

MAKING A SIMPLE BOOLEAN IN BLENDER

By Mr. D at Delta 3D

Boolean is the cutting of one object by another by placing the geometry of one mesh object partially into another.

The results are:

- 1) **Union** – the two objects are joined and the geometry of the cutting shape mesh inside the main mesh is deleted; as well as those faces on the main mesh through which the cutting shape passes. With geometry re-edged at the point of contact to fit the added shape for the new single object.
- 2) **Intersection** – a new object is created from the area of the main mesh through which the cutting shape passes.
- 3) **Difference** – a new object is created based on the main object, but the area into which the cutting shape passes is removed in the new object.

Easier to understand when you see the Boolean carried out.

NOTE: Blender does both a ‘**simple**’ Boolean, and a ‘**modifier**’ Boolean. In a ‘**simple**’ or standard Boolean you are merely using one object to cut another. In ‘**modifier**’ you are adding the Boolean operation to the modifier stack of the object, allowing you to later come back and modify the Boolean or use it in an animated Boolean.

This paper concerns itself with only the simple Boolean.

A point you need to understand before continuing. Blender by default does not automatically delete the two original ‘Meshes’ used in a Boolean operation.

Unlike programs like 3dsMax and Maya which allow you to setup options so both original meshes are automatically deleted.

So it can get confusing while doing a Boolean operation in Blender because when you carry out the Boolean nothing appears to happen. This is because the new object is hidden by or within the two original shapes.

To help out with this problem some people when doing a Boolean like to make use of Blender’s ‘**Layers**’ system, which we will do in this paper to better demonstrate the various Boolean shapes created.

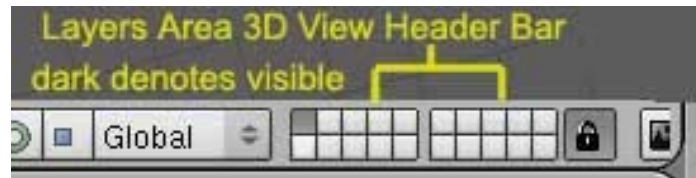
LAYERS

Look toward the right end of your **3D View Header Bar**, where you should see two rows of small boxes. Each box represents a layer for the scene you are working in.

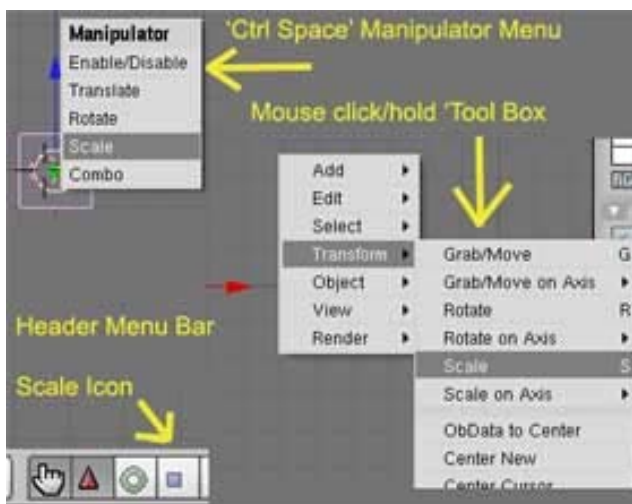
The terminology comes from the days of 2D animations where instead of placing all characters and objects in a scene; each was but on a separate cel, and then the cels were ‘layered’ on top of one another to make the scene.

This is because in 2D animation if I where to make a scene of a man walking to a table and picking up a cup I could put it all in one cel layer. But now if I want the same man walking over and picking up a hat off a tall drum I’d need to do the whole scene over.

Better to do cel layers, one for the man, one for the cup, and one of the table. That way you only need to draw new objects and relayer, and not a complete scene ever time.



Back to the Layers Boxes, where you notice the far left upper box is darkened, this indicates this level is visible. This is the 3D View Work Area you are currently seeing. Just click on any box to view that Layers contents, and you can have more than one view visible at a time which we will make use of.



First do a **File >New** or 'Ctrl x' to start a new scene with a Cube in your 3D View. Make sure your in '**Object Mode**' then pick a nice flat view like Front and scale up your Cube quite a bit. You can do this through the '**Header Bar Scale Icon**', click and hold the mouse button down to bring up the '**Tool Box**' or Marker Menu if your use to Maya. Then **Transform >Scale** or Scale on Axis if you want. Or lastly '**Ctrl Space**' to bring up the '**Manipulator Pop up**'.

Next we are going to place this Cube in a different 'Layer', so in Object Mode with the Cube selected use the Header Menu action **Object >Move to Layer**. Or else the keyboard shortcut of '**m**', and this should cause the '**Move to Layer**' pop up to appear under your cursor.



In this pop up you simple click the layer you want to move your object to, darken here implies selection, and click '**OK**'.

It seems like your object has disappeared, but that is because it's 'Layer' is not visible. Go to the 'Header Menu Bar' and find then click the layer box that matches the one you just chose. Now you should see your object.

Now add a new cube, **Add >Mesh >Cube**, to this layer back in the first Layer. However remember the new Cube is created at the location of your '**Marking Cursor**' in 3d space. And if you are in a 'User View' it will be oriented to that view. So sometimes it's better to use multiple views if you want the new mesh created in a particular spot to locate your '**Marking Cursor**'. Also once a



Mesh is created you can use the 'n' key to bring up it's 'Transform Properties', where you can Numerically input translation values.

But what are we going to cut with this new cube? Why the first cube, so we will need to make both of the 'Layers' the two Cubes are in to be visible. So in the 'Header Menu' make both 'Layers' visible, for remember you can have more than one 'Layer' visible, by clicking the desired Layer icons while holding Shift. And only objects in visible 'Layers' are active for manipulation.

Now manipulate the smaller Cube so it intersects the larger one, when happy carry out your Boolean by first using the 'a' key till you have no objects selected. Then the first object/mesh picked is the main mesh or what will be cut. Shift-Clicking a second object makes it the cutting shape. Now **Object > Boolean Operations**, or 'w' brings up the 'Boolean Tools' pop up. Slide to the type of Boolean you wish to do and click(non-Modifier). As stated above nothing seems to happen, but all is well, your new mesh is there but covered up by the old meshes.

So here's a 'Layers' trick you can use. The second object you clicked on to use as a cutting shape determines the end result layer for the Boolean. Meaning all object are now in that 'Layer', but the Main Mesh and the Cutting Shape Mesh are still selected.

So hit 'm' to bring back up the 'Move to Layer' pop up and click on a new 'Layer' to place them in. Now using the 'Header Menu Layers Icons' switch back and forth between 'Layers' to see your resulting Boolean Mesh, and the two original Meshes.

Better yet you can go to the 'Layer' your original meshes are in and do another 'Boolean Operation', then use the 'Move to Layer' trick and do it for the third type of 'Operation'. This is one reason for keeping the original meshes instead of automatically deleting them. Also remember you can always use the 'Move to Layer' action to move and hide objects as needed, or break up seen to make certain meshes easier to see in a busy scene. Or help out if you have a lower powered video card.

