Case brief

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Precision sub-contract engineering: increasing manufacturing efficiency through in-process control

Save time

Increase throughput

Enhance capability

Overview

Company information	Quality Engineered Products Ltd (QEP) is a precision engineering and machining sub-contractor.	
	The company is based in Cinderford, UK and was established in 2002.	
	Machining capacity is targeted at sectors including aerospace, marine and automotive.	
Products and services	High technology multi-axis CNC machining capability specialising in light alloys, but experienced in most materials.	
Industry accreditation	AS9100C	ISO9001
Company objectives	To provide a service that meets and exceeds customers' expectations on price and quality.	
	To reduce product cost and maximise customers' competitiveness.	
	To grow its business on the back of the level of service it provides.	

Process

A wide range of products are manufactured using a variety of machining centres, including a Mazak Nexus III Series horizontal machining centre and Mazak Integrex i-200 multi-tasking machine.

Low to medium volumes, with 50-off being a typical batch size, result in the need for multiple set-ups during a normal working week.

Challenge

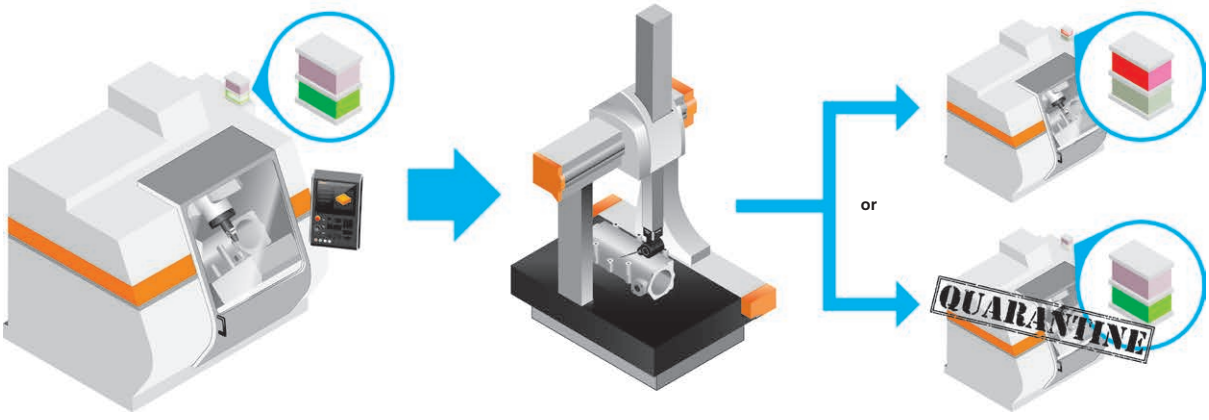
1 Increase productivity and save time

In order to ensure quality and conformance, QEP checked 1 in every 10 parts on a co-ordinate measuring machine (CMM). This process would take at least 30 minutes per part. While the part was being inspected, QEP had two options; to stop the machine until the part had been verified, or to continue machining and 'quarantine' parts until the sample had been checked. Over a 12-month production run, QEP estimates that inspection on the CMM would result in 270 hours of lost production time. On the other hand, continuing to machine a potentially incorrect part increased the risk of high scrap levels.

1. Parts machined on CNC

2. 1 in 10 parts inspected offline on CMM

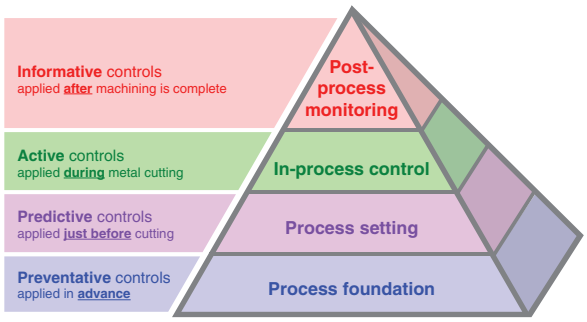
Duration – 30 min



Process considerations

Renishaw engineers considered key elements within Quality Engineered Products' process and production stages of manufacturing using Renishaw's ***Productive Process Pyramid™***. This framework is used to identify and control the variations that can occur at key stages of the machining process.

For more information, please visit the **When do I probe?** section of the Renishaw website:
www.renishaw.com/whendoiprobe



Productive Process Pyramid

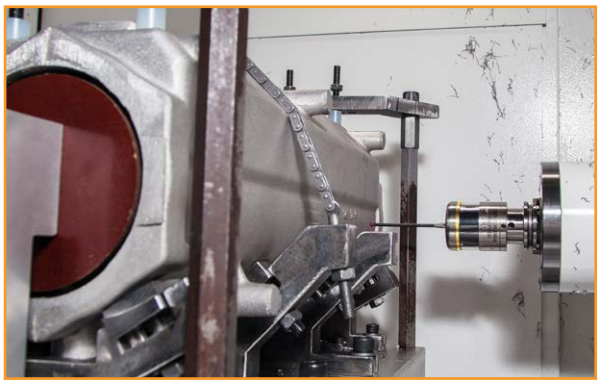
Solutions

Manufacturing process focus: in-process control and post process monitoring

Focusing on in-process control and post-process monitoring, Renishaw engineers have introduced measures to dramatically increase productive time and improve product quality.

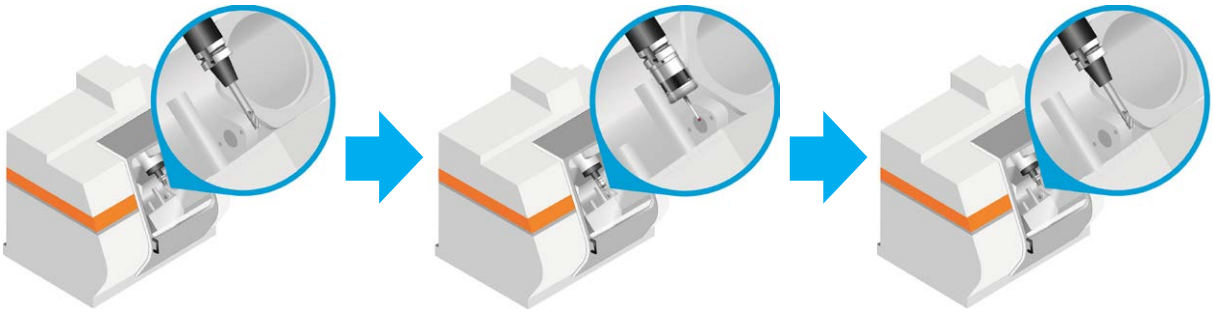
QEP has introduced two Renishaw part inspection systems to its machining process; the RMP60 and RMP600 probing systems enable both fast, automated, in-process inspection and on-machine gauging. Subject to requirements, QEP can now check the same 1 in 10 parts on-machine with each inspection cycle taking 2 minutes per part, saving around 2 hours per batch.

As a result, non-productive waiting time and scrap has been significantly reduced and the quarantining of parts eliminated. Further, off machine inspection is reduced to 1 in 50 parts, releasing valuable inspection time on the previously overloaded CMM.



On-machine gauging using the RMP600

1. **Parts machined on CNC**
2. **On-machine gauging of 1 in 10 parts post-process**
   Duration - 2 min
3. **CNC continues to machine parts**



Results

These charts provide a typical illustration for this industry application where in-process control has been introduced.

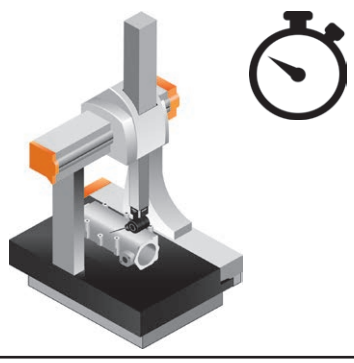
Reduced part inspection time

	Without on-machine probing	With on-machine probing	Saving
Inspection time/ part	30 min	2 min	28 min
Inspection time/ batch	2 h 30 min	10 min	2 h 20 min
Inspection time/ year	270 h	18 h	252 h

Reduced machine tool idle time

	Without on-machine probing	With on-machine probing	Saving
Idle time/year	270 h	18 h	252 h

Released CMM inspection time



	Without on-machine probing	With on-machine probing	Saving
CMM inspection time/year	270 h	54 h (Reduced to 1 in 50 parts)	216 h

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Summary

On-machine gauging using Renishaw probing systems has allowed QEP to eliminate the bottlenecks and non-productive time caused by CMM-only inspection. The fast, automated, on-machine process enabled by Renishaw's RMP60 and RMP600 probing systems has resulted in dramatic time-savings in QEP's inspection process, saving around 2 hours per batch.

Additionally, the new capability has allowed the company to:

- **Increase confidence in the accuracy and reliability of their results**
- **Reduce scrap and rework**
- **Maximise productivity and efficiency**

Contact

To find out how you could benefit from our process control solutions, contact us today – find your local office at **www.renishaw.com/contacts**

Customer comment

"Our challenge was to streamline the process and ensure that we could verify every single component that we delivered. Over a 12-month production run we estimated that using the CMM would result in 270 hours of lost production time.

We have put in place standard procedures that verify what our machines are doing, backed up by the Renishaw probes and measured against standards. These procedures confirm the confidence that we now have in probing across a range of disciplines and the time we have released as a result allows us to add value for our customers, which can only be viewed as a win-win situation."

QEP Quality Engineered Products Ltd

Quality Engineered Products Ltd (United Kingdom)

Best practice

Productive Process Patterns™ from Renishaw provide guidance on best practice and the implementation of a wide range of probing solutions.

For more information regarding job set-up and other applications, visit **www.renishaw.com/processcontrol**

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About Renishaw

Renishaw is an established world leader in engineering technologies, with a strong history of innovation in product development and manufacturing. Since its formation in 1973, the company has supplied leading-edge products that increase process productivity, improve product quality and deliver cost-effective automation solutions.

A worldwide network of subsidiary companies and distributors provides exceptional service and support for its customers.

Products include:

- Additive manufacturing and vacuum casting technologies for design, prototyping, and production applications
- Dental CAD/CAM scanning systems and supply of dental structures
- Encoder systems for high-accuracy linear, angle and rotary position feedback
- Fixturing for CMMs (co-ordinate measuring machines) and gauging systems
- Gauging systems for comparative measurement of machined parts
- High-speed laser measurement and surveying systems for use in extreme environments
- Laser and ballbar systems for performance measurement and calibration of machines
- Medical devices for neurosurgical applications
- Probe systems and software for job set-up, tool setting and inspection on CNC machine tools
- Raman spectroscopy systems for non-destructive material analysis
- Sensor systems and software for measurement on CMMs
- Styli for CMM and machine tool probe applications

For worldwide contact details, visit www.renishaw.com/contact

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