

Valve body boring and drilling: improve process capability



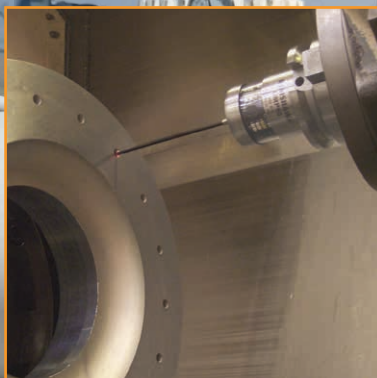
Reduce set-up time



Eliminate operator error



Improve bore alignment



Overview

Company information	Associated Toolings (India) Private Limited is a privately held valve manufacturer based in Kolkata, India, with two decades of experience in manufacturing valves.				
	Currently employs 200 people.				
Products and services	A range of gate valves for the petrochemical industry, with 80,500 units produced per annum, 90% are supplied to the domestic market.				
Industry accreditation	BS 5352	BS 2080	BS 6755	API 600	
	API 602	ISO 9001:2000	API 598	ASME B16.34	ASME B16.10
Company objectives	Increase business exports into the demanding but lucrative western petrochemical markets.				
	Improve quality, increase productivity and reduce lead time.				
	Improve manufacturing performance.				

Process

Boring and drilling of medium to large valve bodies, using BFW Maxpro heavy-duty 3-axis horizontal machining centres with Fanuc Series 0i MD controllers.

Typical machining rate is US\$25.00/hour and fully machined components have a value of \$1,000 each.

Challenges

1

Excessive time on part and tool set-up

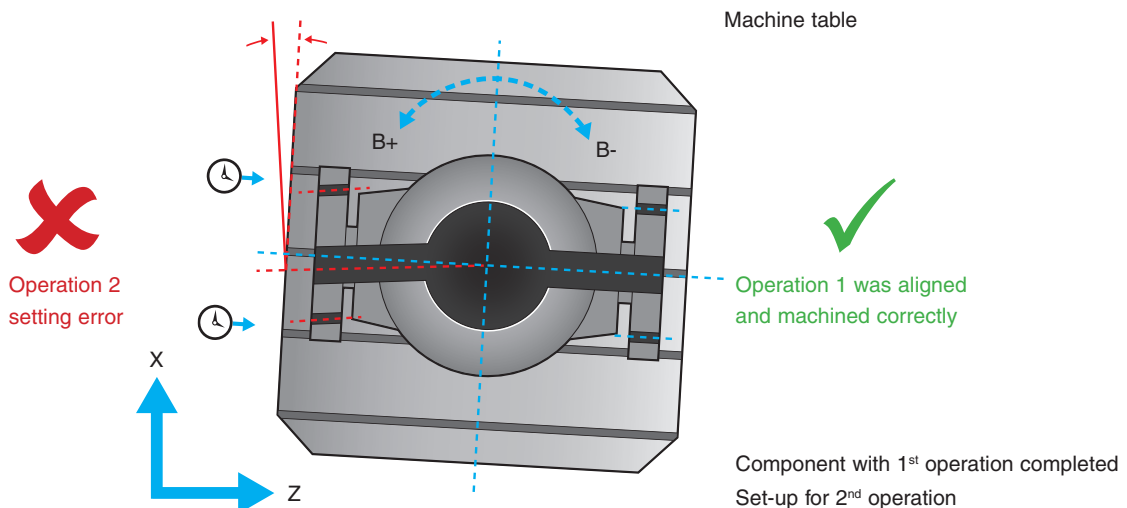
Manual indexing and component positioning of large valves took up a significant proportion of the overall floor-to-floor time for each component. A key objective for the company was to eliminate this non-productive time where possible and to increase productive time, reduce costs and increase profits.

2

Semi-skilled operator error and scrap

Drilling and boring of valve bodies required two operations, with manual indexing and set-up between each one. Operator errors within the second operation led to misaligned components. As a result, holes in the flanges were not perpendicular to the flange face and the bore passing through the valve bodies was misaligned. This led to a substantial amount of scrap and wasted revenue.

Example of incorrect and correct alignments where the table/part are rotated about a machine's B axis



Process considerations

Renishaw engineers considered key elements within Associated Toolings' 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/en/whendoiprobe

Solutions

Manufacturing process focus: process setting

Focusing on **process setting**, the engineers helped introduce measures to increase automation and reduce manual intervention. This was successfully applied to component setting.

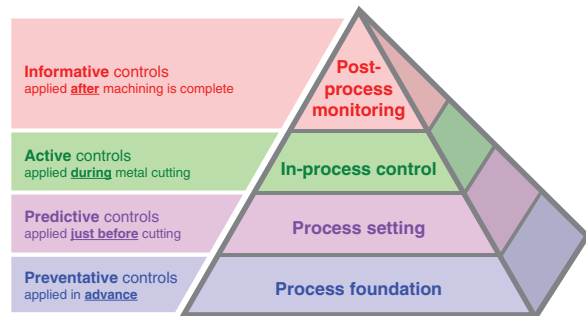
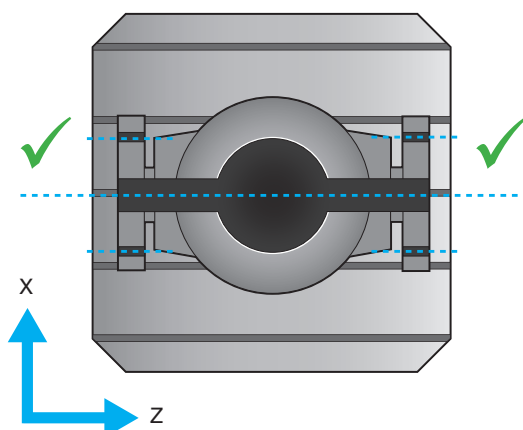
Automated, on-machine measurement of component position and alignment process setting capability was introduced using Renishaw's OMP60 touch-trigger probe.

It was then possible to check the machine table position, update the machine's controller and compensate for error in one automatic cycle. The results were impressive:

- **Set-up time reduced by 75%**
- **Operator error eliminated**
- **Scrap reduced by 83%**

Additionally, the new capability enabled the company to further eliminate its specialised fixtures, providing a less costly and more flexible response to customer needs.

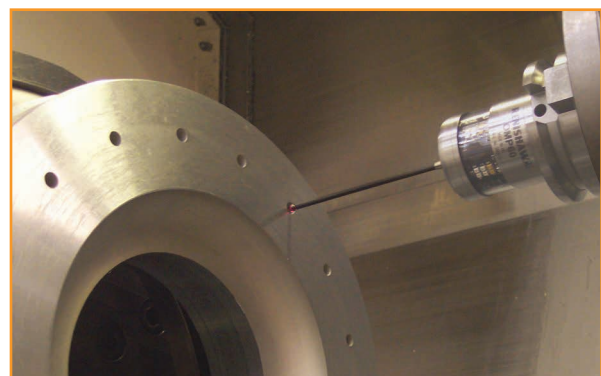
Example of alignment with correctly positioned bores and holes



Productive Process Pyramid

Renishaw tools in use


The pictures below show the Renishaw OMP60 touch-trigger probe mounted in the spindle of one of the company's Hurco vertical machining centres (VMCs), and checking the pitch circle diameter (PCD) of a valve body flange on a Maxpro horizontal machining centre (HMC).



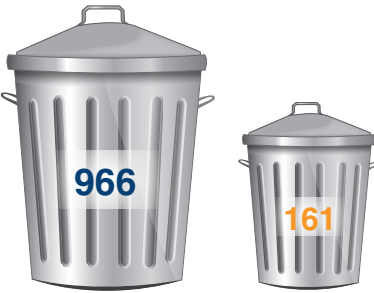
Results

These charts provide a typical illustration for this industry application where probing has been introduced.


Reduced component setting time

	Without probing	With probing	Saving/reduction	
	Part volume (large valves)	25,200	25,200	
	Time (each)	1 h 15 min	18 min 45 s	75%
	Cost US\$	787,500	196,875	590,625

Reduced scrap amount

	Without probing	With probing	Saving/reduction	
	Part volume (all valves)	80,500	80,500	
	Scrap rate	1.2%	0.2%	83%
	Scrap volume	966	161	805
	Cost US\$	966,000	161,000	805,000

Reduced costs, increased profits

	Without probing	With probing	Saving/reduction	
	Total cost US\$	1,753,500	357,875	1,395,625

Summary

Process control applied to Associated Toolings' component setting operations using Renishaw's OMP60 touch-trigger probe eliminated manual intervention and reduced set-up time. Alignment problems were also eliminated, leading to significant reductions in scrap.

These measures enabled the company to improve its quality management system and achieve dramatic savings in the first year. The subsequent increase in profitability enabled investment in new product development and new machine tools.

Additionally, the new capability helped the company to:

- **Reduce reliance on outdated fixtures, enabling rapid introduction of new processes**
- **Reduce delivery times and improve customer relations**
- **Increase confidence in capability and performance, enabling new market opportunities**

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

// Implementing Renishaw's process control solutions has enabled our company to drastically reduce our costs and quickly increase our profitability. Importantly, it has provided us with a highly competitive edge which, coupled with our improved quality, has impacted positively on our export strategy. //



Associated Toolings (India) Private Limited

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



RENISHAW HAS MADE CONSIDERABLE EFFORTS TO ENSURE THE CONTENT OF THIS DOCUMENT IS CORRECT AT THE DATE OF PUBLICATION BUT MAKES NO WARRANTIES OR REPRESENTATIONS REGARDING THE CONTENT. RENISHAW EXCLUDES LIABILITY, HOWSOEVER ARISING, FOR ANY INACCURACIES IN THIS DOCUMENT.

© 2015 Renishaw plc. All rights reserved.

Renishaw reserves the right to change specifications without notice.

RENISHAW and the probe symbol used in the **RENISHAW** logo are registered trade marks of Renishaw plc in the United Kingdom and other countries. **apply innovation** and names and designations of other Renishaw products and technologies are trade marks of Renishaw plc or its subsidiaries. All other brand names and product names used in this document are trade names, trade marks or registered trade marks of their respective owners.



H - 2000 - 3800 - 02

Part no.: H-2000-3800-02-A

Issued: 08.2015