



Success Story

OPEN MIND Moulds Success For Carbon Composite Manufacturer

When Simon Farren started Reverie Ltd 2000 with the focus upon high quality carbon fibre aftermarket parts for the motorsport sector, the ex-Lotus engineer couldn't have envisaged the success that would stem from car enthusiasts...



About Reverie Ltd

Reverie is acknowledged in the industry worldwide as being a highly accomplished and skilled carbon fibre composite design, repair and manufacturing company with over 12 years of experience crafting the finest autoclaved carbon fibre composite parts from alloy or carbon composite tooling. Reverie is an established composites manufacturer with a 'can-do' attitude and uniquely a Range of its own vastly expanding Motorsport products and accessories available world wide directly from Reverie or through our our expanding world wide dealer network as well as a healthy sub-contract composites manufacturing business.

> www.reverie.ltd.uk

...appetite for lighter and faster vehicles. Initially producing body parts and panels from pre-pre fibre glass, Kevlar and carbon fibre to reduce weight in the limited edition Lotus 340R, the business grew when demand started to pour in from the 9,000 or so Lotus Elise drivers worldwide.

The business that has its own autoclave oven for carbon fibre production grew exponentially when it won the PETRONAS FP1 Superbike contract to produce full carbon fibre panel sets for over 150 homologated bikes for the then team of World Champion Karl Fogarty. The contract soon took the small business to an employee base of 20 with an additional 6 F1 contractors drafted in for additional support for the 14 month build plan. The project enabled Reverie to plough its profits into the business with more product development and expansion of site and facilities. The re-investment later noted the arrival of a new 5-axis routing machine from Thermwood and CAD & CAM packages from OPEN MIND Technologies.

The simultaneous arrival of the Thermwood router and hyperCAD® and hyperMILL® from OPEN MIND in July 2012 enabled the company to 'hit the ground running'. As Reverie's Managing Director, Mr Simon Farren comments: "One problem for us was that we

were subbing out almost £15,000 of work each month. Whilst the financial implications weren't a critical issue, availability was. We were using leading motorsport subcontractors that could only support us adequately until December. This was when F1 teams loaded the subcontractors with development work for the forthcoming season. The knock-on effect was that we struggled to be able to quote or meet the lead-times

Composite Racing Seat In Production at Reverie



„The demo was comprehensive, answered all our questions and we all felt the package was intuitive and easy to use. This set it apart from what the other CAM vendors showed us.“

Simon Farren, Reverie's Managing Director



of our customers due to the workload of our supply chain. By acquiring our own machine, CAD and CAM software, we have eliminated excessive lead-times, saved over £150,000 in sub-contracting costs in the first 12 months and also been able to open our business up to new opportunities.”

The opportunities have seen the Colchester based company increase its turnover by 30% in the last 12 months whilst becoming less reliant on motorsport work. A little over a year ago the Essex company had an 80/20 split in its workload – with 80% in Motorsport and 20% in numerous sectors. Now, the business has a 60/40 split, and supported up by its own

Carbon fibre electronic boxes being machined with PCD Tooling at Reverie



product ranges as well as diversifying into the electronics, telecoms and defence sectors. All this is credit to the investment in the Thermwood machine, *hyperMILL*® & *hyperCAD*® software.

Choosing Suppliers Carefully

When Reverie opted to buy CAD/CAM software, it reviewed the whole market. For Reverie, the key points in selecting the package were the levels of support, ease of use and functionality. These criteria were critical, as the business had little machining experience and no experience of 5-axis machining or CAM packages. The OPEN MIND team demonstrated *hyperMILL*® and *hyperCAD*® and immediately put the Reverie team in a comfort zone. As Mr Farren continues: „The demo was comprehensive, answered all our questions and we all felt the package was intuitive and easy to use. This set it apart from what the other CAM vendors showed us.“

A year down the line and the company is delighted with the OPEN MIND purchase. „We manufacture aluminium and epoxy patterns and tools in male or female format for our epoxy pre-preg parts/tools. We transfer jobs from part models in SOLIDWORKS to the *hyperCAD*® package. This allows us to generate a CAD model of the tooling or pattern required and add-in features such as split lines, dowel holes, drilled holes, bushes and scribe lines for EOP and trimming any post-production excess. This enables our manufacturing team to review the complete tool pre-production and ensure its fit for purpose before we export the file to *hyperMILL*® for the tool paths to be generated for the machine,“ continues Mr Farren.

Discussing the OPEN MIND experience, Reverie's Manufacturing Engineer, Mr Peter Farndell comments: “I was new to CAM packages when we went through the selection process, but it was evident that *hyperMILL*® was ahead of the alternate packages in terms of its capabilities. Furthermore, it was intuitive and user friendly and that was a very key aspect for someone new to CAM systems. Another aspect that really attracted us was the forthcoming upgrade to OPEN MIND's *hyperCAD*® package.

We are continually striving to move the business forward and the prospect of having a CAD package that is being continually developed and improved is very appealing to us. OPEN MIND wanted to simplify the transition period for us and not make the learning curve too steep. To this end, we trained on *hyperCAD*® firstly, then on *hyperMILL*® to produce simple 3-axis parts before we advanced to full 5-axis simultaneous machining. They also provided all the post-processors to simplify the transition.”

“Once we became familiar with *hyperMILL*®, we identified a number of features within *hyperMILL*® that would simplify our

operation, create ease of use and most importantly enhance productivity. The Z-level finishing feature has improved productivity when cavity machining our mould tools whilst simultaneously enhancing our surface finishes. *hyperMILL*® also incorporates a contour milling cycle and we have used this to great effect for trimming the edges of our carbon fibre components that are clamped upon the router bed,” continues Mr Farndell.

hyperMILL® Brings Productivity Benefits

Since the *hyperMILL*® and *hyperCAD*® introduction the benefits are evident. The very first job produced internally was a 6 cylinder air-box epoxy male pattern that required a carbon mould tool. Then we fitted an oil mister system and progressed to machining alloy moulds these were previously manufactured externally with a lead-time of seven days per part with three parts completing the assembly (21 day total); Reverie wouldn't have won the contract based on this time scale. By utilising *hyperCAD*® and *hyperMILL*®, the company completed all three components of the project in the seven day timescale, reducing lead times by 40%.

The ability to machine carbon fibre components to high tolerances in house has also been of huge benefit and again coupled to our Faro arm and inspection software allowed us to machine and produce and control components time and again to high tolerances.

On a project to reverse engineer in CAD here and produce an 18 foot skiff mast extension and spreader assemblies for a sailing boat, three parts were required and each needed a two-piece tool for production. Externally produced, each tool had a minimum lead-time of three days – a total of three female 2 piece tools. By conducting this project internally with *hyperMILL*® and its 5-axis machine, the entire contract was completed in 3 days.

As Mr Farren concludes: “Since acquiring the 5-axis router and the *hyperCAD*® and *hyperMILL*® packages, we have improved cycle times, product quality and reduced our overall lead-times. Most impressively, our capabilities have increased beyond re-



Electronic boxes having holes positioned with *hyperCAD*®

cognition and this has enabled us to win new orders and bring in work previously outside our scope. This and the ability to develop and grow our own product completely in-house, are the underpinning factors in our turnover growing by over 30% in the last 12 months. Our world renowned product range includes carbon fibre steering wheels, seats, single and dual element wings, rear diffusers, lotus specific fitment parts, cam covers, air boxes, inlets, scoops ducts and filter kits, plus much more for the motorsport sector. Without the new machining capabilities and the OPEN MIND software, the company growth and the extensive product range wouldn't have been possible.” ■

About OPEN MIND Technologies AG

OPEN MIND is one of the world's most sought-after developers of powerful CAM solutions for machine and controller-independent programming.

OPEN MIND designs optimized CAM solutions that include a high number of innovative features not available elsewhere to deliver significantly higher performance in both programming and machining. Strategies such as 2D, 3D as well as 5axis milling/mill turning, and machining operations like HSC and HPC are efficiently built into the *hyperMILL*® CAM system. *hyperMILL*® provides the maximum possible benefits to customers thanks to its full compatibility with all current CAD solutions and extensive programming automation.

OPEN MIND strives to be the best and most innovative CAM/CAD manufacturer in the world, helping it become one of the top five in the CAM/CAD industry according to the NC Market Analysis Report 2015 compiled by CIMdata. The CAM/CAD solutions of OPEN MIND fulfil the highest demands in the automotive, tool and mould manufacturing, production machining, medical, job shops, energy and aerospace industries. OPEN MIND is represented in all key markets in Asia, Europe and America, and is a Mensch und Maschine company.



We push machining to the limit

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