

Amapi Tutorial: Building an Easter Island Statue From Photographs

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The Watchers of the Years

The image above depicts some of the giant stone statues of Easter Island in the south Pacific. It was rendered in Bryce using a model created in AmaPi Designer 7 from reference photographs. This tutorial will cover the use of reference images in AmaPi as well as the construction of the statue.

We will start with a little bit of background about Easter Island, then outline the strategy for this project before starting construction. After the model is built, we will take a look how the rest of the image was made with a focus on the terrains and the textures.

The History of the Statues

Easter Island was originally settled around 400 AD and was called "The Navel of the World" by the original inhabitants. The name Easter Island was coined by the European explorers who discovered the island on Easter Sunday in 1722. Today, the island is known locally as Rapa Nui. It is extremely remote, located over 2000 miles from the nearest population center. It is also the home of the giant enigmatic stone statues known locally as Moai.

The late archaeologist and explorer Thor Heyerdahl, famous for the Ra and Kon-Tiki ocean voyages, said that Easter Island originally had two social classes. The members of the ruling class were distinguished by their long ears which had been stretched with weights or earrings as a sign of nobility. The servant class built the statues as monuments to the nobility, and the long ears can still be seen in the statues. In the process of building the monuments, the island was stripped of trees and other resources, and the social order collapsed. Many of the statues were then toppled over the years, and only recently have they been restored to their original positions.

The Moai statues consist of a head and body, though in many cases they are partially buried from centuries of erosion, leaving just the head sticking out of the ground. The Moai vary in size, with the average being 14.5 feet (4.5 meters) tall and weighing 14 tons. The larger Moai were up to 33 feet (10 meters) tall and 80 tons. The largest, about 65 feet tall, was never completed. The work on this giant may have stopped when the uprising occurred.

Strategy for Modeling From Photographs

Inserting Reference Photographs

Get the Reference Images - at least a front and side view at the same scale are required.

Import the Images as Backdrops

Use orthogonal view instead of perspective view to minimize distortion.

Building the Model

The object is symmetrical, so model one half of the object and mirror it later to complete the model.

Chamfer the sharp edges to preserve them during smoothing and rendering.

Mirror the half model and weld the two halves together.

Smooth the model if desired.

Get the Reference Images

You are going to need front and side views of the object you plan to model, preferably at the same scale. If you plan on building the Easter Island statue, the front and side view photographs of the statue shown below are free for any non-commercial use. Just right click on them and use the Save As function to copy them to your hard drive for use as reference images. The images are of a scale model of the head of one of the Moai, purchased through eBay for this project, and photographed at the same distance to keep the scale constant. If you make your own images, you will want to get as far away from your model as is practical, then zoom in on it to minimize distortion in the images due to perspective effects. In general, the longer the focal length of your camera lens, the less distortion you will get.



Import Images as Backdrops

To import the images into Amapi for use as reference backdrops, press Alt+P to open the Preferences Editor and click on the second icon in the top row to bring up the Ergonomics section. Set the controls to match those shown in the image below. For the Image on the XY plane, use the browser to load the front view. Similarly, use the browser to load the side view into the YZ plane.

Preferences editor

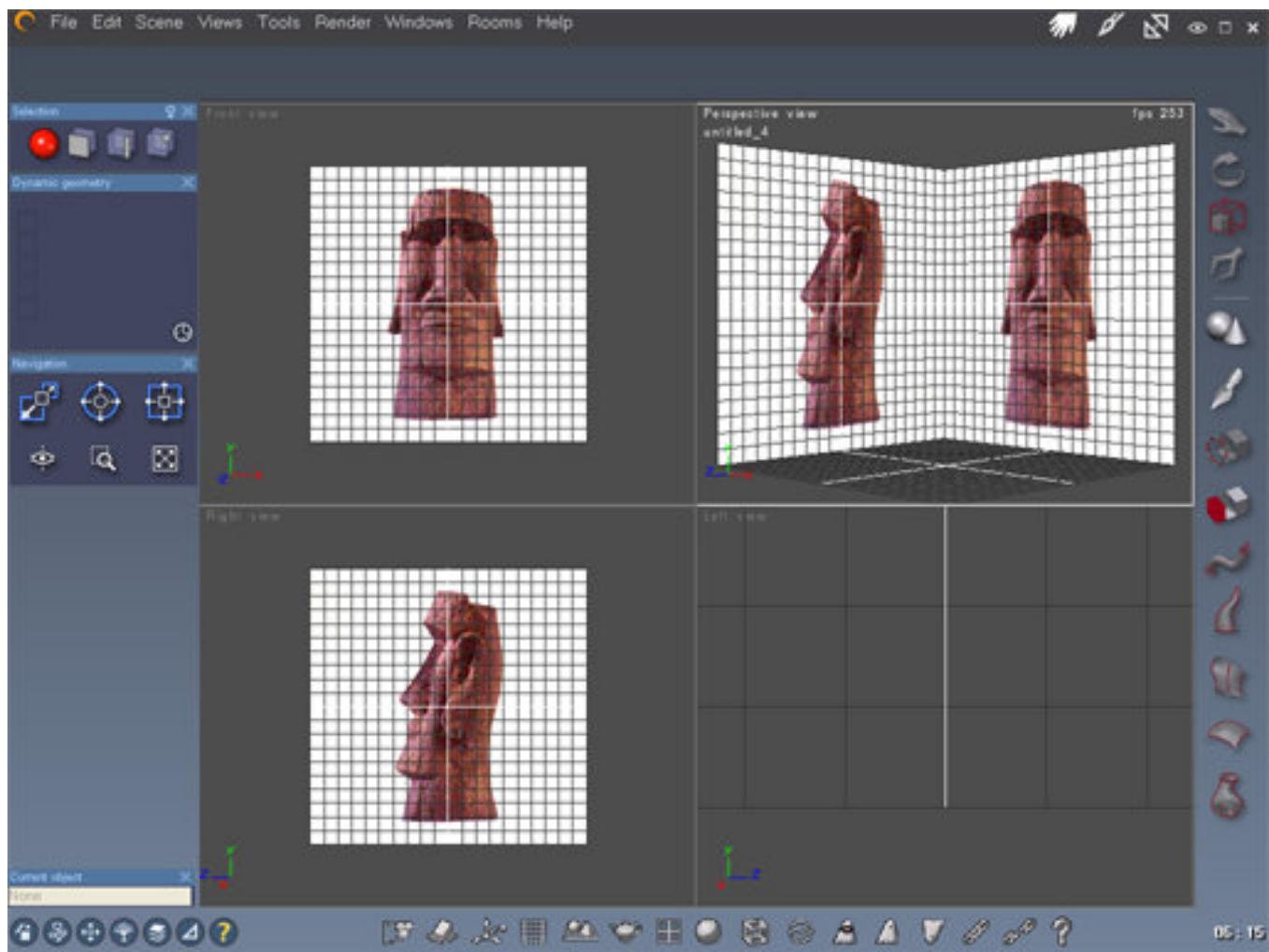
Ergonomics



Grid	Display a grid on the floor	<input checked="" type="radio"/> Enabled
Rulers	Checker plane	<input checked="" type="radio"/> Enabled
Cursor	Translucent Checker plane	<input checked="" type="radio"/> Enabled
Animation	Antialias on grid textures	<input checked="" type="radio"/> Enabled
	Grid size	<input type="range" value="5"/> 5
	Number of columns of the grid	<input type="range" value="10"/> 10
	Number of rows of the grid	<input type="range" value="10"/> 10
	Display the three grids	<input type="radio"/> Disabled
	Display image on the XY plane	<input checked="" type="radio"/> Enabled
	Image on XY	C:\Graphics\WebStuff\EasterIsland\ Browse
	Display image on the XZ plane	<input type="radio"/> Disabled
	Image on XZ	Browse
	Display image on the YZ plane	<input checked="" type="radio"/> Enabled
	Image on YZ	C:\Graphics\WebStuff\EasterIsland\ Browse
	Grid color	
	Axis color	
	Planes color	



When you are finished loading the backdrop images, set your interface for a quad layout with a Front view at the lower left window and a Right view at the lower right window. You should see something like the screen shot image below. An orthogonal view was used instead of a perspective view to minimize distortion when modeling. Note also that the contrast and brightness of the reference images was increased using PhotoShop.



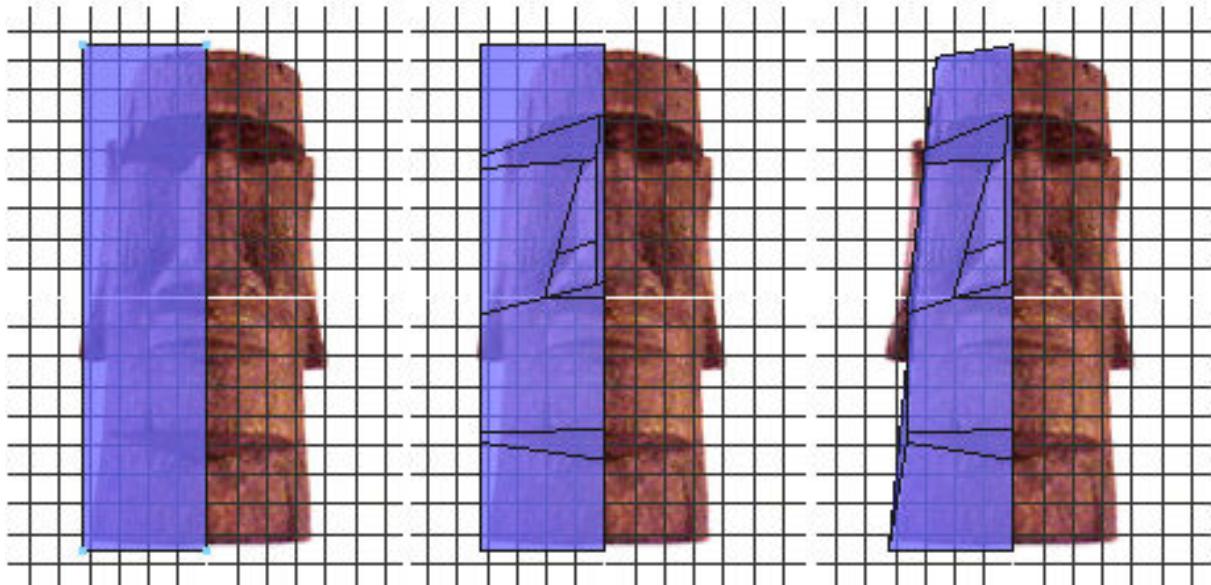
The Tessellation Tool

To cut facets into the model, we will be using the Tessellation tool. To access this tool, press the Tessellation icon shown below left, from the Modeling Tool Palette. Set the options as shown below right by selecting the fifth icon for Multi-Slice Tessellation.

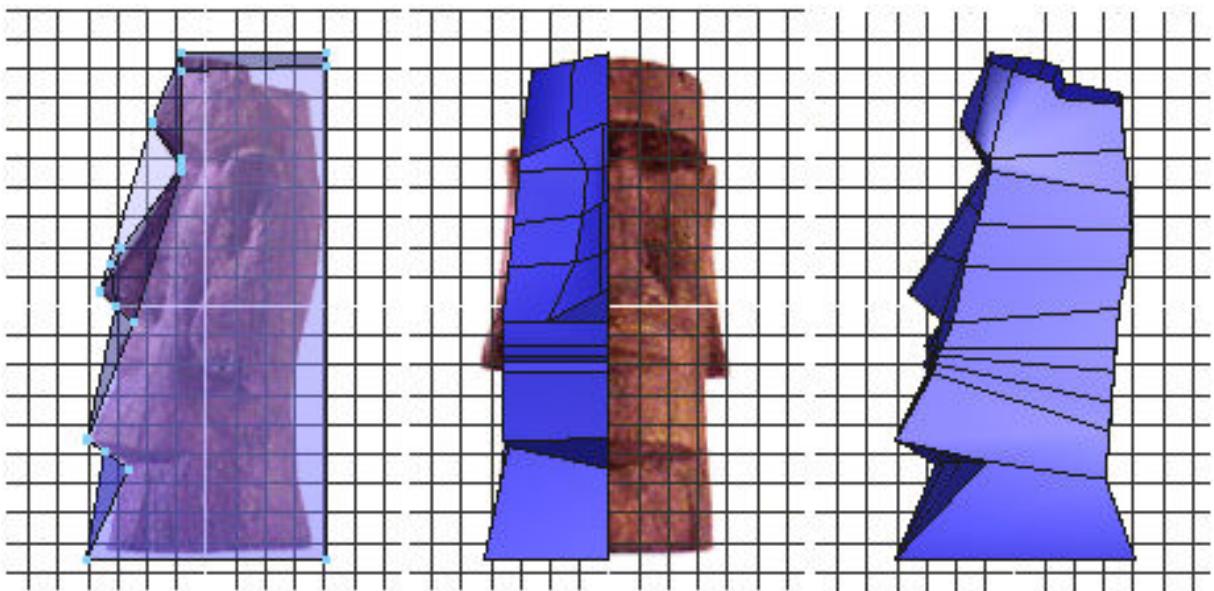


Modeling the Statue From a Cube

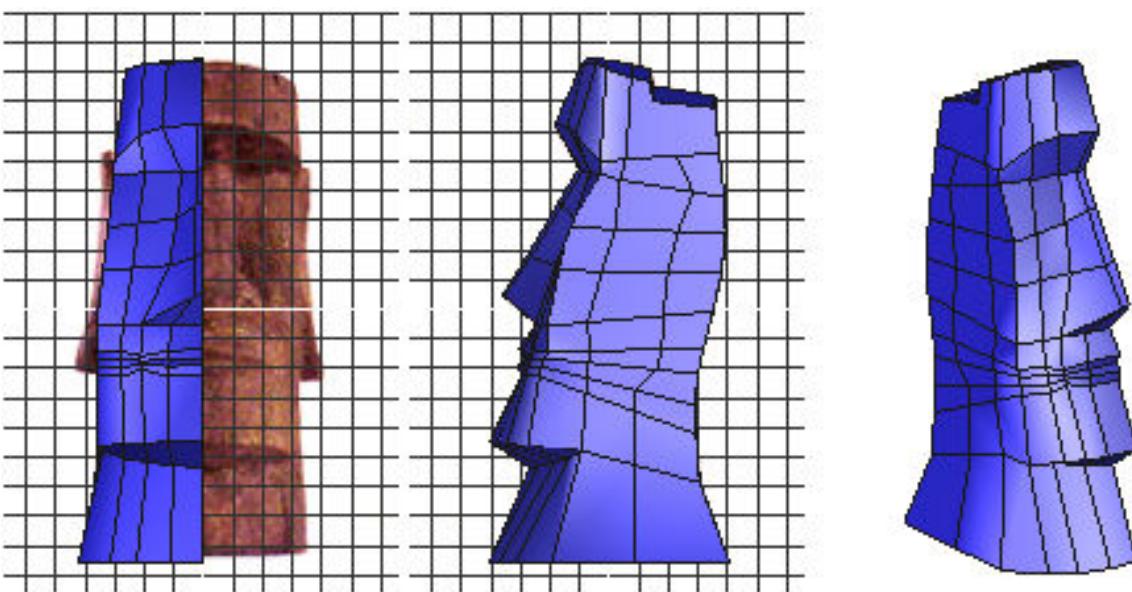
To begin the modeling process, a cube was created and its size was adjusted to fit the left side of the head when viewed from the front, as shown at below left. Faces were cut with the Tessellation tool (below center) and the outer face was sloped to match the image (below right).



Next we switch to the side view and begin moving the available vertices to roughly line up the edges with the reference image (below left). Back in the front view, we cut more faces for the nose and mouth with the Tessellation tool (below center). This process is continued in the side view to ensure that all of the polygons are four sided (below right).

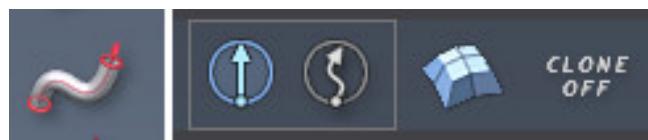


Still more faces are cut for the face and the ear as shown below.



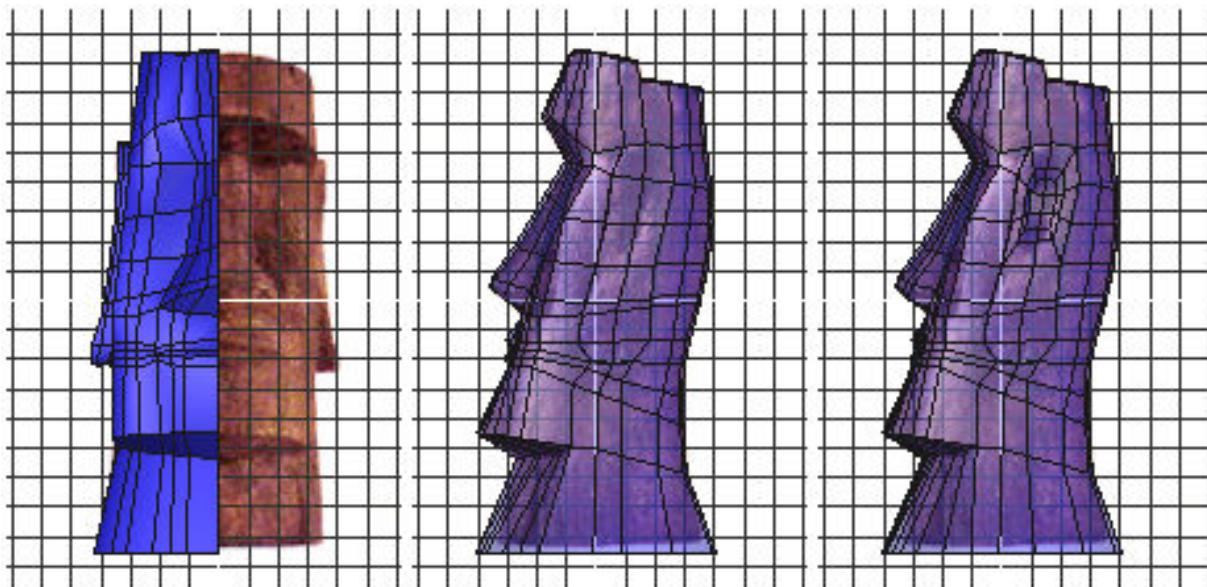
The Extrusion Tool

To extrude the ear, we will be using the Extrusion tool. To use this tool, select the facets you want to extrude, then press the Extrusion icon shown below left, from the Construction Tool Palette. Set the options as shown below right by selecting the straight block extrusion. Press Enter to start the extrusion process and tap the spacebar a few times to toggle between the different extrusion modes.

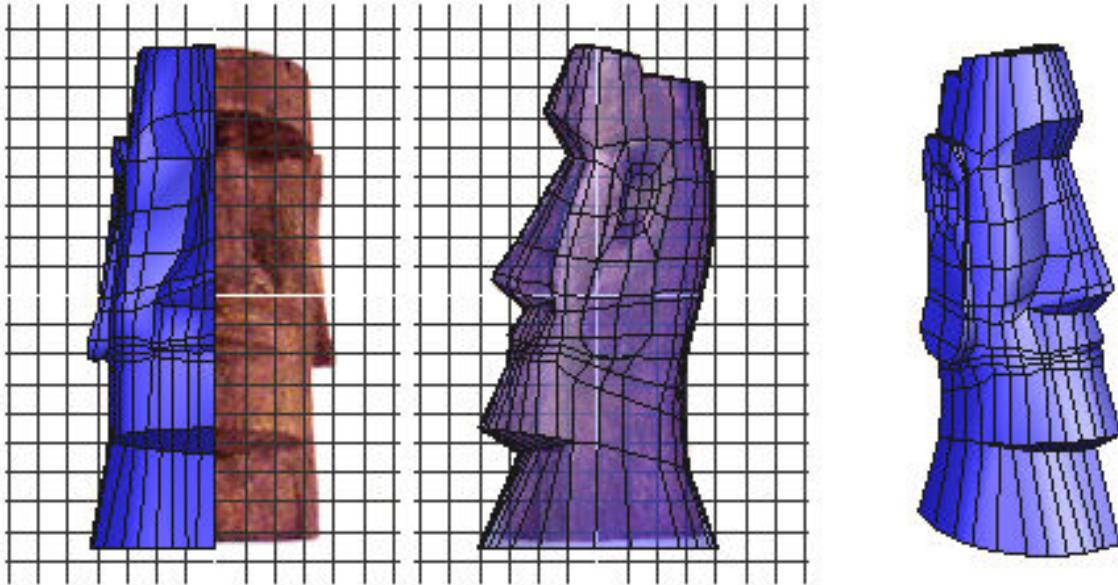


Extruding the Ear

More facets were cut for detailing, and the facets for the ear were extruded outward as a block (below left and center). The indentation in the ear was produced by selecting the top six facets of the ear and extruding them as a block three times while decreasing the size and varying the position (below right).



A last bit of detailing was added and the vertex positions were tweaked to get the three views shown below.



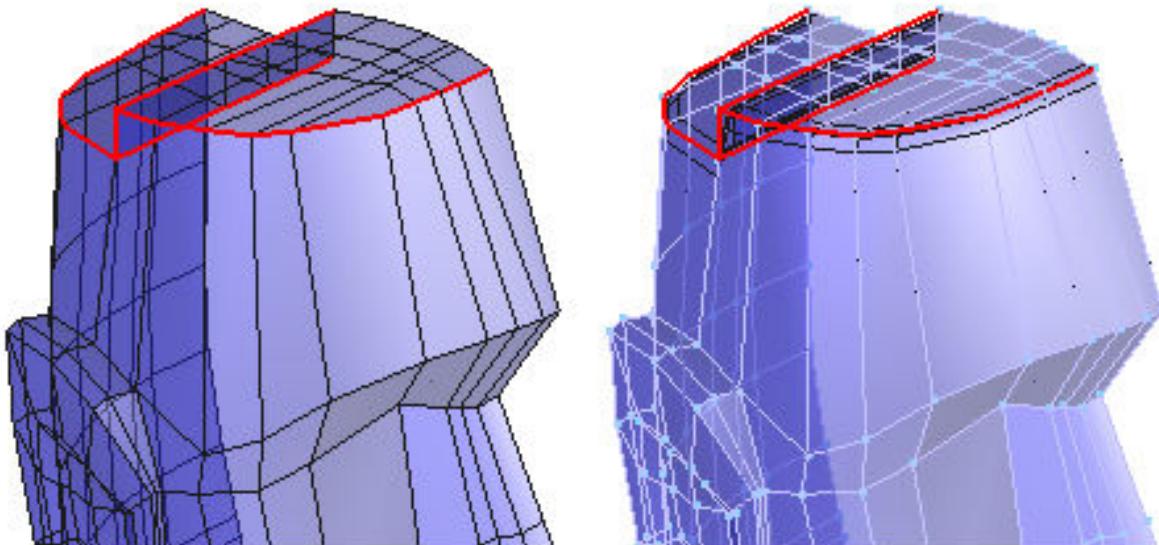
Chamfer Edges Before Smoothing

Before smoothing the model, we will need to chamfer the hard edges to preserve the angular shapes of the statue. Otherwise, applying smoothing will probably turn your model into Mister Potato Head. Even if you decide not to apply smoothing in AmaPI, chamfering the edges will help to preserve the model's appearance in programs like Poser which automatically smooth over edges when rendering.

To use the Chamfering tool, select the edges you wish to chamfer, then click the icon shown below left which is located in the Modeling Tool Palette. Select the option shown below center highlighted in blue. Below right we see the parameters, where the range is set to 1 to minimize the geometry that is added, and the radius is set to give the desired spacing between the original selected edge and the new edges created by the chamfering.



The illustration below shows the edges along the top of the head selected before chamfering (left) and after chamfering (right). This process was repeated along the edges of the eyes, ears, nose, lips, and jaw.



Mirror the Model

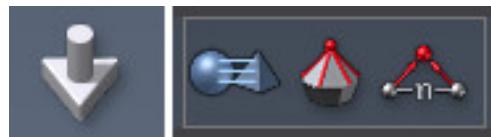
Before mirroring and welding the model, you will need to make sure the edge going down the centerline is completely flat. To do this, select all of the vertices on the centerline all of the way around the model, then click on the Size tool. In the Parameters window that opens up, the size in the X direction should be equal to zero.

To mirror the model, click on the Symmetry icon shown below left, which is located in the Assembly Tool Palette. Accept the default options shown below center, and set the parameters to mirror in the +X direction as shown below right. Press Enter to validate the mirroring.



Weld the Model

To weld the model, press the Weld icon shown below left, from the Assembly Tool Palette. Set the options as shown below right. Left click on one half of the model, then hold the shift key down and left click the other half so that both halves are selected. Validate the weld by pressing the Enter key.

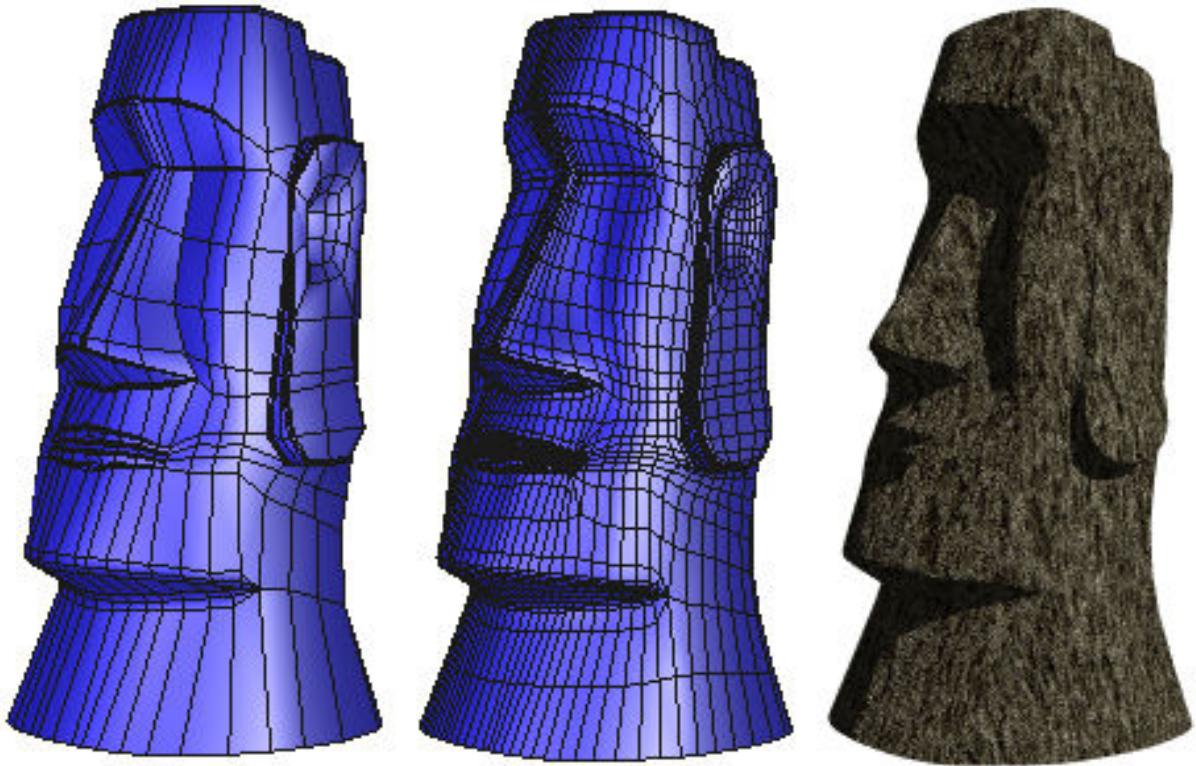


Smooth the Model

To smooth the model, click on the smooth icon shown below left, which is located in the Modeling Tool Palette. Accept the default options shown below center, and set the parameters for a range of 1 as shown below right. Press Enter to validate the mirroring.



The image below left shows the model after chamfering, mirroring, and welding. The smoothed, finished model is shown below center, and a textured render is shown below right.



The Rest of the Picture

The image at the top of this tutorial, called The Watchers of the Years, was rendered in Bryce. The ground was made up of four identical terrains stacked one atop the other, with a ground texture applied to the bottom-most terrain, and a vegetation texture with randomized transparency applied to the rest. The top two terrains also had low amplitude high frequency noise added to their height maps and the walk path was cut into these two terrains using the Bryce Terrain Editor.

The textures used for the four statues are tiled variations of an image of one of the huge Sarsen, or Standing Stones, at Stonehenge in Salisbury, England, UK. A UK based artist and friend named Strike photographed the Sarsen while vacationing with his wife, and I processed the image through the TextureMaker program to produce a series of seamlessly tiled images. My thanks to Strike for the use of his fine image.

Related Links

[Eovia, home of AmaPI Designer 7](#)

[TextureMaker](#)

[Easter Island Virtual Tour](#)

[RETURN TO TUTORIALS]

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