

Additive Manufacturing processing of plastics for mass production: technical and economic analysis

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Abstract.

Additive manufacturing (AM) is largely used today for prototyping and small production run. However, there is still a gap to fill to bring additive manufacturing of plastics to be competitive with routinely used for mass production. Several companies started to introduce new process that aims to let printed parts to be massively produced. As an example, Carbon3D patented a process named CLIP, now DLS, that is claimed to let parts to be printed in minutes rather than hours. However, time consuming post processing are required for some of Carbon3D materials to fully develop resin's properties [1]. Different approaches have been proposed by other companies using large LCD display to shorten production times for each part produced. Photocentric Ltd, for example, automated its process delivering up to 10.000 parts on 24 hr during the COVID emergency. An application which might benefit of such high production throughput is the tooling for polymer composites. In the present paper we discuss the use of several AM techniques for composite tooling. Different geometries of increasing complexity were selected and their use analyzed in a real industrial environment for composites production. Cost modelling already developed for AM analysis [2,3] was used to verify the industrial scalability of the proposed approach.

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