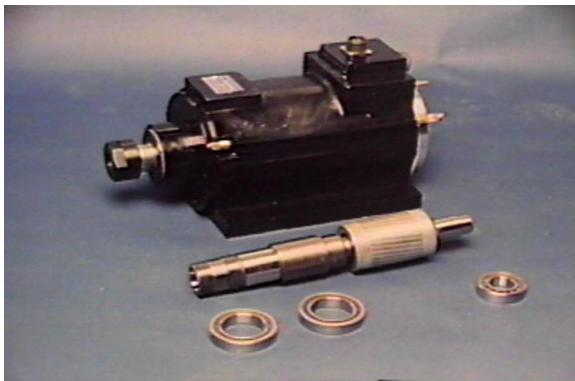


Technical Notes

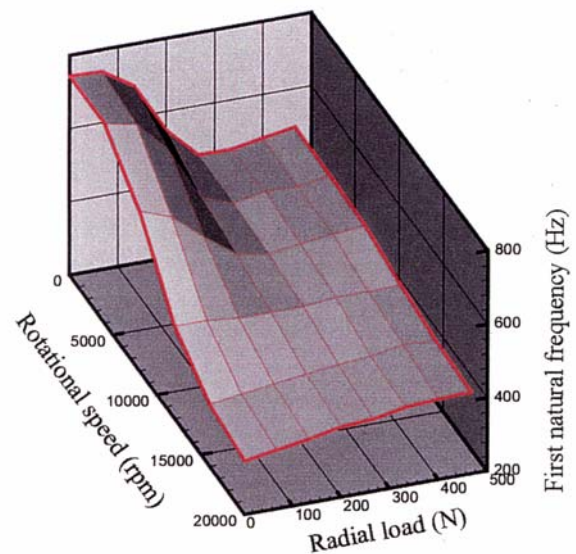
WOOD MACHINING & TOOLING RESEARCH

WMTRP TECHNICAL NOTE: HIGH SPEED CNC ROUTER SPINDLES

Spindle problems have plagued CNC routers for decades. These problems are partially due to the use of poorly maintained and balanced tools and chucks, however, many problems are inherent in the spindle design and are a result of the use of low cost, poor quality spindles. In order to perform in high rpm/high power environments, factors such as spindle cooling and spindle bearing lubrication must be controlled. Liquid chilled spindles with oil mist bearing lubrication are routinely used for high speed / high power applications in metalworking and are now available for woodworking applications. In addition to these factors, details of bearing and shaft design affect spindle dynamics and are crucial to satisfactory high speed spindle operation. Recent WMTRP research has focused on issues such as bearing stiffness, bearing configuration, bearing spacing, shaft diameter, shaft length and the effect of these parameters on vibration and critical speeds (spindle operation near a critical speed causes amplified vibration response and premature bearing failure).



High Speed / High Power Spindle



Spindle Critical Speeds

The Wood Machining & Tooling Research Program (WMTRP) is a multidisciplinary program involving the fields of Mechanical Engineering, Industrial Engineering, Manufacturing Engineering, Material Science, and Wood Science. The program mission is to provide the woodworking industry with personnel educated in machining and tooling technology and provide applied research results aimed at improving efficiency and wood utilization. Major program support is provided by the U.S. Department of Agriculture.

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