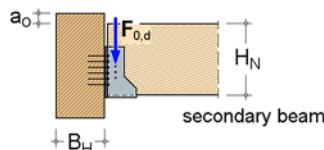
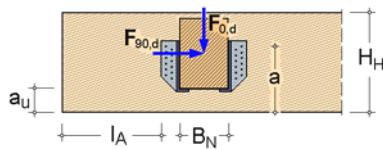


POSITION 12: SIMPSON BSN2P

4H-HOLZ joist hanger connection

(4H-HLZ72 Version: 10/2012-1j) (principle sketch)

main beam



calculation bases:

DIN EN 1995-1-1:2010-12 (EC5) /NA:2010-12,

ETA-06/0270 und ETA-04/0013

sizes of main and secondary beam (single-sided)

$H_H = 320 \text{ mm}$ $B_H = 240 \text{ mm}$ $a_0 = 50 \text{ mm}$

$H_N = 220 \text{ mm}$ $B_N = 120 \text{ mm}$ $a_u = 50 \text{ mm}$

$w = 189 \text{ mm}$ $a = 224.5 \text{ mm}$ $l_A < H_H$

service class 2

species/timber grade

main beam: coniferous timber, timber grade C24

secondary beam: coniferous timber, timber grade C24

internal forces and factors

$F_{0,d}$ force perpendicular to the base plate

$F_{90,d}$ force parallel to the base plate

$N_{d,0}$ normal force in secondary beam

combinations of internal forces (design values)

LK-Nr.	KLED	$F_{0,d}$	$F_{90,d}$	$N_{d,0}$	k_{mod}
1	permanent	1.50 kN	0.50 kN	---	0.60

connection method joist hanger (2-teilig)

make Simpson BSN2P 30X182

joist hanger size width $b = 30.0 \text{ mm}$ height $h = 182.0 \text{ mm}$ steel plate thickness $t = 2.0 \text{ mm}$

nails CNA ribbed nails 4,0x40

$d_n = 4.0 \text{ mm}$ $l_n = 38.5 \text{ mm}$ $d_k = 8.0 \text{ mm}$ $l_g = 30.0 \text{ mm}$ $M_{y,k} = 6.6 \text{ Nm}$

verifications

combination of internal forces 1 (design values)

LK-Nr.	KLED	$F_{0,d}$	$F_{90,d}$	$N_{d,0}$	k_{mod}
1	permanent	1.50 kN	0.50 kN	---	0.60

nail anchorage capacities (withdrawal)

main beam $f_{1,k} = 7.350 \text{ N/mm}^2$ $R_{ax,k} = 0.882 \text{ kN}$ $R_{ax,d} = 0.407 \text{ kN}$

secondary beam $f_{1,k} = 7.350 \text{ N/mm}^2$ $R_{ax,k} = 0.882 \text{ kN}$ $R_{ax,d} = 0.407 \text{ kN}$

nail anchorage capacities (shear), simplified method, without consideration of rope effect

main beam $f_{h,k} = 18.935 \text{ N/mm}^2$ $R_{1a,k} = 1.279 \text{ kN}$ $R_{1a,d} = 0.698 \text{ kN}$

secondary beam $f_{h,k} = 18.935 \text{ N/mm}^2$ $R_{1a,k} = 1.279 \text{ kN}$ $R_{1a,d} = 0.698 \text{ kN}$

joist hanger load-carrying capacities (full nailing)

number of nails $n_H = 26$ $n_N = 14$

form factors $k_{H1} = 73.40$ $k_{H2} = 37.60$

material safety factors $\gamma_{M,Holz,main\ beam} = 1.30$ $\gamma_{M,Holz,secondary\ beam} = 1.30$ $\gamma_{M,steel} = 1.10$
 $\gamma_{M,calc,main\ beam} = 1.10$ $\gamma_{M,calc,secondary\ beam} = 1.10$

load-carrying capacity for load towards base plate ($R_{1,d}$) (2)

$F_{1,d} = 1.50 \text{ kN}$ $R_{1,d} = 11.16 \text{ kN}$ $F_{1,d}/R_{1,d} = 0.13 \leq 1.00$ verification successful

load-carrying capacity for load away from base plate ($R_{1a,d}$) (3)

$F_{1a,d} = 0.00 \text{ kN}$ $R_{1a,d} = 9.77 \text{ kN}$ $F_{1a,d}/R_{1a,d} = 0.00 \leq 1.00$ verification successful

verification of splitting capacity (6)

$a = 224.5 \text{ mm}$ $H_H = 320.0 \text{ mm}$ $a/H_H = 0.702$

at $a/H_H = 0.702 > 0.7$ no verification of splitting capacity required.

LK1: all verifications successful.

summary

maximum utilization max $U = 0.15$

decisive load combination 1, verification 1