Prof. Brahim Ben Fathallah (Tunisia)

Biography:

Brahim BEN FATHALLAH is an HDR (Habilitation à Diriger des Recherches), PhD and Agrégation holder, serving as an Professor in the Mechanical Engineering Department at ENIT, University of Tunis El Manar, Tunisia. He is part of the Mechanical, Materials, and Processes Laboratory (LR99ES05) at ENSIT. His expertise lies in mechanical engineering and materials science, particularly for materials like steel, cobalt, nickel, titanium alloys, ceramics, and composites. His research focuses to the effects of machining and nitriding process parameters ... on the microgemetrical characteristics, microstructural and metallurgical properties and mecanicanical characteristics as well as their impact on the surface and fatigue integrities, machining, and wear testing. These studies incorporating artificial intelligence (ANN, SVM, and statistical methods...) for modeling analysis results, optimizing process parameters, and finite element modeling to study thermomechanical processes. Additionally, he is working on projects related to advanced manufacturing techniques, emphasizing AI's role in Metal Additive Manufacturing and aerospace production.

Beneficial effect of MRR and abrasive type in the compromise high productivity - best surface integrity under fatigue loading of AISI D2 tool steel

Abstract :

During this investigation, the comparison between high productivity into the combination of two conventional grinding tests (CGT15 and CGT30). These tests were conducted on AISI D2 tool steel. The CGTs were using two abrasive types (Al2O3 and Sol–gel alumina) and two depths of cut (15µm and 30µm). The results of CGT15 leads the lower residual stresses and lower density of micro-cracks. The relationship between density of thermally induced micro-cracks and fatigue damage was clearly established. The ground surface under CGT15 tests provides a substantial improvement in the fatigue life with an enhancement between 125 % to 210 % compared to CGT30 combination. Nevertheless, the Goodman–Smith diagram in the uniaxial criterion and Dang Van multiaxial fatigue criterion are used to take into account the surface stabilized characteristics and isotropic damage to validate and to predict the combined beneficial effects on the high cycle fatigue limit.