Design and Construction of the TX-1

Thermoplastic Extruder

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Project Summary

One of the major barriers to getting students in involved with 3D printing is the cost associated with the printing material. The goal of this project is to design, build, and operate a thermoplastic extrusion system that will supply students at the University of Memphis with an extremely low-cost supply of printing material. To achieve this goal, it is proposed that the extruder project should become the first of a series of course projects that will lead to a self-perpetuating, continuously improving series of projects related to 3D printing and additive manufacturing.

Introduction

3D printing (or “additive manufacturing”) is an exciting emerging technology that has become widely recognized in both technical and popular culture. As this technology increases in popularity, the cost of owning a 3D printer has been reduced to under $1000. In recent years, an abundance of information has been widely distributed that enables home enthusiasts to construct 3D printing machines themselves.

Engineering technology students benefit greatly from exposure to this technology as it allows them to interact with their own designs in a tangible way. Students gain increased proficiency with allied technologies such as Computer-Aided Design and Computer Programming. In addition, it is completely feasible for students to design and build 3D printers themselves, adding exposure to machine design and manufacturing concepts in the context of a real-world design problem.

As the first step in this curriculum pathway, a series of design projects is proposed that will give student incremental exposure to 3D printing, machine design, thermoplastics

processing, industrial control systems as well as manufacturing engineering functions processes associated with machine design and building. The proposed sequence of development is as follows: 1) Design and build the TP Extruder 2) Design and build downstream extrusion equipment 3) Design and build a fused deposition modeler 4) Refine and improve designs of FDM equipment 5) Design and build allied CNC equipment including routers and cutters.

Highest Level Heading

The highest-level heading shall be centered, boldface, uppercase and lowercase, in either Times New Roman or Courier style font.

Level 2 Heading

The heading at the first sublevel is left-aligned, boldface, uppercase and lowercase. Your text begins below the heading like this.

Level 3 heading. The third level heading is a little less dramatic. It is indented, boldface, lowercase with a period. The body of the text begins right after the period in the heading.

Works Cited

Conner, Brett P., Guha P. Manogharan, Ashley N. Martof, Lauren M. Rodomsky, Caitlyn M. Rodomsky, Dakesha C. Jordan, and James W. Limperos. "Making Sense of 3-D Printing: Creating a Map of Additive Manufacturing Products and Services." *Additive Manufacturing* 1-4 (2014): 64-76. Web.

"Patent US3632256 - Extrusion-compounding Apparatus." *Google Patents*. Google, Web. 29 Sept. 2017. Web.