CaYPT
Canadian Young Physicists' Tournament

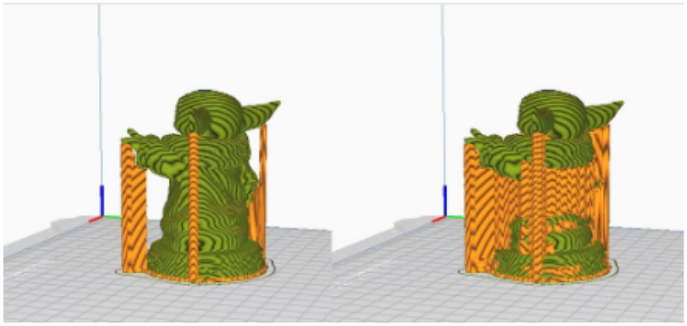
3D PRINTING SUPPORTS

Author: Archie Shou
Editor: Jim Chen

Date Created: 05/21/21
Date Edited: 05/20/23
Version 1.0

Abstract

In this SOP, a detailed description and usage of 3D printing supports are documented.



Contents

List of Figures

[1] *Footnote 1 etc.*
[2] *Footnote 2 etc.*

1 Introduction

1.1 Supports

A critical topic for 3D printing is support. To start off, not everything needs support. 3D printers use a very small horizontal offset. That's why things that are not too far apart or less than 45 degrees usually don't need supports unless you are using a really big nozzle. A good rule of thumb to use for printing supports is that any bridging longer than 5mm requires supports whereas for those less than 5mm a 3D printer can usually deal with that jump. Here is a quick photo demonstration:

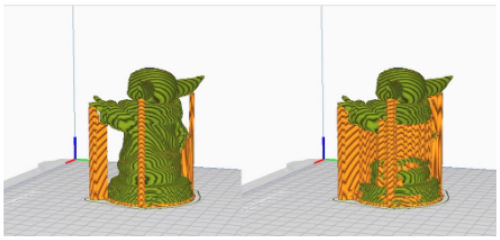
1.2 Types of Support

Another thing to take note of when modifying supports is what type of supports you want and the density of the supports, and there are some types as the following:

Some support patterns offer more structural integrity but use more plastic and are harder to take apart and some add to the time of the print. Most of the time, for prototypes you should stick to support patterns like lines and zig zags which are easy to take apart, use less filament, and are easy to remove. On projects that utilize shapes like curves and circles, concentric is recommended since it tends to be stronger than lines and zigzags. Lastly, grids are triangles usually are used a lot less since they are extremely hard to take off without damaging your design. However, these types of patterns are better off when using dual nozzle extrusion with supports made from a dissolvable material. (This is when just the supports are made up of a special material like PVA that dissolves in water, making it easy to take apart the supports).

1.3 Prevention of Damage

If supports are damaging your prints, you can also utilize X/Y/Z distance hidden in the settings. These set a small distance away from either the walls of your print to support the overhangs, or connect themselves to the wall to support the overhangs to make them more easily removable and thus less damage to your design.



1.4 Support Placement

Lastly, support placement. Support placement is very self-explanatory and has only 2 options. One is that support has to always be touching the build plate or everywhere. For the case of everywhere, these supports are printed on your design and can often cause some imperfections. That is why only touching the build plate is usually recommended but for extreme scenarios like printing something with a hole in the middle, support everywhere may be necessary for the print to succeed.

Reference

3D Printing Supports – The Ultimate Guide. (2021, November 5). All3DP; All3DP. https://all3dp.com/1/3d-printing-support-structures/