Creating your own Texture

Hi there. As a starting game builder I know the importance of good tutorials, I also know the fact when everybody contribute and write about his or her specialty or things they know the tutorials about game building will grow. And that is just what we need!
Also writing about things, makes you better and it learns you a lot. In most cases you will improve your knowledge when you write it down. Now I am not English so I hope people don't mind my typos and bad choice of words sometimes. It is all about what I have to tell not about how I tell it.
Making your own textures is a big part of the fun in making 3D. As a programmer I became interested in 3D some 15 years ago. I start learning 3D Studio and recently I start using Maya but my real interest is game building but I am still a new be in that department.

People that know 3D also understand the importance of texture. It is the texture that gives our subjects the looks we want. The importance of good texture grows the smaller the polygon counts become. Low polygons need better texture and this is even more important for a 3D game.

What do we need?

Well for creating good looking texture, you don't need a lot. But I use the following.

- Adobe Photoshop: Most of us have this software, and when you don't believe me this is software you want! I know it is expensive but it still is the best tool for the job. You can use other software, but for the tutorial I use Photoshop. I am not familiar with different software so don't write me about how to do things using other tools!
- A good digital camera. Well you don't really need this. You can find pictures on the web. But hunting for your own pictures is a part of the fun to.
- A Graphic Tablet. Now if you get serious about building games and do a lot of graphics this is something to consider buying! You don't need it you can do everything with the mouse. But using the pen is making things easier. Just like digital camera's the prices of this hardware dropt immense in resent years. Maybe a good idea in your letter to Santa.

So the only thing you really need is Photoshop all the rest are just handy tools.

Seamless texture.

I start thinking about this tutorial when I needed texture for my 19th century London level in my game Time Hoppers. Like for most levels it is difficult to find the exact texture you want. So it was the time to start up Photoshop, and look at the pictures I made on a trip to London. Is there a better place to get the exact texture then the original? Well I don't think there is. London has a typical building stile and this comes with a lot of texture for us.
The first thing I wanted was a rooftop for my houses in the London streets of my level. The first thing about this is the fact I wanted it to be seamless. But pictures rarely are seamless so we need to make it like that.

This is the picture I use to take the rooftop texture from. Like you can see we have a few rooftops on the picture, and they all have a different look. The texture I want is the one on the house at the right at the picture.

This has the bumpy look I want in my London level. The only problem we have is the fact we don't have much of it, so we need a way to replicate it. And this is where we need a seamless texture. The Idea to make it seamless makes it more useful for building all the roofs we have in the level. Not to mention about the advantage of reusing it in the future over and over again.

Needless to tell this is not the real size of the picture. I used the original size for capturing the part I needed. Use the rectangular marquee tool for selecting what you want and move it into a new picture project using the move tool. Make that new project bigger then your selection this is important, because we need to do some manipulations with it.
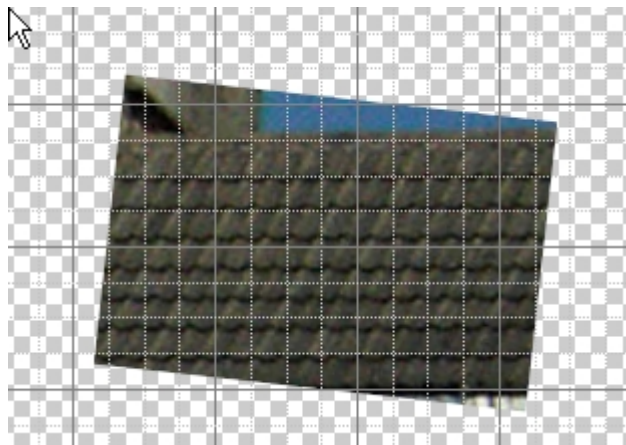
 rectangular marquee tool

 move tool

Now this is what I selected. Now a few things we notice here.

1. The rows are not strait.
2. The angle is not 100% correct.
3. I selected it to big.

Now point 3 is logical, we need to manipulate it in something we can use. This is the reason we select much more then we really need. The first thing we want to do at this point is make the rows strait. A useful thing to do this is make use from the show grid option we can find in the view menu. View->Show->Grid. Or we can use the shortcut CTRL + ' .
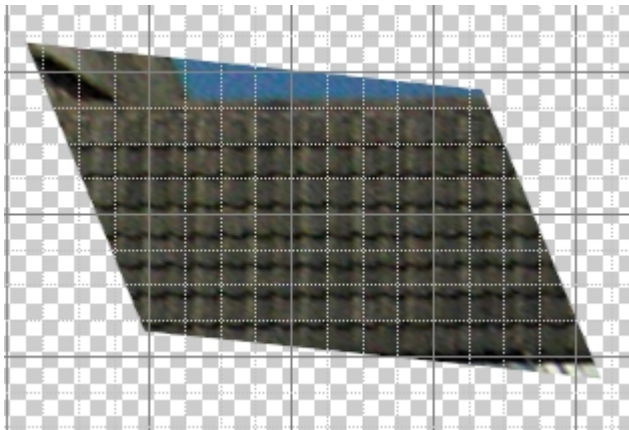

To strait out the rows we use the rotate option. You can find this in the transform options of the Edit menu. Edit->Transporl->Rotate. At the picture you can see using the show grid is a big help for this kind of work.

Like you can see here the rows are now strait, but the angle is still wrong. In real life the angle of the roof is strait down and not like this. The reason we have it like this here is the picture. We can crop the changes we made here now and use that to

make the angle correct. But it is better to do it right now. This saves us work.

To correct the angle we can't use the rotate tool. Else we loose the changes we made for striating out the rows. But we have a different tool so we can keep the changes we made with the rotate tool.
What we will use here is the skew tool. This you can find at the transform option of the edit menu to. Edit->Transform->Skew.
Now this will change the picture a little, but don't worry about that it is such a minor change people won't really notice.
So when we have it like we want, it is time to crop it to the part we want.

You can use the crop tool for this. I mostly use the rectangular marquee tool for this work. But that is because I am old and use Photoshop from before the Crop tool was entered in Photoshop. ☺

The crop tool.

Now this is what I ended up with. Pretty cool is it not? Well it sure is. The angle is correct, and the lines are strait. So cool we have our new texture! Or is it not so? Well see for yourself and try to use it. Wow it works, hey that is not the case it don't works. Where are those strange lines come from?
Well let me tell you, the reason it don't work is because it is not seamless. We still need to do some minor work on it for making it like that. Now don't close the tutorial now! Making texture seamless is not as difficult as you think. And no I won't use any third party plug-in like Seamless welder from Keys Power tools. To be honest I hate the tool and I always come to a better result doing it myself. When you know the trick you will think the same.

A tool what many people overlook is the offset filter. Most people think it is not very useful but in our case it is!

Look at this. It shows you what the Offset filter can do for us. I was using a vertical offset of -50 on this one. Notice how it made the horizontal line visible. Now it is this line we have to get rid of. You can find the offset filter here. Filter->Other->Offset.

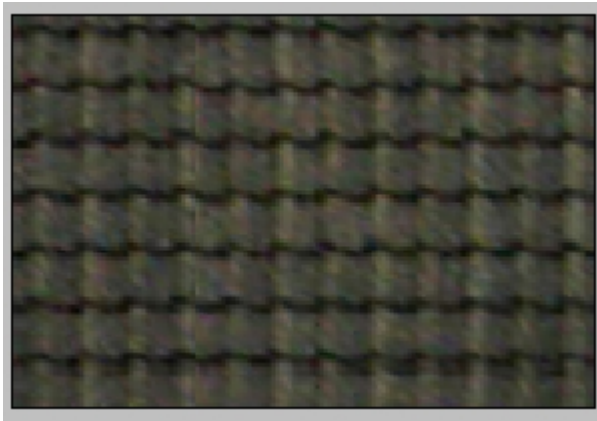A very useful tool to work out the line is the clone stamp tool.

Now this is the same offset. And notice you can't see the horizontal line anymore. I was working it out using the Clone Stamp tool and a soft mechanical brush of 12 pixels. Now the trick is to set up the stamp using the ALT key on the row above.
And use it to draw over the line we noticed in the picture before. The result of this work is that we made the texture seamless in the horizontal direction. Now let's do the same for the vertical direction by using the same technique. The only difference is we now use the offset filter with a vertical displacement.
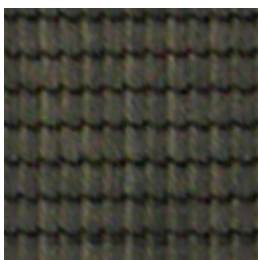
The clone stamp tool.

This is how it looks like when I used a displacement of 50. Notice the thin horizontal vertical line. We need to work this out like we did with the horizontal line. So have fun with your clone stamp tool.

And this is the finished result. Believe it or not but this texture is perfectly seamless. The only thing we need to do know is making it into a perfect square so we can use it in Game Studio.
Now for this case I don't care too much about the size of the individual parts, so I just resized it to 128 X 128.

And this is the texture it became. Making texture from pictures has a different advantage to. Pictures contain a limited form of reality. This texture has no need for bump maps when you look thro it from a distance in the engine it gives you a 3D look. And because we don't really see it close we can get away whit it to.

Non repeating photo texture

In many cases you will need texture that will fill up a complete wall or block. So it won't repeat at all, or maybe just 1 or 2 times. Seamless texture is good in some cases like the rooftop for example or the street. This are repeating structures in real life to, so we will use seamless texture for those.

But the front of a house for example is lesser repetitive so seamless texture wont work in those cases. Well not if you want it looking good and natural. Now in my London level I have houses I want to look natural. The most important thing I want is give them a nice 3D look all the way. But some parts like the top floor and the cellar you only see from a distance. So it has no real use building real 3D windows in those parts. Using a photo picture what contains a 3D look from will do just fine. Because we only see them from a distance the players will see the picture and believe it is 3D. The only thing we need to remember is when we light the level we have to keep the light angle of the real picture in mind! Maybe I make a tutorial about that later if you want. But for now we only concentrate on the texture.

First let me explain how I build the house in Game Studio. I did not build it from 1 block. The texture work will save me a lot of polygons so I decided to split the house in 3 main blocks. The bottom containing the cellar and the first floor the cellar is a part you only see from a distance so this will be texture only, but first floor is different so I will make 3D parts like the door and the window there. The top floor, this is never reached so this will be only texture work. The rooftop, now you won't reach this, but this has some big parts you will see from a distance to like the typical English chimney and so on. But the texture for the roof we already have. We made that in the previous part.
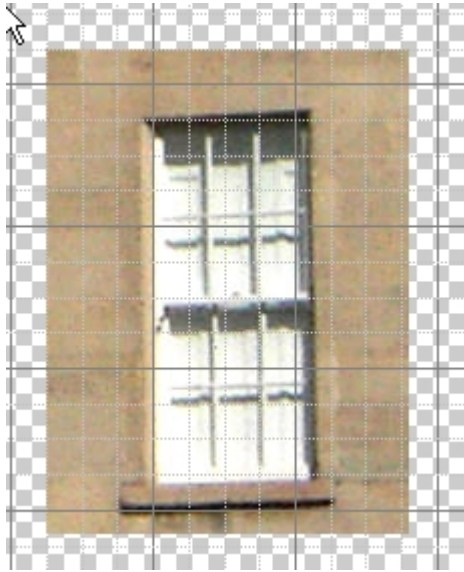
Part 1 the top floor texture.

We can find a new photo, but I just used the one I have used before for the rooftop. And now I had a big question do I want it in a way it can repeat? In other words seamless. After thinking I decided want to have it repetitive in the horizontal direction but not in the vertical way. Why this is important you will see soon. I also wanted it on 512 X 512 so it will be really sharp in the level.

For this work I create a new document I will use to do the work on. So let's start with that here to. Make a new document File->New. In the window that appears just enter 512 by 512 and keep it transparent for name fill in Top Floor. OK now we have our work document, but for now we just minimize it.

The first thing I wanted was a window, so I opened the Photo the real one is included in the zip file so you have the original to! Now let's explore it for a bit. We see the houses at the left site of the picture those are not possible to use. We look at them from an angle and this make them completely wrong. We can only use the houses directly in front of us. Now the reason I choose this picture is because they are on it and you can see the difference for yourself! A golden rule when you go texture hunting is always taking your object in front. This will not only save you a lot of work later it also will save you from huge disappointments.

Now I don't want the windows with a balcony the reason for this is they won't work for what we want to do! An object like the balcony reach out to far it looks strange when we look at it from an angle in our level. The top windows I don't really like but when I was looking at the house with the red door found the window I wanted the one next to the door with the white curtains inside. So let's steal it using the Rectangular marquee tool and the move tool like we did with the rooftop. You can use the work document we created but I don't advise this, a

better way is making a complete new document specially for manipulating the window. And turn on the show grid in View->Show->Grid also like we did before.

This is what I captured from the picture. Now lets us look at this more closely. Dam it is like the devil plays with it! Also this window is not 100% correct it has a slight twist when you see it with the grid.
Yes it is, and it is also time to say "Welcome in the world of texture making!" I do this kind of things for years and I have to tell you I only had 2 pictures I did not need to rework in all that time. And lets be honest this is probably the best you will ever have it just needs some rotating.
Edit->Transform->Rotate

This is what I ended with. OK I admit I also skewed it a tiny bit after rotating to have it as staid as possible. Same thing like with the rooftop. Edid->Transform->Skew
Now we are ready to crop it, try to get a big part of the material around the window, believe me you will be glad you did that later.

And here is my window! Now this is just a part of our texture. What we will do now is make it appear a few times on our work area. So we need to make this perfectly seamless. Lucky we know a technique to do this from our rooftop texture. So Use the Offset and Clone Stamp technique from the rooftop on this window part to. I won't repeat how to do this when you don't remember do the rooftop tutorial again. After we made the window seamless we make the work area we minimised at the start bigger. What we do now is use the move tool to move in 6 windows to that area. When you do it like this you will notice you don't need to make new layers! Photoshop will do this for you for every window you move to the work area.
Long live Adobe Photoshop, for knowing what we want! ☺
Move the window layers around so you will get the result of the next picture.

Now is that what we want or not? Yes it everything is looking like I want it. My top I will have 2 top floors in my house so this is really what I want.

But what about the bottom of the texture will it stay transparent? No it won't! I want some extra in this one. If we look at the house on the picture we see something below the balcony. And I want that on my house to, that is why I left some room. So like always we start with moving the selection to a work area.

Now the part is difficult to catch on the house we have the window from. So I used the house next to it, that has no balcony so we have a bigger area to capture it from. Also for this part we need to rotate a bit and make the sides seamless. Now don't bother to make the horizontal seamless in this case because this has no use! We just need it 1 time in our texture and this is at the bottom.

Work on it until you come up with something like this. When you do you can move them inside your work area to just like we did for the windows. Super it works. The only thing we still see now is where the border texture meets the window texture.

We can use the Clone Stamp tool on this. But not like we have it now. The best way is work out the layers in this stage and flatten the image. Layer->Flatten Image. Now work out the irritating line. By now you have to be a specialist in this department. When making texture this is 95% of the work we do.

So the line is out now. And we are almost done. Almost I hear you say, well yes think back on the start of the project. We wanted it seamless in the horizontal direction and now this is not the case. We made the windows seamless to fit together in the work area, but we did not make the texture like we have it now seamless. So for the last part we will use the Offset filter again and work out the last line using the Clone Stamp tool. After that we are done and we have something what looks like this.

Just one thing we still need to do now. Save it as a top_floor.tga so we can use it in our levels by entering it in our .wad file.

I really hope you have some use of my tutorial, and when you do I am prepared to write some more. I enjoy it myself and learned a lot while writing this.

Stained glass texture

At some point in our life we all come to a moment we need something special. And one of those times is when we need stained glass. You can go out with your digital camera, go to the local church and make pictures. Now that is a good base material, but when we look at it it's always a little flat.
The problem here is in the lead around the figures. If you make pictures from the inside of the building, what is the correct thing to do by the way because then they will have the nice and shiny look. But the problem here is the fact the bumpy look from the lead is not really like we want. In most cases they show up like black lines, and that is not really what we want in our 3D environment. We want the bumpy look of the lead.
Now the picture I included has a different problem, the lead is showing but it is rather flat. So I had to come up with my own technique for painting the lead on my window.
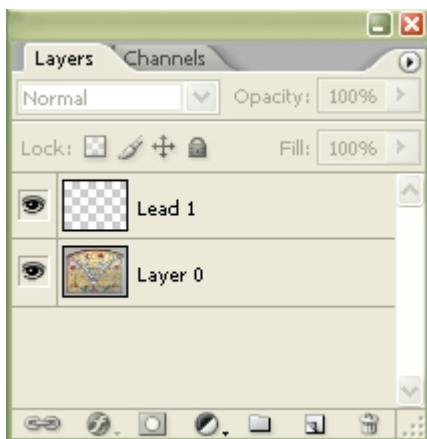
Now the cool part of this tutorial is you can use it for improving pictures of stained glass like we use here. But a cool thing is you can also use it to make your own designs. At the end of this tutorial I will add information how to do that.

Here you see the original I am using for the tutorial. The original you can find in the zip file. Notice the thing I was telling you about. The lead is visible but it looks really flat not natural at all. Now this is not a problem when you use it like a picture but in a 3D environment it is not very good. In normal cases like 3D studio or Maya we wood correct this with a bump map. But for the game engine we need to do it a little different. For the engine we want to include the bump in our texture. We can use a few techniques for this. Capture t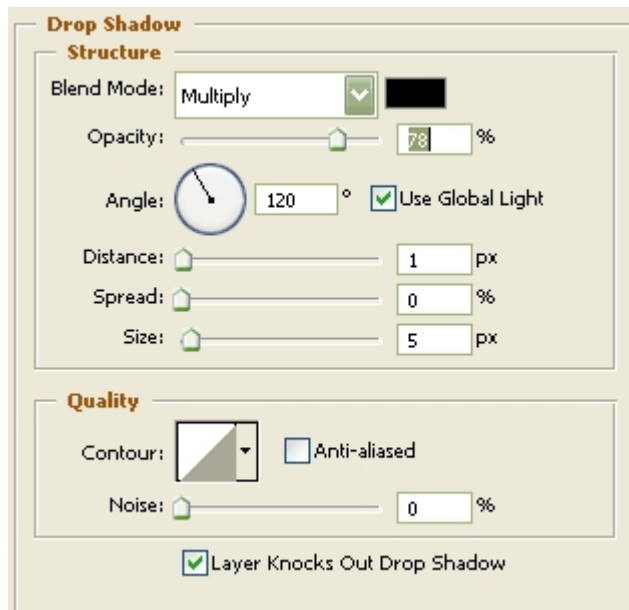he lead using the magic wand tool for example. But for the tutorial here I decided to paint a new leaded layer on top. This makes it more natural. Original those windows are made by artists and they make it freehand. When painting the new lead on top it is also freehand so it looks also natural.
But how can we do it? Well open the picture in Photoshop and ad a new layer you can do this using the layer menu Layer->New->Layer or just click the create new layer icon in the layers panel. Rename this layer to lead1.
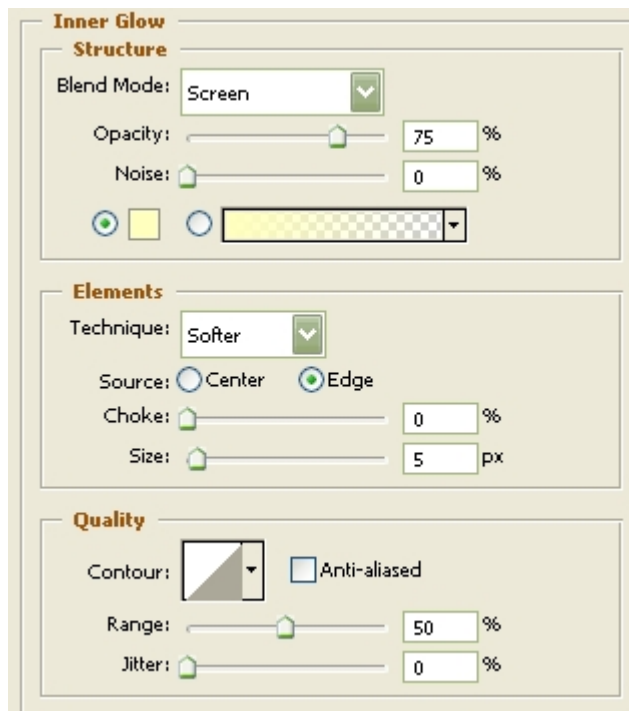

This will give you something like this. What we will do now is we will change this layer in our 3 dimensional lead paint bucked.
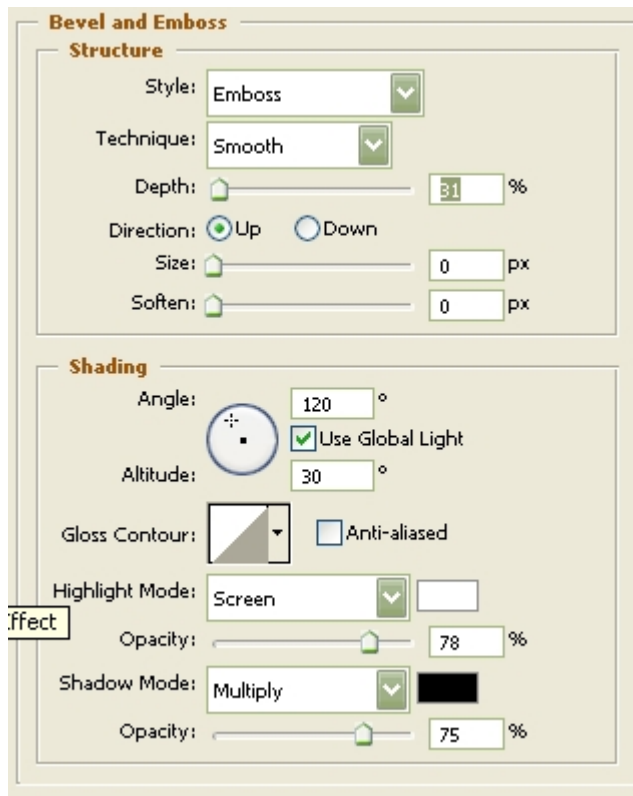Yes you read correct, we will change the layer into a paint effect, and it is really easy to do this! To start right click on lead 1 and from the menu that appears choose Blending Options. This will open the blending options dialog and this is the tool we will use for making our lead paint effect. And because a picture tells more then 1000 words I made screenshots to show you the settings. ☺

Drop Shadow

Structure

Blend Mode: Multiply

Opacity: 78 %

Angle: 120 ° ☑ Use Global Light

Distance: 1 px

Spread: 0 %

Size: 5 px

Quality

Contour: ☐ Anti-aliased

Noise: 0 %

☑ Layer Knocks Out Drop Shadow

The first thing to do is go to the drop shadow panel. And insert these settings. I use a distance of 1 because there is not really a distance between the lead and the glass.

Inner Glow

Structure

Blend Mode: Screen

Opacity: 75 %

Noise: 0 %

Elements

Technique: Softer

Source: ○ Center ⦿ Edge

Choke: 0 %

Size: 5 px

Quality

Contour: ☐ Anti-aliased
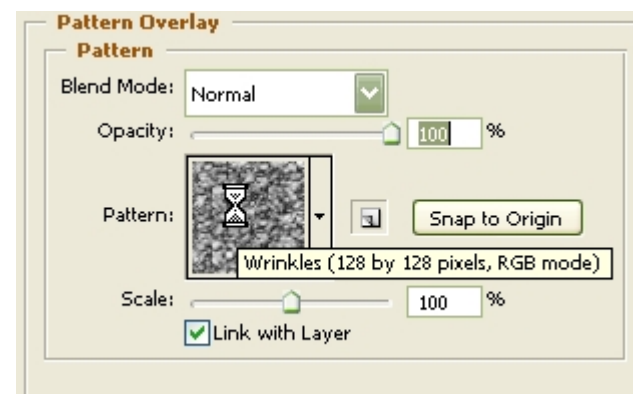
Range: 50 %

Jitter: 0 %

Next we go to the inner glow tab and use the settings you see here. Now this is mostly standard so you don't need to change much. You can experiment with it later, this part makes a big difference when you play around with it.

Now this part is one of the most important parts of the effect we are making. This is the part that will give our paint the nice 3 dimensional look. You can play around whit these but I found this are the best settings for the look we want.

One thing you have to keep for sure! Look at the angle! It is set to 120° just the same we used for the shadow. Change this and the effect will loose its magic.
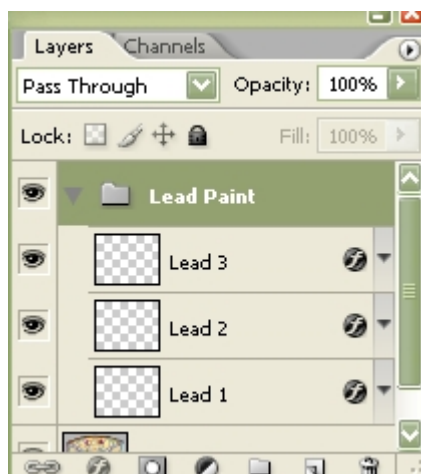
The last part I used is a pattern overlay. The lead in stained glass is never strait. It always has some pattern in it. This is because the bending and the welding while making the window. I use the standard Wrinkles pattern here but you can experiment with this to, even make your own patterns.

Now this is all we need! We now have our paint. And everything we paint in this layer will use these settings!
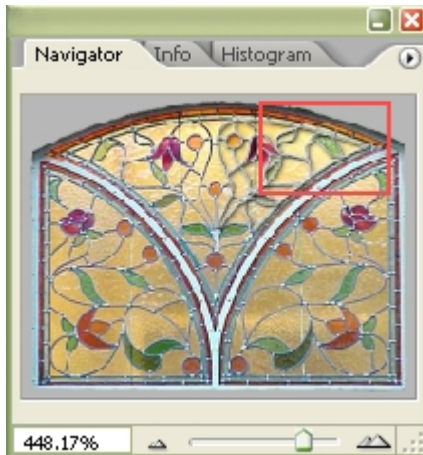
Ok now we have our paint and we can start painting with it. But I want my 3 parts on different layers so I started to copy my paint layer to lead 2 and lead 3. To do this right click on the lead 1 layer and use the Duplicate Layer option.

A different option most people keep forgetting while using Photoshop is the group layers option. Now I am a bit of a freak about grouping things together so I use it often. In this case I made a group named Lead Paint and group my paint layers into this.

The advantage of the technique I am explaining here is the fact that everything you do on the paint layers changes into lead paint. This aspect gives you a wide range of opportunities to use your creativity.

I started to paint over the old lead in the window on my paint layer using a brush of 2 pixels.
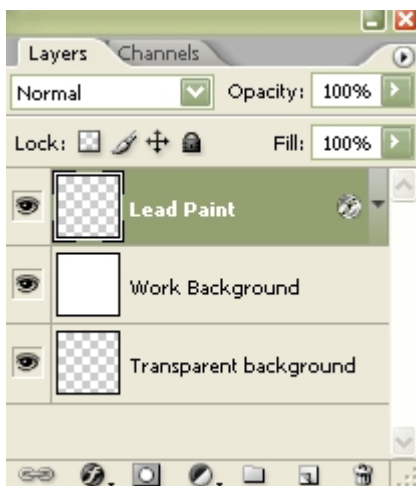
An easy way to do this job is use the navigator and enlarges the picture until it is really large so it is easier to follow.

Here you see a fragment of my work that is partly done. Notice the part I used the paint has much more dimension. When we started this part of the tutorial I told it was a good technique to design your own stained glass texture and this is what I will show you now.
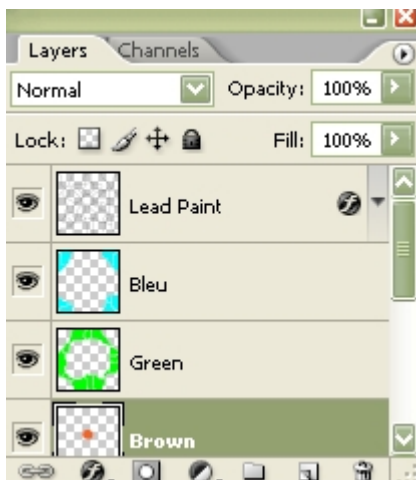
For my own design I started a new project I want it to be a texture of 256 X 256 pixels and transparent. Then I added a layer named Lead Paint. And I used the settings for my lead paint like before. To have a better look on what I was doing I also added a layer and filled it with a white colour.

This is the layers tab I started my work with. I selected the Lead Paint layer and start drawing my design on this. The white work background, I will remove later from the project is a big help now so I can see what I am drawing much better.
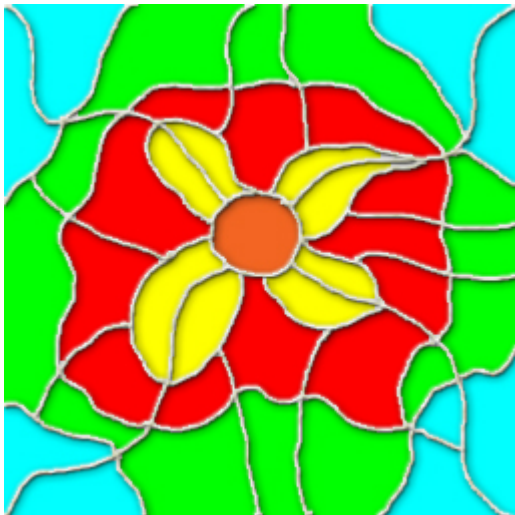
After playing around with it I came up with this design. Like you notice it already has the lead effect we need in our Stained Glass window. We can use the Magic Wand tool to select the glass parts. And we use the paint bucked to fill them with the colour we want. Start a new layer for every colour so we can give every colour a different treat later. Those layers need to be below the Lead paint layer.

Now the trick here is we have to make the selection a little bigger. Now I used a brush of 2 pixels here, so after selecting the parts you want use the Select->Modify->Expand option and use a expand of 1 pixel.
You can use the shift button while selecting with the Magic Wand tool to select all parts of the same colour at ones.

Here you see my design with the colours in place. Like you can see it already starts to have the look we wanted. What we will do now is play around with the glass parts and gives them a nice natural look.

Now I did not use a glass filter here. I came up with this just using the satin and pattern from bending options.
Like you can see here this also gave it a cool natural glass look. Turning it into a stained glass window we can use for our levels. Try some experimenting with the technique and you will come up with some really cool looking windows by yourself.