



BALL BURNISHING PROCESS OPTIMIZATION FOR ALUMINUM ALLOY USING TAGUCHI TECHNIQUE

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ABSTRACT

The purpose of this work is to study the relationships between surface finish, fatigue life and the ball burnishing process parameters. Non-ferrous surface are difficult-to-finish due to many problems encountered in grinding which is optimum for ferrous metals. Taguchi technique is employed to identify the effect of four burnishing parameters; namely, burnishing speed, burnishing feed, depth of penetration and number of passes on the surface finish and fatigue life of 6061-aluminum alloy. Experimental work was carried out on a CNC lathe. The surface roughness is determined. The number of cycles to failure is determined using a cantilever type fatigue machine, which is suitable for testing specimen requiring oscillatory or reciprocating motion. It was found that the optimal burnishing parameters for the best surface finish was obtained at burnishing speed of 25m/min, burnishing feed of 60 $\mu\text{m}/\text{rev}$, depth of penetration of 6 $\mu\text{m}/\text{rev}$ and number of passes of 1. The optimum performance for fatigue life was obtained at 125m/min burnishing speed, 100 $\mu\text{m}/\text{rev}$ burnishing feed, 9 μm depth of penetration and 3passes.

KEYWORDS: Ball Burnishing Process, Fatigue Life, Surface Roughness, Taguchi Technique