



Since 2007, MTTRF is supporting us with the loan of modern machine tools, used in education and research. Within several educational under-graduate as well as graduate courses, students learn about the different steps in manufacturing technology: CAD/CAM, Process Planning, Machining. In addition, the loaned equipment is used in various research programs.

RESEARCH

Machining of Precision Components

Many Industries often need to produce precision prototype components. We have been working on some of these topics for several years and various processes are being investigated such as EDM, vibration assisted machining, micro-milling, multi-axis machining and software development. The current research focuses on the precise machining of complex shaped prototype components where strategies will be developed to machine these in a fast and energy efficient way. Currently, the research focuses on the integration of a hardening process allowing execution of the whole process, roughing, selective hardening and finishing, on the same machine platform.

Efficient High Speed Processing of Sheet Metal Parts

Research on flexible manufacturing of prototype sheet metal parts has been

conducted for several years and our current focus is on Increment Sheet Forming (ISF). The application of the SPIF concept on a turning center allows fast manufacturing of more or less axi-symmetric sheet metal parts. This process allows die-less forming of a wide range of complex shaped geometries. Using the rotating action of the spindle in combination with the additional degrees of freedom from the mill/turn center allows making asymmetric sheet metal parts in a fast way.

The research aims to study the processing of prototype sheet metal parts, both die-less and forming with a supporting die, and are subject of possible studies on a mill/turn center



where a partial die could be used on a turret as a kinematic supporting tool which can follow the forming tool somewhat like a potter, using its hands to form a clay pot. This will allow for increased control of accuracy and thickness.

EDUCATION

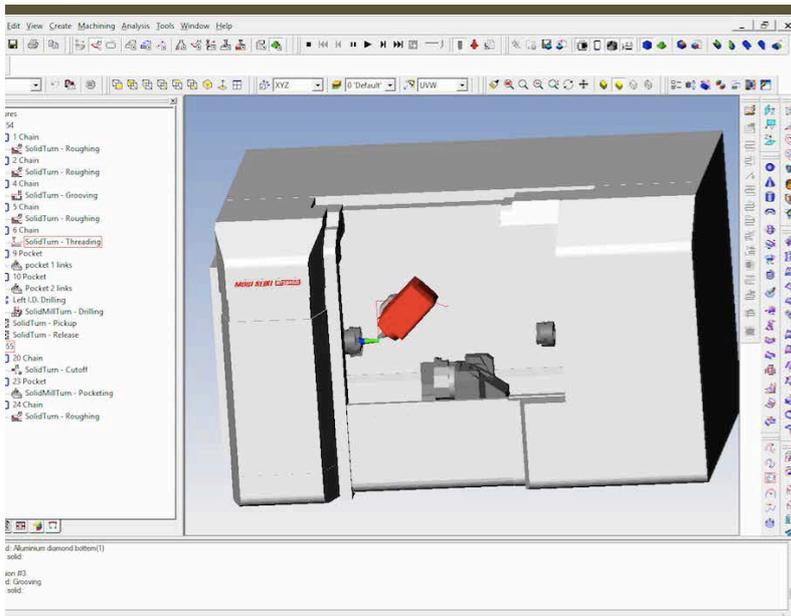
Production Engineering and Systems (Undergraduate course)

Groups of students receive a detailed explanation of different machine technologies such as EDM, additive manufacturing, and metrology. With the MTTRF equipment, students will learn about the capabilities of a

mill-turn center and be given a demonstration. In addition, students are assigned to create CAM programs, followed by fabrication on the machine.

Production Systems: Machine Tools, Flexible Computer Integrated Production (Graduate course)

In this course, the MTTRF equipment is used in the lab session and exercise. In the lab session, the constructions of modern machine tools are explained and students will analyze different components of the machine tool. During exercise, students apply the method and principles about CAD – NC machine trajectory, learned during the lectures.



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MTTRF Awardee since 2007