

AR0771 - Textures

Constructing textures

Instr0_2 /lecture

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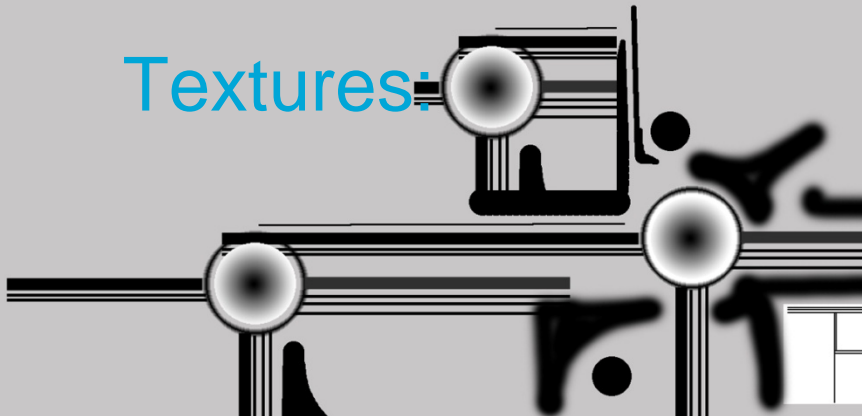




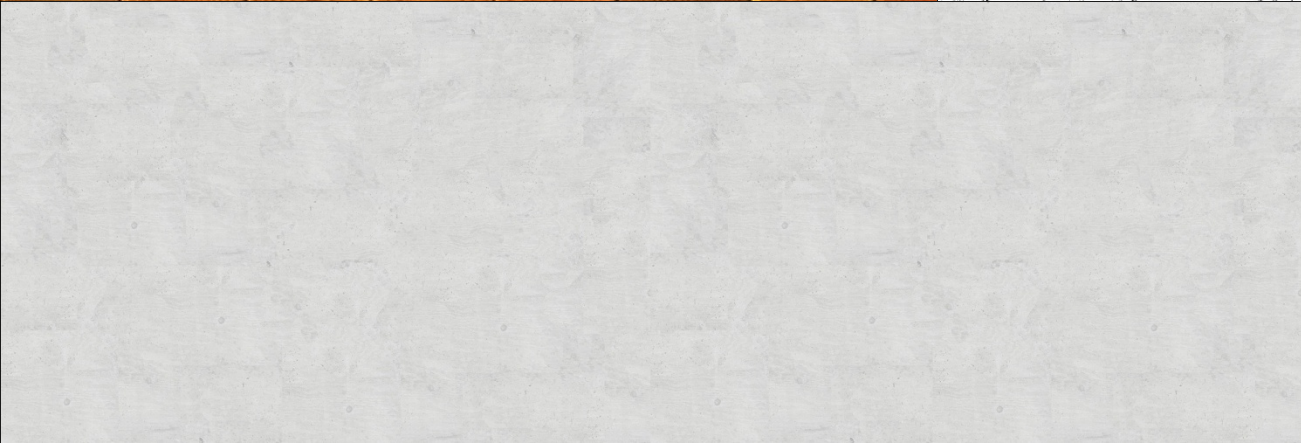
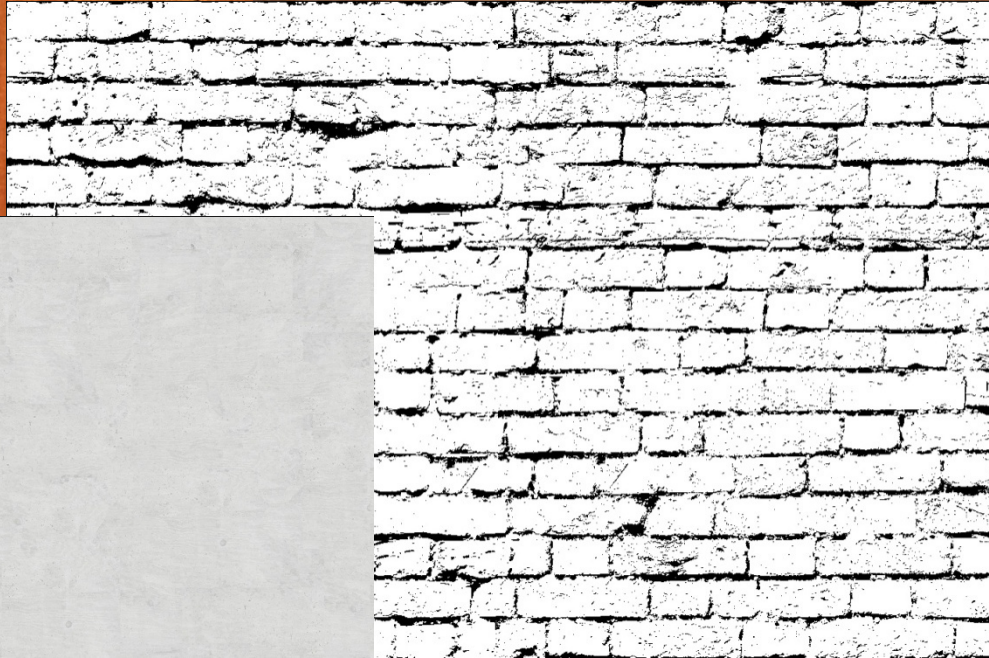
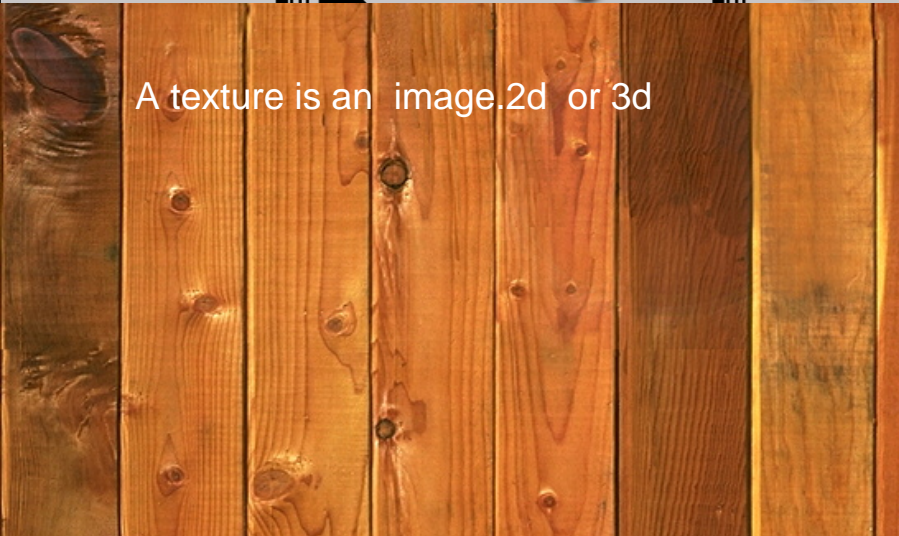




Textures:



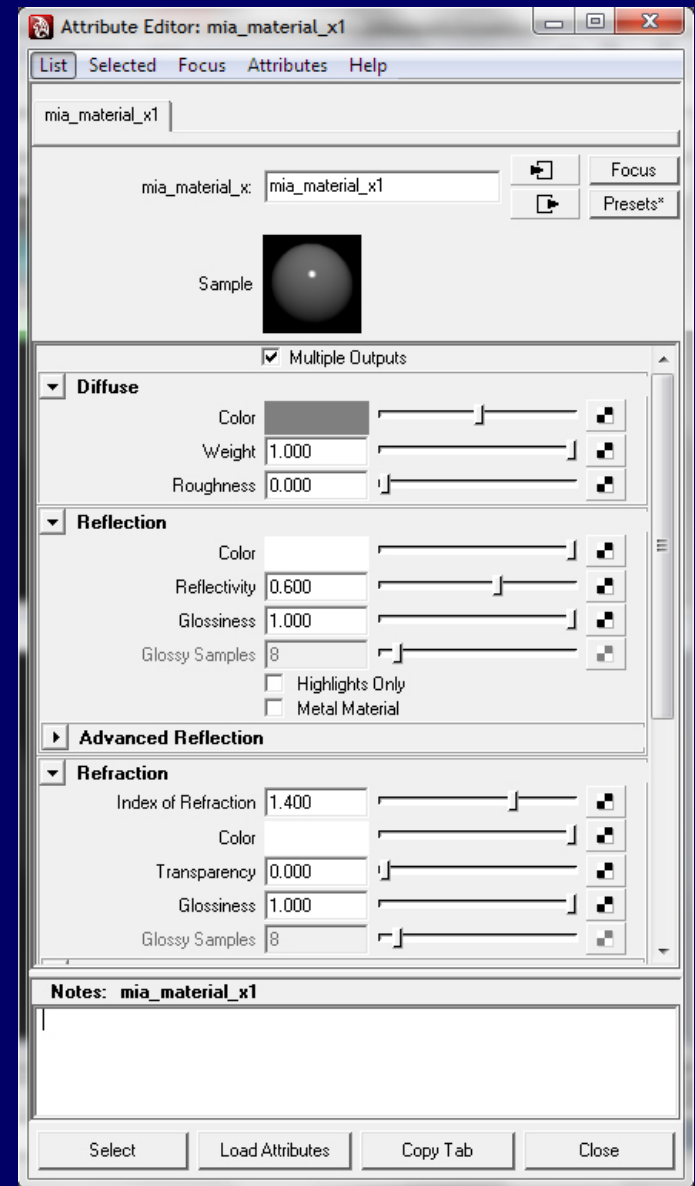
A texture is an image. 2d or 3d



Textures:

Defining the characteristics of the material.

- Color – diffuse color
- Shininess of the material
- Reflection of the material
- Refraction of the material
- Transparency – amount
- Texture of surface – roughness



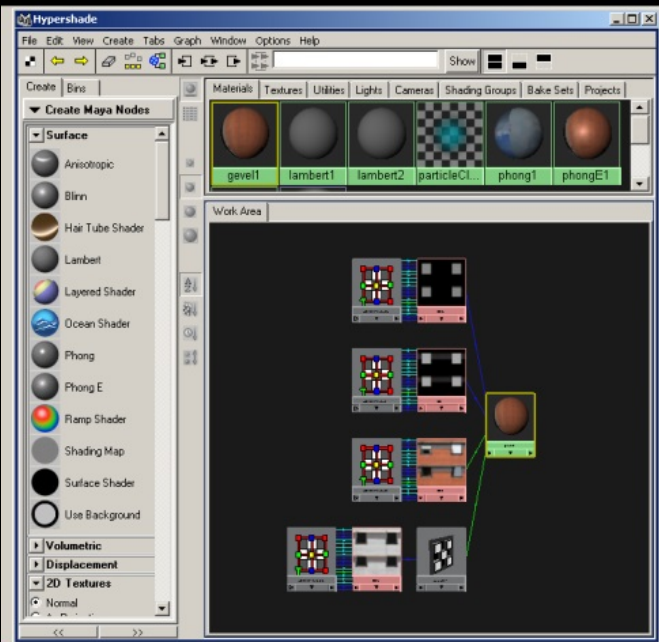
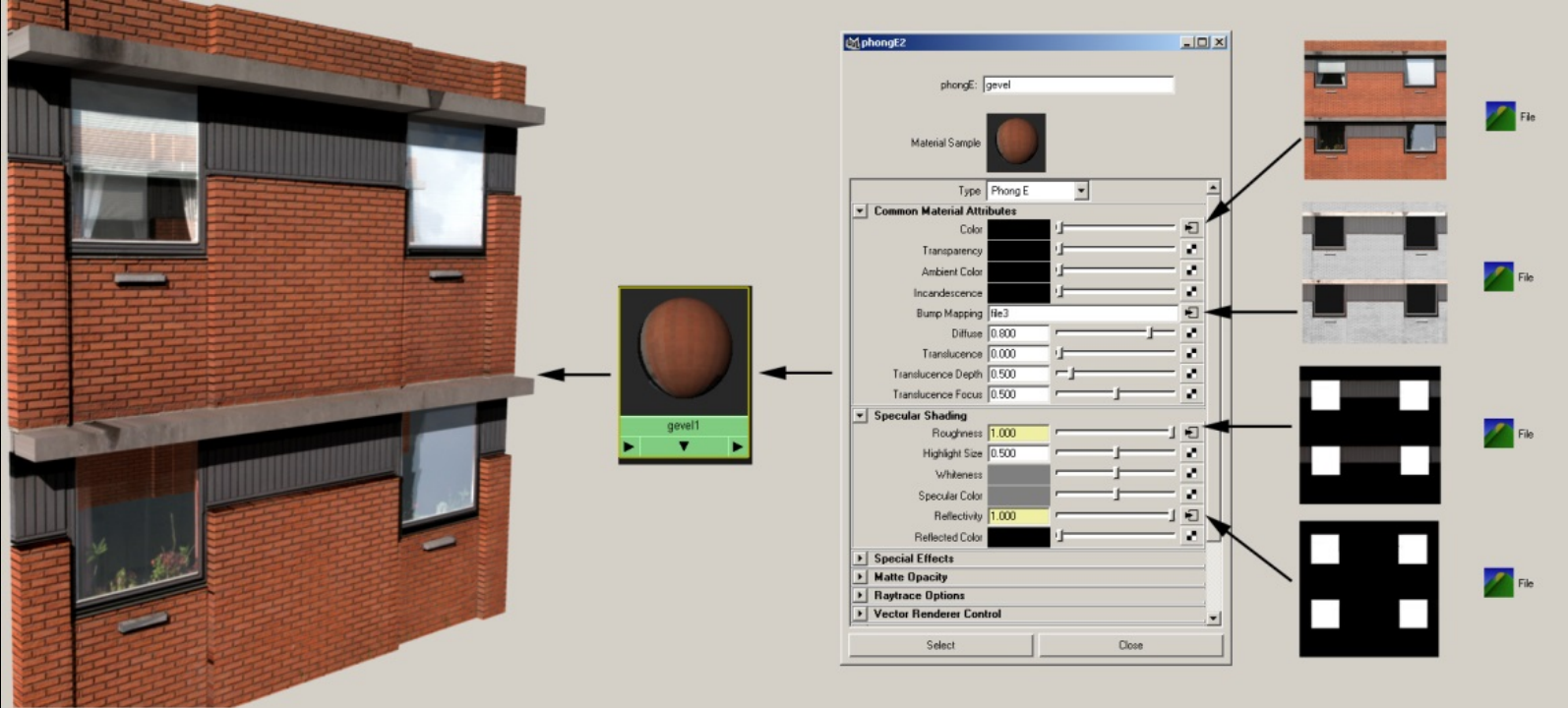
Geometry versus Textures:



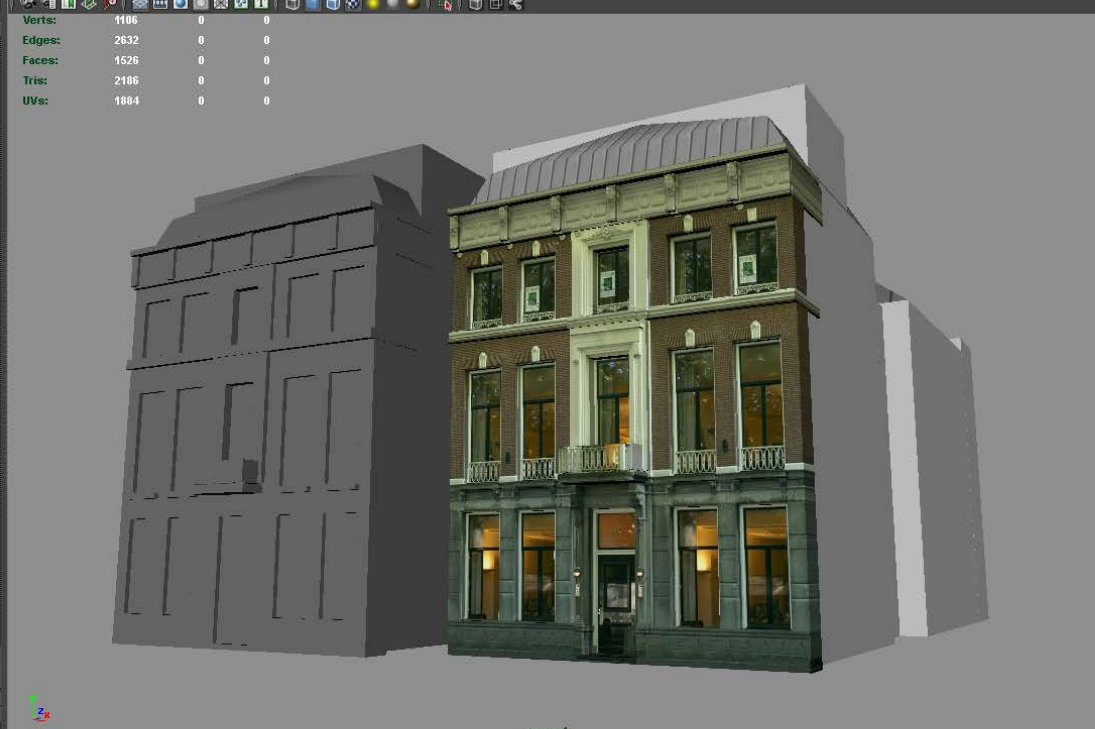
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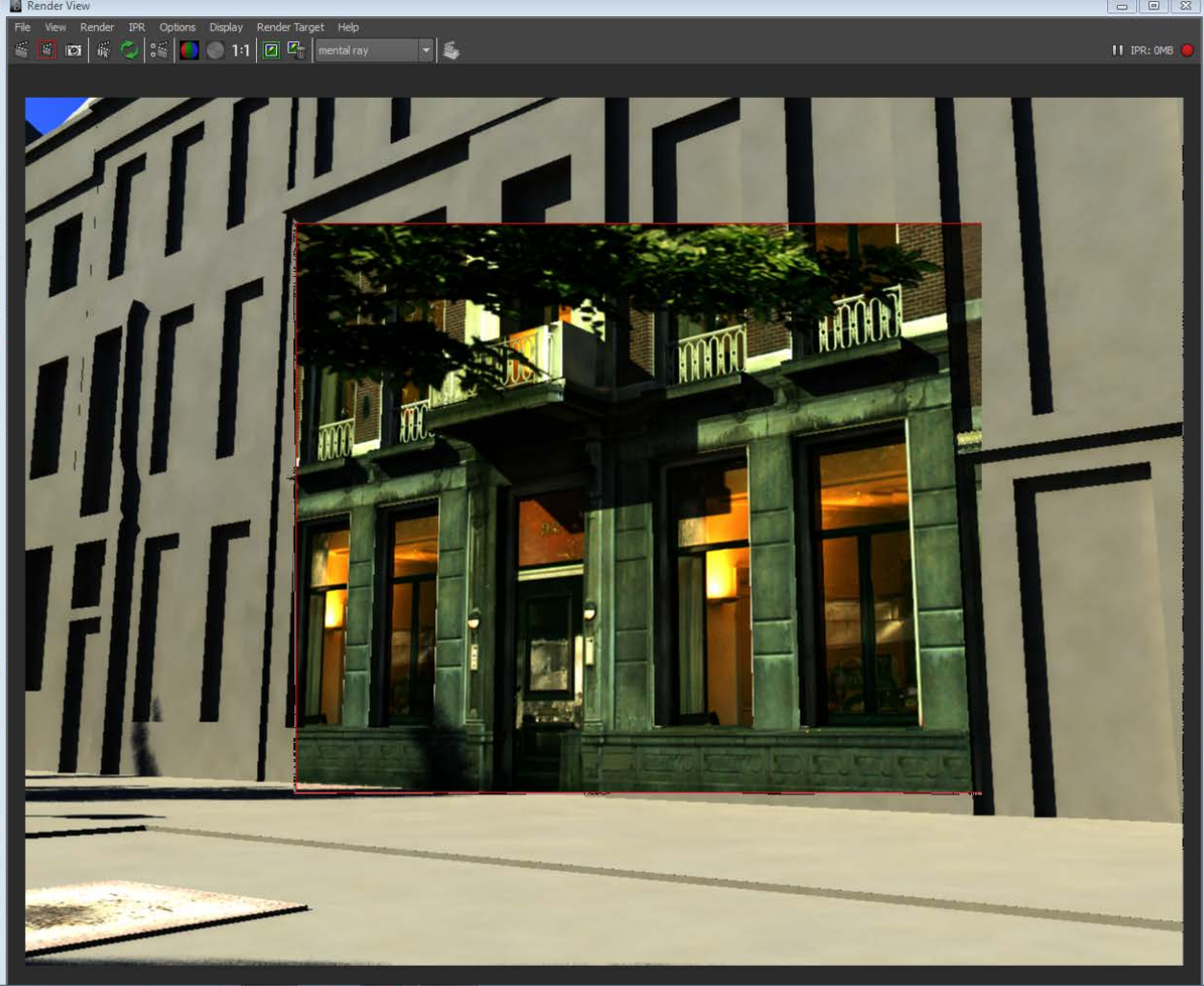


- polySurface647
- polySurface648
- polySurface649
- polySurface650
- polySurface651
- polySurface652
- polySurface923
- polySurface967
- polySurface996
- polySurface997
- polySurface998
- polySurface999
- pSphere1
- pSphere2
- pSphere3
- pSphere4
- pSphere5
- side
- side.1
- strokeOakForest11
- strokeOakForest110
- strokeOakForest111
- strokeOakForest12
- strokeOakForest13
- strokeOakForest14
- strokeOakForest15
- strokeOakForest16
- strokeOakForest17
- strokeOakForest18
- strokeOakForest19
- sunDirection
- top
- polySurface133
- defaultLightSet
- defaultObjectSet



Make a selection to view attributes

Select Load Attributes Copy Tab

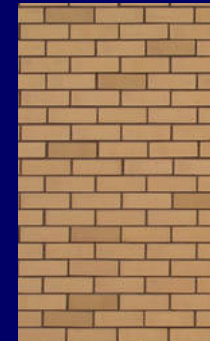
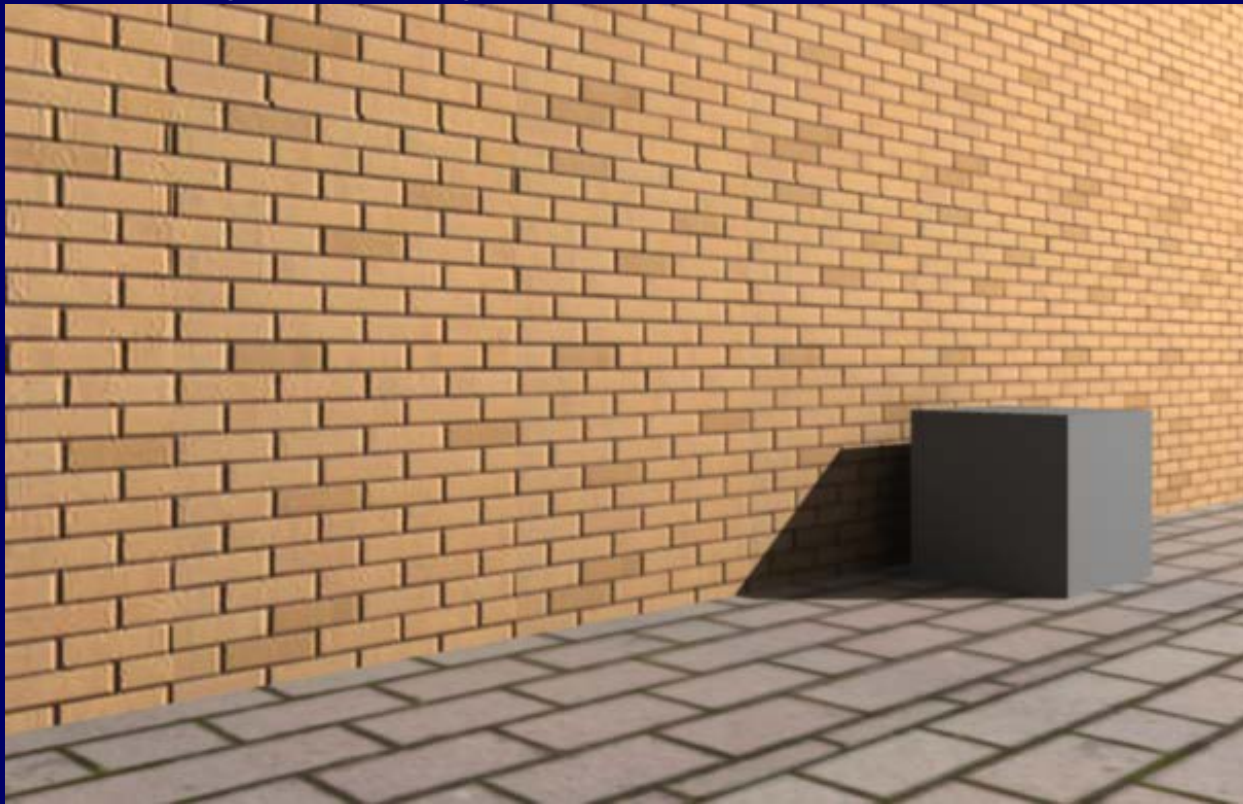


Use of color information in materials:

Color

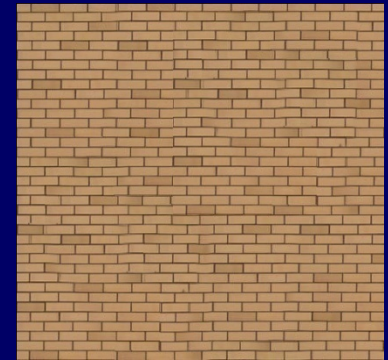
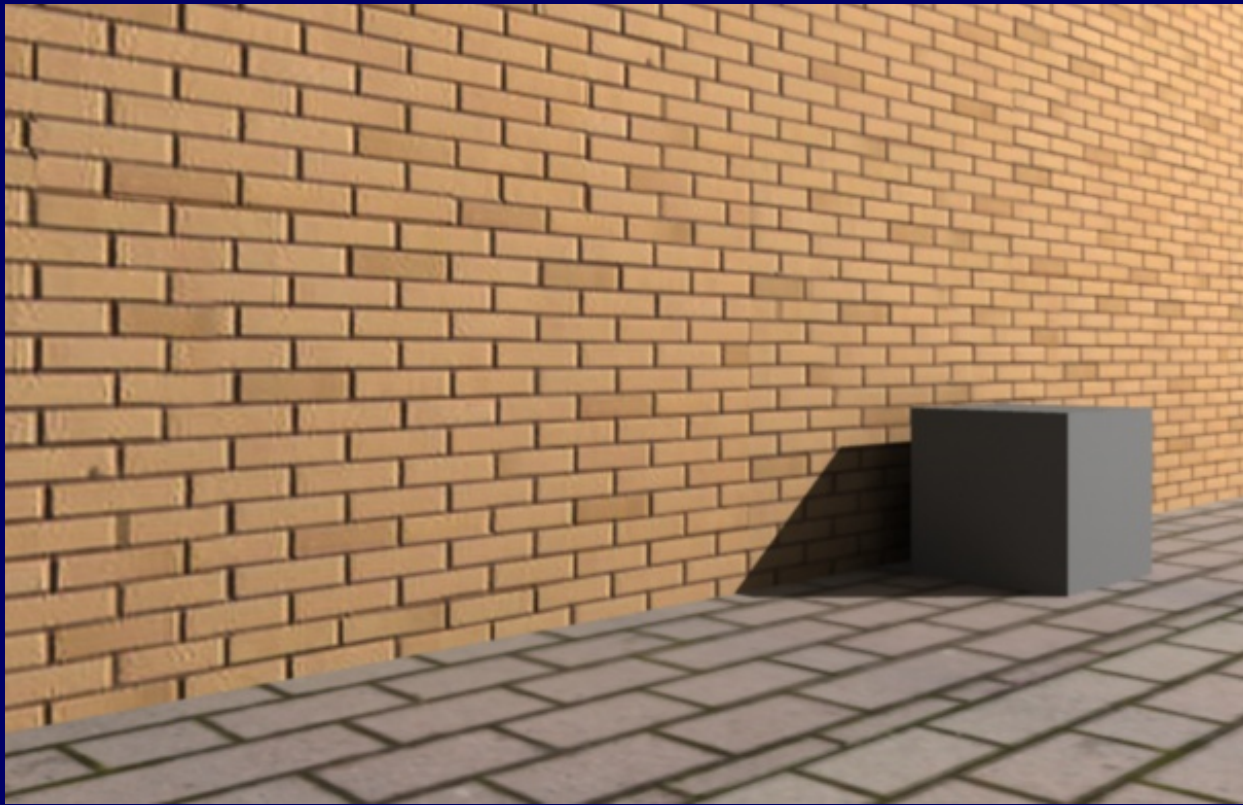
Biggest problem with creating the right color texture is to capture the complexity of surfaces with their imperfections, aged look and apply them in a non tillable fashion.

What is wrong with this image ?



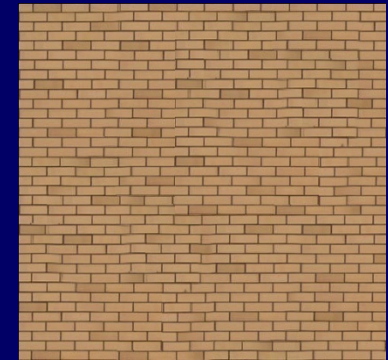
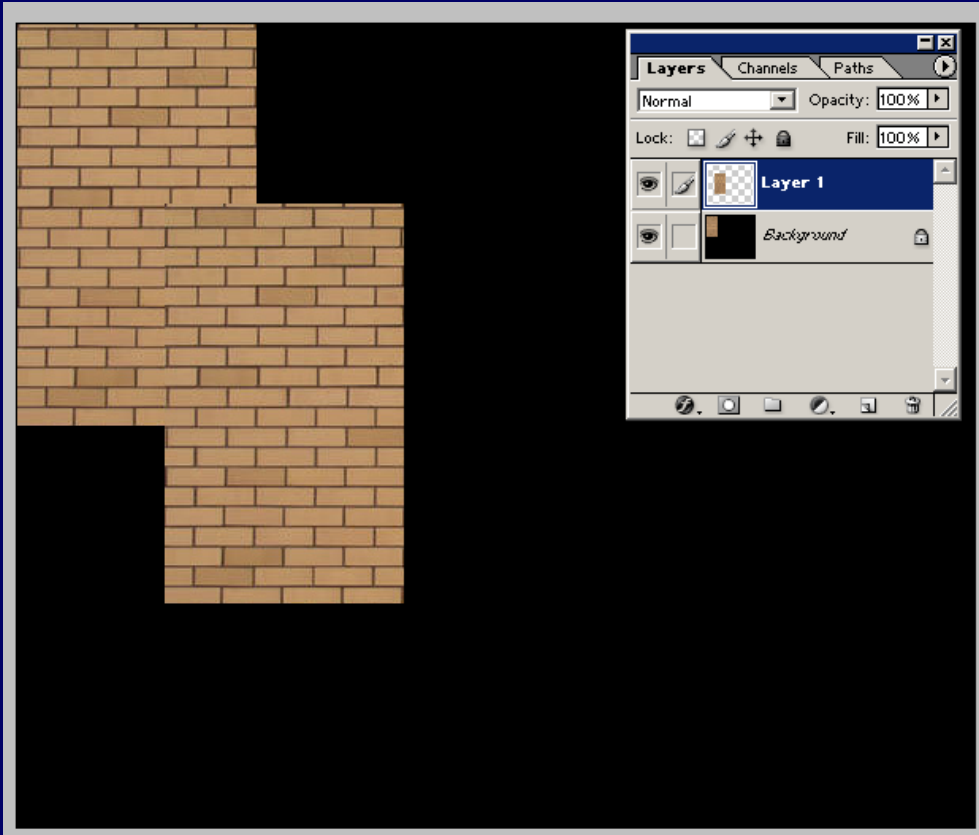
Color – tiling problem

Obvious solution is to increase the size of the colour map in photoshop and de- tile the image.
Drawback is the increased size of the texture map.
The tiling effect is diminished



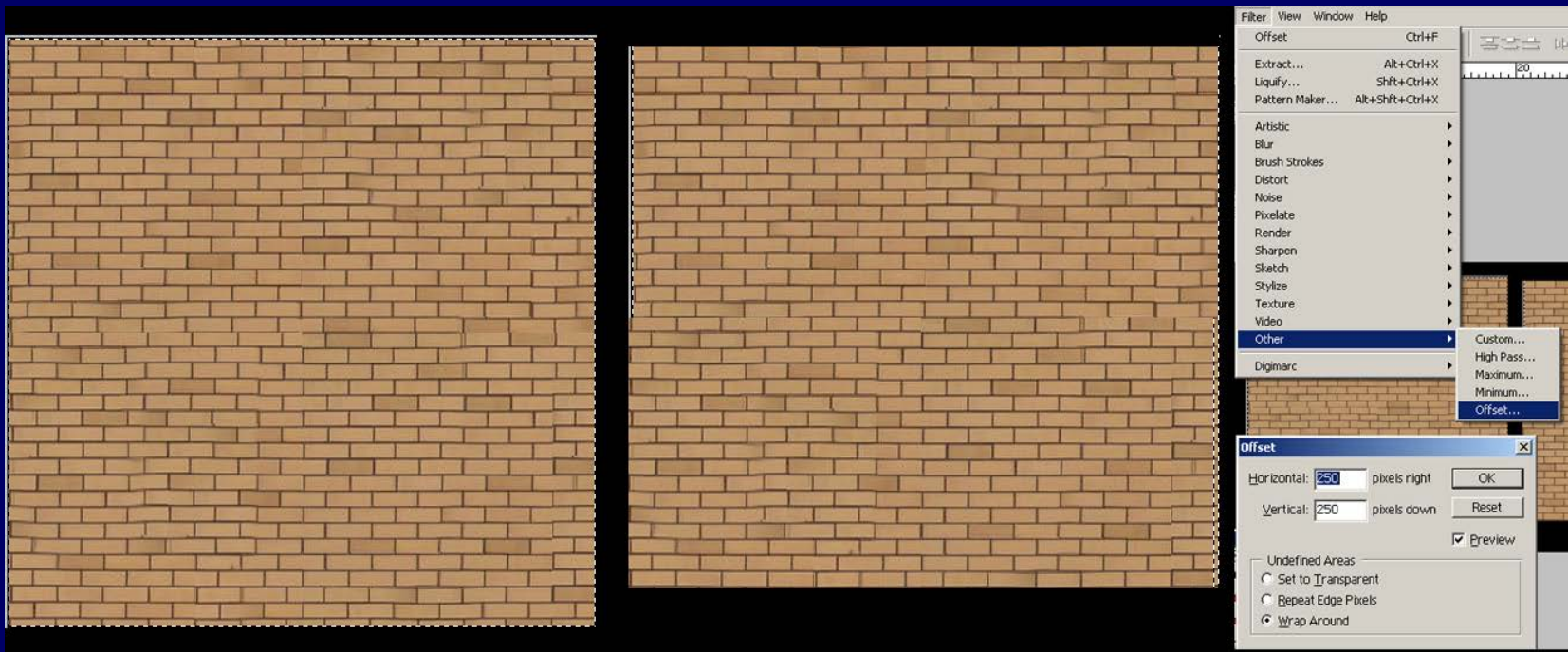
Color – tiling problem

Increase the canvas size of the texture and randomly fill the texture with clones of the texture. Adjust the edges of the overlapping parts. Especially effective with textures with strong repetitive patterns like bricks and floor tiles.



Color – tiling problem

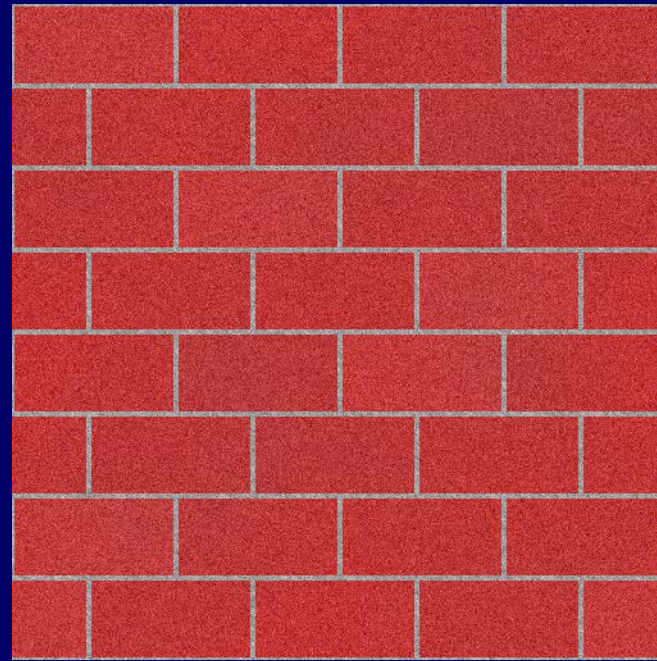
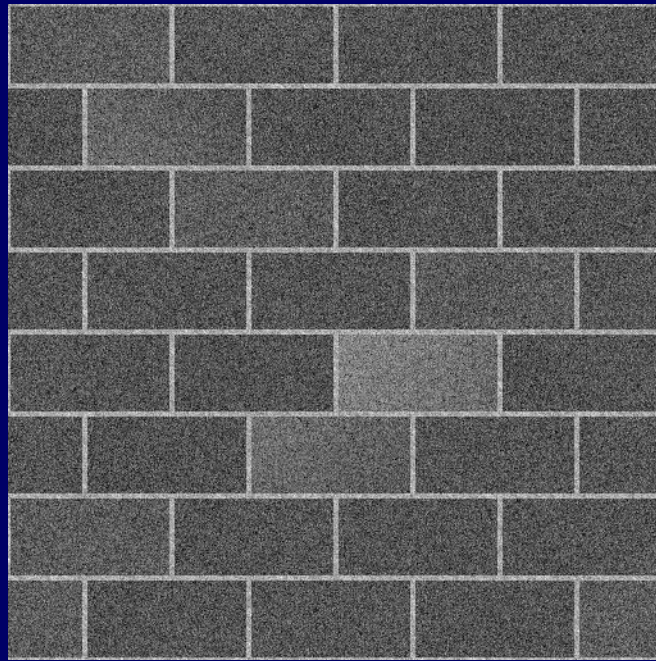
To make sure the new image connects correctly at the edges, the image is offset by 50% and adjusted accordingly.



Color – tiling problem

In photoshop textures can be constructed. With the use of filters color textures can obtain the right look of the material.

Using the same texture a bump material can be extracted.

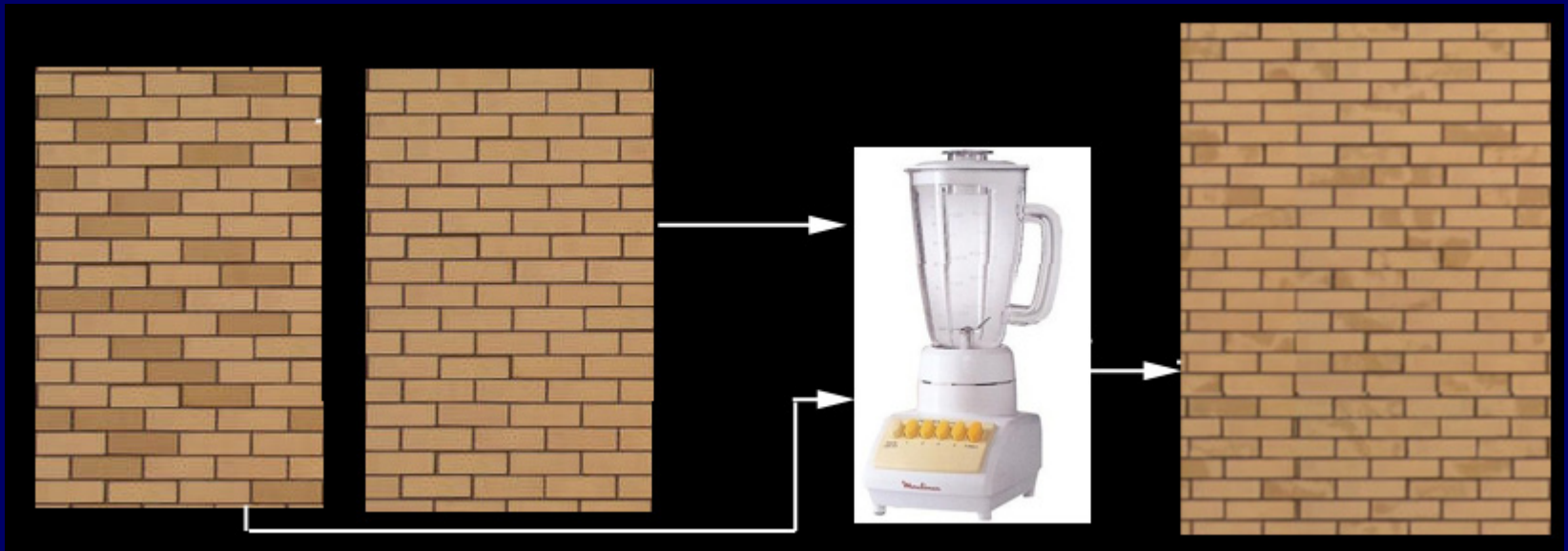


Color – tiling problem

Another option to prevent tiling:

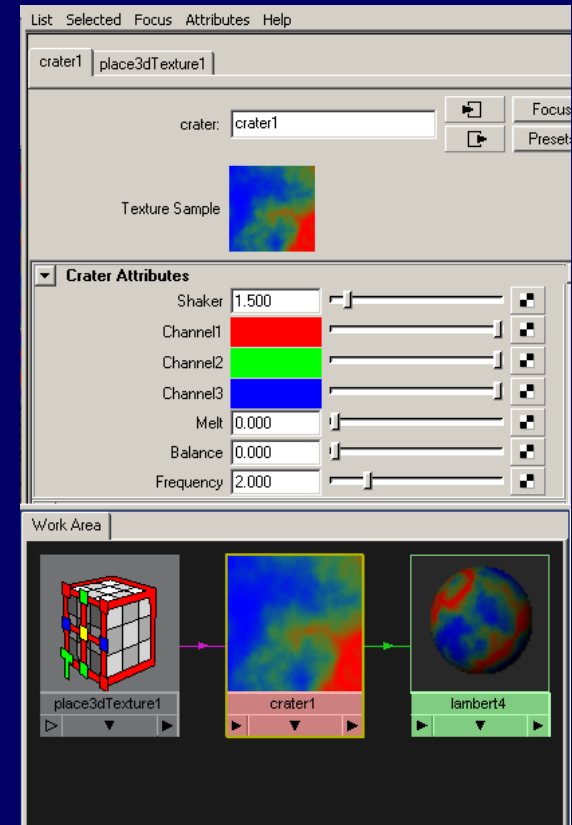
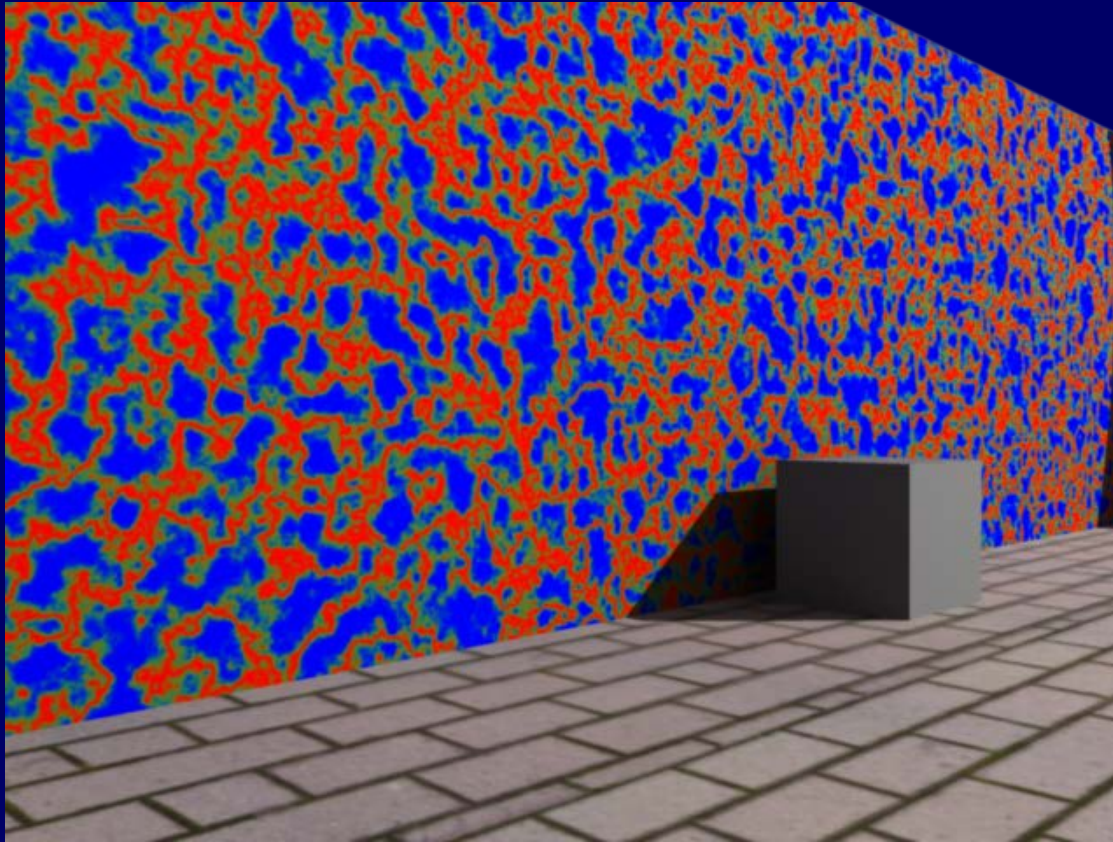
Mix multiple textures with different patterns in one shader.

- Use the colour channels of the procedural textures to mix the different textures.
- Use a layered texture
- Use a layered shader.



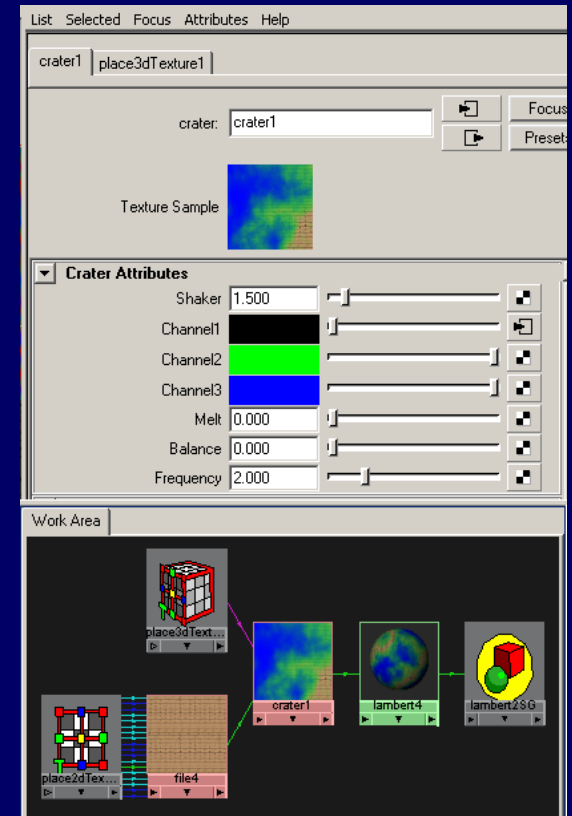
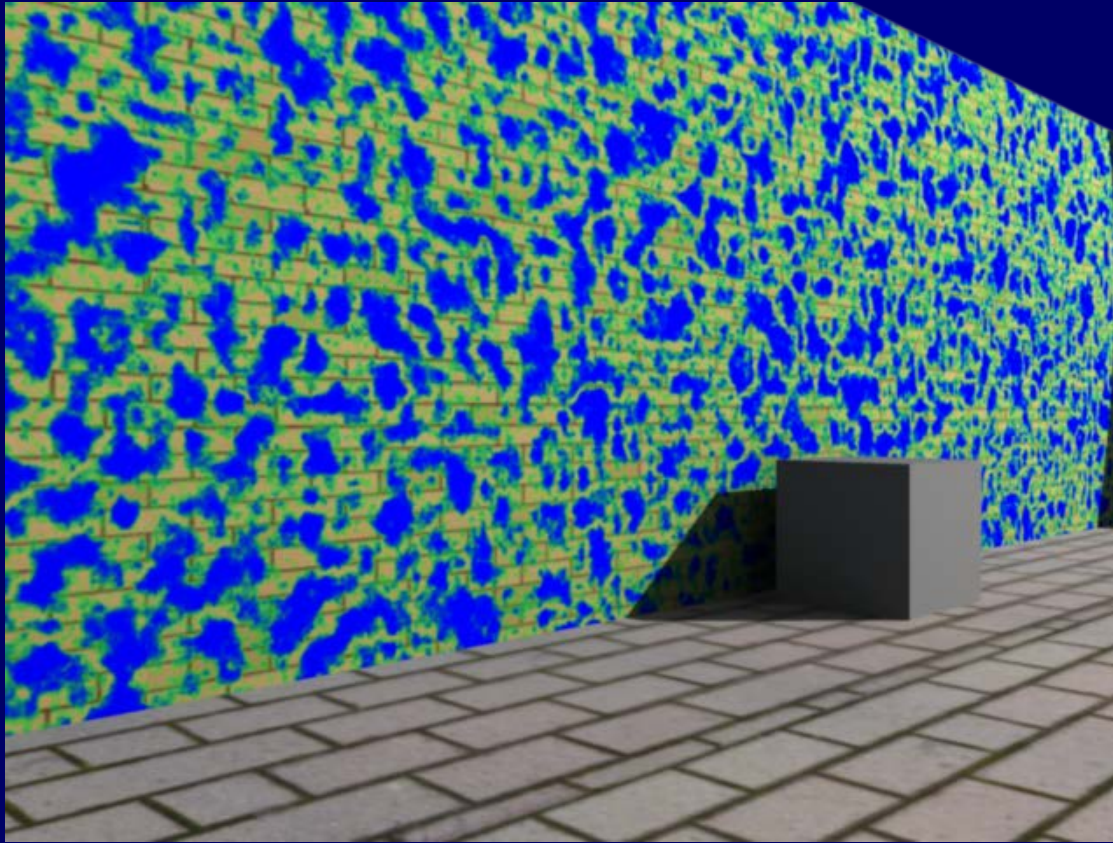
Color – tiling problem

Use the color channels of the procedural textures to mix the different textures.



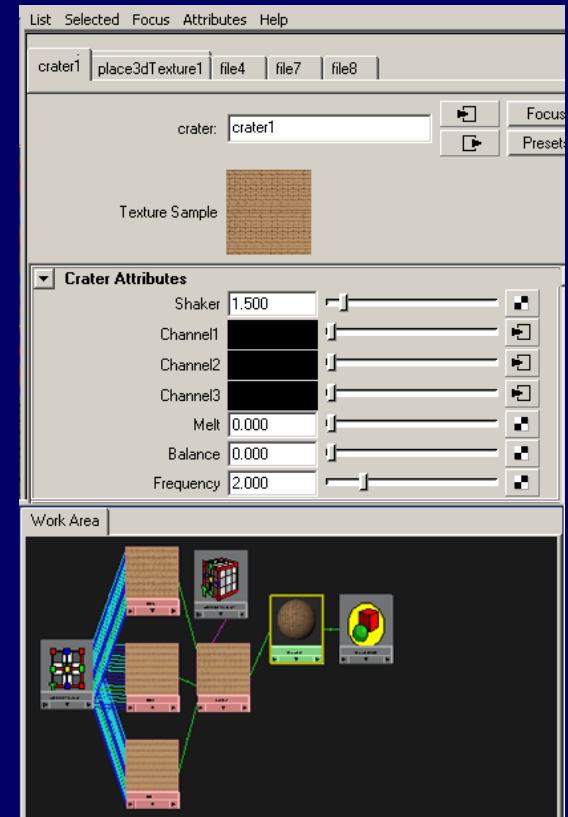
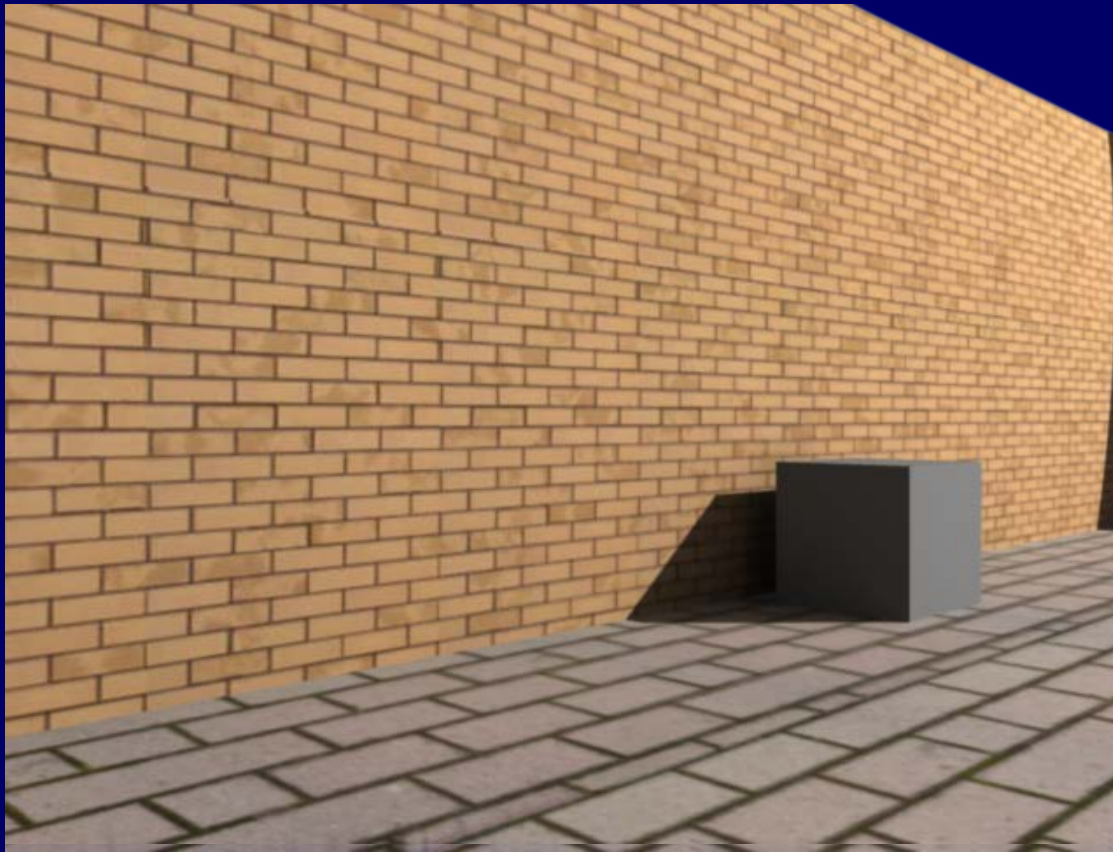
Color – tiling problem

Use the color channels of the procedural textures to mix the different textures.



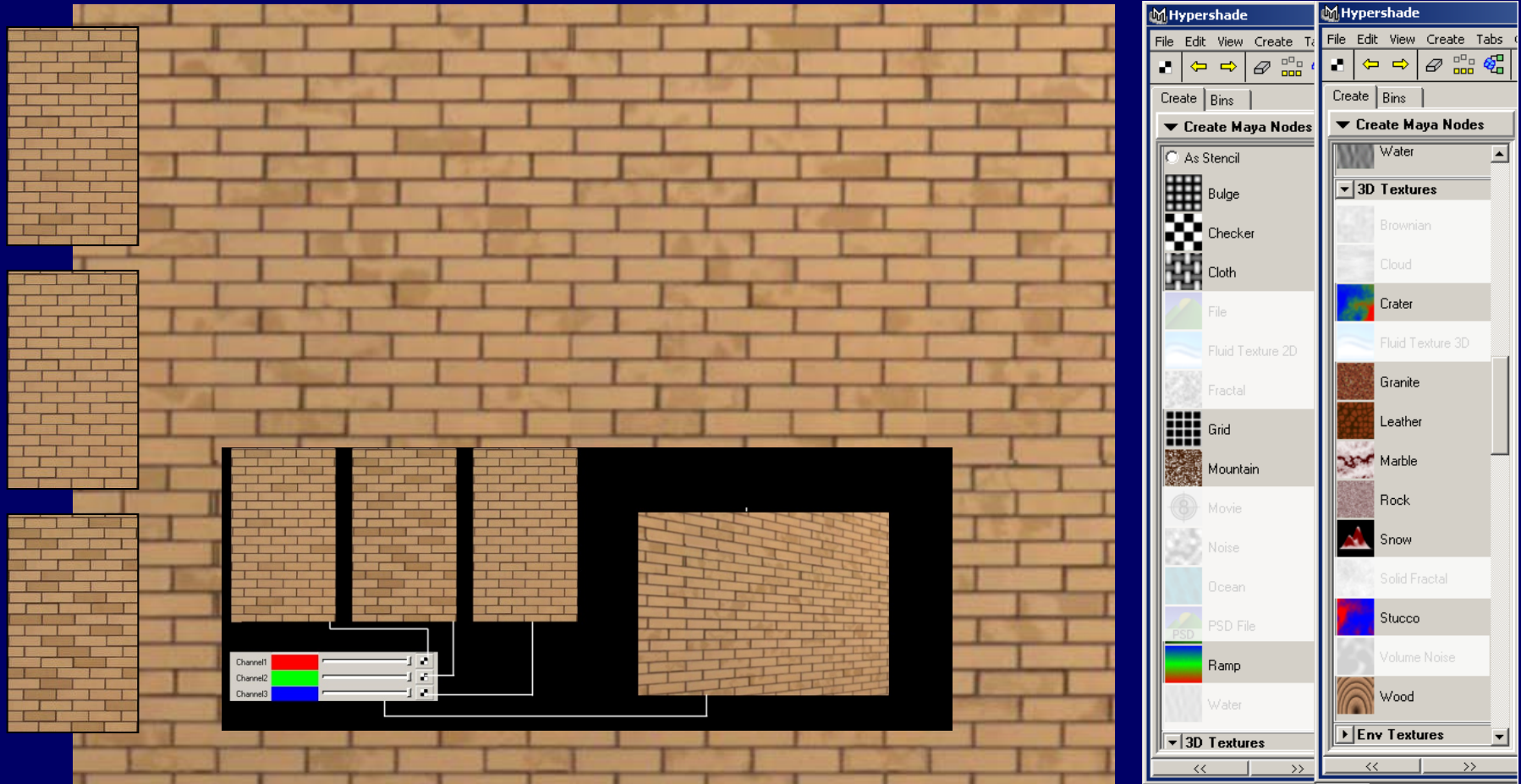
Color – tiling problem

Use the color channels of the procedural textures to mix the different textures.



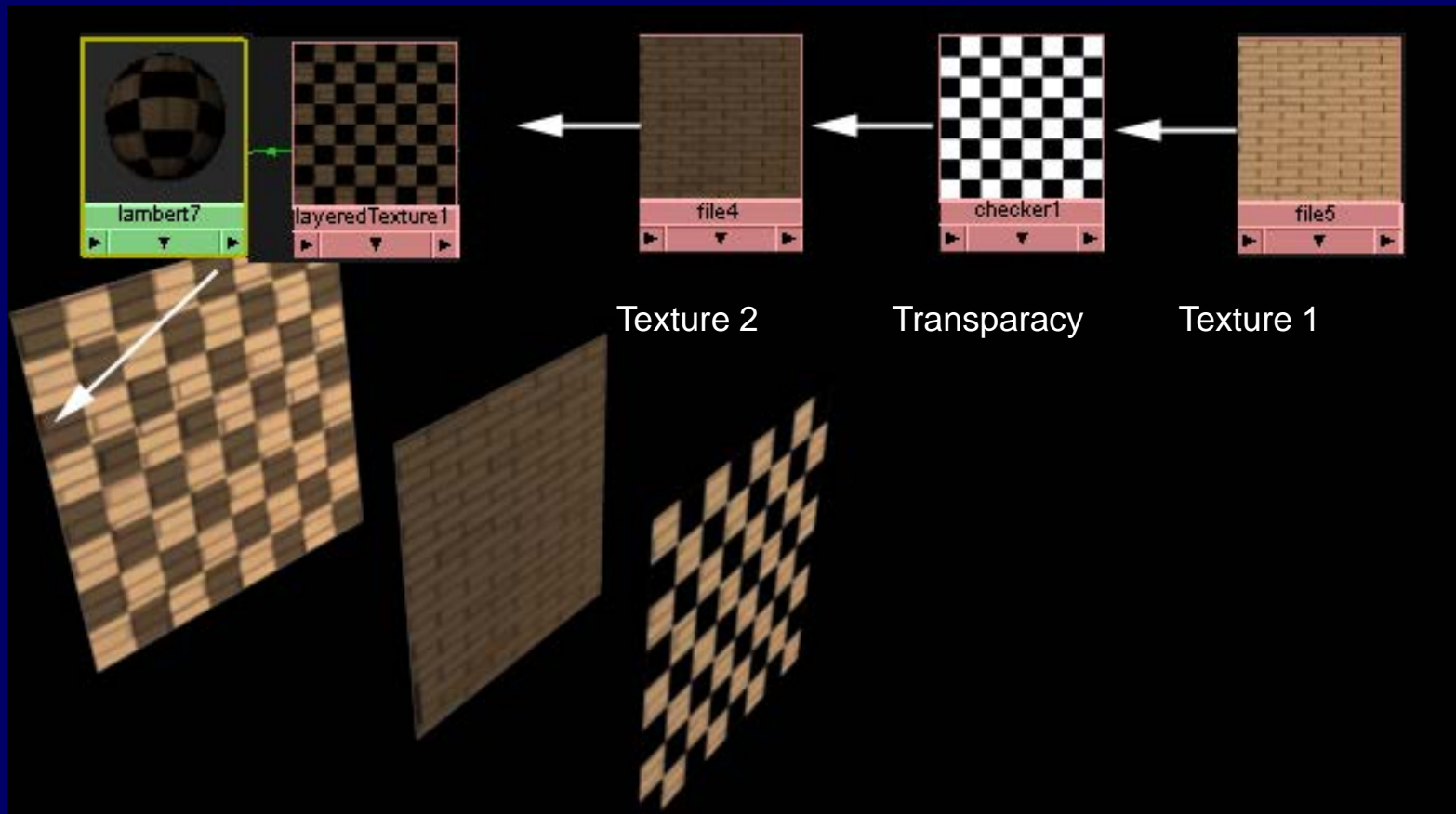
Color – tiling problem

Use the color channels of the procedural textures to mix the different textures.



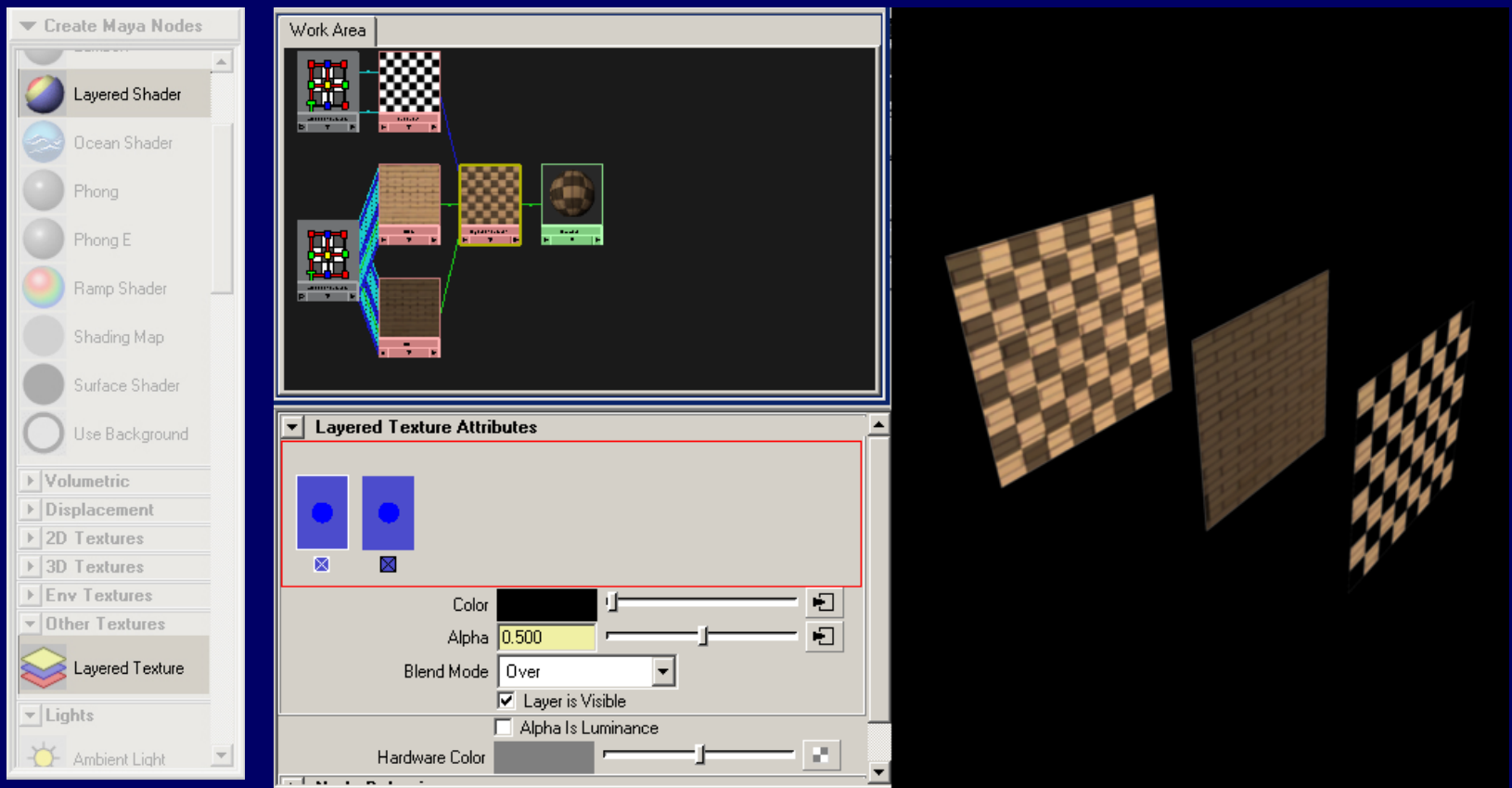
Color – tiling problem

By making use of transparency maps (masks) we can combine several textures into one texture. The transparency map influences the way the textures are mixed.



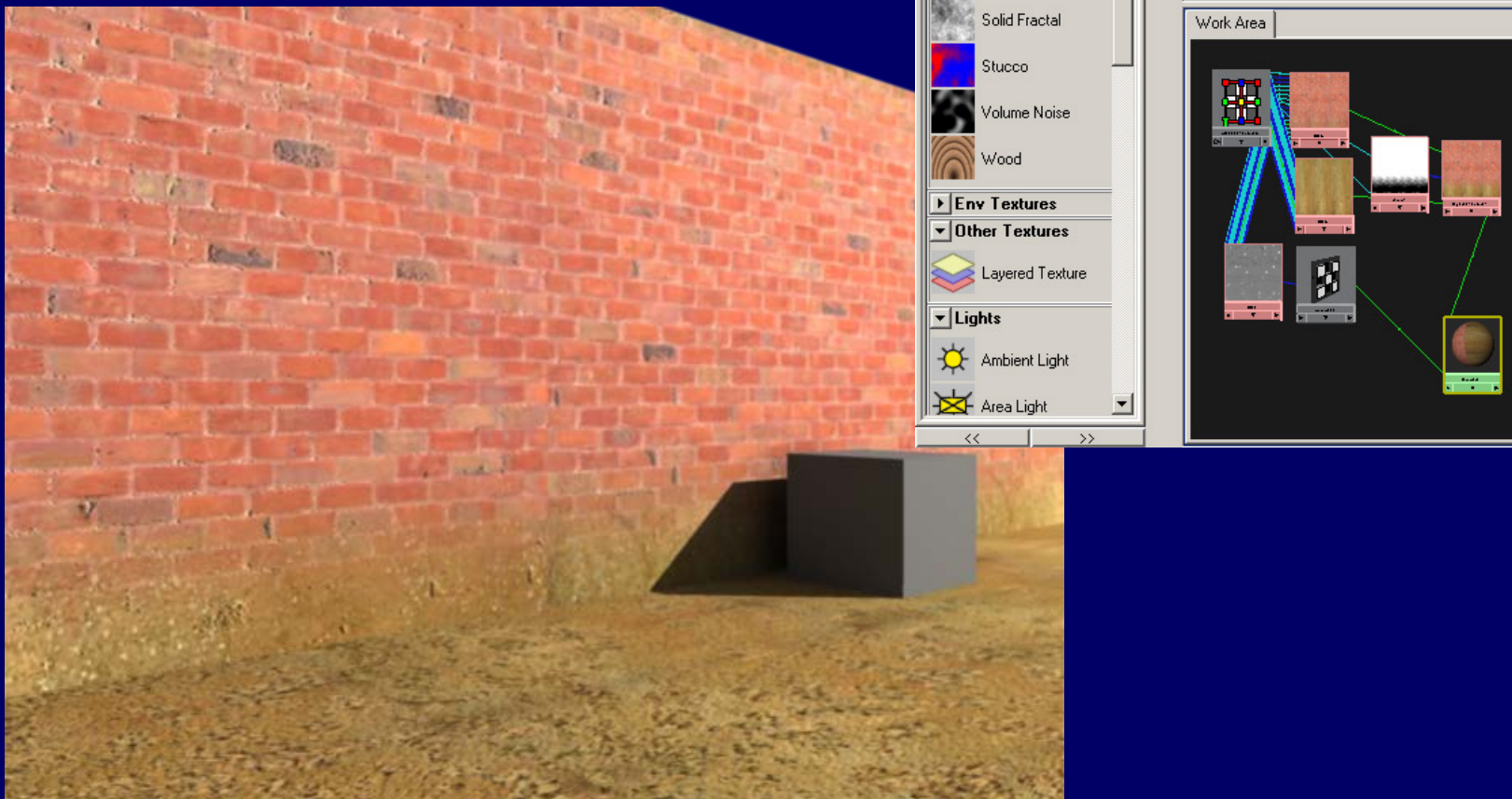
Color – tiling problem

We can use layered textures to mix several textures in one texture. You can compare this with Photoshop layer filtering and the use of layer masks.



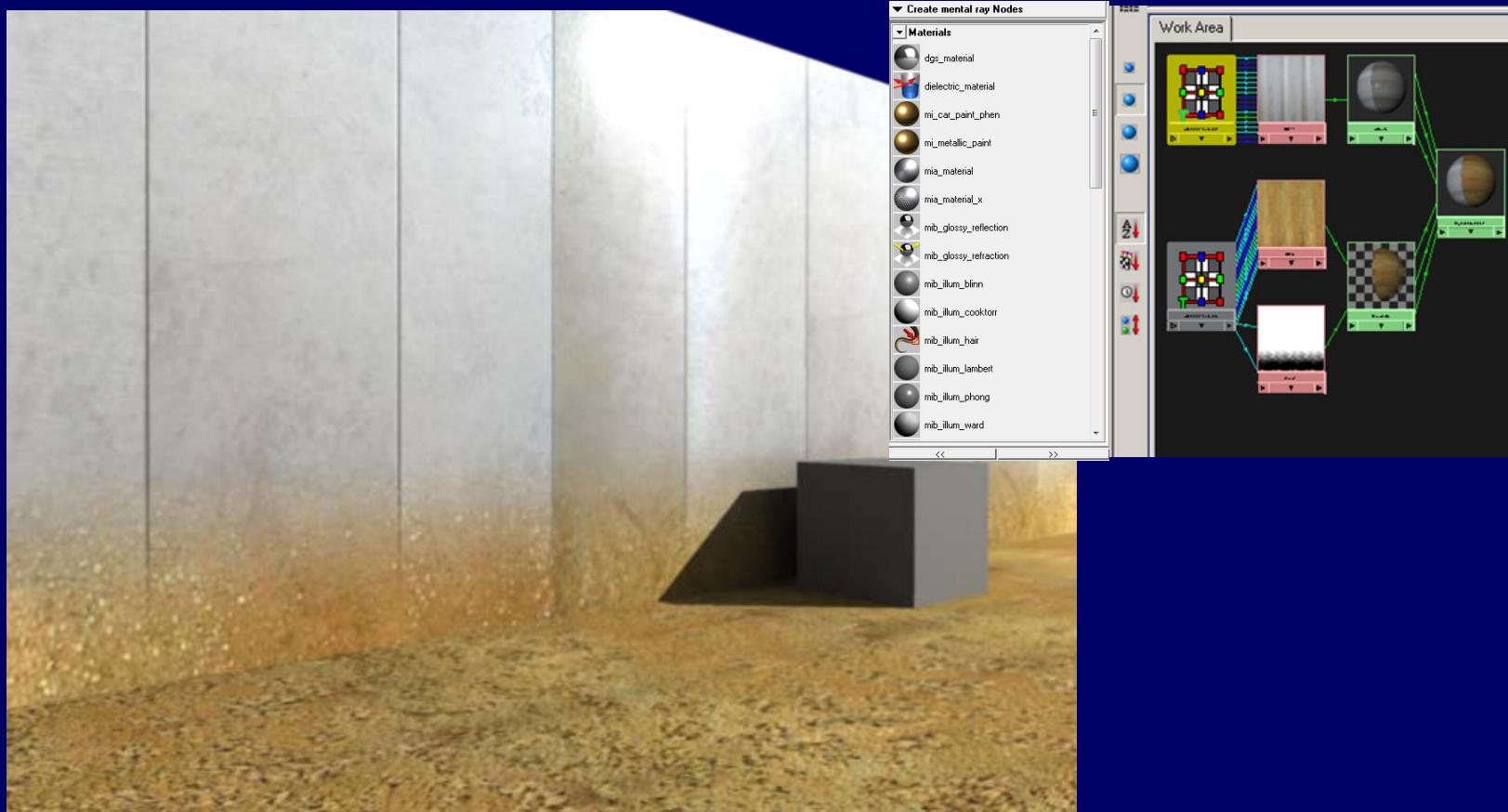
Color – dirt and ageing

We can use layered textures to mix several textures in one texture. So an object can obtain several different textures like brick and dirt.



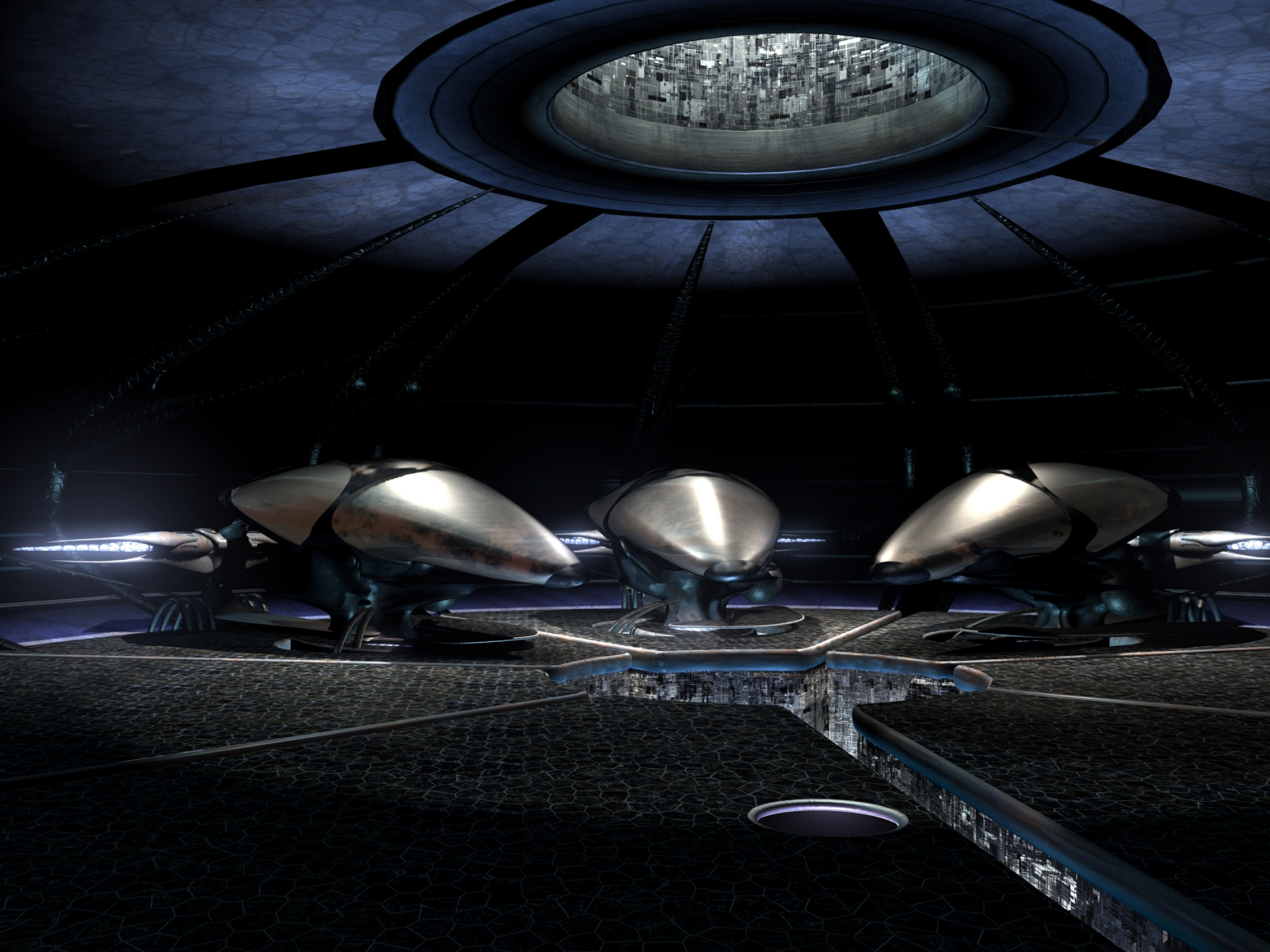
Color – dirt and ageing

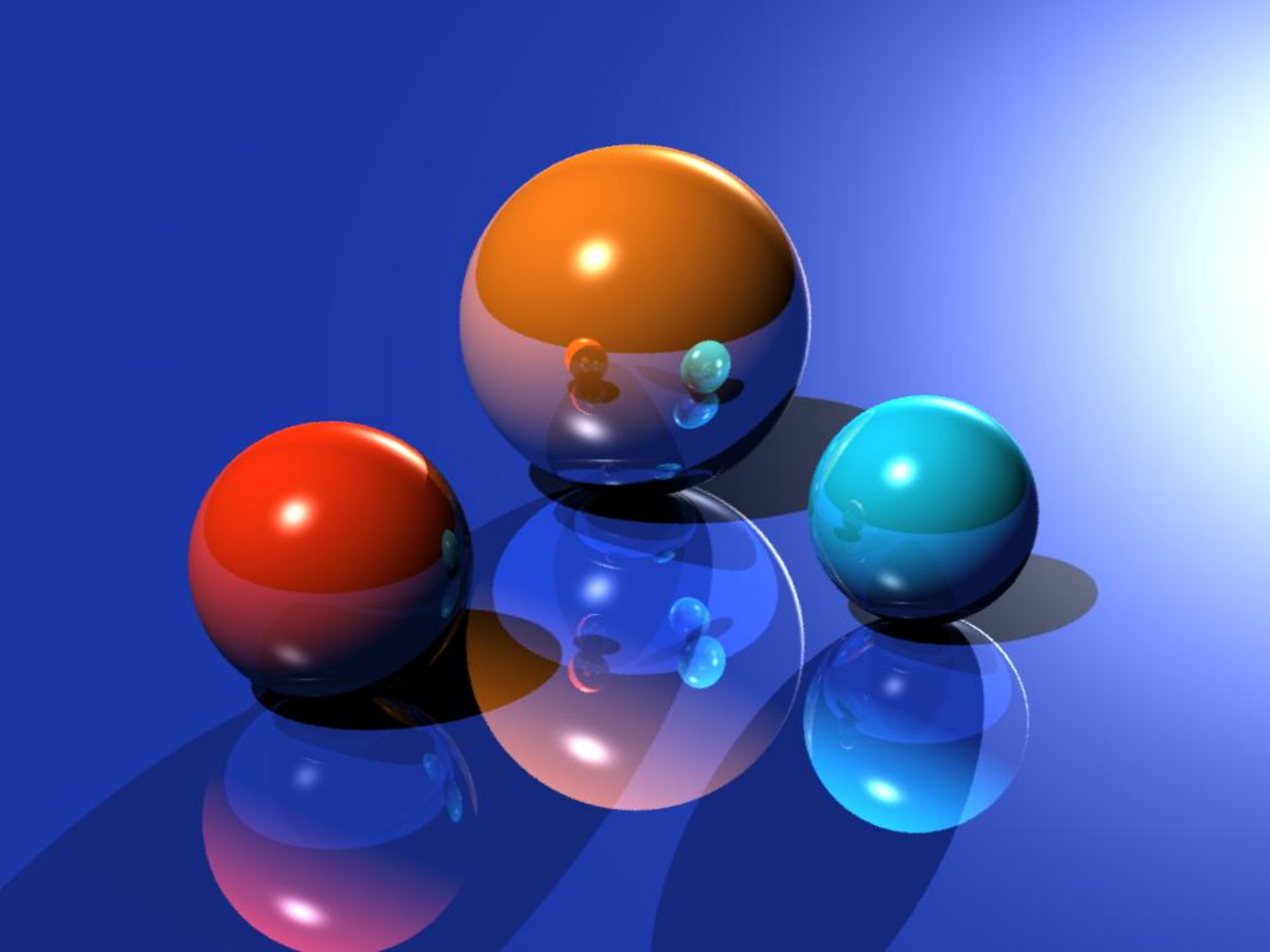
We can use layered shaders to mix several shaders. The difference with the layered texture is that the layered texture has only one option for the shader setting . A layered shader has multiple.





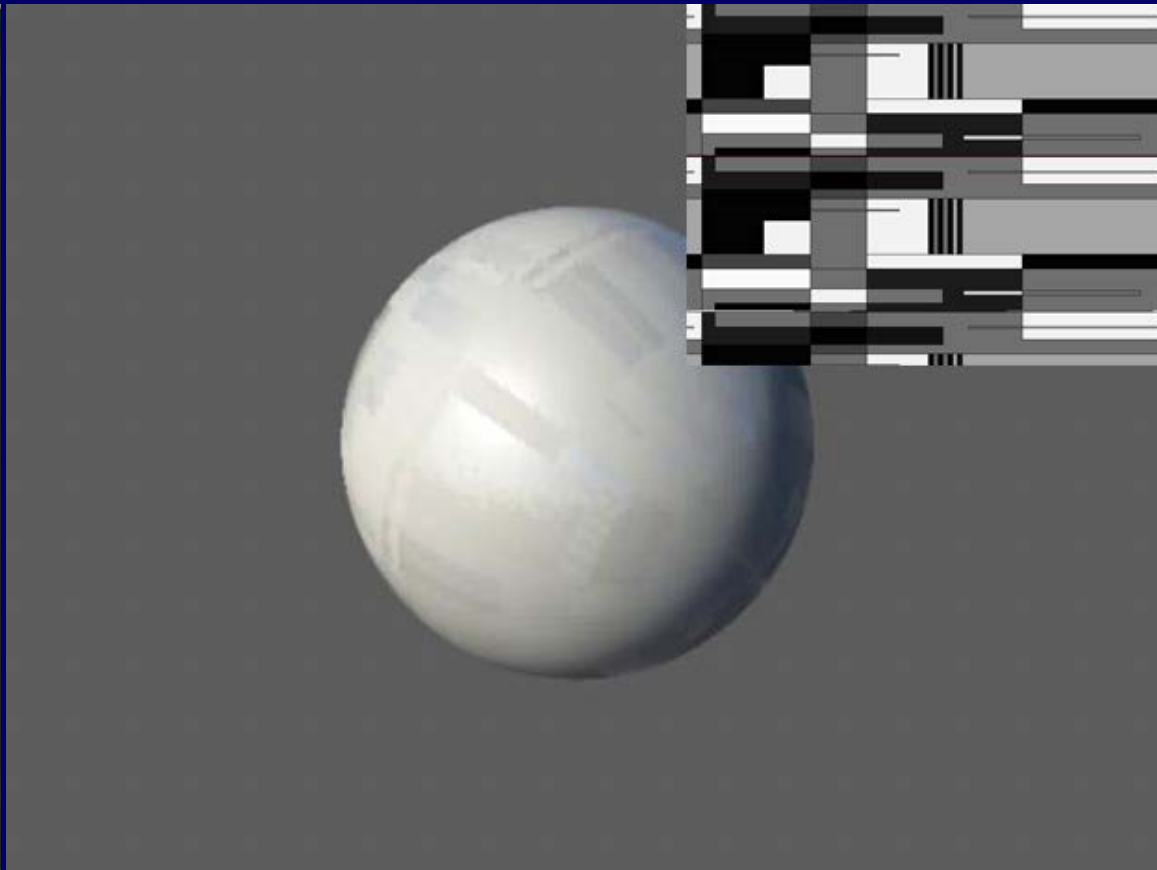
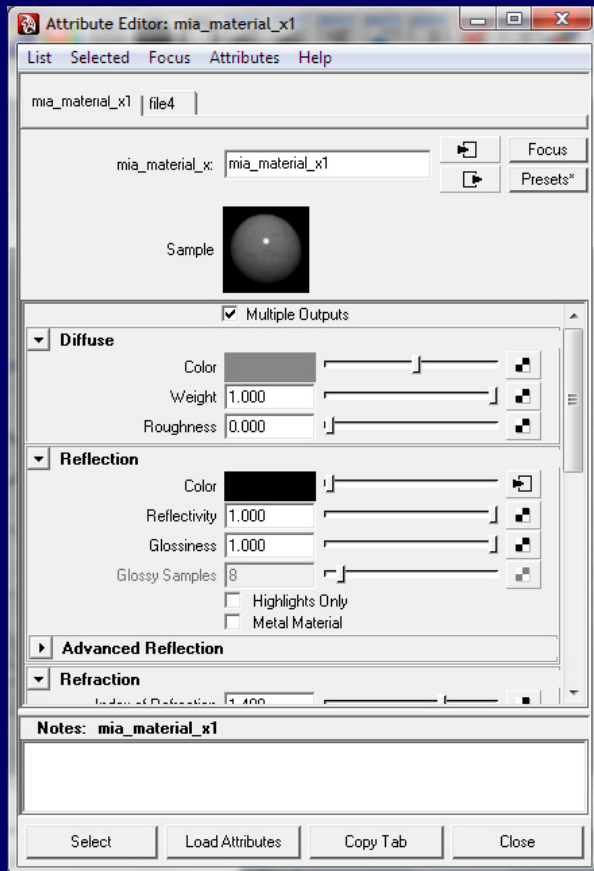






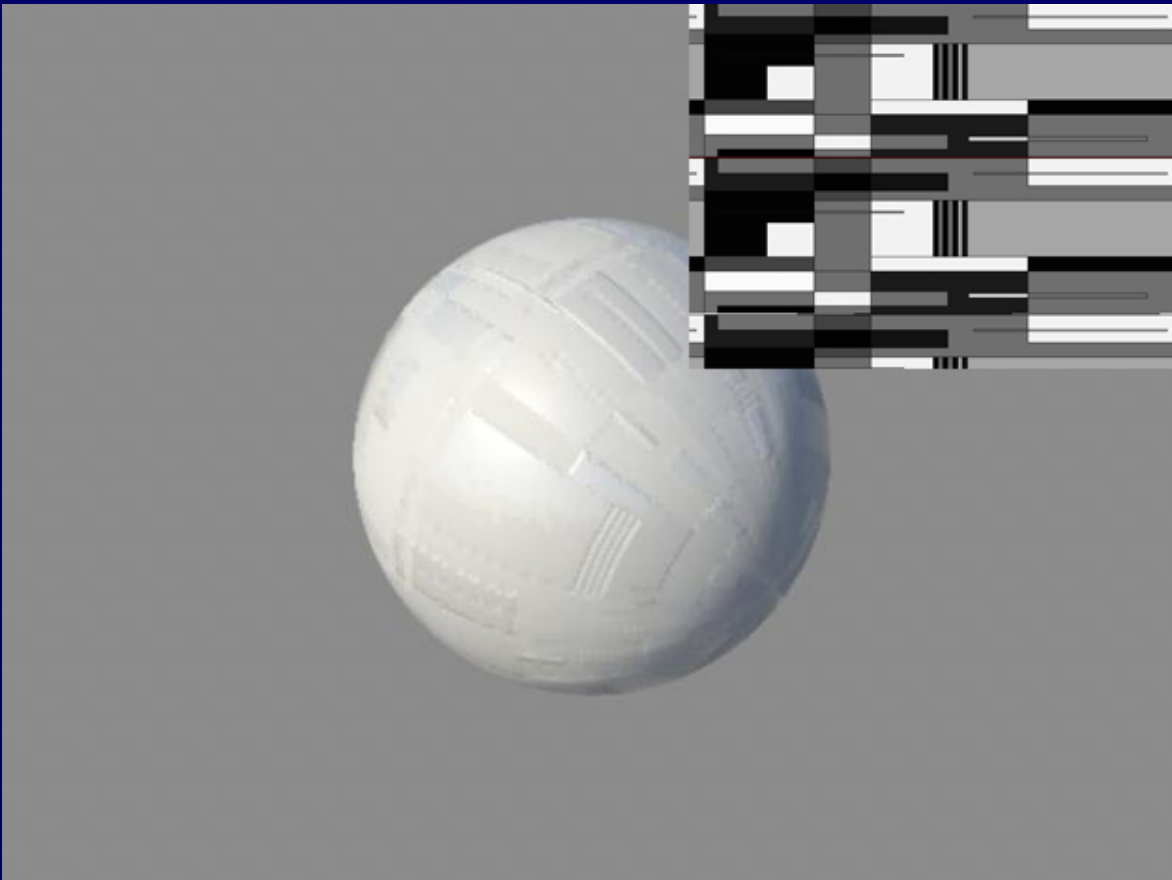
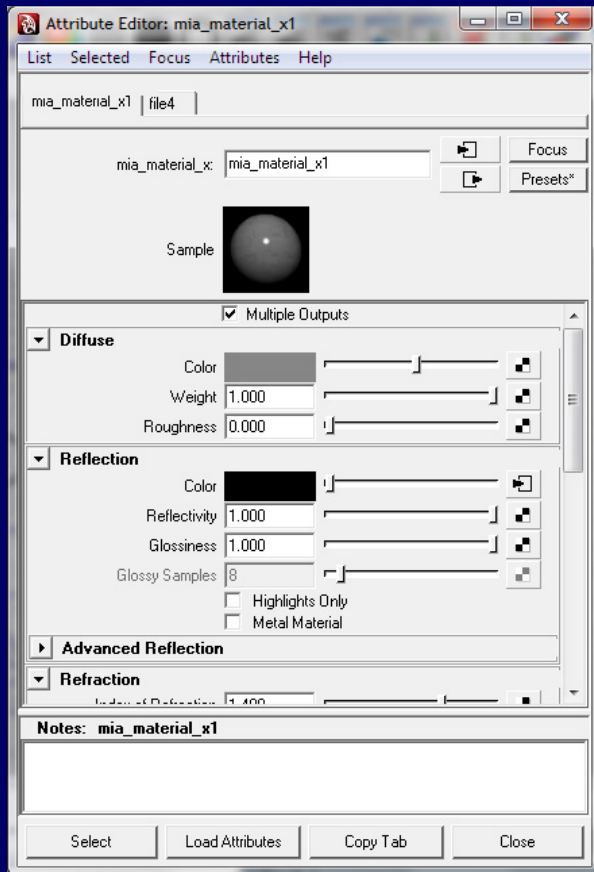
Reflection color

Using a texture map for the reflection color to simulate the dirt on the material



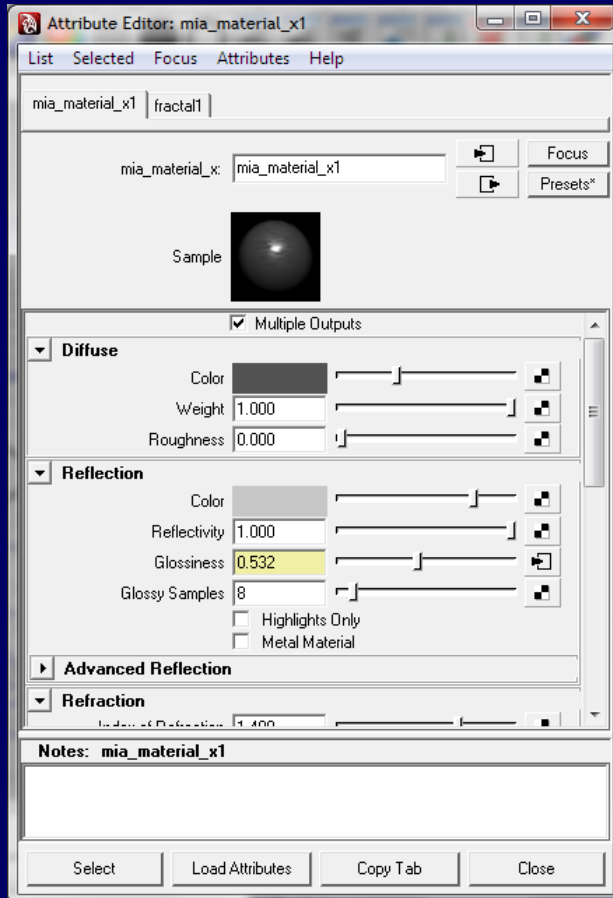
Reflection color

Using a texture map for the reflection color and bump to simulate complexity of the object



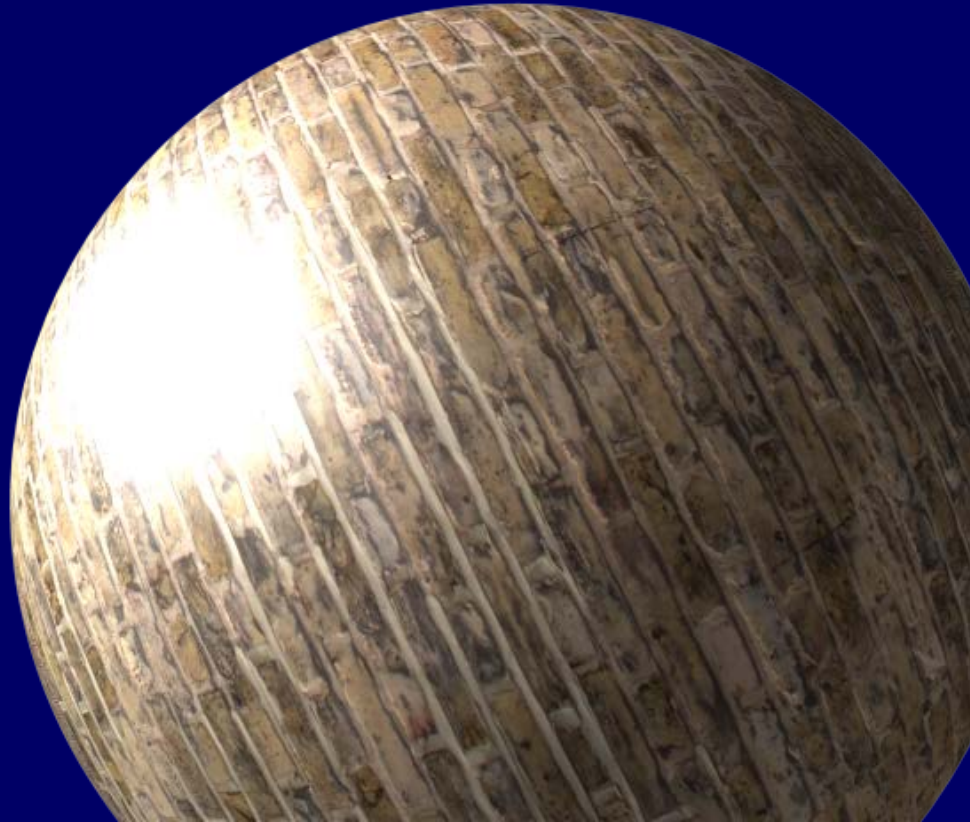
Glossiness

Using a texture map for the glossiness to simulate scratches on the material



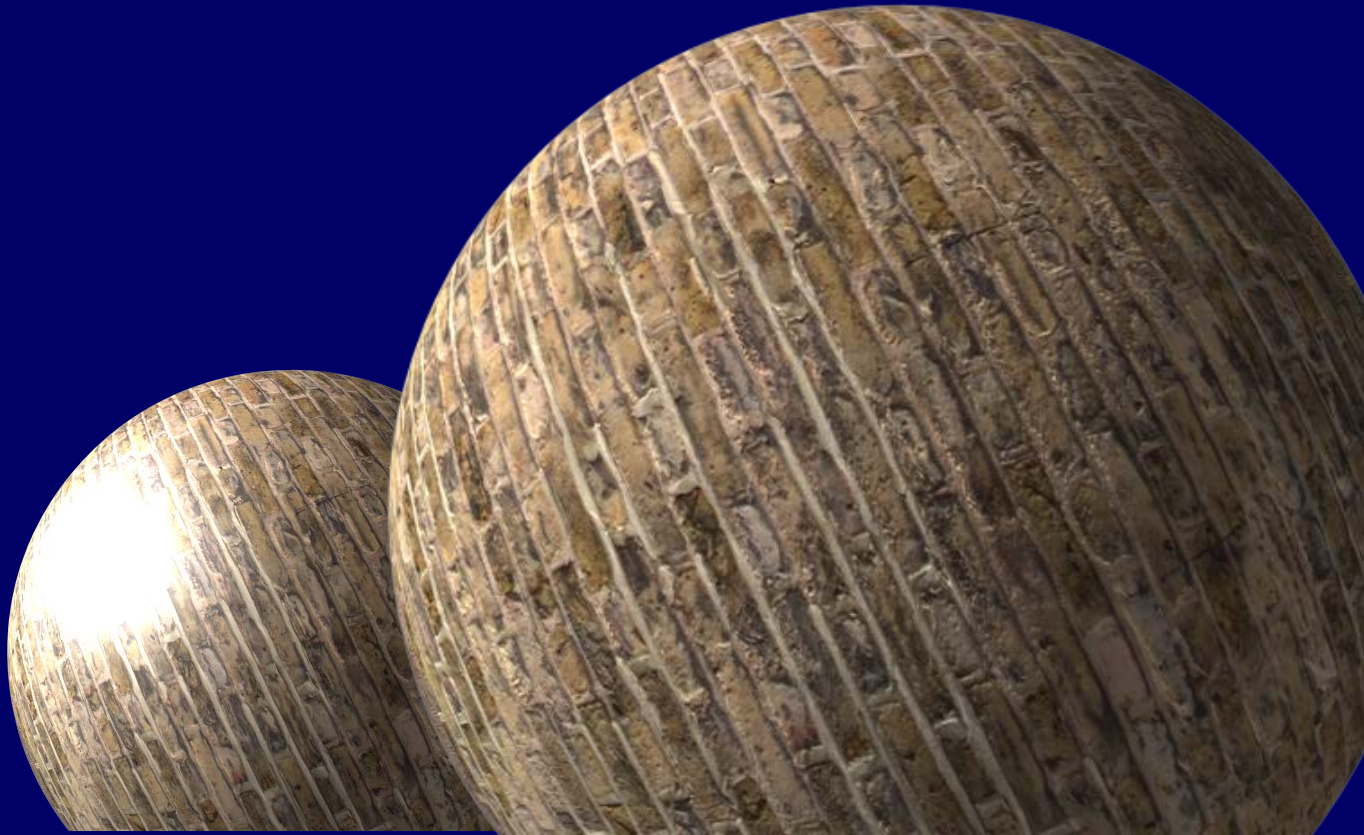
Reflectivity

What is wrong with this picture ?



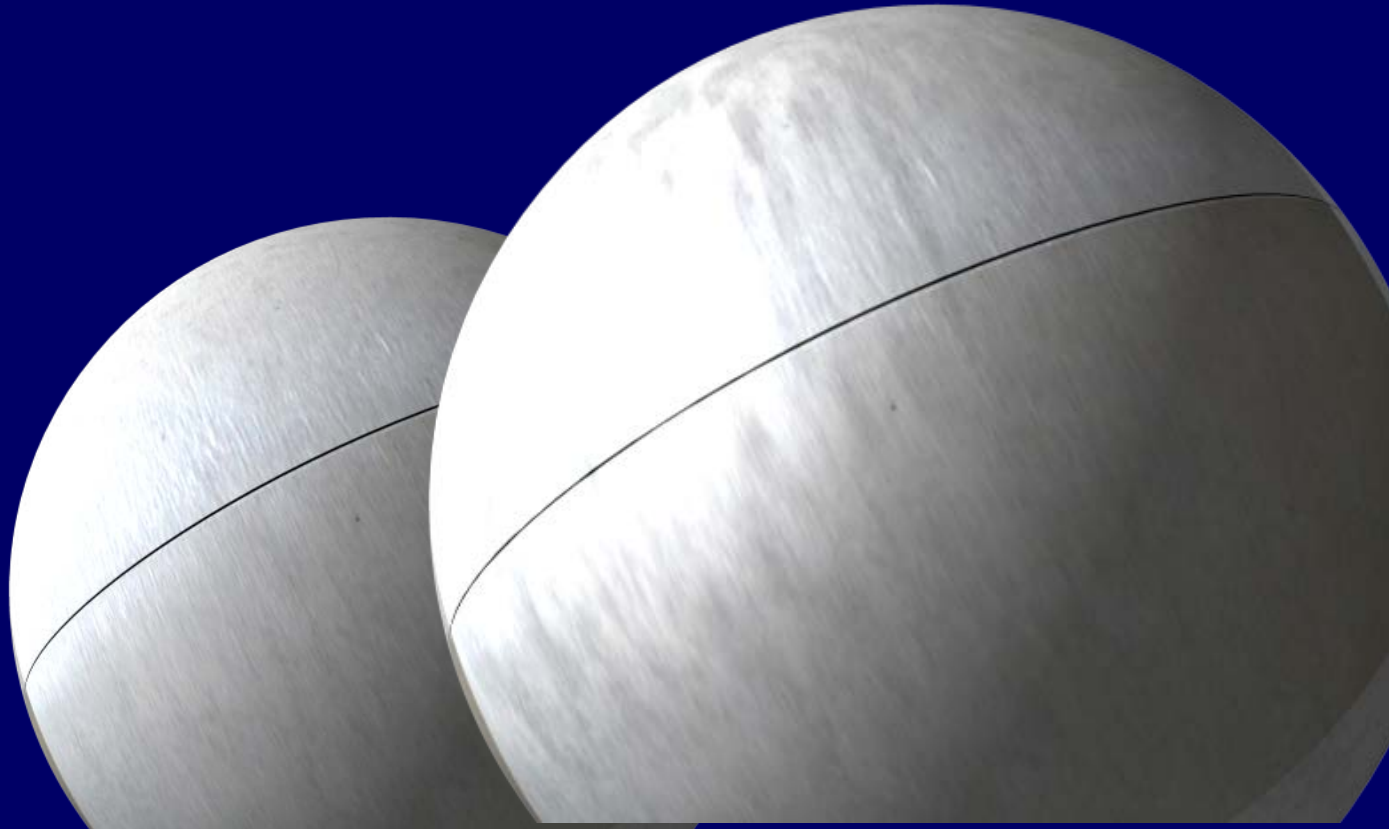
Reflectivity

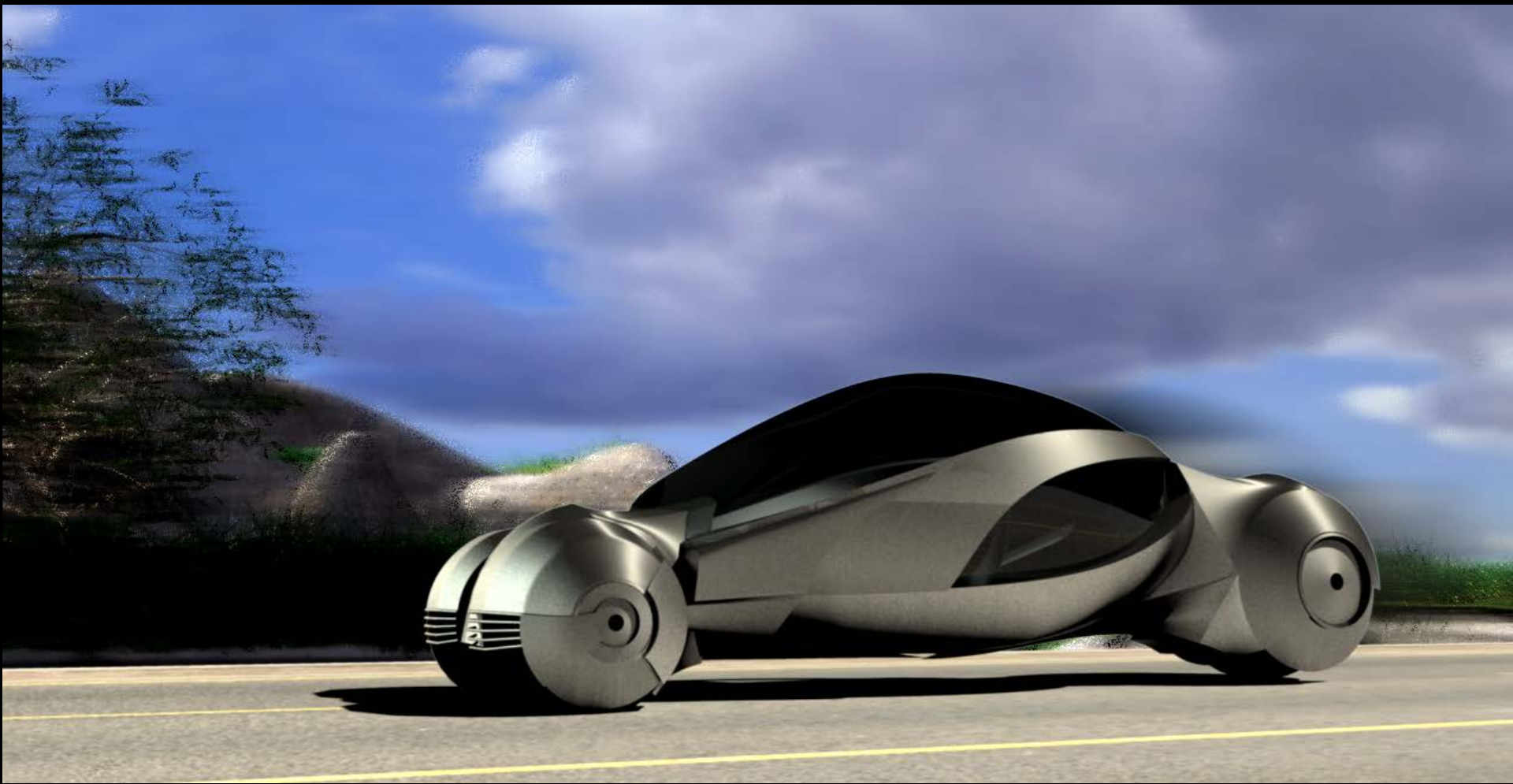
Specular highlights on matte objects can give the object a plastic look.

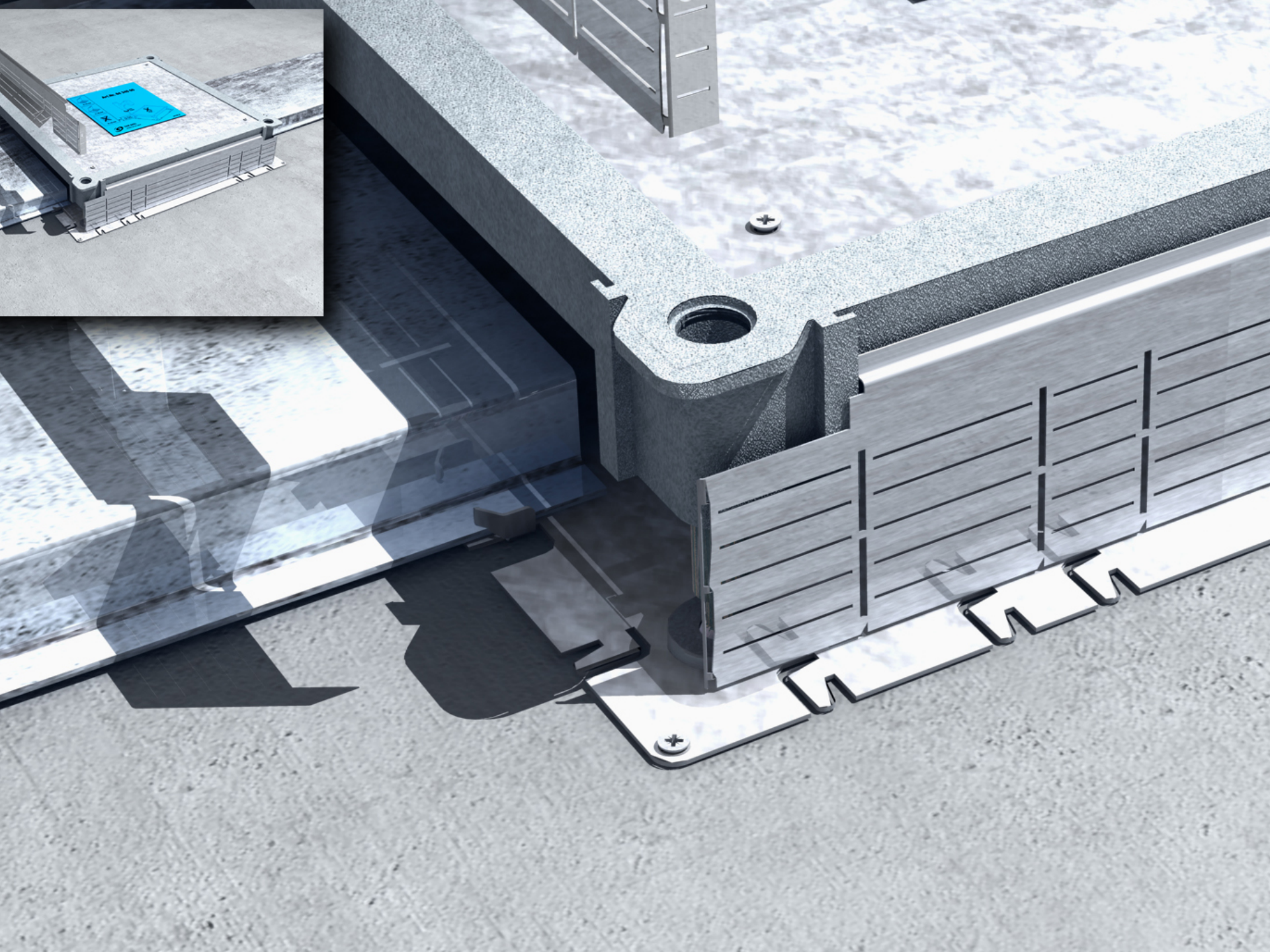


Reflectivity

Especially metal objects have distinctive highlights







Reflectivity and color mapping



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Reflection

Standard reflection of materials is set to 0.6 (60%).

The amount of reflection is based on the material properties like type and smoothness.

- A mirror 0.9
- Glass 0.3
- Shiny plastic 0.4
- Shiny floor 0.1
- Shiny metal 0.2
- Brick 0

Raytrace reflection will react to a bumpmap. Smoothness can be partially simulated with the bumpmap.

The diffuse reflection of brushed metals will need a reflection blur to simulate the microscopic scratches of the surface.

Reflection

Standard reflection amount



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Reflection

Effect of bump on reflection



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Reflection

Glossiness

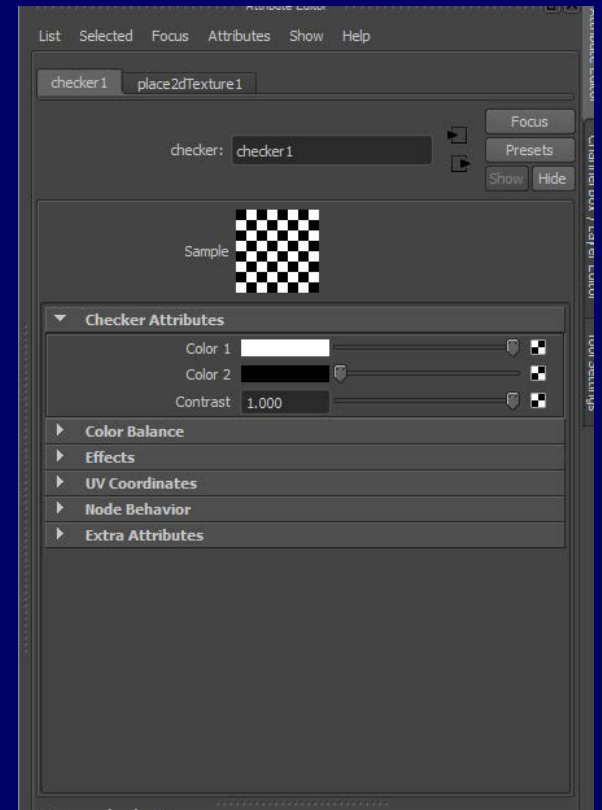
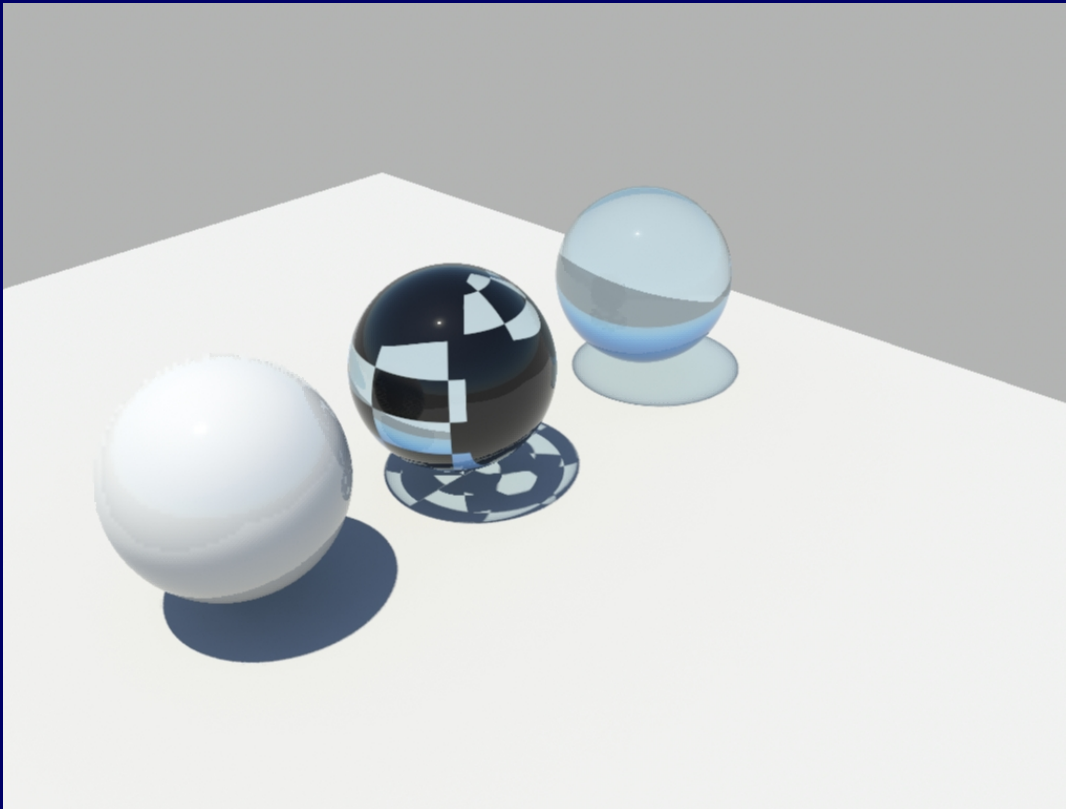


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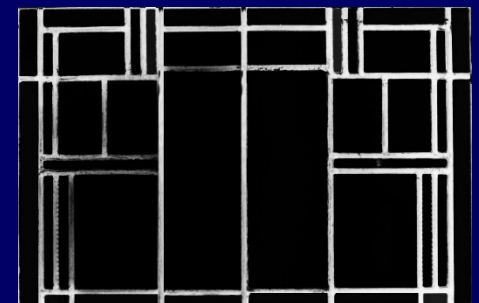
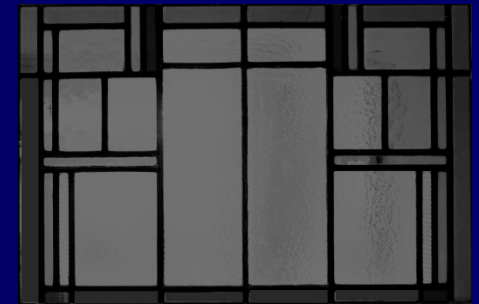
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Transparency - mapped



Transparency - mapped



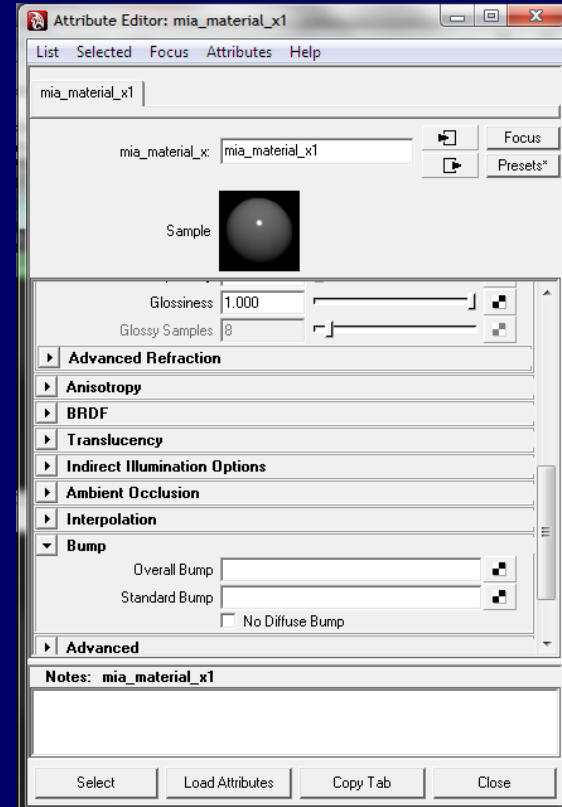
Cutout opacity - mapped

Cutout opacity (MIA material) is not the same as transparency.
A transparent surface may still reflect and refract!
'Cutout' parts of a surface are completely ignored



Bump material

By adding a bump map the shader can simulate a more complex geometry by locally simulating depth of geometry. The effect is 2D and influences only the shading properties and shadow effects on the object

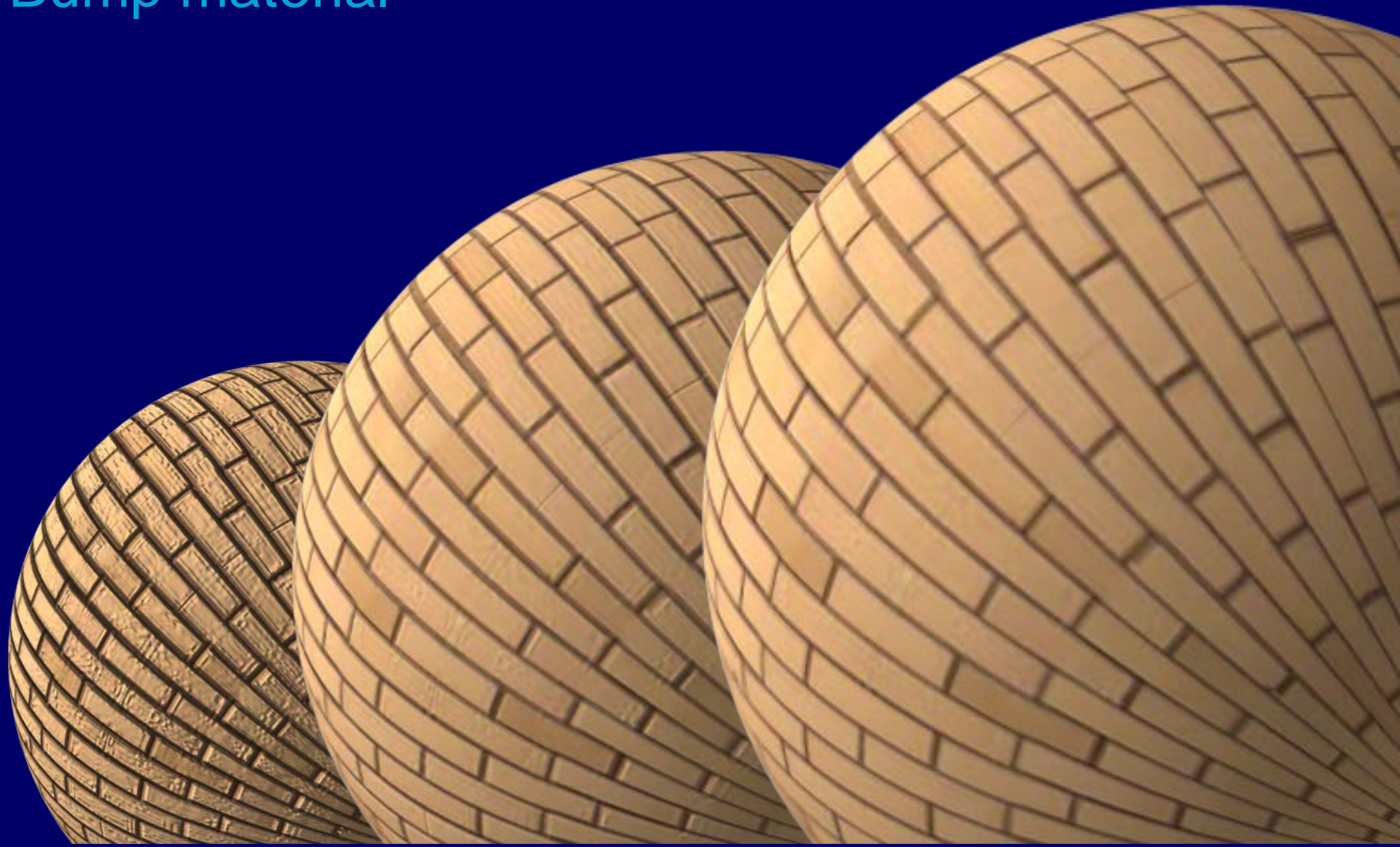


Bump material

The effect of the bump diminishes at a larger angle of view.



Bump material



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Bump material

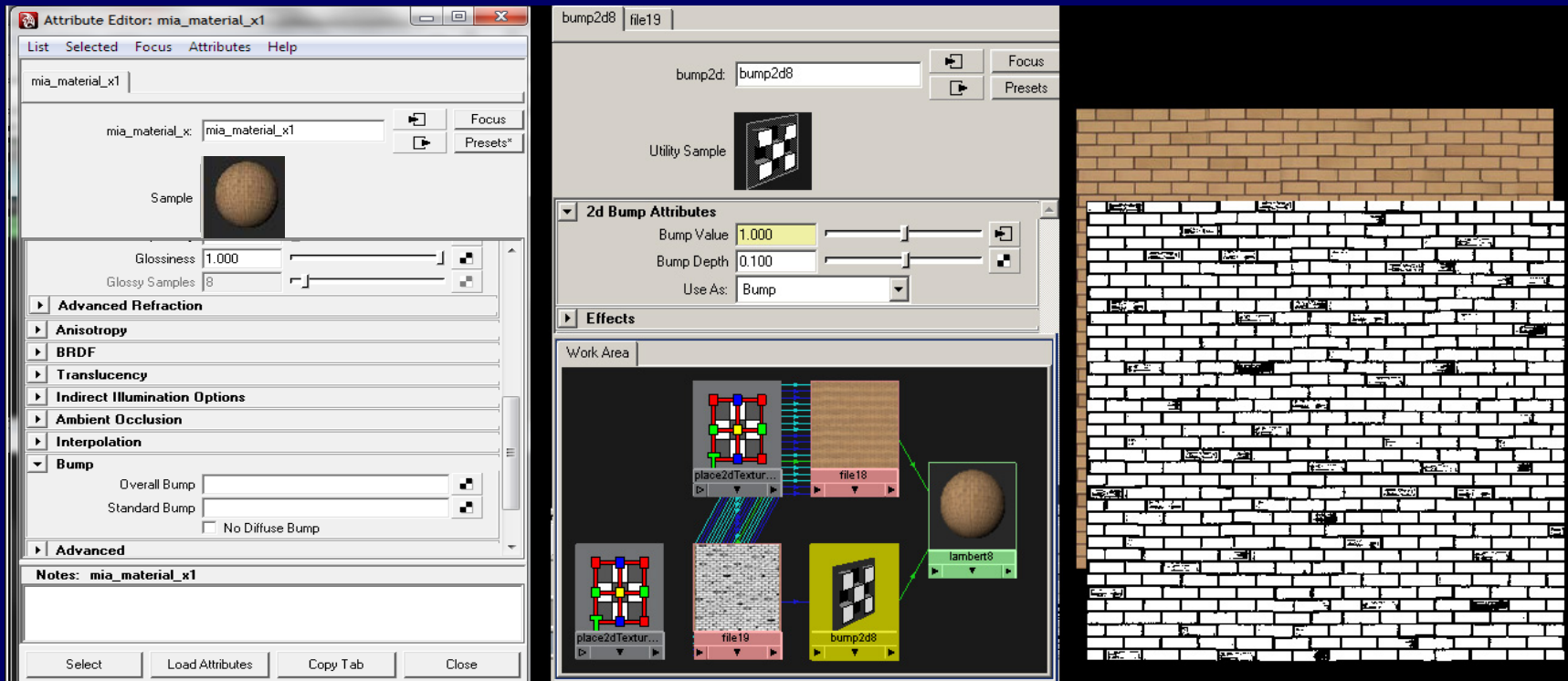
The bump map is based on a greyscale image.

50% grey is a neutral position (no bump effect)

White areas are protruded by the maximum distance (bump depth)

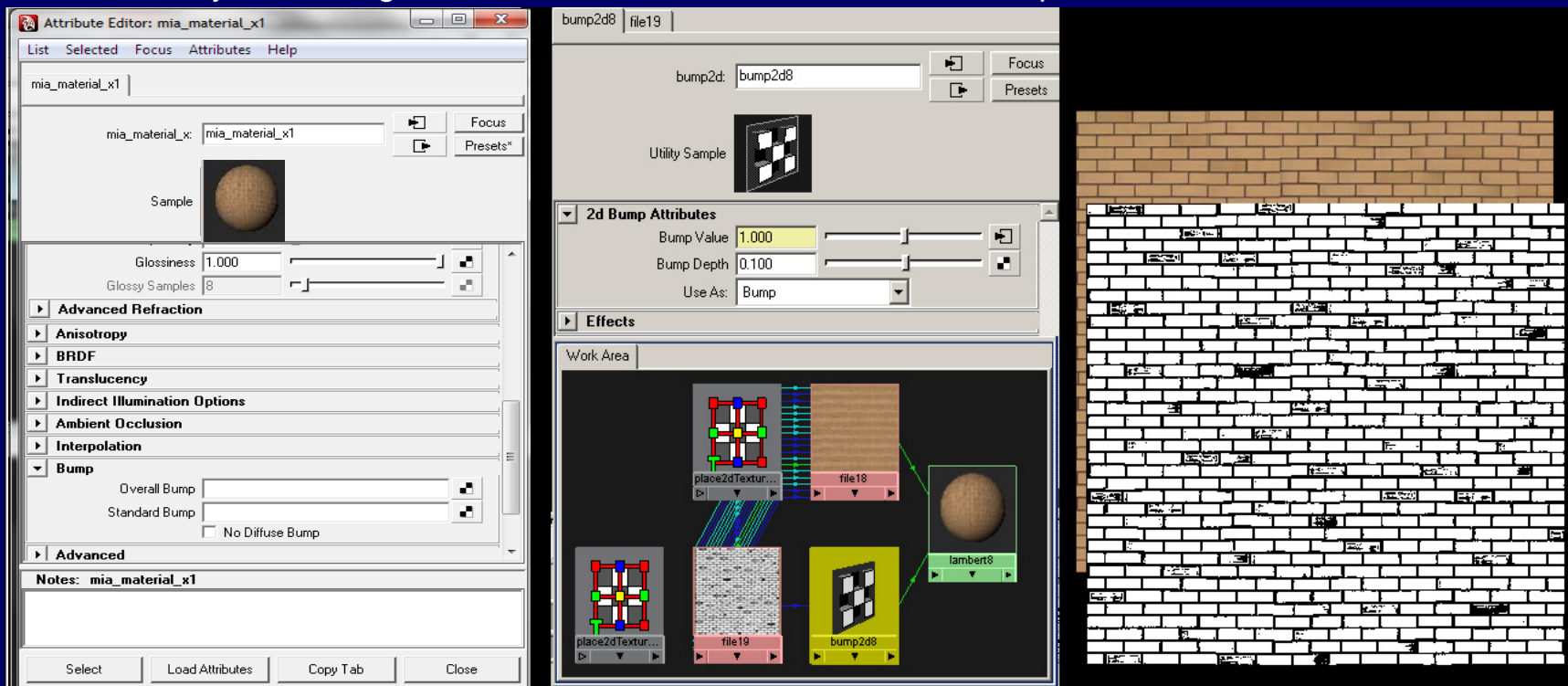
Black is 'pushed' inward by the maximum

The gradient between black and white simulates different heights of the texture.



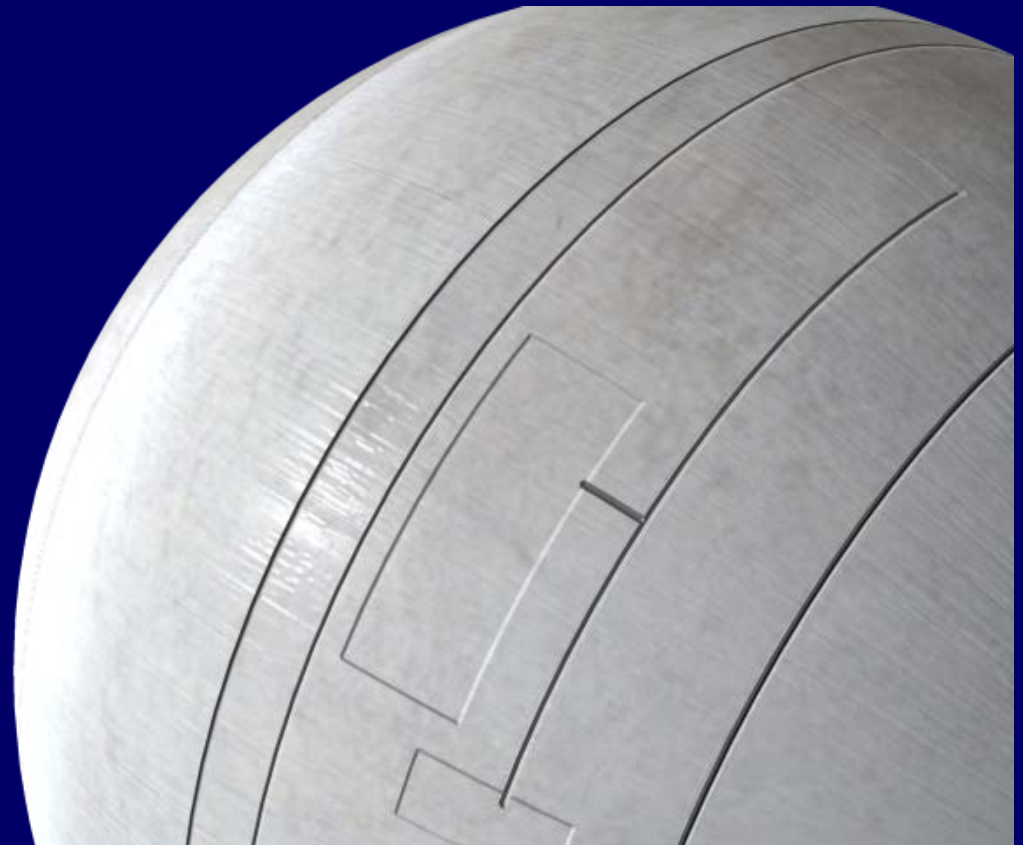
Bump material

- In photoshop this bump texture can be created by:
- Enhancing the contrast of the colour image and de saturate the result.
- Colour select the grooves of the brick wall and paint them black. De saturate the image.
- Manually draw the grooves in the brick wall with a black colour pencil or line.

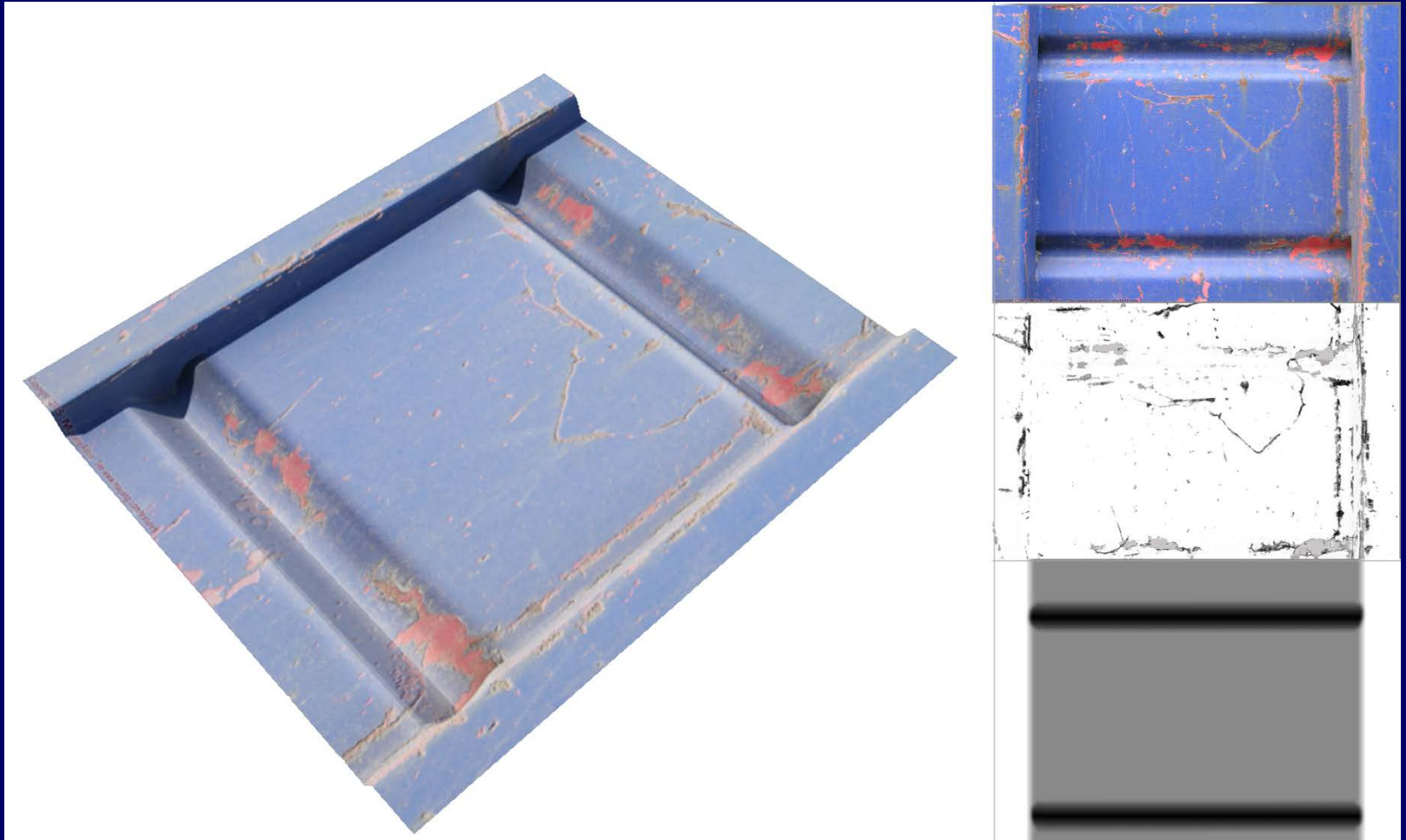


Bump material

Extra detail of the geometry can be added by making a bump map, to simulate panels for example. In this case the bump map isn't related to the type of material but never the less intergrated in the shader.



Displacement material





Tips and tricks

- Analyse the material used in your scene on the following aspects.

Color

- Photo or map made in photoshop
- Tiling aspects
- Age of material (combining textures or shaders)
- Dirt on material (combining textures or shaders)
- Size of texture maps used.

Transparency

Bump

- Analyse the roughness of the surface
- Adding extra geometry detail by using bump
- Effect on specular highlights and reflections.

Specular shading

- Shinniness of the material
- Uniform or influenced by tiny scratches or dirt on surface (apply specular shading texture)

Reflecting

- Amount
- Influenced by dirt or roughness of material.

Test textures with the least amount of geometry in the scene. If starting testing, save the implementation and testing of the settings of reflectivity and refraction for last due to rendertime

Final notes

- When using file textures:

Use Maya project (Create and Set project)

- When using grayscale images for properties such as transparency, bump, reflectivity, cutout, etc:

- **PNG files are preferred**

Jpeg may produce strange artifacts due to lossy compression

- **Color Balance > Alpha is Luminance**

To make sure it works as expected

Otherwise it uses the 'alpha channel' of the image, which in most cases is empty (unless you created it manually, e.g. in Photoshop) and jpeg images can't even have one.

