

MR LaserCut Users Guide

Version 0.8.7

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What it is and what it is not

MR LaserCut is an easy way to

- make mockups
- create buildings from 2D walls
- produce SVG to feed into a laser cutter program
- produce AYOD (Add Your Own Detailing) kits

MR LaserCut will not

- create complete building kits
- produce 3D details

EULA

MR LaserCut is provided as is.

I am happy to answer questions, but I can not be held responsible for any damage to your computer, layout, business or personal life.

You may use MR LaserCut to create as many SVG exports as you like.

You may use MR LaserCut to create the basis for commercial kits, as long as you, free of charge, sent me a copy of each type of kit you put on the market.

If you fail to send me a copy and I find out about it, I might track you down and pour a Wiener Melange into your keyboard.

Demo database

A demo database called DemoDB.lcdb can be found in the Documentation folder.

Use the File → Copy and Open demo database menu to make a read-write copy of the database in a folder of your choice.

Using scale

All values in MR LaserCut are stored as real world numbers, ie. in 1:1, but you can change the user interface to show values in any scale you want.

! Very few numbers are cleanly divisible by 87 or 76. This means that rounding will occur if you edit the same values in different scales.

If you have a drawing of something you want to model and you know the scale of the drawing, you can switch the UI to show values in that scale. Then you can enter measurements directly and MR LaserCut will convert the values to 1 : 1.

When exporting you can choose any scale you want for the output.

You can for instance enter values as 1 : 200, they are stored as 1:1, and you export as 1 :87, and 1 : 176 and 1 : 32 etc.

Things to vary with scale

Laser dot size and minimum frame width

The size of the laser dot is a property of your laser cutter. It can not be changed. It is usually somewhere between 0.1 mm and 0.2 mm.

The size of the laser dot does not vary, but when cutting for smaller scales it is relatively larger. This is the reason that the SVG output may look a little funny in smaller scales. To avoid the laser dot almost overlapping when cutting multi-pane windows, the minimum frame width will ensure sufficient distance between panes.

You can adjust laser dot size and minimum frame width in the settings. The default settings works pretty well, but depending on your laser and your chosen material you might be able to optimize it.

Brickwork

For H0, the brickwork sizing parameter should be 1.5 or so.

For smaller scales like N, you should use a sizing of 2.5 or so to avoid a brickwall ending up as an all black surface.

Quick start

Make a simple little building.

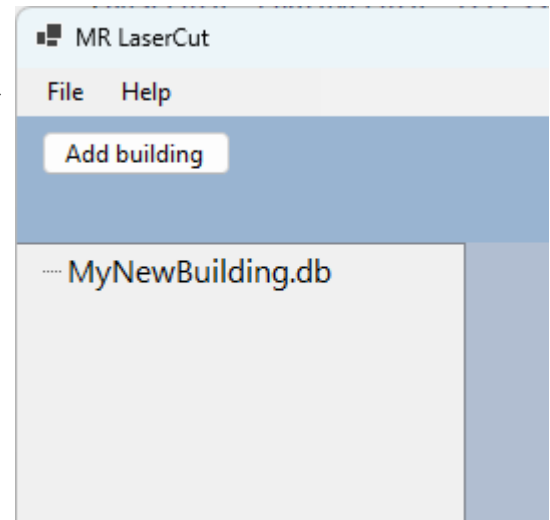
Make a new database

Click File → New

Choose a folder and enter a name for your database, for instance “MyNewBuilding”.

Click [Save]

The main window should look like this now:



Add a building

Click [Add building]

Click the [+] to expand the tree

Click on “New building” and give it a better name if you like.

Note! You must click [Save] to store your changes!

Add a storey

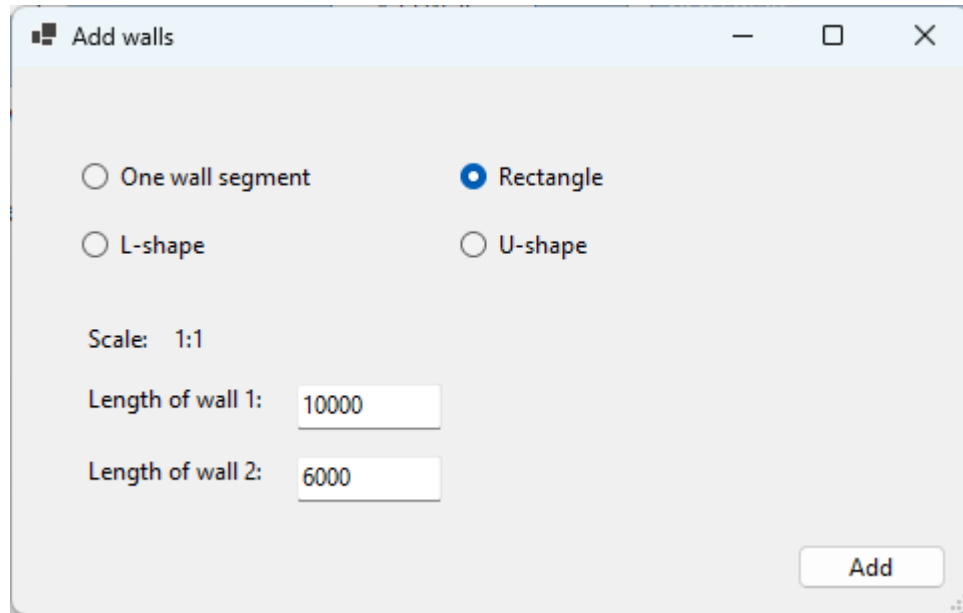
Click your building in the tree.

Click the [Add storey] button.

Add walls to the storey

Click your storey in the tree.

Click the [Add wall...] button.



The 'Add walls' dialog box is shown. It has four radio button options: 'One wall segment', 'Rectangle' (which is selected), 'L-shape', and 'U-shape'. Below these options, the 'Scale' is set to '1:1'. There are two input fields: 'Length of wall 1:' with the value '10000' and 'Length of wall 2:' with the value '6000'. An 'Add' button is located at the bottom right of the dialog.

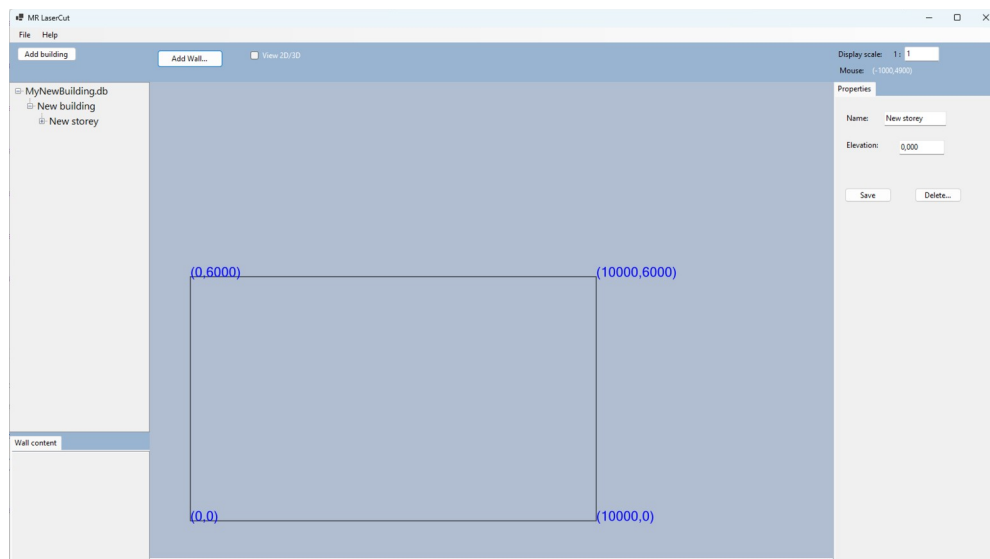
Select “Rectangle” to get a normal rectangular building.

Enter the length of each side of the rectangle.

Note! The scale is 1:1, so the entered values are in real world millimeters.

Close the popup.

You should now have this:



Set height, roofline and surface on each wall

Expand the storey to see the list of walls.

Click the leftmost of the short walls on the drawing.

We will make this a gable.

- Give a name that makes sense, for instance “Gable W” for west.
- Select Gable as Roof line
- Set the Overheight 1 to something larger than 0. The larger the number the higher the gable.
- Set the surface to “StrecherBond” to get a brick wall appearance.
- Set Start Corner and End Corner to “Cover” (see description of this later in the manual)

Click [Save]

Repeat for the other short wall.

For the long walls, just change the name and the surface.

Properties

Name: Gable W

Start X: 0,000

Start Y: 6000,000

End X: 0,000

End Y: 0,000

☒ Has wall

Height: 3000,000

Roof line: Gable

Overheight 1: 2000,000

Overheight 2: 0,000

Offset 1: 0,000

Surface: StretcherBond

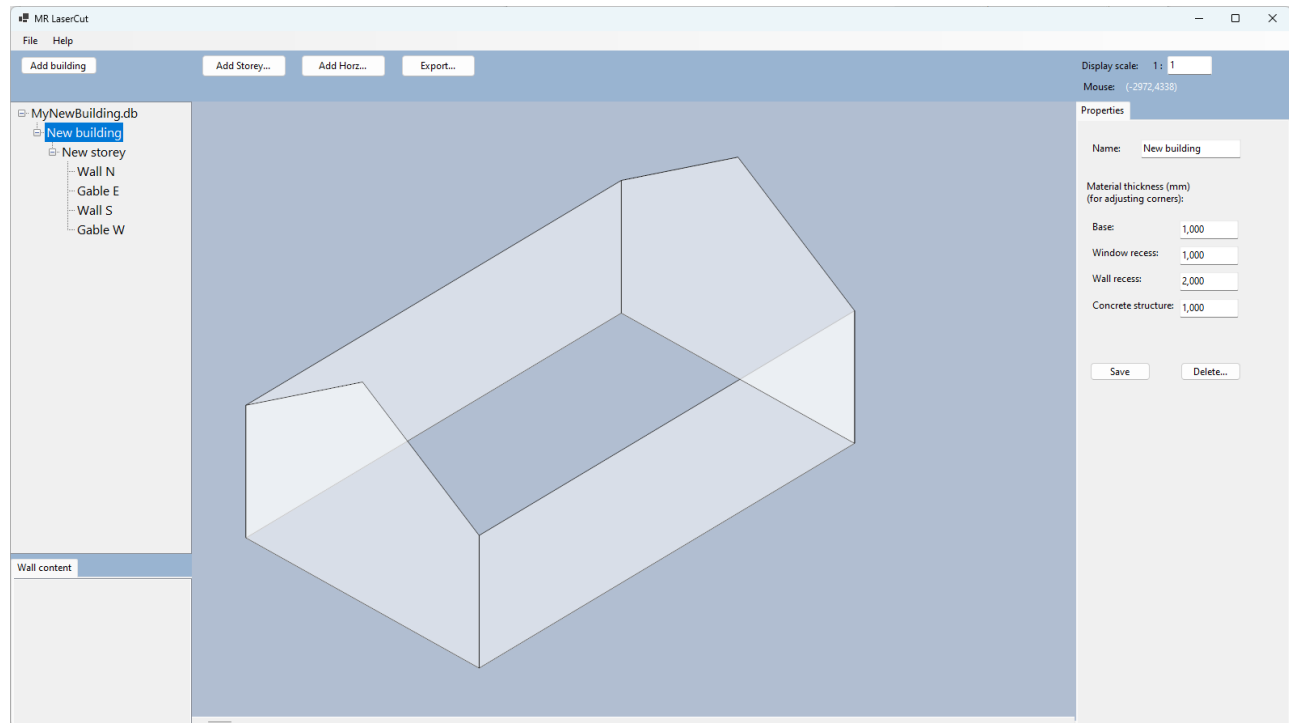
Size: 1,500

Start Corner: Cover

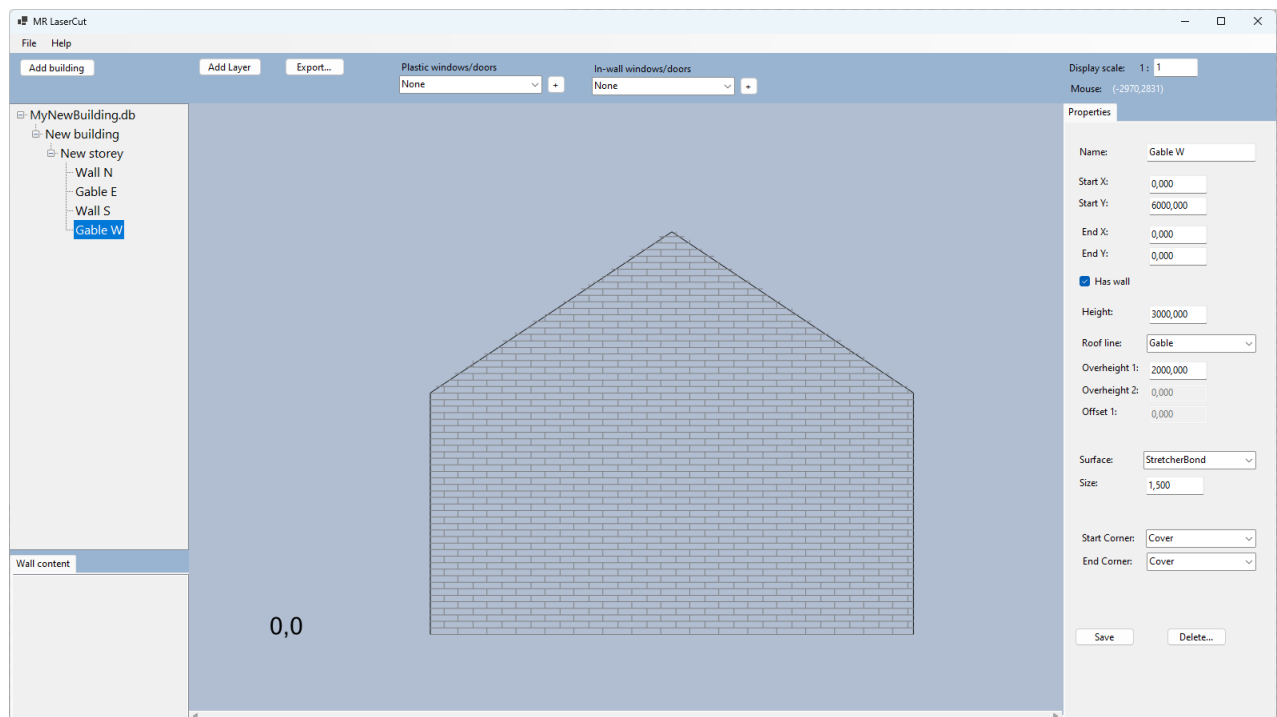
End Corner: Cover

Save Delete...

Your building should look like this now:



and your walls something like this:



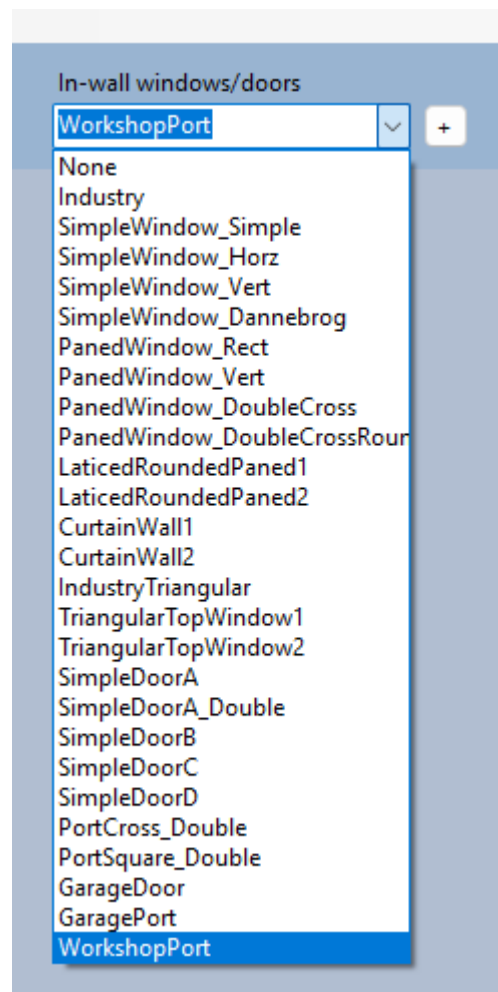
Add doors and windows

Select one of the long walls in the tree.

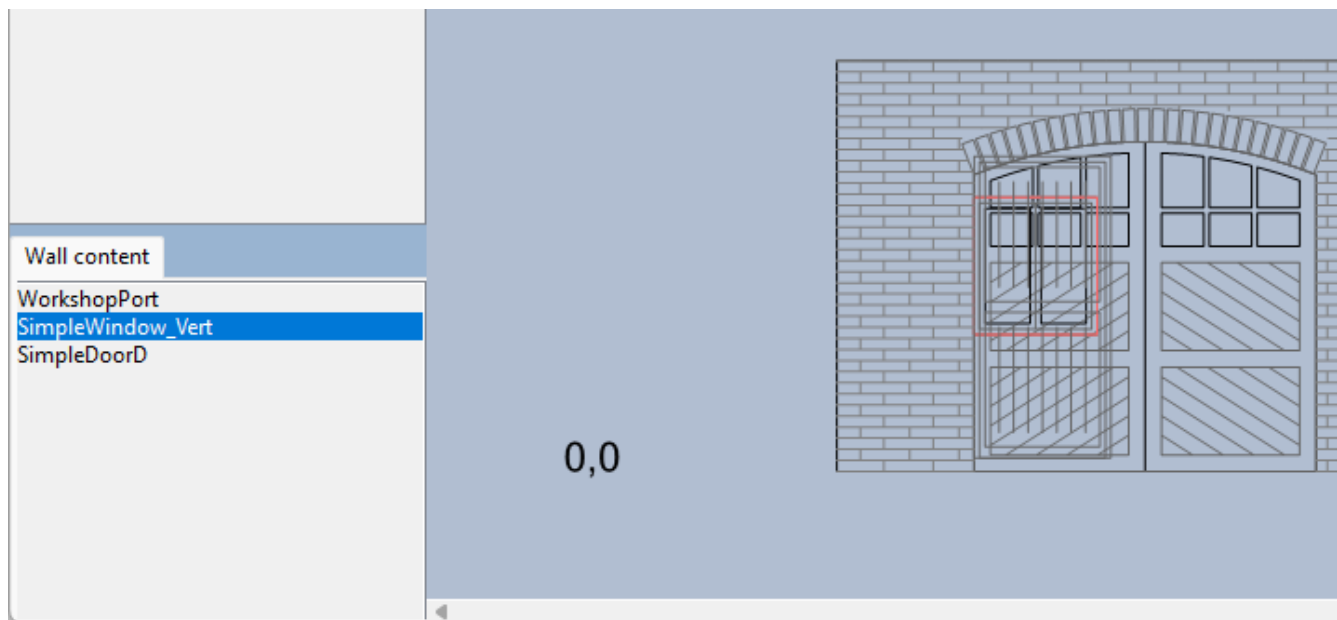
Select the “WorkshopPort” in the “In-Wall window/doors” list and click the [+] button.

Select the “SimpleWindow_Vert” and click the [+].

Select the “SimpleDoorD” and click the [+].



Select the “SimpleWindow_Vert” in the “Wall content” list.



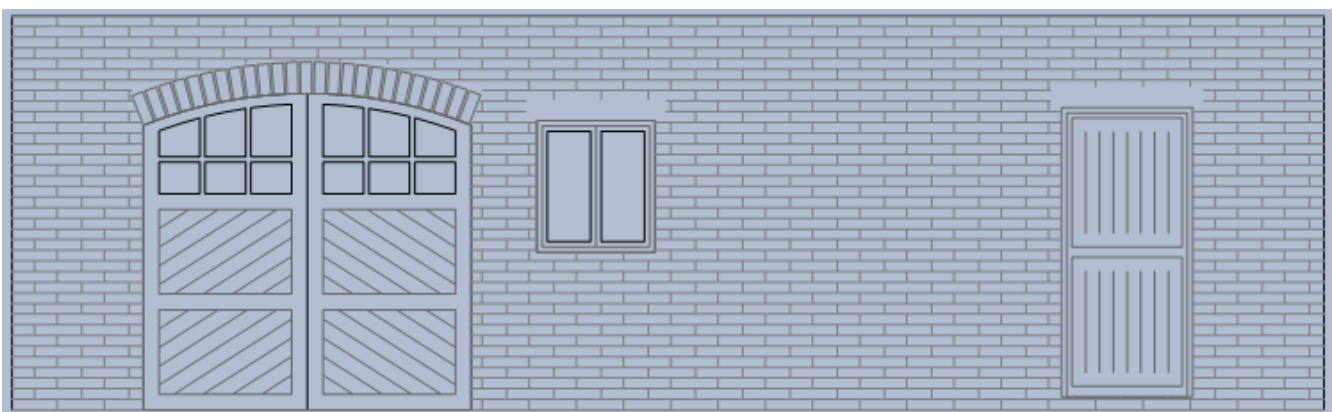
Set its X = 4000 and Y = 1200 and Decoration = “SimpleLintel”. Click [Save].

Select “SimpleDoorD” in the “Wall content” list.

Set its X = 8000 and Decoration = “SimpleLintel”. Click [Save].

Select the WorkshopPort and set Decoration = “SoldiersOrArch”. Click [Save].

Your wall should look like this now:



Add/change things till you are happy with the look.

Do the same to the other walls.

Export

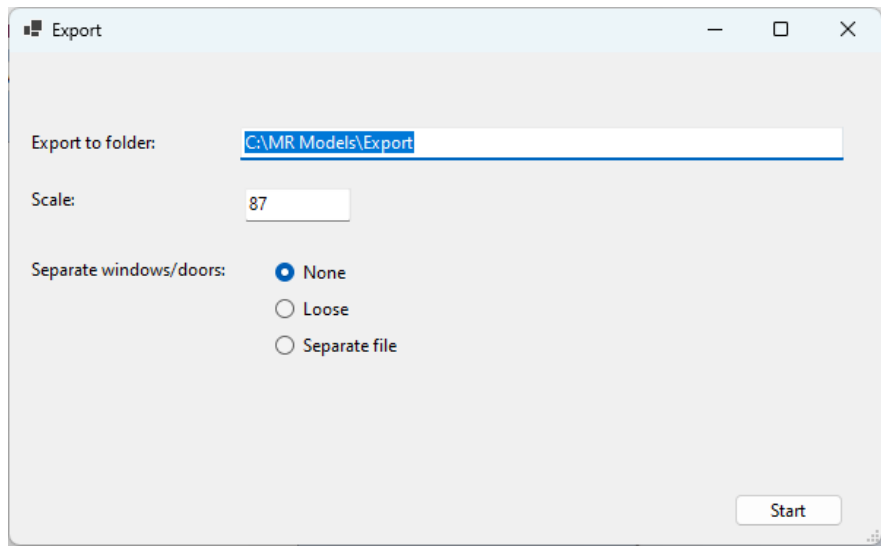
Select your building in the tree.

Click the [Export] button.

Choose the folder where the SVG files should be placed.

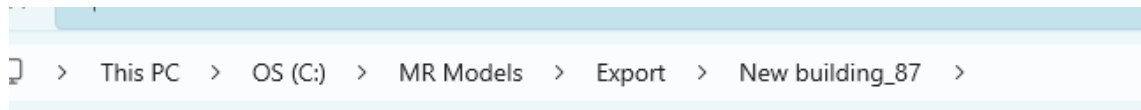
Choose the scale. Default is 87 for H0.

Click [Start].

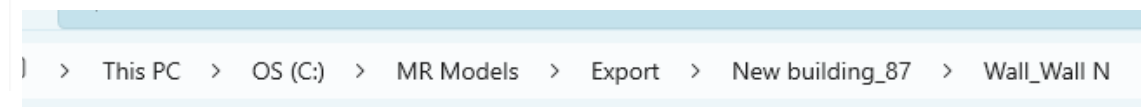


The result

In FileExplorer you should be able to find this:



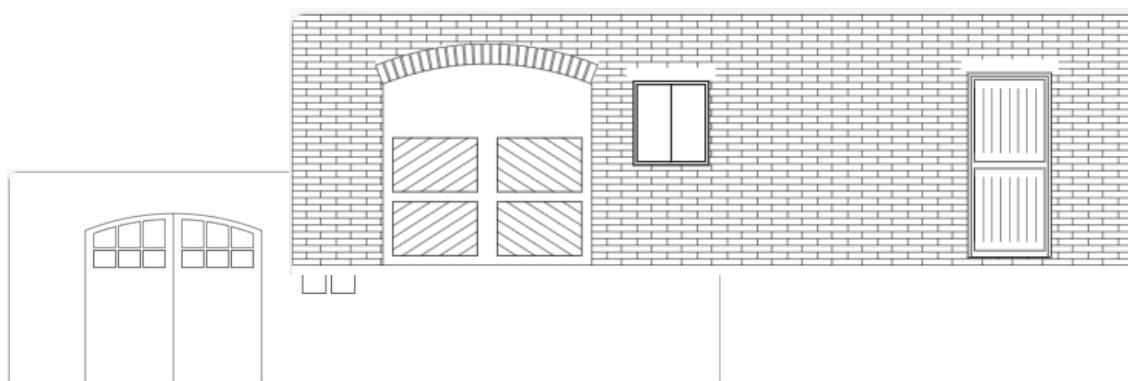
Name	Date modified	Type	Size
Wall_Gable E	30/12/2023 10.29	File folder	
Wall_Gable W	30/12/2023 10.29	File folder	
Wall_Wall N	30/12/2023 10.29	File folder	
Wall_Wall S	30/12/2023 10.29	File folder	



Name	Date modified	Type	Size
Cut_Base_1mm.svg	30/12/2023 10.29	Microsoft Edge H...	5 KB
Engrave_Base_1mm.svg	30/12/2023 10.29	Microsoft Edge H...	101 KB

M

The content of the files is this:



That is it. Ready for cutting and engraving.

Depending on your laser cutter, budget and taste, you can use programs such as LightBurn or LaserGRBL to run the laser.

UI

Tree navigation

A tree structure showing the Building(s), Storey(s) and Wall(s) that are in the database.

Wall Content list

A list of windows, sections and decorations in the current selected wall.

2D viewer

For viewing and editing a wall, or a storey, roof or horizontal.

3D viewer

For viewing a complete building as a wireframe.

Properties

Where you edit the properties of the selected wall, window etc.

Constraints

Where you edit any constraints you want on the selected window etc.

Multi-select

Use Left mouse button to select something in the 2D viewer.

Ctrl + Left mouse button will let you add to your selection.

Copy/paste

Copy/paste works for PlasticWindows, InWallWindows and WallSections.

Also works for a whole wall.

The insertion point for paste is the mouse position.

The lower, left item in the clipboard selection will be placed at the insertion point.

Paste special

Paste special will ask for the precise X and Y of the insertion point.

Define your building

Building

Just a top-level thing to keep other things together.

You can have one or many buildings in a database.

Name

Give your building a name.

The name will be used to create a separate folder when exporting.

Material thicknesses

Base

This is the layer where windows and doors will be cut.

Depending on the look you want, 1-2 mm will be fine for H0.

Window Recess

The window recess is an optional layer.

If used, 1 mm is fine for H0. That corresponds to approx. the width of a brick in real life.

Wall Recess

The wall recess is an optional layer.

If used, 1-2 mm will be fine for H0.

Concrete structure

The concrete structure is an optional layer.

If used, 0.5 mm will be fine.

3D view

The, rather primitive, 3D view is useful for visualizing the whole building to see that adjoining walls have correct height and proportions are as expected.

Storeys

A storey is a horizontal plane at some elevation.

A single-storey building has one storey, usually at elevation 0.

A multi-storey building has two or more storeys, with elevations usually increasing by 2.6 meters or more for each storey.

The storey is defined by its elevation and by the walls that describe its shape.

If your building has the shape all the way up, you can get by with just the first the storey and let its walls extend all the way up to the roof.

But it is often useful to add all the storeys of your building even if you only use one of them for walls.

If your building changes shape at some elevation you will need to add storeys to be able to add new walls.

Fields

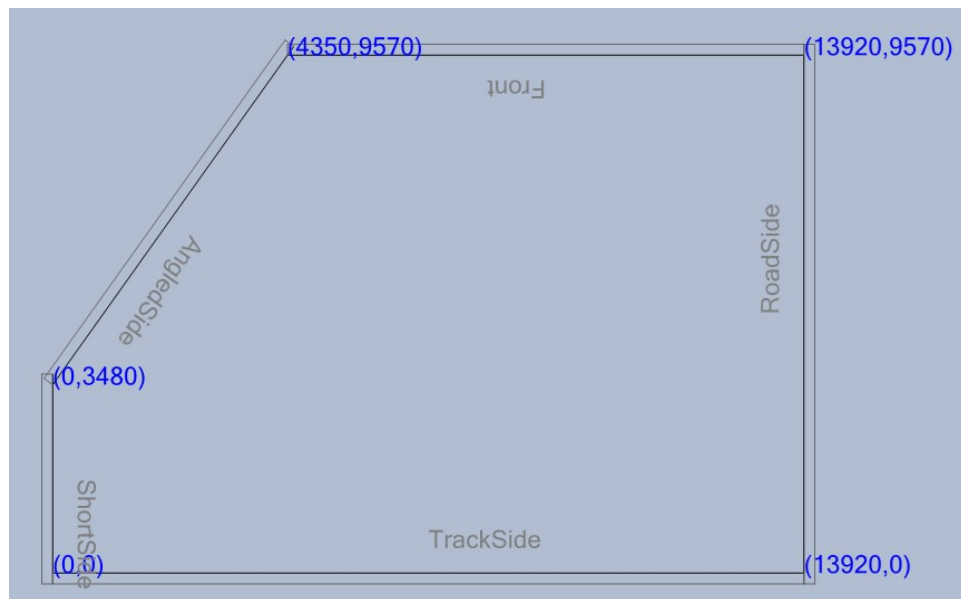
Name

Give your storey a name.

Elevation

Elevation in millimeters.

2D storey view



The 2D view of a storey shows the walls and the corners.

The dark line is the inner side, and will be used to cut the outline of the storey. The lighter lines illustrate how the walls connect in the corners.

If you add walls and see them inside-out on the storey view, just swap the start and end coordinates.

Wall segments

Wall segments define the outline of a storey.

A wall segment can have a wall or not.

A wall can be as tall or as low as you want it to. It can span 1, 2 or many storeys.

Walls are always vertical.

Looking at some building facades it is clear they designed to be a whole with lines running from ground to roof.

Other building facades may have different styles for first and second floor.

If you want to have different surfaces on different parts of a wall, for instance the lower storey is smooth and the upper storeys are brick, you have to make separate walls for the lower and upper part.

Fields

Name

Give your wall a name.

Start X, Start Y

The point in horizontal plane of the storey where the wall starts.

End X, End Y

The point in the horizontal plane of the storey where the wall ends.

Wall type

Line: A wall with no actual wall. It can be used to help define the outline of the storey.

Wall: A wall with a height. Will be used to cut the outline of the storey.

InnerWall: A wall with a height. Will NOT cut the outline of the storey.

Height

The height of the wall in millimeters.

The height is independent of the storeys elevation.

Roof line

Choose the roof line you want.

Overheight 1

This value will change the look of the chosen roof line.

Overheight 2

This value will change the look of the chosen roof line.

Offset 1

This value will change the look of the chosen roof line.

Surface

Choose what the wall surface should look like.

Size

Use this to change the size of surface pattern.

Real life bricks are very small in H0 and N, so it might be necessary to enlarge the pattern to get something that can be recognized as bricks on the final wall.

For H0, 1.5 or 2 will give decent bricks that are visible and not too big.

Start corner

Choose the type of corner you want. See the later chapter Corners for an explanation.

End corner

Choose the type of corner you want. See the later chapter Corners for an explanation.

Layers

Card stock is flat, so additional layers of card are necessary to create structure to a wall.

Window recess

A Window recess layer will have holes for each door, port and window. The holes will be slightly bigger than the items underneath, thereby making the items seem recessed in the wall.

Fields**Name**

Give your layer a name.

Width A

This is how much bigger than the actual window/door the hole in this layer will be.

Surface

Choose what the wall surface should look like.

Size

Use this to change the size of surface pattern.

Wall recess

A Wall recess layer will have holes going from ground and almost to the top, thereby giving the impression that whole sections of wall are recessed.

This is useful for late 1800 brick buildings.

Fields**Name**

Give your layer a name.

Width A

The width of the recess, ie. the distance between pillars.

Width B

The width of pillars.

Overheight 1

0 for a flat top, anything larger than 0 for a rounded top.

Overheight 2

The height at which the pillars should start.

Offset X

The position on X axis where the first recess starts.

Surface

Choose what the wall surface should look like.

Size

Use this to change the size of surface pattern.

Concrete structure

A classic industrial look, probably first used for the Packard plant in Detroit in 1903.

A lattice of concrete pillars and beams, filled in with brick and large paned windows.

To re-create the look, use this layer to create the pillars and beams, and use the Industry window in all the wall sections.

Fields

Name

Give your layer a name.

Width A

The distance between pillars.

Width B

The width of pillars.

Sections

Sections can be used to cut holes in a wall or to give part of the wall a different surface.

Doors, ports and windows

Plastic windows

Adding plastic windows to your wall will create holes that fit the chosen window type. Currently only a selection of Auhagen are supported.

Notice that plastic windows are of a specific scale! If you add a H0 scale plastic window to your wall, you will get H0 scale holes no matter what scale you export.

In-Wall windows

Adding In-Wall windows to your wall will create holes and engravings that should look convincing.

Typically the holes for glass is cut and any lines indicating frames are engraved.

Sills

If you specify a Sill for a window, a slot will be cut below the window and the sill is exported as extras.

The thickness of the sill material is determined by the export scale:

Scale name	Scale	Thickness
1, 0	<= 45	2 mm
S, H0	<= 87	1 mm
TT	<= 120	0.5 mm
N	<= 160	0.2 mm

Wall decorations

Cornices

Cornices are horizontal decorations.

Use Left and Right constraints to make sure they go all the way across the wall.

Pillars

Pillars are vertical decorations.

Use Left and Right constraints if you want them right on the corner.

Quoins

Quoins are vertical decorations for corners.

Use Left and Right constraints to make sure they cover the corner.

The height and width of the quoins are determined by the type of quoin selected and the surface pattern of the wall.

If you don't want a surface pattern on the wall but still want to control the size of the quoins, use the surface pattern called "Invisible".

Constraints

Constraints can be used to place windows, sections and wall decorations relative to the wall or a storey.

The constraints works a little different on some decorations, for instance a Left constraint will only change the X cordinate of a pillar, but it will change both X coordinate and width of a cornice.

Constraints are also duplicated when you duplicate a window.

Roofs

There are 3 ways to make roofs.

Roof based on Gables

A roof segment runs between 2 walls and results in a number of roof fields.

Generally, the 2 walls must have the same roof line, or at least the roof lines of the 2 walls must have similar characteristics.

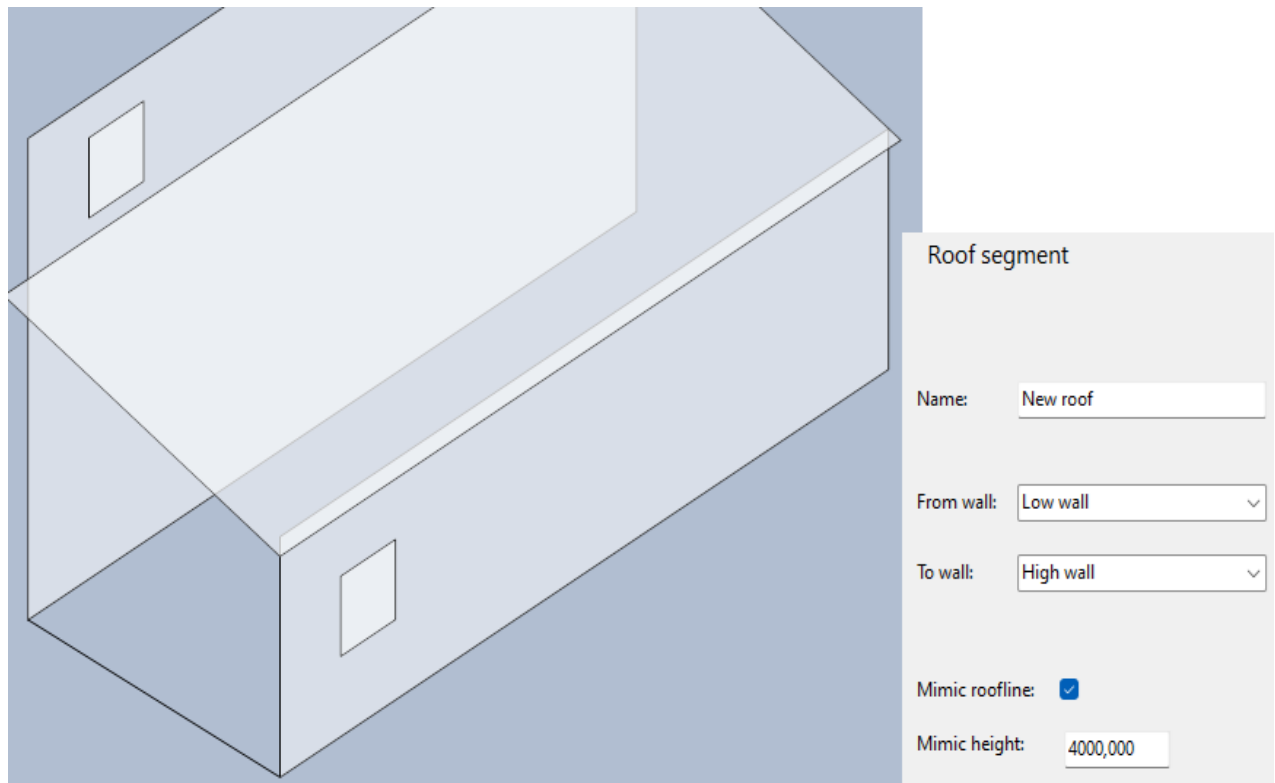
When using Mimic there is an exception.

How to make roof inside gables?

Clear the checkbox “Adjust for material thickness” and add a little extra to the “Overhang side”.

Mimic

When editing a roof segment, you can make a roof from the top of the From wall to somewhere on the To wall by putting a checkmark in Mimic roofline and specifying at which height on the To wall the roof field should end.

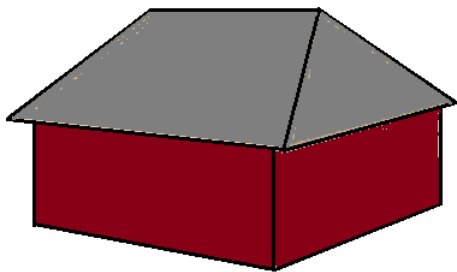


Tip! To make it clear to the builder where the roof should meet the wall, use a section on the lower part of the To wall to make a different surface.

Roof based on Outline

Some types of roofs can't be described by 2 end gables.

A typical example is a hipped roof.



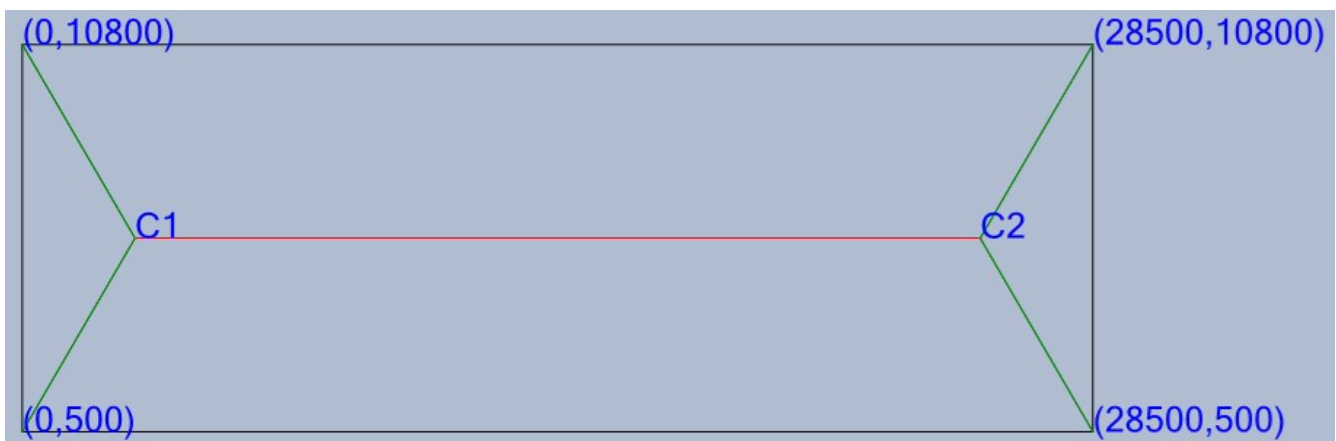
There are 3 steps to make an outline roof:

1. Choose the walls that define the outline, there can be up to 7
2. Specify the ridge(s)
3. Press [Auto] to let MR LaserCut figure out the roof fields.
4. Adjust the lines between walls and ridge(s) if the automatic ones are not correct.

Tip! When using 2mm thick material for wall, the SideOverhang should be set to at least 400mm. 500mm will give a little visible overhang on the finished model.

Calculate the middle of the roof

In this case the Y coordinate of the ridge is $500 + ((10800 - 500) / 2)$.



Horizontal segments

To make pavements and platforms, you can use horizontal segments.

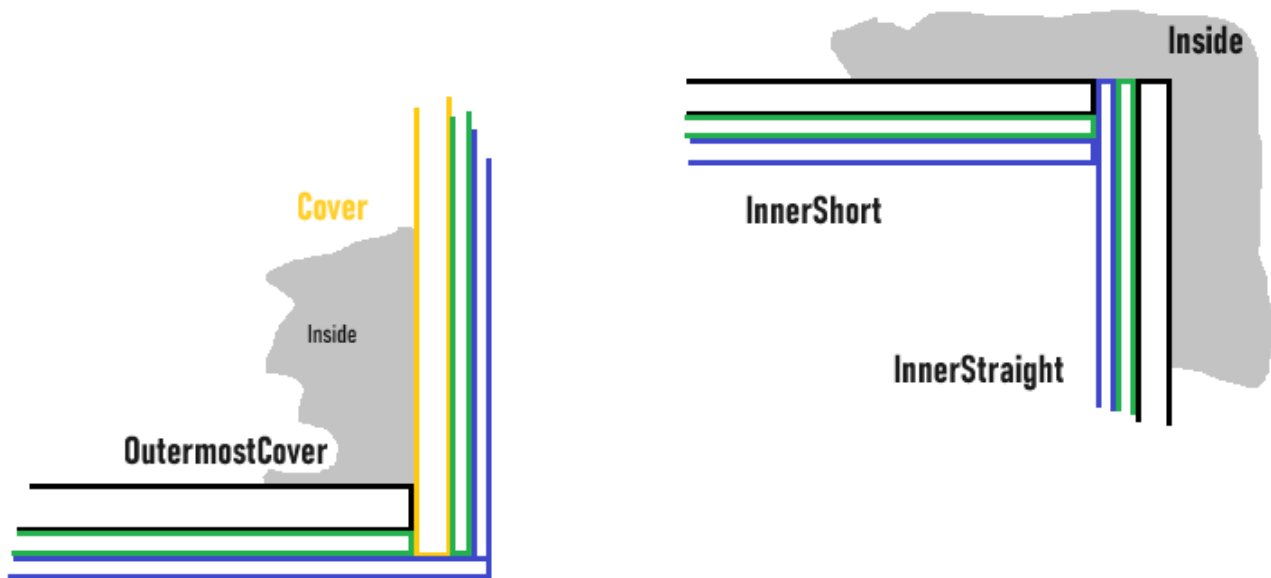
Corners

Before exporting you should make sure that all corners are defined correct.

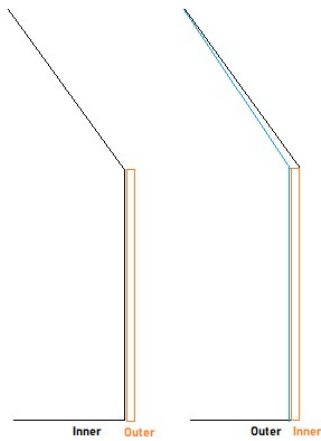
The 2D Storey view makes it easy to see if there are overlaps.

Each end of a wall has 5 options: “Cover”, “OutermostCover”, “InnerShort”, “InnerStraight” or “Miter45”.

- Cover means that all layers of the wall will extend to cover the adjoining walls materials. This is the preferred option for any wall with an angled roof.
- OutermostCover means that all layers except the outermost will be exactly as specified. The outermost layer will extend to cover the adjoining walls materials. The corner of the adjoining wall should be a Cover.
- InnerShort means that all layers of the wall will be shorter than specified to be able to fit in an inner corner. The corner of the adjoining wall should be a InnerStraight.
- InnerStraight means the all layers of the wall will be exactly as specified.
- Miter45 means that you will cut the ends of your walls to a 45 degree miter, for instance by using a passepartout knife. This is the ideal way to do it but takes more tools and extra work. Like Cover, the wall will be slightly wider.



! Notice that the angle of the roof changes slightly when a corner of a non-flat roof is set to Cover or Miter45.



Tips

Loading docks

Can be made in 2 ways:

1. Define the lower storey to be 1.5 meters high and larger than the rest of the building. The actual building will then sit on top of the lower storey.

Drawback: you get a horizontal line to cover up where building meets platform.

2. Define the lower storey to 1.5 meters higher than otherwise needed and add another storey with same elevation and use this for the platform.

Drawback: you get a vertical line to cover up where building meet platform and a horizontal line between building and platform where the ports are.

Manual fitting of top layer

This is possible with some layer types. OffsetX will determine where the pattern starts.

Export

Exporting a wall will create a set of SVG files:

- Cut_Base
- Engrave_Base
- A Cut for each layer and maybe an Engrave for some layers
- Maybe an Extra layer for cutting details
- Maybe an extra file for surface textures, like Slate.

The Cut files are for cutting. Set your laser to go all thru the material you choose.

The Engrave files are for drawing lines, like mortar lines in brickwork or indication of window frames. Set your laser to make lines that are deep enough to be visible after painting.