

Alternative machining procedures of hardened steels

Prof. Dr. János Kundrák, DSc.

Department of Production Engineering, University of Miskolc 3515 Miskolc-Egyetemváros, Hungary.

E-mail: kundrak@uni-miskolc.hu

This paper outlines the hard machining procedures, their applicability, the increase of their efficiency and the possibilities provided through their combination. It focuses on the advantages of the cutting and grinding compared to each other and also on the cases when it is appropriate to apply them or possibly combine them.

Keywords: grinding, hard turning, alternative machining, hardened steel

Acknowledgement

The work was presented by the support of the Hungarian Scientific Research Fund (Number of Agreement: OTKA K 78482 and OTKA 84177), which the authors greatly appreciate.

The described work was carried out as part of the TÁMOP-4.2.1.B-10/2/KONV-2010-0001 project.

References

- [1] Tönshoff, H. K.; Arendt, C.; Ben Amor, R. (2000). Cutting of hardened steel, *Annals of the CIRP*, Vol.49/2/2000 pp.547-566
- [2] Karpuschewski-Knoche-Hipke: Gear finishing by abrasive processes, *CIRP Annals* 57 (2008) pp.621-640
- [3] Zębala W.: Simulation of Cutting with the Defined Tool Geometry, *Journal of Machine Engineering*, Vol.5, Nr 3-4, 2005, pp.109-119
- [4] Varga, Gy.: Mechanical Modelling of Dry Machining Processes Production Processes and Systems, a *Publication of the University of Miskolc*, Vol. 04, Miskolc University Press, 2004, pp.139-149.
- [5] Beňo, J.: Selected geometrical problems and relationships in hard machining. In: *Archiwum Technologii Maszyn i Automatyzacji*. vol. 21, No. 2 (2001), pp.13-21
- [6] Kundrak, J; Gyani, K; Bana, V: Roughness of ground and hard-turned surfaces on the basis of 3D parameters *International Journal Of Advanced Manufacturing Technology* Vol. 38 Iss. 1-2 pp.110-119 Published: 2008
- [7] J. Kundrák; B. Karpuschewski; K. Gyáni et al.: Accuracy of hard turning, *Journal Of Materials Processing Technology* Volume: 202 Issue: 1-3 (2008) pp.328-338
- [8] Szabó O.: Theory and Practice of Ultraprecisional Turning. *Gépgyártás*, XLV. 2005. 6-7., pp.60-65
- [9] Lukovics, I., Bílek, O.: High Speed Grinding, Proc. on the microCAD'2001 *International Computer Science Conference*, Section N, Production Engineering and Manufacturing Systems, Miskolc, 18-20 March, 2010, pp.207-212
- [10] Kundrak J., V. Bana: When hard turning is recommended in machining of hardened steels. *Proc. on the 13th International DAAAM Symposium "Intelligent Manufacturing & Automation: Learning from the Nature"*, Vienna, Austria, 2002. October 23-26. pp.297-298
- [11] Koch, K. F.: Technologie des Hochpräzisions-Hartdrehens, Dr.-Ing. *Dissertation*, RWTH Aachen;
- [12] Tóth T., Kundrák J., Gyáni K.: The material removal rate and the surface rate as two new parameters of qualification for hard turning and grinding, *Fifth International Symposium on Tools and Methods of Competitive Engineering (TMCE 2004)* Switzerland, Lausanne, 2004. pp.629-639
- [13] K. Weinert, G. Johlen: Kombinierte Bearbeitung durch Hartdrehen und Schleifen, *IDR Archiv* 1/2003
- [14] Klocke, Brinksmeier, Wiessert: Capability Profile of Hard Cutting and Grinding Processes, *Annals of the CIRP* Vol. 54/2 (2005) pp.557-580
- [15] Zębala W.: *Modeling of Cutting Process with Cooling*. Journal Advances in Manufacturing Science and Technology, Oficyna Wydawnicza Politechniki Rzeszowskiej, Vol. 32, Nr 4, 2008, pp.73-81
- [16] Szabó O.: Stochastic Modeling of Abrasive Machining Process. University of Miskolc, microCAD 2006 *International Scientific Conference*, Section M: Production Engineering and Manufacturing Systems, 2006. Marc. 16-17., pp.157-162

-
- [17] Varga Gy., Nyíró, J: Finite Element Analysis of Metal Cutting Proceedings of the microCAD 2006, *International Scientific Conference*, Section M, Production Engineering and Manufacturing Systems, Miskolc, Hungary, March 16-17, 2006, pp.219-224
- [18] G. Johlen: Kombinierte Bearbeitung von Futterteilen durch Hartdrehen und Schleifen, *IDR Archiv* 1/2004
- [19] Maňková, I. - Beňo, J. - Marková, G.: Contribution to hard turned and ground surfaces microgeometry evaluation. In: *Acta Mechanica Slovaca*. roč. 12, č. 4-a (2008), pp.85-92 ISSN 1335-2393.

Paper number: M201107

Manuscript of the paper received in 2011-06-21. Final paper including reviews received to editors in 2011-11-04. The reviewers of this paper: Prof. Dr. h.c. Karol Vasilko, MSc., Sc.D. and Prof. Jan Madl, MSc., Ph.D.
