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## VISUALIZATION SETTINGS FOR CERTAIN CLOTHING MATERIALS IN BLENDER 2.79, AN OPEN-SOURCE PROGRAM FOR MODELLING AND VISUALIZATION

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Open-source programs have become a full-fledged alternative for low-cost use by students and beginning professionals. Today, these programs allow the calibration of all settings required for designers to achieve the intended visualization in fields of modelling, animation and visualization. In this submission I focus on specific settings for several clothing materials of different complexity, for example the surface properties like color, print, textures with irregularities, mapped textures with irregularities and procedural textures. These settings are used in Blender version 2.79a [1]. Textures used are freely available images on the internet [2].

**Key words:** open-source, blender 2.7, design, visualization, texturing.

### INTRODUCTION

Rendering textile materials in visualizations is a compelling problem for designers. The priority of such rendering is not the photorealism, but reaching the intended visualization. Reaching a rich and flexible composition is possible in Blender 2.79a by using its schematic interface for setting NODE parameters, where such parameters are set in the form of node trees.

### PURPOSE

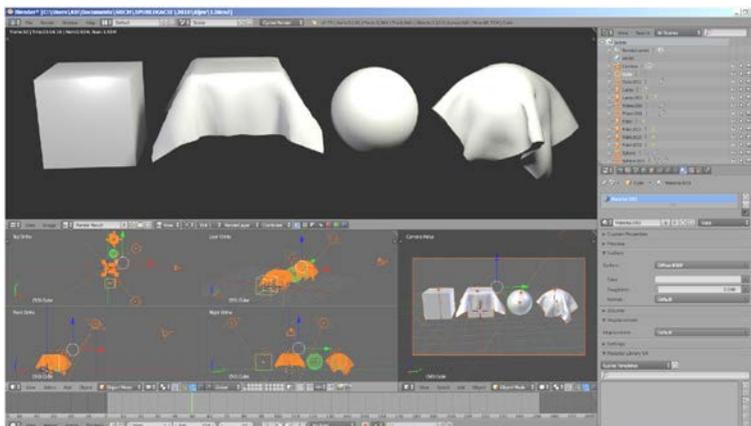
Materials created in the NODE editor can be used on various models and their complexity edited by the requirements of individual visualizations. Within the tree structure of a texture, it is possible to insert concrete properties of materials, but also the customizations of these properties, for example abrasion, tainting and glossiness. Changing these properties can be very valuable in terms of judging the visual longevity, wearability, and usability of the mapped texture.

### RESULTS AND DISCUSSION

As models of reference for visualizing material properties I have chosen a cube, a free hanging sheet over the cube, a sphere and a free hanging sheet over the sphere. Backgrounds are black. Lighting is applied from left and right under a 45 degree horizontal angle, where the left light



has a cold temperature and the right light has a warm temperature with an intensity meaningful for the given scene. A reflective component has been applied to all objects for analytical purposes.



**Pict. 1.** Reference model - scene setting in Blender 2.79a

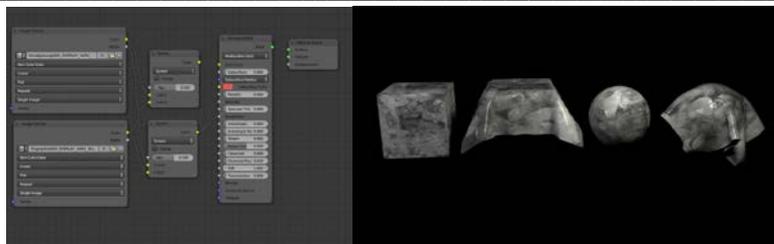
For analyzing the rendering possibilities I have chosen the following clothing materials: velvet, denim, knitted fabric, leather. These materials were visualized in two variants: a clean variant and a worn and dirty variant.

Denim is made from 3 bitmaps [2] a picture of real denim, a normal map, and a displacement map. The knitted fabric is made from a real picture of the fabric. Pict. 2. The settings of velvet material are predefined by Blender itself.

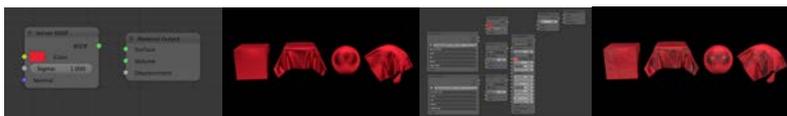
To display abrasion and wear, images of prints and smudges. Pict. 2. Node editor scheme settings for calculating the visualization of individual materials. The resulting visualization can be seen in Pict. 3 - 7.



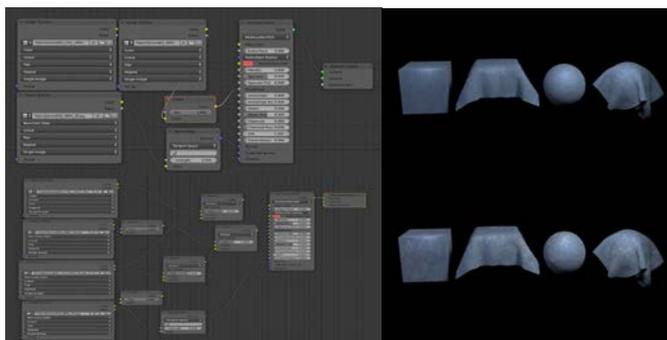
**Pict. 2.** Used textures



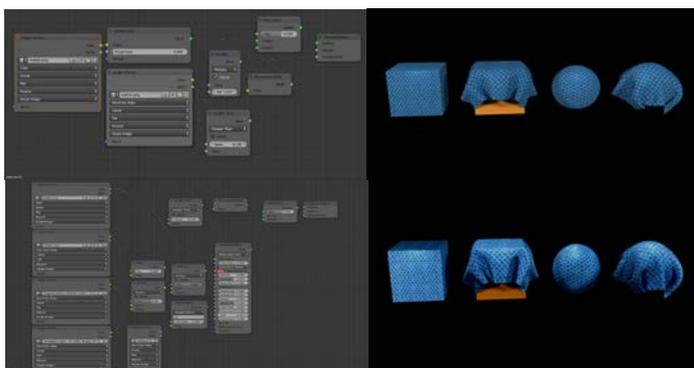
**Pict. 3.** Settings and visualization of abbration



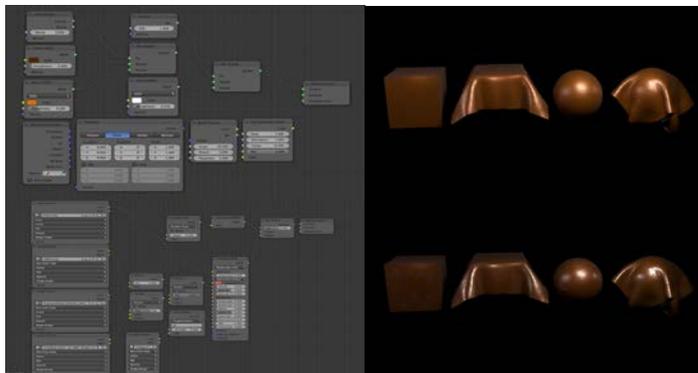
**Pict. 4.** Settings and visualization of velvet material



**Pict. 5.** Settings and visualization of denim material



**Pict. 6.** Settings and visualization of knitted material



**Pict. 7** Settings and visualization of leather material

## **CONCLUSIONS**

In this submission we demonstrated the possibilities of visualization using an example of four specific clothing materials. The velvet material is predefined within the used program itself and is represented by a single function. Leather material is created procedurally and the resulting texture does not require any images or bitmaps for input, and is stored as a set of surface defining functions. The remaining materials are created with UV mapping and postprocessing of images specifically made for this purpose. Based on the presented settings it is possible to create a wide variety of settings for use in visualizing similar, but also completely different materials. However we cannot forget that „... when mapping surfaces and their structures, it is important to preserve the correct object size to texture ration.“ [3] Based on this we can assert that the visualization of materials in photorealistic quality can be done using open-source software with different techniques with various levels of difficulty, and without the need of programming knowledge. Specific surface properties are defined in a simple and well arranged NODES editor which uses parameter functions in the form of tree nodes. The presented settings and bitmaps within this presentation can be directly used for creating photorealistic visualizations in BLENDER 2.79a.

## **REFERENCES**

1. [www.blender.org](http://www.blender.org)
2. [www.poliigon.org](http://www.poliigon.org)
3. Nôta, Roman 2017, Distortion of reality in virtual space, In: Creativity in Design III., ISBN 978-80-228-2996-0, p.66