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ABSTRACT:

Hard turning has been explored as an alternative to the traditional processing technique used to manufacture parts made of hardened steels. However, advanced cutting tool materials for hard turning applications are relatively expensive. The continuous developments in carbide tool material and its coating technology have offered inexpensive cutting tool alternatives for a mild range of hard turning operations. Commercially available TiAlN-coated carbide tool is utilized in this study to perform hard turning of stainless steel within the mild range (47-48 HRC) at various cutting parameters, i.e., cutting speed and feed. Empirical models to measure its performance by quantifying the effect of the cutting parameters to the tool's service lifetime and the machined workpiece's surface roughness are developed. The coated carbide tool performed hard turning with fair tool life and fine surface finish, especially at low cutting parameters as shown by the models' solutions for the optimized input selection.