

Surface Integrity Improvement for Selective Laser Melting (SLM) Additive Manufacturing of C300 Parts Using Ball Burnishing

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Abstract : The effect of the non-vibration-assisted and vibration-assisted ball burnishing on both the surface and mechanical properties of C300 obtained by Selective Laser Melting additive manufacturing technology is studied in this paper. Different vibration amplitudes preloads, and burnishing strategies were tested. A topographical analysis was performed to determine the surface roughness of the different conditions. Besides, micro tensile tests were carried out in situ on Scanning Electron Microscopy to elucidate the post-treatment effects on damaging mechanisms. Experiments show that vibration-assisted ball burnishing significantly enhances mechanical properties compared to the non-vibration-assisted method. Moreover, it was found that the surface roughness was significantly improved with respect to the reference surface.

Keywords : additive manufacturing, ball burnishing, mechanical properties, metals, surface roughness

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