

Optimization of pocket cycle machining process in CNC milling machining

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ABSTRACT

The objectives of this study were: (1) to analyze the ratio of the time required for the roughing process of making a pocket (pocket) from several different strategies for the roughing process, and (2) to analyze the wear of cutting tools for the roughing process of making a pocket from several kinds of roughing cutting method. The research method used was experiment. The materials used are the work piece of Mild Steel (St37) and the cutting tool HSS End mill with a diameter of 10 mm with 2 flutes. The machine used was a CNC milling machine and the software used was Master Cam X7. Retrieval of data using a built-in time-measuring instrument, vernier caliper, micrometer, and a digital micrometer with a magnification of 600x to 1000X. Data were analyzed by comparing the time required for each cutting method (8 kinds of methods) on CAD/CAM and the time on the actual CNC milling machine. The results showed: the fastest time required for roughing the pocket size 80 mm x 80 mm in 6 mm was the zigzag cutting method with straight-in feed (41 minutes 46.68 seconds in the CAM simulation and 42 minutes in machining using a CNC Milling machine), and the longest time is the true spiral cutting method with a ramping in-feed (62 minutes 20.59 seconds in the Master Cam X7 simulation and 62 minutes 21 seconds in the machining process using a CNC Milling machine). The wear of tools for the zigzag cutting method is greater than the true spiral cutting method. The optimization of the pocket making process in a CNC milling machine is calculated based on time and wear, if machining time is the goal, the zigzag cutting method is chosen and if the durability of the cutting tool is the goal, the true spiral cutting method is chosen.

Kata Kunci: *milling, CNC, wear, efficiency, machining*