

Article Abstract

Title:	Performance evaluation of coating materials and process parameters optimization for surface quality during turning of AISI 304 austenitic stainless steel
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Abstract:	Austenitic stainless steels are a widely used group of stainless steels. Problems have been reported by users during machining due to its low thermal conductivity, high work hardening, high strength, and high ductility. These made it difficult to machine the materials. The aim of the present study is to investigate the influence of Pressure Vapour Deposition (PVD) and Chemical Vapour Deposition (CVD) coated cemented carbide inserts on the surface quality of the work piece when turning on AISI 304 austenitic stainless steel work pieces, on computer numerical controlled (CNC) lathe. Taguchi's Design of Experiments approach (DOE) is used to analyze the effect of process parameters on surface roughness to obtain their optimal setting. The analysis of variance (ANOVA) is employed to analyze the influence of process parameters during turning. The results have shown that the improvement in average surface finish is obtained when machining with PVD coated insert (1.13 μm). The nose radius is the most significant process parameter (62.88% contribution) when turning with PVD insert. The cutting speed is the most significant factor (37.84% contribution) when turning with CVD insert. Optimal ranges of surface roughness values are also predicted.
Keywords:	CVD coated insert, Surface roughness, AISI 304 austenitic stainless steel, Taguchi approach, ANOVA