

Tracking & Tracing in the field of beverage production

Leading Israeli beverage manufacturer relies on the ProLeiT process control system

As a rule, the production of carbonated beverages and fruit juices follows different principles: Soft drinks are to a large extent produced from standardized ingredients with unvarying product properties, whereas most fruit juices, fruit nectars and fruit drinks are mixed from non-standardized fruit juice concentrates subjected to natural variations. This means that a standardized mixing process is sufficient for the production of most carbonated or soft drinks. The properties of natural raw materials for juice production, however, can vary depending on the batch and origin. Varying acid and sugar contents require intelligent and flexible process control in order to ensure consistently high product quality of instant drinks. IBBL, one of the producers of Prigat, Israel's leading beverage brand, has modernized its juice production. With the Plant iT process control system designed by ProLeiT, IBBL has successfully combined

- high flexibility in production and
- comprehensive traceability.

The Central Bottling Company (CBC Group) is the number one beverage producer in the dynamically growing Israeli beverage market. Among the affiliates of the CBC group is Israel Beer Breweries Ltd. (IBBL) which produces beer brands such as Carlsberg or Tuborg under license. The company not only produces Nestle under license, but also Prigat fruit juices. Prigat offers a large range of direct fruit juices, mixed juices and fruit nectars, deep-frozen concentrates, soft drinks and syrups.

To cope with the strongly growing demand, the company decided in favor of an extensive modernization of its plant in the Israeli town of Ashkelon. An entirely new syrup room is at the core of this special plant. As a logical consequence, IBBL has also replaced its existing, isolated automation solutions with the open Plant iT process control system. Plant iT has provided the basis for the consistent automation of the entire production system - including the receipt of raw material, the mixing tanks and even the buffer tanks at the bottling plant.

With this extensive modernization, IBBL has not only increased its production capacity, but ensures safe production based on strict hygienic standards and consistent traceability. One major factor in the company's decision in favor of the ProLeiT Plant iT process control system was the fact that an IBBL brewery at the same location was automated with Plant iT two years ago. Therefore, IBBL wanted to benefit from the outstanding advantages of this process control system also for its fruit juice production. In addition, the two IBBL plants will be able to jointly utilize numerous components of the hardware equipment, and especially the video server for the recording of all plant states.

The syrup room at the heart of a consistent concept

With its 4 mixers, 8 final syrup tanks, 3 road tanker stations, 2 drum handling stations, 5 silos for the solution of dry substances such as fructose or pectin, 2 sugar tanks, one citric acid tank and a CIP plant with 3 circuits, the new Prigat fruit juice production plant features a high degree of complexity. This complex plant is now fully automated based on Plant iT - from the incoming goods receipt, the raw material store, the production in the new syrup room with all tank farms to bottling. A Siemens S7 controller communicating with a server via Ethernet provides the hardware framework for the automation. At the bay and unit levels, three Profibus segments ensure a reliable connection to the controller. The production areas are equipped with hand-held scanners connected to the Ethernet network via WLAN. These scanners serve to verify the products delivered in containers, sacks and other receptacles before making them available for the production process.

The Plant Direct iT module provides for the connection of actuators and field devices to the automation system. This sophisticated concept ensures operation, monitoring and process visualization. The Plant Acquis iT module serves for data acquisition and reporting during the entire production process. But the core compo-

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| Company: | Israel Beer Breweries Ltd. (IBBL) |
| Sector: | Beverages |
| Location: | Ashkelon |
| Country: | Israel |

nent for process automation is Batch iT, because all the recipe details are stored in this module. What is so unique about Batch iT is the fact that

- the ingredients of a mixture,
- the quantities of raw materials and
- the parameters for the production process

are represented and edited separately from each other. This data is classified according to so-called bills of materials and process descriptions in the database. When starting a mixing recipe, the plant operator selects the bill of materials assigned to the desired product, and the system automatically suggests the related process description. This linkage is the prerequisite for an executable control recipe processed by the controller (PLC).

Since the process control system requires information concerning the entire materials inventory, Plant iT is structured in such a way that even the incoming goods receipt is inter-linked to the automation system. And of course all information concerning a stored product, including its expiration date, is recorded in the database.

application profile

Beverages // IBBL

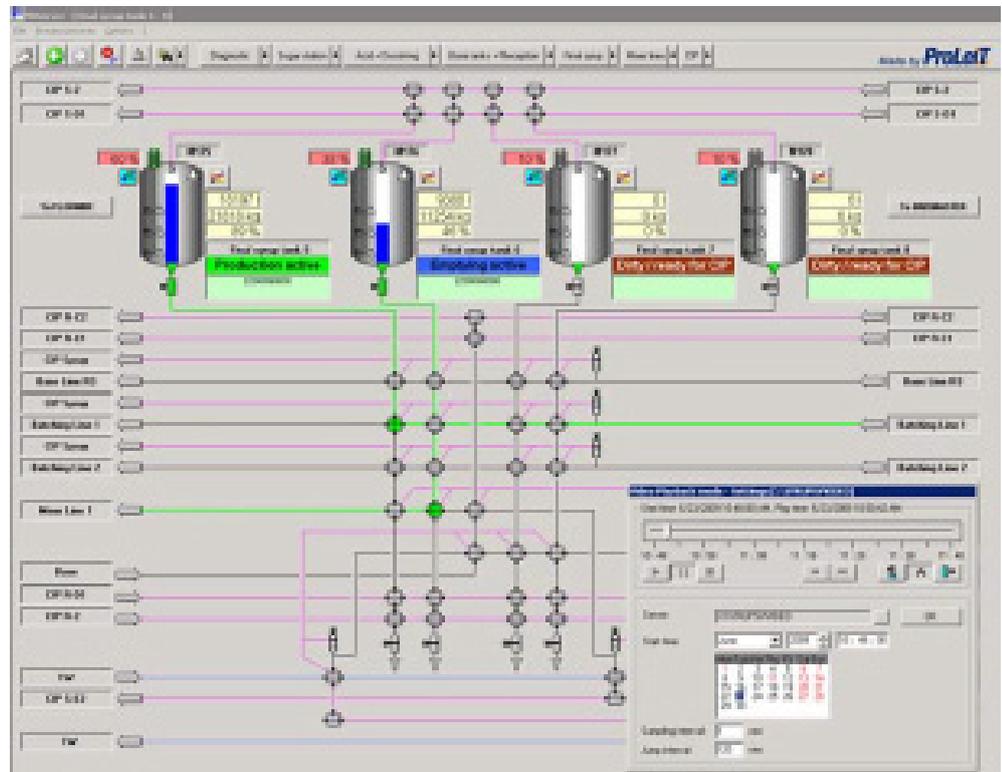
Furthermore, this unique concept of particularly flexible parameterization is ideal for IBBL's large product range. It not only allows the mixing of existing recipes in this plant, but new recipes for future beverage sorts can be conveniently integrated into the process control.

The plant operator is notified accordingly if a recipe prescribes raw materials or pre-mixtures which are not available from a tank farm at the plant, but require ingredients which have to be added manually from containers or other packages. The Plant iT materials management module automatically follows the First In, First Out principle.

Traceability and diagnosis included

What is essential in this context is that the recipe control recognizes each material with all its important parameters, as well as all dosing organs and dosing paths. The accounting records, which are indispensable for tracking, can only be created afterwards. Full traceability and unique transparency of products are essential features of the ProLeiT system and highly appreciated by IBBL.

IBBL not only focused on highly precise and system-wide product tracking and tracing, but also strived to achieve a high level of process control transparency. In order to reach this ambitious goal, a video server has been additionally installed in order to allow the documentation of each process step by IBBL. The system records highly detailed information concerning e.g. the opening of a valve, a program start, the tanks currently involved, the path of each product within the plant and also operator interventions. For this purpose, the video server only records pictures from the process visualization. Each operator intervention is additionally recorded in the user log with the precise date and time stamp. The operator benefits from the outstanding advantage that all interventions by the operating personnel can be easily traced. This approach simplifies the search for faulty operations leading to off-specification batches or product contaminations. This system proves particularly beneficial during the first months after commissioning, because not each error in a program sequence can be detected immediately. The program sequence is checked in video mode, and parameters are adjusted if required. Based on this sophisticated approach, Plant iT has integrated an ideal analysis tool for the fast tracking of sequence errors.



Monitoring Production in Videomode

At each operator workstation, the user can leave the online process view at any time and switch over directly to the process history. On the time axis, the point in question is reached quickly, and the individual operating steps are represented in real time or in time lapse mode.

This video recording option and the resulting advantages for optimized operator training is a unique feature of Plant iT. In contrast to Scada applications, the ProLeiT data structure facilitates this kind of activities. IBBL uses this video server not only for the monitoring of fruit juice production, but also for the monitoring and optimization of the IBBL brewery working in parallel.

Implementation in 6 steps

This extensive modernization of the Prigat fruit juice mixing plant was implemented in just 6 steps in parallel to daily plant operation. The support provided by the specialists of C-Vision, ProLeiT's local partner in Israel, along with the implementation of sub-projects by this partner, were of primary importance in this context. Thanks to joint efforts, the complete modernization of the plant could be successfully completed within an extremely tight time frame.

Since it's commissioning, the Plant iT process automation system has operated so smoothly that no fruit juice batch had to be discarded so far and production is running entirely loss-free.

The next expansion phase is already in progress:

Based upon the measured values and meters already available in the Plant iT process control system a fully-fledged energy management system will be implemented gradually for the whole production site, namely brewery and syrup production.