

# Design Expert 5.2

## Materials and Textures

### ***First Edition***

Ismo Mäkelä: "Design Expert 5.2 Materials and Textures".

July 2003.

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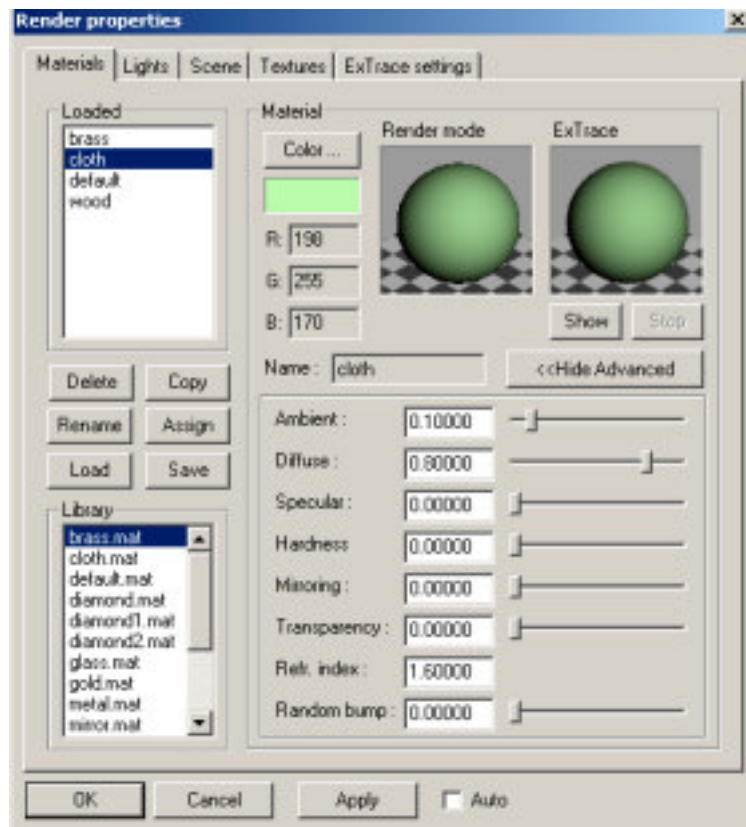
### ***Chapter 1 – Foreword***

This Materials and Textures document describes the improvements done for the material and texture handling with DeskArtes Design Expert software for the version 5.2 (5.2.0.11). In particular following subjects are covered:

- material appearance in Render mode (OpenGL) vs. ExTrace image,
- intuitive texture positioning,
- wrapping, rotating and mirroring textures,
- displaying texture markers and texture images,
- texture appearance in Render mode vs. ExTrace image.

### Chapter 2 – Controlling Materials

The materials may appear different in the OpenGL graphics when compared to ExTrace. This is due to different rendering methods in OpenGL hardware and ExTrace ray tracing implementation. Thus the materials will never be exactly the same for all combinations of different material properties. Anyhow, with new checking tool you can easily control and see the difference of materials in the two rendering modes while editing materials. This will help you to use real time Rendering during the design process and later generate impressive photo realistic ExTrace images from your designs.



#### Materials Page

The Materials Tab in DE includes now two separate graphics windows. These display how different materials appear in OpenGL Render mode and ExTrace image.

When a new material is selected from the Loaded list Render mode window shows the material characteristics immediately. To get correct ExTrace image you need to press the Show button below ExTrace window.

Experiment by loading different materials and changing the different material values. The main rules are that ExTrace is more sensitive to ambient and

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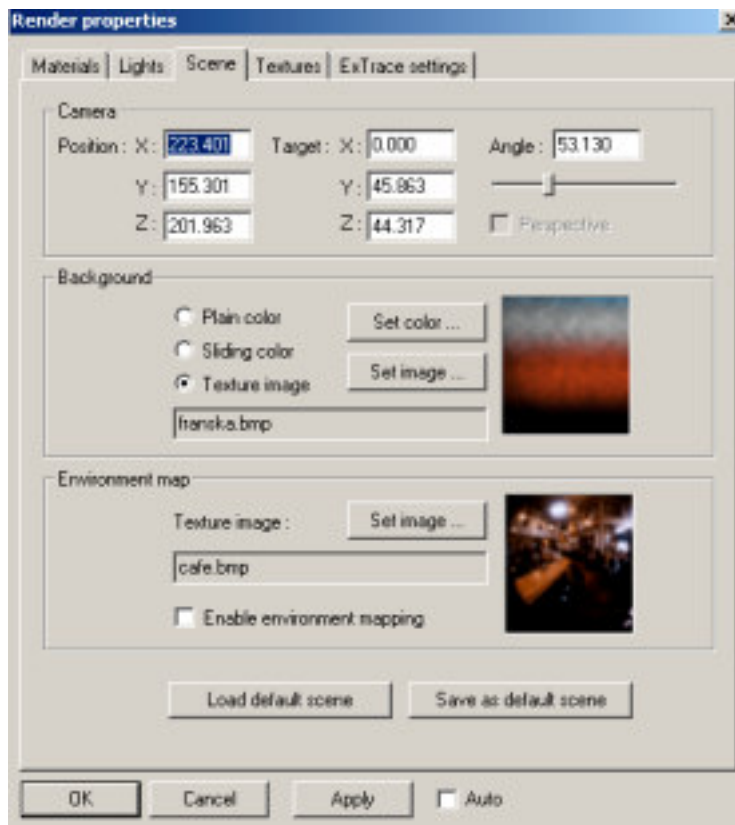
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mirroring values. High ambient make ExTrace appear brighter than Render mode image. Also, Render mode can not show mirroring effects similar to ExTrace.

For example, compare the brass and cloth materials. Changing any other parameter than ambient and mirroring for the brass has a stronger influence on ExTrace image than on Render image. On the cloth material the changes are rather similar.

### The Scene Page

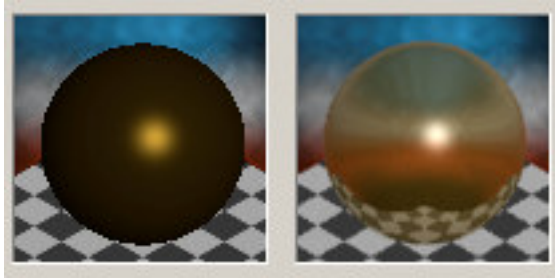
The Scene Tab settings have a strong influence on the material preview images on the Materials Tab. Materials Tab material preview is affected by two settings in the Scene Tab albeit slightly differently. These are Background and Environment map settings.



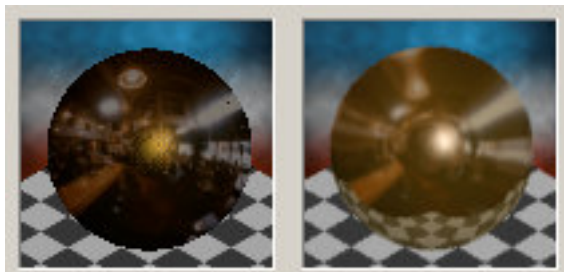
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The effects of the Background setting affect the background in both material preview windows. Also, the ExTrace window will mirror the background image if the defined material has some mirroring value as seen in the image below.



The effects of the Environment mapping are visible on both windows in similar manner. Environment mapping overrides the Background Texture display with ExTrace preview window, as seen below.



### Chapter 3 – Controlling the Textures

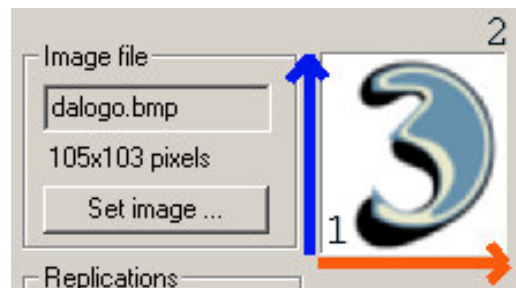
In this section we will describe the texture handling with the Design Expert. Textures can be positioned very intuitively and displayed in different ways on the graphics area.

#### The Texture Page

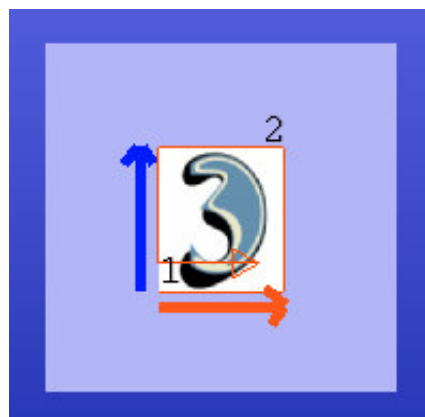
The Texture Tab gives you the control to the textures on each surface. There are some important changes to make the positioning operation more intuitive.

Initially the texture is either positioned on the whole surface or onto an area which is indicated with the mouse. When the position is indicated with the mouse two points are given to define the position and orientation of the image on the surface. These two points also define the direction of horizontal and vertical axis of the texture image on the surface.

The number 1 and 2 in the image below give the order of the texture corners to be given with the mouse. The vertical (blue) and horizontal (red) Texture Image axis are also shown.



Below we can see the same texture positioned on a plane primitive. The points 1 and 2 indicate the order and position of the two corners given with the mouse. The blue and red axis give the vertical and horizontal axis on the surface. The Texture Marker arrow (thin red line on and around the image) shows the direction of the Texture Image horizontal axis on the surface *at all times*.

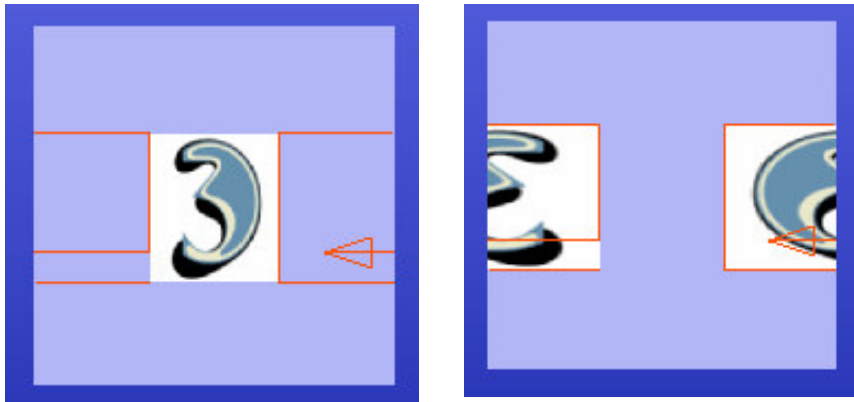




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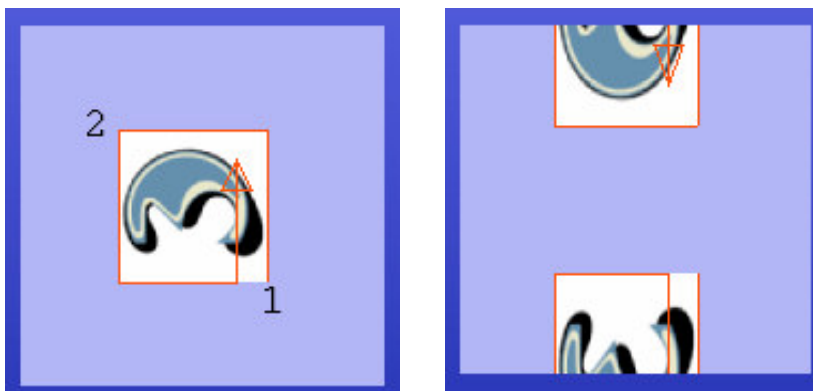
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From now on all wrapping and rotation commands are done with respect to the vertical and horizontal axis defined above. For example, wrapping horizontally the texture above causes the DeskArtes logo to revolve around the plane primitive as seen below. Leftmost image is seen after giving the wrapping Execute, rightmost after pressing Apply or OK button.



**Note:** After defining the texture positioning on a surface, the Texture Marker is draw immediately on the surface. To show the actual texture image on the surface you need to press either OK or Apply to generate up-to-date texture images.

If you give the corner points in another place the direction of the horizontal and vertical axis on the surface change. In the two images below the points 1 and 2 are given in the order appearing in the left image and a subsequent horizontal wrapping result is shown in the right image. Again, horizontal wrapping happens in the direction of the horizontal Texture Image axis.

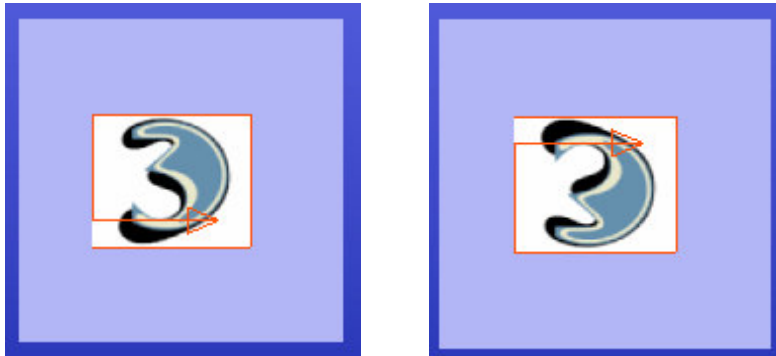


Again, the Texture Marker arrow shows the Texture Image horizontal axis direction.

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Another example, mirroring vertically the left image below gives us a result where the image is mirrored along the vertical axis as seen on the right image. The Texture Marker is updated to show the new horizontal direction of the Texture Image on the surface.



With cylindrical surfaces the defined texture area may go over the seam of the surface and the result will thus go around the object. This can be easily fixed with wrapping and rotation commands remembering that the Texture Marker arrow on the surface always gives the direction of the Texture Image horizontal axis.

If you are using Center or Around Placement method, same rules apply as for The Corners method. For Center method the 1<sup>st</sup> point remains in the middle of the image and the 2<sup>nd</sup> point in the upper right corner. For Around method the square given with the two points is stretched around the whole surface in the direction of the horizontal image axis. The vertical and horizontal Texture Image axis are defined in the same manner as given for the Corners method above.

### Displaying Texture Areas

To display texture information on the surfaces the user must toggle them on/off with the View menu commands. Texture Images are controlled with the “View/Display Texture Images” and Texture Markers are controlled with the “View/Display Texture Markers” command. If Texture Markers are not show when defining new textures the display is automatically toggled on. Markers are always updated to reflect the current texture combination.

The Texture Images are only displayed when Display Texture Images is toggled. Also, to update the texture display on the screen after changes in the texture composition, either OK or Apply button has to be pressed in the Texture Tab.

### Texture Appearance

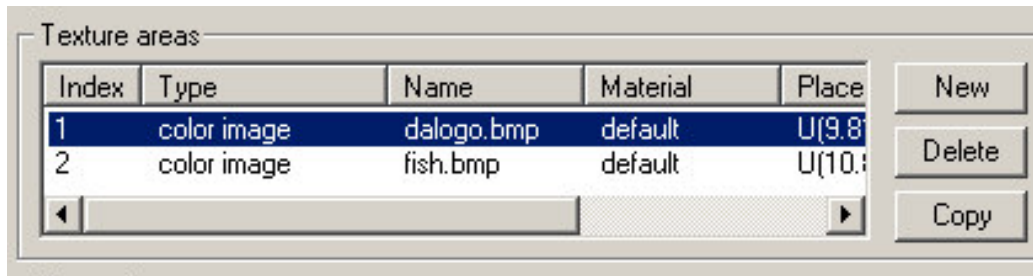
There are several things which affect how the textures are displayed on the screen. For example, the order in which the textures are defined can leave some textures behind other textures. Also, the Texture display in ExTrace and Render

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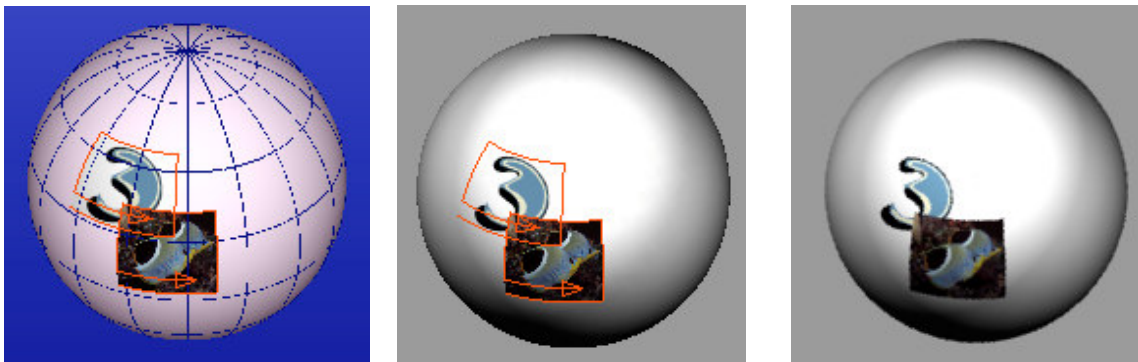
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mode may differ. Render mode (OpenGL) does not support all texture types available for the ExTrace, namely solid textures. In this chapter we will show the similarities and differences between ExTrace and Render mode textures.

Normally textures can be defined quite freely only taking into account the order of texture definition. For example, sphere with two textures shows topmost the texture which is last defined in the Texture list in the Texture Page.



The fish.bmp is on top of the dalogo.bmp both in Viewing mode, Render mode and ExTrace image as seen below.



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The bounding texture usage has been improved to allow bounding surface transformations both in Render mode and ExTrace images similarly. For example, rotating bounding surface updates the corresponding bounding texture in Render mode as seen in the two images below.

