



Flexibility in the Food and Beverage Sector

The Movicon Scada features have made it possible for Tuchenhagen Italy to reach their goal in guaranteeing production flexibility and hygiene standards in manned and unmanned plants.

The food and beverage sector is among those industrial sectors where automation plays a major role, and where companies invest a great deal of their resources in making their plants more efficient and reliable in guaranteeing increased productivity and hygienically safe.

Based on this philosophy Dilat Spa, a company of 130 employees from the Granarolo Group operating in Italy in dairy products, commissioned Tuchenhagen Italia Srl with a new line of special food products. Thanks to the

experienced gained by Tuchenhagen Italia, the Italian branch of the German company of the same name belonging to the GEA multinational, Dilat Spa now have a very modern plant with advanced technology that has enabled them not only to simplify production procedures, therefore increase productivity, but to obtain direct control of their plant through numerous network stations as well. This has meant a decrease in factory personnel and an increased in the levels of industrial hygiene required when handling such delicate

food products at the same time. The plant, designed by Tuchenhagen, has a PC-PLC distributed architecture with remote control workstations to ensure the complete production supervision and control to the extent that no operator assistance is required in certain stages of the production process. The PLC comes from the SIMATIC S7-400 family and the Movicon SCADA system has been installed and operates in the Windows 2000 environment. Movicon is the Scada platform chosen by Tuchenhagen Italia for its enhanced potentialities, user friendliness and technical support services provided by Progea.

The plant's structure is built up of a series of tanks connected to the existing loading and unloading lines composed of pipes, valves and pumps which allow liquid to travel around in order to get the desired end product using the different preset plant processes such as homogenizing, pasteurizing, mixing in powder, re-heating and cooling.

The plant complex is comprised of and integrated with CIP stations (Clean in Place) with single user solutions, cleaning and sanitizing, the necessary hygiene requirements of all utensils and equipment (piping, valves, tanks and any other equipment used in the product cycle) utilized throughout the whole production process.

The operator manages the plant from the Control Room where the PC is connected in a TCP/IP network to a second Movicon Client station, positioned on a platform at the end of the product line, enabling the operator to control the plant when working at a distance from the Control Room.

The operator monitors and controls the plant by means of a central supervision workstation using a series of animated screen pages reporting, in real time, the statuses of valves, pumps, mixers, and displays the values of temperature probes, conductivity and loading cells located in strategical parts of the production line. All the commands are extremely simple and user-friendly and are from numerous features provided by the supervision platform that performs in compliance with the Windows operating system standards. Little time was needed to set the project up with all the operating functionalities needed for easy operator use with guided menus, pop-up menus, hot regions, dialog windows and similar.

The project's graphical copycat page layouts of the plant allow the operator to intuitively control the process run by the system in realtime. The different colors and

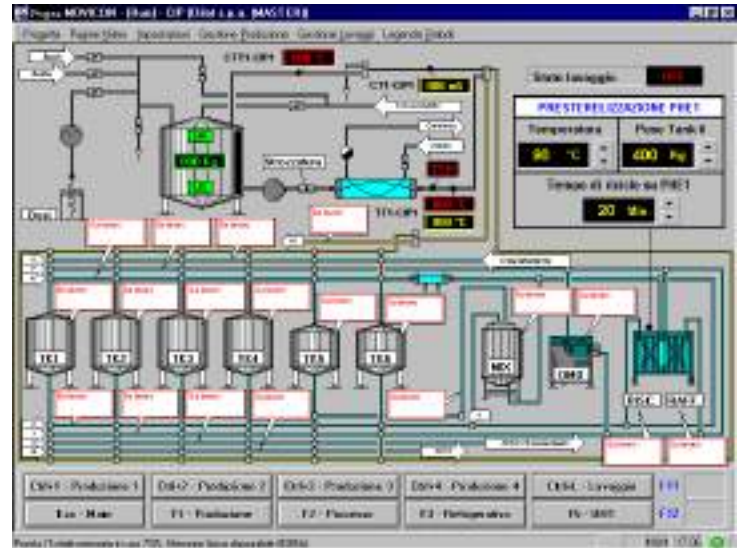


Fig. 1: One of the project's screens through which the user can get immediate vision on the status of the production lines in real time and the operations required.

designs of the valves and pumps give immediate and clear vision of the product's journey along the piping. Regular reports on embedded probe values and alarm diagnostics are accurate and reliable, permitting the operator to interact straight way when any errors occur during the production and cleaning operations to prevent any product waste from developing and to optimize production times.

The historical logging of events, alarms and messages are crucial to solving any problems that may arise in the running of the plant, ensuring that constant and efficient maintenance is carried out properly and instantly; while production and cleaning behaviour is recorded and archived on disk to supply an inexhaustible documentation based on the ISO 9001 procedures for which the company has been certified.

The system manages sanitation reports by recording, printing and archiving summaries on each cleaning process carried out with monthly summaries on preprinted forms to ensure that quality is kept up to standard.

The Reports exploit the Microsoft Access database file archive format (MS SQL Server is preferred by clients for its company format compatibility), using the powerful ODBC features of Movicon and the powerful Crystal Report functionalities with which Movicon embed the report engine.

The most significant data shown on the reports are the date, start and stop times of each cleaning process along with the cleaning type, equipment involved, temperature and conductivity values recorded during the process, any alarm occurrences and alerts on anomalous cycle endings. Similar functions are also used in the production Reports, with the monthly archiving of overall and each production phase. The recorded data, vital to the by product management and administration personnel, include the start/end times, tanks used, quantity produced, mixer movement, production line involved, any alarm occurrences or alerts on anomalous cycle endings.

In addition to these reports, the Historical Trends record



fig. 2: The Movicon dialog boxes allow the plant's parameters to be set intuitively.

each part of the plant is used only when free and cleaned.

These processes can be monitored throughout their cycle on graphical screen pages showing realtime statuses and descriptions. The operator can therefore keep an eye on the whole situation and interact at anytime by stopping, starting or restoring each process when necessary. Productions and cleaning operations will be automatically switched into pause mode, whenever problems arise, to prevent any product contamination or incomplete cleansing. The operator will be alerted and guided to the cause of the problem in order to take immediate action.

Pop-up menus can be displayed with a click on the interested section or item of the plant graphically laid out and animated on screen pages, to allow the authorized operator to easily intervene manually whenever values have to be forced or valve, pump and mixer alarms have to be acknowledged and reset, or restore the cycle to automatic or manual mode.

The most important plant parameters, production and cleaning recipes can be modified by using the appropriate Dialog windows, which are modal windows managed by the Dialog Editor embedded in the Movicon project. These Dialog windows allow the operator to set data using the Windows operating standards.



fig. 5: The operator can set consecutive washes by associating each different piece of plant equipment with a different cleaning recipe.

all the significant values of the temperature probes and plant conductivity while individual processes are run. The operator can easily launch up to four production runs at the same time along with sequence of 10 consecutive cleaning processes, without the risk of the same apparatus being occupied by both processes at the same time. The system automatically controls that

The dialog boxes report the current descriptions and values of all the plant's parameters and selected plant sections, including production and cleaning recipes.

Great attention has been paid to plant safety, an extremely important in plants handling food and beverages for human consumption.

All the potentially hazardous operations (commands and manual forcing, recipe and parameter editing, etc) are under supervision and protected by the password management containing powerful functions to allow, among other things, to identify and record the name of each logged on operator and their access level. The operator in charge can insert/delete users or edit the already existing user passwords for greater plant management flexibility.

Dilat Spa commissioned Tuchenhagen to automatize their plant with explicit instruction to replace the old restricted productivity management with a much more flexible one. Tuchenhagen came up with a brilliant solution for the production batches. One of the most important features provided by Movicon, is to setup, record cleaning and production recipes with great flexibility. There are no restrictions on quantities and tanks that can be used. The same recipe type can be activated to handle different quantities in different tanks. The operator enters the ingredients and recipe instructions for the programmed product in a step-by-step sequence (pouring in of milk, cream, water, pasteurizing, mixer recycling, etc) in all the combinations desired. This technique has made recipes easier, simple, user-friendly to create and more versatile. Movicon also runs a

hygiene safety check in automatic mode between each cycle before continuing on to the next process without requiring the operator to confirmation or activate the required controls and functions that are completely managed by Movicon automatically according to batch being run. Movicon alerts the operator to interact in step-by-step instructions when needed.

The openness and flexibility of the production management permits new products to be added to the production cycle whenever needed without any added costs or technical intervention.

The cleaning parameters are simply set by using dialog windows through which recipes can also be deleted, saved, loaded or edited. Recipes are created enabling and setting of the cleaning functions macro. By using the cleaning management screen pages, the operator can assign each piece of equipment with a specific recipe as well as setting a sequence of 10 items of equipment for cleaning in CIP mode, permitting long and thorough washes without needing the constant presence of the operator along side.

Tuchenhagen's experience in food processing and sanitation has allowed them to realize an extremely modern, efficient and easy to manage plant application. This applications guarantees quality and hygiene and completely meets the standards set by the ISO 9001 normatives for which the client is certified.

The choice of using the Movicon as SCADA platform on PC-based supervision has enabled Dilat Spa to integrate production data with company managerial data to ensure future plant productivity expansion at zero costs.

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