

# Standardised swabbing

Ralf Schilling describes how product advances and project research led to performance gains and improved process control

The art of glassmaking relies heavily on the skills and experience of the glassmaker. From a traditional point of view, it could be said that the overall result of the production process depends upon the quality of the moulds, the production speed, the production tools, the resources and the knowledge on site. Six Sigma is a customer-driven process-focused approach that provides a framework for quality management. The role for Six Sigma within the production process is to supply real-time feedback on various aspects of the process.

Six Sigma is about measurement to quantify, understand and improve the quality of the process (reducing variations). The Six Sigma method has been adopted by several companies in the container glass industry, as its main focus is waste reduction and improvement of quality. The precondition for Six Sigma is the availability of process data, which can be realised in several ways. Values are stored in different defect information systems located at different points in the production process. It is possible to process these values in order to base conclusions on them, and now the storage of data from the hot end is also possible.

## UPDATING DATA

Using an XPAR infrared (IR) camera system, the IR information transmitted by the containers is processed by software and categorised based on settings made by the production specialists. In this way containers that do not meet the predetermined quality standards – shape, glass distribution,

inclusions, defects and transport – are identified and rejected if necessary.

Previously the data processed by XPAR Vision's IR camera systems was difficult to apply to Six Sigma projects, especially long-term data. However with XPAR's development of a new product, a SQL-based information system, this is no longer a problem. This system enables the user to evaluate the measurement values of all the containers that have passed in front of the camera system. Additional process information, such as shift times, job changes, alterations made to settings etc. is also stored, allowing the user to look at individual containers and compare shifts, jobs, cavities, sections, lines – and even complete plants in the future.

## SWABBING PROJECT

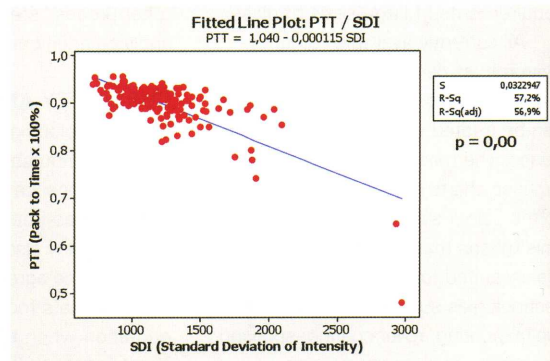
Previous studies showed that the standard deviation of the total intensity varied per shift. By simple regression on data from approximately 37 million containers, staff at Ardagh Glass tried to find out if deviations in the total intensity would result in actual performance differences. The outcome was positive with a p-value of 0.00 at a 95% confidence interval and a  $R^2$  value of approximately 60%.

This motivated the staff to compare individual shifts. The results were astonishing: by setting the best performing shift as the benchmark, a potential tonnage saving could be realised if the other shifts performed at the same level as the benchmark. Based on this, a Black Belt project was started which covers different aspects of swabbing including techniques, cycle and agents. Objective conclusions were possible due to the availability of XPAR data, enabling staff to use hot end performance as a performance indicator.

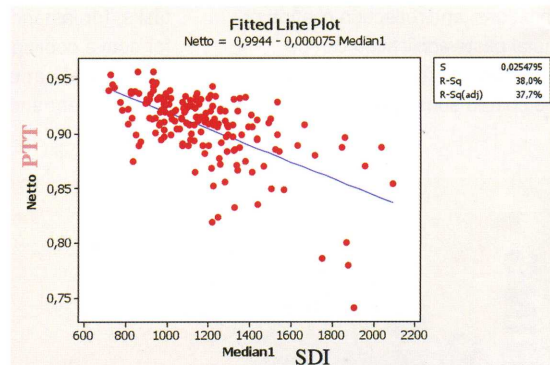
## PROJECT RESULTS

The operators were very interested in this project and gave their full co-operation from the start. At first a current product was used which a previous job had already been performed on. The result was a hot

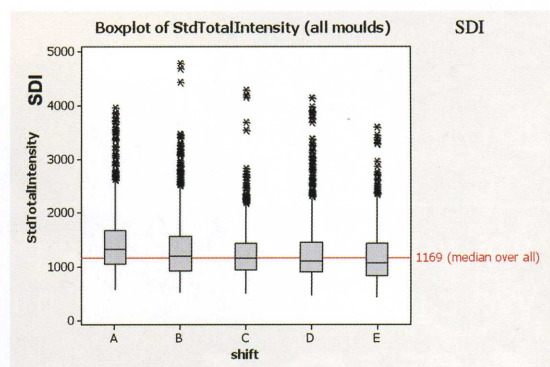
end improvement of 1.8%. An additional result is the smooth running of the ware transport, so the operator can spend more time on quality issues. With the availability of new hot end data, more projects are sure to follow. ■



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