



Boosting efficiency: Renishaw Central reduces intervention from 1 hour to 7 minutes per shift



Background:

Renishaw Central was developed to digitalise, visualise, and control manufacturing and measurement processes.



Challenge:

Lengthy set-up times for 12-axis lathes with complex tool offsets. Finding highly skilled operators to make the offsets is difficult.



Solution:

Renishaw Central standardised production, reduced tool set-up time and simplified the process to lower the skill level needed.



We've taken our use of Renishaw Central to a whole new level. Instead of using it as just a monitoring or reactionary tool, we also use it to send offsets to the machines. It communicates with the machines and adjusts the tools accordingly to make the part correctly.



Tim Stokes
Manufacturing Production Engineer, Renishaw plc



We have revisited our manufacturing site at Stonehouse, UK, to find out how they have progressed with using Renishaw Central since it was implemented in 2023.

Renishaw Central connects manufacturing machines for automatic control of processes, data collection and passing updates between CNC machines. At our Stonehouse site, we originally used Renishaw Central in a preventative way to monitor machine tools for stoppages.

Today, Renishaw Central has revolutionised the way we set-up sliding-head lathes. Renishaw Central analyses the metrology data of workpieces made on any connected machine tool then calculates and sends offset adjustments to the appropriate CNC controller. It also shows when no adjustment is needed. Now the operator can load new or replacement tools into the machine with an open tolerance of a millimetre of accuracy. Renishaw Central automatically makes the micro adjustments to the tools which would be time consuming if made manually. Our Equator™ gauging system uses machined indentations, like binary dots, to identify which machine made the part and make sure the correct offset adjustments are fed back to the original machine.

“When the Equator gauge measures the part, it looks for and measures those indentations too. You can take any part off any manufacturing machine, put it on any Equator gauging system and it will know from the binary dots that are engraved on there, which machine it came from, even across different geographical sites. With Renishaw Central, you could take the part to another site, put it on an Equator gauge and it will still send the offsets to the correct machine,” said Chris McWhannell, Manufacturing Production Engineer.

Prior to using Renishaw Central, if a problem was found with a product, then all of the machines had to be stopped while the root cause was investigated. This was time-consuming and inefficient, but necessary to locate the issue. However, this has greatly improved since connecting to Renishaw Central which uses Renishaw's Intelligent Process Control (IPC) technology. IPC uses closed loop feedback and Equator™ gauging data to update offsets directly on machine tool controllers.

Chris continues, "We make 250,000 parts a year on these four lathes, meaning they are running continuously. If there was a problem in assembly, and we didn't have any identification on the parts (the binary dots), then we wouldn't know which machine had caused the problem so all of the machines would have to be stopped. We would then have to purge every part that's been made and inspect everything.

With Renishaw Central and the identification on parts, we can narrow that down to where, and even when, they were made. Having that data and information helps us to make improvements."

Renishaw Central has significantly improved the efficiency of setting tools in machines, reducing the time required by 85%. Previously, manually setting the tools was a challenging and time-consuming process, especially for new staff, who could take up to a week to complete the task. Each lathe, which holds 33 tools with X, Y, Z, and R offsets, was prone to errors and quality issues during manual set-up. With Renishaw Central, the average set-up time has been reduced to just 77 minutes. This improvement has also increased accuracy, and reduced the number of setting pieces, or scrap, produced during the set-up process.



Without Renishaw Central, one person per machine would be required to make the high-volume parts that Renishaw produces. Now, one person can run six machines.



Renishaw Central has advanced what and how we manufacture. The setting piece was designed around the Equator gauging system, but a CMM system could also be used. When combined with Renishaw Central, the offsets can be sent anywhere, giving full control.

The success of Renishaw Central has continued to grow with the incorporation of bespoke live dashboard views which were created by the maintenance team to monitor the health of our processes.

The team at Stonehouse also use Renishaw Central to gather data for machine health, by checking the characteristics of specifically designed features. By knowing the baseline of the characteristic and looking for change, it's possible to see if machine condition is deteriorating.

“It's something we can pick up on that other companies have never been able to do. Together, Renishaw Central and Microsoft® Power BI displays this information and sends us notifications,” says Tim Stokes, Manufacturing Production Engineer.

Previously, data was given in the form of long reports which were difficult to interpret. Benefitting from the open API, the production staff view Renishaw Central data within Microsoft Power BI. They can tailor reports and filter the information to only show what is important. Filtering data and using it precisely solves problems much faster and restores machine run time much more quickly.

“ What we can do with the interface of the Renishaw Central system when connected to Microsoft Power BI has been very impressive. We use Microsoft Power BI to integrate data from Renishaw Central. It visualises the vast amount of data into charts and graphs so anyone can understand the information and identify where to make improvements. ”

Roger Burleigh
Manufacturing Production Engineering Manager

The team at Stonehouse also uses Renishaw Central to quickly alert them to machine errors. When there is an error, Renishaw Central sends an email advising the number of parts that have passed or failed, and on which Equator gauge. At the same time, the operator also receives an alarm on the monitor for the number of passes or fails. This has reduced operator intervention from 1 hour per machine, per shift, to just 7 minutes.

“Renishaw Central has increased machine up-time because it helps us to identify underlying or patterns of problems. For example, if the CNC frequently stops with a low coolant alarm, then it won't take long to realise the coolant level is going down quicker than expected and we need to check for a leak instead of continually topping it up,” said Chris McWhannell.





Case study

The investment in time it takes to set up Renishaw Central has been quickly paid back by the time saved on finding and diagnosing problems.

“It’s easy to set up Renishaw Central but the IPC elements needs some planning. We created spreadsheets with all of the IPC offset settings to have a methodical approach which sped up the process. The time it takes to set up is paid back within a couple of sets. Once it’s done, IPC tests all of the offsets along with an Equator gauge for fine tuning. Using Renishaw Central means all 73 tool offsets for the 33 tools can now be sent from the Equator gauging system.

With recent upgrades to Renishaw Central, tool offset updates can now be sent to multiple CNCs using a single Equator gauging system, rather than a one-to-one relationship. Hats off to everyone involved – the applications team, the Equator system team and the Renishaw Central support team, because we would never have done it otherwise,” adds Roger.

In the labour market, there is a shortage of skilled people who can understand and update a machining process quickly and manually. Removing the manual steps by automating them reduces the skill level required. It also reduces the scope of human error and saves time.

“We have had outstanding feedback from our operators. They can see the benefits of the productivity it brings and the analytics on the screen. The autonomy of it allows them to follow a process and at the end of it get a green or red light,” explains Roger.

Without Renishaw Central, one person per machine would be required to make the high-volume parts that Renishaw produces. Now, one person can run six machines.

“ I’m more proud of the lathe section, that we connected to Renishaw Central, than any other in the last 30 years. The work being done there is truly incredible! ”

Roger Burleigh
Manufacturing Production Engineering Manager

The foundation of monitoring and predicting is key to keeping the machines running. Thanks to the processes being monitored effectively with Renishaw Central, the team at Stonehouse will soon be investigating ways to reduce the frequency of checking parts.

“Every 100th part is made as a generic set piece. From Renishaw Central, the operator can monitor the status of all of the machines on one screen and see what part number each machine is producing so they know when to expect the 100th part. In future, we could take it to the next level and lower this to every 200 parts, 500 parts, or even once a week,” adds Chris.

Roger concludes, “Renishaw Central has given us lower set-up time, lower cost of parts and can help us forecast our future machine capacity. Any one of these is a benefit, but combined keeps us highly competitive in the market. If we can forecast what the demand is on the parts, and we know how many machines we’ve got, then we can plan for the future.”

“Our success to date has been through taking small, methodical steps, which is how we will continue to improve. We live and breathe metrology and process control which allows us to make all our decisions based on data. We must demonstrate all facets of our metrology benchmark and Renishaw Central goes towards that. We are very excited about the results Renishaw Central has given us already and we are excited to see where else we can go with Renishaw Central in the future.”

Case study



Roger Burleigh,
Manufacturing Production Engineering Manager
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