

Gob measurement innovation to optimise production

The latest technology available from Bucher Emhart Glass allows glass container manufacturers to measure every gob, opening up possibilities for optimising production and closed loop control. Florian Boucher reports.

For years, glass container manufacturers have been searching for a practical way to analyse the shape and fall of gobs as they drop from the feeder into the scoops. The solution was easy to imagine: A camera mounted just below the shear that would capture an image of the falling gob. However, the technical limitations of photographic technology meant this was easier said than done. It was possible to photograph one gob - or a few - but that was little help in optimising production. There simply was not enough high quality data to draw any meaningful conclusion on what was happening inside the machine.

Line-scan cameras are useful but they do not reveal everything about the direction and orientation of the drop. Matrix cameras were superior in theory but for a long time, they could only handle smaller gob sizes or a relatively narrow field of view.

System description

Now, Bucher Emhart Glass has found the answer. Its GobRadar system uses high speed matrix cameras to scan up to four gobs simultaneously as they fall into the scoops. GobRadar can capture every gob, despite the very limited time window available and can even scan gobs that are larger than its own field of view by taking multiple pictures of the falling gob.

Two separate cameras are used, so the equipment can achieve full 3D stereo vision. This allows full 3D modeling and 'all-round' vision to detect bending on the far side of the camera that would otherwise be missed.

Ideally, the cameras are set at 90° to each other. However, the system can operate within 70° to 110° and a range of inter-camera distances, allowing it to adapt to whatever space is available on the feeder platform.

The cameras are mounted in a protective housing that is specially designed to withstand the harsh environment of



GobRadar measures the gob immediately after the shear cut.

the feeder area. The housing itself is water-cooled and the lens is regularly flushed with air to keep it free of dirt. This design means the cameras need virtually no maintenance.

Accurate measurement and instant analysis

Based on the images captured, GobRadar can analyse a host of physical properties, including length, diameter, radius, overall shape and mass, allowing freak gobs to be detected on the fly. It also picks up the angle, position and trajectory of each gob and even its temperature. This

reduces the workload on operators, as the time between manual weightings can be extended drastically.

Geometry data is continuously collected, analysed and displayed on the easy-to-use interface, which can be viewed on a dedicated workstation in the IS control room or remotely via a mobile device. A dedicated touchscreen is recommended and is available as an option.

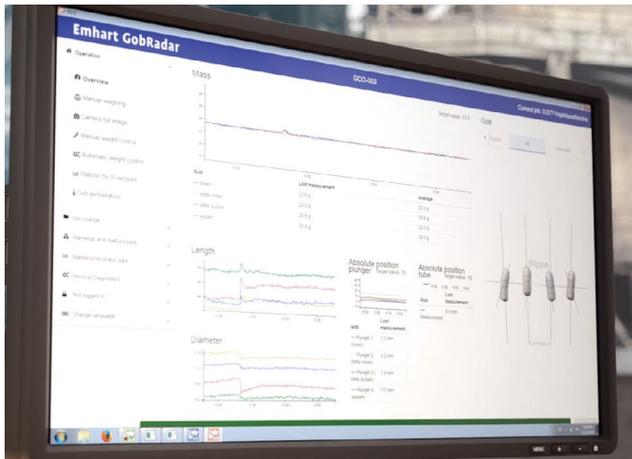
Clear, colour-coded graphs show trends, variations and deviations, while 3D reconstructions and multiple sectional views give the operator an intuitive 'snapshot' of the gobs being produced. Users can even define their own 'gadgets' within the interface, featuring the metrics in which they are most interested.

Gob shapes can be stored for reference and compared with current production. This is particularly helpful during job changes, in order to reproduce the 'best shape from last time'.

GobRadar correlates its data to each individual section of the IS machine. It even highlights the adjustments that need to be made in order to correct anomalies. Malfunctions and warnings are all recorded and displayed on a clear timeline for reference.



The high speed matrix cameras can still monitor partially obscured gobs.



Results are displayed continuously on the monitor.

Closed loop and look ahead control

With GobRadar, operators can stabilise the shape and length of gobs to compensate for the shifting viscosity of the molten glass. Flow conditions at the spout and outlet mean that gobs can vary within a multiple gob zone – even on the same cut. However, if tube and plunger needles can be controlled individually, results from the industry show that the gobs can be adjusted to hit a very narrow target range of weights (0.25% typically $\pm 0.5g$), ultimately saving glass. Additional drive solutions for the tube and plunger needles are available.

With closed loop weight control, the weight of the gob can be automatically controlled on the fly, in real time. In theory, it could even be possible to create a 'look ahead' system that delivers the perfect gob to each section of an IS machine, rather than relying on the delivery system to alter gobs within each section.

A quick win with rapid payback

GobRadar offers traceability and quality assurance from the beginning of the production line, at the cut of the gobs. It delivers an instant process improvement with rapid payback at minimal maintenance.

The equipment can be installed on any production line, from single to quadruple gob, as well as on multi-gob machines where it significantly reduces job change times. It works with press and blow and narrow neck press and blow, as well as blow and blow, where PPC weight control cannot be applied. The BEG innovations currently in development, such as SmartFeeder, will work seamlessly in combination with GobRadar.

Over 30 systems are already in production around the world, at multi-weight production lines operated by industry leaders including SGD, Vetropack, Verallia, Ardagh and Wiegand. The sensor system includes two cameras, mounting brackets, connection boxes for electricity, water and air, plus a control cabinet, touch screen and scale.

"We're delighted to introduce GobRadar to our customers" says Martin Jetter, President of Bucher Emhart Glass. "It's another important link in the chain of closed loop control, which we ultimately aim to extend to every stage of the production line End to End development strategy. However, no matter how manufacturers choose to use it, GobRadar will deliver quality improvements from day one, with almost no extra work or maintenance. We expect it to be very popular indeed." ●

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