AGC DRIVES CONTINUOUS PROCESS IMPROVEMENT INITIATIVES WITH DELMIA

Improve traceability, cycle time and product quality with digital production management

Challenge:

To improve profitability in a highly competitive market, AGC, the world's largest producer of flat glass, needed to support continuous process improvement initiatives that help ensure superior product quality.

Solution:

The company uses Dassault Systèmes' DELMIA manufacturing operations management solutions to achieve traceability and standardization throughout its European, North African and South American plants.

Results:

With digital continuity in its glass manufacturing processes, AGC has real-time visibility by extracting manufacturing intelligence information from the shop floor to reduce waste and increase right-first-time production.

AGC, FLAT GLASS WORLD LEADER

From the windshield of our car to the windows, facades and interior of our buildings, flat glass is an essential component of the world's most commonly used products in most industries. AGC Glass Europe, the European branch of world-leading flat glass manufacturer AGC, provides flat and bended glass solutions for the building, automotive, transport, solar power and high-tech sectors. "AGC has more than 100 sites across Europe and is supported by a worldwide distribution network," Alain Michel, automotive & manufacturing IT delivery center manager at AGC, said. "We provide glass solutions in response to a wide range of needs such as comfort and energy control (insulation against cold and heat), safety (tempered, laminated and fire-resistant glass), production of energy (solar mirrors, building integrated photovoltaics glass), aesthetics (mirrors, painted, patterned, screen-printed glass, etc.), infotainment and communication (electroluminescent glass), as well as connectivity (glass incorporating antennas)."

The production of flat glass: a float process unchanged over the years

The production of flat glass through the float process is now used almost universally and has been relatively unchanged over the years. In this technology molten glass floats out over a bath of molten tin. The "float glass" produced in this way is sold in large sheets for processing into secondary products. In fact nearly all flat glass products are now made from float glass. Glass physical properties for automotive, architectural or high-tech applications depend both on the composition of glass and on the different downstream processes it goes through such as coating, assembly into double/triple glazing or laminated glass, thermal or chemical tempering, silvering and more.

This preparation process is critical and criteria such as batch reference, temperature, humidity, quantity, oven used, level of dust, sand quality, raw material expiration date, as well as location of the glass in the production line must be cautiously monitored to ensure the end-product responds to requirements, or else the glass batch is wasted, which impacts a manufacturer's bottom line.

Whether in construction (buildings), automotive (cars), or transport (buses and trains), the window area is constantly increasing. This is because apart from transparency, glass has acquired many other properties that can be combined to make a truly multifunctional material.

Modern buildings, for instance, comprise windows with insulating coated glass that provide significant energy savings to comply with sustainability requirements. New smart-tinting glass can even switch from transparent to opaque on demand or automatically when needed. These innovations are what will determine the future of the flat glass industry for decades to come. "We are now launching a vacuum double glazing which is as insulating as a triple glazing but which is 4 to 5 times thinner," Michel said. "Our windshields can benefit from a head-up display feature: a virtual image with useful information (speed, consumption, etc.) is displayed ahead of the driver. The sunroof can also switch from clear to dark in seconds. Moreover, with connectivity becoming paramount in the years to come, we integrate antennas in our glazings with a perfect finish to better communicate with the world around us," he said.

NEW REGULATIONS CALL FOR INCREASED QUALITY AND INNOVATION

Drastic safety, quality and environmental regulations as well as growing competition, which leave little room for error, have increased glass manufacturers' need for solutions that continuously help ensure and contribute to improving the already high quality standards of both products and the production process itself. "Window sizes have increased (bigger sunroofs, cars with larger windows) and have become more complex in terms of shape or embedded technology. Windows, for example, must last the entire life of a car and be of impeccable quality or else be rejected by consumers," he said. "It is essential to have traceability of all glass components and process steps from sand to glass. So we needed software that would help us improve this traceability and hence the quality of our products," he said.

A UNIQUE MANUFACTURING EXECUTION SYSTEM FOR AGC

AGC chose Dassault Systèmes' **DELMIA's Manufacturing Operations Management** solutions to digitally manage its glass production. "So far, we have deployed DELMIA in our central, western and eastern European, northern African and Brazilian facilities as our manufacturing and logistics execution system," Michel said. "For example, DELMIA enables us to implement a unique Manufacturing Execution System for all our flat glass activities and a Manufacturing and Logistics Execution System in some plants for our automotive sector, with automatic RFID tracking capabilities. Our plan is to facilitate our transition to the world of IoT and the digital factory in anticipation of our future technological and business needs. DELMIA monitors production flows and manages our stock. It integrates with our ERP system SAP, and together with the historian application from OSIsoft PI, tracks the data generated by our manufacturing equipment and supplies it for further analysis by other tools."

AUTOMATIC RFID TRACKING FOR REAL-TIME RESPONSE TIME

With respect to RFID tracking, AGC wanted a reading and tracking solution that did not adversely impact production cycle times. The company also wanted to prevent (via a digital version of a Poka-Yoke*) the use of inadequate raw materials that could impact quality, generate waste and require costly and time-consuming reworks. It developed an application communicating with the PLCs in the manufacturing execution systems and RFID antennas that could easily be implemented across all its production sites.

"Since visual inspection and barcode reading were not sufficiently reliable, and to not slow down manufacturing cycles, we opted for an automatic RFID tag reading solution that checks, for example, that the right components are on the production line or flagged when their period of validity has expired," Michel said. "DELMIA enabled us to create this solution ourselves. It minimizes the complexity of the technical architecture by letting us leverage the data existing in our standard DELMIA solution used for manufacturing control (SKU records, components and bill of materials). It easily communicates with the RFID antennas, RFID printers, the PLCs on the automated lines and the visual and audible flags and alarms," he said.

DELMIA can process large volumes of data (AGC has more than 90 antennas in one plant reading all the labels several times per second) and archives all relevant information in the system. The RFID antenna is constantly active and provides continuous monitoring throughout the manufacturing process.

Other benefits of the RFID solution are:

- Total control of production flows,
- Productivity gains because automatic RFID reading does not slow down production lines,
- Improved product quality thanks to automatic detection and handling of non-compliances in real time before using or processing components,
- Faster detection of defects or anomalies from a supplier thanks to the application's automatic RFID reading and precise sub-second tracking,
- Multi-threading capabilities that supports near-instant response time,
- Central management of quality indicators.

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"The RFID solution has so far been successfully deployed in 11 of our sites and will be up and running in Morocco by the beginning of 2019 and in Brazil later on," Michel said. "We, thus, successfully transitioned from the bar-code system we used in the past to automatic tracking with RFID and in the coming years we will combine or replace RFID with more advantageous IOT trackers."

Alain Michel looks to the future with serenity. "In addition to the flat glass manufacturing division, plans to deploy DELMIA are underway in the processed glass division and for logistics," he said. "With DELMIA we can fulfill our Factory of the Future vision to implement completely automated factories with standardized applications that send data from all our sites to a unique database. And as DELMIA is natively multi-lingual, barriers to global collaboration are mitigated, as best practices are more easily shared, thereby further improving quality and cycle times."

* *a mechanism that helps equipment operators avoid (yokeru) mistakes (poka).*

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