

Redesign of a 3D low cost filament printer, adapting it to a pellet extruder for new material assays

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Abstract.

Due to the lack of stock commercial low-cost pellet 3D printers on the market, the main purpose of this research paper is to adjust a pellet extruder to a 3D filament printer, in order to enhance the printing characteristics of an open-source low-cost printer. To achieve this goal, it was crucial to redesign the printer mechanical structure by carrying out the following process, first designing the extruder fasten to the Pellet Extruder Mahor V4 to adapt it to the original filament extruder dimensions, and outlining control to the internal chamber temperature. The designs were proposed and tested by simulation programs. The findings of this study showed that by controlling temperature, it is possible to avoid harsh heat changes, which may affect the mechanical characteristics of the printed piece. Furthermore, the proposed design enables filament and pellet printing with the same machine. Finally, despite the presence of extruders, it is very likely to adjust the control parameters with simple changes on the Marlin firmware. After the analysis, it is concluded that the usage of pellets allows recycling and 3D printing with such a variety of raw materials by using a pellet extruder with an ongoing material flow is feasible, avoiding interruptions during the printing process. All these modifications help to improve the characteristics of a common low-cost printer.