

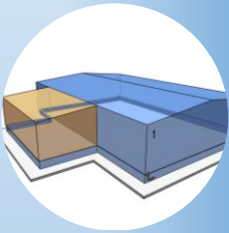
HiStruct Building Configurator

BOOST YOUR PROFITABILITY WITH AUTOMATED DESIGN AND SALES

HiStruct Building Configurator - the sales winner

We build success

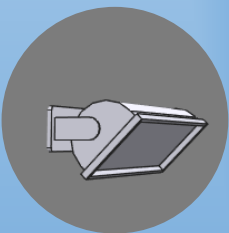
3D MODEL



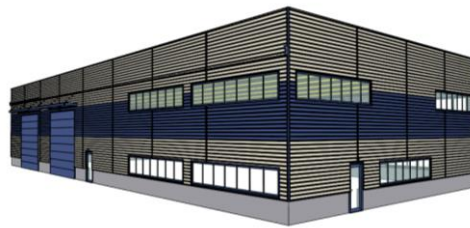
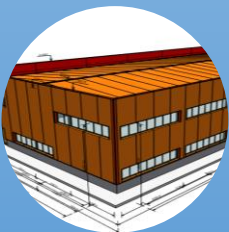
INSTANT ENGINEERING



TEMPLATES



SPEED AND QUALITY



You know how to build structures – we know how to build your success. Our focus is to delight both the constructor and the customer. We can reach that goal by enhancing the process these two subjects interact – during the planning and proposal arrangement.

Added value to the service a company can offer to its customers is an essential in being vital and prospering. The 3D visualisation, instant engineering and quality request management significantly supports the impressive feeling that customer have about their partner and stimulate business.

HiStruct is highly efficient and modern web-based application that helps you automate the engineering and sales process. Its customizable focus creates fully detailed 3D model – powerful visualization serves for both sales representative as well as the client to agree on optimal solution.

Your achievements

- HiStruct Building configurator enables you to focus on more valuable job as the rest is automated and saves you significant amount of energy and time.
- You can get rid of proceeding initial proposal that is going to be adapted many times. Your right place is rather in negotiating the optimal solution right after the client expressed his needs.
- You won't waste your time with boring standard configurations. Better get involved in later stage of the sales process that brings higher efficiency in closing deal.
- You don't need to ask your client to wait a couple of days until the visualisation of the structure is ready. Instead, you amaze him by super-quality model online that attracts him immediately.

BUILDING DESIGN

BASE SHAPE
LOAD BEARING STRUCTURE
SECONDARY FRAMING
SHEETING PANELS
DOORS, WINDOWS,
SKYLIGHTS
ACCESSORIES
COLOURS



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Abstract

People are keen on someone who can solve their problems. Engineering and construction are both about continuous problem solving. However, many problems are repeating, anticipated and their solution is known. Spending time on dealing with such problems does not make neither any additional value nor satisfaction. We at FemCAD solutions know how to transform our expertise into effective solution, without losing valuable time and effort so that you can be focusing on more profitable and satisfactory tasks.

There is a big demand on quality and speed which sometimes goes in an opposite direction to customisation which is required by clients, in the construction industry. Satisfy the client and solve all his problems with the limited resources every person has is often challenging. Not mentioning the fact that client can withdraw the idea of having cooperation with such a fabricator when the process does not flow smoothly. This brings concern to both sides and effects future business cases.

Unfortunately, today's world is oriented on immediate solution perfectly fitting to specific needs but in the highest possible quality and effortless. We know that as we are part of this world. Therefore, we also know that there are opportunities that directly help people to fulfil such demands. We grabbed them and transformed them into existing solution that turns considerable problems into piece of cake. And as a reward, we are enjoying the cake itself.

Let us give similar example from the daily life. Our society revealed that it's rather a thing of past when you handed a list to the shop assistant in a supermarket and he had to run around, gathering required items from the shopping list so that he could finally write down all the prices and sum them manually. Instead, you are the one who walks through the grocery shop (or internet mall) and pick anything you like, meeting the cashier at the very end or your pleasant journey through the corridors. It makes you more comfortable in your choice. It makes the cashier more productive and gainful.

THE HUMAN BRAIN IS TOO VALUABLE TO
CARRY OUT ROUTINE ACTS - IT SHOULD
RATHER BE UTILIZED FOR CREATIVE TASKS.

We gained our knowledge and experiences in different fields and utilize them to produce high-quality products and service. Our synergy and teamwork resulted in an application that is appreciated not only by our customers but also their own clients.

HiStruct Building configurator enables you to focus on more valuable job as the rest is automated and saves you significant amount of time and energy.

You can get rid of proceeding initial proposal that is going to be adapted many times. Your right place is rather in negotiating the optimal solution right after the client expressed his needs.

You won't waste your time with boring standard configurations. Better get involved in later stage of the sales process that brings higher efficiency in closing deal.

You don't need to ask your client to wait a few days until the visualisation of the structure is ready. Instead, you amaze him by super-quality model online that attracts him immediately.

For organizations that operate in fast-paced markets, speed is of the essence. When pricing data is more streamlined, workflow is streamlined too, time is saved, and more sales can be made. We know that and keep focusing on bringing this benefits to the daily practice of our customers. HiStruct Building configurator is your essential colleague to skyrocket your sales achievements.

About the developers

There are many challenges in the world around us. Losers can be scared of them as there is a need of considerable effort to tackle them. We are driven by them, feeling satisfied when one job is successfully completed and there is a new thrilling challenge ahead.

We gained our knowledge and experiences in different fields (from civil engineering, to worldwide sales or information technologies) and were disappointed that tasks that can be automated are manually repeated, human mistakes that blight someone's work are not eliminated by computer intelligence and that big capacity is spend on processing straightforward issues rather than profitable activities.

Our unique synergy and enthusiasm resulted in software tool that solves the issues we were facing and makes us proud of the fact that we contributed to the better world, where both the computer solution and human intelligence has its right position.

THE WAY OUR SOFTWARE IS BUILD
BRINGS US ENDLESS OPPORTUNITIES.

Designing the model

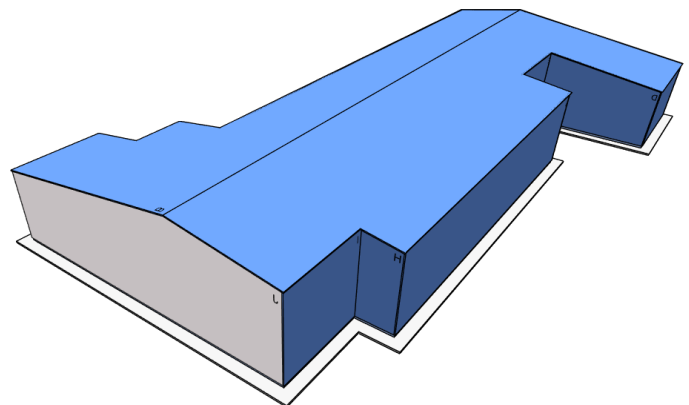
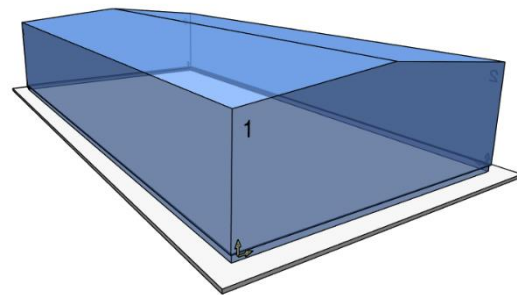
The core purpose of the building configurator is to create 3D model of the original investor's idea. It is extremely important to discuss this 3D model from the very beginning of the design process, as both the investor and the sales representative have clear overview of the building appearance.

HiStruct Building Configurator generates fully detailed model that even extends the requirement on the visualisation of the early planning stage. However, when having one, complete and comprehensive model for the whole design and purchase process makes the communication between both sides of the contract more trustworthy and eliminates much of the errors caused by misunderstanding or bad assumptions.

Building geometry

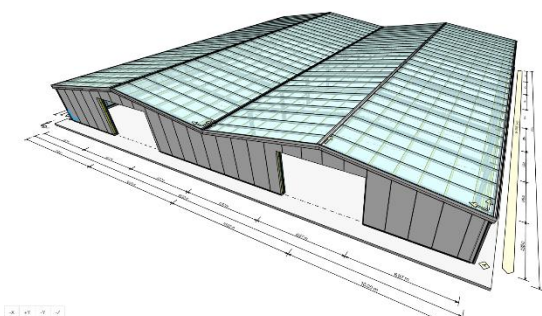
Essential definition of the building comes from the base geometry. HiStruct Building Configurator enables to vary building width and length within reasonable limits. Third dimension, being here height at eave on the left wall when viewing the structure in +Y axis direction, completes the basic 3D volume of the model.

Apart from the standard rectangular shape there can also be additional building extensions on any of the original 4 walls. These walls are labelled A, B, C and D, starting from the global coordinate system origin, following in anti-clockwise direction. The building extension can start and end within the wall length, it can also be aligned with a neighbouring wall and it can even extend the wall length. HiStruct Building Configurator automatically adds primary and secondary structure so that the structural conditions of the model are fulfilled.



Building geometry parameters contain also choice of roof shape and number of roof planes. As it is

commonly accepted that standard metal building has duo-pitched roof with identical slope (in opposite sign, naturally) this is the default arrangement one can find in majority of templates. But there can also be architectural or structural reasons to use mono-pitched roof with one slope of the roofing panels. Such choice can be easily made by one combo-box. More advanced arrangements are then accessible via



“custom” type of input and enable the user to define exact number of roof planes (up to 8 parts) where each part can have its own length (therefore also unsymmetrical roofs are available) and slope.

In case a plat roof building is to be modelled, one can simply assign mono-pitched roof with 0° slope.

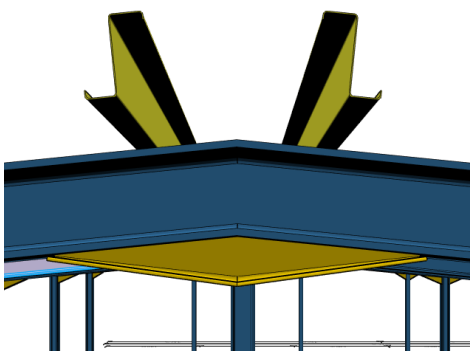
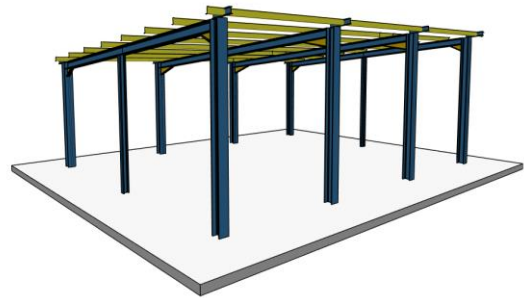
Primary structure

Primary load bearing structure of typical steel building consist of rigid or semirigid frames. Such frames determine the basic geometry of the structure (width, height, roof shape) and is being erected first on the construction site.

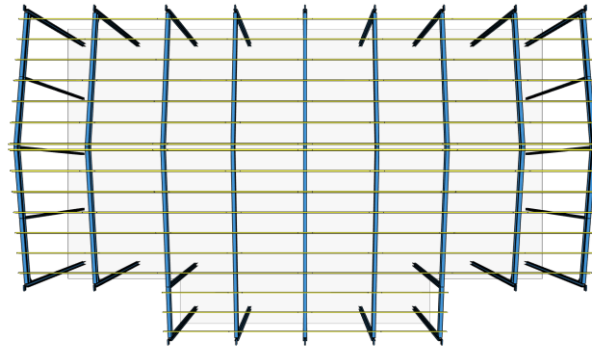
HiStruct Building Configurator builds the structure with the most commonly used hot rolled steel sections. Columns, subjected to biaxial bending and compression, consist of HEB profiles (there is a choice between the most obvious dimensions) and rafters, subjected to bending and shear, consist of IPE profile.

Roof overhangs are made of welded sections because its height needs to have identical height as the purlin section height. This ensures that the overhang beam fits between the roof panel and roof overlapping sheeting.

Rafters are connected to column flanges at eaves while the major column extends the rafter centre line. For large spans between columns (or between column and the apex) there appears additional haunch at the rafter bottom side right next to the column. The default haunch length is 10% of the span and it is basically cut from the identical cross-section as the rafter.

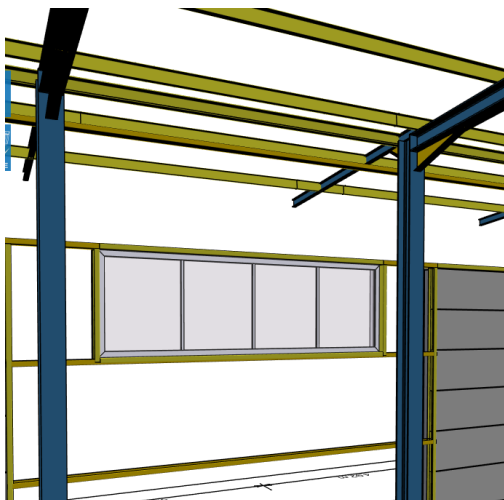


There are always haunches at apexes. In case there is also an internal column, this one is not extended and starts at the bottom apex haunch point.



Secondary framing

Secondary structure plays an important role in the structural arrangement of the steel building. Unlike the hot rolled primary frames, cold rolled profiles are used for secondary framing. An interesting feature of single storey buildings is the relatively high proportion of the steelwork that is cold rolled. Secondary structure consists of roof purlins and side rails for supporting roof cladding sheets and vertical cladding respectively. Although these items are very light, weighing only a few kilograms per metre, they typically account for 15-25% of the total weight of the steelwork in the building.



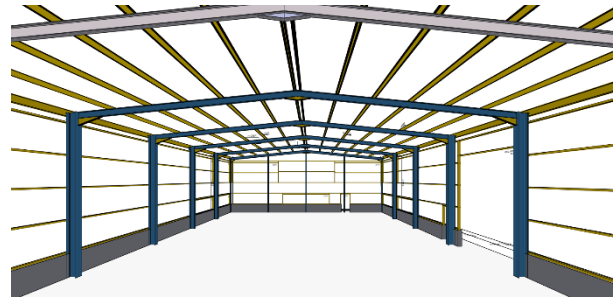
There can also be parts of the building without any secondary structure (open walls or when sheeting panels are fitted to primary columns and rafters directly) which affects the total outer dimensions.

HBC places secondary beams to all wall and roof segments by default. The beam cross-section is automatically selected from list of thin Cee sections. Particular cross-section dimensions are detected by the pre-design, as well as maximal spacings (meaning support distance for sheeting panels).

The actual beam spacings are recalculated on each individual plane segment, however. The reason behind is that the maximal spacing does not necessarily divides the particular segment length to rounded value of intervals. Also - to keep reasonable arrangement all around the structure - secondary beams cannot have different spacings on neighbouring walls.

Having these aspects in mind, HBC recalculates secondary beam spacings so that it does not exceed the limit value (regulated by design tables for sheeting) and uniforms it on all wall segments up to the height of the lower wall plane. Walls that overreach this level and therefore need additional beams at the top (e.g. gable walls) have more beam lines, that are recalculated equally on the exceeding height.

The very top girt at walls parallel to building ridge is eave beam. Eave beam uses different shape of cold-formed section because its role is to bridge the connection between roof panels and wall sheeting. The shape of the cross-section is similar to C profile but with inclined top flange. The top flange is bend in the same angle as the roof plane so that it offers comfortable fitting for roof panels. The height of eave beam is calculated from the roof purlin thickness so that there is a possible fixing of the beam to primary frame. Also, the beam vertical and horizontal eccentricity is determined from the roof and wall framing, having correct position to touch both planes.

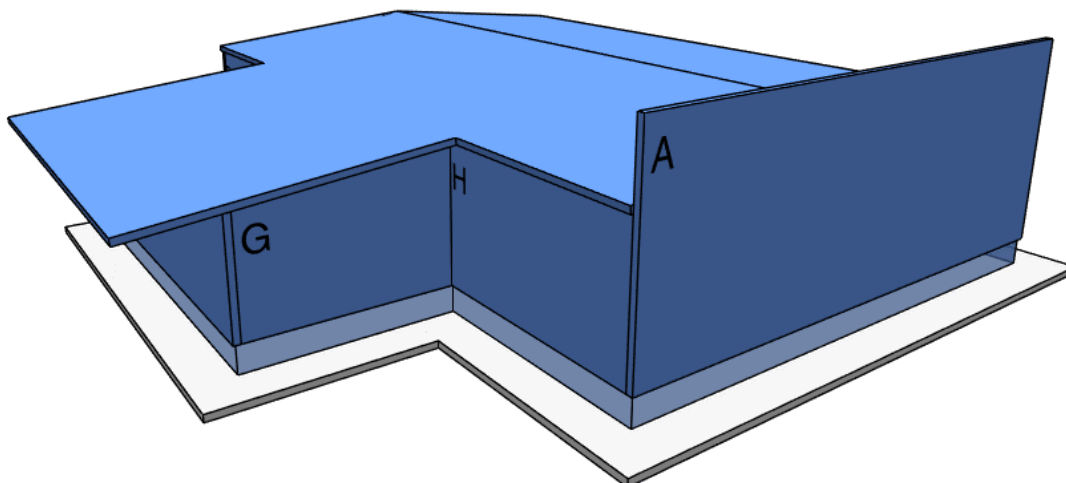


Sheeting

Sheeting of a steel structure – we mean an envelope resisting to external effects such as climatic load – is essential to determine visual appearance and indoor comfort of the building. Both have its inherent purpose and both have to be considered in the design process.



Overall appearance of the building is created by sheeting detailing such as attics and roof overlap. Both supplements can be assigned to particular wall segment in HiStruct Building Configurator, making it adjustable tool in hands of a designer-architect.



There are in fact three possibilities of structural envelope for metal building

1. No sheeting at all – this is a case of simple shelters and temporary structures
2. Uninsulated sheeting – panels consist of metal part only, no insulation material is used to protect interior against temperature changes
3. Insulated sheeting – panels of variable thickness provide both mechanical and thermal barrier between exterior and interior



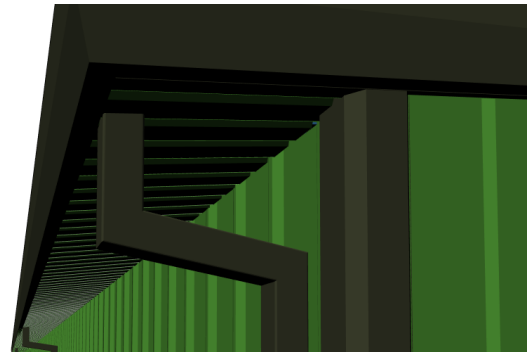
HiStruct Building Configurator supports four options for sheeting panels. Uninsulated sheeting is represented by a list of trapezoidal profiles (manufacturers deliver trapezoidal sheeting with different nominal thickness of the sheet and total thickness of the profile). Insulated buildings can have PUR panels (with variable total thickness) or façade cassettes (C shaped cassettes accommodate insulation and are covered by another trapezoidal sheeting).

Façade cassettes are available on walls only and replace the secondary framing beams, in fact. Thus there is no thin walled C beam to support external panels as this is provided by cassettes lips.

Another sheeting that has no exact profile and specification, like the three above, is named “general sheeting” in HiStruct Building Configurator and is displayed as simple rectangular panel with no profiling. When general sheeting is used, panel thickness and width is required input parameter.

Note: Any insulation is neither graphically presented nor evaluated in the bill of material.

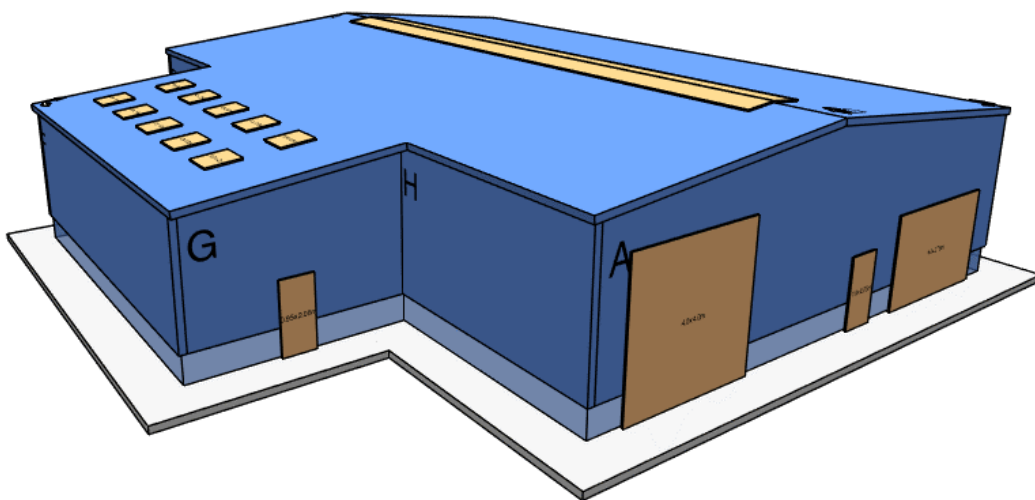
There is also an additional piece of sheeting underneath the roof overhang to provide necessary protection of the primary and secondary structure. As well as keeping the building “closed”.



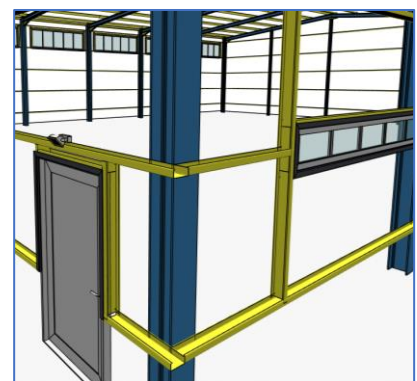
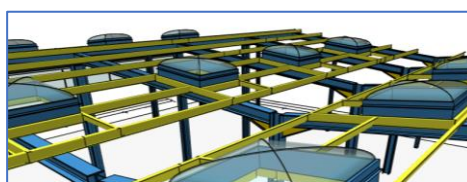
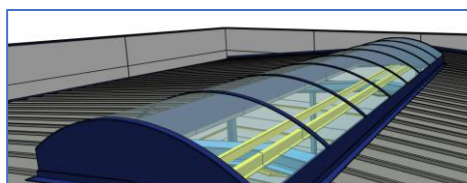
Openings

There is hardly any building that needs no openings that allow entrance and let the sunlight in. HiStruct Building Configurator offers variety of openings in the building shell such as windows, doors, sectional doors, skylights, cross-skylights or simply blank opening with no filling.

Each opening is assigned to a certain segment (wall or roof or ridge). Filtering of the opening type based on segment characteristics is controlling the user selection. There are doors, sectional doors, windows and blank opening available for walls, skylights and blank openings for roofs and skylight and cross-skylight for roof ridges. Position and repeating of an opening can be managed in its properties dialogue. Thanks to exact definition of distances from the bottom and side edge of a plane (coordinates X and Y are expected) the configurator is able to place the opening to the precise position. Array input makes it easy to define more identical openings of the same type in one dialogue. Simple click on displayed opening offers to edit it right away. Group management of all openings on particular plane segment is accessible from the main menu button. All of the features mentioned above ensures clarity and ease-of-use of the input procedure.



Openings influence the sheeting area (which is decreased) and also secondary framing (which is increased). Secondary framing is automatically modelled to the opening border line and made of identical thin walled cross-section as the main purlin or girt beams.



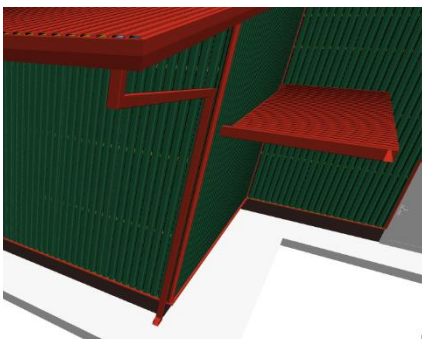
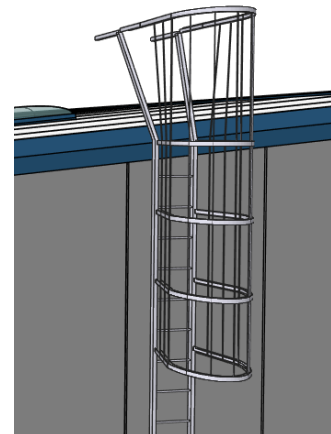
Accessories

HiStruct Building Configurator is proud of being detail oriented building configurator. All the details that makes the 3D model nicer, more attractive and real are necessary when it is about to persuade the client. Nevertheless, the company that focus on detail from the very first moment of the intention is surely regarded as trustworthy for the further cooperation.

In this context, accessories are basically not needful for the preliminary design. But they significantly increase the visual effect of the model and take into account building parts that should be considered in the overall concept.

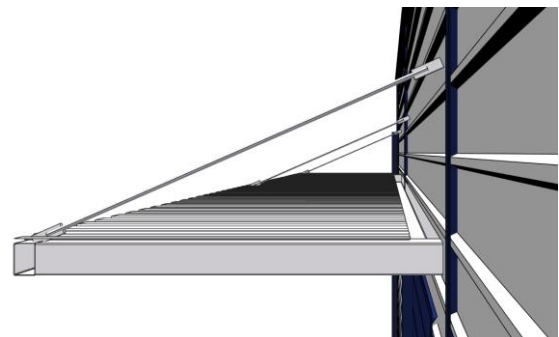
HiStruct Building Configurator introduces the following accessories:

- Downspouts
- Cage ladder
- Vent grill
- External reflector
- Canopy



Downspouts can be either disabled or enabled with respect to maximal distance between two pieces. Apart from that, any downspout can be edited individually – its position along the wall edge and bottom end (to land or to drain). Downspouts that drain water from roof overhang automatically adapt its geometry and attach the vertical tube to the wall sheeting as close as possible. Downspouts are modelled alto to wall attics. They start at the level of roof gutter and go straight down.

Canopy is a separate part of a roofing, intended to be used above doors or sectional doors. However, it can be places also above a row of windows to shade the sun. It consists of a simple beam structure covered by simple trapezoidal sheeting. There is a possibility to slope the canopy and add hanging rods at the top of it, if appropriate.



Reporting, documentation

HiStruct Building Configurator offers numerous outputs that refers to the designed structure. The outputs describe the model in a form of tables, images or drawings.

There are three main types of the outputs:

- Reports in HTML (PDF)
- Drawings in DXF
- Analysis model in ESA file

1. Reports cover mainly material consumption with basic sketches of the building. They are always generated (and saved) on up-to-date state of the structure, thus they also reflect particular design variant at a certain time. Reports are created in HTML file format with easy manual transfer into PDF. HiStruct enables the following report to be generated:

- Project summary** – basic summary information about the project is provided to the author (either prospect or sales representative) and can be automatically send to personal email address
- Building views** – a series of images of the model from all possible view directions is generated; images contain also basic dimensions and roof slope labels
- Primary structure** - drawings of each unique primary frame with dimension lines and beam labels are presented here, together with the bill of material used for all primary structure frames
- Secondary structure overall report** - general axonometric view on the building is followed by the table of used beams with individual cross-sections, lengths and weights
- Secondary structure per plane** - the report consists of partial documents about each roof and wall plane, where the section view, cross-section specification and bill of material for the individual plane is displayed
- Sheeting summary** – overall summary of sheeting panels per type is composed in a table form
- Sheeting per plane** – general axonometric view on the building with highlighted sheeting is followed by the individual table for each wall and roof segment, listing the required panel (name, type, thickness, width) and area of the plane segment (cut and uncut panels, including and excluding openings)
- Openings** - list of openings with nominal dimensions, location and surfaces is presented

2. Drawings

Having the model in nice 3D view in the browser is very important for negotiations about the final appearance and to impress to customer. However, it might not be sufficient enough to work further on the structure design and arrangements. Therefore, there is an easy option to export 3D DXF files to enable more detailed processing of the building.

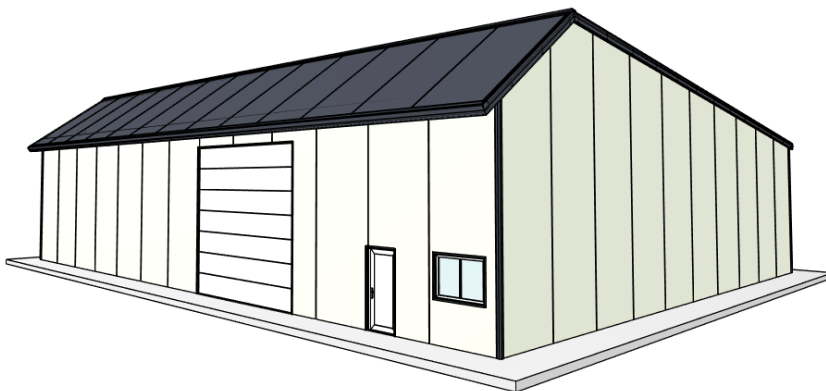
Quote Request Summary

Contact information:

Company Name:	Stahlbau dauert auf ewig
Company VAT:	keine
Contact person:	Herr Gott
Phone:	739314644
Email:	jiripodvalwork@outlook.com
Street:	
City:	
ZIP:	
Building location:	Himmelstrasse, zip-zap Gottland, die Welt
Quote request created:	6/22/2018 10:00:49 AM

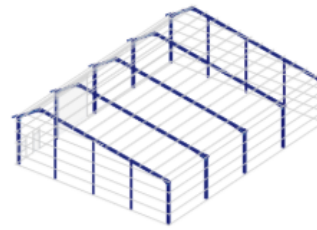
Notes:

Building Overview:

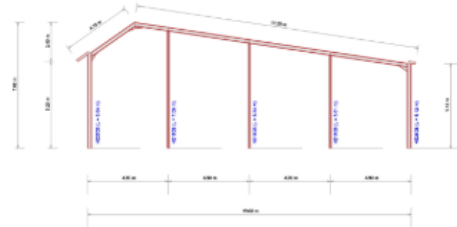


1. Dokument der Rahmen

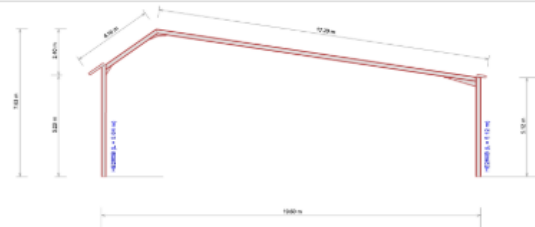
1.1. Rahmenübersicht desstrukturs



1.1.1. PROJEKT - RIAHME A Schritte



1.1.2. PROJEKT - RIAHME B Schritte



1.2. Stukture - Stutzen

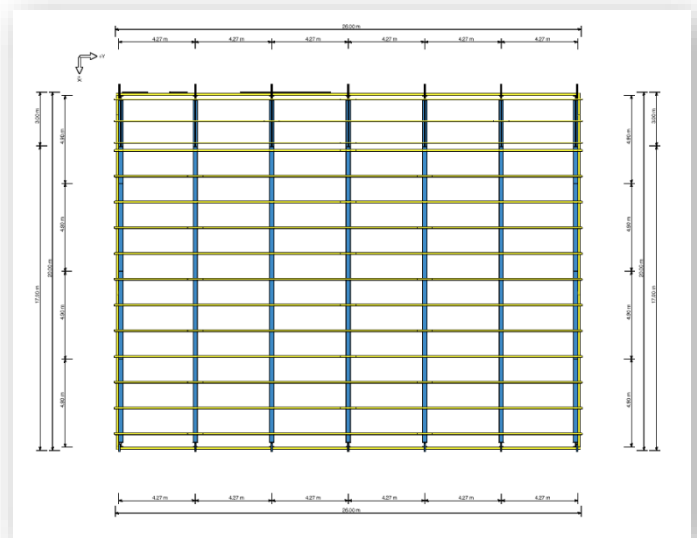
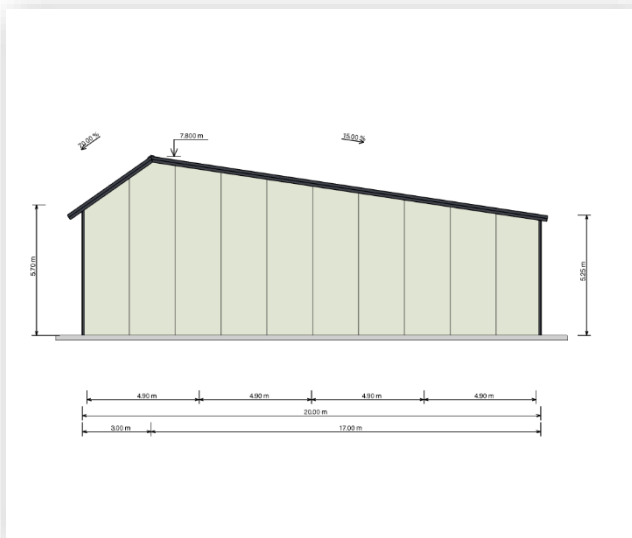
Artikel	Profil	Stahlwerk	Länge (mm)	Menge (Stück)	Gewichtseinheit (kg/m)	Gewicht (kg)	Volumen (m³)
1	HL200B	S235	5 640	5	90.47	2353.1	0.325
2	HL200B	S235	5 120	5	90.47	2314.6	0.295
3	HL160B	S235	7 080	2	41.89	589	0.078
4	HL160B	S235	6 340	2	41.89	531.5	0.068
5	HL160B	S235	5 610	2	41.89	469.9	0.06
Gesamtsumme						6462.1	0.823

1.3. Stukture - Dachstuhl

Artikel	Profil	Stahlwerk	Länge (mm)	Menge (Stück)	Gewichtseinheit (kg/m)	Gewicht (kg)	Volumen (m³)
1	Ive142	S235	940	3	12.89	38.3	0.005
2	Ive142	S235	900	2	12.89	23.2	0.003
3	Ive142	S235	480	3	12.89	18.5	0.002
4	Ive142	S235	440	2	12.89	11.3	0.001
5	HL240B	S235	16 680	3	81.56	4062	0.52
6	HL240B	S235	4 950	4	81.56	1616.1	0.208
7	HL240B	S235	4 890	2	81.56	785.2	0.097
8	HL240B	S235	3 150	5	81.56	1263.2	0.163
9	HL240B	S235	2 080	2	81.56	339.9	0.043
Gesamtsumme						8175.8	1.042

1.4. Notizen

Die Preisstruktur ist nicht enthalten. Die obigen wettgewaschen oder geschweißten Stahlwerkstoffe sind die Standardprofile.



1.6.1. Wall D - plan view



1.6.1.2. Used profiles on Wall D

The following cross-section is user selected for secondary structure:

1.6.1.2.1. Wall D purlin (C 142 14)

1.6.1.3. Wall D bill of material - purlins

Item	Section	Steel grade	Length (m)	Quantity (pcs)	Unit weight (kg/m)	Weight (kg)	Volume (m³)
1	C 142 14	S355	13 810	2	3.00	82.70	0.0105
2	C 142 14	S355	12 950	1	3.00	38.80	0.0049
3	C 142 14	S355	12 810	1	3.00	38.40	0.0049
4	C 142 14	S355	8 540	2	3.00	51.20	0.0065
5	C 142 14	S355	6 950	1	3.00	20.80	0.0027
6	C 142 14	S355	6 810	1	3.00	20.40	0.0026
7	C 142 14	S355	5 270	2	3.00	31.60	0.004
8	C 142 14	S355	3 000	3	3.00	27.00	0.0034
9	C 142 14	S355	1 250	1	3.00	3.70	0.0005
10	C 142 14	S355	140	1	3.00	0.40	0.0001
Total sum						314.9	0.040

Request management

HiStruct Building configurator brings full automation in the pre-sales process.

Prospect himself defines all the variable inputs and has got immediate result in front of his eyes. Complete process of structure composition (based on user definition) is controlled by internal engineering rules. There is no need of interaction from the side of sales representative, until the client submits the proposal.

At that moment there are three major circumstances.

The client receives an email with summary about his inputs and various views of the structure he designed. This can make him passionate about the final result as he already sees his original idea visualized and can feel thrilled that he was able to create a 3D model himself.

The sales representative (or anyone else responsible for request management) also receives an email about submitted request, together with summary output. Such a message means there is a serious client who is willing to close a deal.

The request is saved in the HiStruct Building configurator database for evaluation and future adjustments.

So far, each part of the process run on its own. The client is offered enough freedom to think about his needs and transformed them into impressive 3D model of his structure, led by the configurator's user interface. He is able to make this at his preferred timing and comfortable manner (an online configurator is reachable everywhere and anytime).

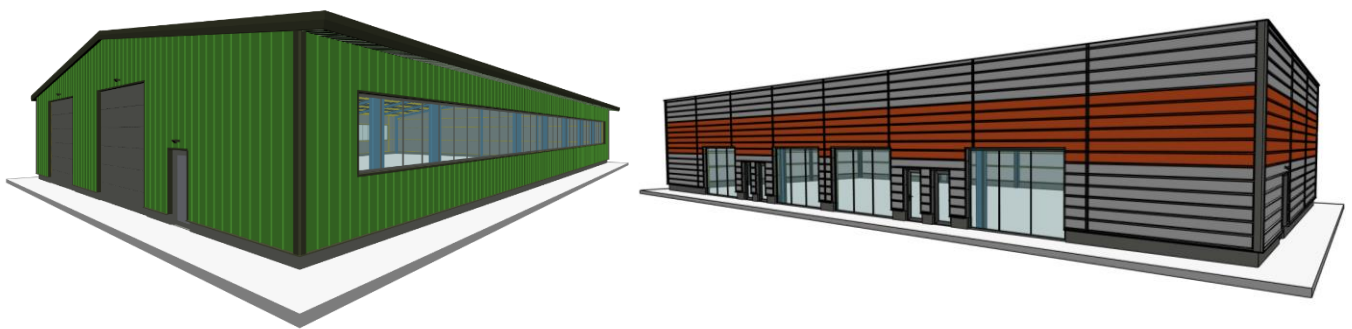
The sales professional does not need to interact, until there is a time to start negotiating or closing the deal. Significant amount of time - needed to make the design and reports - is completed effortless for him. This means he can focus on more sales with the same capacity and thanks to filtering out the unpromising clients possess more winning deals.

There is a dedicated user interface for those who proceed the requests internally. Similarly, to the visitors, the manager can see the structure and change any of the input values. It is expected that the prospect does not necessarily know all the structural details and construction patterns. (However, nothing is

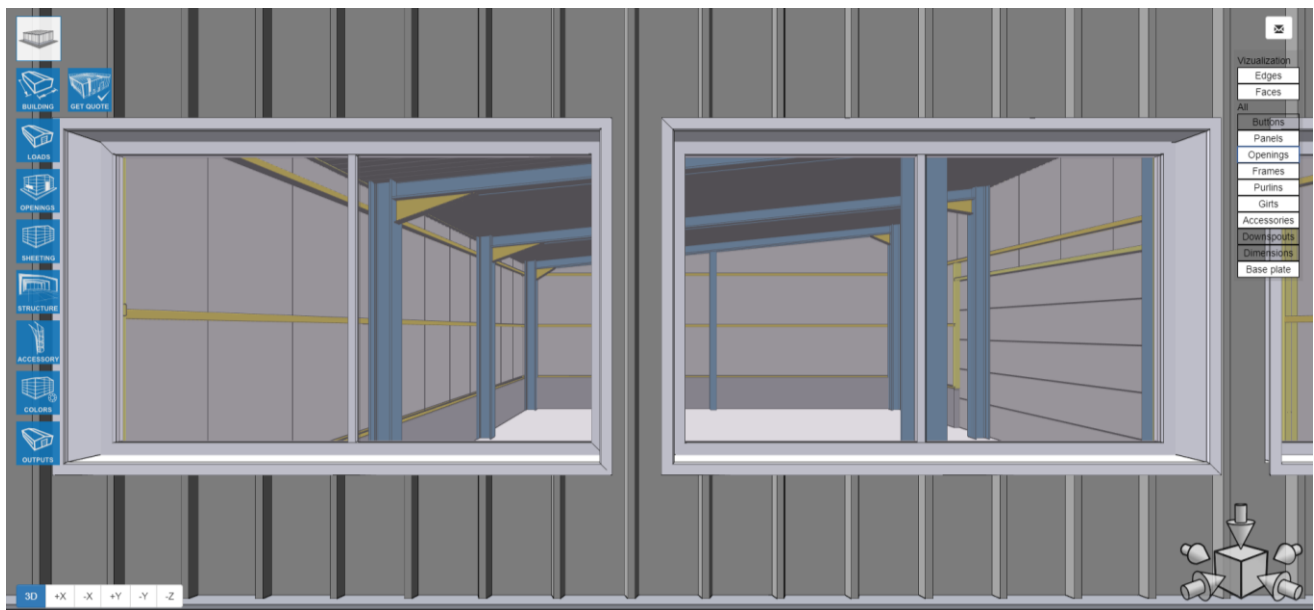


blocking him from creating an initial design while the engineering part is controlled by the software.) There are contact details so that the prospect can be reached and possible variants discussed. Any new version of the structure can be shared with the client via website link. Thanks to that there is always a full and actual 3D model present in the whole sales process. No surprises for both sites, misunderstanding eliminated as much as possible.

Another important and valuable benefit for the request manager is that he has got direct access to all the reports (see chapter Outputs), including bill of materials and drawing files. Such document are essential for further steps - making price quote or detailing of the structure.



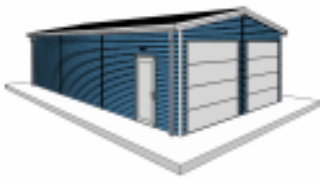
It might seem obvious but we rather emphasize this - the sales representative can start making a proposal on his own, of course. Nothing prohibits him from starting a new project with structure variants directly from the interface he works with. Therefore - HiStruct Building configurator can be utilized as an internal design tool as well, without forcing any prospect to proceed himself if there is no interest on his side.



Templates

HiStruct Building Configurator is freely configurable and capable of modelling various building types. There is set of predefined building templates to be used for smooth and fast start of creating a desired structure. They reflect the most widely used types of metal buildings. However, anyone can create his own template or start from scratch (simple rectangular building with no additions).

Garage



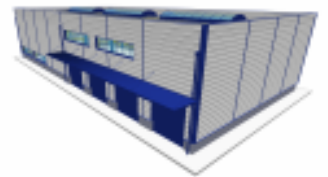
Showroom



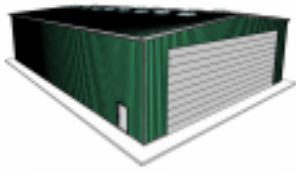
Agricultural machinery



Business center



Steel hangar



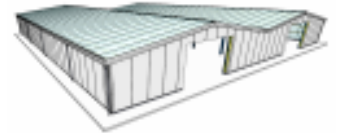
Multipurpose building



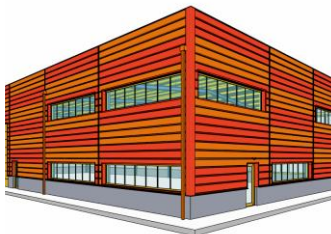
Sport hall



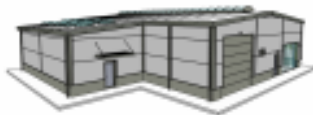
Warehouse



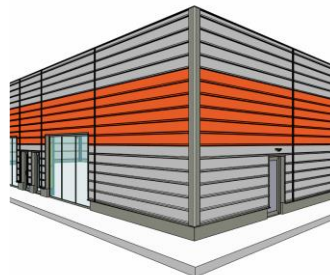
Office Building



Building with extension



Commerce center



Small workshop



Supplementation

This white paper is intended to provide comprehensive information about HiStruct Building Configurator – software tool to design buildings and automate sales and engineering process.

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