An Investigation of Reaming Test Parameters Used for Cutting Fluid Evaluations

It has been suggested that the lubricating efficiency of cutting fluids can be assessed using a reaming test that measures cutting forces and surface roughness. In the present work, an investigation was undertaken to ream austenitic stainless steel using water-based fluids and to evaluate the effect of the cutting fluid on cutting forces, surface finish, and hole diameter. Tests were performed at three different cutting depths and using two different tool holders. The main parameters influencing the reaming torque test, which are pilot hole accuracy, built-up edge formation, and sampling window of the force analysis, are discussed. For mean reaming torque, a measurement uncertainty of 5 percent (with 6 repetitions) was achieved. Results show that torque and thrust measurements offer a reliable description of the lubricating properties of cutting fluids, while conventional surface roughness evaluation is connected to a larger scatter in the results.

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