Design of PLA, ABS and PET Extrusion System For 3D Printing Filaments

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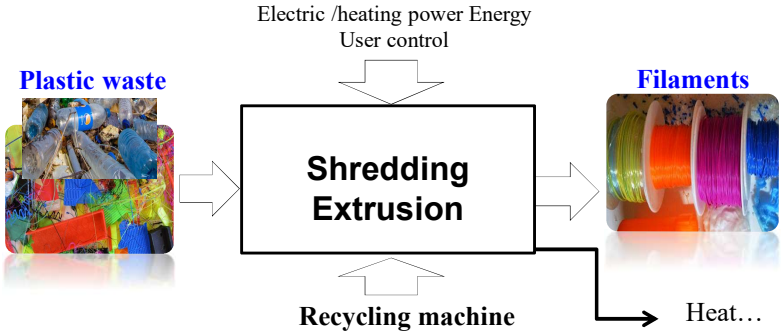
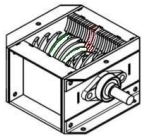
ABSTRACT

This project is a contribution to **reducing the pollution** coming from **plastic** waste and **recycling** it for **3D printing** using. There are global efforts to **lower** the use of **plastic products** by replacing them with glass and other recyclable materials, but that is not enough to solve this problem completely. In general, this project follow the scientific way of thinking starting from defining the problem to getting the results. Design of the machine is built based on parameterized dimensions determined by **Analysis** and **Simulation**.

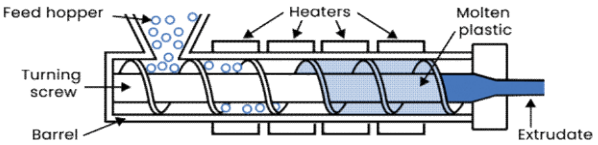
The recycling machine consists of two main parts: the **shredder** and the **extruder**, these two sub-machines work simultaneously to produce the filaments.

SADT





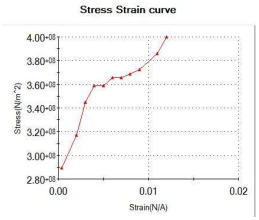
Shredder



Extruder

SCOPE

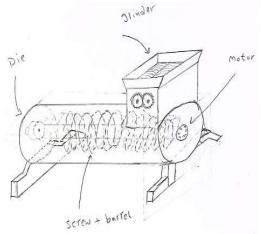
Plastics play a significant role in day-to-day life. The project is an attempt to participate in saving the environment and reducing plastic waste, the recycling machine provides a way to reuse the wasted plastic from 3D printers and water bottles and make 3D printer filament.



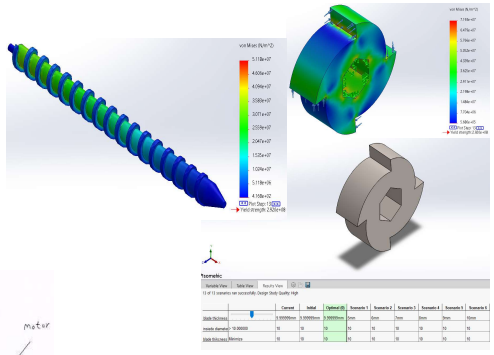
The material of the machine is 201 Annealed stainless steel which has a high yield strength of 292 MPa and a modulus of elasticity is 207 Gpa.

The produced filaments are PLA, ABS and PET

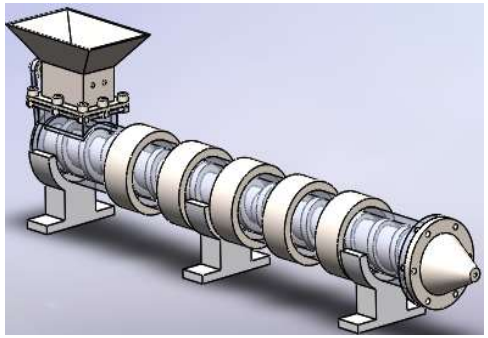
DESIGN, PARAMETERIZATION, OPTIMIZATION, ANALYSIS & SIMULATION



Pre-sketch



Analysis and optimization



Final Design

Industrialization

OBJECTIVES

- *Designing a 3D printer waste **recycling machine** by using the **Solidworks** program.*
- *Attempting to expand the scope of the 3D printer waste recycling machine, which contributes to the development of **filament** recycling processes and **preserving** the **environment** as much as possible.*
- *Publishing the **source** of the project to public **organizations**, **government**, or **individuals**.*
- *Apply the fundamentals of **manufacturing engineering** and **practical** applications.*

References

Voet, V., Jager, J., & Folkersma, R. (2021). Plastics in the Circular Economy (1st ed.). De Gruyter.

https://www.unep.org/