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Research article

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INVESTIGATION OF THE SURFACE ROUGHNESS OF ALUMINIUM COMPOSITE IN THE DRILLING PROCESS

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Abstract. This paper investigates the Surface roughness in the various Aluminium composite. The drilling experiment is performed on specimens Al7075 + 3% Al2O3, Al7075 + 3% Al2O3 + 1% Mica, Al7075 + 3% Al2O3 + 2% Mica, Al7075 + 3% Al2O3 + 3% Mica with high-speed steel twist drills of 5 mm diameter grade M2. ISO 234:1980 is the specification of the drills used in the current work. The drilling experiment takes place with a feed speed of 0.5 mm/rev. For the aluminum composite samples with coolant, the cutting speed is at different speeds of 10, 20, and 30 mm/min. The Surface Measuring Unit of the Stylus type is used to locate the Surface Roughness Ra of the drilled hole surface. The number of iterations completed is five times for the repeatability of effects with the same drilling parameters. The surface roughness had increased with the addition of reinforcement. The 2% mica addition showed a better surface finish than the 3% addition. Scanning Electron Microscopy investigated the Surface Morphological characteristics.

Keywords: drilling process, surface roughness, composite, measurement, aluminium

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1. Introduction

The drilling machine is commonly used for the manufacturing process in various industries. The materials are assembled by casting, shaping, and different manufacturing processes before the industries prepare the assembly. Also, activities are carried out to increase the output of the commodity. Aluminium is commonly soft material , but while adding reinforcement particles it became very hard and strong [5,6]. The existing results of Al-Alloy show the machining performance [7]. The spinning cutting edge, such as single or multiple wedge-shaped instruments to create holes, eliminates the metal bits. Drilling, milling, spinning, and turning are the four main phases of the traditional machining process. In traditional devices, rotation and feeding movements were applied concurrently using a drill on a clamped workpiece that exerts large forces. Drilling is an inexpensive and critical method in the final production process of mechanical parts. The plastic deformation and drill geometry

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