



MITSUBISHI MATERIALS & FIGEAC AÉRO

INCREASED CAPABILITIES IN
MACHINING TITANIUM



In cooperation with

MMC Metal France S.A.R.L.

A Group Company of  **MITSUBISHI MATERIALS CORPORATION**





Front row: Fabien Calmejane (Cutting Tools Manager), Thomas Lesbre (Cutting Tools Technician), Freddy Couderc (Cutting Tools Technician)

Back row: Fabien Viguier (Production Manager), Raphaël Morelle (CNC Machine Operator), Cyril Sabrazat (Business Unit Leader of the Metal Division), Jérôme Rouchet (Machine Programmer of the Metal Division), Laurent Le Méteil (Regional Sales Manager of MMC Metal France)

The technical and production team of Figeac Aéro with the MMC Metal France representative.

A high-tech contract worth over \$200m

Figeac Aéro, a major international player in aeronautical subcontracting, offers its much sought-after expertise in the key sector of difficult to machine materials that are used for large components: technology that is central to reducing energy use in new-generation aircraft.

In order to reduce fuel consumption and benefit from the advantages of this machining process, a major aerospace manufacturer based in Brazil, who is a key customer of Figeac Aéro implemented this technology, by fitting its latest jets with titanium spars. The signing of the manufacturing agreement with the Brazilian company, worth over \$200m, meant that a promising cooperation was established and continues to develop positively.

In today's high tech global environment, Figeac Aéro is facing numerous

challenges. To master such challenges, Figeac Aéro's workforce utilises its whole potential of creativity, talent and competitive advantage to maximise the success of such pioneering projects. "Such a success requires a solid foundation and a continuous strive for growth", states Cyril Sabrazat, Business Unit Leader of the Metal Division and responsible for the planning, development and execution of the project. "Quality and performance are also two principles that must not be left out of the equation", Cyril continues.

Figeac Aéro's technical specialists, machining strategy and programming experts, workshop staff and the cutting tools supplier Mitsubishi Materials form a well-coordinated, cohesive team. Achieving flawless production from the start is not always a matter of course, considering the immense material removal volume that in this

case reaches almost 1000kg of titanium per batch. When an order is placed, Figeac Aéro needs to receive approval for the first titanium spar and the first sample report (F.A.I - First Article Inspection) before production starts. This is required for completing the joint certification by the customer and the Brazilian civil aviation authority.



Multi-tooth shell milling cutter VFX-5

Exceptional cutting tools for a technological challenge

Machining of the first titanium spar spent a long time in the planning process, but due to this diligence it was carried out successfully. This first success shows the reliability and performance of all elements of the process and was a crucial stage for Fabien Viguier, Production Manager, and his team.

The biggest challenge of such workpieces is that they are heat-resistant and extraordinarily large, resulting in high levels of difficulty during the machining process. „Rough

machining and hollowing out a 3.5-metre-long component can be a real headache if you do not plan carefully; some tools wear out so fast that it becomes impossible to carry out one complete roughing cycle with the same tool. As a result, we needed to take these issues into account before choosing a cutting tool. It would be unwise to invest in the development of an optimised machining and programming strategy without considerable knowledge of how the cutting tool would behave", emphasises Fabien Calmejane, Cutting Tool

Manager and Stéphane Delmas, Technical Manager.

Freddy Couderc, Cutting Tools Technician, was given the task to test and find out the best tool and inserts for roughing this new generation of spars. Following a comparative testing phase and evaluation of several solutions from different manufacturers, Mitsubishi Materials' VFX multi-tooth milling cutter range was eventually chosen.

Due to the exceptional test results and previous proven successful implementation in high productive





Up to one ton of swarf can be generated during machining of the 3.5-metre-long titanium component.

machining of such voluminous workpieces at other customers, the VFX-5 milling cutter, specifically developed for the efficient machining of titanium was recommended. Mitsubishi Materials, represented by Laurent Le Méteil, Regional Manager of MMC Metal France and responsible for the project from its early stages, convinced Figeac Aéro with the professional consultancy; the solution with VFX-5 proved the most suitable for the tremendous demands of this

application, showing low cutting resistance and simultaneously, remarkably high metal removal rates. The VFX-5 is an anti-vibration roughing cutter with high metal-removal rate capabilities. The tangential inserts in grade MP9030 from Mitsubishi Materials offers exceptionally increased tool life when machining titanium. „Each cutting edge provides four times greater wear resistance than the next best tool that was tested! This became evident when the first

titanium spar was produced. Everything went according to plan. A 4-hour period of continuous milling, without changing the inserts, demonstrated the tool's resistance during a complete machining cycle. This full cycle capability was an essential base for meeting the quality and economic requirements. During the field test, we were completely satisfied with the choice of Mitsubishi Materials' VFX multi-tooth milling cutter“, Freddy Couderc points out.

Accompanying performance with high-tech production

For its new-generation jets the key account customer of Figeac-Aéro set important economic and ecological goals. As a partner in achieving these goals, Figeac Aéro combined optimised cost structure with best technical solution, including thorough resource planning.

Consequently, the challenges associated with the first production runs were on the one hand, to optimise the machining process for meeting the requirements in terms of quality, timings and costs, and on the other hand to seek continuous improvements in process configurations, taking into account all external parameters. This is a step forward in the product development of such strategic importance as these new spars.

Today, Cyril Sabrazat is pleased to have Mitsubishi Materials as a partner, represented by Laurent Le Méteil of MMC Metal France. „Laurent was very co-operative when it came to our project planning. Due to his motivation

and commitment to this project, we were able to tackle the complex machining requirements of this application, using a new, economical milling cutter. We were already confident in Mitsubishi Materials' technology, but our trust is even greater now, due to the reliability of the results obtained during this application. This is a valuable partnership for us. The consultancy and advice on the optimisation of the cutting parameters has been particularly key to our success. We need the experience, knowledge and support of the experts from MMC Metal France, in order to improve the outcome of current projects and gain access to new markets.“

This dynamic performance improvement is extremely important considering the increase in workload due to the spar manufacturing programme. This increase paved the way to the expansion of our manufacturing site for large components with the imminent arrival

of four additional large dimension 5-axis machines with five-metre X-axis travel capabilities. A further six, state-of-the-art 5-axis CNC machining centres will be added to the Metal Division site by 2017, increasing the total production capacity by 40%. Figeac Aéro Management team is relying on Mitsubishi Materials to support this expansion with further resources. Future-proof production solutions that optimise existing processes and successfully manage complex applications in the machining of difficult-to-cut materials will be now offered by the strengthened MMC sales and technical team. Laurent Le Méteil (Sales) and Grégory Lafon, (Application Engineer) will further support Figeac Aéro to fully exploit its production potential and increase profitability.

With dedication to best practices and true commitment to performance, Cyril Sabrazat and his team will apply their longstanding experience and field expertise to ensure the sustainable growth of the Figeac Aéro Group.





A large production hall at Figeac Aéro

About FIGEAC AERO

FIGEAC AERO is an international player in aeronautical subcontracting, specialising in the machining of difficult to cut materials that are used for the development and production of large components and assembly units. The Group employs more than 1,800 people worldwide, operating subsidiaries in France, Morocco, Mexico, Tunisia and the United States. In fiscal year 2015, the group achieved a turnover of € 204 million and the order book stood at € 3.7 billion.

www.figeac-aero.com

About MMC Metal France

MMC Metal France is one of the 7 European subsidiaries of the Japanese Mitsubishi Materials Corporation cutting tools division based in Orsay, France. Founded in 1992 the company delivers over the last 22 years precision tools and integrated cutting tool solutions for the automotive, aerospace and medical as well as the general machine building and mould & die industries. MMC Metal France is a member of the European Group, reporting to the European Headquarters in Germany. Together with a great number of local distributors and associates the company offers customised solutions and a wide variety of precision tools for turning, milling and drilling to the French metal working industry.

Mitsubishi Materials Corporation employs more than 23,000 people in 77 countries, operating Head Offices in Europe, India, Brazil, China, USA, Japan and Thailand, a modern R&D Centre in Japan as well as several production facilities throughout the world.

www.mmc-hardmetal.com | www.mitsubishicarbide.com



About VFX series

Diameter	Ø40 – Ø100
Corner Radius	0.8 – 4.0
Length	short & standard
Grades	MP9030, MP9130
Breaker	LS, MS, HS

Metal removal rate up to 400cm³/min
For difficult to cut materials.