Changeover of brewhouse control system from Braumat to brewmaxx

PLATFORM SWITCH-OVER | Changeover of a control system always involves considerable risks for plant operators. It is only when compelling reasons exist that a decision is made in favour of a new system. Bavaria Brewery in Lieshout, Netherlands, decided to switch from Braumat PA 5700 to brewmaxx.

AT BAVARIA IN LIESHOUT, the whole brewhouse from malt intake to wort cooling has been newly automated. The previous Braumat PA 5700 control system was replaced by brewmaxx Liqu iT Advanced. The configuration extends over four operator stations, a server and two Simatic S7 control systems, coupled to existing peripherals using IM 463-2. In addition, the flash evaporation installed was integrated into the brewmaxx system. Frans Klaasen, Project Manager at Bavaria N.V.: "In order to ensure that a universal system platform was used throughout the whole brewery – with all options for technological upgrading, – we were obliged to go for a specific system".

Functional extensions necessary

The installed system, Braumat PA 5700, has been withdrawn, spare parts and components for extensions were no longer available or only at high cost. The VDU's at the operator stations did not meet current requirements for computer screen workstations, neither in terms of their resolution nor in terms of their picture refresh frequency.

In addition, planned functional extensions as well as coupling to the ERP together with continuous batch traceability and the associated brew-batch based measured value recording and archiving could no longer be achieved in the existing system. The functions referred to could have been implemented only with a disproportionate high cost investment and then only to a limited extent.

The decision in favour of a brewmaxx solution was made easier for Bavaria as brewmaxx is already installed in various other sections of the brewery and a risk-free changeover was assured using the existing switchover tools for Braumat.

Process peripherals not affected

The requirement stipulated to have a switchover carried out within the shortest possible downtime facilitated the decision to maintain the whole Simatic S5 process peripherals. This would preclude wiring errors. Functional extensions with new process peripherals additionally required could nevertheless be installed as the brewmaxx system is capable of working both with existing S5 peripherals as well as with the new S7 peripherals in mixed operation. Investment costs as well as subsequent costs for spare parts inventory can thus be kept low.

Though the primary aim was to have assured production, the newly installed brewmaxx Liqu iT system "Advanced" incorporates a whole series of future-oriented options such as optimised recipe management in graphic form, integrated MES functionality such as material management for comprehensive batch and product traceability, together with an associated standardised reporting system.

A further advantage is the fact that structures are similar to the Braumat control software. Basic functions could thus be taken over on a practically one to one basis and all interlock conditions translated over. The existing modular configuration was replaced by modern objective-oriented class-based software in the new system.

Object-oriented solutions

The modular configuration has function as the only objective, e.g. control of a motor; all additional functions such as display or alarm functions have to be engineered and parameterised in addition. In the object-oriented brewmaxx solution, a class, e.g. the class of "motor", incorporates all functions associated with this motor. Apart from operating options such as "manual", "automatic" or "simulation", these are status signals and alarms, acceptance functions as well as parameters and messages, such as e.g. need to be passed on from one shift to the next. The advantages of this object-oriented method are available both for the engineer who configures the objects as well as for the operator who works with them. In the case

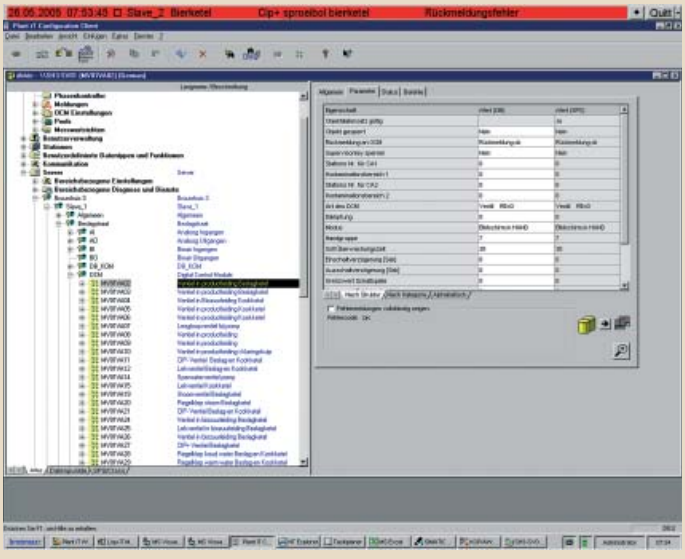

Fig. 1 Switchover–generating objects

Author: Manfred Czepl, Board Member, ProLeiT AG, Herzogenaurach

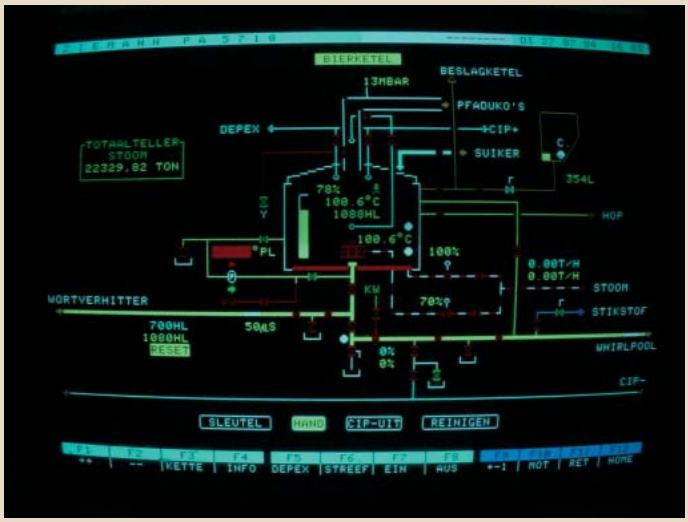

Fig. 2 Example switchover – original process representation

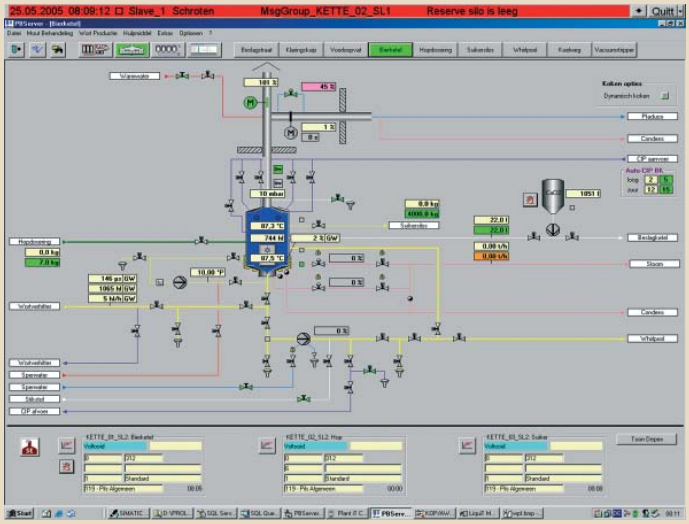

Fig. 3 Example switchover – converted process representation

of the engineer, time and labour input is reduced; for the operator, all objects are available in a uniform format, with the same operational options in the same position on the particular faceplate.

Harald Pallor, Project Manager at ProLeiT, explains how it works: "As every module in Braumat appears in a corresponding class in brewmaxx, it was not necessary for us to do the programming again, we were able to convert the existing programs automatically using a converting tool. Together with consistent retention of names of recipes, procedures as well as the basic functionality in the sequences, semi-automatic production was resumed after only one day downtime."

A basic prerequisite for the success of a switchover is consistent evaluation of the actual situation as an up-to-date reflection of the status of the plant and the process-relevant parameters. Jointly with Bavaria, a concept was drawn up for conversion, starting with hardware-related conversion, engineering with a detailed integration test, right through to start-up with fallback strategy. The conversion tool ("S5 file converting") was selected based on this concept.

After deletion of functions and open outputs no longer needed, the first step involved conversion of the "old" S5 programs to an S7 file in AWL with absolute addresses as well as a converted attribution list. In a second conversion step, the S7 manager transformed these two files into an S7 file in AWL with symbolic addresses. After the third step, modification of the symbol table whereby the absolute addresses were adapted to the new system, a base program with all specific functions was available. Using this procedure, the overall functionality, for example in sequence cascades, procedures and recipes as well as their structure, distribution and names are maintained.

Just like the functionality, the process diagrams were converted in keeping with existing layouts. The big advantage of this procedure related to the fact that operators easily accept the system because functionality and operational processes are known and thus facilitate fast familiarisation.

Werner Pieters, Manager Brewery Department in Lieshout, is convinced: "We did not need to reinvent the wheel, we have got a new system with compatible hardware and software that incorporates a maximum of improvements with a minimum of shutdown time – both in terms of functionality and reliability as well as from a costing point". He went on: "As a result of the switchover, we save not only in training and maintenance costs; we have got a new system that we can extend at any time". This is a very considerable competitive advantage in the cut-throat market in which Bavaria has to operate.

Tech News

B+B ANLAGENBAU GMBH, TÖNISVORST

Highly efficient PET recycling

Separation of contaminating material such as labels, adhesives, sand, etc. represents an important task in the recycling of PET bottles. B+B Anlagenbau GmbH offers an innovative and highly efficient plant concept based on dry grinding with separation of contaminants by downstream dry mechanical separation and subsequent continuous hot washing.

After large, heavy contaminants have been removed from the dry ground plastic, e.g. by a pre-classifier, the material is passed via a rotary valve to the TR dry cleaner. This consists of a screen cage within which there is a turning rotor, with paddles fixed around its full extent (Fig. 1). The PET flakes that have been brought into screen cage are passed horizontally through the screen

Fig. 1 TR dry cleaner – screen cage open, view of the rotor and paddle

area. Contamination such as glass, paper fibres, sand, sugar, etc. is freed in a dry me-

chanical way through the friction of the flakes against each other.

The freed contamination is conveyed outwards by centrifugal force, where they exit the screen area through the screen perforation and are taken away by a conveying screwed fixed underneath the screen cage. A continuously working mechanical cleaner is fixed to the screen cage itself. The cleaned ground material is transported further by the rotor and passed via a discharge unit, that functions as a ventilator, to the next process stage (for example, air classification).

80-90 percent of the contamination is already removed by the TR dry cleaner before further cleaning steps are applied. The costs arising with wet treatment, such as e.g. through substantially higher overall water consumption and through the distinctly higher degree of contamination of the water, can be significantly reduced in this way. A further advantage is that the waste remains dry during separation and does not have to be disposed of as slurry.

The HWK hot washing system (Fig. 2) that is applied after dry mechanical separation of contamination enables a constant washing process. The washer is divided into several segments and is continuously filled. All segments are thereby fed evenly with material via a filling screw. The material passes through washing in a predetermined time that can be set by the rotation speed of the segments. This way, each of the flakes of the ground material to be cleaned has the same residence time in the washing reactor: the residence time can be varied according to the degree of contamination. Furthermore, consistent effectiveness of the washing is achieved by the permanent cleaning of the washing water by centrifuges.

The PET flakes are finally mechanically dried in a downstream drier. The material is now suitable for further processing and has residual moisture content of between 1-2 percent. The throughput of the plant amounts to up 3,000 kg/h. B+B Anlagenbau additionally offers a plant concept under the name of "Economy Lines" with levels of throughput performance of 250 kg/h, 500 kg/h and 1,000 kg/h, which is especially suitable for companies that plan to enter recycling for the first time or that want to process special grades with smaller, compact equipment.

Fig. 2 HWK hot washing system

Photos: B+B Anlagenbau GmbH, Tönisvorst/Germany

The range of products offered by B+B Anlagenbau GmbH extends from worldwide delivery of complete turnkey lines, through special individual components for particular process stages, up to modernisation or reconstruction of existing lines. More than 45 complete recycling lines for processing of PE/PP, PS, PVC, PET, as well as for special plastics waste, have been so far realised worldwide. Large numbers of driers, fabric dyeing plant and dosing equipment are supplied in the textile machinery area. The company has applied for more than 30 patents in the area of plastics recycling.