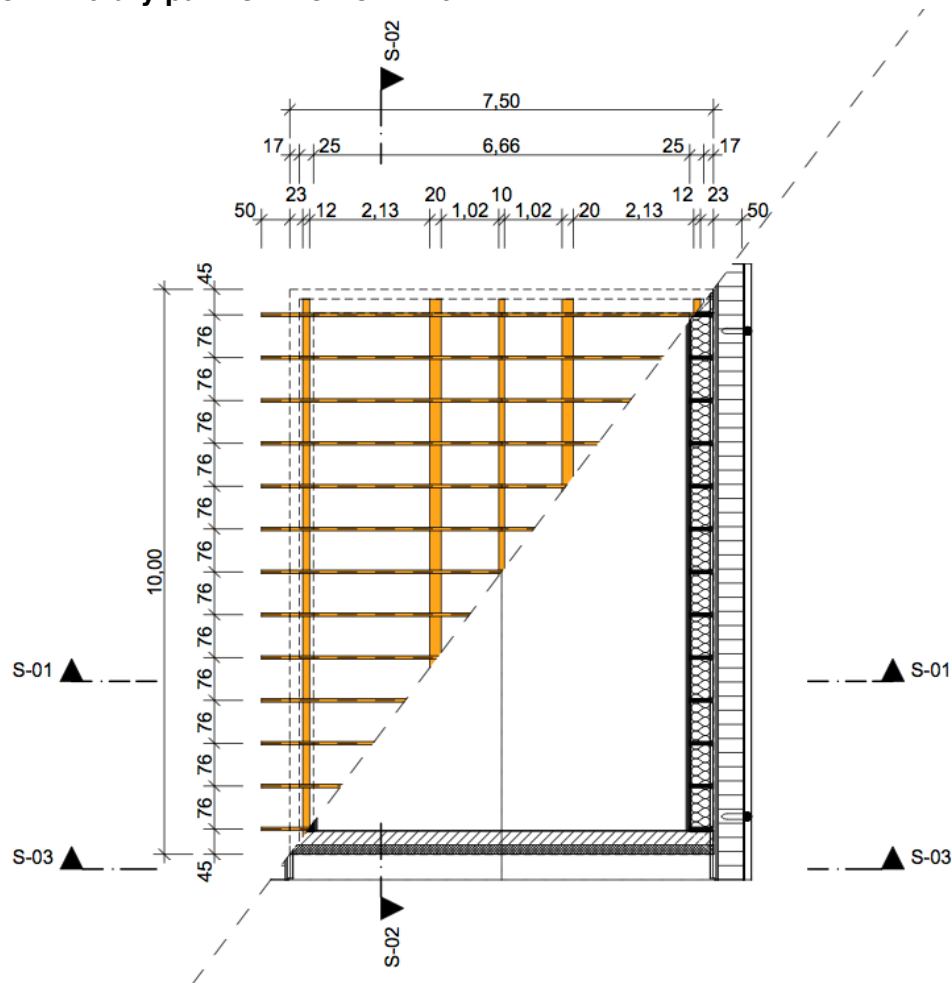# Satteldach_19

GDL library part for ArchiCAD 19+

With the library part, it is possible to create highly parametric gabled roof constructions in many variants.

Due to the rapid development in the BIM area and not in all respects satisfactory solutions to the roof tool alone, it came to the development of this library part that represents an evolution of the "old" gable roof object, with the difference that the new object smoothly works with the multi composite ArchiCAD roof tool.

Using this object, the roof timbers and roof accessories in floor plans, elevations, sections and 3D can be displayed realistically. The roofs can be relatively quickly created and - when plans are changing- customised quickly and easily using the extensive range of parameters.

Functions and Features

- isosceles symmetrical gable roof, asymmetric variants are planned at a later stage

- parameters for:

    - floor plan length and width
    - roof slope
    - height of the inferior purlins above zero level of the current story
    - height of the collar beam above zero level of the current story
    - roof overhang
    - gable wall distance
    - all dimensions of all timbers

- showing/Hiding of:

    - inferior purlins
    - middle purlins

- ▪ collar ties
- ▪ ridge purlins
- ▪ flight rafters
- ▪ gable cuts
- ▪ roof cuts
- ▪ SEO bodies for trimming the roof of the roof tool at the eaves, verge and in the loft area
- ▪ verge and eaves accessories, gutters and downspouts, multilayer slab in collar ties height, panel knee stick
- • variation of:
  - ▪ shape rafter head (5 variants)
  - ▪ shape purlins head in case of flight rafters (5 variants)
  - ▪ collar tie (individually centered on rafters, individually in addition to the rafters or pliers)
  - ▪ variants of roof incuts(4)
- • the library part contains all the necessary SEO bodies to cut away unnecessary parts of the roof (roof tool) (eaves and attic area with not insulated loft)
- • the library part has its own global library part with which you can control the plan view on the model view options, so that you have a floor plan and a rafter plan (see graphic at top) generated from the same plan. Here, the kind of projection is set, and the visibility of certain components in the plan. Different display options can be mapped within the view map, generated by the same plan.

The User Interface

The input of all parameters is done in the User Interface, that is the tab „gable_roof_19..." in the dialog box of the library part.

Attention: The width of this settings dialog deviates from the standard of 600 pixels instead of 444. Newer ArchiCAD versions adapt the dialog automatically. In older versions, the width may have to be increased manually with the mouse.

The settings are done in a logical order tab by tab.

The page control can be done via the hierarchical arrow and popup navigation at the top as well as via the TAB navigation, whereby both types work in parallel.
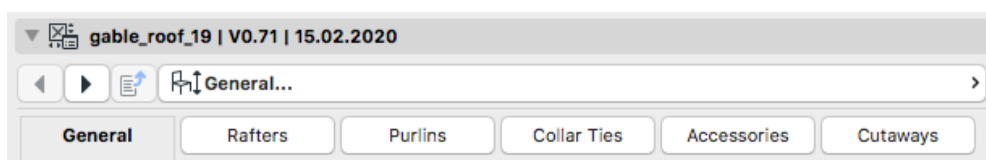
Below the parameter entries will be explained for each tab, so that the functions of the library part will be understandable.

Page 1: General

On the first page, you will find explanatory graphics for almost every parameter that will be visible when you press the question mark.

- • Building width extends from the outer edge to the outer edge of the eaves walls; the length of the building also extends to the outer wall edge.
- • Roof pitch
- • Height of foot purlin above floor: the roof truss must be set to the zero level of the respective floor. Its height depends on the input of this parameter
- • Axle spacing rafters: From this, an axis dimension is automatically calculated from the available space, which is either

the same or smaller than the entered dimension. All pairs of rafters can be moved individually in 2D or 3D / section via hotspots.

- Distance rafters from wall: both gable walls separated; In gable sections, this is the distance to the main building.

- Distance floor to bottom edge of collar tie

- Roof overhang eaves measured from the outer edge of the outer wall to the outer edge of the rafters on the eaves side

- Thickness of the eaves wall and gable wall, as well as the thickness of the supporting wall core (from the inside edge of the outer wall)

- Material timber consistent: if this checkbox is checked, all construction timber in 3D will have the same material, which is editable below the checkbox. If this checkbox is deactivated, all construction timbers will have their materials given on the according tabs

- Material (only editable, if checkbox above is activated) and fill of the timber in sections

- Fill colour consistent from model view options: If this checkbox is activated, all construction timber is displayed in 2D with the same surface colour, which can be selected in the model representation in the area "Saddleroof_19" on tab 1.

- Request if object is up to date

- Link to manual

- Language selection (Deutsch + English)

Page 2: Rafters

On the second page you will find the settings of the rafters and flying rafters, as well as counter battens and battens.

- Rafter width and height

- Shape rafter head (3-5 to choose from)

- Turn-on of one or up to 10 pairs of flying rafters and their dimensions

- Width and height of the flying rafters

- Wall distance of the last flying rafters: distance of the outer flying rafter (inner edge) from the outer edge of the gable wall.

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◀ ▶ ⬚ 🖊 Rafters... ›

| General | **Rafters** | Purlins | Collar Ties | Accessories | Cutaways |

rafter width | rafter height | shape rafter head | Material timber
6,00 | 24,00 | vertical ⬤ | 302 |... ›

flight rafters on/off front/rear ☐ ☑
number flight rafters front/rear 1 › 1 › planking ☑
width flight r. | height flight r. 8,00 24,00
wall dist. last flight rafter 32,00 32,00

Rafters | ... **Battens**

- Distance between the first flying rafter: distance of the inner flying rafter from the outer edge of the gable wall.

- Boards under overhang: shuttering on the flying rafters and wall distance

- Battens: connectivity and dimensions (planned for a later version)

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◀ ▶ ⬚ 🖊 ... Battens... ›

| General | **Rafters** | Purlins | Collar Ties | Accessories | Cutaways |

Rump width rafter support 4,00

counter battens on/off ☑ Material timber
width/height counter battens 5,00 3,00 002 |... ›

battens on/off ☑ Material timber
width/height battens 6,00 4,00 002 |... ›
axis distance battens 35,00

Rafters | ... **Battens**

The following can be entered on the 2nd sub-tab about **battens**:

- Width of the rafter's knees on the foot and middle purlins

- Counter battens and battens: connectivity and dimensions

Page 3: Purlins

On this page the settings for all purlins are made

- Turn on and off foot purlins

- Width and height of the foot purlins

- Wall inset of foot purlin in the gable wall (not with activated rafters)

- Distance between the axis of the foot purlin and the outer edge of the eaves wall

- Switch on and off middle purlins

- Width and height of the middle purlins

- Wall support in the gable wall (not with activated rafters)

- Purlins position: above or beside to the collar ties

- Switch ridge purlin on and off; the ridge purlin always sits under the rafters

- Width and height of the ridge purlins

- Wall support in the gable wall (not with activated rafters)

- Form visible purlin head (only selectable when flying rafters activated); you can choose from the following 5 forms:
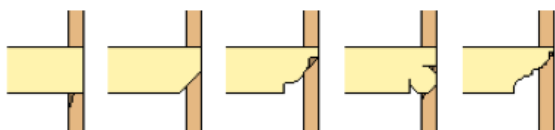
Page 4: Collar Ties

On this page the settings for the collar ties are made

- Switch collar ties bar on and off

- Width and height of the collar ties

- Collar ties either individually between the rafters, individually next to the rafters or as a pair of pliers on both sides of the rafters

- Optional switching on of up to 6 composites of a collar tie ceiling: here you determine whether there should be a fillet trim, how it is constructed, the thickness of the individual composites and the material and the fill.

- The contours of the collar tie ceiling depend on the SEO body, with which one can optionally cut out the roof covering in the loft area and thus adapt seamlessly to the roof trim. Even with the extension of the loft the SEO body can be used to trim the collar tie layer with the rest of the roof.

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◄ ▶ 🗏 ⌂ Collar Ties... ›

| General | Rafters | Purlins | **Collar Ties** | Accessories | Cutaways |

collar ties?	w collar ties	h collar ties	kind of collar ties		Material timber
☑	8,00	24,00	single collar ties between rafters ›		■ 017 | L... ›

number skins	5 ›	thickn.	material	section fill	pen + bpen	
Skin 1 ab. ct		2,50	■ 311 |... ›	▦ 002... ›	▮■	∅
Skin 2		24,00	■ 328... ›	▨ 909... ›	▮■	∅
Skin 3		0,50	■ 009... ›	Ⅲ 924... ›	▮■	∅
Skin 4		3,00	□ 000... ›	□ 803... ›	▮■	∅
Skin 5		1,25	□ 001... ›	▦ 213 |... ›	▮■	∅

Page 5: Accessories

On this page or the 4 sub-tabs, the settings for various types of roof accessories are made.

Knee Wall Paneling

On the first sub-tab you can clad the knee wall above the eaves wall between lower edge of the purlin and the inner shell of the roof membrane. Here you determine how many composites this interior cladding should have, what thickness, materials, fill and pen colors it should have. In addition, you determine whether a composite should be visible or invisible and thus form a cavity and you can choose whether these composites should be slanted on the upper side in the roof slope. In addition, you can change the top edge of the composite with hotspots in the section view, so that you can practically put a vapor barrier around the corner, as shown in the example in the settings and in the section picture below.

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◄ ▶ 🗏 ✎ Accessories... ›

| General | Rafters | Purlins | Collar Ties | **Accessories** | Cutaways |

Knee wall paneling on/off	☑	distance composites from inside	0,00

number composit.	5 ›	thickn.	material	section fill	pen + bpen	visible	top slanted
from inside	Skin 1	1,25	□ 201... ›	▦ 001 |... ›	▮■	∅	☑	☐
	Skin 2	2,50	■ 019... ›	Ⅲ 924... ›	▮■	∅	☑	☐
	Skin 3	0,50	■ 019... ›	Ⅲ 925... ›	▮■	∅	☑	☑
	Skin 4	14,75	□ 715... ›	□ empty ›	▮■	∅	☐	☐
	Skin 5	11,25	▨ 329... ›	▨ 910 |... ›	▮▨	∅	☑	☑

| **Accessories** | ... Drainage | ... Eaves | ... Verge/Ridge | ... Roof reference |

Drainage

Settings for gutters and downspouts are made on the second sub-tab (currently only circular cross-sections are possible):

- gutters on / off

- gutter diameter

- gutter material

- value for individual adjustment of the height

- downpipes on / off (up to 4 pieces: 2 each Side)

- Pipe diameter

- Bend angle of the slanted piece

- Height of the upper vertical piece

- The height of the lower vertical piece to the ground can be done in 3D / Section with hotspots

Eaves

Settings for eaves panels, eaves box, eaves wedge with underlayment foil are made on the third tab:

- Eaves panels on / off

- Thickness of the eaves panels, as well as material and fills

- Front piece on / off

- Eaves box on / off

- Kind of eaves box (2 variants) and wall thickness and optional face board; with the eaves box, the front board is automatically available as part of the box

- Front height of the front board, automatically or individually

- Materials on the 3 eaves box sides

- Eaves wedge on / off with definition of width and forehead height, as well as definition of fill and color of the underlay in the area the eaves wedge. This underlayment foil should connect to that from the roof tool (part of the multi-layer structure).

Rake / Ridge

Settings for rake overhangs, rake boxes and ridge tiles are made on the fourth sub-tab:

- At the top, the rake overhang, measured from the outer edge of the outer wall to the outer edge of the rake tiles, is set individually

- Rake box on/off

- Width and height of the rake tiles. Roof

skin must be adjusted so that it extends to the outer edge of the rake tile.

- Excess of the vertical front board over the lower board (the height of the lower board is shifted).

- Material rake box and rake tile

- Switchability of a semi-cylindrical ridge tile and its individual height. For special roof shapes, both ends of the ridge tiles can be extended in length with hotspots.

Roof Reference

On the fifth sub-tab, the following roof references are set so that the library part is dimensionally identical to the roof of the roof tool:

- Number of composites of the roof tool and their composite thicknesses. The number of composites and their thicknesses can be found in the "Options >> Element Attributes >> Composites" settings for the multi-composite roof structure you have selected (see the references graphic)

- Which composite corresponds to top
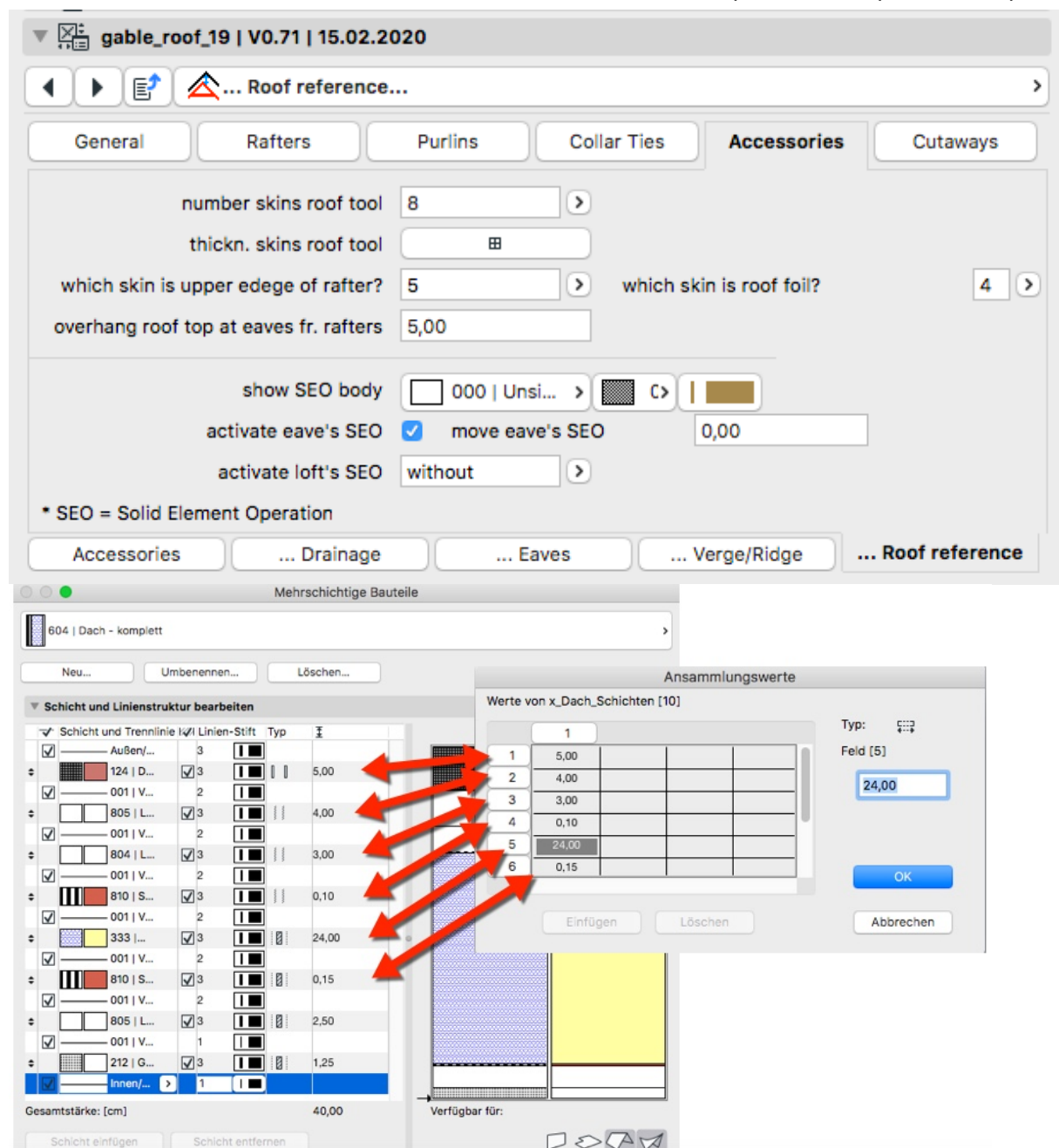
side of rafters

- How far the roof cladding should protrude over the rafter head on the eaves side

- Solid Element Operation Object to Roof: Display SEO body; Display material, fill and pen of the SEO body, activate the eaves SEOs and the peak SEOs

Page 6: Cutaways

On page 6 with a total of 6 undertabs, several roof trimmings can be made for the following purposes:

- secondary roof

- cuts for dormers and roof superstructures in triangular, rectangular and pentagonal shapes

- the gable roof cuts into another roof

- changing collar beams

The settings are largely self-explanatory.

Intelligent Hotspots

The following parameters can be set in the floor plan with the movable hotspots:

- Position of the individual rafters

- Position of the downpipes

- Support length of the purlins on the gable walls

The following parameters can only be set in section and 3D with the movable hotspots:

- Switching on and off the visibility of the SEO bodies via hotspot on zero level centered under ridge.

- The SEO cutting bodies for trimming the roof created with the Roof tool then appear in the section in the eaves area and optionally in the attic area (if this is not removed or if a collar beam ceiling is to be cut cleanly with the roof slopes). The eaves SEO bodies have polyline hotspots, so they can be extended and collapsed as required.
  This defines the subtraction body that cuts the roof in the eaves area.
  You only need to remove the roof truss from the roof once with the SEO tool (please use only "subtraction ", not "subtraction with extension ..."); further changes to the SEO hotspots are also possible at a later date without having to execute a new SEO command.
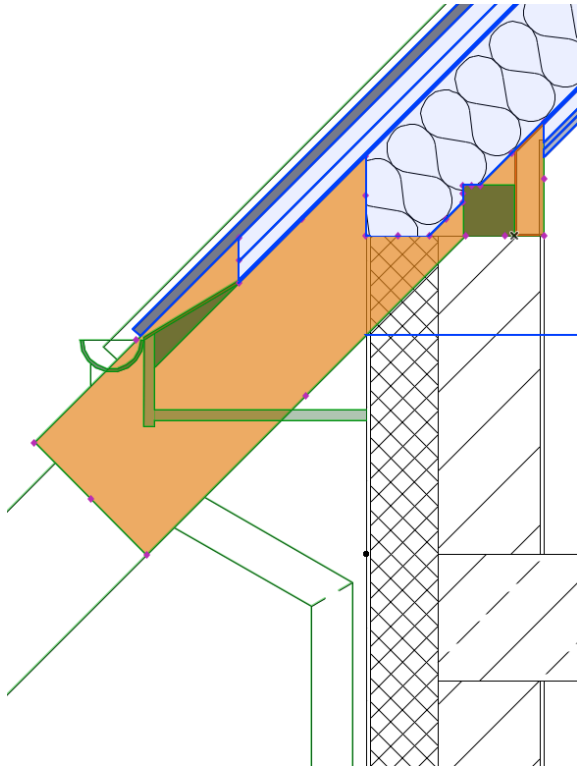
- The eaves SEOs are identical on both sides of the roof.
  The loft floor SEO does not have a POLY hotspot function, but a fixed number of hotspots and may only have the following two forms

- Cut-out for collar beam ceiling

- Cut-out for non-insulated loft floor plus collar beam ceiling
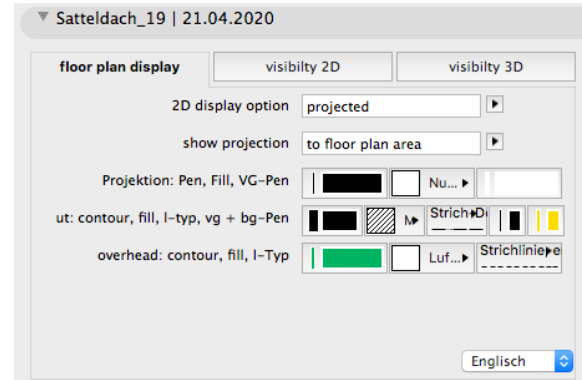
Model View Options (MVO)

There is a separate model view options library part called "Library_Global_Satteldach" for this library part. Please add this object to your loaded library so that the following settings are available.

Basics: Using the model view options, you can assign different representations of the saddleback roof object in 2D as well as in 3D to each saved view, so that representations like those on page 1 of this manual are possible.
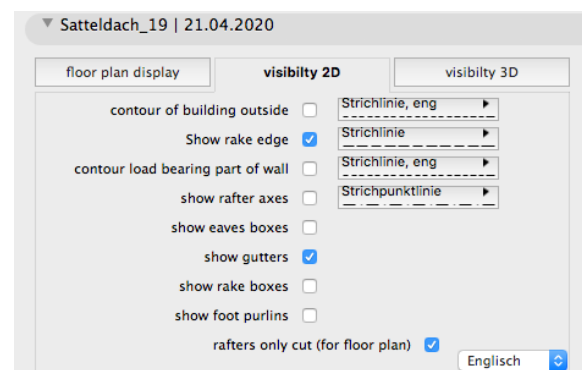
On the 1st tab of the model view options

you can set details about projection modes, visibility range, 2D representation modes such as pens, fills, etc.

On the 2nd tab of the model view

options, you can control the 2D visibility of individual elements and, in some cases, their line types.

On the 3rd tab of the model view

options you can control the 3D visibility of individual elements.

Colour representation in 2D and 3D

In order to assign different colors to the different types of roof timber such as rafters, purlins and collar beams in 2D, the surface material is set on the corresponding sub-tabs. The surface colour from 3D is thus transferred to 2D.

In order to be able to assign different surface colours to the different types of roof timber such as rafters, purlins, collar beams in 3D, the checkbox at "Material uniform" on the 1st tab must be removed. Now the individual component types receive the surface material set on the corresponding sub-tabs.

Basic procedure for trimming the roof and gable walls

The following basic procedure is recommended for the construction of the truss and roof to ensure a fast and smooth workflow.

In the following text you can also see what is possible and what is not possible with the truss object.

1. create the exterior walls in the attic: the gable walls up to approx. ridge height, the eaves walls only up to the lower edge of the purlin.
    Since the roof truss object only allows purlin roofs (no rafter roofs and collar beam roofs), the lower edge of the base
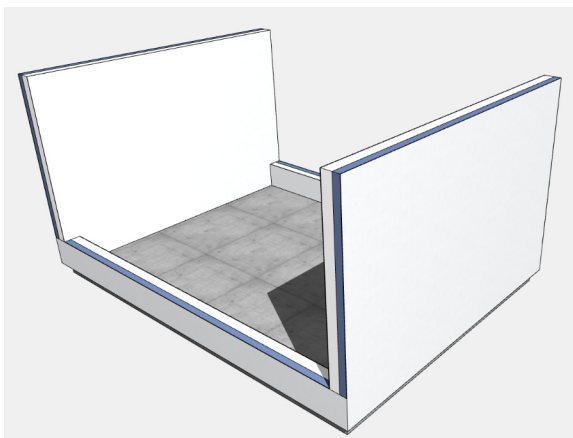
purlin always forms the upper edge of the eaves wall.

2. place the truss object with height zero to the current floor and desired purlin height (set on page 1) in the floor plan so that one of the outer corner points is located on an outer wall corner. After placement, drag the opposite object corner to the opposite corner of the building (see screenshot.
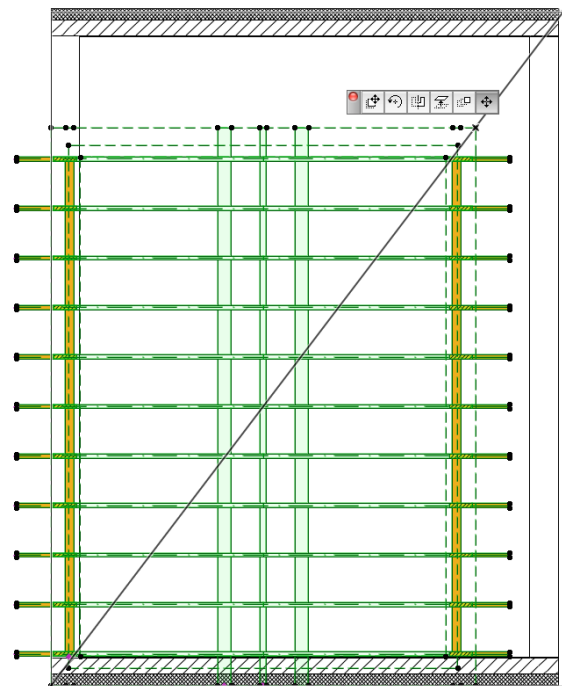
3. now adjust all necessary values, such as roof pitch, timber dimensions, rafter spacing, roof overhangs, position of the base purlin.
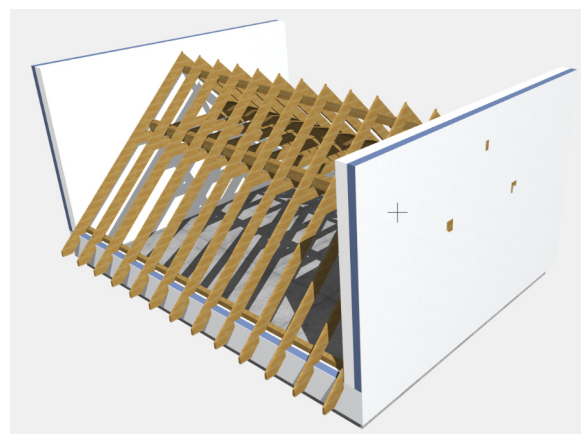
4. if everything is correct, place the roof: it is best to take a multi-roof with the rafter roof overhang + 5cm, place the multi-layer component you want to use there (whereby the insulation thickness should correspond to the rafter thickness in most cases); draw a rectangular contour with the roof tool. You get a hipped roof; to create 2 open gables click on the construction lines at the gables, select the roof symbol from the context menu and choose "stretch horizontal ridge" in the appearing dialog window.
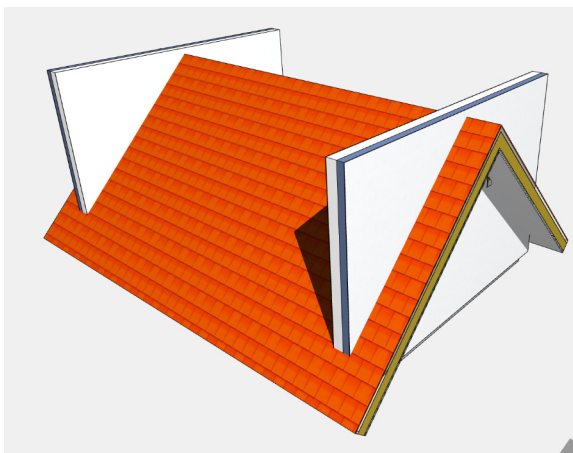
5. now go into the cross section, drag the hotspot in the middle of the object to floor level zero 25cm downwards: now the edit area of the solid element bodies appears, which cut the roof in the area of the eaves.
Drag as many points as you like to create a suitable subtraction body. You can see an example in the movie and in the sample PLN file (AC 19 and higher), which is attached to the object.
Finally, drag the hotspot back up so that the edit area disappears.

6. Now select the roof and open the Solid Element Commands tool from the Design menu. The roof should be included as the target element with the number 1. Now select the saddle roof object in 2D or 3D and click on "Apply Operational Elements".

Select "Subtraction" as the operation type and click on "Execute".
The trimming of the roof cladding should now have been carried out correctly in the eaves area.

7. finally, remove the protruding gable walls from the roof. In the solid element operation, the roof becomes the operator and the two walls become the target. As operation method select "Subtraction with upward extrusion" and then "Execute".
The gable walls should now be trimmed correctly in the upper area.

Trimming of the roof in the collar beam area and if necessary in the top floor area

In the object settings on the tab Accessories >> Roof Reference in the field "Activate Loft's SEO" activate either the selection "only collar tie level" (a) or "T collar tie level and loft" (b).

Then either cut the main roof only in the collar beam area or in the area of the collar beam and the topsoil, so that the unneeded pitched roof thermal insulation is cut out in the topsoil area.

Scope of delivery and installation

The supplied zip file contains the gable roof object, the model representation object, an example PLN and this manual.

After unpacking, please place the folder "Satteldach_19.lib" into your loaded library, including the one of the Demo-PLN.

Update-Check

Please use the button "up to date?" on the 1st page of the settings dialog. You will be taken to a web page which checks if you have the current version. All updates are free for proven purchasers of the object; send an email and you will receive the latest version.

System requirements

This object only works in the following versions: ArchiCAD 19, 20, 21, 22, 23, 24.

The object is also available in lower versions on request.

Questions and Suggestions

Questions and suggestions are very welcome, because GDL programmers want to know how the users use the objects, which disadvantages, restrictions, improvement wishes etc. are present.

Beside this manual you can find a movie about the functionality of the object in the internet, which might help to understand it better: https://b-prisma.de/ video/ Satteldach_19.mp4

Exclusions and licences

This software is delivered "as is". The library part has been extensively tested, but the programmer assumes no liability for possible loss of data, data corruption, or hardware damage and other damages (including damages for loss of profit, business interruption, loss of business information or data, or other financial loss).

This object is not freeware. Please be fair and do not give it to third parties. However, with a purchased license you can work on as many computers in your office or at home as you like.