מדריך למשתמש עבור מנוע ההדמיה בתוכנת ארכ+
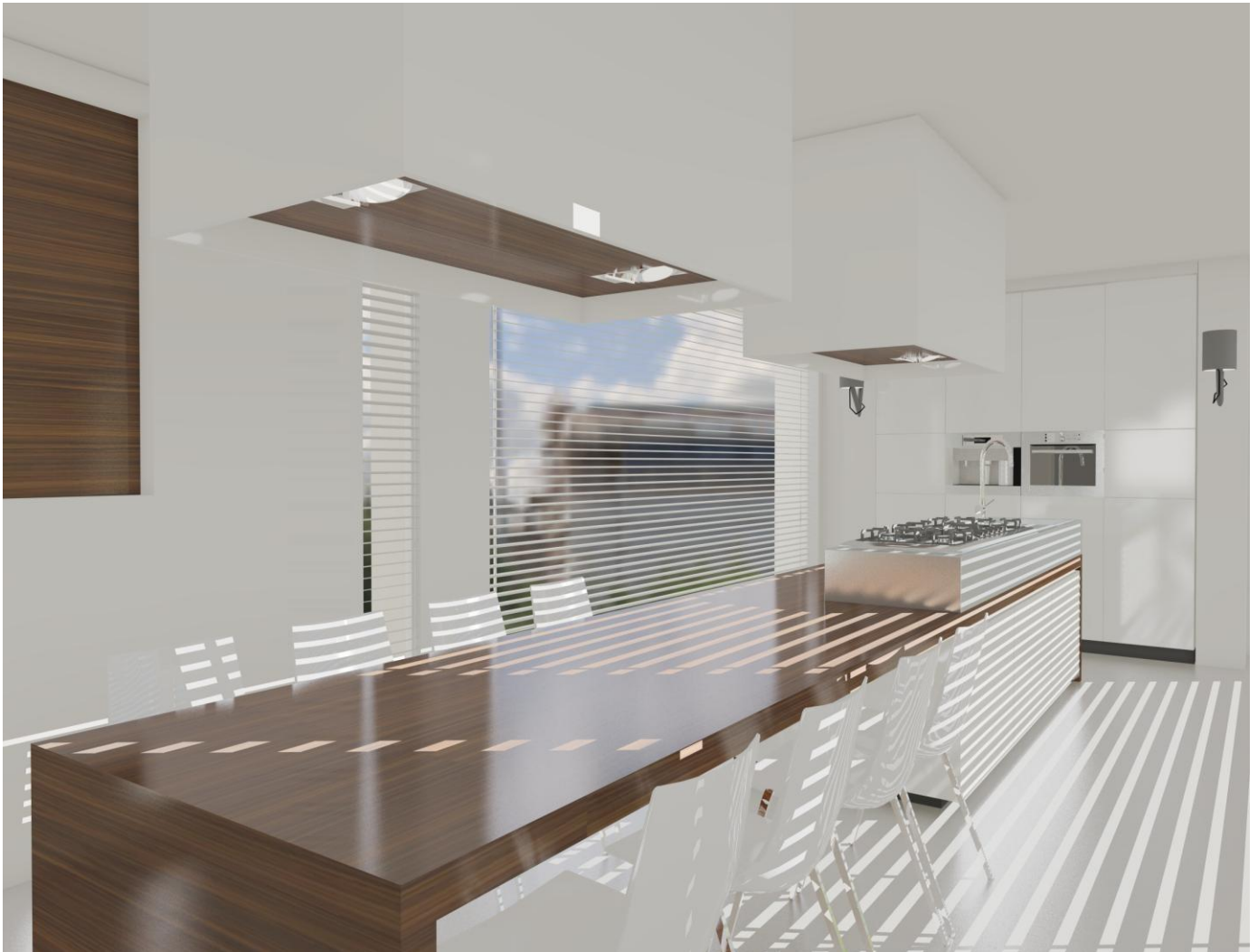

Until Gutenberg, architecture was the main form of writing, the universal writing.

Victor Hugo

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INTRODUCTION

ARC+ offers the possibility of 3D rendering on your projects. Due to internal ARC+, this engine rendering includes the structure of your project and follows your philosophy of work in editing textures and application materials.

Thanks to the presence of pre-configured models, its use becomes more ergonomic whilst leaving you the freedom to customize your settings.

This manual will help you quickly learn the interface of work and become quicker at running it.

The rendering engine is fully integrated with ARC+ and communicates constantly with interface modelling. Each change in the model is returned to the renderer and updated in real time.

Engine ARC+ gives you the following advantages, amongst others: it offers the possibility of alternating between real-time rendering and offline rendering. Performance and processing time are incomparable. Therefore the real-time editing allows you to work quickly and navigate inside your model while having a true and fair view of the final result while the offline mode allows you to generate high quality renderings in a shorter time.

The rendering engine is easy to use, since the philosophy of work is considered.

You can learn to model in a structured way (layers / colours), to simplify the use of this render both ergonomically and efficiently.

ENTITIES WHICH ARE VISIBLE IN THE REPORT

Features appearing in the rendering area:

- The surfaces of 3D polygons in the model

- Solid model

- the polymeshes

- 2D polygons with attribute "Polygon Render"

ENTITIES WHICH ARE NOT VISIBLE IN THE REPORT

Invisible entities in the rendering area:

- 2D polygons

- Strong negative

- All 2D entities
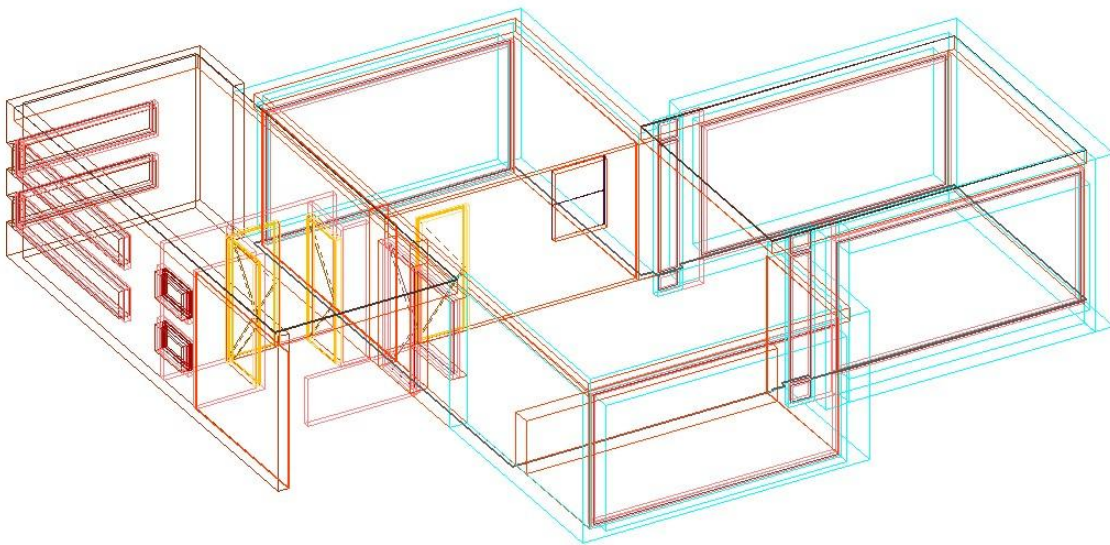
IMPORTANT CONCEPTS

- Different light sources
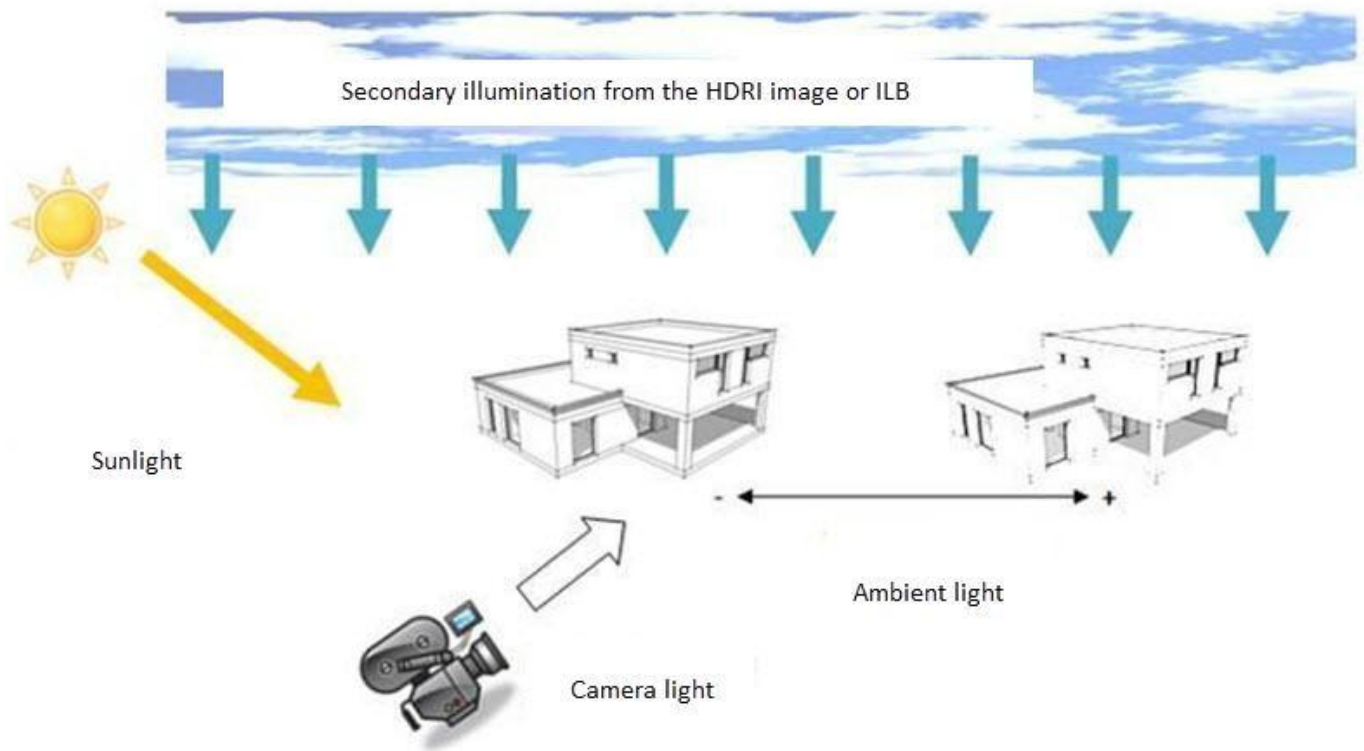
The shadows created by direct sunlight, camera or the sky are easy to represent and do not require a large amount of calculations.

The shadow reflection and diffusion require more calculations.

- BYPASS NORTH DEFAULT
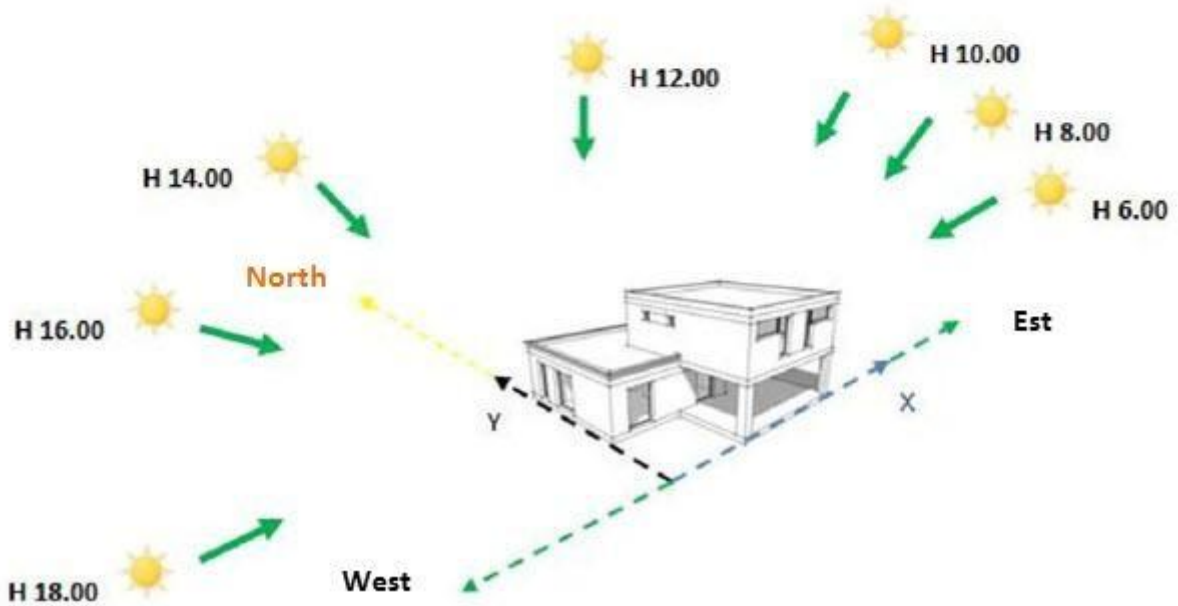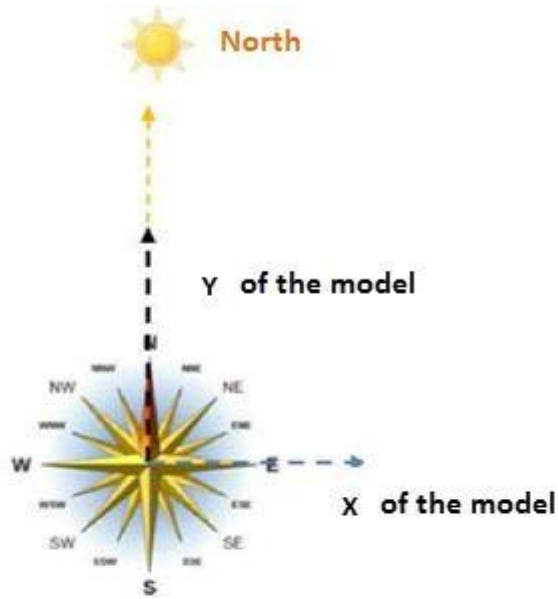
- BYPASS NORTH 45°
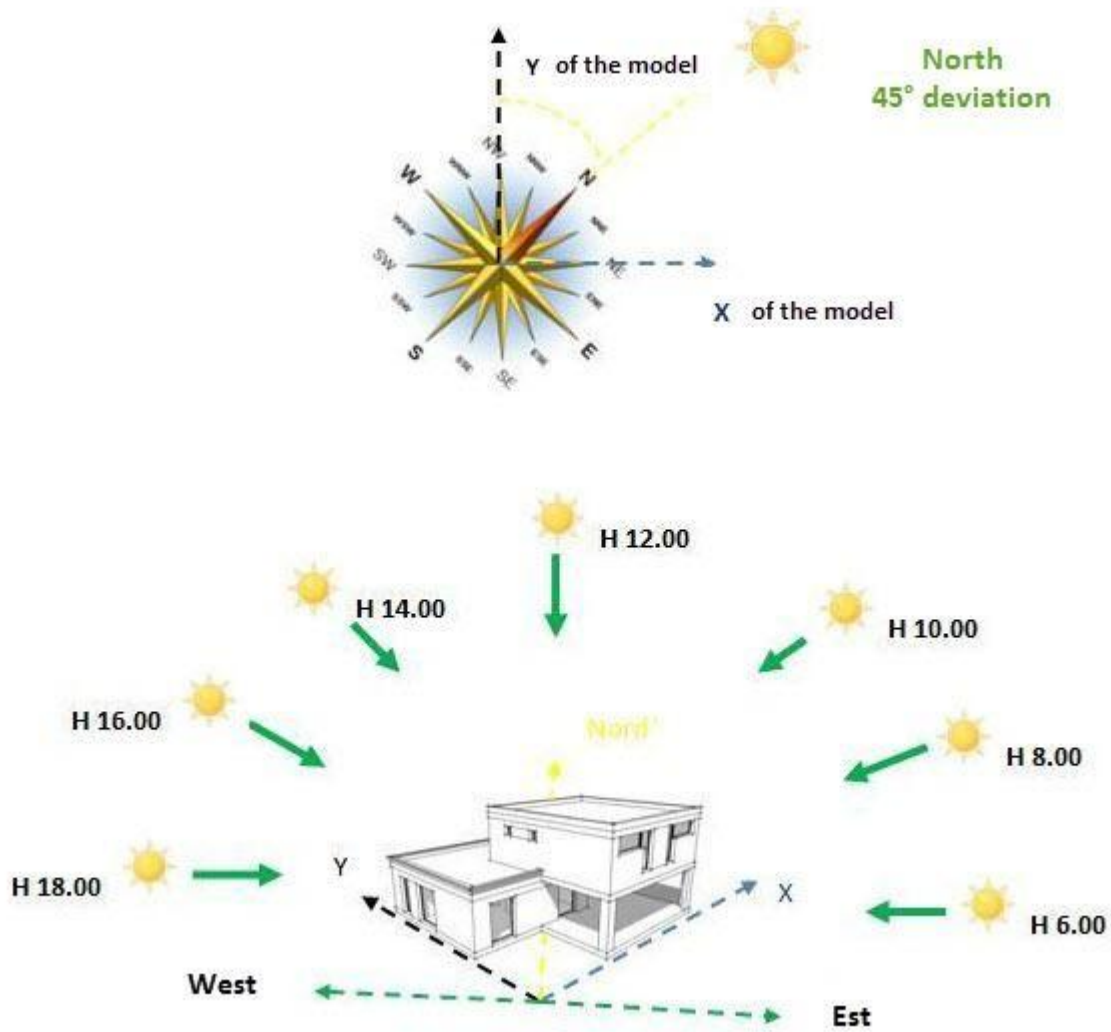
ENTER THE RENDERING MODE

To access the Render from the interface modelling on ARC+, you must click:

or
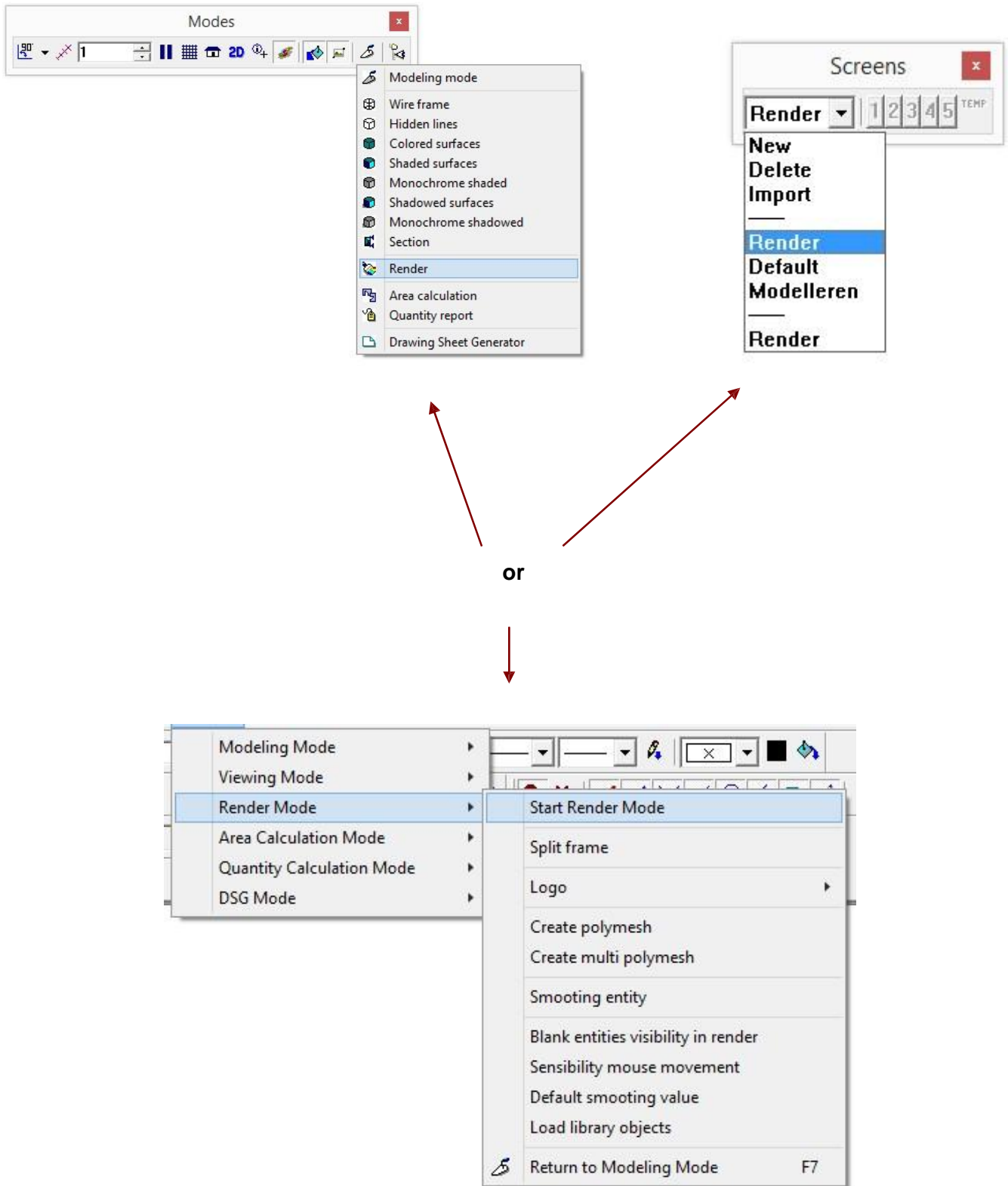
MODELLING IN VIEWING THE REPORT IN REAL TIME

You can divide your screen in order to share a workspace where you can use modelling on one side and rendering on the other.

To do this you must divide the modelling window:

The program will begin working in DEFAULT Mode
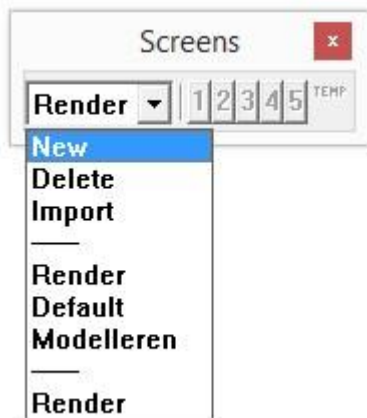
You can divide the window from the configuration screen.

Click New and create another interface that you can call for example DUO:
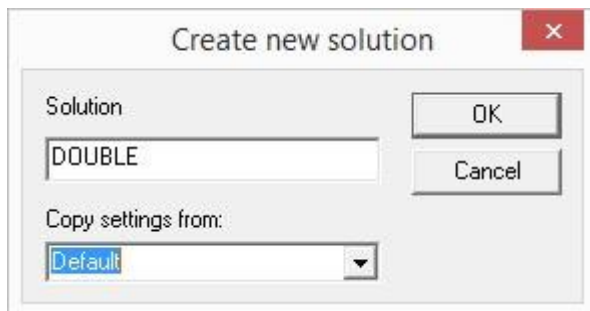
You are now in DUO mode. To avoid repeating this each time you open ARC+, you can save this configuration as a template (Save As / Format: ARC+ Template).

Now click:
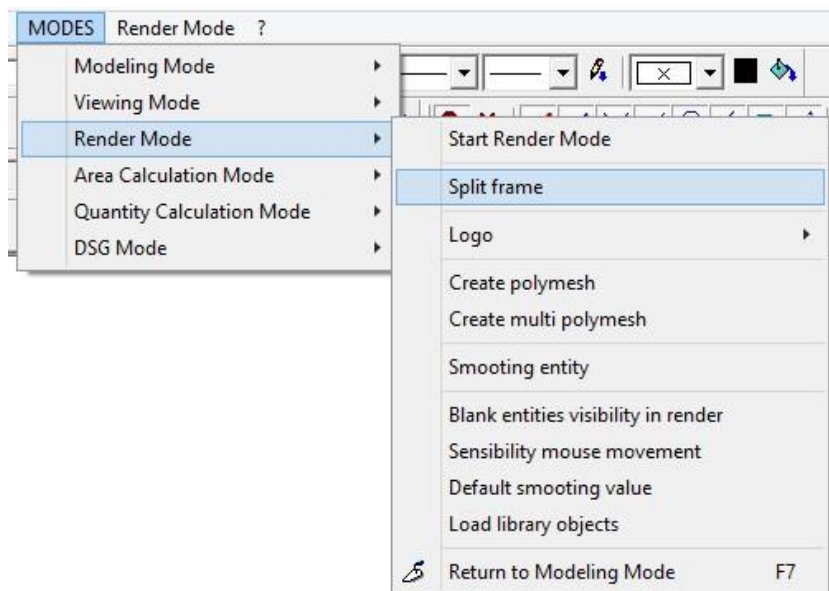
Follow the instructions at the bottom left of the screen to configure the layout of your windows.

Place one of your windows into modelling mode and the other into render mode.
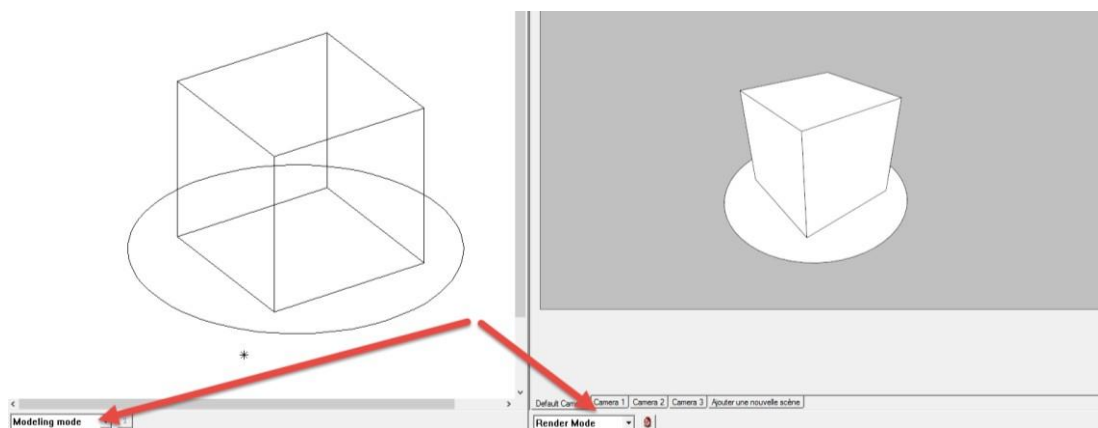
When your model is complete, you can switch to full report mode:
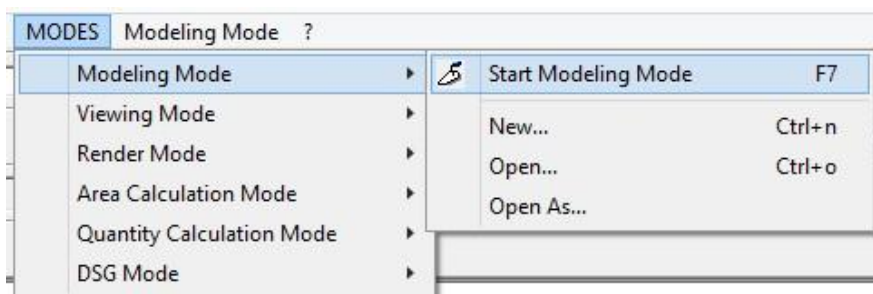
HOW TO POSITION THE MODEL IN THE RENDER WINDOW

The interface rendering when you open is composed of a main window that allows you to view the model and to move within the model.

- Left button: move around the model like a camera in rotation around a target.

- Right button pressed: move around like a camera rotating around itself.

- Middle button: move around like a fixed camera on a rail.

- Front dial: advance to the object, you can cross it and continue to move forward, leaving it behind.

- Rear wheel: move away from the object.

- Shift + previous action: the displacement is 10 times faster.

- Ctrl + previous action: the displacement is 10 times slower.

THREE AREAS OF ACTIVE WINDOW PRINCIPLE

This window contains three active areas identified by the help of the following bar:

To view the contents of these two areas, simply move the cursor close to the tabs and the menu will appear.
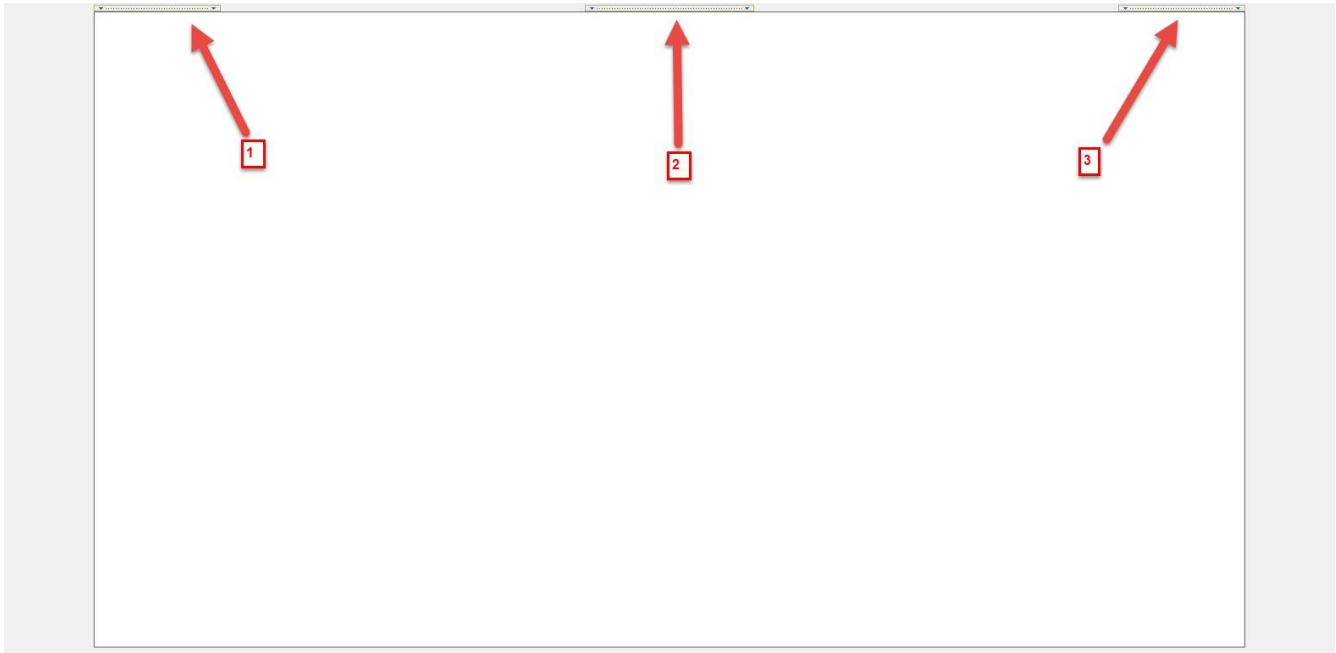
1: Work modes: Editing Real-Time (GPU) / Navigation Real-Time (GPU) / Presentation Real-Time (CPU).
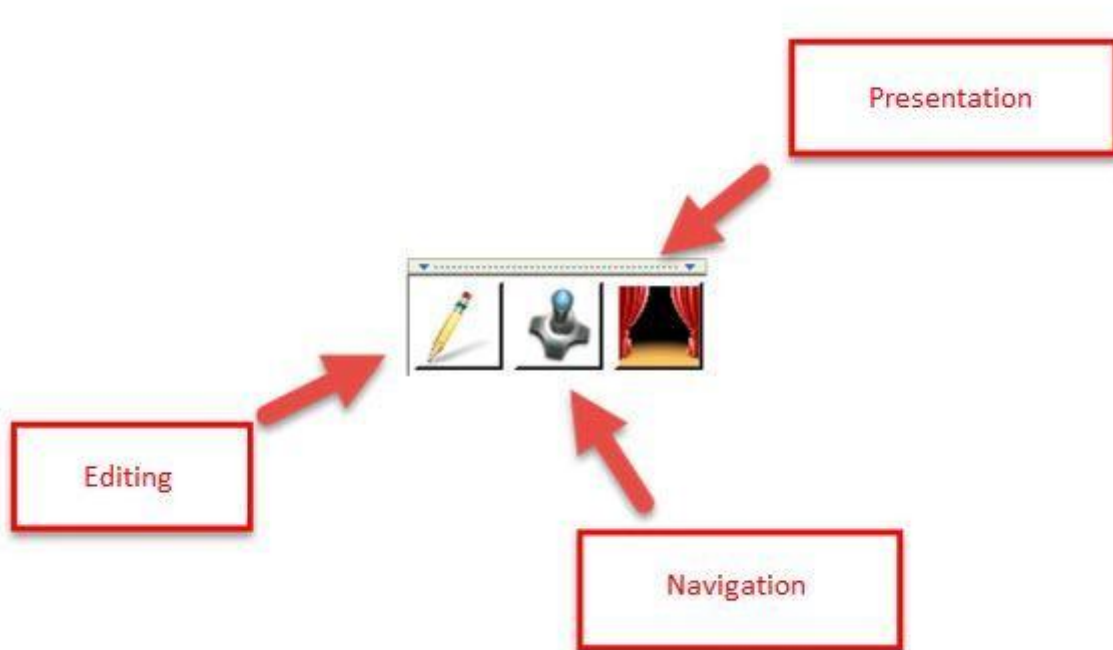
2: Setting the scene (Material Studio / Camera Settings / Lights and General Settings /Render).
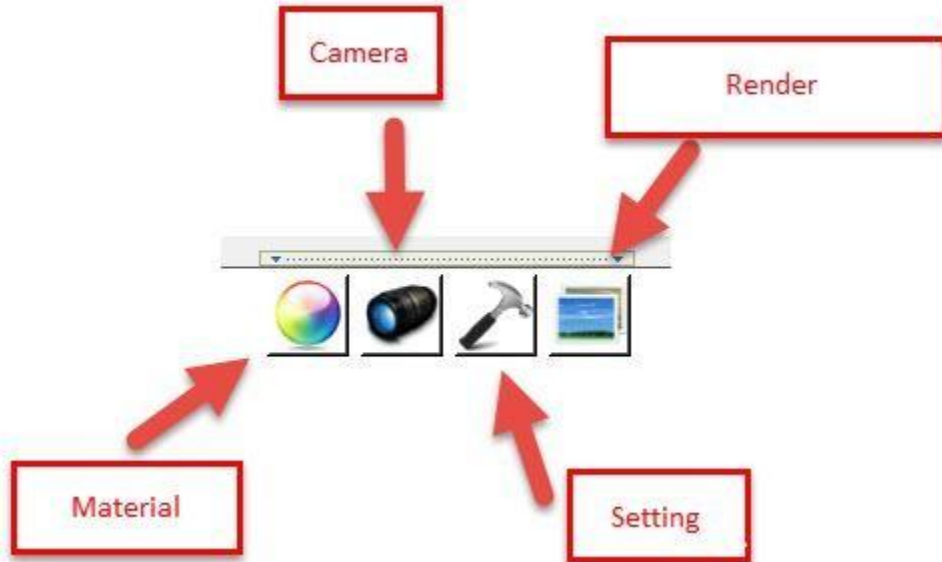
3: Configuration modes / views.
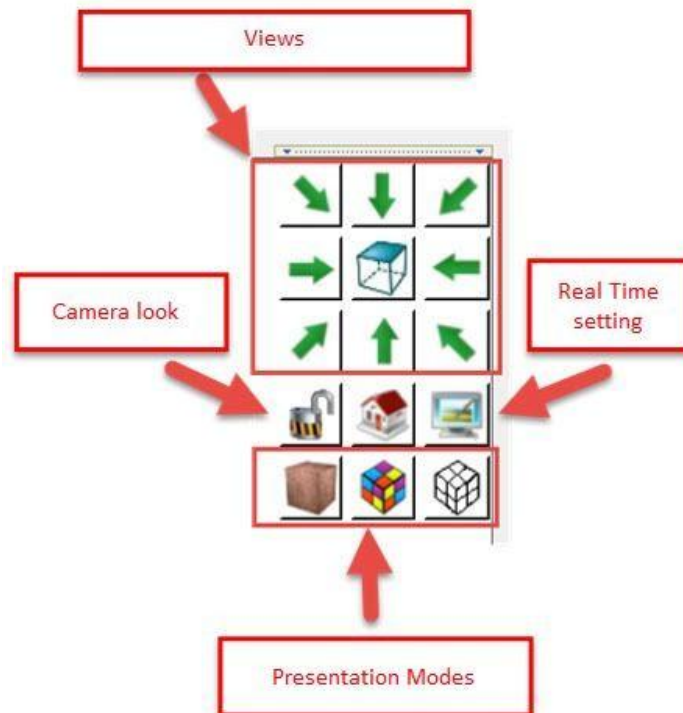
MODES OF WORK

Moving the cursor to a drop-down menu.

The active area appears. This allows you to switch between different modes of work. In reality, there are two different modes: CPU and GPU. The CPU mode uses the performance of your processor to show your materials and textures while the GPU mode uses the power of your graphics card to navigate and quickly edit textures and see your model update automatically. Your processor (CPU) allows you to make better renderings with your graphics card, however, the calculations are longer. Your graphics card (GPU) lets you work seamlessly while having a true and fair view of the final result.

You can work on your model using your much more powerful graphics card, rather than the CPU. When your model is completed you can view the final result in real time generated by the CPU.
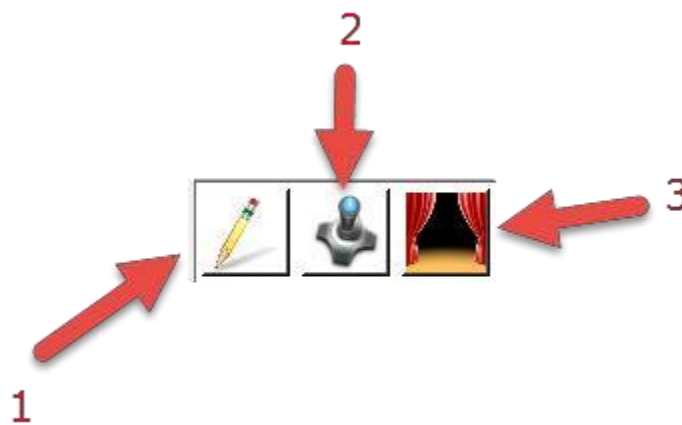
- 1/2: Ways of working GPU (graphics card) Edition / Navigation

- 3: Work mode CPU (processor) Presentation

DIFFERENT VIEWS

Move the cursor to menu 3.

The active area appears. This interface allows you to view your model from two types of views:
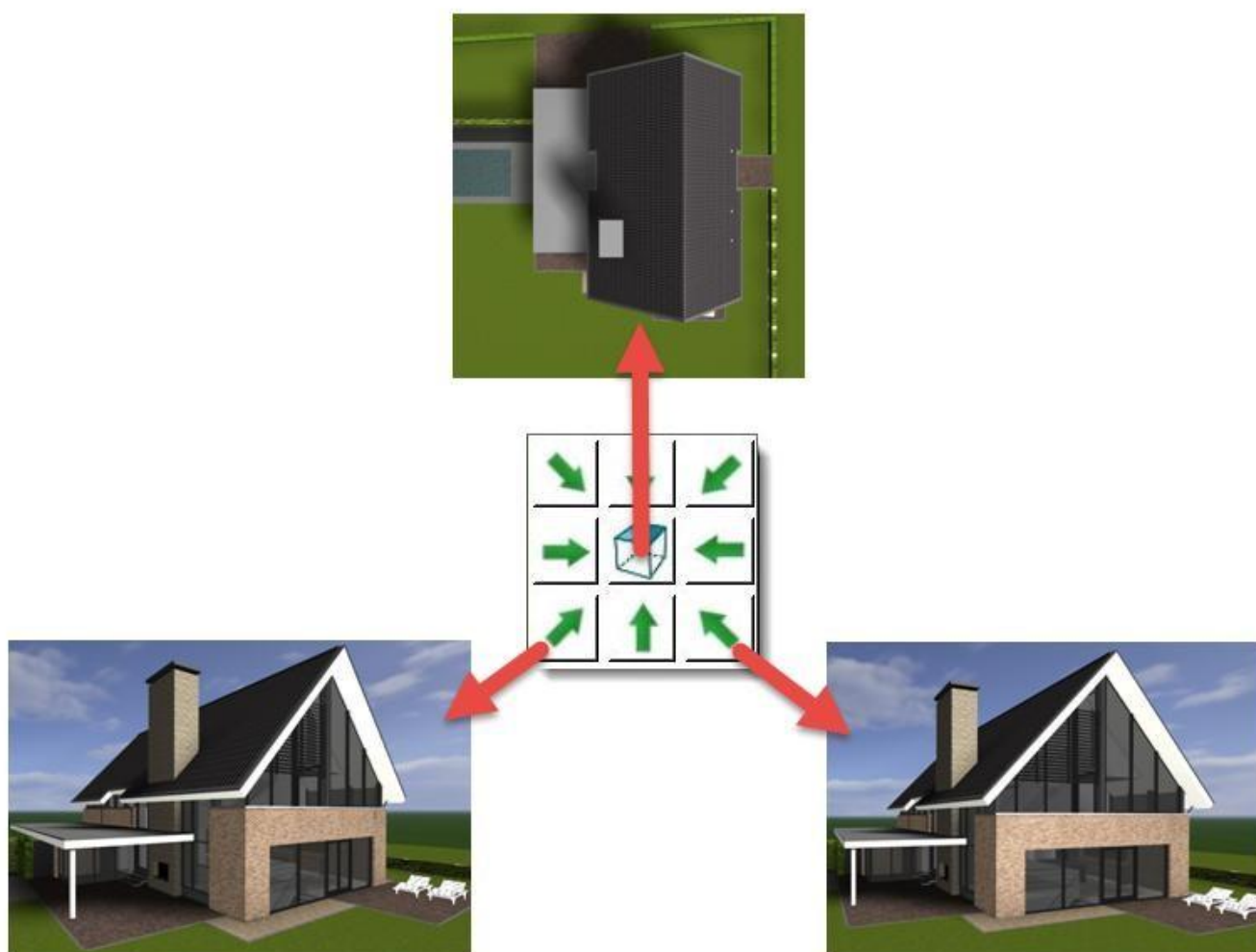
- Perspective

Navigation is done using your cursor. You can use it to place it at a specific angle. However, these different modes of outlook can help you to return to a reference point automatically!

LOCK THE VIEW

You can lock the current view using the icon created for this purpose. Thereafter, all other icons will be locked:

After you select this, the icons show a lock on them and their function is disabled, no matter what action you are trying to achieve in the Render.

To disable the lock simply click on the icon again:

The Different modes of Representation
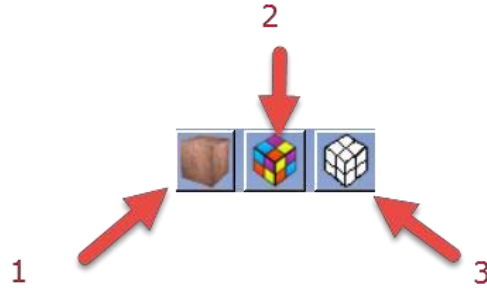
1: Show Textured Materials. Representation of the model with solid coloured textures (makes the applied textures visible).

2: Show Geometry Colours. The colour of the visualization depends on the colours of the layers used in the model.
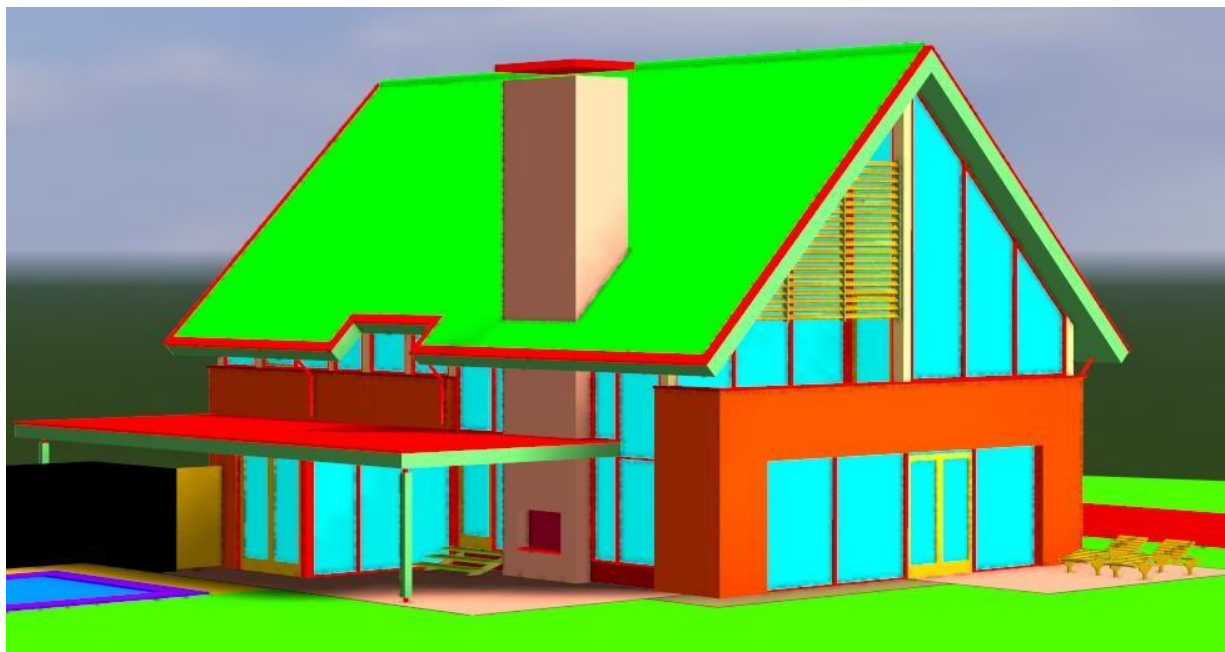
3: Show Fast Hidden Lines. This display shows the lines in monochrome and hides the lines which are not visible (it is not accurate, but it is fast).

SETTING UP REAL TIME SPECIFICATION

You can also access some of the parameters of the real-time visualization of the model using the following icon, which you can find in the active area 3:

This menu is very important because it allows you to change the general brightness (sun / ambient / camera) and set different working modes (editing / navigation / presentation).

- **Sun**: lighting from the sun.

- **Ambient**: light affects the whole scene without considering the position of the objects.

- **Camera**: An additional light from the camera.

  The following parameters only apply for viewing in real time. It means they are not used during preview rendering or calculation of the final report (offline). They are only there to help you when editing rendering.

DESCRIPTION OF INTERFACE
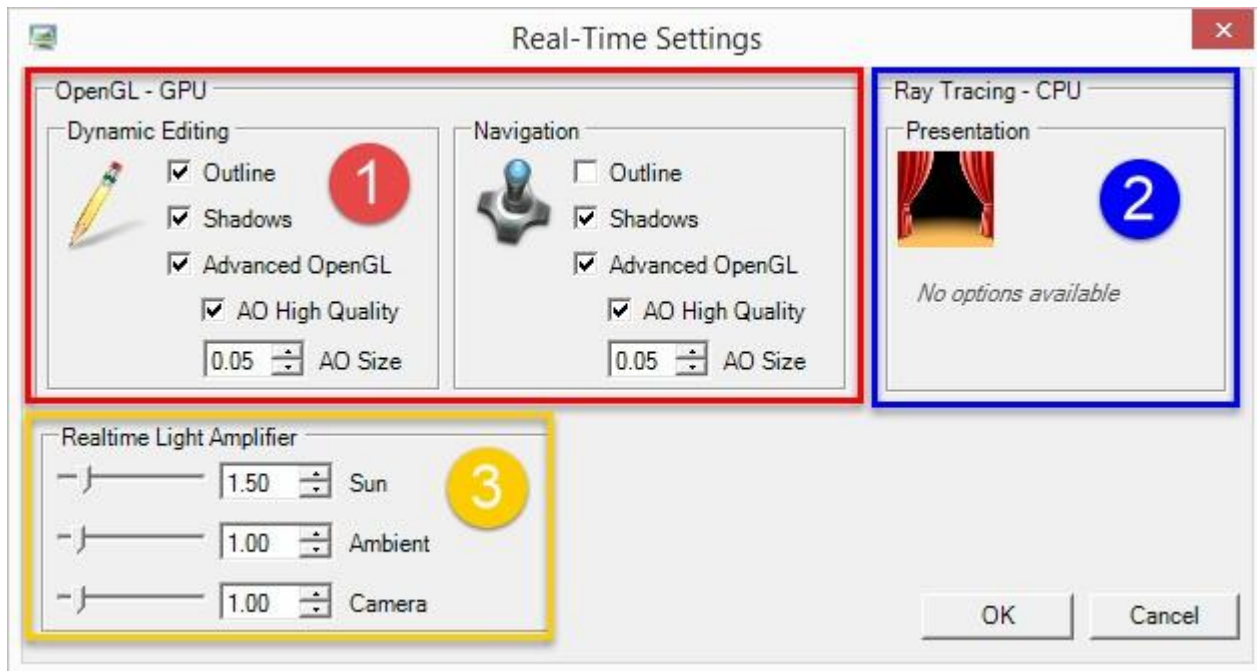
1: Configuring two working modes using the performance of your graphics card (GPU)

Contour: Shows the contour lines of your geometric model

Shading : shows shadows.

Advanced OpenGL: OpenGL is a set of standard functions of calculating 2D and 3D images.

If you use this function the result is more realistic, however each calculation is slower, hence the need to have a good graphics card – eg. NVIDIA.

Quality of shadow: Without this setting enabled, shadows are rough.

1. Setting disabled:

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2. Setting enabled:

Enabling this setting is useful when calculating transparency, reflection, etc. which require more calculations. The case of objects imported from Sketchup is a good example.

Ambient Occlusion: This setting is to adjust the quantity of light reflected between two surfaces. The closer the two surfaces, the darker the shadow. You can alter this setting to get a more realistic effect.
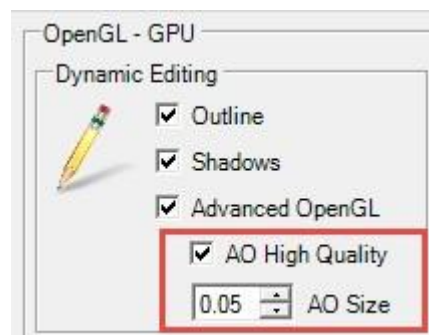
1. Ambient Occlusion enabled

2. Ambient Occlusion disabled

These two modes (editing and navigation) are similar and are using the same engine calculation engine. However, you can work in the "Dynamic Editing" mode and set two types of visualisation. You can show or not show shadows, contour lines etc. You can change the settings with just a click.

2: **Working mode "Presentation" using the performance of your processor (CPU)**

In this operating mode, the result is closest to the final result (final render).

Reflection, transparency etc.... are calculated therefore result of the texture is more realistic.

GPU :

CPU :

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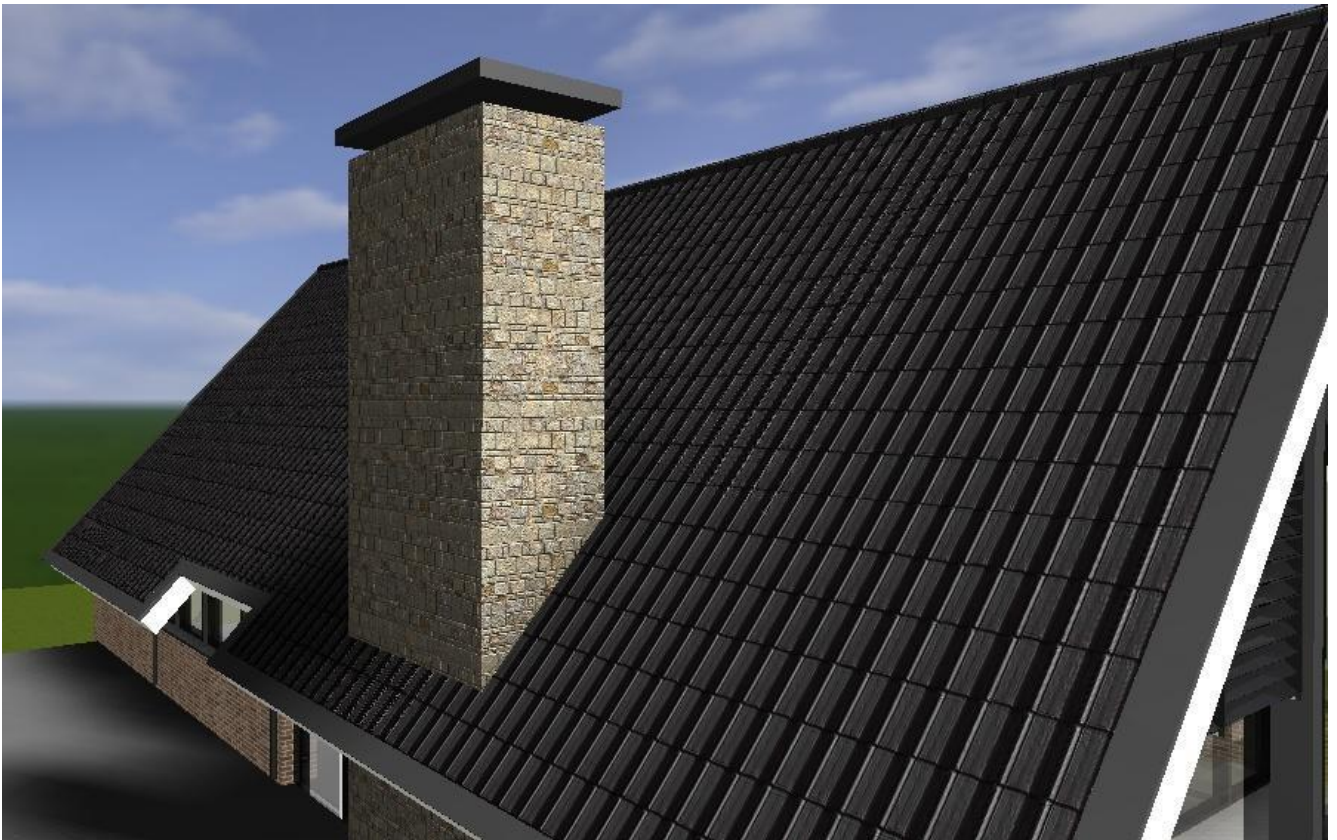
This mode of operation is based on the performance of your processor - memory CPU.
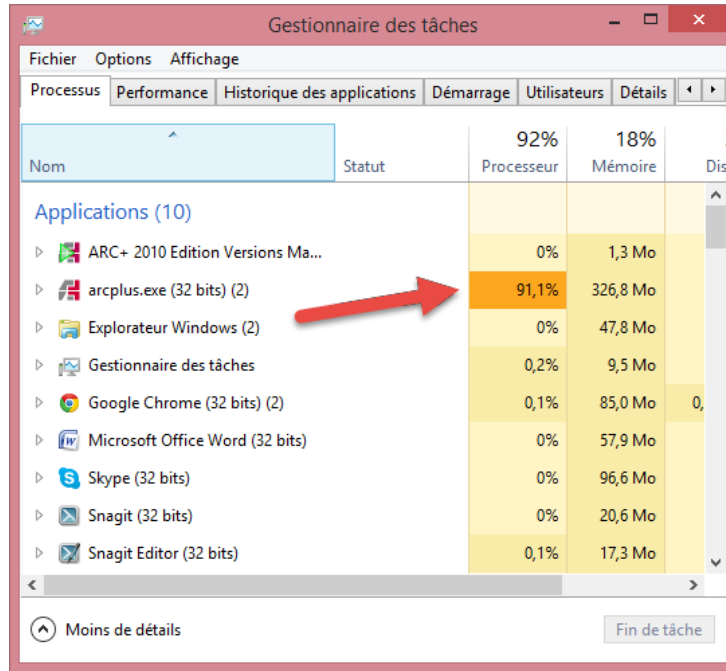
Therefore, it is preferable to use this mode in real time and only these options to view the model. Indeed mode Presentation (CPU) in the real time results are closest to the final result you get generating the final output image (offline).

INTERFACE CONFIGURATION OF THE SCENE

Move the cursor towards the **active zone 2.**
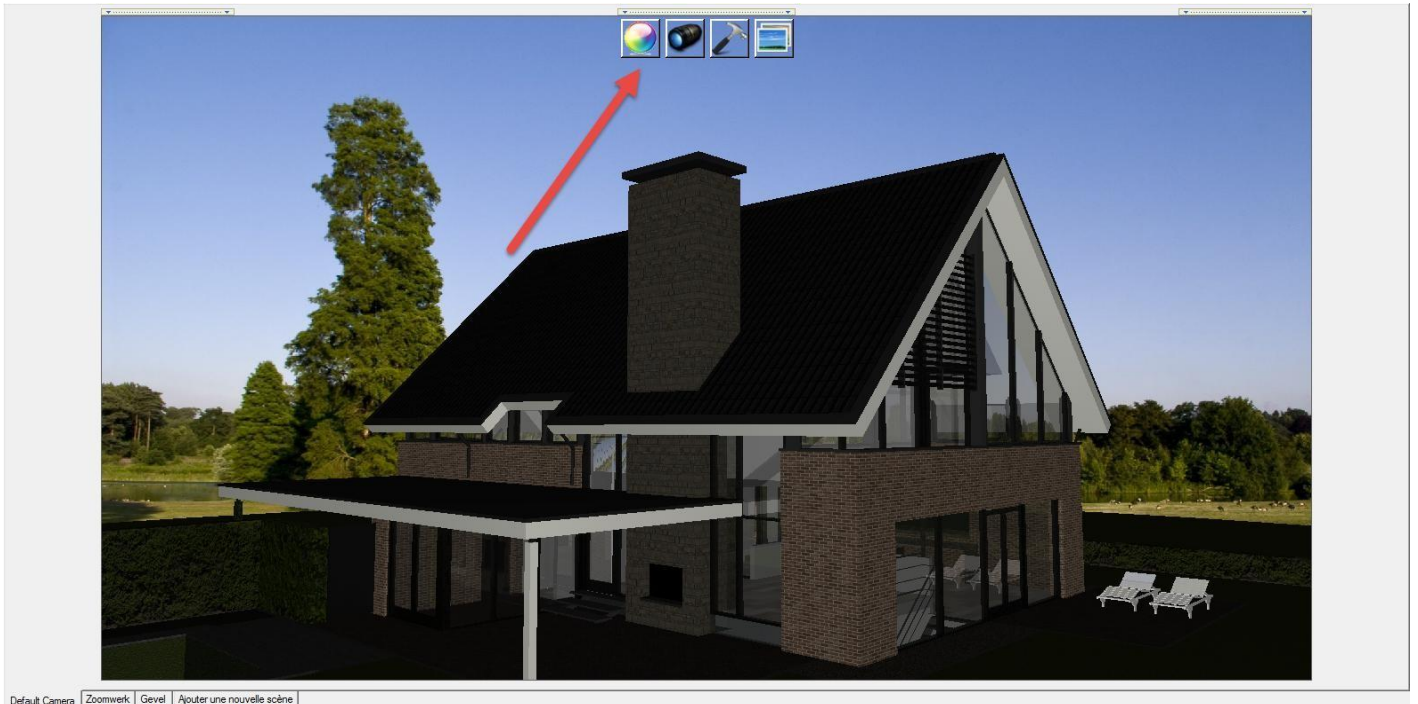
The active area appears.

1. Material Studio

2. Camera Settings

3. Lighting and general settings

4. Render

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INTERFACE MANAGER MATERIALS
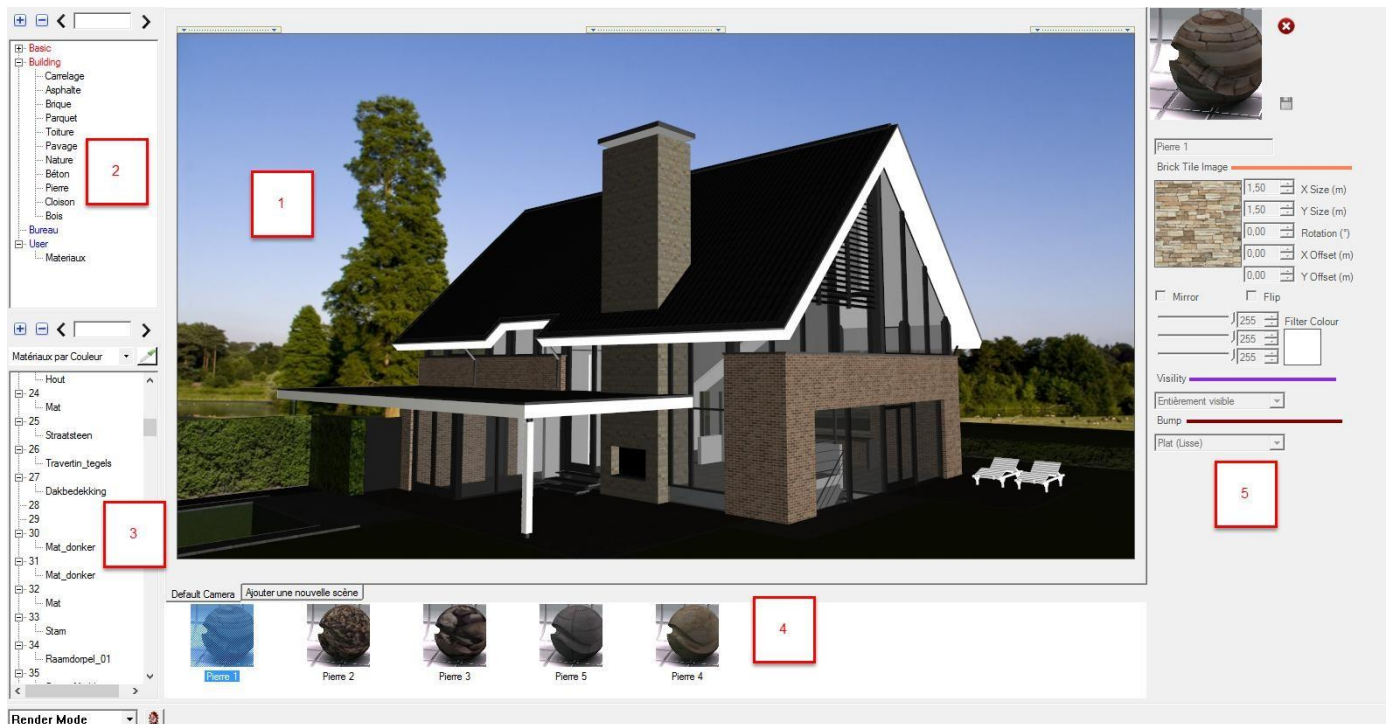
1. Visualization of real-time rendering

2. Manage classes of materials: creates separate classes for materials

3. Manage the application of materials: choose the method of the application of materials and view applied materials (possible applications by model, colour and layer).

4. Material Preview Panel: visualization of materials and real-time implementation of the materials by simple drag and drop.

5. Material Setting Panel.

MANAGE CLASS OF MATERIALS

You can view the categories of existing materials and create new categories. You can also create new materials in a selected category.

In Material Preview Panel (4), the materials contained in the selected category, and their appearance, are displayed in real time.

Warning: It is impossible to create a category and materials within libraries "Basic" and "Building" because they contain basic materials that cannot be changed.
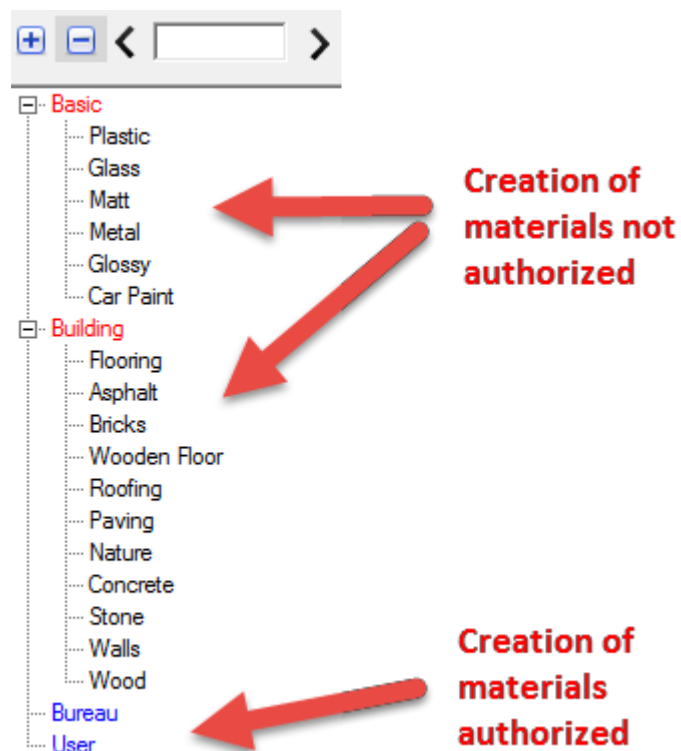
HOW TO ADD A CATEGORY

Right-click the name of the library "Bureau" or "User" (which are the only modifiable categories) in which you want to add a category and select « new category ».

Add a name to your new category.

HOW TO ADD MATERIAL

Right click on a category that has already been created and select « new Material ».
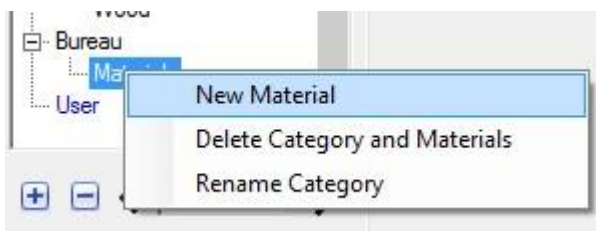
HOW TO VIEW THE MATERIAL WHICH IS PRESENT IN A CATEGORY

When you select a category, the constituent materials are displayed in the panel preview.
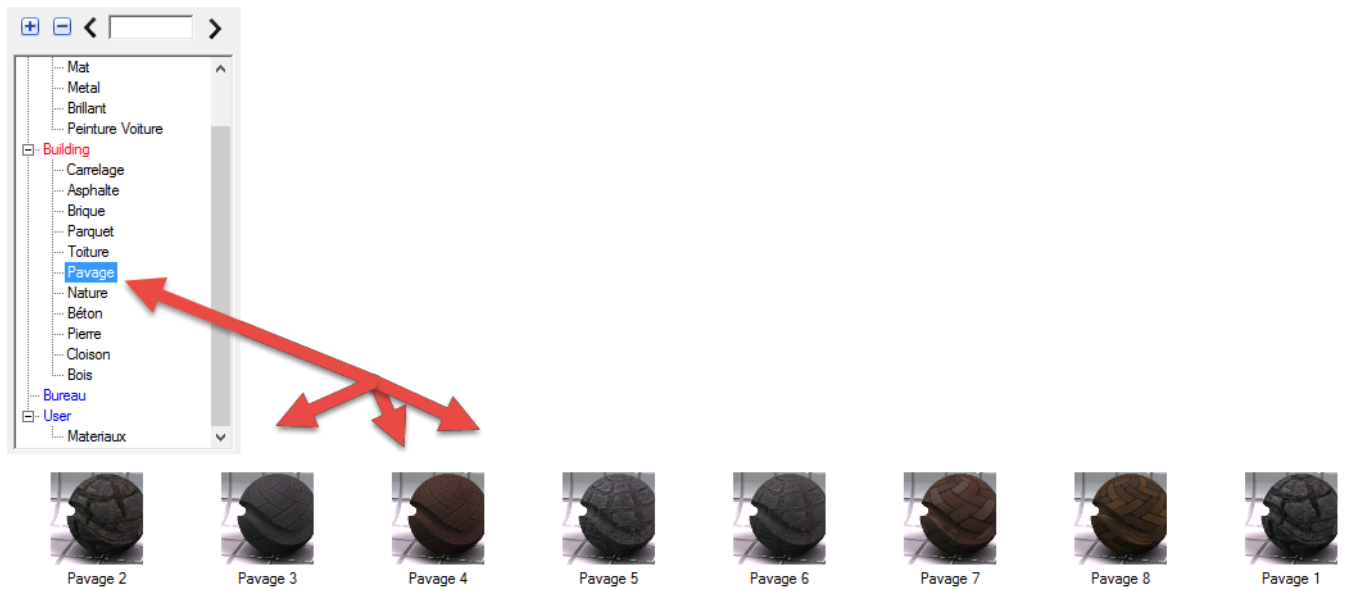
HOW TO MODIFY MATERIAL IN A SPECIFIC CATEGORY

To edit material, you need to drag this material into a modifiable category called "Bureau" or "User". Once they are in this library, you can modify this material:

- choose a category

- select the material

- the material parameters are displayed in panel 5 and can be changed

Warning: the materials present in Building and Basic (in red) are not modifiable.

HOW TO CREATE MATERIAL FROM EXISTING MATERIAL

To duplicate material starting from one which already exists, that you can modify:

- Right-click on one of the materials present in the preview panel of the Bureau or User library (if the material is not present, you can drag and drop it into there).

- select « Duplicate »

- choose a name for the duplicated material

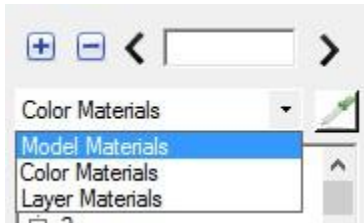- the material parameters are displayed in banner 5 and can be modified.

To create a material from a base material (library Red Building / Basic) you must apply the material to the object and after duplicate it, using the icon below :

We will see more about this later.

HOW TO SEE THE APPLIED MATERIAL

It is possible to see the list of applied material by the selection method.

HOW TO MANAGE THE APPLIED MATERIAL

There are 3 methods of applying materials ordered from highest priority to lowest priority in listed below:
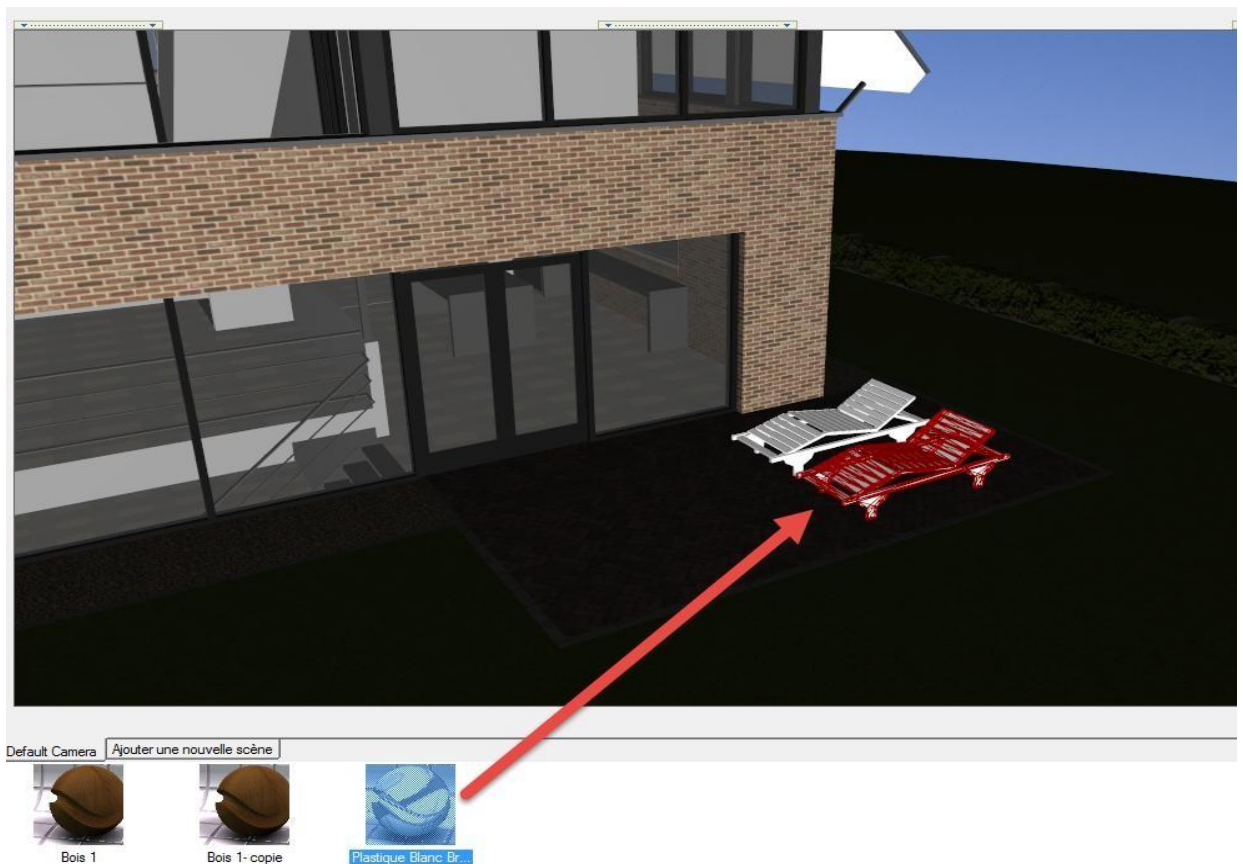
- By Model

- by Colour

- by Layer

This means that for a given entity, if there is material applied, it will always be possible to apply another one on top if the priority is higher. If nothing happens when you try to apply the material, this means that there is already a material applied in a higher category, so you cannot over-write it.

HOW TO APPLY MATERIAL BY MODEL

To apply a material by model:

- select « Model Materials »

- select a category

- select material

- drag on the entity model to which you want to apply the material

- the designated entity highlights in red (see below)

- release the left mouse button and the material will be applied

HOW TO APPLY MATERIAL BY COLOUR

To apply a material by colour, two methods exist:

method 1 :

- select « Colour Materials » in the dialog box

- select a category

- select material

- drag on the entity model to which you want to apply the material

- the designated entity highlights in red (see below)

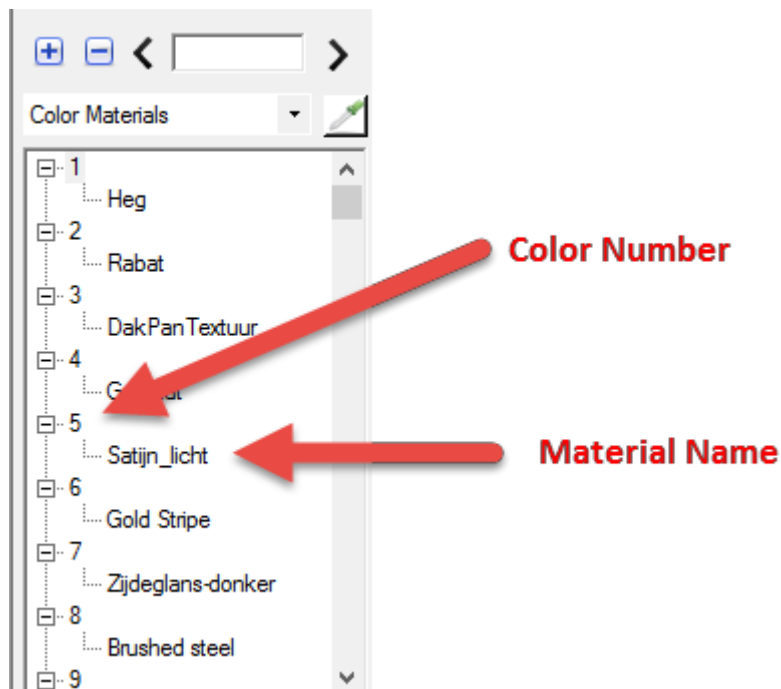- release the left mouse button and the material will be applied

Important: if the material is not applied to certain entities of the chosen colour, it means that the entity has already been applied by model.

Method 2 :

- Select « Layer Materials » in the dialog box

 The available list of 255 colours are displayed:

- select a category

- select a material

- drag the number of the colour you want to assign to the material

- release the left mouse button, the material is applied to all entities that are this colour

Important: if the material is not applied to certain entities of the chosen colour, it means the entity already has an applied model material.

Example : Our chaise lounge is colour 44 (in the model).

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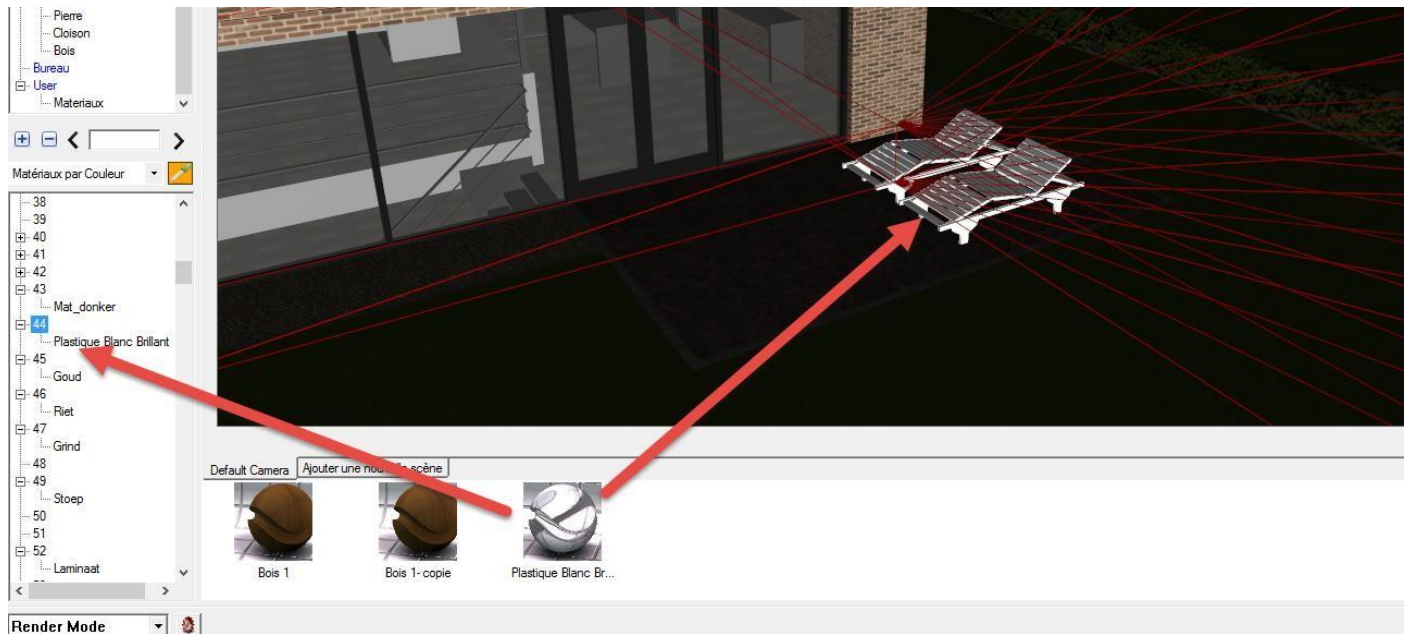
HOW TO APPLY BY LAYER MATERIAL

To apply a material object you can use two methods:

Method 1 :

- select " Layer Materials " in the dialog box

- select a category

- select a material

- drag on the entity model to which you want to apply the material

- the designated entity highlights in red (see below)

- release the left mouse button and the material will be applied on all the entities which have the same layer

Important : if the material is not applied to certain entities in the selected layer, it means the entity already has an applied subject model or colour.

Method 2 :

- select "Layer Materials" in the dialog box

- The list of layers appears

- select a category

- select a material

- drag the material on the layer number that you want to apply it to.

- When you release the mouse button, the material is applied to all entities belonging to the

- layer

Important: if the material is not applied to certain entities in the selected layer, this means that the entity has already been applied by a model or colour.
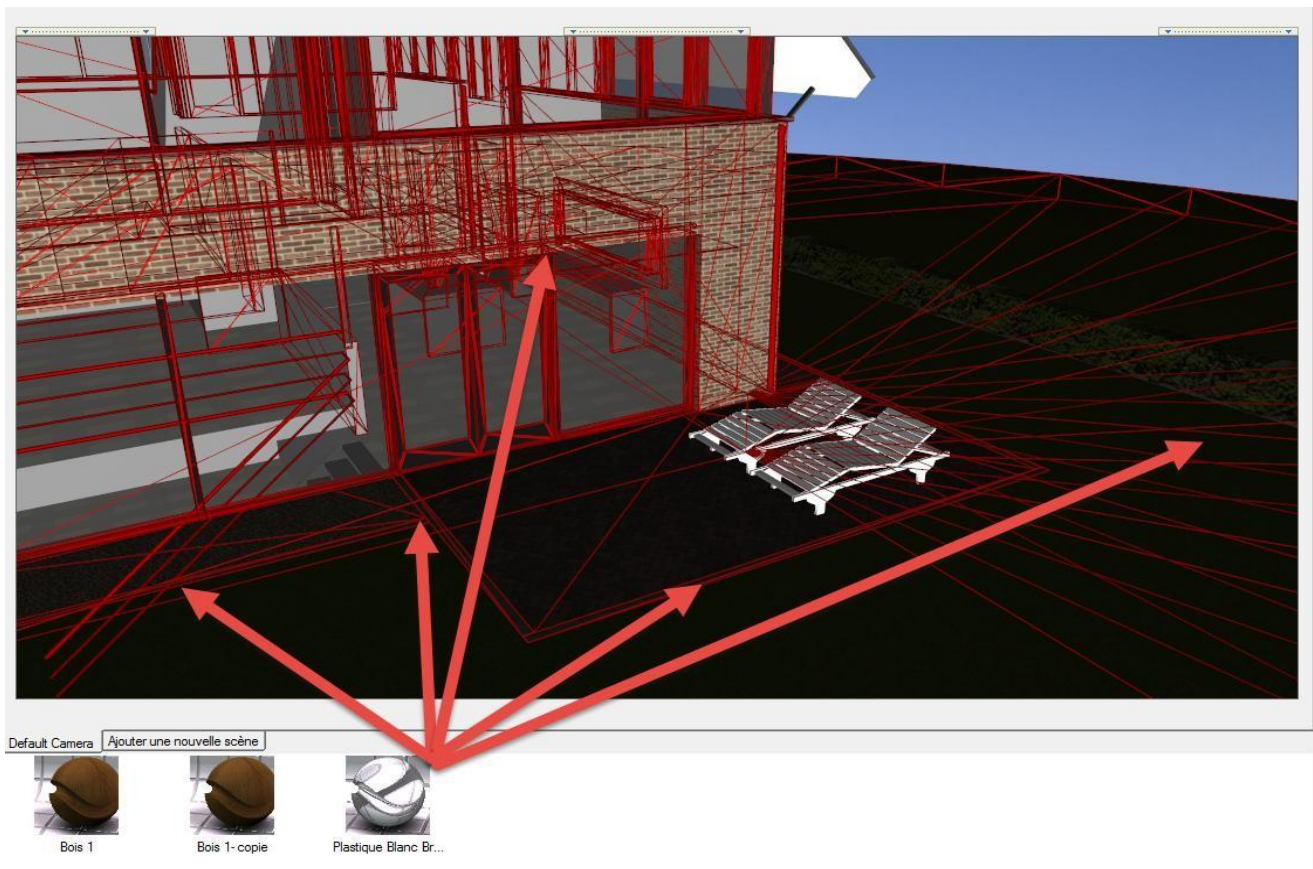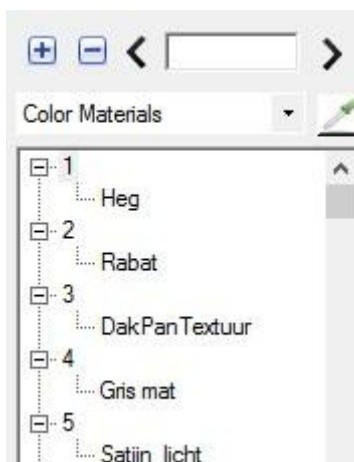
HOW TO VIEW THE LIST OF APPLIED MATERIALS MODEL

by model

- Select "Materials by model" in the dialog box
- the list of the materials applied to the model is displayed below
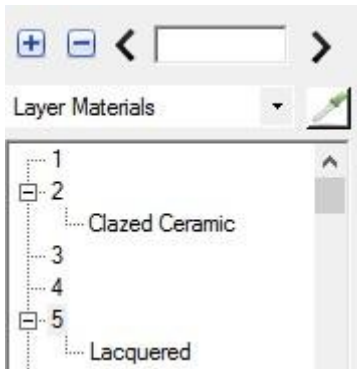- the list of materials applied to the model is shown in the preview panel

by colour

- select "Materials colour" in the dialog box
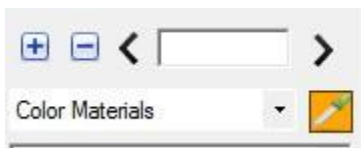- the list of the materials applied to the model is displayed below

by Layer

- select "Materials by Layer" in the dialog box

- the list of the materials applied to the model is displayed below

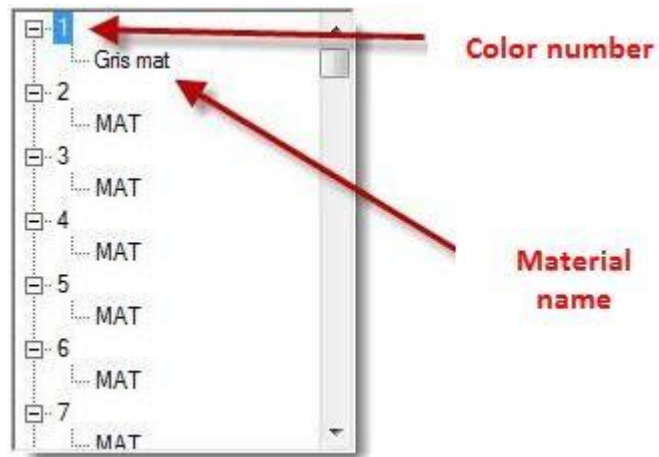## HOW TO KNOW WHICH MATERIAL IS APPLIED

To know which material is applied to the model, select the following icon:

Then select the part of the drawing you want to determine the material.

Attention: When this icon is active, you can not navigate in the model.

To create a material from another material which is present in base libraries

1. Place the material

2. Select the material (following the method of selection, in this example the materials are by model) by clicking on the entity through the Dropper.

3. You can now modify the parameters of this base material applied to this entity.

We saw that it was impossible to change the basic materials belonging to the basic libraries and because the definition of these materials is stored in files it is important not to change. By applying the material from the base libraries, a copy is made in the file for your model and then modifying its parameters is possible because the database file is not changed.
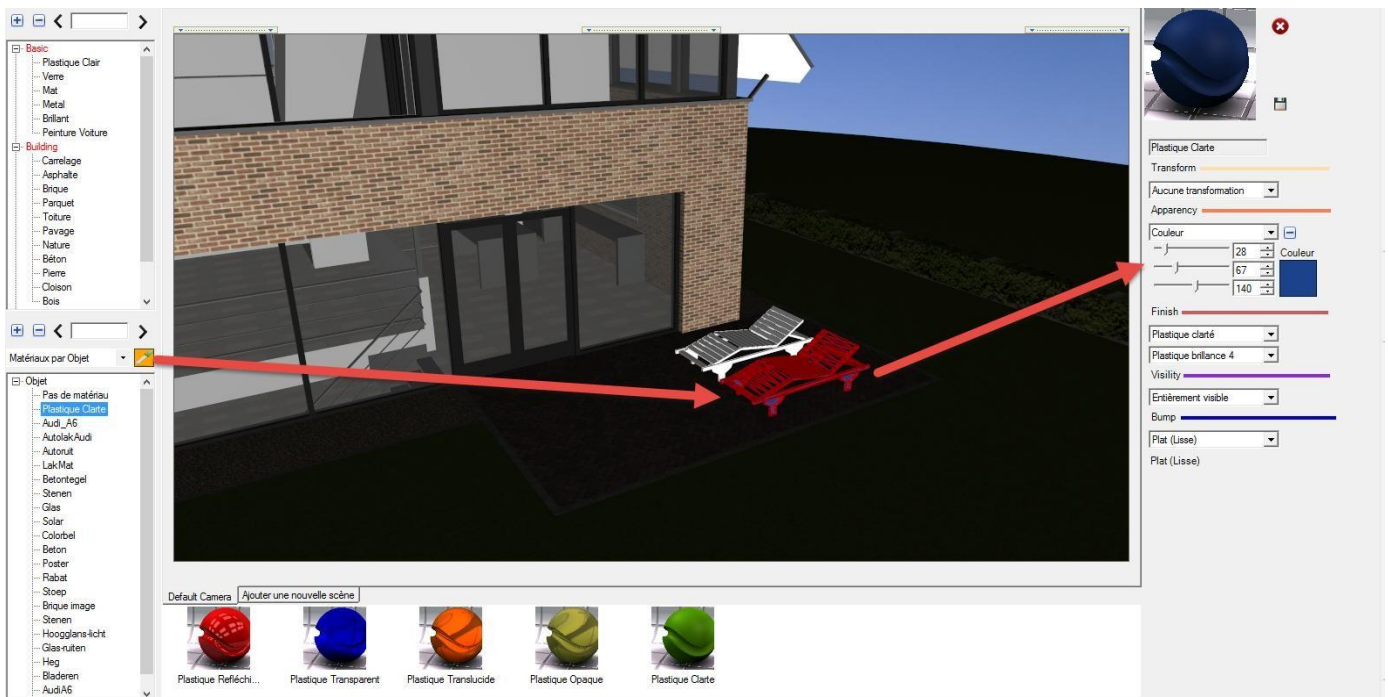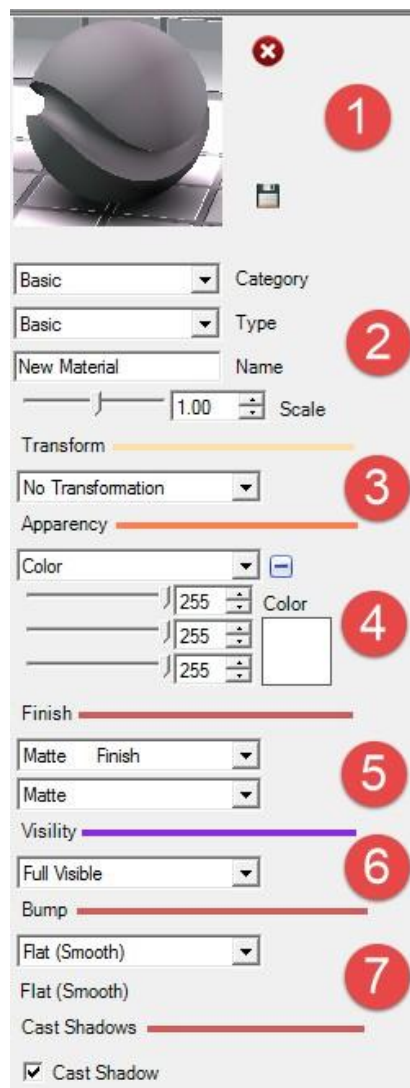
SETTING OF MATERIALS

Materials can be considered as colours, and a single colour is the simplest form of a material. Full material is visualised as a colour by superimposing additional types of attributes that control how a surface interacts with the light and the environment. You can set your new materials or modify the parameters of existing materials.

Creating materials is limitless and through playing with the parameters of this setting the user can generate more realistic results.

Presentation of the basic categories

The basic categories are used to create materials with different finishes starting from a colour or image in the easiest way possible.

For example, a wood floor can be created in this category by using an image and adding some graphic effects.

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1. Material Preview

At each change of material parameter, the preview is automatically updated in real time.

❌   Remove the material

💾   Save the material

2. General settings

In this section you can change the name, the scale of the material and its subcategory.

3. Transform

This section allows you to change the settings of the base image (if you want to create a texture from an image). The tools of rotation and offset allow you to adjust the image on the surface on which you want to apply the texture.
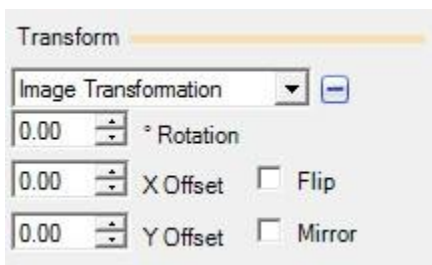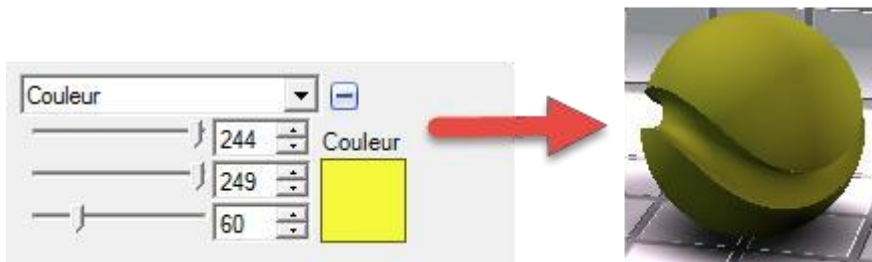
4. Appearance

In this section, the user can specify the texture which they would like to use generate the final material.

Several choices are available:

- **Colour**: RGB palette is displayed, the texture will be created from a single colour. This option is useful for uniform material that is monochrome such as plastic.

- **Image**: The texture is created from an image that you can download from the internet.

Then choose the size of the image to match the surface on which it will be applied. For example, if you choose to use an image representing 5 tiles of 3 cm each, specify the real dimensions (15cm + 2sm for joints). It is possible to change the colour of the image by applying a colour filter.
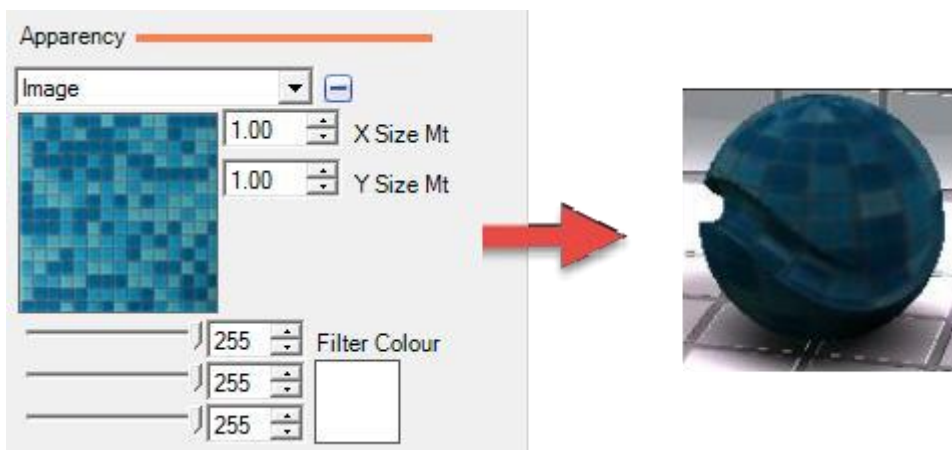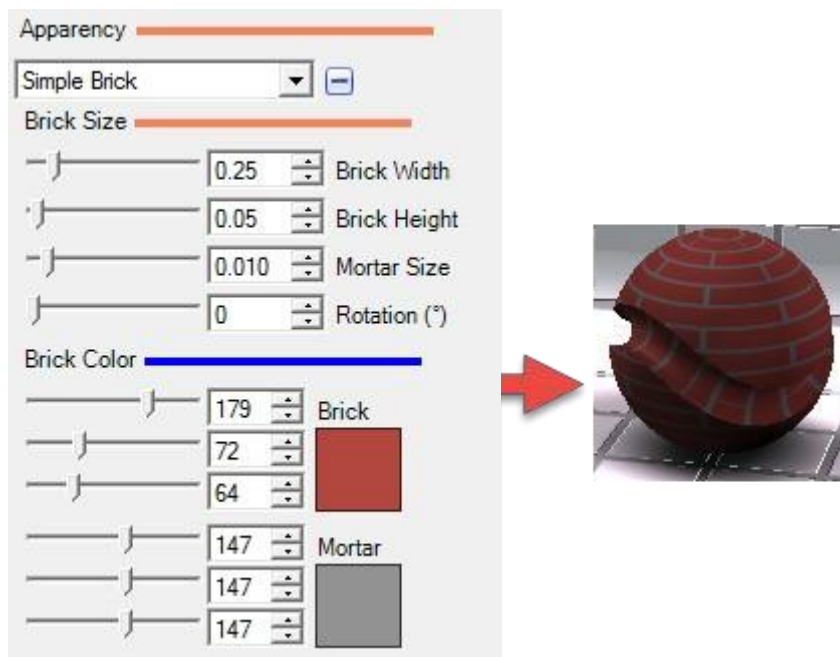
When the user selects an image from the library, it is taken directly from the folder of ARC+:
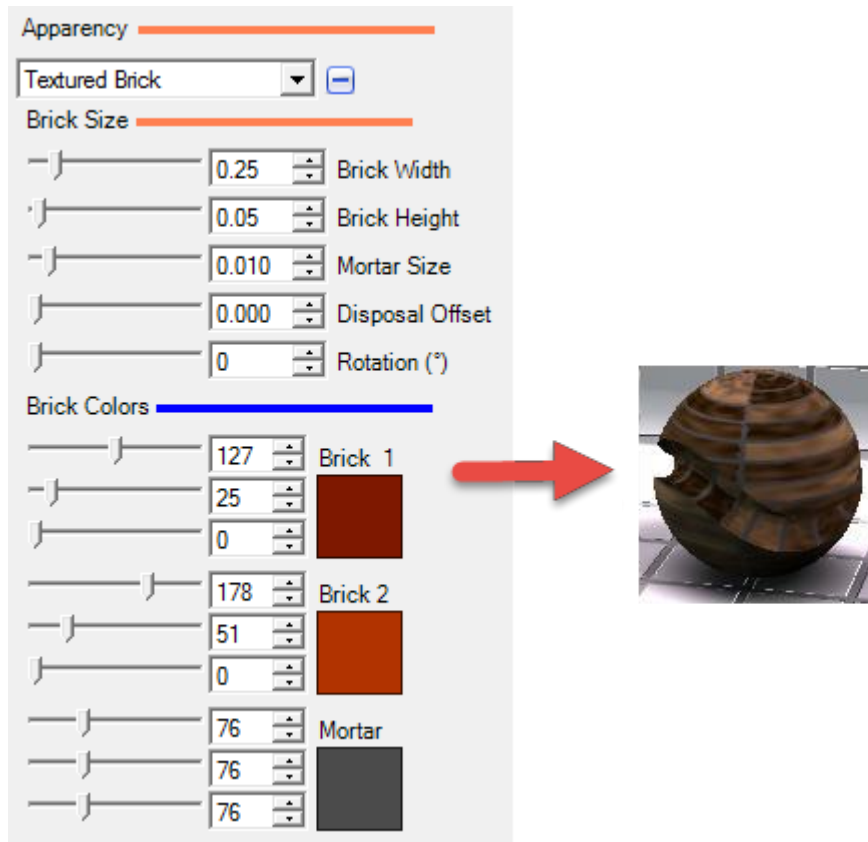
C:\ARC+ X8 Edition\RESOURCE\LW\smdata\textures\Textures_2012

If you want to upload images to create materials from them, the user must place the images in this folder.
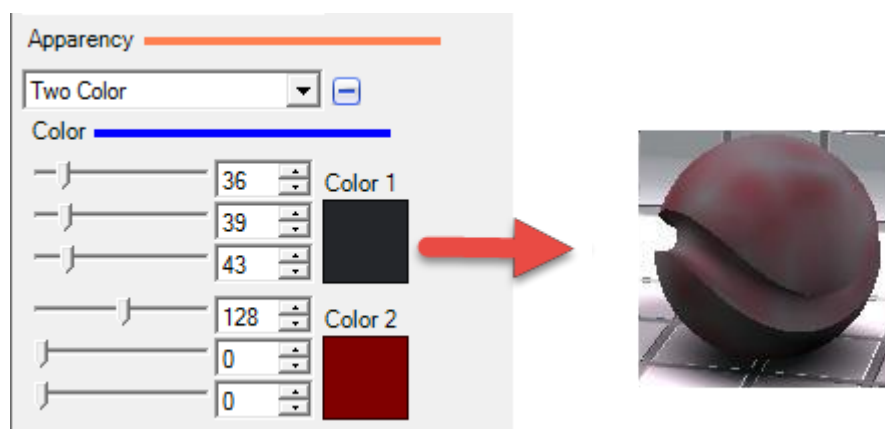
- **Simple brick**: specify sizes and colours

- **Textured Bricks**: specify sizes and colours as well as a gap between the bricks

- **Coating**: to simulate a lacquered effect. Specify the type of flooring, dimensions and colours.

- **Two colours**: Layer two colours for a non-uniformed texture with colour

5. Finish

This interface allows you to configure how your material will reflect light. This is because materials such as metal, plastic or glass does not reflect light in the same way.

In this section, you can choose from:

- **Matte Finish**. change by the degree of brightness of the material (1-8). Here you control how your material diffuses light.
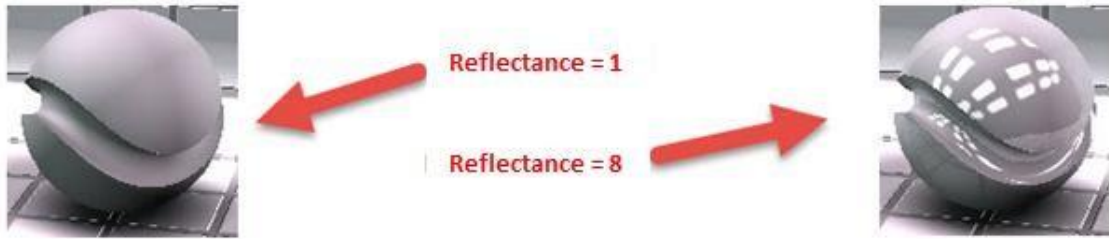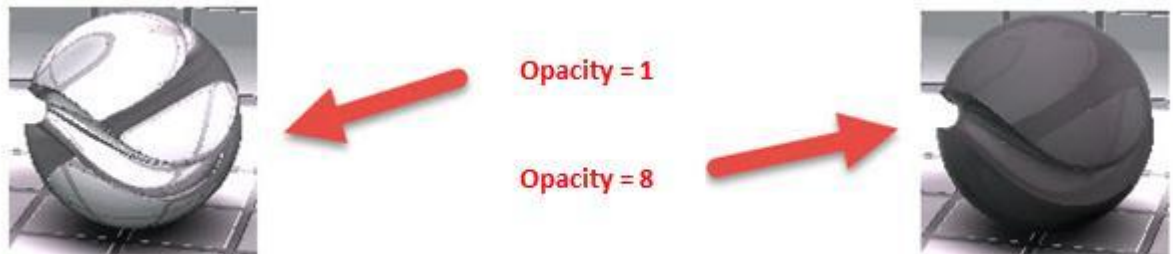

Plastic Finish. Choose from:
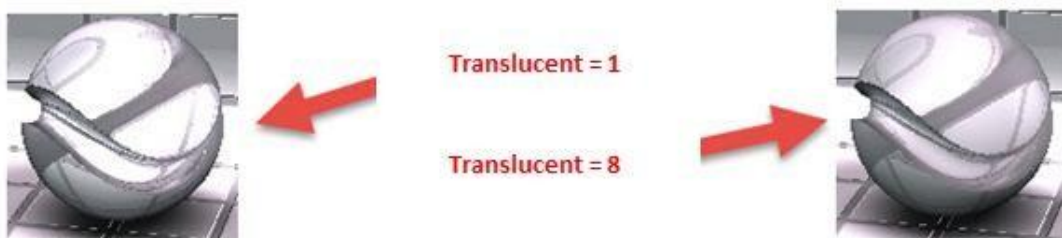
- Plastic Shininess
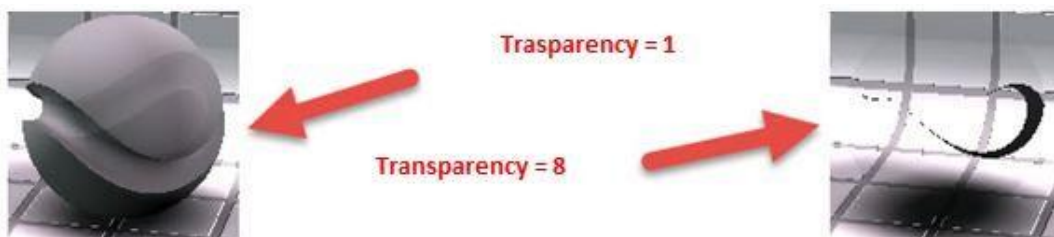
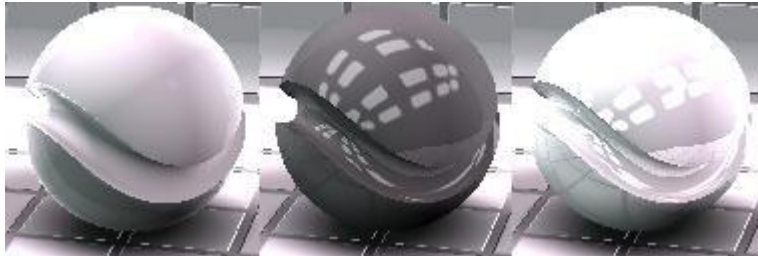- Plastic Reflectance

- Plastic clear Opaque

- Plastic Translucent
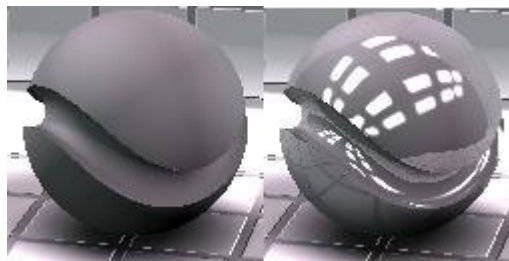

- Plastic transparent
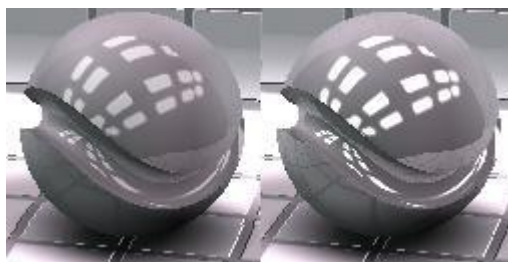
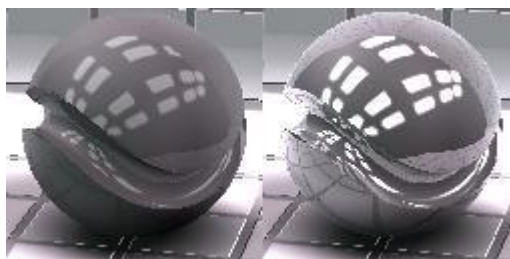**Glossy Finish.** Choose from:

- Ceramic

- Glossy

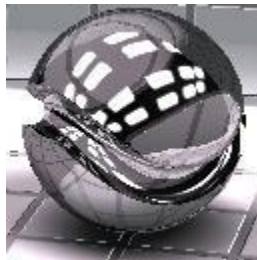- Glossy roughness

- Clear lacquer

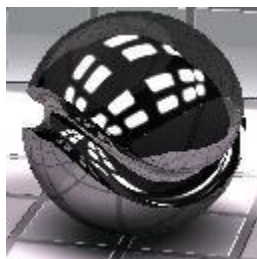**Glass finish**. choose between several types of glass:

- Transparent:

- Clear Glass Reflect
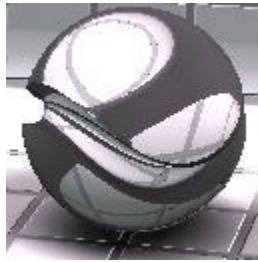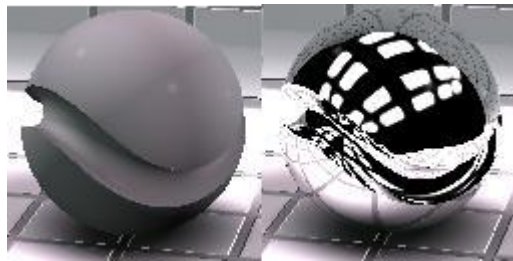

- Tinted Glass Reflect

- Smoked Glass Reflect

תוכנת השרטוט שעובדת בשבילך

- Translucent Glass Opaque

Mirror finish

Metals Finish:

Car Paint Finish:

תוכנת השרטוט שעובדת בשבילך
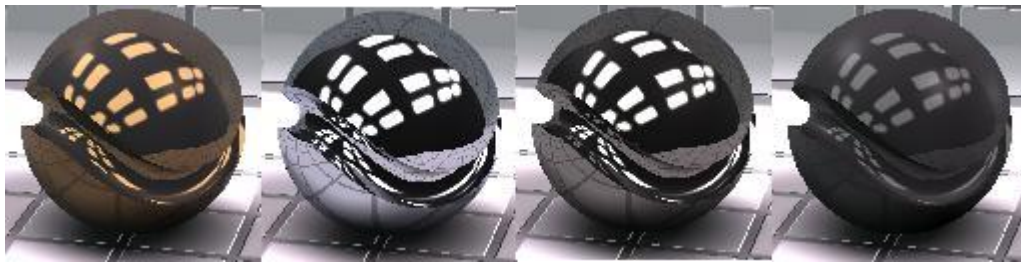
All these parameters are pre-built templates. However, you can at any time decide to customize these settings and change factors such as roughness / reflection / transparency / diffusion / environment.
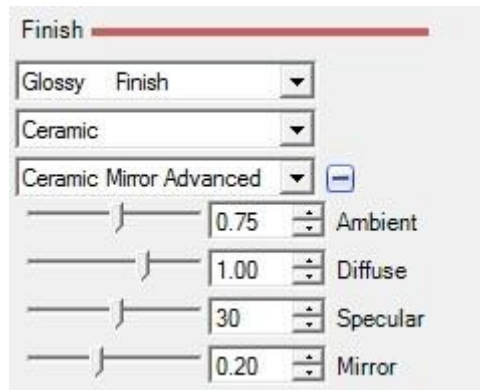
Mirror-Reflection Map:

When working from a picture, you can generate different maps from specialized software. Three maps are sufficient to reproduce a realistic material.

The Mirror-Reflection map manages how the light is diffused and reflected by the material. It is a file format .jpg as the base image.

Take this .jpg file for example:
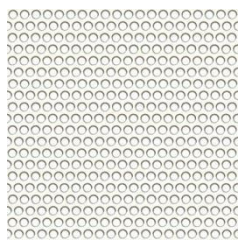
From this image we can create its Mirror-reflection map:
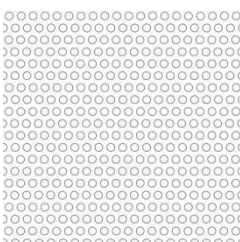
Then create the material from this image and the Mirror-Reflection map:
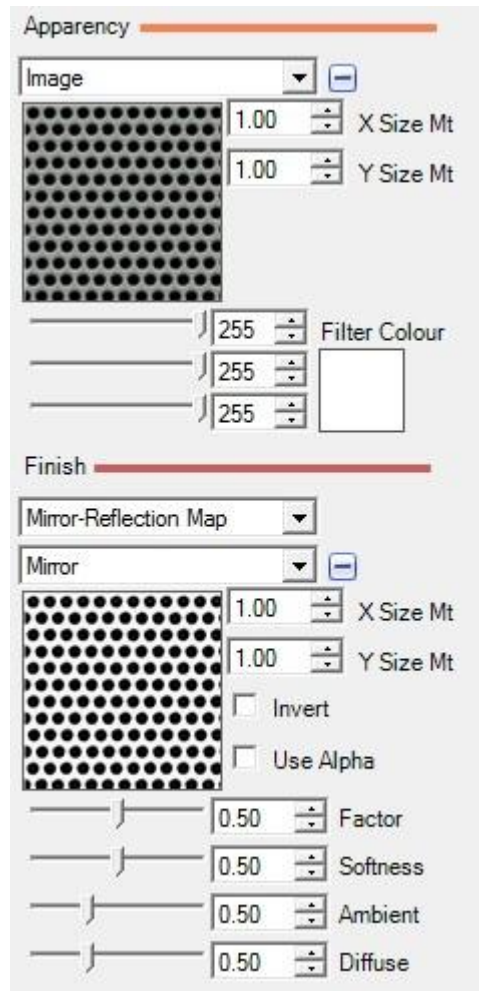
Attention: the dimensions of the base image and Mirror-Reflection map must be exactly the same.

CPU mode in Presentation Real-Time Visualization. This is the result of two sun chairs:
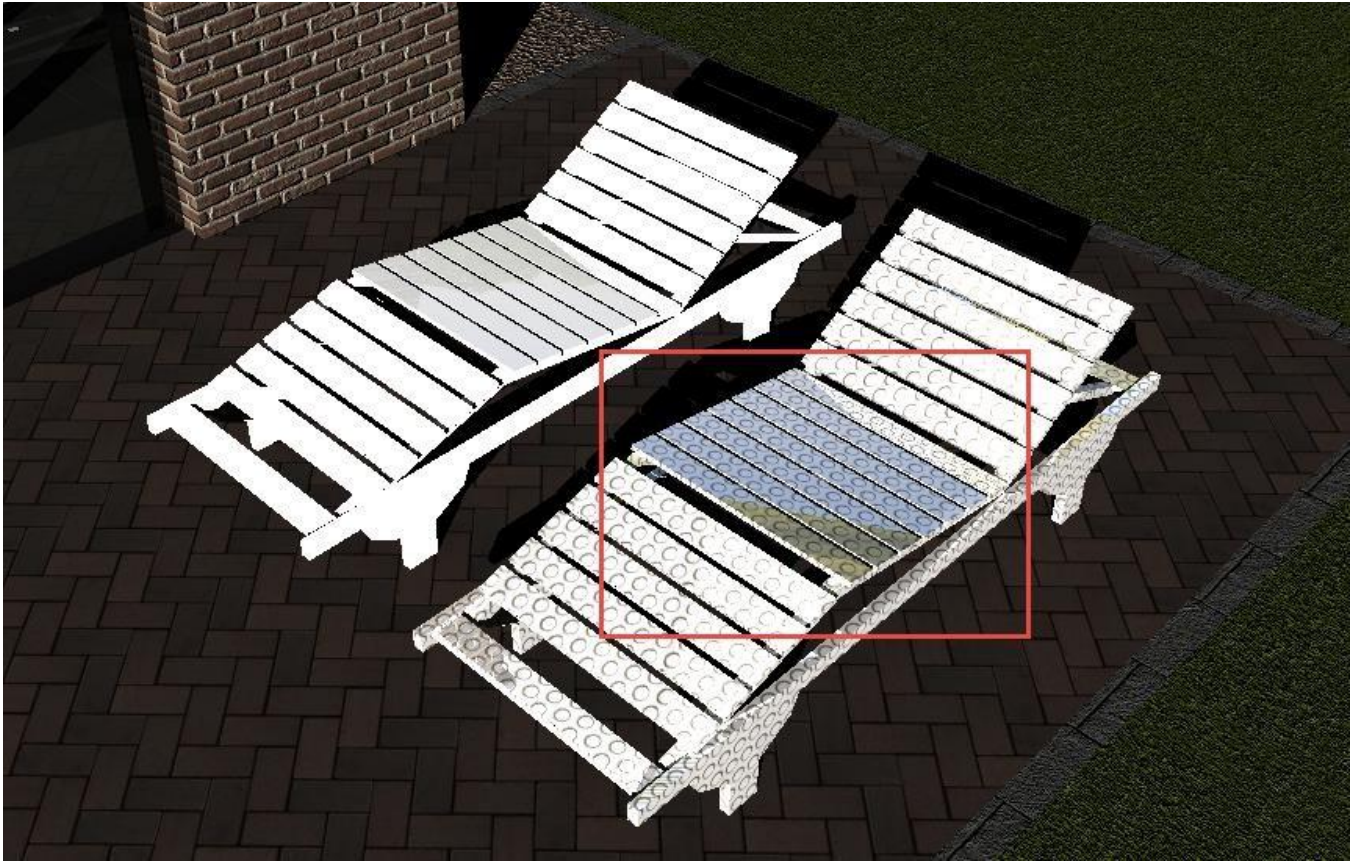
The sky is reflected from the material.

6. Visibility

In this section, the user can set the total or partial visibility of the material.

Three options are available:

- Full Visibility
- Partial Visibility
- Visibility Mask

Here we again involve concept mapping. Using the concept of alpha channel, you can determine which parts of the image are visible or not.

Reusing the previous image:
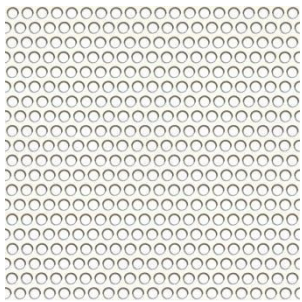
This is the Visibility Mask:
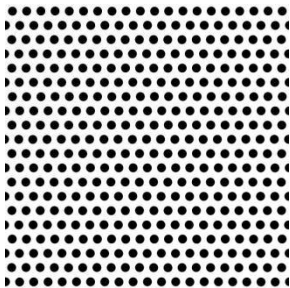
Then create the material:
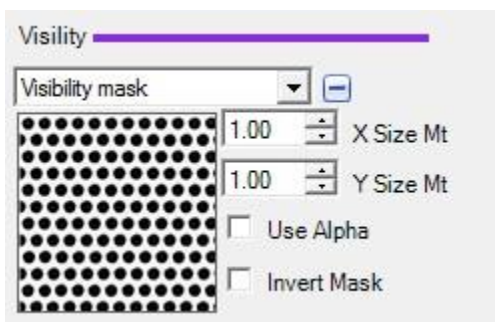
Here is the previous result:
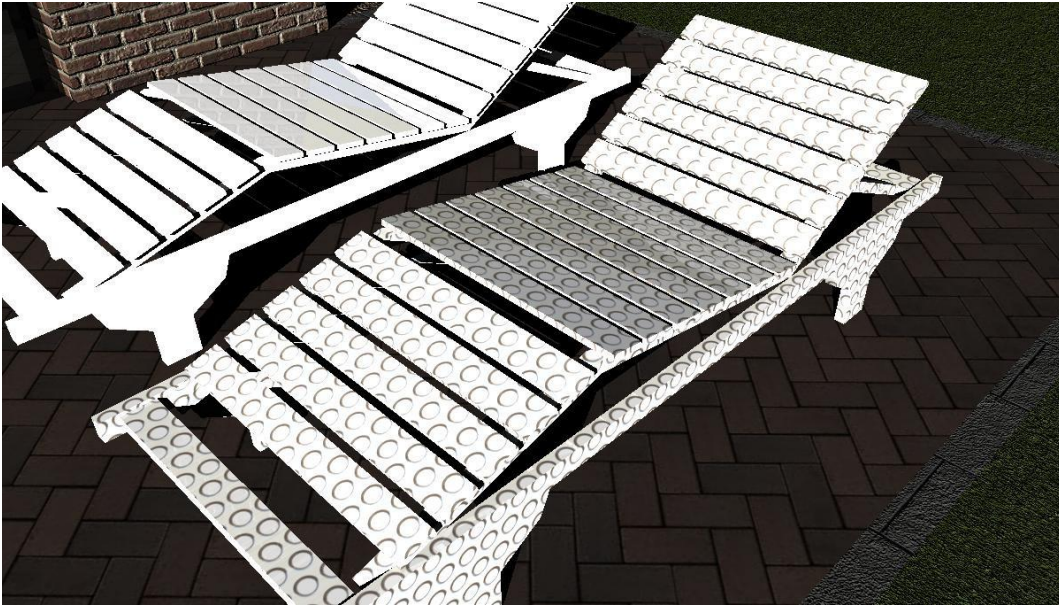
Here is the result after:

As we can see, the holes allow light to pass logically.

The freedom of 3Design
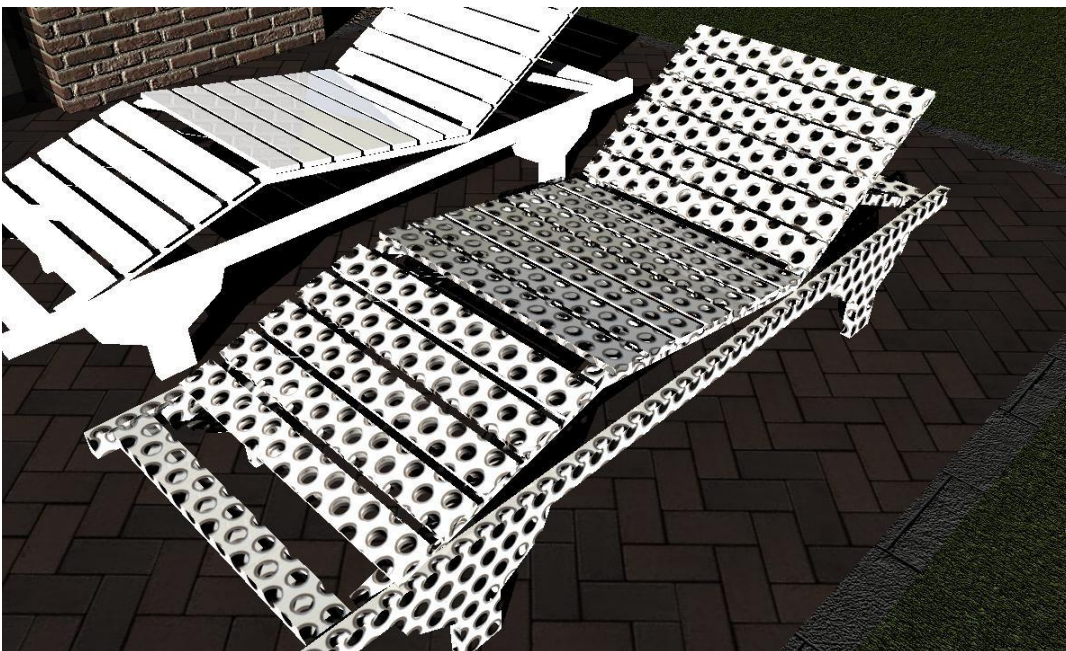
7. Bump

This section allows the user to highlight the relief of a material effect more realistically.

- Flat (Smooth)

- 3D linked with Appearance

- 3D by Image map

The user may, if desired, combine two .jpg images. One for the appearance and the other for relief effect.

- 3D by Normal Map

This concept uses a .jpg image recalculated from the base image to recalculate with each pixel redrawn. These redrawn pixels determine the relief effect according to the orientation of the pixels, which will adjust the reflection of light.

Here is the .jpg picture used in this example:
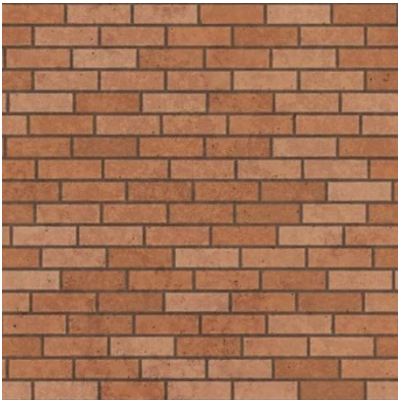
Here is the normal 3D Map redrawing of the pixels:

T h e   f r e e d o m   o f   3 D e s i g n
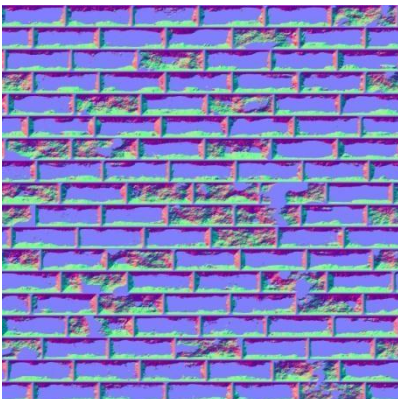
This is the result:
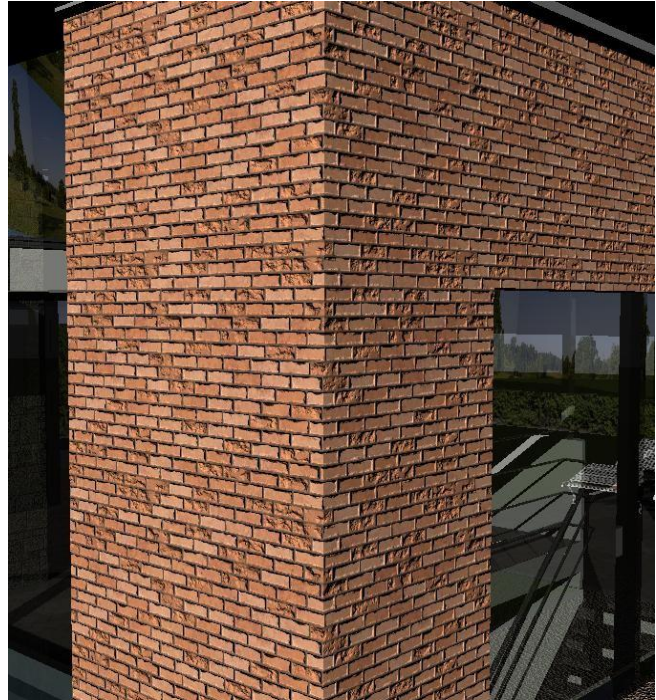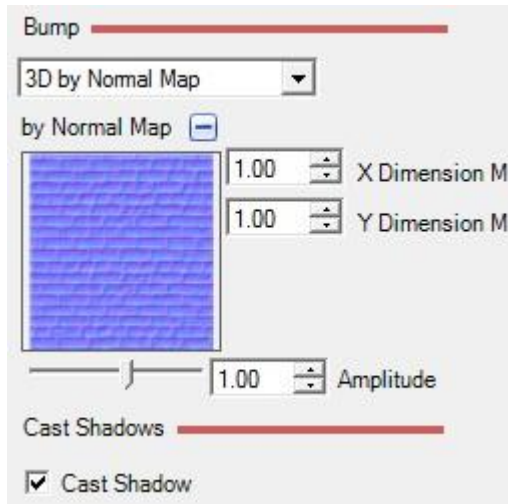
- The Cast Shadow option allows you to manage the shadows.

This option allows you to specify whether the entity in question casts a shadow or not.

- Cast shadows disabled:

- Cast Shadows enabled:

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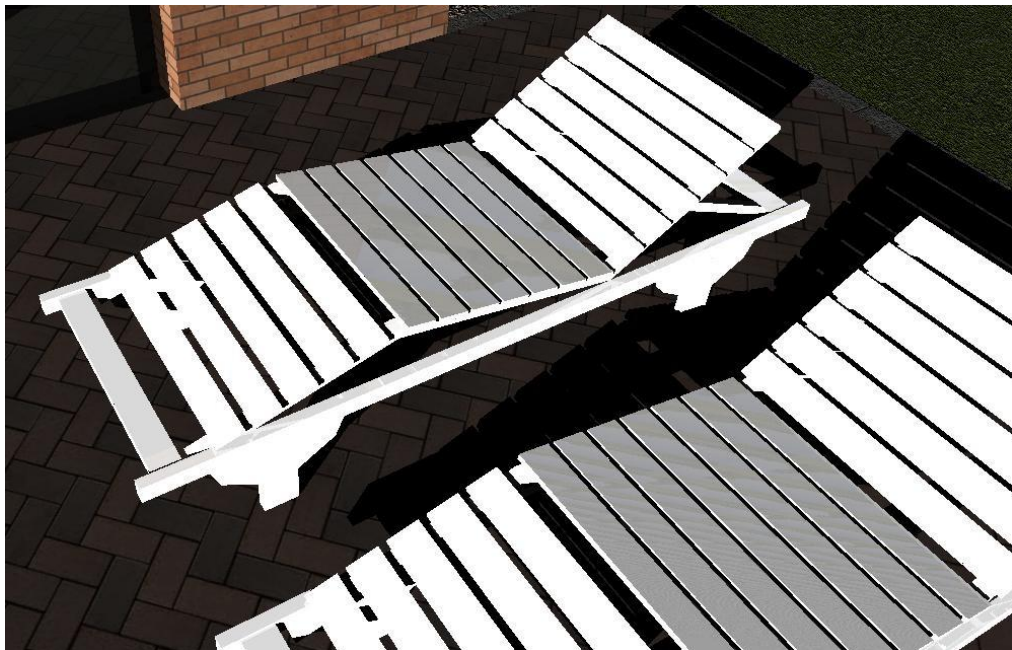
The Building category

This category allows you to quickly create materials for your roofing.
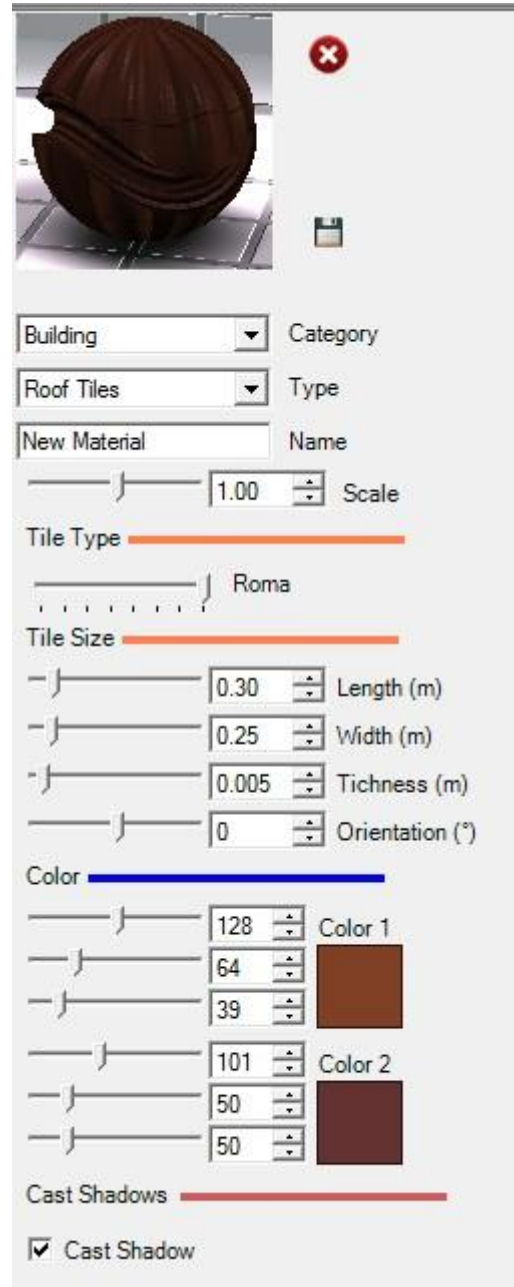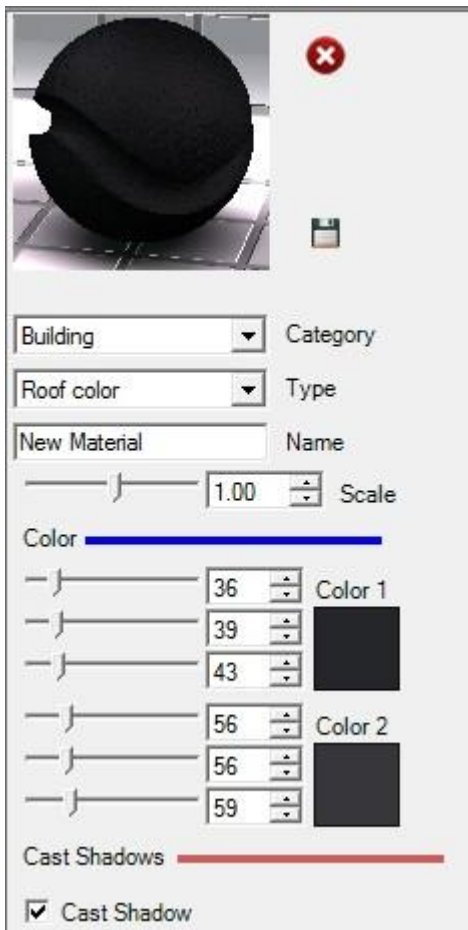
You can achieve this by using the "Basic" category which allows you to create any type of material.

Introducing the Water category

Water is a particularly complicated material to achieve because its appearance depends on several

parameters such as diffusion, transparency, waves etc ... In addition they are conditioned by the effects of light applied to the

model.

Therefore, this category offers pre-built templates that the user can customize according to their needs.

Two types of water are present:

- **Water Swimming-pool and Water Nature**. As you can see, only the transparency varies to give the desired realistic effect.

- **Advanced Water**. It is from this model that you can create any type of water, specifying parameters such as diffusion, transmission, transparency etc ... In fact, it is the light reflected and the refractive index of the material which determines   the   final   appearance.
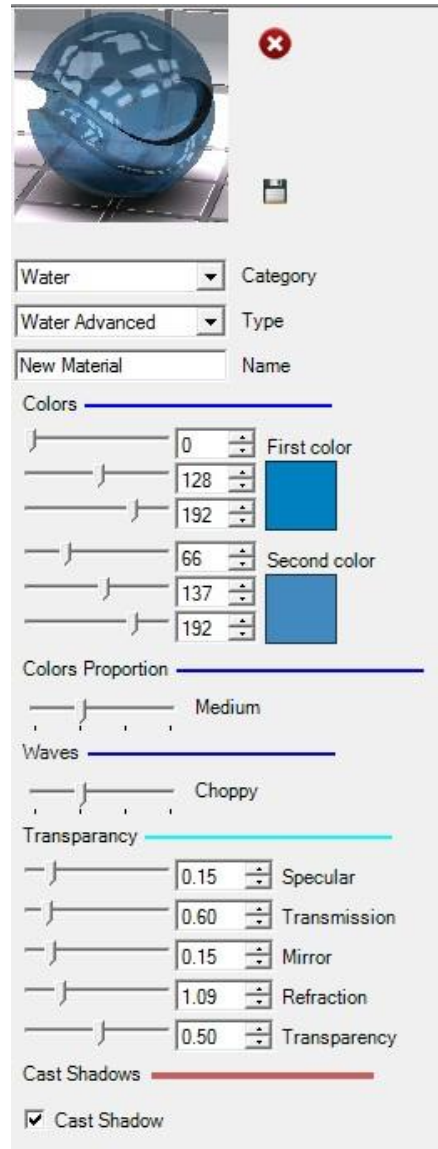
The Illumination category

This category allows you to create materials simulating artificial light. This category is adapted for floor lamps, or to simulate a night scene.

You can choose between different light intensities.
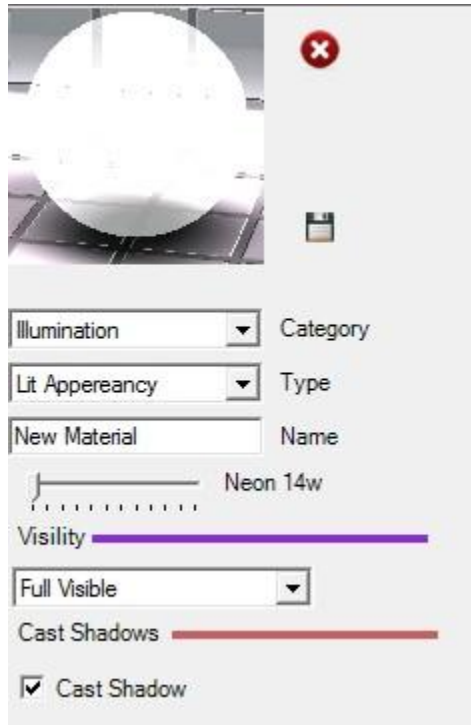
This type of material simulates light, but does not generate real light. Of course, if other reflective materials like metal are close to these materials they reflect the simulated light.

SETTINGS OF THE CAMERA
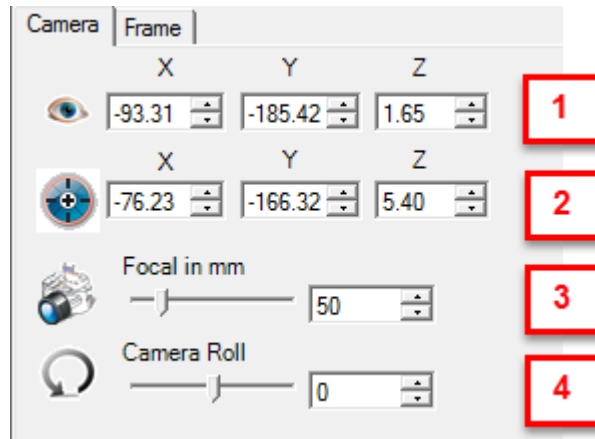
1. Moves the camera in the scene to the coordinates indicated

When the user clicks on the different views available:
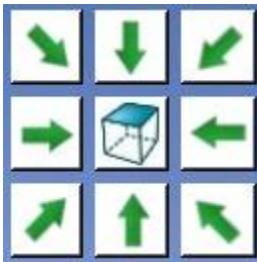
It merely enters predetermined spatial coordinates relative to the model. So you can navigate through this interface through your model and especially change the position and the focal length of the camera. In other words you can set the eye with which you view your model.

2. Moves the reference to the coordinates you indicate.
3. The zoom capacity is from 1 to 300mm.

Example:

focal length 13mm
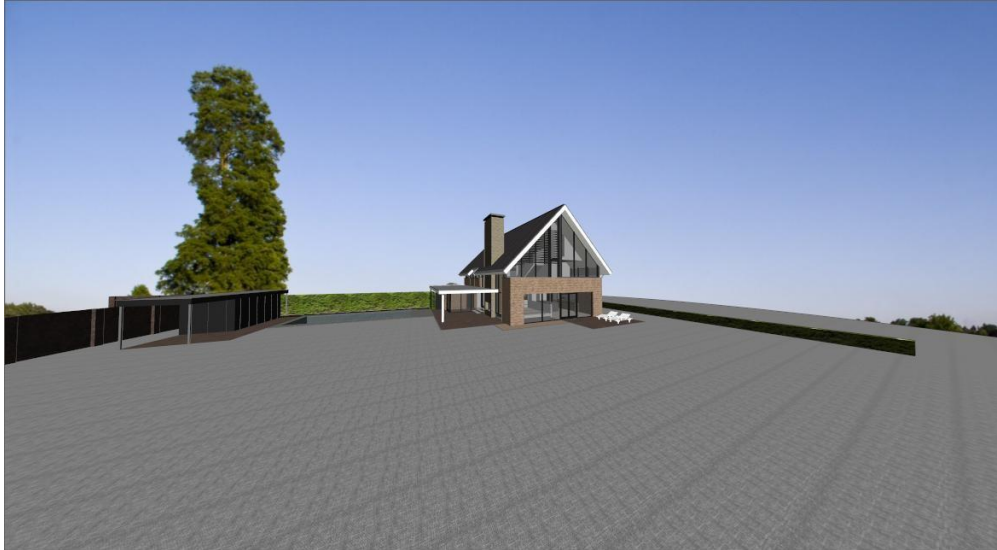
focal length 103mm

4. Rotation of the camera up to 360 degrees
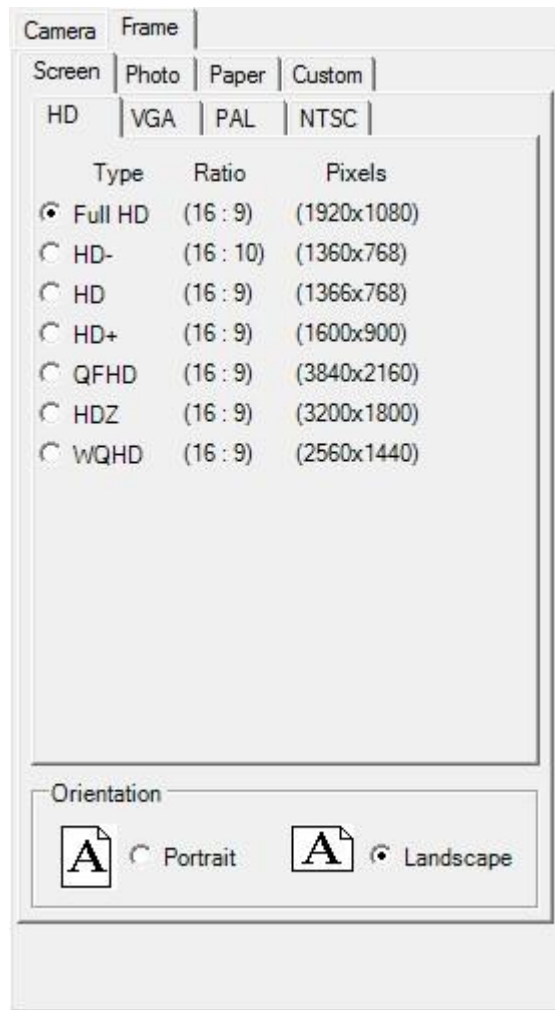
In the "Frame" tab, different options are offered. In other words, here you can set the dimension of the window on which you will work.

Most common formats are available and will generate a final report in the dimension specified (. jpg or other).

In the "Custom" tab you can define your format of the camera - in pixels or mm.

Example :

- Format A3 / Portrait

- Format landscape / 148mm/105mm / 200 DPI

REGISTRATION OF SCENES

ARC+ has the ability to remember specific scenes. For a model, you can save multiple views so you can avoid resetting the camera manually.

To save a new view:

- Place your camera manually depending on the view you want to get.

- Click "add new scene"

The view is registered!

If you want to rename the scene, simply right click on it to rename it.
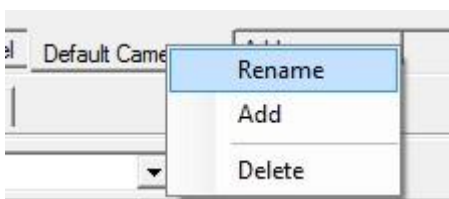
TAB FOR LIGHT SETTINGS AND RENDERING PARAMETERS

This is probably the most important tab in the configuration of your final renders as it will determine the light source used, the parameters of the background and especially the settings for the final calculations.

We will discover this interface systematically based on two important concepts: rendering in real time and offline rendering.

The real-time rendering is the image you see on the screen when you work on your project.
Real-time rendering means that the user can directly view any changes to the model without having to generate complex and slow calculations.

In other words, you can choose three ways to work, using these icons:

Modify GPU   Navigation GPU   Presentation CPU
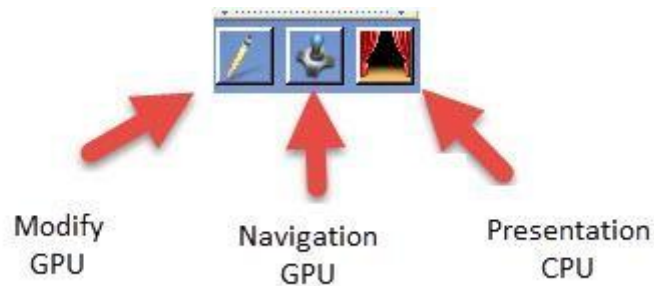
As explained above, the modes 'Editing' and 'Navigation' use the graphic card GPU:

- Quick navigation and quick modification of materials. This is the algorithm for fast computation and allows you to get an overview of your model.

'Presentation' mode uses the performance of your processor (CPU):

- The calculation is longer and recalculates the image for each change. However more parameters are calculated and the result is closer to the final result.

Therefore, these three modes are called 'Real-time'. They are different to the final result that you can reach in offline mode but you can work easily with them and on Presentation you can the most similar result to the offline one. For example, the Presentation mode shows the reflection of your material and for materials such as glass you can test it. If you like the result, you can return to GPU mode to complete your model.

The "Offline" render uses a calculation algorithm which is from the computer processor (CPU). This is more complex and efficient than the Real-Time algorithm. The offline result is obtained via this icon:

It is important to understand these two concepts of rendering – Real-time and Offline because they are crucial in setting the lighting of your model. Indeed, in the tab some options are available only for the Real-time settings. However they are do not change the Offline lights.

On the contrary, other settings with this symbol * are applied to the Offline rendering.

This is how it works. This interface may seem complex at first glance, however it offers different ways of working which are adapted to a specific phase of project development.

DIFFERENT LIGHT SOURCES
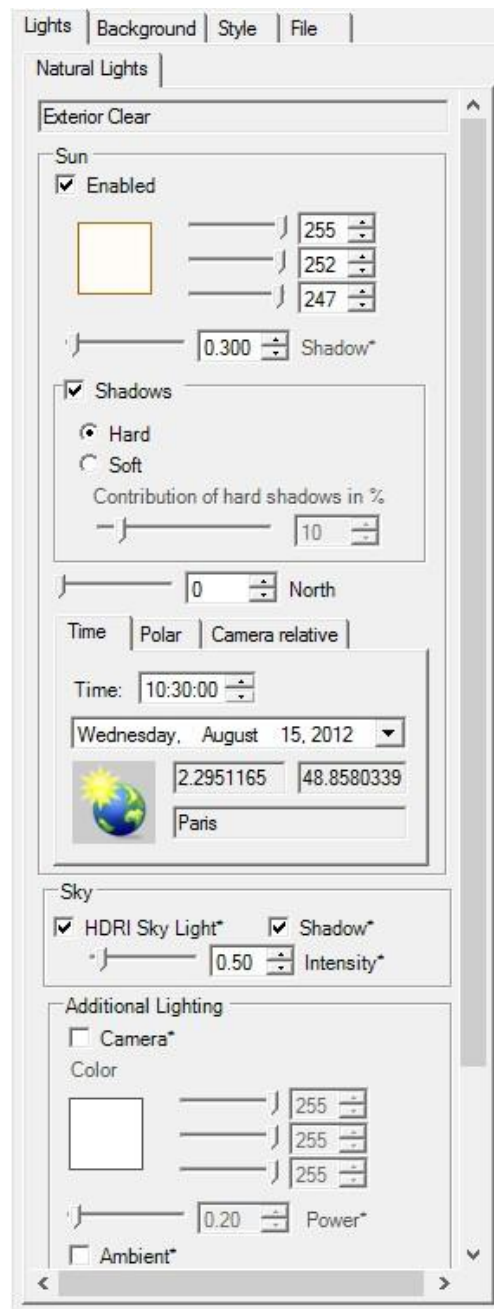
As you can see there are 2 types of lighting – Natural Light (Sun / Sky) and Additional Lighting (Camera and Ambient).

Remember - * means that any change in this parameter will not be seen in Real-time but will be seen in Offline mode.

SUN

It is a Real-time setting that affects your offline rendering too. Therefore, any change directly affects the model and your final report.
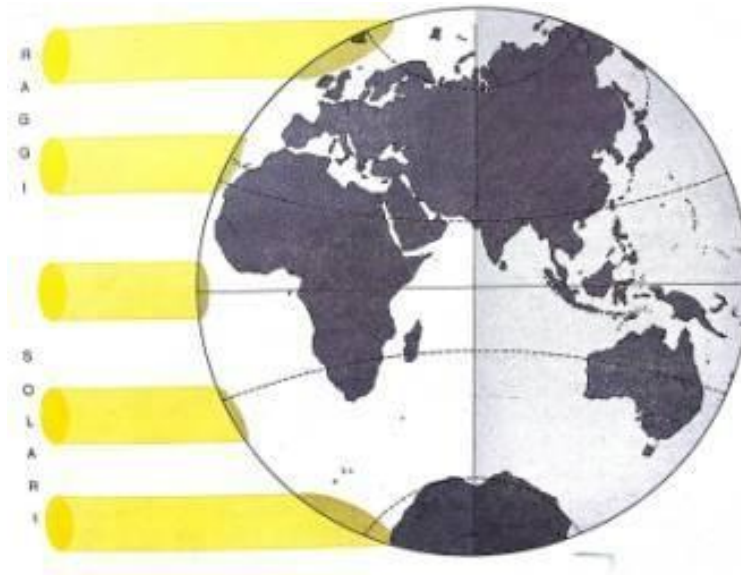
The sun's rays are parallel and the lighting is uniform and depends on other parameters such as direction and zenith. Therefore, depending on the position of the sun, the light is different.

In this interface, you can change:

THE COLOUR
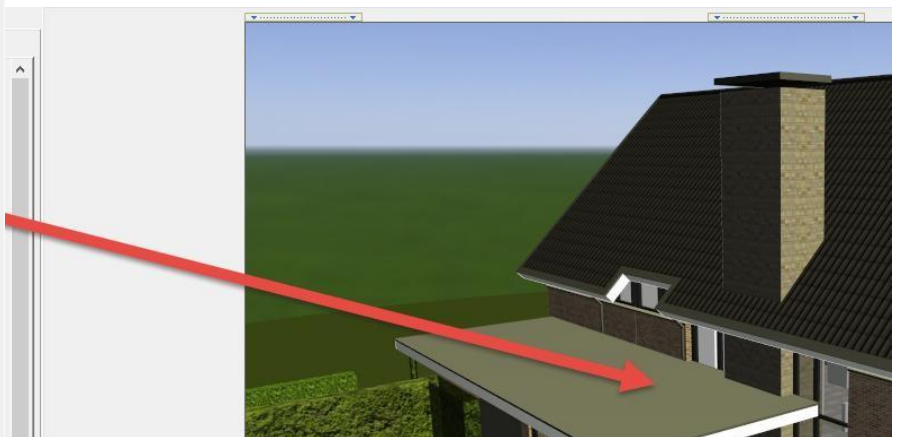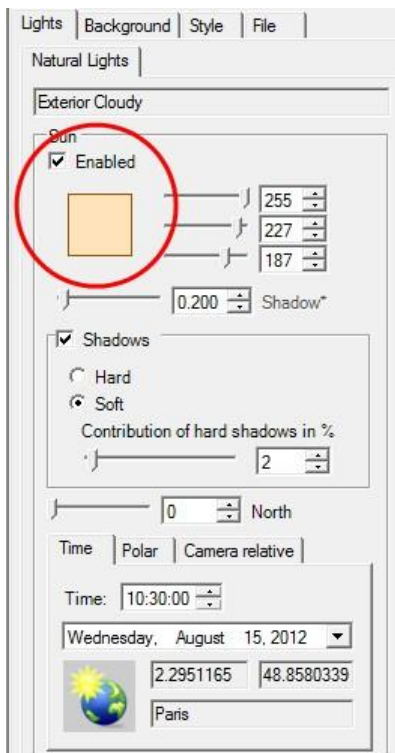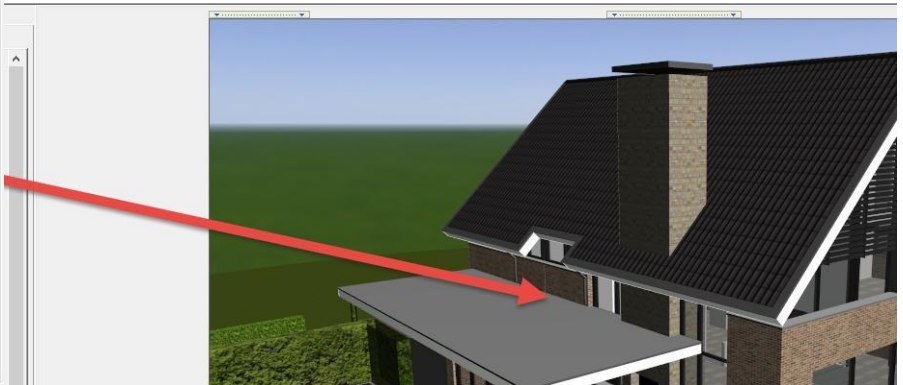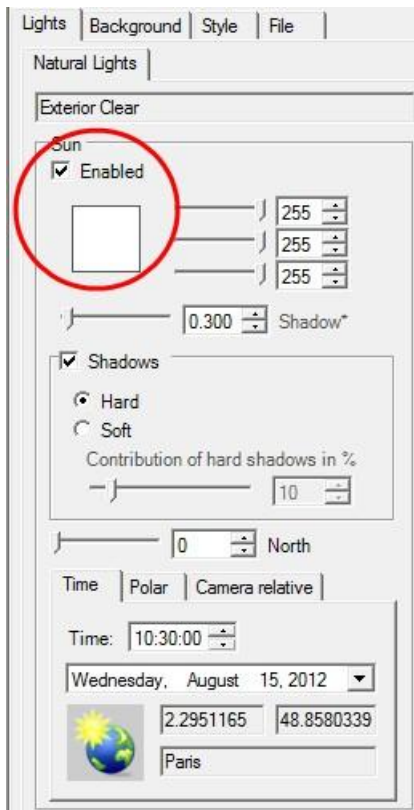
THE INTENSITY OF THE SHADOW AND THE POSITION OF NORTH

Changing the intensity of shadows will also alter the light intensity.

Changing the position of North will change the orientation of the sun.

In the Sun tab you can change Time / Orientation / Camera relative:

THE TIME

Thanks to a Google maps plug-in you can give the exact date, time and location in order to calculate the exact position of the sun at a specific time. Google maps allows you to determine a specific position.
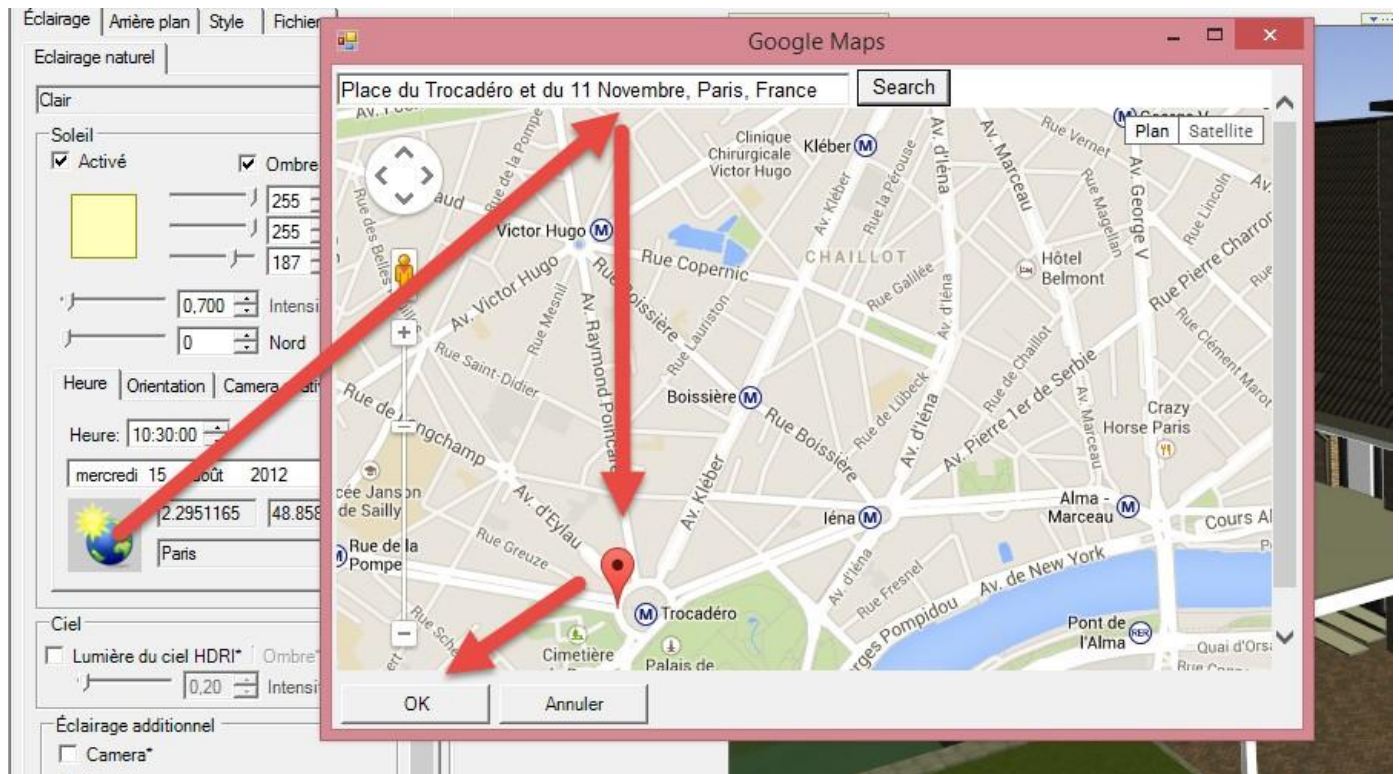
CONFIGURING THE SHADOWS
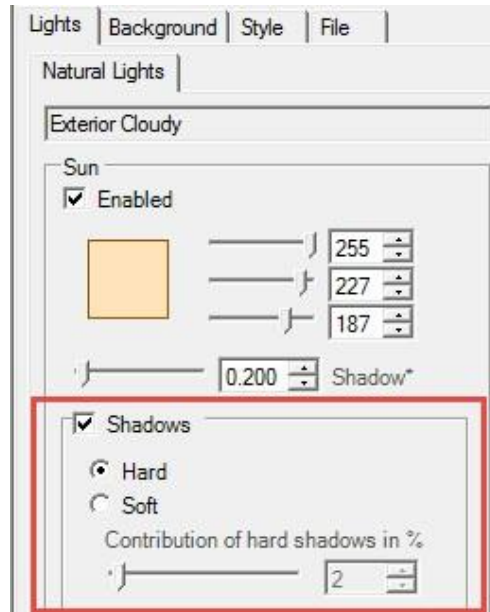
- This command allows you to configure and adjust the shadows created by the sun. There are two choices:

- Strong: the shadows are sharp and suitable for simulating a sunny day and highlights the strong shadows.

- Soft: the shadows generated are gentle and gradual and vary according to the projection distance. This creates a gradient effect that adds realism to the final render.

THE ORIENTATION:

This tab allows you to adjust the horizontal position (orientation) and vertical position (zenith) of the sun with respect to your model.
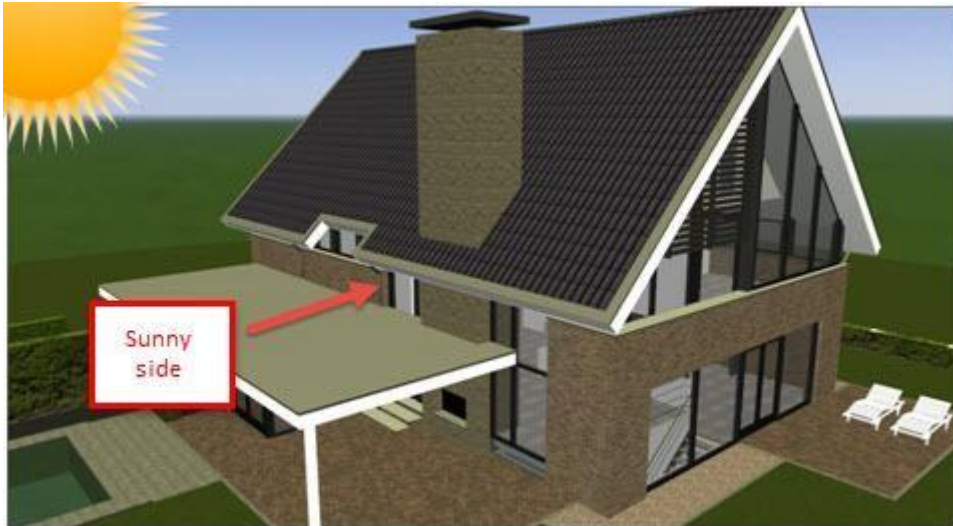
THE ZENITH

This is the vertical position of the sun relative to your model.
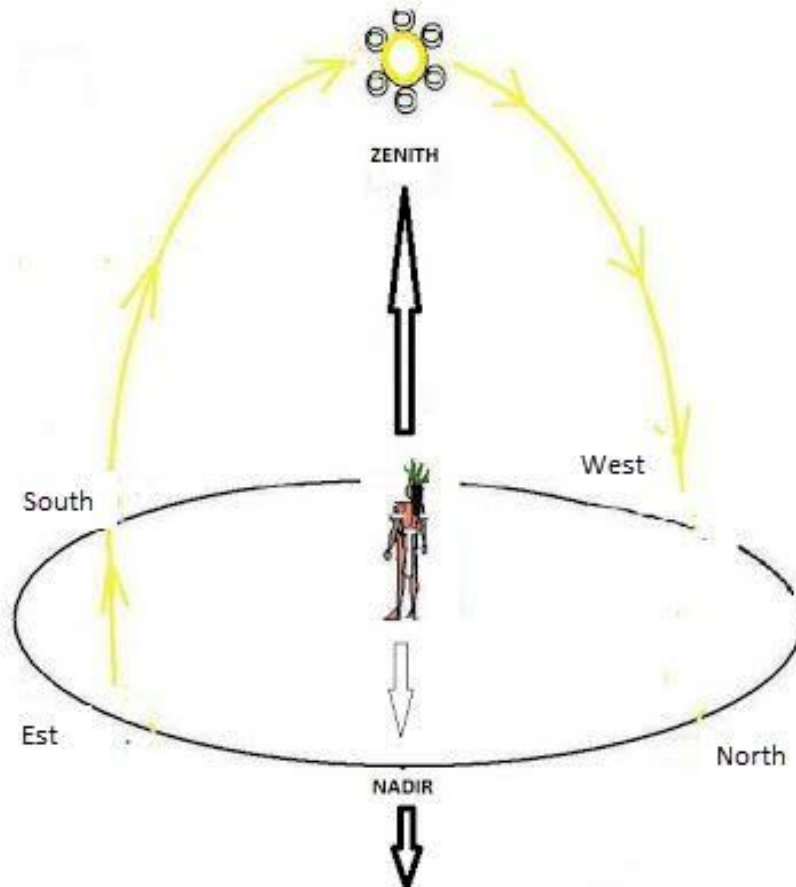
You must play with these two parameters for the desired shadows and light level.

CAMERA RELATIVE
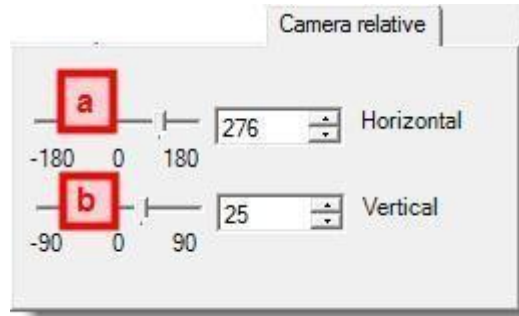
The Camera Relative determines the deviation of the sun relative to the position of the camera.

a) The first option indicates the angles between the sun and the camera.

b) The second indicates the elevation of the sun from the horizon (if the input is 0°, the sun rays will be parallel to the XY plane).

PRE ESTABLISHED STYLES

T h e   f r e e d o m   o f   3 D e s i g n

These different styles are pre-made settings to simulate a time and type of day.

The modified parameters are the colour of the sun (refraction) and the intensity of the light emitted.

The "clear" template is perfect for working in daylight.

Example:

- Clear:

- Evening:
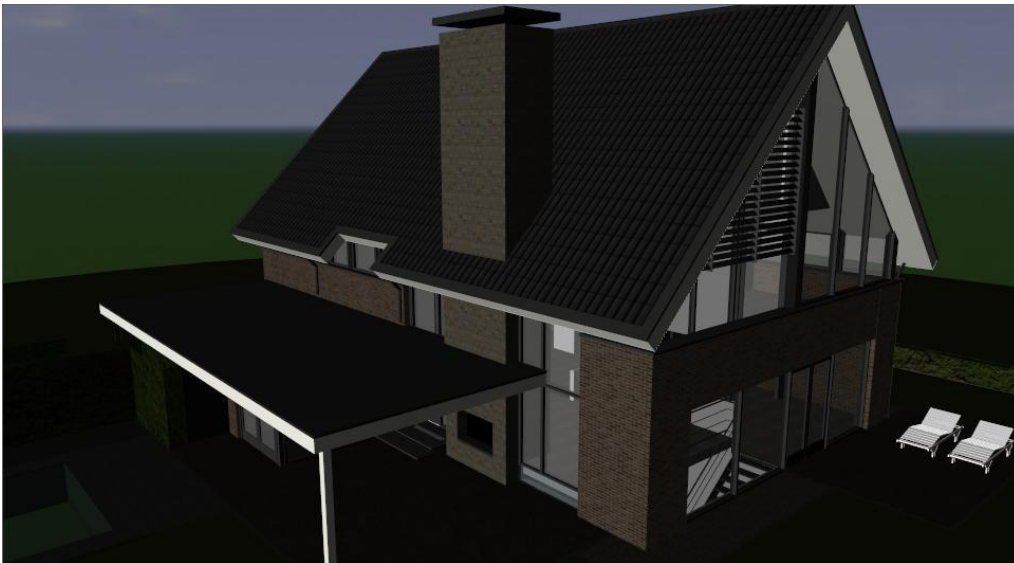
THE SKY

In ARC+ the light emitted by the "sky" is called HDRI (High Dynamic Range Imaging).

This is a numerical technique to simulate several light intensities in a drawing.

The purpose of this light is to illuminate the model from all angles and not with parallel rays.

Note the * sign present. This means that this parameter will only be visible by launching an Offline rendering.

Take the example of a sphere:

- Using sunlight with a clear orientation:

- With HDRI light, shadows are uniformly distributed on the model.
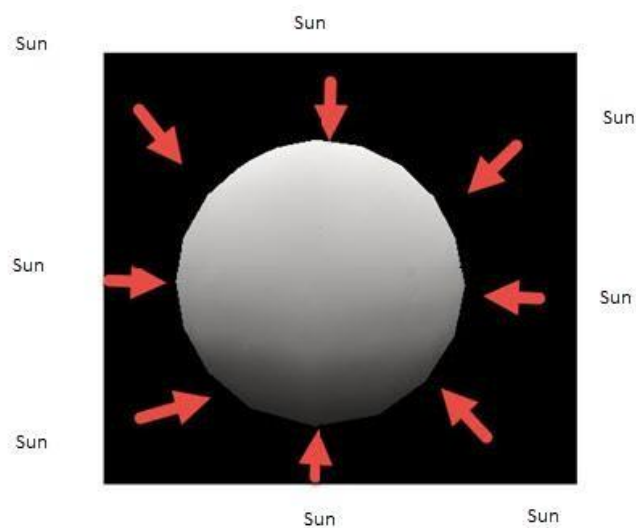
ADDITIONAL LIGHTING

CAMERA

If you want, you can set the camera (the eye with which you view your model) so that it emits light. This can be useful when you want to increase the intensity of a small portion of your model.

This is an Offline setting (*)

AMBIENT

This parameter allows you to increase the overall brightness of your project. In other words, all materials present will be lighter.

This is an Offline setting (*)

THE BACKGROUND

Another option for the Render is to change the background to reach a more realistic effect..

The following options are available:

COLOUR
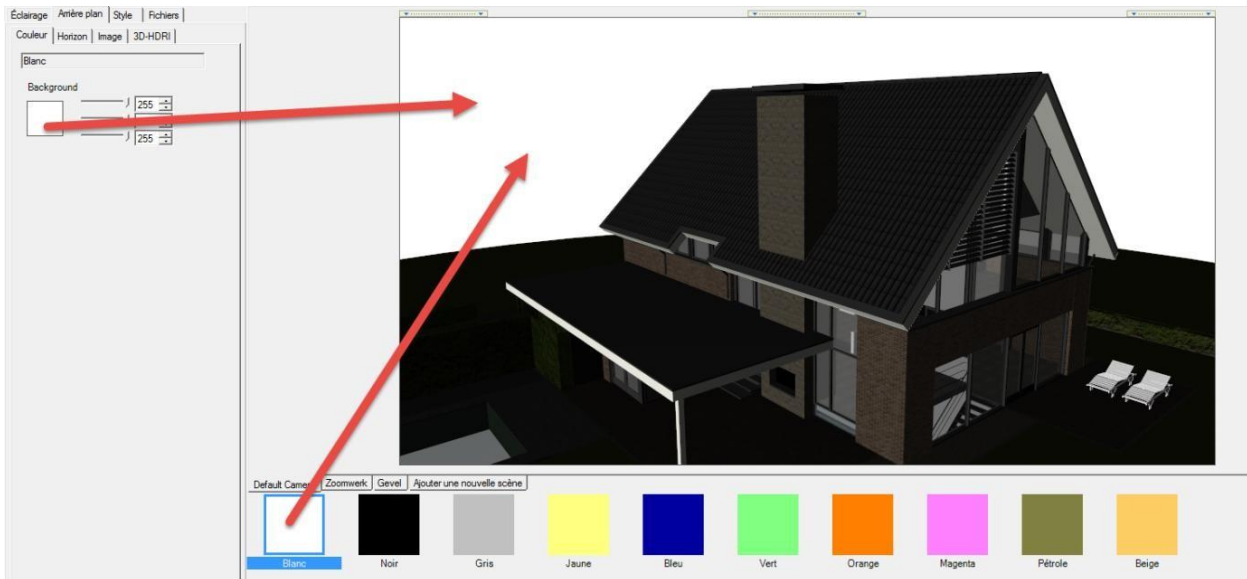
HORIZON
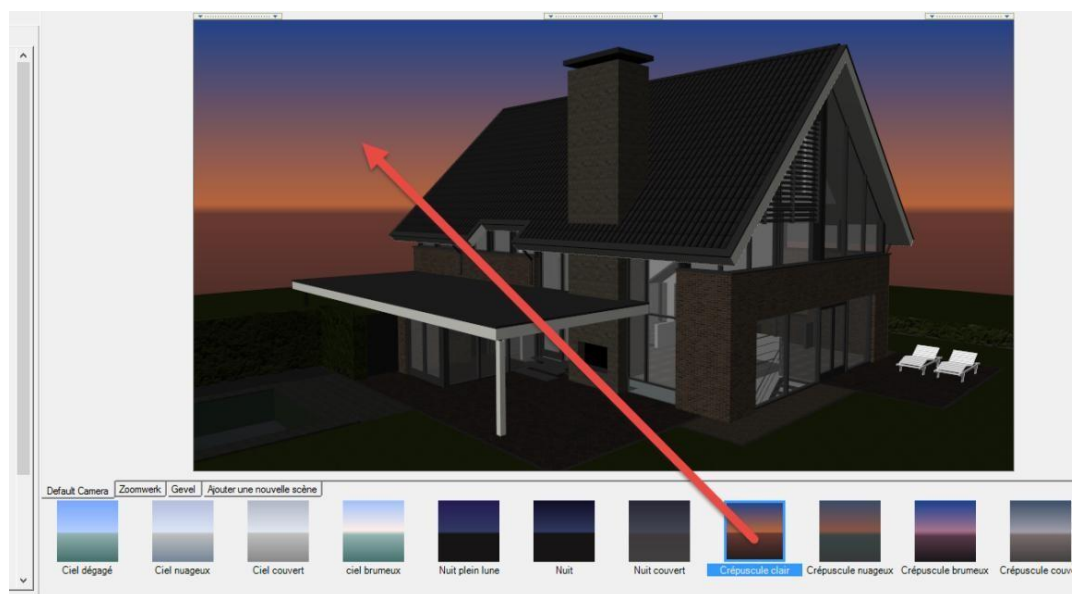
There are pre-set styles, however you can choose to customize the horizon by adjusting different colours and the reflection of these in your model.

IMAGE

Choose an image from the library. This library is just an overview of available images. You can easily download them from the internet and place the image in the folder:

C:\ARC+ X8 Edition\RESOURCE\LW \smdata\textures\Textures_2012\backgrounds
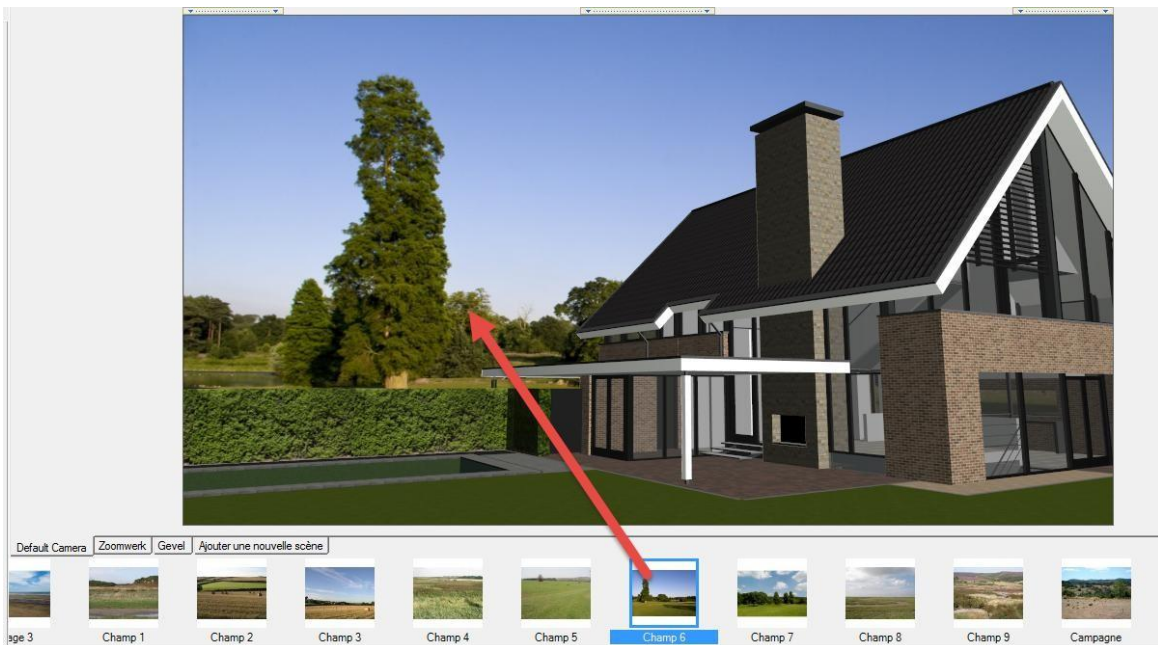
Warning, the background images do not emit light!

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3D HDRI

HDRI images have the distinction of having a definition range of light much larger than that of a basic picture. Another peculiarity is that, unlike a normal image, each HDRI pixel emits light. Thus, each material can according to the settings reflect the image that surrounds it:

The user also has the possibility of the image rotating around the model while keeping the position of the sun and north.

STYLE

This interface allows you to change settings that will be visible in your final report (offline). They are not visible in real time, but are very important because they determine the final result.

PHOTOREALISTIC

Before generating your final render (offline) it is preferable to select the desired final quality.

Two options are present:

- Exterior (Preview to Best)

- Interior (Preview to Best)

These templates automatically adjust the values of each of the parameters in the Quality tab.

To apply a style, simply select it using the left click of your mouse and drag it onto your model.

You should know that the final calculation time depends a lot on these parameters and the performance of your computer. If your processor is more powerful, the time of calculation is shorter. The power of your graphics card is important when you use the real-time GPU mode.

QUALITY

You can choose between **Ray Tracing** and **Radiosity**, which are two different algorithms. Simply put, a Ray Tracer is suitable for calculations taking into account parameters such as the refractive light, shadows and reflections. Radiosity takes more into account the interaction between materials according to the angle of the received light intensity and the nature of the material.
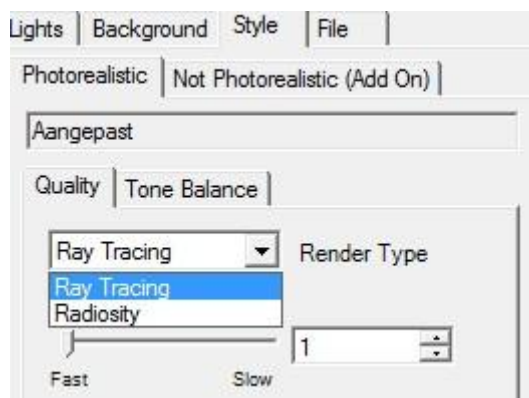
Imagine two sealed walls - a red wall and the other white. If these two walls receive light, you see on the white wall a reddish effect, which is a reflection of the red wall on this one and vice versa. Thus, each wall, when it receives light, retransmits a part of the light. Radiosity calculations will show this type of effect because this algorithm takes into account the so-called "second enlightenment" or how materials can emit light from the light they receive.

To conclude, there is no perfect calculation. Each calculation is suitable for one type of model, light and material. Through the chemistry of all these parameters, you will achieve the desired effect, without necessarily using the most efficient algorithm result.

AMBIENT OCCLUSION

This concept has been seen before; it creates a nice effect at walls / floors joining etc … In fact, when two surfaces are close together, the light intensity at that specific location decreases.

DETAIL PRECISION
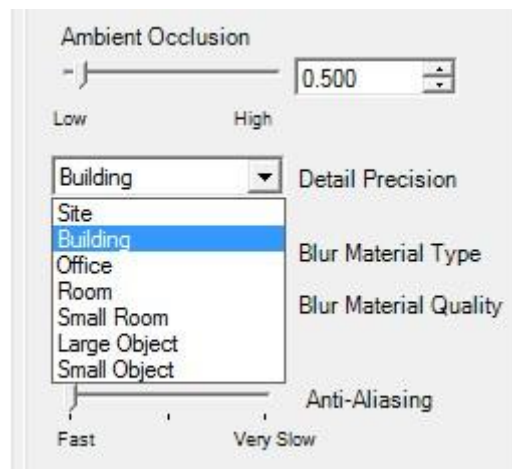
These parameters influence the calculation time for the rendering. Indeed, with a model the size of a building, there are fewer parameters to calculate than on a small object when we want to show every detail. You also need to take into account the zoom. With a large model, the size of a building, you should use less zoom so you can see the whole model. In this way, small details become less important because they are less visible. However if the user wants to focus on a small part of the model containing multiple objects whose effects can interact with each other, then it is preferable to increase the quality of the calculation.

BLUR MATERIAL

This option is very important. It allows you to see more realistic reflections of light from flat surfaces which in reality are not.

Take the example of a floor. The texture of a floor is flat but slightly rough. Therefore, this surface will reflect light in a non-uniform way, to give a more realistic effect.

We are talking about the quality of blur because the result gives the impression of some fuzzy areas on the surface in question.

Here is an example of ground with "blur quality" option enabled. The light reflected by this surface is not uniform.

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ANTI-ALIASING

Aliasing is an option used to make the edge of sloped shaped objects smoother and better defined. This is necessary because computers are not able to create smooth curves. The more you zoom, the more the 'stairs' effect is visible. However, you can reduce this effect with the Anti-aliasing option. The model is recalculated using the performance of your CPU and your system can become slower.

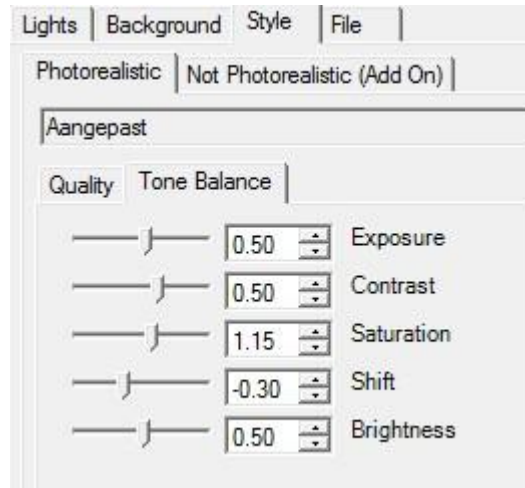o   Anti-Aliasing disabled

o   Anti-Aliasing enabled
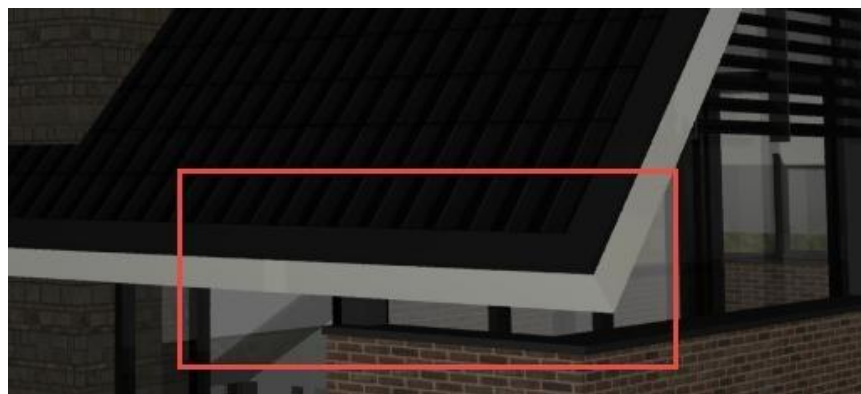
TONE BALANCE

This interface allows you to change the global settings of light and colour of your model in offline mode.


EXPOSURE

This is probably the most important parameter. Since real-time parameters are only an overview of the expected results, you can view them in offline mode. It is possible that in the offline mode, the brightness is reduced. You can increase the exposure to increase overall brightness.

CONTRAST

This option allows you to increase/decrease the contrast.

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SATURATION

This command allows you to change the saturation of an image. The saturation process intensifies the colours.
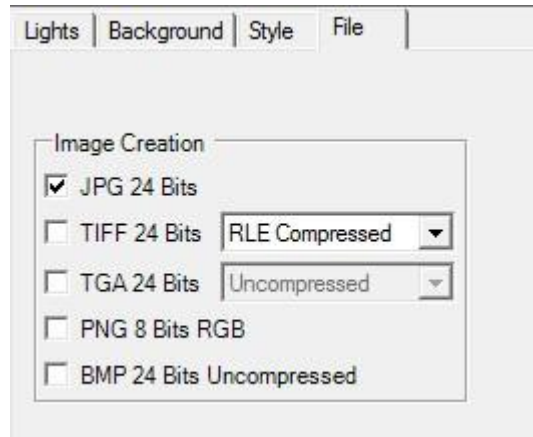

Before   **After**
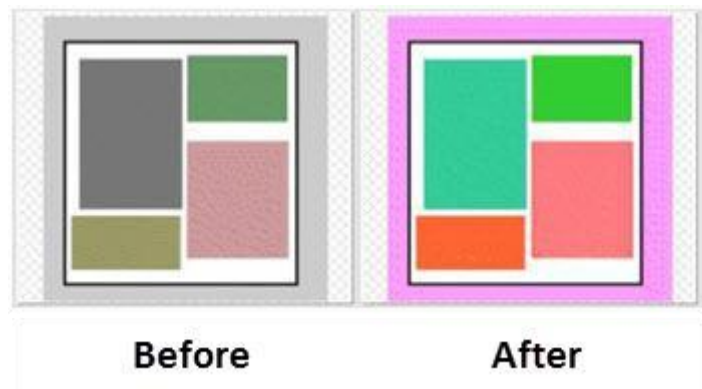
SHIFT

You can change the colour according to the spectrum that you choose. Put simply: This command allows you to adjust the colours of an image.

BRIGHTNESS

This command allows you to change the brightness of an image.

o   When the value is greater than zero, the render is brighter.
o   When the value is less than zero, the render is darker.

**Before**   **After**

FILE

This tab allows you to determine the file format in which the final report will be generated.

RENDER INTERFACE FINAL REPORT

It is through this interface that you can generate your final render. This rendering is made offline.

The algorithm is more efficient and therefore takes longer. It is through this interface that you can view the report which you will

get at the end.

There are 3 types of offline rendering:
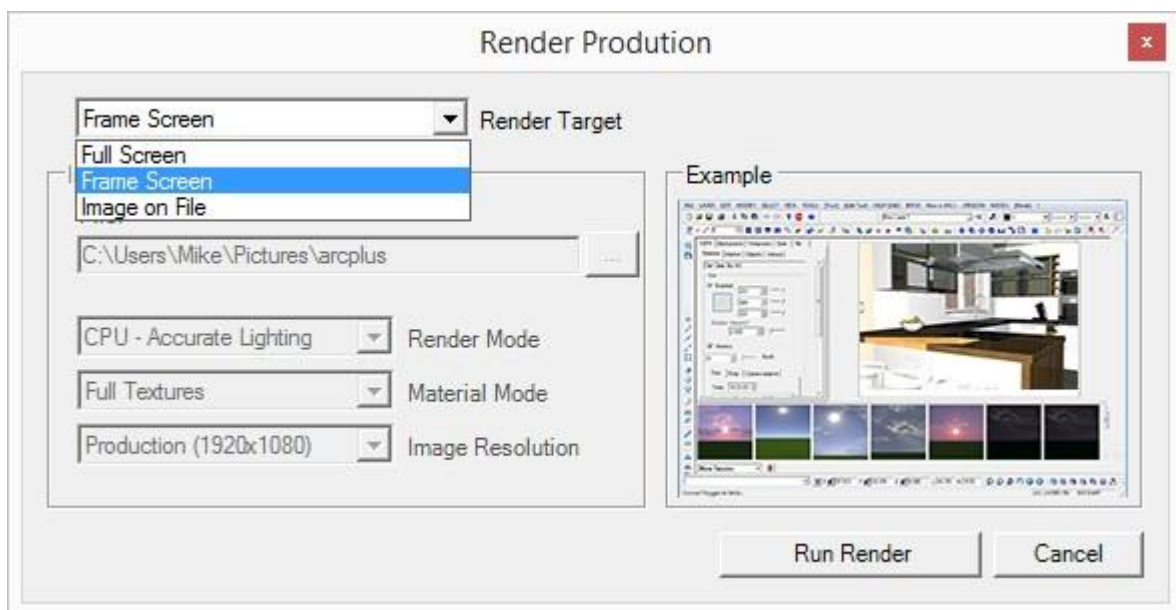
FULL SCREEN

This modes shows one image on your full screen, chosen from the camera setting.

The f r e e d o m o f 3 D e s i g n

FRAME SCREEN

This mode is similar to the full screen mode, except that it displays the rendered result in a window.
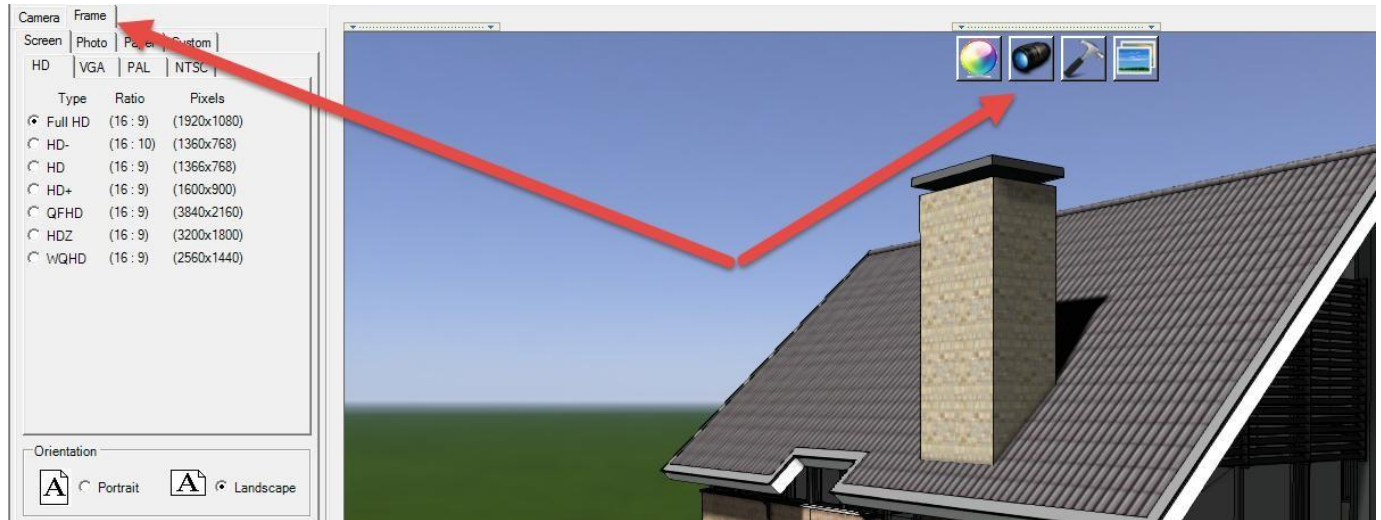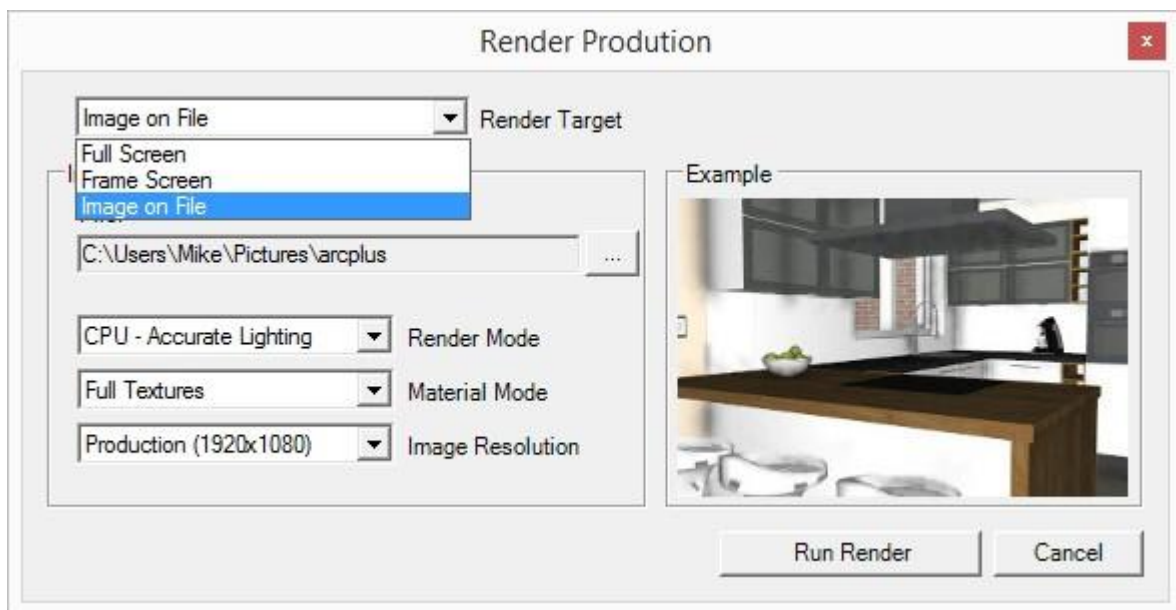

IMAGE ON FILE

It is through this mode that you can generate the final report in a file and share it. Of course in the full screen mode you can also save the report but you must use the Print Screen on your keyboard. However, this method generates a more accurate result and uses all the performance of your processor (CPU).
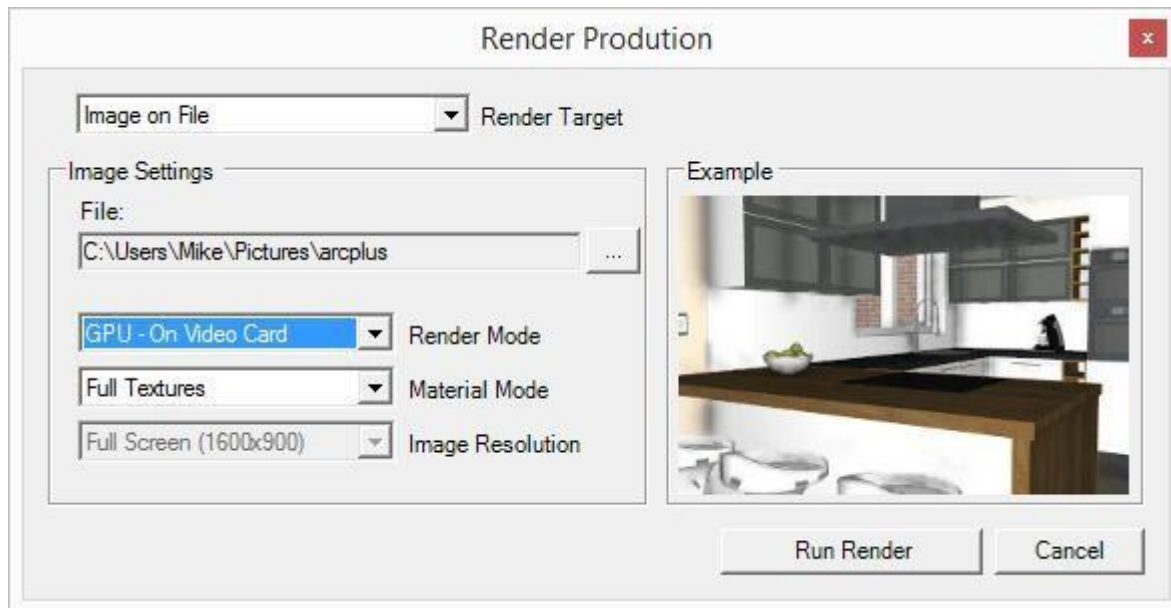
Depending on the chosen style (Lighting / Style) the calculation time can be different.

Example:

With a 64 bits RAM / 16GB operating system / Intel Core i-7, the calculation at maximum performance is between 15 - 45 mins, depending on the size of the model and details.

Three rendering modes are available:

GPU

The performance of your graphics card (GPU) is requested and the calculation is faster than calculation CPU but the result is less detailed (diffusion, transparency etc...).

CPU SIMPLE LIGHTING / ACCURATE LIGHTING

It is this mode that will generate the best results. However, the computation time is slower.

MATERIAL MODE

You then have different types of structures:

- FULL TEXTURE

The final render shows all the texture of each material you are using. It is the mode that will give you the most realistic results.

-GEOMETRY COLOUR

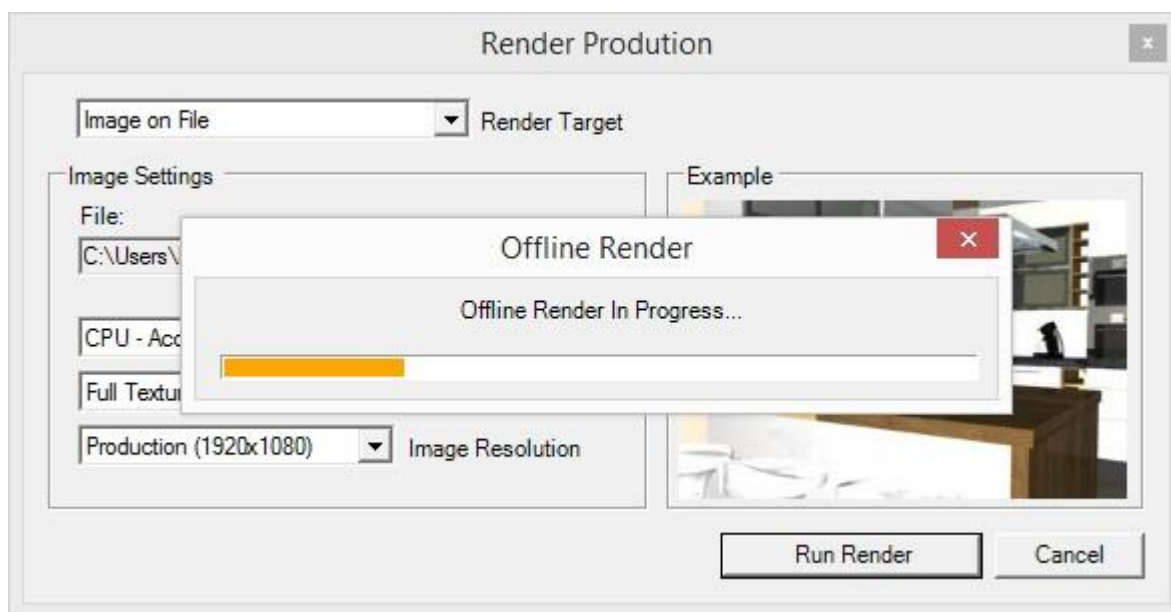Your final render shows the colour model of each entity.

-HIDDEN LINES

Your final render is shown with lines hidden.

IMAGE RESOLUTION

This option allows you to select the resolution of the generated image.

To generate the final report simply click "Run Render"

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While generating the report, all the performance of your processor is used by the external application BladeRenderX64.exe (64 if your system is 64bits). It is therefore normal that during the calculation your system is slower.

105 | P a g e   T h e   f r e e d o m   o f   3 D e s i g n
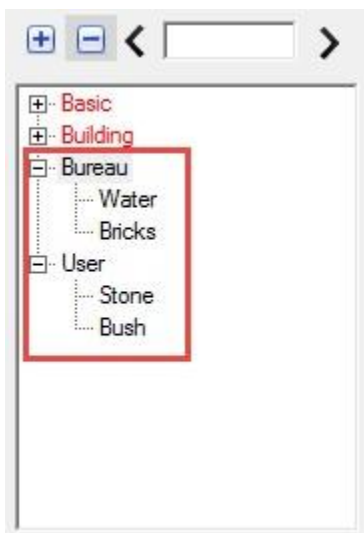
HOW TO SHARE MATERIAL WITH ANOTHER USER

We saw earlier that it is possible in ARC+ to create your own materials with you own textures (from images, for example).

Reminder: ARC+ offers the possibility to create your own materials in both "Desktop" and "User" categories.


o   When you create a material from an existing material in the ARC+ library, you can change its settings using the dropper. This modification will be saved in a new file. In other words, you can save this new material for use in other files. To do that, you must create a new material.

o   When you have created a material, you can share it and then it may be used in any other ARC+ project.

We will see all the operation:

There are two categories in which modification is prohibited - "Basic" and "Building" category. These two categories contain basic materials. Your new category has to be created in either "Bureau" or "User" category. Therefore, it will be possible to create your personalised library.
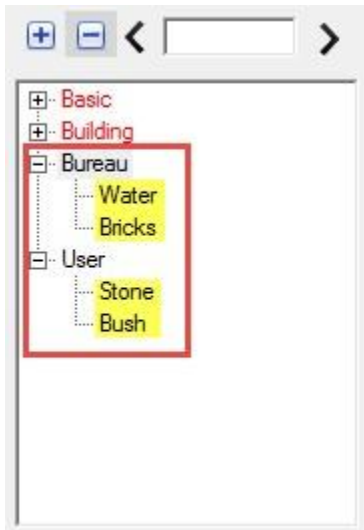
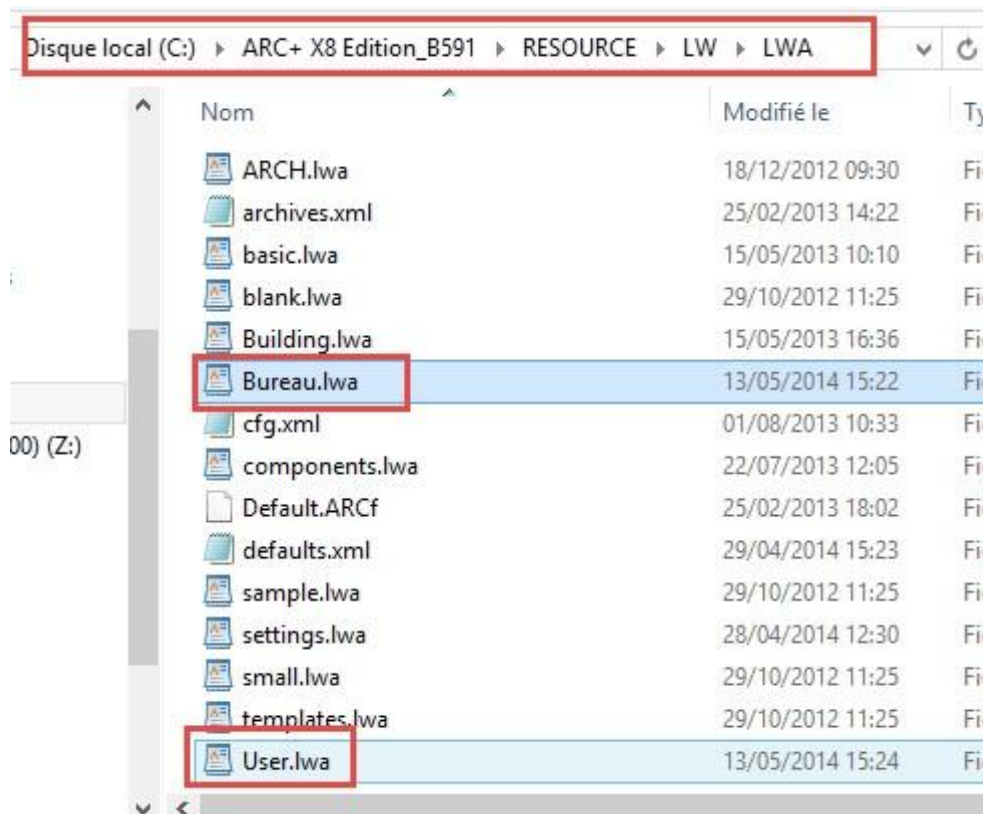Each of its categories contain materials created:
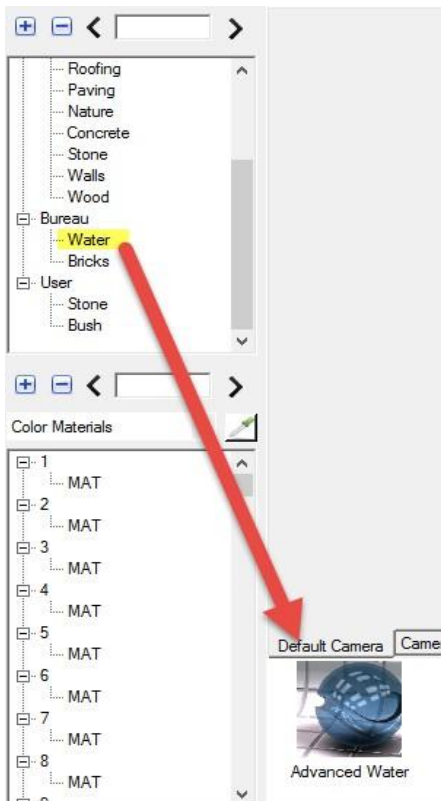
In order to share this new library of custom materials or simply transfer this ARC+ library to another PC, simply send the .lwa file that contains the same name of your category.

For example:

These two files are "User.lwa" and "Bureau.lwa" and are placed in the following folder:
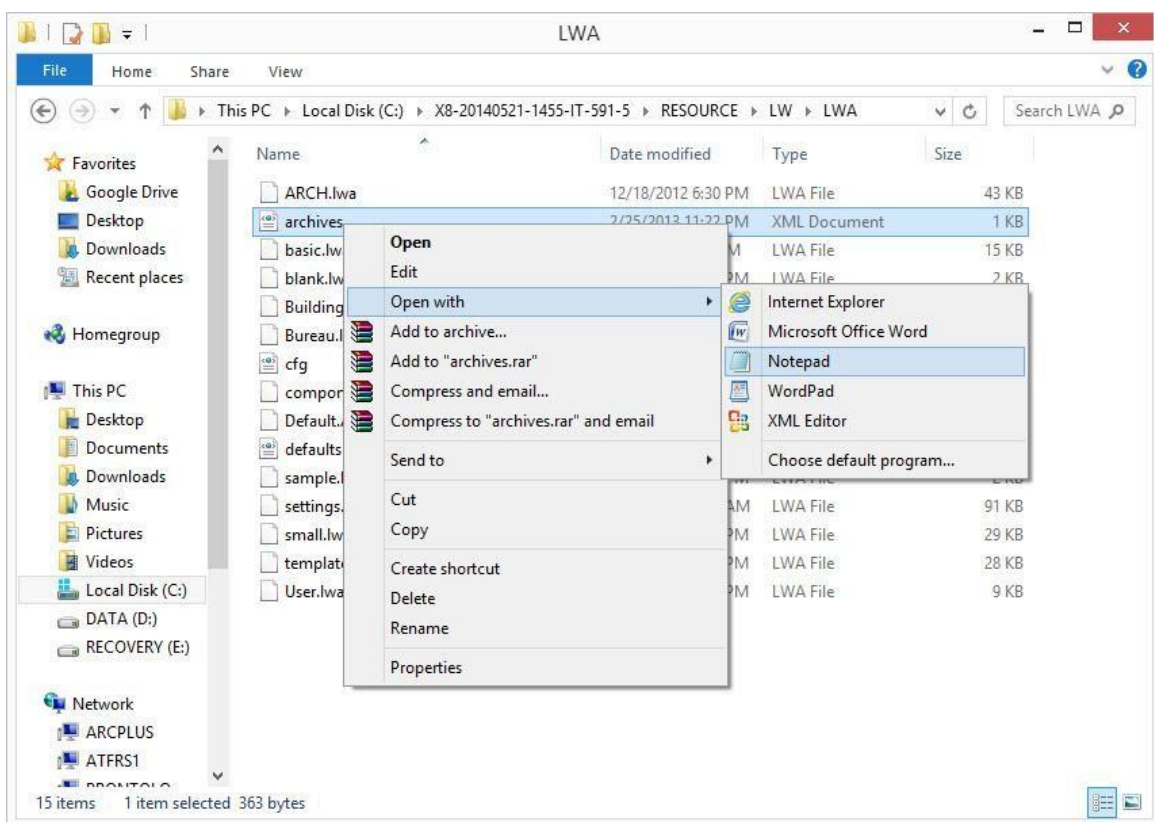
C:\ARC+ X8 Edition\RESOURCE\LW\LWA

HOW TO CREATE NEW MATERIAL ARCHIVES

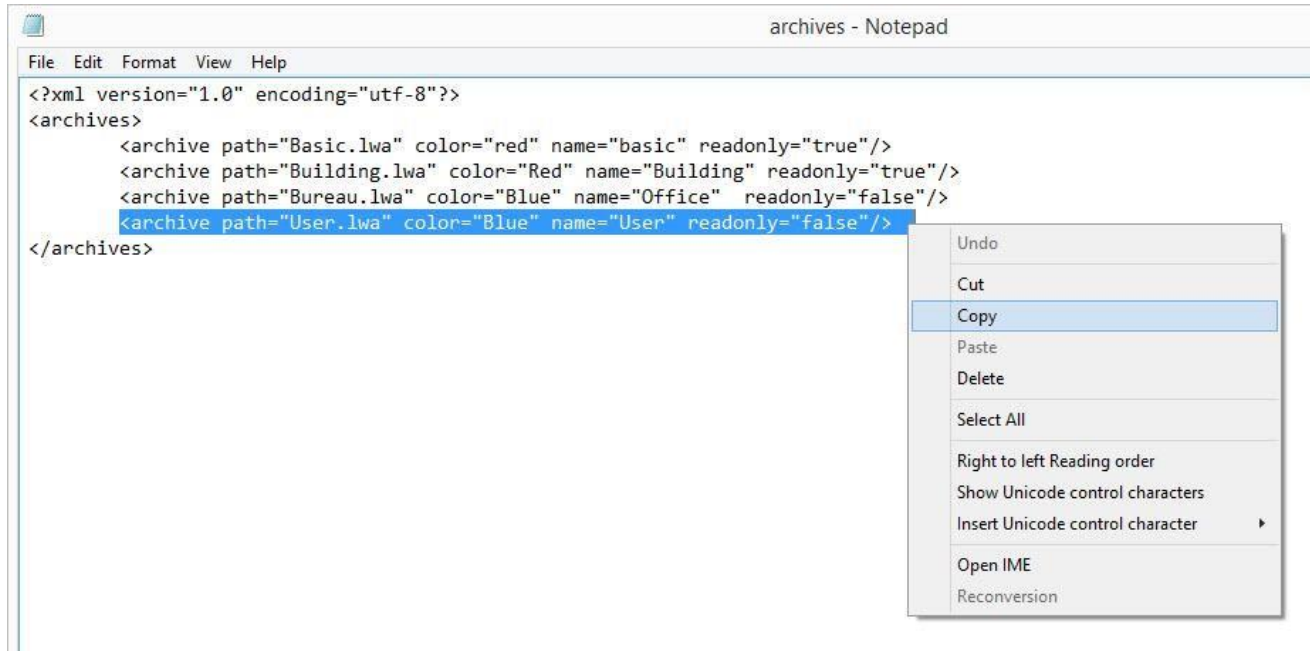To create new material archives, go to this folder:

C:\ARC+ X8 Edition\RESOURCE\LW \LWA

Open the file archives.xml with a text editor (notes/wordpad/notepad etc.). This file contains the hierarchy of structures in the rendering mode.
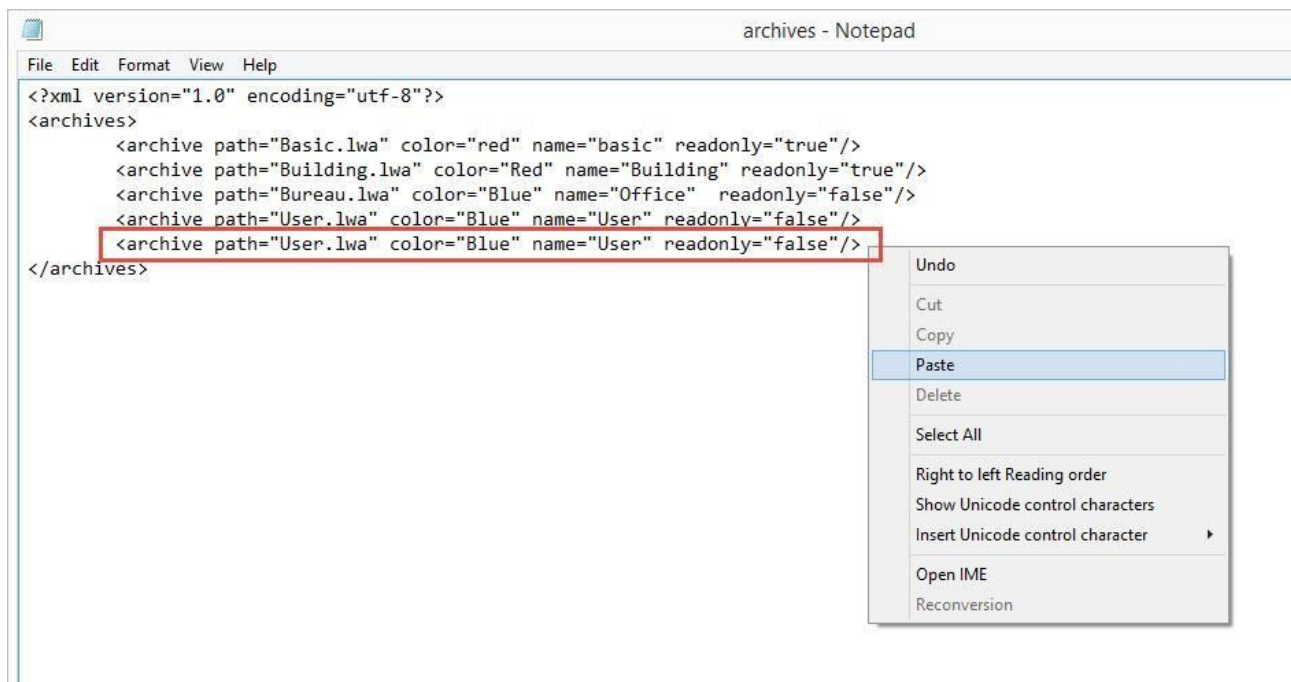
Open the file archives.xml:

1. Select a line, then copy and paste it.


2. Paste this line under the last one.

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3. If, for example we want to call the new archive 'nature', we have to rename these two words in speech marks.


4. Save and close the file.

5. Now it is necessary to create a new file that is called Nature.lwa, which will contain the definition of your new materials. To do that, select the file User.lwa or Bureau.lwa, make a copy and rename it Nature.lwa.
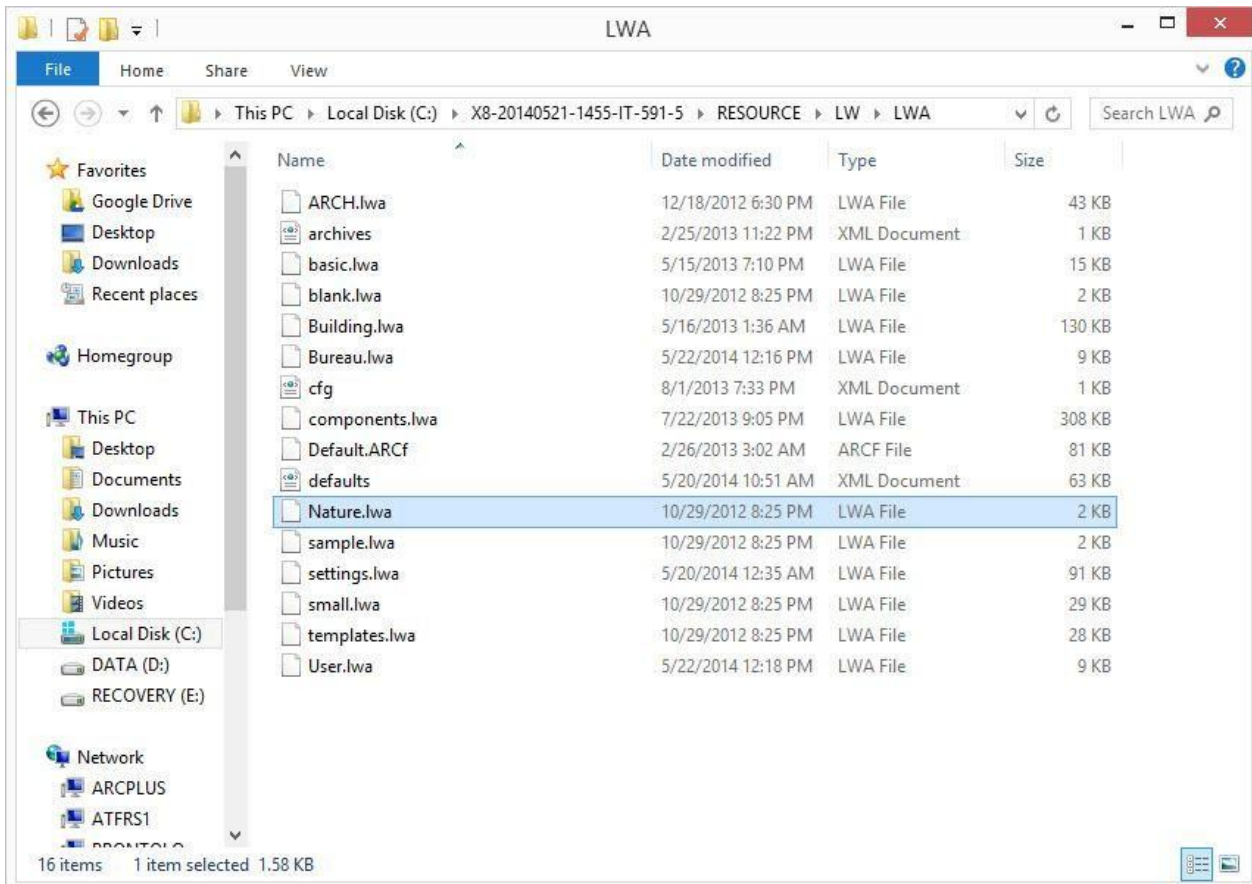
Be sure that Arc+ is closed during this operation. Also, never change the two lines with "Basic" and "Building" categories, because it could be irreversible.

6. Open ARC+ and go in Render mode. You will see the new 'Nature' archive. This now contains the material you copied from the original User.lwa. To delete them, it is possible to do it directly in Arc+.
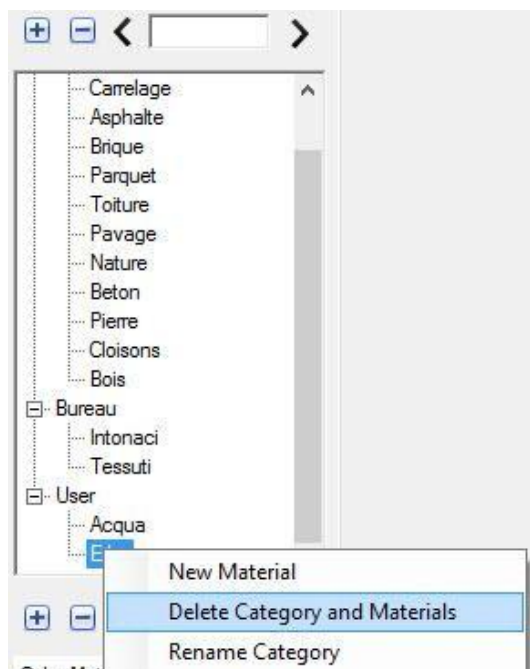
THE CONNECTION BETWEEN MATERIAL AND TEXTURE

We saw before that the materials could be created from modified textures taken from a picture. These images must be copied into the following folder:

C:\ARC+ X8 Edition\RESOURCE\LW\smdata\textures\Textures_2012

This folder contains images that are possible to use for textures. When we create a material, Arc+ remembers the pathway of the file. This path is fixed and included in the file. If, by mistake, you change the position of the image, Arc+ will not be able to find the image. Therefore, it is better to keep all your textures and images in this folder.

1. Create a personal folder under the folder 'Textures 2012', for example PERSO:
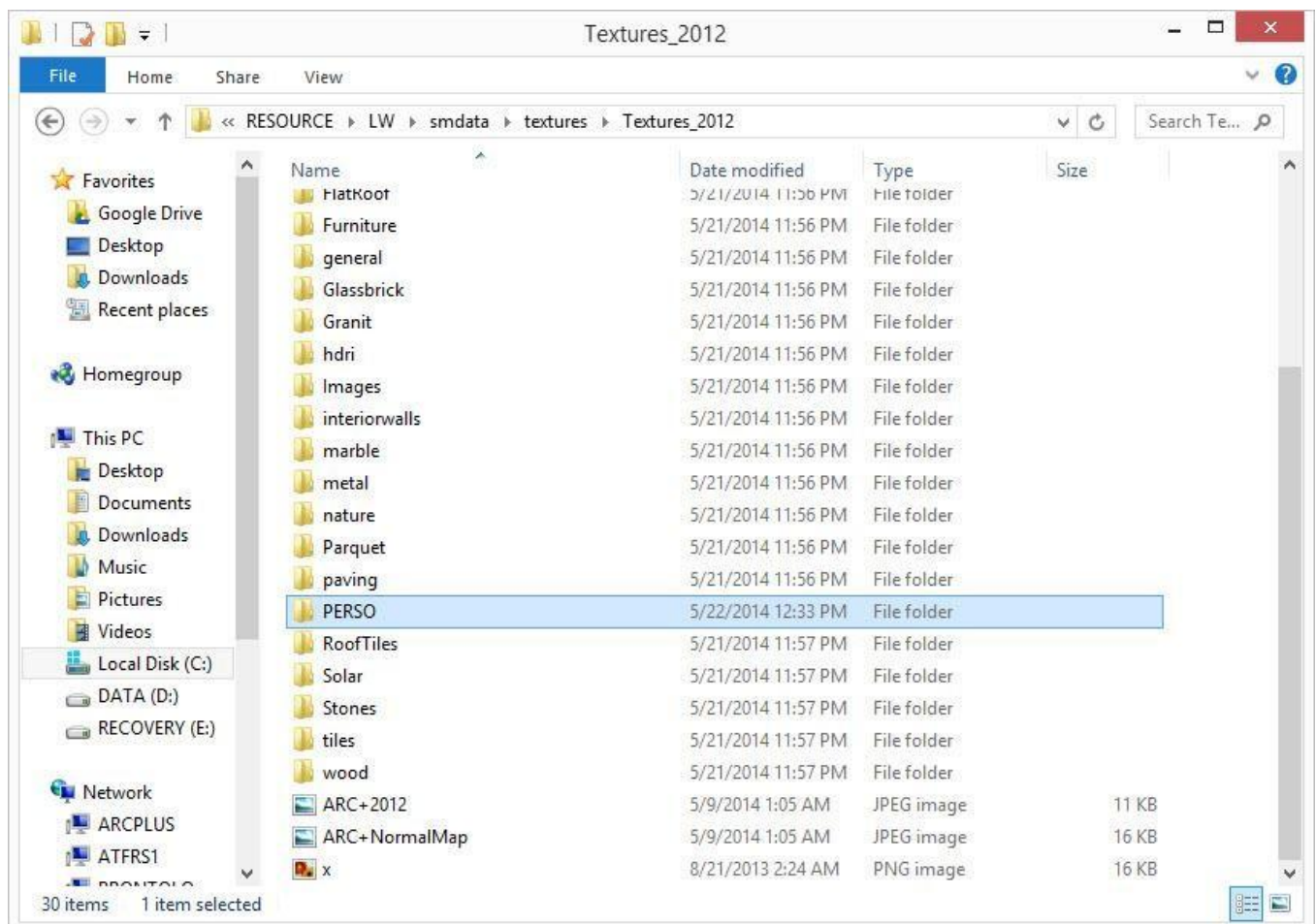
When you create a material from an image, copy and paste that image into this folder. After, when you create a material, you can select this image from the PERSO folder.

SHARE YOUR MATERIAL WITH ANOTHER USER

To share the material of a category, it is necessary to send the file .lwa of this category.

E.g. For the material in the "Nature" category, you need to send the file Nature.lwa.

Attention: If the other user has also created material in the same category, when they replace it, they will automatically all their own material from this category. Therefore, they will see your material, but lose their material. If you want to avoid this problem, it is better to send a copy of the .lwa file with another name, this way your friend will only need to copy the files to his folder.

How to complete this procedure, step by step.
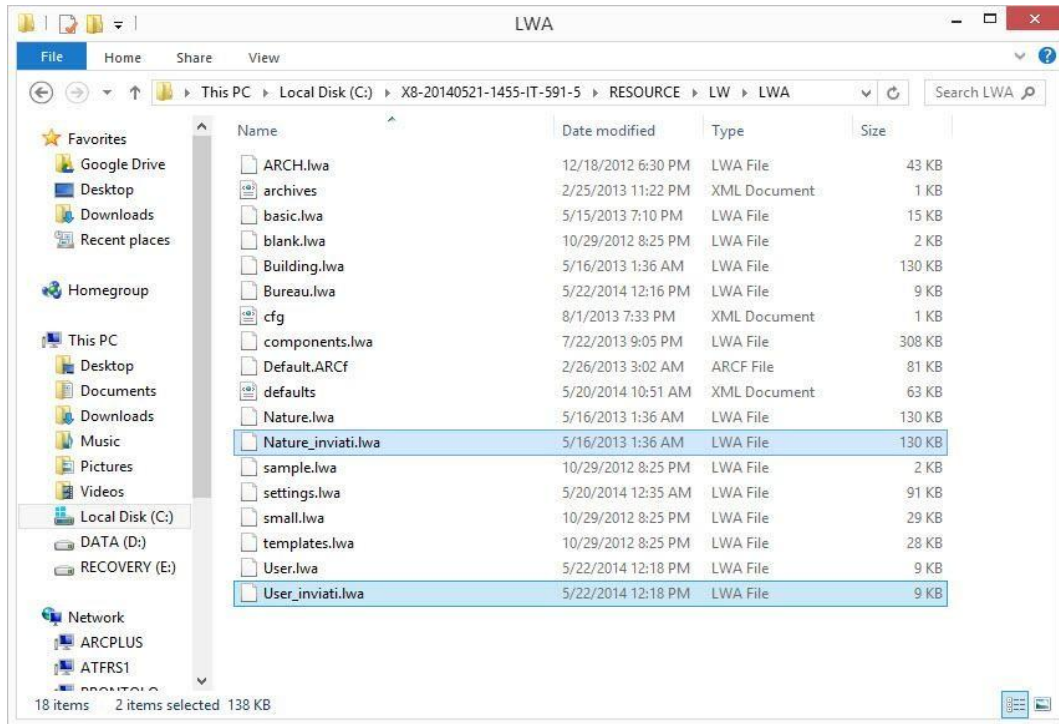
Imagine that you would like to send the Nature and User archives:

1.   Open Windows Explorer and go to the following folder:

C:\ARC+ X8 Edition\RESOURCE\LW\LWA
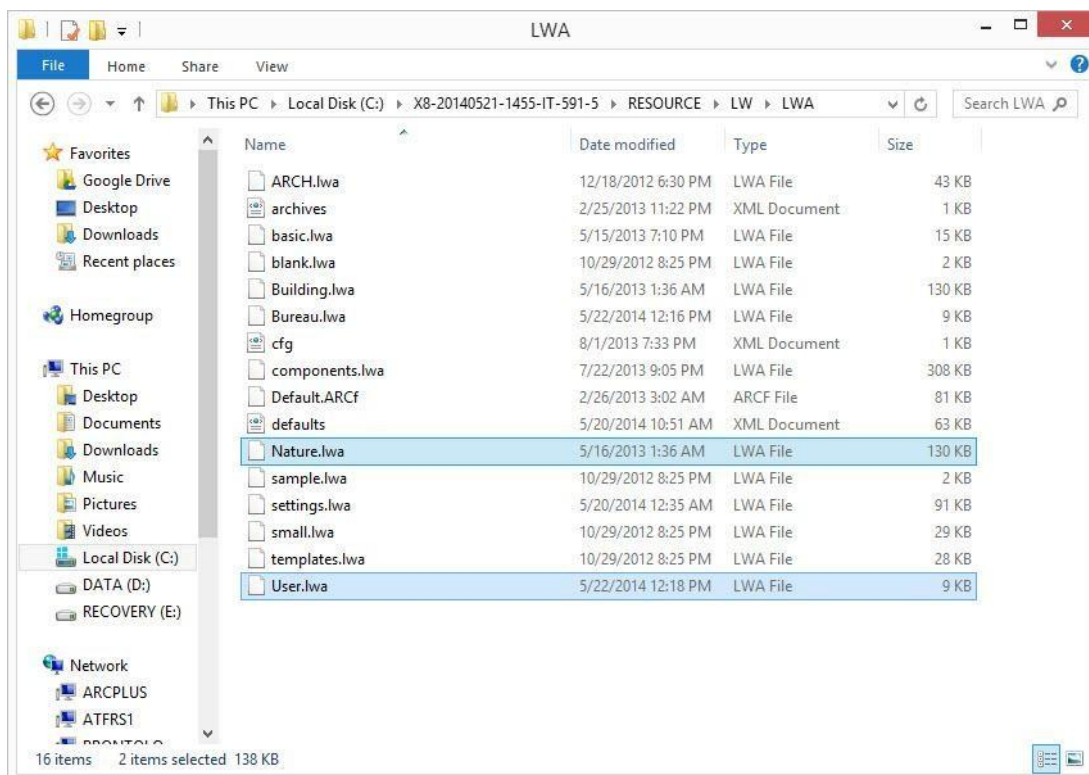
2.   We created our material in two categories, Nature and User. Make a copy of this file with another name (to avoid your friend losing their material).

Change the name, for example in this way: Nature_sent.lwa or User_sent.lwa

3.   Choose the folder where the texture that you want to send is.

4.   Make a Zip folder of everything and send it.

For example, my folder, PERSO, contains all the images that allow me to create all the materials kept in the User and Nature archives. Therefore, when we sent the files Nature_sent.lwa or User_sent.lwa, we must also send the folder with all the images. In your Zip at the end, you will have Nature_sent.lwa or User_sent.lwa and the PERSO folder.

RECEIVE MATERIALS CREATED BY ANOTHER USER

We can use the last example. Imagine that you want to receive material from the categories User and Nature from another user. We receive a Zip file containing:

- Nature_sent.lwa

- User_sent.lwa

- Perso.rar
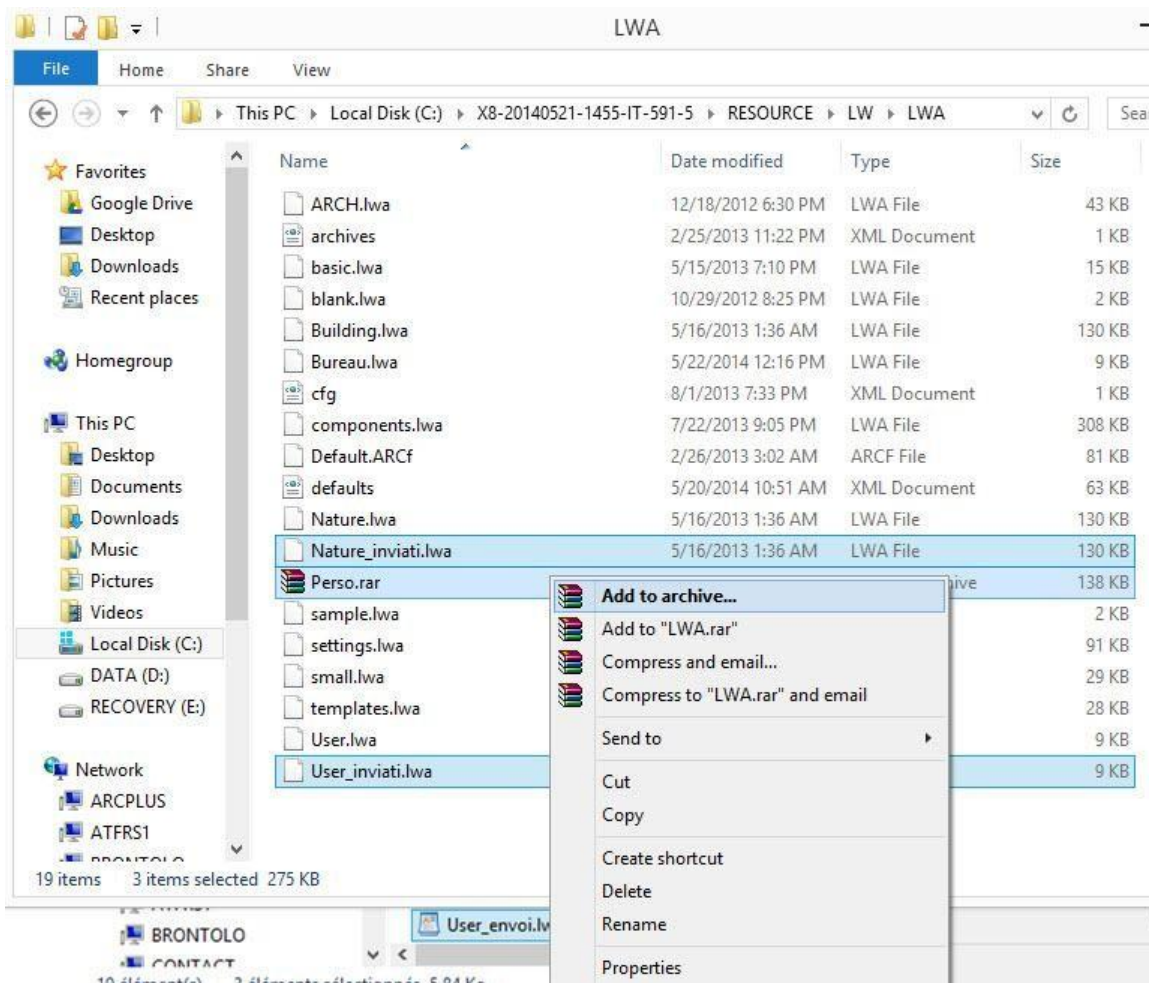
1.   Select the first two .lwa files – copy and paste them into your folder

C:\ARC+ X8 Edition\RESOURCE\LW\LWA

2.   Open the file archives.xml, present in the same folder

C:\ARC+ X8 Edition\RESOURCE\LW\LWA

Add the following lines:

3.   Copy the folder Nature into the file Texture_2012:

C:\ARC+ X8 Edition\RESOURCE\LW\smdata\textures\Textures_2012

Remember that Arc+ must be closed during this operation.

4.   Open Arc+, go into Render mode and now it is possible to use the material send from the other user.