Effect of Spindle Unit Extrusion on Stability of Machining Process

Zdenek Fiala, Ales Jaros, Josef Sedlak, Ladislav Kolar, Vendula Blazkova
Department of Machining Technology, Institute of Manufacturing Technology, Faculty of Mechanical Engineeering, Brno University of Technology, Technicka 2896/2, Brno 616 69, Czech Republic.
E-mail: yfiala18@stud.fme.vutbr.cz, yjaros18@stud.fme.vutbr.cz, sedlak@fme.vutbr.cz, ykolar26@stud.fme.vutbr.cz, ysveco01@stud.fme.vutbr.cz

Dynamic characteristics of a machine-tool-workpiece system are not constant during machining, but they can be changed by a variable spindle position, a rising tool wear or a gradual change of a workpiece geometry. This paper deals with an influence of spindle unit extrusion on stability of a machining process. Two milling cutters with different rigidity, flexible and stiff, were used for experimental machining at three axis milling machines. Clamped milling cutters were extracted systematically and a frequency response function was measured simultaneously. Reached data (natural frequency and dynamic compliance) were used for finding a correlation between dynamic parameters and extrusion of the spindle. Critical extrusion of the spindle unit was predicted by an experimental measurement and an axial depth of cut thresholds was established for the stable machining.

Keywords: Vibration, spindle, stability, extrusion, dynamic compliance

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