

Influence of cutting edge radius on milling performance

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Abstract. Nowadays, cutting tools manufacturing companies must to be improve their processes in order to satisfy the growing competitiveness. In fact, a hot topic among cutting tool manufacturers is to increase the quality and repeatability. However, the technology and know-how used has reached a limit which slightly differences can suppose a high advantage to achieve more robust and reliable tools. Then, a deep study between the different parameters which take part in cutting tools geometry is needed. In this paper, the influence between incidence and rake angles and cutting edge radius were studied with the aim of improving the current cutting tools. In particular, a design of experiments (DOE) was carried out in which these three parameters were analyzed by Finite Element Simulations (FEM). The results shown that cutting edge radius is the parameter which presents the highest influence in the tool wear rate. Finally, based on this issue, a battery of experimental tests was carried out with different cutting edge radius values in order to achieve a tool which improves its useful life in comparison with current ones. The results shown that control cutting edge radius implies a significant improvement in cutting tools quality due to the tool life increase achieved.