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A model application of clamping tech

Long before a new car model hits the streets, you can see it in the flesh at MT Technologies.

The Ingolstadt, Germany-based model maker, whose history dates back even before the car was invented, manufactures entire vehicles as reference and test models made of aluminium for numerous OEMs.

What the company produces from solid blocks must be clamped efficiently. Thanks to intelligent zero-point clamping technology from AMF, this can be done quickly, flexibly and with high accuracy by means of a modular principle.

"The idea came from Formula 1," says Mario Goth, remembering a visit in 2013 to the Sauber Team in Switzerland. Here the manager of mechanical production at MT Technologies saw how effectively the racing engineers clamped individual parts with AMF clamping technology. This triggered the adoption of the clamping system in his own production operation.

With Andreas Maier & Co (AMF) MT Technologies has a competent partner that takes on the challenges of its customers and can offer customised solutions.

"MT Technologies listened to us intently from the very start," says Erik Laubengeiger from AMF, who provided customer support at the time. "They needed to simplify the complex clamping operations of aluminium ingots and significantly reduce long set-up and calibration times. Most of the parts manufactured are small batches or individual parts."

The huge raw aluminium blocks for the individual parts of an aluminium model on a scale of 1:1

The side panel of the body and aluminium rims are machined from solid blocks

When finished, the 1:1 scale model looks like a real car, but made solely from aluminium. Even the doors and boot lid can be opened. This is so the designers and engineers can make an initial three-dimensional image of a newly planned car model and actually walk around it.

Attachments and cladding parts are also fixed at the OEMs to verify the fit for subsequent series production.

The raw aluminium blocks for the individual parts, such as the floor assembly, side parts, roof, boot lid and wheels must be manufactured on large gantry milling machines and clamped precisely beforehand.

Two worktables with dimensions of 1,300 x 2,000mm and two with 1,300 x 1,000mm as well as another are used on Jobs Linx machines from FFG. They are equipped with 50 or 20 K10 zero-point installation clamping modules from AMF at intervals of 200mm.

"With the defined grid pitch, each worktable offers us the greatest possible flexibility in positioning the parts," explains Mr Goth. "And if a clamping point should be outside the grid or even outside the plate, that is not a problem. With clamping rails, multiple clamping bars or other numerous clamping elements from AMF, we can reach every point that we need for safe clamping."

The operators place modular spacer elements on top of each other on the worktables with integrated zero-point clamping modules and cross-T-slots until the block or the blank reaches the appropriate height so that five-side machining is possible. The AMF range of connecting, construction and counterbalance elements as well as various adapters is almost inexhaustible.

The upper interface to the workpiece is again a mechanical zero-point clamping K10 module which positions and clamps the M8 or M10 pull-studs screwed into the workpiece.

"The system is just as easy and logical as Lego. Everything fits together and can be positioned quickly and precisely thanks to the zero-point clamping," adds Christian Vogel from AMF, who is currently in charge of the Ingolstadt-based company.

The clamping modules on the worktable are opened hydraulically at an operating pressure of 60 bar. Each one pulls in the correct pull-stud with 10kN and then holds it tightly with 25kN. Since the modules are intelligently designed and carefully manufactured, they can achieve this with a repeatable accuracy of less than 0.005mm (<5µm). And since they are mechanically locked by spring force and tensioned without pressure, the pressure lines are removed after the clamping operation.

For direct clamping, the holes necessary for the pull-studs are made directly in the unmachined part or aluminium block. To ensure that subsequent processing takes place without any interfering contours and is collision-free, AMF makes CAD data freely available in many common formats for all of its own products.

The cutting capacity is significant and can add up to a machining time of 40 hours. For example, a boot lid milled from an aluminium block with an initial weight of 1.7 tons, can be reduced to a part of just 90kg. All in all, aluminium blocks of various sizes, totalling around 20 tons,

At MT Technologies, the workpiece is clamped in just a few simple steps for five-sided machining

The clamping plates are equipped with K10 installation clamping modules from AMF at a grid pitch of 200mm

The zero-point clamping system is just as easy and logical as Lego

are required for a vehicle. It takes about five months for a vehicle to be finished to its full scale size and since several spacious halls ensure the strict separation of individual projects from one another, the model-building experts at MT Technologies can produce up to ten models a year.

For car manufacturers, this is an indispensable part of a new model's development phase. And thanks to the experience in model construction and the manufacturing skills at MT they already know whether a car will meet their expectations at an early stage.

AMF
www.amf.de

MT Technologies
www.mt-technologies.com

Super tough indexable milling

Kennametal has introduced the KCK20B and KCKP10 indexable milling grades for higher wear resistance and up to 30% longer tool life when machining cast iron and compacted graphite iron components.

Both grades offer high productivity and consistent, repeatable performance during roughing, semi-finishing, and finishing operations. Available for many indexable milling product lines, the new grades come with a golden top layer for fast, easy wear identification, ensuring maximum tool life for each cutting edge.

"The new grades feature High-Power Impulse Magnetron Sputtering (High-PIMS) technology that provides a smooth insert surface and optimal layer adhesion for less flank wear – one of the leading causes of insert failure," says Gil Getz, product manager at Kennametal.

He notes that the new coating technology also increases cutting edge strength: "The result is high-performance milling in a broad range of cast iron alloys, including grey cast iron, ductile cast iron, and compacted graphite cast iron."

KCK20B and KCKP10 are suitable for wet or dry cuts. These include rotor hubs used in windmills, pump housings, steering knuckles and gear housings for heavy equipment, and automotive components like crankshafts and cylinder heads. While KCK20B delivers higher productivity in roughing and semi-finishing operations, KCKP10 is applicable for finishing operations, but also works exceptionally well when profiling and copy milling cast iron and steels up to 45 HRC.

The new grades come with a golden top layer for fast, easy wear identification

"For customers where high tooling cost and downtime associated with tool changes are especially important, KCK20B and KCKP10 grades promise to increase tool life tremendously," says Mr Getz. "And for those who wish to increase throughput, the new grades deliver there as well. Either way, it is a win-win for any shop machining cast iron."

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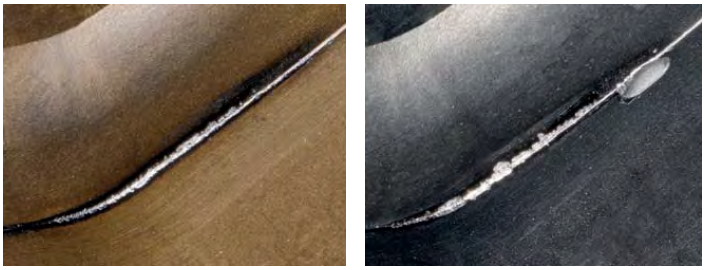

Flank wear comparison: KCK20B on the left and another grade on the right. Flank wear limits tool life when machining cast iron and compacted graphite cast iron