

Defence Seminar

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Seminar Title	: Investigation of machinability criteria of Titanium alloy using textured cutting tool
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Venue	: Seminar Hall, Mechanical Engineering Department
Date and Time	: 07 Jun 2024 (04.30PM)
Abstract	: Dry machining in today's modern manufacturing system is becoming very popular but dry machining has been challenging for high strength materials without the use of cutting fluids. Titanium, also well-known as wonder metal, has a wide range of applications in various industries for desirable properties (lower density, higher tensile power and resistance towards corrosion in aqua region, liquid chlorine and seawater). Because of its poor thermal conductivity and higher chemical reactivity, it has been termed as 'difficult to machine' material. This situation necessitates proper selection of the machining parameter as well as cutting tool material before machining the workpiece. The present work has been carried out exploring the effect of surface texturing cutting tools on dry turning Titanium grade 23 through experimental and numerical investigations. Cutting performance was analysed and compared using both uncoated and coated tools. Machinability criteria had been studied on the basis of cutting forces( $F_x$ , $F_y$ , $F_z$ ), cutting temperature, tool wear, chip morphology. A 3D numerical investigation has been carried out comparing the performance of textured tools in conventional machining as well as vibration assistance. The cryo-treated and tempered textured inserts had been taken for dry turning of Titanium Grade 23 in experimental investigations. The effect of cryo-treatment and tempering on carbide tools with and without textures have been studied.