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### **New Andritz FibreSolve Pulper Rotor and TD Screen for Debottlenecking and Energy Saving**

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Andritz has developed a new technology of FibreSolve Pulper Rotor designed for increasing pulping capacity, reducing specific energy consumption in the under machine pulpers. For rationalization, existing board machine lines are more and more integrated and upgraded that require capacity increase of under machine pulpers without changing the size of vats. The various functions with newly developed FibreSolve Pulper Rotor satisfy the needs and improve energy consumption and pulp quality.

### **— Blade Type Canvas Cleaner— AOKI CLEANER**

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In recent years, operational troubles, poor quality of products and less production efficiency due to sticky or adhesive materials brought to paper machines have become more common as a result of poor quality of furnish caused by increasing amount of use of recycled paper. As a matter of course, the level of contamination of dryer fabrics in the dryer section is getting worse and worse.

Many paper mills are suffering from various troubles including paper breaks, increasing number of defects, more frequent splicing works on winders, increasing amount of broke and so forth. On the other hand, cleaning of dryer fabrics by hand during operation is regarded as inappropriate job considering its safety.

In order to overcome this situation, ultra-high pressure water cleaning systems or chemical cleaning systems are widely introduced, and furthermore fabrics are sometimes installed by using inside rolls of the paper machine. However, since these attempts are not able to eliminate the problems completely, the operational troubles, poor quality of products and less production

efficiency are still permanent issues for many paper mills.

The epoch-making blade type dryer fabric cleaning system “AOKI Cleaner” which is able to eliminate use of water during operation was developed by AOKI Machinery 16 years ago in order to solve the problems caused by sticky or adhesive materials caught by dryer fabrics.

In this article, the blade type cleaning system and its benefits as well as recent results at some paper mills are introduced.

## **Development of Papermaking Chemicals for Food Packaging Grades**

### **— Development of Safe Products as Indirect Food Additives —**

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Harima Chemicals Group, Inc. has been supplying various paper chemicals such as strength and sizing agents for paper and paperboard mills in order to provide desired functions on papers.

Paper and paperboard have been widely used in our life not only for printing, wrapping and transporting purposes but also as food packaging materials such as boxboards, paper plates and beverage cartons. Food packaging materials have been regulated in countries around the world, and paper chemicals used in paper intended to come into contact with food also need to be compliant with the regulations.

In this situation, we have developed and begun sales of polyacrylamide (PAM) type dry strength agents, dispersed rosin sizes which were approved by FDA (Food and Drug Administration) for indirect food additives. Both PAM strength agent which has high molecular weight and amphoteric property, and dispersed rosin size which applied synthetic anionic polymer as an emulsifier, are the first products in the world of paper chemicals to meet FDA regulatory requirements.

The FDA approved PAM strength agent, “Harmide KS series” , and dispersed rosin size, “NeuRoz series” as well as the efforts to aim for “the development of safe products as indirect food additives” are introduced in this report.

## **New Pitch Control Agent Having a Breakthrough Characteristics**

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Recycled paper utilization has risen due to environmental protection. As a consequence, use of lower quality recycled paper is increasing year by year, and because of this, problems with machine runnability and finished-product paper quality are increasing. Adhesive materials that exist in recycled paper accumulated on the surface of papermaking system or fabrics and these deposits are one cause of problems in papermaking. Thus control of low material is essential.

In this presentation, we report on the development of a chemical agent which has a revolutionary effect on adhesives. We discovered that this chemical had three effects. At first, it detackified the adhesives. Secondly disperse them. Thirdly the dispersed adhesives are attached to the cellulose fibers. This means that adhesives are discharged from the wetend with celluloses. As a result, papermaking loss is reduced.

Given these results, this chemical agent can become an important solution for discharging adhesives to the outside of the machine.

### **New Concept Pitch Control Agent “Spanplus FT”**

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We developed "Spanplus FT" as a pitch control agent for the DIP process to achieve production capacity of DIP and quality improvement while using poor quality wastepaper.

“Spanplus FT” is special water-soluble polymer having hydrophilic part and hydrophobic part. It has an effect to agglutinate pitch selectively.

So after dosing "Spanplus FT" in flotation part, pitch is attached on froth and pitch removal efficiency is increase. As a result, pitch volume in DIP pulp is decreased.

Moreover, "Spanplus FT" has a high selectivity for pitch, so it dose not react to suspended solid matter. It leads the decrease of outflow raw material.

We applied "Spanplus FT" in flotation of newsprint DIP, pitch removal efficiency increase 10- 20 %. And suspended solid matter was not removed. it was able to contribute to reduction of outflow raw material.

### **Maruishi — High-speed Full Synchro Folio Sheeter**

Yoshino Hagiwara  
Maruishi Co., Ltd.

Maruishi has been working for paper industry over 73 years. Today, the finishing line is the one of the main products and especially, more than 180 units of ream wrapping machine are already sold all over the worlds. Maruishi has been developed their original High speed full synchro Folio sheeter reviewing former design. Unique synchro knife cutting is designed for wide range sheet production from low GSM to high GSM board paper /special art paper. Top air jet at overwrap is another advantage for simple and quiet operation. Here, we would like to introduce the modern High speed Synchro Folio sheeter with high quality production with different models available for variable kinds of paper and need from customer.

### **Effective and Efficient Pest Management Based on Scientific Evidence and Risk Assessment**

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Since leading to product complaints and a reduction in yield, contamination of the insect to the paper product is a major problem. In such a reason, various insect measures have been implemented in the paper products manufacturing plant. However, it is not a sufficient effect of their insect measures in some of the plant. In these plants, they do not analyze how insects contaminate the product. We call this analysis the insect contamination scenario. The next two are important to do insect measures effectively. One is to investigate the insect contamination scenario based on scientific grounds. The other is to decide the priority of insect measures based on the risk assessment of contamination.

At first the analysis of insect contamination to the product is necessary for the investigation of the insect contamination scenario. The problem of the manufacturing site is investigated based on this analysis next. The investigator needs experience and training. At the same time scientific and objective data is required. For this, various measuring equipment is recruited in the survey of the factors that influence the contamination, such as air flow and ultraviolet. Furthermore, we have introduced new powerful investigation tools such as EMS-Q which measures some contamination factors at the same time and identification technology of the insect by gene.

To take investments for insect measures effectively, it is necessary to consider the priority based on the risk analysis of contamination. The contamination risk is evaluated in points of

view such as the past contamination results, the characteristic of insect, the habitation of the insect, the exposure characteristics of the process of manufacture, the detectability. This evaluation makes it possible to decide the order of insect measures reasonably.

### **Evaluation of Corrosion- and Erosion- Resistant Weld Metal in Various Boilers**

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Due to fuel and operating conditions of various boilers, surface of water-cooled panel tends to be damaged mainly by corrosion and erosion. And availability factor of boiler itself becomes low and maintenance cost problem occurs as a result. Therefore, exclusive welding system was developed by WA Japan to apply to damaged surface of water-cooled panel. And thereafter cladded tube surface by this welding system was checked after certain period of operation time. The results obtained in these activities are below summarized.

a. Welding technology, by means of exclusive, compact and solid welding system developed, is suitable to cladding of water-cooled panel in furnace and effectively applied to repair of damaged surface under the conditions with many restrictions.

b. Weld metals overlaid onto water-cooled panel with Alloy 625 and Alloy 622 are effective protection against thickness loss under corrosive and erosive environments, same as the cases in other countries.

From above-shown results, it can be safely said that welding technology developed herein is effectively applied to repair of damaged surface of water-cooled panel in various boilers and that weld metal overlaid with Alloy 625 etc. is right and permanent protection to the damage. This technology is expected to be hereafter employed in planned maintenance of various boilers in near future.

### **Improvement on Plant-Wide Energy System Efficiency by Thermoelectric Solutions — Open and Closed Condensate Recovery System, Air Compressors, and Boiler Feed Water Heating Unit with Waste Heat Recovery —**

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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
- Various air compressors meeting expectations of energy-saving effects for each purpose or usage
- Boiler feed water heating unit with waste heat recovery type which reuses low-temperature waste hot water occurred in the production process as a heat source to heat boiler feed water.

## **A Report on Nanocellulose Summit 2016 in Tokyo**

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JAPAN TAPPI

“Nanocellulose Summit 2016 in Tokyo” was held on December 9, 2016 at Tokyo Big Site International Conference Hall. Distinguished scientists, project manager, government administrator and consultant were invited from Canada, U.S.A., Sweden, Switzerland, Korea and Japan to advance commercialization of nanocellulosic nature-based materials. They made presentations on production technologies, characterization, applications, standards development and safety demonstrations. At the industrial level, applications are being developed in upstream oil and gas, wood product adhesive, pulp and paper, cement, resin composites, synthetic rubbers, paints, coating and the high-end use, for instance, in biomedical tissue engineering and electronic materials. Some of the nanocellulosic materials are already implemented in industries and several companies claim production capacities in tonnage scale. However, a straightforward material supply with marketable prices is still not given. Cellulosic materials have been safely used in many industries for centuries but current regulatory frameworks and customer supply chains demand safety demonstrations for the novel forms now entering commerce with nanoscale properties. The requirements to demonstrate safety vary by geography, product category, and life cycle stages.

### **Basics of Ozone Bleaching**

#### **Part 3 : Medium Consistency Ozone Bleaching Plants**

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It is preferable to place the ozone stage at the beginning of the bleaching sequence to remove most of the residual lignin. This is based on the much faster reaction of ozone with lignin than with polysaccharides: the rate constant of ozone with lignin is 1,000 times higher than that of ozone with carbohydrates. So lignin should be considered and used as a protection for polysaccharides. Another important reason to use ozone in the first bleaching stage is that the higher the lignin content, the higher is ozone's selectivity expressed as the Kappa number reduction per added ozone unit ( $\Delta\text{KN}/\text{kgO}_3$ ). If mills use ozone in the middle of the bleaching sequence or at the end, then the high oxidation potential can definitely impact bleached pulp strength. Medium consistency ozone bleaching is placed as ZD in the first bleaching sequence. ZD does not need a washer between Z and D, and removes residual lignin at the maximum efficiency with the minimum cost. Ozone charge should not exceed 5 kg/AD.pulp.ton in medium consistency ozone bleaching. Ozonization was initially carried out at 40°C in the 90s and such a low temperature was not very convenient as the Z-stage is located after the 85-95°C oxygen delignification and before an alkaline extraction generally carried out at 60-80°C. It is therefore necessary to cool down the pulp before heating it up. Several results have demonstrated that for hardwood pulp medium consistency ozone bleaching, Z-stage temperature can be increased up to 60°C and sometimes even higher without any negative impact on pulp strength and brightness.

—Peer Reviewed—

### **Modified Operation of a Laboratory Refiner for Obtaining Dried Thermomechanical Pulp from Sugarcane Bagasse and Oil Palm Empty Fruit Bunch as Non-wood Fibers**

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A process for the production of thermomechanical pulp (TMP) from non-wood fibrous materials such as sugarcane (*Saccharum officinarum*) bagasse (SB) and empty fruit bunch (EFB) of oil palm (*Elaeis guineensis*) has not yet been industrialized. On the other hand, there is a requirement for the production of dried TMP from non-wood fibers for the preparation of medium density fiberboard (MDF board) as an alternative to wood and as a possible method of treatment of agricultural wastes. Dried fibers are required to produce high quality MDF board. SB and oil palm EFB are non-wood fibrous materials that are easily available in Indonesia, and

have the potential to be developed as fibers for use in materials of MDF board. This research is aimed at modifying the operation of a laboratory pressurized TMP refiner to obtain dried fibers from both these non-wood fiber sources for fabricating MDF materials under suitable conditions. An approximate solid content of 80% of oil palm EFB dried fibers and an around 55% solid content of SB dried fibers were obtained by this modified method. These fibers could then be fully dried to obtain a solid content of 90–92%. On observing the results from fiber fractionation and the length of these dried fibers, it was found that the SB and oil palm EFB dried fibers were comparable to mixed light hardwoods fibers produced in an industrial MDF board process.