University of Huddersfield Repository

Wright, Daniel, Murgatroyd, S., Longstaff, Andrew P., Myers, Alan and Fletcher, Simon

Process control within an SME to increase output and achieve consistent manufacture of components

Original Citation


This version is available at http://eprints.hud.ac.uk/9349/

The University Repository is a digital collection of the research output of the University, available on Open Access. Copyright and Moral Rights for the items on this site are retained by the individual author and/or other copyright owners. Users may access full items free of charge; copies of full text items generally can be reproduced, displayed or performed and given to third parties in any format or medium for personal research or study, educational or not-for-profit purposes without prior permission or charge, provided:

- The authors, title and full bibliographic details is credited in any copy;
- A hyperlink and/or URL is included for the original metadata page; and
- The content is not changed in any way.

For more information, including our policy and submission procedure, please contact the Repository Team at: E.mailbox@hud.ac.uk.
Process control within an SME to increase output and achieve consistent manufacture of components

D. Wright, S. Murgatroyd, A. P. Longstaff, A. Myers, S. Fletcher

Introduction - Process control is a key aspect to any company looking to increase machining output and availability, and also those who strive to achieve automation. The dangers associated with this philosophy can be seen when producing batch’s automatically. With no operator intervention, any weakness in the process control chain can result in high levels of scrap being produced. To achieve consistent manufacturing it is necessary to look at the processes which make up the whole operation. The majority of the components manufactured within the case-study SME can be single or batches of very few parts.

On machine collision causes crash within machine damaging work piece, smashing probe and possibly causing machine error

Ballbar graph showing the machine error relating to the large crash of probe body into the side of the work piece

Outcomes - On-machine probing of a component has been used as a first-line diagnostic tool when comparison with manual inspection identified errors in the production machine. Collisions on the machine tool give need for testing with the ballbar as a damage indicator and allow for maintenance to take place if necessary. Processes within manufacture have been standardised and allow for greater control of the components produced across a number of Machine Tools.

Component correctly secured to correct fixture check. Modification taken place within this example to allow for measurement to occur using touch probe

Tooling file created for standardisation across machining centres. Standard tools are kept within the machine for common jobs and includes the Touch Probe. Pockets are left blank for job specific tooling and are changed as necessary. All tool information is recorded including grades, speeds, feeds lengths and manufacturer

Information to help develop new processes

Information to help develop new processes

Critical features ONLY

PROCESS SPECIFIC

Indication of Process

Produce from Manual Errors

Regular Maintenance

Design For Manufacture

Feed and Speed Rates

Machine Capability – BallBar Testing

Probe Qualification

Updates

Finished AND roughing data

Thermal Track

Tool offsets

Broken Tool Check

Machine Check

Tooling Suite Check

Component in Feature check

Correct part check

WCS Set

Tool Set

Component re-checked after machine alignment and showing a realistic dimension report which is comparable to manual inspection

Machine checked using ballbar test equipment to evaluate machine alignment post incident

Component re-checked after machine alignment and showing a realistic dimension report which is comparable to manual inspection

Component measured on the machine tool highlighting large errors. First checks are made with a quick ballbar test

Component correctly secured to correct fixture check. Modification taken place within this example to allow for measurement to occur using touch probe