

Dynavista

CAA V5 based

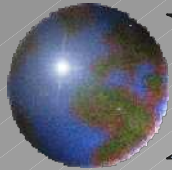
V10.2 / V11.2

Formability Shaper

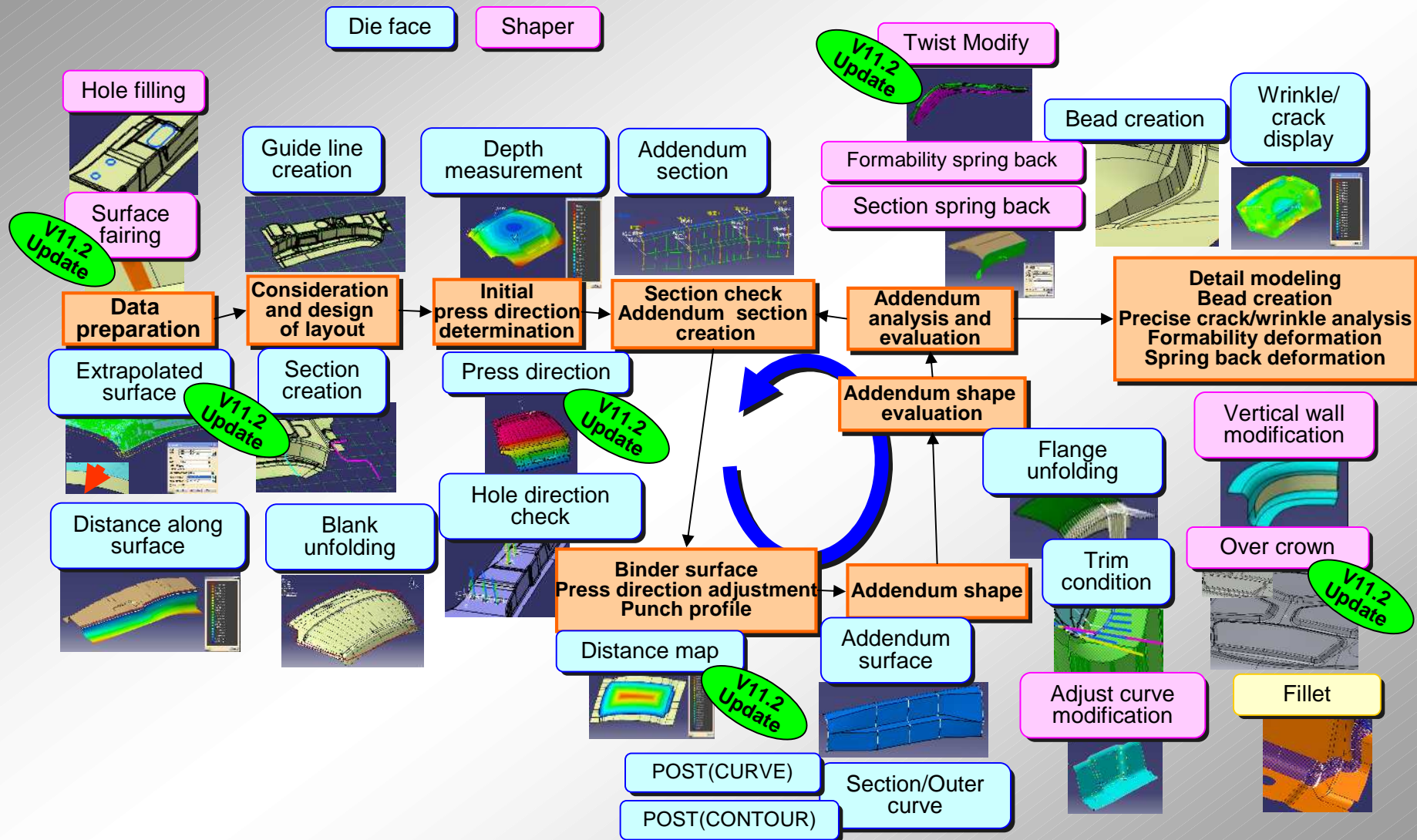
October, 2011

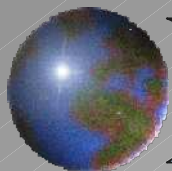
UNIADEX, Ltd.

All Rights Reserved, Copyright(C) 2011 Nihon Unisys, Ltd.



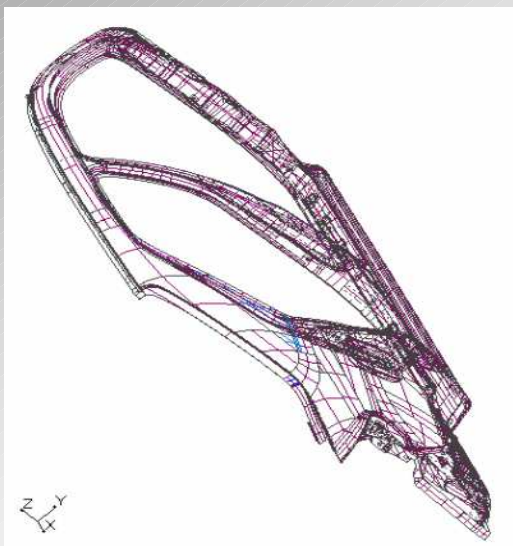
Dynavista functions for die layout design





Formability Shaper

Estimation of large deformation of panel after forming - Formability Shaper.



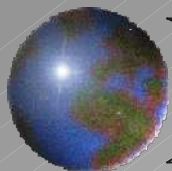
- Sophisticated die shape deformation functions which drastically decrease die design time.
- Simple input for gaining deformed shape.
- Strong surface deformation functions which preserve characteristics of original surfaces.

 **V5R18**

 **V5R19**

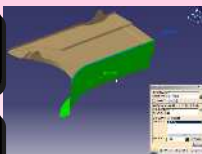
 **V5R20**

V5 prerequisite: GSD (or HD2)



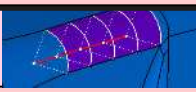
Formability Shaper command

Formability spring back

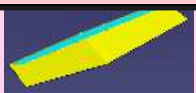


Section spring back

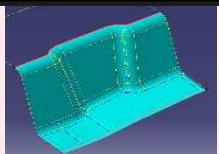
Rotation base
curve creation



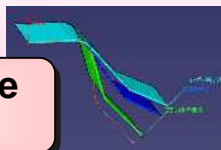
Section base
curve creation



Adjust Curve
Modification



Section Curve
Modify

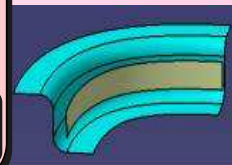


Vertical wall deformation

Surface normal offset

Specified direction

Along surface



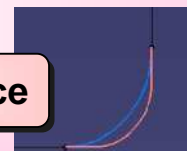
Twist Modify



Over crown



R Reduced Surface



Deformation

Gap filling



Hole filling



Notch filling

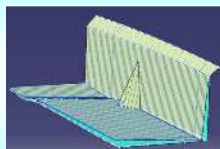


Surface fairing



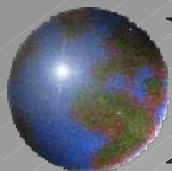
Complementary

Angle evaluation



Evaluation of deformation amount

Dynavista / Formability Shaper

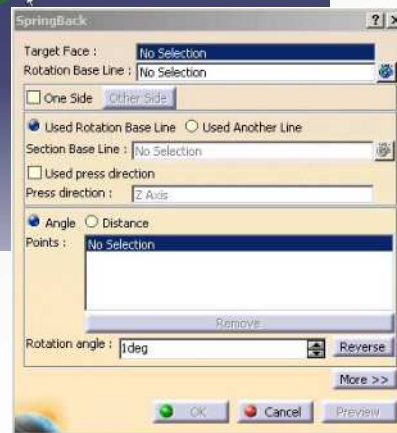
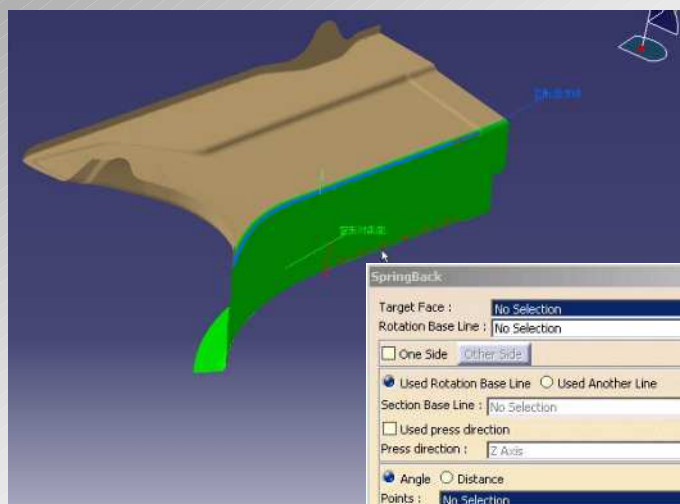


Formability spring back

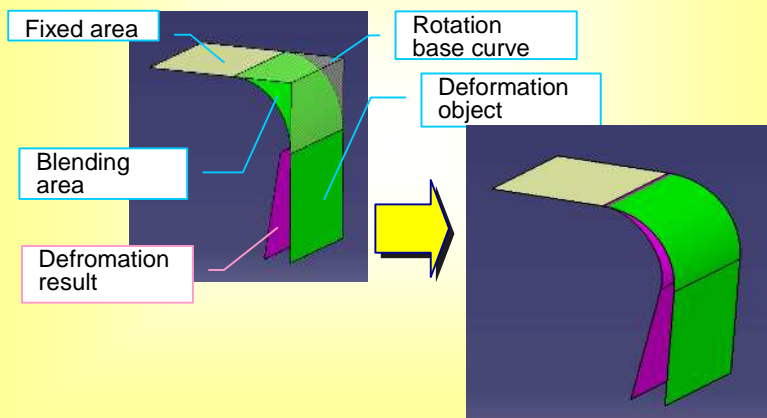
- Creation of a surface by rotating specified surface around a rotation base curve (Estimation of spring back deformation)

Quality

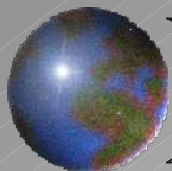
Data size



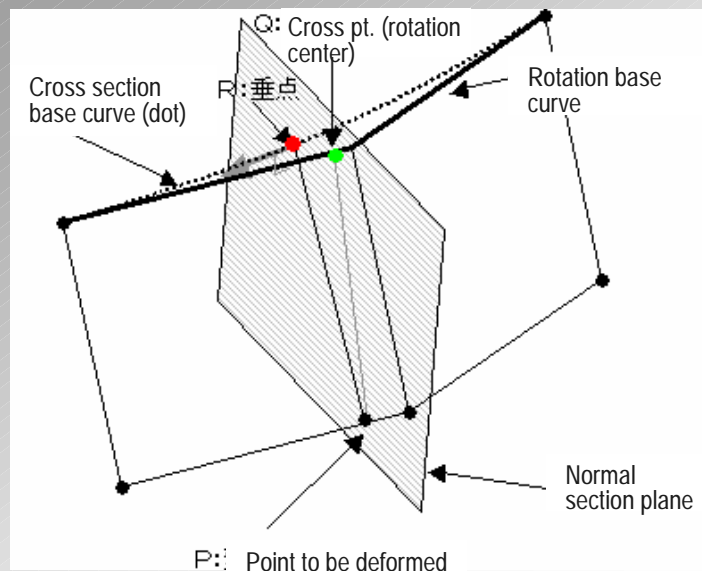
Rotation deformation and affected surface deformation are performed at one time.



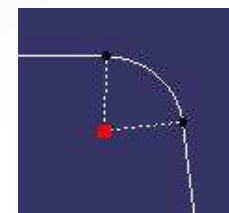
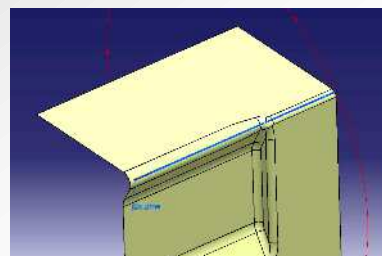
- Either rotation angle around a base curve or enforced displacement of arbitrary points on surface are possible as deformation type. (Indication of target curve after deformation will be available in the future version.)
- Variable deformation by specifying various rotations at two or more positions is possible.
- The surface after deformation preserves the shape characteristics of the original surface.



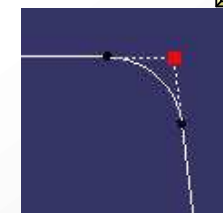
Rotation base curve / Section base curve



- Rotation base curve creation.



Center

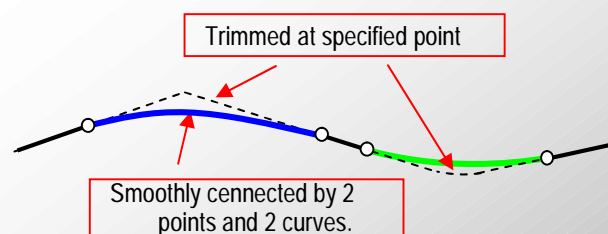
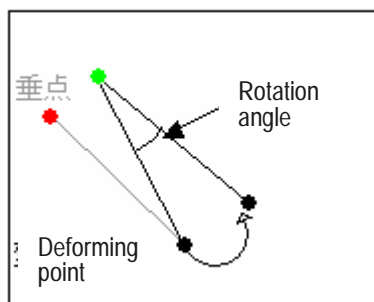


Intersection

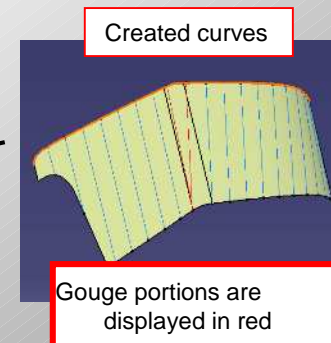
- Both center and intersection specification are available.
- If bends exist between created curves, merge them into one by blending them.

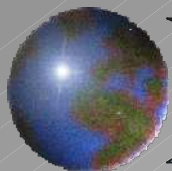
- Section base curve creation.

<Cross section shape>



- Created by easy operation checking if gauges are generated or not.

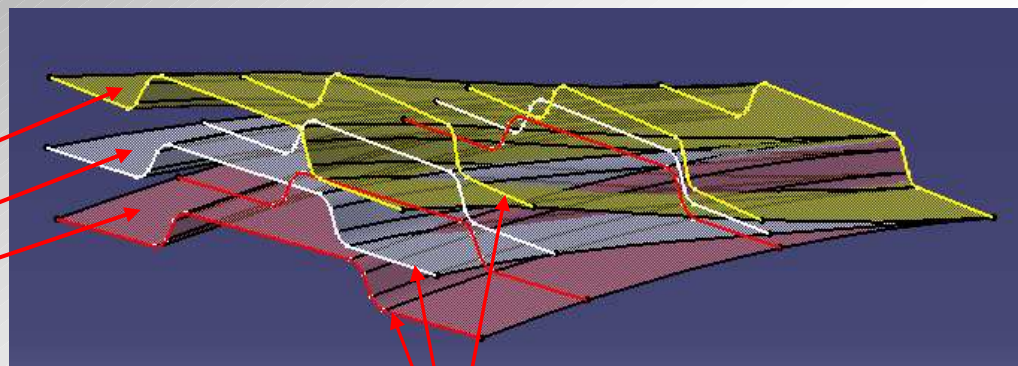




Section spring back

Direct: Difference between object and target surface is reflected to the object surface.

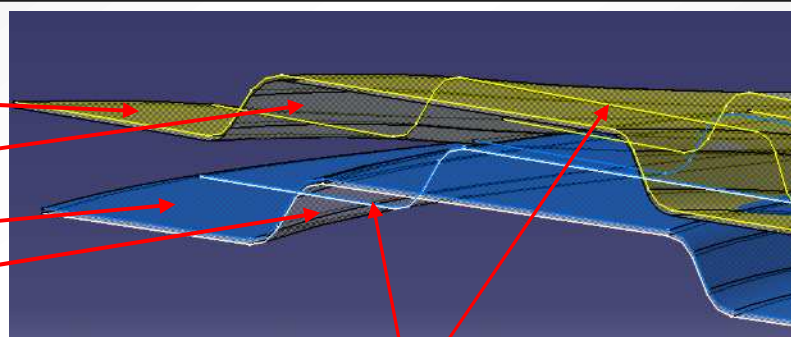
Result of direct transformation
Object surface
Target surface



Cross section curve

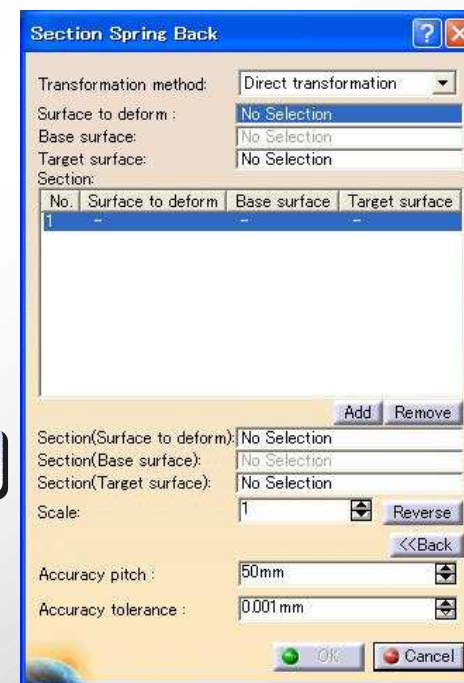
Correct: Difference between base and target surface is reflected to the object surface.

Target surface
Result of correct transformation
Target surface
Base surface



Cross section curve

*It is possible to input a section plane or a cross section for each position.



Cloud Scenario

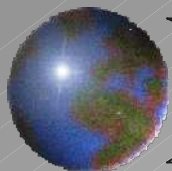


Direct



Correct





Scenario of Section spring back

- (1) Product shape
- (2) Make Target surface 1 by measuring an actual trial shape or analyzing it.
- (3) First transformation by the difference from the product shape (Direct transformation)
- (4) Make Target surface 2 by measuring the trial shape (3) or analyzing it.
- (5) Second transformation by the difference between the Target surface 2 of (4) and the product shape (Correct transformation.)
- (6) Repeat (4) and (5) in order to approximate the result of press to the product shape.

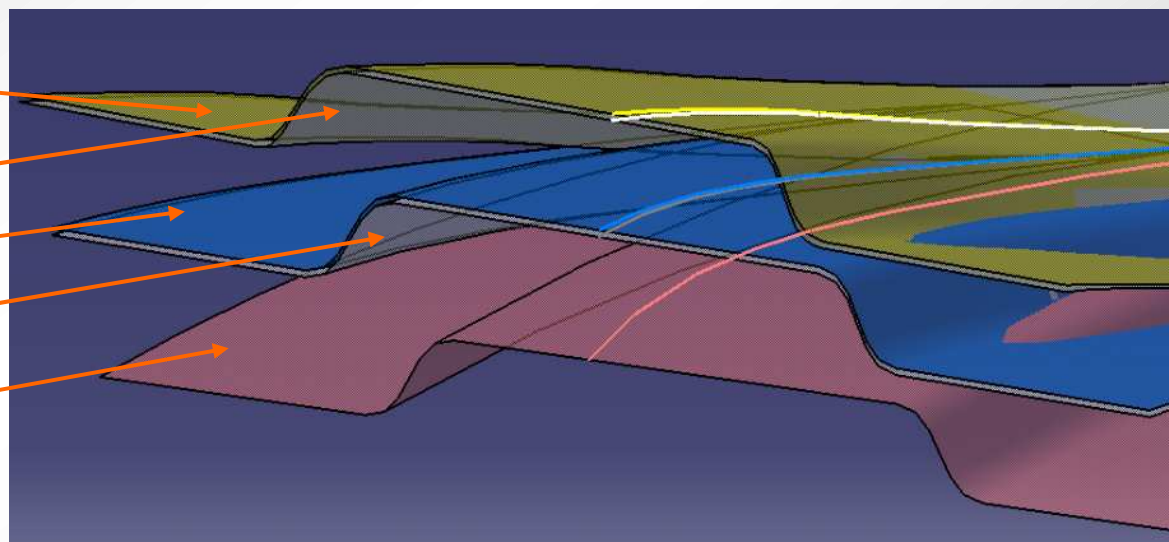
(3) Result of first transformation
=Object surface of second transformation

(5) Result of second transformation

(4) Target surface 2

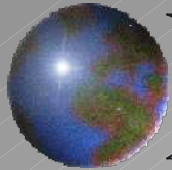
(1) Product shape

(2) Target surface 1



Section
spring back

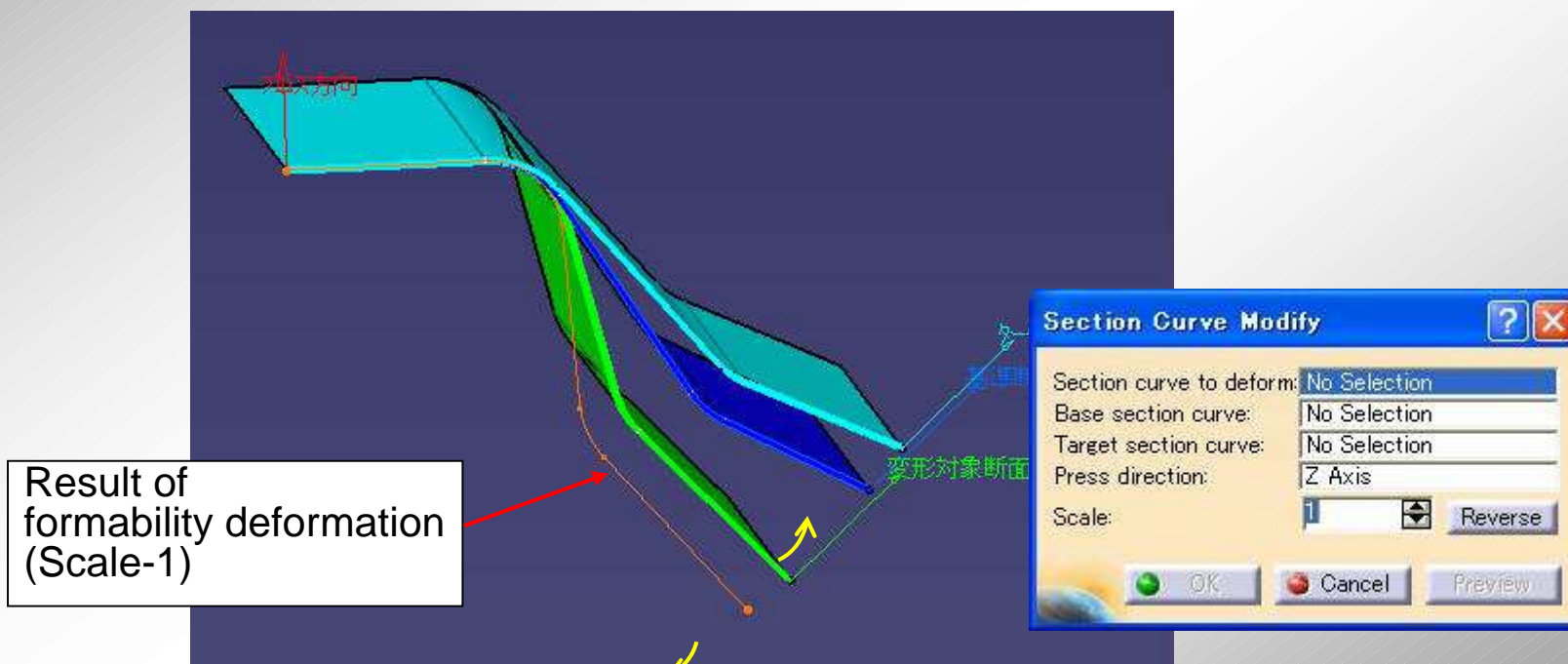


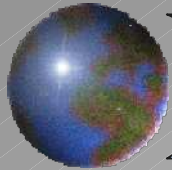


Section Curve Modify

A surface after-deformation will be created by inputting an original cross section, a base section and a target section.

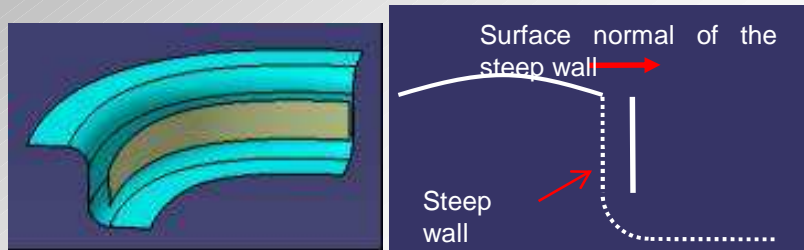
A forward compensation shape will be calculated by giving a positive value (e.g. 1.0) for the “Scale”, and a backward compensation shape will be created by a negative value (e.g. -1.0).



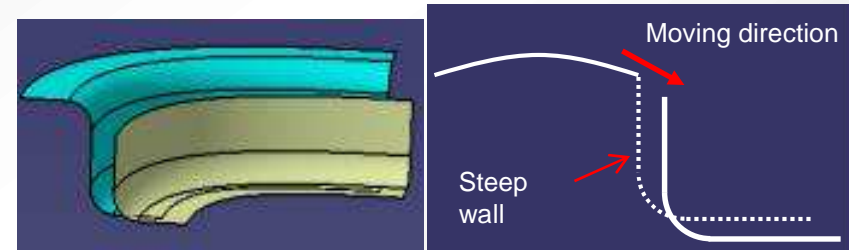


Vertical wall deformation

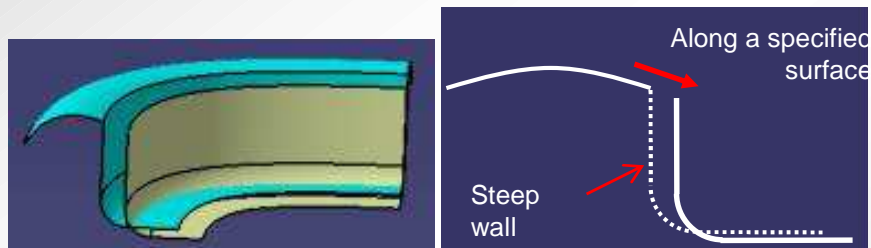
- Create a surface taking into account strain which takes place at steep wall positions by three deformation methods(surface normal offset/ movement to indicated direction/ movement along surface).



[surface normal offset] case



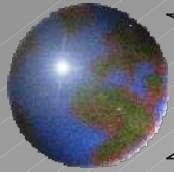
[movement to indicated direction] case



[movement along surface] case

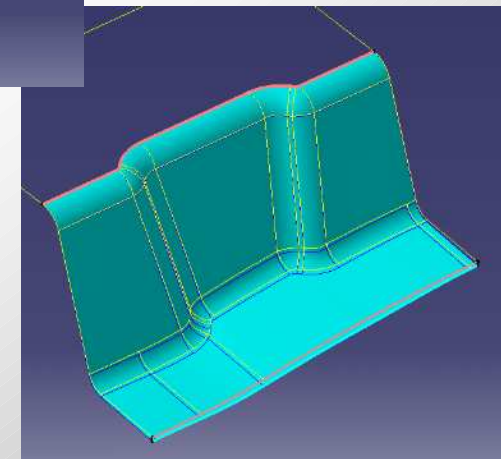
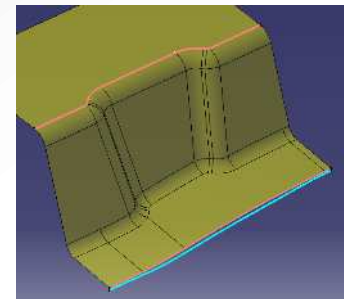
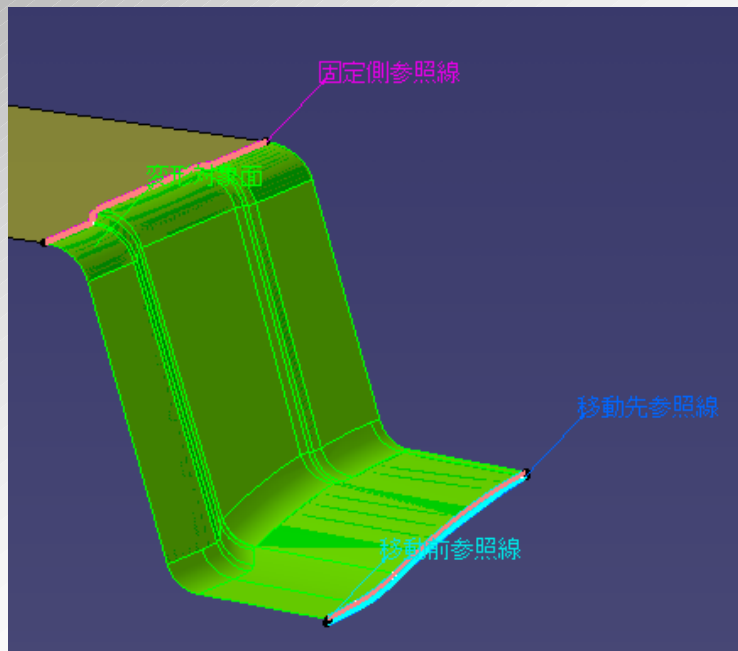
- Variable deformation by specifying different deformation amounts at two or more locations is possible.
- The surface after deformation preserves the shape characteristics of the original surface.





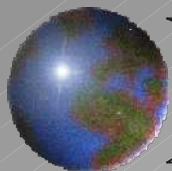
Adjust Curve Modification

- A deformed surface will be created so that it follows curve movement.



- Variable deformation by specifying different deformation amounts at two or more locations is possible.
- The surface after deformation preserves shape characteristics of the original surface.

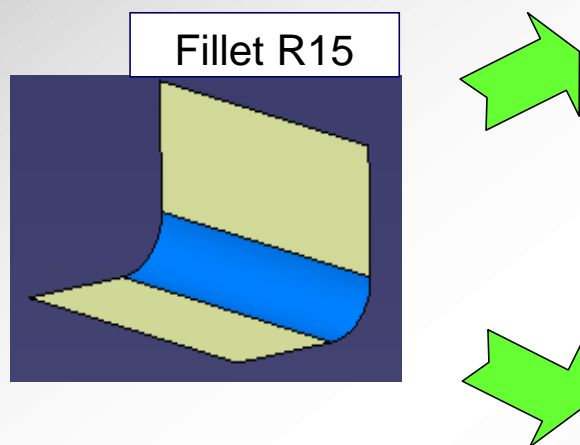




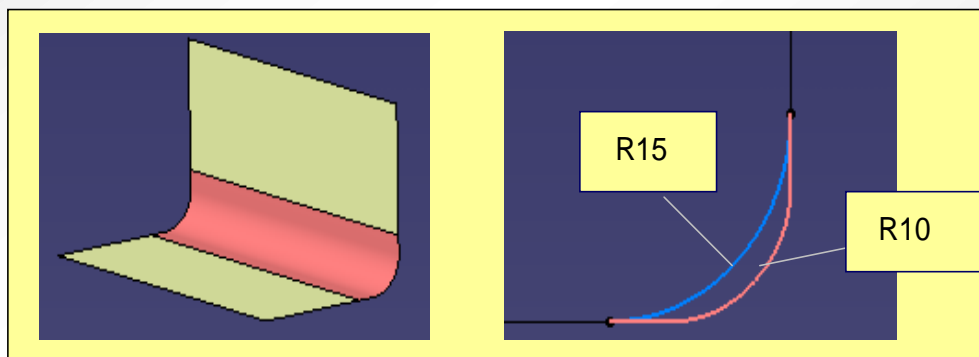
R Reduct Surface

Creates a surface with a gap in order to reduce friction between a die and a panel at a corner portion.

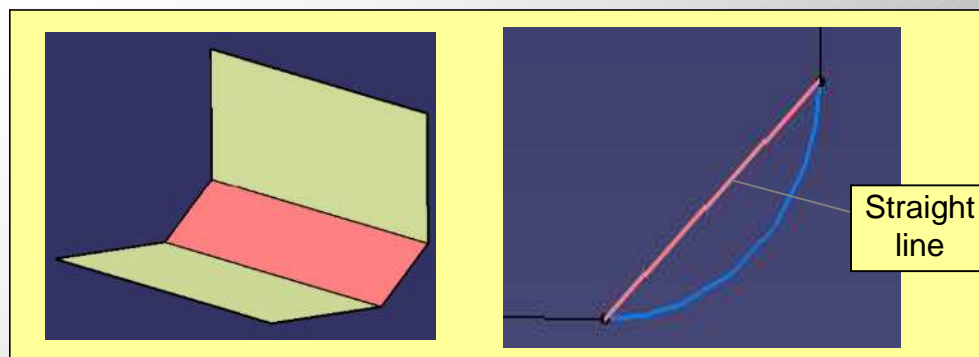
There are 2 methods, one is to reduce the R value and the other is to replace the R with a straight line.

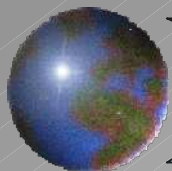


Reduce R value (Reduction of arc/Radius of arc)



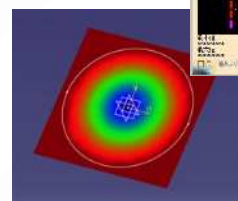
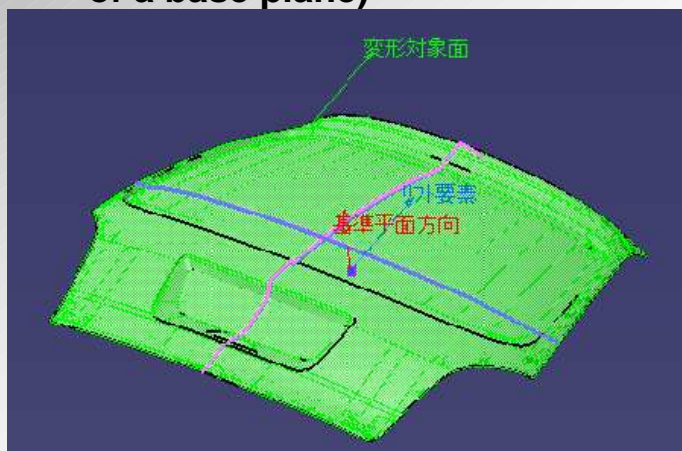
Replace with a line (Connect with line)



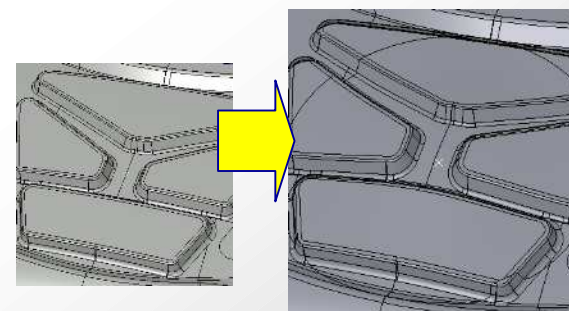


Over crown

- A shape will be created by variable partial lifting of inside of a specified shape so that formability is taken into account.
- Deform inside of the deformation area by lifting the peak point with maximum deformation for a specified direction (normal direction of a base plane)



Color map



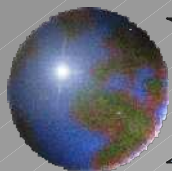
- Deformation preserving surface characteristics of the original surface for whole composite surface.
- Specifications for deformation
 - "Point" ... Specify a point, then lift the point.
 - "Curve" ... Specify an open curve then lift the curve.
 - "Area" ... Specify a closed curve then list the curve
 - "Contour" ...controlling deformed shape



Point

Contour

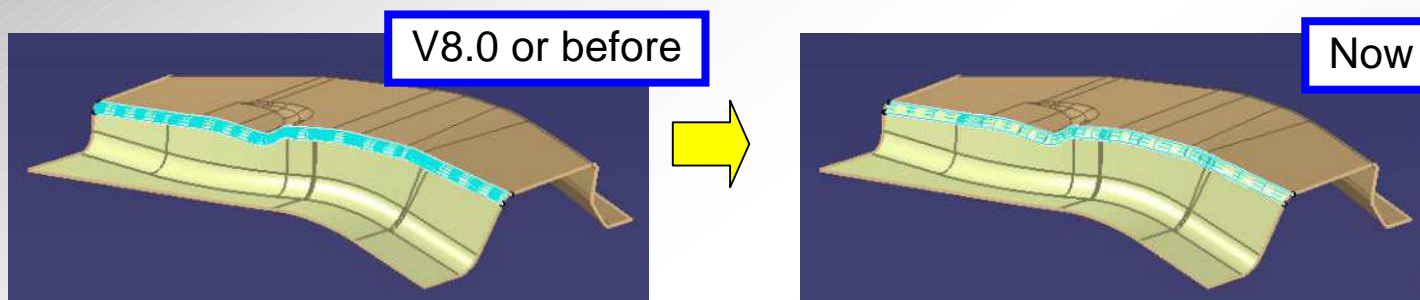




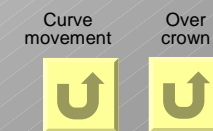
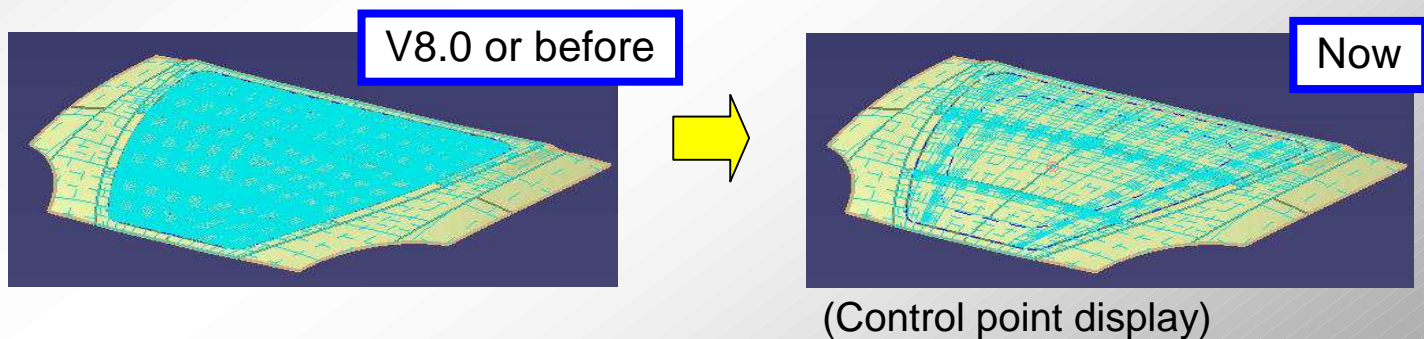
Surface quality of Adjust curve modification and Over crown

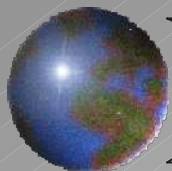
- ✦ Much fewer number of control points compared with the former version.

❏ Curve movement deformation



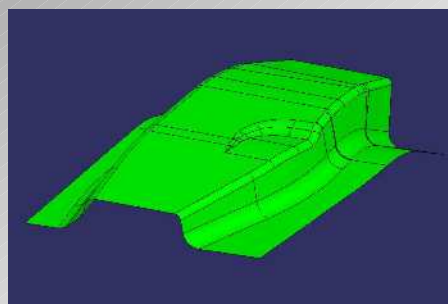
❏ Over crown



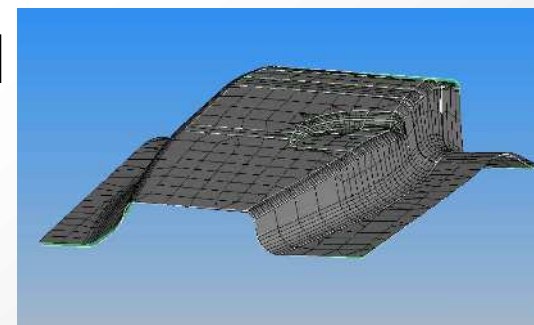
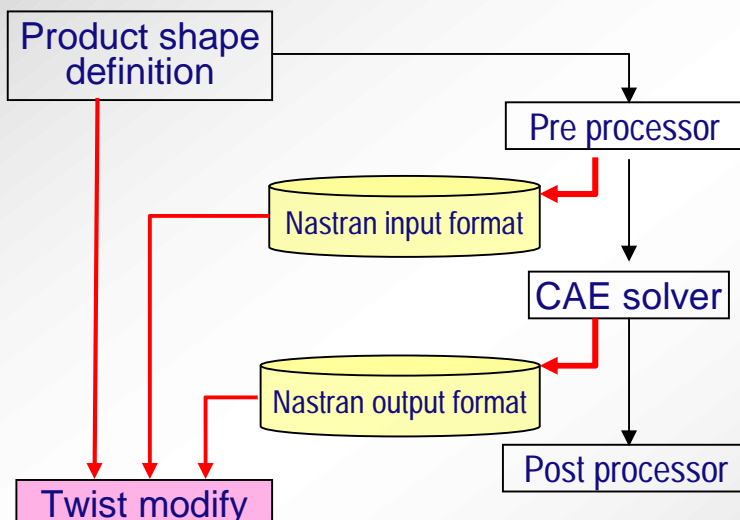


Twist modify

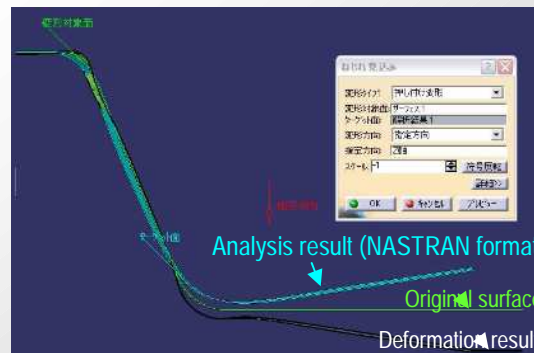
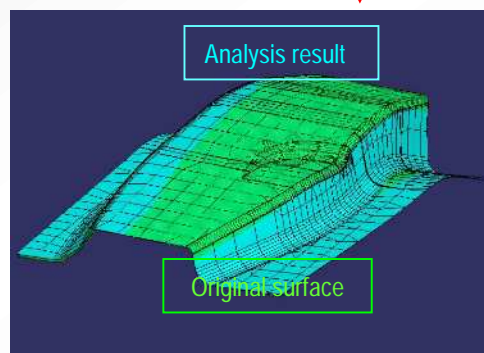
- Surface deformation with formability compensation by the direct use of analysis result of CAE.



Original shape (Dynavista)



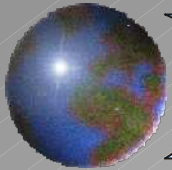
Analysis result



Surface deformation
by importing
analysis result

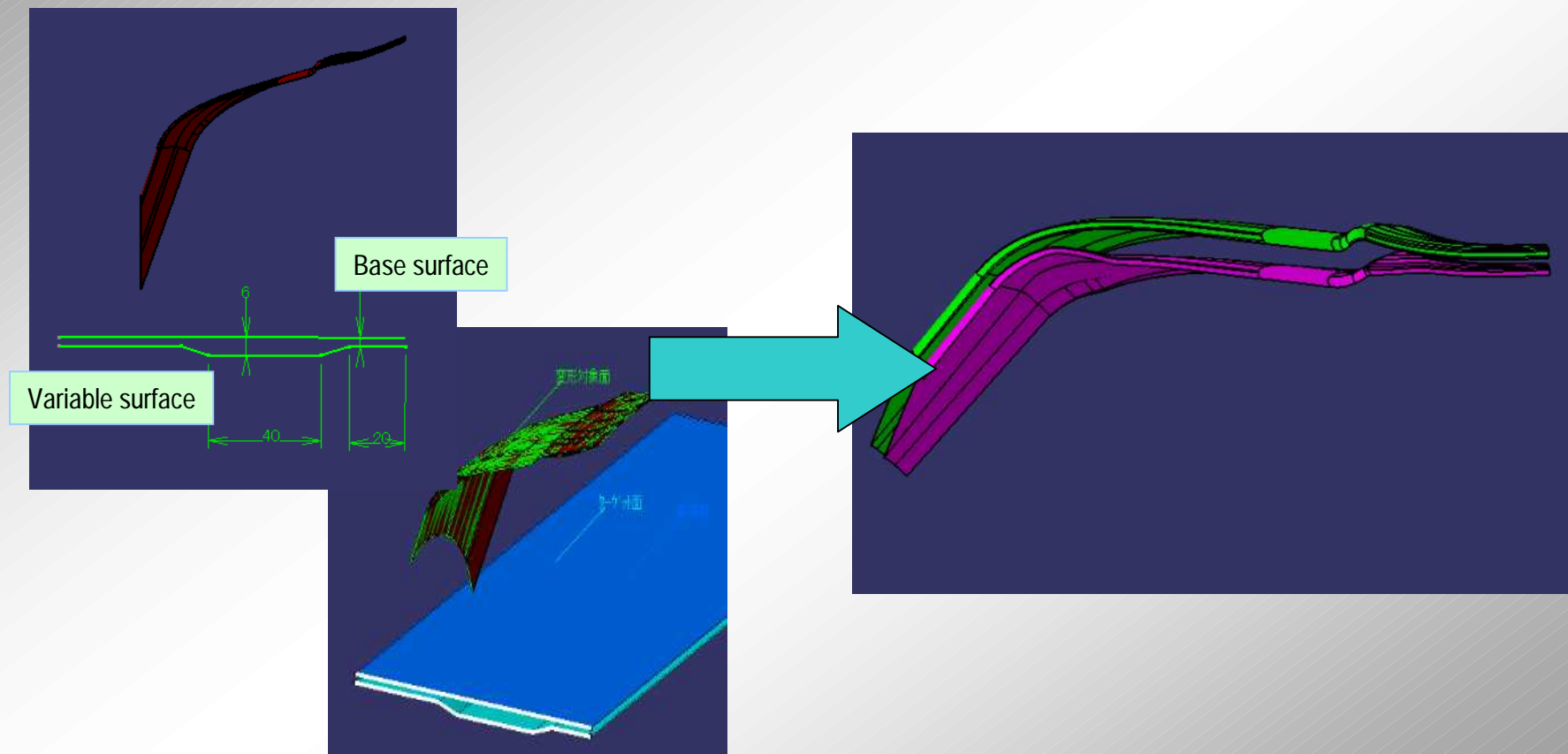
Cloud

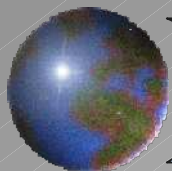




Twist modify – cont.

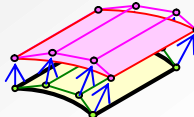
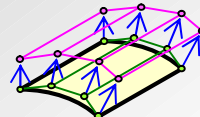
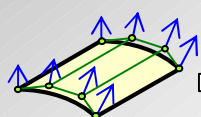
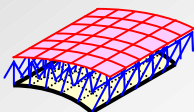
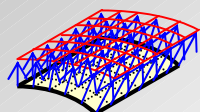
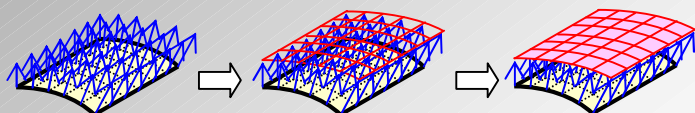
- A target surface is variably deformed by making distance between base surface and variable surface as variable value.
- STL can be used for a variable value surface as well as a surface.





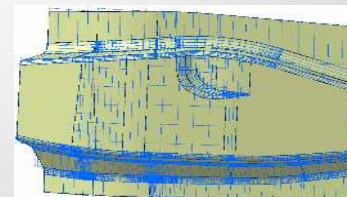
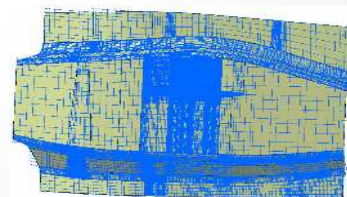
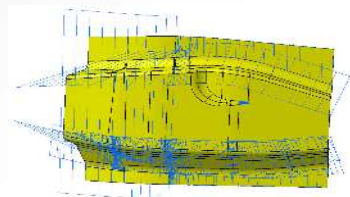
High quality surface for Twist modify

- High quality surface will be created by specifying High quality option (default: on)

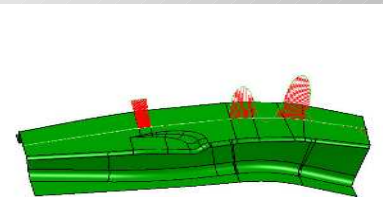
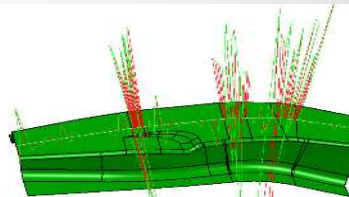
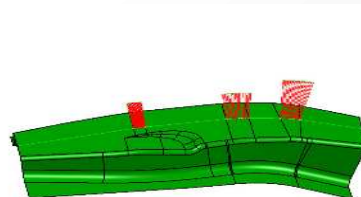


Optimum surface will be created by the movement of control points

Control point display



Curvature display

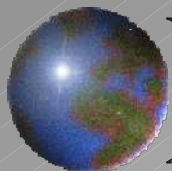


Original surface

Result - V8.0 or before

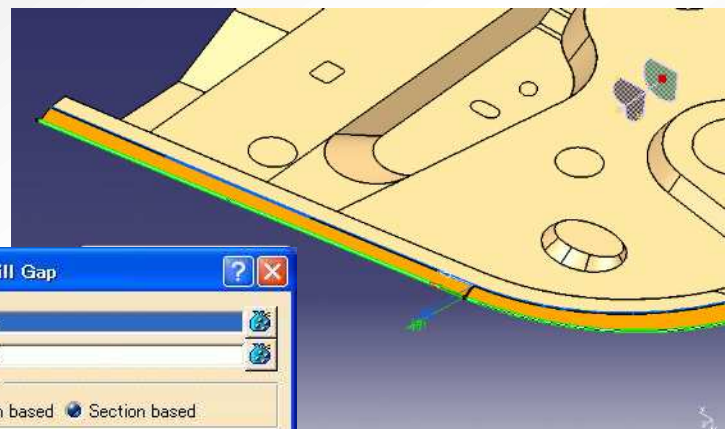
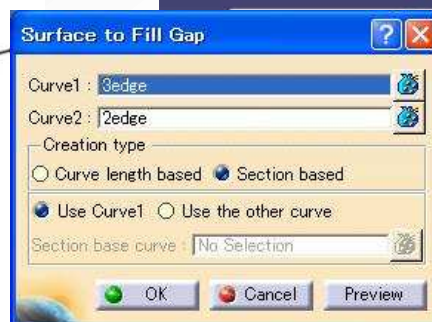
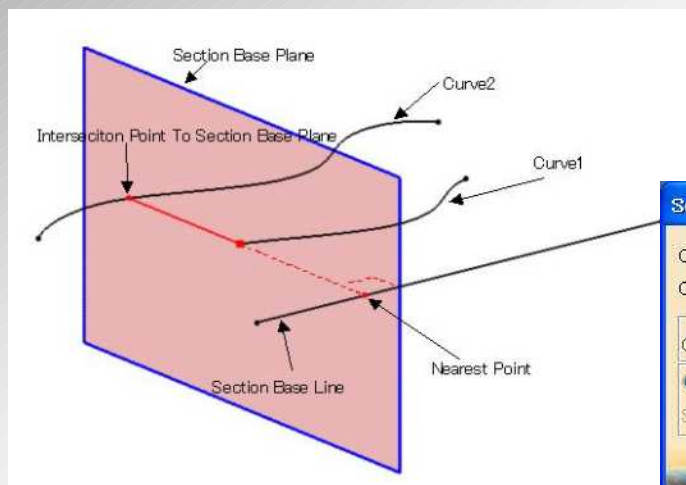
Result - V9.5



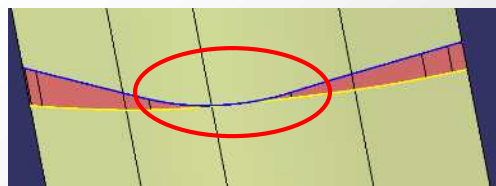


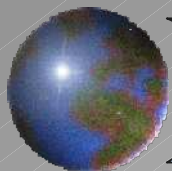
Gap filling surface

- A ruled surface will be created between two curves.



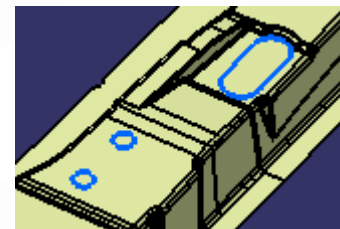
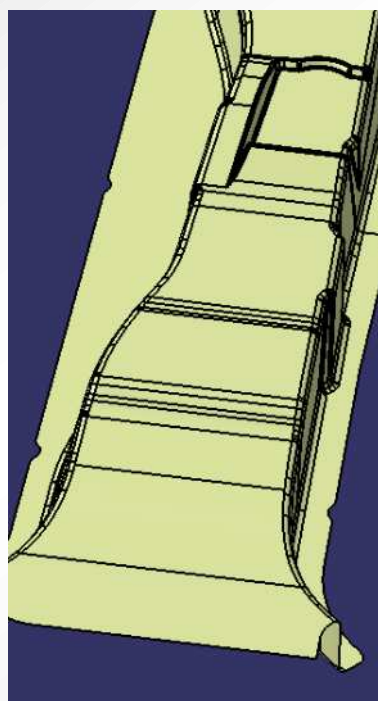
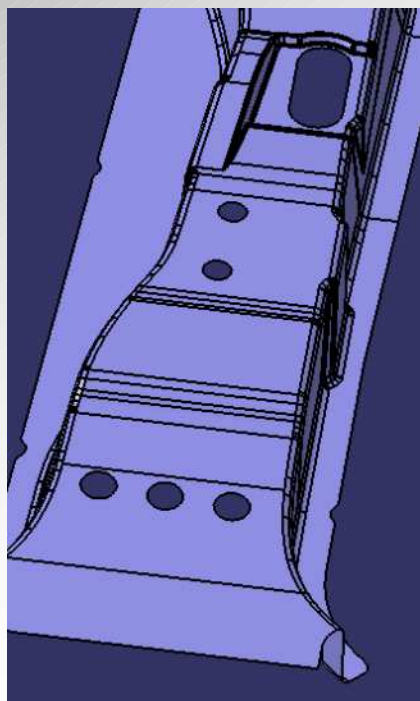
- A surface will be created following to curve length or sections (use of spine).
- The surface will be created removing overlapped portion of the two curves.





Hole filling

- Holes will be filled by the use of a basal surface of the surface after retrieving holes on the surface.
- Holes can be selectively filled by specifying each edge.

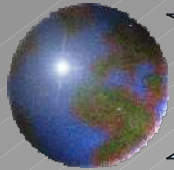


Holes successfully filled are temporarily displayed in blue.



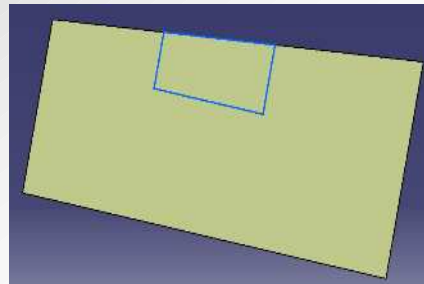
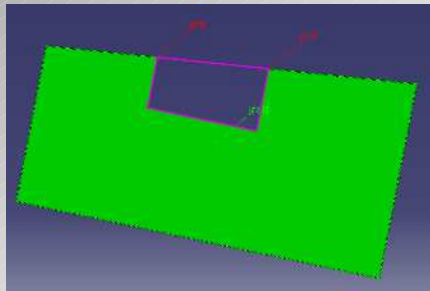
Holes can be selectively filled by specifying each edge.





Notch filling

- Specified Notch portion will be filled by using the base surface or by Fill surface.

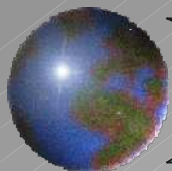


Result displayed in temporary figure.

- Notch filled by the base surface: **Blue**
- Notch filled by Fill surface: **Green**
- Notch filling is failed: **Red**

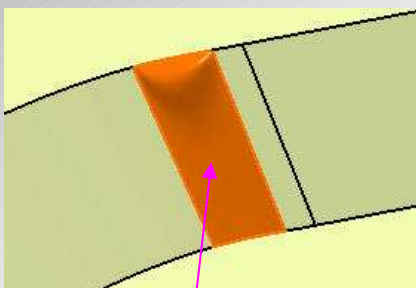
Connection method

(1) Base curve	(2) Line	(3) Arc	(4) Spline	(5) 2 Curves	(6) Direct curve

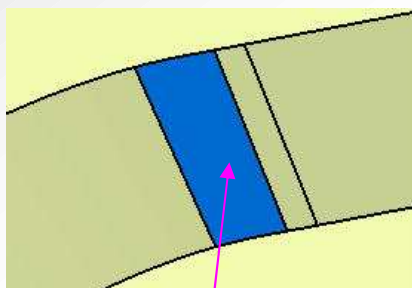


Surface fairing

- Defective surface such as wrinkle, distortion, very small surface and bend to surrounded surfaces will be reshaped.
- It can be used for data preparation for imported data from other system.

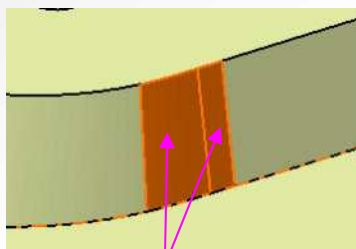


Target (distortion)

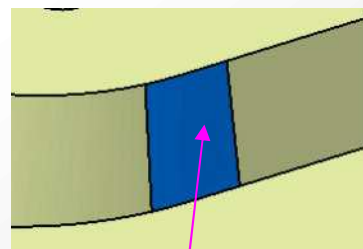
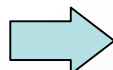


Reshaped surface

Removal of distortion in a face



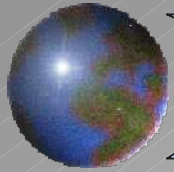
Target (adjacent two surfaces)



Reshaped surface (one surface)

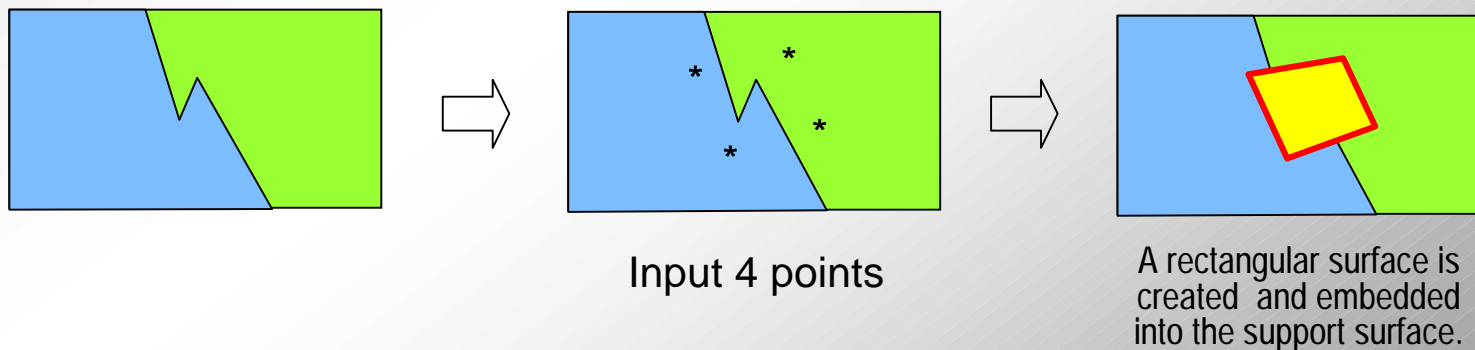
Merge a very small face into adjacent face.

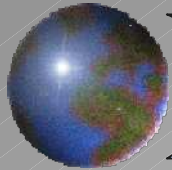




Surface fairing (taping)

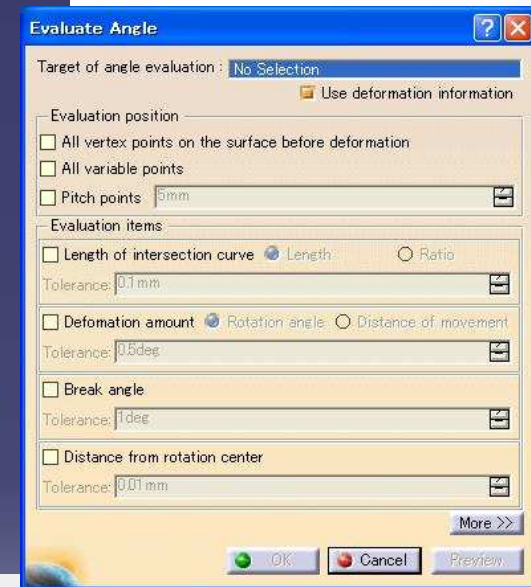
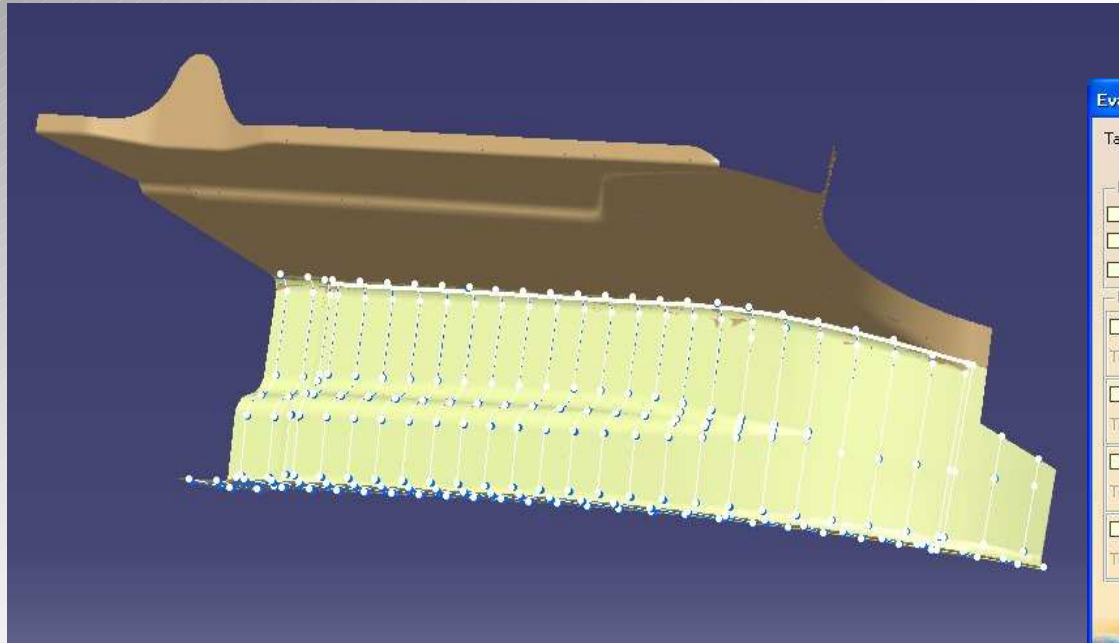
- Added to “Surface fairing” command.
- A function which covers over a defect shape by patching the portion with a rectangular surface. The shape such as
small gap or bend
small edge and face
tends to be generated at shapes imported from another system.





Angle evaluation

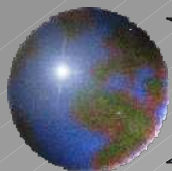
- Evaluate angle of surfaces deformed by spring back estimation.



Check items

- If length of cross section is equal before and after deformation.
- If each vertex is correctly rotated.
- If distance from crossing point of cross section plane and a base curve to each vertex on cross section is equal before and after deformation.
- If bend angle at crossing edge is preserved before and after deformation.

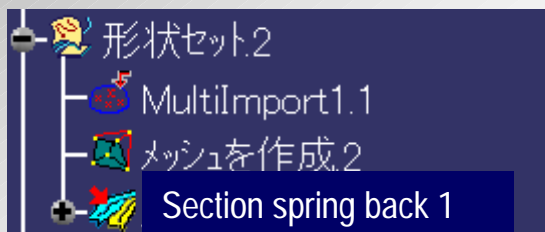




About cloud feature

- Only polygon can be used for a cloud feature in Dynavista.
- A command in “Digital shape editor” workbench of CATIA will be used for mesh creation in case of point cloud input.

- In case of point cloud data input



After import
(point clouds)

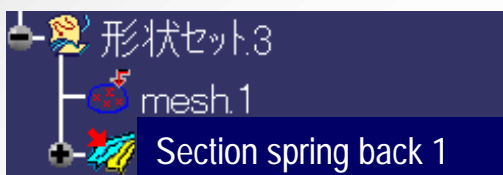


Make mesh



Dynavista

- In case of STL file input



After import
(polygon)



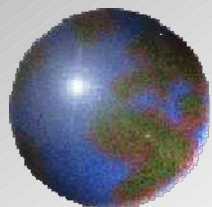
Dynavista

Section
spring back



Twist
modify





Dynavista

CAA V5 based

<http://www.unisys.co.jp/e/dynavista/>

Dynavista[®] is a registered trade mark of Nihon Unisys, Ltd. In Japan.
CATIA[®] and DELMIA[®] are registered trade marks of Dassault Systèmes S.A.
ENOVIA is a registered trade mark of Dassault Systèmes S.A.
SMARTEAM[®] is a registered trade mark of Smarteam Corporation.

All Rights Reserved, Copyright(C) 2011 Nihon Unisys, Ltd.