



3DxSUITE Editor

Tutorial -Geometry Simplification-

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Shortened Names for 3DxSUITE Products

In this document, the 3DxSUITE product names are referred to as follows:

- 3DxSUITE Components → Components
- 3DxSUITE Viewer → Viewer
- 3DxSUITE Editor → Editor
- 3DxSUITE SmartLauncher (Standalone) → SmartLauncher (Standalone)
- 3DxSUITE SmartLauncher (Plug-in) → SmartLauncher (Plug-in)
- 3DxSUITE SmartController → SmartController
- 3DxSUITE SmartController Pro → SmartController Pro
- 3DxSUITE TransServer → TransServer
- 3DxSUITE WorkerNode → WorkerNode
- 3DxSUITE ScenarioEditor → ScenarioEditor
- 3DxSUITE Data Package Studio → Data Package Studio
- 3DxSUITE Validation Configurator → Validation Configurator
- 3DxSUITE PDQ Checker Configurator → PDQ Checker Configurator
- 3DxSUITE Setting Utility → Setting Utility

1. Preface

1.1. About this Tutorial

This tutorial is composed of two parts: "[3, Recognize and Remove Feature](#)" and "[4, Additional Simplification Functions](#)". You can learn how to operate Editor (Simplification mode) step by step.



Simplification mode is a function that performs geometry simplification by removing characteristic shapes such as fillets, holes, bosses, ribs, and chamfers.

Furthermore, the features described in this tutorial are just a part of Editor (Simplification Mode). Please refer to the online help for other features.

About Help

For Editor help, select [Help] > [Help Index] from Editor menu. The help provides details about the content, how to operate, options, and things to keep in mind.

Another way to open the corresponding page of help, select [Help] > [Context Help], and a question mark appears next to the cursor so either click the menu or the icon.



Go through Editor "Tutorial -Standard function-" to learn the basic functions of Editor before starting this tutorial.



"Geometry Simplifier" license is required to use Editor (Simplification Mode) in addition to the Editor license.

1.2. About the Notations of Menus and Icons

Each menu item button or dialog is represented by [Menu Name] and icon image. Right angle bracket (>) is used in sub menu.

For example:

The function of fit is described as [View] > [Fit] ().

In this tutorial, the folder containing sample data is referred to as <tutorial>.



If the toolbar of Simplification is not displayed in the Editor, select [View] > [Toolbar] > [Simplification].

1.3. About Sample Data

The sample data to be used is located in the folder "\\document\tutorial_models\simplification" inside the folder where Editor is installed.

1.4. About Images

The images in this document may include slight differences from the ones actually displayed on your Editor depending on your specific computer hardware and Editor version.

2. Operation Flow

This tutorial will review the standard flow through the use of the simplification tools. As seen in the table below, this process follows the standard Editor sequence of operations with new capabilities defined in steps 4, 5 and 6.

	Operation	Mode
1	File Import	Translation or PDQ
2	Model Check	
3	Stitch (if free edges exist)	
4	Recognize and Remove Feature	Simplification
5	Additional Simplification Functions	
6	Auto Heal	Translation or PDQ
7	Manual Heal	
8	Export File	

The following will explain how to use Simplification mode (Steps 4~5 in the above flow) using sample files. Please refer to the help if you see any unknown terms during the tutorial.

3. Recognize and Remove Feature

3.1. Summary

Editor can recognize several common types of features including Fillets, Chamfers, holes, Bosses and Ribs after the recognition of Boundary Geometry. Once these features have been recognized to your specifications, they can be easily removed. Most operations are automatic; therefore Simplification can be done very easily.

3.2. Recognize and Remove Fillets

1. Select [File] > [Open] and open " **feature.drfx** " in <tutorial> folder.

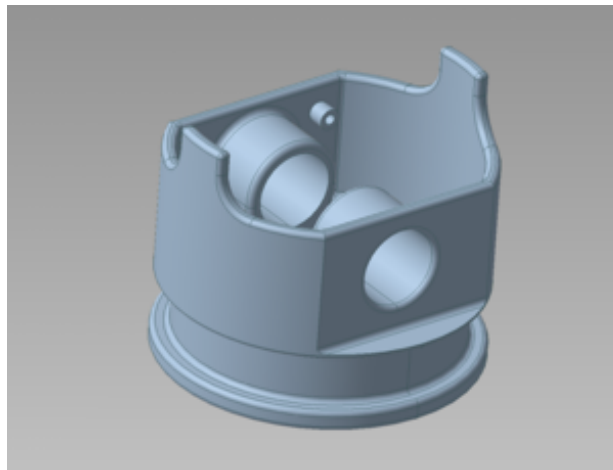




Figure 1. Sample Model for Removing Fillets

2. Select "Fillet" from the feature list to display [Check All Fillets] () in [Main] panel. Press this icon to automatically recognize fillets. (Double-click "Fillet" from the feature list will automatically recognize it as well.)
Select [Check All Fillets] () (*1) and the fillets less than 5mm will be found and highlighted. Here, a fillet radius of 5 mm or less is recognized.



[Check All Fillets] (*1)

Fillet recognition is based on the threshold value displayed in the list. (This threshold can be changed by right-clicking "Fillet" and selecting "Modify Threshold" from the context menu.)

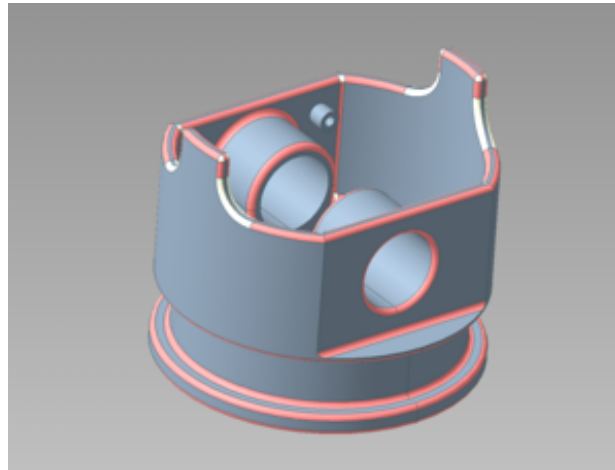


Figure 2. Recognized Fillets



- The threshold value to recognize fillets can be specified in the item list of [Main (Work)] panel.
- To recognize the large fillets of the model, change the maximum limit of the threshold value, and perform automatic recognition again.

3. Press [Remove All (Fillets)] () to remove recognized fillets.

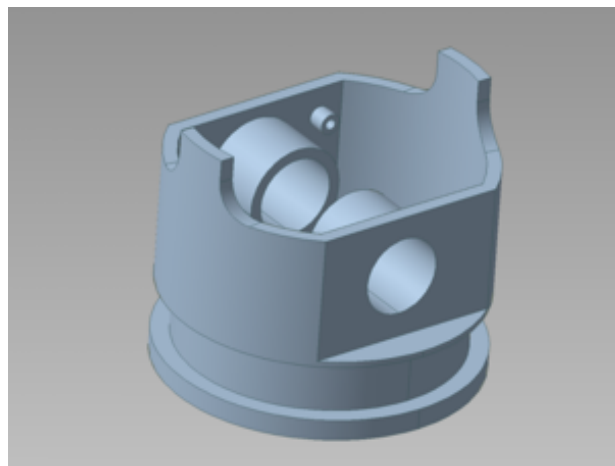



Figure 3. After Removal of Fillets

Also, the operating method of "Recognize and Remove Chamfers" is similar to the above section, "Recognize and Remove Fillets". The threshold value that can be set is the fillet radius when recognizing the fillet, whereas the width of chamfer face when recognizing the chamfer.

3.3. Recognize and Remove Holes

1. Select "Round Hole" from the feature list to display [Check All Round Holes] () in [Main] panel. Press this icon to automatically recognize holes. (Double-click "Round Hole" from the feature list to automatically recognize as well.) The number of recognized feature "Round Hole" is displayed, and the recognized areas are highlighted.

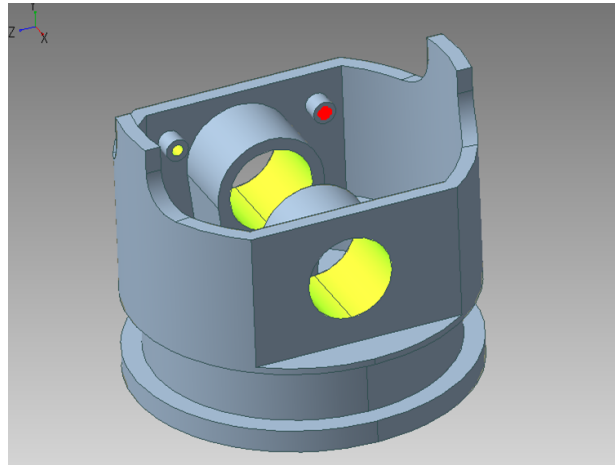


Figure 4. Recognized Holes



Round holes are recognized based on the threshold values displayed in the list. In this case, holes with a diameter of 25 mm or less are recognized. (This threshold can be changed by right-clicking "Round hole" and selecting "Modify Threshold" from the context menu.)

2. Press [Remove All (Round Holes)] () on Navigation panel to remove recognized holes.

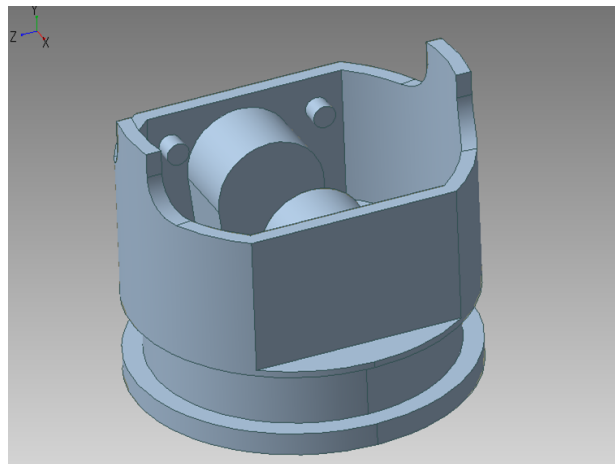




Figure 5. After Hole Removal

3. When rotating the model, semi-circular holes can be seen as below. Non-circular holes can also be recognized manually. Press [Check/Uncheck Round Hole] () from [Main] panel. For manual recognition, pick (*1) the face around the hole (In the figure, the face is highlighted in blue.) and press [Done]().

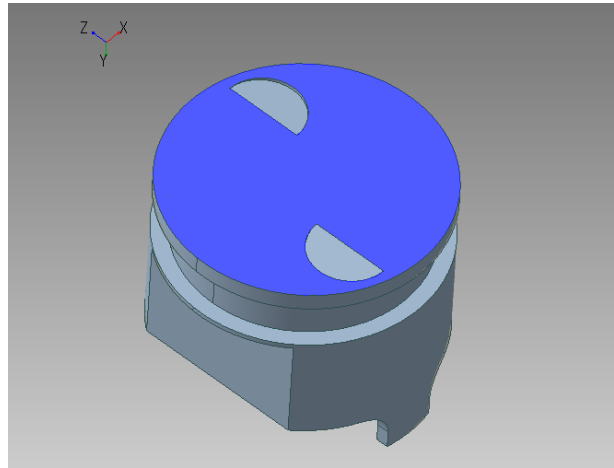


Figure 6. Manual Hole Recognition



(*1) To recognize a through hole, pick the faces on both sides of the hole.

4. A confirmation dialog will appear. To recognize the area as a round hole, click [Yes].

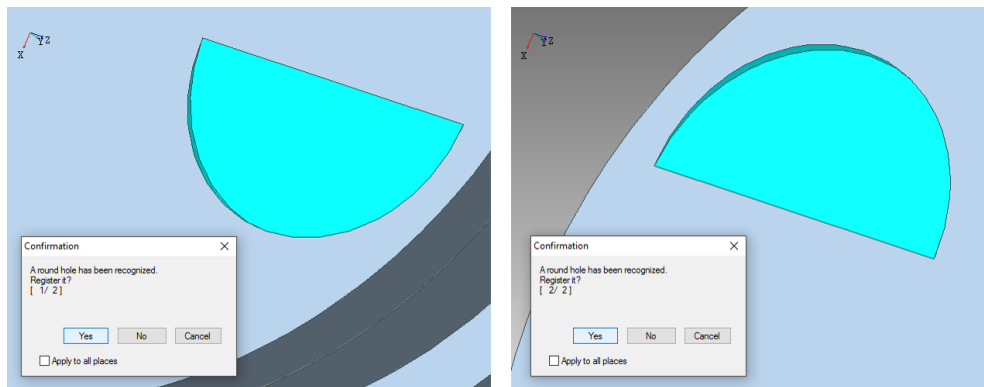


Figure 7. Manual Hole Recognition 1

The number of recognized feature "Round Hole" is displayed, and the recognized areas are highlighted.

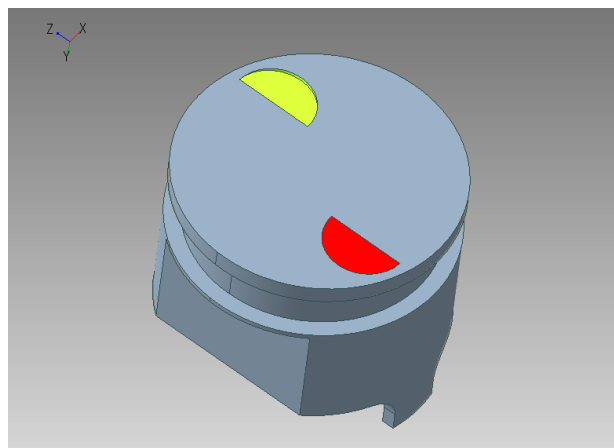


Figure 8. Manual Hole Recognition 2

5. Press [Remove All (Round Holes)] () on Navigation panel to remove all recognized round holes.

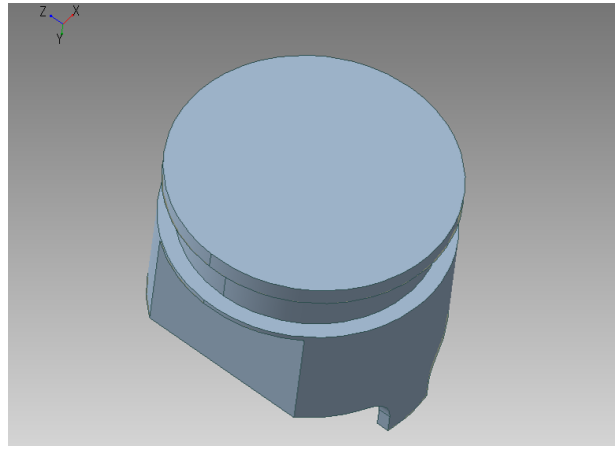



Figure 9. Remove Hole

3.4. Recognize and Remove Boss/Ribs

1. Select "Boss/Rib" from the feature list to display [Check All Bosses/Ribs] () in [Main] panel. Press this icon to automatically recognize Boss / Rib (*1). (Double-click "Boss/Rib" from the feature list to automatically recognize as well.) The number of recognized feature "Boss/Rib" is displayed, and the recognized areas are highlighted.



[Check All Bosses/Ribs] (*1)

Boss/Rib recognition is performed based on the threshold value displayed in the list. Please refer to the help for more details about setting the threshold.

In this tutorial, recognition will be performed according to threshold in the following dialog.

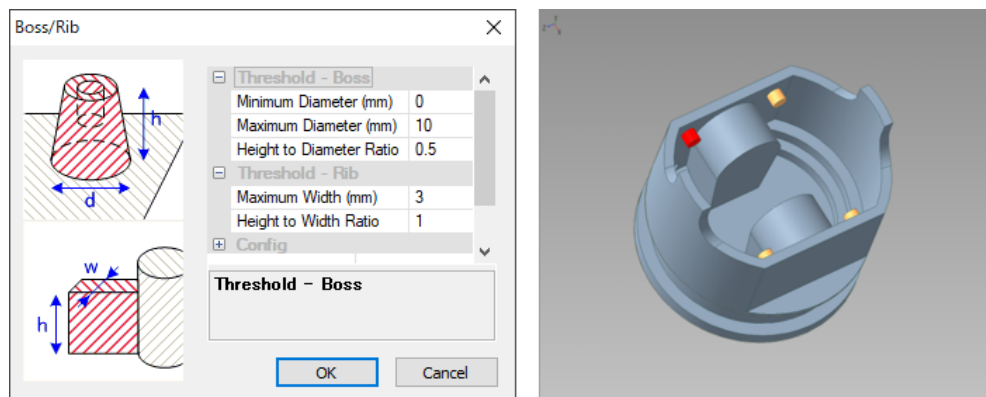



Figure 10. Boss/Rib Threshold Setting dialog, Boss/Rib Recognition

2. Press [Remove All (Bosses/Ribs)] () on Navigation panel to remove all recognized bosses/ribs.

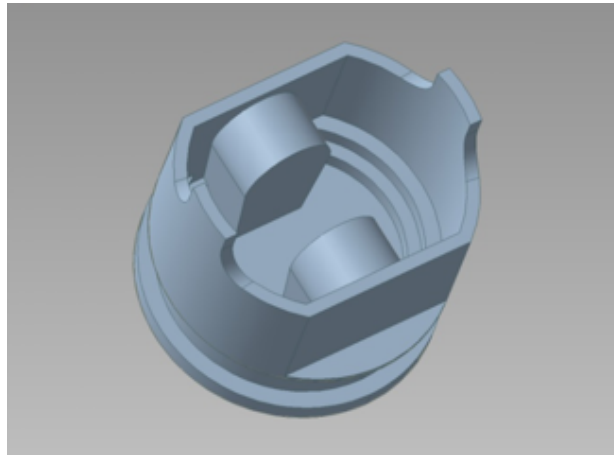





Figure 11. After Removal of Bosses/Ribs

3.5. Recognize and Remove Projection

Shapes on the face such as bosses/ribs can also be recognized manually as projections. This section will explain how to recognize bosses/ribs as projections and remove them.

1. Select [Edit] > [Undo] () to go back to the model with boss/rib.
(Likewise, select [File] > [Open] and open " **feature2.drfx** " in < tutorial > folder.)
2. Select "Projection" from the feature list to display [Check/Uncheck Projection] () in [Main] panel. Press this icon. Editor will be in a waiting state for you to pick the face. Pick the face around the projection (In the figure, the face is highlighted in blue.) and press [Done] (). A confirmation dialog will appear. To recognize the area as a projection, click [Yes].

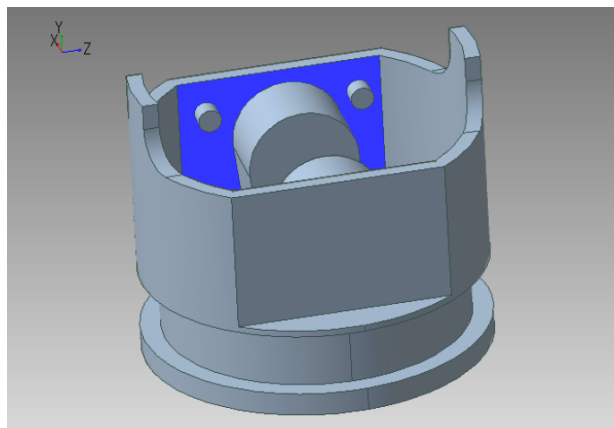


Figure 12. Recognized Projection 1

3. The number of recognized feature "Projection" is displayed, and the recognized areas are highlighted. Similarly, recognize the projection on the opposite side.

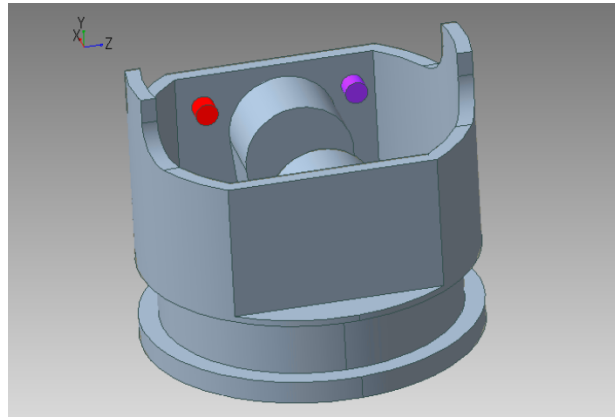


Figure 13. Recognized Projection 2

4. Press [Remove All (Projections)] (✖) on Navigation panel to remove all recognized projections.

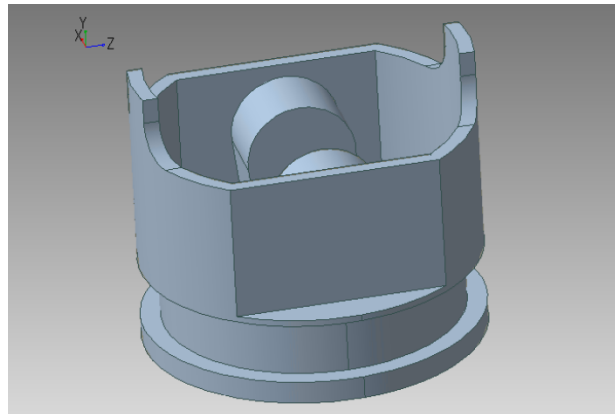


Figure 14. After Removal of Projection

Simplification can be used with a very simple operation.

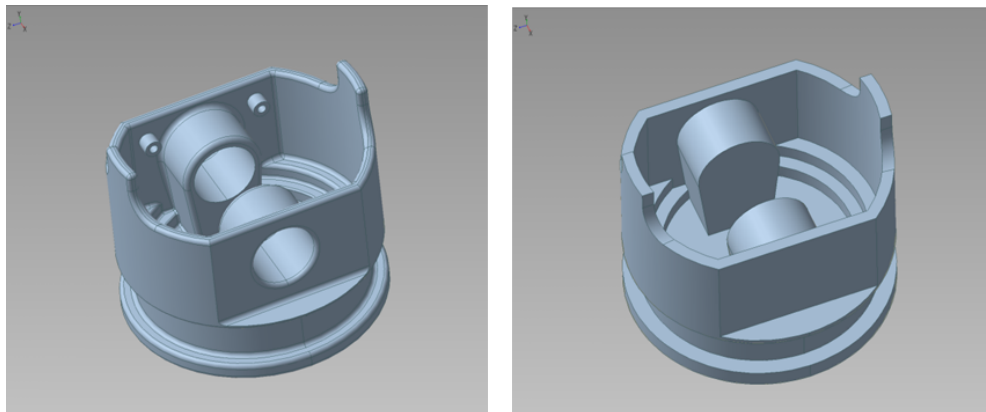


Figure 15. The Original Model, The Simplified Model

This is the end of removing the recognized feature in Simplification.

3.6. Recognize and Extract Holes

1. Select [File] > [Open] (📁) and open "hole.drxf" in <tutorial> folder.

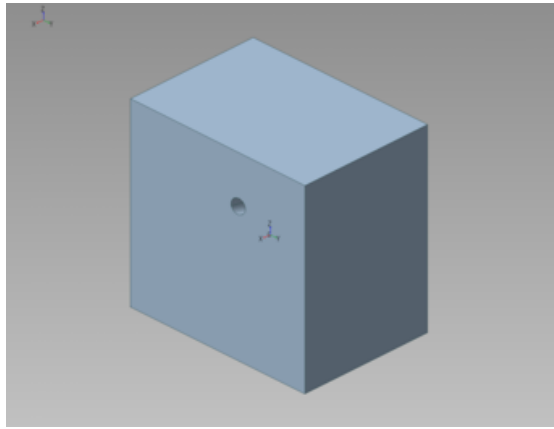
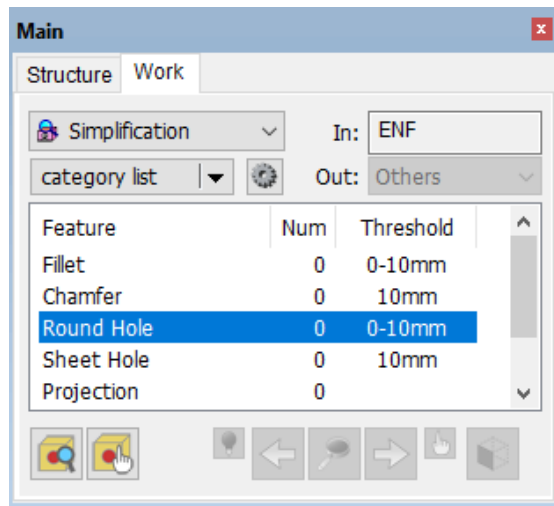



Figure 16. After import

2. Select "Round Hole" from the feature list in [Main] panel, and press [Check/Uncheck Round Hole] ().



3. To recognize a through hole, pick the faces on both sides of the hole, and press [Done] ().

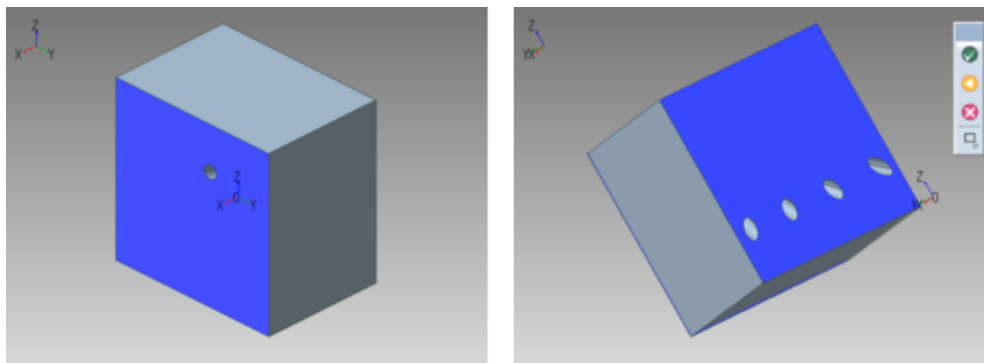
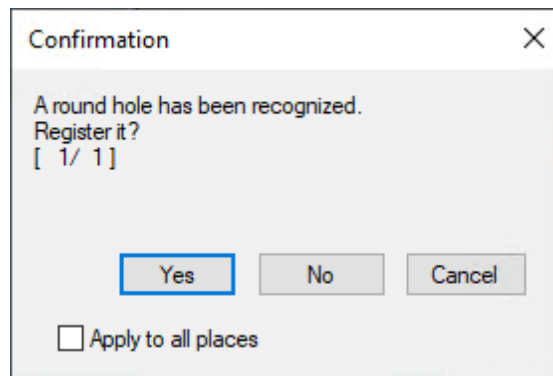


Figure 17. Hole Recognition

4. A confirmation dialog will appear. Click [Yes] to recognize the area as a round hole.



5. Press [Extract All Round Holes] () to extract only the recognized holes as another solid part.

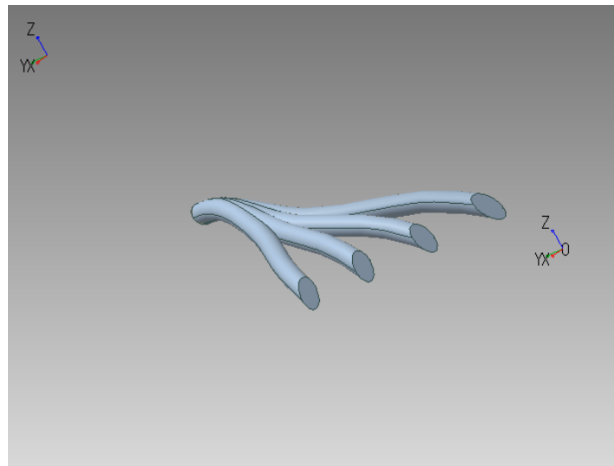


Figure 18. Extract Hole

3.7. Recognize and Remove Steps

1. Select [File] > [Open] and open " **remove_step.drfx** " in <tutorial> folder.

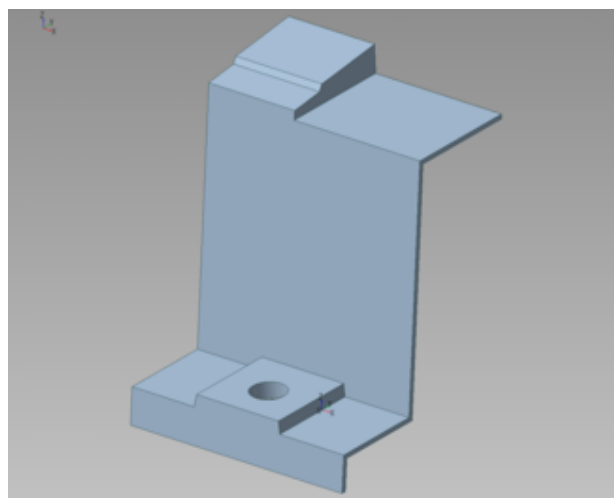



Figure 19. After import

2. Select "Step" from the feature to display [Check All Steps] () in [Main] panel. Press this icon to perform automatic step recognition. (Double-click "Step" from feature list to

automatically recognize as well.) The number of recognized feature "Step" is displayed, and the recognized areas are highlighted.

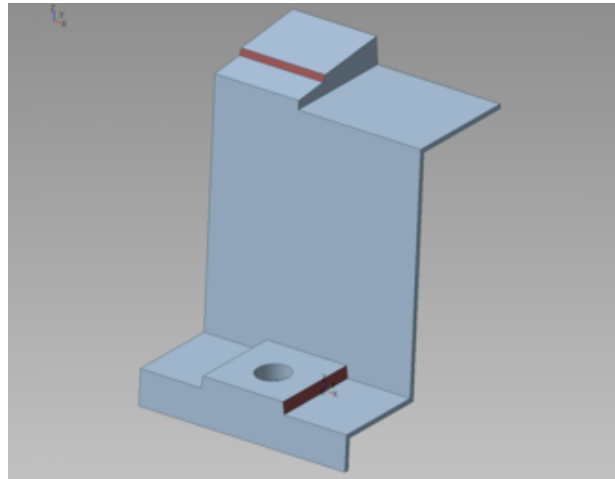
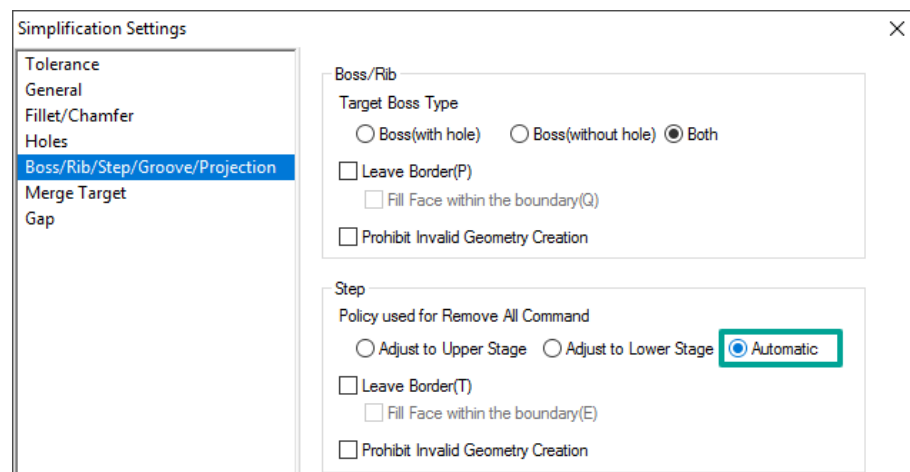


Figure 20. Check All Steps



Step recognition is performed based on the threshold value displayed in the list. Here, faces with the maximum width of 10 mm or less are recognized. (To change the threshold, right-click the feature name "Step" and select [Modify Threshold]. A dialog will appear.)

In this tutorial, set the following option for step ([Simplification] > [Options]). Please refer to the help for details about the settings.



3. Press [Remove All (Steps)]() on Navigation panel to remove all recognized steps.

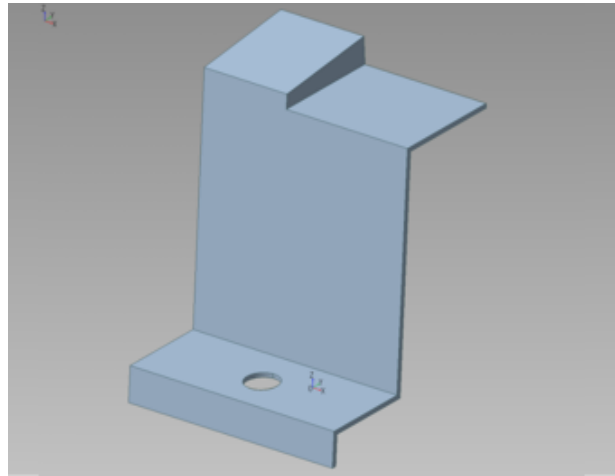


Figure 21. After Step removal

The step on top of the model is not recognized automatically because the face width is greater than the threshold. In this case, perform manual recognition on this step and remove it.

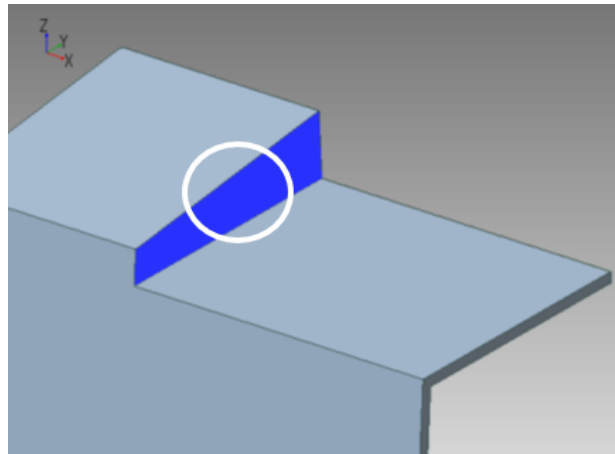




Figure 22. The step that Editor cannot recognize as step feature automatically

4. Press [Check/Uncheck Step] () in [Main] panel. Pick the face to be recognized as step, and press [Done] (). A confirmation dialog will appear. Click [Yes] to recognize the area as the step if you prefer.

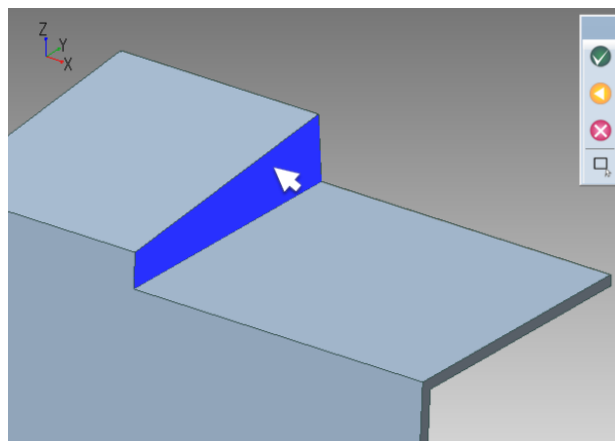



Figure 23. Selection of the step

5. Press [Remove Step] () on Navigation panel to remove the recognized step. After pressing the icon, pick the faces to match after the step is removed. In this case, pick face [1].

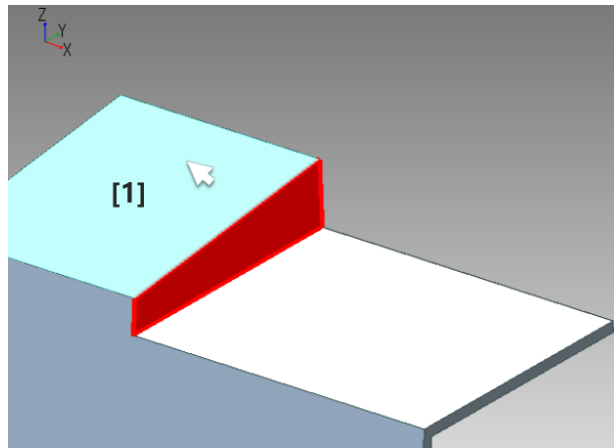


Figure 24. Selection of the face to match

The step is removed according to the selected face.

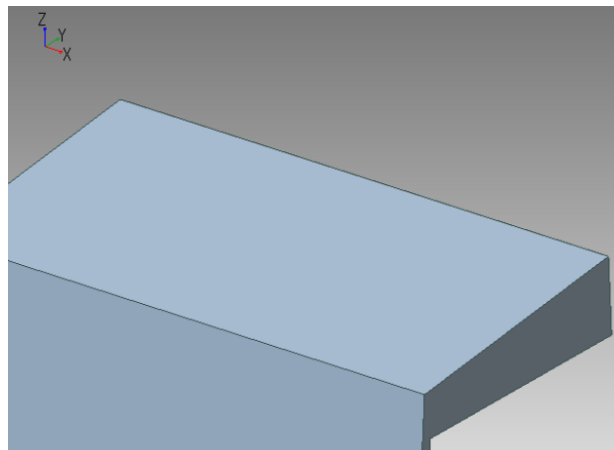



Figure 25. After Step removal

6. Remove the step on the back of the model. Press [Check/Uncheck Step] (). Pick the face pointed by the arrow in the below figure to recognize the step.

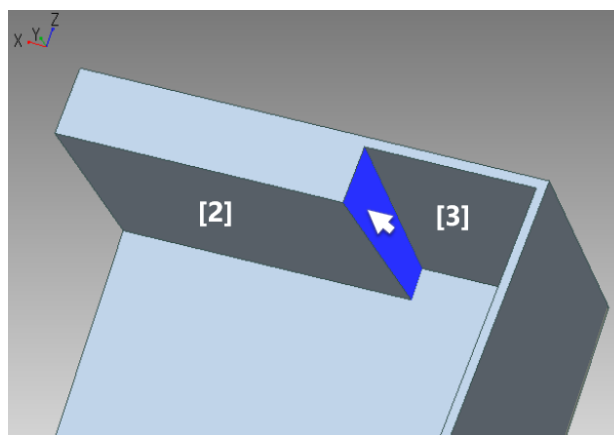


Figure 26. The selection of the step

7. Press [Remove Step] () in [Main] panel, and pick the face ([2] or [3]) to match after

removing the step.

The following are the results when steps are removed using faces [2] and [3] as the base.

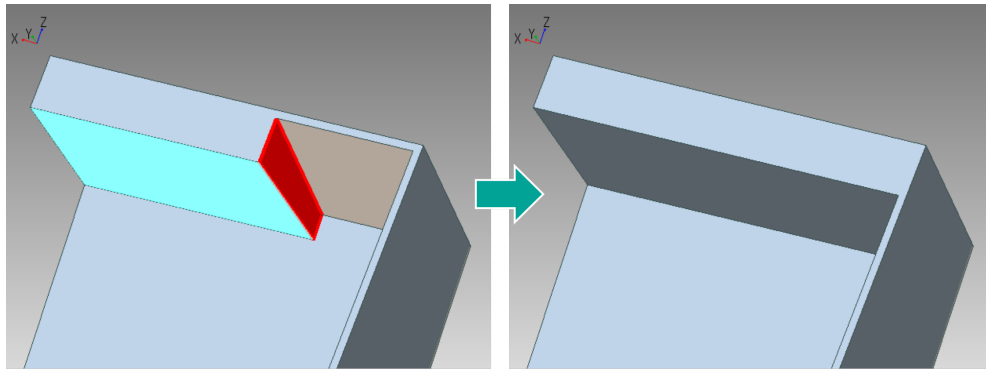


Figure 27. After Step removal (Selected face [2])

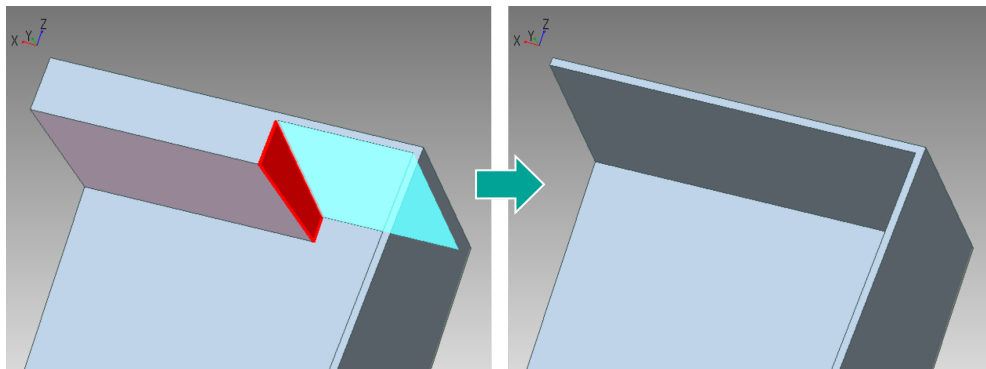


Figure 28. After Step removal (Selected face [3])

4. Additional Simplification Functions

4.1. Summary

According to the previous chapter, a large portion of the model can be simplified by removing features. In this chapter, additional tools are introduced to assist simplifying geometry which could not be simplified by already introduced methods.

4.2. Fill Crack (Create surface between curve sets)

1. Select [File] > [Open] and open " **others.drfx** " in <tutorial> folder. This model is similar to the one used in Chapter 3. Because the deleted part leaves behind an unused edge, create a face that connects the unused edges.

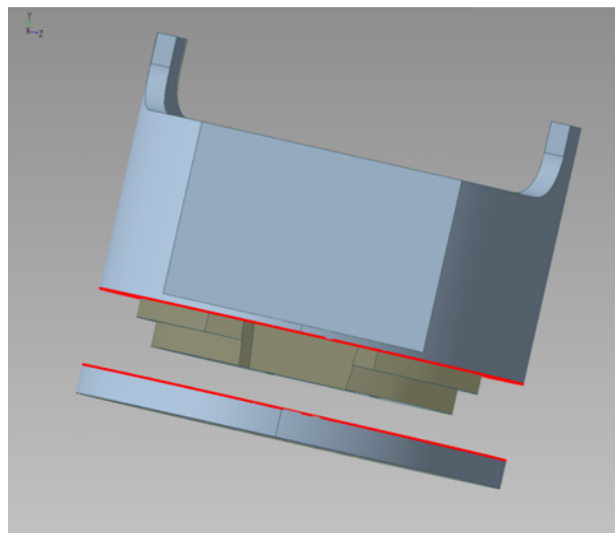


Figure 29. Sample Model for Fill Crack

2. From the menu, select [Simplification] > [Fill Crack] ().



The command [Fill Crack] creates a new connecting face between the two specified edges.

3. Pick the edges at both ends of the curve group to specify the first set of edges. In this model, the curve group consists of two edges, so pick the edges at both ends. Refer to the figure below to specify the first set of edges. A group of curve is highlighted and a confirmation dialog will appear. Click [Yes].

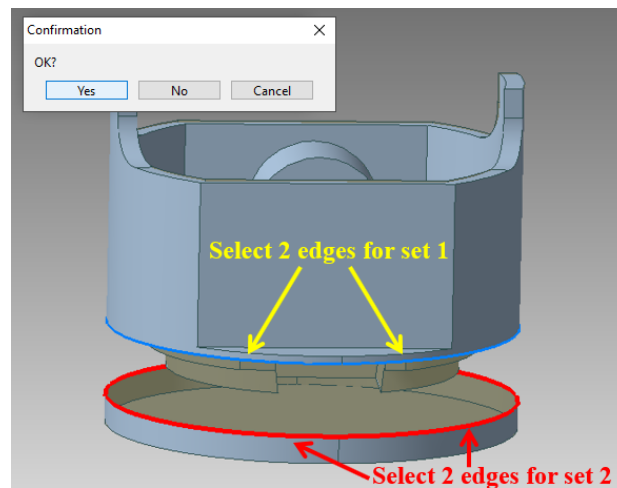


Figure 30. Select Edges

- Similarly, specify the second set of edges, and a confirmation dialog will appear. Click [Yes] to create a connecting face between the unused edges.



To flip the faces, select [Modify] > [Repair Solid] > [Flip Face] () and select the face that is incorrect.

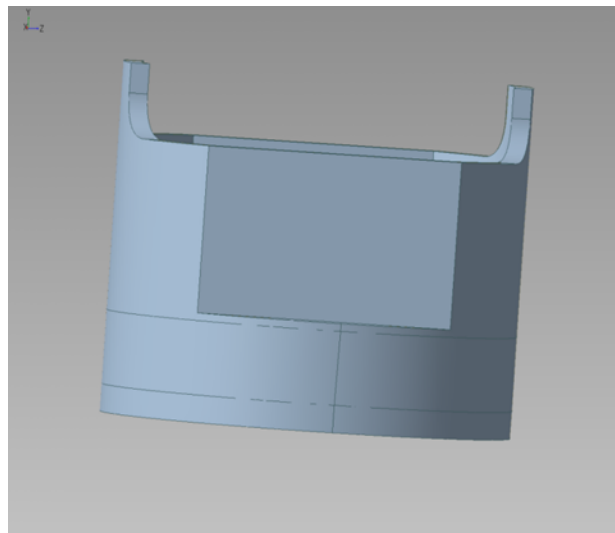




Figure 31. Face is Created

4.3. Remove Faces with Fix

This function will remove the selected faces and then repair the geometry using the adjacent faces as guidelines for the shape.

- In this example, select [Simplification] > [Remove Faces with Fix] (). Referring to the lower left figure, pick the two faces to delete. When pressing [Done] (), the faces are deleted as shown in the lower right figure.

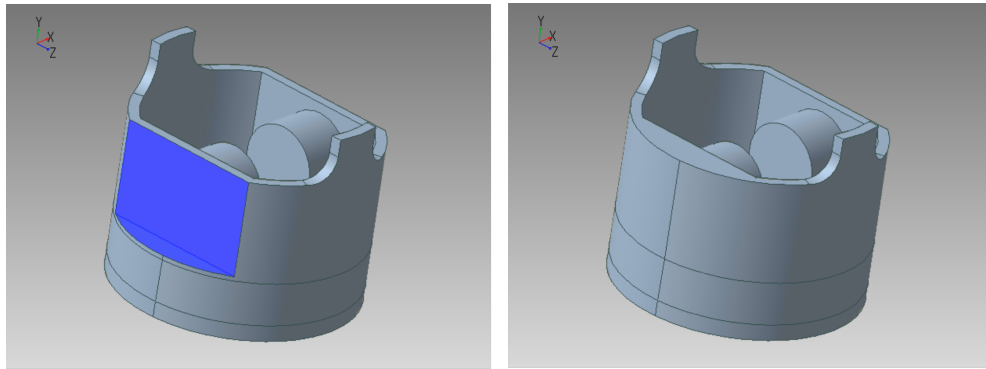


Figure 32. Remove Faces with Fix 1

Repeat this step for the other side if desired as below.

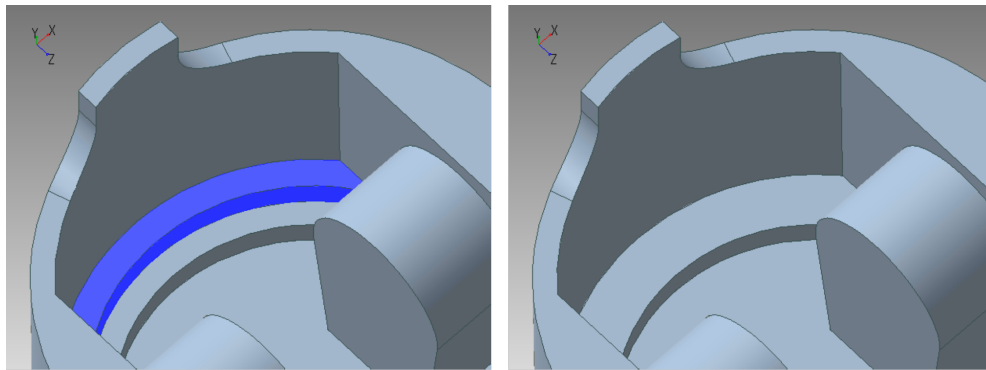


Figure 33. Remove Faces with Fix 2

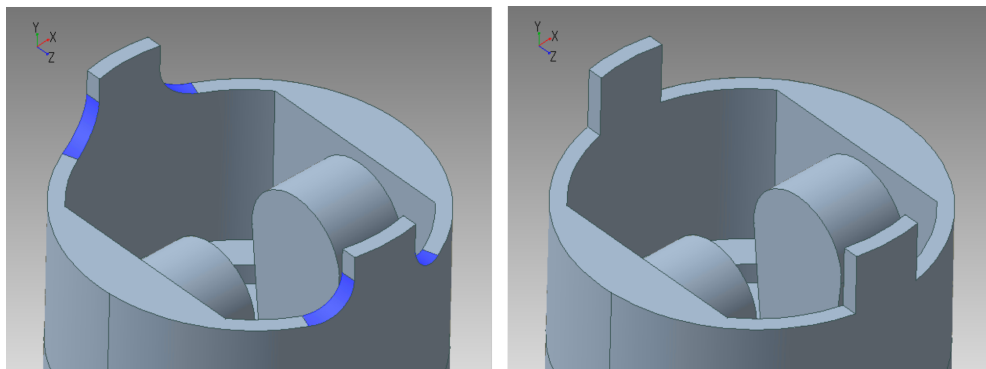




Figure 34. Remove Faces with Fix 3, Simplified Model

4.4. Merge Faces

1. Select "Mergeable Faces" from the feature list to display [Check All Mergeable Faces] () in [Main] panel. Press this icon to automatically recognize the faces to be merged. (Double-click "Mergeable Faces" from the feature list to automatically recognize as well.)
2. The number of recognized feature "Mergeable Faces" is displayed, and the recognized areas are highlighted.
3. Press [Merge All Mergeable Faces] () on Navigation panel to connect (merge) the recognized connectable faces.

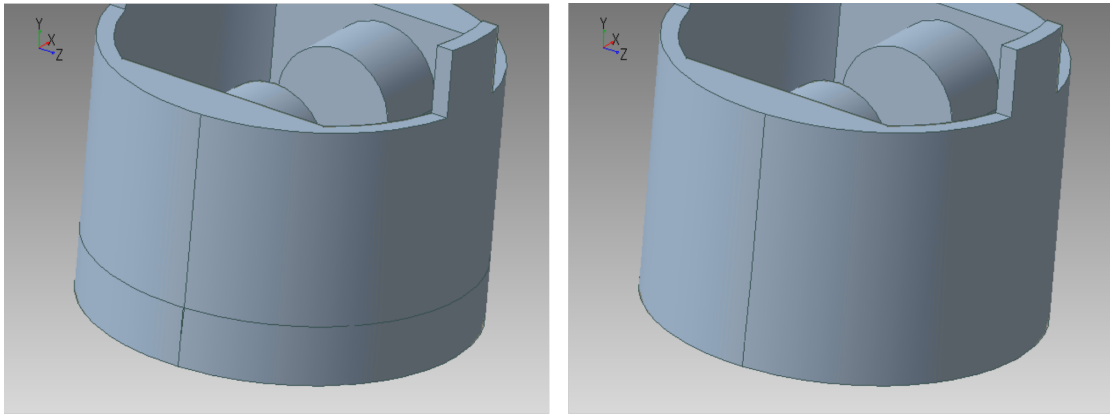


Figure 35. Merged Face

This completes the introduction of additional Simplification functions.

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