Plastic Bottle 3D Print Filament

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Introduction

Goals:

- Recycle plastic water bottles and turn them into usable 3D printing filament
- Reduce waste, help environment
- Develop cheaper filament for 3D printers adequate for nonimportant testing and practice modeling

Statistics

Plastic:

- About 60 million plastic bottles end up in landfills every day
- Around 8 million tons of plastic make it into the ocean every year

3D-Print related:

- Common 3D print filament can cost $20-$30 a spool after already paying several hundreds or even thousands of dollars on the actual 3d Printer

Steps to Create Filament

Process:

- Take a plastic 2L bottle and cut off the bottom.
- Place plastic bottle on the cutter station, slowly spin to start the cut. Next grab the cut piece and pull it all the way through with pliers
- Take the cut water bottle and feed it into the pre heated glue gun. When it comes out the other side pull the end with pliers slowly.
- Once enough is extruded wrap it around a spool, taping it at first and slowly rolling it until you have completed that bottle.
- This is now usable filament

Results From Our Findings

Makeshift Bottle Cutter

Unnecessary Waste

What we found:

- There are many environmentally conscious people out there who are more than happy to save and donate their plastic bottles for the betterment of society.
- Developing a system to create 3D print filament from plastic water bottles is possible.
- The tools to design and model a way to create 3D print filament don't need to be complex for a small scale.
- Currently, even with tools that aren't complex, there will be a lot of issues that come up and it can take copious amounts of time to solve them in the manufacturing of this product.

Future Advancements

What we know:

- There is a lot of plastic waste that could be put to good use and help the environment
- The plastic is of lower quality than typical filament and would only be used for practice models to use less of the expensive filament.
- It is possible to make an at home version and potentially sell that to those who wish to make their own filament

What we need to find out:

- Discover if we can combine it with higher quality plastic to make it stronger so the filament has more versatility.
- Could we partner with manufacturing companies who want to advertise to this type of consumer and allow them to put advertising on packaging to get cost as low as possible.
- Better way to get filament to stay on spool and look more like store bought filament.

Problem Solving

Nozzle

- •Obtain desired diameter to support the filament size requirements
- •Design and create a whole new attachment for the glue gun

Glue Gun

- •Modifying the interior
- •Adjusting setting to proper temperature

Plastic Strips

- •Blade Sharpness
- •Plastic Malleability
- •Uniform Cutting

Conclusions

- There's a clear problem with the current waste of plastic water bottles that could be put to good use.
- Possible to create 3D printer filament on a small scale with just plastic bottles and relatively cheap materials
- More consistent process with expensive materials would produce better results

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