ARCHLine.XP® 2024

Windows

INTERMEDIATE COURSE

Architectural and Interior Design

Tutorial

This tutorial was produced using Microsoft Word and ARCHLine.XP®.

Contents

What is ARCHLine.XP®?

We highly recommend the Intermediate Training Tutorial to our potential and current ARCHLine.XP® users who successfully completed the ARCHLine.XP Preliminary Courses.

The course contains 9 workshops:
Material management, Importing architectural plans, Save and manage large-size projects, KBB - Modelling and furniture design, Upholstered furniture based on profiles, Stairs and railing, Roof design, Visual design, Design phases.
After accomplishing these workshops, you will be able to execute more challenging and advanced design tasks.

Enjoy the successful design!
CadLine

Start your design and work with ARCHLine.XP®

This training material is a guidance to help you to become familiar with the typical interior design examples, and enables you to create more complex designs. To get the most out of the tutorial, run the ARCHLine.XP® program and the appropriate YouTube video to try those features and tools which can be found in this training material.

For most workshops you will need an initial project!
To complete tasks please download the Intermediate Course – Interior design – Workshop Projects 2024 from our website and install to your computer. This contains all projects for Intermediate workshops.

Workshop 1: Material management

1. Workshop: Material management

During this workshop we will take a look on one of the most important aspects of the work of interior designers:
How can we create good quality materials and textures for our plans that helps us present them even more realistically?
Let's see the following steps:

Creating material

- Creating new material from color
- Downloading new material from the Showroom
- Downloading new texture from the internet, from the manufacturer's website
- Creating new material from texture by copying or browsing the downloaded image file
- Creating and using Sprite

Material properties

- Material properties settings
- Render styes

Material / Texture editing

- Resizing and rotating material in 3D
- Editing a seamless pattern
- Material and texture coloring
- Materials with transparent background – Alfa channel
- Creating wall stickers
- Bump mapping with the pattern of the original image

Color cards

- Create a new color card
- Convert existing material into a color card

PBR materials

To complete tasks please download the Intermediate Course – Interior design – Workshop Projects 2024 from our website and install to your computer. This contains all projects for Intermediate workshops.
You can also find the video of the presentation on the website.

- Open ..\Documents\ARCHlineXP DRAW\2024\Workshop_Intermediate\1_Material_management\1_Material management_Start.pro file.

1.1. Create new material

We will create a new material from color or texture.

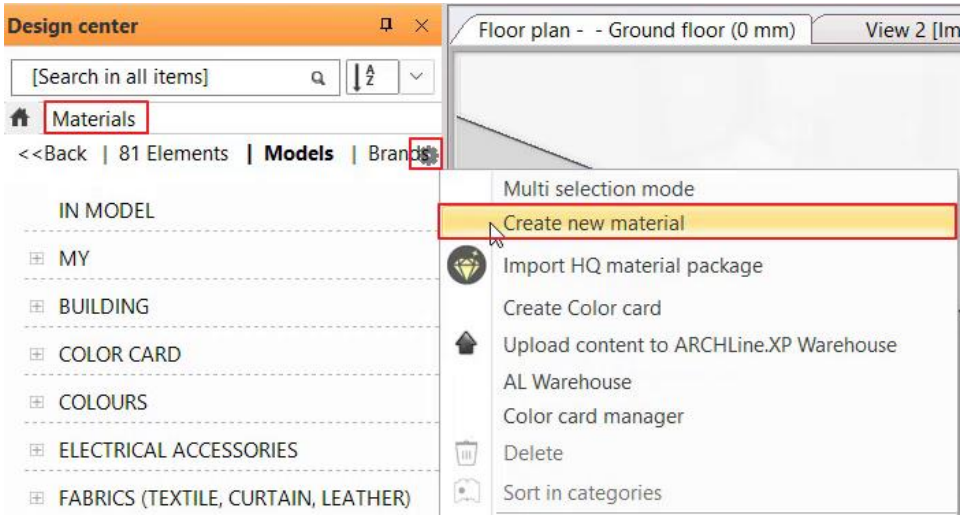
1.1.1. Creating a new material from color

Frist we will choose a color from the RAL color palette and we will use it as the basis of our new material.

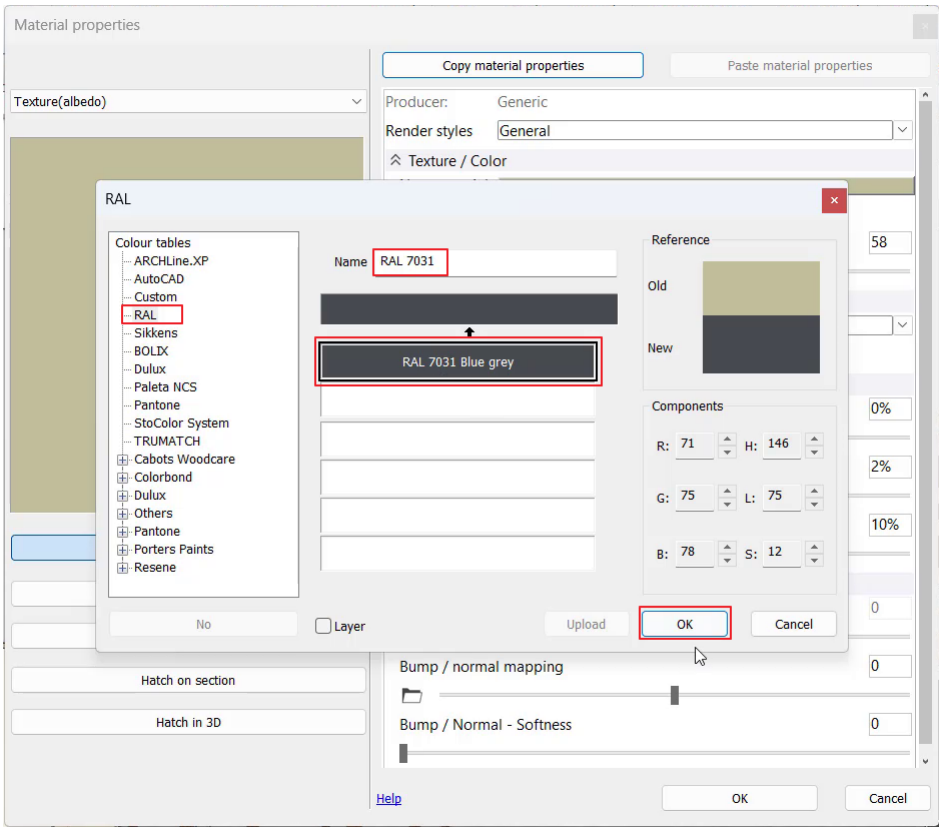
You can also search by name in the color palettes created by the manufacturers (RAL, Sikkens, Pantone, ...).
It is sufficient to enter the partial name, but you cannot search by color code.

In the example we will choose RAL 7031 Blue Gray.

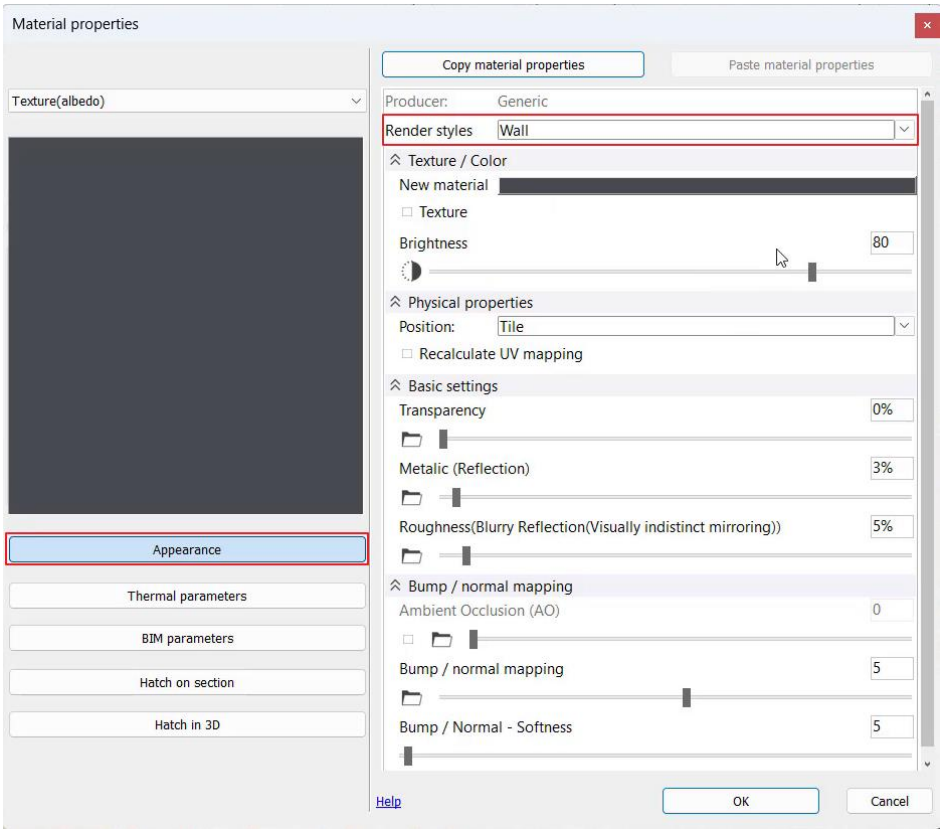
- In the Design Center select the Materials - Settings - **Create new material** option.



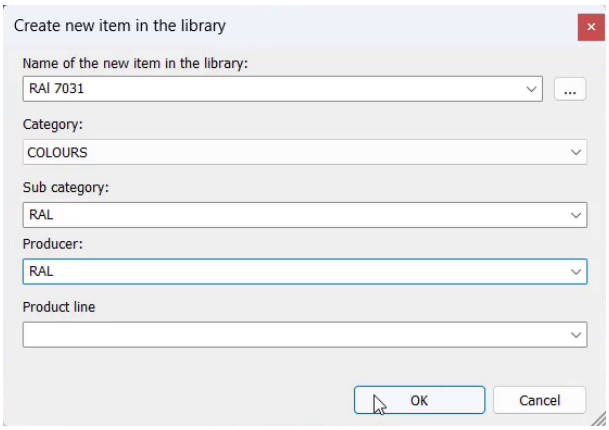
- Click on the color button, select the RAL color palette and type RAL 7031 in the search field.
- Click on RAL 7031 Blue Gray.



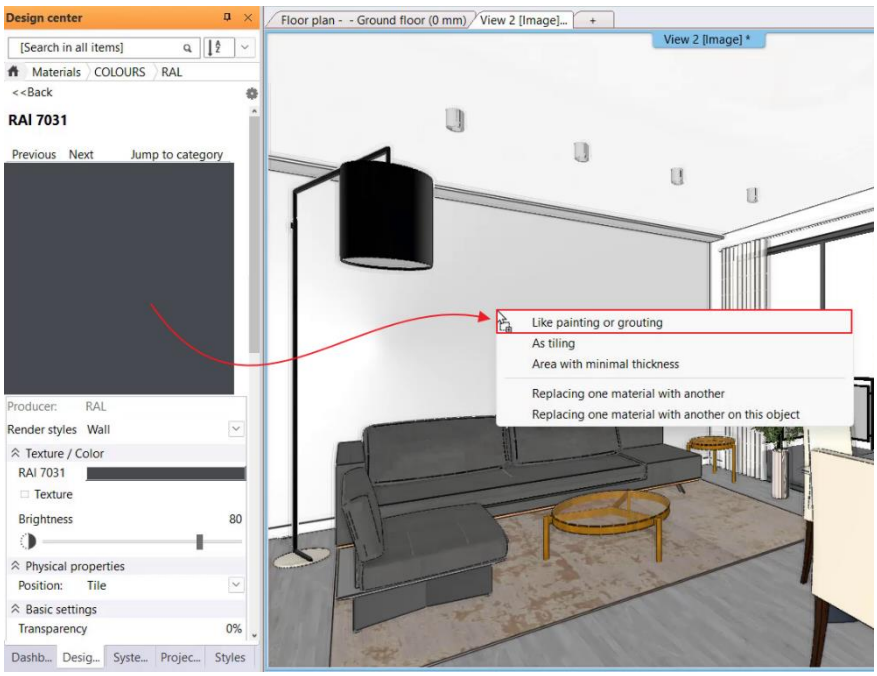
- Select the Wall render style at the Appearance tab.
  The RAL color name will appear in the window.



- After pressing OK, save the material to the appropriate category:



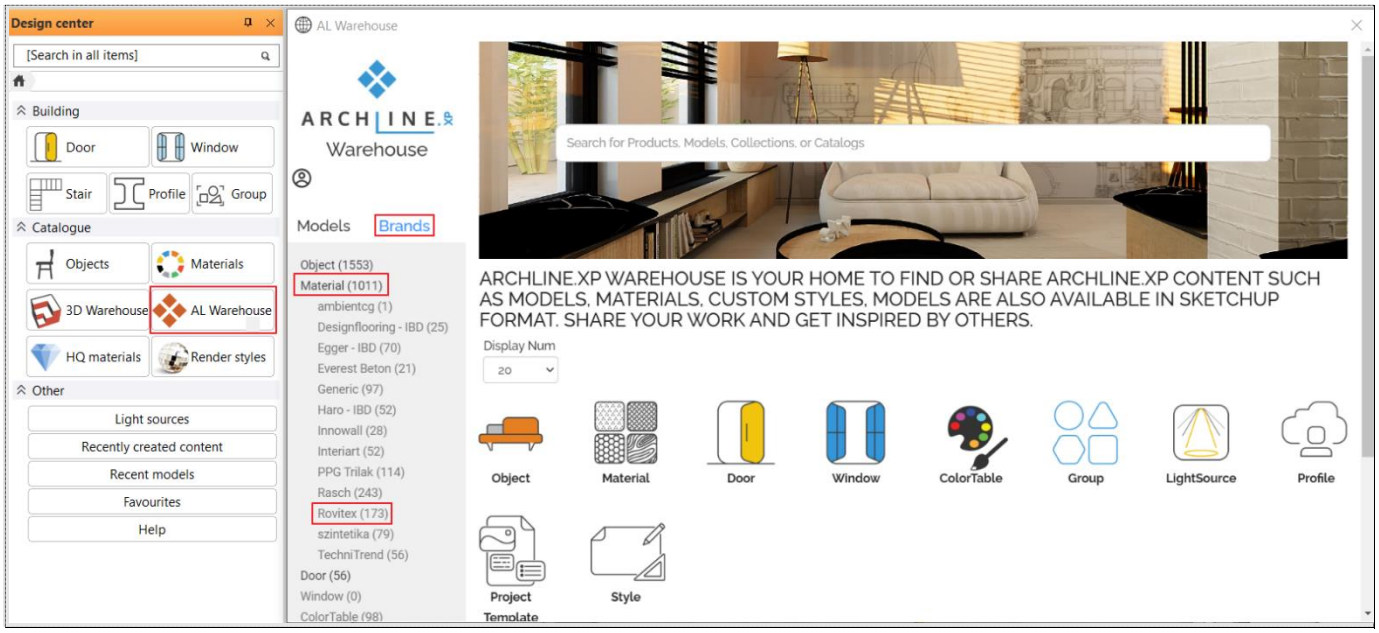
- Drag and drop the new material on the wall behind the sofa. Use the Like painting or grouting option.

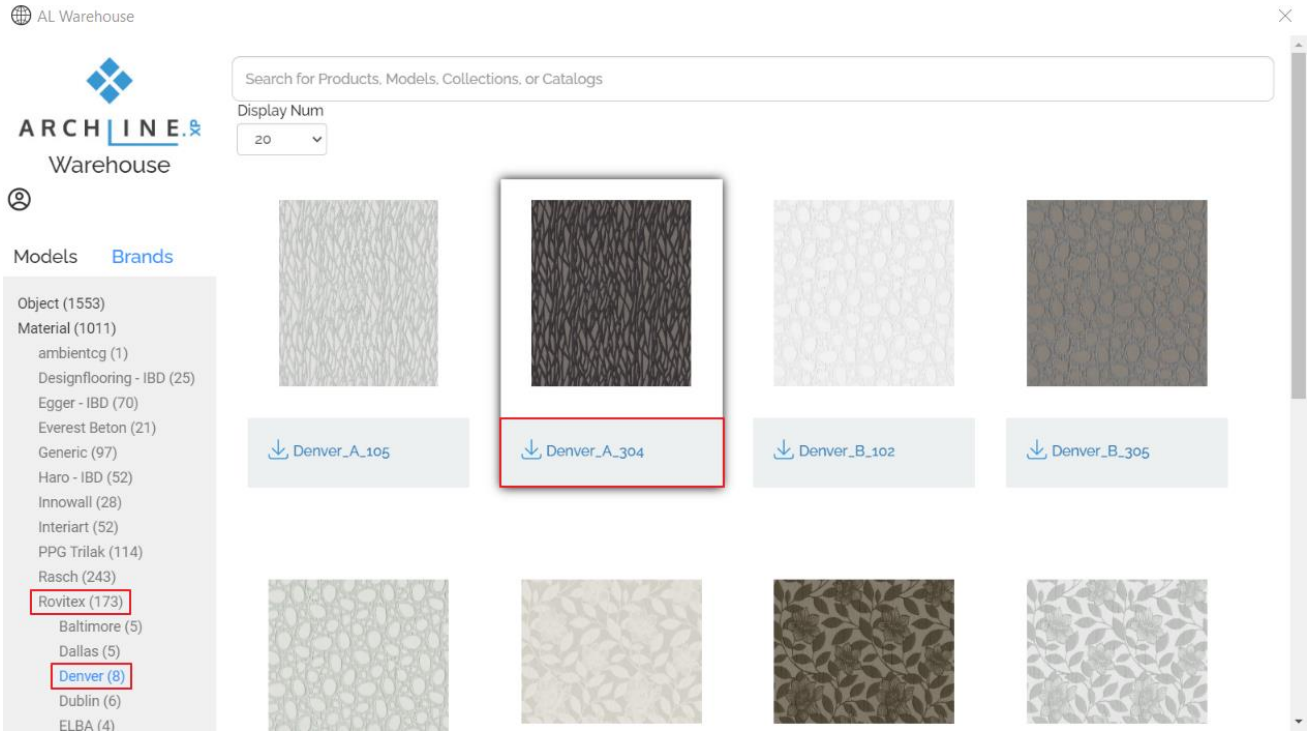


1.1.2. Downloading material from the ARCHLine.XP Warehouse

We can use a material from the Design Center – Material library or we can download one from the ARCHLine.XP Warehouse.
We will change the material of the curtain in the living room to a material downloaded from the ARCHLine.XP Warehouse.

- Select the ARCHLine.XP Warehouse – Brands – Material – Rovitex – Denver – Denver_A_304 material and after download, drag and drop it on the curtain using the Replacing one material with another option.





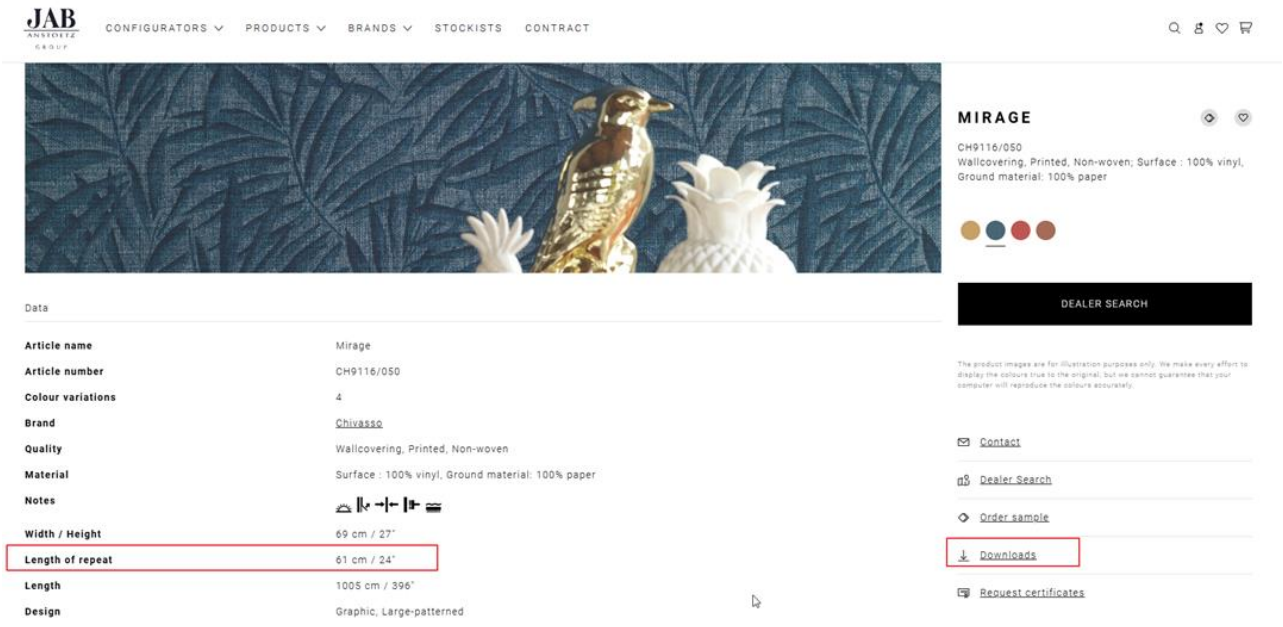
Right-click on the curtain and select Find Material to view the properties of the material. For this material, for example, the Transparency is set automatically to 13%, but you may want to set it to 0%, since we are talking about a blackout curtain.

1.1.3. Downloading the texture from manufacturer's website

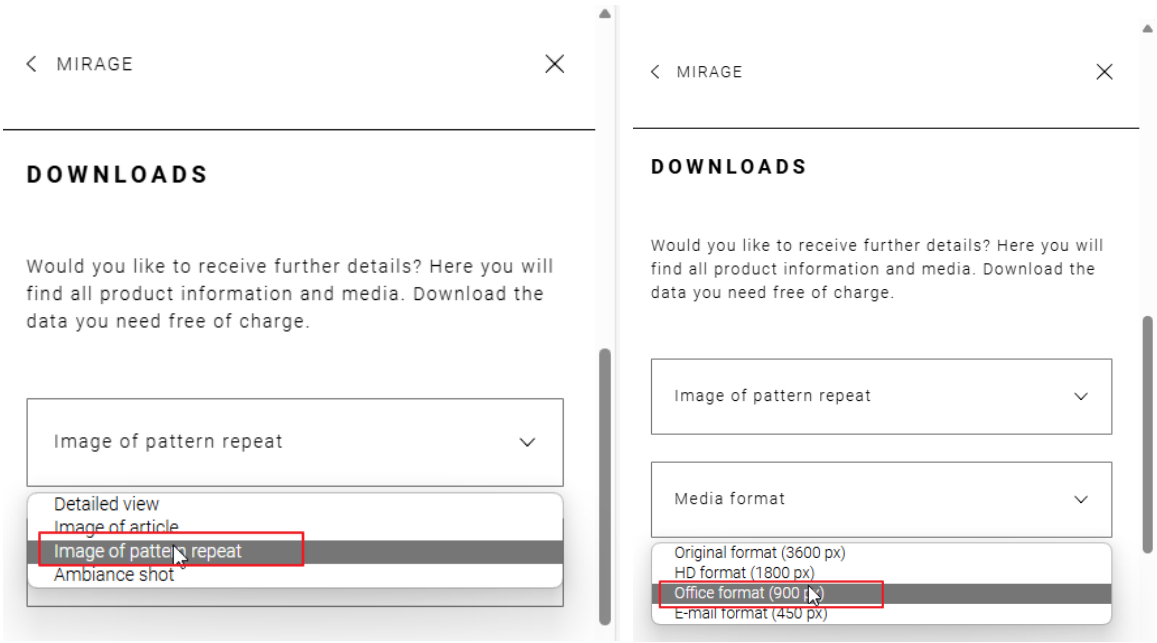
We can not only create a material from color but from texture as well. It is worth to select the appropriate texture from the manufacturer's website.
In our example we will use a wallpaper from JAB (https://www.jab.de/de/en) and we will apply it to the wall behind the sofa.
Before download we need to register on the website, and log in.

Search for the MIRAGE wallpaper and select a color:

Pay attention to the „***Length of repeat***" value on the webpage. This will be the width of our pattern: 610mm.



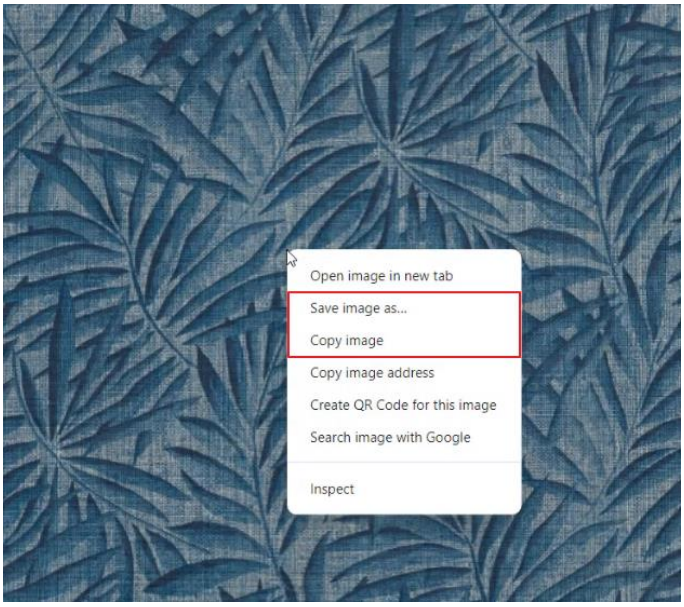
In the download section, select „***Image of pattern repeat*"** option.
We have to specify the resolution of the pattern. It is not recommended to choose a too large resolution, because it will only increase the project size: 900 pixels.



After download we can choose

- Copy image – this will place the image on the clipboard or

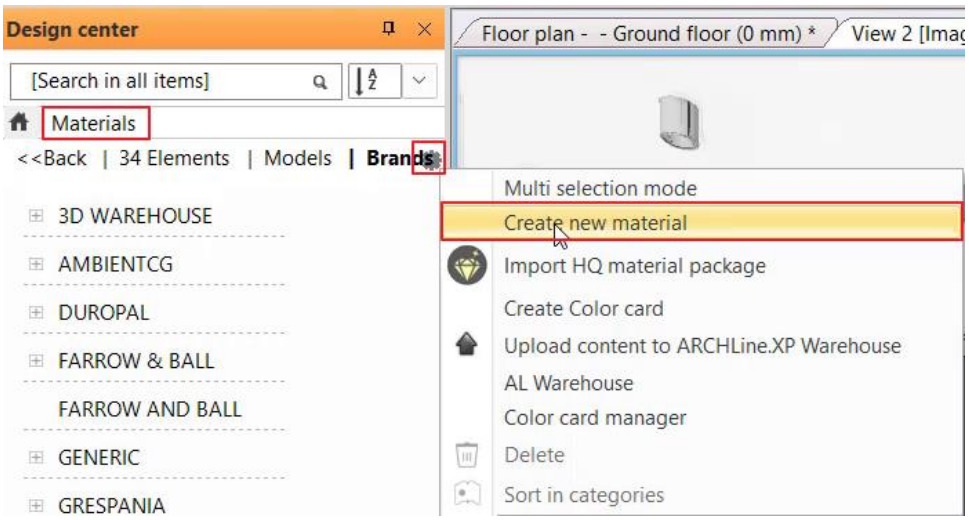
- Save image – this will save the image file to our computer.



1.1.4. Creating new material from texture

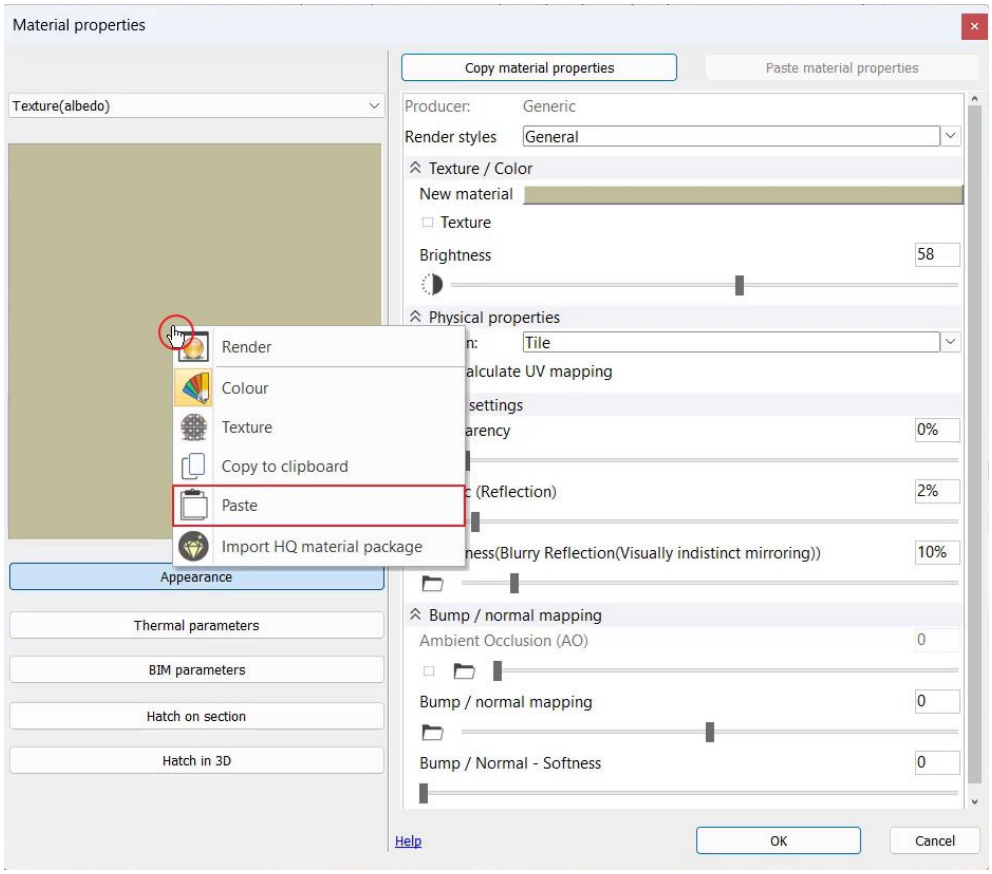
The downloaded material is on the clipboard or is saved as an image file.
We can create a new material from texture by pasting the element on the clipboard or by browsing the downloaded image file.

- Select in the Design Center the **Materials** category, then **Settings – Create new material** option.

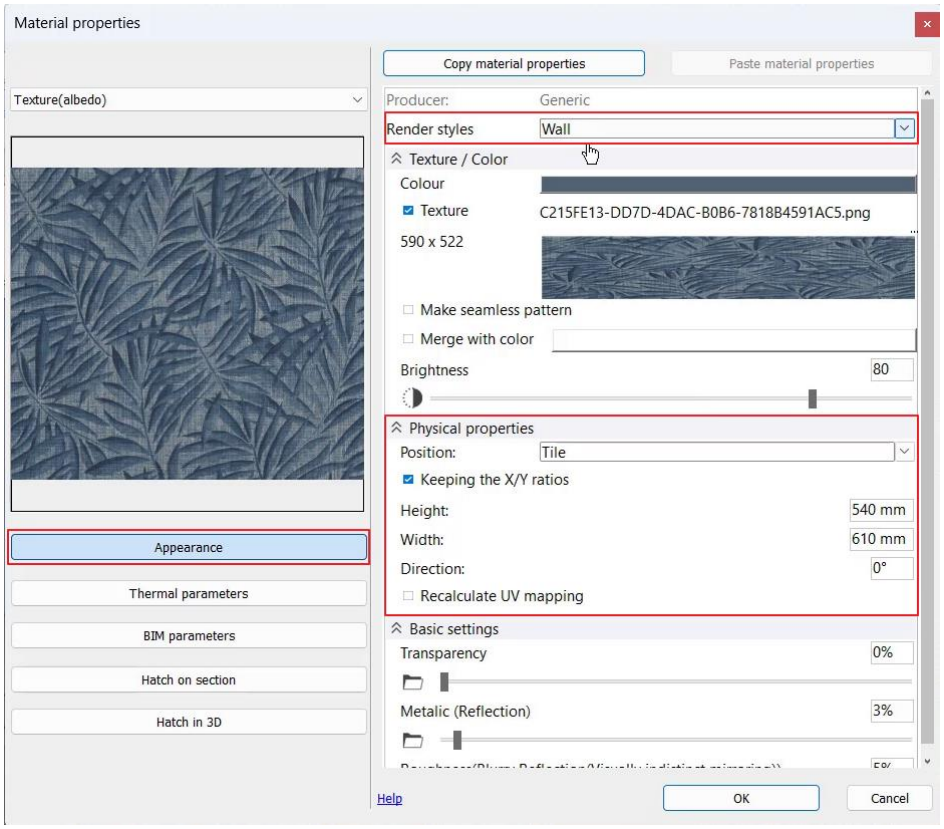


The Material properties dialog appears.

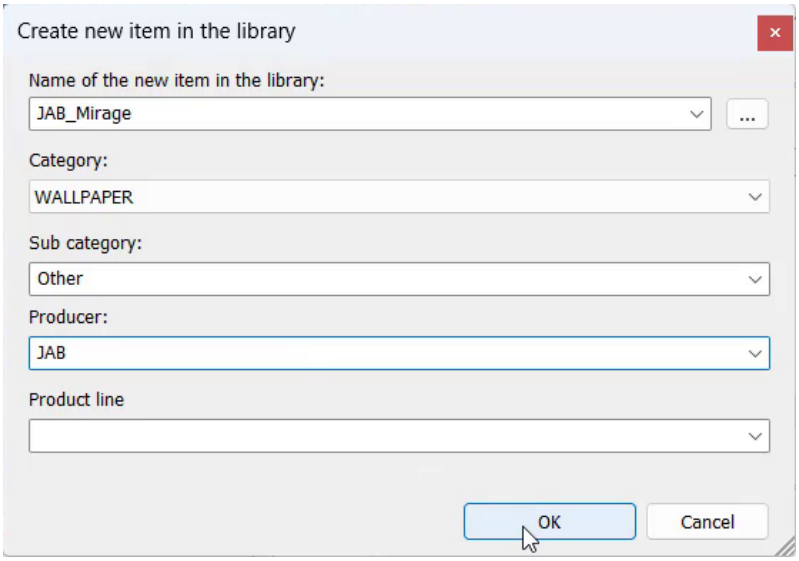
- Click on the color area on the left.
- If you have the image on the clipboard, click on the **Insert** button from the drop-down menu.
- If you have saved the image to your computer, click on the **Texture** button and browse it on the computer.



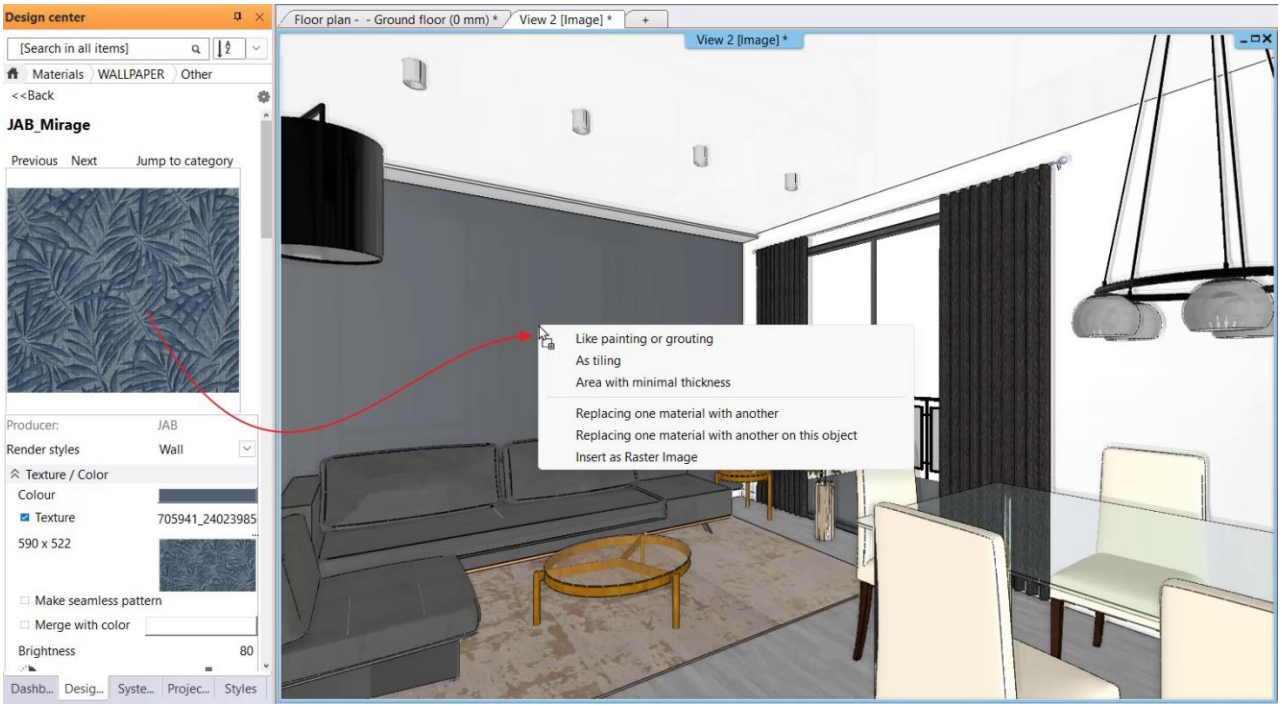
- On the Appearance - **Physical properties** tab, type in the value of „***Length of repeat***" from the website: 610 mm as the Horizontal dimension. It is important to turn on the Keeping the X/Y ratios command first.
- It is important to choose the right Render style. You can fine-tune the parameters of the selected render style.



After pressing OK, name the new material and enter the appropriate category and subcategory where you want to save it.



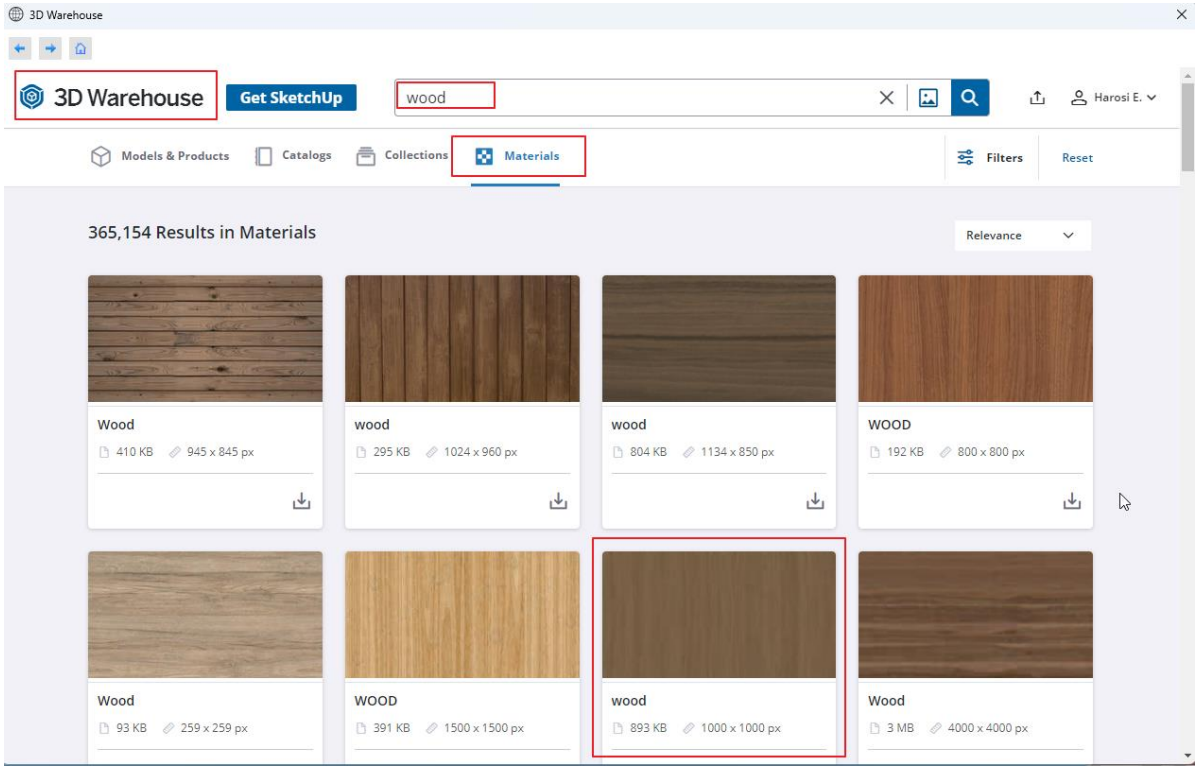
After closing the dialog drag and drop the wallpaper on the wall behid the sofa, and select the Like painting or grouting option.



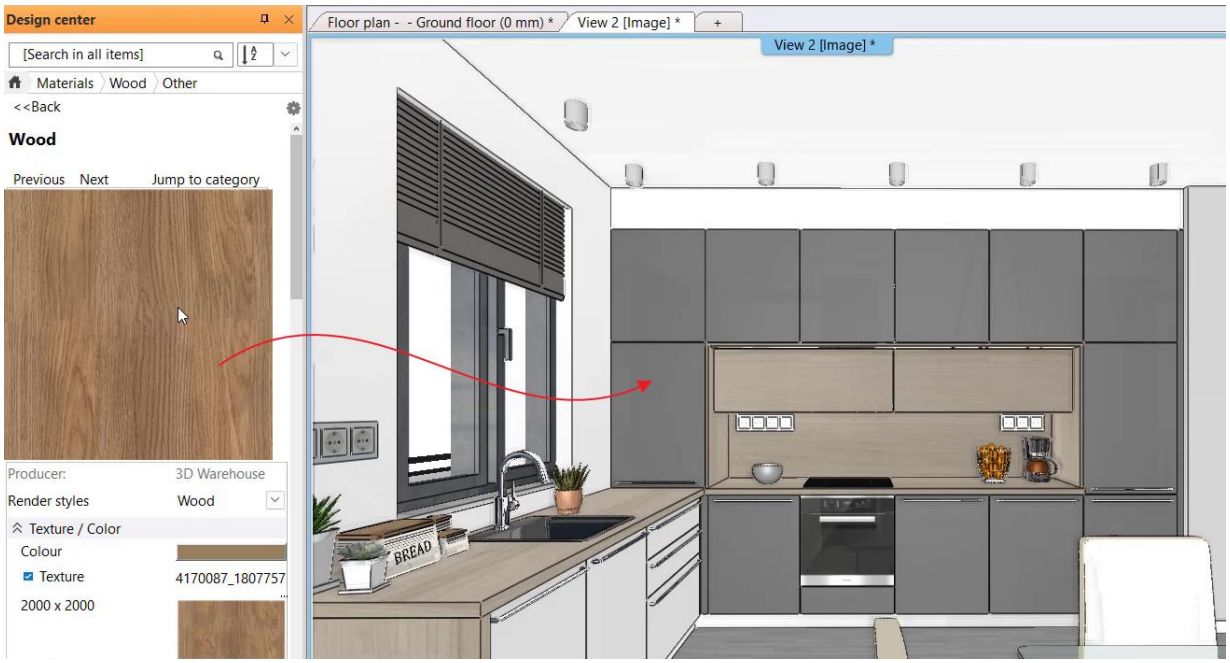
1.1.5. Downloading material from the 3D Warehouse

It is also possible to download material from the 3D Warehouse.
The .skm file is a material file that SketchUp uses for texture information.
It contains the raster image file, a stamp image and additional content describing how much area the image should cover.
You can download the textures (skm-files) from the 3D Warehouse page directly into ARCHLine.XP.

- Select a wood material from the 3D Warehouse, download it, save it with the right name in the right place.
The material will then be added to the material library.



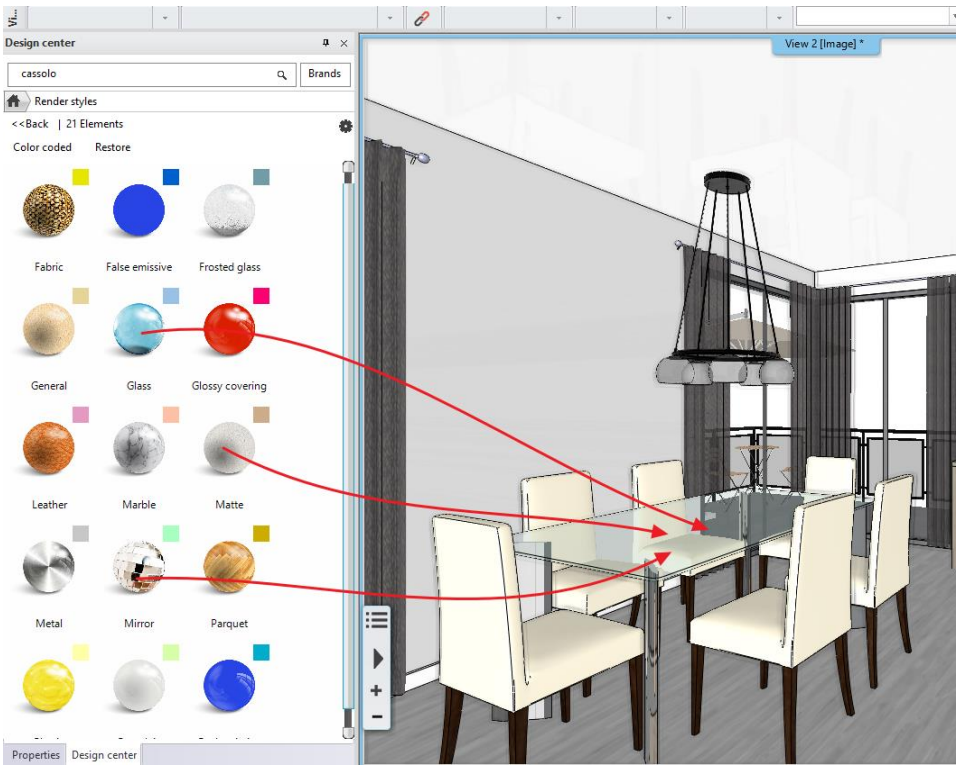
- Drag and drop the material onto the front of the kitchen cabinet.



1.2. Material properties

When creating the materials, we saw how the **physical and appearance properties** of the material can be set. These properties can be modified later.
Render styles are a great help in setting the appearance properties of materials.
Let's try different render styles for example on the dining table glass. The result is best seen in Rendering, but the difference is also visible in the Textured display mode in the 3D window. (This assumes using DirectX 11.)

For example, from the **Design Center - Catalogs - Render styles**, drag the Matte style onto the glass, and then the Mirror style then reset it to Glass.



1.3. Material/Texture editing

Textures you receive or download from the Internet may need to be readjusted so that we can use them in our project. For example, the pattern is not continuous, not a seamless pattern, so it shows a square like repetition when applied to the surfaces, or some part of the pattern is transparent in real life, or the color of the pattern may not what we want.
In such cases, we need to edit the texture.

1.3.1. Creating a seamless pattern

What is a seamless pattern?

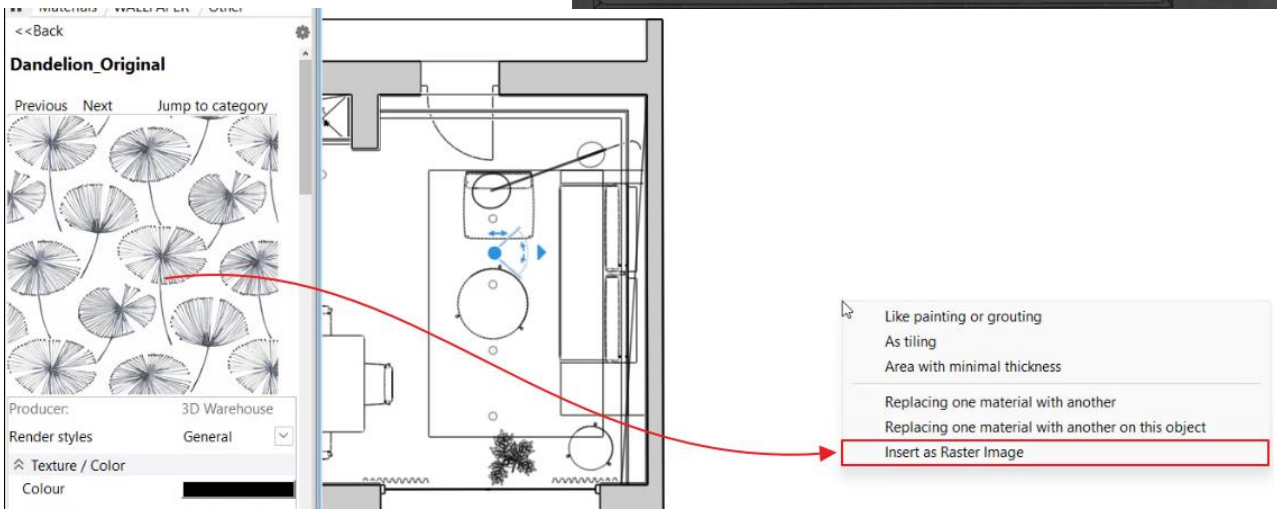
A continuous, endless pattern that shows no square like repetition in either direction when applied on a surface.
"*A pattern is actually a small image that, when repeated one after the other in each direction, forms a seamless pattern, and you can fill the available space with it as long as you repeat it. Because the pattern is repeatable, you don't see the image being interrupted anywhere.*"

With the **Create Seamless Pattern** command, it is possible to convert the imported texture to a seamless pattern (endless pattern). This means that the pattern row and column become continuous. This makes it possible to edit the texture within ARCHLine.XP and we do not have to use an external image editing program. The pattern edited this way can be saved as

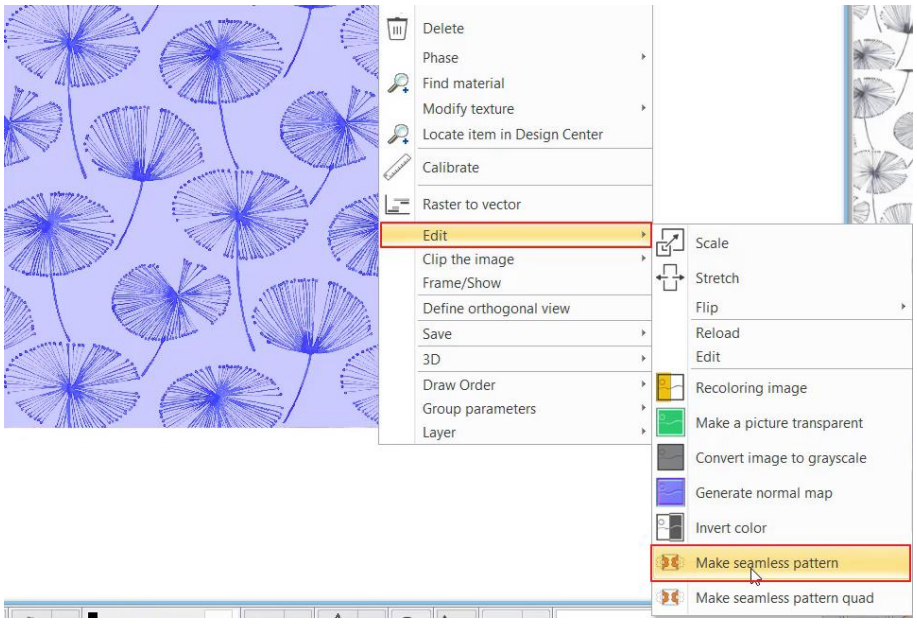
material and may be used in the model immediately. By using seamless patterns, we can avoid that for example the wallpaper applied to the wall looks like a “checkered tablecloth”.

- Let’s create a material from the **Dandelion.jpg** texture from the …\Material management\Textures folder, and use it on the wall behind the sofa.
  In the image, we can see that it is not a seamless pattern.

- Let’s place the material from the Design Center on the floor plan as a raster image.



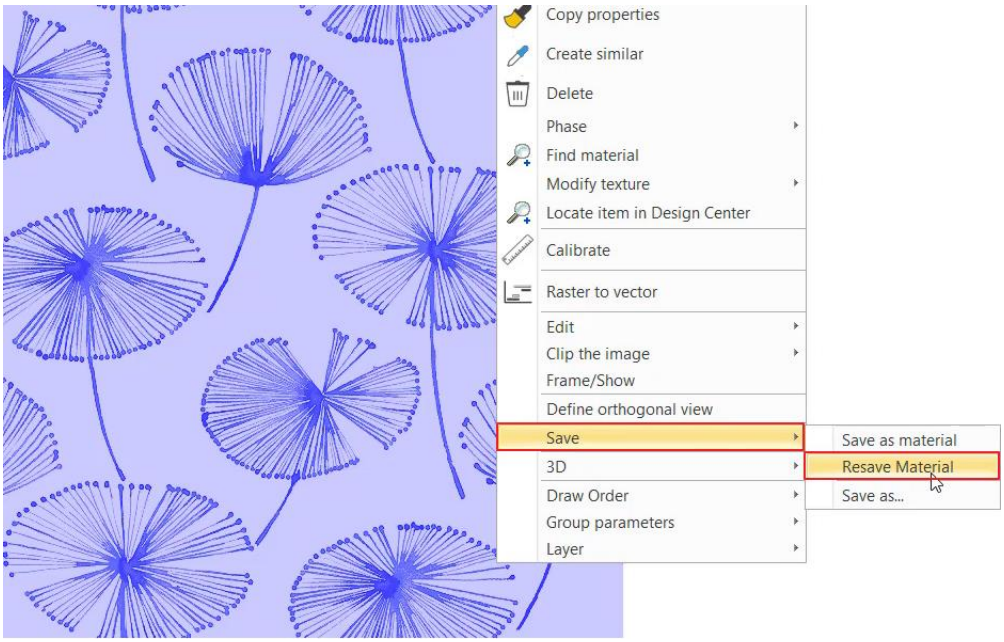
- Click on the pattern and from its local menu select the Edit – Make seamless pattern option.



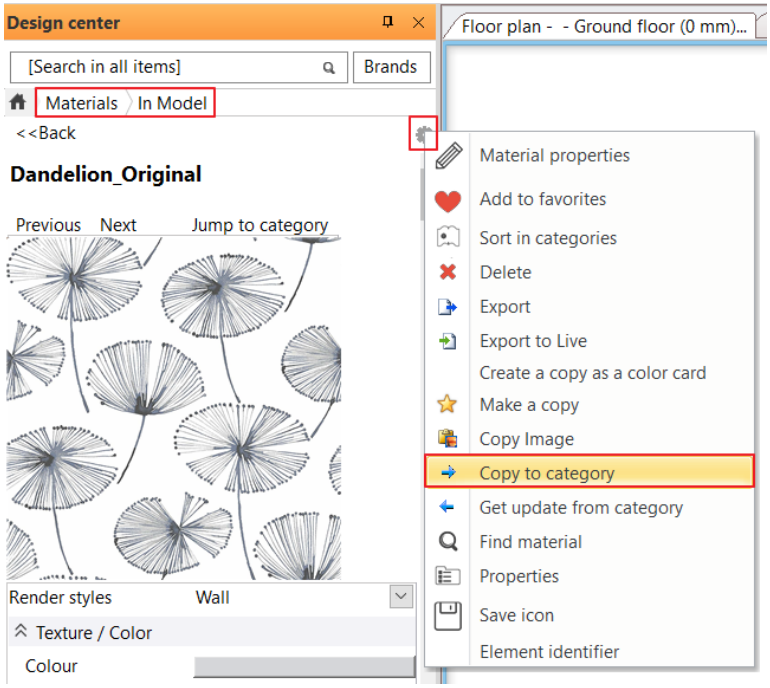
By clicking on one of the sides of the pattern, the program complete the pattern into a 3x3 pattern. Move the cursor til the pattern is overlapping
Repeat it with the other side, then Enter. The seamless pattern is ready.

! The command can only be used with textures that has a repetition.

- Save the seamless pattern as a material: Choose the Resave Material. The material in the “In Model” category will then be overwritten with the new material and the model will display the modified seamless pattern material on the wall.



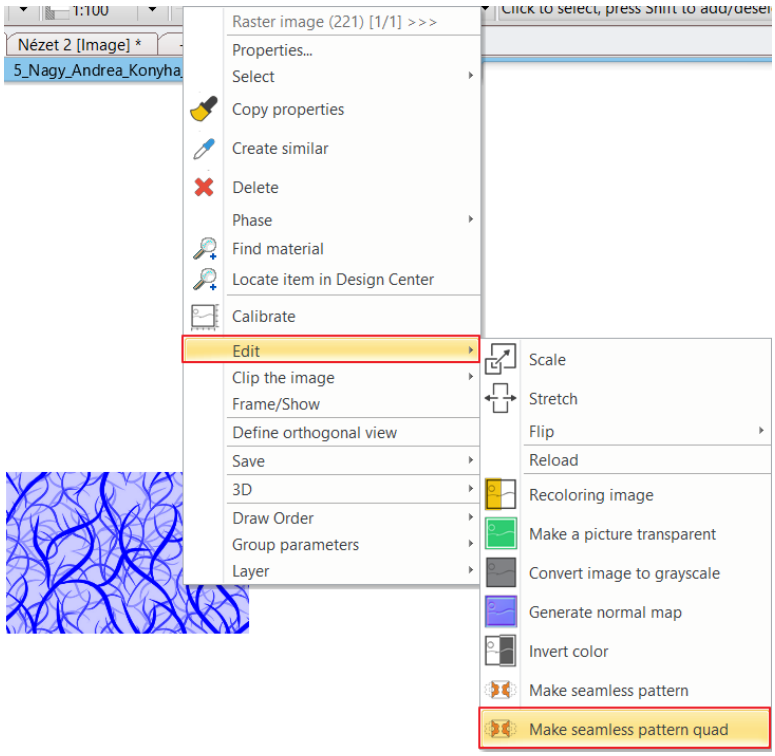
- It is worth copy material in the In Model category back into the category, overwriting the original material.



Create a seamless pattern from a non-repeating pattern

If you find material on the Internet that is not a repetitive pattern, proceed as follows:

- Let's create a material from the **Abstract2.jpg** texture from the …\Material management\Textures folder, based on the previous steps, and place it on the floor plan as a raster image.
- Now click on the pattern and from the Local menu, select Edit – Make seamless pattern quad command.
  The program will then mirror the pattern on the X and Y axes, giving you a seamless pattern.
  Save the seamless pattern using the Save as material command, then you can use the material Like painting or grouting as usual.

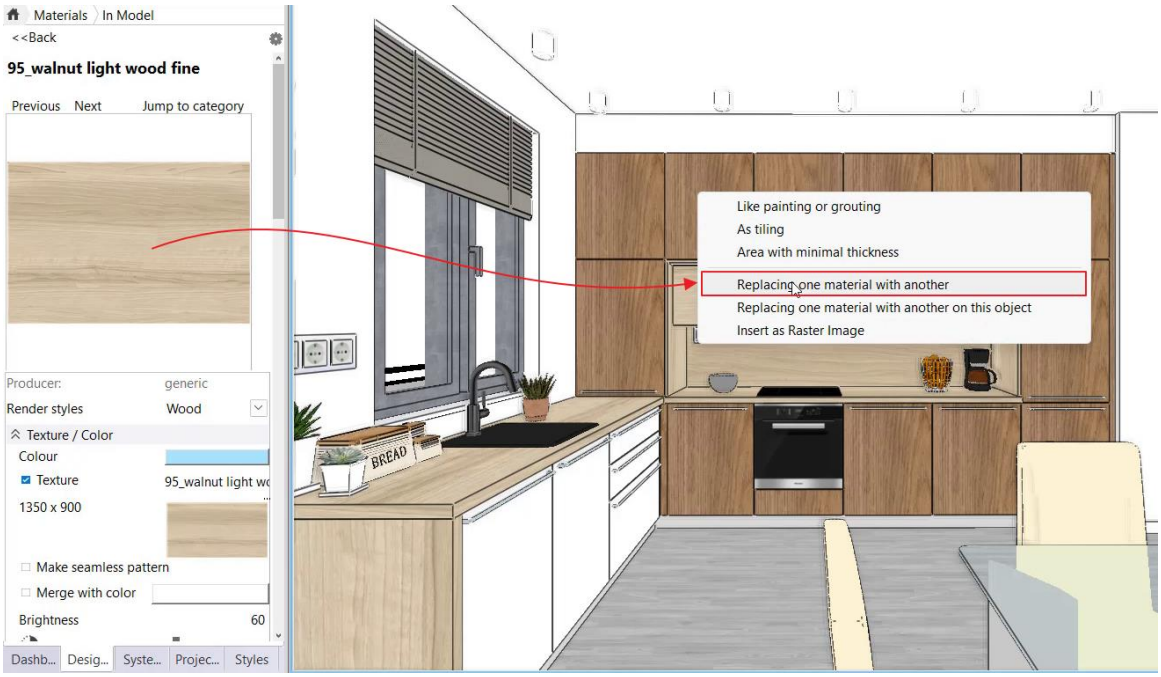


1.3.2. Resizing and rotating textures in 3D

A texture is globally mapped to a surface in the world coordinate system, independent of the object coordinates. This means that the texture does not stick to any object, but is fixed to the global origin, so that the texture remains untouched by the transformation (resizing, rotation) within the object, and does not move relative to the global origin. However, if the object is moved or transformed, the texture moves with the geometry of the object.

It is possible to graphically resize and rotate the texture by selecting the surface in the 3D model.
This option is shown on the kitchen cabinet. First, we replace the front with the material of the worktop to make the example more demonstrative.

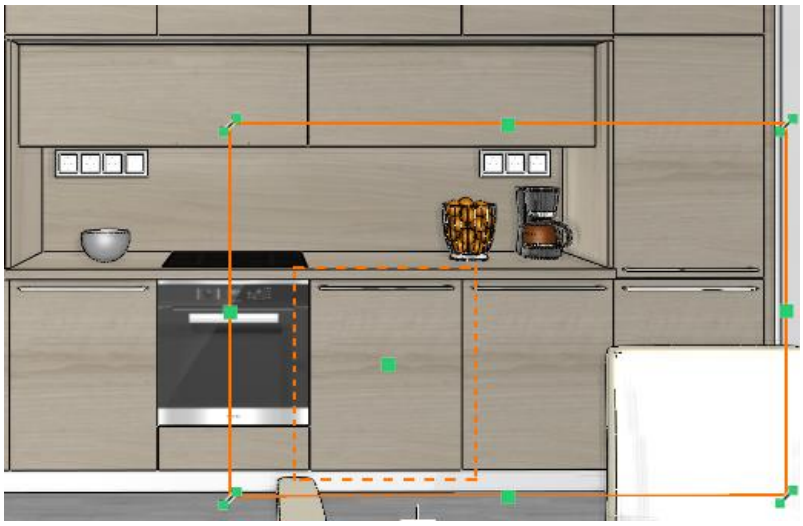
- Select *Kitchen 2* perspective.
- Replace the front material with *95_walnut light wood fine* material.



- Start the *Interior menu - Material - Scaling Texture* and click on the front interface.

  The command displays how the texture is currently mapped onto the surface.

When resizing, the program stretches the texture in the direction in which one of its sides is modified. It is also possible to modify it proportionally.



- Resize the texture graphically: reduce the height of the texture.

Now we will change the grain direction:

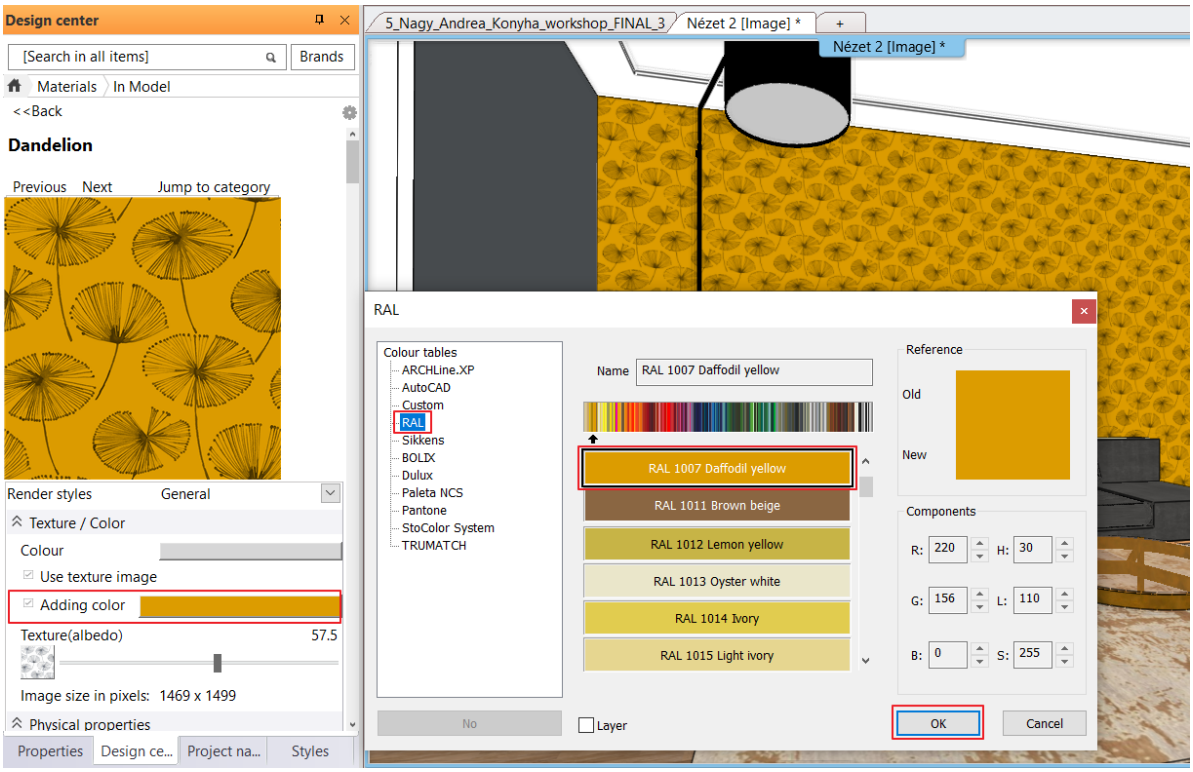
- Select the Local menu - Modify texture - Rotate texture - Rotate 90 cw option, and click on the front surface. You can rotate by +90, -90, and 180 degrees.

1.3.3. Coloring material and texture

How can we use the same material or texture with different color alternatives in ARCHLine.XP?
It is possible to add a background color to a material or texture, so we will have another color alternative.

Coloring material

The Adding Color option can be turned on at the material properties. Click the Color button to select the appropriate color from the color tables. The added background color can be turned off at any time, this is just a property of the material, it does not affect the texture.
The advantage is that you can try many color variations quickly, the result is immediately visible in the 3D model.



- Turn off the Merge with color option.

Coloring texture

The pattern on the floor plan can be recolored using the ***Local menu*** – ***Edit*** – ***Recoloring image*** option.
After that the texture can be saved as a material.
In contrast to the Material Coloring method, we create textures that are actually recolored here, as well as the materials saved from them. The disadvantage is that the result will only appear in the model later when these textures are used as material.

1.3.4. Materials with transparent background – Alfa channel

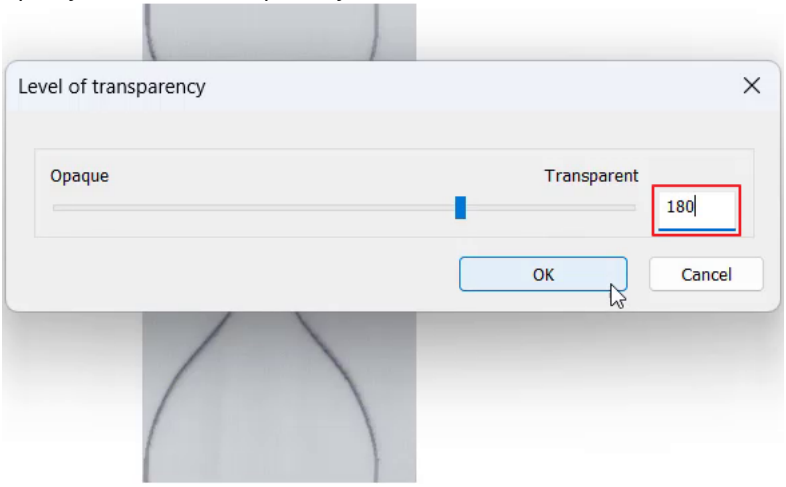
We might need an image with a transparent background. Such an image for example is a wall sticker.
We also use a transparent image when we want to display a patterned but transparent curtain.

The solution is the ALFA channel. This means that we can mark the colors on the image that are transparent.

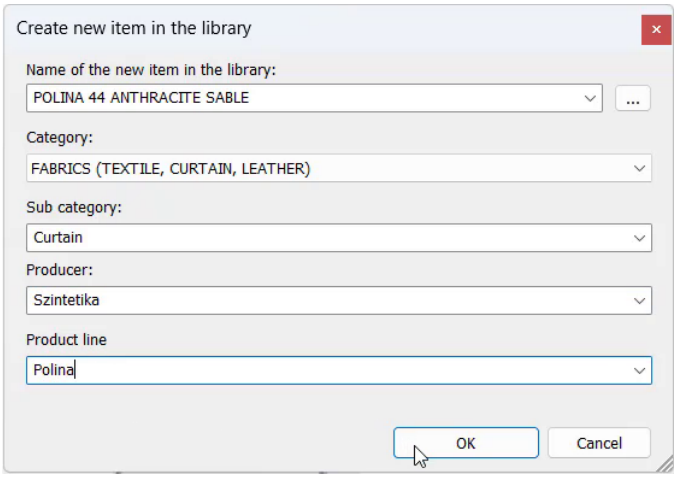
Let's create images with transparent backgrounds:

Transparent, patterned curtain

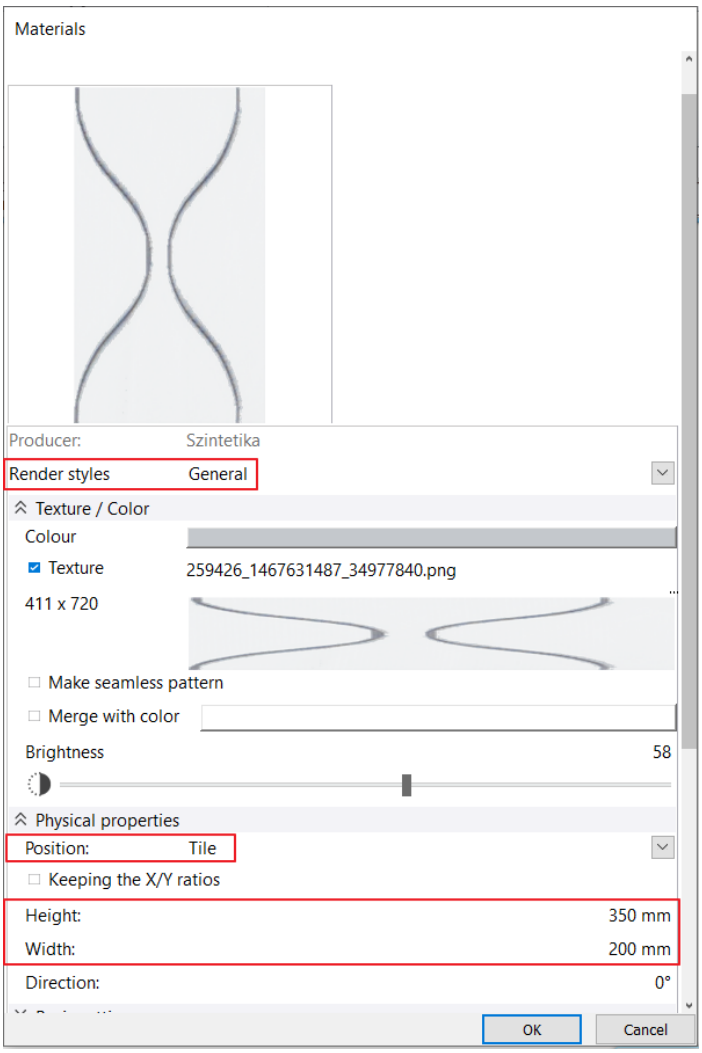
- From the \Material management\Textures folder, place POLINA 44 ANTHRACITE SABLE.jpg on the floor plan.
- Select **Local menu - Edit - Make a picture transparent** option.
- Highlight the color in the image you want to make transparent with the eyedropper, in this case grey, the background color.
- Specify the level of transparency: 180.



- Save the texture as a material using **Local menu - Save - Save as material**



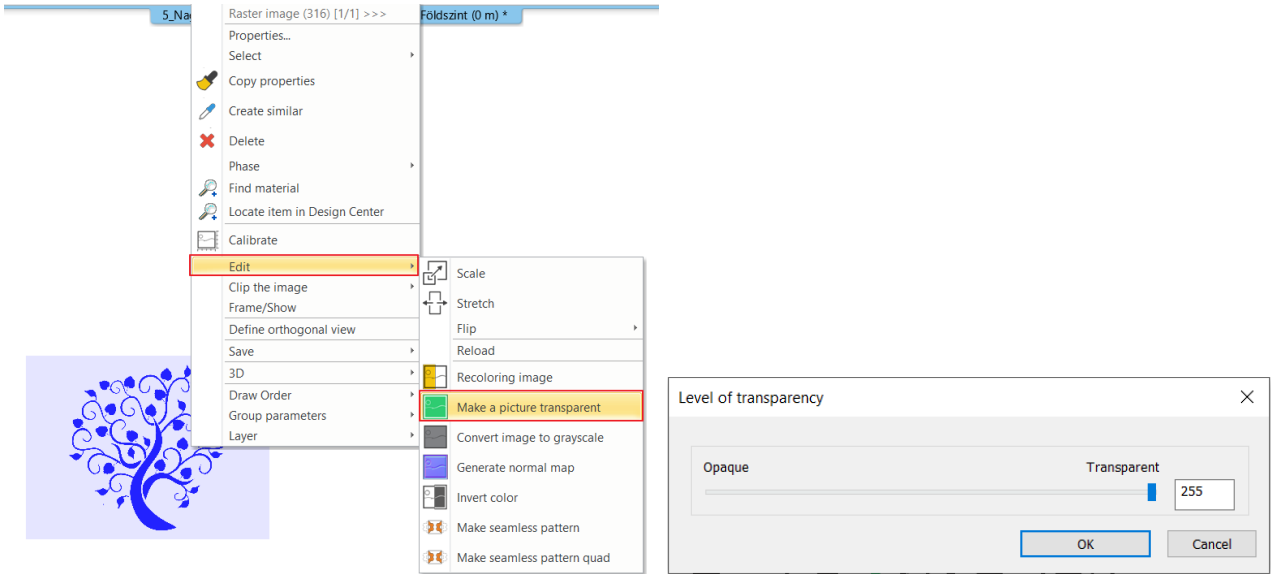
- The Render styles should be General. Set the physical size of the sample: 200 x 350 mm
- Drag it onto the curtain.



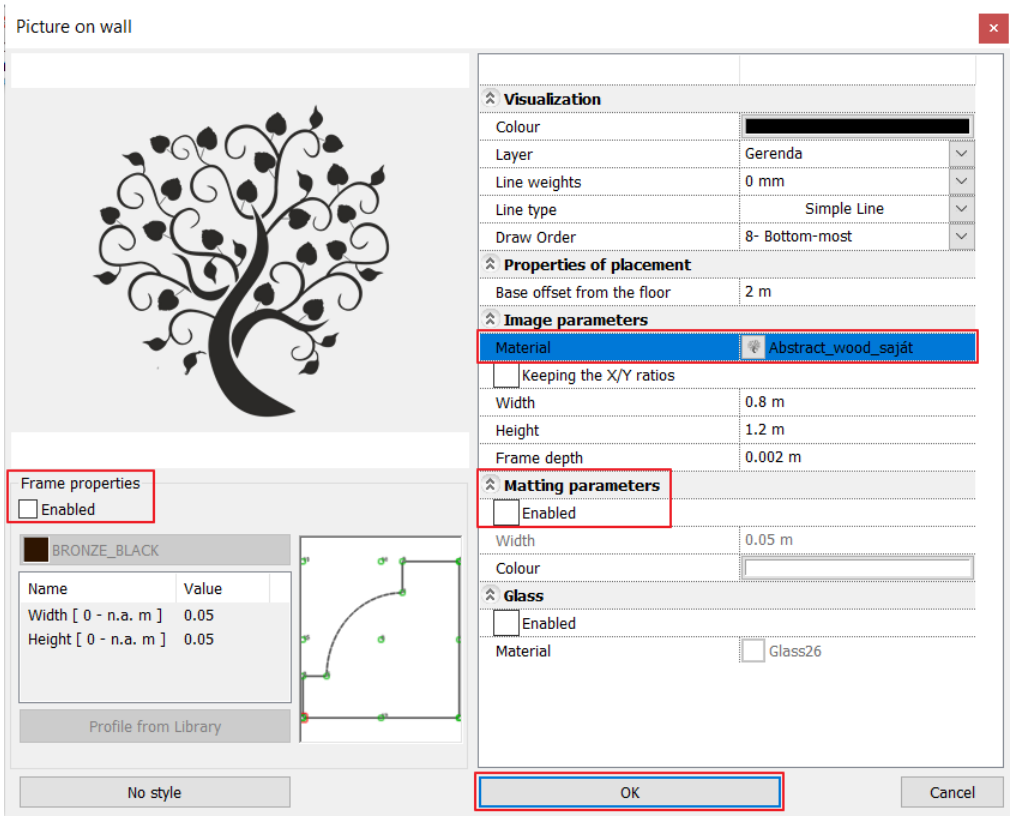
Create a wall sticker

- Place the Abstract_wood.jpg on the floor plan from the …\Material management\Textures folder.
- Select the **Local menu – Edit – Make a picture transparent** option.
- Select the color you want to make transparent with the eyedropper tool. Here the white.

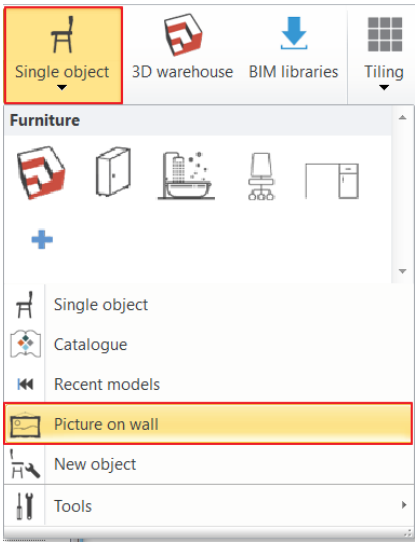
- Set the level of transparency: 255. OK.



- Save it as a material, then choose which wall you want to place it on.
- You can do this with the Picture on wall command, which you first set the properties of the command. Choose Interior - Properties - Picture on wall command.
- Here, turn off the frame and the matting, and in the Image parameters, specify the previously created Abstract_wood material as the Material.



- Place the sticker on the wall using the **Interior - Single object - Picture on wall** instruction.

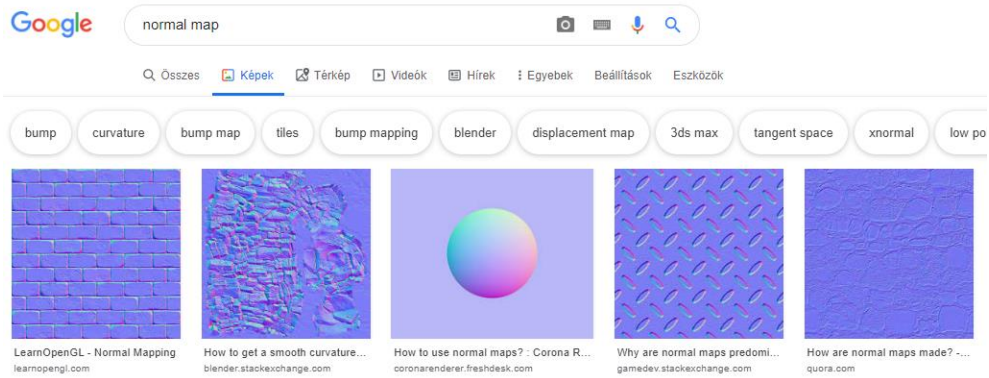


1.3.5. Bump mapping – with the pattern of the original image

By adding bump map to a texture, we can create a 3D depth. We call it bump mapping.

Bump mapping

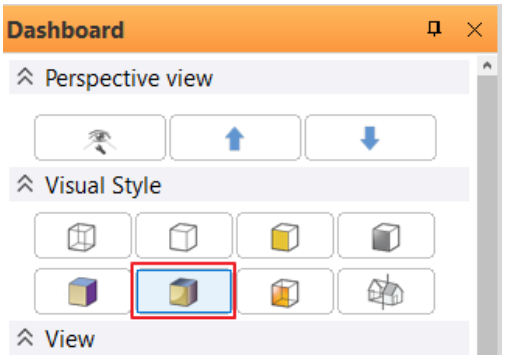
Bump Mapping makes the appearance of surfaces uneven, creating a much more realistic effect.
During the procedure, a more uneven surface is created by freely modifying the direction of the normal vectors of the model, thus creating the illusion of a more complex, uneven surface. These normal vectors are stored in a texture. These textures are called **Normal Map**. It corresponds to the RGB 3 color (red, green, blue) of the 3 axes of the coordinate system, so that the blue color falls on the axis pointing towards us. Therefore, Normal Maps are mostly bluish.



The bump map of a material can be set 3 ways in the Material properties:

- Automatic by the texture of the material
- By selecting a built-in Normal map from the list
- By using our own Normal map texture

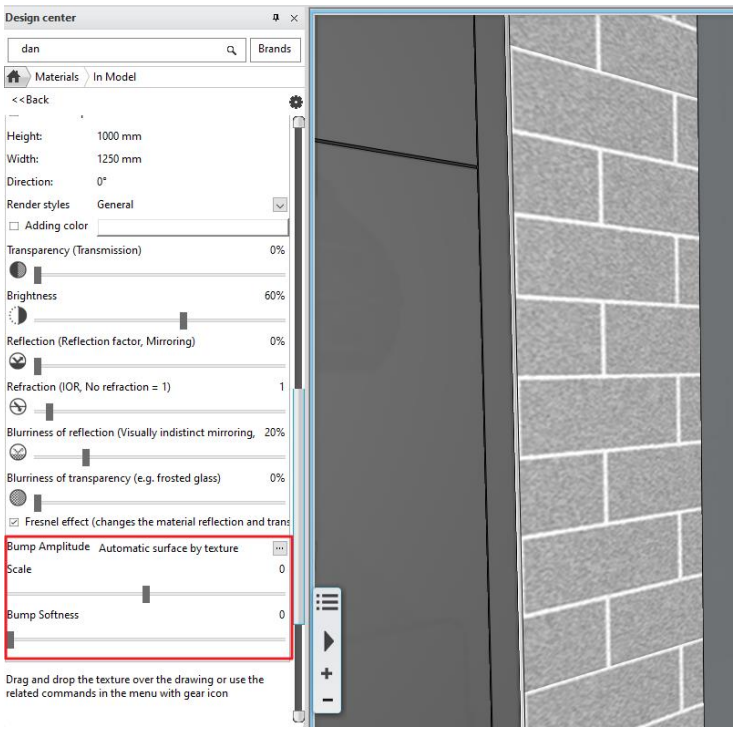
In the following examples, use the Realistic representation to display the 3D window.

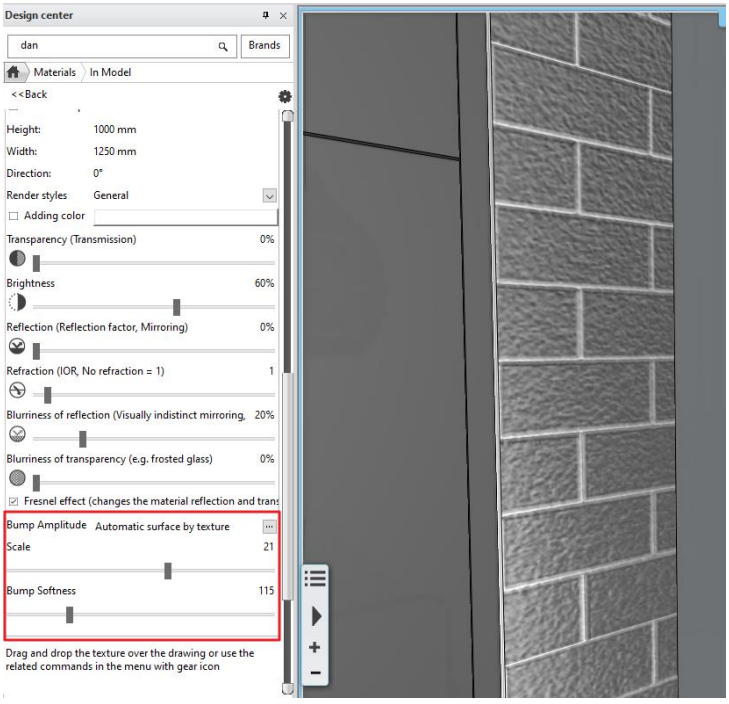


Automatic bump mapping by the texture of the material

For materials with texture, if the scale factor is other than 0, a normal map is automatically added, creating the illusion of a 3D effect. The surface roughness must always be corrected by smoothing the roughness, otherwise a too rough effect is obtained.
Specifying a surface roughness with a scale factor only makes sense on a suitable texture, on a color based pattern it is meaningless.

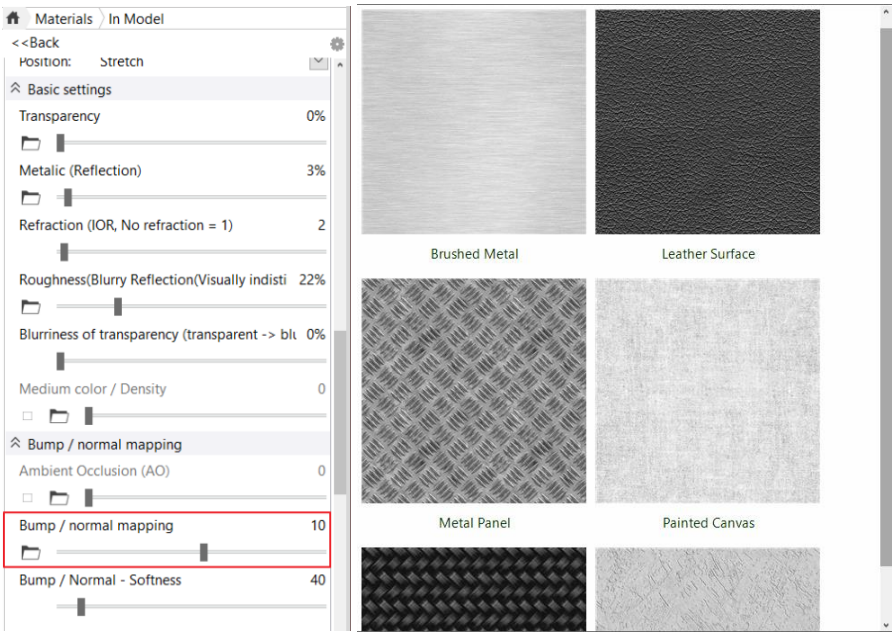
- Select the *Building - Brick - Blockwork* material and drag it to the wall between the kitchen cabinet and the front door with the *Replacing one material with another on this object* option.
- Try the values below.





Bump mapping with built-in Normal map texture

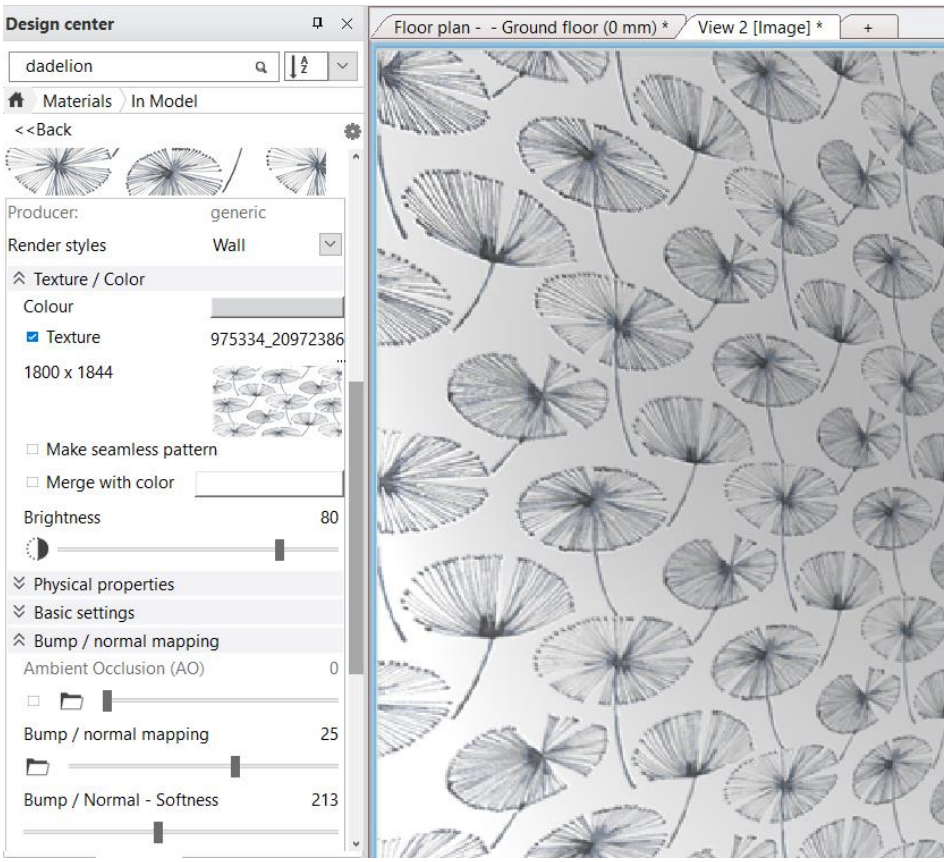
Normal Map texture can be used on texture based material or on color based material.
Normal Map textures can be built-in textures, or you can specify your own Normal Map texture pattern.
The built-in Normal Map textures can be selected from the list below:



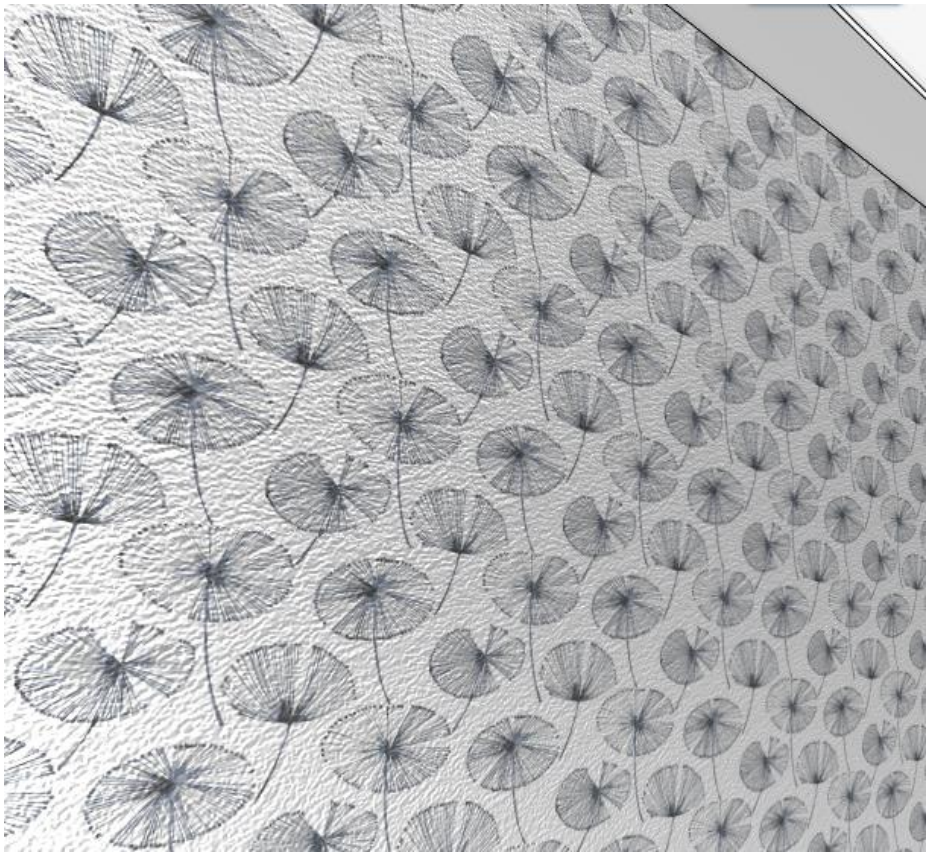
Built-in Normal map on texture based material

Transform the Dadelion wallpaper material into a rough wallpaper effect:

- Turn off the merge with color option. Now the wallpaper looks like this:



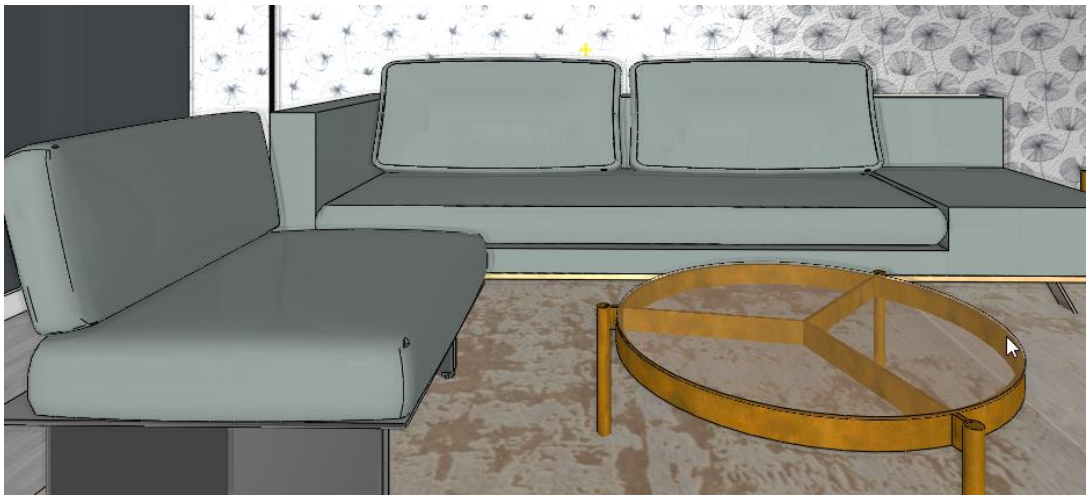
- From the list, select *Wallpaper - Splash* built-in normal map.
  The result:



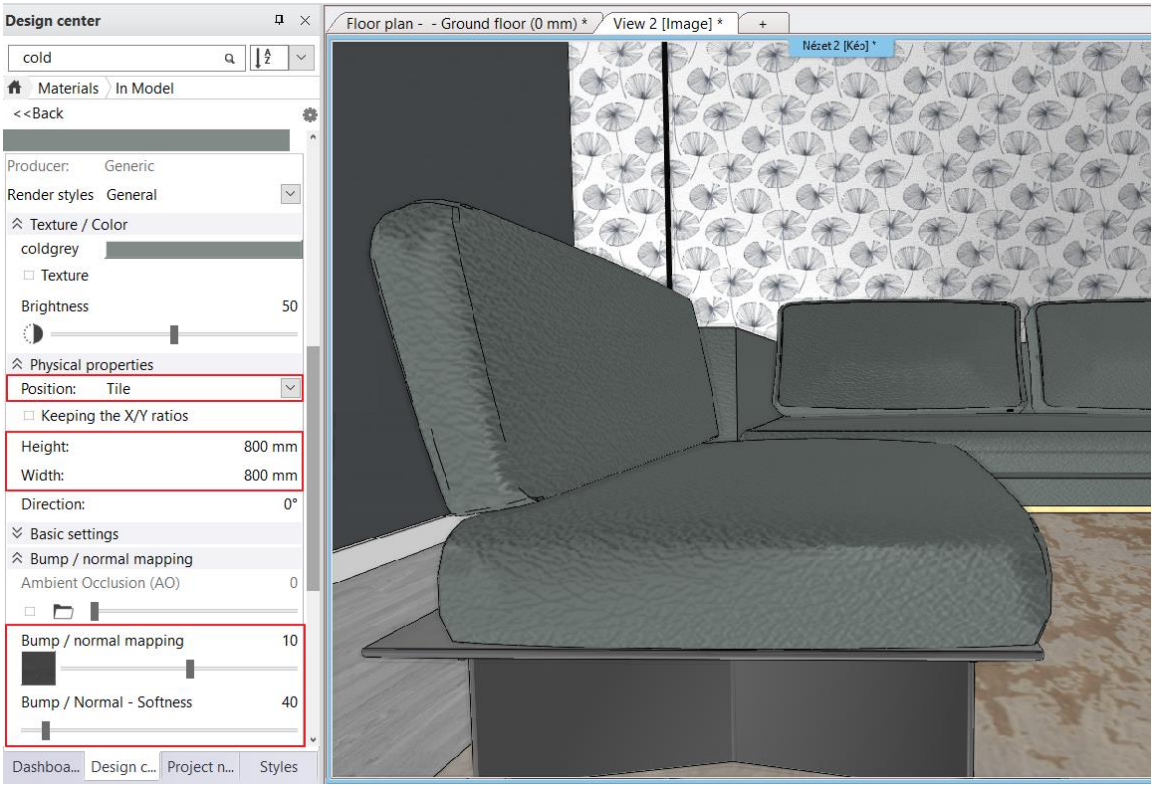
Built-in Normal map on color based material

It is also possible to assign a built-in normal map to a color based material to create a 3D surface effect.
In this case, the color position must be set from stretched to mosaic. A texture size is then assigned to the color. This size will affect the appearance of the normal map. Let's try it out:

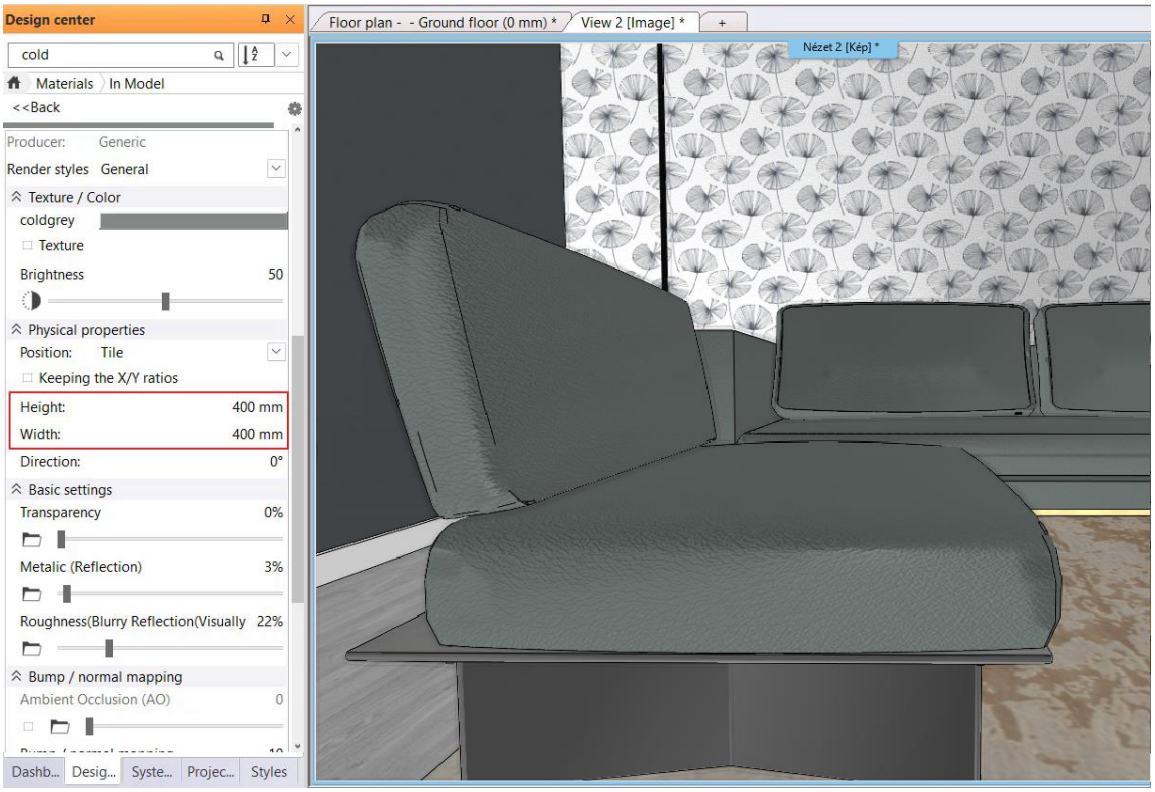
- Replace the fabric of the sofa with e.g. RAL coldgrey



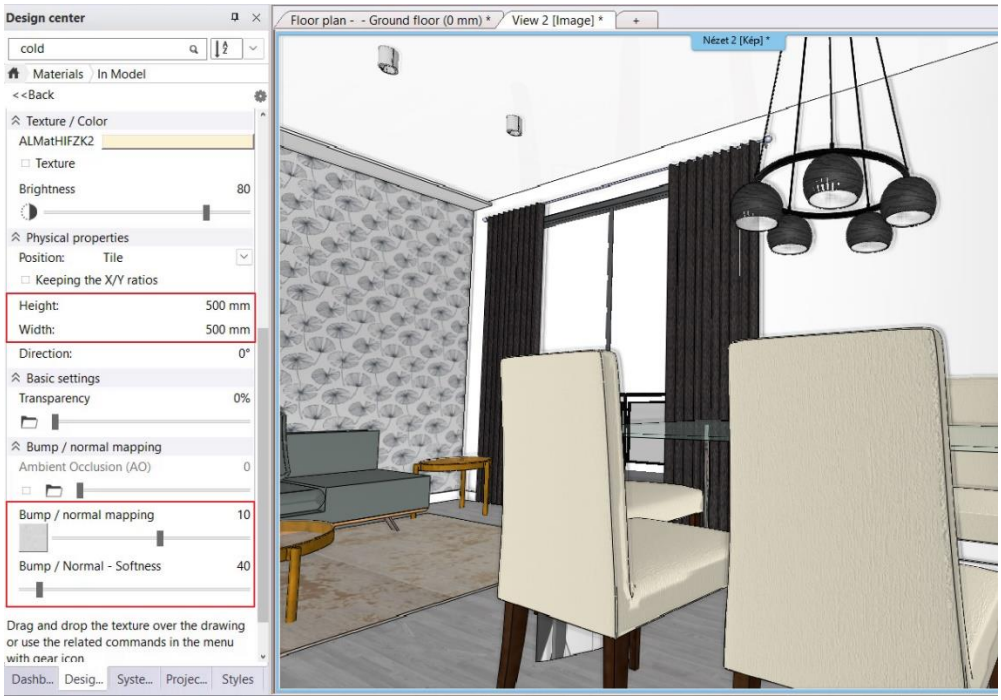
- Set the built-in *Leather surface* to normal map.
- Select *Tile* position instead of Stretch.
  For a size of 800 x 800 mm, we get the following result:



Try it with 400 x 400 mm:



- Also set the bump mapping of the material of the chairs as well. Use *Striated Stucco – Vertical* built-in normal map.



When modifying textures in 3D, we modify the properties of the original material.

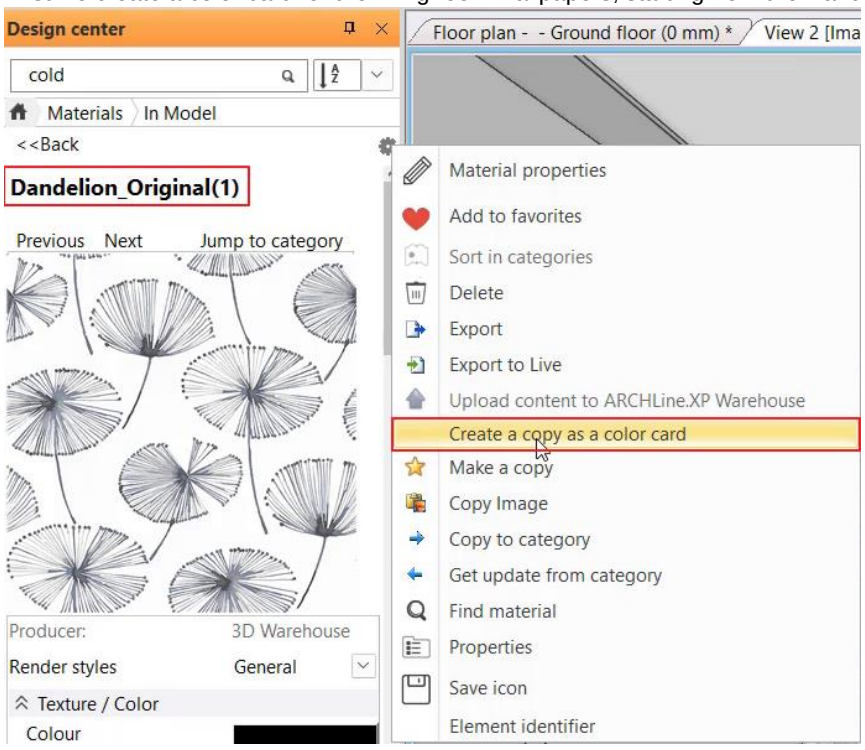
1.4. Color cards

The purpose of a color card is to make the color or texture selection on the 3D model easier, without modifying the plan. The house or flat can be displayed in a new color just by one click.

We can create a color card 2 ways:

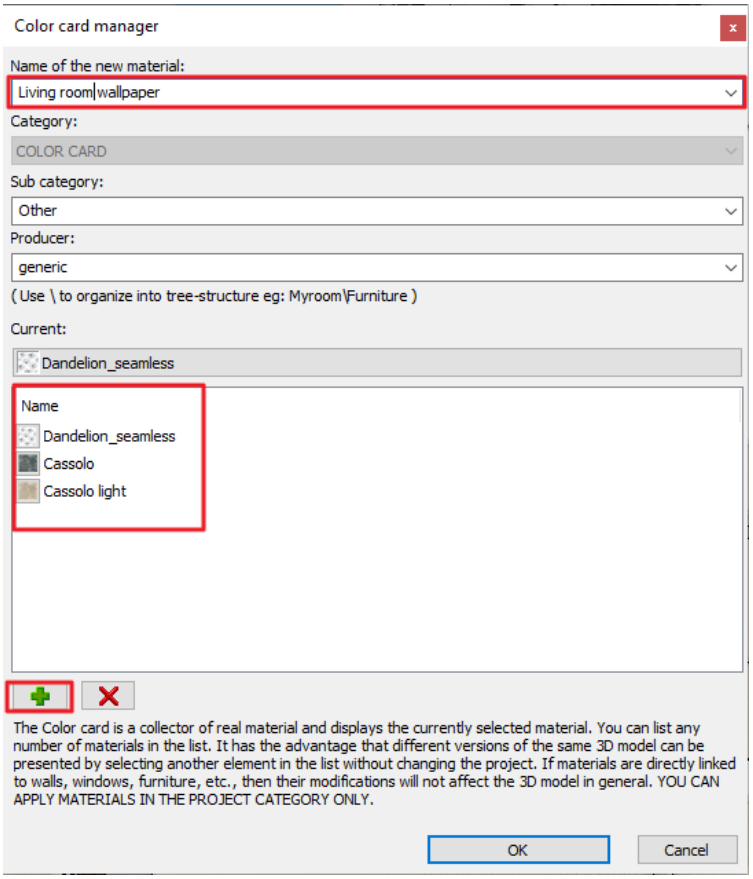
1. Create a new color card
2. Create a color card from an existing material. In the Design Center – Project folder select the material that we want to transform to a color card. Then select the **Create a copy as a color card** option by clicking on the cogwheel icon.

First we create a color card for the living room wallpapers, starting from the Dandelion wallpaper.



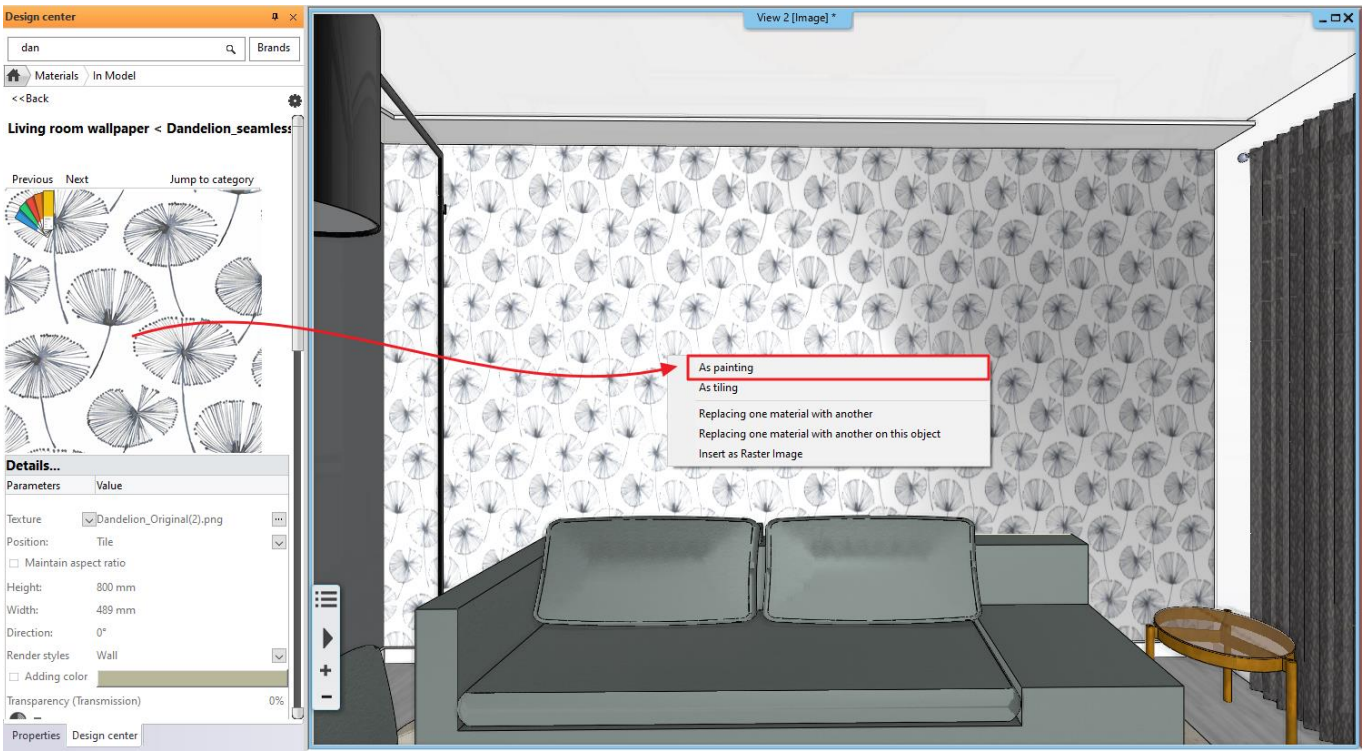
In the color card manager dialog:

- Change its name: Living room wallpaper. Add new materials. These will be the wallpaper variations. You can also delete material here.



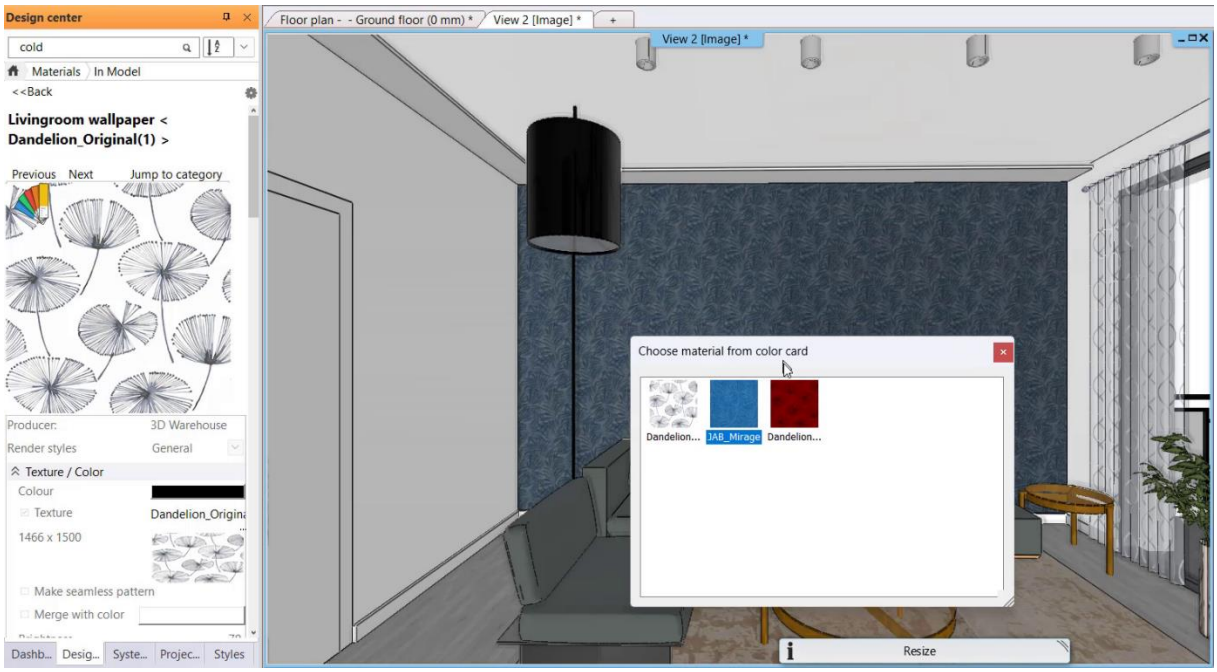
When you modify the current material, the program automatically replaces the entire 3D model with the new one. Attention, the name of the material will not change!

- Drag and drop the color card (Living room wallpaper) on the wall behind the sofa.

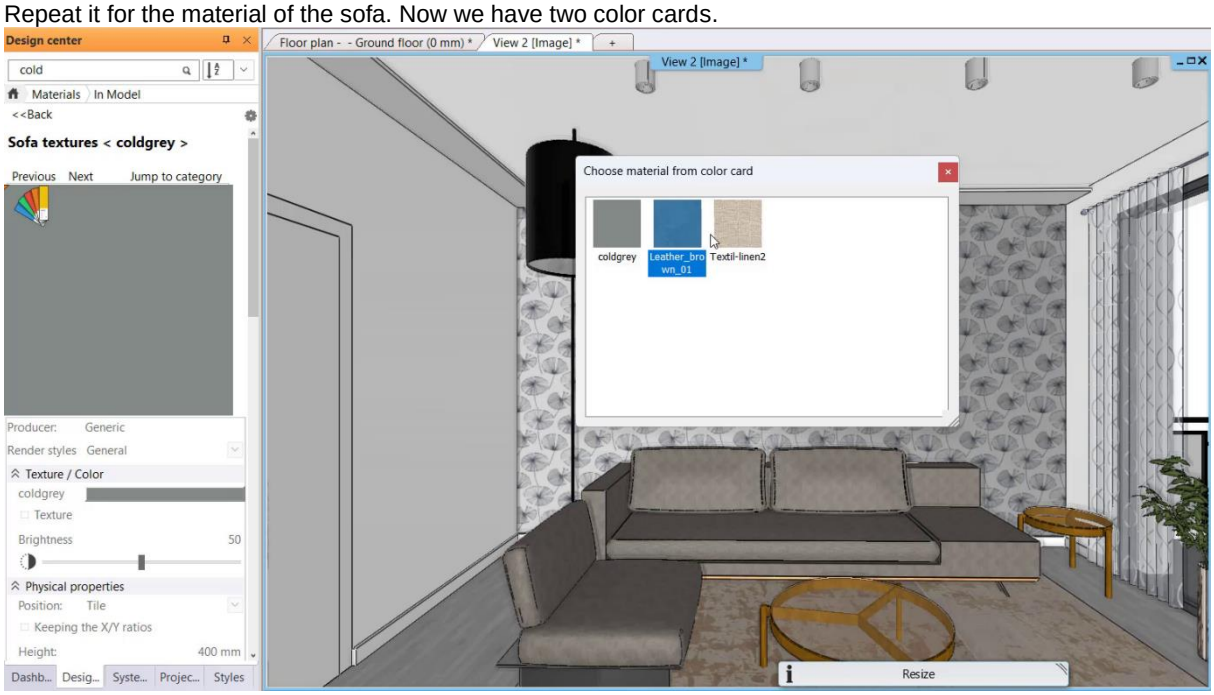


From now on, the materials of the 3D model can be changed to the materials on the color card.

- Click on the color card icon in the upper left corner and select the new material in the appearing dialog.

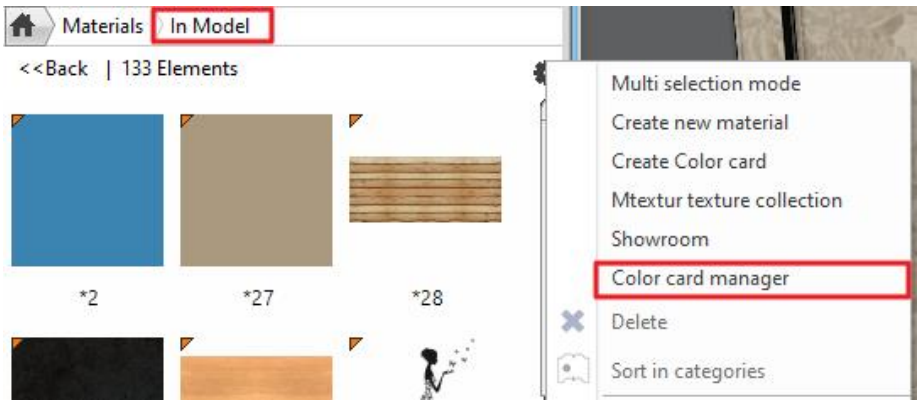


- Repeat it for the material of the sofa. Now we have two color cards.

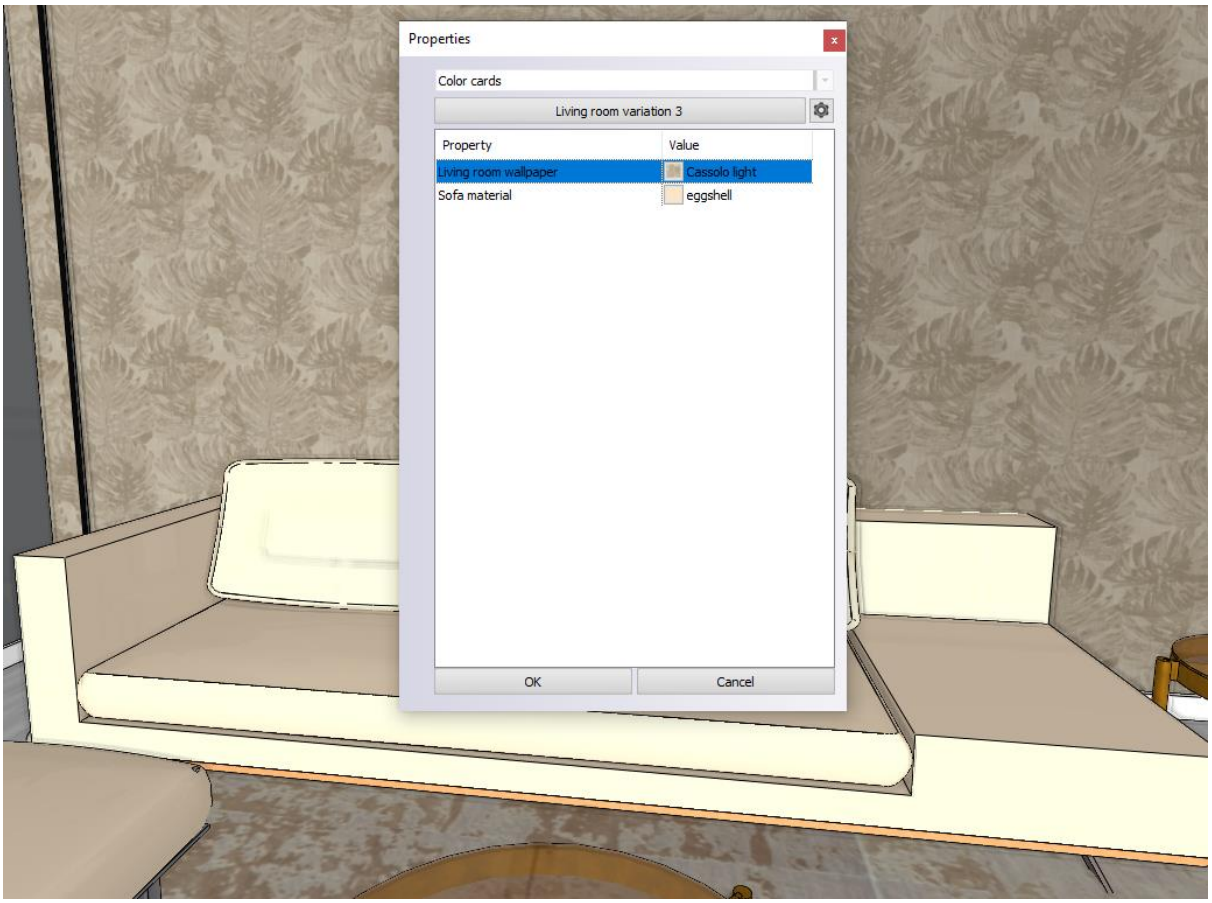


After that the color cards can be organized into styles so the different variations can be displayed immediately.

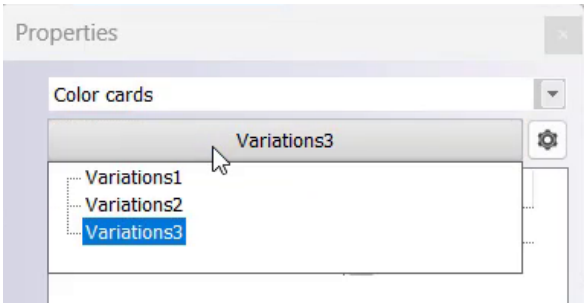
- Select the **In Model library – Settings – Color card manager**.



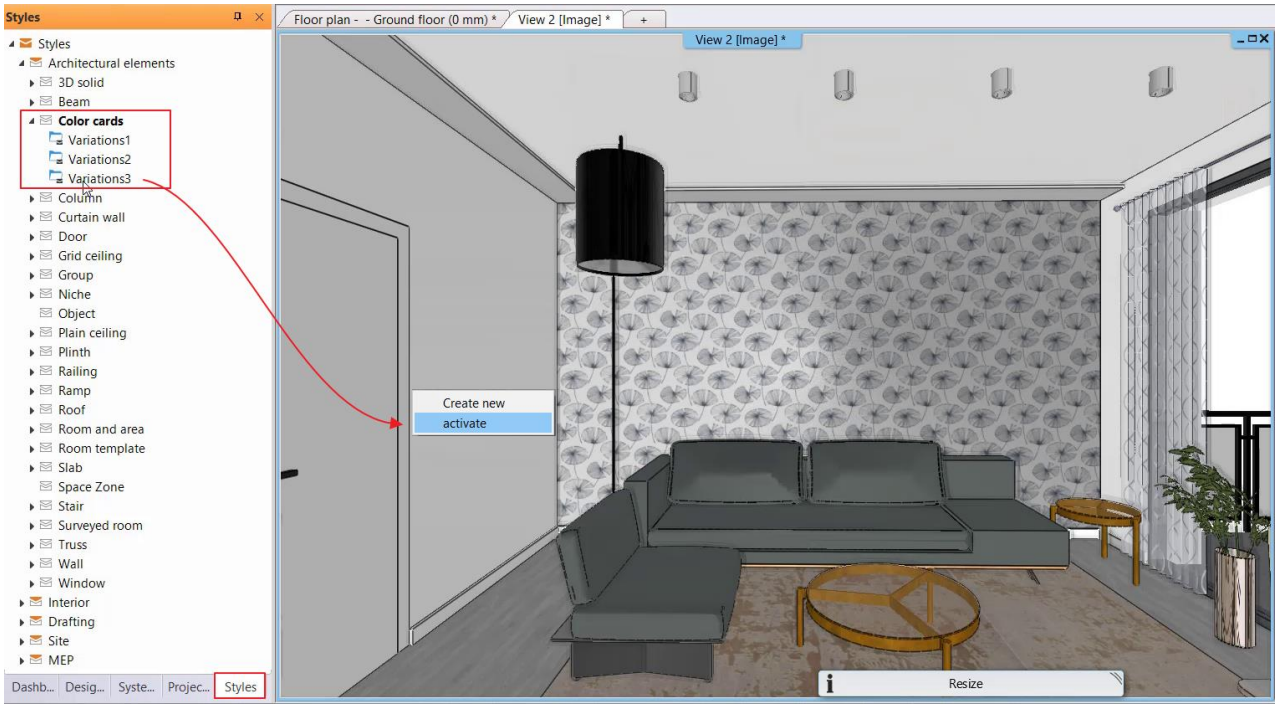
- Create 3 variations.
  Select the sofa fabric and living room wallpaper you want to see in a version, then click on the gear to save it as New Style. Repeat this as many times as you want to make as many versions as you like.



- When you are done, you can open these styles in the same place. Select the first version, and after pressing OK, the program will automatically generate the new 3D view.



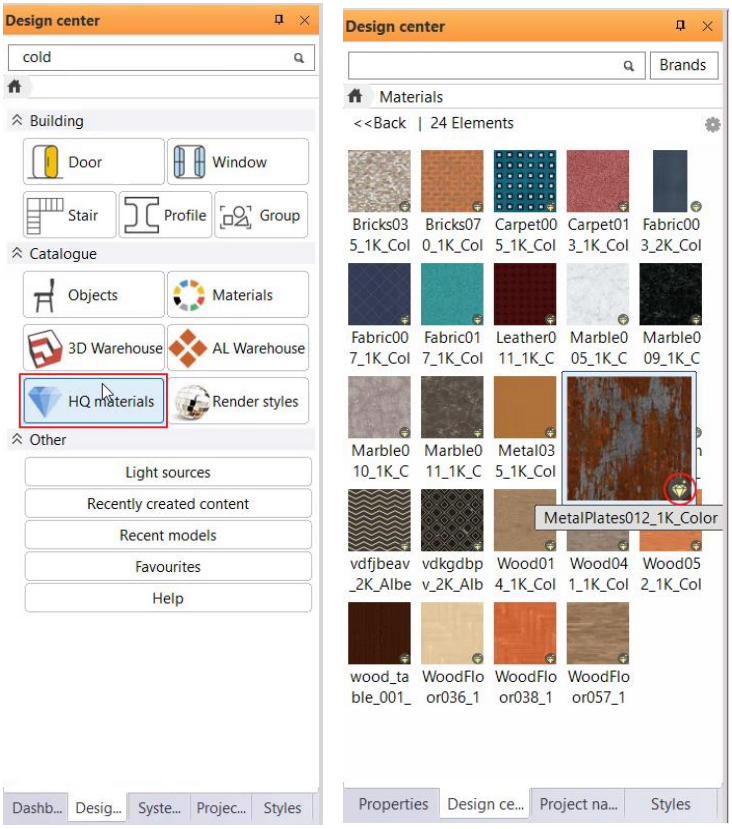
You can also activate a color card style from Styles by dragging the style onto the drawing and selecting activation.



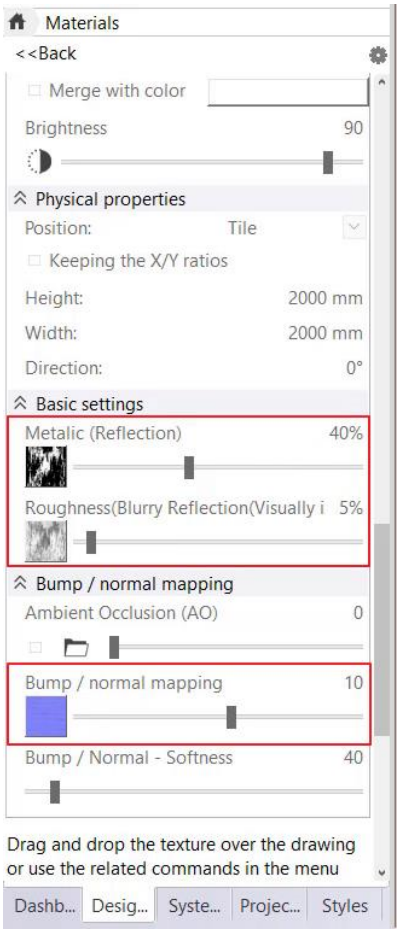
1.5. PBR materials

PBR materials open a new world to realism thanks to the channels being not only colors for reflection, transparency and roughness channels for example, but allowing designers to use a wide range of ready to use textures for these too from extremely rich and continuously growing online sources. PBR means Physically Based Rendering and allows to simulate existing materials as realistic as possible under all lighting conditions.

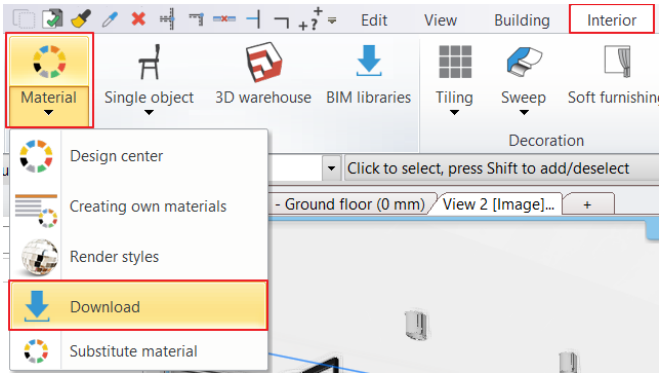
- These materials are available in ARCHLine.XP under **Design Center - HQ Materials**. Here, a number of materials are already pre-saved with a diamond symbol in the bottom right corner indicating that they are PBR materials.



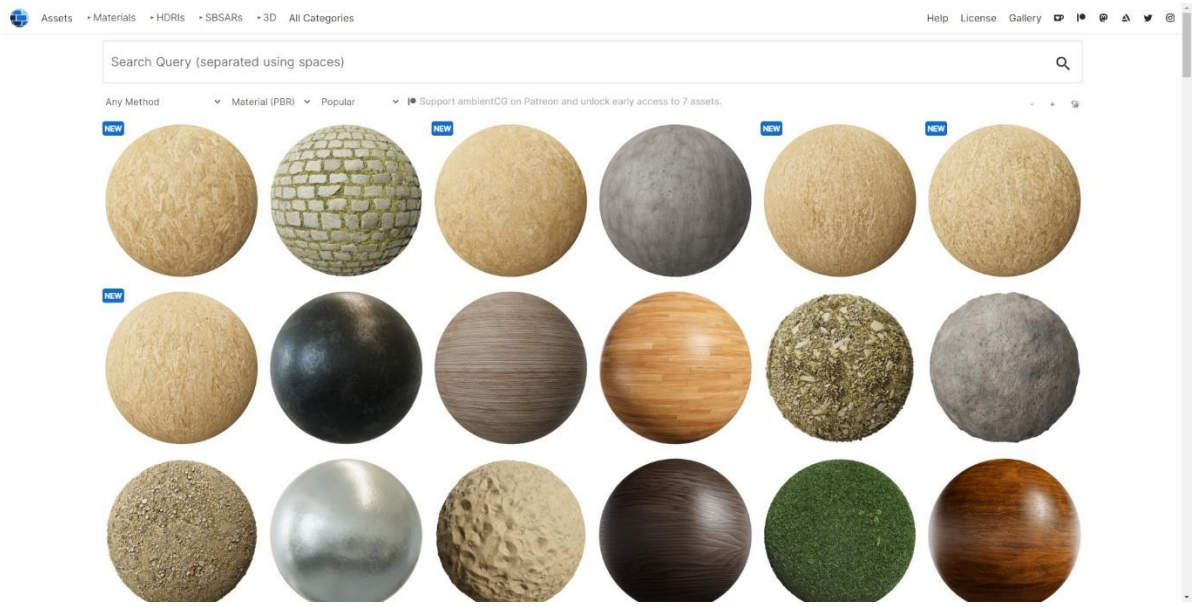
- In the material setting, you can see that Metallic (Reflection), Roughness and Bumb mapping can be specified not only by values but also by textures. This makes PBR materials much more detailed and realistic than "normal" materials.

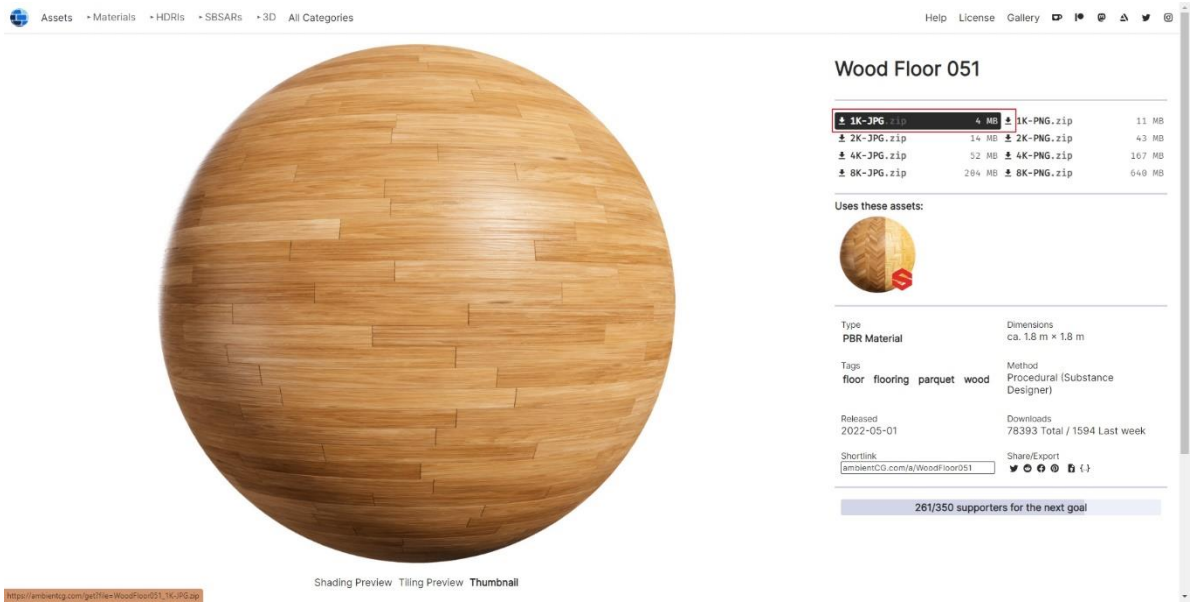


- Another advantage is that you can access these materials from a huge and constantly growing database. By choosing Interior - Material - Download, the program redirects you to the PBR material library of ARCHLine.XP, where you can find a list of where to download additional PBR materials.

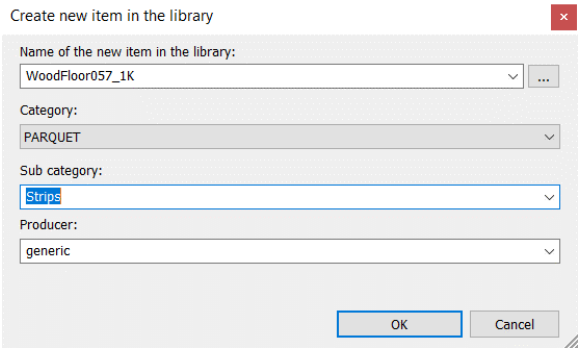


- Go to ambientCG, where you can find a range of textures under Materials. Search for 'wood' and download a sample of your choice. There are several resolutions to choose from, but we recommend that you do not use a resolution higher than 1K-2K. If you choose a higher resolution, it may slow down your work considerably.





- After downloading the .zip file, drag and drop the zipped folder into the Design Center of ARCHLine.XP (on the left sidebar) without unzipping it.
- The program then pops up the material properties, where you can set the following:
  Render styles – Parquet
  Texture (albedo): 55
- If necessary, the reflection, roughness, refraction and bump mapping of the material can also be adjusted here.
- Save the material after pressing OK:



- In **Design Centre - HQ materials** or **Design Centre - Recently created content - Materials**, select the material you just saved, then place it on the floor as usual Like painting or grouting.

  For more useful information on material management, watch this video: [ARCHLine.XP Materials]

Workshop 2: Visual design

2. Workshop: Visual design

Created by Krisztina Hárosi

First of all, we need to answer one question.

Why is photorealistic rendering important?

One of the most common ways of communicating in today's modern world is through images. You only have to think of the various social networking sites, we communicate with each other almost exclusively through pictures. This is also mostly the case in interior design. Often our clients prefer to look at a visual image rather than a drawing or a section. A good render will help you to visualize the interior design, answering many questions/doubts:

"Will the materials and colors I choose look good in my living room? Will my client like the lights? Will they light the room well enough? And the accessories? What will she/he think of them?".

These are questions that can be answered positively with a well-done render image.
So why is photorealistic rendering important? Because we can capture the heart of our client with a sophisticated visual image. The interior will feel like their own.
Let's look at these two pictures taken in the same room. In the first image (image 1), the materials are not set up yet, I didn't use render styles, excessive use of sun and artificial lights, poor perspective, few test renders and short render times.
The second image (image 2) required more time, many test renders and longer render times, but if we put the two images in front of our client, which one would have the greater impact?

Image 1.

Image 2.

To achieve the quality of image 2 in our renderings, we need to learn to create photorealistic images. You have to learn to deal with lights and shadows, know the physical properties of the materials, find the ideal point of view, and build up a photorealistic image that looks realistic, step by step.
In this tutorial, I will show you the main steps of rendering using a simple living room example. From setting the viewpoint to the final render, we will see in detail what values to add in this project and what to look out for to avoid the main mistakes. The result will be the image shown above.

- The tutorial video assumes a basic knowledge of rendering, which you can learn in the Preliminary Course - Rendering workshop.
  To complete tasks please download the Intermediate Course – Interior design – Workshop Projects 2024 from our website and install to your computer. This contains all projects for Intermediate workshops.
  You can also find the video of the presentation on the website.

  If you feel like it, first create a render with the default settings and save it, so you can compare the two images at the end of the process. It's also a good idea to save the test renders so you can track the progress of the image.
  In the tutorial, we will follow the steps below:

1) **Viewpoint setting**
2) **Sun position**
3) **Material options - Render styles**
4) **Artificial lights**
5) **Final render image**

- Open the *..\Documents\ARCHlineXP DRAW\2024\ Workshop_Intermediate\2_Visual_Design\ Harosi_Krisztina_Render_Start.pro* file.

2.1. Viewpoint setting

We often overlook the right perspective. Perhaps the main mistake you see in interior renders is that the creator wants to show as much as possible in a picture: usually setting the perspective from a corner, diagonally (so the scene will look insignificant) or from the top down (so it will look smaller) and with a high camera angle (so the scene will look deformed) to fit everything in.

Scene with wrong viewpoint setting

Let's look at the basic rules for setting a good perspective:
Set the viewpoint perpendicular to the opposite wall at a height of 1-1.4 m so that the camera is at the same height as the point of view. This will make the scene of the picture more pronounced, resembling a professional photographer's image.

In the perspective dialogue window:

- Set the height of the camera and the object to between 1.1-1.4 m.
- Camera angle should be between 50° and 70°, otherwise the scene will be distorted. Choose 60°.
- Position the camera opposite the back wall.

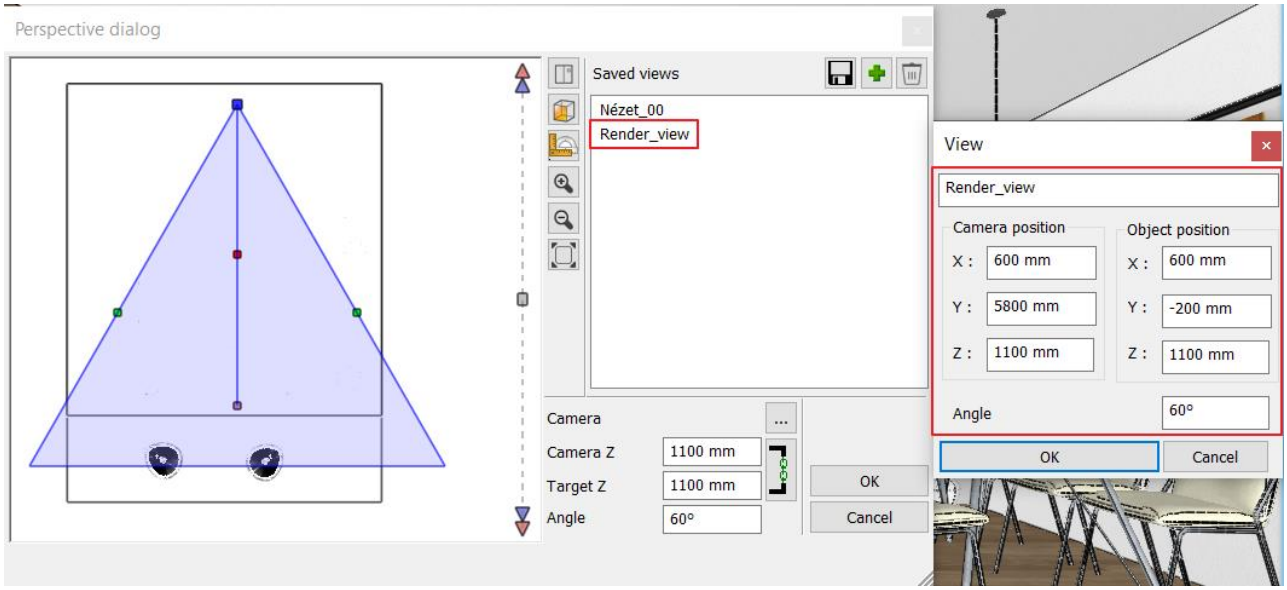
Scene with good point of view setting

Of course, this is not a rule that cannot be "broken". If necessary, from this position, you can take small steps to turn towards the corner (while making test renders), but don't overdo it.

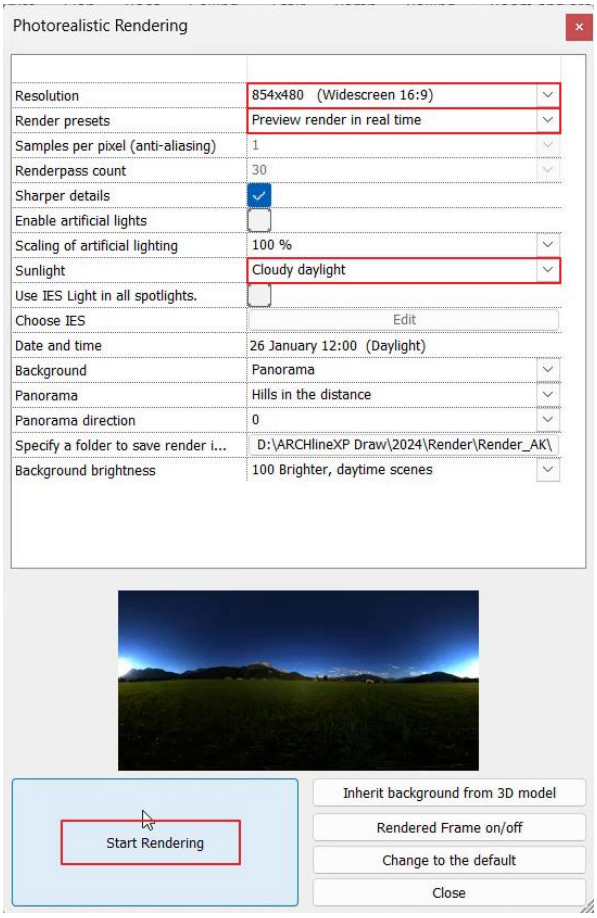
Render image with turned viewpoint

When setting the viewpoint, adjust the position of the camera and object:
Camera position - X: 0.594, Y: 5.809, Z: 1.095
Subject position - X: 0.594, Y: -0.207, 1.095

Save the setting by clicking on the Save setting icon.



At this point you can also adjust the size of the image. Of course, here it's only at a low resolution. In the rendering settings, in the Standalone Rendering window, set the Resolution to 854x480.
Choose the Preview render in real time and the Cloudy daylight sky.



- Start the rendering. Save the first render image: Render_01.

  Don't turn off the Render window, so you can see the real-time image following the changes.

- Turn on the *Render frame* in the *View - Rendering* menu.
- Maximize view in 3D to see which parts of the scene are rendering.

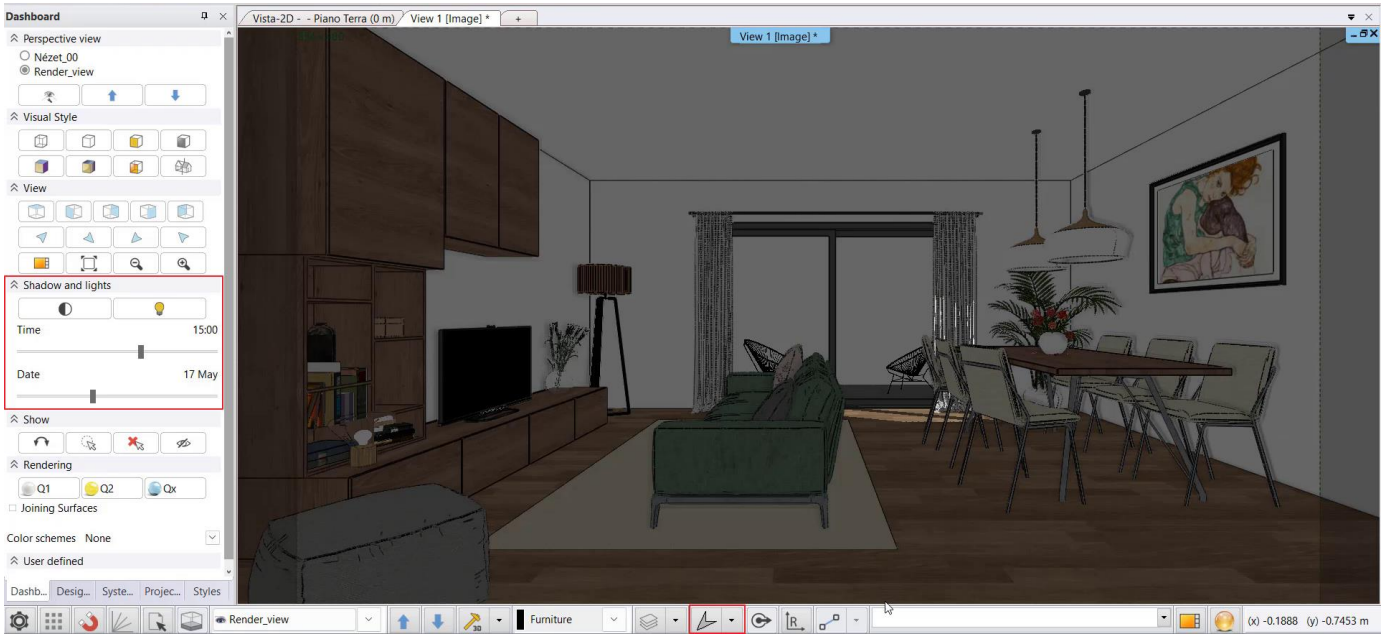
  It's a good idea to leave this on as you work, so that if you use a new viewpoint or modify an existing one, you can keep track of what you'll see in the render.

2.2. Sun position

After setting the right viewpoint, try several sun positions, compare the results and choose the best one. Some like a late autumnal late afternoon sun setting with longer shadows, others like a high sun setting in the summer after lunch. Choose the sun setting that works best for you, but make sure it creates a contrast between light and shadow. For example, don't brighten the whole scene by having the light come from behind the camera, or choose a sun setting so low from the eye that it illuminates the whole interior. Try to find a good light/shadow balance.

Example: too low sun exposure from the front, date: 26 January 12:00

- On the Dashboard, turn on the shadow and set the date: 17 May 15:00
- Set the North direction to 225°



The result is directly displayed in the real-time draft render.
If you don't like the result, look for another sun position.

- Save the second render image: Render_02
- Once you have set the correct sun position, turn off the real-time draft render and turn off the shadow.

Compare the 1st and 2nd render images:

1st render

2nd render

2.3. Material Options - Render Styles

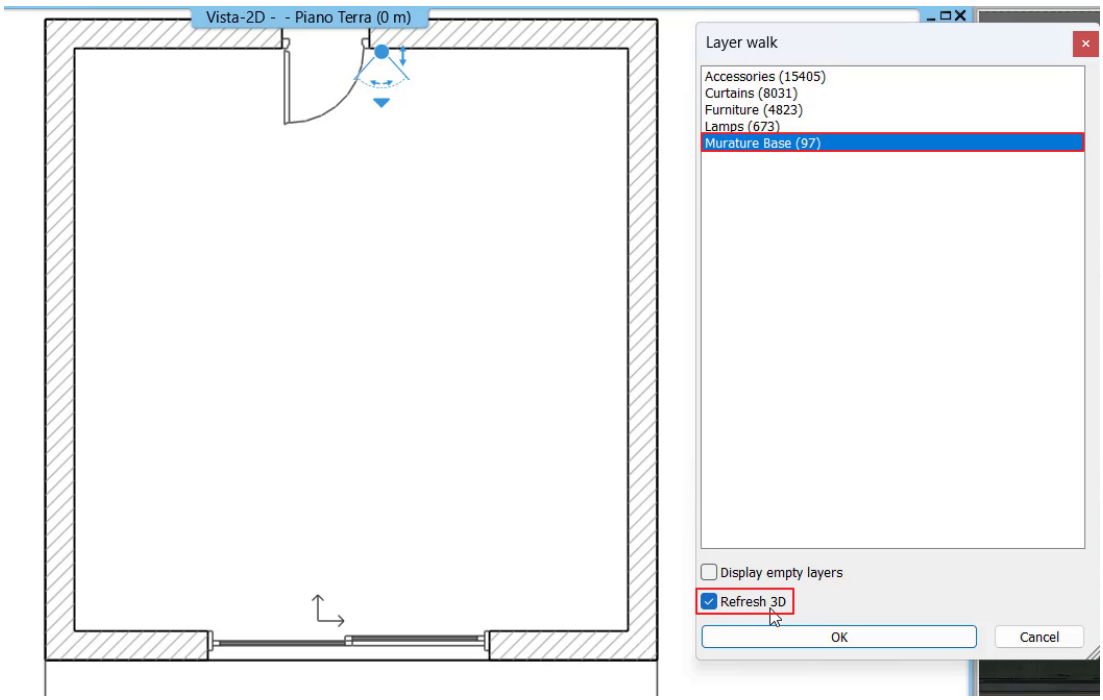
Before we get into this not at all easy subject, I would like to give you some general advice on choosing the right texture and setting the material.
Always use high quality textures. These can be found in the ARCHLine.XP Showroom or downloaded from various websites, but make sure you choose images with a medium resolution, about 400x400 pixels, but this depends on the actual size of the texture. For example, if it's a poster covering a whole wall, choose a higher resolution image.
It is important that the textures are seamless. If they are not, they should be converted into a seamless pattern either in ARCHLine.XP or in an image editing program, if possible.
If you want a really good rendering, not only assign the right render styles to the objects, but also take the time to fine tune the parameters of the materials while checking the settings with test renders.
During test renders, it is possible that the color of some materials, e.g., wood, may become too dominant and affect the surroundings, e.g. walls (Image 1), so it is recommended to desaturate them somewhat in an external program such as Photoshop, Gimp, Lightroom, etc. (Image 2).

Image 1

Image 2

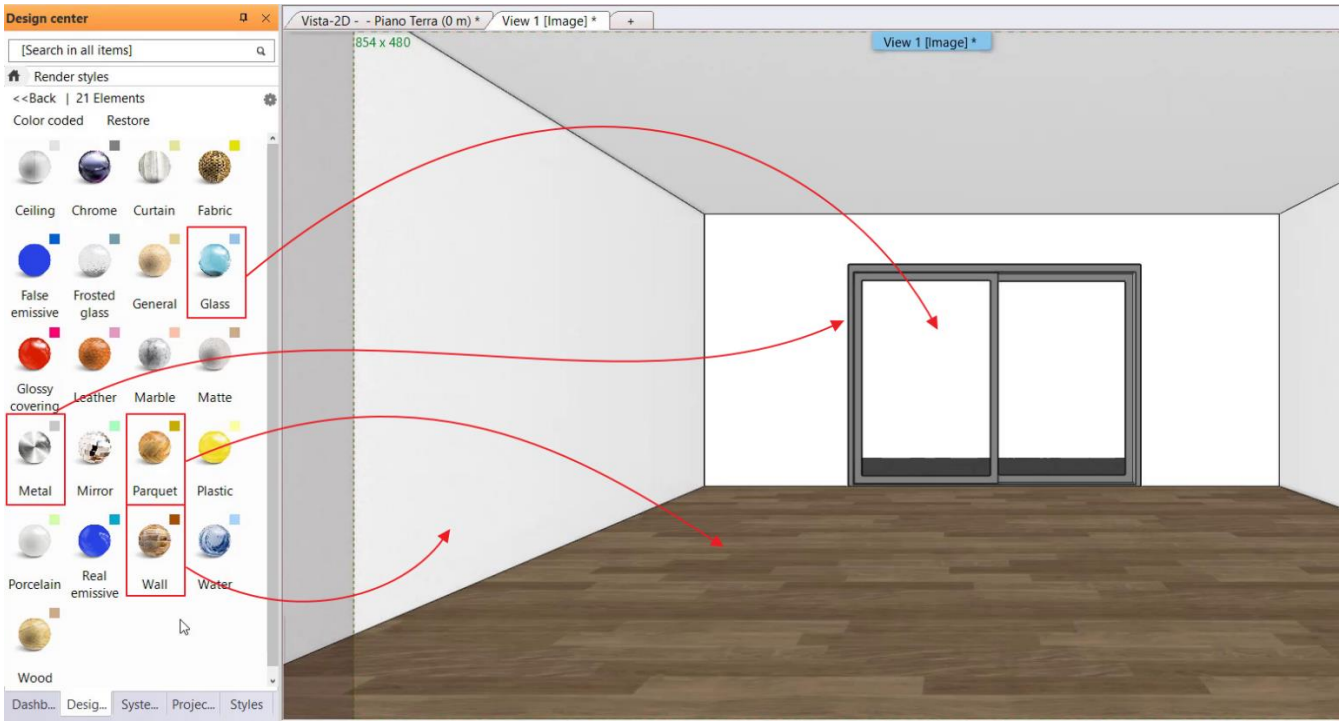
2.3.1. Material adjustment on architectural elements - Phase 1

In the first phase, only the architectural model is displayed, which is located on the "Murature Base" layer in the example project. Switch off all other layers. Rebuild the 3D model.



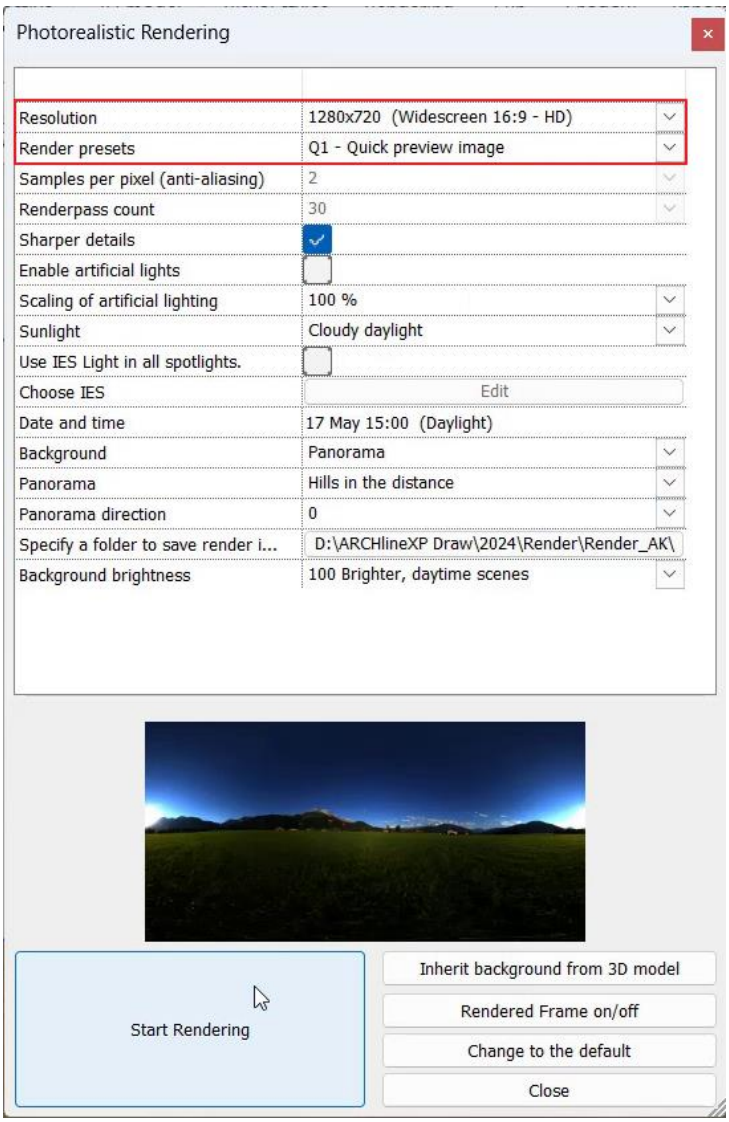
Using render styles

Use the drag and drop method to assign appropriate render styles to these main elements. Wall for the wall, parquet for the parquet, metal for the metal door and glass for the glass.



Render styles

Before fine-tuning the material settings, let's create the first standalone test render.
In the **Standalone Render** window, set a medium resolution and Q1 preset with the following parameters:

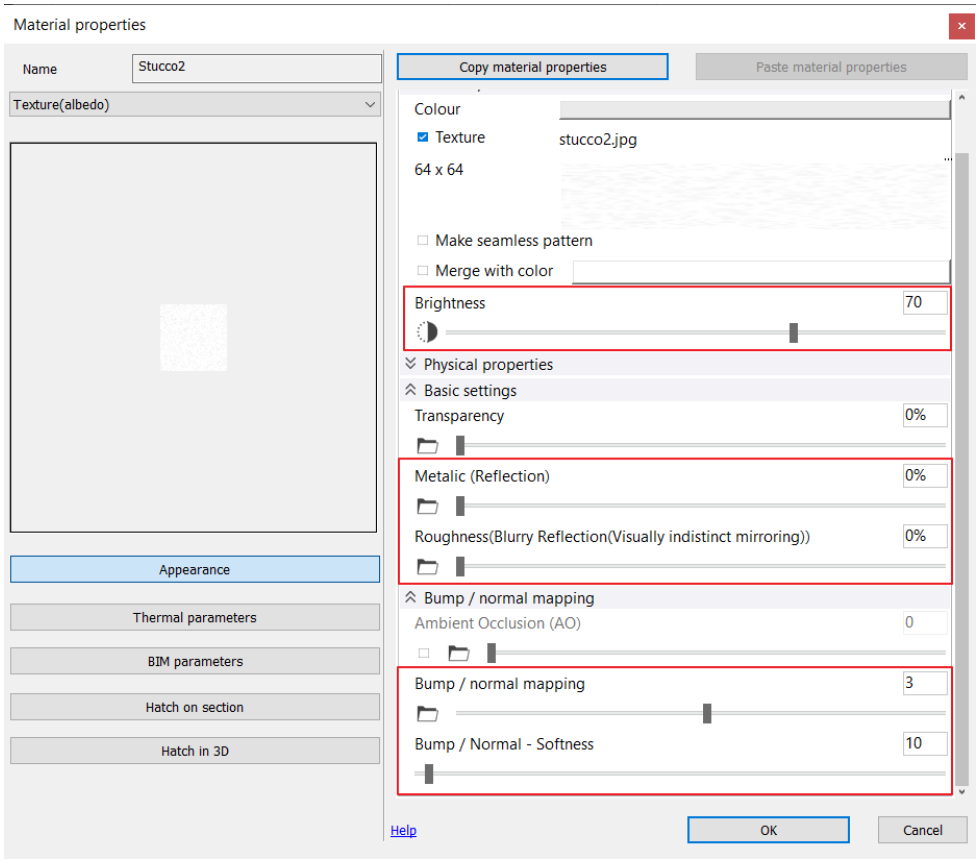


3rd render: without fine-tuning the materials

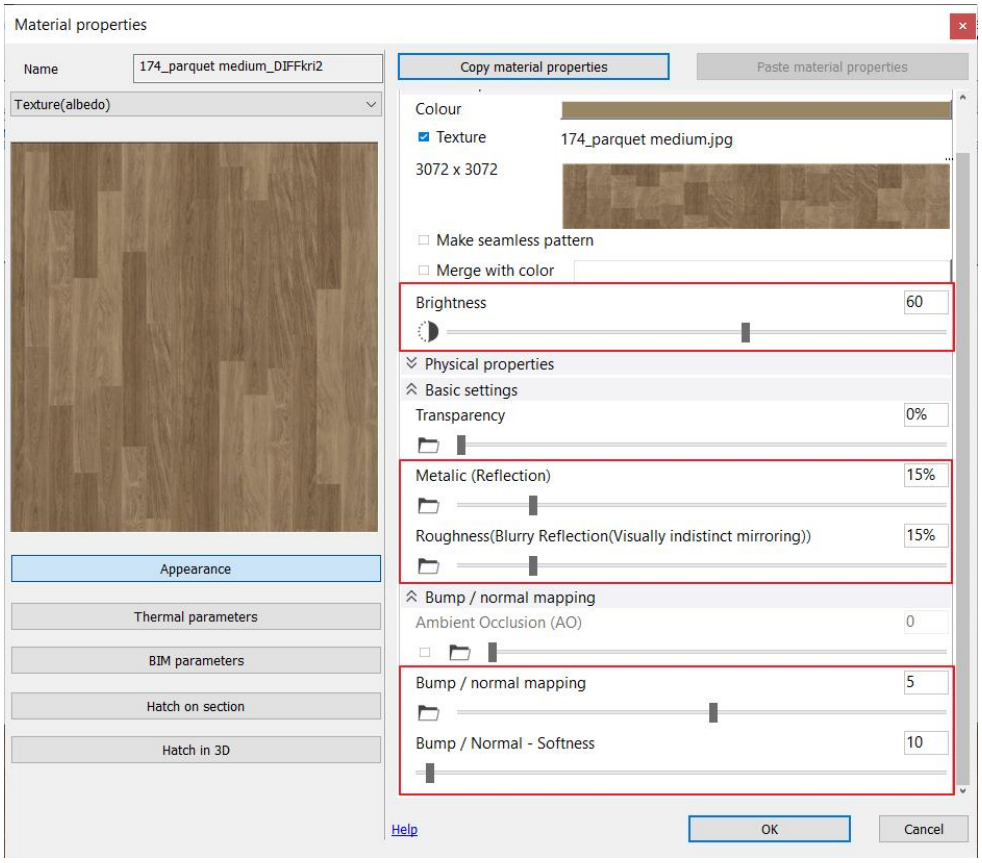
- Save the third render image: Render_03

  Next, fine-tune the materials as shown in the following images:

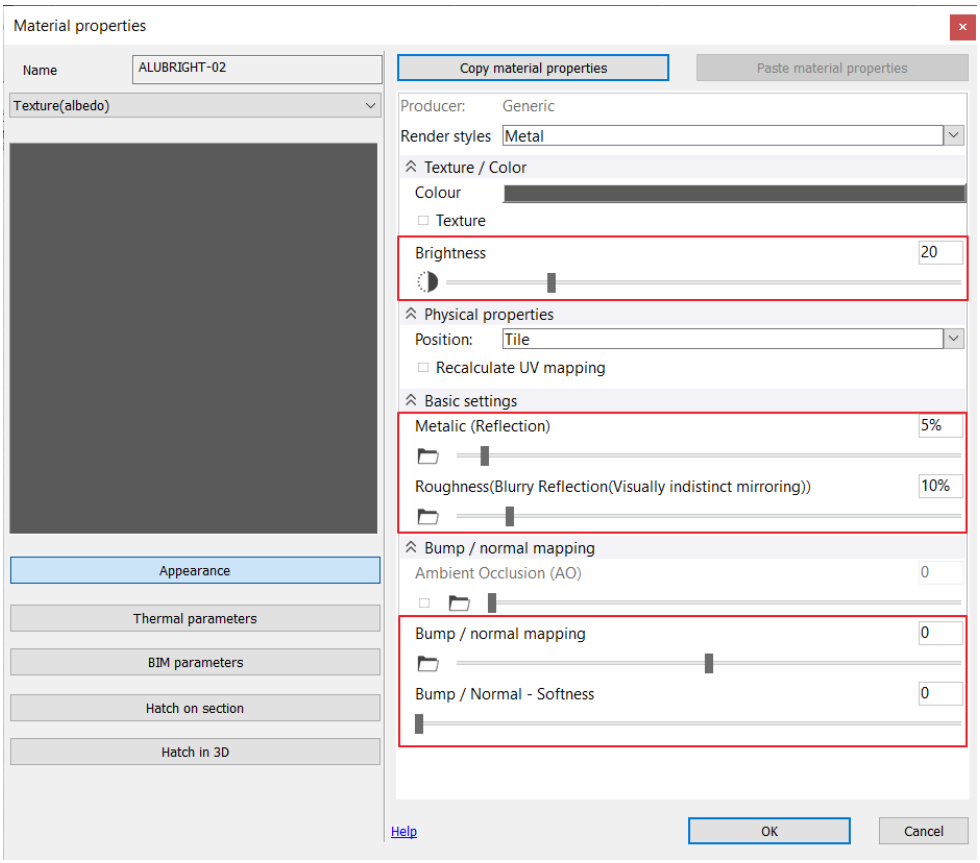
Wall:



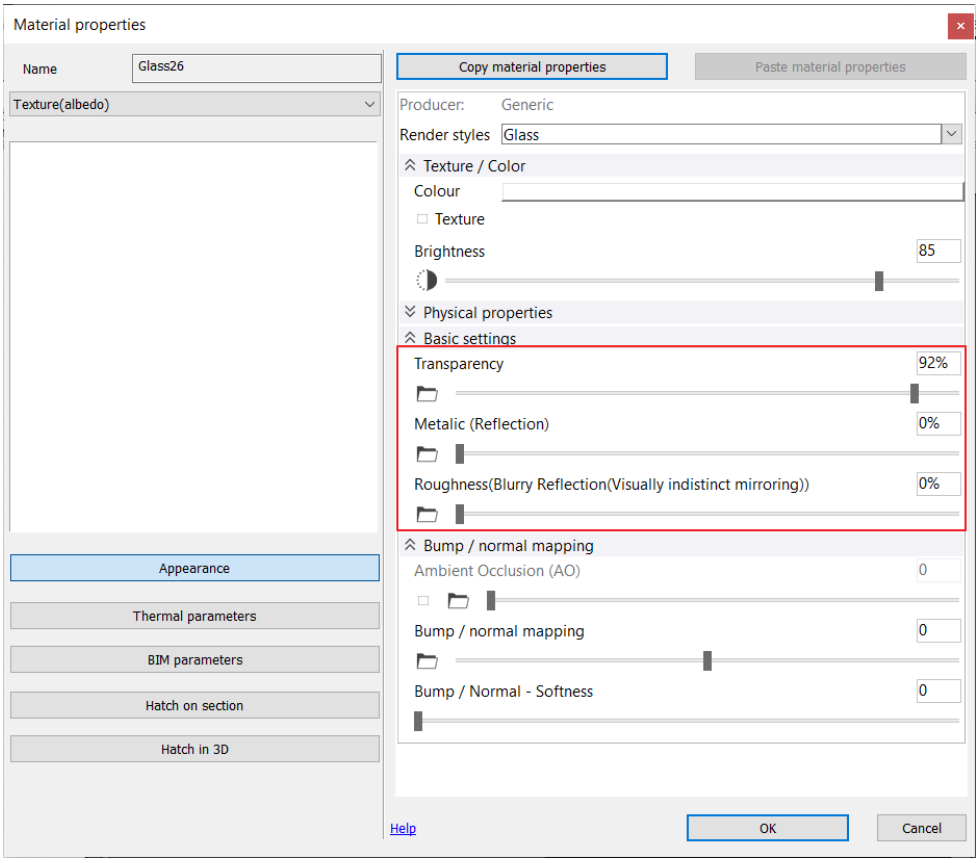
Parquet:



Door frame:

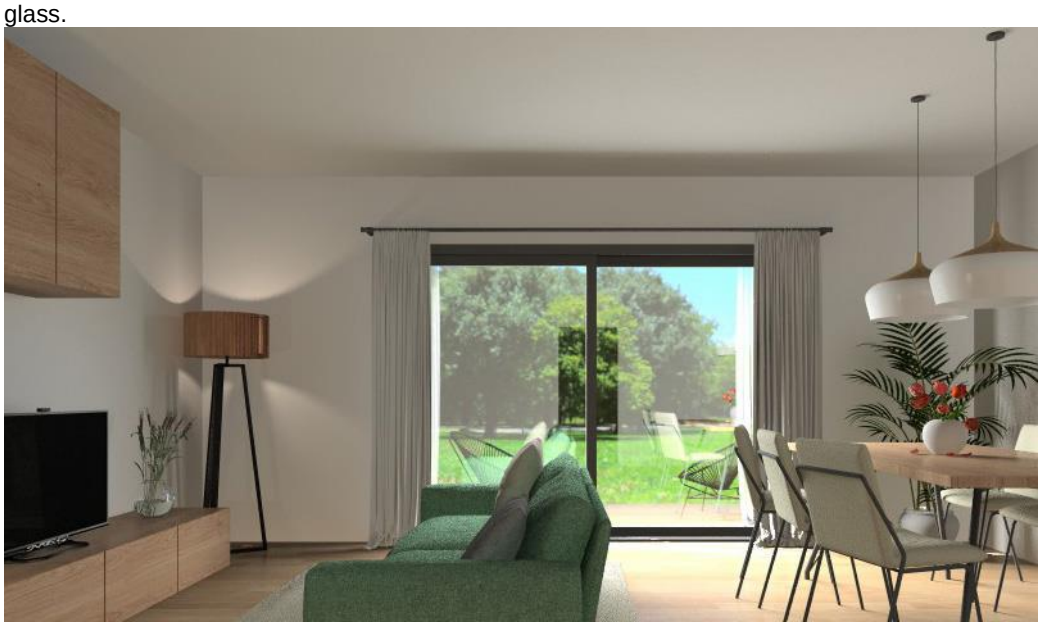


Door glass:



In the Glass property window, as you can see, I've completely removed the reflection, as if the glass wasn't there. Of course, if you want, you can set low values for refraction and reflection. However, keep in mind that in this scene the

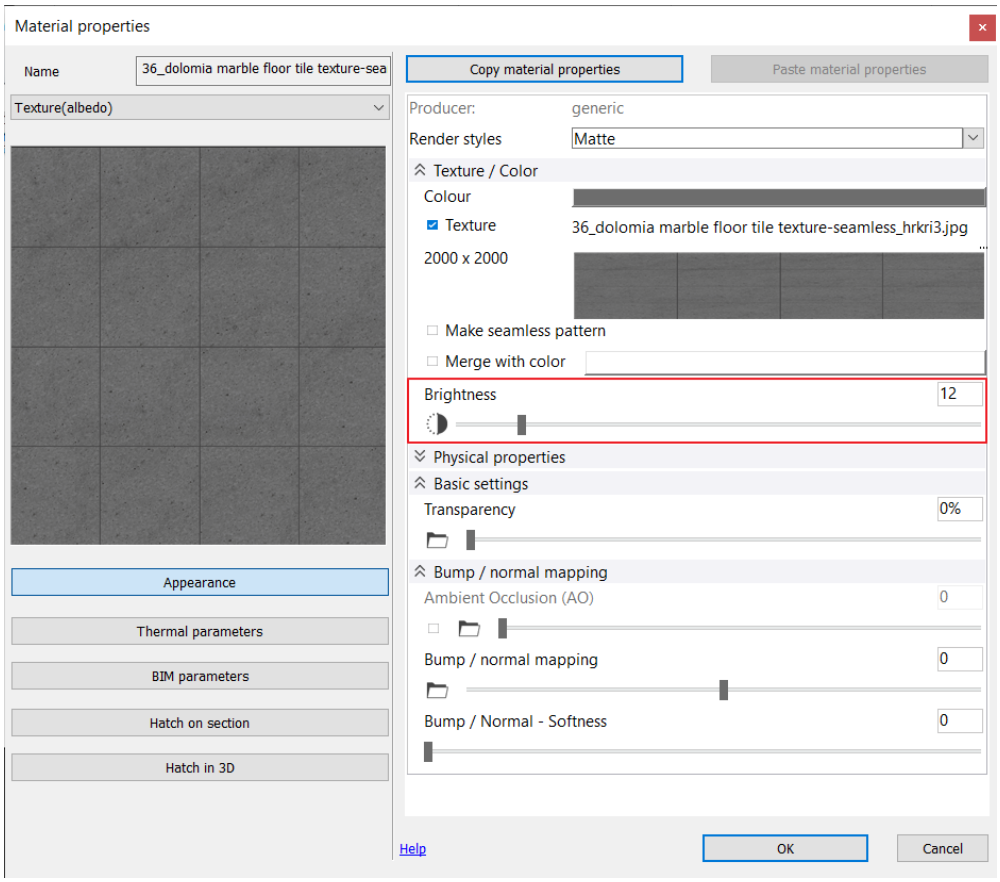
intensity of the sunlight is strong and the background is bright, so you shouldn't see any reflection of the interior on the glass.



Window glass with reflection

Terrace flooring:

This will be the surface that gets the most sun. To keep it from being over-burned, I've assigned it a matte render style and set the brightness to low.



Prepare the next test render with the values already set.

4th render: after fine-tuning the materials

- Save the fourth render image: Render_04
  It's okay if it looks dark, we'll correct it with effects at the end of the workflow.

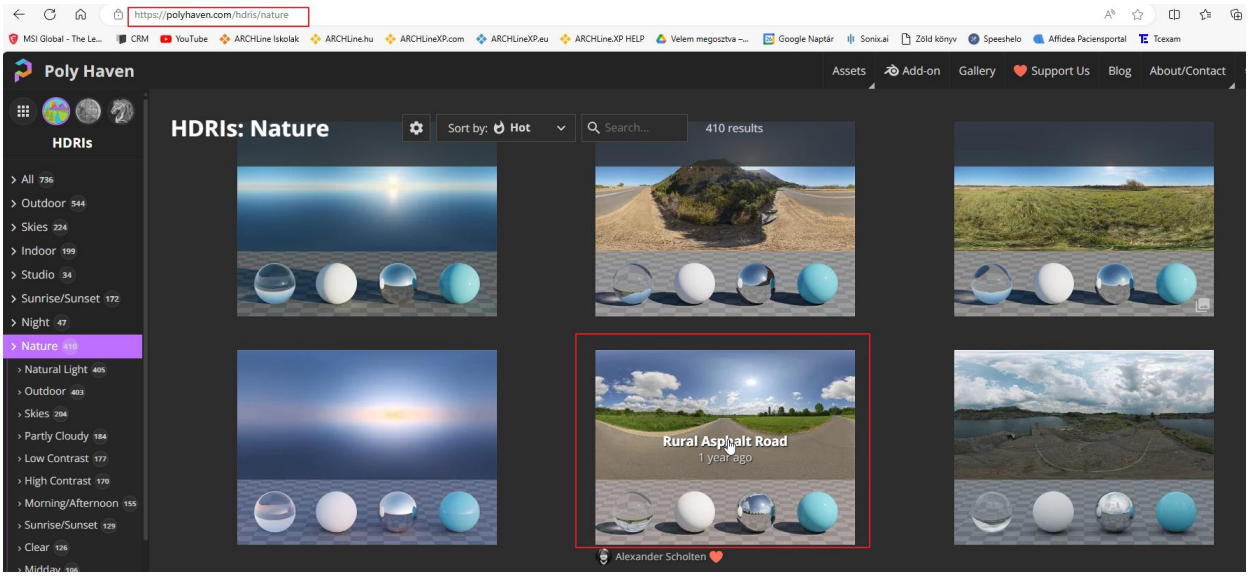
  Compare the third and fourth render images:

3rd render

4th render

Using a custom panoramic image

The *Hills in the distance* panorama image is replaced by a custom panorama image.
The extension of the panoramic images is .hdr. You can download high quality panoramic images from various websites, e.g. Poly haven: https://polyhaven.com/hdris/nature



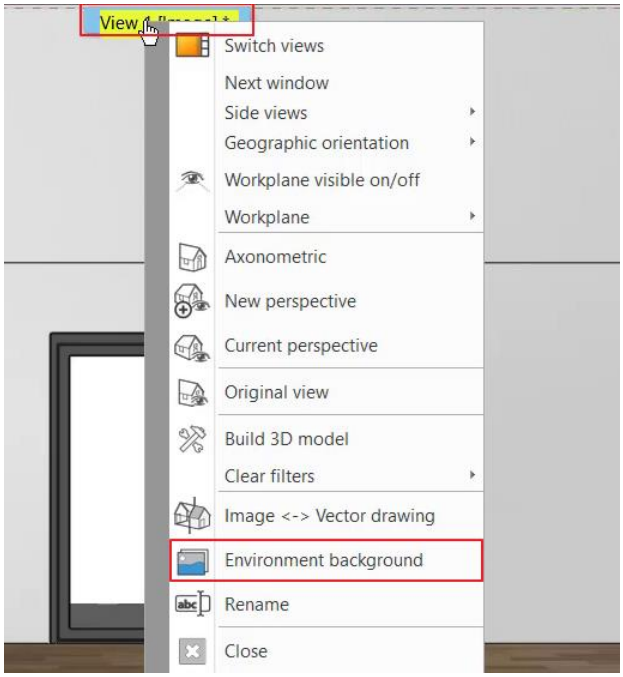
- Download the Rural Asphalt ROAD hdr image.
- Resolution is recommended 2K - 4K. Images with higher resolution may overload the project due to their large size. (In case of low resolution, the image will be pixelated.)

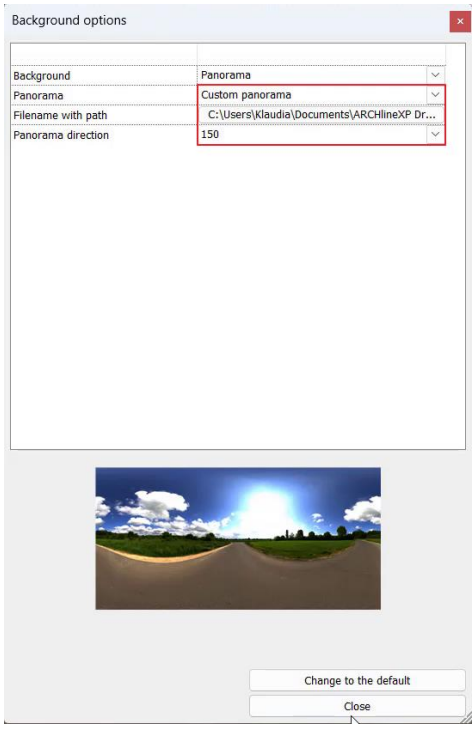
  (The already downloaded panorama image can be found here:
  ..\ARCHlineXP DRAW\2024\Workshop_Intermediate\2_Visual_Design\rural_asphalt_road_4k.hdr

  Setting up the panoramic image is easy to do in the 3D window.

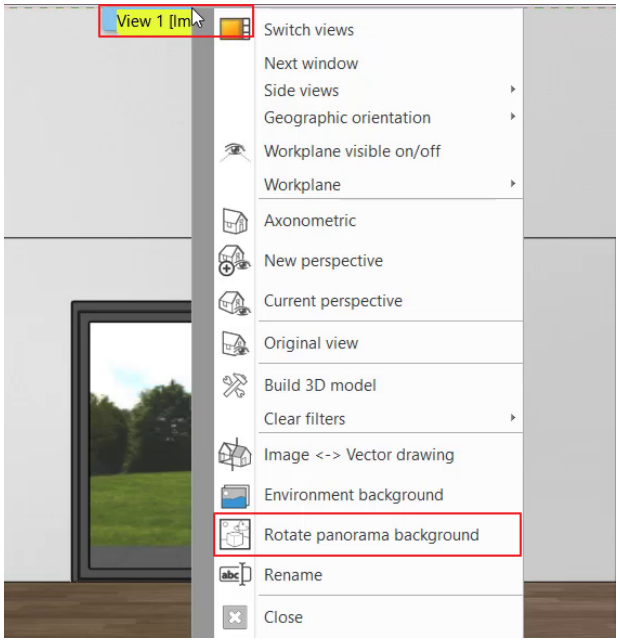
- Select the panoramic image

  After closing, the result is displayed in the 3D window.

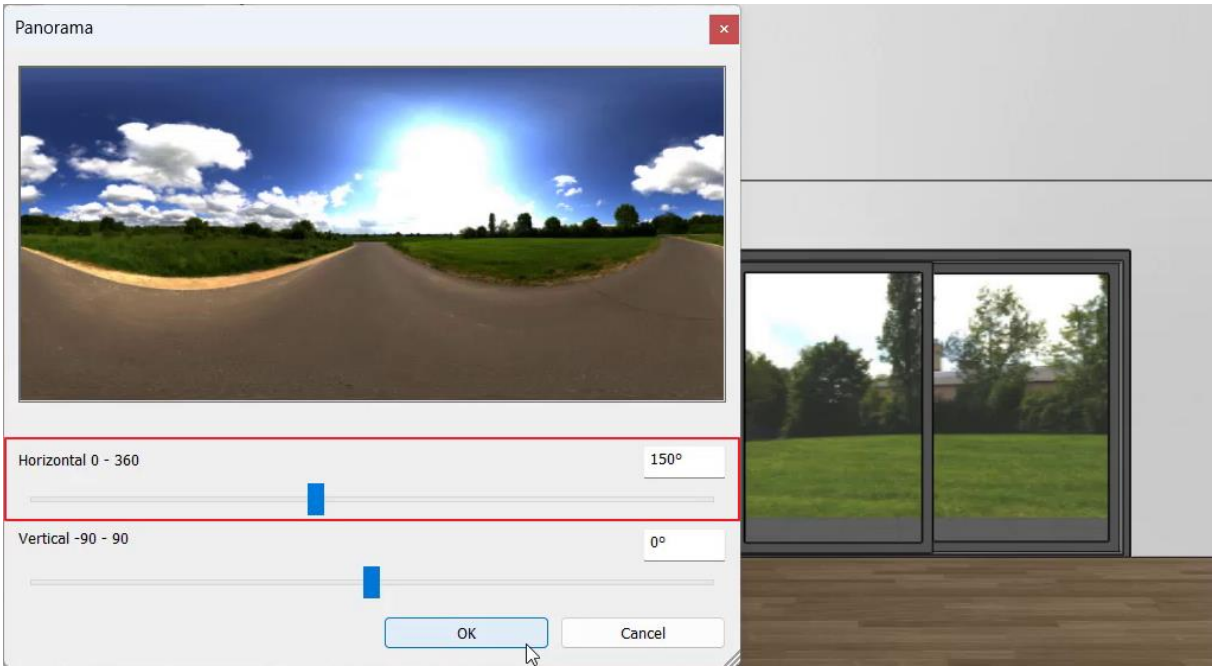




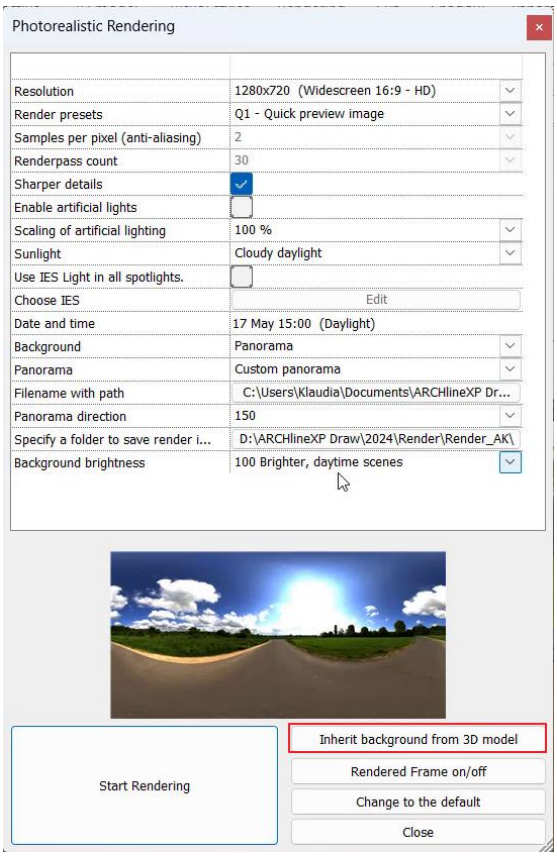
- Now select the Rotate panorama background command:



- Use the horizontal slider to change the direction of the panorama and find the view you want. In the example we use 150°. The 3D view follows the movement of the slider.
  The angle thus adopted will be used in the render window.

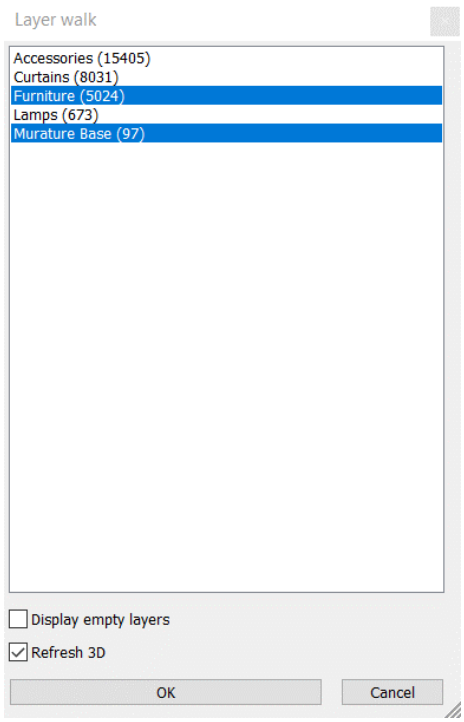


- Create the render with the new panorama image: click on the **Inherit background from 3D model** button. The panorama image selected and set in the 3D view will be transferred to the render window.



2.3.2. Material adjustment on furniture - Phase 2

In phase 2, we deal with the furniture.
Let's turn on the "*Furniture*" layer, where the furniture can be found and rebuild the 3D model.



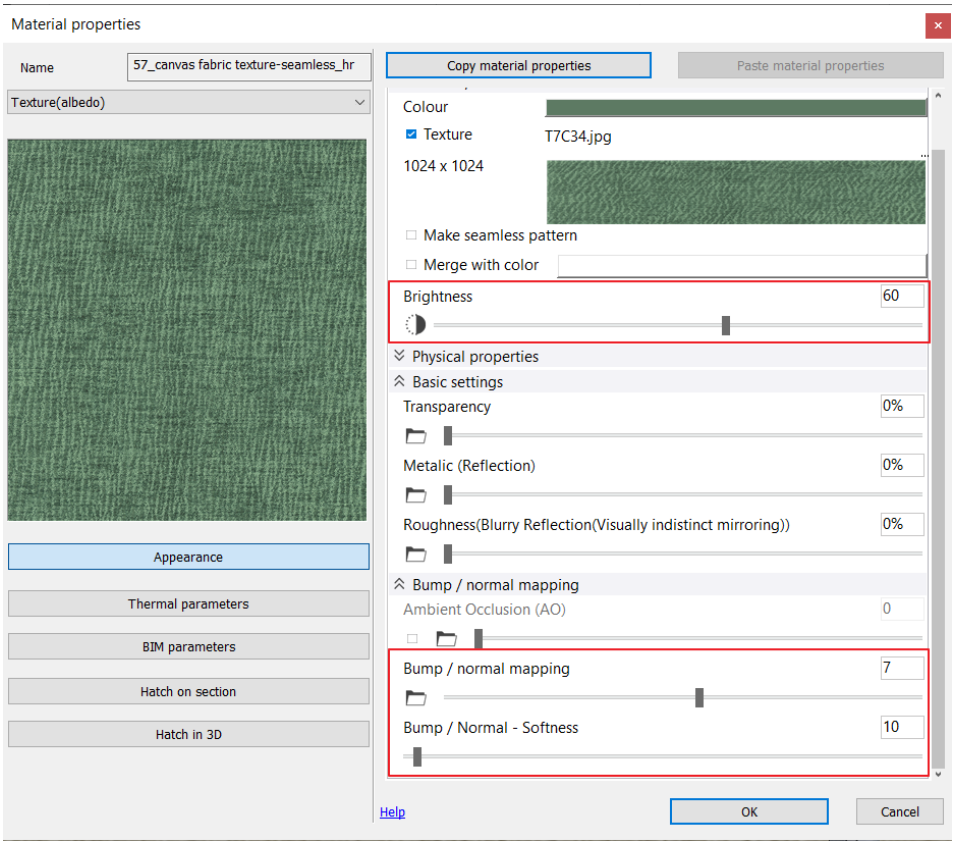
We also assign render styles to the new elements:

- Parquet style for the bookcase
- Textiles for the sofa, cushions, chair fabric and carpet
- Metal style for metal legs.

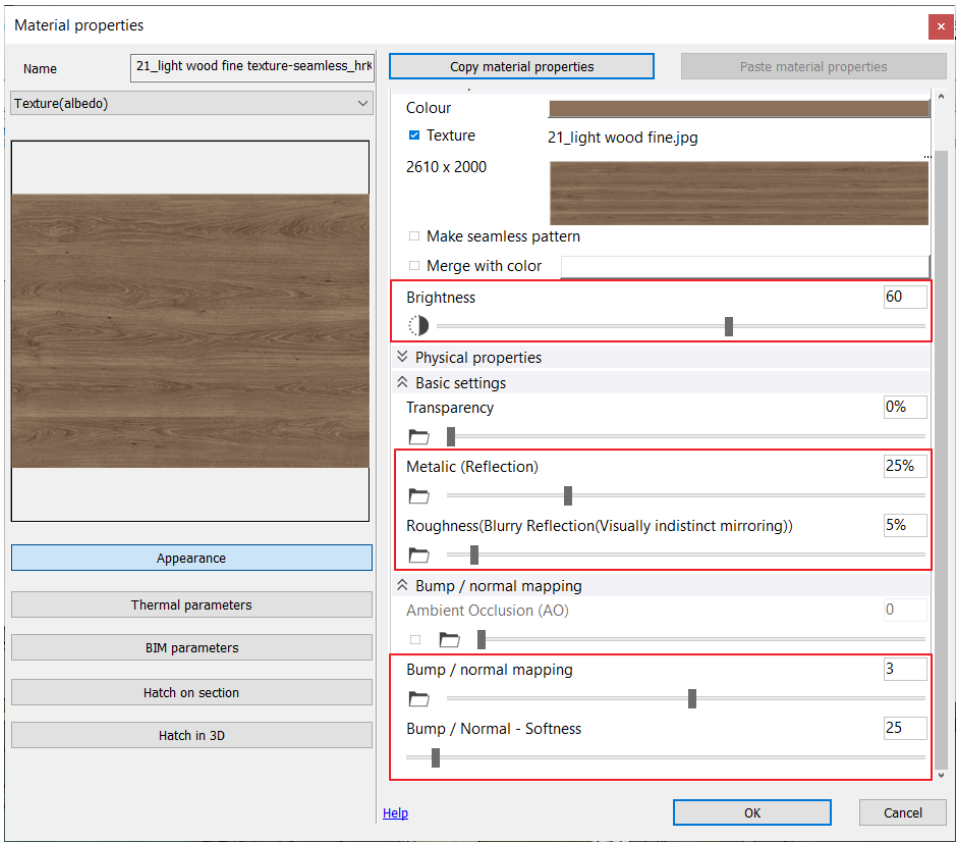
It's worth taking a close-up test render of each piece of furniture to see any imperfections at a low resolution.

5th render

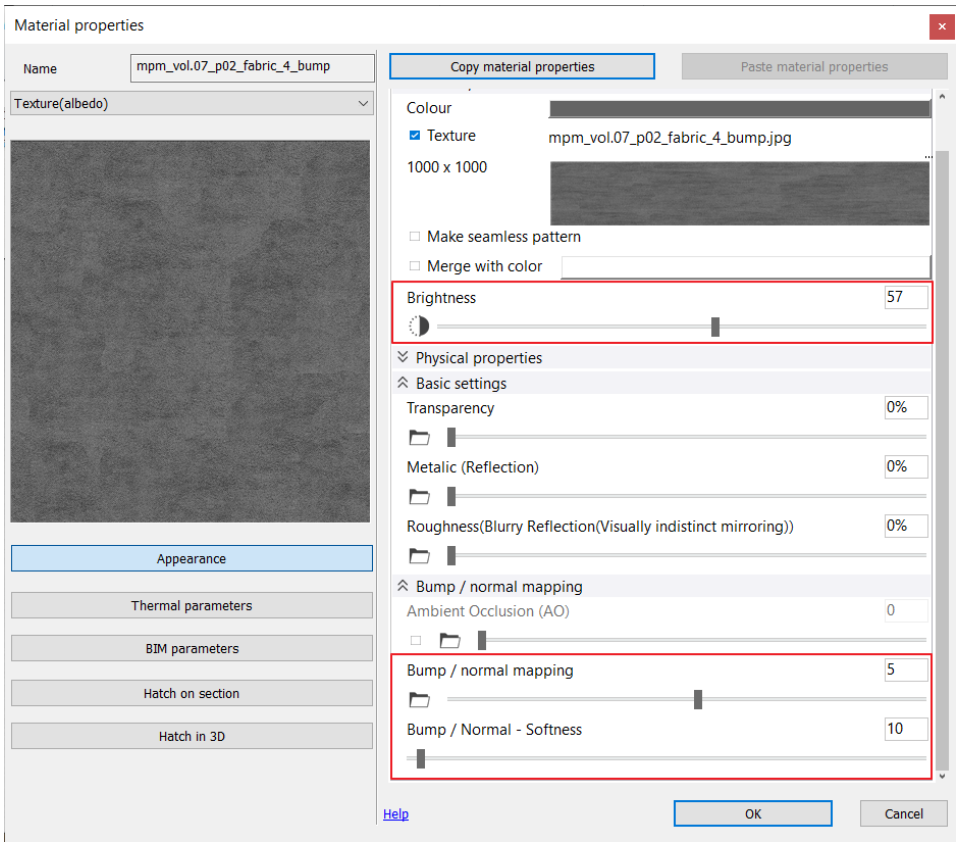
Sofa upholstery material:



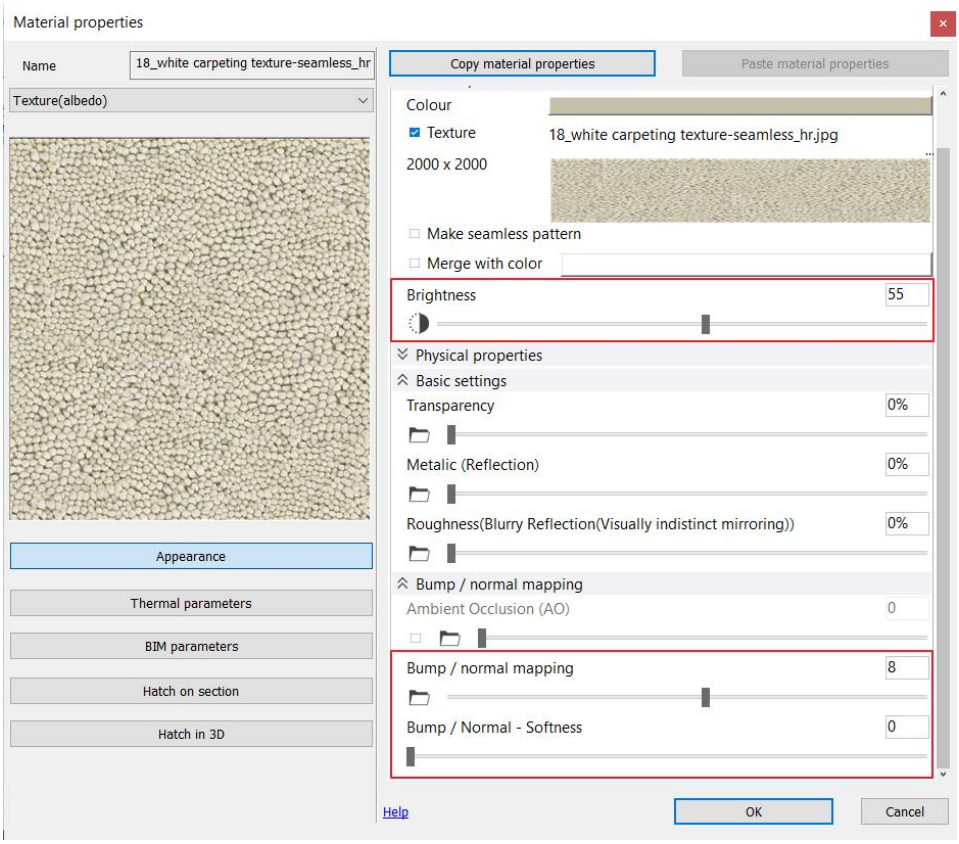
Bookcase:



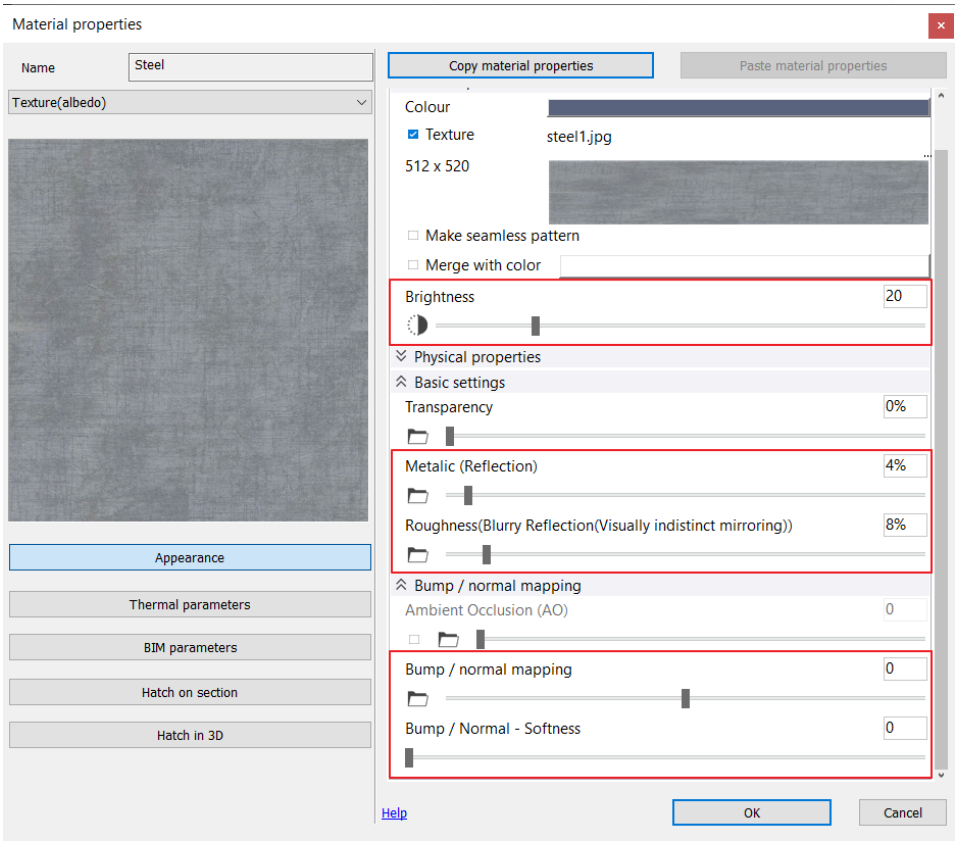
Grey and brown cushion, chair upholstery:



Carpet:



Metal legs of sofa, table, chairs:



Make the new test render still with 1280x720 resolution and Q1 preset:

6th render

The result is evolving, let's continue working with artificial lights.

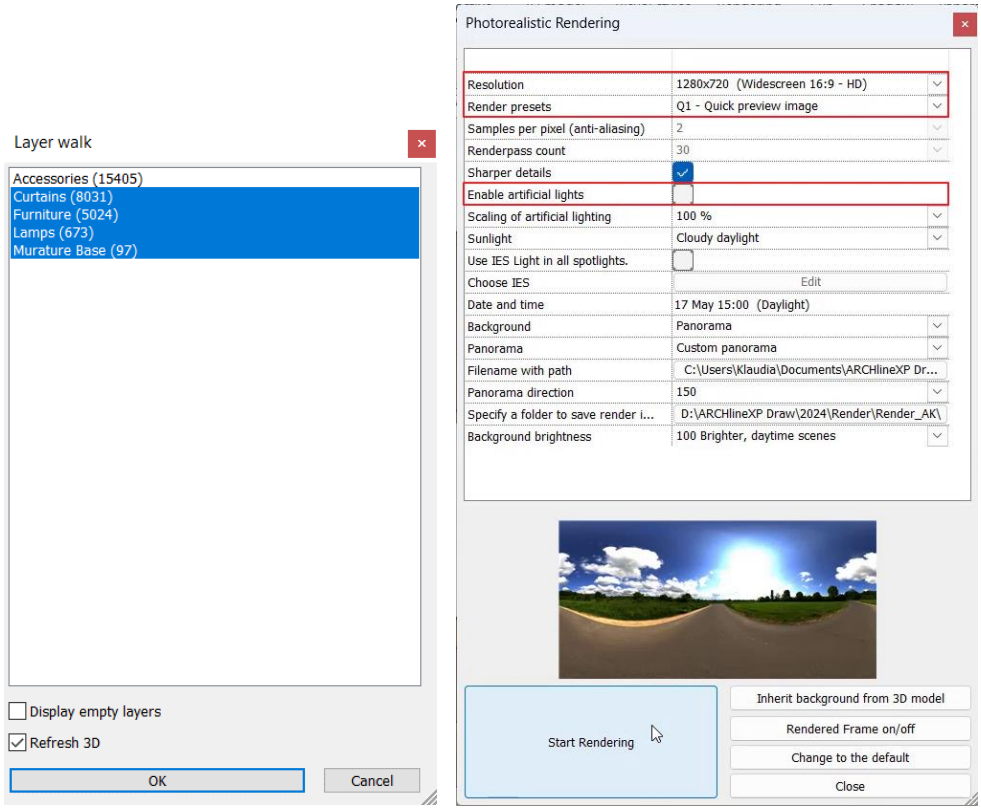
2.4. Artificial lights

In addition to natural lighting, the correct management of artificial light sources is very important. A well-lit space can give a pleasant feeling to those who look at it. It can help to highlight important parts of the room. By playing with light and shadow reflections, you can make the final result more exciting.
Start with lighting the darker parts of the room, then use spots, for example, to brighten up the more interesting parts of the room (e.g., a wall painting) and so on, taking care not to over-light the scene. If you reduce the intensity of the shadow, you 'flatten' your image.

With lamps off

- Turn on the "Lamp" and "Curtains" layers.

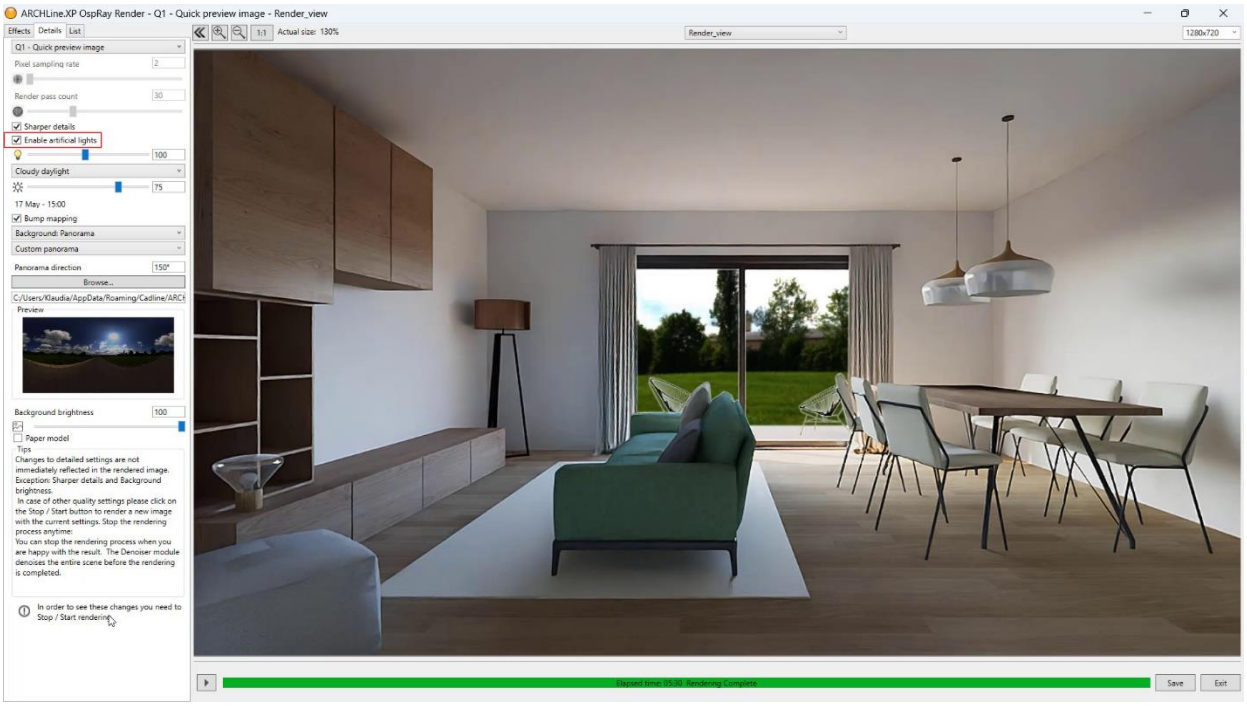
We have three groups of light sources: a floor lamp in the left corner, a small table lamp on the bookcase and 2 large pendant lamps. In the Standalone rendering window, turn off the *Enable artificial lights* option and start rendering.



7th render: Render image with lights switched off

With lamps on

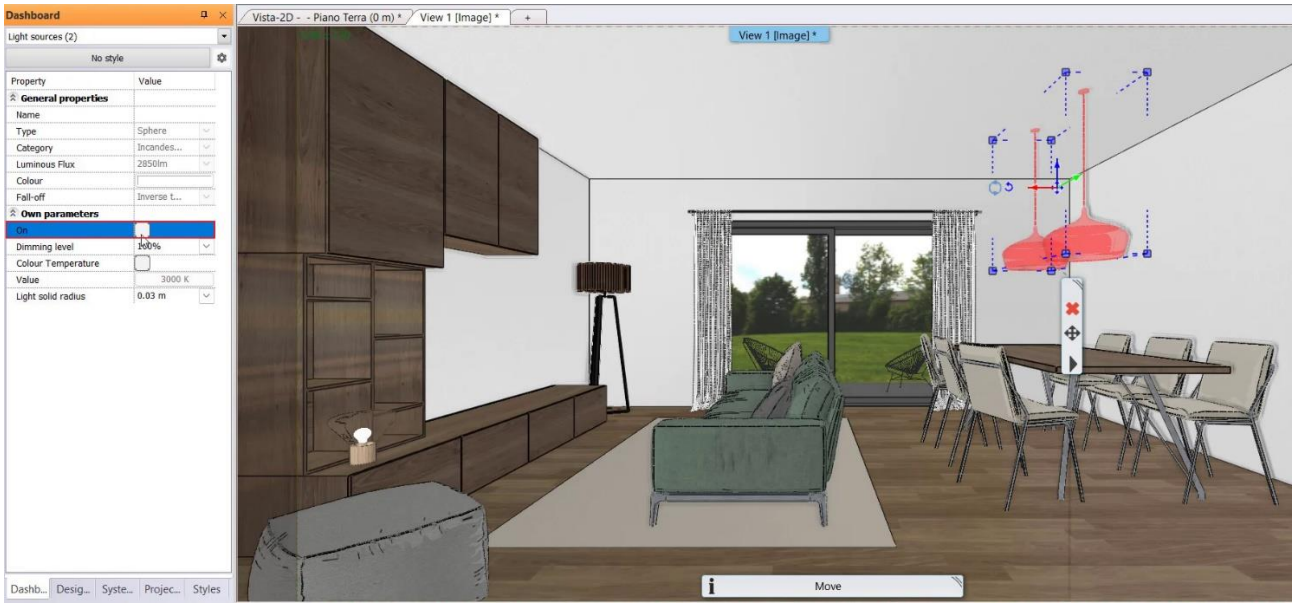
The picture still shows only natural lighting, regardless of whether the lights were on.
In the render window, under *Details*, turn on *Enable artificial lights* and restart the render.



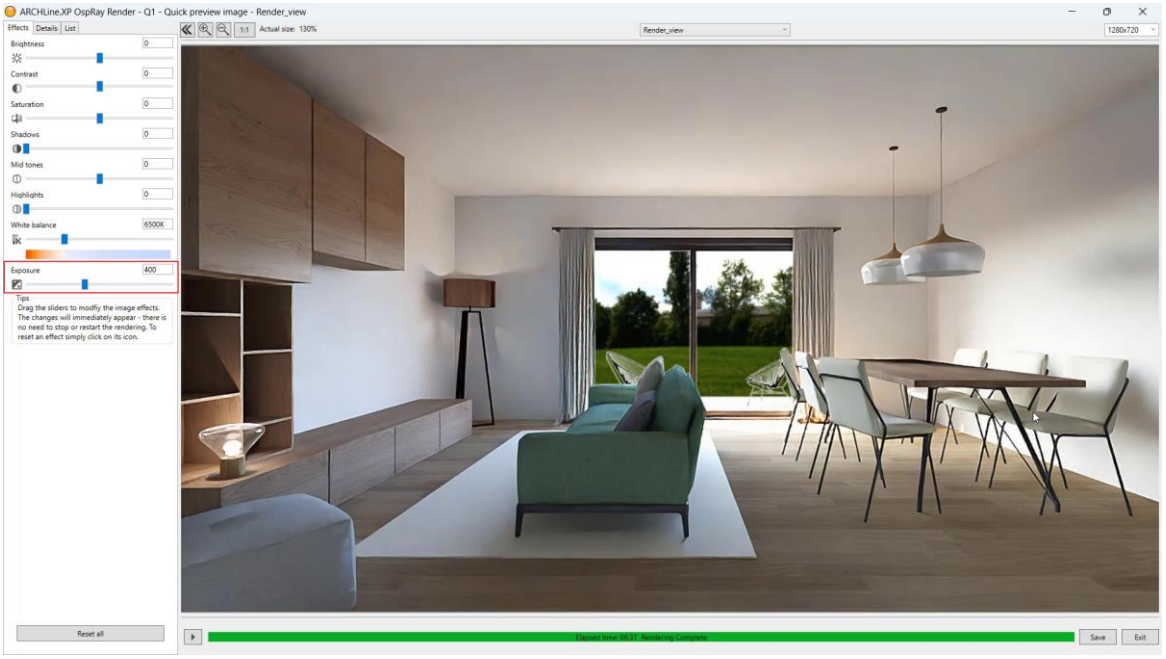
8th render: Render image with lights switched on

Low light

If you compare the two pictures, you can see that the small lamp and the floor lamp are very good at illuminating the dark parts of the scene. The 2 large pendant lights can be switched off, because this part of the room is already illuminated by the sun.



Let's make a rendering anyway. Remember to turn the lights back on in the standalone render window.
At this point, it's worth setting the exposure higher in the effects tab to brighten up the scene.



9th render

So, the lighting of the scene is right.

2.5. Final render image

We are now preparing the final render: in **FullHD (1920x1080) resolution** and **Q2 quality**. In most cases, Q2 quality is sufficient because there is no significant difference between Q2 and QX quality.

When do we recommend QX quality?

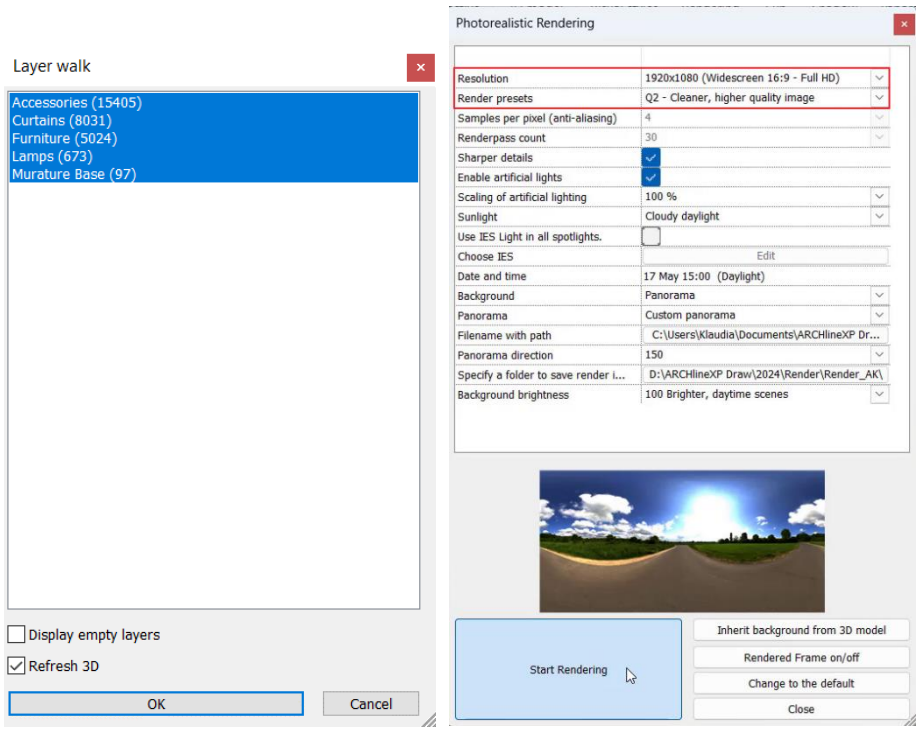
It should be used when there are parallel edges close to each other in the scene, e.g. a decorative strip. In such cases, you will get significantly better results with Qx.

Phase 3: switching on accessories

- Let's also turn on the last layer with the Accessories.

  We can also refine the material of the accessories, we can make more test renders.
  Here we are preparing the final render:

- In the standalone render window, enter the following values:



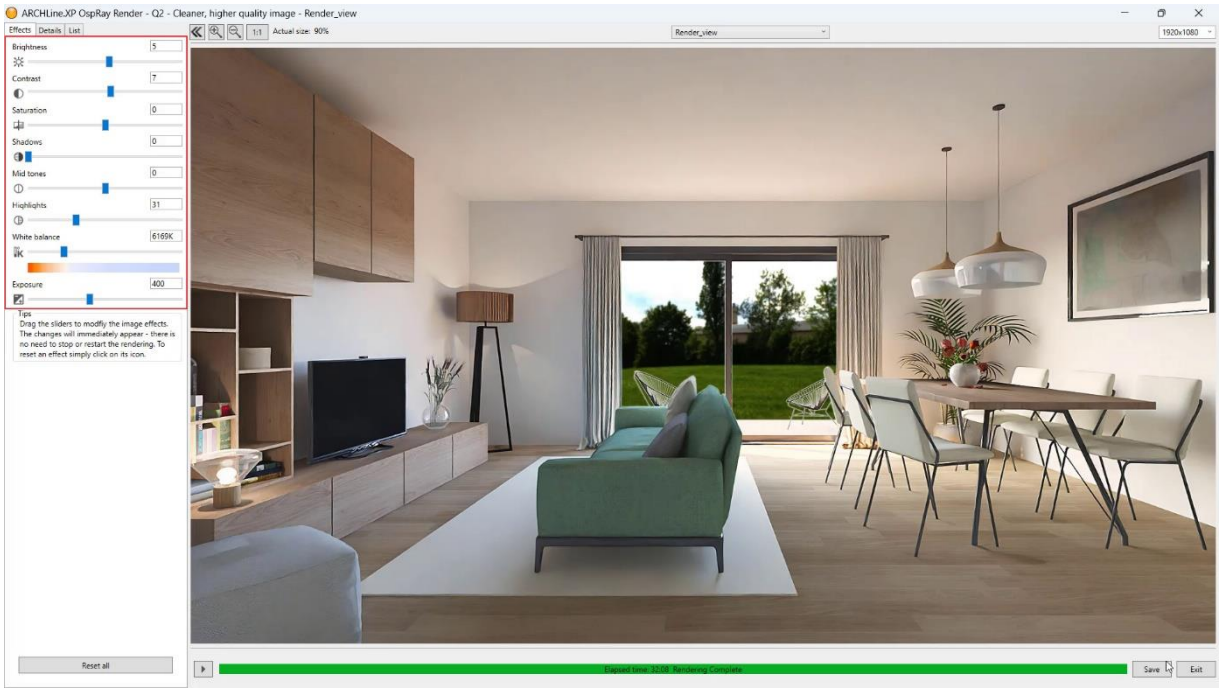
Let's start the rendering. The larger size of the image and the Q2 setting make it easier to check that everything is correct in the image. However, more render time is needed.

Save this image as: Render_10_Q2_1920

Using effects

The final result may still look dark. Now set *Effects* with the values below.
Of course, if you want the image to look lighter or darker, you can change them.
Always set the Exposure first so that the image is bright enough. Adjust the other values very gently.

Also save this image as Render_10_Q2_1920_effect to compare it with the original.
You can save multiple images with different Effect settings.



10th final render: Q2, 1920x1080, using effects

We can also create the QX render if needed. Here the render time will increase significantly.

Photo retouching

The visual designs you see on the internet or in catalogues are all photo-retouched. A good photo post-production only enhances the beauty of the render image that is already well done. Just adding a little contrast or lighting can add a lot of subtlety to the result.
There are different programs: Gimp, Lightroom, Photoshop, etc.
You can use these, but you can also use the Effects in ARCHLine.XP Render to get a nice result without using an external program.

Workshop 3: Importing architectural plans

3. Workshop: Importing architectural plans

During this workshop, we look through all options how we can import an architectural floorplan into ARCHLine.XP then create a 3D architectural model on that basis. The time to complete the model depends on the imported file type. Going down on the list below the time significantly lessens.

We can get the floorplan in the following formats.

- ❖ image as .jpg, .png format
- ❖ raster image as PDF format
- ❖ as vector PDF
- ❖ as DWG drawing
- ❖ as IFC model
- ❖ as Revit file

- Open your browser and watch the "Importing Architectural plans" video tutorial.

3.1. Blueprint: Converting floor plans from images to 3D models

When preparing a design, we often start with an existing floor plan, which requires architectural plan processing. The simplest scenario is when we receive the floor plan as a scanned raster image.

- ❖ When the floor plan is available as a raster image in which architectural elements are clearly recognizable, and the image contains few other types of elements, this "clean" floor plan can be vectorized. In this case, we recommend using the *Blueprint* method, which allows you to *convert a floor plan provided as an image into a 3D model*.

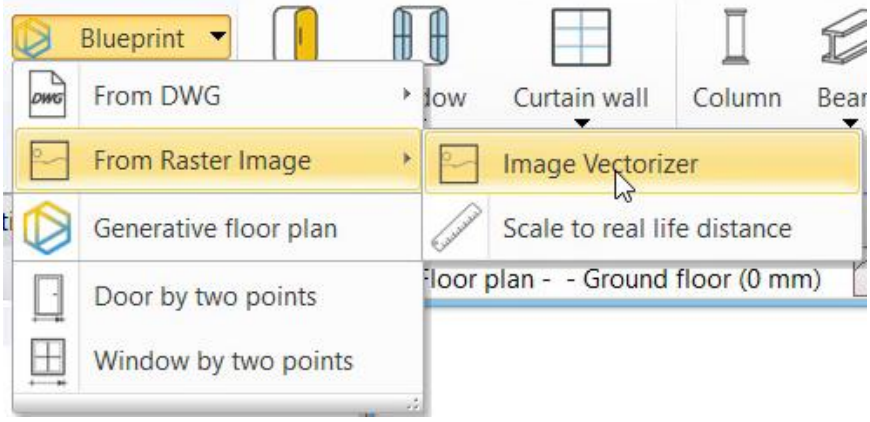
- ❖ If the image containing the floor plan is "not clean", meaning it contains many elements beyond the architectural components, we suggest using the "*Importing a Floor Plan as an Image*" method demonstrated in the next section.

Let's look at the case of a "clean" floor plan:

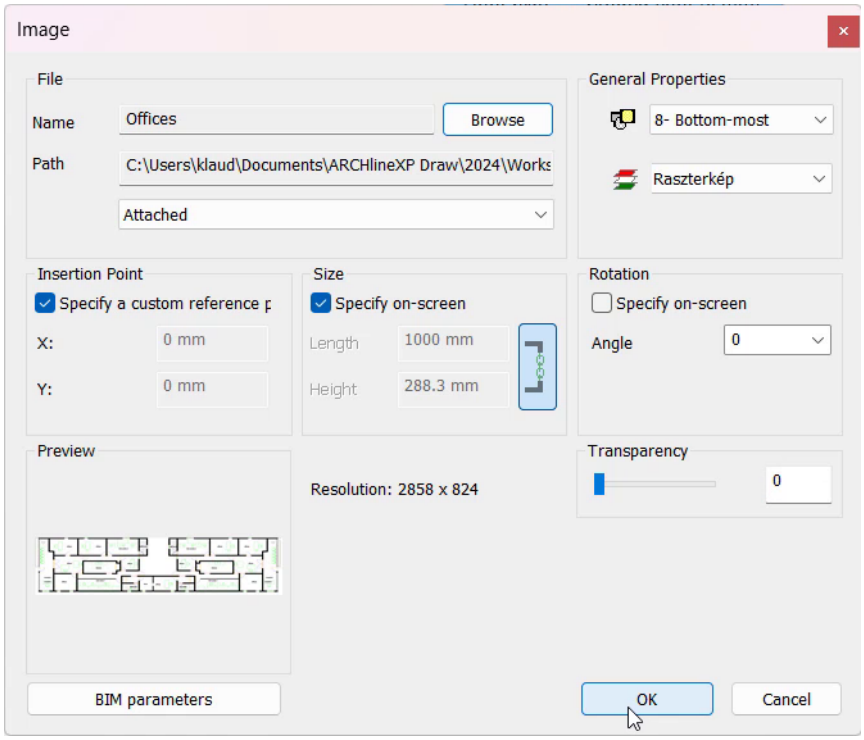
Vectorizing raster image floor plans allows for converting a scanned floor plan into a vector drawing, then into a 3D model. After importing the raster image, ARCHLine.XP automatically performs the vectorization, and the result can be placed as a group anywhere on the floor plan.
Next, the vector drawing needs to be calibrated by setting a recognizable measurement.
The *Generative Floor Plan* command interprets the 2D group and converts it into a 3D model containing walls, doors, and windows.

3.1.1. Importing a Raster Image

- Select the *Building menu - Blueprint - From Raster Image - Image Vectorizer* command.

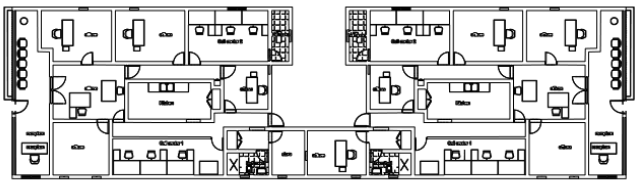


- Choose the desired raster image format floor plan on your computer from the folder: Documents\ARCHlineXP Draw\2024\Workshop_Intermediate\3_Importing_Architectural_Plans\JPEG-PNG and select **Offices.png**.
Ensure that the DPI (dots per inch) value is between 300 and 500. If you import a lower-resolution image, it is likely to result in pixelated scanning.



- Place the image in the floor plan window. The program will automatically perform the vectorization and display the vectorized group elements (lines, polylines). Place the group as well:

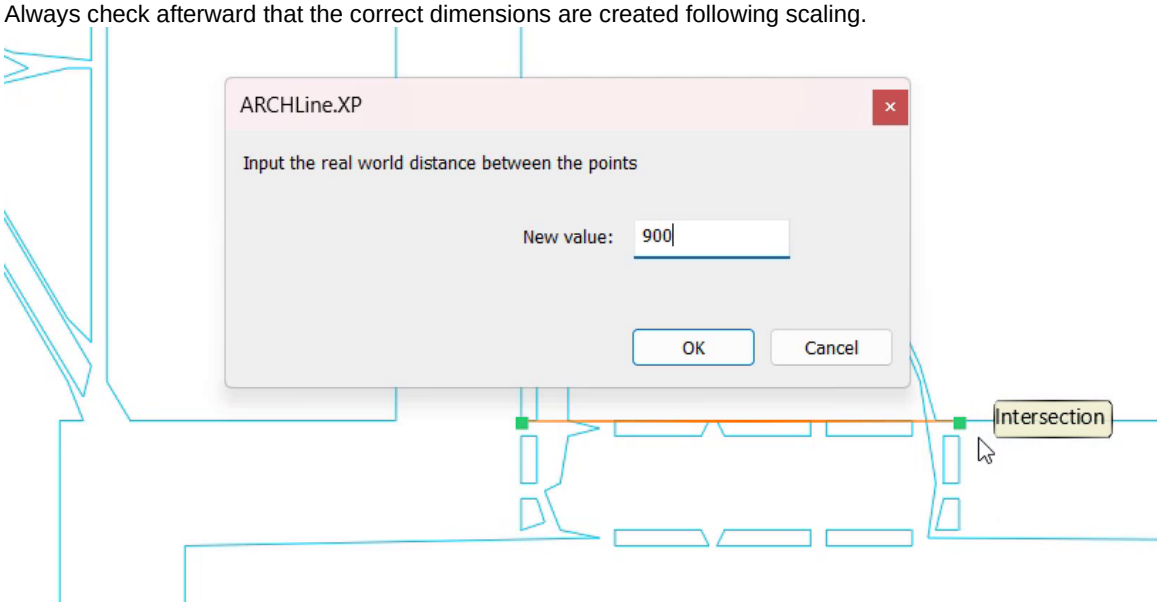
Image



Group

3.1.2. Scaling to real life distance

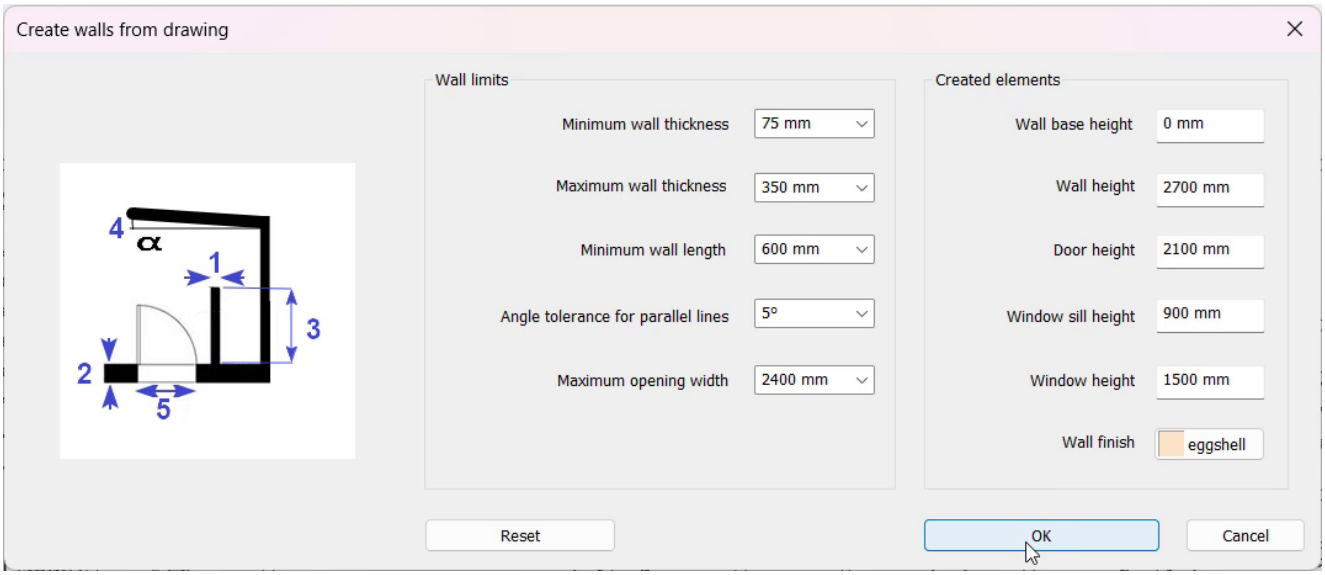
- Select the *Building menu - Blueprint - From Raster Image – Scale to real life distance* command. Then select the group and press Enter.
- Specify the distance by marking two points, then assign the new physical distance. Always check afterward that the correct dimensions are created following scaling.



3.1.3. Converting lines to walls – Generative floor plan

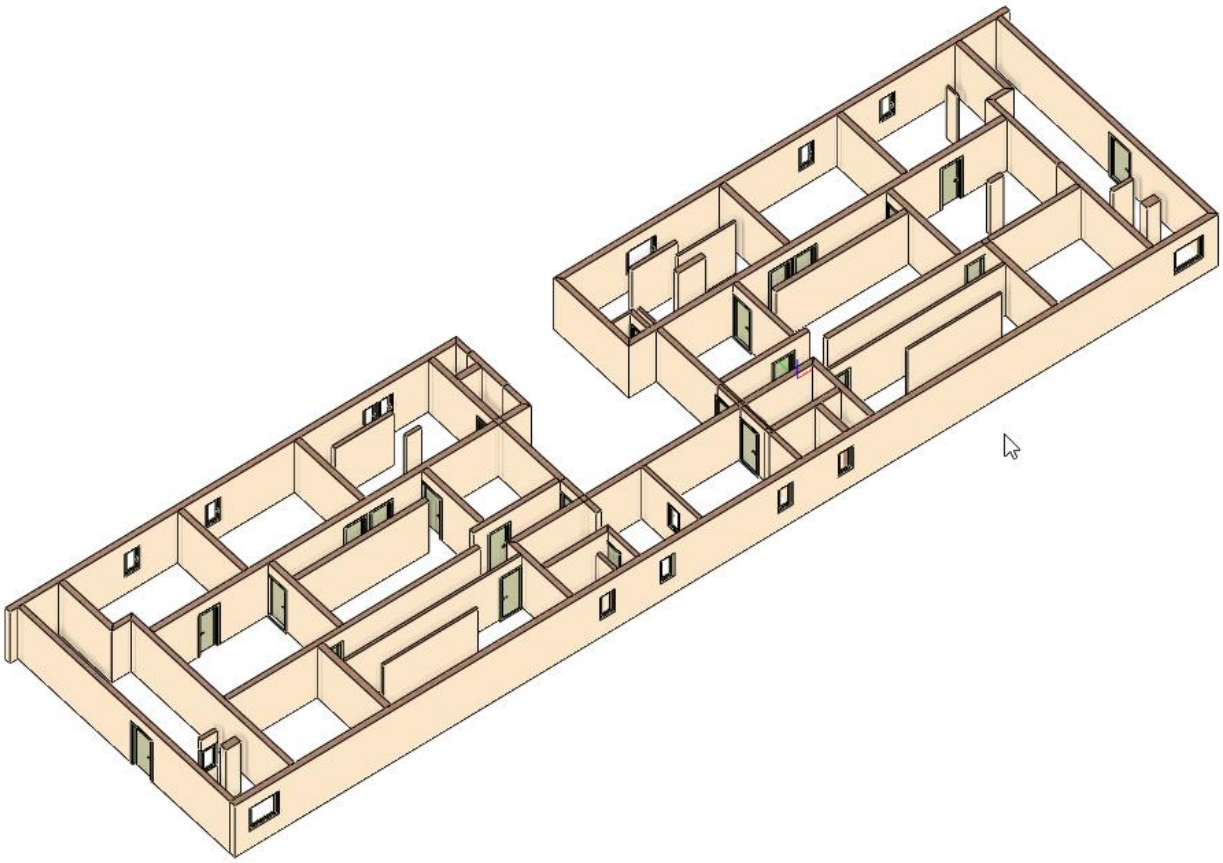
Converting lines to walls and openings is an automated process.

- Select the Generative floor plan command. In the dialog that appears, set the desired threshold values.

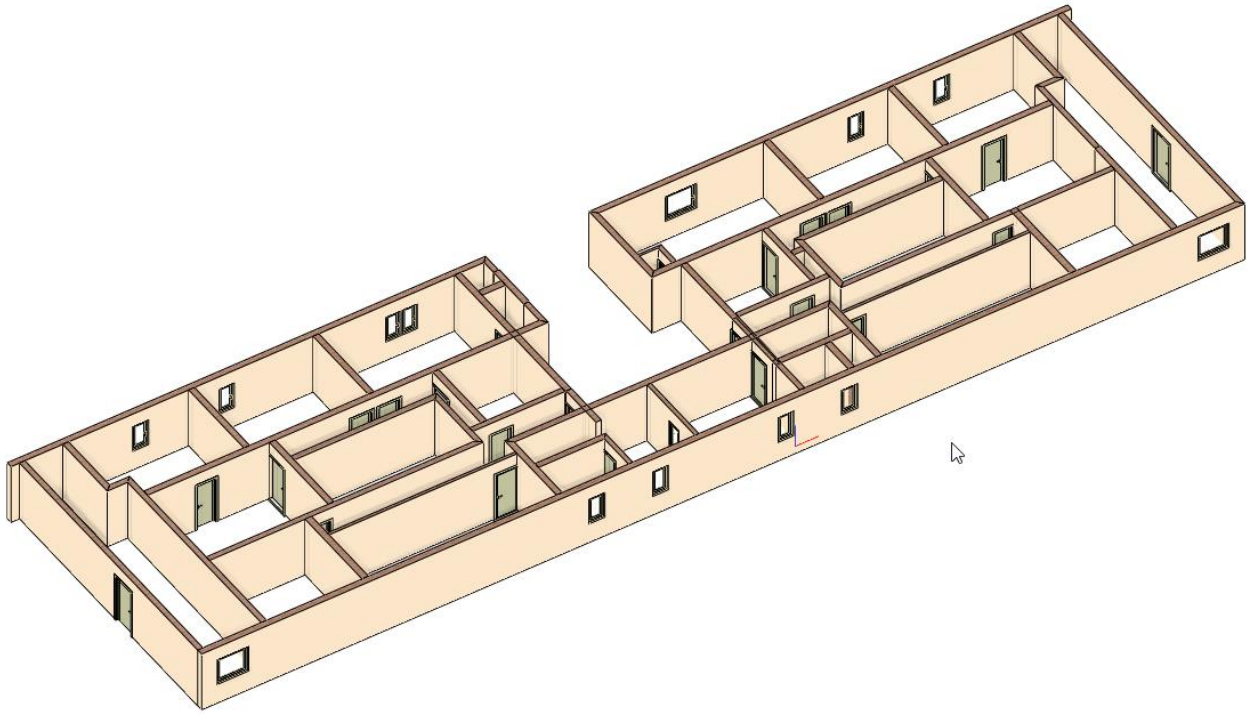


- Select the group.

  The 3D model is generated:



- Adjust the architectural elements: delete unnecessary walls, connect the required ones, and place the missing openings.



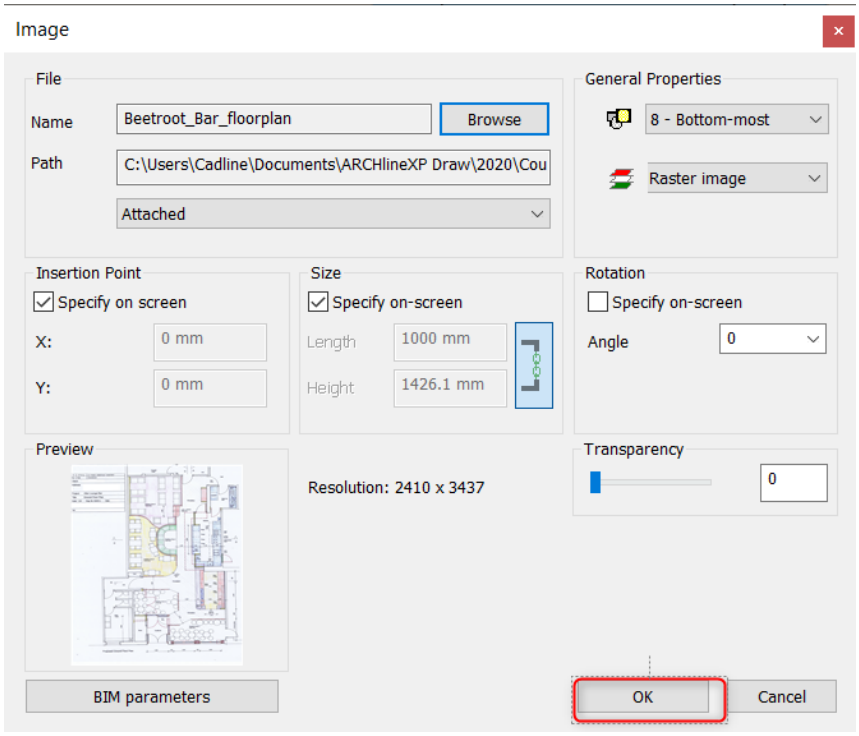
3.2. Import floorplan as image

This method is recommended when the image containing the floor plan is "not clean," meaning it contains many elements besides the architectural ones, making it difficult to recognize the architectural elements.
In this case, the previous *Blueprint – Converting floor plan from image to 3D model* method cannot be used.

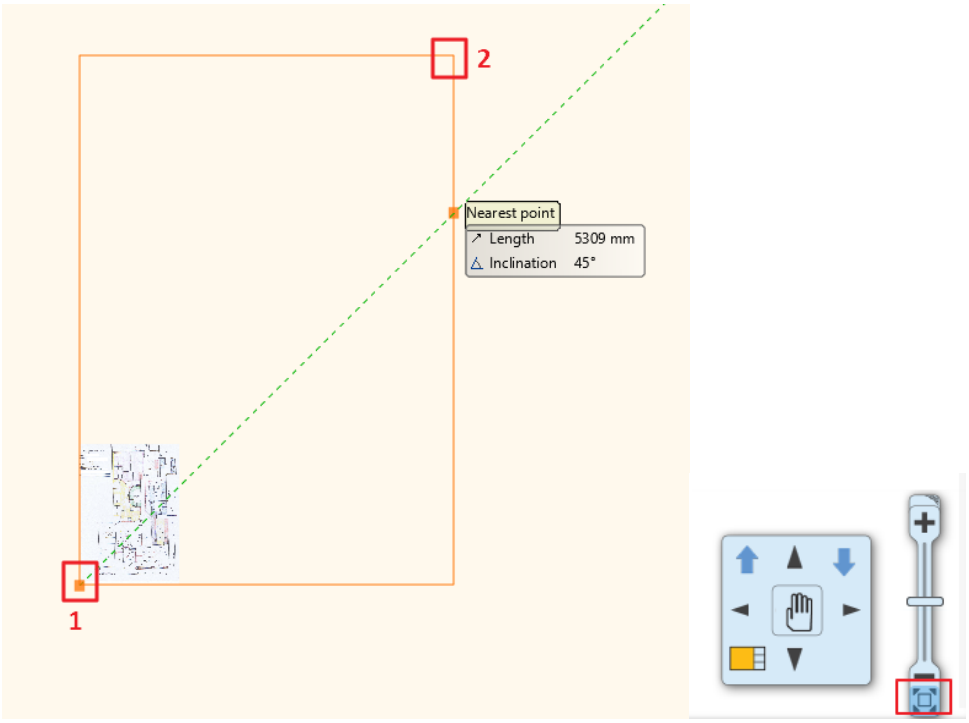
Let's look at the *Importing floor plan as an image* method:

3.2.1. Import raster image

- First import the previously saved raster image. Select **File / Import / Raster image** command.
- Choose the folder …*\ARCHlineXP Draw\2024\ Workshop_Intermediate\3_Importing architectural plans\JPEG* and the file **Beetroot_Bar_floorplan**.jpg.
- Now the Image Property window appears:



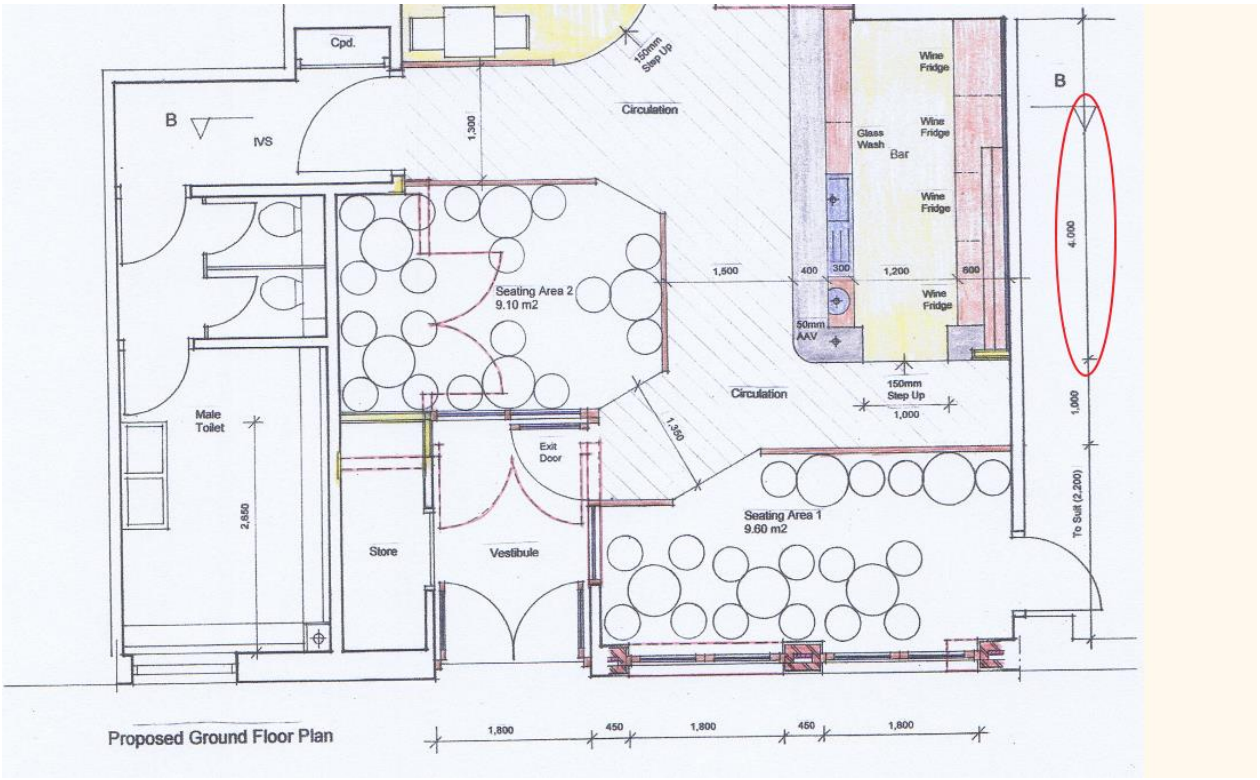
- Press OK to close the dialogue and either place the image by entering the two corner points, or press Enter after entering the first corner point to place the image at the original size.



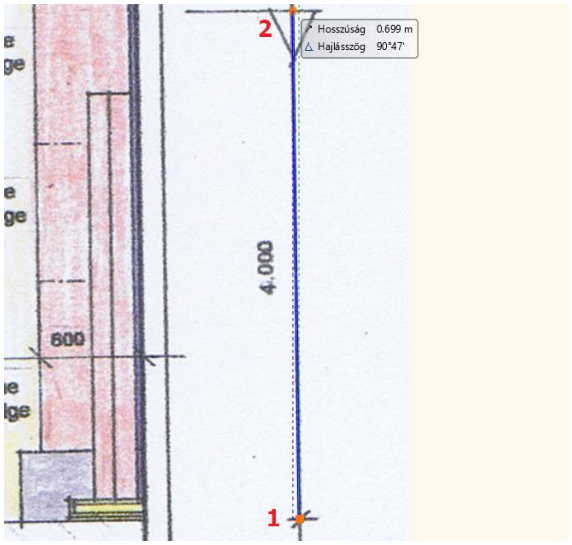
- Then it is recommended to use “Fit to view” command to get the optimal zoom of the image.

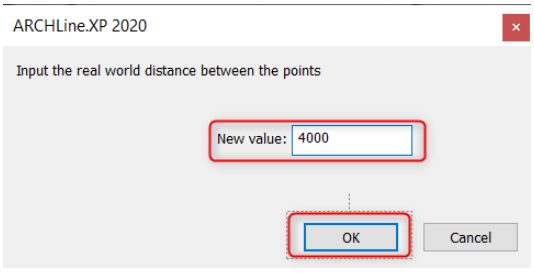
3.2.2. Calibration

- The imported image is not scaled. Now we have to calibrate the drawing. On the image, there are dimensions such as wall length.
- Use the shown wall length for calibration:

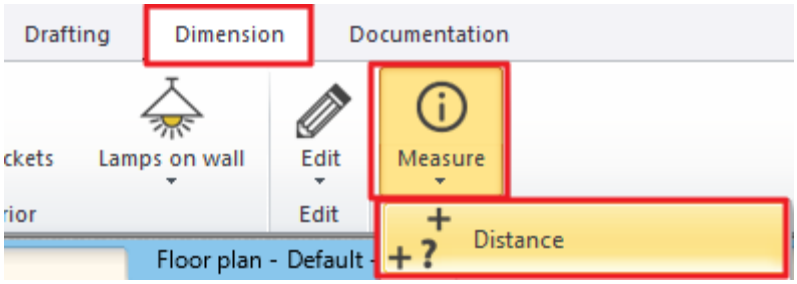


- Click on the image, then choose “**Calibrate**” from the local menu.
- Now define endpoints of the selected wall and enter the actual size (**4000 mm**).



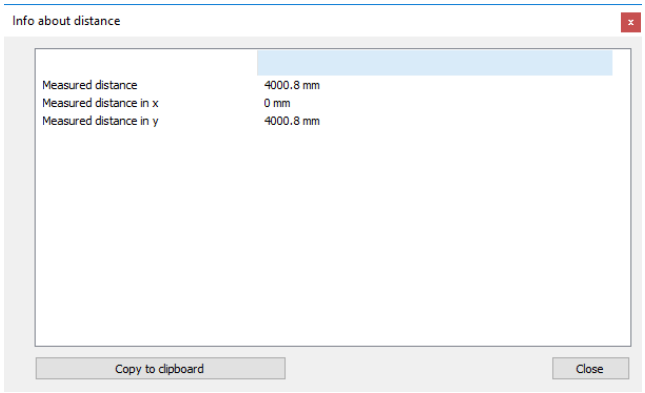


- Now use the “Fit to view” command again.
- It is advisable to check the accuracy of the calibration. The quickest way is going to the **Ribbon menu / Dimension / Measure** and select **Distance** tool.



- As you can see the “Measured distance” is 4000 mm, so the calibration was accurate. Now we have a scaled floor plan.

A difference of 10-20 mm is acceptable. If the deviation is greater than this, repeat the Calibration instruction.

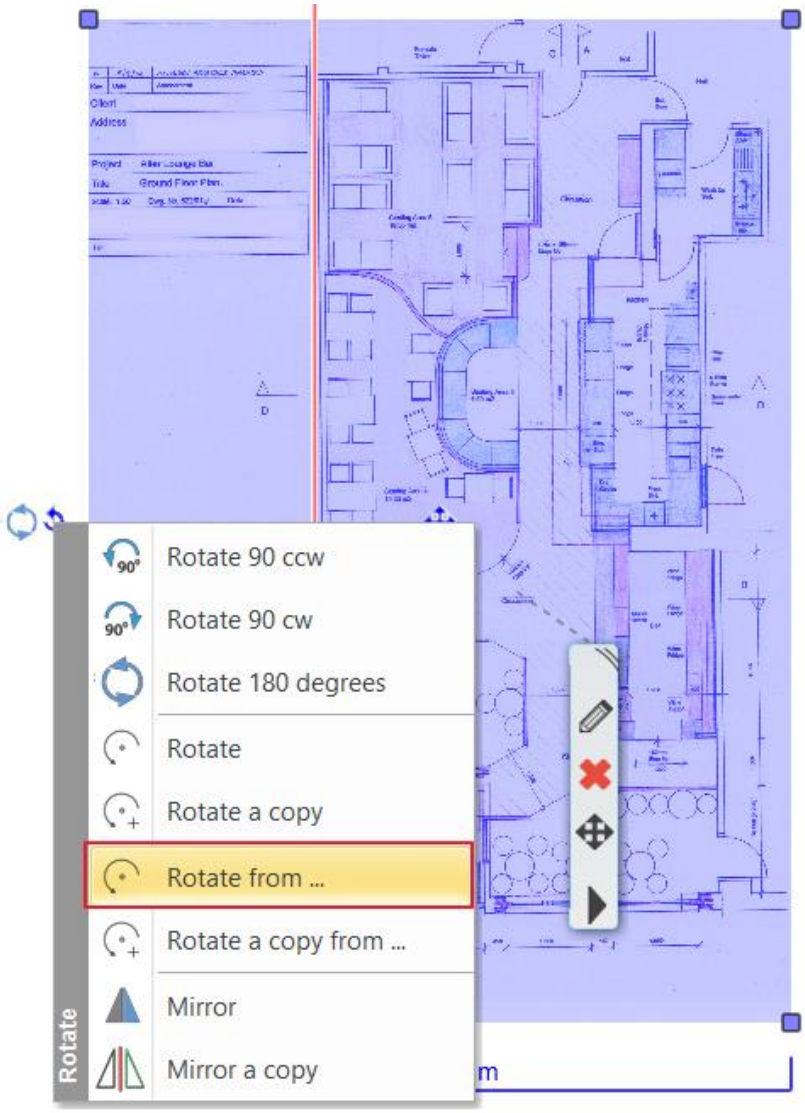


Next step is to draw walls.

3.2.3. Rotate the image

The vertical and horizontal walls in the image are not completely vertical and horizontal because the drawing in the image is rotated slightly.
In such a case, it is a good idea to rotate it back before starting work.

- Draw a vertical red line (Drafting - Line tool) from point 1 upwards. Now you can clearly see the inaccuracy.
- From the local menu of the image, select *Rotate from…* command.
- Specify the first angular segment by clicking on points 1 and 2.
- Then click on the red line (3).

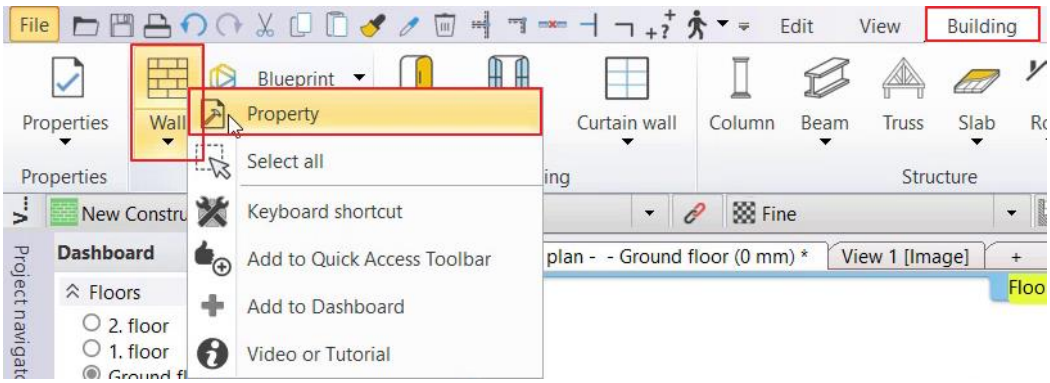


If the lines overlap, the walls are completely vertical. Delete the auxiliary line.

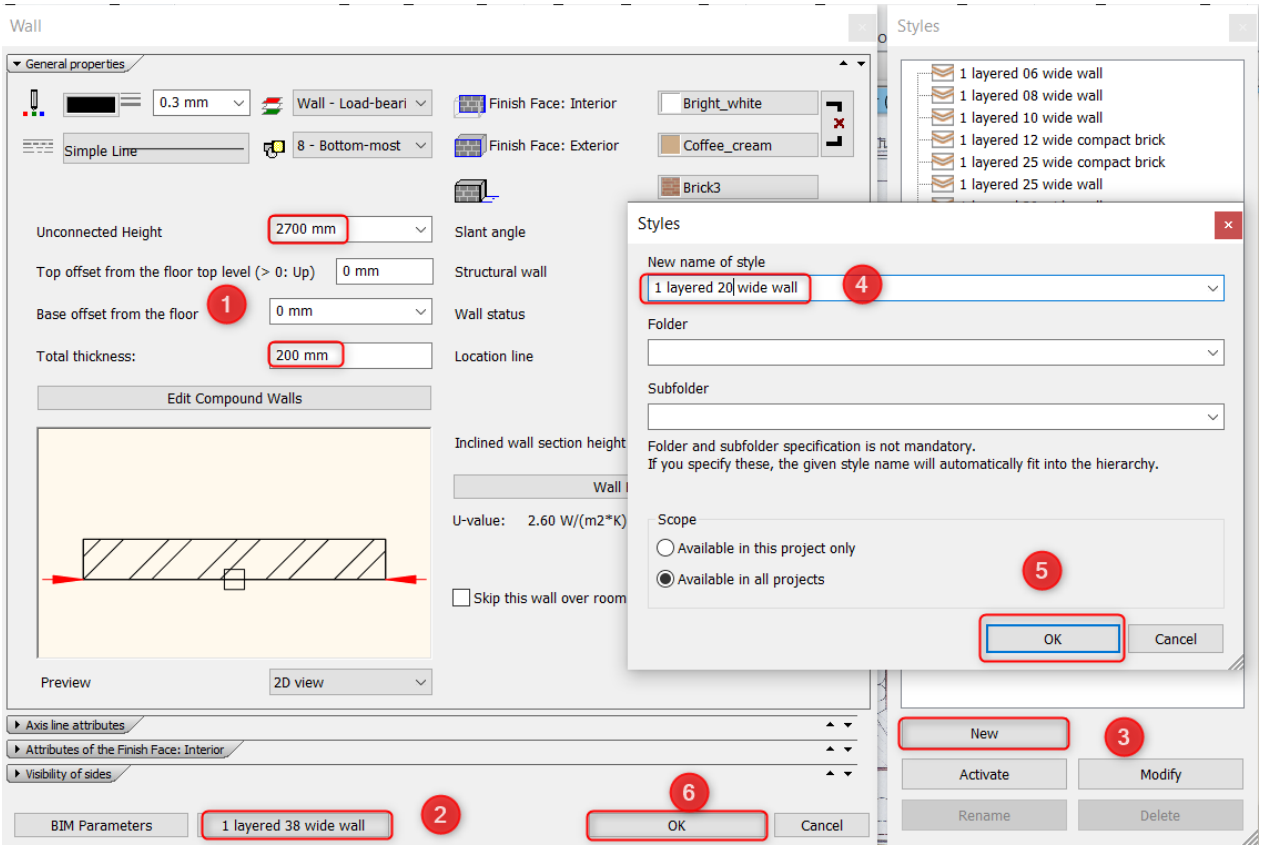
3.2.4. Create wall styles

Now we create a new wall style which can be used for all projects: 1 layered 20 wide wall

- From the **Ribbon bar / Building menu**, right-click on the **Wall** command and select **Property**.



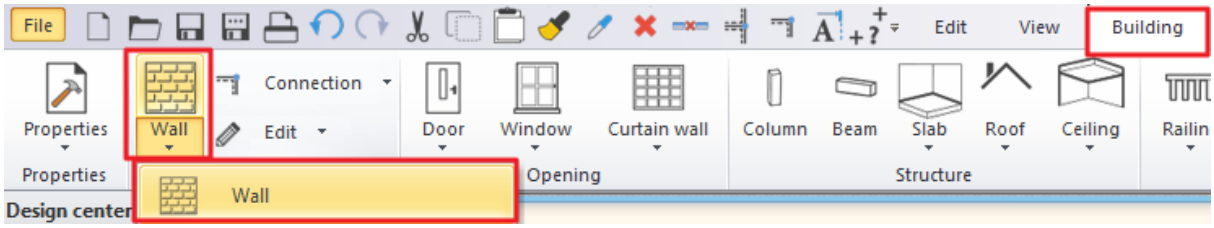
- Set the wall “Total thickness” to 200 mm, and “Unconnected height” to 2700 mm (1).



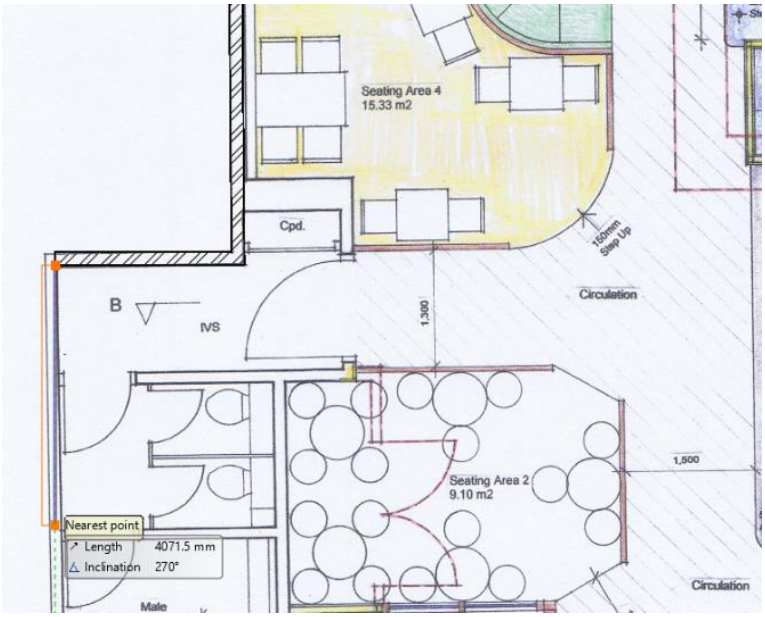
- Click on the **Style** button (2).
- In the "**Styles"** dialogue window, click on "**New**" to create a new style (3).
- Name the new style "**1 layered 20 wide wall**" (4). This style can be used in any projects. Hit OK (5) to close the dialogue window.
- The new style activated automatically. Close the wall dialogue window (6).

3.2.5. Draw a wall

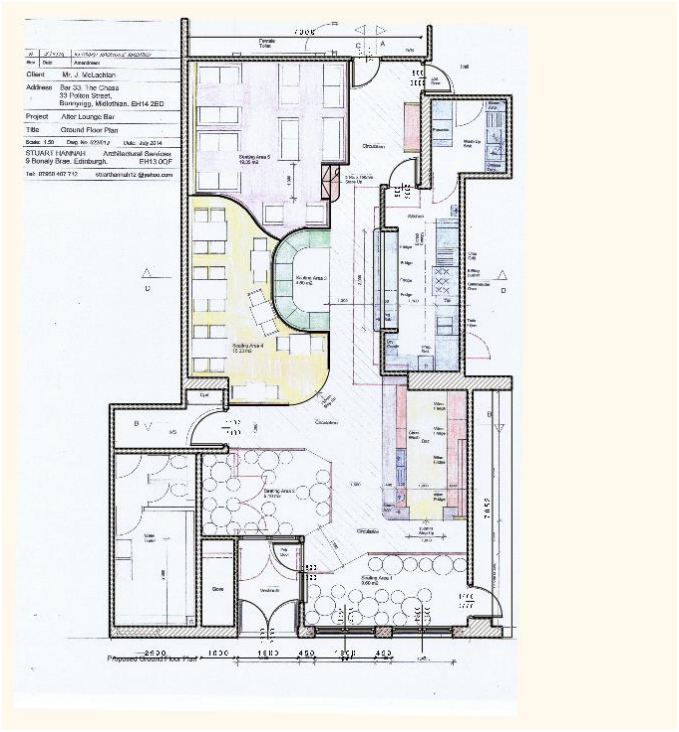
- Let's draw walls by choosing the **Ribbon menu / Building / Wall** command.

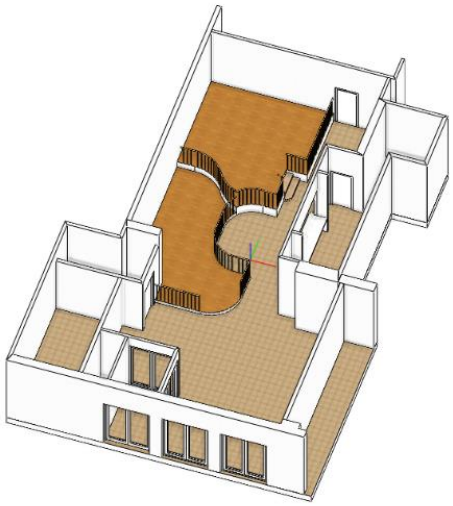


- To redraw walls, you have to give the starting and endpoints. Be careful the wall thickness should fall to the good side of the reference line.
  From the floating menu, choose "**Right side**" then click on the wall endpoint. Now follow the image and draw all walls on the floorplan.



To complete the entire model, you can use other ARCHLine.XP tools such as door, window, slab.





3.3. Import floor plan from raster PDF file

In the following example, the floor plan is provided in a raster PDF file. Before we start processing, let us clarify what the contents of the PDF file might be:

There are two types of PDF file:

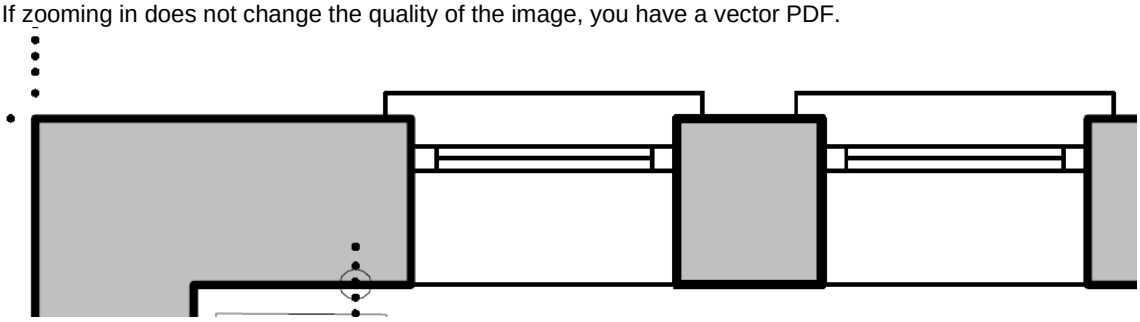
- The PDF file content is real raster image
- The PDF file content is a geometric (vector) drawing.

How can we decide which type of PDF file we received?

Before importing the PDF file, open it from File Explorer and enlarge the floor plan:

1. If you notice that the more you zoom in, the more pixelated the image, then the PDF file is actually a raster image.

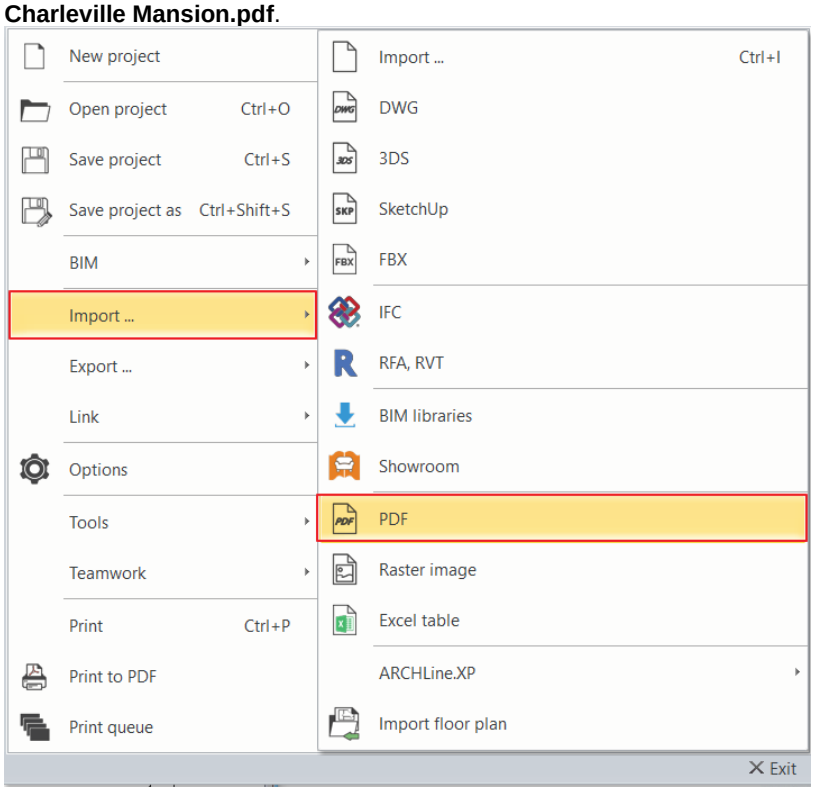
2. If zooming in does not change the quality of the image, you have a vector PDF.



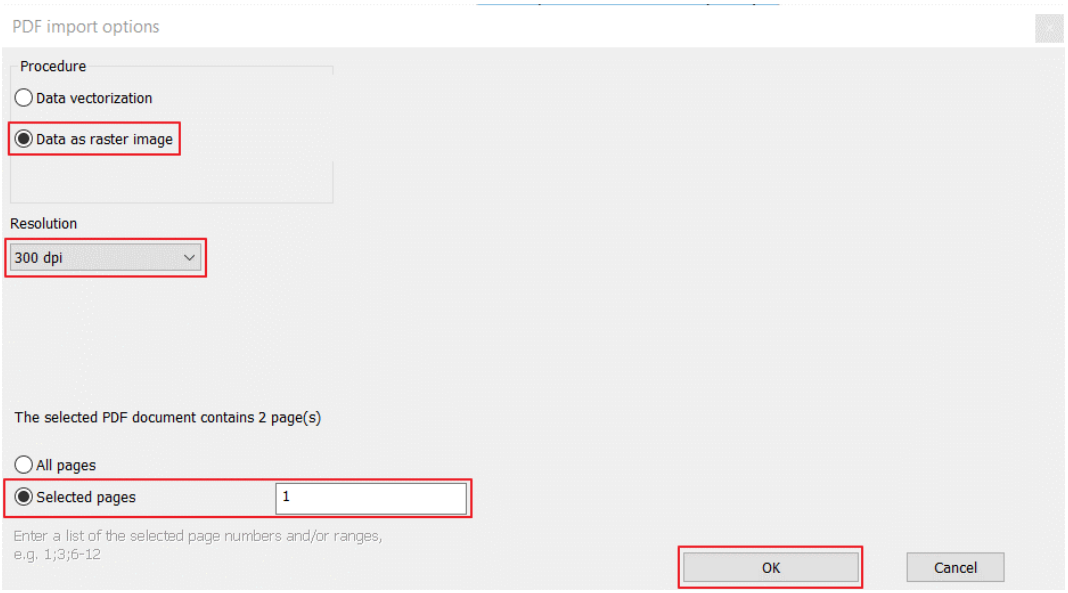
Whether the PDF file is raster or vector, it is processed by the same PDF import command.
For raster PDFs, the imported base drawing remains raster (image), for vector PDFs the result is a vector drawing.

3.3.1. Import a PDF file as a raster image

- Select the **File menu / Import / PDF** command.
- Choose the folder *…ARCHlineXP Draw\2024\Workshop_Intermediate\3_Importing_Architectural_Plans\PDF* and the file **Charleville Mansion.pdf**.



- Once it is a raster file, select the *Data as raster image* option.
- The *Resolution* should be 300 dpi to ensure that details are visible when enlarged.
- Select page 1 of the multi-page PDF file.

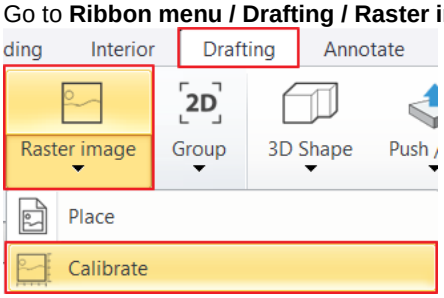


- Place the PDF file near the origin. Enter.
  Use the “Fit to view” tool to enlarge the image if necessary.

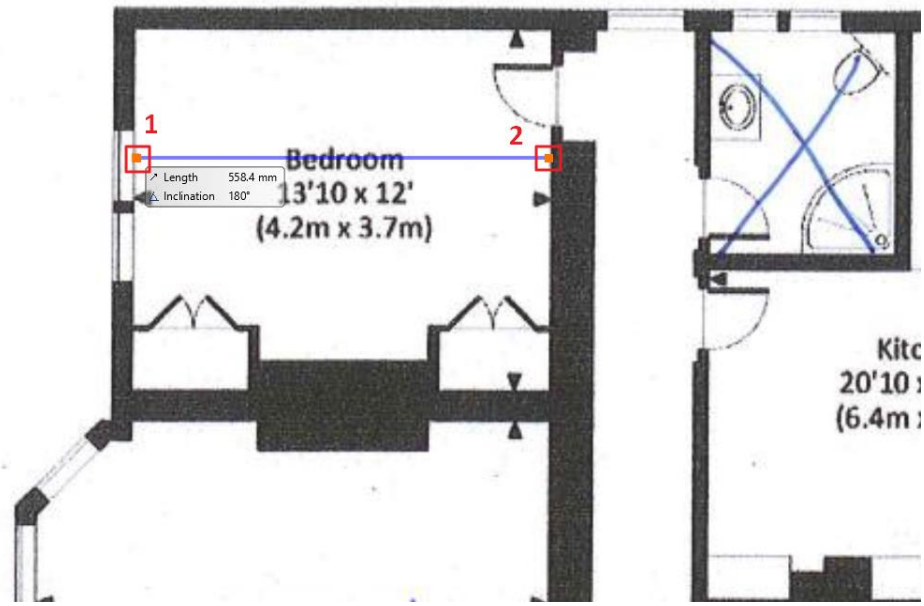
3.3.2. Calibration

The raster image is not scaled; therefore, we have to calibrate. Zoom in the raster image and select a wall which has a dimension value.

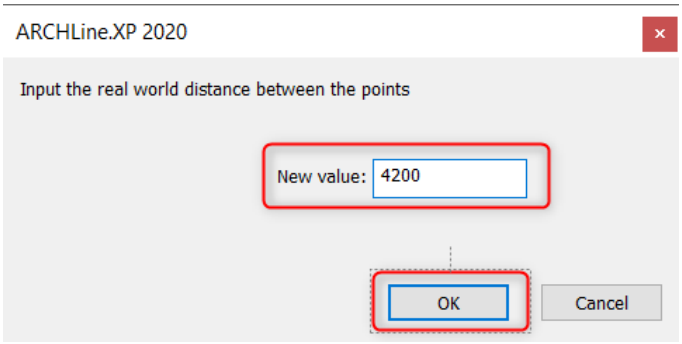
- Go to **Ribbon menu / Drafting / Raster image** and select **Calibrate** tool and then the image.



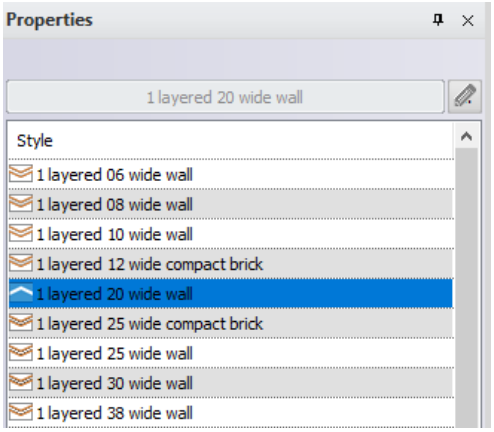
- Select the first point (1) then the second point on the parallel wall (2).



- In the appearing dialogue window enter the dimension given by the imported floorplan **4,200 mm**. Check your work with the Measure command.



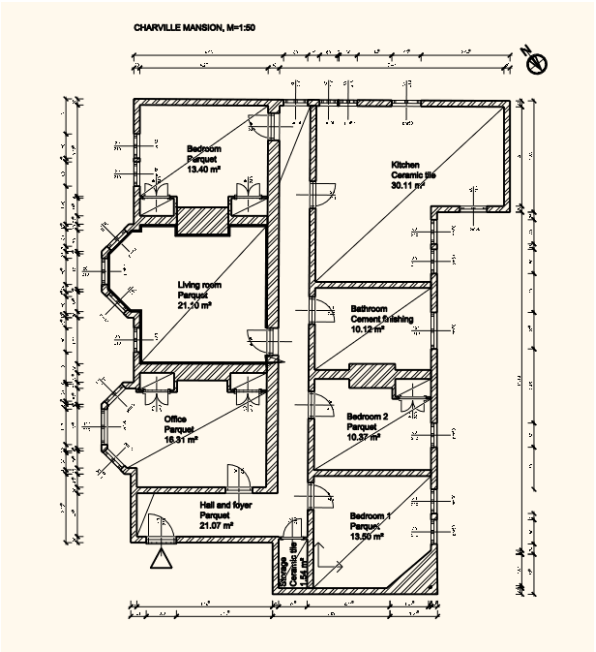
3.3.3. Create walls

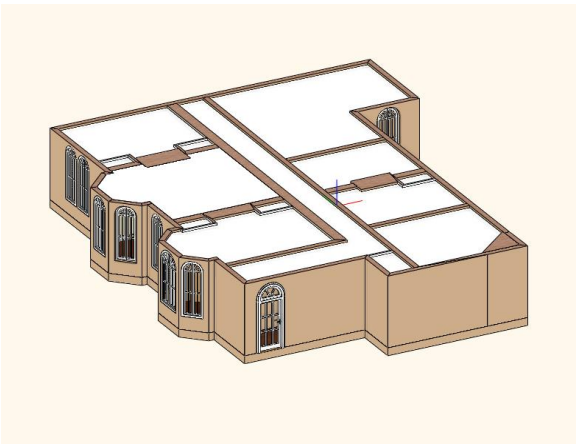


- Now, images are scaled. Use the “Fit to view” option.
- Clicking on **Ribbon menu / Building / Wall** option, on the left side under properties wall styles will come up.
- Choose the previously created 200 mm wide wall style (1 layered 20 wide wall) from the appearing list and start to redraw the external walls.

  When you finished with it, you can see other walls of different widths on the floorplan.
- Under properties, you can easily swap between different wall thickness without closing the drawing command. Choose “1 layered 38 wide” wall, and draw the last wall.
- Now open “Layer Manager”  and turn off the layer on which the program has placed the PDF file. Only the floor plan you have drawn will be visible, not the PDF.

  Now we completed the floorplan. This method helps us to reproduce quickly and precisely the existing architectural floorplan.





3.4. Import a floor plan from a vector PDF file as geometry

In the case of the architectural design process, as we have already seen, the floorplan can be obtained in different formats. Let’s see an example when the floorplan is available in PDF geometry.

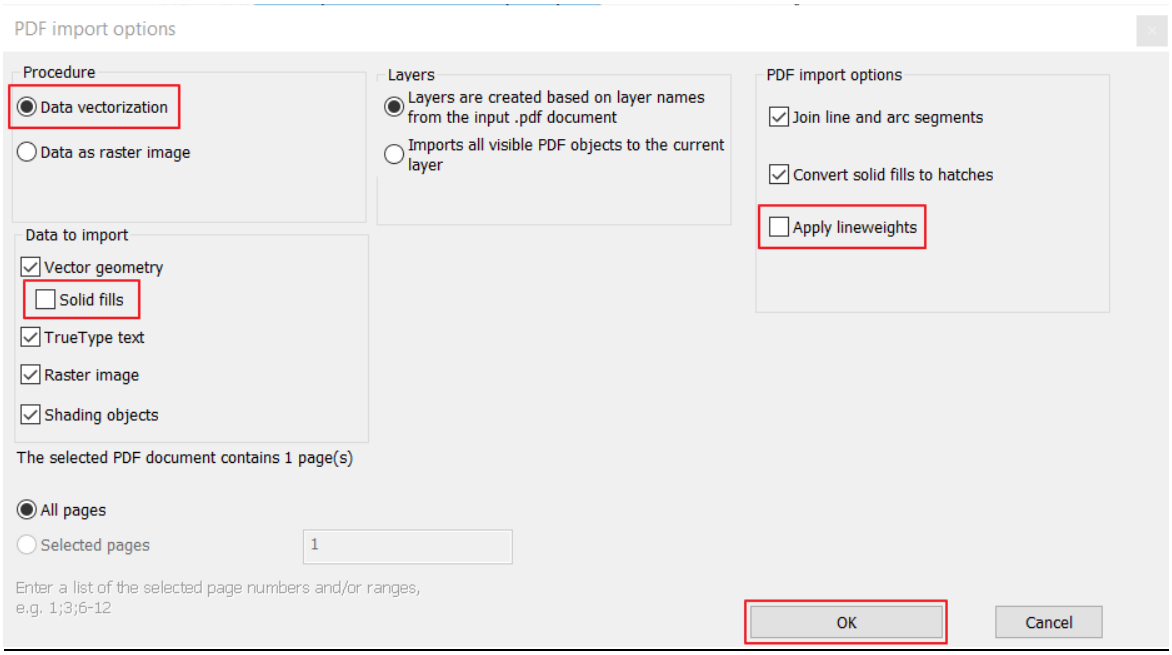
Before importing **Happy House first floor**.pdf, open the image from File Explorer and zoom in. The more you zoom in, the lines remain lines, and it won't be pixelated as we have seen in the previous example. Therefore, you have to import it as PDF geometry.

3.4.1. Import a vector PDF file

- Now select **Ribbon menu / Import / PDF** command.
- Choose the folder …*ARCHlineXP Draw\2024\Workshop_Intermediate\3_Importing_Architectural_Plans\PDF* and the file **Happy House first floor**.pdf.

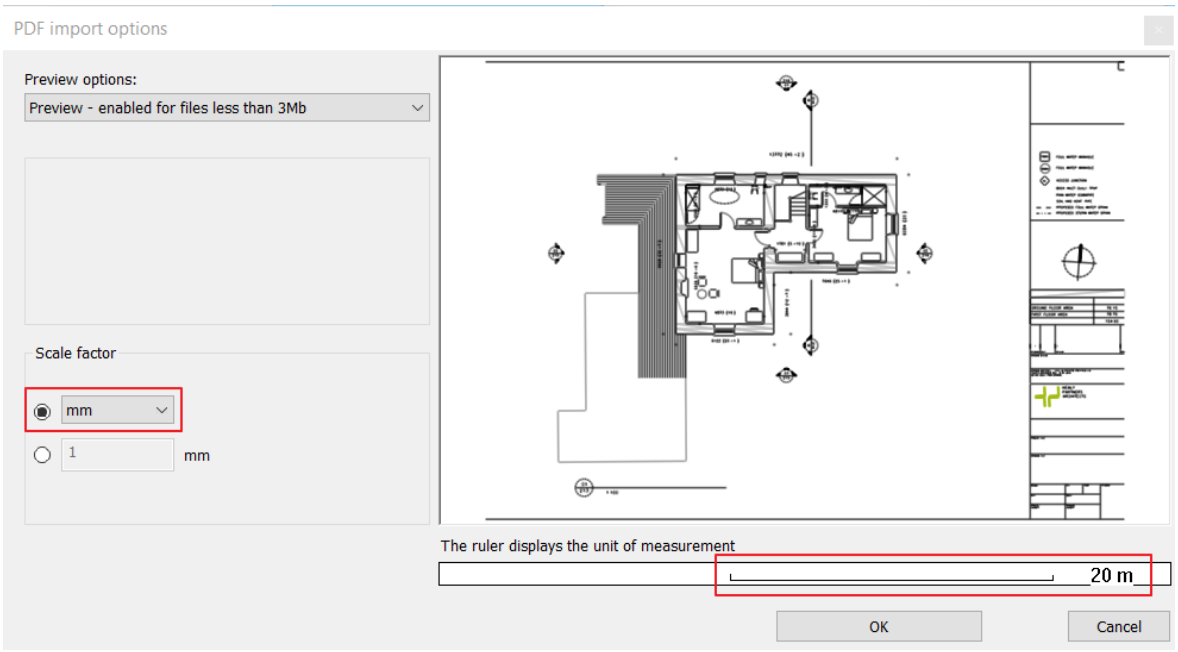
The PDF import options are including vector geometry, raster image, True Type text, Layers, drawing scales and other minor features.
In the dialog box, select the following options. Turn off the "Solid fills" and the "Apply lineweights" command.

We recommend to try different import options as well.



In the next window, enable the preview and set the scale factor of the PDF file so that you get a scaled floor plan. Use the ruler to decide which scale unit to use.

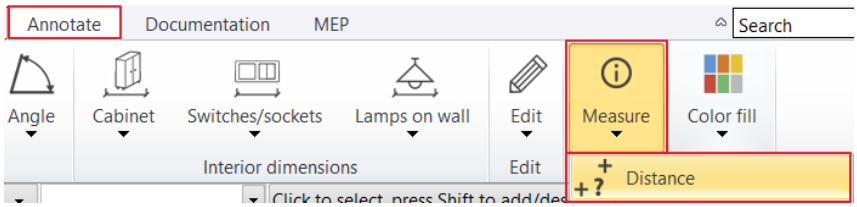
Here we choose mm. The unit of measurement displayed on the ruler is then closest to the actual measurement: 20 m.

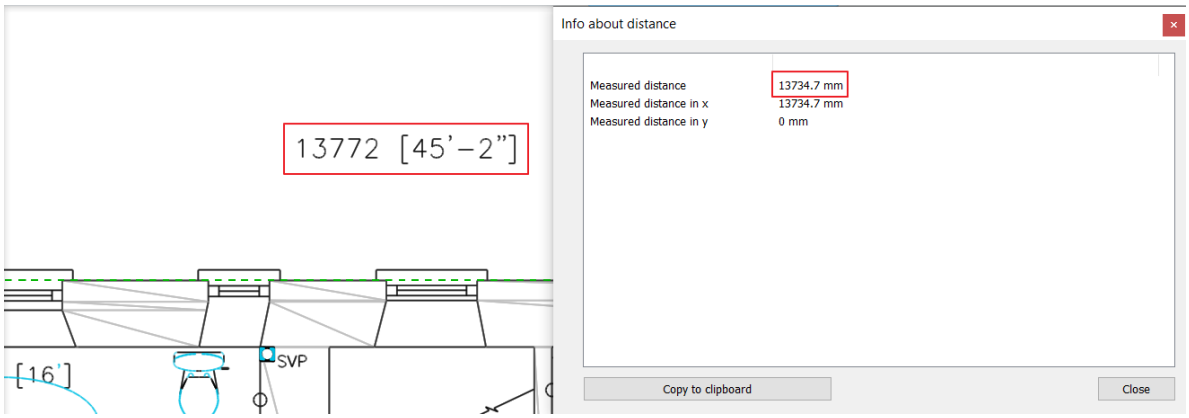


- The program automatically places the PDF file in the origin as a group. Use the "*Place with new origin*" option only if you want to place the image elsewhere.

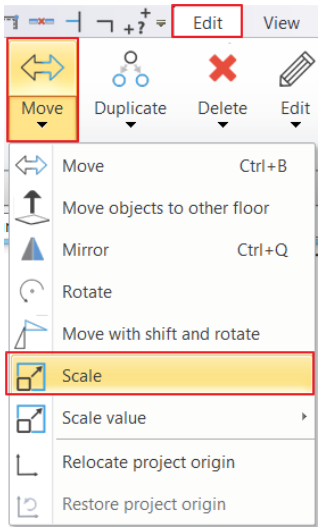
Scaling

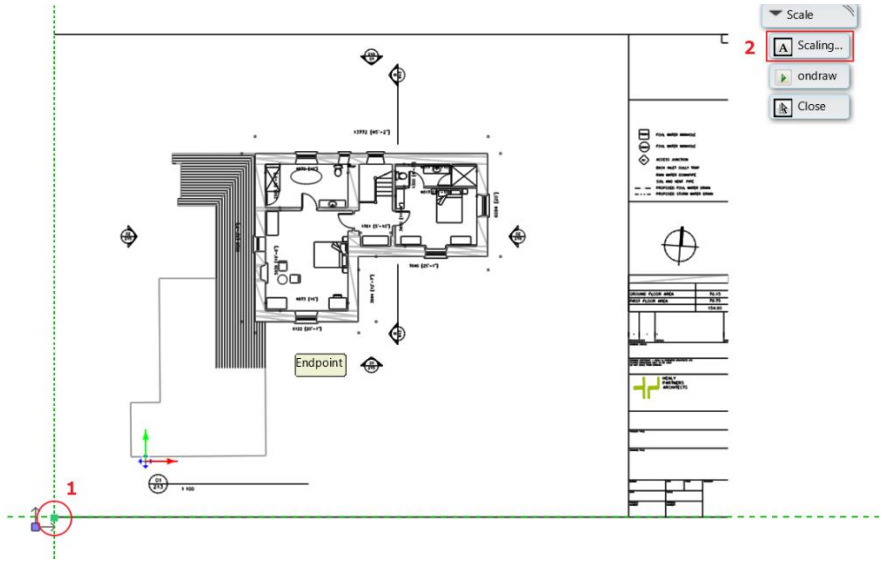
- In the PDF file, the length of the wall above is 13 772 mm.
- Check this value using the **Annotate / Measure / Distance** command: it is 13 735 mm. So, there is a difference of 37 mm. We can correct this.

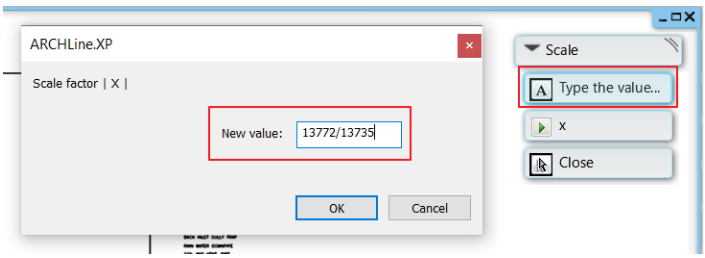




- Select **Ribbon menu / Edit / Move / Scale** command.
- Now select the PDF as a group, Enter.
- Enter the center of the zoom (1).
- In the options menu, click on the *Scaling* option (2),
- Then click on *Type the value* option.
- Type the value of the scale, which is very easy to determine by formula: 13772 / 13735

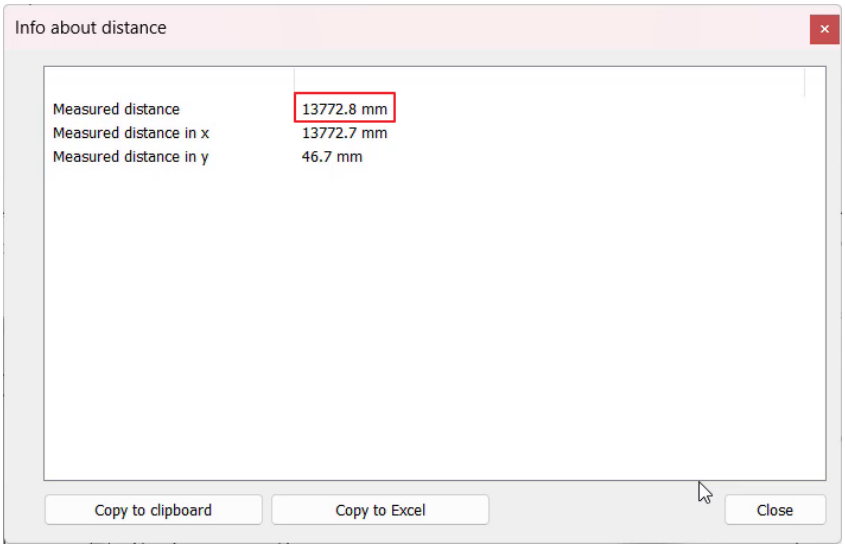




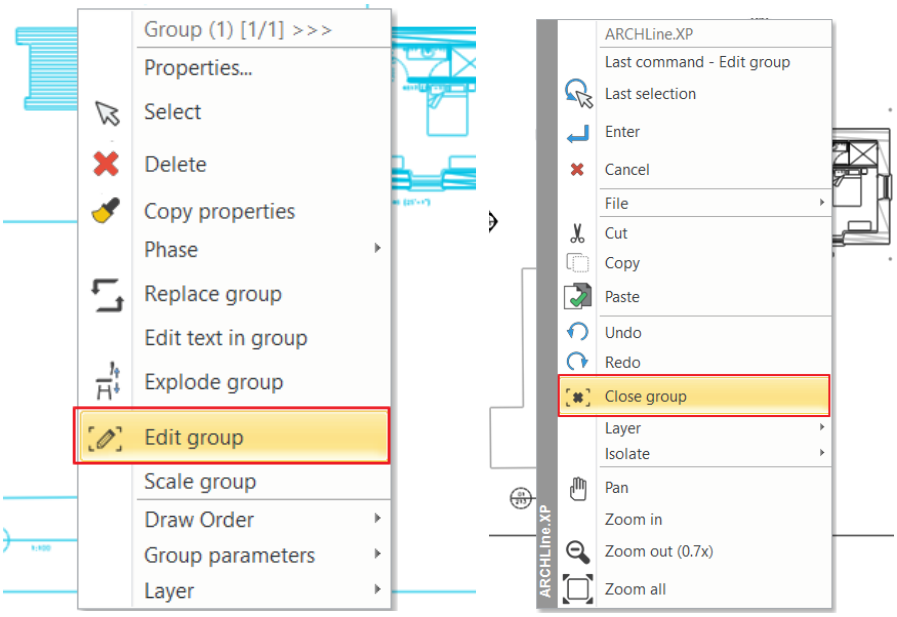


The scaling is done.

- Check the previous distance also with **Annotate / Measure / Distance**: 13 772 mm, so we are working with an accurate drawing.



The imported PDF file is a group. The elements of the group can be edited if necessary. To do this, you need to enter the group, which you can do using the *Local menu - Edit group* command. Once editing is complete, the group must be closed using the *Local Menu - Close group* command so that work can continue.



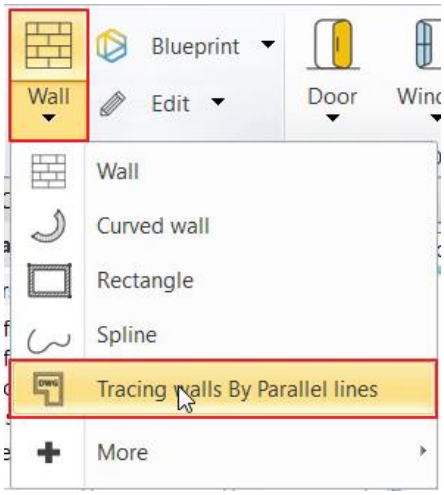
This PDF has been imported with its elements on a separate layer, which can be seen in the Layer Manager. However, it can be confusing to be able to select the PDF when working with it, so you may want to follow these steps to lock it:

- Move the group's layer to the "*Transfer*" layer.
- In the group properties, set the *Force layer*,
- Then go to the Layer Manager and close the "Transfer" layer.
  This way, when you click on the floor plan, the group will not be selected, but its elements can be referenced.

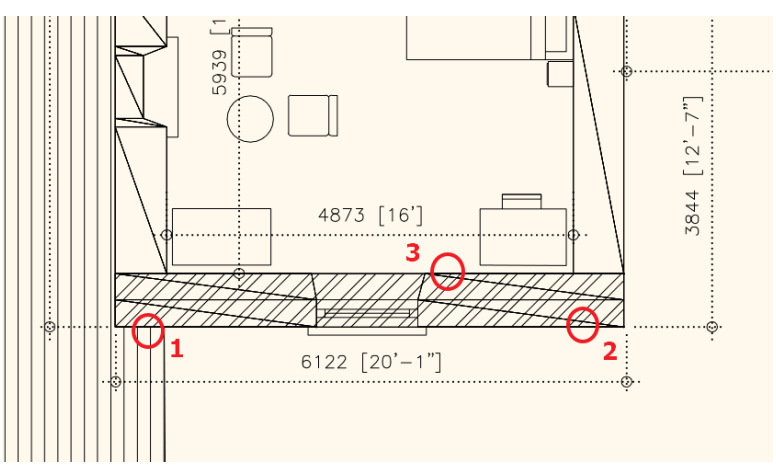
3.4.2. Draw walls on DWG floor plan

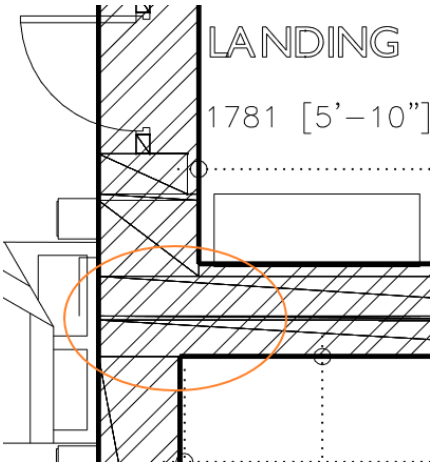
Let's continue our work with drawing walls.

- First set the wall properties. Set the height to 2,700 mm.
- Select **Ribbon menu / Building** / **Wall / Tracing walls By Parallel lines** command.



- By using this command, we can easily draw a wall without knowing the width of the walls. The technique is the following. First click near to starting point (1) and then the endpoint (2), finally click on the opposite side of the wall (3).

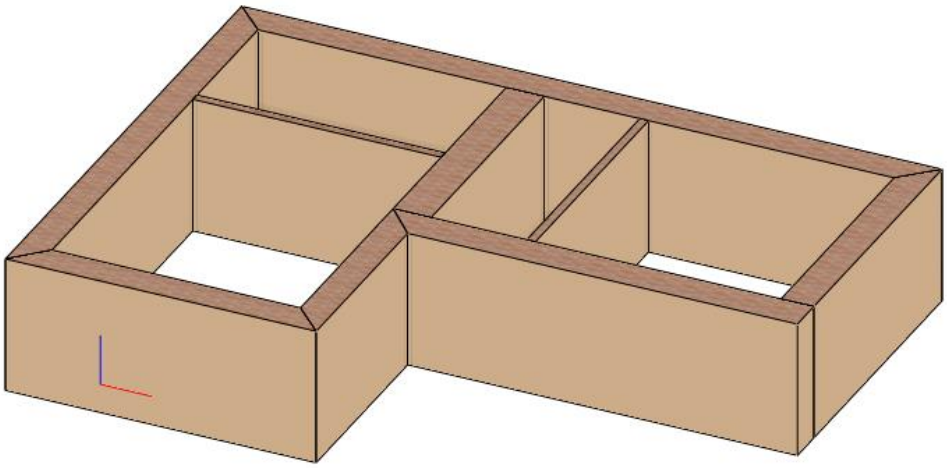




- Now redraw the entire floorplan.
- As a final step, it's worth to connect the main wall into an already existing L connection. Click on Toolbar; there you can find wall connection commands, find T connection and then specify the wall to be connected and select the already connected walls.

- The partition walls are still missing. Draw them by using **Tracing walls By Parallel lines** command.

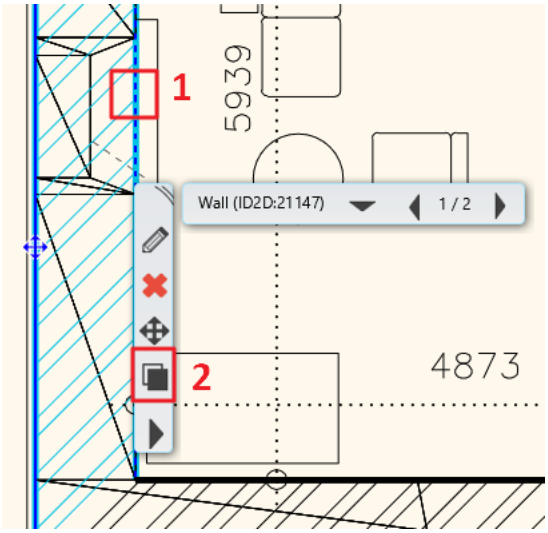
Now we finished. If it is necessary, we can improve on wall connections by using L or T connections.

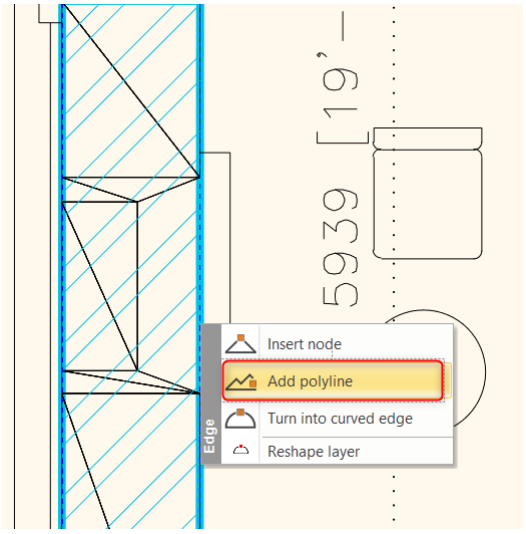


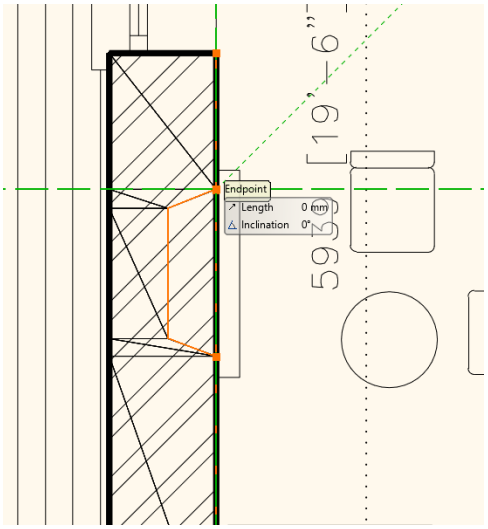
3.4.3. Creating niche

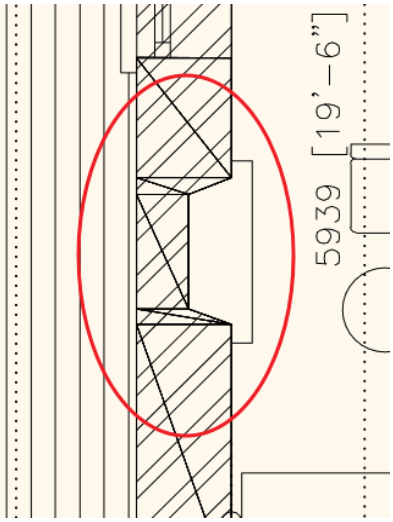
Next, we are going to create a niche:

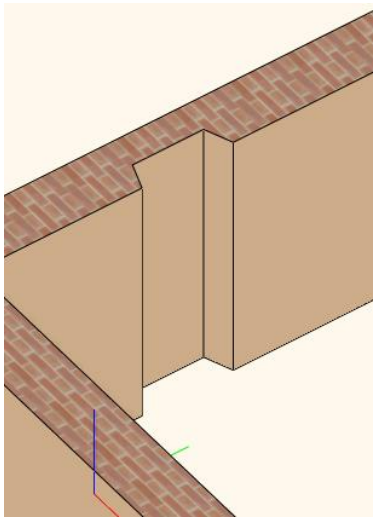
- When you click on the wall (1) click on Component mode (2).
- Activating this command now you can edit only one side of the wall.
- Click on the inner side of the wall and choose “Add polyline”, now you can insert a niche here.









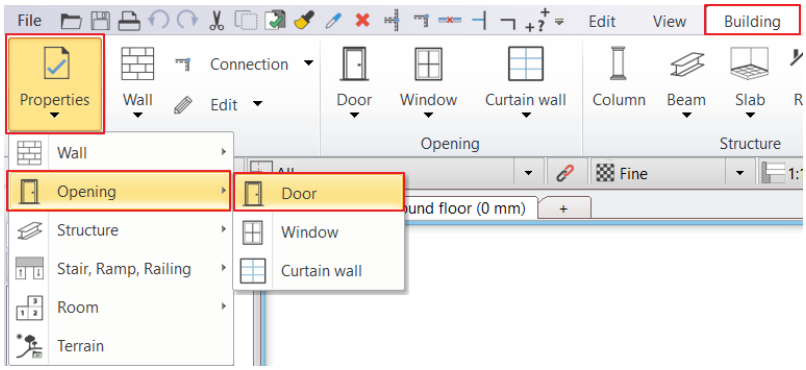


3.4.4. Place openings

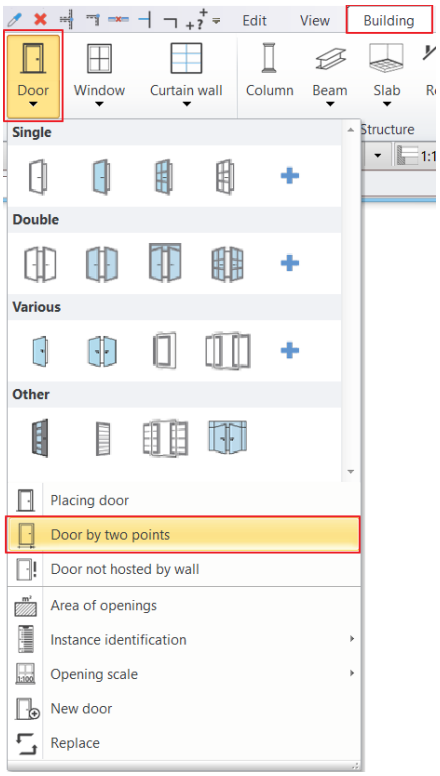
Let's continue the work with placing openings.

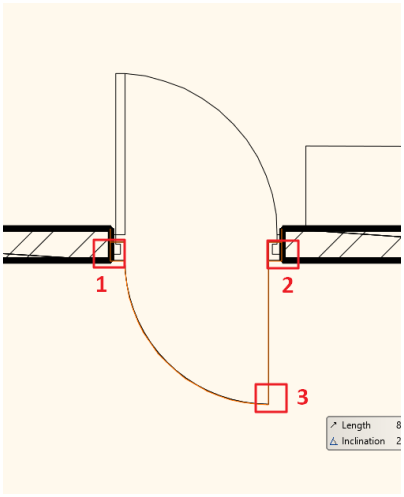
Doors

- First set the door properties.



- Select "Flash" door and set its distance from the wall to 0 mm.
- Now choose Ribbon menu / Building / Door / Door by two points command.
  Give the door first (1) and second point (2) on the floor plan and finally set the opening direction (3)
- Repeat these steps for placing other doors.



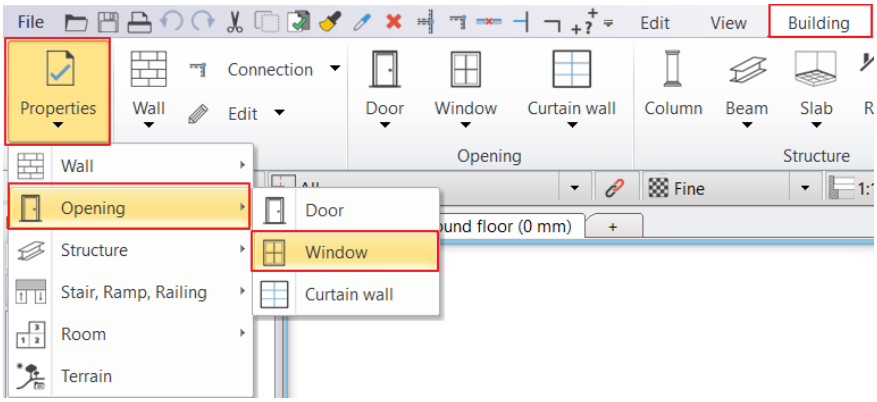


If it is necessary, we can modify its distance from wall under properties later.

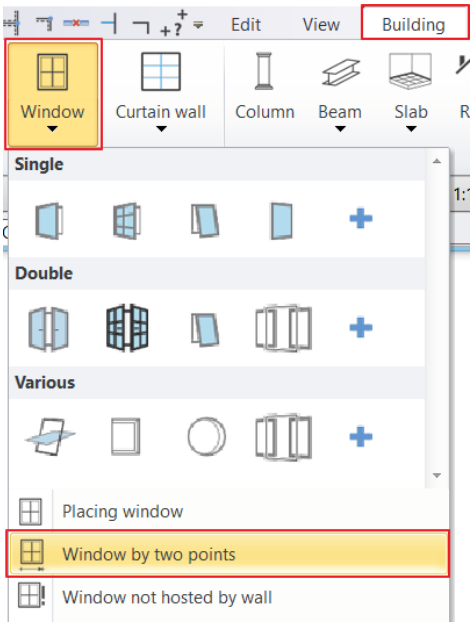
Windows

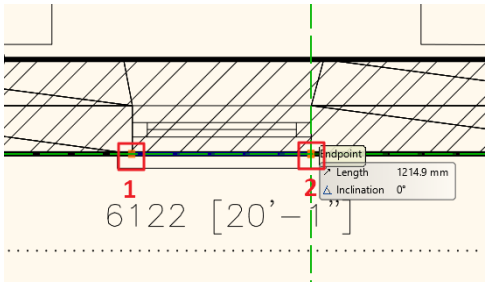
Now place windows.

- First set the windows properties.



- Now select the “Flush” window and set the distance from wall to 400 mm.
- Now select from Building / Window / Window by two points.

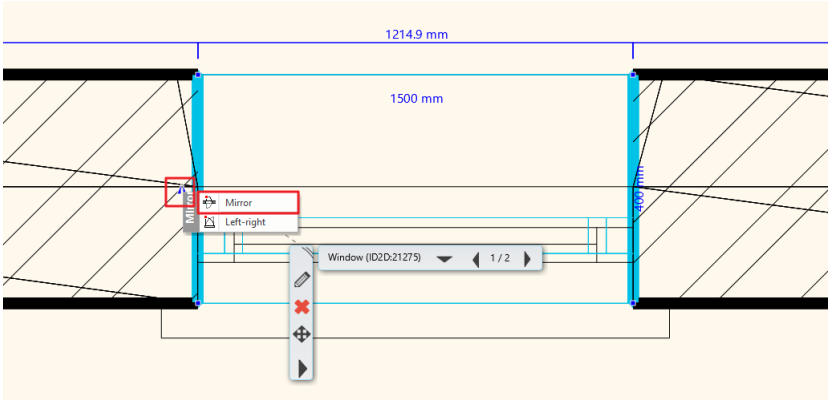




- Now give the window starting and endpoint on the floorplan. Now the window is placed.
- Repeat the same to place other windows.

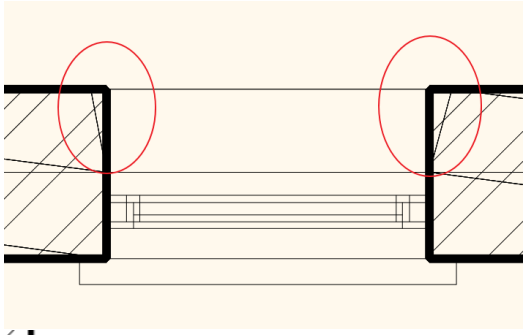
Where the program has placed the window on the exterior of the wall, it is necessary to mirror it.

- Select the window and by clicking on the “Mirror” marker, choose “Mirror” command.



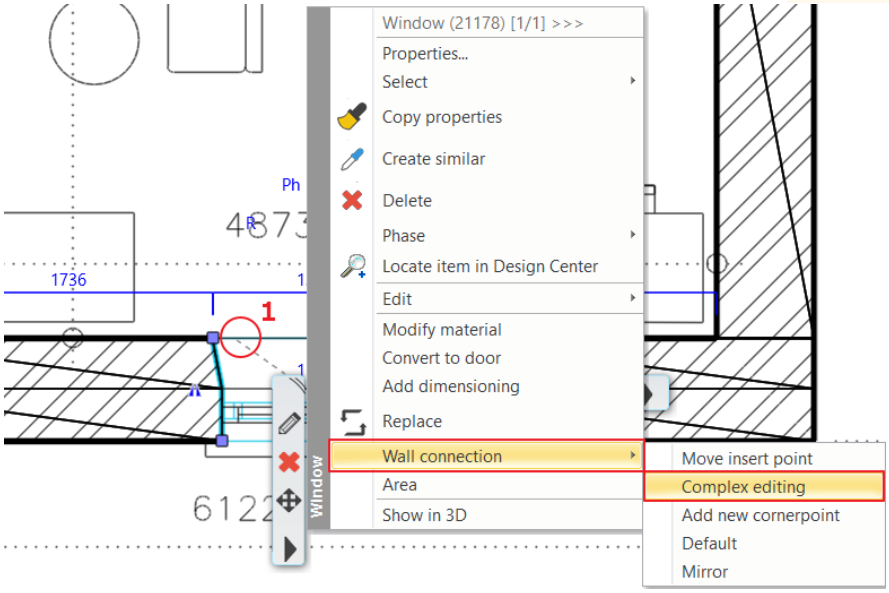
- Originally the distance from wall is 100 mm, now modify this value to 400 mm.
- Now mirror other windows and change the distance from the wall too.

3.4.5. Create window chamfer

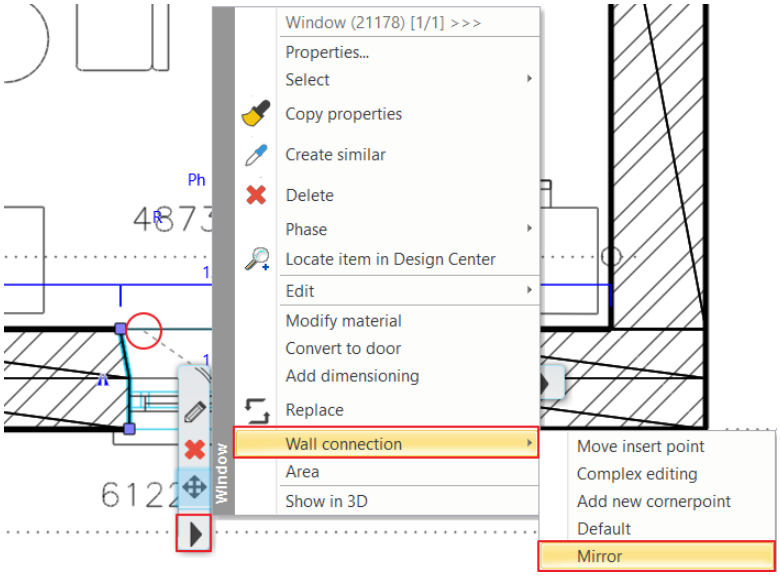


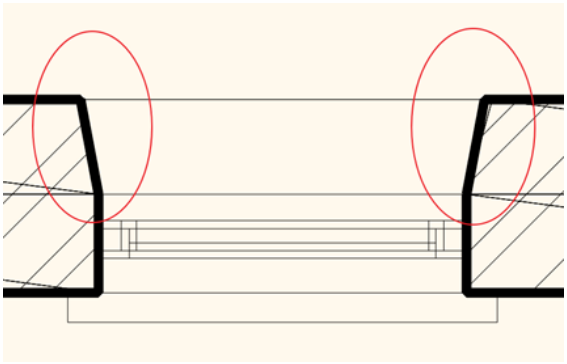
If you zoom in, you can see on the floorplan that the connection between window and wall is slightly beveled; therefore, a chamfer is needed.

- To create chamfer, click on the inner side of the wall (1) and choose from the local menu **Wall connection / Complex editing** (2) command.



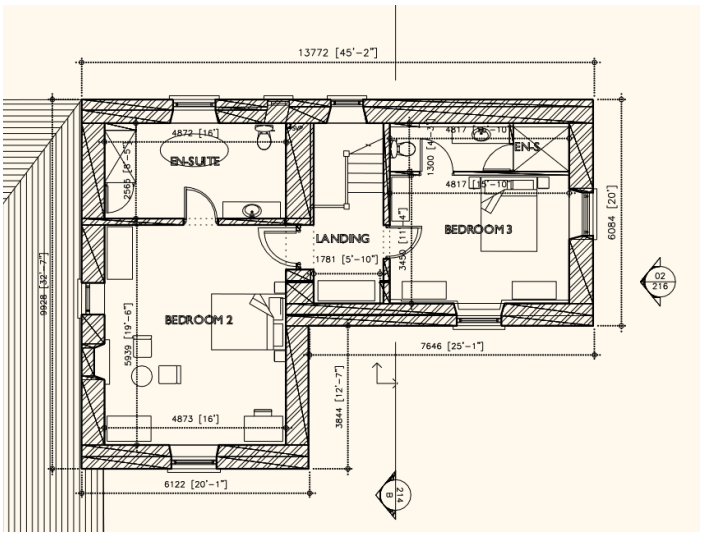
- Since this is not just a typical chamfer, as the wall goes straight for a while and then it becomes slope. Therefore, we have to insert a node.
- Click on the marker and choose Insert node command and place it.
- The chamfer ending point can be placed by Move node command. Hit Enter to finish.
- Finally click close to the left inner side of the window and from the local menu, choose **Wall connection / Mirror** command. This way, the chamfer can be easily copied to the other side.

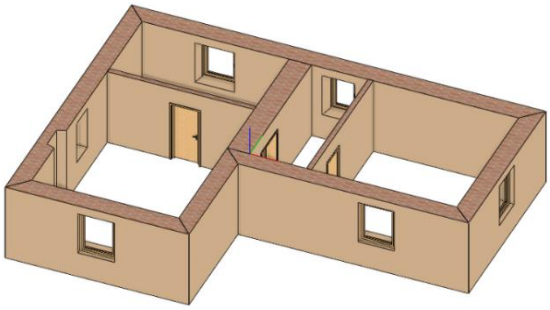




- Now repeat these steps on other walls. The window chamfer is created.

  You completed importing the floorplan and architectural design process.





3.5. Blueprint: Automatic BIM modeling from 2D DWG floor plans

In this example we are going to import a DWG drawing. It also means a geometry import, so as a result, we get a calibrated drawing, which contains lines, polylines, curves, notes, hatches, dimensions, in other words, 2D elements. These items after importing can stay on the original layers, or all object can be placed on one single layer. Based on this DWG drawing, we will now create a two-level building.

The Blueprint feature automatically generates BIM models from DWG floor plans. This intelligent tool interprets 2D drawings and transforms them into 3D models, accelerating the design process and giving designers more time for creative work.
The algorithm "reviews" the drawing and analyzes it based on the specified wall and opening limits.
During the "review," it filters out unnecessary content and searches for patterns in the drawing that can reliably be identified as walls, doors, and windows.
In the next step, it transforms these into real architectural elements, creating walls, doors, and windows.
The process is very fast – architectural models of office buildings covering several hundred square meters are completed in just a few seconds.

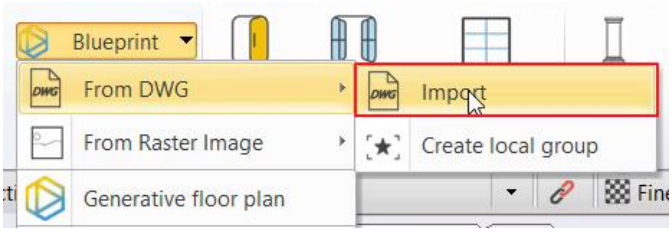
What is the recognition rate for walls and openings on the floor plan?
For CAD drawings, the algorithm can achieve a 90-95% recognition rate.
Naturally, there may be patterns in the drawing that cause errors, such as pergolas, which may mislead the program.
Therefore, it's always worthwhile to review the result with a designer's eye before further processing the plan.

The process consists of the following steps:

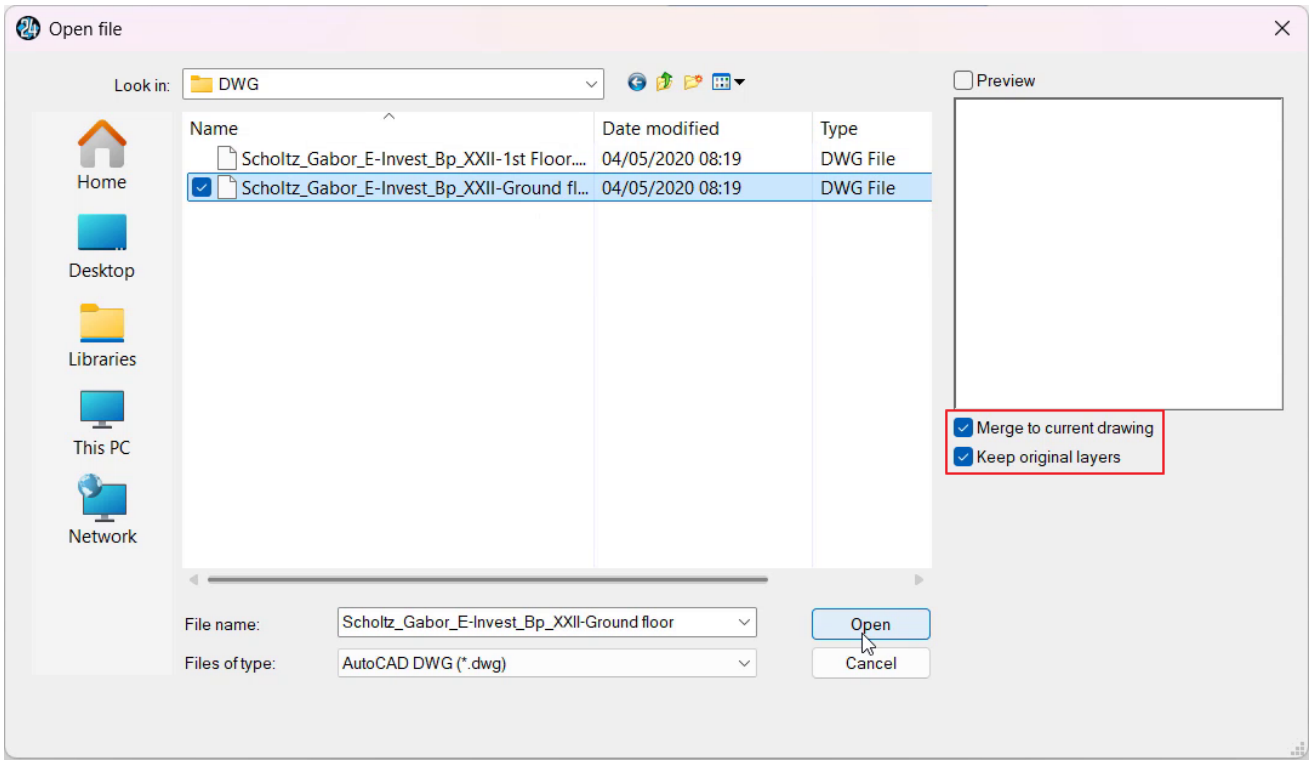
1. Import DWG drawing
2. Convert the drawing into a local group
3. Generated floor plan - Convert lines into walls

3.5.1. Import DWG drawing

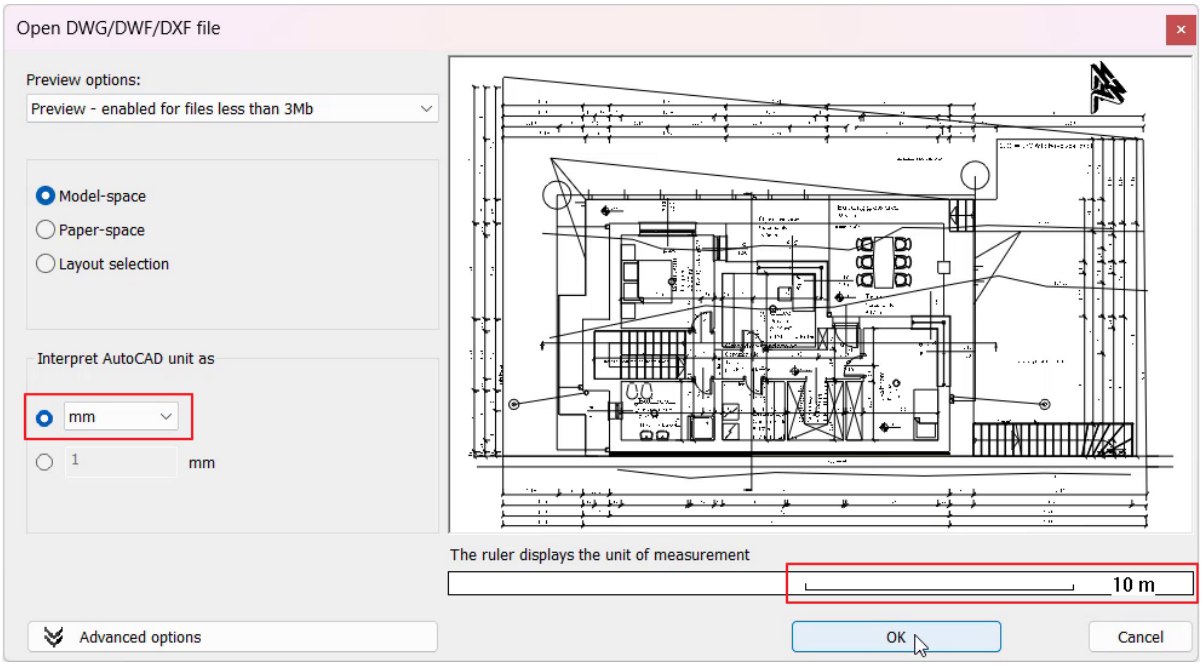
- Select the *Building menu - Blueprint - From DWG - Import* command.



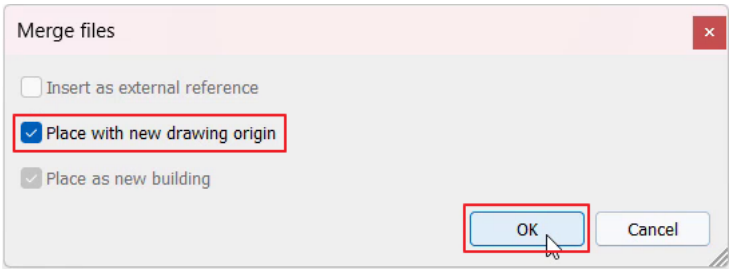
- Open the **Scholtz_Gabor_E-Invest_ DWG-Ground floor.dwg** file from the Documents\ARCHlineXP Draw\2024\Workshop_Intermediate\3_Architectural Plan Processing\DWG folder.



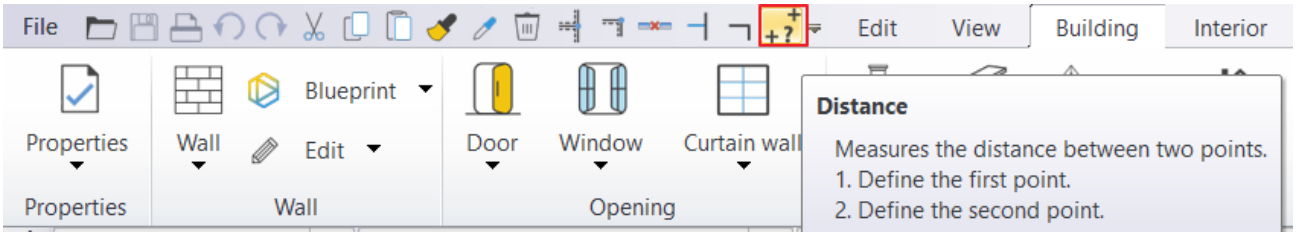
Click on the *Open* button and the pop-up window will show the following:



- Set the scale of the floor plan to achieve a scaled floor plan. Use the ruler to determine the correct measurement unit - select mm here.
- Load the plan by pressing OK.
- Choose the *Place with new drawing origin* option and position the drawing near the origin with one click.



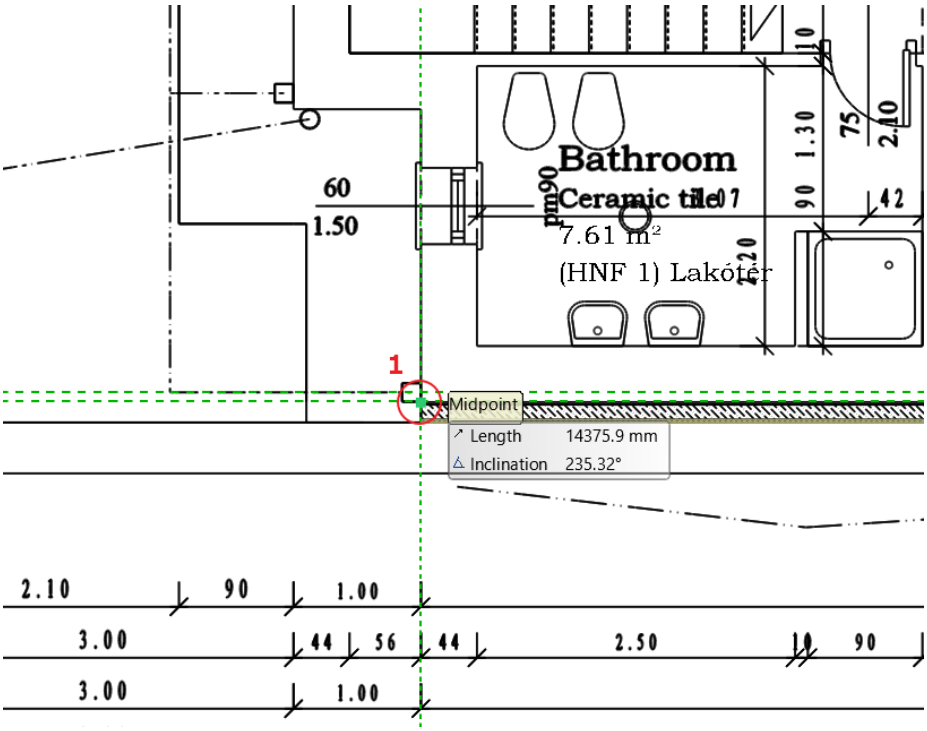
- Afterward, it's essential to verify that the correct scale was set.
- You can also select the **Measure Distance** command from the **Quick Access Toolbar**:

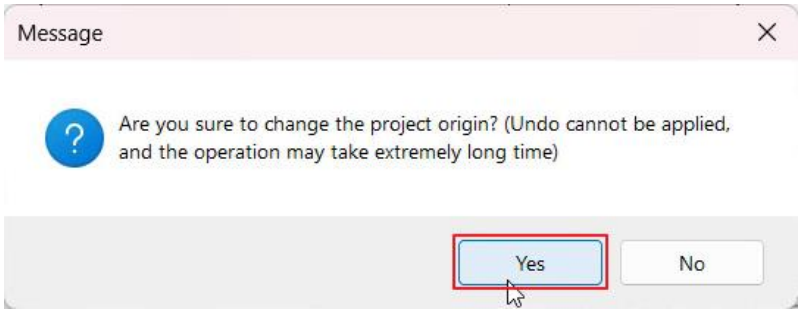


Following the DWG import, you get a high-quality, usable floor plan. In DWG format, the program recognizes not only geometric elements but also dimensions and text, allowing easy editing or deletion from your own floor plan.

Move the bottom-left corner of the floor plan to the origin. To do this:

- Select *Edit menu - Move - Relocate project origin*.
- Select the bottom-left corner of the structural wall (1), then click YES in the pop-up window.



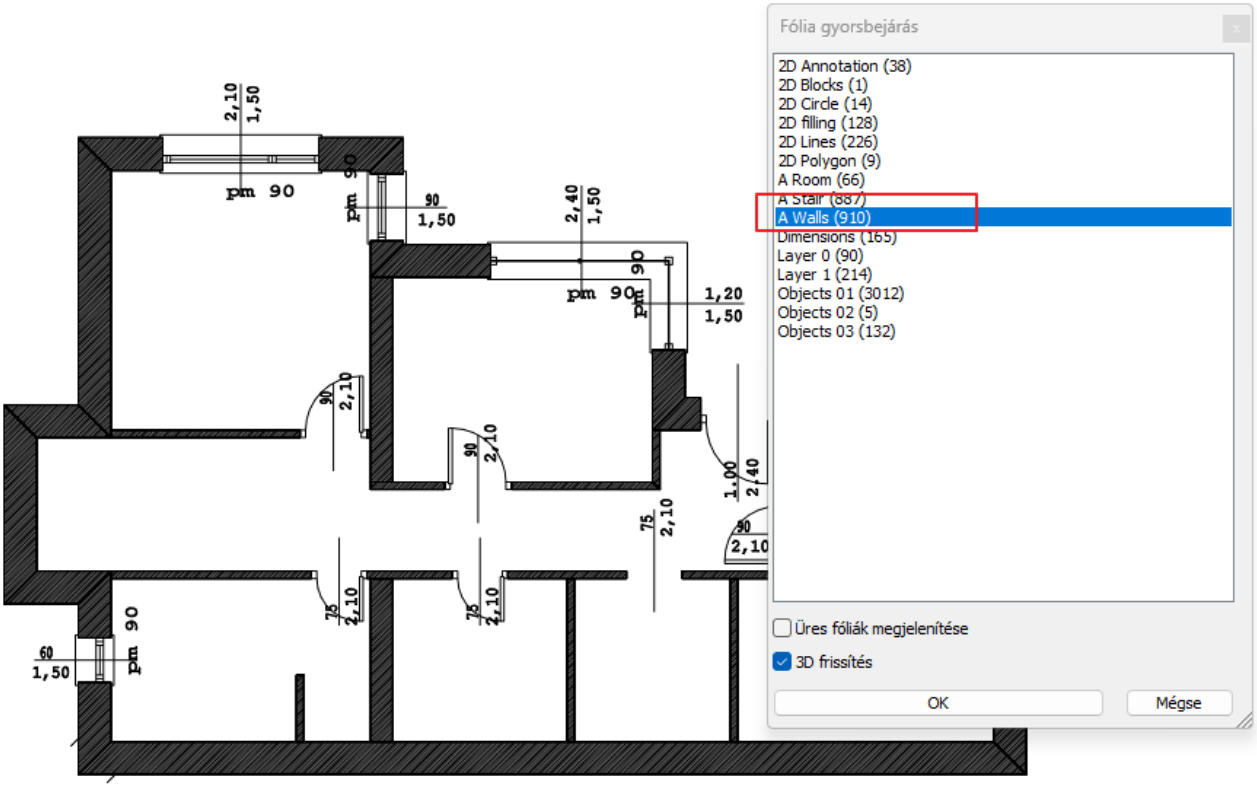


- Apply “Fit to View”, and you will see that the previously selected corner of the wall has moved to the origin.

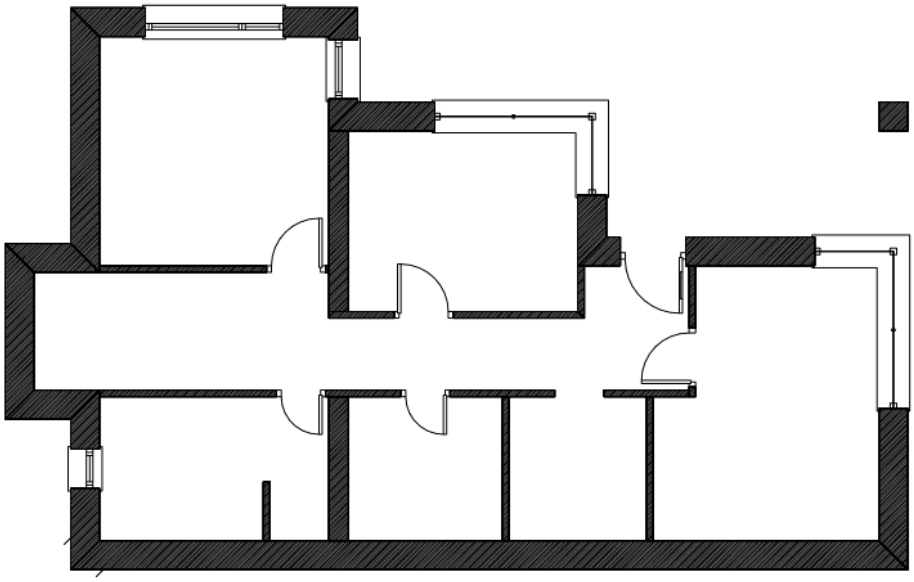
3.5.2. Converting the drawing into a Local group

We can significantly increase the accuracy of the Blueprint algorithm by only leaving the layer related to the walls turned on.

- Using the *Layer Walk* command, I activate only the *A Walls* layer.



- On the floor plan, I select the dimensioning for the openings and move it to the *Dimension* layer, which I then turn off. Now only the walls and the openings within the walls are visible on the floor plan.



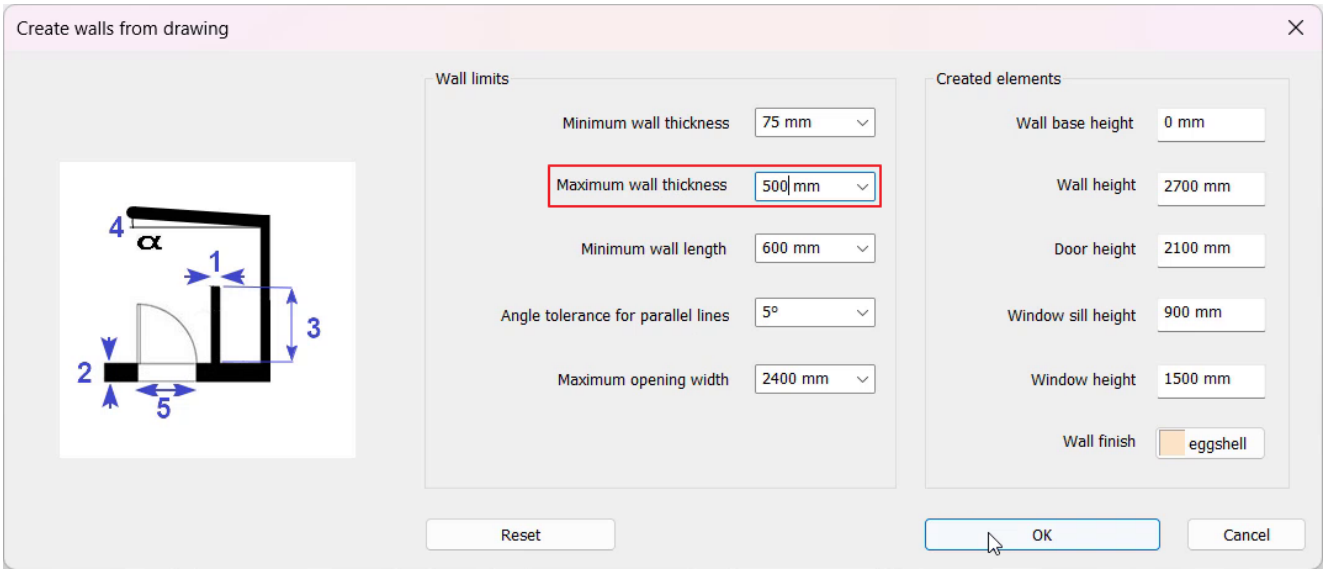
In the next step, I convert the drawing into a local group

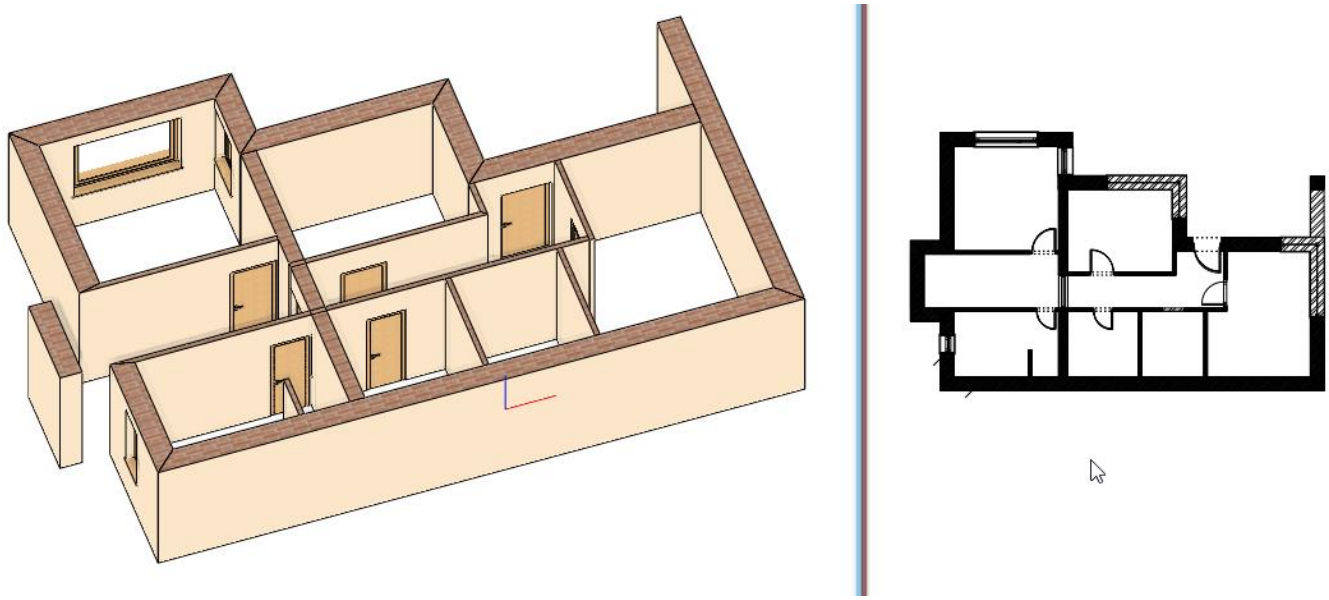
- Select the *Building menu - Blueprint - From DWG - Create local group* command.
  Select the entire drawing, and the group is created.

3.5.3. Generative Floor Plan – Creating a 3D BIM model

The algorithm "reviews" the drawing and analyzes it based on the specified wall and opening limits. During the "review," it filters out unnecessary content and searches for patterns in the drawing that can reliably be identified as walls, doors, and windows. It then transforms these into real architectural elements, creating walls, doors, and windows.

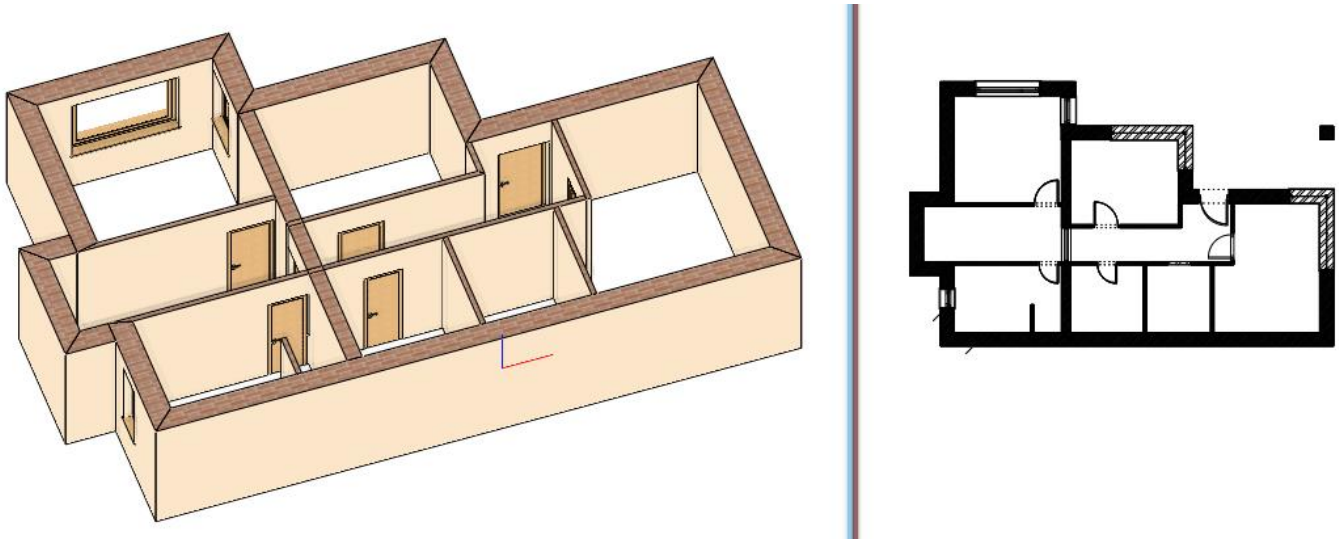
- Select the *Building menu - Blueprint - Generative Floor Plan* command.
- Enter the threshold values in the dialog box, then press OK.





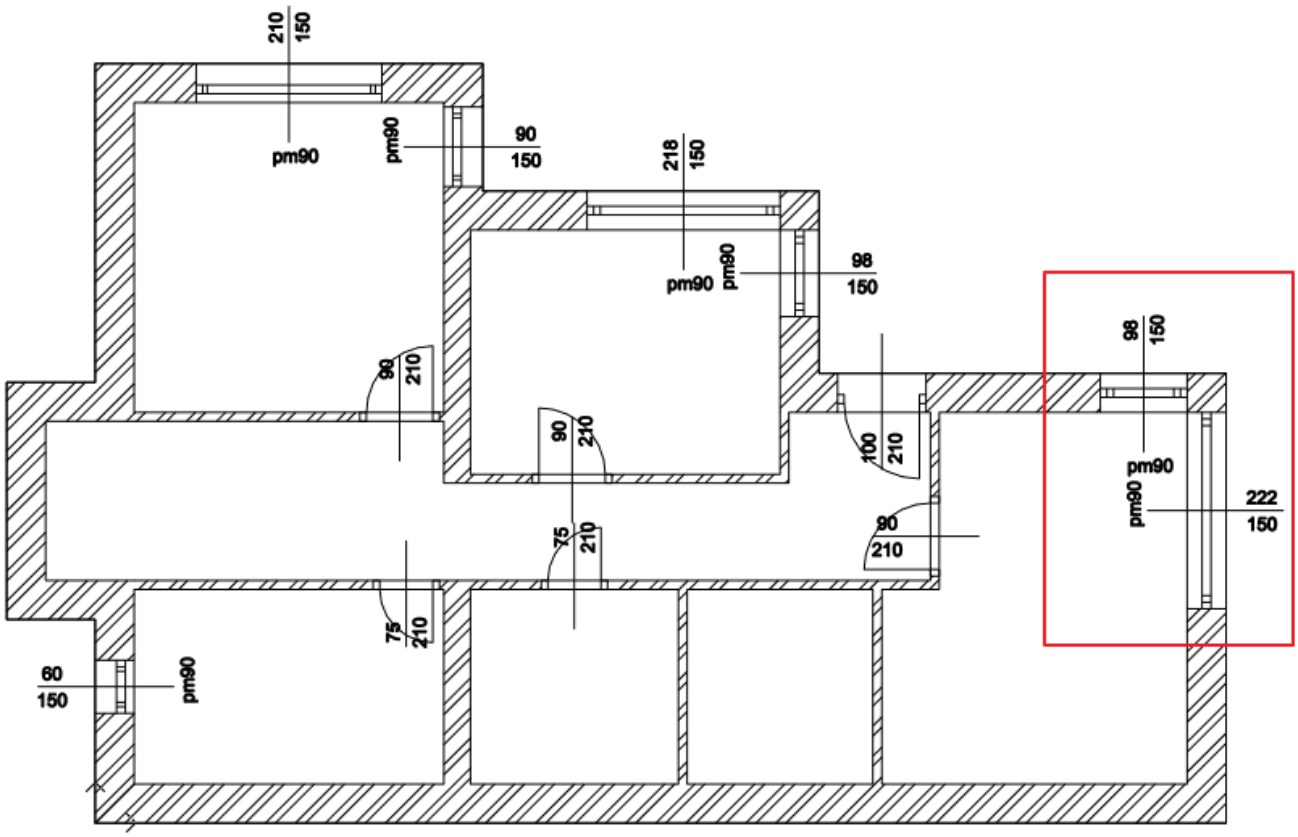
Refining the model:

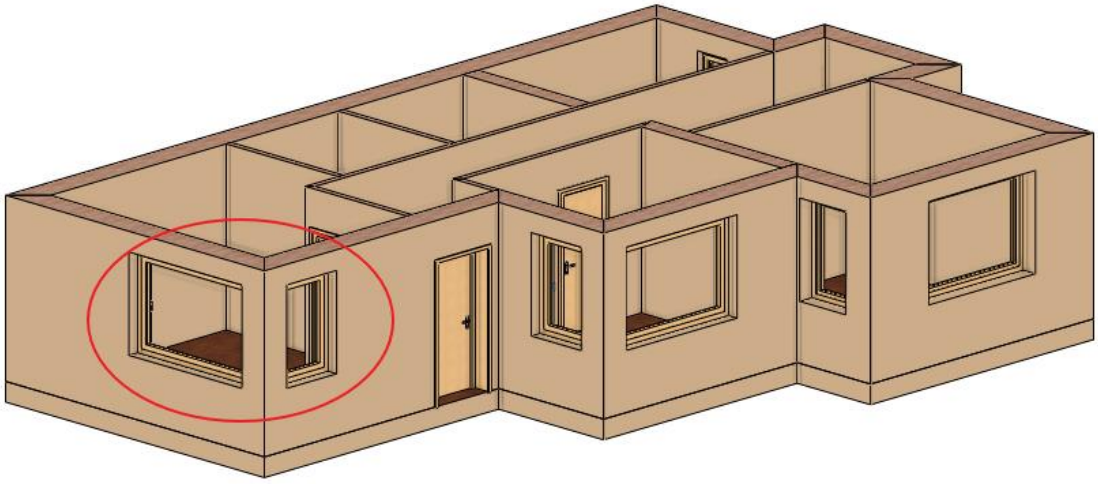
- Draw any missing walls and apply wall T and L connections.



- Add the missing openings using the Door or Window by Two Points command.
- Draw the slab
- Select **Building / Slab / Slab by Walls**, select the entire drawing, and press Enter to complete the slab.

After deactivating the AWall layer and placing the opening dimensions, the following result is achieved.

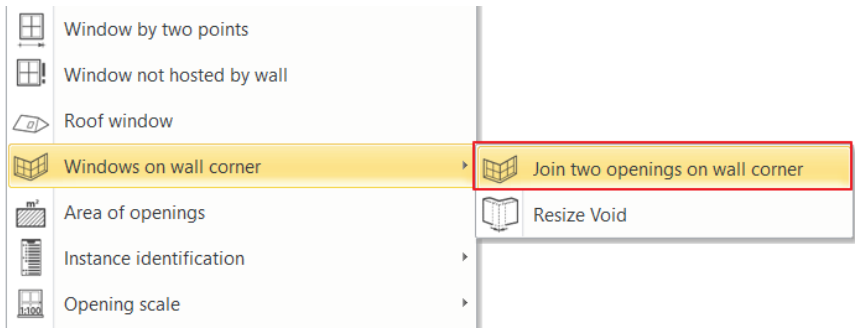


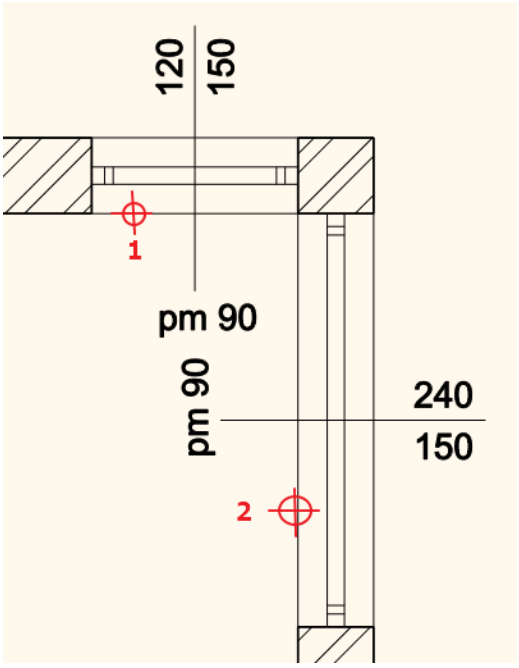


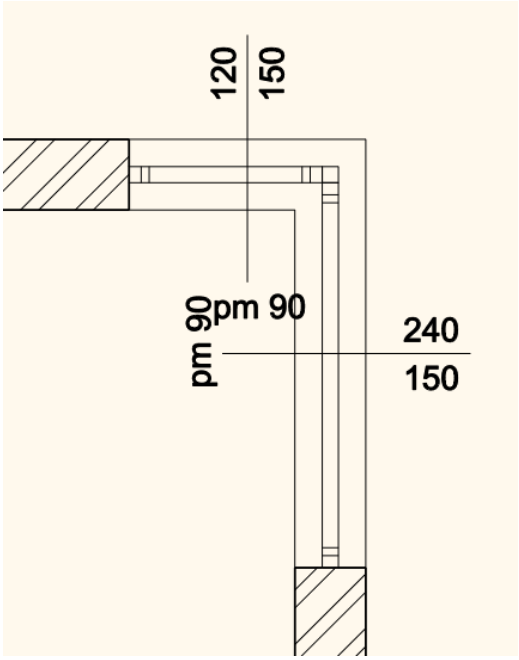
3.5.4. Create corner window

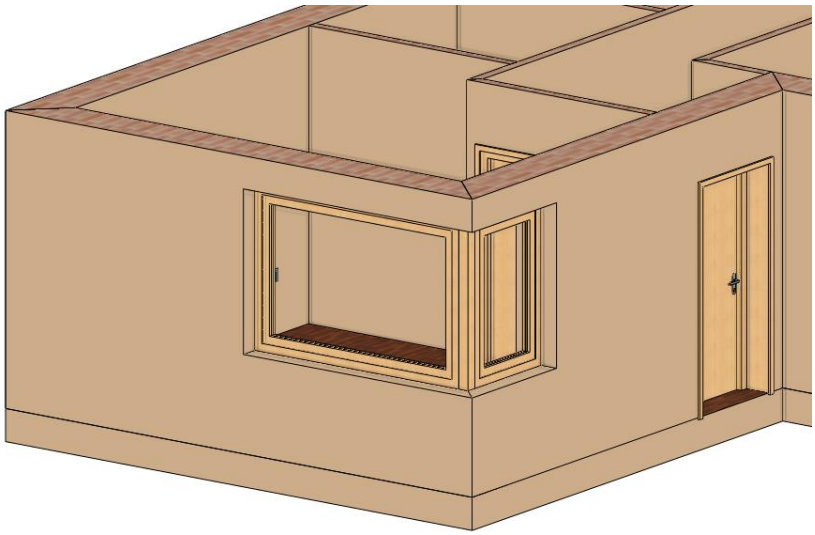
We create corner windows by using previously placed windows.
You can join any combination of standard windows:

- Two windows are placed on each side of the wall corner, close to where the two walls meet (in the example, these are already available.)
- Using the **Window / Windows on wall corner / Join two openings on wall corner** command, we select the first and second windows.
- The program will automatically create the alignment and insert the line between the two windows.
- Resize the windows if necessary.





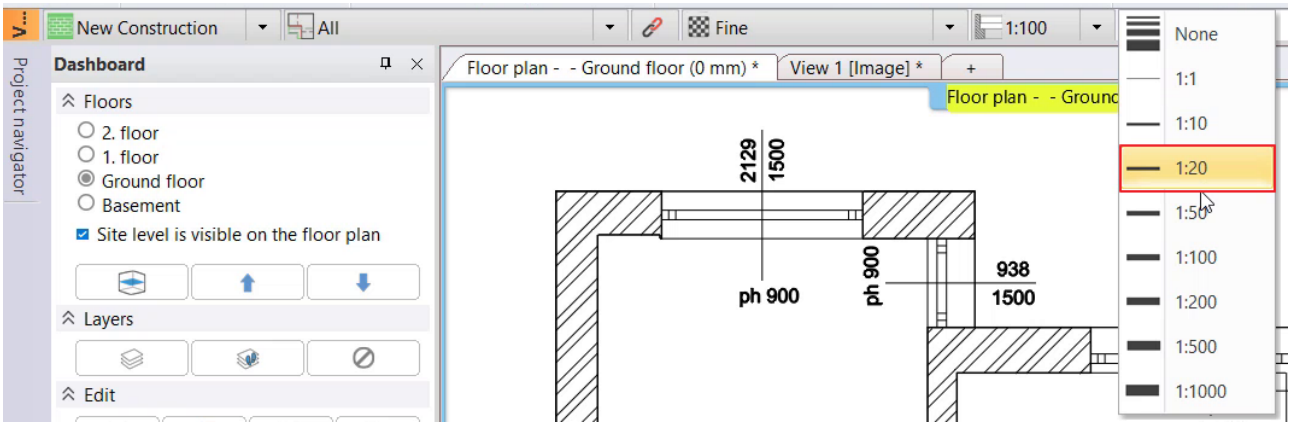




3.5.5. Display Lineweights on screen

As a small detour, it's worth reviewing the line thickness display on the screen.

In the **View Control bar**, clicking on **Line weights scale** allows us to choose from different line weights scales. The line weights scale applies to the screen and does not affect print settings. The default line weights scale is set to **1:20**.



Tip

For example, if you want to print the plan later at a 1:100 scale and also see the corresponding line weight on the screen, choose the 1:100 scale.

"None" Lineweights

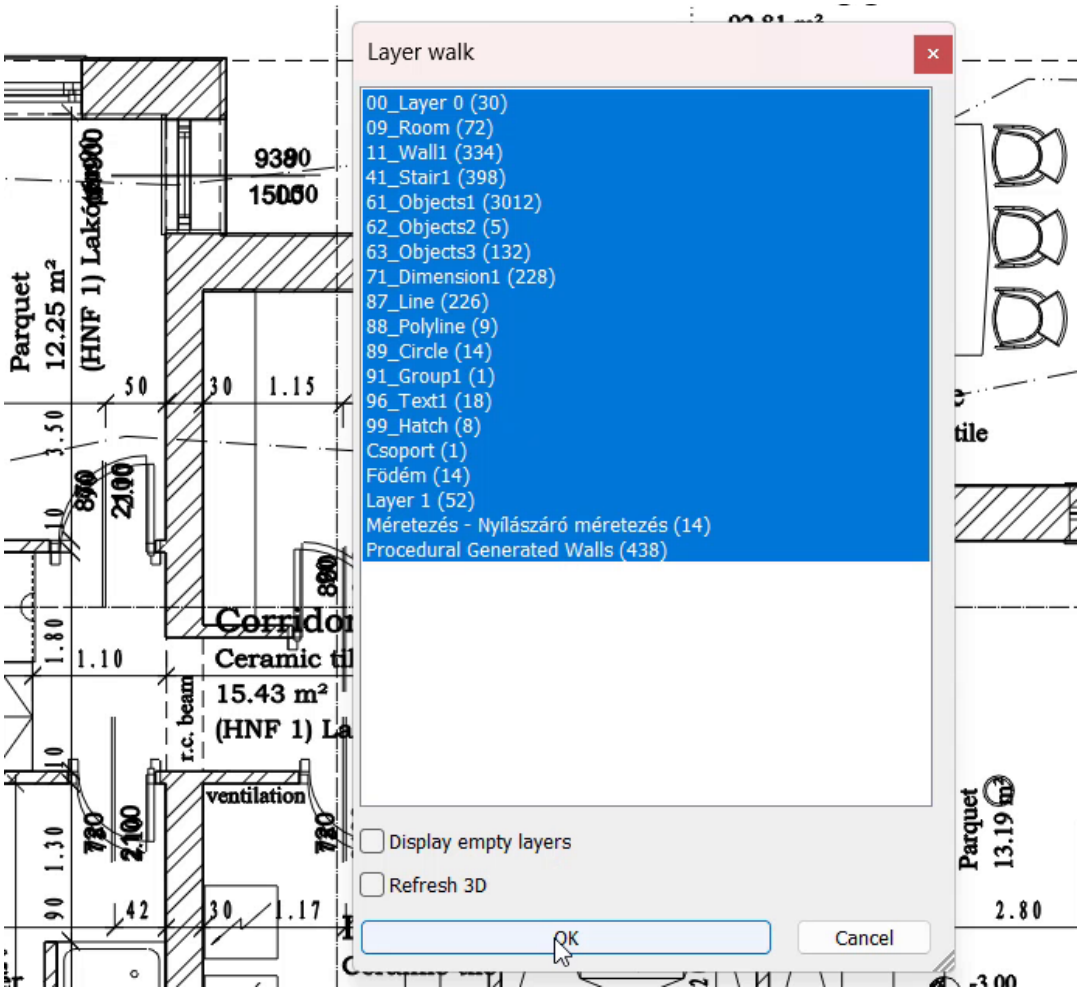
The "None" lineweights means that lines are represented in the smallest unit (1px) in the screen, i.e., the lineweights are turned off. It can be useful for editing on floorplan because clear visibility of endpoints and other particular points will improve the accurate work.

1:100 **None lineweights**

3.5.6. Create First floor

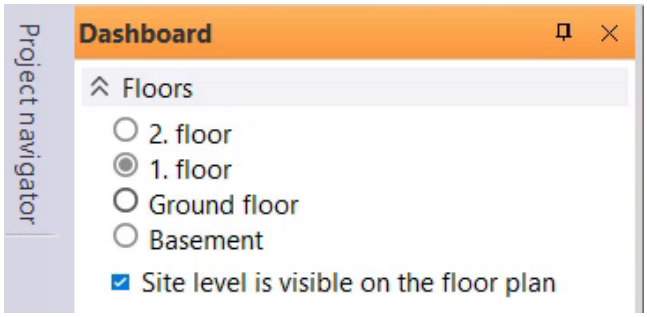
We have already seen before that we are currently working with a two-story house. We have already finished with the ground floor. Next step is to create the 1st floor.

- On the floor plan, turn on all the used layers using the **Layer Walk** icon.



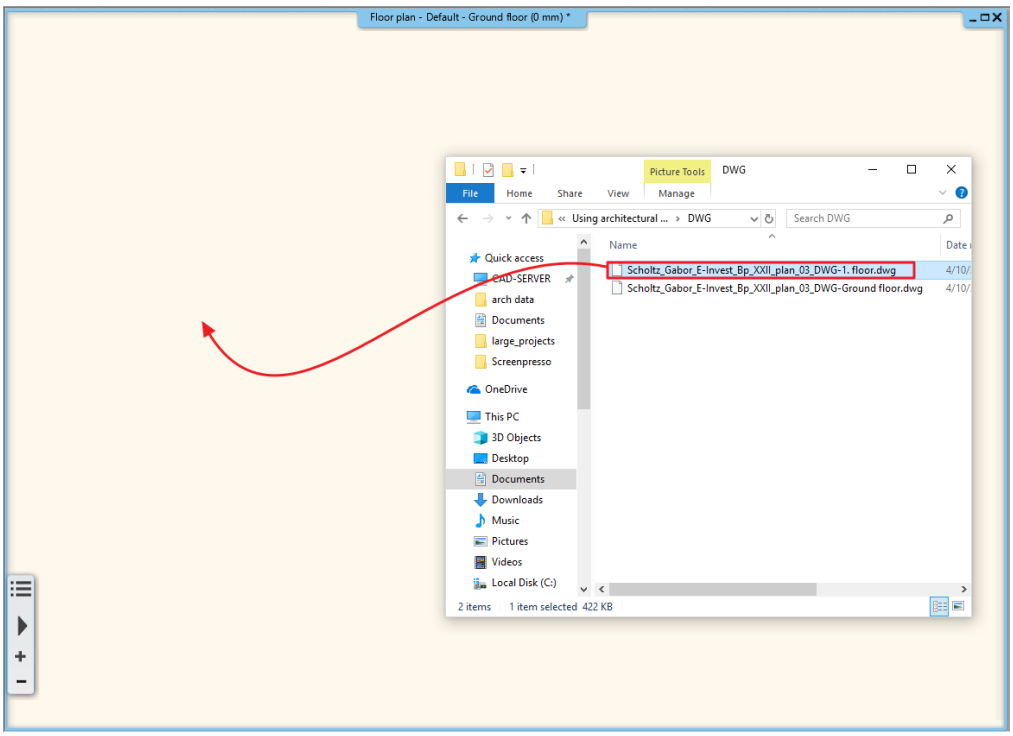
Let's move to the first floor:

- On the Dashboard, select the 1st floor.



We will import the DWG drawing of the first floor to this level. Here we will show another method:

- By opening the **File Explorer**, simply drag the floor plan onto the first floor.



- In the pop-up window select mm as in the previous import.
- Place the DWG drawing with new drawing origin.

The first step is to move the DWG drawing to the origin:

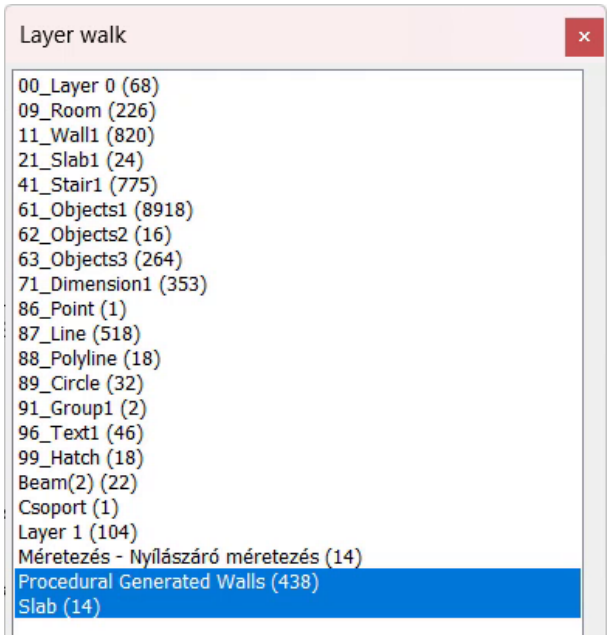
- In the lower status bar, I select the Absolute coordinate input and then select the entire floor plan.

- Select the entire floor plan.
- Choose **Edit menu - Move - Move** command.
- Select the bottom left corner of the supporting wall and type "0 0" (0 space 0) and press Enter.
- Select “Fit to view” and you will see that the corner point has been moved to the origin.

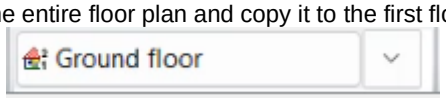
Shift levels with blue arrows you can move between the Ground floor and First floor, it can also be seen that two DWG drawings are precisely overlapping each other.

In this case, it is not worth using the Blueprint function on the first floor, since generally, the main walls of buildings are the same across different levels.

Therefore, move to the Ground Floor, activate the walls and slab layers with Layer Walk:



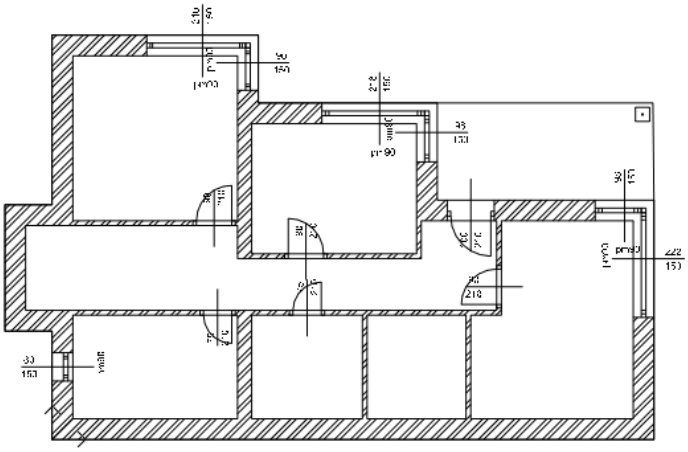
Select the entire floor plan and copy it to the first floor as follows:

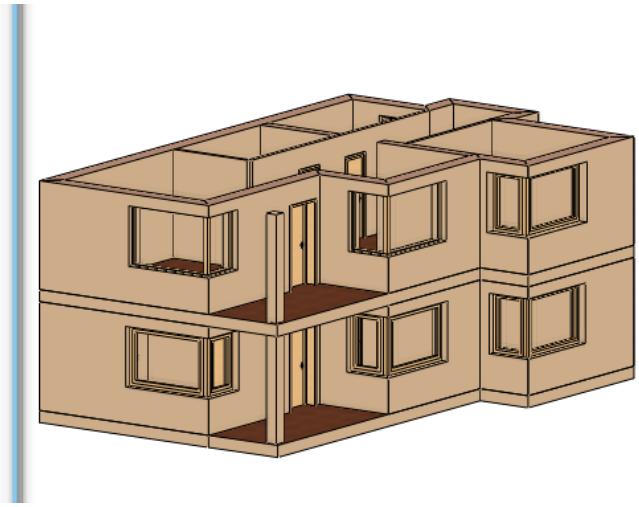
- Click the 

button.
- In the Level Manager, select the “Copy objects to other floor” command  , and in the popup window, choose the 1st floor.
- Close the window by pressing “OK”, the walls were copied to the first floor.

Now the walls, openings, slab are copied to the first floor which is nicely represented in 3D view.

- Next, on the 1st floor, you need to modify the walls based on the floor plan. Delete those walls which are non-existent on the first floor.
- Move existing walls to the previously drawn place, thus speeding up the work, then use L and T wall connection tools.





By also utilizing the Blueprint function, we can quickly and easily design a multi-story house from a DWG floor plan.

3.6. Importing IFC model

During the architectural design process, we may receive the floor plan from the architect in various file formats. As we’ve seen, it can be provided as an image, i.e., .jpg, .png format, raster PDF, vector PDF, or DWG drawing.

ARCHLine.XP is IFC Coordination View 2.0 Import certified design software. Thanks to this we can get floor plans and 3D models at a higher standard from designer using other software like ARCHICAD®, Revit®, Allplan®….

In the previous examples, you could see how much work processing the floor plan entails. The model processing will be the fastest in the case of IFC.

About the IFC file format

The Industry Foundation Classes (IFC) data model was designed to describe building and construction information. The IFC format is a universal, neutral data format considered standard for industrial data exchange today.

ARCHLine.XP supports both IFC4 and IFC 2x3 for import and export. It has an IFC 2X3 Coordination View 2.0 certification. IFC provides 3D geometry and data exchange between different CAD/BIM design software. The most valuable property of the IFC format is preserving architectural elements and properties. The properties of elements like walls and ceilings remain unchanged, though some compromises may occur due to current technology levels. IFC-based data exchange has a much larger capacity than the more widely used DXF/DWG-based data format.

In the case of IFC import, we can adopt real walls, floors, and other elements from a co-designer using another software, which we can then edit as actual walls, floors, and other elements. Finally, we can pass the finished plan back as an IFC file, allowing our co-designers to continue working on it with similar ease using other programs.

Let's take a look when we receive the project as an IFC model.

3.6.1. Importing IFC files

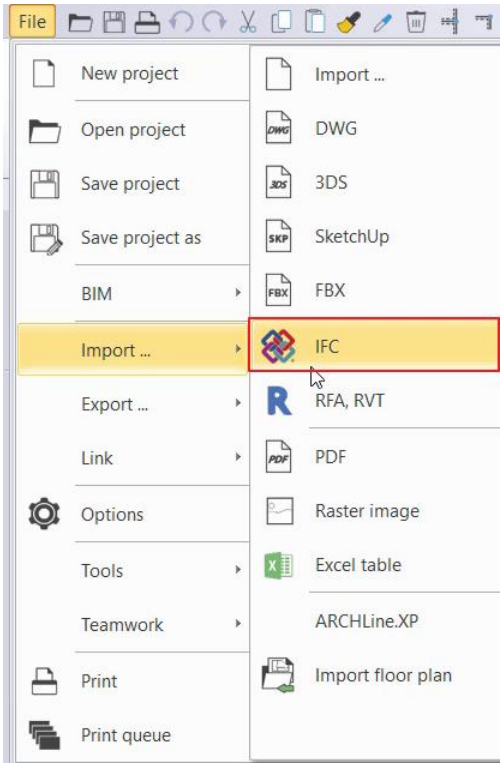
When importing an IFC file, separate drawing units are created that correspond to the individual parts of the IFC project structure. IFC files can be imported as a new project, as a new project part, as an attached external reference, or as a standalone model. The imported IFC model retains the complete layer structure and level structure of the original model. You can check this in the Layer Manager and Level Manager dialog.

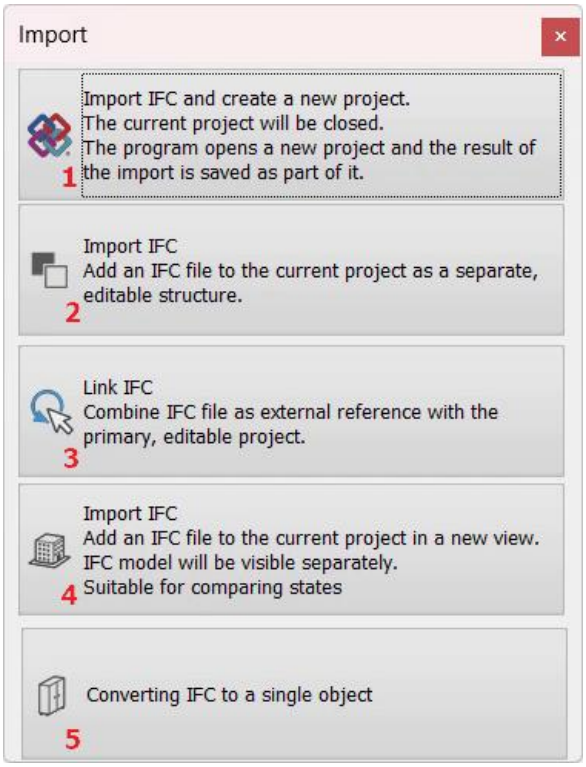
The import of IFC files can occur in two ways::

- **Drag and Drop**
  The drag-and-drop tool is a convenient and straightforward way to open an IFC file. Open the folder from which you want to import documents. Drag the files from Windows Explorer onto the ARCHLine.XP window and release the mouse. In the dialog that appears, select the method of import.

- **File Menu / Import / Import IFC**
  To import an IFC file, choose File / Import / IFC. In the dialog that appears, select the method of import. The import file dialog will appear, and then select the IFC model you wish to import.

- Click on **File menu / Import / IFC** command. The program will offer five options.





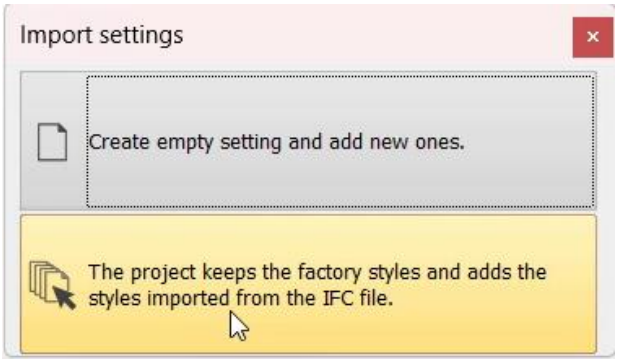
1. Open a new project file, import the IFC model, and continue working on it.

2. Add the IFC model to the current project as a separate, editable structure.
3. Link IFC to the current project as an external reference.
4. Import the IFC model to the current project in a new view window, suitable for comparing states or for later using a part of the IFC model by copying it into the floor plan view.
5. Convert the IFC file content into a single object, useful for furniture objects downloaded in IFC format.

- In our case, when we want to load a floor plan as an IFC, we need to use the first option.
- Select the IFC file from the Documents\ARCHlineXP Draw\2024\Workshop_Intermediate\3_Architectural_Planning\IFC folder, then click the Open button.

Styles

The style names stored in the IFC file appear in the Style Manager. You can specify how and when styles are created.



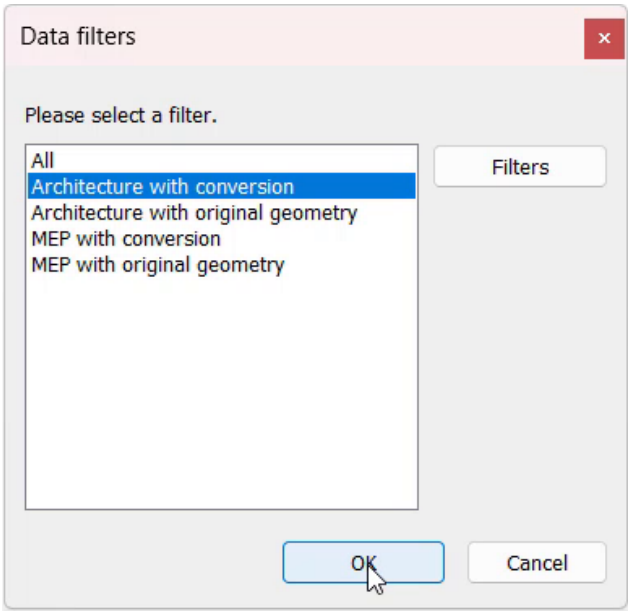
1. Create empty setting and add new ones:
   In this case, ARCHLine.XP default styles are deleted, and the project contains only the styles imported from the IFC file.

2. Keep ARCHLine.XP factory styles and add new ones:
   In this case, ARCHLine.XP retains the default styles and adds the styles imported from the IFC file.

- In the Import settings window that appears, select the 2nd option: The project keeps the factory styles…

Data filters

You can select what to import from the IFC file:
All, or only Architecture or only MEP (pipeline) elements with or without geometry conversion.



With original geometry:
This means the model retains the geometry it was originally created with, and the elements are created in ARCHLine.XP as IFC element types. When exporting, the same model received can be returned to the co-designer, supplemented with the user's own model.

With geometry conversion:
This means that architectural elements like walls, slabs, doors, windows, columns, beams, and terrain are converted into the corresponding ARCHLine.XP elements (walls, slabs, etc.). If the original model is very complex, walls, slabs, etc., may

become IFC elements due to non-corresponding complex geometry. Railings, stairs, and roofs can only be created as IFC elements.

Filters

In the Filters window, you can individually select which element types to apply or not apply conversion to.

- Choose the *Architecture with geometry conversion* option.

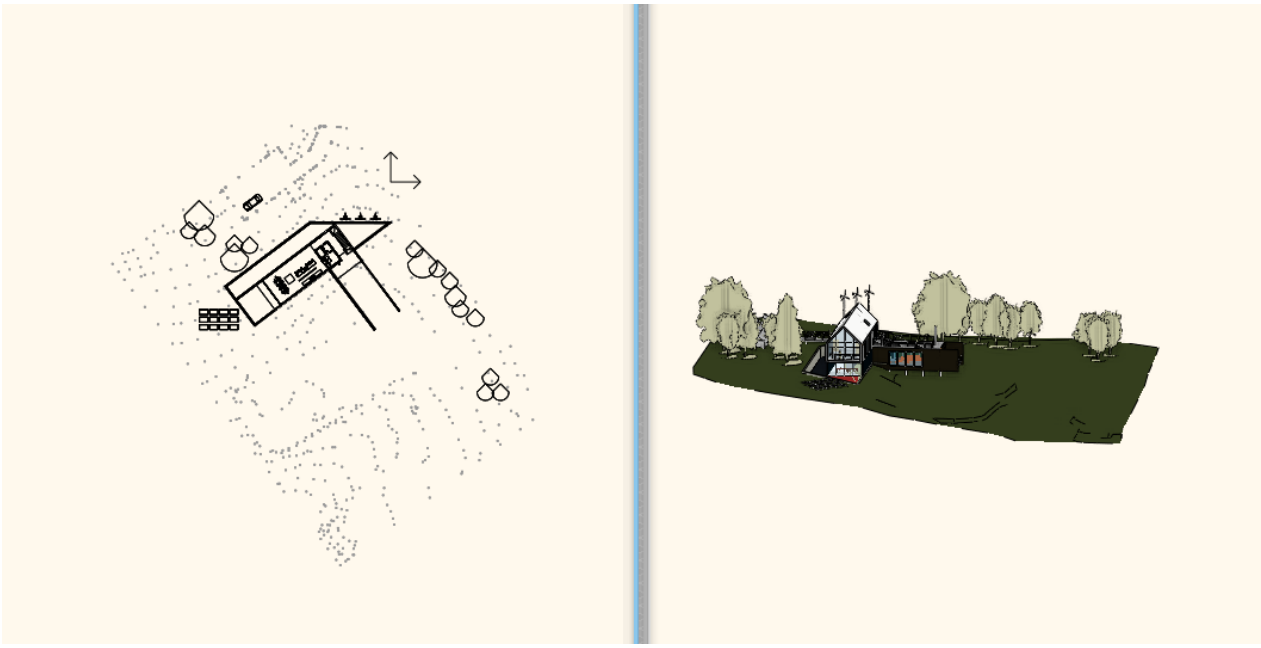
3.6.2. Using the model after importing

Specifics of IFC Import

After importing the IFC model, the entire floor plan and 3D model will be visible. It's important to note that the model and its floor plan imported from IFC do not contain drawing elements, such as dimensions or labels. The model retains its original scale, so no scaling is needed in this case.
Another key difference from other imports is that the model imported this way retains the original layer and level structure of the design. We can check this in the Layer Manager and Level Manager dialog windows.

Properties of the imported elements

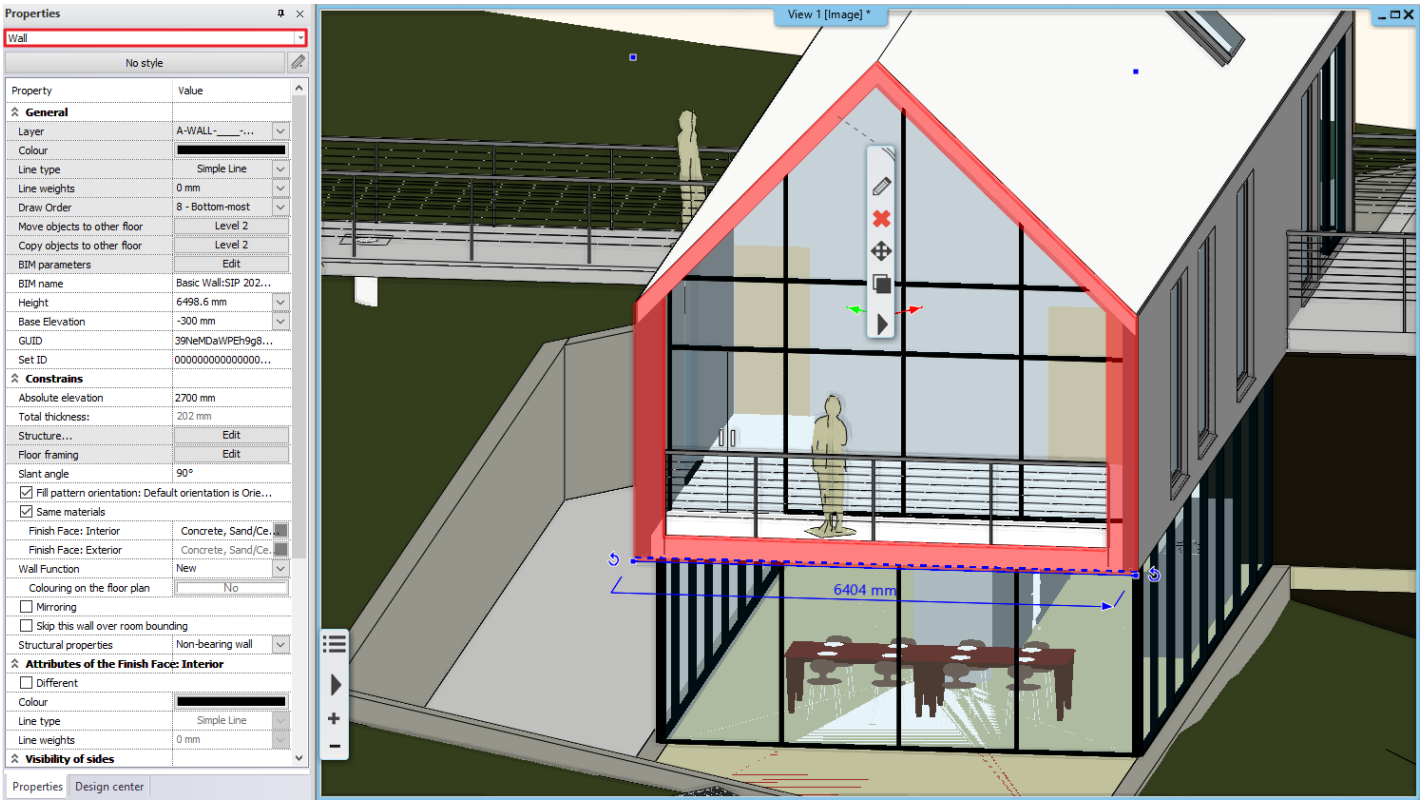
One of the most attractive features of the IFC import is that it can transfer architectural elements from one program to another, ensuring that they not only preserve their geometry but also remain as actual walls, floors, doors, windows, etc., rather than just 3D solids. These elements not only correspond to the element types in ARCHLine.XP but are also editable. The easiest way to verify the type of a specific element is to select it and check its type in the Properties panel that appears on the side.



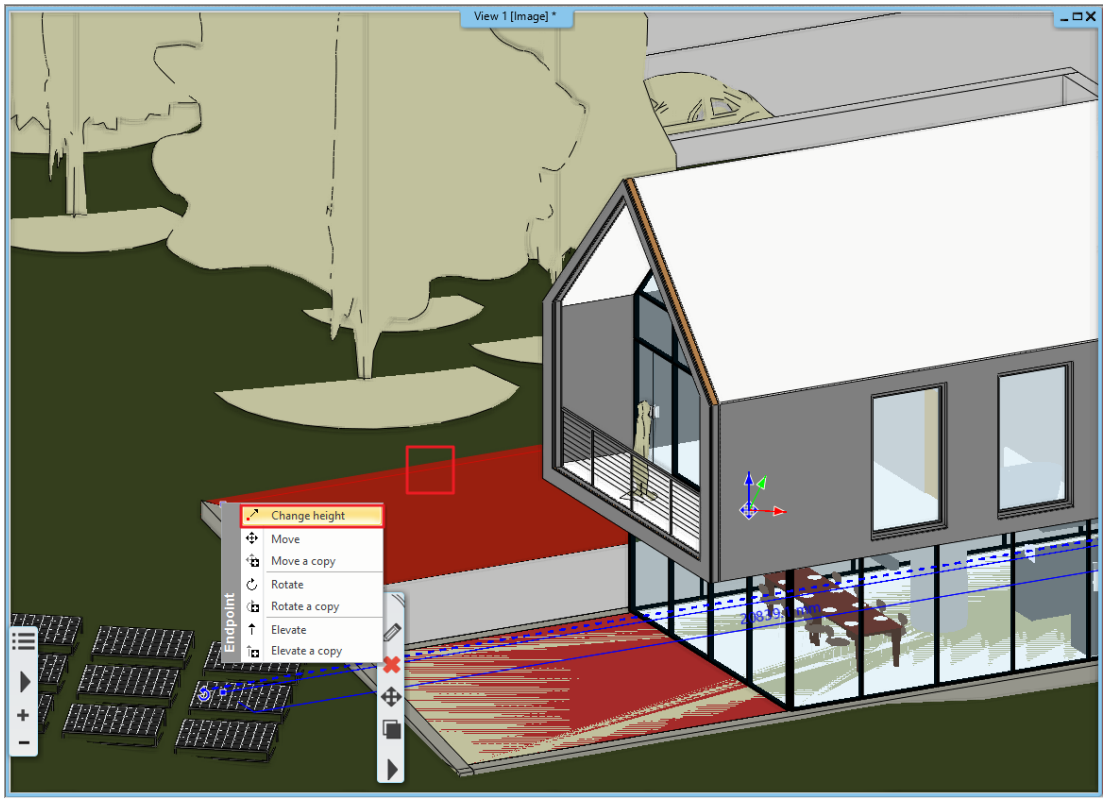
- During IFC import, the model keeps its original level structure. We can check this by opening the Level Manager.

- Check the 3D model as well. In the 3D model, you can see that the building, the terrain, and the objects have loaded.

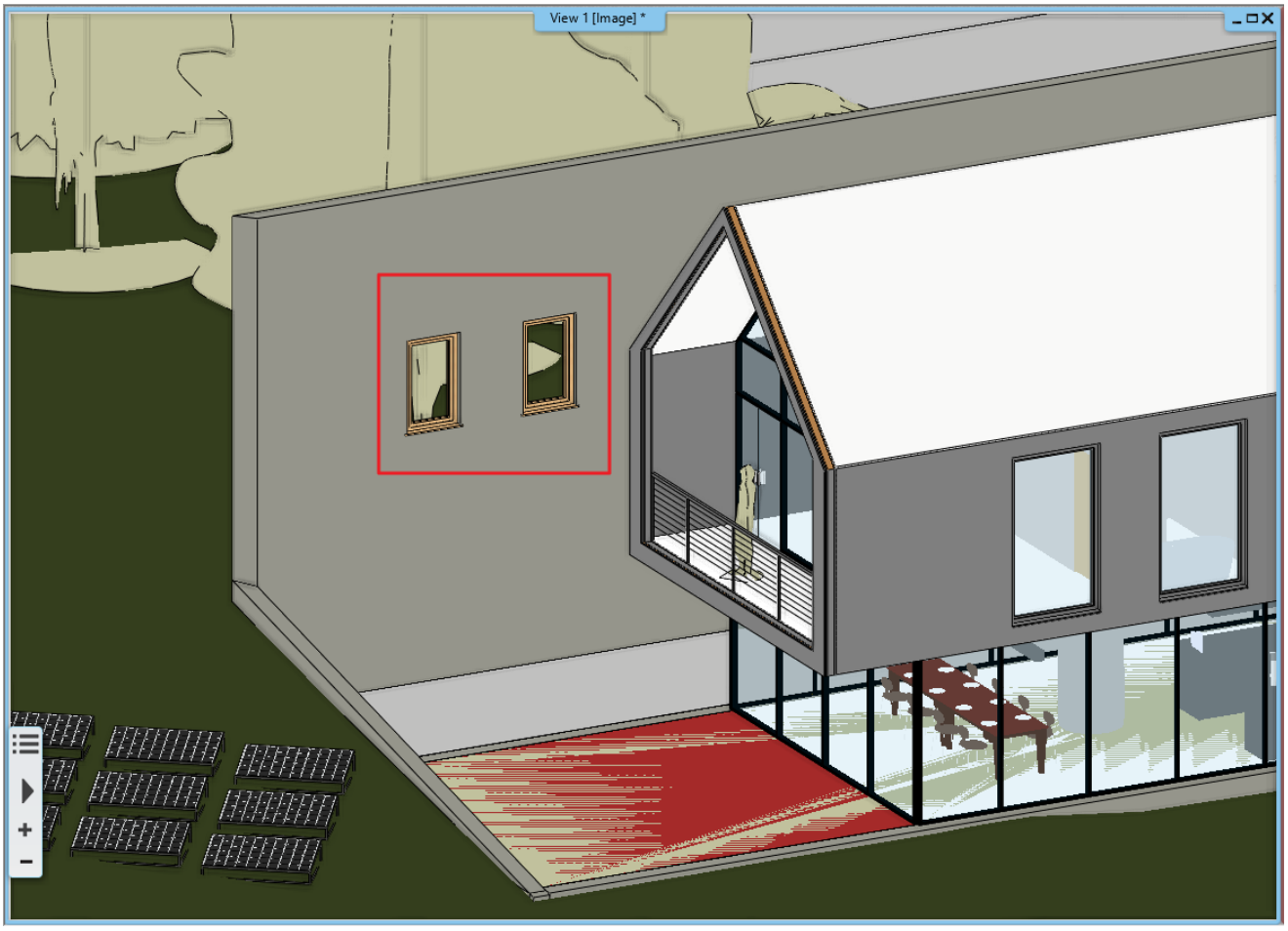
- Now delete al the trees to make it easier to see through the model.
- Now let's examine the building closer.
- Click on one of its items, e.g., a wall. On the left side under Properties, you can see that it was brought in as a wall in the model. These items not only correspond to ARCHLine.XP item classification, although these can be adjusted/modified.



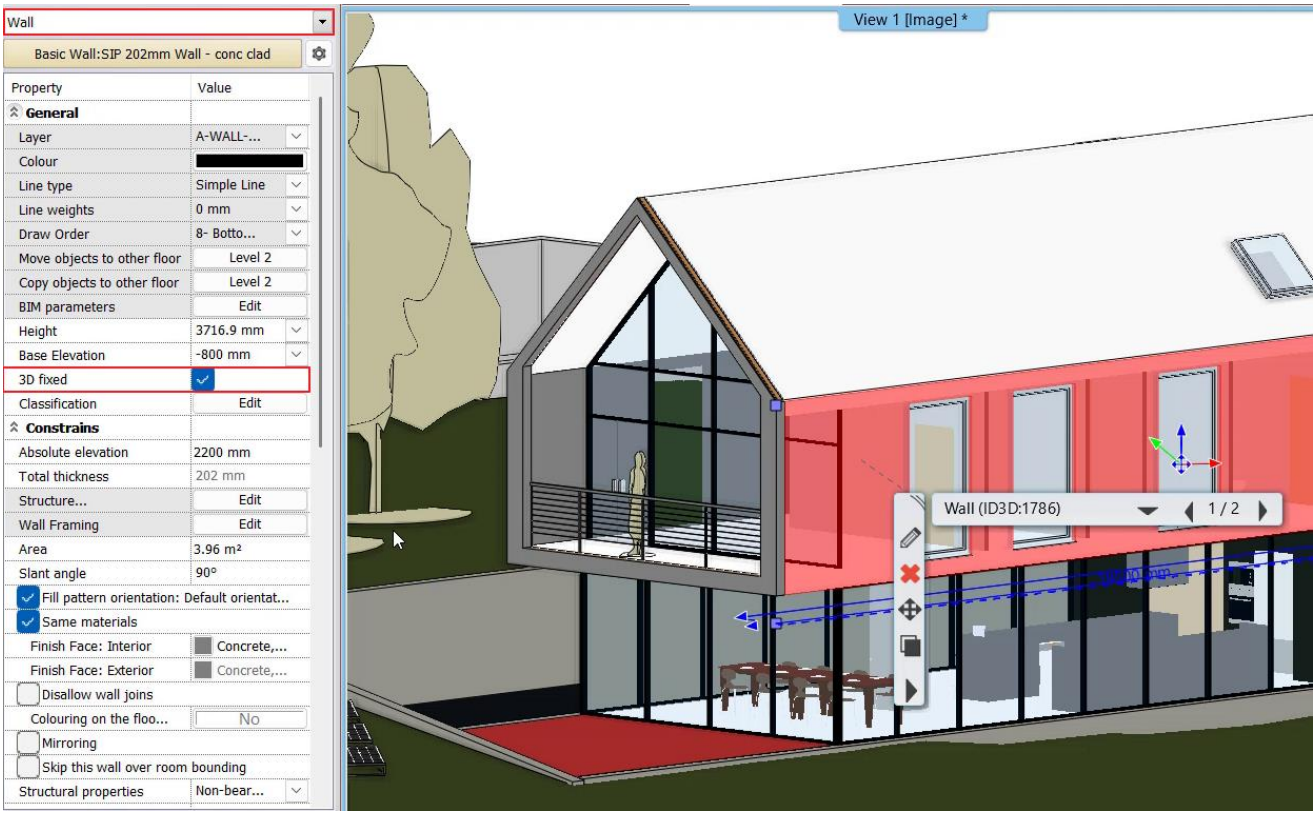
- Now click on a wall and change the height. Now click on the wall and increase the height.



- This is wall remained a wall so we can place opening there. For example, place some windows.

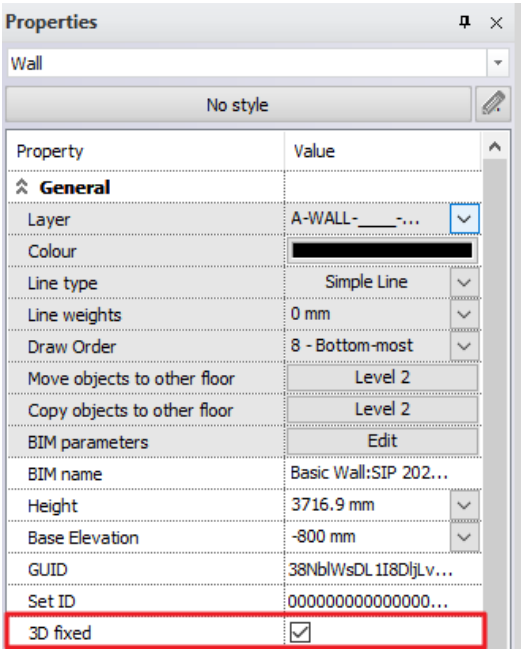


Not all walls conduct this way. Let's check this wall with windows.

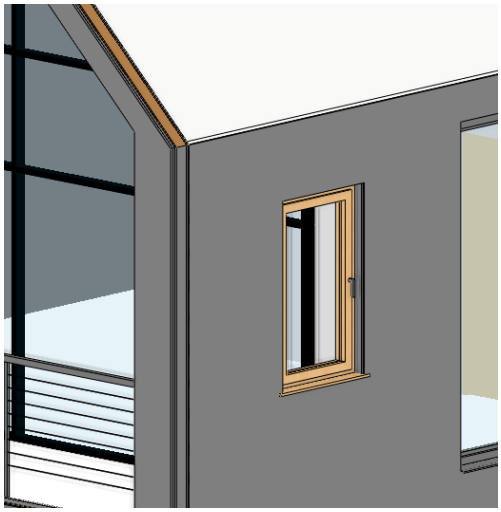


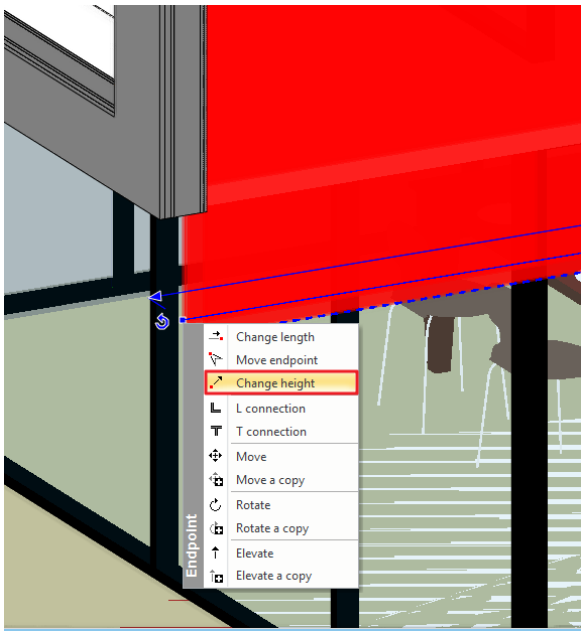
- Now place a window on this wall. As a result, you can see that the window was placed, but it is not visible.

It could happen when the software imported the item is 3D fixed. It can be checked on the side menu too. In this case, we have to unlock fixation to execute any modification. Turn off this option.



- After resolving the fixation, the previously placed window now appears on the wall.



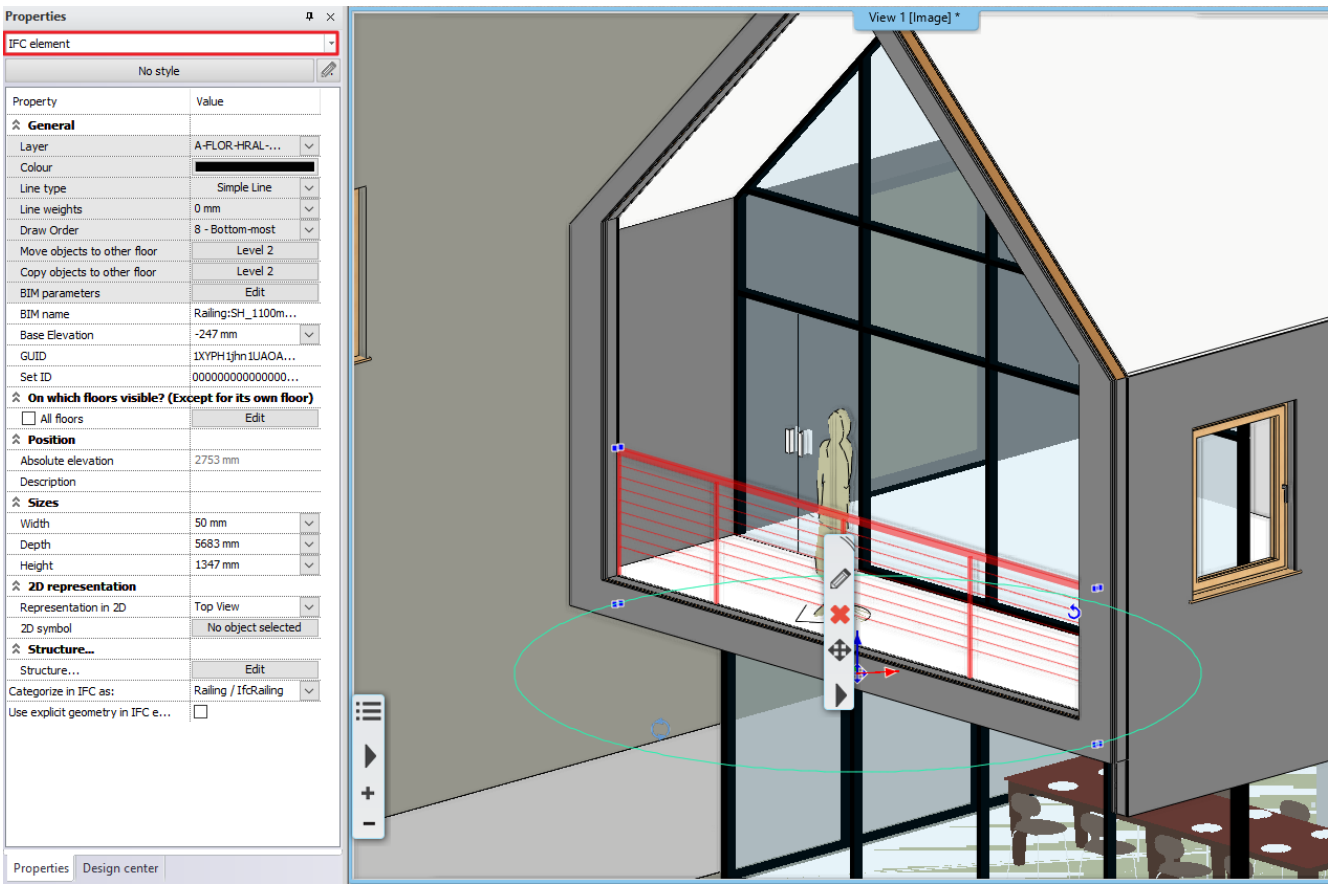


The wall dimension has also changed; the bottom is now much below. Change the height back to the original position.

- Now click on the wall, in the appearing pop-up menu choose “Change height” command.
- Align to the next wall endpoint.
- Now remove previously placed window, as there will be no need for it during our work.

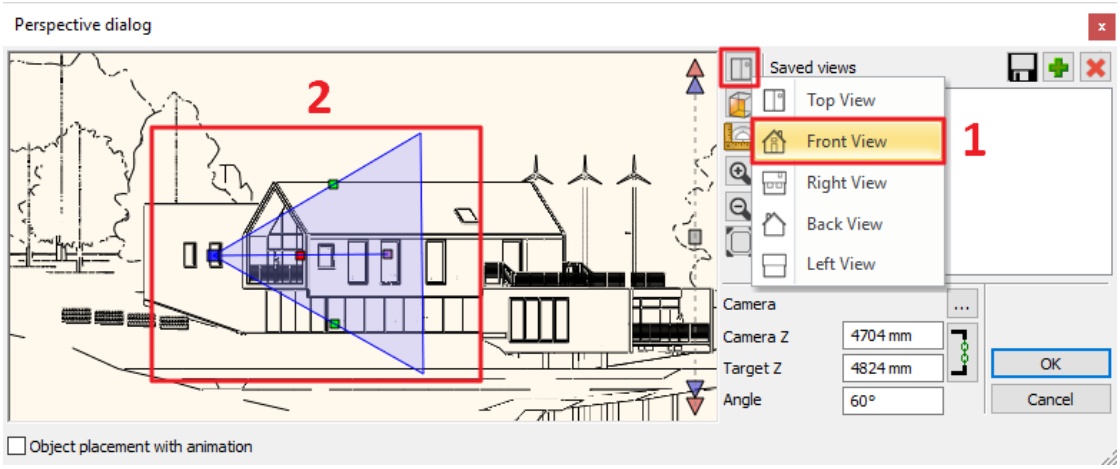
The imported items can be an architectural item such as walls, slab.

- Now click on the handrail. As you can see, this is an IFC element.

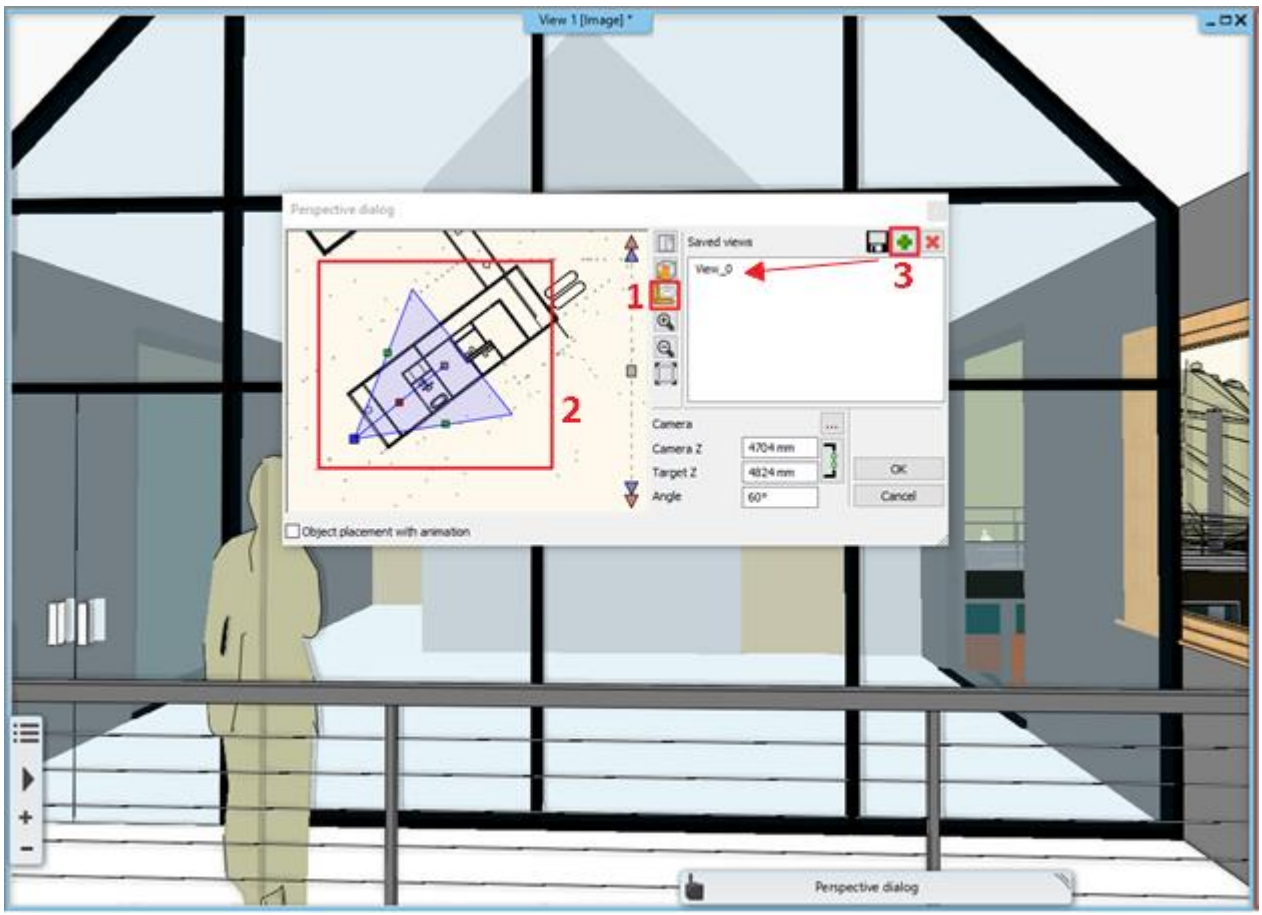


Now let's start our work, the task is to furnish the room on the first floor facing to the balcony.

- For this, we have to create a perspective view. 
- To set the correct height of the view, choose front view (1) option in the appearing pop-up dialogue window. Now move the camera point to the shown position, i.e., to the first floor (2).

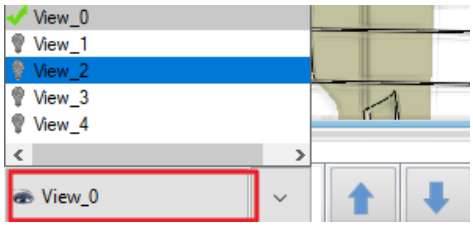


- Set 2D view. (1)
- At the first view set the perspective to look the room from outside. (2)
- If the preferred view is set, press green cross to add to the list of the saved views (3).



- Add 3-4 more views; this way, you can practically view around in the given room.
- Press OK to close the dialogue window.

- Start from “View 0” and delete the man standing on the balcony.

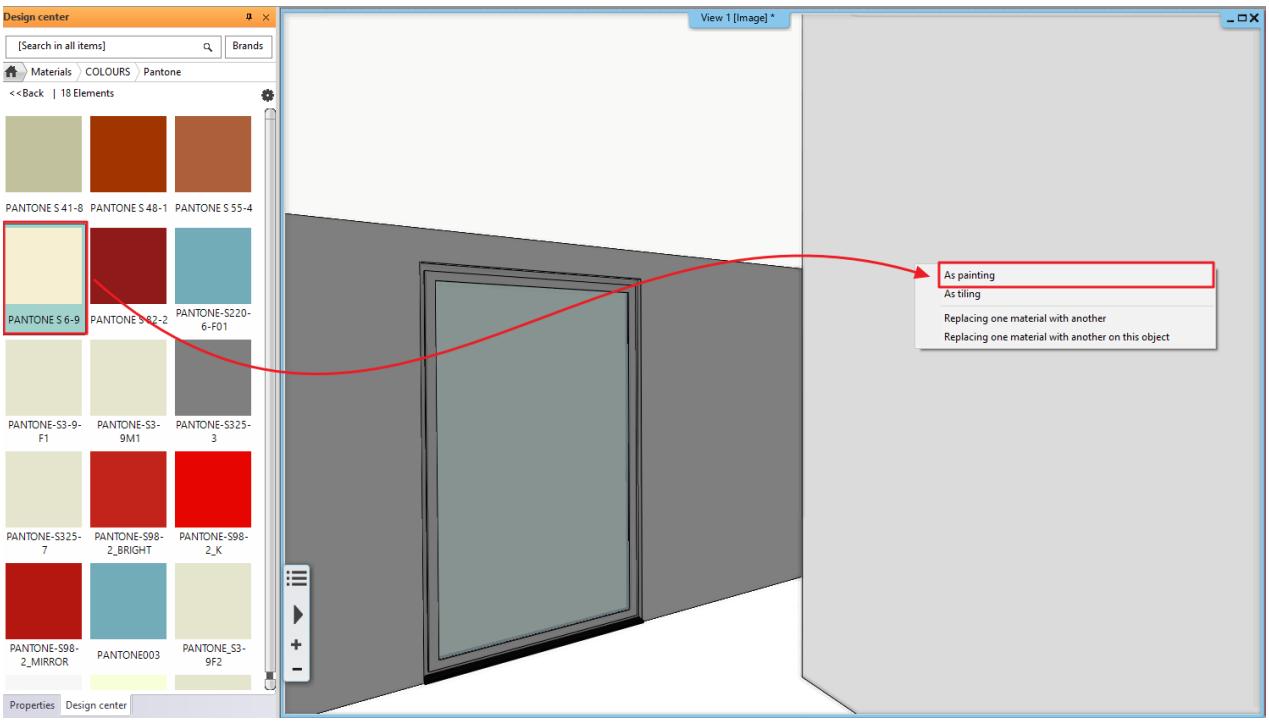


Shifting views, we can gradually look around in the room.

Let’s see some examples of how to work in an IFC model. The workflow is the same as we had built the model in ARCHLine.XP using architectural elements.

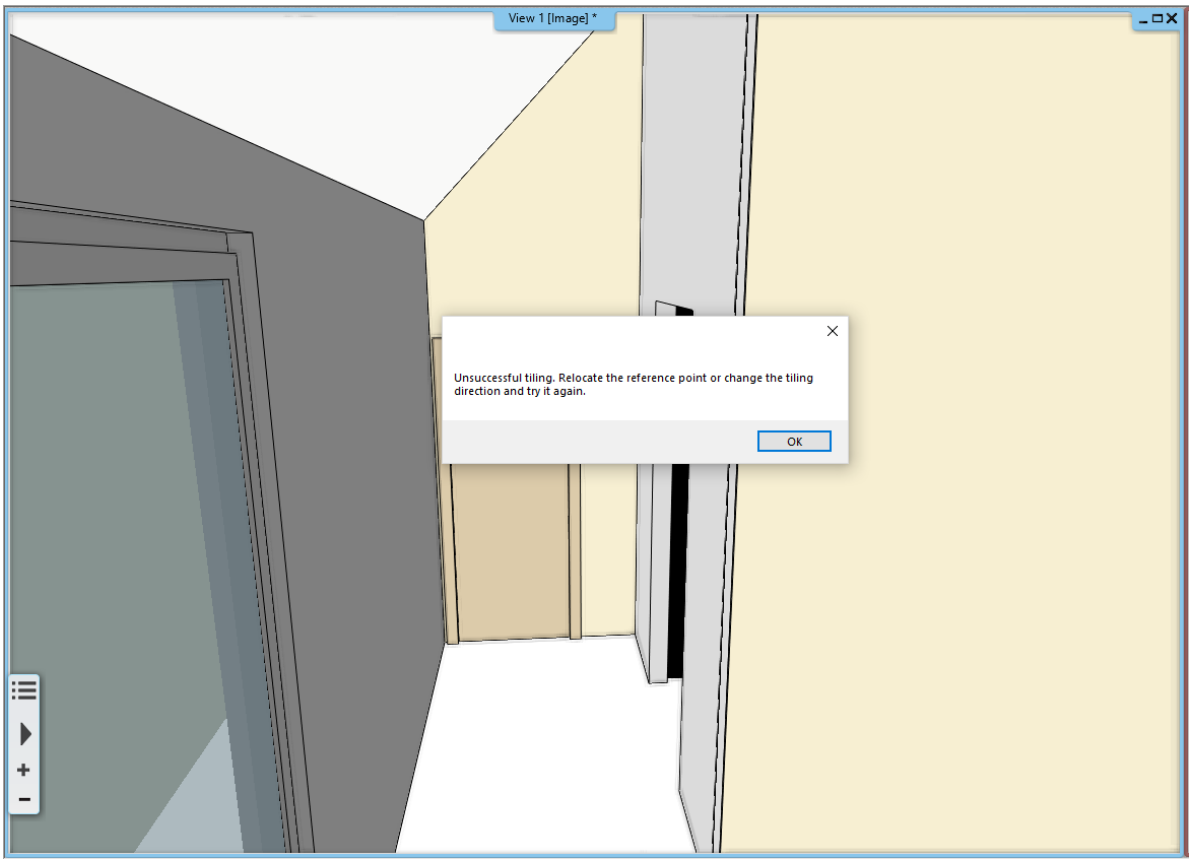
First, put colors on the walls:

- Therefore, we have to go to the Design Center then Catalog / Materials and here you can choose a color.
- Use drag and drop to place the chosen color on the wall and then from the appearing menu choose “as painting” option.



- Click on the second wall, a warning comes up, as we cannot apply the paint on the selected wall. The reason for this that this had been previously 3D fixed.
- Now unlock it.
- Try again to place color on this wall.
- Apply colors on other walls too.

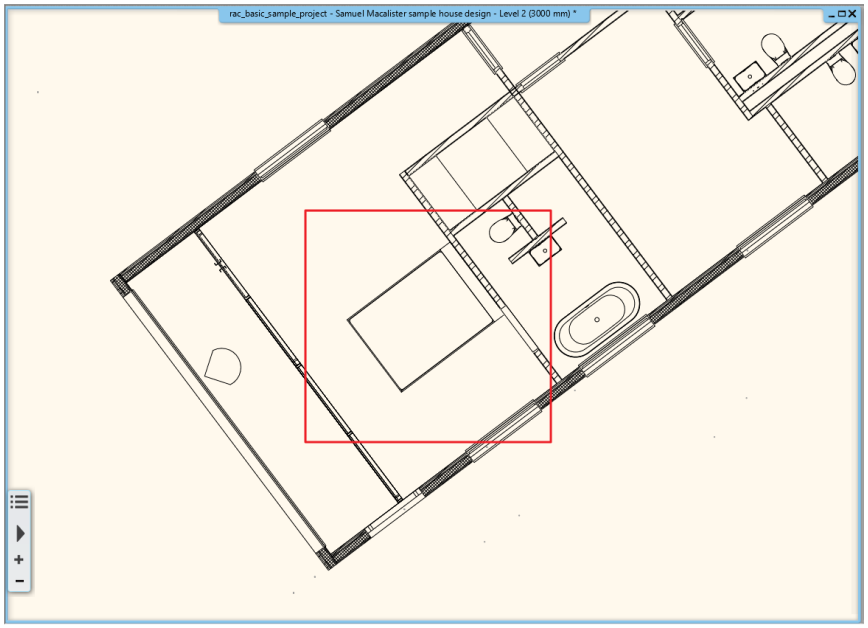
- In case of the wall shown below you have to unlock the 3D fixation.



- Now modify the floor material and put a carpet there.
- Select a carpet from Catalog / Material / Fabrics / Carpet folder and then choose a color. Place it “as painting” on the carpet.

Continue the design the same way.

- You can also place here furniture, let's see an example.
- From the Design Center / Catalog / Objects / Bedroom library, select a bed and place it on the floor plan.
- Activate the floor plan and place the bed shown on the picture.



- Finally, set the relative height of the bed to zero.

We demonstrated a few methods on how to dress up a room to create the interior design plan.

3.7. Importing Revit file

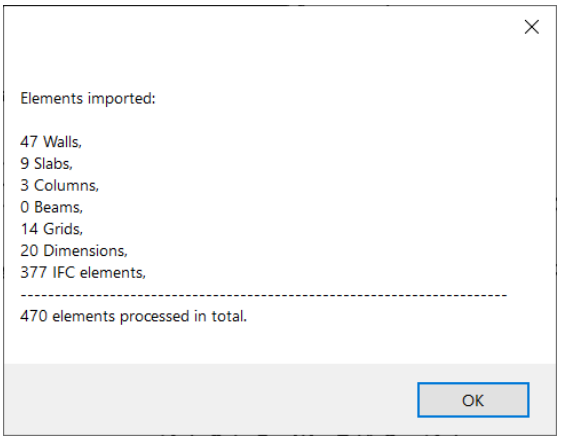
BIM collaboration between architects is based on quick and easy model exchange. A good solution is to import Revit .rvt and .rfa files.
Revit imports often refer to materials in the Autodesk Material Library.
The Autodesk Material Library is a free downloadable installer that contains low, medium, or high-resolution images (approximately 512 x 512, 1024 x 1024, or larger) for material representation.
If the Autodesk Material Library is downloaded to the computer, the model will appear with the textures. These textures are included in the Revit file only as references.

3.7.1. Importing RVT and RFA Files

Revit models can be used in ARCHLine.XP in two ways: as a standalone file or as a reference link. We import them as a standalone file:

- Select File menu / Import / RFA, RVT command.
- Select the RVT file from the Documents\ARCHlineXP Draw\2024\Workshop_Intermediate\3_Importing_Architectural_Plans\RVT folder and click Open.
-
- In the import settings window select *Method 2: Native RVT/RFA* option.

At the end of the import, a dialog box will display the statistics of the imported elements. Here, you can see what architectural and IFC elements the program will import. Click OK to accept.



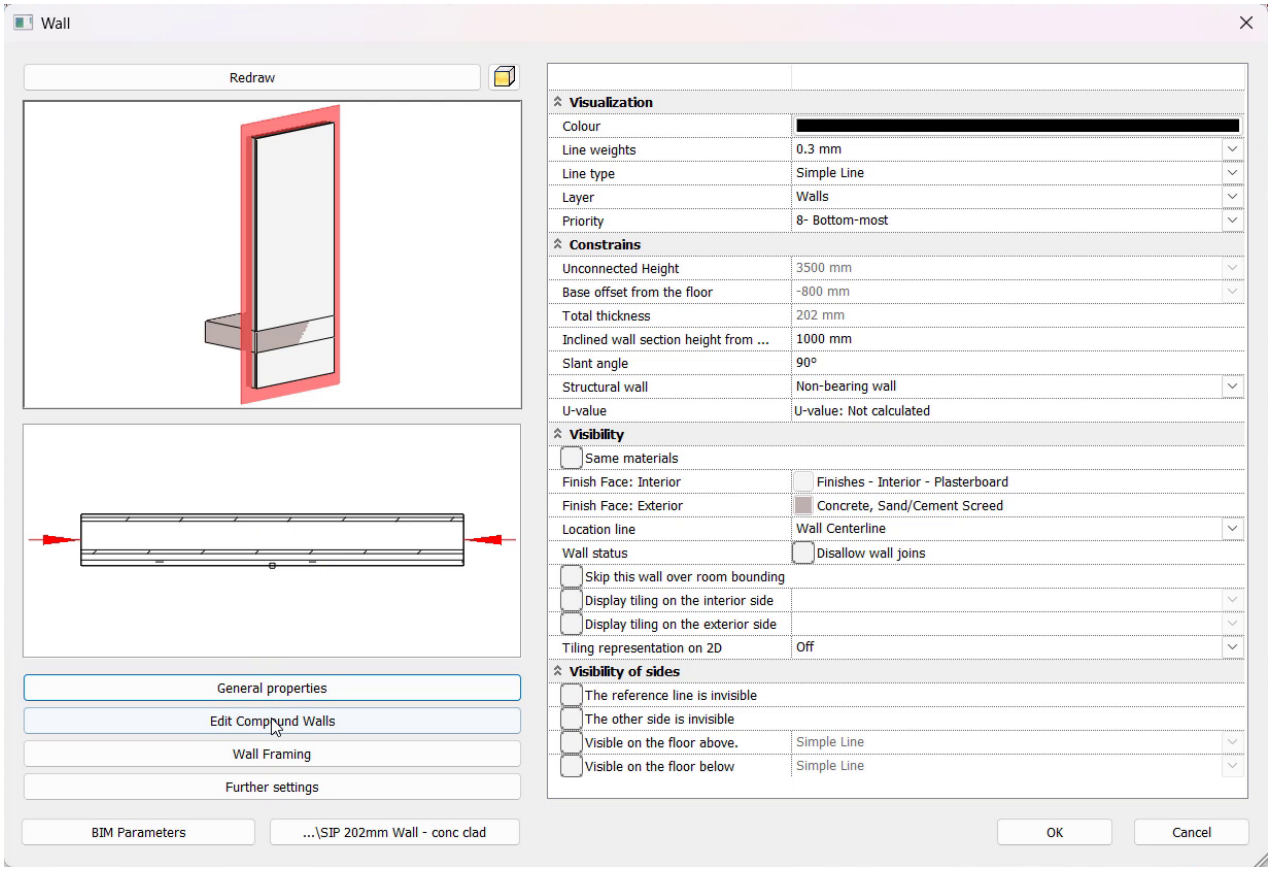
3.7.2. Using the model after import

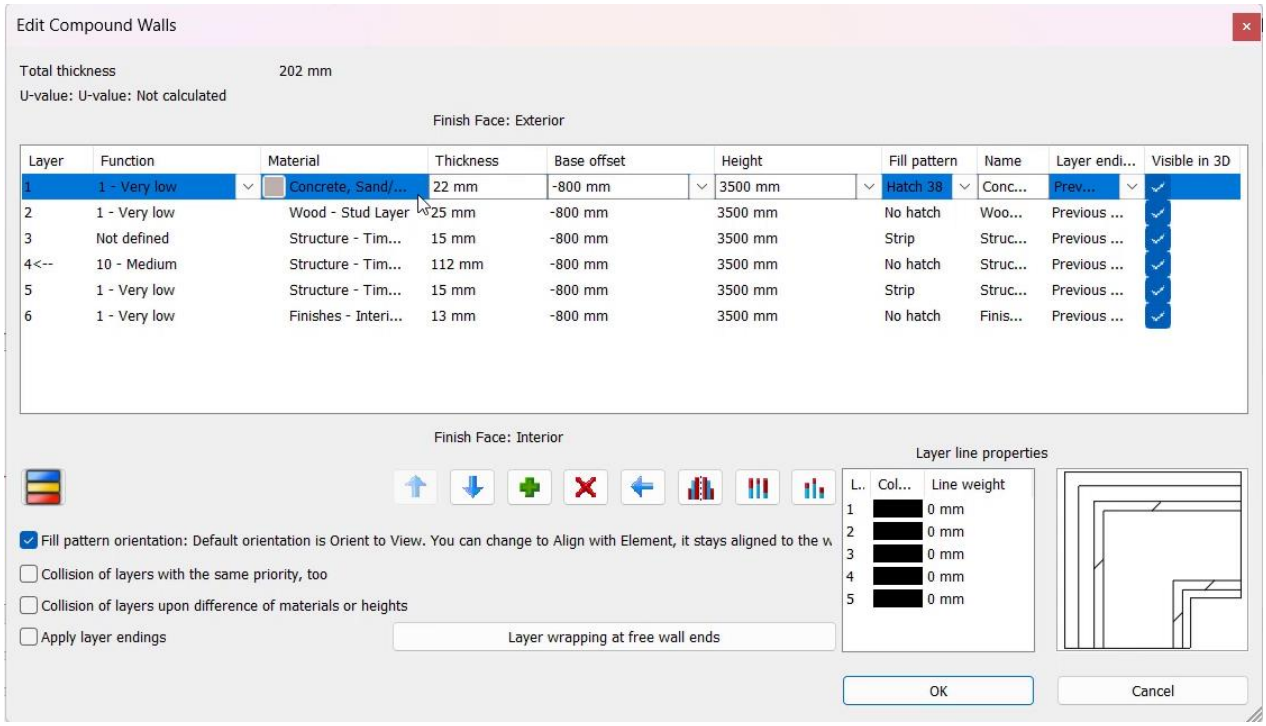
Characteristics of RVT/RFA import

- Depending on the size of the Revit file, it may take several minutes to open the file.
- The original Revit walls, slabs, columns and beams are converted into slabs, columns and beams by ARCHLine.XP, and the other elements are converted into IFC elements.
- The import does not retain references to the source model.
- Project data and model BIM parameters, element type, geometry, wall structure, and materials are imported from the Revit model.
- Families are converted into styles in ARCHLine.XP.

See the model in 3D!

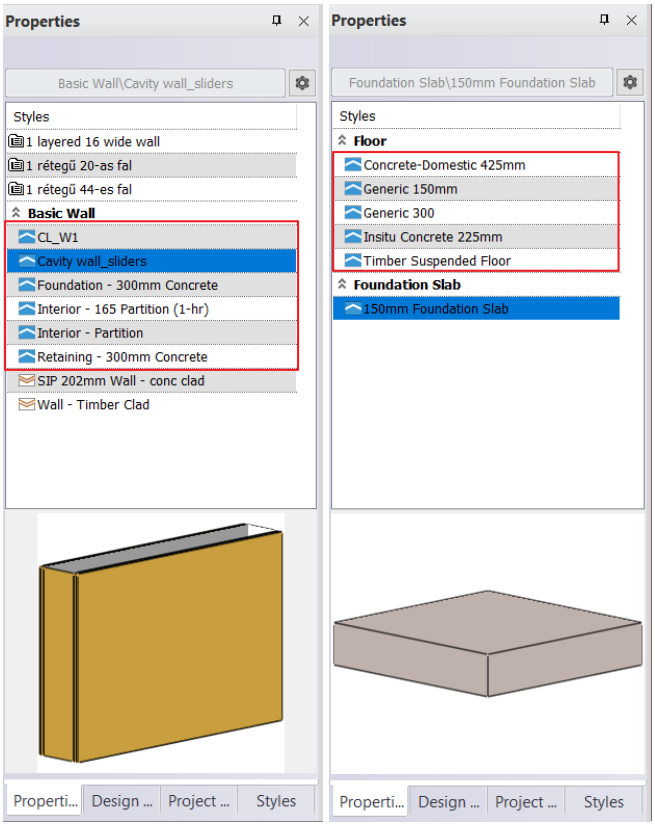
Click on the building wall. In the Properties on the left, you can see that it appears as a wall in the program. In the local menu, look at its properties. Here you can see that it is a layered wall structure, and you can even edit it by clicking on the “Edit Compound Walls” button. You can also edit its general properties like material, height.



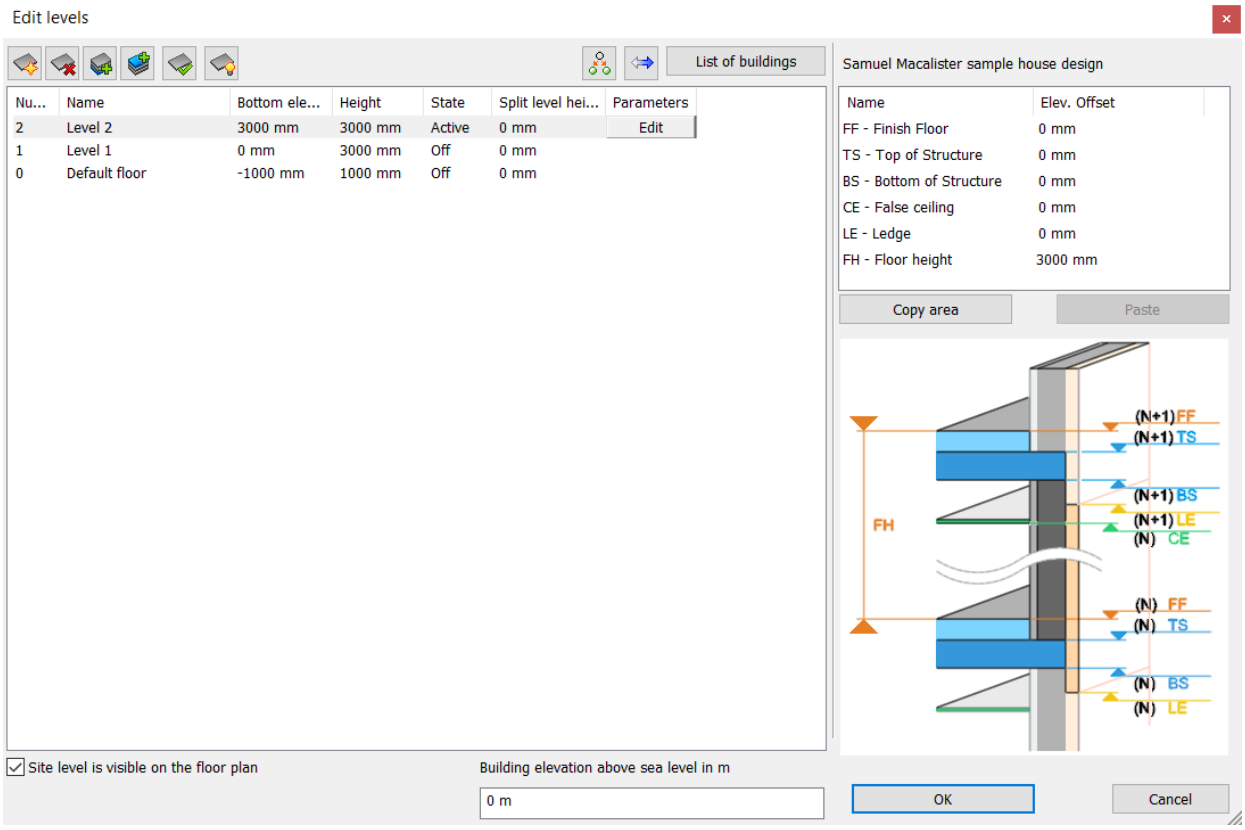


Revit Families appear in ARCHLine.XP, available as styles with the same properties as ARCHLine styles.

- For example, when you click on the Wall or Slab tool, the Revit families, or styles, appear in blue on the left.



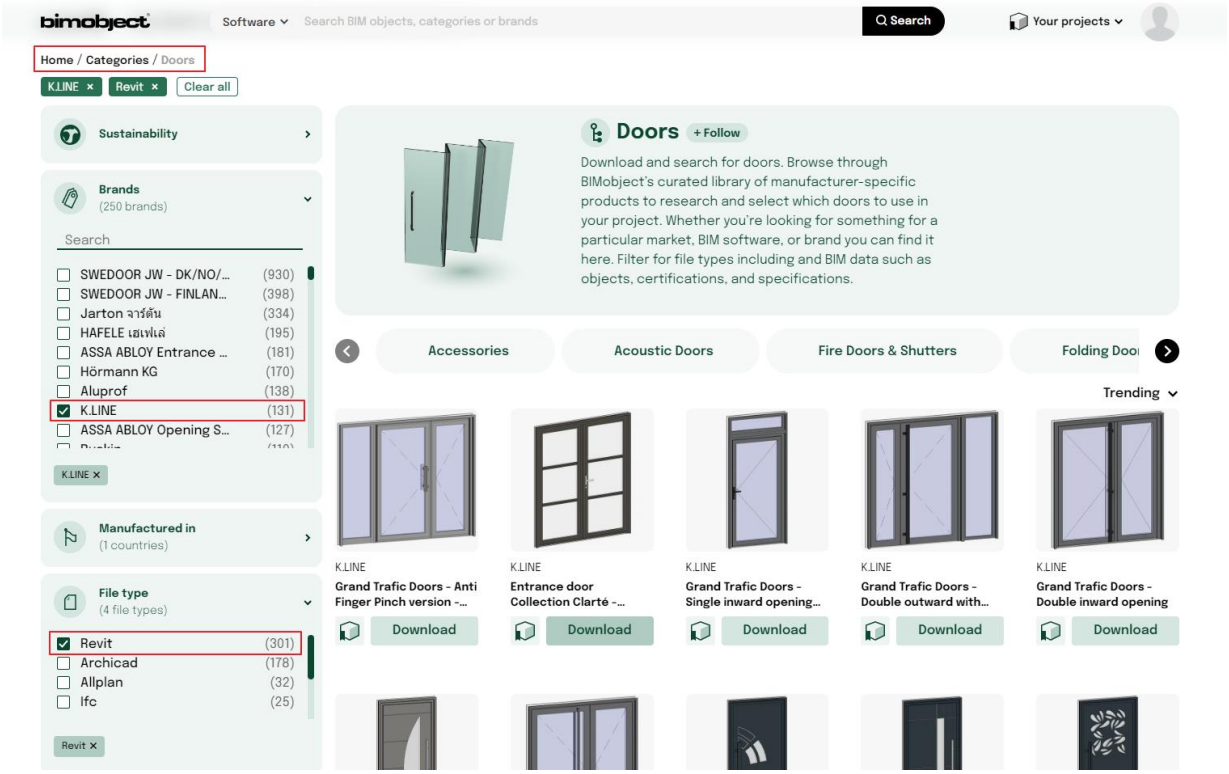
- Another great advantage of importing Revit is that level structures are also displayed. By clicking on the Level dialog, you can see that the same level structures are there as in the original Revit plan.



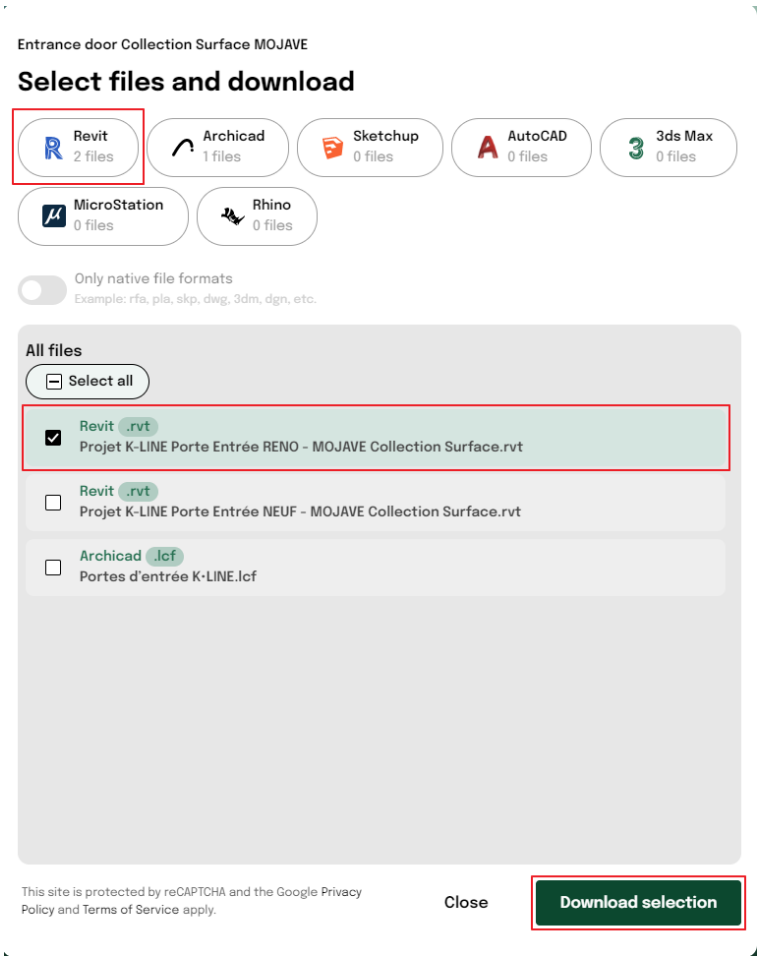
3.7.3. Importing doors and windows

You can also import doors and windows from .rvt and .rfa files into ARCHLine.XP.

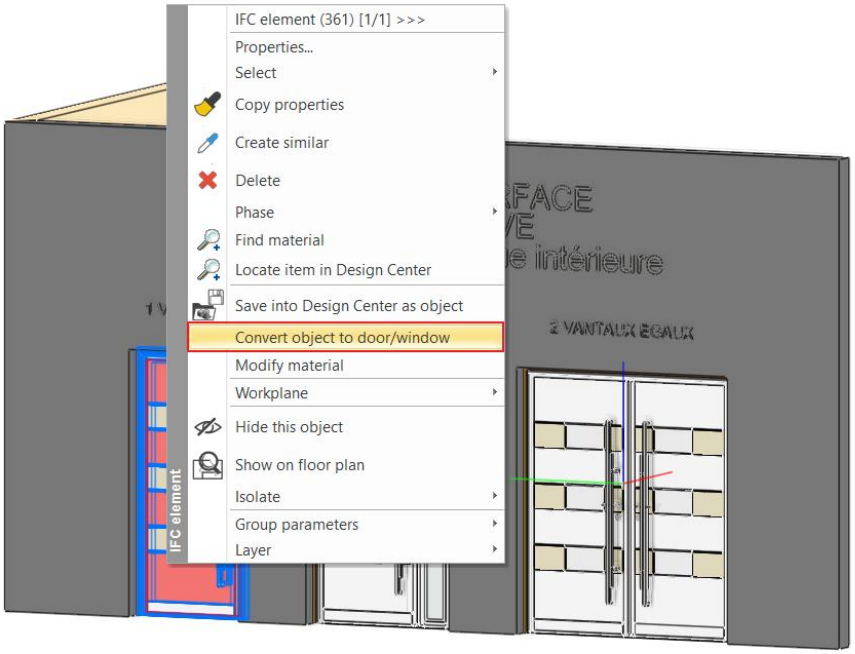
- Visit the https://www.bimobject.com/ website. Create a user account, as you need to be logged in to download the items.
- Select the doors category, then filter by Revit files, including the K.LINE brand.



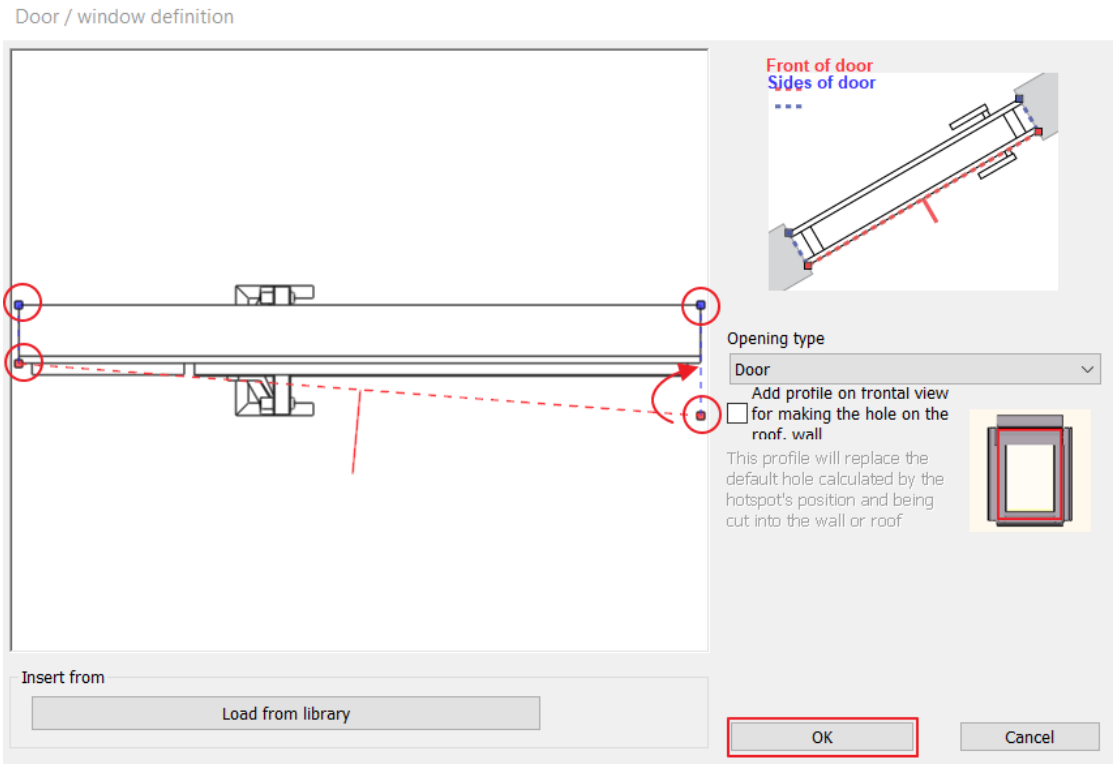
- Choose a door of your choice (we are using the "*Entrance door Collection Surface MOJAVE*"), then click on the Download page to download it.



- Go back to ARCHLine, select **File menu / Import / RFA, RVT** and load the model.
- Here we also get the statistics of the imported elements, accept this by clicking OK.
- View the model in 3D, right click on the first door and select Convert object to door/window.

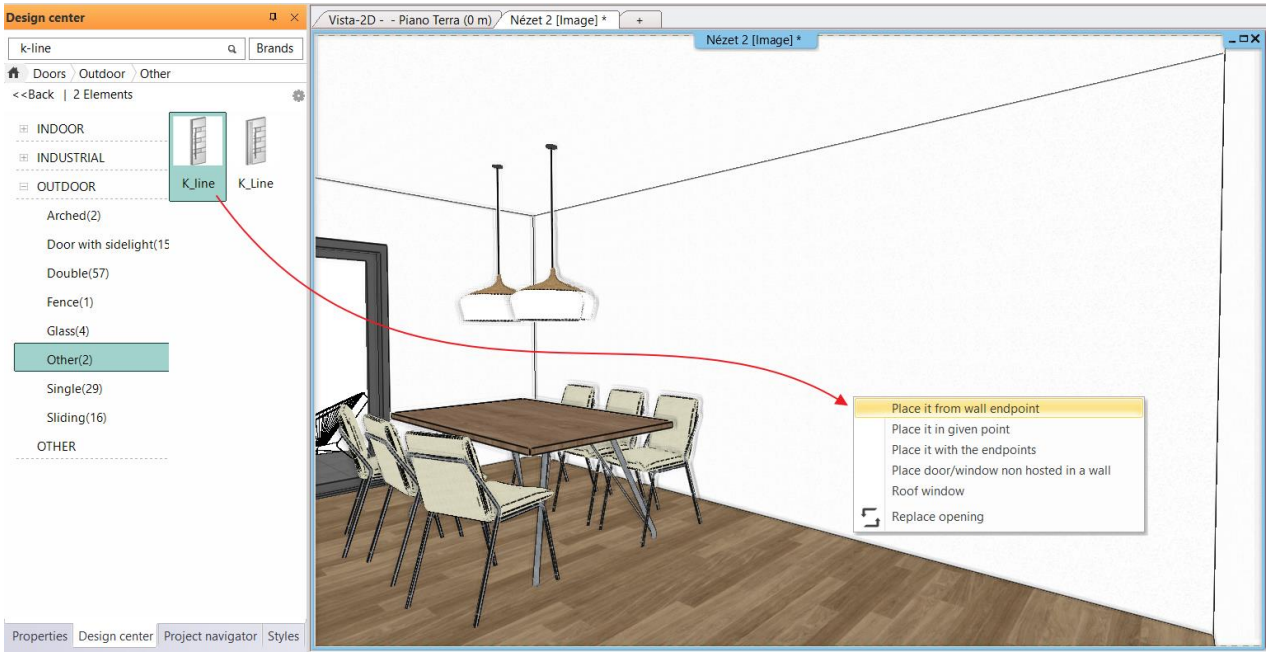


- In this window, the wall connection points must be aligned with the corresponding points on the model. Grab the points and drag them to the right place. The diagram at the top right will help you see exactly how to do this. After pressing the OK button, save it in the library under a name of your choice, in the OUTDOOR category.

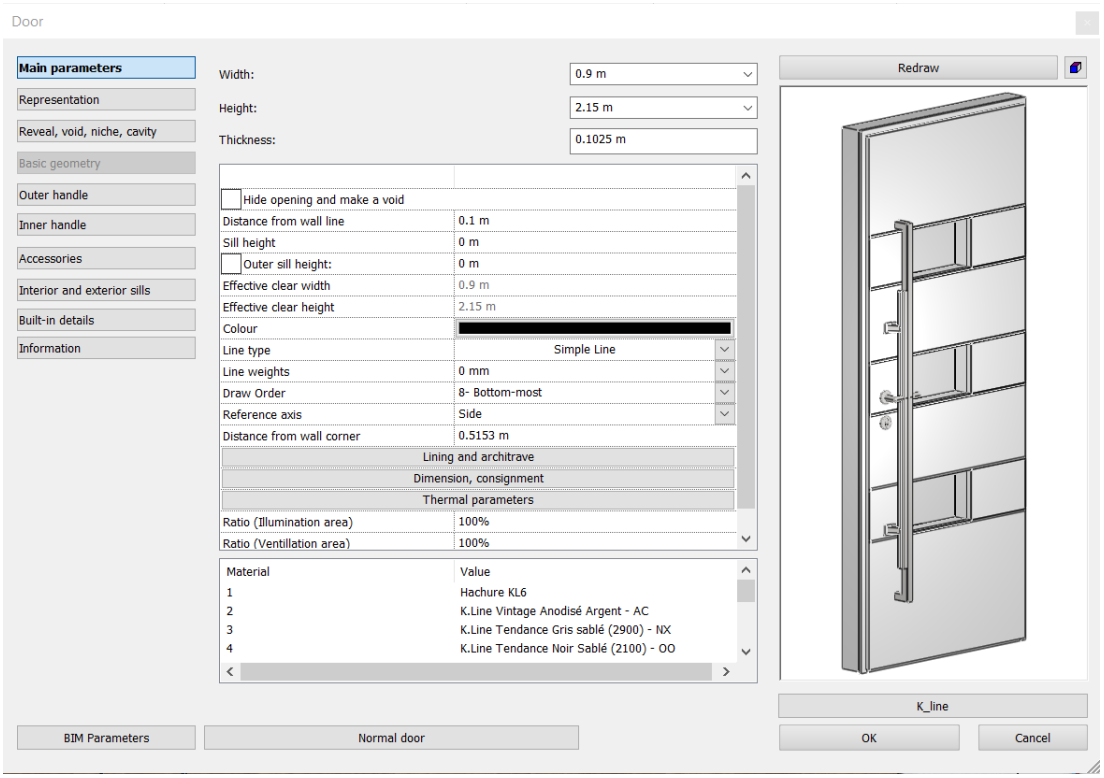


- You can even save an entire product line using this method: save the other doors using the same method.
- Use the **File menu / Open Project** command to open an older project (in the example we use the file Documents\ARCHlineXP Draw\2023\Workshop_Intermediate*2_Visual_Design\ Harosi_Krisztina_Render_Final.pro* file) and place the doors you just saved in it.

- Activate the 3D view, then from the Design Center, select the doors you just saved from the Building / Doors / Outdoor folder. Use the drag and drop method to drag and drop into the 3D view, then select *Place it from wall endpoint*, select the wall surface and then enter the door location.



- With this, the door was included in the project. Click on the door and then on the pencil icon to change its properties, including material, width, height and other parameters.

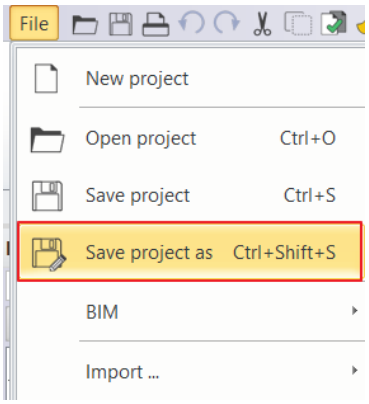


If you want to learn more about importing Revit RVT and RFA files, watch the following tutorial video: https://youtu.be/j5jpNyoIDgk

Workshop 4: How to save and manage large-size project

4. Workshop: How to save and manage large-size projects

This tutorial explains how to save project files in different ways, and also gives you essential guide how to manage large size projects.



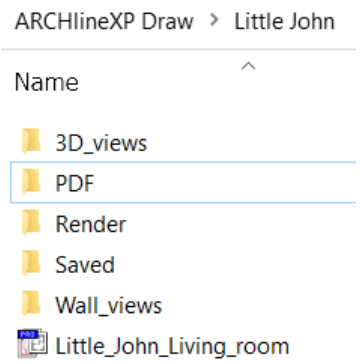
- **Save Project**
- **Backup archive**
- **Automatic save**
- **Project management**
- **Large size project management**

- Open File Explorer and watch the following tutorial videos on this topic: https://www.archlinexp.com/enrollments/courses/intermediate-course/how-to-save-and-manage-large-size-projects/1

- Choose the folder *…ARCHlineXP Draw\2024\Workshop_Intermediate\4_ Project_ Management* and the file **Little_John_Living_room.pro**

4.1. Save Project

- Before starting your work on the project, save it under a new name.
- Select Ribbon menu / **File / Save Project as** command, then name the project and select the folder where to save it.



Categorization

- Now save the project under the folder with the name of the customer: *ARCHLineXP Draw\Customer_name\Versions\project_name.pro,* Here we can create sub-folders for different documentations: Pl. PDF, Render, 3D_Views, Wall_views
- Every day, save a new file with the current date in the Versions folder, so that all versions are available in case the customer still wants an older design version.

4.2. Backup archive

In ARCHLine.XP there is a Backup Archive function, this can help us to restore a project at a previous stage.
It is important to know this does not replace Save and does not contain the latest version. The backup archive help us to restart our work on the project due to an unexpected computer crash, when the operating system, stops functioning properly and exits.

How it works:

During the day, the program stores a total of three .pro files in the Archive folder in a hidden folder automatically created with the date of the day.

Backup 1: The program makes a copy of the project every day when you open it. This will not be overwritten by later backups, so the daily start status can always be retrieved.

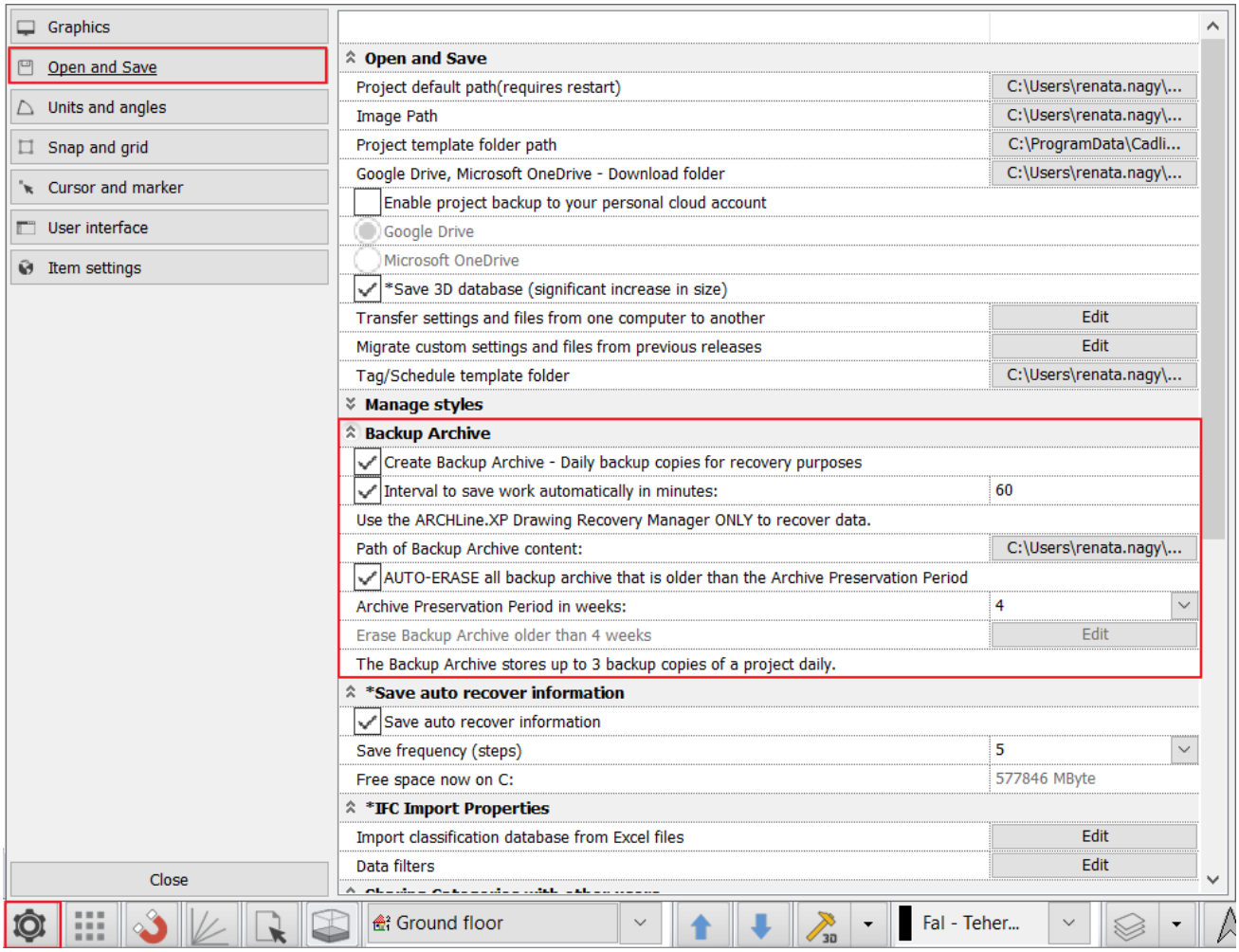
Backup 2-3: Two more backups are made during the day. The user-issued backup and the Automatic Backup to Backup Archive library always overwrite the older of these if it has been at least 60 minutes since the last backup.

Automatic backup to the Backup Archive library

If this option is enabled, ARCHLine.XP will automatically save the project to the Backup Archive library at specified intervals to help preserve your work. Automatic saving is enabled by default. The backup is activated at specified intervals. The default and minimum backup period are 60 minutes. These backups also count towards the maximum of 3 backups per day of a project.

- Click on the cogwheel  in the left bottom corner and find Backup Archive under „Open and Save”. Here we can set the followings:

- Create Backup Archive
- Interval to save work automatically: 60 minutes
- Path of Backup Archive content
- Delete backup file that is older than the given time interval.
- The interval for keeping archive files: 4 weeks.



! Please note switching off the auto-erase function means that archived files will use your PC memory.

Deleted archive files are permanently deleted, so they are not stored in the computer's Recycle Bin. However, it is recommended that the Recycle Bin is emptied on a weekly basis.

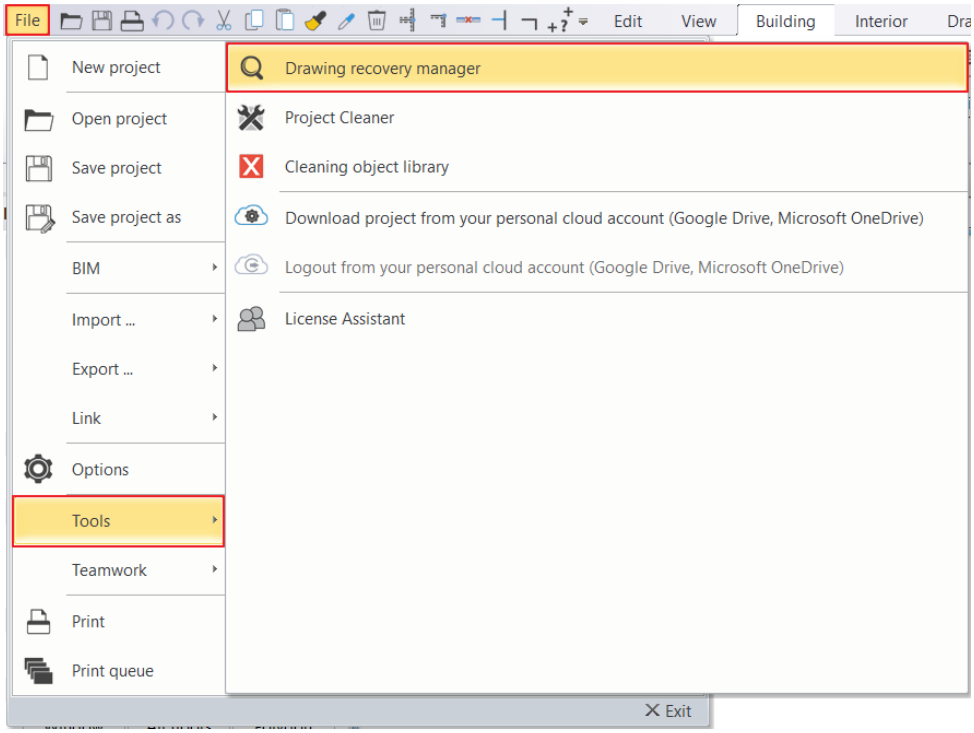
4.2.1. Recover Backup Archive

To demonstrate how to use the "Backup Archive", do the following:

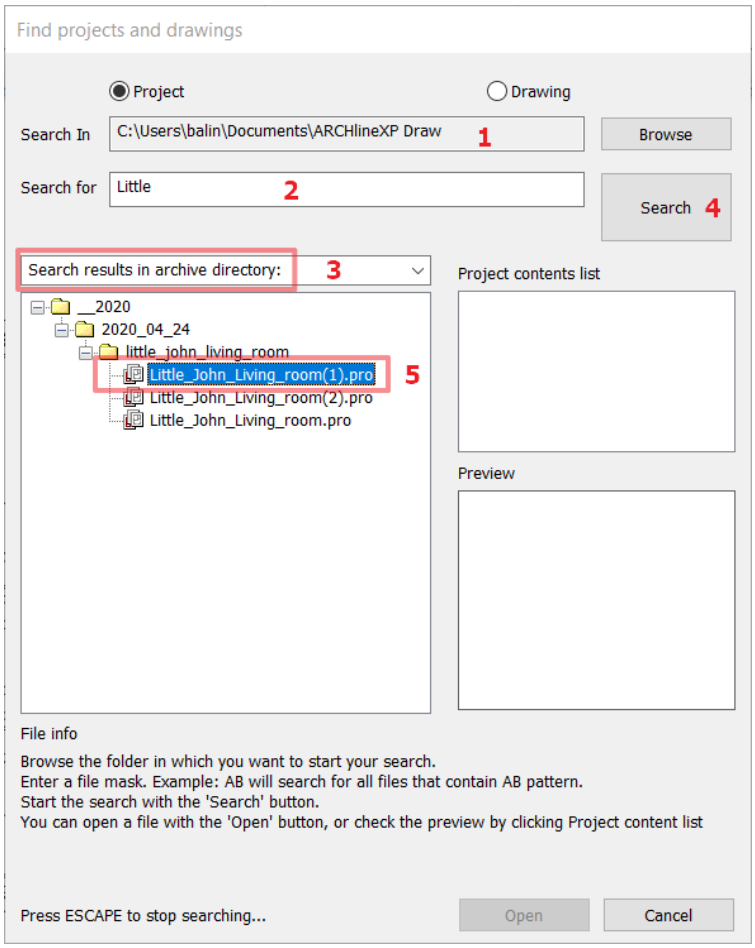
- Draw a wall and save the project.
- Draw another wall and save the project again.
- Repeat the previous step one more time.

So, you have 3 backups.

It is very easy to recover files from Backup Archive. Click on **File / Tools / Drawing Recovery manager**.



- In the appearing dialog you will see the path to the Archive folder, here it will search for the archive file, by default it is C:\User\Admin\Appdata\Roaming\cadline\ARCHLineXP2024\Archive. (1)
- Then enter the key word what is included in your project name (2), select the „archive directory" option from scroll down menu, the program will run a search in here (3).
- Click on „Search" (4) and the program lists the results.
- If you find the requested file (5) by clicking on **Open** you can download it.



After opening the file, you need to exit the existing project.
The program will then open the retrieved project under the name Document.
The project is not yet saved, it has to be saved. Click on the save icon and enter a name.
It is advisable to select the folder of the original project and save it there with the appropriate name.

- Save the project with the name 1_Little_John_Living_room_1.pro in the folder Documents\ARCHlineXP Draw\2024\Workshop_Intermediate\4_ Project_ Management.
- Delete the walls you just drew and save the project.

When you recover a backup that has been found, the program will behave as if you had started a new project, so you have to enter the project name and path when you first save.

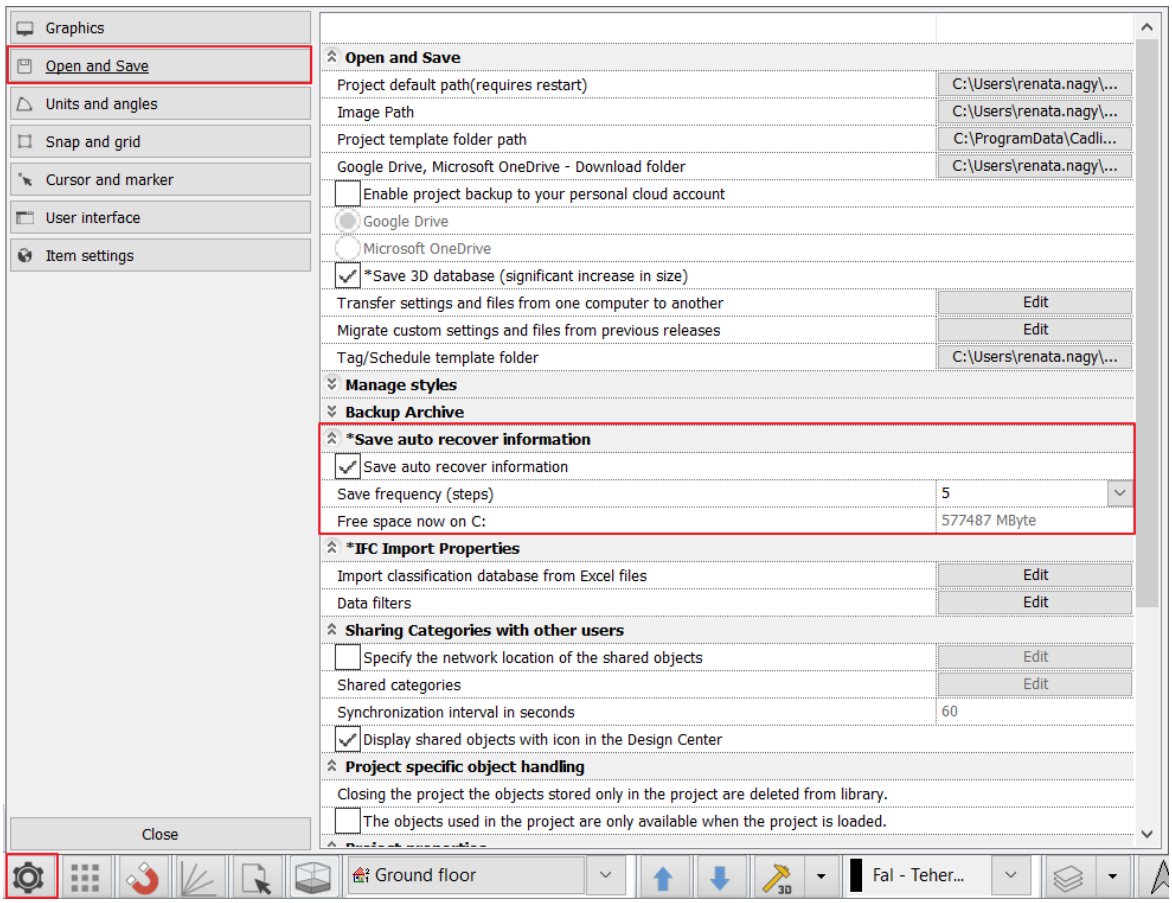
4.3. Automatic save

Similar to the Backup Archive, the purpose of Automatic Save is to ensure that in the case of an unexpected system failure, the project can also be recovered with little loss. We call this function “Save Autorecover”.

The Automatic save function DOES NOT ENSURE SAVING THE PROJECT! The content of this folder is automatically deleted when the program is closed normally.

- Click on the cogwheel icon in the left bottom corner.
- Under „*Open and Save*” find *Save Autorecover information* option. Here you can modify the default properties:

❖ Should there be an automatic save?
❖ What is the save frequency, in how many steps should the program do this: 5



! It is important to know that this function **does not replace Save**. When you turn off the computer in the normal way, this file is automatically deleted, and if you choose „Exit without save” and you rely on only Save Autorcover function you will lose all modifications on the project you have done since the last save.

! In case of large-size projects it’s worth increasing the frequency (number of steps). It can be bothering saving a large content after every five steps which may take several seconds.

4.4. OneDrive backup restrictions

ARCHLine.XP cannot save a project 100% safely if the file is located in a folder that is synchronized with the OneDrive file storage service.
Saving an ARCHLine.XP project is a complex, multi-step process, and OneDrive may attempt to synchronize due to a change detected during the save process while the save is still in progress. As a result, your project may become damaged and show a file length of 0 because ARCHLine.XP cannot successfully complete saving the project file.

Can the backup folder for the ARCHLine.XP project still be on OneDrive?

It can be, but periodic data loss must be expected, so (as with other CADs) it is **not highly recommended**. It is recommended to exclude from OneDrive synchronization the ... Documents\ARCHLineXP Draw folder. The project files should be saved locally on the computer. However, archiving a project saved on your computer to OneDrive is supported. It is recommended to change the path to the Project folder in the *Options - Open and Save* window.
See next section: *Running out of space on your C: drive?*

What can I use OneDrive cloud storage for?

OneDrive can be used for archiving.

4.5. Running out of space on the C: drive?

A common problem is that there is not enough space on the C: drive. Where to install ARCHLine.XP in such a case?
It should be noted that the Windows operating system requires at least 10% free space on the C: drive to run properly. Of course, it is recommended to uninstall any unused applications from the computer.

Let's look at where files are placed during installation:

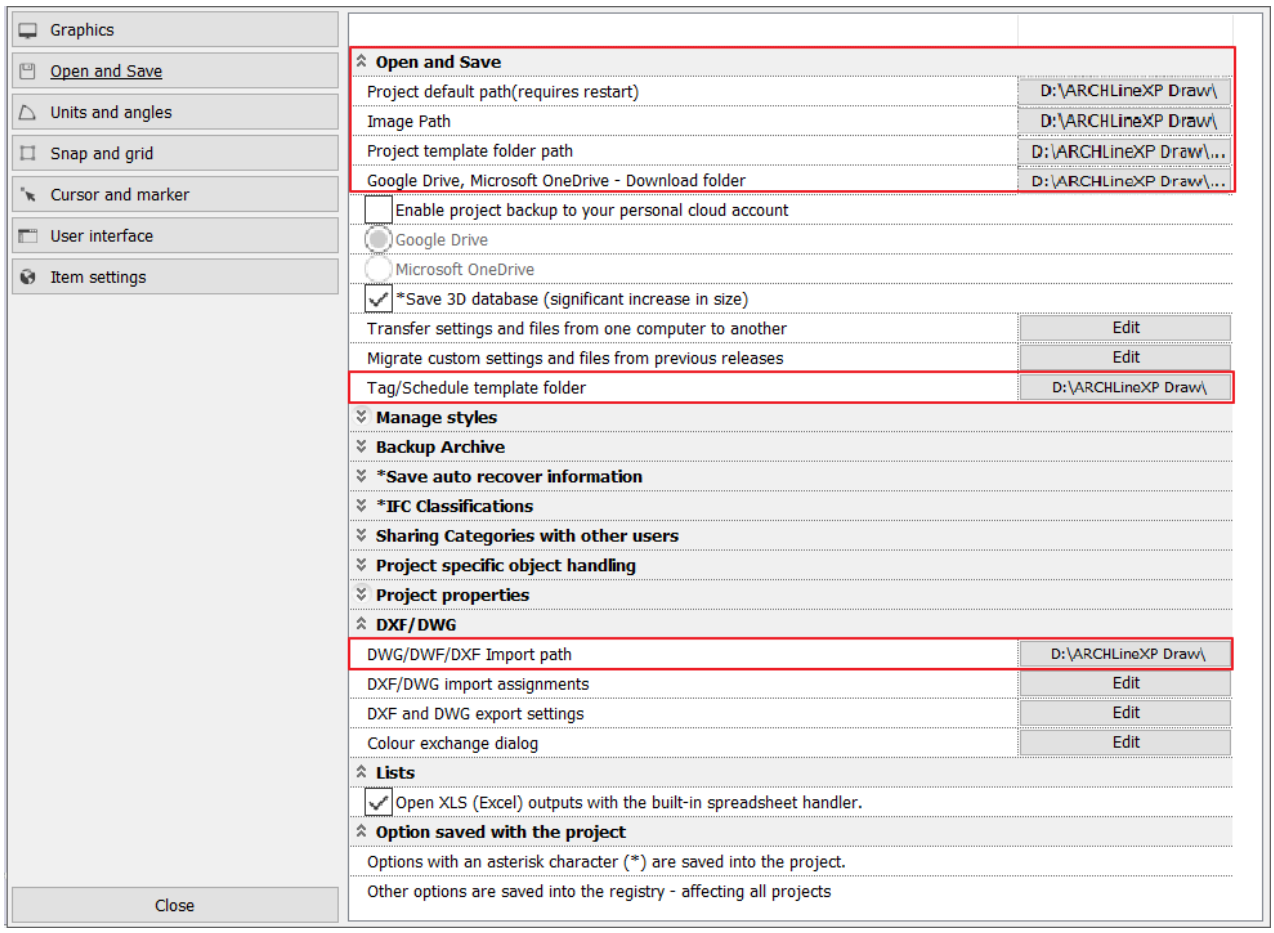
- It is recommended that you install ARCHLine.XP on the C: drive under the *Program Files* folder offered by the installer. You should expect the program to take up about 3 GB of space under *Program Files*.
- In addition to this, the libraries will take up about 5-15 GB (depending on the number of objects, materials, etc. in the library).
- In addition, the *ARCHLine XP Draw* folder is created under *Documents* during installation. This may contain projects.
- The Archive folder will be placed under C:\Users\...\AppData\Roaming\cadline\ARCHlineXP2024\Archive ...., which is a hidden file. As we have seen, by default it is deleted every 4 weeks, with 3 backups per day, so the size of this can grow significantly.

In the case where space on the C: drive is limited and there is enough space on the D: drive, the following 2 folders should be moved to the D:\ drive:
1. ARCHLine XP Draw
2. Archive

! It is important not to touch the ARCHLine.XP files under Program Files and ProgramData. Never copy them!

We recommend the following steps:

- To copy the Documents ... ARCHLine XP Draw folder from C: to the D: drive, to the root: D:\ ARCHLine XP Draw
- C:\Users\...\AppData\Roaming\cadline\ARCHlineXP2024**Archive** folder is also copied to D:\ ARCHLine XP Draw
- In ARCHLine.XP, in the *Options - Open and Save* window, you need to change the folder paths to the D:\ARCHLineXP Draw folder or its corresponding subfolders.
- Also change the path to the Backup Archive.



Restart the program.

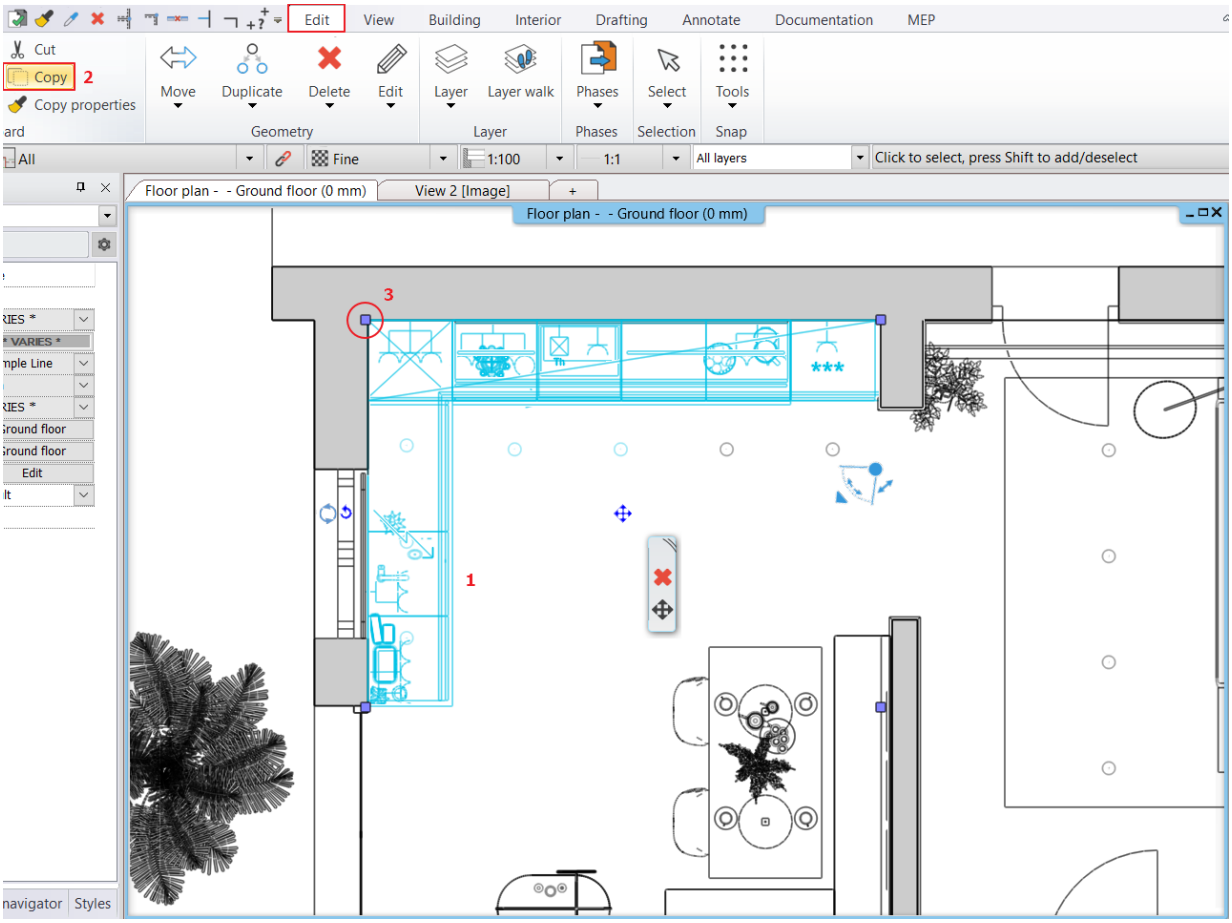
- On C:, under Documents, delete the ARCHLine XP Draw folder.
- Also delete the C:\Users\...\AppData\Roaming\cadline\ARCHlineXP2024\Archive folder.
- Then empty the Recycle Bin.
  This will significantly increase the space on the C: drive.

  Please note:
  Do not keep older versions of ARCHLine.XP on your computer. It is recommended to keep the current version and the version before that. Uninstall the older versions.
  Accordingly, you should also delete the libraries of already installed versions under ProgramData. These are hidden files, so it is recommended to consult an IT specialist.

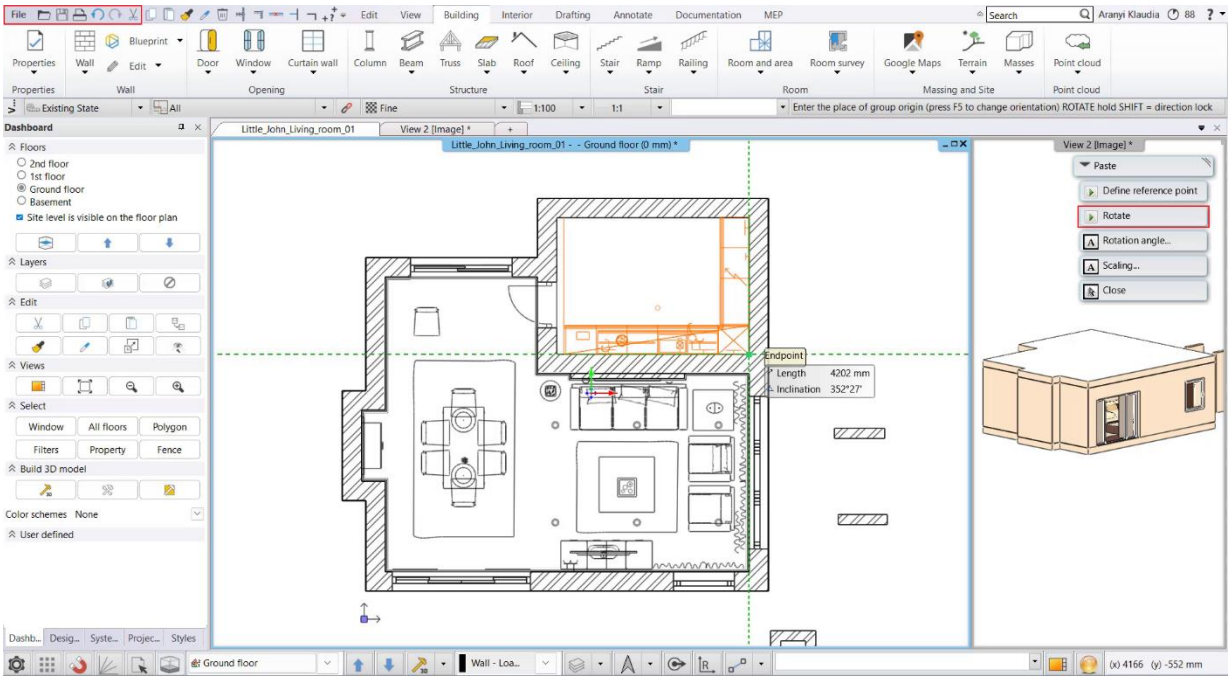
4.6. Copy project detail

In case the customer prefers an older version, we can easily copy it into the current project. We will now copy the kitchen created in the Preliminary Course, Kitchen Design workshop into the current project.

- Open the *Documents\ARCHlineXP Draw\2024\ Workshop_Preliminary\ 4_Kitchen_Design\3_Nagy_Andrea_Kitchen_workshop_FINAL.pro* file.
- Select the kitchen, (1) then select **Edit \ Copy**. (2) After selecting the command, enter the reference point for the copy, which should be the top left wall corner. (3)



- Go to the Little John project and select **Edit \ Paste**. In the floating menu on the right, select Rotate and rotate to the position shown in the image, then place it in the bottom left corner.



- For optimal workflow, only run one copy of the program at a time, so close the Kitchen workshop file after successful insertion.

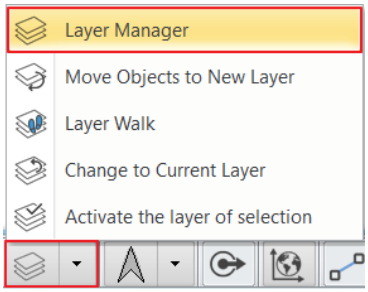
4.7. Organizing projects

Proper organization is needed for well-ordered, self-explanatory and easy to use projects. We have to do two important things.

- ❖ Handling and organizing layers properly
- ❖ Setting and naming views correctly

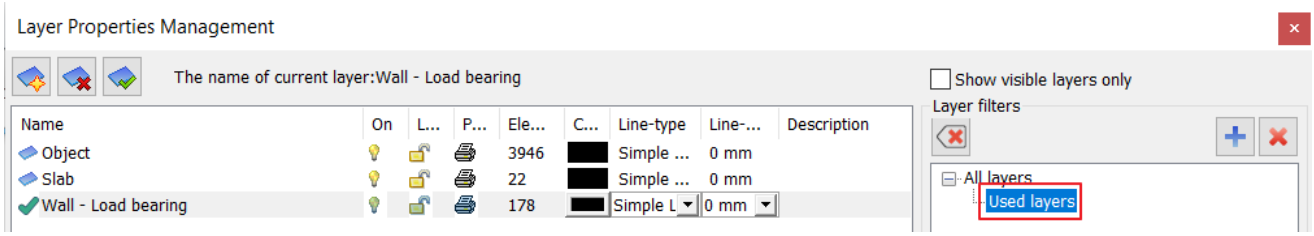
4.7.1. Organizing layers: Layer variations

The layers are used to group the elements used in the project. As different groups of elements are placed on separate layers, it is possible to modify them together.
The layer variations allow you to save different states, so that you can, for example, show only the equipment of one room without having to re-enter the Layer Manager and set the states of the layers one by one.



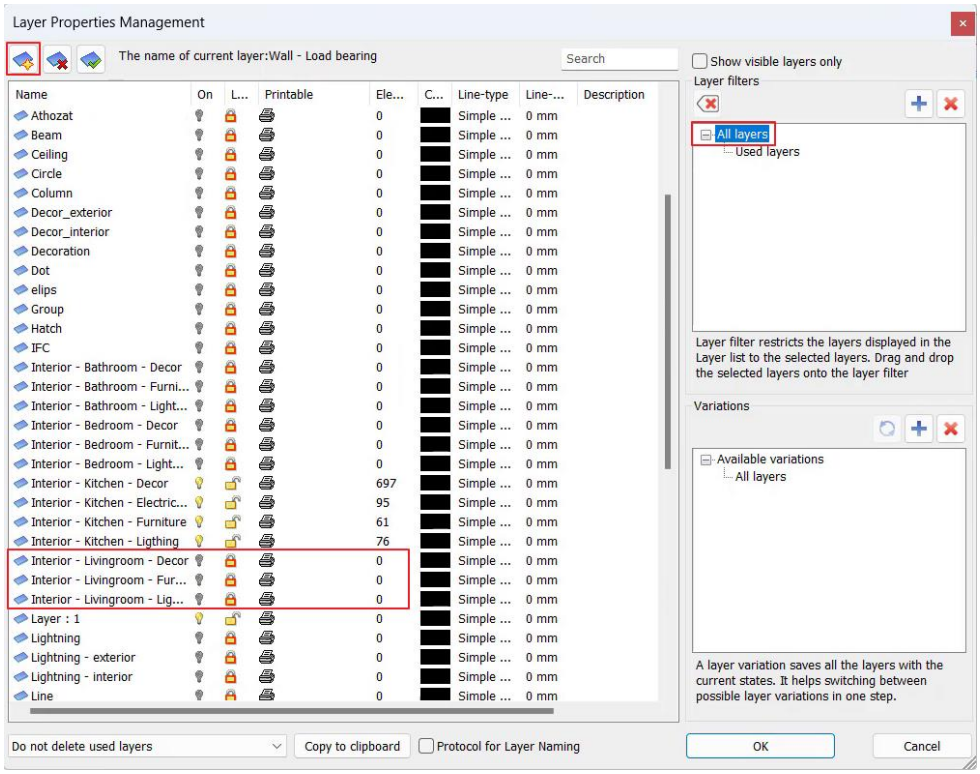
- The floor plan should be active.
- Open “Layer Manager”. In the appearing dialog window, you can find layers.
- Click on the Used layers option.

Now you can see, that in this project the objects are placed on three layers: Object, Slab and Wall – Load bearing.
Our aim is to handle the two premises separately in this project: the **Living room** and the **Dining room**. Also, we want to handle the objects, the decoration and the lamps separately in these rooms. This kind of folder system helps the rendering process, it is much quicker to change the views.



- Now click on the *All layers* option.

Now all of the layers in the project will appear. You can see that we created preset layers for the architectural objects (these are automatically assigned to the object types) and the facilities so the architect can easily place the furnishes, lamps and decorations on separate layers. If you need a room that is not included in the list, you can create new layers for them.

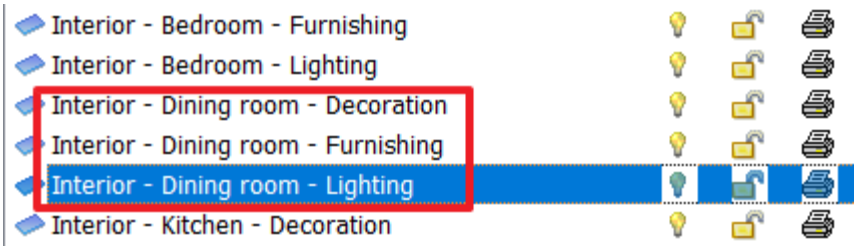


As we can see, the layers are prepared for the living room furnishings, but there are no dining room layers. Therefore, let's create 3 new layers for the dining room furnishings.

Creating new layers

- Click on the *Add new layer* icon. Now the new layer is created: “Layer : 1”.
- Rename it by double clicking on it **Interior - Dining room - Decoration**, then hit Enter.
- Now create two new layers for the *Furnishing* and the *Lighting*.

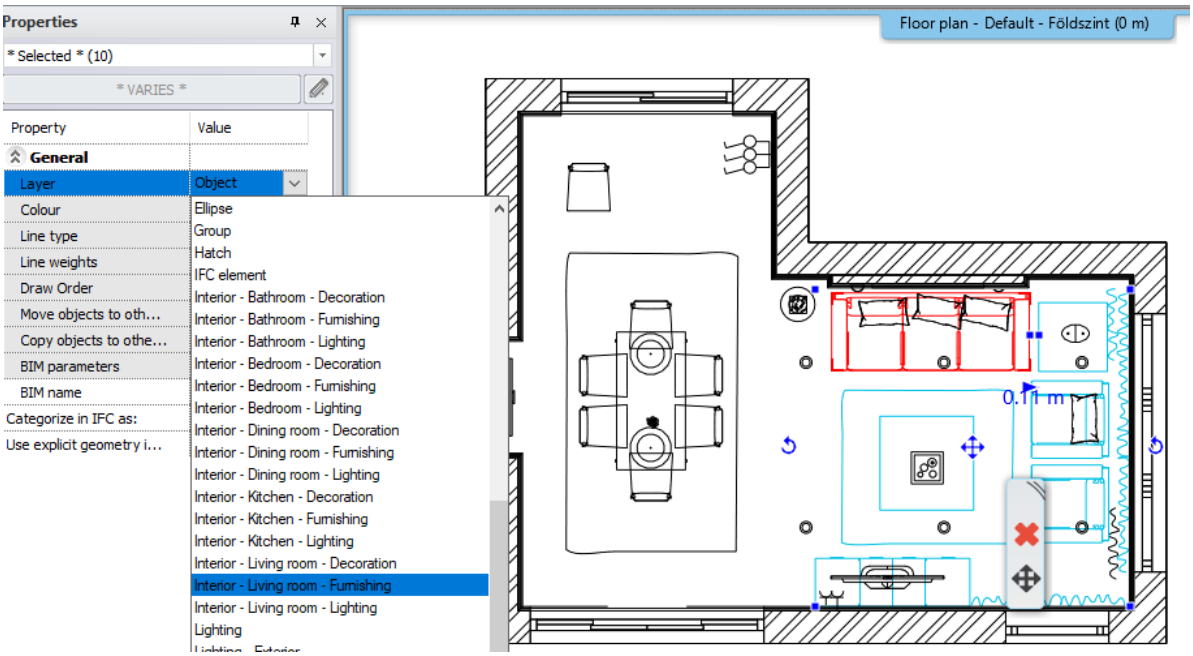
! You can create new layers only if all the layers are visible.



- After finishing with all three layers, click on “OK” to close the window.

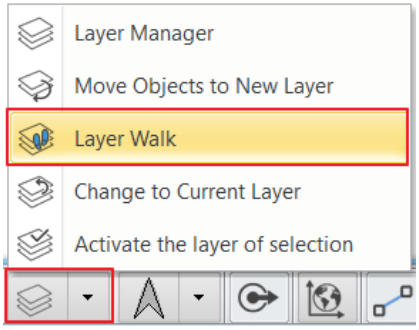
Moving objects to other layers

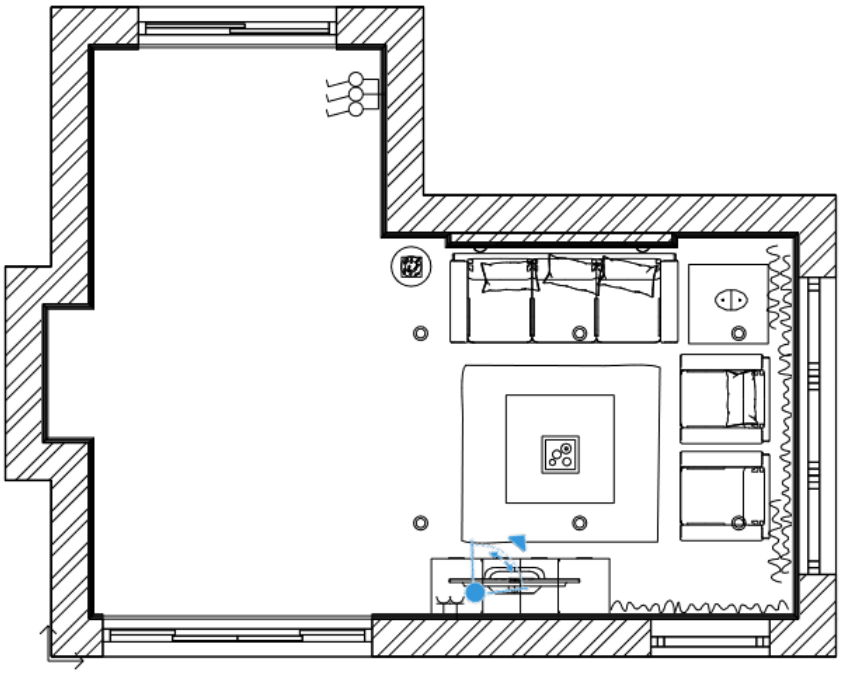
- Now select all furniture in the Living room area.
- Go to Properties on the left side of the screen and select *“Interior – Living room - Furnishing”* layer from the dropdown layer menu.
- Also place the other furniture, lighting and decoration elements on the correct layers.

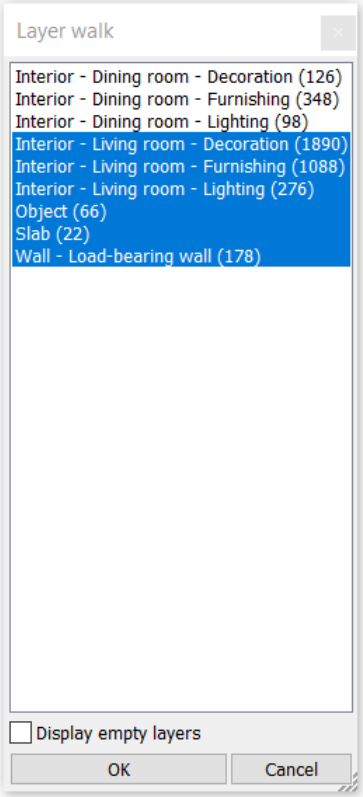


Layer walk

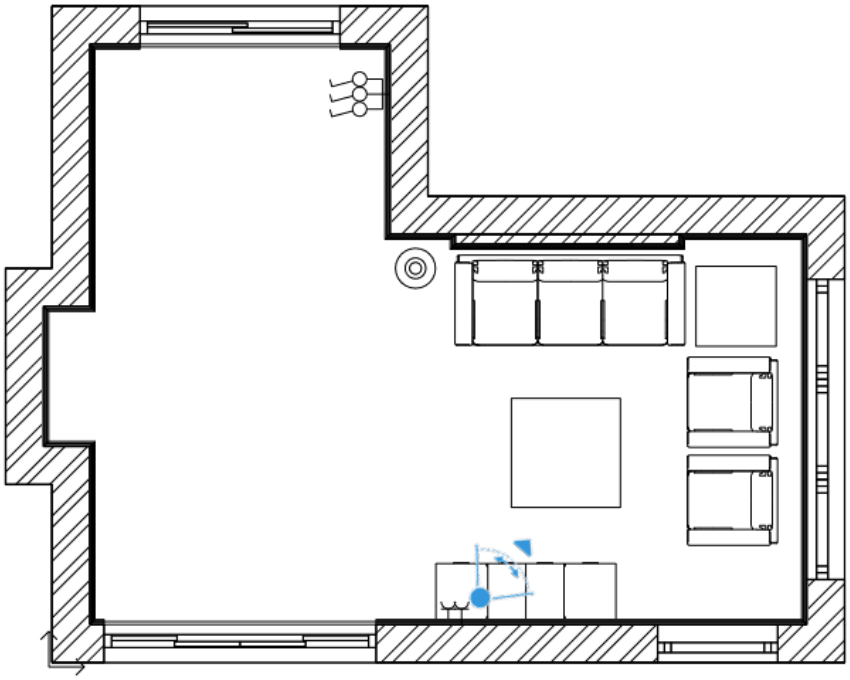
With Layer walk, you can narrow or expand the appearance of items within a selected layer group. It can also be used to check that the elements have been placed on the correct layers.
It's worth a try, you can work with it very quickly and spectacularly.

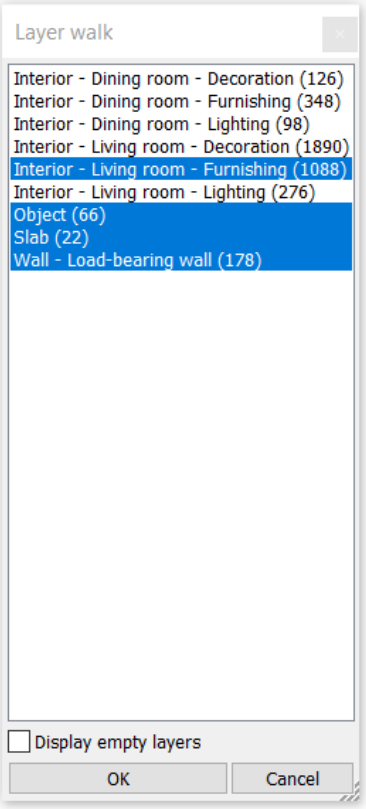






Display only the living room furnishings using the CTRL key.
The result is as follows:





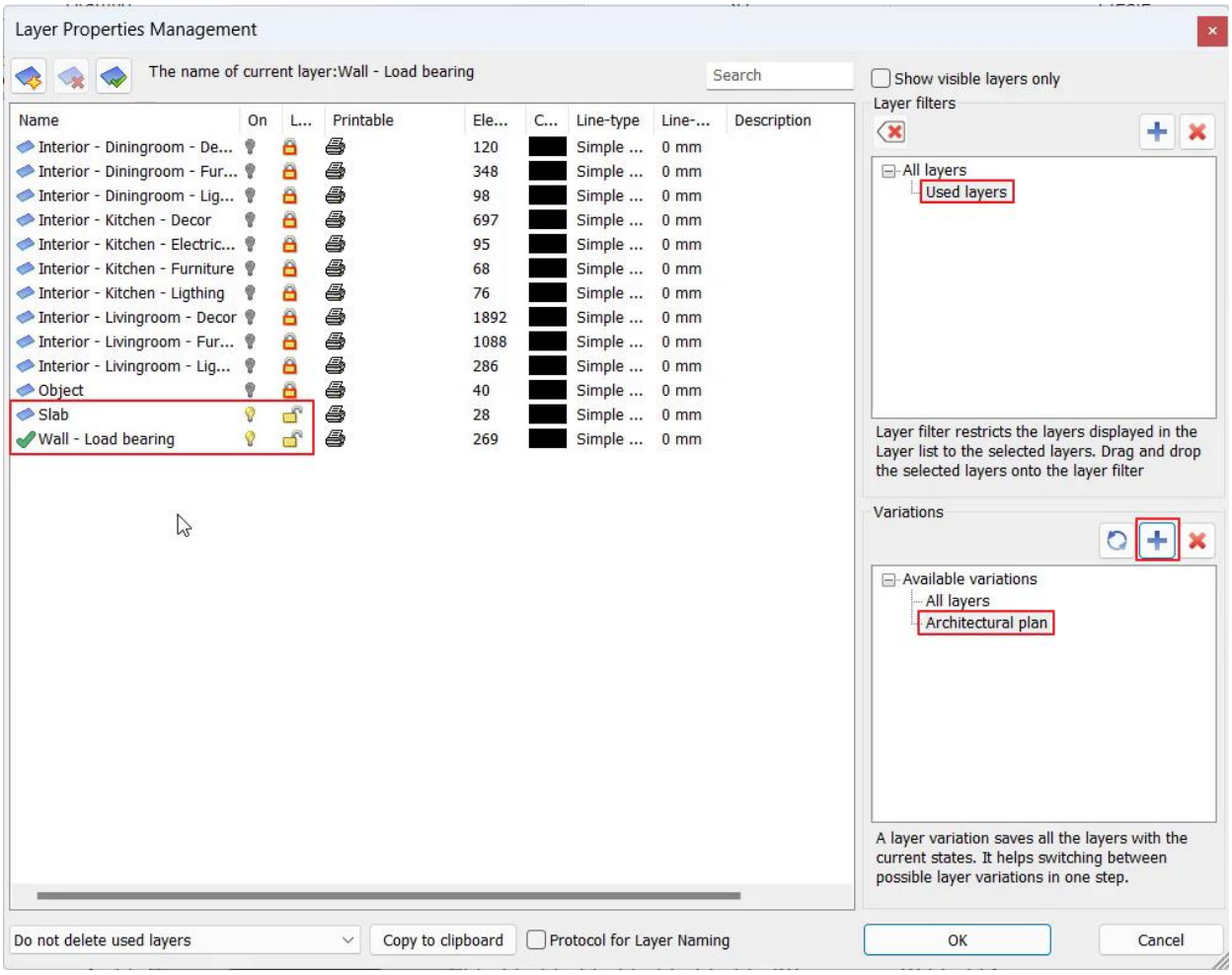
This makes it very easy to check that all the elements are on the right layer.

Layer variations

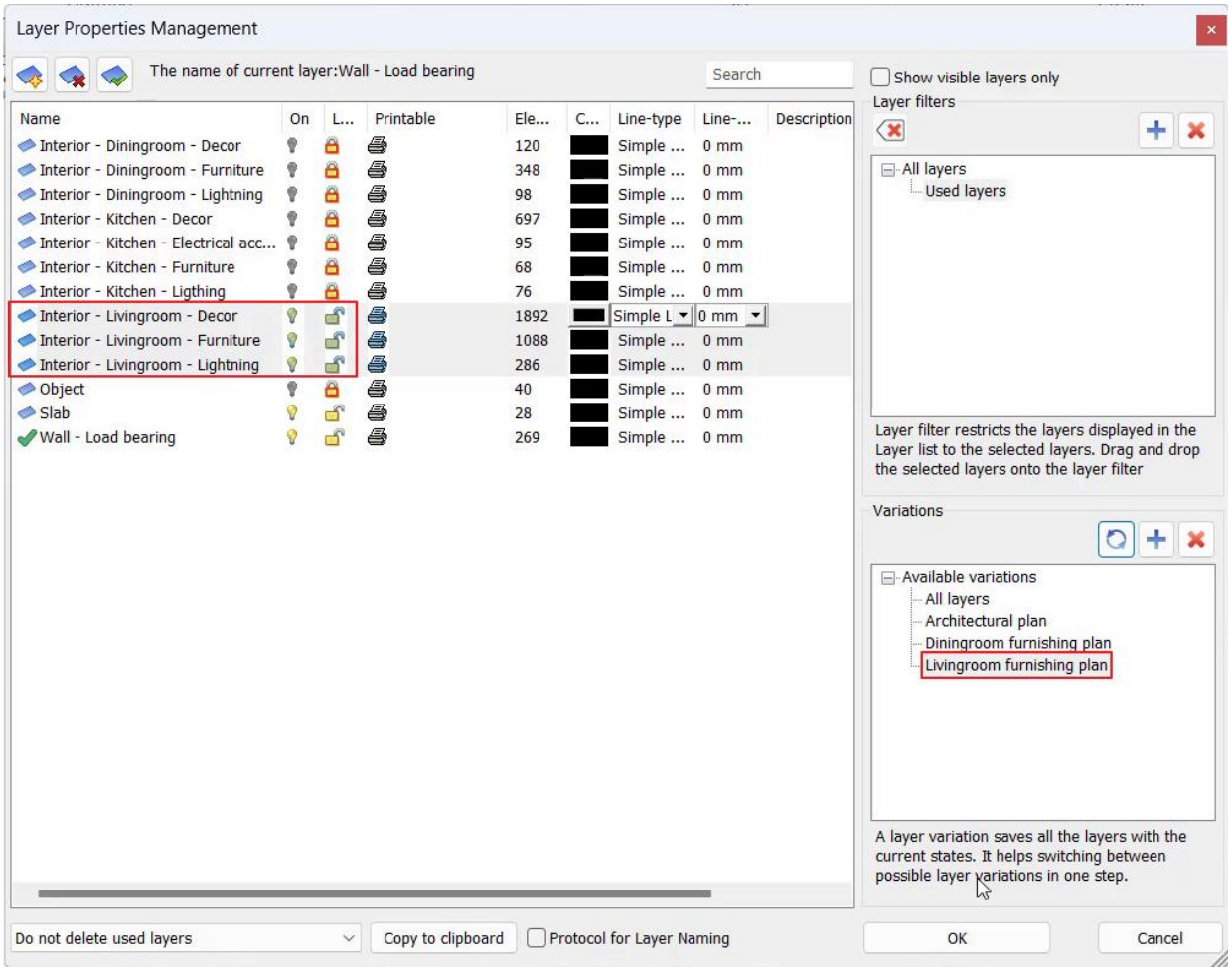
Create 3 layer variations, one for the architectural floor plan, one for the living room and one for the dining room.

- Activate the 2D window.
- Open Layer Manager.
- Click on the Used layers option.
- Switch off all layers except the Wall - Load bearing wall and Slab layers.
- To create a new layer variation, click on the blue plus icon.

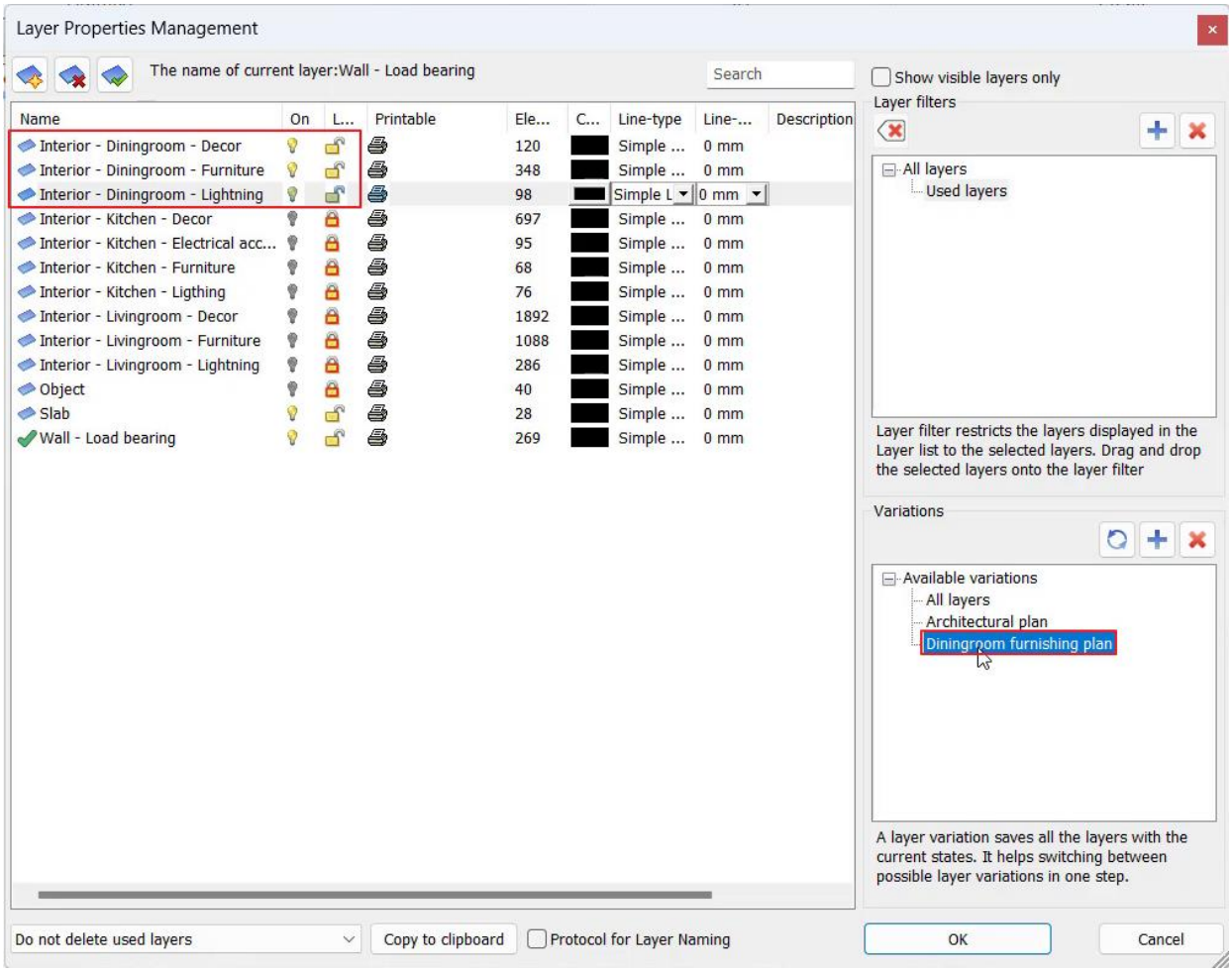
- A new group is created. Click on it with the right mouse button and select the *Rename* option: **Architectural** plan.



- Turn on the living room layers by double-clicking on the lock, then create a second group: **Living room furnishing plan**.



- Turn off the layers for the living room by double-clicking on the yellow light bulb and turn on the layers for the dining room by double-clicking on the lock, then create a third group: **Dining room furnishing plan**.

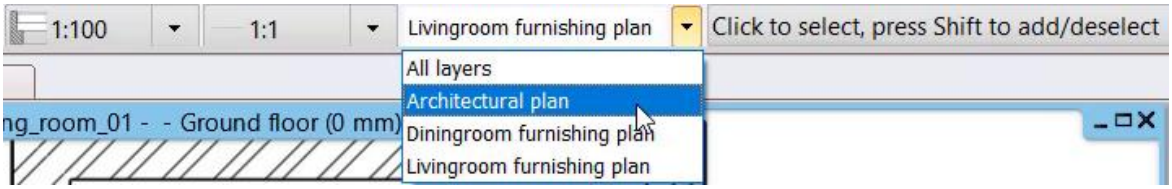


If you select now these variations, you can see that the settings of these layers change based on it.

- Click on OK to close the window.

  On the plan in the View Control bar, you can change the variations easily, you don't have to open the Layer Manager every time you want a different variation.

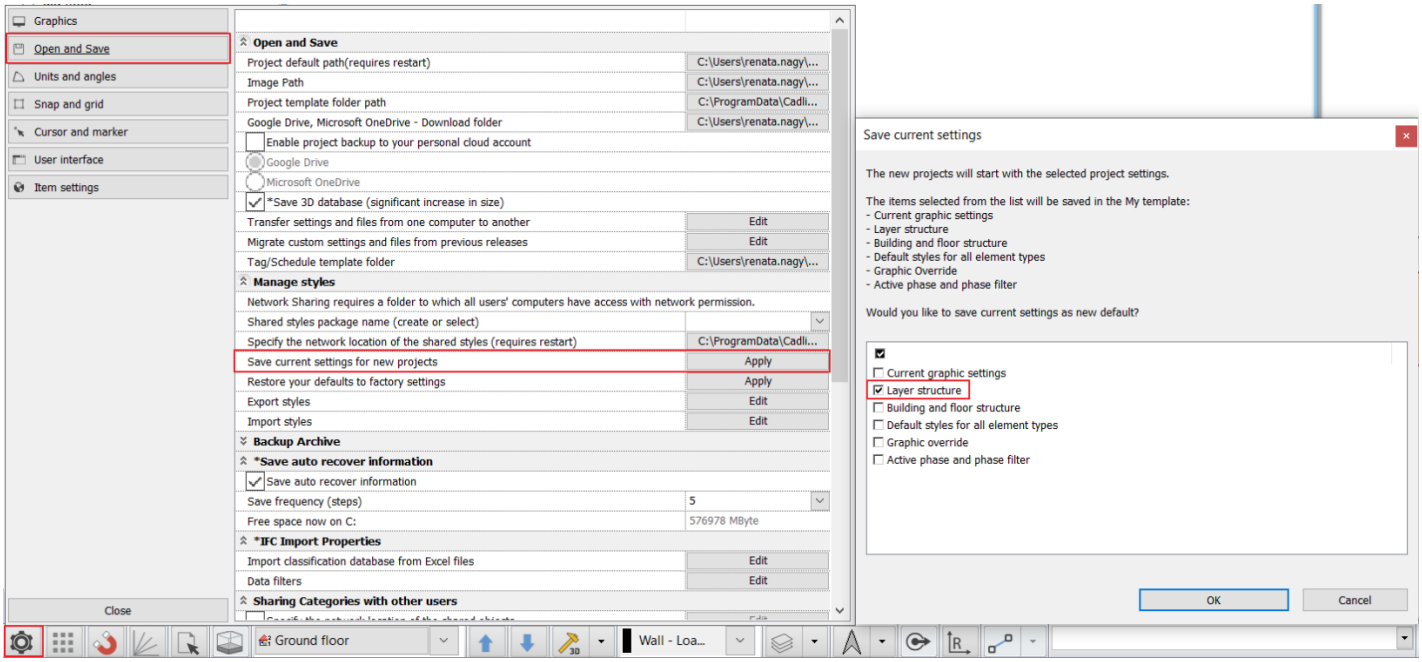
- In the View Control bar, select the desired layer variation from the list. Click on the "3D Hammer" icon to make the 3D view follow the change.



Saving new layers

! The new layers are saved automatically only in the project.
If you want to save these layers into new projects as well, then you have to save these settings. This is how you can do it:

Select the *Gear icon* in the bottom left corner and select the *Open and Save* tab. Select the **Save current settings for new projects** option and select the **Layer structure** option.

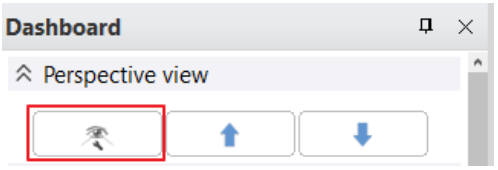


4.7.2. Settings and naming the perspective views

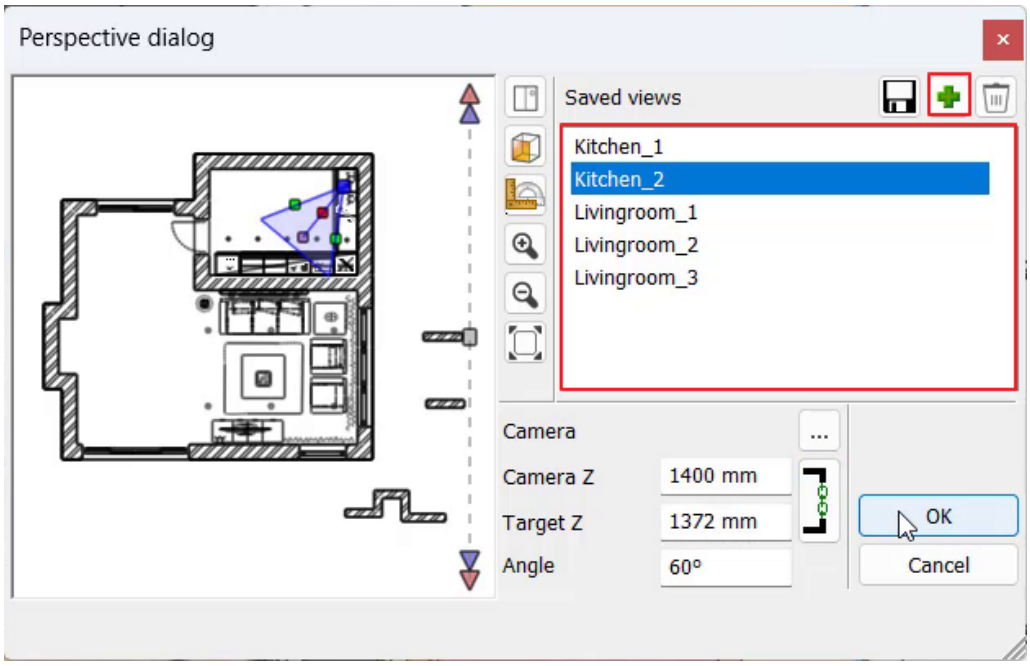
The other essential part of the project organization is setting the **views** properly in the well-ordered projects. If you consistently follow the same logic (even clockwise), to set perspectives in the 3D window and name them appropriately, it will be easier to navigate through them.

When designing a multi-storey building, it is a good idea to put a number in front of the view name, so you can move through the building in order when switching views:
0_Living_room_01 (ground floor - living room - first view)
1_Bathroom_01 (upstairs - bathroom - first view).

- Now move to the 3D window.
- From the Dashboard select the “Perspective dialog” icon.



- Create new views by clicking on the green plus button and rename them according to the example: " Living room_1 "
The program automatically will put all views in alphabetical order. Always put serial number after the name of the consecutive perspective views.



After exiting the dialog, you can use the Dashboard to select the view you want or use the blue arrows to switch between them.

If you follow the instructions above perspective views always will be orderly arranged in your projects, which makes easier and more transparent your work and project.

- Open the following project: *ARCHlineXP Draw\2024\Workshop_Intermediate\4_ Project_ Management\Little_John_Living_room_02_Layers*

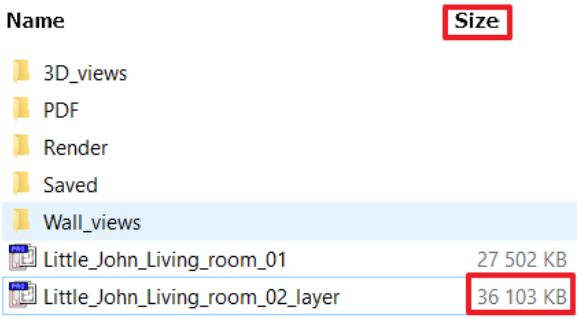
4.8. Managing large-size projects

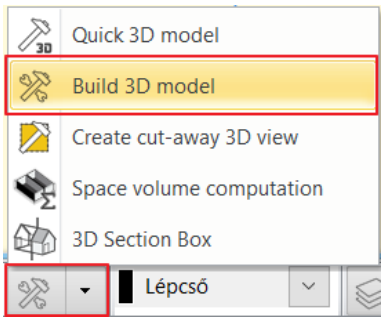
Project size

The size of the project is defined by 2 parameters:

- File size
- Surfaces in the 3D model

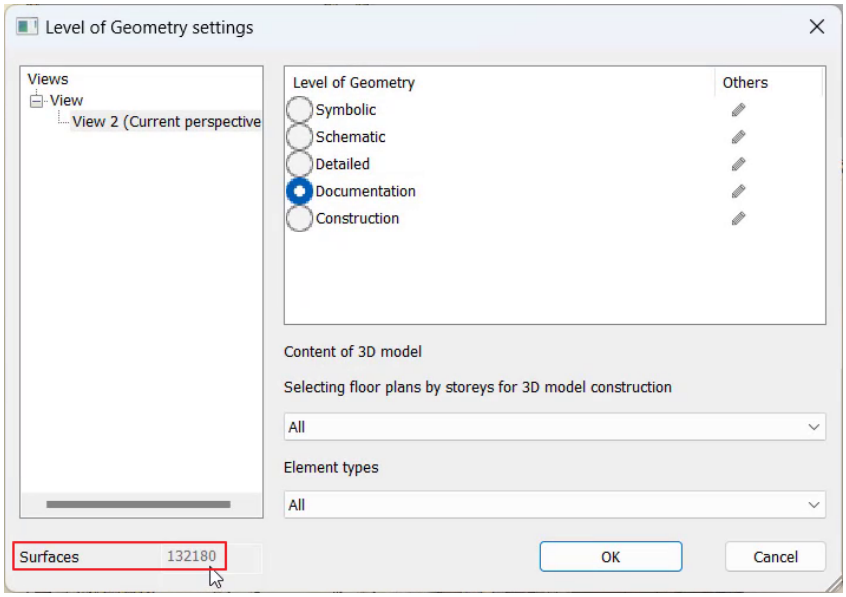
In Windows File manager you can check the size of the file you saved on your computer. This project is approximately 36 MB.





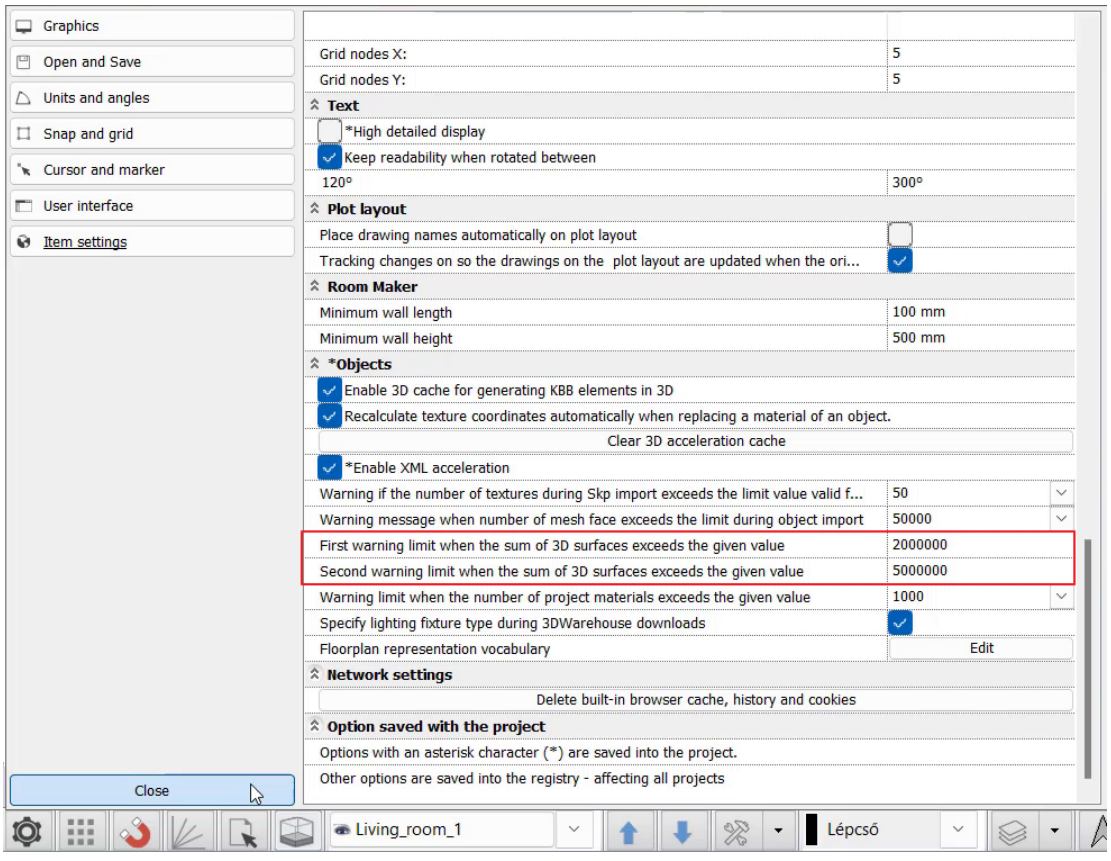
Surface number

The **Surface** number is displayed in the Build 3D model window.
In the pop-up window you can see that this project currently has **132 180** 3D surfaces. Quit this window with the “Cancel” button.



In case you use a mid-range laptop, it is recommended to keep the surface number under **1 000 000**.
If the number of surfaces exceeds 2.000.000 surfaces, the program sends a warning and repeats the warning at 5.000.000 surfaces. Take the warning seriously, otherwise the efficiency of your work may be significantly reduced.

The surface boundaries can be changed if necessary under Settings / Item settings / Objects.



Reducing the size of a project

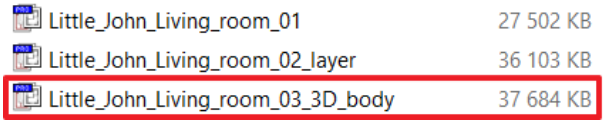
The size of a project can significantly increase while we are working on it. If you have already received a warning about the surface area of the project, you should definitely take the time to clean up the project, thus reducing its size. This contains four steps:

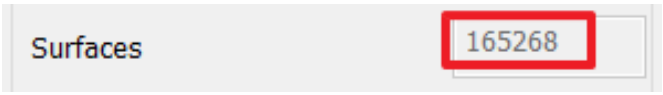
- Delete unnecessary 3D solids
- Delete too large objects
- Delete objects with too much material
- Delete unused materials in your project

4.8.1. Delete unnecessary 3D solids

There might be 3D solids in the project that were temporarily used during 3D modelling, we did not create objects from them, and accidentally remained in the project.
3D solids only appear in 3D, they do not have a floor plan symbol.
These unnecessarily increase the project size; therefore, we have to delete them.

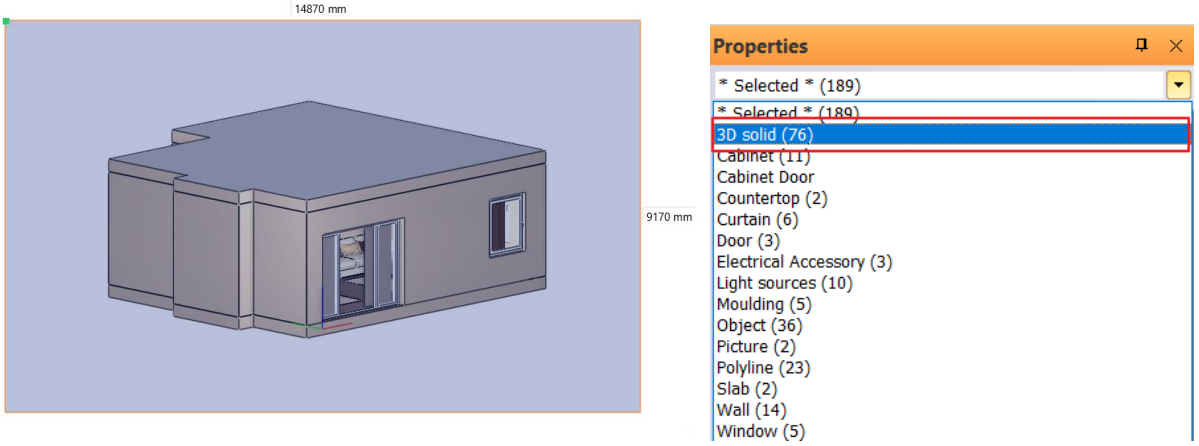
Open the following project: ARCHlineXP Draw\2024\Workshop_Intermediate\4_Project_ Management\Little_John_Living_room_ 03_3D_body.pro





How can we find quickly these 3D solids and delete them from the model?

- Activate the 3D view and select the entire model. In the side menu under Properties, select 3D solid and delete them.



- Now click again on Build 3D model tool. As you can see the number of surfaces decreased from 165.268 **to 132 351.**

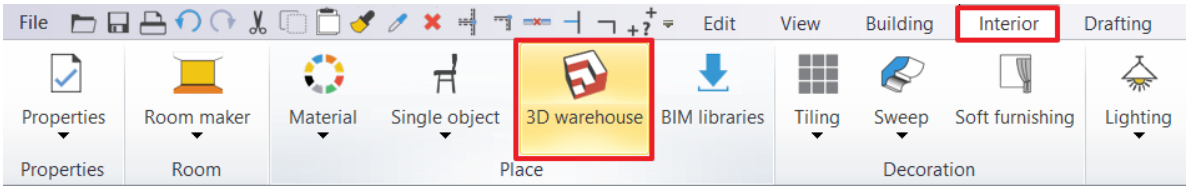
4.8.2. Delete too large objects and those contain too much materials

An object downloaded from the 3D Warehouse site or elsewhere may be too large or contain too much material. These objects often complicate and slow down the work and the program significantly. The program warns you in 3 cases:

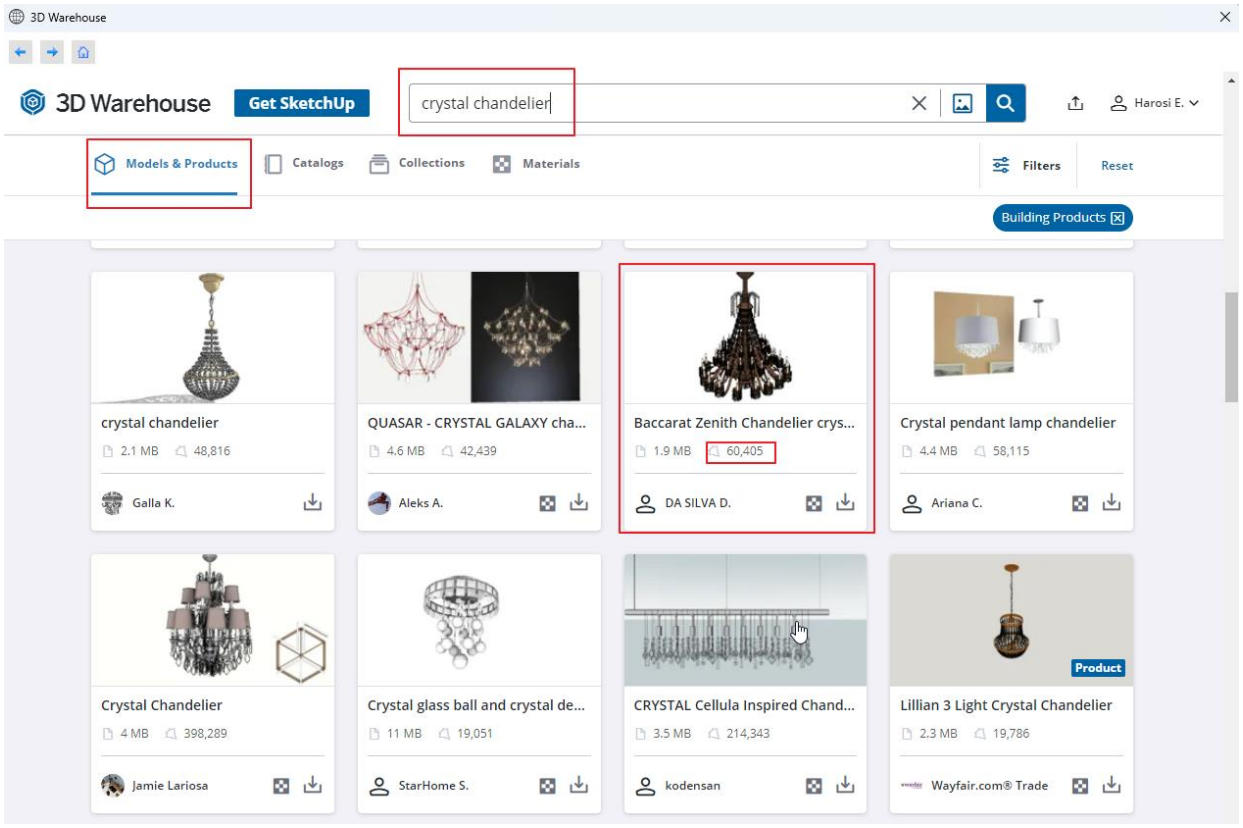
- ❖ When the object is too large, so it contains more than **50 000 polygons**
- ❖ When the object contains more than **50 materials**, or
- ❖ When the physical extension is larger than **100 m**

Now let's look at an example of too large objects.

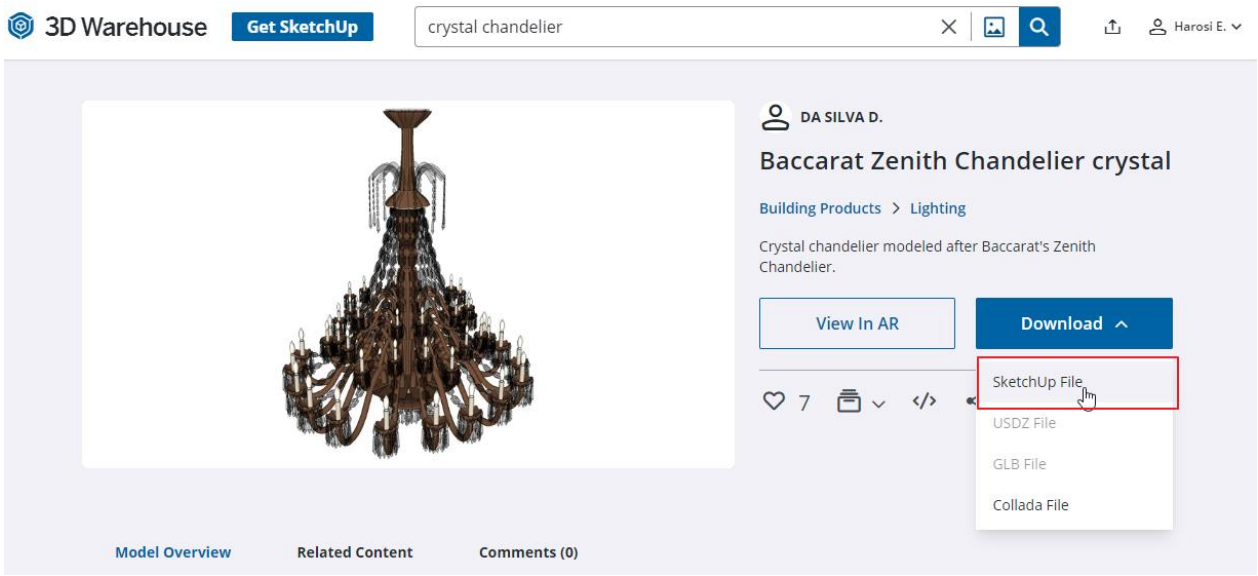
- Open the following project file: ARCHlineXP Draw\2024\Workshop_Intermediate\4_Project_ Management\Little_John_Living_room_ 04_larger.pro
- Open 3D Warehouse, this can find under **Ribbon menu / Interior / Place / 3D Warehouse**.



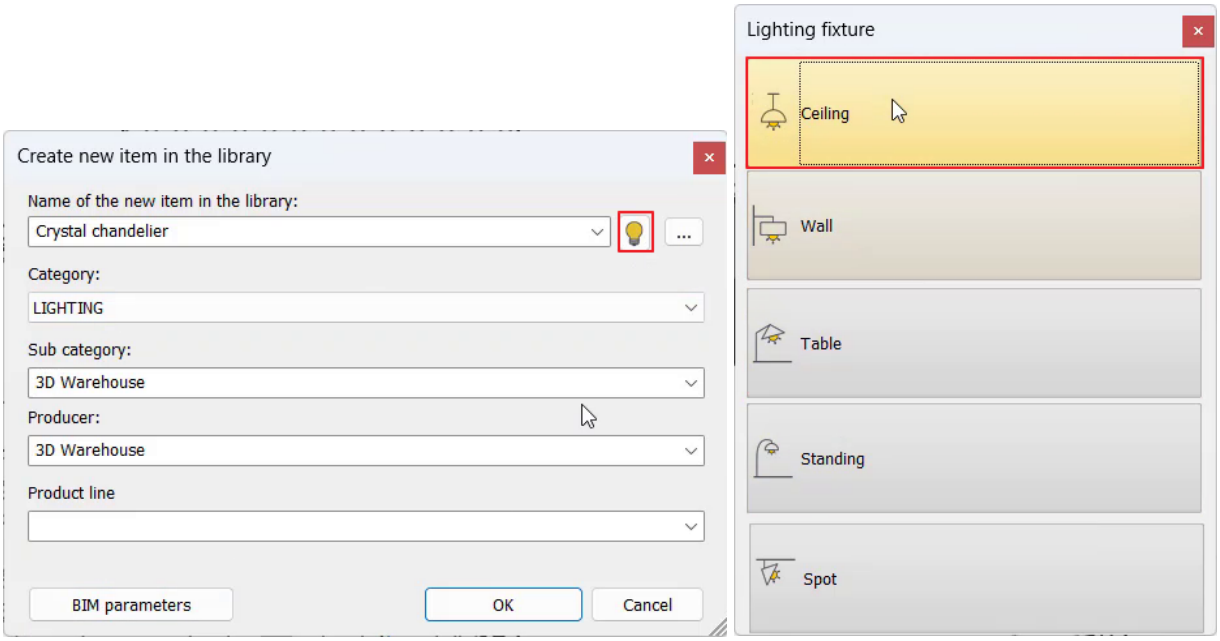
- In the search field type "crystal chandelier".
- Select "Baccarat Zenith Chandelier crystal" from the Models & Products
  This object contains 60,405 polygons.



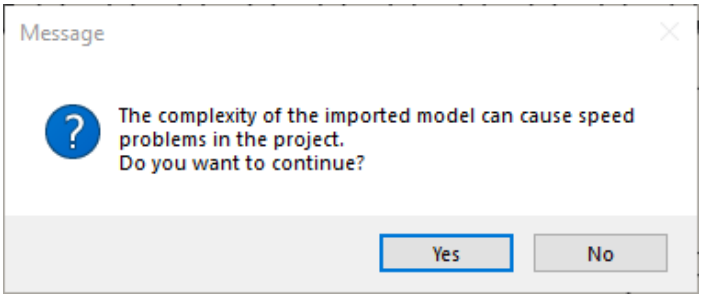
- Download the object as a SketchUp file.



- Enter the lamp name, category and click on the light bulb to indicate that this object is a lamp.
- Select the type of the lighting fixture: *Ceiling*



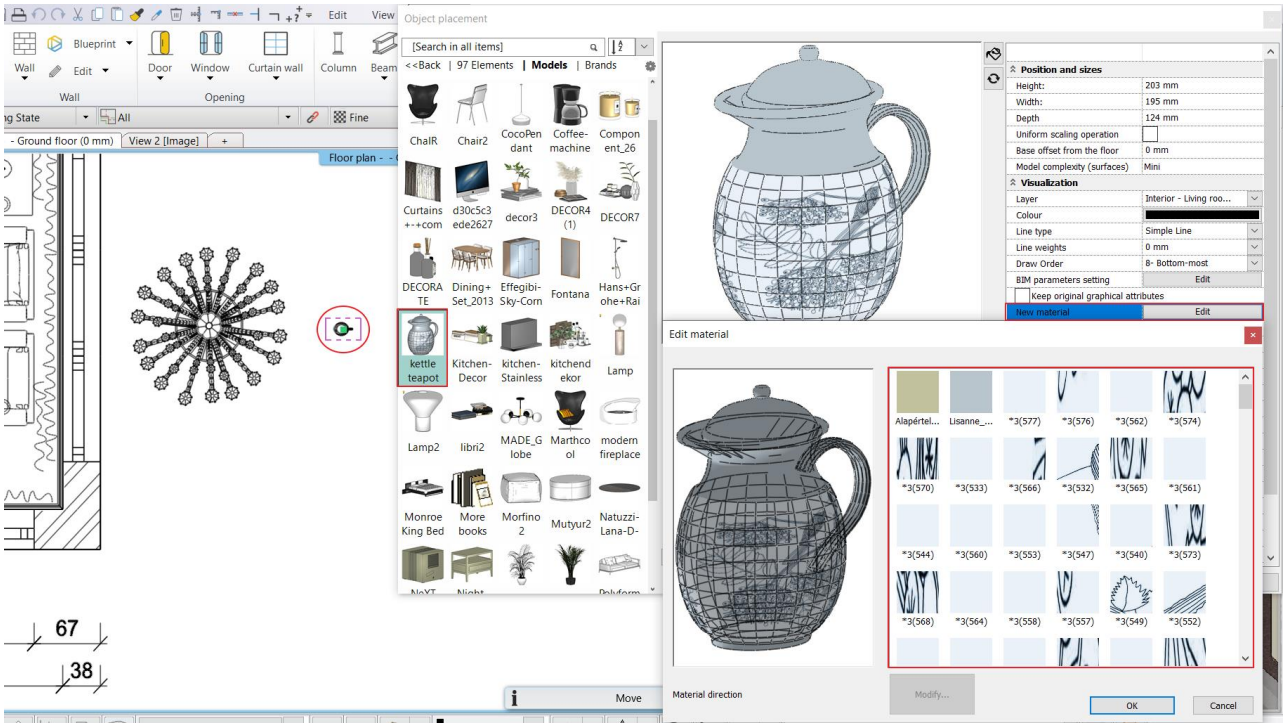
- A warning window will pop up after the download. If you click "No", the object download will be cancelled and the program will not download the object. Now select "Yes", knowing that this object will slow down your work.



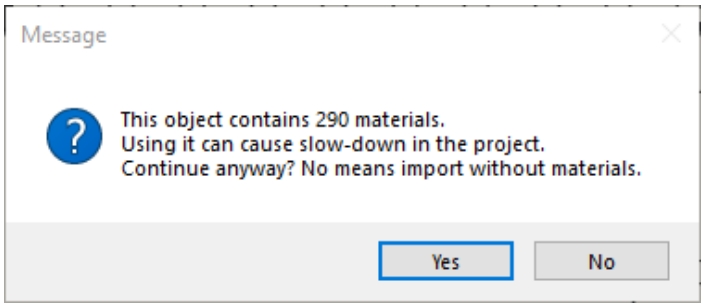
- Place the object on the floor plan.
- Look at the 3D surface number, with the option "Build 3D model". You will see that the number of interfaces has increased significantly, which may again slow down your work.
  The previous surface number of **132,350** has increased to **181,060** surfaces.

  Now let's look at an example of an object with a lot of material (more than 50 materials).

  In the loaded project, we have already placed the *kettle teapot* object, which contains incorrectly 290 materials.

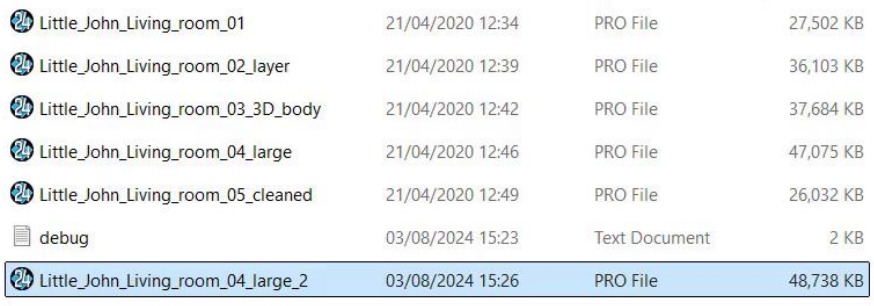


This type of faulty object can cause problems with the program. So, if you accidentally download such an object, a window will pop up after the download warning you that the number of materials on the object exceeds 50. If you choose "**Yes**", the download will take longer and may slow down or later prevent you from working. If you select "**No**" the object will download, but only one material.



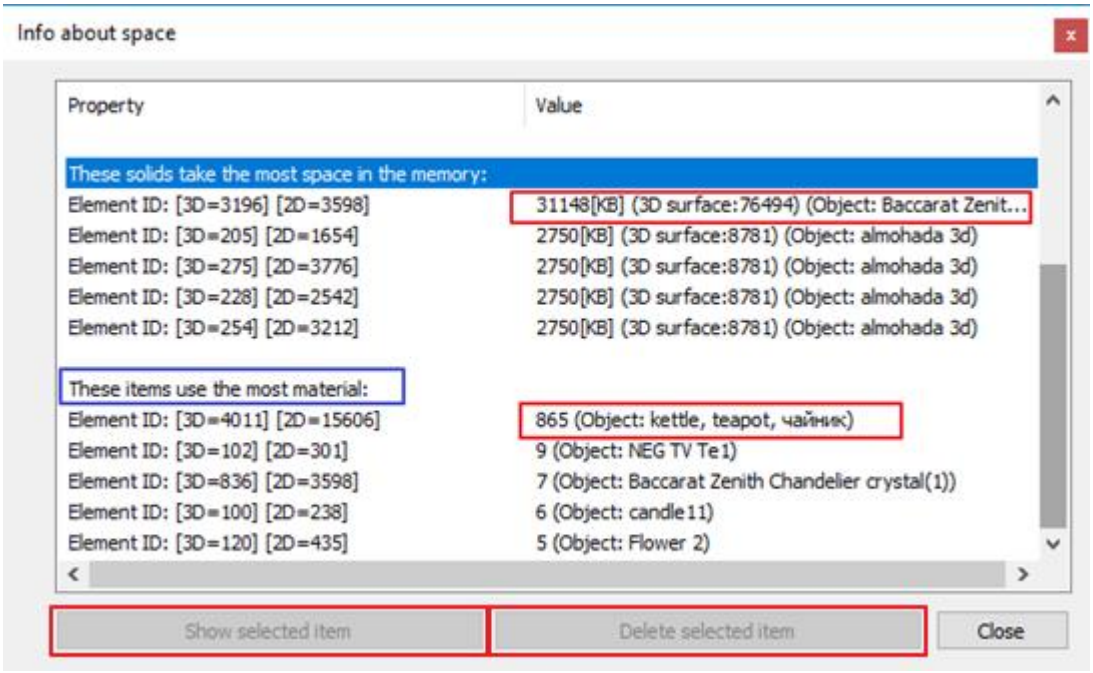
- Now save the project under the name *Little_John_Living_Room_4_Large_2.pro*.

  Its size:



  To reduce the size of the project, unnecessary objects with a large surface area, and a lot of material should be deleted from the project. These overly complex objects can be easily found and deleted.

- Activate 3D window.
- Go to **Ribbon menu / Dimension / Measure** and click on "**List of elements**".
- In the pop-up dialog window, we can find **the 5 objects take the most space in the memory and the 5 items use the most materials**. Here you have an option to "Delete selected item" straight away. In case you cannot identify the item, you can use "Show selected item" command. Last two downloaded objects are the largest in both categories. Delete them.

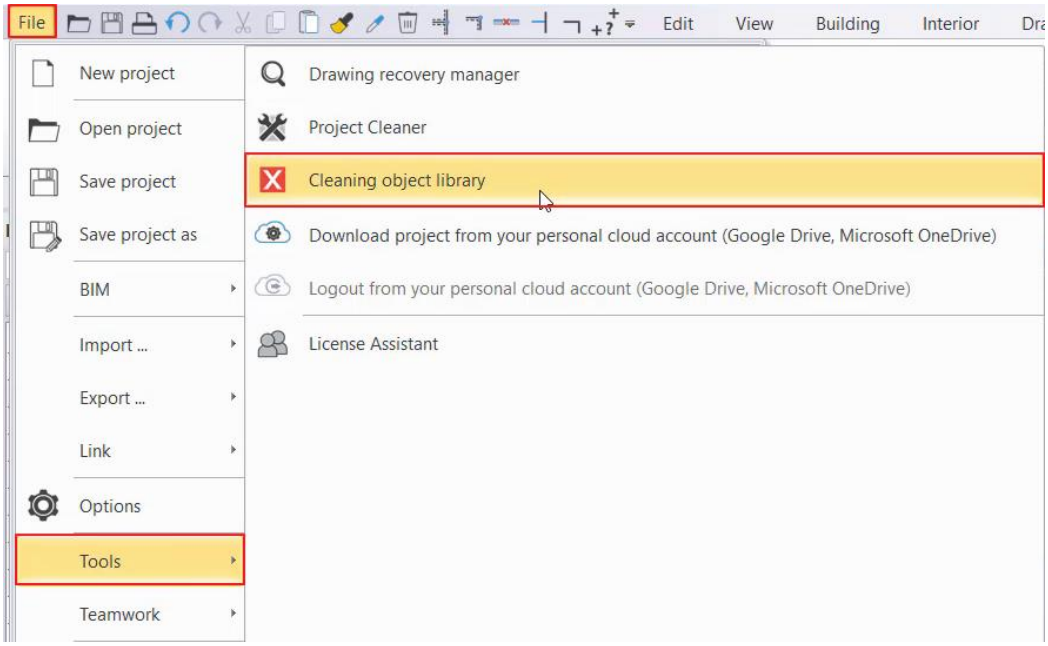


- Now check again the number of surfaces by using Build 3D model tool. By deleting these two large objects the number decreased to **132 351** from **181 060**.
- Save project under a new name *Little_John_Living_room_04_large_deleted.pro*, use “Save project as... “command.

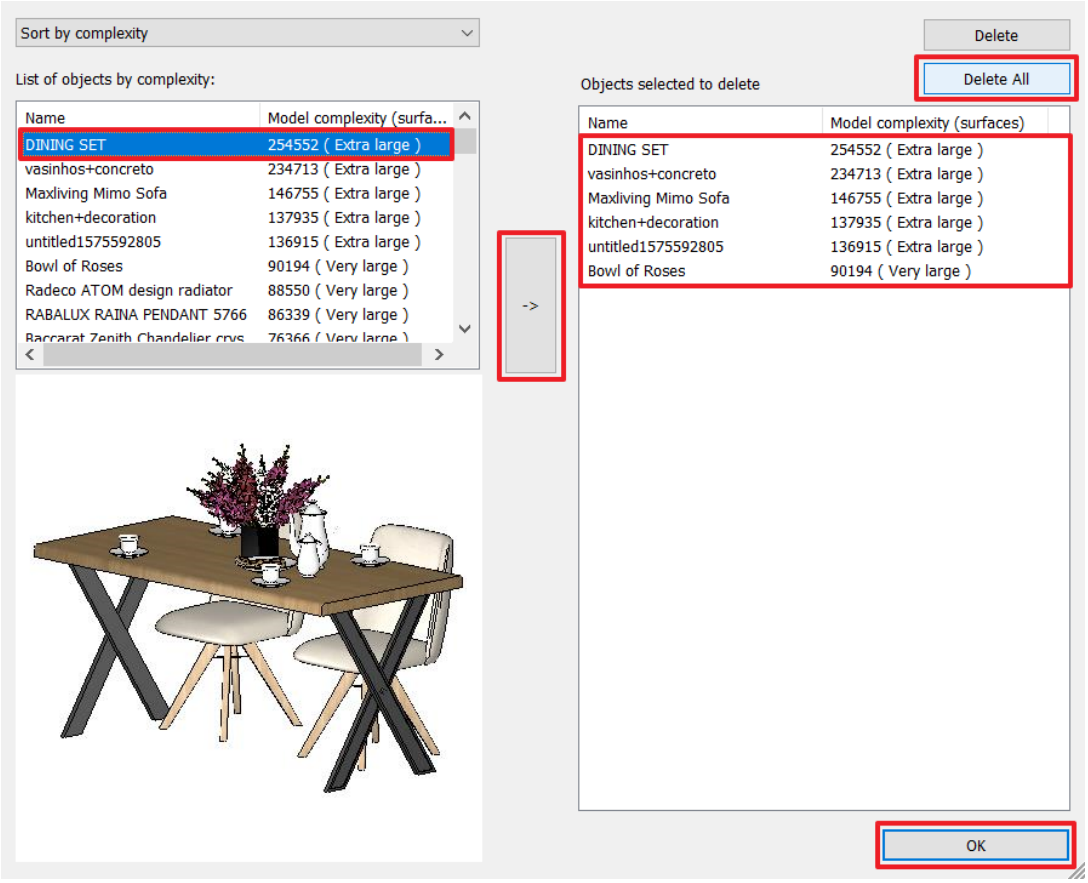
Cleaning object library

You should also clean up the object library in the Design Center of any models that have already been downloaded with too much surface area, so that they are not used in the next project.

To do this, use the *File menu - Tools - Cleaning object library* command.

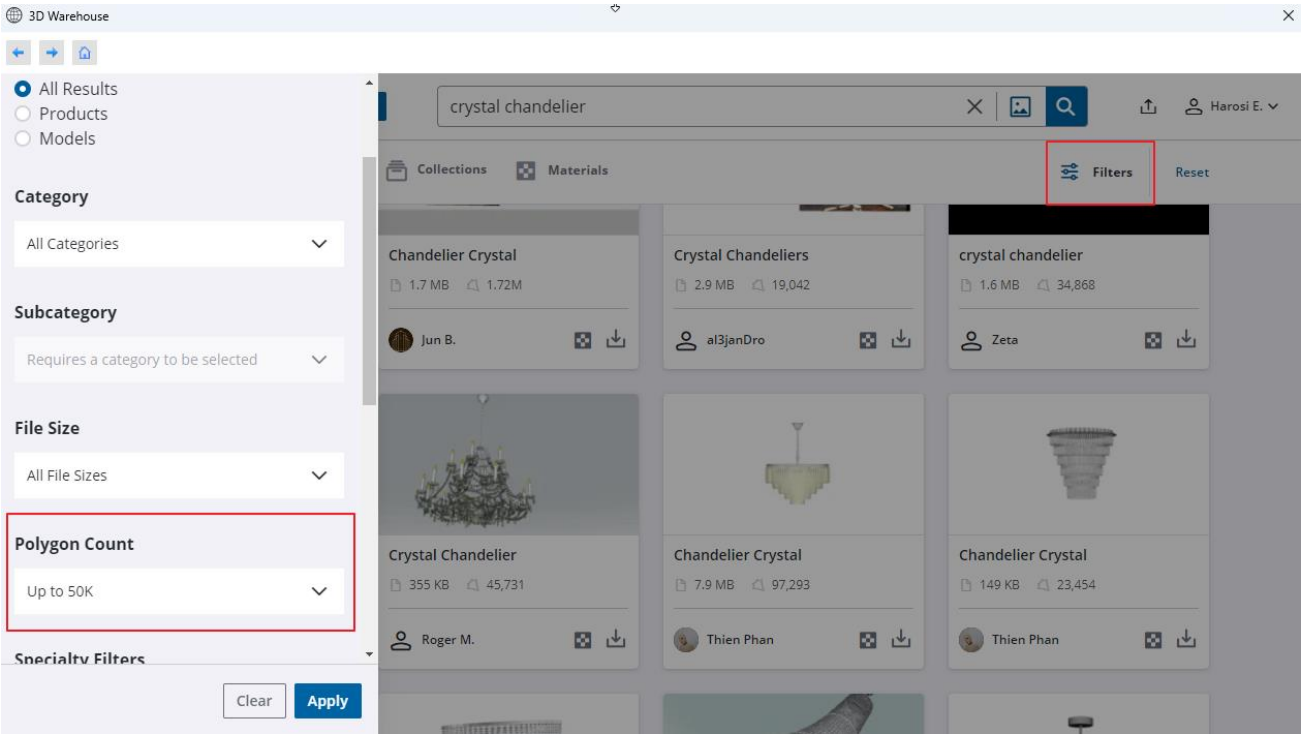


A dialog box filters the contents of the Object library and sorts the items by size or date.
In the list on the right, you can collect the items you want to delete and then delete them.



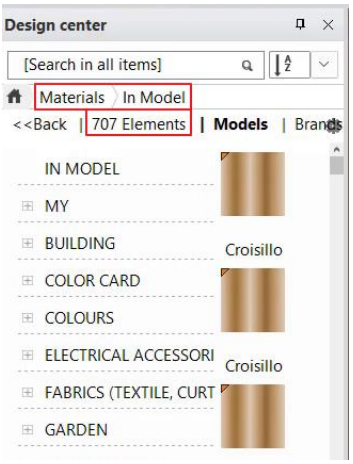
Filter 3D Warehouse® by surface number

The 3D Warehouse website also helps to filter out objects with a large surface area.
After entering the search word, select Filter on the right:
For Polygon Count, set the maximum to 50 K.
The page will then only display objects with a maximum of 50,000 polygons. This way, objects with an unnecessarily large surface area count, which ARCHLine.XP does not recommend downloading, will not appear in the list.



4.8.3. Delete unused materials in the project

When you delete an object containing hundreds of materials from the project, the object itself is deleted, but the hundreds of unnecessary materials remain in the Materials – In Model library. As a result, in larger projects, there can be thousands of materials present that increase the project size, slow down the workflow, but are not used. These materials must be deleted.



- Select the **Design Center / Materials / In Model** folder. Here, you can see that there are currently **707 elements** in the project.

  The deletion is done with **Project Cleaner**.

- Save the project under a new name. The new project name should be "*Little_John_Living_Room_05_Cleaned.pro"*.

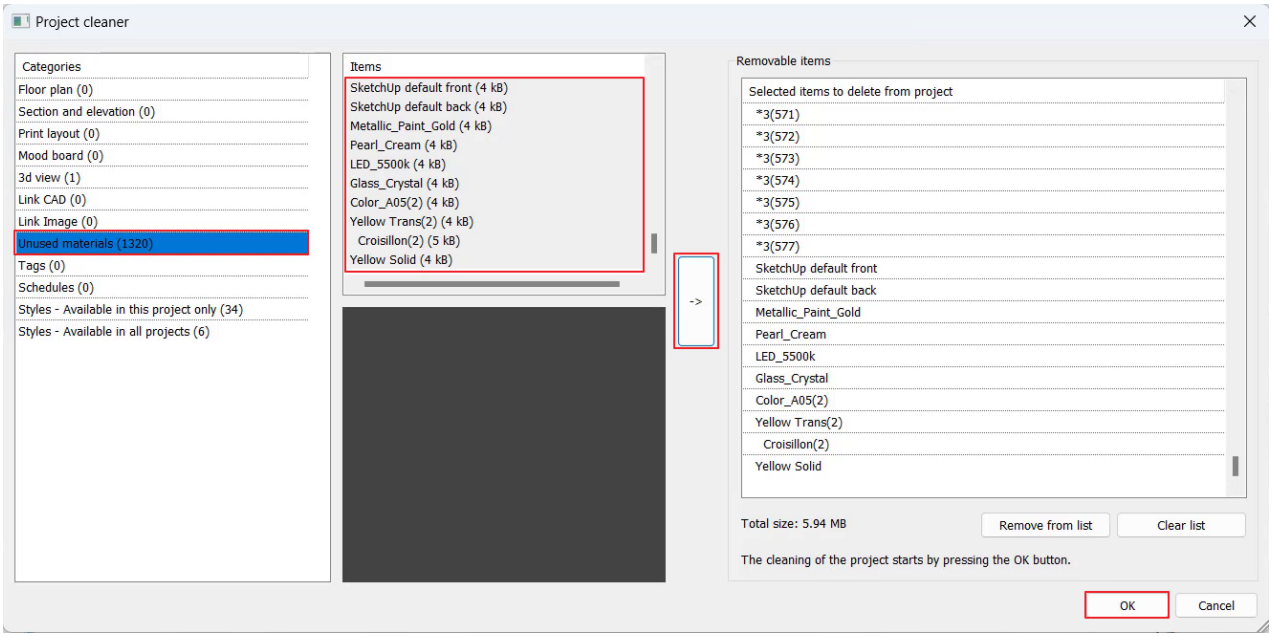
  You need to save the project under a different name so that the original state can be restored if necessary.

- To perform the material cleanup, exit the project and reopen it.

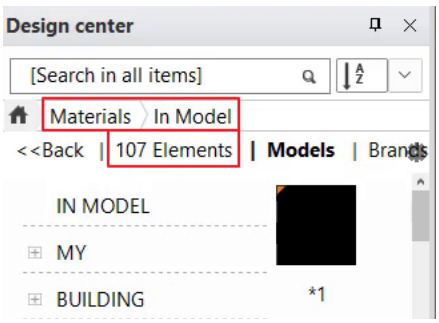
- Select the **File menu / Tools / Project Cleaner** option.
- Select the Unused materials category. The unused materials will appear in the middle, Items window.
- Select the first and last item while holding down the SHIFT key, then move them to the Removable Items section using the arrow.

  In the Project Cleaner, besides unused materials, there are other items that can be deleted, such as sections, views, or schedules.

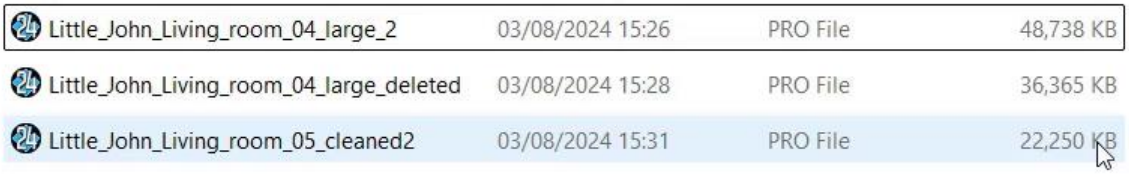
- Click OK to confirm the settings so that the program can delete the unused materials.



- Check the number of materials. Click again on **Design Center / Materials / In Model.** Now the number of the materials decreased **from 707 to 107** items. Deleted materials increased the project size unnecessarily.



After all these steps it can be seen that our project size significantly decreased from 48 738 KB to 22 250 KB. Thanks to the clearing, more storage space is left on our computer.



If you follow these steps, all your projects will be transparent, traceable and (depending on the performance of your computer) you can work quickly and without disruption.

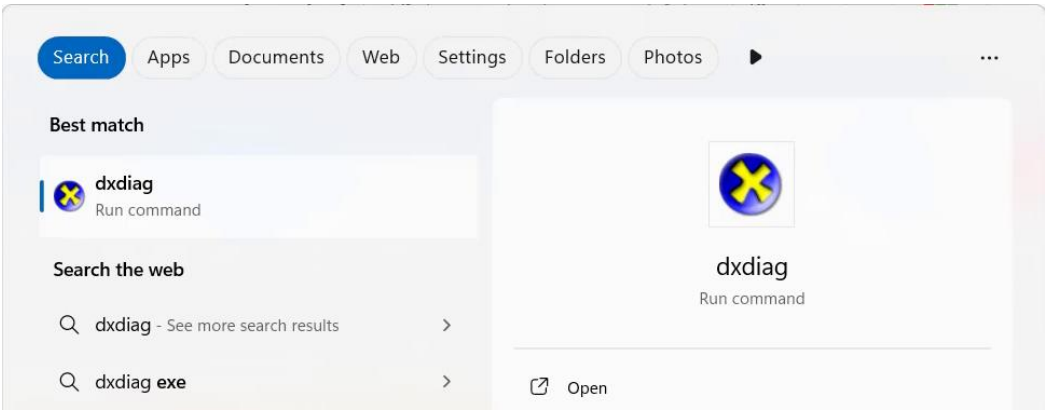
4.9. Tips to avoid IT problems in 10 points

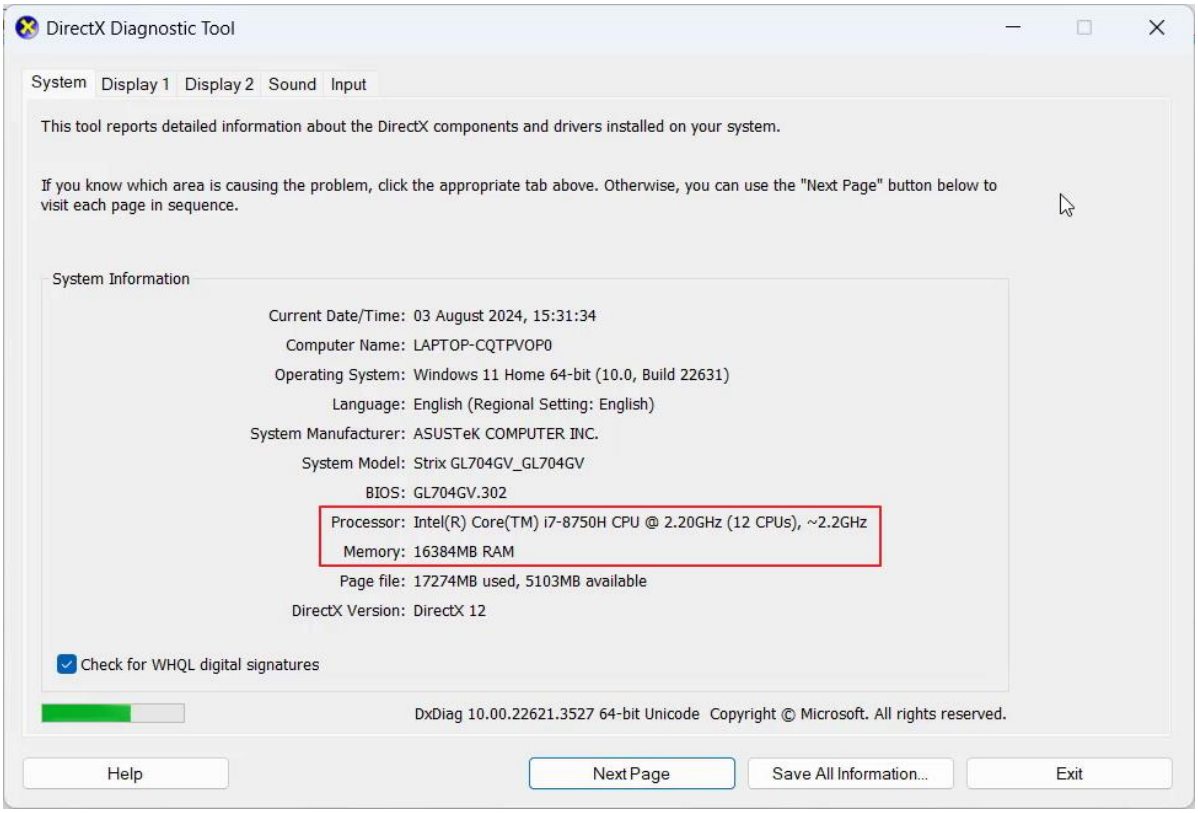
The finished project is usually large, hundreds of Mb. in size. During its preparation, several IT problems can occur that can make it very difficult to solve the task:
We therefore recommend that you check the following **10-point list** for each project to make sure you are not experiencing the problem. Several of the points will be familiar to you, and we have reviewed them in section *4.8. Managing large-size projects*.

4.9.1. Does the computer meet the recommended system requirements?

The recommended configuration is suitable for preparing a large-scale exam work. A computer that meets the minimum requirements is for creating example projects during the course, but not for exam work or large projects.
Low memory (RAM e.g. 4 GB) can lead to the "Out of memory" crash.
In this case, the program displays the following message: *"The system does not meet the minimum memory requirements required to run the application. Low memory can result in unpredictable behavior."*

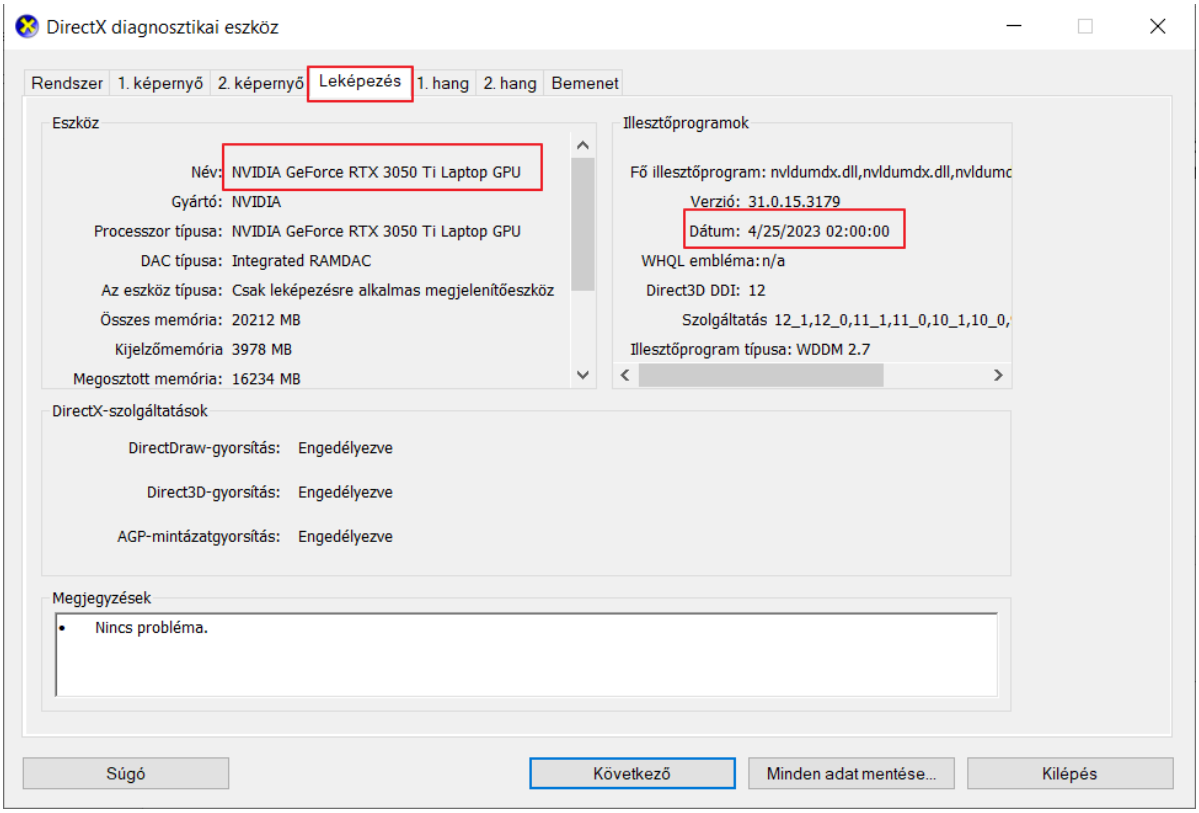
With DxDiag you can check the parameters of your computer:
Click on the Windows start icon and type: **dxdiag**





4.9.2. Integrated video card

An integrated video card is not recommended, a dedicated video card is recommended. Check the date of the video card driver. If it is older than 1 year, it is recommended to download the update.



4.9.3. Is there enough space on the C:\ drive?

If there is not enough space on C:, there may be a problem with the operation of Windows. In practice, Windows needs at least 10 GB of free space. The recommended size of the C: drive is at least 100 Gb.
If there is not enough space on the drive, saving the project may be interrupted. The program will send you a message. In such cases, the computer must be cleaned, e.g., Empty Recycle Bin.
More here: Free up disk space in Windows

4.9.4. Is the ARCHLine.XP project save folder on OneDrive?

ARCHLine.XP cannot save a project 100% safely if the file is located in a folder that is synchronized with the OneDrive file storage service. It is therefore **strongly not recommended**. Saving a project may be interrupted.
More here: OneDrive issues

The following should be checked regularly throughout the project:

4.9.5. Distant element

Elements located at long distances (several km) cause calculation inaccuracies and errors may occur during work. The program warns about remote elements.

Symptoms:

1. In the optimal view, the floor plan is not visible in the floor plan window
Reason: some elements on the floor plan are far from the origin.

2. In axonometric view, the 3D model is only a small point
Reason: some elements are far from the rest of the model in 3D.

3. Poor texture quality in 3D view, elements cannot be selected in 3D, etc.
Reason: the model is far from the origin.

4. Elements cannot be selected in 3D
Reason: the model is far away from the original or DirectX9 is set instead of DirectX11 in the Options - Display Setup section.

5. The image wall view results empty grey area
Reason: some elements on the floor plan are far from the origin or in perspective, the viewed point is far from the camera.

If this distance is possibly several km, calculation inaccuracy will occur.
DirectX 11 uses floating point number representation (NOT double precision!). This means that it cannot be accurate in mm and more than 100 km at a time.

Therefore, it is necessary to check whether there is a **distant element:**

- **on the floor plan,**
- **in the 3D window,**
- **or is the perspective object far away, or is the model far away from the origin?**

More here: Issues with model being far from origin

4.9.6. Does the number of surfaces in the model exceed 2,000,000?

The program warns you about this. Models with a large number of surfaces slow down work depending on the performance of the machine. When importing objects with more than 50,000 surface numbers, the program sends a warning. A list of elements with a large surface area in the project can be requested. The use of layers is recommended. We recommend the ARCHLine.XP LIVE program for displaying decorative elements with a large number of surfaces.

4.9.7. Are there elements with extremely large surfaces in the Object Library?

Use the Object Library Cleaner!
It's a good idea to delete extremely large items not only from the project, but also from the Object Library, to avoid using them in the next project.

4.9.8. Is there an object in the plan that contains more than 50 materials?

A list of these can be requested, it is recommended to delete them. Such objects are mainly made for game programs, where each surface piece has its own texture. When downloading such objects, the program sends a warning, because errors may occur in the operation of CAD/BIM programs during their use.

4.9.9. Does the number of unused materials in the project exceed several hundred?

Then it is worth cleaning the project, because in most cases the materials of previously downloaded, but no longer used, redundant objects accumulate. Due to the high number of materials occupying a large amount of memory (over 1000), an error may occur during work. The program sends a warning about the high number of materials.

4.9.10. Did the ARCHLine.XP program send a warning from the aforementioned?

It must be taken seriously and the cause must be eliminated!

Workshop 5: KBB, Modelling and furniture design

5. Workshop: KBB - Modelling and furniture design

During this lesson you can learn how to use the furniture design tools in ARCHLine.XP, this way you can easily create customized kitchen and storage cabinets. The following points will be covered:

- ❖ Using different fronts on the same cabinet
- ❖ Creating fronts with hidden handles
- ❖ Creating a custom shaped, curved cabinet
- ❖ Creating a custom shaped, curved countertop
- ❖ Preparing documentation

- Watch the video of the workshop here:
  Intermediate Course – Interior design

Refresh your skills

In order to understand this lesson completely, the basic knowledge of the furniture design tools is required. Before starting this workshop, it is recommended to repeat the *Preliminary course - Kitchen design* workshop. This project can be found among the files of the Preliminary course files.
The tutorial videos can be found here: Preliminary Course – Interior design

Start

- Open ARCHLine.XP software.
- Click on **Open Project** button.
- Open the following project: *…ARCHlineXP Draw\2024\Workshop_Intermediate\5_KBB-Modelling_and_furniture design\01_KBB_Modelling_and_furniture_design_start.pro*

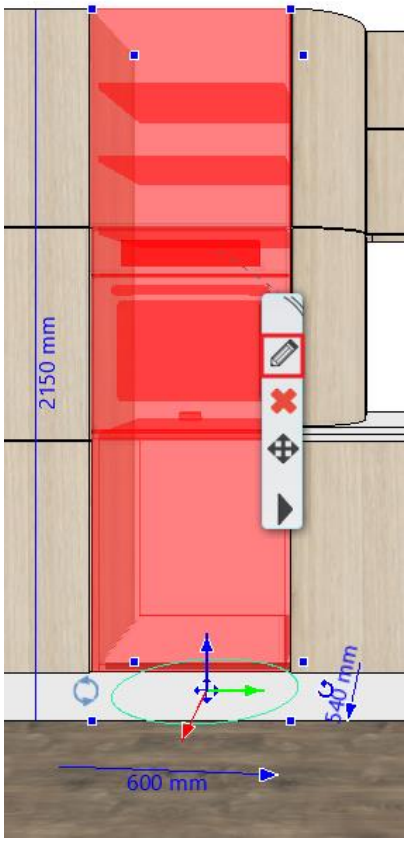
Save project as…

- Before starting the work save the project file with another name.
- Choose **File / Save project as…** command and specify the name and location.

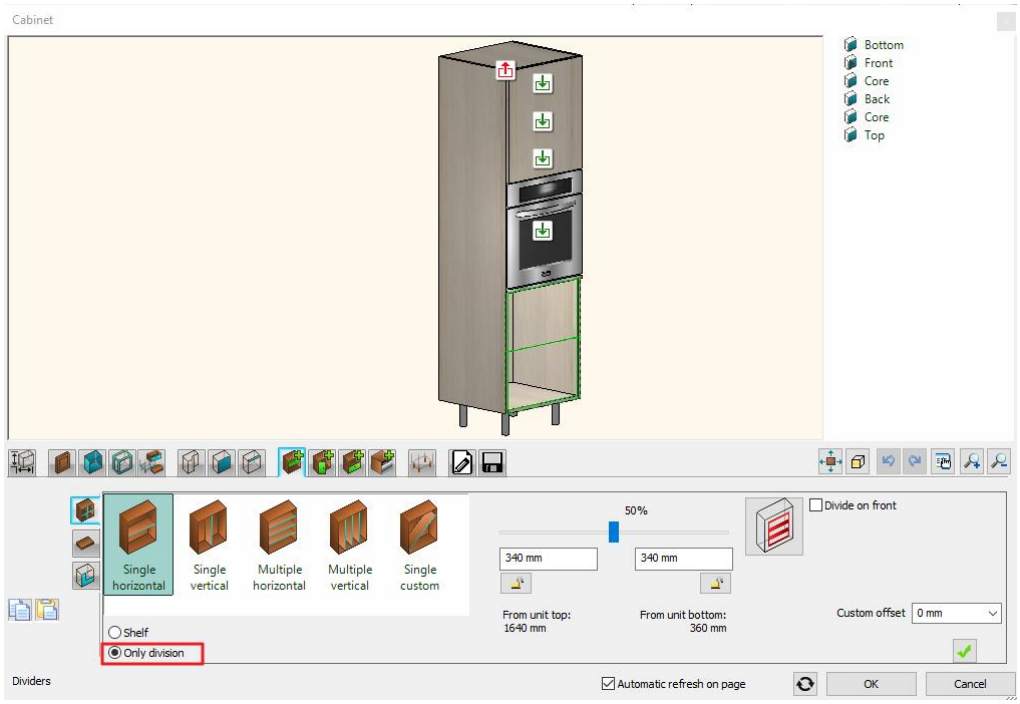
5.1. Adding drawers, changing fronts

During this workshop we will modify the kitchen in the opened project.

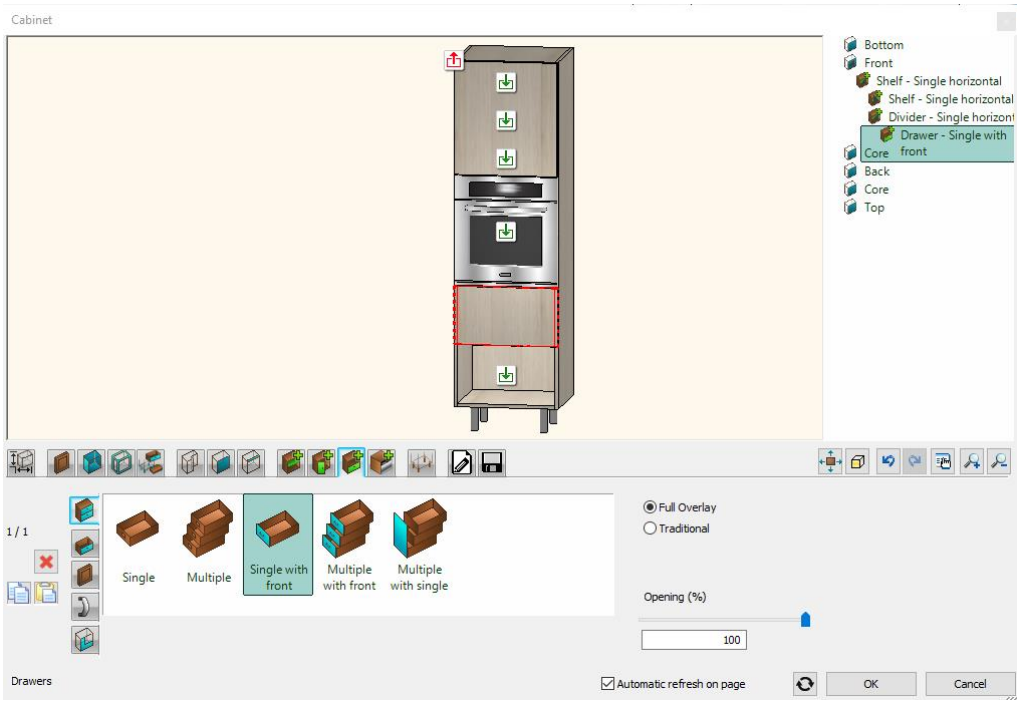
- Click on the high cabinet from which the drawers are missing and open its properties.



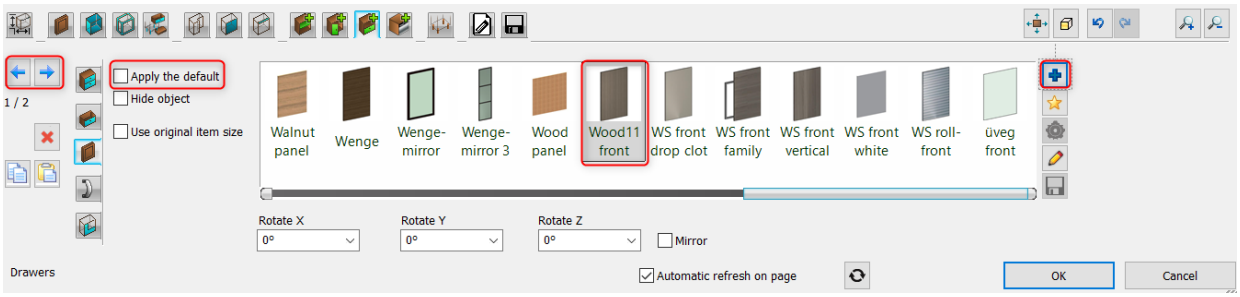
- In the dialog click on the Dividers tab and add a Single horizontal divider. Before placing the divider with the green tick, activate the *Only division* option.



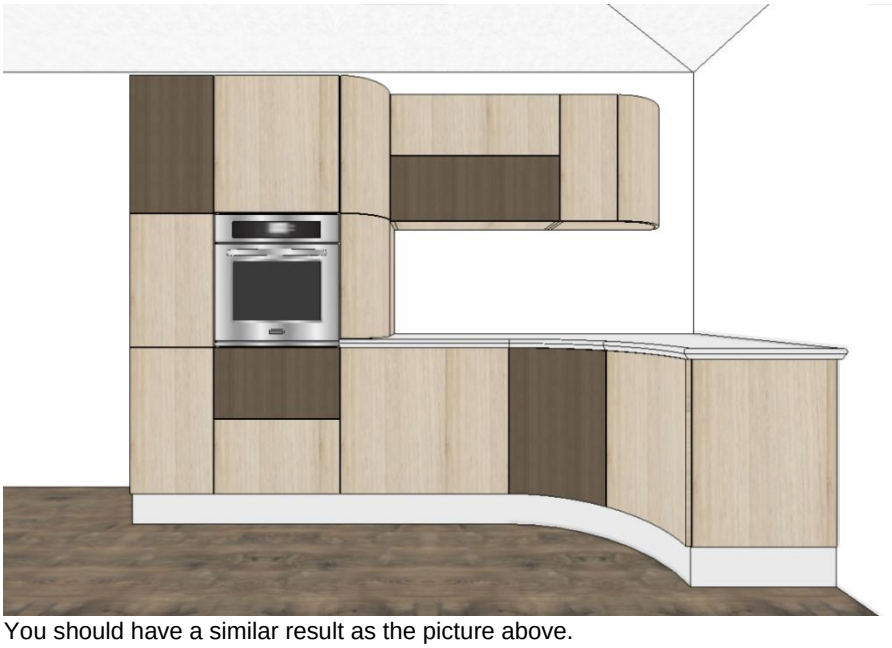
- Click into the upper division and add a Single drawer with front, then repeat this step in the lower division.



- Select the newly added upper drawer using the blue arrows on the left. On the third vertical tab deactivate the *Apply the default* option.



- Using the blue plus on the right, search for a front named *Wood11 front* in the library, then close the dialog with the OK button.
- Change the one front of three further cabinets to the *Wood011 front*. To do that select the cabinet and open its properties. On the Doors tab select the front to be modified, then with the learned method change its front to the desired one. You can easily navigate to the front you need by ALT + clicking.

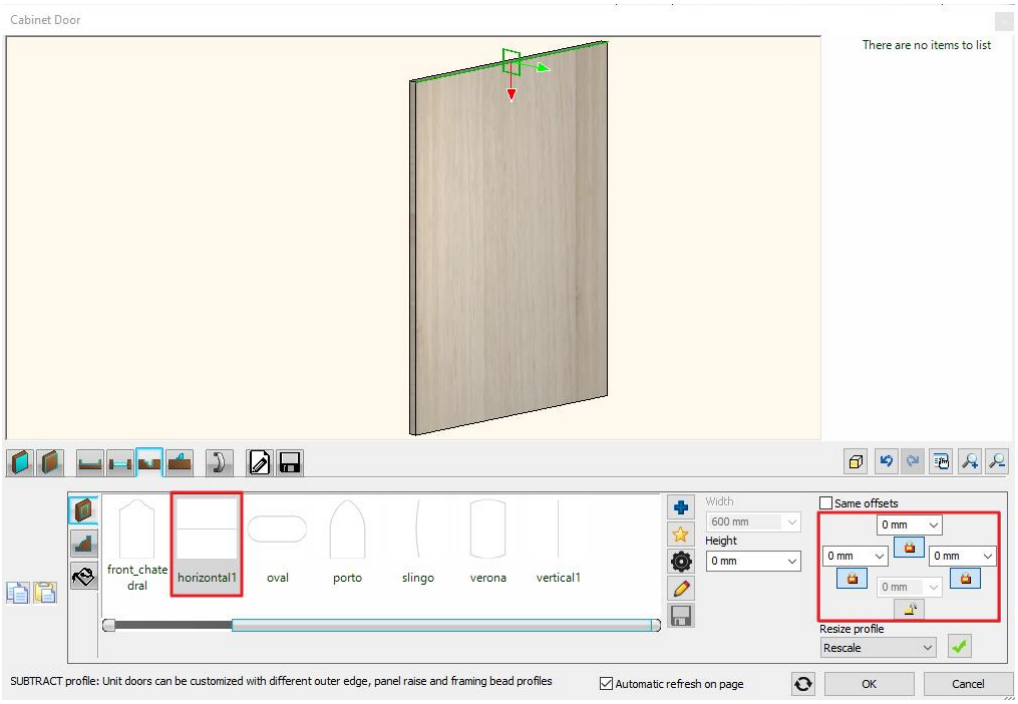


You should have a similar result as the picture above.

5.2. Creating a front with hidden handles

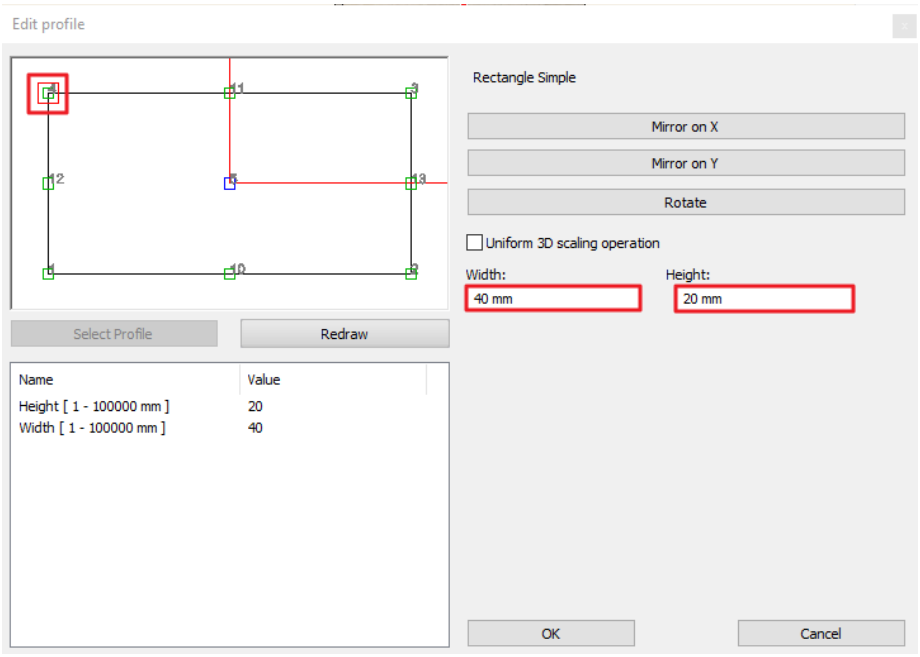
In modern kitchens non-traditional solutions are often used at the handle design. With the handy tools of ARCHLine.XP you can easily create alternative variations.
The Cabinet door command is an extremely flexible tool with which you can define the shape of the front, insert or extract profiles in order to create more unique pieces.

- Start the Cabinet Door command from the **Ribbon bar / Interior / KBB** group.
- Select *Old_Ashtree* as the material of the front.
- Select the fifth tab from the left, the Subtract profile tab. With this option we can define a frontal profile (on the first vertical tab on the left) along which the section profile (chosen on the second vertical tab on the left) will be drawn.
- Select the profile named *horizontal1* as the frontal profile.
- The four values on the right indicate the distance of the profile from the edges of the front. Rewrite the upper value to 0, then deactivate the Same offsets option and unlock the bottom padlock. By fixing the two side values we can assure that the front fits on cabinets of all sizes and the handle does not end after a specific length but adjusts to the cabinet size.
-

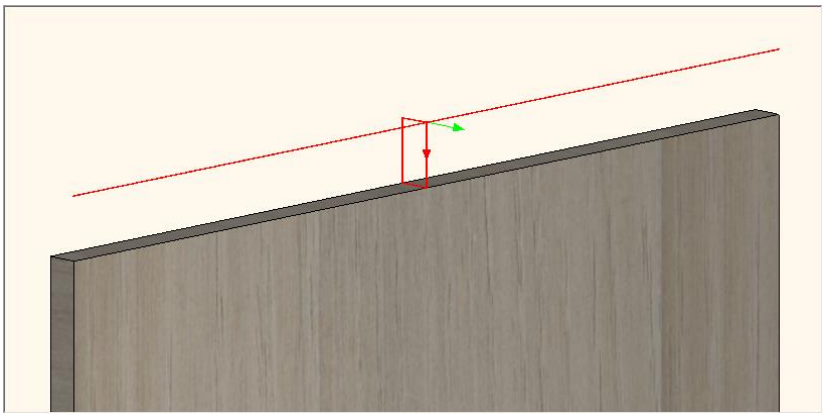


- After this select the section profile. This will be a simple rectangle. After selecting it, click on the cogwheel icon on the right to access its properties. Here set the dimensions: width: 40 mm, height: 20 mm. Select the upper left corner as a reference point. This defines the point with which the section profile is connected to the route drawn by the frontal profile. (The appropriate point is different in every situation, so it is possible that you will not find it at the first try.)

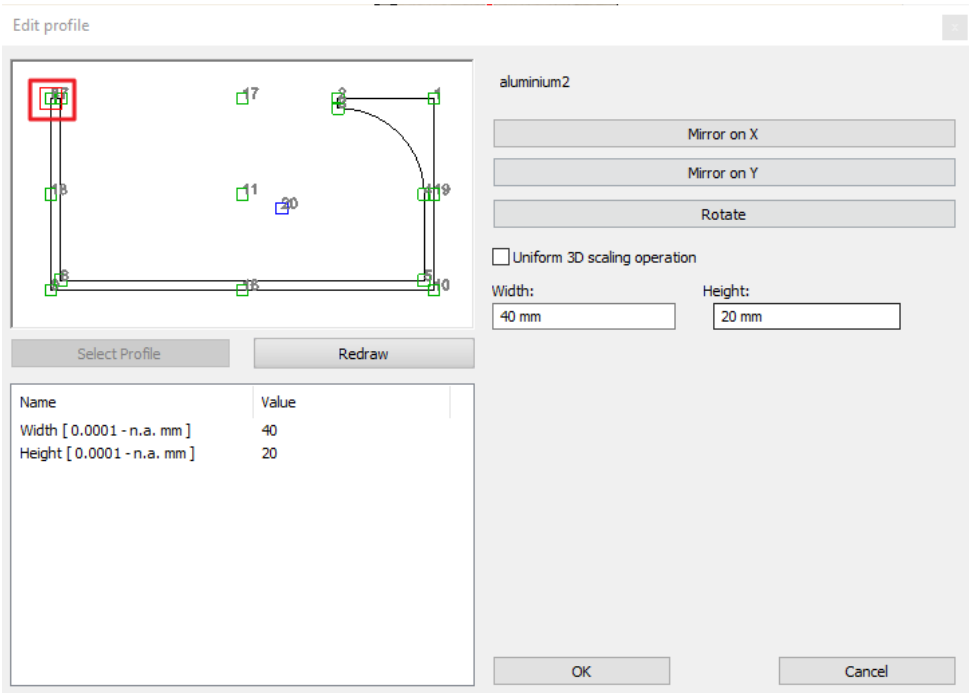
  This profile operation is important because first we will subtract a profile from the front, then add another, which will be the handle. In order to place the handle ‘inside’ the front and not ‘on’ it, we have to subtract a handle profile size part of the front to have space for the other profile (handle) and to prevent it from overhanging.



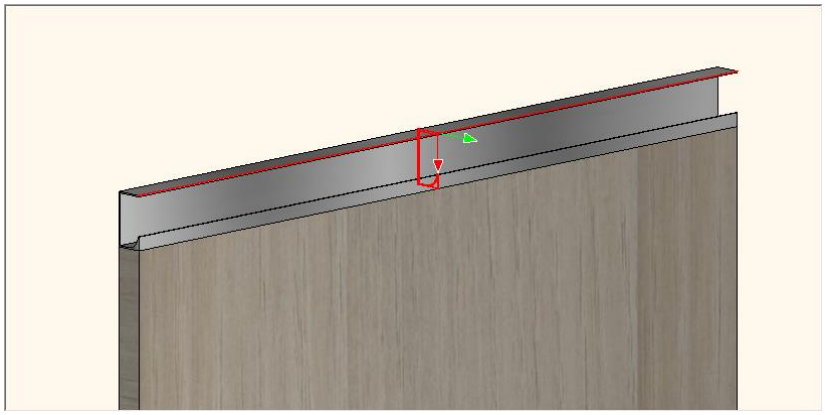
- Close the profile properties and make sure that both green profiles are inside the front, then click on the green tick in the right bottom corner.



- Click on the sixth tab from the right, the Add profile tab. This option operates on the same principle as the Subtract profile option with the difference that here a profile will be added not subtracted.
- Select the profile named *horizontal1* as the frontal profile and set its distance from the front edges the same way as at the subtracted profile.
- After this, on the second vertical tab on the left select the profile named *aluminium2* as the section profile. Click on the cogwheel icon to access its properties. Its dimensions do not require further modifications, just select the upper left corner as the new reference point of the profile.



- In the third vertical tab on the left, set a unique material for the added profile, then press the green tick to place it on the front.

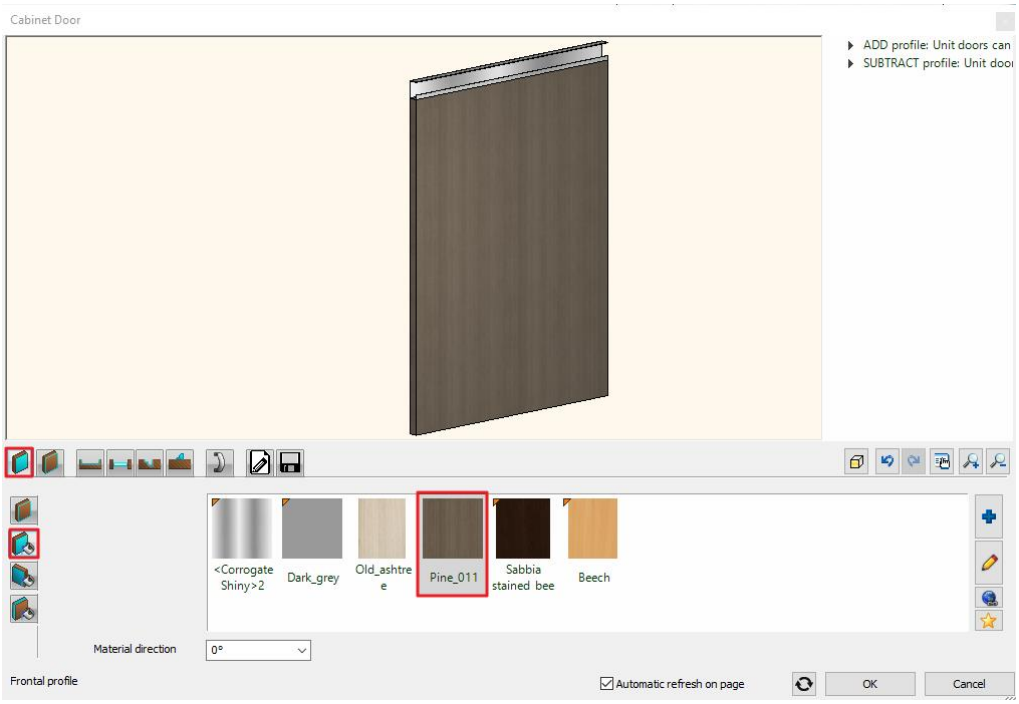


- Save the front on the last tab with another name: *front with hidden handle 01 - ashtree*.

5.2.1. Creating alternative front variations

In order to vary the handle positions and front colors in the kitchen we need to create alternative variations from the front created previously.

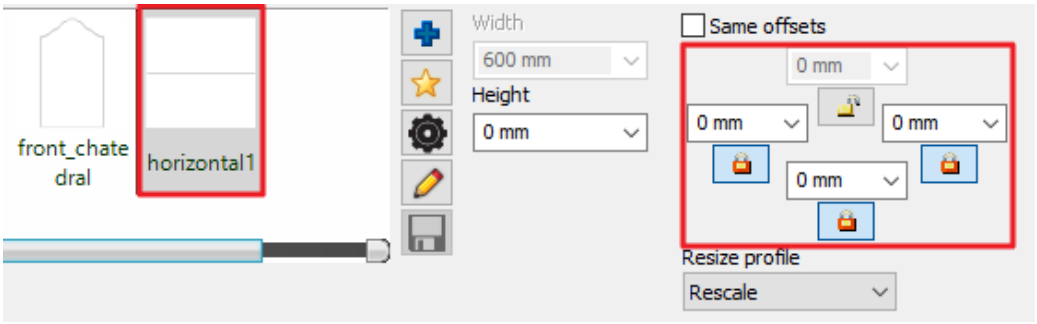
- Let's create the front with the *Pine_011* material. It can be done by selecting the second vertical tab on the Frontal profile tab and here choose *Pine_011* material.



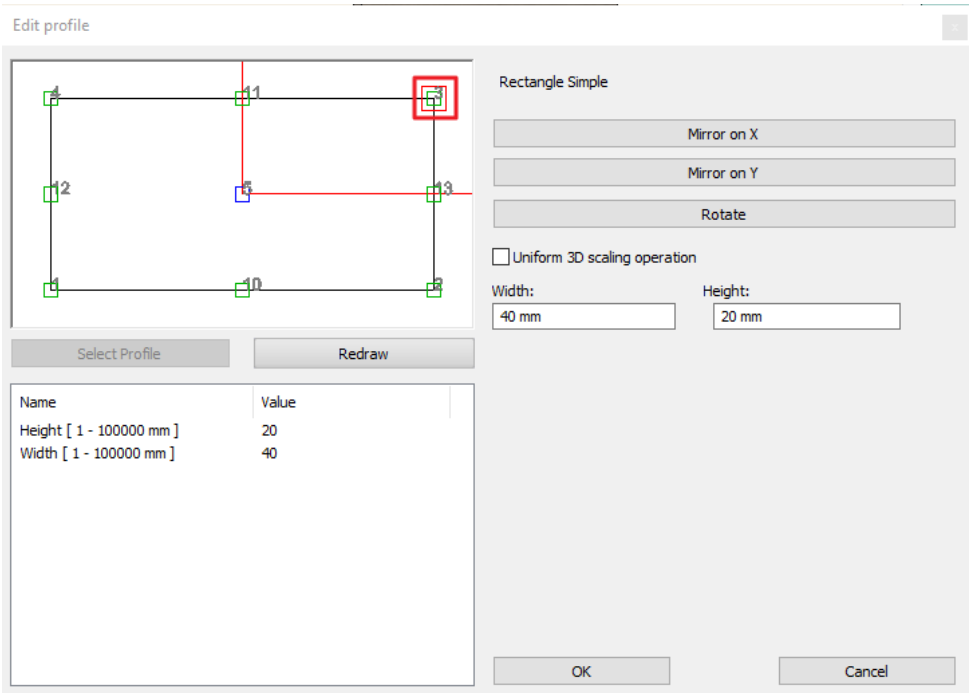
- After this save the new front with another name: *front with hidden handle 01 – pine*

  Let's create the other two alternatives. It will have the handle at the bottom of the front. The easiest way to do so is to modify the position of the subtracted and added profiles.

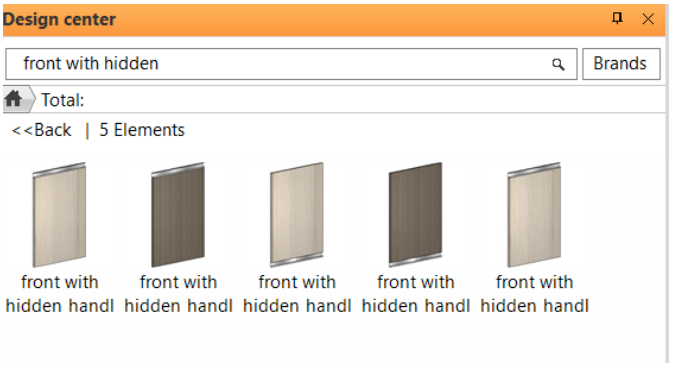
- Click on the Subtracted profile tab and open the upper lock and close the one at the bottom.



- After this, modify the reference point of the section profile to the upper right corner by clicking on the cogwheel icon on the second vertical tab on the left.

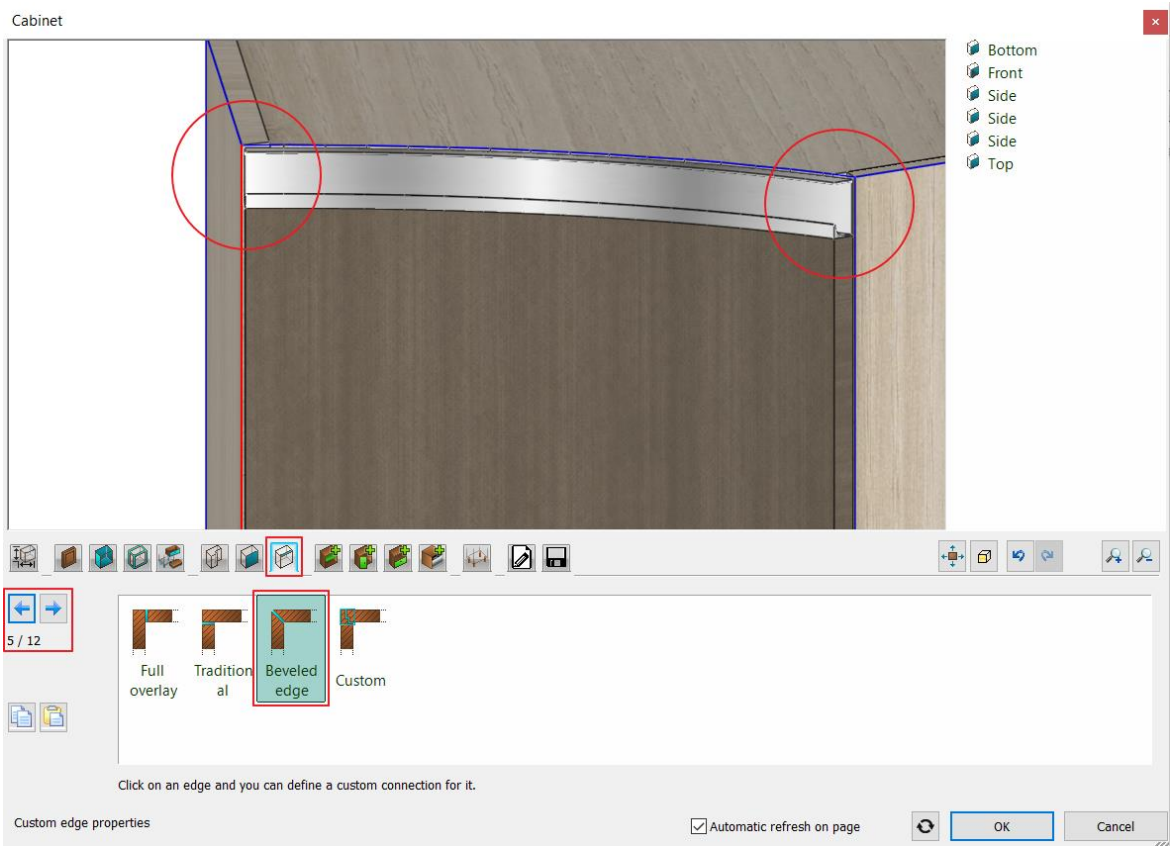


- Repeat these modifications on the Add profile tab.
- Save this front with another name: *front with hidden handle 02 - pine*
- After this, modify the material to *Old_Ashtree* on the first tab, then save it with another name on the last tab: *front with hidden handle 02 - ashtree*.
- As a last step, change the fronts on the cabinets to the appropriate one. This can be done by selecting the front in the Design Center and with the drag and drop method place it to the cabinet. This method, however, will only modify the default fronts of the cabinet. If you would like to modify a front which is not a default one, you can do it by selecting it in the Cabinet dialog window.



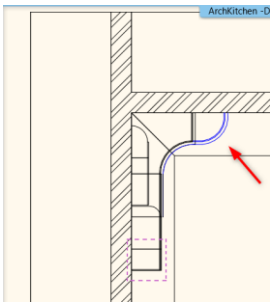
For curved elements, we need to modify the panel connections so that the hidden handle does not cut into the side panels.

- Select the curved element, then go to Properties.
- Go to the Custom Edge Properties tab and use the arrow keys to select the two edges you want to modify. Change the connection to Beveled Edge.



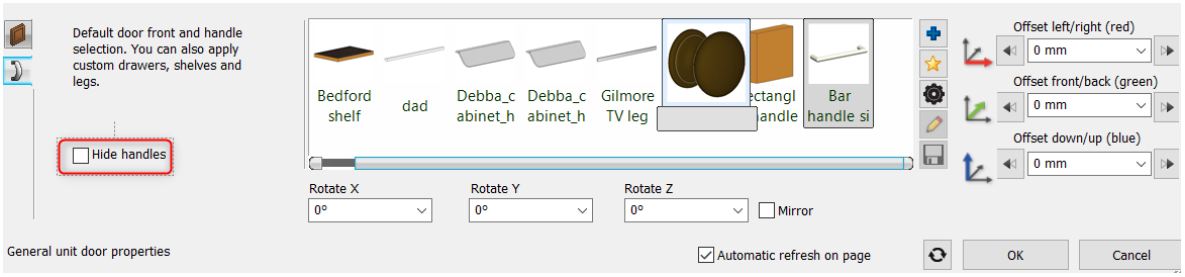
- Save the modified item with the Save button to overwrite the original cabinet.
- Also modify the panel settings on the curved element next to it, then save the furniture.

5.3. Creating a curved cabinet

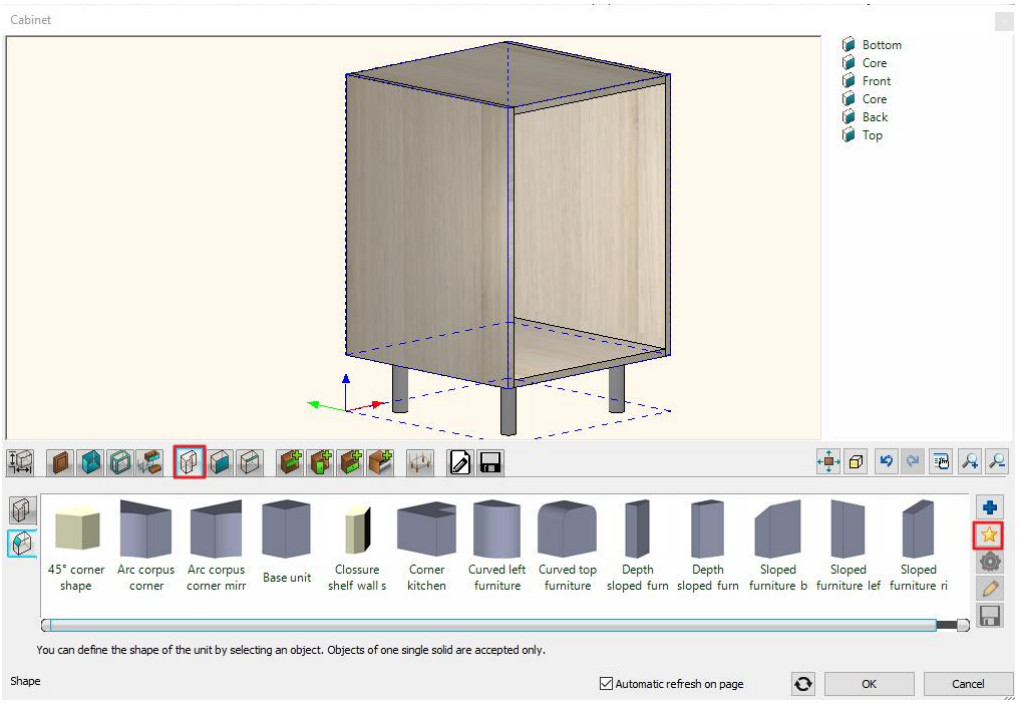


In ARCHLine.XP you have the possibility to create furniture with unique shapes. In this example we will create a custom shaped, curved cabinet to the place marked with blue lines on the layout.

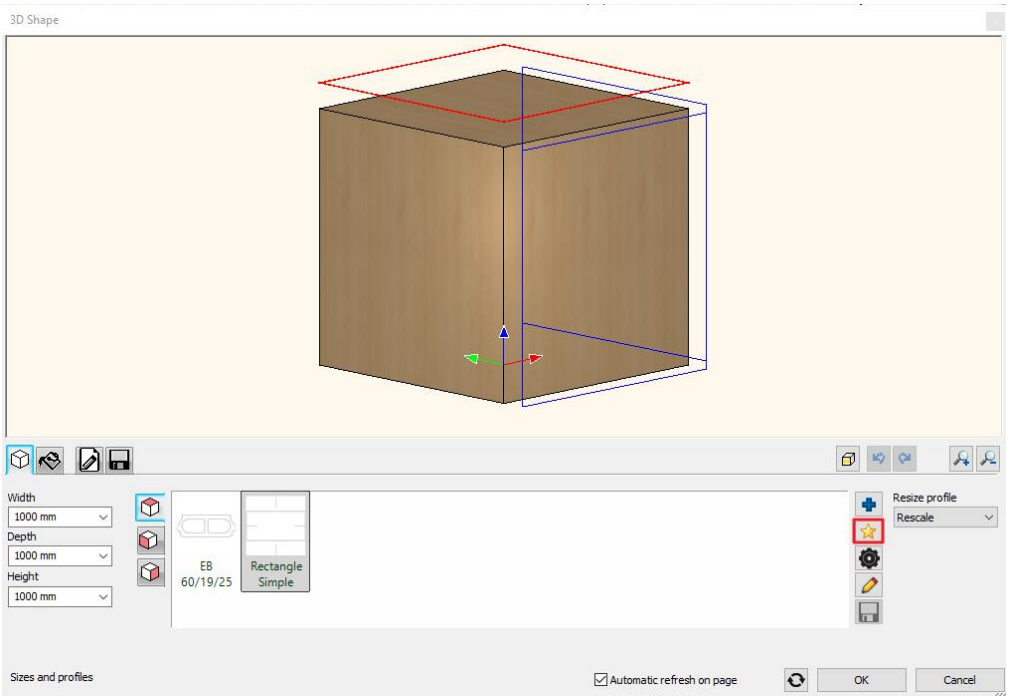
- Start the Cabinet command from the **Ribbon bar / Interior / KBB group.**
- First, set the default front of the cabinet on the second tab. This will be the *front with hidden handle 01 - ashtree.*
- Hide the default handle since the chosen front already has built-in handles. This can be done on the second vertical tab on the left.



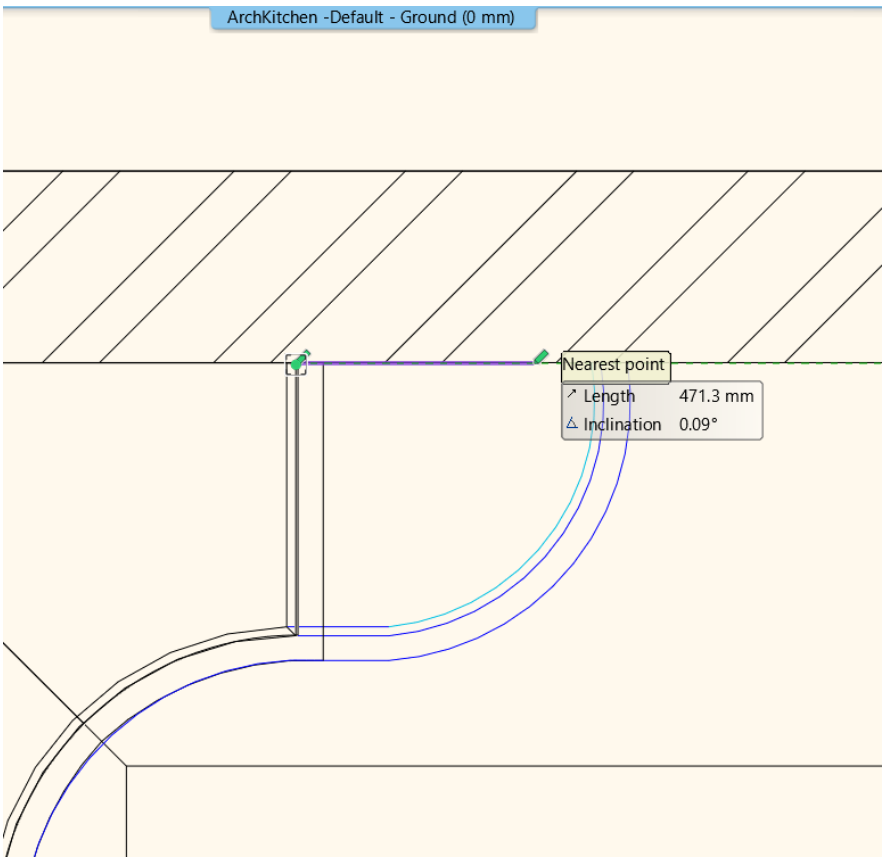
- Set the default side panels of the cabinet on the third tab. This will be the *Old ashtree front*.
- On the sixth tab you can select the shape of the new cabinet. Choose the custom option here. On the appearing tab click on the star icon on the right to create a new shape.



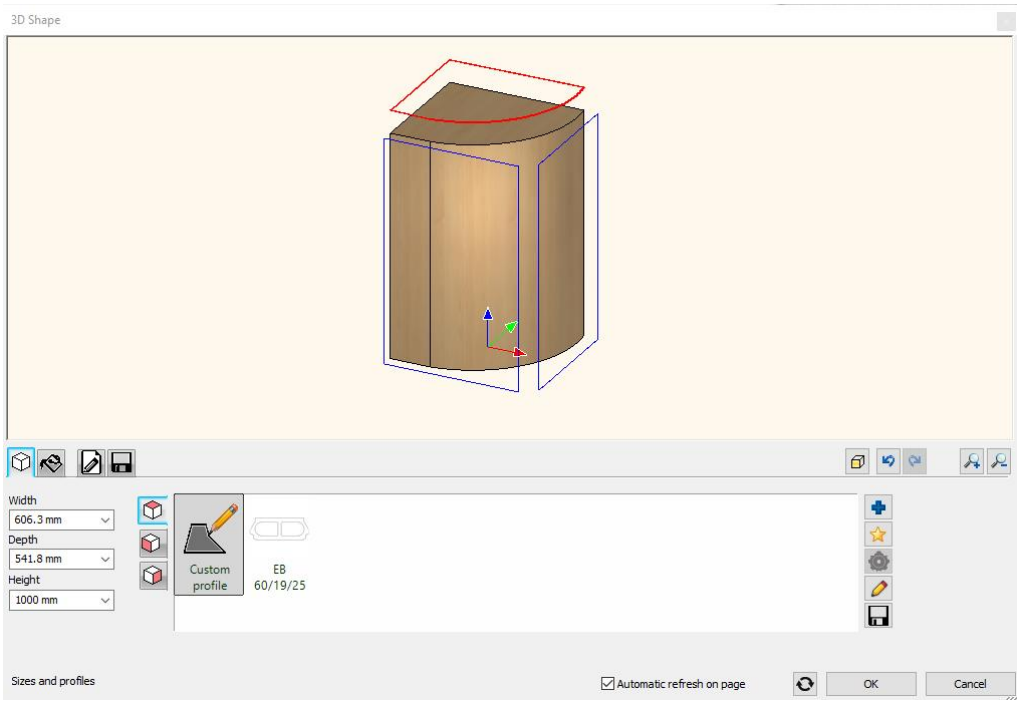
- We will create the new shape of the cabinet using the 3D shape tool. You can edit the default solid cube with the help of three profiles (front, side and top view). The active profile is always the red one. In this case the top profile should be the active one. Click on the star icon to define the profile.



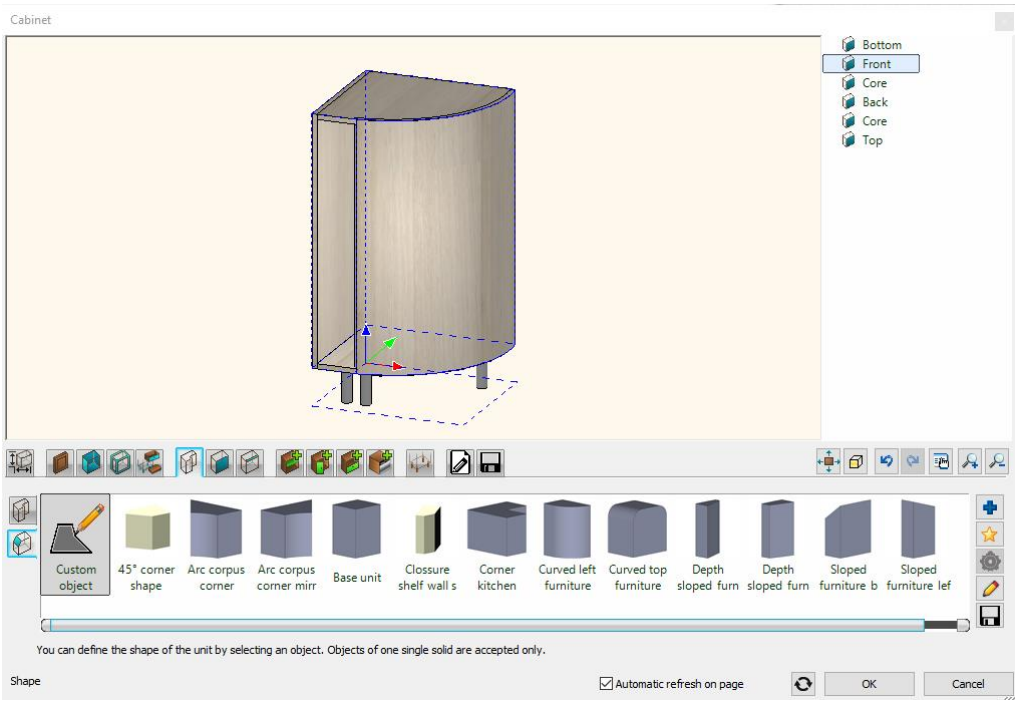
- The command automatically activates the 2D layout, where you can draw the shape of the cabinet along the blue line.



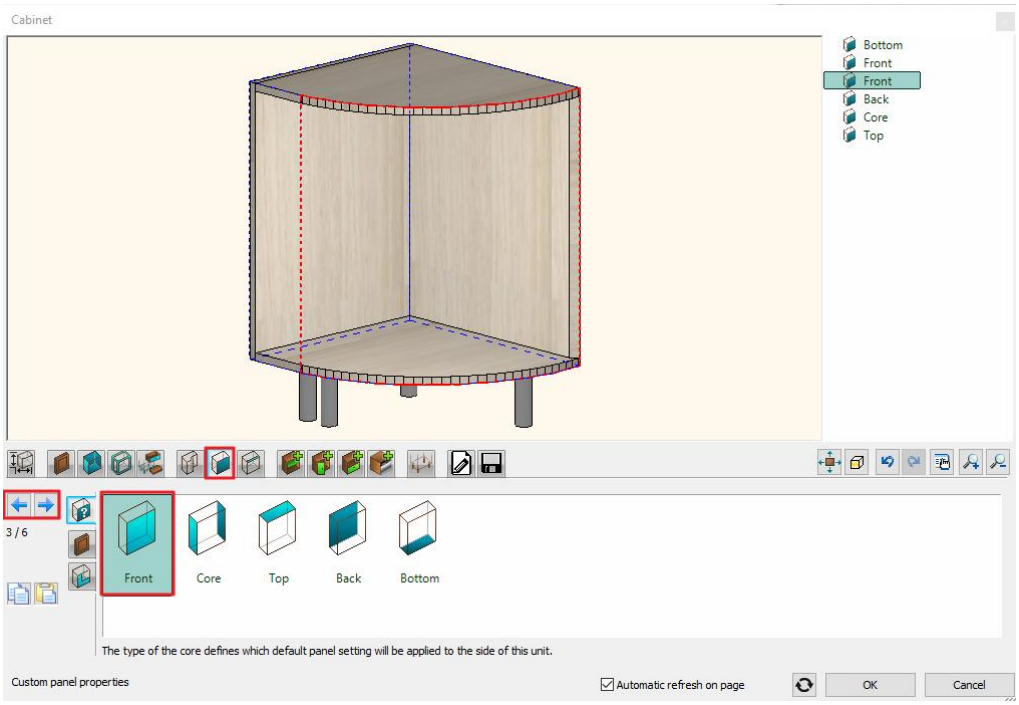
- When you have finished drawing, click on the Close button on the Ribbon bar. The new top profile is automatically engraved on the top of default cube, and now it is modified to the desired shape.



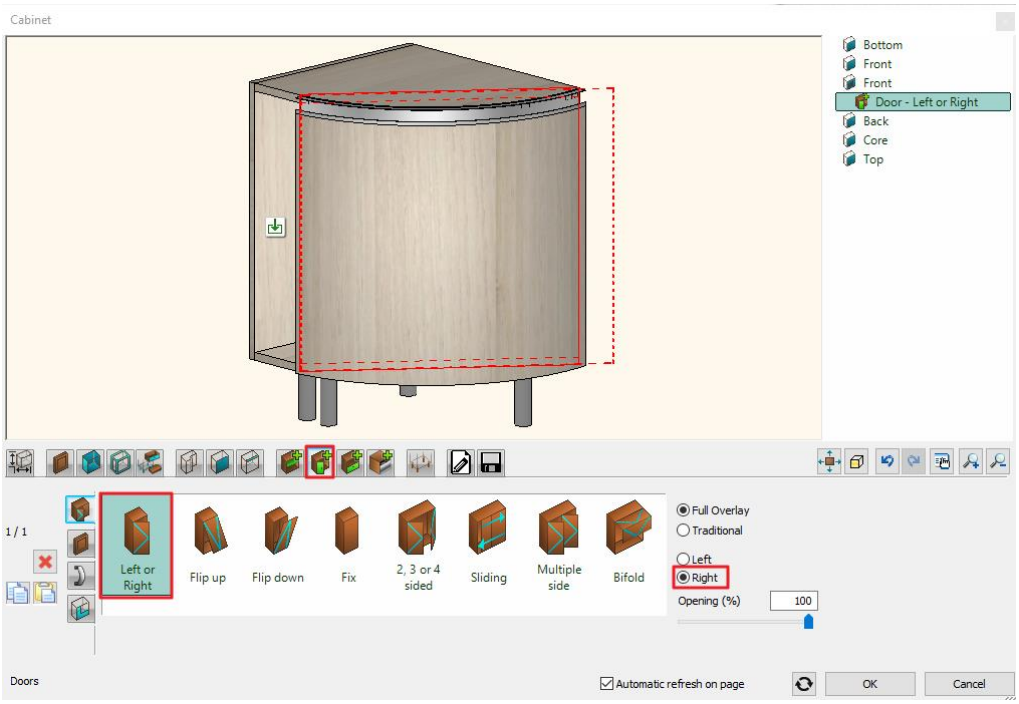
- Press the OK button and the program switches back to the cabinet dialog, where the cabinet is created from the customized shape.



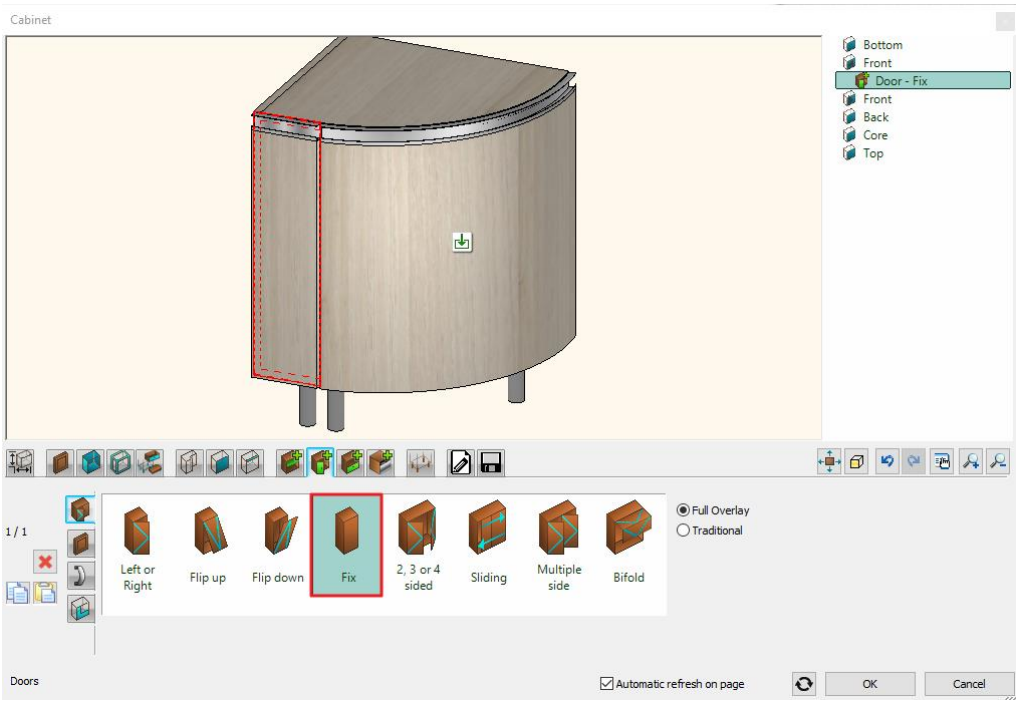
- Click on the first tab and set the dimensions. The total height of the cabinet is 850 mm, the carcass height is 700 mm, and the space for legs is 150 mm.
- On the seventh tab you can customize the panel properties. This means that you can change flexibly the type of the panels, so a you can make a front panel from a side panel; or a top panel can be turned into a back panel. This is useful in situations like this one.
  In the next step we will modify the curved side panel of the cabinet to a front; so, a door can be assigned to it. Navigate with the blue arrows on the left side until the color of the contour of the curved panel is marked with red. After this, select the Front type from the options below.



- Click on the Doors tab and assign a door to the curved part and set its opening direction to the right.



- After this, click on the other front and add a fix door.

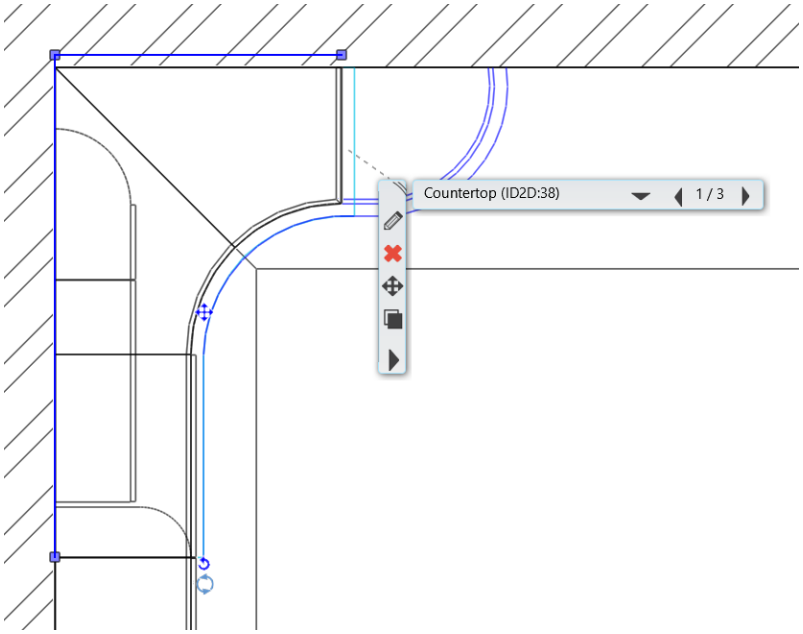


- On the penultimate tab, switch off the automatic dimensioning.
- As a last step, save the cabinet to the library.
- Close the dialog and place the cabinet.
- You should have a similar result as the picture below.

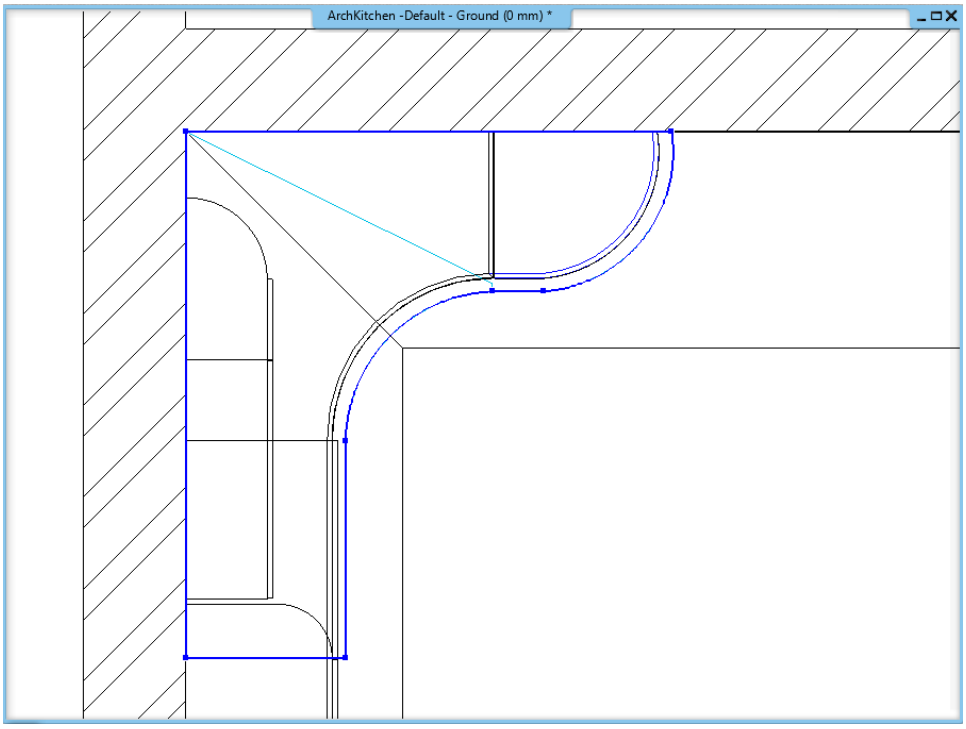
5.3.1. Creating a curved countertop

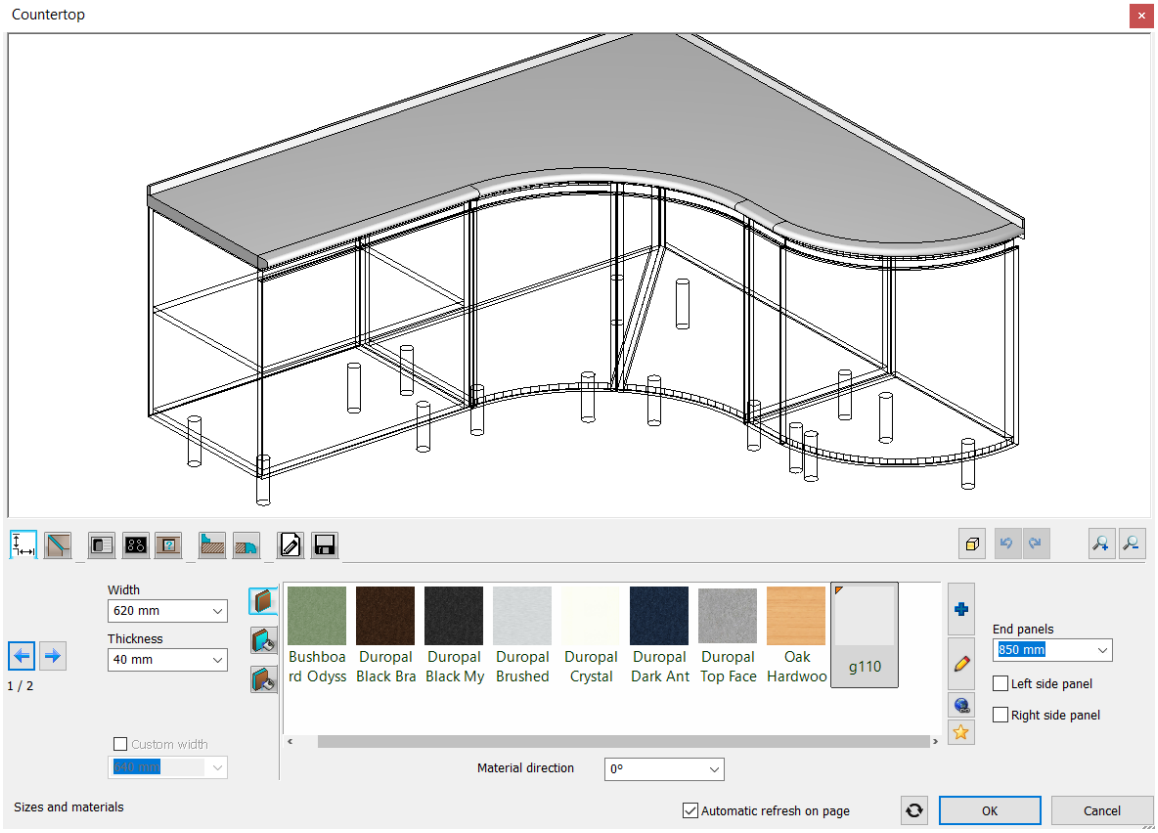
In the following, we will create the countertop. In order to fit to the kitchen cabinets, you have to turn few of its edges into curved ones.

- Activate the floor plan window and select the existing worksheet, then Component mode from the Local menu. Component mode allows you to edit each side of the element flexibly, move nodes around or insert new ones.



- In Component mode adjust the contour of the countertop to the blue line by moving and inserting nodes, and turning edges into curved ones. You should get a final result similar to the picture below.

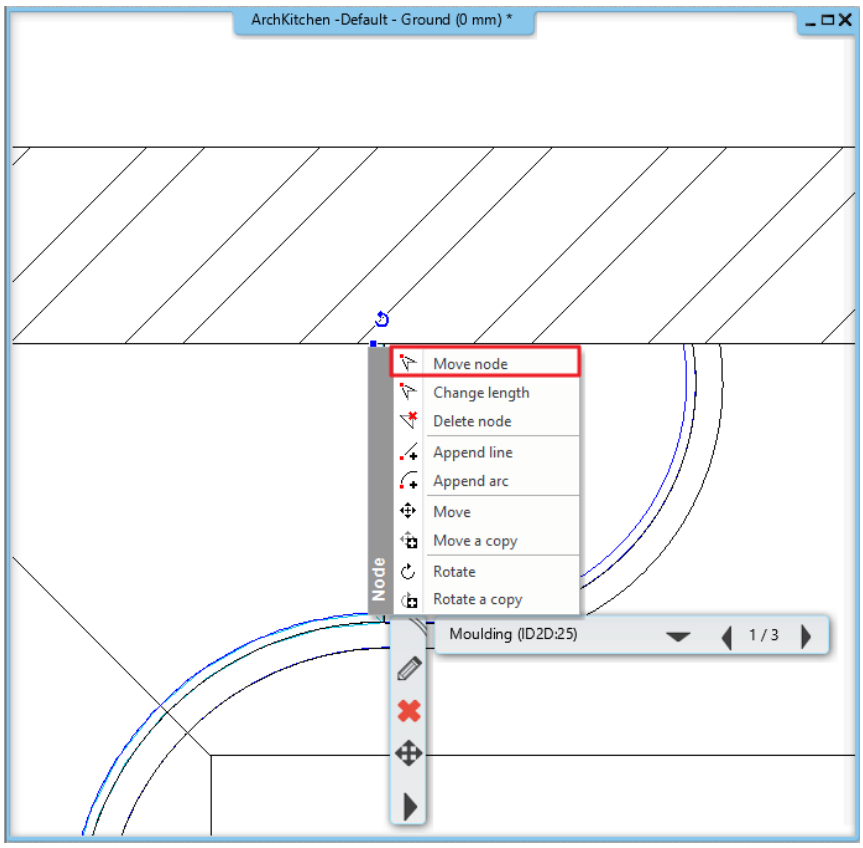




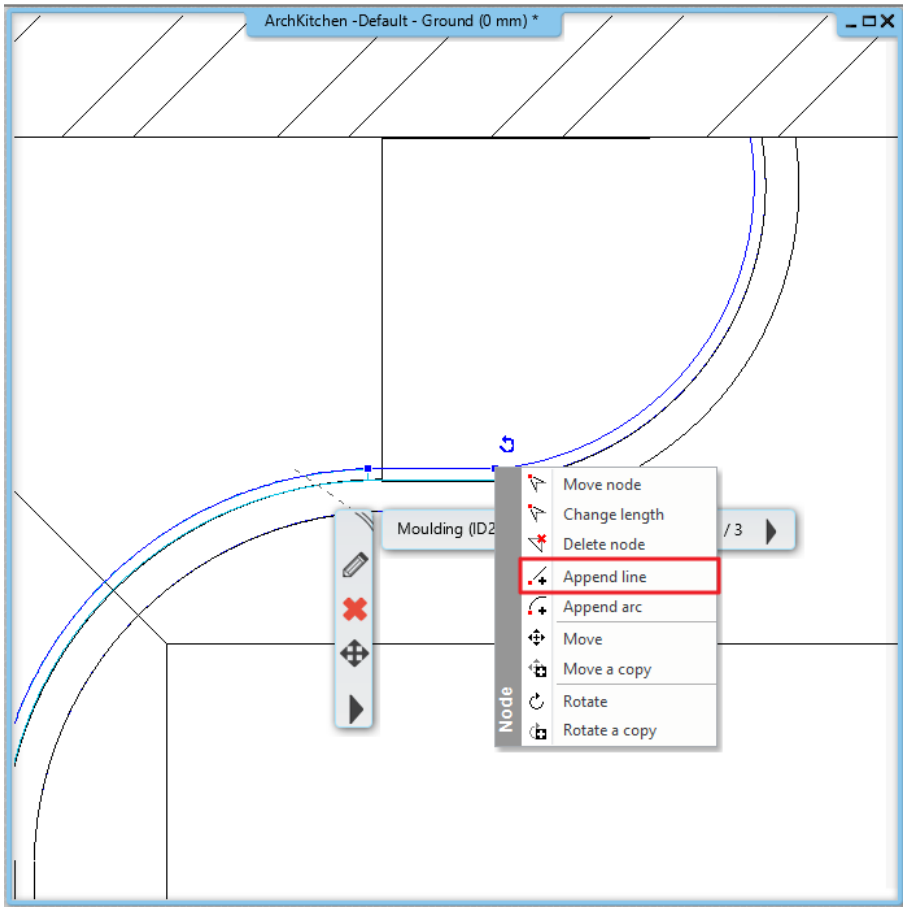
5.3.2. Modifying the plinth

In the next step we will adjust the plinth to the curved cabinet.

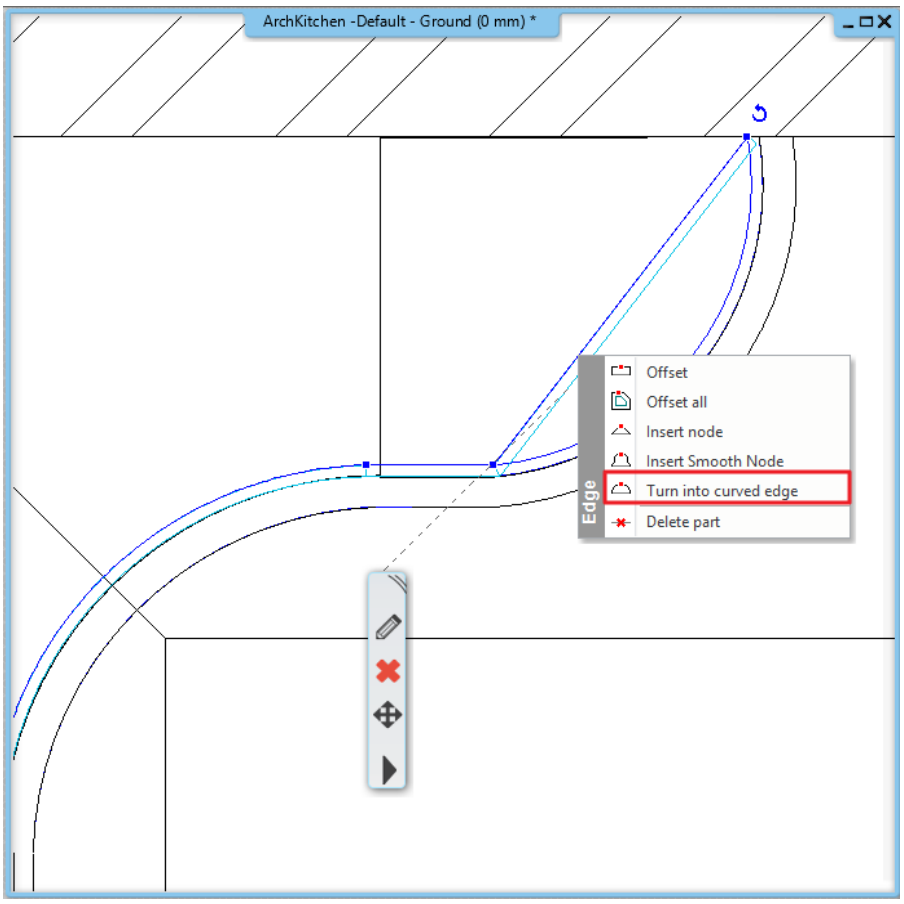
- Activate the floorplan window.
- Click on the last node of the plinth and in the appearing edge menu select the *Move node* option.



- Move it to the beginning to the curved part, then click on it again and select the *Append line* option from the appearing menu.



- Adjust the endpoint to the end of the curved part, then by clicking on the new part select the *Turn into curved edge* option from the appearing menu. Adjust the arc to the blue line.

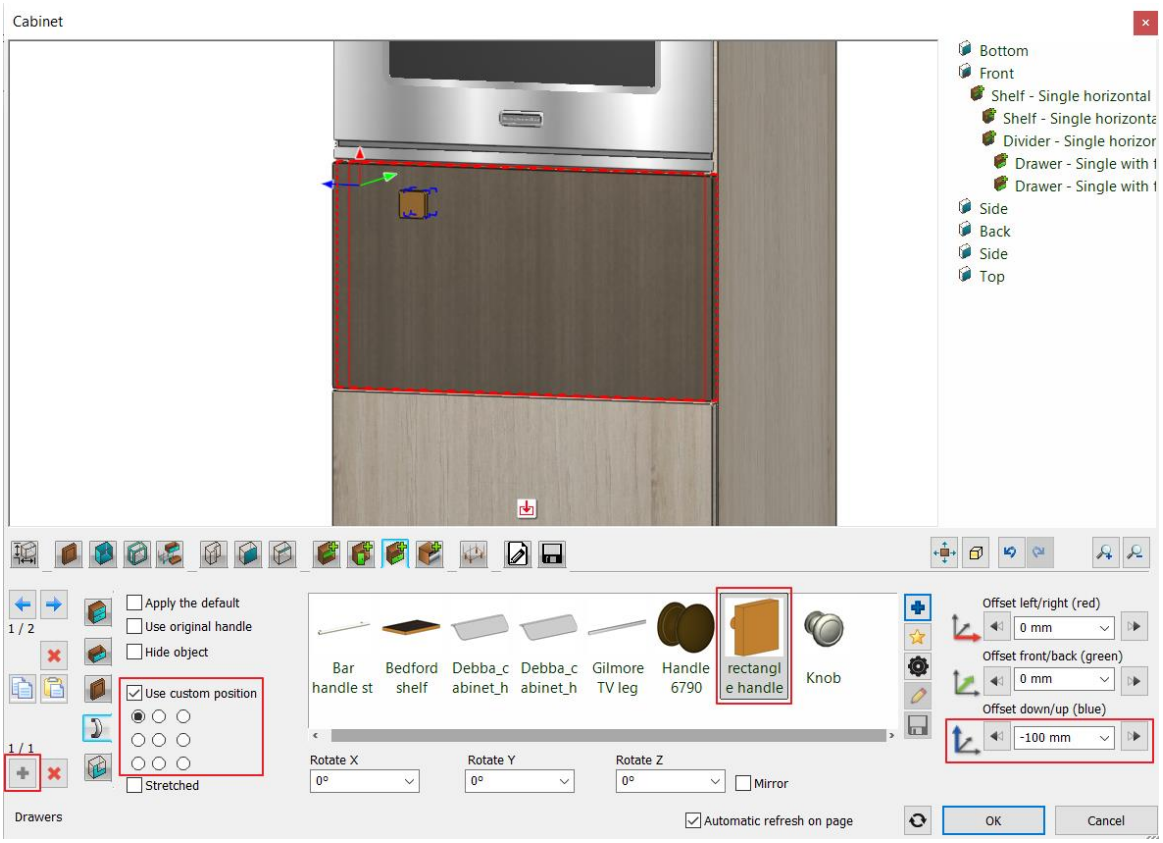


5.4. Modify fronts

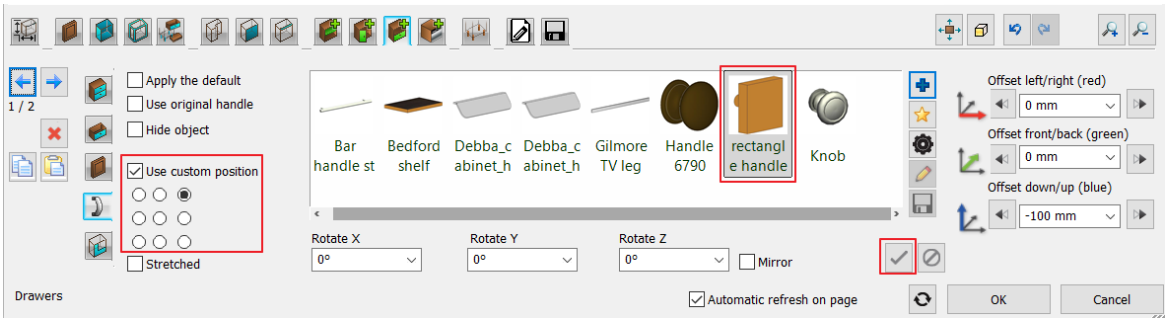
5.4.1. Drawers with multiple handles

KBB furniture fronts can accommodate more than one handle, so you can add different handles to the same drawer or door.

- Select the drawer cabinet you created above and enter the editor.
- Select the top drawer by ALT+clicking on it, then go to the Door front tab from the horizontal tabs and select the Pine011 front, then go to the Handle tab.
- Uncheck the “Apply the default” option and then select the rectangle handle. Use custom position and select the top left position. Change the Offset down/up value to -100 mm.
- Click the plus button to add the second handle.



- Select the same handle, move the position to the top right position and add the item by clicking on the plus button.



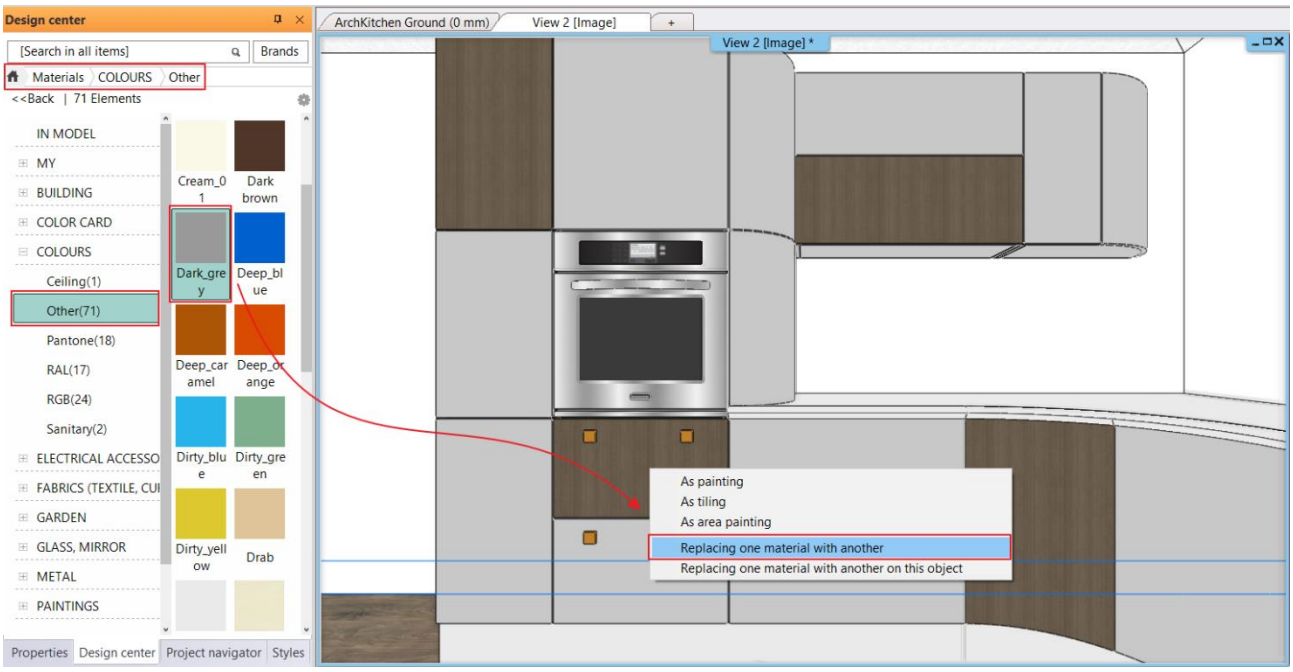
You can copy the finished handles to another drawer in a single movement.

- Standing on the two-handle drawer, select the copy button, then select the bottom drawer and press the apply button. On the front tab, uncheck the “Apply the default” option and select Old ashtree front.

5.4.2. Change the color of fronts

Creating new fronts is a time-consuming process. It is possible to change the color of the fronts with a much quicker solution.

- Go to the Design Centre and select Materials - Colors - Other. Find the Grey and Dark Grey colors.
- Using the drag and drop method, drag the Grey material onto one of the light-colored fronts and select the “Replacing one material with another” option.
- Select the Dark Grey material and drag it onto the Dark Brown front. To replace, select the same option as for the grey.



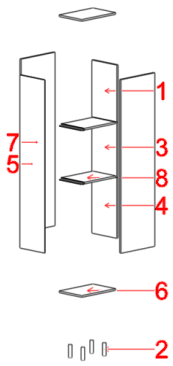
5.5. Creating documentation

5.5.1. Create an exploded view

The exploded view helps to understand the structure of the cabinets and provides information to facilitate the manufacturing process. The exploded view only works for cabinets created with the KBB tool.

- Select Ribbon bar / Documentation / Quantity take-off / Cabinet exploded view / Create and select one of the furniture items, or select the furniture and from the local menu click Cabinet exploded view from the local menu.

  The resulting diagram is free to edit and modify once you have entered the group.



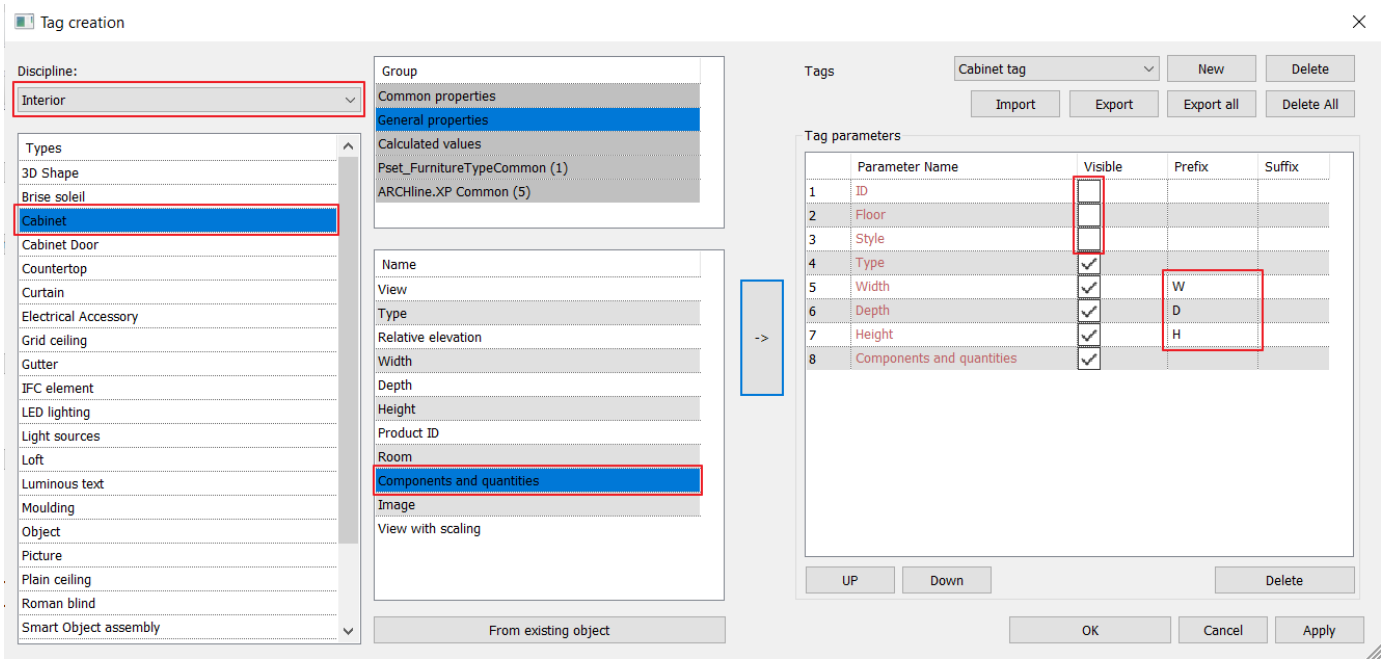
ID	Qty	Part
1	1	Pine011 front (396 mm x 656 mm x 20 mm)
2	4	Simple Circular Leg (40 mm x 150 mm x 40 mm)
3	1	Old_Ashtree fornt (396 mm x 636 mm x 20 mm)
4	1	Old_Ashtree fornt (396 mm x 696 mm x 20 mm)
5	1	Back Corpus Panel (396 mm x 1996 mm x 3 mm)
6	2	Arc cabinet side panel (360 mm x 537 mm x 20 mm)
7	2	Arc cabinet side panel (537 mm x 2000 mm x 20 mm)
8	2	Arc cabinet door (360 mm x 20 mm x 537 mm)

5.5.2. Create tags

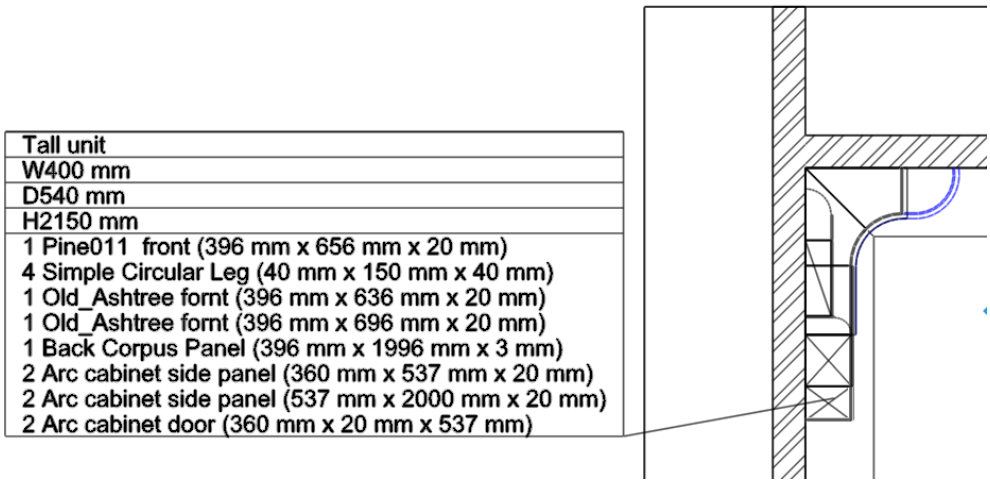
- Select Ribbon bar / Documentation / Tags / Create Tags.
- Select Interior from the Discipline and Cabinet from the Types.

Under Tag parameters, you can select which parameters the tag should list. You can turn off the visibility of existing parameters or add new ones from the middle list.

- Turn off the visibility of the ID, Floor and Style parameters and add the Components and quantities property. Fill in the Prefix column for the Width, Depth, Height parameters with the prefixes W, D, H.
- Use the Apply and OK buttons to confirm the settings, then select Menu Ribbon / Tags / Place Tags.



- Click OK to accept the pop-up window, which will show the parameters you have previously set.
- In the next window you can format the style of the tags. Now click OK to accept.
- Select the cabinet to be tagged and place the tag on the floor plan.

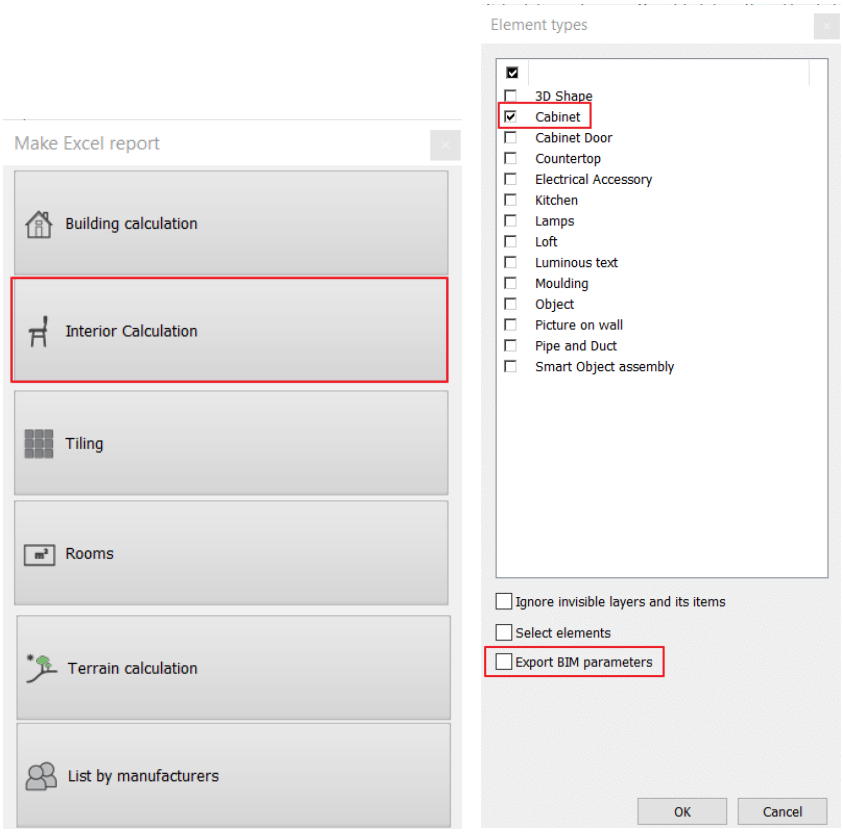


There is a live connection between the tag and the furniture, if you change the parameters of the furniture, the tag will also be changed by selecting Update Tag from the Local menu of the tag.

5.5.3. Creating an Excel list

At the end of the work, we can create the Excel file, which is necessary for the production of the cabinets, with a few clicks.

- Start the **Ribbon bar / Documentation / Quantity take-off / Excel list** command.
- In the appearing dialog select the Interior Calculation option.



- From the appearing list, select the types to be listed, in this case *Cabinet*, and turn off the export of BIM parameters.
- Finally save the Excel worksheet, which opens automatically if Excel is installed on your computer.

In the Furniture detailed tab, you will find the components of each cabinet, the number of pieces and their dimensions.

Cabinet details list (Overall dimensions)

Name	Copies	Components	Type	Width [mm]	Height [mm]	Thickness [mm]
Curved counter part 2			**Base unit**	715	1140	850
	4	**Simple Circular Leg**		40	**150**	40
	1	**Old_Ashtree fornt**		467	**696**	20
	1	**Arc cabinet side panel**		539	**700**	20
	1	**Arc cabinet side panel**		701	**1092**	20
	1	**Arc cabinet side panel**		1012	**700**	20
	1	**Arc cabinet side panel**		1092	**680**	20
2 door curved clossure wall cabinet 2			**Wall unit**	300	600	660
	1	**Old_Ashtree fornt**		296	**656**	20
	1	**Old_Ashtree fornt**		467	**656**	20
	1	**Back Corpus Panel**		596	**656**	3
	2	**Arc cabinet side panel**		297	**580**	20
	1	**Arc cabinet side panel**		297	**660**	20
Curved counter part 1			**Base unit**	1140	716	850
	1	**Pine011 front**		467	**696**	20
	4	**Simple Circular Leg**		40	**150**	40
	1	**Arc cabinet side panel**		540	**700**	20
	1	**Arc cabinet side panel**		984	**700**	20
	2	**Arc cabinet side panel**		1072	**682**	20
	1	**Arc cabinet side panel**		1120	**700**	20

Project properties | Furniture summary | **Furniture detailed** | Summary

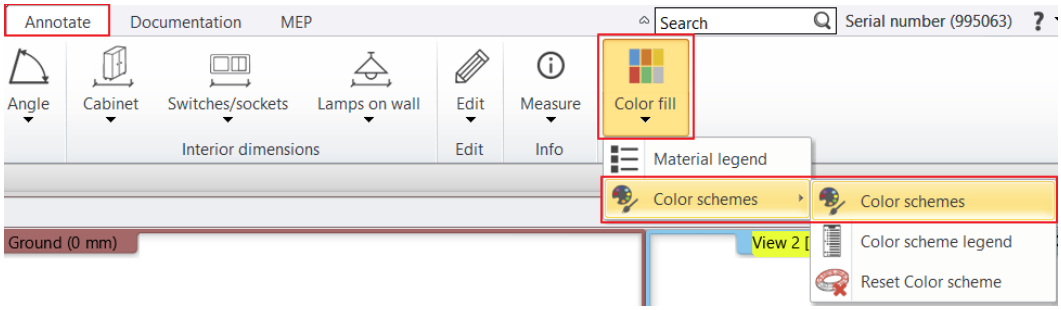
And in the Summary tab, you can see how many m2 of surface area will be needed from the given panels and fronts.

5.5.4. Using color schemes

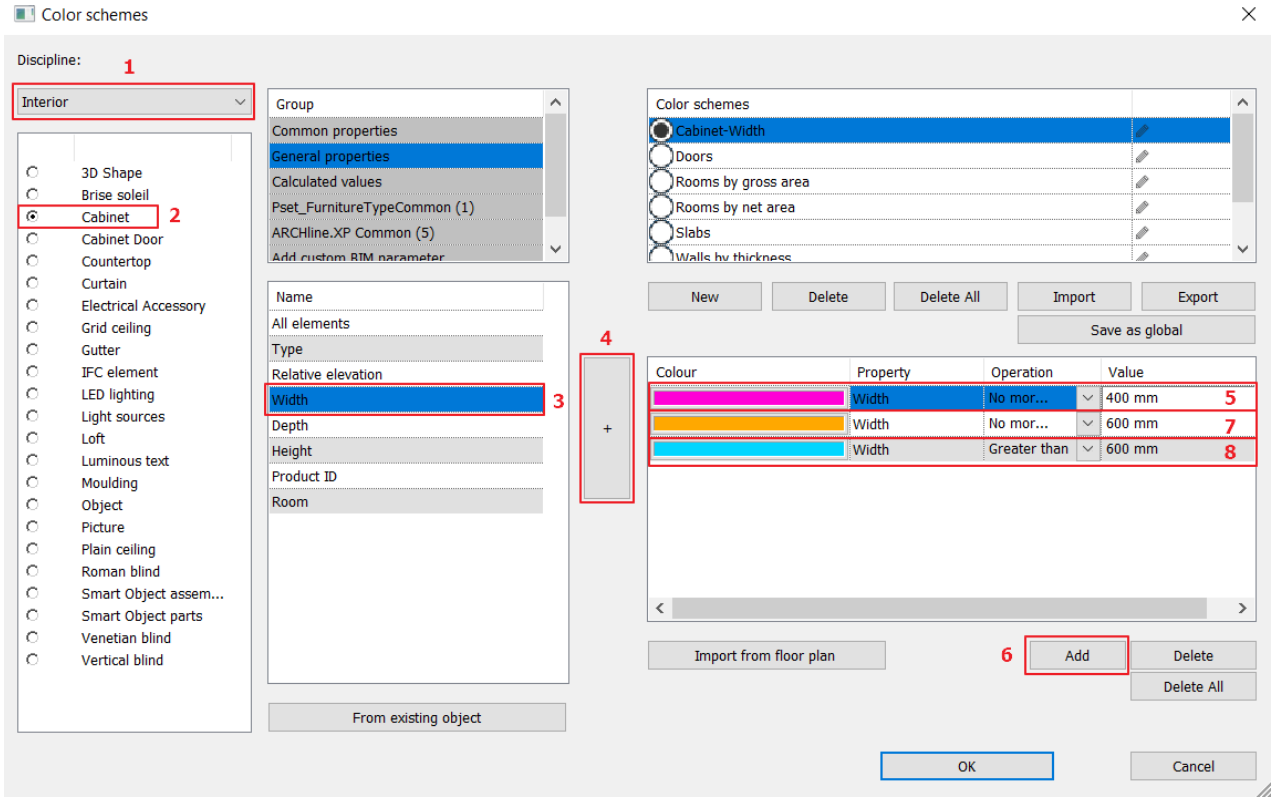
Color scheme is a graphical representation that is used to group elements or spaces according to any of their properties and to present them in a way that is easy to understand. A color scheme is based on an element type, its parameter and its assigned value. The color schemes by property can be saved in templates, so that by changing the templates, the model can be presented according to different aspects.
The color schemes help to understand the content of the project.

In this project, we will group and color the cabinets according to their width: cabinets 400 mm or narrower, 600 mm or narrower, and 600 mm or wider will be displayed in a different color.

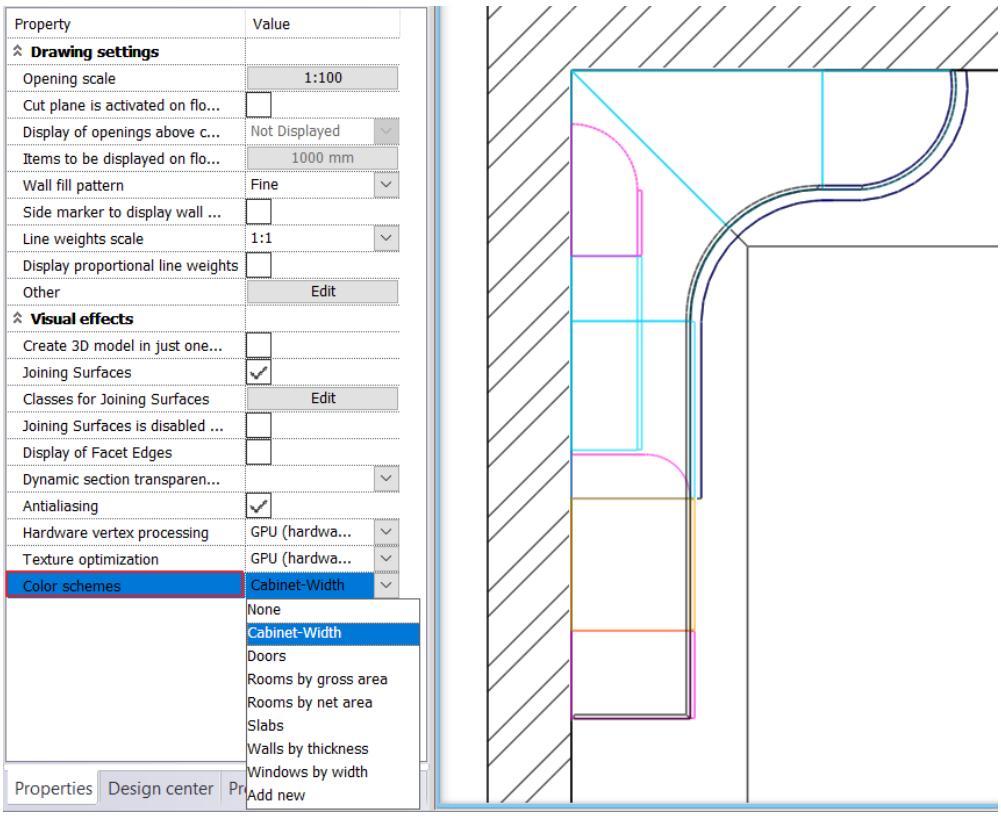
- Activate the floor plan.
- Select Ribbon bar / Annotate / Color Fill / Color schemes / Color schemes command.



- In the pop-up window, select Interior (1) from the Discipline, and within that select Cabinet (2). Select the Width parameter (3) from the middle list and add it by clicking on the button (4).
- Select the No more than action, then enter the value 400 mm. Select a color of your choice. (5)
- Select Add and create the following line: up to 600 mm. Select a color of your choice. (6)
- Finally, create the last line: Greater than 600 mm. Select a color of your choice. (7)

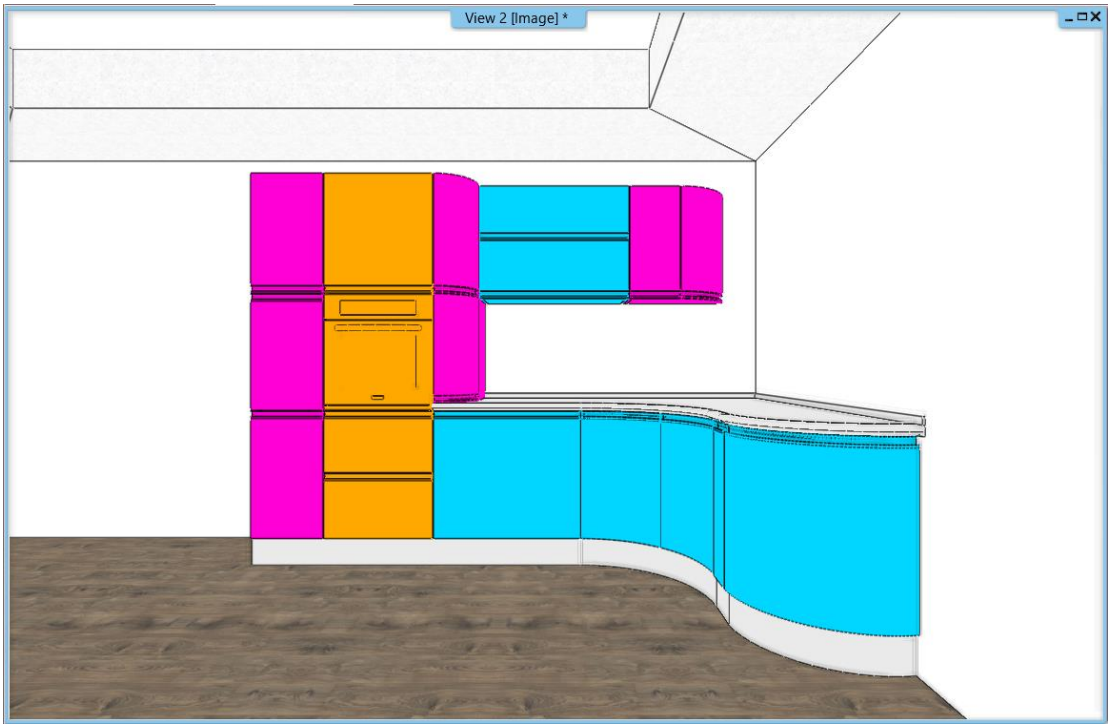


The outlines of the cabinets on the floor plan have been changed based on the color schemes. In the side menu you can change or turn off the color schemes.



Color schemes can also be displayed in the 3D view.

Activate the 3D window and select Cabinet-Width from the side menu under Color schemes.



Workshop 6: Upholstered furniture based on profiles

6. Workshop: Upholstered furniture based on profiles

In this workshop, you will learn to use the ARCHLine.XP Smart Objects, allowing you to create custom upholstered furniture. During the training, you will become familiar with several functions and solutions, including the use of the Loft tool for creating furniture legs, the Smart Object parts tool for supporting the creation of seating surfaces and back panels, as well as Assembled object tool.

- Creating Esmeralda ottoman components
- Assemble Esmeralda ottoman
- Drawing profiles for Marseille chair
- Creating components of Marseille chair
- Assemble Marseille chair

- Open your browser and watch the video tutorial here.

Start

- Start ARCHLine.XP software on your computer.
- Click on New project button.

Save project

- Before starting your work, save it under a new name.
- Choose **File / Save project** command and enter your project name and save it under your preferred folder.

6.1. Esmeralda ottoman

During this workshop first, we create Esmeralda ottoman, as it is in the picture below. Before doing anything, let's check how many parts the ottoman has. There are three components such as:

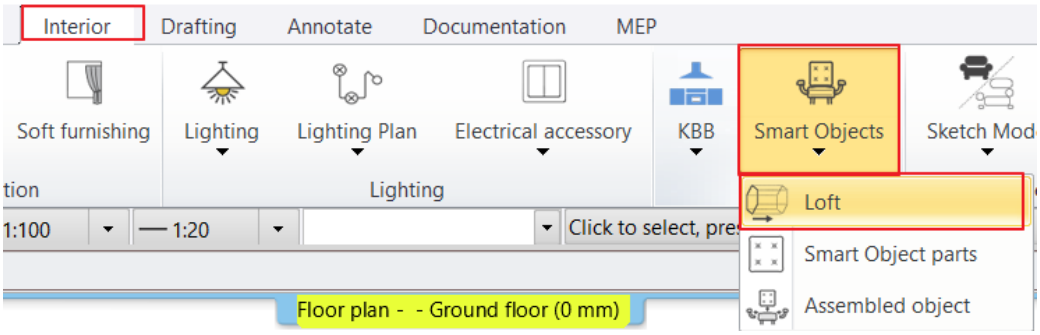
- legs,
- the base and
- cushioned seating.

After analyzing the furniture, you can start the design.

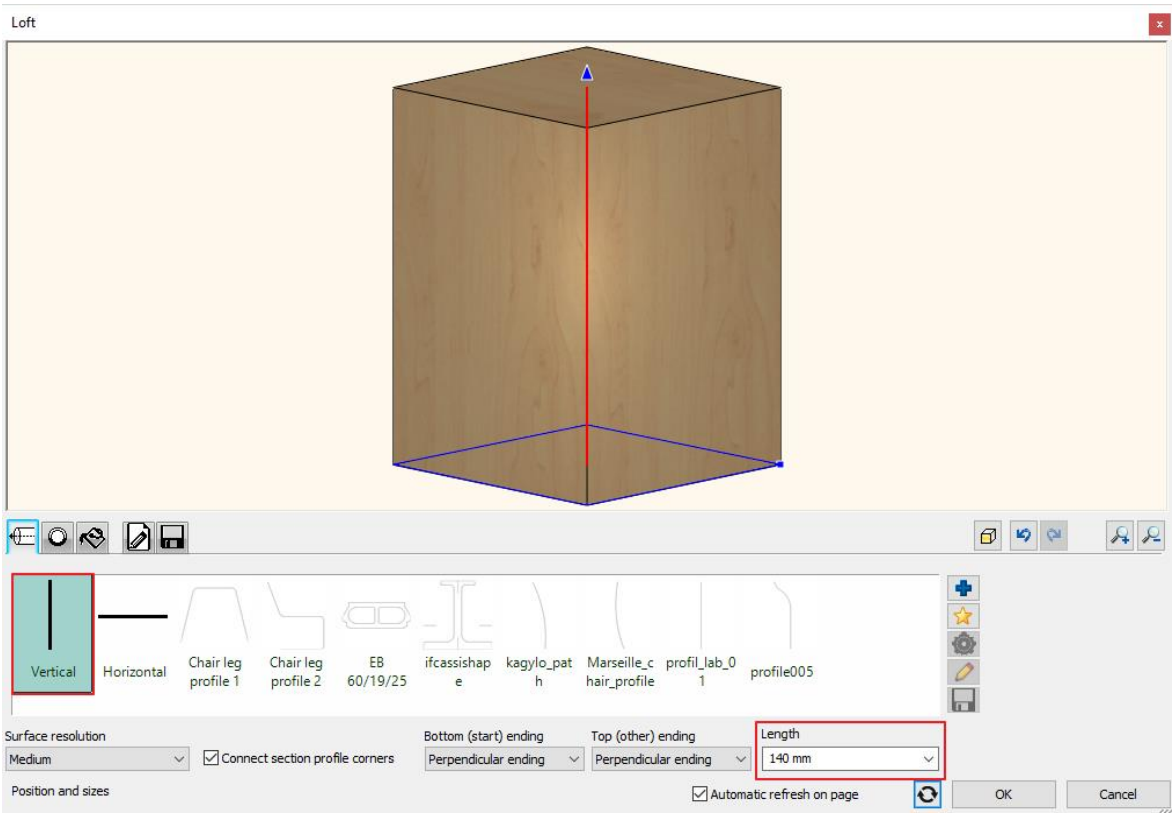
6.1.1. Creating Esmeralda legs

First, we create legs.
As you can see, these are particular legs, not a normal cuboid. Profiles on the top and at the bottom are different, and the whole 3D shape is slanted.

- Select from Ribbon menu / Interior / Smart Objects / Loft command. Now we use the Loft tool to create a 3D solid or surface in the space between several cross-sections. We pull a drawn cross-section profile all along a specified path for the lofted solid.

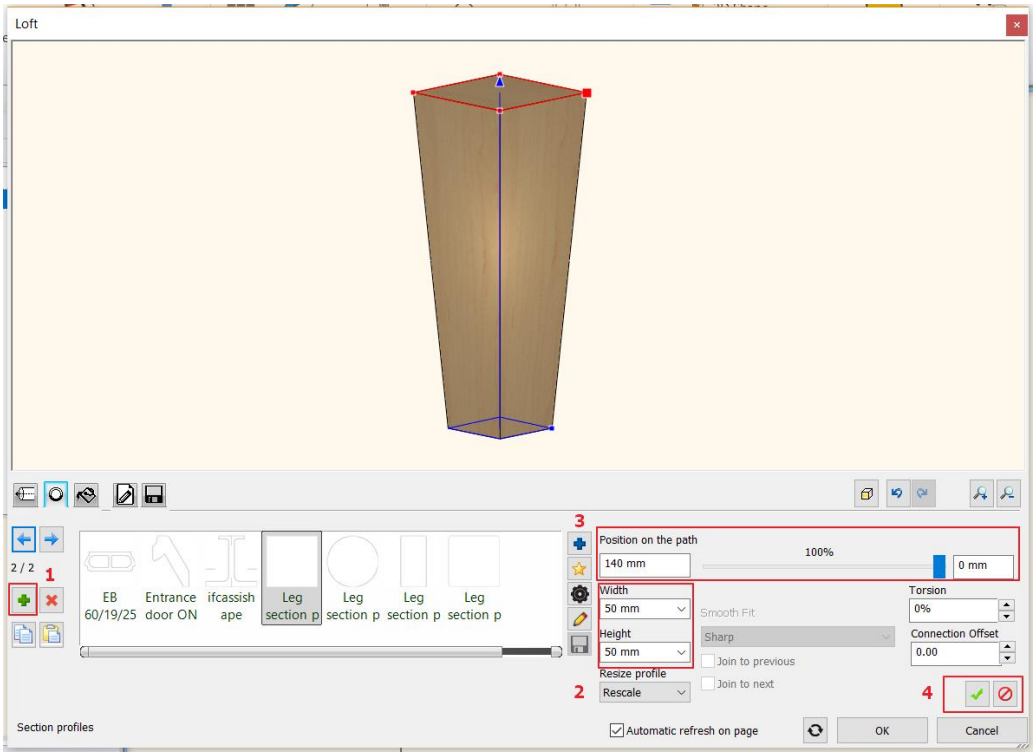


- The path is going to be a vertical profile. On the first tab, set the height to 140 mm.



On the second tab, define the section profiles.

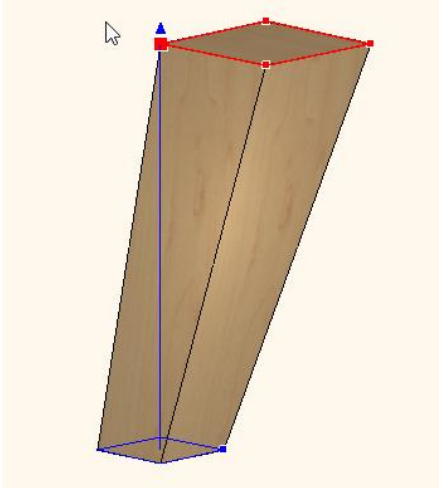
- The bottom profile is 30x30 mm rectangle. Enter the new width and heights values. Click on the refresh button to see the changes.
- Add the top section profile, by clicking on the green cross icon (1), then enter its values (width: 50; height:50 mm) (2). Now you have to define its position on the path. This profile is on the top; therefore, move the slider to the value 100% to the right side (3). Finally, click on the green tick to apply changes (4).



When we thoroughly checked the leg, we saw that the basic shape is a truncated pyramid, which has two vertical sides and two slanted sides. To get this shape, we have to modify the reference points of the profiles.

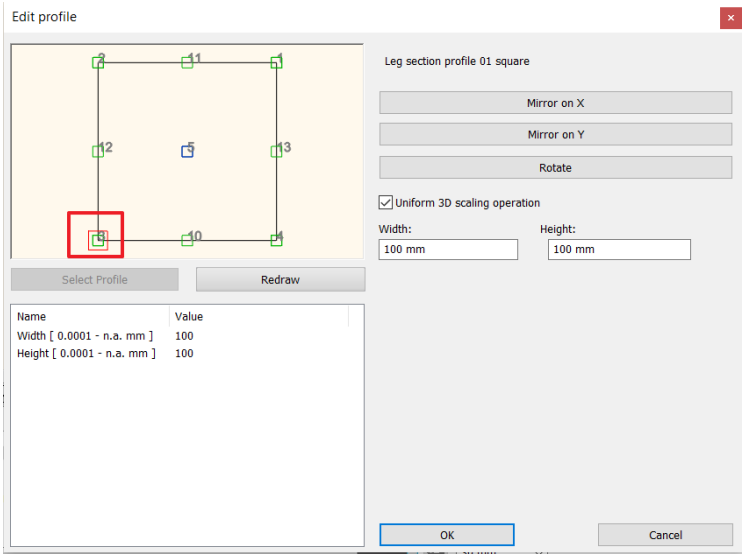
- Now the top profile is active as it is highlighted with red. So, if you click on the cogwheel, in the appearing “Edit profile” window you can designate the new reference point. That should be the left bottom corner. Now click on “Ok” to accept changes.

  Now in the “Loft” window, you can see that the center point of the bottom profile is connected with the reference point of the top profile. The section profile is pushed to the side, so we have to repeat the same at the bottom.



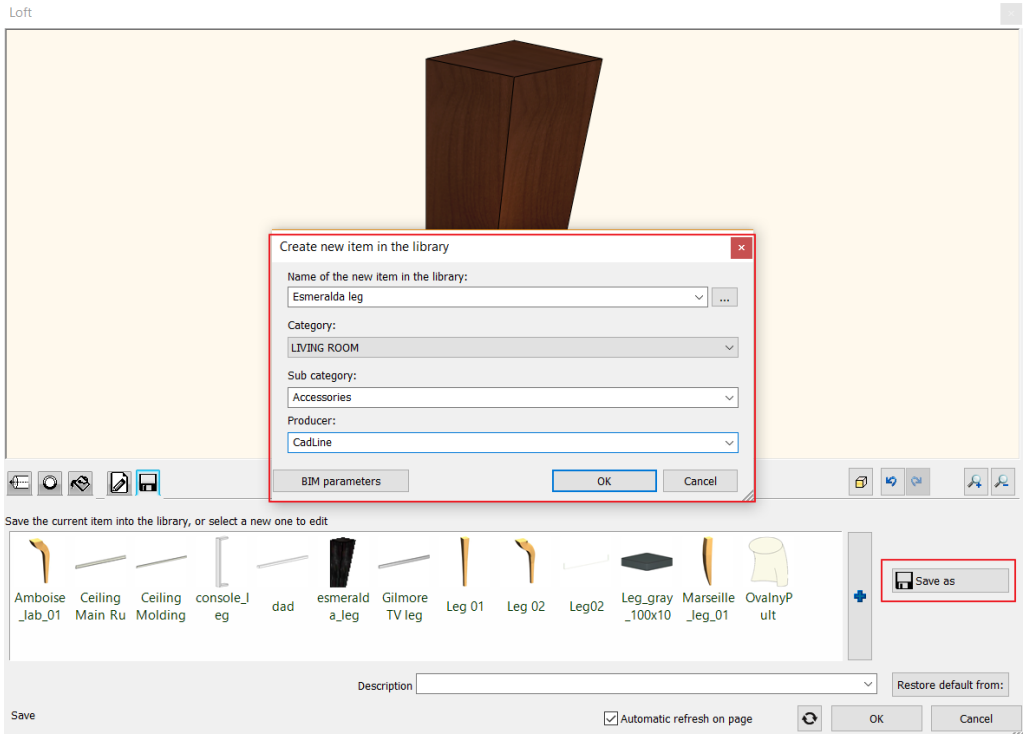
- Let’s change the bottom reference point. Click on the blue arrow to swap between profiles; the selected profile is activated and marked with red.

- Click on the profile properties and set the reference point. Here this should also be the bottom left corner point.



Now the 3D shape of the leg has the desired shape; two sides are vertical, others are slant.

- On the next tab, select the material. We use “*Egzot03*” for legs.
- On the next tab under “General settings” set the type of the representation in 2D. We recommend to use the Simplified version.
- Finally, save the leg. On the last tab by clicking on the “Save as “command, you can give the name, category, sub-category. In this case we recommend to use Living room as the main category, and **accessories for sub-category**. Components and other furniture parts are good to save under this section. If you like, you can enter the producer’s name here too.

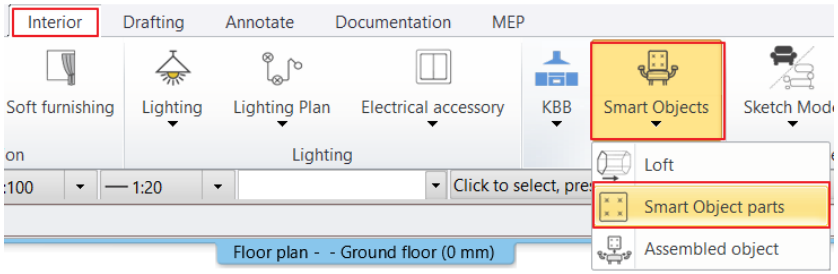


- Finally, place the leg on the floor plan.

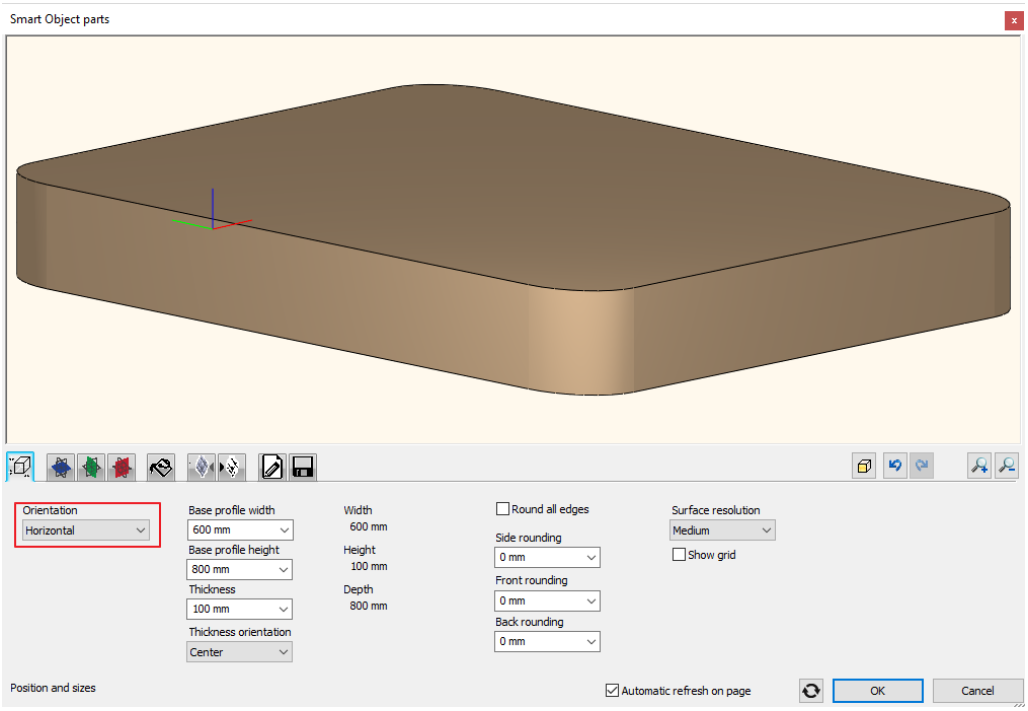
6.1.2. Create the base for Esmeralda ottoman

The next session is about to create the seat of the ottoman.

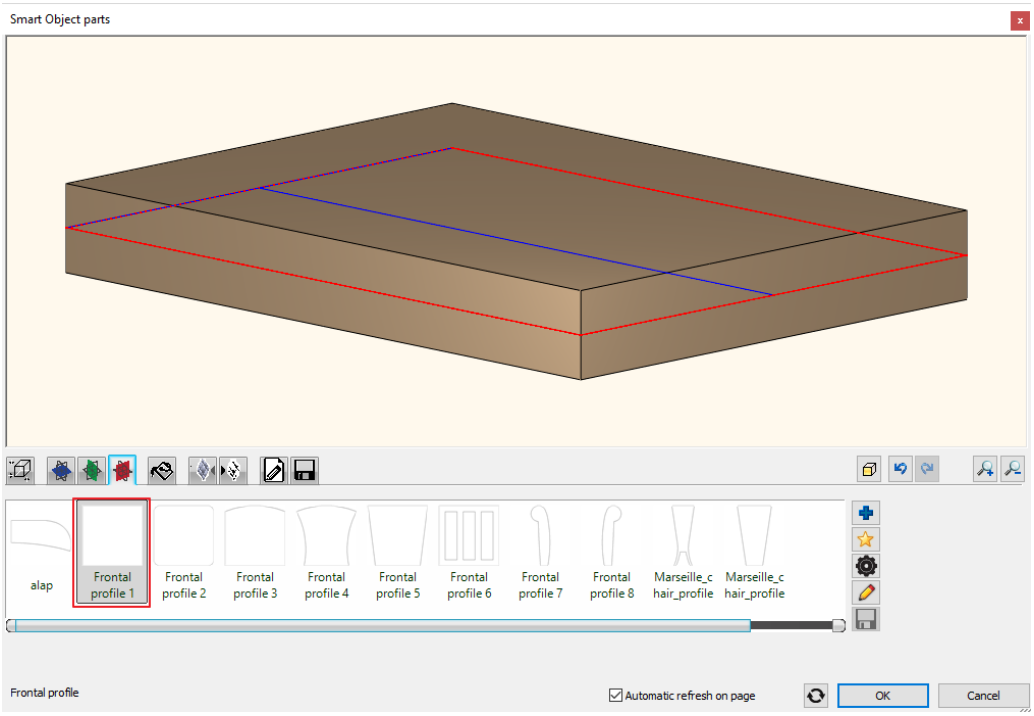
- For this use Ribbon menu / Interior / Smart Objects and choose Smart Object parts command.



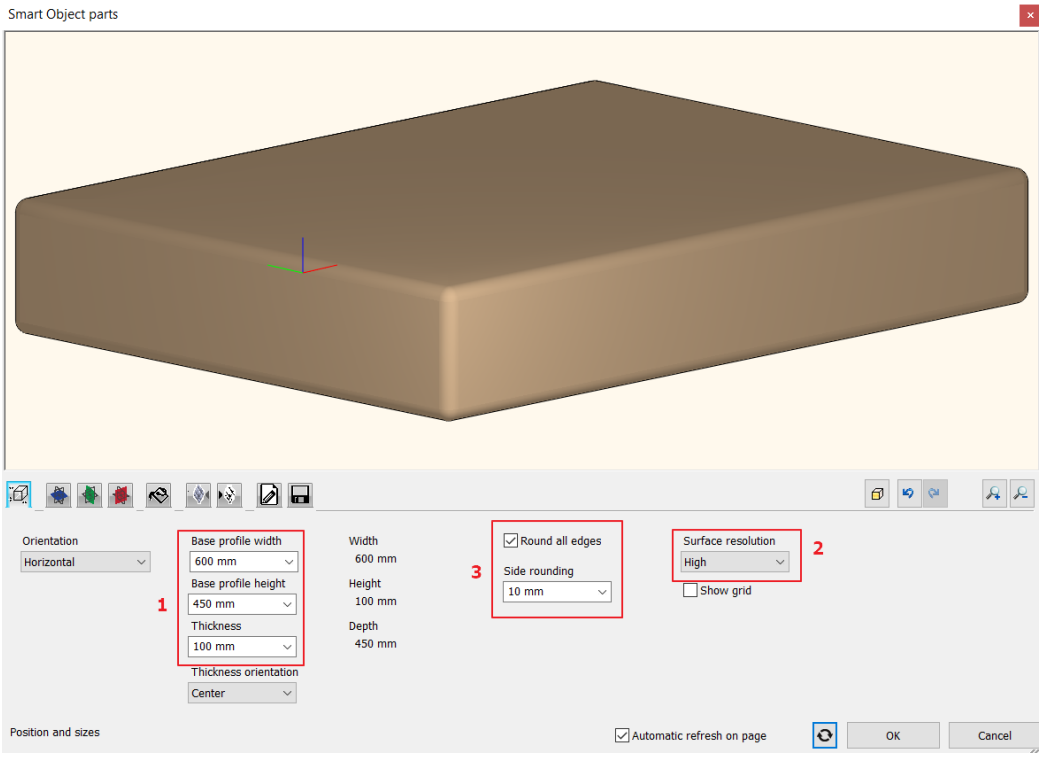
- In the appearing dialogue set the horizontal orientation.



- On the fourth tab, you can set the frontal profile, select from the list “Frontal profile 1”. There are two frontal profiles, one with rounded edges, the other one without these.



- Now go back to the first tab, under position and sizes set the Base profile width to 600 mm, Base profile height to 450 mm and Thickness to 100 mm (1).
- Set the surface resolution to high (2).
- Round all edges to 10 mm (3).

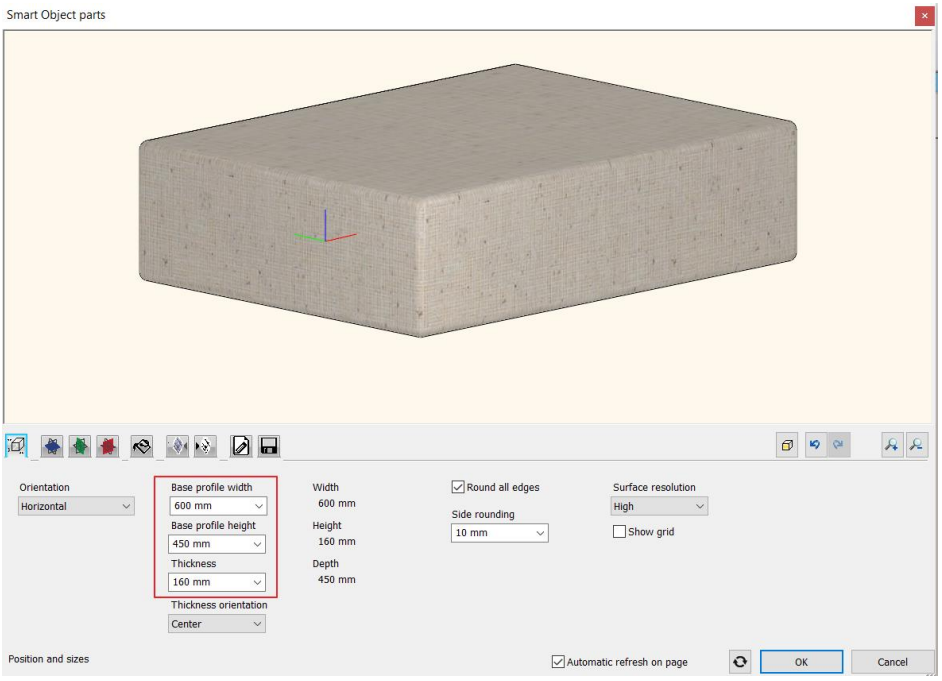


- On the fifth tab, you can select materials from the Library, now choose "*Cream_01*".
- Finally, on the last tab, save the base by clicking "Save as" command. The category should be Living room, for sub-category we recommend to use accessories for furniture components. Now enter the producer's name, which could be the model manufacturer.
- Now place it on the floor plan.

6.1.3. Create Esmeralda seat cushion

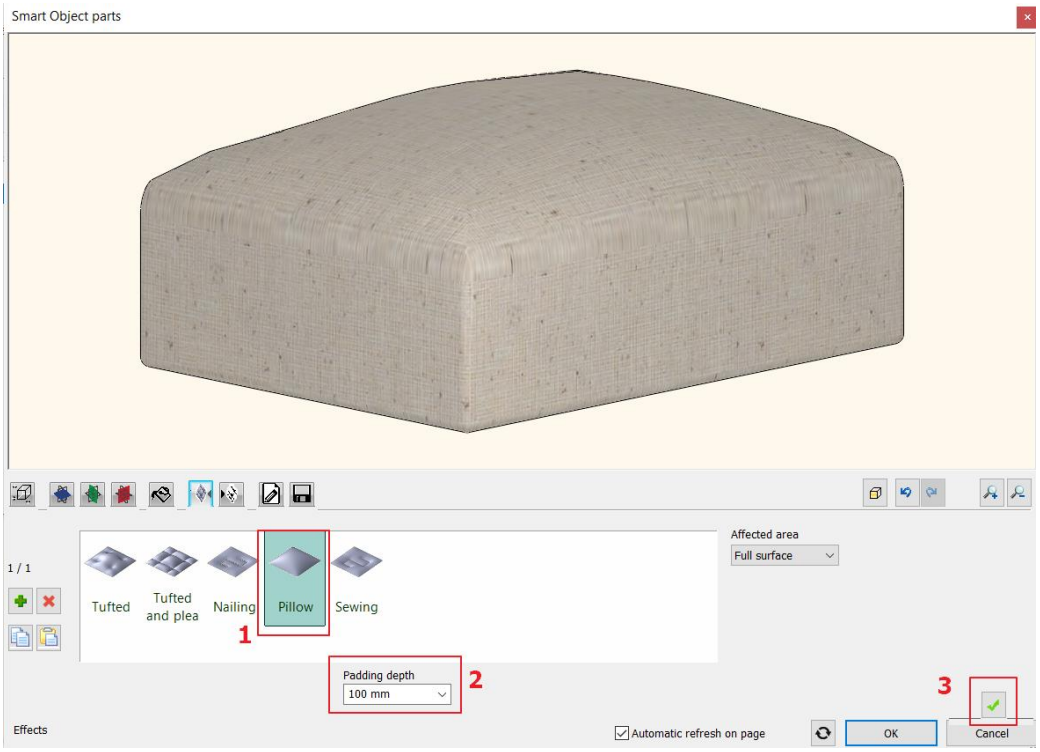
Let's continue our work on the seat cushion.

- Go to Ribbon menu / Interior / Smart Objects and select "Smart Object Parts" command.
- The seat cushion is similar to the base, therefore open the previously created base. Go to the last tab and select the Esmeralda base from favorites then save it under a new name.
- Next, under "Position and sizes" tab set the new parameters. The Base profile width and height remain the same, but change the Thickness to 160 mm.
- Edges are rounded, keep the value at the same: 10 mm.



Let's get familiar with decoration effects. Tools for effects are stored on two tabs next to material settings. One is adding decoration to the top; the other is adding to the bottom alternatively if you have a vertical 3D shape to the front and the back.

- Pillow effect is added to the cushion; which you can create in the following way. Select the first decoration effect tab, which adds effects to the top side.
- Select "Pillow" effect (1) and set the padding depth to 100 mm (2). This value indicates how much the pillow effect is rising from the top of the item. To apply changes, click on green tick (3). As you can see, the padding depth is adding to the base height.

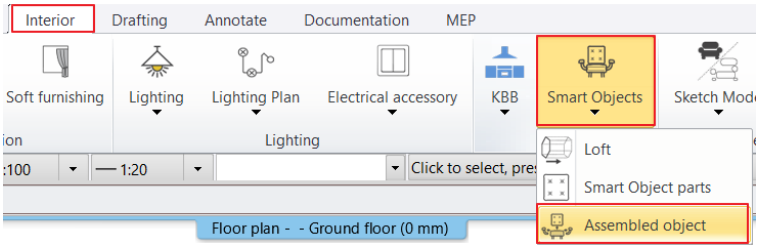


- Save the changes on the seat cushion, go to last tab and press "Save". Overwrite the changes on Esmeralda seat cushion and place it on the floor plan.

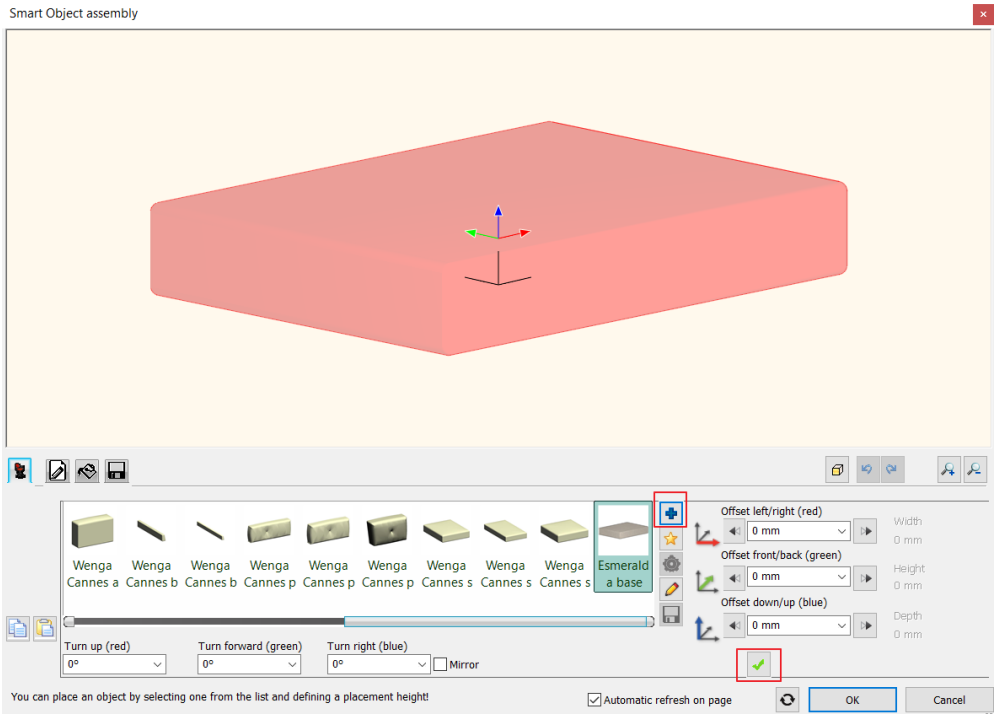
6.1.4. How to assemble Esmeralda ottoman

As we have created all three components for the Esmeralda ottoman, now the next step is to put them together.

- Open "Assembled objects" command from the Smart Objects group.



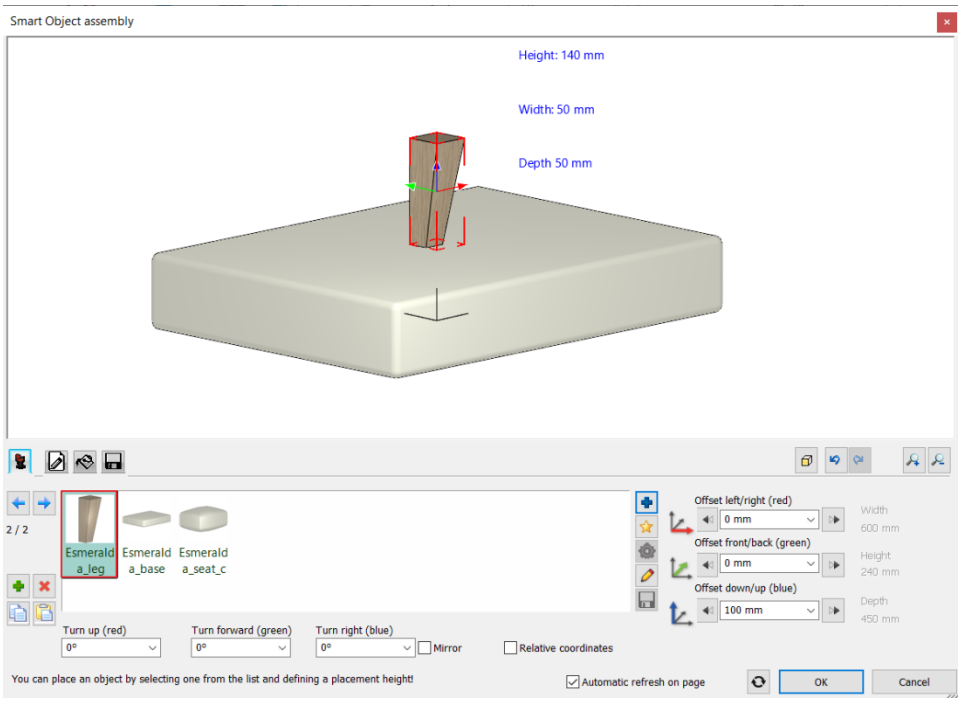
- First select Esmeralda base. Select the new item from the library by pressing the blue cross.
- The selected item appears. If the selected item is red in the dialogue window, that means the item has not been placed there yet. Therefore, click on the green tick.



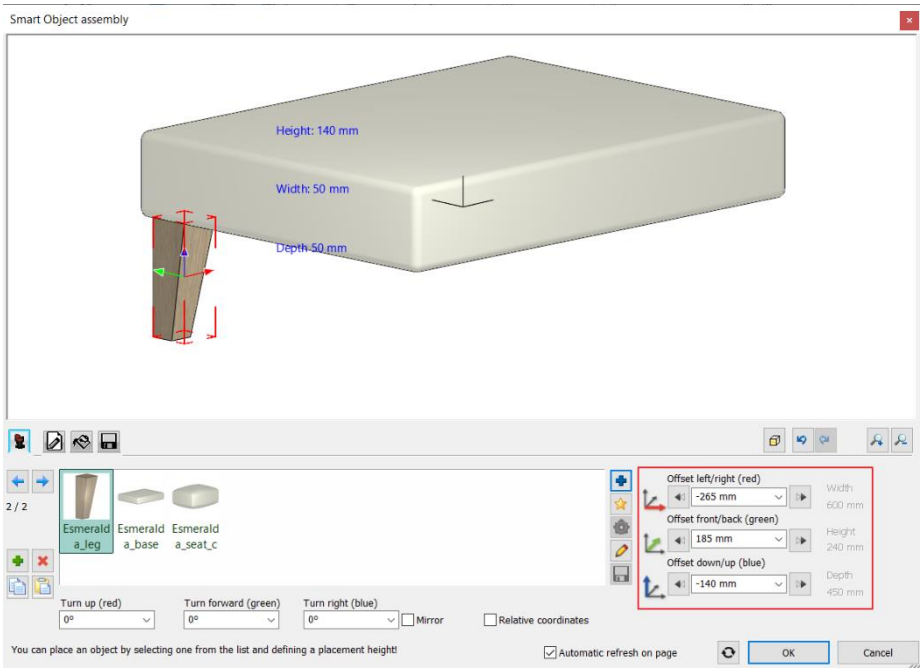
If we choose another item now, this is highlighted in red which refers to its selected status.

Let's add legs to the bottom of the Esmeralda base.

- Now click on the green cross icon. By default, the program puts the new item on top of the previously placed item. Now select from the library Living room / Accessories / Esmeralda leg.



- You can see that the program placed the new item in the middle of the base with the leg center point. Switch off Relative coordinates to make it easier to position the leg. Move the leg: Along the blue axis (downward), minus 140 mm; along the red axis (to the left), minus 265 mm; and along the green axis (forward), 185 mm.

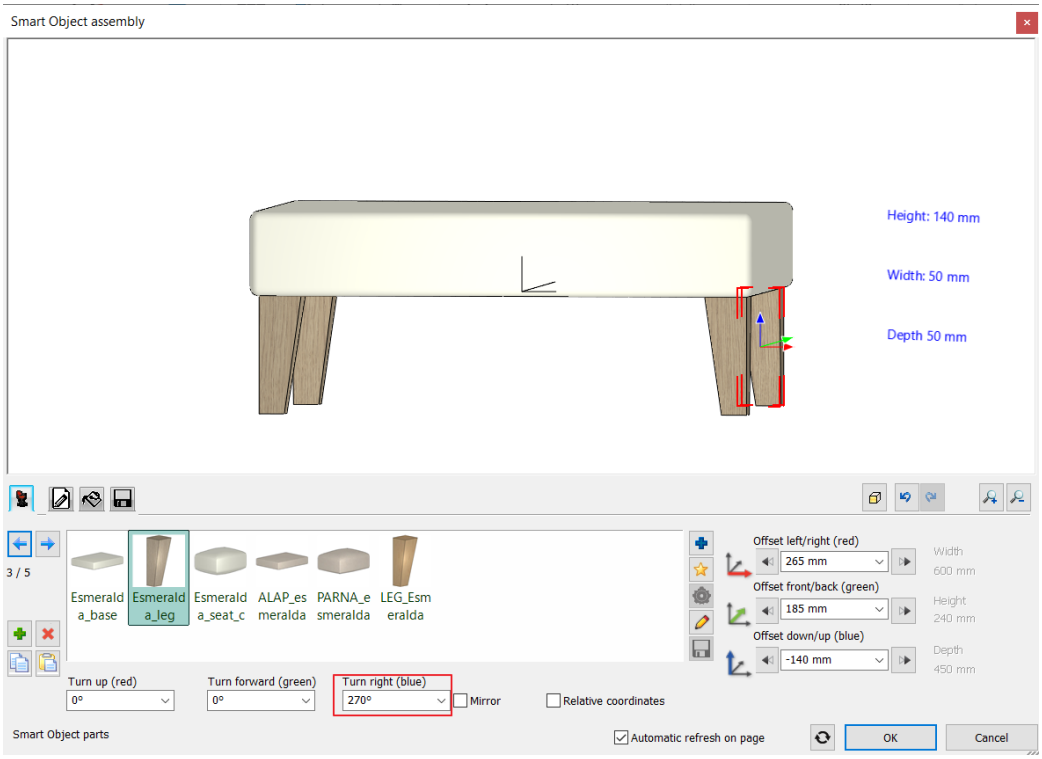


- Add the following leg. Click on the green plus button, then position it: Along the blue axis (downward), minus 140mm; along the red axis (to the right), 265mm; and along the green axis (forward), 185mm.

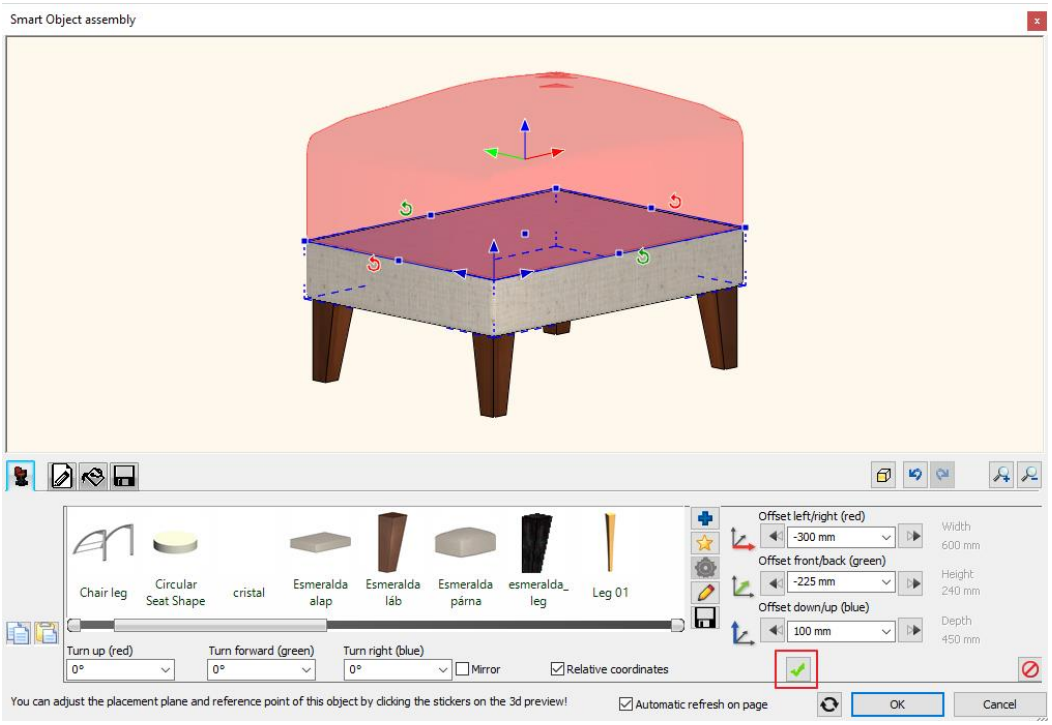
- After adding the third leg, adjust the values as follows: Along the blue axis (downward), minus 140mm; along the red axis (to the right), 265mm; and along the green axis (backward), minus 185mm.

- The position values for the fourth leg are: Along the blue axis (downward), minus 140mm; along the red axis (to the left), minus 265mm; and along the green axis (backward), minus 185mm.

- You finished with placing legs. However, not all legs are positioned correctly. The leg is in a good position when its two vertical sides are facing outside. We have to adjust legs accordingly. Select the leg and set the value “Turn right (blue)” to 90, 180 or 270 degrees.



- The final task is to place the seat cushion on top of the Esmeralda ottoman. For this, select the base then add the seat cushion from the library / Living room / Accessories category. The software automatically places it in the middle, finally click on the green tick to create it.

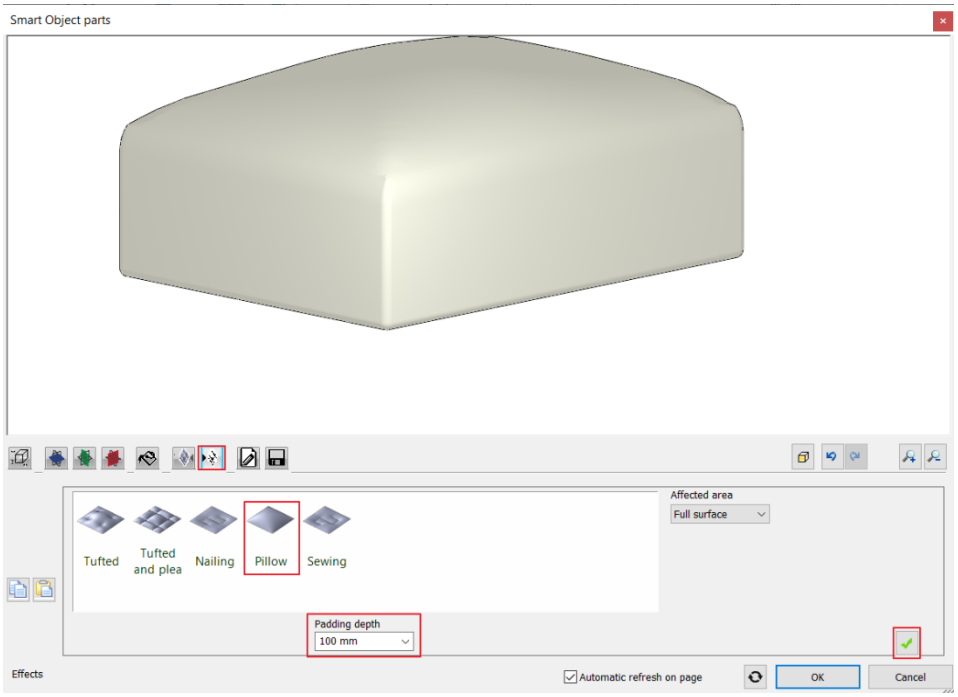


- Now the Esmeralda ottoman is assembled. As a final step, save it in the Library on the last tab. Click on “Save as” button; don’t forget to give the producer’s name.
- Finally place it on the floor plan.

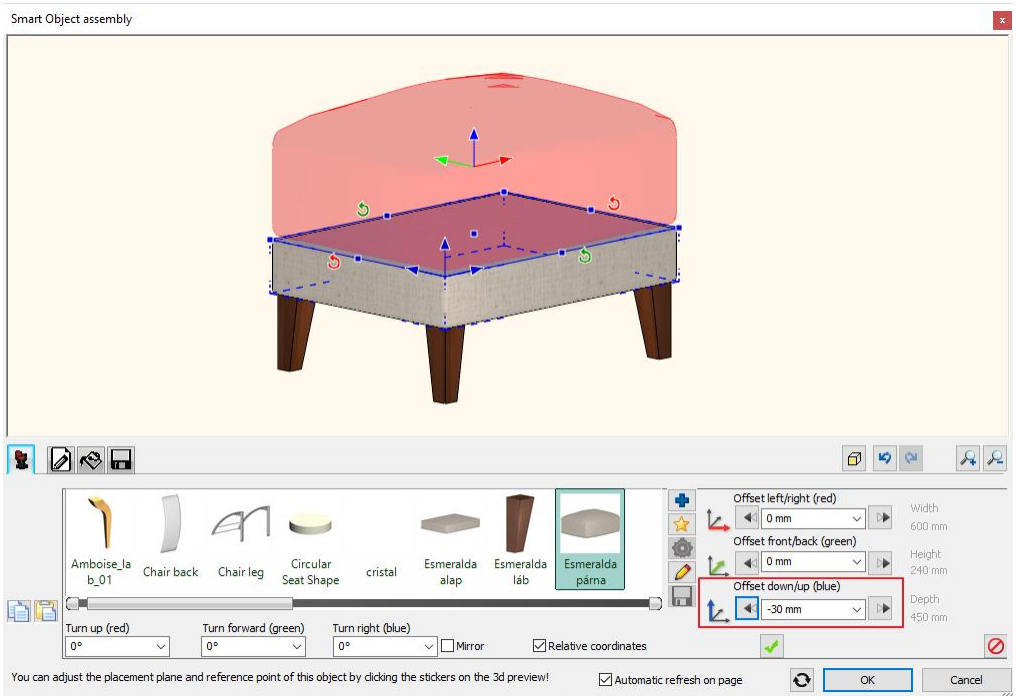
6.1.5. How to modify assembled object?

Let’s check the difference between the original and the newly created Esmeralda Ottoman. There is a tiny dissimilarity. Between the base and the cushion seat, there is a little more space at the original one. The aim is to adjust this gap without making it too large so that we could see through between them. For this, we have to modify the newly assembled furniture. Whenever we create a new furniture with the “Smart object” tools, by double-clicking on the item again, the “Smart Object Assembly” dialogue window opens up and here can modify any components. In this special case we will adjust seat cushion.

- Select the cushion in the Smart Object Assembly dialogue window, then click on the pencil icon. This way, you can go back to the Smart Object Parts dialogue window.
- Here, you can see that the pillow effect was only added onto the top side and not to the bottom. If you click on the second decoration effect tab, there you can add padding depth to the bottom. The padding depth value is 100 mm. Click on the green tick to apply changes. Now the pillow effect nicely appears.



- Save the changes, then go back to Smart Object Assembly dialog.
- If the Offset down/up value is zero, the bottom of the seat cushion will be placed right on the base. Now change this value to minus 30 mm, this way the pillow effect will nicely pushed into the base.



- Now save the changes and close the dialogue window.

  Whenever you want to use the newly created ottoman, simply find it in the Library under Living room / Armchair sub-category.

6.2. Marseille chair

The following example will be more exclusive chair. We will show how to create Marseille chair. We have found it on the internet, and we have only three parameters such as the depth, height and length. Also, we found three photos see below them.

The photo of the back of the chair will be handy for us later on. Using the parameters mentioned above, let's start our work. First, we have to investigate what makes this chair special and also analyze how the components are built-up, such as the **cushion seat, curved legs, curved back panel**.

Start

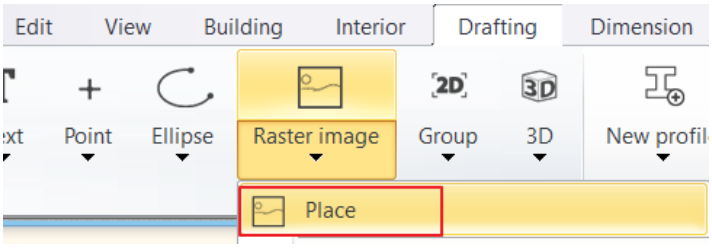
Open the project which has already included the ready model and profiles before you start the work. Here you can find the project:
…ARCHlineXP Draw\2024\Course_Intermediate\6_Upholstered_furniture\Marseille_chair.pro

6.2.1. Drawing profiles

The profile of back of the chair

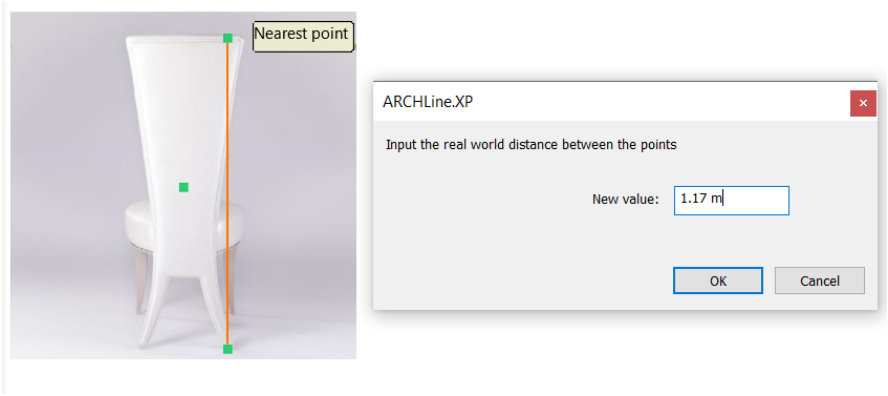
Now let's see the profile of the back, how it can be created.

- Import the previously mentioned photo of the back chair:
  …ARCHlineXP Draw\2024\Course_Intermediate\6_Upholstered_furniture\Photos
  From **Ribbon menu / Drafting / Raster image** choose "Place" command, or use drag&drop to place it on the floorplan.



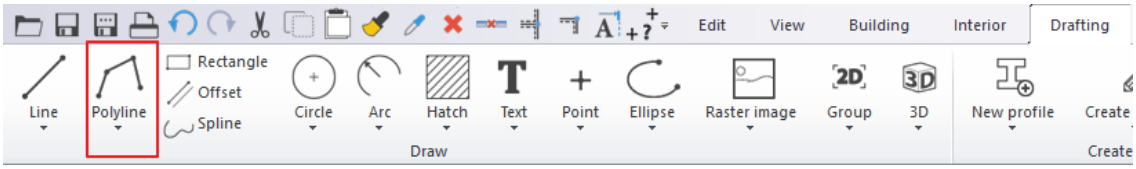
The photo is not scaled, but suitable to get the profile of the back panel. To work with a scaled back panel first, we have to calibrate it.

- Click on the chair and from the local menu choose "Calibrate" command. The height of the chair is 1170 mm; using this value, you can calibrate the chair. Draw a straight line starting from the bottom of the leg to the top of the back. Holding Shift down, you can easily draw a vertical line. In the pop-up dialogue window enter 1170mm the height of the chair.

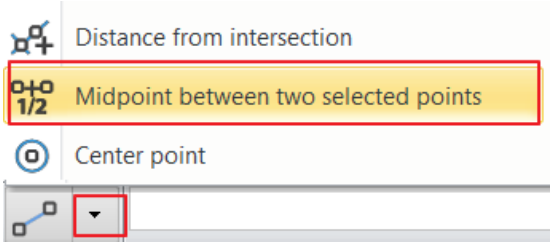


This is a perspective image and not suitable for getting more information about the chair. We aim to get the shape of the back of the chair. This photo is scaled now; we have to draw its profile.

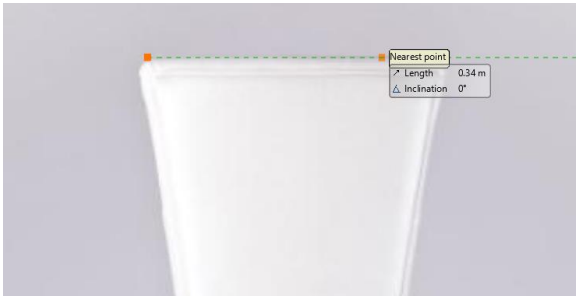
- Use Polyline command from Ribbon menu / Drafting.



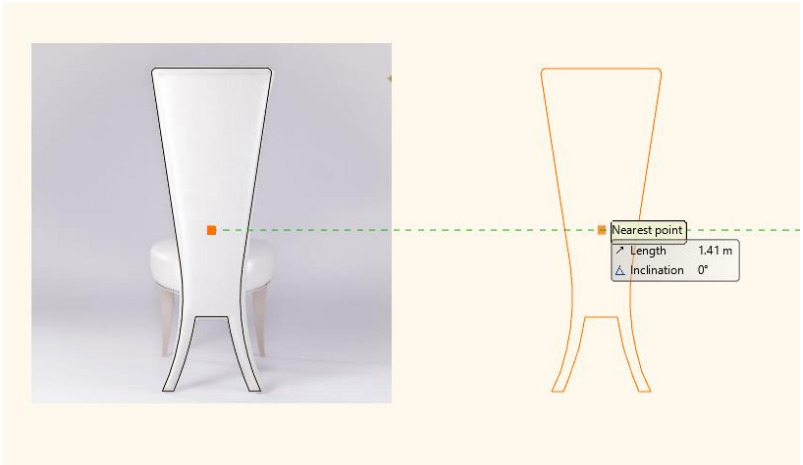
- We are going to draw the half of the profile of the chair. First, select the “Half division point” from the snapping options and define the half division point of the back panel. The option can be found on the toolbar at the bottom.



- Draw a line on the top; after placing its endpoint, the program automatically sets the starting point of the polyline in the half division point. From here, you can start drawing the profile.



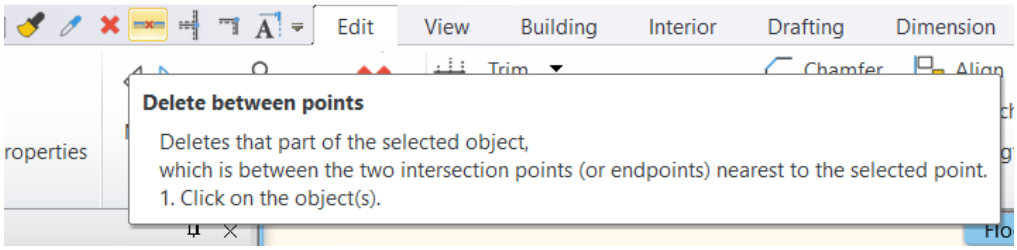
- First draw a line then an arc. You can draw an arc by using three points. The first is given, then select the endpoint, finally a middle point which helps to define the arc.
- Continue the drawing with a line and a smooth arc. To draw the arc, select option from the pop-up menu, first select *Smooth* then *Arc* option.
- For the next line, select “No smooth” command.
- Continue with an arc.
- Draw the last line until the perpendicular projection of the half division point. Close the drawing command, the half of the profile is ready.
- Select this profile and from the local menu choose “*Mirror a copy*” command.
- This way, the missing part of the profile is created. Now the profile is completed. Now move it next to the photo.

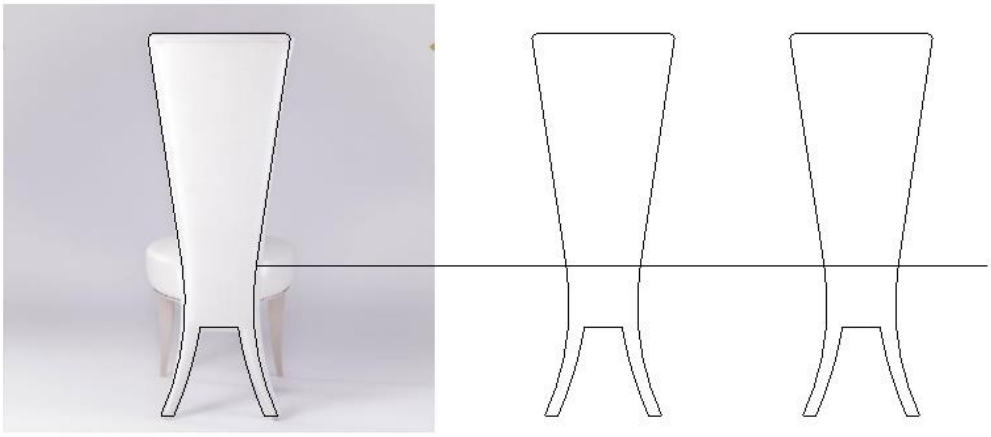


Next, we have to draw the upper part of the back panel. This is necessary because the back is not the same everywhere. If you check the model from a bit closer, you can see that the pillow effect is smaller on legs, then on the other parts. We have to define another profile to reach this pillow effect.

- Select the profile and create another copy of it.
- Try to find the seat height and start to draw a straight line from there.

- Use Delete between point command from the top toolbar to remove unnecessary lines. The second profile is ready.



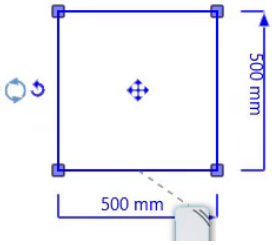


To complete the chair back profile, we need the front profile and the previously created top profile.
Also, the back of the chair is curved. Therefore, this is a vertical base profile, and we use for modelling.

- Draw an arc; the height is 1170 mm.
- The curve of the back panel leans a bit backwards. It is not a regular arc as this one is drawn here. Lean backwards the profile by moving the endpoint.

Seat profile

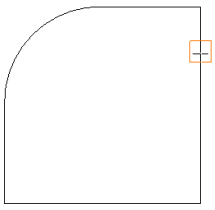
Let's look at the next item, the seat. To create it, we will use a rectangle.



- Use the Draw - Rectangle command to draw a rectangle of your choice. Click on the rectangle and use the dimension lines to change its size: 500x500. We already know that the total length of the chair is 500 mm and depth 580 mm, which includes the back of the chair. We assume the size of a rectangle will be enough for the seat.

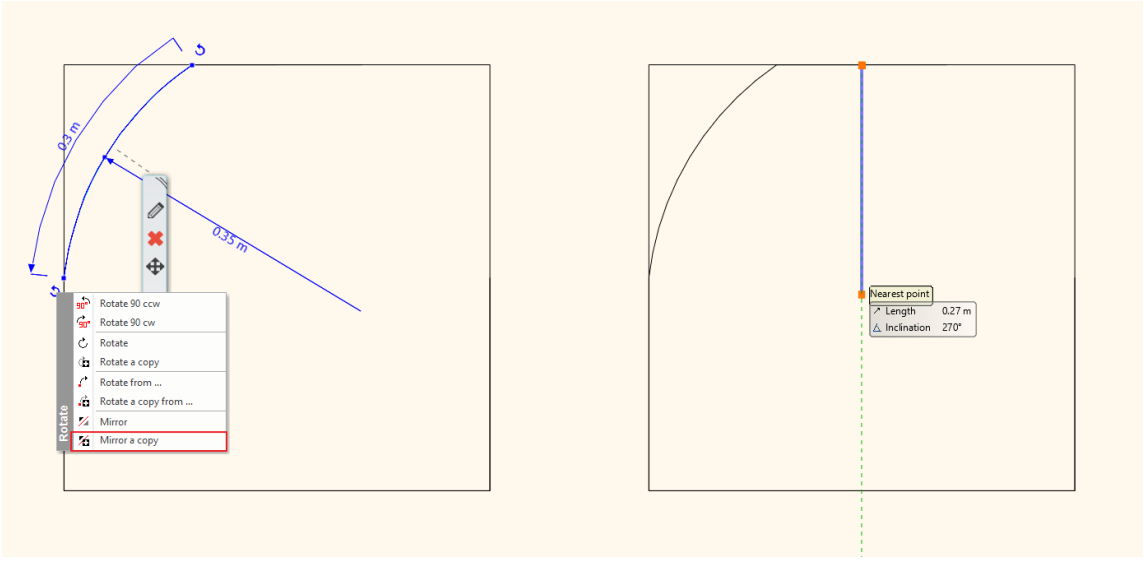
  If you check the photos, then you can see that we have to fillet edges. There are more options to do that.

- From the local menu, select "Edit" then "Fillet" command. From the appearing menu now, you can choose how to round edges by using radius, diameter etc. If you click on the other side, the selected method will be applied for rounding.



  So, we can create the seat this way. However, in our example, it looks a little bit different; the arc is not fitting so nicely.

- Place a rectangle again and inside draw an arc from the half division point until the quarter-point by using the arc command.
- Mirror the arc by using Mirror a copy command.

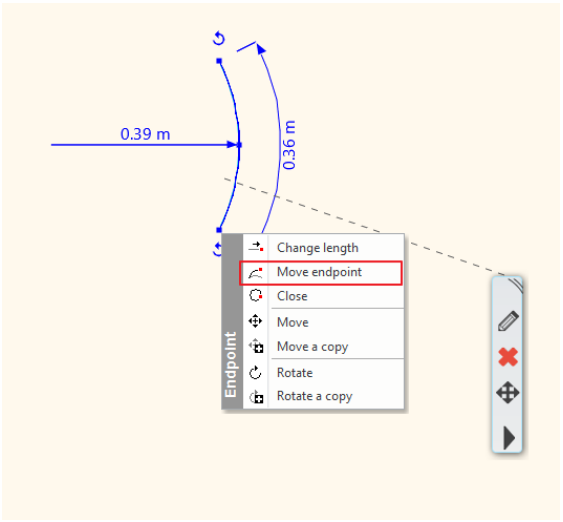


- Then use “Delete between points” command to remove unnecessary lines. The top view profile of the seat is ready.

Leg profile

One more profile needs to be created for legs. Here we have to draw an arc again; the leg is 350 mm high and curved.

- Draw an arc which is 350 mm high.
- Lean it backwards slightly by moving the endpoints.

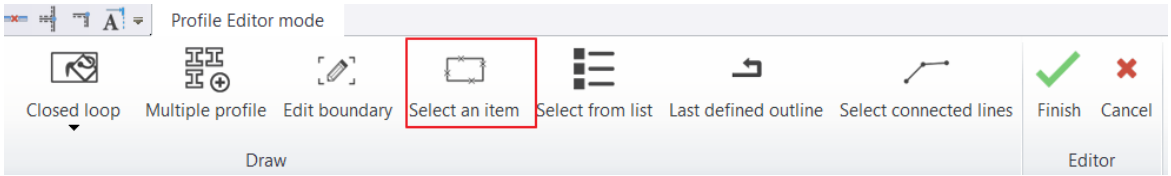


Now we created all profiles for the Marseille chair. Delete these items and use Smart Object commands to create the chair components.

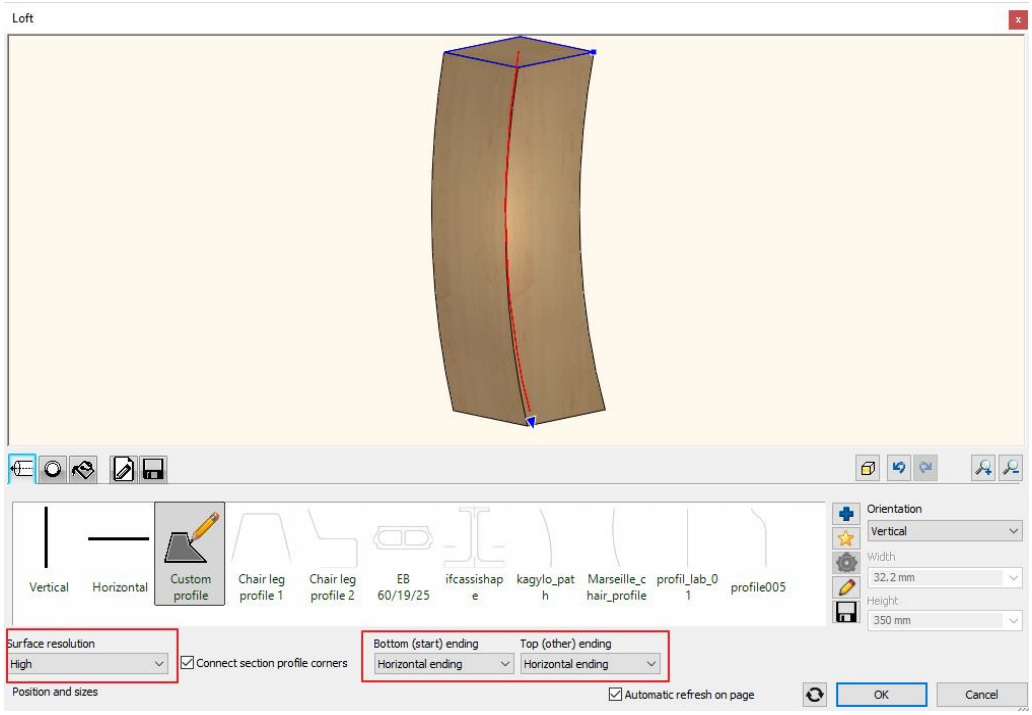
6.2.2. Creating Marseille legs

Once we have created the profiles for the modelling, let's continue with the creation of the components. As we have seen, we need three different components: the leg, the seat and the back. We will continue with the leg.

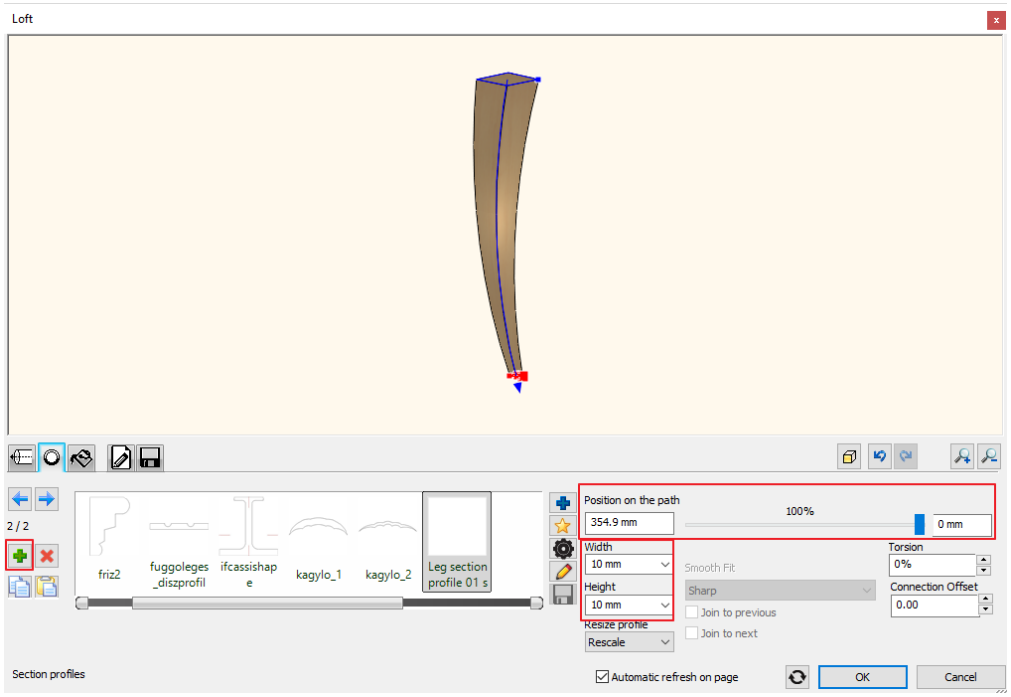
- Select from Ribbon menu / Interior / Smart Objects then Loft command. It means we draw a profile along a selected path.
- First, select the path to use for drawing the profile. In this case, this is a special one, therefore click on the yellow start icon and choose “Custom profile” option. Here you can select, the previously drawn profile on the floorplan.
- Now choose from Ribbon menu / Profile editor mode the “Select an item” command and select the leg profile with one click.



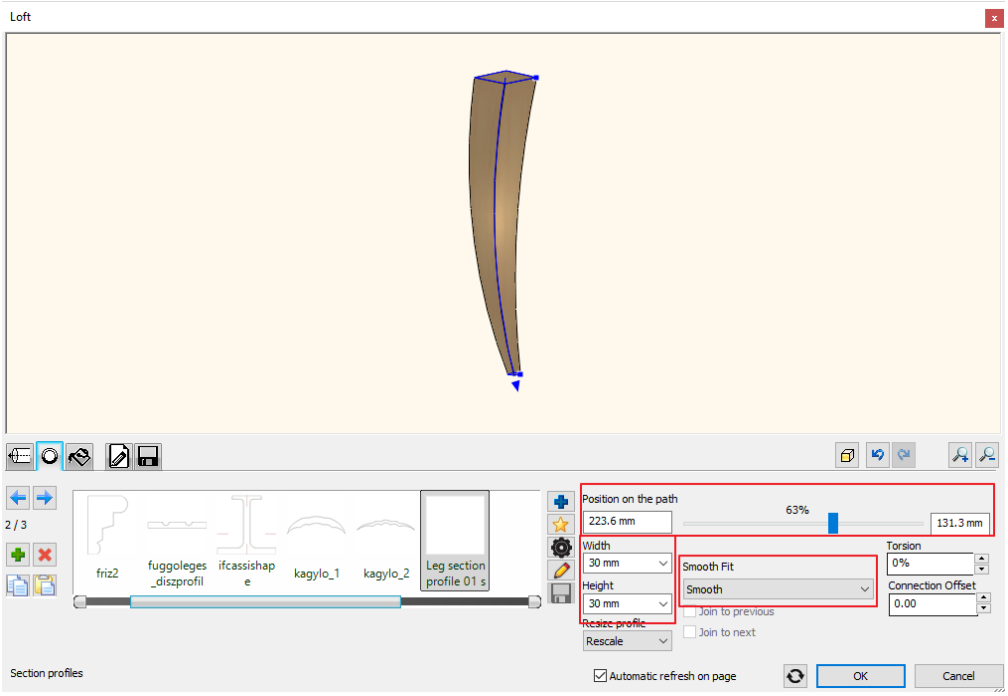
- When the profile is selected, then the software automatically brings up the Loft dialogue window. We recommend to set the high resolution and define the bottom and top ending to horizontal.



- The next step is to set the size of the top profile on the leg. It is a 50*50 mm rectangle. Set the parameters on the second tab.
- Set the size at the bottom that is a 10*10 mm rectangle. For this, click on the green plus icon and enter the parameters. Now set the position on the path. When you finished, apply changes by pressing the green tick.



- It is optional to add a third profile which is a 30*30 mm rectangle. Change its position on the path by moving the slider; the shape of the leg will also change. We also recommend to set the Smooth fit to Smooth.

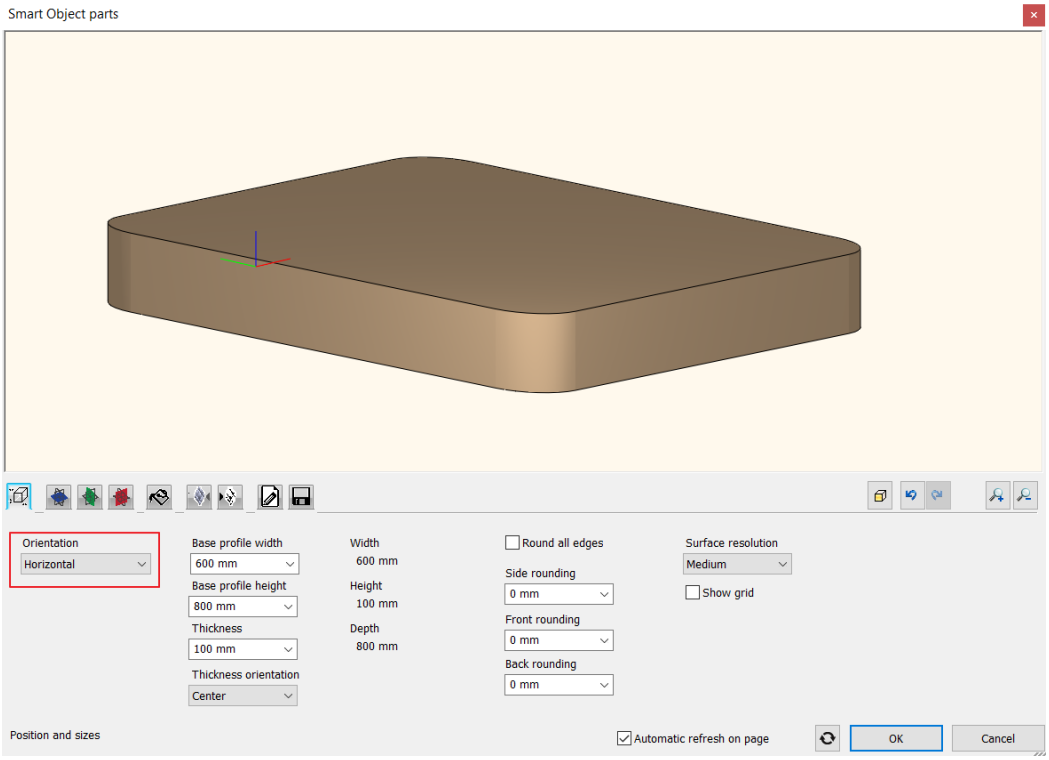


- We select the material on the third tab.
- Finally, save the leg on the last tab. Click on “Save as...” first enter the name, then category. The category the Dining room; then **we recommend to save the leg under Accessories sub-category. All furniture components should be saved here.** Enter the producer’s name, Wenga.
- Now place the chair on the floor plan.

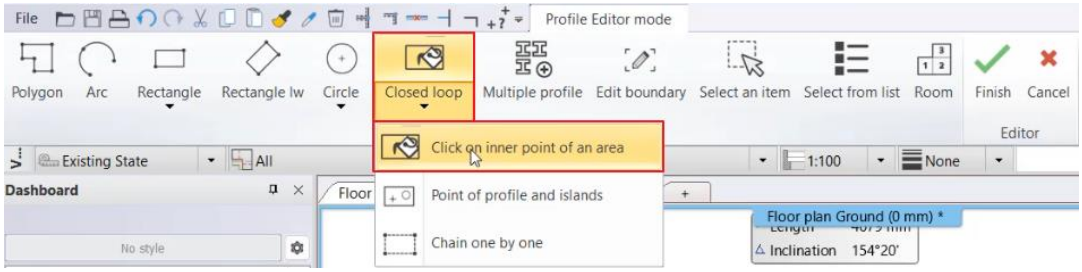
6.2.3. Create the seat cushion

The next component is the seat cushion which we will create for Marseille chair.

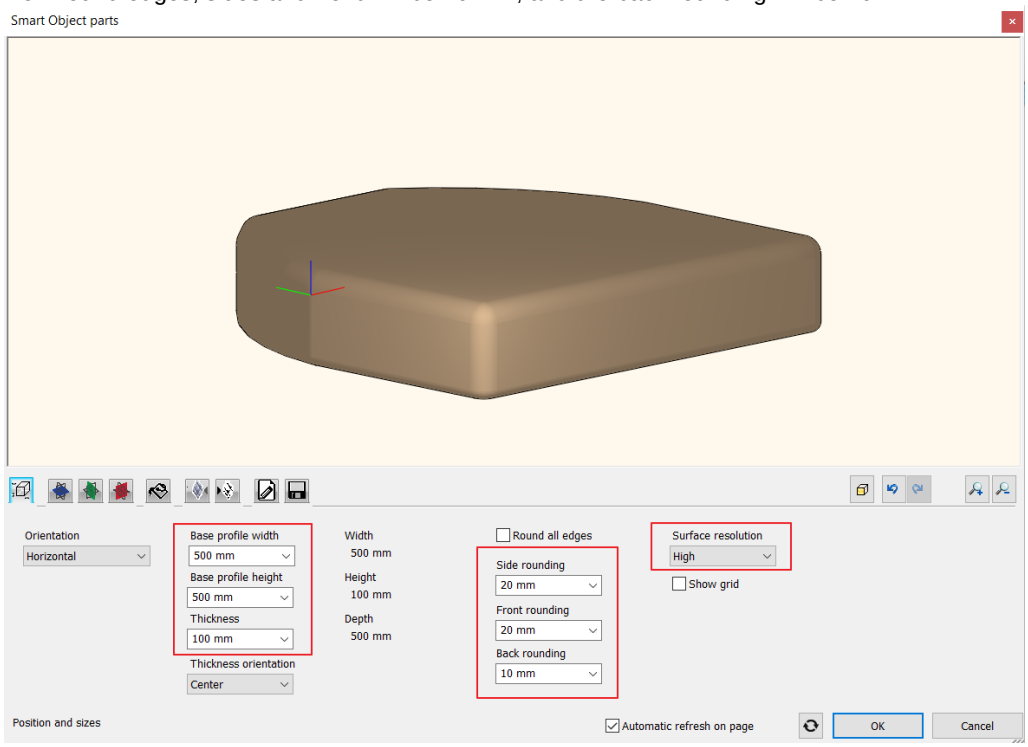
- Select “Smart Object Parts” from the “Smart Object” menu.
- Set the seat cushion position to horizontal.



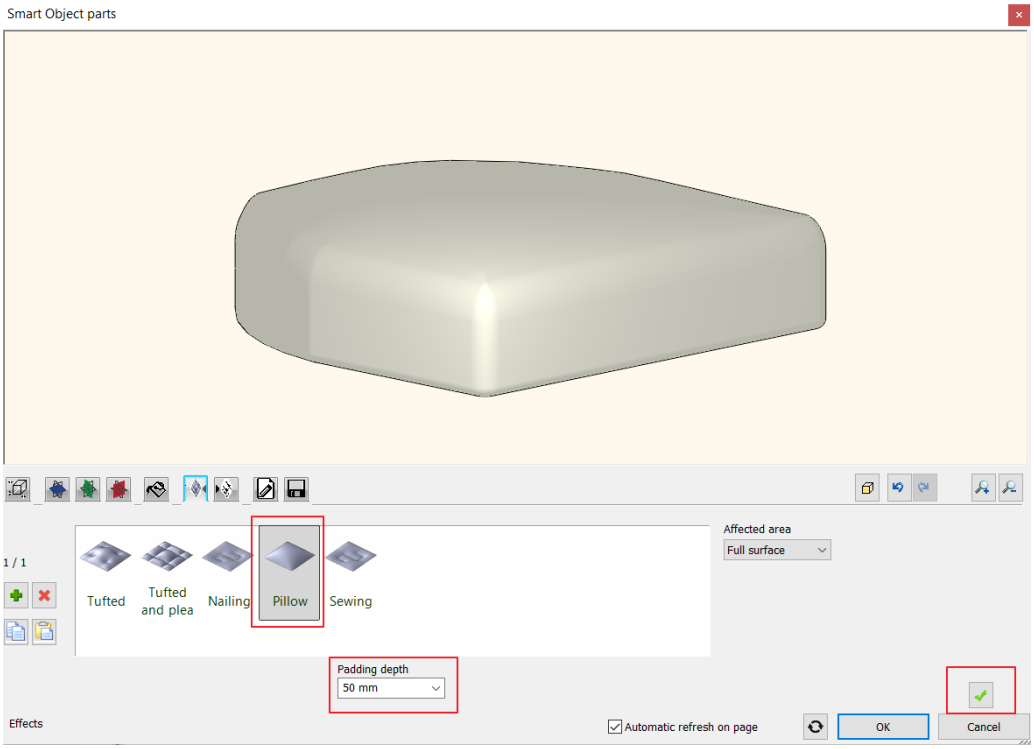
- Set the frontal profile on the fourth profile. Click on the yellow star icon and from the floorplan select the seat profile. By selecting the *Closed loop – Click on inner point of an area* option, you have the possibility to select an existing profile to get the form.



- On the first tab, set the parameters. The base profile width is 500 mm, the base profile height is 500 mm, and the thickness is 100 mm. The resolution is high.
- Now round edges, sides and front will be 20 mm, and the back rounding will be 10 mm.



- Now Set the material on the 5th tab. Choose *Cream_01*.
- On the following next two tab, you can add effects to the seat. On the first tab, you can set the top effects; on the second, you can add effects to the bottom. Now we will add pillow effect to the top. The padding depth should be 50 mm. Click on the green tick to apply changes.



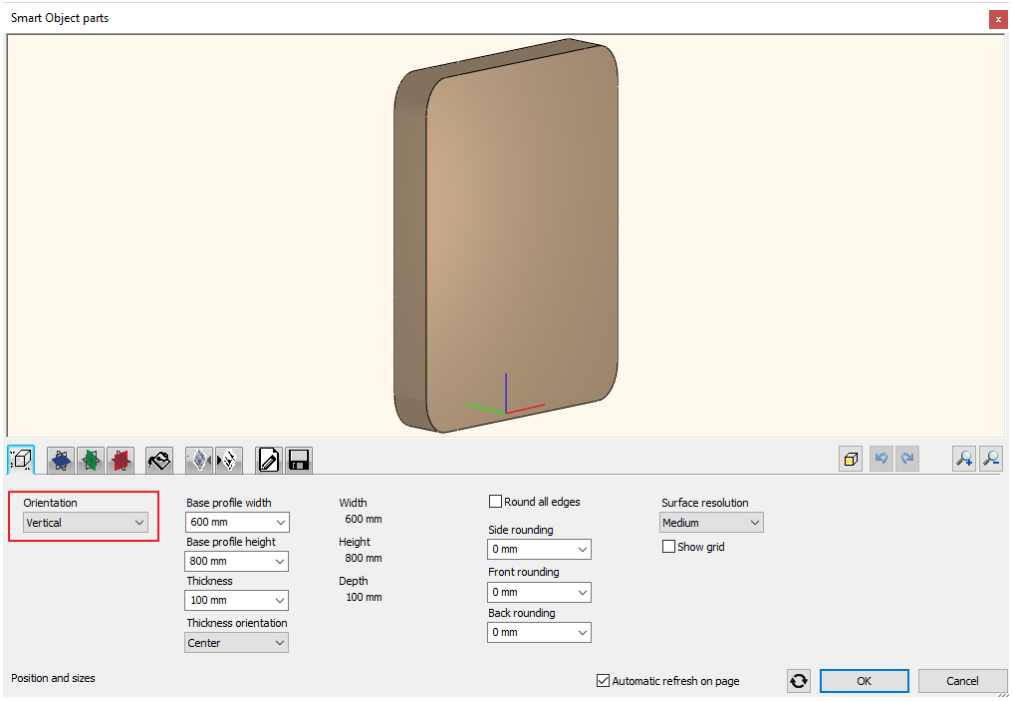
- Final step is to save the seat. On the last tab, click on “Save as… “command, first enter the name and the category. The category should be the Dining room, choose Accessories for sub-category. Enter the name of the producer, which should be Wenga.

  It is crucial to save components before closing the dialogue window. If we close the dialogue without saving the component, then always place it on the floorplan. If none of these happen, then we could lose our work. In case we placed the item on the floorplan, but that is still unsaved that we could do that anytime. Select the item on the floorplan, choose the properties; this will open the Smart Object Parts dialogue window, here you can save the item.

6.2.4. Create the back of Marseille chair

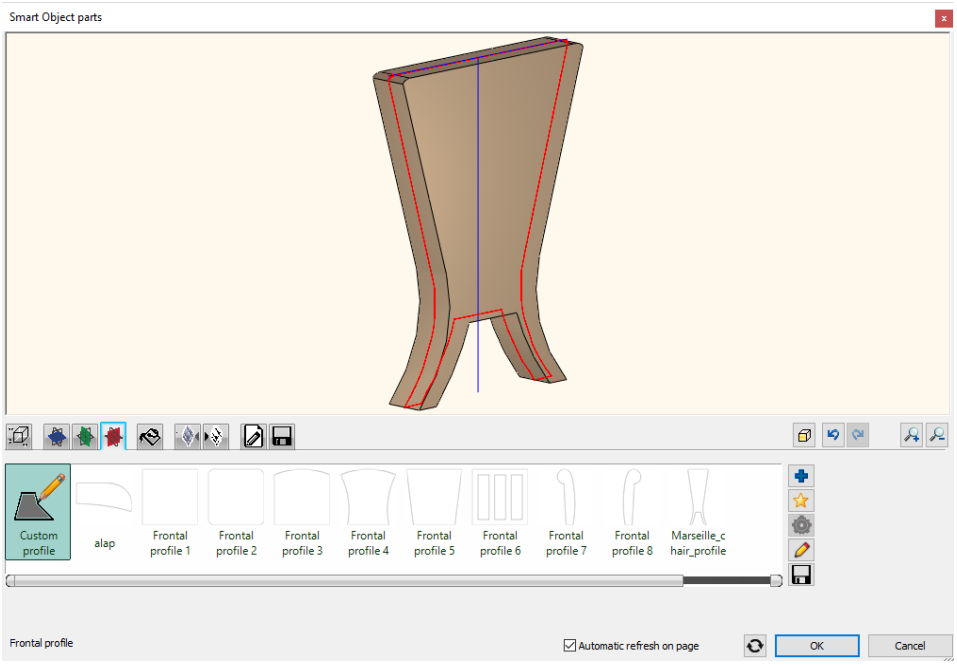
There is one more component missing, that is the back of the chair. We will continue the work modelling this.

- Select Smart Object Parts.
- The back profile of the chair is a vertical item, so this setting is correct.



- On the fourth tab, define the frontal profile. Select it from the floorplan, by clicking on the yellow star icon. Here, we have to use the "*Closed loop – Click on inner point of an area*" command and click inside the profile.

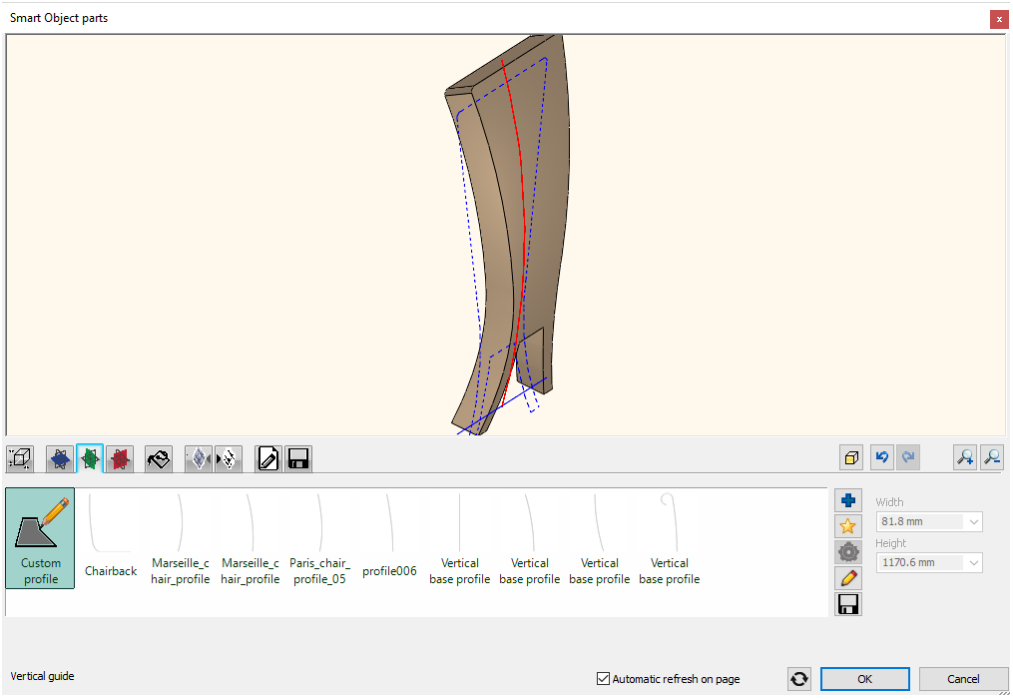
  We now have the back profile part, but there is still a problem with the dimensions.



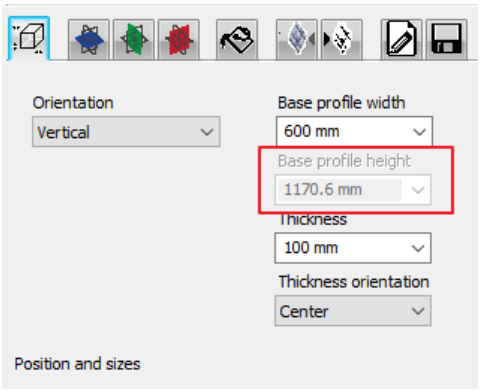
  On the first tab, we can set the parameters. Here we have to mention that so far, there was no need to use the second and the third tab. Here we can customize the vertical and the horizontal base profiles.

- In the case of the Marseille chair, the vertical base profile is an arc. Select this arc from the floorplan, for this use "Select an item" command. Select the arc then define the reference point with one click.

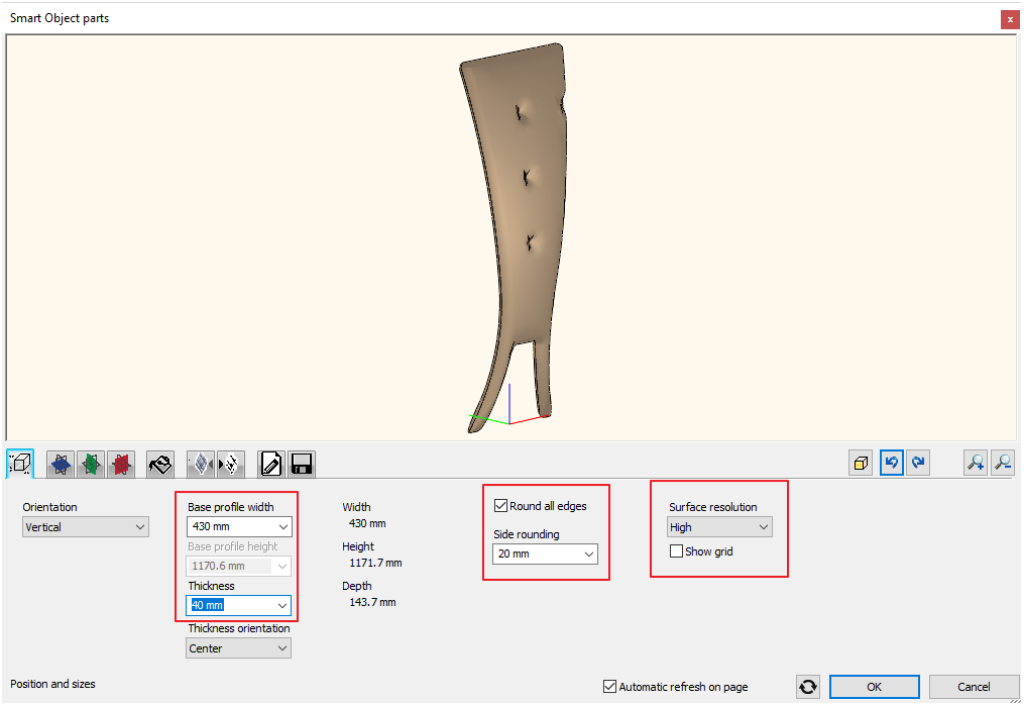
  Now the software will pull over the back-frontal profile on this vertical base profile.



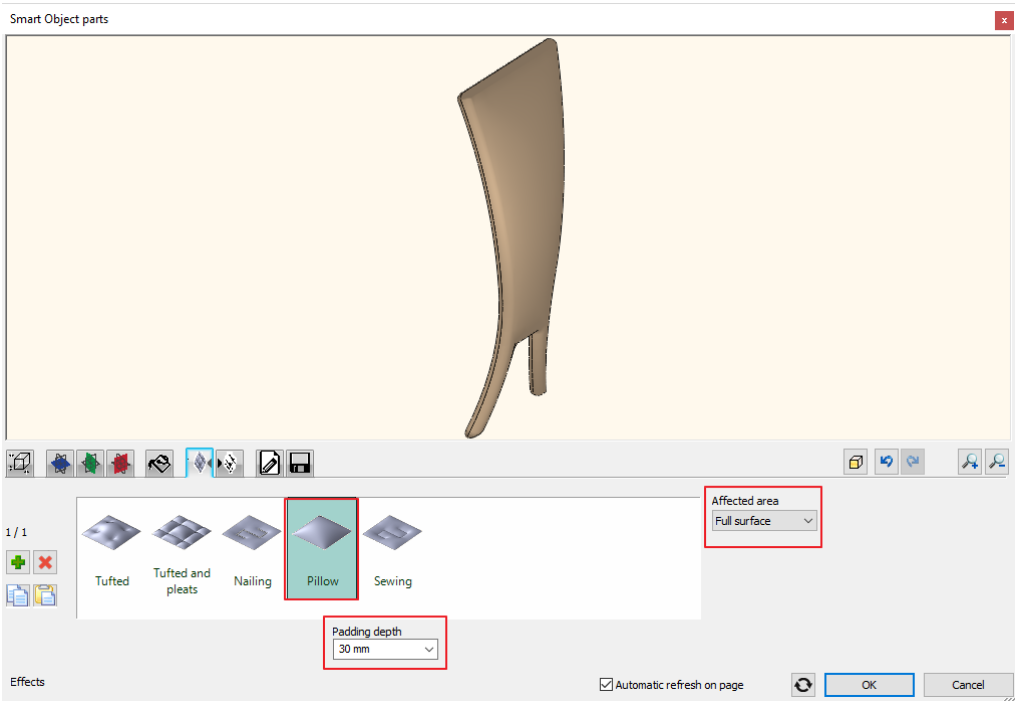
  It is important to note that the height of the back cannot be modified on the first tab. It happens because the vertical base profile defines the height.



- It works as above-mentioned in the same way on the horizontal base profile. In our case, we do not have to modify it. So, the width will not be defined by the horizontal base profile. Here we leave unchanged the horizontal line as a base profile.
- Now go back to the first tab, the vertical base profile defines the height, but we should set the length, which is 430 mm, and the depth is 40 mm. The resolution is high, and the rounding is 20 mm. In case of the back of the chair, the rounding value cannot be more than this value.

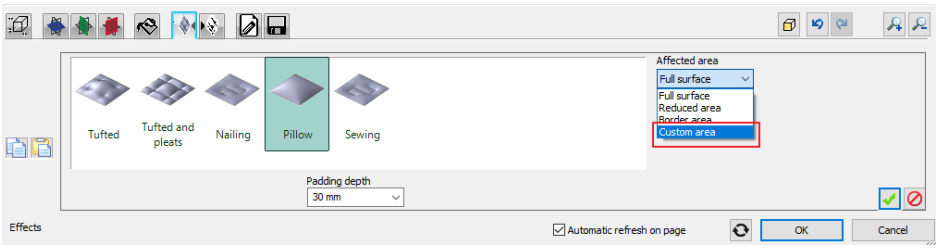


- The next, we add pillow effect on the front. The padding depth should be 30 mm and affects the full area.

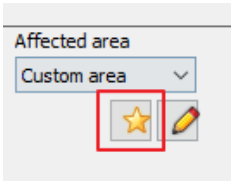


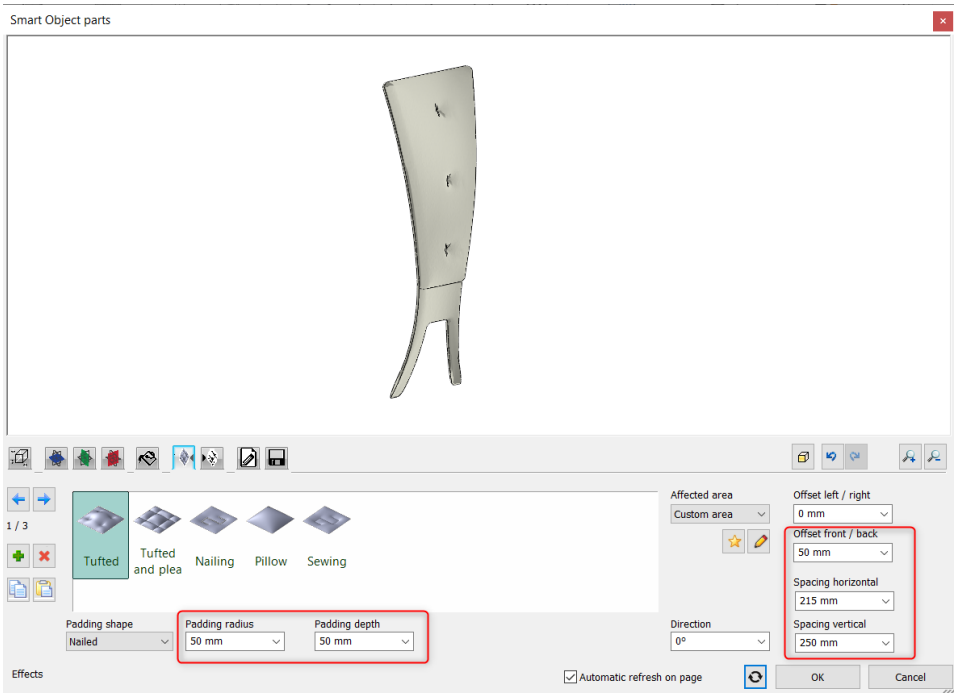
In this case, the pillow effect is more significant on the backside. Therefore, we add another pillow effect and the affected area will be a customized area.

- Click on the green cross icon to add further effect. Now select from the drop-down menu the “Custom area” option.

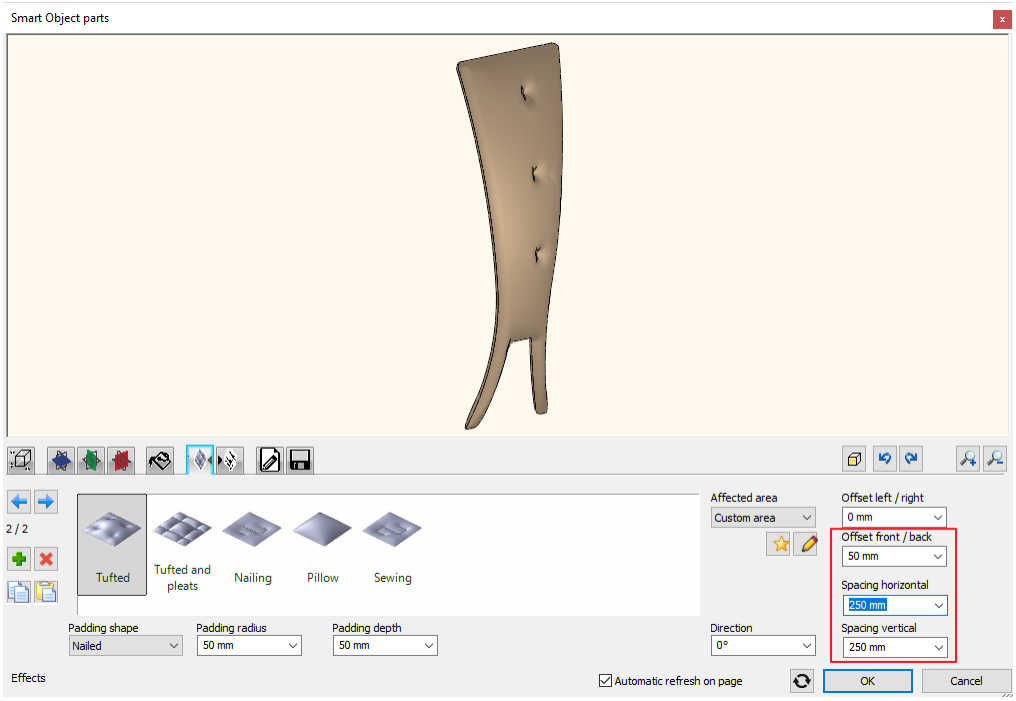


- The customized area can be given by using the yellow star icon. The program offers the chair back profile. We have to fit it right on top of the smaller back seat profile. Then we have to use the “Closed loop” command to click inside this profile. As you can see the second pillow effect is created on the upper part of the back chair.
- Add further effect, like “Tufted” nailed shape. The padding shape and padding radius should be 50 mm. Click on the green tick to create the effects.





- Now set the nailing properties, our aim to place the nailing effect in one row. You can reach this if you half the length 430 mm, so 215 mm will be the value for the horizontal spacing. The vertical spacing will be 250 mm. Finally set the front/back offset to 50 mm.



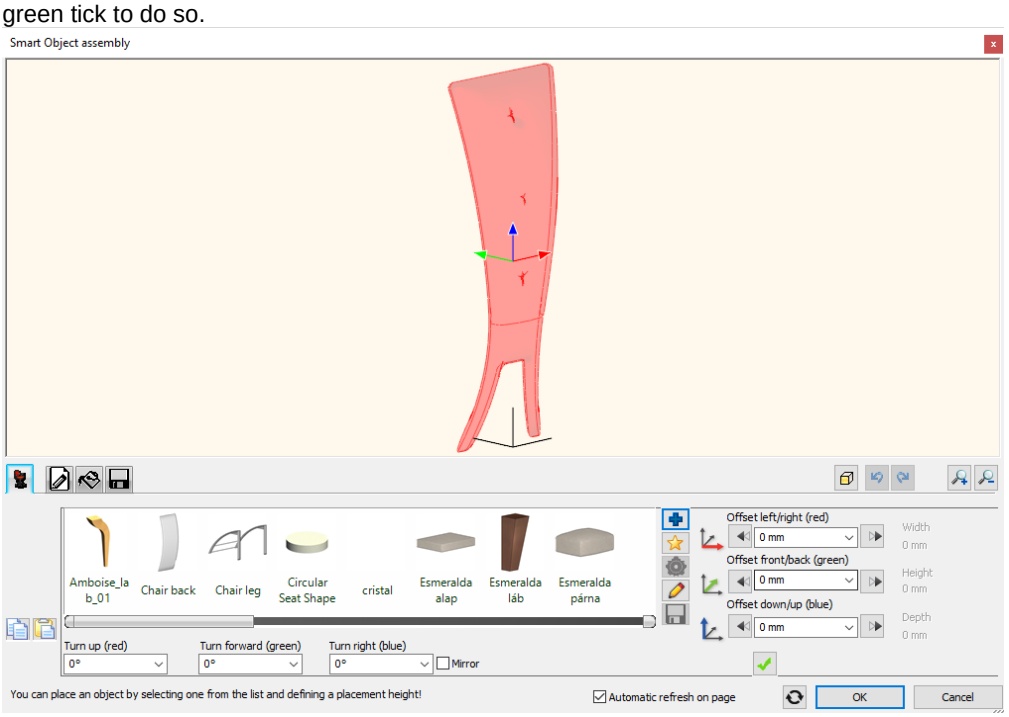
- Finally set the material Cream_01.
- The back chair is ready. You have to save it in the library. Use “Save as ...” command, the category is the Dining room, sub-category is Accessories, producer is Wenga.
- Now place the back chair next to other parts.

6.2.5. Assemble Marseille chair

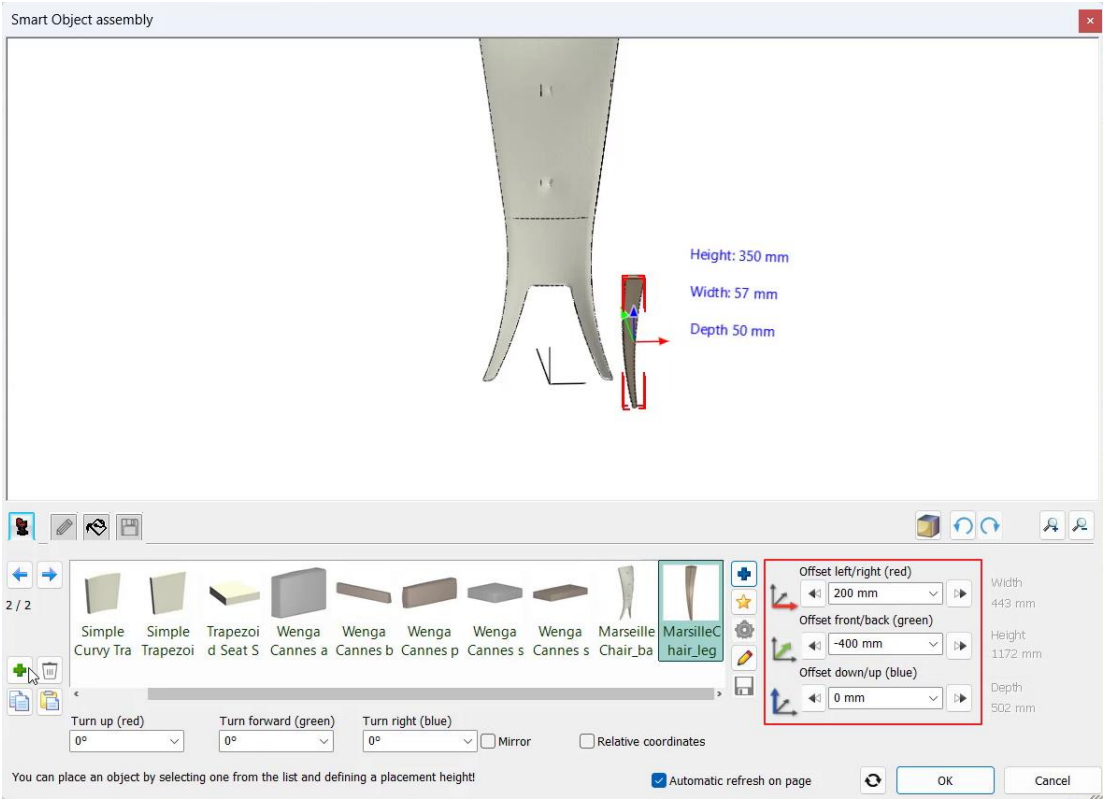
The last task is to assemble the Marseille chair components.

- Select Smart objects / Assembled object command.
- First, you have to select the components from the library. Place the back of the chair first. You can find this component in the Accessories subcategory of the Dining room category.

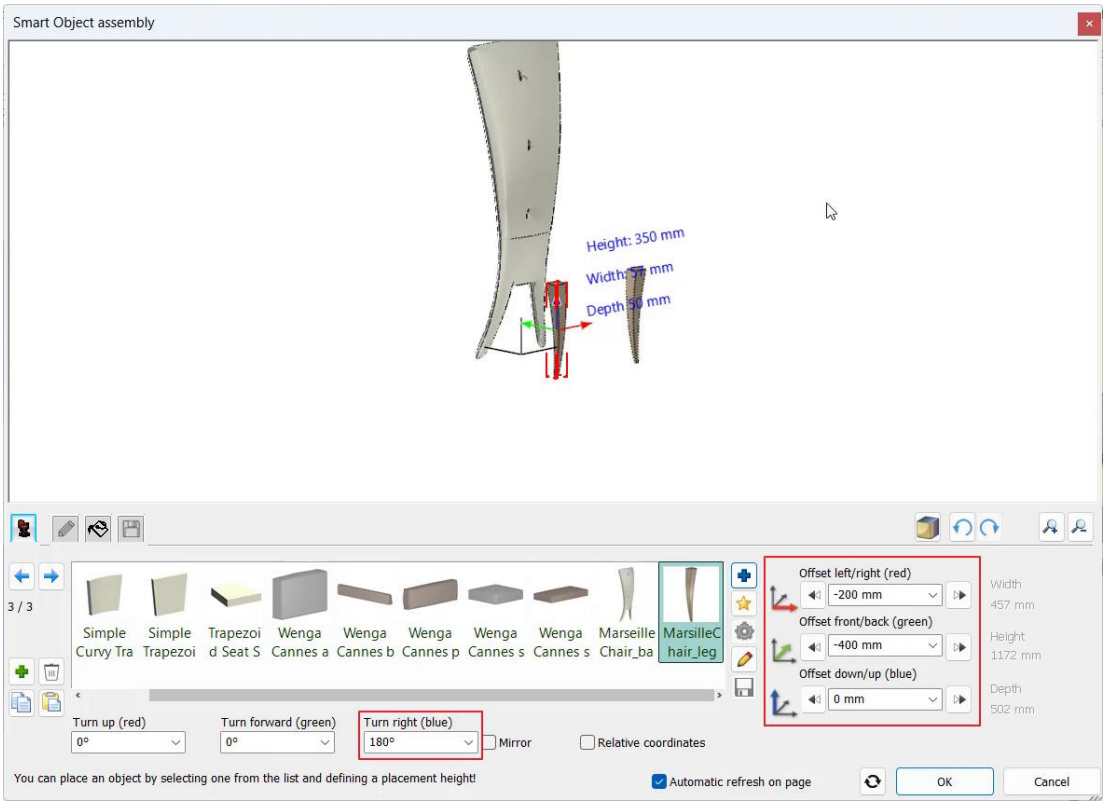
- The component appears in red in the dialogue. It means that the back of the chair has not been placed yet. Click on the green tick to do so.



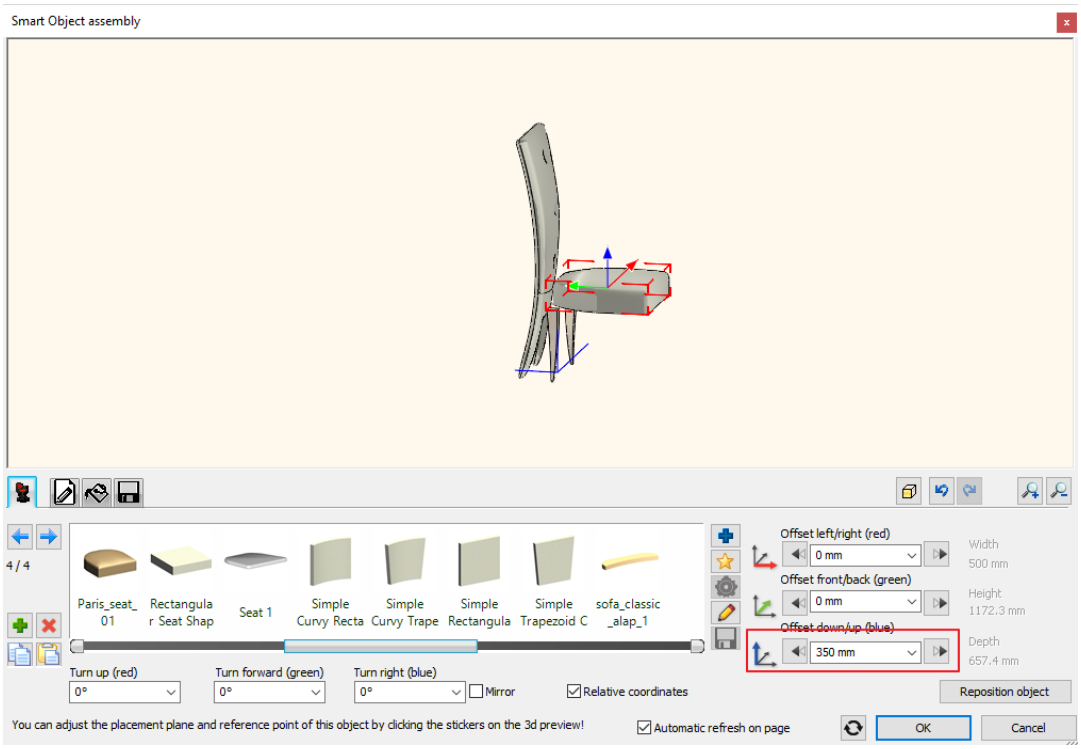
- Add the subsequent parts: the legs. First, click on the green cross icon.
- Find the legs in the library.
- It is placed on the top of the back, so it needs to be positioned. Move it 0 mm along the blue axis, 200 mm along the red axis and minus 400 mm along the green axis.



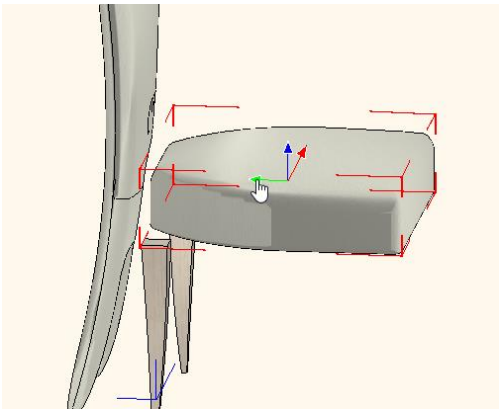
- The next element that we place is going to be the other leg, so leave the leg selected and click on the green plus icon.
- Move the leg so that its position is 0 mm along the blue axis, minus 200 mm along the red axis and minus 400 mm along the green axis. One more thing to note here. You must turn right the foot 180 degrees along the blue axis.



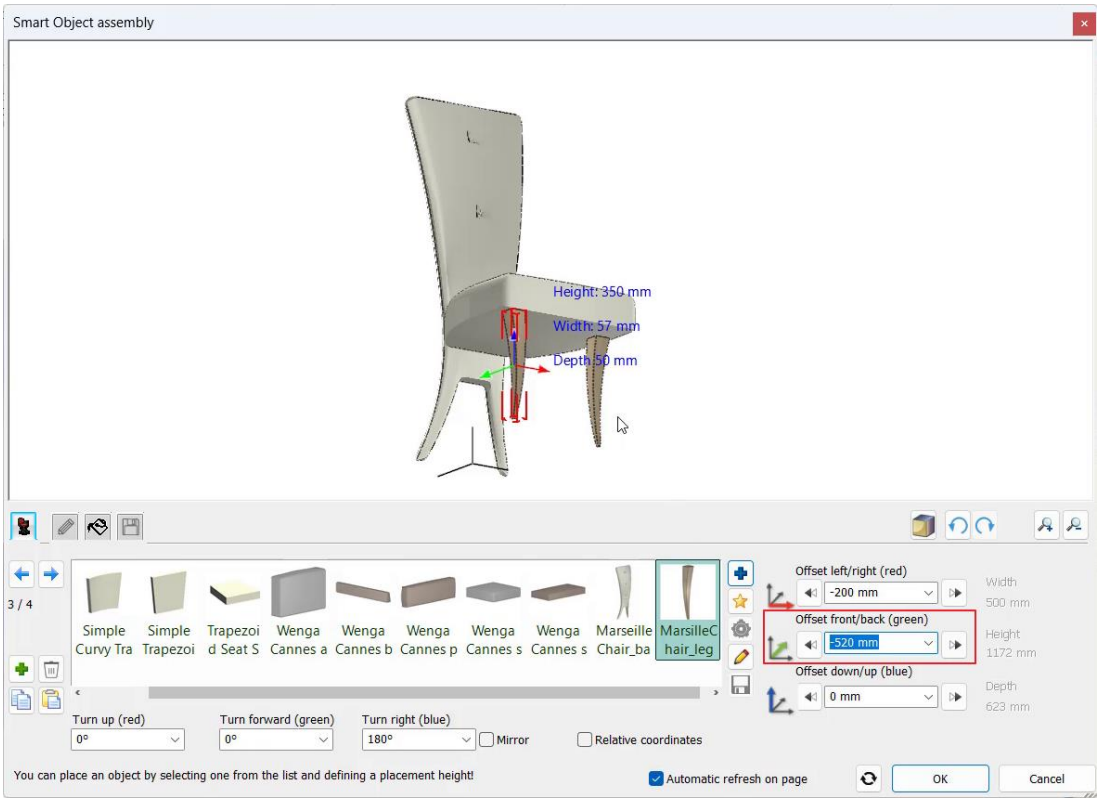
- Let's place the seat cushion. Click on the green plus.
- Select the seat cushion from the library.
- The height of the seat cushion will be 350 cm, since that was the height of the feet. This means that you need to offset it by 350 cm along the blue axis.



- Move the seat cushion to the right position along the green axis.



- The last task is to place the legs in the right position. After selecting, move it -520 mm along the green axis. If you do not know the exact value, you can move it by using the arrows.



- Move the other leg to the right place too. Move it -520 mm along the green axis.
- The chair is ready. The final task is to save it in the Library. Name the chair and save it to the Dining room category and Chair subcategory. You can also give the name of the producer.
- Now you can place it on the floor plan.

  In the future, the chair is available from the Design Center / Objects / Dining room / Chair subcategory, where you can find the original and your chair as well.

Workshop 7: Stairs and railing

7. Workshop: Stairs and railing

In this lesson, you can learn how to create stairs with different geometry and their railing.

- ❖ Placement and editing stairwell with U-shaped stairs and its expanded railing
- ❖ Creating a gallery
- ❖ Placement and editing of a Spiral Stairs
- ❖ Customized railing
- ❖ Customized stairs
- ❖ Steel-framed stairs

- You can watch a video of the workshop here.

Opening and saving project

First download the "**Workshop Projects 2024 - Intermediate Course**" from our website, then install it if it is not already installed. It contains the projects for the intermediate course workshops.
https://www.archlinexp.com/enrollments/courses/intermediate-course

How to start

- Start ARCHLine.XP software
- Click on „**Open Project**" button
- Open the following project file without any furniture *…\ARCHlineXP Draw\2024\Workshop_Intermediate\7_Stair_and_Railing\Stair_and_Railing_START.*

Save project

Before doing anything, first you must save the project under a different name.

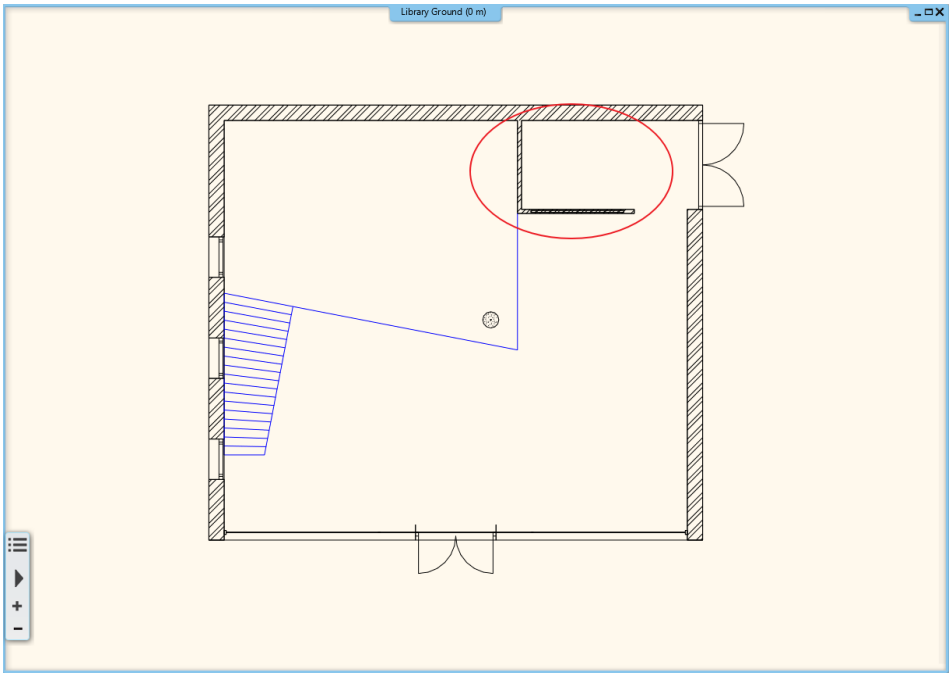
- Choose **File menu / Save project as** command then you can give the new project name and location to be saved.

7.1. Placing stairwell and stairs

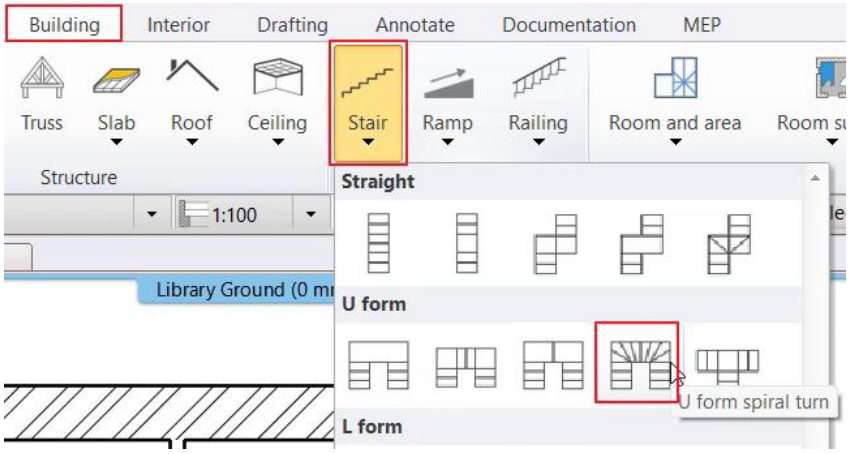
The first type of stairs we are going to create in the project will be a U-shaped stair with expanded railing in a stairwell.

- Activate the floor plan window, then go to the Ground floor.

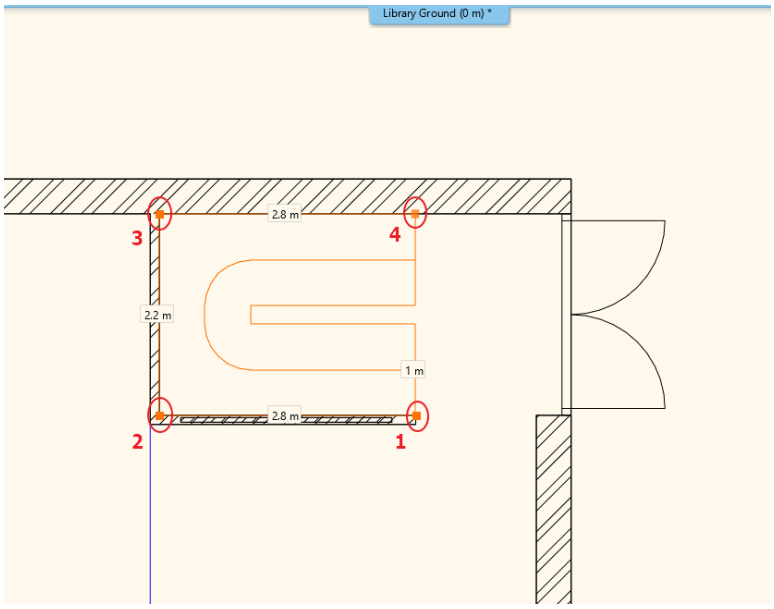
We will place stairs on this level:



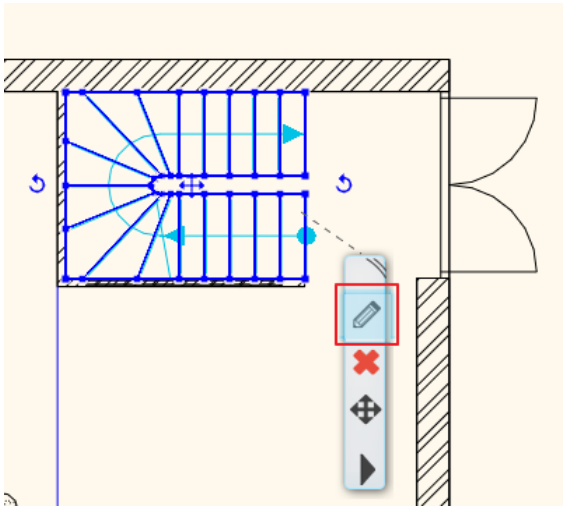
- Go to **Ribbon bar / Building / Stair**. Here you can find tools for creating and editing stairs.
- Select U-form category and "U-form spiral turn" option.



- Move the cursor over to that area where you will place it, and define its four-corner point.



- After placing the fourth corner point the stairs will be automatically created.



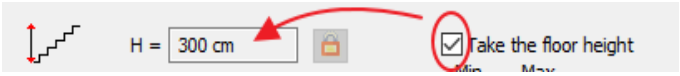
7.1.1. Modifying properties of the previously placed stairs

When you placed the stairs, modify its properties. To do this, click on any points of it, and select the pencil icon from the floating menu.

- Now the Stair window will appear. Set the following values:

Floor height:

Activate the “Take the floor height” option, this value will be automatically overwritten as per the project to 300 cm.

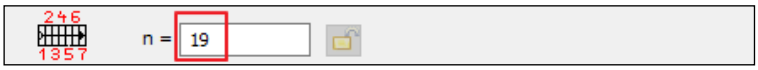


Action and entry parameters:

Unchanged now, since these will be derived from the number of the steps. These parameters should fall within that range is defined by standards. If they don’t, the program will indicate in red. The stairs can be placed in the plan anyway.

Number of the steps:

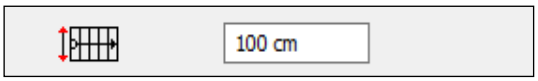
It can be changed here. Enter the new value 19.

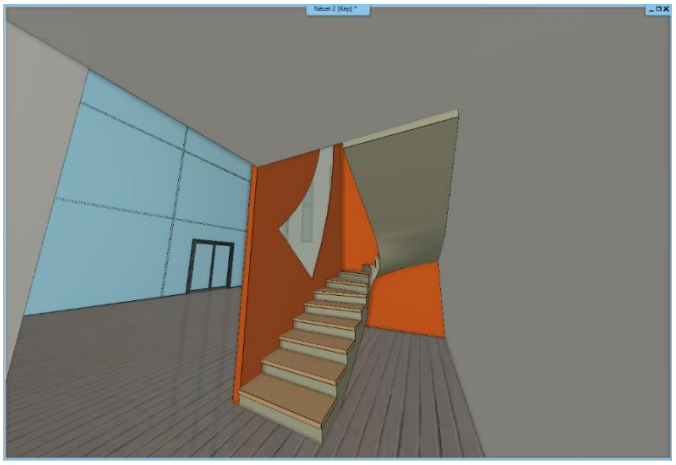


❖ **n1, n2:** In the case of winded stair, the values of n1, n2 define the number of non-winded steps on the straight side. If you want staircases of the same size, the two values must be the same. Both should be 6.

Width:

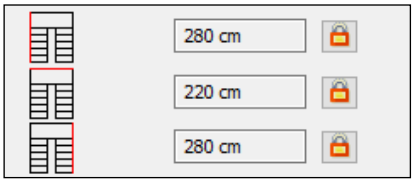
It is shown here, which is currently 100 cm.





Side parameters:

These three values show the length on each side of the stairs, shown below:
The padlock must be opened before modification.



Rounded radius:

Rounded radius can be found at the bottom.:

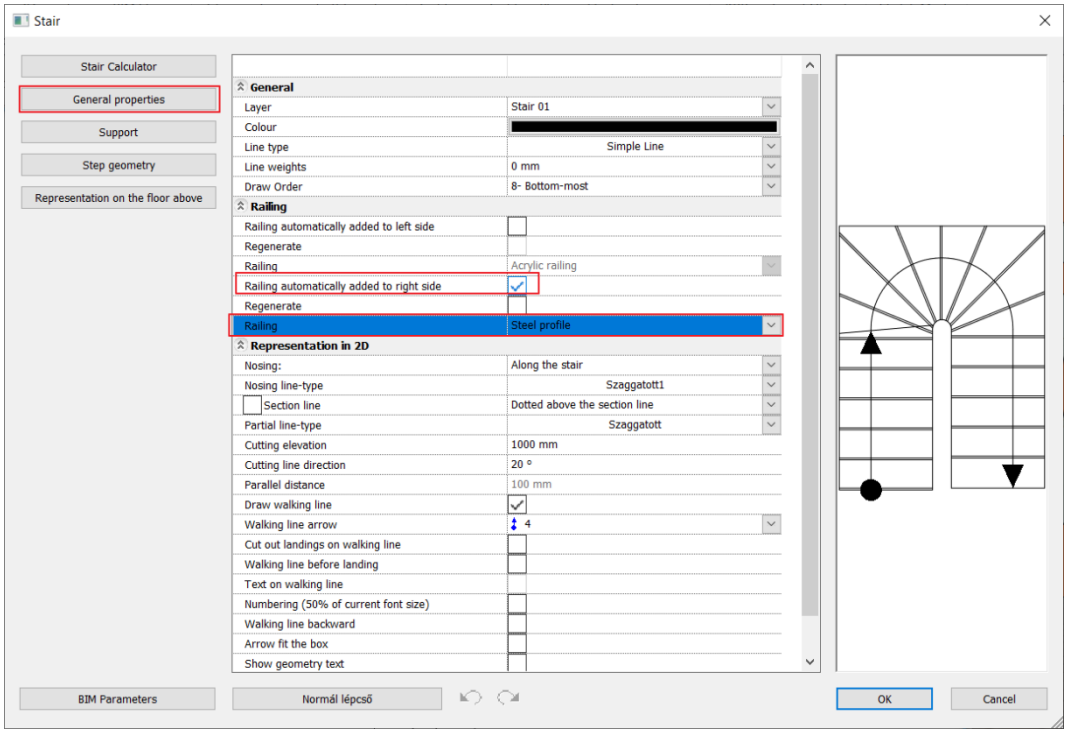
When you finished with the settings, close the dialog window by pressing “OK”. Now the program will create the stairs with the modified parameters.

Active the 3D window, switch to that view point from where the stairs can be well presented.

7.1.2. Create handrail

In the next few steps, we will add railing to the previously created stairs.

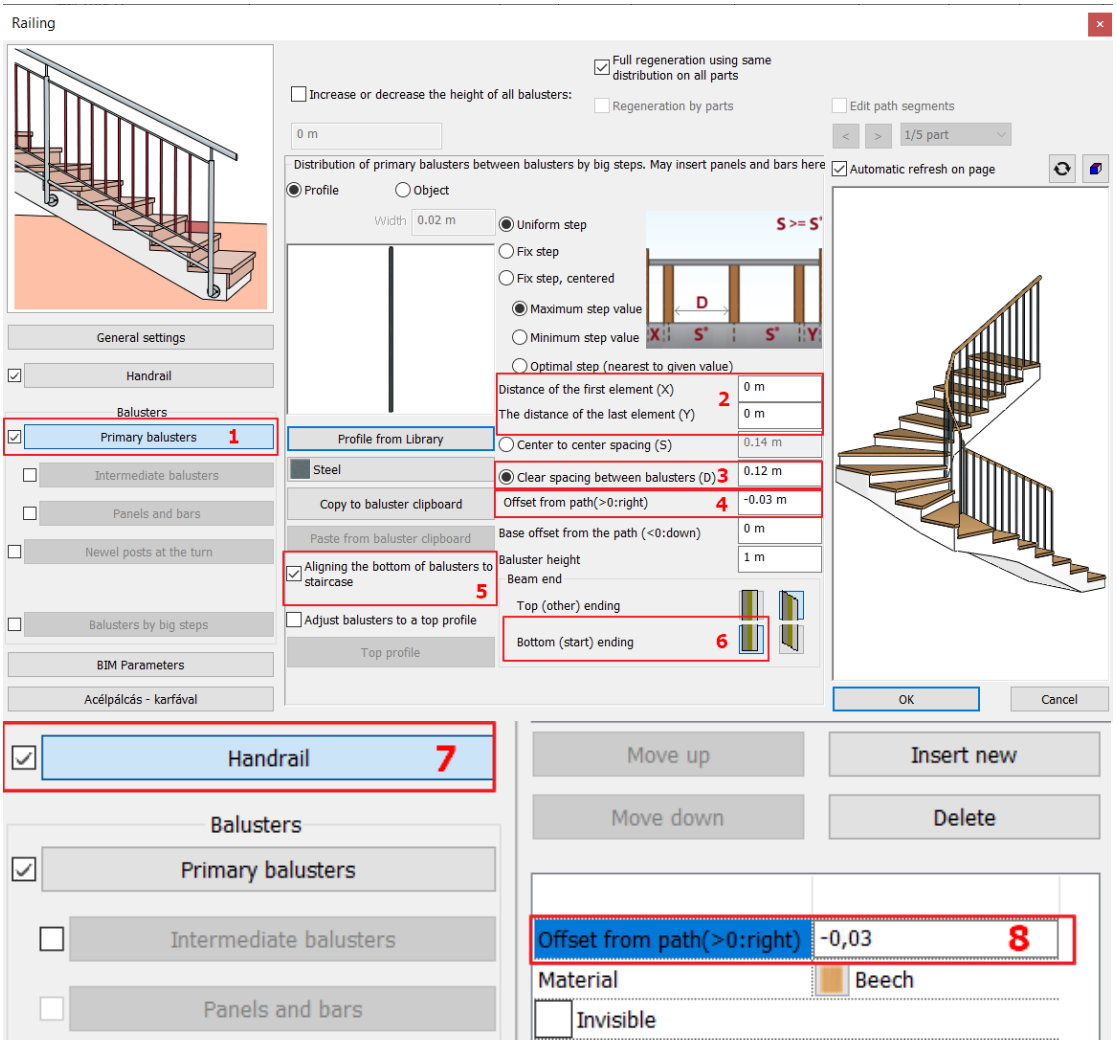
- Select the stairs and open its properties.
- Click on “General properties” tab.
- Activate the style on right side, as the handrail only goes up on the right side of the stairs, and select the “Steel profile” type.



- Close the window with OK, and the program creates the railing.

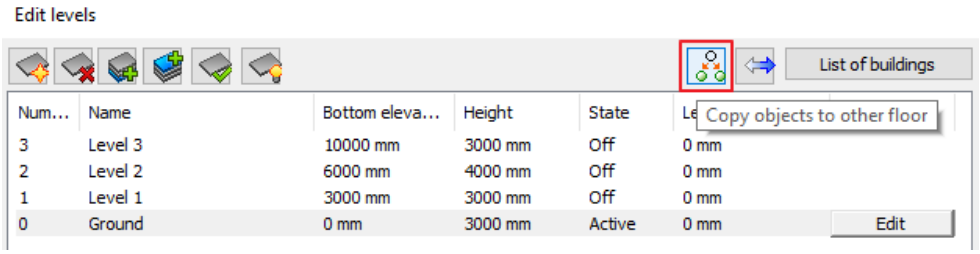
  The railing follows the stairs’ line and goes up. The railing is a separate element, so the stairs and railing can be selected separately.
  Further changes should be implemented to use this stair in practice.

- Select railing and open its properties.
- Select Primary balusters tab and then set the followings (1):
- Change the distance of the first and last balustrade to 0 (2),
- Activate the **Clear spacing between balusters** instead of Center to center spacing, its value will be 120 mm. (3)
- Offset from path will be -30 mm. (4)
- Activate Aligning the bottom of balusters to staircase, and set the Bottom ending condition to perpendicularly ending. (5,6)
- Now go to **Handrail** option. Set Offset from path to -30 mm. (7,8)
- Click OK to close the window, now the railing is finished.

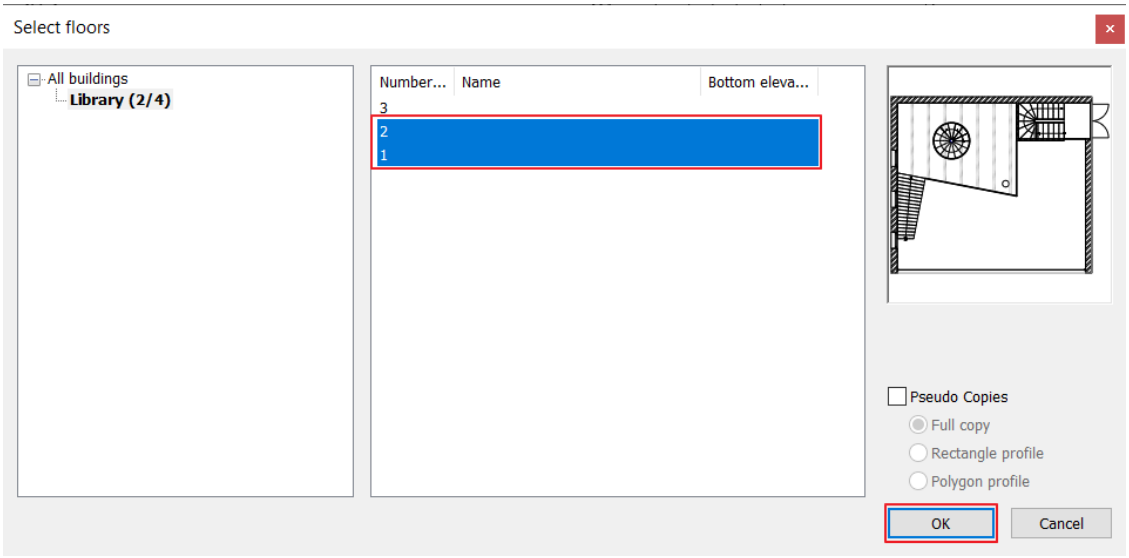


Since our building consists of several levels, the stairs should continue. The simplest way is to copy the existing stairs and railing to other levels.

- Activate the floor plan window.
- Select both, the stairs and the railing, holding down CTRL key, then open Edit levels dialog window.
- Select Copy objects to another floor.

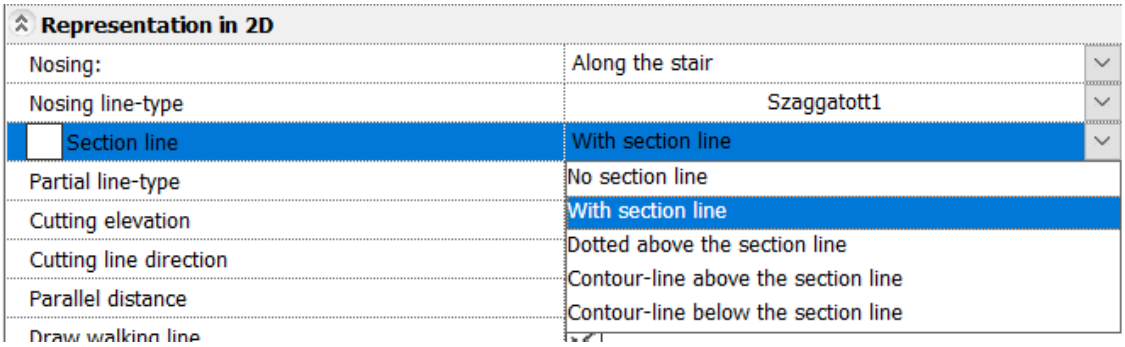


- In the popup dialog window, select the first and second level, and then click OK to finish copying.

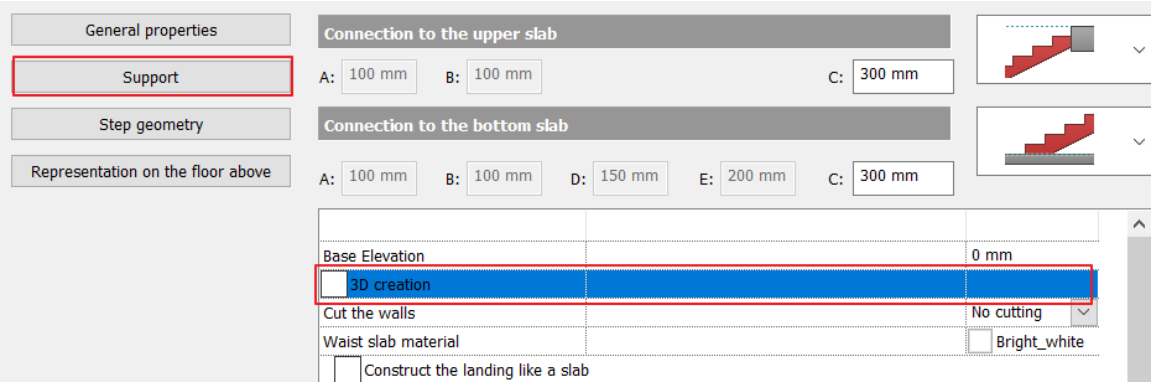


There is another faster and easier way to create a copy to other floor. Select items to be copied on the floor plan, then on the property grid next to “Copy to other floor” option, choose the requested floor. Click on OK to finish.

- Go to the first level and enter the properties of the stairs there.
- In the General properties, select the Representation 2D option with section line.



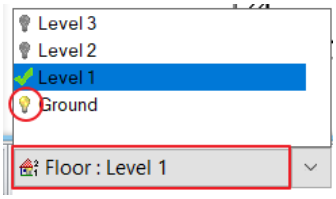
- Go to the second level and select the properties of the stairs there.
- Under Support, turn off the 3D creation option, and under General properties, select No section line for 2D representation. Clear the barrier on the second level.



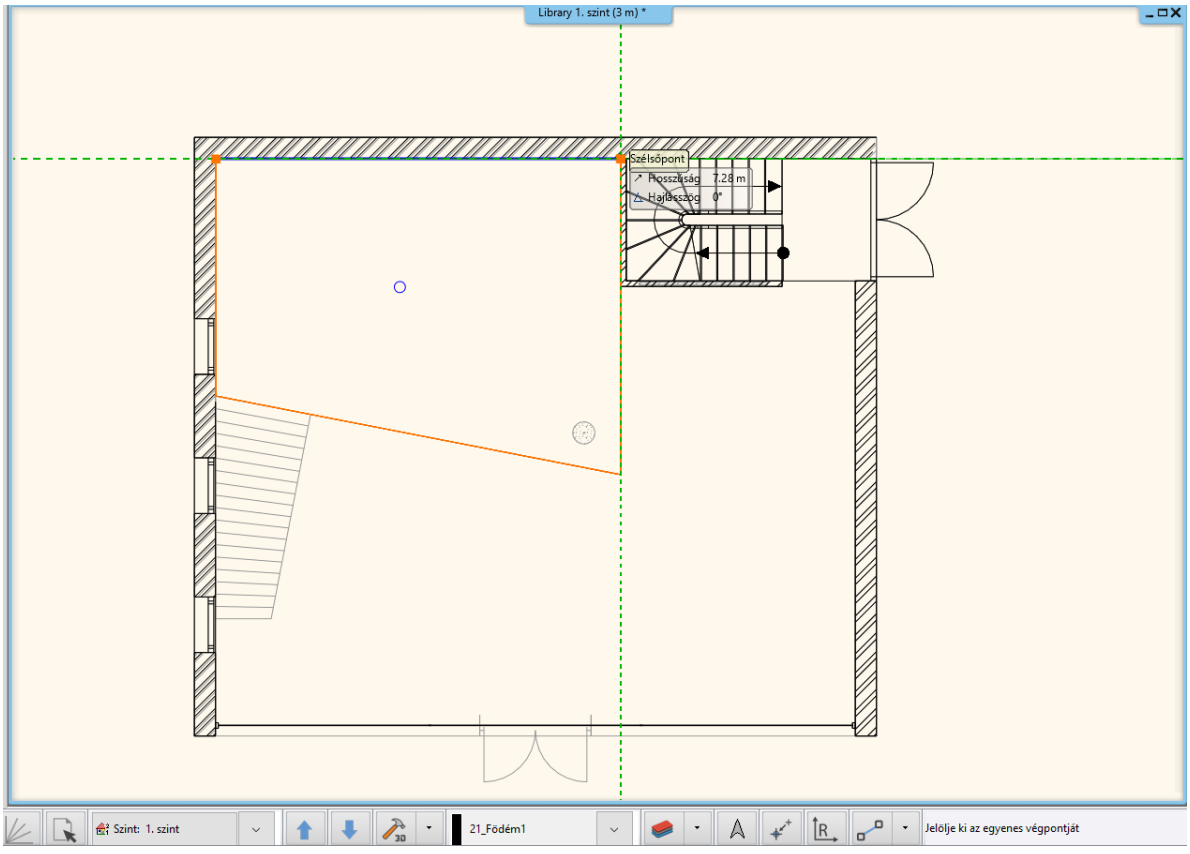
7.2. Create gallery

Before moving forward, now create gallery on both floors. These galleries will be made of timber slabs. Let's see how to create them.

- The floor plan window is active.
- Go to the first level, then make the ground level visible by clicking on the light bulb icon next to it.

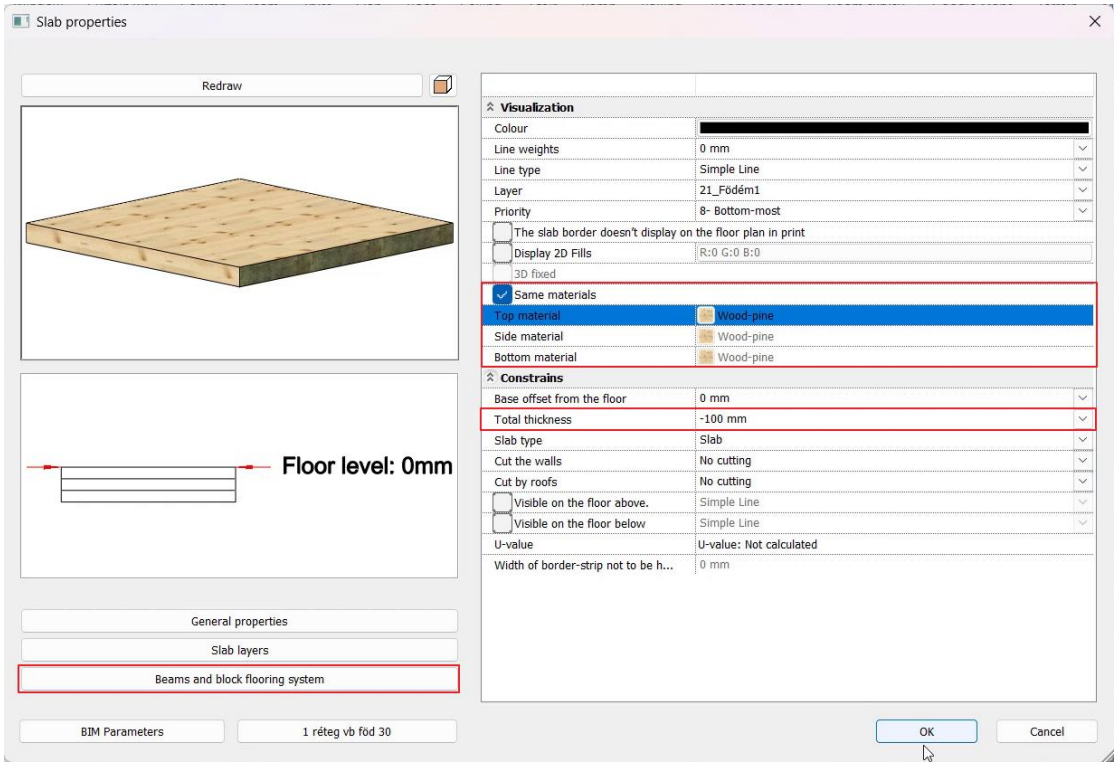


- Use the **Ribbon menu / Building / Slab / Slab in Sketch mode** command**.** Draw around the slab line, starting from the top right-hand corner and moving clockwise.

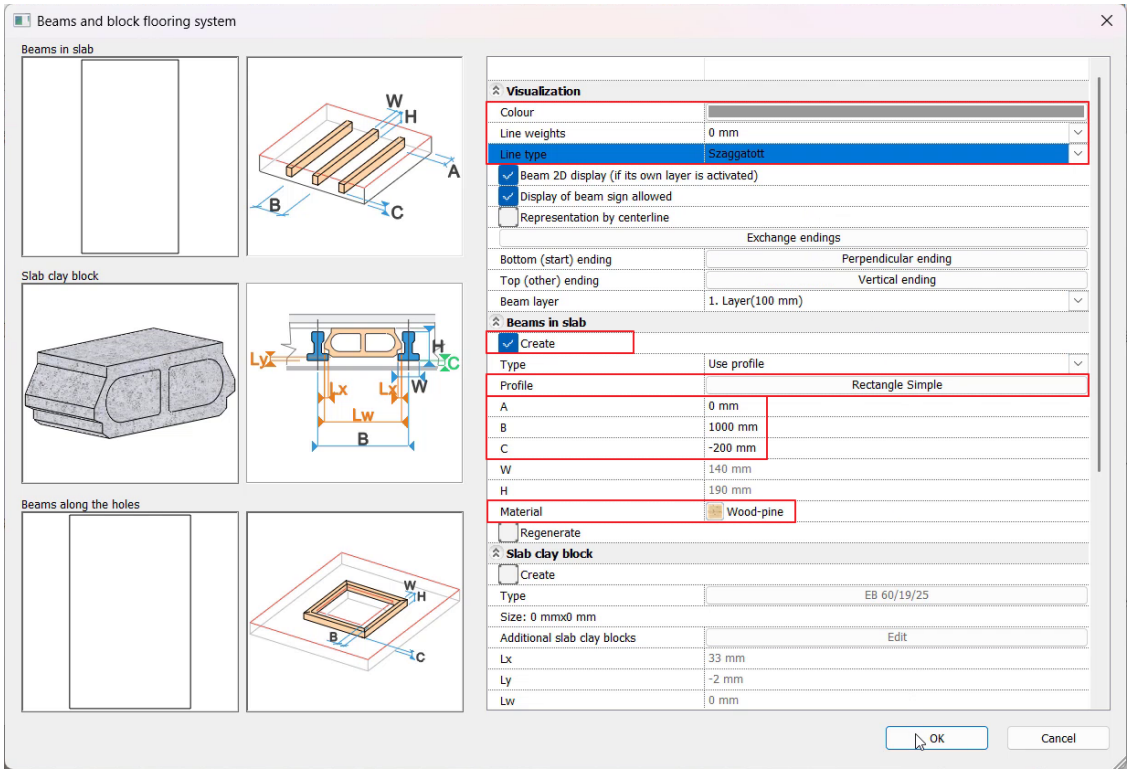


- First select the slab and edit its properties.
- Make sure that all sides are of the same material.
- Change the top material to Wood-pine type.

- Set the total thickness to minus 100 mm.
- To set the structural properties click on “*Beams and block flooring system*”.



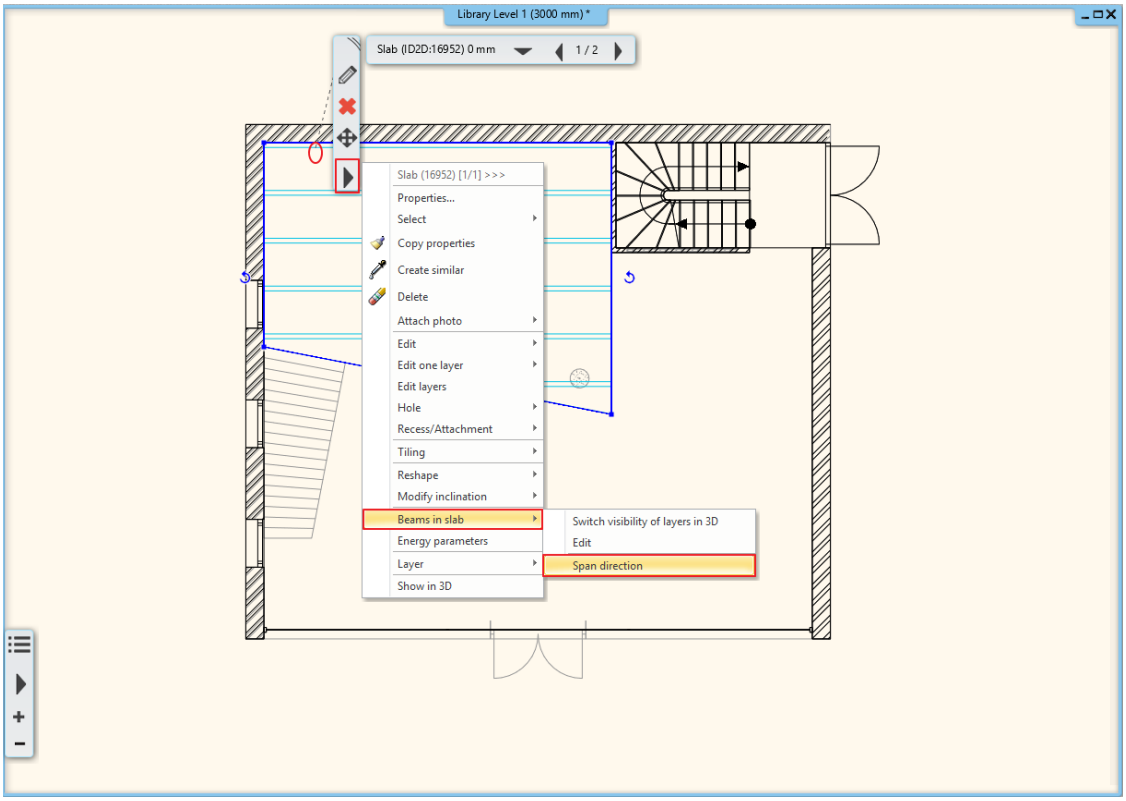
- In the appearing dialog window under “Beams in slab”, activate “*Create*” option.



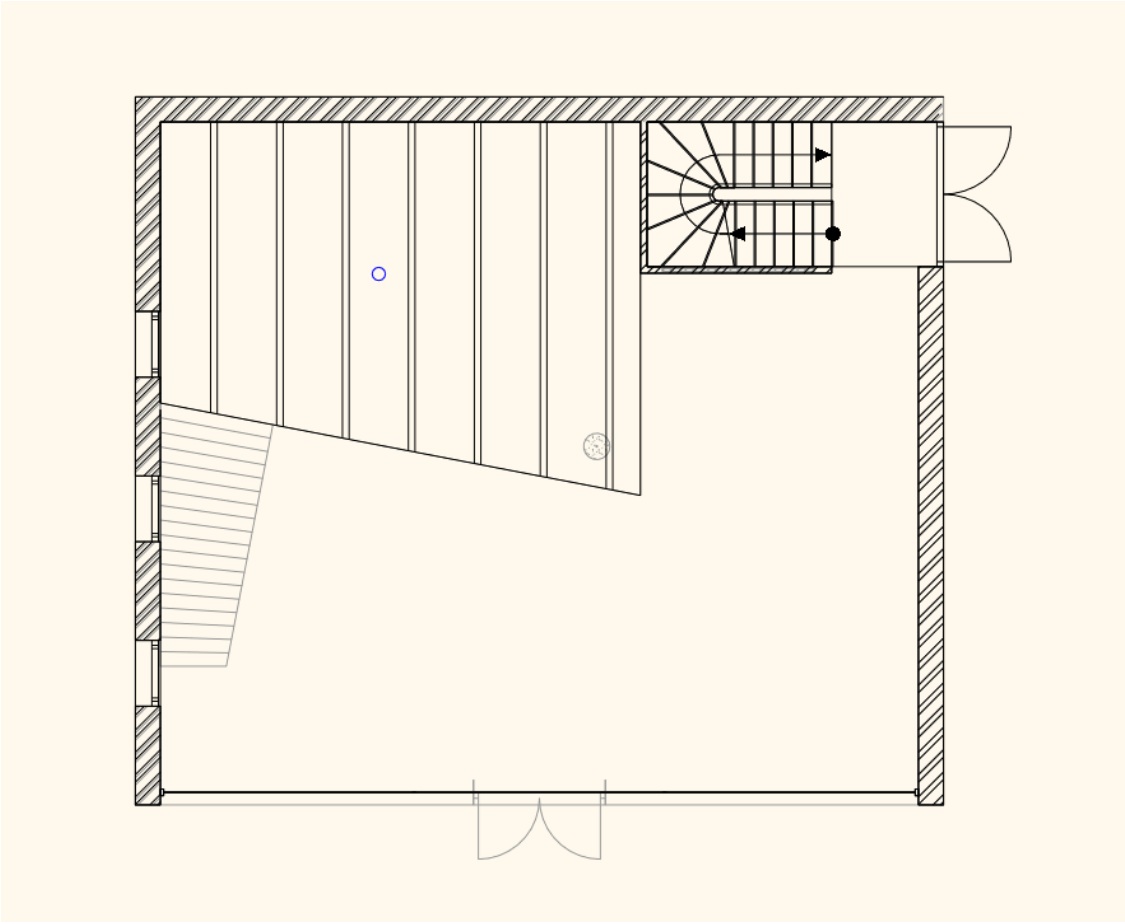
- Select rectangle simple profile by clicking on E-24 style. This is the current profile.
- In Edit Profile window set the width to 100 mm and the height to 200 mm.
  After selecting it, set the main beam parameters.
- The value “A” defines the distance between the beam ends and the slab. Here can be set that the beam ends should be at a certain distance from the slab or be exactly next to each other. Leave this at 0, so that the beams will reach the edge of the slab.
- “B” stands for the distance between beams. Now set this value 1,000 mm.

- “C” defines that height we can raise beams against the lower plane of the slab. Overwrite this value to -200 mm, this way the beam is placed under the 100 mm layer of the slab.
- Finally set the material “Wood-pine”.
- In the Visualization set the color to dark grey and the line type to Dashed.

- When you finished copy the gallery created on the first floor to the second floor. Now go to “Edit level”. Click on the Copy objects to another floor. In the appearing dialog window select second floor and click on OK. Now the copying has finished.
- Finally modify the direction of the Beams in slab if needed. Select the gallery and choose from the local menu Beams in Slab / Span direction.



- Hold SHIFT button down and modify the direction by 90 degrees. It is important to hold SHIFT key down, this will secure that we could modify the direction along a straight line.

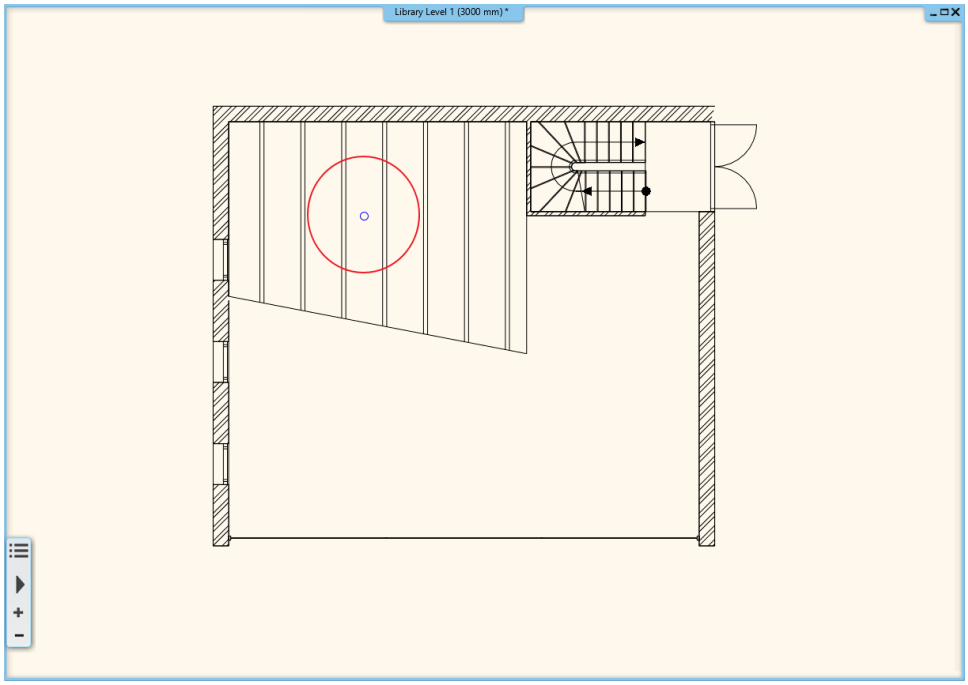


Now repeat this procedure on the second level.

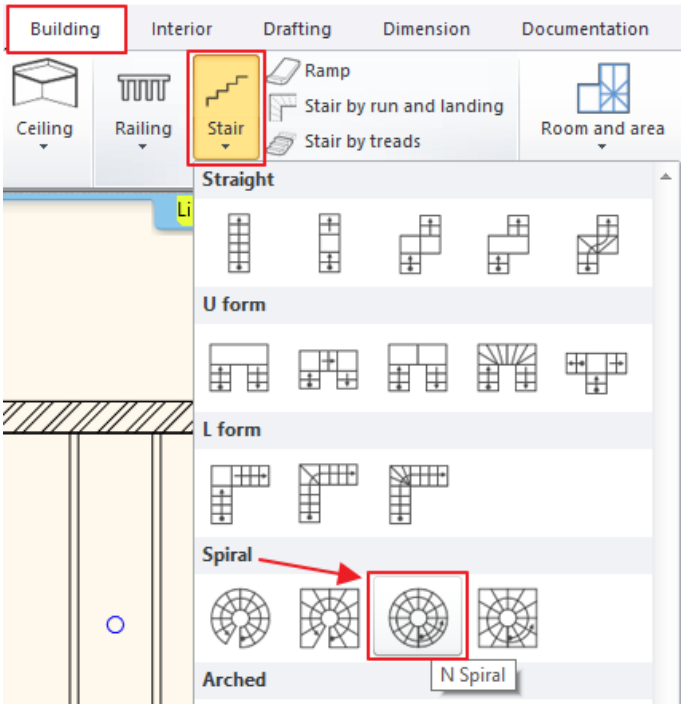
7.3. Placing Spiral Stair

The next step we will place a Spiral stair, which will be the passage between the galleries.

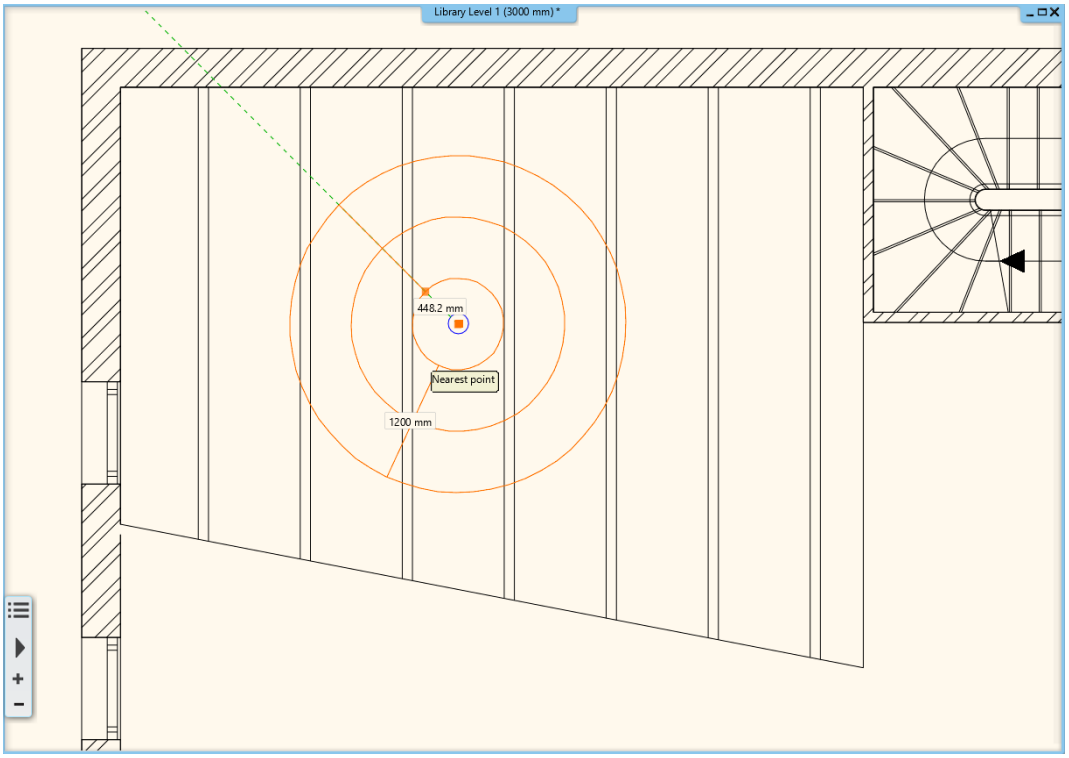
- Activate the floor plan window.
- Go to Level 1. We will place the spiral stair where blue circle is on the floor plan, let’s place the center point here.



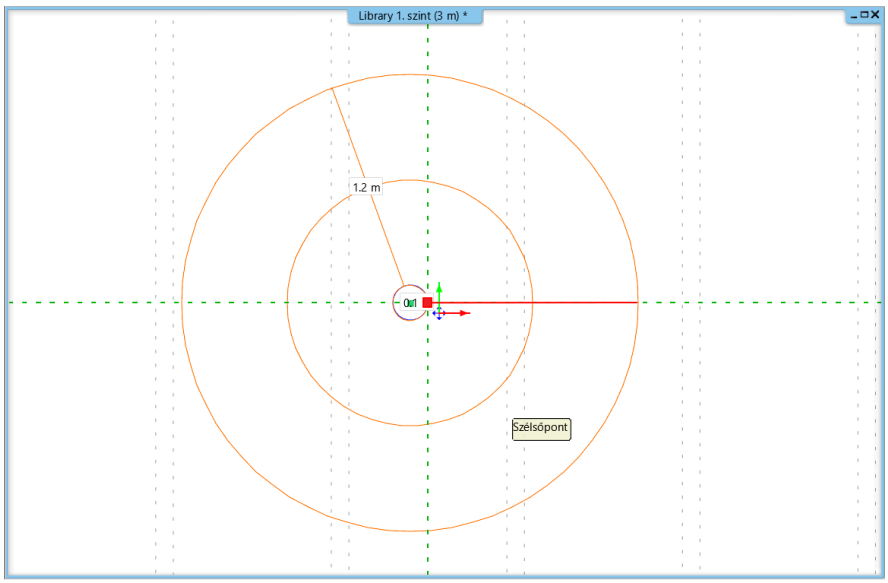
- Go to Ribbon menu / Building / Stairs and from Spiral select “N spiral” stairs from the list.



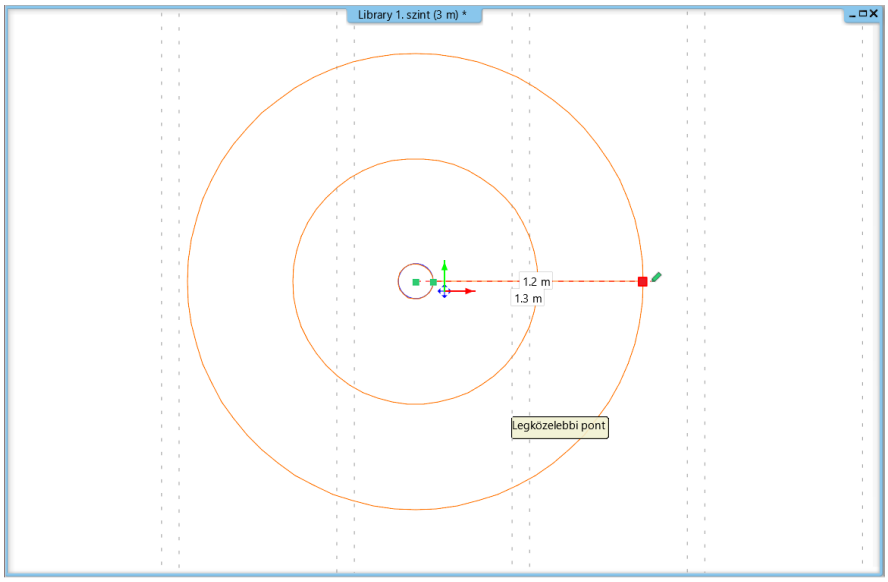
- Place it in the middle of the pre-drawn circle.



- Give the starting point of the staircase. Here it is very important the distance and direction. Click on the right side of the circle so that the first line is horizontal.

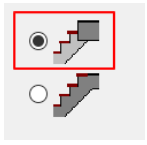


- With the second point, you need to specify how big a circle the staircase should describe. Since we are creating a 360° staircase, click on the starting point of the staircase circle.

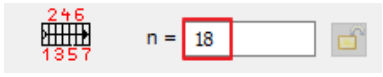


7.3.1. Modify Spiral stairs properties

- When the stairs are placed modify its properties. Click on the stair, then select “pencil” icon.
- First, choose the last step to be the slab.



- The values for step in and step-up haven’t been updated.
- Now modify the number of steps to 18.

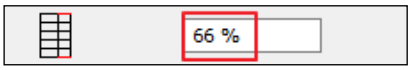


- The difference between the starting and end point is 360°. This means that the stair runs along a whole circle.

- The width should be 100 cm.

- To get a radius of 10 cm, rewrite the total width of the staircase to 220 cm after unlocking the padlock.

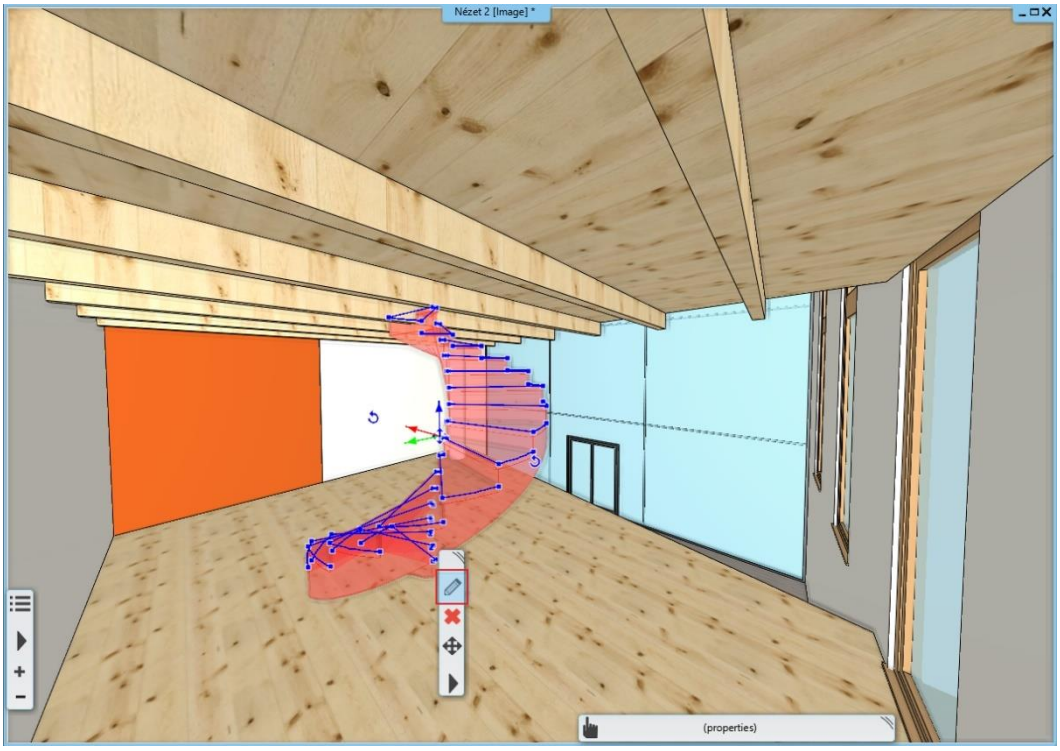
- The last parameter helps to define the walk line. Along this line the program automatically calculates the values of tread and riser. The walk line of the spiral stair is not in the middle. This should be closer to the outer circle somewhere around the 2/3 of the total width. It means that the walk line will be 66 % away from the center point and that way the tread will be wider outside.



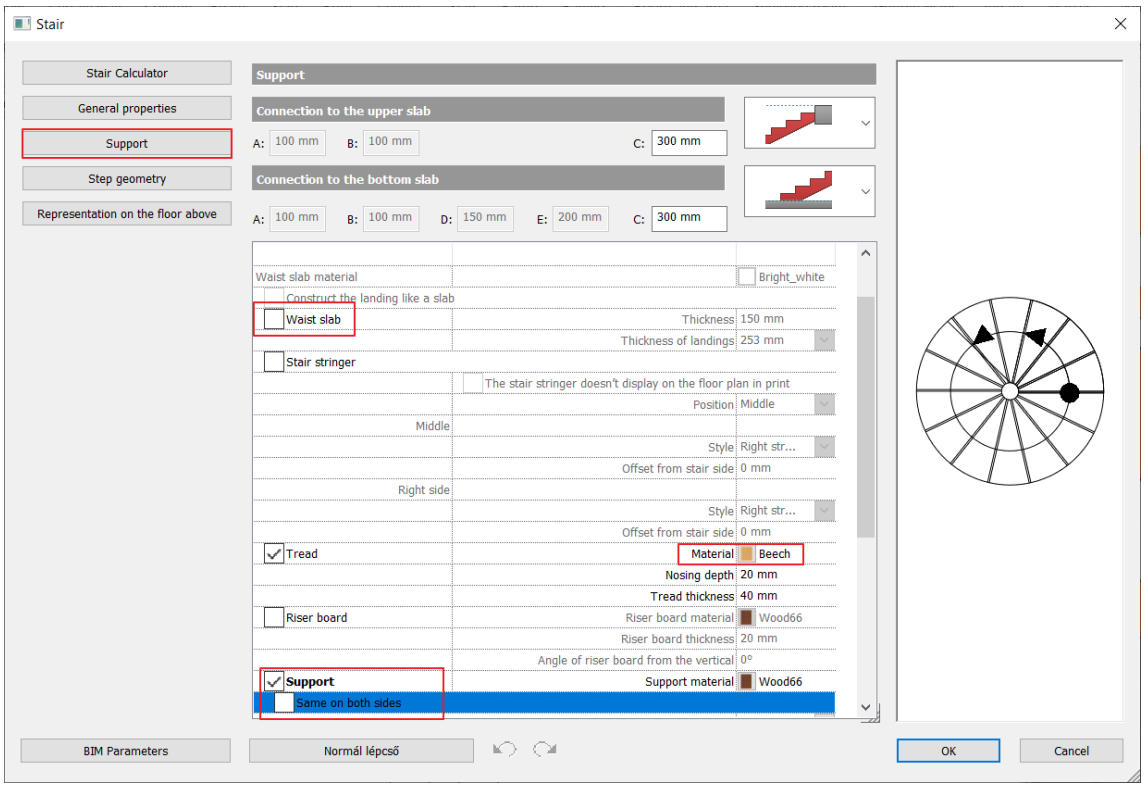
- Now close the window by pressing **OK** and changes will be applied.

  This stair is concrete we like some lighter structure instead. On the other hand, we have to cut the slab and place railing. Let's edit its properties.

- First, we modify the visual presentation in 3D. Activate 3D window and change the viewpoint from where the stairs look good.
- Click on the stairs and check its properties.

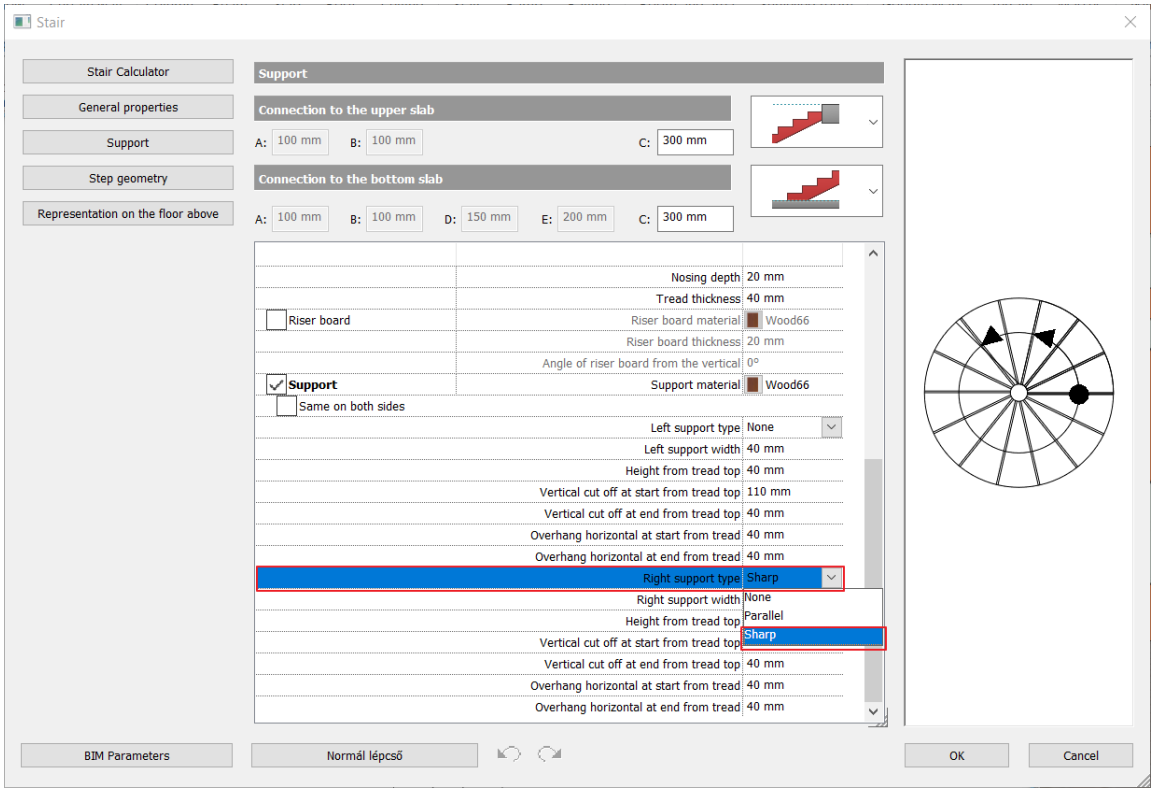


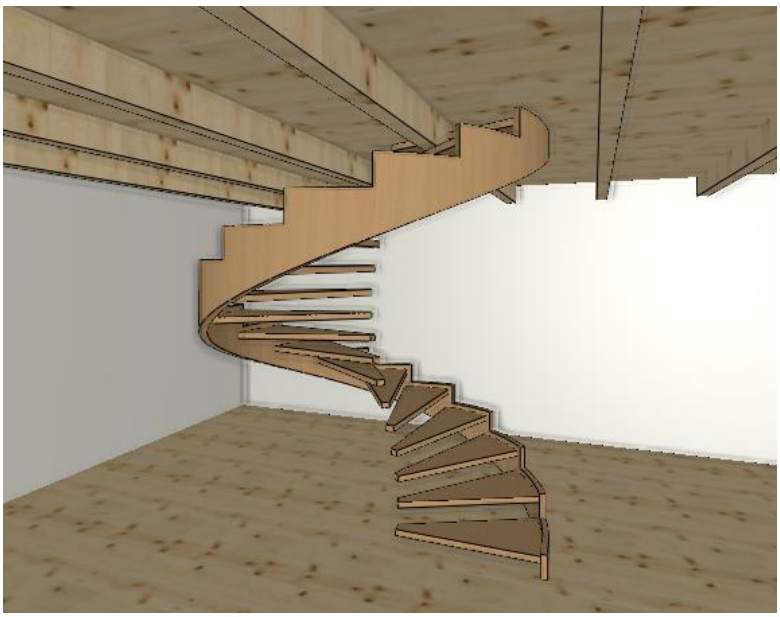
- In order to make changes on the structure click on Support tab.
- Turn off "Waist slab" and switch on the "Support". This command refers to the support representation which follows the steps straight or the bottom edge of the steps.
- Sides of stairs are different, so we will place a column inside. Therefore, switch off the "Same on both side" option.
- Set the material to Beech.



Go further down, then select Sharp from The Right support type.

- Close the dialog by clicking on OK.

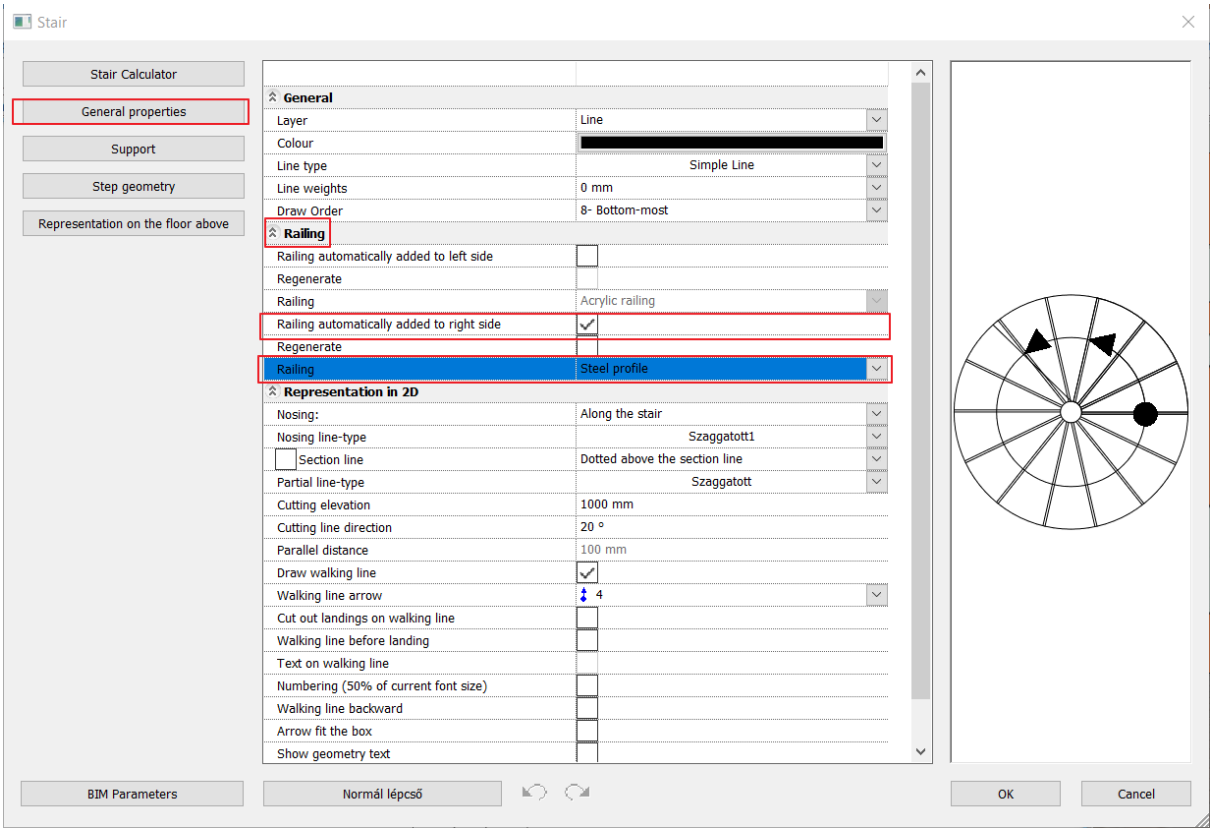




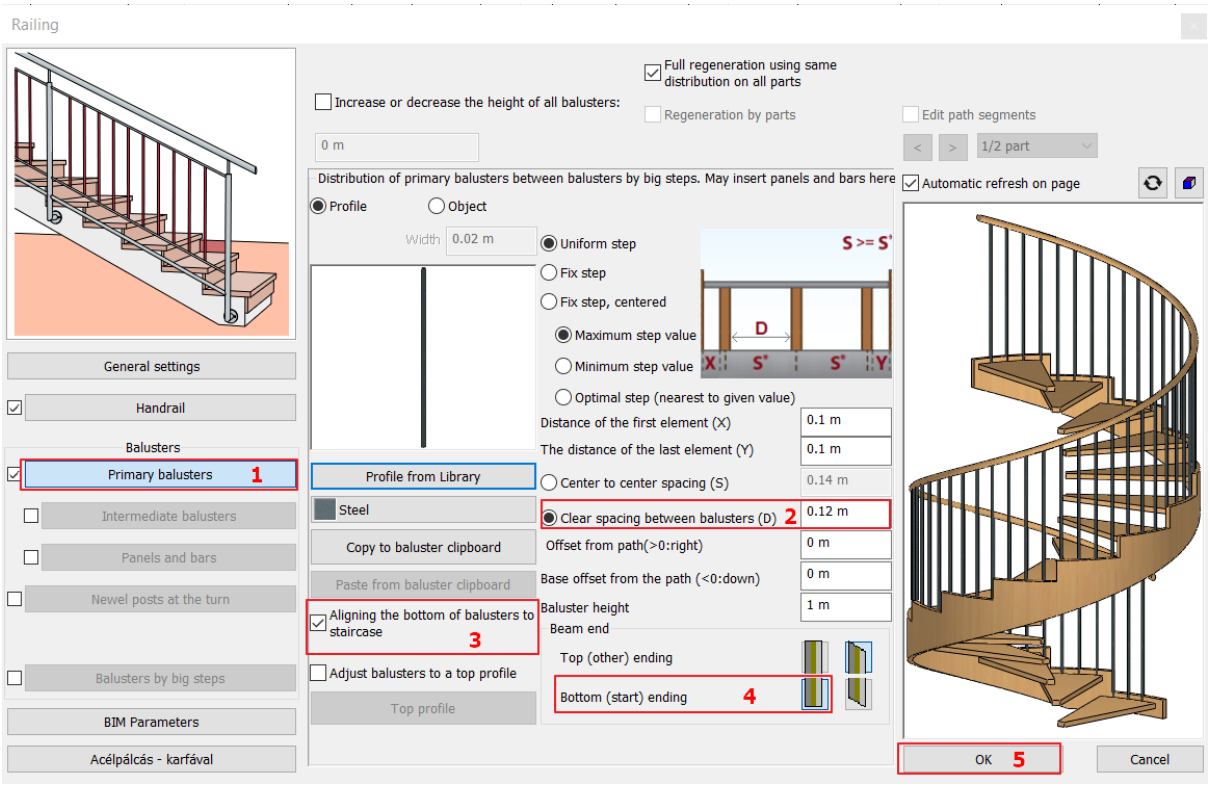
We still need to create the column in the middle, and ceiling cut, and railing.

7.3.2. Placing handrail

- Now go back to the stair properties and select General properties. We set the style on the right side to Steel profile.

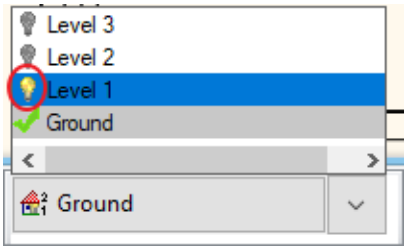


- The railing is created but still not perfect. To modify further open its properties.
- First click on Primary Balustrade tab (1) and activate Clear spacing between items to 120 mm (2).
- Activate Adjust bottom of balustrades to stair (3), also select perpendicular ending condition on the bottom (4).
- Close the dialog by clicking on OK. (5)



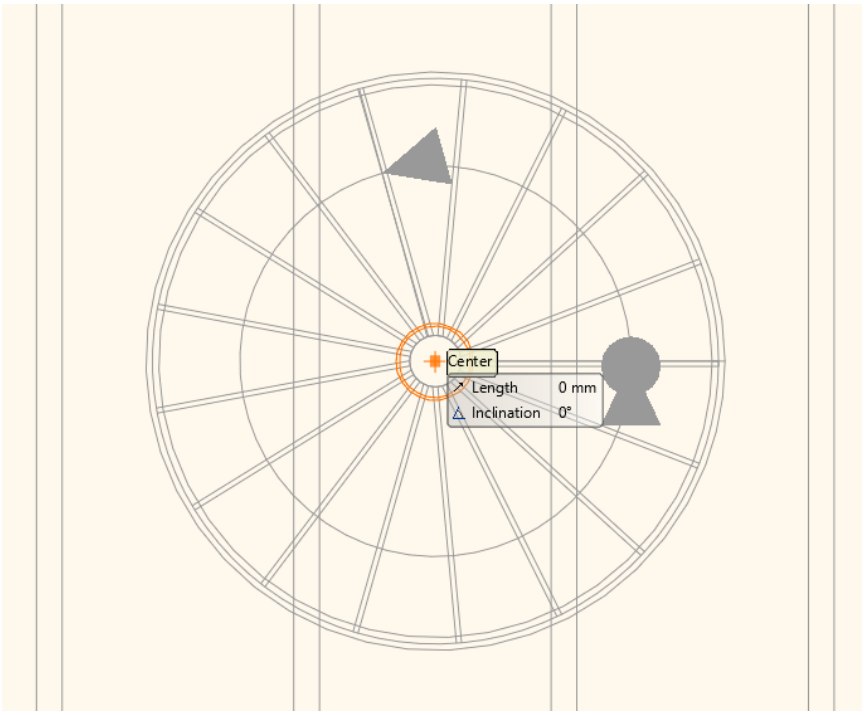
7.3.3. Placing column

Now place a column in the middle of the spiral stair.

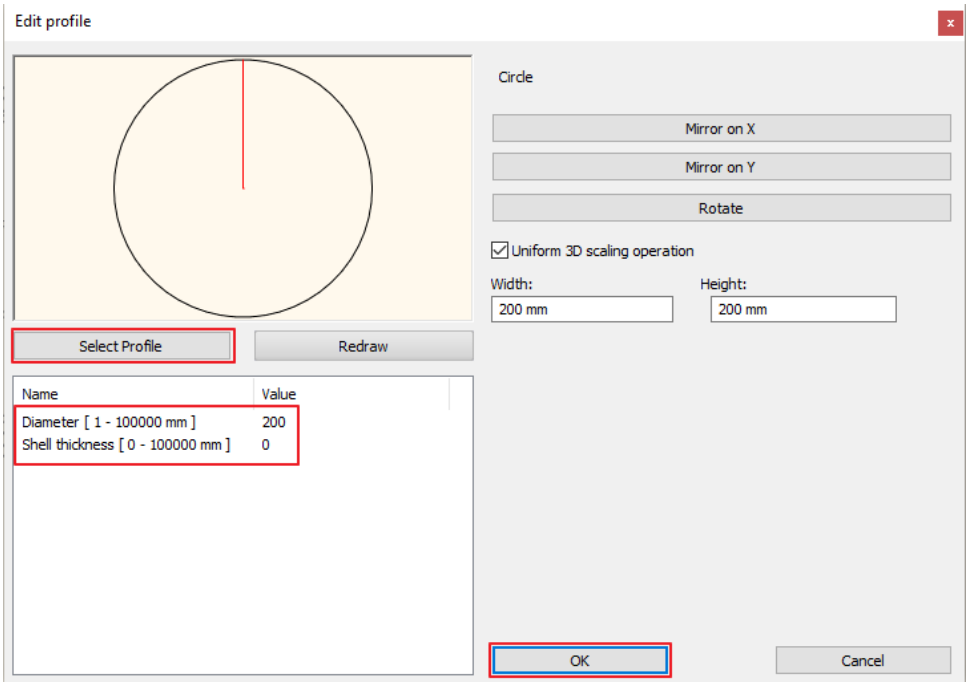


- On the floor plan go to the ground floor, make visible the first floor by clicking on the light bulb icon with the left mouse button.

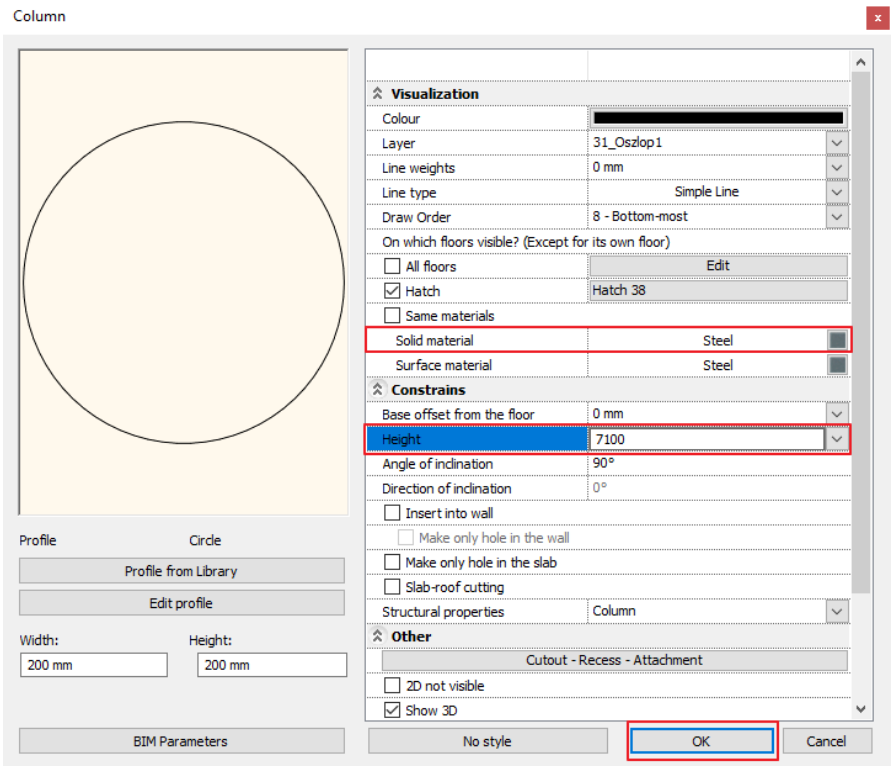
- Go to Ribbon menu / Building and select Column.
- Place it into the middle of the circle and check its properties.



- Specify the value of the section profile. Change the column section profile. Click on Profile from library and select Circle and set the Radius to 200 mm and the Shell thickness to zero.
- Click on OK to accept changes.



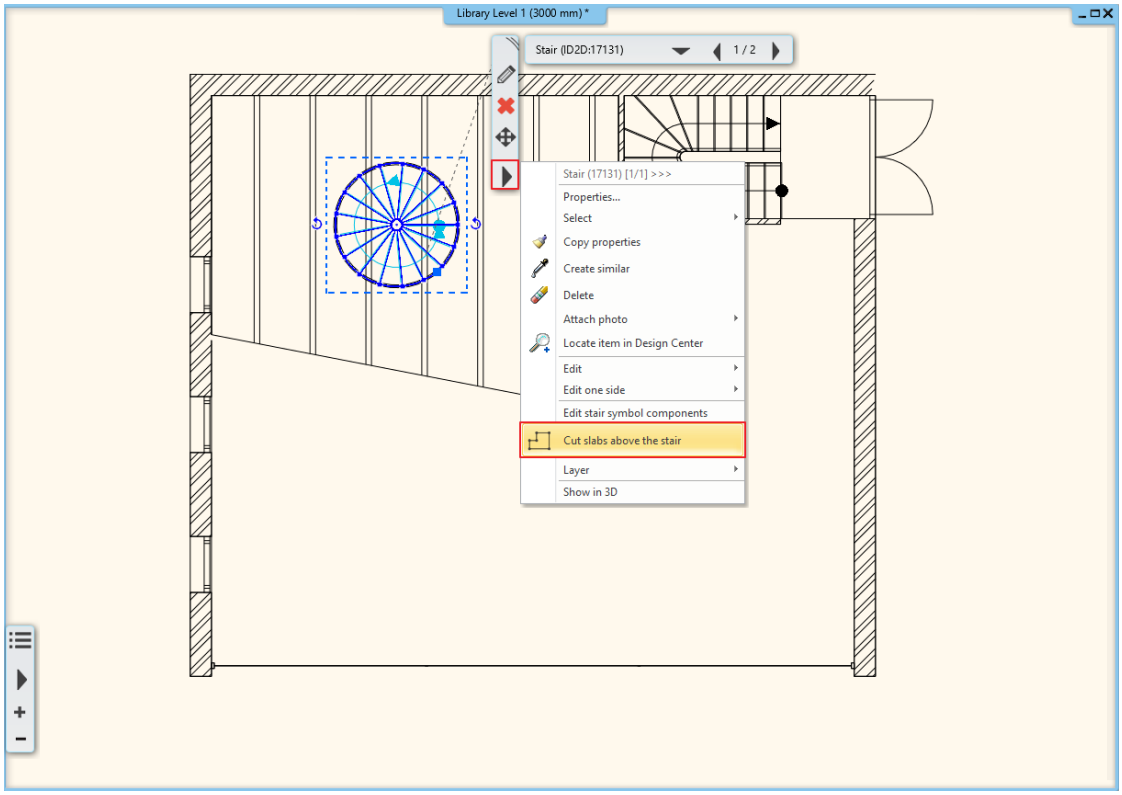
- Turn off the Hatching.
- Its' material is "Steel", before closing the dialog window, we still have to modify the height of the column. In order to calculate the correct height use "Edit Level" tool. Open Edit level dialog window, here you can see that the total height from ground floor up to 2nd level is 6,000 mm. In addition, if the stair ends on the first floor, the handrail is needed here, therefore we have to add 1 000 mm. To be on the safe side, we use slightly higher value 7100 mm.
- Close the dialog by clicking on OK.



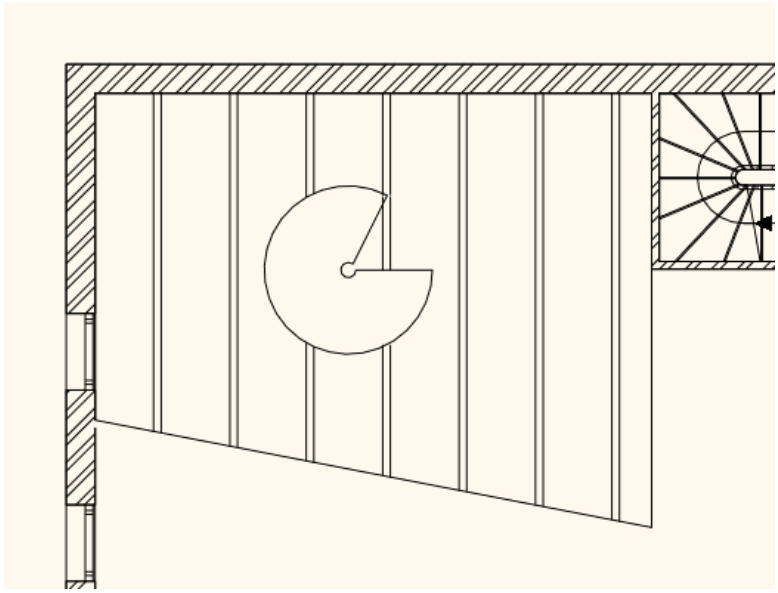
7.3.4. Cutting the slab

Finally, we cut the slab above the stair.

- Go to the first level.
- Click on the stair and select from the local menu "Cut slabs above stair" command.



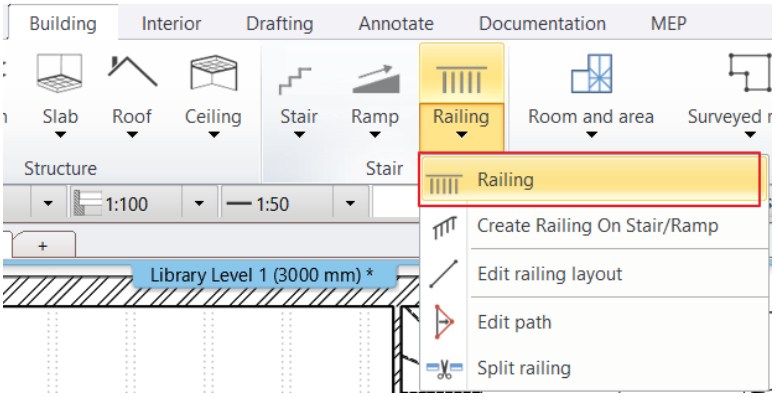
- Now the cutting is done. Go to the next level, here you can see the result.

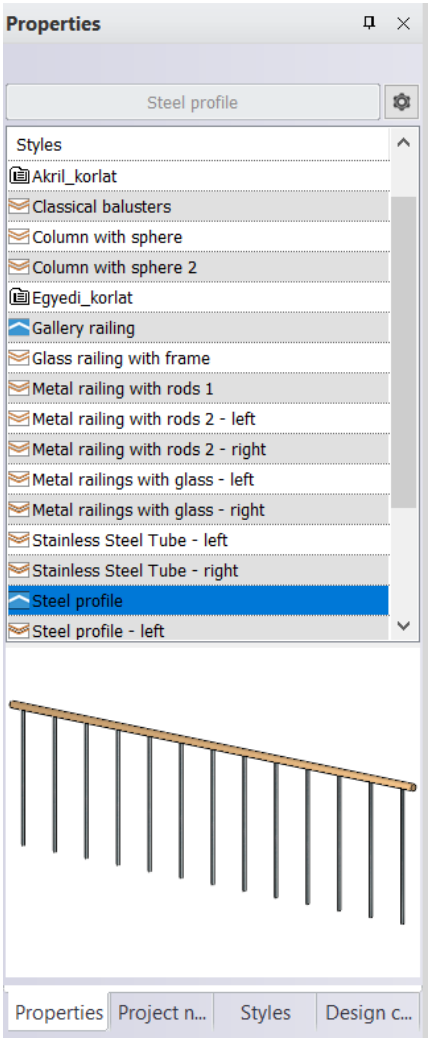


7.3.5. Handrails along the slab cutting

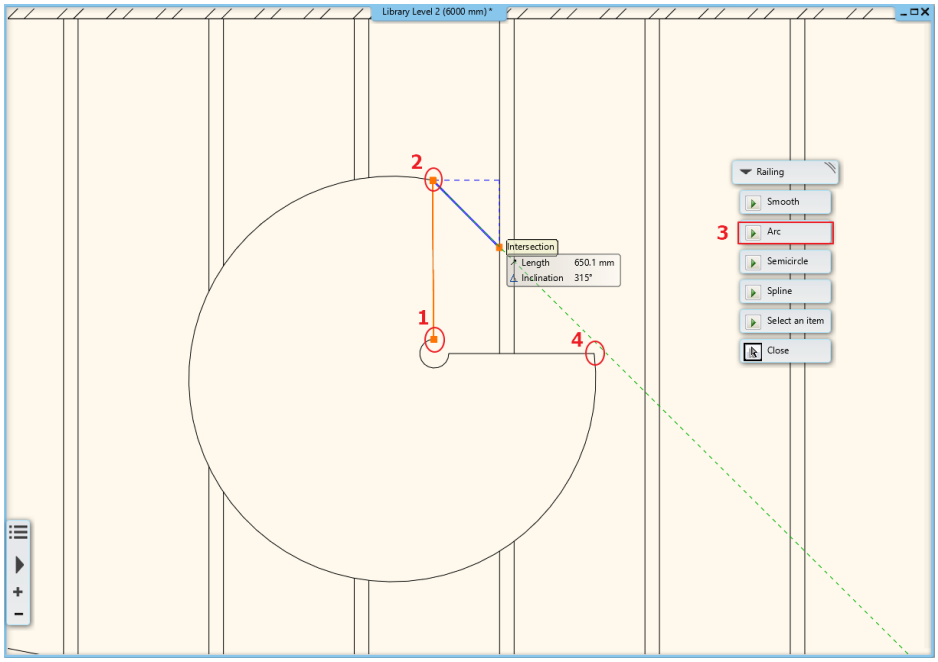
We can create handrail in ARCHLine.XP individually, not just only by placing them on the edges of steps. Now we create handrails following the line of the slab cutting.

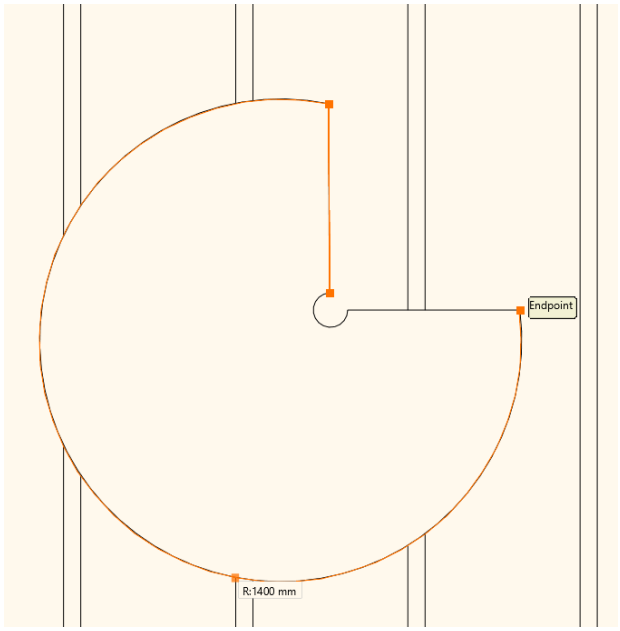
- Activate the floor plan window, now the second floor is active. Turn off the visibility of the ground level and turn on the visibility of level 1 to display the stairs.
- First go to Ribbon menu / Building / Railing /Railing and choose “Steel profile” from the side menu.



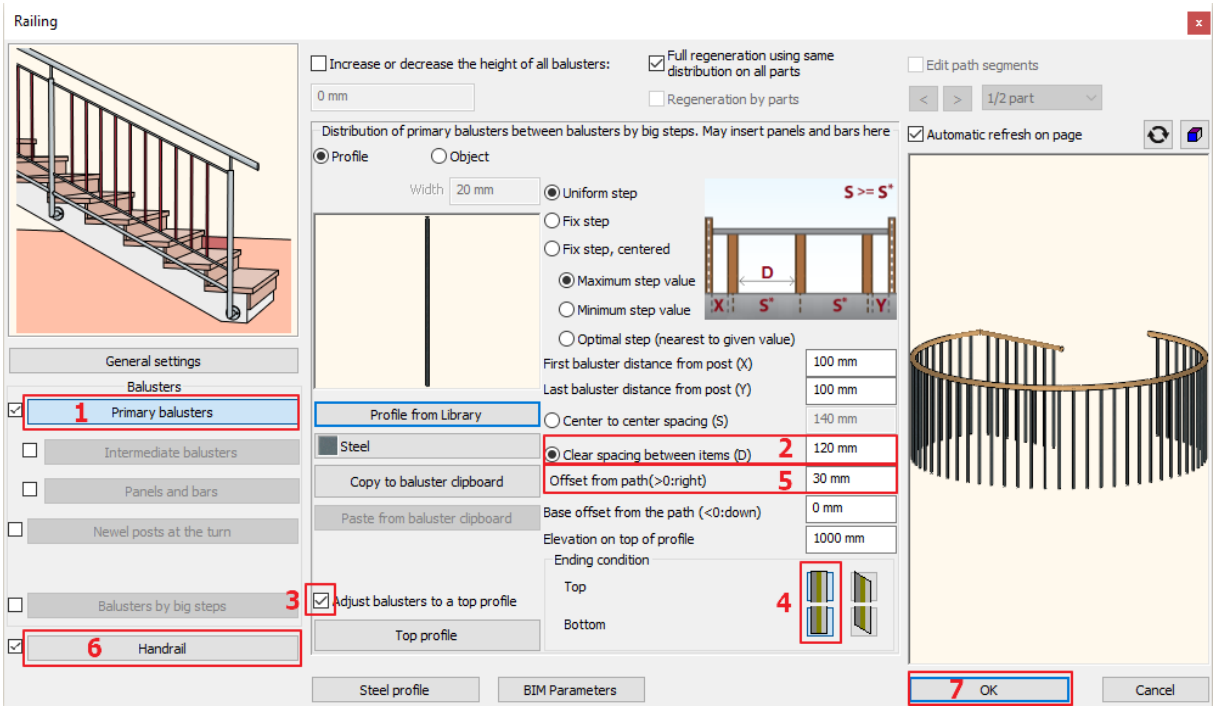


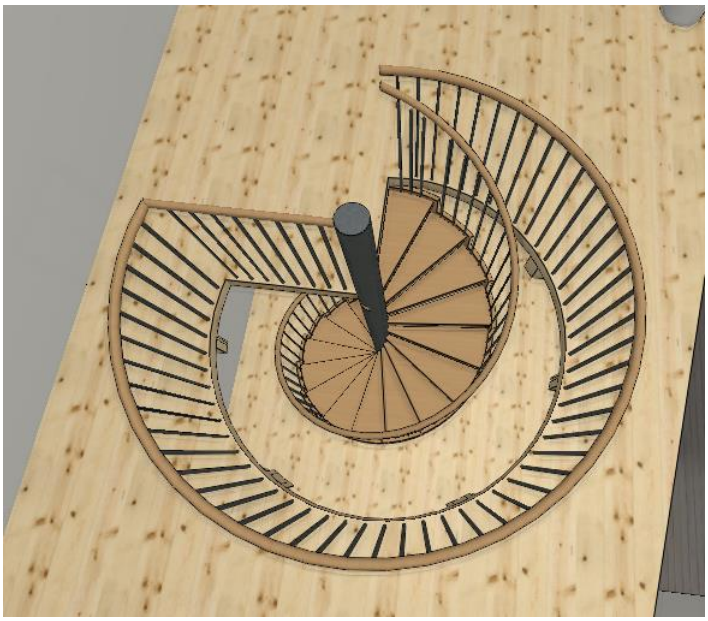
- Draw the railing by using polylines.
- After placing the first two points (1,2) choose from the top right menu Arc option (3). Place the third point too (4), and pull the arc to the proper place.





- When you finished the drawing, close the command by hitting Enter twice.
- This handrail is still not perfect we have to set those properties we have done before.
- First click on Primary Balustrade tab (1)
- Activate Clear spacing between items to 120 mm (2).
- Activate Adjust bottom of balustrades to stair and Adjust balustrades to a top profile (3).
- Select perpendicular Ending condition on top and bottom (4).
- Furthermore, we also have to adjust the Offset from path to 30 mm (5), also change this value to the 30 mm under Handrails tab (6).
- Close the dialog by clicking on OK.



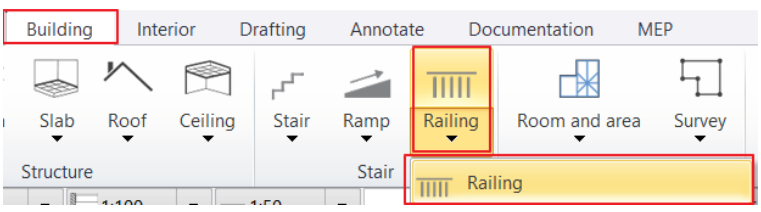


If like to apply the same material on the gallery and stairs too, change it under the Stairs properties to “Natural pine”.

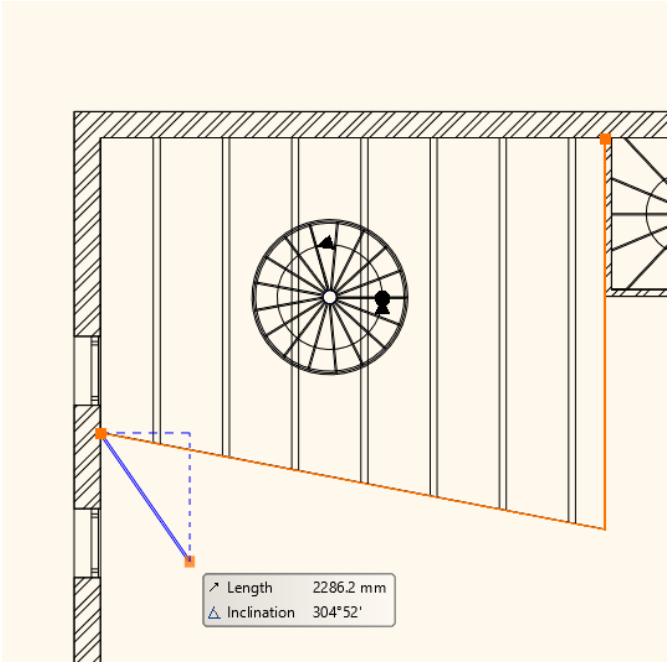
7.4. Handrail on gallery

Let’s create a separate railing on the gallery.

- The floor plan window is active. Go to level 1.
- Go to **Ribbon menu / Building / Railing**, now draw a line following the outer side of the gallery.



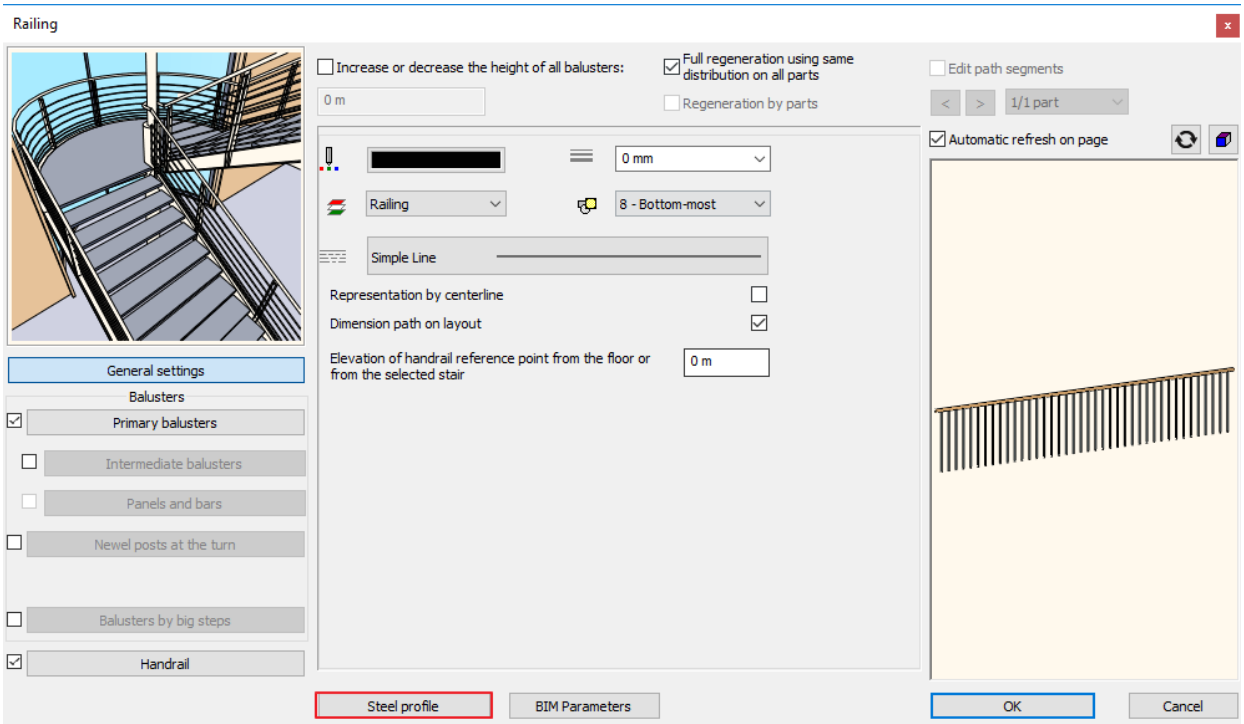
- When you finished press Entre twice.



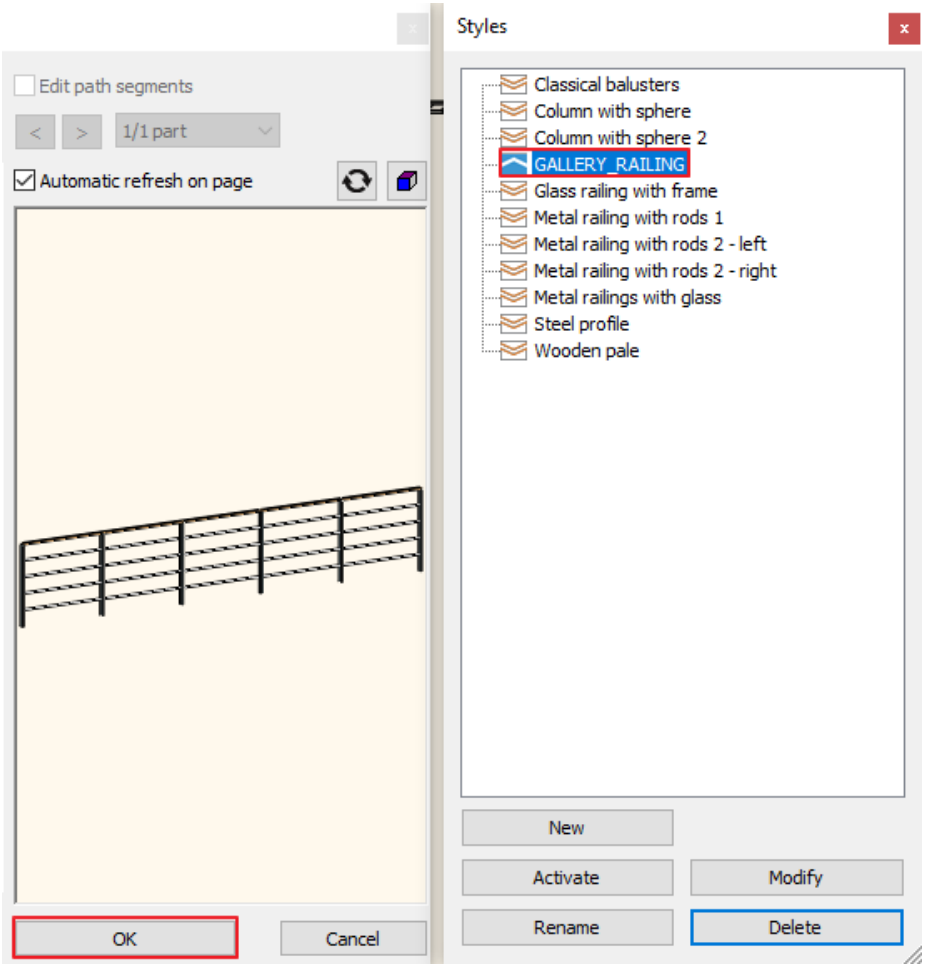
- The railing is finished.

7.4.1. Modify the style of the handrail

- Modify the style of the handrail.
- Select the ready railing and open its' properties
- Click on the name of style – Steel profile in the appearing dialog window below, this opens the library.

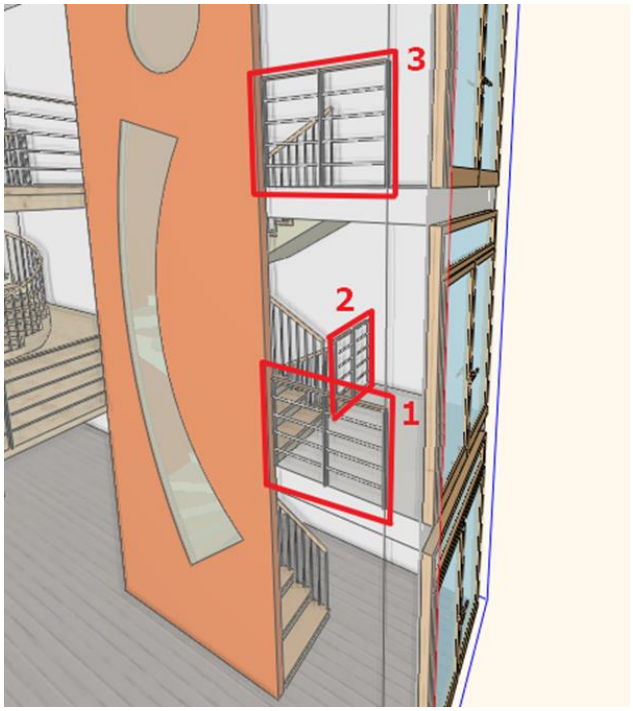


- Now select GALLERY_RAILING style, and click on the Activate button.



- Close the dialog by pressing OK, now the railing is modified.
- Repeat these changes on the gallery on the second floor. In Edit level dialog window copy the previously created railing.

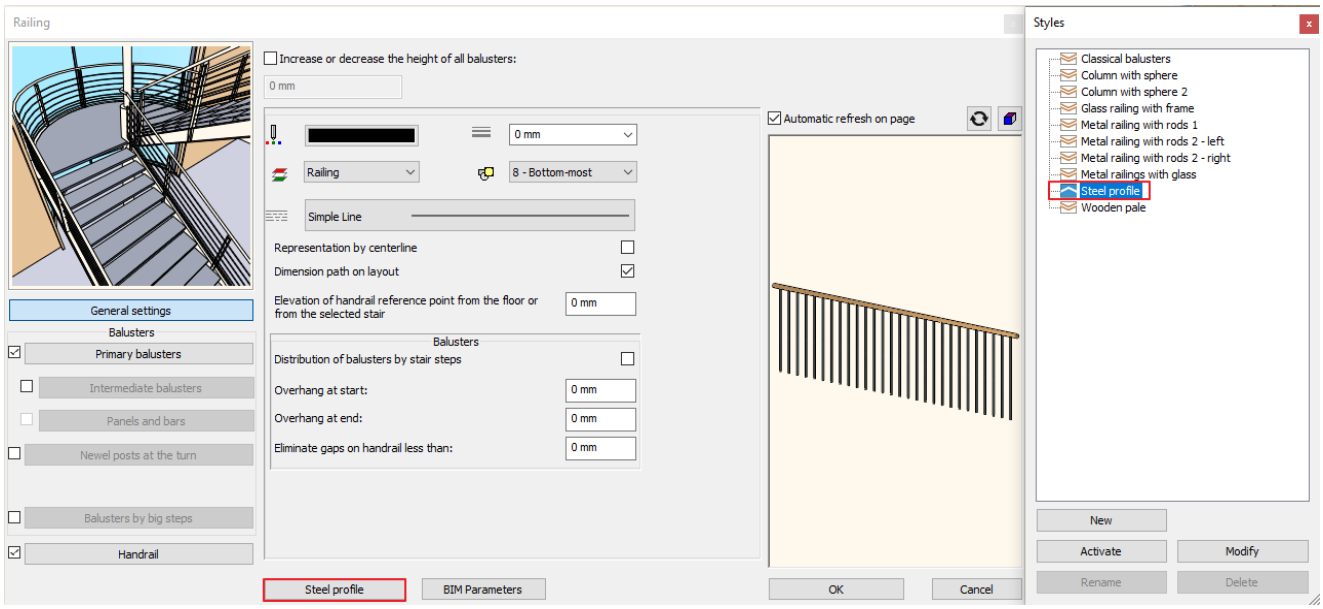
Draw the railing to the staircase (1.2.3), by using GALLERY style. Choose Ribbon menu / Building / Railing command, and select the style from the side menu..



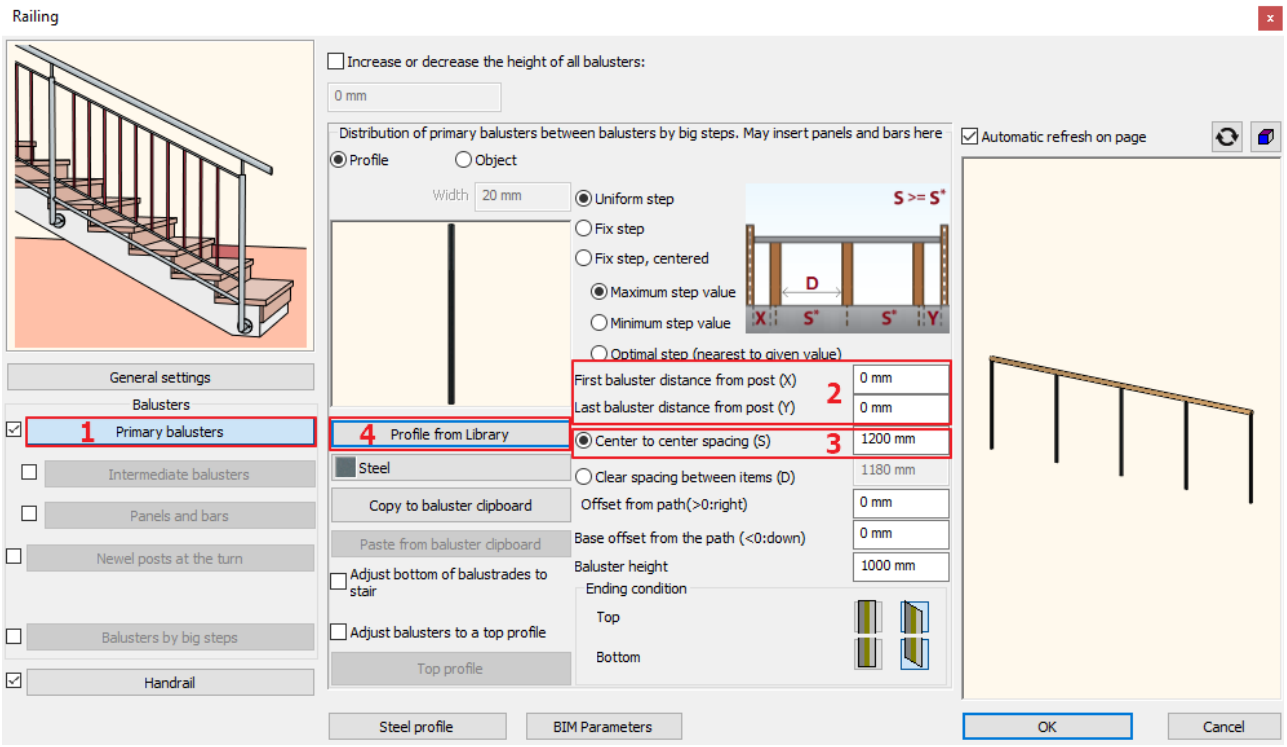
7.5. Customized handrail

Now we will create a new handrail style which will be used on the gallery. This way you can learn the basic steps of creating customized handrails.

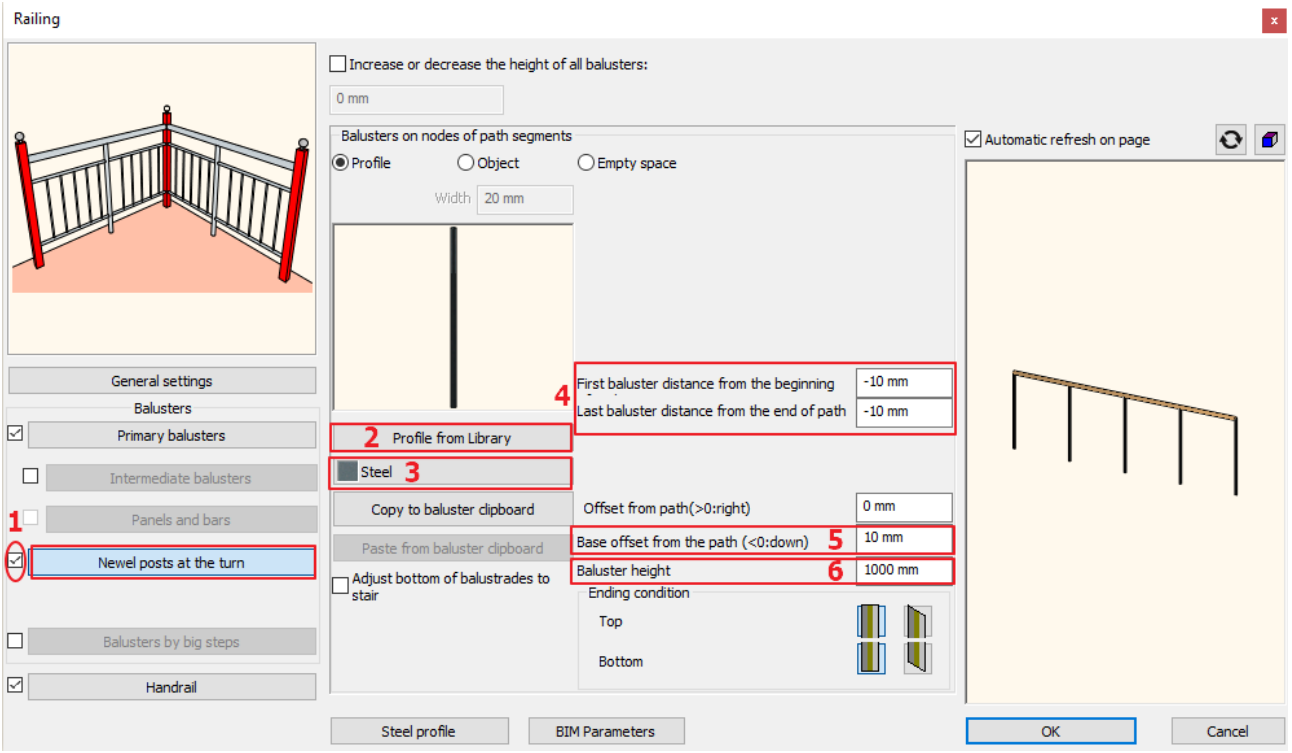
- First, go to **Ribbon menu / Building / Properties** and click on **Railing**. In the appearing dialog window select handrail styles. For that click on the name of the previously used handrail style, now the list of the styles will pop up on the right side. Double click on the Steel profile, now it is activated and it will serve as the base of the new handrail style.



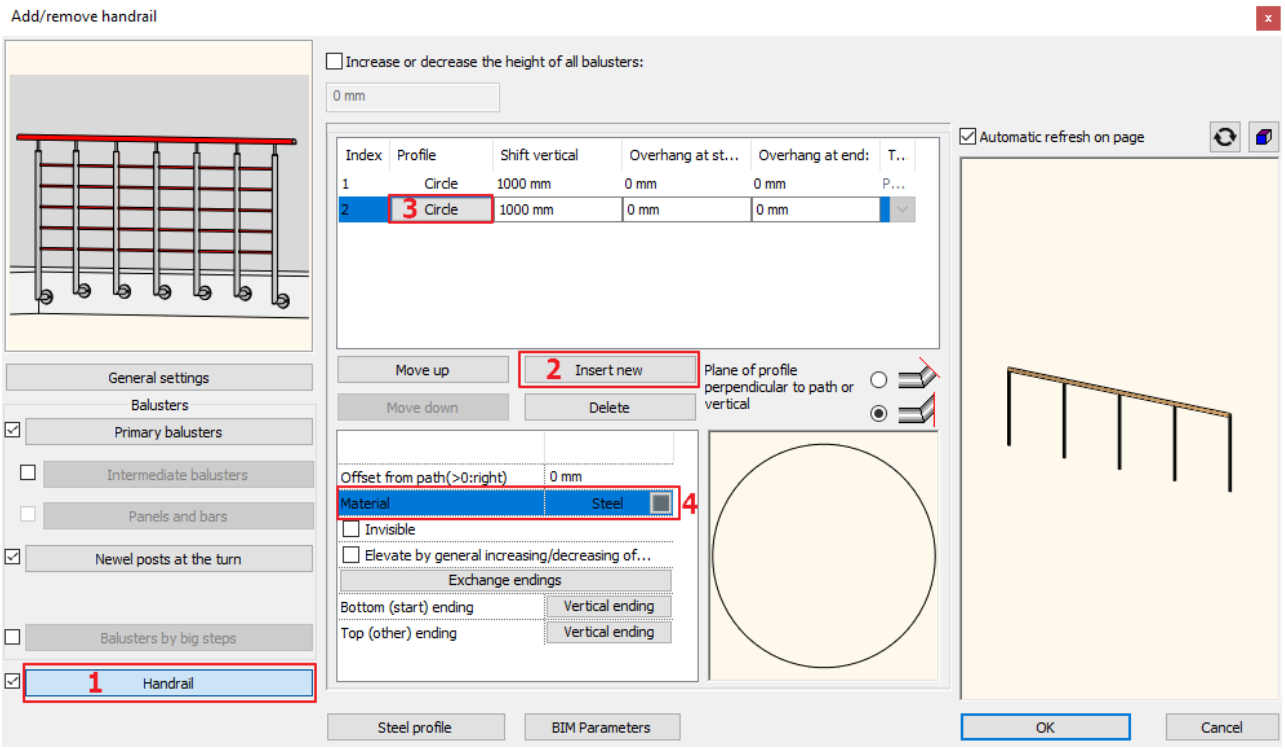
- Now click on the Primary balusters option (1) and set the followings.
- Set the distance from the first and last baluster to zero. (2).
- Set “Center to center spacing” 1200 mm (3).
- Now select the rectangle column profile from “Profile from Library”, then change the values of height to 50 mm and width to 20 mm.



- Activate “Newel posts at the turn” and then click on it (1).
- Change the profile to rectangle like the previous way (2), then set the material to “Steel” (3).
- Change the value of the first and the last balusters to -10 mm (4).
- The Offset from path is 10 mm (5).
- The base offset from the path is 100 mm (6).



- Now click on Handrail tab (1). There is only one handrail and its profile are circle by default. Add another one by clicking on “Insert new” button, then modify the diameter to 20 mm by clicking on the circle profile. Close the dialog by pressing “OK” and change the material to steel.

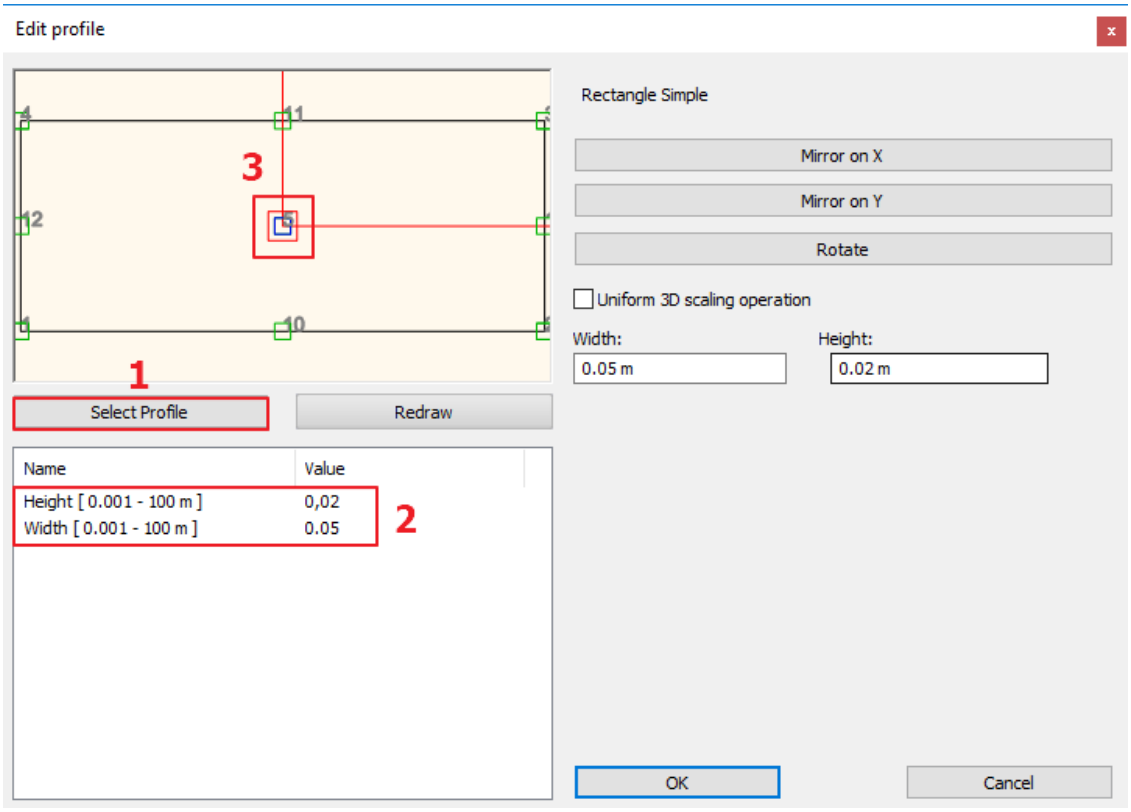


- Click on “Insert new” add three more, this way you will add three handrails with the previous settings.
- Now modify Shift vertical values as per followings:

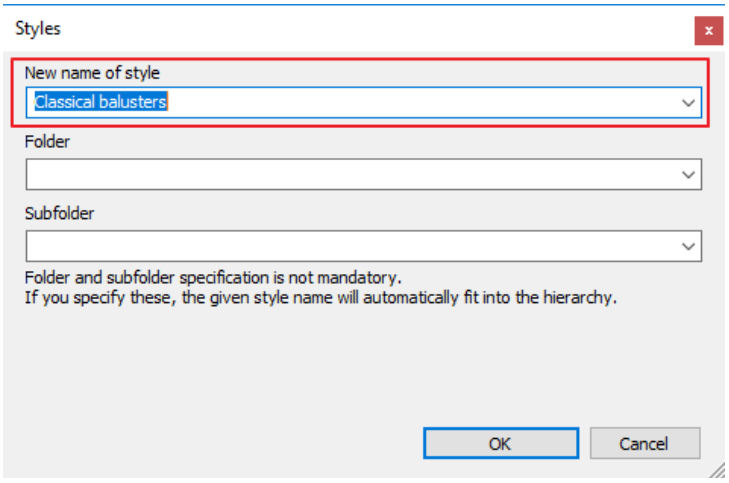
❖ 2nd handrail shift value: 800 mm.
❖ 3rd handrail shift value 600 mm.
❖ 4th handrail shift value 400 mm.
❖ 5th handrail shift value 200 mm.

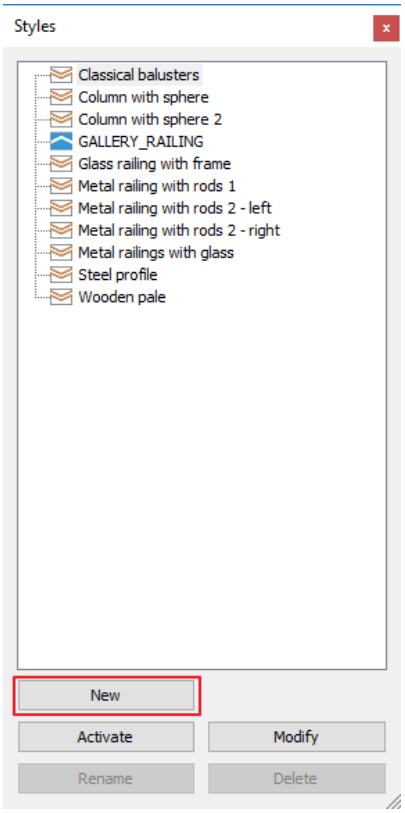
Index	Profile	Shift vertical	Overhang at st...	Overhang at end:	T..
1	Circle	1000 mm	0 mm	0 mm	P...
2	Circle	800 mm	0 mm	0 mm	P...
3	Circle	600 mm	0 mm	0 mm	P...
4	Circle	400 mm	0 mm	0 mm	P...
5	Circle	200 mm	0 mm	0 mm	

- Finally modify the profile of the first handrail to rectangle. Change the height to 20 mm and width to 50 mm (2), move the reference point to the center with a single click (3).



- The handrail is finished and save it as a new style. Bring up the style library and click on “New” and give a name to the new style. Click on “Activate”, the close the window by pressing “OK”.





Check the result. Place the handrail by using Ribbon menu / Building / Railing / Railing. Later this style can be used any time.

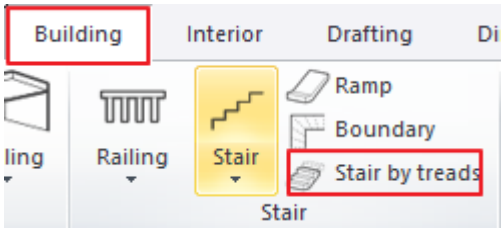
7.6. Customized stairs

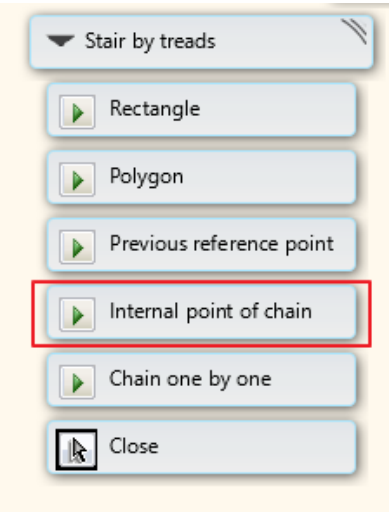
7.6.1. Specifying a stair by treads

We will create customized stairs which is leading from the ground floor to the first-floor gallery.

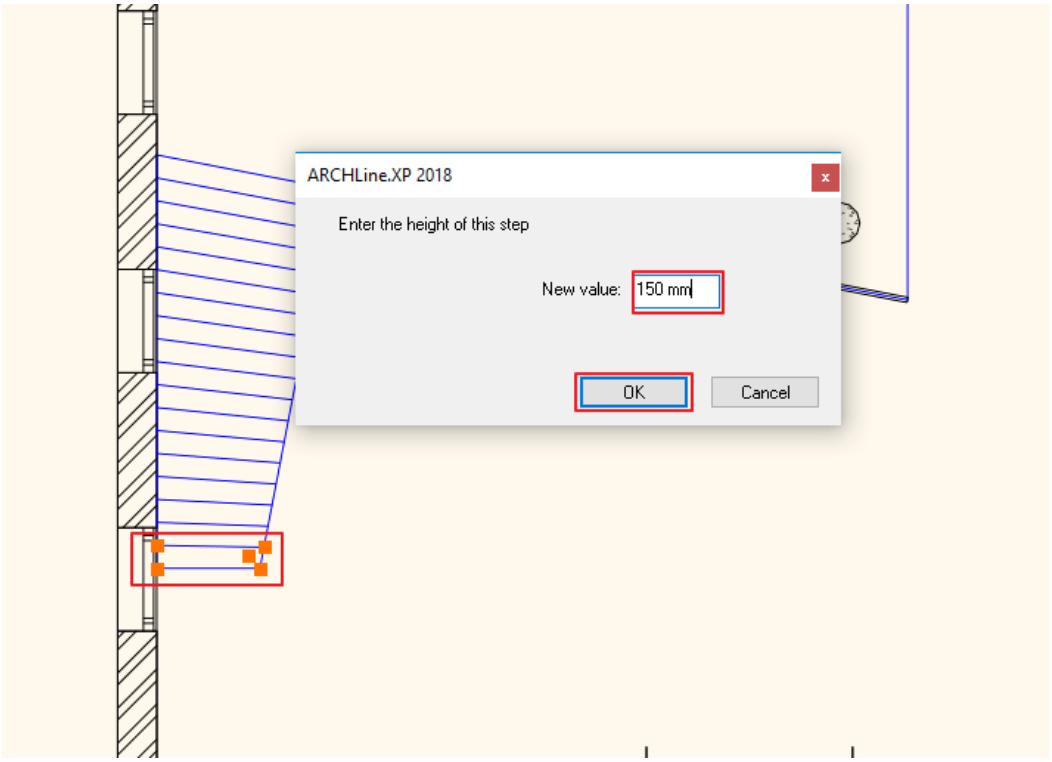
Activate the floor plan window. Go to the Ground floor. On the area marked by blue we will place stairs. Now you have to draw it step by step, then the program will automatically put together the model of the stairs.

- Go to **Ribbon menu / Building** and choose **Stair by treads** commands.

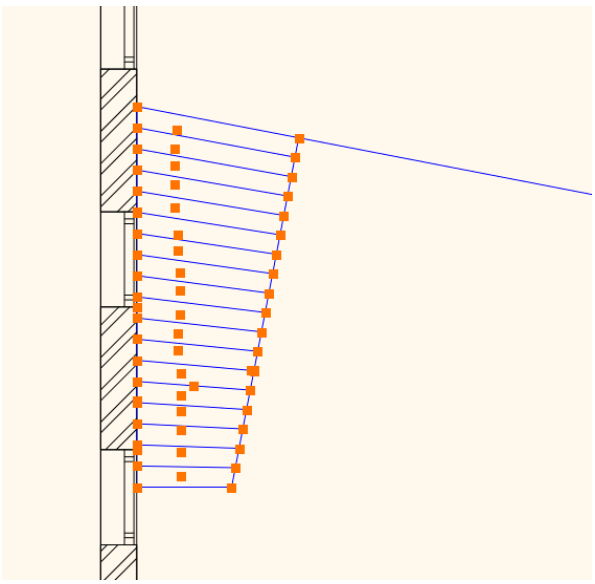


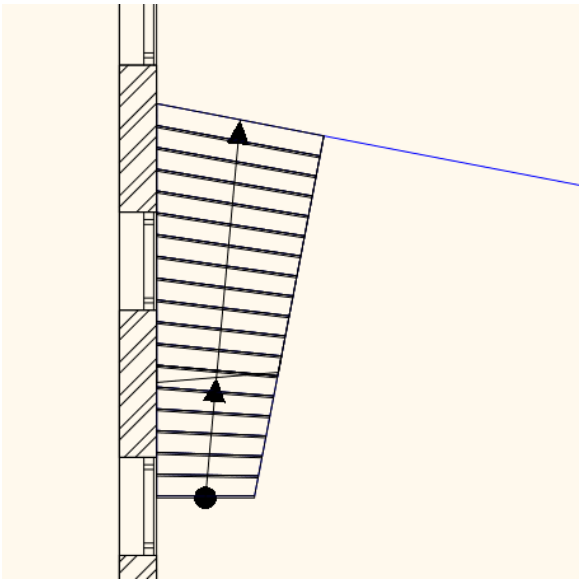


- From the appearing floating menu Choose “Internal point of chain” tool. As you can see the cursor shape has changed, move it over the lowest stair, and click on every step one by one, preferably in one line.
- After the first click, the program will ask for the height of steps. This should be 150 mm and if it is necessary, we can modify it later.



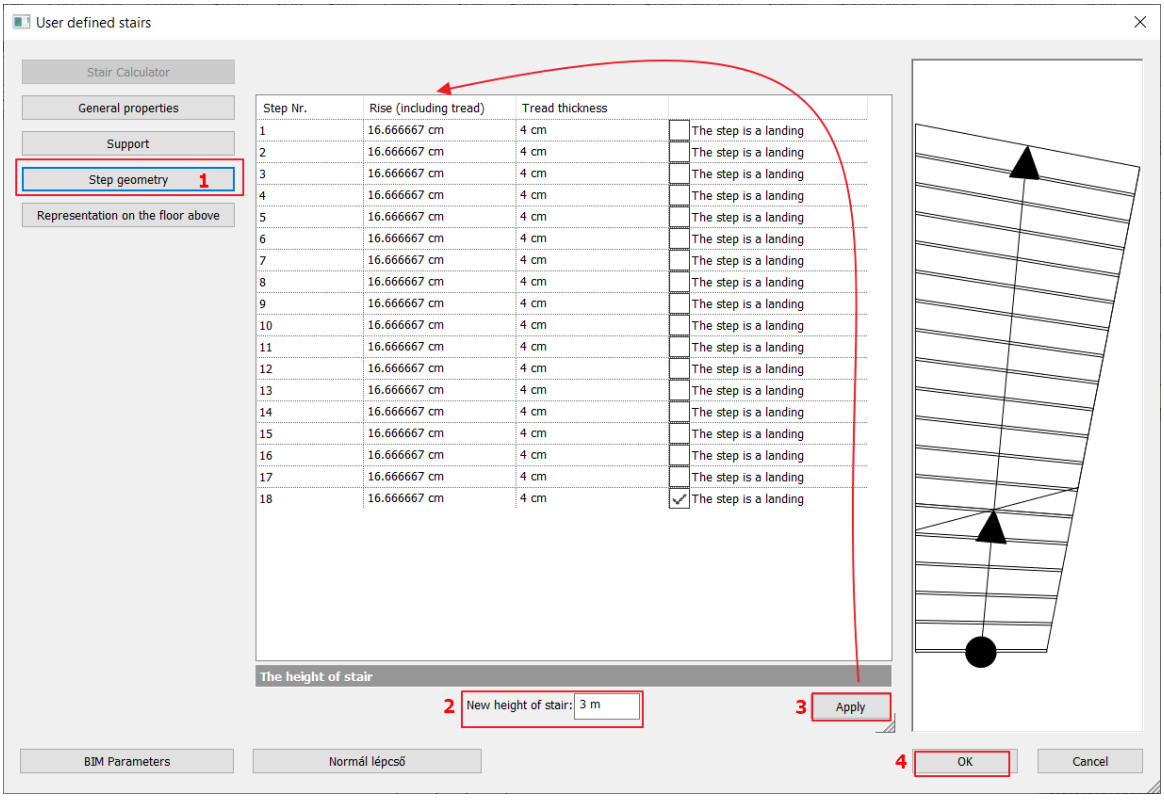
- When finished, close the command with double Enter.





If you switch to 3D view, you can see that the top of the stair does not reach the correct height. We want that the top step to be at the same height as the first-floor level. Please do the followings:

- Click on the stair and look at the properties.
- The User defined stairs dialog window appears. Here we can find the general properties, now let's go to Step Geometry tab. (1). In the preview window you can see all steps were created individually. At the bottom of the window, you can set the New height of stair, now change it to 3,000 mm (2). Click on Apply (3), then the program will automatically re calculate the rise of stairs.
- Click on OK to close the window

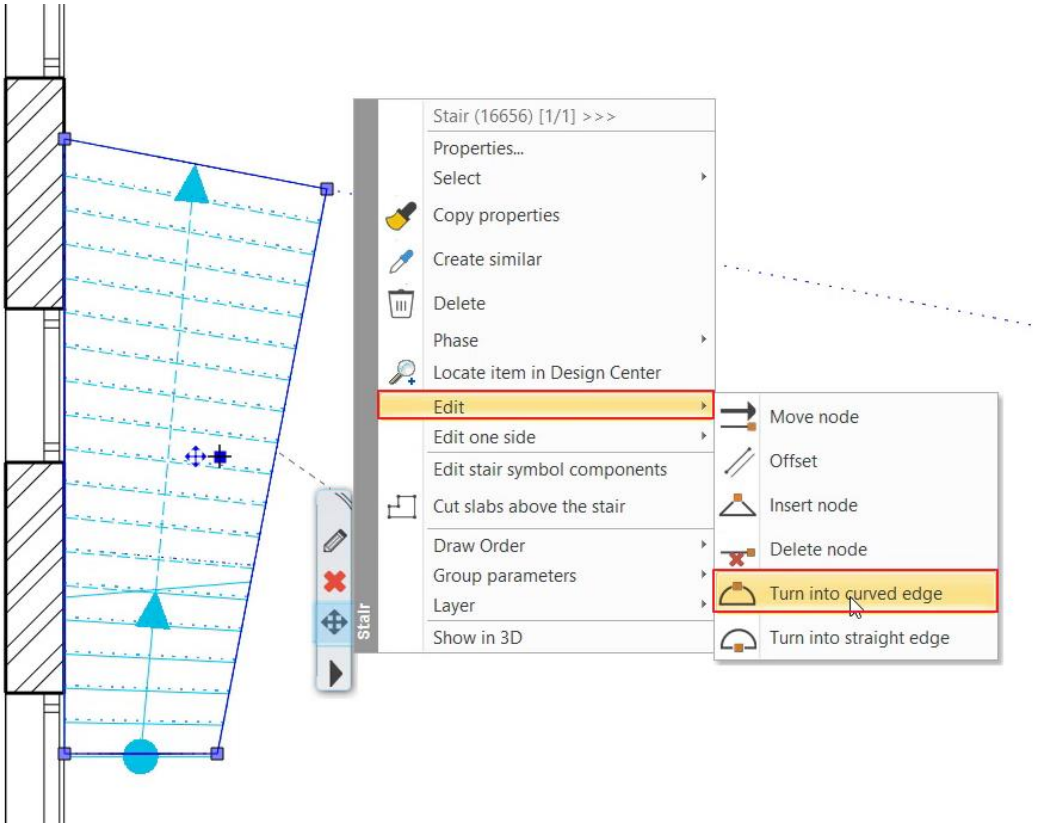


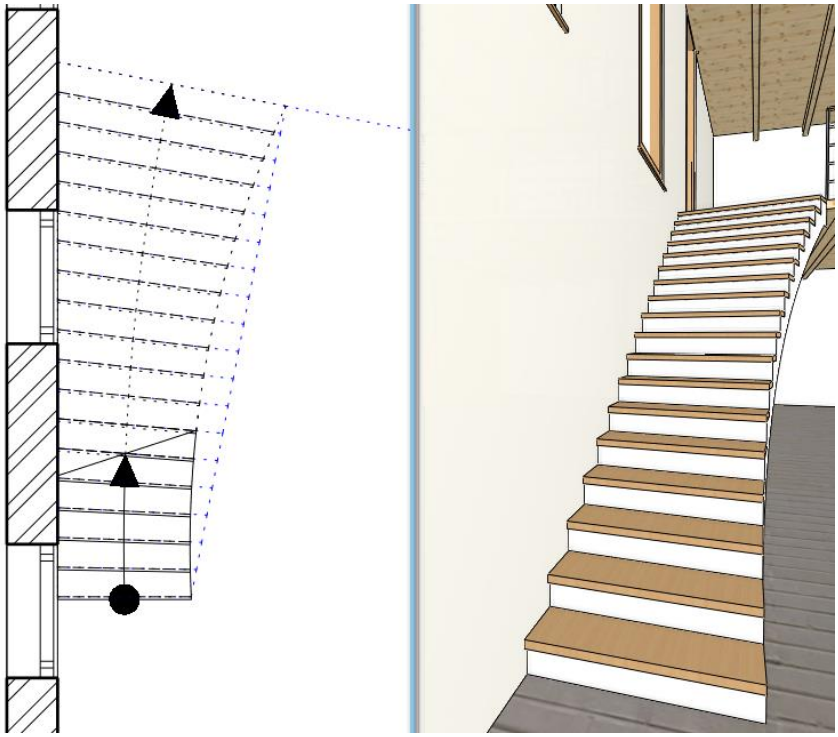
7.6.2. Editing the staircase

In the following example, we will show how to modify a staircase. First, we will curve the right side, then undo this action, insert a new node, and move an existing node. Finally, we will undo the edits.

- Click on the right side of the customized stair.
- From the local menu, select **Edit – Turn into curved edge**

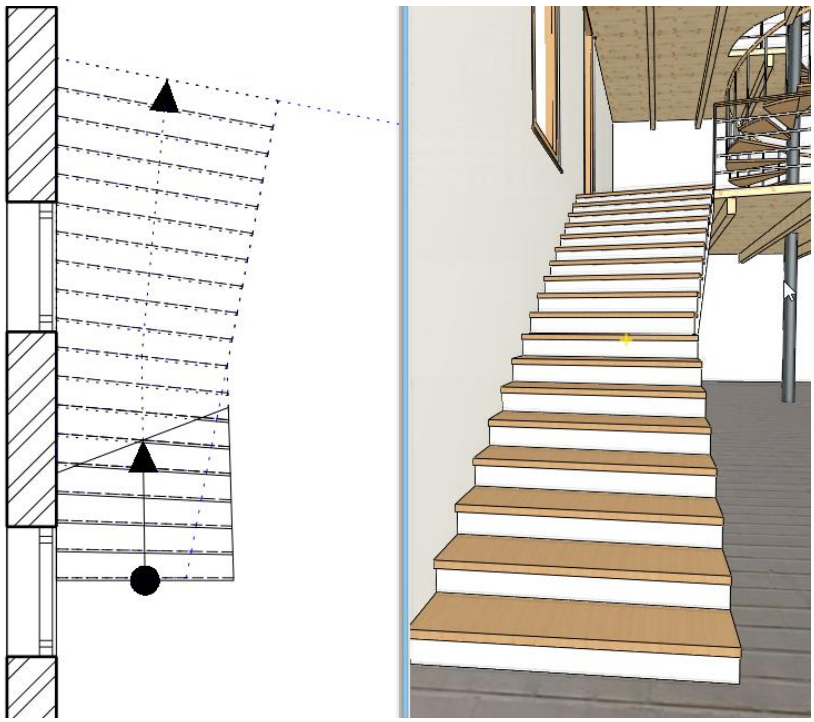
- Specify the curve.





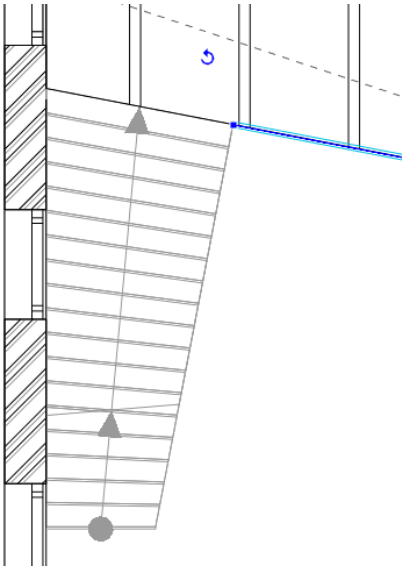
- Use the Undo command to revert the edit.

- Insert a new node on the right side of the stair:
  From the local menu, select **Edit – Insert node**.
- Then move the lower right node.



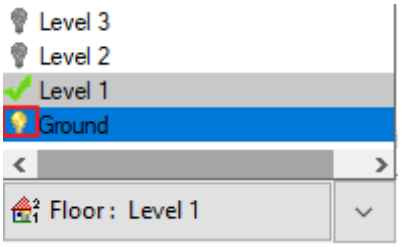
Use the **Undo** command to go back two steps to restore the original state.

7.6.3. Handrail on the side of the stairs



Now create the same handrail to this stair which can be found on the gallery. First modify the handrail of the gallery complying with step up.

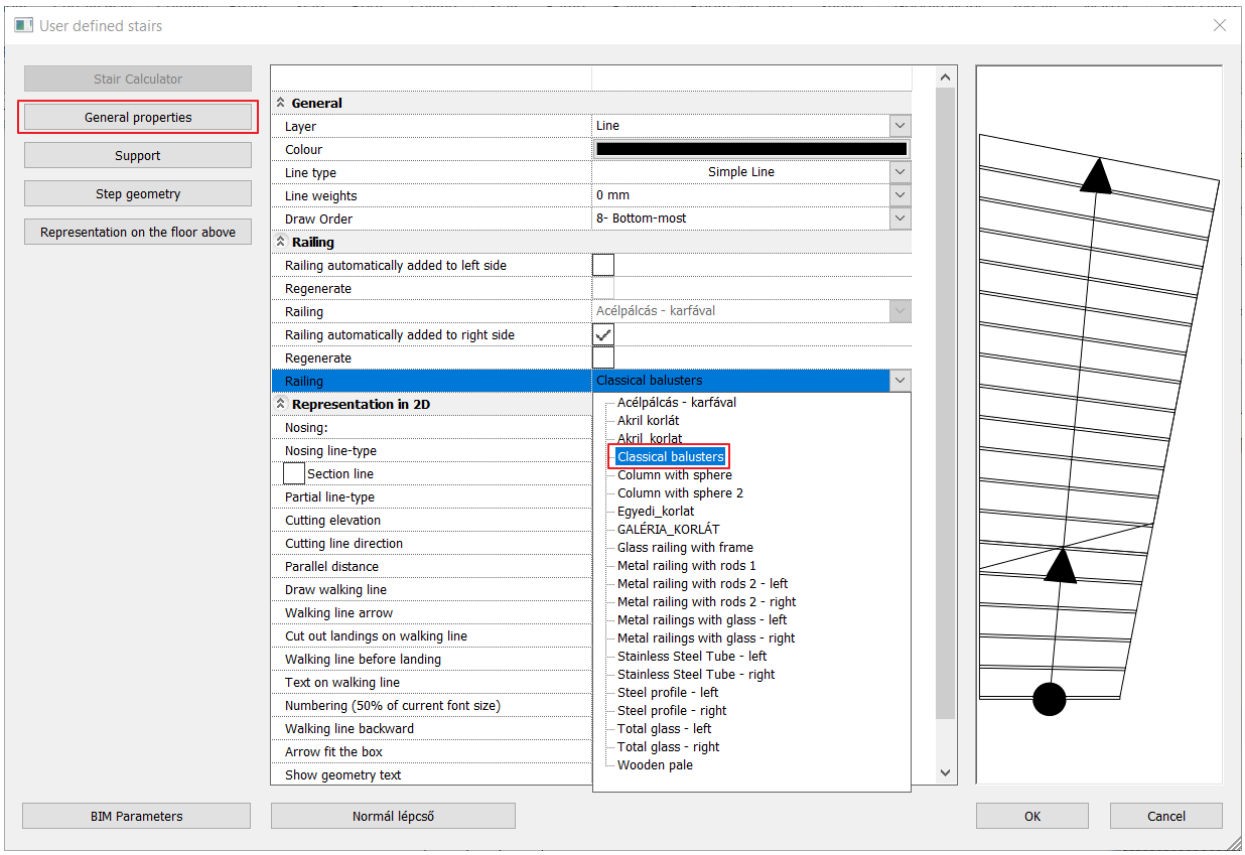
- Activate the floor plan window. Move to the first floor.
- Make visible the ground floor.
-



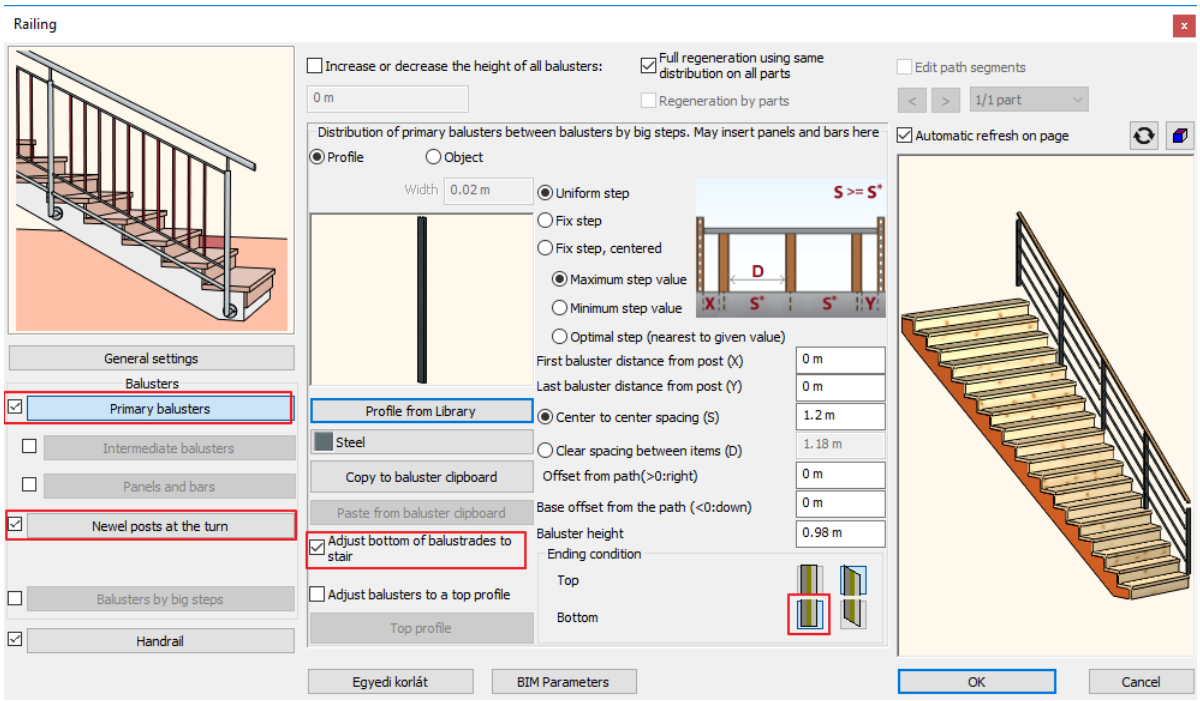
- Select railing, by using “Move node” command place the railing line to the right place.
- Close the command.

Now simply place handrail on the stairs:

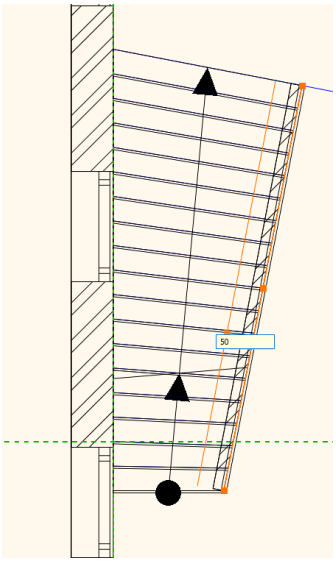
- Go to the properties of the staircase, select the General properties tab, then activate the Railing on the right and select the custom railing style, the classical balusters.



- Open railing properties. Click on “Primary balusters”, and active “Adjust bottom of balusters to stair” option. Then select perpendicular “Ending condition”.
- Activate „Newel posts at turn” and activate “Adjust bottom of balusters to stair” option.
- Close the window by pressing OK.



- Finally select the handrail on the floor plan, use Offset to pull it closer to stairs by 50 mm.

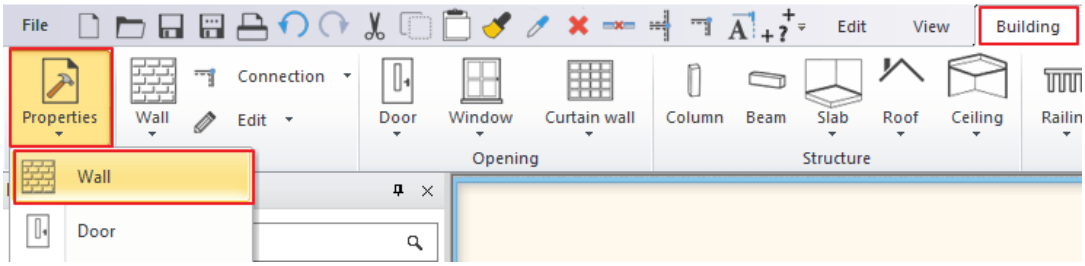


7.6.4. Place wall along the stairs

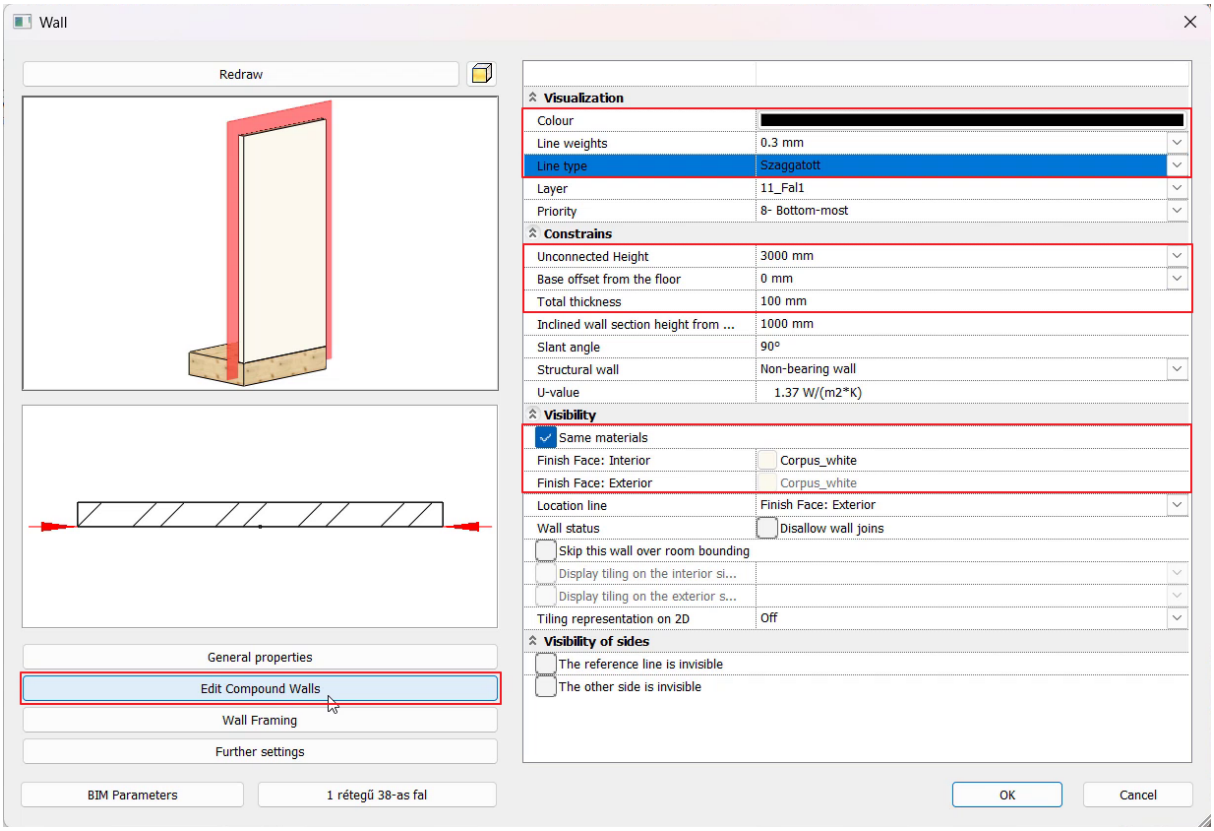
Now we will place a wall under the customized stairs, this area now can be built-in.

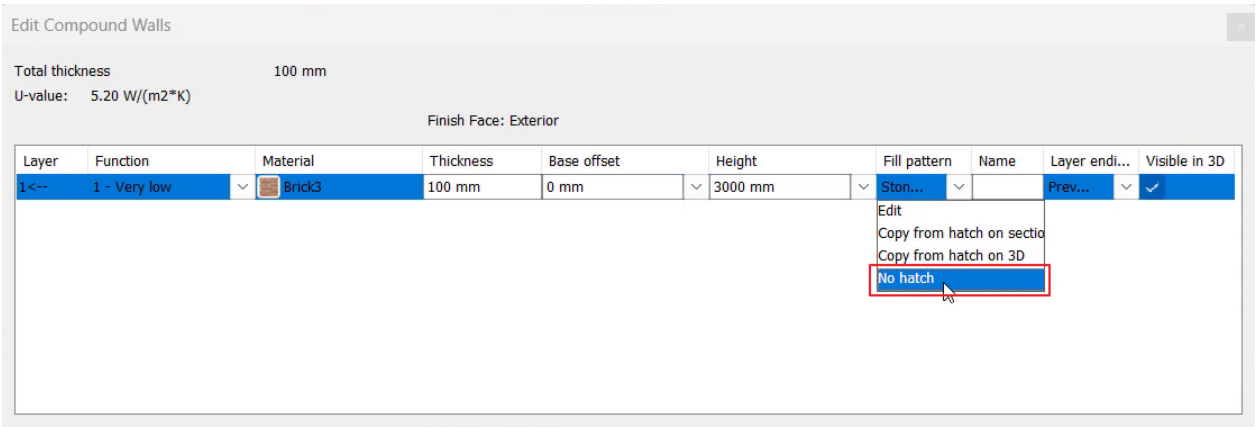
Please do the followings:

- The floor plan window is active. Go to Ground floor, where the customized stairs can be found.
- Go to **Ribbon bar / Building / Properties / Wall**.



- Change the Unconnected height of the wall to 3000 mm, the Total thickness to 100 mm and change the Finish face to "Corpus white".
- Set the line type to Dashed and select No hatch in the Edit Compound Walls menu.

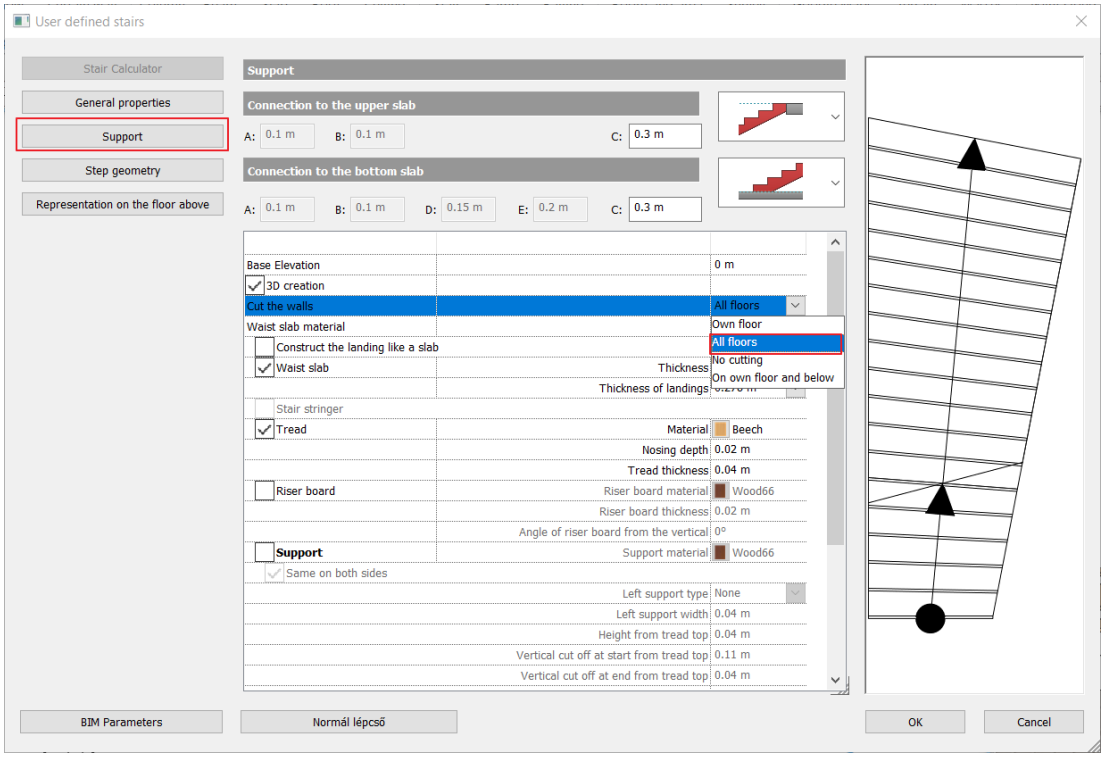


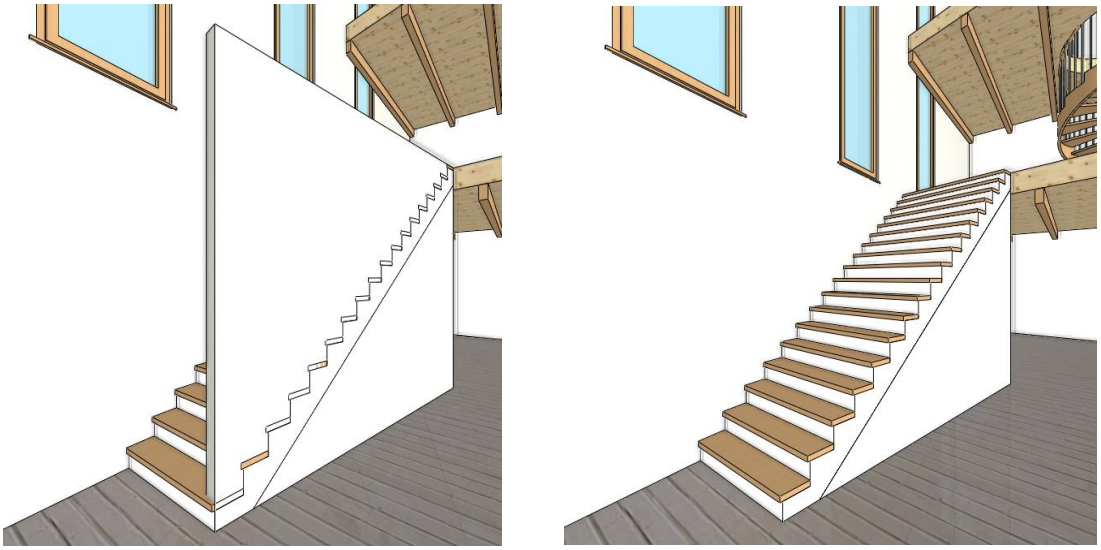


- Draw a wall along the outer line of the customized stairs. The wall reference line is this outer line. You can change this in the appearing right floating menu or using Space key. Click on right side option.

  The wall under the stairs is finished, but the stairs do not cut the wall.
- Select the staircase and enter its properties. On the Support tab, set the Cut the walls option to All floors and close the window by clicking OK.

  This completes the wall under the stairs. Rebuild the model so that the change appears in the 3D view.



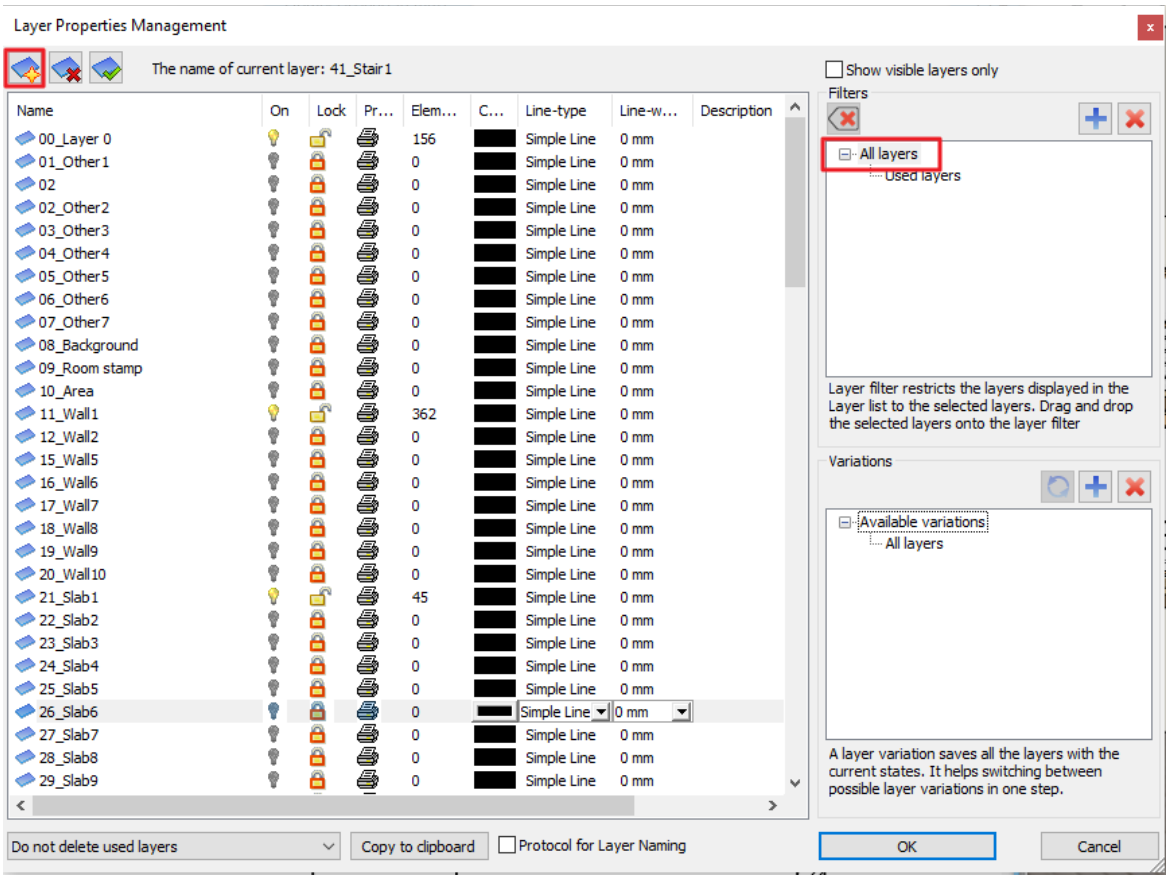


7.7. Floating stair with steel support

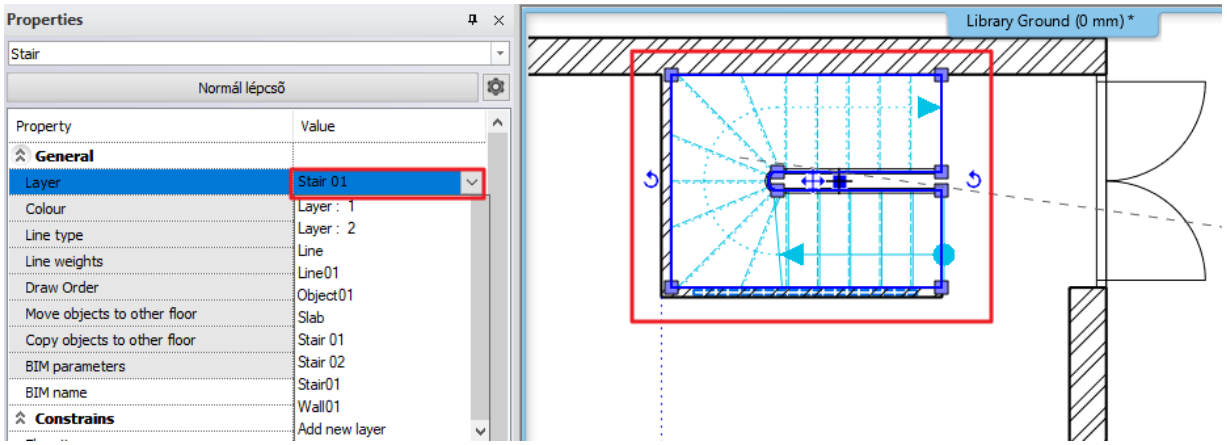
In the program, it is possible to create different stair types. We will now see an example of these. Let's suppose there is a cloakroom at the entrance in place of the present U-shaped staircase, and a steel-structured staircase leads upstairs along the wall.

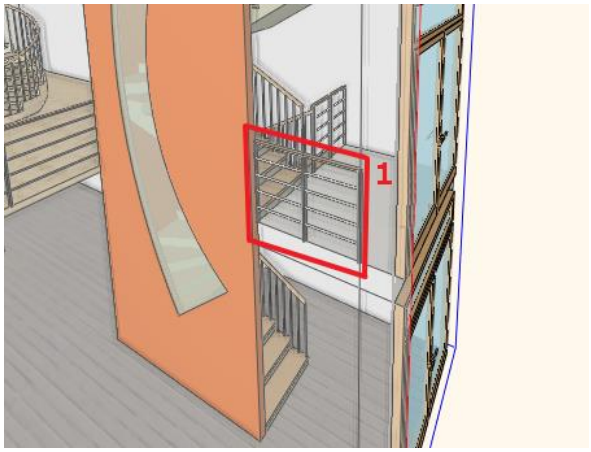
7.7.1. New stair

- In the Layer manager place the already existing stair to a new layer.
- Open the Layer manager dialog and create a new layer. Name them "Stair01" and "Stair02"."

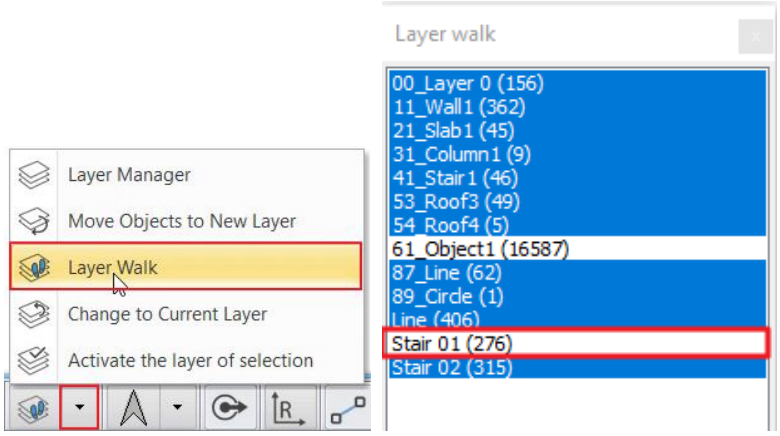


- Place the U stair and its railing to the layer “Stair01”. Place the previously created 1st gallery railing to this layer as well.



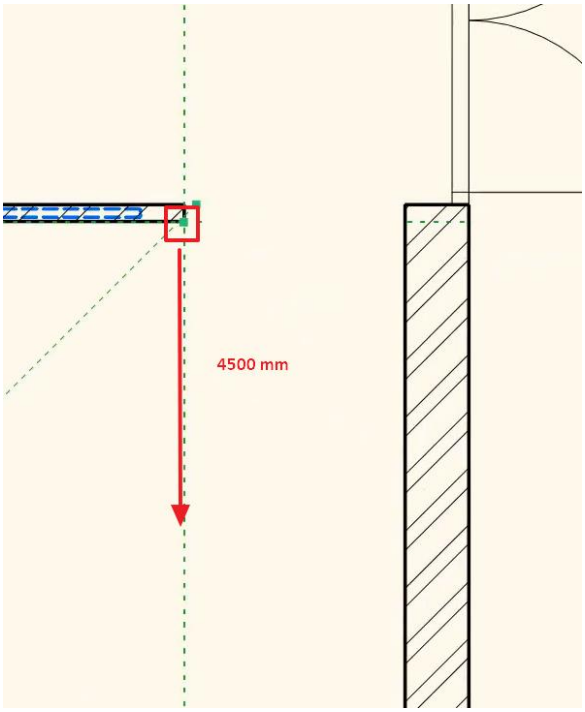


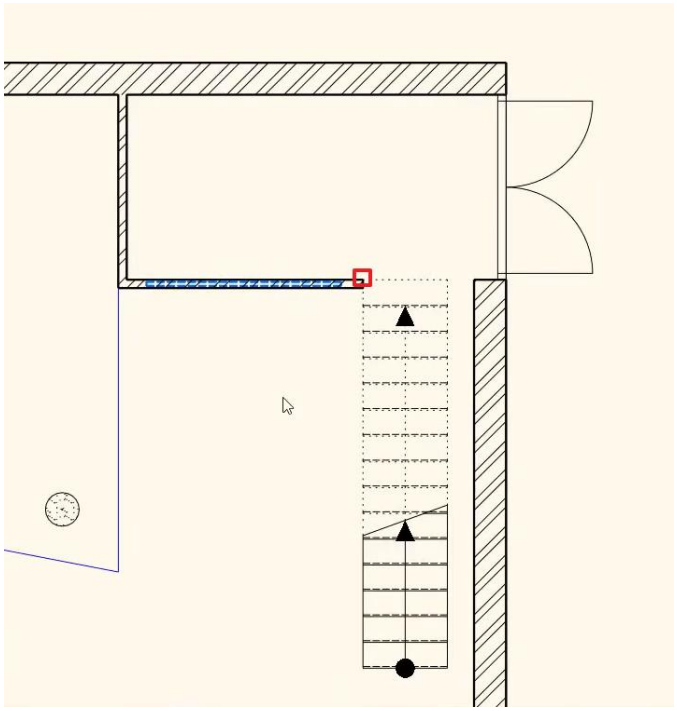
- Turn off this layer by activating the Layer walk dialog and CTRL + click on the “Stair01” layer.



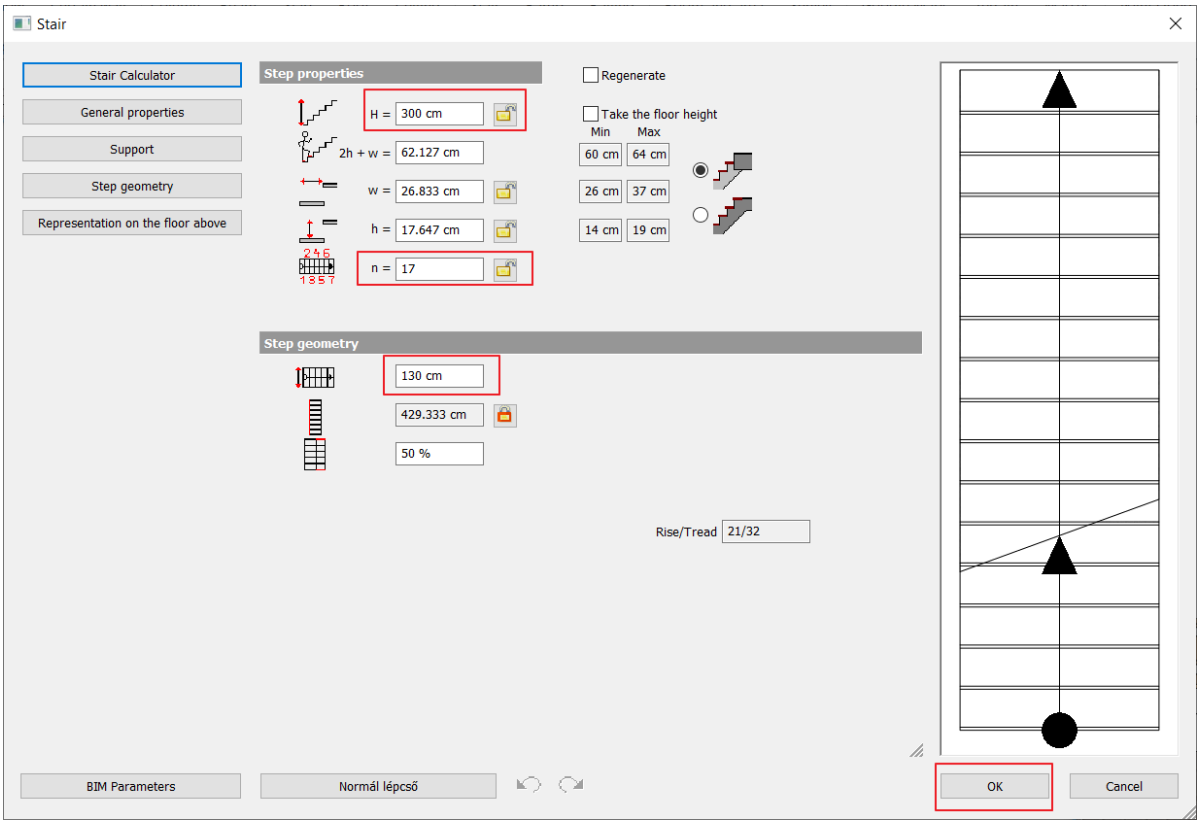
- Select the **Ribbon Bar / Building / Stair / Straight run** type, the click on the Reference option on the Status bar below.

- Select the outer wall corner of the cloak room as reference and drag the cursor down 4500 mm. Select the inner corner point of the cloak room as the endpoint of the stair.

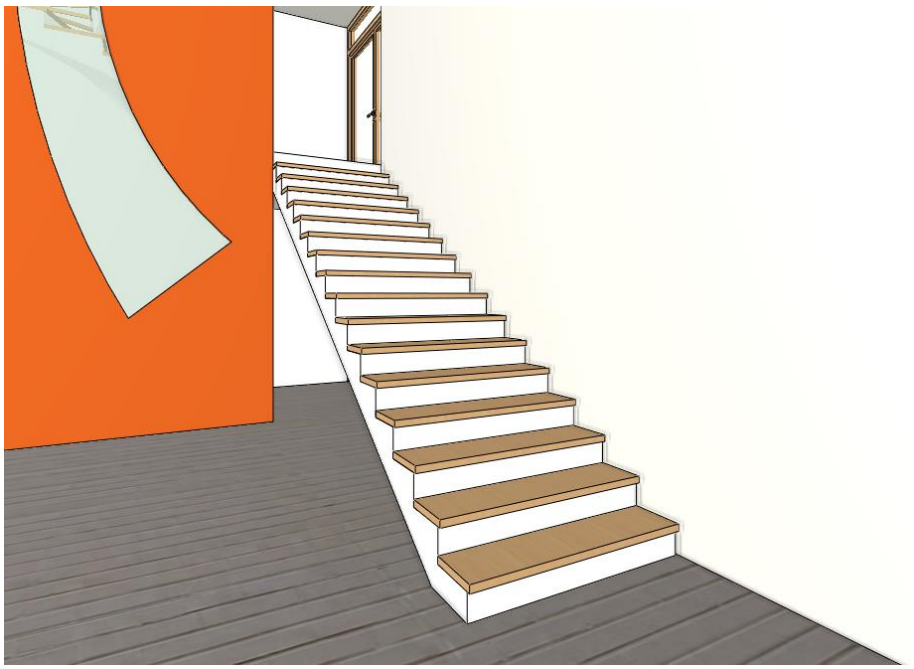




- Modify the properties of the stair: set the height to 300 cm, change the number of steps (n) to 17, and set the width to 130 cm.

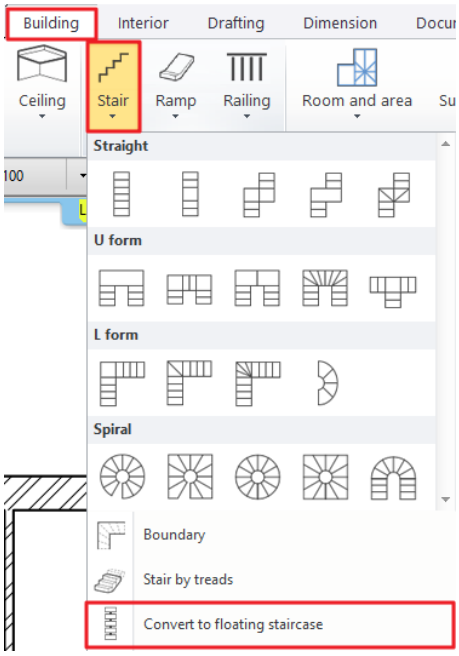


The following stair will appear in the 3D window:

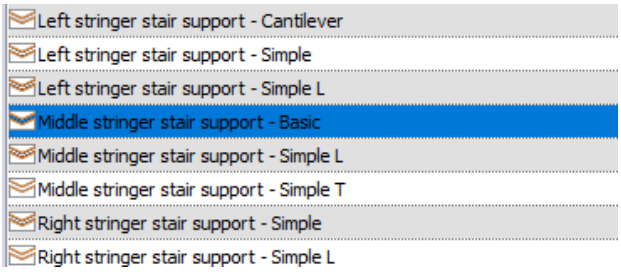


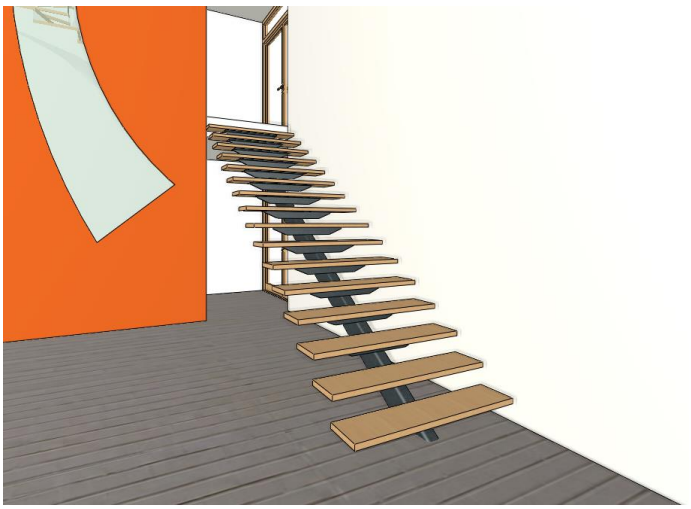
7.7.2. Selecting the stair support

Many different stairs support can be created. These can be accessed from the **Ribbon bar / Building / Stair / Convert to floating staircase**. The stair supports listed here are integrated into the program and you can activate them with just one click on the stair.

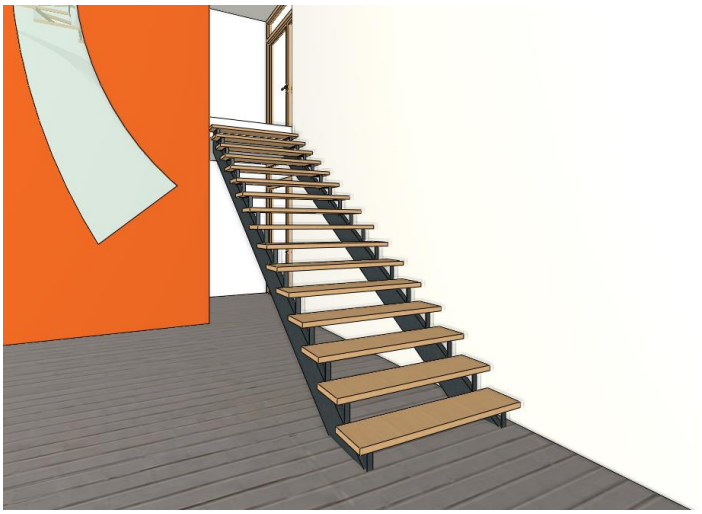


- Select the Middle stringer stair support – Basic style, the click on the stair boundary on the floor plan.

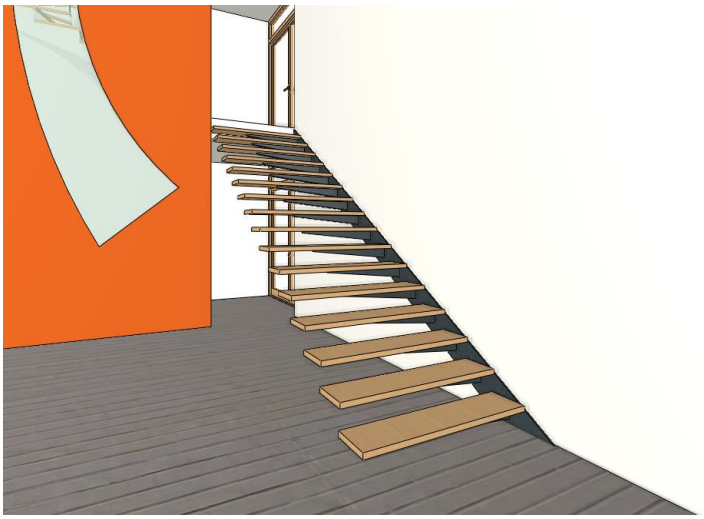




- Let's try another stair support style: select the *Left stringer stair support – Simple L* and click on the left side of the stair on the floor plan. Then select the *Right stringer stair support – Simple L* and click on the right side of the stair.

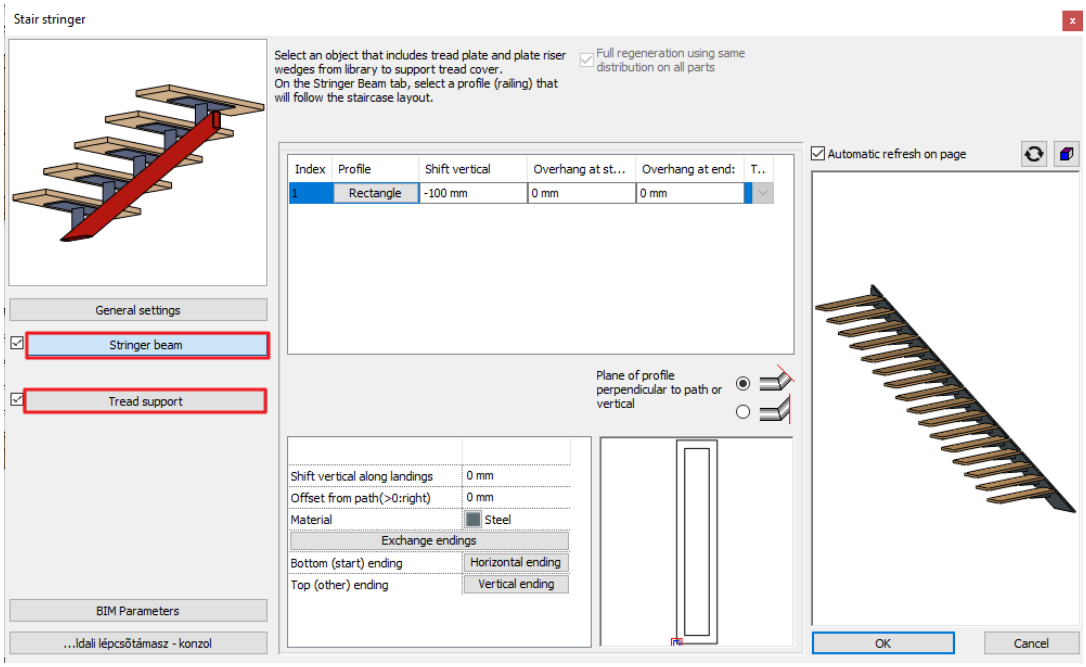


- Finally select the *Right stringer stair support – Cantilever* from the list. Click on the right side of the stair, then hit Enter. Delete the remaining left stair support from the drawing.



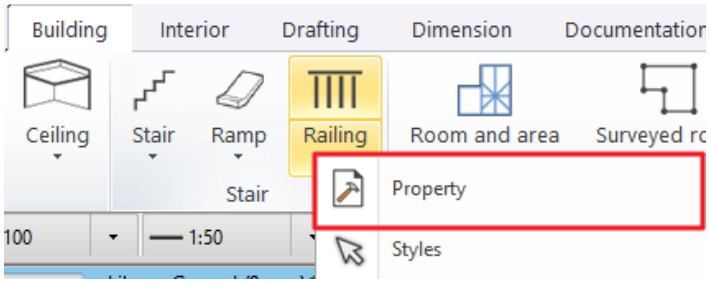
Editing the stair support

Upon entering the properties of the stair support, the editable parameters of the stringer beam and the tread support appear. With these options the whole stair support can be customized.

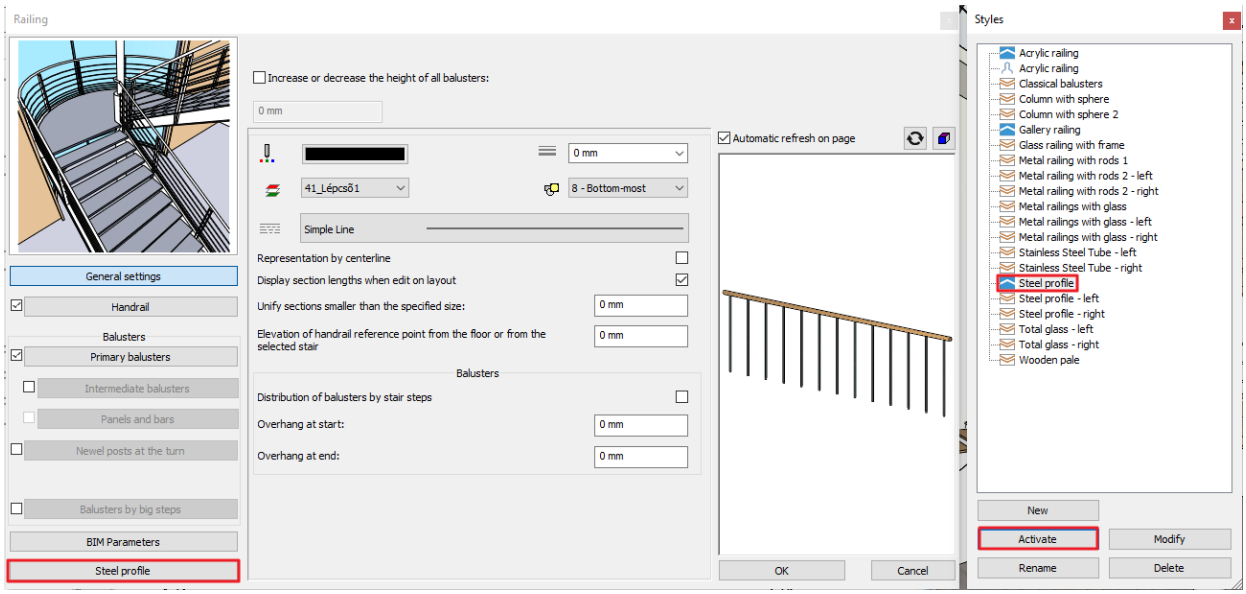


7.7.3. Creating a glass railing

- To create the railing of the stair, select the Ribbon Bar / Building / Railing option and click with right mouse button, and select the Properties option.

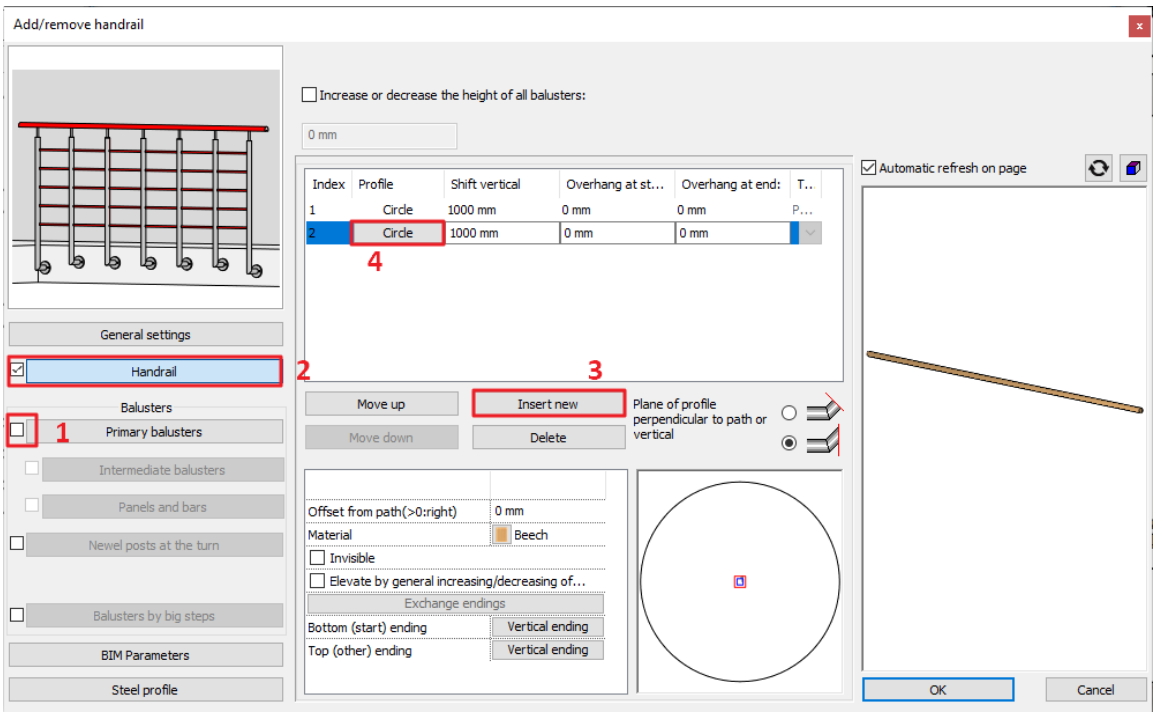


- In the appearing dialog click on the name of the railing, then click on the Steel profile style on the right.

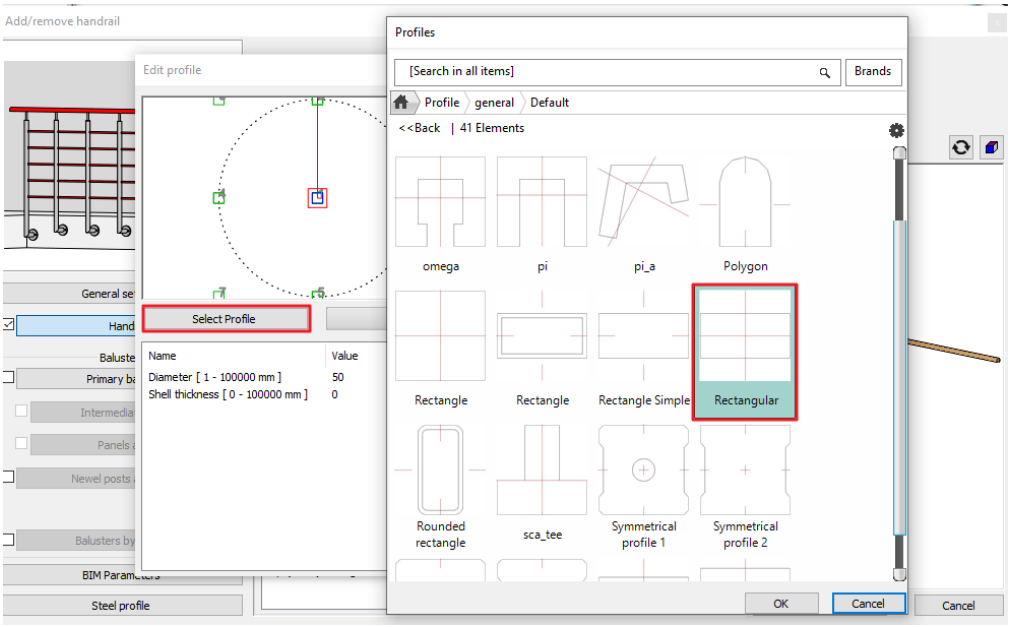


There are many ways to create a railing. We will now see an easy example.

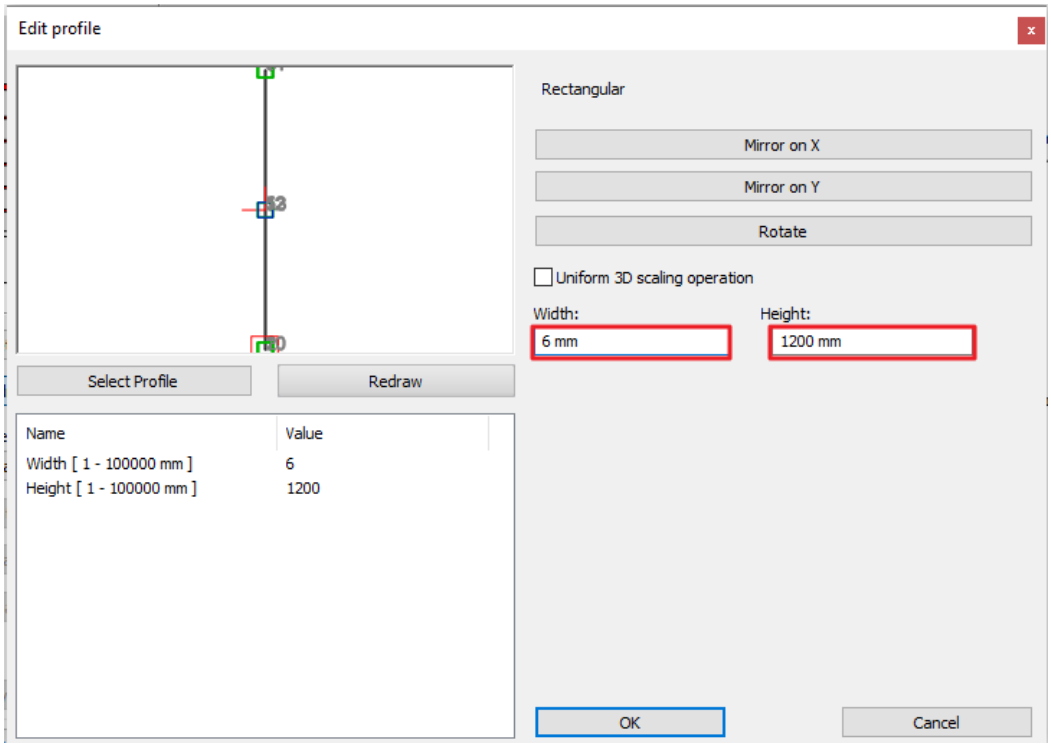
- Turn off the *Primary balusters* and on the Handrail tab add another handrail element with the Insert new button. We will convert this to a glass plate. Click on the profile in the new row.



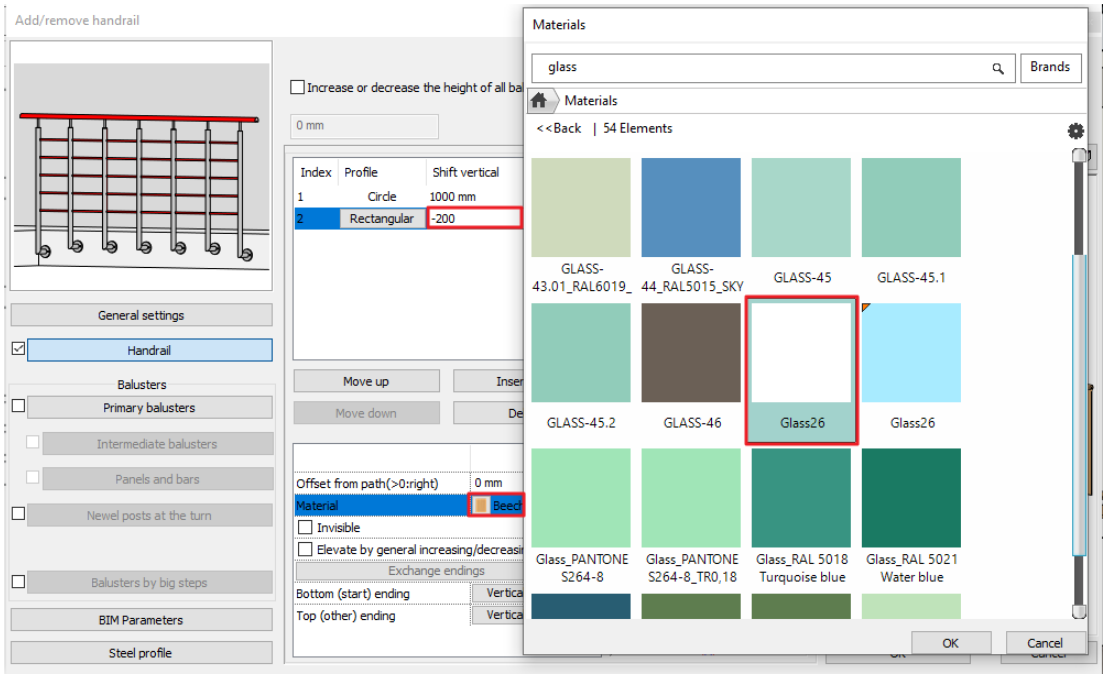
- In the appearing dialog click on the *Select profile* button and select the Rectangle profile from the library, then hit OK.



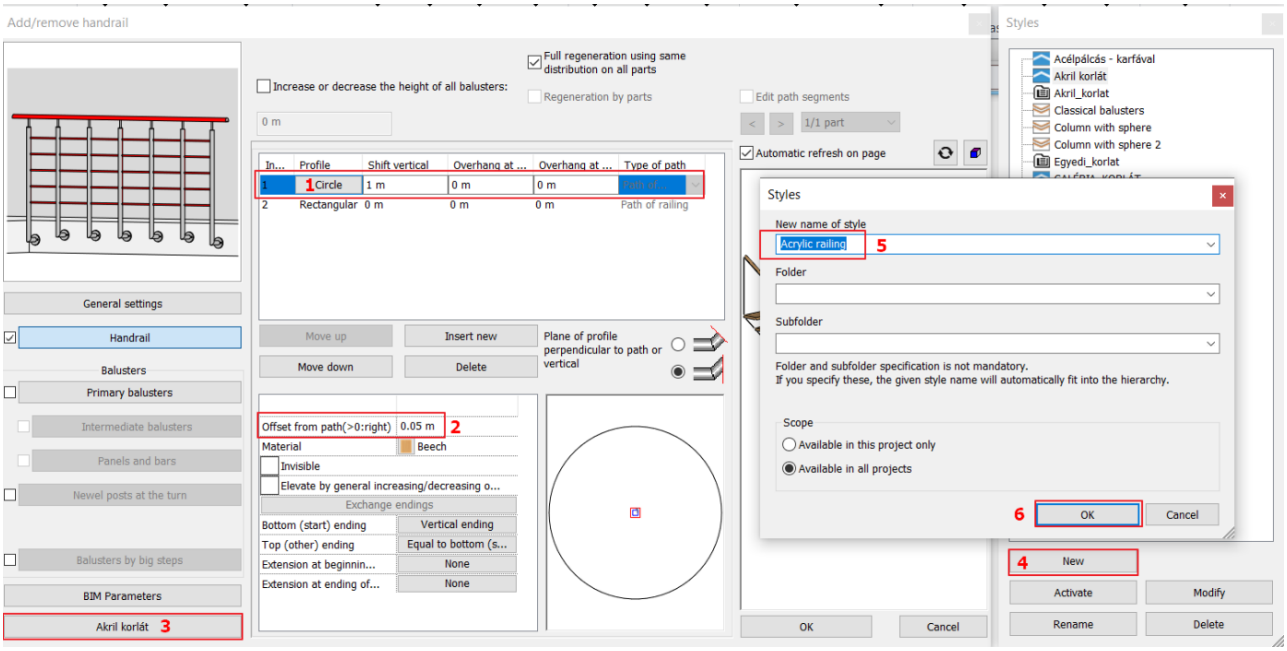
- Turn off the Uniform 3D scaling operation option, and set the profile width to 6 mm and its height to 1200 mm, then hit OK.



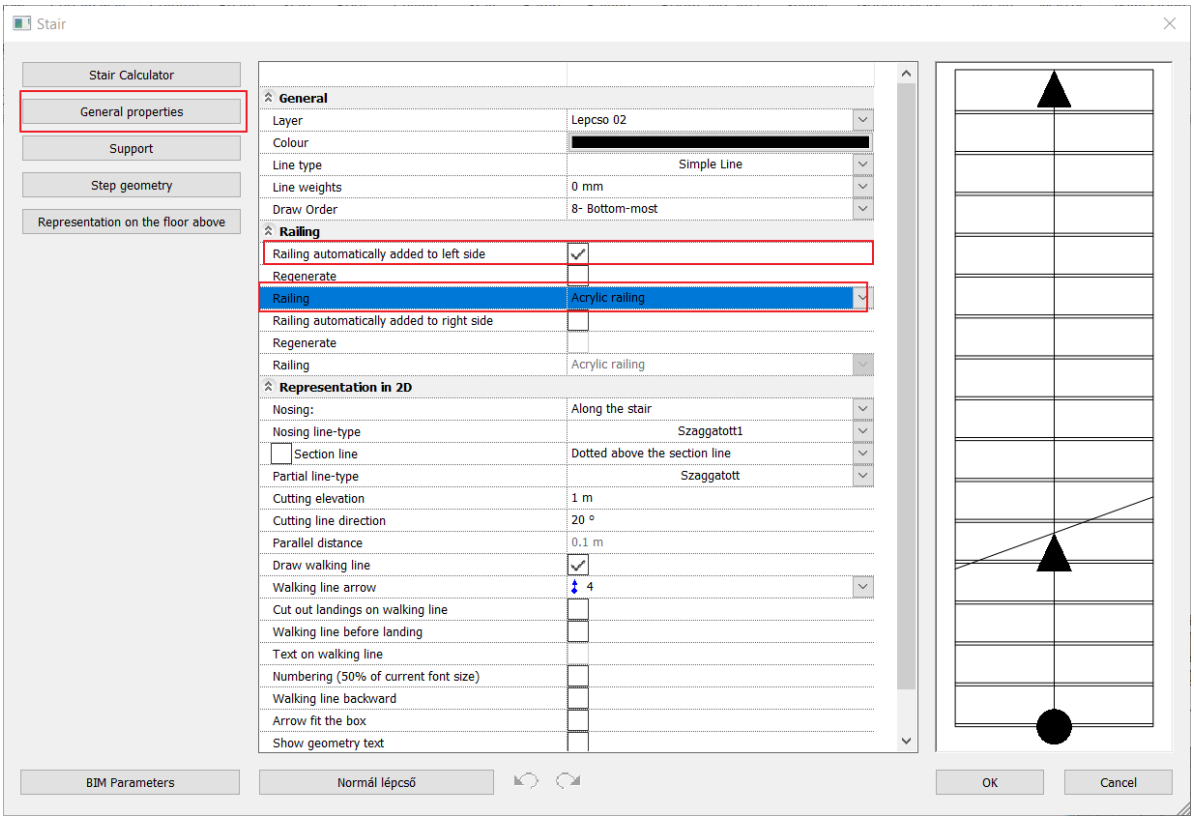
- Set the vertical shift of the profile to -200 mm, then modify its material to “Glass26”.



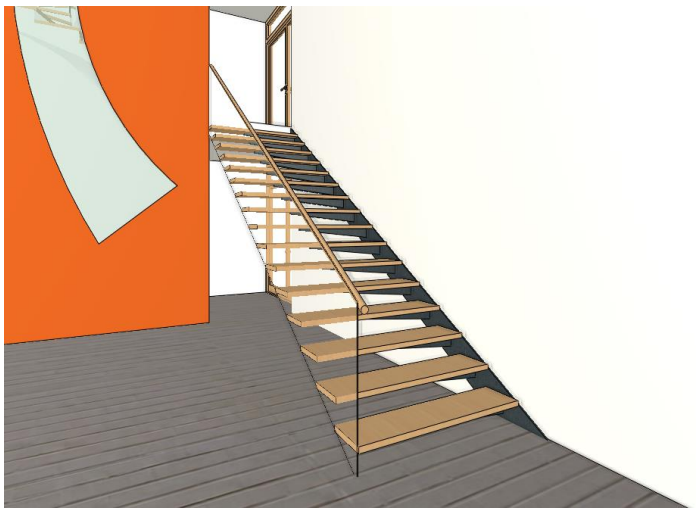
- Select the handrail in the first row with the circle cross-section (1) and set its Offset from path to 50 mm. (2)
- Open the library by clicking on the button in the lower left corner, (3) then click on the New button (4) and name the railing as “Acrylic railing”. (5,6)



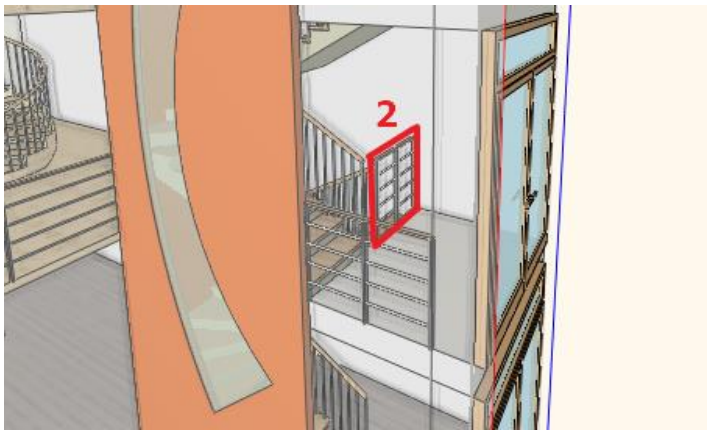
- Select the stair on the floor plan and select its properties. In the dialog, on the General properties tab, tick the Railing automatically added to the left side option. Select the “Acrylic railing” from the drop-down list, then hit OK.



- The railing automatically appears in the 3D window as well.



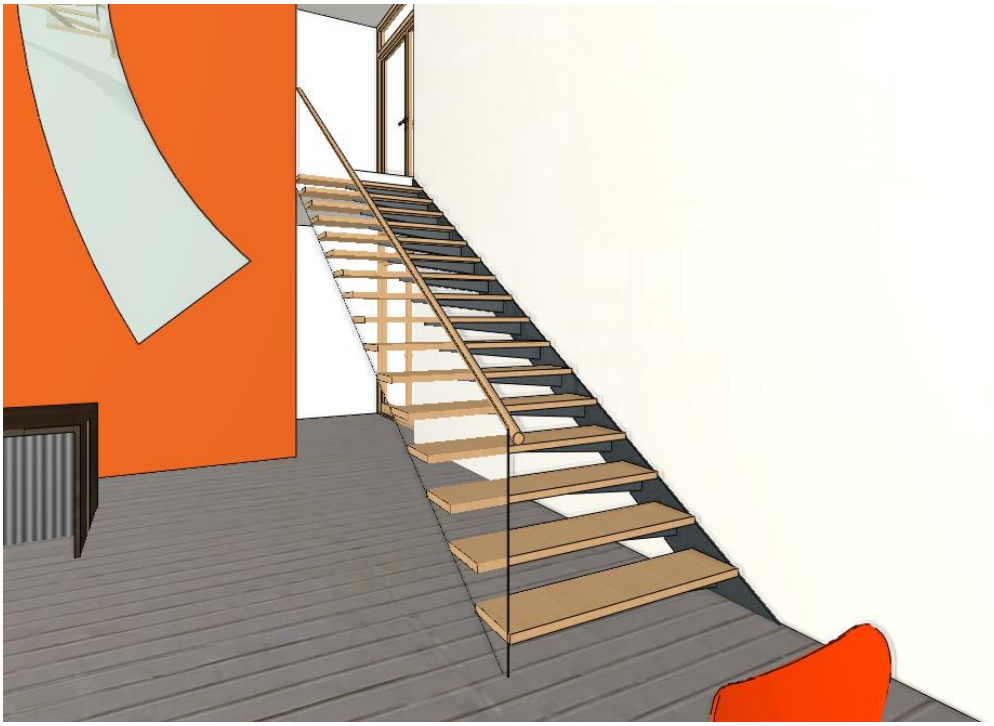
- Put the recently created railing and stair and the 2nd gallery railing to the “Stair02” layer.



In the Layer manager you can switch between “Stair01” and “Stair02” versions. This way you can easily and quckly activate different versions.

The end result using the “Stair01” layer:

The end result using the “Stair02” layer:



Finally switch on Object layer from the used layers in the Layer Walk and display the entire project including furnishing.

Workshop 8: Designing roofs

8. Workshop: Designing roofs

This workshop guides you through how to design a roof.

- Settings, creating styles
- Roof plane with three points
- Roof in sketch mode
- Extruded roof
- Roof slab
- Roof window, customized window, curtain wall

Watch the video of the workshop here.

8.1. Open and save project

First download the "**Workshop Projects - Intermediate Course**" from our website, then install it if it is not already installed. It contains the projects for the intermediate course workshops.

Start

- Start the ARCHLine.XP program.
- Click on the **Open Project** button.
- Open the following project:
  …\ARCHlineXP Draw\2024\Workshop_Intermediate\6_Roof\01_Roof_START.pro

Save project

Before you start working on the project, save it under a new name.

- Select **File / Save project as**… command and rename the project, then select the folder you want to save it.

8.2. Settings and creating styles

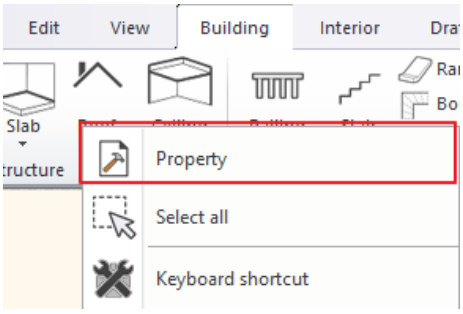
The roof is one of the most complex architectural design elements. As it has loads of fine details that goes beyond simple roof plane representation, which can be sufficient for a conceptual design plan.

Let’s see how we can achieve that all details are visible and also how we can design a simple roof with roof planes for a conceptual plan.

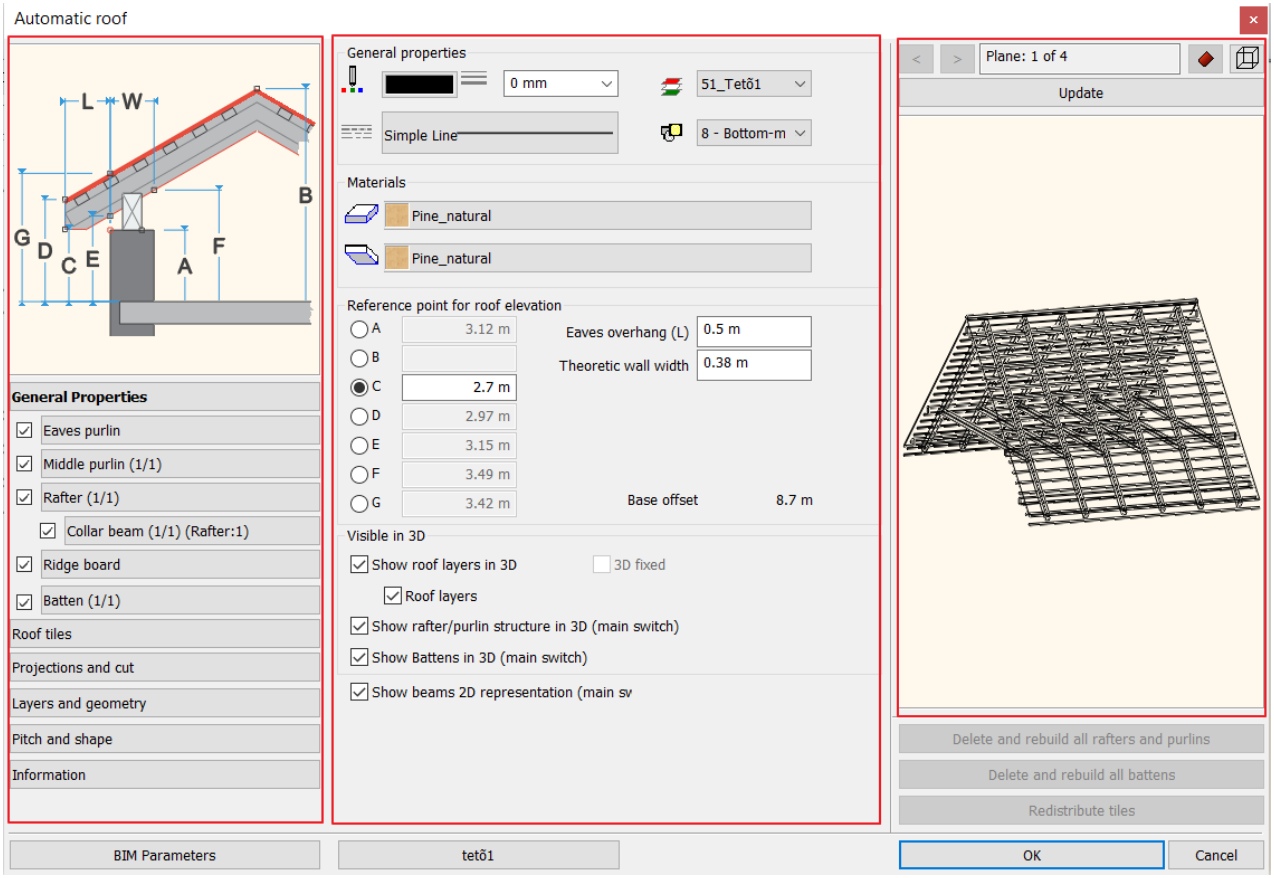
8.2.1. Roof - settings

First let’s check the roof properties:

- Go to **Ribbon menu / Building / Roof** tool and right-click on it. From the pop-up menu choose **Property** command.

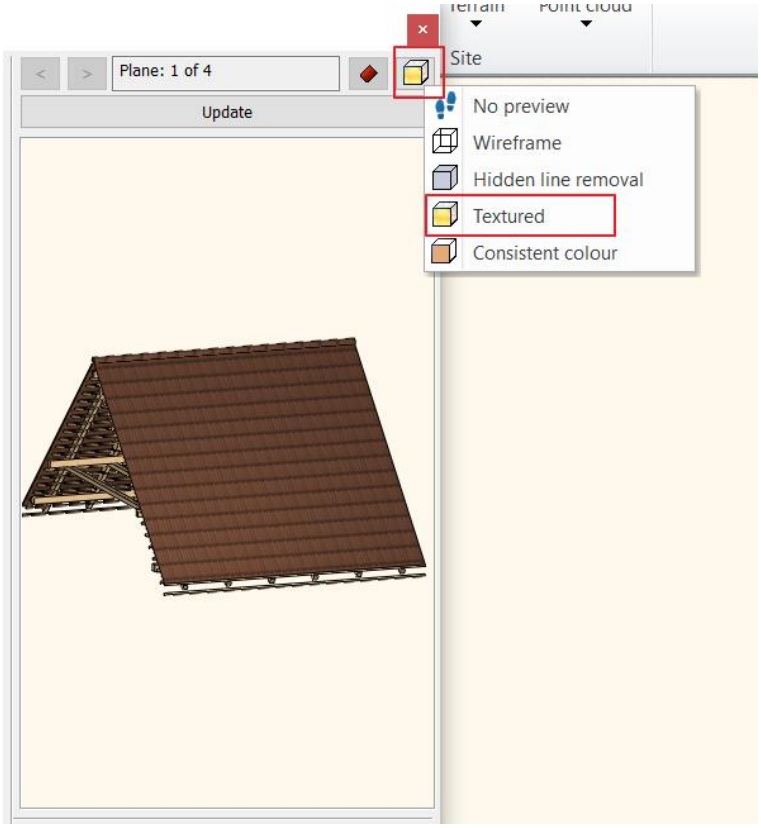


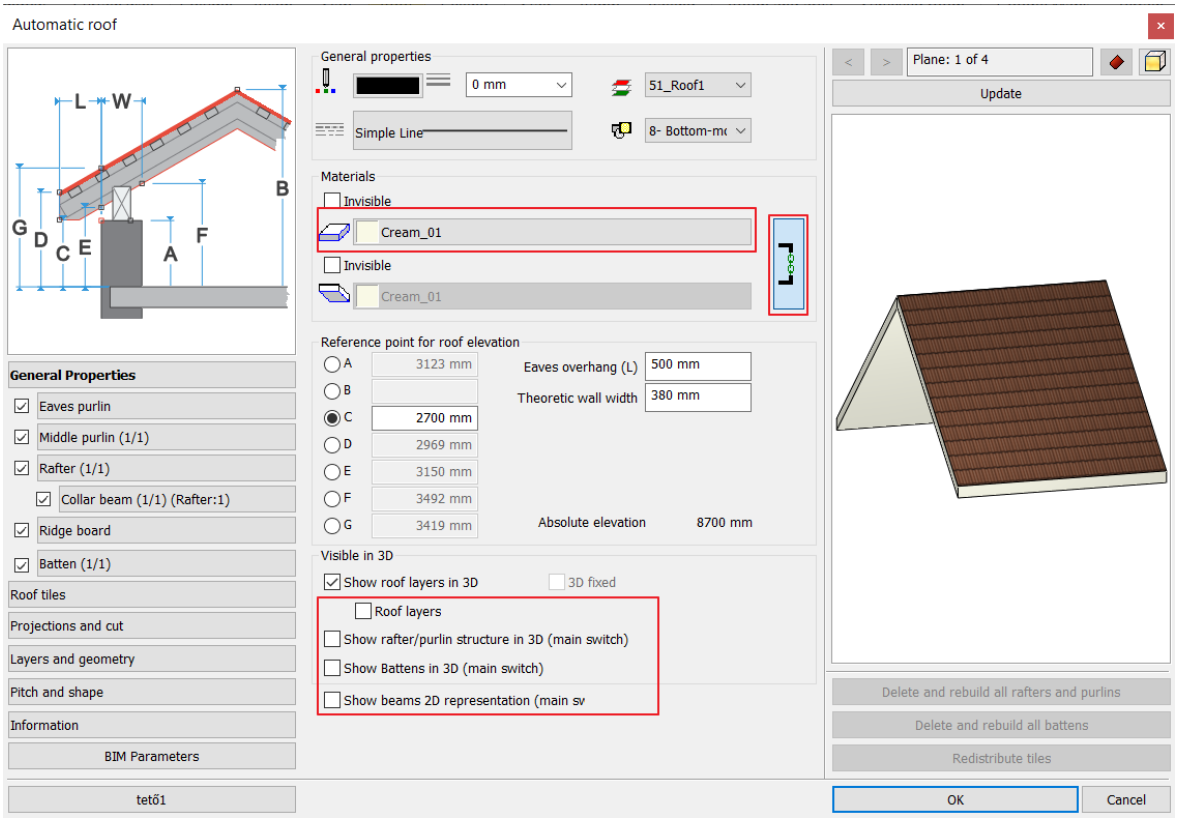
Now the “Automatic roof” dialog window will come up.



This property window has three sections. On the left side we can choose from the main property categories which can be modified in small details. The middle section shows all details of the selected main category. Finally, there is a “preview” window on the right side, here we can check the result of all modification. Clicking on the “3D preview mode” icon we can set other 3D representation mode.

- Select “Textured” view.
- We are currently on the **General Properties** tab. Now change the finely detailed 3D representation to much simpler one.

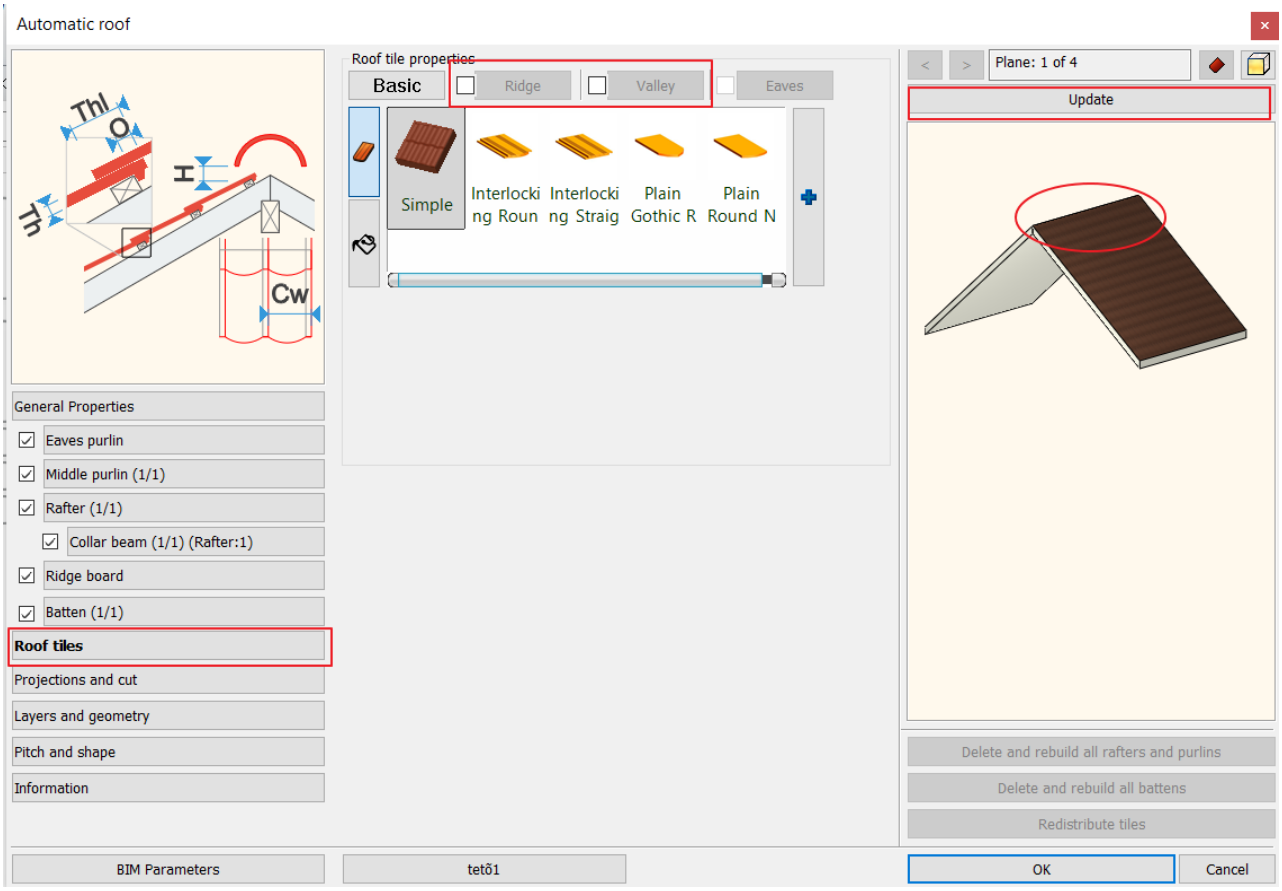




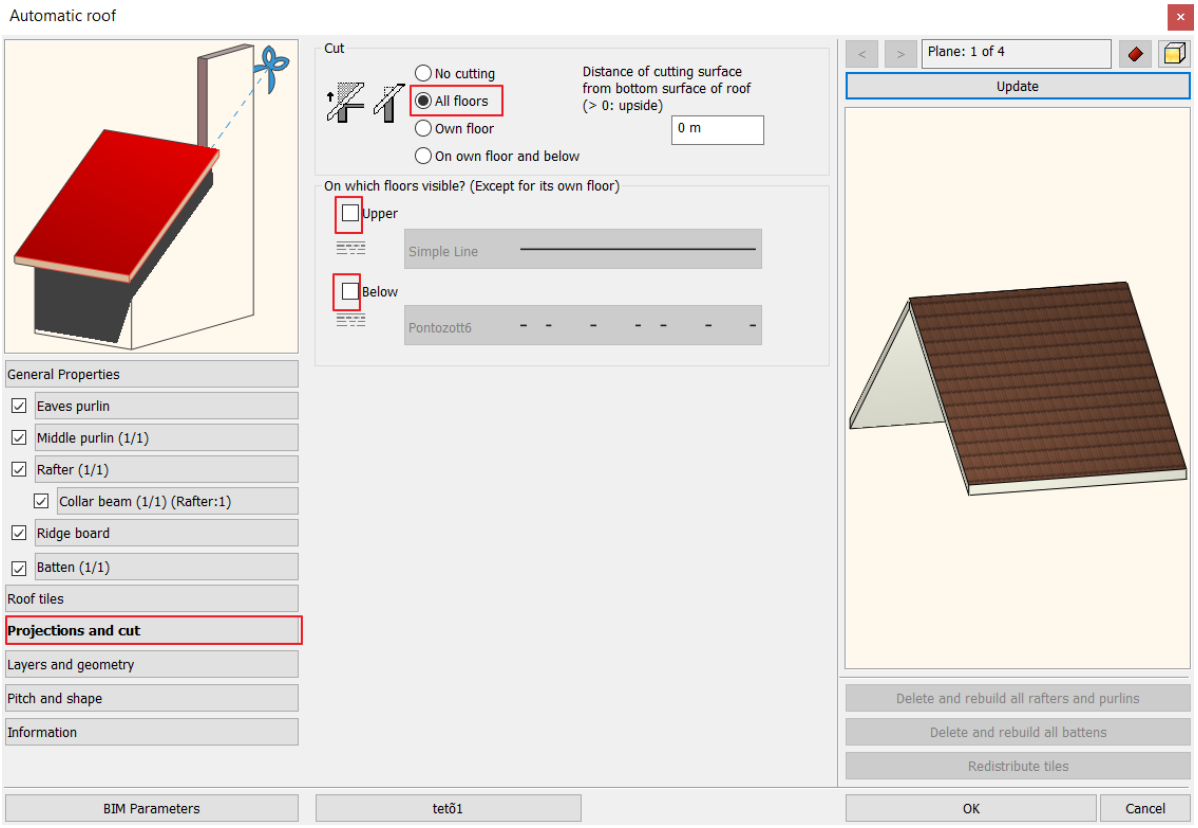
- At the bottom can be found the “Visible in 3D” settings, first turn off “Show beams 2D representation” main switch.
- For the simplest representation “Show Battens in 3D” and “Show rafter / purlin structure in 3D” main switches should be also turned off. (If this is an architectural plan and these will be needed later then come back here and turn them on)
- In this example we don’t need “Roof layers” so let’s turn it off.
- In order to see changes, click on “Update” button above the preview window.

- Now change the roof material. Currently it is “Pine_natural” on side plane and bottom plane. Click on the name and set “Cream_01”. Connect the material of the upper and lower planes so that both are changed.
- When you finished update the preview, press “Update” button. The changes immediately can be seen.

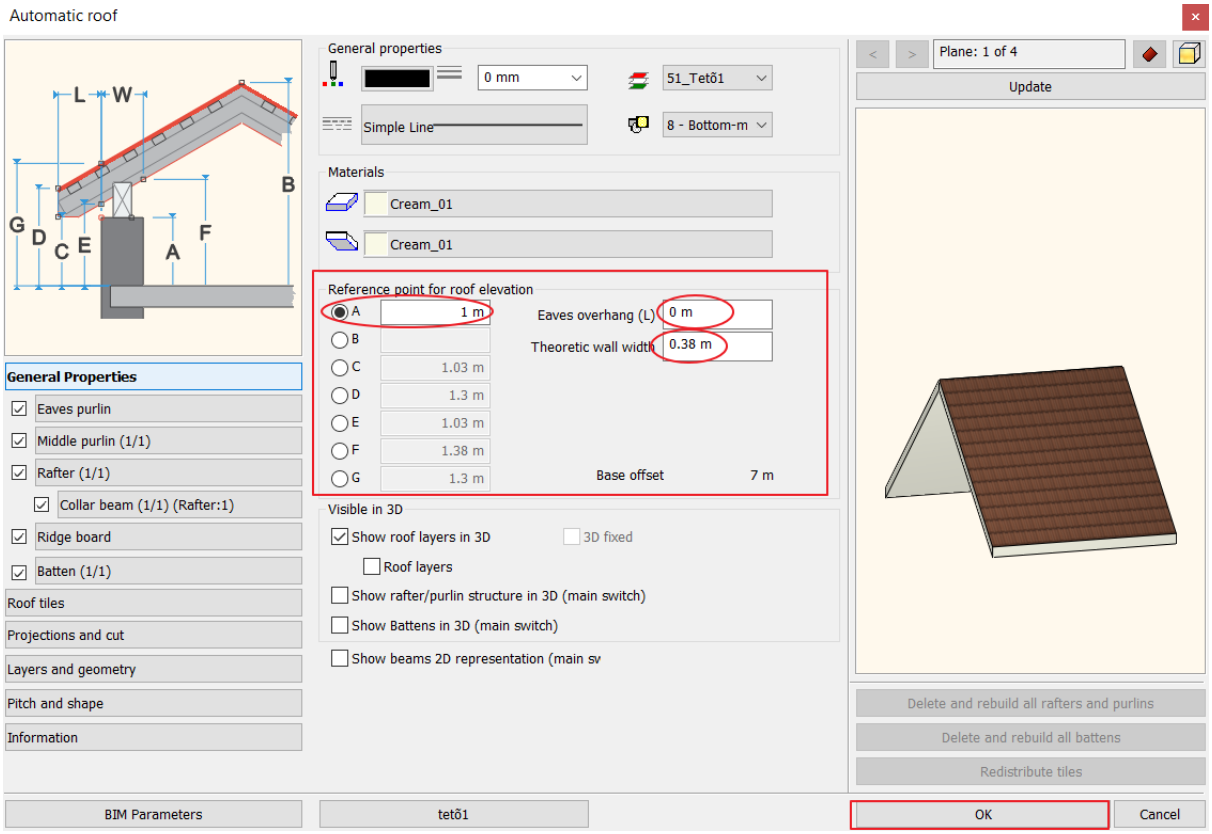
- On the left side click on the “Roof tiles”, here can be set the material and the type of the roof tiles.
- Detailed roof tiling is not needed now, as we are preparing the interior design plan so turn off “Ridge” and “Valley” options.
- Updating the preview, the “Ridge” has disappeared. (Valley wasn’t on the original model.) Now there is only a simple connection line between two planes.



- Now click on the "**Projections and cut**" category. Here you can set where the roof cut the different walls. You can determine depending on which level you created the wall which connects to the roof to cut it or not.
- Select "**All floors**", so anywhere walls are coming from those will be chopped by the bottom of roof plane by all means.
- The next setting is to make visible the roof not just on that level it was originally created, but furthermore on the level above or below. You can also set the line type.
- Now turn off both options, so now the roof line can be seen where it was originally created.



- Now let's go back to **General Properties** and see through Reference point for roof elevation settings. There are several values from A to G, the diagram on the left side can help to interpret them.
- In this example we have to define "A" representing the wall knee height.
- Activate "A" and enter 1 m. Then set the "Eaves overhang" to 0.
- It is recommended to set the "Theoretic wall width" to the same value as the wall width on the original plan. If there is a difference the software alters the interior structure of the roof differently. Now it is 380 mm, this should not be changed.

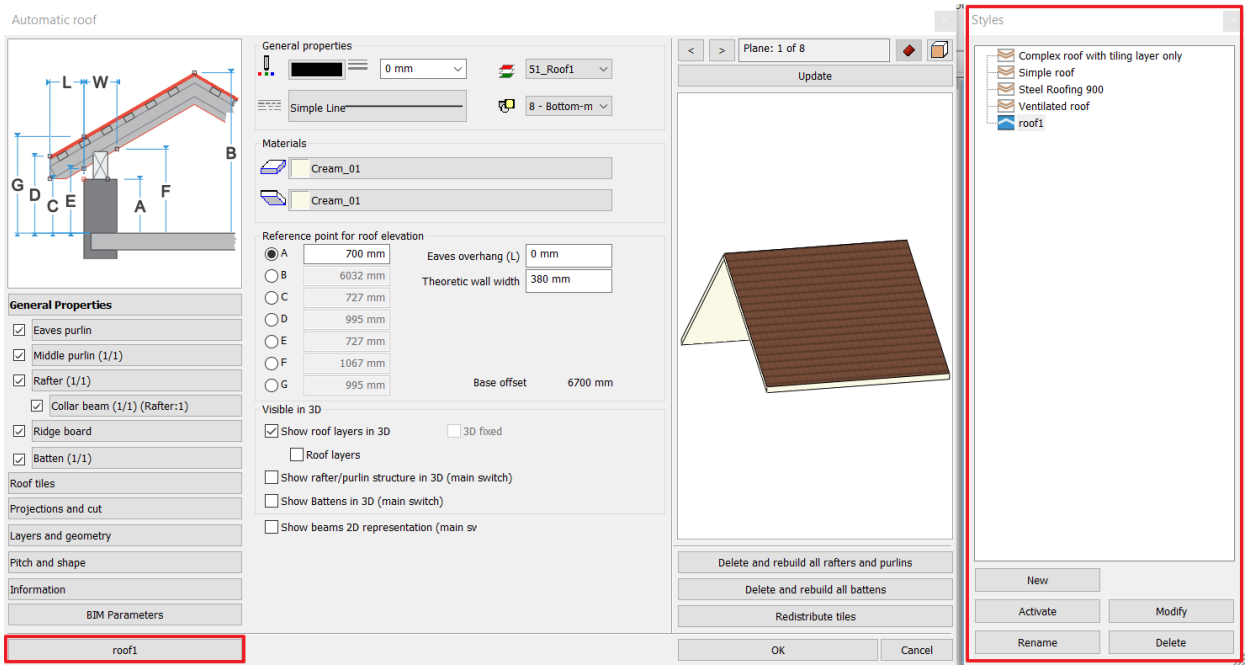


We customized the settings.

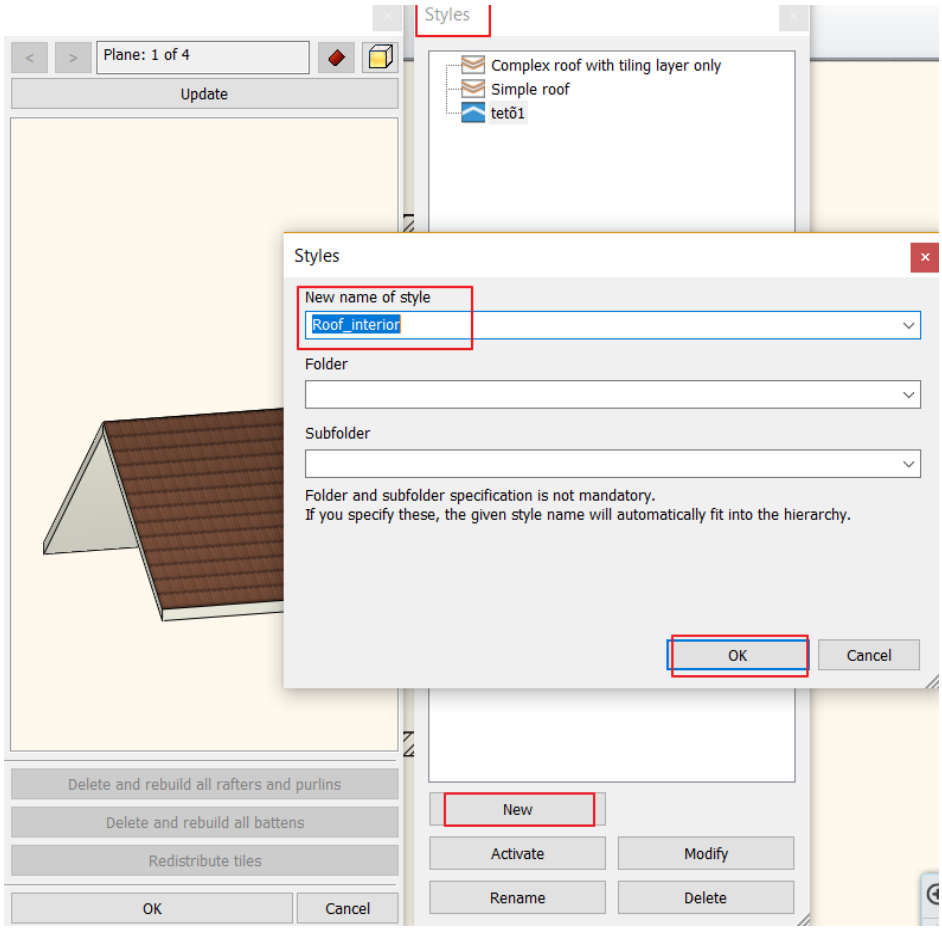
8.2.2. Creating styles

We finished with modification of the roof properties, let's save it as a new style.

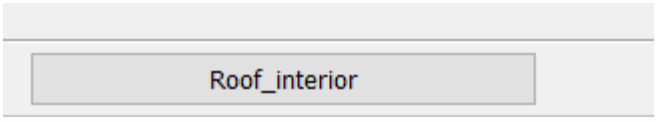
There is a button to do so at the bottom of the dialog window with the currently used style name on it.



- Click on „roof1”, then the list of styles will appear on the right side. Here are those styles which can be used after installing the software.
- Now save it as a new style under the list. Click on “New” button.
- Enter the name of the new style “Roof_Interior”, then press “OK”. The program has created a new style.



- From now on the newly created style is active. This is indicated by the name of the style button on the bottom toolbar. You can continue to work with this new style settings until another one is activated.



New style can be activated by clicking on the selected style, then you choose “Activate” command at the bottom.

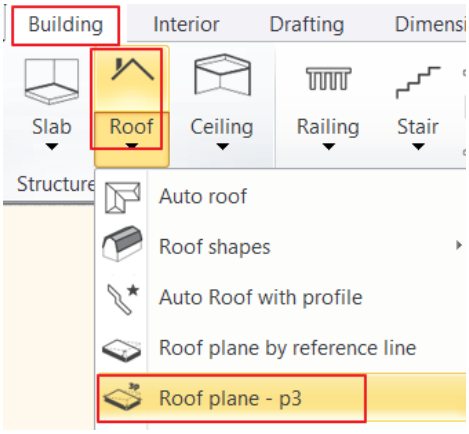
- Now the “Roof_Interior” style should be active, close the dialog by pressing “OK”.

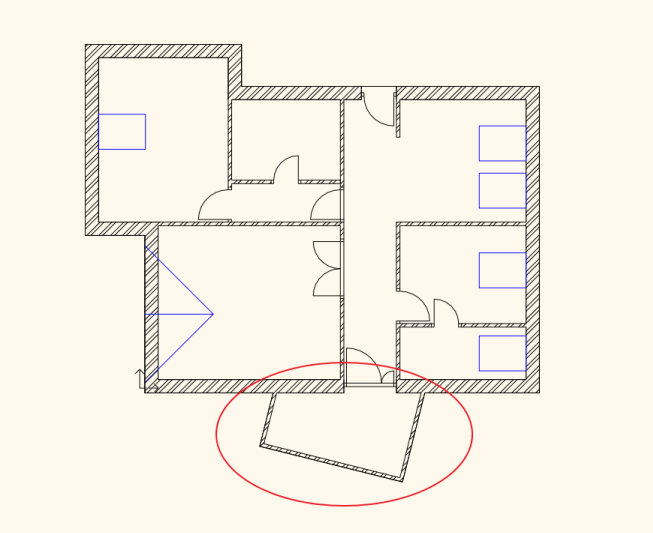
  Using this style, we are going to create a new roof structure.

8.3. Creating roof plane with 3 points

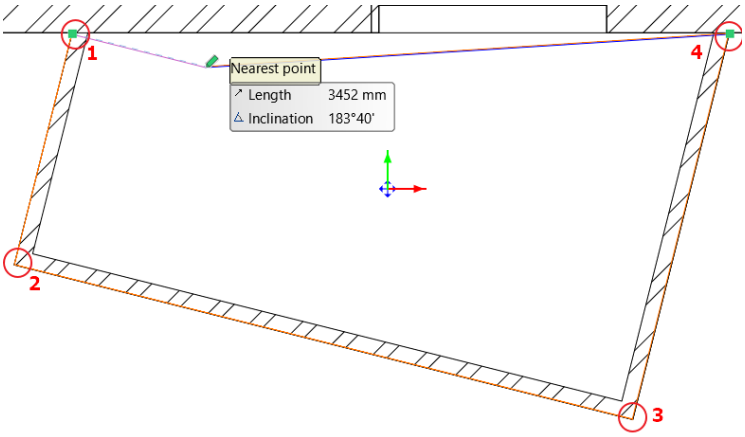
In the first example we are going to create a roof by using three elevation points that we had measured before. This is where we are going to start:

- Select **Ribbon menu / Building / Roof / Roof plane – p3** command.



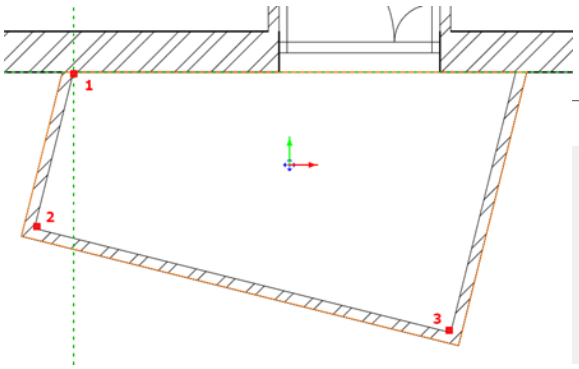


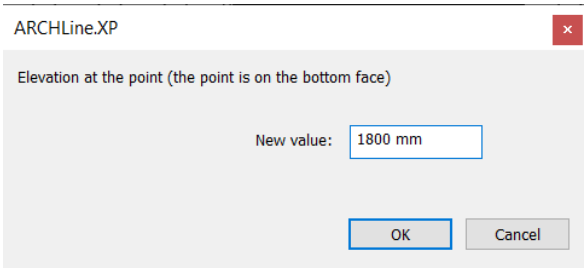
- After starting the command, we have to define the roof contour. Click on four corner points alongside the outer wall.



When you are done, the program will bring up a dialog box asking you if the points you want to enter next will be the lowest points of the roof or the highest points. Here, select Yes, i.e. the lowest point.

- In three clicks, enter the three interior elevation points measured on site as in the example.
- Click on the first internal elevation point (corner point) and type 1800 mm as the first elevation point is 1800 mm. Press Enter or OK.

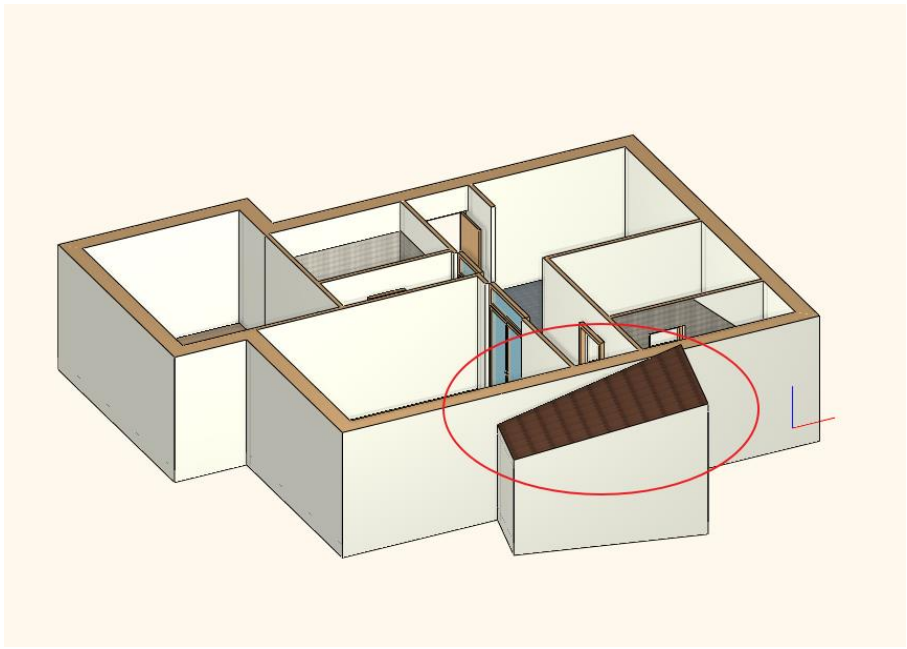




- Click on the second corner point inside and type 1800 mm, then hit Enter.
- Finally click inside of the third corner point and type 2600 mm, then hit Enter.
- The roof is finished, which is indicated by only contour lines on the floor plan. The modification is not striking as the roof contour overlaps other contours.

- On Navibar click on  “Magnify window” button and zoom in the 3D window, here you can see changes.
- Previously you set that the roof cuts walls. You have to update the model in order to cut walls according to the settings.

- The floor plan window is active. Click on  “3D hammer” icon on the Toolbar to rebuild the model.

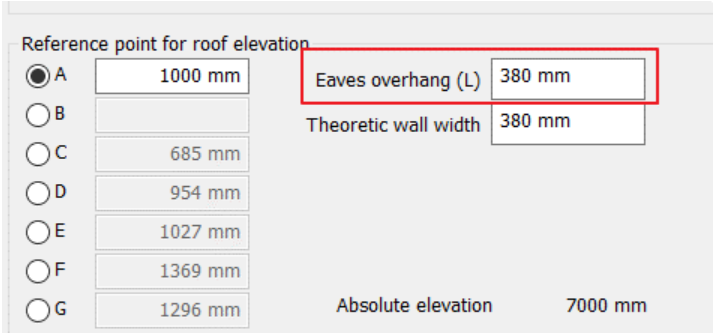


8.4. Roof in Sketch mode

In the next example we are going to create a roof structure, which is automatically generated.

The roof will be drawn along inner walls; therefore, we have to modify the value of “Eaves overhang” by adding the wall thickness to it. So, the roof will overhang just that much to cover the walls entirely. Please do the followings.

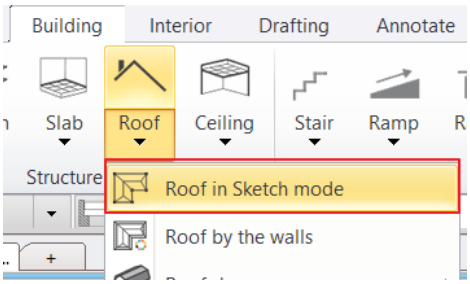
- Click on **Ribbon menu / Building / Roof** and select properties with right-click.
- Modify the “Eaves overhang” value to 380 mm. You have to add the wall thickness to the existing value.



- Accept changes by pressing “OK”.

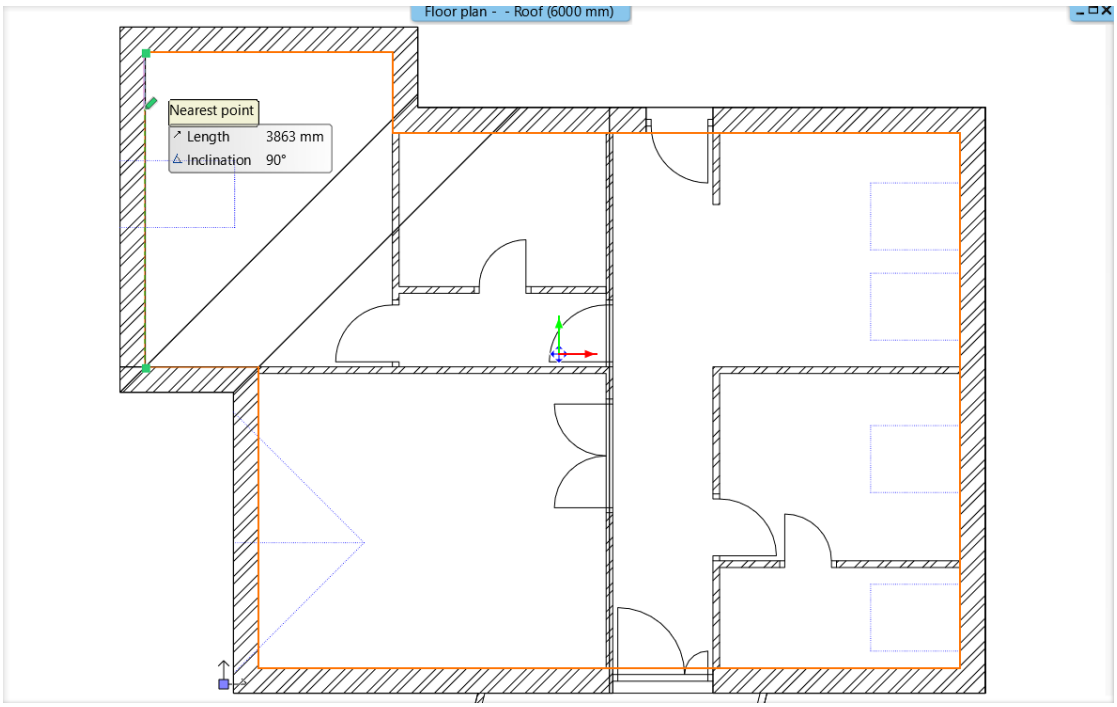
  Now draw the roof.

- Activate floor plan window.
- Click on **Ribbon menu / Building / Roof / Roof in Sketch mode** command.

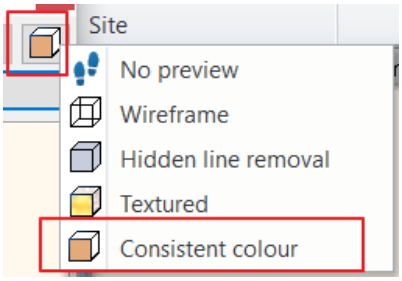


- Start to draw the contour along the corner points. Click on all corner points except the conservatory area as we have created a roof there in the previous example.

Be careful to click on the proper corner points in places with multiple corner points.

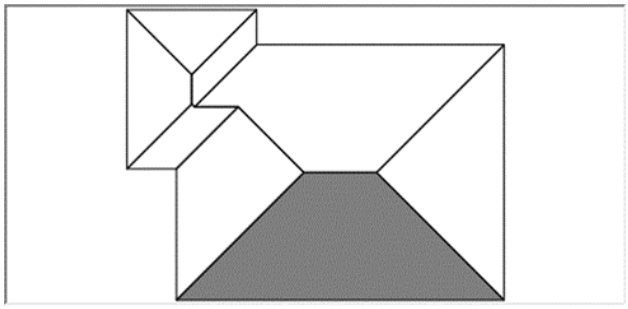


- When you finished, press Enter or click in the starting point.
- Set the 3D preview mode to “Consistent color” so you can see changes better.



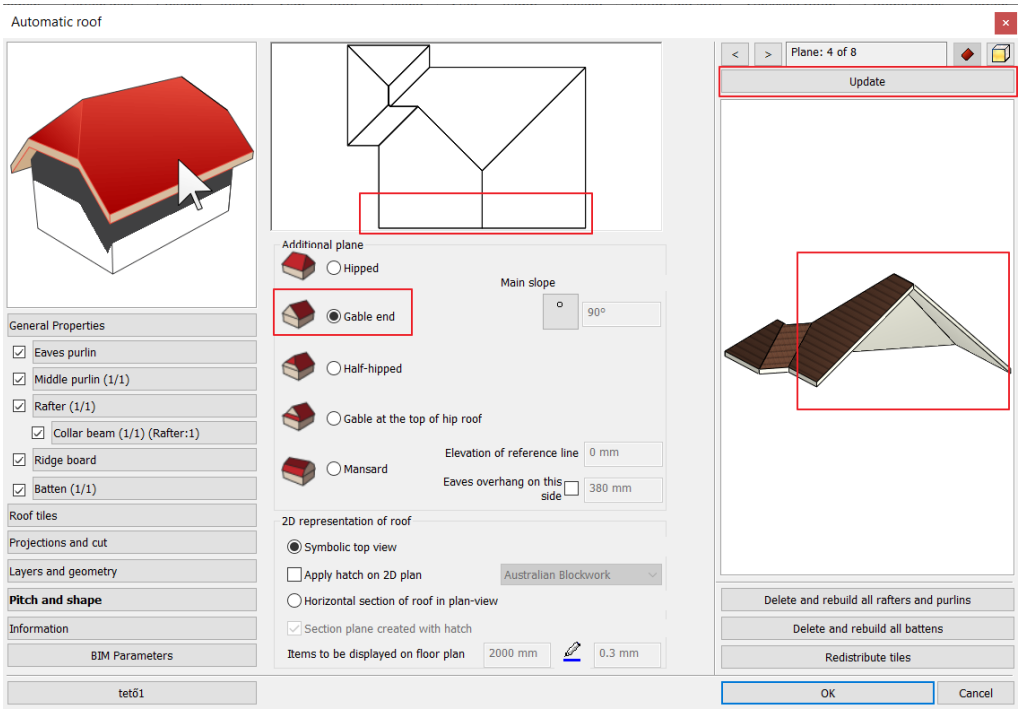
Now let's see another option how to modify a roof.

- On the right side of the "Automatic roof" dialog window, select from the main categories **"Pitch and shape".** Here we can modify the roof plane settings.
- In the middle section we can find the top view of the roof, here we can click on any roof planes to modify.

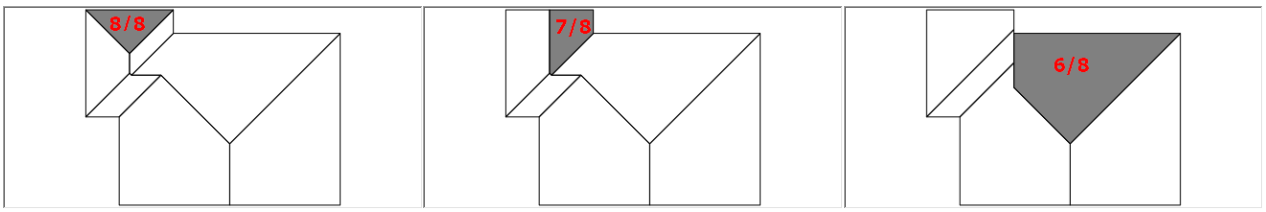


- Let's start working on the roof plane shown in the picture below. You can find the number of roof planes above the Update button. You can easily swap between planes by using arrows next to numbering. (This makes it easy to select roof planes with a smaller surface area.)

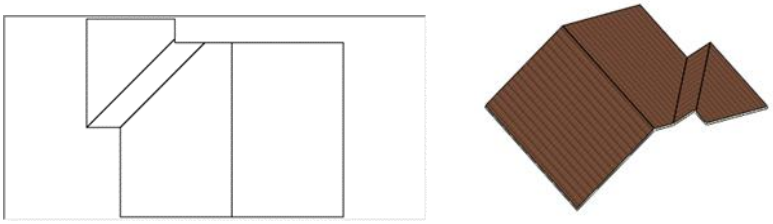
- Simply change the roof plane to "Gable end" on 3/8 roof plane. Activate the "Gable end" option and click on "Update" above the 3D preview. The changes are striking. It looks that a roof plane disappears and a saddle type of roof is created instead.



- Repeat the same on the roof planes 8/8, 7/8, 6/8, to create Gable end roof planes until you get the same result as in the picture below.



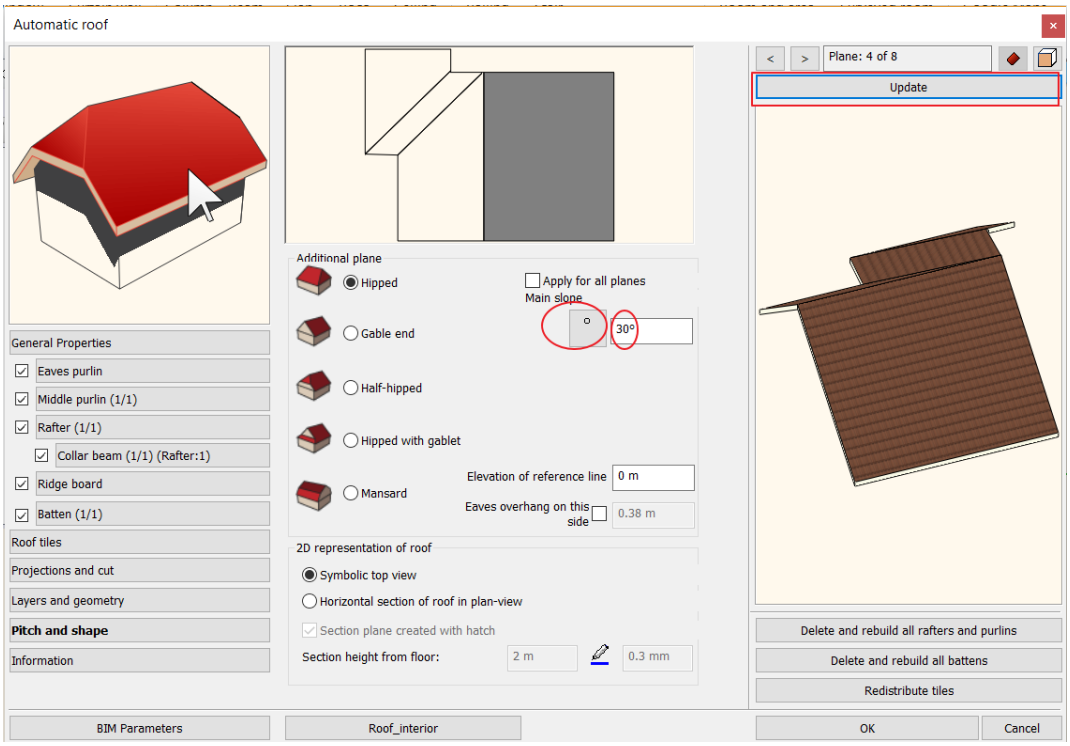
- When you finished press update. The result is shown immediately.



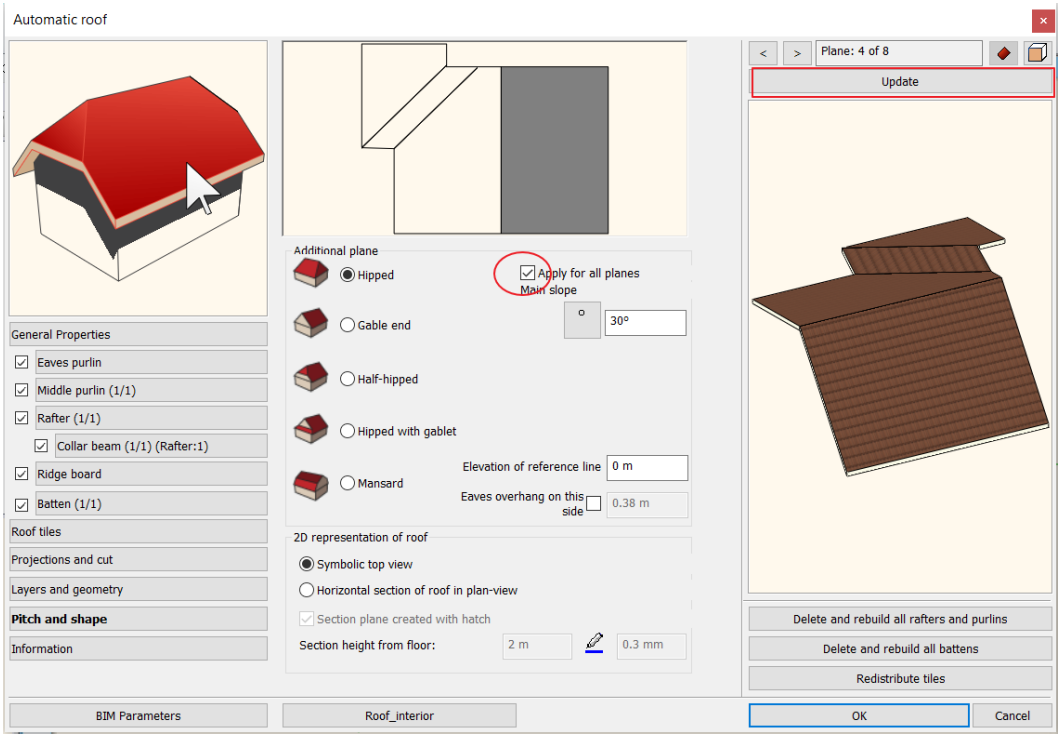
The continuous changes on the roof structure are noticeable. As we turned off some of the roof planes, then roofs that remained unchanged are now connected to each other different way. Different edges, ridges, and valleys are formed accordingly as it is shown on our model.

Often, we want to change the roof inclination. Let's see how we can do it.

- Select a roof plane with a single click.
- Under "Main slope" you can define the way how the inclination is to be changed.
- In case you are working on an architectural plan, it is worth to set the inclination in degrees. In this instance all you have to do is to enter the value in the field.
- In this case enter 30° and refresh the 3D preview. You can see the roof became flatter.



- If you want to apply this value on all roof planes, then activate "Apply for all planes" option, then update the preview.



Using degrees for defining a roof plane inclination can be very effective when we are designing the roof structure by ourselves. But if we are working with data collected from the site then we have to define the roof inclination by ourselves this is much more difficult situation. This can be only derived from the measured values such as distances, heights, projections. To avoid these calculations in the program exists an input method.

Click on the option button again. One of the three options is when a right-angled triangle appears. 

- In essence the software calculates the inclination based on the measured length of a right-angled triangle. As you can see on the picture this value is **a/b**. Where "**a**" represents the vertical side and "**b**" is the horizontal side of the triangle.
- You can determine these values based on the values measured at the original site in this ratio pair.

Let's see an example:

The point is that, in a situation where the roof slope can be measured next to a wall at the original location, we can determine both values by defining either a horizontal or vertical surface. In this case, we measured a horizontal value of 1.9 m and a vertical value of 1.7 m relative to a 1 m knee wall height.

- Now type 1.7 as the vertical length (first), then 1.9 values as horizontal length (second).

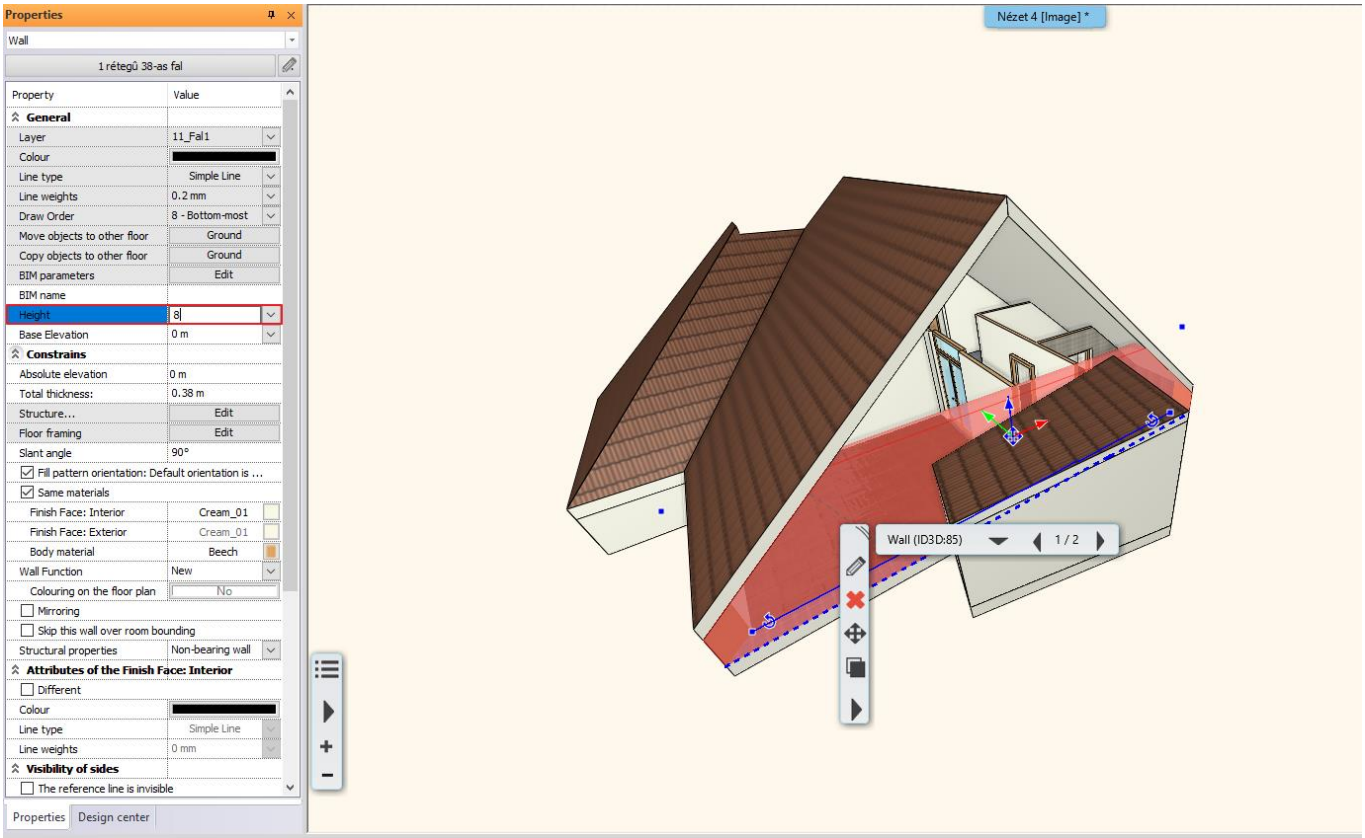
It is important to separate values with forward slash, but also enter space before and after it. Now these values will be interpreted as ratio pair not division. The inclination will be calculated accordingly.

- To set the inclination at the same time for all roof planes activate “Apply for all planes”, then update the 3D preview.
- Now the inclination has been modified. If you click again on the option button, the software calculates the inclination in degrees according to the given values.

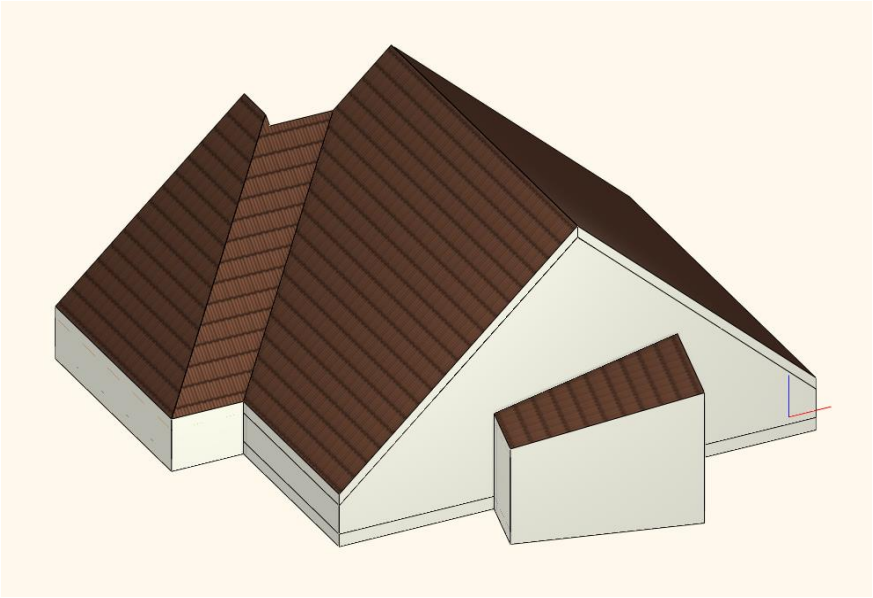
- Now close the dialog by pressing “OK”, now the roof is completed.
- Finally fix the wall connections, by clicking on the 3D hammer.

As you can see in some cases the walls are not high enough to meet some of the roof planes. Now we have to adjust these values accordingly.

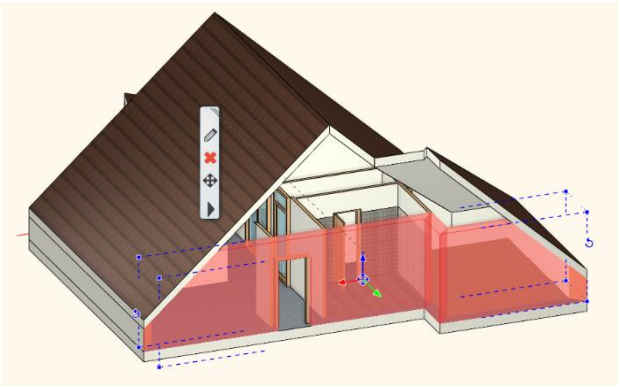
- Activate 3D window. Select any of those walls mentioned above.
- On the left side under properties change the wall height to that value which might reach the roof top point.
- In this example it is 8 m. Enter the value and press OK.

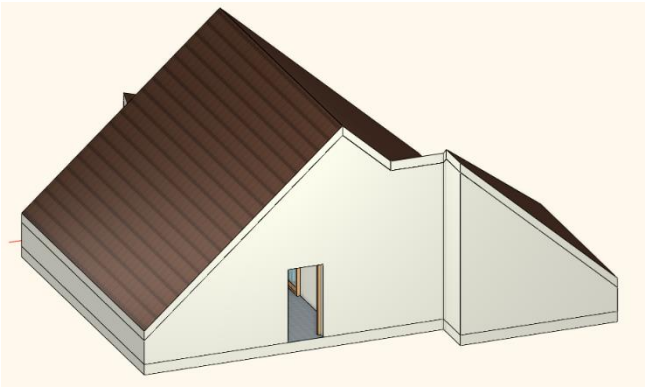


- After this modification the roof meets the wall. Due to the roof settings the roof cuts the wall anyway.

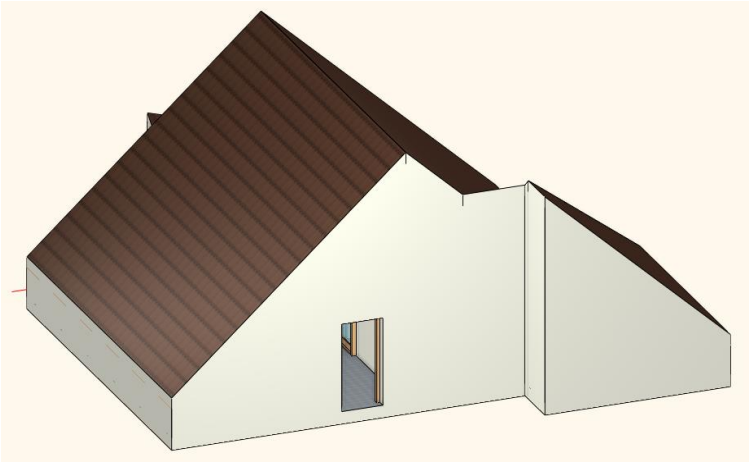


- Rotate the model to the opposite side, select all three walls by holding the CTRL key down, and modify heights to 8 m on the left side under properties. Hit Enter.



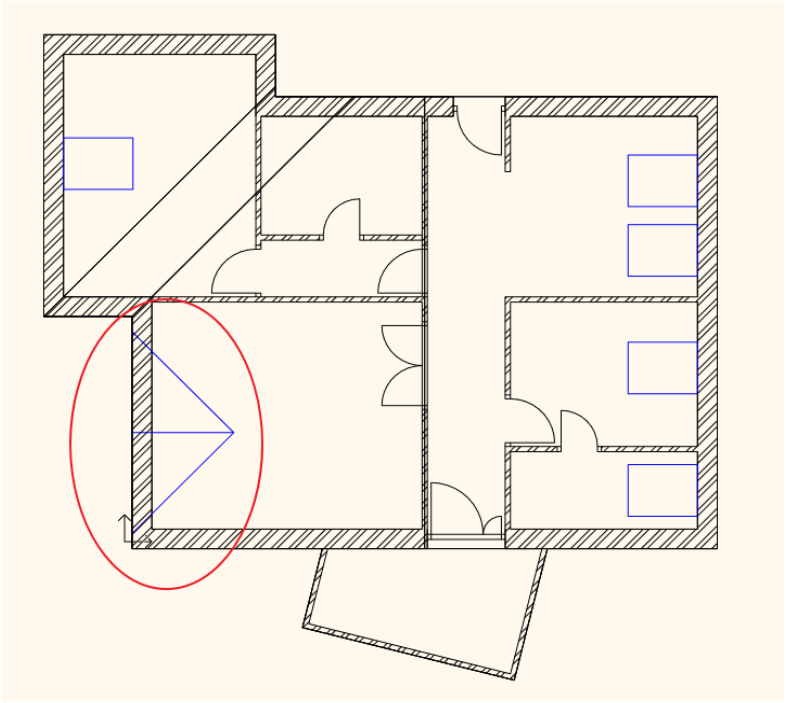


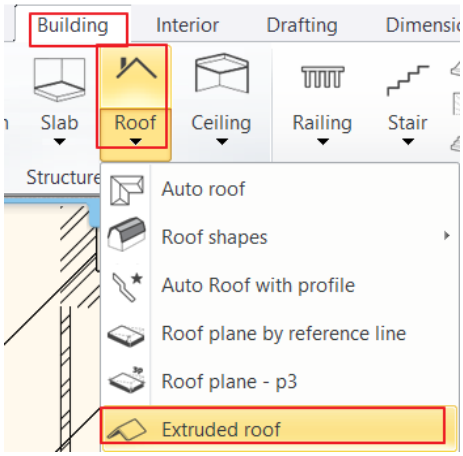
- In order to remove the border lines, surface integration is necessary. Use 3D hammer and those will disappear immediately.



8.5. Extruded roof

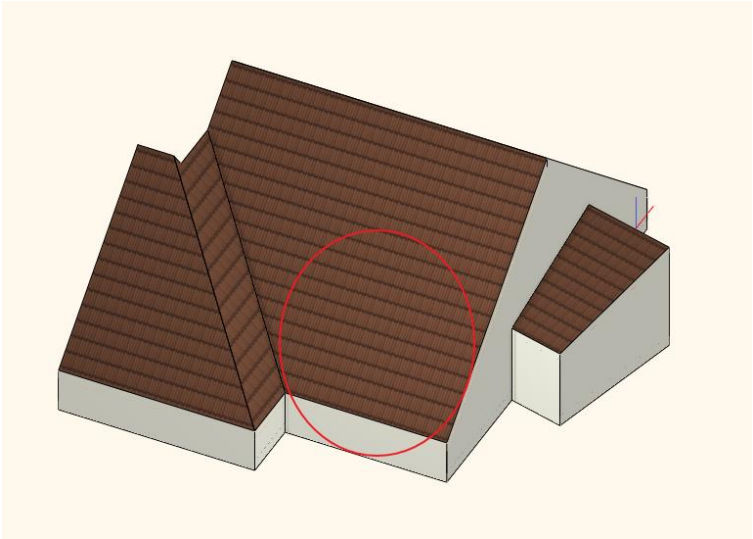
In this part we will create an extruded roof. It will be placed on the floor plan marked by blue.





When creating extruded roofs basically there is no need for predefined editing lines, but in our case, those will be very helpful.

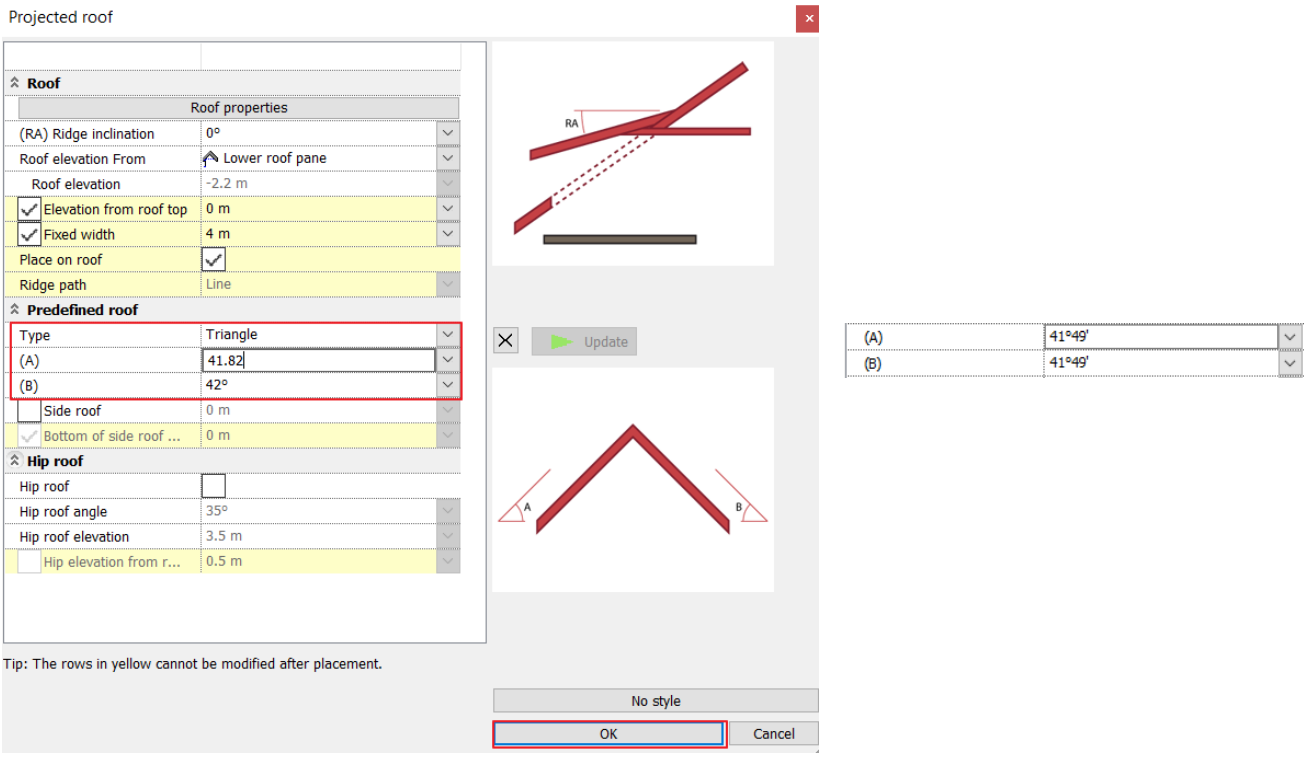
- The 3D window must be activated, rotate the model to see the top roof plane as shown below.



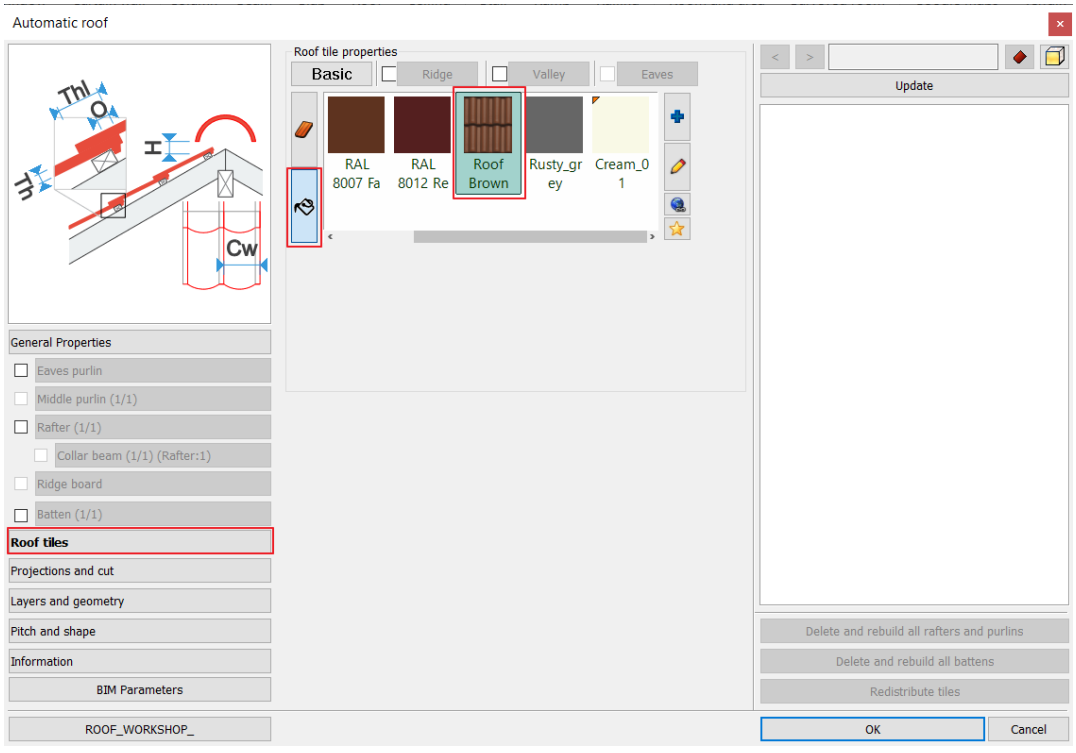
- Now go back to the floor plan and activate it.
- Select **Ribbon menu / Building / Roof / Extruded roof** command.

In the pop-up dialog window change the followings:

- Under “Predefined roof” change the values “A and B” to 41.82°, this will be automatically converted into degrees and minutes.

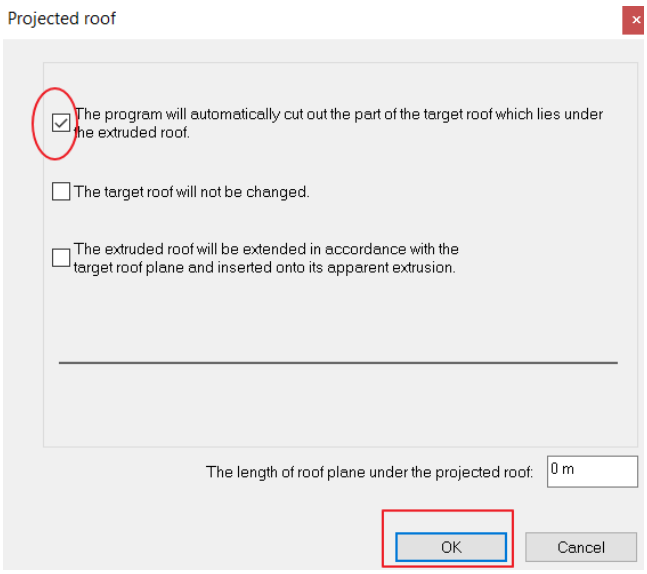


- Click on the Roof properties, then on the Roof tiles tab, set the Roof - Brown material.

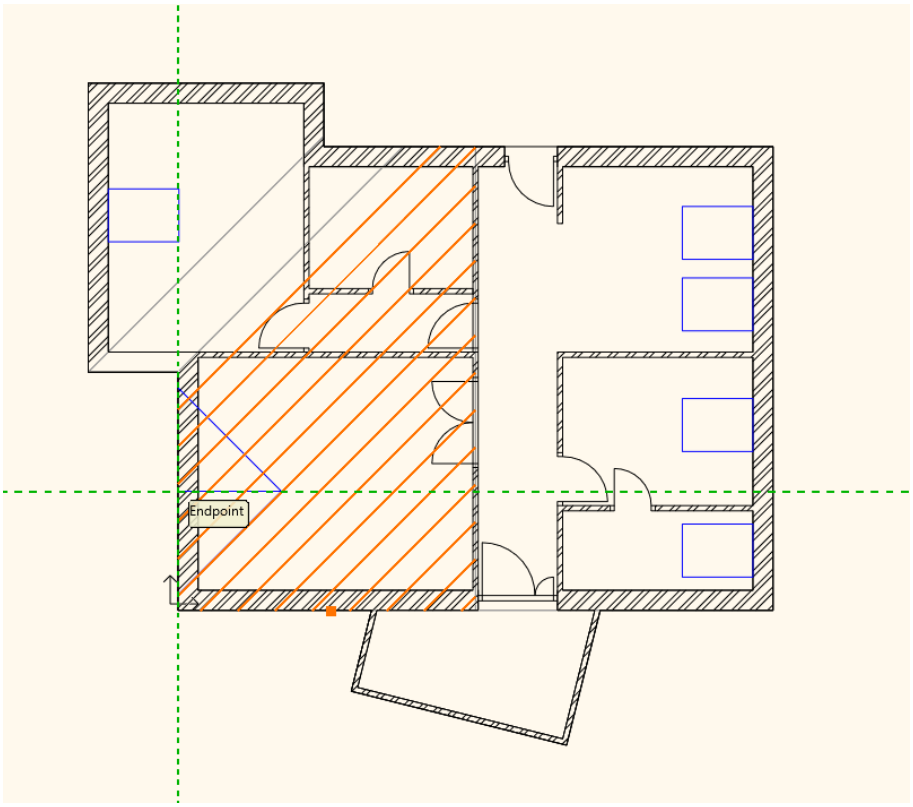


- Accept the changes with OK.

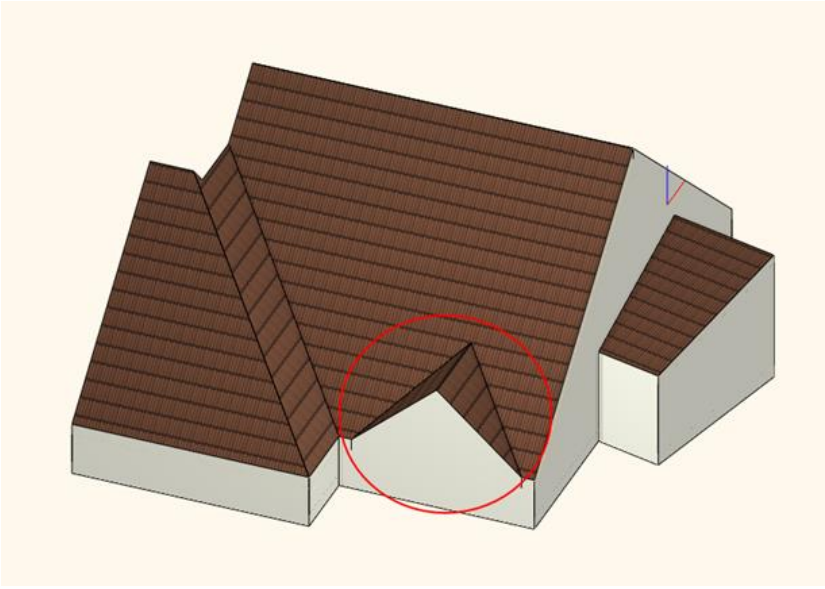
- In the pop-up dialog window, you can characterize the extruded roof how to be projected into the main roof. The most common default setting can be found here, when the projected roof creates a cut-out along the contour of the connection underneath it. So, the projected roof is accessible and not a closed roof plane.
- Close the dialog by pressing “OK. As you can see the cursor shape has changed.



- Next you have to define which roof plane to use for the projection. Click on the eaves lines next to predefined lines.
- The software recognized the selected roof plane and the current roof can be moved according to the current settings.
- Click on one point and place the projected roof.



- Close the dialog by pressing ESC, as we don't need any more projected roofs as per the original floor plan.
- Use 3D hammer to generate the 3D model based on the floor plan.



The material and tiles are not the same compared to the previously created ones, in this example we didn't modify those relevant settings which can be found in Projected Roof dialog window under Roof properties. Obviously, these can be changed later as well.

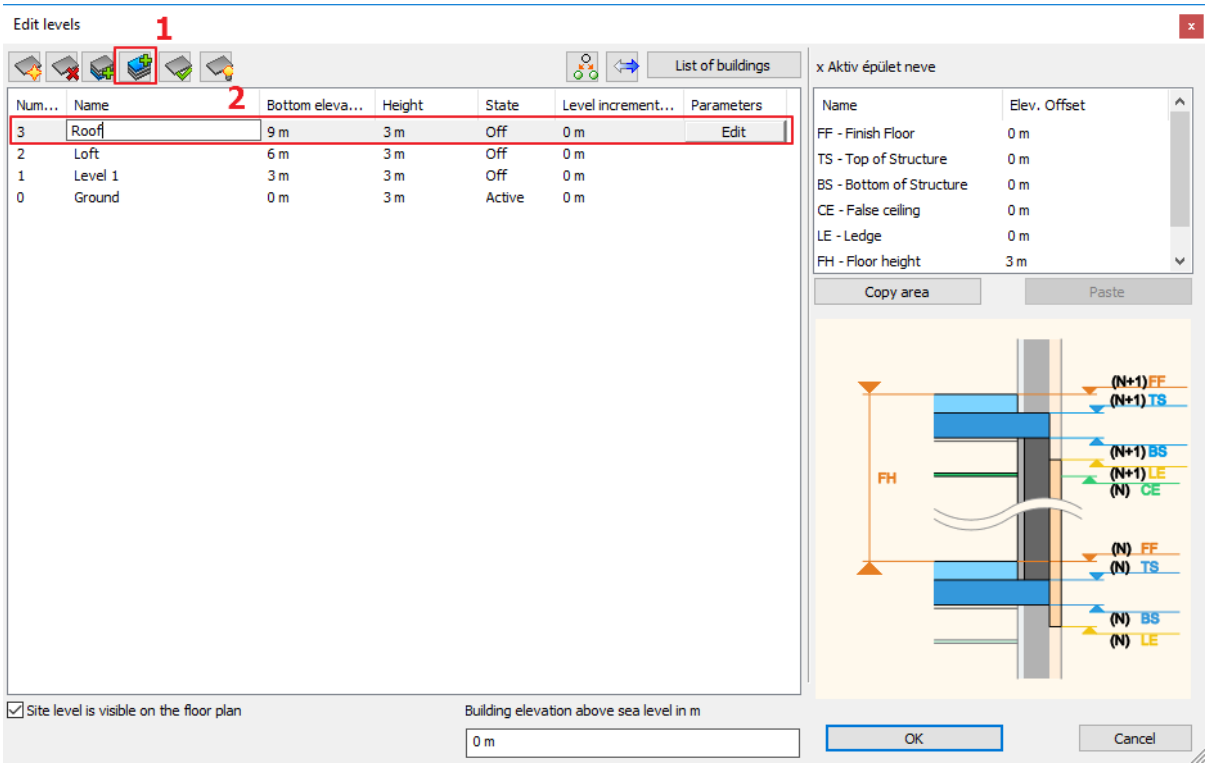
8.6. Loft slab

Now we are going to move the whole roof structure to another level. In this example we are going to use this to eliminate the roof edge lines. This is also useful when we want to work out the fine details of the roof structure in a completely separate drawing.

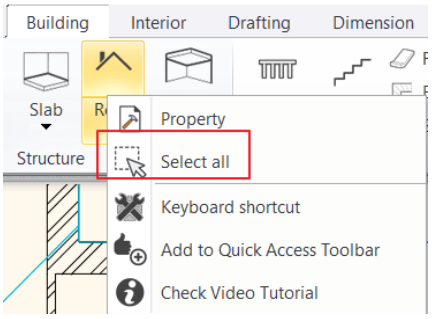
8.6.1. Managing levels

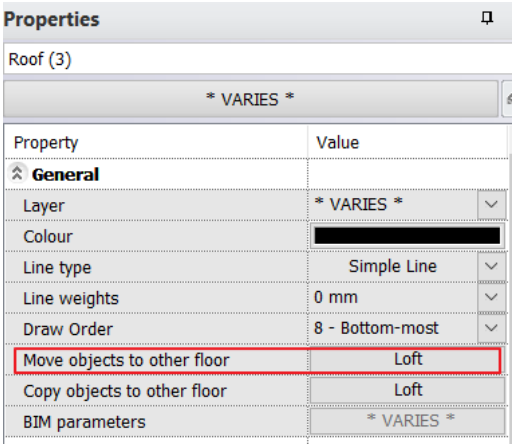
At the moment we are working on the Loft level. We can add new layers in the "Level Edit" dialog window.

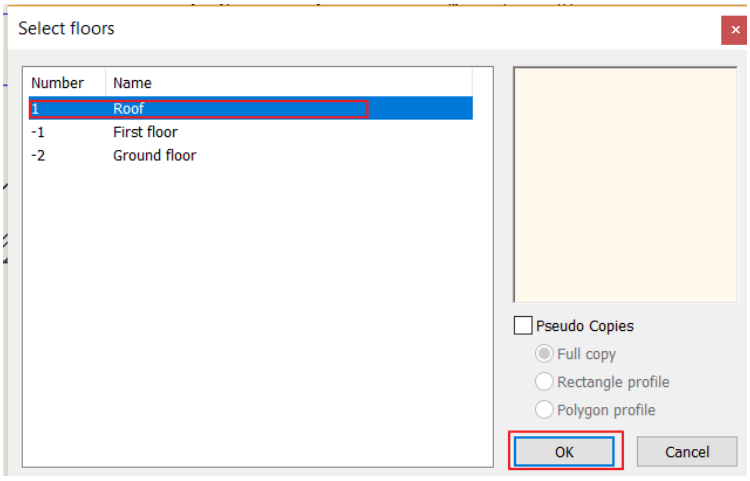
- Click on "Loft" tab at the bottom toolbar, then the Edit level dialog window will come up. Here we can find all levels which are here by default.
- Insert a new level by clicking on "Add-up" button (1).
- Click on the label twice and rename it to "Roof". We are going to move the roof structure to this level. Doing so now an empty Roof level is created above the Loft where all three roofs can be moved together.
- Close the dialog by pressing "OK".



- Select all three roofs by right clicking on **"Roof"** icon **under Ribbon menu / Building**, then "**Select All**" command. As you can see all three roofs are selected in 2D and 3D.
- On the left side under properties press the "Loft" button next to "Move objects to other floor" and select "Roof" from the pop-up dialog window, finally press "OK".

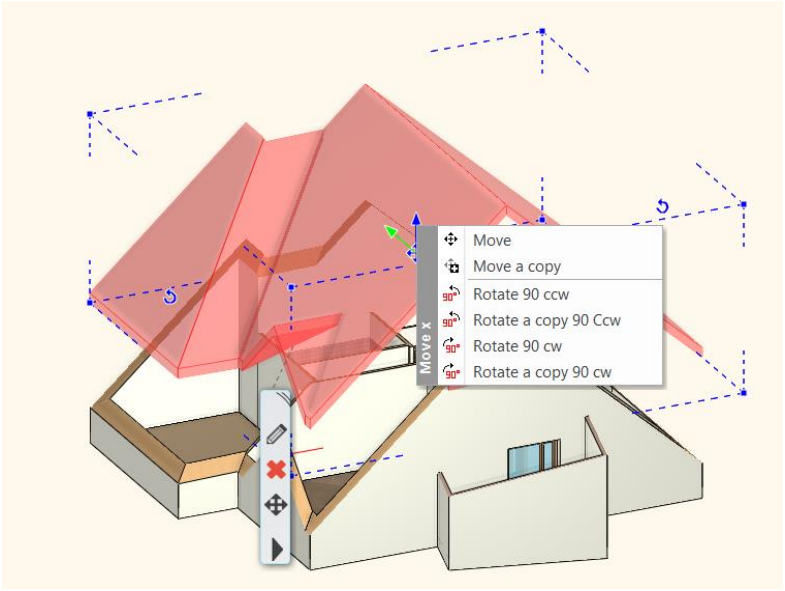




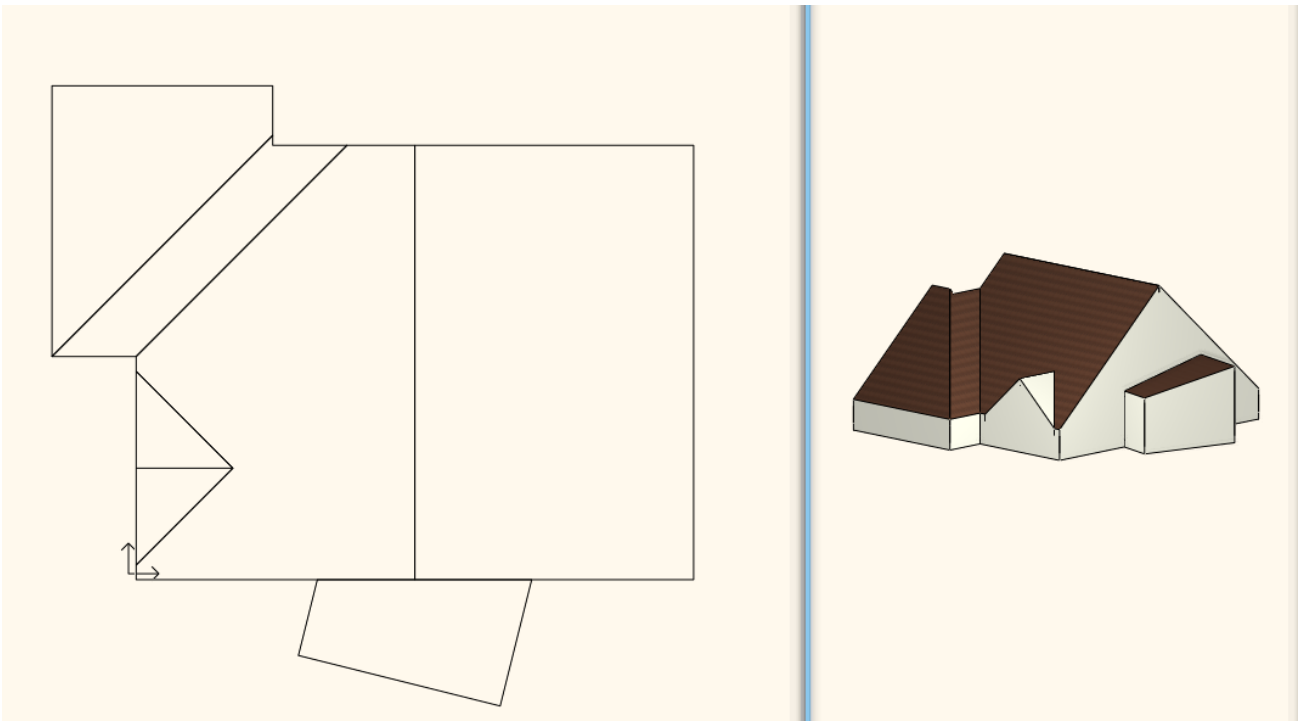


That happened exactly what we were expecting in the 2D window, but in 3D as result the roof is now placed 3 m higher. Now let's move downwards.

- You can do this in the quickest way as follows. First select all three roofs in 3D.
- Then click on the vertical blue arrow, then select "Move" command.



- Move down the roof and type 3 m.
- Accept changes by pressing Enter, now the roof is placed correctly in 3D window as well.

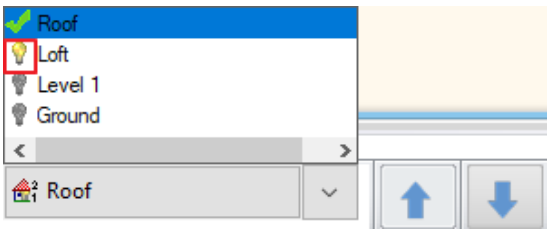


- Activate the floor plan window. You can easily swap between levels (Roof, Loft) by using the blue arrows at the bottom toolbar. These levels now can be managed as completely separated items.

8.6.2. Creating Slab

Now we will create the slab on the Roof level.

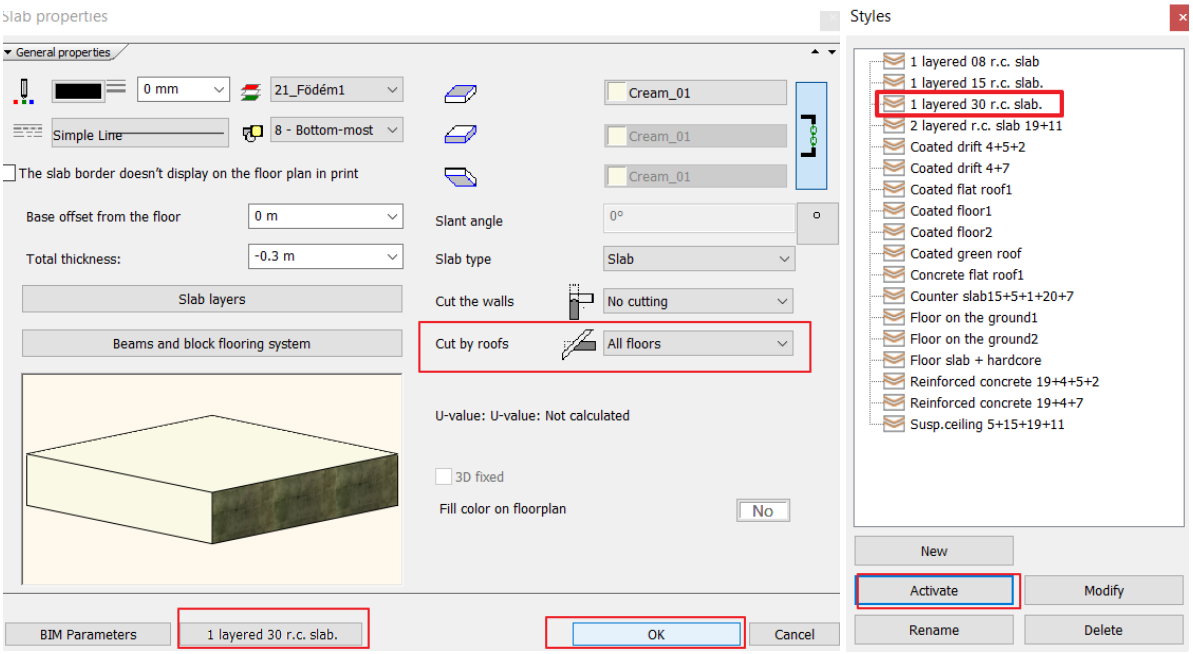
- For this we have to move to Roof level by using blue arrows.
- In order to make visible it for editing later you have to choose the level down below, select the arrow next to Roof and open the level list.
- Click on the bulb icon next to Loft. Now it has changed to yellow.



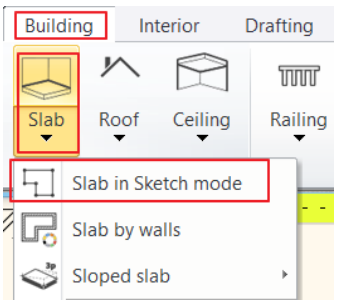
On floor plan window the effect of this modification can be immediately seen. This method allows you to see different levels including the level you are currently working on.

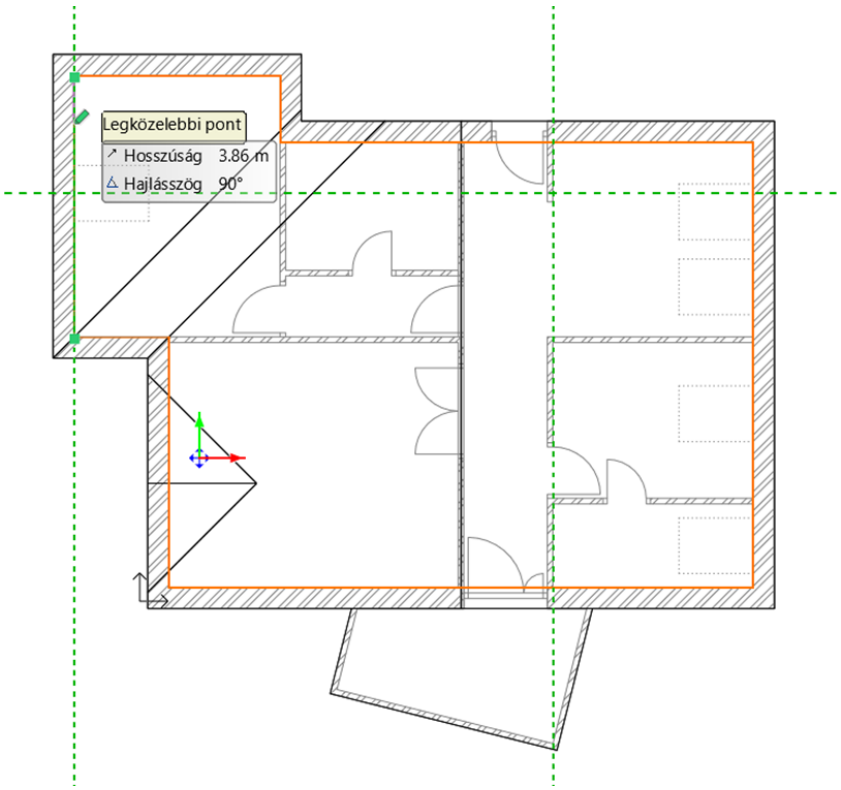
Before creating the slab, check its properties.

- Go to **Ribbon menu / Building / Properties / Slab** tool.
- Now the Slab properties window will come up. Now select a new wall style. For this click on the currently use style name at the bottom. On the right side select from the style list the 300 mm thick reinforced concrete slab "1 layered 30 r.c. slab".
- Click on "Activate" button. Under properties all relevant details have changed, which are needed for later.
- It is very important to set "Cut by roofs" option to "All floors". So, if the slab meets the roof structure, the roof overlay will be automatically cut off by the roof.
- Close the dialog by pressing "OK".



- Draw the slab by using **Ribbon menu / Building / Slab / Slab in Sketch mode** command.
- Click on the inner corner points except the conservatory and press Enter.
- The slab is ready.





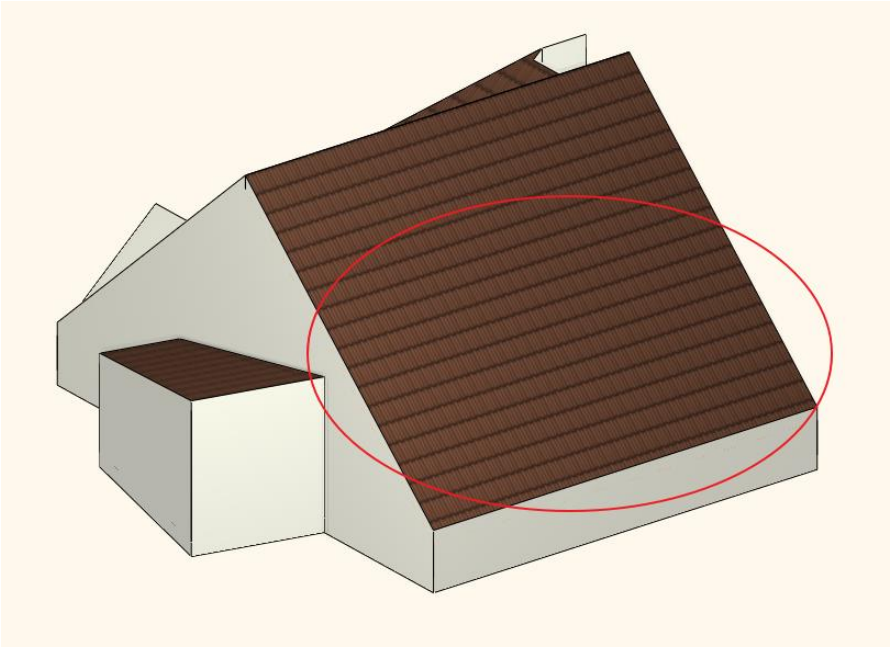
8.7. Placing openings

The next step is to install some windows and doors on the building.

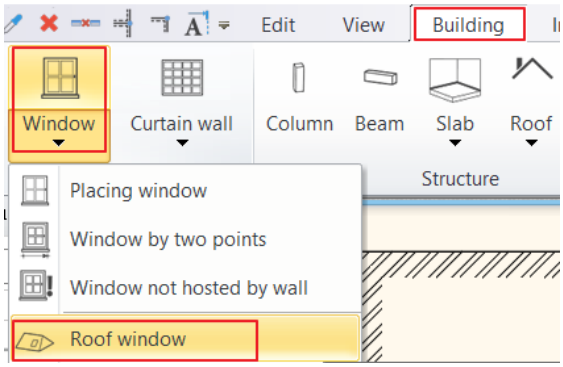
8.7.1. Placing roof window

Let’s start our work with placing roof windows.

- Activate 3D window rotate the model to make clearly visible the roof plane is shown below:



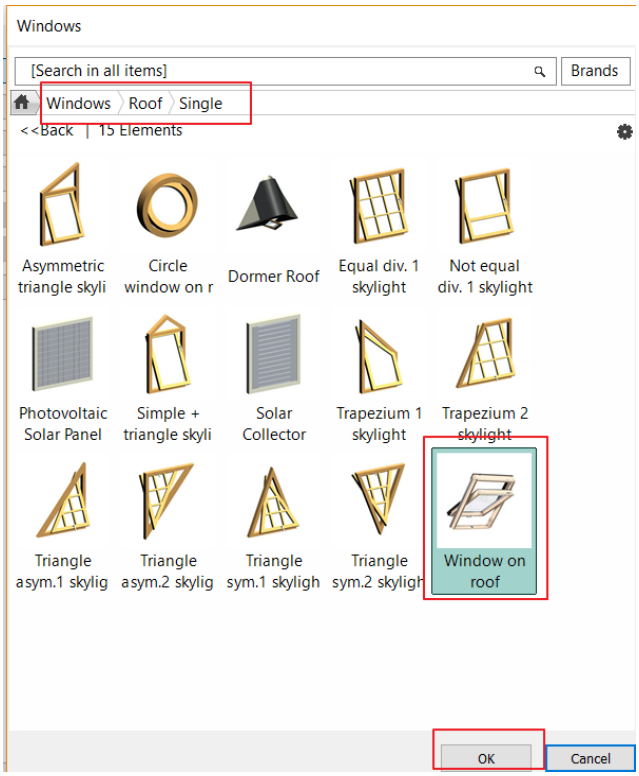
- Click on floor plan window and activate it.
- Select **Ribbon menu / Building /Window** and **Roof Window** command.



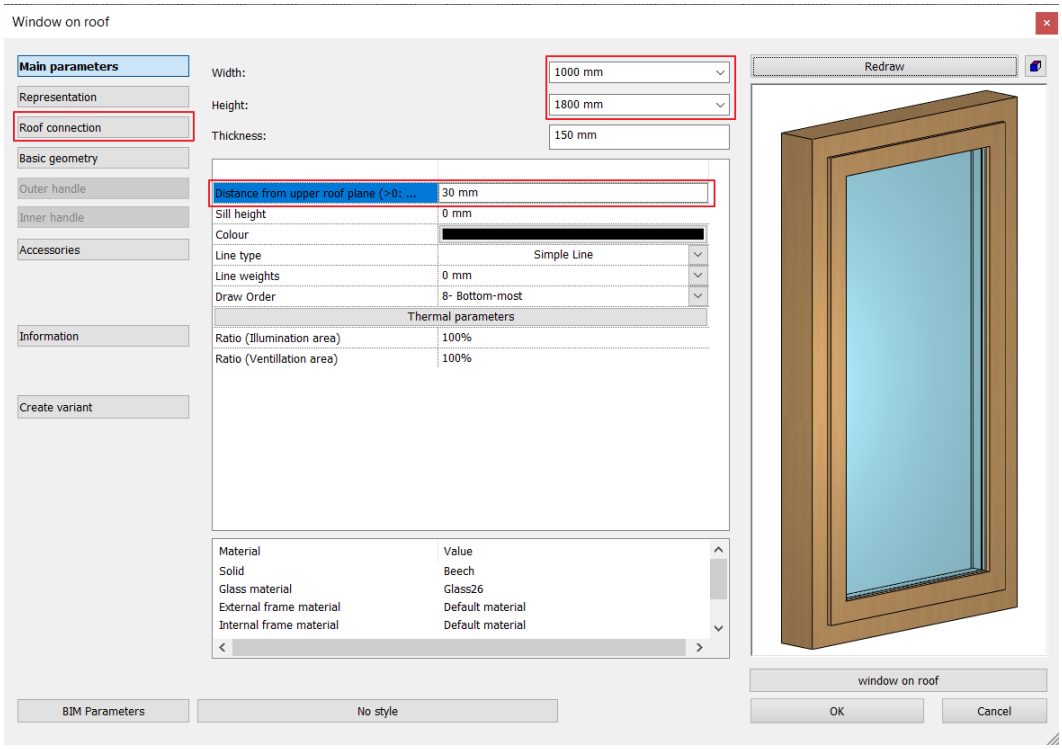
- The shape of the cursor has changed. Select that roof plan on which you want to work where you like to place roof windows. The location of the roof windows can be seen on the floor plan. (You should click on the outer contour of the roof plane to select.)
- The program immediately brings up “Window on roof” dialog, here you can define window properties.

It is important to select roof window. This makes sure that roof windows will be correctly represented on floor plan and 3D model.

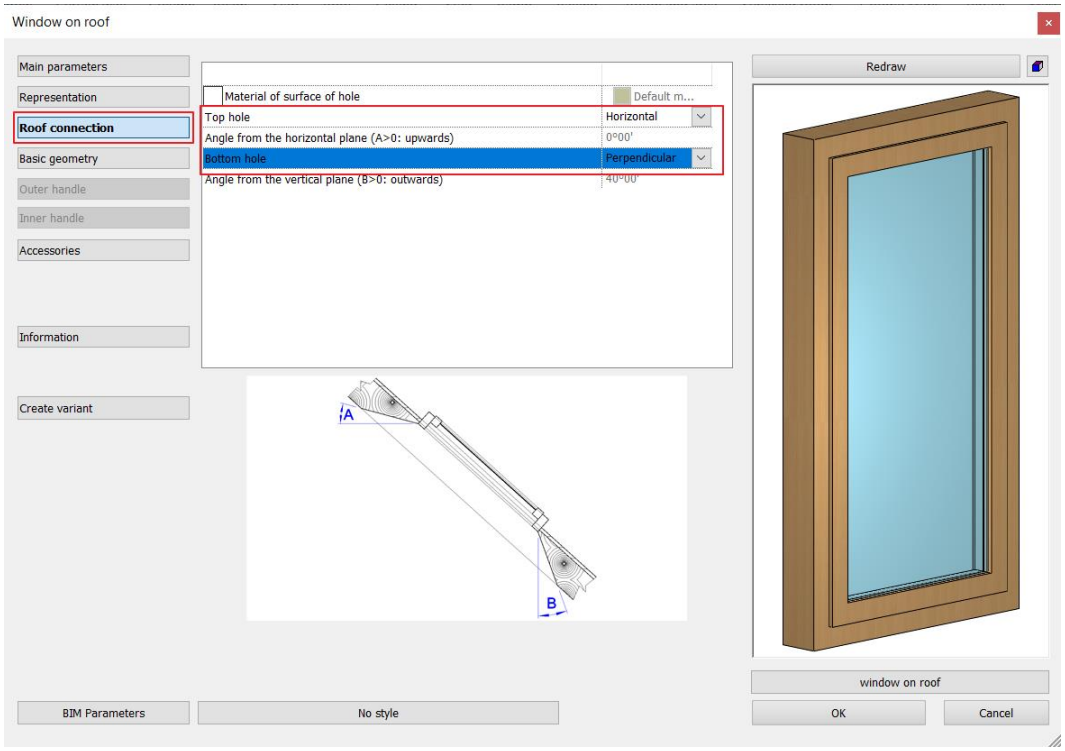
- According to the current example, the window type should be a roof window. For this click on the “Default” button below the preview, this way we can have an access to the window library.
- Select from Window / Roof / Single folder “Window on roof” type.



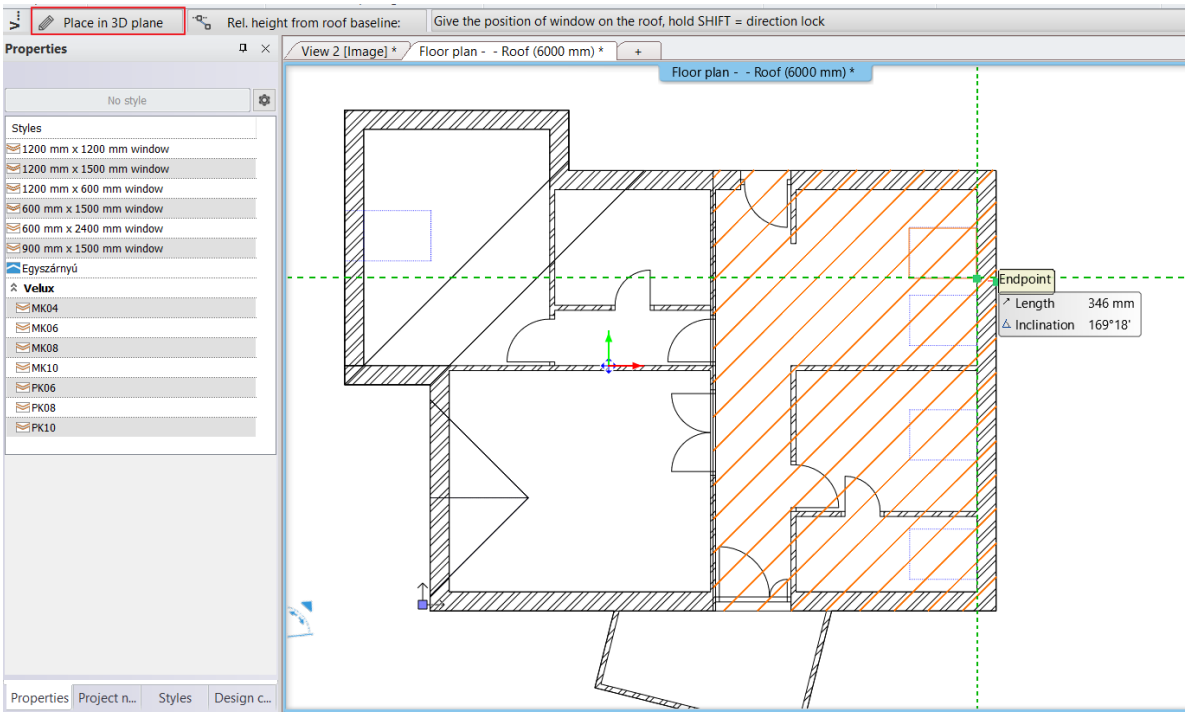
- The width 1000 mm, thickness/ height 1800 mm, the distance from the upper roof plane is 30 m.



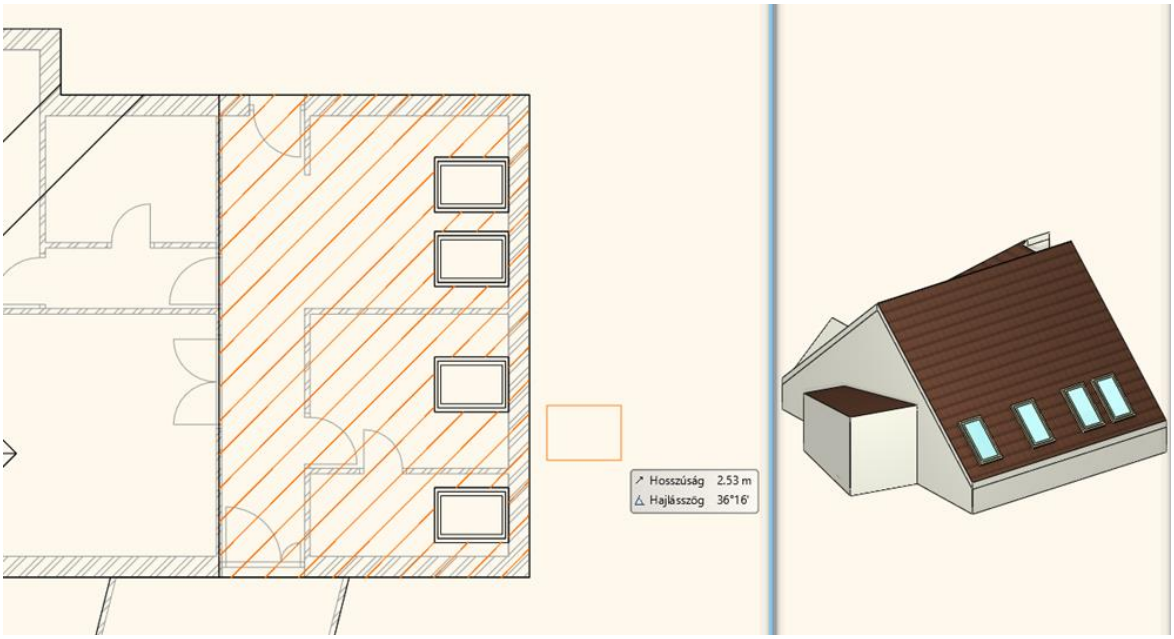
- On the Roof connections tab, set the Top hole to Horizontal and the Bottom hole to Perpendicular to the Roof. This will give the most light to the room.



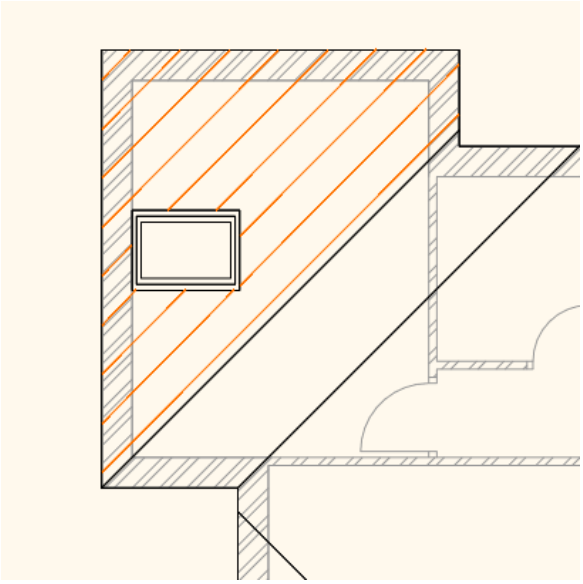
- Close the dialog with OK.
- Now place the windows.
- Since you don't want to place the window at a fixed height, where the program currently places it, select the **Place in 3D plane** option in the top menu bar.



- Place all four windows in any position you like with a single click. You can also follow the changes in the 3D window.



- If you want to place window on a separate roof plane, then press Enter to close the command and select the new roof plane.
- Close the pop-up dialog “Window on roof” dialog by pressing “OK”, then place the window.

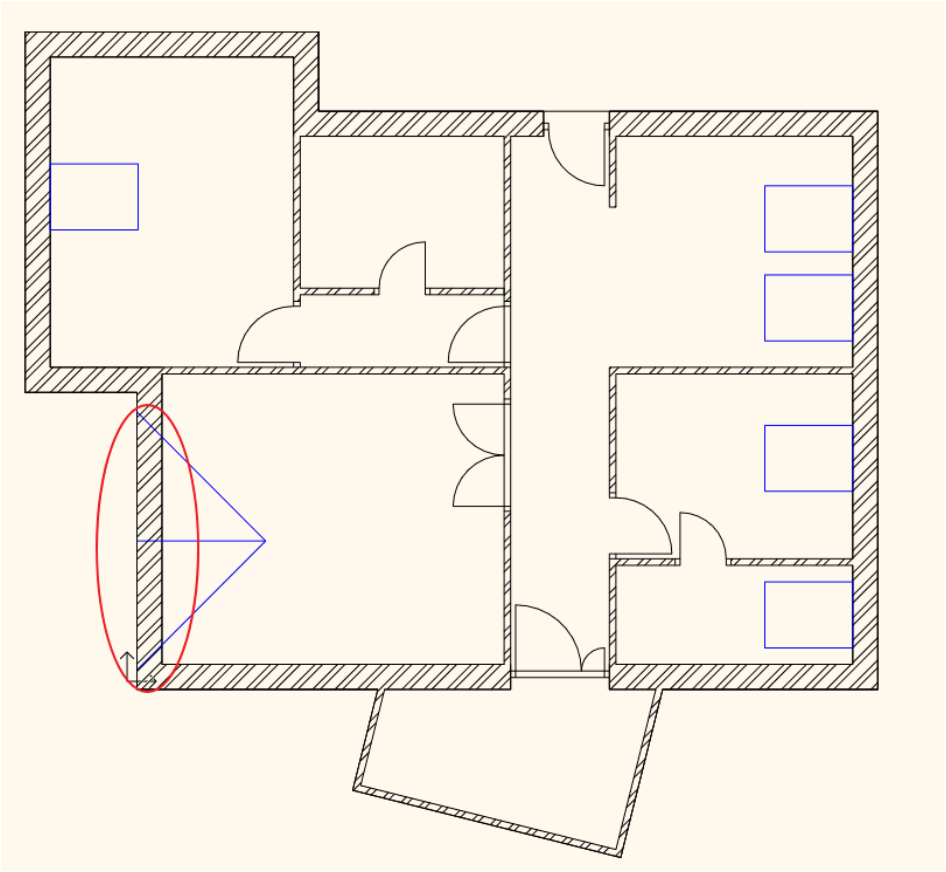


- Close the command with double Enter.

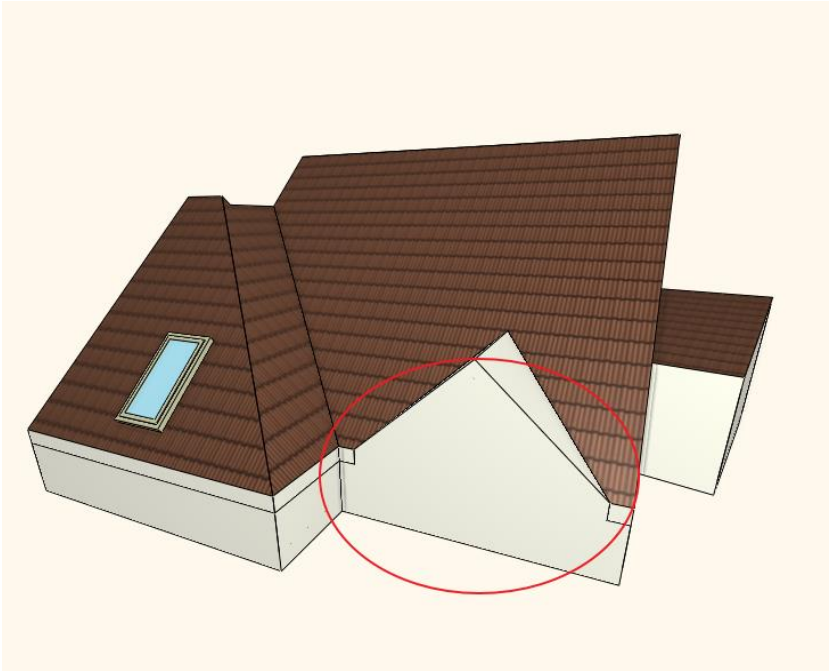
8.7.2. Place customized windows

Now we are going to create a customized window.

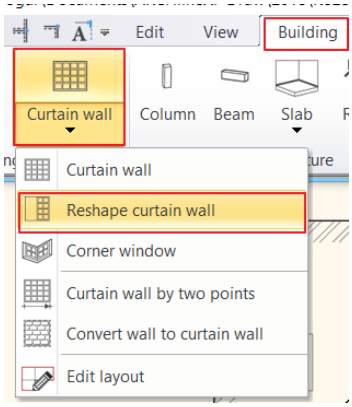
To create the window first we have to move to Loft level. We place the window on the wall is shown on the picture below:



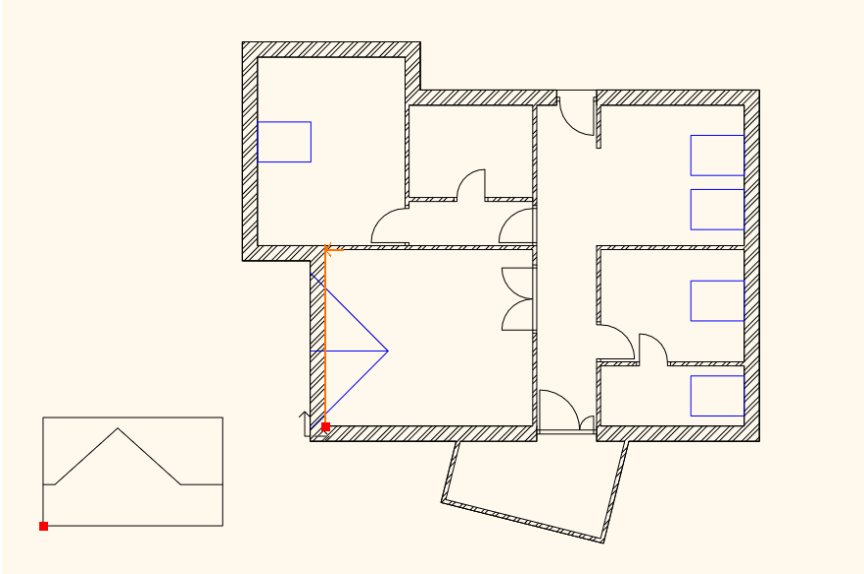
- Activate the 3D window and change the perspective to an external view.
- Rotate the model to see the selected wall properly.



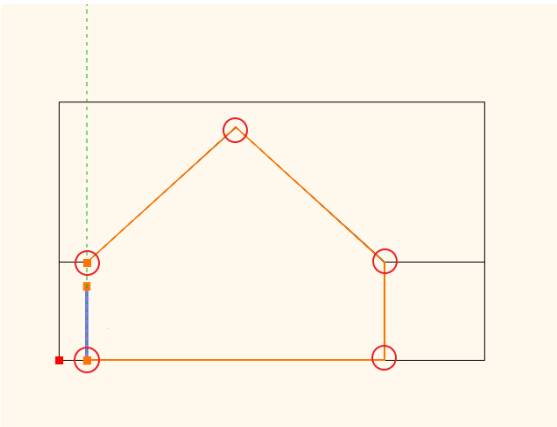
- Activate the floor plan window.
- Go to **Ribbon menu / Building / Curtain wall** and “select **Reshape curtain wall**” command.



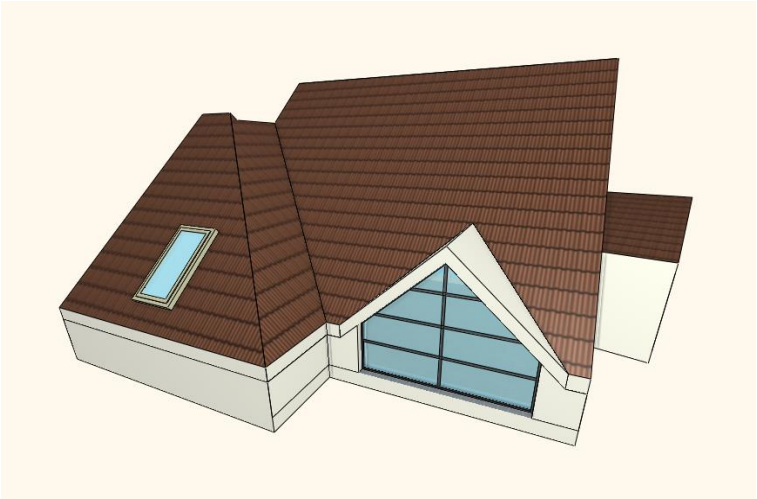
- Now select the inner side of the wall with one click, then place its layout, but not to overlap the floor plan.
- Now a question will pop-up: “Do you want to keep the layout of wall?”- answer: YES.
- An alert message will appear asking to specify a profile in order to describe the frontal shape of the curtain wall. Please press “OK”. You can start creating the pentagonal custom window on the extension.



- Click around the shape is shown below:



- When you close the polygon “Curtain Wall” dialog window will appear, here you can customize the window.
- At the moment we are going to keep the settings, close the dialog with “OK”.
- The curtain wall now is visible on the floor plan and 3D window.

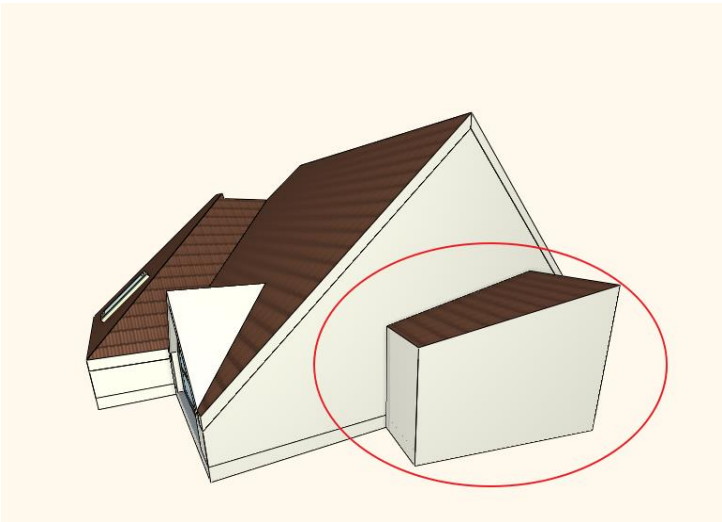


The mullion can be modified which we will demonstrate in the following example. Now close the command with ESC. Now the customized window is ready.

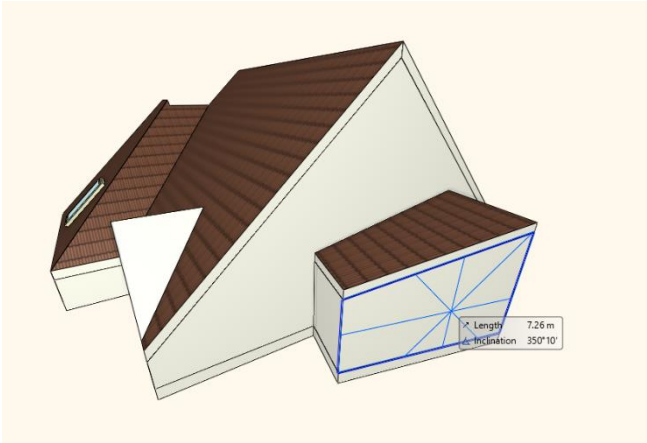
8.7.3. Conservatory with curtain walls

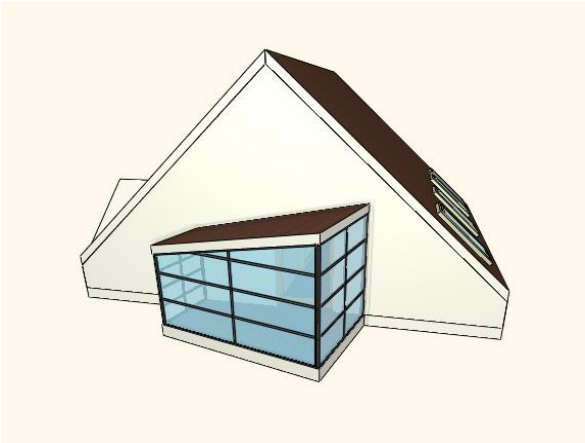
The last openings that will be placed in this project will transform the walls of conservatory into curtain walls.

- Activate 3D window and rotate the model to clearly see the conservatory.



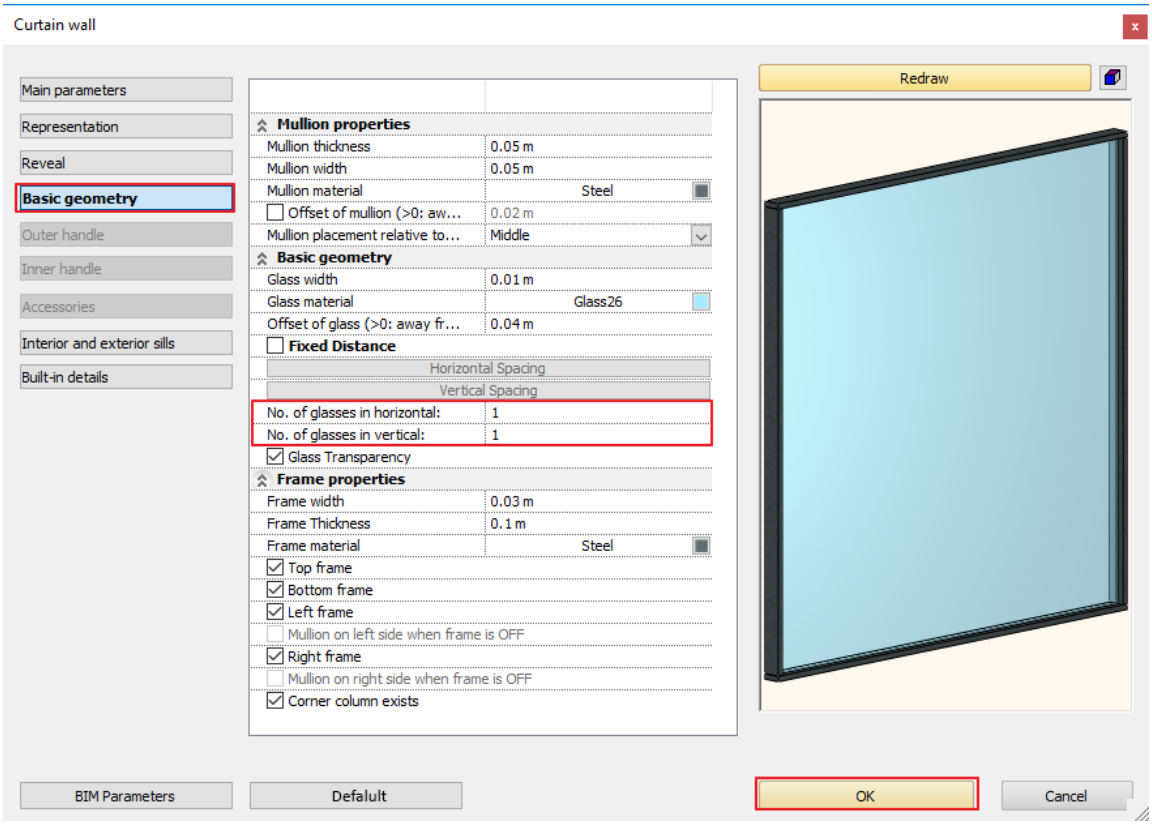
- The modification can be done in 2D and 3D window. Now work in 3D.
- Select **Ribbon menu/ Building / Curtain wall / Convert wall into curtain wall** command.
- As you move the cursor you can see that the software recognizes wall planes. Click on one of the conservatory walls, then it turns into curtain wall with the current settings.
- Modify the other two walls.
- Close command with Enter, now the conservatory has glazed walls.



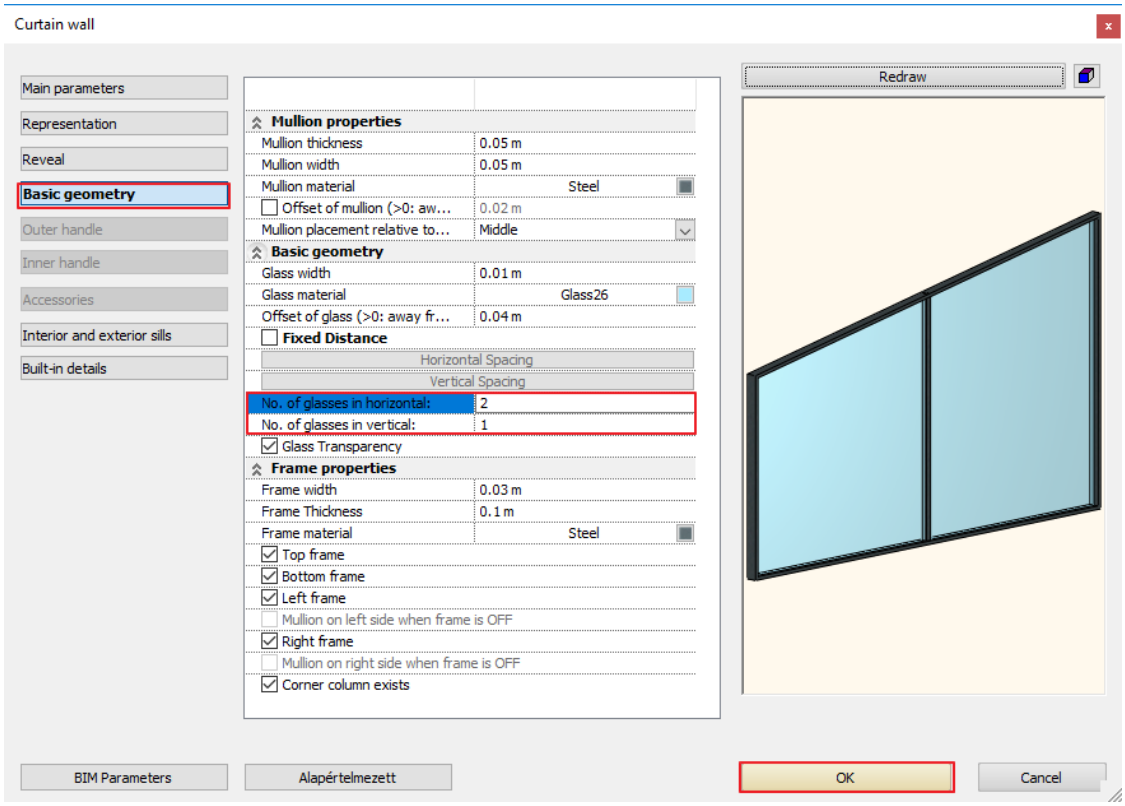


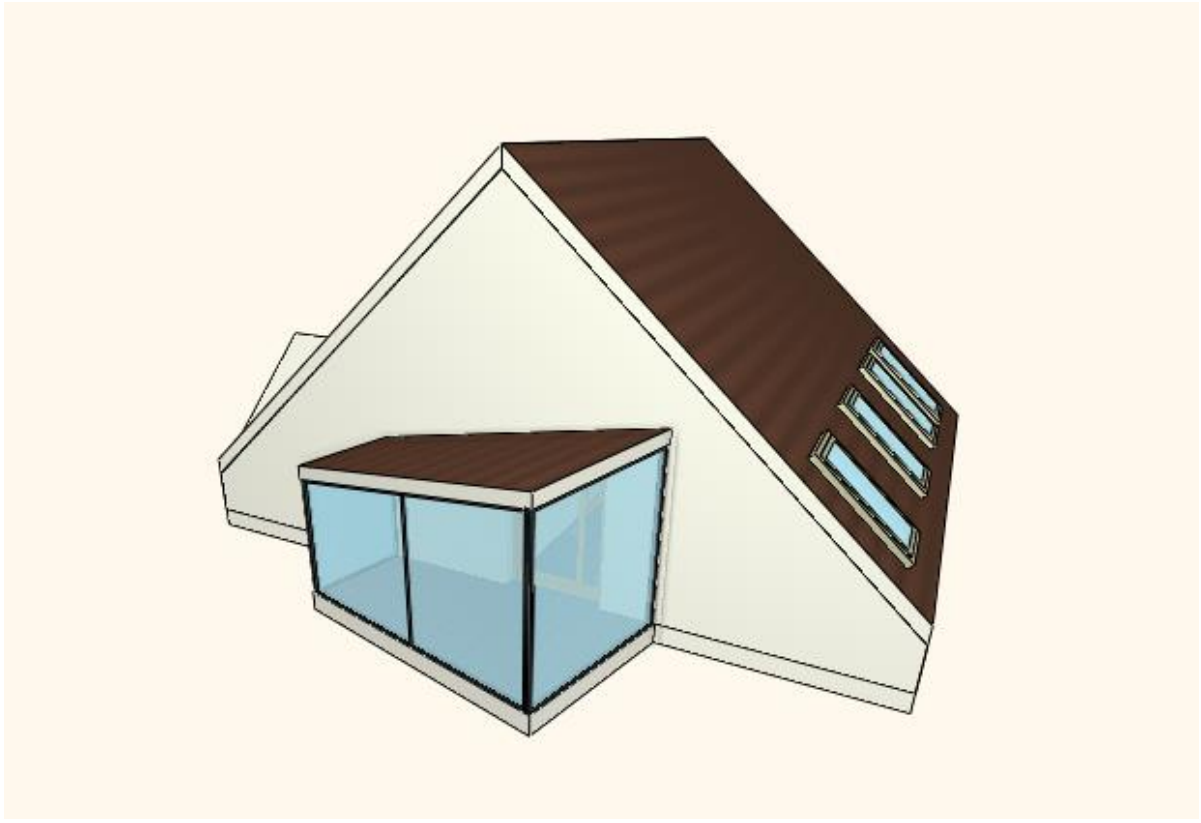
Let's see an example how to customize curtain walls.

- Select the curtain wall on the left side and open its properties.
- Click on "Basic geometry" tab. On this tab you can define Curtain wall properties that are related to divisions, representation and even the geometric representation of the window.
- In this example we modify only one thing - the division.
- Now change the number of glasses horizontal and vertical to 1-1, then press OK to close the dialog.



- Do the same for the right-hand curtain wall on the opposite side.
- Finally, go into the properties of the middle curtain wall and here just change the number of glasses in horizontal to 2.
- Close the dialog with "OK" and now the conservatory is ready.

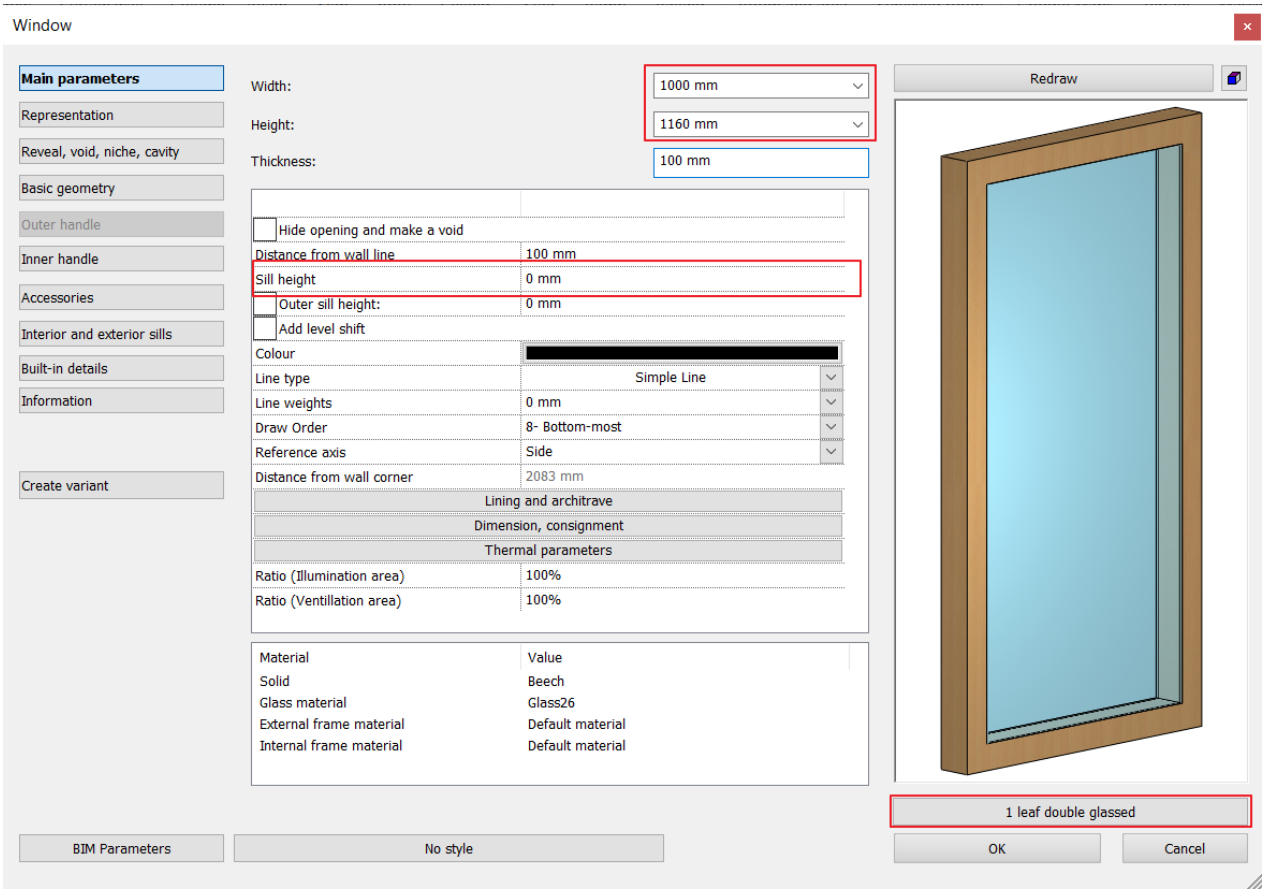




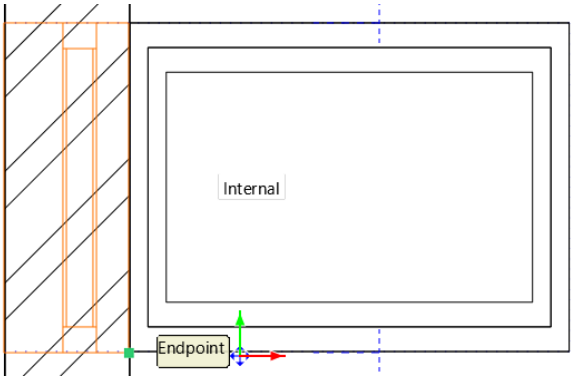
8.7.4. Creating complex roof window

Let’s create a complex roof window with the combination of a roof window and a window in the wall.

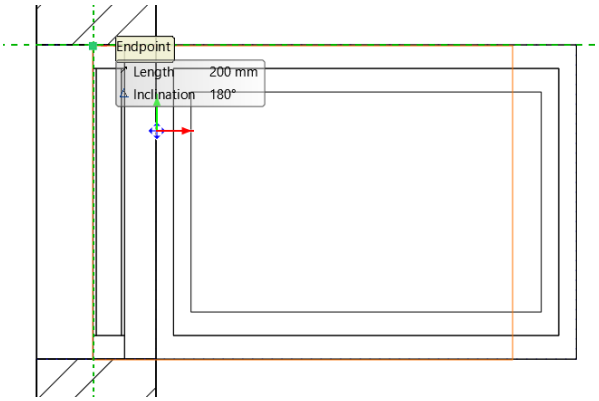
- Activate the 2D window and navigate to the left roof window.
- Set the properties of the window by right-clicking the Window command.
- Click on the Flush designation to change the window style to “1 leaf double glassed” type from the library.
- Set the Width to 1000 mm, the Height to 1160 mm and the Parapet Height to 0 mm.



- Use the *Place window* command to position a window so that it is flush with the bottom plane of the roof window.

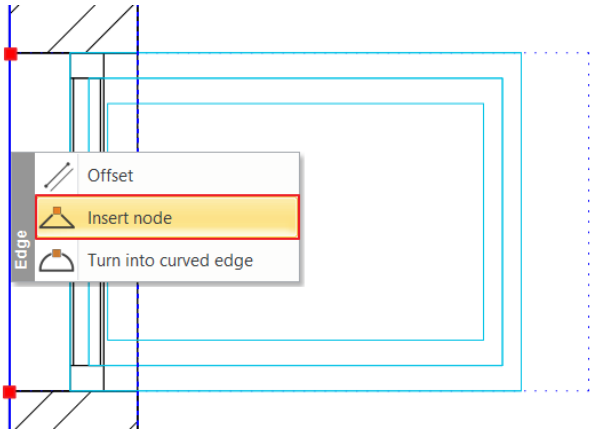


- Go to the Roof level, select the roof window and click on the top left corner to select *Move*. Move it to the outside of the window in the wall plane.

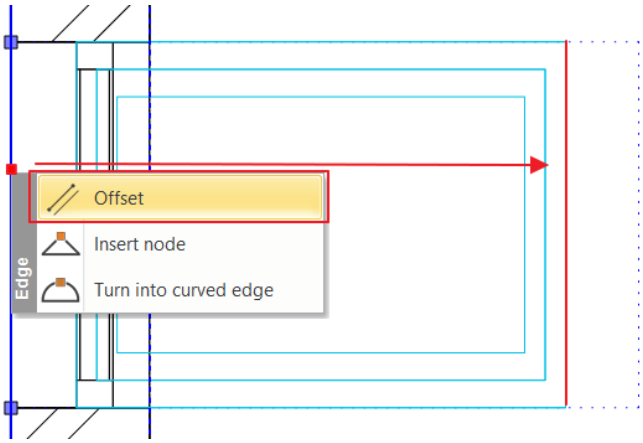


The roof will still cut into the window in the plane of the wall, so in the next steps we will modify the contour of the roof so that it does not cut into the window.

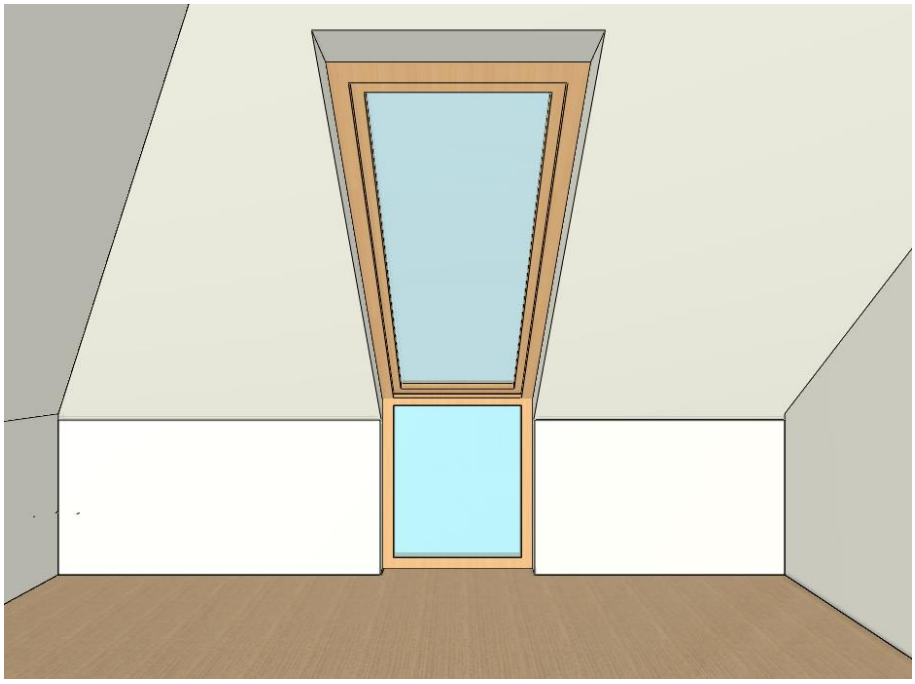
- Select the roof and click on its contour. Then in the pop-up window, select the Insert Node option.



- Place a node at each end of the window, then click on the roof outline in the window line and select Offset. Drag the plane of the roof to the inside of the window, then click to place it.



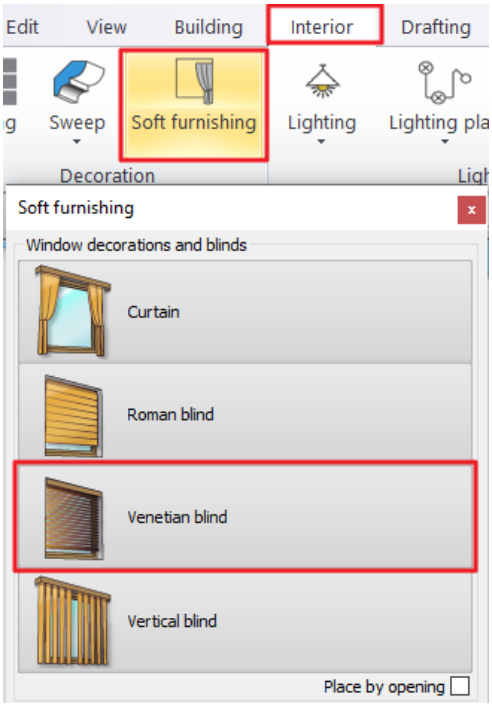
- The window is ready, the end result should look like in the picture below:



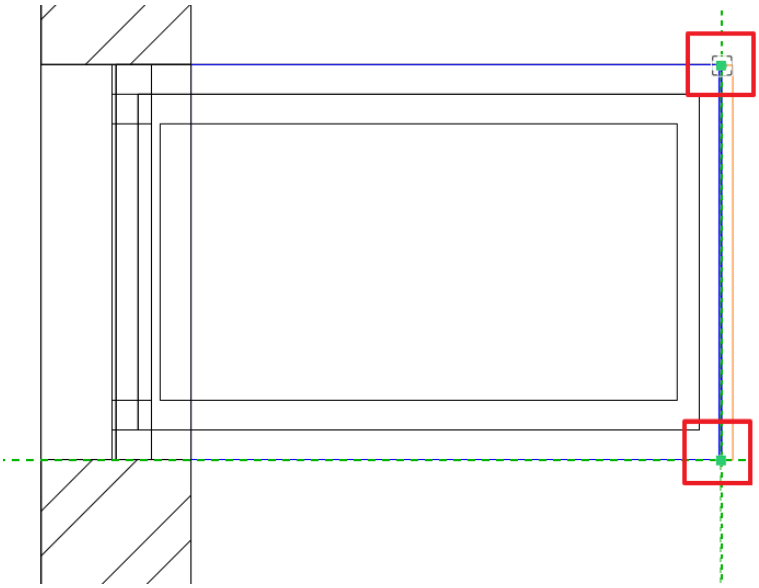
8.8. Blinds and curtains on roof windows

We can place curtains and blinds on different window types. Now we will place an aluminum Venetian blind on the roof window.

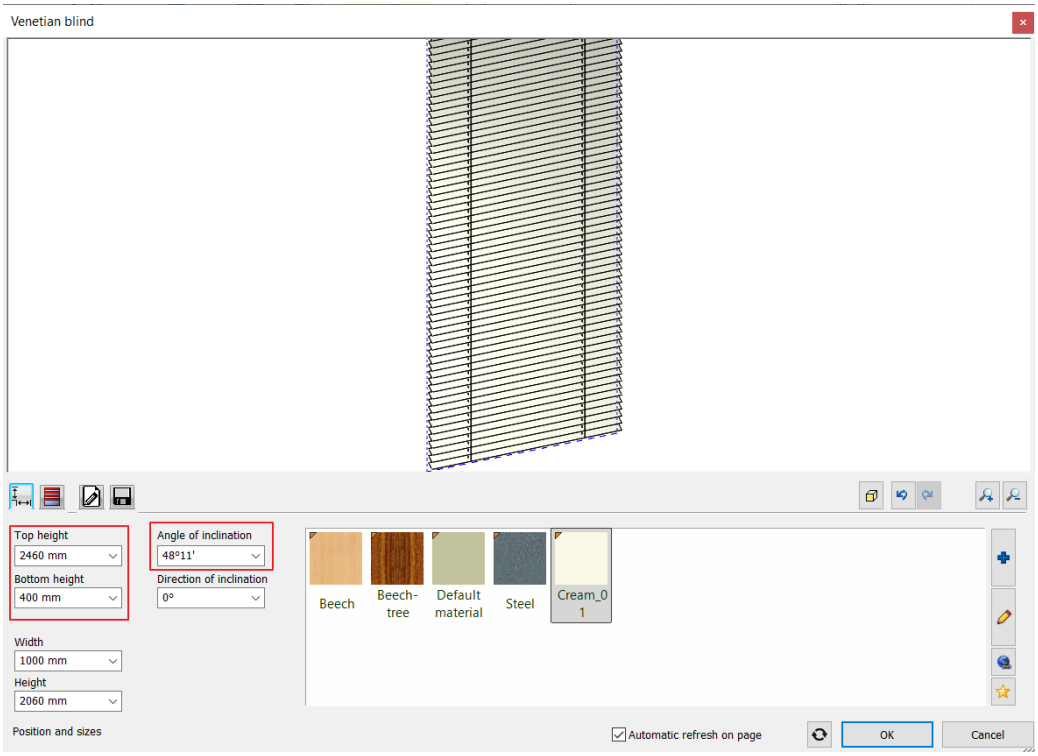
- Activate the floor plan and select the **Ribbon Bar / Interior/ Soft furnishing / Venetian blind**.



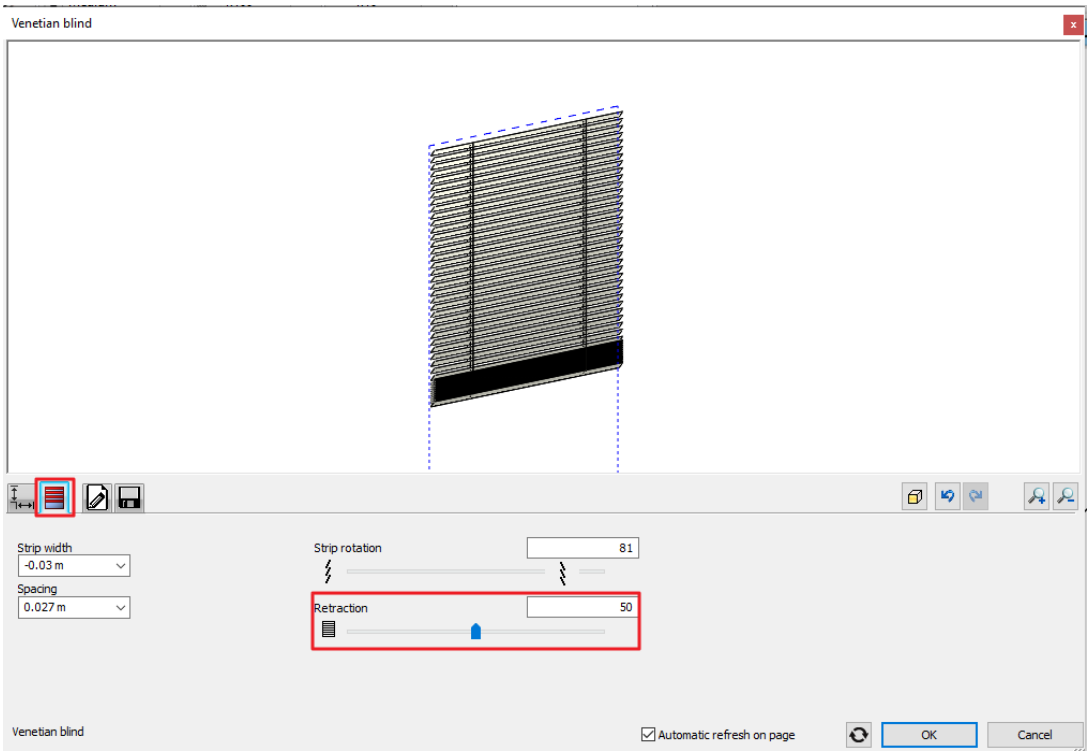
- Place the Venetian blind on the floor plan. First select the lower corner point of the window, the upper.



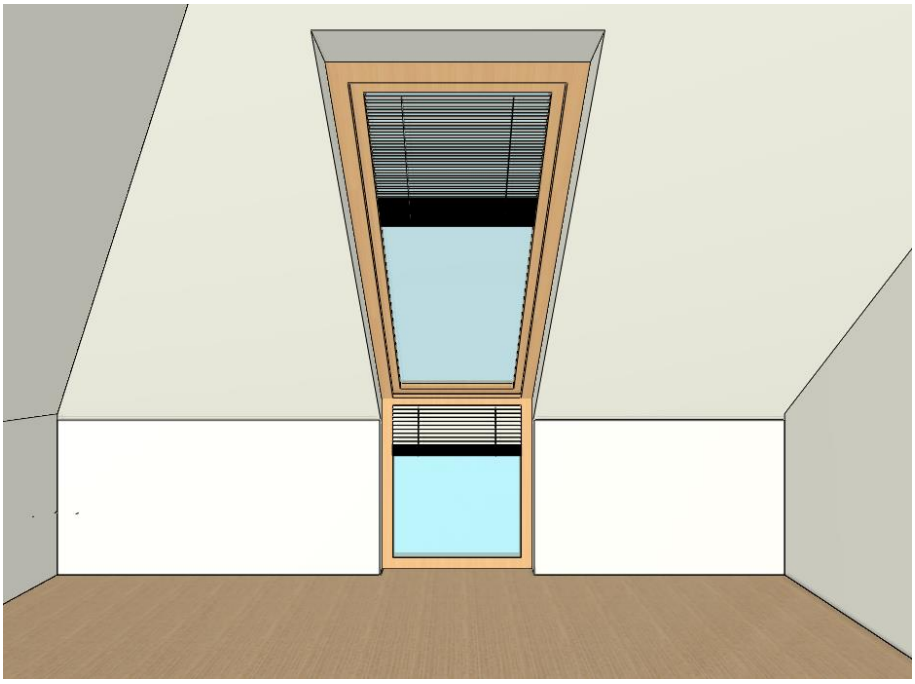
- In the appearing dialog set the following parameters: Top height: 2460 mm, Bottom height: 400 m, Angle of inclination: 48.19 (since we measure the angle from the vertical and the rotation point is on the top of the blind)



- The program automatically places the blind before the roof window.



- Set the retraction of the blind by clicking on the second tab.
- Select the blind and rewrite its relative height to 15 m.
- Place a blind on the lower, fixed window as well with the following parameters: width: 850 m, height: 1030 mm, relative elevation: 70 m.



This is how the complex roof window looks like with the blinds and furniture:

Workshop 9: Design Phases

9. Workshop: Design Phases

Using the design phases, it is possible to present the existing status and the new construction plan simultaneously in a single project file on the same drawing. Using phase filters, all stages of the design process can be demonstrated. Renovating buildings or planning more complex projects is significantly simpler using the design phases.

A huge advantage is that when modifying elements that appear in all phases of design – for example, when we want to correct the inaccuracies of the survey – changes appear immediately in all phases, since we are talking about the representation of the same element at different times.

- Watch the video of the workshop here.
- Open …*\Documents\ARCHlineXP Draw\2024\Workshop_Intermediate\9_Phases\Elata_nova_FINAL_Surrounding.pro* file. Save it under a different name.
  You can also choose the Phases_START.pro file, on the basis of which the video tutorial was created.

9.1. Design phases

The four main phases of the planning process:

1. **Existing state** (recording survey data)
2. **Demolition plan** (representation of the parts to be demolished)
3. **Existing plan after demolition** (elements have been demolished)
4. **New construction plan** (realized condition after renovation)

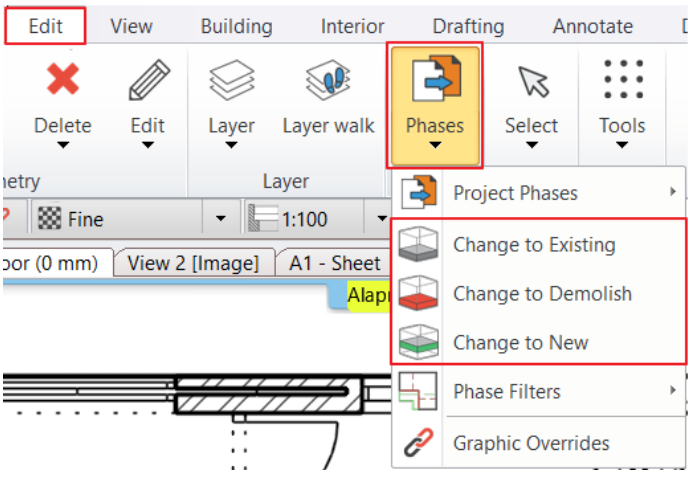
The phases that can be used during planning can be: Existing or New.
Creating a new item is always assigned to the current phase (Existing or New)
An item cannot be created in the Demolition phase. Items marked for demolition from New or Existing phases are added to the Demolition phase.

The phases can be followed throughout the documentation in the form of a 3D view, sections, elevations and a material overview.

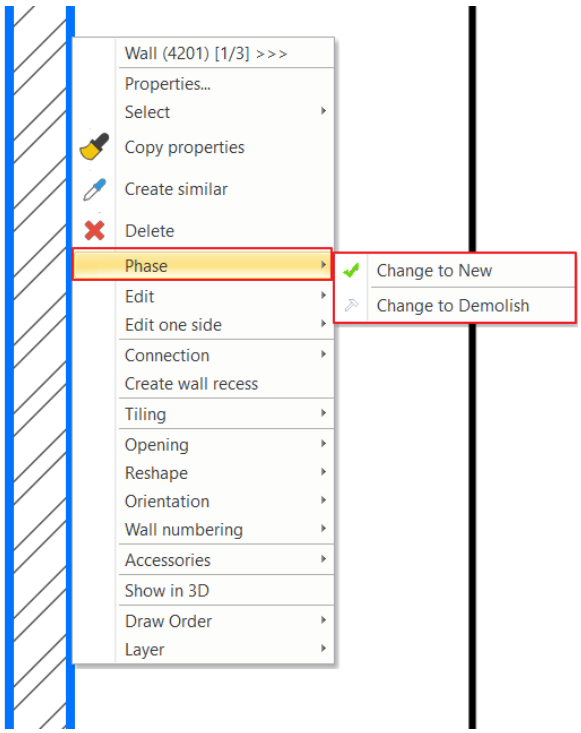
Setting the phases

There are several ways to categorize each element:

- Select the Ribbon bar / Edit / Phases option. After selecting a phase from this menu, you can select the objects on the floor plan or in the 3D view for which you want to validate the selected view.



- You can move the selected item to the appropriate phase by right-clicking the item or selecting the item and selecting the additional options then clicking on the Phase.



Phase settings for drawing elements

During the designing process, we can not only work with basic objects, but also depict certain details with other additional elements. When setting phases, you can therefore set not only which phases to display on walls, doors, and roofs, but also other objects, 3D elements, and drawing 2D elements, as well as scaling. This makes it much easier to use this feature during the designing process.

Phases for scaling

Scaling is in a special situation compared to other drawing elements because they are almost always related to another element depicted in some phase. Here, therefore, we distinguish two main cases:

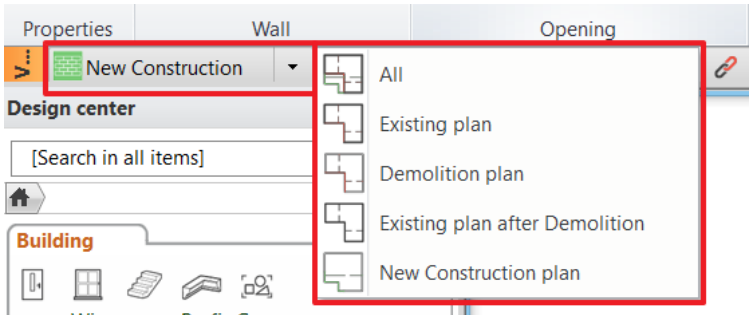
- If the scaling scales the element(s) that are entirely in the same phase, the scaling disappears or is displayed when the phase is turned on / off.
- If the scaling scales elements in two different phases, it does not belong to either, in which case it will still be visible when any phase is switched off.

9.2. Phase filters

Phase filters are representation rules for displaying elements by status (New, Existing, Demolition): ARCHLine.XP® has 5 phase filters:

1. All phases
2. Existing plan
3. Demolition plan
4. Existing plan after demolition
5. New construction plan

In the Drawing Status Manager, on the left are the various phase display settings. When you place Existing or New items, the program automatically places the objects in the appropriate phase.

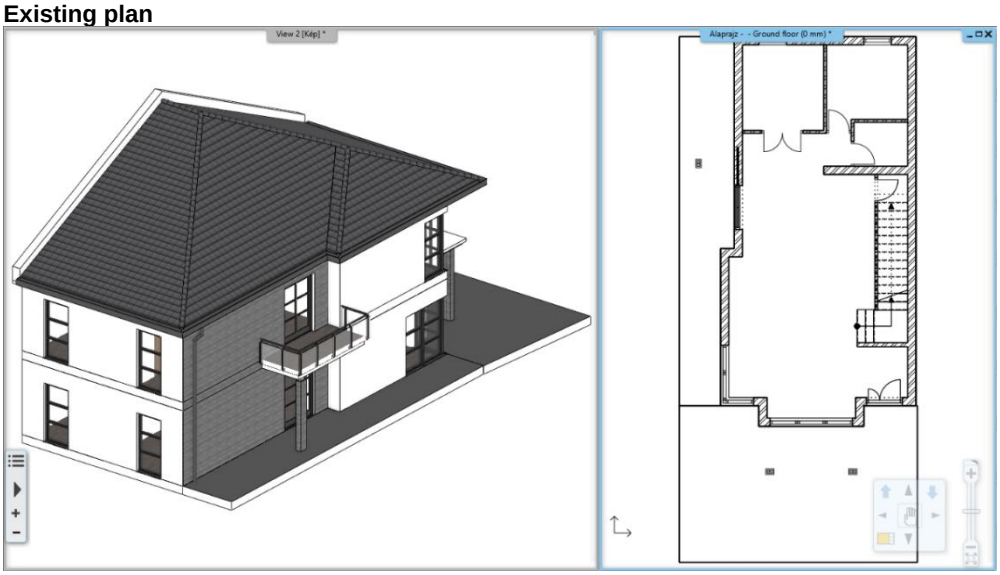


It is possible to categorize items not only before they are drawn, but you can change this setting at any stage of the workflow in one of the ways described earlier.

Appearance of phases

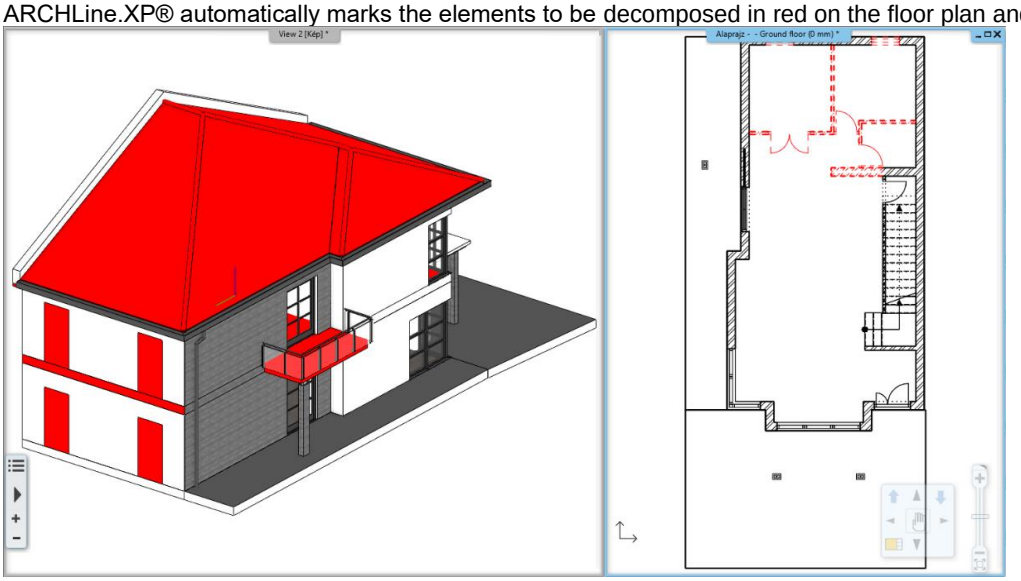
The images below show examples of Existing plan, Demolition plan, Existing plan after demolition and New construction plan Phases.

Existing plan

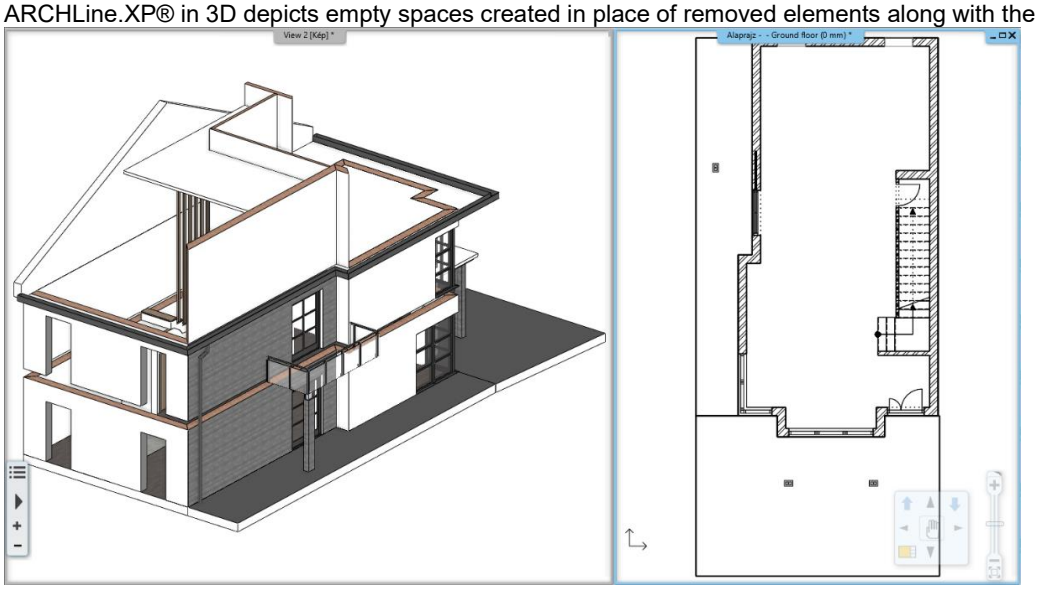


Demolition plan

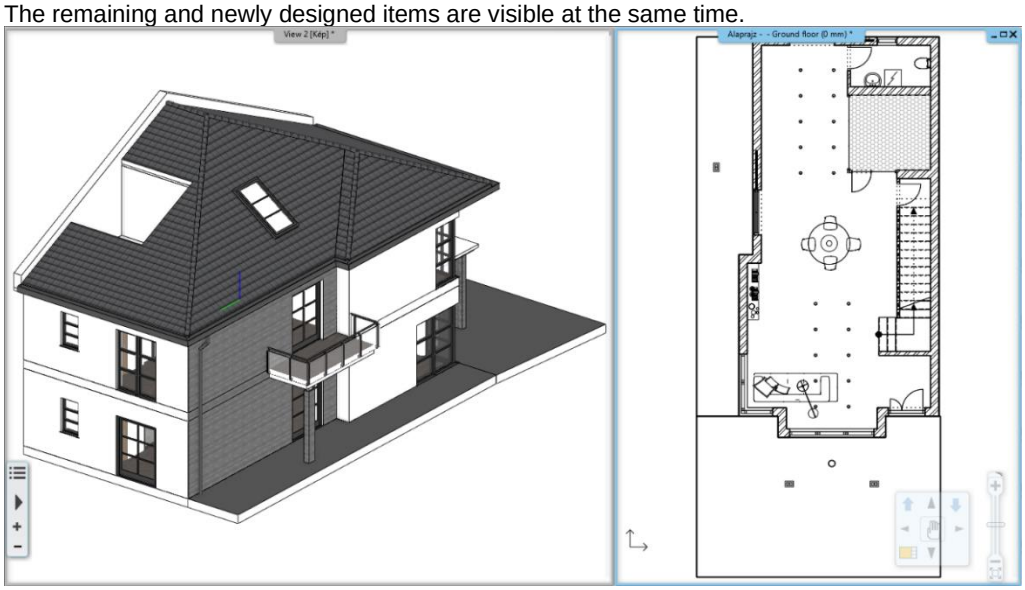
ARCHLine.XP® automatically marks the elements to be decomposed in red on the floor plan and in 3D.



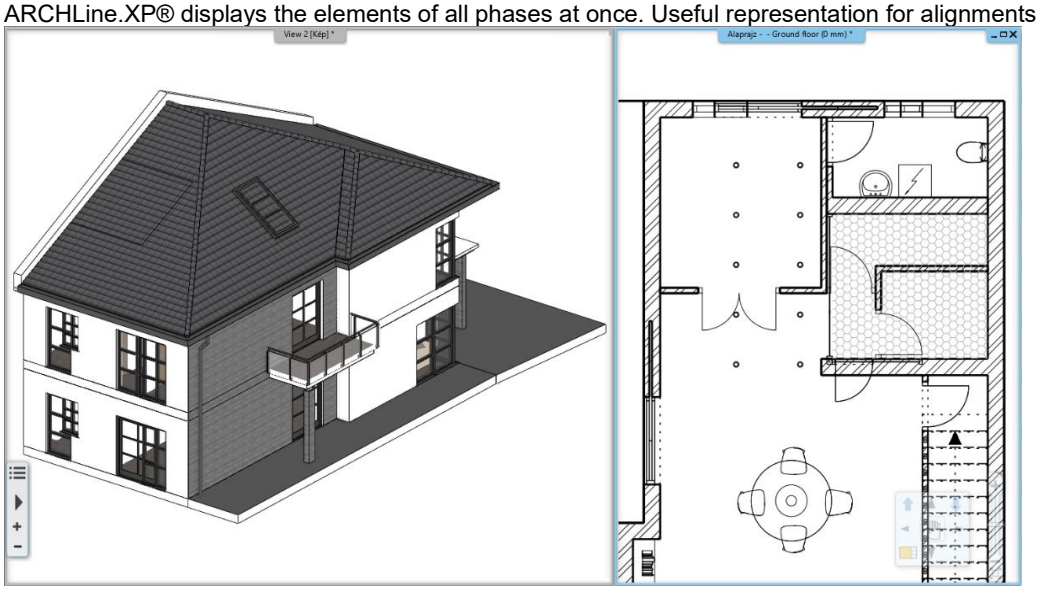
Existing plan after demolition
ARCHLine.XP® in 3D depicts empty spaces created in place of removed elements along with the remaining structures.



New construction plan
The remaining and newly designed items are visible at the same time.



All phases
ARCHLine.XP® displays the elements of all phases at once. Useful representation for alignments and checks.



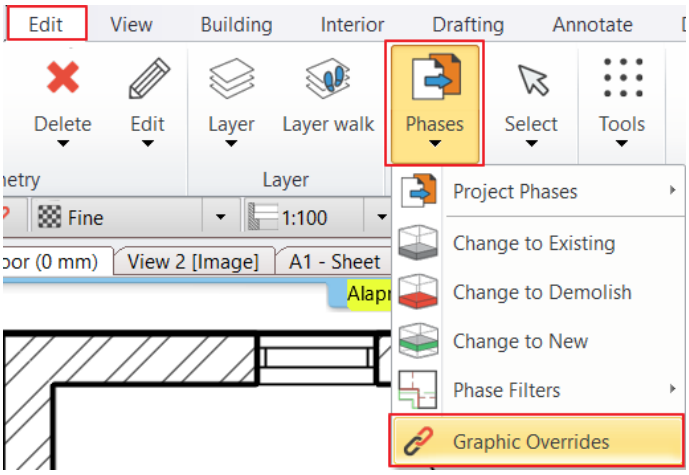
Wall parts in different phases

In the case of walls, it is also possible to mark only a certain part of the wall for demolition.

In this case, you can use the *Edit / Cut with wall* or *Cut with line option* from the wall's local menu to cut the wall in half at the desired point, to have a remaining and a demolished part. After the successful cutting of the wall, a line in the wall indicates the boundary line of the two newly created wall parts. To remove the line, you can use the *T connection* command to connect the two new parts of the wall you just cut. One of the sections can then be moved to the appropriate phase.

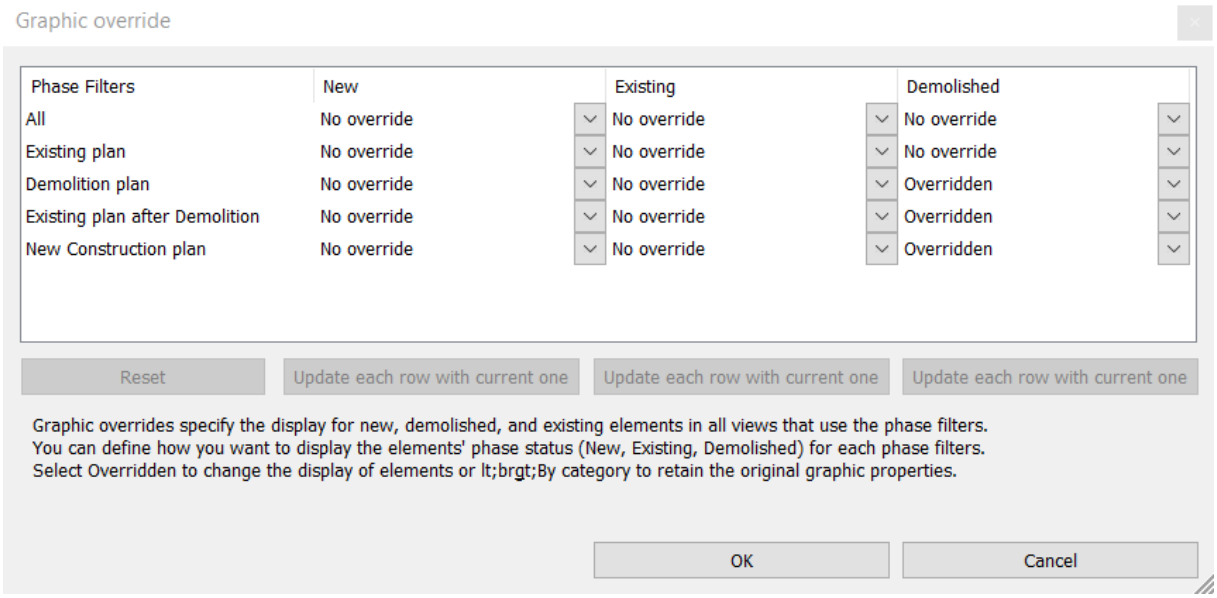
9.3. Graphic overrides

Thanks to the graphic overrides, the representation of the different phases can be customized according to the needs of different disciplines. A graphic override is nothing more than specifying that an item with a given color, lineweight, and fill appears with the color, lineweight, and fill specified in the override, despite its original properties. This allows, for example, all elements of the demolition plan marked for demolition to appear automatically in red at the same time, without the need to change their appearance by any other manual method.



Graphic overrides can be determined in the phase filter for each phase separately. In the case of the "All" phase, which is used to display the phases on top of each other, it can be used as a clear, color-separated technical or even documentation drawing with the appropriate settings.

The appearance of each element in the phases can be fully customized: the colors, linetypes, lineweights, fills and the way they are displayed can also be customized.



This feature allows you to deviate from the default settings, which may be required for either regional or industry reasons.

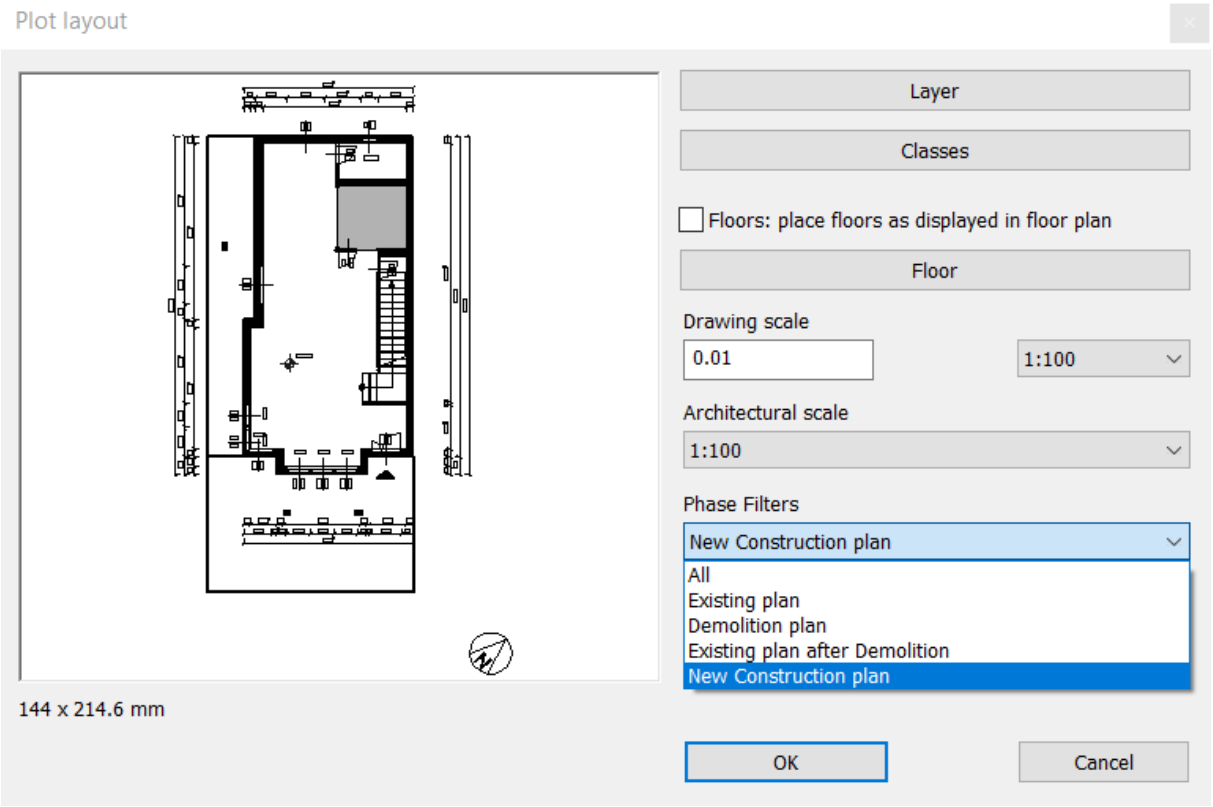
The feature can also be useful if you want to compare new elements, existing elements, and elements to be demolished in the plan. By specifying custom settings for the different phases, you can view the entire plan in both floor plan and 3D views by clicking All Phases.

9.4. Design phases on the sheets

The drawings placed on the layout sheet are displayed according to the current design phase. There is also a way to modify the design phase, so that regardless of the current drawing state, you can quickly compile a design sheet that shows different phases of the same drawing even side by side.

There are two ways to display the different phases on a design sheet:

- On the floor plan, set the appropriate phase, and after the program has loaded it, place the drawing on the sheet.
- Place the drawing on the sheet, and then in the drawing properties change the phase filter drop-down menu to the desired phase.



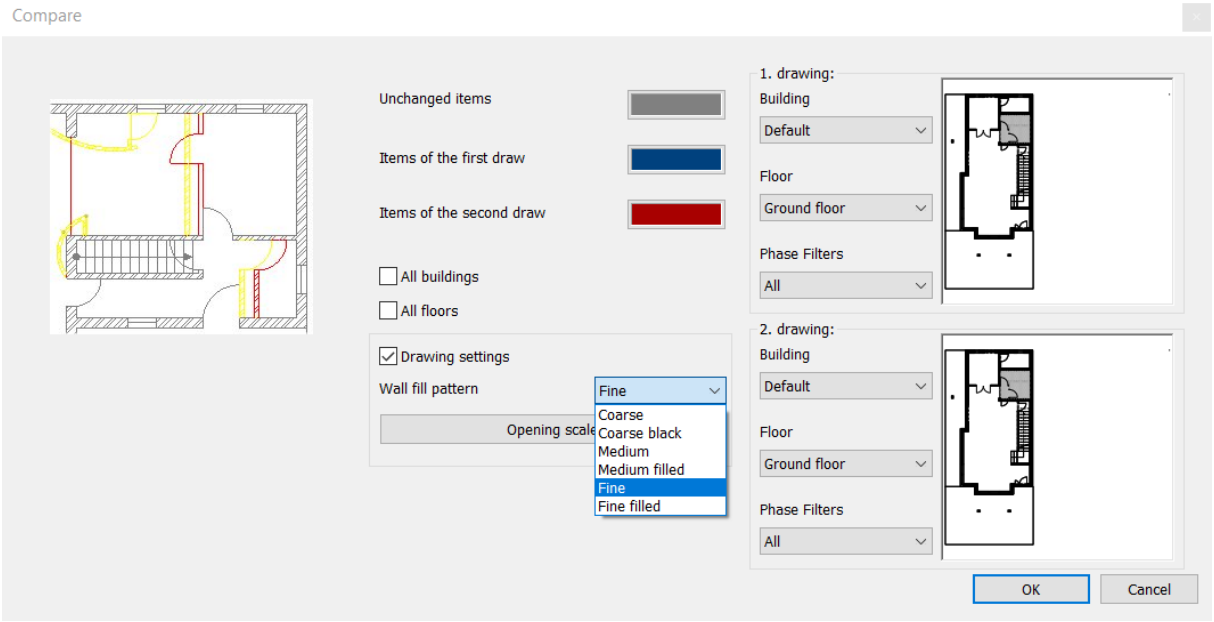
Changing the phase of the floor plan view does not affect the phases set in the print view, so you can change the phases in the drawings without interruption.

Drawing comparison

With this function it is possible for the program to compare different phases automatically.

❖ This requires the “Compare between 2 design phases” option of the Ribbon bar / Documentation / Drawing Comparison / Drawing Comparison command, which you can select from the list after starting the command.

Based on the parameters that can be set in the comparison window, displays the program the corresponding buildings, levels, phases, colors and display modes.



The resulting drawing is treated as a closed, non-editable, dynamically updatable group that you can place in the print view. If you change the plan, you can also update the comparison drawing with the "Update Comparison" command.