Chapter 3

Primitives

Learning Objectives

After completing this chapter, you will be able to:

- *Create standard primitives*
- *Create extended primitives*
- *Create the 3D model of a table with drawers*
- *Create the 3D model of a park bench*
- *Create the model of a chair*

INTRODUCTION

Autodesk 3ds Max has several basic three-dimensional geometric shapes which are known as standard primitives and extended primitives such as box, cone, sphere, cylinder, torus, tube, chamfer box, spindle, hedra, and so on. You can use these primitives to create simple 3D models such as a table, box, chair, and so on.

STANDARD PRIMITIVES AND EXTENDED PRIMITIVES

All standard primitives and extended primitives can be created dynamically using the mouse or by specifying the parameters in the **Keyboard Entry** rollout of the **Command Panel**.




To create the standard primitives, choose **Create > Geometry** in the **Command Panel**. By default, the **Standard Primitives** option is selected in the drop-down list below the **Geometry** button. Now, activate the viewport in which you want to create the primitives by clicking in it. Next, invoke the required tool from the **Object Type** rollout. In the following section, you will learn to create and modify the standard primitives using various tools available in the **Object Type** rollout.

Creating a Box

Menu bar:	Create > Standard Primitives > Box
Command Panel:	Create > Geometry > Standard Primitives > Object Type rollout > Box

To create a box, activate the viewport in which you want to create a box by clicking in it. Next, invoke the **Box** tool from the **Object Type** rollout; the **Name and Color**, **Creation Method**, **Keyboard Entry**, and **Parameters** rollouts will be displayed, as shown in Figure 3-1. Press and hold the left mouse button in the viewport to specify the first corner of the box and then drag the cursor to define the length and width of the box. Release the left mouse button to get the desired length and width. Now, move the cursor up or down to define the height of the box. Click after you get the desired height; the box will be created, as shown in Figure 3-2.

Various rollouts used to create and modify the box are discussed next.



Note

1. To view all rollouts, position the cursor over any rollout until you see the pan icon (hand). Then, press the left mouse button and drag the cursor in the rollout.



2. The plus sign (+) on the left side of the rollout indicates that the rollout is collapsed and the minus sign (-) indicates that the rollout is expanded.

Name and Color Rollout

In Autodesk 3ds Max, a specific name and color is automatically assigned to the newly created box. To modify this name, expand the **Name and Color** rollout. Enter a new name in the **Name and Color** text box and press ENTER. To change the color of the box, choose the color

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

swatch on the right side of the name text box; the **Object Color** dialog box will be displayed, as shown in Figure 3-3. Choose a new color from this dialog box; the selected color will be displayed in the **Current Color** color swatch. Now, choose the **OK** button; the new color will be assigned to the box.

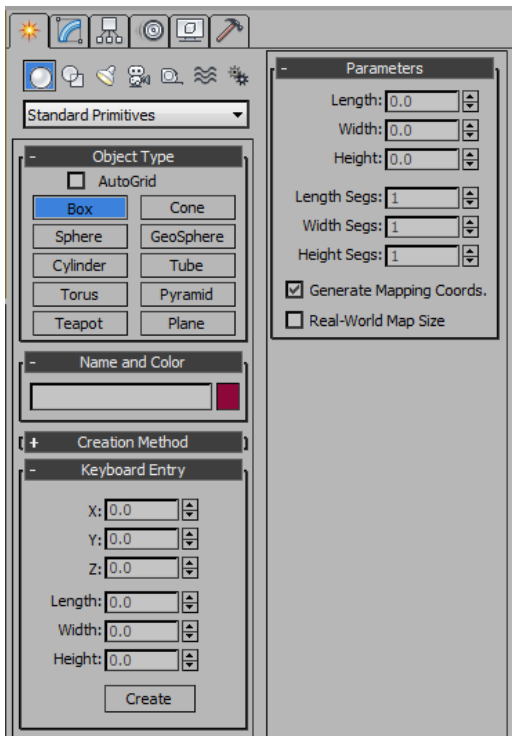

Figure 3-1 *Various rollouts to create a box*

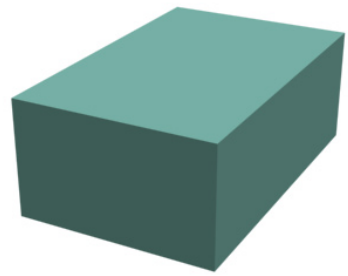

Figure 3-2 *The box created*

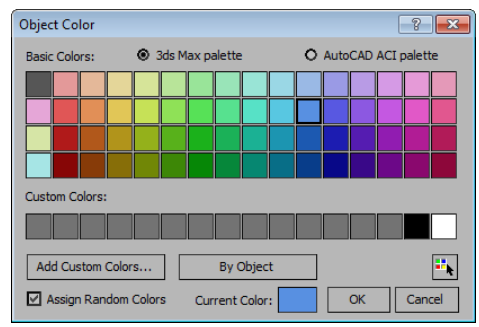

Figure 3-3 *The **Object Color** dialog box*

To customize the new color, choose the **Add Custom Colors** button in the **Object Color** dialog box; the **Color Selector: Add Color** dialog box will be displayed, as shown in Figure 3-4. Now, customize a new color in this dialog box and choose the **Add Color** button; the new color will be displayed in one of the color swatches in the **Custom Colors** area of the **Object Color** dialog box. Next, choose the **OK** button; the new color will be assigned to the box.



Note

*The options in the **Name and Color** rollout are the same for all standard primitives.*

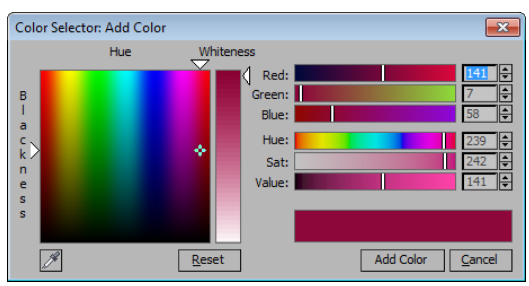

Figure 3-4 *The **Color Selector: Add Color** dialog box*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Creation Method Rollout

The options in this rollout are used for creating the box dynamically using the mouse. Select the **Cube** radio button to create a box of equal length, width, and height. Select the **Box** radio button to create a box having different length, width, and height.

Keyboard Entry Rollout

This rollout is used to create a box by entering the parameters in the **Keyboard Entry** rollout using the keyboard. To do so, expand the **Keyboard Entry** rollout and enter the values in the **Length**, **Width**, and **Height** spinners to specify the length, width, and height of the box, respectively. Also, enter the values in the **X**, **Y**, and **Z** spinners to specify the position of the box in the viewport along the axes of the home grid or the grid object. By default, the value in these spinners is 0, therefore, the object is created at the center of the home grid or the grid object in the viewport. Next, choose the **Create** button in the **Keyboard Entry** rollout; a box will be displayed with the specified dimensions in all viewports.



Note

The grid object is a type of helper object. It is a local grid other than the home grid that you can create yourself as per the requirement.

*The **Keyboard Entry** rollout in all standard primitives is used to create the corresponding primitive by entering the parameters in this rollout. The method of creating all primitives is the same as discussed. The only difference is in the type and number of parameters of various standard primitives.*

Parameters Rollout

After creating the box, you can modify its dimensions using the **Parameters** rollout. To do so, enter the new values of length, width, and height in the respective spinners in the **Parameters** rollout. Similarly, set the values in the **Length Segs**, **Width Segs**, and **Height Segs** spinners to define the number of divisions or segments along each axis of the object. Select the **Generate Mapping Coords.** check box to calculate the mapping of the box being created.



Note

*After creating a primitive in the standard primitives list, if you right-click in the viewport to exit the tool, the **Parameters** rollout will disappear from the **Create** tab. In such a case, to modify the parameters of the primitive, select the primitive in the viewport and choose the **Modify** tab in the **Command Panel**; the **Parameters** rollout will appear again.*



Creating a Sphere

Menu bar:	Create > Standard Primitives > Sphere
Command Panel:	Create > Geometry > Standard Primitives > Object Type rollout > Sphere

To create a sphere, activate a viewport by clicking in it and invoke the **Sphere** tool from the **Object Type** rollout; the **Name and Color**, **Creation Method**, **Keyboard Entry**, and **Parameters** rollouts will be displayed, as shown in Figure 3-5. Press and hold the left mouse button to specify the center of the sphere and then drag the cursor to define the radius of the sphere. Release the left mouse button to get the desired radius; the sphere will be created, as shown

in Figure 3-6. Note that the sphere will be displayed in all viewports.

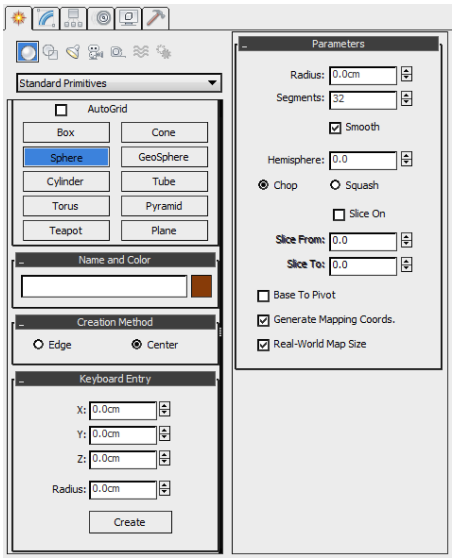

Figure 3-5 *Various rollouts to create a sphere*

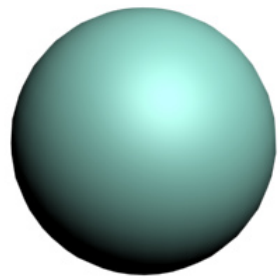

Figure 3-6 *A sphere*

Various rollouts used to create and modify the sphere are discussed next.

Creation Method Rollout

The options in this rollout are used for creating a sphere dynamically. Select the **Edge** radio button to specify the first point on an edge at the surface of the sphere and then drag to specify its diameter. Select the **Center** radio button to specify the first point at the center of the sphere and then drag to specify the radius.

Parameters Rollout

The options in this rollout are used to modify the parameters of the sphere. To do so, enter a new value in the **Radius** spinner. By default, the **Smooth** check box is selected, therefore, the sphere appears smooth. If this check box is cleared, it will give a faceted appearance to the sphere. The **Hemisphere** spinner is used to create one-half of the sphere. To create a hemisphere, enter a value in the **Hemisphere** spinner. While creating a hemisphere, if you select the **Chop** radio button, then the number of vertices and faces in the hemisphere will be chopped or reduced. If you select the **Squash** radio button, the hemisphere will have the same number of vertices and faces as in the complete sphere. On selecting the **Slice On** check box, the **Slice From** and **Slice To** spinners will be enabled. Set the values in the **Slice From** and **Slice To** spinners to specify the start and end of the sphere around its local Z-axis. By default, the pivot point of the sphere is located at its center. If you select the **Base To Pivot** check box, then the pivot point of the sphere will shift toward its local Z-axis.



Note

The pivot point represents the local center and the local coordinate system of an object.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Creating a Cylinder

Menu bar:	Create > Standard Primitives > Cylinder
Command Panel:	Create > Geometry > Standard Primitives > Object Type rollout > Cylinder

To create a cylinder, activate the viewport by clicking in it and invoke the **Cylinder** tool from the **Object Type** rollout; the **Name and Color**, **Creation Method**, **Keyboard Entry**, and **Parameters** rollouts will be displayed, as shown in Figure 3-7.

Press and hold the left mouse button to specify the center of the base of the cylinder and then drag the cursor to define the radius of the cylinder. Release the left mouse button. Next, move the cursor up or down to define the height of the cylinder. Click after you get the desired height; a cylinder will be created, as shown in Figure 3-8.

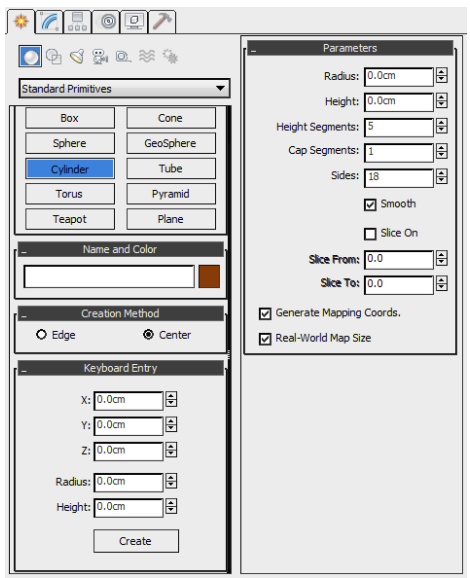

Figure 3-7 *Various rollouts to create a cylinder*

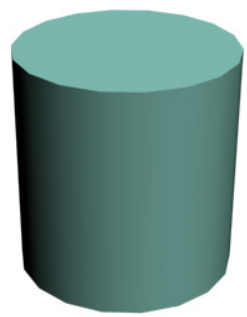

Figure 3-8 *A cylinder*

Various rollouts used to create and modify the cylinder are discussed next.

Creation Method Rollout

The options in this rollout are the same as those discussed in the **Sphere** tool.

Parameters Rollout

The options in this rollout are used to modify the cylinder. Enter a new value for the radius and height in the **Radius** and **Height** spinners, respectively. The value in the **Height Segments** spinner defines the number of segments along the height of the cylinder. The value in the **Cap Segments** spinner specifies the number of segments at the top and bottom of the cylinder. The

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

value in the **Sides** spinner specifies the number of sides on the cylinder. Different shapes of the cylinder can be created by entering different values in the **Sides** spinner. By default, the **Smooth** check box is selected, therefore, the cylinder appears smoother. The **Slice On** check box is the same as described in the **Sphere** tool.

Creating a Plane

Menu bar:	Create > Standard Primitives > Plane
Command Panel:	Create > Geometry > Standard Primitives > Object Type rollout > Plane

To create a plane, activate the viewport by clicking in it and then invoke the **Plane** tool from the **Object Type** rollout; the **Name and Color**, **Creation Method**, **Keyboard Entry**, and **Parameters** rollouts will be displayed, as shown in Figure 3-9.

Press and hold the left mouse button to specify the first corner of the plane and then drag the cursor to define the length and width of the plane. Release the left mouse button; a plane will be created, as shown in Figure 3-10.

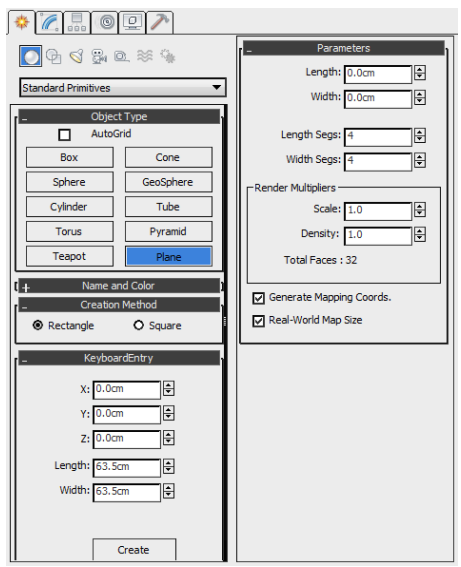

Figure 3-9 *Various rollouts to create a plane*

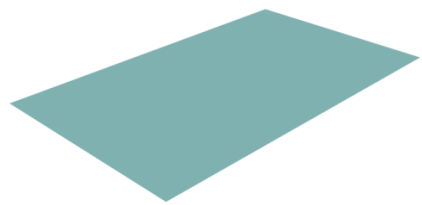

Figure 3-10 *A plane*

Various rollouts used to create and modify the plane are discussed next.

Creation Method Rollout

The options in this rollout are used for creating a plane dynamically. Select the **Rectangle** radio button to specify the first point as the corner of a rectangular plane. Select the **Square** radio button to specify the first point as the center of a square plane. Note that in the case of a square plane, the length and width of the plane will be equal.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Parameters Rollout

The options in this rollout are used to modify the plane. Enter the new values in the **Length** and **Width** spinners to modify the plane. The values in the **Length Segs** and **Width Segs** spinners define the number of segments along the length and width of the plane, respectively. The **Render Multipliers** area is used to set the multipliers for rendering. The **Scale** spinner is used to specify the value by which the length and width will be multiplied while rendering. The **Density** spinner is used to specify the value by which the number of segments along the length and width will be multiplied while rendering.

In the following sections, you will learn to create and modify the extended primitives using various tools available in the **Object Type** rollout.

Creating a Chamfer Box

Menu bar:	Create > Extended Primitives > Chamfer Box
Command Panel:	Create > Geometry > Extended Primitives > Object Type rollout > ChamferBox

The chamfer box is similar to the box in the standard primitives. The only difference is that a chamfer box has beveled or rounded edges. To create a chamfer box, activate the viewport and invoke the **ChamferBox** tool from the **Object Type** rollout; the **Name and Color**, **Creation Method**, **Keyboard Entry**, and **Parameters** rollouts will be displayed, as shown in Figure 3-11.

Now, press and hold the left mouse button on a point in the viewport for defining the first corner of the chamfer box, and drag the cursor to define its length and width. Release the left mouse button to get the desired length and width. Next, move the cursor up or down to define its height, and click on the screen to get the desired height. Then, move the cursor to define the fillet and click on the screen to get the fillet or chamfer; a chamfer box will be created, as shown in Figure 3-12.

Various rollouts used to create and modify a chamfer box are discussed next.

Creation Method Rollout

The options in this rollout are used for creating a chamfer box dynamically. Select the **Cube** radio button to create a chamfer box of equal length, width, and height. Select the **Box** radio button to create a chamfer box having different length, width, and height.

Parameters Rollout

The options in this rollout are used to modify the chamfer box. Enter the new values in the **Length**, **Width**, **Height**, and **Fillet** spinners. The values in the **Length Segs**, **Width Segs**, and **Height Segs** spinners are used to define the number of segments along the length, width, and height of the chamfer box, respectively. The value in the **Fillet Segs** spinner specifies the number of segments in the fillet of the chamfer box.

Select the **Smooth** check box, if it is not already selected, to create a chamfer box with rounded edges, refer to Figure 3-12. If this check box is cleared, a chamfer box with beveled edges will be created, as shown in Figure 3-13.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

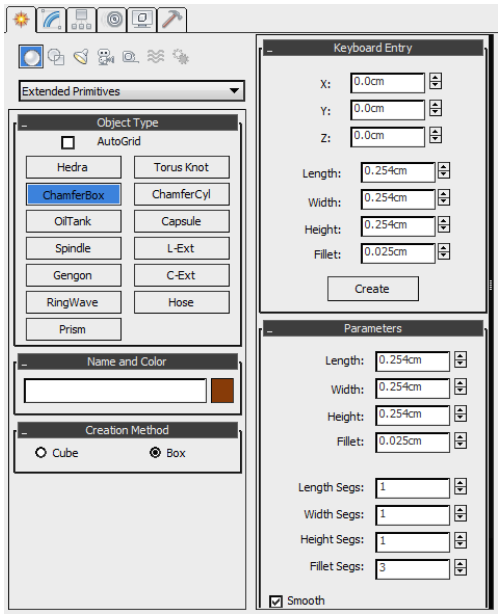

Figure 3-11 *Various rollouts to create a chamfer box*

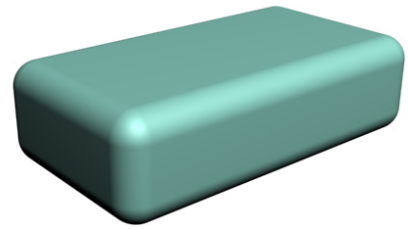

Figure 3-12 *A chamfer box with rounded edges*

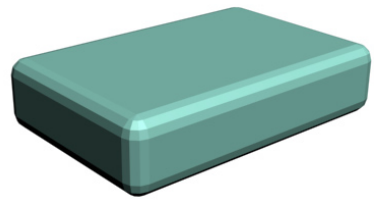

Figure 3-13 *A chamfer box with beveled edges*

Creating a Chamfer Cylinder

Menu bar:	Create > Extended Primitives > Chamfer Cylinder
Command Panel:	Create > Geometry > Extended Primitives > Object Type rollout > ChamferCyl

The chamfer cylinder is similar to the cylinder in the standard primitives. The only difference is that the chamfer cylinder has beveled or rounded edges. To create a chamfer cylinder, activate the viewport and invoke the **ChamferCyl** tool from the **Object Type** rollout; the **Name and Color**, **Creation Method**, **Keyboard Entry**, and **Parameters** rollouts will be displayed, as shown in Figure 3-14.

Next, press and hold the left mouse button on a point in the viewport for defining the center of the base of the cylinder, and drag the cursor to define its radius. Release the left mouse button and move the cursor up or down to define its height. Click on the screen to get the desired height and move the cursor to define the fillet. Again, click on the screen to get the desired fillet; a chamfer cylinder will be created, as shown in Figure 3-15.

Various rollouts used to create and modify a chamfer cylinder are discussed next.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Creation Method Rollout

The options in this rollout are the same as those discussed while creating the sphere in Chapter 2.

Parameters Rollout

The options in this rollout are used to modify the chamfer cylinder. Enter new values of the radius, height, and fillet in their respective spinners. The value in the **Height Segs** spinner is used to define the number of segments along the height of the chamfer cylinder. Similarly, the value in the **Fillet Segs** spinner is used to define the number of segments in the fillet area of the chamfer cylinder. The value in the **Sides** spinner specifies the number of sides of the chamfer cylinder. The **Cap Segs** spinner is used to define the number of segments on each end of the cylinder. Select the **Smooth** check box to create a chamfer cylinder with rounded edges, refer to Figure 3-15. If this check box is cleared, a chamfer cylinder with beveled edges will be created, as shown in Figure 3-16.

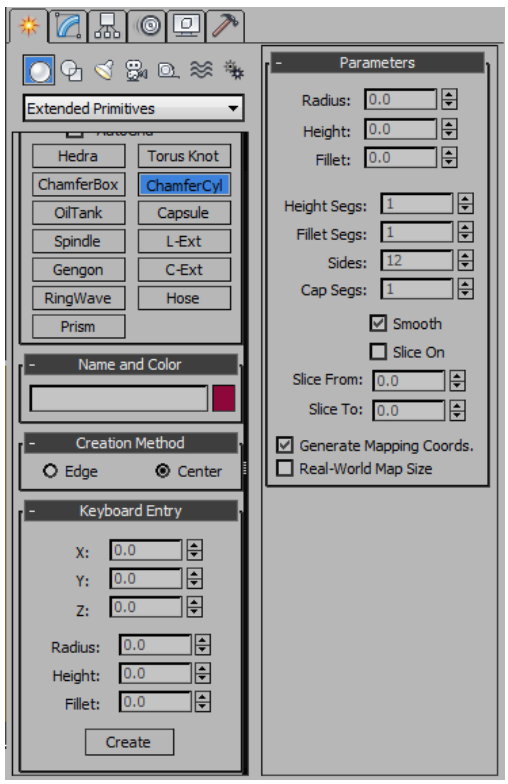

Figure 3-14 *Various rollouts to create a chamfer cylinder*



Figure 3-15 *A chamfer cylinder with rounded edges*



Figure 3-16 *A chamfer cylinder with beveled edges*

Creating a Hose

Menu bar:	Create > Extended Primitives > Hose
Command Panel:	Create > Geometry > Extended Primitives > Object Type rollout > Hose

A hose is an extended primitive that can be used to link two objects. To create a hose, activate the viewport and invoke the **Hose** tool from the **Object Type** rollout; the **Name and Color** and **Hose Parameters** rollouts will be displayed, as shown in Figures 3-17 and 3-18. Now, press and hold the left mouse button in the viewport to specify the center of the hose and drag the cursor to define its radius. Release the left mouse button and move the cursor up or down to define the height of the hose. Click on the screen to get the desired height of the hose; a hose will be created, as shown in Figure 3-19.

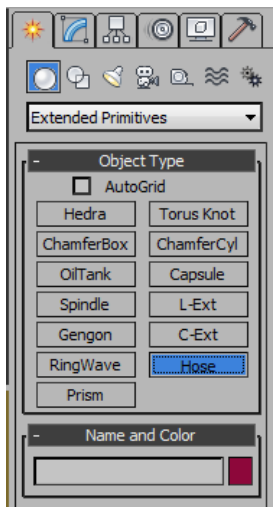

Figure 3-17 *The* ***Name and Color*** *rollout*

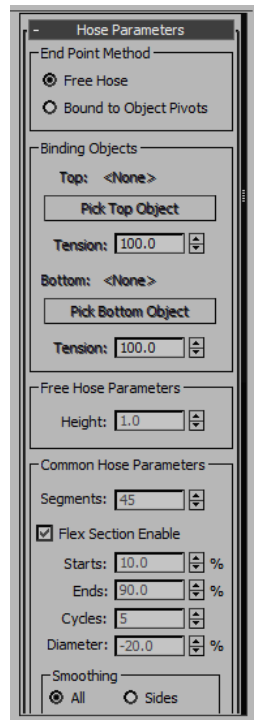

Figure 3-18 *Partial view of the* ***Hose Parameters*** *rollout*

The rollouts used to create and modify a hose are discussed next.

Hose Parameters Rollout

The options in this rollout are used to modify the hose. To do so, select the hose and choose the **Modify** tab in the **Command Panel**; the **Parameters** rollout will be displayed. Set the new values in the spinners in this rollout. The different areas in this rollout are discussed next.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

End Point Method Area

In the **End Point Method** area, select the **Free Hose** radio button to create a free hose. You can modify the height of the free hose by setting the value in the **Height** spinner of the **Free Hose Parameters** area. If you want to bind the hose with two objects, then you need to select the **Bound to Object Pivots** radio button in the **End Point Method** area. On selecting this radio button, the options in the **Binding Objects** area will be enabled.

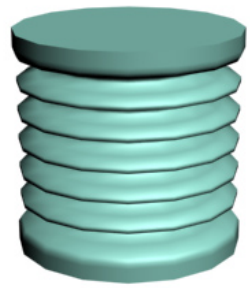

Figure 3-19 *A hose*

Binding Objects Area

The options in this area are used to bind two objects to the hose at the pivot point of these objects. To do so, choose the **Pick Top Object** button in the **Binding Objects** area and move the cursor over the object that you want to bind with the top of the hose; a selection cursor will be displayed. Select the object in the viewport to bind it at the top of the hose. Choose the **Pick Bottom Object** button in this area and move the cursor over another object that you want to bind with the bottom of the hose; a selection cursor will be displayed. Select the object in the viewport to bind it at the bottom of the hose. When you select the objects for the top and bottom of the hose, the name of these objects will be displayed in the **Top** and **Bottom** labels. The value in the **Tension** spinner is used to control the tension between the bend in the hose and the top or bottom objects.

Common Hose Parameters Area

In the **Common Hose Parameters** area, the **Segments** spinner specifies the number of segments along the length of the hose. By default, the **Flex Section Enable** check box is selected. As a result, the **Starts**, **Ends**, **Cycles**, and **Diameter** spinners will be enabled. The values in all these spinners are a percentage of the values of the main hose. The value in the **Starts** spinner specifies the point where the flex section starts along the hose. The value in the **Ends** spinner specifies the point where the flex section ends. The **Cycles** spinner is used to define the number of cycles in the flexible section. To display all cycles properly, the number of segments should be more. The **Diameter** spinner is used to specify the secondary diameter of the flexible section.

Smoothing Area

You need to select the **All** radio button in this area to add smoothness to the entire hose. Select the **Sides** radio button to smoothen only the sides of the hose. Select the **None** radio button to create a faceted surface of the hose. Select the **Segments** radio button to apply smoothness on the inner section of the hose.

By default, the **Renderable** and **Generate Mapping Coords** check boxes are selected in this area. The **Renderable** check box is used to view the hose at rendering. The **Generate Mapping Coords** check box is used to automatically assign the mapping coordinates to an object.

Hose Shape Area

The **Hose Shape** area is used to define the basic shape of the hose. Select the **Round Hose** radio button to create a circular cross-section; the **Diameter** and **Sides** spinners will be

activated. The **Diameter** spinner specifies the diameter of the hose. The **Sides** spinner specifies the number of sides of the hose.

Select the **Rectangular Hose** radio button to create a rectangular hose; various spinners below this radio button will be activated. The **Width** and **Depth** spinners are used to define the width and depth of the hose, respectively. The **Fillet** spinner specifies the value by which the cross-section corners of the hose get rounded. The value in the **Fillet Segs** spinner should be higher in order to view the fillet. The value in the **Rotation** spinner rotates the hose around its local Z-axis.

Select the **D-Section Hose** radio button to create a D-shaped hose; various spinners below this radio button will be activated. The **Width** and **Depth** spinners in the **D-Section Hose** radio button are used to define the width and depth of the hose, respectively. The value in the **Round Sides** spinner specifies the total number of segments along the rounded side of the D-shaped hose. The **Fillet** spinner specifies the value by which the square corners of the cross-section get rounded. The value in the **Fillet Segs** spinner should be higher to view the fillet. The value in the **Rotation** spinner rotates the D-shaped hose around its local Z-axis.

TUTORIALS

Tutorial 1

In this tutorial, you will create the 3D model of a table with drawers, as shown in Figure 3-20, using the standard primitives. **(Expected time: 30 min)**



Figure 3-20 *The 3D model of a table with drawers*

The following steps are required to complete this tutorial:

a. Create the project folder.
b. Create the left and right boxes of the table.
c. Align the boxes.
d. Create the drawers.
e. Make clones of drawer.
f. Create outer faces of the table.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

g. Create the knobs for the drawers of the table.
h. Change the background color of the scene.
i. Save the scene.
j. Render the scene.

Creating the Project Folder

Before starting a new scene, it is recommended that you set the project folder at the beginning stage. Setting a project folder helps you keep all files of a project in an organized manner. You need to follow the steps given next to set the project folder.

1. Open the Windows File Browser and browse to the *Documents* folder. In this folder, create a new folder with the name *camax*.

2. Start Autodesk 3ds Max 2012. If 3ds Max is already running, you need to reset it. To do so, choose **Reset** from the **Application** menu; the **3ds Max** message box is displayed. Choose the **Yes** button from the message box; a new screen is displayed with the default settings.



Note

*The **Reset** option is used to reset 3ds Max settings such as viewport configuration, snap settings, **Material Editor**, **Background image**, and so on. It also restores the startup defaults.*

3. Choose the **Application** button; the **Application** menu is displayed. Next, choose **Manage > Set Project Folder** from it; the **Browse For Folder** dialog box is displayed.

4. In the **Browse For Folder** dialog box, navigate to *\Documents\camax*. Next, choose the **Make New Folder** button to create a new folder with the name *c03_tut1*. Next, choose the **OK** button to close the **Browser For Folder** dialog box.

5. In the Window File Browser, navigate to *\Documents\camax\c03_tut1*; a series of folders are displayed in the browser such as scenes and renderoutput.



Note

When you open or save a scene after setting the project, 3ds max uses the scenes folder inside the project folder, by default.

Creating the Left and Right Boxes

In this section, you need to create the basic shape of the table using the **Box** tool from **Standard Primitives**.

1. By default, the **Select Object** tool is invoked in the **Main Toolbar**. Choose **Create > Geometry** in the **Command Panel**; **Standard Primitives** is displayed in the drop-down list below the **Geometry** button. Also, the **Object Type** rollout is displayed in the **Command Panel**.



2. Activate the Top viewport by right-clicking in it. Next, invoke the **Box** tool from the **Object Type** rollout. Press and hold the left mouse button at the upper left corner of the viewport

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

and then drag the cursor to the lower right corner. Release the left mouse button to set the length and width of the box. Next, move the mouse in the upward direction and click in the viewport to set the height of the box.

3. Choose the **Modify** tab in the **Command Panel**. In the **Parameters** rollout, enter the values as follows:

   Length: **90** Width: **75** Height: **95**

4. Invoke the **Zoom Extents All** tool in the viewport navigation controls to view the box; the box is displayed in all viewports, as shown in Figure 3-21. Alternatively, press the Z key to invoke the **Zoom Extents All** tool.

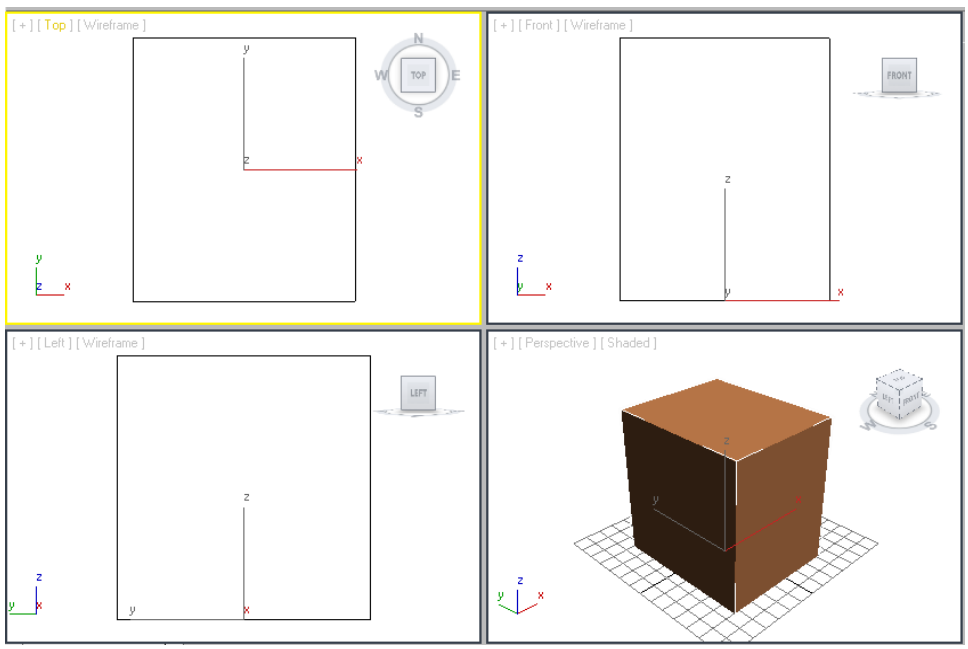

Figure 3-21 *The box displayed in all viewports*

5. In the **Name and Color** rollout, enter **left box** and press ENTER; the object is named as *left box*.

6. Choose the color swatch in the **Name and Color** rollout to change the color of the *left box*; the **Object Color** dialog box is displayed. Choose the **Add Custom Colors** button from this dialog box; the **Color Selector: Add Color** dialog box is displayed. Enter the values as follows:

   Red: **224** Green: **143** Blue: **87**

7. Choose the **Add Color** button in the **Color Selector: Add Color** dialog box to add the selected color; the color is displayed in one of the **Custom Colors** boxes in the **Object Color** dialog box. Choose the **OK** button to apply the color to the *left box*.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

8. Create another box using the same method in the Top viewport. Enter the following values in the **Parameters** rollout:

   Length: **90** Width: **80** Height: **25**

9. In the **Name and Color** rollout, enter **right box** and press ENTER; the object is named as *right box*. Also, assign the same color to the *right box* that you have assigned to the *left box*, refer to steps 6 and 7.

Aligning the Boxes

In this section, you need to align the *left* and *right boxes* together.

1. Invoke the **Select and Move** tool and make sure that the *right box* is selected. Move the *right box* along the X, Y, and Z axes in all viewports to align it with the *left box*, as shown in Figure 3-22. Click in the viewport and press the Z key to invoke the **Zoom Extents All** tool, as shown in Figure 3-22.

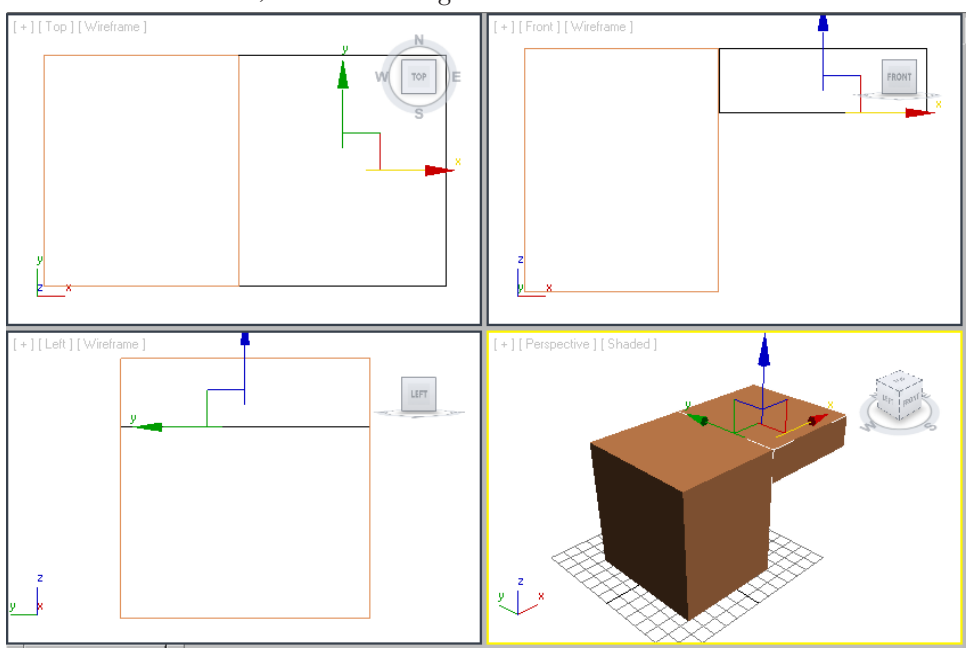

Figure 3-22 *Alignment of the left box with the right box in all viewports*

Note

While aligning the objects, you need to make sure that the objects are aligned properly in all viewports and the color of the right box is same as that of the left box.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Creating the Drawer

In this section, you need to create the drawers of the table.

1. Create another box in the Top viewport and enter the following values in the **Parameters** rollout:

   Length: **90** Width: **55** Height: **25**

2. In the **Name and Color** rollout, enter **drawer001** and press ENTER. Choose the color swatch to change the color of the *drawer001*; the **Object Color** dialog box is displayed. Choose the **Add Custom Colors** button; the **Color Selector: Add Color** dialog box is displayed. Enter the values as follows:

   Red: **177** Green: **88** Blue: **27**

3. Choose the **Add Color** button from the **Color Selector: Add Color** dialog box to add the selected color. The color is displayed in one of the **Custom Color** boxes in the **Object Color** dialog box. Choose the **OK** button; the new color is assigned to the *drawer001*.

4. Align the *drawer001* with the *left box* in all viewports using the **Select and Move** tool, as shown in Figure 3-23.

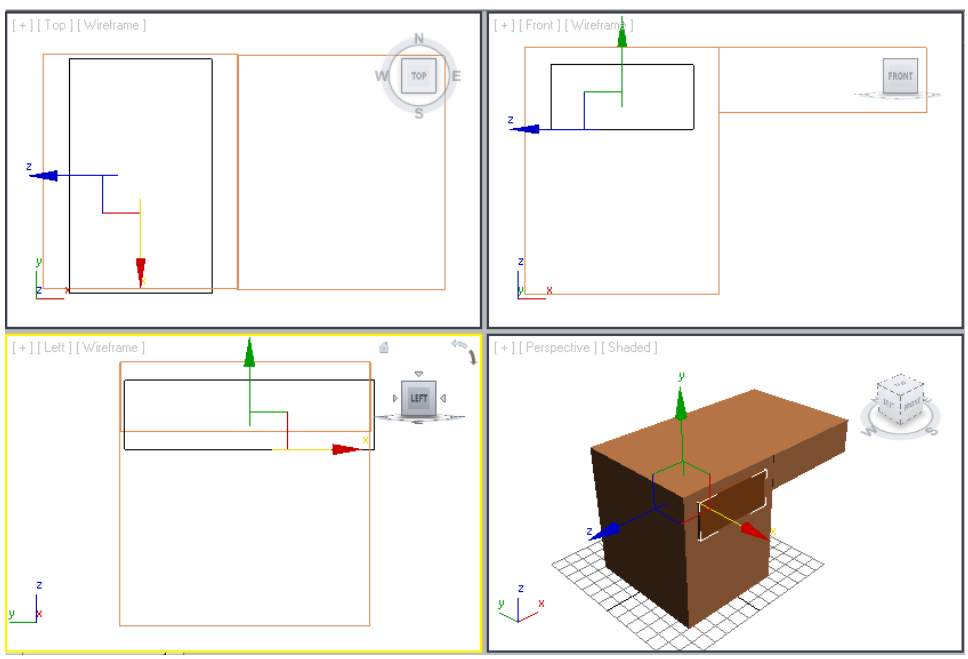

Figure 3-23 *Alignment of the drawer001 with the left box*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Making Clones of the Drawer

In this section, you will create copies of the *drawer001*.

1. Activate the Front viewport by right-clicking on it and make sure the *drawer001* is selected. Next, move the cursor over the Y axis, press and hold the SHIFT key, and drag the box downward until the value in the **Y** spinner of the coordinate display at the bottom of the screen is **-29** approximately. Release the left mouse button and the SHIFT key; the **Clone Options** dialog box is displayed, as shown in Figure 3-24.

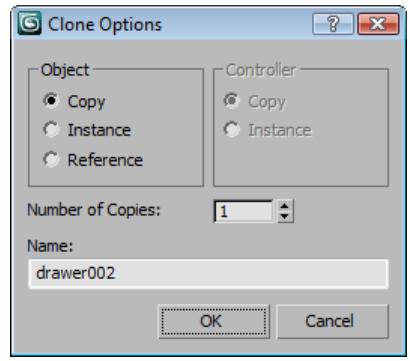

Figure 3-24 *The* ***Clone Options*** *dialog box*

2. Make sure that the **Copy** radio button is selected in the **Object** area of the **Clone Options** dialog box. In the **Number of Copies** spinner, enter **2** to create two copies of the *drawer001*. Then, choose the **OK** button; two drawers with same dimensions are created, as shown in Figure 3-25.

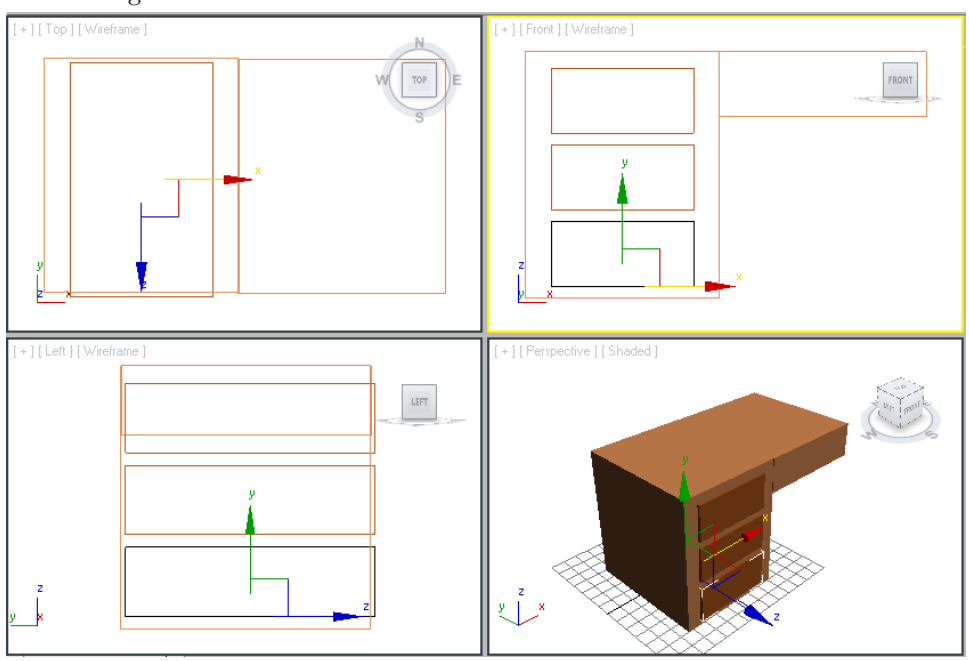

Figure 3-25 *The drawer002 and drawer003 created after copying the drawer001*

Note

The copied objects are automatically named as drawer002 and drawer003 in a sequence, based on the name of the original object. You can also copy an object by holding the SHIFT key while rotating or scaling it.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

3. Create another box in the Top viewport using the values as follows:

   Length: **90** Width: **70** Height: **17**

4. Name the newly created box as *drawer004* and change its color as you did for the drawers created previously.

5. Align the *drawer004* in all viewports, as shown in Figure 3-26.

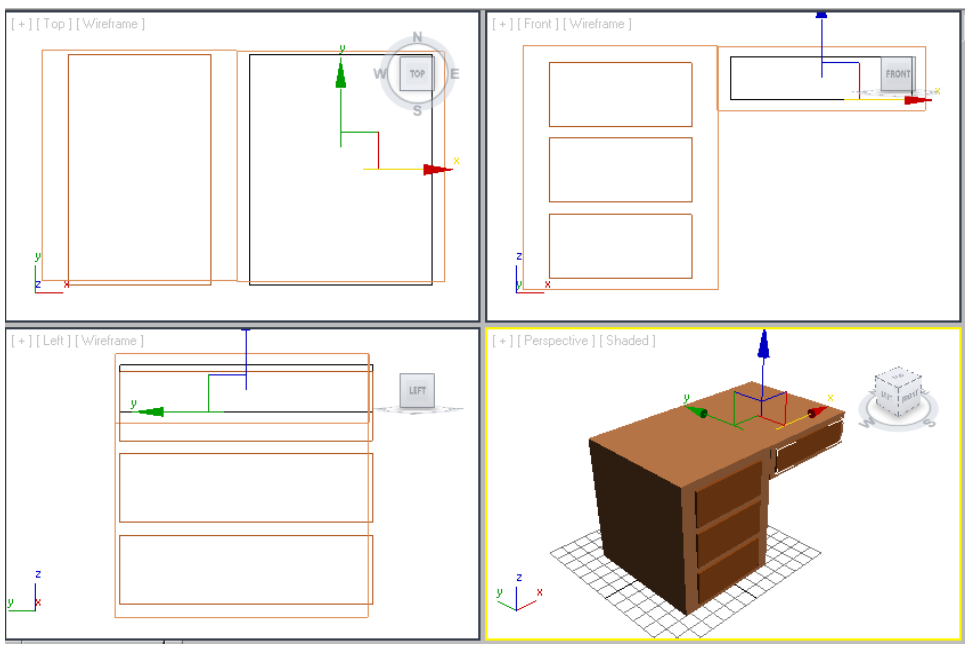

Figure 3-26 *The drawer004 aligned in all viewports*

Creating the Outer Faces of the Table

In this section, you need to create the outer faces of the table to make it appear more realistic.

1. Create a box in the Left viewport by using the following dimensions:

   Length: **95.5** Width: **90** Height: **1.5**

2. In the **Name and Color** rollout, enter **left face001** and press ENTER. Choose the color swatch to change the color of the box; the **Object Color** dialog box is displayed. Choose the **Add Custom Colors** button from this dialog box; the **Color Selector: Add Color** dialog box is displayed. Enter the values as follows:

   Red: **134** Green: **59** Blue: **8**

3. In all viewports, align the *left face001* with the left side of the *left box* using the **Select and Move** tool, as shown in Figure 3-27.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

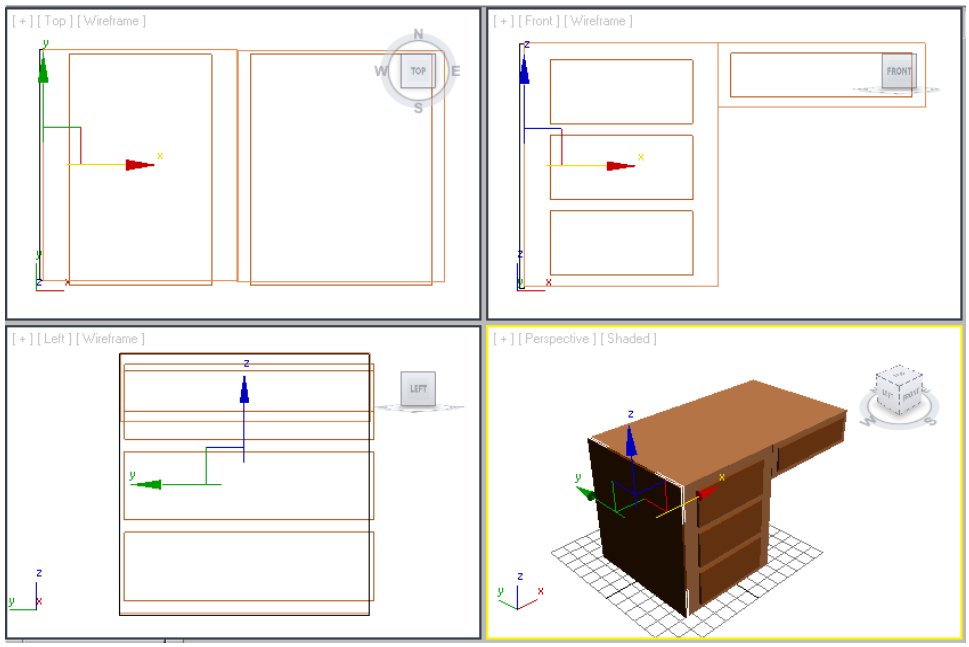

Figure 3-27 *Alignment of the left face001 with the left side of the left box*

4. In the Front viewport, copy the *left face001* by using the **Clone Options** dialog box as described earlier; the new face is automatically named as *left face002*. Now, align it with the other side of the *left box*, as shown in Figure 3-28.

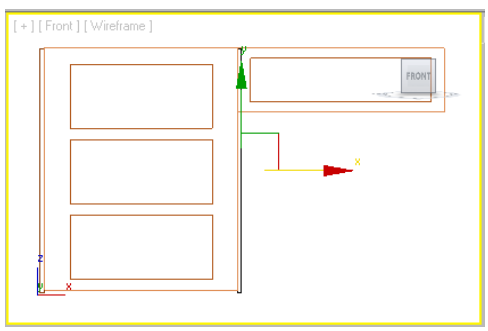

Figure 3-28 *Alignment of the left face002 with the other side of the left box*

5. To create the upper face of the table, create another box in the Top viewport by using the following dimensions:

   Length: **90.5** Width: **156.5**
   Height: **1.5**

6. Name the box as *upper face* and assign the same color to it as assigned to the other faces.

7. Align the *upper face* with the top of the table, as shown in Figure 3-29.

8. Create one more box in the Top viewport using the following dimensions:

   Length: **90.5** Width: **77.5** Height: **1.5**

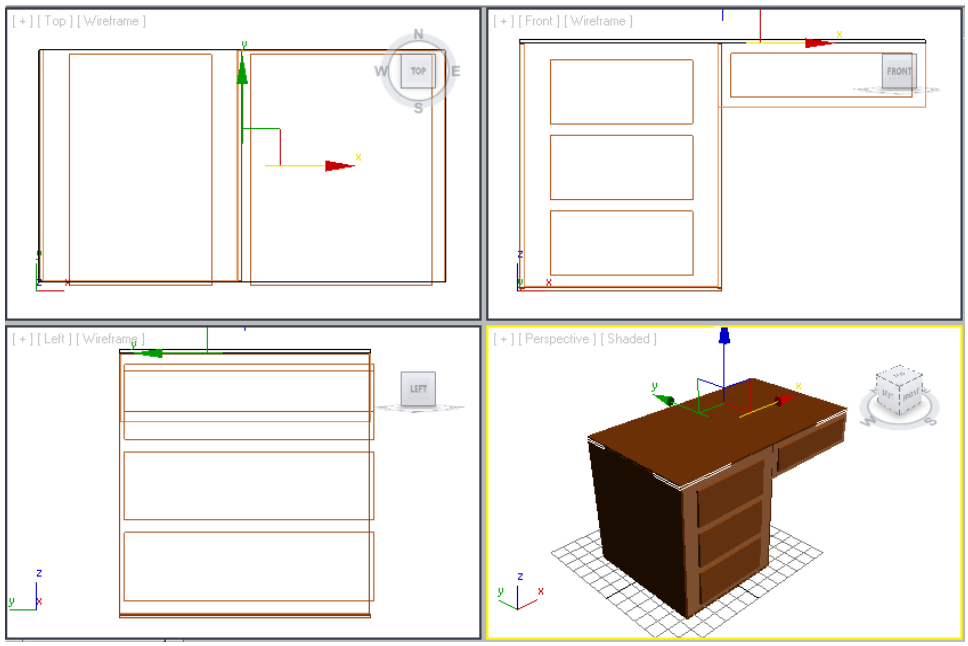

Figure 3-29 *Alignment of the upper face with the top of the table*

9. Name the box as *lower face* and assign the same color to it as assigned to the other faces.

10. Align the *lower face* box with the bottom of the *left box*, as shown in Figure 3-30

11. Create a box for the lower face of the *right box* in the Top viewport by using the following dimensions:

    Length: **90.5** Width: **79** Height: **1.5**

12. Name the box as the *right lower face* and assign the same color to it as assigned to the other faces.

13. Align the *right lower face* to the bottom of the *right box*, as shown in Figure 3-31.

14. Now, create a box for the right face of the *right box* in the Left viewport using the following dimensions:

    Length: **28.9** Width: **90** Height: **1.5**

15. Name the box as the *right face* and assign the same color to it as assigned to the other faces.

16. Align the *right face* with the right side of the *right box*, refer to Figure 3-31.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

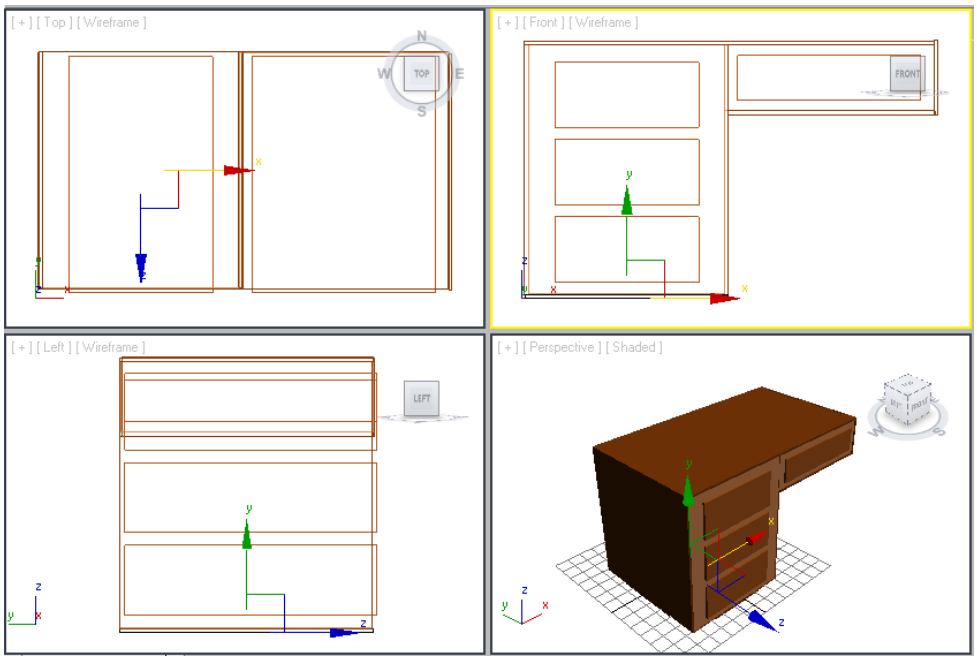

Figure 3-30 *Alignment of the lower face with the bottom of the left box*

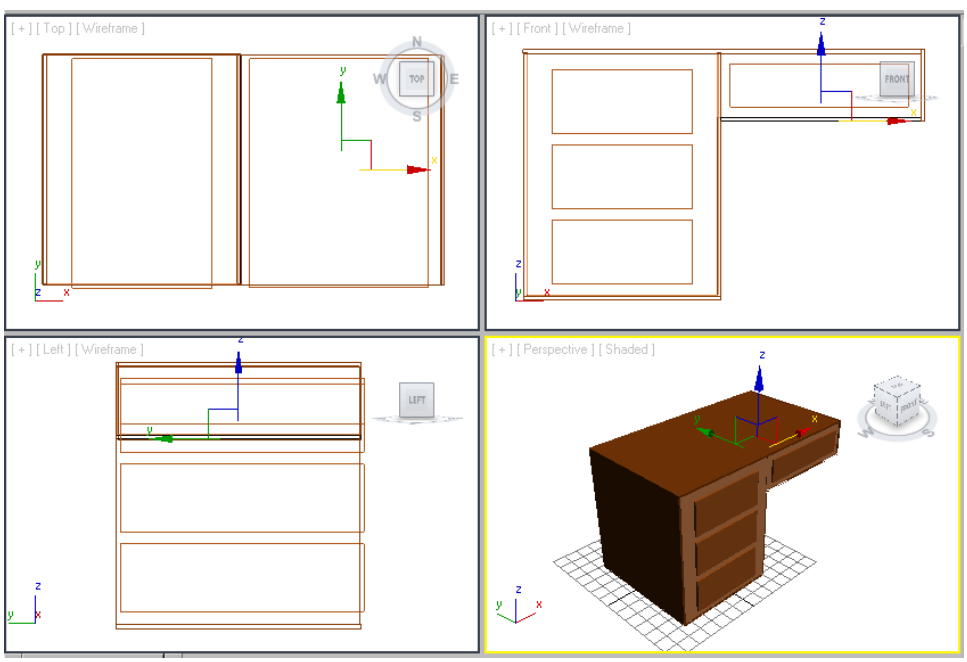

Figure 3-31 *Alignment of the right lower face and the right face with the right box of the table*

Creating Knobs for the Drawers

In this section, you need to create a knob for a drawer. Then, you can copy this knob for other drawers.

1. Invoke the **Sphere** tool from **Create > Geometry > Standard Primitives > Object Type** rollout of the **Command Panel**.

2. Now, create a sphere in the Front viewport and in the **Parameters** rollout, enter the following value:

   Radius: **2.3**

   Also, make sure the **Smooth** and **Generate Mapping Coords** check boxes and the **Chop** radio button are selected in this rollout.

3. Name the sphere as *knob001* and use the color swatch to change its color to white.

4. Align *knob001* with *drawer001* in all viewports using the **Select and Move** tool, as shown in Figure 3-32.

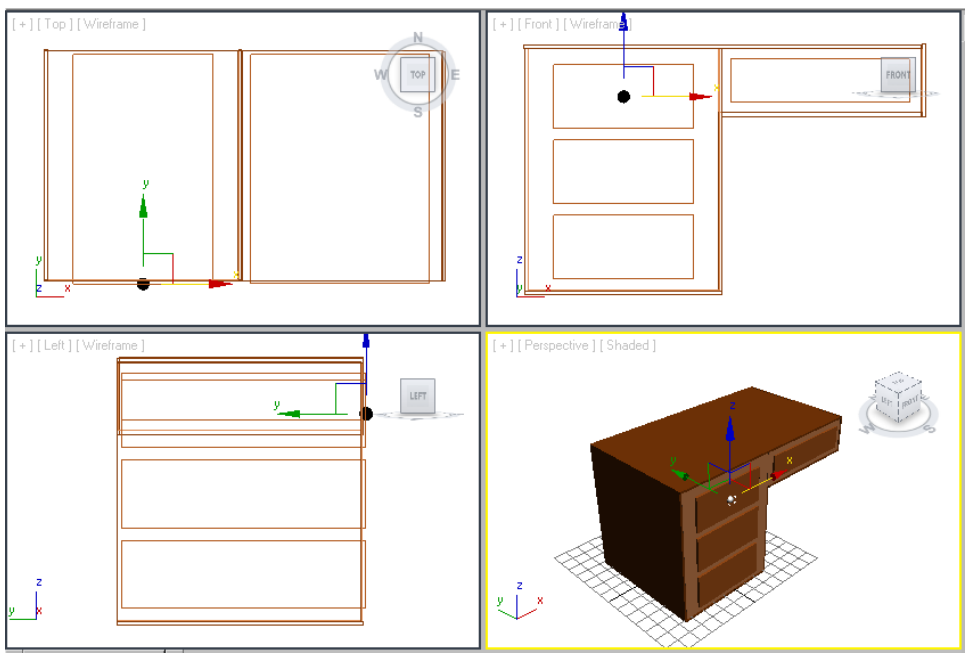

Figure 3-32 *Alignment of knob001 with drawer001*

5. Activate the Front viewport by right-clicking on it and create three copies of *knob001* by using the **Clone Options** dialog box as described earlier; these are automatically named as *knob002*, *knob003*, and *knob004*. Next, align them in all viewports, as shown in Figure 3-33.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

6. Set the view of the table in the Perspective viewport using the **Orbit** tool from the viewport navigation controls.

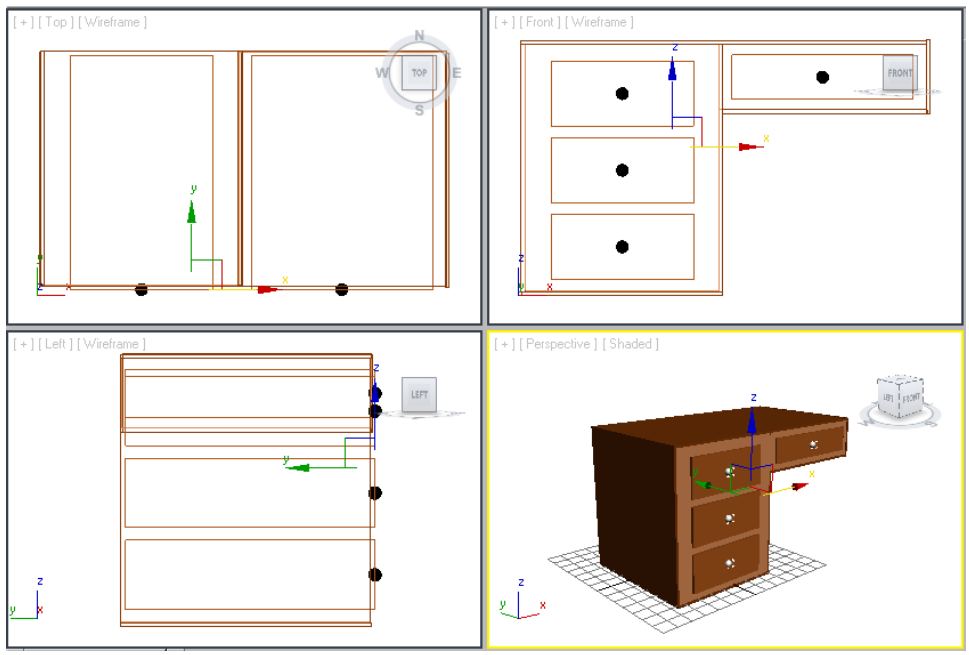

Figure 3-33 *Alignment of knobs in all viewports*

Changing the Background Color of the Scene

In this section, you need to change the background color of the scene.

1. Choose **Rendering > Environment** from the menu bar; the **Environment and Effects** dialog box is displayed. The **Environment** tab is chosen by default in this dialog box.

2. Now, in the **Background** area of the **Common Parameters** rollout, choose the color swatch below the **Color** label; the **Color Selector: Background Color** dialog box is displayed. Select the white color and choose the **OK** button.

3. Close the **Environment and Effects** dialog box. After rendering, the background color of the scene will change to white.

Saving the Scene

After completing the tutorial, you will save the scene using the steps given next.

1. Choose **Save** from the **Application** menu; the **Save File As** dialog box is displayed.

Note

The scenes created in 3ds Max are saved with .max extension.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

As the project folder is already set, the path *\Documents\camax\c03_tut1\scenes* is displayed in the **Save in** drop-down list of the **Save File As** dialog box.

2. Save the file with the name *c03tut1.max*.

Rendering the Scene

In this section, you will render the final output.

1. Activate the Perspective viewport.

2. Invoke the **Render Production** tool from the **Main Toolbar**; the **Perspective, frame1, Display Gamma 2.2, RGBA Color 16 Bits/Channel(1:1)** window is displayed with the final output of the table at one frame, refer to Figure 3-34.



Figure 3-34 *The final output*

You can view the final rendered image of this model by downloading the *c03_camax_rndr.zip* file from *http://www.cadcim.com*. The path of the file is as follows:

Textbooks > Animation and Visual Effects > Character Animation > Character Animation: A Tutorial Approach (Using 3ds Max)

Tutorial 2

In this tutorial, you will create the 3D model of a park bench, as shown in Figure 3-35, using the standard primitives. **(Expected time: 90 min)**

The following steps are required to complete this tutorial:

a. Create the project folder.
b. Create the horizontal back supports.
c. Create the horizontal seat supports.
d. Create a vertical back support.
e. Create rivets for the horizontal back support.
f. Create leg supports.
g. Create the legs of the park bench.
h. Change the background color of the scene.
i. Save the scene.
j. Render the scene.



Figure 3-35 *The model of a bench*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Creating the Project Folder

Before starting the tutorial, it is recommended that you create a project folder with the name *c03_tut2* in the *camax* folder.

Creating the Horizontal Back Supports

In this section, you need to invoke the **Box** tool to create the horizontal back supports of the park bench.

1. Activate the Top viewport by right-clicking in it. Choose **Create > Geometry** in the **Command Panel**; **Standard Primitives** is displayed in the drop-down list. Next, invoke the **Box** tool from the **Object Type** rollout; various rollouts are displayed in the **Command Panel**.

2. Expand the **Keyboard Entry** rollout and set the values as follows:

   Length: **1.5** Width: **124** Height: **6.03**

3. Choose the **Create** button from the **Keyboard Entry** rollout; a box is created in all viewports, as shown in Figure 3-36.

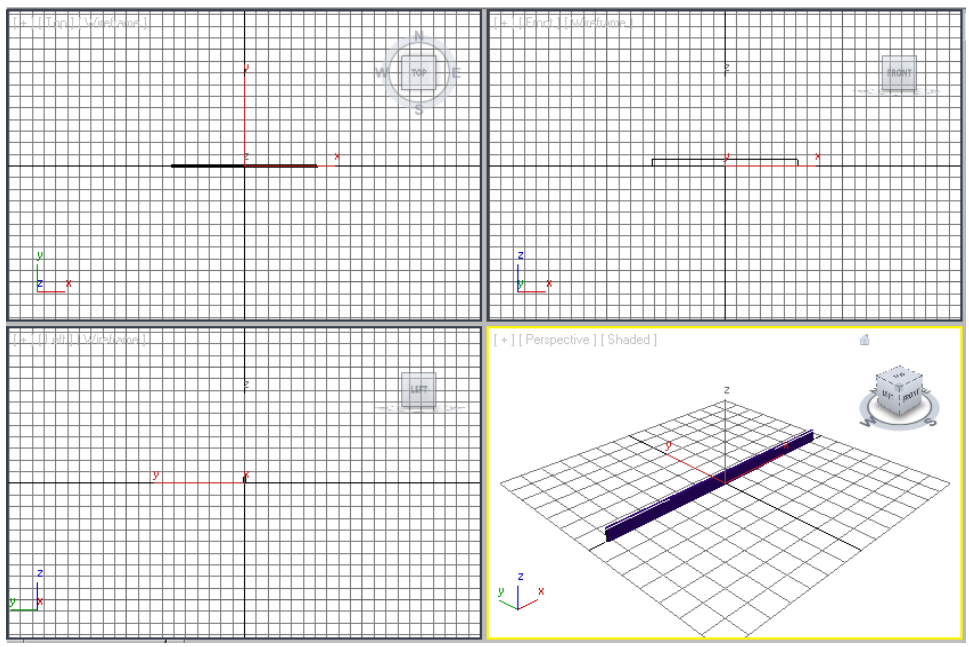

Figure 3-36 *A box created in all viewports*

4. In the **Name and Color** rollout, name the box as *horizontal back support001* and press the ENTER key.

5. Choose the color swatch from the **Name and Color** rollout; the **Object Color** dialog box is displayed. Now, using this dialog box, modify the color of the *horizontal back support001* to light brown. Choose the **OK** button to close the **Object Color** dialog box.

Next, you need to create copies of the *horizontal back support001*.

6. Activate the Front viewport by right-clicking in it. Invoke the **Select and Move** tool from the **Main Toolbar** and make sure that the *horizontal back support001* is selected. Next, move the cursor over the Y axis. Press and hold the SHIFT key and the left mouse button. Now, drag the *horizontal back support001* upward until the value in the **Y** spinner in the coordinate display is approximately **8.0**. Release the left mouse button and the SHIFT key; the **Clone Options** dialog box is displayed.

7. In the **Clone Options** dialog box, make sure that the **Copy** radio button is selected. Set the value in the **Number of Copies** spinner to **4**. Choose the **OK** button; four boxes with the same dimensions are displayed and they are automatically named as *horizontal back support002*, *horizontal back support003*, *horizontal back support004*, and *horizontal back support005*.

8. Invoke the **Zoom Extents All** tool from the viewport navigation controls; the horizontal back supports are displayed in all viewports, as shown in Figure 3-37.

Next, you need to rotate the *horizontal back support005*.

9. Activate the Left viewport and select the *horizontal back support005*. Next, right-click on the **Select and Rotate** tool in the **Main Toolbar**; the **Rotate Transform Type-In** dialog box is displayed.

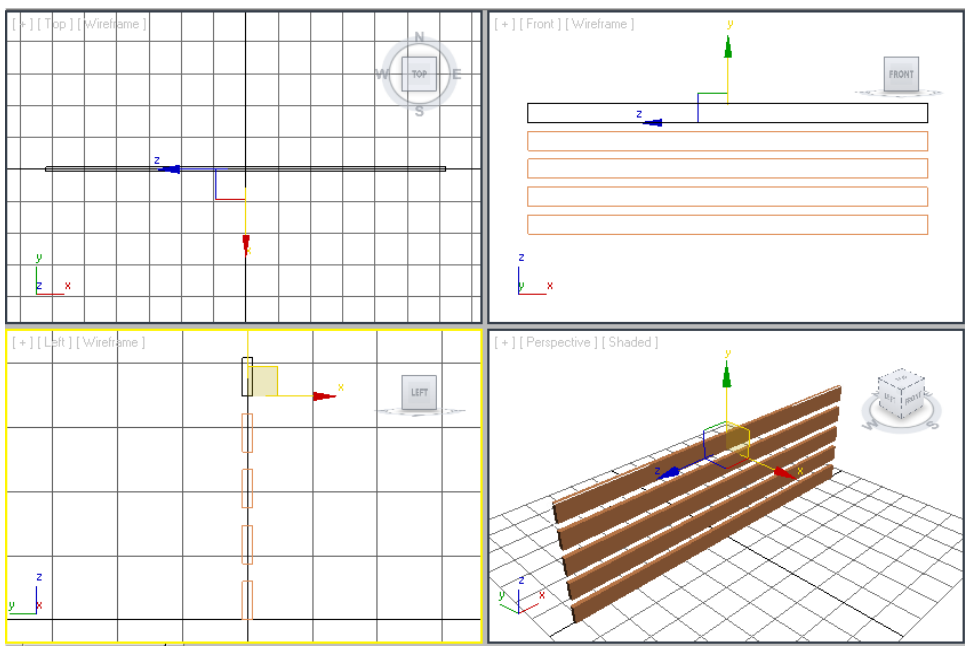

Figure 3-37 *Horizontal back supports in all viewports*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

10. In the **Absolute:World** area, set the value **-15** in the **X** spinner and press the ENTER key, as shown in Figure 3-38; the *horizontal back support005* gets rotated, as shown in Figure 3-39. Now, close the **Rotate Transform Type-In** dialog box.

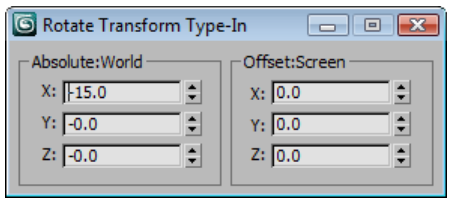

Figure 3-38 *The* ***Rotate Transform Type-In*** *dialog box*

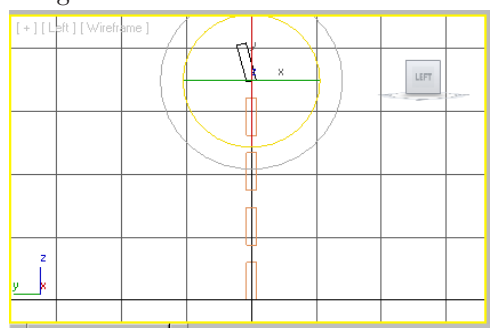

Figure 3-39 *The horizontal back support005 after rotating in the Left viewport*

11. Next, click anywhere in the viewport to deselect the *horizontal back support005*.

Grouping All Horizontal Back supports

In this section, you need to group all the horizontal back supports of the bench.

1. Activate the Left viewport and invoke the **Select Object** tool. Now, select all the horizontal back supports by dragging a selection box around them, as shown in Figure 3-40. All the horizontal back supports are selected.



2. Choose **Group > Group** from the menu bar; the **Group** dialog box is displayed.

3. In the **Group name** text box, enter **horizontal back support**, as shown in Figure 3-41 and then choose the **OK** button; all horizontal back supports are grouped together.

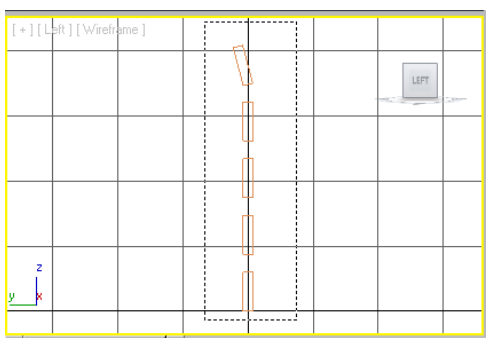

Figure 3-40 *All horizontal back supports selected simultaneously*

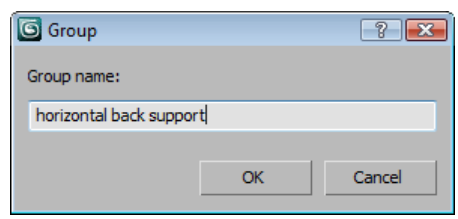

Figure 3-41 *The* ***Group*** *dialog box*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Creating the Horizontal Seat Supports

In this section, you need to create the horizontal seat supports using the following steps:

1. Activate the Top viewport and invoke the **Box** tool from the **Object Type** rollout.

2. Expand the **Keyboard Entry** rollout and using the following dimensions:

   Length: **6.03** Width: **124** Height: **1.5**

3. Choose the **Create** button from the **Keyboard Entry** rollout; a box is created in all viewports.

4. In the **Name and Color** rollout, name the box as *horizontal seat support001*.

5. Use the color swatch to assign the same color to the *horizontal seat support001* that you have assigned to the *horizontal back support*.

6. Invoke the **Select and Move** tool from the **Main Toolbar** and align the *horizontal seat support001* with the *horizontal back support* in all viewports, as shown in Figure 3-42.

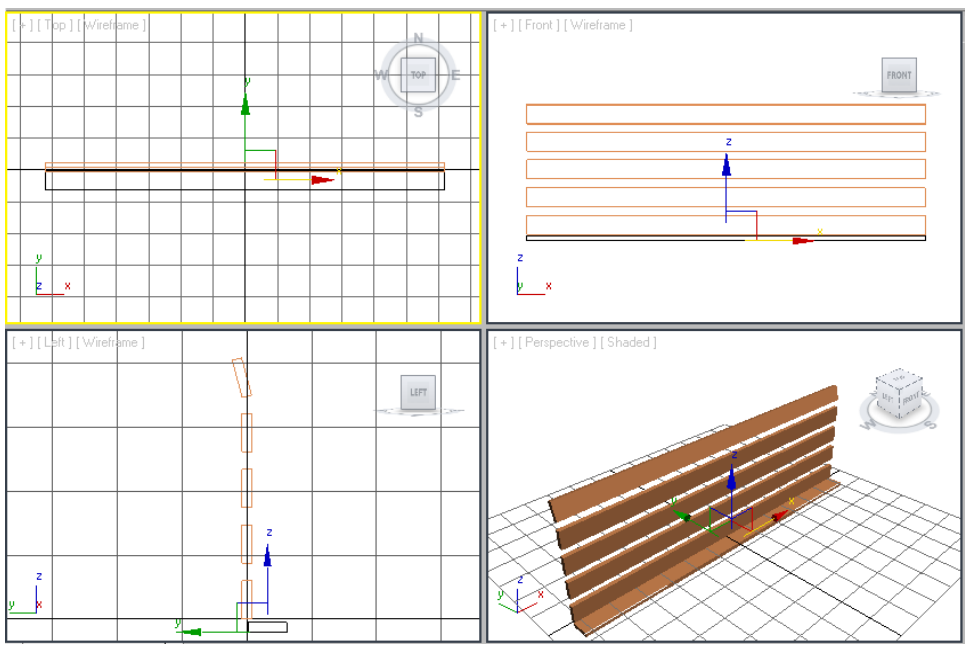

Figure 3-42 *Alignment of the horizontal seat support001 in all viewports*

Next, you need to create four copies of the *horizontal seat support001*.

7. Activate the Top viewport by right-clicking in it and make sure that the *horizontal seat support001* is selected. Next, move the cursor over the vertical axis. Press and hold the SHIFT key and drag the box downward until the value in the **Y** spinner in the coordinate

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

display is approximately **-7.5**. Release the left mouse button and the SHIFT key; the **Clone Options** dialog box is displayed.

8. In the **Clone Options** dialog box, make sure that the **Copy** radio button is selected. Set the value in the **Number of Copies** spinner to **4** and choose **OK**; four boxes with the same dimensions are displayed and they are automatically named as *horizontal seat support002*, *horizontal seat support003*, *horizontal seat support004*, and *horizontal seat support005*.

9. Invoke the **Zoom Extents All** tool; all the objects are displayed in all viewports, as shown in Figure 3-43.

10. Click anywhere in the viewport to deselect the objects.

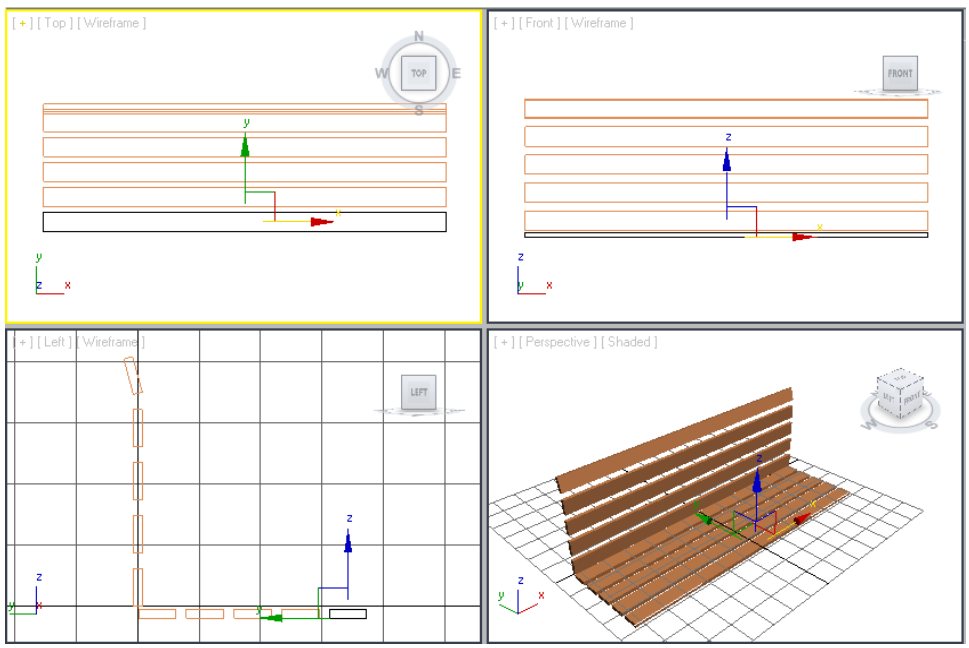

Figure 3-43 *Horizontal seat supports displayed in all viewports*

Grouping All Horizontal Seat Supports

In this section, you need to group all horizontal seat supports using the following steps:

1. Invoke the **Select Object** tool and select all horizontal seat supports by dragging a selection box around them in any viewport.



2. Choose **Group > Group** from the menu bar; the **Group** dialog box is displayed.

3. In the **Group name** text box, enter **horizontal seat support** and then choose the **OK** button.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Creating the Vertical Back Supports

In this section, you need to create the vertical back supports of the park bench using the following steps:

1. Activate the Top viewport. Choose **Create > Geometry** in the **Command Panel**; **Standard Primitives** is displayed in the drop-down list. Next, invoke the **Cylinder** tool in the **Object Type** rollout.

2. In the **Keyboard Entry** rollout, set the values as follows:

   X: **-60** Y: **1.5** Z: **0.0**
   Radius: **1.0** Height: **38.0**

3. Now, choose the **Create** button in the **Keyboard Entry** rollout; a cylinder is created in all viewports, refer to Figure 3-44.

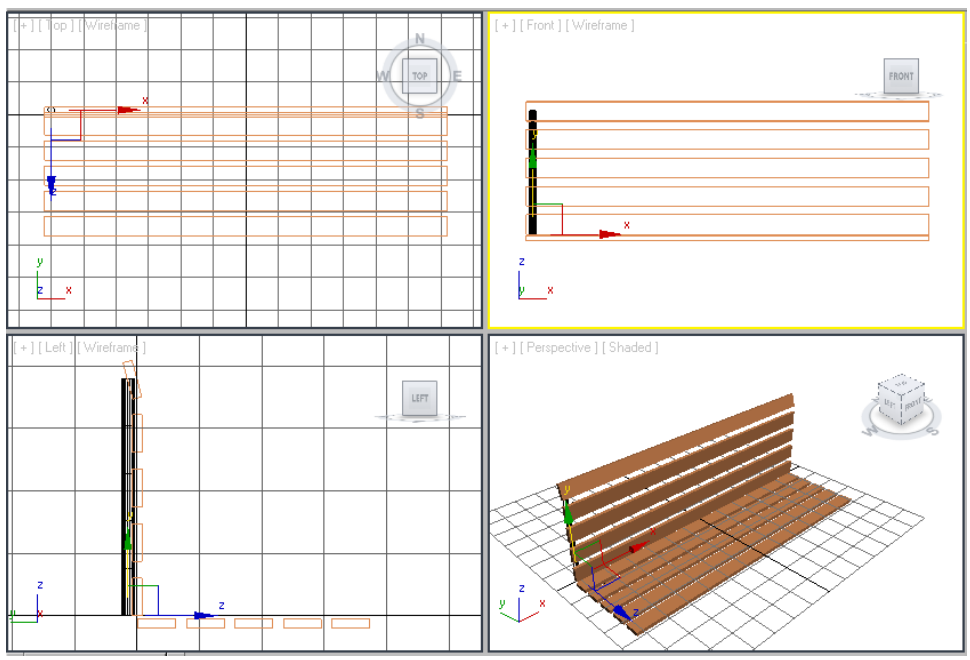

Figure 3-44 *The vertical back support001 in all viewports*

4. In the **Name and Color** rollout, name the cylinder as *vertical back support001* and press ENTER.

5. Change the color of the *vertical back support001* to black.

   Next, you need to create a copy of the *vertical back support001*.

6. Activate the Front viewport by right-clicking in it. Invoke the **Select and Move** tool and move the cursor over the horizontal axis. Press and hold the SHIFT key and the left mouse button, and then drag the *vertical back support001* to the right side

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

to align it with the right side of the *horizontal back support*, as shown in Figure 3-44. Release the left mouse button and the SHIFT key; the **Clone Options** dialog box is displayed.

7. In the **Clone Options** dialog box, make sure that the **Copy** radio button is selected. Set the value **1** in the **Number of Copies** spinner, if it is not already set and choose the **OK** button; the *vertical back support002* is created with the same dimensions as the *vertical back support001*, as shown in Figure 3-45.

8. Click anywhere in the viewport to deselect the objects.

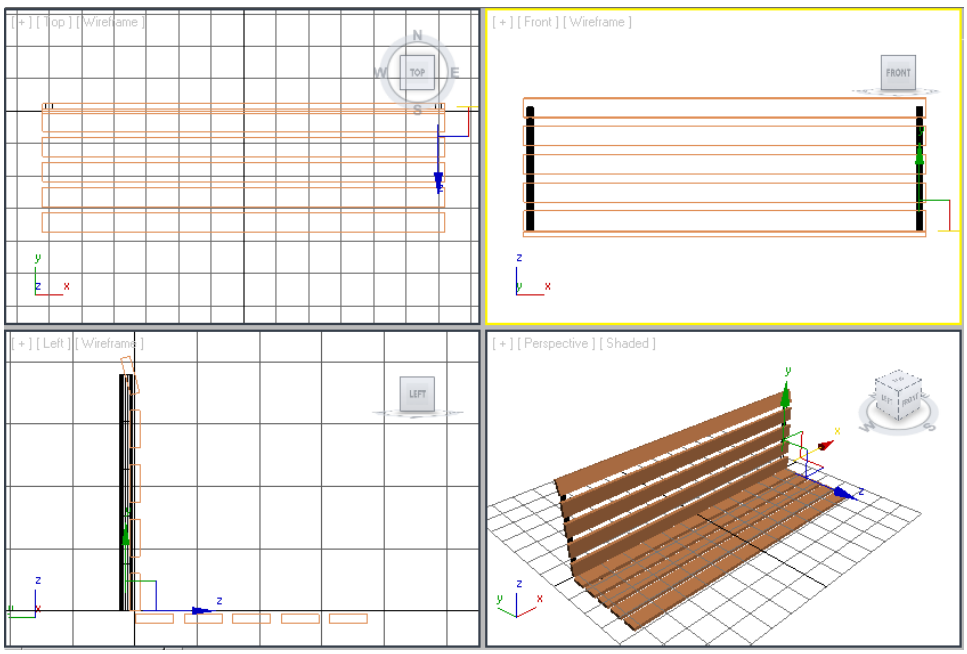

Figure 3-45 *The vertical back support002 in all viewports*

Creating Rivets for the Horizontal Back Support

In this section, you need to create a sphere and a cylinder to create the cap and the body of rivet, respectively.

1. Activate the Top viewport and choose **Create > Geometry** in the **Command Panel**; **Standard Primitives** is displayed in the drop-down list. Next, invoke the **Sphere** tool in the **Object Type** rollout.

2. In the **Keyboard Entry** rollout, set the value **0.8** in the **Radius** spinner and choose the **Create** button; a sphere is created in the viewport.

3. In the **Parameters** rollout, make sure that the **Smooth** check box and the **Chop** radio button are selected. Also, in the **Hemisphere** spinner, enter the value **0.5**.

4. Name the sphere as *cap* and assign black color to it.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Next, you need to create a cylinder for the body of the rivet.

5. From the **Command Panel**, choose **Create > Geometry > Standard Primitives > Object Type** rollout **> Cylinder**.

6. In the **Keyboard Entry** rollout, set the values as follows:

X: **0** Y: **0** Z: **0**
Radius: **0.241** Height: **3.5**

7. Choose the **Create** button from the **Keyboard Entry** rollout; a cylinder is created in the viewport.

8. Name the cylinder as *body* and assign black color to it.

9. Next, activate the Left viewport by right-clicking in it and invoke the **Select by Name** tool; the **Select From Scene** dialog box is displayed. Select the *cap* and the *body* simultaneously by holding the CTRL key. Choose the **OK** button; the *cap* and the *body* are selected in the viewports.



10. Invoke the **Zoom Extents All Selected** tool to increase the magnification of the selected objects in all viewports.



11. Align the *cap* and the *body* of the rivet in the Left viewport using the **Select and Move** tool, as shown in Figure 3-46.



Note
*You may need to use the **Zoom** and **Pan View** tools to align the cap and the body of the rivet.*

Next, you need to group the *body* and the *cap* to create the rivet.

12. Select the *cap* and the *body* of the rivet in any viewport and group them as *rivet001*.

13. Invoke the **Zoom Extents All** tool and move the *rivet001* in the Left viewport to visualize it properly, as shown in Figure 3-47.

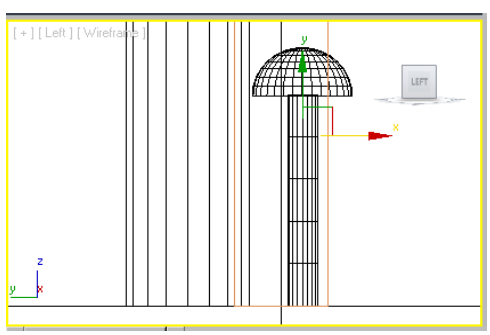

Figure 3-46 *Alignment of the cap and the body*

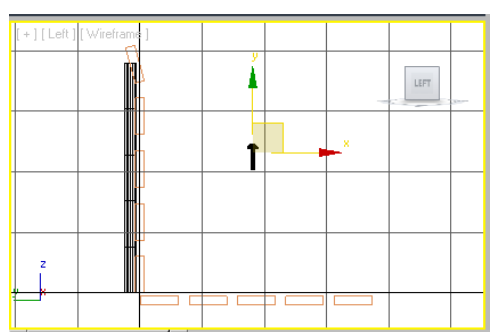

Figure 3-47 *The rivet001 in the Left viewport*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Aligning the Rivets

In this section, you need to align the rivets.

1. In the Left viewport, select *rivet001* and right-click on the **Select and Rotate** tool; the **Rotate Transform Type-In** dialog box is displayed. Also, a circular gizmo along with the X, Y, and Z axes is displayed.

2. In the **Offset:Screen** area of the **Rotate Transform Type-In** dialog box, enter **-90** in the **Z** spinner and press ENTER; the *rivet001* gets rotated, as shown in Figure 3-48. Now, close the **Rotate Transform Type-In** dialog box.

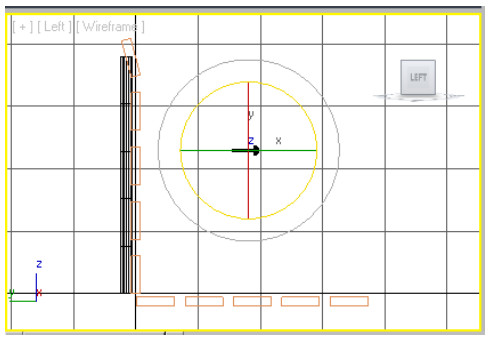

Figure 3-48 *Rotating rivet001 in the Left viewport*

3. Invoke the **Select and Move** tool and align *rivet001* with the *horizontal back support* in all viewports, as shown in Figure 3-49.

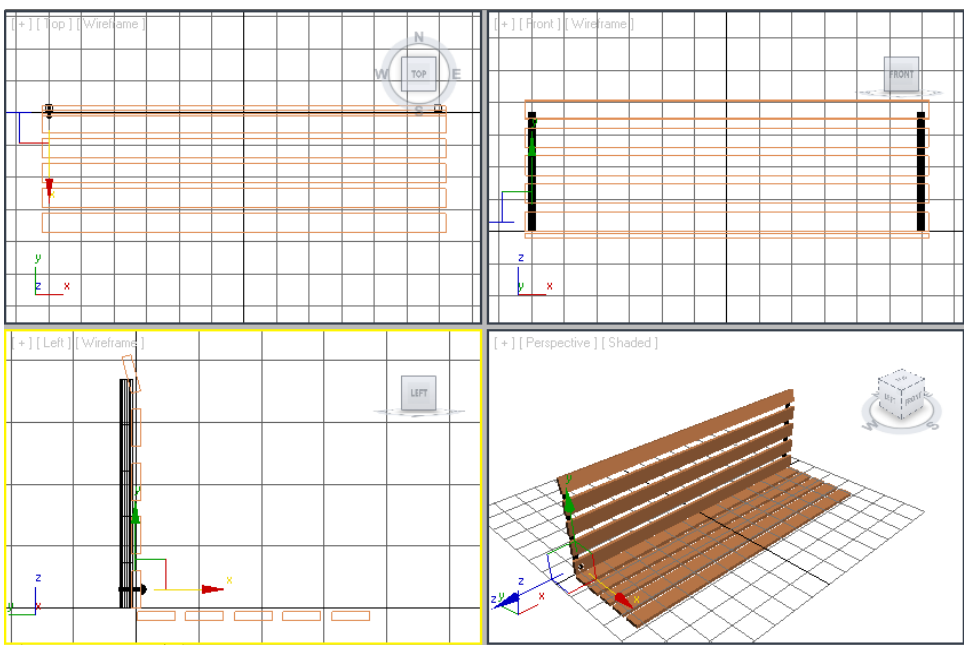

Figure 3-49 *Alignment of rivet001 with the horizontal back support*

4. In the Left viewport, select *rivet001* using the **Select and Move** tool and move the cursor over the vertical axis. Now, create 4 copies of *rivet001,* as discussed earlier. These copies are automatically named as *rivet002*, *rivet003*, *rivet004*, and *rivet005*. Align them in the Left viewport, as shown in Figure 3-50.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

5. Select the uppermost rivet and invoke the **Select and Rotate** tool. Now, rotate the uppermost rivet by using the outermost ring of the **Select and Rotate** tool in the counterclockwise direction until the value in the **X** spinner in the coordinate display becomes **-20**, refer to Figure 3-51.

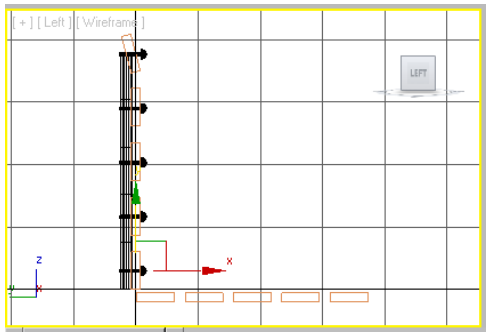

Figure 3-50 *Alignment of rivets in the Left viewport*

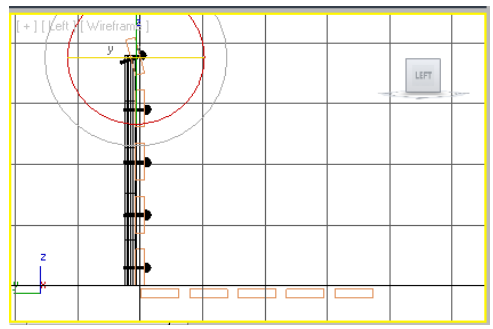

Figure 3-51 *Rotating the uppermost rivet*

6. Press and hold the CTRL key and select all rivets in the Left viewport. Now, group them as the *left side rivets*. Click anywhere in the viewport to deselect the objects.

Note

To change the viewport without deselecting the objects, right-click in that viewport; the objects will remain selected.

Creating the Right Side Rivets

In this section, you need to copy the *left side rivets* for creating the right side rivets.

1. Select the *left side rivets* in the Front viewport using the **Select and Move** tool. Next, move the cursor over the horizontal axis, press and hold the SHIFT key and the left mouse button, and then drag the mouse toward the right side. Release the left mouse button and the SHIFT key exactly over the *vertical back support002* on the right side; the **Clone Options** dialog box is displayed.

2. In the **Clone Options** dialog box, make sure that the **Copy** radio button is selected. Set the value **1** in the **Number of Copies** spinner. In the **Name** spinner, enter **right side rivets** to modify the name of the group and choose **OK**; the *right side rivets* are displayed, as shown in Figure 3-52.

   Now, you need to select the *horizontal back support*, *vertical back support001*, *vertical back support002*, *left side rivets*, and *right side rivets*.

3. Invoke the **Select Object** tool and activate the Left viewport. Drag a selection box around the *horizontal back support*, *vertical back support001*, *vertical back support002*, *left side rivets*, and *right side rivets* to select them simultaneously, and then group them as *back support* as described earlier.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

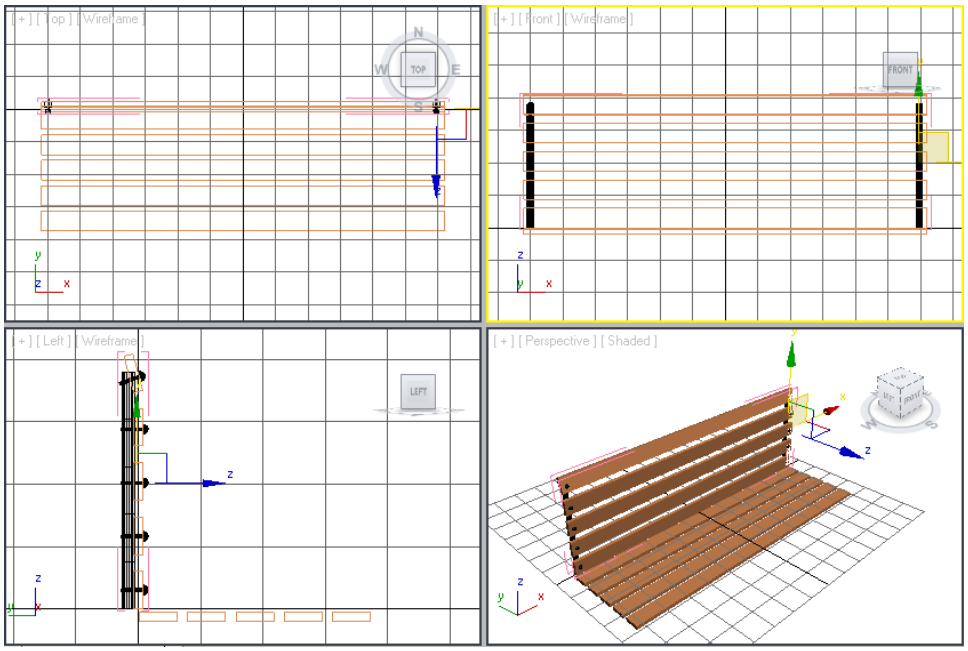

Figure 3-52 *The right side rivets displayed in all viewports*

Rotating the Back Support

In this section, you need to rotate the back support.

1. Select the *back support* in the Left viewport and invoke the **Select and Rotate** tool; a circular gizmo is displayed.

2. Move the cursor over the Z-axis. Now, press the left mouse button and drag the cursor counterclockwise to rotate the back support until the value in the **Z** spinner in the coordinate display becomes **10**. Release the left mouse button. The *back support* is rotated, as shown in Figure 3-53.

3. Invoke the **Select and Move** tool and align the *back support* with the *horizontal seat support*, as shown in Figure 3-54.

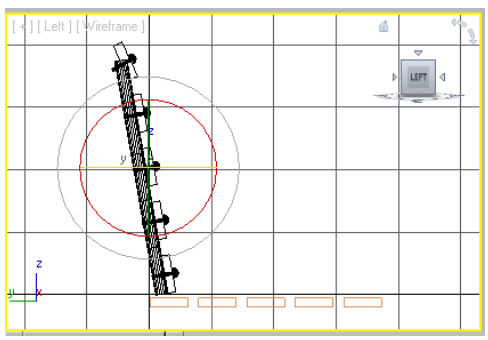

Figure 3-53 *Rotating the back support in the Left viewport*

Creating the Leg Supports

In this section you need to create the leg support using the box tool.

1. Activate the Top viewport and choose **Create > Geometry** in the **Command Panel**; **Standard Primitives** is displayed in the drop-down list. Next, invoke the **Box** tool in the **Object Type** rollout.

2. In the **Keyboard Entry** rollout, set the parameters as follows:

   Length: **36.67** Width: **9.0**
   Height: **2.8**

3. Choose the **Create** button from the **Keyboard Entry** rollout; the box is created.

4. Name the box as *leg support001* and change its color to black.

5. Invoke the **Select and Move** tool and align the *leg support001* to the extreme left, below the *horizontal seat support* in all viewports, as shown in Figure 3-55.

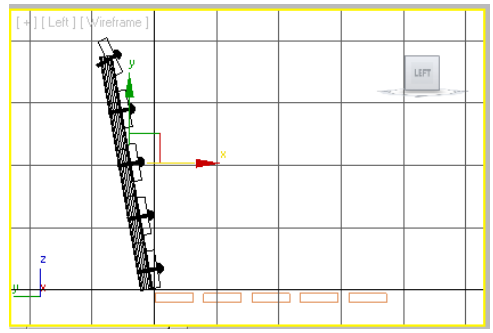

Figure 3-54 *Alignment of the back support in the Left viewport*

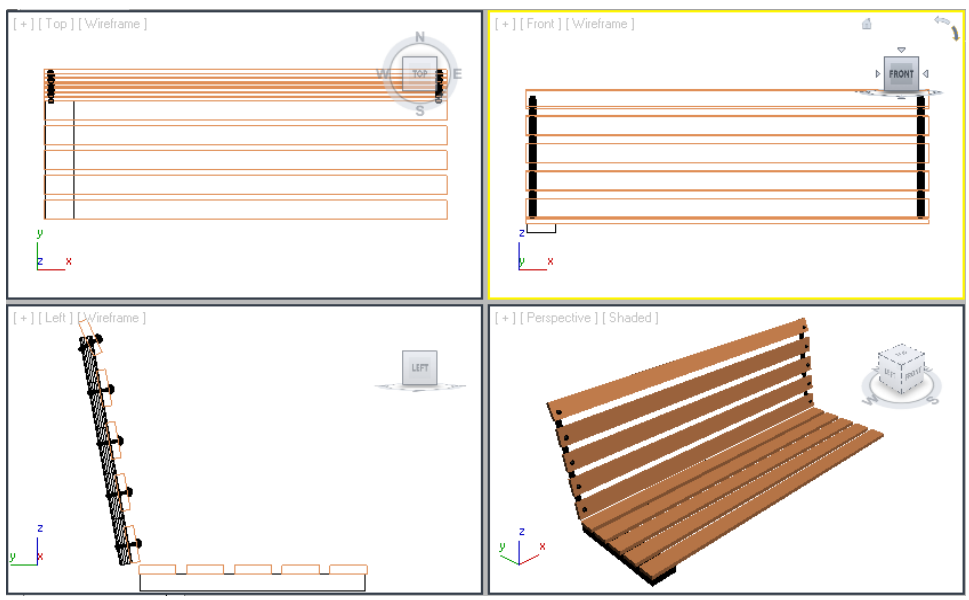

Figure 3-55 *Alignment of the leg support001 with the horizontal seat support*

Next, you need to copy the *leg support001* to create the leg support on the right side of the *horizontal seat support*.

6. Activate the Top viewport by right-clicking in it and create a copy of the *leg support001* as described earlier. It is automatically named as *leg support002*.

7. Invoke the **Select and Move** tool and align the *leg support002* with the *horizontal seat support* in all viewports, as shown in Figure 3-56.

   Next, you need to create another box for other leg supports.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

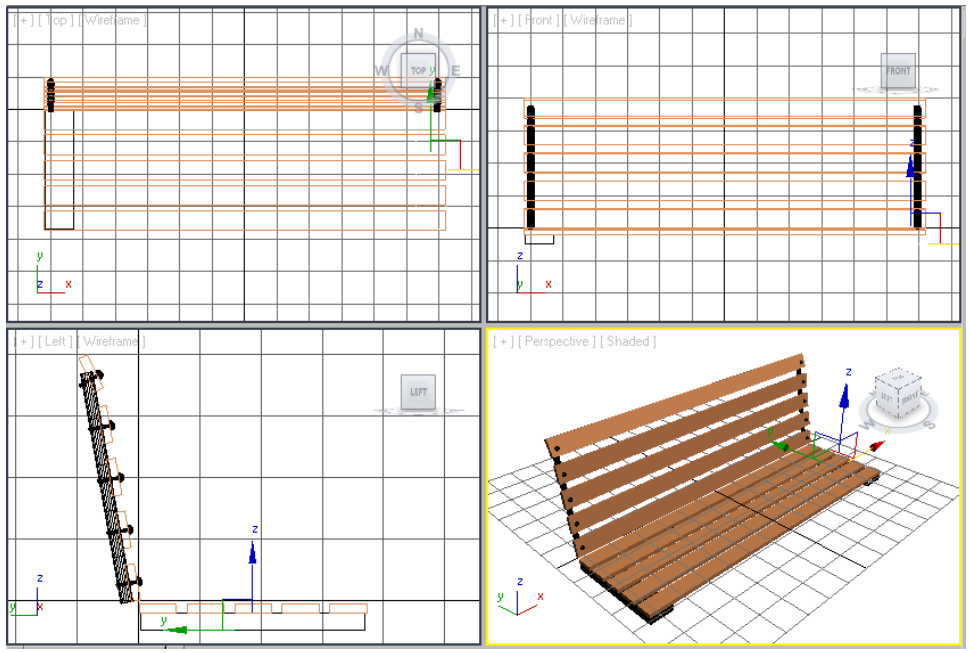

Figure 3-56 *Alignment of the leg support002 with the horizontal seat support*

8. Activate the Top viewport and create a box and set the values as follows:

   Length: **9.0** Width: **124** Height: **2.8**

9. In the **Name and Color** rollout, name the box as *leg support003* and change its color to black.

10. Invoke the **Select and Move** tool and align the *leg support003* with the *horizontal seat support* in all viewports, as shown in Figure 3-57.

Note

You need to use the ***Arc Rotate*** *tool to view the leg support003 properly in the Perspective viewport.*

11. Next, create a copy of the *leg support003* in the Top viewport; it is automatically named as *leg support004*.

12. Invoke the **Select and Move** tool and align the *leg support004* with the *horizontal seat support* in all viewports, as shown in Figure 3-58.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

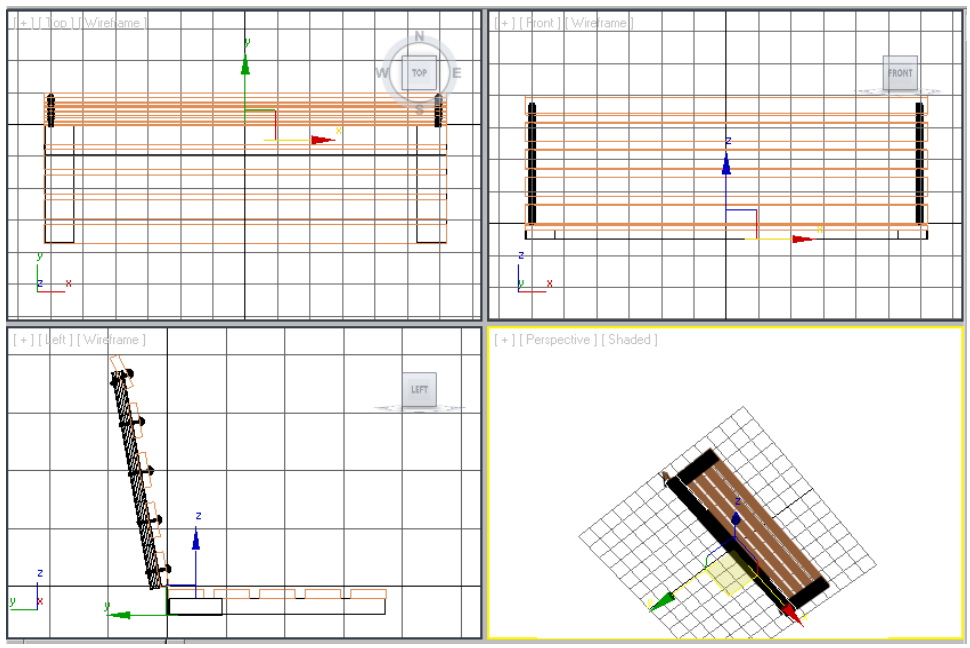

Figure 3-57 *Alignment of the leg support003 with the horizontal seat support in all viewports*

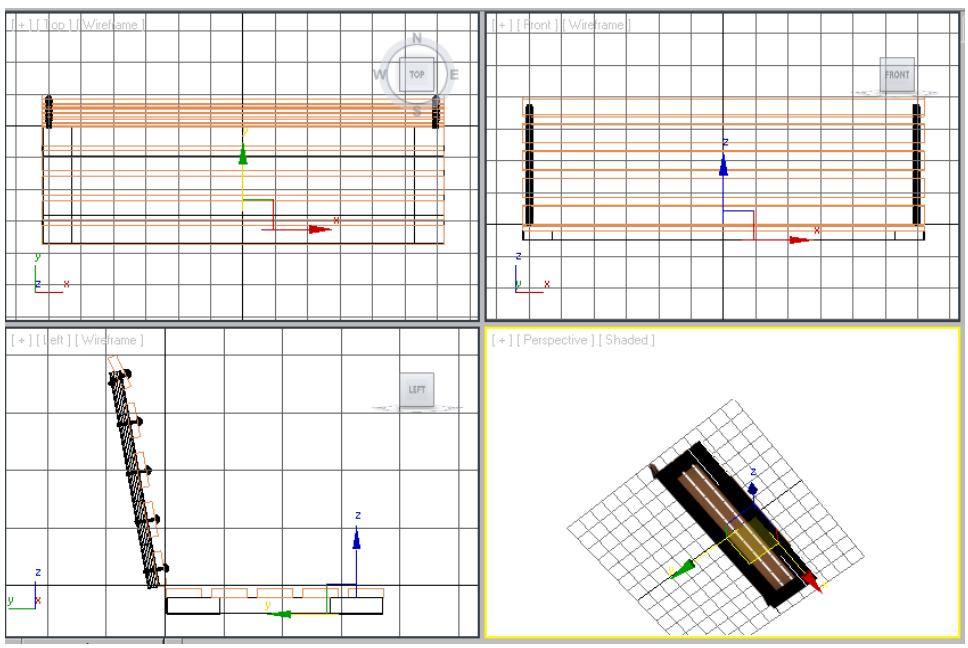

Figure 3-58 *Alignment of the leg support004 in all viewports*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Creating Rivets for the Seat Support

In this section you need to create rivets of the seat support. To create the rivets for the *horizontal seat support*, you need to copy the *right side rivets*. As you already know that the *right side rivets* are grouped under *back support,* therefore first you need to open this group to access the *right side rivets* independently. After opening, the *back support* group will be ungrouped temporarily and you can transform the objects within it independently.

1. Activate the Left viewport and select the *back support*.

2. Choose **Group > Open** from the menu bar; the *back support* is now ungrouped temporarily. Also, a pink colored bounding box is displayed around the *back support*.

3. Invoke the **Select By Name** tool; the **Select From Scene** dialog box is displayed, as shown in Figure 3-59.

4. In the **Select From Scene** dialog box, select the *right side rivets* and choose the **OK** button.

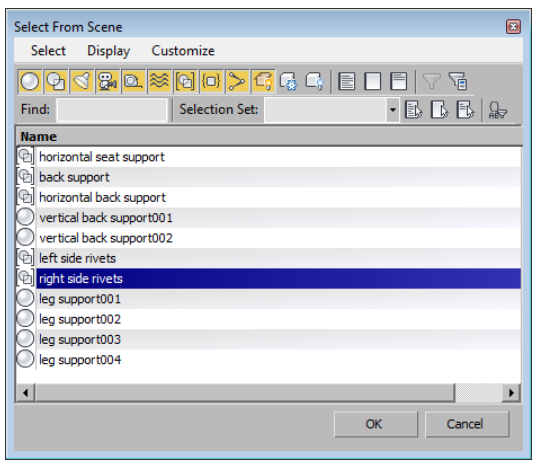

Figure 3-59 *The right side rivets selected in the* ***Select From Scene*** *dialog box*

5. Activate the Left viewport by right-clicking in it. Make sure the *right side rivets* are still selected. Then, create a copy of the *right side rivets* and name it as *right side seat rivets*, as shown in Figure 3-60.

6. Make sure that the *right side seat rivets* are selected and choose **Group > Detach** from the menu bar; the *right side seat rivets* are detached from the *back support* group.

7. Select the pink colored gizmo of the *back support* group and choose **Group > Close** from the menu bar to group them again.

   Next, you need to align the *right side seat rivets*.

8. Invoke the **Select and Rotate** tool and select the *right side seat rivets* in the Left viewport. Move the cursor over the Z-axis. Now, press the left mouse button and drag the cursor in the counterclockwise direction to rotate *rivet001* until the angle of rotation in the **Z** spinner becomes **-90**, refer to Figure 3-61.

9. Invoke the **Select and Move** tool. Now, move the cursor over the vertical axis and then drag the mouse downward to align the *right side seat rivets* with the *horizontal seat support*, as shown in Figure 3-62.

   Next, you need to align the rivet (which is near the horizontal back support) to the horizontal seat support.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

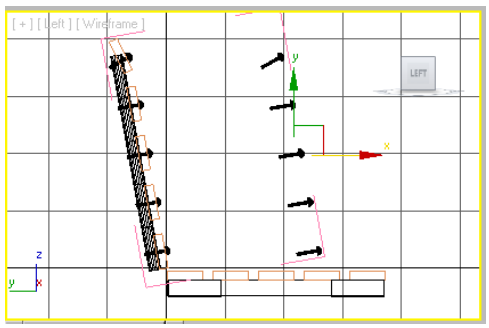

Figure 3-60 *The right side seat rivets in the Left viewport*

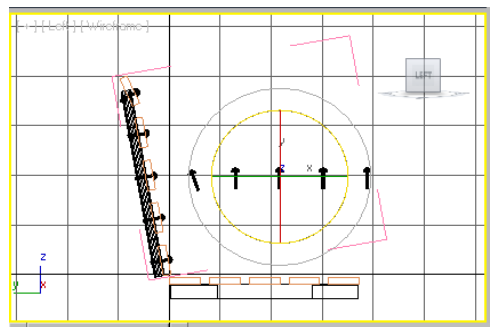

Figure 3-61 *Rotating the right side seat rivets in the Left viewport*

10. Make sure the *right side seat rivets* are selected and choose **Group > Open** from the menu bar to ungroup them temporarily.

11. Select the rivet which is near the *horizontal back support* and invoke the **Select and Rotate** tool. Move the cursor over the Z-axis. Now, press the left mouse button and drag the cursor in the clockwise direction to rotate the rivet until the angle of rotation in the Z spinner of the coordinate display becomes **-87**, refer to Figure 3-63.

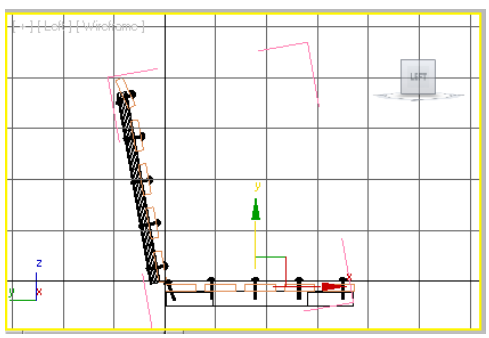

Figure 3-62 *Alignment of the right side seat rivets in the Left viewport*

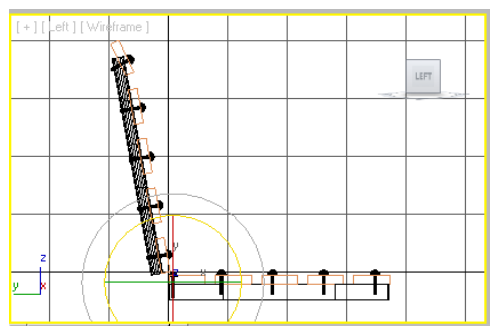

Figure 3-63 *Rotating the rivet in the Left viewport*

12. Invoke the **Select and Move** tool and align all rivets of the *right side seat rivets* group with the *horizontal seat support*, as shown in Figure 3-64.

13. Make sure that one of the rivets of the *right side seat rivets* group is selected and choose **Group > Close** from the menu bar to group them again.

    Next, you need to copy the *right side seat rivets* to create rivets on the left side of the *horizontal seat support*.

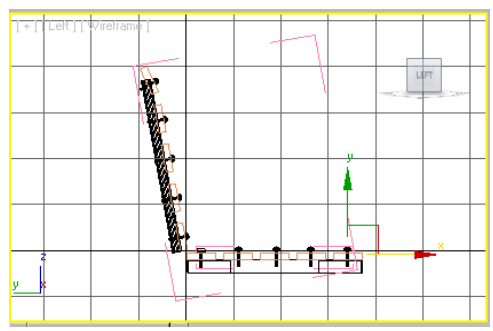

Figure 3-64 *Alignment of the right side of the rivets in the Left viewport*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

14. Activate the Top viewport and create a copy of the *right side seat rivets*. Name the new group as *left side seat rivets*.

15. Align the *left side seat rivets* using the **Select and Move** tool in all viewports, as shown in Figure 3-65.

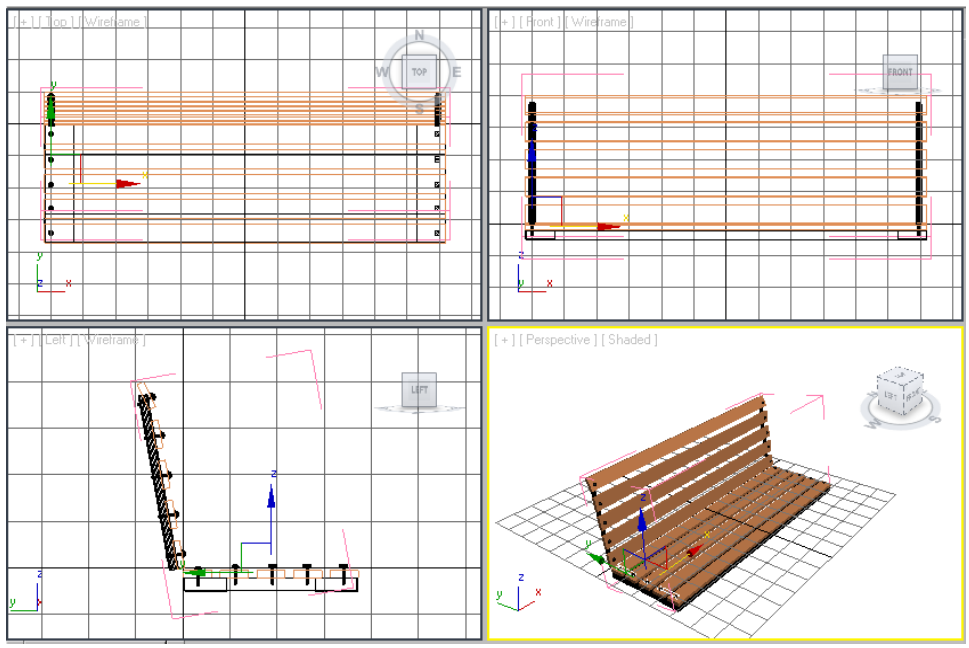

Figure 3-65 *Alignment of the left side seat rivets in all viewports*

Creating the Legs of the Park Bench

In this section, you need to create the legs of the park bench using the **Move** tool.

1. Activate the Top viewport and choose **Create > Geometry** in the **Command Panel**; **Standard Primitives** is displayed in the drop-down list. Next, invoke the **Box** tool in the **Object Type** rollout.

2. In the **Keyboard Entry** rollout, set the values as follows:

   Length: **4.0** Width: **3.0** Height: **26.88**

   Next, choose the **Create** button from the **Keyboard Entry** rollout; a box is created.

3. In the **Name and Color** rollout, name the box as *leg001*. Also, change its color to black.

4. Invoke the **Select and Move** tool and align the *leg001* with the *leg support001* in all viewports, as shown in Figure 3-66. You need to adjust the viewport to display all objects properly using the **Zoom** and **Pan View** tools.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

5. Create three copies of the *leg001* to create three more legs. These are automatically named as *leg002*, *leg003*, and *leg004*.

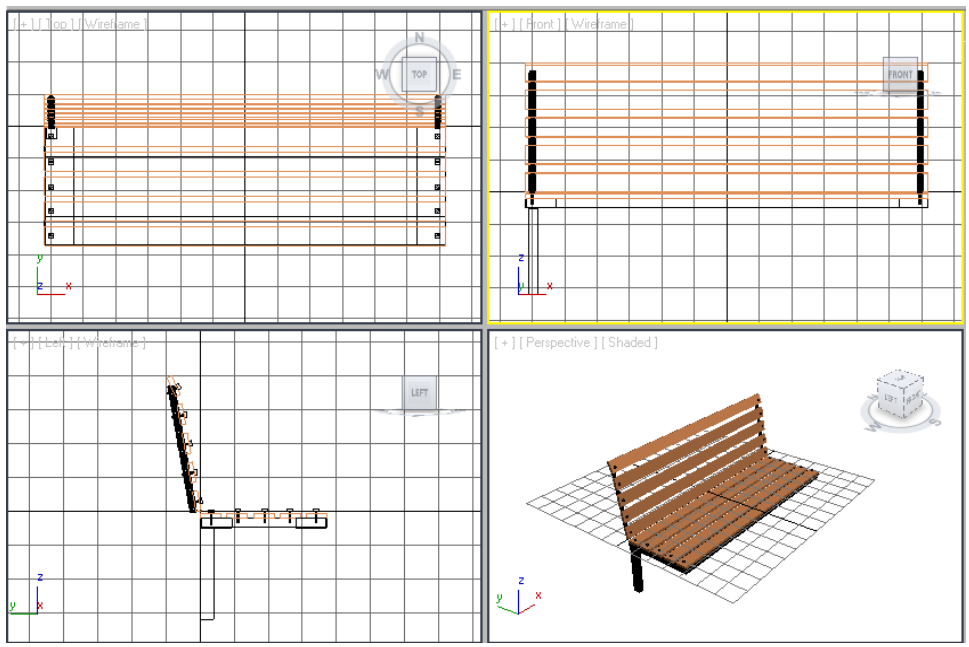

Figure 3-66 *Alignment of the leg001 in all viewports*

6. Invoke the **Select and Move** tool and align the *leg002*, *leg003*, and *leg004* at the corners of the *leg support002*, *leg support003*, and *leg support004*, respectively in all viewports, as shown in Figure 3-67.

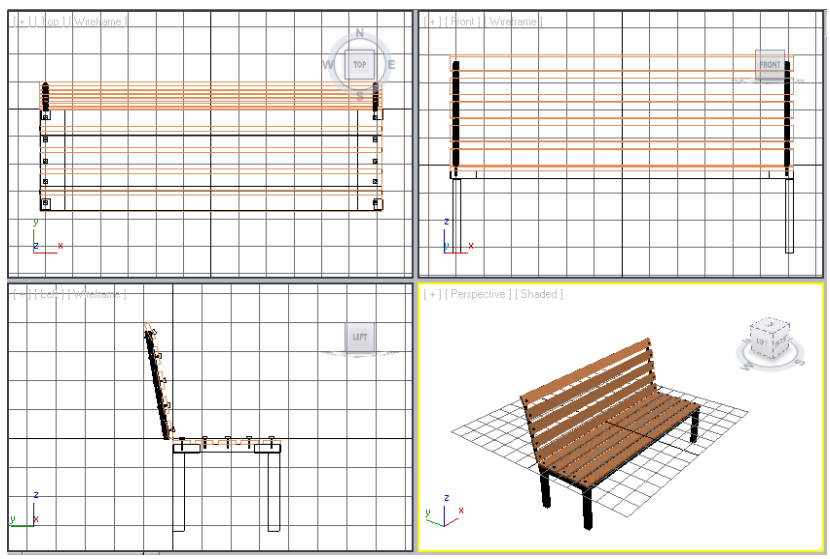

Figure 3-67 *Alignment of the legs in all viewports*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

7. Invoke the **Zoom Extents All** tool and modify the view in the Perspective viewport using the **Orbit** tool.

Changing the Background Color of the Scene

In this section, you need to set the background color.

To change the background color of the scene to white in final output, follow the steps given in Tutorial 1.

Saving the Scene

In this section, you need to save the file.

1. Choose **Save** from the **Application** menu; the **Save File As** dialog box is displayed.

   As the project folder is already set, the path *\Documents\camax\c03_tut2\scenes* is displayed in the **Save in** drop-down list of the **Save File As** dialog box.

2. Save the scene with the name *c03tut2.max*.

Rendering the Final Output

In this section, you need to render the final output.

1. Activate the Perspective viewport.

2. Invoke the **Render Production** tool  from the **Main Toolbar**; the Perspective, **frame 0, Display Gamma 2.2, RGBA Color 16Bits/Channel (1:1)** window is displayed, showing the final output of the park bench at frame one, refer to Figure 3-68.



Figure 3-68 *The final output*

You can view the final rendered image of this model by downloading the *c03_camax_rndr.zip* file from *http://www.cadcim.com*. The path of the file is as follows:

Textbooks > Animation and Visual Effects > Character Animation > Character Animation: A Tutorial Approach (Using 3ds Max)

Tutorial 3

In this tutorial, you will create the model of a chair, as shown in Figure 3-69, using the extended primitives and modifiers. **(Expected time: 30 min)**

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

The following steps are required to complete this tutorial:

a. Create the project folder.
b. Create the seat support.
c. Create the back support.
d. Create the spring support.
e. Create the leg support.
f. Create legs.
g. Create rollers for legs.
h. Create the right hand support.
i. Create the left hand support.
j. Change the background color of the scene.
k. Save the scene.
l. Render the scene.



Figure 3-69 *The chair model*

Creating the Project Folder

Before starting the tutorial, it is recommended that you create a project folder with the name *c03_tut3* in the *camax* folder.

Creating the Seat Support

In this section, you need to create a chamfer box primitive to create the seat support of the chair.

1. Activate the Top viewport by right-clicking in it. Choose **Create > Geometry** in the **Command Panel**; the **Standard Primitives** option is displayed by default in the drop-down list. Select the **Extended Primitives** option from the list and then invoke the **ChamferBox** tool from the **Object Type** rollout.

2. Expand the **Keyboard Entry** rollout and set the values as as follows:

   Length: **90.0** Width: **100.0** Height: **17.0**
   Fillet: **10.0**

3. Choose the **Create** button; a chamfer box is created.

4. Now, make sure that the chamfer box is selected. In the **Parameters** rollout, set the value to **10** in the **Fillet Segs** spinner; the chamfer box is modified, as shown in Figure 3-70.

5. In the **Name and Color** rollout, enter **seat support** as the name of the chamfer box and press ENTER.

6. Choose the color swatch to change the color of the box; the **Object Color** dialog box is displayed. Next, choose the **Add Custom Colors** button from this dialog box; the **Color Selector: Add Color** dialog box is displayed. Enter the values as follows:

   Red: **88** Green: **199** Blue: **225**

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

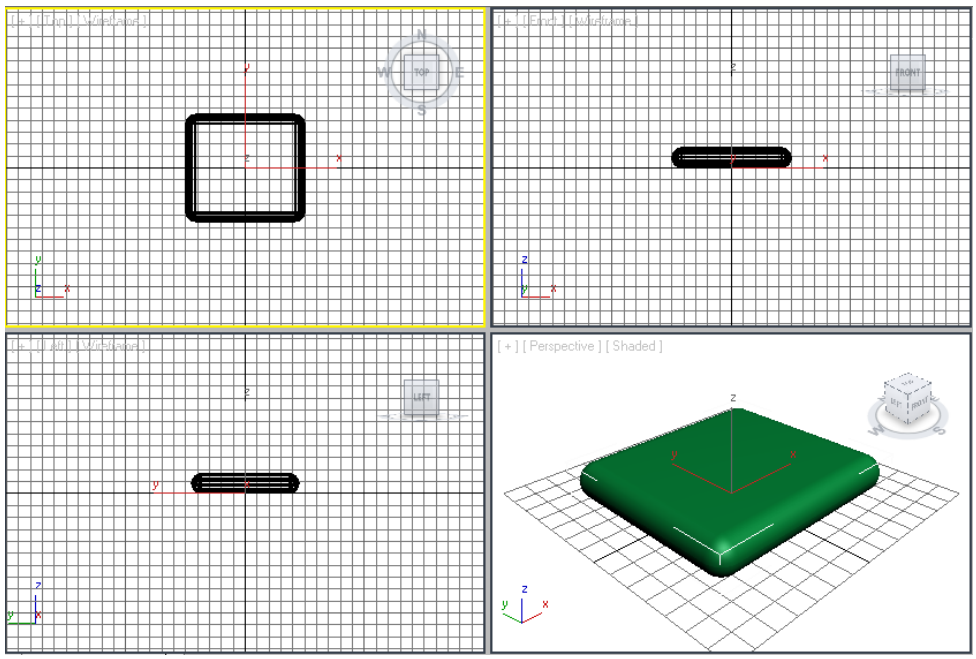

Figure 3-70 The chamfer box created for the seat support of the chair

Creating the Back Support

In this section, you need to create a chamfer box primitive to create the back support of the chair using the **ChamferBox** tool.

1. Activate the Front viewport and make sure that the **ChamferBox** tool is invoked.

2. Expand the **Keyboard Entry** rollout and set the values as follows:

   X: **0.0** Y: **65.0** Z: **-65.0**
   Length: **90.0** Width: **100.0** Height: **19.633** Fillet: **10.0**

3. Choose the **Create** button; a chamfer box is created.

4. Now, make sure that the chamfer box is selected. In the **Parameters** rollout, make sure that value **10** is set in the **Fillet Segs** spinner; the chamfer box is modified, as shown in Figure 3-71.

5. In the **Name and Color** rollout, enter **back support** as the name of the chamfer box and press ENTER.

6. Choose the color swatch and assign the same color to the *back support* that you have assigned to the *seat support*.

7. Invoke the **Zoom Extents All** tool to display the objects properly in all viewports.

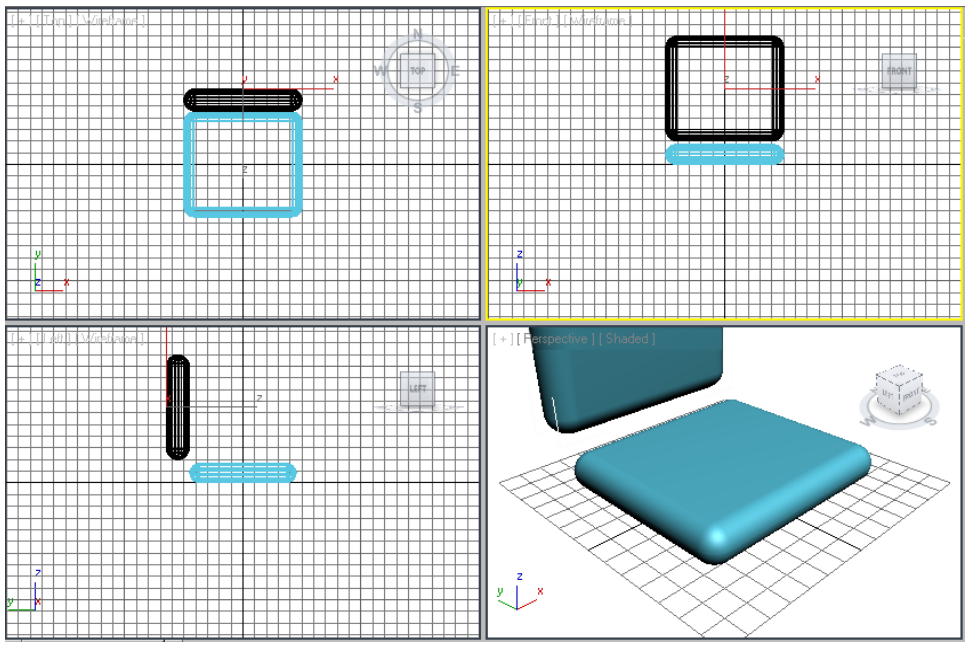

Figure 3-71 The back support for the chair in all viewports

Creating the Spring Support

In this section, you need to create the spring support, using the **Hose** tool from the extended primitives.

1. Activate the Top viewport by clicking in it. Choose **Create > Geometry** in the **Command Panel**. Make sure that the **Extended Primitives** option is selected in the drop-down list. Next, invoke the **Hose** tool from the **Object Type** rollout.

2. In the Top viewport, press and hold the left mouse button, drag the cursor to define the radius of the hose, and then release the left mouse button. Next, move the cursor upwards to define the height of the hose and click on the viewport; a hose is created.

3. In the **Name and Color** rollout, enter **spring support** as the name of the hose and press ENTER. Now, modify the color of the *spring support* to black.

4. Choose the **Modify** tab in the **Command Panel**. In the **Hose Parameters** rollout, set the values of the *spring support* as follows:

   End Point Method Area
   Make sure that the **Free Hose** radio button is selected.

   Free Hose Parameters Area
   Height: **25.81**

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Common Hose Parameters Area
Cycles: **9**
Use the default values for the other options in this area.

Hose Shape Area
Diameter: **15.0** Sides: **8**

After setting the values in the **Hose Parameters** rollout, align the *spring support* in all viewports, as shown in Figure 3-72.

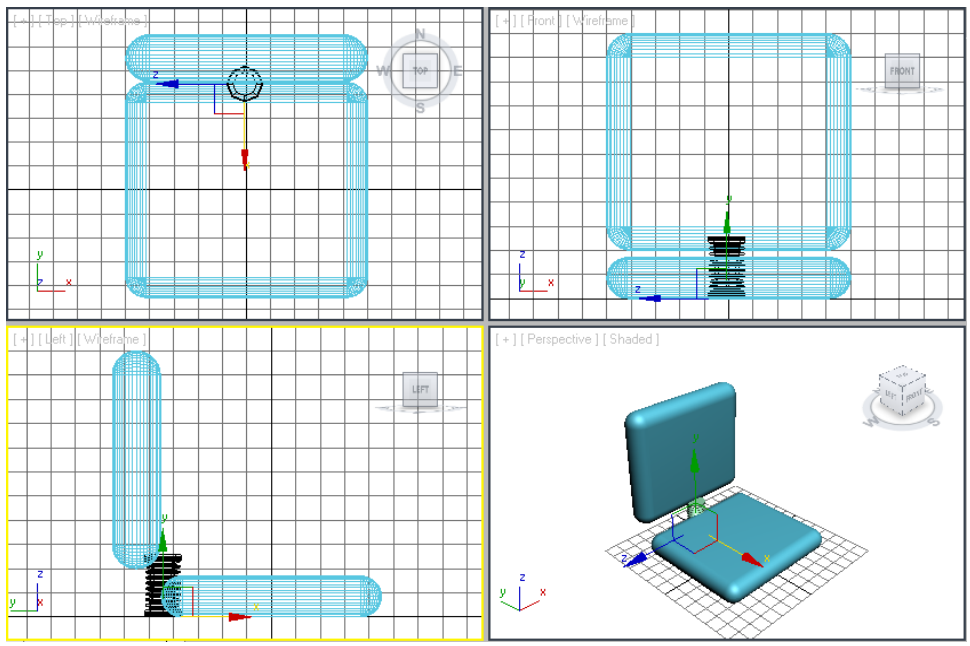

Figure 3-72 *The spring support in all viewports*

Applying the Bend Modifier

In this section, you need to apply the **Bend** modifier to the *spring support* to join the *seat* and the *back support*.

1. First, make sure that the *spring support* is selected and then choose **Modifiers > Parametric Deformers > Bend** from the menu bar; the **Bend** modifier is displayed in the modifier stack. Also, the **Parameters** rollout is displayed in the modify panel.

2. In the **Parameters** rollout of the **Bend** modifier, set the parameters as follows:

Bend Area
Angle: **90.0** Direction: **90**

Bend Axis area
Make sure that the **Z** radio button is selected.

3. After entering the values, the *spring support* is displayed, as shown in Figure 3-73.

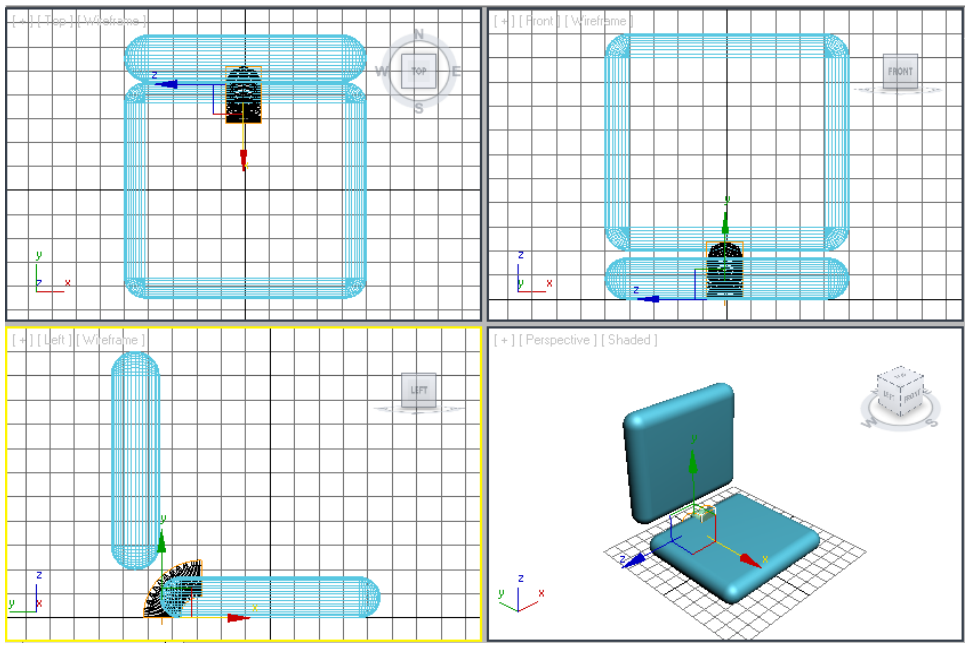

Figure 3-73 *The spring support after applying the* ***Bend*** *modifier*

Aligning the Spring Support

In this section, you need to align the *spring support*.

1. Activate the Left viewport and make sure that the *spring support* is selected. Invoke the **Zoom Extents Selected** tool; the *spring support* is zoomed in the Left viewport, as shown in Figure 3-74.

2. Right-click on the **Select and Rotate** tool; the **Rotate Transform Type-In** dialog box is displayed. In the **Offset: Screen** area, set the value **90** in the **Z** spinner; the *spring support* is rotated, as shown in Figure 3-75. Now, close the **Rotate Transform Type-In** dialog box.

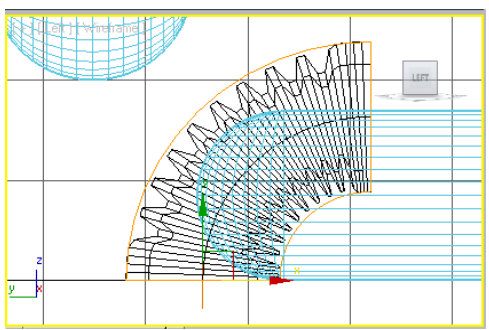

Figure 3-74 *The spring support zoomed in the Left viewport*

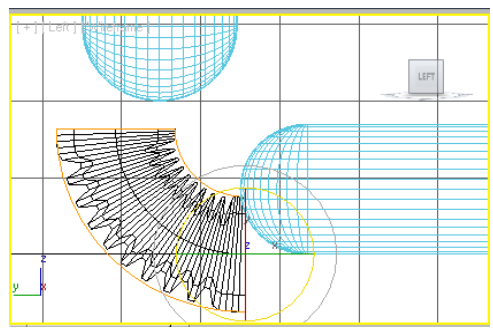

Figure 3-75 *The spring support rotated in the Left viewport*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

3. Invoke the **Select and Move** tool and align the *spring support*, as shown in Figure 3-76.

4. Align the *spring support* in all viewports, refer to Figure 3-77. Invoke the **Zoom Extents All** tool to display all the objects properly in all viewports.

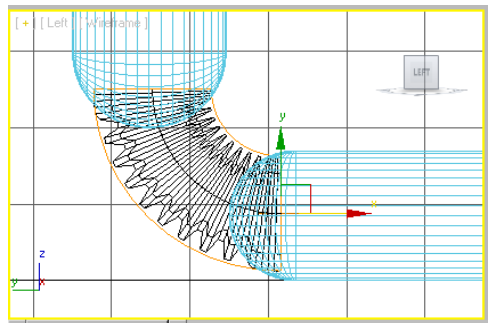

Figure 3-76 *Alignment of the spring support in the Left viewport*

Creating the Leg Support

In this section, you need to create the leg support using the **Hose** tool from the extended primitives.

1. Activate the Top viewport by right clicking in it and then create a hose object as discussed earlier.

2. In the **Name and Color** rollout, enter **leg support** as the name of the hose and press ENTER. Also, modify the color of the *leg support* to black.

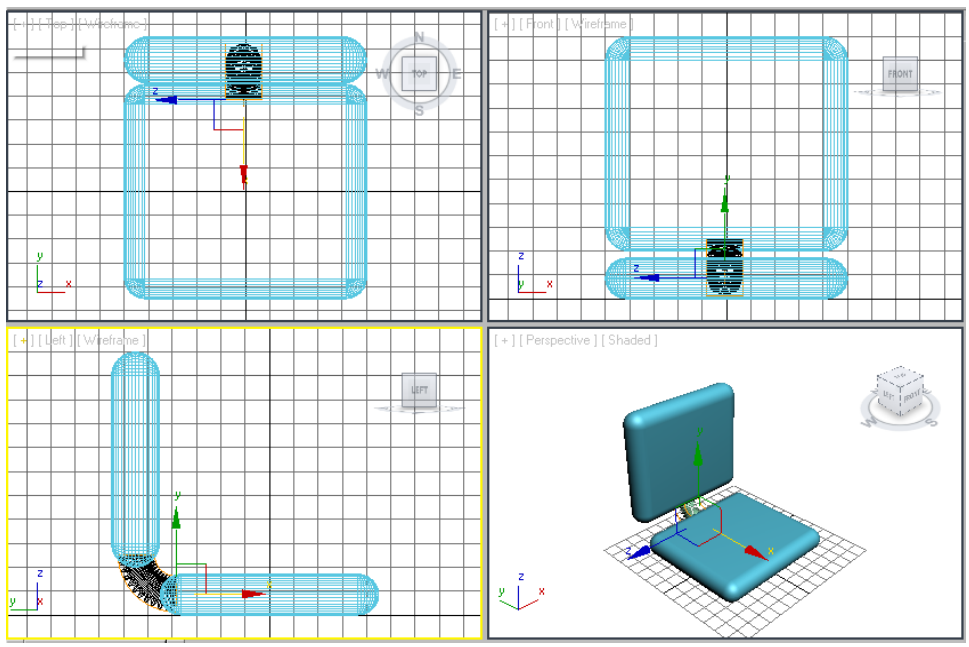

Figure 3-77 *Alignment of the spring support in all viewports*

3. In the **Hose Parameters** rollout, set the values of the *leg support* as follows:

End Point Method Area
Make sure that the **Free Hose** radio button is selected.

Free Hose Parameters Area
Height: **42.0**

Common Hose Parameters Area
Make sure that the **Flex Section Enable** check box is selected.

Starts: **22.0** Ends: **82.0**
Cycles: **10**

In the **Hose Shape** area, select the **Round Hose** radio button.
Diameter: **17.0**

4. Invoke the **Select and Move** tool and align the *leg support* in all viewports, as shown in Figure 3-78.

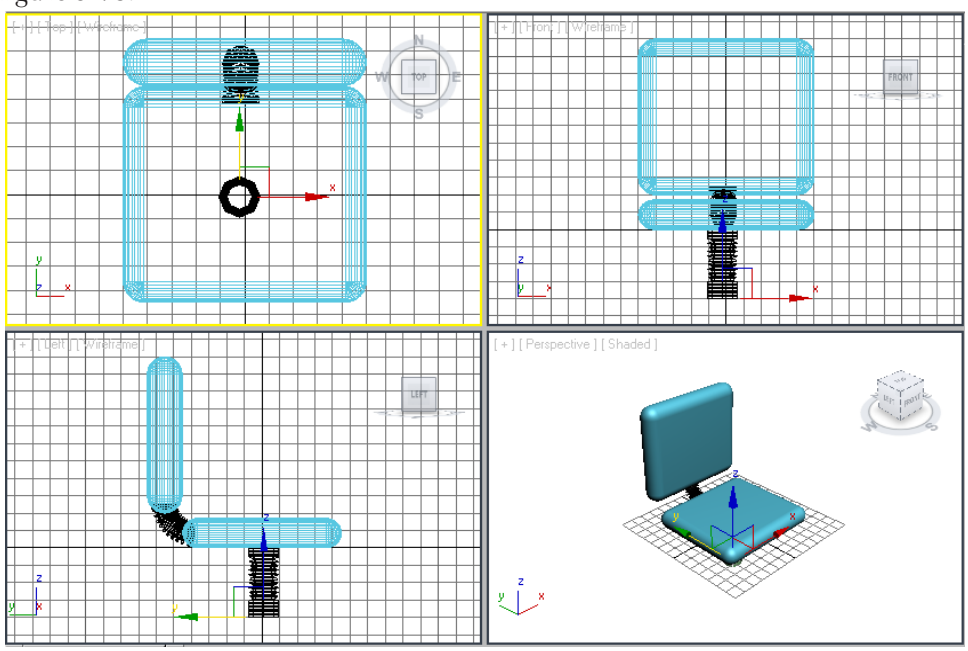

Figure 3-78 *Alignment of the leg support in all viewports*

Creating the Legs

In this section, you need to use the **ChamferBox** tool from **Extended Primitives** to create the legs of the chair.

1. Activate the Top viewport and invoke the **ChamferBox** tool.

2. Expand the **Keyboard Entry** rollout and set the values as follows:

X: **-29** Y: **0.0** Z: **-42.0**
Length: **5.748** Width: **44.0** Height: **7.0**
Fillet: **2.0**

3. Choose the **Create** button; a chamfer box is created.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

4. Now, make sure that the chamfer box is selected. In the **Parameters** rollout, set the values as follows:

   Length Segs: **10** Width Segs: **10** Height Segs: **10**
   Fillet Segs: **10**

5. In the **Name and Color** rollout, enter **leg01** as the name of the chamfer box and press ENTER. Also, modify its color to black.

6. Invoke the **Select and Move** tool and align the *leg01* with the *leg support* in all viewports, as shown in Figure 3-79.

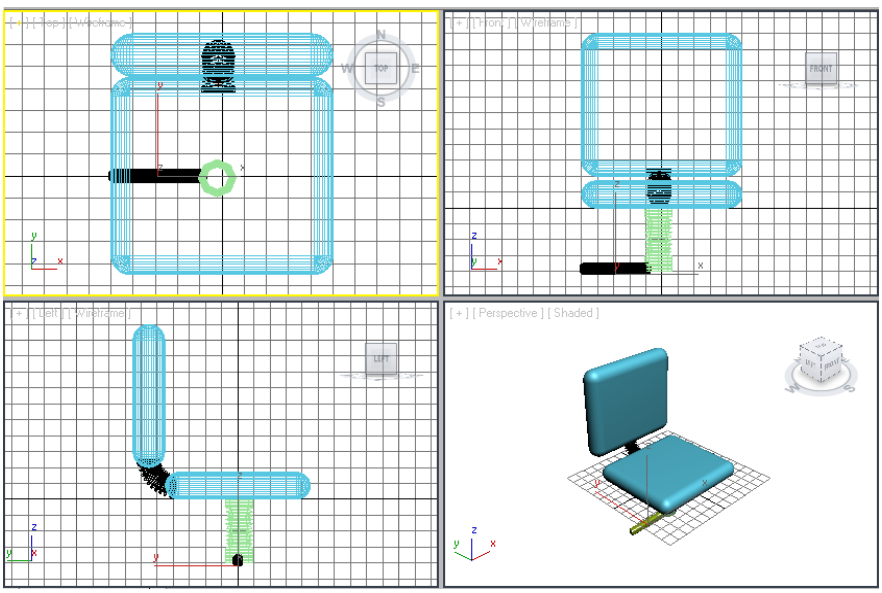

Figure 3-79 *Alignment of the leg01 in all viewports*

Applying the Taper Modifier

In this section, you need to apply the taper modifier to the *leg01* to taper it .

1. First, make sure that the *leg01* is selected, and then invoke the **Zoom Extents All Selected** tool; the *leg01* is zoomed in all viewports, as shown in Figure 3-80.

2. Choose **Modifiers > Parametric Deformers > Taper** from the menu bar; the **Taper** modifier is displayed in the modifier stack. Also, the **Parameters** rollout is displayed in the modify panel.

3. In the **Parameters** rollout of the **Taper** modifier, set the values as as follows:

   Taper Area
   Amount: **0.53**

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Taper Axis Area

Select the **X** radio button in the **Primary** group

4. After entering the values, *leg01* is tapered, as shown in Figure 3-81.

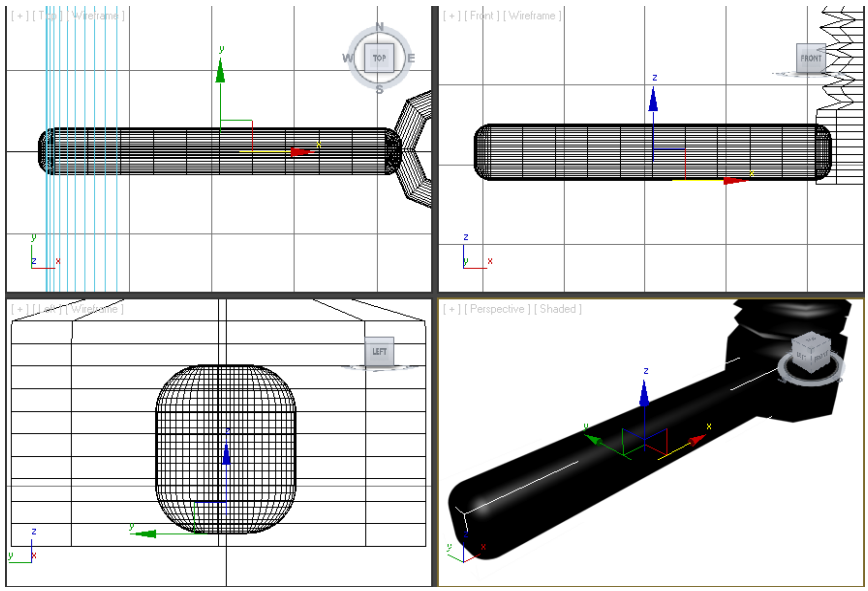

Figure 3-80 *The leg01 after invoking the* ***Zoom Extents All Selected*** *tool*

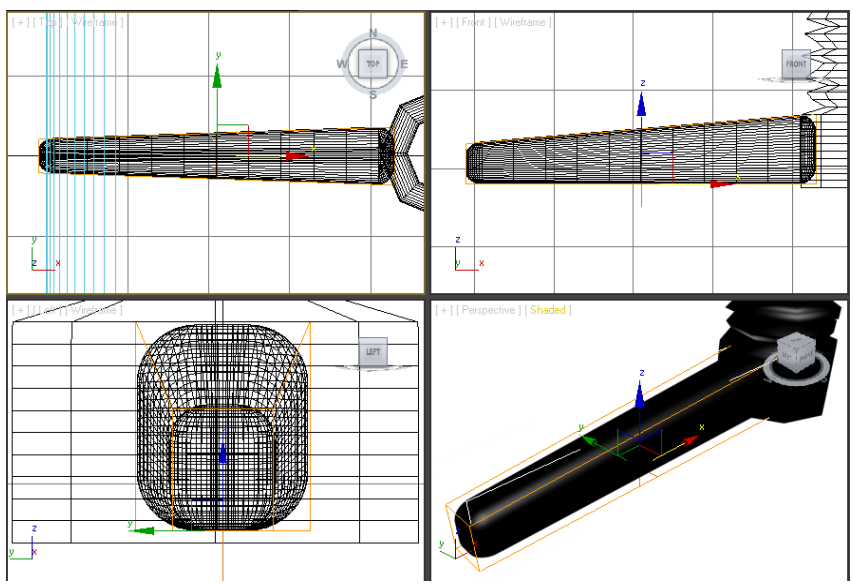

Figure 3-81 *The leg01 displayed in all viewports after applying the* ***Taper*** *modifier*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Creating Rollers for Legs

In this section, you need to create rollers using the chamfer box and chamfer cylinder primitives.

1. Activate the Top viewport and invoke the **ChamferBox** tool.

2. Expand the **Keyboard Entry** rollout and set the values as follows:

   X: **-40** Y: **0.0** Z: **-20.0**
   Length: **7.0** Width: **14.8** Height: **1.7** Fillet: **1.0**

3. Choose the **Create** button; a chamfer box is created.

4. Make sure that the chamfer box is selected. In the **Parameters** rollout, set the values as follows:

   Length Segs: **10** Width Segs: **10** Height Segs: **10**
   Fillet Segs: **10**

5. In the **Name and Color** rollout, enter **box01** as the name of the chamfer box and press ENTER. Also, modify its color to black.



Note

*To view the box01 in all viewports, you need to adjust the view by invoking the **Zoom** and **Pan View** tools.*

Next, you need to apply the **Bend** modifier to the *box01*.

6. Choose **Modifiers > Parametric Deformers > Bend** from the menu bar; the **Bend** modifier is displayed in the modifier stack. Also, the **Parameters** rollout is displayed in the modify panel.

7. In the **Parameters** rollout of the **Bend** modifier, set the parameters as follows:

   Bend Area
   Angle: **173.5**

   Bend Axis Area
   Select the **X** radio button.

8. After applying the **Bend** modifier, the *box01* is displayed, as shown in Figure 3-82.

   Next, you need to create a chamfer cylinder.

9. Make sure that the **Extended Primitives** option is selected in the drop-down list of the **Command Panel**. Now, invoke the **ChamferCyl** tool in the **Object Type** rollout.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

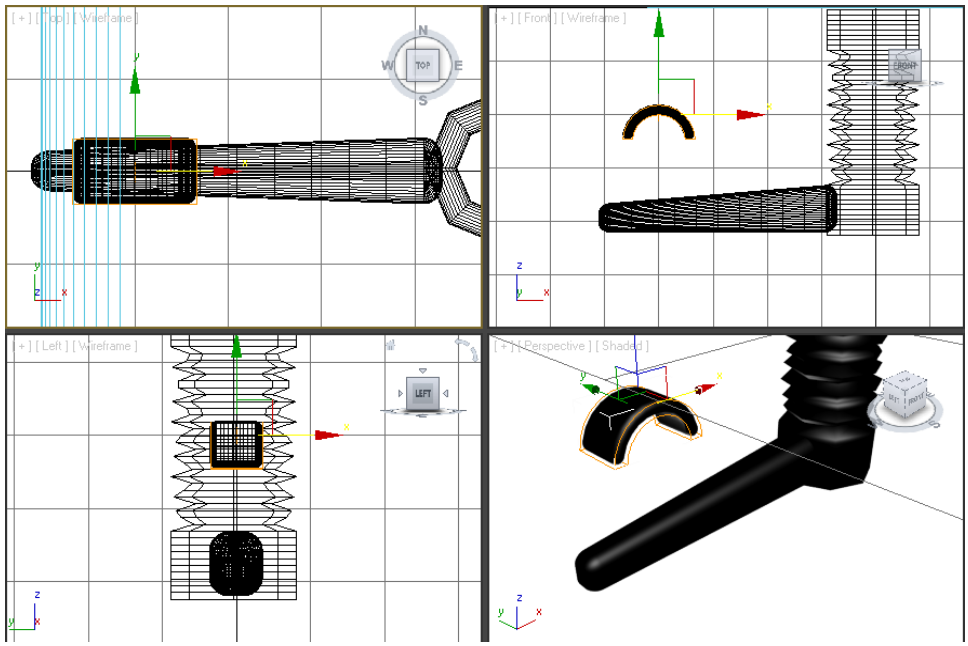

Figure 3-82 *The box01 displayed in all viewports after applying the* ***Bend*** *modifier*

10. Activate the Top viewport and expand the **Keyboard Entry** rollout. Set the parameters as as follows:

    X: **-40** Z: **-20.0**
    Radius: **5.0** Height: **7.0** Fillet: **1.0**

11. Choose the **Create** button; a chamfer cylinder is created.

12. Now, make sure that the chamfer cylinder is selected. In the **Parameters** rollout, set the parameters as follows:

    Height Segs: **10** Fillet Segs: **10** Sides: **12**
    Cap Segs: **11**

    Make sure that the **Smooth** check box is selected.

13. In the **Name and Color** rollout, enter **cylinder01** as the name of the chamfer box and press ENTER. Choose the color swatch to change the color of the box; the **Object Color** dialog box is displayed. Next, choose the **Add Custom Colors** button from this dialog box; the **Color Selector: Add Color** dialog box is displayed. Enter the values as as follows:

    Red: **151** Green: **151** Blue: **151**

14. Align the *cylinder01* with the *box01* in all viewports using the **Select and Rotate** and **Select and Move** tools, refer to Figure 3-83.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

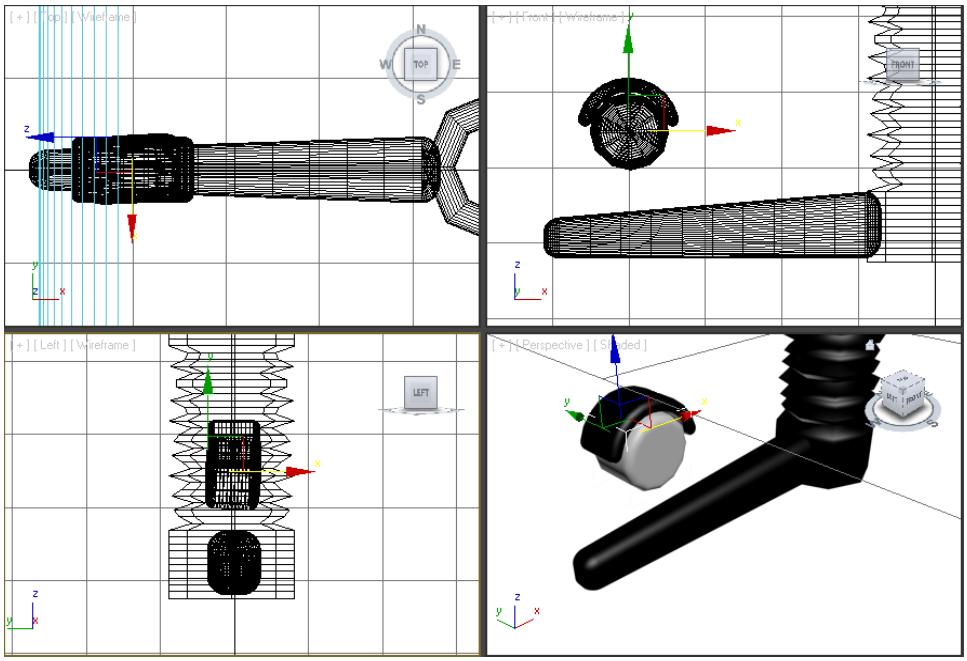

Figure 3-83 *Alignment of the cylinder01 with the box01 in all viewports*

Next, you need to group *cylinder01* and *box01*.

15. Invoke the **Select Object** tool from the **Main Toolbar** and select the *cylinder01* and *box01* by dragging a selection box around them.

16. Choose **Group > Group** from the menu bar; the **Group** dialog box is displayed.

17. Enter **roller01** in the **Group name** text box and choose **OK**; the group is named as *roller01*.

18. Using the **Select and Move** and **Select and Rotate** tools, align the *roller01* with the *leg01*, in all viewports, as shown in Figure 3-84.

19. Next, group the *leg01* and the *roller01* as *f_leg01*.

20. Invoke the **Zoom Extents All** tool to view all the objects in all viewports.

Next, you need to create other legs for the chair using the same dimensions. To do so, you need to copy *f_leg01*.

21. Activate the Top viewport and select the *f_leg01*. Now, choose the **Hierarchy** tab in the **Command Panel**; the **Pivot** tab is chosen by default in the hierarchy panel.



22. In the **Pivot** tab, choose the **Use Working Pivot** button in the **Working Pivot** rollout; the cursor is displayed at the center of the scene. Also, the **USE WP** text is displayed below the viewport label in all viewports. The working pivot point enables you to rotate the *f_leg01*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

about an arbitrary and persistent point in the scene without affecting the original pivot point of the object.

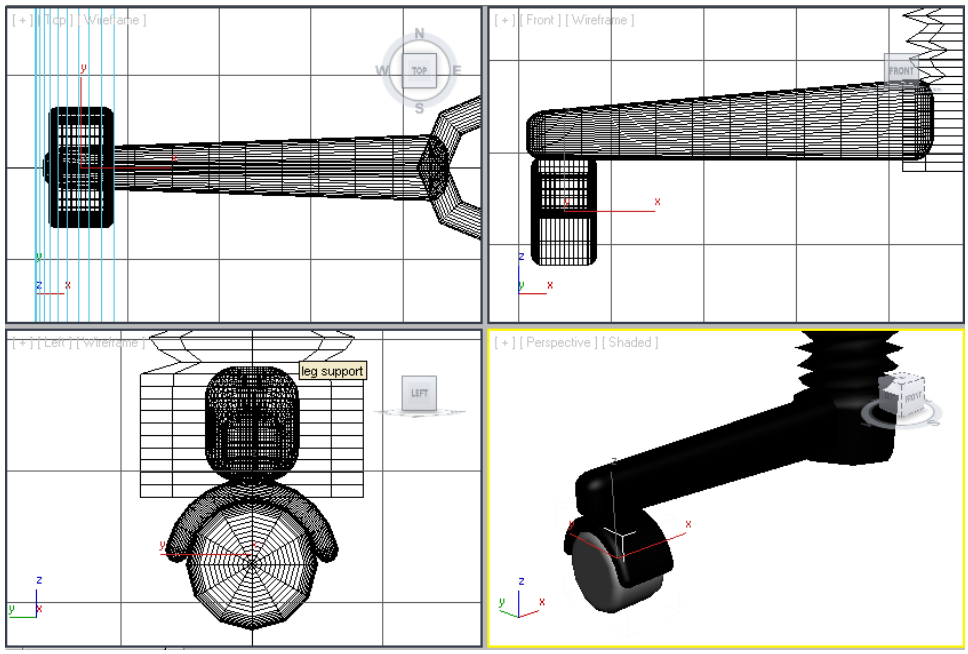

Figure 3-84 *Alignment of the roller01 with the leg01 in all viewports*

23. In the Top viewport, invoke the **Select and Rotate** tool; a circular gizmo is displayed, as shown in Figure 3-85.

24. Move the cursor over the Z-axis. Now, press and hold the SHIFT key as well as the left mouse button, and drag the cursor until the value in the **Z** spinner of the coordinate display is approximately **-72**, as shown in Figure 3-86. Release the left mouse button; the **Clone Options** dialog box is displayed. Make sure that the **Copy** radio button is selected. Set the value **4** in the **Number of Copies** spinner. Choose the **OK** button; the *f_leg002*, *f_leg003*, *f_leg004*, and *f_leg005* are displayed in all viewports, as shown in Figure 3-87.

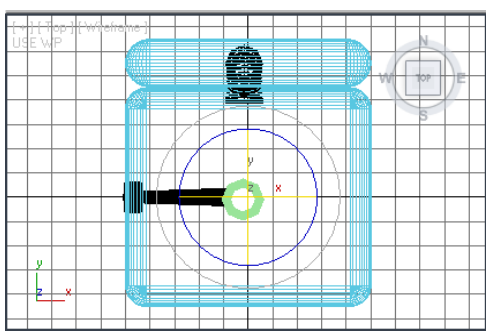

Figure 3-85 *A circular gizmo displayed at the location of the working pivot point*

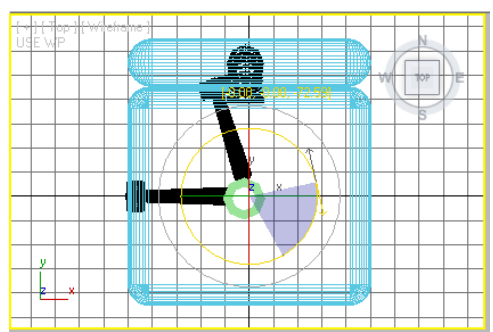

Figure 3-86 *The f_leg01 rotated about* ***-72*** *degrees according to the working pivot point*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

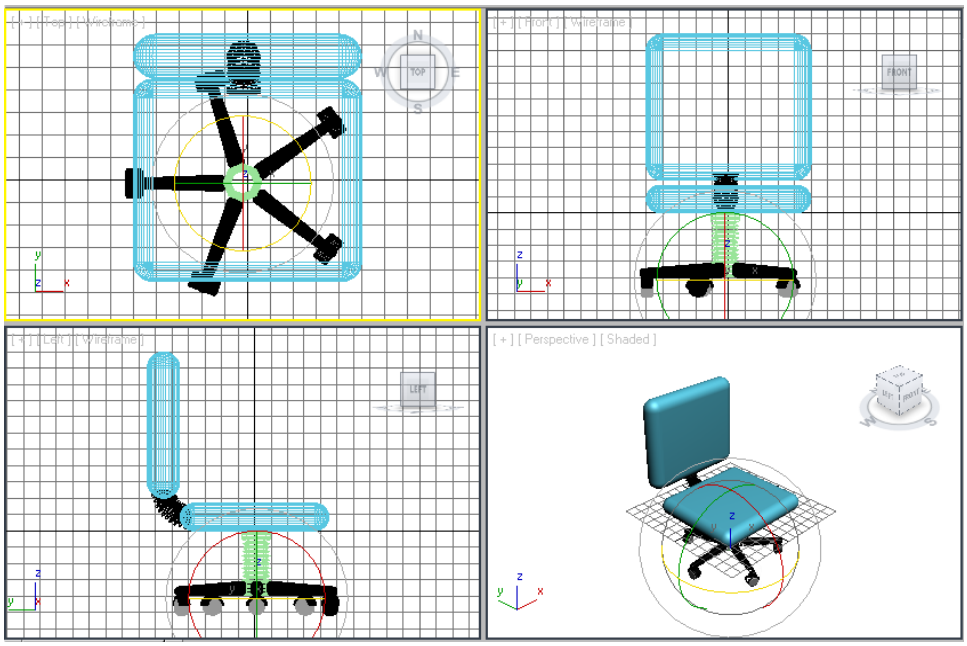

Figure 3-87 The f_leg002, f_leg003, f_leg004, and f_leg005 in all viewports

25. Deactivate the **Use Working Pivot** button by choosing it again in the **Working Pivot** rollout in the hierarchy panel; the cursor is moved to its original position. Also, the **USE WP** text disappears from the viewport label in all viewports.

Creating the Right Hand Support

In this section, you need to create the right hand support of the chair using the **Box** tool from the **Standard Primitives**.

1. Activate the Top viewport and choose **Create > Geometry** in the **Command Panel**. Now, select the **Standard Primitives** option from the drop-down list. Invoke the **Box** tool in the **Object Type** rollout.

2. Expand the **Keyboard Entry** rollout and set the values as follows:

   Length: **5.51** Width: **9.0** Height: **55.0**

3. Choose the **Create** button; a box is created.

4. In the **Parameters** rollout, set the parameters as follows:

   Length Segs: **15** Width Segs: **15** Height Segs: **15**



Note

More the number of segments in an object, smoother is the surface, when you apply a modifier to it.

5. In the **Name and Color** rollout, enter **right hand support01** as the name of the box and press ENTER. Also, modify its color to black.

   Next, you need to apply the **Bend** modifier to the *right hand support01* to give it a shape.

6. Make sure that the *right hand support01* is selected and then apply the **Bend** modifier to it, as discussed earlier.

7. In the **Parameters** rollout of the **Bend** modifier, set the parameters as follows:

   Bend Area
   Angle: **107.5** Direction: **270.0**

8. Align the *right hand support01* in all viewports, as shown in Figure 3-88.

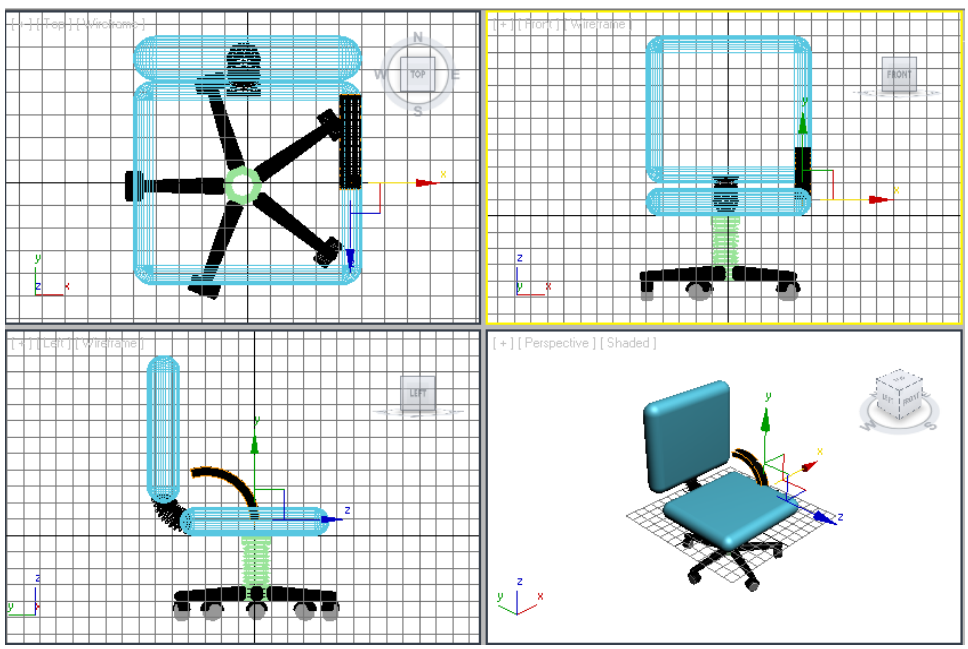

Figure 3-88 *Alignment of the right hand support01 in all viewports*

Next, you need to create the second part of the *right hand support01*. To do so, you need to copy the *right hand support01*.

9. Activate the Top viewport, select the *right hand support01,* and then create its copy; it is automatically named as the *right hand support002*.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

10. In the **Parameters** rollout of the **Bend** modifier, set the values as follows:

    Bend Area
    Angle: **90** Direction: **180**

    Limits Area
    Select the **Limit Effect** check box.
    Upper Limit: **18.0**

11. After entering the values, the *right hand support002* is modified, as shown in Figure 3-89.

12. Align the *right hand support002* in all viewports using the **Select and Move** and **Select and Rotate** tools, as shown in Figure 3-90.



Note

*You can use the **Orbit** tool in the Perspective viewport to view the proper alignment of the right hand support002 in all viewports.*

13. Now, select the *right hand support01* and *right hand support002* and group them as the *right hand support*.

14. Invoke the **Zoom Extents All** tool to view all the objects in all viewports.

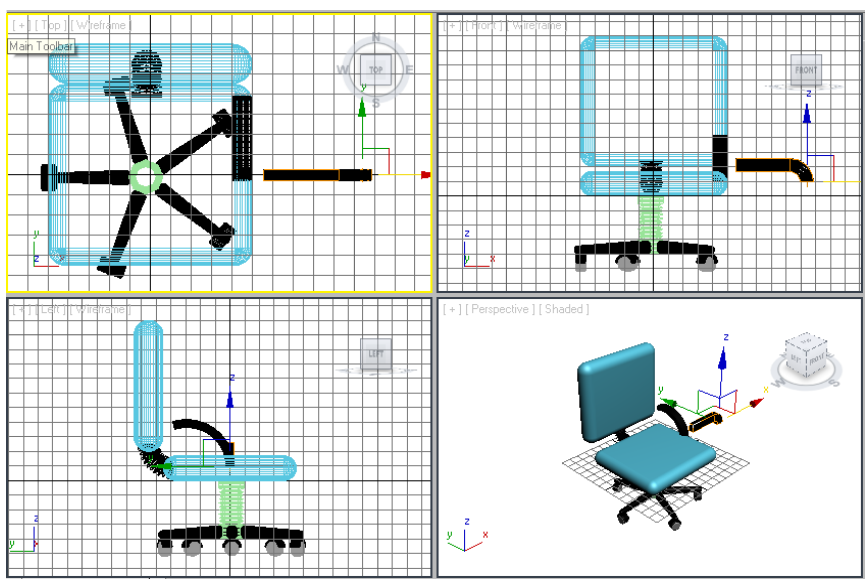

Figure 3-89 *The right hand support002 after modifying the values of the **Bend** modifier*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

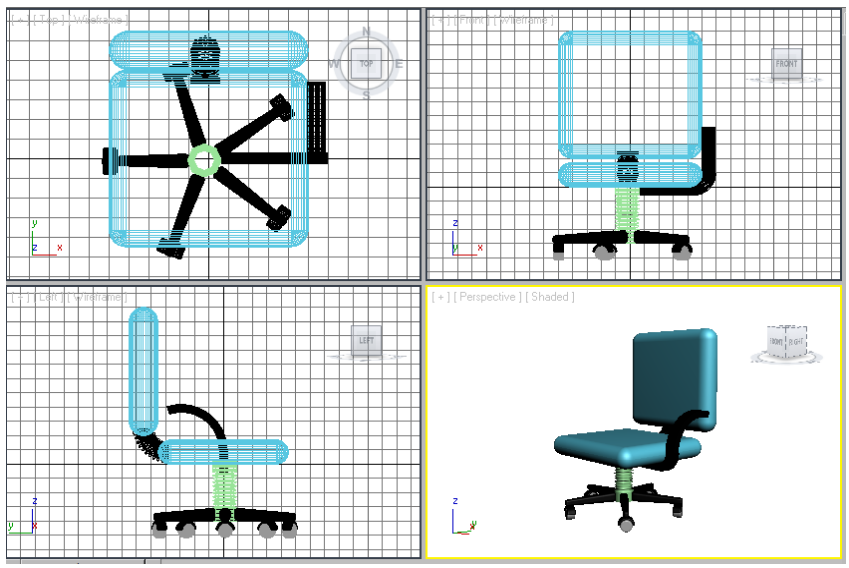

Figure 3-90 *Alignment of the right hand support002 in all viewports*

Creating the Left Hand Support

In this section, you need to create the left hand support by creating the copy of the *right hand support* using the **Mirror** tool.

1. Activate the Top viewport, select the *right hand support*, and create its copy. Modify the name of the newly created copy to *left hand support*.

2. Invoke the **Mirror** tool from the **Main Toolbar**; the **Mirror: Screen Coordinates** dialog box is displayed, as shown in Figure 3-91.

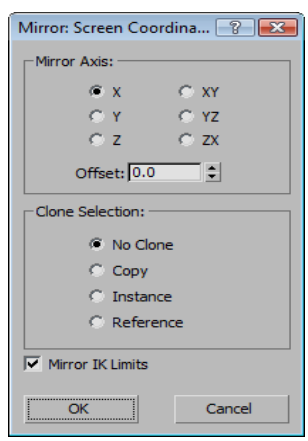

Figure 3-91 *The* ***Mirror: Screen Coordinates*** *dialog box*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

3. In this dialog box, make sure that the **X** radio button is selected in the **Mirror Axis** area and the **Copy** radio button is selected in the **Clone Selection** area. Then, choose the **OK** button.

4. Align the *left hand support* in all viewports, as shown in Figure 3-92.

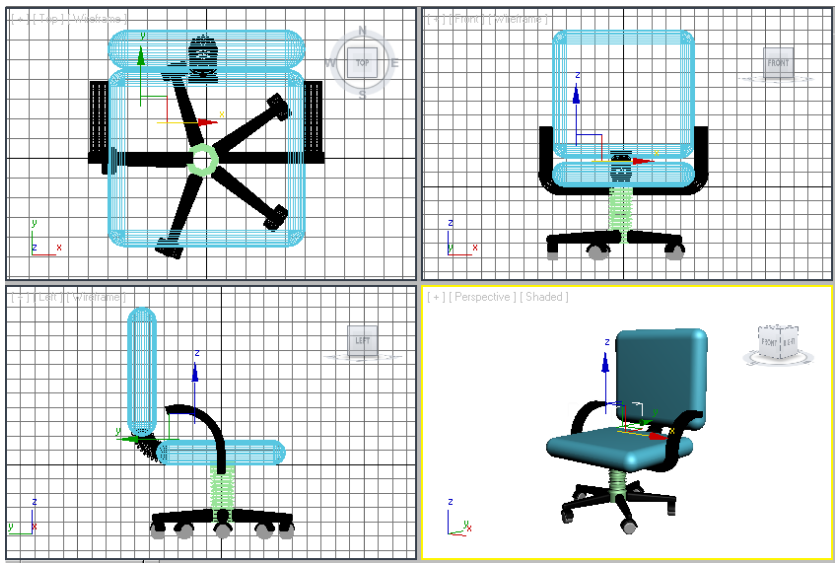

Figure 3-92 *Alignment of the left hand support in all viewports*

Changing the Background Color of the Scene

In this section, you need to change the background color of the scene to white as discussed earlier. To change the background color of the scene to white in final output, follow the steps given in Tutorial 1.

Saving the Scene

In this section, you need to save the scene.

1. Choose **Save** from the **Application** menu; the **Save File As** dialog box is displayed.

   As the project folder is already set, the path *\Documents\camax\c03_tut3\scenes* is displayed in the **Save in** drop-down list of the **Save File As** dialog box.

2. Save the scene with the name *c03tut3.max*.

Rendering the Scene

In this section, you need to render the final output.

1. Activate the Perspective viewport by clicking in it.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

2. Invoke the **Render Production** tool from the **Main Toolbar**; the **Perspective, frame 0, Display Gamma:2.2, RGBA Color 16 Bits/Channel (1:1)** dialog box is displayed. The final output of the model is displayed in Figure 3-93. Now, close this dialog box.



Figure 3-93 *The final output after rendering*

You can view the final rendered image of this model by downloading the file *c03_camax_rndr.zip* from *http://www.cadcim.com*. The path of the file is as follows:

Textbooks > Animation and Visual Effects > Character Animation > Character Animation: A Tutorial Approach (Using 3ds Max)

Self-Evaluation Test

Answer the following questions and then compare them to those given at the end of this chapter:

1. Which of the following tools is used to rotate an object in the active viewport?

   (a) **Zoom Extents All** (b) **Orbit**
   (c) **Pan** (d) All of these

2. Which of the following tools is used to select an object by its name from the list of objects that are currently in the scene?

   (a) **Select Object** (b) **Select and Move**
   (c) **Select by Name** (d) **Select and Rotate**

3. Which of the following rollouts is available when you invoke the **Box** tool?

   (a) **Name and Color** (b) **Creation Method**
   (c) **Parameters** (d) All of these

4. Which of the following objects is not a standard primitive?

   (a) Pyramid (b) Geosphere
   (c) Torus Knot (d) Torus

5. To stretch and squash an object, you need to invoke the _____ tool from the **Main Toolbar**.

6. To change the name and color of an object, use the _____ rollout.

7. To modify the dimensions of an object, you need to use the _____ rollout.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

8. The _____tool is used to move the objects in the viewport.

9. On choosing the **Add Custom Colors** button from the **Object Color** dialog box, the **Color Selector: Add Color** dialog box is displayed. (T/F)

10. You can create any standard primitive dynamically as well as by entering the parameters in the **Keyboard Entry** rollout. (T/F)

11. The options in the **Creation Method** rollout are used only when you create an object using the keyboard. (T/F)

Review Questions

Answer the following questions:

1. Which of the following tools is used to display all objects in all viewports?

   (a) **Zoom** (b) **Pan**
   (c) **Zoom Extents All** (d) **Orbit**

2. Which of the following tools is used to move an object along the X, Y, or Z axis?

   (a) **Select Object** (b) **Select and Move**
   (c) **Select by Name** (d) All of these

3. To select more than one object simultaneously in a viewport, you need to invoke the _____ tool and press and hold the _____ key.

4. While creating the clone of an object, you need to hold the CTRL key and drag the object. (T/F)

5. To change the background color of a scene, you need to choose **Rendering > Environment** from the menu bar. (T/F)

6. The chamfer box is not similar to the box in the standard primitives. (T/F)

7. A hose is a standard primitive that can be used to link two objects. (T/F)

8. To render a view, you need to invoke the **Render Production** tool from the **Main Toolbar**. (T/F)

9. You need to choose **Reset** from the **Application** menu to reset all settings of Autodesk 3ds Max. (T/F)

10. The **Hemisphere** spinner is used to create one-half of the sphere. (T/F)

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Exercises

Exercise 1

Create the dining table set, as shown in Figure 3-94, using your own dimensions. You can view the final rendered image of this model by downloading the *c03_camax_exr.zip* file from *http://www.cadcim.com.* The path of the file is as follows:

Textbooks > Animation and Visual Effects > Character Animation> Character Animation: A Tutorial Approach (Using 3ds max) **(Expected time: 15 min)**



Figure 3-94 *The dining table set*

Exercise 2

Create the model shown in Figure 3-95 using your own dimensions. You can view the final rendered image of this model by downloading the *c03_camax_exr.zip* file from *http://www.cadcim.com*. The path of the file is mentioned in Exercise 1.

(Expected time: 15 min)

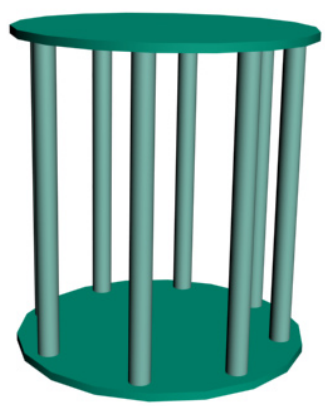

Figure 3-95 *Model to be created in exercise 2*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Exercise 3

Create the model of a nut, as shown in Figures 3-96, using your own dimensions. You can view the final rendered image of this model by downloading the *c03_camax_exr.zip* file from *http://www.cadcim.com*. The path of the file is mentioned in Exercise 1.

(Expected time: 15 min)

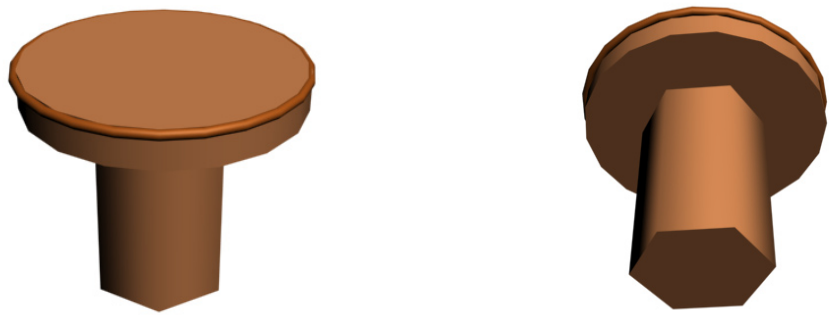

Figure 3-96 *The nut model*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Answers to Self-Evaluation Test

1. b, **2.** c, **3.** d, **4.** c, **5. Select and Squash**, **6. Name and Color**, **7. Parameters , 8. Move, 9.** T, **10.** T, **11.** F.