CAD for CAM: What Designers and Engineers Need to Know AKA Problems CAD causes for CAM

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Class summary

Every CAM system have problems with some essential CAD features. During this presentation I will identify a few of the major issues faced by CNC programs. Along the way I will discuss the pros and cons of some file handling techniques.

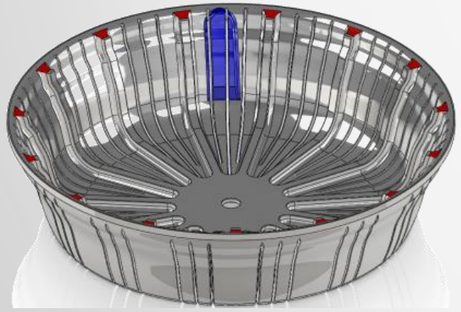
Key learning objectives

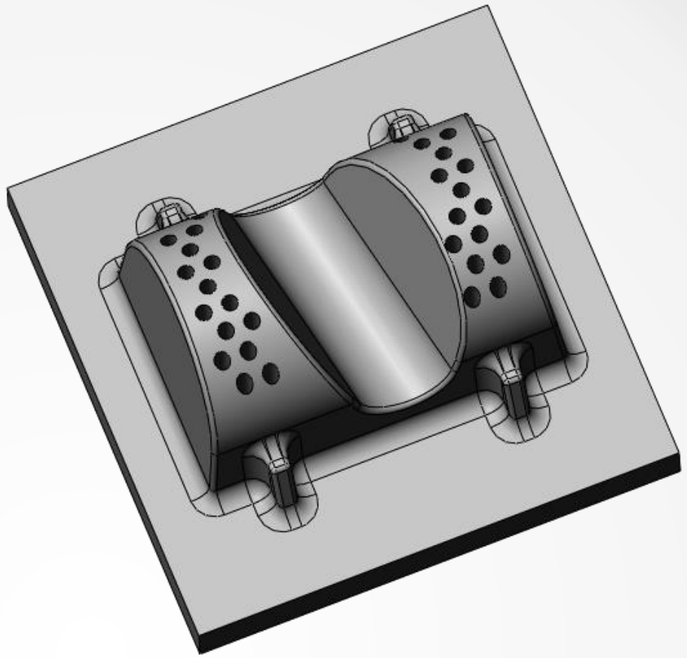
At the end of this class, you will be able to:

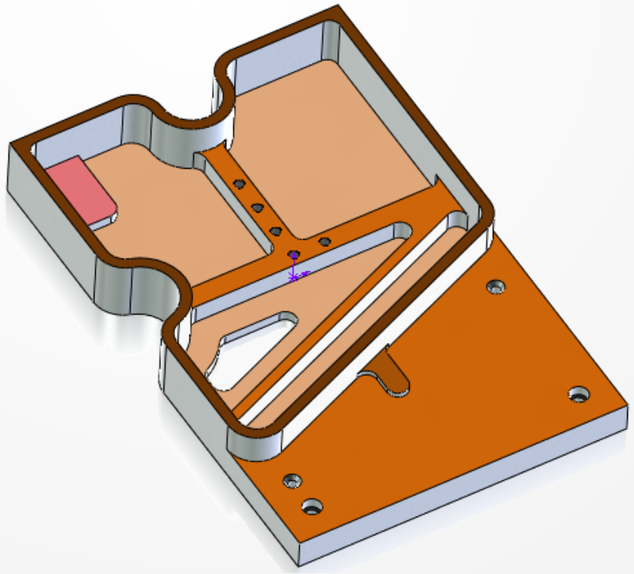
- Remove unwanted fillets
- Remove undesirable faces
- “Cap” holes for 3D milling
- Manage files to protect the “GOD” part.
- Have a better understanding of how design effects machinability (cost)

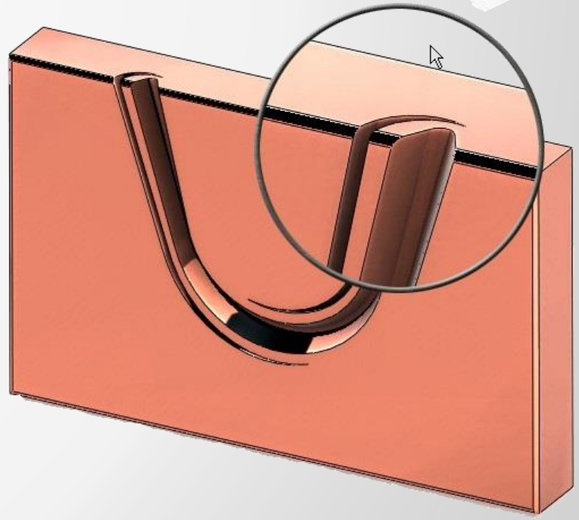
Common Issues

- Unwanted Fillets
- Unwanted Tapers
- Missing Faces (Gaps)
- Capping Holes
- File Management



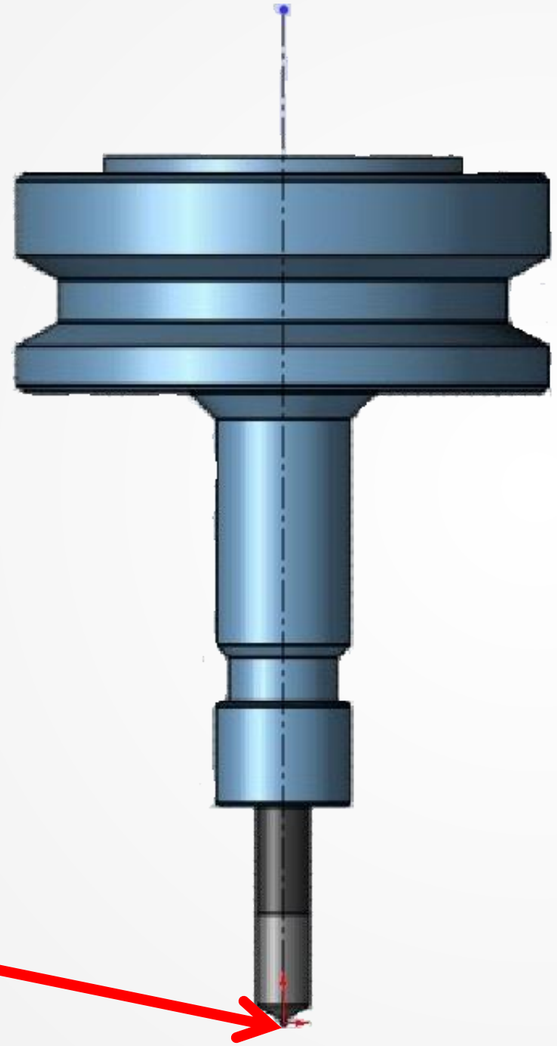


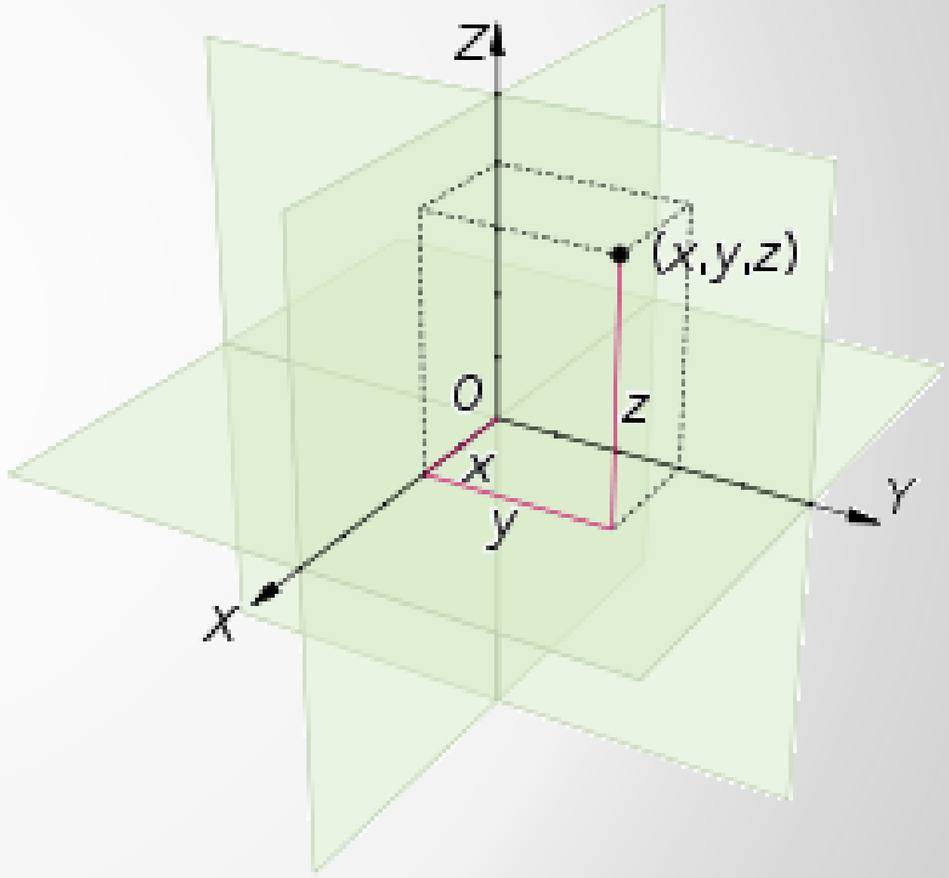




CNC Programming ??? What's that

```
%
O1234 (PART)
(T1 D=0.5 CR=0.03 - ZMIN=-1.9485 - BULLNOSE
END MILL)
(T2 D=0.375 CR=0.1875 - ZMIN=-1.176 - BALL END
MILL)
(T3 D=0.3125 CR=0.1563 - ZMIN=-1.5748 - BALL
END MILL)
(T4 D=0.375 CR=0. - ZMIN=-1.5748 - FLAT END
MILL)
N1 G90 G94 G17
N2 G20
N3 G28 G91 Z0.
N4 G90
(ADAPTIVE1)
N5 M09
N6 T1 M06
(12 3 FLUTE CB ROUGH ENDMILL)
N7 T2
N8 S6000 M03
N9 G54
N10 M08
N11 G00 X-0.2741 Y-4.364
N12 G43 Z0.6399 H01
N13 G00 Z0.2399
N14 Z-0.78
N15 G01 X-0.2739 Y-4.3637 Z-0.7856 F20.
N16 X-0.2732 Y-4.3631 Z-0.7911
N17 X-0.2721 Y-4.362 Z-0.7965
N18 X-0.2706 Y-4.3604 Z-0.8017
N19 X-0.2687 Y-4.3585 Z-0.8066
N20 X-0.2664 Y-4.3562 Z-0.8112
N21 X-0.2638 Y-4.3536 Z-0.8154
```





Mill Tools

CNC Programming ??? What's that

```
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```
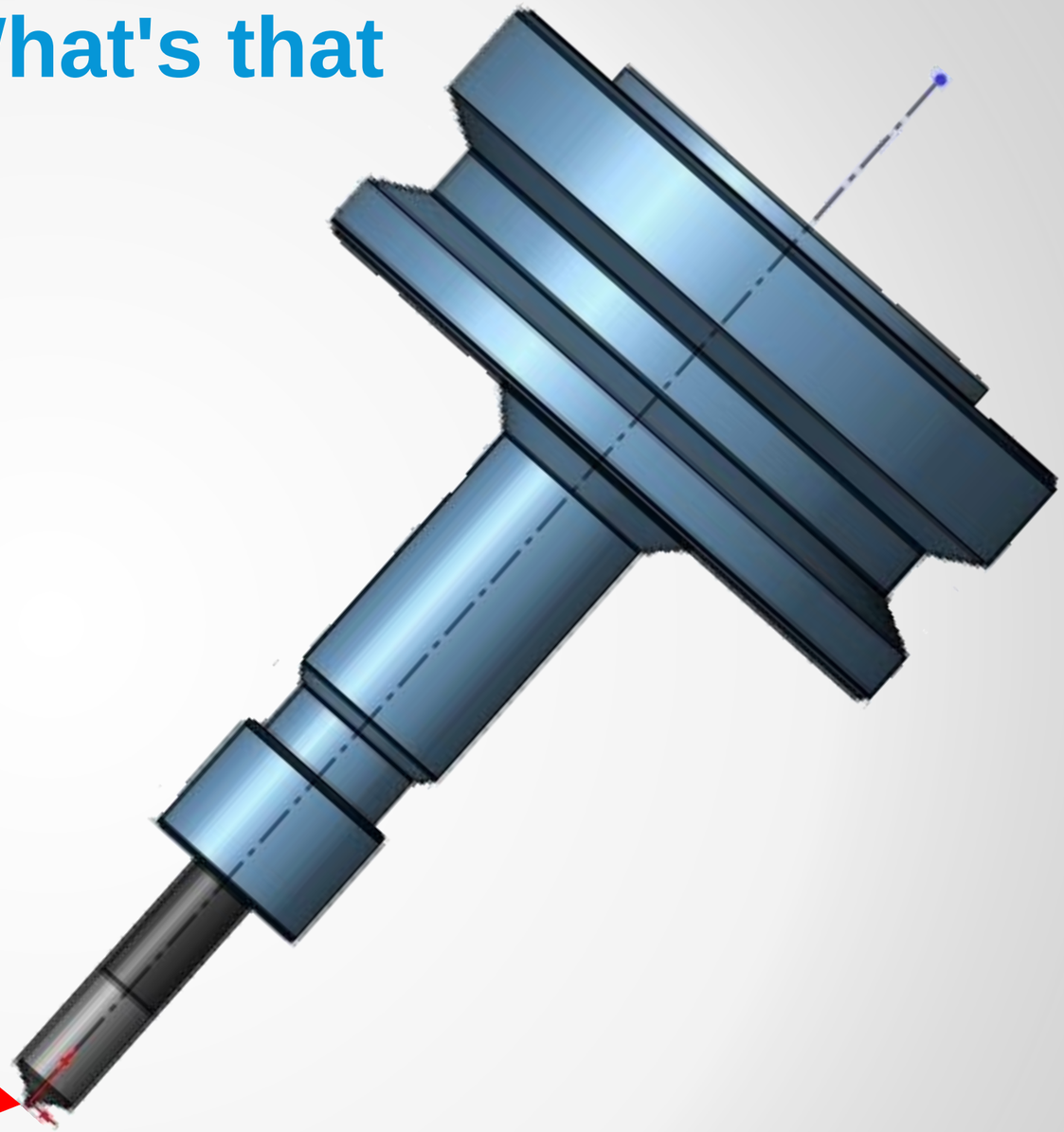
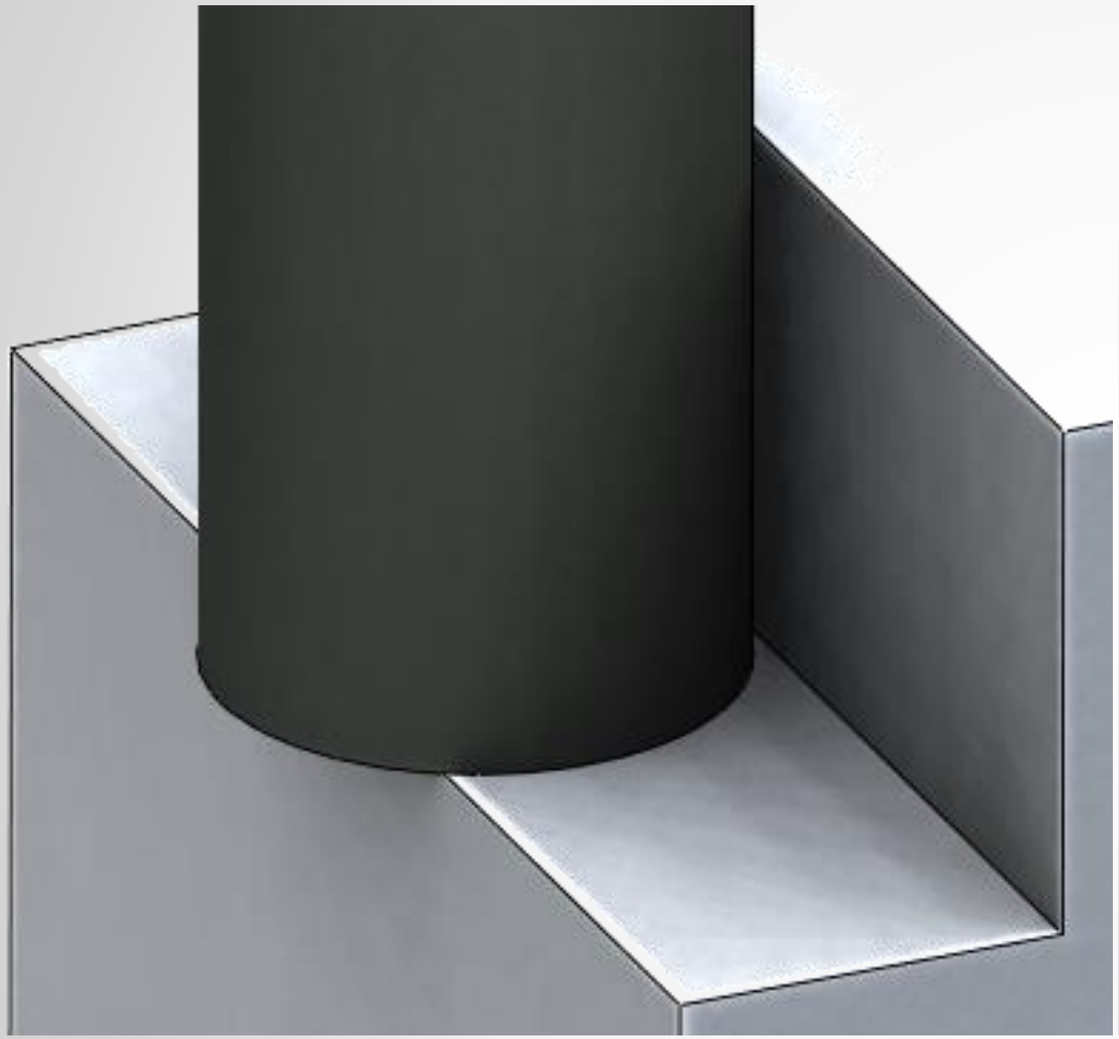
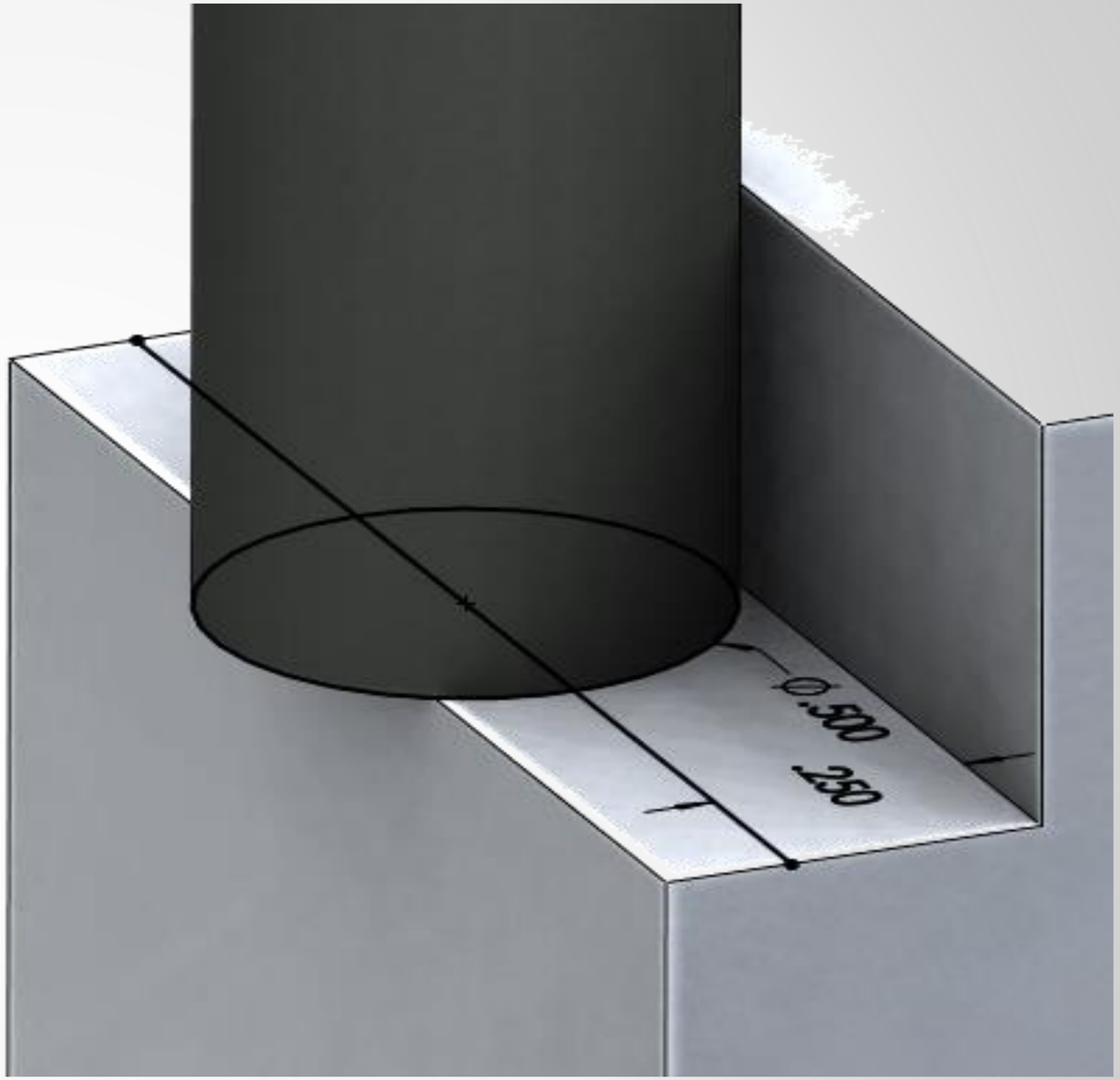
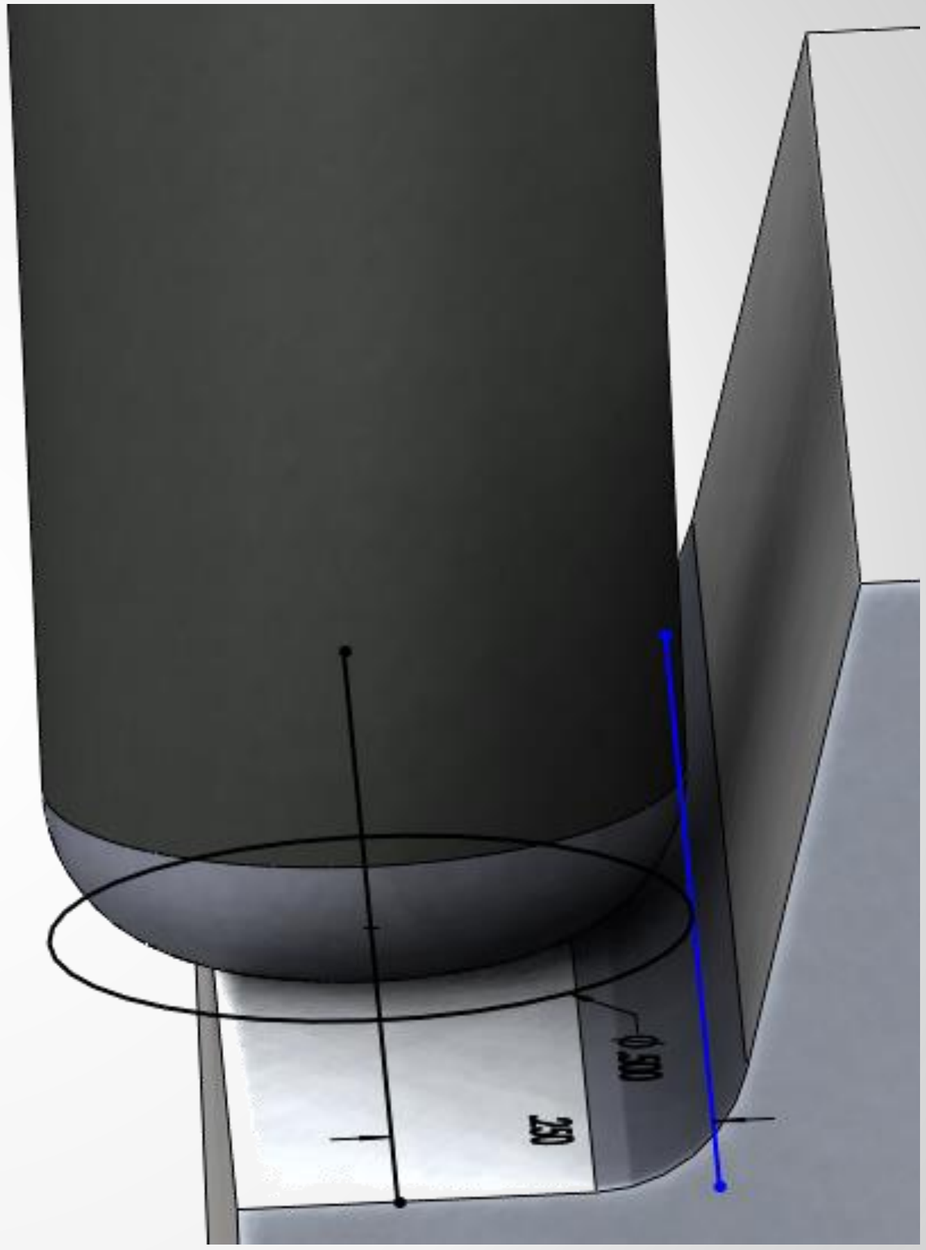



Finding the Edge

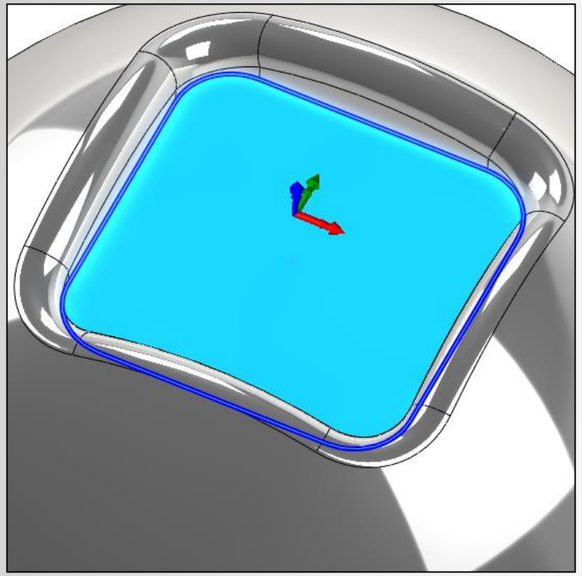


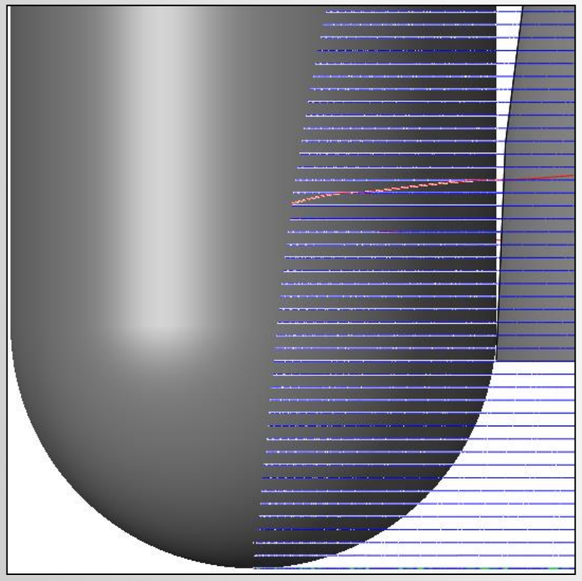


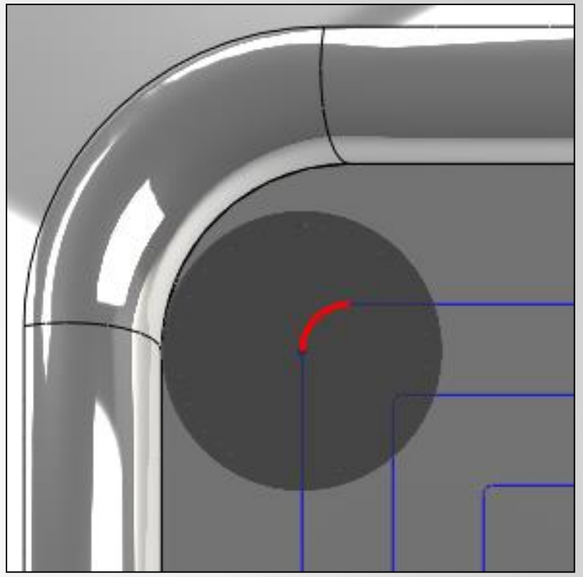
Where did the edge go ???

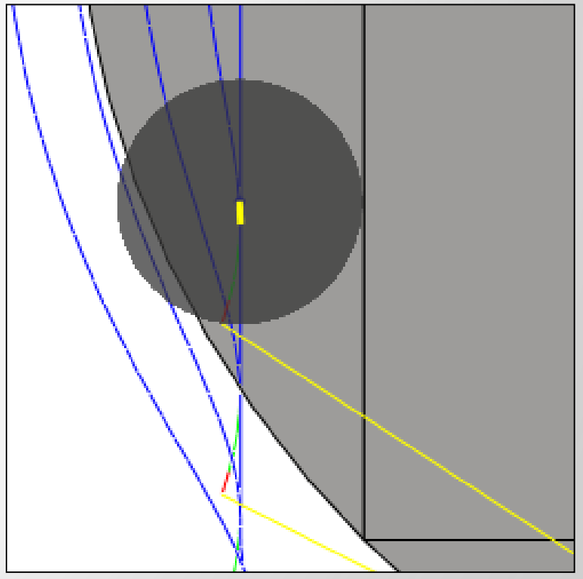


So how does CAM work



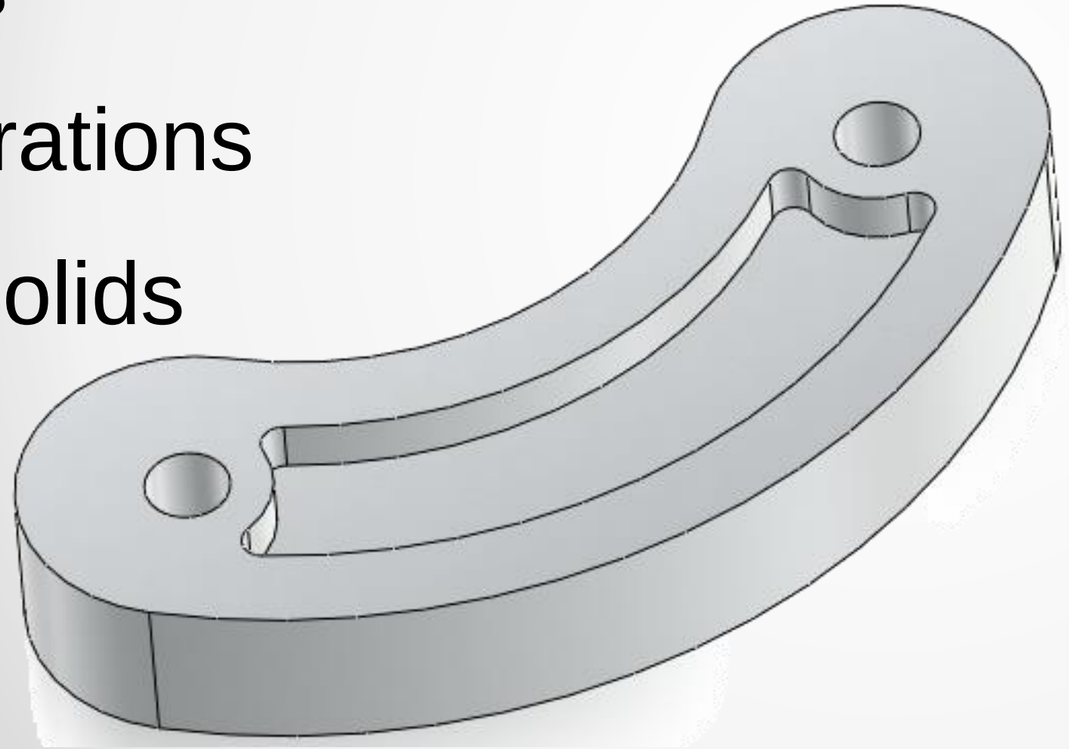






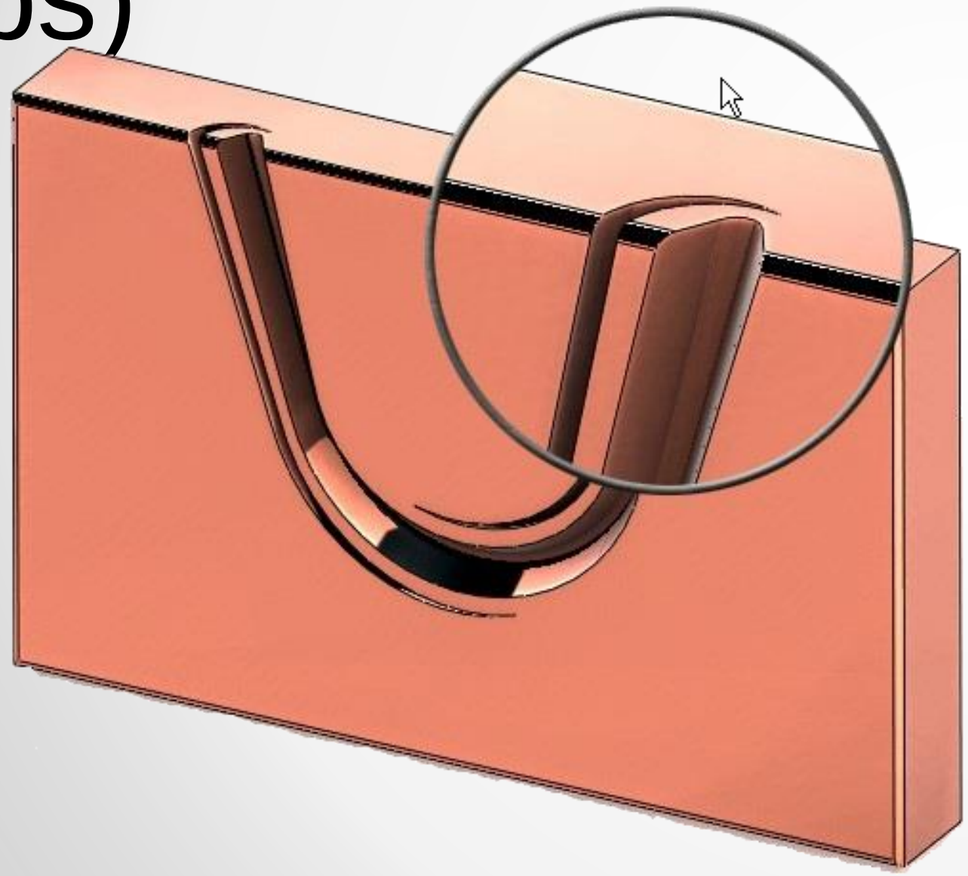
Removing Unwanted Features
AKA **Defeaturing**

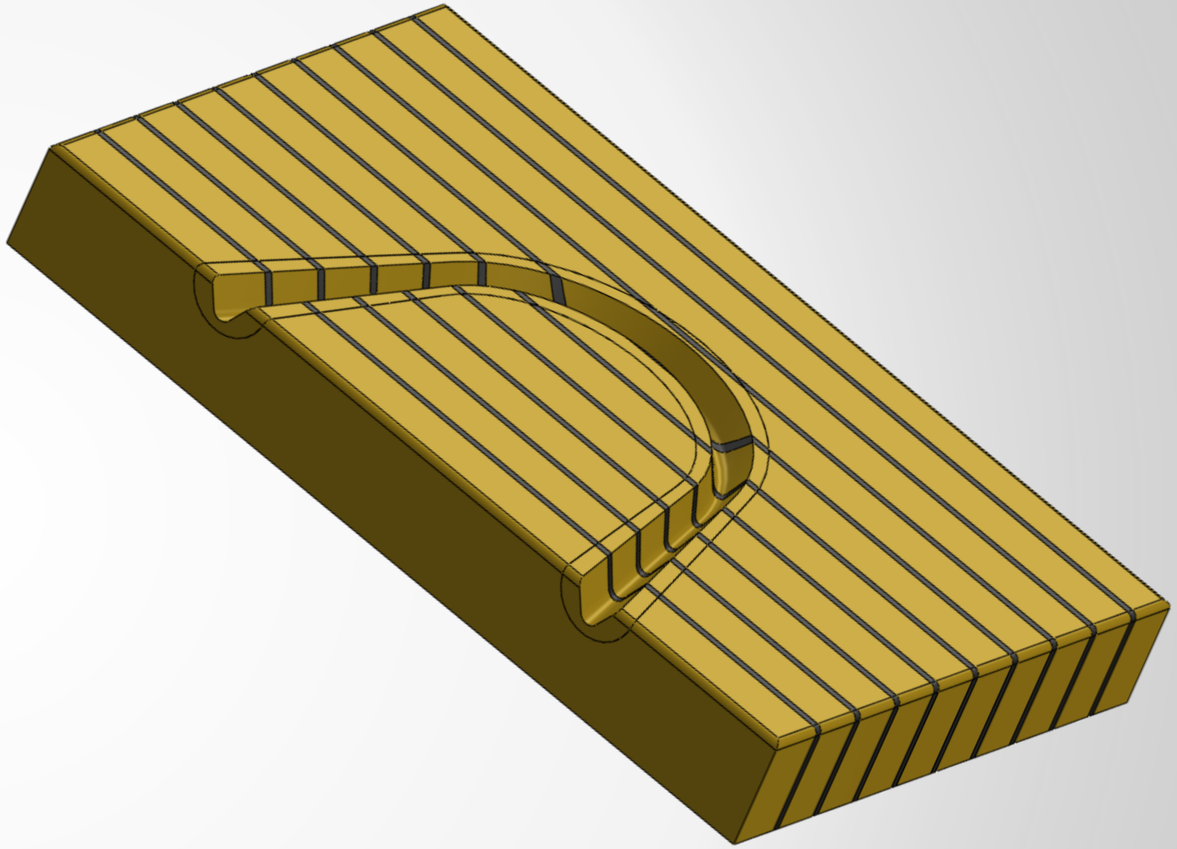
- Fillets
- Tappers
- Configurations
- Dumb Solids



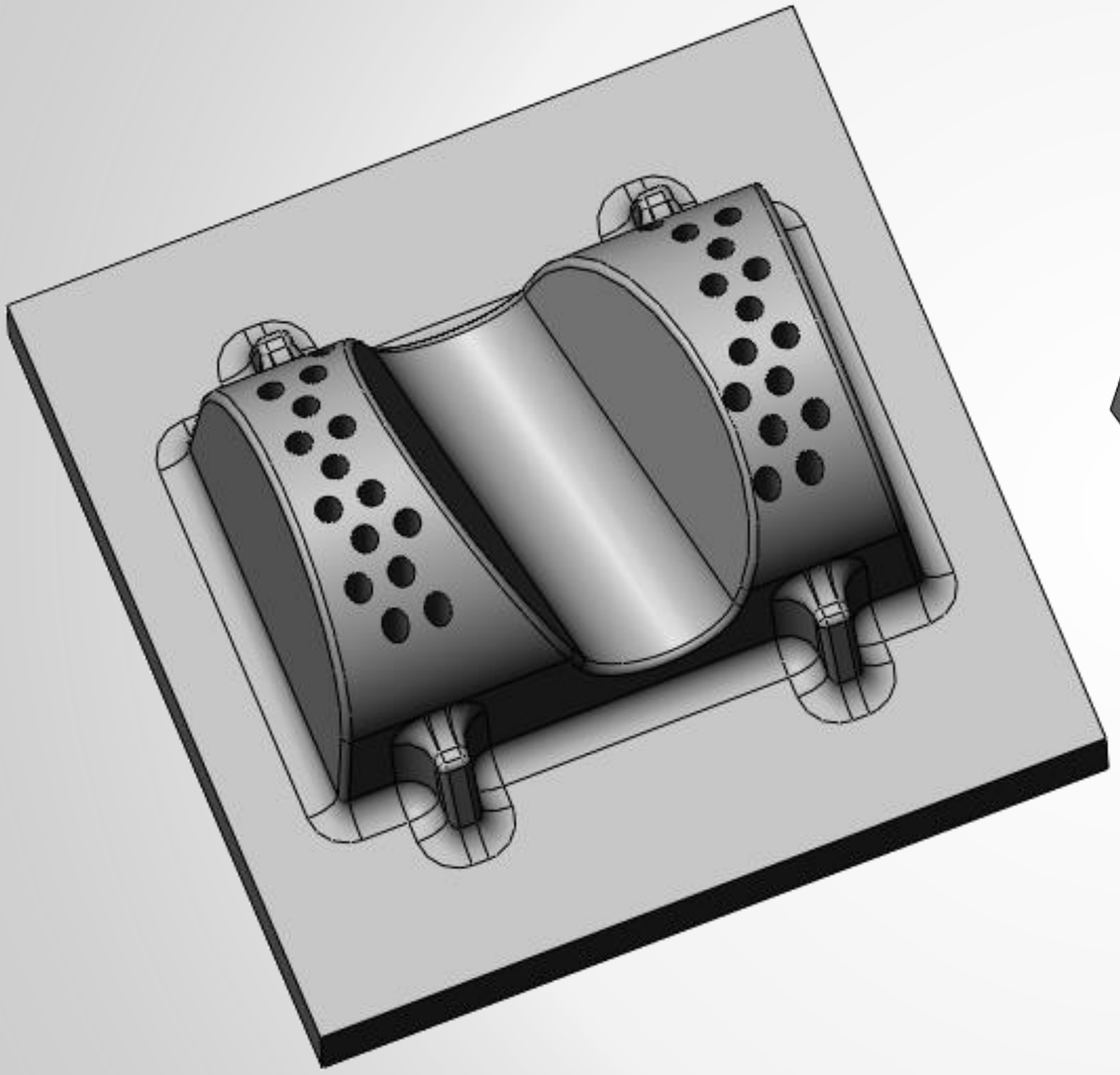
Bad imported files

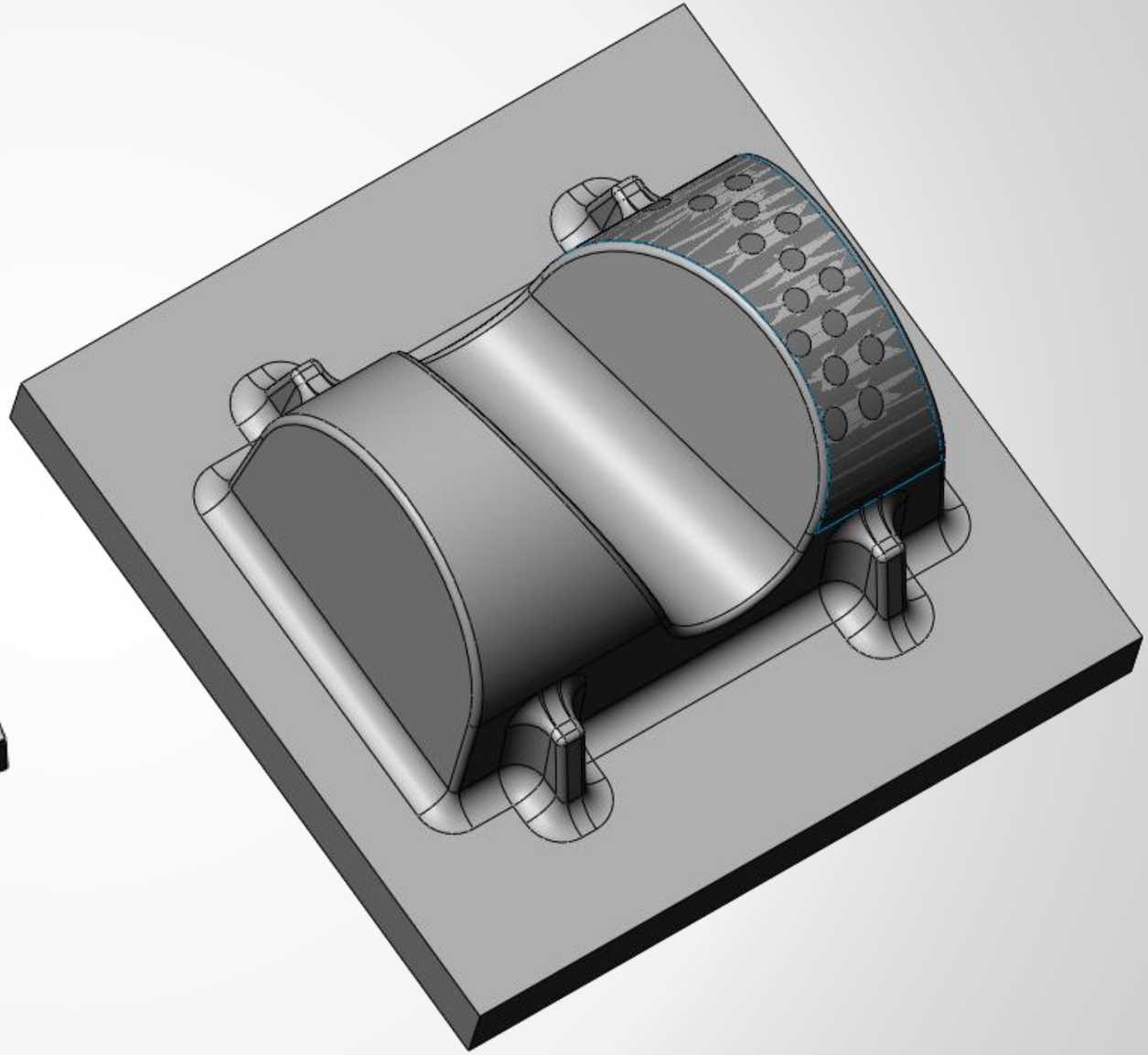
- Missing Faces (Gaps)





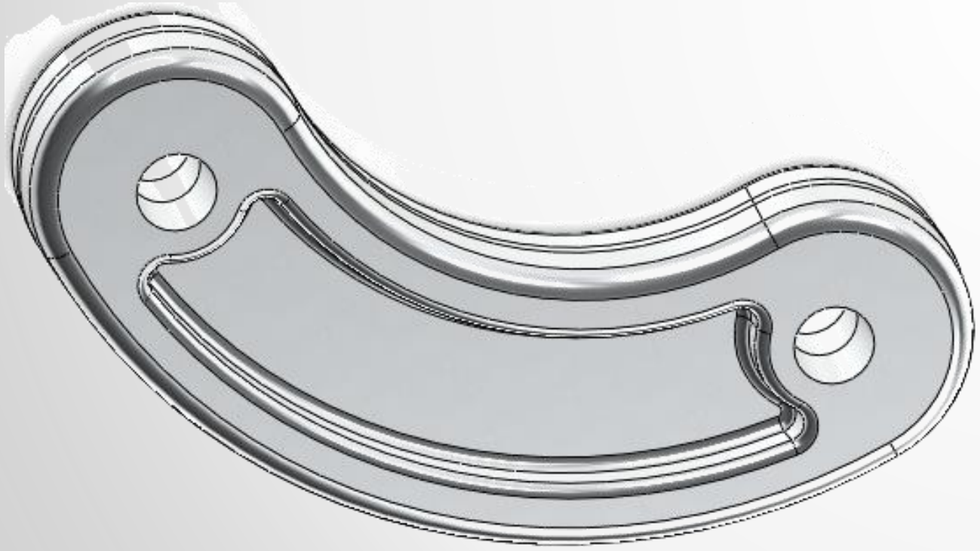
Capping Holes

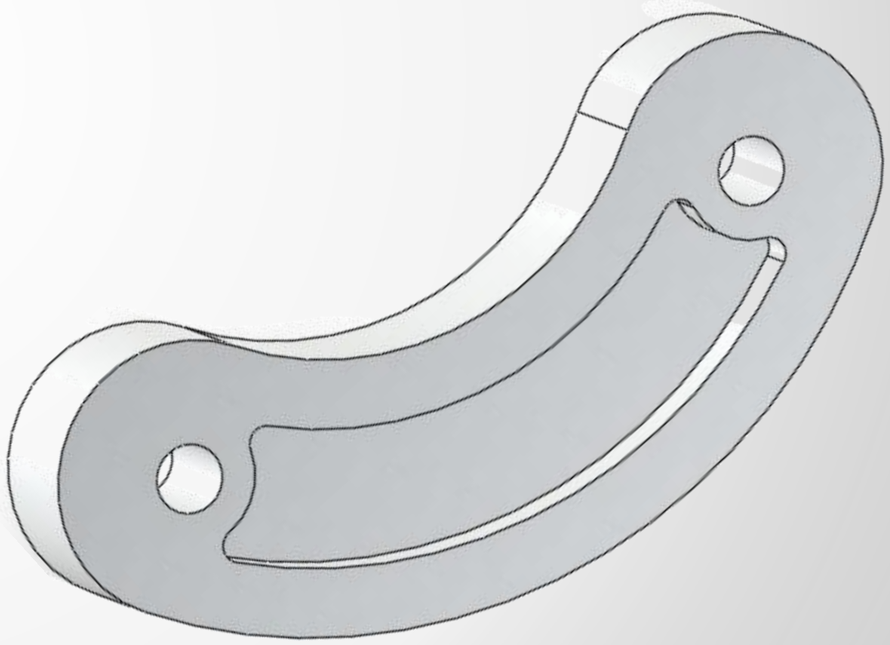




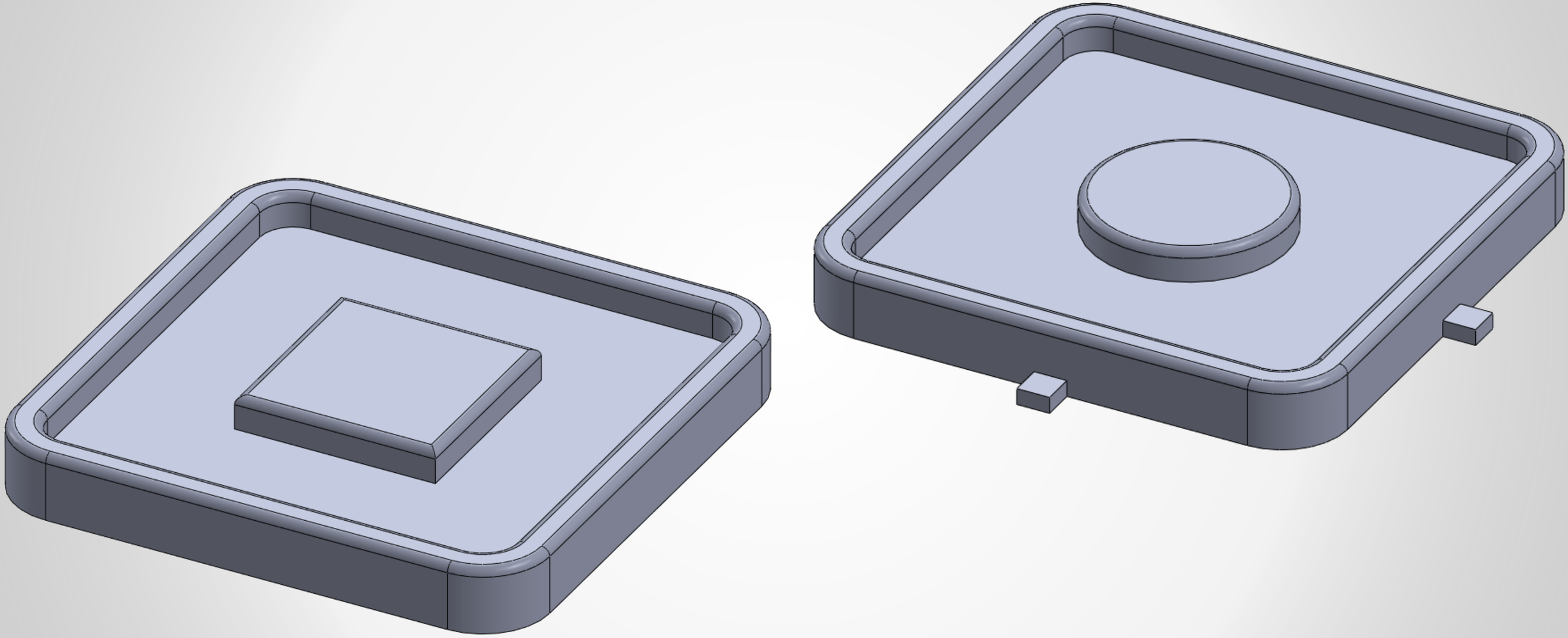
File Management: Configurations

- **Configurations**
- **Pros**: One file to manage.
- **Cons**: Chance of manufacturing changes being done in engineering configuration, or wrong configuration being used in assembly.



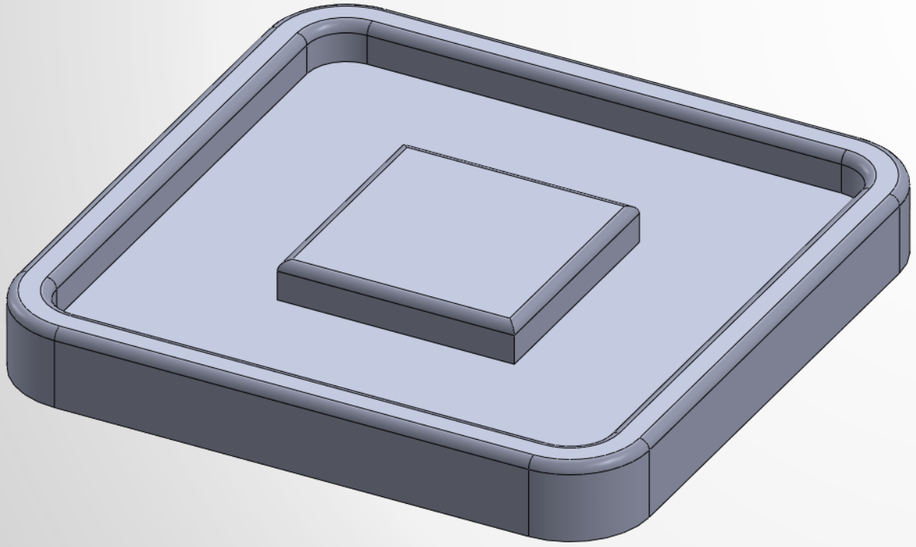


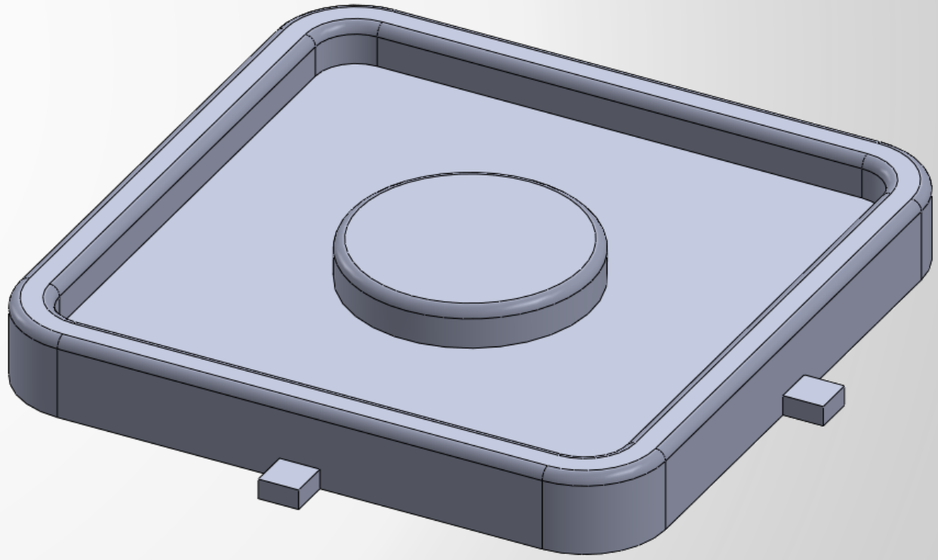
File Management: Insert Part



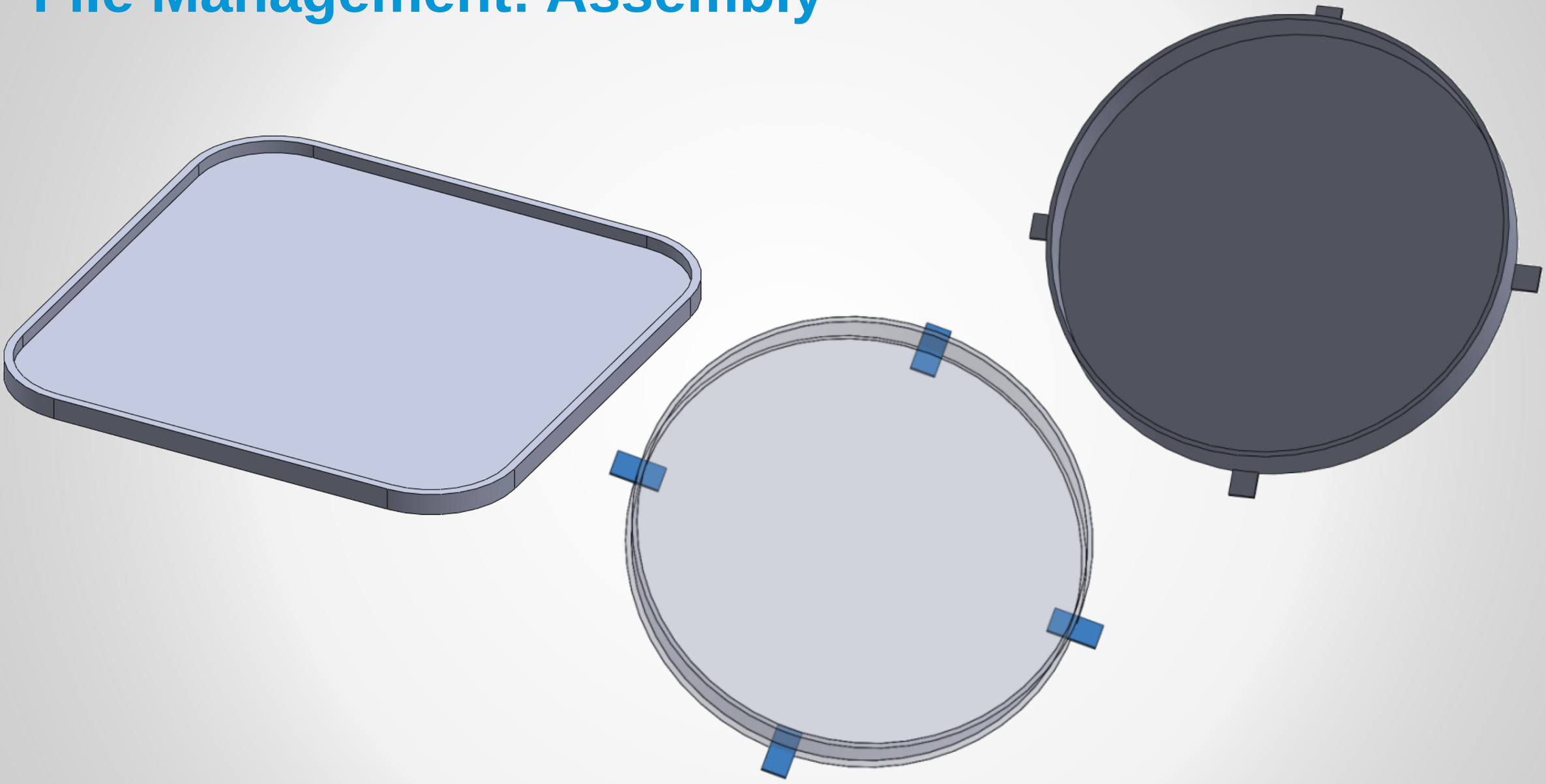
File Management: Insert Part

- **Insert Part**
- **Pros**: Engineering changes to manufacturing part, Manufacturing changes stay in the manufacturing part.
- **Cons**: Harder to remove unwanted fillets and radiuses, Two files to manage.



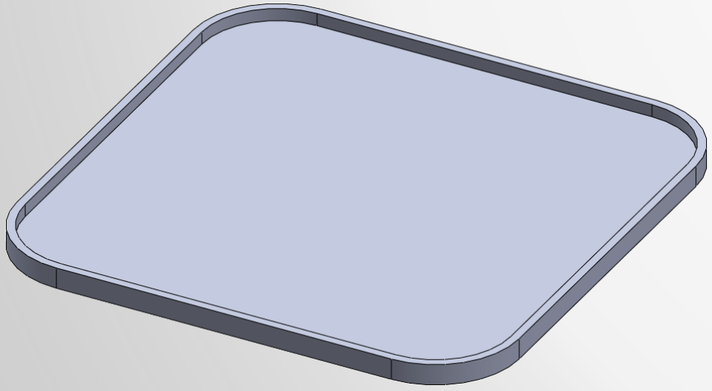


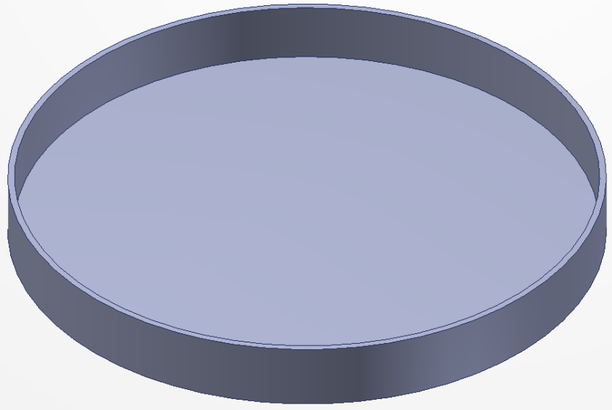
File Management: Assembly

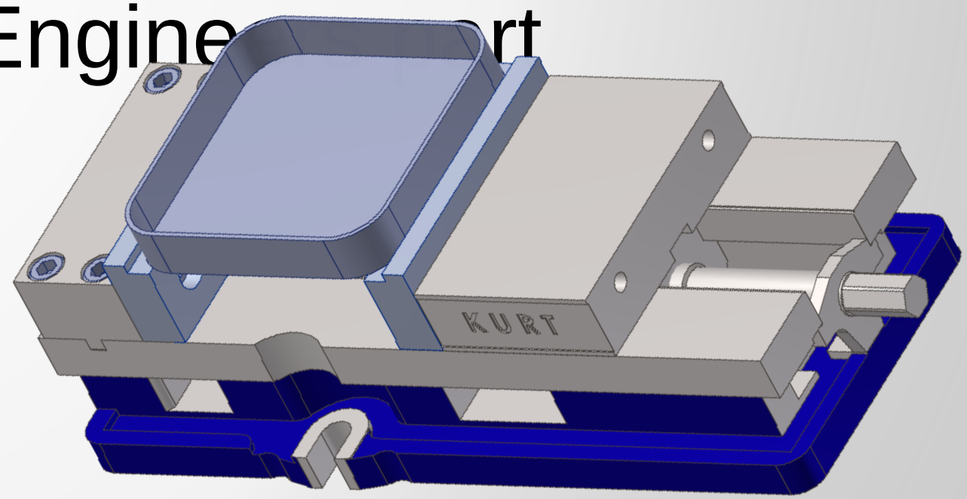


File Management: Assembly

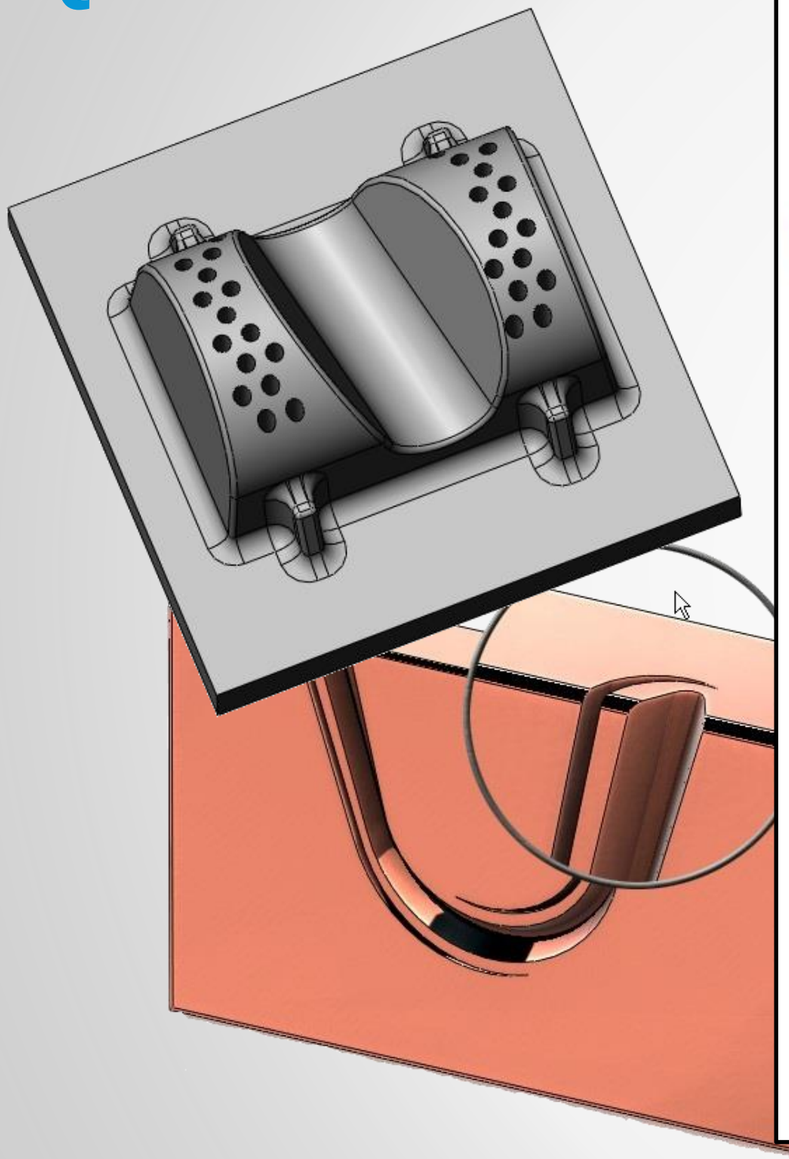
- **Assembly** (join)
- **Pros**: Can add fixtures, clamps, and tabs without modifying the engineering part. Can replace base part and keep existing fixtures, clamps, and tabs (with minor edits). Engineering part can be kept read only.
- **Cons**: 3 (or more) files to manage and more steps involved. Still a risk of changing the Engine[illegible]rt

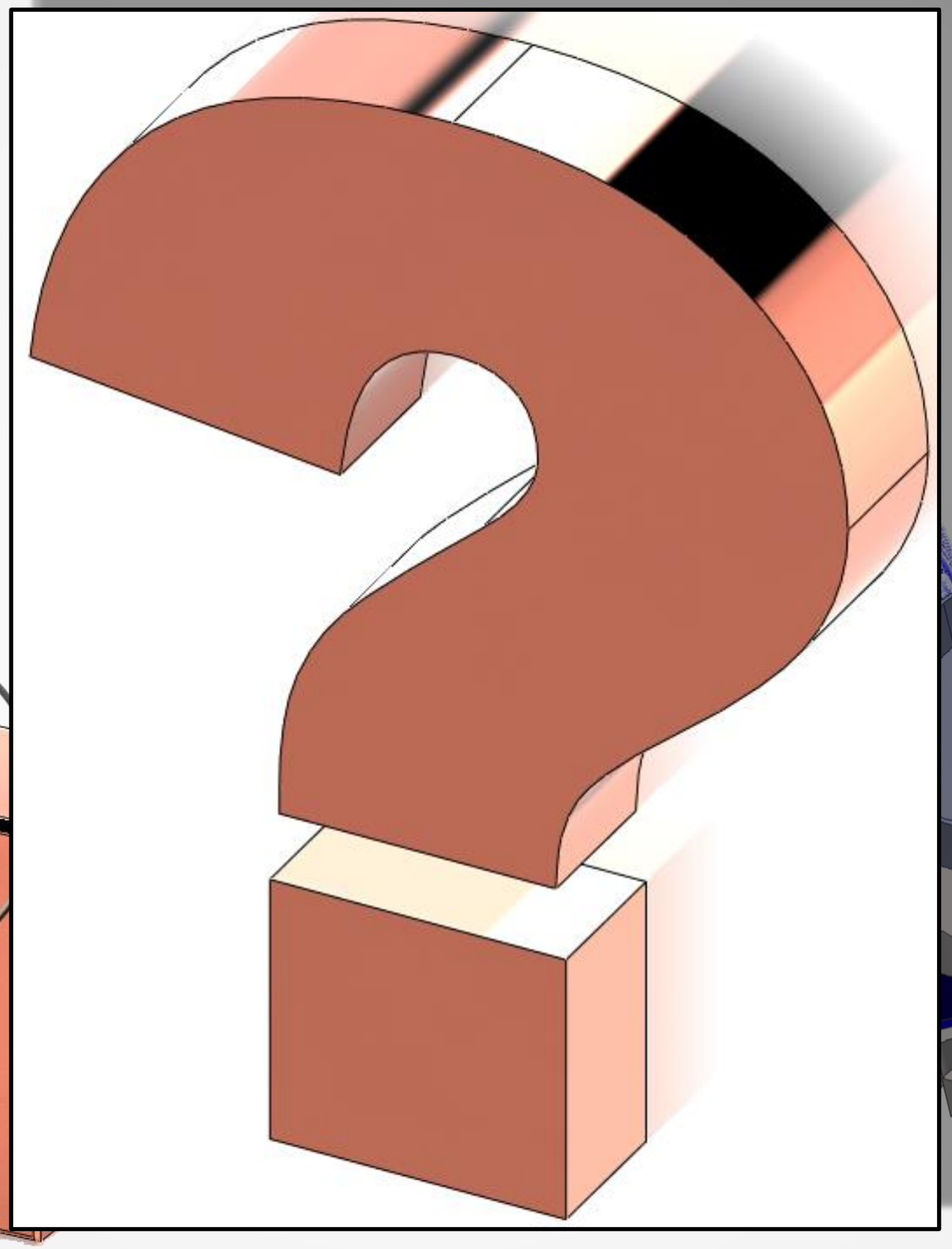


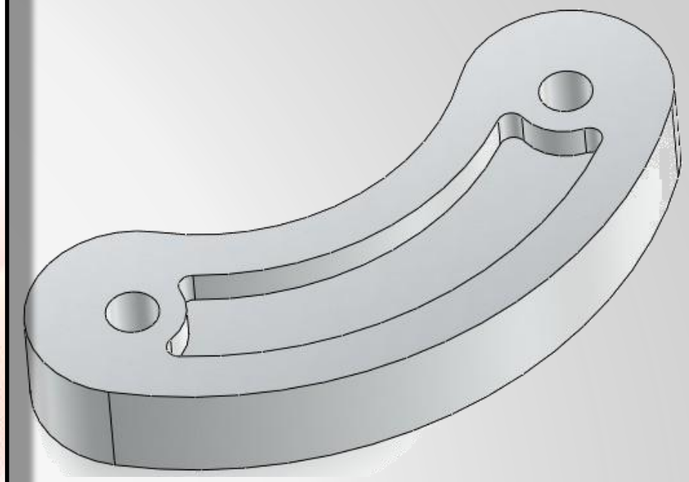


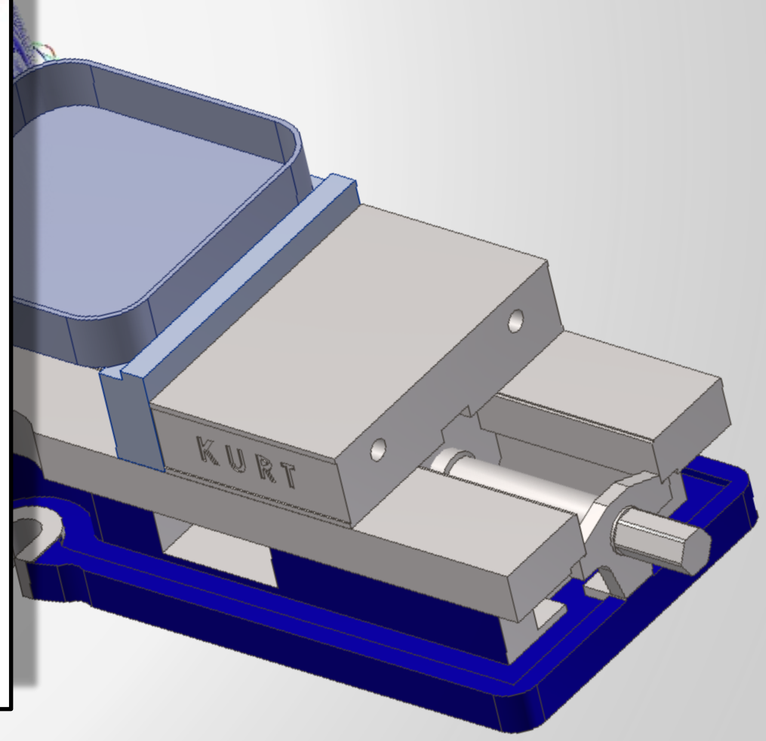


Questions ?









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