



Medical specialist takes machining and RP technology from HK

HK Technologies supply Willemin-Macodel and Objet machines to Surgical Innovations

May 2011 – UK Press Release

As part of a radical transformation over the past five years that has seen it evolve from an outsourcing company to a leading medical device manufacturer, Surgical Innovations Ltd (part of Surgical Innovations Group Plc) has installed two high precision, Swiss-built Willemin-Macodel 408B bar-fed machining centres and an Objet Alaris desktop 3D rapid prototyping machine from HK Technologies, the Rugby-based supplier of specialist manufacturing solutions.

Surgical Innovations is a Leeds-based international designer and manufacturer of medical devices, chiefly for laparoscopic and port access applications, as well as instrumentation for minimally invasive procedures. In 2008, with a turnover of £3 million and 30 employees, many companies would be satisfied with their performance, but Surgical Innovations was struggling to be reactive to customer demands and this led the board to try a different strategy. Originally, the company outsourced all of its manufacturing and assembly from overseas sites, but faced with rising costs for labour and logistics, as well as a question mark over the quality of certain components, something had to change – by its own admission Surgical Innovations had more stock on the water than it did in its own factory.

“To gain more control over quality, product cost and deliveries we decided to bring manufacturing and assembly in-house,” states Manufacturing Director Paul Birtles. “The first phase was to relocate from six separate units to an all-encompassing 32,000 sq ft facility in April 2008.”

This provided the AIM-listed company with the platform to plan its manufacturing operations, including a commitment to extensive in-house machining. Recently, this has included the adoption of enhanced milling and turning capabilities.

“We machine intricate sets of jaws with complex profiles for a range of laparoscopic instrument systems,” says Mr Birtles. “Searching for a capable machine with the required precision and reliability narrowed our shortlist to just three potential suppliers. We visited all three but the

Willemin-Macodel machine proved to be the stand-out option, especially when backed-up by the support and responsiveness of HK Technologies.”

The first Willemin-Macodel 408B CNC bar-fed machining centre arrived in September 2009, with a second arriving in February 2010. However, with the order book continuing to swell, a third machine is planned for late 2011.

Willemin-Macodel machines are designed purposely for the manufacture of complex parts. Their high level of static and dynamic rigidity as well as the minimised heat variations in their structure guarantee high accuracy machining and high quality surface finish. Milling/turning from bar stock allows machining on six sides. According to customer requirements, the machining centres may either be equipped with a simple back-working unit with a vice, or with a multi-position back-working turret that can manage a counter-spindle (simultaneously to the main spindle), a vice and a tailstock.

“In some instances we have reduced cycle times by two-thirds of what our previous subcontract supplier could achieve,” says Mr Birtles. “On average I would estimate we have taken around €8 out of piece-part cost, ensuring rapid payback on our investment in Willemin-Macodel technology.”

Surgical Innovations machines several jaw variants, which measure around 15mm in length. Attached to the end of long shafts and operated by scissor-type handles, surgeons use the instruments through port access technology for procedures such as gall bladder removal and gastric banding.

Each Willemin-Macodel machine works 24 hours a day, seven days a week, 51 weeks a year. Operations include turning, end milling, drilling, spot-drilling, slit sawing, chamfering and the application of a special form tool for the generation of fine teeth profiles.

“With tolerances of around $\pm 0.005\text{mm}$ in some instances, precision was top of our shopping list when it came to specifying a suitable machine,” says Mr Birtles. “I’m pleased to report that the Willemin-Macodel machines run largely unattended without any accuracy drift operating in a non-temperature regulated environment. We are very proud of our quality and it’s important we deploy the best-available production technology. Demonstrating we have capable processes is also vital for validation purposes. We operate a rigorous quality system approved to ISO 9001 and ISO 13485. The company is also FDA registered.”

Reduced manufacturing costs and more efficient deliveries have combined with a move away from third party suppliers to its own distribution network; all of which has helped boost margins.

Turnover now stands at £7 million, while the workforce is now some 120 strong and includes three apprentices with a further six to be recruited in the summer of 2011.

“Today we sell into 42 countries worldwide,” says Mr Birtles. “Over 90% of our output is exported and we believe we’re the premier manufacturer of these device types in the UK, by a long way!”

The company’s investment in milling/turning is supported with new rapid prototyping technology in the shape of a recently acquired Objet Alaris desktop 3D printer, also supplied by HK Technologies.

“We were previously subcontracting our rapid prototyping requirements with a 2-3 day turnaround,” explains Mr Birtles. “But now, our 30-strong design team can design during the day and leave parts to build overnight on the Alaris 3D printer – components are complete and waiting in the morning. The machine is used every day and we achieved payback within six months.”

Surgical Innovations has its own clinical advisory board comprising of leading surgeons from across the world who provide comment on the company’s latest prototypes. Some of the surgical procedures take several hours to complete so it’s vital to supply accurate prototypes for purposes of comfort and usability.

Ultimately, the target for Surgical Innovations is to achieve turnover of £15 million within the next three years. Meeting this ambition will be a stiff challenge and could require the installation of up to four further Willemin-Macodel machines to build on the company’s already considerable success...a feat that hasn’t passed unnoticed. In 2010 Surgical Innovations won a Queen’s Award for Enterprise in the innovation category, while in June of the same year the company was honoured by a visit from Prime Minister David Cameron. In February 2011 The Princess Royal called in to meet the directors and many of the staff, showing great interest in the production process of the medical instruments, and unveiling Surgical Innovations’ new injection moulding centre.

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