ME 363
[Lab #11] 3D Printing
2 week assignment

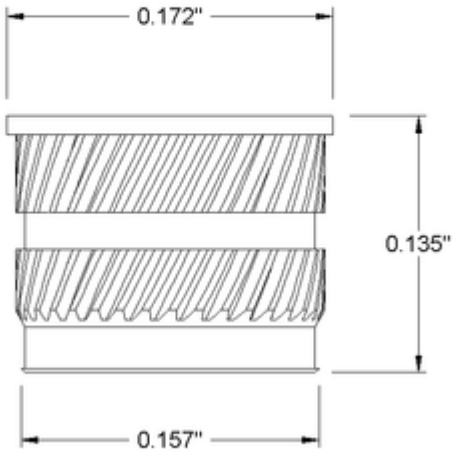
Objective

This week's laboratory assignment involves 3D printing. You will be using the 3D printing machine (FDM) to fabricate this part. Your creativity is needed! The objective is to select a part component that will be difficult to make by other manufacturing processes. The design you create will be assembled with other parts components created by the conventional machining technique. The goal is to 3D print a part component where the advantages of 3D printing warrants such a process. The 3D printed part will be assembled with other parts using 4-40 socket cap screws.

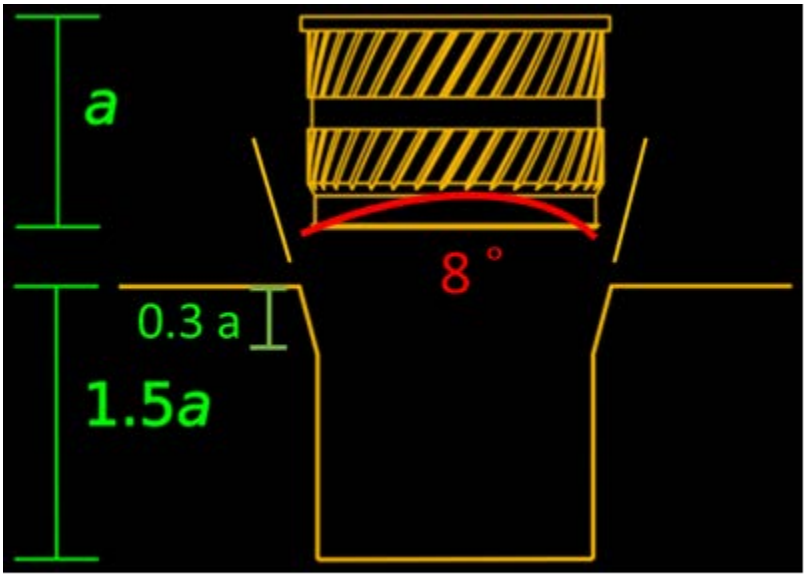
Task

The three-dimensional drawing file you generate must be converted to STL format for processing. Your 3D printed part may not exceed 2" by 2" by 2" in size. Make sure that your CAD software has the correct drawing units of inches. You are not required to manufacture the conventional machined part of the design. However, you will have to show the assembled CAD including the 3D printed component and conventionally machined component in your report.

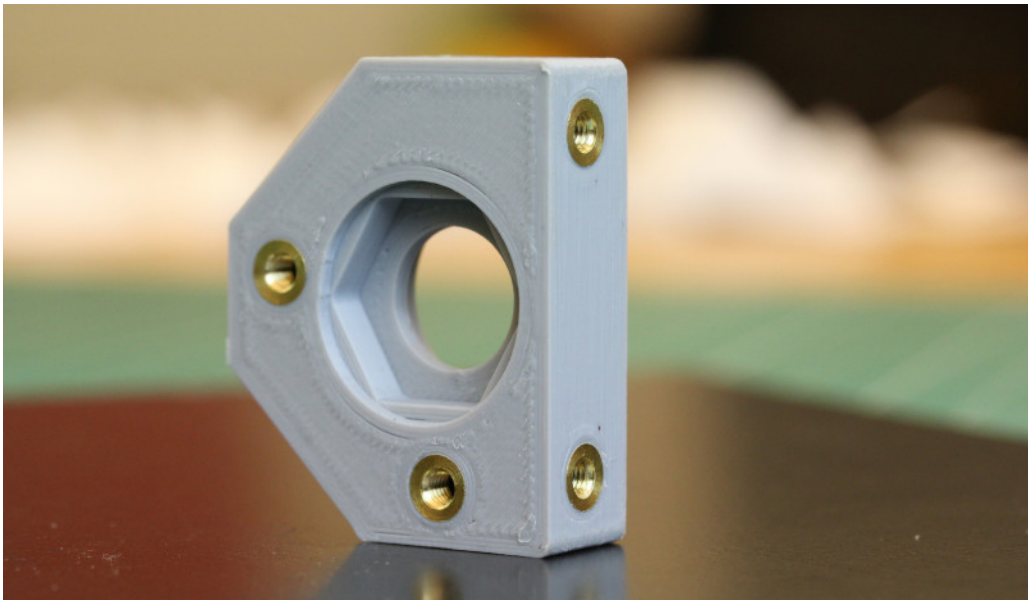
The thread will be created by using a heat-set insert. Heat-set inserts work by softening the surrounding material as they're being installed. Once installed, removing the heat-source causes this molten plastic to re-solidify around the inserts' knurled feature, holding it in place.



To insert these heat-set inserts the 3D printed part component should include a hole with the following dimensions. The hole depth is increased by about 50% of the insert length to accommodate the displaced material.



An example of the heat-set inserts mounted on a 3D printed part is shown below.



In the report, the following items must be included.

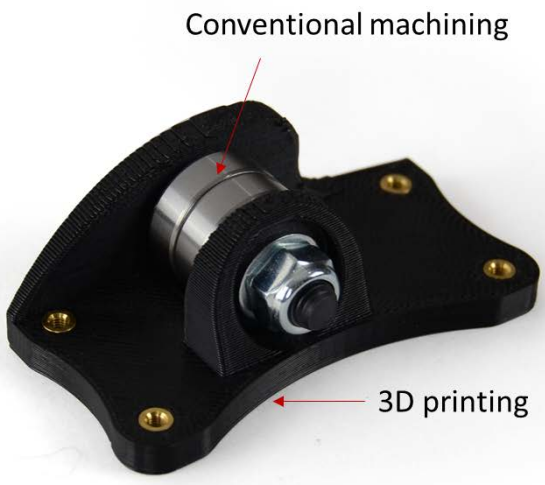
1. Design drawings of the part and part components.
2. Rationale for selecting this part for the freeform fabrication process, including any potential applications.

3. Any comparison with alternative processes in terms of manufacturing cost would be desirable.

Once you create the part drawing and get the approval from your TA during the first week of 3D printing, convert it to STL format. The file needs to be loaded to the Pulse XE printer in Potter 333 or in the lithography lab and is directly student operable to print.

Pulse XE printer

An example of a hybridized part combining different manufacturing techniques is shown below.



Idler Mount