Recycling Plastic Waste with a 3D Printer Filament Extruder

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Introduction

- The goal of the project is to create reusable plastic filament for 3D printers.
- The ocean is filled with millions of metric tons of plastic, called the Plastic Reef (PlasticsEurope, 2018).
- Ocean plastic is harder to work with due to saline levels and sunlight it is exposed to.
- With 3D printing on the rise, we intend to utilize the neglected waste.
- The future goal would be to navigate using ocean plastic as an input in the future.

Approach

- First, we must order the parts listed below, and assemble like so on the extruder prototype below
- Must break down plastics into pellots
- To reach the end goal we need to first test normal, unexposed recyclables and process those into filaments with the use of an extruder.
- Must make sure temperatures correspond with specific plastic
- Then once we have sufficient data, we move onto the step of treating ocean plastic in a way that allows its recycled quality to be a usable standard for printing.
- To create a cost effective way of creating filament, then having to buy expensive filament from stores
- Will use recyclable waste.

Schematic and Budget

Description	*Material*	*Details*	*Quantity*	*Remarks*	*Price ($)*
Strip	Steel	30x30MM	10cm		1.29
Round bar	Steel	30MM	5.5 cm	Accurate and smooth from the inside	2.59
Round bar	Steel	25MM	22 cm		3.88
Square tube	Steel	30X30X3MM	800 cm		45.28
Tube	Steel	34X26X4MM	53 cm	Make sure if fits the drill	1.29
Angle profile	Steel	30X30X3mm	32		2.59
Sheet metal	Steel	1mm			19.40
Motor	-		1	Around 70 RPM	38.81
Bearing	-		1	UCFL 204	6.47
Drill	-	26x600 MM	1	Make sure if fits the tube	38.81
PID Controller	-	0-400 Degree	2x		28.18
SSR	-	2-24 V	2x		^ Above item comes with ssr
Thermocouple	-	Type K	2x		9.99
Bandheater	metal	35X45MM	3x		17.04
Bandheater	metal	40X45MM	1x		21.99
Power Switch	-	220 V	1x		0.37
Led Indicator	-	220V	1x		5.48
Power cord	-		5 M		3.88
				TOTAL	246.34

Figure 1. Budget of Extruder

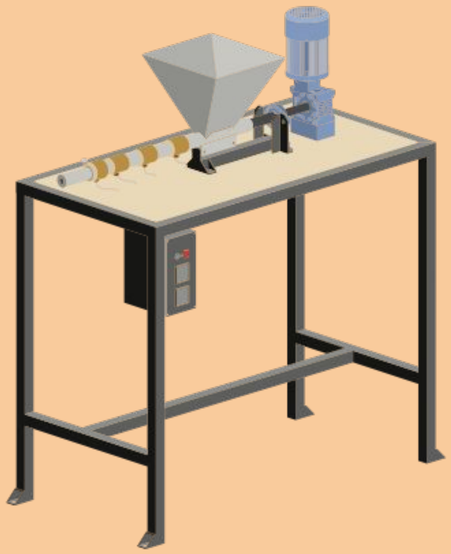

Figure 2. Schematic of Extruder

Conclusions

- 3D printing is a very new and evolving field of science
- Very feasible way to reduce waste production globally.
- Should this work as intended, we will look towards avenues of simplifying the process and developing large scale extruders for ocean relief and at home filament extruding.

Acknowledgments

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