



**CATIA V5 Training**  
Foils

Student Notes:

**Generative Shape  
Design V5R19  
Update**

Version 5 Release 19  
Agust 2008

EDU\_CAT\_EN\_HD2\_UF\_V5R19

Student Notes:

# About this course

## Objectives of the course

Upon completion of this course you will be able to use the new and enhanced functionalities of V5R19 Generative Shape Design workbench.

## Targeted audience

CATIA Surface Designers

## Prerequisites




Generative Shape Design V5R18 Course



0.5 day

Student Notes:

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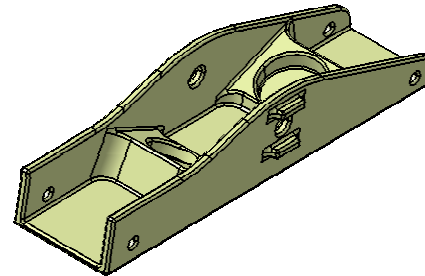
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## What's New in V5R19

The list of new and enhanced functionalities in CATIA Generative Shape Design V5R19 are given below:

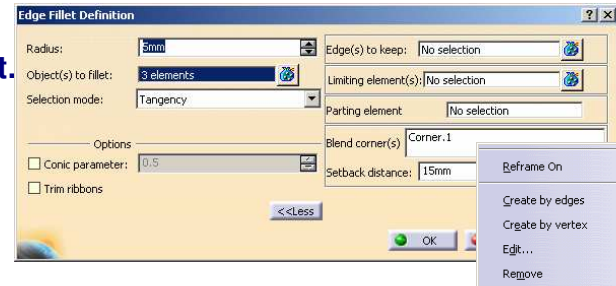
### Auto Fillet

- A new functionality called Auto Fillet has been introduced in V5R19. It allows filleting of almost all the sharp edges of a skin in one operation. It is a good way of drastically reducing the time spent on filleting.



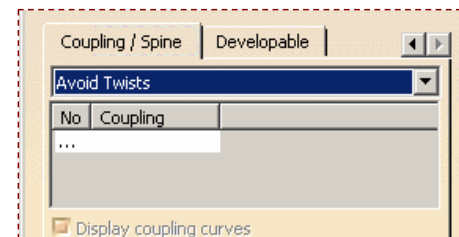
### Enhancement in the Edge Fillet

- A contextual menu has been added to create and manage the 'blend corner' capability of the edge fillet. Now it is easy to edit the edge fillet containing the blend corners.



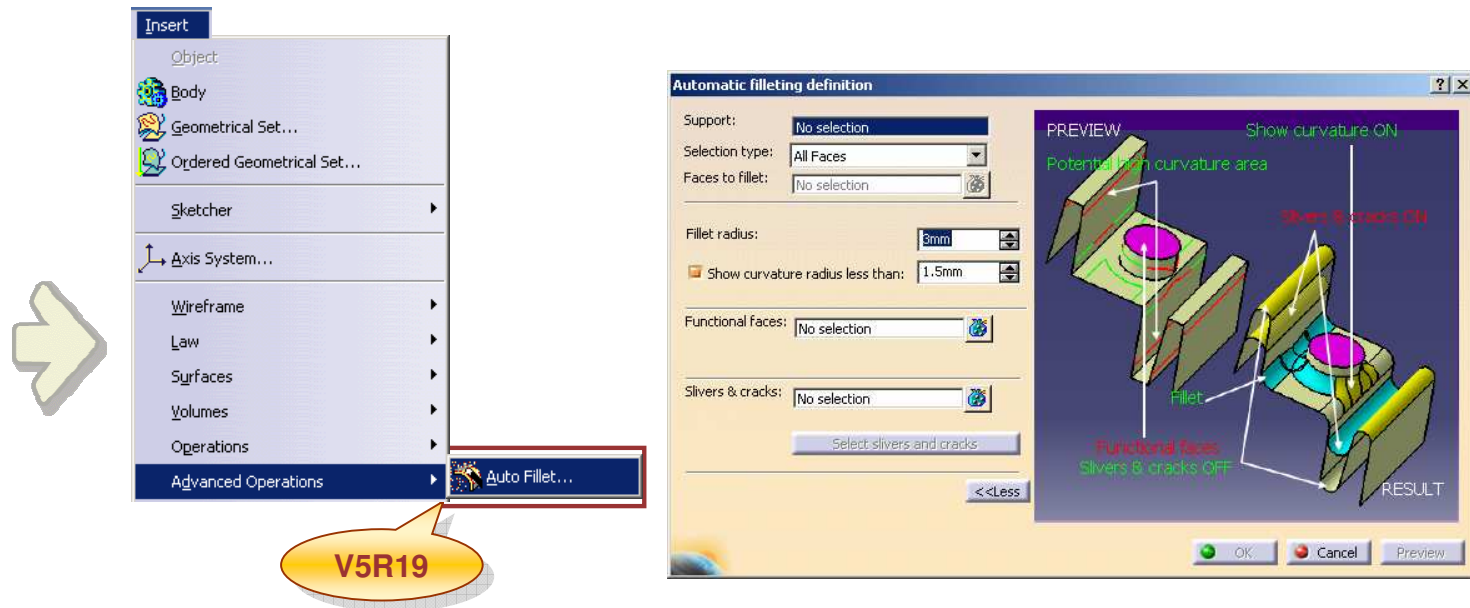
### Enhancements in the Blend

- A new coupling type called 'Avoid Twists' has been added in the Blend Definition dialog box. This enhancement computes the coupling points automatically and avoids the possibilities of twisted geometry.



# Auto Fillet

You will learn how to use the new Auto Fillet tool.

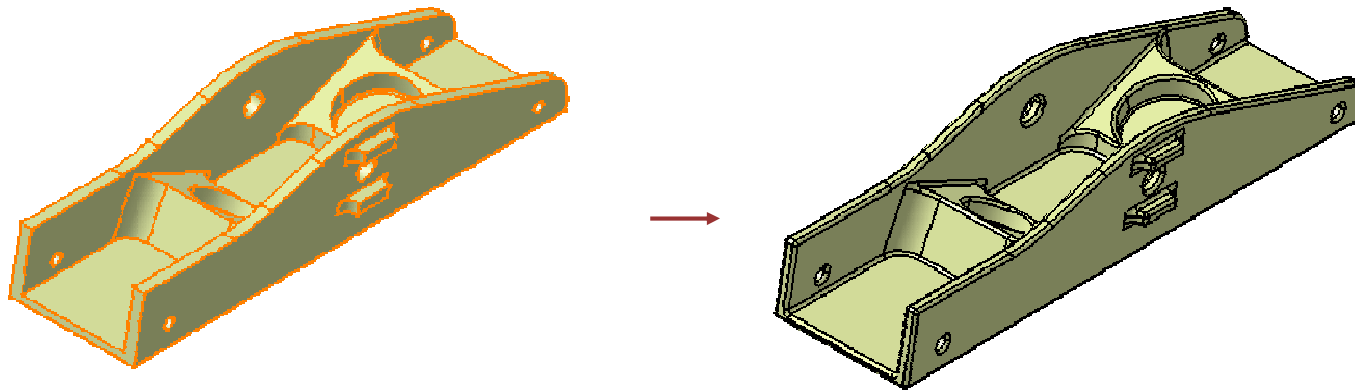


## What is an Auto Fillet?

An Auto Fillet is a new tool added in V5R19 Generative Shape Design workbench. Using this tool you can remove the sharp edges of a part in one shot hence reducing the time spent in applying fillets with the existing features.

For an Auto Fillet you need to select the faces to be filleted and optionally select the functional faces which you do not want to fillet.

In the illustration given below, you can observe that on selecting the joined surface at least 90% of the sharp edges get automatically filleted.



Whole part is selected

Final result

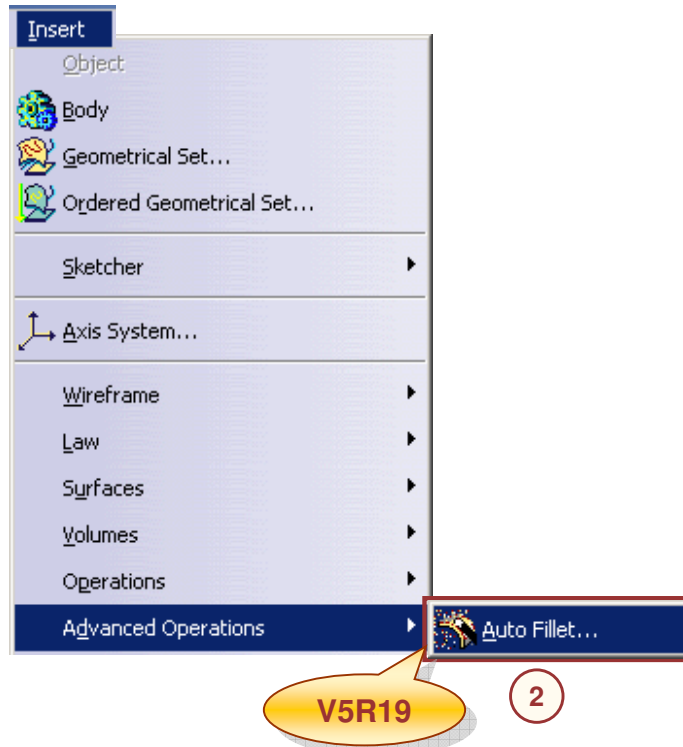
## Auto Fillet User Interface (1/3)

You can use any of the following methods to access the Auto Fillet command in the Generative Shape Design workbench:

1 You can access it from the 'Advanced Operation' toolbar.



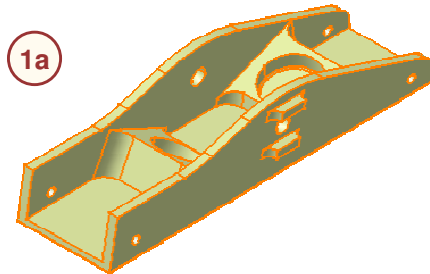
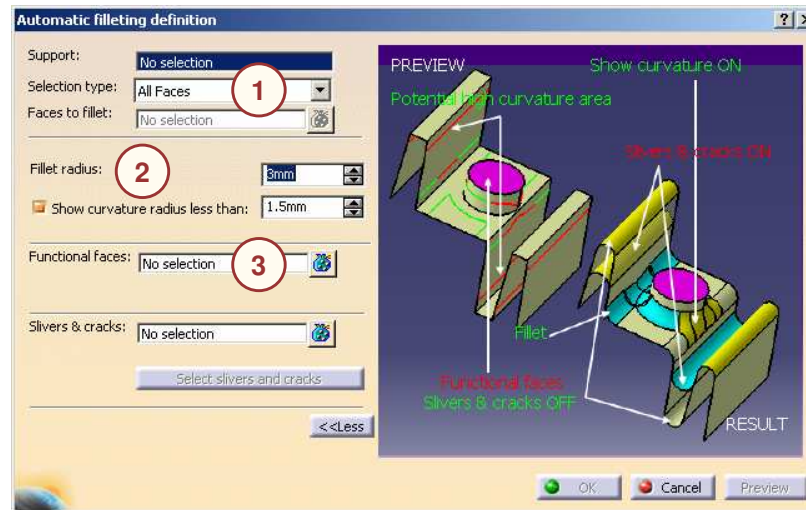
2 You can also access it from the Insert > Advanced Operations menu.



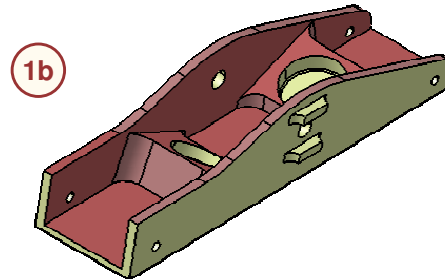
## Auto Fillet User Interface (2/3)

The user interface of the Auto Fillet dialog box is explained below.

1. **Selection type:** You can select the computation mode from the two available modes.
  - a. **All Faces:** It allows you to select the whole surface.
  - b. **Faces Selection:** It allows you to select the faces to fillet individually.
2. **Fillet radius:** It is the radius of the surface.
3. **Functional faces:** You can specify the faces which you do not want to fillet.



Whole part is selected



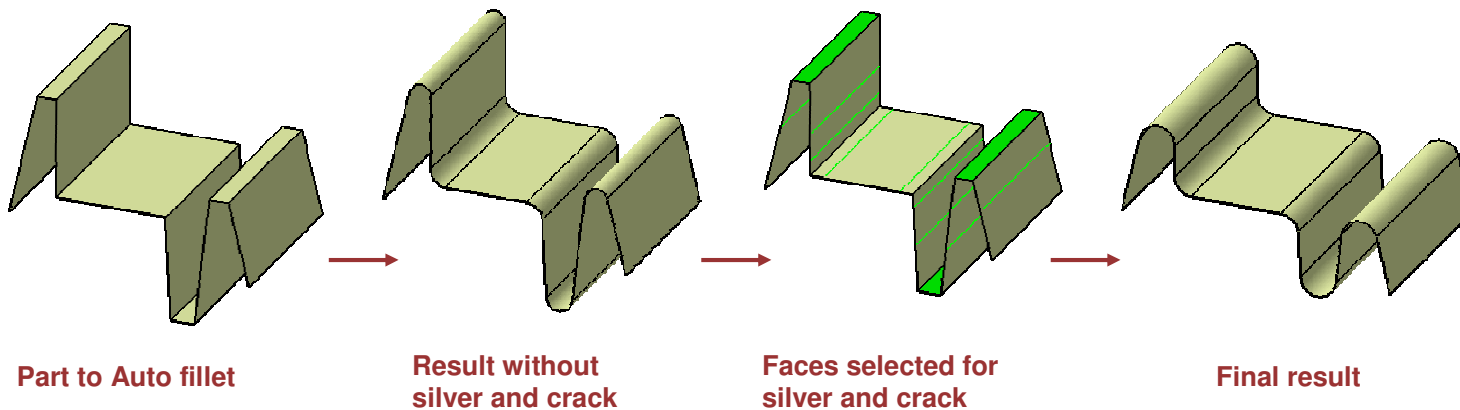
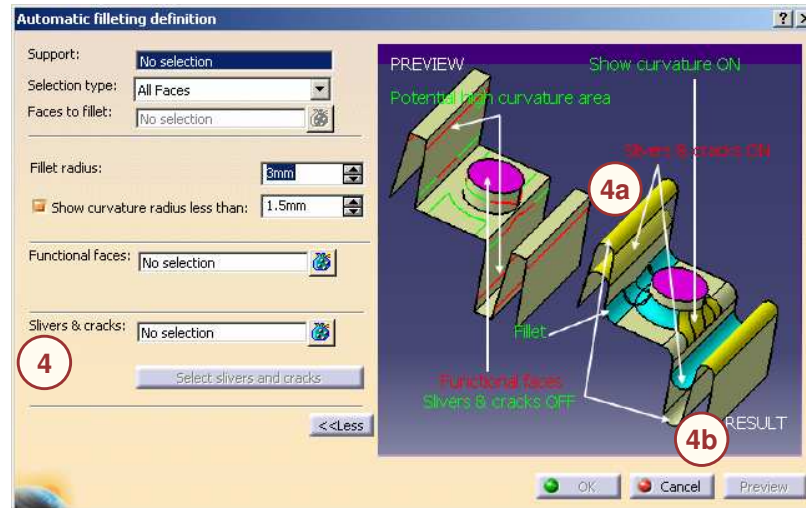
Some faces are selected



## Auto Fillet User Interface (3/3)

### 4. Slivers & cracks:

- a. **Silver:** It is an unwanted thin wall which should be smoothed and partially removed by the automatic filleting operation.
- b. **Crack:** It is an unwanted slot which should be smoothed and partially filled by the automatic filleting operation.



# Creating an Auto Fillet

You will perform the following steps to create an Auto Fillet



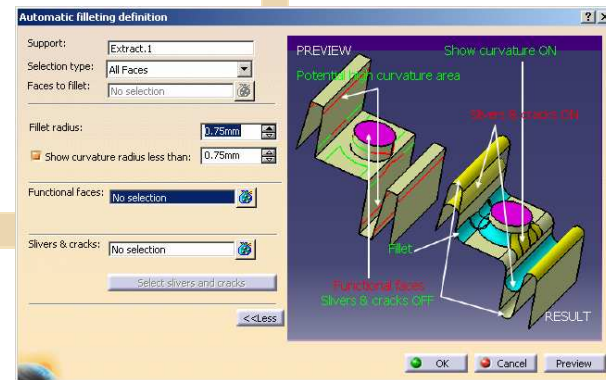
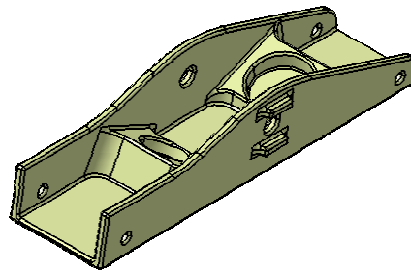
**1** Click on the Auto Fillet tool.

**2** Select the surface to be filleted.

**3** Specify the Fillet radius.

Fillet radius: 0.75mm  
 Show curvature radius less than: 0.75mm  
Functional faces: No selection

**4** Click OK to create the Auto fillet.



# Auto Fillet

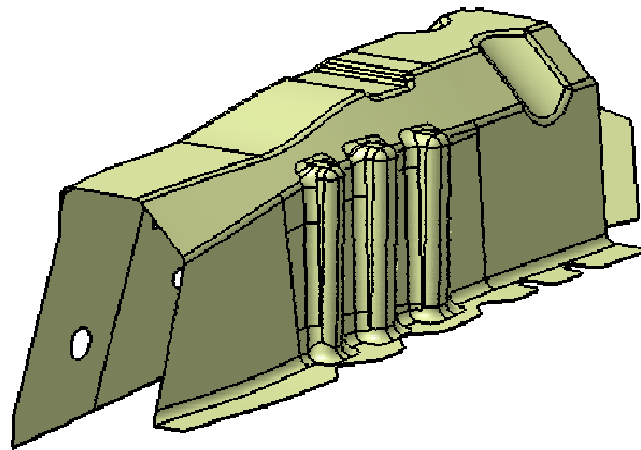
## Recap Exercise



10 min

In this exercise you will create:

- Edge Fillet
- Auto Fillet to all faces
- Auto Fillet with faces selection



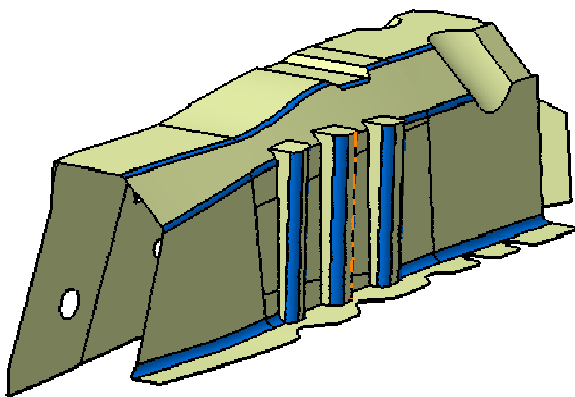
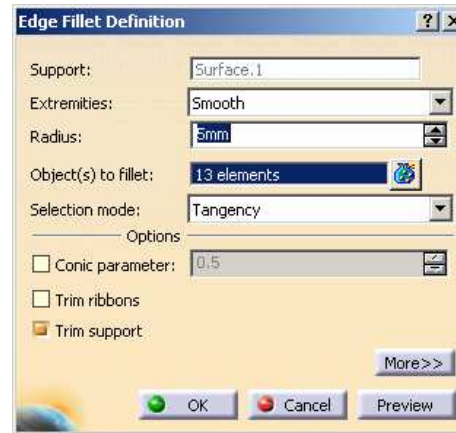
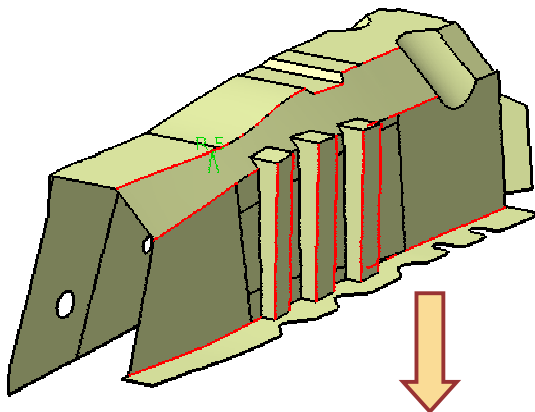
Student Notes:

## Do It Yourself (1/3)



Part used: UHD19\_Auto\_Fillet\_Start.CATPart

- Create an Edge Fillet of 5mm radius on 13 edges of the cover surface.



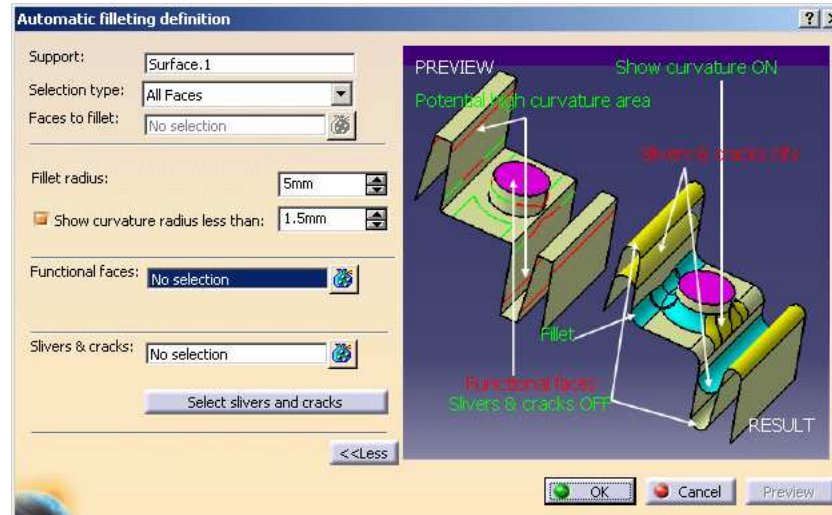
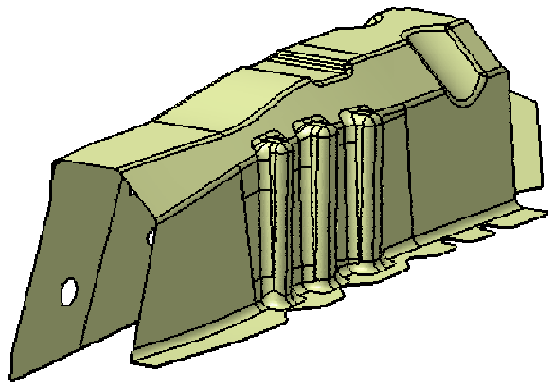
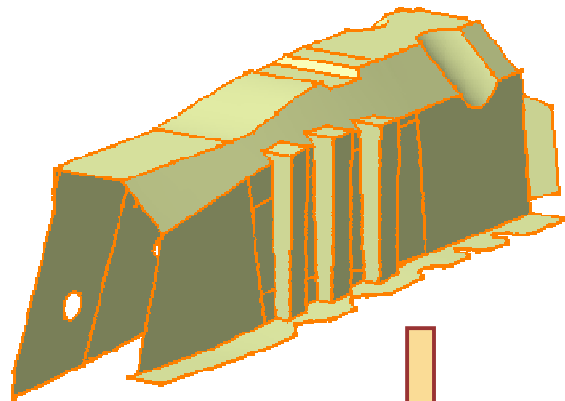
### Observation:

You can see that only the selected edges are filleted.

If you want to apply a fillet to all the edges, you will have to select all the edges one by one with proper sequence which is time consuming.

## Do It Yourself (2/3)

- Create an Auto Fillet of 5mm radius on the cover surface.

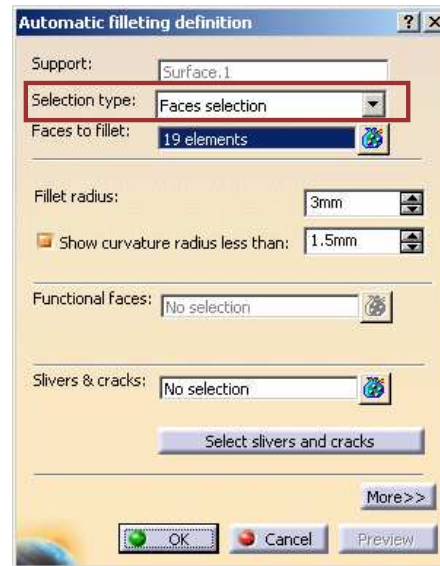
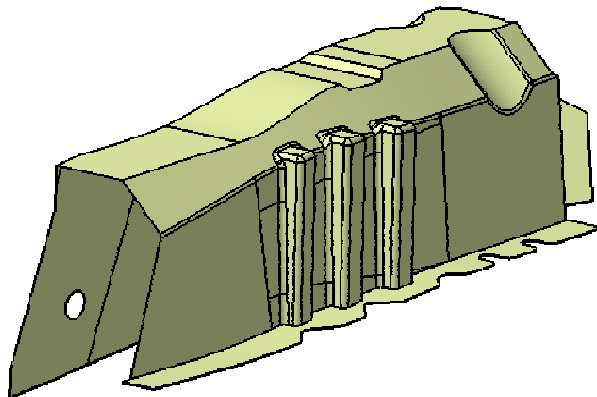
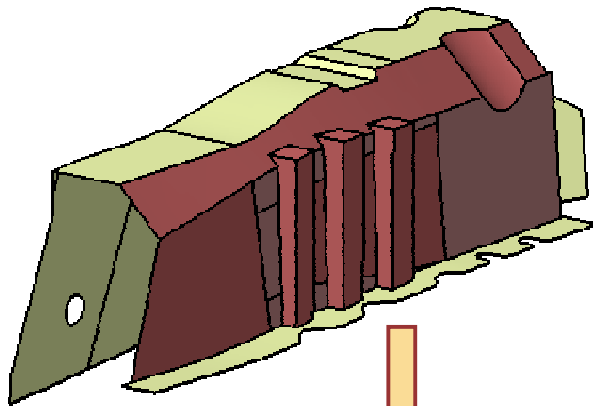


**Observation:**  
You can see that all the sharp edges are filleted in one shot.

Student Notes:

### Do It Yourself (3/3)

- Create an Auto Fillet of 3mm radius on the cover surface using the Faces selection.



#### Observation:

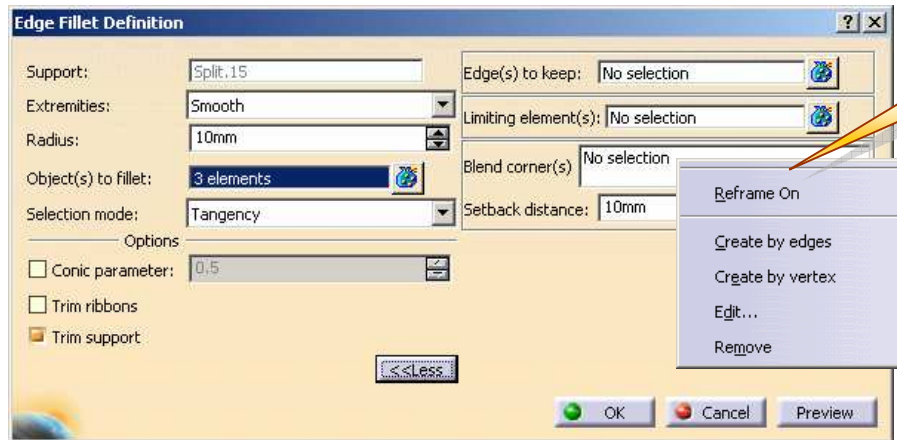
You can see that the fillets are applied only to the edges of the selected faces.



End Part: UHD19\_Auto\_Fillet\_End.CATPart

# Enhancement in the Edge Fillet

*You will learn about the new options available for managing the blend corner in the Edge Fillet.*

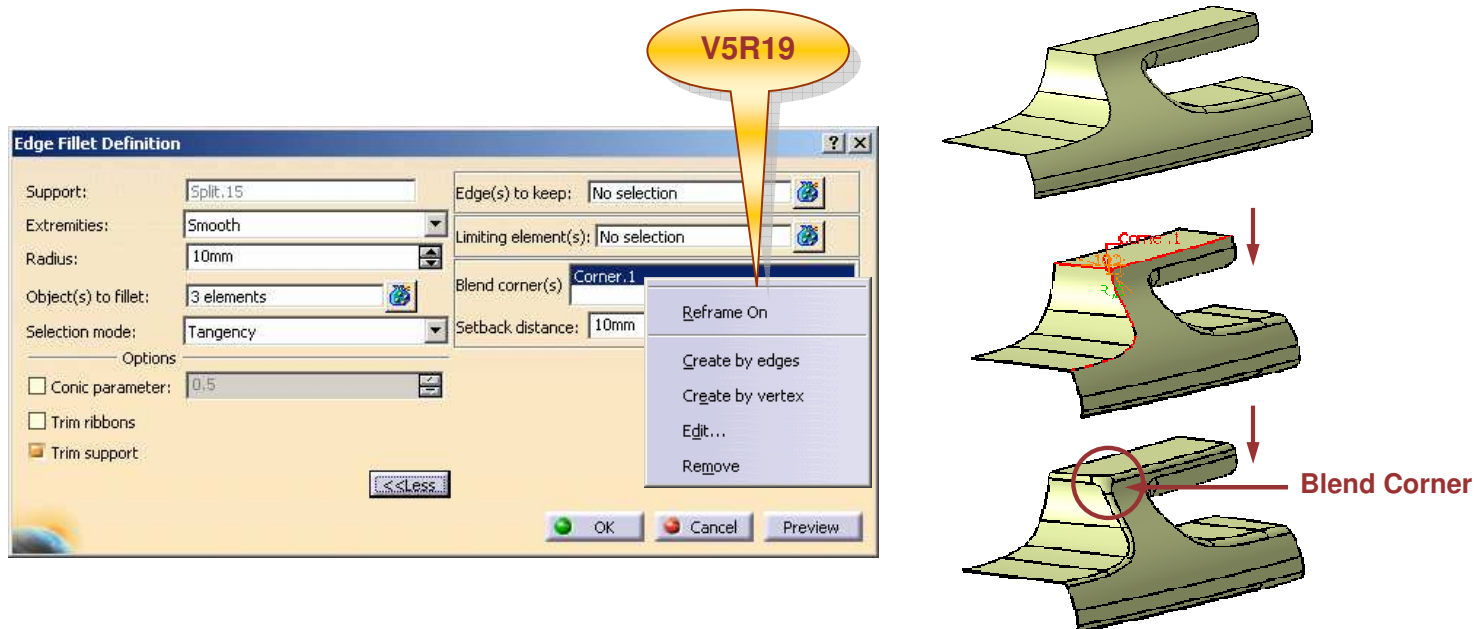


## About Enhancement in the Edge Fillet (1/3)

While applying the fillets to the sharp edges, you can see that corners resulting from the operation are not satisfactory. The goal of this enhancement is to easily create and edit the 'blend corner' of the edge fillet.

A contextual menu has been added in the blend corner field to create, edit and manage the blend corners of the edge fillet.

In V5R18, when you change the edges to be filleted, then the blend corners must also be redefined, even though they are not impacted by the modifications performed in the edge fillet. There is no way to keep the definition of the existing blend corners.

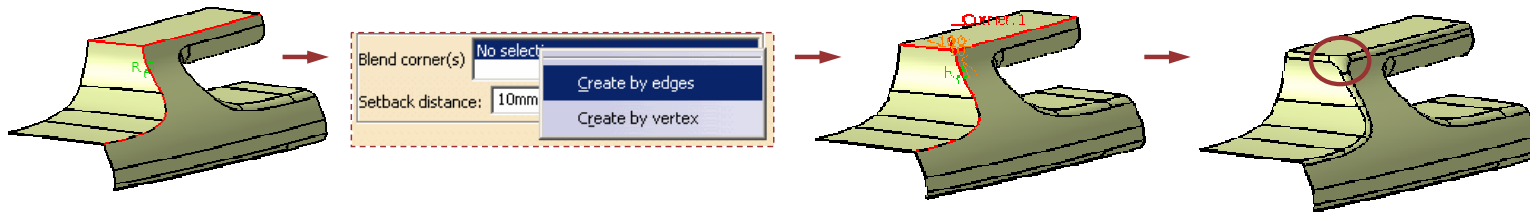




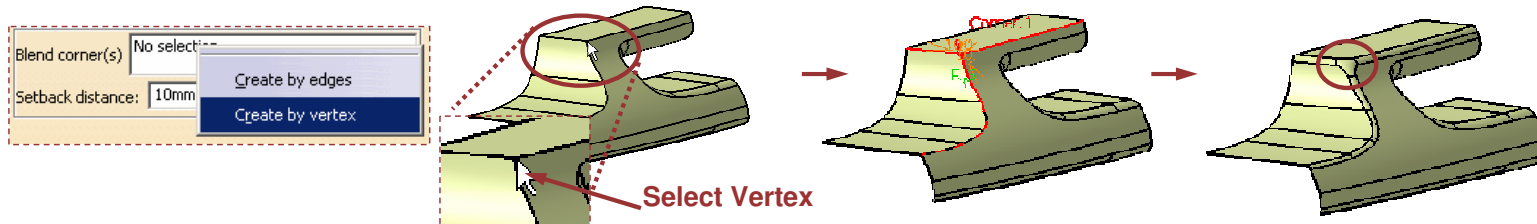
## About Enhancement in the Edge Fillet (2/3)

The enhancement gives the following options in the Blend corner's contextual menu to create and edit an edge fillet containing at least one blend corner, :

- **Reframe On:** This command reframes the model at the selected corner.
- **Create by edges:** The selected and propagated edges are taken into account which automatically adds the corresponding blend corner with default setback distance. This option does not remove the existing blend corners.



- **Create by vertex:** It automatically adds the corresponding blend corner with default setback distance. The concurrent edges of the selected vertex are added to the list of object(s) to fillet if these edges are new ones or if they are not part of the propagations. This option is available even if some corners are already defined.



## About Enhancement in the Edge Fillet (3/3)

- **Edit:** This option displays a list of editable setback values. However, an error message is displayed if you edit multiple blend corners.

The diagram illustrates the workflow for editing an edge fillet:

- The initial state shows the **Edge-fillet.1** feature with a **Radius** and a **Setback distance** of 10mm.
- The **Edit...** option is selected from the context menu.
- The **Corner.1** dialog box is displayed, showing three setback distances, all set to 10mm.
- The setback distances are updated to 12mm, 15mm, and 17mm.
- The **Remove** option is shown in the context menu.

- **Remove:** This command removes the selected blend corners.

## Creating a Blend Corner Using Create by Edges

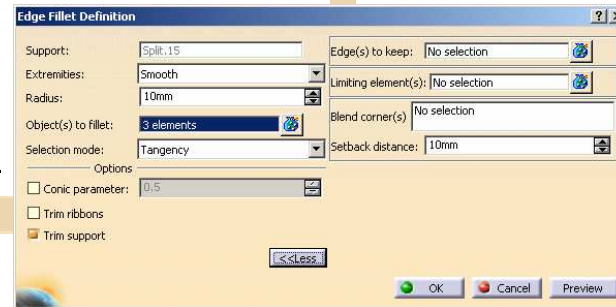
You will perform the following steps to create a Blend Corner using Create by edges option



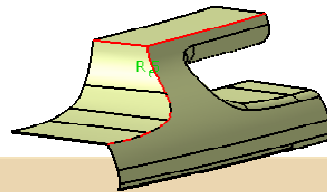
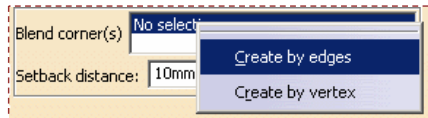
1 Click the Edge Fillet icon.



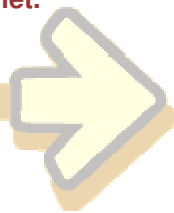
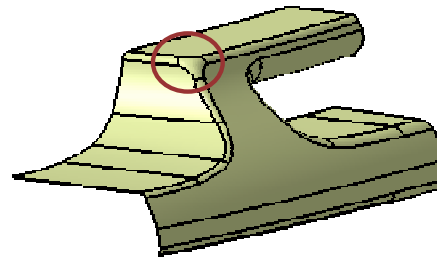
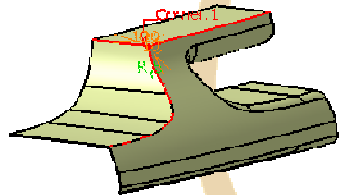
2 Select the edges to be filleted.



3 Right-click the Blend corner(s) field and select Create by edges.



4 Enter the Setback distance and click OK to create the Edge fillet.



## Creating a Blend Corner Using Create by Vertex

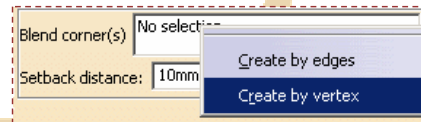
You will perform the following steps to create a Blend Corner using Create by vertex option



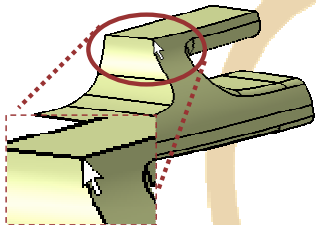
1 Click the Edge Fillet icon.



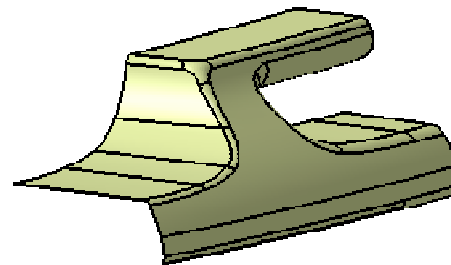
2 Right-click the Blend corner(s) field and select Create by vertex.



3 Select the vertex.  
(The concurrent edges will automatically get selected.)



4 Enter the Setback distance and click OK to create the Edge fillet.



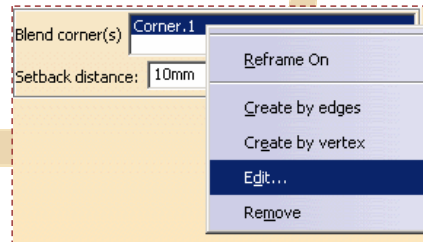
## Editing a Blend Corner in the Edge Fillet

You will perform the following steps to edit a Blend Corner in the edge fillet

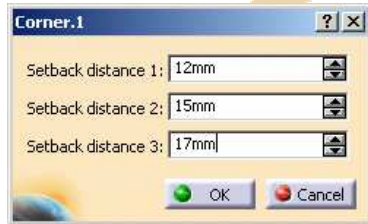


1 Double-Click the Edge Fillet in specification tree.

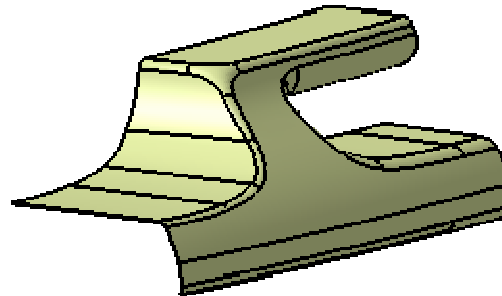
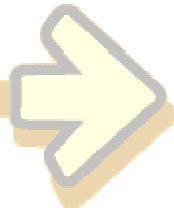
2 Right-click the Corner.1 in Blend corner(s) field and select Edit.



3 Enter the Setback distance values and click OK.



4 Click OK to create the Edge fillet.



Student Notes:

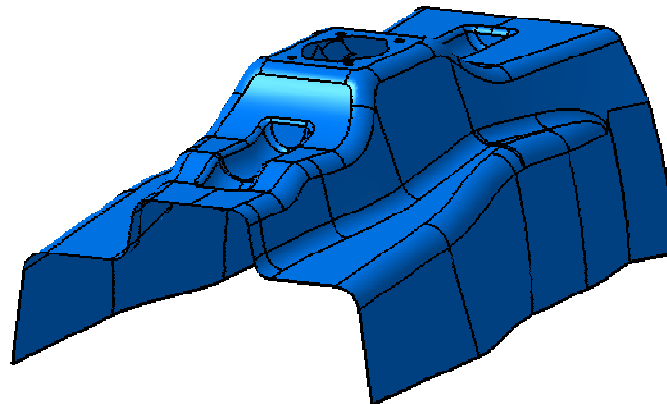
## Edge Fillet with Blend Corner

### Recap Exercise



In this exercise you will create:

- Edge Fillet with Blend Corner
- Blend Corner with Setback distance
- Edge fillet with different setback distance values

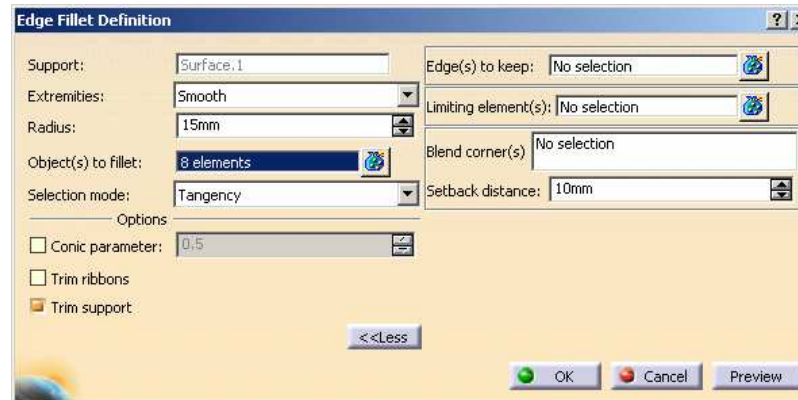
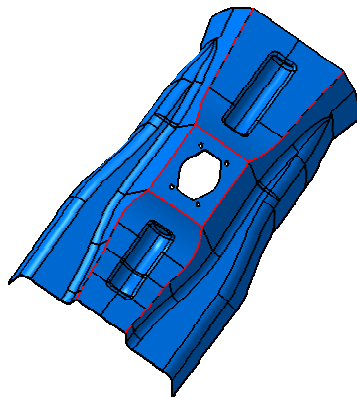


## Do It Yourself (1/2)

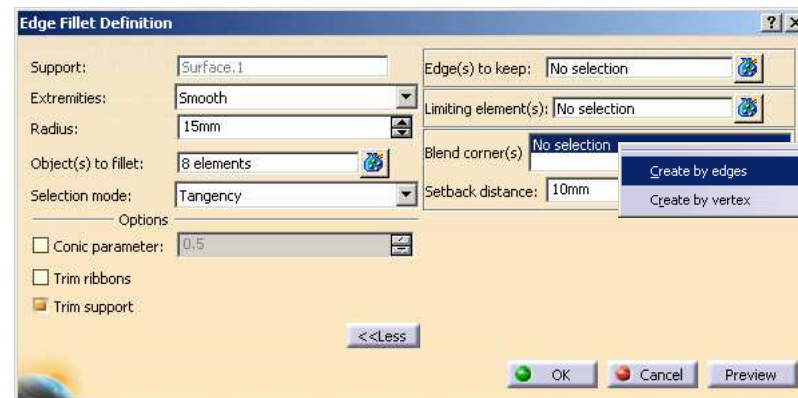
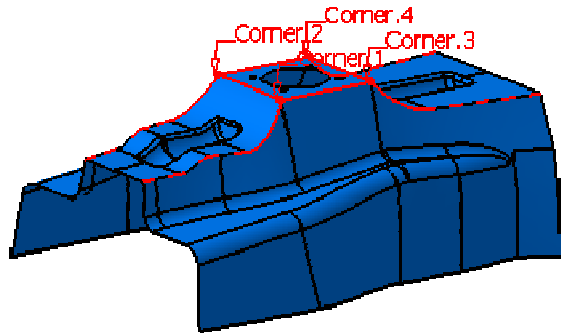


Part used: UHD19\_BlendCorner\_Start.CATPart

- Select the eight edges of the surface.

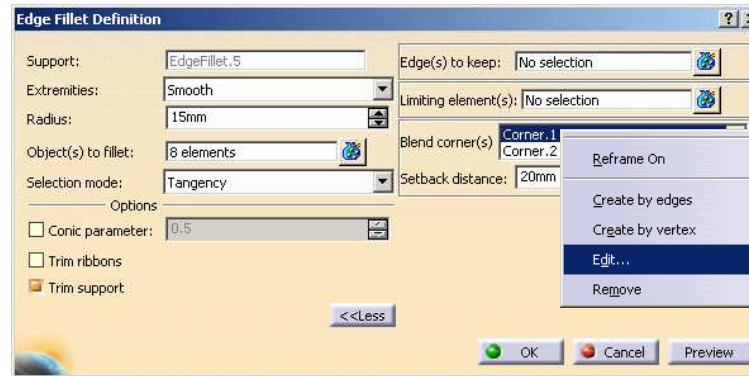
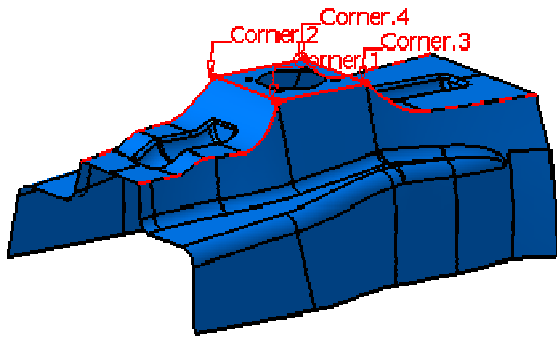


- Right-click the Blend corner field and select 'Create by edges'.

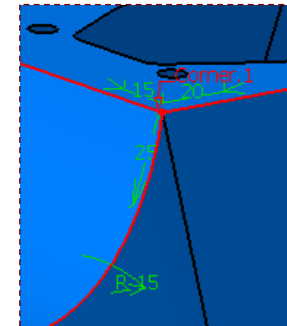
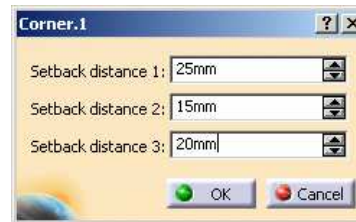
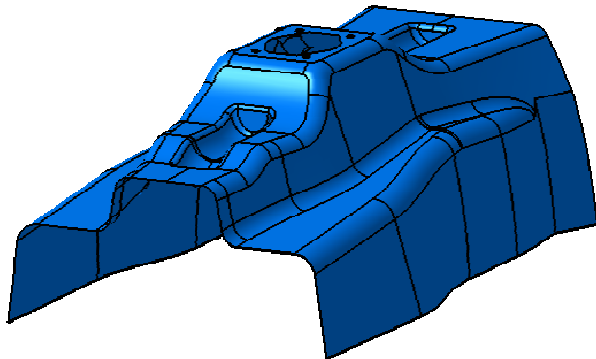


## Do It Yourself (2/2)

- Right-Click the newly created Corners in Blend corner field and select Edit.



- Enter the different values of Setback distance and click OK to make the fillet.



### Observation:

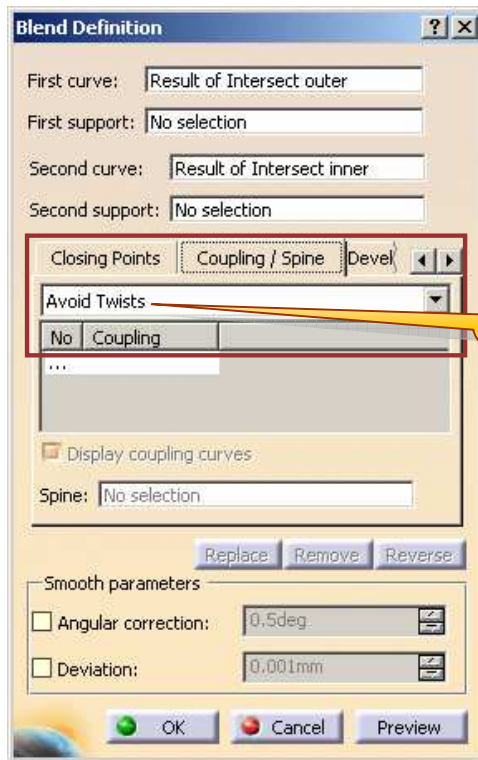
You can see that it is now easy to edit the fillets with blend corner.





# Enhancement in the Blend

*You will learn about the new option available for avoiding the twist in the blend.*



V5R19

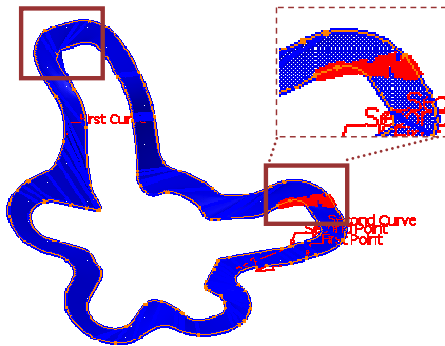
## About Enhancement in the Blend

An Avoid Twists option has been added in the Coupling/Spine tab to optimize surface creation.

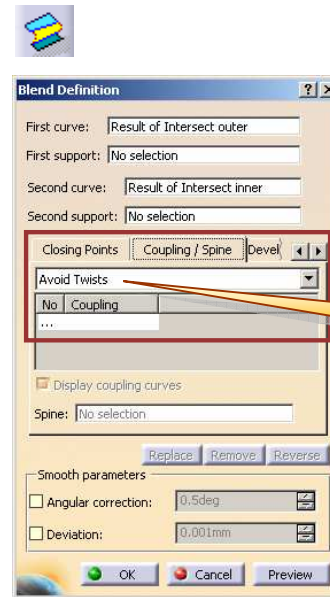
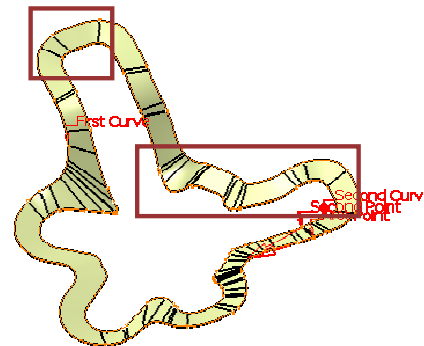
The user no longer has to select the coupling points. They are automatically computed, thus reducing risks of imperfect blends creation and providing a gain of time.

The correct directions still have to be checked for.

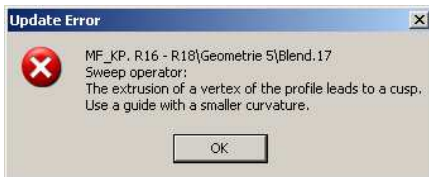
Result of Ratio Mode



Result of Avoid Twists Mode



The coupling curves are regenerated to avoid the cusp or twist in the surface.



As some coupling curves are intersecting each other, surface can not be created.

## Creating a Blend Using Avoid Twist option

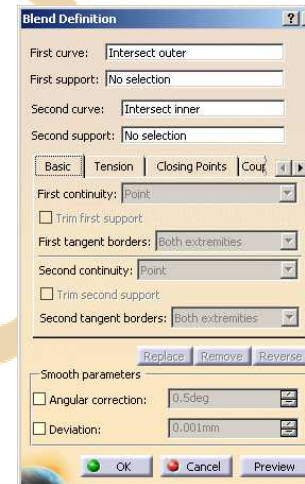
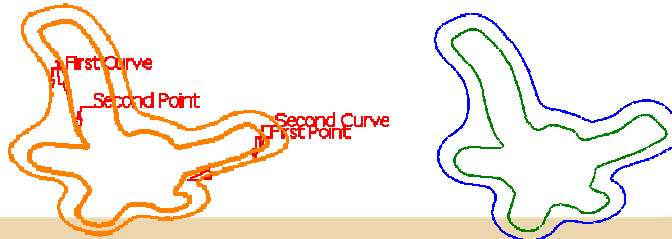
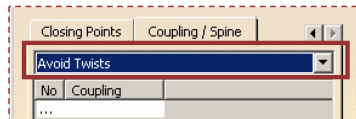
You will perform the following steps to create a Blend using Avoid Twist option



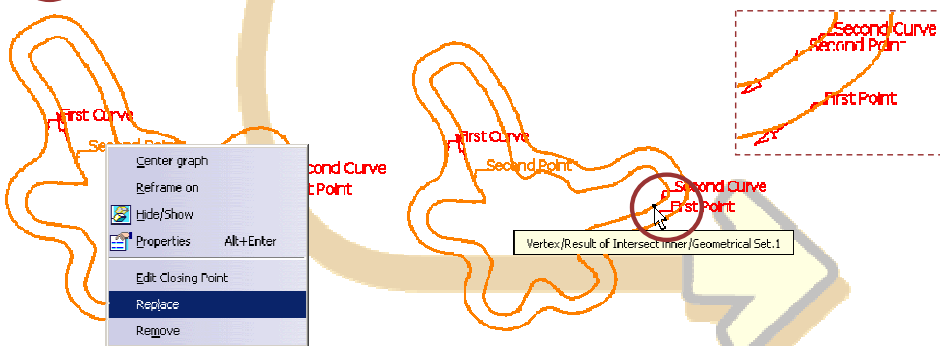
1 Click the Blend icon.

2 Select the curves.

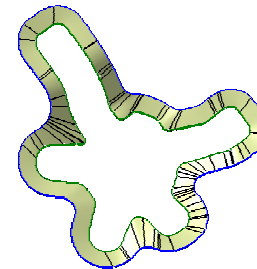
3 Select the Avoid Twist option from Coupling/Spine tab.



4 Replace the second point nearer to first point.



5 Click OK to create the Blend.



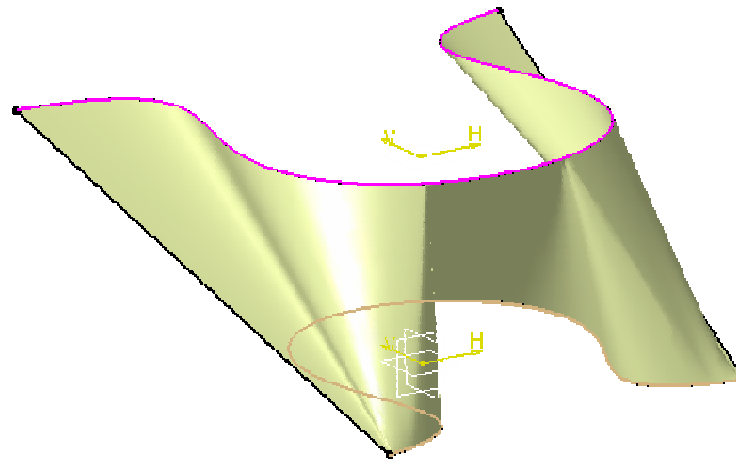
# Blend with Avoid Twist

## Recap Exercise



In this exercise you will create:

- Blend surface using Ratio coupling mode
- Blend surface using Avoid Twist coupling mode

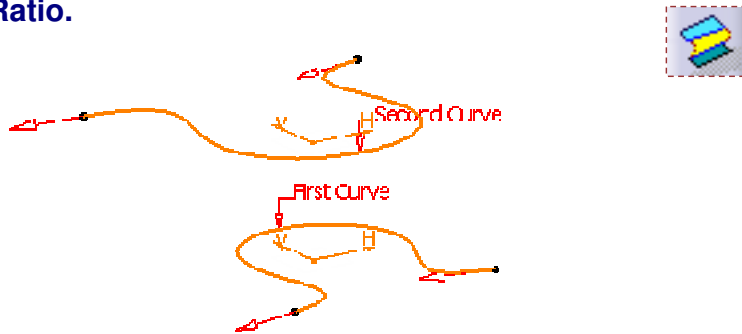


## Do It Yourself (1/2)

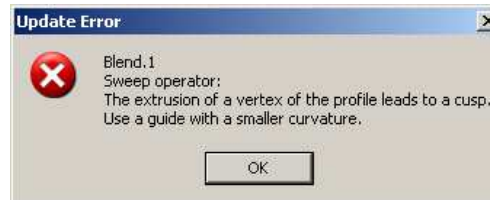
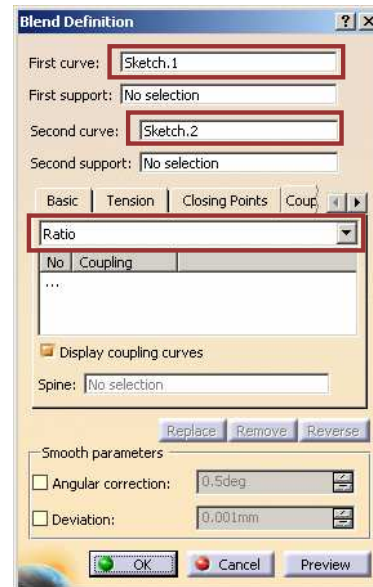
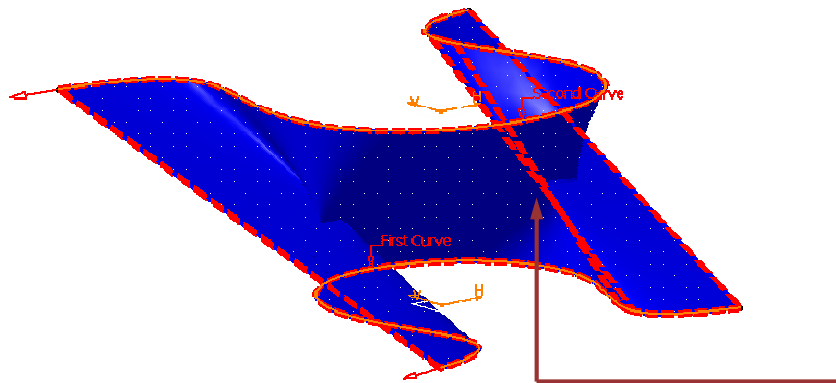


Part used: UHD19\_Blend\_Avoid\_Twist\_Start.CATPart

- Select the two sketches and coupling mode as Ratio.



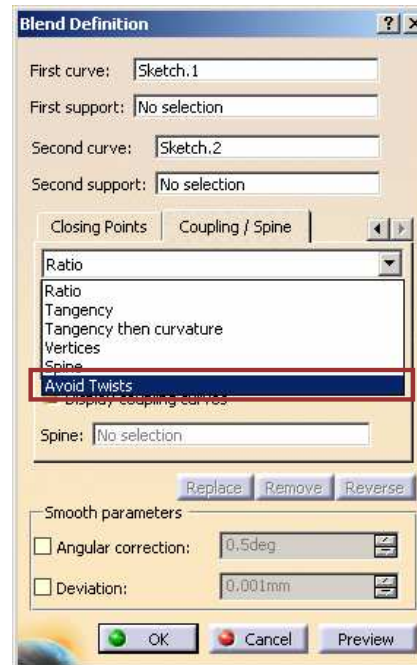
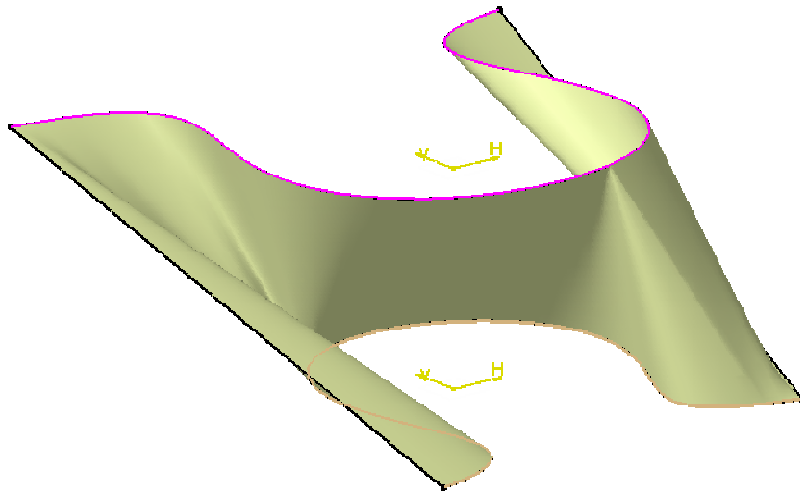
- Click OK to create the blend surface.



Blend surface will not be created because the coupling curves are intersecting each other. It results into the cusp formation.

## Do It Yourself (2/2)

- Click OK to the update error and select Avoid Twist option from Coupling/Spine tab.
- Click OK to create the blend surface.



### Observation:

You can see that the coupling curves are automatically calculated to avoid the cusp formation in the surface.



## Sum up

In this course, you have learnt about the key V5R19 enhancements in CATIA Generative Shape Design workbench.

### CATIA Generative Shape Design

#### V5 R19

- ➔ **Auto Fillet:** This function allows filleting of almost all the sharp edges of a skin in one operation.
- ➔ **Enhancement in Edge Fillet:** These options make it easier to edit the edge fillet containing the blend corner.
- ➔ **Enhancements in Blend:** this new coupling type helps to avoid the possibilities of twisted geometry.

