



iCon – intelligent Control for stock preparation lines

The technological trend in stock preparation lines today is increasingly toward continuous production, with fewer vats accordingly. In this connection Voith has developed the EcoProcess system concept (Fig. 1), which enables enormous savings in investment and operating costs.



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For maximum benefit, the EcoProcess depends on systematic plant automation with higher-ranking control strategies. All these higher-ranking systems work on the same principle: they supply a production automation system with setpoint inputs for various control parameters, to keep plant operation as near as possible to the technical and technological optimum. EcoProcess can also be retrofitted to increase the productivity of existing deinking lines.

To cover such higher-ranking control needs in stock preparation lines, Voith Paper Automation developed the iCon product family. iCon stands for intelligent Control, and incorporates all the control and regulation tools beyond basic automation of a stock preparation line.

The modular iCon product family offers hardware and software solutions with associated services for simplifying stock preparation line operation, improving

reliability and minimizing costs (e.g. for bleach chemicals). Investment costs for these intelligent systems are very quickly amortized: according to Helmut Berger, production manager at WEPA Giershagen, deinking line upgrading saved 30% oxidative and about 40% reductive bleaching costs, with an investment pay-back time of less than two years.

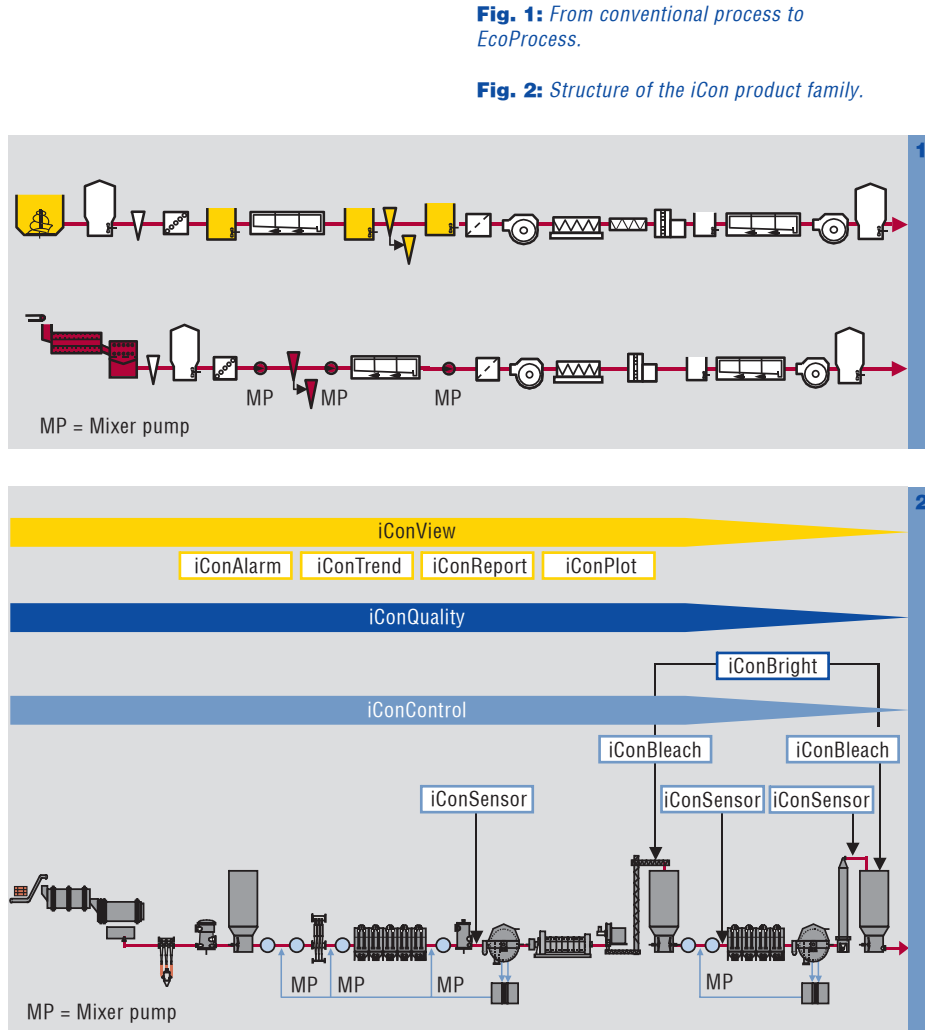
System structure

iCon is mainly divided into three inter-linked areas:

- **iConControl** is the platform under which all controls and the information system run. It communicates directly with the process control system.
- **iConQuality** incorporates all the control systems for improving stock quality and at the same time optimizing process operating costs.
- **iConView** covers all the communication and information systems required for stock preparation line control (Fig. 2).

iConControl

The MS Windows based iConControl platform comprises a high-end industrial PC with standard OPC interface to the process control system. Via this interface



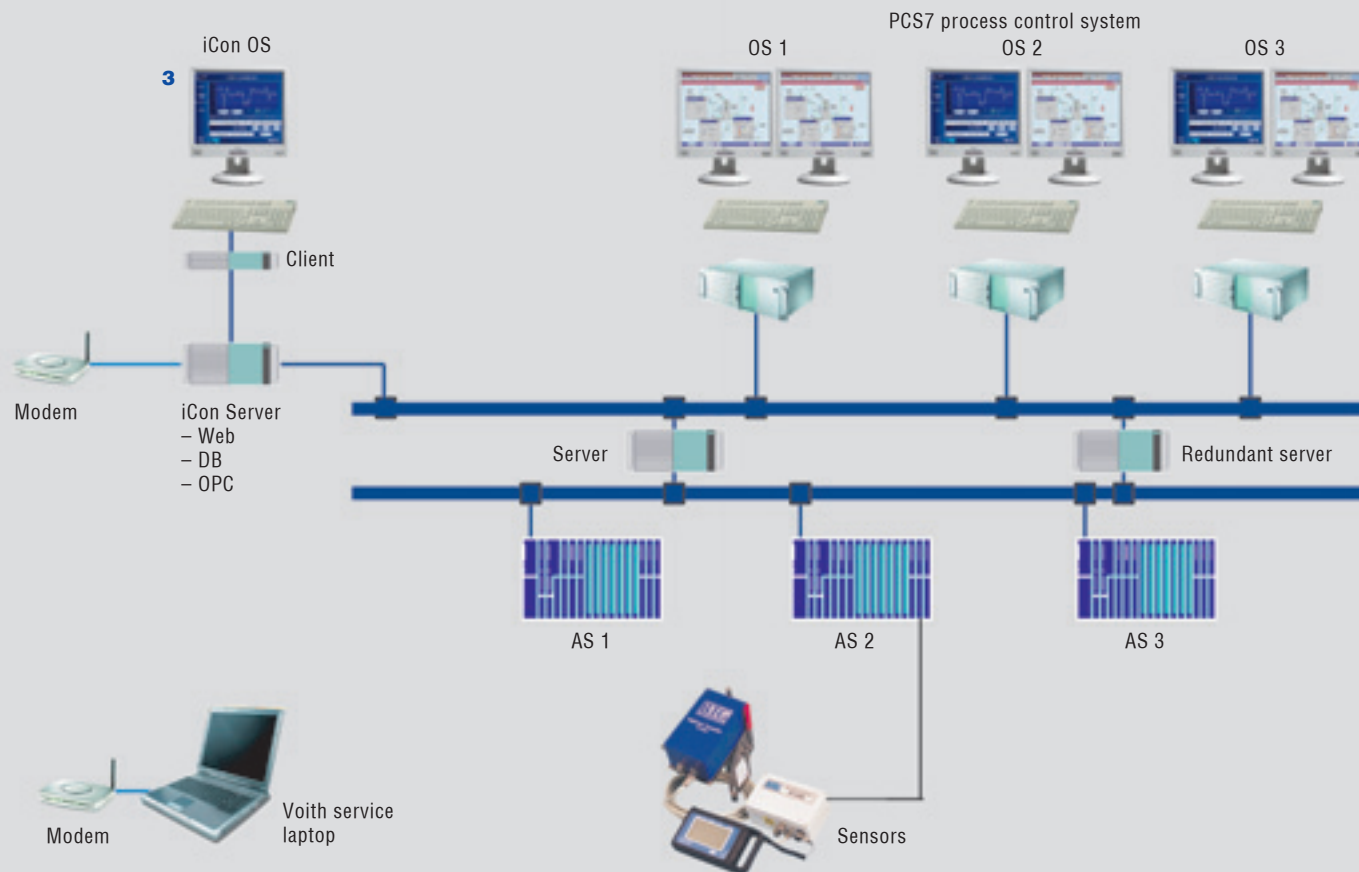
large quantities of data are read in from the process control system, and the requisite setpoints are fed back to the deinking process. This OPC and web technology ensures seamless integration in practically all process control systems, irrespective of manufacturer.

The user operates the system from a browser window on the process control

Fig. 1: From conventional process to EcoProcess.

Fig. 2: Structure of the iCon product family.

interface, and is unaware that another system is operating in the background. All necessary inputs and outputs are continuously provided by the database, thus enabling for example visualization on the form of freely configurable graphics. Via an ethernet link, the PC can access the process control system OPC server to read and write process data and variables.



iConView

The Voith iConView system is installed on the iConControl platform to ensure basic functionality of the individual quality control modules. The large quantities of data are stored in compressed form in a database developed by Voith Paper Automation. This system forms the basis for various modules providing interactive data interchange with the iConView system.

With ongoing automation of the paper-making process, the volume of process data is increasing rapidly. On the one hand this enables increasingly precise analysis, but on the other hand such a flood of information can hardly be evaluated manually. This is where the iConView system plays a decisive role in drawing the right conclusions and taking the right action.

iConView thus supplies plant operators, engineers and management not only with online process information, but also with historical data. The only limit to the time span of such data is the system storage capacity, which can however be expanded to take account of increasing data volumes during the course of time. This enables for example data and parameter comparisons over several months or even years. The iConView module is therefore an ideal decision-making tool both for engineers and management (Fig. 4).

Process data can be displayed in various forms depending on requirements – such as individual values, bar or column charts, trends, or X-Y diagrams – not only on individual client PCs via web browser, but also per intranet throughout the paper mill's process control system. By allocating the respective access rights, system

operation can be limited to specific user groups.

An iConView reporting system is also available optionally. By compressing the vast array of data, this enables documentation both chronologically (by shift, day, week, month and year) and according to product grade. The form of reporting is agreed in advance with the customer.

iConBright and iConBleach

Brightness, one of the most important paper quality criteria, can be improved by stock bleaching. The online brightness measuring sensors installed by most paper mills in recent years supply the necessary data for Voith Paper Automation's intelligent bleach control system. By reducing the bleached stock brightness

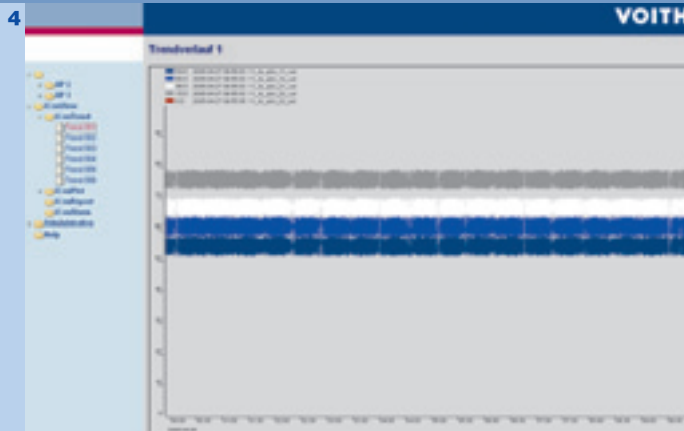


Fig. 3: iCon product integration in the process control system environment.

Fig. 4: iConTrend display.

Fig. 5: iConBright – mimic diagram for brightness control.

Fig. 6: iConSensor – sensor calibration.



fluctuation, this significantly improves the finished stock quality and also brings considerable cost savings.

Each iConBleach system comprises several modules according to customer requirements. The main system module, iConBleach, regulates the brightness gain per bleaching stage and determines the dosing of bleach chemicals and additives. An internal model-based controller (IMC) takes into account the long deadtimes and nonlinearities of the bleaching process as well as the upstream and downstream process values.

Two or more iConBleach modules are linked with a higher-ranking iConBright module, thanks to which only one setpoint for brightness at the end of the stock preparation line has to be entered. This module coordinates the individual

iConBleach modules to optimize bleaching chemical costs, the technological weighting of each bleaching stage, deadtimes, and other factors (Fig. 5).

iConSensor

The iConSensor module is a so-called soft sensor for various quality criteria sensors in the stock preparation line. By linking various internal and external sensor signals, the display precision is improved. In future this will enable the inclusion of additional quality criteria signals in the Voith iCon control system. Furthermore, various sensor calibration curves for different grades can be stored and selected according to need.

Another advantage is that the central calibration not only saves time, but also enables automated interrogation of a

laboratory data system. The deviations between online and laboratory measurements can thus be determined and displayed, as a basis for recalibrating the online sensors whenever required (Fig. 6).

The iConBright and iConSensor modules can be activated by a grade selection program so that the respective grade only has to be set and activated at one point in the program. The respective setpoints and parameters are then adjusted automatically in the iCon modules.

Summary

Voith Paper Automation's new iCon product family offers a comprehensive package of tools and modules not only giving users a better overview and control of the stock preparation process, but also paying off quickly thanks to short ROI times.