



MOTOMAN[®] ROBOTICS (UK) LTD.

PRESS RELEASE

EFFICIENT ROBOTIC PACKING SPEEDS SOFT DRINKS MANUFACTURE

Three robotic packing cells developed by Motoman Robotics (UK) and supplied as turnkey systems to Wrexham-based Calypso Soft Drinks have enabled significant improvements in efficiency. In one case, introduction of an SV-3 robot for placement of 85ml cuplet drinks into outer boxes has allowed line speed to be increased by 25 per cent. In another, the cell has succeeded in automating the palletisation of 56 different product and pack size combinations onto shipping pallets.

Calypso is a leading manufacturer of packaged soft drinks. The Wrexham factory is fully self-contained including its own natural mineral water supply. Its products include Tetra Pak 200ml and 250ml cartons and aseptic cup drinks cartons. The latter are produced as six-packs of 200 ml cup product and individual 85 ml cuplets for catering use.

John Ball, the company engineering manager at Calypso, commented, "Calypso has been very progressive in the adoption of automated technology. Up to the 1990's this mainly applied to the production side; we were the first company in the UK to adopt the Tetra packing system, and we then adopted form/fill/seal technology during the 1980s. In the early 1990s we acquired a Tetra machine which had an automatic tray packing facility, although palletisation and carton packing were still carried out manually."

He continued, "At that time the company was spread over two sites but we consolidated our operations at Wrexham in the late 1990s. That has given us much more factory space and provided the opportunity to extend the use of packaging automation. We began with a layer palletising machine which has been highly successful. However, applying that concept to multiple case sizes was not cost- or space-effective so we elected to develop a system based on robots."

Calypso decided to automate the palletising function on four lines producing Tetra packed drinks. This is quite a complex task as the system has to be capable of coping with trays comprising either 24 or 27 packs with further variation occasioned by the use of 200 ml and 250 ml packs in addition to differences in the flavour of the actual product. In all there are 56 pack variations that demand three different pallet stacking patterns.

The aims of the robot packing project were well defined from the start. One cell would be required to place the six 200ml packs and cuplets into cartons as they came off the filling line. Flexibility was needed to pack 200 ml six-packs at a density of four packs per box, or individual cuplets at a density of five layers of 20 per box. Specified packing time was four seconds per box for the six-packs. An additional requirement for the cuplets was the insertion of a cardboard separator between each of five layers; around 20 seconds/box is allowed on this product.

A second cell on the same line was required to stack the cartons from the cup line onto pallets, with a maximum case weight of 12 kg for the cuplet boxes.

“With hindsight we were embarking on a highly ambitious project,” Mr Ball recounted. “However we had a lot of incentives to make it work. It made sense to apply automation to areas of production that, while they are essential, do not add value to the product. On cuplet packing especially, it was very labour intensive with up to six people needed to pack the cartons.”

In selecting Motoman Robotics as supplier/project partner, Calypso was drawn to the company’s systems experience and the quality and performance of the product. The electric operation of the basic robot was also seen to be an advantage on the basis of the need to combine speed with precise positioning accuracy in both the box-filling and pallet stacking applications. Likewise the six-axis robot format provided comprehensive positioning flexibility which proved essential in the box filling role.

As installed, the latter system comprises a pair of Motoman SV-3 robots for box filling. One of these is equipped with a handling device comprising vacuum suction cups for the pick and place function, while the second is dedicated to inserting a separator card. Subsequent development of the packaging materials has led to the use of separator cards being reviewed and this robot may be redeployed in the future.

The mode of operation is that cups come off the line into a set of guidance rails that present the cups to the robot. It picks two six-packs or 20 cuplets using a dedicated gripper and places them into the box. If cuplets are being packed, the second robot places a separator card before the next layer is placed. Changeover time for the robot cell is five to ten minutes, well inside the time needed to change over the filling line.

“The system operates extremely well,” said factory engineering manager Chris Edwards. “Whereas keeping up with production on cuplet packing used to be a problem, the robots have allowed us to increase the speed of the line by 25 per cent. On the cuplets, presentation of the box is critical because we are dealing with individual product, so the robots are programmed to spiral as they place the product to ensure that the box sides do not hinder clean placement. This sort of versatility is something that we have come to appreciate as the project has progressed.”

The palletising robot on the same line operates equally well. Again, vacuum-suction is used to grip the cartons which are palletised two at a time. Once a pallet load is completed, the pallet is moved away from the load area on a powered roller conveyor. The robot then picks an empty pallet from an integrated pallet stacker using hook-type lifters built into the box handling attachment. The new pallet is placed onto the load area.

Alongside this installation is the palletising cell for the Tetrapak line. This is the most complicated of the three Motoman-supplied systems as the robot needs to service up to three process lines simultaneously. It does this using an ingenious marshalling system, which is operated by the incoming trays, each of which has a product-specific barcode.

Once the barcode is read by an integral reader, an electro mechanical path selection system directs the tray onto a designated pick-up conveyor. As soon as there are three trays on an infeed conveyor, an optical switch calls up the robot which lifts the trays, placing two in their designated position and leaving the third in a convenient pick-up position.

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When it next visits the same pallet, the robot again places two trays and makes up a third pair with the previously-deposited tray, placing that pair also. Programming the movements in this way offers the most efficient pallet stacking routine and appears strangely human-like. As with the pallet stacking robot on the cup line, pallet replacement is incorporated into the cell.

Mr Edwards related, "When the robot cells initially arrived on the shop floor I found it difficult to see how we were going to benefit. However, once I had completed the Motoman training course and began to gain some programming experience as we developed the application, it began to make a lot of sense. It is actually quite easy to teach the robot what to do and it is also very satisfying."

Mr Ball continued, "Although we had defined the practical aims and objectives quite well at the outset, commissioning the system on site revealed that there are a lot of things that a human does subconsciously that have to be taught to a machine.

Also, on the Tetra stacking line which uses frictional grippers to lift the trays, the specification of the packing film that holds the tray together significantly affects the robot's ability to lift and place the trays because of variations in friction."

Mr Edwards added, "Throughout the commissioning phase we had very good technical support from Motoman. Equally the level of adjustment available on the robots themselves allowed us to address issues like gripping pressure with confidence. Many of the difficulties that we experienced were attributable to external factors such as positioning and

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these were solved by our having to tighten up the way in which we present product to the robots.”

The end result is a highly workable system that has generated the benefits expected by Calypso at the start of the project. Mr Ball concluded, “We brought a high level of commitment to making this system work – as did Motoman – and that has been instrumental in achieving a satisfactory result. The key lesson that we have learnt is that if we provide the robot with consistent quality in terms of the way its work is presented, then it will perform extremely well.

“We now have a system in which people have complete confidence and which is fully accepted by the workforce. It has also allowed us to redeploy a number of people to tasks where they add value to the end product.”

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Two photographs herewith, captioned:

1. A pair of Motoman SV-3 six-axis robots provide positioning flexibility for box filling at Calypso Soft Drinks, Wrexham. The second robot (background) inserts a separator card between the layers of cuplets.
2. A Motoman robot palletising two cartons at a time at Calypso Soft Drinks, Wrexham. The completed load is transported away on a roller conveyor while the same robot handles an empty pallet onto the load area.

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On behalf of: Motoman Robotics (UK) Ltd,
Unit 2, Johnson Park, Wildwere Road,
Wildmere Industrial Estate, Banbury,
Oxfordshire, OX16 3JU.
Tel: 01295 272755. Fax: 01295 267127.
E-mail: johnd'angelillo@motoman.co.uk
Web site: www.motoman.se
Contact: John D'Angelillo, MD.

Issued by: *THE RIGHT IMAGE,*
PO Box 42, Twickenham, TW1 1BQ.
Tel: 020 8891 0603. Fax: 020 8744 1109.
E-mail: tri999pr@aol.com
Contact: Chris Wright.

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