

Abstract

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Design and Modeling of an Improved Stiffness Boring Bar

Boring bars usually have a limitation on increasing the depth of cut due to the self-induced chatter vibration. This decreases productivity levels. The main cause of their sensitivity to chatter is their excessive flexibility. This paper introduces boring bar with new design, which increases its stiffness considerably. The new design involves adding a boundary condition, which is supporting the boring bar inside the workpiece. This design resembles a fixed-roller supporting system instead of the common used fixed-free system. The design is analyzed analytically to find its static stiffness and modeled using finite element method to simulate its static and dynamic properties. It is found that the boring bar stiffness is improved significantly and consequently its resistance to chatter is enhanced.