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MACHINE TOOL VIBRATIONS | MODAL TESTING | HIGH SPEED MACHINING

Demonstration Date: April 29, 2004
Demonstration Time: 10 am – Noon, 2 – 4 pm
Location: Methods & Equipment Associates
24860 Hathaway Street
Farmington Hills, Michigan 48335

D3V will be demonstrating the latest techniques in machine tool vibration technology on CNC milling machines using MLI's MetalMAX™ technology. Hi-Performance milling cannot be achieved without identifying dynamically optimized cutting parameters (speeds, DOC's and feeds). Stable cutting speeds produce **maximum** use of power, metal removal rate, and depth-of-cut. Scientific analysis of machining dynamics identifies cutter and workpiece frequencies used to produce recommendations for spindle speeds, depth of cuts and feed rates. In addition, MLI's Harmonizer® 4.0 software for acoustic chatter (self-excited) and forced-vibration (resonance) recognition will be demonstrated on cutting tests. A specialized Harmonizer® CNC software is also available that incorporates its patented technology into a machine tool monitoring system.

- Scientifically based predictions with minimum machine down time.
- Rapid, useful results presented in a shop floor friendly manner.
- Applicable for all materials including light alloy, tool steels and hi-temp materials.

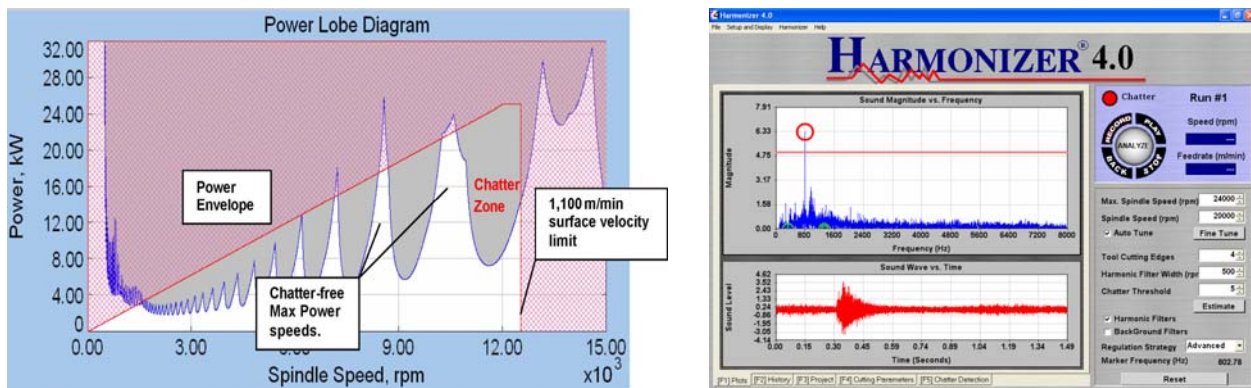


Figure 1: (a) Measured stability charts display speeds where power (shown above), metal removal rate, or depth of cut are maximum. (b) Harmonizer® 4.0 provides the chatter frequency and recommends a new spindle rpm

Benefits:

- Design robust processes that improve quality, throughput, and cost.
- Achieve consistent and repeatable part quality and machining times.
- Reduce or eliminate part-try-out, 2nd operations, and scrap parts due to unstable machining conditions.
- Drastically reduce tool trial cost at design phase
- 30% or better effective increase in cutting tool life.
- Reduce wear and tear on machine components such as spindle bearings, machine guide ways and servo drives.
- Simplify cutter setups by identifying redundant, under-performing cutter setups, reduce tool inventory.
- Improve shop process flow and scheduling with more accurate estimates of machining time resulting from optimized parameter specifications.

Please bring one of your endmills in a Cat40 holder, as we will demonstrate these techniques on your production tool. We can also discuss other vibration areas that we specialize in: drilling, reaming, boring, high L/D tools, fixturing, thin-walled parts, "bell-like" structures.

Demonstrator:

Dr. David Dilley founded D3V in 2004 to provide machine tool vibration services designed specifically for the metal-cutting industry. Dilley has been working in the metal-cutting industry for 10 years, with 6 of those years at GM Powertrain as a tool and die supervisor, senior process engineer, and senior project engineer. In 2001, he was awarded a Boeing Fellowship to research drill and reamer vibrations with Boeing's military Advanced Manufacturing R&D. D3V is currently working with Manufacturing Laboratories Inc. to develop drilling and reaming software to complement MLI's MetalMAX™ technology. Dilley has numerous journal and conference publications, and has lectured classes at Oakland University and the University of Michigan – Ann Arbor. Dilley holds a BSME from the University of Missouri-Columbia, MS Engineering Management from Rensselaer Polytechnic Institute, and both MSME and D.Sc. from Washington University in St. Louis.