Hayabusa Renderer 2.0 for Rhinoceros

IBL (Image Based Lighting) Tutorial
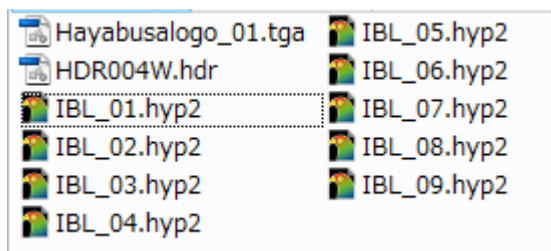
（Lighting calculation from background image・Using HDR)

Contents

Files to use

The downloaded data folder contains the following files

● **IBL_01～09.hyp2 file**:Hayabusa 2.0 files to be used for this tutorial. Including files in process of creation.

● **Hayabusalogo_01.tga**:Logo image file.

● **HDR004W.hdr (with watermark)** :A .hdr file to be used as Image Based Lighting **(Note)**

> **Note**：This .hdr file has got a permission to use from Creative Market so it has the watermark. If you want to use theoriginal.hdr file, please download it from the following site directly.

> **Download to:**

> **Creative Market**

> http://www.cr-market.com/

> **Original image** of [HDR004S.hdr] with no watermark

> http://www.cr-market.com/2007/03/29-223312.php

■IBL (Image Based Lighting) is

a lighting method which uses background images. You can create an image blended easily to the background since the lighting is done with the color and the brightness of the background. You can use regular images like jpg or TARGA, but if you use a HDR (High Dynamic Range) which maintains high brightness data, you can simulate a natural reflection which has high contrast, and the effects such as Bloom and Star as well by using/creating extensive brightness.

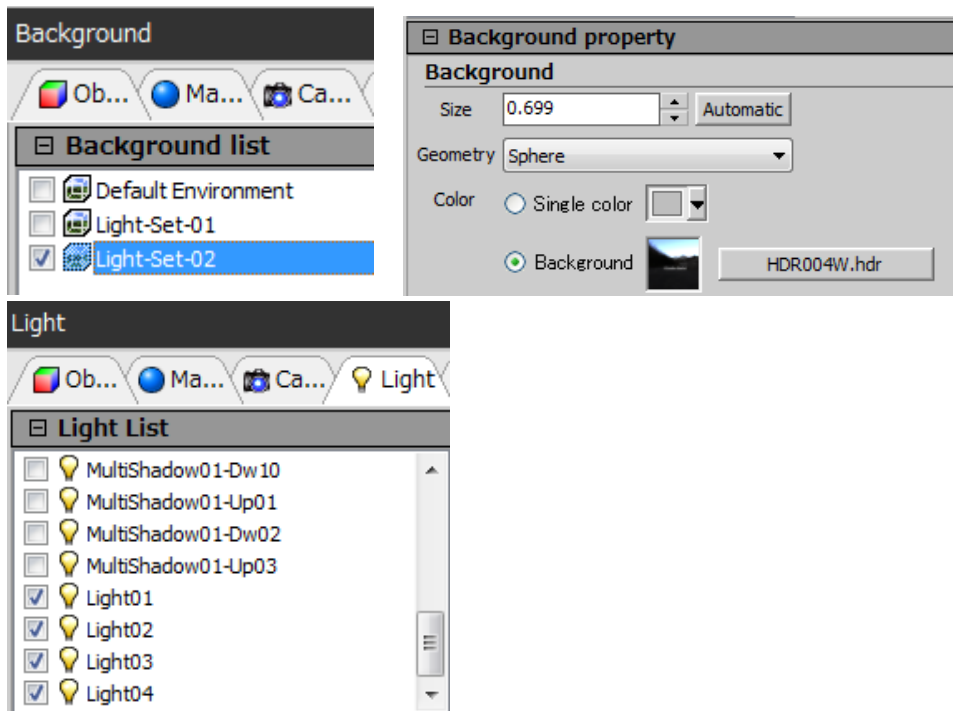Image with only regular lighting   Image with IBL

● Switch to lighting with HDR image

1. Select File > IBL_01.hyp2 to open. Select "Light_set_02" to enable in the Background tab. Make sure the file "HDR004W.hdr (＊Note)" is applied as a background in the HDR setup. At this time, it is not functioning as a light, it is just used as an image in the background.
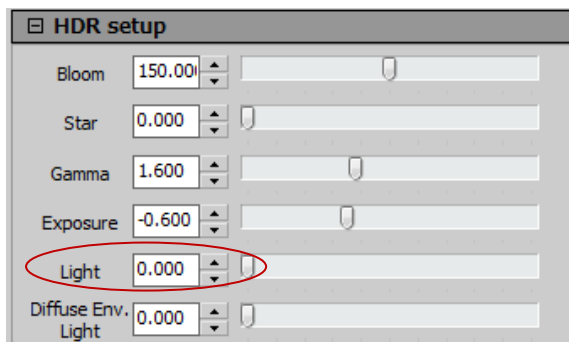   Also, there are four weak lights available in the scene.

   Note:) This .hdr file contains a watermark. If you want to use a file which has no watermark, please download "HDR004S.hdr" directly from the link written on the cover page.
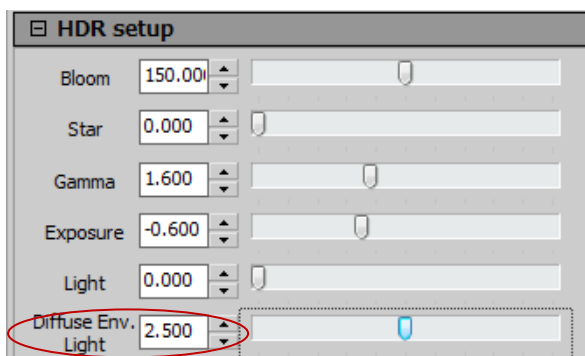   For the tutorial below, the original .hdr image files are used.

2.　 Select HDR setup > Light, and set the Light to 0 (same as OFF). Using only the light of the background image makes the object appear black. This is because the material applied to the object is not set to be affected from the environment.

3.　 Here again select Background > HDR setup tab, and set the Diffuse Environment Light to 2.5 (Mid). The image does not change, but it is ready to be affected by the lighting from the background.

　　■ What's Diffuse Environment Light?

A light which illuminates the target uniformly after hitting the surrounding objects and reflecting diffusely. This calculates diffuse environment lights from the color or the intensity of the background data and renders them.
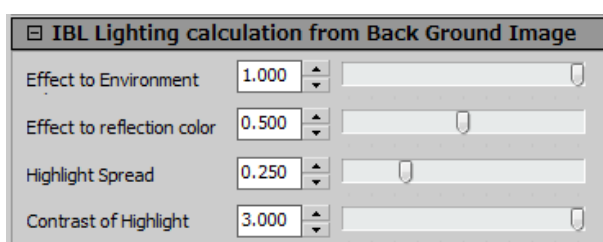
The greater the value you enter, the greater the diffuse environment light effect. Even if you increase the value of the Environment Color in the Material setup dialog box, described below, if the Diffuse Environment Light value is 0, you will see no light change.

■IBL_02.hyp2

●Setup material

　■Point:　 Hayabusa's IBL affects the environment color and the reflection color of the material and does not affect the diffuse color and the self luminance color.

4.　 Select "body" material in the Material tab. In the Lighting calculation from background images, set it up as illustrated below.

Set Effect to Environment color to 1 (Max)
Set Effect to reflection color to 0.5 (Mid)

3

It gets a bit blue by the influence of the background, but the color of "body" is maintained in black. This is because the Environment color is 0.
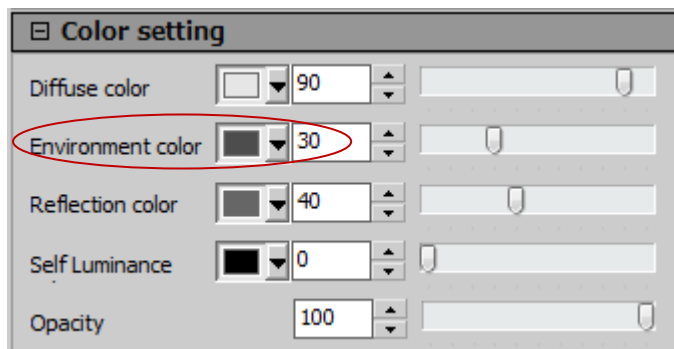

5. Select Color setting and set the Environment color from 0 to about 30.

   The environment color is influenced the most by the brightness from the background since the Effect to Environment color in the IBL Lighting calculation from Back Ground Image, is 1.

■ What's Environment color?

Unlike the direct reflection of light, this sets the color of the light reflected by the environment. It is influenced by the background or the environment light.

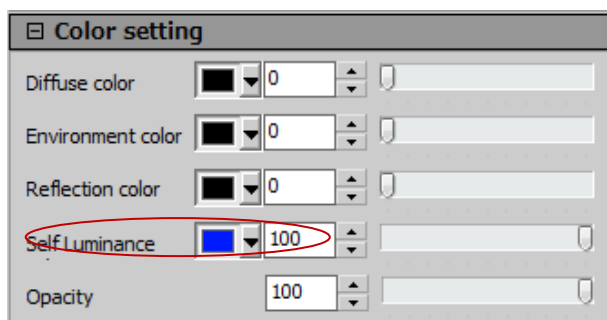*There is no effect when the Diffuse Environment Light in the HDR setup was originally set to 0.
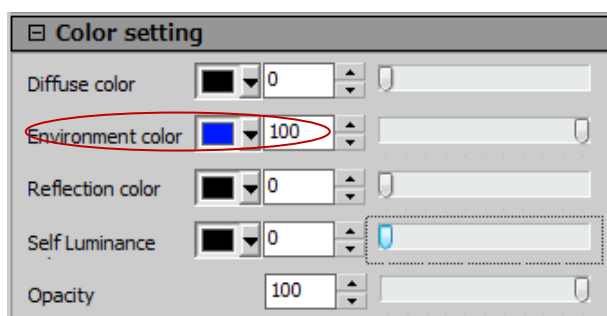
■IBL_03.hyp2

● Various influence test

6. Select Color setting and set the Diffuse color to Blue 100 as a trial. With 0, there will be no change. As described above, Hayabusa's IBL does not affect to the diffuse color and the self luminance color. Since there in no light except the background, no light illuminates and no color shows up.
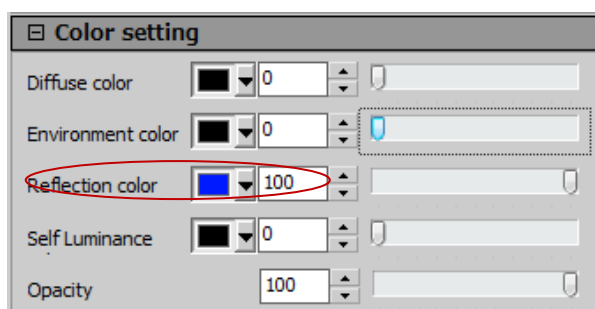

7. Select Color setting >Self Luminance color and set Blue to 100 and the other colors to 0 as a trial. The Self Luminance color gets blue since it shows color with or without a light, but, as with the Diffuse color, it is not affected by the IBL. It is useful when you want to emphasize the color because the Self Luminance color ignores the environment to show the color.

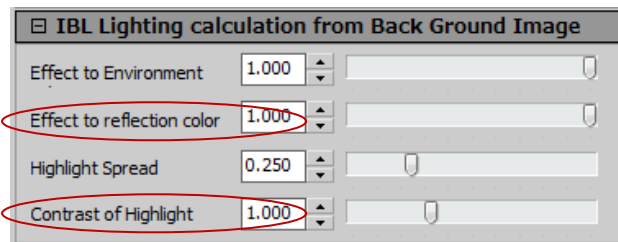8. Set the Environment color to Blue 100 and the other colors to 0. Because of the IBL, it shows blue.

9. Set the Reflection color to Blue 100 and the other colors to 0. Because of the IBL, the highlight shows blue.

The Effect to reflection color is 0.5 (Mid), so the contrast is medium degree and the Contrast of Highlight is 3 (Max), so the contrast will be storing and other than the contrast will be dark.

10. Set the Effect to reflection color to 1 (Max) and the Contrast of Highlight to 1 (Default) as a trial. There will be almost no distinction between the highlight area and non highlight area and it will look more like one set the Diffuse color to Blue 100.

In this way, for lightings by IBL, you should use the environment color and the reflection color, not the diffuse color, to adjust colors of the object.
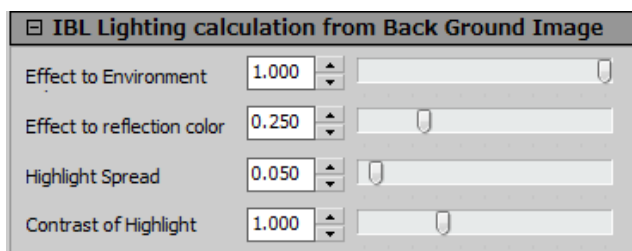
● Set other materials

■ Base material

11. Now, to get back to the result before the testing, open "IBL_03.hyp2" file again. (Or, manually set the environment color of the body material back to 30 and the reflection color of it back to 40, and open the Color box and set the RGB of the environment color back to 76 and the RGB of the reflection back to 102 respectively.)
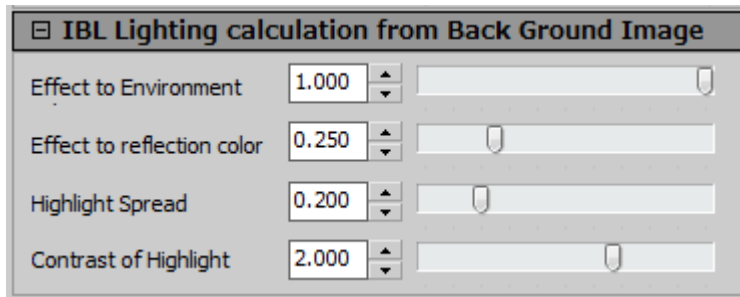
Switch to camera02.

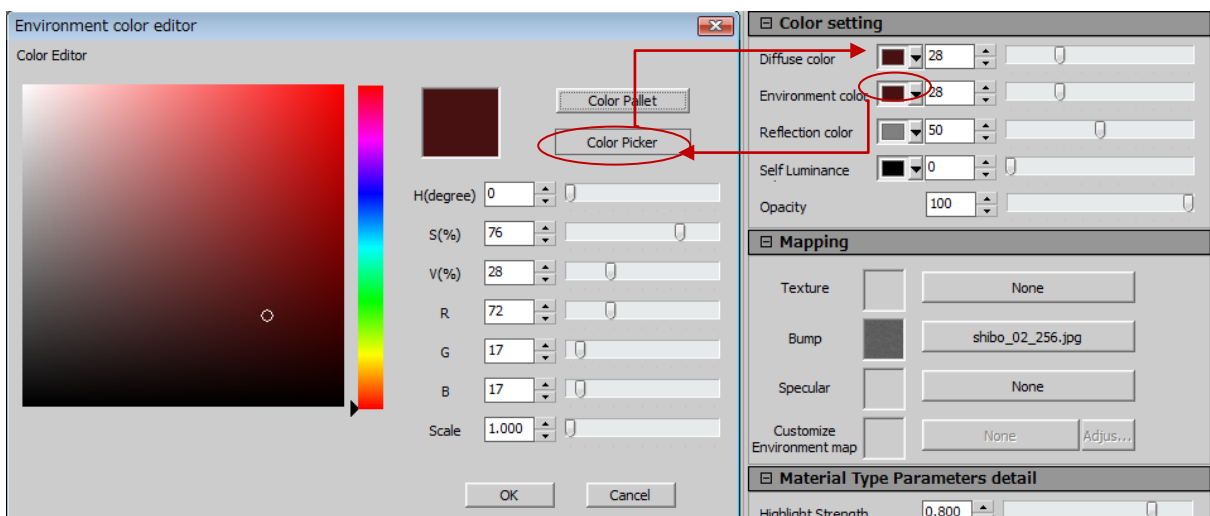12. Then, select "base" material and set it as illustrated below.

■ IBL_04.hyp2

■Controller material

13. Then, select "Controller" material and set the Lighting calculation from background images as illustrated below.

14. Since the diffuse color gets lost in IBL, use the environment color to adjust. Click the color box of the environment color to open the Environment color editor. Click the Color picker and drag the mouse to the color box of the Diffuse color, then release the mouse button. This makes the Diffuse color same as Environment color.
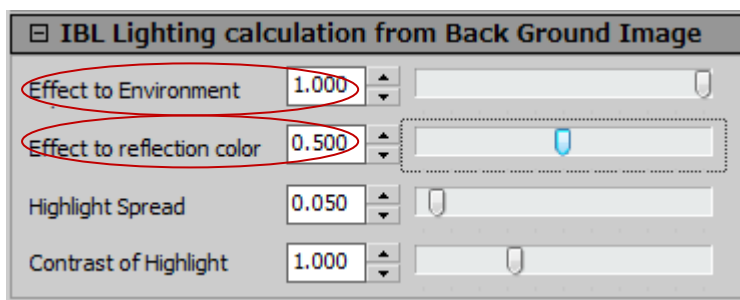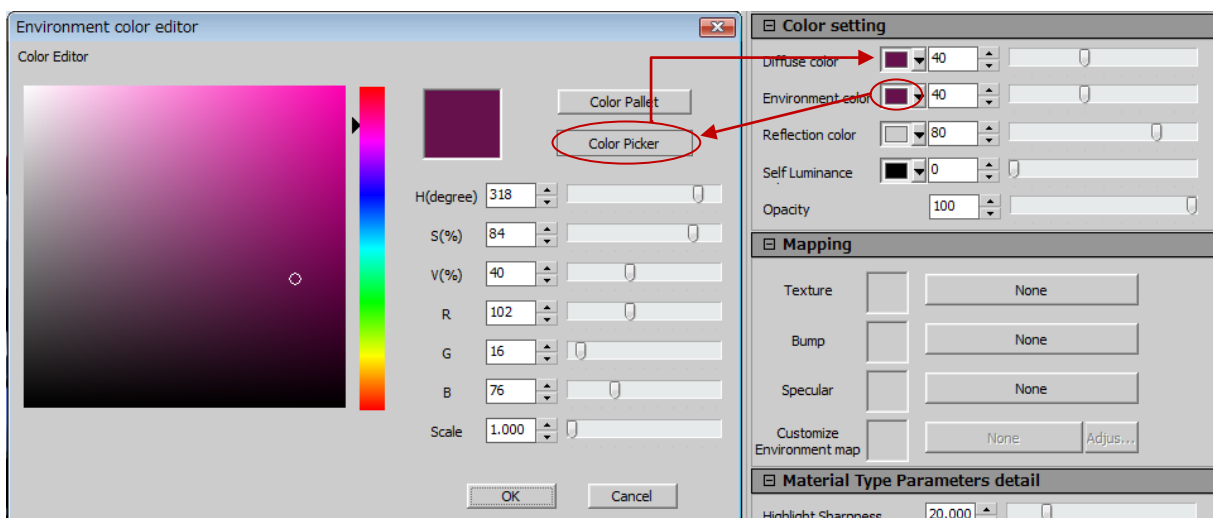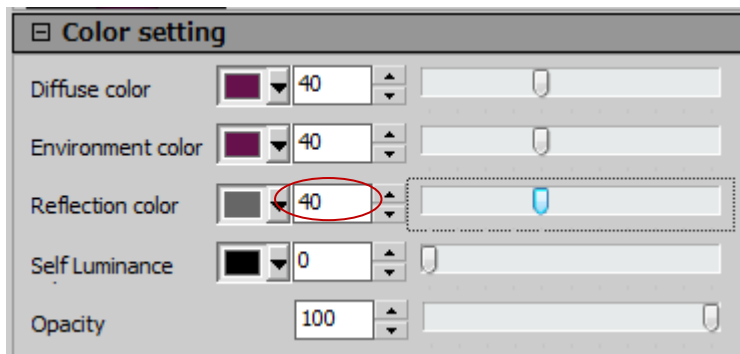
■Button material

15. Select "A_button" material. In the Lighting calculation from background images, set the Effect to Environment color to 1.000 and the Effect to reflection color to 0.5.

16. The object still looks white because its color does not show up. Click the color box of the environment color to open the Environment color editor as previously. Click and hold the color picker and move the mouse to the color box of the Diffuse color to copy the Diffuse color.
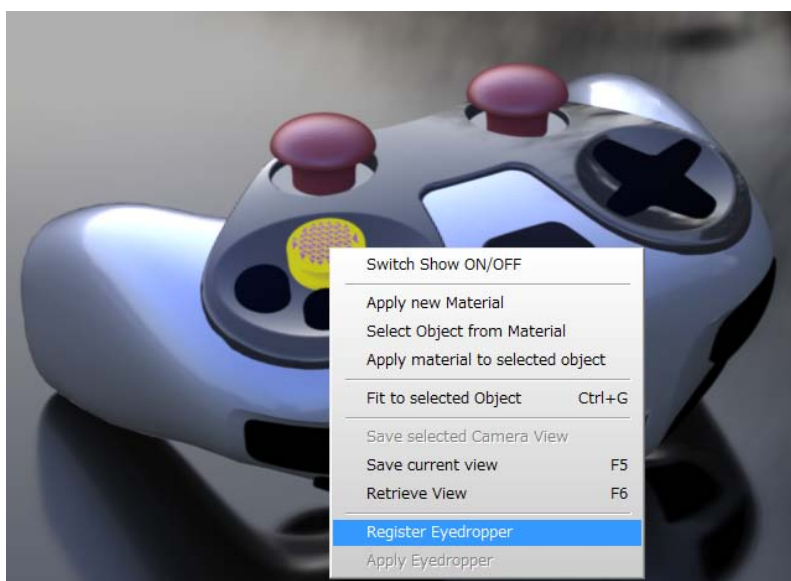
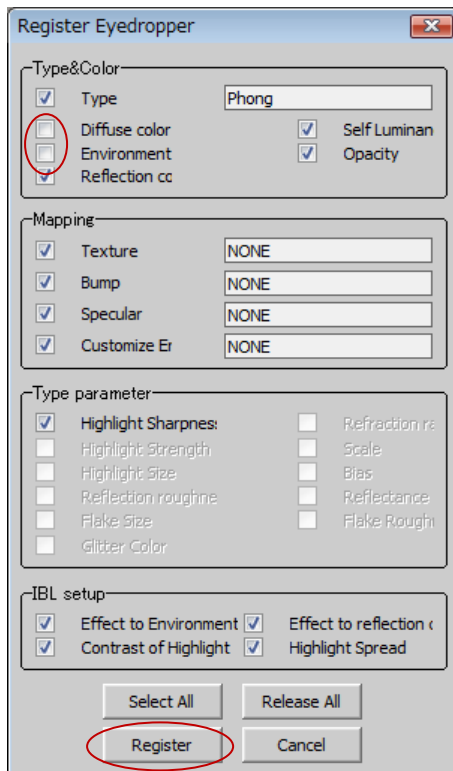17. Set it to 40 since the reflection color is too strong.

18. As required, tweak the Highlight spread and the Highlight contrast in the Lighting calculation from background images. Here, set the Contrast of Highlight to 1.200.
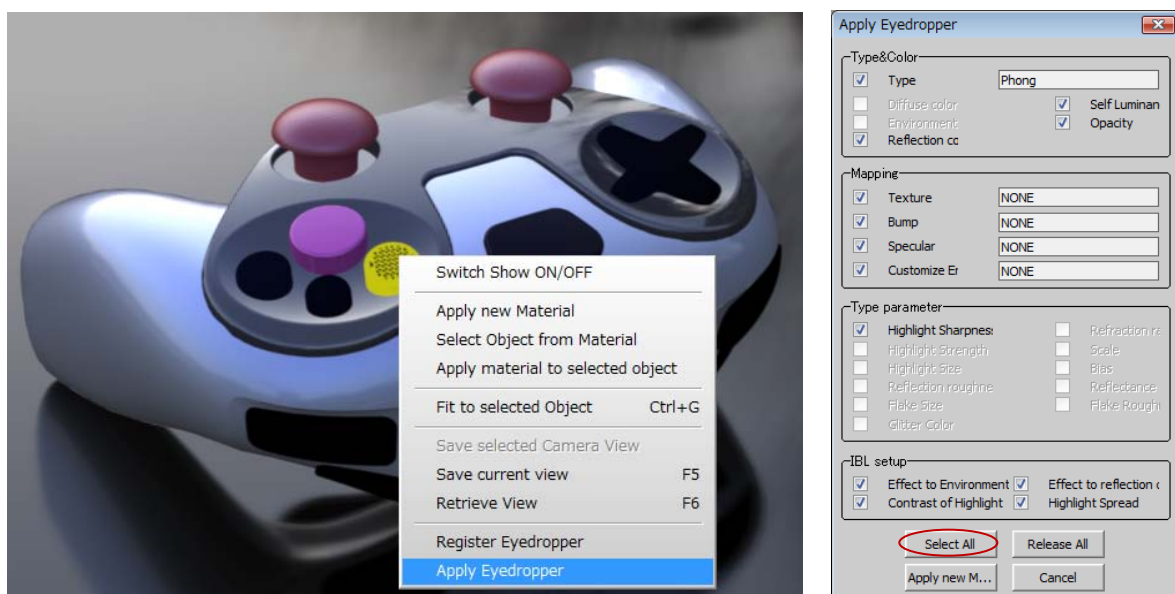

19. To copy the setting of "A_button" to another button, double click "A_button" in the view to select it. Right click to open the option and select Register Eyedropper.

20. In the open Register Eyedropper window, deselect the check box of the Diffuse color and the Environment color in the Type & Color, then click the Register button.

21. Double click "B_button" to select it and right click it to open the context menu, then select Apply Eyedropper. Click the Apply button in the open window. The values of the reflection color and IBL setting are copied.

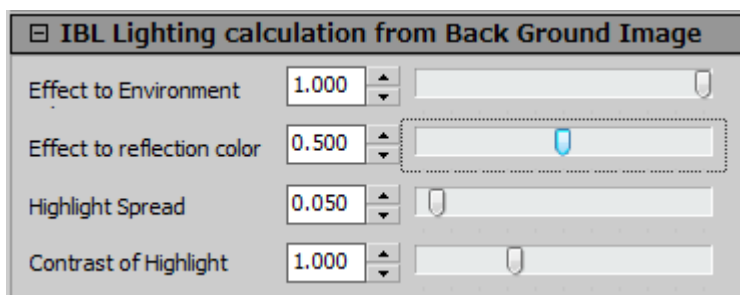22. Also, apply eyedroppers to "C_button" and "D_button".

23. Since the color is not copied, as with "A_button", click the color box of the Environment color and use the color picker to copy the Diffuse color. Repeat the same procedure for B-D buttons.
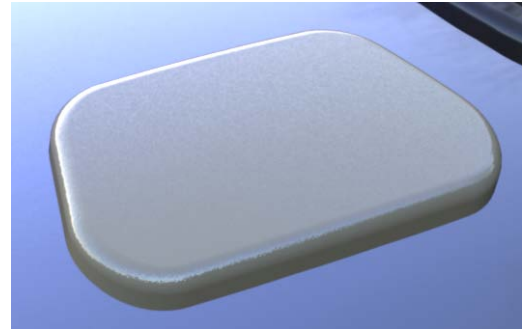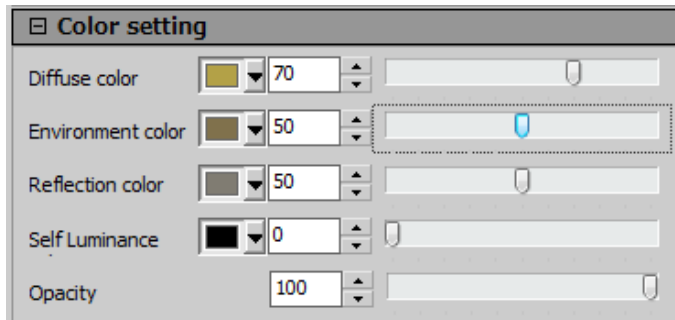

■IBL_06.hyp2

■centor_buttonmaterial

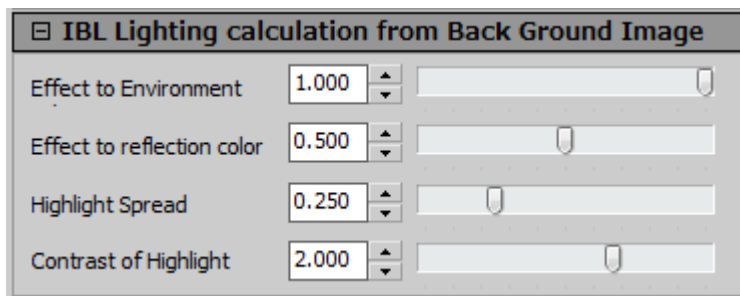24. Select "centor_button" material and set the Lighting calculation from background images as illustrated below.
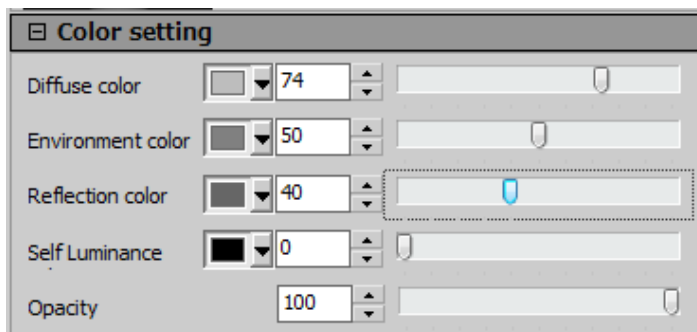
25. Tweak the Color setting as illustrated below.

■IBL_07.hyp2

■move_buttonmaterial

26. Select "move_button" material and set the Lighting calculation from background images as illustrated below.
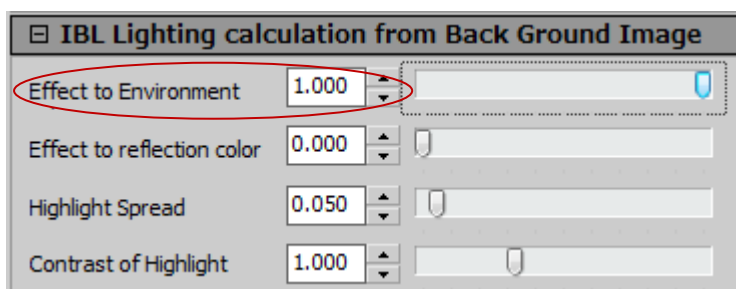

27. Tweak the Color setting as illustrated below.
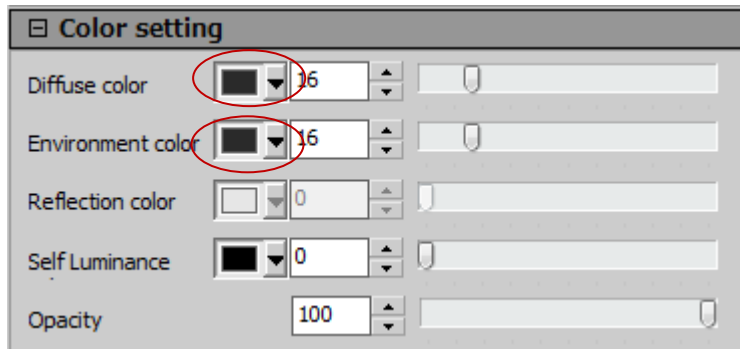

■LR_down/LR_up material

28. Select "LR_up" material. This material is called Lambert which is used likely for rubber, does not have the reflection color value. Set only the Effect to Environment color in the Lighting calculation from background images to 1.0.

29. Also, as described above, click the color box of the Environment color to open and use the color picker to copy the Diffuse color.
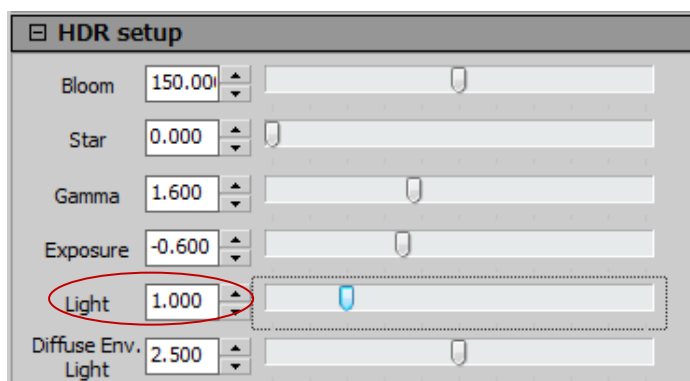

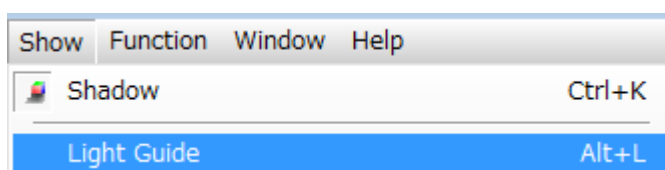30. Repeat the same procedure for "LR_down" material.

■IBL_08.hyp2

● Adjust HDR setting / lights

31. Select Background > HDR setup and set the Light to 1.0 as trial.

32. Select the menu Show > Light Guide .For the camera, there are four weak lights set based on the brightness of the background.

13

If it is hard to show the diffuse color only with the lighting from the background image, get these weak lights illuminate along the camera angle. The more lights with same brightness, the brighter it gets, so when you use multiple light sources, set them weak first, then use the Light in the HDR setup to adjust the intensity to make them look better. Usually set the Light to1.0 as start, but this time set it to 0.7. Adjust the values of the Gamma and the Exposure as required.

light0

light1.0

■IBL_09.hyp2