

Factors Affecting Sustainability of a 3D Printed Object

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Abstract : 3D Printing (3DP) is a distinct, disruptive technology that belongs to a wider group of manufacturing technologies, Additive Manufacturing (AM). In 3DP, a custom digital file turns into a solid object using a single computer and a 3D printer. Among multiple advantages, 3DP offers production with fewer steps compared to conventional manufacturing, lower production costs, and customizable designs. 3DP can be performed by several techniques, while the most common is Fused Deposition Modeling (FDM). FDM belongs to a wider group of AM techniques, material extrusion, where a digital file converts into a solid object using raw material (called filament) melted in high temperatures. As in most manufacturing procedures, environmental issues have been raised here, too. This study aims to review the literature on issues that determine technical and mechanical factors that affect the sustainability and resilience of a final 3D-printed object. The research focuses on the collection of papers that deal with 3D printing techniques and use keywords or phrases like '3D printed objects', 'factors of 3DP sustainability', 'waste materials,' 'infill patterns,' and 'support structures.' After determining factors, a pilot survey will be conducted at the 3D Printing Lab in order to define the significance of each factor in the final 3D printed object.

Keywords : additive manufacturing, 3D printing, sustainable manufacturing, sustainable production

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