

NEWS RELEASE

TRIO MOTION TECHNOLOGY GETS THE NEEDLE - JUST RIGHT!

When the World's largest manufacturers of carpet tufting machines needed help with their new generation of advanced products, they turned to Trio Motion Technology for an equally sophisticated control system.

A subsidiary of Spencer Wright Industries Inc., Cobble Blackburn Ltd. employs around 600 people in the U.K. The company produces a wide range of equipment for the carpet manufacturing industry, including tufting and weaving machines, drying and backing plants. Excluding America, where the company's parent is a leading supplier, Cobble products dominate the World market with over 80% of total sales.

Tufted carpet is usually produced by the equivalent of a giant sewing machine, equipped with anything up to 600 closely-spaced needles mounted on each metre of rapidly moving bars. The first tufted carpets were made in the late 1940's, at a time when there was considerable demand for low-cost yet hard-wearing carpet. Gradually as the market matured, a growing need for more sophisticated pattern designs and sculptured finishes prompted the steady development of manufacturing techniques with an associated increase in machine complexity.

The carpet manufacturing industry itself has always been highly competitive. Private and contract buyers alike will follow strict price guidelines, seeking the best value for money whilst maintaining a careful eye on current fashions. Carpet manufacturers, therefore, must maximise their productivity, control costs rigorously, and yet still provide an ever-changing pattern book to retain their market share. Cobble have long recognised these conflicting needs with an extensive programme of machine development.

Typical of Cobble's U.K. customers is the Kidderminster-based Tomkinsons Carpets Ltd. Originally formed in 1869, this company bought the British patent rights to manufacture Spool Axminster looms and made the first piece of Royal Axminster in 1878. Tomkinson's maintained their reputation for innovation by taking delivery of a new tufting machine from Cobble in 1961.

That early machine had a fixed bar, and could only tuft in a straight line. In 1968 a moving needle bar was installed, reflecting a trend noted in the previous year when tufted carpet sales exceeded woven carpet for the first time.

Further improvements and additional Cobble machines followed, expanding Tomkinson's production capacity and flexibility. New tufting machines were installed equipped with interchangeable mechanical cams to achieve a greater variety of pattern effects.

Whilst a highly cost-effective solution for most carpet manufacturing needs, the cam drive

system has an inherent limitation in production speed when working with complex pattern designs. Cams, too, must be designed and manufactured to comply with each different pattern, and setting up the machine takes a skilled technician several hours.

The growing use of CAD design systems, relatively short production runs, frequent pattern changes and greatly increased competition within the carpet manufacturing industry all generated a need for higher speed machines with a fast, simple method of changing patterns.

Cobble's answer lay in the development of the programmable drive system, first installed by Tomkinson's in 1981. This method of driving the needle bar by mechanical means allowed greater flexibility and easy pattern changes, but still retained some of the production speed restrictions inherent in the system.

Ever mindful of the pace with which the carpet industry changes, Cobble began to explore the advantages of microprocessor control systems applied to hydraulic shifting of the needle bar.

Early machines used a control system from an American company, but this proved to have little advantage over mechanical systems. In particular, the lack of a cam profile feature and restrictions within the reaction time of the unit effectively prevented Cobble from achieving the production speeds required.

Turning to Gloucester-based Trio Motion Technology, Cobble's Electronics Research and Development Manager David McBride asked for assistance in the development of a new control system. "The theoretical benefits of hydraulic needle bar movement with microprocessor control include doubling the output rate, greatly increased flexibility, significant reduction of set-up times and a useful facility to experiment on the machine with new pattern effects," he comments. "The first system we looked at was unable to deliver these benefits at the operating speeds we were looking for. Trio, however, were able to offer their DAC MX system "off-the-shelf" and, within two weeks, we had a totally new control system programmed and running."

The Trio system used by Cobble consists of a modular master control board and two slave controllers. The master is capable of performing at better than 10 machine cycles per second, using a fast BASIC interpreter operating at 2,000 program lines per second with a servo cycle down to 1 millisecond. Four axes may be connected, all interpolating together, or with any two selected for circular interpolation. The unit is designed to minimise the need for external components, drastically reducing wiring and commissioning times whilst enhancing inherent reliability.

"We were particularly impressed by Trio's support," continued David McBride. "The control system offers considerable flexibility in application, and can be programmed in the company's own version of BASIC. Their efforts in assisting us to generate a fully featured, working program in a very short time were a significant factor in meeting the requirements of our customer."

Trio's Coordinator features a software cam profile facility which allows the needle bar to move to a precisely determined position under variable speed control. This ensures that the individual needles are always in the correct place to meet the underlying hooks regardless

of operating speed. With a cycle time down to 25 milliseconds, the ability of the control system to follow machine speed changes accurately is critical to effective performance.

The system is also capable of reacting quickly to an emergency stop, preventing the wholesale destruction of needles that could otherwise occur.

Still maintaining their reputation for innovation after more than a hundred years, Tomkinson Carpets chose to install the new machine, now christened the Decormatic. Paul Bradley of Tomkinson's Product Development Department is impressed with the capabilities the new machine. "The system has proven very reliable," he said. "It is now working at much higher speeds than the older mechanical tufting machines. The flexibility of the new system allows us to consider more ambitious designs without loss of production, and changing patterns is very simple. By storing the design data on disk we can ensure that each batch of carpet is produced in exactly the same way, improving quality control."

Final comments from Cobble's David McBride revealed the importance placed on the company's continuous development policy. "Trio have provided us with a sophisticated control system which once again places Cobble at the forefront of tufting machine technology," concluded David. "Their product performance and build quality is excellent, and we have nothing but praise for the level of support. Our development of the new Decormatic machine has been made much easier with Trio Motion Technology's valuable input. We are now evaluating ways in which Trio could assist us further."