

Introduction and Operating Experience of the No.2 Gas Turbine Plant

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We run the mill emphasizing the environment, based on the company's corporate philosophy.

We have improved CO₂ emission intensities with continued activities of saving energy on power plant sections, introductions of large scale Soda Recovery Boiler and Biomass Boiler utilizing fuel wood, fuel source of existing boiler and turbine have been changed to natural gas. We have also experienced violent fluctuations of energy prices around the failure of Lehman Brothers and felt the necessity of diversification of energy source caused by the Great Japan East Earthquake. Against such a background, we planned to introduce the 40 MW class Gas Turbine divertible of aircraft engine, as renewing the existing outdated Oil Boiler, 18 MW-class Steam Turbine and 17 MW-class Gas Turbine.

No.2 Gas Turbine plant has started business operation since March 2014. Thereafter, Fuel intensities converted into crude oil equivalent and CO₂ emission intensities have been improving. In this paper, we briefly describe the outline of the equipment and operating experience of No.2 Gas Turbine plant.

The Waste Heat Utilization by an Absorption Heat Transformer

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The low temperature heat sources such as hot water less than 100 deg C are usually difficult to be utilized because the temperature is too low. An absorption heat transformer was developed to generate 180 deg C steam by utilizing these low temperature heat sources. A single lift absorption heat transformer generates 120 deg C steam in theoretical COP 0.5. A double lift and a triple lift absorption heat transformer generate 180 deg C steam in theoretical COP 0.33 and 0.25, respectively.

The Highest Nip Load Shoe Press in Japan - Energy Saving by Introduction of High Nip Load Shoe Press to the Container Board Machine

Ryuji Shinoda

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As companies are expected to take environmental actions, Rengo established “Eco Challenge 020” as the company's environmental action plan and is strenuously working to reduce the carbon emissions by 32% in 2020 compared to 1990 levels. In addition, Saitama Prefecture, where Rengo Yashio mill is located, has set the reduction target of CO₂ emission by 13% in 2019 compared to the average level between 2002-2004 by enforcing the local regulation of global warming prevention since 2009. Moreover, energy saving is the urgent issue of Yashio Mill because of the raising fuel cost in recent years.

Against such a background, Yashio Mill PM1 (medium machine) introduced the high nip load shoe press with an aim of improving the productivity as well as reducing the steam consumption. The outline of the retrofit and an operating experience will be discussed in detail below.

Suggestions towards Energy-Saving for Refining at Stock Preparation

Masaharu Menjo and Akifumi Hatta

Valmet K. K.

In this paper, two topics are to be described how to reduce energy consumption at stock preparation. In general, refining process requires lots of electricity. Therefore, it can be mentioned that there are still some big possibilities left for energy-savings.

One of these two topics is newly developed conical type refiner (OptiFiner Pro). With its unique refining mechanism, the refining efficiency is highly improved by comparison with previous generation of conical refiners (for example, OptiFiner RF). Due to the high refining efficiency, we have experienced some installation cases indicating that previous generation of two or three conical refiners can be replaced by only one OptiFiner Pro. In addition, there is also one installation case that successfully ended by the replacement from conventional type of three double disc refiners with only one OptiFiner Pro. Our customers are satisfied with not only energy savings but also reduction of maintenance cost for stopped refiners. By choosing suitable fillings (i.e. refiner segments), OptiFiner Pro is available for virgin pulp refining (i.e. hardwood and softwood) as well as recycled pulp nowadays.

The other topic is refiner segments with much narrower bars and grooves than ones from conventional refiner segments. We have finally succeeded to manufacture these refiner segments (MicroBar) by casting and MicroBar is now widely used for hardwood refining at stock preparation as a good tool for energy- savings. The refining intensity of MicroBar is so high that the motor load for double disc refiners can be lowered by using MicroBar.

There is also possibility that one double disc refiner can be stopped from where there are two double disc refiners installed in series. For softwood refining, we have found a very effective pattern throughout test runs with a customer in 2014. This new pattern for softwood refining is also to be briefly described in this paper.

Introduction and Operating Experience of the Energy-Saving Rotor for Inward Type Headbox Screen

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Fuji Mill, Oji Materia Co., Ltd.

It is accepted that, in the pulping process, we are able to achieve a reduction in power consumption by installing an energy-saving rotor at the screen and additionally by reducing the rotating speed of the rotor.

On this basis, we installed the same kind of rotor to the headbox screen in the paper making process in order to assess any possible energy savings. We have now carried out actual machine tests using the energy-saving rotor manufactured by Aikawa Iron Works Co., Ltd.

In this paper, I will explain our operating experience of the energy saving as a result of installing the energy-saving rotor for inward type headbox screens in the case of N - 2 M/C.

Case Study of Steam Saving at Dryer of No.4 Paper Machine

Naoyuki Sekine

MPM OPERATION Co., Ltd.

Our No.4 paper machine operated at Hachinohe mill of Mitsubishi Paper Mills LTD was not really outstanding at steam saving as compared with other paper machines.

A factor is difference of the steam consumption at the dryer part. And problems are lower efficiency of the steam equipment and differences of the operational condition, the mechanical drainage flow, and the drainage balance. We modified the drainage system as a solution of these

problems in December 2013 and achieved big steam saving.

This report is described about the past problems, the modifying of drainage system, and the result of steam saving.

Blade Type Canvas Cleaner — AOKI CLEANER

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In recent years the operation troubles of paper machine and its quality problems occur more frequently due to foreign materials including sticky pitch coming from increasing recycled paper usage. The sticky materials and pitch on canvas causes paper break at dryer, faulty spot, frequent splicing at winder, which decrease productivity.

Screening, pitch control chemical, high pressure water has been used to improve these situations, but these measures cannot solve the problems completely.

We, AOKI Machinery, has been developed “AOKI CLEANER” , an epoch-making blade type canvas cleaner. Let us introduce its mechanism and some operation facts.

Looked from the Factory Diagnosis, Introduction of the Basic Unit Reduction

Takehiro Uwafuji

MIURA Co., Ltd.

In our company, conventional boiler energy conservation diagnosis carried out to present a tangible cost benefits amount of simulation of the steam pressure in the boiler updated, update, etc., diagnosed in effect hold-open, was committed to the spread of once-through boiler. However, energy conservation in boiler unit is marginal. In recent years, energy consumption rate study is sought by energy saving steam heat, water, and air, *etc.* which occurs in a factory. Energy conservation checks of the whole factory based on the diagnostic technic grown by a boiler are being put into effect. Measurement enabled difficult equipment to measure the energy in the past without installing an exclusive measuring instrument as flowmeters by utilizing analytical instrument of patent acquisition. By measurement technology, we can get visualization of effective energy, and quickly and precise grasp of the effects of when renewing.

In this paper, we would like to introduce points of energy consumption rate study, reduced through the use of the latest factory diagnostic tools developed in-house.

Corporate Profile & Products Information (23)

Maintech Co., Ltd

We, Maintech Co., Ltd., are the consulting partner for the Paper Mills, supplying with the Chemicals and Equipments, in order to achieve Improvement of quality and production efficiency by "Preventive Method" & "Creping Control for Tissue grade".

Our "Dryer Section Passivation" technology is applied for most of board grade machines in Japan, which uses higher rate of recycled pulp, and is also applied for Printing & Writing grade to reduce dusting and printing problems on the press rolls and Dryer Cylinder, which are deeply related to the printing problems.

In the field of Tissue grade, every manufacturer had tried to improve quality by use of fabric softener since year 2005, but they had found the fabric softener makes a bad influence on the paper making operation. Since then, "Creping Control" with our lubrication technology has been popular in the market, and Major Tissue Companies have started to adopt this technology.

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Bulky Paper from Chemically Crosslinked Hardwood Kraft Pulp Fibers

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There is a general interest among paper and board makers to produce lighter and bulkier paper and board products. The aim of the present study was to characterize chemically crosslinked hardwood kraft fibers regarding their potential in making bulky paper and board. Crosslinking agents are molecules that contain two or more reactive ends that form inter-chain covalent bonds with cellulosic hydroxyl groups. The formed water resistant crosslinks prevent mutual movement and relocation of cellulosic chains and further, changes in fibers physical shape and dimensions, as the fibers are wetted, mechanically stressed and dried. In paper and board making chemically crosslinked fibers are less prone to swelling and deformation. Blocking of fibers surface hydroxyl groups by reactions with crosslinking agents reduce fibres ability to form inter-fibre hydrogen bonds. In the present study the crosslinking treatments were carried out in laboratory scale. The used pulp was never-dried, bleached hardwood (*Betula*

pendula) kraft pulp. Experiments were performed using various dosages of crosslinking agents followed by beating of the pulp and subsequent standard laboratory paper sheet making. The crosslinking treatments resulted in significantly increased paper sheet bulk. As expected, crosslinking decreased the dry strength of the sheets. However, after moderate refining, crosslinked pulps had much better tensile strength at constant bulk than never-dried or dried reference pulps. An additional advantage of crosslinking treatment is that it improves dewatering ability of the pulp significantly. Thus, use of chemically crosslinked pulp offers an attractive option for manufacture of bulky printing papers and paper boards.