

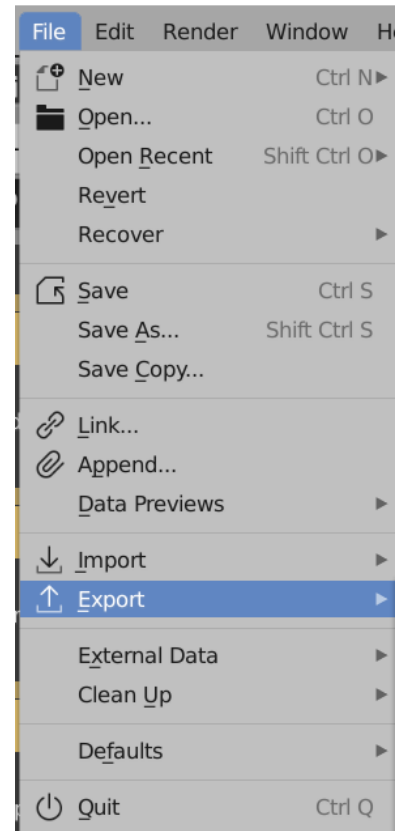
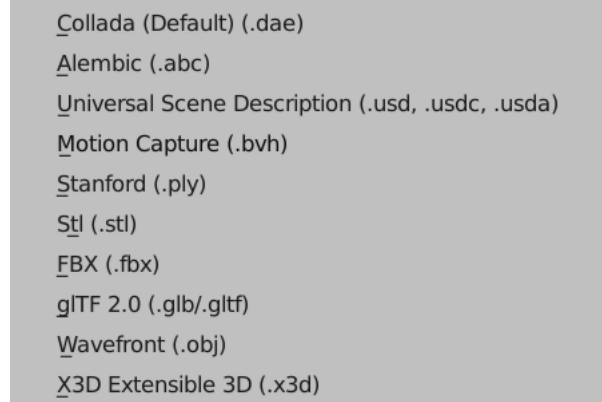
## Exporting Blender models & textures/materials to Vue

The best software for creating geometric models is AutoCAD or it's equivalent: GstarCAD. The best software to create organic models is Blender.

The process of exporting a Blender model for importing into Vue is quite straight forward:

- Select **File**, then **External Data**. Check **ON** the **Automatically pack into .blend** item.
- Select **File**, then **Export** and then select which file format to export to:

The best file-types for import into Vue seem to be .FBX and .OBJ



Our first example will be a simple ball-peen hammer modeled in a blender tutorial. This was exported as an .FBX file to the **Importable objects/FBX** folder in Vue.



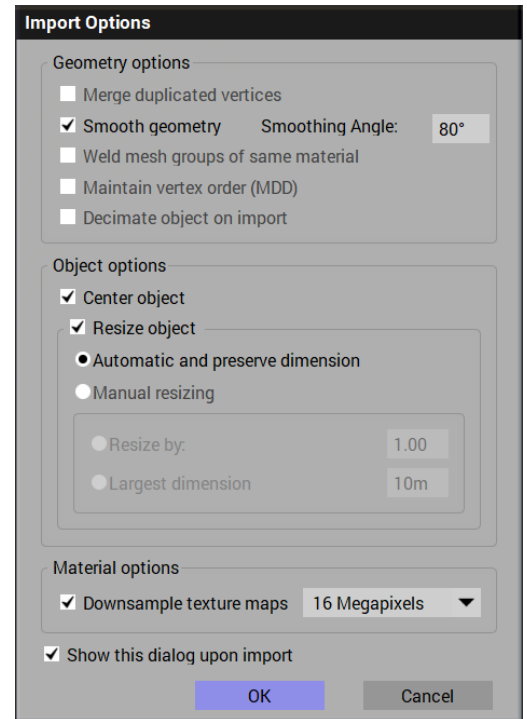
When we import the hammer into Vue, not only do we want the 3D mesh that defines the item but we would also like to have the model's colours, materials and the material textures to be exported as well.

- In Vue the exported is imported by clicking on **File/Import Object**. A file widow will open. Select the folder and .FBX file to load.

The Import Options window opens. If it does not, make sure to check the box for "Show this dialog upon import" on.

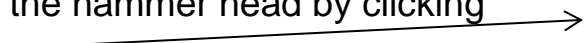
- Generally the settings to the right are correct. Set them accordingly and click **OK**.

The hammer should load into the scene. You will notice that the geometry is properly loaded but textures are missing. The only colour information that came over was the wood of the handle.



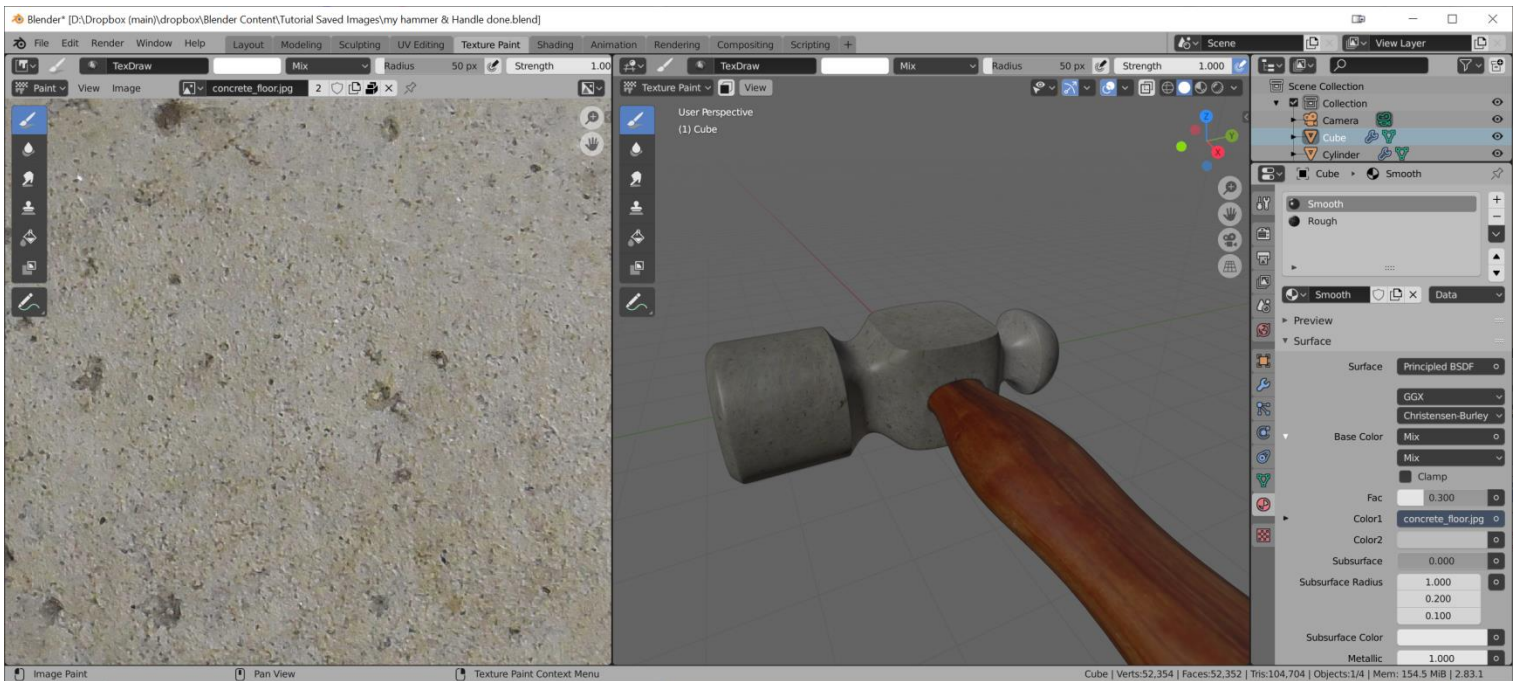
When the hammer was constructed in Blender, it was given two different colours for the head but using the same texture material.

Blender and Vue can be open at the same time. Just switch between them.

- In Blender press **tab** to go to **Object Mode** and highlight the hammer head only.
- Open the **Material Properties** panel for the hammer head by clicking the icon to the right of the display area. 

The basic colour information for the **Smooth** part of the hammer head is from the **Color1** parameter which set to a bitmap file called `concrete_floor.jpg`.

- Press the **Texture Paint** menu at the top of the display to see that the `concrete_floor.jpg` bitmap picture is now applied to the hammer head:



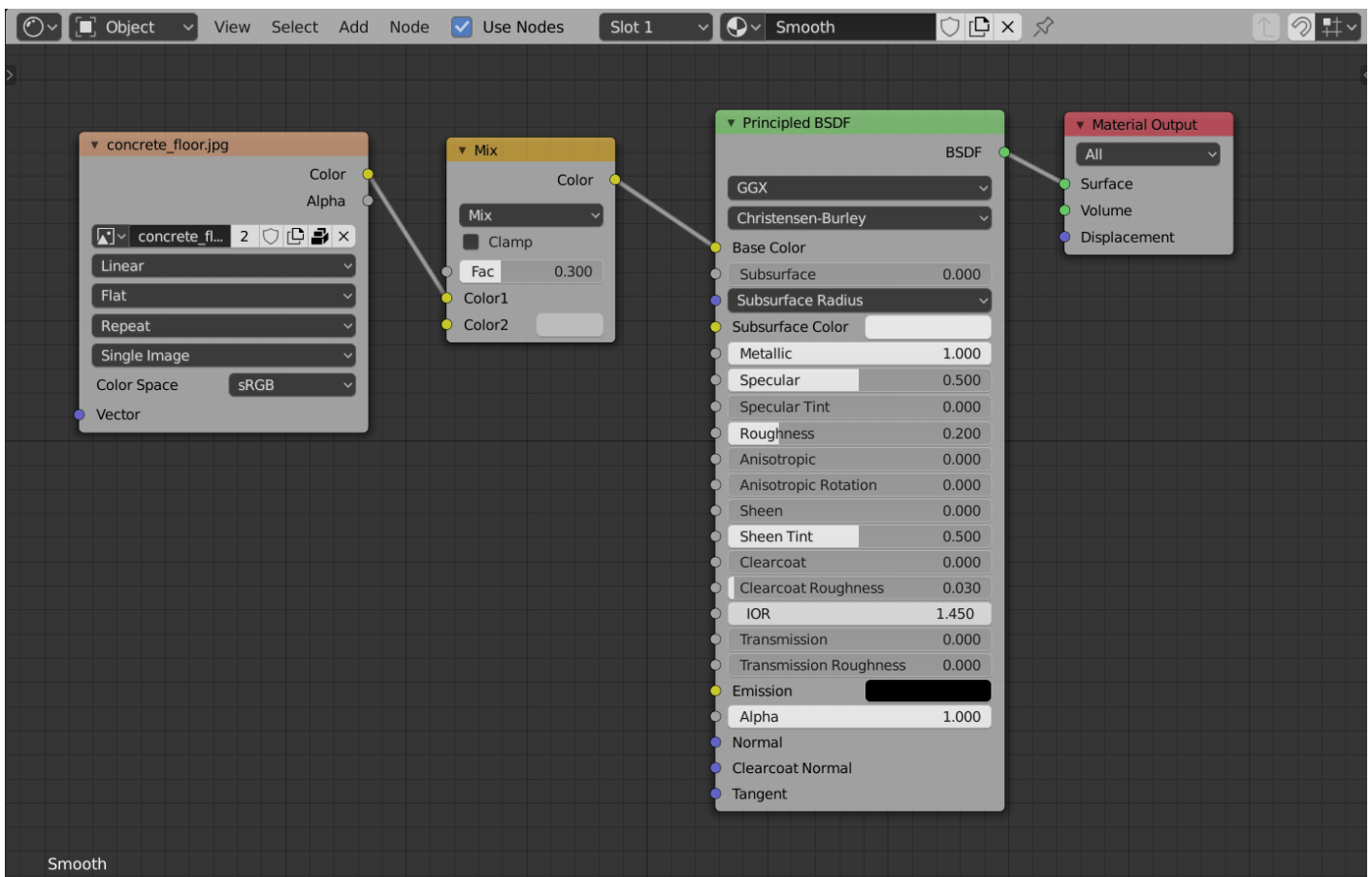
- The texture used for the hammer head is the same for both the **Smooth** material and the **Rough** material. The difference in the hammer head's appearance is in the **Shading** parameters of the `concrete_floor` material.

Much of this data can be seen in the right panel when the **Material Properties** icon is selected, but a better view is offered under the **Shading** tab at the top of the display area.

1. Switch back to **Layout** mode, then select the hammer head and click on the **Shading** tab.

In the **Shading** view the various nodes of the material for the hammer are shown:

2. Make sure that, above the node display, the materials list in is set to **Smooth**.

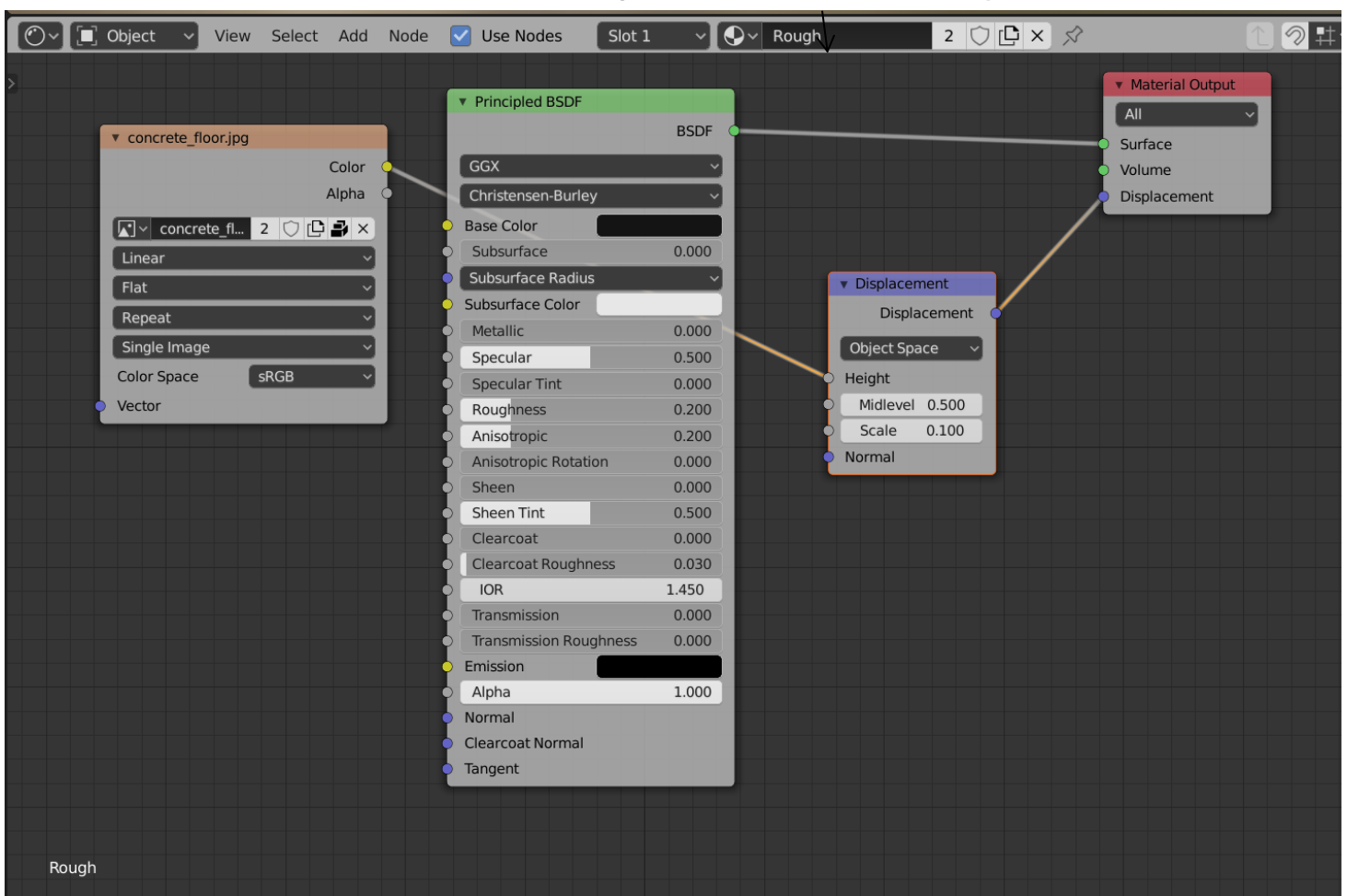


1. The first, **Texture** node is using an image that sets the texture colour: `concrete_floor`.



- The second, **Mix** node is a mixer of the two input colours. The Fac or mix factor is how much (.3) of the unconnected input (Colour) is used for the **Color** output to the **Base Color** input of the **BSDF**.
- The **BSDF** node. (BSDF stands for: **bidirectional scattering distribution function** which is a material standard used in Blender and many other 3D applications, established by Disney). Of note here are the values of Metallic (1.0), Specular (.5), Roughness (.2) and Sheen Tint (.5).
- The output of the **BSDF** usually goes into the **Material Output** node's **Surface** input, which will finally influence the material's appearance.

➤ Now click on the materials list again and select the **Rough** material.

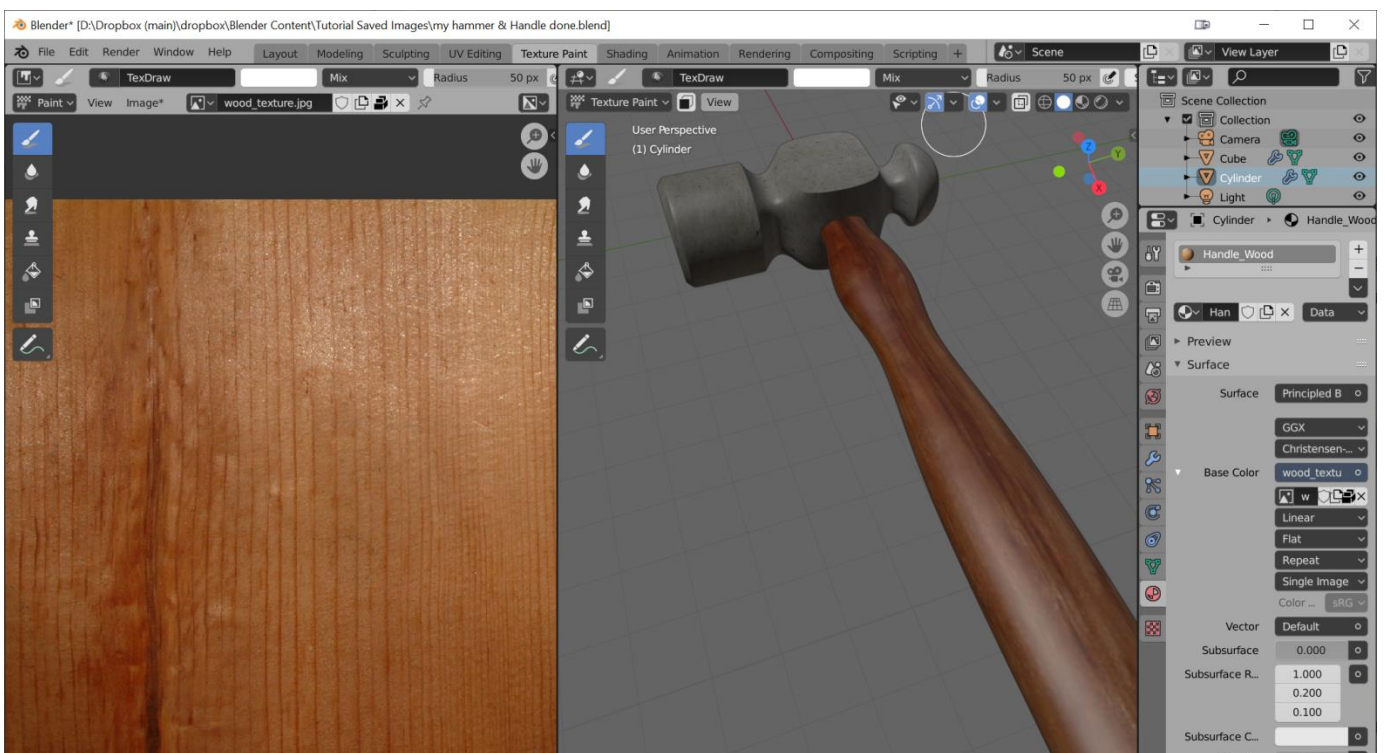


Note here that the **Mix** node has been removed and instead, a **Displacement** node has been added.

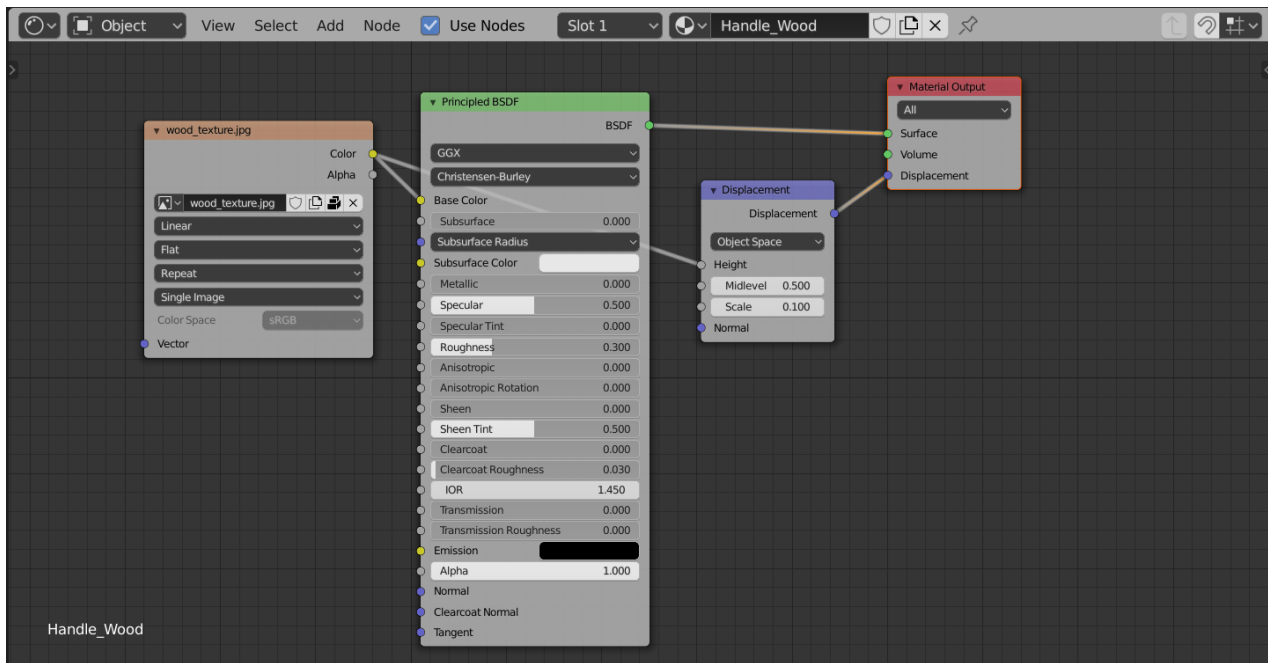


1. The first, **Texture** node is using an image that sets the texture colour: `concrete_floor`. But Instead of feeding the **Base Color** of the **BSDF** it feeds this colour to influence the **Height** input of the **Displacement** node.
  2. Here, the **BSDF** node feeds directly to the **Material Output** to define the material's appearance. It's **Base Color** has no influencing input but set at a flat black: Base Color
- Of note here are the values of **Metallic** (now 0), **Specular** (.5), **Roughness** (.2), **Anisotropic** (.2) and **Sheen Tint** (.5).
3. The **Displacement** node receives its **Height** information from the texture image so the roughness of its surface will be directly influenced by the `concrete_surface.jpg` file. It is set for **Object Space**, **Midlevel** (.5) and **Scale** (.1)
- Of note here is that the **Displacement output** of the **Displacement** node feeds to the Material Output's **Displacement** input.
4. The output of the **BSDF** usually goes into the **Material Output** node's **Surface** input, which will finally influence the material's appearance. But also, this time the output of the **Displacement** node is connected to the **Material Output's Displacement** input.
- Now click on the materials list again and select the **Handle\_wood** material. Then click the Texture Paint tab to see the wood material.

The wood material used for the handle is an image file, as before with the head. This one is named: `wood_texture.jpg`.



- Now click back on the Shading tab to see the nodes used for this material.



The node setup here is very similar to the previous; **Rough** material

1. The first, **Texture** node is using an image that sets the texture colour: wood\_texture. It feeds into the **Base Color** of the **BSDF** but also feeds this texture file to influence the **Height** input of the **Displacement** node.
2. Here, the **BSDF** node feeds directly to the **Material Output** to define the material's appearance. It's **Base Color** is defined by the incoming **Texture** node.

Of note here are the values of **Metallic** (now 0), **Specular** (.5), **Roughness** (.3) and **Sheen Tint** (.5).

3. The **Displacement** node receives its **Height** information from the texture image so the roughness of its surface will be directly influenced by the **wood\_texture.jpg** file. It is set for **Object Space**, **Midlevel** (.5) and **Scale** (.1)

Of note here is that the **Displacement output** of the **Displacement** node feeds to the Material Output's **Displacement** input.

- The output of the **BSDF** usually goes into the **Material Output** node's **Surface** input, which will finally influence the material's appearance. But also, this time the output of the **Displacement** node is connected to the **Material Output's Displacement** input.

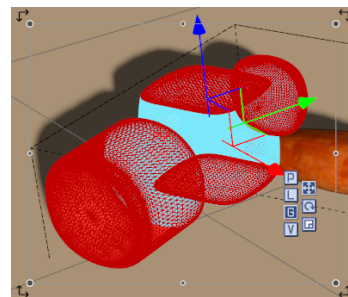
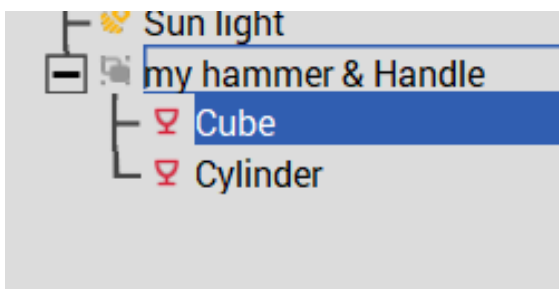
## Getting the equivalent Materials in Vue


### Hammer head

The head of the hammer seems to have no defining texture or colour when imported into Vue.

To begin we will apply the concrete\_floor.jpg, which we have access to, onto the hammer head.

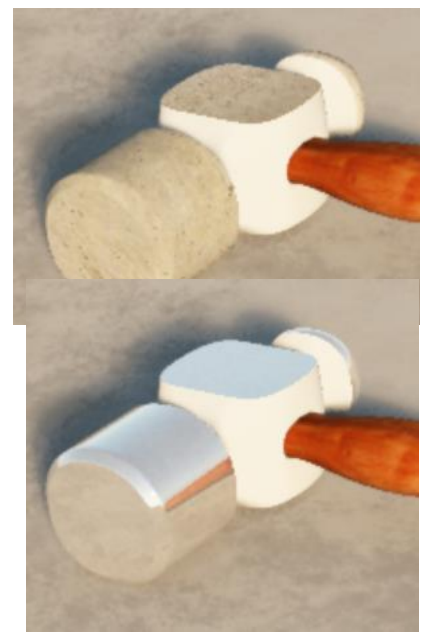
- In **World Browser**, highlight the hammer head. The object imported into Vue is called my hammer & handle. Expand the object and select cube (the hammer head). (the handle is called the cylinder)



- In the **Object - Aspect** panel, note that there are arrows that indicate there is more than one material in this object. Make sure that material 1 of 2 is showing and double-click the sphere to open the **Advanced Material Editor**.
- Note that the material layer is called **Smooth** (from Blender). With the **Color** tab highlighted, change the **Mode** to **Mapped picture** and click the **Download image** icon:  Search the files for the concrete\_floor.jpg file to load it.

The smooth sections of the hammer head now take on the concrete material.

- Blender used a **Mix** node to bring the material colour to a lighter shade. Here, the Overall Color can be set to a metallic grey to get the same effect.





- Blender used the BSDF - Metalness parameter to make the hammer head look reflective. Here, under the **Reflection** tab, set the **Global reflectivity** to 90 – 95%.

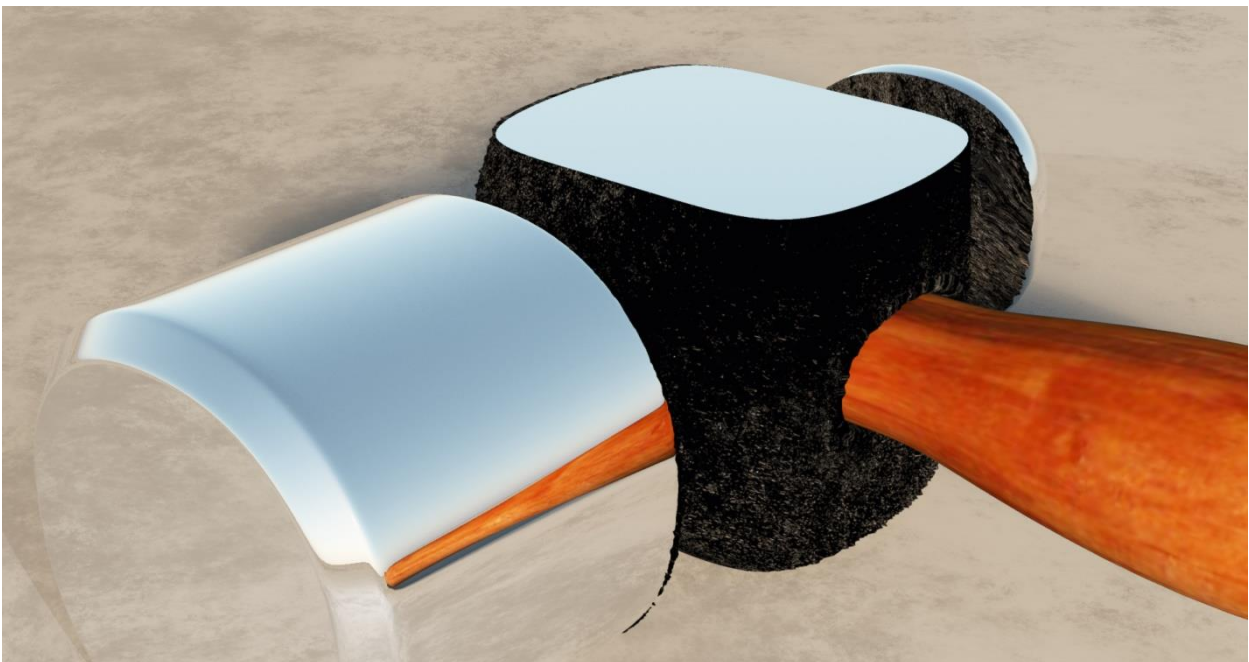
## Rough Material

- In World Browser, highlight the hammer head. The object imported into Vue is called my hammer & handle. Expand the object and select the cube.
- In the Object - Aspect panel, note that there are arrows that indicate there is more than one material in this object. Make sure that material 2 of 2 is showing and double-click the sphere to open the Advanced Material Editor.
- Note that the material layer is called **Rough** (also from Blender). With the **Color** tab highlighted, change the **Mode** to **Mapped picture** and select the **concrete\_floor.jpg** file again and set the **Overall color** to black.

Back in Blender the Rough material had a displacement applied to it using the concrete\_floor texture.

- In the **Advanced Material Editor** with the **Rough** material still open, select the **Displacement** tab and set its **Mode** to **Mapped picture** and select the concrete\_floor.jpg file. Set the **Depth** of the displacement to about 5.

The render of the hammer head shows the rough material, black and displaced.



## Wood Handle

Recall that the nodes used for the **Rough** material of the hammer head, included a **Displacement** node that received the **Color** output from the **Texture** node to its **Height** input. The Displacement node output then fed into the Material Output node's Displacement input.

The exact same node arrangement is used on the hammer's wooden handle.

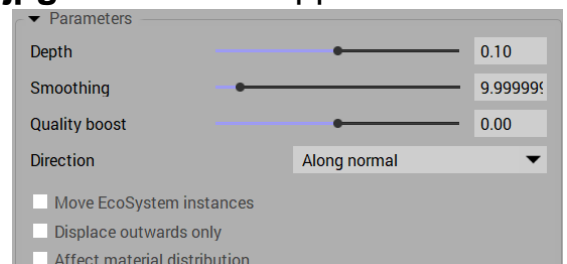
Here, the **wood\_texture.jpg** was automatically being used for the handle's colour. Now, we will also use that texture image to define the handle's displacement.

- In Vue, highlight the hammer handle (called cylinder here) and open the **Advanced Material Editor**.
- Click on the **Color** tab to see that the handle colour already uses a **Mapped picture** from the **wood\_texture.jpg** file.

You can change the colour of the handle by adjusting the **Overall color** in the **Color correction** area

Now we'll add some displacement texture to the handle from the same **wood\_texture.jpg** file.

- Click on the **Displacement** tab and change the **Mode** to **Mapped picture**, and then select the **wood\_texture.jpg** file for the mapped picture.
- In the **Parameters** area, set the **Depth** to about .1, the **Smoothing** to about 10%.
- The **Quality boost** can stay at 0 and the **Direction** can be left at **Along normal**.



NOTE:

The preview window of the active camera will not show the displacement of the texture, even at the highest quality, To see this the scene is rendered.

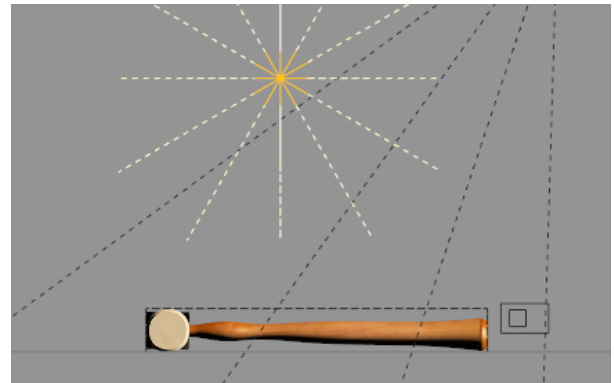
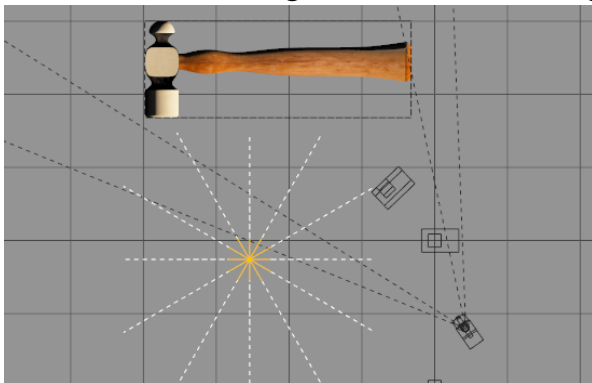


## Shininess:

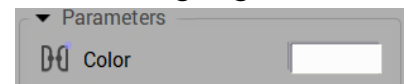
We now have the displacement showing the pits and grooves in the wood handle but it looks like the bare wood: no varnish or shine to it.

We can add a shininess to the material in the **Advanced Material Editor** but first we'll set up a point light to highlight the shine of the wood.

- Add a **Point light** to the scene. In relation to the hammer, place it about a hammer's length in front of the hammer and a hammer's length above the hammer.
- Set the Point light's **Power** setting to 10.

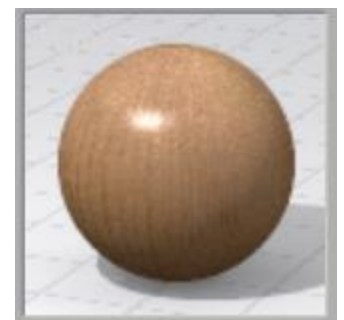
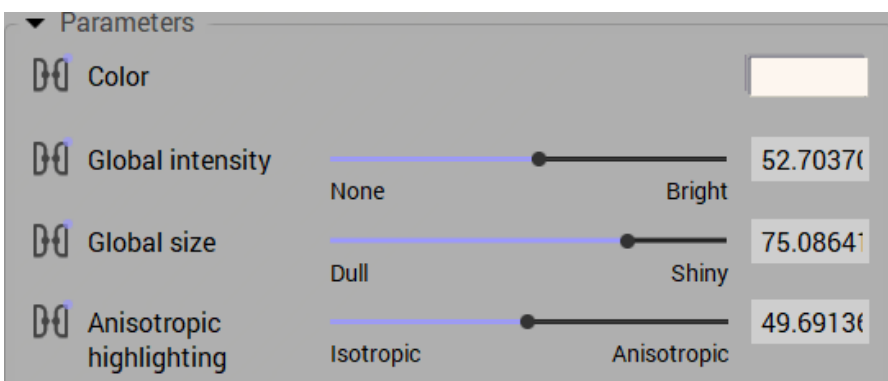


- With the hammer handle selected, open the Advanced Material Editor (if it isn't already) and select the Highlights tab.
- There are only a few parameters that can be manipulated for Highlights, but certainly the **Color** value should be set to white or just a bit on the wood colour side of white.



The material sphere to the left of the **Material list** window will illustrate the effect of changes made to the Highlights parameters.

The parameters shown will give the effect shown here:



The availability of the bit-mapped images from Blender allows for the appropriate textures to be applied in Vue.



## Importing Wavefront .OBJ files to Vue

If the option to “**Automatically pack all external files into the .blend** file on export was set, the imported object will be a single mesh with all the materials included but accessible through the **Advanced Material Editor**

### **Smooth metal Material:**

It comes with white colour and Highlights but no displacement

- Change Reflection parameter to near max looks right.

### **Rough metal Material:**

It comes with black colour and Highlights but no displacement

### **Wood Material:**

It comes with wood colour and Highlights but no displacement

- So the D:/Blender content/Saved images/ got a folder created called Textures. In it are the two files: **wood\_texture.jpg** and **concrete\_floor.jpg**

So far, the wood\_texture.jpg was used automatically in Vue but the concrete\_floor.jpg was not. Will have to do it manually as was the case above for the .FBX export.