

# The 2016 Shot Peener of the Year Colin McGrory

**COLIN MCGRORY** is an entrepreneur, an innovator and a shot peening explorer. Colin appreciates being part of a successful business, but he especially thrives on continually learning something new about the shot peening process.

Colin is the Technical Director of Sandwell UK. He and Liz Slater, Managing Director, founded the company in 1997. Sandwell UK provides shot peening, decorative finishing, specialist coatings, advanced technologies, failure analysis and performance engineering consulting to high-end clients in motorsports, oil and gas, renewables, aerospace, medical and consumer products.

Colin's interest in shot peening started long before he and Liz founded Sandwell UK. He began his career as a Metallurgical Engineer for military and civil aircraft systems. He transferred those skills to what many of us would consider to be a dream career in the world of Formula One. For over 20 years, he was fortunate enough to work alongside many of the greatest motorsport designers and engineers.

The following interview with Colin will showcase the reasons he was chosen as our 2016 **Shot Peener of the Year**.

**The Shot Peener:** When and where were you first introduced to shot peening?

**Colin:** I became aware of shot peening during my metallurgy studies but I didn't really appreciate or fully understand the process. During my time in aerospace, I became more aware as it was an accepted process although I was never directly involved at that time. I think it was really in the early 80s when we were seeing component failure on transmission parts of race cars that I started to read research papers and began to recognize the benefits of the process.

Engine performance was increasing and the level of electronic control of engine parameters was producing a much more sophisticated stress pattern within the transmission. I had introduced various NDT methods to analyze cracking and to understand root cause, but the main objective was to increase component life. I introduced the first shot peening cell in Formula One in 1984 to process gears and associated transmission components. This had a significant outcome in terms of reliability.

**The Shot Peener:** What was it about shot peening that earned your dedication to the process?



*Colin McGrory inspects a part that was peened in the RoboPeen—an 8-axis robotic shot peening system designed by the Sandwell UK team.*

**Colin:** When I first heard about shot peening it was almost like a secret magical process and I was intrigued by this. In fact, I still am!

Shot peening appears to be a relatively simple operation with control of the variables, media size and type, flow rate and velocity, but I soon realized the interaction between these controllable variables and the component is an extremely complex one. The transformation of the energy state in a material during shot peening, whether by recrystallization, dislocation or surface compliance, can produce unexpected results. It is this unpredictability that makes the process so interesting. Just when you think you fully understand the process, another little anomaly is uncovered that questions your whole understanding.

The Sandwell staff has increased the life and performance of many components over the years. It is so satisfying when a designer is confined by limits of packaging, size or material

and has an unresolved fatigue issue. This is where shot peening comes into its own. Engineers and designers working together to develop a technique which significantly increases fatigue life is testament to the validity of the process.

Shot peening is an extremely subtle technique—it's so important to tune the process to the material and understand its ability to respond. I think people look at a residual stress graph as a measure of depth and magnitude and think they have optimized their technique, but there is so much more to learn. Every graph tells a story and it's important to read the graph and try to understand and quantify the technique.

**The Shot Peener:** We admire your entrepreneurial spirit. Why did you leave an illustrious career with Jaguar Racing to start Sandwell UK?

**Colin:** During my time in motorsport, I read about and researched surface enhancement processes, including DLC coatings, superfinishing, carbonitriding, shot peening and many others. We were always chasing performance and I always knew that working with the surface of materials is a great way to add value in terms of fatigue life or fatigue load. I wanted to put some of this knowledge into practice; hence, I bought a machine and started to shot peen on my own. Sandwell started out as a part-time project, initially as much to improve my own understanding of the process while I continued to work for Jaguar Racing. Soon, however, I felt I had something to offer in terms of my knowledge and my ability to understand the needs of customers. The mentality of top level motorsport is very much a "can-do attitude" and I adopted this approach for Sandwell.

I wanted to provide the best possible service in terms of quality of process and turnaround time which I knew was critical for race teams on short lead times. Because of this, I have always had high demand from motorsport companies for our services. This approach has opened many other doors for us and, 20 years later, we reach into almost every industry and still dedicate our time to satisfying our customers' needs.

Sandwell very much goes its own way. We need to be commercially viable, but our business is about developing machines, techniques, and furthering our understanding of the effects and benefits of shot peening on a wide range of components and materials. We interact and work closely with our customers.

It's important to understand that most engineers and designers do not have an in-depth understanding of the shot peening process and it is our responsibility to apply our knowledge to their parts to ensure improved reliability and performance.

We often take on a small job that is not in itself financially beneficial, but if we can learn from it, if we have to develop a new technique or produce a nozzle to access certain areas, then the value of the work is in the knowledge we gain. I guess

I'm fortunate in that as it is my company, we tend to choose the more interesting work even if it is not always the most financially rewarding.

**The Shot Peener:** We mentioned earlier that Sandwell UK provides several surface finishing services. Would you like to elaborate on that?

**Colin:** Whilst shot peening is our core business, it is very much part of a suite of engineering processes that complement each other. We try to offer a one-stop shop where parts can be shot peened, superfinished and, in some instances, coated or given a final decorative finish. We like to think that within our range of processes we can offer a customer a number of solutions to their component performance needs. Having the range of processes on site means we have a much wider understanding of what works and what doesn't. This depth of knowledge is invaluable when working with customers to develop engineered solutions.

**The Shot Peener:** Your contribution to the advancement of shot peening is especially evident in your research projects. Please tell us what Sandwell is working on.

**Colin:** Like for most companies, most of our work and client list must be kept confidential, but I can share that we're working on a joint project to develop techniques to manage stress in additive manufactured parts. Another joint project is the development of a cell to improve the surface finishing of additive manufactured parts by integrating laser polishing and shot peening. We are also exploring a shot peening method to generate nanocrystalline structures in high-strength materials.

**The Shot Peener:** What are your thoughts on receiving **The Shot Peener of the Year** award?

**Colin:** I am delighted to join the list of highly regarded individuals in my profession. To me there is no greater accolade than to have the recognition of your peers. I was certainly not expecting this and as such it makes this award even more rewarding. ●

### About The Shot Peener of the Year Award

Since 1992, *The Shot Peener* magazine has given **The Shot Peener of the Year** award to individuals in our industry that have made significant contributions to the advancement of shot peening.

Visit [www.theshotpeenermagazine.com](http://www.theshotpeenermagazine.com) for a complete list of past **Shot Peener of the Year** award recipients.