Mech Aero-2013

OMICS Group Conferences
Accelerating Scientific Discovery

International Conference and Exhibition on
Mechanical & Aerospace Engineering

September 30- October 2, 2013 San Antonio, Texas, USA

Optimization of the cutting parameters for the cutting forces and surface roughness in Inconel 625 super Alloy Based on the Taguchi method

Abdullah Altın

Yuzuncu Yıl University, Turkey

Abstract

In this study, were determined the effects of cutting tool coating material and cutting speed on cutting forces and surface roughness based on Taguchi experimental design. For this aim, Aeroscape material, nickel based super alloy Inconel 625 is machined at dry cutting conditions with three different cemented carbide tools namely Physical Vapor Deposition (PVD) coated with TiN/TiCN/TiN; Chemical Vapor Deposition (CVD) coated with TİN+AL2O3-TİCN+TİN; and WC/CO on CNC lathe. Metal removing process is carried out at four different cutting speeds (50, 65, 80, 100 m/min.) while 1.5 mm depth of cut and 0.10-0,15 mm/rev. feed rate are to be constant. Main cutting force, Fz is considered to be cutting force as a criterion. The results show that hardening of material increased by machining up. Mechanical loading and abrassivenes of the carpide particles has increase effect on cutting forces and in addition, the effect of cutting speeds was not important in the analysis of variance. Cutting force (Fx) and surface roughness (Ra) decreases with improving work-piece material machinability. In the experiments, depending on the tool coating material, lowest main cutting force is found to be 548 N and Lowest average surface roughness (0.812 µm) both at 100 m/min with multicoated cemented carbide insert KC9240 and KT315 respectively. The results obtained indicated that CVD cutting tools performed better than PVD and uncoated cutting tools according to cutting forces,but in terms of surface quality and cutting forces KT315 shoved better performance with current parameters.

Biography

Abdullah is a Assist. Prof in Van Vocational of Higher School Mechanical and Metal Technology Department, from Van Yuzuncu Yıl University in Turkey. My Field of study is Manufacturing and Construction and I have been working on CAD/CAM (Computer Aid Design/ Computer Aid Manufacture) , Solidedge, MasterCAM and Production Technics. I have been in Germany Zittau-Görlitz University- Mechanical Engineering Department for research and access to training in CAD/CAM by Erasmus Peoject. And also I have been İnvitated for teaching Staff Mobility By Erasmus Program to France University of Lorraine, Mechanical Engineering Department in May 2013. Since 1996 I have working in Yuzuncu yıl University as a Lecturer and then as an Assist Prof. Dr. (2007). I I am Head of Department..