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Measuring with speed and precision

"REVO® has reduced inspection times by up to 80% per part." Mecanizados Escribano has reduced bottlenecks while maintaining rigorous part inspection

A Madrid, Spain - based precision engineering business specialising in complex parts for aerospace and defence applications has invested in a Renishaw REVO® five-axis measuring head and probe system. The change has resulted in a reduction in inspection time by as much as a factor of 5, ensuring quality control and inspection keep up with its high-productivity CNC machine tools.

REVO® scanning a large bore on an aerospace component.

It's true that in many ways making things is getting easier, at least as far as the technology is concerned. For example, machine tools are simpler to program and operate, rapid prototyping means that product development is faster and cheaper than ever, and user-friendly CAD software may even negate the need for physical prototypes entirely. All of this assumes that what you are actually making, or trying to make, is relatively uncomplicated. It's a different matter, however, if you are building complex multi-million dollar aerospace systems, like those engineered by Mecanizados Escribano.

Escribano supply precision parts to Airbus

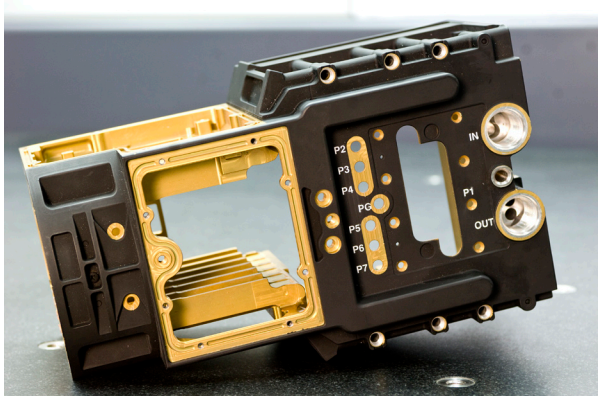
“When we buy a machine tool we specify all the options,” says company project manager Juan A. Humanes. “But, having the best machines is only part of the equation. Our customers demand very rigorous part inspection, which means there’s always the chance that the metrology department can become a bottleneck, especially when the parts are complex and machined to very tight tolerances.”

He continues, “Depending on what the customer requests, we inspect between 10% and 100% of machined parts. The Renishaw REVO system, recently fitted to a Metris CMM, measures non-prismatic surfaces very quickly, many of which would be difficult or impossible to measure with touch trigger systems. In some cases, such as a complex avionics chassis for the Typhoon, the REVO has increased our inspection throughput by a factor of 5; typically, up to 80% reduction in time per part.”

Exceptional scanning speed and accuracy
The key attribute of the REVO five-axis head is its ability to overcome the limitations of three-axis scanning methods, where any attempt to rapidly move the large mass of a CMM results in inertial errors caused by accelerations and decelerations. Therefore, the only possible way to maintain acceptable accuracy in three-axis scanning has been at the expense of measuring speed. However, REVO uses synchronised head and machine motion when scanning, rapidly following changes in part geometry without introducing its own dynamic errors. The CMM is able to move at a constant velocity whilst measurements are being taken, without impacting accuracy.

REVO also benefits CMM users with infinite head positioning and innovative tip-sensing probe technology, which further improves measurement accuracy by sensing close to the measured surface. This combination of speed, flexibility and accuracy has proven to give exceptional performance in a wide range of scanning measurement applications, including circle, helix, sweep and gasket scanning, plus, if required, rapid single-touch routines.

Expanding to meet increased demand
Any visitor lucky enough to tour the Escribano factory can see the size and significance of the investment required for such production. Juan A. Humanes reveals it to be between €1million and €1.5million a year, and most of the company’s CNC machines are top-end, Japanese or Swiss-built multi-pallet and multi-axis: Makino, Matsuura, Mazak; Sodick wire EDMs and CNC precision grinders from Jung.



Avionics chassis for the Typhoon


Juan A. Humanes, Project Manager, has significantly reduced bottlenecks on the inspection of complex parts.

All of them are the latest models, meticulously maintained and configured to minimise set-up and non-machining time, mostly using Renishaw OMP40 spindle-mounted touch probes and NC4 non-contact laser tool setting systems.

Escribano has outgrown its current building and has designed and built a new facility, where it will relocate in the next few weeks. Until then, the two small rooms adjacent to the main workshop that house the company’s inspection equipment will remain crowded. In the larger of the two rooms, three DEA Global Advance coordinate measuring machines (CMMs) with Renishaw probes check samples of parts for everything from thermal imaging cameras to components destined for the Joint Strike Fighter.

Alongside the main metrology lab' is a smaller room housing the company's largest CMM: a Metris LKV CMM equipped with the Renishaw REVO five-axis measuring head and probe system; part of a recent investment in inspection equipment that totalled around €300,000.

For most precision engineering businesses, the Metris and Renishaw REVO combination would be enough to cater for their metrology needs. But Escribano isn't your typical workshop and its customers are somewhat more demanding, leading to further investments in other advanced metrology systems such as a white light interferometer microscope for measuring roughness, and a contact profile meter capable of assessing the size and texture of a part's surface.

Sophisticated expertise and technology

The Madrid-based company is a rarity; privately owned engineering workshops with the expertise and the technology to deliver components and systems for such sophisticated applications are few and far between. No one at Escribano can or will talk about its customers or their products, but Humanes is happy to discuss what the company is equipped to do and how it does it.

"We specialise in machining complex, 5-axis parts in aircraft-grade aluminium, stainless steel, nickel alloys, copper and titanium," he says. "The only way to be good at this kind of work is to make the necessary investments in technology and people. Our customers can choose between some of the best equipped suppliers in the world, so we have to make sure we can deliver exactly what they want, when they want it."

A large proportion of Escribano's production is for the US defence sector, which probably has more small, privately owned precision engineering companies than any other country on Earth so the question is; why would a US defence contractor choose to outsource some of its most complicated, quality-critical parts to a company in Spain, instead of one closer to home?

Typical aerospace component produced by Mecanizados Escribano

"Some people might assume that we win business because Spanish labour costs are lower than they would be at a similar, US company,' says Humanes. "But they would be wrong. If that were the case the work would simply migrate to Asia. The truth is we are competitive because we invest in the best technology and we train people to high levels. We don't just benchmark ourselves with competitors in Spain or Europe, we aspire to be the best in the world."

General precision engineering may, thanks to the technology, be getting easier, but Escribano's willingness to meet almost any standard of engineering precision means that even during the worst recession in living memory – and the Spanish economy is suffering the effects as acutely as any country – this family-owned company is still busy 20 hours a day.

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