Abstract

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Assessing Additive and Subtractive Manufacturing Technologies for the Production of Tools in the Automotive Industry

Tooling is integral to the manufacturing cycle, despite the fact that it’s both costly and time-consuming to produce. Additive manufacturing (AM) is currently considered viable in many instances to compete against subtractive manufacturing in the delivery of tools on time with the required quality. This work investigates the use of AM and computer numerical control (CNC) machining to manufacture an for the tooling of a headlight adjuster clip. The proposed methodology for manufacturing the is composed of three manufacturing techniques: AM using Selective laser melting technology (SLM), CNC machining using milling and wire cut technologies, and Hybrid manufacturing (integrating both AM and CNC by Selecting some features on the same to be produced by either technique). The tool material used to manufacture the s is Stainless Steel 316L, whilst the injected parts are polypropylene. Performance tests were applied to each of the three s regarding dimensional accuracy, surface roughness, and microstructure. Furthermore, the injected parts produced were also tested in terms of quality and functionality. The purpose of this paper is to establish the Selection criteria that distinguish the use of the process methodologies for particular geometric features when producing functional injection mould tooling.