

New light onto TV screen manufacture

LG.Philips Displays in Simonstone, Lancashire, manufacture glass screens for 28" and 32" Widescreen television tubes. The company re-invested in the plant's glass tank 18 months ago, and has seen the benefits accrued through the application of real-time process data gathering. Information reporting in bringing the new facility on-stream and in making high yield, high quality TV Screens has been critical in maximising the investment.

"... we knew that we would see a lot, but just how much still impresses us".
LG.Philips Displays
System Analyst,
David Dicks.

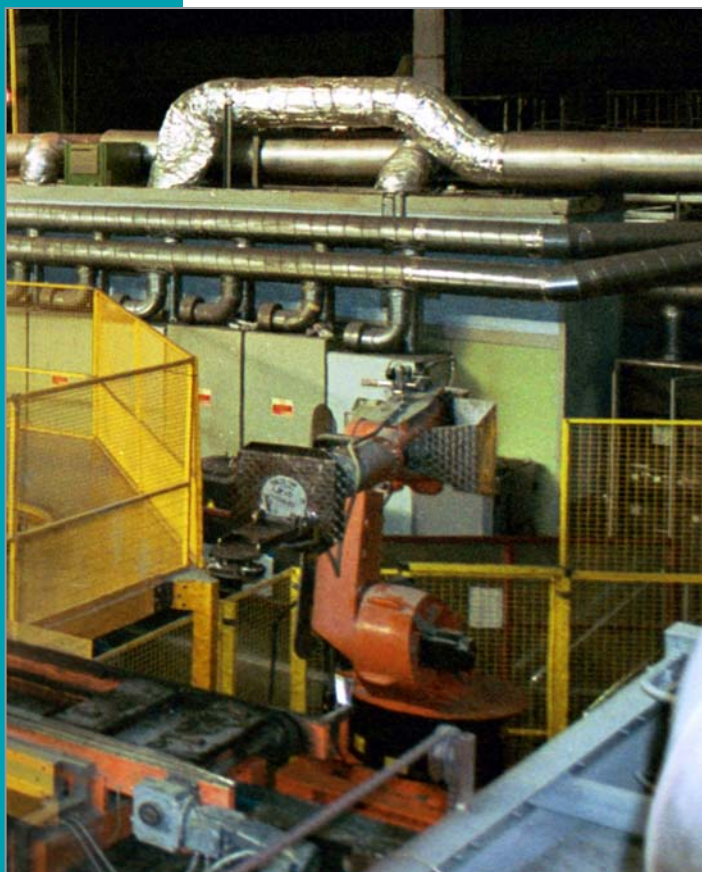
When a glass factory requires a new glass tank everything is re-appraised for this enormous investment. The LG.Philips Displays' glass facility at Simonstone had already achieved a reputation for high-yield, high-quality screen manufacture, and this success led to the factory being invited to manufacture the company's premium products; 28 and 32 inch wide screen real flat products. These screens were new to LG.Philips Displays and therefore

new to Simonstone. The challenge was to be the best on a worldwide basis.

Experience was at the fore, the company having already developed manufacturing technologies and Manufacturing Information Systems that looked at product history and quality. Whilst retaining these systems, the company knew that it needed more process information in order that a detailed understanding of the new production methods could be obtained.

Consulting company Atos Origin was commissioned to undertake an "MES Scan" of the facility. Based on their findings Wonderware's InTouch and Historian products were recommended. It was agreed to proceed with a pilot implementation to test for the operational benefits and integration requirements that would be encountered.

The output product of Simonstone is the familiar front part of a wide screen television tube. This is a precision component in its own right, the television viewer being the final quality controller! At Simonstone the company produces glass on a continuous basis in a special oxifuelled glass tank at a rate of 240 tons per 24 hours. Special considerations have to be made to cleanliness, purity and viscosity that do not exist to the same degree in other glass processes. The output of the glass tank is two channels of molten glass that feed two presses. Here shears cut off a measured amount of glass and this then drops into a mould where it is pressed to shape by a plunger. The complete screen is cooled following an accurate temperature profile, then pinned, annealed, polished and packed. Quality assurance is maintained throughout the process. The finished product from LG.Philips Displays is a highly polished, dimensionally accurate TV screen with four hot welded pins



Robot handling

Glass poured from furnace to mould



inserted for shadow-mask mounting and a rear side that is ready for phosphor application. This is currently supplied to another LG Philips Displays' plant in Aachen, Germany where the final tube is assembled.

The transition to installing the new tank and handling equipment took place at the end of 2000. The production handling system needed

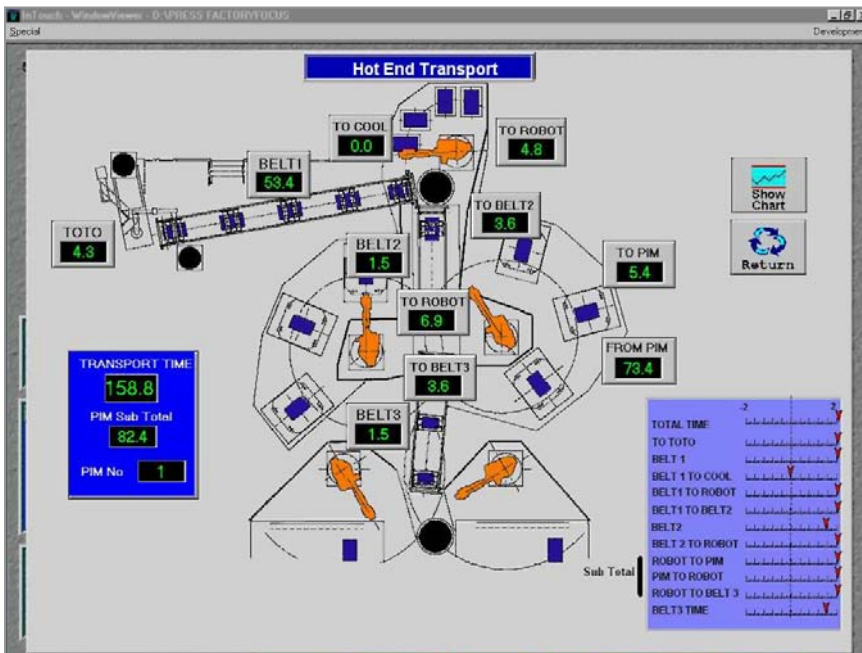
shop floor

to be radically changed as the previous lighter smaller screens weighed 9Kg, whereas the new wide screen products weigh 26Kg. The MIS team took what they had and applied this to the new production system; in addition they actively deployed the new Wonderware process monitoring system. The mission was "to tame the beast (of new process, new product)", and sufficient time was never going to be available. The pilot of this was started in January 2001; immediate results were seen on the trend displays on InTouch. One example was a display that slowly incremented upwards, showing an accumulation of "micro stoppages" (duration of about 2 seconds) that resulted in 2-8% lost production; process timing adjustments rectified the problem. Another example was the detailed logging of polishing head motor current, which was seen to be fluctuating, resulting in reject product that took 8-9 cycles to recover; the polishing technology was reviewed, and the problem solved. In both cases it would simply not have been possible for process operators to monitor events without the fine granular information being displayed by Wonderware InTouch SCADA.

Following these early successes, some of which were demonstrated on a real-time display in the boardroom to the factory's management team, the system was deployed on a wide scale. This involved determining key process variables (400 being initially suggested by focus teams), engineering connectivity to PLC's and other production devices and utilising Wonderware's Active Factory software to operate on the data and produce useful process information. A single one-day training course was sufficient for LG Philips Displays' process engineers to become familiar with Active Factory, and get their "bespoke" information from Wonderware Historian. This was seen to be "very quick, and easy to use", with the process engineers "using it out of the box".

One observation from this was the revelation





one of the main elements of this success. Truly casting new light on to the process!

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InTouch SCADA screen showing robot handling

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of a build-up of transportation time from the pressing process to annealing, this time being critical for the correct stress to be left in the product – a key safety issue for subsequent assembly. The effect also resulted in a loss of one in sixteen screens. Such was the initial magnitude of this problem that visual confirmation was required, and indeed this confirmed that the information was true. Consequently the process automation was re-timed and the problems overcome. Again the information from the shop-floor data allowed issues to be seen that simply could not be witnessed through traditional means.

LG.Philips Displays System Analyst David Dicks knew that the process information was the missing part of his toolkit. He had the history and matched quality information and thus could see when, and where, a particular screen was routed through the plant, but he was blind to the process values being used. The successful deployment of Wonderware products fully delivered on his missing process information, and he says "we knew that we would see a lot, but just how much still impresses us".

Current and future plans are to deploy the system further along the finishing and packing stages of production and to include effluent and energy measurements, further supporting the company's ISO 14000 accreditation and allowing energy utilisation in production to be seen in real-time. Plant maintenance personnel already utilise the system for diagnosis.

Production and low scrap rates at Simonstone are world-class when benchmarked against the global industry. The experience-driven and imaginative way in which process information has been obtained and acted upon has been

Wonderware UK wishes to thank the following company for its valued contribution to this success story...

LG Philips Displays

www.lgphilips-lcd.com

Note: The Simonstone plant is now closed owing to the global switchover to LCD screen technology, but the testimonial to Wonderware products (in particular Active Factory) remains valid.



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