

# TOOLROOM TECHNOLOGY (TTL)

IT'S NOT OFTEN THAT A MACHINING SPECIALIST JUMPS INTO RESELLING MANUFACTURING TECHNOLOGY, BUT WHEN THEY HAVE DECADES OF PRODUCTION EXPERIENCE AT THE CUTTING EDGE OF MANUFACTURING, THEN YOU SIT UP AND TAKE NOTICE. AL DEAN REPORTS

**T**oolroom Technology Limited or TTL as they are known to those in the know, are a name familiar to many that operate in the machining world. Based in Haddenham, Oxfordshire the company has built a reputation amongst the elite in the machine world for providing a high level of expertise across many facets of the metal cutting world. Much of TTL's experience revolves around the concept of "Adaptive Machining" so let's explore that a little further, then look at how this ties into its new relationship with Siemens PLM.

Adaptive Machining has been developed at TTL to solve some key issues that are found in the aviation, power generation and marine industries and they relate to variable geometry. When such products are in service, it's very common for the form of the components to change with time as they undergo the extreme loading and working conditions they typically operate within. As a result, the 'in use' components can be different from the ideal CAD geometry from which they were initially manufactured, if geometry was even used in their development. This can cause serious issues when maintenance and repair is made, as you can't machine according to the nominal CAD data because of these differences. What adaptive machining does, is solve the problem by providing a closed feedback loop where the parts are reverse engineered, then the tool-paths are adapted to

the physical form of the part, rather than the ideal geometry.

Not surprisingly, TTL has mastered the creation of these closed loop systems, in a fully automated production environment. In terms of the benefits to an organisation working with these types of problems, it's clear that there are significant costs savings to be made. An example quoted by TTL shows that within the Gas Turbine industries typical cost savings for repair or manufacture of any given part can be in excess of 50%. This is achieved by the creation of an intelligent system which adapts to the form of a part and provides significant reductions in not only cycle time to affect repairs, but also to remove many of the non-conformance and labour costs by eliminating handwork and human error. To create such systems, TTL has become a master of a couple of different core technologies, which when combined, provide its customers with a pretty much bespoke system for fulfilling this kind of work.

One is the ability to machine complex surfaces, whether that's a turbine blade, or to recreate the precise form of components for pharmaceutical processing machinery. To support this, it's pretty clear that you need a solid understanding of complex machining in true simultaneous five axis.

The other core technology and expertise at TTL is in the field of Reverse Engineering. When you're working with variable geometry, then the ability to capture the actual form of the components you're working on is essential. Over the years, TTL has built up a comprehensive knowledge of the reverse engineering world and uses the hardware and subsequent software that allows you to adapt toolpaths to accommodate the variation in a part's form, using a variety of contact and non-contact devices. Of course, while mastery of disparate technologies is one thing, the real experience and knowledge at TTL is held in the ability to mix these two technologies together, along with fixturing and software development, to ensure that the system under development can do the job.

So, how does this relate to Siemens PLM software? The answer is that TTL has just signed up as a technology partner for Siemens PLM. The background to the deal, from speaking to the team in Thame, is that they are constantly looking to improve what they do and ensure that the platform technologies they use can provide the tools they need, both now and in the future. With this in mind, TTL has engaged with Siemens to adopt NX as its platform of choice for both geometry handling and machining. Alongside this, the company has signed up to become a reseller for Siemens PLM solutions, including NX and Teamcenter. With TTL's expertise in production proven machining and the handling of complex geometry for the machining world, it looks like it's a relationship that not only provides TTL with the core platform they need to continue their work in the adaptive machining world, but also one that has the potential to provide users with a sound source of advice and expertise when looking to adopt Siemens' tools for production.

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