

Vol.61 No.1 CONTENTS

New Year's Speech	Yoshihiro Kanamaru…(1)
The Special Issue of JAPAN TAPPI2006Annual Meeting at Fukuoka・Yatsushiro	
General Review of JAPAN TAPPI2006Annual Meeting at Fukuoka・Yatsushiro	Planning Subcommittee, JAPAN TAPPI…(4)
Keynote Address	Yoshihiro Kanamaru…(14)
Lecture by Winner of 2005 JAPAN TAPPI Prize	…(22)
A Visit to Yatsushiro Mill—Nippon Paper Industries Co., Ltd.—	…(29)
Technical Report	
Creative Technologies of the Thermally Sprayed Coating, "KX ROCK",for Press Roll	Toshiro Tajiri, Nobuaki Sakoda and Susumu Arakawa…(36)
Retrofit of the Existing PS Screens by Unique Technology —Dramatic Energy Saving and Performance Improvement—	Takeshi Kanazawa…(42)
Challenge to the Development of Bulky Paper in NPI	Takashi Ochi…(50)
Quantitative Estimation of Macro Stickies in Recycled Pulps for Linerboard	Tadahira Yaguchi…(54)
Inhibition of Yellowing of ECF Bleached Hardwood Kraft Pulp	Ayano Kawae and Yosuke Uchida…(59)
Excellent Printing Effect of High—quality Newsprint	Masayuki Kawasaki …(63)
Operational Experience of New Winder Control System	Tetsuya Okouchi…(68)
Operational Experience of the Biomass Boiler	Yousuke Makita…(72)
Breeding Strategy for the Pulp Quality Improvement in Eucalyptus Trees	Shigeru Sato…(79)
The Approach for No Manual Sorting System	Hiromu Nakamura…(84)
Committee report	…(03)
Coffee break	…(88)
Papyrus	…(89)
Industry News(Domestic and International)	…(91)
List of Titles in Foreign Journals Received by JAPAN TAPPI	…(102)
List of Patents issued and Laid—open Publication	…(104)
Price list of Domestic Logs and Wood Chips by District	…(113)
Wholesale Price list of Papers at Tokyo Trade Center	…(114)
Other Monthly Statistics	…(116)
News from the Association	…(118)

2007年1月 紙パ技協誌

[プリント用ページ]

Creative Technologies of the Thermally Sprayed Coating, "KX ROCK", for Press Roll

Toshiro Tajiri, Nobuaki Sakoda and Susumu Arakawa
KURASHIKI BORING KIKO Co., Ltd.

Recently, the requirement of high productivity in papermaking industry demands increasing the size and the running speed of papermaking machine, thus press-roll in the papermaking machine requires continuous improvement of the durability and stability.

In the past years, the press-roll replaced drastically the natural granite stone in whole roll with an artificial ceramic coating in the surface only. This artificial ceramic coating in the surface requires not only good mechanical and chemical properties, such as resistance to wear and corrosion, but also surface properties, in which the condition of releasing paper off the roll surface, i.e. the draw property, and without contaminations attached are important.

The "KX ROCK", which is ceramic coating by thermal spray for the press-roll, was developed as a replacement of the granite stone roll. The "KX ROCK" coating shows a superior draw property due to optimized surface roughness and wettability by the coating material. Especially, surface energy of the "KX ROCK" is higher than that of original stone roll, which leads to a good wettability, resulting in a better paper releasing property. And in addition, the "KX ROCK" also shows a good wear resistance and a perfect protection of base material from corrosion.

Retrofit of the Existing PS Screens by Unique Technology
- Dramatic Energy Saving and Performance Improvement -

Takeshi Kanazawa
Technical Department, Aikawa Iron Works Co., Ltd.

One of the most familiar outward flow screens in Japan is a pressure screen that is called as PS-Screen. Using the latest screening technology developed by Aikawa, the performance of those screens can be dramatically improved; for instance, the specific unit power consumption can be reduced by 75% comparing with the original PS-Screen. This retrofit technology was conferred Sasaki prize on as the best development machinery of this year by Japan Tappi. This report introduces this technology.

Challenge to the Development of Bulky Paper in NPI

Takashi Ochi
Nippon Paper Industries Co., Ltd.

Bulky paper is getting popular in the past ten years. If the thickness of paper is the same, the weight of bulky paper is lighter than conventional paper. This means that bulky paper is environmentally friendly because of the lower amount of pulps and other energy consumption, and is human friendly as well. Nippon Paper Industries Co., Ltd. (NPI) has been developing and producing bulky paper ranging from non-coated paper to coated grade by new technologies. These new bulking technologies are based on fillers and chemicals. These materials were not used for bulking paper in the past. NPI has challenged and succeeded to use these new technologies. Precipitated calcium carbonate (PCC) which has scalenohedral shape and appropriately controlled particle size is favorable for bulky paper. Those PCCs have been producing at mill-site plants of NPI. Chemicals for bulky paper (bulking agents) work as blocking hydrogen bonds of fibers and so cause the decrease of strength of paper. For this reason, paper makers have hesitated to use these chemicals. However, NPI has had conquered problems to use the bulking agents. With well designed filler and bulking agent and other novel technologies, up to 30% lighter wood free book grade can be obtained.

Quantitative Estimation of Macro Stickies in Recycled Pulps for Linerboard

Tadahira Yaguchi
Pulp & Paper Laboratory, Nippon Daishowa Paperboard Co., Ltd.

It was difficult to separate macro stickies efficiently from recycled pulp for linerboard which consists mainly of old corrugated container and measure them accurately by image analysis method, because the pulp contains much flakes, shives and nonsticky foreign substances besides them.

We improved the image analysis method of measuring macro stickies content, ISO 15360-2, to apply it to the pulp. By the improved method, macro stickies content in the pulp in treatment process was measured and the effect of removal and dispersion of macro stickies with equipments for screening and dispersing was estimated.

Inhibition of Yellowing of ECF Bleached Hardwood Kraft Pulp

Ayano Kawae and Yosuke Uchida

Research Development Div., Pulp & Paper Research Laboratory, Oji Paper Co., Ltd.

The aim of this work was to inhibit the heat- and moisture- induced yellowing of ECF bleached hard wood kraft pulp (LBKP) in acidic paper. We have already reported that one of the derivatives of hexenuronic acid (HexA) in LBKP, 5-formyl-2-furancarboxylic acid (FFA), causes yellowing, and that FFA might polymerize or react with pulp components to form new chromophoric groups¹).

In this study, it was shown that the carboxylic base of FFA interacts with that of glucuronic acid or galacturonic acid, resulting in strong yellowing. Therefore, it seems that preventing the reaction of carboxylic bases could be effective in suppressing this yellowing. We have discovered that polycarboxylic acids (for example, citric acid, tartaric acid, etc.) are useful as a yellowing inhibitor.

Excellent Printing Effect of High-quality Newsprint

Masayuki Kawasaki

Nippon Paper Industries Co., Ltd.

High quality newsprint is characterized by neutralized paper manufacturing process and high addition of calcium carbonate. We have almost converted to the high quality newsprint from previous product in all mills of our company. We confirmed that operation aptitude for print like web break and dust level is as good as the previous product according to past market evaluation. On the other hand, print qualities of multi color printing such as show through, tone reproduction, color reproduction are highly evaluated compared with the previous product. It was considered that high addition of calcium carbonate that showed high light scattering as filler contributed to these print qualities of multi color printing.

In this paper, characteristics and printability of the high quality newsprint are introduced, especially the analysis result of the mechanism that derives excellent print effect in multi color printing than the previous product is explained.

Operational Experience of New Winder Control System

Tetsuya Okouchi

Noumachi Mill, Chuetsu Pulp & Paper Co., Ltd.

Usually, only position data are sent to the drive for stopping winder to remove spots on the paper. Stopping position of winder is not accurate by that way, because paper length changes on the process, web brake shortens paper length, and also the marking position is reversed on winder.

New Winder Control System (NWCS) solved that problems, by adding position data on the mark, which is printed on the paper edge by ink jet printer. The data included in the mark are read by the camera on winder, and control signal based on the data are sent to the drive. The stopping position is very accurate, because the position data in the controller are always refreshed by the mark.

This is really useful system, and will be quite popular system in near future.

Operational Experience of the Biomass Boiler

Yousuke Makita

Power Section Tokai Pulp & Paper Co., Ltd.

Tokai Pulp Ltd sets up a mill at Shimada city located almost middle in Shizuoka prefecture. This Shimada Mill reaches 100th anniversary in next year and manufactures paper and pulp mainly. Much electric power and steam is necessary for the manufacturing process of paper & pulp. The necessary electric power was generated at its own power plants; a hydroelectric power plant and thermal power plants and it bought the shortage of it from Chubu Electric Power Co., so far. The steam was generated by its own some boilers; heavy oil fired boiler, soda recovery boiler and waste fired boiler, so far.

We planed biomass boiler power plant in order to reduce a mount of exhaust CO2 and a cost of energy among the social trend to stop green house effect and to realize Society with an Environmentally-Sound Material Cycle. We started to construct No.11 Boiler/ No.5 steam turbine generation plant whose fuels are wood biomass and RPF at May in 2005, completed it at January in 2006. The introduction of this plant realized the conversion from fossil fuels to biomass fuels and can achieve the initial purpose.

In the report, we describe the outline of biomass boiler plant operated from February in 2006 and the operational experience.

Breeding Strategy for the Pulp Quality Improvement in Eucalyptus Trees

Shigeru Sato

Forestry Research Institute, Research & Development Division, Oji Paper Co. Ltd.

The Eucalyptus species are widely distributed in the temperate zone in the southern hemisphere and used as a raw material of pulp in Asian-Oceania region. The paper manufacturing industry has particularly high expectations to this tree because it has superior growth property and pulp quality. Since 1991, Oji Paper has been advancing the overseas forest plantation business for securing the forest resource and to protect the environment.

Forestry Research Institute of Oji Paper has been studying the improvement of the productivity of Eucalyptus plantation in Australia. We have already isolated a lots of plus tree candidates which were selected by growth characteristics (height, diameter, etc.) from several plantation sites. We carried out the wood quality analysis of the candidates. The results of the analysis showed that there were great differences of basic density and pulp yields among the candidates, and suggested that it is very important to improve not only growth but also wood quality for the plantation business and paper manufacturing. Therefore, we have been progressing the Eucalyptus breeding project to improve the wood quality of the candidates. Our breeding project has two approaches. One is the conventional breeding method and the another is the molecular breeding method using the regulatory genes of wood quality. We report our current status of the project.

The Approach for No Manual Sorting System

Hiromu Nakamura

Hokuetsu Kamiseisen Co., Ltd.

A sheet finishing process is still underdeveloped compared to developed large scale and well controlled paper manufacturing process. Therefore, it needs many skilled employees who work on manual inspection and sorting. Hokuetsu Kamiseisen Co., Ltd. operates wrapping on rolls, sheeting and sheet finishing process in Hokuetsu Paper Mills, Ltd. Niigata Mill and has plugged away at labor-saving through not only automatic equipment but also awareness reform that called "quality verification activity between processes".

This report is focused on the labor-saving history, especially "the quality verification activity" is described. This activity is extremely successful with the labor-saving and the re-inspection and resort worked by many skilled sorter are basically abolished.

Vol.61 No.2 CONTENTS

Papermaking Technology II

Technical Trend of Printing Industry, and Coated Paper/Imported Paper	Michio Haibara…(1)
A State of Art of the Board Coating Technology	Katsumi Ishizuka…(7)
Operating Experience of Paperboard Coater	Kouhei Kawamura…(12)
Recent Tendency of Coating Technologies	Yasuhiro Hatano…(17)
Operating Experience of Water Jet Turn—up Device	Toshinao Imai…(26)
How to Detect Defects on Coating Paper —SmartView Inspection System Technology—	Satoshi Suzuki…(31)

Topics & Information

Low Intensity Refining —The Approach from the Refiner & the Refining Fillings—	Kazumi Fujita…(33)
The Development of New ASA Sizing Agent and that Systematized Kenji Tsunekawa, Kazutaka Kasuga, Koichi Tadaki and Hiroyoshi Numoto…(43)	
Optimizing the Paper Machine and its Tools —Scanpro, its Method and Features of the New Felt Moisture Meter—	Yoshihiro Ohkawa…(48)
The Operational Experience of New Canvas Cleaning Facilities"AOKI Cleaner"	Toshio Kameyama…(54)
About Flow Characteristic of Low Viscosity Coating Materials in High Shear Region Tazuko Watanabe and Keisuke Miyamoto…(60)	
Application of the Coating with High Wear and Stain Resistance to the Parts for Paper Manufacturing Tokumi Ikeda, Teruyuki Kitagawa, Junji Taguchi and Yong—Bo Chong…(63)	

Introduction of Research Laboratories (57)

Laboratory of Chemistry of Composite Materials, Chair of Biomaterials Function, Division of Forest and Biomaterials Science, Graduate School of Agriculture, Kyoto University	…(68)
---	-------

Research Report(Original Paper)

The Feasibility of Recycling Zeolite Synthesized from Paper Sludge(CPSZ) Part1:The Evaluation of the Chemical and Mineralogical Properties of CPSZ and the Feasibility of Mass Production Takao Ando, Takabumi Sakamoto, Kimio Hiyoshi, Naoto Matsue and Teruo Henmi…(72)	
---	--

Pulp and Paper Mills in Japan (65)

—Shimizu Mill, Tomoegawa Co., Ltd—	Tomoegawa Co., Ltd…(84)
------------------------------------	-------------------------

Committee report	…(03)
Essay on Intellectual Property	…(70)
Coffee break	…(71)
Papyrus	…(88)
Industry News(Domestic and International)	…(91)
List of Titles in Foreign Journals Received by JAPAN TAPPI	…(102)
List of Patents issued and Laid—open Publication	…(104)
Price list of Domestic Logs and Wood Chips by District	…(120)
Wholesale Price list of Papers at Tokyo Trade Center	…(121)
Other Monthly Statistics	…(123)
News from the Association	…(125)

2007年2月 紙パ技協誌

[プリント用ページ]

Technical Trend of Printing Industry, and Coated Paper/Imported Paper

Michio Haibara

Dai Nippon Printing Co., Ltd.

"Graphic Arts" is now going to be "Printing Industry".

In the printing industry, the digitalization of prepress-process has been established at the end of 1990s. And from the beginning of this century, the development of the printing technology is concentrated on the improvement of productive efficiency and the standardization of the print-quality. For this standardization, it tends to be more important to study interrelations between the print-quality and the paper qualities.

This paper describes the technical trend of printing press and printing process, and the technical problem concerning the coated paper.

A State of Art of the Board Coating Technology

Katsumi Ishizuka

Coating and Finishing Engineering Department,

Voith IHI Paper Technology Co., Ltd.

Low speed and small width coaters have been used for paperboard coating in the past. However, production by high speed and large width coating machine is recently getting popular. Due to this trend, uniformity of coating and drying at cross direction is becoming a great concern for manufacturers. High power drying becomes important factor, too.

In order to cope with such demand, we developed new coating system such as DF Coater, SF Coater and HP-SCAF Dryer. DF Coater (Curtain Coater) could realize non-stop coating by no loss time from cleaning coating head and changing consumable parts.

Being developed based on Jet Fountain Blade Coater and DF Coater, SF Coater has both advantages from them.

Due to high power drying, HP-SCAF Dryer could also realize drying uniformity without giving up stabilized web handling performance.

Operating Experience of Paperboard Coater

Kouhei Kawamura

Sec.2 Paperboard Production Dept.,

Nippon Daishowa Paperboard YOSHINAGA Co., Ltd.

Nippon Daishowa Paperboard Yoshinaga Co., Ltd. was floated in April of 2003. We are positively working on the energy saving activity aiming "Paper Recycling mill".

51 Paperboard machine has 4 on-line coater heads, started up in 1992 and with the purpose of getting into a new business for double-side coated bleached paper board business.

As one of the pioneers for the recent trend of the combination of on-machine coater and gloss-purpose calender, 51 Paperboard machine has developed various experiences and improvements in terms of runnability, safety, productivity, and cost savings.

This report is described on the operating experience Paperboard Coater of 51 Paperboard machine from start to now.

Recent Tendency of Coating Technologies

Yasuhiro Hatano

Metso-SHI Co., Ltd

Since the first announcement of introduction of OptiConcept machines for this century several years ago, Metso Paper have put many OptiConcept machines into world-wide market. The machines with design speed of 2000 m/min and 10m wide are running now. As for coaters, Metso Paper also has OptiCoater technologies, for which different types of coater heads can be supplied depending on each customer's purpose. For example, film coaters are now widely used for all on-line LWC production machines. Blade coaters are widely used for coated woodfree paper production and coated board production. Then, recent examples of new coaters are non-contact coaters such as spray coater and curtain coater. Drying concept for coating station has been also developed in these years. Air dryers plays major role for drying coated papers.

In this paper, the author will describe representative OptiCoater coating technologies.

Operating Experience of Water Jet Turn-up Device

Toshinao Imai

Kasugai Mill, Oji Paper Co., Ltd.

The CM3 at Kasugai Mill, Oji Paper has been in operation as off line coating machine since 1991. Thanks to the fine improvement of PM10 which produces base paper for CM3, production rate of the coater has increased gradually, but on the other hand, unsuccessful turn up at high weight grade became a serious problem. In order to achieve stable operation, the Water Jet Turn-up device has been installed in reel section in August, 2005. In this report, I describe the outline of remodeling, the operation experience, and the effect of the project.

How to Detect Defects on Coating Paper

- SmartView Inspection System Technology -

Satoshi Suzuki

Surface Inspection Systems Division, COGNEX K.K.

The Cognex SmartViewR Inspection System have been successfully inspecting various grades of coating paper in coater, supercalender, cutter and sorter. And Cognex developed Advanced Winder Advisor, which locates defects at the re-reeler or winder and controls the winder to stop on the selected defects.

We will introduce SmartView technology focused on how to detect and identify defects on coating paper.

Low Intensity Refining

- The Approach from the Refiner & the Refining Fillings -

Kazumi Fujita

Aikawa Iron Works Co., Ltd.

From ancient times, the refining has been a most important process to decide the paper characteristics, but the refining style changed with the times. A thing having the biggest influence in this transition is a change of paper stock itself. Recently, the planted LBKP fiber, and the recycled secondly fiber, these are the today's main raw materials for paper, length are becoming the shorter and shorter, accordingly their freeness are also getting to lower and lower. Today, therefore, is the big turning point of the refining from cutting to the "Low Intensity Refining" which can keep the length of fiber and change the shape of fiber to improve the paper mechanical properties. In this report, we AIKAWA IRON WORKS introduce our approach for the "Low Intensity Refining" with the capital refiner and the refining fillings.

The Development of New ASA Sizing Agent and that Systematized

Kenji Tsunekawa and Kazutaka Kasuga

R & D Dept., SOMAR Corporation

Koichi Tadaki and Hiroyoshi Numoto

Technical Dept., SOMAR Corporation

In recent year, low priced wet-end chemicals tend to be used in paper industry because of reducing costs and the productivity. Also the conditions of runnability are getting worse by increasing the recycle fiber sources and the improvement of runnability. Alum used in acid papermaking brought the ability regarding fixation of Rosin sizing agent. But the usage of Alum is getting down as the neutral papermaking is growing because of the weak ability of Alum in higher pH. Rosin sizing agent needs Alum to fix pulp fibers. So some problems happen in neutral papermaking about the fixation of Rosin sizing agent.

And the increase of AKD usage in neutral papermaking tends to decline because of the quality and the cost. In stead of AKD and Rosin sizing agent, Alkenyl succinic anhydride (ASA) is being paid attention in neutral papermaking. ASA sizing agent is spreading in Europe and USA but is not used so much in Japan. In future ASA sizing will be spreading in Japan because of the supply shortage of Rosin and reducing costs.

We need to control the deposit generating by ASA sizing agent in order to make ASA sizing spread in Japan. We investigated the method of emulsion, emulsion polymer, dispersion system and optimum conditions of particle size. Also we developed the new dispersion system in order to control the deposit by ASA sizing agent.

Optimizing the Paper Machine and Its Tools

- Scanpro, Its Method and Features of the New Felt Moisture Meter -

Yoshihiro Ohkawa

Lorentzen & Wettre Japan K.K.

Press and Dewatering at press part in paper machine has impact on paper properties, cost of dry part and run-ability, so that optimizing its part is always required to machine operator. For its purpose, in order to know press condition, Scanpro moisture meter was developed and introduced into the market in early of 1970 by AB Scanpro where in Sweden (now merged with AB Lorentzen & Wettre). Since developed, delivered more than thousand this meters to felt suppliers, chemical suppliers, machine suppliers and mills all over the world have been used as benchmark measurement. Now, meeting demand of more efficient measurement, two kinds of Scanpro meters are provided, which are Prestuner for measuring moisture and Feltperm for measuring water permeability. Trial by using both meters ensure more understanding the press condition and create benefit. This presentation introduces this method and the feature of New Felt Moisture Meter, which has just developed and has more advanced analyze-able function. Short-term effective investment with New Felt Moisture Meter can be promised.

The Operational Experience of New Canvas Cleaning Facilities "AOKI Cleaner"

Toshio Kameyama

AOKI Kikai Co., Ltd.

Currently the utilization of recycled old paper ha been accelerated especially on paper board manufacturing. This tendency has caused defective troubles at paper manufacturing process originated by sticky materials and effected drastically on machine run ability.

For this countermeasure of rejecting sticky materials from the process, canvas cleaning method might be the best way. Most paper mill's operators has expected such method as higher cleaning efficiency with reasonable price.

Based on the operational experience with "Canvas clean roll" developed by ourselves, new canvas cleaning facility "AOKI cleaner" has been developed after remodeling and adding many ideas on it. This report is referred the operational experience of "AOKI cleaner" on paper board machine.

About Flow Characteristic of Low Viscosity Coating Materials in High Shear Region

Tazuko Watanabe and Keisuke Miyamoto

Nihon SiberHegner K.K.

In practical applications the following information is important concerning the rheological behavior of coatings:

- The propose of coating for the filter of flat panel and the special paper of ink jet printer
- To take flow behavior of high shear rate region for the process of coating (ex. thixotropy behavior, leveling, sagging, layer thickness.

This paper informs newer rheological measurement about the behavior coatings. Presented is a new test method for the high shear rate region of the coating materials.

Application of the Coating with High Wear and Stain Resistance to the Parts for Paper Manufacturing

Tokumi Ikeda, Teruyuki Kitagawa and Junji Taguchi

Nomura Plating Co., Ltd.

Yong-Bo Chong

Research Institute for Applied Science

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 -- it is -- 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.

The Feasibility of Recycling Zeolite Synthesized from Paper Sludge (CPSZ)

Part 1: The Evaluation of the Chemical and Mineralogical Properties of CPSZ and the Feasibility of Mass Production

Takao Ando and Takabumi Sakamoto

Faculty of Risk and Crisis Management, Chiba Institute of Science

Kimio Hiyoshi

Fuji Industrial Research Institute of Shizuoka Prefecture

Naoto Matsue and Teruo Henmi

Department of Agriculture, Ehime Univ.

We tried to synthesize the carbonized paper sludge zeolite (CPSZ) by alkali hydrothermal treatment for the carbonized paper sludge (CPS) that was collected from the paper recycling association in Fuji city of Shizuoka Prefecture. First, the synthesis conditions were optimized in laboratory scale alkali hydrothermal experiments (alkali solvent = 20mL) on a hot plate. It was found that the coexistence of carbon-species with the precursor of zeolite (i.e. metakaolinite) scarcely affected the crystallization of zeolite. From the measurement of N₂ adsorption isotherm, the specific surface area of carbonized material in CPS increased by 3 times through the alkali hydrothermal treatment. Next, the synthesis of CPSZ on the semi-plant scale was carried out in a 50 L boiling reaction-chamber (alkali solvent = 40L). There was no difference between the products in 20 mL and in 40 L alkali solvent scale experiments in terms of mineral assemblage and other physical properties. In conclusion, the CPSZ can be mass-produced up to the scale of 2000 times with alkali solvent volume. It means that the mass-production of CPSZ is possible to industrial scale.

Keywords: paper sludge, zeolite, alkali hydrothermal treatment, meso pore, recycle

Vol.61 No.3 CONTENTS

Process Control and Automation

General Review of 30th Pulp and Paper Process Control Symposium

Process Control and Automation Committee, JAPAN TAPPI... (2)

On the Occasion of the Manufacturer's Presentation (Maker's Lecture), the 30 Years of History
for Instrumentation

Process Control and Automation Committee, JAPAN TAPPI... (12)

Innovation of Technology, History and Future Technology for QCS

Satoshi Nakamura... (23)

Innovating Distributed Control System

Masatoshi Nakahara... (28)

—The Past and the Future—

The WIS of Evolution and its History and Future

Masahiro Nakata... (33)

About the History and the Future of the Evolving MES

Yasuki Nagai... (37)

Technology Innovations of Field Instruments

Fumitaka Nozawa... (43)

—Technology Innovations of Flow Measurement—

A Multivariable Brightness Control of Bleaching Process by Model Predictive Control

Masahiro Kawakita, Yoshitatsu Mori and Jun Nishimura... (50)

Example of Waste Water pH Control by Fuzzy

Takayuki Ohkura... (55)

About the Adoption Made of the Other Companies DCS in the DCS Superannuation Update

Hirokazu Tanaka... (60)

Improvement of DCS (Distributed Control System) Operation Under the Environmental

Yasuhiro Miki... (64)

Optimization of Industrial Conditions

Installation of Next generation Webinspection system and Verification of System Performance

Tomoyoshi Kudoh... (73)

Current State and Development in the Future of GelView Sensor on No.5 Coater

Yutaka Maemura... (79)

Topics & Information

Report of 2006 TAPPI Engineering, Pulping & Environmental Conference

Koki Kisara and Shinichi Onogi... (84)

Research Report (Original Paper)

Development of Manufacturing Process for High Quality Calcium Carbonate by Causticizing
Process in a Kraft Pulp Mill

—Part 2: Controlling Factors for Precipitation of Aragonite—

Haruo Konno, Yasunori Nanri, Hideyuki Goto, Kazuto Takahashi and Mitsutaka Kitamura... (90)

Pulp and Paper Mills in Japan (66)

—Nayoro Mill, Oji Paperboard Co., Ltd.—

Oji Paperboard Co., Ltd... (100)

Committee report

... (03)

Coffee break

... (89)

Papyrus

... (105)

Industry News (Domestic and International)

... (107)

List of Titles in Foreign Journals Received by JAPAN TAPPI

... (118)

List of Patents issued and Laid—open Publication

... (120)

Price list of Domestic Logs and Wood Chips by District

... (132)

Wholesale Price list of Papers at Tokyo Trade Center

... (133)

Other Monthly Statistics

... (135)

News from the Association

... (137)

2007年3月 紙パ技協誌

[プリント用ページ]

On the Occasion of the Manufacturer's Presentation (Maker's Lecture), the 30 Years of History for Instrumentation

Process Control and Automation Committee, JAPAN TAPPI

As a memorial to the 30th anniversary of instrument show, we have planned a manufacturer's presentation. "The History and Future" of instrument system are presented by various manufacturers. At the same time, we made the chronology of "The instrument technology of pulp and paper" and insert them.

Innovation of Technology, History and Future Technology for QCS

Satoshi Nakamura

Process Solution Pulp & Paper, Honeywell Japan Co., Ltd.

Fundamental technology of basis weight sensor was funded in '40s and it was used for survey meter for radiation. Since first QCS was introduced in '50s to the paper market, technologies for QCS were dramatically changed. Recently, Honeywell introduced new and unique technologies as SpectraFoil, Express Moisture sensor, GalView, Laser caliper sensor and Multi variable controls for Supercalender. And advanced camera technologies are used for new generation's sensors as formation and fiber orientation. We believe those technologies are going to contribute making better paper in terms of quality and productivity.

Innovating Distributed Control System

- The Past and the Future -

Masatoshi Nakahara

PA Solution Dept., YOKOGAWA Electric Corporation

Distributed Control System (DCS) appears on the market as a substitution of a panel instrument or a distributed system of Direct Digital Controller. At the beginning stage DCS was growing based on the severe evaluation and the feedback from the customers of all process industries and finally DCS established the firm position as one of the indispensable equipments in the process industry. During this period the technical development of computers was remarkable and our office environment changed drastically however the basic architecture of DCS has not changed. This proves that DCS abstracted the necessary functions highly and integrated them from the beginning. Currently the production activity of the company regarded as one system. All the function in the company evaluated as the contribution of the profits of the company as a whole. Naturally, the expected role for DCS exceeds a limit as merely a distributed control system and it should be innovated as an important platform to operate the plant.

The WIS of Evolution and its History and Future

Masahiro Nakata

W.I.S. Group, IT Solution Division, Omron Corporation

Now, the demand to the improvement in quality from a market increases further, and especially the quality demand of the surface defect of the packing material of food and medicine is remarkable. Each packing material maker planned the performance rise of surface defective inspection equipment more often, in order to respond to it. On the other hand, low cost and rationalization are advanced for company survival. OMRON had about 2500 sets of the history of the enterprise of about 30 years. The delivery track records, expectation and a demand to the domestic maker from a user also had a severe thing especially. Positioning in the field of WIS is also severe and the equipment trouble has become a situation of carrying out a line stop and making it restore. Therefore, the demand of reliability to 24-hour operation is high. Also in order to answer to the expectation and the demand patronage-obtained for years from a user, in OMRON, it supposes that a model change is undergone as inspection equipment of the 7th generation, and came to develop "Super NASP". "Super NASP" is used as the indicator which respects and develops the opinion of a user, specification is determined as the basis of cooperation of a user. The viewpoint of its history, present, and future of WIS has described the text.

About the History and the Future of the Evolving MES

Yasuki Nagai
Industrial Systems Solutions Department
Industrial Systems Division
TOSHIBA MITSUBISHI-ELECTRIC INDUSTRIAL SYSTEMS CORPORATION

In this paper, we introduce MES (Manufacturing execution System). We first describe the history, and, next, explain the system that applies the Web applications as one of the latest technologies of MES.

As a merit of the system that applies this technology, the long-term use for the application software, and the extendibility of the system are shown. It explains the function of the information system in the future at the end.

Technology Innovations of Field Instruments - Technology Innovations of Flow Measurement -

Fumitaka Nozawa
Yamatate Corporation, Advanced Automation Company
Industrial Products Marketing Department

The customers utilize the differential pressure flowmeters and electromagnetic flowmeters on their sites to measure steams and pulp slurries. However these flowmeters have some issues to measure them stably. Especially the differential pressure flowmeters have clogging problems in the lead pipe, and the electromagnetic flowmeters have adhesive problems on the lining by pulp slurries. In this writing , I will propose the solutions for steams applications, and for black liquor and green liquor applications.

A Multivariable Brightness Control of Bleaching Process by Model Predictive Control

Masahiro Kawakita
Kasugai Mill, Oji Paper Co., Ltd.
Yoshitatsu Mori
Pulp and Paper Research Laboratory, Oji Paper Co., Ltd.
Jun Nishimura
Industrial Solutions Business Headquarters, Yokogawa Electric Corporation

The needs of the optimal control for paper mills are increasing. The optimal control can reduce the cost and increase the productivity. MPC (Model Predictive Control) is a controller which can control the multivariable and long delay time system optimally, so the MPC is suitable for the optimal control of the paper plant.

We applied the MPC system to the soft wood bleaching process of the KASUGAI Mill for the brightness control. The purpose of the brightness control is to stabilize the discharged final pulp brightness and to decrease the chemical cost.

The sequence flow of the target bleaching process consists of [D1-E/O-P-D2] stages. At first, we applied this MPC system to the D2 stage of the bleaching process to verify the controllability of MPC to bleach process. As the result, we could see the contribution effect of the MPC system to stabilize the final brightness. The next target is to expand and to improve the MPC system to cover the whole process of the bleach plant.

Example of Waste Water pH Control by Fuzzy

Takayuki Ohkura
Saga Mill, Oji Paperboard Co., Ltd.

Seven loops of pH control for wastewater treatment plant at Oji Paperboard Saga Mill, which used to be taken control of with conventional PID algorithm, did not totally satisfy with its control response.

Generally, pH controls for neutralization process have non-linear characteristics. In addition, dead time would be long at the wastewater treatment plant because of limited installation location of pH meter and would vary depending upon discharge volume. Accordingly, time consuming fine tuning procedure for PID parameters just covers some specific conditions, but never represents satisfactorily entire status of the plant.

In this article, introduction of fuzzy control system in two out of seven pH control loops which had worse performance and had been strongly claimed for modification, significant improvement in control response and reduction of neutralizing agent cost after installation as well as principle of two loops with fuzzy system are summarized.

About the Adoption Made of the Other Companies DCS in the DCS Superannuation Update

Hirokazu Tanaka

Soka Mill, Nippon Daisyowa Paperboard Kannto Co., Ltd.

DCS introduced first in the grass processing place has passed 20 years since it operated, and has come to interfere from the production stoppage to the spending passing of time increase remodeling.

In addition, the problem of the part supply and the maintenance time limit was instituted by the manufacturer, and the examination of the system update in parallel with the life prolongment measures started.

It was judged that it was possible to change in a short time comparatively because the update by the migration method was proposed by another manufacturer, and the update of the entire system became possible without detaching external wiring and executed it though a phased partial update by the same manufacturer was examined from the relation between the budget and the construction period at first. It reports on the update case by the migration this time.

Improvement of DCS (Distributed Control System) Operation Under the Environmental Optimization of Industrial Conditions

Yasuhiro Miki

Mishima Mill, Daio Paper Corp.

For the last 4 or 5 years, incidents of DCS failure had been increasing at our Mishima Mill. Due to the increasing downtime these events were causing, the company undertook an in-house project to identify the causes and develop methods of reducing such failures.

We analyzed the system's environment and the hardware's susceptibility to a number of potential irritants such as dust, temperature, humidity levels and corrosive gases (like hydrogen sulfide(H₂S), sulfur dioxide (SO₂), etc.) to see if we could reveal an obvious culprit. Our team also focused on improving the general conditions in control rooms and computer areas to make them more machine-friendly.

In this report we detail the processes we followed to isolate the control system's physical vulnerability vectors and the steps we've since taken which have resulted in a marked decrease in the number of hardware failures.

Installation of Next-generation Web-inspection-system and Verification of System Performance

Tomoyoshi Kudoh

Ishinomaki Mill, Nippon Paper Industries Co., Ltd.

The web-inspection-system is one of the indispensable systems as a tool of a quality control and defective cause investigation for paper making.

Nowadays, reconversion of the system is achieved as full-digital system according to digital camera adoption. Nippon Paper Industries has been developed the next-generation web inspection system in collaboration with OMRON in earnest since March, 2005.

In this paper, conquest of the weak point of an old Analog web-inspection-system and the circumstances of the improvement, the introduction details and quality assessment to the present stage of the system, and the future view are described.

Current State and Development in the Future of GelView Sensor on No.5 Coater

Yutaka Maemura

Maintenance and Engineering Dept., Mitsubishi Paper Engineering Co., Ltd.

Old Honeywell QCS (MX-2002ET) on No.5 Coater in Hachinohe Mill was upgraded to new Honeywell QCS (DaVinci) on August 2005. DaVinci System can consolidate various Honeywell new sensors. The one of them is GelView sensors which are installed in the dryer to measure the coating surface quality directly after the coater head. GelView would make it possible to optimize the evaporation rate in MD position and coating speed, which lead to the improvement of the coating quality and the reduction of the energy of the dryer. GelView sensors were installed in June, 2006.

In this article, the results of the introducing GelView and the future of GelView would be reported.

Report of 2006 TAPPI Engineering, Pulping & Environmental Conference

Koki Kisara
Oji Paper Co., Ltd.
Shinichi Onogi
Nippon Paper Industries Co., Ltd.

2006 TAPPI Engineering, Pulping & Environmental Conference was held in Atlanta, GA, USA from November 6 to 8. This conference included 110 presentations, 5 Panel sessions and 4 Workshops. In this report, the review of the conference and some presentations are presented.

Development of Manufacturing Process for High Quality Calcium Carbonate by Causticizing Process in a Kraft Pulp Mill
- Part2: Controlling Factors for Precipitation of Aragonite -

Haruo Konno, Yasunori Nanri and Hideyuki Goto
Pulp and Paper Research Laboratory, Nippon Paper Industries Co., Ltd.
Kazuto Takahashi
Gotsu Mill, Nippon Paper Chemicals Co., Ltd.
Mitsutaka Kitamura
University of Hyogo, Graduate School of Engineering

Precipitated calcium carbonate is produced as a by-product in the causticization step 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 can be shortened or stopped, 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 aragonite crystal with high quality performance was obtained in the causticizing reaction. However, it is not clear the reason why high quality aragonite crystal could be obtained by the causticizing reaction. In this paper, the effect of reaction conditions on the precipitation of aragonite was precisely investigated. The results showed that aragonite crystal could be obtained under the conditions at optimum temperatures with low CO concentration. In addition, the presence of NaOH in the mother liquor accelerated the precipitation of aragonite crystal. These favorable conditions to precipitate aragonite crystal can be easily formed in the causticizing reaction; therefore, causticizing reaction is suitable to produce aragonite crystal.

Keywords: Causticizing reaction, calcium carbonate, aragonite, crystallization

Vol.61 No.4 CONTENTS

Welcoming New Graduates

- Characteristics of Technical Development in the Japanese Paper Industry Kiyooki Iida... (3)
—A Welcoming for Newcomers to the Industry—
- Remodelling Effects and Operating Experience of ISHINOMAKI PM N5 Hiroki Nagata... (8)
Operational Experience of Gas Engine Kazuyoshi Seo... (15)
—Reduction of CO₂ by Energy Plant Conversion—
- Application of Photocatalytic Effect to Coated Papers Hidehiko Kai... (19)
Efforts for Green Procurement of Raw Materials Yoshiaki Matsubayashi... (24)
- Development of Water-resistant Paper Masaaki Fukunaga... (31)
—Compatible with Color Laser Printers 『OPER MDP』—
- Operating Experience of RPF Boiler at Oita Mill Yoshinobu Koike... (35)
- Latest Development in Forming Technology Timo Valkama and Takashi Akazawa... (40)
- Estimation of Yield Variation in KP Mill Junji Tanaka... (45)
- The Influence of Wet End Chemicals on Paper Density and Strength
—The Effect of Paper Additives Used for "Bulky Paper"— Masayuki Takishita, Yohei Otsuka and Daijiro Arai... (50)
- Introduction of Paper Technology Center for Stock Preparation Takayuki Kokubun... (56)
—Introduction of the Stock Preparation Trial Facility—
- Structural Analysis of Water Resistance Paper Using New Types of Materials Yoko Saito, Liu Xiang, Hideki Touda and Junji Kasai... (65)

Topics & Information

- A Report on ABTCP—TAPPI2006 Kunitaka Toyofuku... (70)
—39th Pulp and Paper International Congress & Exhibition—

Introduction of Research Laboratories(58)

- Hattori Laboratory, Department of Natural Resources and Eco—materials, Graduate School of
Agriculture, Tokyo University of Agriculture and Technology ... (76)

Research Report(Original Paper)

- Effect of Surface Properties of Base Paper on Print Quality Hiroshi Koyamoto and Koji Okomori... (80)
—Application of Pre—calendering at High Temperature—

Pulp and Paper Mills in Japan(67)

- TOHO TOKUSHU PULP CO., LTD., KITAKAMI MILL— TOHO TOKUSHU PULP CO., LTD... (87)

- Committee report ... (03)
- Essay on Intellectual Property ... (78)
- Coffee break ... (79)
- Papyrus ... (90)
- Industry News(Domestic and International) ... (93)
- List of Titles in Foreign Journals Received by JAPAN TAPPI ... (104)
- List of Patents issued and Laid—open Publication ... (106)
- Price list of Domestic Logs and Wood Chips by District ... (112)
- Wholesale Price list of Papers at Tokyo Trade Center ... (113)
- Other Monthly Statistics ... (115)
- News from the Association ... (117)

2007年4月 紙パ技協誌

[プリント用ページ]

Characteristics of Technical Development in the Japanese Paper Industry

-A Welcoming for Newcomers to the Industry-

Kiyooki Iida

Project for preserving and publicizing technical archives of the Japanese paper industry

Though it has been disadvantageous in wood resource and energy supply, the Japanese paper industry has been one of major paper producers in the world. That fact demonstrates that the Japanese paper industry has technical capability, comparable to other major players in the world.

Technical capability is not easy to define, as it has many faces. So, it is divided in six categories, namely strategic planning, wood resource development, energy conservation, productivity and quality control, environment preservation and R & D power. The historical efforts of the industry in these six categories are reviewed.

It turns out that the Japanese paper industry has been coping with successive changes and difficulties in the business with its technical capability. Its flexible and challenging attitude toward problems is deserved to be proud of. With that capability, the industry has been survived in the international competition.

The industry will face difficulties in the future as it had in the past. It will be flexible and challenging as it did.

Remodelling Effects and Operating Experience of ISHINOMAKI PM N5

Hiroki Nagata

Ishinomaki Mill, Nippon Paper Industries Co., Ltd.

Paper Machine N5 in Ishinomaki Mill started the operation on 1988 as on-line blade coating machine. This is one of the nucleus machines which produces approximately 500-ton of LWC per day.

In 2005 September, in order to achieve following "Quality improvement", "Production increase" and "Reduction of labor", a large-scale remodelling was installed.

- (1) On top former conversion
- (2) 3P shoe press conversion
- (3) On-line hot soft nip calendar addition
- (4) Reel center wind conversion
- (5) Disuse of the rereeler and super calendar
- (6) Automated winder core supply system addition

and so on.

This report is described about the remodelling summary and the latest operation experience of PM N5.

Operational Experience of Gas Engine

-Reduction of CO2 by Energy Plant Conversion-

Kazuyoshi Seo

Takasago Mill, Mitsubishi Paper Mills Limited

Today, environment protection and energy-savings are crucial issue not only for industries but also for households and individuals.

MPM carries an environment charter and slash of carbon-dioxide emission is regarded as one of the major subjects to be tackled. One example is the implementation of a power plant in Takasago mill operated by high-efficiency gas engine. The plant, with the help of ESCO, materialized co-generation and turning the fuel from petroleum to gas. We will accomplish the reduction of carbon-dioxide emission in Takasago mill by 27% in accordance with our plan.

Application of Photocatalytic Effect to Coated Papers

Hidehiko Kai

Pulp and Paper Laboratory, Nippon Paper Industries Co., Ltd.

Titanium dioxide works as a photocatalyst oxidizing most of organic matter strongly under the light which has a wavelength around 400 nm or shorter than 400 nm. Organic matter is decomposed to CO₂, H₂O, and so on. In these days, there are many products with the functions of deodorization, sterilization, and self-cleaning in the market. Photocatalyst TiO₂ has extremely small diameter around 10 to 20 nm. The reason of being nano order is large surface area. For instance, the average diameter of 150 nm TiO₂ is estimated about 10 m²/g, while 7 nm TiO₂ has a greater surface area of 320 m². We found that titanium dioxide which has diameter around 10 nm works most effective when then are applied as a coating pigment. We have developed unique "photocatalyst paper" with air purifying effect. TiO₂ surface modified with decomposable binder by TiO₂ were used to avoid chalking. The photo catalytic paper includes new technologies such as preventing chalking and printability control.

Efforts for Green Procurement of Raw Materials

Yoshiaki Matsubayashi

Environmental Management Department, Oji Paper Co., Ltd.

In 1994, Oji Paper introduced its own New Raw Material Safety Sheets to improve the chemical substance management. Under this cutting-edge green procurement system, new raw materials are evaluated whether they can be safely handled by employees in our mills and used in our products, and also reviewed to prevent environmental pollution.

The Oji Paper Group requests suppliers to provide our Safety Sheets ahead of the trial of new raw materials, and when they include substances that do not meet the criteria established, the trial can be stopped.

JIS Z 7250 requires manufacturers and importers that sell chemical substances to provide Material Safety Data Sheet (MSDS) to customers, which contains information on the safety and proper handling of chemical substances. The Oji Paper Group obtains MSDS prior to the trial of new raw materials. However, it is often the case that the information on MSDS from suppliers is inadequate for assessing the raw materials to ensure the safety during production and use, and for complying with the green procurement of our customers. Accordingly, the system of our unique New Raw Material Safety Sheets is becoming more important in these days and progressing to attain our green procurement.

Development of Water-Resistant Paper

-Compatible with Color Laser Printers 『OPER MDP』 -

Masaaki Fukunaga

Product Laboratory, Nippon Paper Industries Co., Ltd.

A waterproof paper "OPER", which maintains the same characteristics as general papers like 'softness', 'printability', 'convertibility', is used in a commercial printing and converting fields. As recently in a commercial printing field, on-demand printing is growing remarkably, we developed "OPER MDP" for color laser printings. As a countermeasure against high temperature treatment in the laser beam printing, "OPER MDP" is composed of a sheet of paper with higher internal bond strength and heat-resisting resin layers are extrusion laminated on both side of the sheet. And on the heat-resisting layers, coating layers are given to improve the electric properties and the fixing with toner. In this paper, we would like to show the significant characteristics of the newly developed "OPER MDP" and how we develop the product.

Operating Experience of RPF Boiler at Oita Mill

Yoshinobu Koike

Oita Mill, Oji Paperboard Co., Ltd.

Oji Paperboard Co., Ltd., Oita Mill, using favorable geographical conditions, has started its operation on November 1957. Since then as environmentally friendly products, the Mill has been producing corrugated paper and white board paper. Particularly considering the environment seriously, we have installed facilities and have been trying to preserve the local and global environment.

The Mill has been operating a clean boiler, whose main fuel is RPF (Refuse Paper & Plastic Fuel). RPF consists of mixture of recovered paper that is hard to be used as material for recycled paper and also waste plastic, which contributes to reduce the waste globally. Furthermore, comparing to the fossil fuel, RPF generates less CO₂, which leads to contribute to prevent the global warming.

Here, the outline, character and operational records of the RPF (#2) boiler and its electric generator (steam condition; 11.6Mpa × 541°C, max 200t/h) facilities are reported.

Latest Development in Forming Technology

Timo Valkama
Metso Paper Inc.
Takashi Akazawa
Metso-SHI Co., Ltd.

The ability of a papermachine to provide value for its owners depends, to a large extent, on the technical concepts chosen. The main components of a machine are developed in phases over the years. As a consequence, the key sections of a papermachine may have different operating ranges. Each new section can be utilized only partially, if other sections do not fully support the operating range of the new section.

The new ValShoe and BelShoe technology developed by Metso Paper will improve the productivity and profitability of hybrid formers and bring exiting BelBaie formers BelBaie's to competitive level with gap technology. The new technology is cost-effective and competitive with any other technical solution available today. Considering the existing limitation and unutilized capacity of current production lines, ValFormer and BelBaie V technologies open up new opportunities for increasing the lifetime of the entire production line.

Estimation of Yield Variation in KP Mill

Junji Tanaka
Research and Development Center, Kawasaki Kasei Chemicals Ltd.

SAQ® has been used as a cooking additive in many kraft pulp (KP) mills. This process is known as "Quinone Cooking". In order to establish a convenient method for estimation of KP yield variation by SAQ addition in pulp mill, analysis of black liquor is investigated.

The yield variations by SAQ addition were compared between analysis of black liquor and actual measurement of pulp weight using the laboratory test sample. This result that estimated the variation of pulp yield was in agreement with the calculated value by actual measurement of pulp.

Mill scale trials were conducted to examine the effect of SAQ. Black liquor samples were used the extracted liquor from a digester. As a result, the increases of pulp yield were observed by analysis of black liquor in all trials.

The Influence of Wet End Chemicals on Paper Density and Strength

-The Effect of Paper Additives Used for "Bulky Paper"-

Masayuki Takishita, Yohei Otsuka and Daijiro Arai
Paper Chemicals Division, Arakawa Chemical Industries, Ltd.

Low-density paper is now most trendy in Japanese market in recent years. Consumption of low-density paper, called "bulky paper", becomes higher and the market grows getting larger. Many types of "bulky paper" have been developed, and most of them are used for high quality printing paper, million-seller book, wood-free printing paper, and so on.

One of the most important feature of "bulky paper" is a thickness of the paper. Although the basis weight of paper is same, bulky paper is thicker, lighter and softer than traditional ones. Paper strength of bulky paper is supposed to be weaker, therefore, it is important to prevent decreasing tensile strength or internal bond strength of the paper. In order to produce well-balanced sheet, addition level of paper strength agent, such as cationic starch, modified polyacrylamide, and bulking promoters (agent), organic and inorganic compounds, are discussed.

Introduction of Paper Technology Center for Stock Preparation

-Introduction of the Stock Preparation Trial Facility-

Takayuki Kokubun
Voith IHI Paper Technology Co., Ltd.

In order to meet our customers' demands, Voith Paper and VIPT (Voith IHI Paper Technology) are ready to conduct stock preparation trials. Each single equipment trial as well as systematic trial can be conducted by customers' various requirements. Depending on what they would like to test, through reviewing the situation we can offer the most appropriate trial condition in advance and advise what trial facilities would be the most suitable one for them.

Now, here we would like to introduce the stock preparation trial facilities of Voith Paper, Ravensburg and Heidenheim mills and VIPT's Paper Technology Center.

Structural Analysis of Water Resistance Paper Using New Types of Materials

Yoko Saito, Liu Xiang, Hideki Touda and Junji Kasai
ZEON CORPORATION, R&D Center Elastomer & C5 Chemicals

We developed new materials that are called PVA-graft-Latexes. PVA-graft-Latexes are produced by grafting reaction of PVA as protective colloid on the surface of polymer particles. When we coat these PVA-graft-Latexes on the substrate materials such as papers, they show excellently high water resistance. We observed the latex films by using AFM. The structure of the coated film using PVA-graft-Latexes has not changed before and after contact with water. On the other hand, the coated film using conventional latexes has changed remarkably. The contact angle of the coated film using PVA-graft-Latexes was higher than that of conventional latexes.

In this report we describe the characteristics and application of PVA-g-Latexes as water resistance papers with results of structural analysis.

A Report on ABTCP-TAPPI 2006
-39th Pulp and Paper International Congress & Exhibition-

Kunitaka Toyofuku
JAPAN TAPPI

The 39th ABTCP Pulp and Paper International Congress & Exhibition was held in Sao Paulo, Brazil on October 15-18, 2006 co-hosted by ABTCP and TAPPI.

There were 8 special presentations by representative of association of the world and 68 general presentations on 6 sessions.

Reflecting of positive overseas activity of ABTCP and growth of Brazilian pulp & paper industry, there were quite many presentations from foreign countries.

Special mention is enormousness of the attached exhibition. In the area of 10,000m², 250 exhibitions were performed.

After the meeting, I visited eucalyptus afforestations, Cenibra in Brazil and each subsidiary company of Nippon Paper Industries and Mitsubishi Paper Mills in Chile.

Effect of Surface Properties of Base Paper on Print Quality
-Application of Pre-calendering at High Temperature-

Hiroshi Koyamoto and Koji Okomori
Nippon Paper Industries Co., Ltd.

The uniformity of coating layer is one of the most important properties of coated paper in terms of the print quality. If the coating layer is not uniform, poor print qualities such as mottling in offset printing might be occurred. The uniformity of coating layer is affected by surface properties of base paper such as roughness and porosity, and penetration of coating color into base paper. Pre-calendering is used to improve these properties of base paper, which leads to better coverage and uniformity of coating layer. For the pre-calendering of base paper, hard nip calender has been widely used. On the other hand, hot soft nip calender (HSNC) has been used as post-calender for coated paper. Comparing with conventional method like supercalender or soft nip calender (SNC), HSNC has advantages as followings, 1) increase of paper density is relatively small, 2) smoothness is higher at the same calendering linear load. In this study, the effect of HSNC for pre-calendering was investigated by comparing with/without pre-calendering using SNC (the temperature was different from HSNC). As a result of this comparison, mottling of LWC was improved by pre-calendering using HSNC. The base paper pre-calendered with HSNC has smaller pore diameter on the surface than that with supercalender or SNC. As a consequent, the coating coverage of base paper was improved by HSNC.

Keywords: Pre-calender, Hot soft nip calender (HSNC), Coated paper, mottling

Vol.61 No.5 CONTENTS

Energy Saving I

Energy Saving by Remodeling the Existing Boiler to the Gas Firing	Kazuaki Shimizu…(3)
Black Liquor Evaporation to High Dry Solids with Crystallization Technology	Heikki Jaakola and Tetsuo Hatano…(9)
Steam Saving by Waste—Heat Recovery from Pulping Wastewater	Susumu Chiba…(13)
Energy Saving Cases in Kraft Pulping Section	Hidemori Ninomiya…(17)
Steam Turbine New Sealing and Clearance—controlling Technologies	Nobuhiro Osaki…(20)
Reduction of Heavy Oil Consumption in Lime Kiln	Ryo Konishi…(28)
Saving Fuel Oil by Capacity Increase of No.4Boiler	Tatsuya Kamada…(34)
Case Studies of Collecting Our Waste—Heat at Mishima Mill, Daio Paper Corporation	Taku Fujita…(38)
Power Consumption Reduction by Modifying Oil—outlet and Pressurizing Shoe of CCR	Katsuyuki Fukushima…(42)

Topics & Information

Role and Effect of Ionic Groups of Polymer as a Surface Sizing Agent	Takahiro Fujiwara…(46)
Estimation of the Cost of Afforestation by the Cost Analysis	Tokiya Yaguchi, Takayuki Sato, Masato Takagi and Shigehiro Okamura…(52)
A Report on the20th ISO/TC6Meeting	Takayuki Okayama, Takashi Yaezawa, Shisei Goto and Tadashi Kano…(65)
2006Research Projects of Universities and Government Research Institutes	Wood Science Committee, JAPAN TAPPI…(74)

Research Report(Original Paper)

Development of Method for Analyzing Internal Properties of Coated Paper:Image Analysis Using X—ray Microtomography	Yusuke Kondo and Cyrus K. Aidun…(83)
---	--------------------------------------

Pulp and Paper Mills in Japan (68)

—Fushiki Mill, Nippon Paper Industries Co., Ltd.—	Nippon Paper Industries Co., Ltd.…(92)
---	--

Committee report	…(03)
Coffee break	…(82)
Papyrus	…(97)
Industry News(Domestic and International)	…(99)
List of Titles in Foreign Journals Received by JAPAN TAPPI	…(110)
List of Patents issued and Laid—open Publication	…(112)
Price list of Domestic Logs and Wood Chips by District	…(123)
Wholesale Price list of Papers at Tokyo Trade Center	…(124)
Other Monthly Statistics	…(126)
News from the Association	…(128)

2007年5月 紙パ技協誌

[プリント用ページ]

Energy Saving by Remodeling the Existing Boiler to the Gas Firing

Kazuaki Shimizu

Hokuetsu Paper Mills, Ltd.

In the Nagaoka Mill of Hokuetsu Paper Mills, Ltd. we have maintained the mill, considering environmental protection (reducing CO2 etc.) and energy-saving. Under the recent sudden rise in prices of oil, further improvement in environmental protection, energy-saving and reduction of energy costs has come to be urgent. We determined to adapt our heavy oil boiler plant for natural gas that is supposed to be the most effective way to solve the above problems. The remodeling of all our existing boiler plants finished in November last year. In this report, we introduce the point and the effect of the remodeling.

Black Liquor Evaporation to High Dry Solids with Crystallization Technology

Heikki Jaakola

Evaporator Technology, Andritz Oy

Tetsuo Hatano

Evaporation Technology, Andritz KK

Modern pulp mills have improved their energy efficiency by increasing firing liquor dry solids concentrations. Steam production in a recovery boiler can be increased over 2% when the firing liquor dry solids content is increased from 75% to 80% /1/. At the same time also SO₂ emissions are practically eliminated.

When black liquor is evaporated to concentrations over 50-55% sodium salts start to precipitate from the liquor. The precipitated salts form crystals in the liquor and more or less scale on the evaporator heating surfaces. Traditionally the scale is removed from the surfaces by sequence switching technique, which may require water washing even daily.

The scaling formation on the heating surfaces can be reduced remarkably by mixing electro static precipitator ash in the liquor before high dry solids concentration. The ash particles act as centers of crystallization (seeds / nuclei). The crystallization takes place on the ash particles, not on the heating surfaces and the need for the washings will be reduced remarkably.

This paper describes Andritz's concept for high dry solids evaporation with crystallization technology.

Steam Saving by Waste-Heat Recovery from Pulping Wastewater

Susumu Chiba

Hachinohe Mill, Mitsubishi Paper Mills Limited

In Hachinohe mill of Mitsubishi Paper Mills Limited, an energy saving is forwarded as an urgent task for a cost-reduction theme which is set in "Pheonix Plan" of our company. An energy-utilization committee and an executive meeting of international organization for standardization (ISO) 14001 in our mill are organized with same members to link efforts for the task. Thus, we are tackling an improvement of a specific energy-consumption grasping an effect of the energy saving in real time.

In this paper, effects of facilities, which started running in November 2006 for a waste-heat recovery from wastewater, on the energy saving were described. These efforts were conducted for saving an increased steam usage in a papermaking process by decreased water temperature in winter. Water temperature was increased in the papermaking process by recovering waste-heat which had been discharged to the atmosphere from a cooling tower of pulping wastewater. This considerably improved a specific steam-consumption in the process.

Energy Saving Cases in Kraft Pulping Section

Hidemori Ninomiya

Pulping Section in Sendai Mill, Chuetsu Pulp & Paper Co., Ltd.

Recently, there has been an urgent need to reduce the cost in pulp and paper mills, since the cost of raw materials and fuels such as raw wood and crude petroleum has risen. Energy consumption in pulping section is high, then it leads to high production cost.

Its reduction even a little could contribute to company's profits.

In this article, energy conservation which has been achieved by optimizing the use of warm water, filtrate and operating condition in the bleaching process, is reported.

Steam Turbine New Sealing and Clearance-controlling Technologies

Nobuhiro Osaki

Power Plant Service Center Power Systems Headquarters,

MITSUBISHI HEAVY INDUSTRIES, LTD.

In order to reply the recent growing needs for energy saving, we focused the steam leak which is one of the most affective to degradation of efficiency and developed and applied for new technology to reduce leak loss.

Leaf seal is a new type of seal. It is different type from conventional labyrinth seal. It has superior feature of good sealing and avoidance of the heat by contact to the rotor. ACC (Active Clearance Control) seal can change the clearance between during start & stop and during load operation. It prevents contact during start & stop and keeps smaller clearance in order to gain efficiency during load operation. Cooling cell prevents contact between lower half of the casing and the rotor by decreasing the differential temperature between upper and lower half casing.

First we applied these new technologies to our in-house power plant for verification. After confirmation of performance and reliability for these new technologies, we applied them to commercial unit without any problems.

We introduce these new sealing and clearance-controlling technologies.

Reduction of Heavy Oil Consumption in Lime Kiln

Ryo Konishi

Oji Engineering Co., Ltd., Kushiro Dept.

Kushiro Mill produces 700 thousand tons per year of newsprint, coated paper, mechanical paper and linerboard by four machines with pulp plants (KP, RGP, DIP and OCC). Based on The Oji Paper Group's Environmental Charter, Kushiro mill has positively used recycled resources for Product design and process of manufacture with small environmental burden. Because of the increase in the wastepaper utilization rate, Kraft pulp and The Black liquor production decrease every year.

The Black liquor from KP plant is used Recovery Boiler for recollection of heat and White liquor, so it is important to reduce the energy cost in the mill.

Since the Black liquor has decreased, a process that produces White liquor and Lime must be operated minimum rate.

In this report, I describe efficiency improvement of Lime Kiln to reduce Heavy Oil consumption.

Saving Fuel Oil by Capacity Increase of No.4 Boiler

Tatsuya Kamada

Nippon Daishowa Paperboard Tohoku Corporation

In accordance with our environmental policy; "Resources & Energy Saving" and "Reducing & Recycling of Waste", we constructed a Waste Heat Power Generation Plant (named No.4 Boiler) and started commercial operation of the plant on October 2003.

The Plant runs on Paper Sludge and Waste Tire without auxiliary fuel (i.e. fossil fuel) and generates high temperatures and pressures steam stably with Waste Heat Boiler and generates 14,000 kW.

We have achieved certain reducing of fossil fuel consumption, and we improved the plant for further resources saving. We increased the steam generation capacity from 65 ton/h to 73 ton/h by adding biomass fuel (i.e. wood chip) to cut tire and paper sludge. And we started operation of the plant on February 2005. We successfully could reduce the fuel consumption of No.2 Boiler by supplying the increased steam of No.4 Boiler through the new process piping.

Now we will present an overview of construction work and operation experience of the plant.

Case Studies of Collecting Our Waste-Heat at Mishima Mill, Daio Paper Corporation

Taku Fujita

Mishima Mill, Daio Paper Corporation

The power generating facility at Misihima Mill has a 531 MW standard output and consists of 18 boilers and 14 turbines. It supplies all the electricity used by the facility and its surplus electricity output is sold to the market.

After the oil crises of the 1970's, Daio Paper shifted from a dependence on petroleum towards coal. Since 1985 we have also attempted to increase energy production efficiency in the power plant by raising the pressure and the temperature in the boilers and installing new turbines. Additionally increased our production of recycled pulp in the production process because it requires less energy than wood chip processing. In 2005, we accomplished a 17% reduction in fossil fuel energy consumption based on tonnage of output compared to 1990.

We are trying to accomplish a 23% reduction by 2010 compared with 1990 levels in fossil fuel energy consumption based on tonnage of output, a 20% reduction in carbon dioxide consumption.

Case studies of our energy curtailment efforts at Mishima Mill are discussed in the following section

Power Consumption Reduction by Modifying Oil-outlet and Pressurizing Shoe of CCR

Katsuyuki Fukushima

Facility Department of Maintenance Section, Tomioka Mill, Oji Paper Co., Ltd.

CCR (Controlled Crown Roll) is one of important equipments to get even dewatering in the cross machine direction.

It was developed jointly by Mitsubishi Heavy Industries, Ltd. and Beloit Corp. over thirty years ago. And many CCRs are still in operation. But paper machine speeds has been increased 1.5 times compared with the original design by a lot of rebuilds. Therefore, many problems recently happen.

We will introduce some trouble cases maintenance engineers faces on and solutions. And also, an example of save energy by modifications of CCR on second press in Tomioka PM9 will be introduced, too.

Role and Effect of Ionic Groups of Polymer as a Surface Sizing Agent

Takahiro Fujiwara

Paper Chemicals Division, Harima Chemicals, Inc.

In this paper, sizing behaviors of synthetic water-soluble polymer surface sizing agents with different ionic charges were investigated using bleached kraft pulp base papers prepared in various conditions. The sizing efficiency of anionic surface sizing agent (A-SFS) was proportional to the alum content in the base paper, and the addition of CaCO₃ to the base paper reduced its effect apparently. On the other hand, it was found that the sizing behavior of cationic surface sizing agent (C-SFS) depended on the presence of CaCO₃. While the sizing efficiency of C-SFS rose with the increase of alum content in the base paper without CaCO₃, that of C-SFS tended to drop with the increase of alum content in the base paper with the addition of either 10 or 20% CaCO₃.

These results indicate that C-SFS develops surface sizing on papers with more complicated mechanism than the case of A-SFS. Furthermore, we suggest a novel mechanism of surface sizing by using various analytical techniques as well.

Estimation of the Cost of Afforestation by the Cost Analysis

Tokiya Yaguchi, Takayuki Sato, Masato Takagi and Shigehiro Okamura

Research Planning Group

Research Institute of Innovative Technology for the Earth

In order to calculate the cost of carbon dioxide fixation by the large scale afforestation (AF) for the reduction of the global greenhouse gas, we have analyzed in detail about the one model AF data and 4 publication AF data. In this report, we have defined the unit cost of accumulated (Acc) AF cost by US\$/ha/year as below.

The unit cost of Acc AF cost by US\$/ha/year

= The Acc AF cost by US\$/the Acc area of AF by ha/year

As a result, we have obtained an estimated (Est.) cost of AF by US\$/ha/year with the functional formulas of the AF year (n) and the gross domestic product per capita (GDP/cap) of the AF country.

Est. cost of AF by US\$/ha/year = $130 + 0.0341 \times n - 0.445 \times \text{GDP/cap}$ ($20 \leq n \leq 30$)

There is a significant coefficient ($R^2 = 0.88$) in 44 data between the real Acc total cost of AF and the est. value.

By the same token, we have obtained Est. Cost of AF by US\$/ha/year among 3 to 30 years of AF.

Est. Cost of AF by US\$/ha/year = $800 \times n - 0.566 + 0.141 \times n - 0.879 \times \text{GDP/cap}$ ($3 \leq n \leq 30$)

In this case, there is a nearly equal coefficient ($R^2 = 0.90$) in 157 data between the real Acc. Total Cost of AF and the Est. Cost of AF.

Keywords: cost of afforestation, estimation, cost analysis, afforestation years, gross domestic product per capita

A Report on the 20th ISO/TC6 Meeting

Takayuki Okayama*1, Takashi Yaezawa*2, Shisei Goto*3 and Tadashi Kano*4

*1 Tokyo University of Agriculture and Technology

*2 Oji Paper Co., Ltd.

*3 Nippon Paper Industries Co., Ltd.

*4 Japan Technical Association of the Pulp and Paper Industry

ISO/TC6 meeting was held on November 13-17, 2006 in Atlanta, USA. The number of registered delegates representing seventeen countries was seventy three.

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

Development of Method for Analyzing Internal Properties of Coated Paper: Image Analysis Using X-ray Microtomography

Yusuke Kondo

Nippon Paper Industries Co., Ltd.

Cyrus K. Aidun

G. W. Woodruff School of Mechanical Engineering

Georgia Institute of Technology

This paper reports a technique, based on analysis of X-ray micro-tomography images to analyze the internal properties of coated paper through the thickness direction (ZD). The image analysis method for paper applications using μ CT have been developed by a few groups, but the method that can analyze these images to obtain the full range of properties in detail has not been presented before.

The internal properties include formation and fiber orientation distribution through the thickness direction (ZD), as well as ash and pore distribution in x-y- and z-directions. The image analysis technique involved many steps including axial conversion, filtering, binarization, skeletonization and alignment. The method is applied for analysis of two kinds of coated paper and the results provide interesting insight for papermaking.

Keywords: X-ray tomography, ash, formation, fiber orientation, distribution, image analysis, Z-direction, pore

Vol.61 No.6 CONTENTS

Energy Saving II

- Results of the Fy2006 Follow-up to JPA's Voluntary Action Plan and Report of Energy Situation in the Pulp and Paper Industry in Japan Osamu Inada... (1)
- Introduction of Save Energy Type Cl&K Removal System Tsunenori Okamura... (13)
- Consideration of Chloride Ion & Potassium Ion Removal System for Solution of Electrical Precipitator Ash from the Point View of Save Energy-
Energy Saving with LP-Screen Atsushi Nishida... (19)
- Steam Stabilization and Energy Conservation for a Coal Boiler by Using a Model-Driven PID Controller
Michihiro Fujiyama, Hiroshi Egi, Takashi Shigemasa and Fumio Kojima... (24)
- Energy Saving in the OCC Pulping Process Kenya Horikawa... (32)
- The Activity of "Energy Saving Team" Akira Takahashi... (38)

Topics & Information

- Fiber Properties-Paper Quality Bertil Olsson and Takuya Maekawa... (43)
- Multidimensional Fiber Characterization-
Improved Runnability and Drying Capacity through New Technology Kari Juppi and Kouichi Yuuki... (49)
- The New Contactless Level Gauge and Density Meter: Accurate Measurement by Using a Weak Gamma Source Hiraku Miyashita... (57)
- Bearing Solution for Paper Plant Kunio Osaki... (61)
- Performance and Function that are Demanded of Next Generation Inspection System Terumasa Miyamoto... (65)

Introduction of Research Laboratories (59)

- Laboratory of Biomacromolecular Materials, Department of Forest and Forest Products Sciences, Faculty of Agriculture, Graduate Schools of Kyushu University ... (70)

Research Report (Original Paper)

- Characterization of Coating Color Penetration by Laser Scanning Microscopy Kenji Hirai and Douglas W. Bousfield... (74)

Pulp and Paper Mills in Japan (69)

- Sanda Plant, Rengo Co., Ltd.- Rengo Co., Ltd... (82)

- Committee report ... (03)
- Essay on Intellectual Property ... (72)
- Coffee break ... (73)
- Papyrus ... (86)
- Industry News (Domestic and International) ... (89)
- List of Titles in Foreign Journals Received by JAPAN TAPPI ... (100)
- List of Patents issued and Laid-open Publication ... (102)
- Price list of Domestic Logs and Wood Chips by District ... (114)
- Wholesale Price list of Papers at Tokyo Trade Center ... (115)
- Other Monthly Statistics ... (117)
- News from the Association ... (119)

2007年6月 紙パ技協誌

[プリント用ページ]

Results of the Fy2006 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

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 Fy2010, reduce fossil energy consumption per product unit for paper products by 13% from that of Fy1990 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 Fy1990, 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 Fy1990. The following are the results for Fy2005 and reports of energy situation in the pulp and paper industry in Japan.

The survey also reported on energy consumption, CO₂ emissions and the position of the pulp and paper industry in Japan, and information related Laws.

Introduction of Save Energy type Cl&K Removal System

- Consideration of Chloride Ion & Potassium Ion Removal System for Solution of Electrical Precipitator Ash from the Point View of Save Energy -

Tsunenori Okamura

Specialty Plant & Materials Division, Nippon Rensui Co.

In the process of Kraft Chemical Recovery Cycle, Chloride (Cl) and Potassium (K) entering with raw-material wood chip are gradually accumulated and concentrated during continuous operation. The plugging issue of carryover particles and dust in the Recovery Boiler is caused by decreasing melting temperature of dust along with increasing concentration of Cl and K in the Black Liquor. At the same time, fouling and corrosion at the super heater of Recovery Boiler is apprehended. This manuscript provides actual result from Cl&K Removal System which are developed and installed at Niigata Mill, Hokuetsu Paper Mills, Ltd. together with the theory of removal system using ion exchange resin which are characterized of this system and advantages from the point view of save energy.

Energy Saving with LP-Screen

Atsushi Nishida

Matsumoto Mill, Oji Paperboard Co., Ltd.

In the stock preparation system to produce the secondary pulp by recycling of the waste paper, each process of the pulper, screen and refiner consumes significant energy.

So, how to positively promote the energy saving issues will become key point to extensively reduce the production cost in such heavy energy consumption type of pulp and paper industry.

In this paper, some examples of energy saving are introduced which were achieved by rebuilding the conventional PS Screens into LP Screens, utilizing the low power and low intensity of LP Screen technology which was developed by Voith IHI Paper Technology (VIPT).

Steam Stabilization and Energy Conservation for a Coal Boiler by Using a Model-Driven PID Controller

Michihiro Fujiyama

Yatsushiro Mill, Nippon Paper Industries Co., Ltd.

Hiroshi Egi and Takashi Shigemasa

Toshiba Mitsubishi-Electric Industrial Systems Corporation

Fumio Kojima

Toshiba IT & Control Systems Corporation

The movements of energy conservation in Japan are promoting based on the Kyoto Protocol concerning the reduction of greenhouse gases at COP3 held in Kyoto in 1997. According to the energy conservation, the industrial world is making various efforts for the conservation of energy. The amount of use of cheap coal for boilers of factories is increasing especially in spite of recent rising of the energy cost.

Comparing to gas boilers and oil boilers, coal boilers have long dead time from the boiler master command to main steam pressure due to long fuel transportation time and long fuel burning time. Due to the long dead time, the large control gain is not able to set, as a result the main steam pressure and the main steam temperature are fluctuating in the large band

If the fluctuation bands could be reduced, and if there is some margin at temperature limit, the boiler efficiency can be improved by setting higher value of the set point of the main steam temperature control loop.

We have already obtained some excellent results by applying the model drive PID control (MD-PID) for long dead time processes.

In this paper, after showing the Yatsushiro plant, coal boiler issues and properties of the MD-PID control system, we show the result for a coal boiler of 440t/hr level of the main steam flow rate.

Energy Saving in the OCC Pulping Process

Kenya Horikawa

Yashio Mill, Rengo Co., Ltd.

Recently, increasing the social demands on environmental conservation, Rengo has established Eco Challenge 009, the document setting forth our environmental vision and is implementing resource and energy savings. Regarding the energy saving, we target reduction of 12% of CO₂ emission from the 1990 level until 2009.

As part of our efforts, Yashio Mill has focused on energy saving in pulping system of old corrugated container ("OCC"), the main material at the mill, and we would like to introduce the way and result of energy saving as a case.

The Activity of "Energy Saving Team"

Akira Takahashi

Nippon Paper Unitec Co., Ltd.

"Energy Saving Team" belongs to Technology Research Section of Nippon Paper Unitec Co., Ltd. and works to help creating energy saving plan for all 12 mills of Nippon Paper Industries Co., Ltd.

The Team started at December 2004 by one person for Power and Environment division and the other person for Pulp and Paper production division.

We visited all 12 mills and had discussion about our ideas for energy saving every-year. On the discussion, we proposed around 30 ideas for each mill last year and the result of our proposal contributed around 8% of total energy saving cost.

Fiber Properties - Paper Quality

- Multidimensional Fiber Characterization -

Bertil Olsson

BTG Pulp and Paper Sensors AB

Takuya Maekawa

Spectris Co., Ltd. BTG Division

This paper deals with the methods of characterizing fiber properties in order to get defined paper properties. The reasons for on-line real time measurement will be discussed as well as the advantage of pulp characterizing methods based on single fiber properties compared with traditional laboratory measurement on a hand sheet. Discussions of some applications involving on-line fiber analyses. A completely new on-line measuring system, based on the state-of-the-art today, will be presented. By combining knowledge from next generation analyzers and use of new tools for control applications a supervisory control system for optimization of fiber quality will be presented. This contributes to an added value from both lower production cost and more stable quality. Some typical applications set up by using this new analyzer in combination with adopted control package will be presented.

Improved Runnability and Drying Capacity through New Technology

Kari Juppi
Metso Paper Inc.
Kouichi Yuuki
Metso Paper Japan Co., Ltd.

Firstly, new efficient runnability components are introduced and their effect on runnability and paper quality are discussed. Results from pilot and production machine installations are described. Secondly, new drying concept is presented. This concept utilizes impingement air technology in paper or board drying. Impingement drying is presented as a short view to history in this field. High-speed paper machines tend to have runnability problems at the beginning of dryer section. A high draw is often needed which leads to poor paper quality. A draw decrease can be implemented utilizing efficient blow boxes. However, when the sheet dry content before cylinder drying must be increased, a good choice is to dry paper with impingement drying before cold paper web contacts the hot cylinder surface. A new solution has been created for meet this challenge. This new concept utilizes impingement drying right after press section by increasing web dry content remarkably before the first drying cylinder. As paper dry content and also paper temperature has been increased, paper strength is higher and runnability is better than normally.

The New Contactless Level Gauge and Density Meter: Accurate Measurement by Using a Weak Gamma Source

Hiraku Miyashita
Nanogray Inc.

Gamma-ray (γ -ray) level gauge TH-1000 and γ -ray density meter PM-1000 have the latest detecting system which is the fruit of our technologies on industrial measurements with radiation over 10 years. Although TH-1000 has only a 100MBq (2.7mCi) source which is a one-several thousandth strength compared with the conventional γ -ray level gauge, TH-1000 can apply for 1.5m-span level gauging and 10m-span level switch. The minimum response time is only 0.5sec which provide quick process control. PM-1000 has only $\pm 0.4\sim 0.7\%$ error @ 2, although PM-1000 also has only 3.66MBq (0.1mCi) source which is a one-several thousandth strength compared with the conventional γ -ray density meter. PM-1000 can attach easily on a pipe of the existing line. PM-1000 can apply density measurement of black liquor, green liquor, lime mud, calcium carbonate, and white carbon etc.

Bearing Solution for Paper Plant

Kunio Osaki
HI Sales Dept., Schaeffler Japan Co., Ltd.

INA group Company integrated FAG and LUK few years ago. After integration, Schaeffler Group started and now has been producing selling bearing and making technical service.

Schaeffler has many experiences of bearing solution for pulp and paper industries. Schaeffler would like to report about 4-cases of special bearing solutions for mainly paper mill application.

Performance and Function that are Demanded of Next Generation Inspection System

Terumasa Miyamoto
W.I.S. Grope, IT Solution Division, Omron Corporation

An initial Web Inspection System, if it detects the defect, was the one only of simple information of it with the buzzer and the lamp, and marking to the defect location. Afterwards, defect information on the defect position, the size, and the classification name is added. It became a very usual function there was a defect recording system that Omron developed in 1988 now, too. Moreover, by transmitting inspection data to the next process like FCS (Fault Control System) and WCS (Winder Control System), it got to do the productivity improvement and the product management of the next process, too. Also, at present, it became possible by the improvement and the generalization of the PC and the network technology to handle a large-volume defect image, too. As a result, it is possible to say that the volume of information of the inspection data became big drastically and that the existence value, too, became bigger. In this way, Web Inspection System was placed in the nucleus of the solution to place as of the paper maker. It introduces about Performance and Function that are demanded of "Next Generation Inspection System".

Characterization of Coating Color Penetration by Laser Scanning Microscopy

Kenji Hirai

Research and Development Dept., Product Development Research Lab.

Nippon Paper Industries Co., Ltd.

Douglas W. Bousfield

University of Maine

The quality of a coating layer and the efficiency of a coating process, depend in large part on the penetration of coating color into the base paper. However, methods to characterize this penetration are limited. This paper proposes a new technique that combines Confocal Laser Scanning Microscopy (CLSM) and the image analysis to characterize the coating penetration into the substrate without any sample destruction and with little sample preparation.

In this paper, two methods to stain samples were tested to achieve the quantitative analysis of the coating layer thickness variation and the liquid phase penetration into the base paper. The results were compared to those obtained from cross sections using Scanning Electron Microscopy (SEM). Coatings applied onto a plastic film calibrated the measured thickness with this technique and demonstrated the limitations of the CLSM method in terms of depth resolution.

As a result of the experiments, the method to stain the coated sample with fluorescence dye gave the coating layer thickness variation that were consistent with those from SEM, while the liquid phase penetration depth, which was larger than the coating layer thickness, could be measured when the dye had been added to the coating color before the application. These results demonstrate a possible method to characterize the coating layer thickness and the penetration depth of the liquid phase into the base paper.

Keywords: coating penetration, confocal scanning laser microscopy

Vol.61 No.7 CONTENTS

Pulp

Report of the 13th Pulping Conference	Pulp Technical Committee, JAPAN TAPPI…(1)
Perspective and Current Research Trend of Pulping Research	Yuji Matsumoto…(3)
The Influence of Pulp on the Printability	Yukio Tani…(7)
Effect of Pulp Quality on Printability(II)	Koji Okomori…(14)
Current Trend in Mechanical Pulping	Akifumi Hatta…(20)
The Design Concept of the Saving Energy for OCC Screening System	Junichi Hashimoto…(27)
Technical Tasks & Solutions for Improvement of Recycled Pulp Rate	Kazumi Fujita…(33)
KP Kiln Dam Ring Preventive Agent	Masahiro Tsurumi…(40)
The Impact of Elemental Chlorine Free Bleaching on Effluent Characteristics	Hitoshi Takagi…(46)
Overview of Elementary Chlorine Free Bleaching	Shintaro Sasada…(51)
Technical Problems and their Measures for ECF Bleaching	Shin-ichi Hara…(56)
Problems and Measures in ECF Bleaching Operation	Makoto Horiguchi…(61)
The Recent Activities of ECF Bleaching	Kazuo Yamasaki…(65)

Research Report(Original Paper)

Measurement of the Elastic Modulus of Paperboard from the Low-Frequency Vibration Modes of Rectangular Plates	Jun Sato, Ian M. Hutchings and Jim Woodhouse…(71)
Relations between Elastic Bending Deformation Strength, Shape and Elastic Moduli for Case of Anisotropic Corrugated Fiberboard Box Shape(Square Tube)under Uniform Compression	Satoru Matsushima and Shigeo Matsushima…(86)

Pulp and Paper Mills in Japan(70)

-North Pacific Paper Corporation-	North Pacific Paper Corporation…(103)
Committee report	…(03)
Coffee break	…(70)
Papyrus	…(109)
Industry News(Domestic and International)	…(111)
List of Titles in Foreign Journals Received by JAPAN TAPPI	…(122)
List of Patents issued and Laid-open Publication	…(123)
Price list of Domestic Logs and Wood Chips by District	…(130)
Wholesale Price list of Papers at Tokyo Trade Center	…(131)
Other Monthly Statistics	…(133)
News from the Association	…(135)

July 2007 Abstracts

Perspective and Current Research Trend of Pulping Research

Yuji Matsumoto

Wood Chemistry Laboratory, Department of Biomaterial Sciences, The University of Tokyo

By a wide survey of inhomogeneity of lignin structure, a certain tendency was found among characteristic factors of lignin structure. Generally, when a certain tree species has lower lignin content, its lignin is richer in -O-4 structure, especially of erythro type, and, syringyl type of aromatics. Interestingly, these characteristics are thought to be favorable for delignification reactions during pulping and bleaching. This result suggests the importance of the analysis of lignin structure for the survey of suitable woods for pulping.

The Influence of Pulp on the Printability

Yukio Tani

Research Development Div., Pulp & Paper Research Laboratory, Oji Paper Co., Ltd.

When paper is treated as a communicative function, it does print to the paper and the first time additional value occurs. Then, the paper does have a commercial value in the market. In this paper, required properties of pulp on printing are discussed when irradiating pulp reverse from the view point of the print and looking at it. In the case of printability, there are print runability and print quality. These properties aren't always compatible, and become the request to be often disagreed with by.

On printing, the shade of the image is resolved into halftone-dots and the image is expressed as the continuous aggregate of dots. The principle is the same even if the different printing method by plate is taken. Therefore, so-called "Dot-reproducibility" is very important to perform better printability, since the print quality is increased by how much a dot is precisely reproduced on the substance in printing. In any printing methods, the smoothness is indispensable for this dot-reproducibility, and pulp is also required to produce good smoothness. In addition to smoothness, surface strength, internal strength, tensile strength, appropriate shrinkage and cutting property (amount of paper powder) are requested on pulp to ensure good printability, e.g. picking, piling, blistering, folding fracture, and print fluting and so on.

Understanding the problems of final printed products becomes an important point when discussing the quality of the pulp as an intermediate-product. It is considered that printability of pulp also becomes one of the big guideposts in studies and developments of pulp in the future.

Keywords: printability, halftone-dot reproducibility, smoothness, pulp

Effect of Pulp Quality on Printability(II)

Koji Okomori

Pulp and Paper Research Laboratory, R&D Division, Nippon Paper Industries Co., Ltd.

Production of coated paper has been increased since it was invented. Bitoko grade is one of the staple commodities of coated paper and the characteristic is the paper containing mechanical pulp. Because bitoko grade paper is mostly printed by rotary offset press with heat-set ink, it is necessary to withstand printing problems like heat-set roughening, blistering and so on. Heat-set roughening is roughening at solid area of printed matter due to rising of fibers. Paper absorbs fountain solution during printing and the fibers are released from out-of-plane stress. Then the shape of the fibers changes from collapsed state to tubular at drying process of the press, and the fibers rise. Mainly, the long fibers of mechanical pulp, especially which cell wall is thick, cause this problem. The effect of pulp is greater than coating conditions such as pre-calendering, coating weight and so forth. Therefore it is quite important to control pulp quality for the better printability.

Current Trend in Mechanical Pulping

Akifumi Hatta
Metso Fiber KK

Even there is no movement of new mechanical pulp project in Japan, capacity of mechanical pulp manufacture is still increasing in the world. As main driving force of this movement, cost reduction has been done by various methods; fewer and larger production units with bigger equipment, process to get lower cost and higher quality, low energy segment and etc.

Even in the existing plants, Metso is working to improve them. One key equipment is mechanical steam separator to improve fiber loss and retention time between two refiners. Adjustable gap sensor instead of conventional TDC sensor is also available now.

The Design Concept of the Saving Energy for OCC Screening System

Junichi Hashimoto
Research & Development Dept., Voith IHI Paper Technology Co., Ltd.

Customers' trials of stock preparation conducted by the VIPT's Technology Center were, except large-scale pilot equipment, mainly performance tests and single process simulation of the single equipment until around 1988. However, recent test mainstream, in the both paperboard and paper fields, turn to be the test to verify the improvement of quality deteriorated by change of raw material quality, improvement of productivity, reduction of production cost, and quality improvement required by end users.

Regarding quality test, customers are more concerned about detailed areas such as adhesive-related contaminants, dirt and flake than in the past. Therefore, highly technological systems optimizing a single equipment performance are strongly being required by customers.

Customer requirement for high quality product being more and more intensified and the difficulty in recycling of waste paper being expected, we need to enhance our technology to be able to respond to these changes of industry's situation. Additionally, in order to develop the "Post-Recycle 60", we VIPT are willingly ready to cooperate with this trend.

This time we would like to introduce our development concept of OCC Screening System with the focus on achieving energy saving and quality improvement at the same time.

Technical Tasks & Solutions for Improvement of Recycled Pulp Rate

Kazumi Fujita
Technical & Engineering Dept., Aikawa Iron Works Co., Ltd.

The increasing target of domestic wastepaper recycling rate to 60% by the end of 2005 had been achieved 2 years ahead by a result of great effort of various quarters. And today, "increasing the paper recycling rate to 62% by the end of 2010" had been set as a new goal again. About 630,000t per year wastepaper usage increase is a condition for this new target realization.

Because of the wastepaper recycling rate for board-paper is already more than 90%, increasing of fine wastepaper recycling rate is needed for the 62% target realization. But, the reality is that there is almost no high quality fine wastepaper remain. In addition, in the booming China the low exactly sorted US wastepaper is avoided, the Japanese wastepaper exporting became regular and domestic wastepaper itself is exhausting rapidly.

Innovation and reform in various fields is necessary to achieve recycling rate 62% under such strict situation. In this seminar, I will show the technical tasks and the solutions of efficient use of low quality wastepaper in the stock preparation process that is Aikawa's field.

Keywords: 62% Wastepaper Recycling Rate, Chinese Pulp & Paper Industry, Japanese Wastepaper
Stock Exporting, Wastepaper Stock Exhaustion, Efficient Use of Low Quality
Wastepaper Stock, Improvement of Recycle Pulp Rate

KP Kiln Dam Ring Preventive Agent

Masahiro Tsurumi
Shizuoka 1st Sec, Techno Chemical Div., Thaihokohzai Co., Ltd.

In the causticizing process, the operation for kiln often requires continuous stability, but the operation is stopped by compulsion due to rapid development of dam ring in some cases.

The dam ring is produced in the following manner: Low-melting alkali impurities such as sodium are supplied together with mud as a core from the kiln end and the low-melting substance exposed to high-temperature gas is made viscous to loosely bind the cores. Then, loose binding moved away from the high-temperature gas under the continuous supply of the mud changes into hard binding in the coating due to temperature decrease or re-carbonation. These reactions continuously work resulting in the formation of a large dam.

Our company, long engaged in producing and selling fuel additives, tried relatively simple countermeasures through chemical addition against the dam ring and has proven many achievements. The details of our actual results are explained in this book.

The Impact of Elemental Chlorine Free Bleaching on Effluent Characteristics

Hitoshi Takagi

Research Department, Japan Pulp and Paper Research Institute, Inc.

The amendment of Air Pollution Control Law that required pulp and paper mills to reduce discharge of chloroform was promulgated in 1996. Since then, Japanese pulp and paper companies have gradually been introducing elemental chlorine free (ECF) bleaching. In 2006, the production of ECF pulps exceeded 80 percent of Japanese bleached chemical pulp production.

Generations of chloroform, chlorinated phenolic compounds, and chlorinated dioxins were decreased dramatically with ECF bleaching. The AOX level in ECF bleaching mill effluent was less than 0.2kg per ton of bleached pulp. On the contrary, chlorate discharges were increased with chlorine dioxide bleaching.

Whether ECF conversion decreases the adverse effects of mill effluents on aquatic organisms is evaluating in Japan Pulp and Paper Research Institute.

It can be concluded that misgivings about the discharge of organic chlorine compounds from Japanese pulp and paper mills were practically eliminated by ECF conversion.

Keywords: Elemental Chlorine Free Bleaching (ECF), Chloroform, Dioxin, Chlorate, Effluent

Overview of Elementary Chlorine Free Bleaching

Shintaro Sasada

Technology Division, Oji Paper Co., Ltd.

In order to reduce environmental impact, chlorine bleaching process has been converted to ECF bleaching, in Japan, following North Europe and North America. Oji Paper Group, according to Environmental Charter Action Guidelines, planned to convert kraft pulp (KP) bleaching process to ECF bleaching. Hardwood bleaching system at Kasugai Mill was converted in August 2000, followed by other domestic mills. All the 8 mills of our group has been completed conversion in June 2006.

Oji Paper Group invested 1.6 billion yen for the conversion of all the 8 mills, where bleaching towers were rebuilt, and other equipments were renovated including the one for chemical production. In this presentation, details of the investment are reported, taking Kushiro LBKP bleaching process as an example.

Conversion to ECF bleaching results in the increase of manufacturing costs, but keeps quality of bleached pulp and stabilizes operation, without any major troubles.

Technical Problems and their Measures for ECF Bleaching

Shin-ichi Hara

Hachinohe Mill, Mitsubishi Paper Mills Limited

In Hachinohe mill of Mitsubishi Paper Mills Limited, the bleached kraft pulp (BKP) line named "3BKP" was switched to an elementary chlorine free (ECF) bleaching in October 2000, and "2BKP" was switched to the ECF bleaching in August 2005.

It was found that there were some differences as to bleaching behaviors between the ECF bleaching whose first stage was chlorine dioxide and a conventional chlorine bleaching. For example, the ECF bleaching was more susceptible to a brightness of oxygen-delignified pulp than the conventional one. Emissions of adsorbable organic halogen and of chloroform were decreased by introducing the ECF bleaching. Thus, environmental targets were achieved. However, technical problems as to the ECF bleaching operation and a pulp quality newly occurred. These problems were an increased bleaching cost, calcium oxalate scales on diffuser screen and a discoloration of pulps and so on. Measures to hexenuronic acid which is deeply related to the problems have to be pursued for a fundamental solution to the problems.

This paper described in regard to characteristics of the ECF bleaching, the technical problems and their measures that became apparent through the ECF bleaching operation.

Keywords: ECF bleaching, Chlorine bleaching, Bleaching cost, Calcium oxalate scale,
Discoloration of pulp, Hexenuronic acid

Problems and Measures in ECF Bleaching Operation

Makoto Horiguchi

Technical Division, Kishu Paper Co., Ltd.

Kishu mill, Kishu Paper fiber line was converted to ECF bleaching sequence in August 2004. This plant was introduced to the hot chlorine dioxide process (DUAL-D), and this bleaching sequence has D*(i)-EP-D.

Also D*stage tower was adopted the gravity feed system (Difeed system) with the first installation in the world.

The scale adhesion of some places is enumerated as a problem in current ECF operation. Continuous operation is possible now by the removal of the scale by a high-pressure washing and the acid washing when a biannual regular repair.

The D*stage is effective as color reversion. However, temperature conditions are changed from 90°C planned at first because the amount of the steam use is large to 85°C now and the amount of the steam use has been reduced.

(i):D* notes hot chlorine dioxide stage

The Recent Activities of ECF Bleaching

Kazuo Yamasaki

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

Elementary Chlorine Free (ECF) bleaching, the bleaching method with no chlorine gas, has now become global standard. With the raising concern over environmental issue and to meet the demand from consumers, ECF bleaching is rapidly spreading among Japanese paper industries as well.

In accordance with the Nippon Paper Group's Environment Charter (established in 1993), Nippon Paper Industries has been keenly engaged in sustainable business activities that are in harmony with nature. Conversion of all bleaching lines to ECF is one of such activities.

When installing ECF bleaching, Nippon Paper Industries pioneered in introducing new technologies such as ozone bleaching and hot acid treatment in Japan. In this report details of NPI's introduction of those new technologies in ECF bleaching are presented.

Keywords: Kraft pulp, ECF bleaching

Measurement of the Elastic Modulus of Paperboard from the Low-Frequency Vibration Modes of Rectangular Plates

Jun Sato and Ian M. Hutchings

Institute for Manufacturing, Department of Engineering, University of Cambridge

Jim Woodhouse

Department of Engineering, University of Cambridge

Static methods (e.g. tensile testing) and ultrasonic methods have been most commonly used in the past to measure the elastic modulus of paper and paperboard. The static method, however, does not provide a dynamic value for modulus, and the accurate measurement of travel-time needed for the ultrasonic method is rather delicate and prone to error. A further problem is that the timescale (or frequency) involved in these methods is often far removed from the actual conditions experienced in the paper industry and in applications of these materials. A method using low frequency vibrations to excite out-of-plane bending vibrations, which are visualised as Chladni figures, might appear to be simple and unsophisticated, but can readily be applied to paper and paperboards in the frequency range from 10 to 1000 Hz. Characteristic patterns are generated on rectangular or square samples at each resonant frequency. From the assumption that machine-made paper is generally orthotropic and that the boundaries are free, values of dynamic Young's modulus and dynamic Poisson's ratio can be calculated by identifying only a few low-frequency modes.

Values of dynamic Young's modulus derived by this method for various core-board samples are lower than those obtained from ultrasonic measurements, which is consistent with a model for viscoelastic behaviour in which elastic modulus depends on frequency. Dynamic Poisson's ratios in the machine direction and cross direction are also derived with high reproducibility. The vibration frequencies required to excite the modes depend on the sample sizes, but no significant differences in elastic moduli were seen for samples with sizes ranging from 75 x 75 to 200 x 200 mm; the main restriction of the method is that the sample should be reasonably flat.

The sensitivity of the vibration method is demonstrated by the reduction in stiffness of paper which can be detected when its surface is scratched or damaged; detection of such damage by ultrasonic measurements is much more difficult. It is suggested that the vibration method using Chladni patterns is well suited to the accurate and reliable measurement of the dynamic elastic constants of the paper/paper board, at frequencies appropriate to the processing and use of these materials. The elastic constants obtained by this method may be useful within the paper industry for product and process design.

Keywords: paper, paperboard, vibrational modes, Chladni patterns, Young's modulus, Poisson's ratio, elastic constants, Rayleigh's principle

Relations between Elastic Bending Deformation Strength, Shape and Elastic Moduli for Case of Anisotropic Corrugated Fiberboard Box Shape (Square Tube) under Uniform Compression

Satoru Matsushima
Ehime University, Center for Cooperative Research and Development
Shigeo Matsushima
Professor Emeritus, Ehime University

Elastic bending deformation analysis for case of anisotropic corrugated fiberboard box shape (square tube: width L, height h and thickness $T=5.54\text{mm}$) under uniform compression (-0.10N/mm^2) on upper and lower edges was performed. And characteristic behavior of stress and deflection for its case was discussed.

Absolute maximum normal stress $b_{x\max}^*$ in the width direction is at plate centers, and maximum normal stress $b_{y\max}$ in the height direction, maximum bending principal stress $b_{0\max}$ and maximum deflection w_{\max} are at centers of side edges for side plate ($L=350$, $h=300\text{mm}$). Absolute maximum bending shear stress $b_{xy\max}^*$ and maximum bending principal shear stress $b_{0\max}^*$ are plate corners. $b_{x\max}^*$, $b_{y\max}$, $b_{xy\max}^*$ and w_{\max} increase and decrease with L increase. And $b_{x\max}^*$ and w_{\max} increase and decrease, and $b_{y\max}$ and $b_{xy\max}^*$ increase with h increase. $b_{x\max}^*$, $b_{y\max}$, $b_{xy\max}^*$ and w_{\max} increase with E_x increase and decrease with E_y increase. $b_{x\max}^*$ and $b_{y\max}$ increase, and $b_{xy\max}^*$ and w_{\max} increase and decrease with ν_{xy} increase.

Key Words: Structural Analysis, Computational Mechanics, Elastic Strength of Corrugated Fiberboard, Elastic Stress Analysis Structural Strength, Numerical Analysis

Vol.61 No.8 CONTENTS

Topics & Information

Press Section Rebuild and Energy Saving Press Roll	Akimine Izawa and Koshi Tanimoto…(1)
Voith Paper New Research & Development Center -Life Cycle Partnership-	Osamu Yasui…(7)
Wet End Optimization -An Ongoing Process with Extensive Benefits-	Roland Berger, Daniel Watzig and Kenichi Ishihara…(11)
The Organic Polymer Coagulant for the Elimination of Pitch Trouble -Stabilization of Paper Making Process by Inactivating Micro-Pitch Particles-	Kenji Sakai, Takahiro Fujimoto, Hiroyuki Koshio and Motosuke Ono…(18)
Brightness Reversion of Eucalyptus Pulps after ECF Bleaching with Various Sequences	Christian Blom, Jiri Basta, Magnus Bjorklund, Thomas Greschik and Muneo Sakamoto…(24)
The Anthony-Ross Automatic Spout Cleaner	Ken Pingel, Dan Higgins and Trevor Ip…(32)
Synergy Effects of PCC and Pigments with High Aspect Ratio	Taro Homma, Benny Hallam and Chris Nutbeam…(38)
Intelligent Sensor Management System -Capable of Self Diagnostic-	Yasuo Watanabe…(44)
Prevention Control of Pest	Yoshihiro Kuroda…(48)
Trend in Mechanical Seal Technology in Pulp and Paper Plant and Erosion Countermeasure Examples of Mechanical Seal	Hidekazu Takahashi…(54)
Introduction of Research Laboratories(60)	
Laboratory of Biomass Conversion, Research Institute for Sustainable Humanosphere, Kyoto University	…(62)
Research Report(Original Paper)	
Effect of Surface Structure on Gloss of Coated Paper	Hideyuki Mikado, Keiro Takigawa, Yukiko Suzuki and Tetsuya Hirabayashi…(65)
Pulp and Paper Mills in Japan(71)	Oji Paperboard Co., Ltd.…(76)
-Nikko Mill, Oji Paperboard Co., Ltd.-	
60th JAPAN TAPPI General Meeting	…(81)
Committee report	…(03)
Essay on Intellectual Property	…(61)
Coffee break	…(64)
Papyrus	…(105)
Industry News(Domestic and International)	…(108)
List of Titles in Foreign Journals Received by JAPAN TAPPI	…(120)
List of Patents issued and Laid-open Publication	…(122)
Price list of Domestic Logs and Wood Chips by District	…(130)
Wholesale Price list of Papers at Tokyo Trade Center	…(131)
Other Monthly Statistics	…(133)
News from the Association	…(135)

August 2007 Abstracts

Press Section Rebuild and Energy Saving Press Roll

Akimine Izawa and Koshi Tanimoto
Mitsubishi Heavy Industries, Ltd.

Recently, the attempt to avoid global warming and a sudden rise of the crude oil price push the paper industry to have the ecological effort, such as energy saving, resource saving and high efficiency. Thinking about such a background, MHI has developed compact type of shoe press "Mini shoe press", of which shoe length is 30~40% of STD shoe press and also has developed energy saving press roll, which reduce stirring energy of internal oil.

This paper presents the feature of Mini shoe press and performance of the first installation in Japan. And also, it presents about the concept and effect of the energy saving press roll.

Voith Paper New Research & Development Center
- Life Cycle Partnership -

Osamu Yasui
Paper Machine Engineering Dept., Voith IHI Paper Technology Co., Ltd.

During these few years several new paper machines with high speed and large width started up around the world, and set one speed record after another. Enough pilot machine trials during planning such machines are very important for successful excellent paper quality after start up. Voith Paper new research & development center started in operation accordingly. That pilot paper machine is consist of MasterJet II G type headbox, DuoFormer TQv, Tandem NipcoFlex Press and Top DuoRun, and maximum operating speed is 3000 m/min.

Here we introduce this sophisticated new research & development center, and we hope this introduction helps for customer to get perfect solution.

Wet End Optimization
- An Ongoing Process with Extensive Benefits -

Roland Berger and Daniel Watzig
BTG Mtek
Kenichi Ishihara
Spectris Co., Ltd. BTG Division

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 Organic Polymer Coagulant for the Elimination of Pitch Trouble
-Stabilization of Paper Making Process by Inactivating Micro-Pitch Particles-

Kenji Sakai, Takahiro Fujimoto, Hiroyuki Koshio and Motosuke Ono
Shonan Research Center, HYMO Corporation

In order to eliminate pitch-trouble in paper-making process, use of coagulants is effective to reduce free pitch particles in the process water by fixing "micro-pitch" onto pulp fibers before growing into a large-size pitch.

In our previous report, we introduced new analysis methods, "micro-pitch image analyzer system" and "film adhesion method", as the tools for analysis of micro-pitches and evaluation of coagulants. The methods showed that a coagulant having specific property reacted with a particular type of pitches selectively, and thus a particular coagulant should be chosen for the different types of furnish, GP, TMP or DIP etc.

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

We believe that our Organic Polymer Coagulants contribute to stabilize the paper-making process by selecting appropriate coagulant according to the property of the furnish, a type of pitch-trouble or other purposes.

Brightness Reversion of Eucalyptus Pulps after ECF Bleaching with Various Sequences

Christian Blom, Jiri Basta, Magnus Bjorklund, Thomas Greschik and Muneo Sakamoto
Eka Chemicals AB

The aim of this study was to compare different bleaching alternatives for oxygen delignified eucalyptus aimed at a low brightness reversion. Three eucalyptus pulps with different characteristics were included in the study. D (OP) Dn D, D*(OP) Dn D, A*D (OP) Dn D and Z (OP) Dn D bleaching sequences were compared, and the corresponding sequences with a final P stage instead of a final final D stage were also included. Brightness reversion in both dry and humid conditions before and after beating was evaluated. Other important parameters such as bleaching chemical demand, pulp viscosity and fiber strength potential were also considered.

When bleaching to 90.5% ISO brightness and compared to the standard D pre-bleaching, D* gave 5-17% savings in OXE, A*D gave 16-24% savings, Z at a high ozone charge (about 5.0 kg/t) gave a small saving (4%) for the traditional E. globulus pulp but increased the OXE consumption with 13-31% for the two other pulps. A considerable increase in chemical demand was recorded at a low ozone charge where also the brightness target was difficult to meet. The standard D sequence gave the highest and the Z sequence the lowest viscosity. The standard D sequence also showed the highest fiber strength potential measured as rewetted zero span strength at 3000 PFI revolutions, and again the Z sequence gave the lowest value.

The different pre-bleaching alternatives gave only small differences in dry brightness reversion and the results after beating were different from those prior to beating. A final P stage always gave better dry brightness reversion than a final D stage. The standard D sequence gave higher humid brightness reversion values than the other sequences, but modifications to the D sequence showed promising results. Evaluation of brightness reversion in humid and dry atmospheres gave different results and there was no general correlation between the two evaluation methods.

Keywords: oxygen delignified, eucalyptus pulp, bleaching, ECF, chlorine dioxide, hydrogen peroxide, ozone, hot D stage, hot acid stage, brightness reversion, beating, fiber strength, viscosity, chemical consumption, modified D stages, effluent characteristics

The Anthony-Ross Automatic Spout Cleaner

Ken Pingel and Dan Higgins
Anthony-Ross Company
Trevor Ip
Recovery Process, Northwood Pulp and Paper

Twelve years ago Anthony-Ross Company applied for and received the patent on our first Automatic Spout Cleaner. Unlike the original however, the Anthony-Ross Spout Cleaner in its current form is a result of over 12-years of design evolution.

Almost without exception, each of the evolutionary steps from our first spout cleaner to the present was a direct result of observations and suggestions from boiler operators and maintenance staff.

Twelve years ago the criteria to a functional spout cleaner was unknown, even to boiler operators, but with each new test, test installation and improvement the design was refined and criterion developed until we understood how to produce spout cleaning equipment that would be a true asset to boiler operators without burdening the maintenance staff.

The following is a description of the Smelt Spout Cleaner in its current form and our patent pending solutions to reliable automatic spout cleaning.

Synergy Effects of PCC and Pigments with High Aspect Ratio

Tatsuya Asano
IMERYS MINERALS JAPAN K.K.
Benny Hallam and Chris Nutbeem
IMERYS Pigments for Paper Europe

Conventional thinking regarding the optical characteristics for coated paper is the design characteristics of the coating pigments are critical. Key design characteristics are the average particle size, the particle size distribution and the particle shape. If these factors can be combined more effectively in the coated layer they can give improved characteristics, namely, the diffusion of light whereby improving opacity and improving gloss of the coating.

Optical synergy effects start to become evident through the combination of calcium carbonate and kaolin in which the unique pigment design of each component is different and the result is a complementary effect on coated paper properties.

Through this research we can understand some of the synergy effects in coated paper when blending coating PCC and high aspect ratio kaolin. The combination of shape engineered pigments leads to synergies that are not evident when simply using size engineered pigments.

Intelligent Sensor Management System
-Capable of Self Diagnostic-

Yasuo Watanabe
Mettler Toledo K.K.

The periodical maintenance work, for instance cleaning, calibration and so on, is needed to get the accurate and reliable value of the inline pH measurement. In the case of Pulp and Paper industry, many pH loops are working in the factory and a lot of labor power is necessary for implementation of these kinds of maintenance works. And also sometime these maintenance works make the downtime of process. As a result productivity is down. New generation pH electrode which provides not only the saving labor cost, but also reliable pH value was launched by Mettler Toledo. In this report, the features and benefits of the new generation pH electrode are introduced.

Prevention Control of Pest

Yoshihiro Kuroda
Research and Development, Earth Environmental Service Co.

There are 3 important activities for effective pest control (prevention of insect contamination) in pulp and paper factories as follows;

- 1) Analysis of claim from customers caused by contamination of insects as well as detection of contamination in the factory. It is important that they get real-time information of insect (=contaminants) and they should identify the kinds of contaminants, and contaminated location of processing line. Results should also be recorded, collected and kept.
- 2) Collecting environmental parameters to use of real time monitoring system indicating direction and velocity of air flow, sheet shutter and doors opened frequency, temperature, humidity for all monitoring points as well as the number of contaminants captured.
- 3) Investigation of successive data of each kind of contaminants captured by traps and other environmental parameter in the factory. It is important that they should find out the root of the problem due to correlation analysis.

Trend in Mechanical Seal Technology in Pulp and Paper Plant and Erosion Countermeasure Examples of Mechanical Seal

Hidekazu Takahashi
EAGLE INDUSTRY Co., Ltd., Seal Engineering Dept.

In a pulp and paper plant, a large number of water pumps and various different pumps for pulp or chemicals are utilized in the production processes from economical point of view (energy saving, resource saving and maintenance saving) and environment preservation point of view. Mechanical Seals are also utilized for other rotating equipment including agitators, screens and refineries. The Mechanical Seals for pulping is especially important. These sometimes leak by the damages of the Seal Rings and the Mechanical Seal Covers by the sand erosion. This text describes failure and countermeasure examples of Mechanical Seal for pulping process.

Effect of Surface Structure on Gloss of Coated Paper

Hideyuki Mikado, Keiro Takigawa, Yukiko Suzuki and Tetsuya Hirabayashi
Pulp & Paper Research Lab., Oji Paper Co., Ltd.

Gloss of coated paper is affected by the surface shape and scattering intensity of pigment layer. The surface shape consists of various micro-plane slopes. Each degree of micro-plane slope is estimated by the differential value of curved surface. Scattering intensity of pigment layer is estimated by the pigment diameter. In this paper, we investigated surface structure of coated papers which had various degrees of surface smoothness in order to clarify the dominant factor of gloss of coated paper.

We found that there was a good correlation between degrees of print gloss and differential values of printed surface. This means that print gloss is dominated by the variety of micro-plane slopes forming the printed surface shape. We also found that there was a good correlation between degrees of differential values of printed surface and degrees of differential values of unprinted surface. This means that the printed surface shape mainly depends on the surface shape before printing.

Ink layer gives various affections to the surface shape of printed paper. In regard to gloss paper including LWC, the ink layer reduces the differential value of curved surface. The matte paper has no effect on that of curved surface. The cast-coated paper is affected increasing the differential value of curved surface. Therefore, as the paper surface becomes much smoother before printing, such as cast-coated paper, the printed surface shape has much stronger influence of ink layer.

We also found that sheet gloss was decided by differential values of the surface shape and the diameter of pigment constituting coated layer. Therefore, we assume that sheet gloss is dominated by the variety of micro-plane slopes on the paper surface and scattering intensity of pigment in the coated layer.

Keywords: coated paper, print gloss, sheet gloss, micro-plane slope, differential value, scattering, pigment diameter, coated layer, ink layer

Vol.61 No.9 CONTENTS

Topics & Information

Perfect Retrofit on Quality Improvement at Stora Enso Kabel OMC5	Hideomi Uchikawa…(1)
Development and Results of Latest Energy Saving Screens	Kazuo Aoshima…(7)
-Introduction of MAXFlow and New GranFlow-	
Efficient Mixing of Papermaking Chemicals with TrumpJet™ System	
-Without Any Fresh Water-	
	Jouni Matula and Akira Ejima…(16)
The Latest Turn—Up System by Water Jet (Paprima, Canada)	Makoto Matsushita…(21)
Improved Runnability with TopBrane	Mantijn van Leeuwen…(25)
Learning Classifier"SmartLearn®"	Atsushi Kurosaki…(30)
Energy Management Control System [Enemap]	Hiroto Abe and Kentaro Ohara…(33)
An Introduction of Biomass Utilization Methods of JFE Environmental Solutions	Koji Omata and Kohei Nishimura…(39)
-Application of JFE-Babcock & Wilcox Vo/lund Biomass Gasification Technology Combined Heat and Power Plant to Paper Industry-	
New Technology of Rotary Consistency Product Uses the FieldCare System Tool for Device Condition Check	Hideo Kikuchi…(45)
Semi—automatic Ream Feeding System	Atsuo Murata…(51)
Proposal of MARSDEN IR DRYER System	Yasuo Harikae…(55)
Research Report(Original Paper)	
Alkali Pre—treatment for the Bioethanol Fuel Production from Woody Biomasses	
—Part 1 : Soda Cooking Conditions as an Alkali Pre—treatment—	
	Tsutomu Ikeda, Tomoko Sugimoto, Masanobu Nojiri, Kengo Magara, Shuji Hosoya and Kinji Shimada…(62)
Pulp and Paper Mills in Japan(72)	Kohjin Co., Ltd.…(72)
-Fuji Mill, Kohjin Co., Ltd.-	
Committee report	…(03)
Coffee break	…(61)
Papyrus	…(76)
Industry News(Domestic and International)	…(78)
List of Titles in Foreign Journals Received by JAPAN TAPPI	…(88)
List of Patents issued and Laid-open Publication	…(89)
Price list of Domestic Logs and Wood Chips by District	…(104)
Wholesale Price list of Papers at Tokyo Trade Center	…(105)
Other Monthly Statistics	…(107)
News from the Association	…(109)

September 2007 Abstracts

Perfect Retrofit on Quality Improvement at Stora Enso Kabel OMC 5

Hideomi Uchikawa
Voith Paper Automation Japan Ltd.

The start-up of the Stora Enso Hagen Kabel OMC5 was in 1980. The applicator roll coaters with blades were changed in two steps to increase the operating speed of the OMC 5. The 2 precoaters were equipped with Voith SpeedCoaters in 1999. In 2001, as a further step, the applicator roll coaters for top coating were further supplemented by 2 Voith JetFlows.

As part of its consistent further development, Voith Paper now supplied the new quality control technology. On February 9, 2005, the quality control system was converted and the four coaters were equipped within only three days.

With this retrofit, the OMC5 now operates on the basis of state-of-the-art control and measuring technology.

Development and Results of Latest Energy Saving Screens

- Introduction of MAXFlow and New GranFlow -

Kazuo Aoshima
Aikawa Iron Works Co., Ltd.

Since the resource and energy saving becomes the challenge for the pulp and paper industry, energy saving is the most important factor in the intense energy consuming industry. We have succeeded to develop two kinds new screen to meet the requirements.

Efficient Mixing of Papermaking Chemicals with TrumpJet™ System

- Without Any Fresh Water -

Jouni Matula
Wetend Technologies Ltd.
Akira Ejima
Matsubo Corporation

Wetend Technologies Ltd has invested during past years on development of chemical and additive mixing into stock close to headbox. A TrumpJet™ jet injection and mixing system for papermaking additives eliminates completely additive post dilution with fresh water in PM Approach system process. Additives are mixed effectively into the process by exploiting circulated headbox feed stock. The system gives considerable energy savings as well as reduction of CO2 emission case by case. Overdosing of additives will be also avoided. This results to chemical savings. About 150 systems are already in operation world wide.

The Latest Turn-Up System by Water Jet (Paprima, Canada)

Makoto Matsushita
KGK Engineering Corp.

Paper mills have been long after the turn-up efficiency improvement and subsequent paper loss reduction. Our full automatic "Reel Jet" & "Reel-Jet S" turn-up system (Paprima Industries Inc., Montreal, Canada) uses 2 until of ultra high pressure water-jet cutting head (1300-1500 bar/20cc per Tune-up) which run fast (2m/sec) to their waiting position each side of the line to get the sheet expanded to its full width keeping a completely uniformed wrapping both ways from the center, immediately after the tail has got caught by a new spool with the help of an air-coanda effect of a specially designed gooseneck. Thus, "Reel Jet" & "Reel-Jet S" makes it possible to execute turn-ups failure free in such a shorter time span as 2 seconds since the issue of turn-up command via DCS until the two heads come back to their park-positions. Also, its beautifully balanced and even wrapping on a spool can release the reel part from vibration and noise related problems.

Its sales has been expanding among big scale world famous paper machines in Europe and North America, and they are quite satisfied with its overwhelmingly nice performance to cut paper loss and subsequently to improve productivity remarkably. Hereunder, we are going to explain about its structure and performance.

Improved Runnability with TopBrane

Mantijn van Leeuwen
DSM Hybrane BV

A range of new Hyper-branched products has been introduced by DSM under the brand name TopBrane for applications in paper coating. TopBrane products show low viscosity in use, due to their hyperbranched structure and high performance at low concentration, due to their high functionality. TopBrane products can be used to improve runnability of coaters and reduce the total cost of operation. This paper shows an application example on Metered Size Press coaters for production of LWC papers. Using TopBrane enables the paper mill to effectively use more starch in the paper coating formulation or apply more coat weight without experiencing operational problems like misting, pilling and spitting. Using our TopBrane products to reduce cost can achieve a reduction of total cost of coating chemicals (binders and additives).

Learning Classifier "SmartLearn®"

Atsushi Kurosaki
Surface Inspection Systems Division, COGNEX K.K.

The Cognex SmartLearnR is a new classification software tool set for SmartViewR web inspection system. SmartLearn was designed such that the latest learning classification technology can be combined with expert knowledge of each application. It has long been known that one single classifier cannot be optimum for every material, every process and every production line. Furthermore, learning classifiers alone do not provide the best result. SmartLearn provide the combination of the learning classification technology and real-time multi-step classifier. SmartLearn dramatically improves defect classification accuracy.

Energy Management Control System [Enemap]

Hiroto Abe and Kentaro Ohara
Energy Group, Solution Promotion Dept., ETS Development Div.,
Yokogawa Electric Corporation

The energy management control system "Enemap" is a software package that predicts the demand for energy by the archived operational data, the weather forecast data and so on, and leads the optimal operation plan of equipments and the most effective combination of the energy such as electric power, gas, and heavy oil.

"Enemap" not only aschieves energy saving and environmental load reduction but also supports daily plant maintenance operation and an enhancement of operation management efficiency.

This paper describes the function and the application example of "Enemap".

An Introduction of Biomass Utilization Methods of JFE Environmental Solutions

- Application of JFE-Babcock & Wilcox Volund Biomass Gasification Technology Combined Heat and Power Plant to Paper Industry -

Koji Omata and Kohei Nishimura
JFE Environmental Solutions Corporation

Recently, effective use of the biomass has been paid attention from a point of view of the global warming prevention and recycling society formation.

JFE Environmental Solutions Corporation has advanced a development for profit use of biomass, and now we have various types of technologies.

In this paper, we introduce the "JFE-Babcock & Wilcox Volund Biomass Gasification Technology combined Heat and Power Plant" that can contribute to the reduction of CO₂ emission and the saving of fossil fuel by utilizing gas and tar converted from biomass.

New Technology of Rotary Consistency Product Uses the FieldCare System Tool for Device Condition Check

Hideo Kikuchi

Pulp & Paper Business Unit, Field Systems Division, Metso Automation K.K.

Metso has been well known about shear force technology. With our tradition of 50 years experience the number of shipment has over 53,000 transmitters of consistency.

Our blade transmitters have set industry standards since launching of Pulp-EL, our first electronics blade transmitter back in 1977, followed with Smart-Pulp 1995, which was the first microprocessor based blade transmitter on the market with extensive calibration features.

Therefore we announce our latest product of kajaaniROTARY and FieldCare system this time.

Semi-automatic Ream Feeding System

Atsuo Murata

Robot and Environment Div., SERVOARM Co., Ltd.

Servoarm Co., Ltd. is an enterprising company that makes the best use of its long and cultivated hydraulic and electronic control technology to develop truly useful and problem solving devices to meet the particular needs of their customers. The company's primary goal is to benefit the customer by improving both their work environment and productivity with eco-friendly, labor saving devices.

In the finishing process, many factories still depend on manual labor for sorting and feeding the reams to the wrapping process due to technical problems with existing systems and the high investment cost for fully automated systems. The newly developed Semi-automatic Ream Feeding System eliminates the need for hard physical work and offers a cost effective, labor saving production process. To truly serve our customers, we offer unique custom-made systems, designed to match their existing systems and peripheral devices.

Although there were many problems in the ream feeding process by manual labor, the following effects and merits have been obtained:

- 1) Increased productivity and operating cost cuts
- 2) Workers relieved from hard manual labor
- 3) Chances of occupational hazards such as backache are lessened
- 4) Friendly work environment for elderly persons

Close collaboration with our customers is the key to new developments, and we at Servoarm continuously strive to develop new and useful devices to actively serve the paper making industry.

Proposal of MARSDEN IR DRYER System

Yasuo Harikae

Industrial Machinery Dept., ITOCHU SANKI CORPORATION

The MARSDEN GAS infrared dryer is an epoch-making, large-scale infrared ray's heater that the Marsden Co. in the United States developed. This is a large-scale infrared ray's heater of highly effective that uses the ceramic fiber and low pollution. This has a lot of features compared with a past infrared rays dryer and can adjust to a wide usage.

This chapter will explain the performance and the effect of MARSDEN system that our company sells in detail.

Alkali Pre-treatment for the Bioethanol Fuel Production from Woody Biomasses

- Part1: Soda Cooking Conditions as an Alkali Pre-treatment -

Bioethanol fuel for motor vehicle use is currently produced from sugar cane and corn starch. However, the production costs of such crops in Japan are much higher than in Brazil and North America. Therefore, Japanese bioethanol fuel production from such crops is very limited. On the other hand, lignocellulosic biomasses, especially woody biomasses, are abundant resources and large amounts of low-cost woody biomasses are available for the bioethanol fuel production in Japan. Bioethanol is produced from the fermentation of glucose and some oligo sugars. However, cellulose, which is the most abundant carbohydrate in wood, is a polymer of glucose linked by α -1, 4-glucosidic bonds and cannot be fermented by yeast directly. Therefore, hydrolysis which converts cellulose to glucose is required for bioethanol fuel production from wood. In response, we have developed a new bioethanol fuel production process using alkali cooking and enzymatic hydrolysis as a pre-treatment. In this work, we discuss suitable soda cooking conditions for producing bioethanol fuel from wood.

Sugi wood contains more lignin, but less carbohydrate than does eucalyptus wood. However, the xylose content of eucalyptus, which comes from hemicelluloses, is higher than that of sugi; therefore, the overall hexoses contents of both sugi and eucalyptus are similar. In the present study, a relationship was investigated between the lignin contents and the enzymatic digestibility of sugi soda pulps. As the lignin content decreased, the enzymatic digestibility increased. However, the enzymatic digestibility of pulps reached mostly 100% without complete lignin removal. Delignification was improved and the pulp yields were increased by the addition of 1, 4-dihydroxy-9, 10-dihydroxyanthracene disodium salt (AQ) to the soda cooking. Soda cooking with AQ around H-Factor (HF) 3000 were the best conditions for alkali pre-treatment of sugi for bioethanol fuel production. On the other hand, soda cooking with AQ around HF 350 were the best conditions for eucalyptus.

Keywords: bioethanol, lignocellulosic biomasses, soda cooking, AQ, pulp

October 2007 CONTENTS

Topics & Information

- Latest Technology of GL&V/KAWANOE Brian J. Gallagher…(1)
—SCREEN, CLEANER, BTF System—
- Preventive Measures for Spots Caused by Dryer—fabric Deposit Daiki Hosaka Daiki Hosaka…(6)
Defoamer for KP matsu, Takashi Tanaka and Yuichi Tomoda…(12)
—FOAMLEX E Series—
- Effects of Alkyl Chain Structures in Alkyl Ketene Dimer (AKD) Sizing Agents on Paper Properties and Machine Runnability
Kazuki Nagao, Hitoshi Ando and Tetsuya Hara…(16)
Yoshiyuki Kawabata…(24)
- Introduction of TAPIO Analyzers
—PMA, TS—Profiler, and Lab Profiler BCX—
- Octopus Stock Approach System Masaaki Inaba and Norihito Toda…(31)
- Anaerobic Treatment of Various Wastewater from the Process of Manufacturing Pulp
Shigeru Noritake, Seiji Imabayashi, Kazuo Kamiji, Hitoshi Kagawa, Atsushi Tanaka,
Hajime Takahashi, Fumio Obama, Akinori Kato and Atsushi Shimamoto…(36)
- New IT Solution Transforms a Tacit into Visible Knowledge Motomi Kohata…(39)
—Text Mining Software REXION Pro—
- Study on Print Abrasion Trouble in Ink Layer of Matt Coated Paper
Takeshi Watanabe, Shigeo Yamanaka and Nobuhiro Matsuda…(44)
- How to Save Money, Increase Efficiency and Meet Regulations by Limiting Seal Water Usage Ryosuke Baba…(50)
- For Sound or Noise in Industrial World Part II Yasuhiko Yamasaki…(56)
—It Thinks about the Noise as Part of T. F. O from SKF—
- A report of the 2007(74th) Pulp and Paper Research Conference Wood Science Committee, JAPAN TAPPI…(61)
- Report of 2007 TAPPI Papermakers Conference Koichi Yanai…(78)
- A Report on PulPaper 2007
—June5~7, 2007at Helsinki, Finland—
Keihachiro Nakajima, Motoi Chiba, Yosuke Uchida, Koji Okomori and Kunitaka Toyofuku…(83)
- Introduction of Research Laboratories(61)
Kochi Prefectural Paper Technology Center…(94)
- Research Report(Original Paper)
Application of Micro Bubble Treatment Technology to Paper —making Effluent Treatment
Yoshihiko Saijo and Makoto Iwasaki…(97)
- Pulp and Paper Mills in Japan(73)
—Daio Paper Corporation Kani Mill (Gifu) —
Daio Paper Corporation…(105)
- Committee report …(03)
- Essay on Intellectual Property …(93)
- Coffee break …(96)
- Papyrus …(111)
- Industry News (Domestic and International) …(114)
- List of Titles in Foreign Journals Received by JAPAN TAPPI …(125)
- List of Patents issued and Laid—open Publication …(127)
- Price list of Domestic Logs and Wood Chips by District …(138)
- Wholesale Price list of Papers at Tokyo Trade Center …(139)
- Other Monthly Statistics …(141)
- News from the Association …(143)

October 2007 Abstracts

Latest Technology of GL&V/KAWANOE
-SCREEN, CLEANER, BTF System-

Brian J. Gallagher
GL&V Pulp Group Inc.

The name GL&V, which stands for Groupe Laperriere & Verreault, is not yet very well known in the Pulp and Paper Industry around the world, but it is a company made up of many familiar names in the industry. Companies such as IMPCO, Beloit Pulping, and Celleco are now all part of GL&V, and these have been combined to create a supplier with a complete and broad range of products for the industry.

GL&V is now working together with Kawano Zoki to serve the Pulp and Paper Industry in Japan. Besides selling new equipment, Kawano Zoki and GL&V are ready to support all existing equipment previously sold by IMPCO, Beloit Pulping, or Celleco.

Preventive Measures for Spots Caused by Dryer-fabric Deposit

Daiki Hosaka
Sales Engineering Dev., Maintech Co., Ltd.

Spot problems originate from deposition of pitch, stickies and latex in the dryer section is becoming a critical problem under high recycled pulp furnish, closed system and alkalization conditions. These spots lead to production and quality problems such as an increase of broke and joint work. To date, not a few pitch control programs have been tried, high-pressure fabric (canvas) showers have been developed. However none of them have met with industry-wide acceptance.

Maintech has developed a spot prevention program, a total solution that passivates all surfaces in the paper machine where the deposition could increase spots. The resulting surface passivation prevents depositions on wire, felt, press rolls, cylinder, fabric and calendar rolls and drastically reduces the number of spots on paper. Mills can take considerable advantage of this program. Elimination of deposits in the paper machine reduces not only the number of joints in the finished rolls but also reduced tonnage and down time for M/C cleaning. This paper reviews an investigative method of spot generation from dryer fabric deposition. Case histories illustrating benefits in news print and liner board M/C are presented.

Defoamer for KP
-FOAMLEX E Series-

Mitsuru Komatsu, Takashi Tanaka and Yuichi Tomoda
Paper & Pulp Group, Specialty Chemical R&D Department,
Research & Development Division, NICCA CHEMICAL CO., LTD

Recently, anti-foamer agents in Kraft-Pulp process are significantly required high performance and efficiency. Their bases are moving from mineral oil to silicone compound.

We, Nicca Chemical Co., Ltd., developed and launched a silicone emulsion anti-foamer agents, named Foamlex E series. The main content of these agents is the modified silicone, which is the mixture of the silicone compound and our own surfactants manufactured with unique self-emulsifying process and doesn't remain in the pulp. Foamlex E series effects high performance for anti-foam, good emulsion stability and reducing black liquid in pulp during filtration.

We continue to develop of these anti-foamer agents in KP process based on modified silicone emulsion to provide unique characteristics and high performance in a paper and pulp industry.

Effects of Alkyl Chain Structures in Alkyl Ketene Dimer (AKD) Sizing Agents on Paper Properties and Machine Runnability

Alkyl ketene dimer (AKD) emulsion sizing agents have been widely used in alkaline papermaking systems for various paper grades from slack-sized to hard-sized papers. Various kinds of AKD sizing agents have been available in Japan. These sizing agents contain AKD waxes with different chain lengths of linear alkyl chains as raw materials. Recently, we have developed novel sizing agent of liquid-type AKD with branched alkyl chains and placed it on the market in Japan. Selections of AKD sizing agent appropriate to each grade of papers and papermaking conditions are crucial to improve paper properties and machine runnability. Thus, to do this, it is important to understand various kinds of available AKD sizing agents including liquid-type AKD. In this paper, physical properties such as melting point and crystallization temperature of AKDs themselves with various chemical structures and their hydrolysis products are described. The physical properties of their emulsion sizing agents are also described. Then effects of chemical structures, i.e. chain length and topological structure, on paper properties such as sizing degree and friction coefficient and on the lamination coating in the finishing process are discussed. Finally combination usages of AKD sizing agent and other paper chemicals such as cationic polymers are exemplified.

Introduction of TAPIO Analyzers

- PMA, TS-profiler, and Lab profiler BCX -

Yoshiyuki Kawabata

Customer Service, NOMURA SHOJI Co., Ltd.

To reduce variation in product quality in paper production field is one of the most important control items to win in the tough competition in the global market.

In the product range of "TAPIO Profile Analyzer" supplied by TAPIO Technologies Oy, a paper analyzer manufacturer in Finland, they have a line-up of PMA (Paper Machine Analyzer), TS-Profiler and BCX.

Those analyzers catch not only variations in CD direction as well as MD direction but also find out and sort out variations which are complicatedly entangled in both CD and MD directions from seemingly irregular variations, and provide users of the analyzers with useful and effective measures to locate and give solutions to a questionable part in the paper machine that has produced a cause of quality variations, and also review control parameters for their optimization.

TAPIO Profile Analyzers have been introduced in not only many paper mills in the world but also major paper machine manufacturers such as Metso and Voith. The measurement method with TAPIO Profile Analyzer is widely adopted as defect standard in the paper industry and as a standard measurement method to verify performance specifications for a new paper machine and a rebuilt machine as well.

This article introduces the outline, features, difference and advantage from the conventional methods, analysis method, and typical problems found from the measurement results.

Octopus Stock Approach System

Masaaki Inaba and Norihito Toda

Kobayashi Engineering Works, Co., Ltd.

Making the paper's basis weight profile in cross direction as even as possible, is one of the most important common needs in paper making, printing and converting processes.

Octopus Stock Approach System (Octopus) with compact and easily accessible design, has become a dilution control system to be applicable not only to multi-ply paperboard machines but also to modern high speed paper machines.

In the north American countries, more than one hundred units of Octopus are in operations, supplied by KADANT-AES, our licensor of the system in U.S.A..

In Japan, 4 units of Octopus of 3 mills are now in operation successfully beyond our customers' expectation. Another several units of Octopus will be started up within next year including China's latest brand new linerboard machines.

Anaerobic Treatment of Various Wastewater from the Process of Manufacturing Pulp

Shigeru Noritake and Seiji Imabayashi

Asahi Breweries Co., Ltd.

Kazuo Kamiji

Asahi Beer Engineering Co., Ltd.

Hitoshi Kagawa, Atsushi Tanaka and Hajime Takahashi
Oji Paper Co., Ltd.
Fumio Obama, Akinori Kato and Atsushi Shimamoto
Sumitomo Heavy Industries Co., Ltd.

Usually, aerobic treatment is applied to the treatment of wastewater from the process of manufacturing pulp. This time, the anaerobic treatment was applied to evaporator drain, deinked pulp wastewater, and bleaching wastewater, with a pilot test plant. The result, high COD removal and high load were obtained in anaerobic treatment of the drain from evaporator though its drain contains inhibitory substances. On the other hand, gas recovery in case of deinked pulp wastewater is smaller than in evaporator drain, and COD removal is small in case of bleaching wastewater.

New IT Solution Transforms a Tacit into Visible Knowledge
- Text Mining Software REXION Pro -

Motomi Kohata
Advanced Automation Company, Yamatake Corporation

This paper introduces Text Mining technology and describes the application of knowledge management for a manufacturing industry aiming at extracting know-hows and transforming an executable pattern.

The algorithm of Text Mining software "REXION" simulates human recognition and processing of document classification (clustering) for bags of unmanaged documents so that large amount of document are automatically clustered.

When various documents are analyzed/clustered with this software, it generates the information map which enables human can understand whole document space and executes correlation analysis between text and attribute/item those data are recorded in simultaneously.

The above-mentioned feature is made the best use of, the maintenance record of the product, the contacting log at the call center, and the engineering documentation, etc. are analyzed, and useful knowledge can be obtained.

Study on Print Abrasion Trouble in Ink Layer of Matt Coated Paper

Takeshi Watanabe, Shigeo Yamanaka and Nobuhiro Matsuda
Polymer Research Laboratories, JSR Corporation

Matt coated papers form a significant and increasing segment of coated paper sector because they fulfill the demand for a paper with high brightness, less glare and moderate gloss to get easy readability. Conventionally, matt coated papers have been produced by compromising between brightness, gloss and print abrasion. Especially, in matt applications, a high amount of ground calcium carbonate (GCC) gives good brightness, but relatively results in low print abrasion (also known as smudging or scuffing). The print abrasion which occurs during the bookbinding process or transportation process is critical problem for matt coated paper. Ideally, a matt coating system would produce a high brightness coating with good print abrasion. Optimization of particle size, particle shape of pigments, blends of pigments and varnishing are therefore used to try to reach a balance of properties and to eliminate this problem.

In this paper, we considered that print abrasion was influenced by surface profile of coating layer; we study on the phenomenon, investigated clarification of the key factor of print abrasion trouble with using scanning white-light interferometer. In addition, this paper presents a new approach to matt coated paper design based on plastic pigment components. As a result, it was found that coated paper surface profile influenced to print abrasion; furthermore it was shown that the new pigment system could improve print abrasion without affecting matt coated paper performance like moderate gloss, resulting in a coarse blocky plastic pigment was used as a "spacer" to reduce print abrasion.

Keywords: matt coated paper, print abrasion, smudging, scuffing, surface profile, plastic pigment

How to Save Money, Increase Efficiency and Meet Regulations by Limiting Seal Water Usage

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

Water consumption not only represents a significant expense for pulp and paper mills and that alone is enough reason for them to look at ways to cut down its usage, but also is increasingly being recognized as a valuable natural resource and industry therefore finds itself under pressure to reduce its water consumption. Increasingly tight environmental regulations covering discharges and pollution are adding to the pressure to use less water and threaten major penalties for those who break them. Mill operators are increasingly being encouraged to question every incidence of water usage and to ask if their total consumption can be reduced. Yet they cannot afford to let this impact on their production or to degrade their levels of efficiency.

Modern technology has created opportunities for water savings in some unlikely areas, prominent among which is the water used in mechanical seals.

For Sound or Noise in Industrial World Part II

-It Thinks about the Noise as Part of T.F.O from SKF-

Yasuhiko Yamasaki

Condition Monitoring Service division, SKF Japan

When it explained last "For sound or noise in industrial world", the generation of the sound and the case were presented. It explains DGBB by centering as the part 2 this time and the mechanism of the movement and the case with the trouble are explanation. As for the damage of the bearing, it is necessary to think about actions to do at once by knowing at the first time and actions to make to the next overhaul. The sound in which the cause of needless environment deterioration is made can be decreased by executing it with the decrease of the energy loss of the machine.

Report of 2007 TAPPI Papermakers Conference

Koichi Yanai

Pulp and Paper Research Laboratory

Nippon Paper Industries Co., Ltd.

The first joint 2007 TAPPI Papermakers Conference / PIMA International Leadership Conference was held in Jacksonville, FL., USA from March 12 to 15. There were 73 presentations in 3 sessions in TAPPI and 28 presentations in 3 sessions in PIMA. In this report some of the presentations in TAPPI Conference were reviewed.

A Report on PulPaper 2007

-June 5-7, 2007 at Helsinki, Finland-

Keihachiro Nakajima, Motoi Chiba and Yosuke Uchida

Oji Paper Co., Ltd.

Koji Okomori

Nippon Paper Industries Co., Ltd.

Kunitaka Toyofuku

JAPAN TAPPI

The PulPaper 2007 Conference & Exhibition was held in Helsinki, Finland on June 5-7, 2006 hosted by PI (Finnish Paper Engineers' Association). There were 48 special presentations on 8 sessions. Reflecting of spirit of innovation of PI and Finnish pulp & paper industry, there were 500 participants from many countries in the world.

Special mention is enormousness of the attached exhibition. In the area of more than 10,000m², 500 exhibitions were performed. Before and after the meeting, we visited research organizations, paper mills, a felling spot, a tree-nursery in Sweden and Finland.

Application of Micro Bubble Treatment Technology to Paper-making Effluent Treatment

Yoshihiko Saijo and Makoto Iwasaki

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

It is said that a region of high temperature (thousands of °C) and high pressure (thousands atmospheric pressure) rises, at the moment when a micro bubble disappears in liquor, and that microorganisms and chemical substance in liquor can be decomposed in the region. In this report, suitable conditions for generating most bubbles whose diameter are 50 micrometers or less underwater were found out using a micro bubble generator (revolution type) at first, and then they were applied to effluent treatment. Although SS decreased approximately by 60% by floatation with the micro bubble, the reduction of COD was not so remarkable. The reduction of COD is considered to be caused by reduction of SS and is not based on decomposition. As a result of applying ozone to micro bubble processing, COD decreased by 22% at the ozone concentration 125 g/m³, and the decrease was more than in case of conventional bubbles. COD in this case was measured after filtration. The cause of the not so large reduction (22%) of COD is thought that a region of high temperature and high pressure did not rise at the moment when a bubble disappeared.

Keywords: micro bubble, effluent treatment, reduction of COD, reduction of SS, ozone

November 2007 CONTENTS

Papermaking Technology I

The Newest Finishing Equipment	Toshio Aoki…(2)
The Efficiency Progress with Sheet Sorting	Hiromu Nakamura…(10)
Advanced On—line Multiplex Calendar	Hidehiko Yamazaki and Juha Linja…(14)
Operating Experience of Janus Calendar	Junichi Kanayama…(22)
Operating Experience of Iwakuni PM 9 On—line Hot Softnip Calendar	Kiminobu Kakino…(26)
Slitting of Core Paper	Heinz Herkenrath…(31)
—Cost Saving and Slitting Quality Improvement through Slitting Process Automation—	
Operating Experience of New Slitting System at PM 7 Winder	Yasuhide Hirota…(35)
VariPlus Single Drum Winder for WFC Grade	Michio Takahashi…(40)
Enhanced Use of Advanced Web Inspection System and Winder Advisor System	Atsushi Kurosaki…(45)

Topics & Information

Report on 2007 TAPPI Coating & Graphic Arts Conference	Masanori Kawashima, Hideaki Yamada and Mitsutaka Kondo…(49)
--	---

Research Report (Original Paper)

Development of Manufacturing Process for High Quality Calcium Carbonate by Causticizing Process in a Kraft Pulp Mill (Part 3)	
—Scale—up Trials at Pilot and Mill Plant for Rice—like Particles—	
	Yasunori Nanri, Haruo Konno, Hideyuki Goto, Yasuhiro Okamoto and Kazuto Takahashi …(58)
Influence of Cooking Conditions on Pulp Properties of Acacia auriculiformis in Kraft Pulping	
	M. Sarwar Jahan, R. Sabina and A. Rubaiyat…(69)

Pulp and Paper Mills in Japan (74)

—KOA KOGYO CO., LTD.—	KOA KOGYO CO., LTD.…(78)
-----------------------	--------------------------

Committee report	…(03)
Coffee break	…(57)
Papyrus	…(85)
Industry News (Domestic and International)	…(87)
List of Titles in Foreign Journals Received by JAPAN TAPPI	…(98)
List of Patents issued and Laid—open Publication	…(99)
Price list of Domestic Logs and Wood Chips by District	…(107)
Wholesale Price list of Papers at Tokyo Trade Center	…(108)
Other Monthly Statistics	…(110)
News from the Association	…(112)

November 2007 Abstracts

The Newest Finishing Equipment

Toshio Aoki
Maruishi Co., Ltd.

Maruishi has been making an unlimited effort to develop the best modern finishing equipment. In addition, Maruishi has many technology partner ship such bielomatik-Jagenberg GmbH, Trancel AB, Saimatec Engineering, Function Control BV, total 11 world-famous companies. In the rapidly changing international market today, End users are demanding the high Quality, High productivities. Maruishi would like to introduce from the Automatic Roll Storage System until Automatic Truck loading/Unloading system which we can make a large contribution of this Paper industry.

The Efficiency Progress with Sheet Sorting

Hiromu Nakamura
Hokuetsu Kamiseisen Co., Ltd.

This is the following report that was told as “The Approach for No Manual Sorting System - The labor-saving history in sheet finishing process” at Japan TAPPI Annual Meeting in 2006. The previous report dealt with paper finishing without resorting based on “the quality verification activity”. In this report, the labor-saving strategy by finishing line renewal is described. The labor-saving is achieved by the combination of the quality verification chain and the latest paper finishing machinery.

Advanced On-line Multinip Calender

Hidehiko Yamazaki
Metso Paper Japan Co., Ltd.
Juha Linja
Metso Paper Inc.

OptiLoad calender is a new generation multinip calender of Metso paper. The advances in both mechanical and process technologies have made it possible to achieve high quality-surface finishing at high speed. OptiLoad has its own special features such as specially designed roll-weight relieving mechanism, application of high-temperature thermo roll, special roll configuration, uniform nip load through top to bottom roll and so forth.

Metso Paper has delivered more than 50 OptiLoad calenders with on-line and off-line. Nowadays, wide range of the application is admitted with related technology development. In this paper, the multinip calender technologies for on-line application for coated paper grades and non-coated paper grades such as SC paper are described.

Operating Experience of Janus Calender

Junichi Kanayama
Yonago Mill, Oji Paper Co., Ltd.

The N-1 Coater Machine at Yonago mill, Oji Paper, has been operating since September 1997. The coating width of this coater machine is 7290mm and the design coating speed is 1600m/min, it produces 835tpd of woodfree coated paper.

The Janus Calender has installed next to the coating section as an on-line supercalender, which was the first case in the world. For the purpose of adopting on-line supercalender was to reduce initial investments and maintenance costs, to achieve higher personnel productivity, and to produce coated paper of better quality. This Janus Calender consists of 2 stacks with each 5 rolls, it can get the quality that is similar to an off-line supercalender. This article introduces the latest operating experiences of the N-1 Coater Machine and the Janus Calender.

Operating Experience of Iwakuni PM9 On-line Hot Softnip Calender

Kiminobu Kakino

Iwakuni Mill, Nippon Paper Industries Co., Ltd.

The start-up of No. 9 paper machine of Iwakuni Mill was in 1997, a decade ago. Currently, its capacity is approximately 700 metric ton per day for woodfree LWC paper (A3 grade). To obtain higher productivity, the No. 9 paper machine was designed as a combination model of paper machine and coater. It's also equipped with Hot Softnip calendar (4stucks) to achieve high temperature and high pressure finishing process.

This report is a summary of the operating experience about vertical four stucks Hot Softnip calendar.

Slitting of Core Paper

- Cost Saving and Slitting Quality Improvement through Slitting Process Automation -

Heinz Herkenrath

DIENES JAPAN (at Mack3 Enterprise, Inc.)

Slitting technology has been subject to rapid developments in recent years. With today's top-quality tools, slitting at higher speeds is no longer wishful thinking. At the same time, better results are achieved in terms of edge quality, dust generation and knife service life. This means, that in many existing slitting systems, there is an enormous efficiency and cost-saving potential, which should be tapped by applying state-of-the-art technologies.

The history of continuous slitting goes back to 150 years and Dienes has been involved in making this history for at least half of that period. This is documented by numerous national and international patents.

Dienes' scope of supply includes the respective slitting tools like dish, top and bottom knives as well as multiple knife blocks of different material quality and surface finish and last but not least knife positioning systems in manual, semi- or fully-automatic design.

Operating Experience of New Slitting System at PM7 Winder

Yasuhide Hirota

Sobue Mill, Oji Paperboard Co., Ltd.

In January 2005, and after a two year rebuilding program concentrated on improvements to the production system, Oji Sobue restarted paper machine #7 producing Linerboard. The main objective of this rebuild program was to introduce the latest technologies available to the industry to maximize production efficiencies with special emphasis on the newest Slitting positioning system developed by German machine manufacture. This slitting positioning system was the first one of its kind installed in Japan. The improvements of the slitting system have reduced substantially the number of mechanical breakdowns and machine stoppages, while dramatically improving slitting accuracy, quality and cleanliness while practically eliminating any dust problems, which previously were an area of great concern to Oji Sobue.

These improvements helped reduce operating costs and improve quality with fewer blade changes easier maintenance and operator friendly interfaces, the solution of the dust problems contributed for the elimination of a dust collecting system, thus also contributing for significant energy savings.

VariPlus Single Drum Winder for WFC Grade

Michio Takahashi

Voith Paper Co., Ltd.

The single drum winding is better winding solution for high density and smooth product. Especially WFC paper grade requires premium quality of roll hardness structure without any winding faults. On the single drum winder, each paper roll is wound in a separate station and supported on a single drum. Each winding station is practically a separate machine. Therefore this type of winder is technologically predestined for various ranges of paper grades and product needs. However, operation resources and high maintenance was required. The VariPlus single drum concept has been thoroughly modernized with a much higher degree of automation. We Voith aim thereby to enhance machine productivity by increasing operating speed without risk and optimizing automation for greatest reliability and time savings.

Enhanced Use of Advanced Web Inspection System and Winder Advisor System

Atsushi Kurosaki
Surface Inspection Systems Division, COGNEX K.K.

Cognex developed "SmartLearnR", a useful classification tool. It was designed such that the latest learning classification technology can be combined with expert knowledge of each application. SmartLearn dramatically improves defect classification accuracy.

The usage of "AWA (Advanced Winder Advisor)" further streamlines the re-reeling process. Automatic and accurate stopping at desired defect positions improves winder operation not seen before.

Report on 2007 TAPPI Coating & Graphic Arts Conference

Masanori Kawashima
Nippon Paper Industries Co., Ltd., Pulp & Paper Research Laboratory
Hideaki Yamada
Oji Paper Co., Ltd., Pulp & Paper Research Laboratory
Mitsutaka Kondo
Oji Paper Co., Ltd., Material Analysis Center

2007 TAPPI Coating and Graphic Arts Conference was held in Hyatt Regency Miami, FL, U.S.A. from April 22 to 25. There were 24 sessions and 69 presentations in this conference. This international conference attracted over 400 participants from around the world. We had an opportunity to join the conference and made a summary of interesting 14 presentations in this report.

Development of Manufacturing Process for High Quality Calcium Carbonate by Causticizing Process in a Kraft Pulp Mill (Part3) - Scale-up Trials at Pilot and Mill Plant for Rice-like Particles -

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

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. Then, production trials at laboratory, pilot, and mill scale plant were carried out to investigate the possibility of production of the rice-like CCC at mill.

Since main purpose of causticizing process is to produce white liquor, the white liquor separation from the CCC slurry is very important for kraft pulp production. To increase the particle size of CCC is one of the most promising way to accelerate the white liquor separation. Therefore, the production methods of the secondary particles having larger particle size were investigated by the step-wise addition and the continuous addition of slaked lime slurry and green liquor against the primary particle. In this paper, results of the production trails of the rice-like CCC at laboratory, pilot, and mill scale plant are reported.

Keywords: Causticizing reaction, calcium carbonate, pilot plant, mill plant, scale-up

Influence of Cooking Conditions on Pulp Properties of *Acacia auriculiformis* in Kraft Pulping

M. Sarwar Jahan

Pulp and Paper Research Division, BCSIR Laboratories

R. Sabina and A. Rubaiyat

Department of Applied Chemistry and Chemical Technology, Dhaka University

Acacia auriculiformis was subjected to kraft pulping by varying operational variables, such as time, temperature, and active alkali charge. A central composite design was used to investigate the influence of operational conditions on the pulp properties (total pulp yield, screened pulp yield, kappa number, tensile index, burst index and tear index). A second order polynomial model consisting of three independent variables was found to accurately describe the kraft pulping of *Acacia auriculiformis*. The minimum R² value was above 0.94, which supported well fitting in the proposed equation. The values of screened pulp yield, total pulp yield, kappa number, tensile index, burst index and tear index at the central point of operational variables were 43.5 %, 44.6 %, 26.1, 41.7 N.m/g, 3.3 kPa.m²/g and 12.3 mN.m²/g, respectively, which are within the vicinity of predicted value.

Keywords: *Acacia auriculiformis* pulping, Central composite design, Dependent and independent variables, Multiple non-linear regression, Pulp properties

December 2007 CONTENTS

ENVIRONMENT

Report of the 14th Environmental Seminar	Environment Technical Committee, JAPAN TAPPI…(1)
New International Approaches for Chemicals Management —REACH, GHS—	Yoshiaki Ichikawa…(5)
Statistical Survey on Industrial Wastes Generation and Its Utilization in Pulp and Paper Mills in Japan	Naohumi Maeda…(9)
Plans to Carry out the Measures against Climate Change in Japan	Akira Saito…(15)
Status and Trend of Environmental Laws and Regulations	Shigenori Imamiya…(19)
The Environmental Policy in China	Meguri Aoyama…(25)
Challenges for GHG Reduction in Steel Industry	Toru Ono…(29)
Bioethanol : Today and Tomorrow	Hideaki Yukawa…(34)
The Latest Information on RPF and C—RPF, the Next—generation Technology	Motoyasu Takenaka…(38)
Ash Treatment Technology and Reuse Technology by Ash Melting System	Testuo Akashi…(43)
Waste Paper Collection : Present Business and Problems	Masao Kurihara…(51)
A Diagnosis System and Service of Activated Sludge Treatment	Takao Ogawa…(54)
Introduction of Research Laboratories (62)	
Laboratory of Functional Material Chemistry, Marine Environmental Chemistry, Department of Ocean Science, Faculty of Marine Science, Tokyo University of Marine Science and Technology	
Research Report (Original Paper)	
Quantitative Analysis of Hydrogen Peroxide by High Performance Liquid Chromatography	Kengo Magara, Tsutomu Ikeda, Tomoko Sugimoto and Shuji Hosoya…(65)
Technical Report (Original Paper)	
Changes of Pulp properties by Recycling —Effects of Alkaline Soaking—	Takashi Yaezawa…(78)
Pulp and Paper Mills in Japan(75)	
—Osaka Mill, Oji Paperboard Co., Ltd.—	Oji Paperboard Co., Ltd.…(96)
Committee report	…(03)
Essay on Intellectual Property	…(61)
Coffee break	…(64)
Papyrus	…(101)
Industry News (Domestic and International)	…(103)
List of Titles in Foreign Journals Received by JAPAN TAPPI	…(114)
List of Patents issued and Laid—open Publication	…(116)
Price list of Domestic Logs and Wood Chips by District	…(131)
Wholesale Price list of Papers at Tokyo Trade Center	…(132)
Other Monthly Statistics	…(134)
News from the Association	…(136)

December 2007 Abstracts

New International Approaches for Chemicals Management
- REACH, GHS -

Yoshiaki Ichikawa
Hitachi, Ltd., Environmental Corporate Policy Div.

Global approaches for new chemicals management in the perspective of legislation on "environmental product policy" are discussed. REACH, a recently introduced EU chemicals policy, is obviously a typical example and a main topic dealt with in this lecture. This approach is featured by the two distinguished issues; one is "wide scope of registration/notification" and the other is "supply-chain obligation". In particular the latter issue should be strongly cautioned by industries since companies in EU seem to be much more advantageous than those in Japan. This presentation also points out that even Japanese companies doing business only domestically are very much likely to be affected by this law. Best strategies for Japanese industries are proposed as well as relevant movements already observed worldwide.

Statistical Survey on Industrial Wastes Generation and Its Utilization in Pulp and Paper Mills in Japan

Naohumi Maeda
Environmental Technology, Japan Paper Association

Japan Paper Association and JAPAN TAPPI investigate industrial waste for the member corporation etc. every year, and have brought the result together. The coverage is 87.7%, based on the paper and paperboard production volume. The total amount of industrial wastes generated in Japanese paper mills corresponds to about 11% of their paper and paperboard production. (BD)

The recycled waste is 87.8% in B.D to the residue (after incineration is processed, etc).
The wastes finally disposed is 12.2% (in B.D) to the residue (after incineration is processed, etc).

Plans to Carry out the Measures against Climate Change in Japan

Akira Saito
Mizuho Information & Research Institute, Inc.
Environment, Natural Resources and Energy Division

Before the first commitment period (2008-2012) of the Kyoto Protocol, the Government is assessing the Kyoto Protocol Target Achievement Plan to revise until next March. It is certain that many Kyoto credits will be necessary for the compliance of Kyoto Targets of Japan. For the procurement of Kyoto credits, the balance between supply and demand should be taken into consideration, and it may not be probable to become oversupply in the Kyoto market for the time being. Moreover, it is necessary for Japan and Japanese companies to make out mid and long-term plans against climate change.

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.

The Environmental Policy in China

Meguri Aoyama
Asia Group, Keidanren

The China's Industrial policy including foreign investment has already changed into environmentally friendly one, because China's environmental problems are mounting.

China's rapid development has become an environmental disaster. Water pollution and water scarcity are burdening the economy, rising level of air pollution are endangering the health of Chinese people, and much of the country's land is rapidly turning into desert.

High economic growth necessarily requires the huge consumption of resources, but in China energy use has been especially unclean and inefficient, with serious consequences for the country's air, land and water. Although per capita GDP in China is still 2000 dollars, China is already attracting international attention for its rapid growing contribution to climate change.

Challenges for GHG Reduction in Steel Industry

Toru Ono
Nippon Steel Corporation

Steel industry of Japan has enthusiastically challenged in energy saving since the oil crisis in 1970's, and reached to the world top level in energy efficiency. Energy saving methods of Japanese steel industry are categorized into I) process innovation, II) process optimization, III) effective use of byproduct gases, IV) waste heat (energy) recovery, and V) utilization of wastes in the iron & steel making processes. Waste plastics and waste tires have started to be used in iron and steel making process to reduce natural resources.

In addition, R&D projects for further process are actively carried out. In the field of process innovation, after a long R&D stage, the advanced coke oven (SCOPE-21 is now on the horizon. For realization of a social system based on hydrogen, coke oven gas is expected as a potential resource of hydrogen supply for fuel cells, and demonstration programs are carried out. In order to realize global warming protection with simultaneous fossil fuel consumption, technologies for CO₂ capturing from blast furnace gas are intentionally investigated as a national R&D project.

Recent economic growth of developing countries, especially China, is bringing a rapid expansion of steel production and related increase in consumption of raw materials and energy, and huge amount of GHG emission. Therefore, improvements of energy efficiency of steel sector of developing countries are very important not only for future shortage of natural resources but also for global warming protection.

Among many challenges by steel industry, contributions through supplying steel products with high performances and use of byproducts in the society are the most important for our better life with protecting global warming and resource problem.

Bioethanol: Today and Tomorrow

Hideaki Yukawa
Microbiology Research Group
Research Institute of Innovative Technology for the Earth (RITE)

From the standpoints of preventing global warming and bracing for the expected exhaustion of fossil fuel resources, worldwide attention is currently focused on bioethanol. In the U.S., development of new technologies is a strongly promoted national policy, leading to a drastic increase in the production of bioethanol. However, feedstocks for current ethanol production processes comprise food crops, the supply of which will be increasingly constrained. Therefore, there is a pressing need to utilize "soft-biomass", obtained from non-food biomass as well as inedible parts of food crops, as demand for ethanol increases. The RITE-bioprocess is based on a new concept that fundamentally resolved the technological problems of bioethanol production from soft-biomass.

Keyword: soft-biomass, bioethanol, RITE-bioprocess

The Latest Information on RPF and C-RPF, the Next-generation Technology

Motoyasu Takenaka

RPF Planning and Developing Dept., SEKI-SHOUTEN CO., LTD.

RPF, "Refuse Paper & Plastic Fuel" is a fuel provided in solid form using non-reclaimable used paper and plastic waste as its staple materials. The use of RPF is increasingly receiving high marks from mainly paper industry as an alternative to fossil fuels, due to its superiorities such as fuel quality, costs and environmentally mild impacts. This report features RPF properties, market demand and related information on the latest activities making conformance of RPF to JIS requirements or ensuing action toward legal revisions, and also introduces a new technology C-RPF, consisted mainly of charcoal and plastic waste. This charcoal, called "Char", is produced through a process of carbonizing kitchen garbage (combustible trash). C-RPF can be substantially substituted for coal as well as RPF and can contribute to reduce green house gas emission by curtailing fossil fuel use. Therefore, C-RPF has high expectations as one of the powerful way for recycling domestic waste which has been being collected and combusted by local governments.

Ash Treatment Technology and Reuse Technology by Ash Melting System

Testuo Akashi

Environmental & Recycling Plant Engineering & Design Dept.,
JFE Environmental Solutions Corporation

This paper explained ash treatment technology and reuse technology which are developed in the MSW [municipal solid waste] incineration process. Next, new melting process of MSW incinerator ash was introduced, and then new reuse technology of slag produced by MSW-melting process was introduced.

Keywords: Ash, Melting Process, Slag, Reuse, Municipal Solid Waste

Waste Paper Collection: Present Business and Problems

Masao Kurihara

Kurihara Shizai Co., Ltd.

Recently articles on waste paper appear in newspapers. The fact that the price of waste paper increased by 30% in a year attracted an attention in the economic situation in which most goods were suffering in deflation for these three years. As the waste paper price increased, growing numbers of newcomers joined in the waste paper business. Some of them took away illegally waste paper deposited at depots where local governments and municipal unions organized for collection. To counter the illegal take-away, many local governments established penal regulations.

I will introduce how the present business is going from the standpoints of collection, consumption, price and international market.

A Diagnosis System and Service of Activated Sludge Treatment

Takao Ogawa

Ogawa Environmental Research Institute, Inc.

Nowadays the computer technology is widely used in the manufacturing processes for controlling the quality of products and production lines. However, the application of computer technology is not well developed in the field of waste water treatment process. For example, most of facilities of Activated Sludge Treatment (AST) are operated based on the operator's experience, although the basic operation procedure is well known.

The main reasons why the AST is not operated systematically are as followed:

- 1) The decomposing ability of BOD component by AS (that is, an activity of AS) in the aeration tank is not evaluated quantitatively in real time.
- 2) The instrument / equipment to measure promptly and continuously the BOD value of raw waste water and its decomposing rate is not available.

I introduce here the method and the computer aided instrument / equipment to easily and promptly measure and monitor the following two indicators of "the activity of AS in the aeration tank" and "the decomposing rate of BOD component in the feed waste water". Moreover, I show that the performance of AST is analyzed quantitatively by using these two indicators.

Keywords: activity of Activated Sludge Treatment, decomposing rate of BOD component, decomposing ability of BOD

Quantitative Analysis of Hydrogen Peroxide by High Performance Liquid Chromatography

Kengo Magara, Tsutomu Ikeda, Tomoko Sugimoto and Shuji Hosoya
Forestry and Forest Products Research Institute

Hydrogen peroxide is generally determined by an iodometric titration method. This method is determining the oxidation-ability of a sample solution. If any compounds that have oxidation-ability toward iodide are involved in the sample solution, the oxidation-ability of those compounds will be counted as a part of hydrogen peroxide. Accordingly, when the reaction mechanisms of oxygen or ozone bleaching are investigated using model compounds, the drawback become serious. Because some of the compounds formed during the bleaching may have oxidation-ability and be still kept in the reaction mixture after the bleaching. The method is, therefore, required to separate hydrogen peroxide from some compounds having oxidation-ability and to determine the accurate amount of hydrogen peroxide.

To satisfy these requirements, chromatographic determination of hydrogen peroxide was investigated using high performance liquid chromatography (HPLC). Hydrogen peroxide was reported to be separated by a ligand exchange type column in which a sulfonated polystyrene/divinyl benzene cation-exchange resin was packed¹).

In our report, the analytical conditions to determine hydrogen peroxide were investigated using the reported column. The column body made with stainless steel resulted in the decomposition of hydrogen peroxide during the separation. This drawback was improved by the addition of EDTA in the eluent. The detection of hydrogen peroxide was accomplished by an electrochemical detector (ECD) with a platinum electrode (+0.45 V of voltammetric charge toward a reference electrode). When the highly acidic or alkaline samples were injected to the column, the separated acid or base would remove a coating by oxidized substrates on the electrode resulting in the disorder of a baseline, because the current between a working and a counter electrode changes suddenly. Therefore, sufficiently buffered solution was needed as an eluent of HPLC-ECD.

Keywords: hydrogen peroxide, high performance liquid chromatography, EDTA

Changes of Pulp Properties by Recycling - Effects of Alkaline Soaking -

Takashi Yaezawa
Pulp & Paper Research Lab., Oji Paper CO., Ltd.

Many works concerning to recycling of paper have suggested that the recycling decreases pulp strengths and optical properties. In these studies, the recycling procedure only consists of repeated treatment such as pulping, drying and re-pulping.

However, actual deinking process usually has a soaking process which is carried out with alkaline chemicals such as sodium hydroxide and hydrogen peroxide.

In this paper, we show the significance of the soaking in the deinking process. For hardwood bleached kraft pulp, the soaking with alkaline chemicals affects negative inferences to pulp strengths, however, the soaking with hydrogen peroxide affects positive inferences. On the other hand, the soaking has a little influence on the TMP properties except optical properties.

Keywords: Recycling, Deinking, Alkaline chemicals, Hydrogen peroxide, Alkaline soaking