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Development and utilize of e-MusenJunkai

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This article explains examples of the development and use of e-MusenJunkai and technical progress.
The prototype of e-MusenJunkai was developed in 2014, and the cumulative sales volume is about 2,500 units (within the group) and 7,400 units (all industries). The development concept was "low-cost and easy to use" and the minimum necessary functions were narrowed down. It can be used as an alternative to maintenance patrols, and the measurement results can be "visualized" and deployed in digital transformation such as AI. In addition to equipment maintenance applications, it can also be used to monitor conveyor temperatures and yard temperatures. It is a cost-effective product that makes it easy to grasp the operating status of equipment. It contributes to the transfer of technical skills and business efficiency, and can be used to manage signs of failure, aiming to stabilize operations.

Application of Reactive Polymer Technology to“REALIZER Series”

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In 1998, we started to study emulsion synthesis in order to introduce emulsion-type retention aids with ultra-high molecular weight to the retention aids, which was mainly powder products and aqueous solution. In 2020, a new concept, “Reactive Polymer” was developed and has been applied to various papermaking machines. “REALIZER R Series” demonstrated a high retention effect against filler material in the neutral paper making machines. In recent years, it has also been applied to large, high-speed paperboard machines overseas, and its ability to demonstrate high retention effect with low dosage has contributed greatly to reduction of cost and environmental impact.
“Reactive Polymer” has also been introduced into the “RALIZR A Series” of coagulants, adding a function to improve the fixation of various additives such as dry strength agents. Nowadays, we can reduce the amount of PAM added to paperboard machines by improving the fixation of dry strength resins, and this has contributes to reducing environmental impact and costs.

Shift from partial optimization to global optimization through data products
-SHINKAWA Platform Concept-

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In 2018, the Ministry of Economy, Trade and Industry warned of the need for a production efficiency strategy to enhance domestic and international competitiveness in its report, "Overcoming the '2025 Cliff' of IT Systems and the Full-Scale Development of DX."

Although manufacturing companies have established departments to promote DX, the reality is that efforts are lagging due to the black boxing of legacy systems in OT departments.
Against this backdrop, Shinkawa Electric developed the bottom-up mechanism "SHINKAWA Platform."
The SHINKAWA Platform is a solution addressing the challenges cited as reasons for OT departments in manufacturing not advancing DX, including the costs of digitizing analog instruments, the difficulty of updating legacy systems, and the individualization and complexity of system construction.
Specifically, it aims to improve production efficiency and reduce investment costs by utilizing existing systems and cloud services to visualize and share information.
The platform's key features include achieving overall optimization through the continued use of existing systems, eliminating black boxing, realizing systems tailored to the company's business model, and enabling a small-scale start.

Additionally, it supports knowledge transfer through smart dashboards and contributes to workplace reform by reducing the time spent on research in business operations.
The SHINKAWA platform aims to centralize data management and improve efficiency by utilizing data from various existing systems to optimize business processes.
It is designed to extract the necessary data while keeping the large investment costs typically required for data platforms to a minimum.

One of its concepts is to emphasize the value of vibration information in analyzing equipment abnormalities and enable preventive prediction through real-time anomaly analysis.
Additionally, it advances the contextualization of information, the collection and visualization of process data, and the integrated management of static data to promote DX and improve operational efficiency.
Finally, the SHINKAWA platform does not remain static but continues to expand into various systems and services in the manufacturing industry, aiming for further utilization.

DX/GX products contribute to productivity improvement at manufacturing sites

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In the manufacturing industry, it is necessary to efficiently utilize resources and maximize production while maintaining product quality. However, in recent years, there have been many challenges, such as labor shortages due to the retirement of veteran engineers, the personalization of equipment maintenance work, and the rise in energy prices due to the deterioration of the global social situation. To address these issues, there is a growing demand for DX (Digital Transformation) and GX (Green Transformation) solutions.

This paper introduces TMEIC's DX and GX product offerings, presents real-world application cases, and outlines the company's initiatives aimed at enhancing productivity and operational efficiency.

Powerful tools for real time process monitoring for Pulping optimization

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Currently, industry got strong pressure from the market because Japan government announced carbon neutral industry by 2050. In Japanese industry, especially material industry, there are several serious potential issues like lack of human resource due to less attractiveness for young people, retirement of baby boomer and the technical transfer. On the other hand, there are bright future in paper industry because paper is excellent material for plastic reduction and new functional material, Cellulose Nano Fiber.

ABB started following four approaches to cooperate with customer to solve facing issues.

1) Reliable and high-performance online measurement for Refiner, Wet end control
2) Cutting-edge fiber analyzer for new material development
3) Speedy, Safety and high precise paper testing machine
4) High speed, high precise and reliable automated paper testing machine

The Author introduced all 4 items from 2022 to 2024 in Japan Tappi. In 2025, all topics are reviewed by 2 sessions and summarized again from point of importance of real time process monitoring. In the session, powerful tools for pulping process are described. Product features, measurement principles and usage of pulp consistency meter (microwave, optical) and freeness online device will be presented.

Innovations and New Strategies for Enzyme Preparations in the Pulp and Paper Industry

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Enzyme-based technologies are being explored for various applications in the papermaking field. Our company has also introduced several new enzyme-based agents, including a fibrillation promoter, a repulping aid, and a pitch control agent.

The enzyme-based fibrillation promoter Hercobond 8988AP demonstrates effectiveness even with shorter reaction times compared to the conventional Hercobond 8922, and it exhibits paper strength enhancement effects even at lower dosages. In addition, Hercobond E-1160 not only improves tensile strength but also enhances Z-direction strength.

The enzyme-based repulping aid DPD-1119, unlike conventional aids, does not require alkaline conditions, thereby eliminating pH fluctuations and the need for a neutralization process. It also avoids fiber degradation caused by alkalis. Furthermore, since it does not use chlorine, it poses no safety risks such as chlorine gas generation.

The enzyme-based pitch control agent Zenix DC8106 reacts with and decomposes pitch and stickies. The resulting finer pitch particles can be effectively removed from the system by combining the agent with a cationic additive, thereby improving pitch retention and further enhancing pitch control.

This report introduces the performance characteristics and application examples of these new enzyme-based papermaking chemical agents.