

The Engineer's guide to new products & design ideas

Muscling in on the new robotics



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Lifting column boosts production ergonomics for Videojet

A custom cart with height adjustment provided by a Thomson ALC2000 lifting column is helping printing and laser marking specialist, Videojet improve product assembly operations at its Wood Dale, Illinois plant. Hakan Persson reports.

Videojet Technologies Inc. is a leading manufacturer of coding, printing and laser marking products, fluids, and accessories for the product identification industry. The company has more than 325,000 continuous ink jet, thermal ink jet, case coding, thermal transfer overprinting and laser marking units installed worldwide, and builds numerous products at its Wood Dale, Illinois plant. For its manufacturing operations, VideoJet took a decision recently to move from typical stationary workstations to using mobile cart workstations.

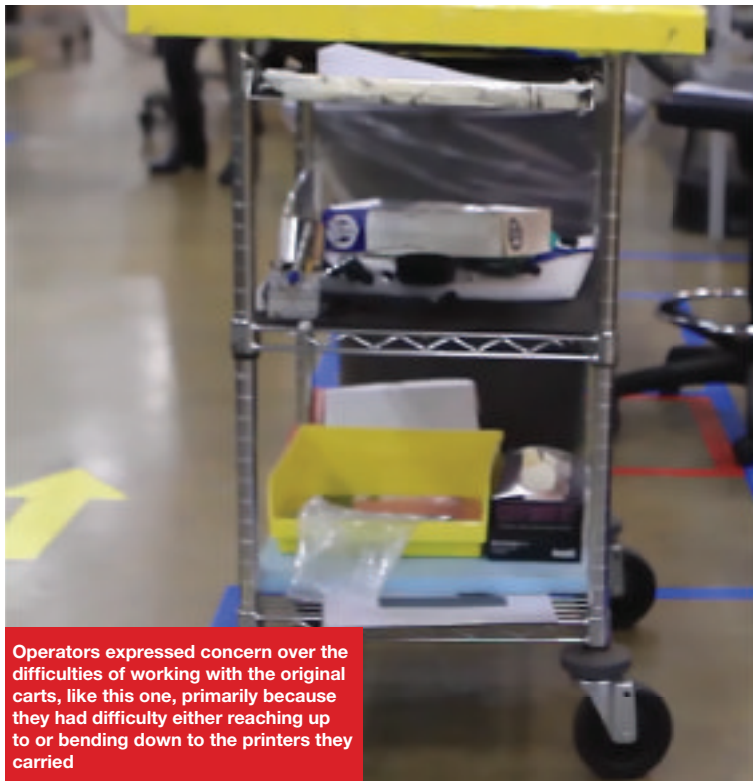
Carts, consisting of wire boxes on wheels, were used to move inkjet printing and laser marking products from station to station during the assembly process. The major problem with this approach was that the height of the work surface could not be adjusted so tall and short operators had difficulty reaching the printer when carrying out assembly operations. Moreover, the cart was not able to store subassemblies that travelled with the printer so they had to be carried by hand and were sometimes misplaced.

Videojet's engineers looked at a number of off-the-shelf alternatives. Most readily available carts offered only a manual, mechanical height adjustment requiring extra time to adjust. This would also create difficulties for smaller operators when heavier products were on the cart. A few offered an electrical height adjustment but they were expensive and the amount of adjustment did not fully accommodate the differences in height among the operators. None of the carts offered for sale could accommodate the assemblies that travel with the printers.

Videojet overcame this problem by building a custom cart using a Thomson Industries LC2000 lifting column to move the work surface up and down for operator comfort and ergonomics. According to Videojet's principal manufacturing engineer, John Forster, they selected the LC2000 lifting column because it provides a very low retracted length to stroke length ratio so it can easily accommodate operators from under five feet to well above six feet. The custom cart is also equipped with shelves



The Thomson LC 200 lifting columns are self-supporting and height adjustable lifting solutions in a compact, pre-aligned package, perfect for applications requiring telescopic motion



Operators expressed concern over the difficulties of working with the original carts, like this one, primarily because they had difficulty either reaching up to or bending down to the printers they carried

to hold the subassemblies that travel with the printer, and it includes electrostatic discharge protection.

Designing a custom cart

When Videojet’s engineering team began looking at ways to make their own cart, the main challenge they faced was finding a lifting column that could deliver the full range of motion required to accommodate the height differences between the company’s shortest and tallest operators. They found the Thomson LC2000 lifting column, which moves from a compact collapsed position to a fully extended position along a single linear axis while achieving a retraction to extension ratio in excess of 2 to 1, provided the best solution to this problem. Moreover, the aesthetic design of the LC2000’s extruded aluminium profiles allows it to be a visible component, and this greatly reduced the effort and cost involved in building the custom carts.

The LC2000 comprises a telescoping lead screw driven by a geared dc motor. This design provides quiet operation and high load capacity with minimum current draw. Engineered polymer bushings are used as the

guide ways between the profiles, creating a high moment load capability in a compact envelope. The lifting column is maintenance free, has built-in end of stroke limit switches, and uses dynamic braking for short and consistent stops. With power off, the integrated load holding brake keeps the unit in position. An encoder option is available for synchronous operation of multiple columns, but was not needed for this single axis application. John Forster takes up the story:

“We have twelve operators on the line and making them all happy is not easy. The quick delivery of the Thomson prototype helped us gain everyone’s buy-in. We made sure that everyone was happy before we built the first cart. The carts only cost us about half the amount of off-the-shelf carts, which would have also required considerable additional expense to adapt them to Videojet’s requirements.

“We ordered 25 carts because that’s the maximum number of units that we have in process at any one time. With the subassemblies travelling along with the printers, we have fewer mistakes and so our first



The LC 2000 provided an easy to install, low-cost ergonomic solution to Videojet’s production line cart problem, and has increased operator comfort and productivity

pass yield has gone up and we are saving a lot of time in the re-work process. In the near future we are also going to mount our test stands on carts.

“The focal distance of our different models of laser marking systems can vary, so today we have to take the laser off the cart and mount it on an adjustable test stand. In the future we will leave the laser on the cart and use the lifting column to achieve the right focal distance. By eliminating the test stands we will be able to double the number of lasers that we are able to test within the space available, doubling our productivity.”

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