Autodesk University 2012

Take Your AutoCAD® 2013 Renderings to the Next Level

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AC1607 In this class, we will go beyond the basic rendering tools and dive deeper into what AutoCAD 2013 has to offer. We'll start by taking an expanded look at the settings that control how to establish and save a 3D view. Next, we'll discuss how to create and edit targeted light sources. The class will then focus on creating custom materials using special effects like bump maps and cutout images. Finally, we'll talk about efficient ways to work with large renderings and then pave the way for animated output. This class is a continuation of the class ***AC1603 -"Bringing Your Ideas to Life: Creating Photorealistic Renderings Using AutoCAD® 2013."***

Learning Objectives

At the end of this class, you will be able to:

- Create custom views using cameras & targets
- Place and edit targeted light sources
- Reinforce realism using bump maps
- Clip materials using cutout images
- Work efficiently with large renderings
- Create an animated rendering

About the Speaker

Jeff has been using Autodesk software to produce civil engineering drawings for more than fifteen years. As a CAD manager, he was responsible for the production and oversight of construction drawings, installation of software, and creating and maintaining CAD standards. In the evenings, Jeff served on the faculty of two colleges where he wrote curriculum and taught Advanced AutoCAD and Civil 3D courses. He is known for always giving 110% in the classroom, as well as for his ability to make complex concepts easy to understand. He is an Autodesk Certified Professional for both AutoCAD and Civil 3D. Jeff is also a published author having produced 19 AutoCAD training titles for lynda.com. He was a top-rated speaker at Autodesk University 2011. As Sr. Application Engineer for Infrastructure at Seiler Instrument, Jeff provides Civil 3D, AutoCAD and Map 3D training, technical support, and implementation services for firms located in the Central U.S. region.

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After 11/30/2012, tutorials can be downloaded from: http://tinyurl.com/AC1607JB

Before we get started

If you think about it, the primary focus of rendering is similar to that of traditional photography. Essentially, you seek to create a compelling image through the use of creative viewpoints, dynamic lighting, and interesting textures and materials. The biggest difference is in the amount of time it takes to capture the photo. When rendering, you're photographing an environment that isn't real, so every subtle nuance must be calculated. For this reason, your "AutoCAD® camera" takes photographs one pixel at a time.
(How long it takes to "snap" a photo will be directly related to the complexity of your model, quality of lighting and materials, and speed of your processor.)

The best part about the rendering process is that you have complete control over EVERY aspect of an image. In essence, you are the ruler of your own virtual environment, having total control over how the rest of the world views your stuff.
"It's good to be the King!"

My approach

Since our time is limited, (90 min.) we will be looking at each rendering concept using a "need to know" approach. By focusing on essential skills, we can cover more ground while laying a solid foundation to be built upon later. This class consists of several small exercises, each of which highlight fundamental rendering skills. Finally, while the models used in these exercises are small, *(facilitates quick renders during class)* the skills learned can be applied to models of any size.

Since this is an intermediate level class there is an assumption that you are already familiar with the "basics" of AutoCAD rendering. If this is your first time exploring this topic, please investigate the AU 2012 course ***AC1603 -"Bringing Your Ideas to Life: Creating Photorealistic Renderings Using AutoCAD® 2013."*** *AC1603 takes a beginner's level approach to rendering, and it sets the stage for the concepts covered in this class!*

Want to work through the exercises on your own? All of the content used in this presentation will be downloadable after 11/30/2012 from http://tinyurl.com/AC1607JB

One last thing!

When it comes to rendering, an important system variable to remember is FACETRES. FACETRES controls the "smoothness" of curved solids when they are rendered. By default, FACETRES is assigned a value of .5. *(Acceptable value range = .01 – 10).* The lower the number, the more "faceted" a curved solid will look in the rendered image. Raising the number improves the appearance while increasing the time it takes to render. All exercise files used in this course have FACETRES = 3.

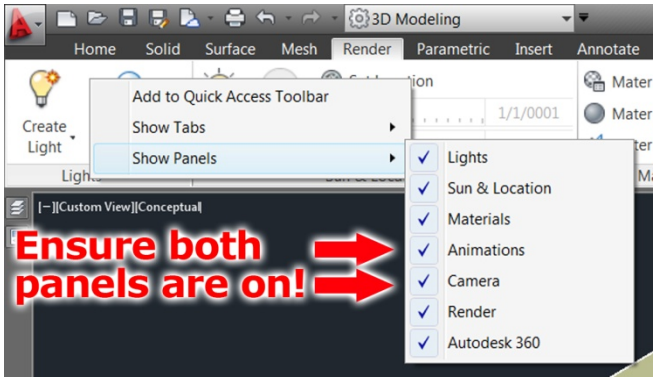
Exercise #1 – Creating Custom Views Using Cameras and Targets

*Open **01_chess_board.dwg***

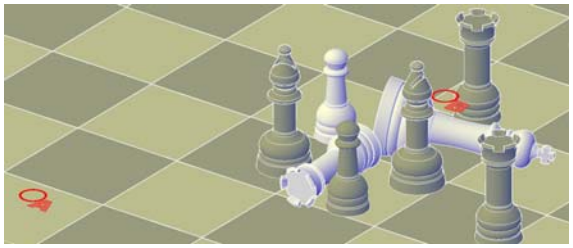
Learning goal: Use a "camera & tripod" methodology to create a custom 3D view.

The first step when preparing to render a model is to create an interesting view. Using AutoCAD's camera feature, we can create a virtual 3D view using the same workflow as a traditional camera and tripod.

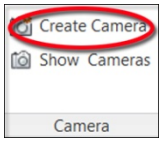
Step 1. Ensure the camera tools are visible.
Open the Workspace menu at the top left of screen and select the 3D Modeling workspace. Once loaded, select the Render Tab. Finally, right-click on the ribbon and in the Show Panels menu, make sure the Camera and Animations panels are selected such that they are visible.



Step 2. Turn on layer "markers-1".
This layer contains a pair of **RED** targets labeled **"A"** and **"B"** to be used when placing your first camera.



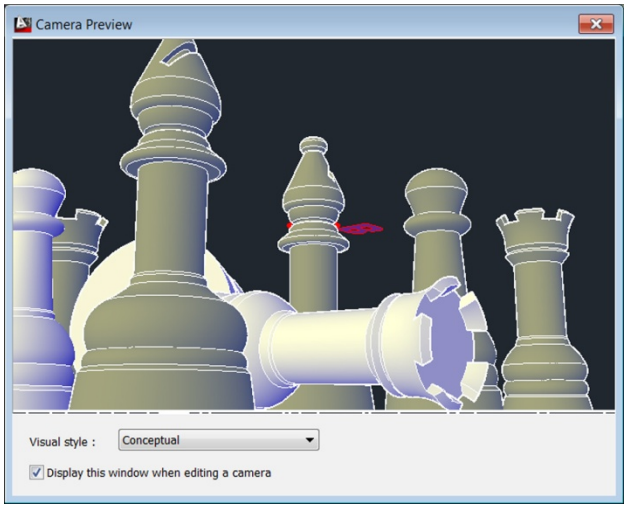
Step 3. Create a custom view by placing a camera in the drawing.



In the Camera panel click "Create Camera" and select the center of marker **"A"** as the camera location and the center of marker **"B"** as the target location. **Press Enter when finished.** *(At this point you should see a small camera glyph at the center of marker "A." If the camera is not visible, click the Show Cameras toggle in the Camera panel.)*

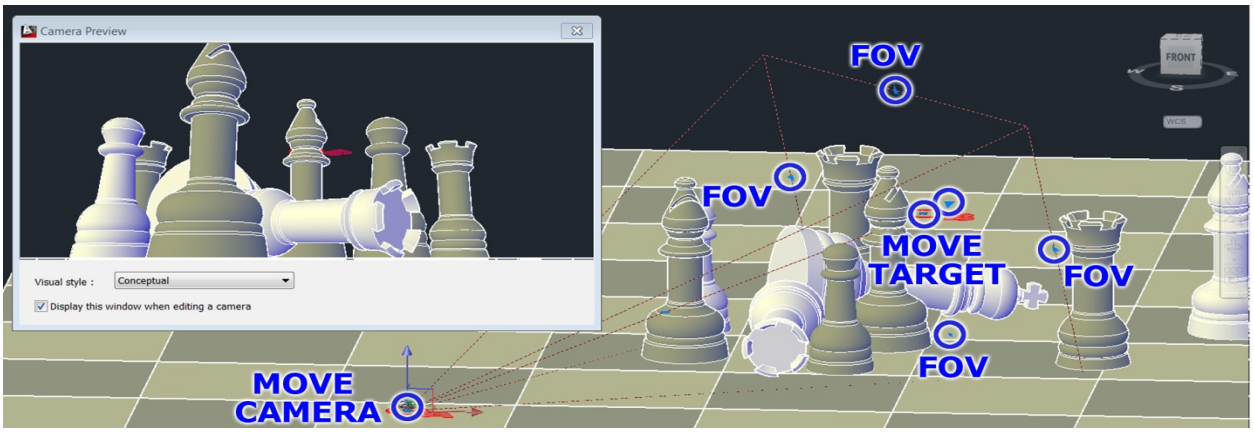
As you can see, positioning a camera in an AutoCAD drawing is very similar to the real-world workflow of placing a camera on a tripod, and then aiming it at a subject. Knowing this, if you are working with a 3D model of a room, realistic architectural views could be created by simply placing a camera at approx 5' above the floor to simulate the "eye level" of an average adult.

Step 4. Look through the camera.
Click to select the camera glyph and a Camera Preview window will appear showing you the view through the lens. *(Note: This window can be disabled using the "Display" checkbox at the bottom. If the window does not automatically display, simply right-click after selecting camera and choose "View Camera Preview" from menu.)*

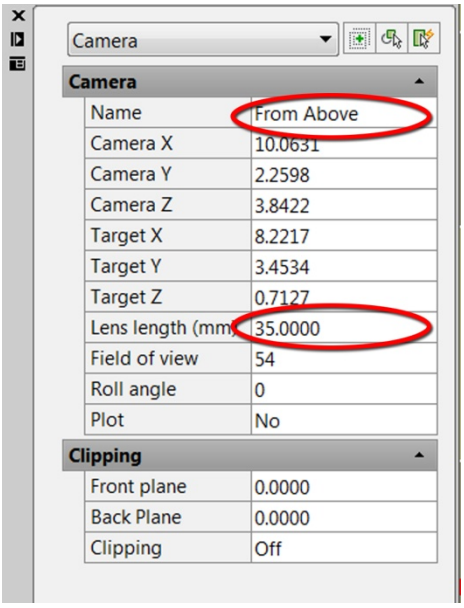


Step 5. Experiment with Camera Preview Window
Use the Visual Style menu to change the way the model displays in the window. Note that the window can be moved on screen and stretched taller or wider if necessary.
Keep the window open for the next step.

Step 6. Adjust the camera position and settings using grips.
After a camera is placed, it can be modified using grips. **Try it!** Select the camera, and then select *(and move)* an FOV *(Field of View)* grip to zoom in and out. *(Use the Camera Preview Window to monitor the changes.)* Reposition the camera using the grip on the camera itself.
Note: As you move the camera, it will always stay fixed on the target. Before moving on, explore some of the remaining grip choices.



Step 7. Adjust camera settings using the Properties Palette.
After selecting a camera, press CTRL+1 to open the Properties Palette and review the available settings. From here you can give the camera a name, select a real-world lens length, or tip the camera to the left or right using the Roll angle. Adjust some of these settings and note how they affect the view in the Camera Preview Window.
Click the X to close the Camera Preview Window and press ESC to deselect the camera when finished.



Step 8. Use what you've learned to create another camera.
Start by turning off layer **"marker-1"** to hide the original markers and turn on layer **"marker-2**". Using the new markers, create a camera and position it at the center of marker **"a"**, using the center of marker **"b"** as its target.

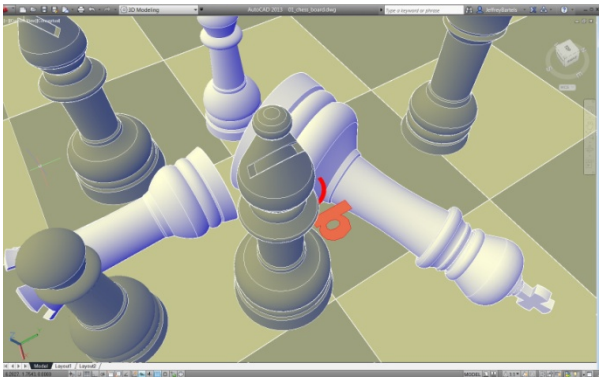
Select the new camera and in the Properties Palette, change the camera name to **"From Above"**, and change the lens length to **35**, to simulate a 35mm camera.

Step 9. Assign the camera's view to modelspace and render the model.
Make sure the new camera is still selected, right-click in modelspace and choose "Set Camera View" from the popup menu. This will set the view in modelspace to match the selected camera. When finished, press ESC to deselect the camera and close the preview window.

Note: A camera view can also be made current using the in-canvas menu in the upper left corner of modelspace. Simply click to open the middle menu (View Menu) and navigate into Custom Model Views to select a camera.

Finally, turn off the **"marker-2"** layer so the marker geometry doesn't display in the final image and click the Render button *(in the Render panel of the ribbon)* to render the drawing using default settings.

Final images below…



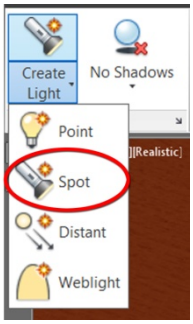
Camera view in modelspace

Final rendered image

After completing this exercise we can…

- Position a virtual camera for the purpose of creating a rendered image
- Adjust camera properties using grips
- Adjust camera properties using the Properties Palette
- Assign a camera view to modelspace such that it can be rendered

Exercise #2 – Placing and Editing Targeted Light Sources



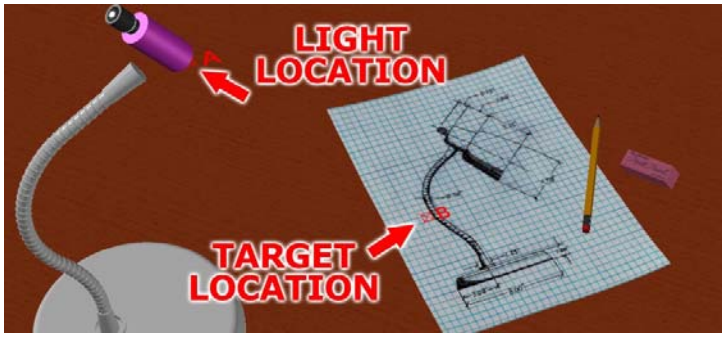
*Open **02_desk_lamp.dwg***

Learning goal: Predictably place and edit a targeted light source.

A targeted light source acts much like a flashlight, creating a "cone" of light in a specific direction. In this lesson we'll use a targeted light to simulate the illumination created by a desk lamp.

Step 1. Adjust layer settings to make it easier to place light source.

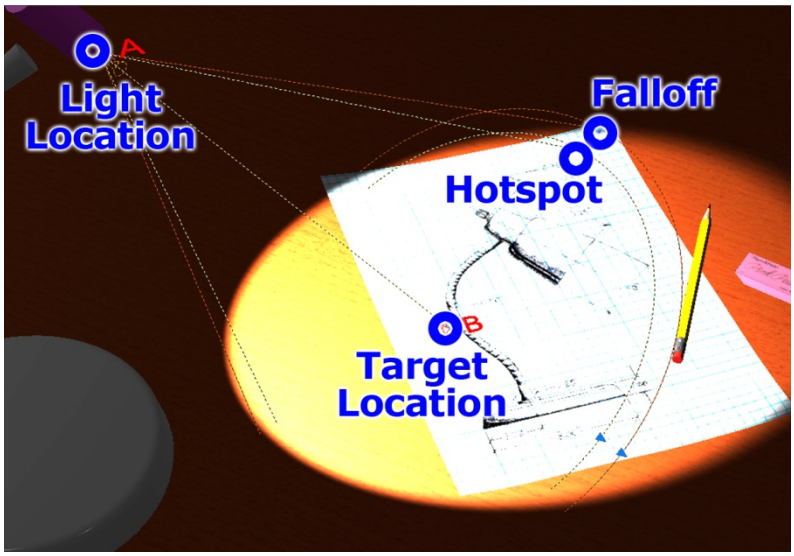
Using the Layer Properties Manager, turn off the **"shade"** layer and turn on layer **"marker-1**". This will hide the lamp shade geometry as well as display targets to be used for placing the light source.



Step 2. Create a spotlight.

In the Lights panel, open the Create Light menu and select "Spot". Select the node at point **"A"** as the source location and the node at point **"B"** as the target location. **Press Enter when finished.** *(At this point, you've probably noticed the workflow for inserting a spotlight is identical to inserting a camera. The editing workflow is also identical!)*

Step 3. Edit the spotlight using grips.



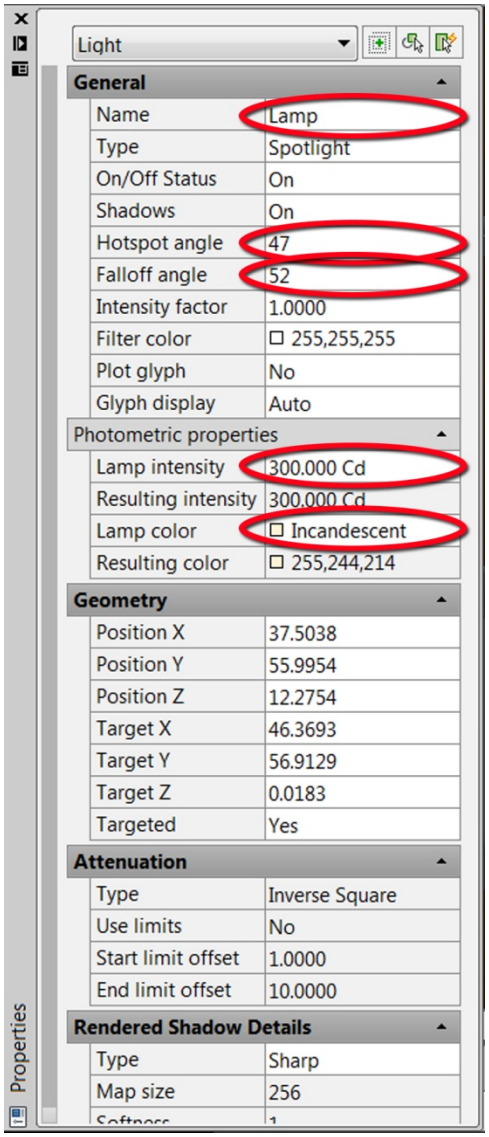
Select the light by clicking on the "glyph" and note the display of the cone of light and the available grips.

Falloff grips *(around the outer edge)* adjust the angle representing the overall size of the cone.

Hotspot grips *(around the inner edge)* adjust the angle representing the size of the hot spot.
There are also grips to reposition the light source and target.

Experiment with the position of the grips and note how they affect the shape/location of the light.

Restore the light location to point "A", and the target to point "B" when finished.



Step 4. Edit the spotlight using the Properties Palette.

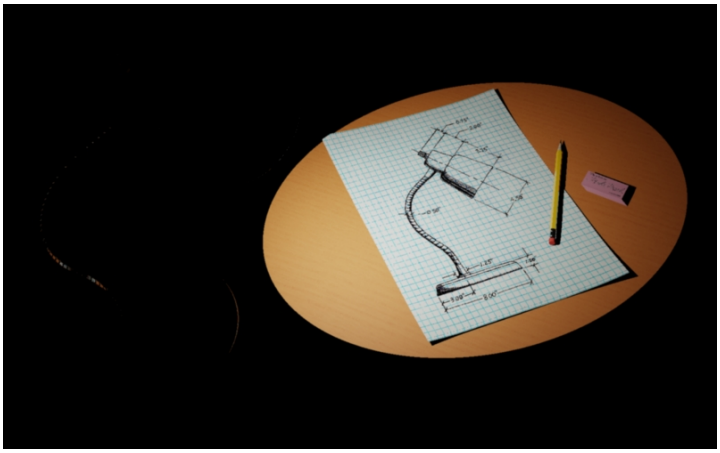
Make sure the spotlight is selected and press CTRL+1 *(if necessary)* to display the Properties Palette. From here you can adjust the light's name, intensity, color, on/off state, shadow properties as well as several other settings.
Note: For more information about specific settings, hover over them to display a popup description.

For this tutorial, use the Properties Palette to assign the spotlight the following settings…
Name = Lamp
Hotspot angle = 47
Falloff angle = 52
Lamp intensity = 300 Cd
Lamp color = Incandescent

When finished, press ESC to deselect the spotlight and then restore the original layer state by turning off layer **"marker-1"** and turning on layer **"shade**".

Step 5. Render the drawing.

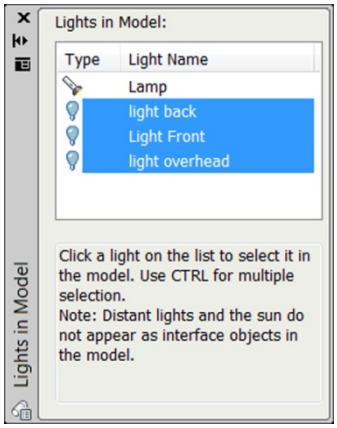
Open the In-canvas View Menu and restore the Custom Model View called "Final". Then click Render to render the drawing using default settings.
Rendered image below…



Remember that we are working with a targeted light! For this reason, the remainder of the rendering looks black, because it receives NO ILLUMINATION.

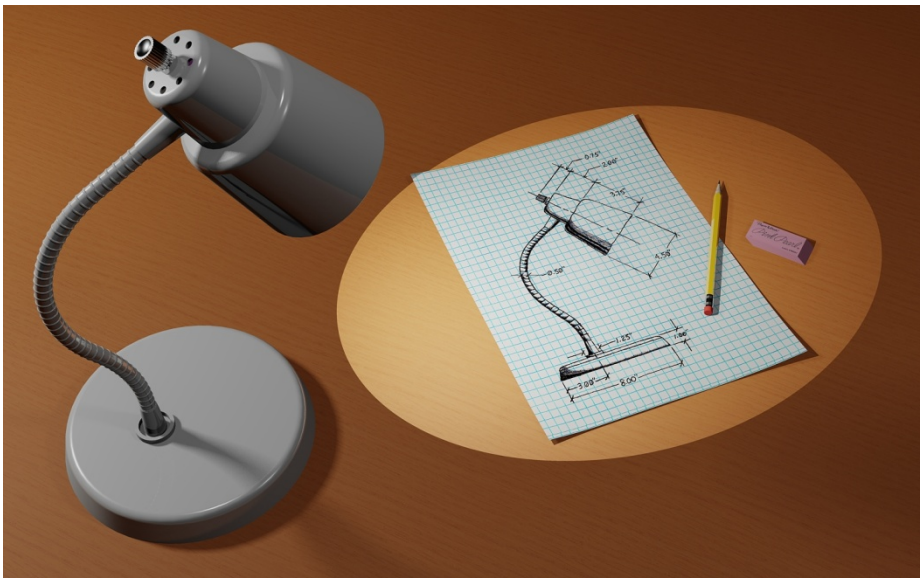
Step 6. Incorporate additional light sources and render again.

Fortunately there are three more light sources in this model to help illuminate the overall scene. To turn them on, use the LIGHTLIST command to display a list of all lights in the drawing.
(You can also display this list by clicking the small arrow in the lower right corner of the Lights panel.)



Selecting a light in this list, also selects the light in the drawing. Click on the light called “light back” and then hold SHIFT and click on “light overhead” to select all three point lights. Once selected, use the Properties Palette to change their On/Off Status to ON.

When finished, render the drawing a final time and note the difference.



After completing this exercise we can…

- Position a spotlight to create targeted illumination
- Adjust spotlight properties using grips
- Adjust spotlight properties using the Properties Palette
- Use the LIGHTLIST feature for quick access to all lights in a drawing

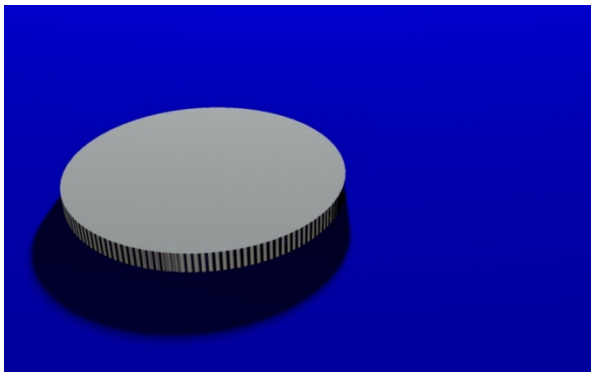
Exercise #3 – Reinforcing Realism using Bump Maps

*Open **03_half_dollar.dwg***

Learning goal: Add believability to a rendering by applying bump maps.

There is no greater way to add realism to a rendering than to add some texture. In this lesson we'll use bump maps to transform some simple geometric shapes into realistic looking objects.

Step 1. Set the existing camera view current and render the initial drawing.

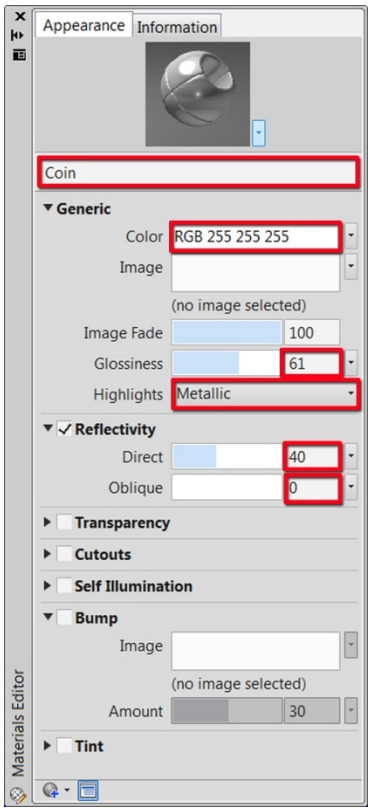


Select the camera glyph, right-click in modelspace and choose Set Camera View from the menu. Press ESC when finished, and then render the drawing.

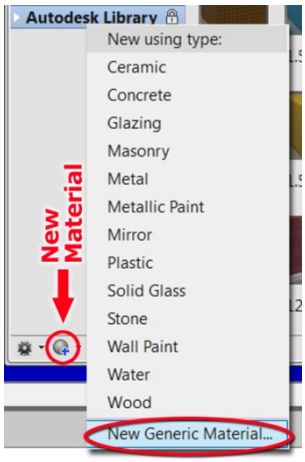
As you can see, the scene consists of a cylindrical shape, sitting on a region representing the floor. Our goal is to make this cylinder look like a Kennedy half dollar. We'll start by applying a bump map to the top. *(Notice that a bump map has already been applied to the edge of the coin.)*

Step 2. Create a custom material to represent the top of the coin.

In the Materials panel of the ribbon, click the Materials Browser button to display the Materials Browser palette.



In the bottom left corner of the palette, open the New Material menu and select "New Generic Material". This will display the Materials Editor such that you can adjust the settings of the new material.



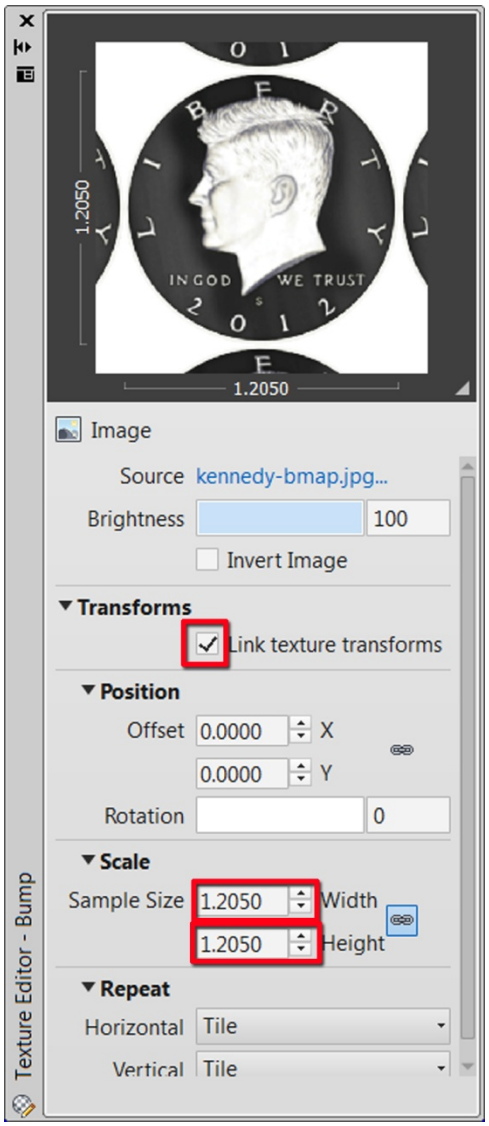
In the Materials Editor, assign the following settings…

Name = Coin
Generic
Color = 255,255,255
Glossiness = 61
Highlights = Metallic
Reflectivity
Direct = 40
Oblique = 0

When finished, close the editor. Before we go any further, let's apply this material to the top of the coin.

Step 3. Apply material to coin.

Drag and drop the coin material from the Materials Browser to the top of the coin. At this point, the cylinder doesn't look much different because the top is still smooth. Let's add a bump map now and see how the surface changes.



Step 4. Add a bump map to the coin material.

In the Materials Browser, double-click the coin material to re-open it in the editor. *(The editor can also be opened by hovering over the material in the Browser and clicking the "pencil" icon.)* In the lower portion of the Materials Editor, click to select the Bump box. This will display the bump settings and allow you to select an image to be used as a bump map. Select the image called **kennedy-bmap.jpg** and click Open. The image will then be displayed in a Texture Editor. *(Note: If the Texture Editor does not automatically display, click on the Bump Image preview in the editor to open it.)*

Bump maps are essentially black and white images used to create "texture" by raising and lowering portions of a material. Lighter shades raise the elevation, while darker shades lower it.

For this tutorial, set the width and height of the image to be 1.205. *(This represents 1.205" which is the actual size of a Kennedy half dollar. This measurement also matches the diameter of the cylinder in this drawing so the bump map should fit perfectly.)*

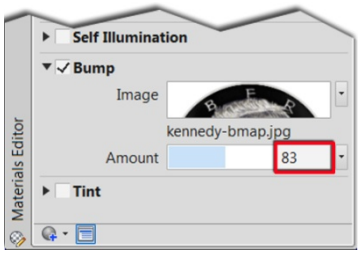
Finally, be sure to select the "Link texture transforms" button. *(This ensures that if the bump map dimensions are changed, any other images associated with this material will be scaled proportionally.)* When finished, close the Texture Editor.

Step 5. Adjust the "bumpiness" of the bump map.

In the Materials Browser, change the Amount setting to 83. The higher the value, the more prominent the bump map appears. Values less than zero will invert the bump map.

Note that as changes are made to the Amount setting, the material mapped to the coin updates accordingly.

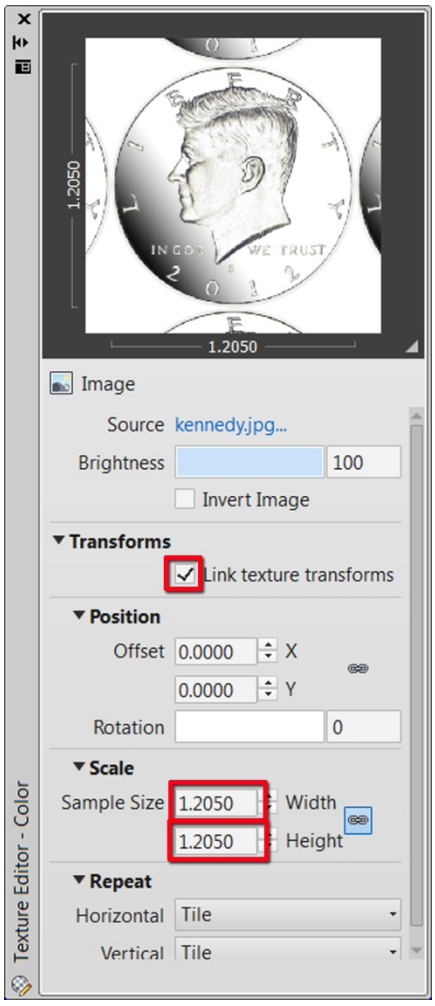
Render the image when finished and compare it with the previous rendering.



As you can see, the addition of the bump map makes the coin look much more lifelike. Bump maps are probably the single best way to add realism to a rendered image. Now, let's see if we can add to the "believability" of this image by mapping a photograph on top of the bump map.

Step 6. Enhance the material by adding a photograph.

Re-open the coin material in the Materials Browser and in the Generic settings category, click the large white field next to the word "Image" to choose an image to apply to this material. Select the image called **kennedy.jpg**.



Once again, this will open a Texture Editor allowing you to edit the image settings. Just as you did in **Step 4**, set the width and height of the image to 1.205 and then select the "Link texture transforms button". Close the Texture Editor and Materials Editor when finished.

(In the event you are wondering, the bump map image we used earlier was created from this photograph. They are identical except for the shading. In many cases, photo based materials can easily be given texture by simply assigning a black and white version of the original photo as a bump map!)

Step 7. Apply a material to the floor and render the drawing a final time.

To create a realistic floor for the rendering, we'll use a material that already exists in the file. Drag the **"3 in Square – Terra Cotta"** material from the Materials Browser and drop it over the blue region representing the floor.
(As a side note, this material also includes a bump map. If you are interested, open the material in the editor and look within the Relief Pattern settings. You'll find the material uses a black and white version of the main image as a bump map.)

Render the drawing when finished.

Final images on next page…

Materials rendered without bump maps

Materials rendered with bump maps

After completing this exercise we can…

- Simulate texture by adding a bump map to a material
- Edit bump map intensity
- “Link” bump maps to other images such that they stay together when edited

Exercise #4 – Clipping Materials Using Cutouts

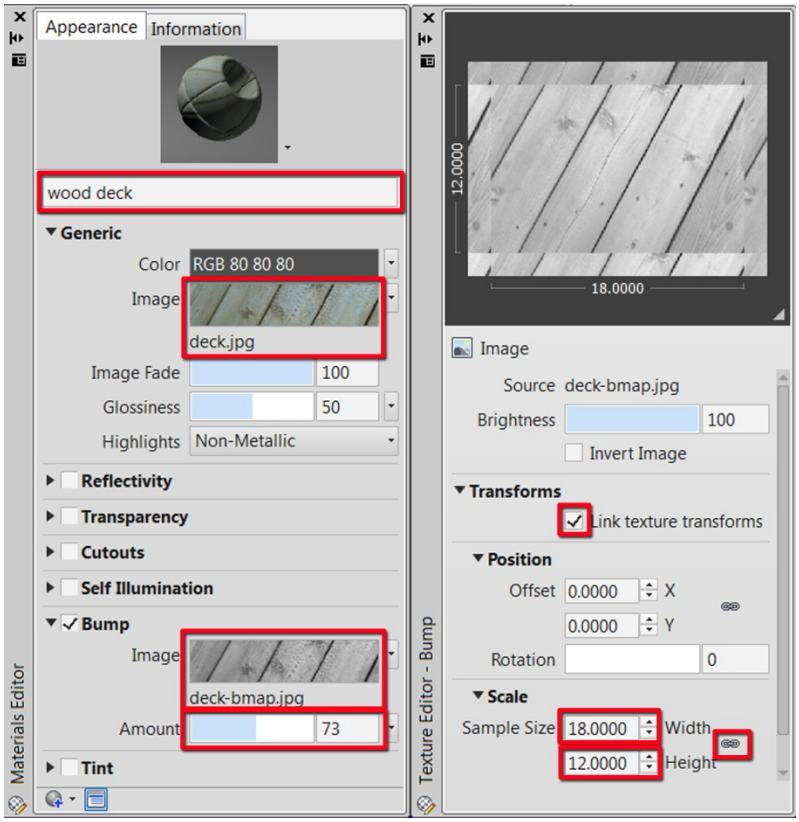
*Open **04_cut_out.dwg***

Learning goal: Use an image to clip the boundary of a material.

AutoCAD isn't usually thought of as a tool for modeling organic shapes. Recently I was doing some experimentation and created a rendering of a leaf. Some people who saw the image were skeptical that it was produced using AutoCAD. In this lesson we'll recreate that rendering to prove it can be done, AND because it provides a perfect opportunity to use a cutout image.

Step 1. Create a material that simulates a wood deck.

Open the Materials Browser and in the New Material Menu, select "New Generic Material". In the Materials Editor, assign the new material the following settings…



Name = wood deck
Generic
Image = deck.jpg
Bump
Image = deck-bmap.jpg
Amount = 73

In the Texture Editor ensure that both images are assigned a width of 18 and a height of 12.
These measurements match the size of the region to which this material will be applied.
(Note: You will have to click the "chain" icon to unlock the aspect ratio before assigning the measurements.)

When finished with each image, be sure to select "Link Texture Transforms"

After the material has been created, drag and drop it on the region in the drawing, restore the camera view, and render the image.

As you can see, including a black and white version of the deck photo as a bump map gives the rendering a realistic texture.

Now that the deck material is finished, we'll restore the default Global material to the deck region such that future renderings go a little faster.

Step 2. Restore the default "Global" material to the region.

Select the deck region and in the Properties Palette, within the 3D Visualization group, change the Material setting to Global. *(We'll restore the deck material in the final step of this tutorial.)*

Step 3. Turn on layer "leaf"

This layer contains a 3D mesh object. This object was originally created as a mesh box primitive. Then, while holding the CTRL key, the top and sides of the box were selected and deleted, leaving only the flat plane on the bottom. Next, a smoothing factor of 4 was applied. Finally, the CTRL key was held down such that individual vertices, edges, and faces could be selected and pulled upward to create an irregular surface area. We will now map a scanned image of a leaf onto this object.

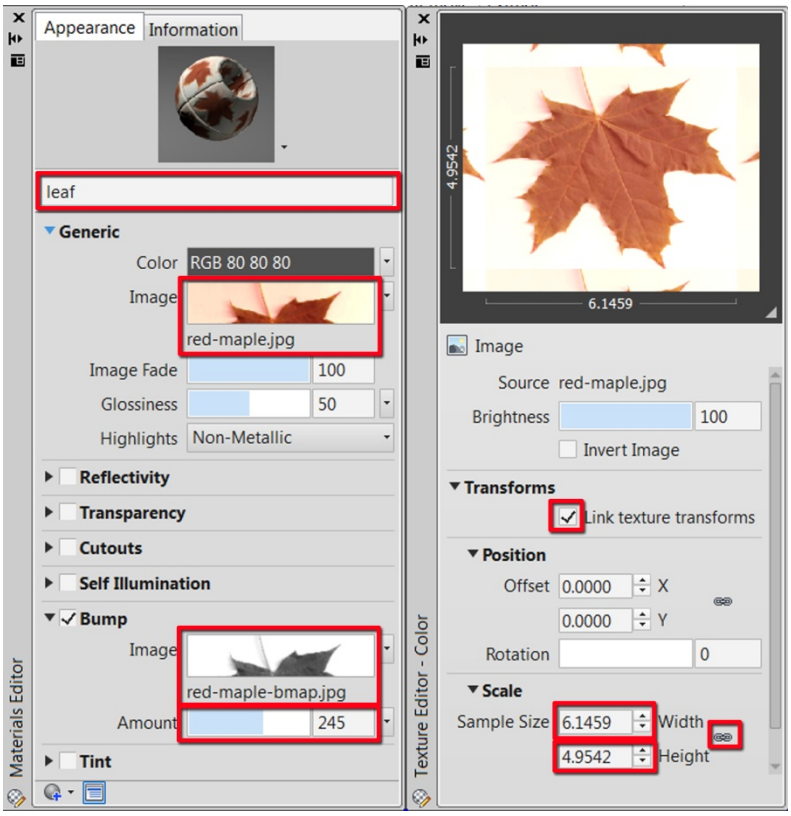
Step 4. Create a material that simulates a leaf

Open the Materials Browser and in the New Material Menu, select "New Generic Material". In the Materials Editor, assign the new material the following settings…

Name = leaf
Generic
Image = red-maple.jpg
Bump
Image = red-maple-bmap.jpg
Amount = 245

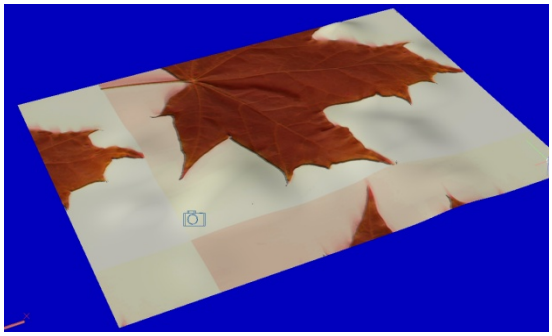
In the Texture Editor ensure that both images are assigned a width of 6.1459 and a height of 4.9542.

Yep, I know these values seem WAY TO SPECIFIC. They happen to be the measurements reported to me from my scanner when I scanned the leaf.
(I also drew the mesh object to match these dimensions.)



When finished with each image, be sure to select "Link Texture Transforms".

After the leaf material has been created, close the editors and drag and drop the material onto the mesh object. Don't be alarmed, it doesn't fit well at first!



Step 5. Correct the mapping of the leaf object.

In the Materials panel of the ribbon, open the Material Mapping menu and select "Planar". Then select the mesh object and press Enter twice.
(This will orient the corner of the material to the corner of the mesh.)

Next, re-open the leaf material in the Materials Editor, click the Image sample to open the Texture Editor and *(inside the Position collection of settings)* assign the image a 90 degree rotation. **Note: You only have to do this for one of the images. The "Link texture transforms" setting will take care of the other.**

Below is what the corrected mapping should look like…

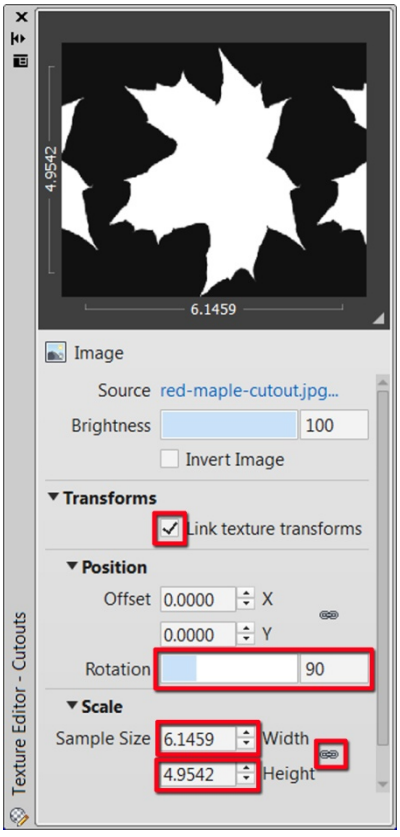
Step 6. Clip the material using a cutout.

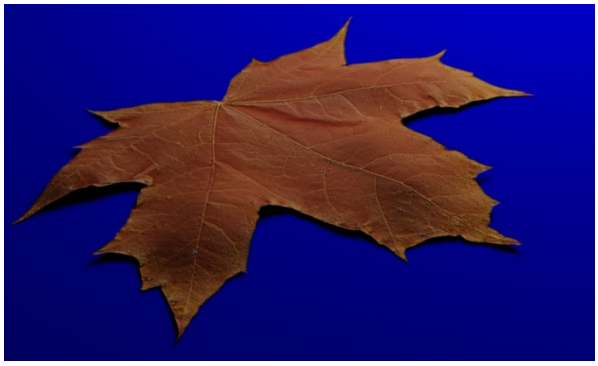
Using an image as a cutout, we can clip the unnecessary white area from this material.
Start by opening the leaf material again in the Materials Editor. Select the Cutouts box to expand the settings and select the image called red-maple-cutout.jpg.

A Cutout is essentially a black and white image identifying the boundary of a material. White areas are kept, and black areas are trimmed away.

In the Texture Editor, assign the cutout the same measurements as the first two images.
Width = 6.1459, Height = 4.9542, Rotation = 90

When finished, ensure "Link texture transforms" is selected and close any open editors. Notice that the material is now clipped nicely to match the photograph. If desired, create a quick rendering to review the progress.





Step 7. Restore materials and layers and render a final time.

Turn on layer **"stem"**. This layer contains a mesh object to simulate the stem attached to the leaf. Drag the "wood deck" material back onto the deck region. *(A REGEN may be required to clean up the screen display.)* Finally, restore the camera view and render the image a final time.

After completing this exercise we can…

- Predictably add, and modify several images within a single material
- Clip a material using a cutout image

Exercise #5 – Working More Efficiently with Large Renderings

*Open **05_large_rendering.dwg***

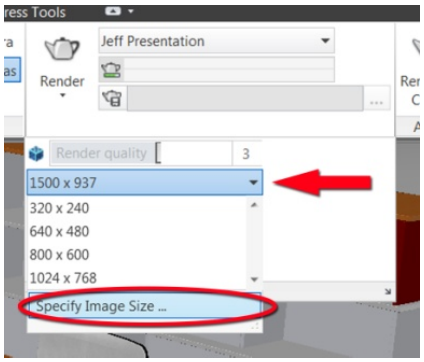
Learning goal: Use the Render tools to create "test" renderings as quickly as possible.

This time we are starting with a finished rendering. While this image looks acceptable *(similar to something you might find in an office furniture catalog)* there is always room for improvement. As a side note, this rendering incorporates indirect illumination, a feature that allows light "bouncing" off objects to contribute to the overall illumination of the scene. Using this setting increases the brightness of the rendering and, more importantly, prevents the area beneath the desk from being too dark.

Unfortunately, indirect illumination only displays properly when using high quality render settings.

On most machines this drawing will take up to 20 minutes to render, so we need to be as efficient as possible when making/reviewing changes.

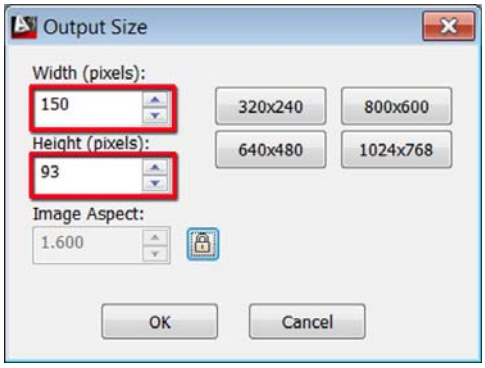
Method 1. Render image at a low resolution.



One way to increase rendering speed is to drop the resolution to the size of a postage stamp! Even at significantly reduced sizes, these images still make it easy to evaluate overall lighting and material colors.

Expand the Render Panel, open the Render Output Size menu and select "Specify Image Size…" This will display the Output Size dialog box.

Using this box, you'll define the size of the rendered image in pixels. Notice the available "presets" on the right representing standard image sizes.



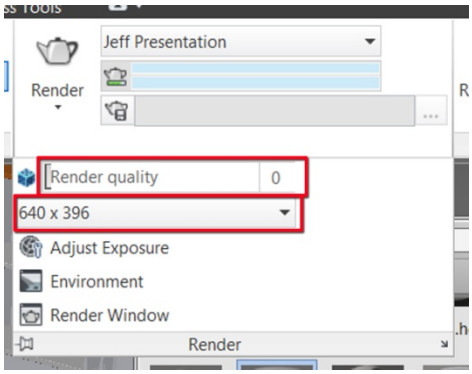
As you can see, the original "intent" of this rendered image was 1500 pixels wide by 937 pixels tall.

Change the width to 150 pixels. *(1/10th size)*
When you press Enter, notice the height measurement is assigned automatically. That's because the Image Aspect is locked, allowing the measurements to be scaled proportionally.

Press OK when finished and render the drawing.

As you can see, the image *(at left)* rendered in approximately 30 seconds and although small, it can easily be used to make decisions regarding lighting or material density.

After reviewing this image, it might be wise to darken the floor such that the furniture "stands out" more in the room. **Using what you've learned in previous lessons, locate the "floor" material in the Materials Browser, and edit its color property to be 170,170,170**. When finished, render the drawing a second time. The revised version can be seen at right.



Method 2. Render image using a lower quality setting.

Another way to increase rendering speed is to lower the render quality of the image. Lowering the quality will reduce anti-aliasing *(smoothness)* of the image while still honoring many of the settings in the render preset.

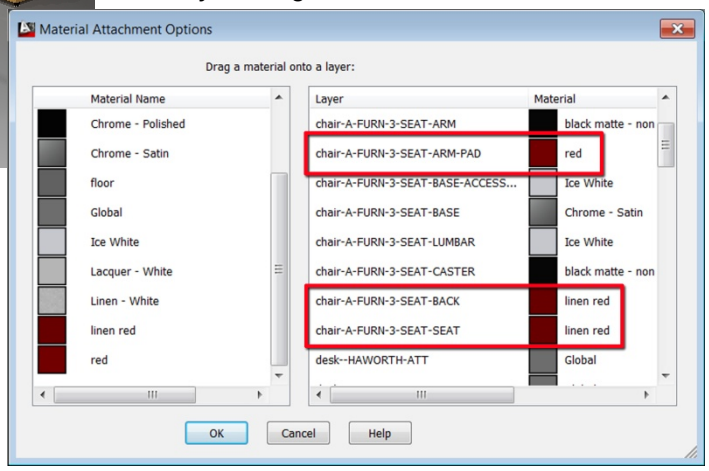
(In this drawing, the current preset is called "Jeff Presentation" because it incorporates additional settings not included in the default Presentation preset.)

To lower the Render quality, expand the Render Panel and drag the Render quality slider down to 0.

Since this change will significantly speed up the rendering, let's also increase the resolution to approximately 640x396. When finished, render the drawing again.

This rendered image took less than 2 minutes to produce and it's large enough to make decisions about material choices. After reviewing the image, it seems the white chairs give the scene a sterile "hospital like" appearance.

Let's try making the chairs red.



Fortunately, all of the materials are assigned BYLAYER, so swapping the chair color is easy.

Start by expanding the Materials panel and select "Attach by Layer". The Material Attachment Options dialog box will display on screen.

Simply drag a material from the left panel and drop it on a layer in the right panel to assign it to the layer. *(Note that column widths can be dragged wider if necessary to make layer names easier to read.)*
Using the Material Attachment dialog box…

Assign the **"red"** material to layer **"chair-A-FURN-3-SEAT-ARM-PAD"**

Assign **"linen red"** to layer **"chair-A-FURN-3-SEAT-BACK"** & **"chair-A-FURN-3-SEAT-SEAT"**

Render the drawing again when finished. *(Example at right.)*

After reviewing this image, it might be a good idea to incorporate some of the wood material used on the shelving units into the pedestals at each workstation.

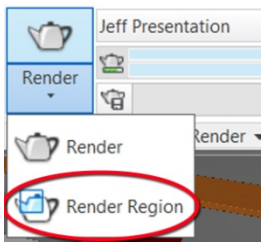
We'll make that change as we look at the next rendering method.

Method 3. Render a small region of the Modelspace viewport.

You don't always have to render an entire scene. Sometimes just rendering a small area is enough to evaluate an image.

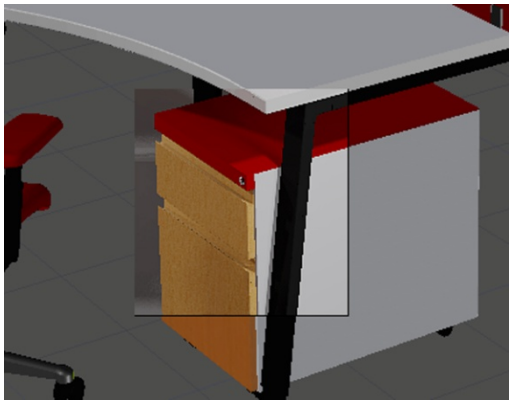
Start by expanding the Materials Panel and select "Attach by Layer" to bring back the Material Attachment dialog box. Using the dialog box…

Assign the **"Cherry – Natural Medium Gloss"** material to layer **"desk--3-PED-DRAWER"**
Click OK when finished.



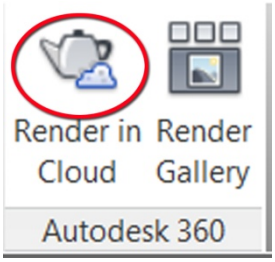
Now let's render ONLY THE FRONT of the pedestal such that we can review the material. To do that, open the flyout menu beneath the Render button and select "Render Region".

When prompted, pick two points on screen to define a rectangular area to render.



Using this method, you can quickly render small samples of an overall image.

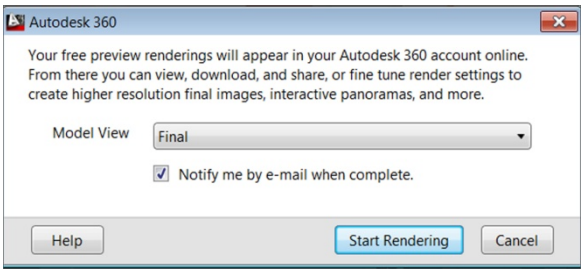
As a final note, you can also render large models to the Autodesk 360 cloud based rendering service. **Before moving on, be sure to expand the Render panel and set the Render quality back to its original setting of 3.**



Method 4. Render the model to the Autodesk 360 rendering service.

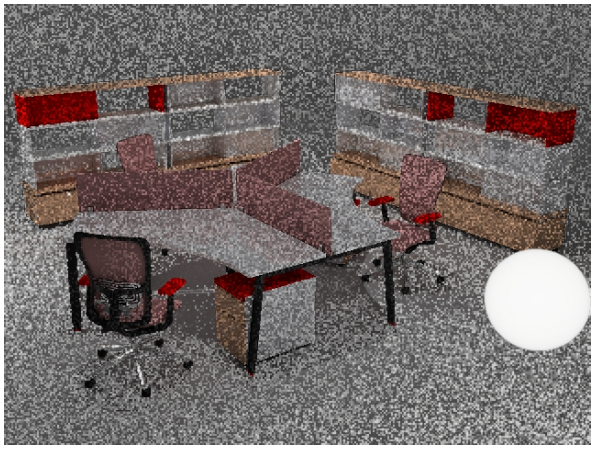
Note: This service requires you to have an account.
Visit http://rendering.360.autodesk.com for more information.

To render the drawing to the cloud, ensure it is in a saved state *(save it under a new name if you like)* and then in the Autodesk 360 panel, select "Render in Cloud".



In the dialog box *(shown at right)* you can select individual cameras/views to render *(ALL views is also an option).* Likewise, you can choose to be notified via. Email when the renderings are complete. **Click Start Rendering when finished.**

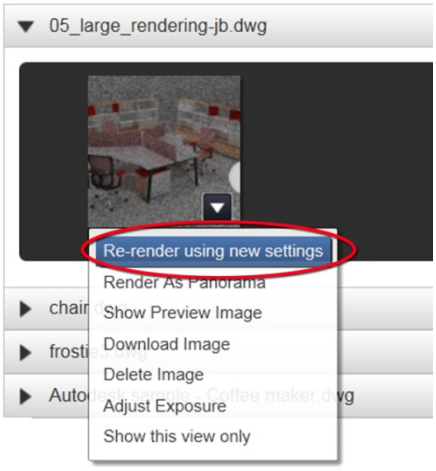
The drawing and materials are then Etransmitted to the Autodesk servers for processing.
If you feel impatient, you can monitor the progress of the rendering by clicking the "Render Gallery" icon in the Autodesk 360 panel of the ribbon. After logging into your account, you can review the images.



Here is an example of the final rendering as it was initially created on my cloud account…

Obviously it's not as attractive as you might want.

To get the highest quality rendering from the cloud, you'll need to render the drawing again using the settings within the web browser.

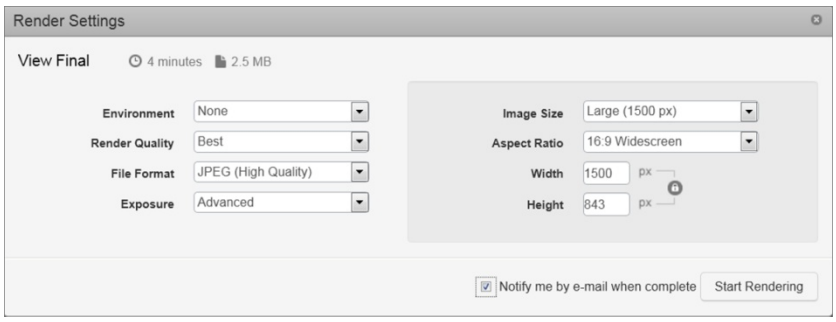


While viewing the online gallery, hover over the image preview and click the flyout icon to open the options menu. From here select "Re-render using new settings". **(Note that this menu can also be used to download images to your local machine.)**

In the Render Settings dialog box adjust the settings to suit your needs.
(The settings I chose are below.)

Render Quality = Best
File Format = JPEG (High Quality)
Exposure = Advanced
Image Size = Large (1500 px)
Aspect Ratio = 16:9 Widescreen

Feel free to experiment with any of these settings!



Below are the final rendered images…

Cloud image rendered at high quality

AutoCAD image rendered at high quality

After completing this exercise we can…

- Generate “test” renderings faster by lowering resolution and/or quality settings
- Render specific regions on screen
- Render drawings to the cloud

Exercise #6 – Creating an Animated Rendering

*Open **06_animation.dwg***

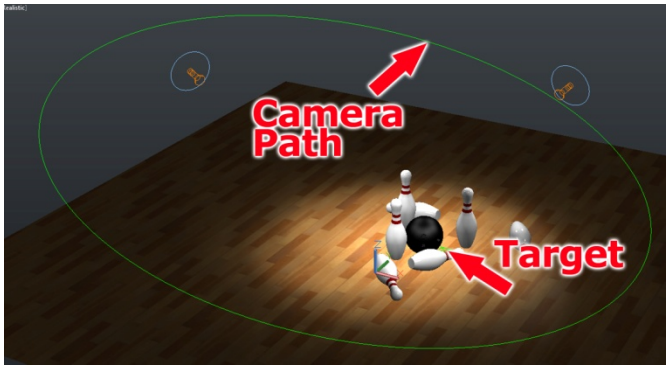
Learning goal: Animate a rendering using a moving camera and/or target.

Generally speaking, an animation is nothing more than a continuous stream of still images. For this reason, animations can take days rather than hours to produce. *(A one second animation may require 30 rendered images!)* That being said, a well made animation is one of the best ways to truly "experience" a 3D design.

In this lesson we'll practice some animation techniques using this small scene.

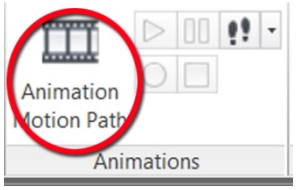
Step 1. Display the camera path and target.

Turn on layer **"camera-A"**. This layer contains a large overhead circular path and a target located near the bowling ball. *(You may have to zoom out to see the circular path.)* One way to animate a scene is to sweep a camera along a path while targeting a fixed point.



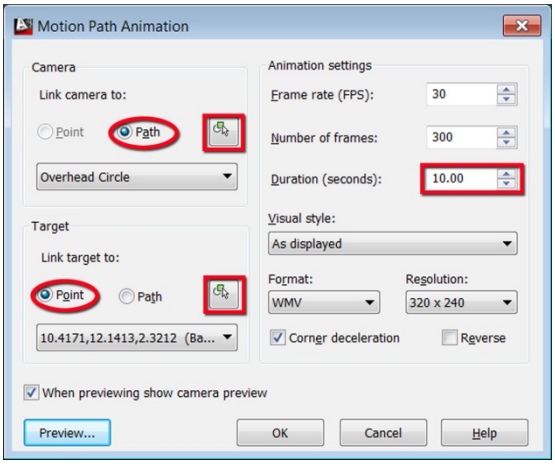
Let's create a moving camera!

Step 2. Launch the animation tool.



In the Animations panel, select "Animation Motion Path". *(If the Animations panel is not visible, refer to **Exercise 1** for instructions explaining how to turn it on.)*

This will display the Motion Path Animation dialog box. **Using this box…**



Select the "Path" option for the Camera. Then click the Select Objects button and select the large **green circle**. *(Name the path "Overhead Circle".)*

Select the "Point" option for the Target. Then click the Select Objects Button and use the Node object snap to select the **green point** in front of the bowling ball. *(Name the point "Ball Front".)*

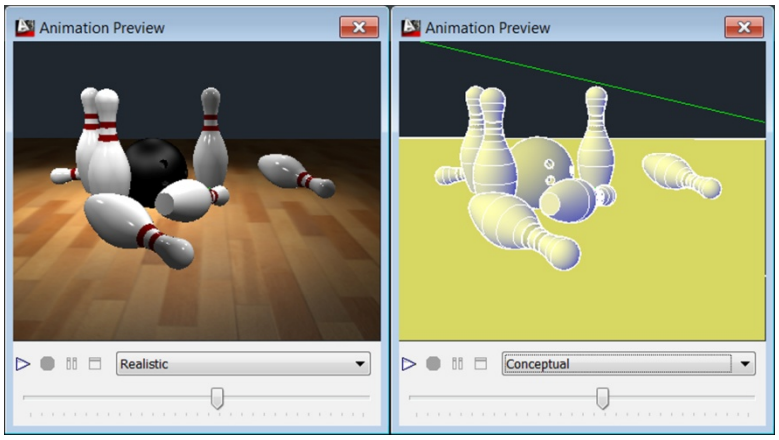
Finally, set the Duration to 10 seconds. As you can see, at 30 frames per second, this 10 second movie will need 300 rendered frames.
Accept the remaining default settings and click the Preview button.

Step 3. Experiment with the Animation Preview dialog box.

The Animation Preview gives you a rough idea of what the final animation will look like.

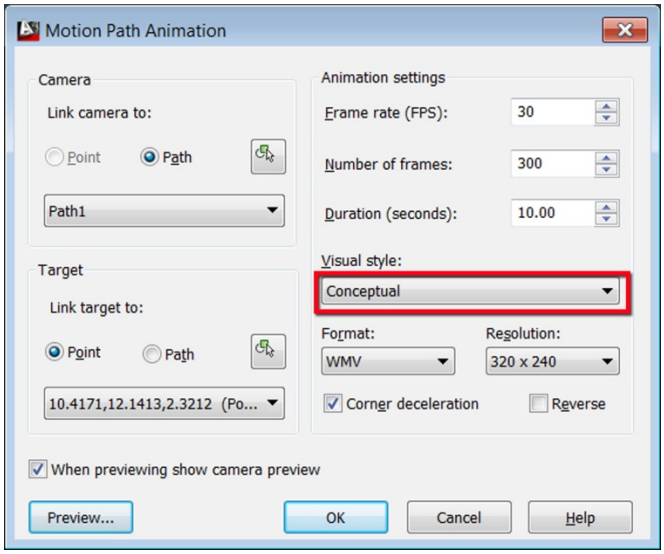
It has a familiar Play and Pause button, as well as a "scrub" bar at the bottom to move back and forth through the movie.

Using the Visual Style menu, you can change the way the model appears in the preview.



Step 4. Save the animation file.

When finished previewing the animation, press ESC *(or close the preview)* to return to the Motion Path Animation dialog box. From here you can make additional changes, or save the animation to one of several standard file formats.



Since this is our first movie, let's **set the Visual style to "Conceptual"** so it will process quickly. *(Note: You can render an animation using the same render presets used for still images with "Presentation" representing the highest quality output.)*

Use the default WMV file format. This format is easily playable using Windows Media Player. AVI, MOV, and MPG are also available options.

Use the default resolution of 320x240. This will provide the fastest output. *(For your next attempt, increase the resolution and see how it affects the render time.)*

Click OK when finished, and save the file.
The time it takes to process the movie will depend on the speed of your computer. As a courtesy, AutoCAD will display a progress bar *(and the render preview)* such that you can monitor the work being done. The progress bar also includes an estimated time of completion.
When the animation is finished, double-click the file to watch (and evaluate) your movie.

Step 5. Create an animation using a still camera and moving target.

This animation method simulates turning your head to look at your surroundings. Start by turning off layer **"camera-A"** and turn on layer **"camera-B"**. Using what you learned in the previous lesson, launch the animation tool and preview an animation using the following settings…

Select the "Point" option for the Camera. Use the Node object snap and select the **magenta point** located near the floor. *(Name the point "Floor".)* *(Note: You may have to assign the target path first!)*

Select the "Path" option for the Target. Then select the **magenta spline** near the bowling ball. *(Name the path "Pan View".)*

Assign a 15 second duration.

Preview the animation in the viewer and, if desired, create a finished movie using the quality settings of your choice.



Still images of this animation rendered at Presentation Quality.

Step 6. Create an animation with a moving camera and target.

This animation method simulates walking *(or flying)* through an environment. Using paths for both camera and target creates dynamic animations, and occasionally motion sickness!

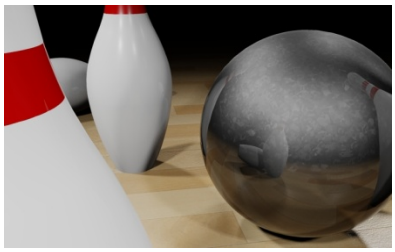
Start by turning off layer **"camera-B"** and turn on layer **"camera-C"**.

Once again, launch the animation tool and use the following settings…

Select the **yellow spline** as the Camera and Target path.
(Assign your own path names)

Note: For best chance of achieving nausea, use different paths for the camera and target.

Assign the duration and quality settings of your choice. Review and save a final animation if desired.


Still images from this animation rendered at Presentation Quality.

After completing this exercise we can…

- Create an animated rendering using multiple techniques
- Save an animation to file such that it can be played back / shared with others.

And this brings the **AC1607 "Take Your AutoCAD® 2013 Renderings to the Next Level"** session to a conclusion. I hope you found these tutorials to be enjoyable, informative and thought provoking. I wish you the best of luck with your future visualizations. If you get an opportunity, I'd love to see some of your rendered work!
jbartels@realworldcad.com

If you are interested, I've included some links below such that you can view a sample of the first animation created in this last lesson.
(Produced using "Presentation" preset at 800x600)

https://dl.dropbox.com/u/17459810/videos/pins.wmv - Windows Media Player version
https://dl.dropbox.com/u/17459810/videos/pins-ipod.m4v -ipod / Quicktime compatible version