

D9

Continuous Rafter

Application options

The D9 application allows the calculation and design of continuous single- and multi-span rafters. Cantilevers can be defined on both sides.

Standards

- DIN EN 1995
- ÖNORM EN 1995
- BS EN 1995
- UNI EN 1995/NTC
- EN 1995
- DIN 1052

Loads

In addition to typical roof loads such as distributed, weight, snow and wind loads, additional loads could be defined as uniform linear loads, single or trapezoidal loads

and assigned to the action groups. Man loads as well as wind underflow at projections can also be taken into account.

Verifications

The verifications can optionally be based on DIN 1052:2008 or EN 1995-1-1 in combination with the relevant National Annex.

The load assumptions can optionally be based on DIN 1055, P 1-5 or EN 1991-1 in combination with the relevant National Annex.

DIN 1055-100 only applies in combination with DIN 1052:2008.

If EN 1995 or EN 1991 was selected, the combinatorial analysis is based on EN 1990.

The support reactions are put out separately for each group of actions.

The ridge joint forces are specified in addition.

The support reactions and connection forces are optionally put out either as characteristic values of the individual actions or design values of the maximum and minimum combinations.

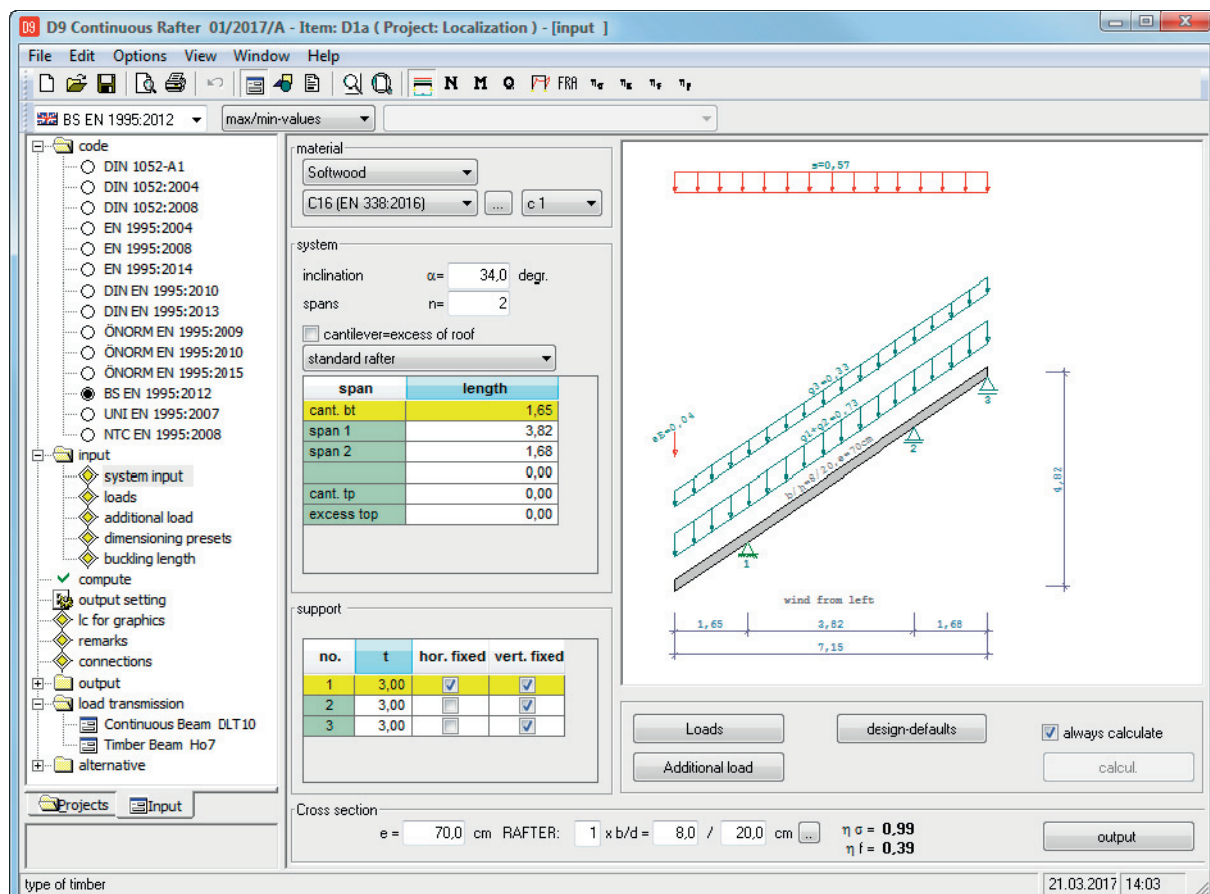
The verification of the resistance against wind suction is optionally available.

The resistance to uplift by wind suction is verified with the help of the force coefficients c_{pe1} as per DIN 1055 or EN 1991.

Connections

There are three solution variants available for the design of the bottom of the rafter:

- Notch at bottom of rafter
- Cleat fixed with nails/bolts



For the verification of the purlin connections, nailed cleats or birdsmouth joints are optionally available.

Basis of calculation

The application determines the most favourable superposition for the design as the decisive one.

In the calculation in accordance with DIN 1052:2008, the combinatorial analysis is based on DIN 1055-100.

In the calculation in accordance with EN 1995, the combinatorial analysis is based on EN 1990 in combination with the relevant National Annex.

The standard guiding the assumption of wind and snow loads is freely selectable.

Note:

D9 is not suitable for the design of rafters with ridge joints (e.g. rafter roofs) because the interaction between the two roof halves as well as the axial loading on the rafter must be taken into account in this case (rafter without purlin support).

For this type of calculation, we recommend the applications D11 - Purlin and Rafter Roof or D12 - Collar Beam Roof.

The screenshot shows a software print preview window for 'FRILO Software GmbH'. The main content is a technical drawing of a continuous rafter system. The drawing includes a side view of the rafter with dimensions and a top view showing the rafter layout on a roof slope. The rafter is labeled 'D9' and 'Friolo pre-release'. The material is 'Softwood C16 (EN 338:2016) class 1'. The drawing shows a rafter with a length of 7.18m and a height of 1.11m. The roof slope is 34.0 degrees. The drawing also shows the wind direction from the left.

The data tables in the print preview are as follows:

SYSTEM continuous rafter
b.ar. = base area, r.ar. = area of roof

rafter	span	length b.ar.	length r.ar. (m)			
ca II	1	1.65	1.99	left	34.0 degree	8/20
	2	3.82	4.61	left	34.0 degree	8/20
	3	1.68	2.03	left	34.0 degree	8/20

definitions of supports of rafter

No	Cx [kN/cm]	Cz [kN/cm]	tx [cm]
1	-1	-1	3.0
2	0	-1	3.0
3	0	-1	3.0

LOADS

RAFTER

- roofing g1 = 0.55 kN/m² r.ac. Act 99
- construction g2 = 0.18 kN/m² r.ac.
- roof space covers. gs = 0.35 kN/m² r.ac.
- main load rafter P = 1.00 kN NA to BS EN 1993-1-1:2005 Act 8
- snow loads acc. NA to BS EN 1993-1-3:2007
- wind load acc. to NA to BS EN 1993-1-4:2011
- height of building h = 10.00 m
- width of wind attack b = 15.00 m angle of wind θ = 0 degr.
- ordm. snow load sk = 0.75 kN/m² b.ac. Act 11
- snow load left sl = 0.57 kN/m² *
- wind imp. press. q = 0.65 kN/m² Act 9
- aerodyn. zones according to NA to BS EN 1993-1-4:2011
- aerodyn. zones referring house-edge
- wind from left
- wind load wG = 0.00 kN/m² *