The Development and Building of an Inexpensive Filament Extrusion System

Norak, Priit

This project „The development and building of a low-cost filament extrusion system“ is about the construction and testing of a low-cost filament extrusion system that is capable of extruding new filament for 3D printing from old plastic bottles, 3D prints, plastic waste and new plastic pellets. The aim of this project is to build and document a filament extruder that could be built by anyone, using parts found from a local junkyard or store. The project consists of 4 main parts: researching 3D printing in general, researching information about extrusion systems, the construction of the extruder and testing of the extruder. The main research questions were: how inexpensively is it possible to build a more effective filament extrusion machine and what kind of difficulties would a person face during the construction of the extruder. The project concluded that it is possible to build a filament extrusion system that is 3.1 times faster and nearly two times cheaper than the most low-cost extrusion system currently on the market. It took almost 80 hours to build the third and final prototype of the extrusion system. Author found that building the main construction and planning the electrical system was the most difficult because the machine needed to be compact yet sturdy at the same time. This topic should certainly be researched further because filament extrusion systems can have a very positive impact on the enviroment by recycling old plastic and waste into usable 3D printing material. It is possible to continue with this research project to study more about how to recycle different materials and the capabilities of the low-cost extruder.

Awards Won: