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Study of the Performance of Wire EDM on Titanium alloy using Taguchi Method

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Abstract: In this work, an experiment using wire electro-discharge machining to analyse titanium alloy is described (WEDM). The goal is to examine how various process factors affect a number of process performance indicators, including pulse width, servo reference voltage, pulse current, and wire tension (such as cutting speed, wire rupture and surface integrity).The Taguchi approach was used. Charmilles WEDM has been used in every trial. It was also shown that both peak current and pulse interval can speed up cutting. It has been demonstrated that surface roughness rises with pulse width and falls with pulse interval.

Keywords: Wedm, Pulse on Time, Pulse off Time, Pulse Current, Taguchi Method.

1. INTRODUCTION

One of the most popular non-conventional material removal techniques is wire electrical discharge machining. Researchers have successfully milled super alloys, composite materials, high-speed steel (HSS), conductive ceramics, etc. using the WEDM technique. It has a competitive advantage in the production of mould, die, and automotive, aircraft, and surgical components because to its unique ability to use heat energy to treat electrically conductive materials regardless of hardness. Using electrically conducting materials as the work piece electrode and the tool electrode, both of which are enclosed in a dielectric fluid and separated by a tiny gap, WEDM is a technique for eroding and removing material.Erosion is mostly produced by local thermal activity brought on by an electric discharge. The material is removed from the work piece by ionisation that occurs inside the discharge column between the electrode and the work piece. This ionisation results in a localised high temperature and extremely high energy density. The EDM process eliminates material as a result of thermal erosion caused by melting and vaporisation. Figure 1 depicts the wire EDM technique approximately. Wire-EDM is currently widely employed in the aerospace and automotive