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Current Situation of the World's Forests and Issues of Industrial Plantations

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Based on "Global Forest Resources Assessment 2010" that FAO performed in 2010, the current situation of the world's forests was introduced. The decrease in world's forests area diminished, but approximately 13 million hectares with annual average is still decreasing in the 2000s. In consideration of increase by afforestation, approximately 5 million hectares with annual average is net reduction in the 2000s.

Concerning increase in the population of the world and the demand for wood increase in the future, there are two important issues for industrial plantations. The first is to raise the productivity of planting area, and it is necessary to continue improving the forest tree breeding and the silviculture technology. The second is the selection of good trees which grows up with the inferior land and the development of new markets.

Trend of KP Continuous Digesters and the Related Basic Theory

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During 70's some injured fishes and marine animals were found in the Baltic Sea. The reason of phenomena seemed to be an effluent from pulp mill. KTH (University) and STFI (Research Institute) in Sweden started to research for decreasing kappa No. entering into bleaching stage in order to reduce chlorine dosage. It is difficult to archive both reduction of kappa No and maintain pulp yield at the same time, so they and machinery companies changed a conventional pulping process and developed some new cooking processes such as MCC, ITC, Lo-solids Compact Cooking. In this paper the trend of KP continuous digester and the rerated basic concept and theory behind of development on new processes are described.

Producing Polysulfide by Electrolysis of White Liquor, Development and Integration with Kraft Pulping Process

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An electrolytic oxidation process to produce polysulfide (PS) from the kraft white liquor (WL) and integration of this process to the kraft pulping (KP) system is described. Electrolytic oxidation of WL through electrolytic cell provides highly concentrated PS liquor in the anode compartment with extremely high efficiency, and simultaneously, sodium hydroxide and hydrogen gas are available in the cathode compartment.

We have succeeded in the log-term stable operation of the electrolytic cell in practical scale for the first time in the world. And more, the merit derived from the integration of this technology with KP process have been actually verified in Nippon Paper Industries, Yatsushiro mill, such as follows.

1. Significantly high yield gain of pulp was available by combination of this electrolytic process and modified cooking process, and agreed with previous lab data.
2. The cathode liquor served as an excellent alkali source for oxygen delignification compared with existing oxidized WL.

Cooking Additives for Kraft Pulping
— The Reasons Why SAQ® Has Been Used for Years —

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It is very important subject for pulp mills to increase pulp yield from a viewpoint of not only the improvement of profitability but also the effective use of fossil fuel and forest resources. In order to improve pulp yield, cooking additives have been applied. Polysulfide, anthraquinone compounds (SAQ or AQ) and surfactant are currently-used, in particular, SAQ has been used since 1976 in Japanese pulp mills. Because SAQ has some features; (i) superior impregnation into wood chips, (ii) many derivative effect for pulping process, and (iii) applicable to all wood species. Furthermore, we would like to add our continuous efforts to confirm effects on the actual operation.

Inorganic Scaling in Pulping Operations & Ways to Live with It

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Inorganic scale deposition is a phenomenon that occurs in almost all pulp and paper making processes. The root cause of this scaling is the presence of trace metal ions and the very suitable process conditions for crystallization to initiate. In bleach plant scale formation is mainly due to trace metals or non-process elements (NPEs), while in evaporator, fouling also takes place due to process chemicals, the sodium salts. Strict waste water discharge using counter current filtrate management in bleaching and higher black liquor solids in evaporators and concentrators makes scaling even more problematic.

It is an unwanted occurrence that causes a number of operational problems, downtime and increased production cost.

This is a review paper dealing with (i) major scale deposition problems (ii) reasons for scaling and (iii) solutions that can be implemented to minimize the issue or live with it. The paper is focused around scaling in bleach plant and evaporator area.

The Review of Operating Experiences of Biorefinery Work

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As a part of biorefinery business of OJI group, we started commercial production of hardwood dissolving kraft pulp at Yonago mill since May 2014. At the same time, we also initiated verification tests for furfural production. In this report, the review of our biorefinery process and operating experiences are presented.

Biorefinery of Woody Biomass

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A chemical article derived from biomass attracts attention for reasons of the reduction of carbon dioxide and substitute of oil resources. Large-scale research and development have been

started in Europe and America, but the process only to use edible biomass is in operation, and then utilization of food resources for another purpose becomes the problem. Woody biomass, which is the non-edible, has a great advantage because the infrastructure exists to handle, circulate, and use it. However it is not easy to refine woody biomass because of the hard structural nature. Therefore further research and development is necessary to overcome the difficult nature of lignin then will make competitive products from lignin. The pulp and paper industry has operated biorefinery process to produce cellulose as pulp, and utilize lignin as fuel. For the future, new technology will be developed to convert three components, cellulose, hemicellulose and lignin, into chemical materials with these natures. It could provide the industry with the chance to utilize it's forest resources and existed technologies.

DIP Technologies for Lower Grade Raw Material
— Keep Product Quality and Maximize System Efficiency & Yield —

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The trend on using more recycled paper in the domestic market has been desired for the fine paper category. It has been more and more difficult to obtain the high grade recycled paper due to a smaller distribution of the recycled paper caused by the decreasing paper consumptions, as well as the decreasing number of exporting the recycled paper to China.

With this background, there are more needs on using the low grade recycled paper based on the increase of using the recycled paper in the fine paper category, but the inductry is facing some issues on the low yield rate by the prohibited materials, maintaining the product quality, and increasing the energy cost due to operating more facilities.

In this section we would like to introduce the technologies using the low grade recycled paper, which are [facilities for improving quality], [facilities for contributing to the system efficiency], and [facilities for contributing to the functional improve of the existing equipment], while giving you some examples based on our experiences.

China Opts for Modern Mechanical Pulping Andritz P-RC APMP
— What Can Europe & Japan Learn from This ? —

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Andritz K.K.

Peter Brauer, Johann Grosalber and Heinrich Munster
Andritz AG

Over the past 5-6 years, China has doubled its paper production to almost 100 million t/a and is now the world's leading producer. In the same period, however, production of mechanical pulp has more than trebled, in spite of a chronic shortage of wood and energy prices at world market level. The main grades are chemi-mechanical high-yield pulps for printing and writing papers, board, and tissue, produced primarily using the P-RC APMP process with excellent energy efficiency. Here we present a range of state-of-the-art equipment and comprehensive consumption and operating data, including information on the latest waste water technology, such as integrated evaporation or anaerobic treatment.

Estimation of Merit by Installation of a Press in D_0 Bleaching Stage

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Replacing an existing D_0 washer such as diffuser or drum washer by a wash press in an existing D_0-E_{OP}-D_1 bleaching plant, it is possible to operate a high dilution factor (D.F.) for D_0 wash press even if D.F. for D_1 washer is operated at a low number, and a large amount of the remaining D_1 filtrate can be used as the dilution liquor before D_0 reactor. In case study 2, by sending the remaining D_1 filtrate to D_0 filtrate tank as the traditional way, it can expect to reduce COD into D_0 reactor about 3.1 kg/ADt by which it estimates to reduce the consumption of chlorine dioxide approximately 0.5 a. Cl kg/ADt. In case study 3, by using the remaining D_1 filtrate for both the dilution liquor before D_0 reactor and the dilution liquor before D_0 washer, it can expect to reduce COD into D_0 reactor about 7.3 kg/ADt by which it estimates to reduce the consumption of chlorine dioxide approximately 1.8 a. Cl kg/ADt.

The History of Technological Developments in Pulp and Paper Industry: From Ts'ai Lun's Invention to the Birth of Modern Pulp and Paper Industry
Part 5: Paper, Economy and Culture in the History of Human Society

Kiyoaki Iida

The fact that paper has been used for two thousand years means that people have appreciated

its value for so long time. At the same time, paper itself has been technologically developed to satisfy needs which followed the economic and cultural progress of society.

Historically, the amount of paper consumed has a positive relationship with the affluence of society that is represented by GDP as one of parameters. When society was stable and prosperous, new technology was invented to meet increasing demand of paper. The paper was invented by Ts'ai Lun in the age of Eastern Han when the dynasty was prospering. The bamboo pulp was developed in the age of Tang and Northern Sung when the culture was at its best in the Chinese history. Italians impregnated paper with gelatin for book bonding when its society was flourishing at the Renaissance. Dutch invented Hollander beater and revolutionized beating operation in the 17th century when they were richest in Europe. England which was leading the industrial revolution invented paper machine in the 19th century.

These technological developments reduced price of paper which in turn stimulated printing technology, and printed matters became common in daily life. In Japan, Japanese paper (Washi) and wood block printing combined made it possible to publish various printed matters in Edo period. Paper was used as one of basic materials in everyday life as well.

Paper was also a useful tool for ruling in empires covering large territories like Chinese dynasties and the Mongolian Empire. Europe, on the other hand, developed typography. With paper produced with efficient productivity and letterpress printing which allowed low cost operation, printed matters became far more common and popular in Europe than anywhere else. This availability induced successive social revolutions like the Renaissance, the Reformation, the Enlightenment age, and the Industrial Revolution.

As Kremer wrote 100 years ago, blossom of mental activity made possible by paper started a new era of civilization.

Corporate Profile & Products Information (24)

Valmet K. K**.**

Valmet is the leading global developer and supplier of technologies, automation and services for the pulp, paper and energy industries. Our 12,000 professionals around the world work close to our customers and are committed to moving our customers' performance forward – every day. Valmet's vision is to become the global champion in serving its customers.

The company has over 200 years of industrial history and was reborn through the demerger of the pulp, paper and power businesses from Metso Group in December 2013. Valmet's net sales in 2014 were approximately EUR 2.5 billion. Valmet's head office is in Espoo, Finland and its shares are listed on the NASDAQ OMX Helsinki Ltd.

Valmet K. K. (former Metso Paper Japan) is established together with the birth of Valmet

Corporation in 2014. We are providing our techonologies, equipment, spare parts and services to Japanese custmers.

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Estimating of the Carbon Footprint (CFP) of Sanitary Paper
—A Case Study of Sanitary Paper Mill on Fuji City, Shizuoka Prefecture —

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Marukin paper company Co., Ltd.

Displaying carbon footprint (CFP) of manufactured articles for daily use is very important to “visualize” the environmental burden, especially life cycle CO_2 emission, from daily life. The goal of this study is to evoke people’s awareness to the environmental burden in daily life through the calculation of CFP from the sanitary paper, in particular sanitary paper, produced in Fuji city, Shizuoka prefecture.

Functional unit is applied to the CFP per 1 package consist of 6 sanitary papers with LDPE package. The life cycle stages in this study are classified into 5 stages, and CFP is calculated as the total amount of GHG emission from each processes.

The calculation result of CFP of 1 package of sanitary papers was 2,406.90 g-CO_2/package references to unacceptable product category rule (PCR) of “paper and paper board（PCR-025）”. The component ratio of each life cycle stages are: raw materials procurement stage 5.8%, production stage 75.8%, distribution and selling stage 13.7%, operation and maintenance stage 0%, disposal and recycling stage 4.7%. The most CO_2 is emitted from energy usage of the production stage, which accounts for 72.1% of the total CO_2 emission. Therefore, it is very important to choose the energy sources with the least environmental burden, e.c. renewable energy.

All sanitary paper mills discharged great deal of paper sludge (PS) from daily process. The CFP of sanitary paper is varies from the calculation conditions based on waste water treatment methods and PS treatment methods. Therefore, it is necessary to review the PCR for clarify the rules of wet end process, especially waste water and PS treating methods.