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Steam reduction by the applied Thermo-compressor to PM14 drainage system

Kanji Kobayashi
Fuji Mill, Nippon Paper Industries Co.,Ltd

Nippon Paper Industries has set a target of "reducing total energy consumption by 1.0% year-on-year" as a measure against global warming as stipulated in the "Environmental Action Plan" based on the Nippon Paper Group's Green Action Plan. At the Fuji Plant various energy-saving activities are promoted and efforts are made to achieve the target, under the energy conservation promotion system through subcommittee activities for each manufacturing process.

In this paper, we introduce a case where steam saving could be attempted by installing an additional thermo-compressor in the pre-dryer of No.14 paper machine, which is a liner paper machine.

Development of LED systems available under high temperatures and humidities of paper dryer hoods

Yasuyuki Funagayama
Kyoritsu Densyo Co.,Ltd.

The dryer process at paper mills is extremely harsh with a temperature of 90 degrees \pm 5 degrees and a humidity of 90%. In the field test, typical LED lightings could be lit continuously for only several months because of abnormalities in the LED lighting and troubles in the power supply. Our company has been working on many experiments for several years and succeeded in commercializing LED lightings with the heat resistance of 70 degrees, but there was concern that the LED lightings and the power supply would be defective in the heat resistance range of 80 to 100 degrees. With the cooperation of Oji Materia from the spring of 2019, we have set the goal of "Development of Products with Heat Resistance of 100 degrees and Humidity Resistance of 95%" in the dryer hoods, and by breaking away from existing LEDs in terms of heat insulation system and durability. We have commercialized "Special Structure LED (Separated Power Supply Type)". We started the actual equipment test in May 2019 and achieved our first goal of 12 consecutive months of lighting. (As of December 20, it has been lit for 19 consecutive months)

Water saving activities at Niigata Mill

Yousuke Namekata
Hokuetsu Corporation Niigata mill

HokuetsuCorp. has a "Minimum Impact" that minimizes all the burdens on the environment. So far, we have aimed to build a minimum impact mill by reducing CO₂ emissions as a measure against global warming, taking measures against air pollution, and taking measures against water pollution. In particular, the Niigata Mill, which is a core mill, has been actively implementing various initiatives and capital investment to lead all mills because of its large scale. The idea is the same for saving water. The Niigata Mill launched a water-saving project in December 2017, and all departments cooperated in water-saving activities. Introducing the content of the initiative.

Realization of energy saving in factory water supply equipment through E-pump

Nobuo Omura
GRUNDFOS PUMPS K.K.

Grundfos is a pump manufacturer based in Denmark with annual production of 16 million units worldwide and sales offices in 55 countries. The E-Pump, which we developed based on the principles of the SDGs adopted by the United Nations in 2015, is an energy-saving product that contributes to Goal 13: "Take concrete actions on climate change". The vertical, multistage centrifugal pump, which we launched for the first time in the world in 1973, is equipped with a pump controller that enables optimal operation, which contributes to energy conservation by optimizing not only wasteful water consumption but also the entire pump system. The E-pump integrates the functions of the control box into the pump, and can control the pump (constant pressure, constant flow, constant water level, constant temperature, etc.) via sensors and external input/output signals connected to the on-board controller. In this project, we use the constant pressure control and flow rate stop functions to utilize the volume control function, which enables us to control the required number of pump operations according to load fluctuations. As a result, the power consumption and CO₂ emissions of the water supply system in the plant were significantly reduced.

Activities of energy-conservation at Kumagaya Mill

Tatsuya Miyazaki
Kumagaya Plant, LINTEC Corporation

It is supposed that greenhouse gas causes various kind of climate change such as increasing global average temperature. Currently, reducing the amount of greenhouse gas emission is one of the significant issues around the world since greenhouse gas causes sea level rise, acidification, drought and flood.

New international framework "Paris Agreement" was adopted in the 21st Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 21). Japan set a goal of greenhouse gas reduction 26% by FY 2030 compared to FY 2013, and companies are taking actions to achieve the goal.

As Energy Saving Act calls for an effort to decrease annual average energy consumption intensity more than 1%, companies must struggle with energy conservation and CO₂ reduction activities. In above circumstances, this paper introduces a case of contributing to energy saving and CO₂ reduction by installing gas engine cogeneration system and replacing RPF production equipment through energy services.

The Activities for Energy Saving in Tomioka Mill

Masafumi Nii
Tomioka Mill,Oji Paper Co.,Ltd

The Tomioka Mill has set an energy saving target of "1.5% reduction in annual energy saving". Then, the entire mill is working in energy saving activities.

In recent years, the environment surrounding the Tomioka Mill, where paper for printing are the main products, has become increasingly severe, and energy saving activities is a major pillar supporting not only CO₂ emission but also profit of the mill.

In order to achieve energy saving targets and contribute to the mill profits, we are raising the awareness of all employees, and grass-roots activities are being continued, such as digging into past energy saving cases and horizontal deployment of energy saving cases from other mills.

In this paper, we will introduce our energy saving activities and examples at the Tomioka Mill.

"Nano Adhesion Technology" and "Coating Reinforcement Technology" Solve "Trouble..." in the World

Yohei Watanabe
Somay-Q Technology

Somay-Q Technology is a technology development laboratory that solves problems in the world. It is possible to reinforce and prolong the life of deteriorated concrete, iron parts, etc. using the "nano adhesion technology" and "coating reinforcement technology", which are the unique technologies of Somay-Q Technology. Somay-Q Technology can be reinforced only by painting without replacing the objects, so wasteful industrial waste is not generated. In addition, no replacement is required, resulting in significant cost savings. It is also widely used in niche fields such as floor paints that can be applied even with oil and rust preventive paints that do not require *keren* (Work to remove rust). We have many achievements already, and we are expanding not only to the private sector but also to public works.

Operating Experience of Automatic Tail Threading

Mayumi Kawano
Yashio Mill , Rengo Co., Ltd.

The Japanese population has been declining since its peak in 2008, and the labor shortage problem has emerged and started to become social issue. In order to allow diverse human resources to perform an active role, we are reviewing work styles from the viewpoint of long working hours and work-life balance. In addition, we are also trying to improve total factor productivity (TFP) in our company. As part of this, we are reviewing the work that requires a long time experience and promoting the installation of equipment that allow both new employees and women to handle paper machine easily.

In order to make our working environment better, we have installed the automatic sheet threading device that can shorten the threading time, secure operator's safety and enable everyone to do a good performance without experiences. This report introduces the outline of the automatic sheet threading system and the operation status after the installation.

Water treatment comprehensive solutions for stable operation by Kurita.

Yasuhiro Kagawa, Hiroki Katsura , Keiji Suruga *and* Takashi Saigusa
Pulp and Paper Industries Department, Kurita Water Industries Ltd.

Recent environment around paper industry has been changing, especially in regard to increasing paper recycle rate. It causes in fluctuation of furnish quality, that influence on machine running stability and paper product quality. In such a complicated situation, we focus on "water" used a lot in paper-making process to improve productivity.

In this report, we first describe the problems caused by changes in the raw materials used. Next, we will introduce effective microbial control methods that use a combination of inorganic slime control agents and aeration, optimal wet end control technology that follows changes in water quality, and water quality control methods that use S.sensing®. Then, we will report the case where the water quality control of the raw material process and the paper making process contributes to the stable operation of the entire factory including the drainage process.

Revolutions in the history of civilization induced by paper
Part 6: Silk Road, India and South-East Asia

Kiyoaki Iida

The paper which became common in the third and the fourth century in China was spreading westward via the Silk Road that was a trade route since ancient ages. The manuscripts, found at Loulan and written in the period between the third and the sixth century, consisted of a large volume of wooden slips and few paper documents. The Dunhuang, manuscripts which covered the age from the fifth to the eleventh century, were mainly paper documents. A large number of Buddha's texts copied on Kozo paper in Tang dynasty were there, along with documents written by several native kingdom tribes living along the road with their own languages. It suggests that native tribes developed their own languages and civilization based on writing with their own letters in the several centuries between the dates of the two manuscripts. The paper that became available might induce the move, which the Buddhism definitely helped. It made the area including China a common culture region.

The paper making in India started in the eighth century by way of Islam and grew big in the 15th century. Many Chinese Buddhist monks visited Nalanda in India to get original Buddhism texts. One monk described use of paper in Indian Buddhist society in the 7th century.

The sea lane which left the Southern China, turned round the Malay Peninsula, passed the Indian Ocean and arrived at the Arabia was the other important trade route, which some Chinese monks traveled. A monk reported that Sumatra Island was prosperous with Buddhism from India using paper from China in the 7th century.

An Essay on Methodology for Innovating "JAPAN TAPPI JOURNAL"
Part 13: New possibilities of the Journal as viewed from the origin of editing of informations

Fumihiko Onabe
Professor Emeritus, The University of Tokyo (Paper Science)

Returning to the starting perspectives of the editor and readers relationship, the significance of information in editing was analyzed. The significant points to be emphasized are that the readers as human being are collective entity or ensemble of a variety of huge and multiple information obtained innately and acquired during growth and learning processes. The thirteenth article of this series is intended to seek innovation of the Japan Tappi Journal based on the above notion. The overall contents are described as below.

1. Introduction
2. The editor and readers relationship as viewed from editing of information
3. A methodology for enhancing the reason for existence and the value of the Journal
4. The difference of the meaning between "editing" and "compiling" in editing process
5. A possibility of enhancing added values by relative increase of "editing"
6. General principles for enhancing attractiveness of the Journal
7. In search for a methodology for innovating the Japan Tappi Journal
8. Parallel use of the paper media and electronic media for the Journal
9. Epilogue

Examination of the microminiaturization of cellulose composite particles for ink-jet printing application

Takashi Okuda , Yasushi Ozaki
Research Institute, National Printing Bureau, Japan

Cellulose nanofibers (CNF) are expected to be a utility new material made by finely pulverized wood pulp. With the introduction of CNF, various functional materials will be able to be added to paper to enhance anti-counterfeiting technology.

In order to develop new functional papers, CNF and functional materials were mixed and treated in a spray dryer. As a result, it was possible to produce cellulose composites into which functional materials and CNF had been integrated.

In this study, ink-jet printing (IJP) techniques were applied to effectively fix cellulose composite particles on paper. For the purpose of discharging droplets of the cellulose composite particles with IJP, it was important that the particle size must be small and uniform. Three kinds of cellulose composite particles which were produced by using CNF of different degrees of disintegration were estimated for IJP.

The particle size of cellulose composite particles made from TEMPO-oxidized CNF was the smallest and the most uniform. However, the particle cellulose composites made from TEMPO-oxidized CNF were formed gel in water. Because of that, discharge liquid of IJP was prepared as the liquid based with solvent. Eventually, the cellulose composite particle droplets could be stably discharged with IJP and strongly fixed to the paper.

As it is possible to discharge droplets with IJP, this technique can be expected to be applicable in variable security fields in the future.