

Dovetail Connection HSC+

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Basic Documentation – Overview

In addition to the individual program manuals, you will find basic explanations on the operation of the programs on our homepage www.friilo.com in the Campus-download-section.


Application options

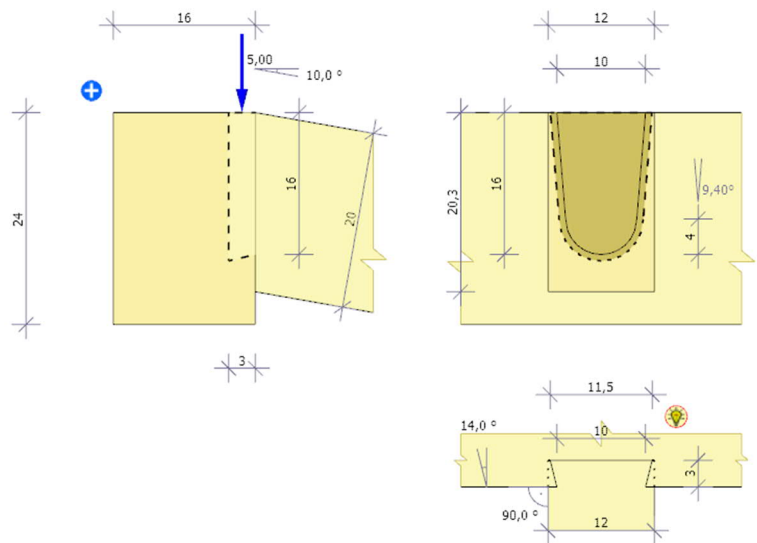
The program HSC+ is used to design dovetail joints of timber girders in accordance with general building inspectorate approval with an inclined or angulated secondary girder connection. One or two-sided connections can be selected.

Standards

- DIN EN 1995-1-1 in conjunction with Z-9.1-649 from „VERBAND HIGH-TECH-ABBUND im Zimmereihandwerk e.V.“ (carpentry association).

The program allows the design according to the following approvals.

Standard	
Standard	 DIN EN 1995:2013
Admission	Z-9.1-649:2022
Material - main bear	Z-9.1-649:2017 Z-9.1-649:2018
Preselection	Z-9.1-649:2022



Basic Parameters

Here you select the [standard](#), the approval as well as the material and the service class.

System

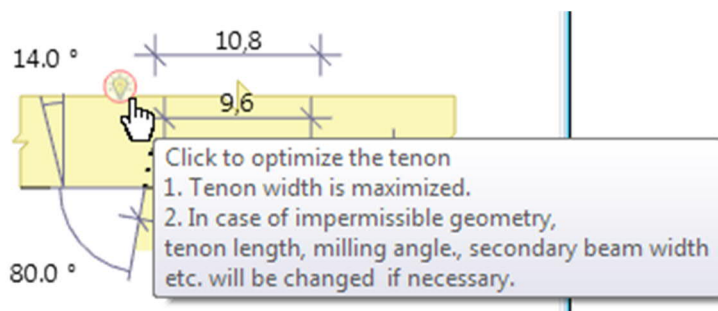
- main beam width b_H and height h_H
- Connection one- or twosided connection
- secondary beam width b_N und height h_N , the slope δ or the connection angle φ .
According to current approval, either inclined or angulated connections may be made.
- Tenon width b_Z , height h_Z , length l_Z , milling angle β , radius r_Z and tenon cone angle γ
- Distances Clearance to the adjacent joint on the same side.

Systemgraphic

Values that contradict the boundary conditions of the approval are marked in red.

Optimize with a mouse click

The icon of the light bulb in the graphic indicates possible improvements or necessary corrections of the geometry - just move the mouse over the light bulb to show a tooltip. By clicking these corrections are made.



Properties	
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Standard	
Standard	DIN EN 1995:2013
Admission	Z-9.1-649:2022
Material - main beam	
Preselection	Wood
Timber	Wood
Material code	Wood-based material EN 338:2016
Strength class	C24
Material - secondary beam	
Preselection	Wood
Timber	Softwood
Material code	EN 338:2016
Strength class	C24
Environment	
Service class	1

Properties	
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Beam geometry			
Width main beam	b_H	[cm]	16.0
Height main beam	h_H	[cm]	24.0
Connection			One-sided
Width secondary beam	b_N		One-sided
Height of secondary beam	h_N	[cm]	20.0
Slope secondary beam	δ	[°]	0.0
Connecting angle secondary beam		[°]	90.0
Tenon			
Tenon width	b_Z	[cm]	10.0
Tenon height	h_Z	[cm]	16.0
Tenon length	l_Z	[cm]	3.0
Milling angle	β	[°]	14.0
Tenon radius	r_Z	[cm]	4.0
Tenon cone angle	γ	[°]	9.4
Distances between adjacent joints			
Distance left	a_l	[cm]	100.0
Distance right	a_r	[cm]	100.0
Remarks			
.. about system			

Loading

Vertical load	Design value of the connection force F_{vd}
Horizontal load	Design value
Distance from UE	Distance of the horizontal load from the top edge of the secondary beam
Load action period	permanent, long, middle, short, instantaneous, short/very short

Properties

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Loads

Vertical load	F23,90,d	[kN]	5.0
Horizontal load	F45,90,d	[kN]	0.0
Distance from UE	evk	[cm]	0.0
Load-action period	Middle		

Output

The output contains all input values, results and intermediate values of the calculation after approval.

With advices Essential information on the boundary conditions of the approval is issued. Full approval is available from "VERBAND HIGH-TECH-ABBUND im Zimmereihandwerk e.V."

See also [Output and printing](#)

Properties

- Basic parameter
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System graphic 2D	<input checked="" type="checkbox"/>
System graphic 3D	<input checked="" type="checkbox"/>
Joint stiffness	<input type="checkbox"/>
Design info main beam	<input type="checkbox"/>
With advices	<input type="checkbox"/>

FRILO Software GmbH
 Stuttgarter Str. 40 phone: +49 711 810020 Project: -
 70469 Stuttgart mail: info@frilo.eu Item: (New item)
 16.02.2024 Page: 1

Item: (New item)
 Dovetail Connection (x64) HSC+ 01/2024 (FRILO R-2024-1/P06)

System
 System graphics

System
 DIN EN 1995-1-1/NA:2013-08 → Z-9.1-649: 30.09.2022 - 30.09.2027
 Service class 1 N/mm²
 Material C24 $f_{t,90,k} = 0.500$ $f_{v,90,k} = 2.500$ $f_{t,90,d} = 2.500$ $f_{v,90,d} = 2.500$ Details

1) The value to be used in accordance with the dovetail approval

Connection: One-sided

Width main beam	$b_w = 16.0$ cm	Height main beam	$h_w = 24.0$ cm
Width secondary beam	$b_s = 12.0$ cm	Height of secondary beam	$h_s = 20.0$ cm
Tenon width	$b_t = 10.0$ cm	Tenon height	$h_t = 16.0$ cm
Tenon length	$l_t = 3.0$ cm	Tenon radius	$r_t = 4.0$ cm
Milling angle	$\beta = 14.0$ °	Tenon cone angle	$\gamma = 9.4$ °
Adjacent joints (clearance, same side)	$a \geq 2 \cdot h_t \Rightarrow$ OK		

Loads
 Vertical load $F_{vd,d} = 5.0$ kN Load-action period = Middle

Results

Main beam	$k_{mod} = 0.800$	$\gamma_M = 1.300$	$f_{t,90,d} = 0.308$ N/mm ²
Secondary beam	$k_{mod} = 0.800$	$\gamma_M = 1.300$	$f_{t,90,d} = 1.538$ N/mm ²
In the insertion direction	$k_{90} = 1.000$	$k_{90} = 5.000$	
In the insertion direction	$\alpha = 0.600$	$k_{90} = 0.633$	$t_{90} = 10.0$ cm

Capacity

Main beam	$F_{t,90,Rd} = 14.4$ kN	Secondary beam	$F_{t,90,Rd} = 9.3$ kN
Vertical load	$F_{v,90,Rd} = 5.0$ kN	Capacity	$F_{v,90,Rd} = 9.3$ kN $\eta = 0.53 \leq 1$

A clear distance of the dovetail connection from the frontal end of the main beams of 20.0 cm should be maintained.

Literatur

Z-9.1-649 from 5. October 2017 - VERBAND HIGH-TECH-ABBUND im Zimmereihandwerk e.V.