2016 February JAPAN TAPPI JOURNAL

Vol.70, No.2 Abstracts

Cutting-Edge Technologies for Recent High Demands on Energy Consumption and Limited Grade Stock

Keiji Yasuda
Overseas Sales Dept., AIKAWA IRON WORKS CO., LTD.
Kazumi Fujita
Technical & Engineering Dept., AIKAWA IRON WORKS CO., LTD.

A higher price and a lower quality of the waste paper due to a recently increased export of the good quality Japanese waste paper have been causing the problems of a poor product quality and a lower yield in the Japanese paper industry. It is said by one of the media that the continuous increase of the waste paper import to China has ceased since the beginning of this year, but the decline of the waste paper volume in Japan will continue due to the decreasing number of the paper consumption.

The major problems that Japanese paper mills are facing now are “Lowering product quality” due to introducing the prohibited materials, “Increasing power consumption” due to the higher ratio of the wet-strength, and “Lowering yield” due to decreasing waste paper grade.

In this article we would like to introduce the concept, structural principle and case studies of the latest products developed with the cutting-edge technologies in design and manufacturing processes that contribute to solving the problems that the paper mills are facing.

Felt Cleaning System “SHOWER ROLL”

Narihiro Ohtaka
Aoki Machinery Co., Ltd.

Due to recent poor quality of furnish caused by increased use of recycled paper, increased dosage of chemicals, increased rate of using collected water, higher machine speed and etc., the level of contamination of felt and canvas is getting higher and higher these days. To eliminate this contamination well enough gives much impact on how efficiently we produce paper and

board.

Concerning felt cleaning, cleaning agents and detergents used for felt cleaning cause foaming in the process, poor sizing level and increased amount of water treatment cost. Because kinds of contamination are different depending on the machine type, the machine speed and the paper grade, the cleaning method must be changed accordingly.

The conventional ideal cleaning method consists of a cleaning shower, a high or a medium pressure shower, a wetting shower and a suction box or a squeeze roll. However, a high or a medium pressure shower causes fluffing and then abrasion on the felt surface leading to poor cleaning effect.

On the other hand, when dewatering with a squeeze roll, it can decrease air permeability of the felt due to the caliper reduction and clogging. It is extremely difficult to maintain the felt condition and to extend the felt life time with using these conventional cleaning methods. Furthermore, much showered water splashed around the shower equipment causes poor working environment. It can also generate rust on mechanical parts and can damage roll bearings.

In this situation, we have developed a cleaning system, “SHOWER ROLL” which has a cleaning method different from those of conventional ones to cope with the above mentioned issues and is environmentally friendly, too.

We hereby introduce mechanical characteristics of SHWER ROLL and our experiences of operations.

Resolving Web Breaks and Defects Fundamentally !
Drastic Chemical Solution of Deposit Problem by Process Cleaning

Eiji Koga
Sales and Marketing Dept., Nissin Kagaku Kenkyusho Co., Ltd.

The deposit in the papermaking process often has bad influence to machine operation, the pulp and paper productivity and the quality of the product. Therefore successive various measures are performed to restrain a deposit. In the papermaking process especially using the waste paper, it's difficult to restrain a deposit perfectly by a fluctuation of the wastepaper quality. There is a way to plan for a solution by strengthening the deposit control to such problem, but the problem as cost increase occurs newly. For the appropriate solution of deposit problem, it's important to clean periodically the papermaking process on the shutdown, and control deposit of a constant level as well. In the recent years' paper making process, the contents of the deposit in the process are changing by various technological introductions. So it's necessary to optimize process cleaning agent and the use method according to the change. Introduction of the most

appropriate process cleaning method makes operation become stable, and improve the productivity, and stabilize the quality, and you can reduce the cost.

Introduction of Liquid AKD for Alkaline Board Making System

Mark Kao and Stephane Menard
Solenis Water Technology
Masanobu Hatano
RIKENGREEN CO., LTD.

Alkaline sizing in paper board making system became the global trend and move into Asia Pacific recently, mainly due to more Calcium Carbonate in recycle waste paper which is not easy to control the system pH and higher cost from rosin size due to the labors cost increase. The other reasons were unexpected raw material supply and getting worse on fiber strength quality due to more recycle times and higher quality demand at paper end used or even lower basis weight required for cost saving.

In order to get good paper machines runnability and paper properties that several topics are discussed (ⅰ) alkaline sizing market trend in recycle board paper making (ⅱ) reasons for alkaline board paper making (ⅲ) solutions that can be implemented to alkaline board paper making system on sizing or (ⅳ) balance of retention and drainage to keep paper machine runnability.

A good alkaline board making system are not only using alkaline fine paper making system as references but also need to consider the balance of retention & drainage on minimize the impact of strength properties due to formation changed.

Recent Technical Trends and Application for Rosin Sizes（Ⅱ）

Takuya Kawamura, Ryuji Itose, Wakako Masuda, and Kenichiro Yokota
Paper Chemicals Development, R&D Center, R&D Company, Harima Chemicals, Inc.

Harima Chemicals Group is the only one manufacturer of tall oil rosin in Japan, and we have our oversea manufacturing bases in 11 countries. By utilizing these advantages, we have been globally developing pine chemical business in various fields such as paper chemicals and printing ink resins.

With respect to the paper chemicals, a rosin size is one of the major paper chemicals in the world, and the rosin size has been applied with aluminum sulfate for wide ranges of

papermaking pH conditions to give desirable sizing property for paper and paperboard.

Recently, it is getting much interest and concern about food contact substances. In the United States, it is general for the paper chemicals including rosin size to comply with FDA (Food & Drug Administration) regulation, and rosin which is a major component of rosin size has been approved as one of the substances to safely use in paper and paperboard which contact with food. Considering FDA compliance for rosin dispersions, we needed to develop anionic polymer type emulsifier with FDA compliance since there was no anionic polymer approved by FDA as the emulsifier even though its quality was basically advanced.

In this report, the newly developed rosin dispersed sizes, an effective application method of this rosin dispersion based on the mechanism study for sizing performance and trial result at paper mill are introduced.

Automatic Core Cutter "with Metal Cap Inserter"

Naoaki Uesugi
Maruishi Co., Ltd.

Papermakers and converters strive to improve the quality, reliability, logistic, ergonomics, environmental sustainability and cost effectiveness. The new paper machines and converting lines get winder and faster for each new installation with maximum automation level. To stay on a global market is constant improvements and investment in new technology.

Maruishi has made a technical alliance with Sweden Core Link as to the core equipment since 1991 and manufactured in Japan. Core Link has technological innovations for the core equipment for dozens of years and tried to increase productivity and customized for a labor-saving machine and reduction of expenses to fit the customer's needs from their experience and delivered to several hundred companies in more than 50 countries.

I would like to explain about Automatic Core Cutter "with Metal Cap Inserter" which was delivered as the first machine manufactured in Japan.

Existing Folio Sheeter High Efficiency Improvement Program

Tayfun Ozbaki and Akihiko Koya
K.K.IRISU （C.ILLIES & CO., LTD.）

BW Papersystems, which includes: MarquipWardUnited, Will-Pemco, Kugler-Womako, and

Curioni, offers market-leading technology for folio, cut-size and digital sheeting and packaging machines, plus stationery, passport production and specialized paper converting applications.

Part of the BW Papersystems history is the Marquip Knife. Its history starts on the corrugator, and then was developed for use in the sheeter industry. Evolving through the years, across multiple industries has made the Marquip Knife the most advanced knife in the world. It provides clean, accurate cuts, with a speed curve that is unmatched; while creating sheets that are press ready. There are over 1,800 knives installed across the globe, of which 350 are on Sheeters. The knife has been installed at paper mills, paper convertors, commercial printers, folding carton plants and on corrugators.

Optimizing Steam Systems for the Paper Industry

Toshiki Takenaka and Katsuhiko Machino
Consulting Engineer
CES Center, TLV CO., LTD.

In recent years at paper mills, due to countermeasures against global warming and steep increases in the price of raw materials, efforts to conserve energy and reduce costs are becoming ever more imperative. Also, mills that been in operation for several dozen years are not rare, and increases in maintenance costs as well as production opportunity losses due to trouble are becoming issues.

Here we will introduce our "Steam System Optimization Program (SSOP)" which realizes improvements in steam conservation and stable operation of steam systems, typified by boilers and paper machines. SSOP is divided into 3 phases dealing with optimization of "Condensate Discharge Locations", "Steam-using Applications", and the "Entire Steam System (Energy Balance)". In order to carry out these phases, there are two programs: a "condensate discharge location management program (BPSTM)" which is a system for maintaining optimum conditions by making visible and solving issues such as steam loss and problems caused by condensate from condensate discharge locations (steam traps and peripheral equipment); and a "comprehensive steam system analysis (CES Survey)", in which a specialist diagnoses the site.

SSOP has been adopted by many plants in the petrochemical industry. BPSTM and individual application surveys have already been implemented in a number of paper mills and have received positive reviews. BPSTM has been adopted primarily by the utility department at these mills, and 3 years after introduction in some mills the steam trap failure rate has been reduced from 20% to about 9%, steam loss cut by 4,700 tons/year, and the problem of blocked steam

traps resolved. Also in a mill where the survey has been adopted, by reconsidering the recovery of steam discharged from coating machines, over 1.5 times more steam was recovered, resulting in an approximately 4% reduction in the steam consumption rate. Furthermore, the problems of water hammer and air temperature fluctuations in the paper machine air system were resolved by identifying their causes and drafting countermeasures.

Ideal Closed Condensate Recovery System for the Paper, Pulp, and Corrugated Cardboard Industries
― Heat Recovery System Utilizing Flash Steam under Both Pressurized and Vented-to-Atmosphere Conditions, and High-Efficiency Gas-Fired High-Pressure Once-Through Boiler with Air heater―

Takehiro Uwafuji, and Hiroyuki Hatanaka
Miura Co., Ltd.

MIURA as a leading manufacturer of once-through boilers has adopted “Total solution” as a slogan, promoting various eco-friendly proposals through industrial-water treatment devices and compressors using in-plant steam, and so on. This paper explains following technologies;

・Closed condensate recovery system which recover heat from flash steam under both pressurized and vented-to-atmosphere conditions

・Industry’s highest gas-fired high-pressure once-through boiler with air heater, under the closed condensate recovery condition

Standardized and Automated Paper Quality Testing for Process Optimization and Control
―L&W Autoline - Case Studies―

Mitsuhiro Yamazaki
Pulp & Paper Group, Process Automation Division, ABB K.K.

In all types of mature production, constant improvements are required for a company to stay competitive. Today it is more important than ever. Search for cost reductions and improved efficiency is always on the agenda. In the pulp and paper industry the goal is to produce a product within given specification at the lowest possible cost - quality testing and monitoring of the process is one way getting there.

In this speech, I would like to share some case studies, introducing design concept and capability of L&W Autoline as well as knowledge which has been obtained from installation

base of more than 400 systems all over the world.

The History of Technological Developments of the Paper Industry in Japan
Part 4: The Start of Pulp Production

Kiyoaki Iida

Following progress of paper machine, pulp making was also revolutionized in the 19th century. Alkaline cooking of rags and straw in a globe digester was perfected by the middle of the century. Then, wood was pulped with alkali in a stationary digester in America and ground wood pulp was produced in Germany in the 1860s. Sulfite process for wood pulping was also investigated at the each side of the Atlantic, and the basic design was completed by the end of the century. At the beginning of the 20th century, newsprint was manufactured with GP and SP in a large scale and KP, a little later, accomplished its system including the recovery plant.

The Meiji era was exactly the time pulping processes were evolving, and pioneers in Japan sensitively understood and followed the progresses.

First, rags were cooked with alkali. Paper manufactured by an imported machine with rag pulp could not compete to imported paper that was efficiently produced. The cost down was done by Heizaburo Ohokawa, who cooked rice straw with alkali, copying straw pulping in the U.S. He made newsprint in which straw pulp was 60% and the rest was rag pulp.

Having a news saying that SP was commercially produced in Europe, Ohokawa visited the mills and decided to produce SP by himself. After efforts for 5 years, he built a mill (Keta mill) in Kiso area. Though the mill was miserable at the start, he accumulated know-how, installed a GP plant and a paper machine, and finished an integrated mill based on wood. In ten years later, this model was repeated as Nakabe mill. The model was very significant in the history and was a base for further expansion to Hokkaido and then to Sakhalin .

Corporate Profile & Products Information (29)

Maruishi Co., Ltd.

In 1943, Mr. Taichi Ishikawa founded Maruishi from scratch to manufacture repair parts for the pulp and paper mills on the foot of Mt.Fuji, Japan. As a man of entrepreneurship, he didn’t set limits for himself. He had a big dream – to start design and engineering work for his own products and serve clients’ needs with the best knowledge. An excellent opportunity presented

itself in 1970 when Maruishi signed its first license agreement with Machinenfabrik ANDRITZ, of Austria, to manufacture its patented Twin Wire Wet Wrap Machine. That was the beginning of Maruishi's global expansion, followed by more than a dozen of international technical alliances later on. Today Maruishi's machine technology covers nearly all paper machinery requirements, from wood handling, stock preparation, paper machine, coater, to modern finishing machines. Maruishi is committed to global technical exchanges and unlimited technological development for high-tech modern paper machinery. We grow together with our worldwide clients and technical partners. And like our founding father, Maruishi's global aspirations for technical challenges, are limitless.

－Peer Reviewed－

Thermomechanical Pulp Innovation for Energy Saving and High Brightness Paper Development

Takanori Miyanishi
JAPAN TAPPI

It is reported that Douglas-fir is not suitable for mechanical pulping. Extractives such as dehydroquercetin and quercetin contained in the heartwood of Douglas-fir are known to be deleterious by consuming costly bleaching chemicals with the result that the end product may be a pulp with lower brightness. The objective of this study was to improve bleachability of thermo-mechanical pulp (TMP) of Douglas-fir. The TMP interstage bleaching was selected as a model process, where hydrogen peroxide bleaching took place between the primary and the secondary refining. Two sets of experiments were carried out to evaluate pulp washing and chip pretreatment in various conditions. The first experiments showed that pulp washing with water after the primary refining prior to the interstage bleaching was effective in improving bleachability. The second experiments found that chip pretreatment with diethylenetriamine-pentaacetic acid (DTPA) or sodium hydroxide (NaOH) prior to the primary refining improved bleachability and saved 35-40% hydrogen peroxide in the interstage bleaching to achieve 55% ISO brightness. Precautions were taken to optimize the chip pretreatment conditions. The pretreatment efficiency depended on the initial pH of the chemical liquor and the optimal pH range was found to be around 11.5. DTPA or NaOH, which were added for the chip pretreatment, showed the same effect. The experimental results were successfully applied to the energy efficiency project in one of the largest TMP plants in North America.