

Issue D – Improvements in Off – Line Wheel Balancing for CNC Cutter Grinders

The merits of balancing a grinding wheel and the inherent process advantages of better part finish, longer abrasive life, longer machine spindle life and improved process performance has long been recognized by Grinding machine manufacturers and are standard features on Creep Feed and Cylindrical Grinding Machines.

Tool and Cutter Grinders have had a much harder path to approaching this issue due to a large number of factors. First off, even though super abrasives used for Tool Manufacture are relatively homogeneous in their make-up and the wheel manufactures work to ensure proper balance, the fact is cutter grinders use wheels of all different shapes and sizes, cup wheels, tapered wheels, cut-off wheels, and all possibly mounted on the same arbor! The very nature of CNC cutter grinding that allows it to be so productive and flexible also promotes stack up errors of unbalance.

Manufacturers of the Cutter Grinders have taken different approaches over the years, many developing on line balance machines. We at **Focus Technology** have pioneered a different approach of off-line wheel balancing. We had long admired the capability of the **Haimer Balancing Machines** to balance Tool Holders for production manufacturing so we approached the Haimer group and inquired into what it would take to perfect the process for Tool and Cutter Grinders.



As this would occur it happened that **Walter Grinders** was simultaneously looking for a partner in this same endeavor. What we prefer about the Haimer machines and their approach was the absolute ease of the process utilizing these key features:

- Automatic clamping spindle for measuring unbalance. Spindles available for all HSK CAT, BT, and SK Tapers (with or without utilizing a retention knob),
- Automatic Indexing Aid: Indexes the spindle to the exact position of unbalance, once the measurement run has been completed
- Engraved 360 degree scale on the measuring spindle
- Plexi-glass cover with safety switch
- Electro-pneumatic control for clamping and unclamping the tool
- Indication when the balancing tolerance has been achieved

- Indication of unbalance in gram - millimeters (gmm) and grams (g) with angular position of unbalance in relation to the spindle
- Software for correcting the unbalance by drilling & milling, or by using balancing rings and balancing screws.
- Variety of measuring methods:
 - Index measuring (most precise measuring method, 2 measuring runs necessary)
 - Measuring with spindle compensation (short measuring period, only one measuring run basic unbalance of spindle is compensated)
 - Simple measuring (total unbalance of the system including spindle)
- External PC will store data for 5000 different tools
- Extremely reliable machine with complete on-board diagnostics

As it turned out the machine was perfect for the application! It was quickly discovered that Balancing rings were the cleanest and simplest method of correction, low cost and reliable; you simply move the rings around the arbour displacing the amount of weight given to you through the Haimer system. After a little tweaking with the Graphics to make it more customer specific for Wheel arbors away we went with an excellent solution to correcting stack up unbalance in grinding arbors. We felt it was much cleaner than doing it on line and definitely a lot easier than in- machine methods we had witnessed.

Now **Haimer** has however combined technologies even further into one simple machine with the introduction of the TD 2002 Saturn/Preset Machine. This machine combines the capability of Grinding Wheel Presetting and Balancing into one simple machine.



Balancing and presetting are key elements of modern manufacturing. It is obviously a good idea to combine these two operations. Now in one simple machine you have a complete Wheel arbour Management system which can supply you a tool you can use for wheel arbors or cutting tool shop floor inspection. You have at your disposal; (A) fully automatic recognition of the wheel edge or cutting edge shape (B) wheel arbor or tool management for at least 1,000 arbors or tools (C) radius measurement, absolute measurement and incremental dimension difference dimension measurement as you're shop may prefer and (D) perfectly balanced setups. We think you can agree the potential for this tool to improve your shop floor quality and productivity is excellent. Ask your **Focus Technology** Representative for more information or call us at 704-799-6820.