Dynamic Forces in Unstable Cutting during Turning Operation

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The theory of self-excited vibrations (chatter) in machining, formulated in the 1950s, assumes a single cutting force. The assumption of a single cutting force in unstable cutting is commonly accepted to this day. In this paper, we will present the reader and listener with a hypothesis concerning the effect of several dynamic forces acting on unstable cutting during turning operations. A new form of the force model will be presented. The calculation of stability limit as well as accuracy of the prediction of stable cutting conditions depends on this model. The validity of the hypothesis has yet to be demonstrated. Preparations for verification experiments have been under way for approximately one year and the experiments will start this year (2014). The hypothesis is based on the results of some earlier measurements of the dynamic forces by foreign authors as well as one of the authors of this paper, Miloš Poláček.

Keywords: Chatter, Complex Dynamic Cutting Forces

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