

Precision sub-contract engineering: process improvement through automatic tool setting



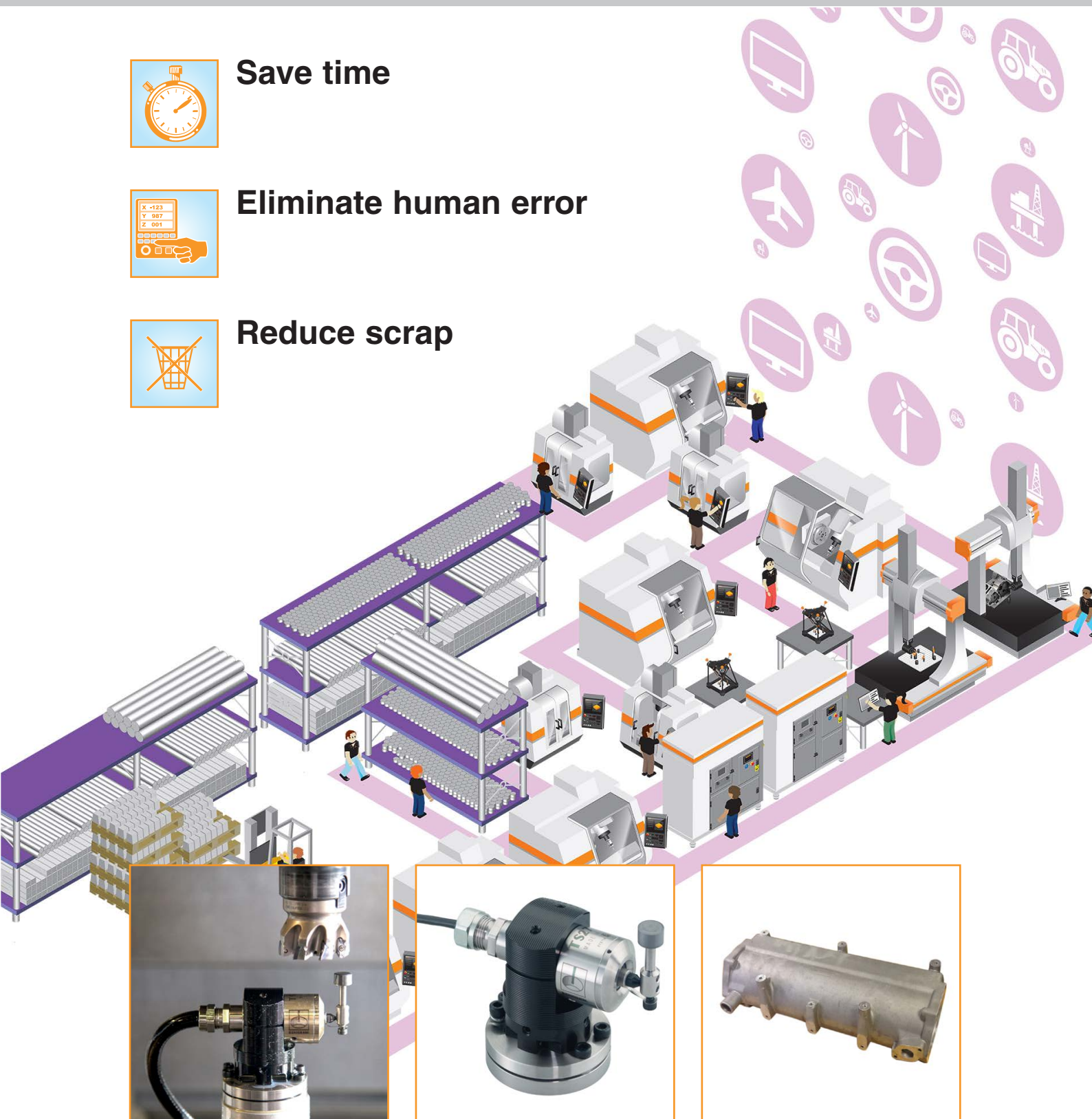
Save time



Eliminate human error



Reduce scrap



Overview

Company information	Quality Engineered Products Ltd 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.

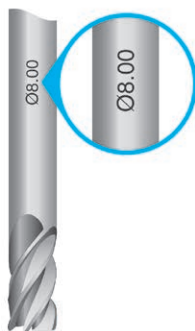
Low to medium volumes, with 50-off being a typical batch size, result in the need for multiple set-ups during a normal working week.

Challenge

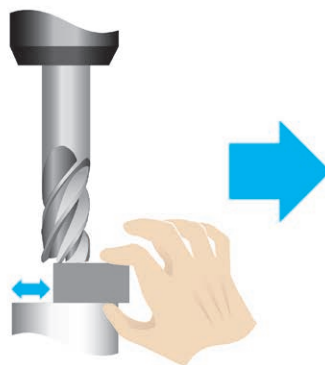
1 Increase work efficiency and save time

Tools were set manually on the machine using feeler gauges. This method was used to set tool lengths against known datum points on the part or machine whilst relying on tool manufacturers for diameter data. All tool offsets were then entered into the machine's controller by the operator. With each tool taking up to six minutes to set and each set-up having up to 15 tools, the manual method was both time consuming and prone to human error.

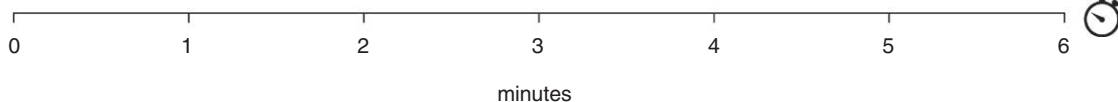
1. Manufacturer's diameter data



2. Manual tool length measurement



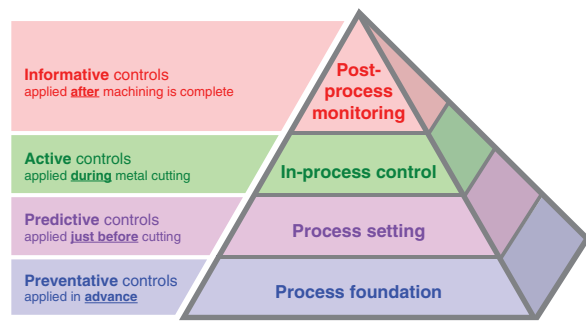
3. Manual update of tool offsets



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: process setting

Focusing on **process setting**, Renishaw engineers have introduced measures to dramatically increase productive time and improve product quality.

The introduction of the Renishaw NC4 non-contact and TS27R contact tool setting probes has enabled rapid checking of each tool in succession, with each probing cycle taking less than 30 seconds. Data is now transferred automatically to the machine's controller, eliminating human error.

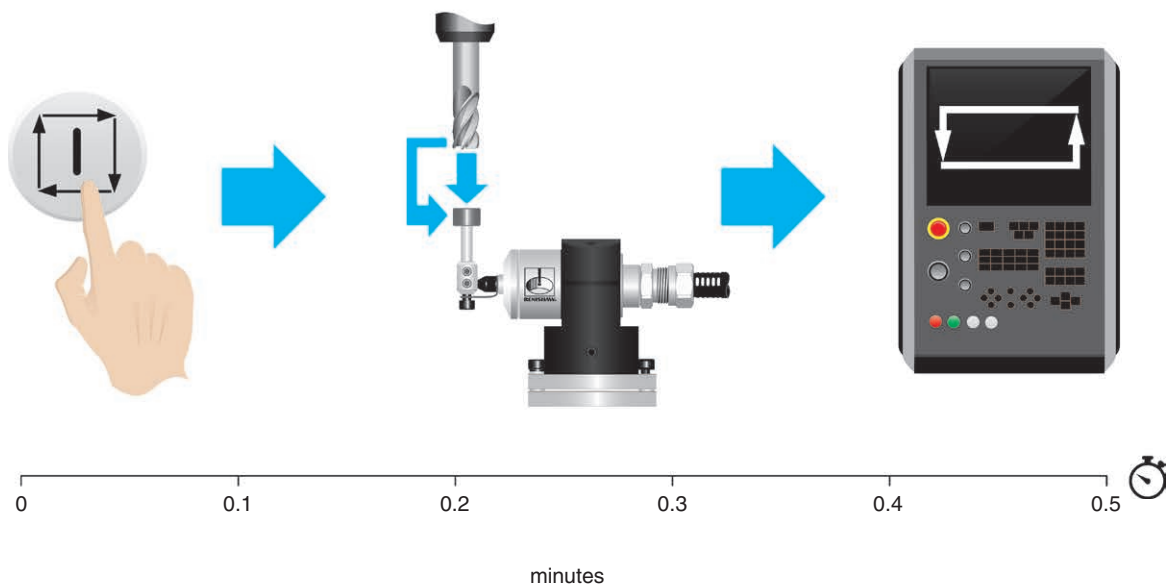


Automatic tool measurement using the TS27R

1. Cycle start

2. Automatic tool length and diameter measurement with TS27R

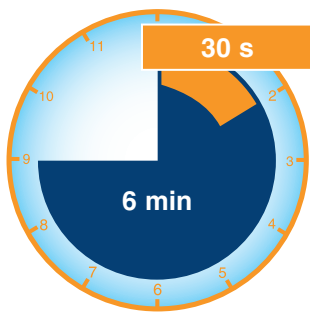
3. Automatic update of tool offsets in the CNC control



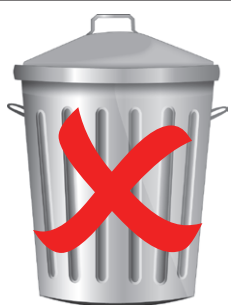
Results

These charts provide a typical illustration for this industry application where automatic tool setting has been introduced.

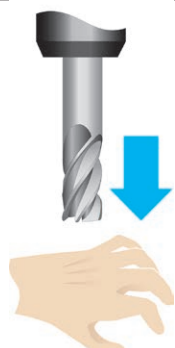
Reduced tool setting time

	Without probing	With probing	Saving	
	Time/tool check	6 min	30 s	5 min 30 s
	Time/15 tools	90 min	7 min 30 s	82 min 30 s
	Time/year (108 batches)	162 h	13 h 30 min	148 h 30 min

Eliminated scrap caused by manual tool setting errors

	Without probing	With probing	Saving	
	Scrap rate	Possible	Eliminated	100%

Increased operator safety

	Without probing	With probing	Saving	
	Risk of injury	High	Low	

Summary

With the Renishaw NC4 non-contact and TS27R contact tool setting probes, QEP is able to rapidly check each tool in succession, with each tool probing cycle taking less than 30 seconds. As a result of the automatic transfer of data from the NC4 and TS27R tool setting systems to the machine's controller, human error has been eliminated.

Additionally, the new capability has allowed the company to:

- Increase confidence in the accuracy and reliability of their results
- Improve machine shop health and safety by eliminating manual intervention
- 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

// Using the old-fashioned methods of paper or feeler gauges, no two people would get the same result, so you would then have to take test cuts to confirm any offsets. With the Renishaw probes we can be confident we have correct and consistent data and we are saving in the region of 85 minutes per set-up, just on tool setting.

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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



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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