SMOOTHING GROUPS FOR CARMAGEDDON 1 & CARMAGEDDON 2 TUTORIAL by TOSHIBA-3

Hello, this tutorial will explain you how to setup proper smoothing groups in either 3dsMax or PlayThing2. It has a major influence on the ingame shading and env mapping efficiency.

This won't tell you how to make a car, export it to C2, or anything else than smoothing groups setup, mmkay ?
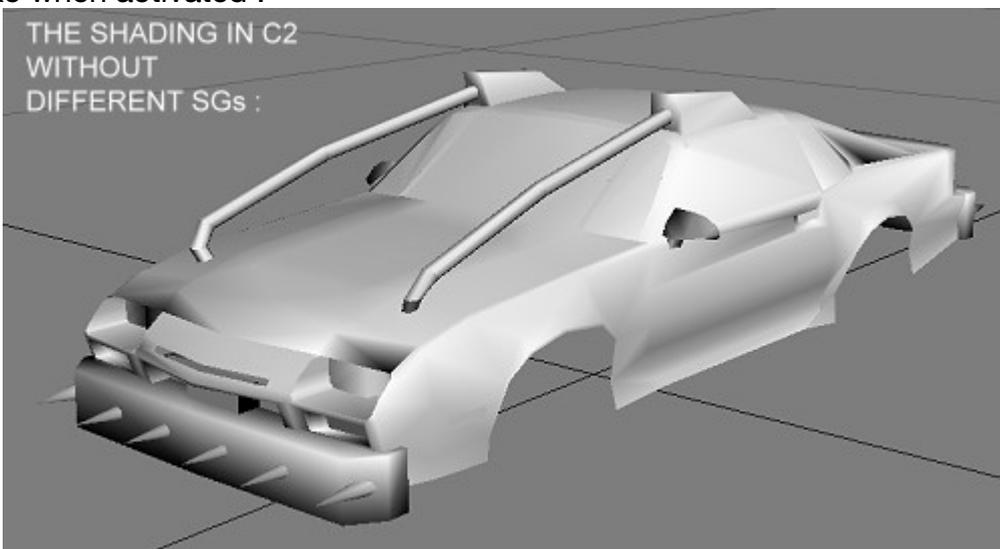
Letsa go!

FIRST PART: IN 3DSMAX

Here I took TTR's Wastemaro to illustrate. I took off the textures to let the shading be easily visible, as this is what we are working on.
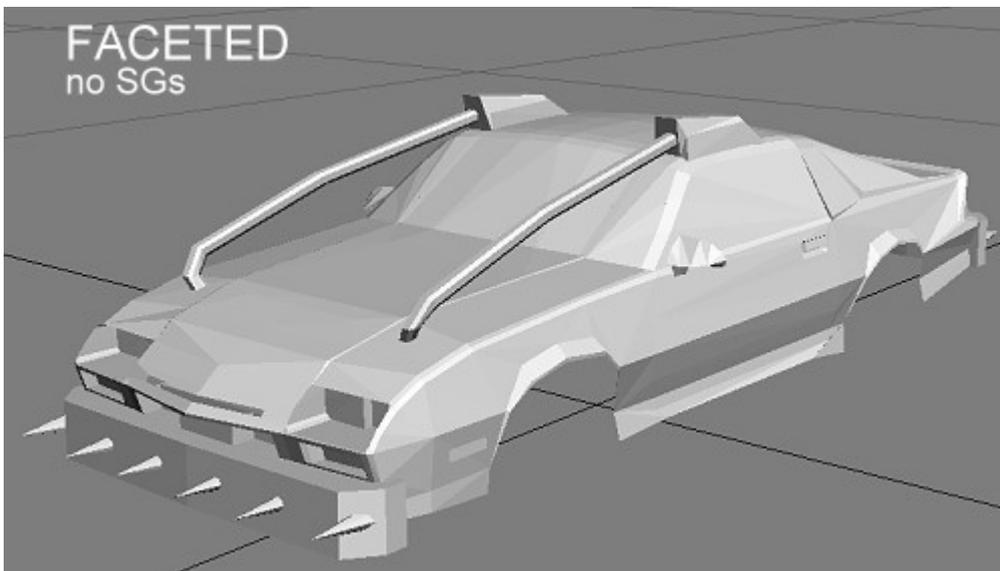
The car has a nice faceted look here, isn't it? That's called the faceted view in Max. Very useful to check the triangulation. But actually, there's one SG on that car, and here's what it looks like when activated :

That's directly less nice uh. And this is what the shading looks like in C2 actually, as this model directly comes from its C2 form. Ofcourse it is less noticeable with detailed textures and if a prerendered shading is part of the textures even. It is still there, and doing a proper SG setup really improves the look of the car, especially if said car uses env mapping.

What causes this weird shading? Every face in the model has the same smoothing group so everything get smoothed together even if there are hard edges.

Let's select the model (here the whole car is merged into one component, in your real projects, Sgs must be setup for each component!), go into the modifier tab, enter the poly mode (might be the face mode only if you're using a very old version of Max).

Then hit CTRL+A to select all the faces, scroll down in the modifier panel to the smoothing group menu and you'll indeed notice that there's either no or the same SG applied on the whole thing :

All faces selected (CTRL+A) and the same SG everywhere
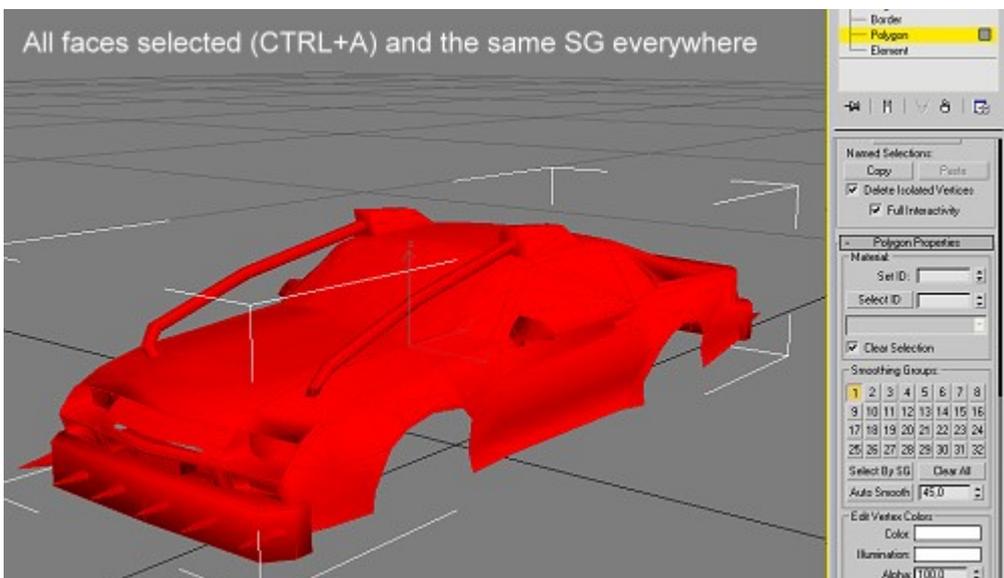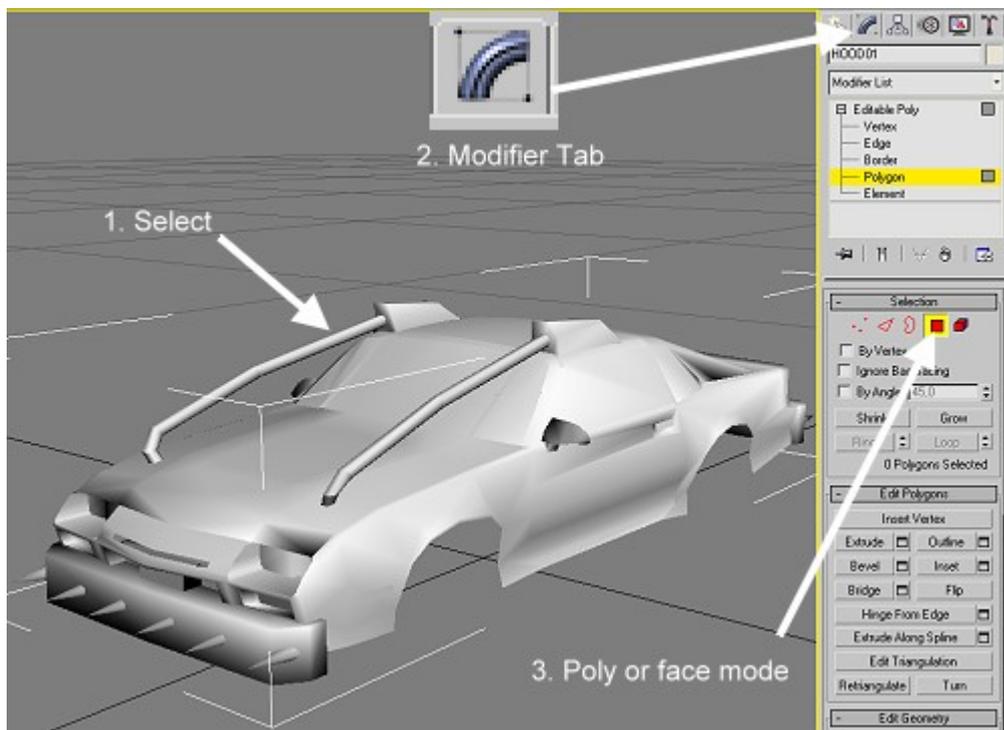
Now I'll show you how to create a hard edge using SGs. It is very useful as it helps detailing the car a lot more without adding polygons or too much details in the textures. Also the existence of SGs helps the shape of the car to react more correctly to the lighting.

So now get rid of that selection and select some triangles manualy. Choose a group of triangles that you think shouldn't be soften with the rest of the model. Then uncheck the existing SG applied on them and apply a new one instead. Pay attention that C2 is limited to 16 different smoothing groups.


Select some tris and change the smoothing group
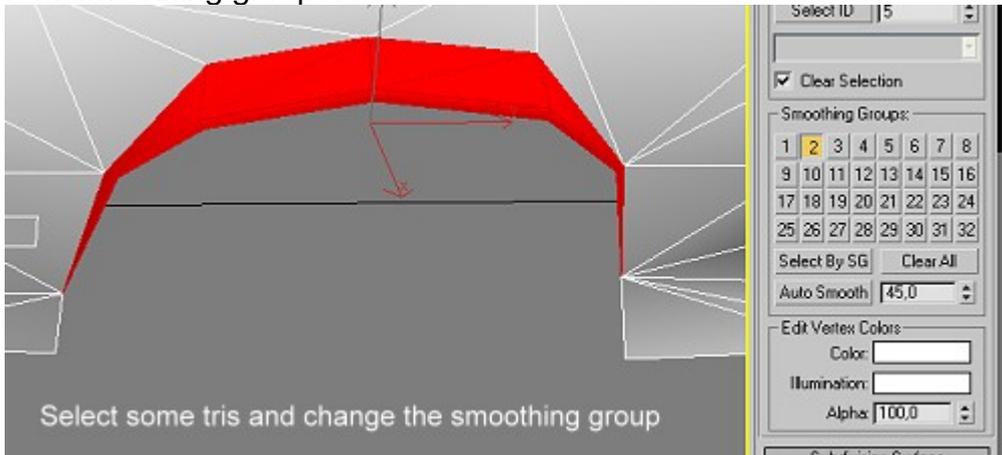
Here I decided to separate the wheel well shading from the rest of the car.
The result:

The result
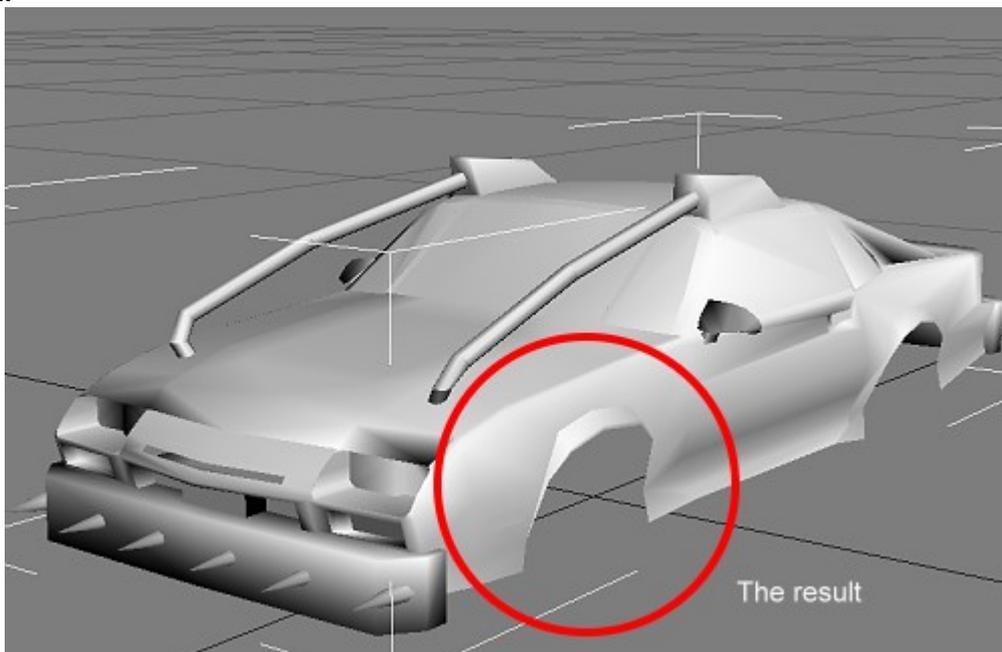
You get the idea?
Let's do a quick SG job on the rest of the car. Always pay attention to separate smoothing groups from each other correctly, using other smoothing groups. If you have 3 triangles next to eachother like that : AVA, even if the two A triangles are set on SG 1 but separated by a V triangle set on SG 2, the fact that they share a vertice will allow the shading to go through it. The last A triangle should be set on SG 3 instead.
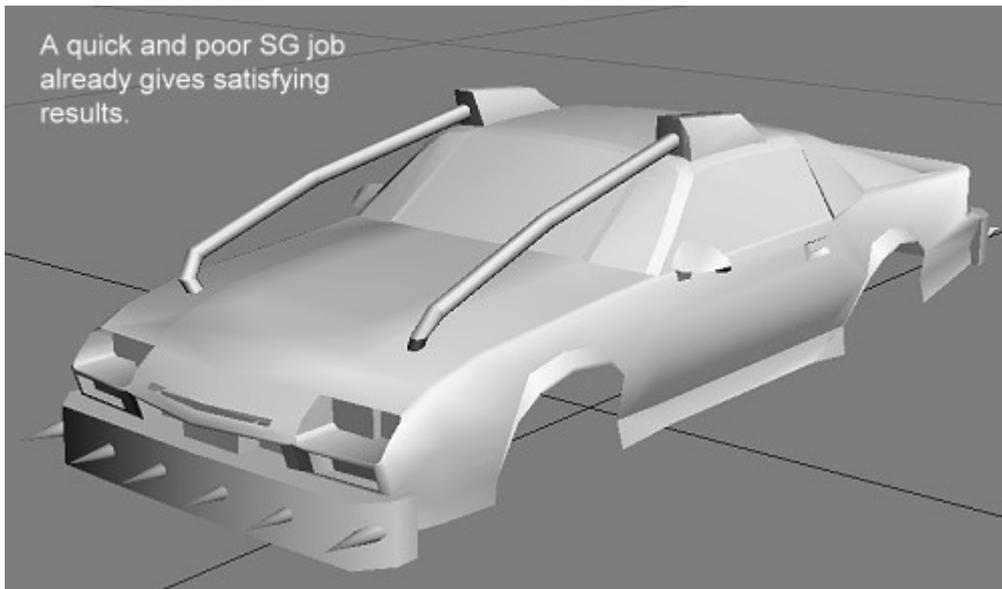
The result of a really quick SG job. Heh

So once you're done with your car in Max you can export it with the last ASE2ASC to PT2 and the SGs will be converted as well ! (Don't forget to check Smooth in the Mat Flags)

SECOND PART: A FEW REMARKS

Actually C2 processes the smoothing groups in a different way than MAX. While in MAX you can see the shadows running over the textures, following the smoothing groups ; the shading in C2 will follow the smoothing groups AND the textures' UVW map AND the textures themselves ! That can be really annoying because it creates a lot more hard edges. This is why Stainless thought about adding a SHELL.DAT file. On the SHELL model, the rendering engine won't stop the shading to the UVW map or even to textures ID. It will look exactly as it does in MAX.

The SHELL file is used when the car is not damaged yet, when it is still intact. As soon as dynamic damages are applied on the car (even after a small shock), doors are open, or if you enter the replay mode, the SHELL will disappear and the real model will be loaded. So it is wise to create a real SHELL model and spend some time to do the SGs (even better) on it. A shell kinda looks like what you see of TTR's Wastemaro in this last pic : no wheel and no animated part (i.e. if you set the engine to move with a GROOVE, don't include it in the shell), also everything is merged together and simply named SHELL. You can even optimize the model as some parts of the SHELL will never be visible: door seams, inside the trunk and under the hood ; as the detachables won't come from the SHELL you can also simplify their geometry (i.e. if you prepared some polys that are only visible when detached). Don't be afraid of floating geometry etc., the SHELL is like the GROOVY parts: dynamic damages aren't calculated on it and thus is more resistant to ingame crashes. The SHELL is also used to generate the Steel Gonad O Death cheat.

Another very important thing to do in PT2 is to prepare the materials. SERIOUSLY. I'll talk about that in the third part. Don't be a lazy ass and just do it, it takes 1 sec per material once you know what to check. Anyway, if you want to see the shading in PT2, the materials must at least have the Smooth flag checked.

Most CarEd users don't like PT2. This is really bad, as the models CarEd creates have no SG setup and no material setup, at all. So the cars shading always look like that second pic on the first page, materials can't be two sided and thus people make the components two sided by copying&flipping polys which results in yet uglier SGs. But also creates a poor SHELL which hasn't SGs too and doesn't think about animated parts.

THIRD PART: IN PLAYTHING2

Ok, this is what most of you guys will follow. I recommend to read the MAX part anyway as it will maybe help you understand better.

This time I used Timmy76's MarinaCoupe car. It was entirely made in CarEd with no interventions in PT2. So, every face is set on SG 1, the materials aren't prepared to support smooth, correct perspective, double side visibility or map antialias. Even though I think I've seen way worse, and anyway everybody's got the start somewhere. The important point is to improve again and again (with this tutorial for example ;)).
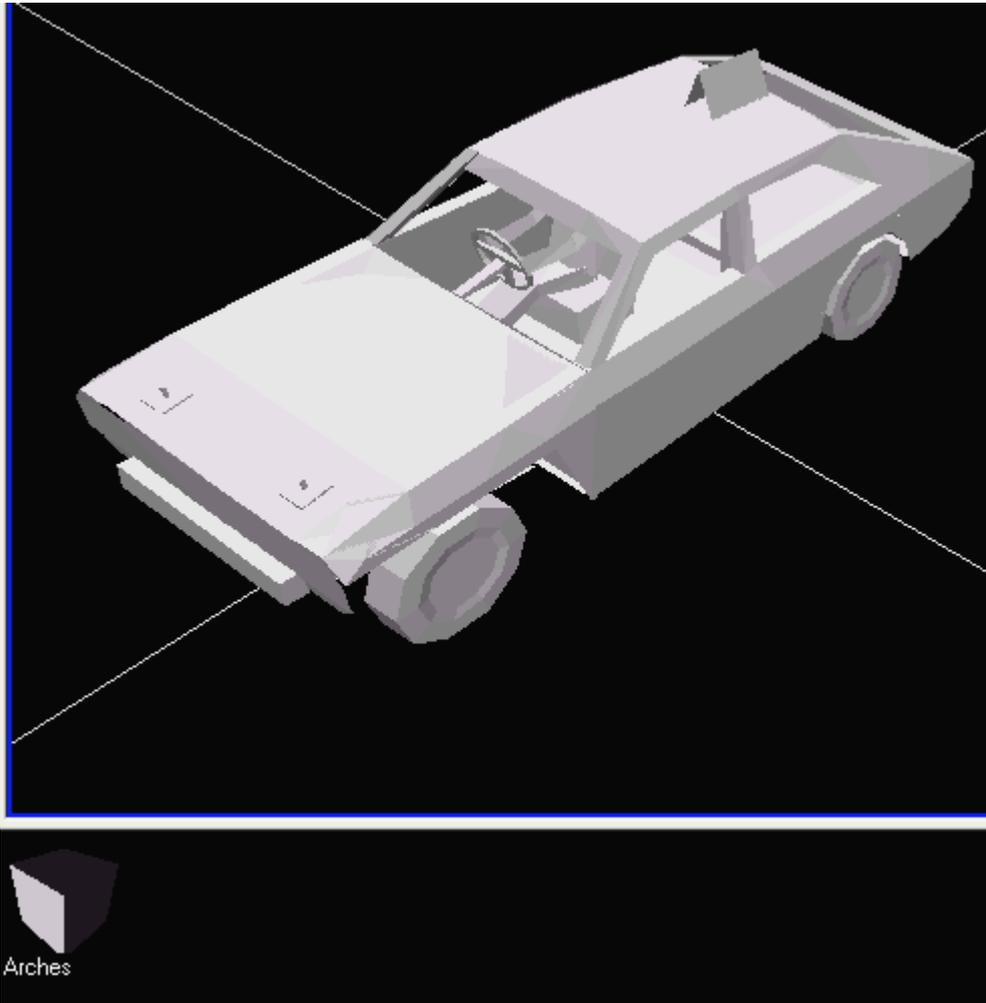

Look here, I've got rid of all the materials to ease the show (and *cough* go a bit faster with this tutorial). So far the sole material (which I applied on the whole car) is not prepared so the model looks *faceted* in PT2 BUT IT WILL BE SMOOTHED INGAME! Notice how we can see some design lines details, or simply the inset in the side of the wheels. Double-click on the materials, go into the Flags tab and then check the Smooth and Correct Perspective flags at least. The double sided flag can often be VERY useful. Env Mapped (loc) is used to fake chrome effects and other reflections. Dither refines the textures as you come closer to it. Very noticeable in C1 and C2 in software mode. Map Antialiasing does what its name says. Other flags have an utility ingame, but it is not likely that you'll make use of them at all.
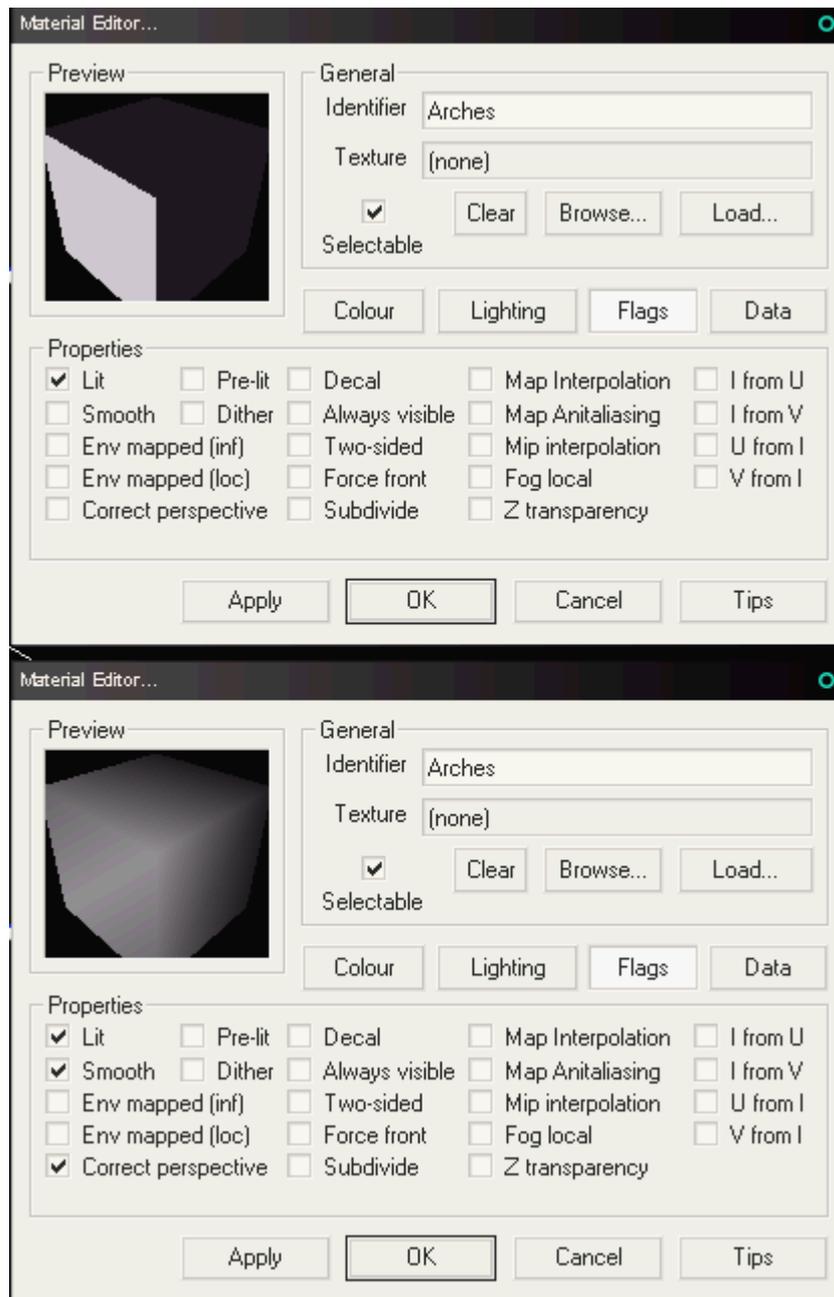
Before   After, look how the material preview already changed. You can tweak the lighting too. Or add a diffuse color.
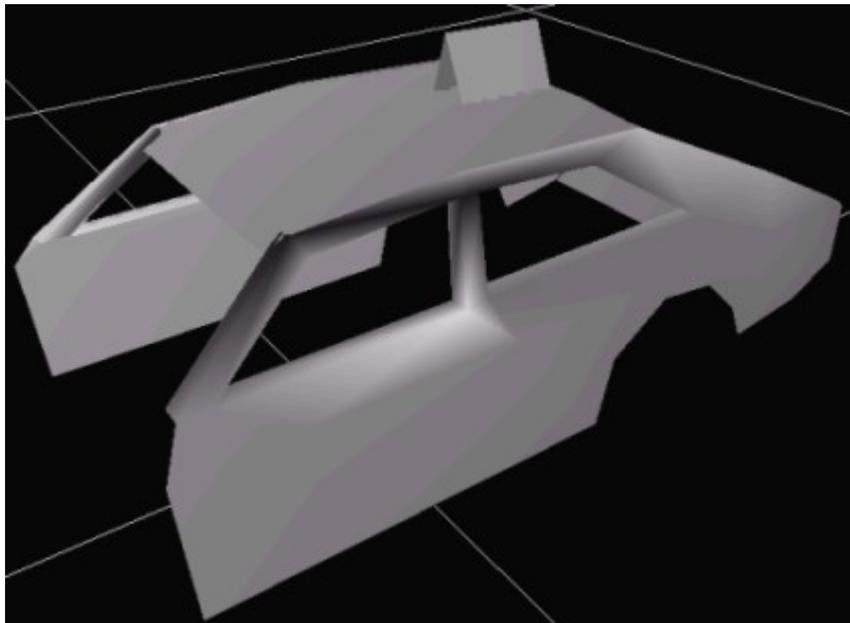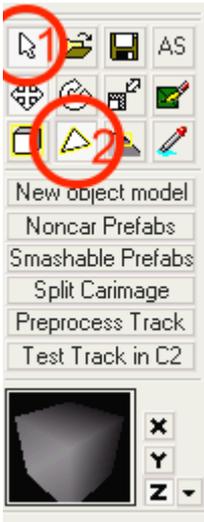
hello

Arches
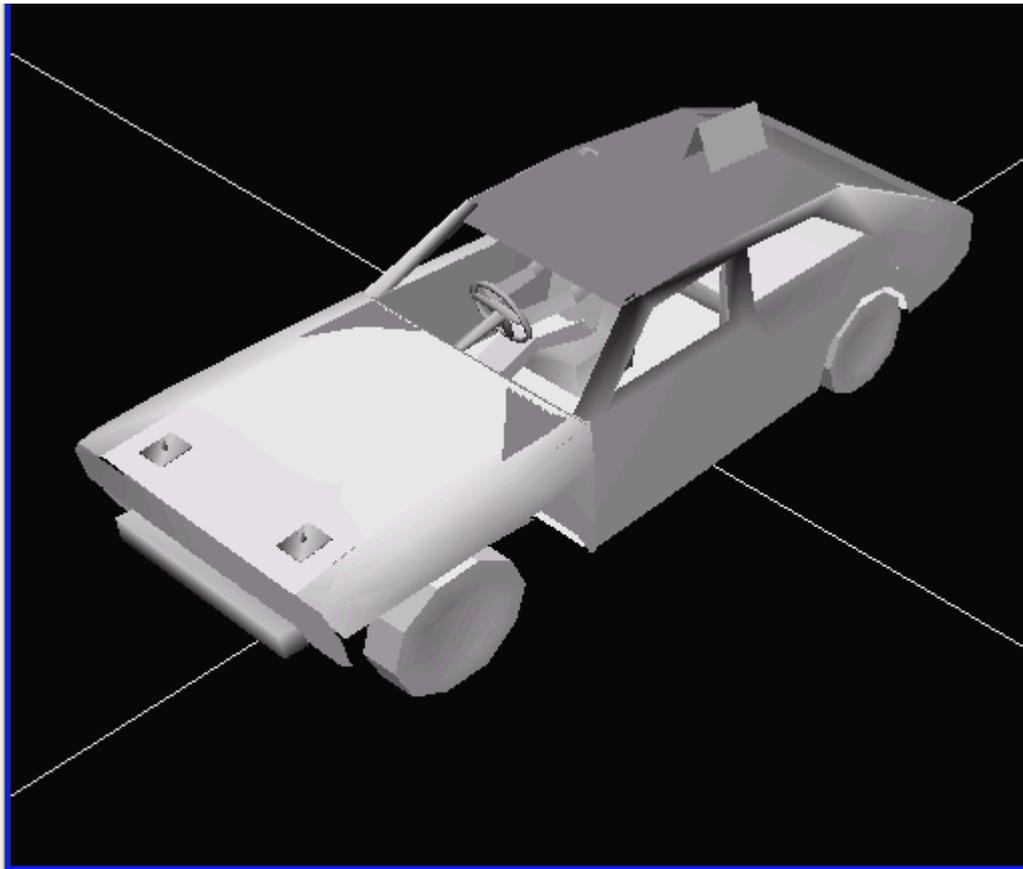
And now PT2 shows you what the shading looks like ingame :]   ... **AN UGLY GOO!**

See, we can't even see the design line on the side of the car, it just looks like jelly. The side of the wheels is even worse. Batman! We've gotta do something!
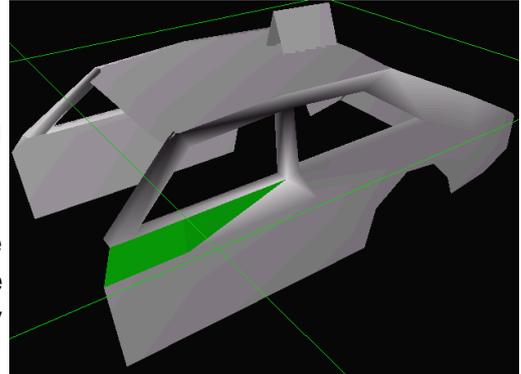Select one component and scale it up 10times (SHIFT + T, Scaling, Whole model : 10). You'll get this :

This is way easier to work and select polygons, you won't be annoyed by the rest of the car. Enter the polygon selection mode (see pic at left), and select all the polygons of this part (zoom out a bit and draw a selection box around the component.
The model will turn totally green.

Right clic on it and select Smoothing groups, a new dialog box will appear. The polygons will be all set on SG 1, on all SGs or no SG at all. Just make sure they are set on the same single SG so far (don't forget to hit the Apply button).
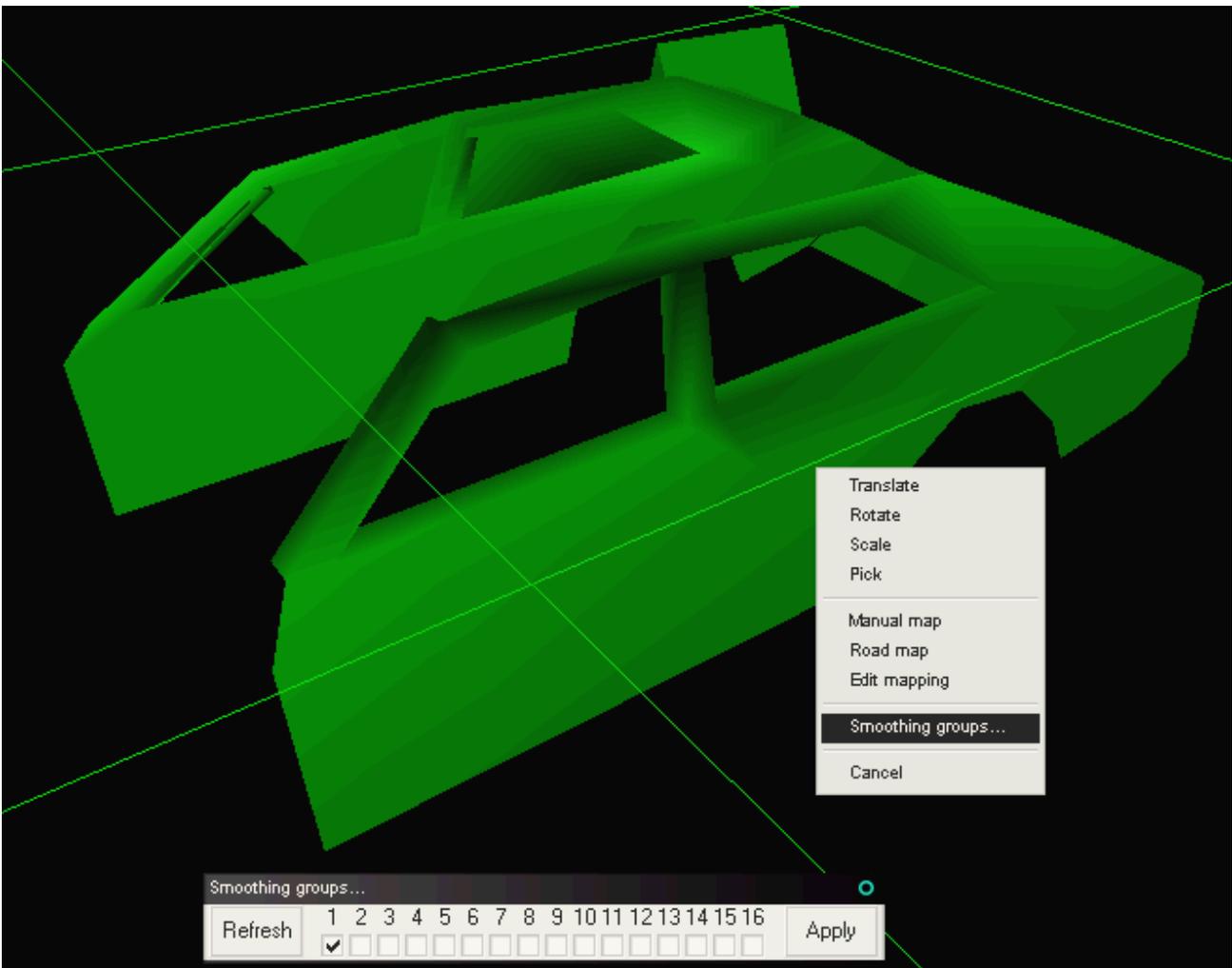

You'll notice that the green selection is visible even on textured polys. This is useful to check the smoothing groups effect when they are set !

Now that we are sure that every polygon has its SG, we'll go into doing the actual SG setup. Unselect the polygons (D key (be sure to always have the cursor in the viewports before using a shortcut)), then start selecting a new group of polygons you think should have their separate shading. Then you know the way already : right-clic, smoothing groups. Uncheck the existing SG and select a different one for that group of polygons. **Apply**. Unselect and see the result (pics next page).

Smoothing groups...

Refresh 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 Apply

Smoothing groups...

Refresh 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 Apply

I did a bit more SG setup in those pics in the previous page and you'll notice that we got rid of most of the wrong shading, but we can go further and use the smoothing groups to get a detailed lighting and define the shape more sharply :
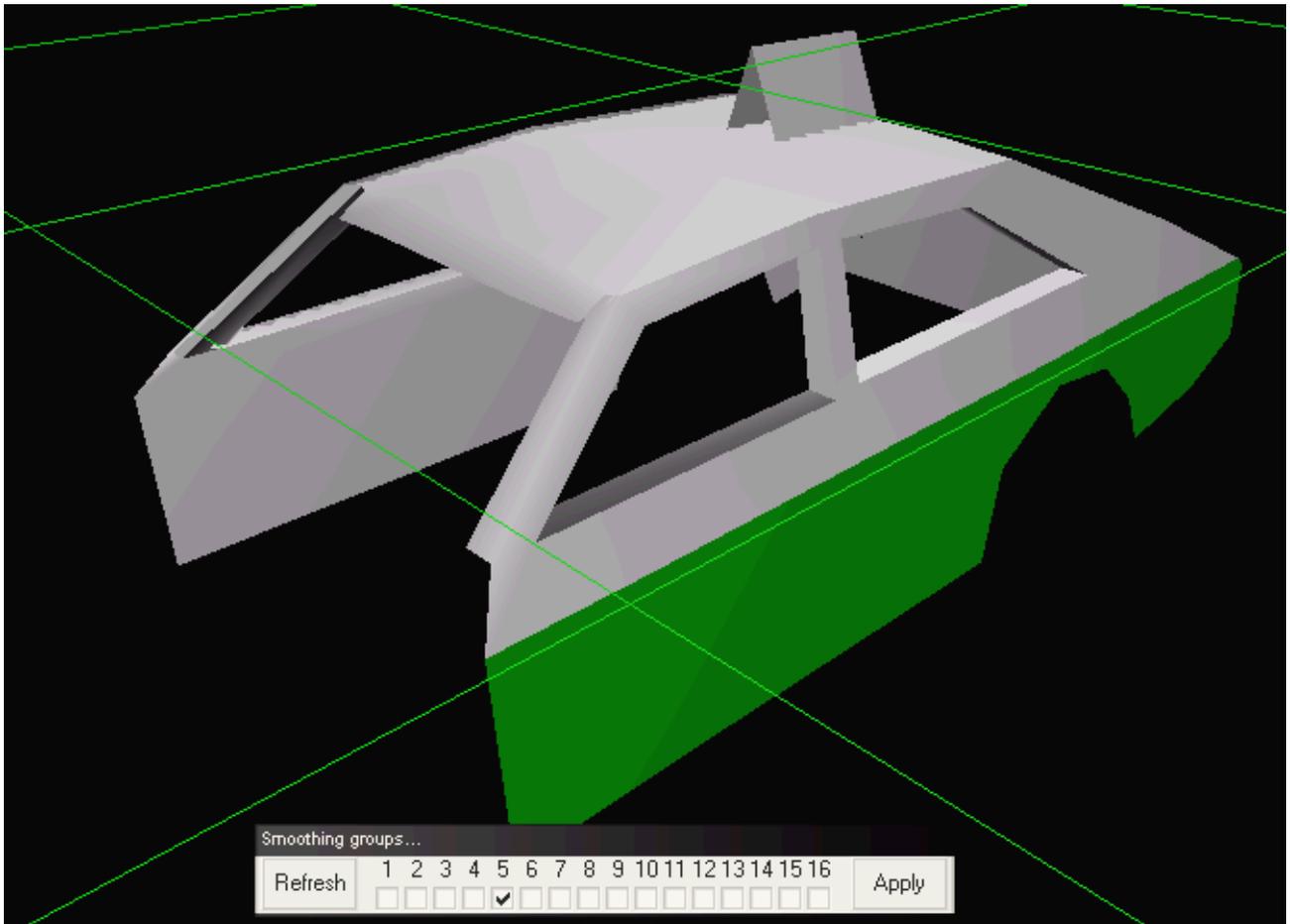
I downscaled the part back to its normal size (whole model scaling : 0.1). The difference with the other parts is obvious. For your model, you'll ofcourse have to do this for all the parts :]   It goes real fast when you're used to it.

And here's what the wheel looks like when the smoothing groups are set correctly :
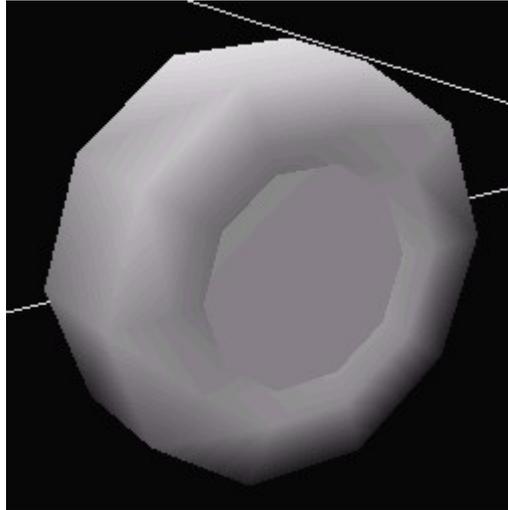
It kept the inset detailing, but is round like a normal wheel now!

Final remarks:

– When you setup the SGs, save very often. PT2 can crash on the selection of some polygons. Can be very annoying to lose a 10min SG job uh.
– MAX supports multi-SG per polygon, PT2 looks like it does too, but actually C2 doesn't (or I haven't found how yet (maybe with the SHELL?)).
– The main source of problem with CarEd cars is when the user created a solid door for example, and applied a single texture on the whole door with CarEd planar ways to apply textures (top, left, front, etc.). This actually means that there's only one texture on the whole thing and no UVW map (remember what I said about the SGs limitation before?), and thus one single SG on every polygons... The door looks like a goo drop. The shading goes from the inside to the outside from every corner.

Oh well. You know the deal now.
Good luck
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