

Materialistic Efficiency of PLA in 3D Printing

Sumaiya Ahmed, Jacob Martin, Owen McFetridge, Jacob Vitale

Abstract

Three-dimensional printing is the process of extruding a material layer by layer to produce a three-dimensional object. This technology has a variety of applications from creating lab equipment to making houses. The goal of our research was to find the most efficient use of material in three-dimensional printing. To do so, the fill density of a rectangular beam was varied, then the spring constant of these beams was determined and compared to what should theoretically occur. This optimal percent fill would be the point in which the least amount of material would be used to maintain the greatest spring constant and would be the most efficient for industrial applications. A graph was created that plotted the determined spring constant versus the percent fill to find an optimal fill percentage. This would occur at the lowest percent fill where the change in the spring constant became the smallest.

RESULTS

The measured deflection did not match the calculated deflection for a symmetrical beam under a certain force

The optimum percent fill, and the most