glass WORLDWIDE

On the way to the ‘smart factory’

Benoit Burin des Roziers discusses Tiama’s approach to the ‘smart factory’ and the company’s latest innovations to reach this goal in glass container production.

Benoit Burin des Roziers.

The traditional glass container manufacturing industry is reliant on skilled people with huge experience but this model is slowly shifting due to changes in society. Glass plants throughout the world face increased staff shortages, with the younger generation less attracted by the harsh environment encountered. In addition, the complexity of glass products and machinery is drastically increasing, while quality requirements are more and more demanding. All of this impacts productivity.

Fortunately, there are now tools available, integrated in the so-called Industry 4.0 or Smart Factory that can help glass manufacturers to change their model. Tiama’s view of the Smart Factory for the hollow glass industry involves how to pave the way to drive this industry from an empirical process to a statistical one. Its approach to reach this goal relies on five pillars:

- Traceability.
- Developing machines/sensors at the hot end and cold end to provide more and more data.
- Business intelligence.
- Manufacturing intelligence.
- Services.

Traceability

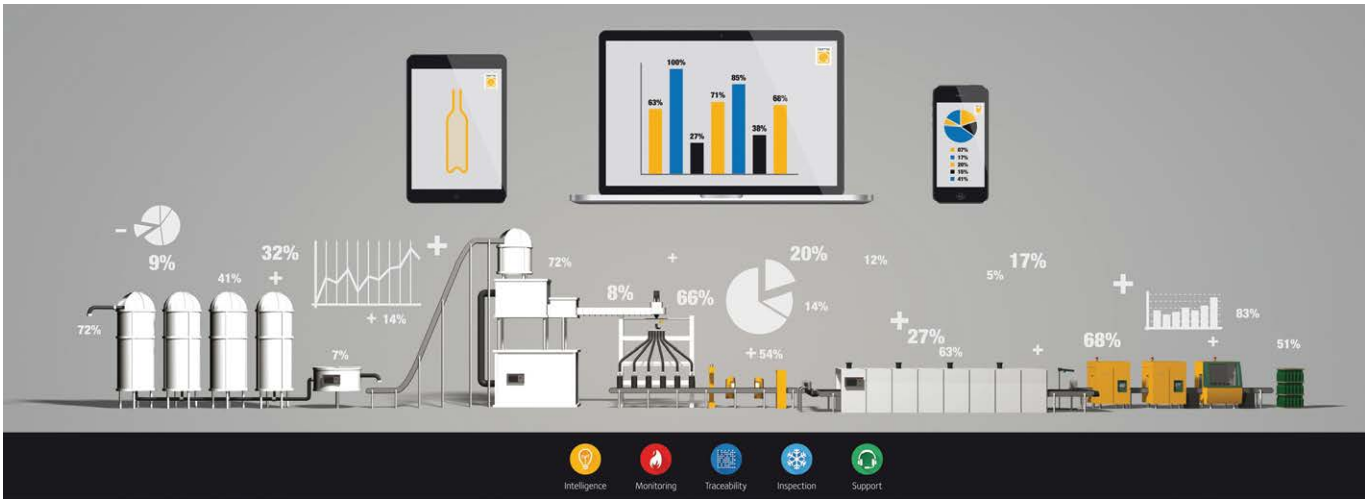
Via its patented TOTAL TRACER device, Tiama is the only company capable of having full unitary traceability of each container. The patent relates to the synchronisation of a 3D data matrix code with the IS machine, making each container unique. In addition, all defect information and events gathered at the hot and cold ends will be correlated to the container, creating a distinct identity card for each item.

Machines

Glass containers are becoming increasingly complex (colour, odd shapes, engravings etc) and quality criteria more and more demanding. Inevitably, with the loss of knowledge occurring in the glass plant, Tiama must develop flexible and automated machines, so-called ‘plug and play’ devices. Performance must also improve to respond to quality expectations.

Machine learning processes, deep learning and artificial intelligence are being pushed on the company’s machines in order to make the inspection smarter and capable to adapt to any changes. The ATLAS camera check system is a good example of machine learning, as the system can be set by any operator without specific skills within less than 15 minutes, whereas more than one hour is needed for an experienced technician to adjust standard check detectors.

A lot of information is already available from Tiama machines but for some of them, additional sensors need to be fitted, especially at the hot end. This is the reason why Tiama is investing so much in this area. It has been more than a decade since the first process improvement tools were introduced, giving the opportunity to IS operators to obtain instant feedback without waiting for the bottles to be inspected at the cold end after a long annealing time. Now, more and more tools can even predict production drifts, so correction can be done even before producing the related defect. On some products, there is already a closed loop enabling automatic regulation (gob weight, ware transportation etc) but in order to go further, it is necessary to collect much more data and to exploit it. This is where business intelligence comes into the game.



Tiama’s view of the ‘smart factory’.

AFGM
ASEAN FEDERATION OF GLASS MANUFACTURERS

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Romain Pioch addresses delegates at the 41st ASEAN Glass Conference in Da Nang, Vietnam.

Business intelligence

Business intelligence is actually gathering all this data from batch plant to the warehouse, in order to improve the global process. Because a lot of information is available today, a tool is needed to collect, store and display it in a single database. Tiama is able to do so through its IQ SCAN and IQ Track products, collecting data from the batch plant to the warehouse. It offers scheduled maintenance reports, production reports or cold end inspection feedback directly to the hot end. Today, lots of data exist but some is being missed. Unfortunately, this data is sometimes left aside or is used individually. The objective is to have all data communicate with each other.

Manufacturing intelligence

The next step on this road to the Smart Factory will be to develop data mining and data crunching solutions. The goal is to be able to compute the huge amount of information to find correlations between all parameters of a glass plant. For one defect for example, it should be possible to identify the most influential forming parameters in order to drive them. The other main challenge will be to go deeper into machine learning features and automatic adjustments.

Service

There is a need for realism. The transition to the Smart Factory will take several years and suppliers must be supporting glassmakers by providing proper training, improving machine settings, assisting with 24/7 hotlines and available local engineers speaking the same language. Considering the high staff turnover and the difficulty to recruit people, service will become increasingly important. Tiama is treating service as a product, just like a machine and has a full team to develop it. This support is mandatory to ensure a smooth transition toward the Smart Factory.

Implementation underway

In summary, Tiama has already started implementing each of these pillars at different plants. The company is capable of bringing raw information to the right person who will, thanks to their experience, be able to make the correct manual adjustments. Tomorrow, it will be possible to do so using big data analyses, in order to provide centering recommendations and ultimately working on an automatic closed loop throughout the plant. In the long run, Tiama will be selling solutions/data and no longer hardware. ●

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