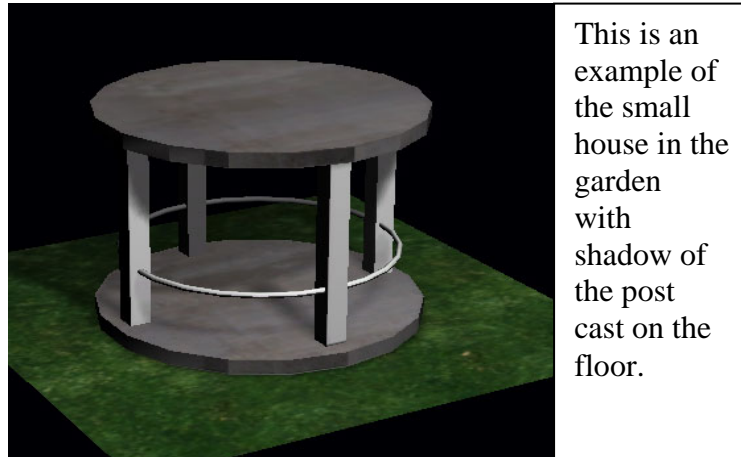


What is Texture Baking ? *by Jirayu Tanabodee*

Texture Baking is a feature in 3dmax and other 3d program such as Blender. Instead of rendering in 3D, the program can be set to render as a sheet of paper to be used as texture. Then we use that texture to show more detail such as shadow and bump. So we can have shadow in texture without using ability of graphic card in the game to draw. The performance will be better.



How to do Texture Baking

At first, you need to have 3dmax. Blender is freeware and can do render to texture as well but the interface is quite different to gmax. So we need a lot of learning before we can use both programs. Whichever program you use, saving in 3ds file format and importing to Gmax make you capable to export to MDL.

The prerequisite of texture baking are:

1. Each object need to have their own texture. If you have only one texture for many objects, you need to render all the objects relate to that texture at the same time.
2. Each polygon in the object must have each own area of texture. The polygons of the object cannot use the same area of texture.

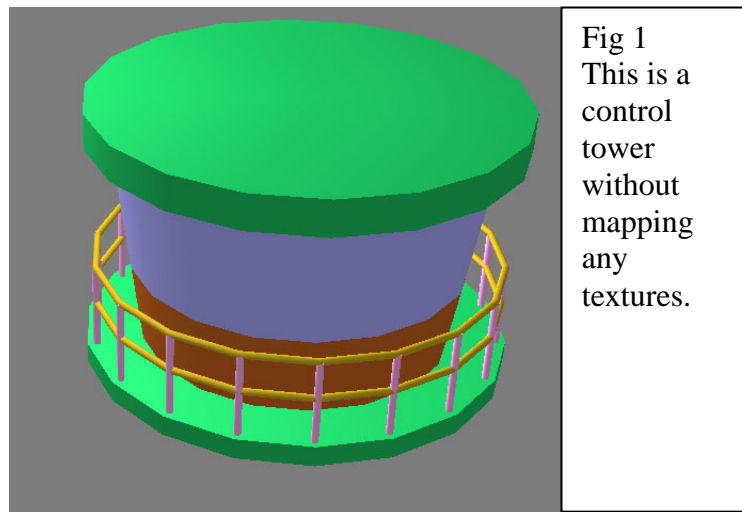
The Process of Texture Baking in 3dmax

1. Build your model as usual. You may add more detail but the actual model using in the game may be less detail and used the baked texture instead.
2. Make a texture for using with each object in the scene. I'll call this "Dummy Texture". This texture should be a small one such as 128 x 128, 256 x 256 or 512x512 pixel. After rendering to texture we will add up these baked textures into a bigger one to minimize draw call.
3. Make a light to replace default light. Adjust ambient and tint until you satisfy with the rendered scene.
4. Choose object to render to texture. Then save the rendered texture to a new file. I'll call this "Dummy Baked Texture"

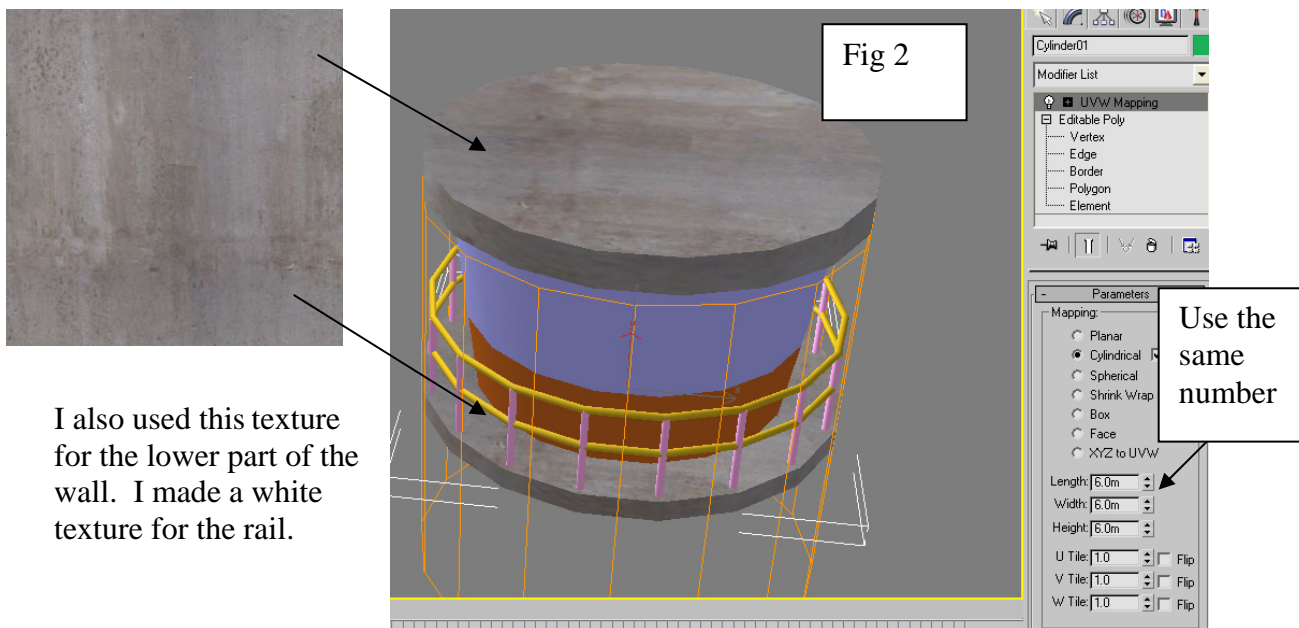
5. Make a biggest texture that the game supports. Copy “dummy baked texture” and pasted to this “Real” texture.
6. Make new material by using Real texture and apply to the object that you just baked.
7. Unwrap this object to fit the Real texture.
8. Now you can begin to bake other object, start at stage 4 and do it all over again.

Let's take an example

1. I'll do a control tower.



2. I used concrete texture at 512x512 to create Dummy Texture for the roof and the floor. Map the texture by using cylindrical method with cap. Make it proportional correct by adding the same number to Length, Width and Height. (Fig 2)



I also used this texture for the lower part of the wall. I made a white texture for the rail.

You can unwrap and adjust the mapping a bit to make each polygon use each own area of texture. I'll use more area for the top and less for under surface. (Fig 3)

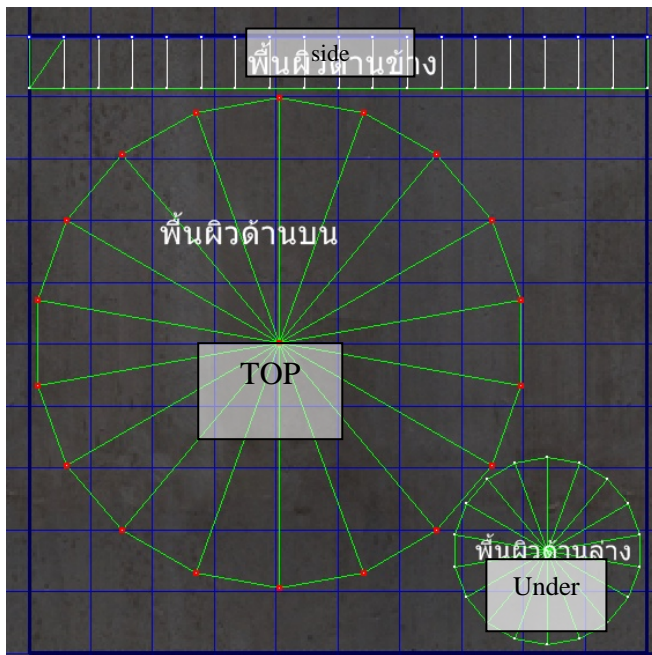
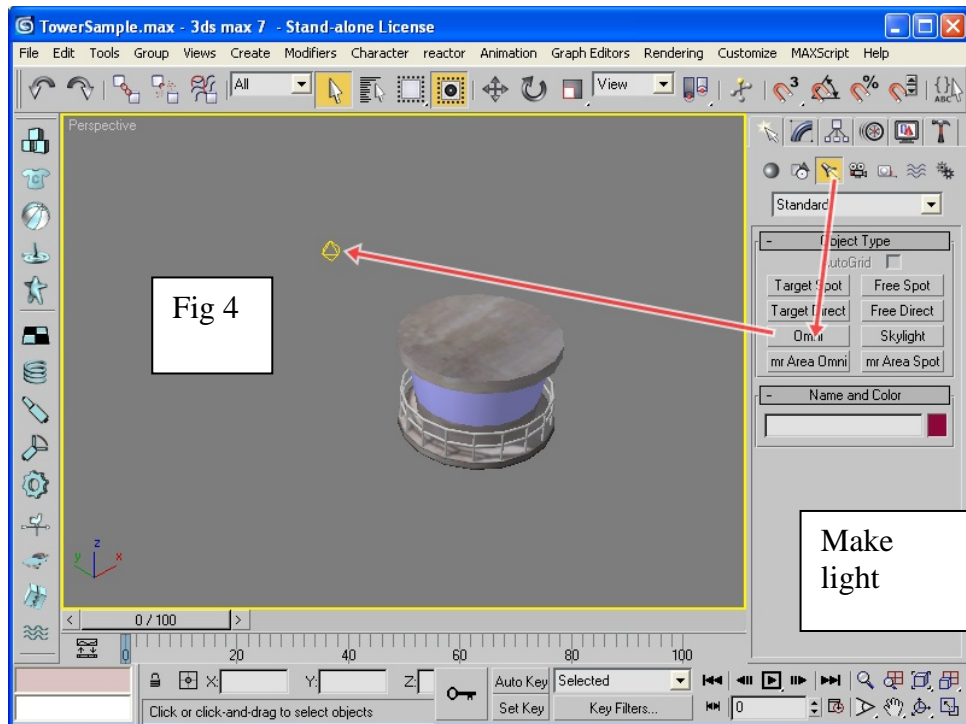


Fig 3

3. Now we need to make a new light to replace the default one. I used Omnidirection which give us a quick render. You can use photometric light but it will use longer time. The direction of light should be the same as the satellite photo that you use with your ground poly or photoscenery . (Fig 4)



Press on F10 to open up the render window. Try to render the scene, if the shadow is too dark, you have to adjust Rendering->Environment and adjust on Ambient and Tint. (Fig 5)

Try out rendering the scene. Now we get a good ambient and shadow.

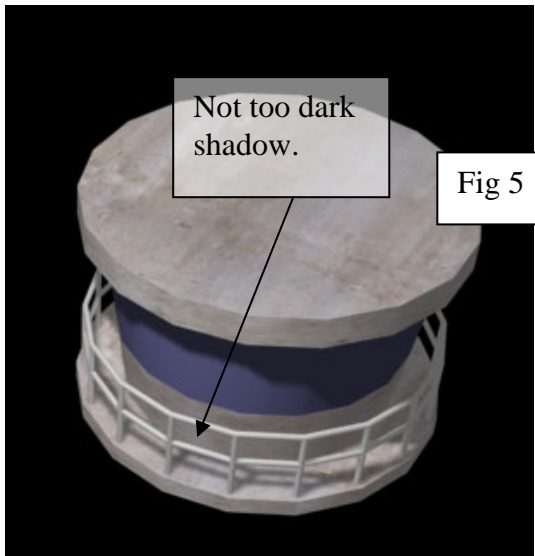
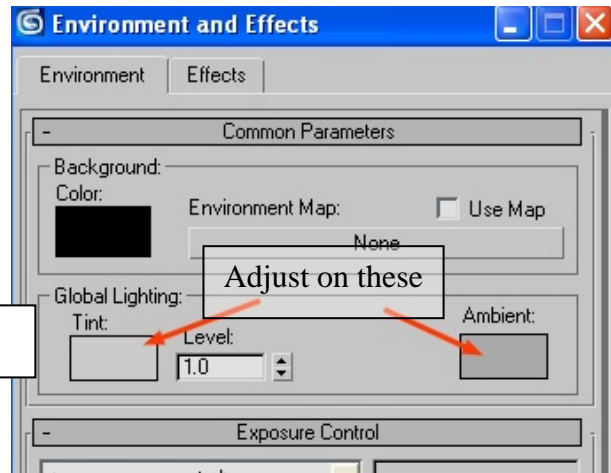


Fig 5



4. Now we will try “Baking Texture”. It is render to texture by pressing 0 or choose from the menu. I will do the base first. Choose the output in the Render to Texture window by pressing on red arrow below. The Output is DiffuseMap. (Fig 6)

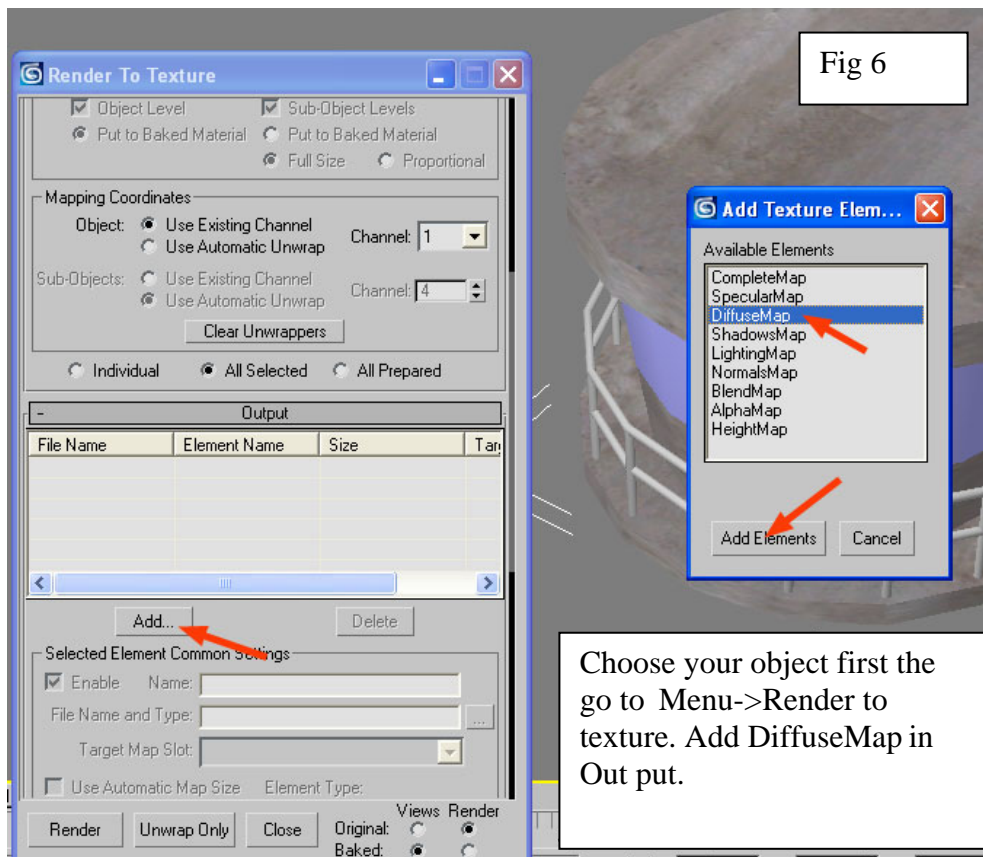


Fig 6

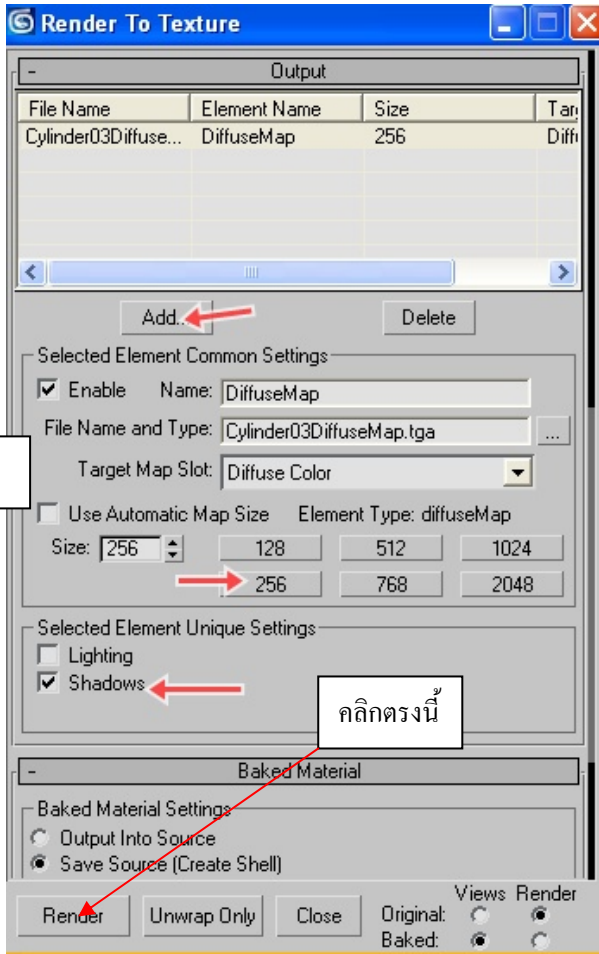


Fig 7

Scroll down and you need to choose how bit the texture is. It should be 128, 256 or 512. Check on the shadow box too. (Fig 7) Then click on Render button. We will get another window of the texture that we are baking. The program will keep it as tga file. But we'd better save this texture to the same folder as our other textures that we are using. I'll save as JPG. The name should be the one that you can recall. I used Base.jpg. Now we get shadow of the side rail already.

Now we have “Dummy Baked Texture”.

5. I then make a “Real Texture” by set up 1024x1024 plain texture sheet and named it as Tower.psd. Open the previous “Dummy Baked Texture” and Ctrl A and Ctrl-C to select all and copy. Then come back to “Real Texture” and press Ctrl-V to paste the “Dummy Baked Texture” to the “Real Texture”.(Fig 8)

We need to do a new bigger texture to make less draw call. You can adjust the brightness or contrast.

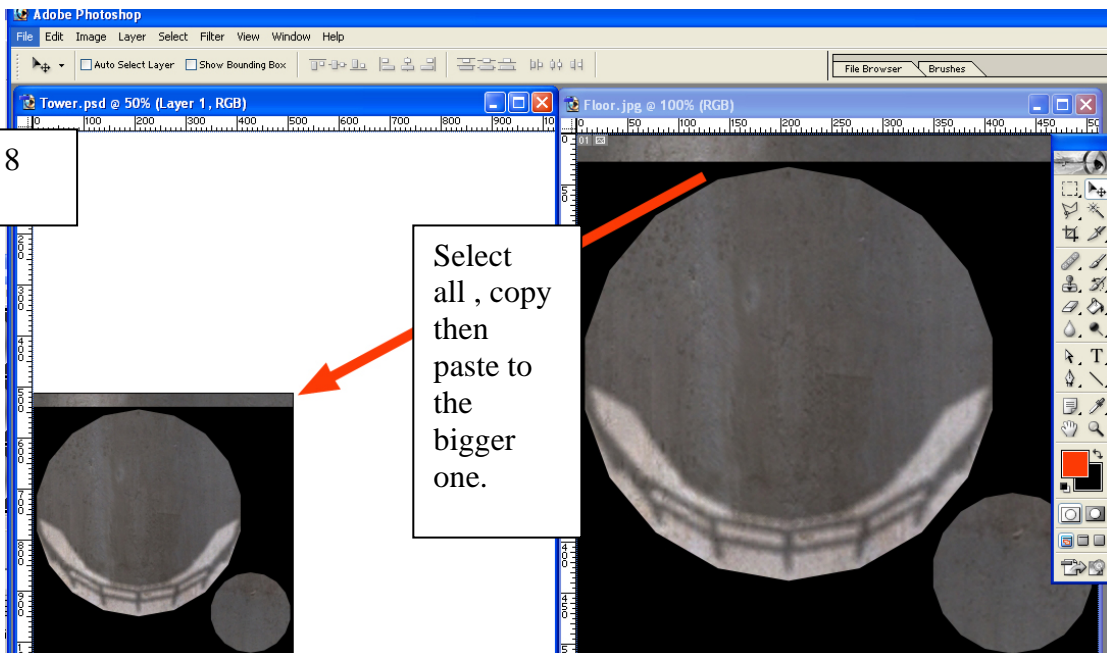
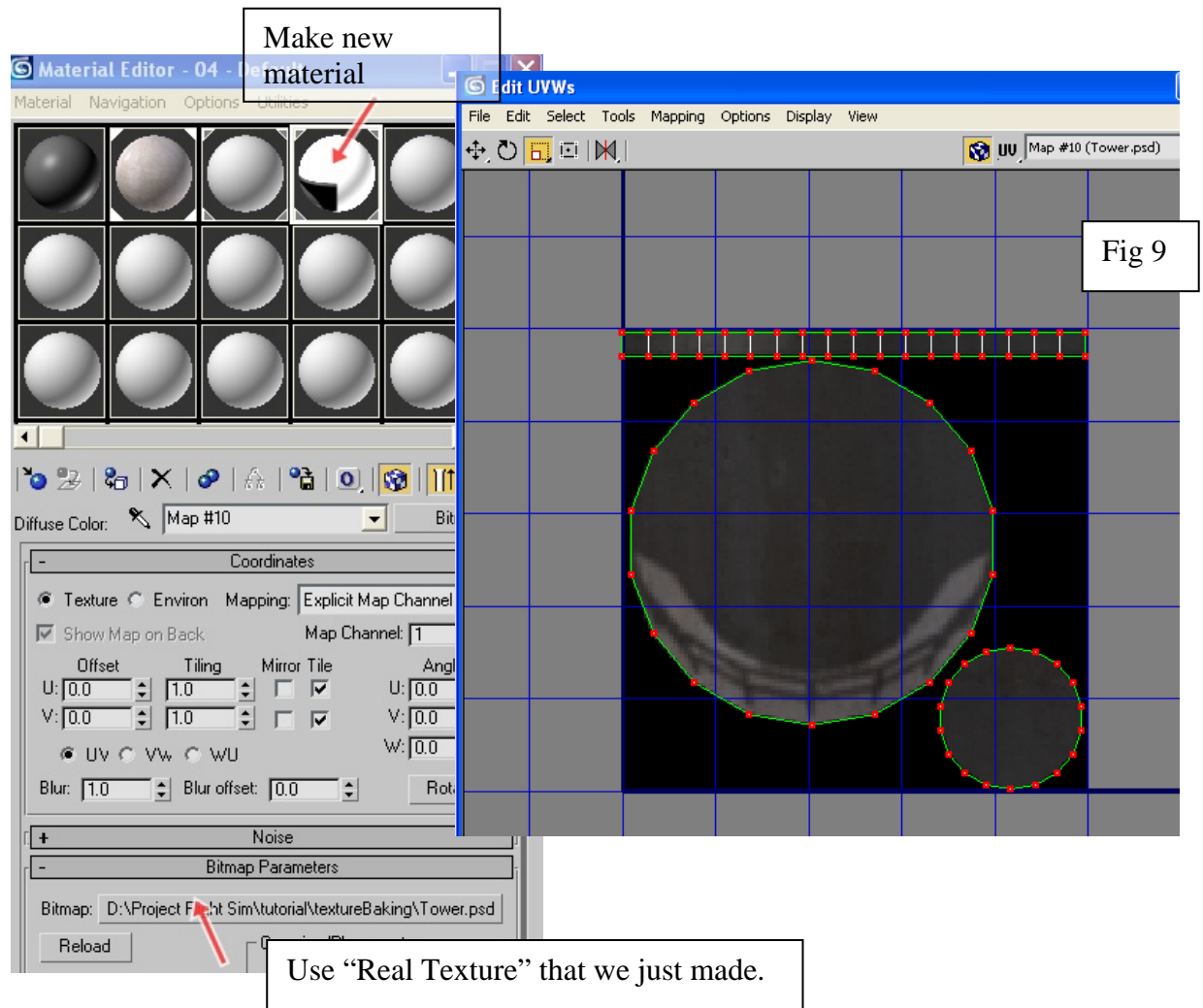
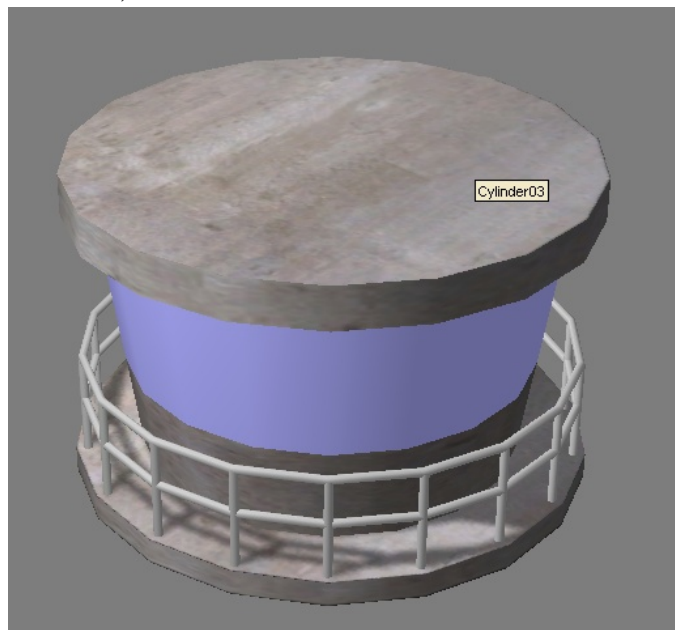


Fig 8

6. Come back to 3dmax, make new material by using “Real Texture”. Apply this material to the same object that we just baked. Then Unwrap the new map to shrink to the new texture since we used a bigger one. (Fig 9)



Go back to our model, now we have our shadow on.



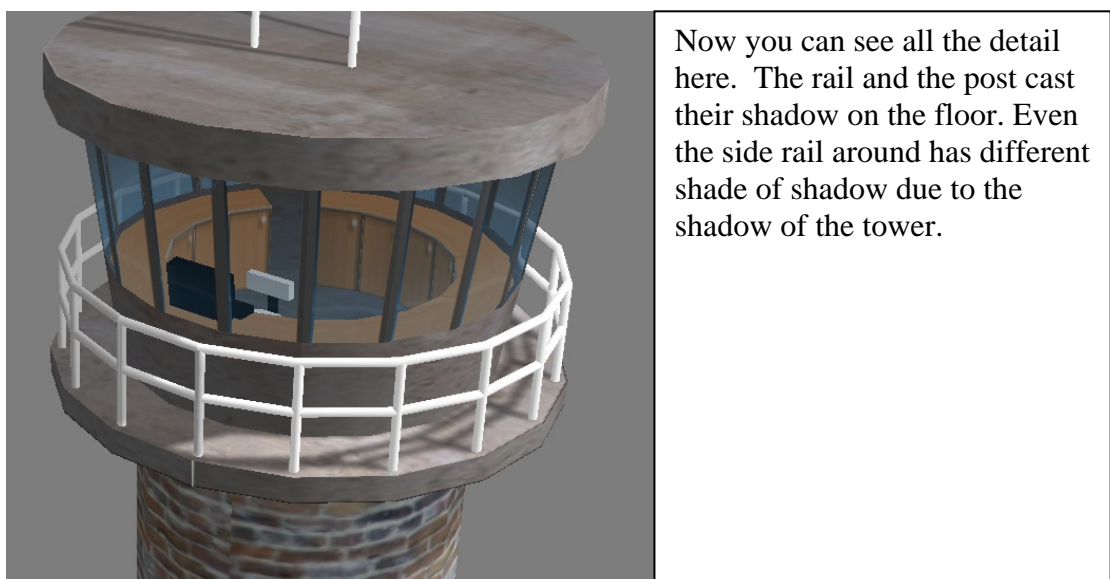
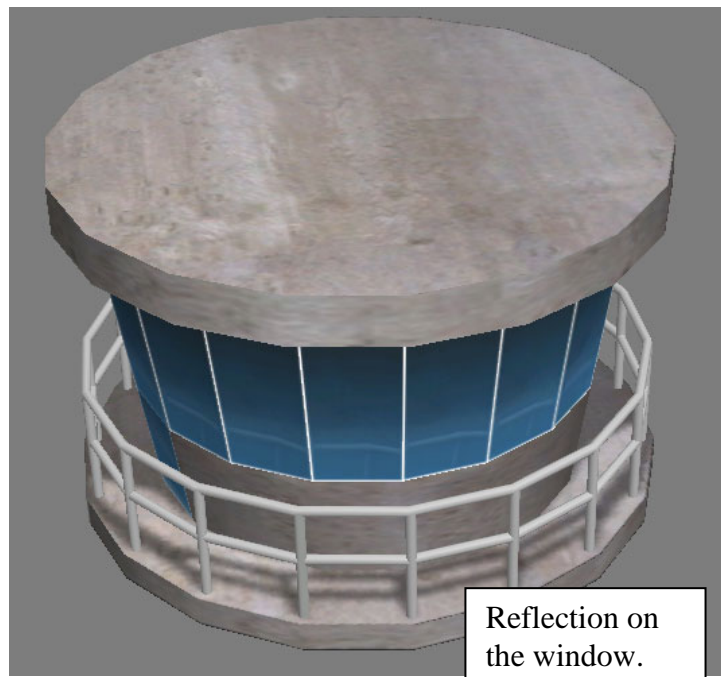
Then we

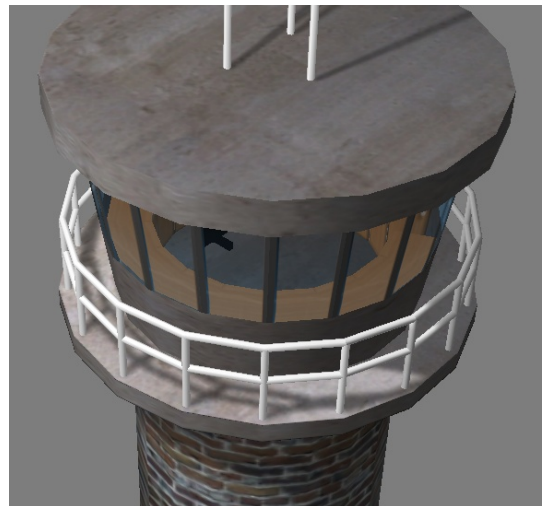
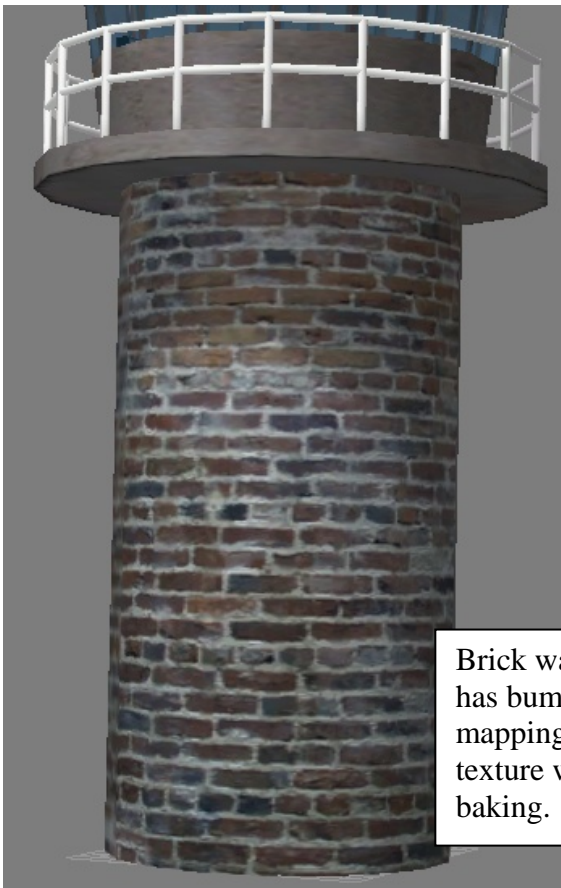
go back to step 2

and do the same thing with roof. The rail is quite complicated. I mapped each part of rail with white plan texture. Each rail need its own mapping to make shade of shadow of the tower that cast on it. Some parts of rail that is in the same zone of shadow. I used the same baked texture.

The lower wall I use the same concrete texture and baked the same way. On the glass wall you will need raytrace material. There is a way to adjust the raytrace material which it is not my scope here. You can find the way to do that in Help or tutorial of the program.

Then I got some reflection of the rail on the window. I added some detail inside. Now here is the final result of my fiction control tower. You can use other feature of 3dmax to make more baked texture such as bump mapping which I used here for the brick wall below. You don't need to have bump map in FSX that will add more complex of rendering in the game.





Brick wall here has bump mapping texture while baking.