Surface roughness contours have been generated from these model equations and are shown in different plots. These models can be useful in computerized process planning and optimization.

[Paper ID565] SURFACE ROUGHNESS AND SURFACE INTEGRITY OF END MILLED TITANIUM ALLOY TI-6AL-4V AT ROOM TEMPERATURE AND PREHEATED MACHINING

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ABSTRACT
This paper is concerned with the surface roughness and surface integrity of titanium alloy Ti- 6Al-4V after end milling under room temperature and preheated conditions. End milling experiments were carried out on a Vertical Machining Centre, using 20 mm uncoated WC-Co inserts. High frequency induction heating was utilized for preheated experiments. Surface roughness values were measured using a surface roughness measuring instrument Mitutoyo Surftest Model SV-500. The surface integrity and subsurface alteration were investigated by employing scanning electron microscope and Vickers micro-hardness. Prior to surface integrity inspections, the sample was cut with electro discharge wire cutting, then mounted using hot mounting, ground using silicon carbide papers, polished with alumina solution, and then etched with 10% HF, 5% HNO_3 and 85% H_2O solutions. Microhardness was measured along the depth (perpendicular to the machined surface) at an interval of 0.01 mm starting from the top surface up and continued up to a depth of 0.5 mm. The results show that the surface layer could be divided into three zones, namely heat affected zone (Zone I), strain hardened zone (Zone II), and the base material (Zone III). A higher surface roughness achieved in preheated machining is attributed to the development of built-up edge (BUE) on the cutting tool surface.

[Paper ID571] STUDY OF TOOL WEAR FOR MICRO-BALL-END MILLING PROCESS

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ABSTRACT
Due to increase demand on the micro-meso component for miniaturized product, micromeso machining technique has gained strong interest in the past decade. Micro-ball-end-milling (MBEM) process can be used to generate complex curve surface and quickly remove work material with sufficient precision under low cost. However, tool wear decreases the machining efficiency and the process quality. Without effective control of tool wear, the process is not economical. Realizing the behavior of tool wear in an MBEM process is then critical. Concept of geometric sliding coefficient (GSC) defined as the fraction of tool-chip contacted area due to friction was proposed to describe the status of tool wear. Experiment was performed in the study to collect milling force data for the estimation of GSC. The GSC was found to be proportional to the measured tool frank wear (VB) under experimental conditions. Dimensionless analysis for GSC was also performed with two parameters, including machining conditions related parameter Km and time related parameter Kt. A mathematical relation with Kt and Km was thus constructed for the GSC such that GSC can be used as an effective reference for the status of tool wear of an MBEM process.

[Paper ID577] APPLICATION OF DUCTILE FRACTURE CRITERIA TO INDUSTRIAL CUTTING PROCESSESS

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ABSTRACT
Experimental and numerical studies of fracture prediction with Czech steel no.41 2050 are presented. Seven ductile fracture criteria were calibrated, applied to simulation of rod cutting and bolt head trimming operation and compared with experimental results of these processes, obtained in semi-industrial conditions in cooperation with