

Tool wears on drill metal matrix composites (MMC) al-si/10%aln material

M. S. Said, J. A. Ghani, A. Syed, M. F. Azlan, Z. A. Latiff, B. Zubir

Abstract

Metal matrix composites (MMCs) represent a relatively new class of materials characterized by lighter weight and greater wear resistance than those of conventional materials. The particle-reinforced aluminium nitride composites, which are among the most widely used composites materials, are rapidly replacing the conventional materials in various industries like aerospace, marine, and automotive. These materials are known to be difficult to machine because of the hardness and abrasive nature of reinforcement element with Aluminium Nitride. In this study, based on tool wear in drilling of metal matrix composite using uncoated carbide, TiCN and TiN coated drill bit. Experiments are conducted on a CNC Vertical Milling Centre KONDIA B-640 using twist drills bit of 6mm diameter. The parameters of the drilling machining used are the speed of 1000 rpm, 1500 rpm, and 2000 rpm and the feed rate is 50 mm/min, 100 mm/min and 150 mm/min. The depth of the cutting are made constant. The experimental results are collected and analysed using Taguchi method commercial software package MINITAB 17. It was found that optimum parameters are: uncoated, 1000 rpm, 150 mm/min. The optimum parameter obtained will help the automotive industry to have a competitive machining operation in the drilling process from an economic perspective and manufacturing. © 2006 -2016 Asian Research Publishing Network (ARPN).

Keywords: Al-Si/10% AlN, Drill bit, MMC, Taguchi method, Tool wear