

Cadbury Keeps Production Sweet with Lanner



APPLICATION:

New Equipment Design

VERTICAL:

Food and Drink

SECTOR:

Packaging

BENEFIT:

Cadbury used WITNESS simulation to test and validate the investment of robotic arms to be used in the packaging process at the Bournville site.



BY
LANNER

With origins stretching back more than 130 years, the Cadbury factory in Bournville manufactures products including Cadbury Dairy Milk, Creme Egg, Wispa and Roses. On 2nd February 2010, Cadbury became part of Kraft Foods.

The challenge

The Bournville site maintains a buffer stock of wrapped but un-packaged product for its Cadbury Roses and Heroes lines of assorted chocolate selections. This 'buffer' stock continually updates as it becomes the input for the subsequent production run.

The individual types of chocolates (or units) that make up these assortments had traditionally been stored separately in cardboard boxes. These boxes would then be emptied by hand for the purposes of packing into the finished Heroes or Roses product.

Because these boxes were emptied by hand, the health and safety regulations for maximum weight handling meant that units had to be stored in a large number of small boxes, rather than 'polypan's' – industrial sized, specifically designed containers that move chocolates around automated parts of the factory.

This created an excessive use of cardboard boxes to store the individual units. With ten types of chocolates in Roses and seven in Heroes, and a maximum weight of 7kg per box, the buffer stock needed some 170,000 boxes at any one time.

The solution

In order to automate the process and eliminate cardboard box storage, Bournville began looking at the use of robots to feed in the different types of chocolates. Because the robots would be able to handle the polypan's directly, the storage and unpacking of the boxes would be eliminated entirely.

However, it soon became apparent that the use of robots would mean very sophisticated control systems.



"Simulation will be critical in helping us to plan and react in the future."

Beccy Smith, Associate Principal Scientist, Cadbury

In addition, the robots represented a very large investment of both time and money, so the confectionery manufacturer turned to WITNESS software from Lanner to simulate the processes that would be involved. A model was developed by the Bournville plant's engineers to fully test and validate the options proposed.

Lanner's WITNESS solution is a proven simulation system used by thousands of organisations to improve business process performance. WITNESS visually represents real world processes in a dynamic animated computer-generated model. The model then enables experimentation with alternative 'what-if' scenarios to identify the best solutions.

Beccy Smith, Associate Principal Scientist at Cadbury explains: *"Simulation was brought on board to validate the investment and make sure it would do what we needed it to. However, it was not just about proving the business case. The control logic for robots is incredibly complex and even something as seemingly simple as four robot arms soon develops a great deal of sophistication. That means time spent simulating and optimising the control logic can make a real difference to productivity."*

to balance the flow of pallets. The delivery of the polypanes on their pallets, via the conveyor systems from various points in the factory, forms part of this complex loop. And of course, this is all variable as production demands change."

WITNESS excels at the quick modelling of large new manufacturing facilities. In this project the modelling of the initial design was completed quickly including a range of complex control logic. At that stage the real investigation began and the model was used heavily over a number of months to refine robot timing and sequences, conveyor delivery and full operational control.

The results

The use of WITNESS at Bournville has been a great success. The new robot introduction has eliminated wasteful manual processes. Beccy Smith explains: *"We have gone from multiple cases of manual unloading of boxes to the single automatic tipping of polypanes that carry 5.5 kg of chocolate. We have also reduced our cardboard usage and transport requirement enormously supporting our 'Purple Goes Green' policy."*

"By simulating and optimising the new equipment and the associated processes prior to implementation we have ensured a streamlined efficient process, one that has been implemented smoothly."

"The model is not finished either," she adds. "There are always changes to be made, new trends and initiatives to follow and factors such as seasonal spikes in production to contend with. Simulation will be critical in helping us to plan and react in the future."



"For example, the four robot arms each have six different 'cell positions' which are used for five full polypanes and one set of empty polypanes. The robot palletises and de-palletises these as required. It must balance the handling of the empty and full polypanes