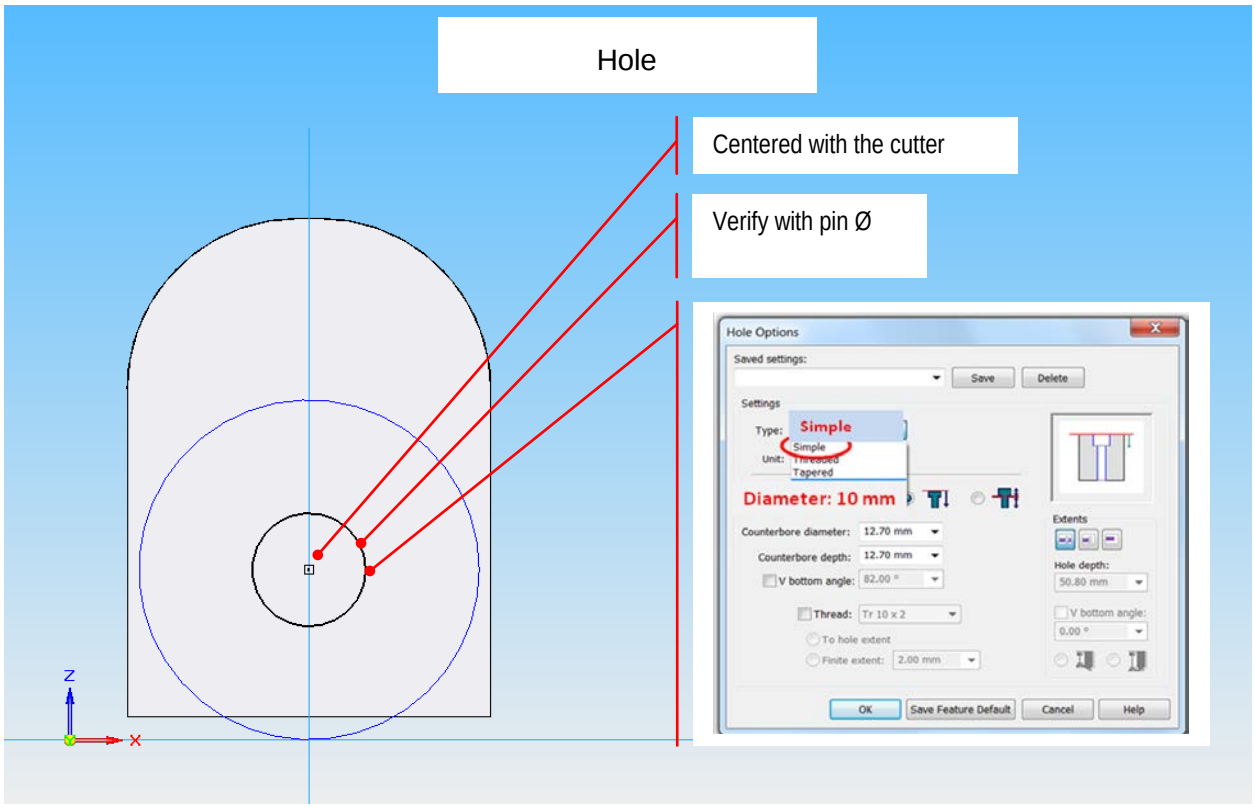
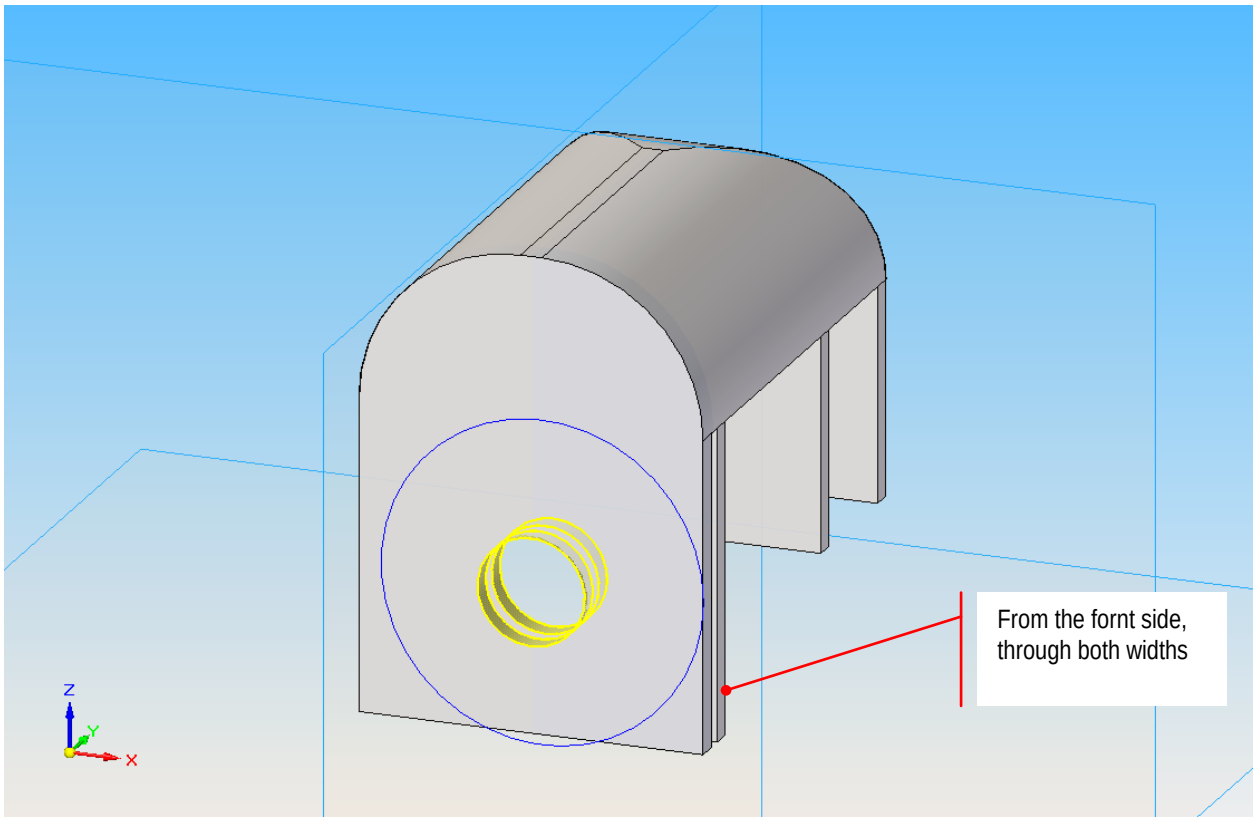
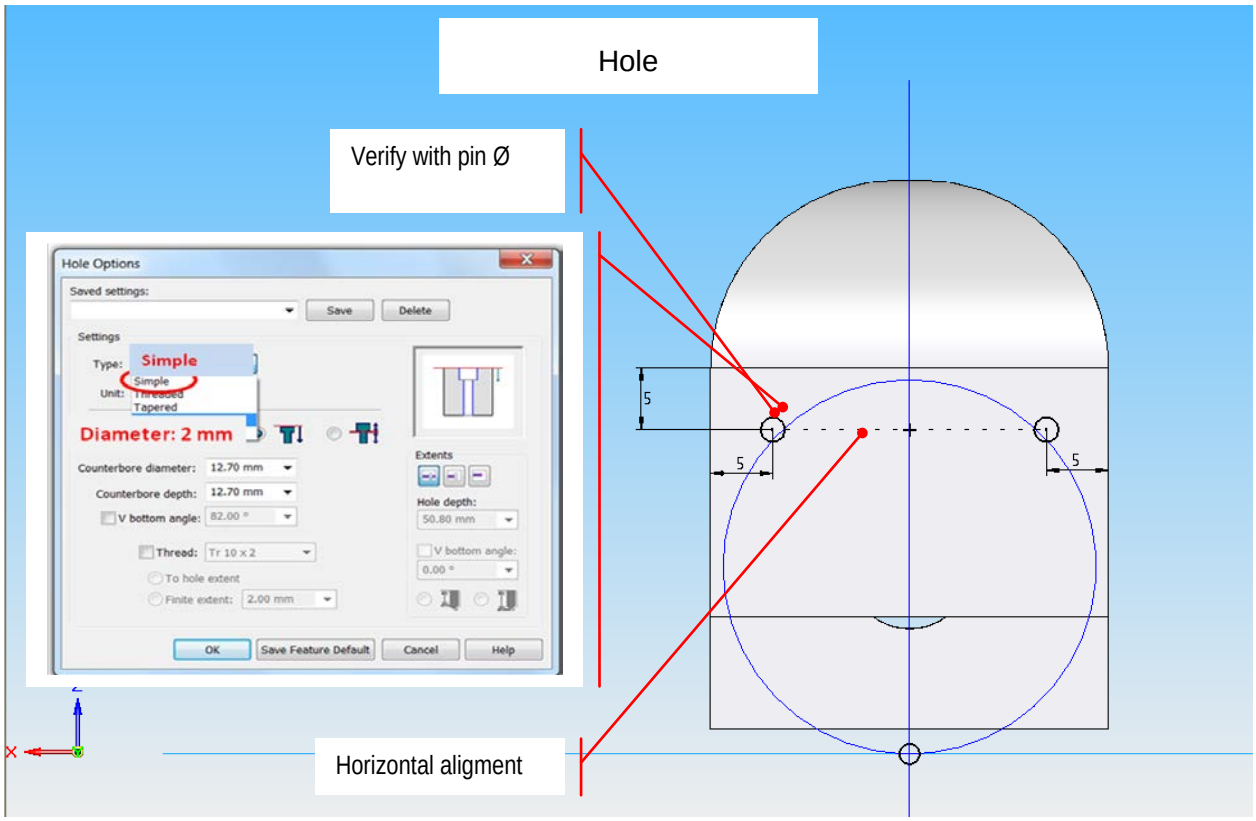


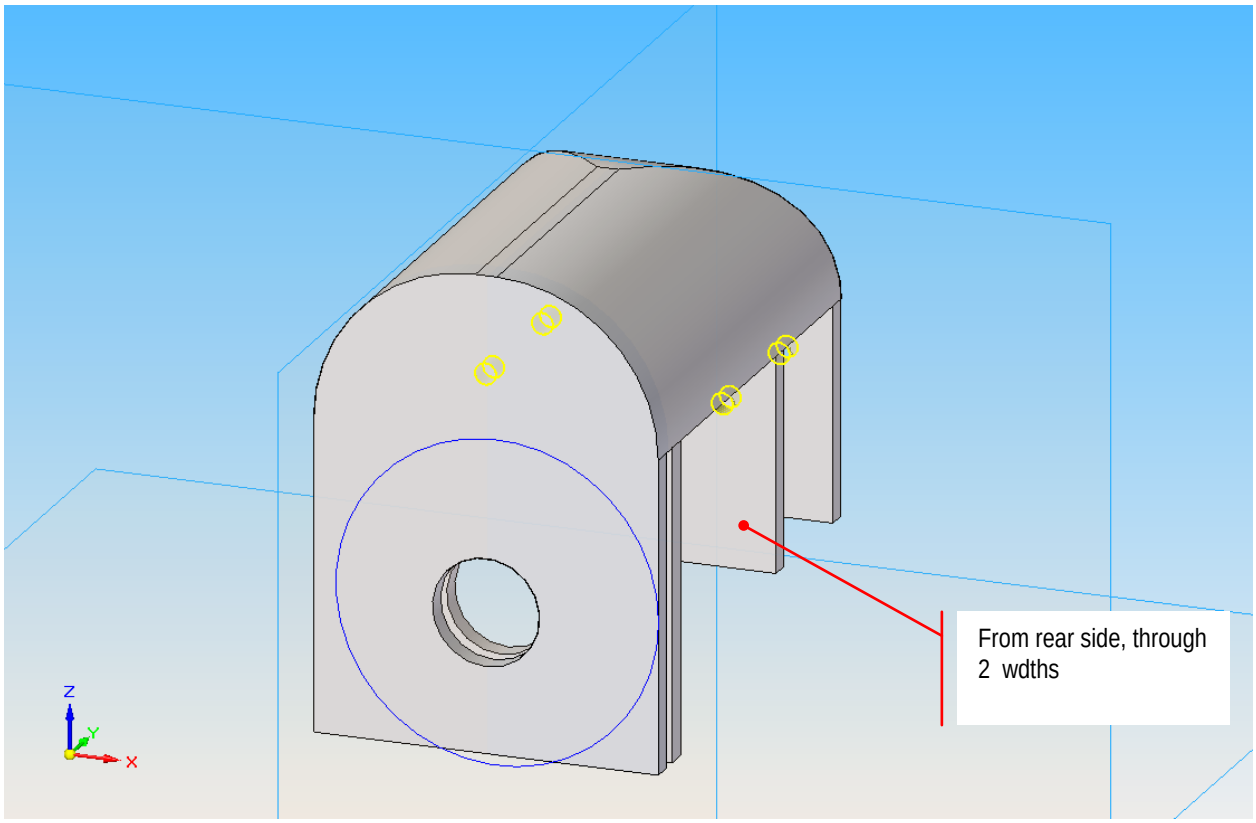
5.51. Image. Holder:Profile of Hole 1 (Image made with Solid Edge)



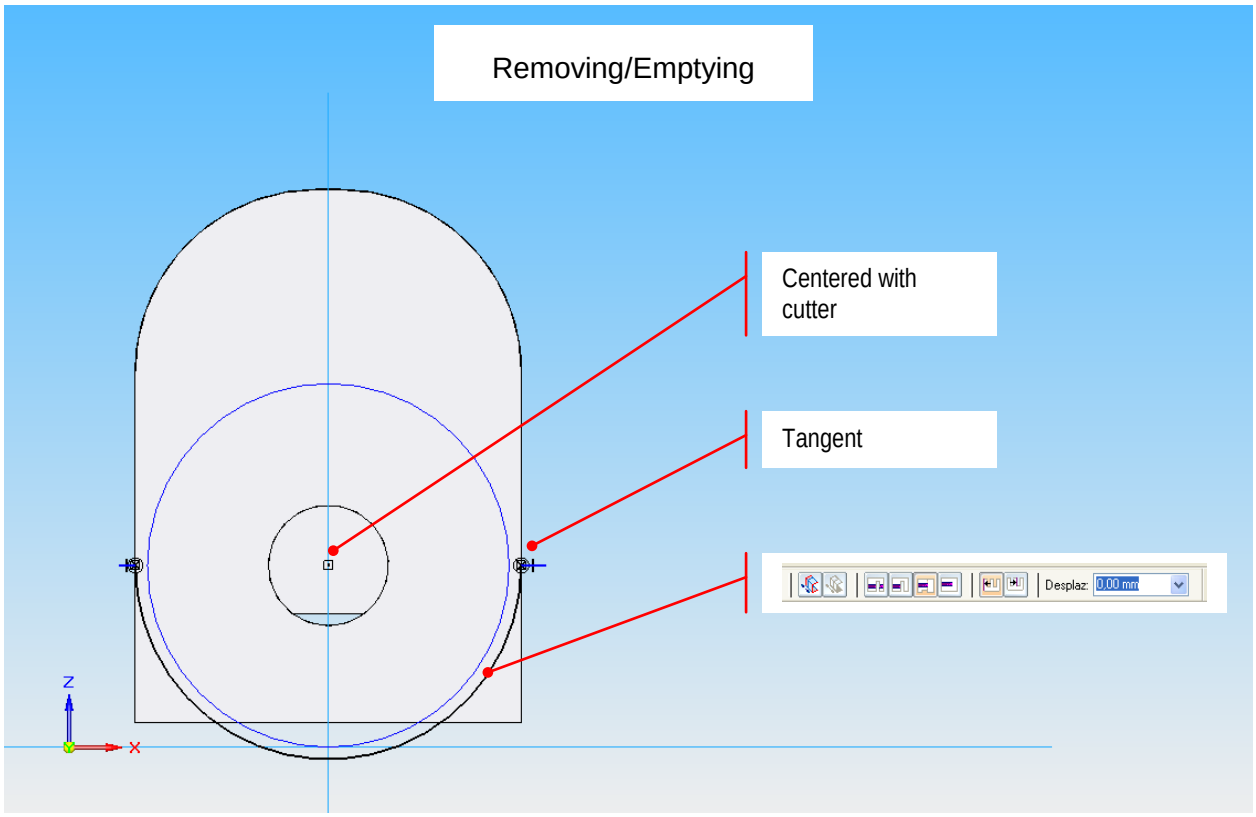
5.52. Image. Holder: Response of Hole 1 (Image made with Solid Edge)



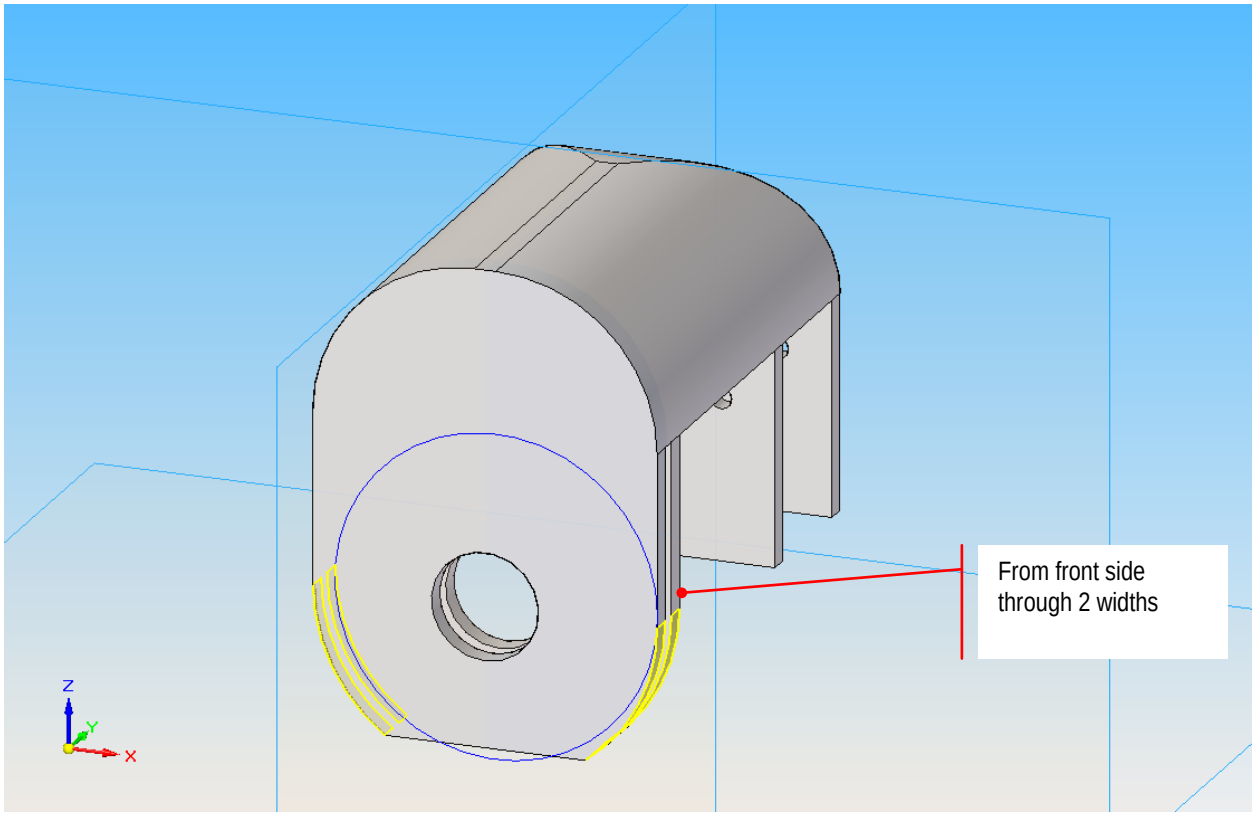
5.53. Image. Holder:Profile of Hole 2 and options ((Image made with Solid Edge)



5.54. Image. Holder: Response of Hole 2 ((Image made with Solid Edge)

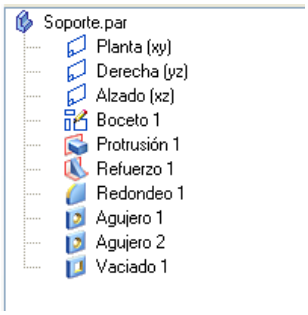


5.55. Image. Holder: Profile and options of Emptying 1 ((Image made with Solid Edge)



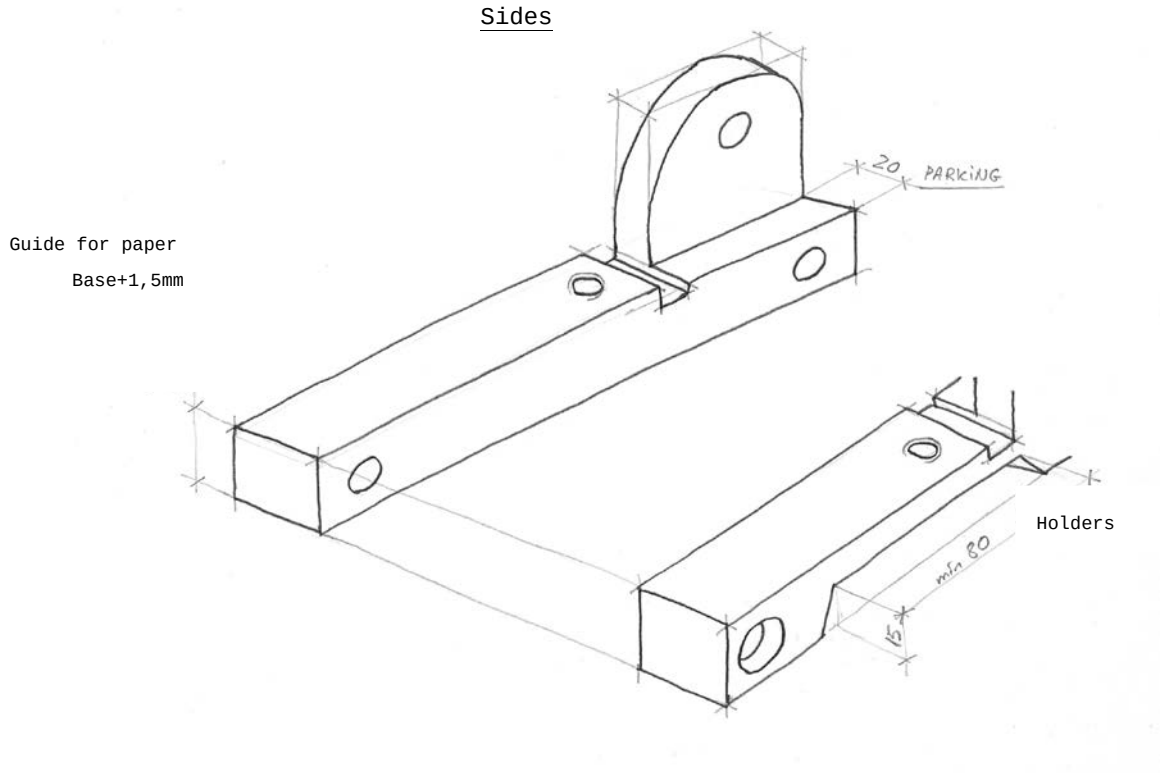
5.56. Image. Holder: Response of Emptying 1 ((Image made with Solid Edge)

PathFinder of the operations for the holder:



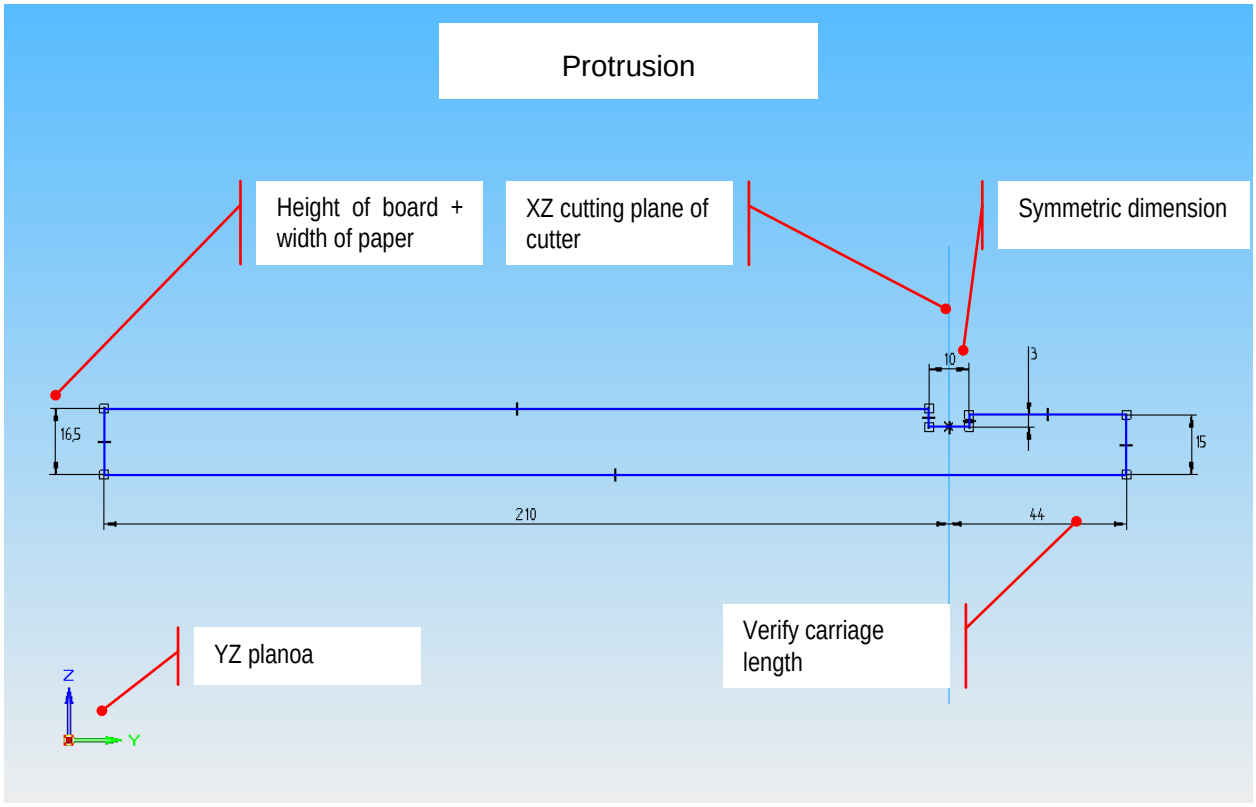
5.57. Image. Holder: Pathinder of the Operations ((Image made with Solid Edge)

Sides

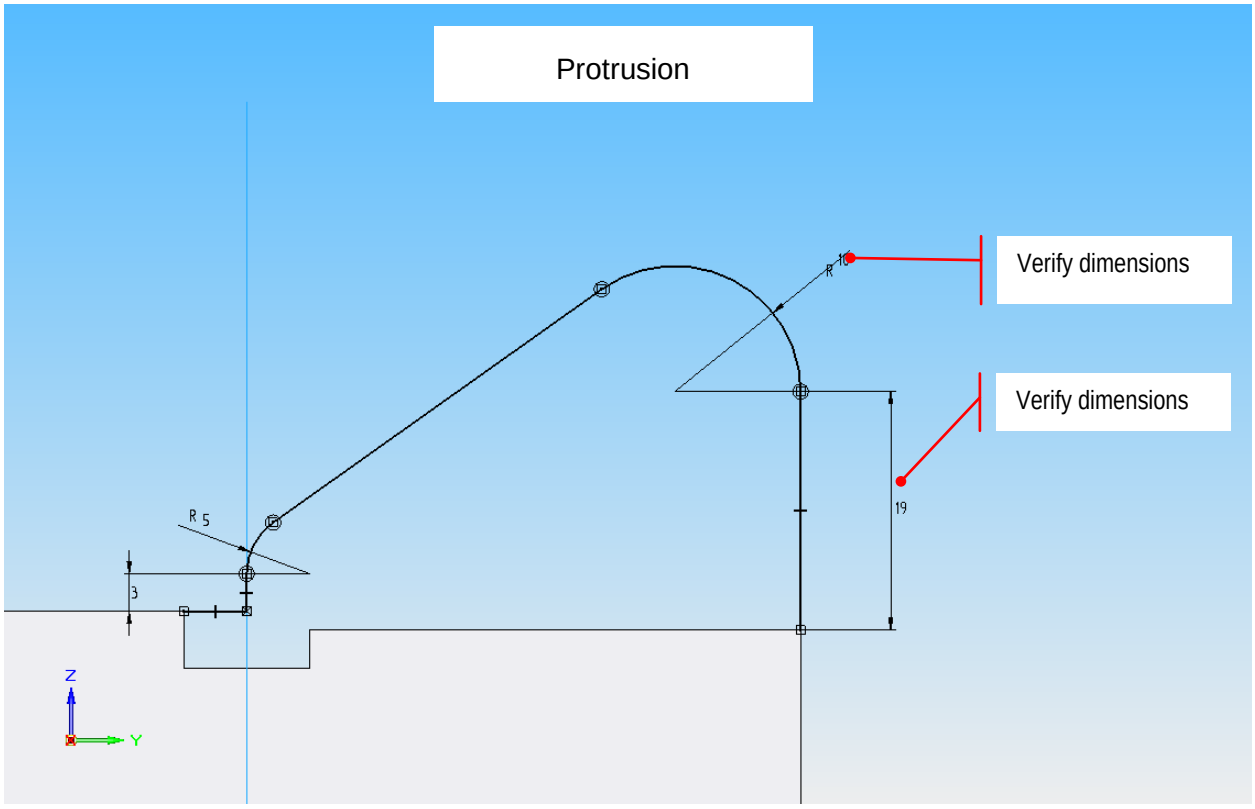


5.58. Image. Sides

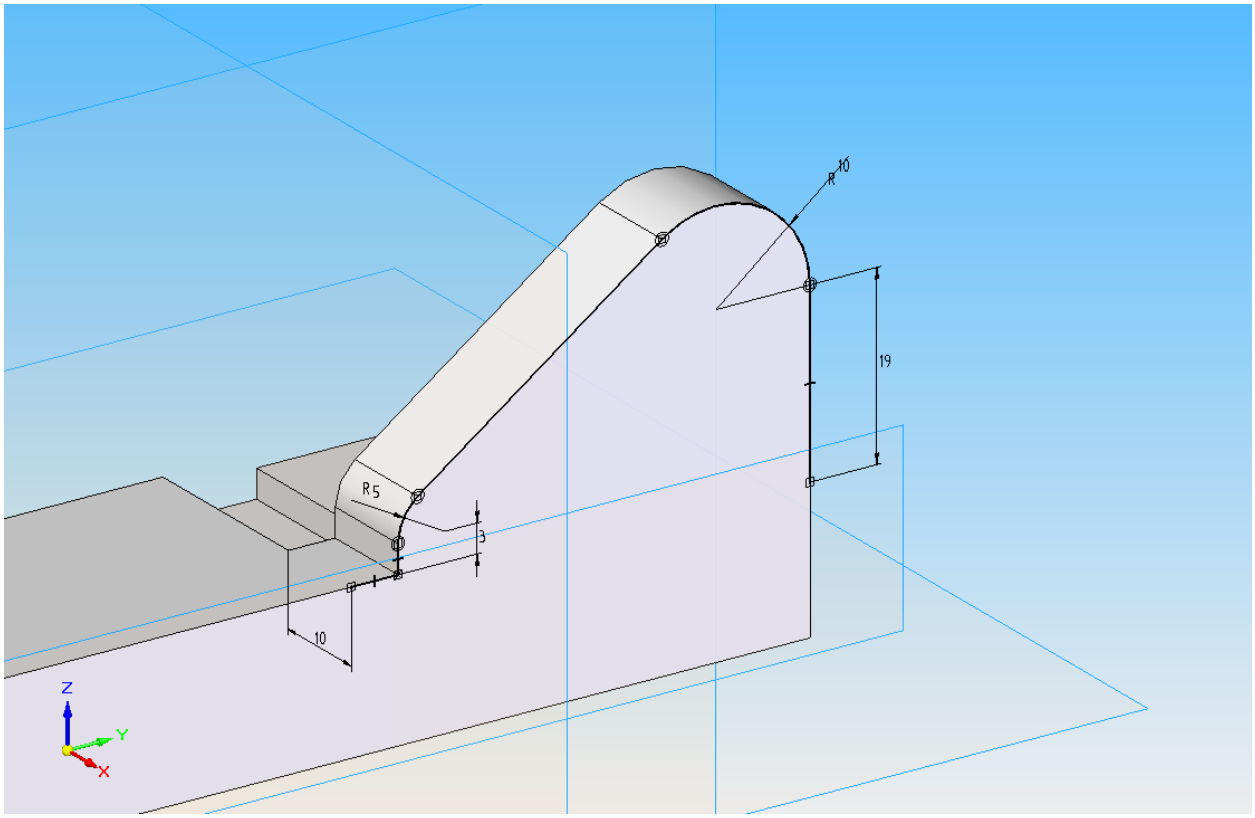
The sides are two different and symmetric parts, and we will analyze only one of them, because the other one has the same information. The operations to add material there are two Protrusions, and to remove material, Holes, Emptying and Roundings.



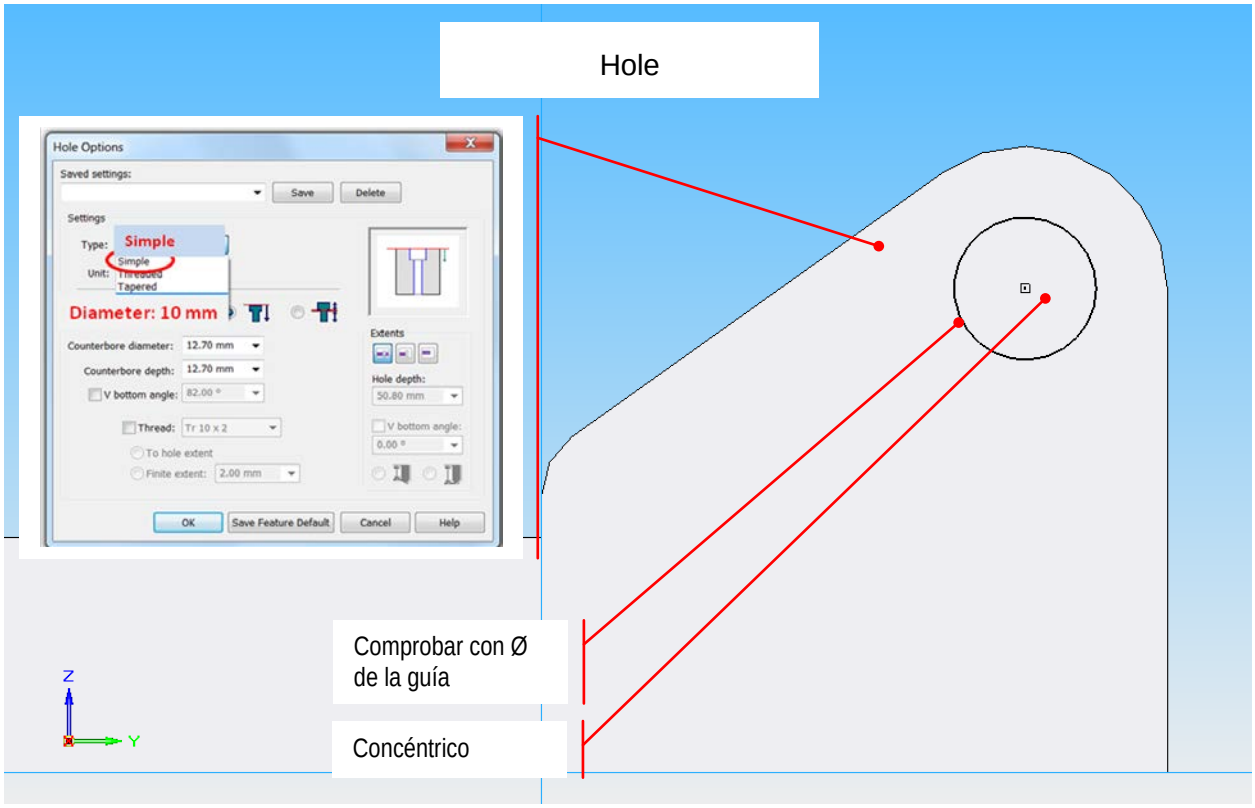
5.59. Image. Right side: Response of Protusion 1 (Image made with Solid Edge)



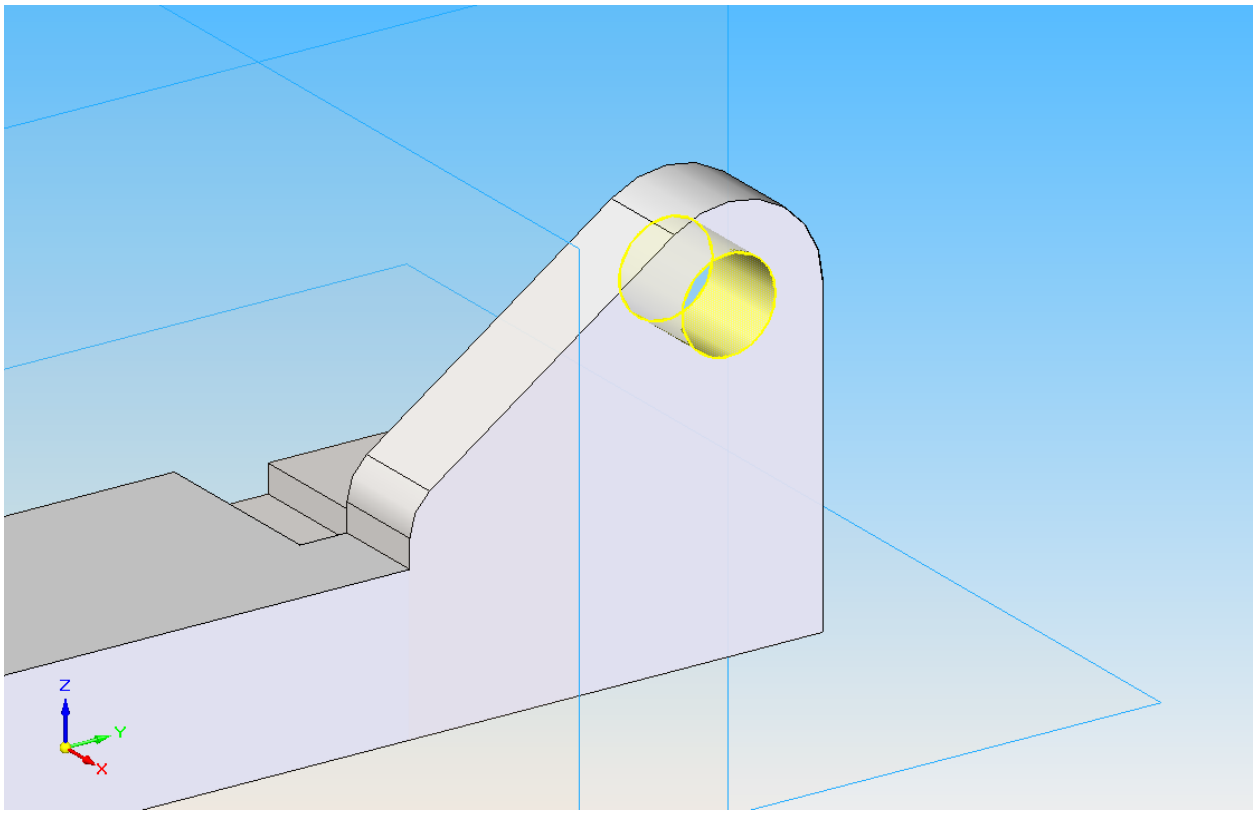
5.60. Image. Right side: Profile of Protusion 2 (Image made with Solid Edge)



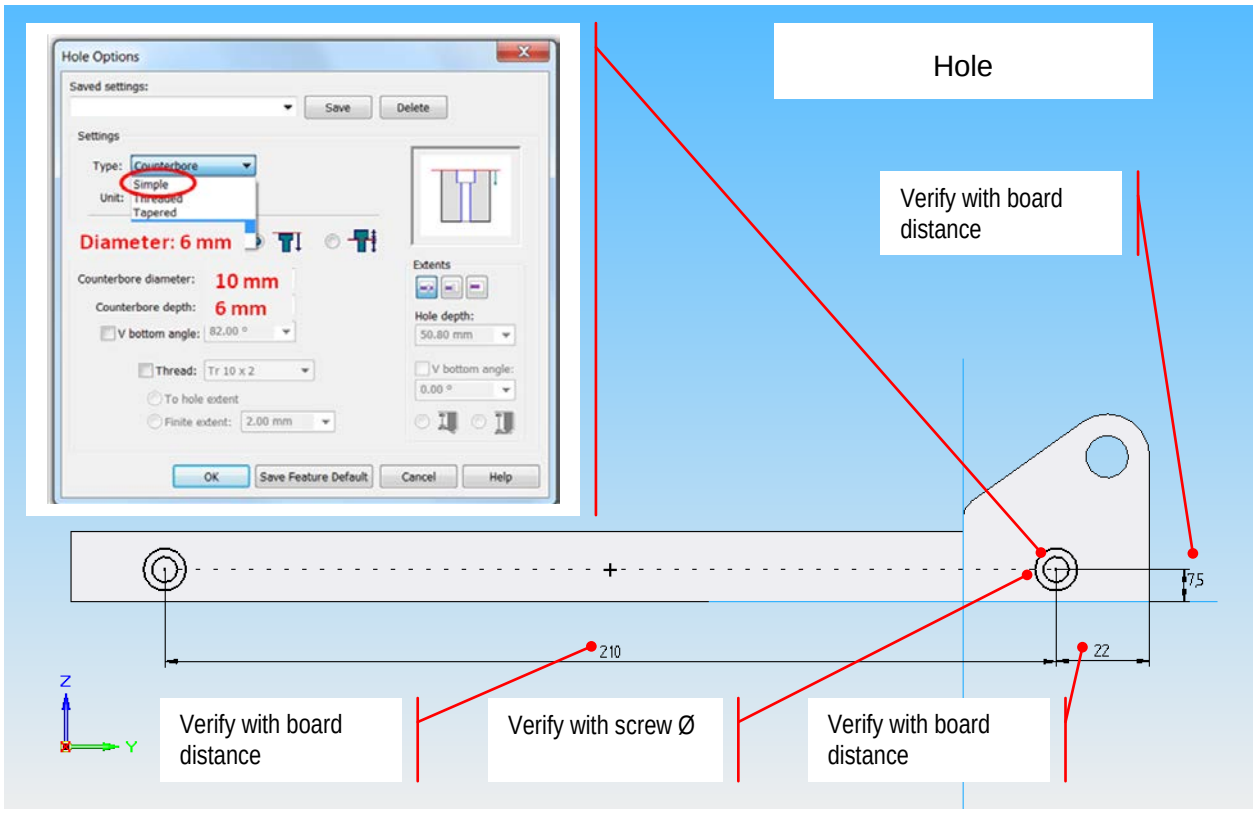
5.61. Image. Right side: Response of Protusion 2 ((Image made with Solid Edge)



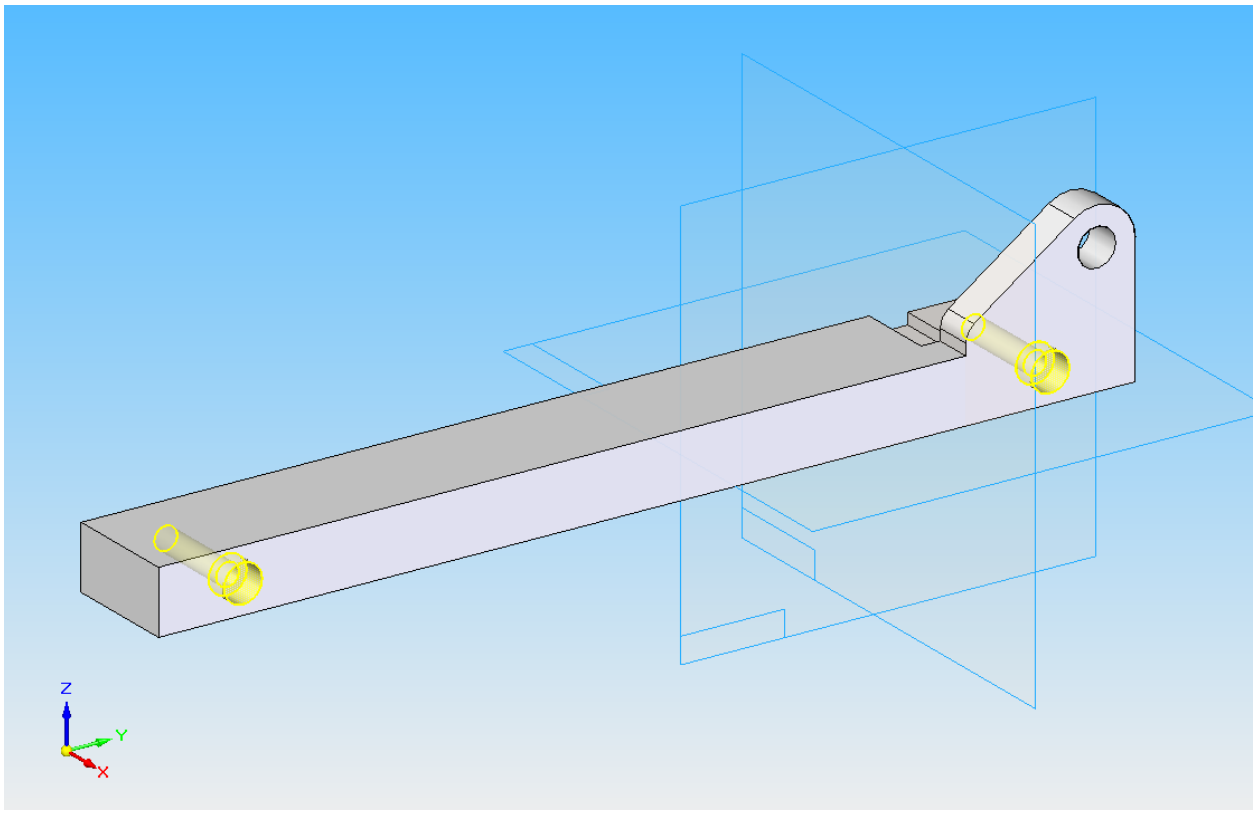
5.62. Image. Right side: Profile and Options of Hole 1 (Image made with Solid Edge)



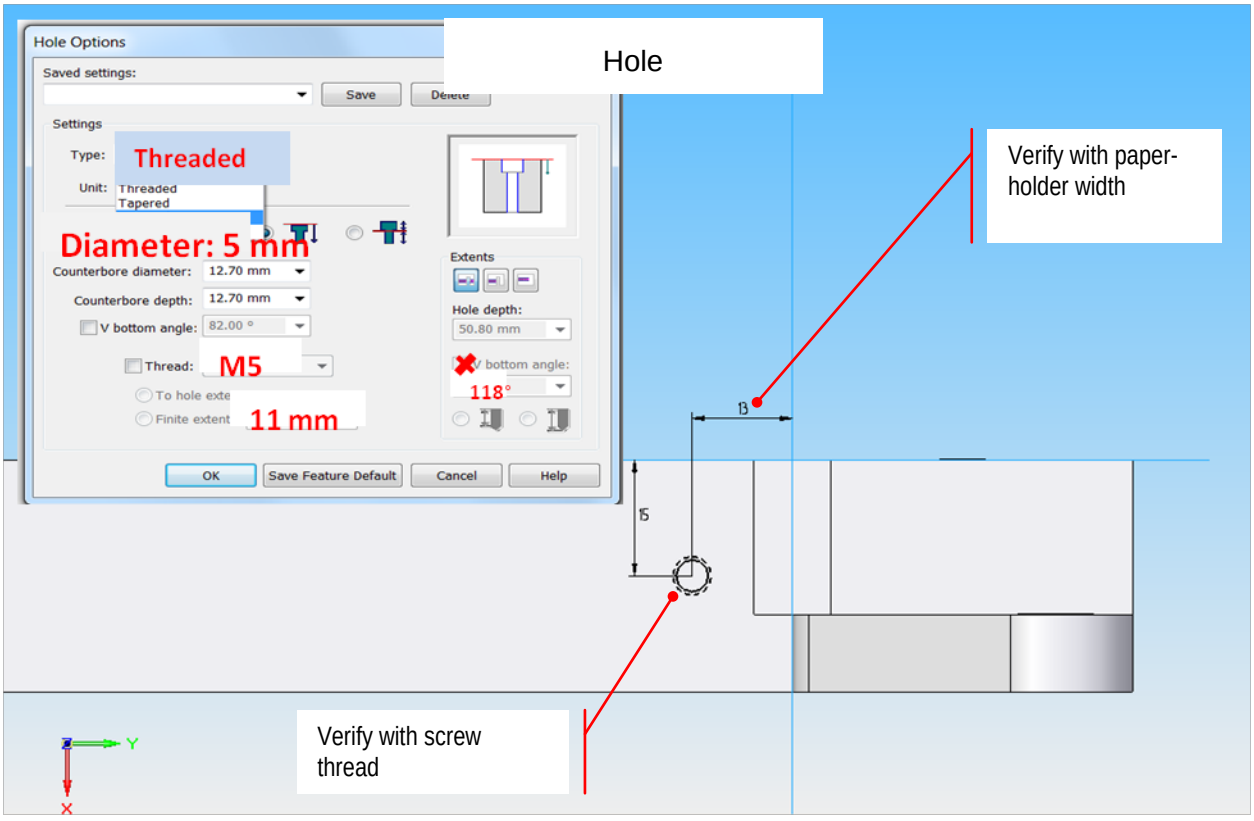
5.63. Image. Right side: Response of Hole 1 (Image made with Solid Edge)



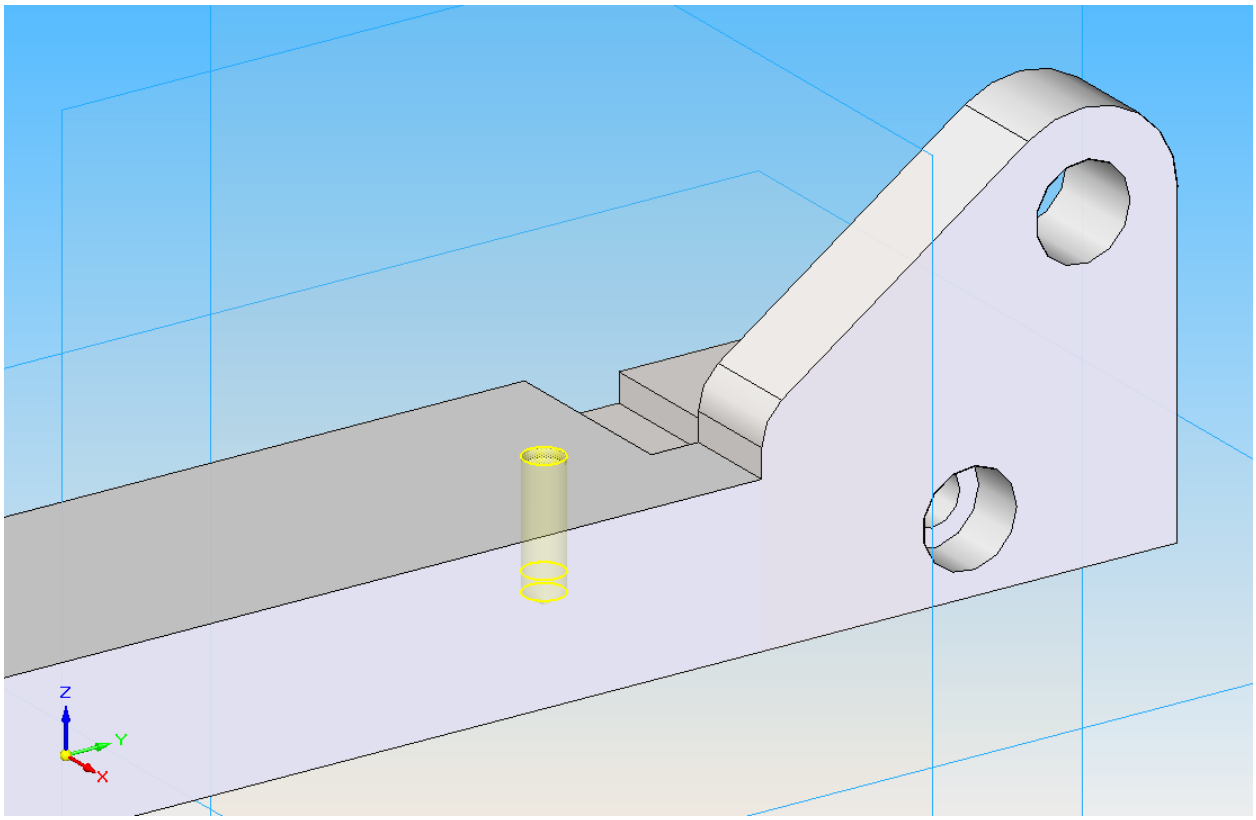
5.64. Image. Right side: Profile and Options of Hole 2 (Image made with Solid Edge)



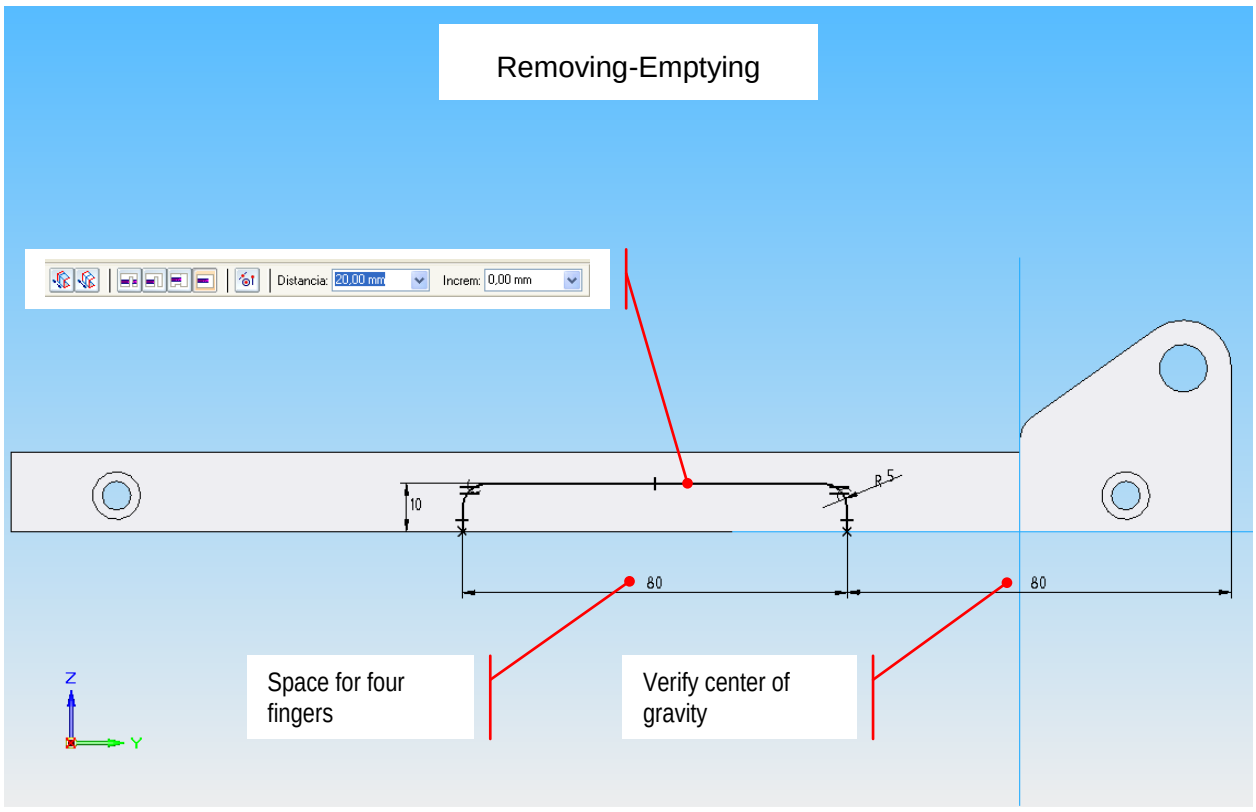
5.65. Image. Right side: Response of Hole 2 (Image made with Solid Edge)



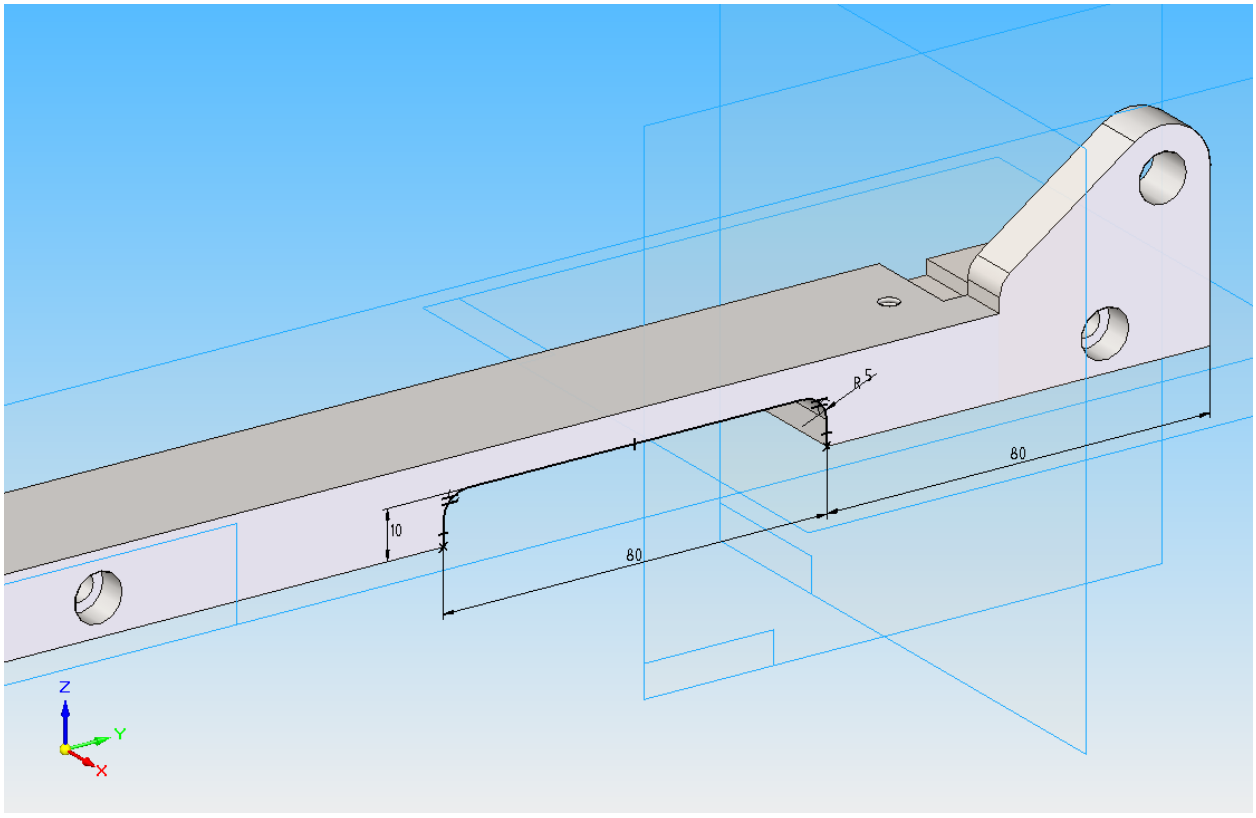
5.66. Image. Right side: Profilea and Options of Hole 3 (Image made with Solid Edge)



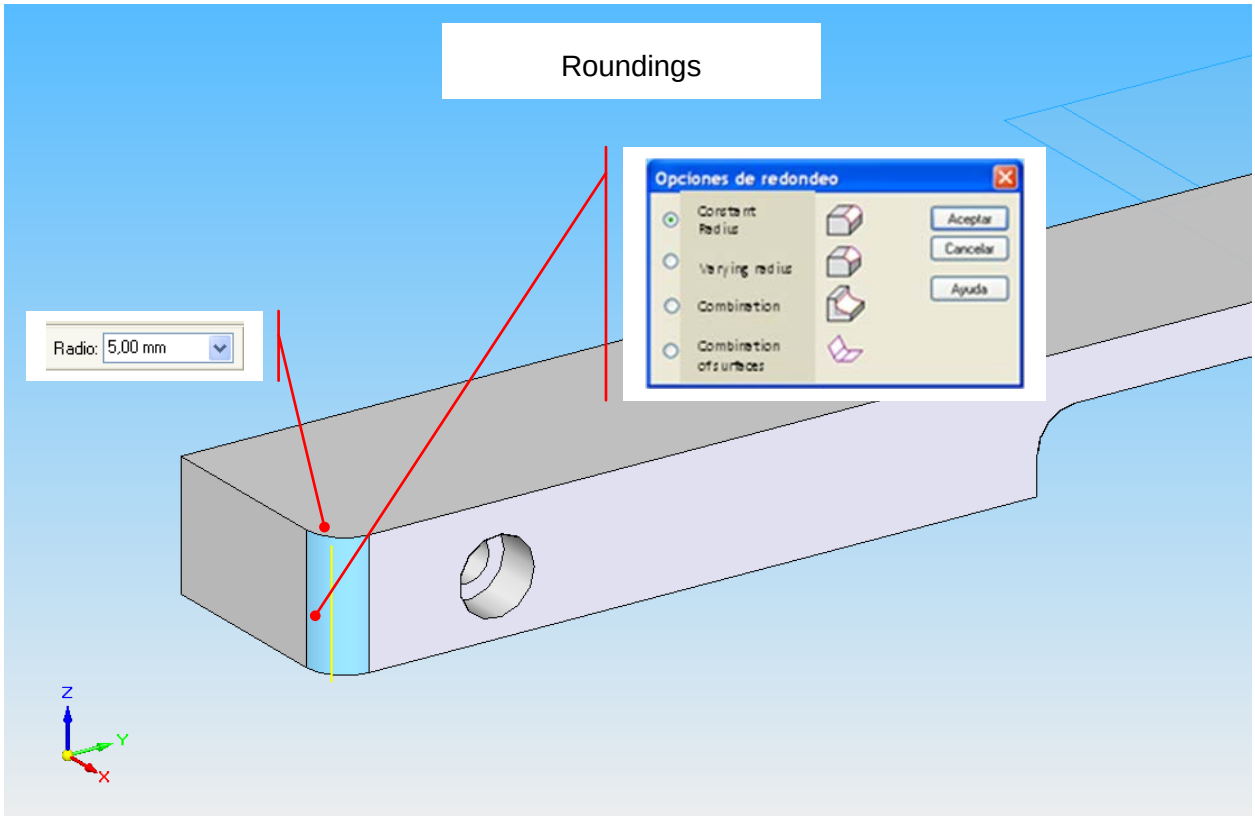
5.67. Image. Right side: Response of Hole 3 (Image made with Solid Edge)



5.68. Image. Right side: Profile of Removing 1 (Image made with Solid Edge)

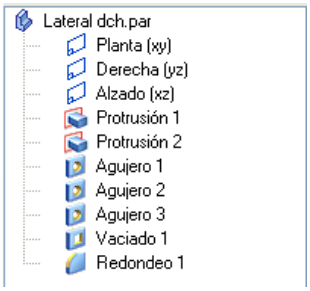


5.69. Image. Right side: Response of Removing 1 (Image made with Solid Edge)



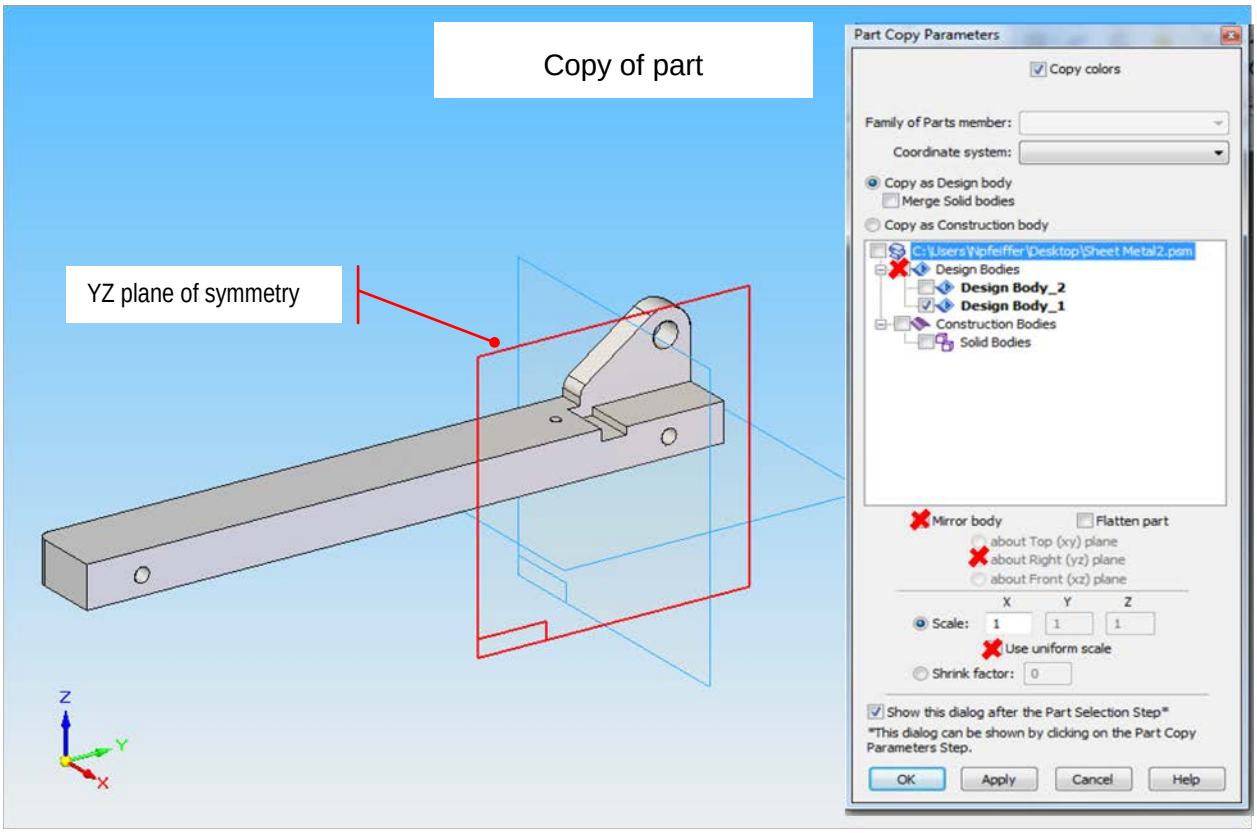
5.70. Image. Right side: Response of Rounding 1 (Image made with Solid Edge)

This is the PathFinder of the Right Side:



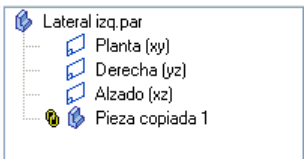
5.71. Image. Right Side: PathFinder of Operations (Image made with Solid Edge)

The Left Side corresponds to other file related with the Right Side and with symmetry.



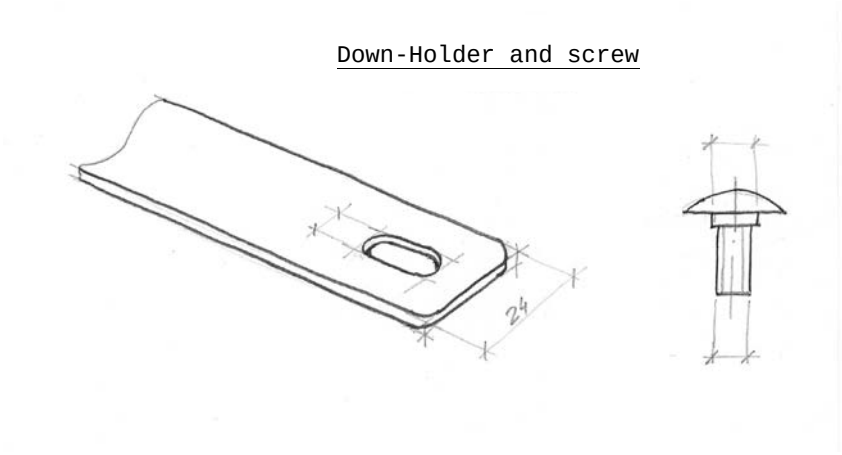
5.72. Image. Left side: Options of Copy 1 (Image made with Solid Edge)

This is the PathFinder of the Left Side:



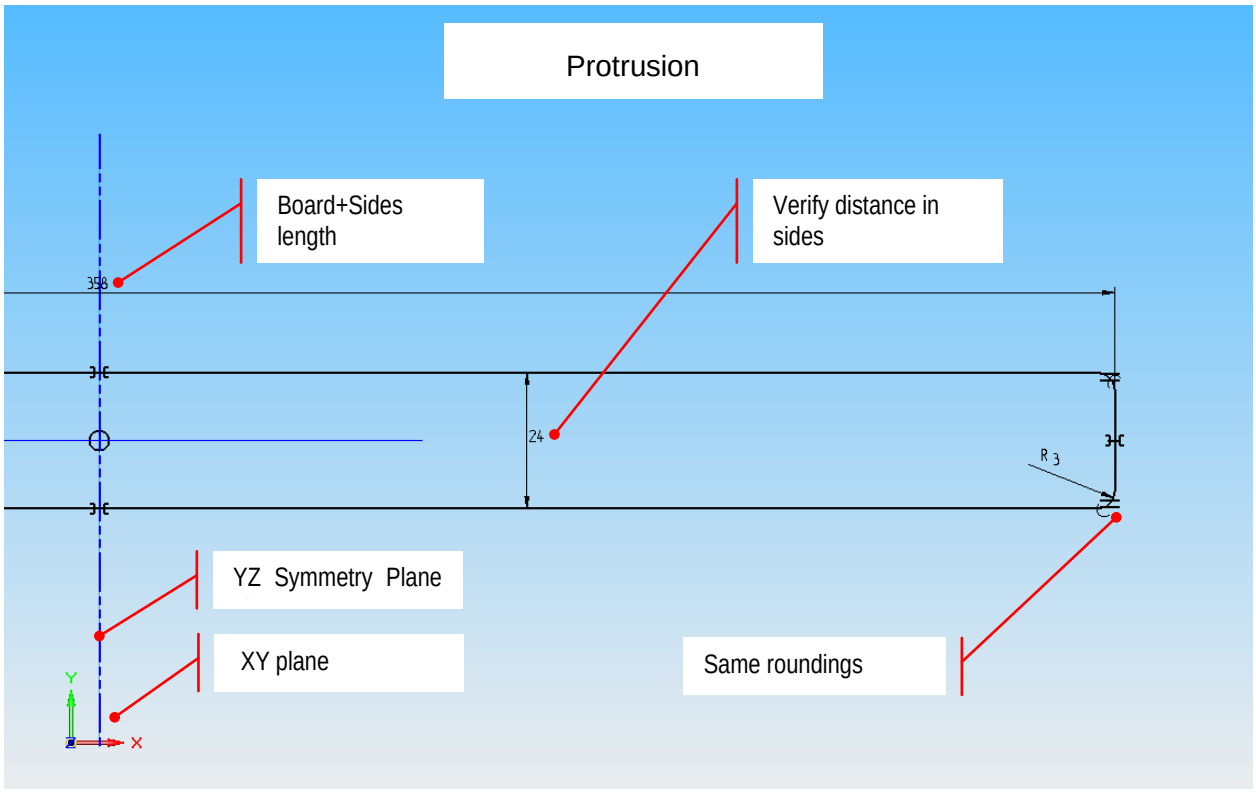
5.73. Image. Right Side: PathFinder of Operations (Image made with Solid Edge)

Down-Holder

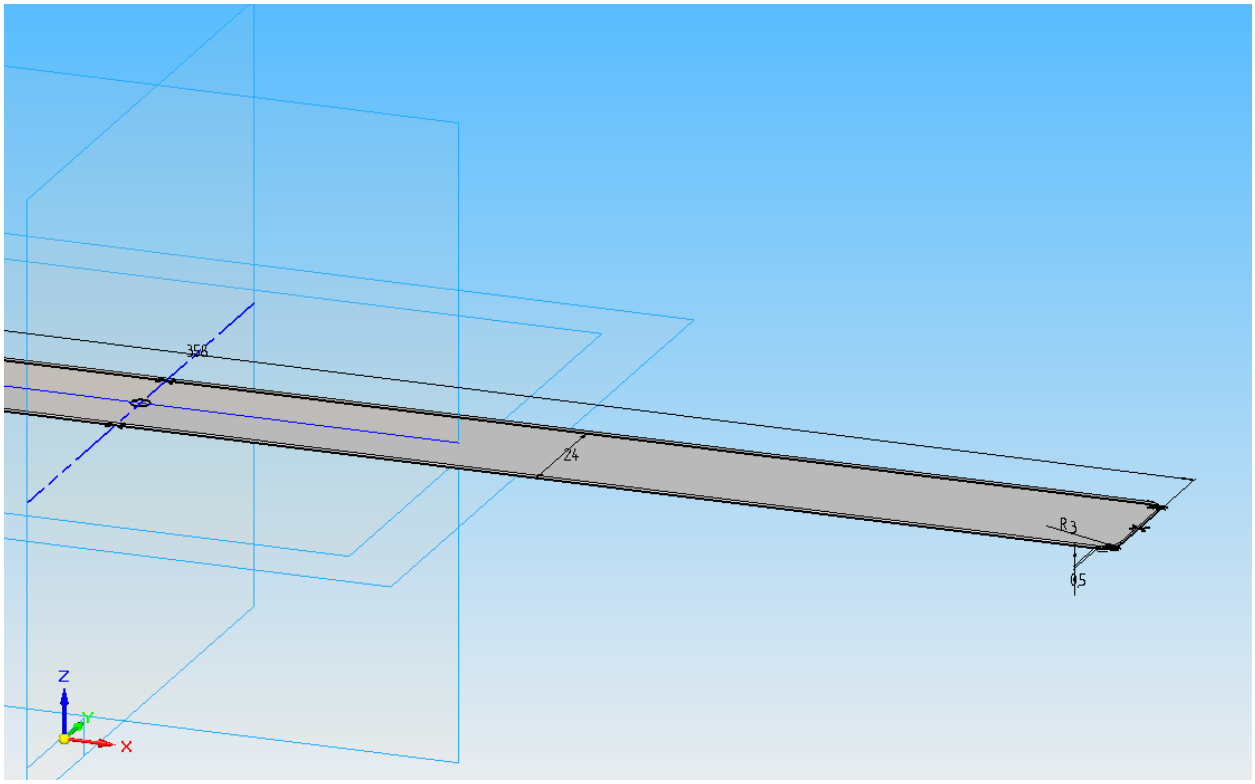


5.74. Image. Paper-Holder and screw

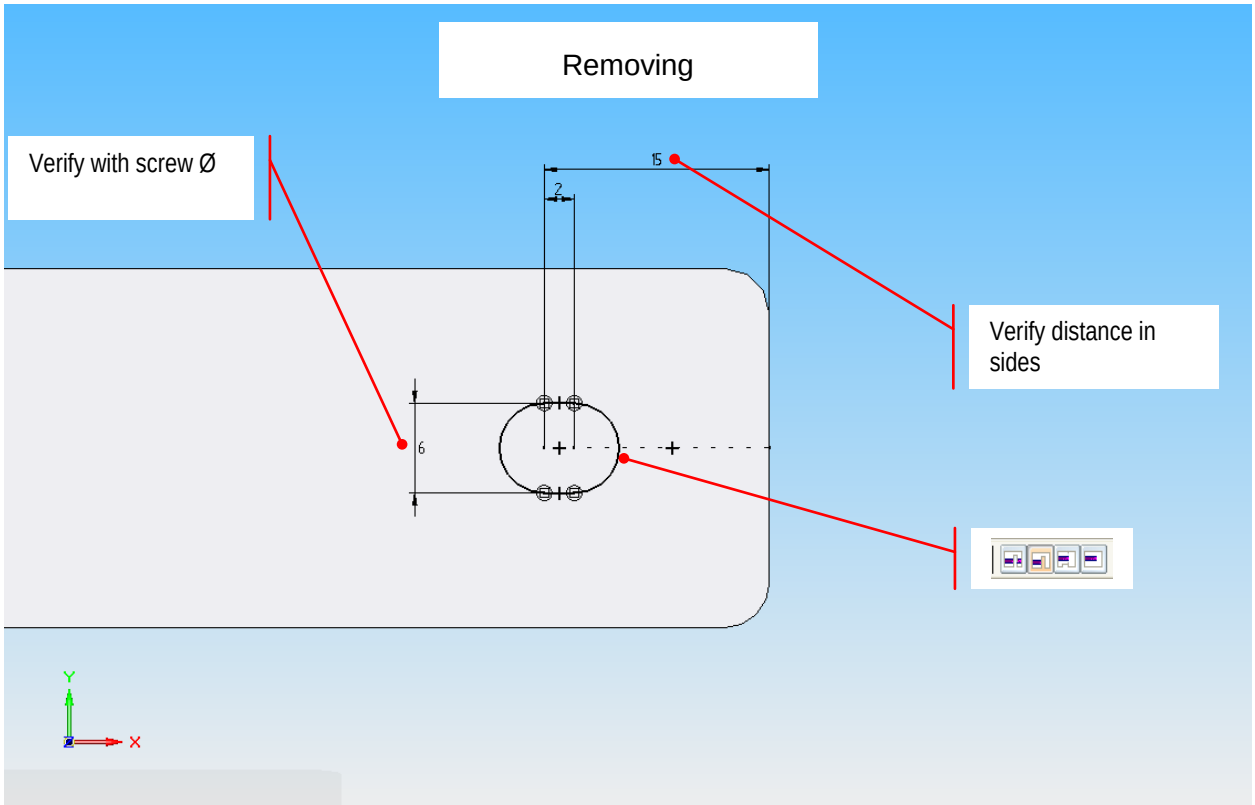
The first operation for the Down-Holder is a Protrusion. A Removing and a Symmetric Copy completes the lists of operations.



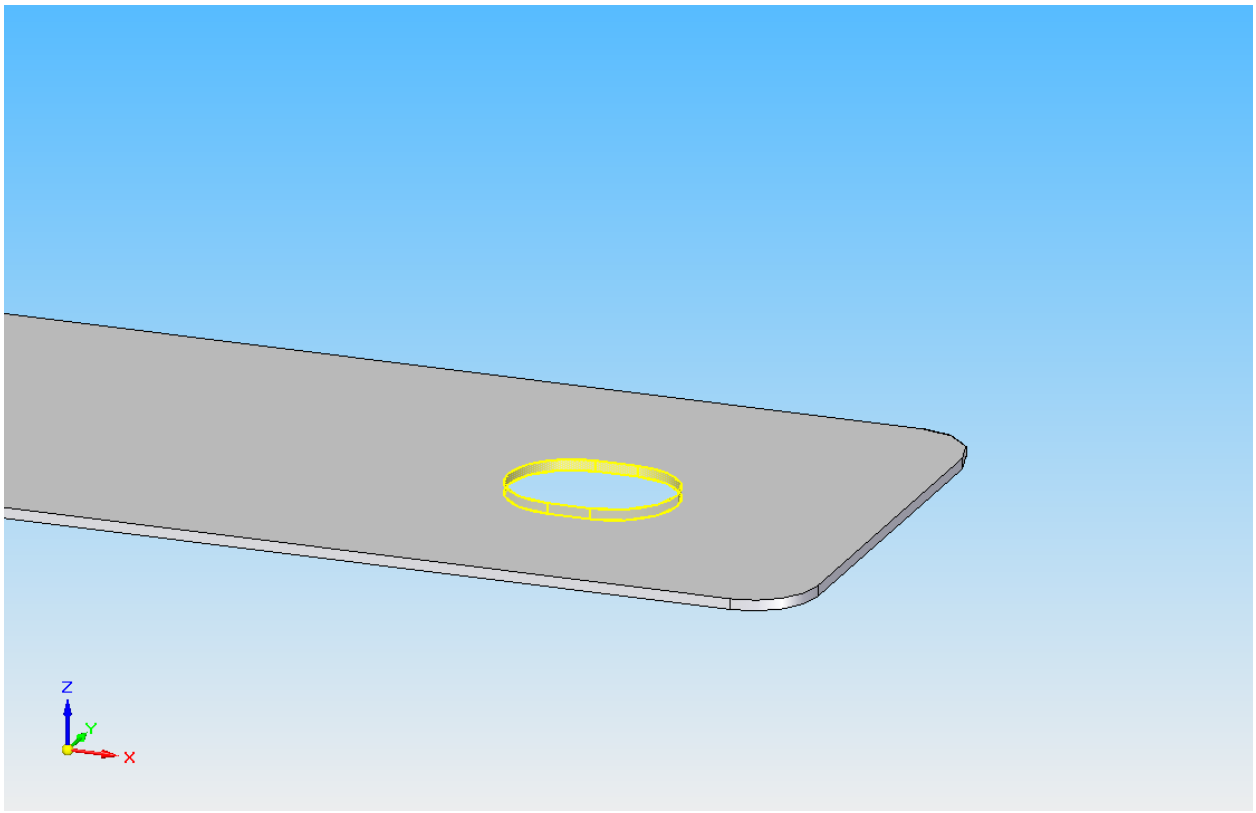
5.75. Image. Down-Holder Profile of Protrusion 1 (Image made with Solid Edge)



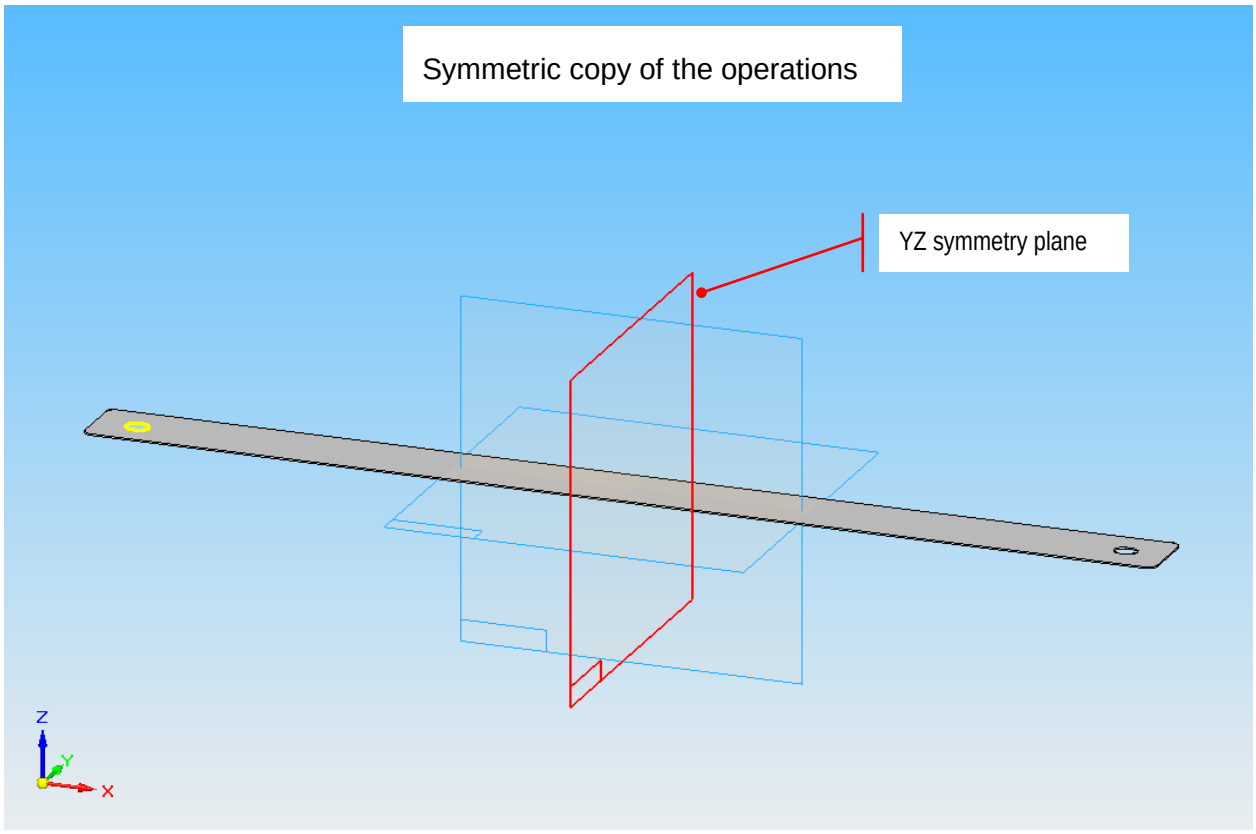
5.76. Image. Down-Holder: Response of Protrusion 1 (Image made with Solid Edge)



5.77. Image. Down-Holder Side: Profile of Removing 1 (Image made with Solid Edge)

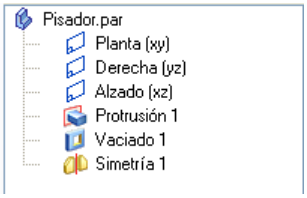


5.78. Image. Down-Holder Side: Response of Removing 1 (Image made with Solid Edge)



5.79. Image. Paper-Holder Side: Symmetry (Image made with Solid Edge)

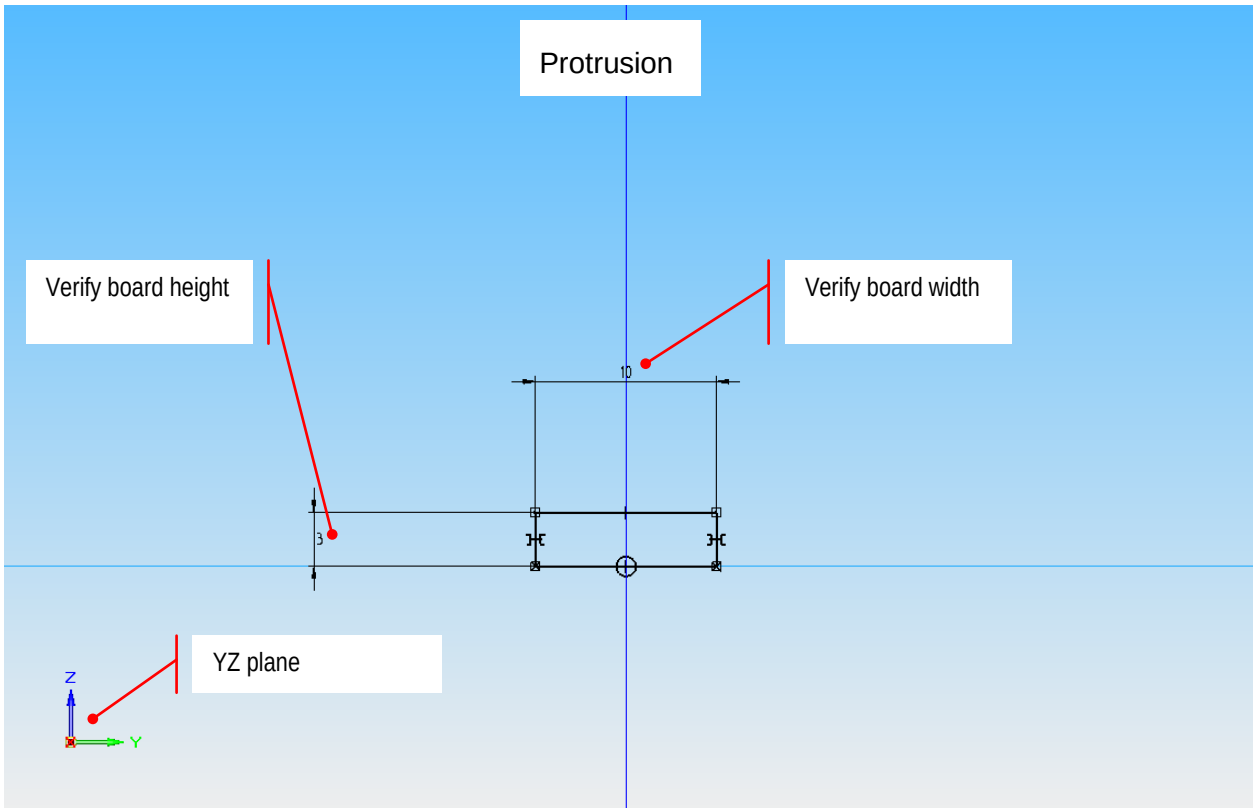
This is the PathFinder of the Paper-Holder:



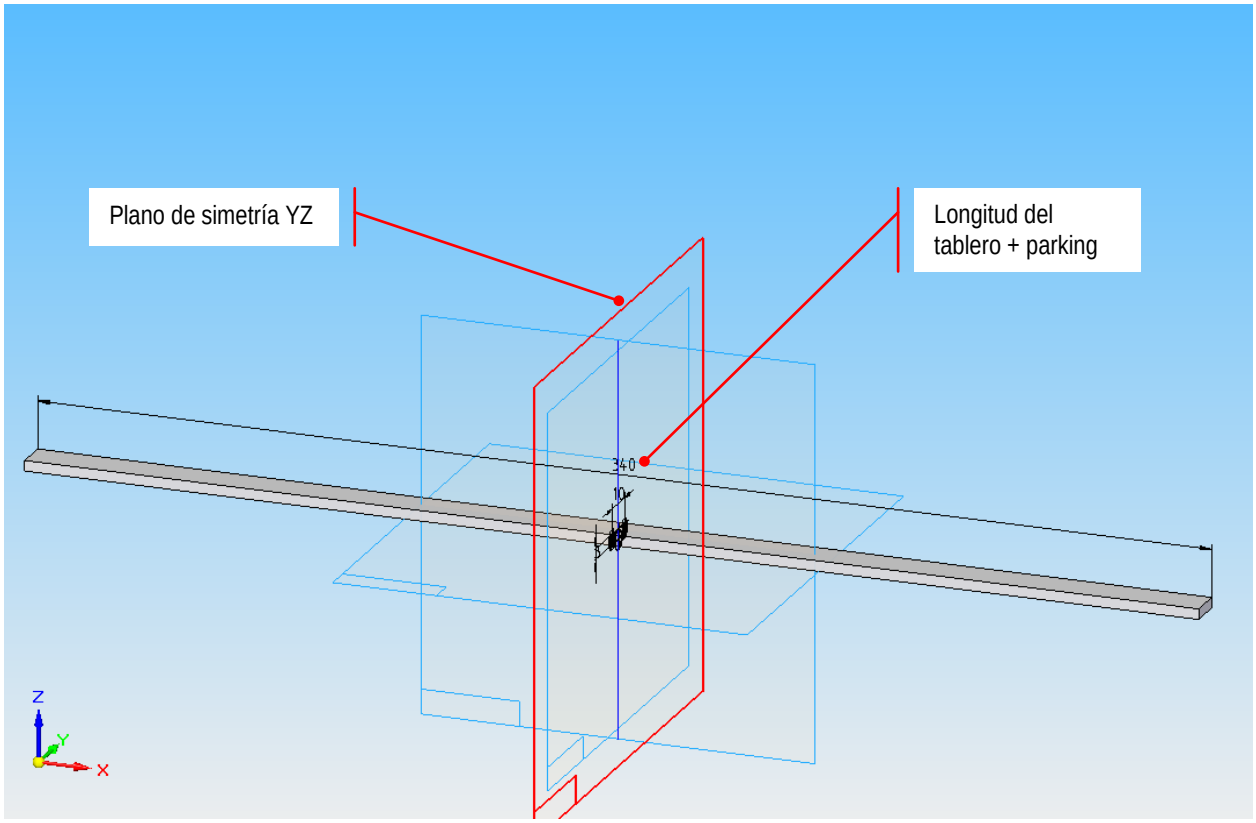
5.80. Image. Paper-Holder Side: PathFinder of Operations (Image made with Solid Edge)

Cutting Base

For this part a Protrusion operation is enough.

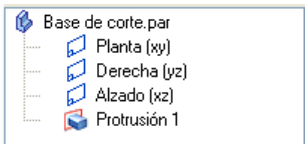


5.81. Image. Cutting Base: Profile of Protrusion 1 (Image made with Solid Edge)



5.82. Image. Cutting Base: Response of Protrusion 1 (Image made with Solid Edge)

This is the PathFinder of the Cutting Base:



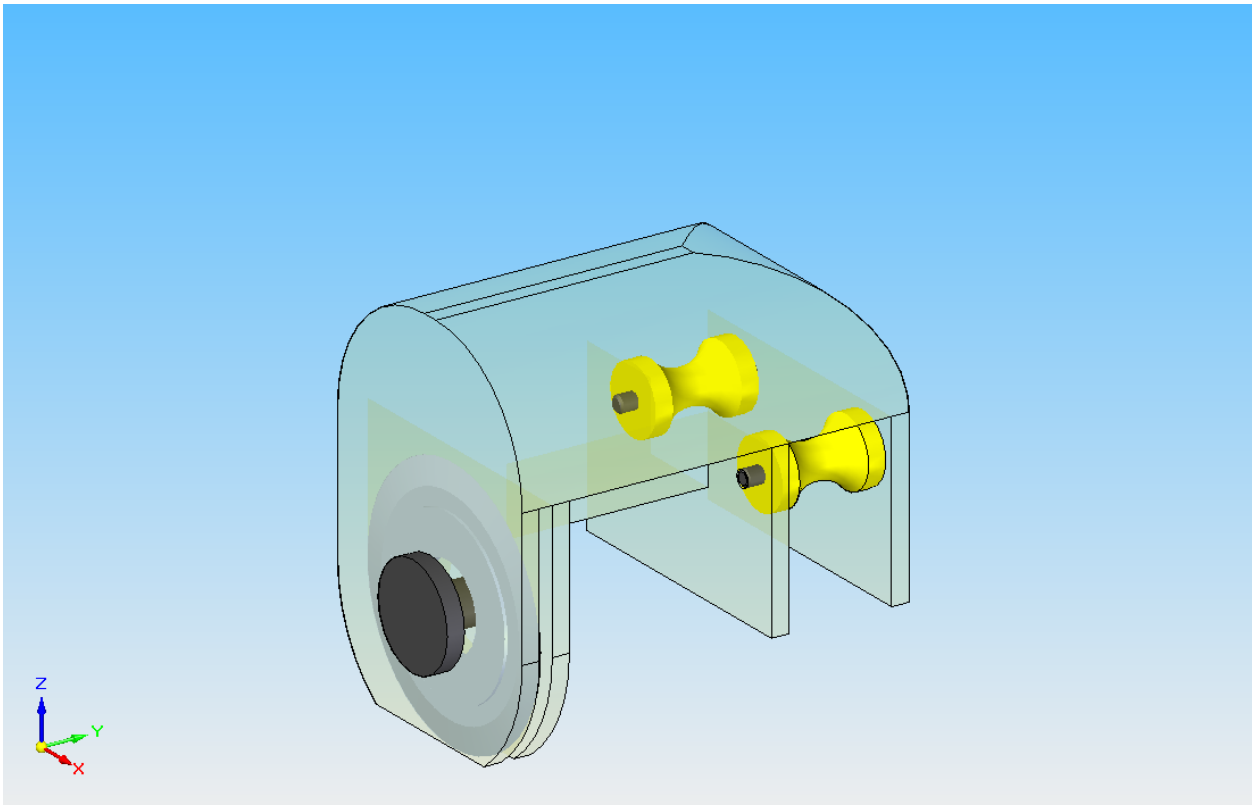
5.83. Image. Cutting Base: PathFinder of Operations (Image made with Solid Edge)

Screw, pin and elastic ring

Those are standardized elements and they must be selected with the proper dimension, which must be verified with the correspondent mouths.

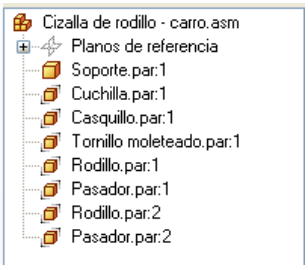
5.4.1. Validation

The assembly of the parts generates a digital prototype that permits validation.



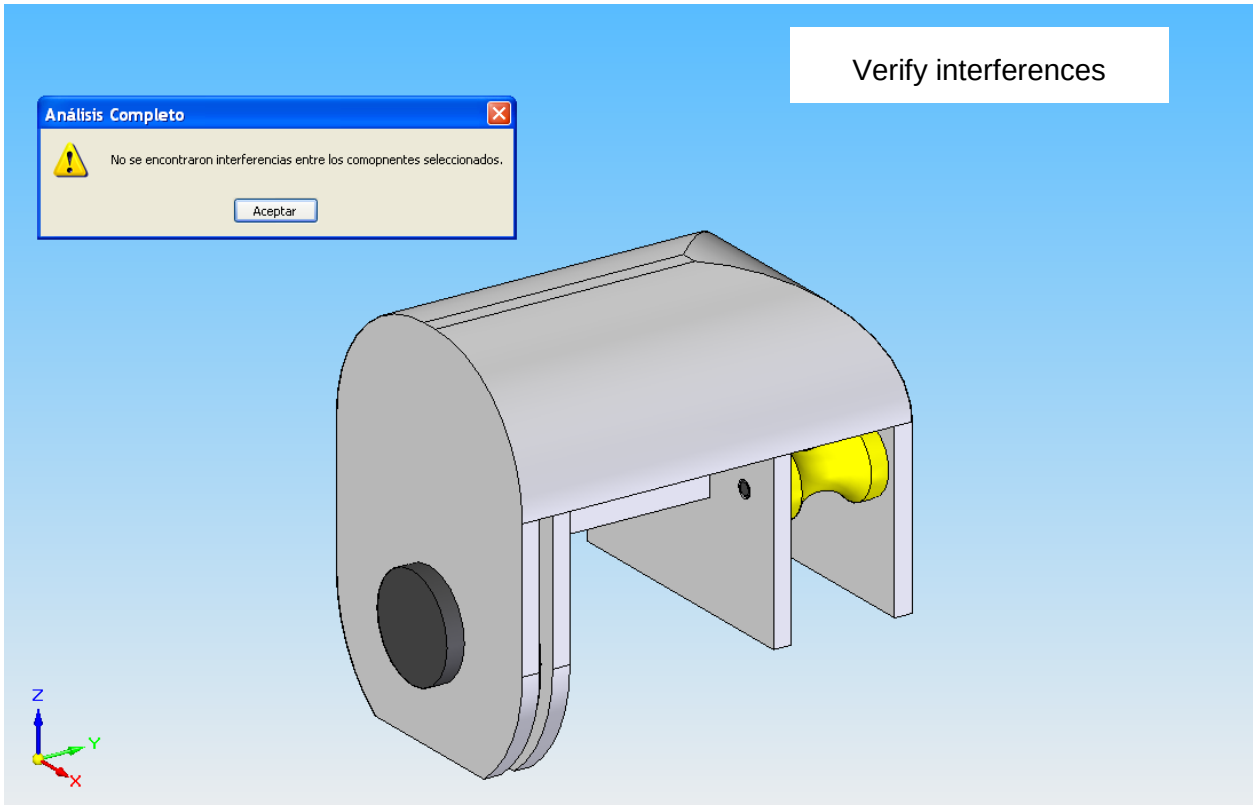
5.84. Image. Carriage sub-assembly (Image made with Solid Edge)

This is the PathFinder of the carriage assembly.

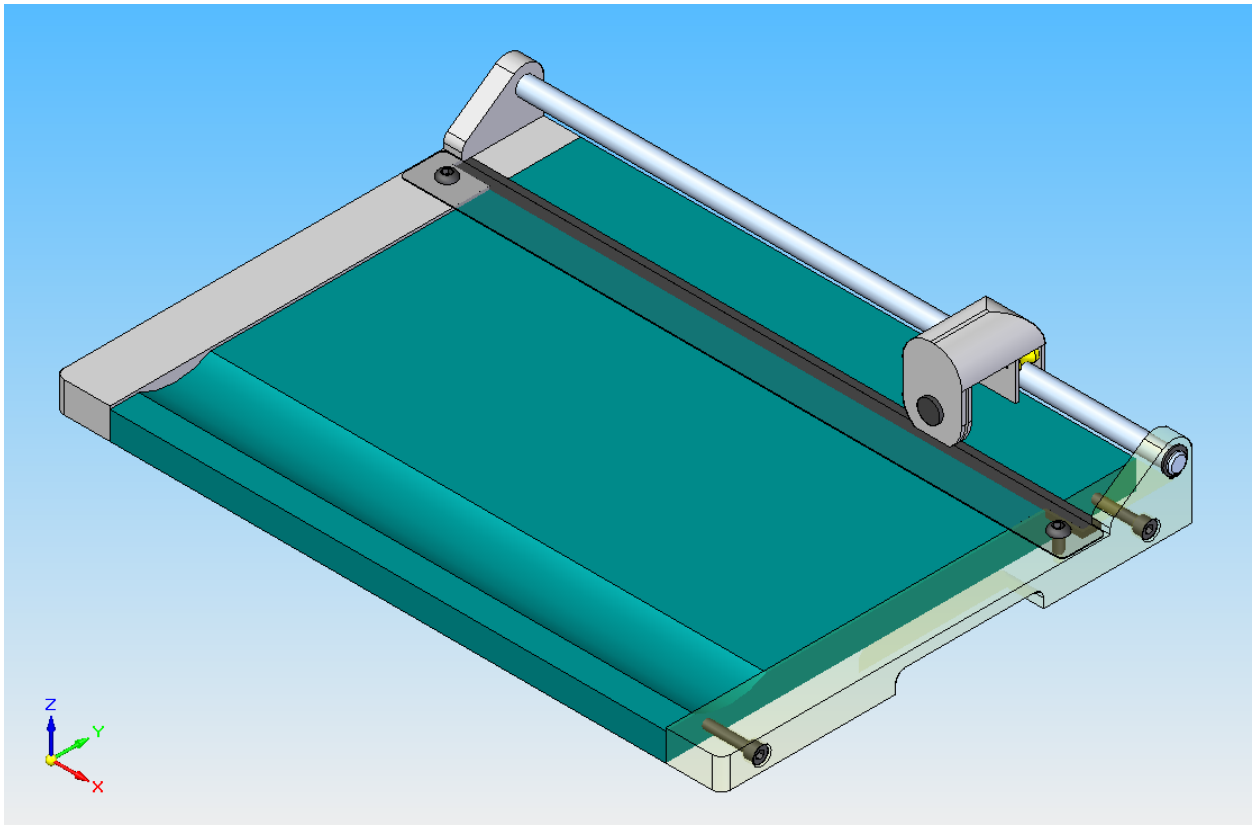


5.85. Image. PathFinder of-assembly (Image made with Solid Edge)

One of the things that must be verified is that there is no interference between parts. To do this, we choose two assemblies ¡ of the parts and verify the interferences between them in both assemblies.

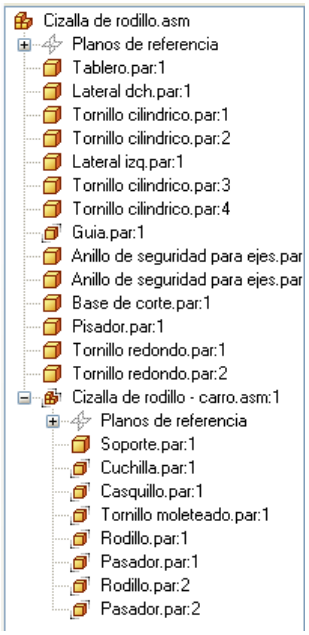


5.86. Image. Carriage: Analysis of interferences between holder and the rest of the parts (Image made with Solid Edge)



5.87. Image. Shear Assembly (Image made with Solid Edge)

This is the PathFinder of the operations of the Shear Assembly:



5.88. Image. Shear: PathFinder of Assembly (Image made with Solid Edge)

It can happen that a part must be modified as a consequence of the verifications. Those modifications are directly made if the part model is constructed using the proper restrictions.

5.4.2. Plane document

The plane document will be completely made by the design team. When the design of the product is completely validated, they will generate definitive planes. This is a binding document, and this is why it must be generated carefully.

The aim of any design team is to communicate the concepts to the manufacturer of the product. That makes essential that the planes are complete and with no mistakes.

The assembly plane is the reference plane for the product. It must show all the parts, or at least all the sub/systems, and all the references of the sub-assemblies and parts. In this way, the plane of any part can be easily found using the reference of the assembly plane.

Sub-assembly planes correspond to assemblies of pieces that form sub-systems of that can be separately assembled. The typical way of presenting a sub-system is an exploded plane, usually in projection, but also in perspective or with diedric views. Those planes are used to note the reference of the parts, defining the quantity and some dimensions.

Those are the characteristics of the assembly and sub-assembly planes>

- They show the whole product.
- They show the relative position of the components.
- In some cases, they give instructions for assembling.
- They give general dimension of the product.

- They have a list of pieces or sub-assemblies, referring to sub-system planes, part planes or deliverer's catalogues.
- They building or assembling specifications.

Part planes are the planes of each part of the product, showing the specifications for the manufacturing, geometric characteristics, tolerances, material, external finishing, etc.

Those are the characteristics of the part planes:

- It shows the whole part.
- It shows the dimensions, tolerances, material, external finishing,, etc of the part.
- It specifies the material and, in some cases, also the manufacturing process. (this is a basic course, therefore, material and manufacturing processes topics are not treated).
- Some can have references to other parts planes.

The planes are presented bind in din A4 format. Planes with bigger formats are fold following the standards. Planes document is headed by an index.