

INVESTIGATION OF THERMAL AND DIMENSIONAL BEHAVIOR OF 3D PRINTED MATERIALS USING THERMAL IMAGING AND 3D SCANNING

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Fused deposition modelling is, among the other additive manufacturing processes, one of the most frequently used three-dimensional printing technologies, because of its ease of use, high speed in production and low cost of the final part. Printing processes and finished parts are often examined and characterized using various techniques, for gathering the mechanical, numerical, thermal, dimensional data, with goal to improve and optimize the outcome. The first part of this research is based on the following the temperature changes using thermal imaging camera during fused deposition modelling printing processes and during cooling process after printing is finished. Specimens were made from polylactic acid and polylactic acid - X improved with second-phase particles, in order to compare thermal and dimensional characteristics of both materials. Obtained results determined characteristic temperature behavior of materials. The second part of research employed optical 3D scanner for verification the stability and accuracy of printed specimens over time. Proposed period of measuring has shown that stabilization of parameters is taking place, and further follow-up should be done afterwards.

Key words: FDM, PLA, PLA-X, thermal imaging, temperature changes, 3D scanning, dimensional accuracy.

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