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Misunderstandings of Noise Control
— Listen, Feel and Understand Its Fact —

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When we visit a factory or plant to discuss about noise control, the customer often tells us that the previous countermeasure has not been sufficient in terms of its effect. However, during the discussion with us, sometimes the customer notices that they are misunderstanding the concept of the noise countermeasure.

In this session, some examples of the noise countermeasures that are tend to be misunderstood will be presented. Moreover, some examples that the noise measurement helps to understand the situation and concept will be presented as well. Also, typical noise control countermeasures and their effect will be demonstrated through some examples.

Odor Measures, Deodorization and Anti-Odor Protection in the Factory

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Odor measures in the factory have changed significantly in the last few years. In the first,odor measures should be carried out that is the understanding of the current state. Odor is an invisible chemical substance. Understanding and visualization of the odor is the shortest way of odor measures. In this section, we introduce the deodorization and anti-odor protection.

iMethod, Choice of the Waste Industry

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iMethod is an analysis method of public information released from industry waste treatment companies. It is intended to extract four basic parameters of companies, including process

capabilities, process outputs, sales and the number of employees. By calculating these parameters, fundamental information to characterize the company are obtained such as operating efficiency, average unit price, overflow ratio and productivity. iMethod allows evaluation of a contractor, quantitative comparison of several contractors, financial analysis of consolidated group companies and trend analysis of the whole industry. Following characteristics of the industry are achieved by this method. The standard treatment price of waste materials is 30,000 yen/ton. Annual labor productivity is 667 ton/year. Sales are 20 million yen/person while the minimum is 15 million yen/person. Price and productivity are incompatible. The ratio of gross asset and sales is 1 to 1. In some companies, productivity and profit tend to increase proportionally when the standard productivity exceeds 1/2.

Development of Fly Ash-based Geopolymer Sleeper

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In recent years, global warming has been recognized as a social issue. In light of this, the manufacturing Portland cement, which releases a significant amount of CO_2, raises concerns. A widely used material in general civil engineering and construction work, Portland cement is manufactured by burning limestone ($CaCO_3$) at a high temperature, and this releases a large amount of CO_2: $CaCO_3 \rightarrow CaO + CO_2\uparrow$. Additional CO_2 release also occurs during this process because fossil fuels are used for the high-temperature burning. Therefore, recently, geopolymer-hardened pastes have attracted significant interest as a substitute for Portland cement, in order to reduce CO_2 emissions. A geopolymer-hardened material is one that is stiffened by the reaction of amorphous silicon and aluminum materials, such as fly ash, with an alkaline silicate solution. Because this material does not contain Portland cement, significantly lower amount of CO_2 is released during its preparation, and it has the added benefit that industrial by-products, including coal ash, are used in its preparation.

The author utilized a geopolymer-hardened paste, and produced a general sleeper from prestressed concrete (PC) and a short sleeper from conventional reinforced concrete. The prestressed concrete sleeper that was produced conformed to the JIS3 sleeper as per JIS1202E "post-tension sleeper," and it was confirmed that it showed the required performance as prescribed by JIS.

A test was performed in which the amount of steel reinforcement in the short sleeper was reduced by reinforcing it with steel or polymer fibers instead. Even in this case where the geopolymer short sleeper was not reinforced with rebar, the performance was as required. However, the load capacity was smaller than that in the case of a commercial short sleeper

without rebar but with vinylon fiber as reinforcement. Therefore, practical use is possible in the case where fiber reinforcement is such that the load capacity of the short sleeper with less rebar reinforcement is equal to or greater than that of the commercially available short sleeper. In this paper, the potential use of geopolymer concrete in the future was discussed, and examples of the development of geopolymer sleepers were provided. Specifically, various properties of modern concrete can be controlled by the use chemical admixtures, and a future challenge is to achieve the same kind of control for geopolymer concrete. As a solution to the difficult problem that geopolymer concrete cannot be unmolded by using the mold lubricant that is normally used for general concrete, a high-melting-point wax-system mold lubricant was developed.

Analytical Methods for Mercury in Exhaust Gases and the Characteristic Features

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Mercury has been emitted from various sources and transported globally. It is pointed that the emitted mercury accumulates on organisms and has harmful impacts on human health and wildlife. Even mercury use and emissions have been reducing in developed countries, mercury is continued to be used and emitted in developing countries. The global effort for adequate management of mercury and emissions reduction is an important issue.

Under the circumstances, Minamata Convention on Mercury was adopted at the international conference held in Kumamoto city and Minamata city in October, 2013. This treaty calls for an action to reduce mercury emissions to the environment through the whole life cycle process, including production, use, and disposal. It is also required to regulate the emissions of mercury and mercury compounds into the atmosphere, and to reduce the emissions where possible. Japan reaches the environmental quality standards regarding mercury, such as water quality, and effluent standards have been stated. On the other hand, emission standards for atmosphere have not been stated despite anthropogenic emissions promote the atmospheric mercury level and deposition rate on the soil. This paper introduces several analytical methods for mercury in exhaust gases, including Japanese and international methods, in conjunction with environmental quality standards and emission standards in Japan.

Mercury Emission to the Air
— Minamata Convention on Mercury —

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Mercury is a chemical of global concern owing to its long-range atmospheric transport, its persistence in the environment once anthropogenically introduced, its ability to bioaccumulate in ecosystems and its significant negative effects on human health and the environment. The Minamata Convention on Mercury is a global treaty to protect human health and the environment from the adverse effects of mercury. The major highlights include a ban on new mercury mines, the phase-out of existing ones, control measures on air emissions, and the international regulation of the informal sector for artisanal and small-scale gold mining. Article 8 of the convention calls for the Conference of the Parties (COP) to adopt four pieces of guidance. At its first meeting, the COP shall adopt guidance on best available techniques and on best environmental practices, taking into account any difference between new and existing sources and the need to minimize cross-media effects, and shall also adopt guidance on support for Parties in implementing the measures set out in paragraph 5, in particular in determining goals and in setting emission limit values. The Expert Group has been given the responsibility of developing these guidance documents, which will be submitted to the Intergovernmental Negotiating Committee for their consideration and to be forwarded to the COP.

Approaches to Biodiversity Conservation of Nippon Paper Group
—A New Partnership with Coca-Cola(Japan)Company, Limited—

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Nippon Paper Industries Co., Ltd.

Last October, Nippon Paper Industries Co., Ltd. concluded a basic agreement with Coca-Cola (Japan) Co., Limited on a joint medium- to long-term initiative for the conservation of forests.

Both companies, through their respective business activities, have been engaged in a variety of activities aiming for a sustainable society. In environmental terms, Nippon Paper Industries have successfully conserved forest resources, and Coca-Cola (Japan) is credited with its efforts to protect water resources. In order to develop the efforts, we agreed to work together to protect and preserve forest and water resources, effectively utilizing our experiences and assets into actions that enhance the multifaceted functions of forests, including biodiversity and water source conservation.

As the first step in our collaboration, the two companies decided to jointly conduct next-generation environmental education and a regionally integrated campaign under the concept of “conserving rich forests and water.” The activities will be carried out in Katashina, Gunma prefecture, where there is a forest that Nippon Paper conserves in the Sugenuma district

and a source of water used by the plant of Coca-Cola East Japan Products Co., Ltd. in Saitama Prefecture. Nippon Paper owns 400 forests areas throughout Japan, while the Coca-Cola system produces a variety of beverages at its 24 bottling facilities nationwide. Looking to the future, the two companies can take advantage of broad range of their assets and businesses in Japan to expand their collaboration nationwide.

Recent Trend in Emission of Offensive Odor from Pulp and Paper Wastewater Treatment Process, and Control Methods with Deodorants and Microbial Products

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Through various countermeasures, such as black liquor recovery, steam or air stripping, enhancement facility of wastewater treatment, or installation of closed system, the strength of odor emitted from pulp and paper mills is decreasing year by year. While the quality of living or work environment required inside or outside mills is concurrently being higher, and therefore it is nessessary for facility managers to continue to take further measures even now.

Mushugen Industries Co., Ltd. is a manufacturer of microbial products and deodorants for waste water treatment. In the field of sewage treatment and disposal of human waste, we have cultivated the technology of these products and the maintenance management know-how by using them for long time, and we have promoted the application in the field of pulp and paper wastewater treatment since eight years ago.

In this paper, we describe the knowledge acquired by experience in it about recent trend in emission of offensive odor from pulp and paper wastewater treatment process, operating technique, and control methods with deodorants and microbial products.

The Problems of Odor Are Deep-Rooted!
― Problems and Measures to Odor in Paper Mills from Paper Making Process to Wastewater Treatment ―

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Some bad smell substances like hydrogen sulfide or lower fatty acid adversely affects to the paper making process and wastewater treatment. These bad smell substances are generated by metabolism of microorganism in pulp slurry or wastewater. As measures, microbial growth inhibition by disinfectants is effective in paper making process. Also, metabolic control of

anaerobic bacteria is effective in wastewater treatment system. By implementing these measures, it is possible to obtain benefits, not only the bad smell control but also such as productivity improvement and stable operation of the plant.

Technological Front of Forest Monitoring
— Domestic Forest and REDD+ —

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The problems which surround a forest are serious every year. The forest is neglected by decline of forestry in Japan and deforestation is progressing in the world. In order to cope with these problems, planned and sustainable forest management is important. For that purpose, it is important to monitor a forest periodically.

In this paper, it divides into two themes, a domestic forest and REDD+, and introduces the advanced forest monitoring technology.

The History of Technological Developments in Pulp and Paper Industry
: From Ts'ai Lun's Invention to the Birth of Modern Pulp and Paper Industry
Part 1: Survey on Historically Utilized Plants and Developments in China

Kiyoaki Iida

Paper and its making process were invented in China and were introduced eastward to Japan. Westward, they moved to Samarkand, then to Damascus, and through North Africa to Europe. One other route was through Greece to Europe. In Europe, the old technology was revolutionized to modern one, taking in it innovations developed in the Industrial Revolution. Then, the modern technology prevailed in the world.

Historically, fiber unit which plant ubiquitously has as its basic structure has been used as pulp for forming paper. Before the industrial Revolution, chemicals available were wood ash (potassium carbonate) and lime, and the highest temperature was 100 degrees C. Refining power for fibrillating fiber was human hands and wooden water wheel at best. Wood could not be pulped in those days, and only bast plant like hemp, flax and mulberry, and bamboo in the later age were candidates which were converted to paper after a lot of hard labor for so many days. In the course of time, every district searched plant natively available and modified its product (paper) for satisfying customers need.

China started to use paper in replacement to Mokkan (wooden strip) in about the third century.

As the society got developed and affluent, paper became not only a media for writing but also commodity of daily life. As the demand of paper increased, new fiber source was searched and finally bamboo was able to be pulped in about tenth century. Bamboo paper was mass-produced probably at a reduced cost in south east China where bamboo was plentiful. Sufficient paper supply supported civilization of dynasties from Tang to Ming, which was the highest level in the world.

Chinese paper making technology was transferred to Islamic lands where Islamic paper, different from Chinese one, was developed.

Corporate Profile & Products Information (17)

RIKENGREEN CO., LTD.

Rikengreen Co., Ltd. (RG) was established in 1957 as a subsidiary of Kumiai Chemical Industry Co., Ltd. (KUMIAI). KUMIAI's business was limited in agriculture field, therefore Specialty Chemical Department of RG was established in 1985 to expand the business of their new biocides in industrial field. Since then, we have been distributing biocides to paper mills throughout Japan together with K-I Chemical Industry Co., Ltd.

To extend our portfolio from biocides, we created a partnership with Houghton Co., in 1987 and release agent and creping adhesive were introduced to us. Those products were well accepted in tissue-towel market and we achieved big success in the business. We have been retained the leading position in the segment since then.

Our partner was changed from Houghton Co. to Hercules Inc. in 1996, and to Ashland Co., Ltd. in 2008, and to Solenis LLC. in 2014 due to company's merger and strategic decision. However, our position has been remained the same as an exclusive distributor of our partner for Japanese paper mill.

Not only biocide, release agent and creping adhesive for tissue-towel market, we are introducing wide range of products to the market now and some of those, such as deposit control agent, retention aid, release agent and creping adhesive, and dry strength additive are explained briefly in this article.

－Peer Reviewed－

Analysis of Chlorine Content in RPF by the X-Ray Fluorescence Spectrometry

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Oji group has been expanding the usage of RPF as a heat source to reduce the fossil energy consumed in mills. RPF is made of paper, plastic, wood and tire waste that is not recyclable as a material source any more. The expanded usage of RPF has sometimes caused serious problems due to corrosion of the thermal boilers by chlorine elements in RPF. Mills that take advantage of RPF have been conducting the chlorine analysis by the X-ray fluorescence spectrometry（compendium method） every day to ensure that the accepted RPF contains less than 0.3% chlorine element to avoid the corrosion problems. It was found that there have been unacceptable deviations in the measured chlorine values and these values sometimes do not match well with those obtained by the JIS method. Introduction of both new pretreatment of RPF samples and a new standard plate to draw a calibration curve has effectively diminished these deviations, and greatly improved the correlation between the locally measured values and those obtained by the JIS method.