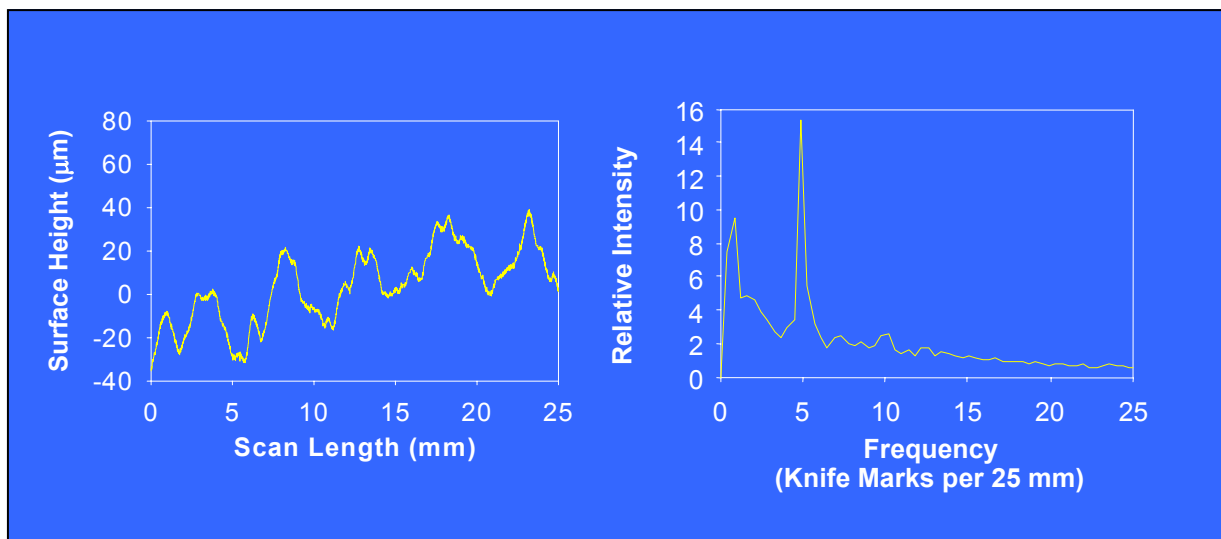


WOOD MACHINING & TOOLING RESEARCH

SURFACE QUALITY RESEARCH - TIME AND FREQUENCY ANALYSIS

The analysis of surface quality is crucial to the successful control of quality in wood manufacturing industries. Current research at North Carolina State University has shown that a multiple domain analysis provides the user with a great deal more information regarding surface characteristics and defects. Traditional time domain analysis, as shown in the figure on the left, is particularly well suited for identification of individual anomalies and showing the magnitude of defects, while frequency domain analysis, as shown on the right, is much better suited for showing overall patterns of defects. In most circumstances where process control is the goal of surface assessment, the pattern of defect (knife marks per inch, waviness, chatter, etc) is in fact the more telling parameter regarding the root cause of the defect. This is very clearly evident in a frequency domain analysis where the intensity of the various frequency components and their relative strength is obvious. The figures below, when used in concert, show that the knife marks on the wood have a very strong component at 5 marks per inch, while the magnitude of the peaks and valleys is evident from the time domain plot.



*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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