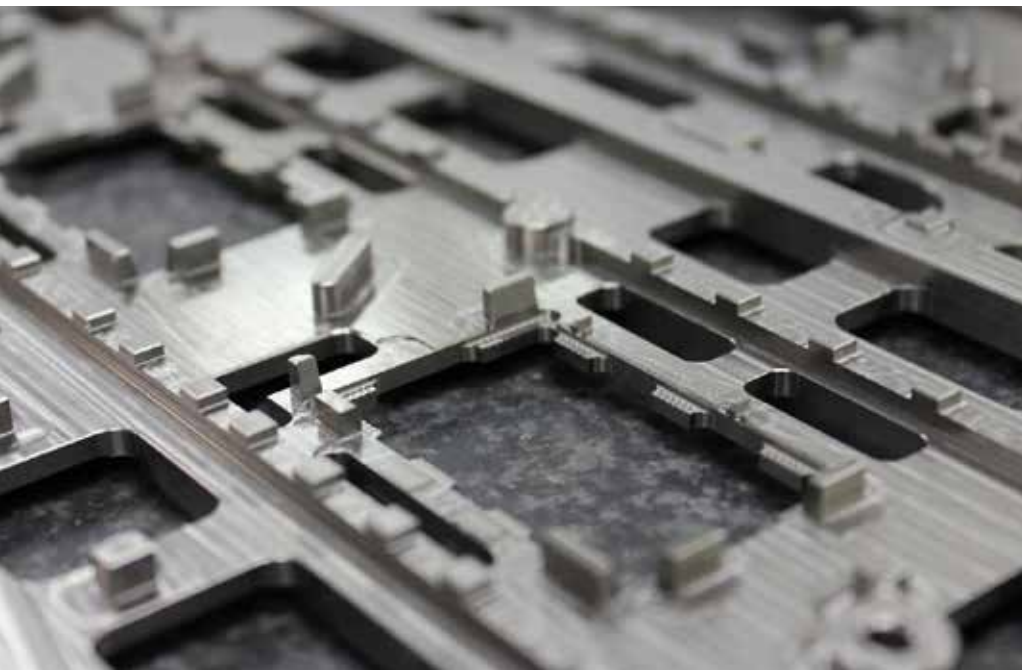

FORMAGRIND & MITSUBISHI MATERIALS

PRECISION, PERFORMANCE AND RELIABILITY



FORMAGRIND

A SUCCESS STORY THROUGH PARTNERSHIP



“We consulted with Mitsubishi at the very start of the project and they recommended the VQ end mills for the majority of the base plate operations”

MIKE JOHN

SHOP FLOOR MANAGER - FORMAGRIND



Machining process: High accuracy and precision with Mitsubishi Materials VQ series of end mills

South Wales Subcontractor has “Steely Determination” to succeed

Operating under the towering shadows of the chimneys at the much publicised Port Talbot Steel works, Formagrind is a subcontractor that is certainly playing its part in supporting the local manufacturing community. The company based in Neath has recently won a significant order that has led to the delivery of two Hurco machining centres and new tooling innovations from Mitsubishi Materials.

Founded in 1983, the current Managing Director and son of company founder Tom Couser; Mr Mike Couser says: “Like any subcontractor, we’ve had our ups and downs. The business grew steadily through the 1990’s with the prominence of consumer electronics giants Panasonic, LG and Sony along the M4 corridor; simultaneously we’ve had difficulties through the numerous downturns. However, we’ve continued with our program of re-investment into new technology during these times and diversified into additional industries so as not to become too exposed to sector downturns.”

With a plant list that includes Mazak, Hardinge and Gildermeister turning centres, Hurco VMCs and Sodick EDMs to name a few, the ISO: 9001 company has invested heavily. In October 2015, the company moved to a new 11,000sq/ft factory and also purchased 3 seats of iMachining CAM software. When the 26 employee business won a major automotive order in February 2016, Formagrind bought two new Hurco VMX30Mi machines. As Mr Couser recalls: “The new order was for over 100 complex titanium fixtures that each consist of a carrier base and corresponding top plates that clamp electronic PCBs assemblies during their production and final assembly processes. Firstly, we needed two new VMC’s to give us the additional machine capacity; and secondly we needed consistent lights-out production. This is when Mitsubishi stepped-in with their solid carbide end mills.”





Optimising machining parameters: Andrew Probert (left) with Robert Owen (right) discussing tooling in front of the new Hurco VMC



ABOUT VQ

Series	9 types - Square corner Ball nose Corner radius Roughing
Diameter	Ø0.2 mm ~ Ø25

Vibration control end mills for difficult to cut materials



High performance through reliable technology

Tooled Up For Production

Like many subcontractors, Formagrind was primarily using the services of a local distributor that sold multiple tooling brands without the required expertise to best service the end user. The frequency that Formagrind was processing materials such as molybdenum, tantalum, titanium, inconel and other difficult to cut materials was increasing and made the situation more prominent. At this point, the company called upon the expertise of Mitsubishi's local application engineer, Mr Jason Gardner for support. The expertise and the consequent results has seen the Formagrind tooling on Mitsubishi products rise from 10% to beyond 80% of the total spend in just over 5 years.

Commenting upon this situation, Formagrind's shop floor manager, Mr Mike John says: "Our tooling spend wasn't truly measured or qualified and we set about using the experience of Mitsubishi to set performance parameters and structures. We initially trialled Mitsubishi's face mills with huge success. Jason Gardner recognised that our existing aluminium roughing end mills were also under-performing compared to the potential of Mitsubishi tools. He implemented the Alimaster aluminium roughing end mill range on a long term satellite project for a major aerospace customer, the material removal rates were nothing short of brutal. The success of the face mills and the

Alimaster cutters gave us complete confidence in both Mitsubishi tools and the local engineer."

The confidence that Formagrind has in Mitsubishi products has seen the subcontractor evolve from an occasional purchaser of Mitsubishi tools to a consignment stock customer with a complete range of solid carbide end mills, indexable end mills and face mills, plus high quality back-end tooling. Additionally in April, an Autocrib vending system to store and automatically re-order tools was installed. So, when it came to the company's largest order to date, Mitsubishi's Jason Gardner was one of the first engineers on-site.

Mitsubishi Guarantees 'Lights-Out' Production

The base plate and corresponding top plate cover units that clamp the automotive electronic assemblies were initially required in a batch size of 105 bases and 160 cover plates. With over 14 hours of machining for each base and 1hour 50 mins hours machining for each cover plate, Formagrind realised that it needed to run its new Hurco VMX30Mi machines 24 hours a day, seven days a week for almost two months. With iMachining optimising the process and the Hurco machines purchased for the project, the key factor for unmanned lights-out production was the cutting tools.

Formagrind developed a fixture to

About Formagrind

Formagrind was established in 1983 by Tom Couser and the business has since passed to the next generation, Tom's son Mike, who is the current managing director. As a specialist subcontractor utilising the latest machine tool technology, Formagrind manufactures high precision components and tooling for customers in the aviation, defence, semiconductor, electronics and medical industries.

Located in Neath, South Wales, Formagrind has over 25 employees and it offers a complete turnkey manufacturing solution from design and project management through to production of the most challenging components. The company has registered significant growth in recent years with the ISO 9001 registered company recently moving to a new 11,000sq/ft factory.



Tel: +44 (0) 1792 817661
E-Mail: sales@formagrind.com
Web: www.formagrind.co.uk

About Mitsubishi Materials

Mitsubishi Materials Corporation is a leading Japanese company, specialising amongst others, in the production of cutting materials, coatings and precision tools for the metal working industry. Mitsubishi Materials Corporation operates Head Offices in Europe, India, Brazil, China, USA, Japan and Thailand, a modern R&D Centre in Japan and several production facilities throughout the world. The Corporation employs over 23,000 people in more than 77 countries.

MMC Hardmetal U.K. LTD.

A Group Company of **MITSUBISHI MATERIALS CORPORATION**

Tel: +44 1827 312312
E-Mail: sales@mitsubishicarbide.co.uk
Web: www.mmc-hardmetal.com
www.mitsubishicarbide.com



Formagrind: Machine shop milling section

Mitsubishi's technical and personal ability creates a true partnership

clamp and subsequently machine two 300mm by 200mm by 9.5mm thick base plates at a time. The grade 2 titanium plates are firstly machined with a Mitsubishi 8mm diameter solid carbide four flute VQ Series end mill at a 4.5mm depth of cut with a 1.2mm step-over and a feed rate of 1400mm/min. After almost two hours of non-stop machining, the 8mm tool is followed by a 4mm and a 3mm diameter VQ end mill for the remaining machining of the finite details. Once the surface and the respective details are complete, Formagrind uses the 2, 3.5 and 4mm diameter VQ end mills for rough and finish machining the pockets that are waterjet cut prior to machining as this reduces on-machine times. For the smallest details, a 0.5mm diameter MS2-XLB end mill is used. With a total machining time of 9 hours for the top-face of the two parts, tool life is critical.

As Mr Mike John continues: "We consulted with Mitsubishi at the very start of the project and they recommended the VQ end mills for the majority of base plate operations. For us, the ability to confidently run unmanned for prolonged periods was crucial. Tool life is an essential aspect of this. We couldn't afford to have a tool breakage mid-cycle, as this would potentially scrap the parts and impact on the tooling in the following sequences. To this end, we change the tools after each pair of bases even though tool wear is hardly noticeable after 14 hours of machining."

As for the smaller top guide clamps, Formagrind created a fixture to

machine 10 guides in a single set-up. On the top guides, the first stage machining is done with a 6mm diameter VQ Series end mill at a 4.5mm depth of cut for a total machining time of 1 hour 50 minutes. Again, this is followed by 3, 3.5 and 4mm diameter VQ end mills for the other machining and pocket milling whilst a 2mm diameter VFH long neck series with a 0.5mm radius and a variable helix is applied to finishing the detailed features. During this process, the 3.5mm VQ end mill has a run-time of 55 minutes and it hasn't been changed through the complete project, demonstrating a staggering tool life of 550 minutes on titanium. Additionally, the 6mm roughing tool has conducted 4.5mm deep roughing throughout the complete batch - returning over 20 hours of machining even at these testing parameters.

Concluding on the project and the support from Mitsubishi, Mr Mike John says: "Mitsubishi have an excellent reputation for its solid carbide end mills and we can clearly see why. Without the truly impressive VQ range and the support from the Mitsubishi engineer, meeting the deadline of this project would have been more of a challenge. The final base plates and top plate covers have now been delivered with a total machining time of 2400 hours. The customer is now moving to the next generation electrical assembly and we will once again be providing the clamping bases and guides for this project. Luckily, we have Mitsubishi tools in our corner."