Chapter 6: Create Surfaces from Curves

A common way of working in 3-D is to draw curves that represent edges, profiles, cross-sections, or other surface features and then to use surfacing commands to create surfaces from those curves.

Edge curves

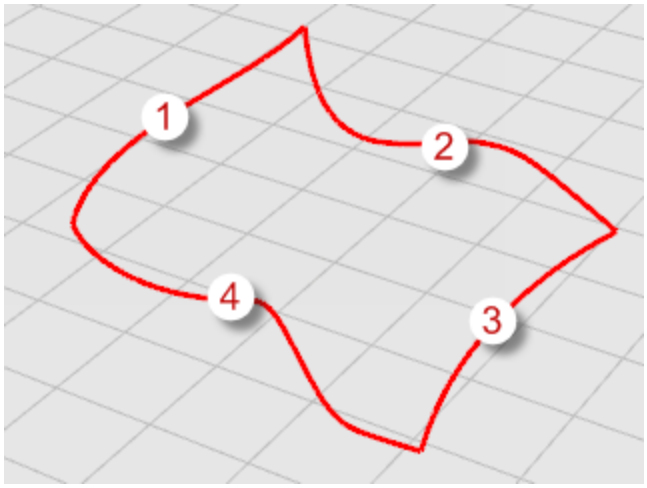
You can create a surface from three or four curves that form the sides of the surface.

Create a surface from edge curves

1. Open the tutorial model **EdgeSrf.3dm**.
2. On the **Surface** menu, click **Edge Curves**.

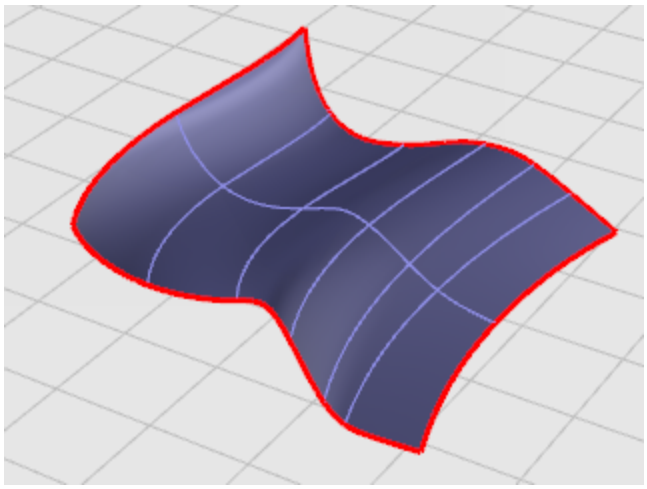
> Press **F1** or open the **Command Help** panel to review the help topic for the **EdgeSrf** command.

3. **Select** the four curves.



Objects change to yellow when you select them.

A surface is created from the curves that form its edges.



Extrude curves

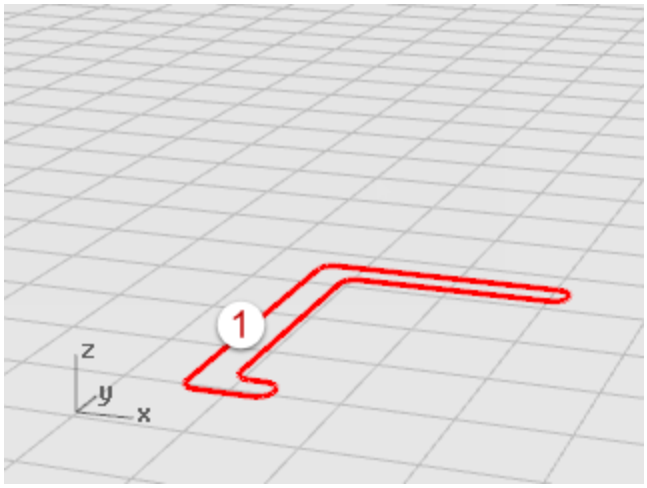
Extruding creates surfaces by tracing the path of a curve in a straight line.

Create an extruded surface

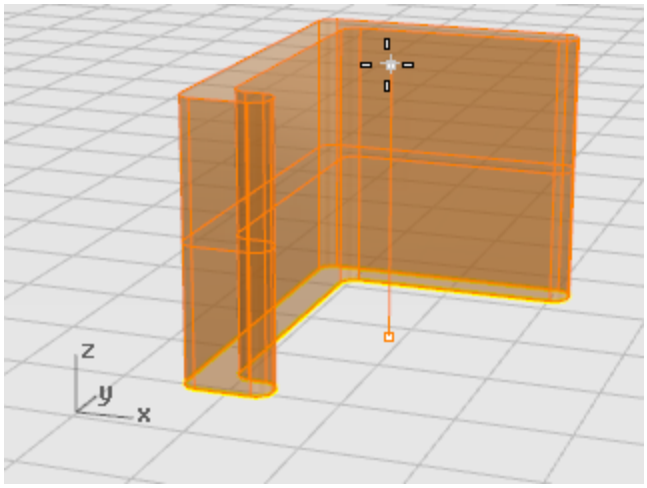
1. Open the tutorial model **Extrude.3dm**.
2. On the **Surface** menu, click **Extrude Curve**, and then click **Straight**.

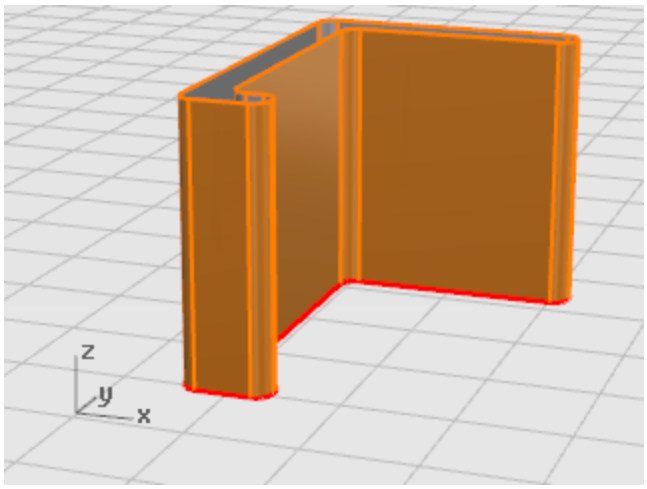
   Press **F1** or open the **Command Help** panel to review the help topic for the **ExtrudeCrv** command.

3. **Select** the curve (1).



4. At the **Extrusion distance** prompt, drag a distance with your mouse and click.




z
y
x

Loft curves

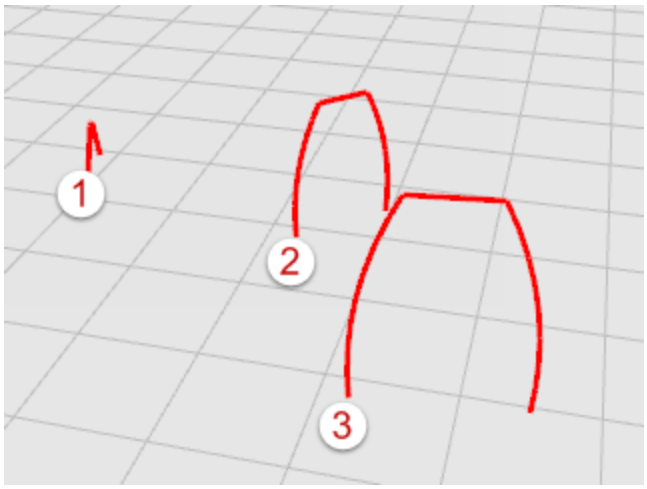
Lofting creates a smooth surface that blends between selected shape curves. This surface looks similar to the Sweep a curve with two rails example, but is created without rail curves. Instead, the edges of the surface are created by fitting smooth curves through the shape curves.

Create a lofted surface

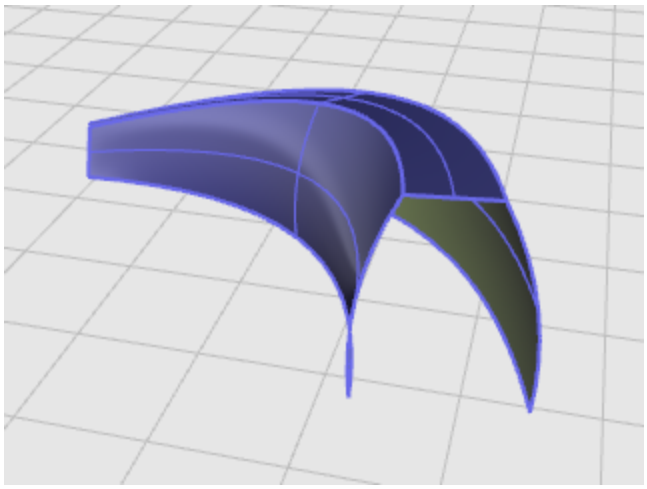
1. Open the tutorial model **Loft.3dm**.
2. On the **Surface** menu, click **Loft**.

> Press **F1** or open the **Command Help** panel to review the help topic for the **Loft** command.

3. **Select** the three curves (1), (2), and (3), and press **Enter**.



4. In the **Loft Options** dialog box, click **OK**.



5. Try some of the **Style** options and then click **Preview** to see the various loft styles.

Revolve curves

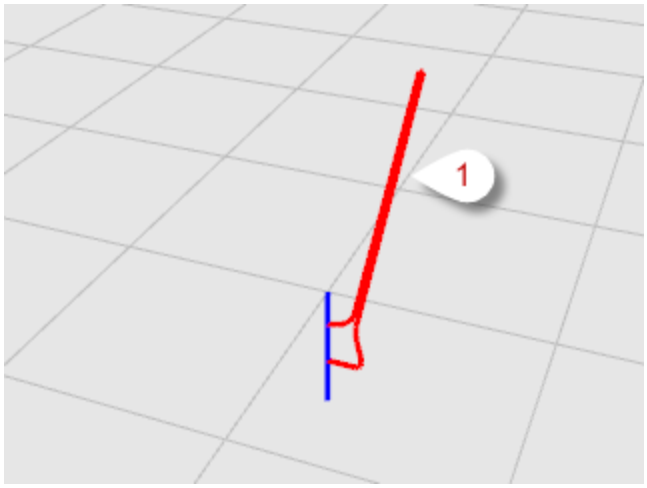
Revolving a curve creates a surface by revolving a profile curve about an axis. This is sometimes called ***lathing.***

Create a revolved surface

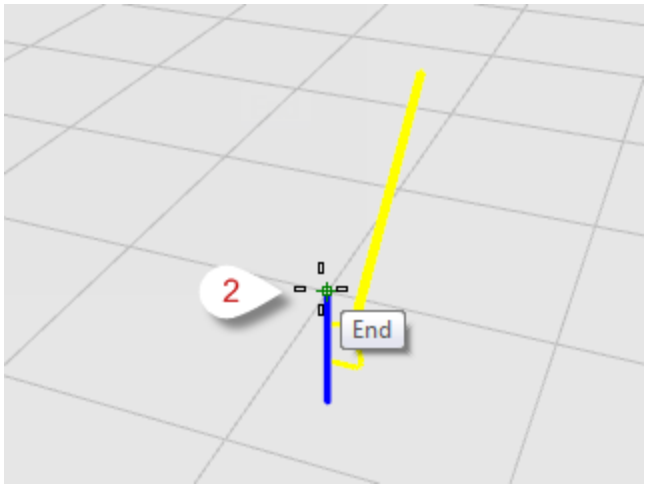
1. Open the tutorial model **Revolve.3dm**.
2. In the **status bar**, click **Osnap**.
3. In the **Osnap** dialog box, click **End**.
4. On the **Surface** menu, click **Revolve**.

> Press **F1** or open the **Command Help** panel to review the help topic for the **Revolve** command.

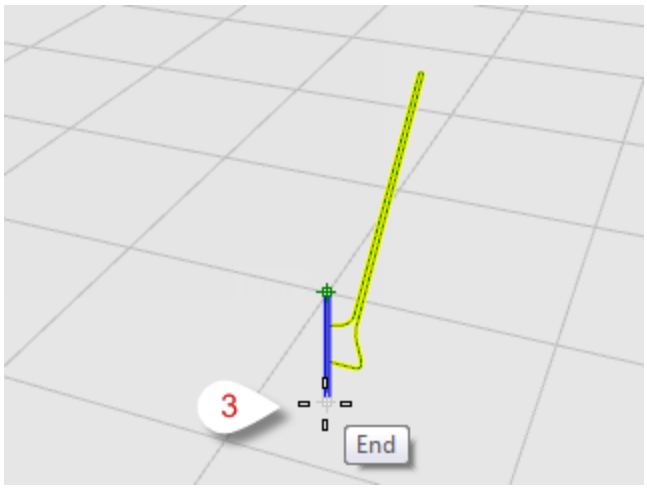
5. **Select** the **profile curve** (1) and press **Enter**.



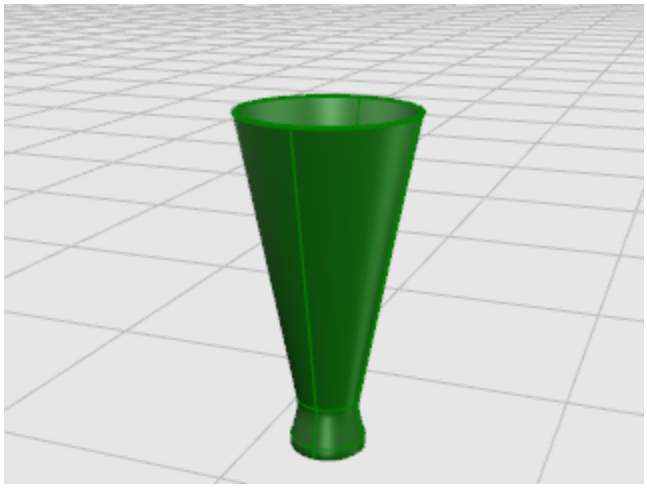
6. At the **Start of revolve axis** prompt, snap to one end of the axis line (2).



7. At the **End of revolve axis** prompt, snap to the other end of the axis line (3).



8. At the **Start angle...** prompt, select the **FullCircle** option.



Revolve curves with a rail

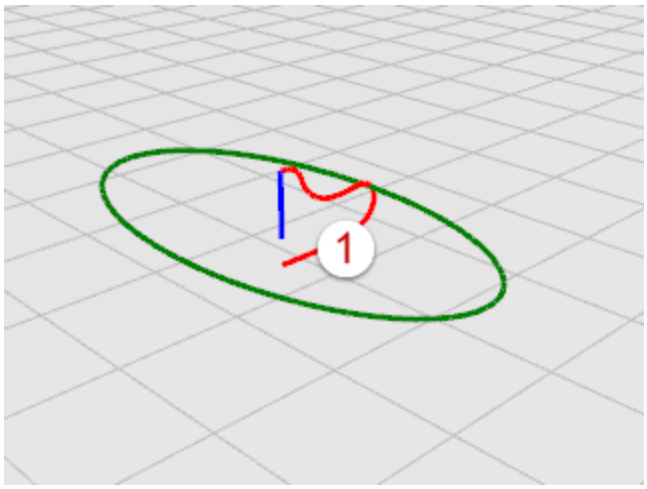
Rail revolve creates a surface by revolving a profile curve around an axis while at the same time following a rail curve. This is basically the same as **Sweep Along 2 Rails**, except one of the rails is a central point.

Create a revolved surface with a rail curve

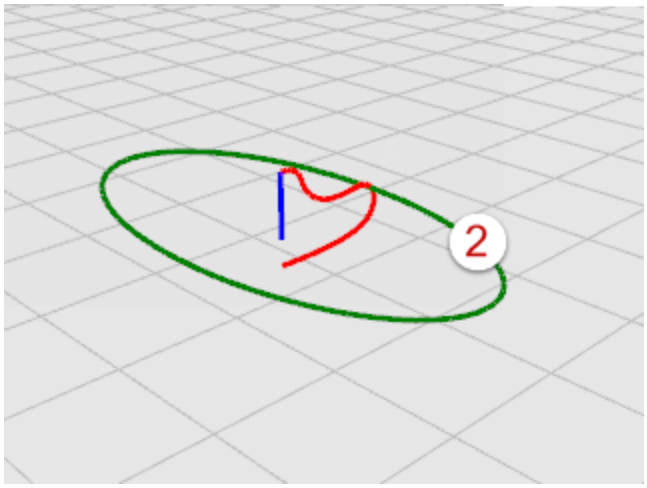
1. Open the tutorial model **RailRev.3dm**.
2. On the **Surface** menu, click **Rail Revolve**.

   Press **F1** or open the **Command Help** panel to review the help topic for the **RailRevolve** command.

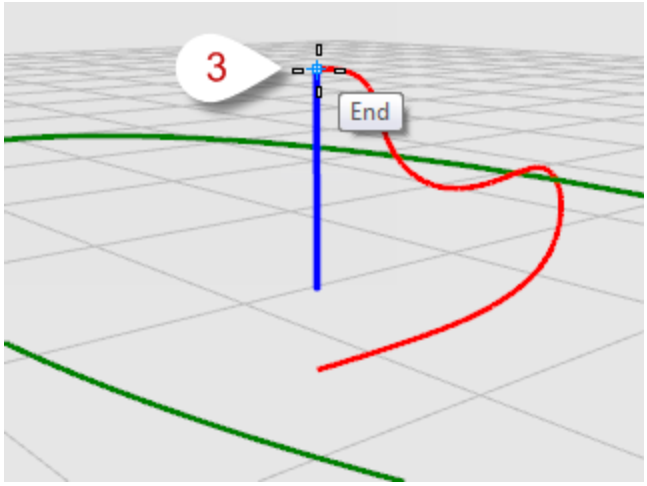
3. **Select** the profile curve (1).



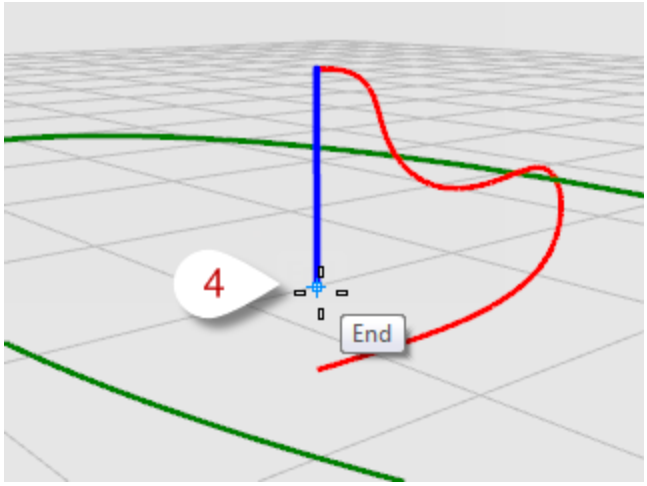
4. At the **Select rail curve...** prompt, select the rail curve the revolve will follow (2).

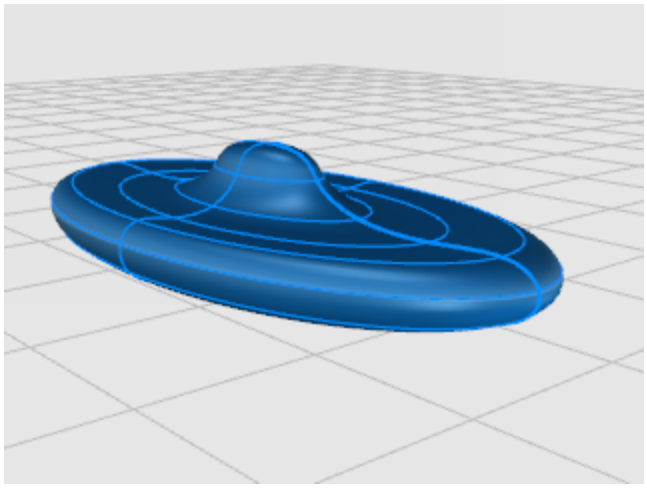


5. At the **Start of RailRevolve axis** prompt, snap to an endpoint of the axis line (3).



6. At the **End of RailRevolve axis** prompt, snap to the other end of the axis line (4).





Sweep along one rail curve

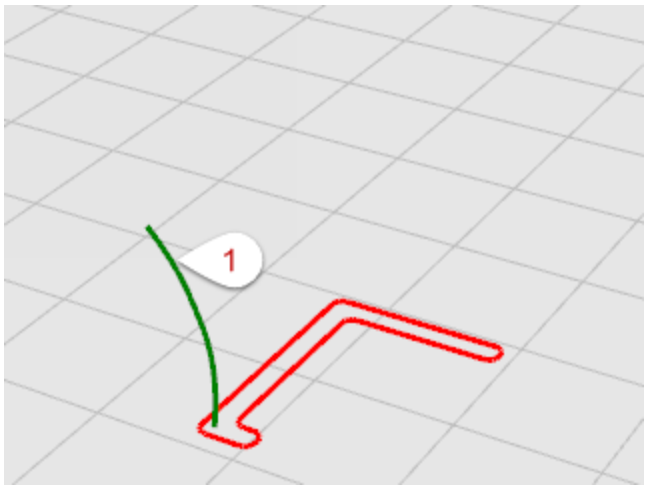
Sweeping creates a surface with cross sections that maintain the initial orientation of the shape curve(s) to the path curve.

Create a sweep surface

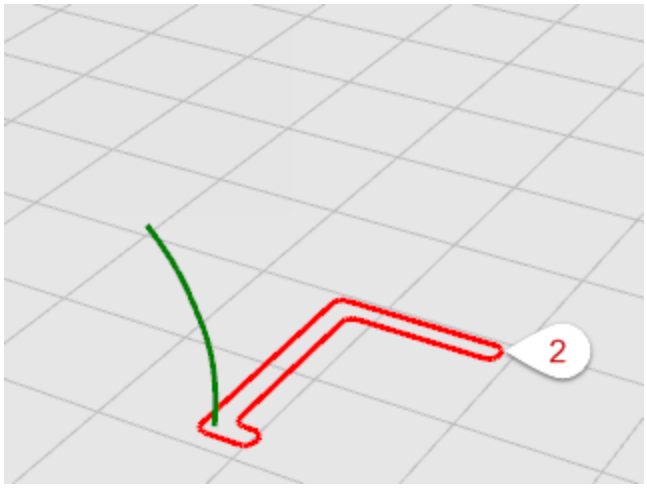
1. Open the tutorial model **Sweep1.3dm**.
2. On the **Surface** menu, click **Sweep 1 Rail**.

> Press **F1** or open the **Command Help** panel to review the help topic for the **Sweep1** command.

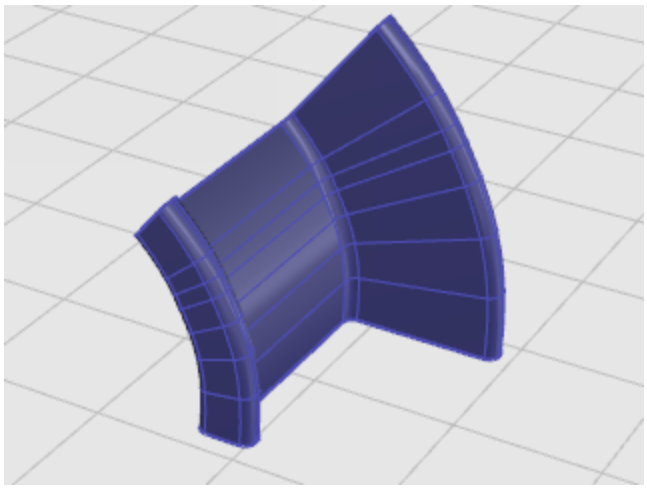
3. **Select** the rail curve (1).



4. At the **Select cross section curves ...** prompt, select the cross-section curve (2), and press **Enter**.



5. In the **Sweep 1 Rail Options** dialog box, click **OK**.



Sweep along two rail curves

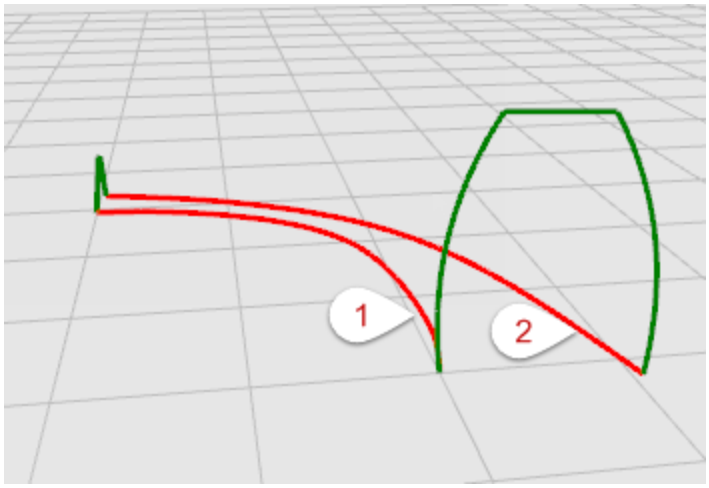
Using two rails for a sweep creates a smooth surface through two or more shape curves that follow two curve rails. The rails also affect the overall shape of the surface. Use this command when you want to control the location of the edges of the surface.

Create a sweep surface with two rail curves

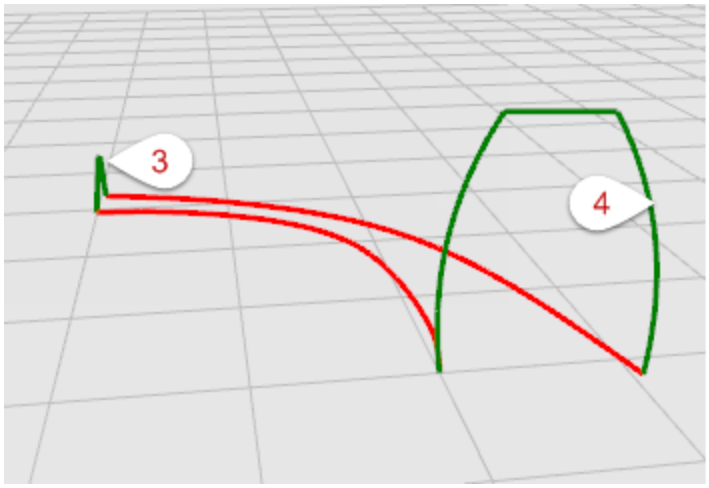
1. Open the tutorial model **Sweep2.3dm**.
2. On the **Surface** menu, click **Sweep 2 Rail**.

> Press **F1** or open the **Command Help** panel to review the help topic for the **Sweep2** command.

3. **Select** the first rail curve (1).
4. At the **Select second rail...** prompt, select the second rail curve (2).



5. At the **Select cross section curves** prompt, select the two cross-section curves (3) and (4), and press **Enter**.



6. In the **Sweep 2 Rails Options** dialog box, click **OK**.