



**Makino Seminar**  
**NEW AEROSPACE MACHINING SOLUTIONS**  
 Presented by Ted Jones, MAG Product Manager

**Maximizing Cutting Performance**

- Tap test
- Eliminate "trail & error" approach
- Maximum MRR with nice finish

**Metal MAX**

Stability Lobe  $\phi 18$  endmill

**Maximizing Cutting Performance**

- Use data
- Save time
- Use added capacity to make more parts

Activity	Conventional	MetalMAX	More Resources
<input type="checkbox"/> Tool/Machine Selection	Arbitrary	Based on measurements	MetalMAX
<input checked="" type="checkbox"/> Selecting Machining Values (DOC, Speed, Feed)	Historical	Scientifically determined	Neither
<input checked="" type="checkbox"/> Optimizing	Trial/Error or Iterative	Deterministic	Conventional
<input checked="" type="checkbox"/> Producing Part	Acceptable	Optimized	Conventional

Resources Expended:

"This slide could be its own complete topic we could talk about, but I'll touch on this briefly now. Maximizing your cutting performance through a method called a tap test, that many of you may be familiar with. You use a harmonizing system. Basically, you can take each individual tool and tap test it, based on the application, and understand the frequency and vibration dampening of each. The system will take that tap test data from each tool, identify, and plot out areas of instability in a cutting process and areas of stability.

So this tool can do for you is make it simple, without being a vibration expert, to find the sweet spots for different cutting conditions and therefore eliminate the trail and error approach that many go through. The bottom-line advantage of all this is it's fairly quick, doesn't require a skill level of a vibration expert, and the results allow you to achieve metal removal rates without vibration and with ideal cutting conditions, very quickly. It's especially valuable in aluminum, where high metal removal rates are common. This is a topic that we'll probably cover all on its own at a later date in depth."

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"This next slide shows a visual image of what I just talked about. If you can use a scientific approach, you can save a lot of time. And if you can save a lot of time you can use that added capacity to make more parts, which is what everyone's trying to do. If you look at the resources expended at the bottom of the page, you can see that the conventional method where you develop your process to produce the part, select machining values like depth of cut and feeds and speeds, write your program, and go through trial-and-error to optimize your program. This trial and error section is quite large, as you can see, before you get to actually produce the part. Based on this process, you may not get to the optimal point of metal removal very quickly, and often people never get there and just settle. With harmonizing equipment, you put more time into the machine and tool selection because you go through the tap-test process, which takes more time, but the impact of that up-front effort is that you slash the time spent on deciding machining conditions. The software guides you through the choices, and optimizes the process for you and allows you to always run closer to the optimum. This process makes a lot more sense from a business point of view, and can easily save you time and money."