

Solutions for problems in hot end ware handling

The importance of hot end ware handling in the glass container production process must not be neglected. Emhart Glass has developed systems to overcome currently known restrictions and reduce losses at the hot end. Christian Fröba* explains.

Today's glass container manufacturers continue to increase machine sizes by more sections and more recently by more cavities per section. Ten and 12-section IS machines with double gob production for wine and triple gob machines for beer production lines are now standard. High performance lines using NIS triple gob machines for wine and spirits and quadruple gob for beer bottle production are setting the latest trend. In addition, cycle rates of modern IS machines continue to increase and glass weights continue to come down, all of which increase the challenge to optimise ware handling. In many existing installations, ware handling is limiting further increases in speed and productivity.

Focus on forming

The traditional focus in the production of glass containers is at the forming process itself, from the gob shaping to finish and parison

forming, up to final blowing of the container. Ware handling that starts when forming is completed and the container stands on the dead plate is typically left to machine operators to optimise after the job change, using their experience and often being helped by mechanical guards and even wires. This has now become a key area for improving overall productivity.

Falling containers on the conveyor belt, coating tunnel jams, falling containers at the ware transfer, as well as damaged and poorly aligned bottles at the stacker are typical examples of areas where productivity is lost. In addition to these losses, poor ware handling also weakens and damages containers, typically with cracks, checks, surface scratches and shape deformations.

The requirement of good and modern hot end ware handling is not only to prevent losses but also to ensure that the ware handling process itself does not create additional defects.

Efficient ware handling

Hot end ware handling is a significant factor in overall efficiency and also has a large impact during job changes, especially during machine start-up. When machine operators and production specialists have to spend more time to take care about fallen containers and have to remove large quantities of glass from the floor instead of taking care of the actual forming of the containers, the start-up of the machine and also, most importantly, the workout time is drastically increased. Stable ware handling saves a lot of time as well as good production during start-up, allowing operators and production specialists to stay focused on forming issues.

The beginning of the hot end ware handling is the pusher mechanism of the IS machine. Placement of the containers and spacing on the

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FlexPusher in TG operation on NIS. ▶

conveyor belt is determined by sweep-out of the pusher. Considering all influences already mentioned, the traditional pusher systems with servo rotary action and pneumatic extent and retract motion are becoming more and more the limiting factor in ware handling optimisation. Pneumatic valves with speed controls for the motion of the cylinder are not precise enough and the repeatability and reproducibility cannot keep pace with demands. Machine speeds could often be further increased but ware handling cannot cope with production speed.

Pusher system

Emhart Glass has now developed and introduced a two-axis servo pusher system called FlexPusher. This mechanism eliminates the deficiencies of a pneumatic motion by utilising two dynamic servo drives for the entire pusher motion. It meets the challenges created, for example, by high-speed production from 12-section NIS quadruple gob machines and leaves potential for further speed increases on many

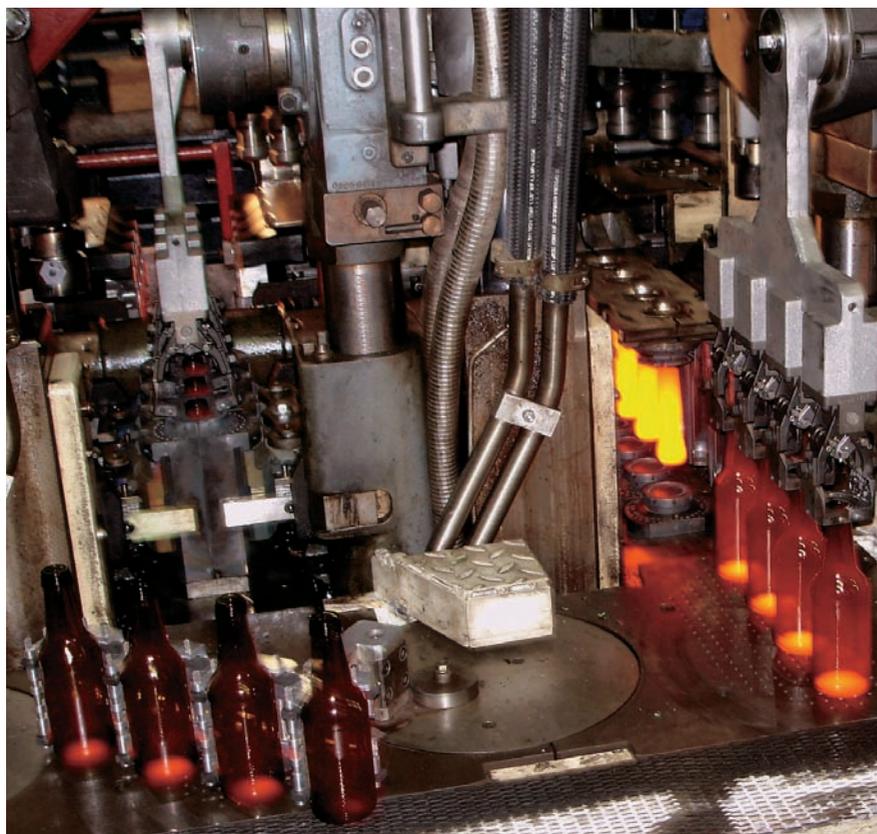


conventional IS machines. The controls are fully integrated into the FlexIS process control system, providing a complete and continual control concept for the IS line. The FlexPusher is also available as a

standalone system for upgrading existing production lines or for non-FlexIS installations. The motion of the system uses the space provided by the specially-designed dead plate for a smooth sweep-out, without compromising on the dead plate time of the container. Incorporating technology developed by Emhart, the product allows for the flexible use of different finger liner inserts. This offers the possibility to adapt the fingers more easily.

Operation with belt speeds around 1m/sec and higher requires a good pusher system but also other high performance components like conveyor belt wear transfer and drive system. For example, unequal stretch of the conveyor belt creates peaks in the speed of the belt, which can result in the unequal and inconsistent spacing of containers. This leads to unreliable ware transfer performance and container losses. Unstable belts can cause placement variations of up to 10mm at randomly varying positions. This demonstrates how important

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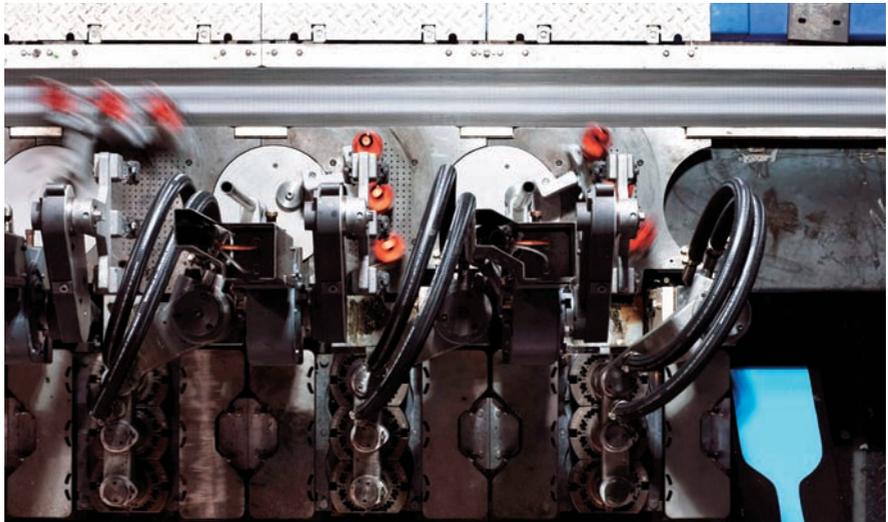


◀ FlexPusher in QG operation on NIS.

attention to detail becomes when high-speed ware handling is required.

The integration of the drive system for machine conveyor, ware transfer and cross conveyor into the FlexIS control system, which is called the ware handling controller (WHC), is another step towards a fully-integrated ware handling concept. The WHC opens the door for automated solution in the area of the hot end ware handling, which will result in a smoother operation with less operator interference and higher hot end pack rates. Supervision of belt speed, ware spacing and hot end ware reject will be possible in the near future with one fully integrated system. This system can react on any drift in the process of time, like an automatic belt speed compensation caused by the stretch of the conveyor belt.

Hot end ware handling is one part of glass container production, the importance of which cannot be underestimated. Constant focus on



FlexPusher in TG operation on NIS.

reducing losses and increasing pack rates includes ware handling. Emhart Glass' systems are available with the FlexPusher and the FlexIS Ware Handling Controller to overcome currently known restrictions and push limits to speeds of 700 to 800 containers/min. Losses at the hot end transport can be reduced as automation

continues to be integrated into the forming process, improving consistency and reliability and reducing the risk of human error. ■

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