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### **Brightness Improvement Program in DIP Process**

Takahito Ikeshita

Pulp and Paper Business, KATAYAMA NALCO INC.

Hiroshi Hasegawa

Technical Development, KATAYAMA CHEMICAL, INC.

Hydrogen peroxide bleaching is a principal method in deinked pulp (DIP) manufacturing. In recent years, it has become more difficult to keep up an operating standard of brightness as the amount of low-quality recycled has been increasing.

On the other side, monochloramine is widely used for the slime control purpose. We found that monochloramine can improve hydrogen peroxide bleaching efficiency in the DIP process. In this article, we will introduce the brightness improvement program using our oxidant techniques with a successful case. This technique helped the mill to achieve more efficient hydrogen peroxide bleaching and to reduce total cost of mill operation.

### **AEGO 3X PRESS I (Inverted Tri-EX Press) for Optimum WTL (White Top Liner) Production**

Giancarlo Gianlorenzi

PMT Italia S.p.A.

Akihiro Ooba

Yonei & Co., Ltd.

The peculiarities of the physical structure of white top liner, together with the high quality demands of this increasingly important packaging grade, present a number of technical challenges to the machinery designer. The press section of the machine is one such challenge. PMT developed a press concept with the Hamburger group in Germany for its rebuild of the Rieger Trostberg PM2 in 2002. The concept - Inverted Tri-Ex was such a success that the group installed a second press of the same design in its new PM1 at Hamburger Spremberg mill in 2006. Subsequently, a couple of years later PMT has started up a third press unit at DS Smith on

PM2 Lucca mill in Italy.

This paper sets out to explain the underlying principles and the evolution of the Inverted Tri-Ex Press, commencing from the basics of the wet pressing process itself.

The fundamentals of water removal, maintaining white-layer purity and surface smoothness and z-direction strength are succinctly covered. A key factor in the design of the press is the closure of all transfers resulting in no open draws.

### **The Newest On Machine Equipment for the Efficiency Improvement — Case Studies of Deposit Removal Facilities on Paper Machine —**

Chihiro Murayama

Technical Sales Department, AIKAWA IRON WORKS CO.,LTD.

By recycling papers usage percent increasing and its quality lowering, the difficulties of impurity removal at paper stock preparation stages are underscored year by year. As the result, the fine impurities reached to paper machine side are increasing, they have chances to deposit everywhere, and bring dirt troubles. Because cleaning up the deposit by hands requires long time and hard tasks with the paper productivity drastic reduction, its improvement would be one of the most important subjects for paper making. We introduce our newest profitable doctors and cleaners for paper machines to improve this big problem. Additionally we will introduce the most suitable suction roll sealing elements for paper machine energy saving which we became to supply from this year.

### **Andritz State-of-the-Art Sludge Dewatering Process — In Combination with Pre-Dewatering Gravity Table —**

Tamio Fukuzawa , Toshio Okunishi and Yosuke Takeshita

Andritz K.K.

Andritz sludge dewatering systems treat all residues created in recycled paper mills. In addition to sludge, these include rejects from various process steps like pulping, cleaning or screening. Every recycled fiber line needs a proper water, sludge and reject treatment system in order to be able to operate economically and in an environmentally sound manner. The first and obvious goal is to minimize costs for resources (water, energy) and disposal. In this article, the combination of Andritz Gravity Table as pre-dewatering and Continuous Pressure Filter

(CPF) or Screw Press (SCS) is introduced mainly.

### **Fully Split Mechanical Seal for Shaft Wobbling**

— **One Mechanical Seal can Change your Working Environment Completely !**

**Provides Clean and Maintenance Free Plan —**

Takashi Kamizono

Engineering Dept. John Crane Japan, Inc.

Retrofit shaft seal from gland packing to mechanical seal in pulp and paper mills is proceeded but it is only limited to the major machines such as pumps for cooking and chemical or refiners. Gland packing is still applied in raw material tanks or horizontal agitators for chest.

This is because the horizontal agitators often occur shaft runout and vibration. These factors are long deflecting shaft and changing tank liquid level, etc. So, it is thought that mechanical seals cannot be applied.

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

We would like to introduce the fully split mechanical seal which can be applied accommodate the shaft runout and vibration for horizontal agitators with actual experiences.

### **Web Inspection Camera System with Dust Filter for Tissue**

— **Productivity Improvement by Integrated Camera System “TotalVision™” —**

Yasuhiro Takeyama

MATSUBO Corporation

It is “Challenging time” producers for household paper such as tissue, toilet roll and towel paper, because of high demands for quality control from consumers. Even in the severe competition against low cost imported tissue, Japanese tissue producers should take care of not only its quality but also cost management. However most of all tissue machines have no web inspection system (WIS) to detect defect such as holes or dirt, which is standard for paper/board machines. The only solution for web break trouble, such as web break at unreel in converting machine caused by pinhole from tissue machine, has been as a rule of thumb. Because conventional line scan camera inspection systems detect flying paper dust as defects. They cannot classify “true defects” on the tissue web.

“WebInspector™ “ the web inspection system by Papertech Inc. (Canada), which have delivered over 730 WIS and web monitoring system to paper/tissue producers, is introduced in this article. WebInspector™ has a powerful dust filter to detect “True defect” .

Furthermore, Papertech can also propose solutions for quality control and cost management. Their TotalVision™ system which is an integrated system of web monitoring and web inspection can specify roots of the troubles (defects, web breaks). It terminates “guess work” by operators and helps them to SEE defects or web breaks in the upstream process to find the root causes rapidly, and also give them appropriate solutions. Some cases which achieved cost reductions and productivity improvements are also introduced.

### **The Proven Effects of the Reel Optimization System (ROS)**

Makoto Matsushita

KGK Engineering Corp.

In the paper manufacturing, the reel process is understood as the end and important process of the paper machine and easily related to the final product loss. The patented BLH Nobel Reel Optimization System (ROS) is a hydraulic force and position control system developed to measure and control the nip load directly during the full reeling process, to eliminate the wrinkles caused by air bubbles and the cracks during critical shifting phase, and to improve the roll density. Consequently ROS can decrease the paper loss dramatically and contributes to produce the optimum density rolls, but also can decrease the losses happened in the next re-winding process caused by the paper slipping in the roll. We would like to introduce the proven effects of the Reel Optimization System (ROS) with Reel Diagnostics System (RDS) which has been already operated in European and USA paper mills.

### **For Sound or Noise in Industrial World Part VII\*1**

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

Yasuhiko Yamasaki

RSS RS SKF Japan.

“For sound or noise in industrial world” is the five in this time. This explanation is a noise by the contamination. The contamination accounts for 14% of the whole of the problem that the damage at the early stage of the bearing doesn't reach the calculation longevity. The

contamination exists from small one to the big one, and from rigid to soft. And, there is the solid and liquid. I present the example of the soft solid one by this contamination, deprave the longevity of the bearing by it, and tell how the noise is generated.

### **Newly-Developed Defoamer and Dosing Control**

Yuuji Sonoda

Kurita Water Industries Ltd.

A fatty alcohol based emulsion type defoamer has widely been applied for paper making process, because of its excellent ability to deaerate white water and less negative impact on sizing. In this article, we introduce newly-developed emulsion type defoamer “KURILESS<sup>®</sup>800 series” and “S.sensing<sup>®</sup> FD II” that enables to quantify foam volume automatically, which has almost the same performance level with a visual measurement.

Notably, “KURILESS<sup>®</sup>800 series” has a beneficial effect both in high temperature system and in surfactant-containing system. These characters have already been proven in actual machine tests. “KURILESS<sup>®</sup>800 series” could be expected to be applied to paper and pulp making process water or wastewater where other types of defoamers have currently been used for, because it is highly effective to defoam the surfactant component system. As a result, we believe “KURILESS<sup>®</sup>800 series” expand the coverage of the emulsion defoamer.

“S.sensing<sup>®</sup> FD II” is an automatic monitoring system of foam volume, instead of visual judgment by a operator. The dosage of defoamer can be also adjusted automatically by utilizing the feeding control function of “S.sensing<sup>®</sup> FD II”, that adjusts defoamer feed according to the foaming volume information. We can quickly give a reaction to increase or decrease dosing at the time of the abnormal foaming. Thus, we expect that “S.sensing<sup>®</sup> FD II” contributes not only to cut the cost by the prevention of excessive dosing, but also to prevent foam obstacles caused by any fluctuation.

### **Construction Cost of KP Mill Construction for Bioethanol Production**

Tokiya Yaguchi

Biomaterial in Tokyo Co., Ltd.

Makoto Iwasaki

MIP Consultant Office

Youichiro Isono

Second-generation bioethanol has been promoted as a viable form of renewable energy to sustain the global environment. In Japan, the technological development in commercializing cellulosic bioethanol production by 2020 has been pursued by the industry, government and academia, focusing on high-yielding herbaceous biomass and fast growing hardwood as the cellulosic feedstock, and the Kraft pulping (KP) process that can pre-treat the large volumes of biomass in preparation for bioethanol production. This report details the capital cost associated with constructing facilities for KP process with bioethanol production. The major findings were:

1. The construction costs of new KP mills and mills being planned or under construction around the world since 2000 were proportional to the scaling exponent 1.03 of their production capacities. The results were determined from a sample size of 85, with a contribution ratio of  $r^2=0.82$ .
2. The approximation formula can be used to calculate the construction cost of the KP (biomass pre-treatment) portion of bioethanol production facility. For example, a facility with an economically viable production capacity of 200,000 kL/year would need a Kraft pulp production capacity of 1,500 ADT/day, one of the largest in Japan. The fixed cost for constructing facilities including the KP process was calculated as US\$0.38/L of bioethanol.
3. The location of the KP mill is irrelevant for the approximation formula. The estimated equipment purchasing cost is proportional to the production capacity to the 0.6-0.7<sup>th</sup> power, which is in line with equipment installation costs reported by NREL to be 1.0 to 3.1 times the purchase cost. Further research and data is needed to confirm these findings.
4. The fixed cost of bioethanol production using Kraft pulp from new KP mills is extremely high, necessitating the need to consider establishing bioethanol plants that use Kraft pulp made from fully-depreciated KP mills to decrease this cost.

### **The Opinion Exchange Meeting with Patent Examiners**

Takanori Miyanishi

JAPAN TAPPI

Recent developments of Japan patent policy was presented at a public meeting by the examiner of Japan Patent Office to intellectual property experts of paper companies. The policy sets several goals to deal with international disputes on intellectual property including trade secrets. It aims to establish the world's fastest and highest quality patent examination system in Japan and to support globalization of corporate activities and open innovation.

## **Corporate Profile & Products Information (21)**

### **KUMAGAI RIKI KOGYO CO., LTD.**

In January 1927, the previous owner Shichijiro Kumagai founded Kumagai Seisakusho in Kanda Sakuma-cho, Tokyo to start manufacture of test equipment for petroleum products. Since the foundation, we have dedicated ourselves to manufacture and sales of physical and chemical appliances with the goal of service and contribution to customers, development of social welfare and harmonization in society.

In 1949, we shifted our business focus from petroleum test equipment to paper pulp testers, and under the development in Japan of the paper pulp industry and the progress of paper making technology for more than a half century after World War II, have continued manufacturing of test equipment for the paper pulp industry. The products of Kumagai Riki Kogyo, Co., Ltd. are utilized extensively in Japan, first of all, and also in various areas in the world such as Asia, North America and Europe. Today, Kumagai Riki is expanding paper making technology into the study of new materials.

We have three categories of products in the area of expertise. The first is paper and board testers based upon the testing methods by ISO Standards, etc. In 1997, we developed a fully automated testing machine for paper physical properties which features high speed measurement, high precision and energy saving, called AutoScan. Today, it finds many users in various production factories. The second is for the fields of processability and printability: the former is devised into two genres: the coating machines including sizing and coating processes, and the glossing machine “Calendar”, and the latter of the processes of off-set and gravure. The third is the pulping tester including a cooking machine and a beating tester (refiner and PFI Mill). We also cover the product line of papermaking machines of various sizes, such as sheet former, press and dryer.

—Peer Reviewed—

### **Evaluation of Pulp Quality of Three Non-Wood Species as Alternative Raw Materials for Paper Production**

Atanu Kumar Das , Akiko Nakagawa-izumi and Hiroshi Ohi

Graduate School of Life and Environmental Sciences, University of Tsukuba, Japan

Parts of three non-wood species, the stem of *Musa sapientum* (banana), the mid-rib of *Cocos nucifera* (coconut) leaves, and the stem and leaves of *Eichhornia crassipes* (water hyacinth), were kraft-cooked to assess their pulp properties as alternative raw materials for paper production. Regarding *M. sapientum* stems, the best result was found for pulp cooked at 150°C with the application of 9.2% effective alkali and 17% sulfidity. The highest tear index was 9.92 mN·m<sup>2</sup>/g with a 57.4 N·m/g of tensile index and 38.4% of screened pulp yield. The mid-rib of *C. nucifera* leaves displayed the best performance with the highest screened yield at 160°C with 21.3% effective alkali and 30% sulfidity. Moreover, the tear index, tensile index, and screened yield were 6.91 mN·m<sup>2</sup>/g, 67.8 N·m/g, and 44.4%, respectively. Considering all of the properties, the best treatment was 9.4% effective alkali, 13% sulfidity, and a cooking temperature of 150°C for *E. crassipes* stems and leaves, which provided pulp with a tear index, tensile index, and screened yield of 2.64 mN·m<sup>2</sup>/g, 63.9 N·m/g, and 33.9%, respectively.