



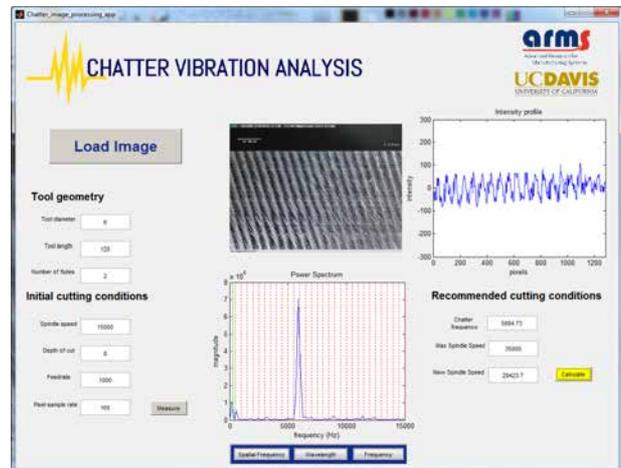
MTTRF has provided us with state-of-the-art equipment, replacing the old obsolete equipment. Students are able to receive hands-on education and gain real-world operating experience with the equipment. The advanced equipment is essential for the cutting-edge research at our laboratory.

RESEARCH

Vision Based System for Chatter Identification and Process Optimization in High Speed Milling

Chatter vibration has been one of major subjects in CNC machine tools over the past decades. There has been a lot of development in the area of chatter vibration identification systems, but many are required to measure data during the machining and require expensive equipment. However, chatter problems often arise unexpectedly. As a result, re-machining is required to gather data to identify the problem. In this research, the machine dynamics and stability of a CNC machine tool system are studied in the interest of finding a set of cutting conditions that produce chatter on the surface of the workpiece.

A machine vision method is proposed to analyze the wavy surface of the workpiece caused by chatter vibration in order to obtain



suitable cutting conditions for stable milling in a practical and cost effective way.

Development of New Machining Method for Finish Surface of Sliding Guideways

The current manufacturing process of sliding guideways is time consuming and expensive because it requires multiple setups, machines, and work piece handling. Our past research used CBN milling to replace the time consuming and expensive grinding operation.

The machining based manufacturing process proved feasible and produced a cast iron sliding guideway.

The objective of this research is to investigate the ability of CBN machining and honing / brush type polishing tool to replace a traditional grinding method for manufacturing cast iron sliding guideways. Two main aspects of this work is determining the optimal machining conditions for CBN milling and honing/polishing combined and quantifying the performance of the produced sliding guideway.

EDUCATION

Manufacturing processes, EME50 (Undergraduate course)

The EME 50 course has a long-standing tradition as the hands-on class that introduces manufacturing technology to second or third

year mechanical engineering students. The class consists of lectures and a weekly 3hour shop section. The students are trained on safety, quality control, and the operation of manual lathes, milling machines, and drill presses. During the course students manufacture a part, which is stacked into a totem with the other students' parts, and a mechanical gyroscope.

Advanced manufacturing, MAE298 (Graduate course)

The advanced manufacturing course is a newly developed course that mainly focuses on advanced topics in machining. In part of the class, students learn simulation techniques to predict cutting processes such as cutting forces, machined surface, machine dynamics, and chatter stability. MTRF machines are fully utilized to check these theories and to complete the hands-on project, which is the final assignment.



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