

Abstract for the general public in English

The concerns for energy demand, machining efficiency, cost and sustainable production are increasing in the field of aerospace sector. The sensitive issues such as depleting fossil fuel sources, increasing pollution, and adverse climate changes have also drawn the focus of research towards the sustainable manufacturing. Therefore, the present proposal deals with the modelling of machining application of one such aerospace material i.e., New Metastable Beta Titanium Alloy by considering the social, economic and environmental effects. The machining tests will be performed under dry, wet, minimum quantity lubrication, liquid nitrogen and dry ice cooling conditions. The various metallurgical, tribological and sustainable aspects will be covered with this proposed proposal. This research work is aligned with the European Aerospace sector to optimize the energy in manufacturing and machining of different products. The ideology presented herein is the optimal model to manufacture the sustainable precise parts. The research work will provide a reference guide to perform the sustainable machining of aerospace grade titanium alloys considering the manufacturing constraints and energy optimization. This research will be highly beneficial for manufacturing experts, computational design engineers, and researchers involved in the area of machining mechanics and precise parts manufacturing. Research results will be theoretical background for scientists working in technologically advanced industries.