

Strength in aluminium

Mouldmaking is dead in the UK, right? Wrong! Dudley Associates has successfully built up business by offering fast delivery of high quality aluminium tooling. *Machinery* reports

Yes, you can send drawings to China and get a pretty cheap tool in return. But what if you want someone to help develop the design? What if you want the tool on a short lead time? What if you want to speak to someone who speaks your language fluently and understands the 'British way' of doing things? What if you want to make a modification, but the finished tool is on a ship just rounding the Cape of Good Hope?

No hope, more like! For this reason, progressive UK toolmakers and mould shops prepared to invest in the right equipment and skills are finding there is a genuine demand for their services. Furthermore, if you throw a unique-selling-point into the equation, then chances are the phone will be ringing off the hook.

Take Lutterworth-based Dudley Associates for example, which was established in 1995 with the aim of becoming one of the UK's leading designers and manufacturers of injection mould tooling and technical plastic injection mouldings. Nothing exceptional in that you might think. However, the ace that Lutterworth-based Dudley Associates holds close to its chest is its specialist knowledge in the field of high grade aluminium tooling.

Now the mention of 'aluminium' will conjure images of tools fit for little more than a few hundred parts at best. However, such tools can produce 30,000-50,000 components. What is more, aluminium tooling offers additional benefits that make the decision to 'go soft' an obvious choice. For a start, the tool cost can be half that of the cost of



Dudley Associates was established in 1995 with the aim of becoming one of the UK's leading designers and manufacturers of injection mould tooling and technical plastic injection mouldings

traditional steel, while lead times are in the order of days-to-weeks, rather than weeks-to-months.

PRODUCTION POSSIBILITIES

"More and more customers are realising that aluminium tooling, once seen as a prototype stage in the manufacturing process, can in fact deliver the required production volumes," states the company's co-founder and operations director, Robert Dudley. "When they also see how quickly we can make it, and the price, let's just say few continue to source steel tools." And for those requiring higher volumes, Dudley Associates can

even manufacture aluminium moulds accommodating local steel inserts to extend life expectancy to 100,000 parts.

With this offering, the company has grown to employ 26 people and reached a turnover of almost £2 million. Its client base includes multi-nationals and private organisations in the automotive, medical, defence, electronics, aerospace and biotech sectors.

"Few toolmakers or production moulding companies have the skills and capability to offer anything near our level of technical input, flexibility or speed of manufacture," claims Mr Dudley bullishly.

Dudley Associates has experience of

Investing to deliver on speed and quality

When a large OEM defence manufacturer approached Dudley Associates to provide consultancy and to manufacture a number of close tolerance electrical receptacles for the Eurofighter Typhoon, the company recognised immediately that its spark erosion capability required improvement.

"It was an area where we would sometimes get bottlenecks and our existing technology wasn't really in keeping with the rest of our facility," says Mr Dudley. "We do not sub-contract – we manufacture all of our jobs in-house here at Lutterworth – so for such an important project we decided to investigate a new die-sink EDM."

High finish, high accuracy, fine rib work all to be delivered on a short lead time were parameters. The company also looked for reliability, low maintenance and excellent support structure. The Sodick AQ55L emerged the clear leader. Sample parts for Eurofighter were submitted.

Mr Dudley adds: "The customer had an existing supplier who couldn't meet the finish requirements, even by hand. However, we manufactured the tool on our new Sodick and the parts passed customer validation first time!

"Obviously when producing aluminium tooling we want to do as much as possible on a machining centre, but with features such as high tolerance (0.02 mm) small ribs, spark erosion is our only way forward. I would estimate the Sodick AQ55L has reduced the cycle time for features like these by 50 per cent compared with our previous machine, whereas surface finish has improved by as much as 80 per cent."

Fears that the machine would be too fast for the available work, and so stand idle, proved unfounded. "When we purchased the machine we thought there might be a danger that it could stand idle for certain periods, simply because of its speed. However, the operators have really taken to the technology and they are introducing an ever-increasing amount of existing jobs to the AQ55L."

The Sodick AQ55L features glass scale feedback, the ability to import 3D CAD files, linear motor drives, menu-driven controls and the absence of 'flush' technology. Sodi-Tech says that Sodick linear servo motors for CNC die sink models can reduce EDM machining time by as much as 50 per cent, and since there are no ballscrews or couplings, backlash is totally eliminated. The control automatically writes the NC code, inserting the optimum cutting conditions.

machining mould tools for single or multi-cavity production; either fully or semi-automated. The aluminium alloys processed by the company are high grade and UK sourced from reputable stockholders who provide certificates of conformity. And quality and traceability are important concerns for the company. Accredited to ISO9001:2000, it additionally operates material batch traceability and a number of more complex quality management systems specific to each sector or client. These are further enhanced by AQP (advanced quality planning) techniques and control

plans, with mouldings/samples being supplied with certificates of conformity and a range of ISIR, PPAP/PSW or PIST/PISC inspection documentation as required. Quality systems at Dudley Associates incorporate aspects of the QS 9000, TS16949, and VDA standards to allow direct supply to large OEM and first tier organisations.

The company's in-house inspection facilities include a fully equipped quality department with an ITP 3-axis co-ordinate measuring machine and geometric tolerancing software, as well as shadowgraph technology with Quadra-Chek software. Issue controlled patrol records and works instruction sheets are standard and boundary samples, as well, 'first-off' and 'last-off' samples are retained.

Dudley Associates has already realised around 1,000 new tools/products and moulded in over 600 grades of high end engineering polymers. The range of polymers used by the company reflects the profile and complexity of the projects that it undertakes, and includes Ultem, nickel, steel, PTFE and glass filled PBTs (polybutylene terephthalates) and nylons.



Indeed, it has been known for certain materials to cost up to £280 per kg.

Typical parts supplied include inter-cavity medical devices, over-moulded inserts, casings, gears, seatbelt mechanisms, steering column components, RF shielded components, computer electronics, connectors, engine cowlings, satellite components, interior and exterior trim, under-bonnet components, safety mechanisms, point of sale equipment and filters. The company has also provided both tooling and mouldings for the authoritative research body in its industry – RAPRA.

“The field in which we operate calls for a completely different mindset to that of traditional manufacturing,” explains Mr Dudley. “It is essential to be able to allocate resources very quickly, to master the latest materials and technologies as required and to be able to collaborate with customer development engineers to

offer guidance and provide feedback.

“Our company was designed to be a centre of excellence; we are not held back by ‘traditional’ attitudes to service, co-operation or flexibility. Delivery and quality are of the essence, and the success of a launch or tender often relies on our ability to improve on our own quotes, as post-order design changes can be frequent. In this business there are no ‘contracts for life’ and you are only as good your last job.”

AND THERE'S MORE

As well as the manufacture of aluminium tooling and complex plastic mouldings for prototype, development and low volume production, the company's extended service includes: metal-to-plastic and cost-down projects; unlimited access to technical and developmental polymers and resources; quality documentation and technical

consultancy; product design and advice on processability; and stereolithography and other prototyping services.

Mr Dudley is clear that while other companies might also offer aluminium tooling, he points to his company's credentials, contrasting them with what else is on offer.

“We are a specialist company offering niche services – sometimes imitated by others but never matched. If you search for ‘aluminium tooling’ on an internet search engine, you will find others offering this service. Some even offer one-to-three-day lead times. All I would say is, tread carefully. These companies are not offering this service on a like-for-like basis. Yes, you can have that lead time but only if certain ‘conditions’ are met, such as supplying your own polymers (not easy or cheap), compromising design, low tool life, strict deadlines, sub-contracted manufacture and payment up-front.



Attention!

**Machine tools
not fitted with
linear encoders for
positioning may be
inaccurate**

“Also, check that you are being quoted for a complete tool rather than just for tooling inserts,” he continues. “It is worth checking the toolmakers’ credit rating and current references. If the supplier is outside the UK, beware of the pitfalls regarding legal accountability and confidentiality.

“At Dudley Associates we quote for exactly what the client requires; we do not later claim ownership of any parts of the tooling (the bolster plates or fittings, for example, in order to make the transfer of tooling to another supplier as difficult as possible), neither do we charge for ‘tooling’ and then only manufacture modular inserts that fit inside our own standard ‘master’ tools.

“We recently completed three sets of interior trim tools in three and a half weeks and I don’t think many, if anyone, would be able to match that achievement with the same level of quality.”□



The Sodick AQ55L emerged the clear leader in relation to a Eurofighter parts requirement

Look for this symbol



HEIDENHAIN Shows the Way
to Precision

Fact:

Machine tools fitted with linear encoders are statically, dynamically and thermally more precise.

Machine tools not fitted with linear encoders for positioning rely on the pitch of the ballscrew for their measuring standard.

The task of the ballscrew is to transfer enormous forces at high traverse speeds but it will deform during operation due to thermal changes.

This must influence the accuracy of any positional values.

