

# Modeling of the cutting edge rounding influence on the tool life in processing a gear wheel by the Power Skiving method

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## Abstract

© 2018 Authors. Modeling of the shaping by a milling cutter is made while forming the internal gear teeth of the driven gear wheel. The estimate of the cutting edge rounding influence on the tool life taking into account the wear-resistant coating. The effects of radii of 10  $\mu\text{m}$ , 15  $\mu\text{m}$ , 20  $\mu\text{m}$ , 25  $\mu\text{m}$  are simulated. At the edge radius of 10  $\mu\text{m}$ , the coating layer is rapidly collapses. At a radius of 15  $\mu\text{m}$ , the highest tool life is obtained. At the more high radii, the tools durability is decreases. A practical experiment was carried out on a cupped skiving cutter with AlTiCN-coating (PVD). Processed steel 41CrAlMo7 with hardness 241-287HB. The simulation results were confirmed, the highest tools lifetime at a radius of 16.13 microns for 60 parts. As a result, for this type of processing and for this coating type of the cutting tool, the most optimal cutting edge rounding can be considered as the value of 15-18  $\mu\text{m}$ . It can be concluded that, perhaps, a more sharp edge from 10 to 15  $\mu\text{m}$  can be a positive effect on tools lifetime, in the case of uniform rounding over the entire cutter edge of the tools tooth (on the top and side tooth profile).

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## Keywords

Modeling of shaping, Skiving, The cutting edges rounding, Tool durability, Tools lifetime

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