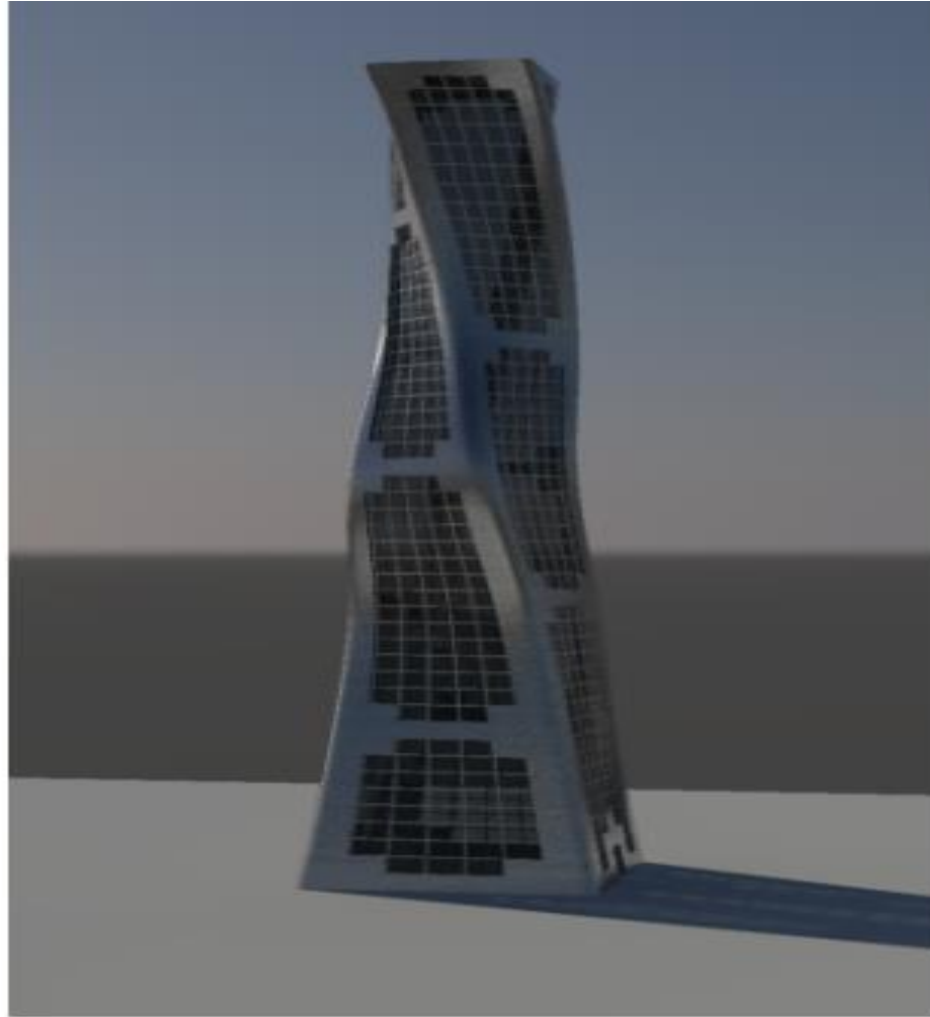


Autodesk® 3ds Max®

Design 2009

Tutorials: Modeling





In this tutorial, you will learn how to:

- Create simple geometry.
- Use the Twist, Taper, and FFD modifiers to alter geometry.

Creating the Tower

In this lesson, you will create the basic geometry of the model, then use 3ds Max Design modifiers to give the object a distinctive shape.

Create the tower object:

- 1 Choose File > Open to open *building 1 - start.max*.

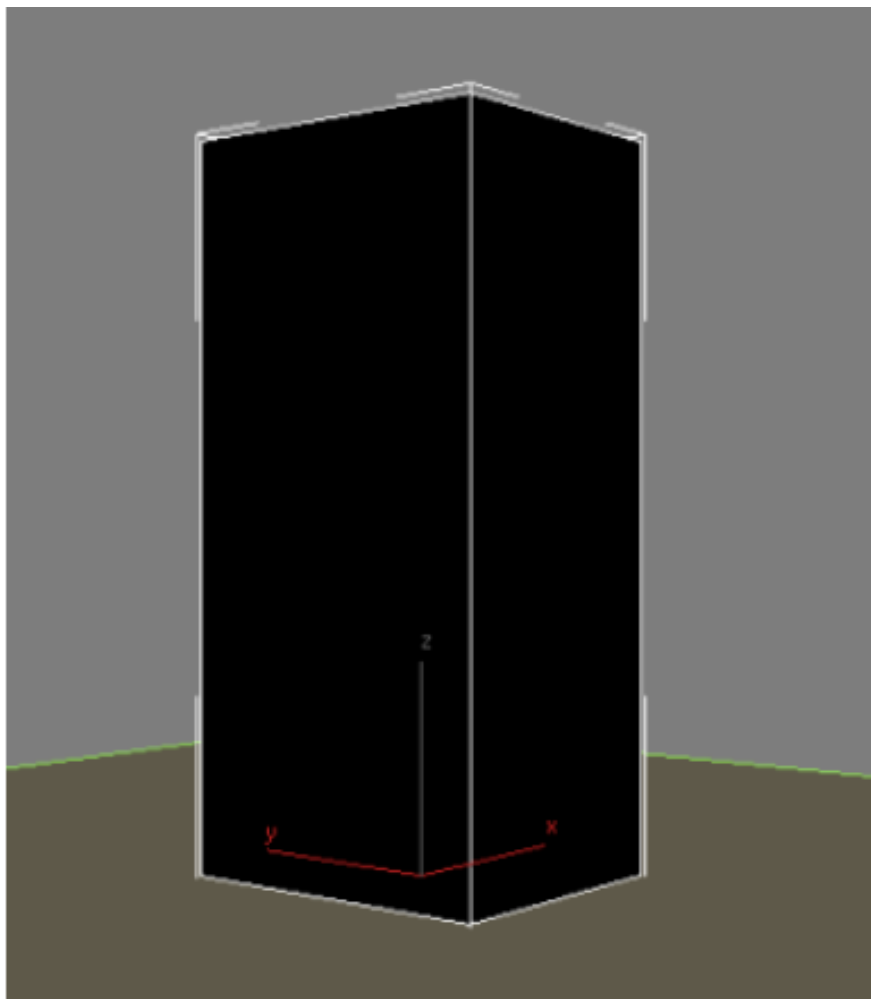
A daylight system has already been set up, so you can start building your model right away.



- 2 On the Create panel, click the Geometry button, then in the Object Type rollout, click Box.

- 3 In the Perspective view, click and drag diagonally at the center of the ground object to set the width and depth of the box. Release the mouse button and drag upwards to set the height. Click a final time to complete the box.

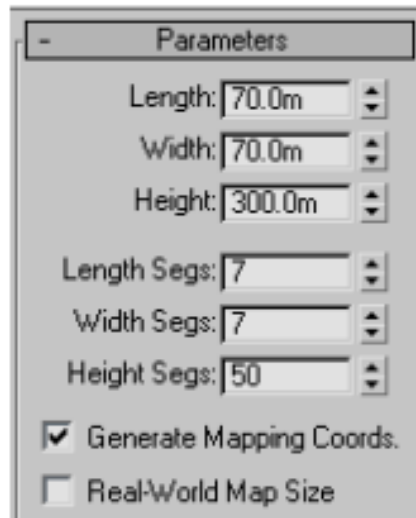
Do not worry about dragging the box to an exact width, depth, or height. You will set these parameters in the next step.



4 On the Modify panel > Parameters rollout, set the parameters of the box as follows:

- Length=70 m
- Width=70 m
- Height=300 m
- Length Segs=7

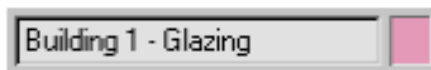
- Width Segs=7
- Height Segs=50



The segments are necessary to define the tower floor and window grid.

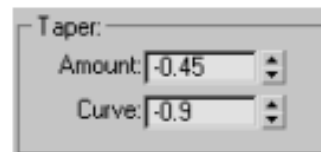
NOTE Normally, a building 300 meters in height would be divided into 100 height segments to create floors of three meters each, but in this tutorial the value is halved to make for easier polygon selection.

- 5 On the Name And Color rollout, change the name of the object to **Building 1 - Glazing**.

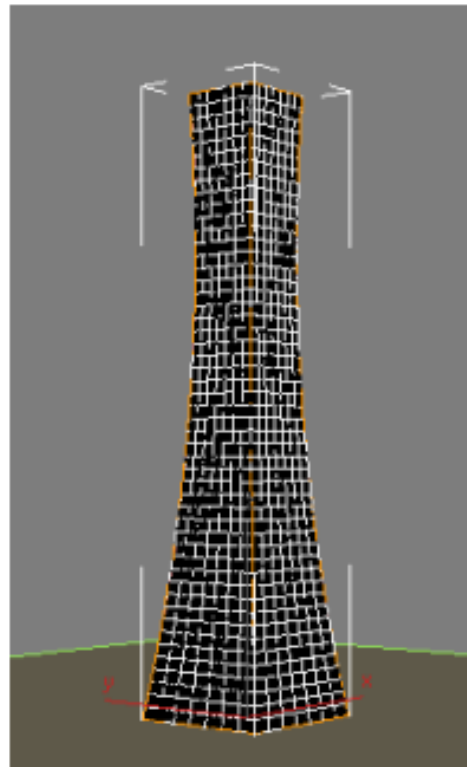


This name change is appropriate, since you will later be applying a glazing material to this object.

- 6 From the Modifier List > Object-Space Modifiers section, choose Taper.
- 7 On the Parameters rollout > Taper group, set Amount to **-0.45** and Curve to **-0.9**.

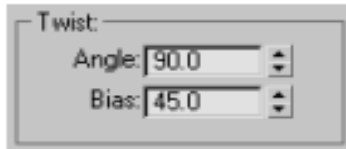


The negative taper amount tapers the building inwards at the top. The negative taper curve pulls the sides of the building in as shown in the next illustration.

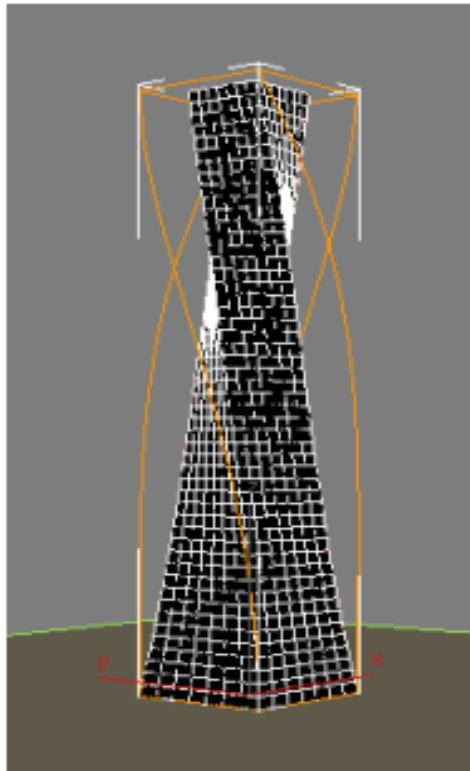


Next, you want to give the tower a twist.

- 8 From the Modifier List > Object-Space Modifiers section, choose Twist.
- 9 On the Parameters rollout > Twist group, set Angle to **90** and Bias to **45**.

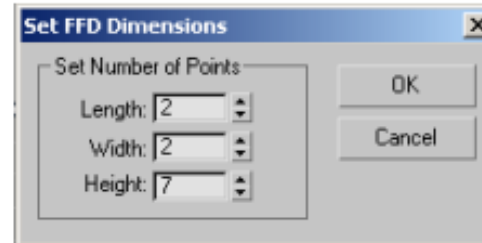


The 90-degree twist creates a quarter turn of the building. The bias of 45 causes the twist to start part-way up the side of the building, rather than immediately at its base.

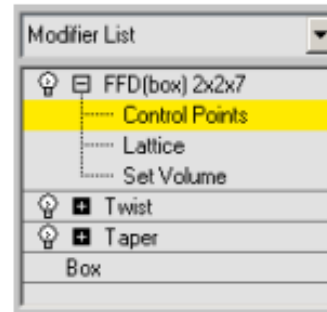


- 10 To give the building a serpent-like quality, from the Modifier List, choose FFD (Box). FFD modifiers surround the selected geometry with an adjustable lattice box.
- 11 On the FFD Parameters rollout > Dimensions group, click Set Number Of Points.

- 12 In the Set FFD Dimensions dialog, set the parameters as follows to set the number of control points for the lattice used to deform the structure:
 - Length=2
 - Width=2
 - Height=7



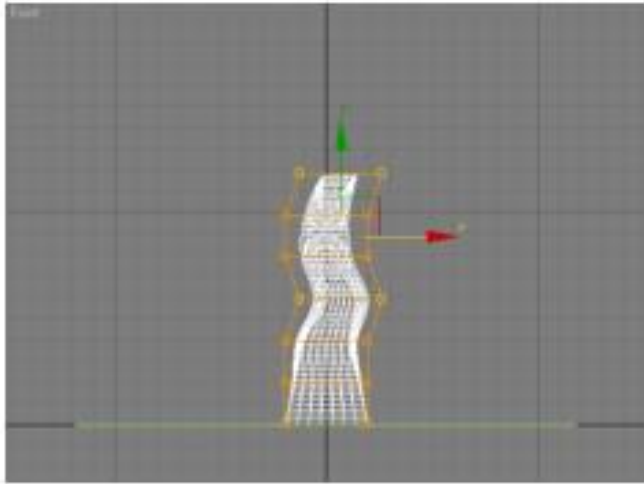
- 13 In the Modifier stack, expand the FFD (Box) modifier and choose Control Points. This lets you select and manipulate the lattice control points you defined in the previous step.



- 14 In the Front view, create the serpent effect by holding Ctrl and selecting the top and fourth row of control points.



- 15 Enable the Move tool and drag right slightly, as shown in the next illustration.



- 16 Exit the FFD Control Point sub-object level by clicking the main modifier entry: FFD (Box) 2x2x7 in the Modifier stack.

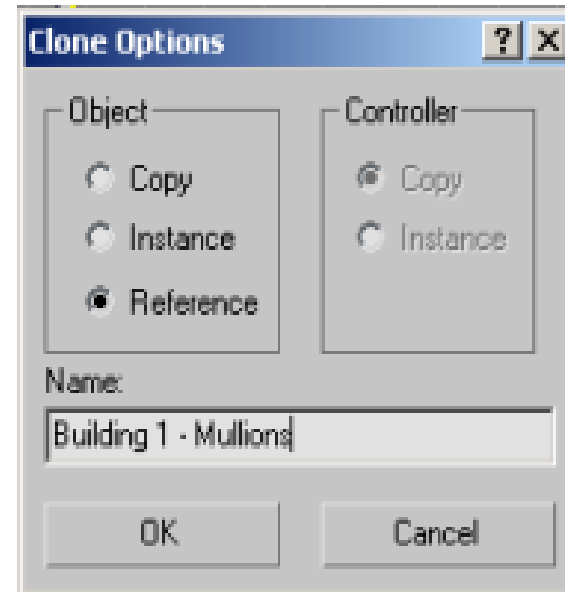
Now you are ready to create the mullions.

Adding the Mullions

You will start by cloning the object you created in the previous lesson. You will then take the clone, which retains twist, taper, and FFD modifiers, and use polygon editing techniques to create the structure's mullions.

Create the mullions for the building:

- 1 Continue working on your scene from the previous lesson, or choose File > Open to open *building 1 - glazing.max*.
- 2 Select the glazing object (the tower) and from the menu bar choose Edit > Clone. In the Clone Options dialog > Object group choose Reference and change the name of the object to **Building 1 - Mullions** and click OK.

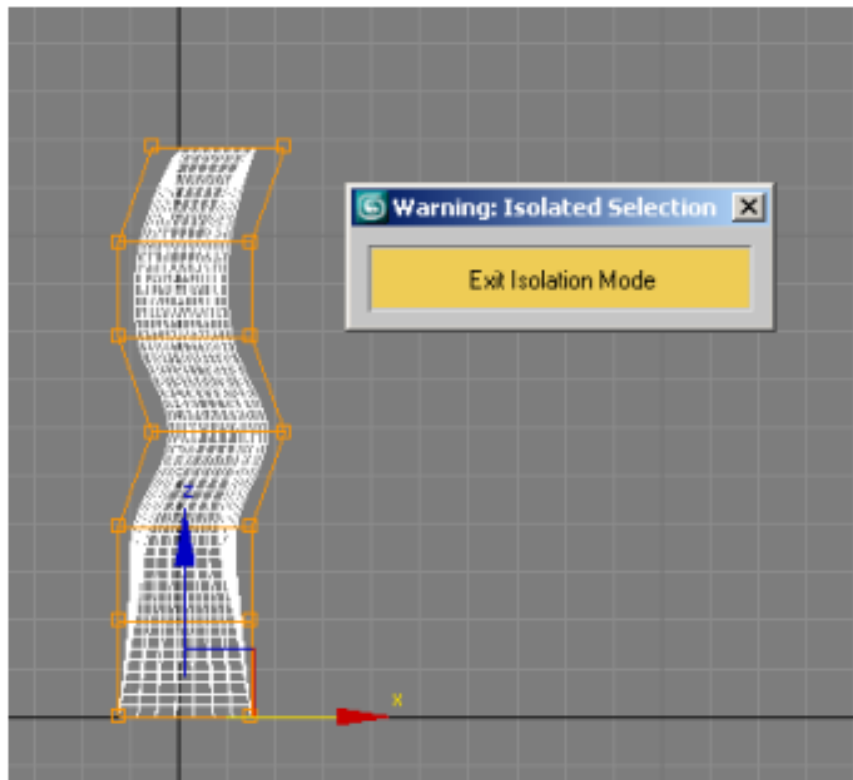


As a reference, the newly created mullions object behaves in a specific way. Any subsequent edits to the mullions object will not affect the glazing object. However, if you modify the glazing object, the mullions object will be affected. This way, any changes to the modifiers that affect the tower structure, which were created in the glazing object, can be carried forward to the mullions. But any polygon edits intended to affect the mullions only, will not affect geometry in the glazing object.

- 3 If the mullions object was cloned as a *copy* instead of a reference, it would be completely independent of the original.

If the mullions object was cloned as an *instance*, it would be completely dependent on the original, and vice versa: any subsequent edits made to either object would affect the other.

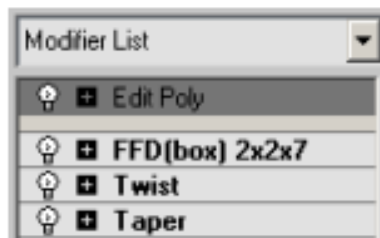
- 4 With the *Building 1 - Mullions* object selected, right-click the viewport, and from the quad menu, choose Isolate Selection.



Isolation mode ensures you are working on the correct object.

You now want to take the polygons that form the window grid and modify them to take on the characteristics of mullions. You will do so using the Edit Poly modifier.


- From the Modifier List, choose Edit Poly.




Notice how a grey bar is inserted between the newly added Edit Poly modifier and all other modifiers. The bar indicates that all modifiers

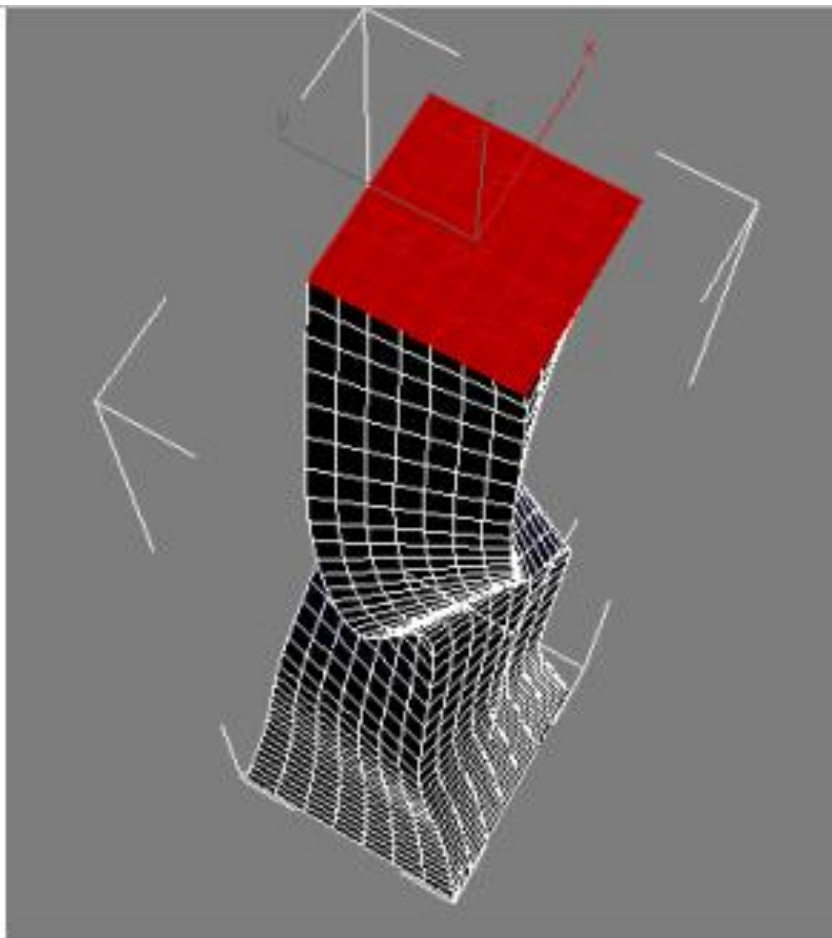
above the bar affect the reference object only and will not affect the original object. This way, you can keep on modifying the mullions object without affecting the glazing object.

Next, you will remove some unneeded polygons.

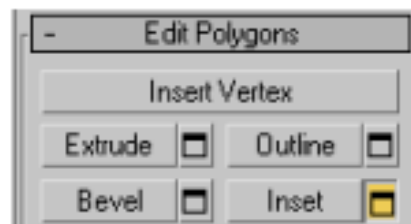
- 
 Activate the Perspective viewport. Zoom, orbit, and pan until the roof of the tower is clearly visible, and then on the Selection rollout, click the Polygon button.



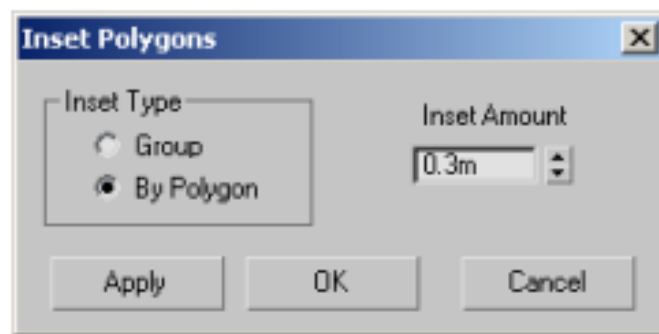
- 
 Select the middle polygon on the roof. On the Selection rollout, click Grow repeatedly until you have selected the entire roof. Press Delete to remove all the selected polygons.



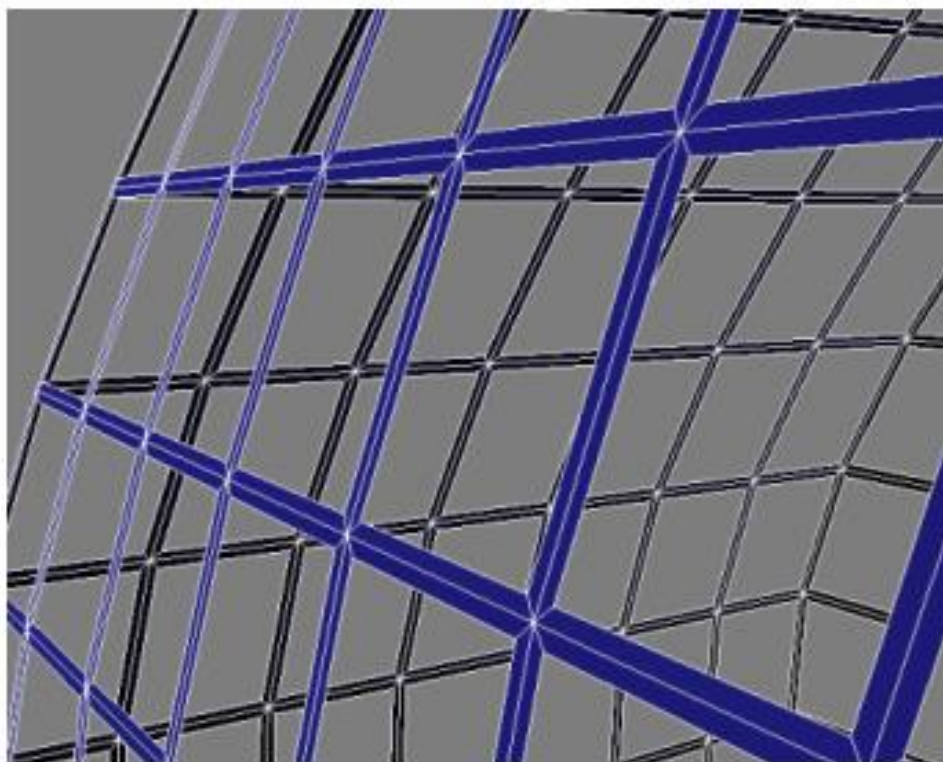
- 8 Repeat the previous two steps to remove the polygons that make up the bottom of the building.
You will now create insets out of the remaining polygons, which you will use as the window mullions.
- 9 Press Shift+Z repeatedly to undo the viewport changes, and can now see the entire building in the Perspective viewport, again.
- 10 Press Ctrl+A to select all the polygons in the building.
- 11 On the Edit Polygons rollout, click the settings button next to the Inset button (just to the right).



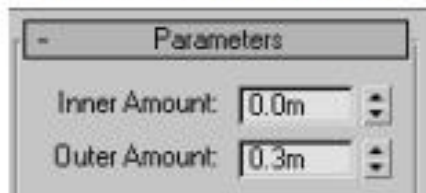
- 12 On the Inset Polygons dialog > Inset Type group, choose By Polygon and set Inset Amount to 0.3 m. Click OK.
The By Polygon option applies the inset poly edit to each polygon in the selection.



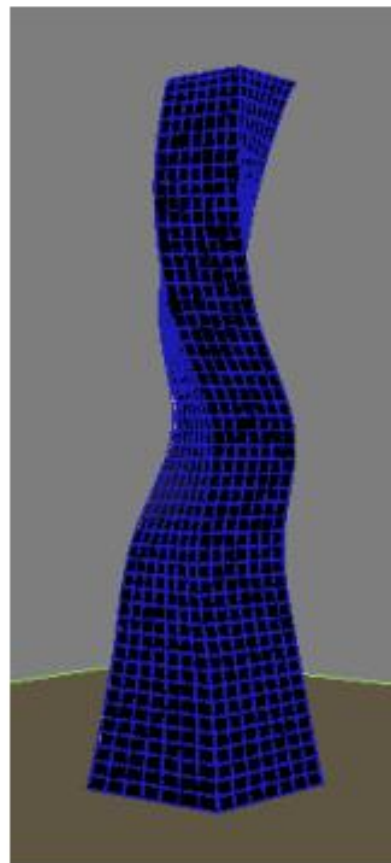
- 13 Press Delete to remove the selected polygons and keep their insets.
- 14 On the Selection rollout, click the Polygon button to exit polygon selection mode.
- 15 In any viewport, zoom in to the mullions you just created.
The mullions appear as thin, two-dimensional faces. You need to give them some thickness.



- 16 From the Modifier List > Object-Space Modifiers section, choose Shell. On the Parameters rollout, set Outer Amount to **0.3**.



- 17 In the Warning: Isolated Selection dialog, click Exit Isolation Mode to view the glazing and mullion objects together.



You are now ready to create the structure's metallic shell.

Creating the Metallic Shell

In this lesson, you will create another reference object and apply additional polygon editing techniques that will cloak the building in a metallic shell.

Create a metallic shell for the building:

- 1 Continue working on your scene from the previous lesson or choose File > Open to open *building 1 - mullions.max*.

You will start by temporarily deactivating the modifiers on the glazing object, so you can work with the polygons of the shell object more easily.



- 2 Press H and use the dialog to select the *Building 1 - Glazing* object. On the Modify Panel, in the Modifier stack, click the light-bulb icons to the left of each modifier to turn off the effect of these modifiers.



- 3 From the menu bar, choose Edit > Clone. In the Clone Options dialog > Object group, choose Reference and change the name of the object to *Building 1 - Metallic Shell*.



- 4 With the shell object selected, right-click the active viewport and from the quad menu, choose Isolate Selection.
- 5 From the Modifier List, choose Edit Poly.



- 6 Right-click the Perspective viewport if it is not already active. Zoom, orbit, and pan until the bottom of the building is clearly visible.



- 7 On the Selection rollout, click the Polygon button to turn it on.



- 8 Select the middle polygon on the bottom of the building. On the Selection rollout, click Grow repeatedly until you have the entire bottom selected. Press Delete to remove the polygons.

You now need to remove additional polygons to create the window pattern on the building exterior.

- 9 Press Shift+Z repeatedly to undo viewport changes until you can see the entire building again.

- 10 In the Perspective view, click Front on the ViewCube.

NOTE If the ViewCube is not visible in your viewports, from the main menu choose Views > Viewport Configuration > ViewCube tab > Display Options group > Show The ViewCube.

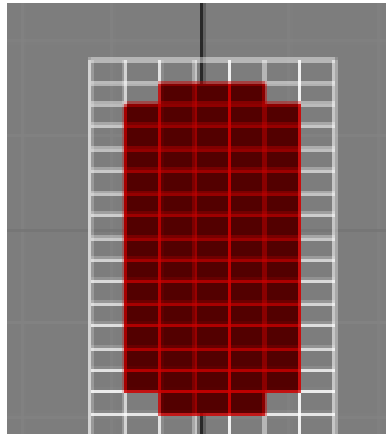
- 11 Press Alt+W to maximize the viewport.



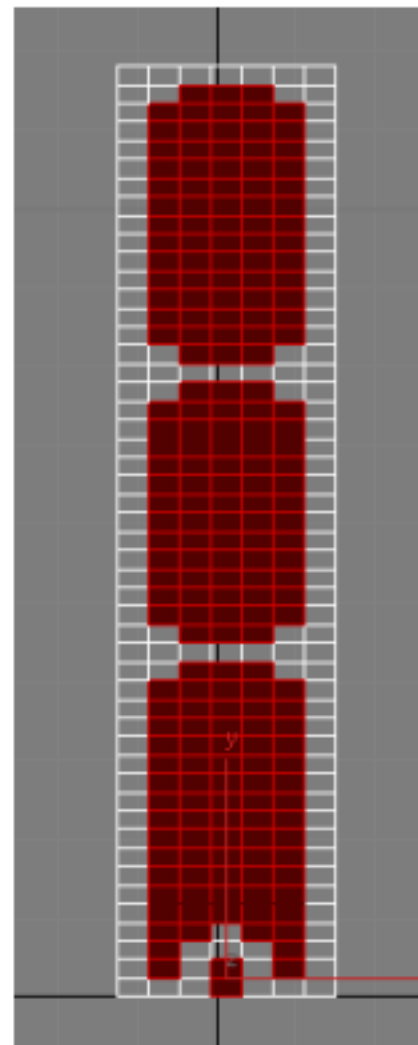
- 12 Turn on Select Objects. Ctrl+click+drag to select a 5x15 grid of polygons in the upper portion of the model, leaving one row of polygons unselected at each edge of the building.

This selects polygons on both the front and back faces of the model.

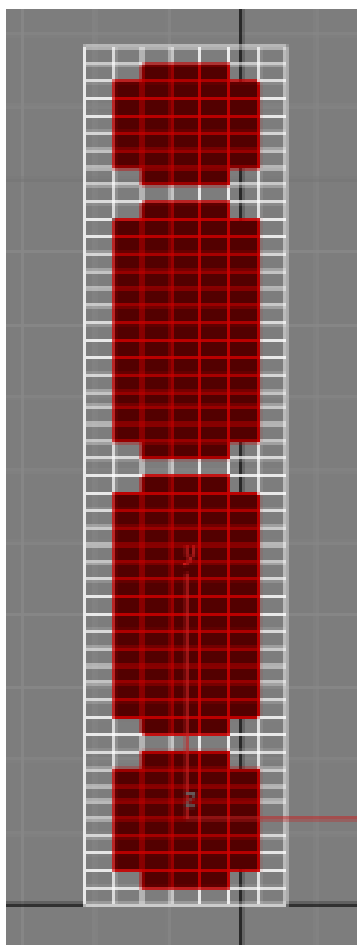
- 13 Alt+drag to select each corner polygon, as shown in the illustration. This removes the selected polygons on the front and back faces of the model.



- 14** Ctrl+click+drag to select the remaining polygons, as shown in the next illustration. Use the Alt+drag technique to remove polygons from the corners as needed.



- 15** Press Delete to delete all of the selected polygons on the front and back of the building.
Next, you will select the polygons on the side of the building, changing the pattern slightly.
- 16** Click the Left face of the ViewCube and begin removing polygons following a pattern of 5x7, 5x15, 5x15, and 5x8 as shown in the next illustration.

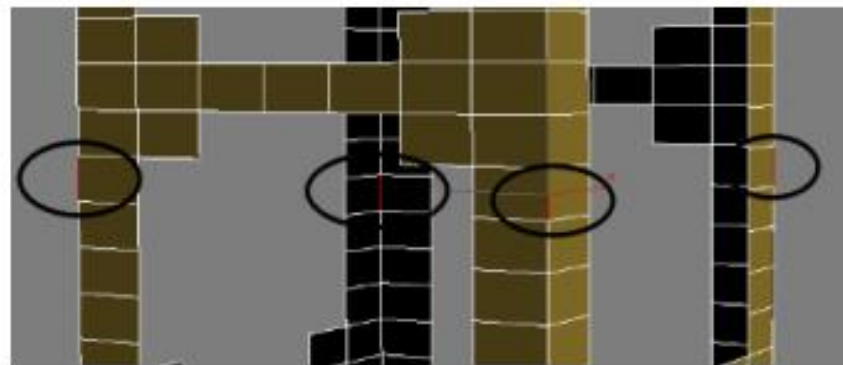


17 Press Delete to delete the polygons, then activate the Perspective viewport. Next, you will edit the building edges to give them a rounded look.

18 From the Selection rollout, choose the Edge sub-object level.

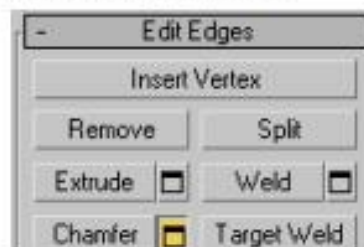


Hold down Ctrl and select four vertical polygon edges, one on each corner of the building.

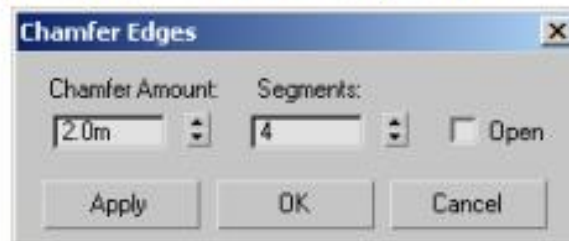


19 On the Selection rollout, click the Loop button. This selects all four edges of the building in their entirety.

20 On the Edit Edges rollout, click the settings button next to the Chamfer button (just to the right).



21 On the Chamfer Edges dialog, set Chamfer Amount to 2.0m. This sets the width of the bevel created by the chamfer operation. Set Segments to 4, to divide the beveled region into four segments. The more segments you set, the more rounded the edge. Click OK.



22 Exit Edge selection mode by clicking the Edge sub-object level button again.

- 23** From the Modifier List, add a Shell modifier and on the Parameters rollout, set Outer Amount to **2.0m**.

This gives the metallic shell a thickness of two meters.

Now, let's look at the building with the modifiers applied.

- 24** Exit Isolation Mode.
- 25** Click Alt+W to view all four viewports again.
- 26** On the Modifier Stack, turn on the three modifiers you turned off earlier: FFD, Twist, and Taper.



The modeling phase of the building is now complete. Next, you will add materials to the building exterior.

- 27** Press **M** to open the Material Editor.
- 28** Press **H** and on the Select From Scene dialog, highlight the *Building 1 - Glazing* object, and then click OK.



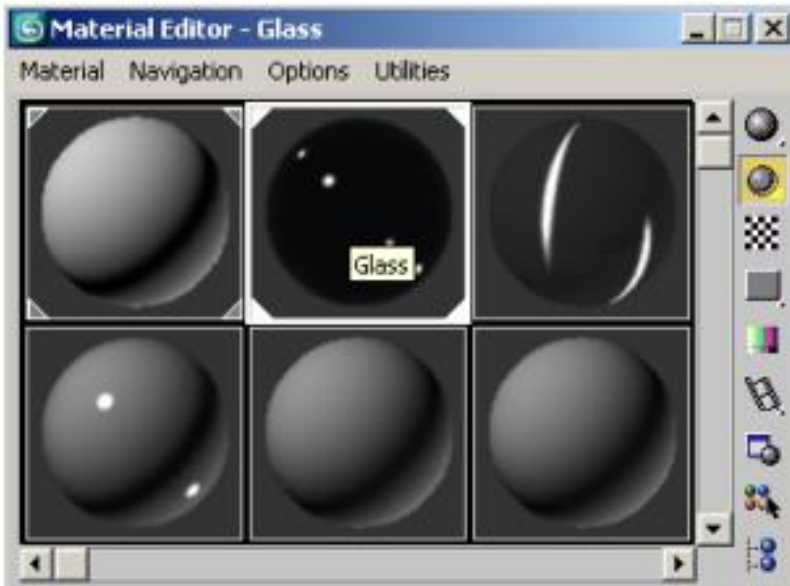
- 30 On the Select From Scene dialog, select the *Building 1 - Mullions* object, and then in the Material Editor, apply the material called Mullions.
- 31 On the Select From Scene dialog box, select the *Building 1 - Metallic Shell* object and apply the material called Metal.



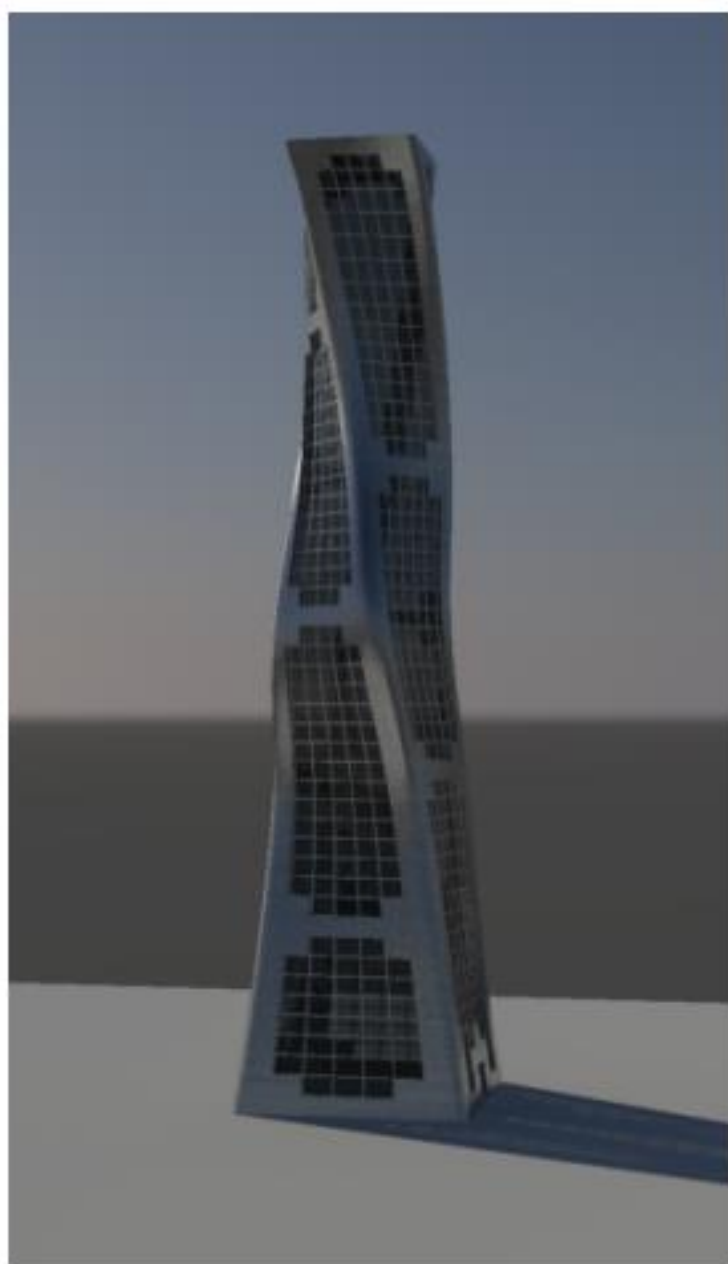
- 32 Make sure the Perspective viewport is active, then click Render to check your work.

Your scene should look something like this:

In the Material Editor, select the Glass material.



- 29 Click Assign Material To Selection to apply the Glass to the glazing object.



33 Save your file and name it **mybuilding 1 - final.max**.

You can use this scene file as your starting point in the tutorial called **Modeling Buildings Using Boolean Operations**.