

Technological Transition of Papermaking Chemicals Focused on Functional Chemicals and Their Application in Wet End

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This paper presents a review of technological transition and recent developments of papermaking chemicals, such as sizing agent and dry-strength resin. In recent years, papermaking conditions have changed by greater use of recycled pulp, high amount of coated broke in furnish, higher loading of filler, increases in speed of paper machine and closed water system in paper mill. These trends result in the rising of pH values and electric conductivity of furnish and the increasing of dissolved and colloidal substances in papermaking systems, that disturb the absorption of papermaking additives to fiber and fine. Under these circumstances, the performance of sizing agent and dry-strength resin has been declined. To improve of paper properties and papermaking efficiency, it is necessary to understand of wet end conditions and utilize new polymer technology in papermaking chemicals.

Optimization of Wet-end Operation by “AXISZ System”

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Please be notified that since marketing in 2001, “AXISZ System” has been adopted by a good number of paper making machines and has contributed to the improvement of the conventional retention system.

“REALIZER R Series” , a version of “AXISZ System” , has been keeping to be used by various types of paper making machines, regardless paper making machine or paperboard machine.

This paper refers to the developing history of “REALIZER R Series, FX Series” and “REALIZER A Series” and introduces the successful cases of the improvements of productivity, runnability and qualities attained by the abovementioned “Series” .

Unfavorable tendency has clearly come into existence, that is, the dosage-increasing of

various kinds of wet-end chemicals provoked by the necessity to deal with deterioration of pulp materials and etc. This fact has brought big change in wet-end chemical condition of paper making machines and has become one of the big causes in poor performance of various wet-end chemicals. Simultaneously, people have already noted the tendency of increase of the deterioration of paper qualities, like defective paper surface and stain of papermaking equipment caused by pitch.

Knowing those unfavorable surroundings, Somar has developed wet-end improvement system named "AXISZ System" which enables various types of wet-end chemicals to demonstrate the original and intrinsic performances to the maximum. "REALIZER A Series" is high-performance coagulant which is effective for sticky pitch and defect paper surface and is also, special cationic polymer which is good to be applied to stuff box. High-performance retention aid, "REALIZER R Series, FX Series" is high molecular polymer with special structure and can achieve higher retention even with small dosage. Optimum Wet-end system can be obtained by combination of those chemicals. Also, it's should be noted it is unique that each chemical alone can demonstrate its own capability.

Transition and Latest Technology of Slime Control

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While paper-making technology has been made progress, slime treatment issue also has been getting more important. Neutralization of pH, reduction of fresh water and increase of using recycled furnish cause in continuously serious slime problem and require more effective slime control technique. From the view of slime control history from 1970, the technology has been developed roughly through three generations.

First generation is "organic biocide" : try to prevent slime deposit by combination of organic biocides.

Second generation is "inorganic biocide & cleanliness treatment" : Development Fuzzicide[®] technology mostly solved any slime problems. Furthermore, cleanliness treatment in whole the process achieved completely slime defects prevention. Third generation is "water quality stabilization" : We found microbial activity changes water qualities and influences on paper-making operation. Thus we have been developing S. sensing[®] system, that has three functions of monitoring, feeding control and analysis and then try to achieve operation stabilization and cost saving simultaneously by stabilizing water quality.

Case Study by Installing Trumpjet System to a Paper Machine

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Hachinohe Mill, Mitsubishi Paper has the capacity of approximately 700,000 ton of papers per year. We have seven paper machines in Hachinohe Mill, and installed Trumpjet System in No.2(2PM) and No.4(4PM) and No.5(5PM) and No.6(6PM) and No.7(7PM) paper machines with the aim of chemical saving.

This report is described about the effect and trouble of Trumpjet System at 5PM.

Improvement in the Operation by Optimizing the Approach System of the Coated Paper Machine in HOKUETSU KISHU Niigata Mill

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This report shows our work on stable operation and saving energy with regard to the coated paper machines, N7, N8 and N9, in HOKUETSU KISHU Niigata Mill, especially the work concerning these machines' approach systems.

Firstly, about N7- in this machine, the quantity of outflow pulp and the number of streaks and sheet breaks has been reduced by reusing the unused cleaner to treat the reject of the final cleaner.

The next is about N8. In this machine, slime deposits have been reduced by changing the method of cleaning the machine pulper and preventing the coated broke in the tank from rotting.

The last is about N9. In this machine, letting the accept of the second cleaner combine with the accept of the first cleaner and sending those to the deaeration tank enabled the number of cleaners to be reduced, as a result, we could achieve high levels of energy saving.

In this report, we would like to explain the details of our work, its effect and result.

The Latest LC and HC Pulping Technology

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The Pulping technology is related not only with deflaking, but also with screening and detranshing. This is the result of technological progress of pulping. For each process of stock preparation system, the pulping system should be optimized for the type of raw material.

Especially pulping for waste paper should consist with detrashing system because the amount of contaminants in raw material is getting bigger.

In this article, the latest pulping technology mainly for LC and HC operation is introduced.

The Process Optimization of Paper Making by Stabilization of Wet-end Process, from a Part of “Metso Fiber to Print Concept”

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When quality control is concerned, the focus is often on the paper machine. However, the quality potential for a paper machine is always set before it in the pulp mill and stock preparation area. Correcting stock preparation upsets at paper machine is already too late. To put it simple, the paper machine merely forms the sheet and removes the water, whereas everything else is done at furnish preparation. This paper will present the measurement and optimization possibilities in holistic quality management at paper machine and present an example case for end product quality management by means of optimizing stock preparation area.

Introduction of Non-Destructive Inspection Technique to Paper Mill Equipments

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Non-destructive Inspection Co., Ltd.

In this paper various kinds of non-destructive Inspection technique in a paper mill is introduced. In a paper mill measurement of internal deposit thickness for boiler waterwall tube in thermal power plant, Corrosion of equipment/piping, and delamination of lining materials serves as subjects of inspection.

Latest DIENES Slitting Systems

Isamu Tobaru

Engineering Depart. Mack 3 Enterprises, Inc.

Since 1913, Dienes Werke has meant outstanding quality, expertise and breakthrough innovations in the field of industrial slitting technology. Dienes is the worldwide leading

supplier of circular and straight knives, knife holders and slitting systems as well as competent partner for all related services. Standard knife holders often do not meet varying customer requirements nor very special applications. The Dienes slitting laboratory will test cut materials with a variety of different holders and knife designs in order to determine the best solution for long term performance, functionality, and user friendness.

Online Measurement and Control of Fiber Orientation Angle

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Fiber orientation sensor for YOKOGAWA “B/M9000VP” system has been contributing to improving the paper quality represented by twist-curl by measuring the fiber orientation on both felt and wire sides of the paper. However, after the fiber orientation control is automated, it is appeared that paper pass-angle fluctuation in the sensor head gap and dust accumulating on the measurement window affect the fiber orientation measurement. In this paper the technical key points and the benefits of the improvement made against these issues are presented.

Corporate Profile & Products Information (15)

Yokogawa Electric Corporation

Yokogawa Solutions Services Corporation

Tamisuke Yokogawa founded YOKOGAWA Electric Corporation in 1915, and we will celebrate its 100th anniversary next year, the factory was transferred in current place, Musashino-city in 1930 and until now we centered on the measurement, control, and information, and provides industry leading products, we have contributed to the development of society.

We develop the affiliated company of 34 countries, 15 in Japan, 70 in foreign countries now. And we read needs to change by the times sensitively and continue growing up while accomplishing a change by oneself and am counted today in one company of the world leading company in the field of control.

In this article, we would like to introduce our corporate profile and product introduction of Yokogawa Solutions Services Corporation and Yokogawa Electric Corporation.

A Multivariable Pulp Brightness Control of ECF Bleaching Process by Model Predictive Control

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In the pulp and paper processes, to improve more cost reduction and more quality stability have been required at any time. But the pulp process response has long delay time and many mutual interference elements that affect each other between control variables' responses; therefore it is well known that Kraft pulp bleaching process is one of the most difficult processes to control automatically.

In the meanwhile, "Model Predictive Control (MPC)" has been developed as a new control function to operate complex multivariable processes systematically in good conditions from days of 1980s, and is called and known as "Advanced Process Control (APC)", too. And, this new control system is reported a lot, it brought fruitful economical outcome by optimizing its process conditions and by controlling multiple points reasonably as observing whole process conditions.

In this paper, we show an example to apply the MPC system to the hardwood pulp (LBKP) brightness control for ECF(Elementary Chlorine Free) bleaching process of Kraft pulp and, at the same time, new "K-value control" utilized for to prevent serious "discoloration trouble" of paper sheet which has been recognized recently. The trouble is, to break out strong "yellowing trouble" when paper rolls are exposed in the heat and high moisture environment during long period for example in warehouses etc. after paper making.

Furthermore, in addition to use many special sensors in this control system, they are "hard sensors", such as pulp brightness sensor, residual chlorine consistency sensor and pulp Kappa number sensor etc., "Soft sensor" functions are also used together with MPC at the same time.

In this system, eight "soft sensors" which utilized multiple linear regression equation models for pulp brightness and residual chlorine consistency etc. are installed in the points where sensors are not equipped or where measurement is done by hand analysis, at fixed intervals, for the reasons of the requirement of more high-precision measurement values and so on.

And these soft sensor' values are linked with the MPC system and monitoring system, and it

had been able to make use of well, in actual plant operation.

Finally, applying the MPC system, we could control the pulp brightness, K-value, residual chlorine consistency and pH etc. of the ECF pulp bleaching process in good conditions. Furthermore we refer to the detailed analysis results obtained from long run operations, the control stability for the pulp brightness quality, the plant operability and the reduction effect of the bleaching chemical cost.