



English Version

Simple 3D Modelling

Part 1: Boxes



By Martin

What will I learn in this tutorial?

This tutorial will cover the process of creating a fully working addon of a box for the game: Armed Assault 2. **Don't let the number of pages scare you, that's just because the writing is big and lots of pictures, this is possibly the best tutorial you will find!** All materials such as textures and examples are included in this tutorial. After finishing this tutorial you should be able to:

- Create a simple box with textures
- Apply a .rvmat to a model
- Create a normal map (bump map) image
- Know what a config.cpp basically is
- Get the addon working in game

What will I need?

For the modelling you will need a program called **Oxygen 2**, which is kindly supplied for free by Bohemia Interactive Studio. This program is bundled together with a program called **TexView 2** which is used to convert images in to a format that can be used in Armed Assault 2 and **BINPbo**. To download the BIS Tools 2 bundle (33.MB) click the link bellow:

ftp://downloads.bistudio.com/Tools/BI_Editing_Tools_2_Setup.zip

For creating the normal map (bump map) this tutorial will use a program called **CrazyBump** which can be downloaded for free and used for 30 days (but there are ways to overcome the 30 day limit, use Google). To download **CrazyBump** click the link bellow:

<http://www.crazybump.com/>

Note: There are also other free programs to use, but I will not explain how to use them in this tutorial.

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Installing BIS Tool 2

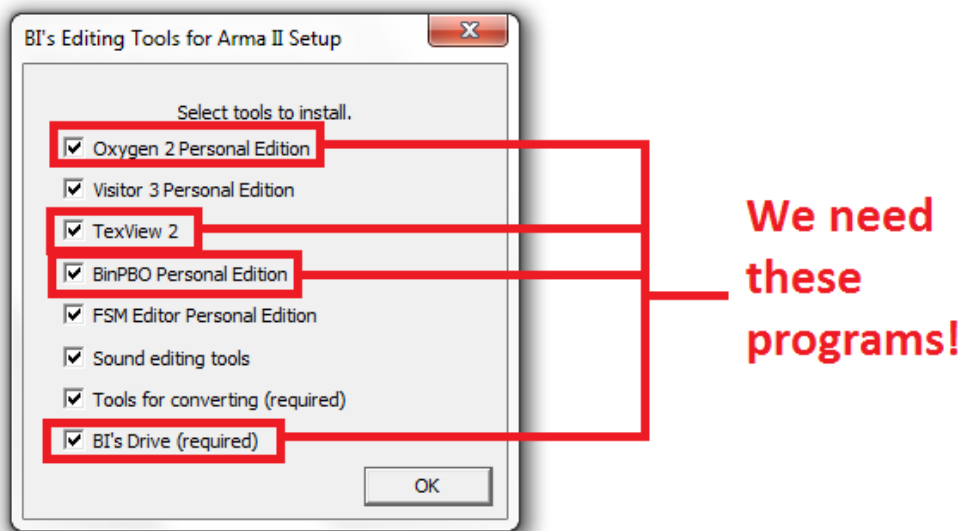
The installation of BIS Tools 2 is very straight forward, just like any other program but in some areas it can get a bit confusing especially if its the first time you're installing them, so I will quickly run through it so we can get started.

1. Download BIS Tools 2 from this link:

ftp://downloads.bistudio.com/Tools/BI_Editing_Tools_2_Setup.zip

2. Once downloaded run the installer, you should be presented with a familiar installation window so do the drill, next, next, next and accept any terms and conditions **until you come to this screen:**

This window will let us choose what programs we want to install, I recommend that you do not change anything and just press **OK**. But I have also circled the programs which we will need for this tutorial.



3. After just keep clicking next and then finish, to finish installing BIS Tools 2!

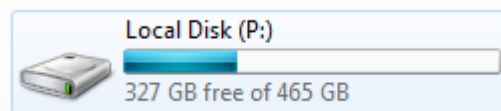
NOTE: The P:\ drive should show up in My Computer/Computer automatically after the installation has finished, if it does not, restart your computer!

Getting Started — Folder structure

So lets get started! I assume that you have installed BIS Tools 2 successfully (Good work!) so now its time to create the folder structure for our project.

The folder structure is one of the most important things so it's important to keep it logical and clean, especially when working on large projects.

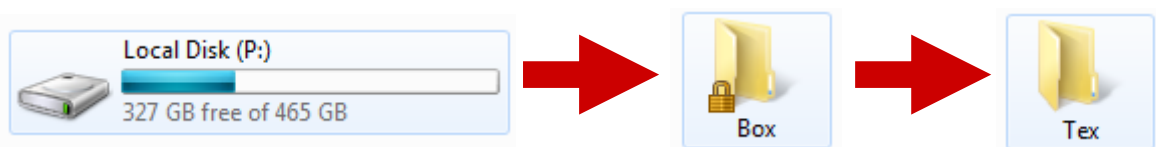
1. Open **“My Computer ”** (Or **“Computer”** if you use Vista or 7)
2. You have surly noticed that there is now a new drive in your computer, the **P:\ Drive**. No, nobody put another hard drive in your computer this is a virtual drive and its real location is: **“My Documents\ArmAWork”**.



3. Open the **P:\ drive** and create a folder called **“Box”**
4. Open the folder called **Box** and inside make a folder called **“Tex”**

The **“Box”** folder will be the main addon folder, the folder inside it called **“Tex”** will be the folder for our texture and bump map.

Overall the structure should look like this:



Running Oxygen 2

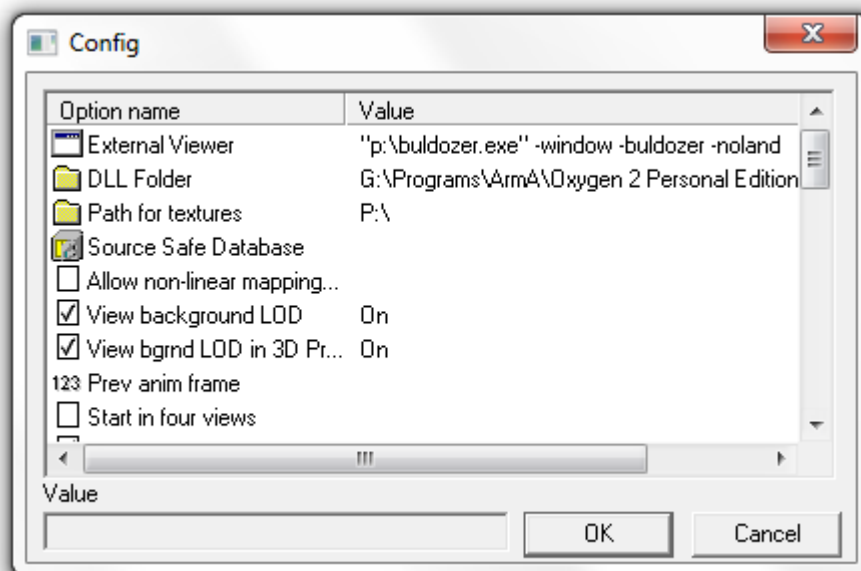
So finally its time to begin.

1. Open **Oxygen 2**

Note: When opening Oxygen 2 for the first time a terms and conditions window will open. You have to scroll down to the end and back up again otherwise it will keep on showing a message that you didn't read it. Clever BIS!

2. Now after getting over the terms and conditions we see the Oxygen 2 program for the first time. Looks pretty neat huh?

3. When you first launch Oxygen 2 you will be presented with this window:



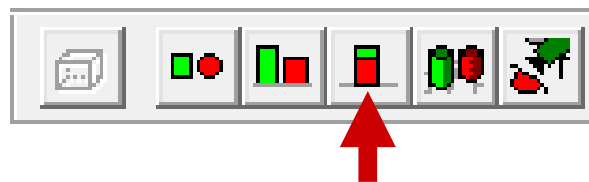
There isn't much to be changed here for now so just click **OK**. Just to quickly explain, this is the options window for Oxygen 2, you can change things like the background colour there etc...

4. So now that everything is setup its time to get modelling! As we go along you will become familiar with some of the basic tools and shortcuts in Oxygen 2.

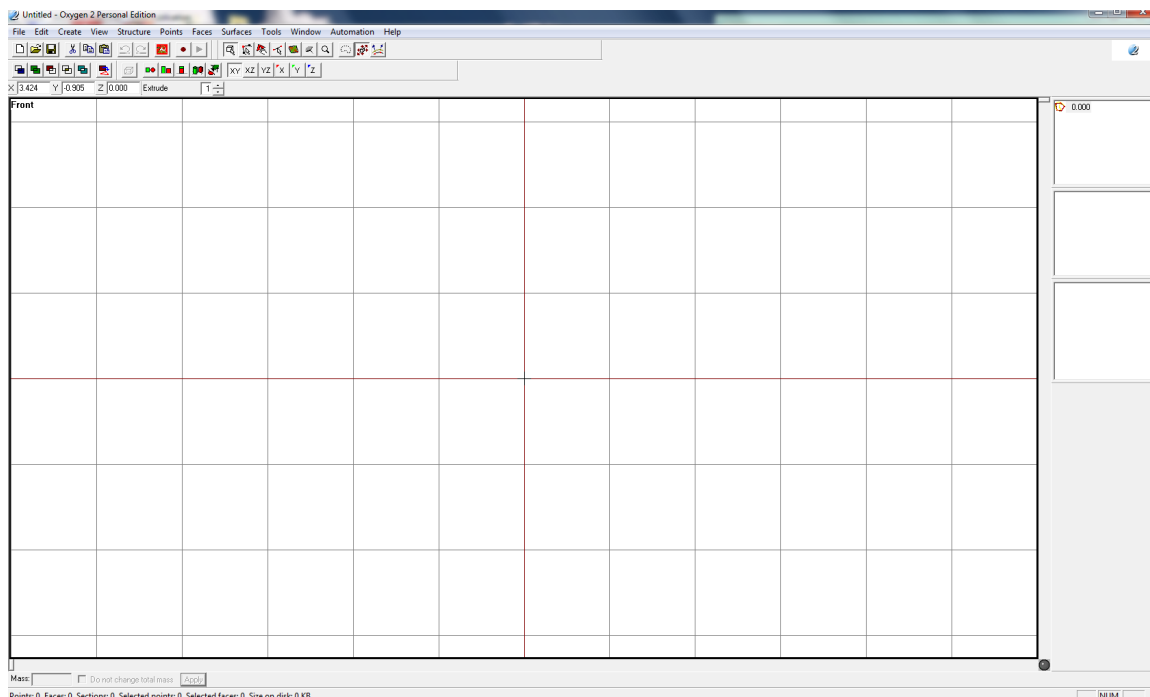
Creating the box

Finally we can begin modelling. In front of us is a clean canvas, so let's get to it!

1. First things first, save the blank file by clicking **File > Save As**
2. Save the file in to **P:\Box** and name it **"Box"**
3. Now let's switch to **front view** by clicking the **"Front"** icon in the **view tool bar**.



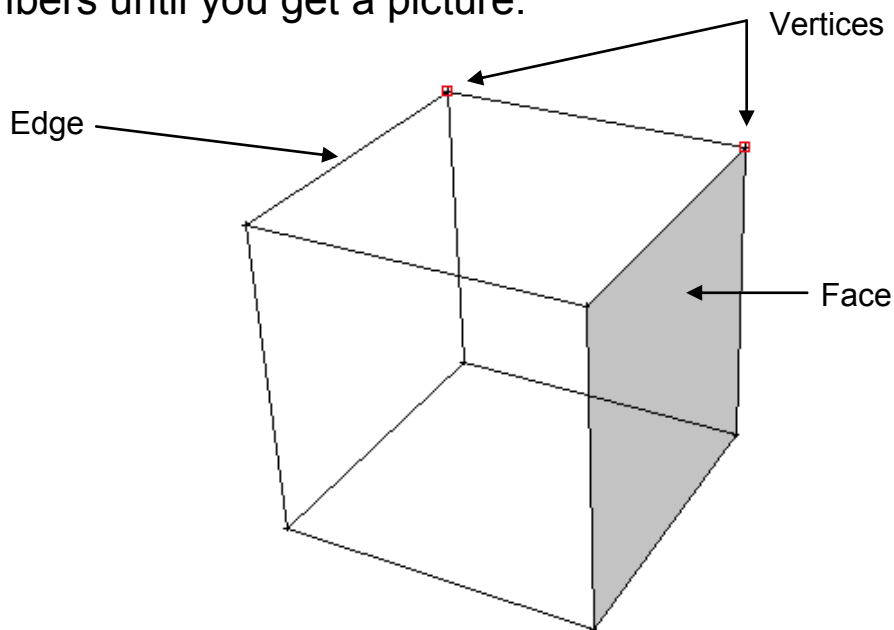
4. By switching to front view we will be able to work on the front side of the box. Now use **the +/- keys** on your number pad to zoom in a bit so you can see around 8-9 of those big boxes on your screen from top to bottom, like this:



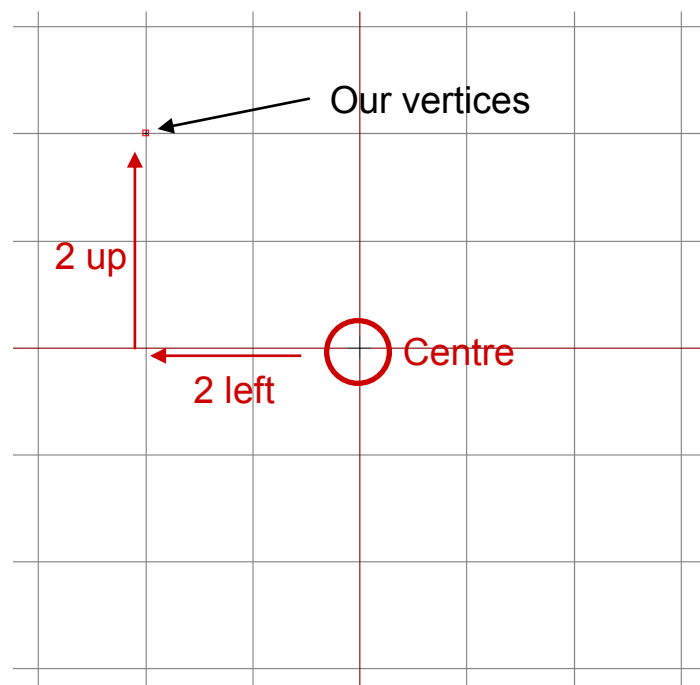
In the next step we will learn how to create vertices or "points" as they are sometimes called.

Vertices (Points)

Vertices, also called “*points*” are something like joints in a model which are connected with lines called “*edges*”. When 3 or more vertices are connected together they form an area called a “*face*” on to which a texture is applied which we see in the game. You can think of it kind of like one of those kids puzzles where you have to connect the numbers until you get a picture.



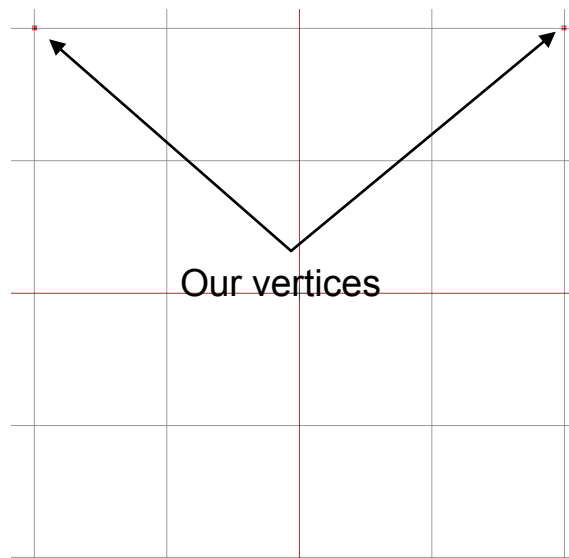
1. To create vertices in Oxygen 2 the “**insert**” button on the keyboard is used.
2. Position your mouse in the top left square’s corner, 2 squares left and up from the centre and press the **insert** button on your keyboard. Well done! You have created your first vertices!



The vertices we have just created is red, which means it is selected, to deselect it click on an empty area of the screen, to select it again drag a square around it with your mouse just like when you select multiple files in Windows.

We now want to duplicate this vertices 4 squares to the right of it.

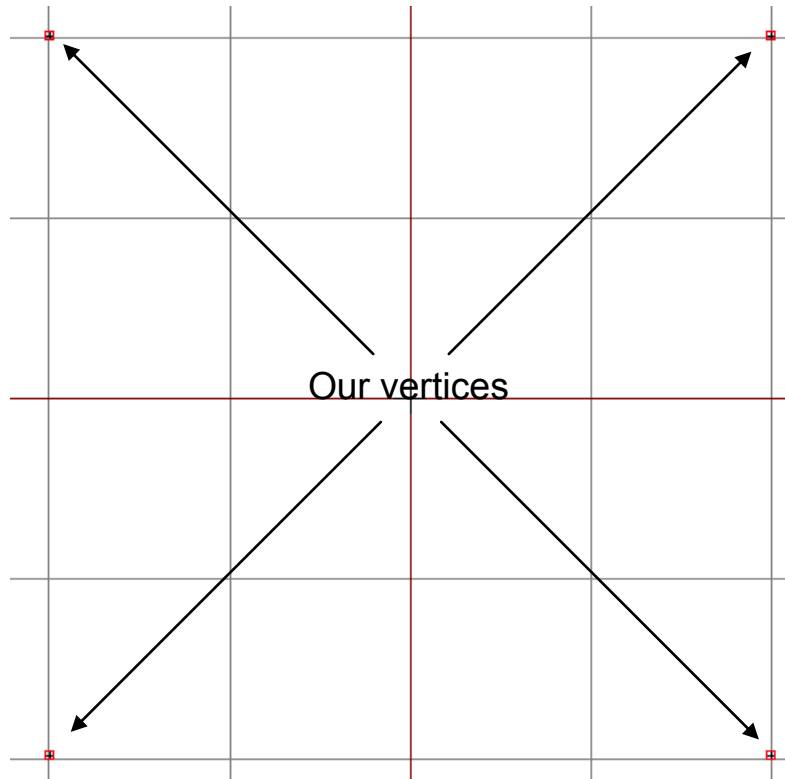
1. Press the “**X**” button on your keyboard, this will lock the mouse to only move left and right. (in the top left corner of the screen you can see it says “Front #X” showing us that the X axis is locked).
2. Now click and hold the **right mouse button** and **SHIFT** and move the mouse in to the top right corner of the 4th square, right of the original square, then release the right mouse button and SHIFT. If you did everything correctly it should look like this:



NOTE: It may seem like the original point has disappeared but it hasn't, its just turned black so you cant see it as well, to make them both red like in my picture just drag a box around them to select them.

3. Now we need to duplicate both of the points to the bottom, select both of them by pressing **CTRL + A** this will select all the points on the screen.
4. Now press the “**Y**” button on your keyboard to lock the mouse in the Y axis so it can only move up and down. (Notice the text in the top left corner has now changed to “Front #Y” showing that the Y axis is now locked, not the X axis).

5. Now, just as before, hold the **right mouse button** and **SHIFT** and move the 2 points 4 squares down, then release the **right Mouse button** and **SHIFT**.
6. Press **CTRL + A** to select all the points and make them red, so you can see them better, if you did everything correctly it should look like this:



7. Now press the **"Y"** button again to deselect the Y axis (not the text in the top left corner has changed to "Front" again showing That all axis are unlocked).
8. Now its time to make the first "face" of our box, press the **F6** button on your keyboard. You will notice lines from the 4 vertices now connect them to make a perfect square, that is the face.

So we have our first face already! That wasn't so hard, was it? Don't worry now it will get more fun, in the next step we will learn how to apply a texture to the face!

Note: Remember to save your work as we go along, press the save button to do a quick save!



Applying a texture

Well done for getting this far! Looks like your getting the hang of it. In this section we will learn how to texture our face! Well not our face... the face of the box.

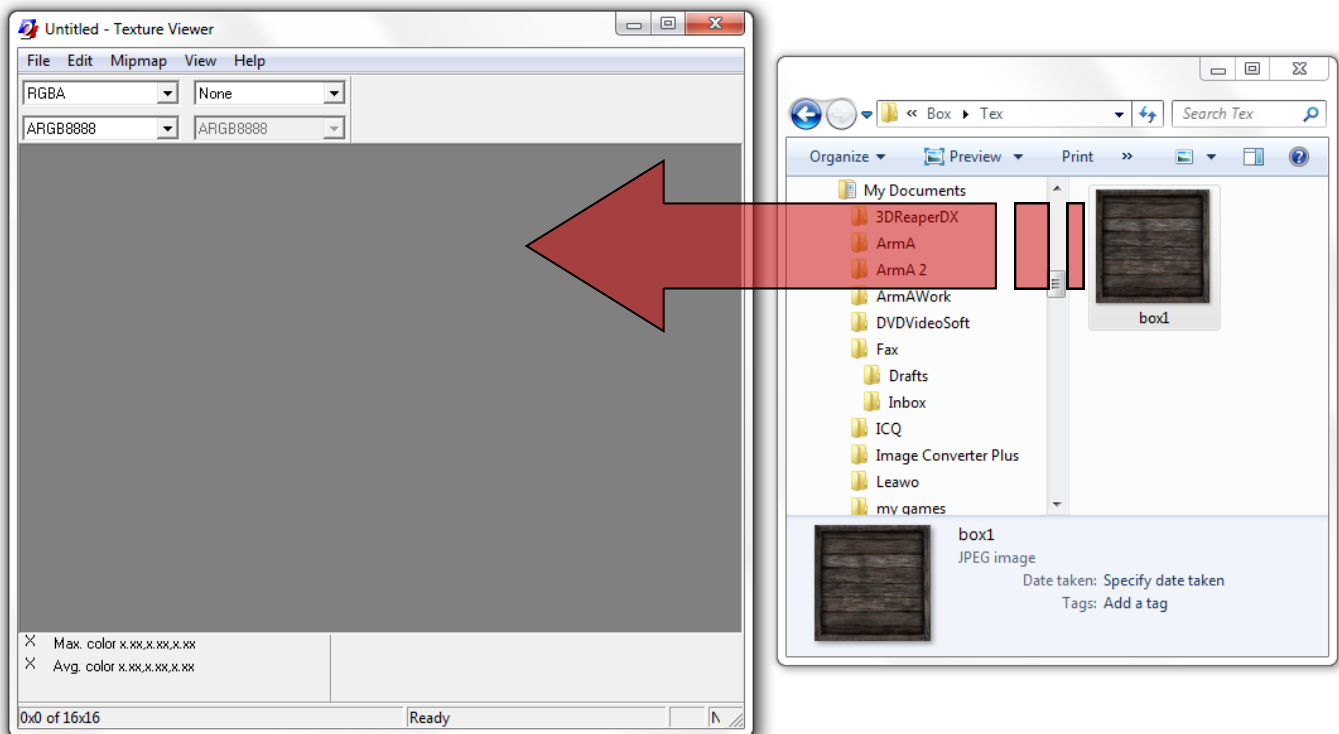
What is a texture? A texture is a 2 dimensional image usually created from a real photograph which is applied to the faces of a model which we later see in the game like a brick wall for example or a piece of wood.

Where do I get a texture!? Because I'm kind I'll provide the textures For this project, click [here to download](#) it or copy it from this document.



Once you have downloaded the image place it to **P:\Box\Tex** but because the image is in .jpeg format we have to convert it to **.paa**.

1. Make sure the window with the texture is still open and on top, then launch **TexView 2**.
2. Now with TexView 2 and the “Tex” folder window side by side, drag the image from the window in to TexView 2 like so:



The reason we do it this way is because TexView crashes when browsing files to open/save... So anyway if you did everything right you will see the image in TexView 2, now its time to save it as .paa.

1. Click **File > Save As**, make sure you do NOT browse to another directory or the program will crash, by default the directory should be **P:\Box\Tex**, if it isn't just save the image and then move it manually to **P:\Box\Tex**!
2. Name the file “**box1.paa**” make sure you write **.PAA** after the file name and then click the **save** button.

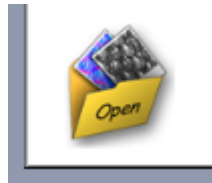
Bump Map

There should now be 2 files in the Tex folder, box1.paa and box1.jpg or what ever you called the other file.

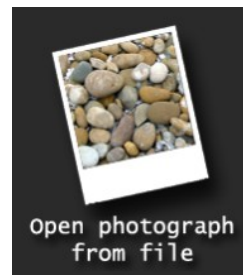
Now its time to create the bump map! We will need the program **CrazyBump** for this, so install it quickly and launch it.

What is a bump map? A normals map, also called “bump map” is a version of the texture in blue-violet colours which tells the computer how bumpy the image is so in game we get that nice 3D effect on walls and stuff.

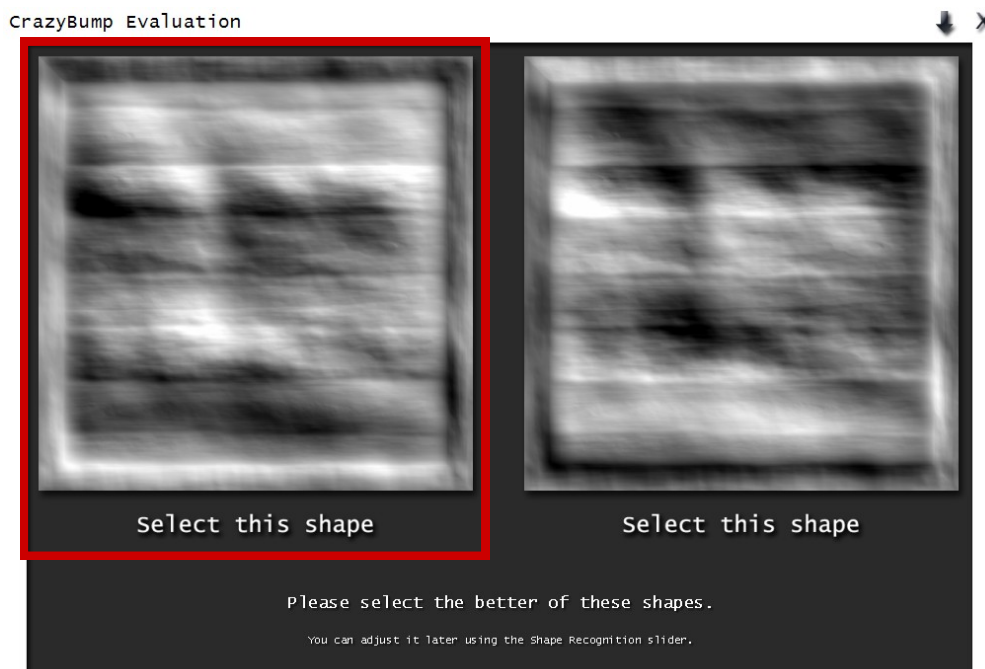
1. Launch **CrazyBump** , in the bottom left corner click the folder icon



2. Click Open file from **photograph**



3. Navigate to **P:\Box\Tex** and open the original file from which we crated the .paa file. Then a screen will ask which shape to select, click on the left shape.

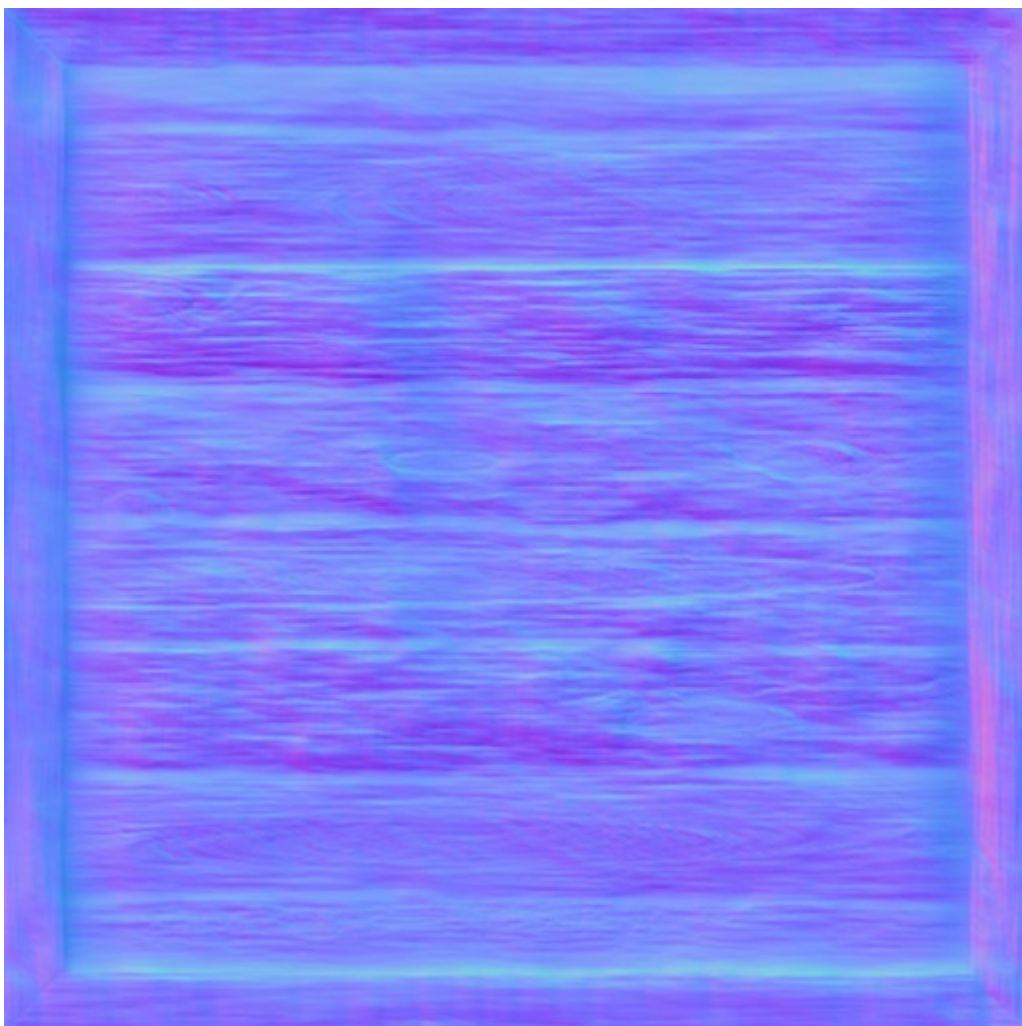


4. Now CrazyBump will open 2 windows, on the left a big window and on the right a small window with a ball. Click in the bottom right corner of the small window where it says “Ball” and select “box”, now you will have a live preview of how the texture will look with the bump map applied on a box.



5. Now just play around with the sliders on the left until you get it how you like.
6. After you tweak the bump map to how you like it save it by clicking the **save** button at the bottom of the window and select “**save normals to file**” from the menu. Save to **P:\Box\Tex** as **.PNG** and call it “Box1_Nohq” (Nohq - stands for “normals high quality”).

Alternatively you can download my bump map [form here](#) or copy it form this document.



Finally we have our textures done! All that's left to do now is convert the **box1_nohq.png** file to **.paa**. So once again open TexView 2, put it side by side with the "tex" folder and drag and drop the .png file in to TexView, then save it as .paa.

Note: You can also put TexView 2 in to the "Open With" menu in Windows Explorer so you don't have to keep dragging and dropping.

After converting the .png file to .paa delete it and also delete the other .jpg or .png file that we used for the first texture. So now our Tex folder should only contain these 2 files:

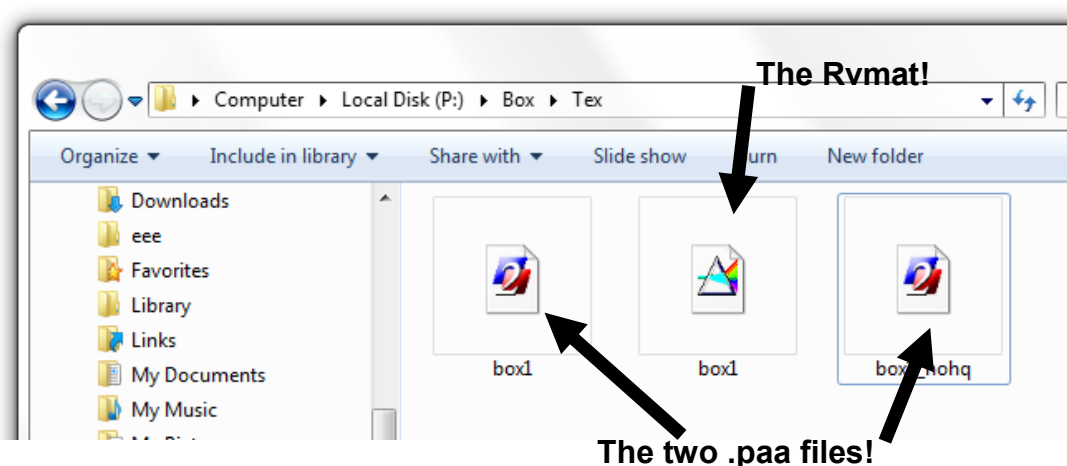
Box1.paa
Box1_nohq.paa

.RVMAT

Congratulations if you managed to get this far! The tutorial may look long but it isn't, the writing is just big.

The last thing we have to do is create an .rvmat for our texture. But this is a bit too advanced for now so I have created it for you. Rvmat's are basically files which tell the game where to find all the textures, what shaders to use etc... But don't worry about that for now.

To being, download the .rvmat file [from here](#) and place it in to the **Tex** folder! So now our **Tex** folder should look like this:



If you can't download the rvmat see next page!

Only read this page if you couldn't download the RVMAT!

Don't worry if you couldn't download the RVMAT from the previous page, we can still create it!

1. Open notepad

2. Copy **all the text bellow** to the notepad window

```
ambient[] = {1, 1, 1, 1};
diffuse[] = {1, 1, 1, 1};
forcedDiffuse[] = {0, 0, 0, 0};
emmisive[] = {0, 0, 0, 1};
specular[] = {0, 0, 0, 1};
specularPower = 1;
PixelShaderID = "NormalMapSpecularDlMap";
VertexShaderID = "NormalMap";

class Stage1 {
    texture = "Box\Tex\box1_nohq.paa";
    uvSource = "tex";

    class uvTransform {
        aside[] = {1, 0, 0};
        up[] = {0, 1, 0};
        dir[] = {0, 0, 0};
        pos[] = {0, 0, 0};
    };
};

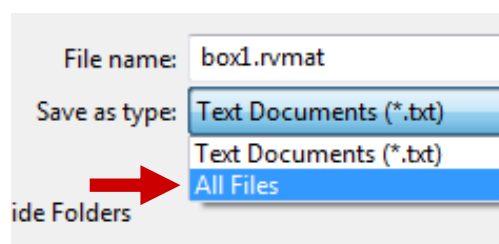
class Stage2 {
    texture = "##(argb,8,8,3)color(1,0,1,1)";
    uvSource = "tex";

    class uvTransform {
        aside[] = {1, 0, 0};
        up[] = {0, 1, 0};
        dir[] = {0, 0, 0};
        pos[] = {0, 0, 0};
    };
};
```

3. Click **File > Save As** and navigate to **P:\Box\Tex**

4. Name the file "box1.rvmat"

5. Under "**save as type**" select "**all files**" then click the **save** button



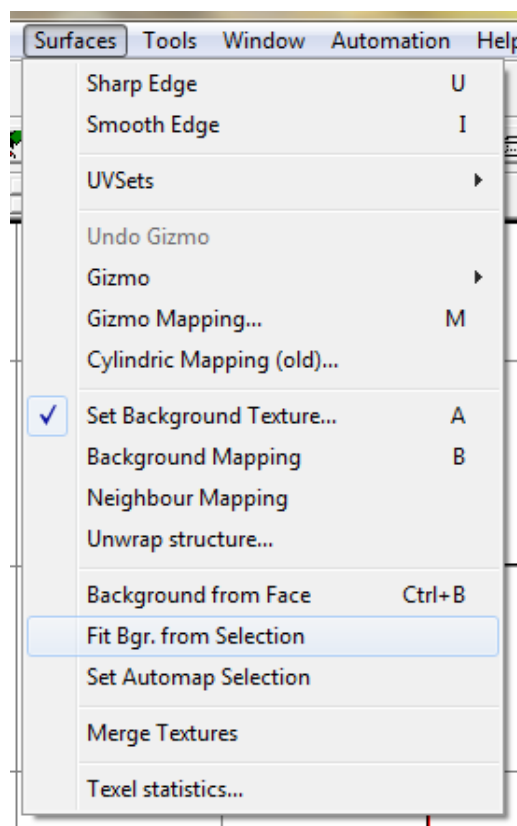
That's it, go to the next page!

Back to Oxygen 2

I'm happy that you managed to get this far! For this stage we will need to save a copy of the **box1.paa file** as a **.tga file**. So just open it with **TexView 2**, click **File > Save As** and after the file name type **.tga**.

Having done that we will apply the texture to the face and finish our box! So let's get to it.

1. Press **CTRL + A** to select everything
2. Press **"A"** on your keyboard to switch to background mapping mode.
3. With your mouse draw a square roughly around the face, then **right click** inside that square and select **"Load texture"** from the menu.
4. Navigate to **P:\Box\Tex** and double click on **Box1.tga**, this is the main texture for the face. Now you should see the texture in Oxygen 2!
5. Now select **"surfaces"** from the **menu bar** and click **"Fit Bgr. From Selection"** this will make the texture big exactly like the face.



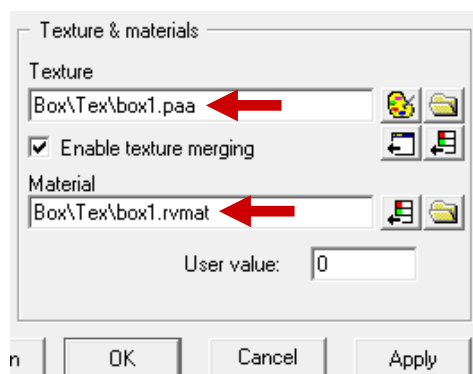
Now everything should look like this:



Time to apply the texture!

1. Press “**B**” on your keyboard, now the texture has been applied to the face.
2. Press “**E**” on your keyboard (or go to **Faces > Face Properties**) to bring up the **face properties** window.
3. Under “**texture**” change “.tga” to “.paa” then under “material” type: **Box\Tex\Box1.rvmat** then click **OK**. (There is no need to type P:\ in the path now because “Box” is the root folder now)

The .rvmat file will tell the game where to find the bump map we created earlier and how to use it. It should look like this:



Note: Remember to save your work as we go along, press the save button to do a quick save!



Previewing the model

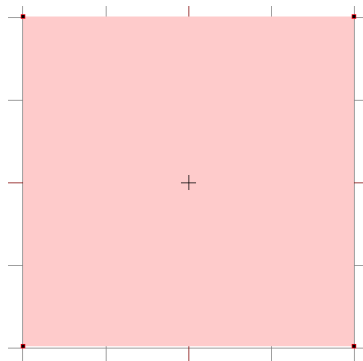
Finally your hard work has paid off! Its time to preview the model.

Just a last minute check, we need to see if the face is facing the right way because faces usually have only one side.

1. Make sure all the points are selected (CTRL +A) then press the **Solid Fill** button.



2. If everything still looks the same as before press “W” on your keyboard to turn the face to the other side. It must look like this:



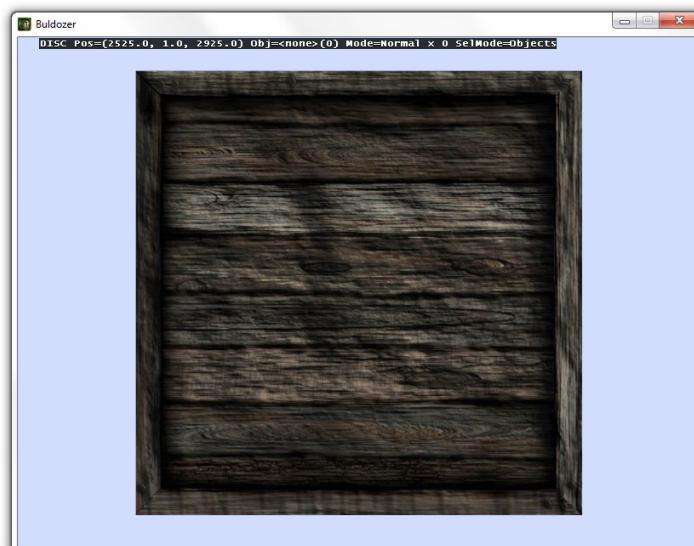
3. If it looks like that, then your on the right track! Press the solid fill button again to return to normal view mode.



4. Now press the **Bulldozer** button and then “Start/Restart” in the menu to preview the model!



After pressing the bulldozer button wait a few moments for bulldozer to finish loading and finally you should be left with this:



Bulldozer

Bulldozer is the program used to preview models for Armed Assault, The controls are easy!

Controls:

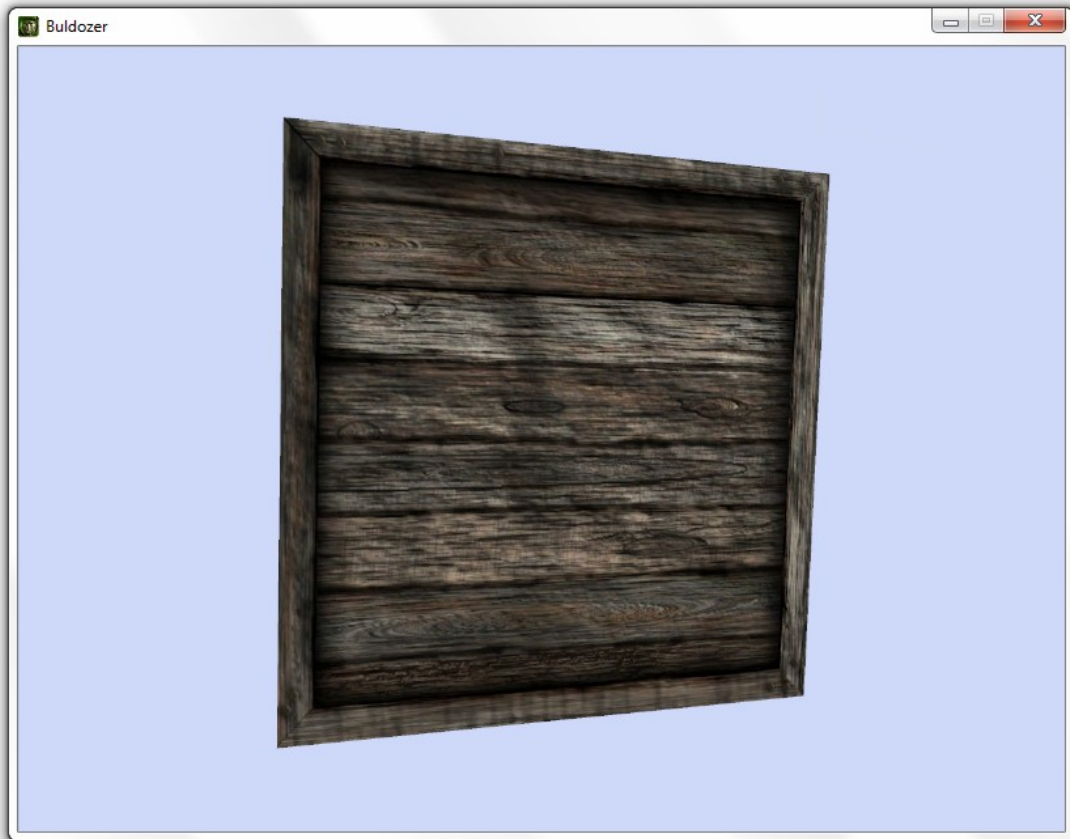
+/- or left mouse button to Zoom in or out

Right Mouse Button to rotate

ALT + F4 to close

NOTE: To leave Bulldozer without closing it you have to press **ALT** and **TAB**.

So what do you think? Looks cool? I think it does, this is how mine looks:

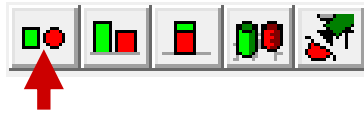


If your having trouble you can download mine [from here](#) before we continue to the next part.

Finishing the box

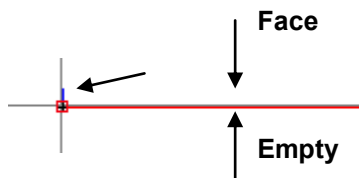
Ready to finish the box? Good!

1. Close bulldozer
2. Switch to **Top view** mode by pressing the **Top** button in the view bar.



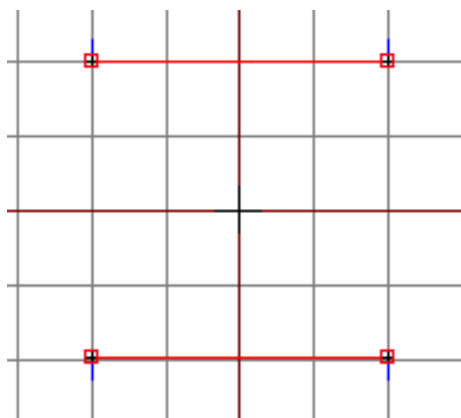
3. Select everything by pressing **CTRL + A**
4. Lock the Y axis by pressing “**Y**” on your keyboard
5. Press “**W**” to reverse the face to the other side

Note: The little blue lines around the edges tell you which way the face is facing.



6. Hold the **right mouse button** and drag the face 2 squares to the top.
7. Hold **SHIFT** and the **right mouse button** and drag the face 4 squares to the bottom.
8. Press “**W**” on your keyboard to reverse the face to the other side. And press “**Y**” to unlock the Y axis.

If done correctly it should look like this (press **CTRL + A** to make everything red like me) :

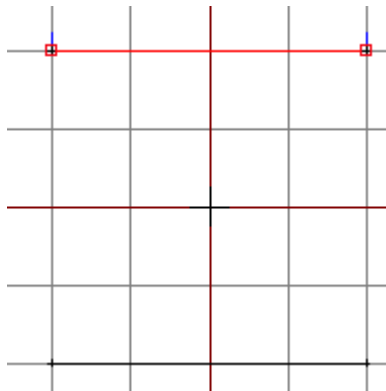


Now we have 2 sides of our box done, you can preview it in bulldozer if you wish.

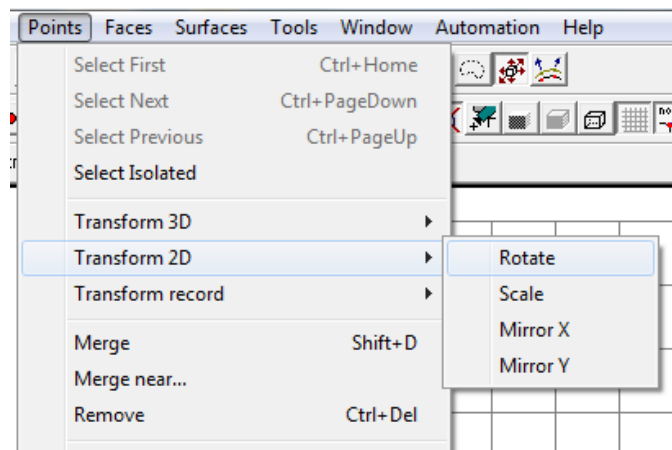
REMEMBER TO SAVE YOUR FILE AS WE GO ALONG!

Now we will finish the remaining sides of our box by coping one of the sides.

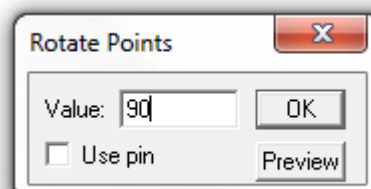
1. Select the top face by dragging a box around it with your mouse. Then press **CTRL + C** to copy it!



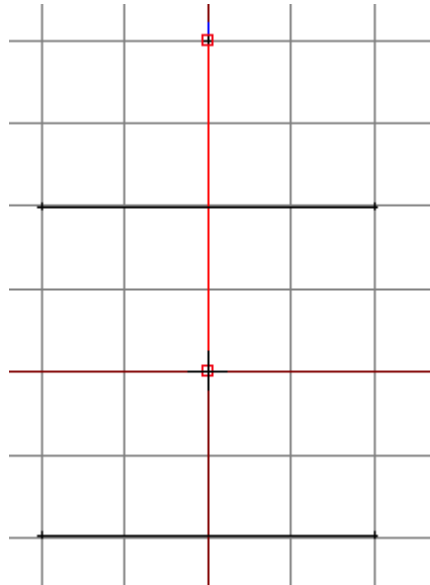
2. Now press **CTRL + V** to paste a copy of the face
3. Press **Points > Transform 2D > Rotate**



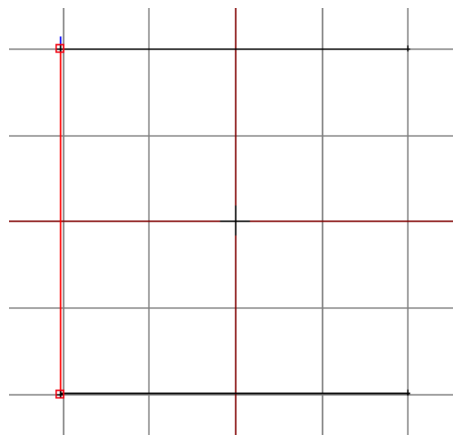
4. In the small window that pops up type **90**, because we want to rotate the face by 90 degrees and press **OK**.



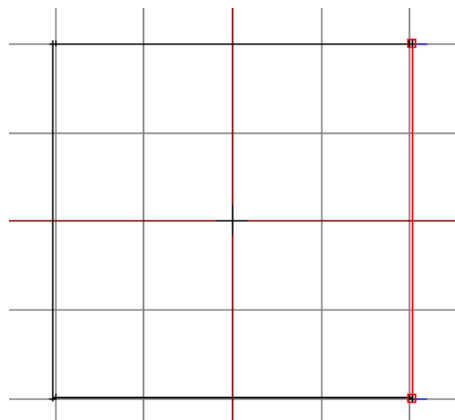
If done correctly you should have something that looks like this:



Now by holding the right mouse button position the face on the left side between the top and bottom face until you have something that looks like this (you can use the **+/-** keys to zoom and arrow keys to move around):



Now lock the X axis by pressing **"X"** and then press **SHIFT** and hold the **right mouse button** and drag the face to the right, then press **"W"** to reverse the face to the other side, if done correctly it should look like this:

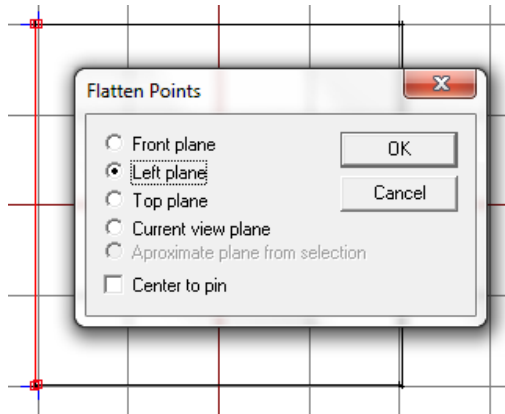


Remember to SAVE!

Flattening points!

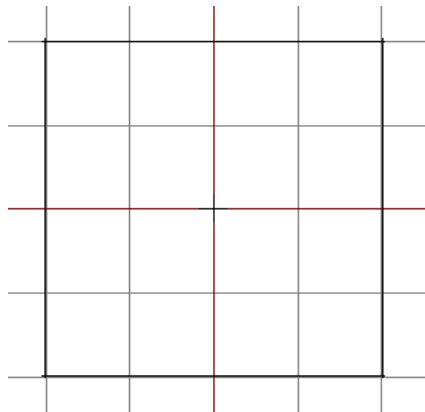
You may have noticed that the sides aren't placed closely enough or something similar, to fix this we will flatten the points.

1. Select the left side by dragging a box around it and then press **"P"** to bring up the **flatten points** window
2. Select **"Left plane"** and click **OK**. Repeat this for the right face!



Note: Remember you can use **CTRL + Z** to undo anything if you make a mistake!

3. Now select the **top face** and press **"P"**, select **"Front plane"** and click **OK**. Repeat this for the bottom face. When done it should look like this:



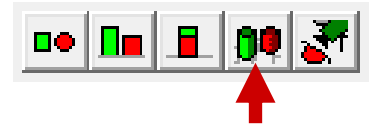
Now just preview the model in Buldozer, if any sides are transparent just select them in Oxygen and press **"W"**.

Only the top sides left to finish! You can of course download my model so far [from here](#).

3D View

You only a bit from the end now before we get the addon in to Armed Assault 2! We have to create the top and bottom sides now.

1. Press the **3D View** button in the view bar

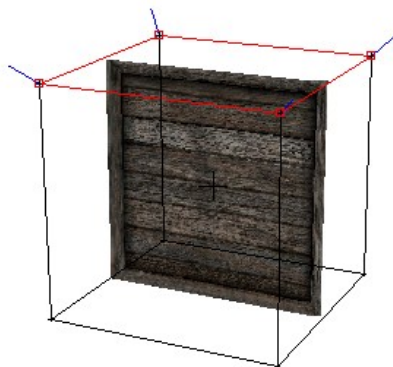


The Controls for 3D View:


+/- or mouse wheel to zoom in/out

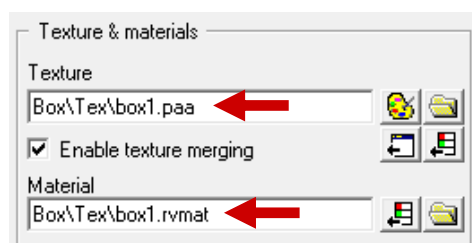
ALT + Right Mouse Button to rotate

2. Individually select each of the 4 top points and press **SHIFT + D** To merge each of them in to one point. Because we joined 2 sides there are also 2 points so close that they seem like one.
3. Now turn the box in such a way as you need and select the top 4 vertices (points) and then press **F6** to create a new face like so:



NOTE: You can hold **CTRL** to select the points one by one.

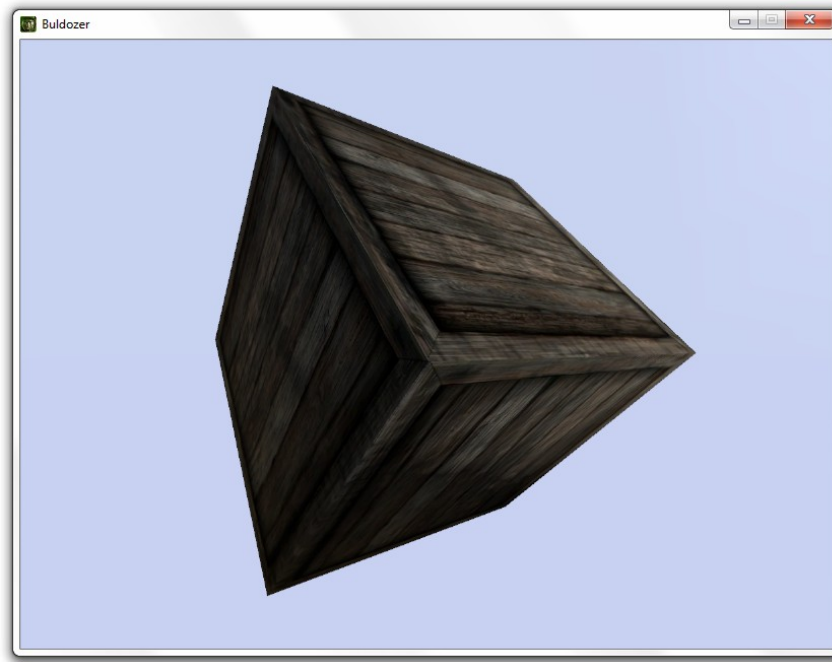
Now its time to apply the texture the top face, switch to **top view**,  press "**A**" and then drag a square around the face, you might have noticed that we didn't need to load a texture this time because we didn't unload it last time, now go to **Surfaces > Fit Brg. From Face**, then press "**B**". After press "**E**" and change .tga to .paa again and under "**material**" write **Box\Tex\box1.rvmat** then click **OK**.



Repeat everything on this page for the bottom face and go to the next page!

Testing & Exporting to ArmA 2

So we are one step from the end! Now lets fire up bulldozer and see how it looks, it should look like this:



NOTE: Bulldozer will only display what is selected in Oxygen, to view the whole box you have to select it by pressing **CTRL + A**

You can also make the edges of the box harder by selecting everything by pressing **CTRL + A** and then **"U"**

The model is still half way in the ground, to fix this press **CTRL + A** to select everything, then hold the right mouse button and move the whole model 2 squares up like so:



At this point the model is done, **SAVE IT**, close Oxygen 2 and lets take a look at the config.cpp.

The Config

What is the Config? The config is a file written in C++ which tells the game everything about the addon like what side it is on, what its called etc... But don't worry we wont write it today! I will provide the config for this addon!

Click [here](#) to download it. Then place it in to the “box” folder.

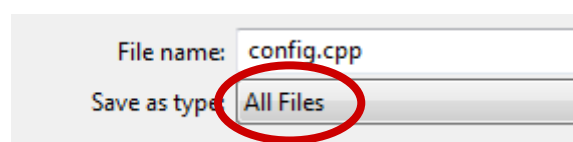
If you haven been able to download the config for some reason follow these steps:

1. Open notepad
2. Copy the following text from this document and paste it in to the notepad window.

```
class CfgPatches
{
    class Box
    {
        units[] = {Box};
        weapons[] = {};
        requiredVersion = 1;
    };
};
class cfgVehicleClasses
{
    class MY_BOX
    {
        displayName = "Tutorial Box";
    };
};

class CfgVehicles
{
    class All{};
    class Static: All{};
    class NonStrategic: Static{};
    class House: NonStrategic{};
    class box: House
    {
        model="\Box\box";
        displayName="My Box";
        vehicleclass="MY_BOX";
        destrType="DestructEngine";
        armor=1000;
        scope=2;
    };
};
```

3. Click **File > Save As** and navigate to **P:\Box** and name the file “config.cpp”
4. Under “**save as type**” select “**all files**” then click the **save** button



Getting the addon in to ArmA 2

You've done it! You've come to the end! Well done. You probably thinking, oh man so many steps just to make a box, well no... You can actually make a box with by pressing 1 button, **F7** or going to **Create > Box** the reason I showed the long way is to get you familiar with Oxygen 2 and for you to learn some basics.

So lets get the addon in to Armed Assault 2! First lets take a look at our folder. The Box folder should contain the following files:

Folder: Tex
config.cpp
box.p3d

NOTE: If you have downloaded my model at some stage and its called for example "Box - part 1.p3d" rename it to "box.p3d"

The "**Tex**" folder should contain:

box1.rvmat
box1.paa
box1_nohq.paa

You can delete the .tga file called box1.tga, because we wont need it anymore.

Now launch BIN PBO! Under "addon source directory" type: **P:\Box**

Under "Destination directory" type:
C:\Program Files\Bohemia Interactive\ArmA 2\Addons
(assuming this is where you installed ArmA 2)

Put a tick (check) in **Binarize** then click the **Options** button.

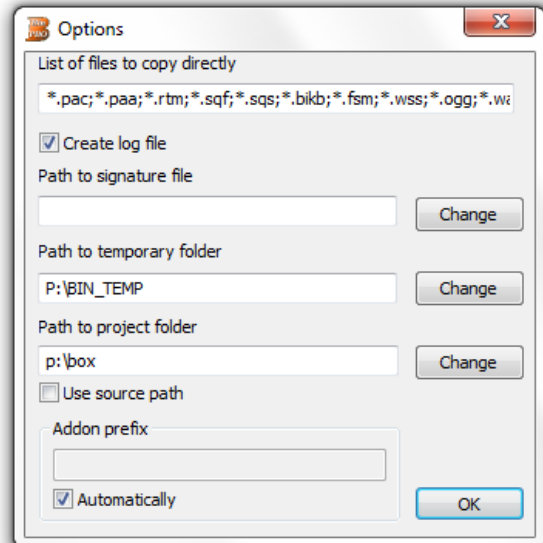
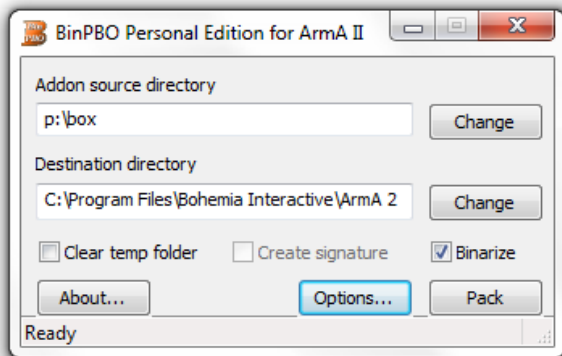
Under "Path to temporary folder" type **P:\BIN_TEMP**

Under "Path to project folder" type **P:\Box** then click **OK**.

After doing that click the **Pack** button!

NOTE: Packing the addon may take some time depending on your computers speed, just wait a while and it will finish!

Here are some screenshots of how BIN PBO should look:



Finally launch ArMA 2! You will find the addon in editor under:
Empty > Tutorial Box > My Box have fun!



In the next part of this tutorial series we will learn how to make the box smaller and create a geometry so we cant walk trough it!

Of course you can download the addon from [here](#) if you wish.

If you have any questions or suggestions please email me at:

OFPBase@Seznam.cz

For more addons and tutorials visit my website:

www.ofpbase.co.nr/tutorials.htm

If you would like to learn some more please download Part 2 of this tutorial series: **Part 2 - Geometry and Road Ways!**