Effect Of Surface Topography Of 8090 Al-Li Alloy During Abrasive Waterjet Peening Process

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ABSTRACT

Abrasive water jet (AWJ) peening strengthening test of aluminum-lithium alloy (8090Al–Li) was carried out with a variety of pressure process parameters. The research was done on the roughness as well as the morphology of the treated samples. A high dislocation density formed in the area of the workpiece that was subjected to the peening process. The result was a surface that was both rough and hardened. The abrasive effect took place in the area where the collapse took place. The fact that this method was the most effective option for treating the surface of the metal was very beneficial. According to the findings, the surface roughness, grain size, micro-strain, erosive effect, and micro-hardness of the alloy were all considerably affected by various peening settings. In this instance, the rise in pressure caused the surface roughness to increase as well. In addition, the microcrystalline structure was shown to have diminished in the treated area by the abrasive peening. The research demonstrated how the effect of varying the peening pressure can reduce the amount of surface roughness on materials. In comparison to the initial sample, the roughness reached its highest values of 62 µm to 92 µm and rose by 7.87 to 27.56 %. These results indicate a significant increase. In comparison, the average surface roughness of the equivalent area increased to 30.04 µm. According to the experimental observation, the AWJ peening collapse limits that were acquired by the proposed sample surface and metallographic images were extremely complete and accurate.

KEYWORDS

Abrasive water jet peening; Surface layer; Roughness; crystallite size; Micro-strain;

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