

Flying success with Dunlop Aerospace Braking Systems



Customer:

Dunlop Aerospace Braking Systems

Industry:

Aerospace

Challenge:

Reduce set-up time and increase process efficiency in the manufacture of wheel and brake components for commercial and military aircraft.

Solution:

Part setting and in-process control solutions using Renishaw touch-trigger probes.

Dunlop Aerospace Braking Systems, a part of Meggitt plc, is a global organisation that designs, develops and manufactures wheels and brakes for commercial and military aircraft applications. Aircraft production in the UK has experienced steady growth and to meet this demand the hub and flange cell at Dunlop Aerospace purchased 3 key CNC machines between 1998 and 2000, at that time actively specifying Renishaw probe systems. This has increased process consistency and has also had a marked effect on the manufacturing time.

Dramatic reductions

Andrew Cartledge, team leader of the hub and flange cell, speaks positively about the decision to employ Renishaw probing systems, “We’ve seen improvement both in machining cycle times and the overall set times every time we’ve introduced a component to the cell. This is critical to our New Product Introduction process (NPI) which we use every time a new wheel is introduced, essentially allowing us to ‘design for manufacture’.”

Runners, repeaters and one-offs

Orders for wheels fall into three different categories according to the number of batches made each year. The ‘runner’ orders

are classed as those wheels produced in more than 10 batches a year; ‘repeaters’ are less than 10 batches a year. Dunlop Aerospace also supply one-off orders and recently succeeded in a very impressive project to remanufacture components for the 1950s Canberra. This involved taking original drawings and reprogramming the machining through the modern CNC process.

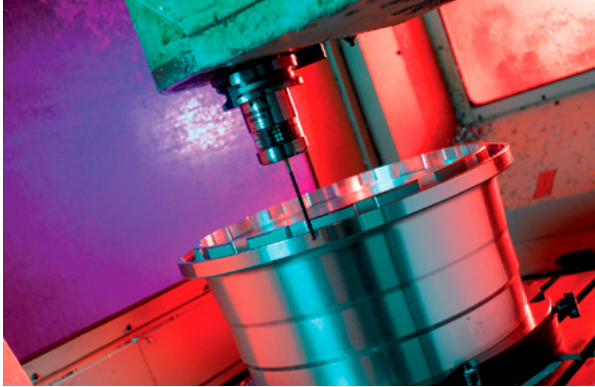
“We have now used probing systems on this cell for over 6 years and have cut costs and times, with a step change in process control and consistency.”

Dunlop Aerospace (UK)

Mr Cartledge continues, “NPI involves a process we call Manufacturing Process Approval (MPA) whereby any machining process must be closely analysed to see if it affects the stresses and component strengths of a wheel assembly. All the main ‘runners’ and any ‘repeaters’ that are introduced to the new cell need MPA before production can start.”

Investment in technology and automation

Between 1998 and 2000 Dunlop Aerospace chose to spend nearly £2 million on three state of the art multi-axis CNC



Spindle-mounted touch probe setting the machine coordinate system



Wheels for a long distance executive jet

machines; a multi-axis Mazak Integrex - a turning centre with full C-axis and driven tooling to give milling capability; a Mazak HV800 5-axis horizontal machine centre; and the most recent investment, a Mori-Seiki MT4000, at the time the first of its type in the UK.

Probe systems make all the difference

The underlying technique made possible by the integration of the probe systems is the ability to identify the component position and material condition, updating and monitoring the deviation in the wheel forgings. This reduces cutting time, as it eliminates fresh-air cuts - this is because the probe ensures that the critical surfaces of forgings are accurately located and metal cutting starts immediately.

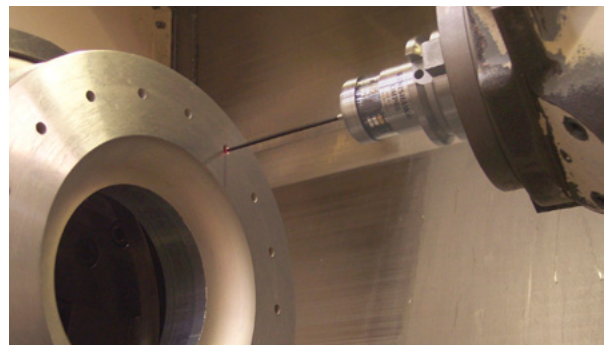
The importance of one hit machining

During the cutting process stresses are relieved in the material, so one hit machining results in the cutting process achieving greater consistency. L77 aluminium is the most commonly used material and, with the high cost of each process, it is essential that Dunlop Aerospace keep scrap levels low. In-process monitoring and tool offset updating ensures process control and minimises scrap.

The nature of the aviation industry demands ever-increasing accuracy and quality, ensuring both wheels and brakes can be reliable in all conditions and scenarios. Mr Cartledge sums up the changes to the process neatly - "We have now used probing systems on this cell for over 6 years and have cut costs and times, with a step change in process control and consistency."



Turboprop passenger plane with wheels and brakes supplied by Dunlop Aerospace



Turret-mounted probe on Mazak Integrex setting the coordinate system by finding the position of a pre-drilled hole

For more information, visit www.renishaw.com/dunlopaerospace

Renishaw plc
 New Mills, Wotton-under-Edge
 Gloucestershire, GL12 8JR
 United Kingdom

T +44 (0) 1453 524524
 F +44 (0) 1453 524901
 E uk@renishaw.com
www.renishaw.com

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.

© 2017 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 - 5650 - 3001 - 01

Part no.: H-5650-3001-01-B
 Issued: 02.2017