

ISO Standardization of Calculation Method of Carbon Dioxide Emission Intensity from Iron and Steel Production

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As one of the CO₂ intensive industry, the Japanese steel industry addresses climate change in many ways and one of the good examples is the establishment of the common indicator for carbon dioxide emission intensity from iron and steel production; ISO14404. This paper presents the overview of ISO14404, the challenges and solutions in the standardization process as well as the future strategy of ISO14404.

The Operating Experience of the Vacuum Evaporator, Type of Vapor Recompression

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Niigata Mill, Hokuetsu Kishu Paper Co., Ltd.

We have been making large facility investment, emphasizing the environment load reduction system. Particularly in Niigata mill, we have improved CO₂ emission intensities by reduction of usage fuel oil and introduction of Gas Turbine Generation and Heat Recovery Boiler. In COP21 held in France at the end of last year, the international framework of the global warming measures become the historic agreement, and the importance of global warming measures and the energy-saving actions have been increasing all over the world.

For the purpose of 2 old facilities over 35 years update, environmental load reduction, the reinforcement of the black liquor concentration process, we planned the introduction of new vacuum evaporator, the name of H Train started the business operation since June 2015. We adopted method Vapor-Re-Compression-System (abbreviate it to VRC as follows) which compressed the steam by the re-compression fan again, and strengthened the black liquor concentration ability and steam reduction. The introduction of the VRC method in the black

liquor concentration facilities made by Sumiju Plant Engineering Co., Ltd. is the first in Japan.

After the operation of H Train, we have continued the stable pulp production. Energy consumption rates and CO₂ emission intensities of Niigata mill have been tending to reform. In this paper, we briefly describe the outline of the equipment and operating experience of the vacuume evaporator, type of vapor recompression.

Development and Application of Hyper Flat Drive System

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H.F.D. (Hyper Flat Drive system) is one of new developing product for an energy serving power transmission system replaced from V-belt system which currently used V-belt transmission system in air conditioner, blower, and ventilate system so on at production plant and commercial facility.

Flat belt self, they have two weaknesses or disadvantage one is belt side tracking, other one is dropping the belt tension those weakness compensate by our new developing mechanical device, self-side tracking control and automatic belt tensioner device.

It was possible to achieve energy serving, long life time and maintenance free, As result of H.F.D could reach about 7% energy saving compared V-belt system and there times of life time. Other features are cleanness and quietness.

Hydrogen Energy Supply Systems Utilizing Renewable Energy

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New Energy Solution Project, Toshiba Corporation

Some variety of hydrogen energy storage and supply system has been developed. The basic concept of those systems is to utilize hydrogen that is derived from renewable energy, aiming to provide carbon-free energy systems. Hydrogen-based autonomous energy supply system “H₂One™” has developed for a “Business Continuity Plan Model” , and has been under demonstration in Kawasaki-city. The other “H₂One™” equipped solid metal hydrate storage has constructed in a hotel as a “Resort Model” . And development of H₂EMS™ which has the function that predicts demand and supply of hydrogen is advanced as the system for the factory.

“Energy-Saving Method of the Satellite Type” by JBIC

Yasuhiko Shiota

JBIC : Japan Business Innovation Consulting Co., Ltd.

Energy-saving of the satellite type is a joint promotion project led by the head office. Project team called Satellite is a gathering of a few factories. Usually this project is composed of 3 factories (own factories or group company's factories) and the head office.

～The Satellite's merits～

1. A team of factory can be formed from a small number of members. (Each factory)
2. At the same time, in three factories together, they can put out results of energy-saving.
3. Communication between the head office and each factory can be actively maintained.
4. External wisdom is obtained (Headquarters technical department and each factory).
5. The principle of competition works.
6. Deep knowledge and information for the target process is required in order to share information, and to acquire skills.
7. It will form the structure which can continue in between the head office and factories.
8. It can plan the energy saving development of the head office-led model, and the profit contribution of all factories is obtained.

The Activity of Energy-Saving Produced Results in a Short Term

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Nakatsu Mill, Oji F-Text Co., Ltd.

Amid rising interests over renewable energy, Oji group has been positively progressing the utilization of biomass and hydroelectric power generation. Since paper manufacturing is an energy-intensive industry, the amount of purchasing energy such as LNG is still large. As recent rise in energy prices influencing severely over the profits of the industry, searching and practicing energy-saving matters that can be realized in short term are desired. Since setting up an aim of reducing 1.5% of energy consumption from the planned number based on the production plan and progressing energy - saving activities in every Oji FTEX mills, Nakatsu mill has limitedly settled a small team and worked on energy-saving during the second half of 2013 in order to produce results in a short term.

As a result, 19 actions have progressed in six months and succeeded in reducing 122 kL of energy per year measured in terms of crude oil. (corresponding to 0.45% reduction compared to the previous year)

This paper presents the activity of the “Energy-saving team” , two energy-saving acts (“Improvement of steam traps” and ”Halting single compressor”) and “System of visualizing energy consumption rate” which was a practical tool to progress energy-saving activity in manufacturing sites.

State-of-the-art Recovery Process Technology by Andritz

—A Futuristic Pulp Mill with Integration of Fiberline and Recovery Processes—

Masato Tsuchitana, Daisuke Nagamine and Chiaki Kawakami
Andritz K.K.

Kraft pulp production mill system is an ideal process as all chemicals are recycled and energy is generated self-sufficiently or more than enough with the biomass fed to the mill. The kraft mill system is consisting of a number of processes in the pulp production line and the recovery island. Until end of 90’s individual processes like cooking, washing, bleaching, evaporation, recovery boiler, recausticizing and lime kiln had been normally supplied by different process plant makers.

From the beginning of 21th century, large pulp production mills with more than 1 million tons/a were built in mainly South America that have required major plant makers to supply more comprehensive and combined processes on EPC basis. In order to meet the requirements and improve the total mill efficiency, Andritz has promoted R&D work and developed new technologies that improve energy saving, production efficiency, product quality, and increase energy generation plus minimizing emissions. These new technologies developed by Andritz are also useful for the existing mills.

LignoBoost

—Further Usage of Lignin from Your Kraft Pulp Mill—

Hiroshi Yamashita
Sales Group 2, Valmet K.K.

LignoBoost enables the kraft pulp mills to have flexible future possibilities about both

process and revenue.

The biorefinery has been focused on by several industries because the sustainable material is getting a key word to develop new processes. Lignin is one of the major compounds of woody material. Lignin has been used as a fuel for a recovery boiler for long years in kraft pulp mills. Today another possibility about lignin is now prevailing. Once lignin is extracted to the outside of recovery process of kraft pulp mills, the mills will get a new opportunity to sell lignin to the market. It could be replaced the fossil fuel with at a lime kiln or a power plant to save carbon dioxide emission. In addition, there is further attractive possibility about lignin which is expected to be a raw material for bio products such as bio plastic, binder, carbon fibers etc. Those kinds of bio products could be a new revenue for kraft pulp mills.

Commercial scale lignin extraction has just started in the US and Europe. It is expected that the speed of development of lignin-based product will be accelerated.

Development of the New Generation Latex that Has Excellent Picking Strength and Runnability for Paper Coating

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Latex is one of the most important components to control the qualities of coated paper. In the conventional latex, the optimization of quantities and distribution of adhesive component in the latex particles has been made to improve picking strength and runnability such as removability of dried coating color film. However further improvement of picking strength and runnability by the conventional way i.e., optimization of adhesive component, is difficult. Therefore, we developed new generation high performance latex that has further improved picking strength and runnability without depending on the adhesive component. The high performance latex has excellent picking strength and runnability. Especially its picking strength is 30% stronger than that of conventional one. In this paper, we discuss the mechanism of excellent picking strength of the high performance latex focusing on its film tensile strength and interaction with pigment. The tensile strength of the high performance latex film is increased significantly than that of conventional one, so its picking strength would be strong. Besides, in only calcium carbonate used coating color, the high performance latex shows excellent picking strength. It is considered that the high performance latex interacted strongly with calcium carbonate. In addition, the dried coating color film which containing the high performance latex could be easily removed with water. The high performance latex has a hydrophilic surface, so its film might be easily washed away.

—Peer Reviewed—

Development of an Excellent Depth Feeling Wallpaper Screen Based on a New Theory of an Optical Biomimetic Model of Human Skin

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When we consider viewing the surface of human skin, the skin gives us a sense of natural depth, while, in contrast, the surface of a plastic does not. It is sure that the feeling of natural depth from human skin does not come from binocular disparity, because we can easily sense the natural depth of the skin, even when using only one eye. In our research program, learning from the structure of human skin, we fabricated screens which consist of multilayers made of translucent sheets coated with TiO₂ nanoparticles. It seems that these screens appear to exhibit Mie scattering which has strong backward scattering relative to forward scattering. Therefore, analogous images can be projected on the screens behind the original images without losing their clearness. The feeling of natural depth from our screen can be considered to come from the multiply-observed images produced by phase differences due to the translucent multi layers and the reflection/diffusion differences of light depending on its wavelength. We also discuss the reflection/diffusion properties using color laser and black and color matrixes. Red ray can reflect many times between the multilayers and resolution of the red image become low. When insert a black matrix among the multilayers, the matrix control the optical properties, and the resolution can be improved. Additionally, in the case of our screens, as well as human skin, we can sense the feeling of depth with one eye. Our screens can be applied to wallpaper or projection screens for events, since they are simple, energy free, and applicable to large area.