Revit Rendering Basics

Rendering is part science and part art. Materials, lighting, camera position and the quality and detail level of your model all combine to make an effective rendering.

The rendering engine of Revit:

Revit includes the ability to render your model by including a rendering engine within the Revit software. The current rendering engine included with Revit is Accurender. Accurender is a product of a company called Robert McNeel & Associates (http://www.accurender.com/) which is an independent company not owned by Autodesk.

Revit also has the ability to be used with other rendering engines via the .dwg export feature. This of course requires an extra step and is not as convenient as staying inside of Revit, but the other rendering engines can bring more sophistication to your rendering. The two most notable offerings are both by Autodesk, Viz2006 and 3D Studio Max.

The first place to look for Accurender help:

The single best source for Accurender rendering tutorials, help and links to other rendering resources is:

www.accustudio.com

There is a complete material library for Accurender on their site that is updated on a regular basis. Downloading and installing the Accustudio library is an essential first step toward better rendering.

3D Content:

While Revit does have a fairly large library of families, most of your renderings will likely require the addition of 3D components that may not exist as Revit families. Fortunately there are a couple of options to help us in this area. One of the options is to use Rich Photorealistic Content or RPC. RPC is photos of real object such as cars, plants and people that take up very little overhead in your Revit model and rendering. (www.archvision.com) Another option is to use 3D AutoCAD objects, insert them into a Revit family and bring into your project. Accustudio has a great selection of 3D objects.

Materials:

The use of texture maps can add photo-realism to your renderings provided you have good images and correct the scaling of the image in Accurender. The most common problem using texture maps is getting a "tiled" look in your rendering. This can be avoided by using "seamless" maps which are designed to not show their edges, or to adjust the scale of a non-seamless texture map so the tiling effect is less noticeable.

There are many free sources of texture maps. Below are some that I have found to be useful.

http://www.accustudio.com/
http://textures.forrest.cz/
http://www.grsites.com/textures/
http://www.3dcafe.com/ (requires registration for free stuff and VIP for better stuff)

There are also many good sites that charge for textures. A few I like are listed below.

http://www.marlinstudios.com/
http://www.doschdesign.com/
http://www.nwginc.com/

Getting started:

It all starts with a camera. To place a camera go to a floor plan or site view then place a camera using the view new command. Cameras are level related, but can be adjusted. Watch where the view extents and focal length of the camera are set to. Once in a 3D camera view be sure to check the size of the view and adjust the view using the dynamic view command [F8 or the eyeball icon]. Be sure to not introduce too much perspective into the view in order to maintain a sense of realism. Camera's also have properties and can be adjusted with the standard Revit properties dialog. To show the camera in a plan view, activate the plan view then in the project browser right click on the 3D view name and choose "show camera". This will then activate the camera in your plan view.

Setting the Scene:

It will be required of you to establish a scene setting in Revit to render your 3D view. The two basic types of scenes are Interior and Exterior. You can have multiple versions of interior and exterior scenes set up, each with different lighting, place and seasons. The most common mistake in Exterior scenes is over-exposure and the opposite is true in Interior scenes, under-exposure. Interior scenes will look best using Radiosity which will bounce light off objects in your scene. Radiosity is very processor/RAM intensive and should only be used on small interior scenes. Accustudio has some good tutorials on this subject.
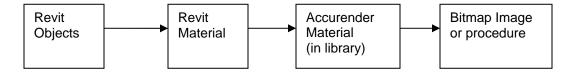
Pixels, resolution and rendering size:

At this point we need to talk about what kind of final output you anticipate for your rendering. It is important that you size your rendering view large enough and render the scene with enough resolution to provide enough pixels for your final output. Most people get way too fixated on increasing the resolution as they have printers capable of 1200 dpi so they try to render at this level. The truth is that the human eye stops picking up any noticeable difference at anything above 300 dpi. Below are some guidelines to follow for resolution:

Type of Job	Ideal Resolution	Acceptable Setting
Full color image for magazine or professional publication	300 ppi	225 ppi
Full color slides	300 ppi	200 ppi
Color ink jet printers	300 ppi	200 ppi
Color image for laser printing	180 ppi	120 ppi
BW images for laser printing	120 ppi	90 ppi
Color images for multimedia and web pages	72 ppi	72 ppi

There is some math involved in this process. For example you render a scene that is 10" wide in Revit at 150 dpi, this yields an image that is 1500 pixels wide. To print this at 300 ppi the image will be 5" wide. To get the full 10" in print width you can render the 10" wide scene at 300 dpi or a 20" wide scene at 150 dpi. Both methods will yield the same number of pixels (3000 wide). You may want to experiment with these settings to see the effect on rendering speed and elimination of stair stepping or jagged edges in the image.

Setting materials to a material library:
There are multiple levels of material definitions within Revit.

Revit Objects → Revit Material → Accurender Material (in library) → Bitmap Image or procedure

Tips:

- Rendering is all about the illusion of reality – it is about tricking the human eye, so use tricks of the trade
- Interior scenes can be lit with "studio lights" which are orbs of light not associated with a fixture
- Concentrate your efforts on a few good shots of your model – you can't render every view effectively
- Tighter camera locations will look better than standing too far away from your model
- Adding people, trees and objects gives your rendering a sense of scale and purpose
- Decals can be used for artwork, signage, flags, images on windows etc. – they render but will not elevate
- Use of RPC content will shorten rendering time
- Post processing of your image in photo editing software can enhance your rendering
- Printing of you image should be done using photo editing software with appropriate color space
- Don't store your final image inside of Revit, rather export to hard drive as to not inflate the Revit file size.