

# Adaptable productivity from REM Systems

**REM Systems is a company focused on getting more out of less for its customers. It achieves this through a range of automation and tooling solutions from world leading companies such as Erowa (automation and robotics), Triag (workholding and fixturing), and FTool (EDM tooling).**

**This combination of Swiss engineering and REM System's expertise can improve productivity of your CNC machine tools, irrespective of batch size. Flexibility is built into each system allowing a variety of pallet sizes to be used simultaneously, systems can combine machine tools from different manufacturers, and the ease of use of the EMC control system ensure maximum productivity from the word go.**

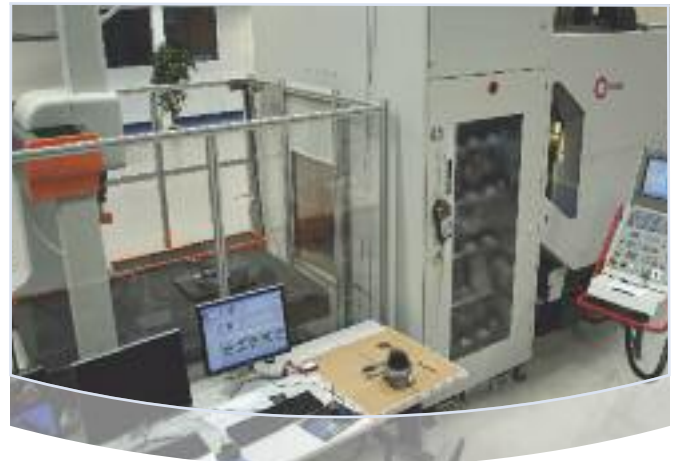
**This newsletter highlights how the solutions provided by REM Systems are helping businesses, across different industry sectors, achieve higher performance and profitability. To see how the adaptability of the automation and tooling available from REM Systems can bring benefits to your business contact John or Peter Ryland for a no-obligation discussion on 01452 750581 or e-mail [sales@remsystems.co.uk](mailto:sales@remsystems.co.uk)**

## TTL integrates Erowa automation to help solve problem

For over 20 years TTL has been at the forefront of CNC machining technology. The company's manufacturing expertise spans several important industry sectors including Gas Turbines, Automotive, Mould & Die and Pharmaceutical. It combined its Adaptive Machining software, a 5-axis milling centre, 3D laser scanning and an Erowa Robot to find a solution to a complex machining problem.

The Problem facing TTL was the repair of Nozzle Guide Vanes (NGV's), which usually involves a number of processes. These include removal of thermal barrier coatings, inspection, brazing to fill cracks and surface erosion and ultimately, recoating. An unfortunate side-effect of the brazing process is that the gas-path surfaces no longer conform to the desired shape and the cooling holes often become filled with new braze material. Brazing also leaves the component in a very rough state with inconsistent wall thickness and aerofoil geometry, symptoms that have been relieved in the past by manual blending and polishing.

To overcome this TTL developed an adaptive repair process that uses a co-ordinate measuring machine (CMM) equipped with a high resolution stripe laser measuring device to scan the complete gas path surfaces, with the resulting data captured onto a computer. This fully automatic scanning cycle - which takes around two minutes - generates a data set of approximately 150,000 points, which is processed and analysed by the Adaptive Machining software, a five-axis machining path, unique to each individual component, is then created. Using this machining path all of the unwanted braze material from the gas



path is removed, leaving a part which conforms to stringent surface finish, external geometry and wall thickness requirements.

To reduce the need for operator intervention, an Erowa Robot Compact pallet handling system has been integrated into the solution. Extensive use is made of the Erowa PowerChuck zero point tooling to facilitate accurate transfer of parts from the CMM to the machine tool and as parts are loaded into the cell, the component type and ID are identified uniquely. With the use of Erowa's Manufacturing Control software the cell can operate with a theoretical batch size of 1, and the potential for 18 hours continuous lights out operation.



# Erowa Robot Dynamic Linear

## Erowa Production Shop, Switzerland

FOR MORE THAN 20 YEARS Erowa has been at the forefront of automation systems for loading CNC machines. Therefore, it is no surprise to find Erowa's latest system, the Robot Dynamic Linear, in use at its own newly built production facility at its headquarters in Büron, Switzerland. It is here that the wide variety of Erowa chucks are produced.

Erowa's challenge is no different from many of its customers in that it has to produce a high mix of different parts as efficiently as possible. This mix includes large and small parts in varying batch quantities, from one-offs upwards. More than one machine is needed and, of course, there are a large number of tools required – more than the machine tool carousels can accommodate. And, with more machine tools planned for the production cell to meet future growth, the Erowa *Robot Dynamic Linear* is capable of taking all this in its stride.

The current installation comprises the *Robot Dynamic Linear* – a robot loader travelling on a 12 metre linear rail, which feeds two Hermle C40U five-axis machining centres. The installation has space to add additional machines at a later date and the linear rail can be extended to ensure the robot can access these machines with the minimum of investment.

Within the cell larger parts are produced on 320 mm x 320 mm pallets, with each of these able to hold parts up to 500 mm<sup>3</sup> and weighing 130kg. The system at Erowa contains 66 of these pallets in a vertical carousel *LiftMagazine* – that's a lot of work in a very small footprint. Each pallet has ease of access for an operator to load/unload workpieces as the magazine brings the

pallet to the operator. When smaller parts require machining, the robot automatically changes its gripper and selects one of the 240, 148 mm diameter, pallets that are stored in the two rotary magazines within the system. Having another pallet size has three major benefits: a substantial saving in pallet costs; greatly reduced space requirement; and the pallets do not restrict cutter access to the workpiece. Again, as with the larger pallets, the robot brings these pallets to the operator loading station, where a screen displays the instruction sheet for the specific pallet in front of the operator. Alternatively, a six-axis robot can fully automate the loading of raw parts onto the fixtures, prior to the Robot Dynamic delivering them to the next available machine.

This installation, inevitably, requires more tools than the machines can hold in the tool changers. But that problem has been solved by letting the *Robot Dynamic Linear* change tools as well. There are another 2 rotary magazines holding 240 tools. The robot controller thinks ahead to the next job and pre-fetches the required tools to a buffer rack right next to the machine. When the last part of the last batch is finished the robot removes the tools no longer needed and loads the tools from the buffer rack. Once the new tools are loaded the next job can start.

You could be excused for thinking all of this takes a great deal of programming and setting up. But no – the whole cell is controlled by Erowa's own manufacturing control software *EMC*. This makes the operation of this production cell very simple. It ensures the right parts are produced in the right order on the right machine using the right NC programme. It manages the tools and tool changes. It can tell you how long

# Unlocking the full potential of your CNC machines

the cell will run without attention. It reads from and writes to the in-house ERP system. It clearly displays the progress of each job within the cell and can even text or email you when it needs attention.

The cell is totally secure and keeps the moving robot out of harms way. But the see-through safety barriers do not create a "solid wall" in the production shop – there is always a clear view of the robot and beyond. Full access to the machines is made possible by using scanning lasers to protect the operators without the need for barriers or security doors. This, together with the robot's impressive 2.35 metre reach, means there is still a good clear working space in front of the machines.

This cell allows round-the-clock production of more than fifty different parts with minimal operator intervention. For a closer look at how this cell runs take a look at the video or, better still, why not take a trip to Erowa to see for yourself.



## Workholding plays a vital role for Trittech

HAVING SECURED A CONTRACT to machine fuel connector components destined for the Airbus A400M transporter Wrexham-based Trittech took on a more radical approach to their manufacture by embracing highly sophisticated five-axis technology and state-of-the-art workholding.

To achieve the complex geometries required on these components Trittech invested in a Huron MX4 twin-pallet, five-axis machining centre equipped with Erowa High Accuracy pallets supplied by REM Systems. The contract turned out to be one of the most ambitious projects that Trittech has undertaken due to changes made by Airbus to reduce weight. The result was that what started out as an investment cast component had to be machined from solid in order to achieve the 1 mm wall thicknesses added to which were tolerances of 15 micron.

Once the machine had been specified and ordered

Trittech worked closely with Huron's UK agent, Fortron, to establish the best solutions for workholding and other ancillary equipment, a process that involved several project meetings. Key to the success of the project was the workholding that needed to be capable of allowing parts to be machined in the minimum number of operations, while enabling full machine movement through the full five-axis volume.

REM System's Peter Ryland attended every project meeting to provide advice on Erowa's workholding solutions which allow pallets to be exchanged with 0.01mm, and facilitates the integration of this project into Trittech's unmanned flexible manufacturing philosophy. Trittech's Paul Beer comments: "Peter had a huge role to play at the front end of this project as he was involved in the machining strategy literally from the base up and the Erowa equipment has proved to be a superb asset to the complete machining process."

## Automation brings flexible unattended running at Alcon

ALCON IS RENOWNED FOR the manufacture and supply of high-specification brakes and clutches for motorsport and high performance vehicles. Anyone working the field of motorsport knows how important it is to achieve a fast response to their customers' needs. Manufacturing processes must be able to adapt quickly to customers demands. Investment in the latest machine tool technology is one way to ensure these demands can be met.

Alcon's flexible production cell includes a Hermle C20U five-axis machining centre and an EROWA Robot Easy automatic pallet loading system. The cell was configured to handle 12 pallets, based on the Erowa Production Chuck 210. Each pallet can be loaded with work up to 260mm square or 325mm diameter and the transfer weight can be up to 130kg. This capacity allows Alcon to automatically load large and complex brake calliper housings that can require as much as 2 to 3 hours machining. This means the machine could be left unattended for 24 hours. More typically, the highly skilled operators attend the machine during the day for process proving and the machine then continues on its own during the night with more established work.

Alcon Production Engineer, Allan Ford, says "As well as being able to run unattended, the cell gives a more flexible way of working. One-off jobs are easily accomplished and the



repeatability of the pallet base allows us to stop jobs before they are finished and restart them later with no realignment. We can change the production plan at any time."

The Robot Easy is just one of a range of standard EROWA automatic pallet loading systems and was tailored to match Alcon's specific requirements. The Tamworth based company is a Technical Partner to Raybestos, supplier of braking systems to the American Nascar racing tour and they have provided all the brake hardware to support Citroën's dominance of the World Rally Championship [WRC] in recent years. In addition, the motorsport departments within Audi, BMW, Honda (Dome), Peugeot, Renault and Volkswagen count amongst their many customers. In the field of specialist and performance road cars they serve an impressive list of prestigious road car manufacturers, including Bentley, Brabus, Jaguar and Land Rover. Alcon also supply bespoke braking systems for specialist armoured vehicle manufacturers.

## Erowa automation delivers lights-out, high-performance at Cosworth

COSWORTH IS SYNONYMOUS with high-performance engines. For many years it has provided the power to take so many great names to Formula One success.

In today's fiercely competitive market such performance is not just required on the track, it is required in the manufacturing processes too. So, Cosworth installed an Erowa Robot PX for the 'lights out' manufacture of high-performance pistons.

"The requirement we had was in order to release the full potential of one of our five-axis machines, we had to be able to run unattended or 'lights-out' for as long a period of time as possible" says Phil Harpham, Cosworth's Head of Manufacturing. "We considered many different handling and loading systems but, to be honest, there was only one clear leader, Erowa. The simplicity and flexibility the system brought with it, made the whole installation a dream. It has certainly met and exceeded the strict requirements we specified and the integration with the machine tool was seamless."

The Robot was installed with a Deckel Maho DMU50v and configured with 60 pallet positions. Half of these 148mm diameter pallets are fitted with special purpose fixtures with the remainder having 3-jaw chucks. From day one, Cosworth achieved 13 hours unattended running. Now the machine runs unattended from Friday night right through to Monday morning.

## Qioptiq invest in five-axis milling and automation

With a requirement to reduce component production times and to achieve more 'lights-out' machining time, Qioptiq, a specialist in the production of electro-optical equipment, has installed a DMG five-axis milling centre, with an Erowa automated pallet changer.

Before the system was implemented machines had to be manually loaded, with material billets being manually clamped to allow quick change of parts on the machines as well as interchangeability between processes, to avoid time consuming realignment.

Now, the Erowa Robot Compact allows operators to load pallets automatically to the DMU 50 eVo Linear, providing Qioptiq with the ability to manufacture parts with fewer setups, longer unattended run times and batch sizes to suit requirements.

"Flexible manufacturing techniques are an absolute necessity in today's competitive markets," says Machine Shop Manager, Jeff Bonning, "and Qioptiq are continually assessing new technology to keep us at the forefront."