets in Action Plan as well as energy consumption, CO2 emissions and the position of the pulp and paper industry in Japan, and information related Kyoto Protocol.

The Energy Conservation Measure for Small Steam System by Using Technology of Screw Compressor

Yasuo Fukushima
Shinsho Corporation

Abstract

The method to generate electricity by using the decompression heat head of steam has been used in the industrial world from of old as an ideal energy form of use.
However, this is to be able to say to the large scale systems for a paper manufacture industry and a chemical industry, etc., and diffusion has decreased extremely additionally in a lot of small-scale steam systems. The reason is that a small steam turbine did not exist.

The Kobe Steel, Ltd. group was made the best use of the technology of the screw compressor accumulated over many years and succeeded in the development of the small capacity steam generator. It is expected that it is possible to contribute to the conservation of energy of the steam system of all fields by being able to generate electricity by the decompression heat head even in the area of the small flowing boiler said to be impossible so far.

Saving Energy for RGP Process at Iwanuma Mill

Yoshifumi Chiba
Iwanuma Mill, Nippon Paper Industries Co., Ltd.

Abstract

Based on Nippon paper Group's Charter on the Environment, Iwanuma Mill promotes saving energy and developing environmentally friendly technologies and products to cope with measures for global warming.

Iwanuma Mill produces 55,000t of High-quality newsprint and coated paper per month. The mill is equipped with four paper machines and one coater. The pulps produced at this mill are DIP, KP (LBKP/NBKP switching) and RGP (Refining-Ground wood-Pulp) and supplies almost all production.

Because RGP process needs an enormous power, the reduction of energy consumption is essential. However our RGP process has not been renovated since 1963. Therefore during 2002 to 2006 three major reconstructions had been carried out to renew obsolete equipment and to save energy.

As a result of these improvements, specific energy has been greatly reduced and the calculated amount of CO2 gas discharge reduced about 26,000t per year.

This report shows a series of examples in energy-saving achieved by the reconstruction of RGP process, including part of the work previously reported.

High Efficiency FAN

Hidemitsu Nagai and Yoshimasa Watanabe
Engineering Div., TERAL INC.

Abstract

For the global warming prevention, it is necessary to reduce the CO2 exhaust in the world scale.

Blowers are the main power consumption equipments such as the paper mill, ironworks, and the cement factories. The electric power and CO2 can be greatly reduced by making the highly effective blower.

Our company succeeded in the development of the highly effective blower that is the highest level in the industry.

This time, CTF3-OB/MOB turbofan (high-pressure type) and CMF3-OB mild fan (Middle-pressure type) blower series were turned on to the market. It introduces the domination of a highly effective blower with the episode of the development process.

Energy Saving by the High Efficiency Refiner Introduction

Kentaro Miyamoto
Osaka Mill, Oji Paperboard Co., Ltd.

Abstract

The rise of the recent crude oil price causes the rise of the energy cost for paper manufacture industry with a lot of energy. On this account, the profit has begun to decrease greatly in each paper manufacturer. In addition, we must hurry energy saving to prevent global warming by the use of the fossil fuel. In our company, it is a very important problem to decrease energy consumption.

In wastepaper pulp process of manufacture, it is the facilities that pulper, screen and refiner use a lot of energy. We carried out energy saving such as the introduction of energy saving facilities, the simplification of the flow, stop of the existing facilities and the intermittent driving in this factory. Besides, we introduced conical type refiner (Triconic Refiner/ Satomi Seisakusho Co., Ltd. - Pilao company) of the energy saving facilities. We introduce this energy saving effect.

A Thermal Insulation Reinforcement Example by the Vacuum Insulation Material Installation to the Coating Machine Dryer

Eishi Koizumi
Kanzaki Division, Oji Engineering Co., Ltd.

Abstract

The Kanzaki division on Oji Engineering Co., Ltd. is located in Amagasaki city, Hyogo Prefecture, and it is on the premises of Kanzaki mill, Oji Paper Co., Ltd. Amagasaki city is on the Osaka bay site, where Kanzaki river pours into and it is the tributary of Yodo river that the fountainhead is originated in Biwako.

The main job in our mill is to do the series of commissions that are from developments of basic plan to material procurements, constructions and the test runs also. Not only we should own the responsibility as the member in Oji Paper Co., Ltd. but having with the accumulated technology and/or the know-how in the constructions or the operations experiences from paper, pulp plants, motivic, environmental equipments, we, Oji Engineering Co., Ltd. have been extending our business to the leading multi-engineering company.

This time, Oji Engineering Co., Ltd. introduce an example, the improved insulation dryer that is "Vacuum insulation material" is applied instead of regular insulation materials.

Improvement on Operation of Paper Machine by Means of OnV FlocSpotter

Hideomi Uchikawa
Voith IHI Paper Technology Co., Ltd.

Voith Paper Automation Japan Co., Ltd.
Armin Bauer
Voith Paper Automation GmbH & Co. KG

Abstract
For papermakers, formation is important: it is a measure of sheet uniformity and relates to other paper quality parameters, like printability. Reel sensors, however, provide only insufficient information about the formation of multi-layer products, such as board. With this in mind, Voith has built a formation sensor operating in the wire section. Now, the formation of every ply in a multi-layer machine can be measured on-line and thus no longer remains obscure. The sensor is a tool that makes machine optimisations and troubleshooting much easier. It also opens up the possibility to save raw materials, process chemicals or energy while keeping formation for a given grade at a desired quality level. The formation sensor is based on digital camera technology. Its housing is built for permanent operation in the harsh environment of the wire section and requires almost no maintenance. Formation is calculated according to established methods and, more than this, classified in a way similar to human perception.

Application of Eco-friendly Water Based Emulsion Polymer

Jiayi Chen, Tomonari Katou, Sakae Futaki, Yuko Okusa and Keiji Suruga
Kurita Water Industries Ltd.

Abstract
An eco-friendly water based emulsion polymer (W/W) was newly developed for papermaking process application. It is oil free and elemental salt free. The W/W product contents two compounds, one is low molecular weight polymer with high charge density, another is higher molecular weight polymer with lower charge density. Each of them could be changed its charge density and molecular weight. Two product lines are developed, the Fixage 600s are fixative agents, and the Hi-form 100s are drainage retention aids. The Fixage 600s show excellent fixing effect comparing with the Epi-chlorohydrine polymer. The Hi-form is a good retention aid. A machine trial showed that the first pass ash retention was improved 8 point without any formation down, and machine speed is increased 5%.

Development of New Pulping Method under Near-Neutral pH Condition Using Hydrogen Peroxide and Metal Complex Catalyst

Ryugo Shimoyama, Yuji Kunisada and Takashi Oka
Development Dept. 1, Nissin Kagaku Kenkyusho Co., Ltd.

Abstract
Hydrogen peroxide is an oxidative bleaching agent which is quite ecological, relatively economic and easy to use. However, its oxidative reactivity is much inferior to chlorine-based bleaching agents. Therefore, many studies have been reported on the activation of hydrogen peroxide by bleaching activators or metal complex catalysts to enhance its reactivity.
We tried to apply this catalytic oxidation method to the deinking process to develop a new pulping method. As using a manganese complex catalyst for repulping old papers, the residual ink area was reduced enough to apply this method to low alkaline deinking process.
In this report, we described the development of the deinking catalyst for DIP process and the solution of the stickies problem and its ink elimination mechanism.

Use of High Aspect Ratio Kaolin as a Tool to Control the Strength and Stiffness Properties of Coated Papers

John C. Husband
Pigments for Paper Group, Imerys Minerals Ltd.

Abstract
The mechanical properties of paper coating layers are very important in converting and printing operations. These include stiffness, resistance to fold cracking, dusting and pick resistance. In this study we have prepared unsupported coating layers and measured the in-plane and z-direction tensile properties as a function of the kaolin particle aspect ratio. We have then compared the results to pilot coated papers containing the same clays.

A coating layer containing high aspect ratio fine clay has an elastic modulus 7-8 times higher than one containing only ground calcium carbonate. With appropriate binder systems, these layers can have a modulus which is of the same magnitude as that of basepaper. We show that this improvement can be used with advantage to increase stiffness or decrease basis weight whilst maintaining stiffness, in order to save costs. The in-plane tensile strength of the coating layers also increases with high aspect ratio particles.

Kaolin - based coating layers differ from those based on ground calcium carbonate because of the platy nature of the clay particles. This gives different mechanical properties in the x-y and z-direction. This is shown by studies of the tensile strength of unsupported clay coatings. The coatings are stronger in the x-y direction than in the z-direction, with the magnitude of the strength difference depending on the aspect ratio of the kaolin plates. Ground calcium carbonate coating layers have the same strength in all directions.

PVDF Emblem/Micro Filter Water Recycling System

Makoto Matsushita
KGK Engineering Corp.
Yoshiharu Numata
Hitachi Plant KIDEN Engineering Co., Ltd.

Abstract

Generally, there is huge volume of water used in Pulp & Paper Manufacturing Process. Besides, lack of water often happens in the summer season, which causes deterioration of water quality and shortening of Mill operation. Pulp & Paper Mills are required to counter-move to consider reduction of water consumption aiming "0-Emission"water recycling system.

In this circumstance, we have developed and started to propose the new water filtering system with new PVDF emblem for the waste water, the white water and the process water treatment in Pulp & Paper Industry. The New PVDF emblem has very good features such as high SS filtering capability, strong against clogging and early restorable capability by washing compared with the traditional filtering emblem. Furthermore, the treated water by our PVDF emblem is proved to be quite adequate for cleaning and showering water which is to be sprayed through high pressure nozzles without clogging continuously. Taking this opportunity, we would like to report the details of very good merits & performance of the New PVDF emblem. We will be happy if you will change your opinion on the filtering emblem to how they are easy to handle with good results.

New Consistency Measurement Technique for Low Shear Force and/or Low Consistency Pulp
-Features and Benefits of BTG ACT-2500-

Emil Engvall
BTG Instruments AB, Sweden
Tetsuro Kakuda
Spectris Co., Ltd., BTG Division

Abstract

Traditional blade consistency transmitters with moving or static blade have a limited sensitivity at consistencies down to 1 % fiber consistency. They also have limited sensitivity to pulp types with low shear force, like recycled fiber with low fiber quality.

A new type of measuring technique has been developed. This technique uses a sensing element that oscillates at its resonance frequency. The transmitter shows great sensitivity even at low consistencies and low shear force.

A Report on Paperex2007
-December 7-10, 2007 at Delhi, India-

Kunitaka Toyofuku
JAPAN TAPPI

Abstract

The Paperex2007 Conference & Exhibition was held in Delhi, Indian on December 7-10, 2007 hosted by Indian Paper Industry.

There were 34 special presentations on 8 sessions. Total number of participant was approximately 500, and Indians occupied the major part of it. However, there were considerable participants from the foreign countries because India is attracting much interest as the huge market next to China. Accordingly presentations by the foreign countries occupied the majority. It should be pointed out the enormousness of the attached exhibition. In the area of more than 10,000 m2 totally, the exhibitions of more than 400 were performed in the 6 sites.

In addition, I visited Indian Paper Manufacturers Association, Indian Pulp & Paper Technical Association, Central Pulp & Paper Research Institute and the paper mill respectively after the meeting. I report in conjunction with the meeting.

The Characteristics of Methane Fermentation of Paper Sludge (PS)
-The Relationship between the Chemical and Mineralogical Properties of PS and the Quantity of Methane Gas-

Takao Ando
Faculty of Risk and Crisis Management, Chiba Institute of Science
Kimio Hiyoshi
Fuji Industrial Research Institute of Shizuoka Prefecture
Shuji Shimada
Gakunan Daiich Cooperation of Paper Manufacturing Association
Naoto Matsue and Teruo Henmi
Department of Agriculture, Ehime Univ.

Abstract

Paper sludge (PS) discharged from Fuji city, Shizuoka prefecture, reach about 1,198,806 tons/year at 2007, it is serious industrial waste. Therefore, the development of a technique for utilizing of PS is essential for recycling waste materials.

In this study, we tried to methane fermentation treatment for creating new recycling process of PS. PS consists of cellulose through out paper remanufacturing processes and some kinds of minerals (e.c. talc, kaolinite, calcite) for adding materials as filler and pigment. The cellulose in PS can be used for the material of methane fermentation. The methane fungus is taken from livestock sewage. The relationship between mineral composition of PS and the generated methane gas volume is tried to clarify, it is obvious that following conclusions. The characteristics of suitable PS for methane fermentation were (1) ash contained about 8.2～30%, and the "ash rate" (ash/organic component)are about 0.2～2.0, (2) the amount of calcite content is about 37%～52%, (3) Ca + Mg in ash corresponding to 1g of organic component is about 0.1 ～0.5g, (4) no chemically treated and refined cellulose in PS is desirable for methane fermentation, (5) PS can be used for the material of multiple stage (cascade type) recycling process which consist methane fermentation process (1st stage) and the zeolite synthesizing process (2nd stage) using residual material of 1st stage.

Keywords: Paper Sludge, methane fermentation, Kaolinite, Calcite, Zeolite

2008年7月　紙パ技協誌
[プリント用ページ]
JAPAN TAPPI JOURNAL July 2008

Vol.62 No.7 Contents

2008年7月　紙パ技協誌
[プリント用ページ]
JAPAN TAPPI JOURNAL July 2008

Vol.62 No.7 Abstracts

Advanced Control of the Pulping Process by Using New Online Fibre Analysers

Hakan Karlsson
Product Manager, AB Lorentzen Wettre (Sweden)
Yoshihiro Ohkawa
Managing Director, Lorentzen Wettre K. K. (Japan)

Abstract
Shape factor is maybe the most important measurement for kraft pulp. L&W STFI Fibermaster was developed to be able to measure this important property better than other instruments. Fiber length is measured according to ISO standard. A number of other properties are measured and available for on-line measurements as well as for laboratory analysis. Applications for modelling of pulp quality, optimisation and control of refining and blending of pulp are described. The latest development has been to analyse vessel cells and shives in more demanding situations including recycled pulps.

The Latest Sensor, Online Analyzer and Control Technology for Chemical Fiber Line

Naoto Takigawa
Sales Manager, Metso Automation K. K.

Abstract
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.

Status of Use and Tasks for Gaskets to Replace Asbestos Gaskets in Alkaline Line of Kraft Pulp Production

Yukihiro Nagao
Sealing Products Department, Nichias Co., Ltd.

Abstract
In Japan, the usage of sealing materials containing asbestos had been banned across the board as of the 1st of September, 2006 in the facilities and equipment in paper and pulp manufacturing industry.
We are herewith to introduce the properties, problems, recommendations as well as the status of use for non-asbestos gaskets to be applicable to alkaline of kraft pulp production which has been said to be the hardest to replace the asbestos gaskets in paper and pulp manufacturing industry.

The Selection of Non-asbestos Sealing materials for Pulp & Paper Plants

Shinji Koike
Basic Technology Industries Development Division, Nippon Valqua Industries, Ltd.

Abstract

The harmfulness of Asbestos and the necessity for alternative material had been recognized, still in Japan the conversion has been delayed in comparison with Europe and the United States. However, even in Japan, the seriousness of health damage by Asbestos came to attract the attention and then the manufacture and sale of Asbestos products were banned in principal by law enforced in Sep. 2006.

We as Gasket manufacturers have been carrying out research & development of alternative materials and there are already many products with which can replace asbestos in various applications on the market.

In this report, I am going to talk about soft gaskets and gland packing for Pulp & Paper industries and explain the points of material selection in time of changing from Asbestos to Non-asbestos.

The AIKAWA's Newest Refining Technology
-From the Standpoint of the Refiner & the Refining Fillings-

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

Abstract

Nowadays, we have two major issues in the Refining process.

One is to reduce the power consumption from this most power consuming process in the stock preparation system.
Second is the suitable Refining method according to the changes of the resent stock fiber condition. Hard wood pulp, OCC and ONP are most commonly used as paper material. But recently, the ratio of plantation Hard wood pulp is rapidly increasing and the recycling rate of OCC and ONP are also increasing which both resulting to shorten the fiber length and becoming the lowering factor of fiber freeness.

To use this short and weak fiber, not cutting Refining but wet beating with less fiber cutting and property (strength) improvement could be the solution. In general, better Refining efficiency means the larger freeness drop with less power consumption and not wet beating. But the resent need in refining is to achieve good balance between these two, power reduction and property improvement with wet beating.

In this report, we would introduce our approach to these issues with our newest technology, Aikawa Double Conifiner (ADC) and Finebar Refining plates, and its merits.

Keywords: Refining energy saving, Planted hardwood pulp, Recycled OCC & ONP, Fiber length & freeness, Cutting refining, Wet beating, Refining power consumption, Fiber characteristics, Aikawa Double Conifiner (ADC), Finebar

Impact of the Design of LC Refiner

Yosuke Takeshita
Sales & Technical Group 2, Andritz K. K., Japan

Abstract

In Japan all kind of fiber material of paper furnish strength is becoming low. For keeping the paper quality, refining process is very important now. Andritz have long history of manufacturing the low consistency equipment and systems for paper machine stock preparation. This report explains the Andritz 3 types refiners laboratory results of fiber impact by design and Fractionation refining process for keeping the paper quality by ecological method.

Selection of Fixative against Pitch Troubles, etc.

Kensuke Shimizu
BASF Japan Ltd., BM Specialties, Paper Chemicals Technical Service

Change of environment around paper manufacturing and technology leads improvement the paper-production efficiency. However, in the other hand, these cause change of type of detrimental substances and amount of detrimental substances in paper making system, and negatively impact to the paper-making. These negative impacts to paper making are roughly classified into (1) troubles on the process and instability of effects of wet-end chemicals and (2) problems on the paper qualities and dirt of the machines. Therefore, it is necessary to select suitable measures (charge control and fixation) and suitable coagulants (charge controller and fixative) depending on the types of troubles happened at paper-making. Each evaluation method of effects of coagulants has merits and demerits respectively, so it is difficult to evaluate the effect of coagulant with only one method.

Therefore, it is necessary for selection of coagulant to apply suitable combinations from various evaluating methods depending on the purpose or problems should be solved. Laser pitch counting technology that was developed by BASF can evaluate the effect of coagulant as quantitatively by resulting pitch size distribution. Therefore, it is one of powerful tool for fixatives with the feature in a past evaluating method without. Further, it is also effective tool for the development of new coagulants.

Pitch Control with Pulp Quality Change

Satoshi Wada, Chen Jiayi and Keiji Suruga
Paper Chemicals Section, Kurita Water Industries Ltd.

Abstract

Recently, papermaking industry has executed waste paper recycling actively from the situation of global environment maintenance and resources protection. With this situation, pitch trouble has been increasing by increasing of the wastepaper usage rate, neutralization of papermaking pH, reduction of papermaking machine using water, speedup of papermaking machine. Pitch trouble is one of important cause of paper machine run ability.

To reduce pitch trouble, various pitch control agent has been applying. And many pitch evaluation methods has been using. Each method has various features and is used depending on the situation and a purpose. We use evaluation method noting “Deposit potential”, and we are applying pitch control agents and fixing agents.

In this article, we collect concerning the basic item of the pitch and pitch control. And we introduce the example of application of the pitch control agent.

The Effects of Chemical and Mechanical Modifications of Pulp Fibers

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

Abstract

Chemical and mechanical modifications of pulp fibers based on the chemical structures of the pulp components and hierarchal tissue structures of pulp fibers are reviewed in this paper. In the mechanical modifications, the highly crystalline cellulose microfibrils and micropores formed in the cell walls during chemical pulping process play a significant role in controlling paper properties as well as retention of wet-end additives. On the other hand, carboxyl groups present in pulp fibers are key interaction sites with various cationic compounds in papermaking and coating processes. There have been various procedures reported so far to improve carboxyl contents in pulp fibers. Irreversible adsorption of carboxymethyl cellulose with low degrees of substitution on pulp fibers is a new and interesting chemical modification of cellulosic fibers, resulting in increases of carboxyl contents of the pulp fibers and in improvement of the effects of wet-end additives. TEMPO-mediated oxidation of pulp fibers is also a promising procedure to introduce carboxyl and aldehyde groups into pup fibers without any changes in crystallinity or fiber morphology. Especially, cellulose single nanofibers 3-4 nm in width and a few microns in length can be prepared from TEMPO-oxidized pulps by moderate disintegration in water.

Development of Continuous Cooking Process for Kraft Pulping

Yan Ju
Metso Paper Japan Co., Ltd., Fiber Business Line, Technical Support

Abstract

Since Kamyr has invented the continuous kraft cooking system in 1949, it was significantly developed along with the improvement of the cooking process in order to meet the different requirement in the past 30 years. A number of cooking processes such as MCC, ITC, and BLI were developed, and have been playing an important role in Japanese paper industry even today.

Metso Paper’s fiber business line (former Kvearner Pulping) had fully inherited Kamyr technologies, and developed COMPACT COOKINGTM system that has become a most popular continuous kraft cooking process. COMPACT COOKINGTM system can fully 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.

Keywords: Continuous Cooking Process, MCC, ITC, and BLI, COMPACT COOKINGTM

Analysis of Relationship between Air Bubble Size Distribution in Flotator Cell and Deinking Efficiency -Progress in Development of a New OK-Flotator-

Atsushi Watanabe
Pulp & Paper Research Lab., Oji Paper Co., Ltd.

Abstract

With a view to improving the ink elimination in Flotator, We directed our attention to the bubble size distribution and examined the relationship between operating condition and deinking efficiency of the flotator. We found that higher rim speed of the rotary tube blower could increase deinking efficiency and the brightness gain drastically. At that time, higher rim speed caused smaller air bubble size.

When the speed was high, large air volume improved deinking efficiency and the brightness gain, then would increase the number of small air bubbles.

On the other hand, when the rim speed was low, large air volume was not effective in deinking, then would increase the number of large air bubbles.

By applying these findings to OK-Flotator, and could succeed in improving the deinking efficiency.

Keywords: OK-Flotator, ink, bubble size distribution

Improvement of DIP by Optimization in Process Control

Yoshio Ito
Chuetsu Pulp and Paper Co., Ltd., Takaoka Mill (Nomachi)

Abstract

Collection of waste-paper and its recycling rate have been going up year after year in order to establish an ecological society here in Japan. The recent trend toward environmental preservation has spoiled a balance between demand and supply of waste paper. There is no other choice but to use a poor quality waste paper for recycling, according to the boost in domestic market price due to increasing exports for waste paper. Under these circumstances, quality problems have been increasingly caused by dirt such as stickies and plastic films residual inks from the inferior waste paper during DIP process.

Deinked pulp contains many types of paper products at Nomachi in Takaoka Mill, while strong demand for higher quality product is rising in the market.

This report described our effort to reduce obstacles in DIP production process to satisfy the strict market demand.

The Technology of Deinked Pulp Made from Low-grade Recovered Paper

Tomoaki Koyanagi
Research Laboratory, R&D Div., Nippon Paper Industries Co., Ltd.
Takuya Yonemoto
Pulp Department, Yatsushiro Mill, Nippon Paper Industries Co., Ltd.

Abstract

It is apparent that promoting the utilization rate of recovered paper in paper manufacture is a key point to reach the target of 62% by 2010. The paper manufactures have started to consume not only old newspapers but also old magazines and fine paper printed. On the other hand, the recovery rate reached 72.4% in 2006 while it was a strong growth of recovered paper export to China. The supply of high quality recovered fine paper has been restricted.

Nippon paper industries has promoted the use of various grades of recovered fine paper for paper manufacture to produce the stable deinked pulp. We describe the latest technology of the high brightness deinked pulp production.

The Rebuild of DIP Lines at Kanto Mill (Katsuta)

Katsushi Mineshima
Kanto Mill (Katsuta), Hokuetsu Paper Mills, Ltd.

Abstract
DIP lines in Kanto Mill (Katsuta) have started its operation since 1975 with a paper machine. Since there is only one paper machine, the operation of DIP lines is matched with what kind of waste paper as raw material is needed for production of the paper machine and how much amount of waste paper should be required for it.
In the original plan, the DIP lines were designed for treatment of newsprint as main raw material, but we installed drum pulper and kneader and remodeled coarse-screen and bleaching process in order to enhance the volume of production, quality and brightness.
Since then, the two DIP lines (one is BDP which has bleaching process, the other is DIP which is non-beaching process) are operated and producing DIP, treating newsprint, magazine, and woodfree-based waste paper.
This report shows the details of remodeling of the DIP lines and the result after remodeling after 2003.

Countermeasures against Dirt in Waste Paper Treatment Process

Tooru Shimomura
Hachinohe Mill, Mitsubishi Paper Mills Limited

Abstract
In Hachinohe mill, we produce deinked pulp with high brightness. The pulp is mainly made from coated book stock (CBS). However, the procurement of CBS has become difficult by the elevated price of waste paper. Therefore, we are forced to utilize several types of raw materials such as waste magazine.

We have tackled the quality loss of the raw materials and stabilized the pulp quality by performing several countermeasures: preventing stickies from being subdivided in defibering process; reconsidering coarse-screen baskets for strengthening dirt removal; removing color spots approached from defibering process and white water treatment process; reconsidering bleaching parameters for restraining brightness decrease.

The conditions of waste paper market are changing at any time. This report contains the efforts under consideration. We aim to continue the efforts for stabilizing and upgrading the pulp quality.

Conference Report of the Cellulose and Renewable Materials Division in the 235th ACS National Meeting & Exposition

Takuya Kitaoka
Faculty of Agriculture, Kyushu University

Abstract

The 235th American Chemical Society National Meeting and Exposition was held in New Orleans, LA, USA on April 6-10, 2008. The ACS is the world's largest scientific society founded in 1876, and the 2008 spring national meeting gathered more than 13,300 attendees from all over the world. This conference report focuses on the interesting presentations in the Cellulose and Renewable Materials Division, especially Anselm Payen Award Symposium honoring Prof. Fumitaka Horii: Structure and Properties of Cellulosic Polymers, Assemblies, and Nanocomposites.

Evaluation of Chloroform Emission at an ECF Bleaching Pulp Mill

Keiichi Nakamata
Technical and Development Division, Hokuetsu Paper Mills, Ltd.
Youichi Motoe
Environmental Section, Niigata Mill, Hokuetsu Paper Mills, Ltd.
Hiroshi Ohi
Graduate School of Life and Environmental Sciences, University of Tsukuba

Abstract

Chloroform formation, balance, and discharge were estimated during 1997-2005 at an ECF bleaching hardwood kraft pulp mill that operated a complete airtight type activated sludge treatment using pure oxygen for the bleaching sewer. This was achieved by collecting and analyzing discharge water and gas samples that contained measurable levels of chloroform. During the stable operation of ECF bleaching, the average formation of chloroform was estimated to be 1.48 g/pulp adt. At the activated sludge treatment of chlorine bleaching sewer, chloroform generated being accompanied with decomposition of organic chlorine compounds indicated by AOX. It was suggested that the activated sludge treatment could remove or decompose the chloroform generated from ECF bleaching sewer.

Keywords: chloroform, bleaching, activated sludge, kraft pulp, hardwood

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Vol.62 No.8 Contents

2008年8月　紙パ技協誌
[プリント用ページ]
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Vol.62 No.8 Abstracts

QualiFlex™Press Sleeve
-A History of Sleeve Development at Voith-

Yosuke Izaki
Domestic Sales Department, Voith IHI Paper Technology Co., Ltd.

Abstract

Voith Paper established the closed shoe press and press sleeves 24 years ago. Due to that it was possible to increase speed and meet special requirements on the paper making side. Because of the risen cost for energy, energy saving is one key factor for business success nowadays.

To achieve the best results concerning dewatering it is necessary to customize the sleeve surface for each application. QualiFlex offers the widest variety of surface designs to meet this requirement. With the development of new polyurethane types it is possible to create steady state conditions over a long lifetime period. Since 1989 QualiFlex is the only product worldwide based on yarn reinforcement, totally embedded in one single layer of polyurethane.

Brazilian Eucalyptus Pulp

Ludwig Johann Moldan
BRACELPA

Abstract

Brazil pioneered the industrial-scale production of both eucalyptus pulp as well as paper 100-percent made of eucalyptus pulp exactly 50 years ago, thanks to the creativity and technical knowledge of our engineers.

The introduction of that new fiber into the market was a tough job right in the beginning, yet highly rewarding afterwards.

Investments in forestry research almost doubled its productivity leading Brazil to a benchmarking position in the area. Massive industrial investments in advanced manufacturing facilities started to be made at the end of the 1970's aiming at supplying the world market with short fiber pulp.

Since then, Brazil has been investing in its production, becoming now the leading producer in eucalyptus pulp and the world's sixth largest in general pulp production.

Brazil enjoys a significant competitive edge in forestry techniques, with state-of-the-art technological development, therefore reaching high productivity rates at competitive costs, totally tuned to sustainability principles, according to the social, environment and economic tripod.

The ongoing development of the industry in Brazil reflects its worldwide recognition by the most demanding marketplaces in Europe, North America, as well as in Asia. The current investment program for the period 2003-2012 forecasts that as much as US$14 billion will be invested in forestry, pulp and paper, half of it already done.

The high productivity of our planted forests has been leading us to consider other wood applications, such as its use as solid wood, or even for ethanol production, while never forgetting that our main product is pulp.

Clean Paper Machine Operation by Proper Wet-end Chemistry

Koichi Tadaki, Tomoko Asada, Hideaki Kawakami, Kazutaka Kasuga and Shigeru Kurose
Technical Dept., Somar Corporation

Abstract

Cleanness of paper machine operation has been transformed drastically due to deterioration of raw material quality and conversion to neutral condition. Main source of stain on the machine comes from un-wanted foreign materials contained in de-inked pulp, as its usage has tendency to increase. To maintain or even to improve machine runability and production, it is important to deal with materials causing unclean operation.

In the past we have tried to identify un-wanted foreign materials in paper machine through chemical and biological analyses, and, at the same time, made a selection of proper chemicals to deal with these materials. Continued development of high-performance coagulant “REALIZER A Series” showed its effectiveness to hydrophobic pitch in recycled pulp. Retention aids effective on microscopic particles such as pulp fines and filler were developed as “REALIZER R Series” and “REXER FX Series”. Combination of these chemicals called “AXISZ SYSTEM” reforms wet-end operation much cleaner environment, which has been recognized by a large number of paper machines. New generation of ASA sizing agent “REGSIS” which was put in the market last year requires less chemicals and thus contributes optimization of wet-end operation. In addition “CURECIDE SYSTEM” which controls micro biological problems, further reduces deposits in a paper machine. Both chemical and biological means of controls improve drastically paper machine as clean operation.

Effect of Filler Distribution on Paper Properties

Katsuhiro Shimamoto
Research and Development Department, Paper Chemicals Division
Arakawa Chemical Industries, Ltd.

Abstract

From the viewpoints of forest resources conservation for the protection of global environment and reduction in paper cost for enhancing its competitiveness in the international market, paper manufacturing companies are promoting to increase the content of DIP and inorganic filler in their paper products. However, this causes a decrease in strength of the finished papers.

This report describes the effect of dispersed condition of fillers in paper on such paper properties.

A Study on Sheet Gloss of Coating Color Only Using Calcium Carbonate

Hiroshi Miwata
Latex Research Group, R&D Center, Nippon A&L Inc.

Abstract

In coated paper, the tendency of investigation is not only improvement of qualities and productivity but also cost cut of coating color. High calcium carbonate contents would provide both higher brightness and lower color costs. However, it would be also difficult to obtain sufficient sheet gloss of coated paper.

In this paper, the effect of color recipes and latex types to sheet gloss would be described. Use of carboxymethylcellulose and higher solid contents gave higher sheet gloss and poor water retention in the coating color, which was only used calcium carbonate as pigment.

In the simulation of de-watering phenomenon at coater head, calculated high shear viscosity was not so high compared with that of kaolin/calcium carbonate coating color. However, use of suitable amounts and type of viscosity modifier might be required, because calculated solid contents was very close to solidified concentration of coating color.

In this color recipe, higher sheet gloss obtained by use of larger particle size of SBR latex, though water retention was poor. And better water retention was provided by latexes, which contain higher carboxyl and functional groups, without decreasing sheet gloss.

From above results, we would like to recommend to use of carboxymethylcellulose, higher solids contents and use of the latexes, which have suitable particle size and higher content of functional group.

Surface Sizing Inducing Microscopic Phase Separation

Shiro Umeuchi, Eiji Hamaya, Hideo Baraki and Hiroharu Kawano
Research and Development Division, SEIKO PMC Corporation

Abstract

Recently, neutral papermaking and increase in the usage of recycled pulp containing calcium carbonates have been proceeding in Japan. Accordingly, dosages of alum are decreased and its activities as cationic sites are also reduced, especially in a higher pH range. And larger amounts of fillers such as calcium carbonate are filled in neutral papers. Under these circumstances, conventional surface sizing agents do not work well, because of the sizing mechanism by electrostatic interaction arising from ionicity.

Thus, we have developed a novel surface sizing system, which is less affected by changes in papermaking pH and filler contents in paper. This surface sizing system consists of newly developed polymer based anionic surface sizing agent (SS) along with modified polyacrylamide based surface strength agent (surface PAM), and shows excellent sizing performance with minor effect of calcium carbonate contents in paper, even for the no alum system.

In order to understand the surface sizing mechanism of the novel system above, we carried out model experiment with use of the cast-coated and spin-coated films of surface PAM and SS, and SS only. Optical microscope and atomic force microscope (AFM) analyses on the films revealed that the films of surface PAM and SS have micro/nano-scale irregular surface structures like sea-island morphology due to phase separation. And they also showed higher contact angles than the film of SS only. Thus, it is suggested that microscopic phase separation may induce the surface sizing performance.

The Latest Fiberline Technology of Andritz
-Advantages and References-

Masahiro Ohkubo
Project Engineering Group, Andritz K.K.

Abstract

So-called Kamyr continuous digester was invented by Johan Richter a great Norwegian inventor more than 50 years ago, of which key component was the special chip feeding rotary valve called High Pressure Feeder (HP feeder). While this HP feeder was unique in its design, its drawback is the complicated chip feeding systems and the very high maintenance cost.

Andritz has made many improvements for the kraft pulping technology. One of the epoch making improvements by Andritz is the “Turbo FeedTM System which has eliminated the conventional HP feeder completely and has so much simplified the total digester chip feed system. This “Turbo FeedTM System” does not require many of the conventional equipment other than HP feeder, such as Low Pressure Feeder, Steaming Vessel. Turbo FeedTM Systems have been very quickly and well accepted at many mills all over the world only a few years after its first commercial system in 2002. In addition Andritz has further developed Lo-SolidsTM Cooking technology to so-called DFLS Lo-SolidsTM Cooking which enables the digester to operate more stably and more easily with good in-digester washing, to expand production capacity and to give better quality of pulp. Andritz has delivered so many DFLS Lo-SolidsTM Cooking digesters for new projects and also for upgrading existing digesters.

Another Andritz technology that is widely accepted by mills is DD Washers. It has shown that the bleach processes with DD washers save bleaching chemicals. Andritz has delivered significant total mill projects all over the world. Also in Japan, a brand new fiberline including above mentioned equipment has been delivered to Marusumi Paper’s Ohe mill in Ehime, Japan, and the fiberline successfully started up in May, 2007.

Process for Manufacturing Solid-fuel Derived from Waste

Takuro Nomura
Planning Section, Environmental & Recycling Plant Planning Department,
JFE Environmental Solutions Corporation

Abstract

Refuse derived fuel so-called RDF manufactured from municipal solid waste is utilized as a substituted fuel for various boilers. This paper describes a manufacturing process and its characteristics developed by JFE Engineering Corporation. The specific feature of our process is to settle a drying step before sorting of the materials in order to ease the separation of objectives from wet and sticky wastes. The fuel produced through the steps of shredding, drying, sorting and pelletizing to be cylindrical shape has great characteristic advantages of a high calorific value of 16,500 - 23,000 kJ/kg, low moisture and ash content, stiffness and uniformity.

JFE Engineering and its subsidiaries have supplied 23 facilities of RDF production; one of those is the biggest capacity having 300 t/d, which bring the group at present as the top supplier for both the number of facilities and the amount of total capacities in Japan.

SUCCESS FORMER for High Speed and Wider Machine

Hideki Sano and Yasuhiro Kato
Paper Machinery Engineering Dept., Kobayashi Engineering Works, Ltd.

Abstract
Not only corresponding to the change of paper machine users' needs, but also creating needs by ourselves, we have been developing various kinds of sophisticated Formers.
In response to the customers' strong expectation of the advent of new former in paperboard industry, Success Former was developed in 1989. It has enabled to achieve both remarkable quality and productivity improvement.
Because customers' reputation of this Former is still very high though ten years or more have already passed since it was developed. We introduce the Success Former including headbox with Octopus CP control system, of wire width 6000 mm and 300,000 tons of annual outputs, which was installed in China.

Preparation of Hydroxyapatite from Paper Sludge Ash (PS ash)

Satoru Fukugaichi and Masaaki Morikawa
Paper Industrial Research Center of Ehime Prefecture
Shouichi Kyougoku and Kosaku Nagashima
LINTEC Corporation
Naoto Matsue and Teruo Henmi
Faculty of Agriculture, Ehime University

Abstract
PS ash contains large amount of calcium carbonate. Calcium ion disturbs formation of zeolites from PS ash, resulting in that synthesizing zeolites was difficult. We synthesized both hydroxyapatite and zeolite from calcium carbonate and meta-kaolin in PS ash in the one batch system. The products were analyzed by XRD and the main component of product is hydroxyapatite and zeolite. Scanning electron microscopy relived that two components are incorporated in molecular level, showing a possible nano-composite materials. The products have been tested for ability in adsorption of acetaldehyde and methylene blue.

New Generation of WIS with Color Technology

Norikazu Ishijima and Tadashi Tomomura
Quality-System Solution Division, IT Solution Business Division, Omron Corporation

Abstract
OMRON has developed printed web inspection system with color technology, at 1992. It was improved for general paper, and "Color Age" has been sold for paper industry. Color processing technology has been improved continuously for about 15 years, and "Color Version of Super NASP" has completed. In this report, we are trying to explain the latest technologies, which have been applied for "Color Version of Super NASP".

An Adaptive Solution in Laboratory Automation
-Technidyne PROFILE/Plus-

Paul M. Crawford
Technidyne Corporation
Katsuhiko Yokoyama
Matsubo Corporation

Abstract

The Technidyne PROFILE/Plus is designed as a modular system. It is a unique approach to the process of automating a laboratory. The PROFILE/Plus has been implemented in many installations. The method of implementation varies greatly. Many installations began as two or three instruments with additional instruments added at a later date. Many of the instruments are currently used as individual instruments with plans for automation in the future. Other installations have been full featured systems installed during the initial process as the budget provided while others have installed and later reconfigured their systems as their testing needs changed. This wide variation is a testament to the PROFILE/Plus concept, its affordability and flexibility. If the paper mills testing needs change, initial investment is not lost. Simply add, change or move instruments to meet the new testing requirements.

A New Detection Method of the Fluorescent Whitening Agents Contained in the Paper Packing Container for Foodstuffs

Takayuki Jikibara**, Chen Ying Tang, Eishun Tozaki and Takashi Miyagawa** Material Analysis Center, Oji Paper Co., Ltd.

Abstract

We examined new detection methods of fluorescent whitening agents contained in paper packaging containers for foodstuffs, and compared Japanese regulations with those of foreign countries to fluorescent whitening agents. A remarkable difference was found between results from the Japanese official method, Kanshoku No.244, and the EU's standard method, EN648. Under the test condition of Kanshoku No. 244, a piece of gauze is dipped into an extract from the dyed sample with fluorescent whitening agents and observed the fluorescence under a UV lamp. It was confirmed that the dyeing ability to the gauze varied among fluorescent agents and an ability of hexa-sulfonated agent was extremely week, while these agents were enough detectable under EN648's condition. Such difference in the dyeing ability may produce the difference results by Kanshoku No.244 and EN648. We tried to improve the dyeing ability of hexa-sulfonated agents to gauze in Kanshoku No.244, however, these attempts were unsuccessful. We modified the test condition of EN648 and established a new method by using the standard agents specified by the Japan Dyestuff and Industrial Chemical Association. This method can be applied to every food type and detect hexa-sulfonated agents.

Keywords: kanshoku No.244, EN648, fluorescent whitening agents, gauze, dyeing ability, hexa-sulfonated agents

**Present organization: Japan Pulp & Paper Research Institute, Inc.

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Vol.62 No.9 Abstracts

Review and Outlook for the China Paper Industry

Zhenlei Cao
China National Pulp and Paper Research Institute
CTAPI

China paper industry has been growing steadily for the last decade. The total paper and board production reached 65 million tons in 2006, and the consumption reached 66 million tons, which leads to an annual growth rate of 16% and 11% respectively. Till today, there is no signal to slow down even with the harshest measure on the environment protection and energy reduction. Look into the future, the china paper industry will have relative moderate growth due to the export of consuming goods and internal consumption growth. It is only a matter of time the total production and consumption will reach 100 million tons, if not by 2010, for sure by 2015!

The Organic Polymer Coagulants for the Elimination of Pitch Trouble　Part ll
-Stabilization of Paper Making Process by Inactivating Micro-Pitch Particles-

Hidetoshi Sakamoto and Kenji Sakai Shonan
Research Center, HYMO Corporation

Cationic Polymer Coagulants is effective to eliminate pitch-trouble causing by stickies. Cationic Polymer Coagulants is able to reduce adhesive surface of stickies particle in the process water and fix stickies onto pulp fibers before growing into a large-size stickies. Cationic Polymer Coagulants decrease fixing stickies released from pulp fibers.

We used new analysis methods, "micro-pitch image analyzer system" and "stickies image analyzer system", and we investigated the effect of Cationic Polymer Coagulants having different characteristics.

In this report, we indicated several Cationic Polymer Coagulants synthesized by controlling the charge density, the molecular weight and the balance of hydrophilic and hydrophobic segments showed different characteristics in adsorption onto stickies, coagulation of micro-pitches and ion-neutralization of anion trash as a pitch control agent.

Nonchlorinated Decolorization Process for Fluorescent Whitening Agent

Masafumi Watanabe
Color Chemicals Division, Fine Chemicals Group, Nippon Kayaku Co., Ltd.

We have developed new reagents called Kayaclean AW and Kayaclean IK. These are potent in decolorizing fluorescent whitening agents.

Used paper in paper manufacturing is increasing as is the demand for its wider application. Used paper which includes fluorescent whitening agents is not suitable for some kinds of paper, for example food wrapping paper, thermal recording paper and pressure-sensitive paper. This is why fluorescent whitening agents have to be decolored. Paper-manufacturing companies generally use chlorine chemicals in the process of recycling used paper for the decoloration of fluorescent whitening agents. But this use has the problem that AOX (Adsorbent Organic Halide) might be generated, and is therefore not desirable due to environmental concerns. Thus, the need for nonchlorinated decolorization fluorescent whitening agents is growing.

In this report, we will introduce Kayaclean AW and Kayaclean IK, which are nonchlorinated, environment-responsive and powerful reagents for decolorizing fluorescent whitening agents.

Dispersing of the Loading Filler and Pigment by Eirich Intensive Mixer

Kazuo Tomita
Nippon Eirich Co., Ltd.

The Eirich Intensive Mixer can be applied for the dispersing of the loading filler and pigment in the field of the paper industry. Its unique design such as the rotating mixing vessel and separately driven high power mixing tool ensures the efficient mixing and dispersing. According to the current supply result, the disintegration, homogeneous mixing and dispersing of the Calcium Carbonate cakes can be managed by one Eirich Intensive Mixer in relatively short time. The mixer can handle any shape of mass from powder to slurry. Because of the high intensive power input by the mixing tool, the total dispersing time can be shorten, which realizes relatively smaller mixer size and installation space compared with the conventional dispersing facility.

TopBrane™ : Hyperbranched Polymers as Additives for Ink Jet Receptive Coatings

M. L. J. van Leeuwen
DSM Hybrane BV

This paper deals with the application of TopBrane products as additive to Ink Jet receptive coatings. It will show how TopBrane additives can be used to enhance the print image quality and improve drying speed of the image after printing. Due to fine-tuned interaction with commonly used pigments in ink jet receptive coatings a controlled coagulation process is obtained during the application of the ink jet receptive coating. This results in improved orientation of the pigments and improved performance during printing. Furthermore the use of TopBrane in ink jet coating formulations helps to reduce the coating viscosity and helps to get to higher solids %. This enables a more efficient coatings process and reduces over all costs of operation.

The Most Modern Fiber Line

Hiroshi Yamashita
Service Dept., Metso Fiber KK

It is getting harder and harder to get good quality chips duet to the fact that some big pulp plants have started operation recently in Southeast Asia and South America. Since low quality chips sometimes cause serious problem to digester operation, appropriate solutions to solve this kind of problem are being required. Compact CookingTM must be one of the most possible solution to cook low quality chips.

On the other hand, when it comes to environmental issue, regulations for environment have been getting strict. This trend sometimes triggers a change of bleaching sequences, for instance the conversion from conventional bleaching to ECF bleaching. D-ECF has been very popular since the beginning of this ECF conversion. But recently more efforts to reduce environmental impacts have been required all over the world. This stricter requirement for environment makes high consistency ozone bleaching more attractive. This means Z-TCF could be a possible sequence as well as Z-ECF.

We are going to introduce tendencies of modern sequences at some mills which meet requirements of not only raw material matters but also environmental matters.

New Technology of Wastewater Treatment System

Atsushi Nakano
Sumitomo Heavy Industries Environment Co., Ltd.

The wastewater treatment system that applied to the pulp and paper mill is required to minimize the influence to environment, save space, save consumption, and recently to recover the electric or heat energy from treatment system. In this paper, new technologies of wastewater treatment system below are introduced.

1) High load anaerobic wastewater treatment technology using the granular biomass
 - Biobed® system (EGSB), Biothane® system (UASB), Aqua-SAT® system.
2) Space saving wastewater treatment systems which combine Sumi-thickener®
 coagulation process and activated sludge treatment process - Sumi-Sludge® system.

Introduction of Digital pH Sensor

Yasuo Watanabe
Mettler Toledo K.K. Ingold Business Unit

Last year, Mettler Toledo introduced the new technology sensor which is called "ISM sensor". This year we would like to introduce the advanced sensor "Digital pH sensor" and show the background of development and the benefit of this sensor.

Inspection Trend in Printing Industry
-Transition of Quality Demand Seen from Inspection System-

Tohru Kojima
Strategic Planning Group, FUTEC INC.

Futec Inc. has sold around 5,500 Inspection Systems to such Paper Pulp Industry, Film Industry, Nonferrous Metal Industry, Non-woven Fabric Industry and Printing Industries, etc. for 30 years. Futec Inc. developed the new Printed Web Inspection System EasyMax. GS which is the corpus of year 20 based on the know-how that has been cultivated and the needs/ wishes obtained from the market.
Futec Inc. introduces the feature of this latest type Inspection System and transition of quality demand of printing quality.

Renovation of Underground Existing Pressure Pipeline

Masahiro Seshimo PALTEM, GEO Engineering Unit Safety & Fibre Protection Equipment, PALTEM, GEO Company Ashimori Industry Co., Ltd.

A large number of pipes are used in various fields and places to improve the industrial efficiency. There are many kinds of pipes such as for gas, industrial water supply, drainage, and oil. Also these are now deteriorating by aging. The PALTEM HL method is the crafting technique for the prolongation of lives of such aging existing pipes, prevention of leakages of pipes, reinforcement of pipes, and renovations of pipes to add quake resistance to it. This report is about the background of the PALTEM HL method as a crafting technique of renovation for the underground existing pressure pipelines.

The Characteristics of the Technology of the Japanese Paper Industry

Kiyoaki Iida
Preserving and Publicizing Technical Archives and
Heritages of the Japanese Paper Industry

The definition of the technology for the industry is not clear enough. So, the definition is proposed as technology needed to develop productive activity in industries, which requires technical knowledge and know-how as its background. The technology can be divided into several categories based on productive activity. By analyzing it in each category, the technology for the industry as a whole can be characterized. The Japanese paper industry was taken as a sample for the analysis.

A Report on 2008 International Pulp Bleaching Conference

Tomoya Yokoyama*1, Koki Kisara*2, Iori Tomoda*2, Kazuhiro Kurosu*3, Shiho Katsukawa*3, Kiyoshi Yoshida*4 and Hitoshi Takagi*5

*1 The University of Tokyo
*2 Oji Paper Co., Ltd.
*3 Nippon Paper Industries Co., Ltd.
*4 Mitsubishi Gas Chemical Co., Inc.
*5 Japan Pulp and Paper Research Institute, Inc.

The 2008 International Pulp Bleaching Conference was held in Quebec City, Quebec, Canada from June 2 to 5. The 35 oral presentations including six Japanese papers and the 18 poster presentations were made at the conference. The topics of oxygen delignification, chlorine dioxide bleaching, ozone/peroxide based bleaching, enzyme, other bleaching processes, brightness reversion, fiber properties and bleaching effluents were reviewed.

Surface Analysis of Papers Treated with Corona Discharge

Kazuko Sugimoto
Odawara Plant, National Printing Bureau
Yasushi Ozaki
Research Institute, National Printing Bureau

Partial surface modification of printing papers can be made by corona discharge treatment with masking. Consequently, it is possible to change the wettability on surface modified portions. It is expected that this technique can be applied as a new representation of image.
In this work, coated papers and wood-free paper treated with corona discharge were analyzed by contact angle measurement, scanning electron microscopy (SEM), scanning probe microscopy (SPM) and X-ray photoelectron spectroscopy (XPS).
Some hydrophobic groups (C-C, C-H) were changed to hydrophilic groups (C-O, COO) through the oxygen incorporation of the corona treatment. Moreover, a part of the binder or surface sizing agent on the papers disappeared. In addition, the morphology of the printing paper was also changed by the corona treatment. Synthetically, these phenomena improved the wettability on printing papers.

Keywords: corona discharge treatment, surface modification, coated paper, XPS, SPM, SEM

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Vol.62 No.10 Abstracts

Introduction of IntensaPulper

Takeshi Murakami
Stock Preparation Dept., Voith IHI Paper Technology Co., Ltd.

In the secondary fiber system, improvement of the runnability of the pulper respects to that of the efficiency of the fiber system itself.
We, Voith IHI Paper Technology (VIPT), offer not only the equipment but also total system of the stock preparation which is combined with worldwide leading technology of Voith Paper, Germany, and more than 40 year's experience and know how in Japan of Ishikawajima Industrial Machinery (IIM). As a result of such synergy effect of the leading technology, the joint venture, VIPT, has developed the innovative low consistency pulper which is named "IntensaPulper".
The "IntensaPulper" and the latest secondary fiber system applied with the IntensaPulper are introduced herewith.

Recent Experience and Tendency of Refiner and Refiner Bar
-Introduction of Saving Energy for Refiner and Low Intensity Bar-

Kazuo Aoshima
Aikawa Iron Works Co., Ltd.

Recently saving energy is an important issue in the pulp and paper industry in Japan because of increasing oil prices. Besides the price of waste paper which is used in our country is increasing, so we have to use low quality material more than before. We have to use low quality and weak strength of material so that we should well manage them. Therefore we would introduce a result of energy saving by our new refining machine and the new suitable plates for the low intensity refining.

Key Parameters for Trouble-Free ASA Operation and Recent Trends

Richard Vonach
Eka Chemicals K.K.

Alkenyl succinic anhydride (ASA) is of increased interest to the paper industry, mainly because of its potential to decrease the application costs. This paper reviews the most relevant parameters for trouble free ASA operations, the ASA manufacturing process, the emulsification process and the application of ASA in the wet end. Since those parameters are today better understood and more optimized than in the past, trouble-free ASA sizing is achieved in an increasing number of paper mills. Recent trends in the ASA technology indicate further developments towards new stabilizers and simpler emulsification systems targeting an even broader field of applications in the future.

Multilayer Curtain Coating and New Type of Calendering

Hidehiko Yamazaki and Akihito Nagano
Metso Paper Japan Co., Ltd.

The authors introduce newly developed coating and calendaring technologies in our presentation.
Multilayer coating gives a broader coating application window compared to traditional coating methods. It can apply both high coat weights and multiple layers in a single stage. In this way it gives better economy by enabling thicker, less expensive, coating layers for certain paper/board properties (bulk, opacity, brightness...) and thinner, more expensive, coating layers for other properties (gloss, barrier...).

Metal belt calendering gives better surface topography and printability compared to traditional, shorter dwell, calendering methods. The other way round is that it gives the targeted surface properties at higher bulk and stiffness thus saving in the material costs of the paper/board manufacturing.

The preliminary research results of combining these new surface treatment processes are promising. It seems to be possible to compensate the less smooth surface produced by contour type multilayer coating by advanced, long dwell, metal belt calendering.

Release Agent for Press Rolls

Shinya Kimura
Sales Engineering Div., Maintech Co., Ltd.

Deposition of pitch or fine fiber on the press rolls causes defects in the sheet, sheet breaks and fiber rising. Especially for high speed PMs, sheet release from the rolls is not only limiting their speed but also giving strong impact to paper quality. Cationic polymer has been generally used to keep the roll surface clean, however, those program are not able to reduce draw and fiber rising effectively.

Our technology, a continuous application of chemical additives (Polymer based product, On PressTM) directly onto press rolls treats surface and establishes a protective coating that prevents deposit buildup.

In addition to preventing deposition and linting on the press rolls, this new technology enables mills to increase PM speed and/or improve paper quality.

In this report, basic mechanism of the roll release is explained and case histories to newsprint and coated paper M/C are presented. Keyword: press roll, web release, open draw, tension, pitch, stickies, deposit, polymer, sheet break

The Coating, which Have Stain Resistance and Easy Separating Properties

Keiji Nakai, Masaki Tsuji, Teruyuki Kitagawa and Junji Taguchi
Nomura Plating Co., Ltd.

Our company has offered various wear (for the paper manufacture industries) parts and mold-release characteristic parts until now. However, it is not that all are also satisfied and nothing, there was a case where meeting the request could not be finished. So, in this announcement, our company introduces the various plating which exceed the plating which can be offered now. Although all needs cannot be grasped since this plating is a utilization stage, it is the plating which is advancing by our company towards utilization.

Pest Control Program for Quality Assurance

Takeshi Teraoka
Research & Development, Earth Environmental Service Co., Ltd.

The various measures have been taken since before in a factory as the prevention of the breeding and extermination of the insects. The pest control program for quality assurance is needed for these factories. However, there are few cases that developed the program of effective prevention of the breeding and extermination. The factory where has the program that be able to explain to the outside a company is few.

Today, we explain about the point of effective pest control program for quality assurance.

High Performance QCS Recognized by New Designed PaperIQ Plus

Reijiro Nakano
Application Engineering, Metso Automation K.K.

PaperIQ Plus developed by Metso is built upon the proven and successful architecture of the first PaperIQ systems. Modular and intelligent IQSensors with their extensive self diagnostic provide the low-noise sheet quality measurements required for stable controls. The performance of IQScanner has been upgraded by increasing its capability to scan at much higher speeds. Horizontal stiffness, alignment and vibration resistance have been improved. New scanning sensors have been added to measure sheet properties based on the optical technology. One of the newest sensors, IQCaliper-L, measures caliper without contacting to the sheet.

Non scanning, full sheet measurements have been developed as well. IQInsight measures high frequency MD and CD snapshots of the sheet moisture immediately after it is formed and pressed, helping with wet end and press section optimization programs and allowing better control from that location.

This paper presents the Metso new developed QCS with new scanner and sensors.

Introduction of Paprican's Optical Calibration Program
-Special Report: Paper Optical Properties, Best Measurement and Influence from Materials and Process-

Yoshihiro Ohkawa
Lorentzen & Wettre K.K.

Optical properties are the most readily-assessed quality attributes of pulp and paper products, which have directly impact on price performance. Visual assessment and ranking are highly subjective and influenced by conditions, so that several evaluation methods were developed. But, insufficient knowledge with the result difference between methods caused disagreement and confusion in the marketplace.

So, knowing a basic knowledge of optical properties and best measurement to meet customer's specification is essential to paper makers. The calibration program is also important part in measurement to sustain reliable results, which productive calibration program is provided by the Paprican, Pulp and Paper Research Institute of Canada.

This report shows highlights of a presentation on optical properties made by Paprican at the L&W seminar in May. It illustrates the basic concepts of optical measurements and factors influencing optical properties, as well as the importance of regular calibration to ensure reliable results.

Fully Sprit Seal for Poor Accurate Rotations in Agitators Services

Ryosuke Baba
Mechanical Seal Engineering Dept., John Crane Japan, Inc.

Conversion of gland packing to mechanical seal in pulp and paper mills is underway but it is only limited to the major machines like pumps for cooking and chemical or refiners. Gland packing is still favoured in raw material tanks or horizontal agitators for chest.

This is because the horizontal agitators often generate shaft runout or vibration because of its long distance with external bearing that maintains shaft, or change of load to impeller due to liquid decrease, etc., and it is thought that mechanical seals cannot accommodate.

However, there is a mechanical seal that can absorb such shaft runout or vibration by using rubber bellows. Furthermore, its fully split design can reduce cost and time of the maintenance.

We would like to introduce here the fully split mechanical seal which can accommodate the shaft runout of horizontal agitators with actual experiences.

For Sound or Noise in Industrial World Part III
-It Thinks about the Noise as Part of T.F.O. from SKF-

Yasuhiko Yamasaki
Condition Monitoring Service Division, SKF Japan

"For sound or noise in industrial world" is the third in this time. I want to see by thinking mainly about the sound that the person doesn't hear of easily this time. In a sense, the noise that the machine is generated seems to be "Scream" of the machine. The state of the rotation seems to have emitted various noise as bad one. I think that the sound of person's hearing is a sound pressure (roundness), the frequency (tone), and it exists variously. I want to explain these while putting the example.

Introduction of Fan: Performance and Design Technique

Hidemitsu Nagai and Yoshimasa Watanabe Engineering Div., TERAL INC.

It is interested in the world scale as the Kyoto Protocol is adopted by COP3, and the reduction of the CO2 gas is requested. In the blower industry, a further energy saving becomes an urgent problem. In our company, a big model of the amount of power consumption is advancing restyling. This time, "CTF3-OB turbofan" (high-pressure type) and "CMF3-OB mild fan" (Middle-pressure type) blower series were turned on to the market, it introduces it here. The new model machine is used as a charging air fan of the paper mill equipment etc.

Report on PaperCon '08

Tamijiro Kaneyuki
Nippon Paper Industries Co., Ltd., Product Development, Research Laboratory
Hiroyuki　Furukawa
Oji Paper Co., Ltd., Pulp & Paper Research Laboratory

PaperCon '08 was held in Sheraton Dallas, Texas, U.S.A. from May 4 to 7. There were 77 sessions and 181 presentations in this conference. This international conference attracted over 1000 participants from around the world. We had an opportunity to join the conference and made a summary of interesting 16 presentations in this report.

Behaviors of Carbohydrate Yield and Hexenuronic Acid Formation during Softwoods Alkaline Cooking

Shiho Takahashi, Guangfan Jin, Akiko Nakagawa-izumi and Hiroshi Ohi
Graduate School of Life and Environmental Sciences, University of Tsukuba
Tomoya Yokoyama
Graduate School of Agricultural and Life Sciences, The University of Tokyo
Masami Furui
Hachinohe Mill, Mitsubishi Paper Mills, Ltd.

It is required to use more Japanese softwoods, for example, Larix leptolepis (Japanese larch), Pinus densiflora (Japanese red pine), and Cryptomeria japonica (Japanese cedar) for the effective production of pulp and bio-energy. The pulp yield in cooking stage is one of the most important factors at a pulp mill. However, it is difficult to know the yield due to a continuous operation of the mill. In this paper, we proposed on a method for estimating Japanese softwood pulp yields at a continuously operated kraft pulp mill. The behaviors of xylan, mannan, carbohydrate and hexenuronic acid (HexA) contents in various alkaline cooking of Japanese larch were studied. A Part of dissolved xylan was re-adsorbed by wood fibers in the cooking, and the result indicates that the pulp yield can not be estimated from ratios of xylose to glucose (X/G ratios) liberated by acid hydrolysis from the pulps. Therefore, we made some equations which could simulate the behaviors of delignification, carbohydrates, ratio of mannose to glucose (M/G ratios), and HexA in the cooking from the results of kraft, kraft-AQ and PS-AQ cooks. From these equations, we clarified the relationship between pulp yields and the M/G ratios, and then, it was shown that a good correlation existed between pulp yields and M/G ratios at kappa number 25. The softwoods pulp yields with kappa number 25 at the mill using the Japanese red pine and Japanese cedar mixed wood chips were estimated by the proposed method. The M/G ratios of mill pulps from kraft-AQ and kraft cooks were 0.0812 and 0.0704, respectively, and the result means that the pulp yield by kraft-AQ cook was 1.3% higher than that by kraft method. HexA contents of PS-AQ and kraft-AQ pulps with kappa number 25 at a given H-factor from Japanese softwoods were higher than that of kraft pulp. At the mill trial, the HexA content of kraft-AQ pulp was 7 mmol/kg higher than that of kraft pulp.

Keywords: kraft, anthraquinone, polysulfide, pulp yield, carbohydrate, hexenuronic acid

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Vol.62 No.11 Abstracts

Basic and Application of Wet End Chemistry

Atsushi Watanabe
Pulp and Paper Research Laboratory, Oji paper Co., Ltd.

The purpose of adding wet end chemicals and wet end chemistry practices are to achieve optimum paper properties and enhance papermaking efficiency. In recent years, papermaking condition has changed by use of variety of recycled paper, high amount of coated broke usage, increase in speed of paper machine and closed water system in paper mill. These trends complicate wet end conditions and make resolution of wet end problems difficult.

In this paper, at first, basic wet end chemicals are introduced, and show some examples of analysis of deposition in paper machine and a useful way for selecting chemicals to fix problems.

The Approach to WET- END Process Optimization
-The Analysis Method for WET- END Process and Case Study-

Roland Berger
BTG Instruments GmbH

Gaining greater productivity and paper quality is a systematic and continuous process. This statement is especially true for the Wet End of the paper machine. Many strategic additives are introduced to influence machine runnability and paper quality. At the same time there are only few areas of the paper machine with less automatic control. This paper will present two case studies of waste paper-based newsprint machines at the Papierfabrik Palm, Eltmann mill that led to better control in the Wet End.

The Application of Fuzzicide in White Water Circuit for Productivity Improvement

Hiroyuki Suzuki, Satoshi Kashiwagi, Sousuke Iwata, Hiroki Katsura, Katsuhiko Hidaka and Takumi Sugi
Technical Section, Pulp & Paper Industry Department, Kurita Water Industries Ltd.

The trend in papermaking is use more recycled fiber in the furnish, maintain the pH of paper machine at neutral, reduce fresh water consumption. These changes accelerate the CaCO3 scale problems, the pitch problems and the slime problems.

Fuzzicide is new inorganic slime control agent and can keep all papermaking processes clean. New monitoring tool can understand cleanness in the processes.

These new techniques are able not only to decrease the spot and the sheet break but also to extend the operation period.

Optimization of the Passing Velocity for Primary Screens on PM5

Kotaro Soda
Yufutsu Mill, Nippon Paper Industries Co., Ltd.

The start of No.5 paper machine (PM5) at Yufutsu Mill was in 1979. Currently, its capacity is approximately 300 metric tons per day. Its product mix includes wood free paper and base paper for thermal paper and no carbon copy paper.

Originally, wet end was run at an acid pH. However, the machine has been converted to neutral pH with the use of calcium carbonate. The calcium carbonate was originally supplied by purchasing from another company. Then, as a cost savings measure, the calcium carbonate was purchased from another Nippon Paper mill.

When this change occurred, there were increased incidents of screen baskets plugged with "stock lumps". There would defect randomly and cause sheet defects or sheet breaks.

This report shows the results of passing velocity optimization of the primary screens to reduce stock lump build up and plugged screen baskets.

Improvement of Cleaning Procedure and Deposit Prevention in Stock Preparation

Takahiro Aya
Nichinan Mill, Oji Paper Co., Ltd.

#2PM in Nichinan mill of Oji Paper was established in 1956 and has been modified in the part of stock preparation process in order to be satisfied with quality of the paper. Now we are making some base papers for Ink Jet printing paper, thermal paper used as specialty, ticket, sketchbook, specialty paper used as business card, and thick fine paper. These papers are used for digital imaging print and require low dart number because end users use them by a piece of sheet and look the fresh printed paper carefully.

This is a report in regard to some improvements of the process and the operation for stock preparation.

Improvement of the Runnability for Paper Making by "Axisz System"

Koichi Tadaki
Technical Dept., Somar Corporation

Neutral papermaking and high recycle fiber usage in recent years make papermaking more troublesome. Conversion of acid to neutral papermaking reduced popular use of alum. Increased recycled fiber usage promoted by global resource protection and environmental concern brings more foreign materials such as pitch and anionic trash in papermaking system. At Somar we have been working on wet-end improvement agent "Realizer A series" as functional coagulant which maximizes the effect of variety of wet-end chemicals. Latest polymer technology help us to develop another functional retention aids as "Realizer R series" and "Rexer FX series" which are effective in fine and ash retention. Synergistic effect of the combination of these chemicals to improve wet-end performance is referred as "Axisz System".

It developed by Somar will give a solution to the problems associated with wet-end operation. The new chemical assists retention of other wet-end chemicals, thus reducing total chemical usage. It also improves drainage and fiber retention. Optimization of wet-end operation using "Axisz System" can be achieved by proper selection of cationic charge, molecular weight and molecular weight distribution. It depends on stock characteristics and other chemical usage. Maximization of the effect with "Axisz System " is demonstrated.

Operating Experience of "Intensa Pulper", The Newly Developed Low Consistency Pulper

Akihiro Yamamori
Oita Mill, Oji Paperboard Co., Ltd.

Oji Paperboard Co., Oita Mill has three paper machines, No.1, 3 and 5, and produces gypsum board, white and colored board, core paperboard, etc. other than main product of linerboard.

As the blending rate of the old corrugated containers (OCC) into the paper products now reaches around 80 percent here, the energy saving in the OCC pulping process and the quality improvement of the recycled pulp have become very essential and important to realize more effective secondary fiber system.

For this purpose the first "Intensa Pulper" in Japan, which was developed by Voith IHI Paper Technology Co. was installed in the OCC pulping process with result of the extensive power saving and the significant improvement of the OCC defibering characteristics.

In this paper, what and how the Intensa Pulper is and its operation experience and running effect are reported.

A New Design for Paper Dry Strength Agent and Its Application Method in Wet End

Hiroshi Nakagawa
Paper Chemicals Division, Arakawa Chemical Industries, Ltd.

Encouraging environmental protection and conservation program, an amount of recycled paper and paper board furnish has been increasing in Japanese. On the other hand, it has become very tight to get used paper in the domestic market recently. A large volume of used paper has been exporting towards China with better price, therefore Japanese paper industry must use lower grades furnish. Such fibre materials cause papermaking conditions worse and hard to control machine runnability.

Many companies have introduced new machines in East Asia, and production cost is very important for domestic papermakers to survive in the market. However, the price of used paper has been increasing dramatically, and optimizing lower quality grade fibre has to be inevitable. In order to produce paper and paperboard by a high speed machine using such grade fibre, high performance wet-end chemicals must be developed to achieve better machine control and cost reduction.

In this paper, recent technical trends of polyacrylamide (PAM) based dry-strength agent and partially cationic starch were discussed. In particular, treatment systems of blanched chain structure PAM combination was investigated, in which two or more type of each PAM equipped different coagulation force. This application could be useful for various papermaking systems and it is expected to be applicable to more complicated wet-end condition and high speed machine papermaking.

kajaaniWEM & kajaaniRM3 - The Integrated Management from Stock to Wet-end

Jukka Nokelainen and Takeshi Sato
Process Automation Systems Division, Metso Automation

This paper introduces two lately launched superior tools for wet end management: modular multi talent analyzer and consistency sensor. The consistency sensor is stand-alone device that performs continuous measurements from one sample point. It is ideal for applications that require continuous total and true ash consistency measurement and automatic control. The new analyser is first in the world that provides papermakers with all the right and relevant wet end measurements. Here we describe by several living examples of charge, pH, temperature, redox, conductivity, and consistency measurements, how to get comprehensive understanding over paper making from Stock to Wet-end and point out process problem areas and find right actions to correct them.

A Report on the 2008 Japan-China Pulp and Paper Technical Exchange Symposium

Takashi Ochi*1, Yutaka Kaneko*1 and Kunitaka Toyofuku*2
*1Nippon Paper Industries Co., Ltd.
*2JAPAN TAPPI

The second Japan-China technical exchange, "2008 Japan-China Pulp and Paper Technical Exchange Symposium", sponsored and arranged by Japan TAPPI, China TAPI and Shandong Light Industry Institute, was held on May 20-21, 2008 in Jinan, Shandong, China. The number of participants of both countries was almost 200. Before and after the symposium, Japanese participants visited five paper mills.

A Report on the 21st ISO/TC6 Meeting

Takayuki Okayama*1, Toshiharu Enomae*2, Yasuhiro Oba*3, Kyoji Kishi*4, Shisei Goto*4 and Tadashi Kano*5
*1 Tokyo University of Agriculture and Technology
*2 The University of Tokyo
*3 Oji Paper Co., Ltd.
*4 Nippon Paper Industries Co., Ltd.
*5 Japan Technical Association of the Pulp and Paper Industry

ISO/TC6 meeting was held on June 9-13, 2008 in Seoul, South Korea. The number of registered delegates representing seventeen countries was seventy three.

Eight delegates representing Japan attended WG meetings, plenary meetings of SC2 and SC5, and TC6 plenary meeting.

Theoretical Study of the Sheet Transport Speed with the Rubber-Covered Roller

Takao Kobayashi and Shinji Nakayama
Pulp and Paper Research Laboratory, Oji Paper Co., Ltd.

In this study, systematic consideration about the sheet transport speed was performed with the finite element analysis. Poisson's effect does not appear in compressible materials such as urethane, and volumes just decrease by compression whereas the normal rubber shows the incompressibility which keeps a fixed volume. The sheet transport speed ratio (the ratio of the movement speed of the sheet for the peripheral speed of the rubber roller) is almost in proportion to a tension difference in front and back of the nip without depending on a value of the sheet tension. It has an increasing linear relationship with the contact pressure of the roller in the case of the incompressible rubber and has a decreasing linear relationship in the case of the compressible material. It was confirmed that this speed ratio depended on a tangential elastic strain of the rubber roller in the stick region by simulation.

In the applied example assumed a printer paper feed tray, we understood that when the sheet was transported with a pickup roller, the frictional force from back side of the sheet had an influence on the speed ratio greatly. When a pickup roller was located in the one side, it followed that frictional force by the weight of the sheet became the resistance, and skew occurred. When two pickup rollers were arranged in parallel and the contact pressure of each roller was not equal, the transport speed difference caused skew. In this case, it is predicted that buckling occurs if skew will be controlled forcibly by side plates.

Keywords: finite element analysis, sheet transport speed ratio, incompressible rubber, compressible material, rubber-covered roller, elastic strain

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Vol.62 No12 Contents

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Vol.62 No.12 Abstracts

Misunderstandings in Environment Conservation

Tokuji Murata
Recyclable Resource Research Institute, Inc.

Many activities aiming to conserve environment are going on in Japan these days. There, however, are projects and researches which are based on misunderstandings and are inconsistent with environment conservations.

This paper demonstrates that some of research concepts on carbon dioxide recycling and its reduction are not right for preventing global warning. Obtaining hydrogen by electrolyzing sea water is not feasible and carbon dioxide should not be reduced by hydrogen. Getting hydrogen from metal does not mean the reduction of carbon dioxide.

Regarding biofurel, only half of grape sugar (glucose) is converted to ethanol and the rest is wasted as carbon dixide. Biodiesel fuel also has problems. Then, prospect for synthetic petrolium and wasted wood utilization are discussed.

Status and Trend of Environmental Laws and Regulations

Shigenori Imamiya
Environmental Management Department, Oji paper Co., Ltd.

Although many environmental laws and regulations have been enacted and put in force mainly to tighten the control since the 1990s, this trend could continue for the duration.

The focus of attention to come in environmental laws and regulations could be placed on (a) energy saving and global warming curbing countermeasures, (b) the chemical substance management and (c) waste and recycling affairs. Especially, it is expected to introduce a drastic reform for “Waste Disposal and Public Cleansing Law” because there are some situations taking place, which interfere with adequate recycling.

In this environmental seminar, the environmental laws and regulations are presented, which have been revised for the past several years and have to be watched closely.

It can be said that for ensuring compliance to environmental laws and regulations, it is necessary to understand the purpose and outline of the laws and regulations, and raise the level of efforts.

Overview of EU REACH Regulation and REACH Compliance Activity in FUJIFILM

Jun Yamaguchi
FUJIFILM Corporation, Ecology & Quality Management Control Div.

The new European Chemicals regulation REACH has entered into force June 1, 2007.
The aim of REACH is to reduce risks related to substances across the supply chains and forces many new responsibilities (Registration, Evaluation, Authorization and Restriction) to manufacturers and importers of substances.

Outside Europe, now, there needs a new social infrastructure to be compliant with the new requirements, especially, for those to inform the content chemicals information in article along the whole supply chain.

This article is an overview of the REACH regulation and REACH compliance activity of JAMP (Joint Article Information Promotion Consortium) and the activity in FUJIFILM Corporation.

World Topics over the Paper Industry
-Mainly about Environment-

Kunitaka Toyofuku
JAPAN TAPPI

A North American decline, North European strength and Chinese rise are remarkable nowadays if we make a survey of world paper industry. It will be necessary for the paper industry to support resources and environment in future.

As for the environment, we must correspond to reduction of the fossil fuel for prevention of global warming, promotion of recycle and reuse of the wastepaper and issue of forest. There is much misunderstanding about forest decrease and the afforestation of industry, and it is necessary that we, engaged in paper industry, can clean people's misunderstanding.

I introduce the present status of Chinese paper industry having a big influence to Japanese it, with the second 2008 Japan-China technology exchanges symposium held in Shangdong Jinan City recently. Furthermore, I introduce too about the conditions of a country and paper industry of India attracting attention next to China, from the experience that participated in Paperex2007 held in 2007.

Application of Methane Fermentation Technology for Waste Water Treatment

Kaoru Hamada
Pulp & Paper Research Lab., Research and Development Division, Nippon Paper Industries Co., Ltd.
Hideaki Fujita
Iwakuni Mill, Nippon Paper Industries Co., Ltd.
Masahiro Murata
Yufutsu Mill, Nippon Paper Industries Co., Ltd.

The methane fermentation is known as the useful technology for the waste water treatment. The technology has some advantages, such as the energy recovery of biogas from organic compounds in waste water and the lower sludge generation compared to the aerobic treatment. After the improvement of treatment efficiency with UASB method, this technology has been used by various kinds of industries including food production, while in the paper industry, it has been introduced mainly in Europe.

Nippon paper industries has launched the waste water treatment facilities with the methane fermentation technology at Yufutsu mill and Iwakuni mill, in 2004 and 2005 respectively. These facilities have been utilized for the treatment of condensate from black liquor, for the first time in Japan.

Principle of NOx Formation and Reduction Technology and Stabilization of NOx Emission

T. Yokoshiki and Y. Taguchi
Boiler Engineering Section, Boiler Engineering Department, Mitsubishi Heavy Industries, Ltd.

An example of the inappropriate facilities management of the Air Pollution Control Law and the Water Pollution Prevention Law had occurred in a part of enterprise which installed boiler facilities for electricity and power in 2007, and it became the socially big concern.

From the viewpoint of laws and ordinances observance enforcement, investigating Committee of Ministry of the Environment and investigation of every enterprise have been performed, and analysis of the example and a future action guidance have been reported.

A nitrogen oxide (it is called as NOx) is a material regulated as one of the soot of the Air Pollution Control Law. In the reports of investigating Committee of Ministry of the Environment and investigation of every enterprise, there are many inappropriate example of NOx emission. Although a principle of the NOx generation and the NOx reduction technology have been published by boiler makers and reported as various public intellect documents in the past, in this document, we will present here in order to help to obey the laws and environment subject from now on.

Sumitomo Chemical's Sustainable Management

Tsuneo Nara
Responsible Care Office, Sumitomo Chemical Co., Ltd.

Sumitomo Chemical has long undertaken voluntary Responsible Care activities to ensure the performance of its products in terms of the safety, environment, health and quality throughout their life cycles. These voluntary activities are undertaken not only at Sumitomo Chemical, but also extend globally to include our Group companies both in Japan and overseas.

The Company takes this beyond the concept of Responsible Care in its active efforts to promote Sustainable Chemistry, by which we endeavor to raise the overall value and benefit to society of our products as well as their economic value-added.

We are promoting CSR-based management (Sustainable management) that contributes to society with the products and services created through its practice of Sustainable Chemistry, while giving due consideration to Responsible Care, the needs of society, and economic requirements in all aspects of its operations.

Our company's approach to Sustainable management and Responsible Care activities will be outlined in this document.

Desirable Measures against Global Warming Issue

Toshinori Kojima
Department of Materials and Life Science, Seikei University

The Kyoto Protocol came into effect in Feb. 2005, by the ratification of Russia. But, the target term is 2008-2012, and now the year. Why it took so long time? All of the measures for global warming problem, especially carbon dioxide problem, are classified into; a) change in primary energy source, b) effective use of energy, c) reduction in CO2 emission from other than energy, d) CO2 recovery and storage or fixation, e) CO2 absorption from atmosphere, e.g., afforestation, and f) policy and economic options. And the various measures as above were classified into two categories; regrettable and no-regrettable. In the course of the present evaluation, we should take resources problems as discussed above and other environmental problems into account. Taking these conditions into account, a tax to all virgin resources is thought to be most suitable, though critical evaluation of amount of resources is essential.

Report on TAPPI Advanced Coating Fundamentals Symposium '08

Masanori Kawashima
Nippon Paper Industries Co., Ltd., Pulp & Paper Research Laboratory

TAPPI Advanced Coating Fundamentals Symposium '08 was held in Delta Centre-Ville hotel, Montreal, QC, Canada from June 11 to 13. There were 11 sessions and 38 presentations in this conference. This international conference attracted over 100 participants from around the world. I had an opportunity to join the conference and made a summary of interesting 9 presentations in this report.

The 2008 Pan Pacific Conference/Control Systems 2008
-June 16-18, 2008 in Vancouver, Canada-

Yoshitatsu Mori*1 and Kunitaka Toyofuku*2
*1Oji Paper Co., Ltd.
*2JAPAN TAPPI

2008 Pan Pacific Conference incorporated in Control Systems 2008 (16-18 June) was held under the PAPTAC's auspices in Vancouver, Canada. On behalf of JAPAN TAPPI, Mr. Toyofuku, executive director of JAPAN TAPPI, attended the conference. Pan Pacific Conference is held every two years in the rotation of 8 countries of Pacific Rim. The conference was held in Seoul, Korea in 2006. As it was incorporated in Control Systems Conference in this time, the presentations from the field of process control were often found. At the 2008 conference, 3 Japanese speakers attended. A summary of Japanese presentations and other interested ones are described.

The representative from PAPTAC (Canada), JAPAN TAPPI (Japan), Korea TAPPI (Korea), APPITA (Australia), Taiwan TAPPI were in the attendance at the conference, but TAPPI (USA), TAPPIP (Philippines), CTIP (Chile) were not.

A Report on the Fall Meeting of the 2008 TAPPI Research Management Committee

Hideki Fujiwara
Nippon Paper-Pak Co., Ltd.

The 2008 fall meeting of the TAPPI Research Management Committee was held from August 20 - 23 in Quebec, Canada. On the way from Montreal to Quebec City by bus, tours were taken to FTInovations PAPRICAN, CIPP (Centre Integreen Pates et Papiers), CIC (Centre International de Couchage). It was impressive that high speed pilot paper machines and a coater were well equipped in such facilities. In Quebec City, meetings were held in two and a half days. Topics discussed were highly bio-refinery oriented.

Development of a New Cooking System using Highly Concentrated Polysulfide (I)
-Effects of Liquor to Wood Ratio and Sulfide Concentration during Hardwoods Cooking-

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

To develop a new cooking system with highly concentrated polysulfide (PS) from the white liquor (WL), effects of liquor to wood (L/W) ratio on hardwood pulp yield, kappa number and screened reject were investigated.

In industrialized technology available today, PS liquors are produced by air oxidation of kraft WL in the presence of a catalyst. Unfortunately, air oxidation promotes side reactions that limit the maximum concentration of PS in the produced liquor, which in turn limits the potential gain in pulp yield.

PS and Na2S concentrations are predominantly important for PS cooking. However, their concentrations in ordinary lab cooking using static autoclaves were often lower than mill continuous digesters because static lab cooking needs higher L/W to soak wood chips in autoclaves.

In this study rotating autoclaves were employed to realize lower L/W ratio cooking system relevant to the one in mill hardwood continuous digester.

The result shows yield gain of PS cooking became obvious at higher initial PS concentrations (1.7-4 g/l as S) in the condition with reduced screened rejects. Also, initial Na2S concentrations on cooking have to be kept more than 6-9 g/l as Na2O, to avoid increase of kappa numbers and screened rejects.

PS have to be produced from Na2S in the WL to keep Na+ and S2- balance in WL recovery cycle. To obtain the optimal effects of mill PS cooking, efficient and self sustained PS production methods with minimum Na2S loss are desired.

Keywords: Polysulfide, Sulfidity, Na2S, Pulp yield

A Comparison between Oken Air Resistance-Smoothness Tester and Related Testers in Relation to Measured Values

Tadashi Kano
JAPAN TAPPI

In Japan, Oken tester is widely used for the measurement of smoothness and air resistance for paper and paperboard. This instrument developed in Japan gives the same measured values as those obtained by Bekk smoothness tester and Gurley air-permeance tester within seconds for most papers, respectively.

As for standards, Oken tester is only adopted as a JAPAN TAPPI Test Method, while other related testers are adopted as ISO standards and Japanese Industrial Standards (JIS). JAPAN TAPPI has been working to publish JIS of Oken methods for both smoothness and air resistance. Also, JAPAN TAPPI has started a work for new work item proposals of Oken methods as ISO standards.

Since Oken tester is not well-known among Western countries, it is necessary to show a comparison between Oken tester and related testers in relation to measured values.

In this paper, various kinds of paper samples were tested using Oken tester, Bekk tester, Print-surf tester and Gurley tester.