MADE SMARTER

CASE STUDY

Powering to further success

A Staffordshire engineering company which exports its innovative rotary engines throughout the globe is continuing to thrive after joining the Made Smarter West Midlands programme.

> **“Made Smarter West Midlands support is highly targeted, meaning that the right businesses are identified who can improve their digitisation; this in turn improves the UK’s manufacturing sector.”**

From the left, Fred Wray (MTC), Tim Kirby (Made Smarter West Midlands), Nathan Bailey (AIE) and Richard Evans (AIE)

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Advanced Innovative Engineering (UK) Ltd was established in May 2012 and designs, develops, assembles, and tests Wankel Rotary Engines – named after its inventor and German mechanical engineer, Felix Wankel.

Based on the Ringway Industrial Estate in Eastern Avenue, Lichfield, the business has increased its workforce from 13 to 20 in the last six months to meet the demand, from Italy to the USA, for its revolutionary technology, from customers in the marine, automotive, and aerospace industries.

Nathan Bailey, Managing Director at AIE, said they had wanted to improve the assembly process of its patented lightweight technology and the support of Tim Kirby, who is the Digital Transformation Specialist for Made Smarter West Midlands in Stoke-on-Trent and Staffordshire, along with strategic partner MTC, had made that a reality.

Nathan said: “Installing Assembly Management Smart Tools has made AIE more efficient, and previously a role which would have required two people – one to hold the torque and another to twist it – has been reduced to one.

“It has enabled us to take that next step, and it’s an enabler of growth because as we move into production, the smart tooling mitigates any problems we encounter from a quality assurance perspective.”

The Challenge

AIE is renowned for its expertise as a market leader in rotary engines, producing between eight and ten engines a month.

They have also patented a liquid-cooled Self-Pressurised-Air Rotor Cooling System (SPARCS), invested in its Research and Development, and achieved the ISO AS9100D for excellence in Quality Management.

Nathan wanted to improve AIE’s assembly torque tooling because, historically, when a part is tightened manually with a spanner and a torque wrench, people’s different strength levels produce different final torque results.

He said: “I knew that more recently electronically controlled torque wrenches have been developed, which use digital technology to give you accurate information and control the torque more efficiently, providing greater consistency with products and applying the torque more accurately.

Nathan contacted Tim, and he arranged for the MTC, one of Made Smarter’s strategic partners, to also visit AIE to discuss their ideas and create a digital roadmap for the business.

Nathan continued: “We had several conversations with Tim, and the MTC team was brought in to scope out the challenges we were facing and how they could assist us.

“We had variations in our assembly process with different people applying the torque, and we wanted more consistency.”

Tim Kirby said: “We first met with Nathan in late 2022, and it was clear this is a highly-skilled business that wanted to achieve efficiencies, with the correct product types each time for their customers.

“The MTC developed a digital roadmap, and the best option for their digital journey was smart tooling to improve the volumes and skills.

“Smart Tooling provides data around what’s happening throughout the process and identifies if there are any problems. If there is a problem, production can be stopped before the engine is built and there’s a catastrophic failure.”

The Solution

Tim and the MTC supported Nathan by applying for a £20,000 grant from Made Smarter West Midlands, which was match-funded by £20,000 from AIE.

Nathan said: “We wanted to become more efficient and productive by implementing a new smart tooling system to ensure the correct torque level is applied each time.

“We have invested in smart tooling manufactured by Cleco to give us that consistency. It also has the advantage of linking to our assembly control software, which is incredibly powerful.”

Fred Wray, Senior Adviser, Digital Transformation, at the MTC, said: “One of the strengths of the Made Smarter programme is that it is targeted at SME manufacturers. “From my experience, SME manufacturers and engineers are the backbone of British manufacturing because we have high-quality engineering firms highly focused on complex solutions, which others can’t always do. This is why we thrive in the UK.

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The Benefits

The new tooling system was introduced at AIE in January 2024 following three days of training and development from Cleco and has been configured with its in-house software.

Nathan said: “The benefits have been numerous, because the application process is more consistent when we apply the torque. There is no longer any difference, no matter the strength of the operator using the tooling.

“It has also increased our production. We hope to increase our output to 50 units a month towards the end of the year.

“We currently have a very skilled workforce, but using smart tooling means we can redeploy these engineers to other business areas and use semi-skilled engineers in production.

“If something goes wrong, we have the data now for problem-solving. In reality, in the past, we would have sent parts to a laboratory to investigate the problem, but we can now identify problems ourselves.

“This means there’s no lengthy downtime because we can analyse the data, solve the problem and get back up and running within an hour. It has laid the foundations for improved quality.”