Innovations at STARA GLASS advance automation and new technologies

Whether it's hollow glass, flat glass, fibres or anything similar, the glass industry has often led the way in automation technologies. However processing this type of high performance, ecological and modern material requires advanced technologies that must be precise and reliable. Over the years, automation has been leveraged to optimise productivity, safety, emission control and energy saving - consistently obtaining higher and faster returns on investment. Here important results have been

A leader in automation tech for the glass industry, STARA GLASS enhances productivity, safety and eco-friendliness. To these it adds such innovations as low NOx emission furnaces and steam reforming systems, which tackle today's dual challenges of energy consumption and CO2 emissions. The company is also integrating Industry 4.0 and Dark Factory concepts – ensuring both efficiency and sustainability for the future.

reached thanks to the contribution of process control automation and companies' know-how like Stara Tech, Hydra Group, who, via its innovations, has transformed the approach to the automation.

Thanks to factory automation, extending to the entire glass plant from batch houses to warehouses -and thanks to the integration of the entire system- factories can now increase both the quantity and quality of their production by managing information from various operations. In fact, it is possible to control, process and monitor parameters in real-time by using state-of-the-art instruments to measure physical quantities and suitable final regulation elements. In addition, advanced SCADA vision techniques achieve precise and reliable measurements in such hostile environments as glass furnaces.

SYSTEM PHILOSOPHY

Once collected, information is sent to the Control System - the heart of the glassmaking process. Here operators can interact with the whole production system using simple interfaces that are located directly at their local HMI rooms or close to the machines. The main supervision devices used by operators are redundant SCADA PCs, to which client PCs and/or operator panels are connected. The structure to access data is significant. It's also safe and based upon different levels of access,

is protected by passwords and is organized on request according to updated regulations. This is a standard for such demanding markets as the pharmaceutical sector. Here the control structure is based upon such redundant components as DCS systems or PLCs with CPUs, power supplies and remote I/O modules - all connected via an industrial field bus. Redundancy is essential for this type of process as it runs 24 hours per day, 365 days a year and never stops during the operational life of the system - which usually varies from ten to twelve years or more. This solution also enables economies of scale for cableways, signal cables and power cables. In turn, acquired data is sent to the ERP (Enterprise Resource Planning) via MES (Manufacturing Execution Systems) software applications, which elaborate and send them to plant controllers. Complete accessibility to data means that this type of approach is extremely safe and easy to use, as both operators and management can modify the system by optimizing productivity, efficiency and investment yields.

TOMORROW'S CHALLENGES

The implementation of automation technologies and efficient integrated systems enables the glass industry to face future challenges posed by both the global economy and current market demand. The European Union and IEA's Roadmap Organization sets a target of less CO2 emissions by 2050 which, in turn, means that this sector needs to take advantage of energy saving strategies. This is essential not only in economic terms to be competitive but it is also important at the social and environmental level. The situation is not easy, as energy consumption is a major problem. In fact, glass requires furnaces with temperatures that reach 1600°C which, of course, need much energy. Nonetheless, producers are facing up to the challenge and investing in up-to-date technologies while improving cost containment. Stara Glass is fully involved in this new philosophy and the first results are on the table with new technologies such as the low NOx emission furnace, the CENTAURO, or the next steam reforming system SU.G.A.R., which is presently under development - born for the production of hydrogen recovered from furnace exhaust fumes and thereupon reused as free additional fuel - both developed by the company's R&D team. To date, consumption has been optimized using sophisticated technologies to monitor energy consumption, as well as technologies that provide actual savings.

Systems for the acquisition of information on electricity, gas and compressed air consumption have proven particularly effective and are available for PC networks (even remote ones) or for process control

networks. Finally, research and production, together with sustainability policies, all seek to achieve an active role in the development of a low emission economy as required by one of the European Union's 2050 objectives. Indeed the use of fossil fuels for furnaces alongside carbon released during processing are the main reasons for CO2 emissions in the glass manufacturing industry.

REDUCING POLLUTANTS

Unfortunately, it is difficult to eliminate such problems, as glass cannot be made any other way, no matter how much the use of recycled cullet is promoted. Nonetheless, significant efforts are being made for the creation of reduced polluting emission plants. Here the company has been able to propose patented systems for the reduction of NOx emissions to the atmosphere which are recognized by the competent bodies of the European Community. The two systems are different from each other and based upon different technologies. The former results from the principle of flue gas recirculation between the chambers of an End Port furnace (SWGR System). The latter results from the staged combustion. However, partializing the air rather than the fuel (HEAS System) for End-Port furnaces means their operation is based on a synchronized, automatic automation and control system that allows for conduction without operator intervention. Here's how they represent yet another example of the level of importance that automation is assuming in the management and control of a production plant. According to Stara Glass, aspects related to real-life experience currently in progress after the introduction of Industry 4.0, combined with the same concept of Dark Factory, will have to take the form of a 'happy' mix of 'work efficiency' and 'technological enablement' - albeit always under the guidance of the entrepreneur and her/his collaborators. The technological innovation resulting from the introduction of Industry 4.0 and approaches to Dark Factory concepts also affects environmental and green questions. The transition to greater automation in industry and the reduction of pollution is a direct and easy link to understand. In many instances automation and advanced process control replace obsolete plants and machinery, increase efficiency and decrease waste - thereby benefiting both the planet and future generations. ■

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