

SKETCH-UP® RENDERERS

by David Morong, Art Director

One of the longtime limitations of working with SketchUp in designing for film and television has been the final output of the program. As powerful as SketchUp is as a modeling tool, and as dynamic as the animations and moving sections can be, the image output from SketchUp has been limited to a shaded polygon model or one lit by a single source (the sun). Even the models lit by the sun are relatively flat and lifeless, without any change of value within the planes of light and shadow.

To overcome the limitations of the SketchUp look your choices were to import images of your model into Photoshop® or export the model to a rendering program and work on it there, both very time-consuming prospects, or using the SketchUp image as a guide to laying out hand-drawn artwork, which has probably been the most common way to turn a SketchUp image into a final drawing.

In the past year, a number of programs have been developed that render from directly within SketchUp. They are all plug-ins, applications that are installed into SketchUp and work as part of the program. These programs completely change the nature of the images produced from SketchUp, offering astounding, close to photorealistic output. They turn SketchUp from a tool that lets you study the shape of a model to one that allows you to see realistic lighting effects in your design. As these renderers become more powerful, accurate and speedy, I think they will radically change the way illustrations and renderings are done for the entertainment industry, and allow even the smallest and most harried Art Departments the ability to achieve photorealistic output from their models.

We will be looking at three rendering programs that work within SketchUp, Podium, IDX Renditioner, and LightUp. All three of these plug-ins are relatively inexpensive (less than \$200), work on both PC and Mac, and create their images based



on added lighting sources (unless you are just using the sun) and specifying a level of reflection for the various materials in your model. Podium and Renditioner, the most commonly used of the rendering plug-ins, support the output of image files where you can see the effects of the lighting in your model. They are both easy to master, with only a few controls you need to manipulate to achieve your results. LightUp has a different approach in that it allows you to maneuver around your illuminated environment, and view the lighting within the model as well as in exported images.

Single light test

To compare the workflow of the programs we will first try to duplicate a single light setup in a studio. The top photo on page 38 shows a subject illuminated by a single 1K on a stand, and below it is the SketchUp model to be used to re-create the scene. To see how well these programs can re-create this basic setup we only need to create a single light, place any finishes we need to match, and select the right render setting.

SU Podium

When you install Podium, you get a new dialog box you can access in the Plugins Menu of SketchUp. To create a light you choose a face or a group in SketchUp, and use the light slider to give it an intensity. Giving a reflective finish to the floor is a matter of selecting the material and giving it a reflective quality on the reflection slider. To create a rendering of the scene you click the render button on the submenu on the upper right giving you options for render size, quality (better takes longer) and the location to save the finished rendering. If you are not satisfied with the lighting, you go back to your model, move the lights or change their intensity, tweak the reflective quality of the materials, and re-render. The small renderings are very fast—for a model this simple less than ten seconds. Once you are satisfied with the settings you can do a full quality rendering, which in this case took only seven and one-half minutes.

IDX Renditioner

When you install Renditioner, you get a new tool bar as well as two new right-click commands. The

tool bar is primarily for creating the renderings; to place a light source you create some geometry, make it a component, and then right click to choose IDX Renditioner Light Attributes. You can assign a number of light qualities, light type, power and color, and there are two sliders that act as a dimmer, and an iris if you want to narrow the beam of a spotlight. Renditioner supports spot sources (you can aim them like a spotlight) and point lights (which act like a regular light bulb). To give the floor a reflective quality you right-click on the material and choose from a list of finishes. The sliders for smoothness and reflectance allow you to adjust the finish, and there is a small material preview window where you can see what it will look like. To preview your rendering, you click the top render button. This will give you a quick, rough render of your scene, again taking only a few seconds, to allow you to see the effect and make changes in your model. When you are ready to do a finished rendering you need to specify the rendering size (for all the finished renderings in this article I chose something in the range of 3000 x 2000) and click the Presentation Render button.

Detail of a SketchUp model, rendered in SU Podium by David Morong. SketchUp 7 supports larger texture files, allowing large images, such as the drop shown here, to be rendered in much greater detail.

This rendering took about six and one-half minutes.

LightUp for SketchUp

LightUp is also accessed by a new Tool Menu when installed. There are two ways to place a light source in LightUp: one is to take a point light component out of your component library and place it in your model, the other is to pick any face and turn it into a light source. To do this you must edit the material by typing the phrase `_LightUp(emitter)` into the material name. To create a reflective surface is a bit more involved and rather non-intuitive to the casual user. To see the effects of your lighting you click the Tour Tool to render your scene. The interesting difference with LightUp is you can maneuver around your illuminated model and view your lighting from different angles, sort of like walking through a 3D video game. Both the rendering and the image export is quite quick for a model this simple, just two or three minutes for the render, less than a minute for the image.

Day and night interiors

Perhaps the most common application of a rendering program in our industry is to render an interior. The challenge of interiors is to maintain the balance between the natural light coming into the room and any sources of illumination within the space. The SketchUp model starts with a single source. The rendered daytime model will have five sources, the sun, two sconces, the lamp on the dressing table, and a light source just off frame right. For the nighttime rendering moonlight is used and an indirect soffit light is added along the back wall.

Podium

For the interior light sources a simple shape was made into a group and given a light value with the Podium controls. You also need to create your own ambient light. There are six invisible sources floating in the room with a very low-light value just to give the room some fill, otherwise the shadows go very dark. To help make the exterior levels look like daylight there are six large lights placed outside. The trick to adding these fill lights is the same as doing it onstage, if they get too bright or are badly positioned, you have multiple shadows falling everywhere. This rendering took a little under an hour, and while the resulting image is on the dark side, raising the interior lighting levels overpowers the sunlight, and raising the levels of the ambient light starts to create shadows from



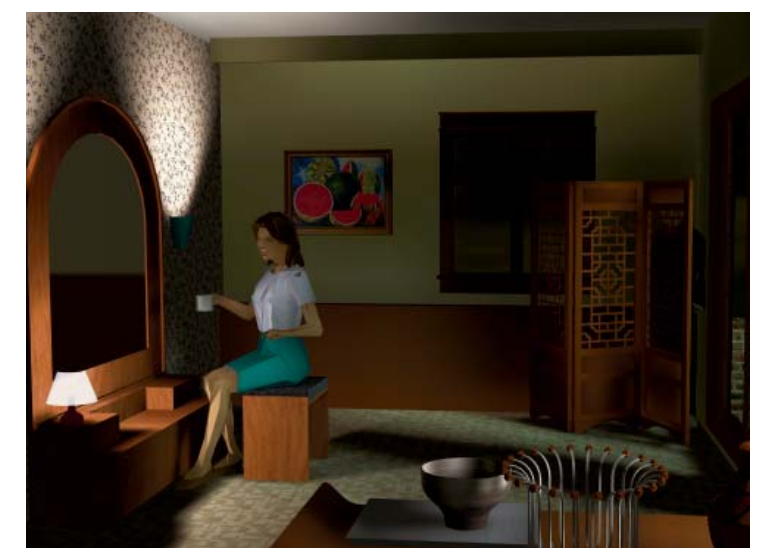
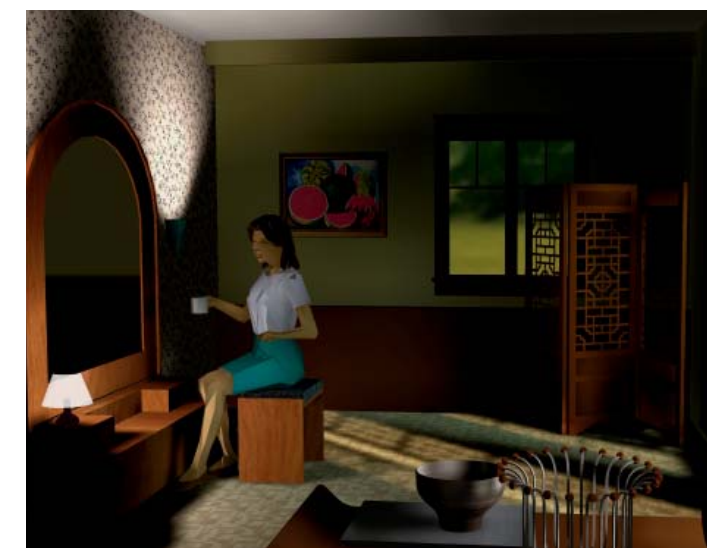
Right, from top: A studio photograph, showing the subject illuminated by a single 1K lamp; SketchUp model built from the photograph and used to test the renderers; the model rendered with SU Podium; the model rendered with IDX Renditioner; and finally, the model rendered with Lightup for SketchUp.



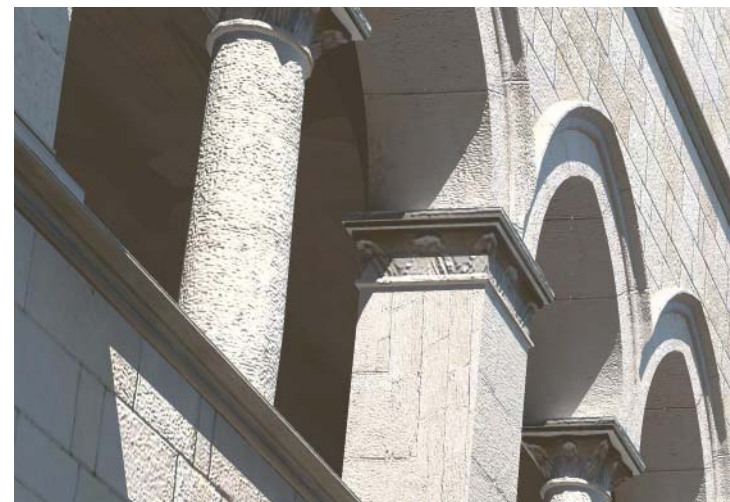
Day and night renderings of the same SketchUp modeled interior, using SU Podium.



Day and night renderings of the same SketchUp modeled interior, using IDX Renditioner.



Day and night renderings of the same SketchUp modeled interior, using LightUp for SketchUp



Above: Two views of a SketchUp model of the atrium of the Sponza Palace in Dubrovnik, both lighted and rendered with IDX Renditioner.
Below: Two studies of SketchUp interiors lighted and rendered with SU Podium.

them. Better results are achieved by taking the rendering into Photoshop and brightening it up there. Podium is capable of very subtle interactions between multiple light sources, and light tends to fall off very naturally.

Renditioner

Renditioner has lighting settings that give you the choice of using the sun, artificial lighting, or both, and if you choose to use the sun, there is an intensity setting and a number of atmospheric settings, (clear, cloudy, moonlight) that allow you to set the character of the sunlight. The setting shown is clear sky and natural lighting set midway on the slider. A dim setting gives much more emphasis on the light sources in the room, and the bright setting renders the interior lights almost unnoticeable. Renditioner also has a material finish called glow, which is very useful for things like lampshades and translights that you want to give a luminescent feeling. The rendering at best quality with a Room/Interior scene setting took ninety-four minutes, a slightly lower quality setting could be done in about half that time with little noticeable effect on the final render. Renditioner produces strong light sources and dramatic, detailed shadows. Light sources tend

to be hard edged, with an intensity that sometimes seems to defy the inverse square law.

LightUp

LightUp's workflow involves once again placing point lights or creating emitters by placing tags in the material name. The involved process of creating reflective surfaces makes it impractical to give many different finishes to the model, so only the mirror was given a reflective finish here. To preview your scene you can set a resolution of 1x or 2x in the preferences tab and you will get a quick preview of the lighting look. When you are satisfied with the look, you will need to render the light at a higher resolution, either by setting it to 5x or 6x, or by setting a sampling size. I set the sampling size at one inch for the rendering, which took about twenty-two minutes. When you export a rendering, you will get an image 5x the resolution of your SketchUp window, so a larger window will give a larger image. The export of a full-screen window only takes a minute. It can be challenging to get hard defined edges to your shadows in LightUp; subtle falloff of light and soft, smooth shadows are the hallmark of its look.



Nighttime interior—Podium

To achieve a real nighttime feeling in Podium you need to change the background color in your SketchUp style to something very dark. Even if you do not see any part of the background, the program uses this color in figuring the lighting settings. Here there are five interior lights being used. There are omnilight (lights made from groups) in the sconces, lamp, and on the wall off right, there is a light emitting surface up in the soffit on the back wall, and there is an invisible omnilight between the lamp and the figure that is giving her more light from that direction. With shadows turned on the sun acts as the moon, and five large omnilight with a blue tint are placed outside the room to supply some exterior fill light. Podium nights are dark and mysterious, with much detail lurking in the shadows.

Renditioner

The two sconces and the lamp are point lights within the light fixtures. In addition, the lampshade is turned into a light object with a yellow tint to give off a glow. The lamp off camera right is a wall fixture from the Renditioner lamp library that comes with the program. The glow from the soffit was a bit of a challenge in Renditioner, as the point lights proved to be too bright and uncontrollable for the job. Here six 50w spotlights are recessed way up above the ceiling to spill down into the room. The sun can be used as the moon but gets easily washed out by artificial lights. Here there is a large spot source placed and colored to be the moonlight, as well as a large point light over the back window to create some ambient light outside, so the approach is very much like setting lights up on stage. The ability to add texture to materials is used here, with a texture applied to the wallpaper and the back wall that interacts nicely with the lighting.

Renditioner is very good at seeing into shadows, and has a kind of automatic exposure, adjusting to the existing levels and balancing lights and darks, so the relationship between different levels is more important than the absolute levels you choose. The color of the light sometimes shifts the colors in the model, and once again, a trip to Photoshop to quickly tweak chroma and levels can be helpful.

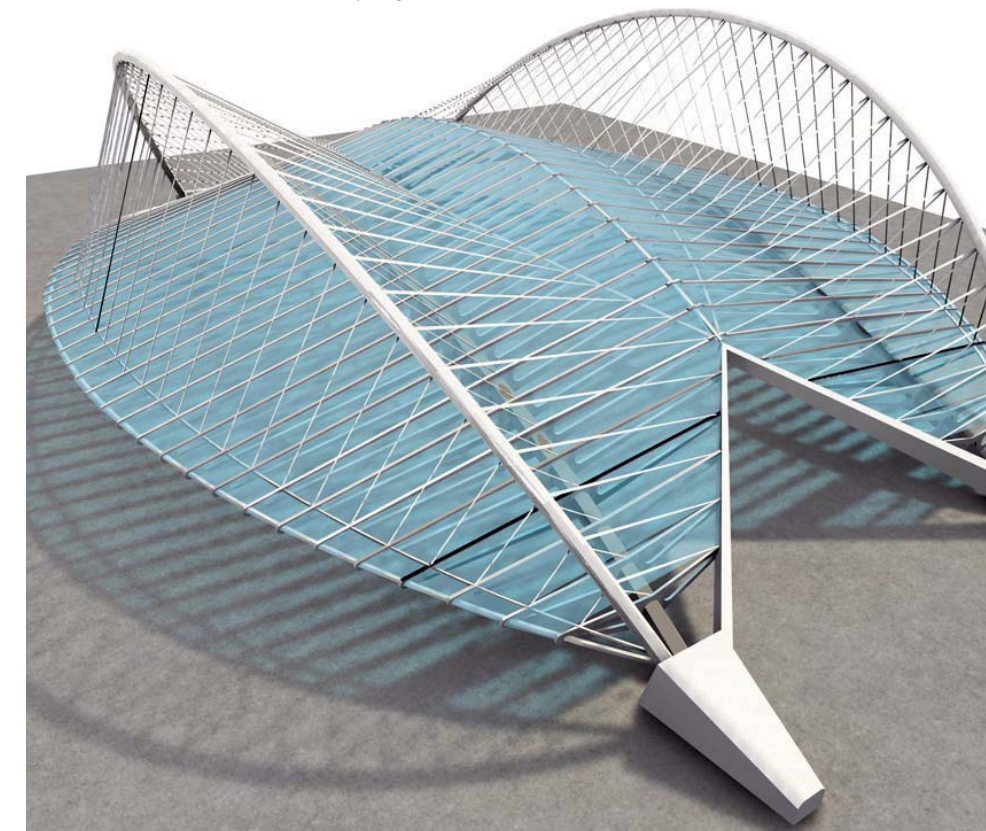
LightUp

The lighting in LightUp is again a combination of pointlights (components) and emitters, (surfaces turned into light sources). Here the lamp and off-camera right sources are point lights, the sconces, soffit light, and moon are created by emitting

surfaces. Once again the diffuse nature of lighting in LightUp gives it an understated and somewhat serene quality.

The thing that excites me most about these rendering tools is that they are all in their infancy, and updates with dramatic improvements are released regularly. Podium just released versions that take advantage of multicore processing, and are promising dramatically shorter rendering times. The new version of Renditioner is faster and offers many ease of use improvements, and the next version of LightUp is promising multicore support, easier application of different finishes, as well the output of animation directly to an .avi file.

I think we can expect tremendous improvements in speed and quality in the future, but even now, these renderers are a valuable addition to our toolkit. For sheer ease of use and the dramatic improvement in the output from SketchUp both Podium and IDX Renditioner offer impressive results from small effort. LightUp is a little more challenging in the way it asks you to handle emitters and materials and a bit more rough around the edges, but the promise of being able to navigate around our illuminated models and export images and even animations from them is enticing. In the very near future it could be the norm that the majority of images we use from SketchUp are produced in association with one of these programs. **ADG**



A SketchUp model of architect Santiago Calatrava's roof structure for the Olympic Velodrome built in Athens for the 2004 Games, here rendered in LightUp with a blue-glass skin.