

Abstract

This paper deals with analyzes of the influence of the perpendicularity of the spindle of the milling machine on the machined surface. This is part of the geometric errors of machine tools and in a direct manner constitutes a defect on the quality of the workpiece. Therefore, the surface roughness is particularly sensitive to the cutting speed, the feed rate, round of teeth default, the tool tip radius and the cutter teeth number. This article examines the characteristics of the surface topography of steel parts, in finishing machining using milling cutters. The study is conducted by computer simulation tests and experimental part using surface condition monitoring instruments, taking into consideration the round teeth default. The variation of the inclination of the spindle of the milling machine in three positions ($90^\circ + 30'$, 90° , and $90^\circ - 30'$) shows a good agreement between the simulation and the experimental results for sharp and moderately worn tools. Similarly, this study showed that the presented model could thus be integrated into systems computer-aided design and computer-aided manufacturing. Finally, the physical and statistical parameters of roughness during milling at position 90° confirmed that, when the defect of the perpendicularity is eliminated to the maximum, the best surface conditions are obtained.