

Driving investment

While the aerospace sector may have grabbed the headlines over the past two years, the UK's automotive industry remains hugely influential in the country's economy, as SteedWebzell reveals

Although Heller now supplies horizontal machining centres to a wide range of industries throughout the world, its roots remain in the automotive businesses that are local to it – Daimler Chrysler, Audi and VW. The company has grown with the needs of this industry, developing its machines and services to suit the sector's ever-changing demands.

Manufactured at the company's plant in Redditch, Heller horizontal machining centres are today a feature at OEMs as well as at first and second tier suppliers across the UK's automotive industry. For instance, the all-wheel-drive system for the new Ford Transit will be produced by MJ Allen at its own foundry and machine shop in Ashford, Kent, using a Heller MCI 16 horizontal machining centre.

"We wanted a machine tool supplier who would give us time and understanding, and in whose expertise and engineering capability we could

trust," says the company's managing director, Tim Allen. "From the outset Heller has given us excellent assistance, developing the production process, recommending manufacturing techniques and designing the fixtures to give us the best and most versatile machining system."

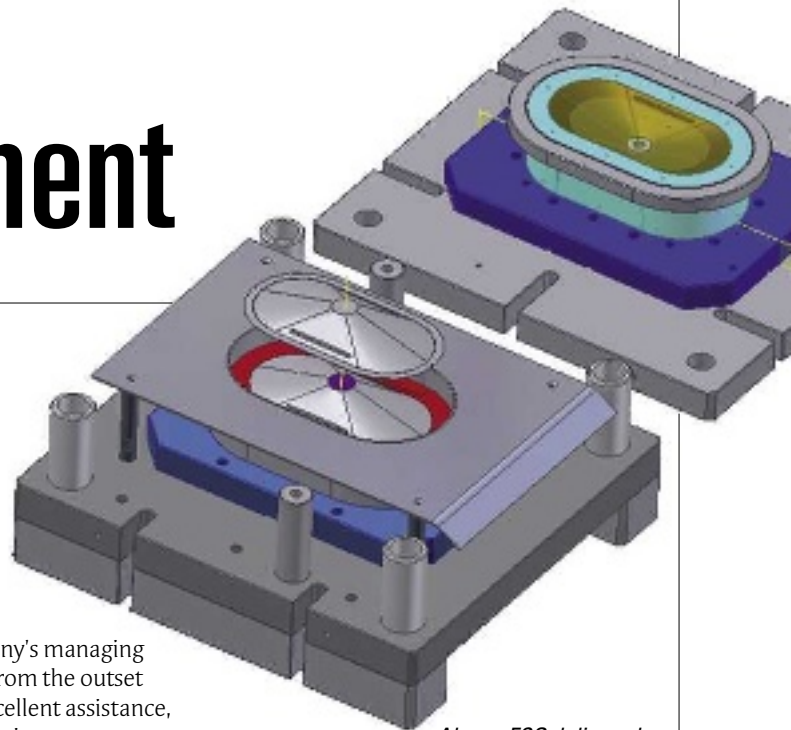
Heller's expertise in the automotive sector is reinforced by its client list. Other notable UK installations include Mahle Powertrain at Wellingborough, and Perkins Stafford, where two new Heller MCH 250 machining centres are working on cylinder heads alongside an existing three-machine Heller con-rod cell.

ALL IN A STANDARD WEEK

Senior manufacturing engineer Mark Johnson, who headed the Six Sigma Green Belt team in charge of the project, says: "With 85 per cent efficiency, which we knew from experience we would achieve on the Heller machines, we could meet the production requirement within a standard five-day week."

Further down the supply chain, Stroud-based sub-contractor Springfield Engineering provides precision volume parts to a host of demanding customers, including those in the automotive sector.

The company has recently won an order for the volume production of diesel engine cylinder heads from one of the leading German manufacturers – its first major contract for an overseas automotive OEM. "Heller was the obvious choice," says company founder Eddie Reed, explaining the installation of an MCH 250. "There is nothing the



Above: FSG delivered a globally competitive moulded part price for Harman Becker. Below, BM Injection brought wire-cut EDM in-house and saved money and boosted its automotive mould tool technology

company doesn't know about the automotive industry, and it provides a second-to-none engineering support service."

While diesel engines are a gaining a following with the motoring public, development and production engineering effort is also being applied to direct injection petrol engines. They are now able to provide up to a 20 per cent improvement in economy over conventional engines, giving motorists another cost-effective alternative.

As Markus Schnyder, managing director of Mikron Machining Technology based in Agno, Switzerland, maintains: "Fuel injection for both diesel and petrol engines is a very demanding technology sector. The associated design and development, as well as machining, constantly push the boundaries of production engineering knowledge to meet ever-tightening legislation." And he should know – because he heads up the Mikron operation that has become expert in the supply of machining technology to the fuel injection business.

Mikron Machining Technology, with a third of its machine tool sales in fuel injection, is at the forefront of these



rapidly developing levels of sophistication but, unlike other machine tool suppliers, it is able to combine both machine tool and tooling expertise, through its sister company, Mikron Tool. This provides the ability to develop cutting tools such as drills, endmills and form tools in conjunction with the application engineering and machine tool build teams.

Typical applications include an extremely tough 50 MnCrV4 forged steel truck injector and, such is the application engineering and machine build quality, that a 3.56 mm diameter hole with a tolerance of ± 0.05 mm has been drilled 78 mm deep, (a 22:1 depth to diameter ratio) using a Mikron CrazyDrill in 20 sec. Starting with a pilot drill to enable bushless drilling at 6,000 rpm and 0.04 mm/rev feedrate, penetration was 254 mm/min over a depth of 6.3 mm. The tool was then changed to a Mikron CrazyDrill of the same size to finally drill to depth at 9,094 rpm at 0.025 mm/rev feedrate (227 mm/min penetration rate). In fuel injection applications, holes as small as 1.7 mm diameter are drilled with high pressure, 120 bar fully programmable through-tool coolant.

ANOTHER MIKRON

The demand for UK manufacturing input into mouldmaking, toolmaking, pattern making and rapid prototyping for the automotive sector is driving reinvigorated investment in machine tools and machining services.

For example, Brackley-based Frazero, an international automotive interior design and manufacturing specialist, has recently invested in a Mikron XSM 600U 5-axis machining centre from Agie Charmilles.

The Frazero operation focuses on providing conceptual solutions through to production of complete car interiors – up to 3,000 a year. Customers include Bentley, Bugatti, Cadillac, Ford, Jaguar Lincoln, Morgan, Nissan and Rolls-Royce.

The investment in the Mikron XSM 600U provides Frazero with ultra-fast machining capability and, as a consequence, has reduced part cycle



A single Index V160C hanging-spindle VTL and innovative tooling from Geo Kingsbury provided capacity at half the alternative solution's price for one automotive sub-contractor

times from two hours to 20 minutes for a glove compartment-housed cigar case.

Investment is all about generating savings. Providing injection mouldings and injection mould tooling to all of the UK's main tier 1, 2 and 3 automotive suppliers is a competitive business, which is why Hampshire-based BM Injection decided to take control of its wire erosion processes, purchasing a new Sodick AQ325L with linear drive technology from Sodi-Tech EDM.

"Having an in-house wire facility for

our injection mould tooling makes us feel more in control when building tool manufacture into estimates," explains general manager Tim Combes. "As well as saving outsource costs, the new machine has improved our ability to produce cutting edge tools."

Many UK toolmaking companies with the right levels of expertise are reporting increased orders from the automotive sector. Take Glamorgan-based FSG Tool & Die for example, which has just won an order from the

Motor industry facts

According to the latest figures (2005) from the Society of Motor Manufacturers and Traders, the UK produces just fewer than 1.6 million cars annually (around 400,000 for the home market). The UK still has car manufacturing sites owned by: Aston Martin (Gaydon and Newport Pagnell); Bentley (Crewe); BMW-Mini (Oxford); Honda (Swindon); Jaguar (Halewood and Birmingham); Land Rover (Solihull); Lotus (Norwich); LTI (Coventry); Metrocab (Tamworth); Morgan (Malvern); Nissan (Sunderland); Rolls-Royce (Goodwood); Toyota (Burnaston); and Vauxhall (Ellesmere Port). The top five plants in terms of annual volume are Sunderland (315,000), Burnaston (264,000), Oxford (200,000), Ellesmere Port (189,000) and Swindon (186,000).

The UK currently manufactures just under 207,000 commercial vehicles a year. Plants include: Alexander Dennis (Guildford); Dennis Eagle (Warwick); Ford (Southampton); IBC (Luton); Land Rover (Solihull); LDV (Birmingham); Leyland Trucks (Leyland); Optare (Leeds); and Peugeot (Ryton).

The UK also produces around 3.1 million engines a year (including non-automotive), which has climbed from 2.4 million in 1999.

automotive division (Harman Becker) of Harman International to help develop an "aluminium cone" in-car speaker system.

The challenge was to develop a mass production manufacturing process, at a competitive price, and create a product appealing to the top-end automotive market. The task for the toolmaker was to develop tooling methodology that could cope with very thin section components and assemblies in a variety of materials, with complex 3D component designs – all at a competitive cost and time-frame.

Working with FSG, the outcome of the project has been more than impressive. The target cost for the cones was achieved at a globally competitive level and the product now has a home as a premium audio system on the luxury vehicle set, including Range Rover, BMW 7 Series and the Mercedes E Class.

Elsewhere, hot runner tools from DMS-Diemould proved to be the solution when Wolverhampton-based Fern Plastic Products secured an order to supply injection mould tooling for diesel engine filter components.

"The six-tool order featured fully automatic unscrewing technology and was fairly complex in its build-up," explains Fern Plastic's works director, Keith Harper. "We opted to use DMS-Diemould for the fixed half of the tools as the company has so much experience in hot runner systems." Mr Harper says that hot runner tools are becoming increasingly popular as customers seek

A DMS hot runner system supports sprue-free moulding for Fern Plastic Products' mould tools, an increasingly common customer request, it says

tools that are the "finished article", and do not need nipping-off sprues.

When a UK automotive sub-contractor won the contract to supply fuel injection pump adapters for a new diesel engine, the company decided that a dedicated cell was required to machine the high pressure aluminium die castings on both ends within a 76-sec TAKT time. The obvious choices were to install four 3-axis horizontal spindle lathes and employ two operators, or to invest in two opposed-spindle turning centres.

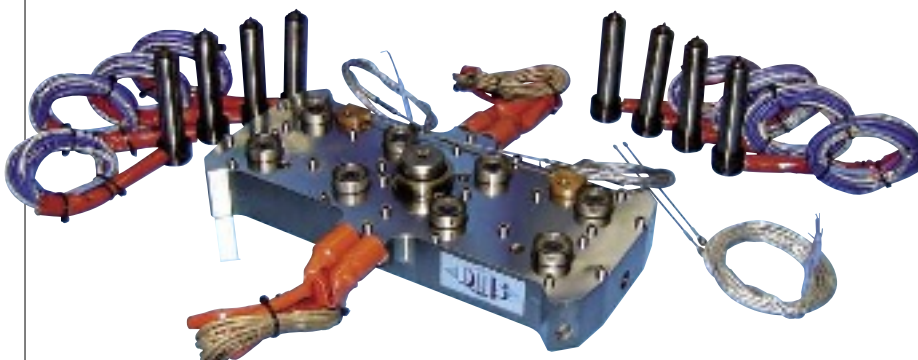
However, Geo Kingsbury Machine Tools came up with an alternative at around half the capital cost, based on a turnkey cell with a single Index V160C hanging-spindle lathe.

Key to achieving this cost-effective solution was the ability to machine the adapter in one clamping, rather than two, using a bespoke two-jaw chuck that allows sufficient clearance at the back for the component to be turned on the reverse end using a special tool that is able to access the back face through the bore of the component. Not only is one machine sufficient, but the 54-second cycle is well within the TAKT time of the line, which includes assembling an O-ring on to the adapter and pressure testing prior to just-in-time delivery to the car manufacturer.

Outside of machine tools and equipment, Master Chemical has been able to solve other machining-related problems in the automotive sector.

One sub-contractor was experiencing heavy graphite residues, insufficient rust protection and a foul smell with its existing product, it set up a trial using TRIM SC9030 in three machining centres and two CNC lathes.

TRIM SC9030 excelled even in this hard water area and cleaned away the graphite residues. It also provided two to three weeks' indoor rust protection on cast iron parts and remained odour-free for the full six month trial. □



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