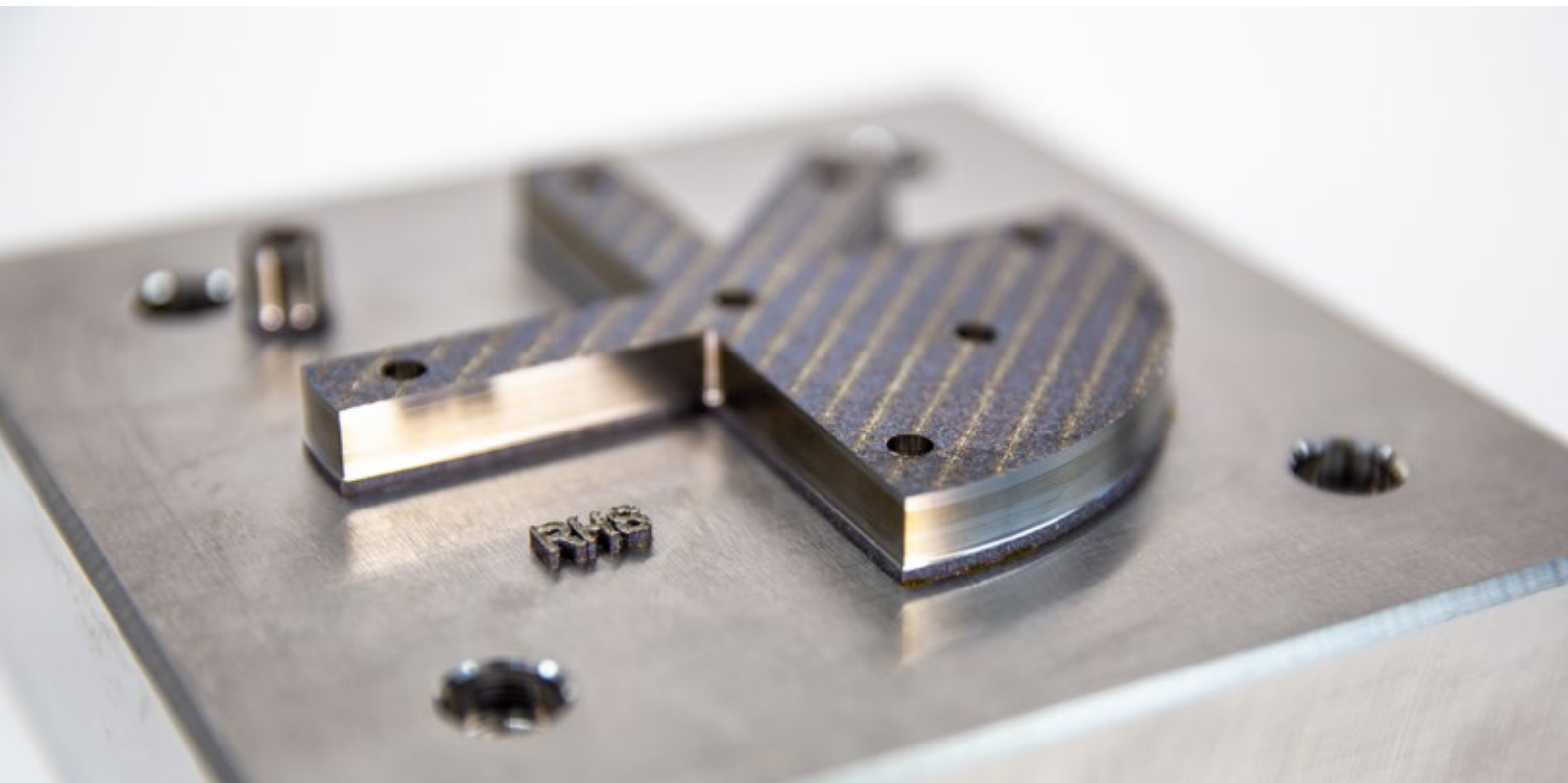


RAPIDPRODUCTION
mould tools

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White Paper

Getting over the line: Rapid Production Mould Tooling delivers critical time-to-market savings



New toolmaking technology helps companies cut weeks from the timeline to high volume production.

Be first and learn fast from the market. In many sectors, the ability to launch, adapt and improve products more rapidly has become a critical competitive differentiator. In this environment, the success of a new product can be determined by an organisation's ability to move as rapidly as possible into high volume production.

For products using plastic components, the design and manufacture of injection mould tooling can be a significant bottleneck on the journey from prototype to full market availability. Conventional processes can entail a four-month wait between sign-off of a part design and the availability of production components.

In an attempt to address the shortcomings of the conventional toolmaking process, many companies have looked offshore. Specialist toolmakers in China can offer the scale, resources and project management skills to build tooling faster than their rivals in Europe or the US. While it is effective for some applications, this approach has significant shortcomings, however. High logistics costs, long transport times and communication challenges can quickly erode the time savings achievable through offshoring.

As an alternative, companies can opt for aluminium bridge tooling, manufactured locally using high speed machining techniques. This approach can provide a fast route to production, but such tools have limited lifespan in high volume applications. That creates significant additional costs if companies have to order additional tools to meet their production goals.

Faster, stronger, higher quality

Now UK injection moulding specialist OGM is developing a new approach that aims to overcome many of the limitations of earlier rapid toolmaking technologies, allowing customers to obtain steel tools suitable for high volume production in as little as four weeks. That's less than a third of the time required for conventional toolmaking. OGM's Rapid Production Tooling technology combines a number of advanced manufacturing approaches to streamline or eliminate some of the most time-consuming steps of the toolmaking process.

OGM is developing a new approach that aims to overcome many of the limitations of earlier rapid toolmaking technologies



At the heart of the approach is the company's hybrid metal additive manufacturing and machining technology, the first of its kind to be installed in the UK. This approach combines additive manufacturing using direct metal laser sintering with conventional CNC machining technologies in an integrated build process. The system builds mould features from powder material layer by layer using a laser. After each layer is added, an automated secondary machining process rapidly removes excess material to generate the finished geometry of the tool. The resulting extremely high dimensional accuracy and fine surface finish allow core and cavity details to be manufactured automatically in one hit. The material surface finish produced is also very hard, avoiding the subsequent need for heat treatment to produce production tooling. If required, a full range of textured or polished surface finishes can be applied in secondary processes.

The machine provides the most significant time savings for complex mould features such as the deep, narrow slots required to produce thin internal walls. Such features cannot be produced using a conventional milling cutter. Instead, traditional toolmaking approaches require either the manufacture of complex split tools, or the uses of EDM (spark erosion) techniques followed by time-consuming hand polishing. The system can also be used to create conformal cooling channels inside mould elements, an approach that can significantly reduce manufacturing cycle time and improve the quality of complex parts.

A modular strategy

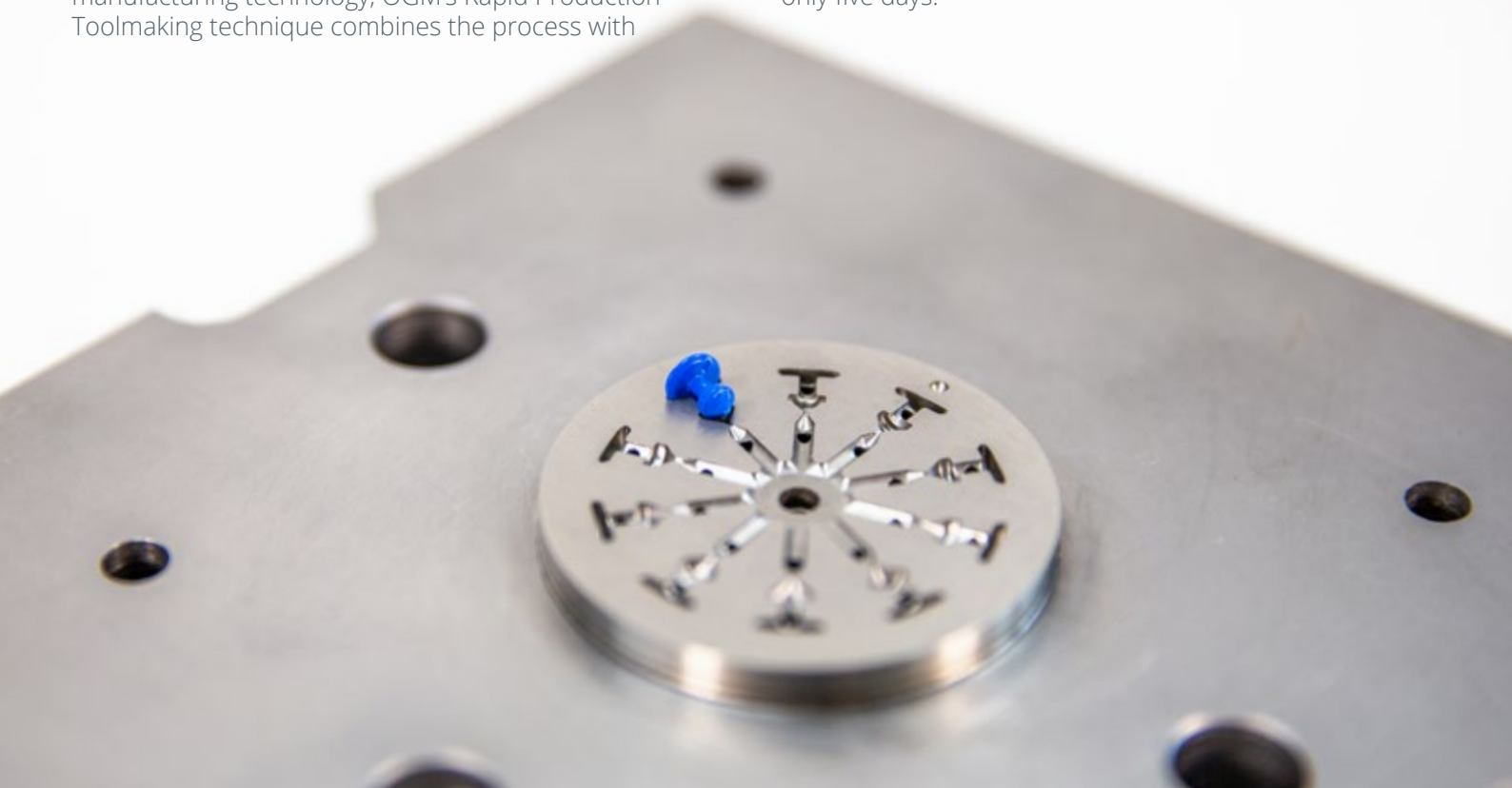
To make the most efficient use of its hybrid metal additive manufacturing technology, OGM's Rapid Production Toolmaking technique combines the process with

conventional high-speed machining. The basic shape and simpler features of a core or cavity are machined first from a solid block of tool steel. This becomes the base structure onto which the more complex features are added. If the overall dimensions of a part have been defined, but certain features are still being refined, this approach means tool production can begin in parallel with the end of the design process, with the complete part definition only required at the final production stage.

The completed core and cavity components are then installed in a standard design of bolster, preassembled and ready for production. To accommodate a wide range of possible part designs, OGM has built a range of these standard bolsters suitable for different sizes of components. The range can accommodate both simple two-part core and cavity designs and more complex components requiring moveable side cores.

If a customer's part falls outside the dimensions of its standard modular components, OGM can also manufacture dedicated bolster assemblies. Here again, customers have the opportunity to save time through parallelisation: bolsters can be made once the basic part dimensions are known, but before detailed design is complete.

The Rapid Production Tooling approach is still undergoing continual development and refinement, but the early experience and feedback from customers has been extremely positive. In one notable case, OGM was able to take a customer's design, manufacture a four-implosion mould tool and deliver 40,000 moulded components in only five days.



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About OGM

As one of the UK's leading trade plastic injection moulders, our comprehensive range of injection moulding machines gives us the flexibility to fulfil the diverse scope of our customers' requirements. Processes we carry out include conventional injection moulding, over-moulding, insert moulding and clean room moulding.

We select and source high-quality materials from proven suppliers and have experience in processing most thermoplastics. We manufacture a huge variety of injection moulded parts, including housings, aesthetic parts, two-part mouldings, clear mouldings/lenses, internal technical parts and high-tolerance parts.

