

# RESEARCH ON THE INFLUENCE OF THE CUTTING CONDITIONS ON THE HOLE QUALITY BY COMPARING COMMON CUTTING WITH ULTRASONIC CUTTING

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## Abstract

Ultrasonic machining (USM) is considered to be a very effective and relatively accurate way to drill deep holes in cast iron or brittle materials. Although brittle fracture (micro-chipping) is the dominant material removal mechanism utilized by the USM process, poor surface roughness and deep penetrated cracks are the consequence if the machining parameters are not properly controlled.

To ensure the process efficiency, effort has been made in the study to correlate the material removal mechanisms, surface integrity and tool wear involved in the USM process to the machining conditions. Diamond-impregnated tools were used in the experiment and the ultra-sonic vibration frequency was kept at 20 KHz. The effects of machining variables such as grit size、feedrate and hole quality were investigated.

Keyword: Ultrasonic machining、Measured inspection、Cast iron