Design for 3D Printing

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Outline

Introduction

A number of items need to be considered when designing an object for 3D printing. Some of them are generic while others may depend on the 3D printing technology used.

Measurements

A good question is, “What does one unit in the CAD program translate to when printed out?”. Depending on your application, the answer may range from mildly interesting to vitally important. If you are creating a stand alone decorative object, you may not care much as long as the result is a reasonable size. If, however, you are designing a part to physically interface with some existing items, the answer is vitally important.

First Layer

Depending on the type of printer and its settings, the first layer printed may be thinner or thicker that the subsequent layers. This is usually accompanied with the material extending beyond or within the subsequent layers. This effect is sometimes called “elephant foot”. The slicer program often has a setting for “elephant foot compensation”.

First Layer

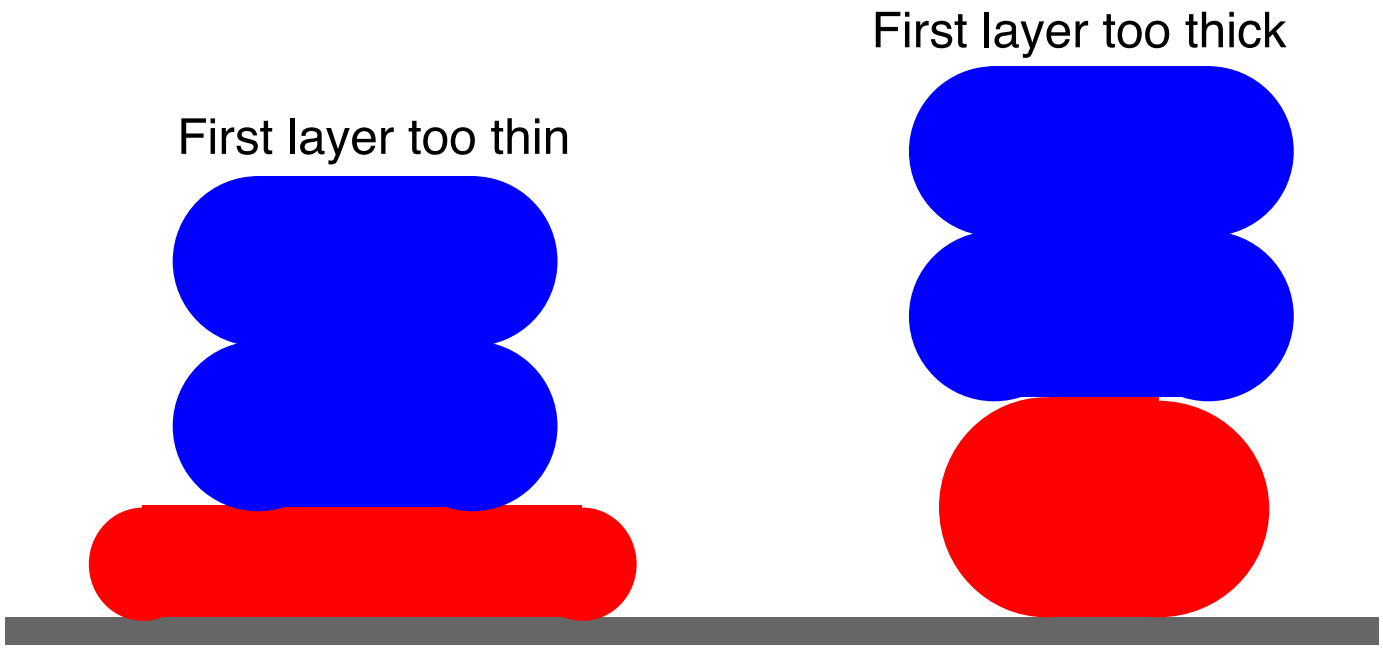

Figure: First Layer Problems

Holes and Voids

The size of holes in a 3D printed object are generally less than specified because holes are printed as polygons. The effect is more pronounced when the polygon has a small number of sides.

Holes and Voids

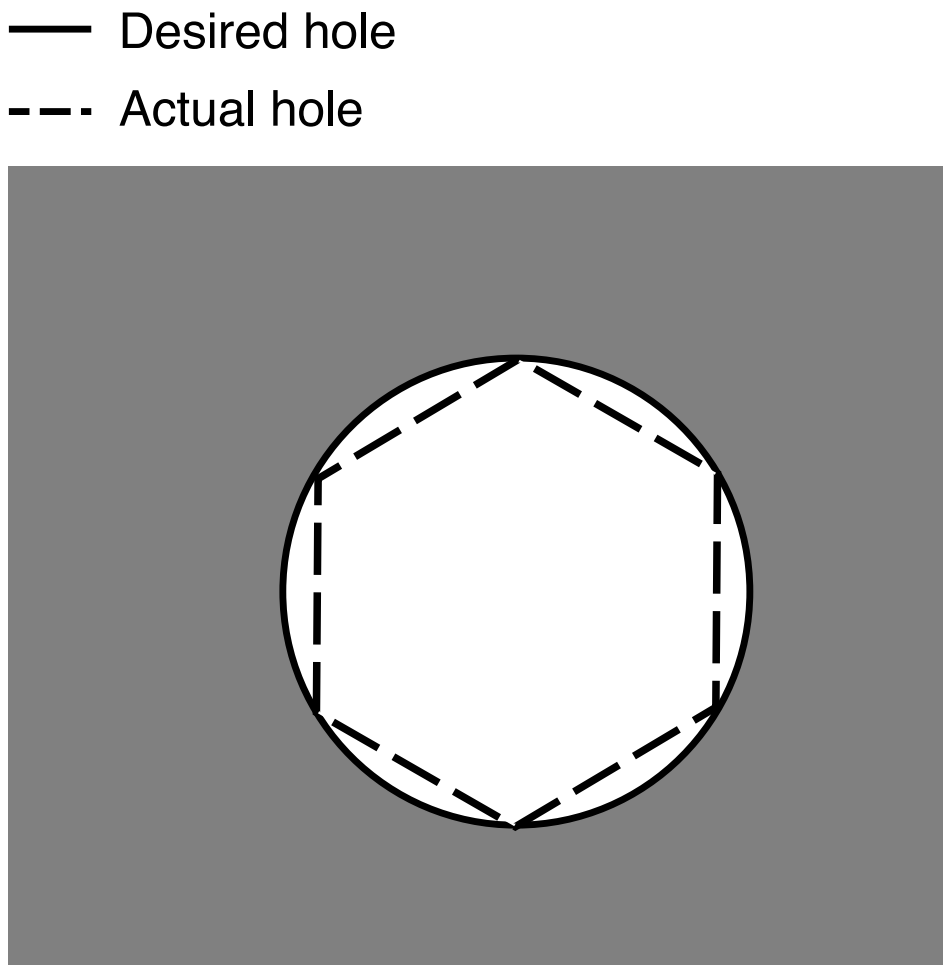

Figure: Desired Hole vs Actual Hole

Overhangs