

Speech Title: An Overview of High-speed Machining Technology for Processing Aero-engine Components

Abstract:

The next generation fuel efficient aircraft employ new age improved materials: Hastelloy, Titanium (Ti6Al4V), Rene77, Inconel 718, MMC, composites and ceramics which exhibits serious machining challenges due to its high temperature strength, hardness and chemical resistance. The poor thermal conductivity further enhances the tool-work interface temperature resulting in extensive tool wear, severe plastic deformation, shear bands and structural changes. Past research suggests decreasing the cutting speed and/or reduce the depth of cut to overcome the machining challenges, but the approach concurrently decreases the machining throughput. However, the development of high-speed machining (HSM) technology along with innovations on machine design, tooling has addressed several machining challenges. Despite of the vast high-speed machining technology developments the transition from the research atmosphere to the industrial platform is limited as the process demands several customization efforts. This presentation overviews the past, present and future developments of HSM technology and unveils how a smooth transition was achieved from a research platform to the industrial shop floor.