New Commands in AutoCAD 2010: Part 11

Smoothing 3D Mesh Objects

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Introduction

The previous tutorial introduced you to 3D mesh objects. In this tutorial, you learn how to smooth them.

Tutorial: Mesh Smoothing

1.   Continue in AutoCAD 2010 with the "Mesh-1.dg" drawing file you created in the previous tutorial.
2.   Let's smooth the chunky looking 3D mesh model: In the Mesh Modeling tab, click the **Smooth More** button. (Do NOT click the misnamed Smooth Object button, whose job is to convert solid models into 3D mesh models.)

3.   Notice that AutoCAD prompts you:

```
Command: '_.MESHSMOOTHMORE
Select mesh objects to increase the smoothness level: (Pick
the distored 3D mesh box.)
```

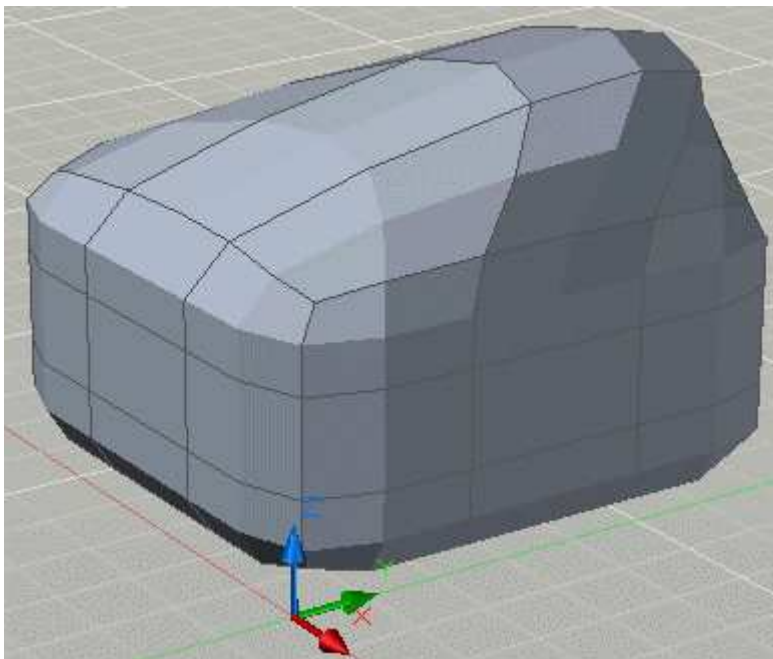Pick the mesh model, and then press **Enter** to end the command.

Figure 1: The Mesh Modeling tab.

4.   Notice that all the surface of the mesh model becomes slightly rounded. (Pick the model, and then click **Smooth More**.)
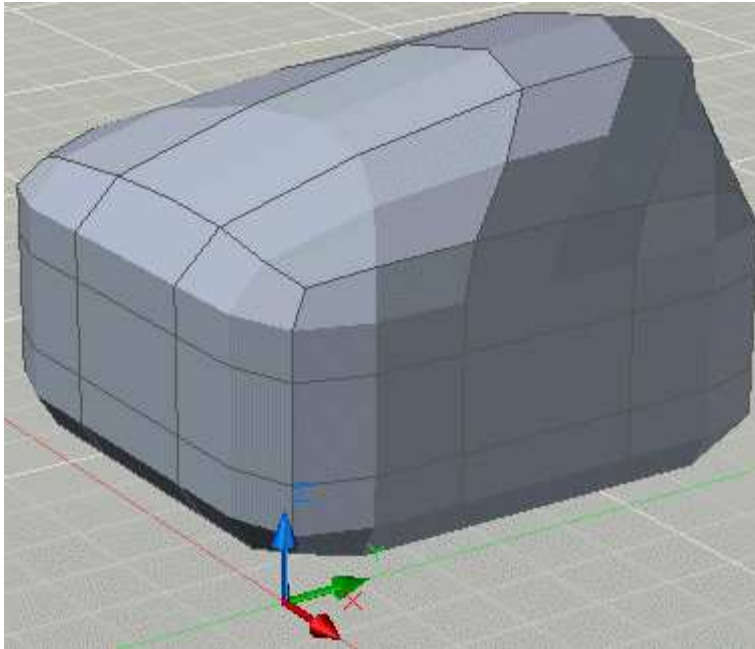

Figure 2: The model is somewhat smoothed.

5.   Repeat the command several times to further smooth the model. Interesting: our formerly clunky box is now looking like a smooth mound of modeling clay. And that is exactly what 3D mesh models are supposed to be: easily moldable 3D objects that create shapes not possible by AutoCAD's other 3D model types (solids, surfaces, polyfaces, and wireframes.)
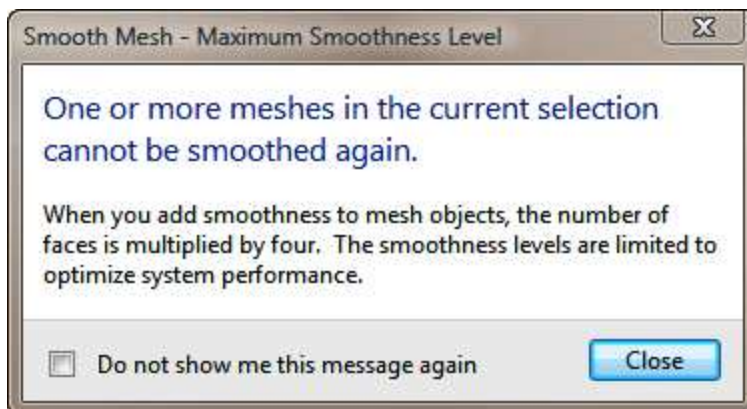

Figure 3: The model is smoothed to the maximum allowed by AutoCAD.

6.   After four smoothing operations, AutoCAD refuses to do any more. It displays a dialog box that sort of explains what's going on. In brief, extremely smooth mesh models take a lot of calculation power; by limiting the smoothing level to four, the speed of AutoCAD is not compromised.
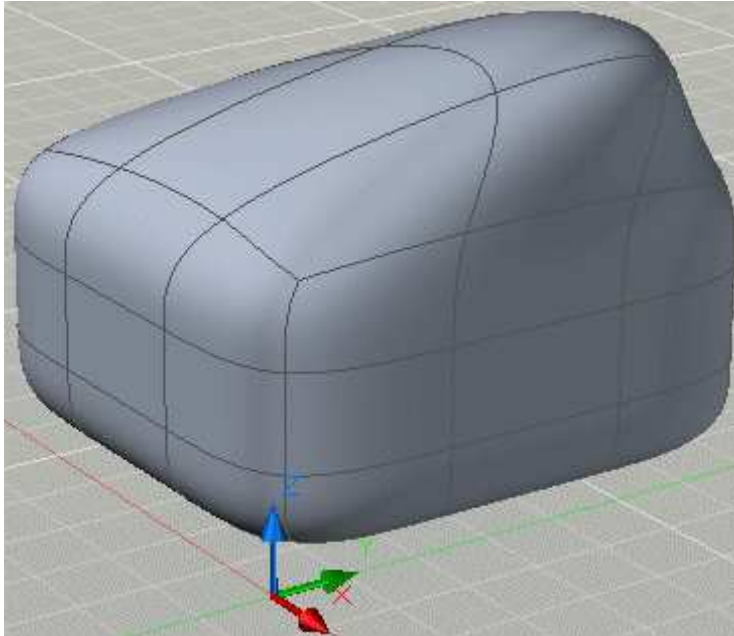
Figure 4: The Smooth Mesh dialog box.

TIP   You can reverse the smoothness process with the Smooth Less **button.**

7.   The model is now very rounded. It is possible to add hard edges, called "creases" by AutoCAD. A crease is added to one or more faces. (Recall from the previous tutorial the trick of holding down the **Ctrl** key to select faces.)
       a. Hold down the **Ctrl** key, and then select any face.
       b. In the ribbon, choose the **Add Crease** button.
       c. In the command prompt area, AutoCAD asks a question:

        Specify crease value [Always] <Always>: *(Press Enter.)*

Press **Enter** to accept the default of Always, which means that the crease will always be there, even when the smoothness is removed.
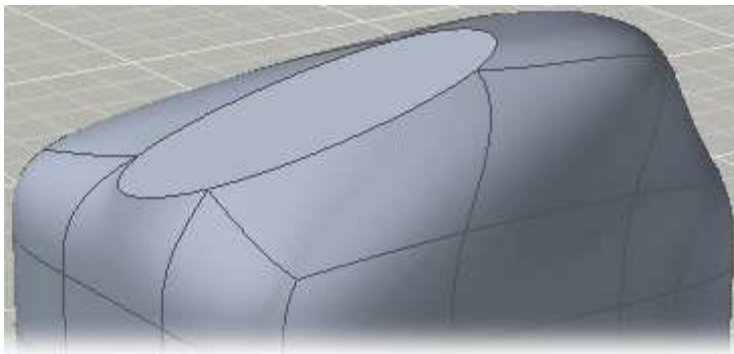

Figure 5: Creased face.

8.   Notice the creased face. Let's rotate the face in freeform mode to give the top of

the mesh model a bit of a twist.

     a. Hold down the **Ctrl** key, and then select the creased face. Release the **Ctrl** key.

     b. There is a small red square that is hard to see: it is at the base of the triad. Click the red square, and the triad disappears.
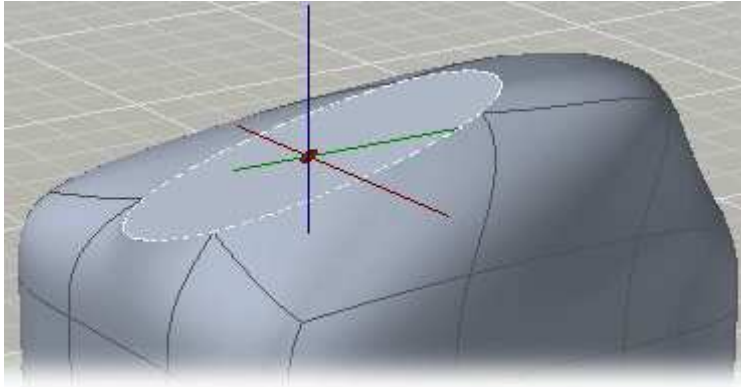

Figure 6: Selecting the small red square.

     The triad is fine for moving/rotating/scaling precisely in the x, y, or z directions. By removing the triad and working with the red square, you can handle the creased face in freeform mode.

     c. Drag the red square. As you do, notice how part of the rest of the 3D mesh model partially moves along. A white ellipse indicates the original location of the creased face.
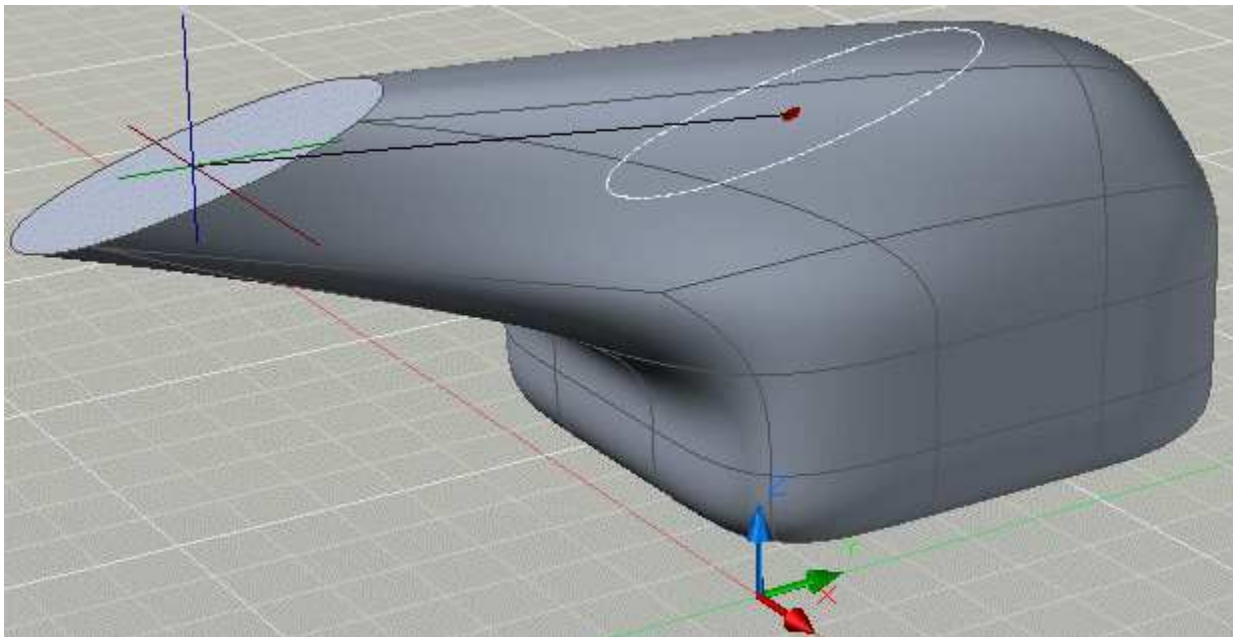

Figure 7: Moving the creased face.

     d. Right-click, and then choose **Rotate** from the shortcut menu.

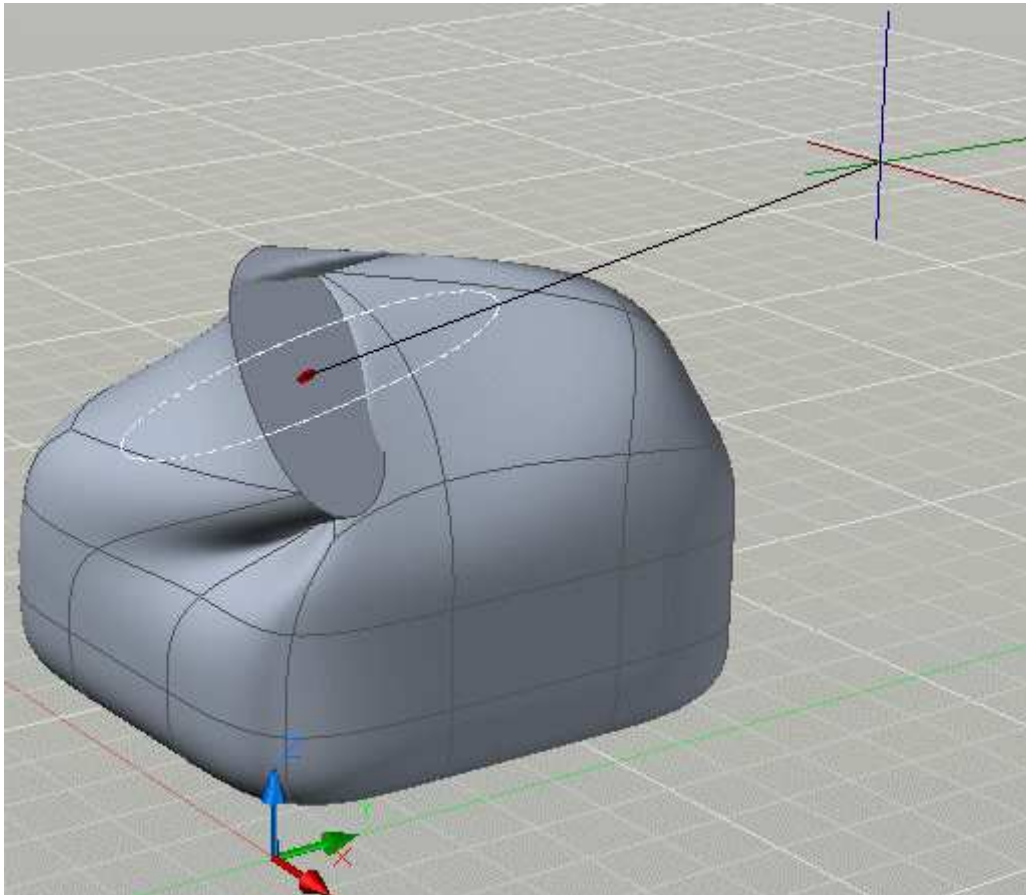   e. Drag the red square. Notice how the face now rotates.

Figure 8: Rotating the creased face.

9. This ends the tutorial. You will use the drawing in the next tutorial, so save it as "Mesh-2.dwg."

Test Yourself

1.   What is the purpose of the **Smooth More** command?
        a. It converts solid models into 3D mesh models.
        b. It adds fillets to 3D mesh models.
        c. It makes 3D mesh models look more rounded.
        d. It converts 2D circles into 3D cylinders.

2.   What effect does the **Add Crease** command have on 3D mesh objects?
        a. It adds sharp edges to selected faces of smoothed 3D meshes.
        b. It mirrors smoothed 3D mesh models.
        c. It furrows the brow of face models.
        d. It adds faces to 3D mesh models.

3.   Triads allow freeform moving, rotation, and scaling of faces.
        True/False.

4.   Faces are fixed; dragging them may cause AutoCAD to shut down.
       True/False

5.   What is the purpose of the small red square?
       a. Rotates faces about any of the three axes.
       b. Rotates faces in freeform mode.
       c. It warns against rotating the face.
       d. Nothing; it is just decoration.

Answers:

1.   c. It makes 3D mesh model look more rounded.
2.   a. It adds sharp edges to selected faces of smoothed 3D meshes
3.   False
4.   False
5.   b. Rotates faces in freeform mode.