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3	PhD Thesis Title	Experimental Investigations on Machining properties of Tib2 reinforced Al-6063 composite Materials using K20 Inserts	
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7	Brief synopsis Aluminum based particulate reinforced metal matrix have emerged as an important class of high performance materials for use in aerospace, chemical and transportation industries because of their improved strength, high elastic modulus and increased wear resistance over conventional base alloys. Recently, In- site techniques to fabricate aluminum- based metal matrix composites, which can lead to better adhesion at the interface and hence better mechanical properties. Among the reinforcement, TiB2 has emerged as a promising candidate for Al-based composites. This is due to the fact that TiB2 is stiff, hard and more importantly, does not react with aluminum to form reaction product at the interface of reinforcement and matrix. TiB2 is a refractory compound that exhibits outstanding features such as high melting point (2790°C), high hardness (86 HRA or 960 HV) and high modulus characteristics. Its resistance to plastic deformation even at high temperatures portrays it to be a good potential reinforcing candidate in an aluminum matrix. In this present research work, optimization model for machining parameters based on taguchi method is employed, it uses standard taguchi L27(313) orthogonal array to assess and optimize the chosen factors to attain minimum surface roughness(Ra) and maximum material removal rate (MRR) by incorporating response table and analysis of variance (ANONA) technique for dry machining of TiB2 reinforced Al-6063 composite material fabricated through stir casting technique, using two different types of carbide tools of K10 and K20 type employed with CNC machine. The present investigative research analysis shows optimum condition of machining parameters for minimum surface roughness(Ra) and maximum material removal rate (MRR) for TiB2 reinforced Al-6063 composite materials. The reinforced TiB2 particle into the Al-6063 matrix alloy increases the surface roughness and decreases the material removal rate. The taguchi analysis predicts the optimum conditions are similar for both type of carbide tool and K20 type carbide tool emerged as better tool compared to K10 type of carbide tool, based on the achieved and analyzed values for surface roughness and material remove rate. The confirmatory tests for the optimum conditions of machining parameters for TiB2 reinforced Al-6063 composite material also shows that K20 type carbide tool is better performer than the K10 type of carbide tool in imparting low surface roughness and high material removal rate.		