

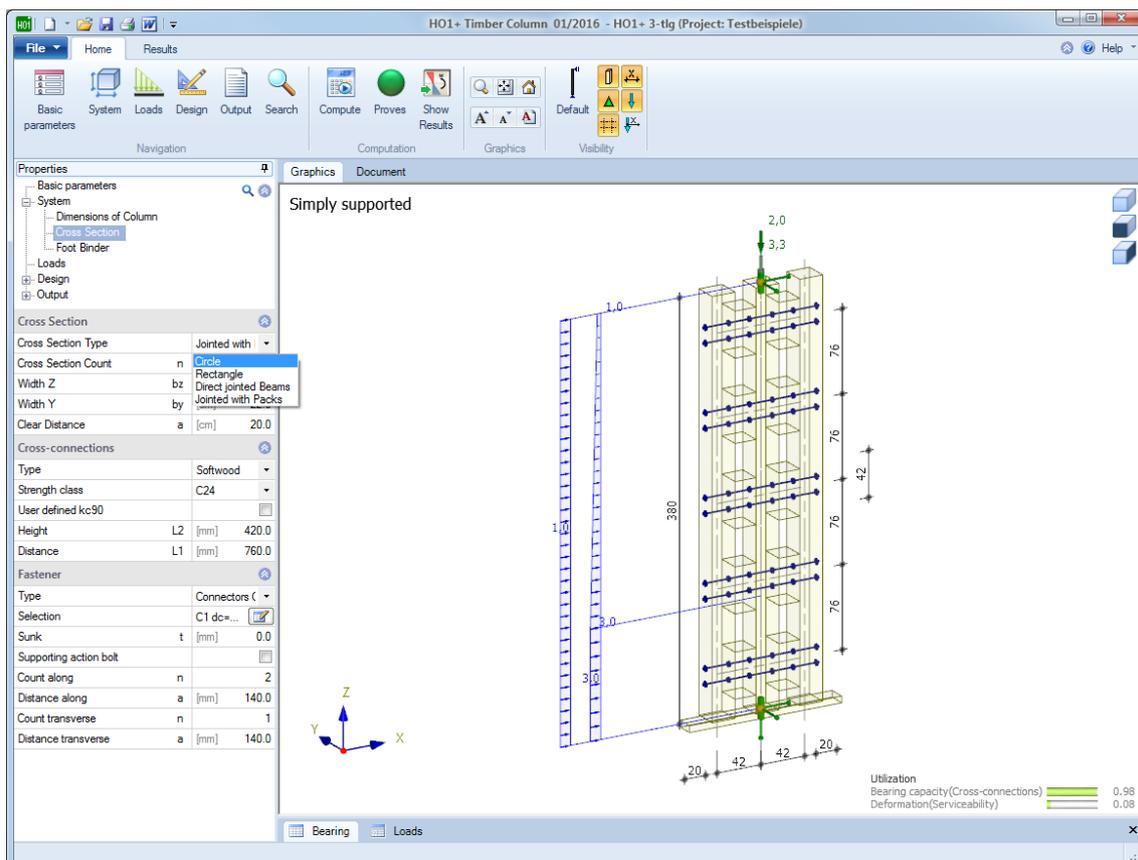
Timber Column HO1+

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As of 01/12/2015



Timber Column HO1+

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Further information and descriptions are available in the relevant documentations:

Basic operating instructions-PLUS	General operating instructions for the user interface of Frilo applications
FCC	Frilo.Control.Center - the easy-to-use administration module for projects and items
FDD	Frilo.Document.Designer - document management based on PDF
Frilo.System.Next	Installation, configuration, network, database
Menu items.pdf	
Output and printing	
Import and export.pdf	

Data entry

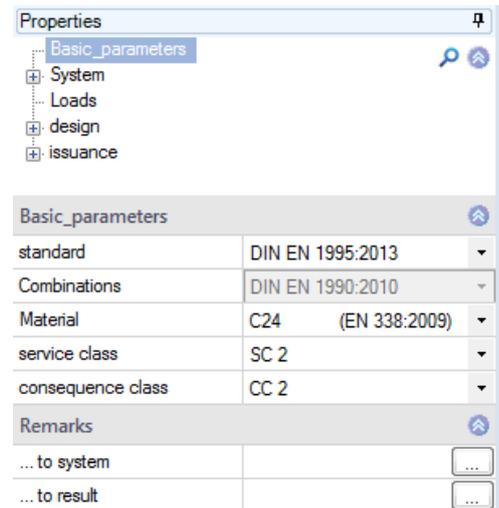
The definition of properties and control parameters is done in the menu of the left screen section, also referred to as FDC section (Frilo.Data.Control). You can check the effect of the entered values in the graphical representation on the right screen section. Fundamental information on the data-entry area and the data-entry options in the 3d graphical user interface is available in the document "[Basic Operating Instructions-PLUS](#)".

Definition wizard

The wizard is automatically launched when you start the software. It supports the user in defining the most important parameters for a new item.

With the help of the wizard, you can quickly define a structural system and gain a first impression of the results. Subsequently, you can customize secondary parameters in a second step.

Note: You can disable the automatic start of the wizard via the corresponding option on the bottom of the window.



Basic parameters

Select the desired [standard](#), the material, the usage class and the consequence class.

Structural system

Tip: The entered values are immediately shown in the 3-d representation allowing you to check the dimensions etc. visually.

You can click on the dimension values on the graphic screen to edit them. Any changes are also taken over in the data-entry fields (on the left).

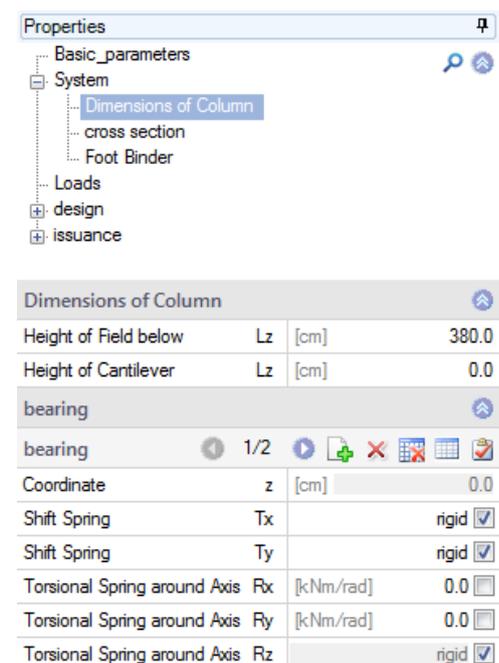
Column dimensions

Lz height of span on bottom and projection on top.

Supports

The definition of several supports can be done in a table via the "Supports" tap (below the 3d GUI) or, alternatively, via the [table toolbar](#).

- z coordinate in the z-direction
- Tx/Ty translational spring in the x- or y-direction
- Rx/y/z rotational spring around the x-/y-/z-axis.



Cross section

Type of cross section

- Circular
- Rectangular
- Multi-piece, direct connection
- Multi-piece with wood spacers

Tip: After having selected the type of cross section, the corresponding data-entry fields are displayed in the dialog area on bottom.

d	diameter with circular cross sections
bx/by	cross sectional dimensions of a rectangular column
n	number of cross sections (2, 3 and/or 4)
a	clear distance of the column parts

Connecting components

L1	distance of the connecting components (in the z-direction, see also the graphical representation)
L2	height of the individual connecting components
Material	a selection list is displayed.

Fasteners

The corresponding data-entry fields are displayed when you select a **multi-piece cross section**.

Type	first select the type of fasteners (nails, bolts, etc.). The corresponding data-entry fields are displayed after the selection of the type: <ul style="list-style-type: none"> - Round nails - Bolts - Glue - Dowel pins - Fit bolts - Special dowels
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Selection	click on the  button to access the fastener selection dialog. After having selected the type, the corresponding parameters displayed with defaults.
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You can edit and customize the parameter setting if required. Click on the individual data-entry fields, options or selection lists to display a brief description in the [information area](#) (below the data-entry fields).

cross section			
Cross Section Type		Jointed with Packs	▼
Cross Section Count	n	3	▼
Width X	bx	[cm]	16.0
Width Y	by	[cm]	16.0
Distance Clear	a	[cm]	20.0
Linker			
Material		C24 (EN 338:2009)	▼
height	L2	[mm]	420.0
distance	L1	[mm]	760.0
Fastener			
type		Connectors C1	▼
Selection		C1 dc=50 M16-4.6	...
Sunk	t	[mm]	0.0
Count along	n		2
Distance along	a	[mm]	140.0
Count transverse	n		1
Distance transverse	a	[mm]	140.0

Fastener	
type	Connectors C1 ▼
Selection	Round Nails
Sunk	Screws
Count along	glue
Distance along	dowel pin
Count transverse	fit bolt
Distance transverse	Connectors A1
	Connectors A2
	Connectors A3
	Connectors A4
	Connectors A5
	Connectors A6
Type of Fasteners	Connectors C1
	Connectors C3
	Connectors C5
	Connectors C6
	Connectors C8
	Connectors C10

Foot binder (sleeper)

Tick this option to define a foot binder

Direction select the direction of the foot binder.

Specify the width, height, projections and the material of the foot binder.

Load-bearing capacity under transverse compression

Threshold pressure $k_{c,90}$ automatically:

- HO1+ determines $k_{c,90}$.

User defined k_{c90} :

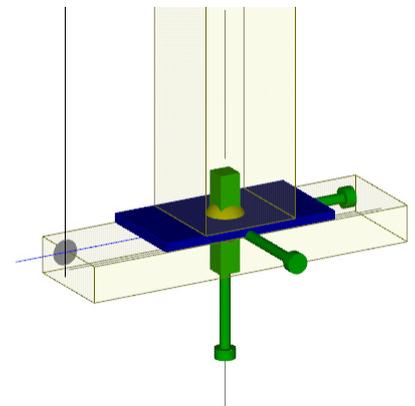
- The user can enter a value which suits better to the situation.

Load distribution plate

Component for load balancing, for example, a steel plate to reduce the compression.

Without design, without consideration of eccentric load position during compression.

Foot Binder			
Foot Binder			<input checked="" type="checkbox"/>
Type		Softwood	▼
Strength class		C24	▼
Direction		X	▼
Width	b	[cm]	16.0
Height	h	[cm]	6.0
Supematant left	a	[cm]	20.0
Supematant right	a	[cm]	20.0
Capacity transverse Pressure		User defined k_{c90}	▼
Coefficient	k_{c90}		1.00
Load distribution plate			<input checked="" type="checkbox"/>
Length	L	[cm]	30.0
Width	b	[cm]	16.0
Thickness	t	[cm]	1.5



Loads

- Self-weight ... If you tick this option, the self-weight of the components is automatically taken into account.
- Plump line offset h/ specify the plump line offset/inclination.
Example: for h/200 enter the value "200".
Enter "0", if there is no plump line offset.

Load cases

Define the first load case directly in the data-entry mask.

Add additional load cases with the help of the load case toolbar:
- see [Data entry via tables](#) (basic operating instructions)

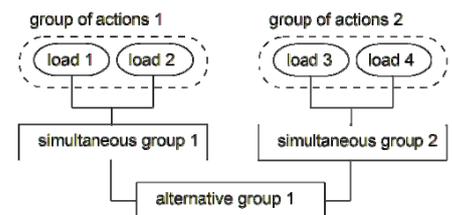
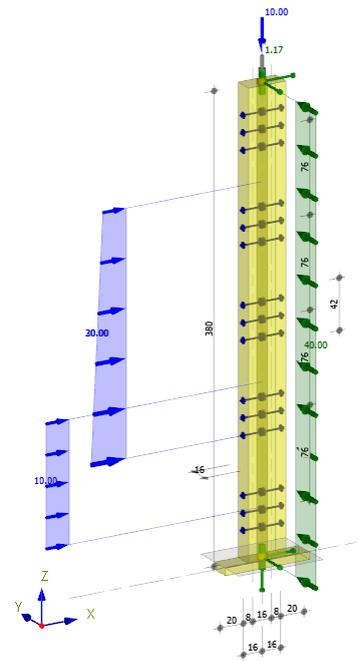


To add a load case always set up a new load case via the  button (an empty load case mask is displayed each time).

Alternatively, add additional load cases via the load case table, which is accessible on the „Loads“ tab (below the graphic screen).

Tip: A description is displayed in the status line each time you click into a particular input field.

- Type of load concentrated, uniformly distributed, block or trapezoidal load.
Note: The corresponding data-entry fields are displayed for each of the selected load types on the bottom of the screen.
- Direction Dir the direction of action of the load: X/Y/Z – the load is shown in the 3d GUI and you can check your specifications - *tip: use the different view options.*
- Ordinate Q1 load value Q1 (lower load value with trapezoidal loads)
- Distance a1 distance of the load or the lower load value to the base point
- Ordinate Q2 upper load value with trapezoidal loads
- Length L2 with block and trapezoidal loads: length of the load
- Factor f specification of a factor e. g. for the load influence width.
- Action group select an action group from a list
- Concurrent group loads of a particular action group can be defined as "always acting simultaneously"
- Alternative group different variable load cases with similar actions can be assigned to an alternative load case group via the allocation of an alternative group number. Only the decisive load case of this alternative load case group is invoked in the superposition.
- Info text you can add a comment to each load case.



Design

Special options

Win: kmod for wind, kmod(short) is used. According to some NA's averaged kmod(short/very short) can be taken into account.

G-portion determines how the portion of permanent loads for the stability are calculated in each combination:
 - no G-portion
 - permanent loads
 - permanent and quasi-permanent loads

Combinatorics

Wind zone 3 or 4 in the wind zones 3 and 4, snow must not be taken into account as accompanying action when wind is the leading action.

Earthquake: Psi2 in some countries, Psi2 for snow must be set to 0.5 in earthquake combinations.

Fastener holes

For shear- and stress analysis of the end sections of the composite cross sections fastener holes can be taken into account.

- no: Not taken into account
- always: Holes will be taken into account
- in tensile stresses...: Only with tensile stresses in the weakened cross-section the fastener holes will be taken into account. We assume that the steel in compression closes the hole positively.
Areas without steel generally will be taken into account.

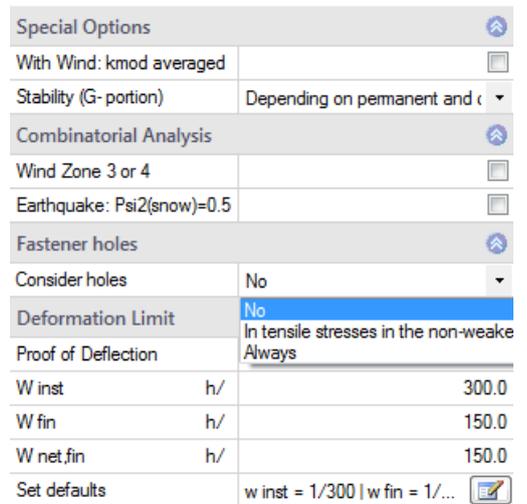
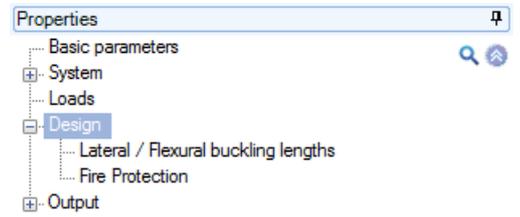
Deformation limits

Deformation verification checking this option triggers the verification and output of the deformation resistance.

Wx inst limitation of deformation, elastic portion, for serviceability verifications.

Wx inst limitation of deformation, elastic portion including creep, for serviceability verifications.

Wx inst limitation of deformation, elastic portion including creep, for load bearing capacity verifications.



Buckling lengths

Eigenvalue:

Calculation with bifurcation loads factor from framework application for each direction and every member section (recommended).

System length:

Calculation on rigid supports conditions and their distances for each direction and each member section (clearly, simplified)

The effective length s_b is always be determined on the supports conditions.

User defined buckling lengths

Tick the options to show up the entry fields for $s_{ky}/s_{kz}/s_b$.

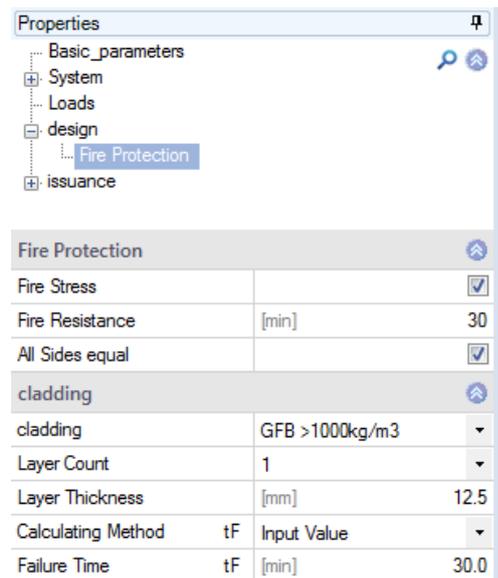
Each entry is valid for the whole column length

Calculation of Buckling Lengths	
Determination by	Eigenvalue
User-defined buckling	Eigenvalue System length
Flexural buckling	sky <input type="checkbox"/>
Flexural buckling	skz <input type="checkbox"/>
Lateral torsion buckling	<input type="checkbox"/>

Fire protection

For single-piece cross sections: tick the fire action option to display the corresponding data-entry fields and enable the calculation.

Fire resistance	burn-off period in minutes.
Same on all sides	disable this option to define fire action individually for <u>each</u> side.
Lining	none, GK A,B... , GK F, GK F > 1,000 kg/m ³
Number of plies	up to 3 plies
Ply thickness	specification in [mm]
Calculation method	entry of the tf-value for the failure time or HFA = Holzforschung Austria
Failure time	specify the tf-value in [min]



Fire Protection	
Fire Stress	<input checked="" type="checkbox"/>
Fire Resistance	[min] 30
All Sides equal	<input checked="" type="checkbox"/>
cladding	
cladding	GFB >1000kg/m3
Layer Count	1
Layer Thickness	[mm] 12.5
Calculating Method	tF Input Value
Failure Time	tF [min] 30.0

Reference literature

/1/ EN 01/01/1995:2004, EN 02/01/1995:2004, EN 1991-1-4:2006/AC:2008