Combined hot and cold end strengths answer Industry 4.0 goals

Mike Rentschler discusses the End to End approach adopted by Bucher Emhart Glass as its answer to Industry 4.0.

More than a century ago, a small group of engineers who would not accept the status quo and refused to quit in their quest to revolutionise the way a glass bottle is made changed the hollow glass container industry forever. They formed a company known then as Hartford Empire that paved the way by designing the machines, defining the processes and setting the standard methods in which glass bottles are still produced.

Known today as Bucher Emhart Glass (BEG), the company is again setting standards in line with the current trend in automation and data exchange in manufacturing technologies called Industry 4.0. For those who study and know about the beginnings of automation of hollow glass production, it was inevitable that Industry 4.0 and the container glass manufacturing technology driven by Bucher Emhart Glass (BEG) would collide in today's modern industrial world.

Information is power

This time, the advancements in automation of the hollow glass industry are built on the principles of Industry 4.0. Information is power; the more one knows, the more one can adapt and change.

It has been just over a year since BEG launched SCOUT technology on its FleXinspect inspection lines. In parallel, the company revealed the vison known as End to End (E2E). BEG believes that the hot end and cold end are stronger when they work together and act as one. With the

FleXinspect portfolio.

E2E vision, BEG is using its resources to tie the cold and hot ends of glass factories together, making the glass plant of tomorrow a reality.

By tapping into the power of SCOUT as the data provider running on the FleXinspect inspection machines, BEG is able to provide large amounts of detailed meta data on the quality of each finished glass container. This however, is just a small piece of a much larger puzzle. In the world of Industry 4.0, big data and statistical analysis are used to drive repeatability and profitability. In BEG's End to End, data between the forming process and the inspection process will be analysed, trended and stored. Special algorithms then evaluate the effects that process variations during the forming process have on the final quality of a glass container. Data gathered from the inspection area will help keep the forming process in control.

What is Industry 4.0?
Industry 4.0 is based on four key principles:
Interoperability:
The ability for machines, devices, sensors and people to connect and communicate with each other to automate the processes.

Information transparency:
The ability of information systems to improve plant efficiencies by aggregating raw sensor data to be analysed and used for higher value process monitoring and control.

Technical assistance:
The ability of assistance systems to support humans by collecting and visualising information, making informed decisions and instantly solving urgent problems based on the information available.

Decentralised decisions:
The ability of cyber physical systems to make decisions on their own, based on available sensor data and to perform their tasks as autonomously as possible, without human interaction.
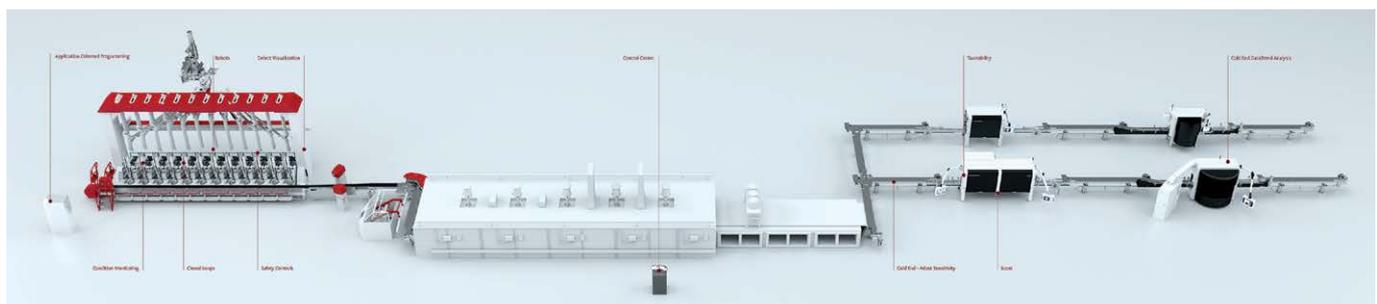
Connectivity and transparency throughout the glass plant – End to End.
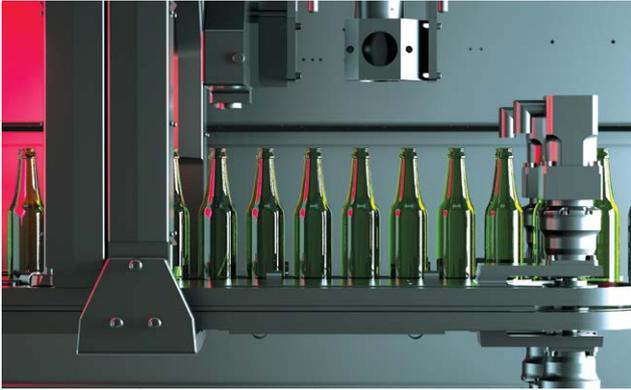
Traceability is an important aspect of Industry 4.0 delivery.

Data capture

To capture this data, BEG will rely on the FleXinspect products to inspect, measure and verify characteristics of each container produced. The FleXinspect products are designed to ensure that the machines are reliable, scalable and capable of performing the highest level of inspection for whatever production requirements a glass plant may have. Today, there are five machine types built on the FleXinspect platform and two of the older Veritas family machines that can be upgraded to run on the FleXinspect SCOUT platform.

SCOUT holds the secrets of how it all works in the inspection area. Inside each BEG inspection machine, SCOUT monitors all of the characteristics provided by the sensors, cameras, gauges or other devices that are used to inspect each container. It then compiles all of the data results and measurements from the inspection machines and sends it to the FlexControlCenter, where the data is matched with the forming data for each container.

One of the major benefits of SCOUT technology is the amount of detailed data that it is capable of gathering. To control the quality of a glass container, it is mandatory to know what types of defects are being produced. Gone are the days of simply saying it was good or bad. In today's world, it is necessary to know detail. It is nice to know there is a defect on the finish but it is far more important to know that the defect in the finish is actually an over press.

By knowing all of the details for the defects produced and then tying that information to the process data for when each defective bottle was created, glassmakers have the ability to further automate and better control the process. In End to End, customers have the tools that allow systems to make informed decisions and instantly solve the problems based on the information available.

With E2E, BEG will again pave the way in which glass bottles will be produced long into the future. Using the principles of Industry 4.0, the company will again set standards through increased connectivity of the equipment at the hot and cold ends of the factory. This way of sharing and visualising key production information along with automated process control loops will help glassmakers obtain the highest efficiencies and profitability possible.●

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