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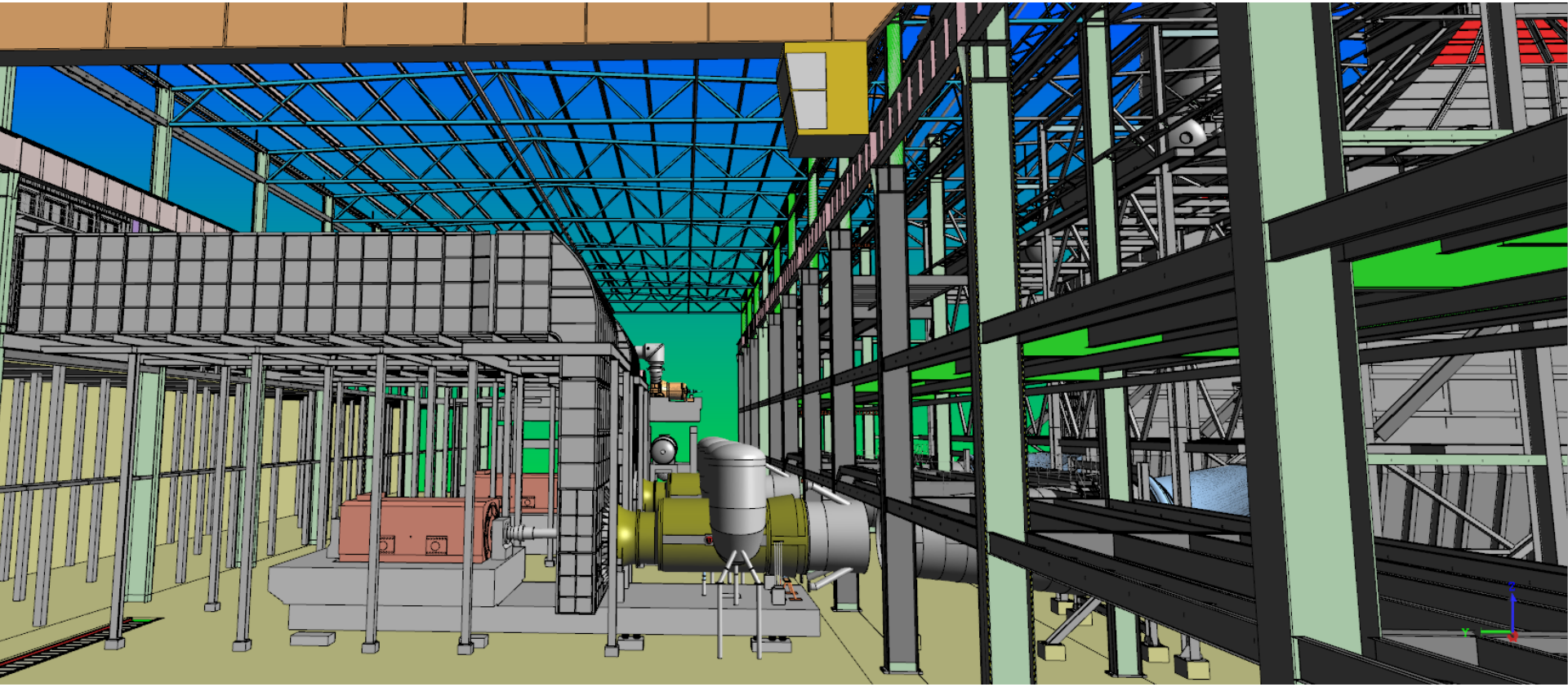
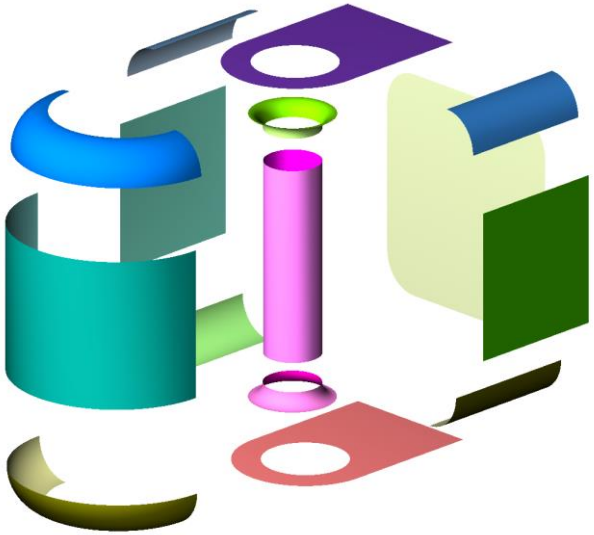
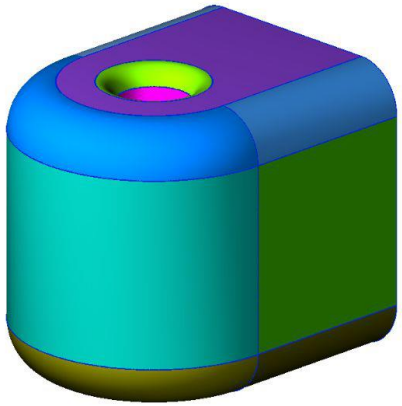
Our 3D Modeling Toolkit - Your Software Perfected

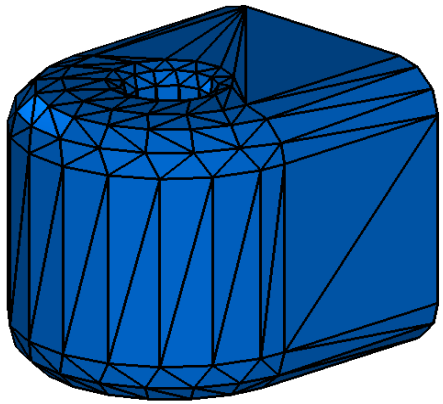


What is C3D Modeler?

SDK for Constructing and Editing 3D Models







B-rep and polygons

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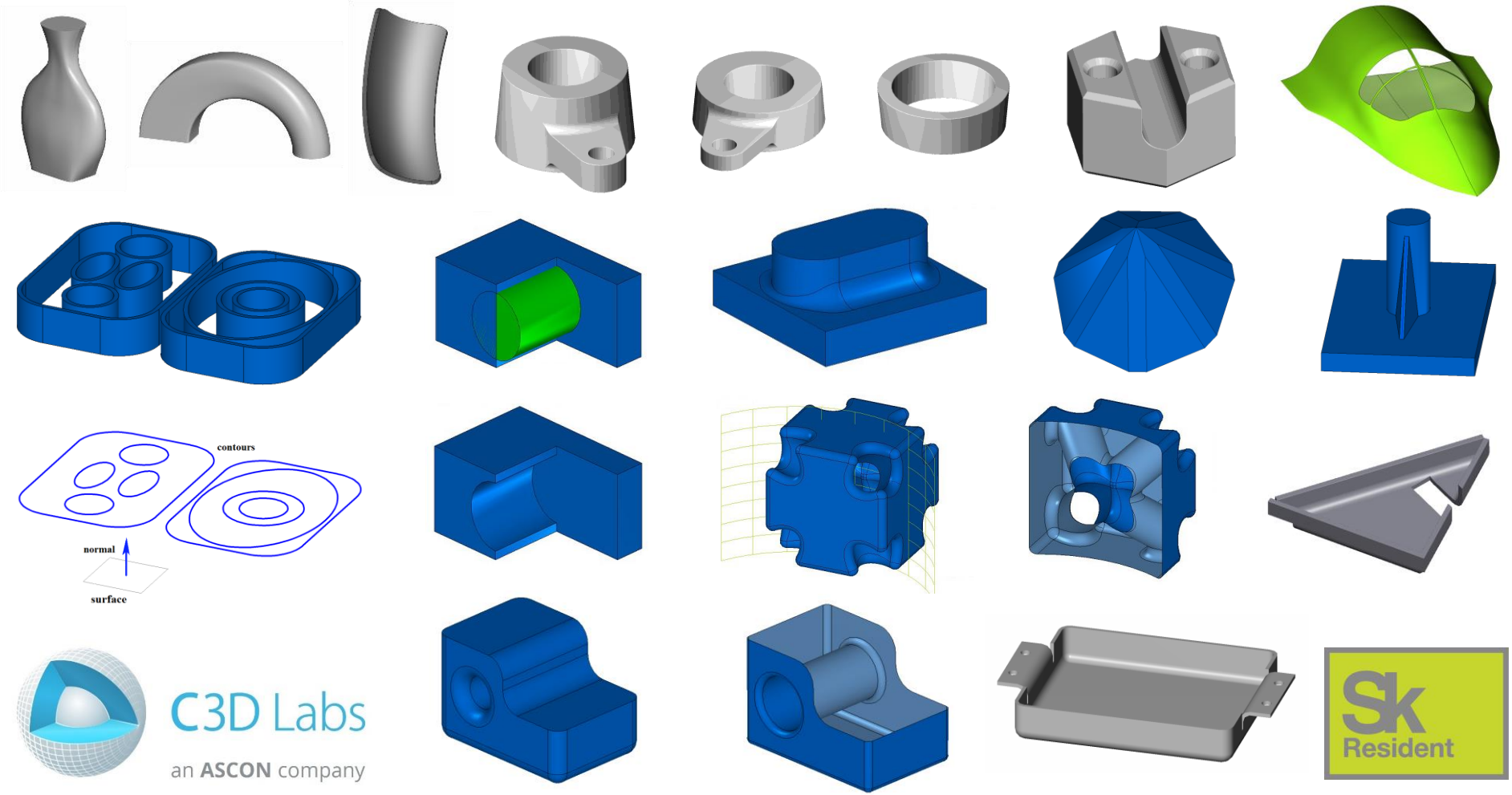
Main Features

Geometric Modeling Operations



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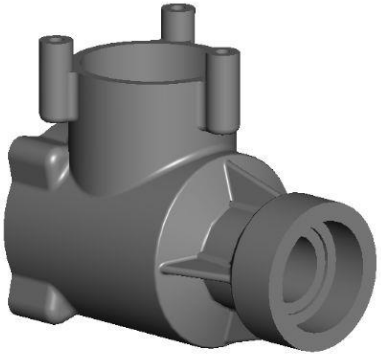
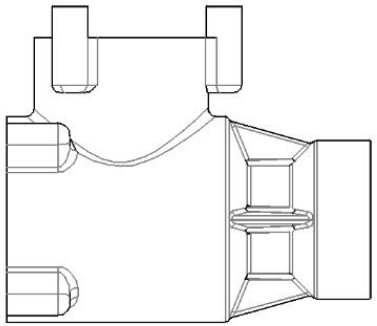
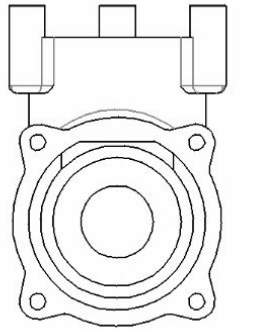
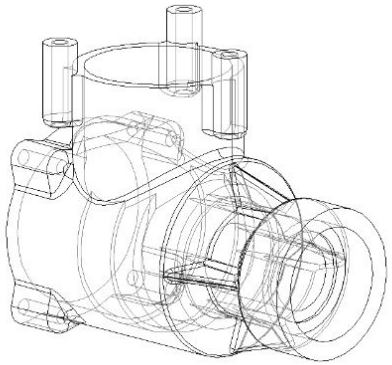
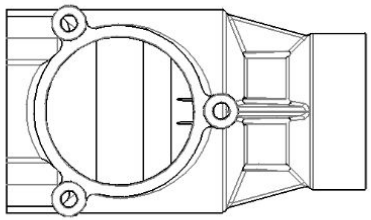
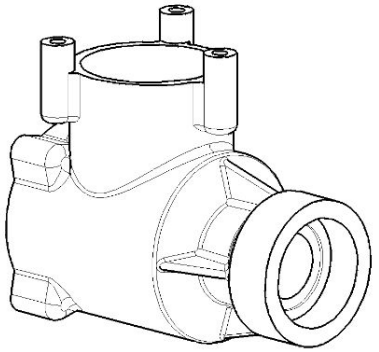
Main Features

Planar Projections

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Main Features

Geometric Calculations

The surface area $S = \iint_{\Omega} \sqrt{g_{11}g_{22} - g_{12}^2}\,du\,dv.$

Volume $\mathbf{F}(\mathbf{r}) = \mathbf{r}$

$$V = \frac{1}{3}\iiint_V \nabla\cdot(\mathbf{r})\,dV = \frac{1}{3}\iint_S \mathbf{m}\cdot\mathbf{r}\,dS = \frac{1}{3}\iint_{\Omega} \mathbf{m}\cdot\mathbf{r}\sqrt{g_{11}g_{22} - g_{12}^2}\,du\,dv.$$

Mass $M = \rho V$

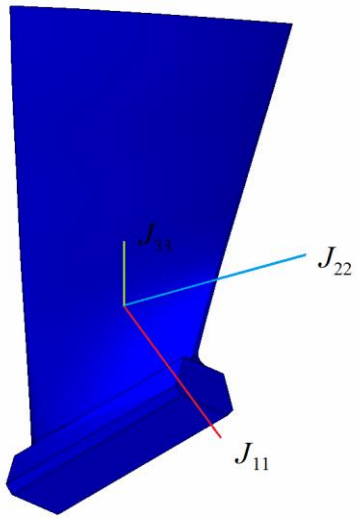
The center of mass $\mathbf{F}(\mathbf{r}) = x\mathbf{r}$, $\mathbf{F}(\mathbf{r}) = y\mathbf{r}$, $\mathbf{F}(\mathbf{r}) = z\mathbf{r}$

$$x_c = \frac{1}{M}\iiint_V \rho x\,dV,\quad y_c = \frac{1}{M}\iiint_V \rho y\,dV,\quad z_c = \frac{1}{M}\iiint_V \rho z\,dV$$

Moments of inertia

$$J_{xx} = \iiint_V \rho\left(y^2 + z^2\right)dV,\quad J_{yy} = \iiint_V \rho\left(z^2 + x^2\right)dV,\quad J_{zz} = \iiint_V \rho\left(x^2 + y^2\right)dV$$

$$J_{xy} = J_{yx} = \iiint_V \rho\, xy\,dV,\quad J_{yz} = J_{zy} = \iiint_V \rho\, yz\,dV,\quad J_{zx} = J_{xz} = \iiint_V \rho\, xz\,dV$$



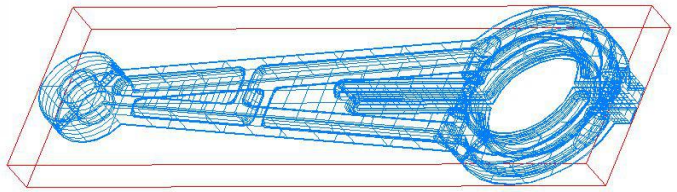
$$\mathbf{J} = \begin{bmatrix} J_{xx} & -J_{xy} & -J_{xz} \\ -J_{yx} & J_{yy} & -J_{yz} \\ -J_{zx} & -J_{zy} & J_{zz} \end{bmatrix}$$

Principal central moments of inertia

$$\mathbf{J} = \begin{bmatrix} J_{11} & 0 & 0 \\ 0 & J_{22} & 0 \\ 0 & 0 & J_{33} \end{bmatrix}$$

$$\mathbf{J}\cdot\mathbf{e} - \lambda\,\mathbf{e} = 0$$

$$\lambda^3 - I_1\lambda^2 + I_2\lambda - I_3 = 0$$



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What's New?

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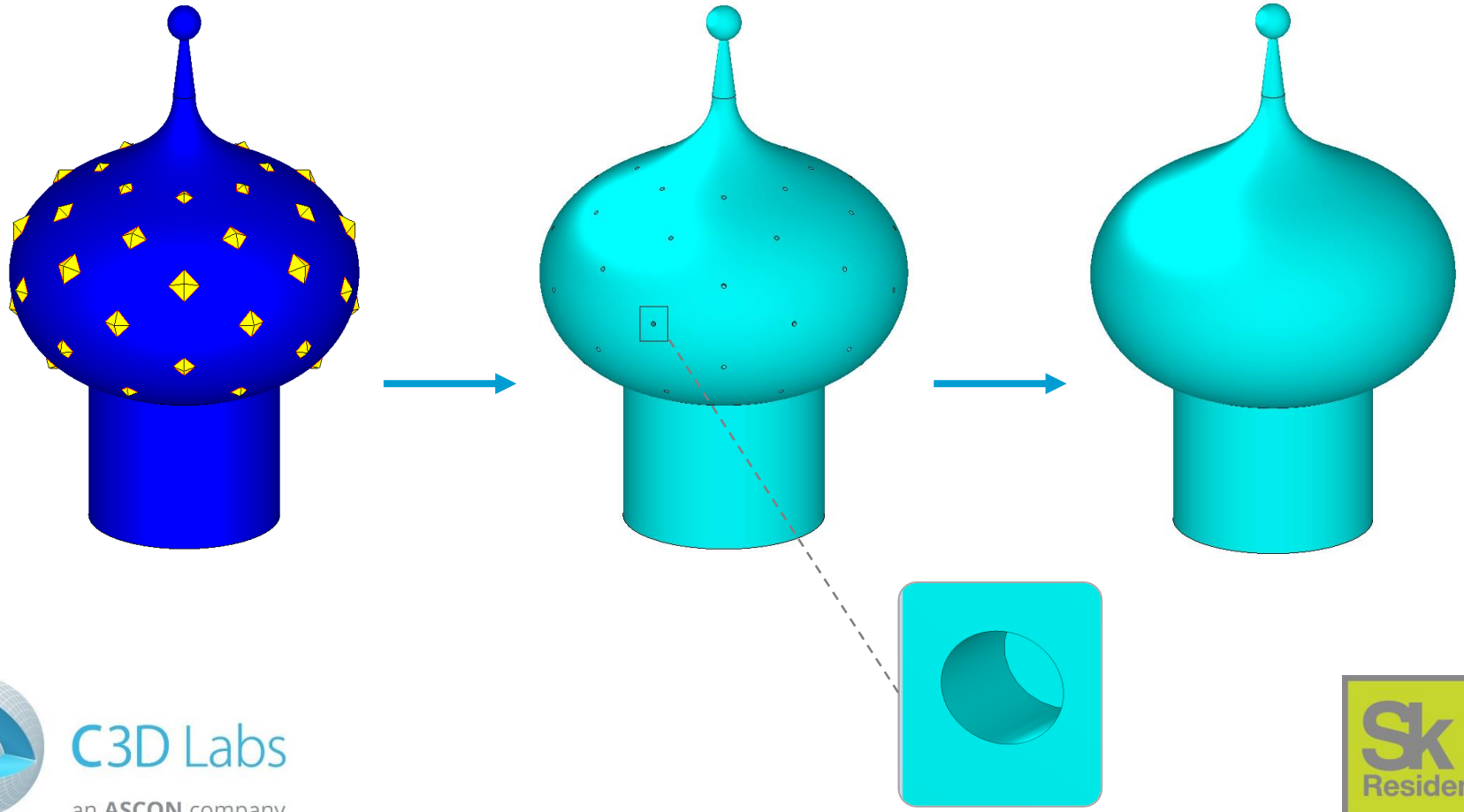
Removing Holes



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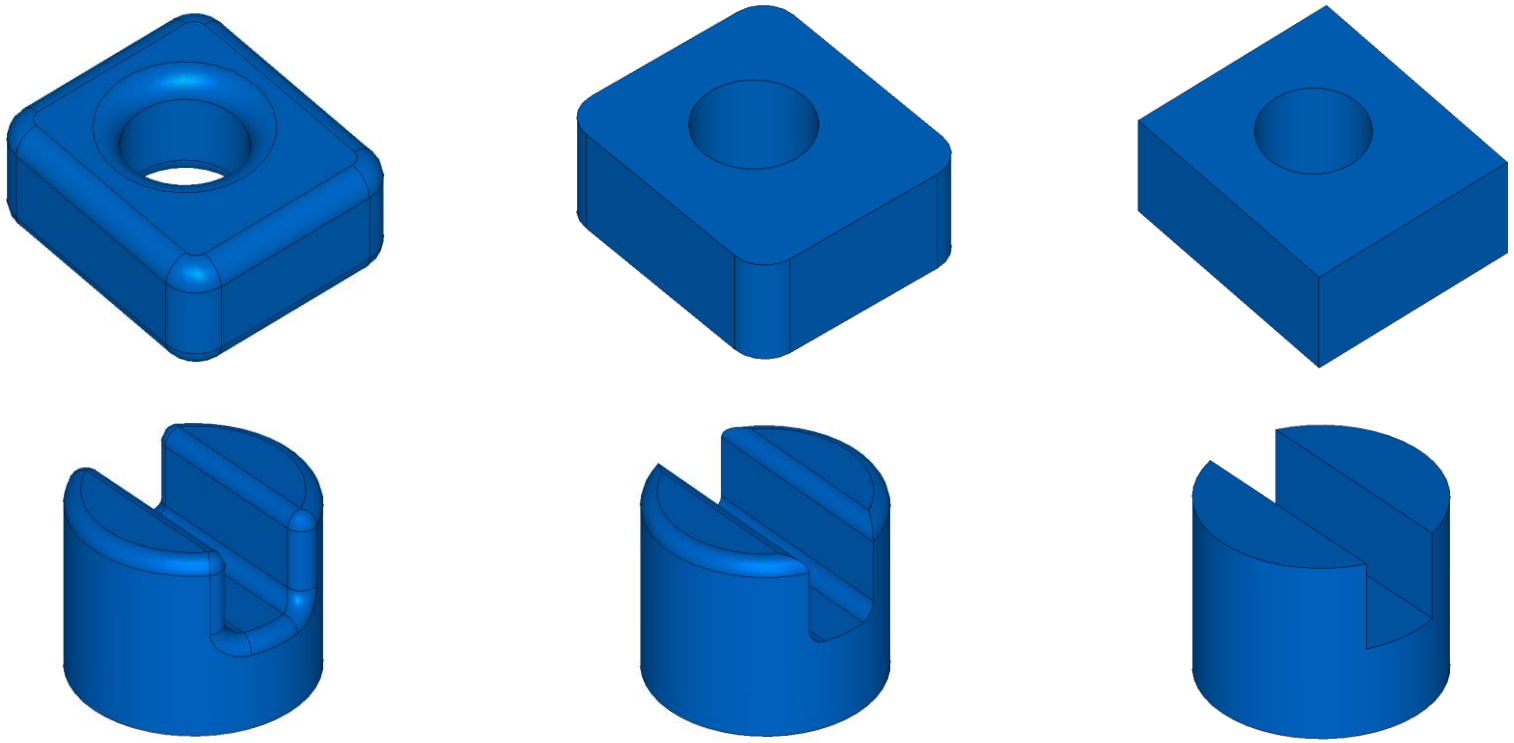
Removing Fillets



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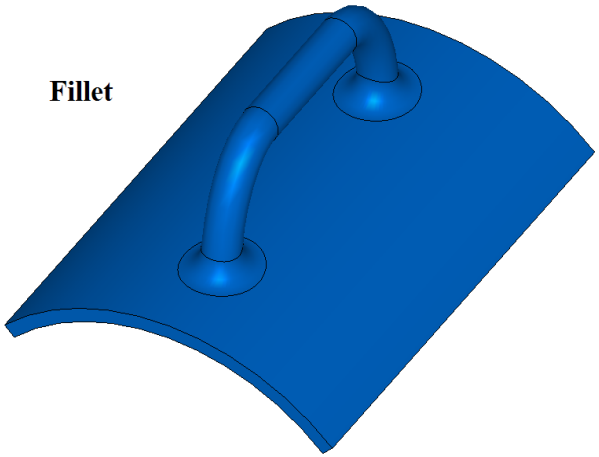
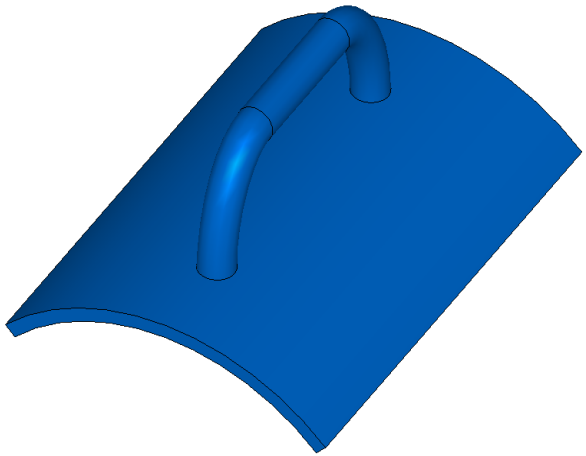
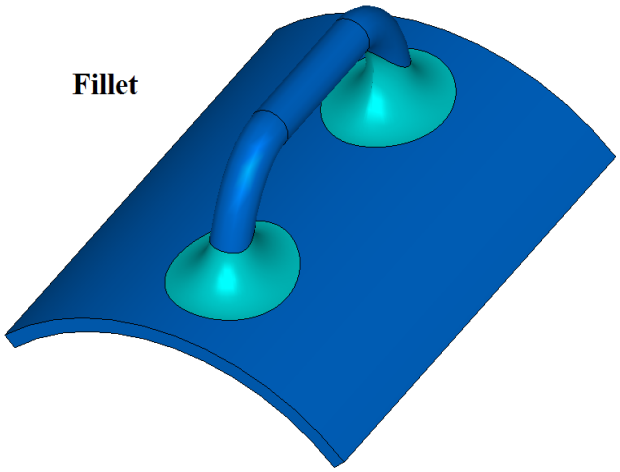
Modifying Fillets







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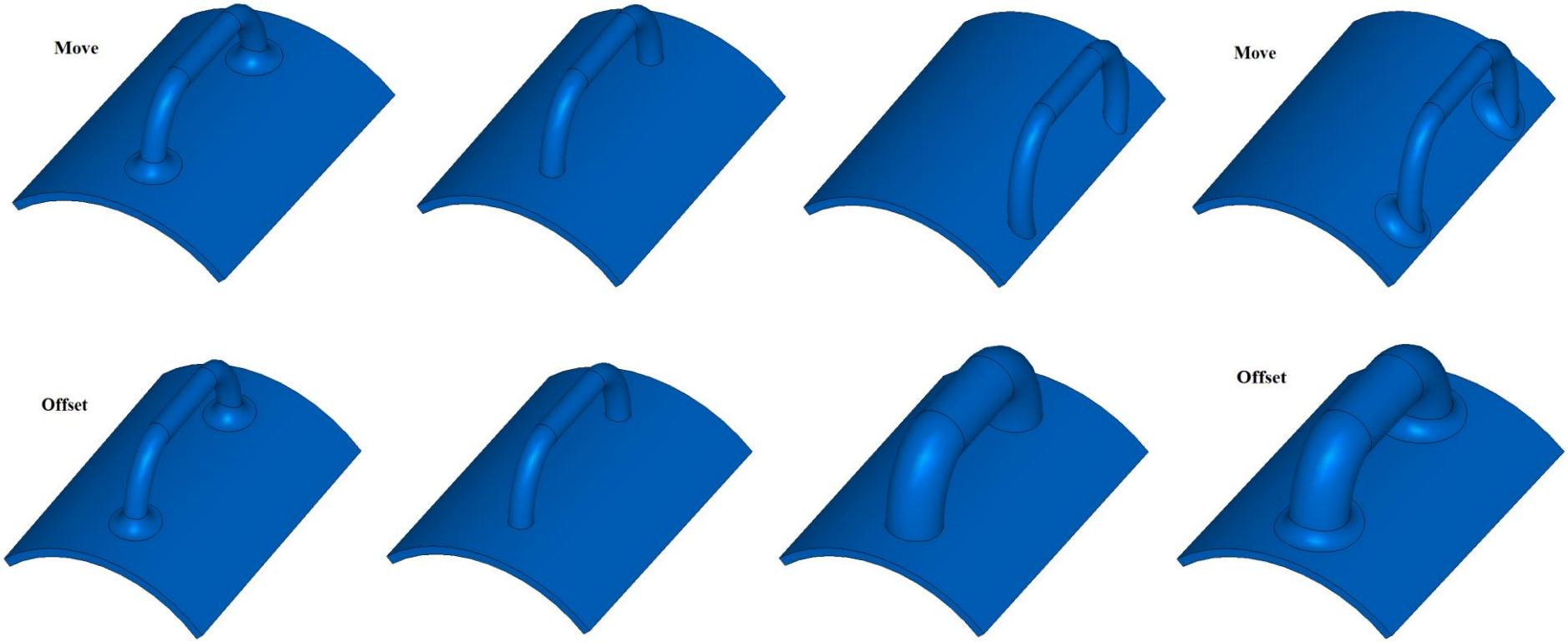
Direct Modeling



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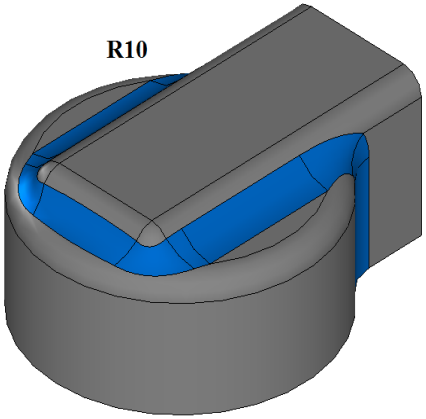
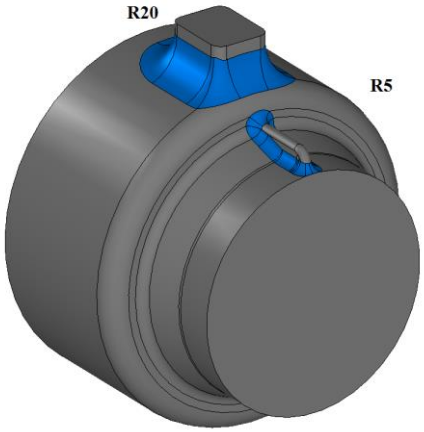
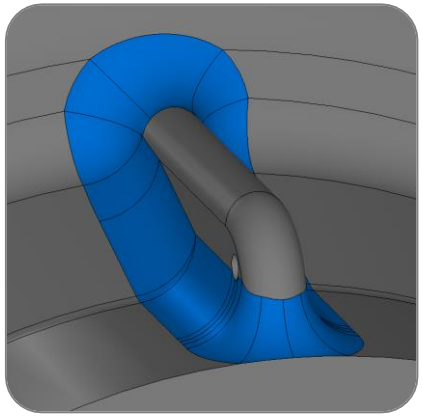
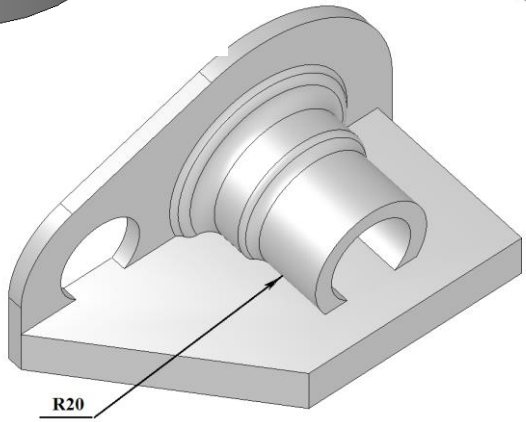
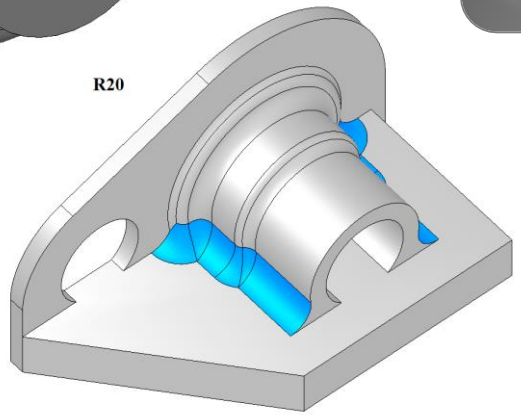
Better Casting Radii Construction











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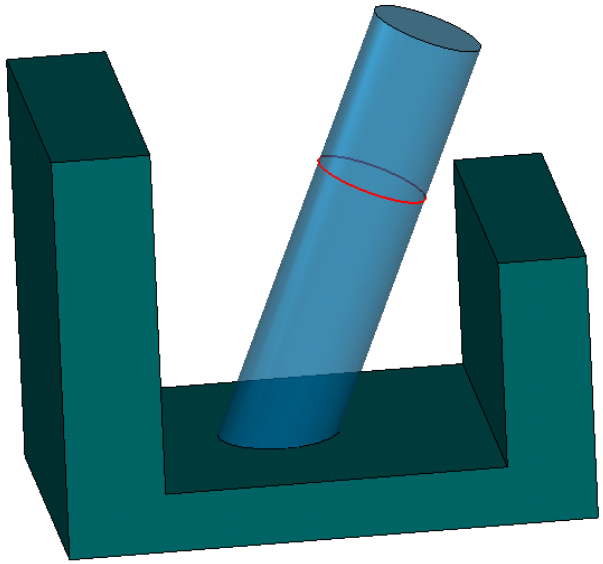
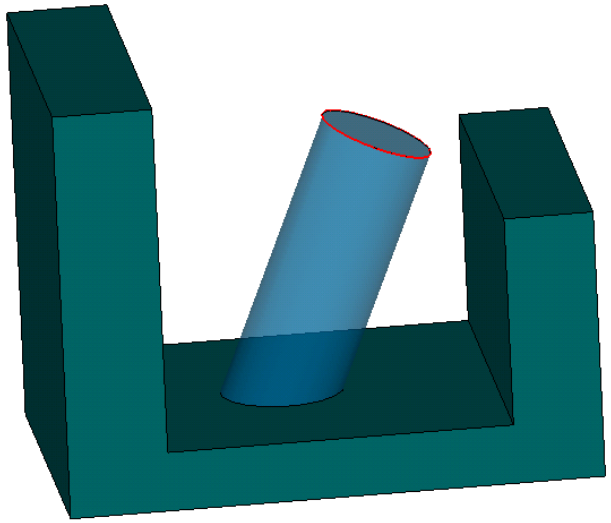
Extruding Contour to the Nearest Body



2016



2017

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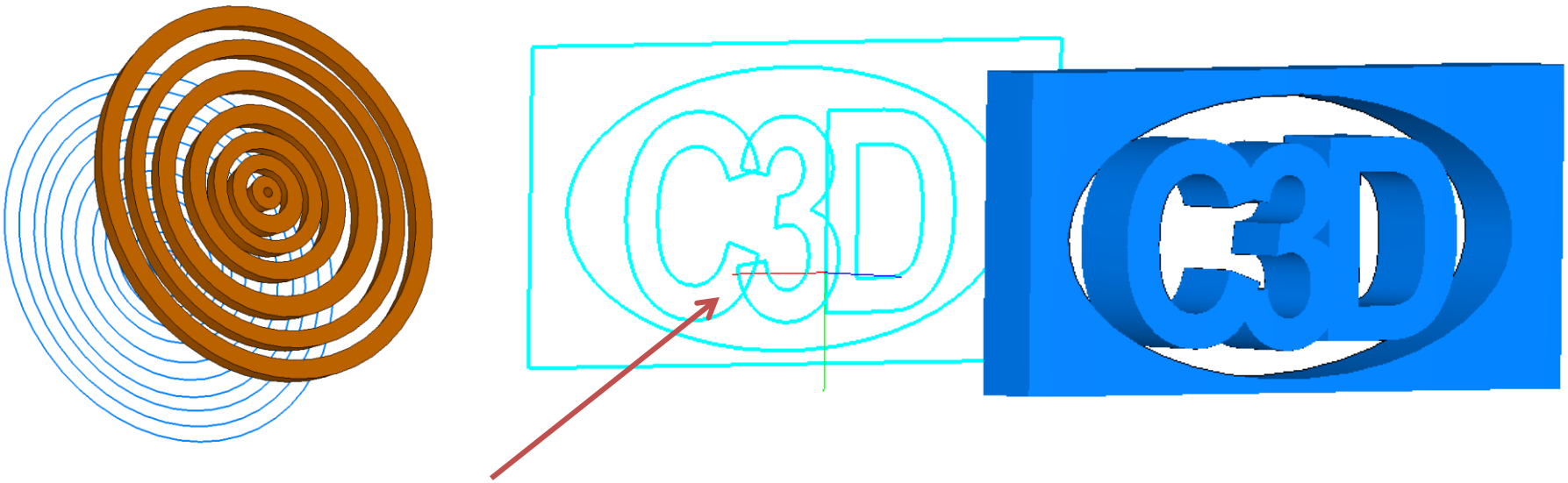
Extruding Multiple Contours



Intersections support implemented

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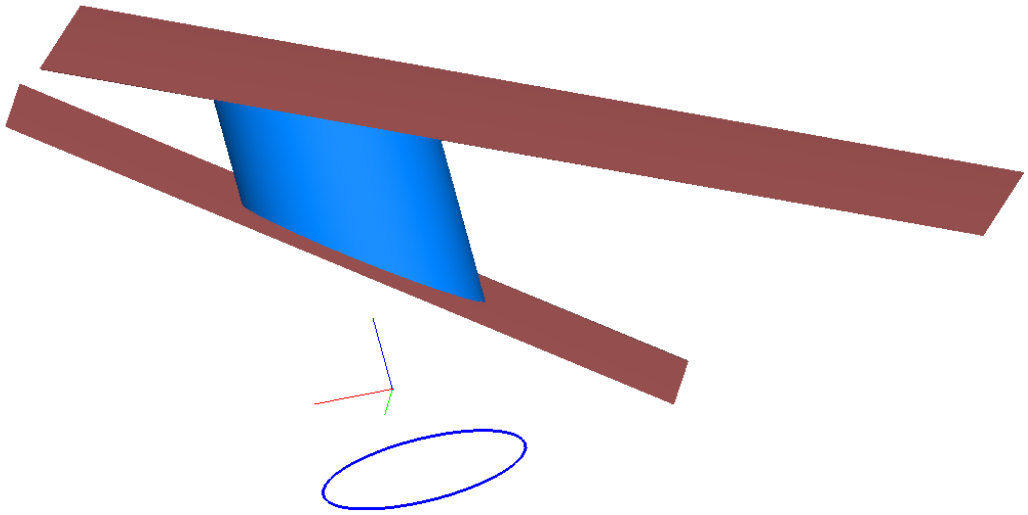
Extruding Sketch to a Couple of Surfaces



Both surfaces lie on one side

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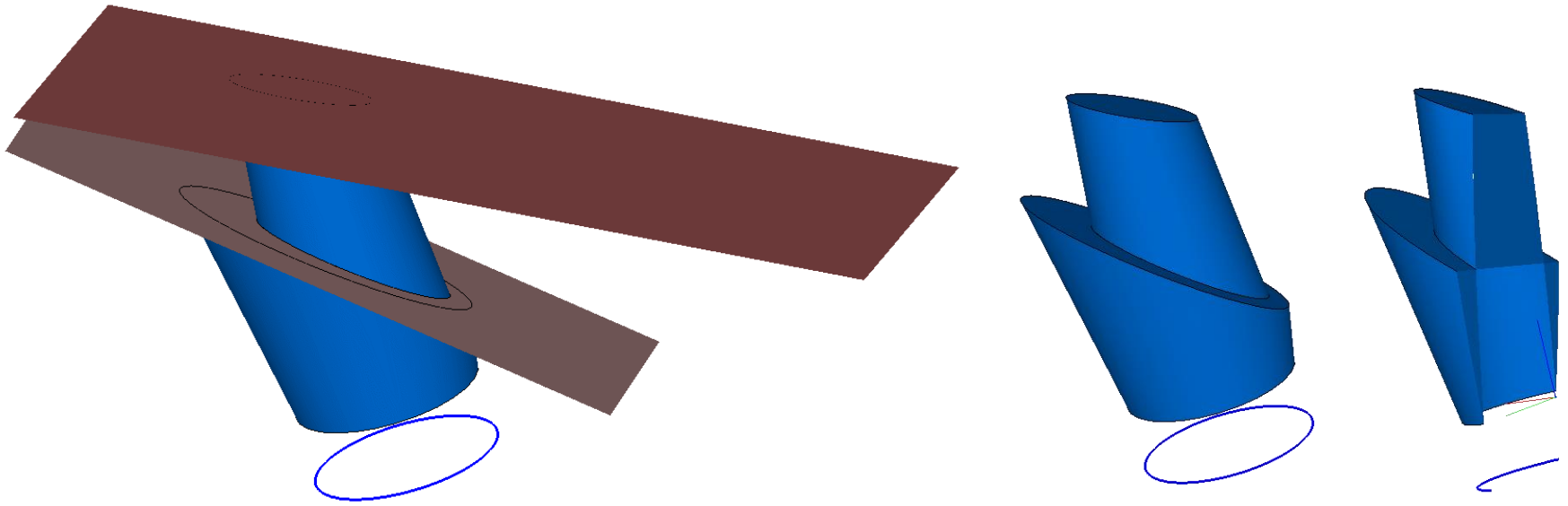
Extruding Sketch to a Couple of Surfaces



Specifying of slopes
is available now!

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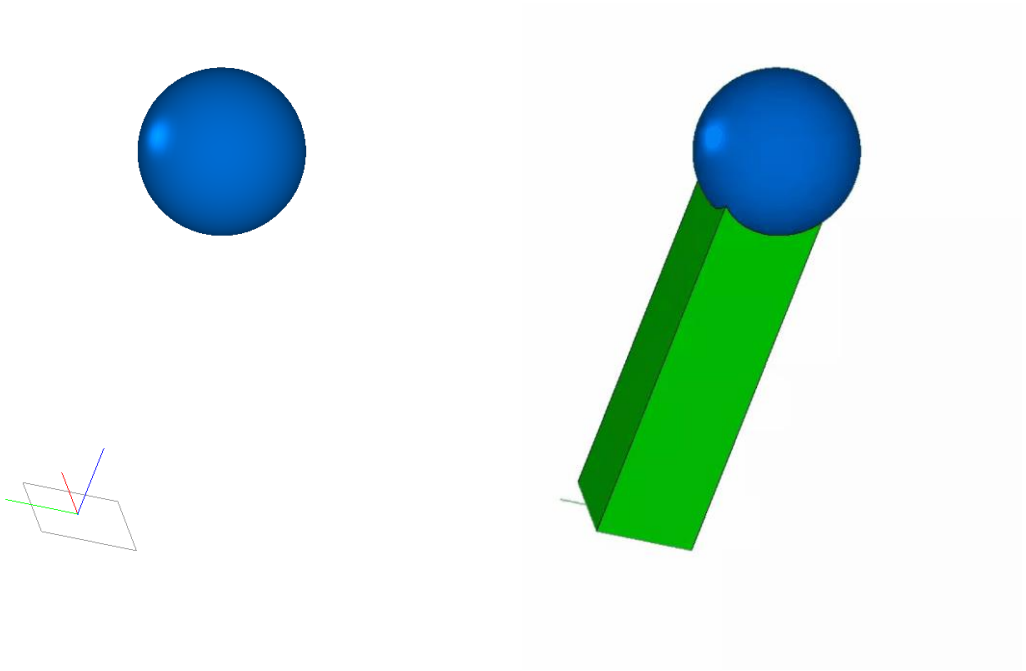
Extruding Sketch Consistent with Surface



+ smooth sketch crossing
within direction change

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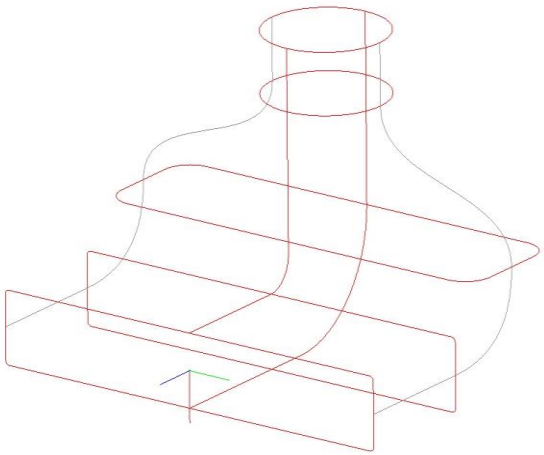
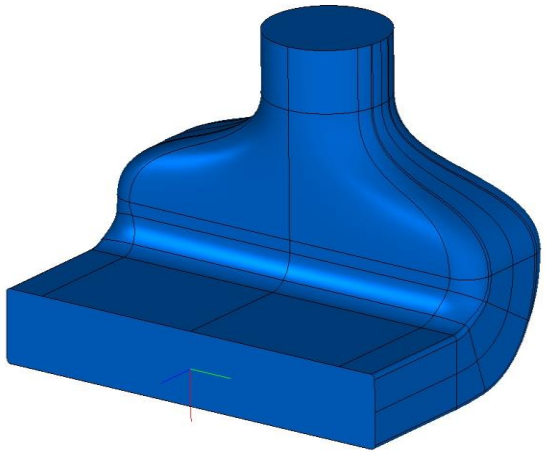
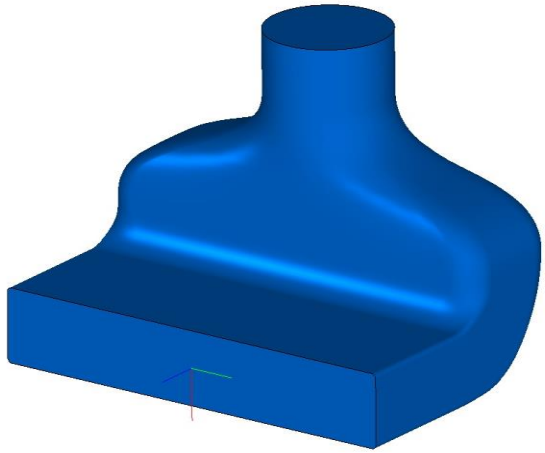
Creating Lofted Bodies



C3D V2016



C3D V2017



Improved with use of sections and several guiding paths

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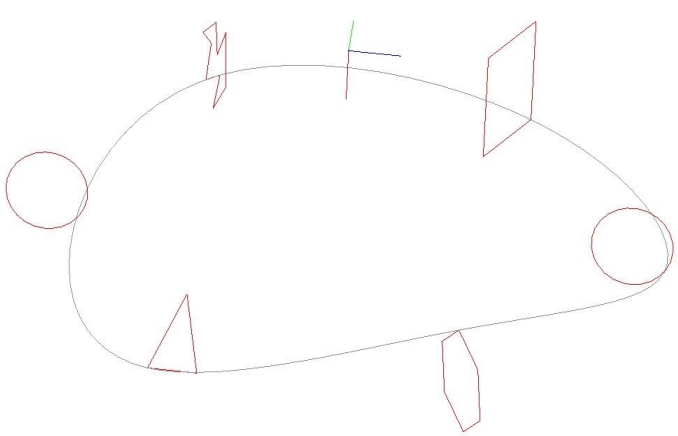
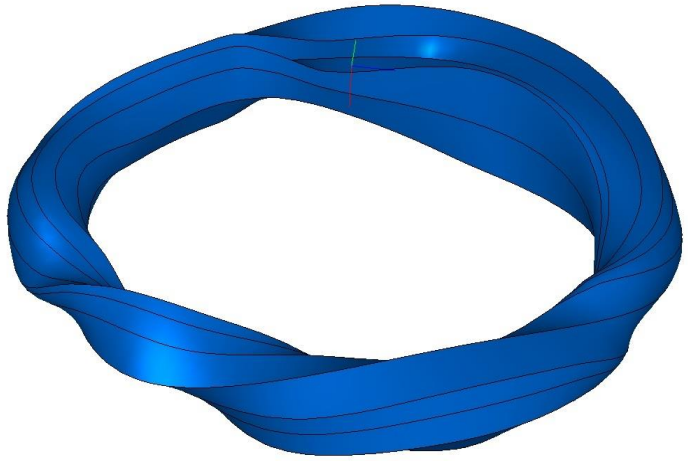
Creating Lofted Bodies





You can build bodies based
on the most difficult sections!

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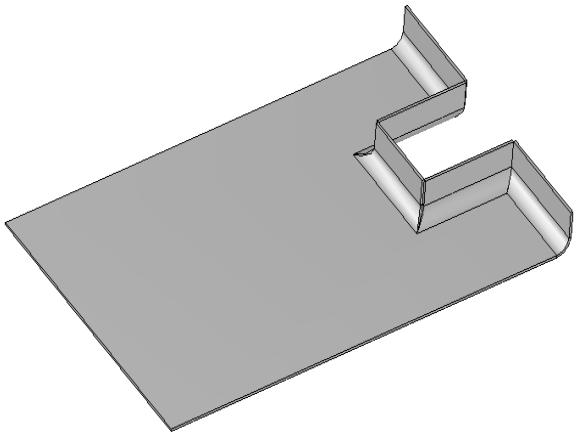
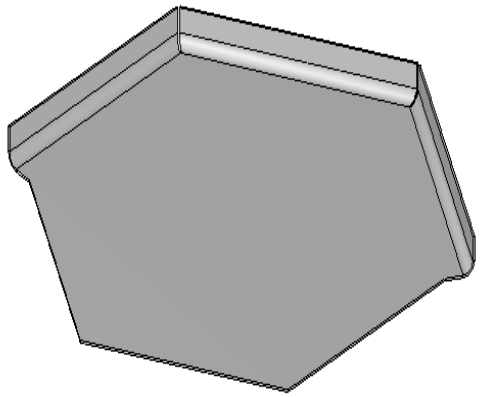
Sheet Metal Bends Update





They are performed even for plenty edges

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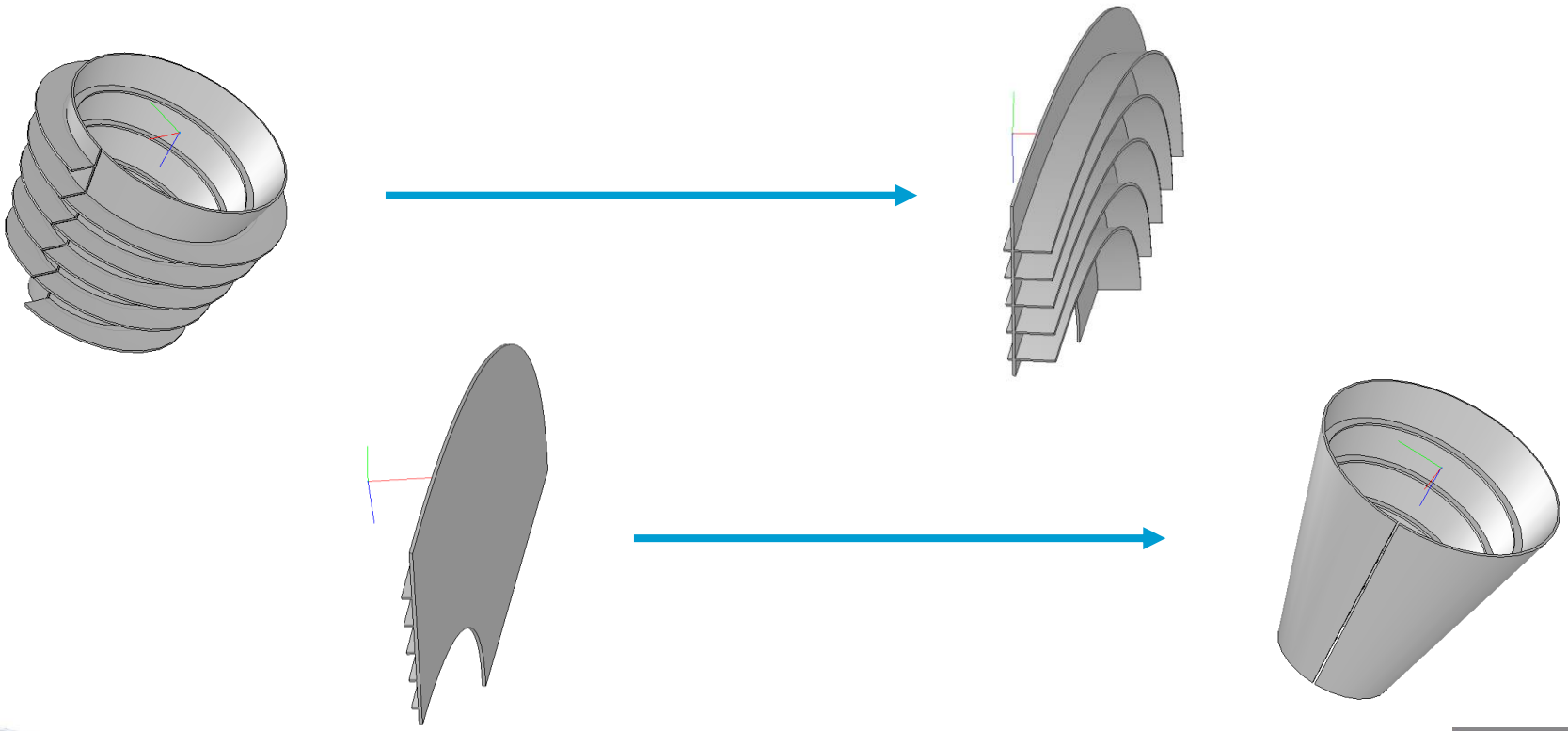
Bends and Unbends of Sheet Metal Bodies



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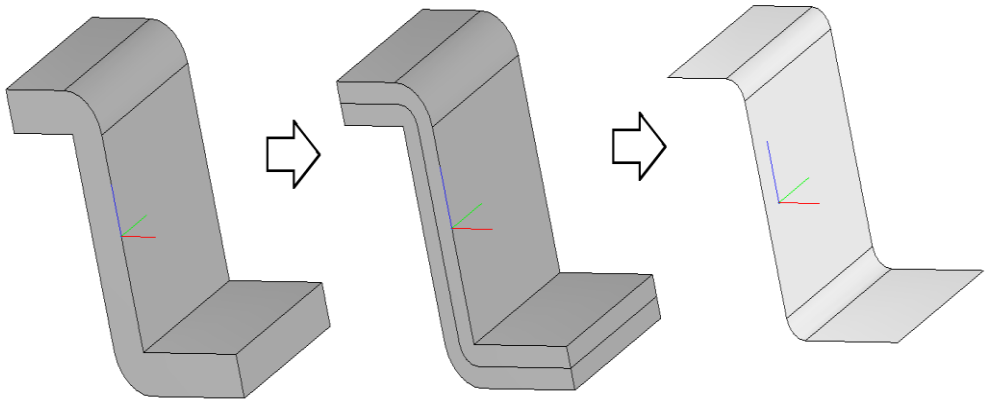
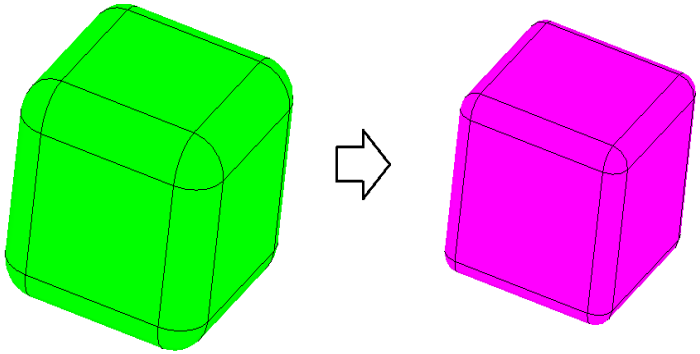
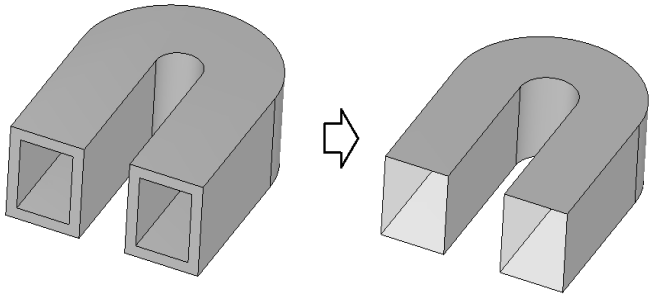
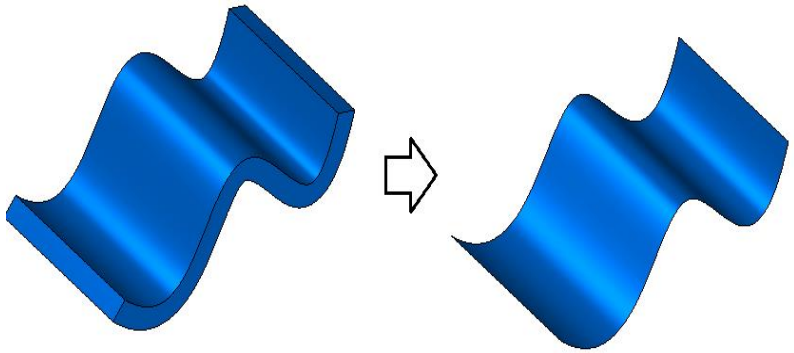
Mid-Surface Shells for Thin-Walled Solids









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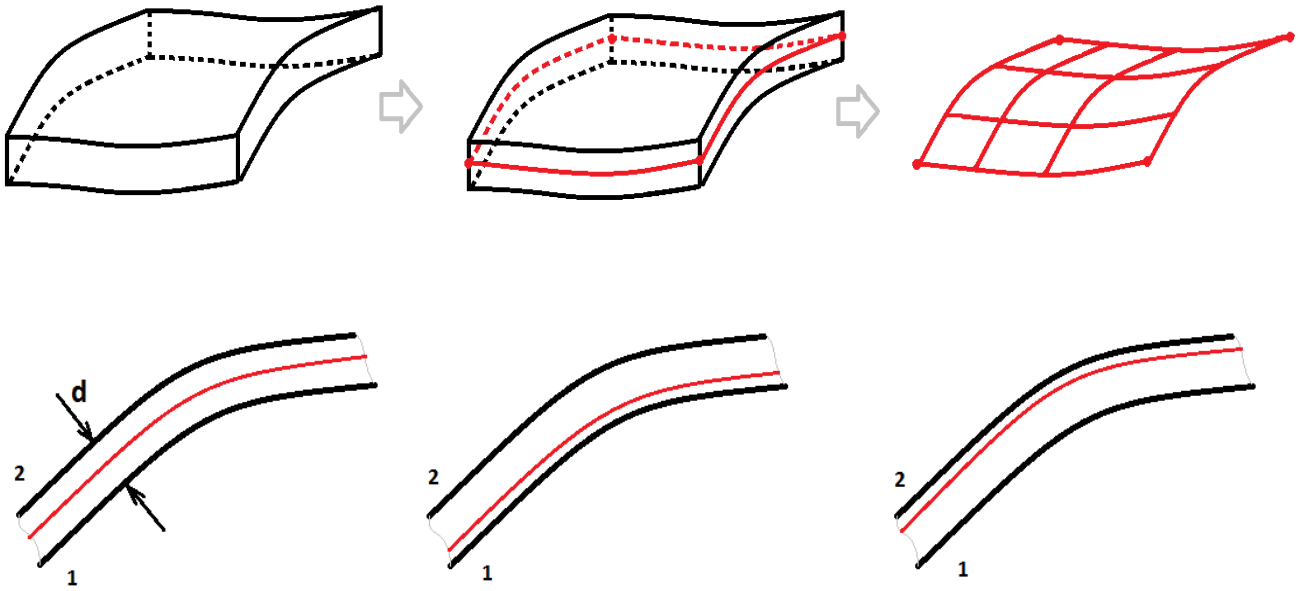
Mid-Surface Shells for Thin-Walled Solids



Options:

- single
- multiple
- all edges (offset = d)

0<t<d (0.5d, 0.25d, 0.75d)

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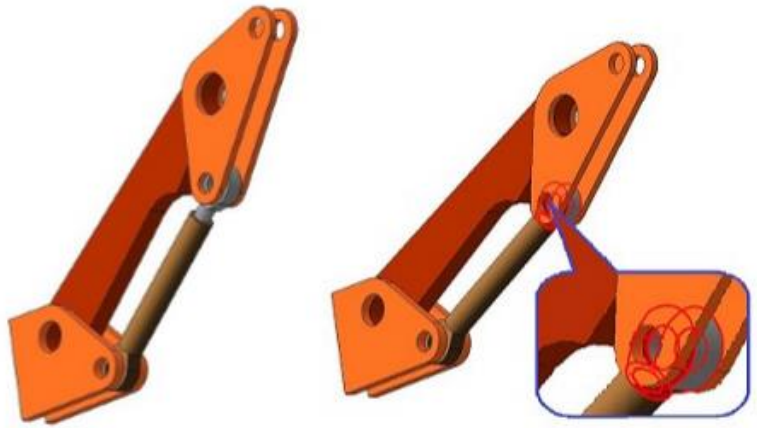
User Setup for Collision Detection



Find all collisions or
stop when the first one is determined

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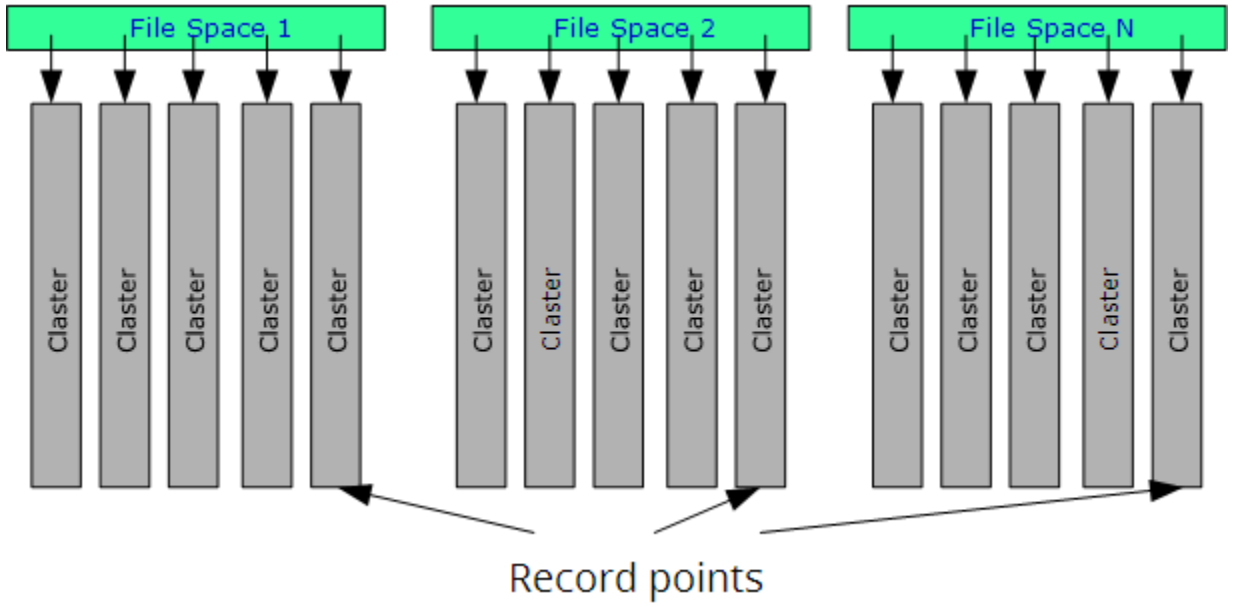
Tree-Structure Storage of 3D Model



Opens up new opportunities for separate reading of geometric model objects

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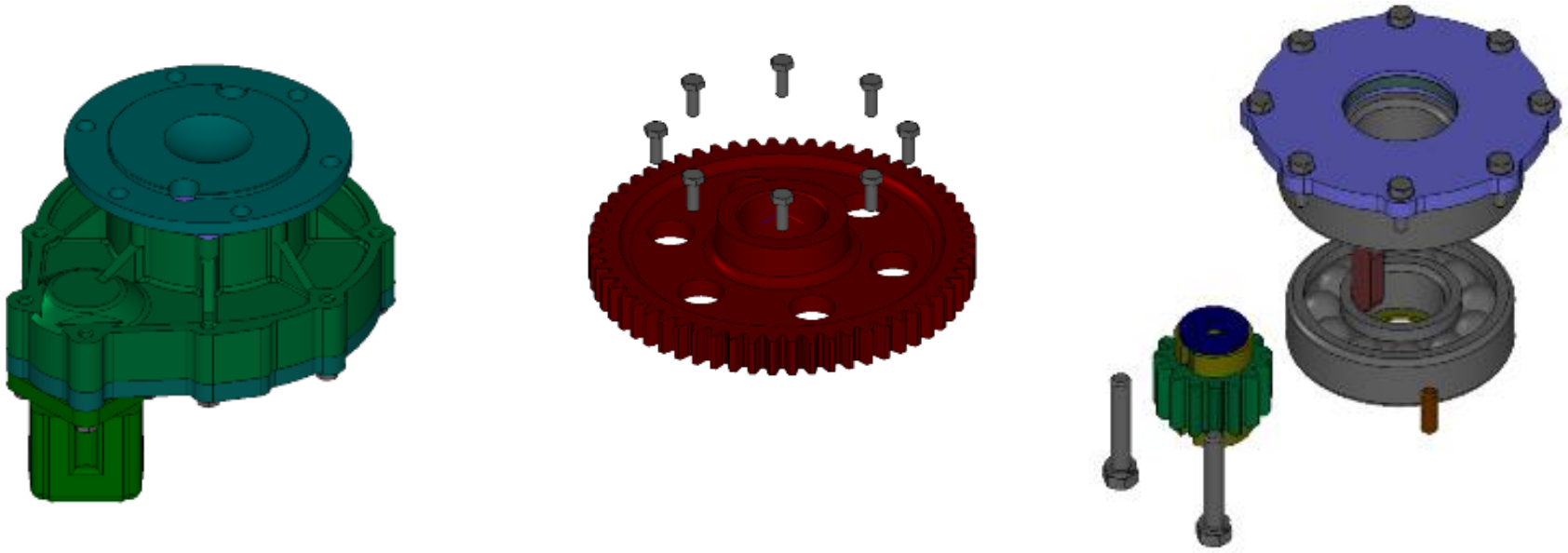
Tree-Structure Storage of 3D Model



Reading objects by selection, type or size

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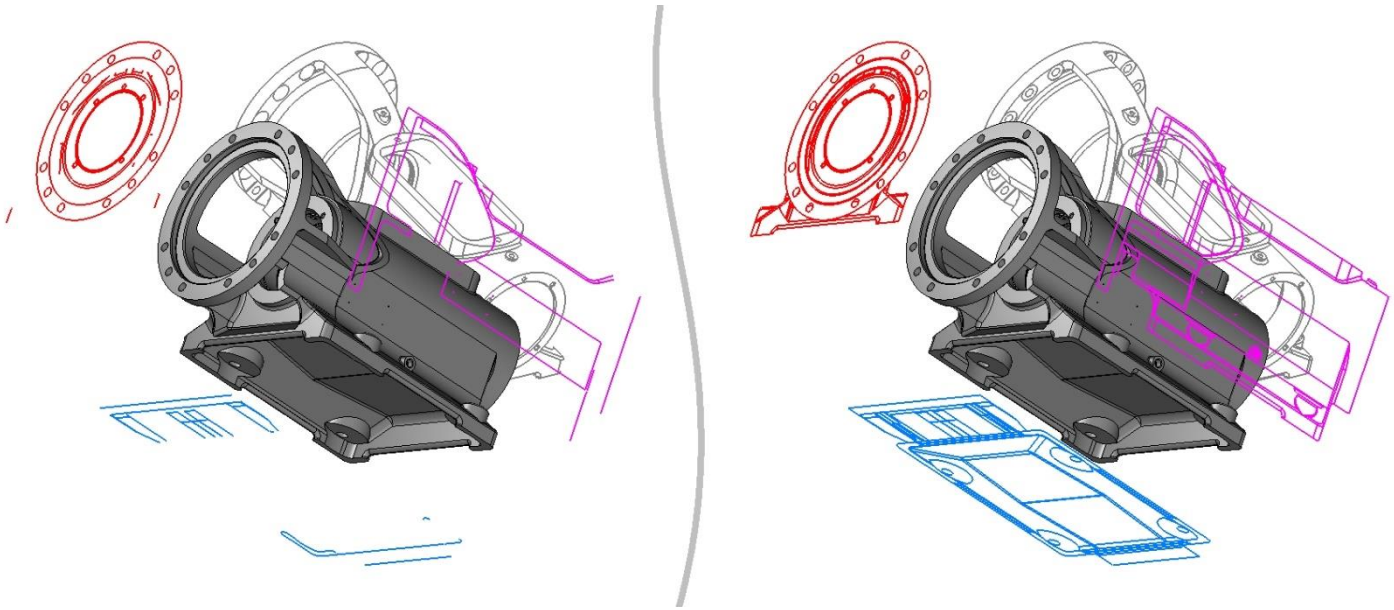
Multi-threaded Modes Realized



Calculating planar projections, tessellation and mass inertia properties, converting models

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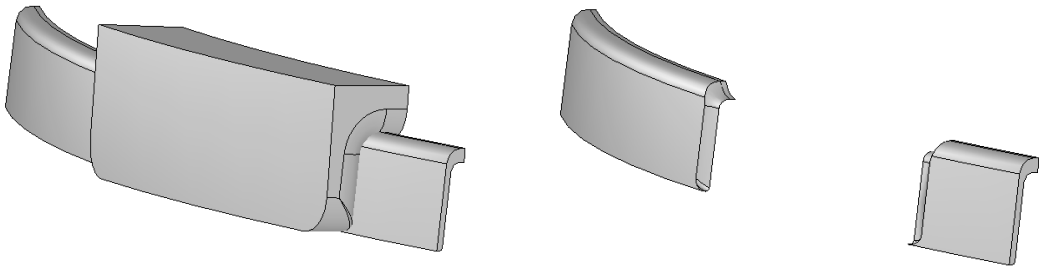
Significant Upgrades

- Merger manager for operations with edges & faces
- Samples of working with user attributes
- Improved performance in Boolean operations
- Accelerated building NURBS with large sets of points



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Future Plans

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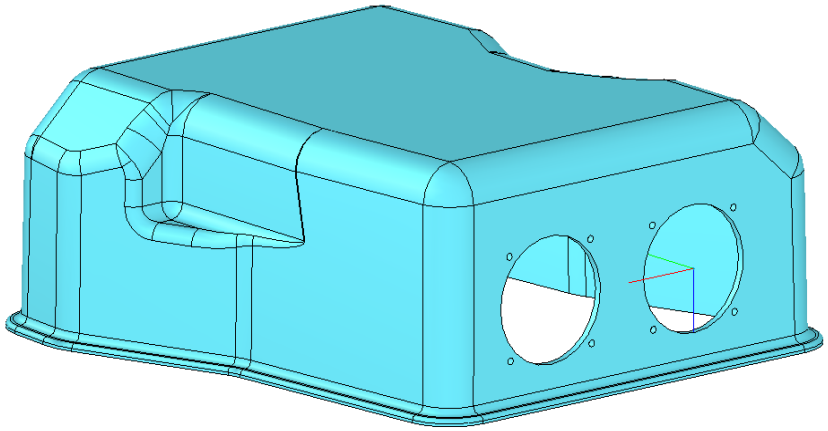
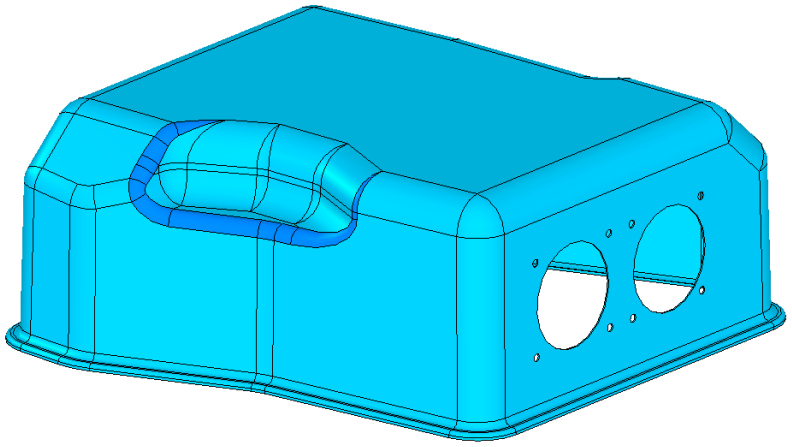
Future Plans for C3D Modeler

Improving Fillets





+ NEW functionality for filleting faces

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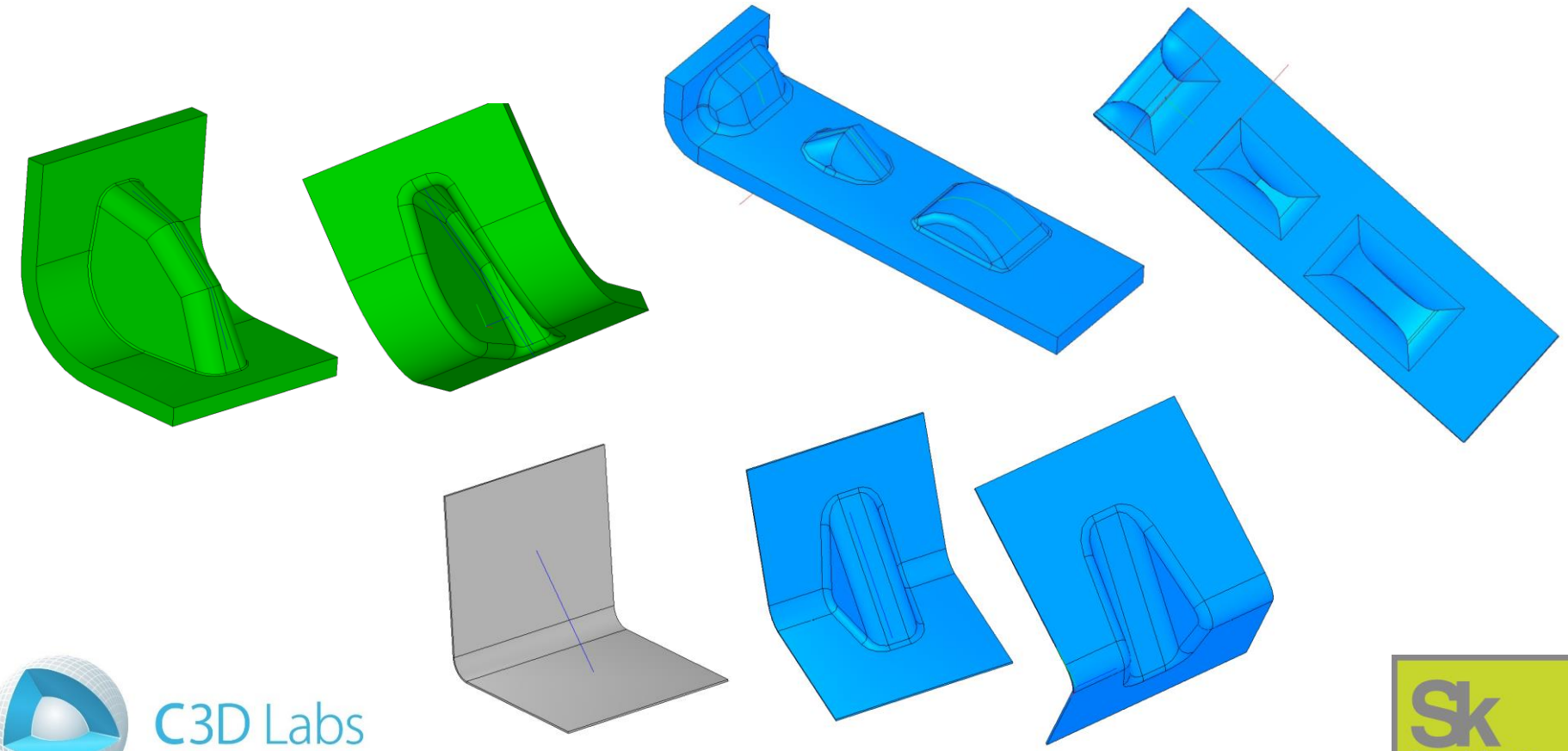
Future Plans for C3D Modeler

Creating Reinforcement Ribs for Sheet Metal Bodies



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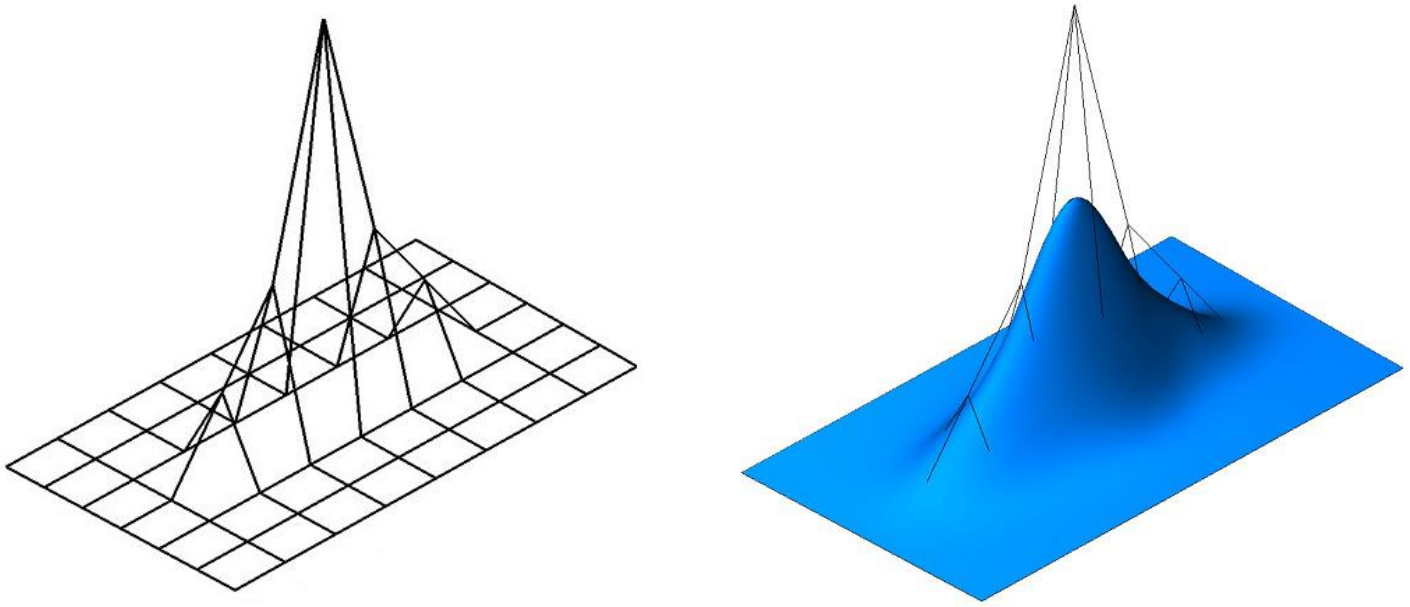
Future Plans for C3D Modeler

Updating Surface Modeling Operations



+ implementing smoothness manager for NURBS surfaces

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Thank You!

Arkadiy Kamnev

Marketing Manager

kamnev@c3dlabs.com

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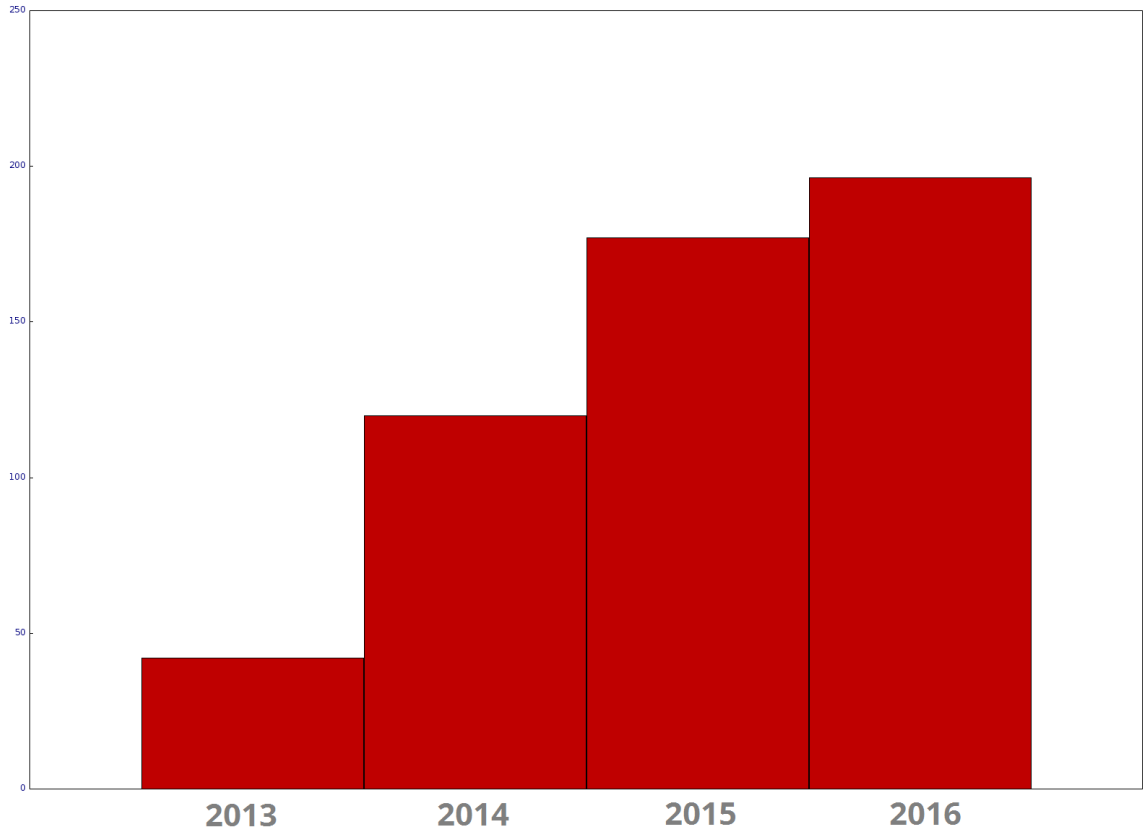
C3D Toolkit 2017

Technical Support Request Statistics



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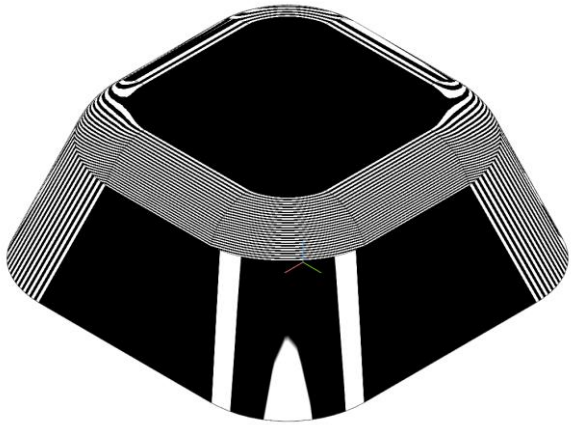
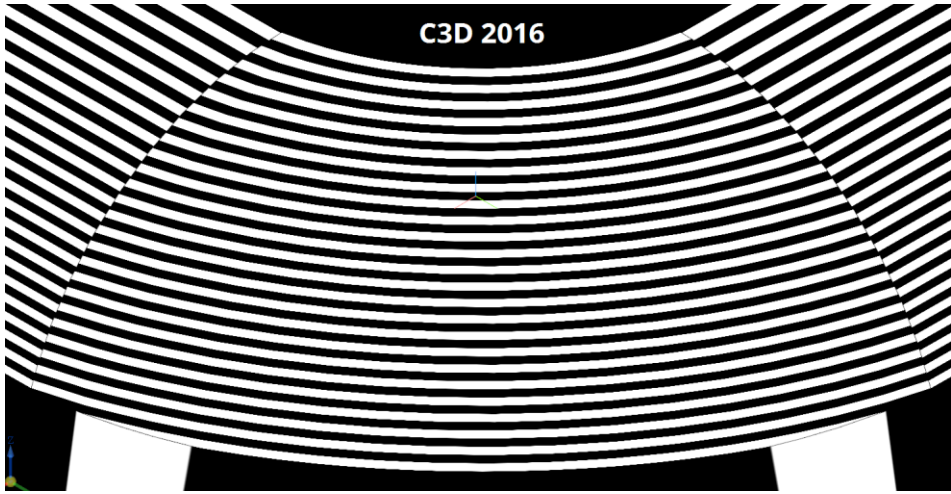
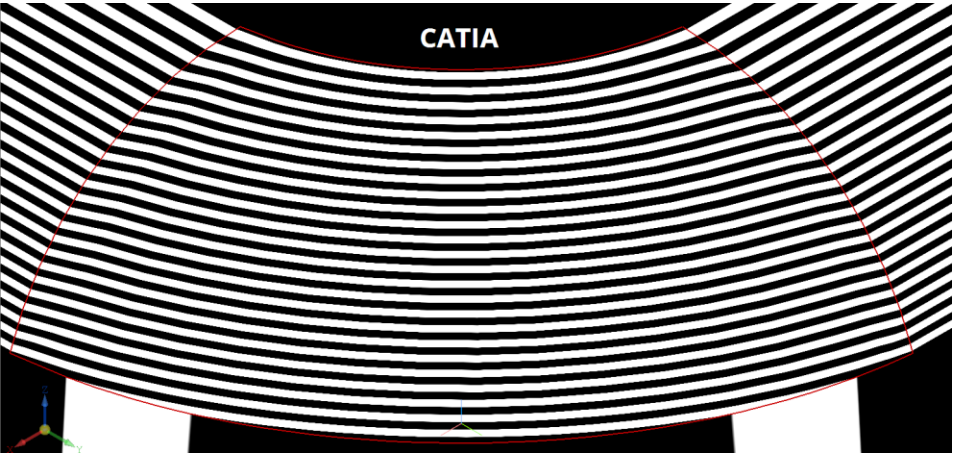
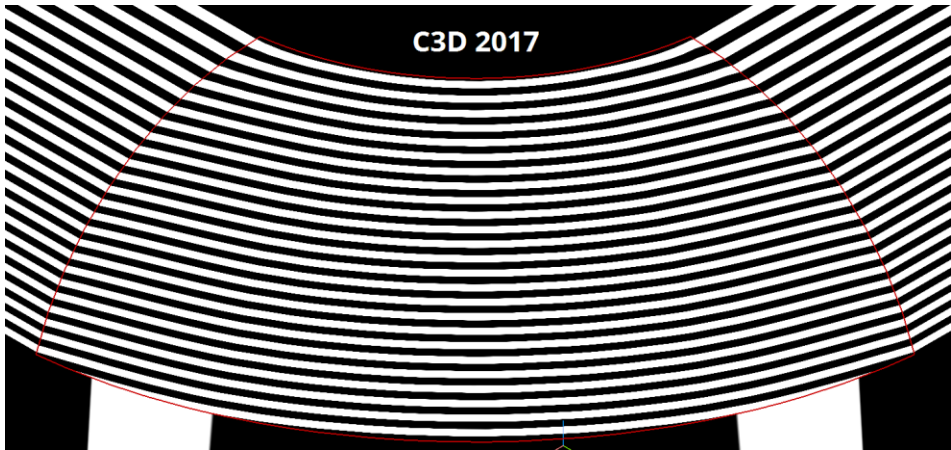
Bug Fixing

Smooth Joining of Filleted Surfaces









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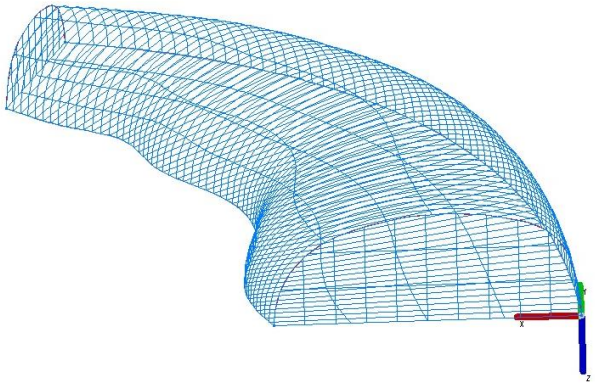
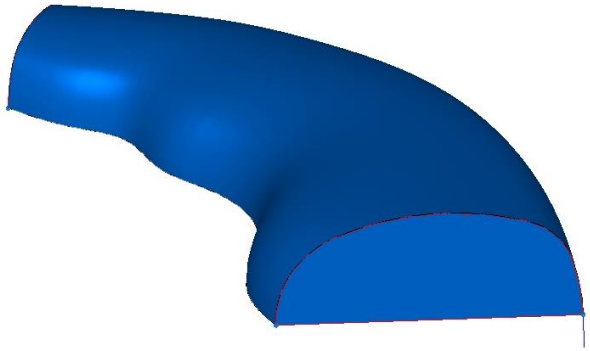
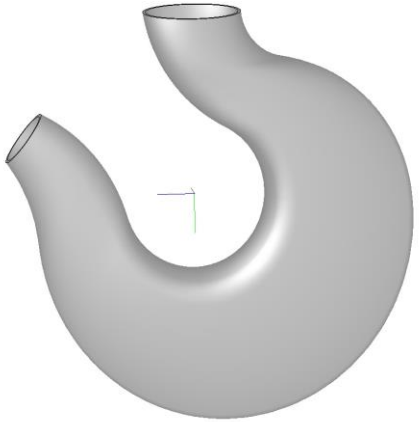
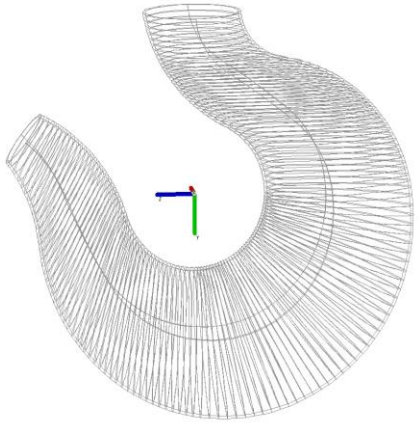
Creating Lofted Bodies









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Event Handler for Collision Detection

```
struct cdet_query
{
  enum cback_res  ///< Result code of the callback function
  {
      CBACK_VOID
    , CBACK_SUFFICIENT  ///< This code means that an app stops collision query for given p
    , CBACK_SKIP        ///< Skip testing a given pair of the lumps
    , CBACK_BREAK       ///< Break search of all collisions of the set
    , CBACK_SEARCH_MORE = CBACK_VOID  ///< This code notifies a collision detector to cont
  };

  enum message  ///< Code of notification
  {
      CDET_QUERY_STARTED  // The collision query is started for the all solids
    , CDET_STARTED        // The collision query is started for the given pair
    , CDET_FINISHED       // Collision detector complete searching a collisions for the gi
    , CDET_INTERSECTED    // The collided pair of objects founded.
    , CDET_TOUCHED        // Touched faces has been founded with no penetration of the sol
  };
```

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