

# PAPER & WEB BUSINESS OF YOKOGAWA

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*In recent years, many Japanese paper companies tend to invest not in partial improvement of their existing facilities, but in construction of new facilities from which a high return can be expected. In the Asian market, especially the Chinese market, many large paper plants are now being built for mass production. To meet these market trends, Yokogawa seeks to deliver the following four types of solutions for the paper and pulp businesses: 1) Machine Technology Solutions (MTS), 2) Pulp Technology Solutions (PTS), 3) Utility Technology Solutions (UTS), and 4) Information Technology Solutions (ITS). These types of solutions will be formulated not merely to add new products to the product lineup, but also to develop original and attractive solutions that integrate all kinds of relevant information. Through affording these solutions, Yokogawa aims to be a total supplier that can contribute to the businesses of customers.*

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## INTRODUCTION

Yokogawa's business involvement in the pulp and paper industry started to grow in the 1970s after the in-house development and to establish the sales force for stand-alone Basis Weight Sensor with an analog recorder for a fixed point measurement. This involvement has expanded exponentially in the Asian region, particularly in the Japanese market over the past 35 years. Many paper companies now tend to reconstruct the whole production process instead of investing on the single system one by one.

There has been a surge in this form of introduction of instrumentation products.

To meet these market trends, Yokogawa's pulp and paper business has merged its Enterprise Technology Solutions (ETS) concepts to formulate four business solutions.

## CONCEPTS OF PULP AND PAPER BUSINESS

### Current Situation of Pulp and Paper Business in Japan

Yokogawa's business involvement with the pulp and paper

industry started to develop from the initial marketing of stand-alone Basis Weight Sensors. Subsequently, the business scale expanded substantially in conjunction with the launch of DCS sales. Since then, Yokogawa has delivered a large number of original products such as DCS QCS, Local controllers, Flowmeters, transmitters, mill information systems and so on. Currently Yokogawa's pulp and paper business continues to achieve consistent annual sales and to hold a market share as high as 60% or more in the Japanese market.

However due to the globalization of marketplaces resulting in fierce competition in paper prices, it is inevitable that Japanese paper companies will make choices based on one of the following two paths:

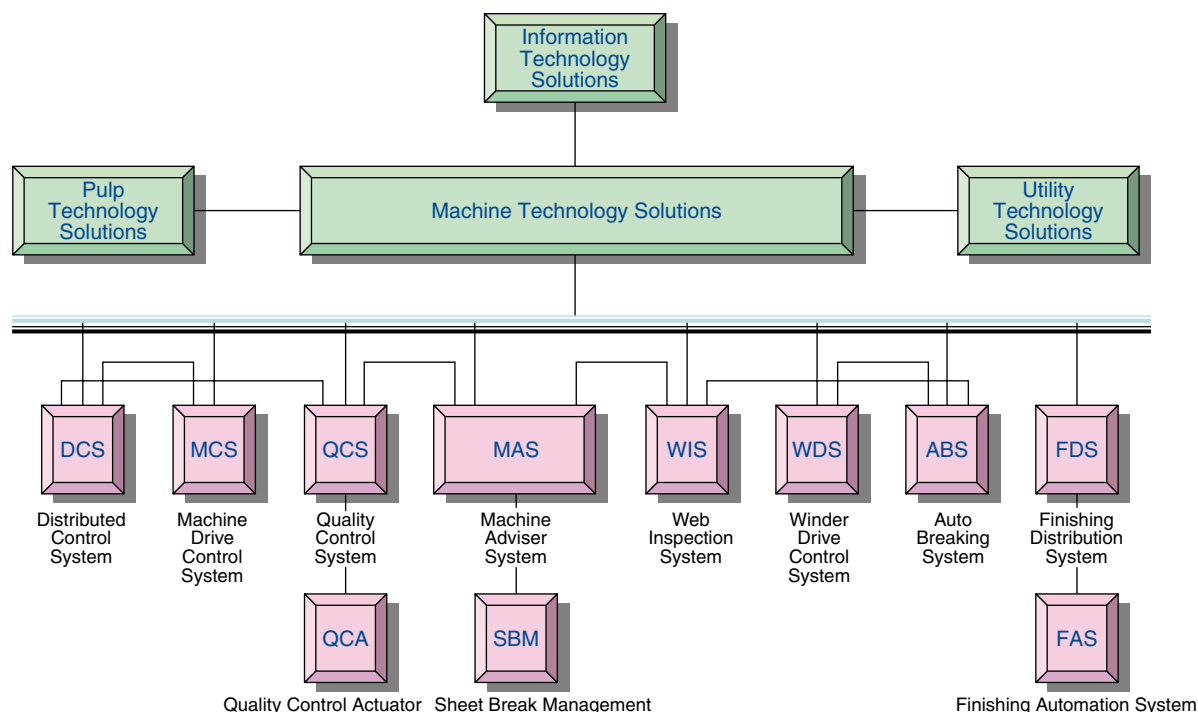
- Thorough cost reduction
- Differentiation by quality

In either case, Japanese paper companies have come to focus their investments only in specific areas of the business, as the cost effectiveness achieved in making improvements to conventional production facilities is limited.

Specifically, recent tendencies have been to shut down or scrap in their entirety conventional facilities in which there is a ceiling in achieving improvements in profitability or quality. They subsequently construct entirely new production facilities (scrap and build, or S and B).

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\*1 Industrial Automation Business Headquarters



**Figure 1** Lineup of the MTS Products

### Current Pulp and Paper Business Situation in the Asian Region

Yokogawa's involvement in the overseas pulp and paper business has mainly been in China, Korea, Taiwan, and Southeast Asia. When considering business expansion in these areas, we must be highly aware of growth in the Chinese market, just as with business in other industries.

The production volume of paper in China, which was approximately 26 million tons in 1995, is expected to reach 50 million tons this year, doubling over the last decade. In particular, it has been growing at an annual rate of about 15% for the last three years. Still, paper usage per capita in China is a little less than 1/6 of that in Japan. Thus when taking the recent rapid economical development in China into account, the rise in papermaking production capacity is expected to continue for some time.

In response to this trend, the major paper-making companies in the world, including those in Japan, have been promoting the construction of production plants in China one after another. Worldwide capital investment continues to be focused on China, and to ensure Yokogawa's expansion in the business, it is essential for us to increase Yokogawa's share in the Chinese market.

### Four Types of Solutions for Pulp and Paper Business

Both in Japan and overseas, there is a tendency for papermaking companies to invest centralizing in large-scale facilities from the viewpoint of production efficiency and response to environmental requirements. In general, the purchase of the newest, large paper machines that process paper stock through every stage, ultimately resulting in paper, is said to cost 8 to 15 million USD. Approximately 10% of that is attributed to instrumentation products. Taking this into account when

considering the provision of optimum solutions from the users' point of view, the following two points can be ascertained:

- It is desirable to facilitate efficient equipment startup by choosing a manufacturer capable of providing all of the instrumentation products (a total supplier).
- It is preferable to secure a warranty on total performance that instrumentation equipment can deliver rather than on individual equipment performance and then incorporate it into management planning.

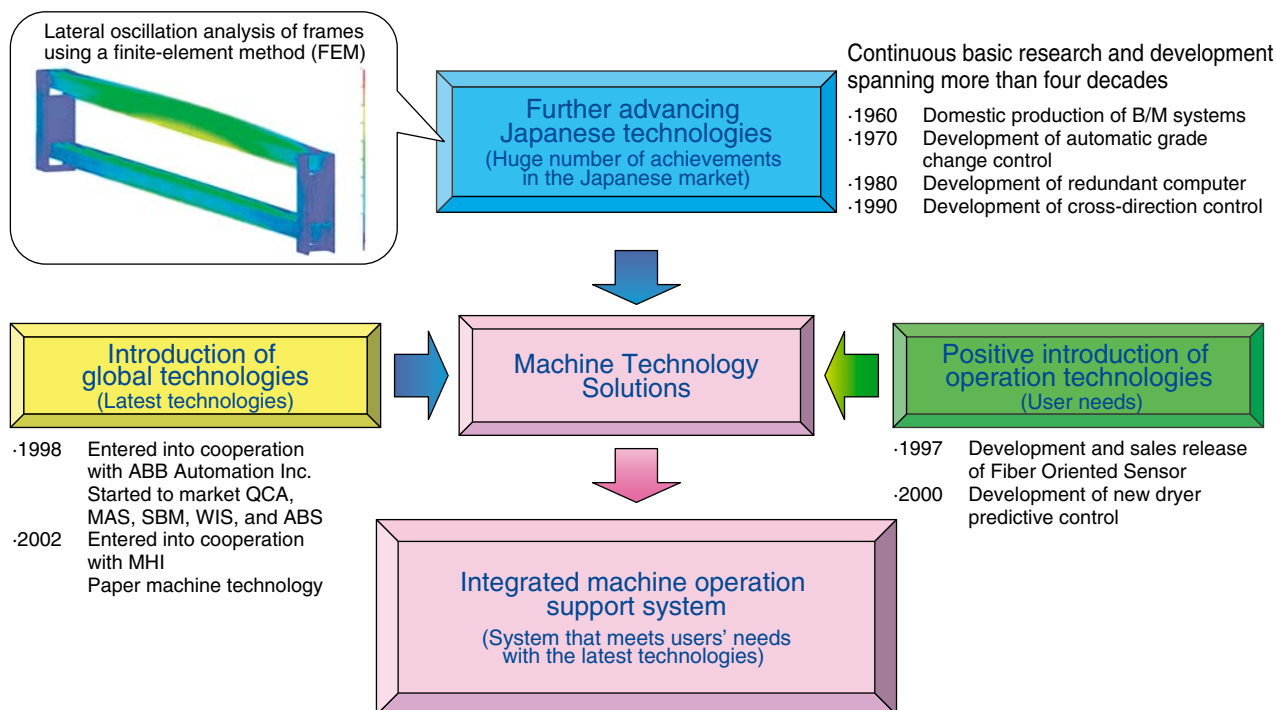
In order to present a concrete, viable corporate Enterprise Technology Solutions concept to the business, it is certainly necessary to meet these needs. Thus, to aim at being a total supplier of equipment for the three major facets of papermaking plants, namely papermaking, pulp, and utilities (including boilers, power generation, water discharge, etc.) as well as information systems, Yokogawa seeks to deliver the following four types of solutions for the pulp and paper business:

- MTS: Machine Technology Solutions
- PTS: Pulp Technology Solutions
- UTS: Utility Technology Solutions
- ITS: Information Technology Solutions

Yokogawa aims to expand its pulp and paper business by providing a lineup of these four types of solutions to lay a stable foundation in positioning itself as a total supplier for pulp and paper instrumentation.

### MTS

MTS stands for Machine Technology Solutions, with "machine" referring to the paper machines in the pulp and paper



**Figure 2** Groups of Technologies for Realizing MTS

industry.

For paper machines, there are a large number of instrumentation products, for example quality control systems (QCS) and web inspection systems (WIS), whose applications are specialized, such as for the on-line measurement of paper quality during the process in which paper, the end product, is finally completed.

When implementing MTS, it is necessary to not only provide a lineup of the products, but also to have rich experience and understanding of the field, such as a thorough knowledge of paper machine technologies, production techniques, and paper quality.

#### Lineup of Products for Realizing MTS

The products comprising MTS include the following (Figure 1):

- DCS: Distributed Control System  
Paper machine control system (such as CENTUM CS 3000)
- QCS: Quality Control System  
Paper quality measurement and control system (such as B/M 9000 CS)
- QCA: Quality Control Actuator  
Actuator system for Cross direction quality improvement
- WIS: Web Inspection System  
Sheet defect monitoring system
- ABS: Auto Breaking System  
Automatic winder shutdown and control system
- MAS: Machine Adviser System  
Analysis and diagnostic system for equipments constructing paper machine
- SBM: Sheet Break Management  
Sheet break monitoring and investigating system

- MCS: Machine drive Control System  
Paper machine drive control system
- WDS: Winder Drive control System  
Winder drive control system
- FDS: Finishing Distribution System  
Finishing distribution control system
- FAS: Finishing Automation System

#### Direction that MTS is Aiming

The lineup of MST products and inherent accumulation of product knowledge facilitates the integration of all kinds of relevant information, enabling us to propose appropriate solutions to users' various needs and budgets. This is the direction that MTS is focusing on.

We have proposed an "integrated machine operation support system" (Figure 2) as the embodiment of MTS. This system makes it possible to integrate all of the data on the machines' operating conditions, paper quality monitoring, defect monitoring, monitoring of the statuses of various devices, diagnoses of mechanical equipment, alarm analysis, etc. that have been stored in individual systems, enabling the creation of new added values.

To realize this "integrated machine operation support system," in addition to the technologies Yokogawa has developed thus far, it is necessary to pursue technologies at a global level and to develop new technologies in cooperation with the users.

#### Expansion of MTS into Other Industries

MTS initially formulated as a solution for the pulp and paper industry can also be applied to the production lines of sheet-like



**Figure 3** BM9F1 Frame

industrial products, such as video tapes and films, due to its particular characteristics.

As a QCS, Yokogawa offers “WEBFREX II” that measures the thickness of the product on-line at the final stage of the line. Furthermore, Yokogawa has quality control packages used with high reputation in the pulp and paper industry.

#### **Example of Latest MTS Development (BM9F1 Frame)**

A QCS (B/M system) is a system that measures and controls final paper quality, such as the basis weight and moisture content on-line and is one of the MTS core systems.

The BM9F1 frame (Figure 3) is one of the constituent elements of the QCS and is a component equipped with a sensor that measures paper quality on-line. This equipment has mainly been optimized for medium- to small-scale paper machines.

#### **FROM MTS TO ITS**

To realize ETS in the pulp and paper industry, it is important to collect and accumulate information necessary for the

Manufacturing Execution System (MES) or Enterprise Resource Planning (ERP) area in real-time from each product belonging to MTS, PTS or UTS.

ITS is a solution for the technology that supports these types of computerization, and the product that lies at the core of ITS is the Plant Information Management System (PIMS).

The users can receive benefit from PIMS such as on-line data management of production progress, inventory, quality, etc.

#### **CONCLUSION**

Yokogawa’s corporate concept is to contribute to the realization of an affluent human society with the concept of “measurement, control, and information” as three pillars.

MTS is a solution based on “measurement and control,” and is the area in which Yokogawa can best deliver its strengths. Due to changes in the pulp and paper market needs, not only major instrumentation manufacturers but also the instrumentation divisions of system manufacturers are beginning to enter into the market as competitors. Fortunately, however, Yokogawa’s DCS and QCS have already demonstrated high reliability along with high reputation in the marketplace, and it is assumed that Yokogawa has a basic strength for the expansion of MTS business in the future as well.

ITS technology is an “information” supporting solution, another pillar of our corporate concept. It is important to merge ITS with ETS to always pursue optimum solutions for the customers’ business.

PTS and UTS are areas that can be implemented by expanding on the experience obtained in the past, but there are a number of subjects that must be challenged from now on, such as global environmental problems and countermeasures against global warming. While pursuing ETS, it is also essential to realize these concerns. ◆

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