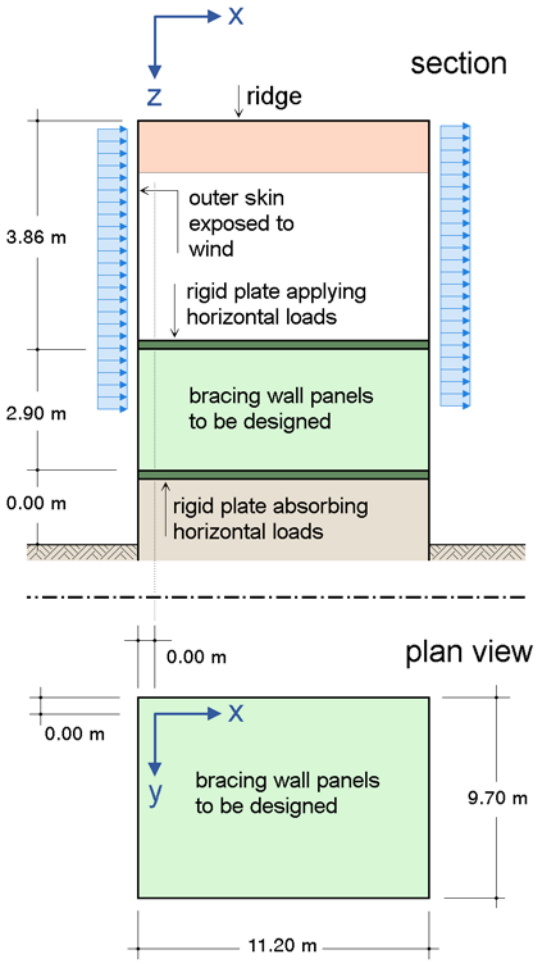
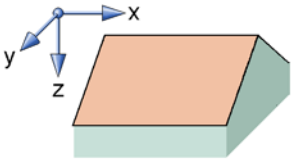
1. building model

1.1. system

principle sketch





roof shape: double pitch roof
roof pitch: 25.0°

estimation of the slab stiffness

to absorb the bending moments:	30 %
to absorb the vertical loads:	0 %
consideration of the warping force:	0 %

The stiffnesses of the wall plates against a horizontal zontale plate load are determined from:

wooden panels:

- ☑ flexibility of the fasteners
- ☑ shear stress on the planking
- ☑ normal force load on the edge ribs
- ☑ transverse compression of the edge rib on the bottom strap

1.2. underlying standards

The calculation is based on **Eurocode** in conjunction with the national application document for **Deutschland**, the parameters of which are given in the annex to this document

short	long-term	reference
EC0	EN 1990:2010	load factors, superposition rules
EC1	EN 1991-1-4:2010	wind load calculation
EC5	EN 1995-1-1:2010	timber construction verifications

for the theory of the formulas used, see: **http://www.pcae.de/main/allgemeines/nachrichten/aussteifungen.pdf**

2. wind loads

2.1. basic data

wind zone	3
height above NN	12 m
q_{ref}	0.47 kN/m²
soil roughness profile:	inland

$q(z) = 1.5\ q_{ref}$ *für* $z < 7\,m$

$q(z) = 1.7\ q_{ref} \left(\frac{z}{10}\right)^{0.37}$ *für* $7\,m < z < 50\,m$

$q(z) = 2.1\ q_{ref} \left(\frac{z}{10}\right)^{0.24}$ *für* $50\,m < z < 300\,m$

$\Rightarrow$ q(0) = 0.70 kN/m²
q(h) = 0.70 kN/m²

2.2. wind from the left

Calculation acc. to EC1-1-4 (5.2): integration of pressure coefficients

eights:			lengths:		char. values:
centre wall plates:	hu =	1.450 m	b =	9.700 m	h/d = 0.60 ≤ 5
eaves line:	ht =	4.498 m	d =	11.200 m	
total height:	h =	6.760 m			

wind on vertical walls

external pressure coefficient acc. to EC1-1-4 Tab 7.1:
pressure (area D): $c_{pe,10(D)} = +0.75$; $q_D = c_{pe,10(D)}\ q(\zeta)$
suction (area E): $c_{pe,10(E)} = -0.39$; $q_E = c_{pe,10(E)}\ q(h)$

ζ runs upwards from the OK area; $\Delta R = 0.5\ (bu+bo)\ \Delta h\ q(\zeta)\ (q_D - q_E)$

from ζu	to ζo	Δh	bu	bo	q(ζ)	q_D	q_E	ΔR	ζm	ΔM_0
m	m	m	m	m	kN/m²	kN/m²	kN/m²	kN	m	kNm
1.45	4.50	3.05	9.70	9.70	0.70	0.53	-0.28	23.79	2.97	70.77
4.50	6.76	2.26	9.70	0.00	0.70	0.53	-0.28	8.83	5.25	46.36

$R_{walls} = \Sigma(\Delta R) =$ **32.62 kN**
$M_{0,walls} = \Sigma(\Delta M_0) =$ **117.13 kNm**

no horizontal load component from wind on roof area.
$R_{roof\ area} = M_{0,roof\ area} = 0$

sum	resulting horizontal force:	R_{total}	$= R_{walls} + R_{roof\ area}$	=	**32.62** kN
	resulting moment:	$M_{0,total}$	$= M_{0,walls} + M_{0,roof\ area}$	=	117.13 kNm
	effective height:	h_0	$= M_{0,total} / R_{total}$	=	3.59 m
	height (top wall plate):	h_W		=	2.90 m
	effective moment:	M_{total}	$= (h_0 - h_W)\ R_{total}$	=	**22.53** kNm

2.3. wind from the front

Calculation acc. to EC1-1-4 (5.2): integration of pressure coefficients

eights:			lengths:		char. values:
centre wall plates:	hu =	1.450 m	b =	11.200 m	h/d = 0.70 ≤ 5
eaves line:	ht =	4.498 m	d =	9.700 m	
total height:	h =	6.760 m			

wind on vertical walls

external pressure coefficient acc. to EC1-1-4 Tab 7.1:
pressure (area D): $c_{pe,10(D)} = +0.76$; $q_D = c_{pe,10(D)}\ q(\zeta)$
suction (area E): $c_{pe,10(E)} = -0.42$; $q_E = c_{pe,10(E)}\ q(h)$

ζ runs upwards from the OK area; $\Delta R = 0.5\ (bu+bo)\ \Delta h\ q(\zeta)\ (q_D - q_E)$

from ζu	to ζo	Δh	bu	bo	q(ζ)	qD	qE	ΔR	ζm	ΔM0
m	m	m	m	m	kN/m²	kN/m²	kN/m²	kN	m	kNm
1.45	4.50	3.05	11.20	11.20	0.70	0.54	-0.30	28.37	2.97	84.39

$R_{walls} = \Sigma(\Delta R) =$ **28.37 kN**
$M_{0,walls} = \Sigma(\Delta M_0) =$ **84.39 kNm**

wind on roof areas

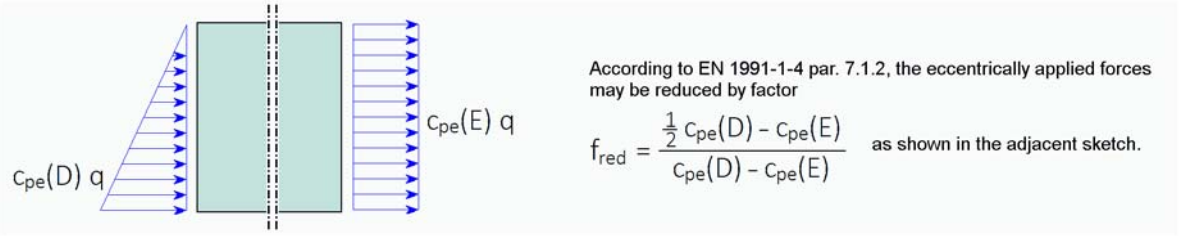
external pressure coefficient acc. to EC1-1-4 Tab 7.4a: e = 11.20 m, q(h) = 0.70 kN/m², $\Delta R = \tan(\alpha)\ A\ c_{pe,10}\ q(h)$
only unfavourable $c_{pe,10}$-values are considered

area	l	b	A	cpe,10	ΔR	h0	ΔM0
-	m	m	m²	-	kN	m	kNm
F	1.12	5.60	6.272	0.53	1.10	4.76	5.23
G	1.12	5.60	6.272	0.53	1.10	4.76	5.23
H	3.73	11.20	41.776	0.33	4.58	5.89	26.97
I	3.73	11.20	41.776	-0.40	-5.49	5.37	29.49
J	1.12	11.20	12.544	-0.67	-2.75	6.50	17.87

$R_{roof\ area} = \Sigma(\Delta R) =$ **15.02 kN**
$M_{0,roof\ area} = \Sigma(\Delta M_0) =$ **84.79 kNm**

sum					
	resulting horizontal force:	R_{total}	$= R_{walls} + R_{roof\ area}$	=	**43.39** kN
	resulting moment:	$M_{0,total}$	$= M_{0,walls} + M_{0,roof\ area}$	=	169.18 kNm
	effective height:	h_0	$= M_{0,total} / R_{total}$	=	3.90 m
	height (top wall plate):	h_W		=	2.90 m
	effective moment:	M_{total}	$= (h_0 - h_W)\ R_{total}$	=	**43.34** kNm

2.4. compilation



According to EN 1991-1-4 par. 7.1.2, the eccentrically applied forces may be reduced by factor

$$f_{red} = \frac{\frac{1}{2}\,c_{pe}(D) - c_{pe}(E)}{c_{pe}(D) - c_{pe}(E)}$$

as shown in the adjacent sketch.

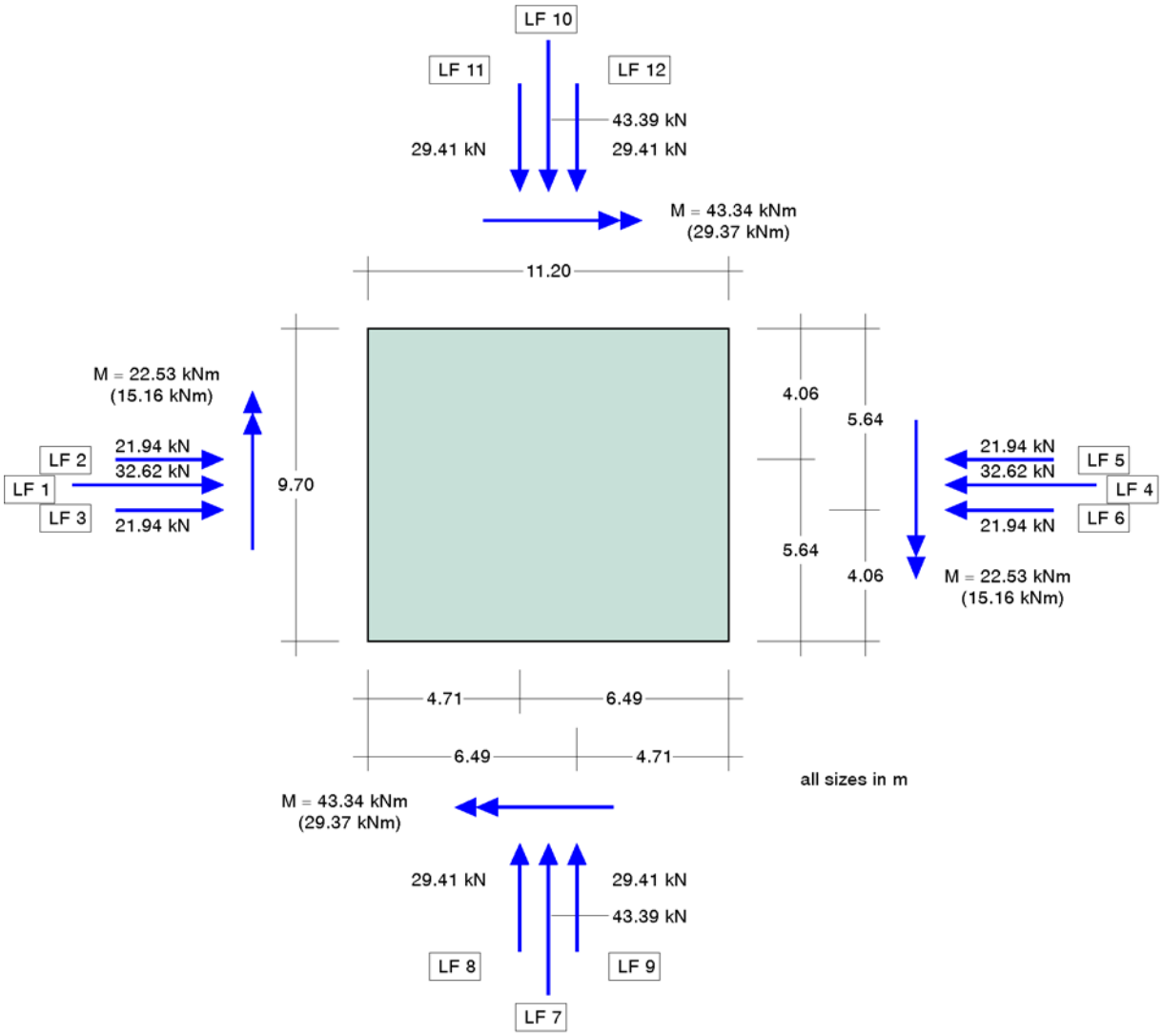
wind from	h/d	cpe (D)	cpe (E)	fred	R	Rred	M	Mred
-	-	-	-	-	kN	kN	kNm	kNm
left	0.604	0.75	-0.39	0.6727	32.62	21.94	22.53	15.16
right	0.604	0.75	-0.39	0.6727	32.62	21.94	22.53	15.16
front	0.697	0.76	-0.42	0.6778	43.39	29.41	43.34	29.37
back	0.697	0.76	-0.42	0.6778	43.39	29.41	43.34	29.37

The eccentricity is calculated acc. to EN 1991-1-4 par. 7.1.2

(b = reference length)

$$e = \frac{c_{pe}(D)}{6\,c_{pe}(D) - 12\,c_{pe}(E)}\,b \qquad \Rightarrow ex = 0.89\ m,\ \ ey = 0.79\ m$$

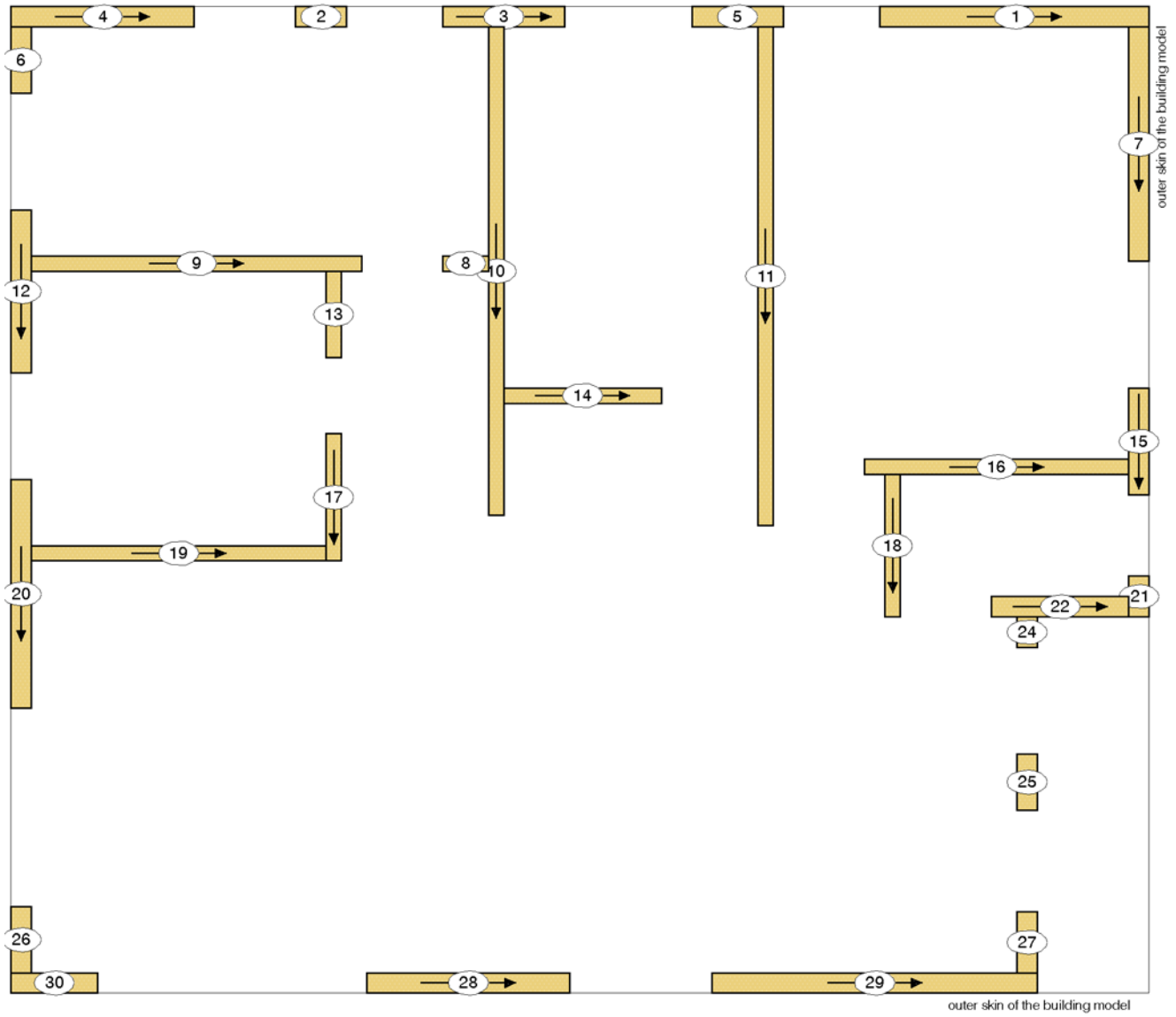
with the eccentricities acc. to EC1-1-4 par. 7.1.2 result 12 alternative wind load cases



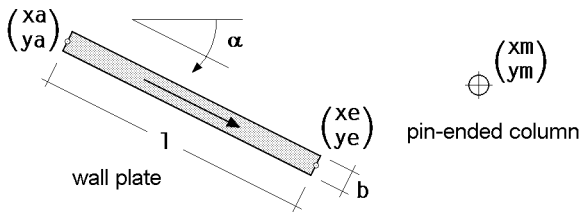
3. wall plates

3.1. protocol of the wall plates and columns

graphic display



protocol of the wall plates



Nr.	type	xa	ya	xe	ye	l	b	α
-	-	m	m	m	m	m	m	°
1	woodpanel	8.55	0.10	11.20	0.10	2.65	0.200	-0.01
2	woodpanel	2.80	0.10	3.30	0.10	0.50	0.200	-0.04
3	woodpanel	4.25	0.10	5.45	0.10	1.20	0.200	0.02
4	woodpanel	0.00	0.10	1.80	0.10	1.80	0.200	0.01
5	woodpanel	6.70	0.10	7.60	0.10	0.90	0.200	0.00
6	woodpanel	0.10	0.20	0.10	0.85	0.65	0.200	90.00
7	woodpanel	11.10	0.20	11.10	2.50	2.30	0.200	90.00
8	woodpanel	4.25	2.53	4.70	2.53	0.45	0.150	-0.01
9	woodpanel	0.20	2.53	3.45	2.53	3.25	0.150	0.00
10	woodpanel	4.77	0.20	4.77	5.00	4.80	0.150	90.00
11	woodpanel	7.42	0.20	7.42	5.10	4.90	0.150	90.00
12	woodpanel	0.10	2.00	0.10	3.60	1.60	0.200	90.00
13	woodpanel	3.17	2.60	3.17	3.45	0.85	0.150	90.00
14	woodpanel	4.85	3.83	6.40	3.83	1.55	0.150	0.00
15	woodpanel	11.10	3.75	11.10	4.80	1.05	0.200	90.00
16	woodpanel	8.40	4.53	11.00	4.53	2.60	0.150	-0.01
17	woodpanel	3.17	4.20	3.17	5.45	1.25	0.150	90.00
18	woodpanel	8.67	4.60	8.67	6.00	1.40	0.150	90.00

Nr.	type	xa	ya	xe	ye	l	b	α
-	-	m	m	m	m	m	m	°
19	woodpanel	0.20	5.38	3.10	5.38	2.90	0.150	0.00
20	woodpanel	0.10	4.65	0.10	6.90	2.25	0.200	90.00
21	woodpanel	11.10	5.60	11.10	6.00	0.40	0.200	90.01
22	woodpanel	9.65	5.90	11.00	5.90	1.35	0.200	0.00
24	woodpanel	10.00	6.00	10.00	6.30	0.30	0.200	90.02
25	woodpanel	10.00	7.35	10.00	7.90	0.55	0.200	90.00
26	woodpanel	0.10	8.85	0.10	9.50	0.65	0.200	90.00
27	woodpanel	10.00	8.90	10.00	9.50	0.60	0.200	90.00
28	woodpanel	3.50	9.60	5.50	9.60	2.00	0.200	0.00
29	woodpanel	6.90	9.60	10.10	9.60	3.20	0.200	0.00
30	woodpanel	0.00	9.60	0.85	9.60	0.85	0.200	0.01

3.2. calculated stiffnesses

C is the spring stiffness against a horizontal head displacement in the plate direction.

Nr.	C	EI	EA	G
-	kN/m	kNm²	kN	kg
1	5657.53	650858.38	844800.00	266.45
2	322.80	12428.97	281600.00	60.94
3	1589.78	88315.44	422400.00	124.14
4	3142.18	231352.08	563200.00	180.05
5	954.63	47321.61	422400.00	102.30
6	526.74	22872.96	281600.00	71.84
7	4604.52	433749.60	704000.00	228.73
8	224.82	7217.54	211200.00	42.95
9	6318.91	825322.06	739200.00	241.79
10	9363.28	2205463.47	950400.00	344.79
11	9508.25	2299652.59	950400.00	350.23
12	2593.16	180788.12	563200.00	165.54
13	735.49	31305.85	316800.00	74.00
14	2105.65	126764.52	422400.00	121.41
15	1258.29	66288.26	422400.00	113.25
16	4704.60	469363.45	633600.00	197.11
17	1459.70	72258.89	316800.00	95.82
18	1774.56	102274.55	422400.00	113.24
19	5463.51	587853.92	633600.00	213.49
20	4454.17	414339.66	704000.00	225.08
21	211.59	7220.36	281600.00	53.67
22	1947.58	126154.09	563200.00	147.32
24	121.43	3394.98	281600.00	46.35
25	385.71	15544.28	281600.00	64.56
26	526.74	22872.96	281600.00	71.84
27	453.62	19018.59	281600.00	68.19
28	3716.35	324436.65	704000.00	206.90
29	7288.48	959468.59	844800.00	306.49
30	861.19	41738.10	422400.00	98.67

3.3. wooden wall panels

wooden wall panels

ribs and straps

Nr.	NKL	ribs outside b/h	ribs inside b/h	ar	HL
-	-	mm	mm	mm	
1	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
2	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
3	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
4	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
5	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
6	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
7	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
8	1	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	625	-
9	1	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	625	-
10	1	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	625	-
11	1	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	625	-
12	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-

wooden wall panels

ribs and straps

Nr.	NKL	ribs outside b/h	ribs inside b/h	ar	HL
-	-	mm	mm	mm	
13	1	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	625	-
14	1	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	625	-
15	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
16	1	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	625	-
17	1	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	625	-
18	1	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	625	-
19	1	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	625	-
20	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
21	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
22	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
24	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
25	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
26	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
27	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
28	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
29	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-
30	1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	625	-

HL = half bearing according to Steico design booklet

Nr.	top strap b/h	bottom strap b/h	$Ü_{li}$	$Ü_{re}$
-	mm	mm	mm(*)	mm(*)
1	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
2	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
3	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
4	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
5	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
6	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
7	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
8	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	0	0
9	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	0	0
10	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	0	0
11	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	0	0
12	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
13	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	0	0
14	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	0	0
15	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
16	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	0	0
17	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	0	0
18	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	0	0
19	sol.con.timbr C24, 80/120	sol.con.timbr C24, 80/120	0	0
20	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
21	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
22	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
24	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
25	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
26	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
27	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
28	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
29	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0
30	sol.con.timbr C24, 80/160	sol.con.timbr C24, 80/160	0	0

(*): $Ü_{li}$ = overhang of the left edge rib, $Ü_{re}$ = overhang of the right edge rib

planking

Nr.	back planking	thick.	NKL	joints	joints	front planking	thick.	NKL	joints	joints
-		mm	-	vert.	hori.		mm	-	vert.	hori.
1	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
2	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
3	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
4	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
5	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
6	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
7	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
8	OSB 3	15.0	1	0	0	OSB 3	15.0	1	0	0
9	OSB 3	15.0	1	0	0	OSB 3	15.0	1	0	0
10	OSB 3	15.0	1	0	0	OSB 3	15.0	1	0	0
11	OSB 3	15.0	1	0	0	OSB 3	15.0	1	0	0
12	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
13	OSB 3	15.0	1	0	0	OSB 3	15.0	1	0	0

planking

Nr. -	back planking	thick. mm	NKL -	joints vert.	joints hori.	front planking	thick. mm	NKL -	joints vert.	joints hori.
14	OSB 3	15.0	1	0	0	OSB 3	15.0	1	0	0
15	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
16	OSB 3	15.0	1	0	0	OSB 3	15.0	1	0	0
17	OSB 3	15.0	1	0	0	OSB 3	15.0	1	0	0
18	OSB 3	15.0	1	0	0	OSB 3	15.0	1	0	0
19	OSB 3	15.0	1	0	0	OSB 3	15.0	1	0	0
20	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
21	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
22	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
24	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
25	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
26	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
27	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
28	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
29	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0
30	OSB 3	20.0	1	0	0	OSB 3	20.0	1	0	0

fastener rear planking

Nr. -	fastener	options	d mm	l mm	l_{ef} mm	d_k mm	a_v mm	in rows -
1	nail		2.8	65.0	65.0	7.0	100.0	1
2	nail		2.8	65.0	65.0	7.0	100.0	1
3	nail		2.8	65.0	65.0	7.0	100.0	1
4	nail		2.8	65.0	65.0	7.0	100.0	1
5	nail		2.8	65.0	65.0	7.0	100.0	1
6	nail		2.8	65.0	65.0	7.0	100.0	1
7	nail		2.8	65.0	65.0	7.0	100.0	1
8	nail		2.8	65.0	65.0	7.0	100.0	1
9	nail		2.8	65.0	65.0	7.0	100.0	1
10	nail		2.8	65.0	65.0	7.0	100.0	1
11	nail		2.8	65.0	65.0	7.0	100.0	1
12	nail		2.8	65.0	65.0	7.0	100.0	1
13	nail		2.8	65.0	65.0	7.0	100.0	1
14	nail		2.8	65.0	65.0	7.0	100.0	1
15	nail		2.8	65.0	65.0	7.0	100.0	1
16	nail		2.8	65.0	65.0	7.0	100.0	1
17	nail		2.8	65.0	65.0	7.0	100.0	1
18	nail		2.8	65.0	65.0	7.0	100.0	1
19	nail		2.8	65.0	65.0	7.0	100.0	1
20	nail		2.8	65.0	65.0	7.0	100.0	1
21	nail		2.8	65.0	65.0	7.0	100.0	1
22	nail		2.8	65.0	65.0	7.0	100.0	1
24	nail		2.8	65.0	65.0	7.0	100.0	1
25	nail		2.8	65.0	65.0	7.0	100.0	1
26	nail		2.8	65.0	65.0	7.0	100.0	1
27	nail		2.8	65.0	65.0	7.0	100.0	1
28	nail		2.8	65.0	65.0	7.0	100.0	1
29	nail		2.8	65.0	65.0	7.0	100.0	1
30	nail		2.8	65.0	65.0	7.0	100.0	1

fastener front planking

Nr. -	fastener	options	d mm	l mm	l_{ef} mm	d_k mm	a_v mm	in rows -
1	nail		2.8	65.0	65.0	7.0	100.0	1
2	nail		2.8	65.0	65.0	7.0	100.0	1
3	nail		2.8	65.0	65.0	7.0	100.0	1
4	nail		2.8	65.0	65.0	7.0	100.0	1
5	nail		2.8	65.0	65.0	7.0	100.0	1
6	nail		2.8	65.0	65.0	7.0	100.0	1
7	nail		2.8	65.0	65.0	7.0	100.0	1
8	nail		2.8	65.0	65.0	7.0	100.0	1
9	nail		2.8	65.0	65.0	7.0	100.0	1
10	nail		2.8	65.0	65.0	7.0	100.0	1
11	nail		2.8	65.0	65.0	7.0	100.0	1
12	nail		2.8	65.0	65.0	7.0	100.0	1
13	nail		2.8	65.0	65.0	7.0	100.0	1
14	nail		2.8	65.0	65.0	7.0	100.0	1
15	nail		2.8	65.0	65.0	7.0	100.0	1

fastener front planking

Nr. -	fastener	options	d mm	l mm	l_{ef} mm	d_k mm	a_v mm	in rows -
16	nail		2.8	65.0	65.0	7.0	100.0	1
17	nail		2.8	65.0	65.0	7.0	100.0	1
18	nail		2.8	65.0	65.0	7.0	100.0	1
19	nail		2.8	65.0	65.0	7.0	100.0	1
20	nail		2.8	65.0	65.0	7.0	100.0	1
21	nail		2.8	65.0	65.0	7.0	100.0	1
22	nail		2.8	65.0	65.0	7.0	100.0	1
24	nail		2.8	65.0	65.0	7.0	100.0	1
25	nail		2.8	65.0	65.0	7.0	100.0	1
26	nail		2.8	65.0	65.0	7.0	100.0	1
27	nail		2.8	65.0	65.0	7.0	100.0	1
28	nail		2.8	65.0	65.0	7.0	100.0	1
29	nail		2.8	65.0	65.0	7.0	100.0	1
30	nail		2.8	65.0	65.0	7.0	100.0	1

verifications and options

R = vertical load transfer via ribs only, R+S = R = vertical load transfer via ribs + plates
shear st. = panel edges shear-resistant, buckling strap = strap is checked for buckling perpendicular to the wall plane.
is increased according to DIN EN 1995, 9.2.4.2 (5) (Panel edges rigidly connected on all sides)
S = plate stress, P = joist pressure, G = pressure strap, R = vertical ribs, V = deformation, Dg = douglas fir
BF = timb. w. fibre sat., GoK = strap without buckling, GmK = strap with buckling, PRS = panel edge shear-res., FTK = spruce, fir or pine

Nr. -	options	verific.
1	R+S GmK	S P G R V
2	R+S GmK	S P G R V
3	R+S GmK	S P G R V
4	R+S GmK	S P G R V
5	R+S GmK	S P G R V
6	R+S GmK	S P G R V
7	R+S GmK	S P G R V
8	R+S GmK	S P G R V
9	R+S GmK	S P G R V
10	R+S GmK	S P G R V
11	R+S GmK	S P G R V
12	R+S GmK	S P G R V
13	R+S GmK	S P G R V
14	R+S GmK	S P G R V
15	R+S GmK	S P G R V
16	R+S GmK	S P G R V
17	R+S GmK	S P G R V
18	R+S GmK	S P G R V
19	R+S GmK	S P G R V
20	R+S GmK	S P G R V
21	R+S GmK	S P G R V
22	R+S GmK	S P G R V
24	R+S GmK	S P G R V
25	R+S GmK	S P G R V
26	R+S GmK	S P G R V
27	R+S GmK	S P G R V
28	R+S GmK	S P G R V
29	R+S GmK	S P G R V
30	R+S GmK	S P G R V

4. result of the load distribution

4.1. characteristic values

assumptions: the panel stiffness for absorbing the bending moments is estimated at 30 %. warping forces are taken into account at 0 %.
Hx (u_{Mx}), Hy (u_{My}) and Mz (Θ_{Mz}) refer to the shear centre; Vz (u_{Sz}), Mx (Θ_{Sx}) and My (Θ_{Sy}) refer to the centre of gravity.

characteristic values	x	y
grav.centre (S)	5.730 m	4.186 m
shear centre (M)	5.675 m	4.556 m

4.2. unit deformations of the rigid plate

the table values are to be multiplied by 10^{-2}

due to	u_{Mx} mm	u_{My} mm	u_{Sz} mm	Θ_{Sx} ‰	Θ_{Sy} ‰	Θ_{Mz} ‰
Hx = 1 kN	2.2574	0	0	0	0	0
Hy = 1 kN	0	2.6332	0	0	0	0
Vz = 1 kN	0	0	0.0197	0	0	0
Mx = 1 kNm	0	0	0	0.0350	0	0
My = 1 kNm	0	0	0	0	0.0455	0
Mz = 1 kNm	0	0	0	0	0	0.0923

4.3. loads on walls and columns due to global unit loads

plate loads due to Hx = 1 kN

wall -	H N	qa N/m	qe N/m	wall -	H N	qa N/m	qe N/m
1	127.72	0.00	0.00	16	106.20	0.00	0.00
2	7.29	0.00	0.00	17	0.00	0.00	0.00
3	35.89	0.00	0.00	18	0.00	0.00	0.00
4	70.93	0.00	0.00	19	123.34	0.00	0.00
5	21.55	0.00	0.00	20	0.00	0.00	0.00
6	0.00	0.00	0.00	21	0.00	0.00	0.00
7	0.00	0.00	0.00	22	43.97	0.00	0.00
8	5.08	0.00	0.00	24	0.00	0.00	0.00
9	142.65	0.00	0.00	25	0.00	0.00	0.00
10	0.00	0.00	0.00	26	0.00	0.00	0.00
11	0.00	0.00	0.00	27	0.00	0.00	0.00
12	0.00	0.00	0.00	28	83.89	0.00	0.00
13	0.00	0.00	0.00	29	164.53	0.00	0.00
14	47.53	0.00	0.00	30	19.44	0.00	0.00
15	0.00	0.00	0.00				

plate loads due to Hy = 1 kN

wall -	H N	qa N/m	qe N/m	wall -	H N	qa N/m	qe N/m
1	-0.02	0.00	0.00	16	-0.02	0.00	0.00
2	-0.01	0.00	0.00	17	38.44	0.00	0.00
3	0.01	0.00	0.00	18	46.73	0.00	0.00
4	0.02	0.00	0.00	19	0.00	0.00	0.00
5	0.00	0.00	0.00	20	117.29	0.00	0.00
6	13.87	0.00	0.00	21	5.57	0.00	0.00
7	121.24	0.00	0.00	22	0.00	0.00	0.00
8	0.00	0.00	0.00	24	3.20	0.00	0.00
9	0.00	0.00	0.00	25	10.16	0.00	0.00
10	246.55	0.00	0.00	26	13.87	0.00	0.00
11	250.37	0.00	0.00	27	11.94	0.00	0.00
12	68.28	0.00	0.00	28	0.00	0.00	0.00
13	19.37	0.00	0.00	29	0.00	0.00	0.00
14	0.00	0.00	0.00	30	0.00	0.00	0.00
15	33.13	0.00	0.00				

plate loads due to Mz = 1 kNm

wall	H	qa	qe	wall	H	qa	qe
-	N	N/m	N/m	-	N	N/m	N/m
1	23.26	0.00	0.00	16	0.13	0.00	0.00
2	1.33	0.00	0.00	17	-3.37	0.00	0.00
3	6.54	0.00	0.00	18	4.91	0.00	0.00
4	12.92	0.00	0.00	19	-4.13	0.00	0.00
5	3.92	0.00	0.00	20	-22.91	0.00	0.00
6	-2.71	0.00	0.00	21	1.06	0.00	0.00
7	23.05	0.00	0.00	22	-2.42	0.00	0.00
8	0.42	0.00	0.00	24	0.48	0.00	0.00
9	11.84	0.00	0.00	25	1.54	0.00	0.00
10	-7.78	0.00	0.00	26	-2.71	0.00	0.00
11	15.36	0.00	0.00	27	1.81	0.00	0.00
12	-13.34	0.00	0.00	28	-17.30	0.00	0.00
13	-1.70	0.00	0.00	29	-33.92	0.00	0.00
14	1.42	0.00	0.00	30	-4.01	0.00	0.00
15	6.30	0.00	0.00				

5. ceiling panel, load schemes

The following specifications are used to automatically distribute vertical surface loads from dead weight or traffic to the wallplates.
Load schemes are defined for this purpose. Edge distances and recesses are assigned to each load scheme. They are used to determine the exact structure of the load-bearing plate. Reference is made to the load scheme used in the description of the load cases.

Whereas in the "rigid slab" model, the stiffnesses of the wall plates are decisive for the distribution of the loads, in the "flexible slab" model, the size of the load application area assigned to the individual wall disc (column) is decisive.
Both models represent a state of equilibrium and are weighted.

Current determination: 0 % "rigid slab" model, 100 % "flexible slab" model (see also page 1: building model).

load scheme: standard

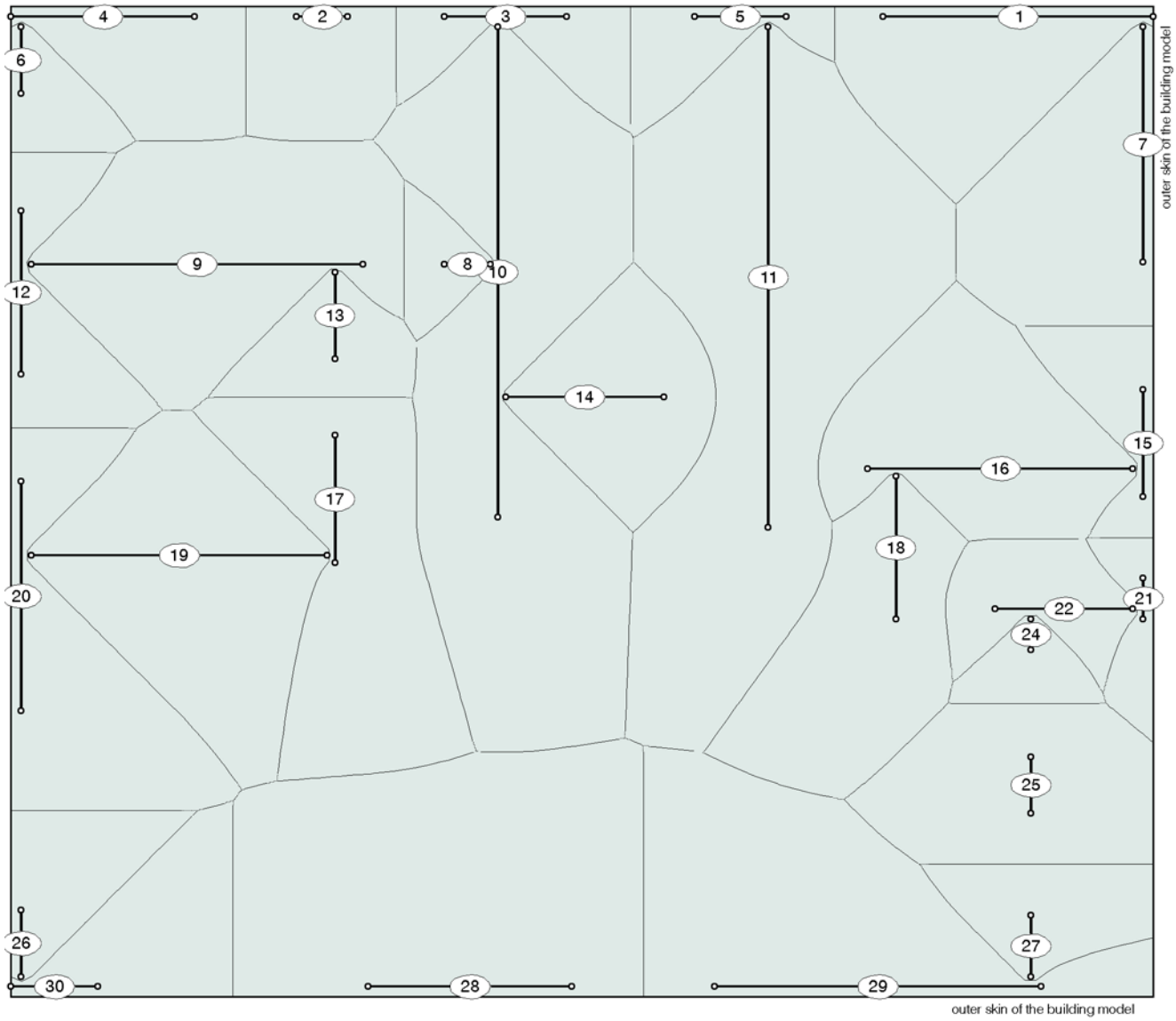
edge distances

positive values move the panel edge measured from the outer skin inwards.

left	right	top	bottom
m	m	m	m
0.000	0.000	0.000	0.000

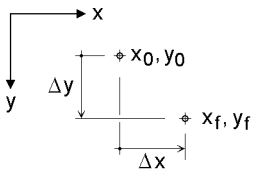
cut-outs

load influencing areas



vertical loads

load area	A	= 108.64 m²
centre of gravity of the load area	x_f	= 5.60 m
	y_f	= 4.85 m
elastic centre of gravity of walls	x_0	= 5.73 m
	y_0	= 4.19 m



$q_{flexible}$ from influence area evaluation

$q_{rigid} = A\left(q(Vz=1) - \Delta x\, q(My=1) + \Delta y\, q(Mx=1)\right)$

$q_{weighted} = {}^{1.00} q_{flexible} + {}^{0.00} q_{rigid}$

vertical loads of the wall plates

for a constant surface load of 1 kN/m², the following distribution on the wall plates results

wall	flexible qa	flexible qe	rigid qa	rigid qe	weighted qa	weighted qe	qm	qm l
-	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m	kN
1	2.65	-0.04	3.36	0.90	**2.65**	**-0.04**	1.31	3.46
2	4.13	3.43	4.51	3.18	**4.13**	**3.43**	3.78	1.89
3	0.52	2.01	3.20	1.57	**0.52**	**2.01**	1.27	1.52
4	-0.59	3.01	3.10	1.20	**-0.59**	**3.01**	1.21	2.18
5	3.31	-0.53	3.94	2.39	**3.31**	**-0.53**	1.39	1.25
6	-1.67	4.62	0.18	5.84	**-1.67**	**4.62**	1.47	0.96
7	-0.64	4.15	-2.19	6.38	**-0.64**	**4.15**	1.76	4.04
8	5.82	-2.23	3.83	2.88	**5.82**	**-2.23**	1.80	0.81
9	1.20	2.74	2.68	0.60	**1.20**	**2.74**	1.97	6.40
10	-0.12	4.80	-3.58	6.42	**-0.12**	**4.80**	2.34	11.23

vertical loads of the wall plates

for a constant surface load of 1 kN/m², the following distribution on the wall plates results

wall	flexible qa	flexible qe	rigid qa	rigid qe	weighted qa	weighted qe	qm	qm l
-	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m	kN
11	0.90	4.36	-3.63	6.38	**0.90**	**4.36**	2.63	12.88
12	0.49	2.10	-1.13	6.25	**0.49**	**2.10**	1.30	2.08
13	-1.46	5.18	0.44	4.97	**-1.46**	**5.18**	1.86	1.58
14	-0.56	4.64	2.70	1.29	**-0.56**	**4.64**	2.04	3.16
15	3.06	-0.46	-0.22	6.06	**3.06**	**-0.46**	1.30	1.37
16	2.85	0.78	2.71	0.86	**2.85**	**0.78**	1.82	4.72
17	-0.49	9.42	-0.51	4.32	**-0.49**	**9.42**	4.47	5.58
18	-3.61	9.93	-0.47	4.98	**-3.61**	**9.93**	3.16	4.43
19	1.48	2.62	2.60	0.74	**1.48**	**2.62**	2.05	5.95
20	-0.59	4.28	-1.86	6.69	**-0.59**	**4.28**	1.84	4.15
21	0.51	3.11	2.91	7.62	**0.51**	**3.11**	1.81	0.72
22	2.52	0.07	4.06	2.22	**2.52**	**0.07**	1.30	1.75
24	-4.25	9.71	5.13	9.08	**-4.25**	**9.71**	2.73	0.82
25	5.95	8.50	1.30	6.67	**5.95**	**8.50**	7.23	3.97
26	8.86	-3.78	0.73	6.39	**8.86**	**-3.78**	2.54	1.65
27	9.20	-3.31	1.00	6.52	**9.20**	**-3.31**	2.94	1.77
28	6.07	3.17	3.96	1.80	**6.07**	**3.17**	4.62	9.24
29	4.43	-0.21	3.38	0.89	**4.43**	**-0.21**	2.11	6.75
30	-4.55	10.04	4.88	3.34	**-4.55**	**10.04**	2.75	2.34
							sum =	108.64 kN

6. actions and load cases

6.1. description of the load structure

On the left-hand side, the relationships between the actions and load cases are shown in a tree structure.
On the right-hand side, the overlay-specific properties are assigned to the objects on the left.

used symbols: action load case

1: permanent loads	**permanent loads**
1: dead weight	additive
2: live loads	**live loads of the category A - living rooms and lounges**
2: traffic	additive
3: snown loads	**snown: places up to SL + 1000 m**
3: snown (fully)	additive
4: increased snown loads	**special load**
4: snown increased	additive
5: wind loads	**wind loads**
5: wind from the left (centric)	alternative
6: wind from the left (- eccentricity)	alternative
7: wind from the left (+ eccentricity)	alternative
8: wind from the right (centric)	alternative
9: wind from the right (- eccentricity)	alternative
10: wind from the right (+ eccentricity)	alternative
11: wind from the front (centric)	alternative
12: wind from the front (- eccentricity)	alternative
13: wind from the front (+ eccentricity)	alternative
14: wind from the rear (centric)	alternative
15: wind from the rear (- eccentricity)	alternative
16: wind from the rear (+ eccentricity)	alternative

6.2. superposition factors of the actions

safety factors and combination coefficients acc. to Eurocode; clld = class of load duration (only relevant for wooden panels)
Ψ_E is the Ψ_2-value for the earthquake design situation

action	γ_{sup}	γ_{inf}	Ψ_0	Ψ_1	Ψ_2	Ψ_E	clld
1	1.35	1.00	1.00	1.00	1.00	1.00	permanent
2	1.50	0.00	0.70	0.50	0.30	0.23	medium-term
3	1.50	0.00	0.50	0.20	0.00	0.50	short-term
4	1.00	1.00	1.00	1.00	1.00	1.00	instantaneous
5	1.50	0.00	0.60	0.20	0.00	0.00	(wind)

6.3. description of the load cases

6.3.1. load case 1: dead weight

resultant and deformations of the rigid slab in the load case 1: dead weight

ΣHx =	0.00 kN	u_{Mx} =	0.000000 mm
ΣHy =	0.00 kN	u_{My} =	0.000000 mm
ΣV =	294.36 kN	u_{Sz} =	0.057879 mm
ΣMx =	129.62 kNm	Θ_{Sx} =	0.045382 ‰
ΣMy =	34.13 kNm	Θ_{Sy} =	0.015546 ‰
ΣMz =	0.00 kNm	Θ_{Mz} =	0.000000 ‰

6.3.2. load case 2: traffic

resultant and deformations of the rigid slab in the load case 2: traffic

ΣHx =	0.00 kN	u_{Mx} =	0.000000 mm
ΣHy =	0.00 kN	u_{My} =	0.000000 mm
ΣV =	162.96 kN	u_{Sz} =	0.032042 mm
ΣMx =	106.82 kNm	Θ_{Sx} =	0.037401 ‰
ΣMy =	23.80 kNm	Θ_{Sy} =	0.010842 ‰
ΣMz =	0.00 kNm	Θ_{Mz} =	0.000000 ‰

6.3.3. load case 3: snown (fully)

resultant and deformations of the rigid slab in the load case 3: snown (fully)

ΣHx =	0.00 kN	u_{Mx} =	0.000000 mm
ΣHy =	0.00 kN	u_{My} =	0.000000 mm
ΣV =	73.88 kN	u_{Sz} =	0.014526 mm
ΣMx =	48.43 kNm	Θ_{Sx} =	0.016955 ‰
ΣMy =	10.79 kNm	Θ_{Sy} =	0.004915 ‰
ΣMz =	0.00 kNm	Θ_{Mz} =	0.000000 ‰

6.3.4. load case 4: snown increased

resultant and deformations of the rigid slab in the load case 4: snown increased

ΣHx =	0.00 kN	u_{Mx} =	0.000000 mm
ΣHy =	0.00 kN	u_{My} =	0.000000 mm
ΣV =	169.91 kN	u_{Sz} =	0.033409 mm
ΣMx =	111.38 kNm	Θ_{Sx} =	0.038997 ‰
ΣMy =	24.82 kNm	Θ_{Sy} =	0.011305 ‰
ΣMz =	0.00 kNm	Θ_{Mz} =	0.000000 ‰

6.3.5. load case 5: wind from the left (centric)

resultant and deformations of the rigid slab in the load case 5: wind from the left (centric)

ΣHx =	32.62 kN	u_{Mx} =	0.736409 mm
ΣHy =	0.00 kN	u_{My} =	0.000000 mm
ΣV =	0.00 kN	u_{Sz} =	0.000000 mm
ΣMx =	0.00 kNm	Θ_{Sx} =	-0.000002 ‰
ΣMy =	-22.53 kNm	Θ_{Sy} =	-0.010253 ‰
ΣMz =	-9.59 kNm	Θ_{Mz} =	-0.008848 ‰

6.3.6. load case 6: wind from the left (- eccentricity)

resultant and deformations of the rigid slab in the load case 6: wind from the left (- eccentricity)

ΣHx =	21.94 kN	u_{Mx} =	0.495394 mm
ΣHy =	0.00 kN	u_{My} =	0.000000 mm
ΣV =	0.00 kN	u_{Sz} =	0.000000 mm
ΣMx =	0.00 kNm	Θ_{Sx} =	-0.000001 ‰
ΣMy =	-15.16 kNm	Θ_{Sy} =	-0.006898 ‰
ΣMz =	10.81 kNm	Θ_{Mz} =	0.009975 ‰

6.3.7. load case 7: wind from the left (+ eccentricity)

resultant and deformations of the rigid slab in the load case 7: wind from the left (+ eccentricity)

ΣHx =	21.94 kN	u_{Mx} =	0.495394 mm
ΣHy =	0.00 kN	u_{My} =	0.000000 mm
ΣV =	0.00 kN	u_{Sz} =	0.000000 mm
ΣMx =	0.00 kNm	Θ_{Sx} =	-0.000001 ‰
ΣMy =	-15.16 kNm	Θ_{Sy} =	-0.006898 ‰
ΣMz =	-23.71 kNm	Θ_{Mz} =	-0.021879 ‰

6.3.8. load case 8: wind from the right (centric)

resultant and deformations of the rigid slab in the load case 8: wind from the right (centric)

ΣHx =	-32.62 kN	u_{Mx} =	-0.736409 mm
ΣHy =	0.00 kN	u_{My} =	0.000000 mm
ΣV =	0.00 kN	u_{Sz} =	0.000000 mm
ΣMx =	0.00 kNm	Θ_{Sx} =	0.000002 ‰
ΣMy =	22.53 kNm	Θ_{Sy} =	0.010253 ‰
ΣMz =	9.59 kNm	Θ_{Mz} =	0.008848 ‰

6.3.9. load case 9: wind from the right (- eccentricity)

resultant and deformations of the rigid slab in the load case 9: wind from the right (- eccentricity)

ΣHx =	-21.94 kN	u_{Mx} =	-0.495394 mm
ΣHy =	0.00 kN	u_{My} =	0.000000 mm
ΣV =	0.00 kN	u_{Sz} =	0.000000 mm
ΣMx =	0.00 kNm	Θ_{Sx} =	0.000001 ‰
ΣMy =	15.16 kNm	Θ_{Sy} =	0.006898 ‰
ΣMz =	-10.81 kNm	Θ_{Mz} =	-0.009975 ‰

6.3.10. load case 10: wind from the right (+ eccentricity)

resultant and deformations of the rigid slab in the load case 10: wind from the right (+ eccentricity)

ΣHx =	-21.94 kN	u_{Mx} =	-0.495394 mm
ΣHy =	0.00 kN	u_{My} =	0.000000 mm
ΣV =	0.00 kN	u_{Sz} =	0.000000 mm
ΣMx =	0.00 kNm	Θ_{Sx} =	0.000001 ‰
ΣMy =	15.16 kNm	Θ_{Sy} =	0.006898 ‰
ΣMz =	23.71 kNm	Θ_{Mz} =	0.021879 ‰

6.3.11. load case 11: wind from the front (centric)

resultant and deformations of the rigid slab in the load case 11: wind from the front (centric)

ΣHx =	0.00 kN	u_{Mx} =	0.000000 mm
ΣHy =	-43.39 kN	u_{My} =	-1.142606 mm
ΣV =	0.00 kN	u_{Sz} =	0.000000 mm
ΣMx =	-43.34 kNm	Θ_{Sx} =	-0.015172 ‰
ΣMy =	0.00 kNm	Θ_{Sy} =	-0.000004 ‰
ΣMz =	3.24 kNm	Θ_{Mz} =	0.002990 ‰

6.3.12. load case 12: wind from the front (- eccentricity)

resultant and deformations of the rigid slab in the load case 12: wind from the front (- eccentricity)

ΣHx =	0.00 kN	u_{Mx} =	0.000000 mm
ΣHy =	-29.41 kN	u_{My} =	-0.774462 mm
ΣV =	0.00 kN	u_{Sz} =	0.000000 mm
ΣMx =	-29.37 kNm	Θ_{Sx} =	-0.010284 ‰
ΣMy =	0.00 kNm	Θ_{Sy} =	-0.000003 ‰
ΣMz =	28.29 kNm	Θ_{Mz} =	0.026109 ‰

6.3.13. load case 13: wind from the front (+ eccentricity)

resultant and deformations of the rigid slab in the load case 13: wind from the front (+ eccentricity)

ΣHx =	0.00 kN	u_{Mx} =	0.000000 mm
ΣHy =	-29.41 kN	u_{My} =	-0.774462 mm
ΣV =	0.00 kN	u_{Sz} =	0.000000 mm
ΣMx =	-29.37 kNm	Θ_{Sx} =	-0.010284 ‰
ΣMy =	0.00 kNm	Θ_{Sy} =	-0.000003 ‰
ΣMz =	-23.90 kNm	Θ_{Mz} =	-0.022056 ‰

6.3.14. load case 14: wind from the rear (centric)

resultant and deformations of the rigid slab in the load case 14: wind from the rear (centric)

ΣHx =	0.00 kN	u_{Mx} =	0.000000 mm
ΣHy =	43.39 kN	u_{My} =	1.142606 mm
ΣV =	0.00 kN	u_{Sz} =	0.000000 mm
ΣMx =	43.34 kNm	Θ_{Sx} =	0.015172 ‰
ΣMy =	0.00 kNm	Θ_{Sy} =	0.000004 ‰
ΣMz =	-3.24 kNm	Θ_{Mz} =	-0.002990 ‰

6.3.15. load case 15: wind from the rear (- eccentricity)

resultant and deformations of the rigid slab in the load case 15: wind from the rear (- eccentricity)

ΣHx =	0.00 kN	u_{Mx} =	0.000000 mm
ΣHy =	29.41 kN	u_{My} =	0.774462 mm
ΣV =	0.00 kN	u_{Sz} =	0.000000 mm
ΣMx =	29.37 kNm	Θ_{Sx} =	0.010284 ‰
ΣMy =	0.00 kNm	Θ_{Sy} =	0.000003 ‰
ΣMz =	-28.29 kNm	Θ_{Mz} =	-0.026109 ‰

6.3.16. load case 16: wind from the rear (+ eccentricity)

resultant and deformations of the rigid slab in the load case 16: wind from the rear (+ eccentricity)

ΣHx =	0.00 kN	u_{Mx} =	0.000000 mm
ΣHy =	29.41 kN	u_{My} =	0.774462 mm
ΣV =	0.00 kN	u_{Sz} =	0.000000 mm
ΣMx =	29.37 kNm	Θ_{Sx} =	0.010284 ‰
ΣMy =	0.00 kNm	Θ_{Sy} =	0.000003 ‰
ΣMz =	23.90 kNm	Θ_{Mz} =	0.022056 ‰

7. sum of the vertical loads

at the height of the top plate of the storey to be verified

explanations: line "permanent": only from action of the type "permanent loads". line "maximum": Actions of the variable load type are fully recognised ($\Psi_i = 1$). All other lines according to DIN 1055-100 or Eurocode. xg and yg describe the position of the centre of mass. The calculation is based on all actions except restraint, prestressing, special loads and earthquakes. In addition, the categories wind loads, temperature loads and subsoil settlement are ignored for the variable loads.

combination	characteristic values - ΣV -		xg	yg	design values - ΣV -		xg	yg
-	kN	t	m	m	kN	t	m	m
perman.	294	29.4	5.61	4.63	397	39.7	5.61	4.63
quasi-perm.	343	34.3	5.61	4.66	471	47.1	5.61	4.66
frequ.	376	37.6	5.61	4.67	520	52.0	5.61	4.68
rarely	494	49.4	5.60	4.71	697	69.7	5.60	4.72
maximum	531	53.1	5.60	4.72	753	75.3	5.60	4.73

8. bearing forces of the walls

8.1. bearing forces of the walls (mode of action)

bearing forces of the walls in action 1: permanent loads

minimum and maximum forces in the wall-floor joint (characteristic) at the start, in the centre and at the end of the plate

wall	max qa	max qm	max qe	min qa	min qm	min qe	max H	min H
-	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m	kN	kN
1	7.04	4.49	1.94	7.04	4.49	1.94	0.00	0.00
2	10.28	9.62	8.95	10.28	9.62	8.95	0.00	0.00
3	3.06	4.48	5.89	3.06	4.48	5.89	0.00	0.00
4	0.88	4.30	7.73	0.88	4.30	7.73	0.00	0.00
5	8.57	4.92	1.27	8.57	4.92	1.27	0.00	0.00
6	-0.96	5.01	10.98	-0.96	5.01	10.98	0.00	0.00
7	0.78	5.33	9.88	0.78	5.33	9.88	0.00	0.00
8	12.97	5.32	-2.32	12.97	5.32	-2.32	0.00	0.00
9	3.78	5.23	6.69	3.78	5.23	6.69	0.00	0.00
10	1.20	5.88	10.56	1.20	5.88	10.56	0.00	0.00
11	3.13	6.43	9.72	3.13	6.43	9.72	0.00	0.00
12	3.01	4.53	6.06	3.01	4.53	6.06	0.00	0.00
13	-1.04	5.27	11.58	-1.04	5.27	11.58	0.00	0.00
14	0.50	5.44	10.38	0.50	5.44	10.38	0.00	0.00
15	7.97	4.63	1.28	7.97	4.63	1.28	0.00	0.00
16	6.94	4.97	3.00	6.94	4.97	3.00	0.00	0.00
17	0.60	10.02	19.44	0.60	10.02	19.44	0.00	0.00
18	-5.23	7.63	20.49	-5.23	7.63	20.49	0.00	0.00

bearing forces of the walls in action 1: permanent loads

minimum and maximum forces in the wall-floor joint (characteristic) at the start, in the centre and at the end of the plate

wall	max qa	max qm	max qe	min qa	min qm	min qe	max H	min H
-	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m	kN	kN
19	4.29	5.37	6.45	4.29	5.37	6.45	0.00	0.00
20	0.88	5.50	10.13	0.88	5.50	10.13	0.00	0.00
21	3.65	6.12	8.59	3.65	6.12	8.59	0.00	0.00
22	6.97	4.65	2.32	6.97	4.65	2.32	0.00	0.00
24	-4.97	8.28	21.53	-4.97	8.28	21.53	0.00	0.00
25	13.66	16.08	18.51	13.66	16.08	18.51	0.00	0.00
26	19.04	7.03	-4.98	19.04	7.03	-4.98	0.00	0.00
27	19.75	7.87	-4.01	19.75	7.87	-4.01	0.00	0.00
28	13.60	10.85	8.09	13.60	10.85	8.09	0.00	0.00
29	10.33	5.92	1.52	10.33	5.92	1.52	0.00	0.00
30	-6.32	7.54	21.40	-6.32	7.54	21.40	0.00	0.00

bearing forces of the walls in action 2: live loads

minimum and maximum forces in the wall-floor joint (characteristic) at the start, in the centre and at the end of the plate

wall	max qa	max qm	max qe	min qa	min qm	min qe	max H	min H
-	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m	kN	kN
1	3.97	1.96	-0.05	3.97	1.96	-0.05	0.00	0.00
2	6.19	5.67	5.14	6.19	5.67	5.14	0.00	0.00
3	0.78	1.90	3.02	0.78	1.90	3.02	0.00	0.00
4	-0.89	1.82	4.52	-0.89	1.82	4.52	0.00	0.00
5	4.97	2.09	-0.79	4.97	2.09	-0.79	0.00	0.00
6	-2.50	2.21	6.92	-2.50	2.21	6.92	0.00	0.00
7	-0.96	2.64	6.23	-0.96	2.64	6.23	0.00	0.00
8	8.73	2.69	-3.34	8.73	2.69	-3.34	0.00	0.00
9	1.81	2.96	4.10	1.81	2.96	4.10	0.00	0.00
10	-0.19	3.51	7.20	-0.19	3.51	7.20	0.00	0.00
11	1.34	3.94	6.54	1.34	3.94	6.54	0.00	0.00
12	0.74	1.95	3.15	0.74	1.95	3.15	0.00	0.00
13	-2.19	2.79	7.77	-2.19	2.79	7.77	0.00	0.00
14	-0.84	3.06	6.95	-0.84	3.06	6.95	0.00	0.00
15	4.59	1.95	-0.69	4.59	1.95	-0.69	0.00	0.00
16	4.28	2.73	1.17	4.28	2.73	1.17	0.00	0.00
17	-0.74	6.70	14.13	-0.74	6.70	14.13	0.00	0.00
18	-5.41	4.74	14.90	-5.41	4.74	14.90	0.00	0.00
19	2.22	3.08	3.93	2.22	3.08	3.93	0.00	0.00
20	-0.89	2.76	6.42	-0.89	2.76	6.42	0.00	0.00
21	0.76	2.71	4.66	0.76	2.71	4.66	0.00	0.00
22	3.78	1.94	0.11	3.78	1.94	0.11	0.00	0.00
24	-6.37	4.09	14.56	-6.37	4.09	14.56	0.00	0.00
25	8.93	10.84	12.76	8.93	10.84	12.76	0.00	0.00
26	13.29	3.81	-5.67	13.29	3.81	-5.67	0.00	0.00
27	13.80	4.42	-4.96	13.80	4.42	-4.96	0.00	0.00
28	9.11	6.93	4.75	9.11	6.93	4.75	0.00	0.00
29	6.64	3.16	-0.32	6.64	3.16	-0.32	0.00	0.00
30	-6.82	4.12	15.06	-6.82	4.12	15.06	0.00	0.00

bearing forces of the walls in action 3: snown loads

minimum and maximum forces in the wall-floor joint (characteristic) at the start, in the centre and at the end of the plate

wall	max qa	max qm	max qe	min qa	min qm	min qe	max H	min H
-	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m	kN	kN
1	1.80	0.89	-0.02	1.80	0.89	-0.02	0.00	0.00
2	2.81	2.57	2.33	2.81	2.57	2.33	0.00	0.00
3	0.35	0.86	1.37	0.35	0.86	1.37	0.00	0.00
4	-0.40	0.82	2.05	-0.40	0.82	2.05	0.00	0.00
5	2.25	0.95	-0.36	2.25	0.95	-0.36	0.00	0.00
6	-1.14	1.00	3.14	-1.14	1.00	3.14	0.00	0.00
7	-0.43	1.19	2.82	-0.43	1.19	2.82	0.00	0.00
8	3.96	1.22	-1.52	3.96	1.22	-1.52	0.00	0.00
9	0.82	1.34	1.86	0.82	1.34	1.86	0.00	0.00
10	-0.08	1.59	3.27	-0.08	1.59	3.27	0.00	0.00
11	0.61	1.79	2.97	0.61	1.79	2.97	0.00	0.00
12	0.34	0.88	1.43	0.34	0.88	1.43	0.00	0.00
13	-0.99	1.26	3.52	-0.99	1.26	3.52	0.00	0.00
14	-0.38	1.39	3.15	-0.38	1.39	3.15	0.00	0.00
15	2.08	0.88	-0.31	2.08	0.88	-0.31	0.00	0.00
16	1.94	1.24	0.53	1.94	1.24	0.53	0.00	0.00

bearing forces of the walls in action 3: snown loads

minimum and maximum forces in the wall-floor joint (characteristic) at the start, in the centre and at the end of the plate

wall	max qa	max qm	max qe	min qa	min qm	min qe	max H	min H
-	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m	kN	kN
17	-0.33	3.04	6.41	-0.33	3.04	6.41	0.00	0.00
18	-2.45	2.15	6.75	-2.45	2.15	6.75	0.00	0.00
19	1.01	1.40	1.78	1.01	1.40	1.78	0.00	0.00
20	-0.40	1.25	2.91	-0.40	1.25	2.91	0.00	0.00
21	0.35	1.23	2.11	0.35	1.23	2.11	0.00	0.00
22	1.71	0.88	0.05	1.71	0.88	0.05	0.00	0.00
24	-2.89	1.86	6.60	-2.89	1.86	6.60	0.00	0.00
25	4.05	4.92	5.78	4.05	4.92	5.78	0.00	0.00
26	6.02	1.73	-2.57	6.02	1.73	-2.57	0.00	0.00
27	6.26	2.00	-2.25	6.26	2.00	-2.25	0.00	0.00
28	4.13	3.14	2.15	4.13	3.14	2.15	0.00	0.00
29	3.01	1.43	-0.14	3.01	1.43	-0.14	0.00	0.00
30	-3.09	1.87	6.83	-3.09	1.87	6.83	0.00	0.00

bearing forces of the walls in action 4: increased snown loads

minimum and maximum forces in the wall-floor joint (characteristic) at the start, in the centre and at the end of the plate

wall	max qa	max qm	max qe	min qa	min qm	min qe	max H	min H
-	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m	kN	kN
1	4.14	2.04	-0.06	4.14	2.04	-0.06	0.00	0.00
2	6.46	5.91	5.36	6.46	5.91	5.36	0.00	0.00
3	0.82	1.98	3.15	0.82	1.98	3.15	0.00	0.00
4	-0.92	1.89	4.71	-0.92	1.89	4.71	0.00	0.00
5	5.18	2.18	-0.83	5.18	2.18	-0.83	0.00	0.00
6	-2.61	2.30	7.22	-2.61	2.30	7.22	0.00	0.00
7	-1.00	2.75	6.49	-1.00	2.75	6.49	0.00	0.00
8	9.10	2.81	-3.49	9.10	2.81	-3.49	0.00	0.00
9	1.88	3.08	4.28	1.88	3.08	4.28	0.00	0.00
10	-0.19	3.66	7.51	-0.19	3.66	7.51	0.00	0.00
11	1.40	4.11	6.82	1.40	4.11	6.82	0.00	0.00
12	0.77	2.03	3.28	0.77	2.03	3.28	0.00	0.00
13	-2.29	2.91	8.10	-2.29	2.91	8.10	0.00	0.00
14	-0.88	3.19	7.25	-0.88	3.19	7.25	0.00	0.00
15	4.79	2.03	-0.72	4.79	2.03	-0.72	0.00	0.00
16	4.46	2.84	1.22	4.46	2.84	1.22	0.00	0.00
17	-0.77	6.99	14.74	-0.77	6.99	14.74	0.00	0.00
18	-5.64	4.95	15.53	-5.64	4.95	15.53	0.00	0.00
19	2.32	3.21	4.10	2.32	3.21	4.10	0.00	0.00
20	-0.92	2.88	6.69	-0.92	2.88	6.69	0.00	0.00
21	0.80	2.83	4.86	0.80	2.83	4.86	0.00	0.00
22	3.94	2.03	0.11	3.94	2.03	0.11	0.00	0.00
24	-6.64	4.27	15.18	-6.64	4.27	15.18	0.00	0.00
25	9.31	11.30	13.30	9.31	11.30	13.30	0.00	0.00
26	13.86	3.97	-5.92	13.86	3.97	-5.92	0.00	0.00
27	14.39	4.61	-5.18	14.39	4.61	-5.18	0.00	0.00
28	9.50	7.23	4.96	9.50	7.23	4.96	0.00	0.00
29	6.92	3.30	-0.33	6.92	3.30	-0.33	0.00	0.00
30	-7.11	4.30	15.70	-7.11	4.30	15.70	0.00	0.00

bearing forces of the walls in action 5: wind loads

minimum and maximum forces in the wall-floor joint (characteristic) at the start, in the centre and at the end of the plate

wall	max qa	max qm	max qe	min qa	min qm	min qe	max H	min H
-	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m	kN	kN
1	11.70	0.12	11.78	-11.70	-0.12	-11.78	3.94	-3.94
2	16.75	0.20	16.66	-16.75	-0.20	-16.66	0.22	-0.22
3	14.70	0.13	14.68	-14.70	-0.13	-14.68	1.11	-1.11
4	13.32	0.11	13.23	-13.32	-0.11	-13.23	2.19	-2.19
5	15.52	0.17	15.56	-15.52	-0.17	-15.56	0.67	-0.67
6	26.98	0.14	26.71	-26.98	-0.14	-26.71	0.61	-0.61
7	19.71	0.08	19.55	-19.71	-0.08	-19.55	5.19	-5.19
8	14.67	0.07	14.64	-14.67	-0.07	-14.64	0.16	-0.16
9	9.16	0.03	9.11	-9.16	-0.03	-9.11	4.54	-4.54
10	11.13	0.03	11.08	-11.13	-0.03	-11.08	10.72	-10.72
11	10.87	0.03	10.82	-10.87	-0.03	-10.82	10.81	-10.81
12	22.68	0.06	22.60	-22.68	-0.06	-22.60	3.01	-3.01
13	21.77	0.04	21.69	-21.77	-0.04	-21.69	0.85	-0.85
14	12.25	0.01	12.25	-12.25	-0.01	-12.25	1.54	-1.54

bearing forces of the walls in action 5: wind loads

minimum and maximum forces in the wall-floor joint (characteristic) at the start, in the centre and at the end of the plate

wall	max qa	max qm	max qe	min qa	min qm	min qe	max H	min H
-	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m	kN	kN
15	24.24	0.07	24.24	-24.24	-0.07	-24.24	1.42	-1.42
16	10.36	0.03	10.42	-10.36	-0.03	-10.42	3.46	-3.46
17	20.14	0.02	20.17	-20.14	-0.02	-20.17	1.68	-1.68
18	19.46	0.03	19.52	-19.46	-0.03	-19.52	2.01	-2.01
19	9.92	0.03	9.86	-9.92	-0.03	-9.86	4.06	-4.06
20	20.27	0.05	20.36	-20.27	-0.05	-20.36	5.16	-5.16
21	27.21	0.11	27.40	-27.21	-0.11	-27.40	0.24	-0.24
22	15.33	0.06	15.44	-15.33	-0.06	-15.44	1.46	-1.46
24	27.62	0.16	27.93	-27.62	-0.16	-27.93	0.14	-0.14
25	26.54	0.15	26.84	-26.54	-0.15	-26.84	0.44	-0.44
26	26.66	0.19	27.04	-26.66	-0.19	-27.04	0.61	-0.61
27	26.24	0.20	26.65	-26.24	-0.20	-26.65	0.51	-0.51
28	14.36	0.17	14.33	-14.36	-0.17	-14.33	2.90	-2.90
29	11.64	0.12	11.68	-11.64	-0.12	-11.68	5.69	-5.69
30	17.51	0.24	17.34	-17.51	-0.24	-17.34	0.67	-0.67

8.2. bearing forces of the walls in the permanent and temporary design situation

minimum and maximum forces in the wall-floor joint (factorised) at the start, in the centre and at the end of the plate

wall	max qa	max qm	max qe	min qa	min qm	min qe	max H	min H
-	kN/m	kN/m	kN/m	kN/m	kN/m	kN/m	kN	kN
1	32.58	9.78	20.29	-10.50	4.32	-15.80	5.91	-5.91
2	47.61	23.59	44.22	-14.84	9.32	-16.04	0.34	-0.34
3	27.26	9.65	34.17	-18.99	4.29	-16.13	1.66	-1.66
4	21.17	9.25	36.57	-20.34	4.14	-12.13	3.29	-3.29
5	41.74	10.63	25.05	-14.71	4.66	-23.17	1.00	-1.00
6	39.51	10.95	64.52	-45.25	4.81	-29.09	0.92	-0.92
7	30.62	12.11	51.32	-30.11	5.21	-19.45	7.78	-7.78
8	51.65	12.20	19.63	-9.04	5.22	-29.74	0.24	-0.24
9	21.35	12.53	28.40	-9.97	5.18	-6.98	6.81	-6.81
10	18.32	14.42	40.88	-15.75	5.84	-6.05	16.09	-16.09
11	22.41	15.96	38.45	-13.18	6.39	-6.51	16.22	-16.22
12	39.12	9.75	46.46	-31.01	4.44	-27.85	4.51	-4.51
13	31.61	12.28	58.98	-37.10	5.22	-20.96	1.27	-1.27
14	19.05	12.97	42.05	-19.05	5.42	-8.00	2.31	-2.31
15	53.51	9.89	38.09	-28.38	4.53	-36.04	2.13	-2.13
16	30.86	11.75	21.29	-8.60	4.92	-12.63	5.19	-5.19
17	31.02	25.87	76.14	-30.62	9.99	-10.81	2.52	-2.52
18	23.96	19.05	77.64	-43.77	7.59	-8.79	3.02	-3.02
19	23.75	12.94	28.97	-10.59	5.33	-8.34	6.09	-6.09
20	31.59	12.56	53.14	-30.76	5.42	-20.42	7.75	-7.75
21	46.79	13.35	59.17	-37.16	5.95	-32.50	0.36	-0.36
22	37.66	9.90	26.44	-16.02	4.56	-20.84	2.19	-2.19
24	36.46	18.85	91.21	-57.00	8.05	-20.37	0.21	-0.21
25	70.65	41.80	82.98	-26.15	15.85	-21.75	0.65	-0.65
26	84.16	16.67	35.58	-20.94	6.74	-55.17	0.92	-0.92
27	85.21	18.93	35.96	-19.61	7.56	-52.30	0.77	-0.77
28	52.57	27.55	39.02	-7.94	10.60	-13.41	4.35	-4.35
29	40.63	13.92	19.57	-7.13	5.73	-16.45	8.54	-8.54
30	19.94	17.98	75.84	-44.26	7.18	-4.62	1.01	-1.01

8.3. bearing forces of the walls in the exceptional design situation

minimum and maximum forces in the wall-floor joint (factorised) at the start, in the centre and at the end of the plate

wall -	max qa kN/m	max qm kN/m	max qe kN/m	min qa kN/m	min qm kN/m	min qe kN/m	max H kN	min H kN
1	14.72	7.52	4.30	4.70	4.47	-0.48	0.79	-0.79
2	19.83	18.36	19.19	6.93	9.58	5.62	0.04	-0.04
3	7.05	7.41	12.88	0.12	4.45	2.95	0.22	-0.22
4	3.54	7.11	16.44	-2.98	4.28	5.08	0.44	-0.44
5	18.34	8.14	4.38	5.46	4.88	-2.91	0.13	-0.13
6	4.44	8.42	25.62	-9.72	4.98	5.64	0.12	-0.12
7	4.72	9.39	22.15	-4.45	5.31	5.97	1.04	-1.04
8	27.62	9.48	0.60	10.03	5.31	-9.74	0.03	-0.03
9	8.03	9.79	14.02	1.94	5.22	4.86	0.91	-0.91
10	3.43	11.29	22.45	-1.27	5.88	8.35	2.14	-2.14
11	7.11	12.51	20.67	0.96	6.42	7.56	2.16	-2.16
12	8.54	7.53	14.80	-1.53	4.52	1.54	0.60	-0.60
13	3.32	9.57	26.35	-8.33	5.27	7.24	0.17	-0.17
14	2.95	10.15	22.16	-3.08	5.44	7.93	0.31	-0.31
15	18.99	7.64	6.13	3.13	4.61	-4.50	0.28	-0.28
16	14.76	9.17	6.65	4.87	4.96	0.91	0.69	-0.69
17	4.63	20.36	42.45	-4.41	10.02	15.40	0.34	-0.34
18	-1.34	14.95	44.39	-16.39	7.62	16.59	0.40	-0.40
19	9.25	10.12	13.71	2.30	5.37	4.48	0.81	-0.81
20	4.93	9.77	22.82	-4.37	5.49	6.05	1.03	-1.03
21	10.11	10.30	20.33	-1.79	6.10	3.11	0.05	-0.05
22	15.11	7.64	5.55	3.91	4.63	-0.77	0.29	-0.29
24	0.55	14.60	46.67	-19.05	8.25	15.95	0.03	-0.03
25	30.95	32.81	38.19	8.35	16.05	13.14	0.09	-0.09
26	42.22	12.91	0.43	13.71	6.99	-18.00	0.12	-0.12
27	43.53	14.68	1.32	14.50	7.83	-16.01	0.10	-0.10
28	28.70	21.54	17.34	10.73	10.81	5.22	0.58	-0.58
29	21.57	10.80	3.85	8.00	5.90	-1.25	1.14	-1.14
30	-2.81	13.90	45.09	-18.97	7.49	17.93	0.13	-0.13

9. extreme verification loads

9.1. permanent and temporary design situation

extreme wall loads (SUV)

for the permanent and temporary design situation

wall -		qa kN/m	qe kN/m	H kN	from load case -
1	max qa	**18.55**	0.72	-3.55	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	6.62	**5.64**	5.91	1.35*[1]+1.50*[5]
	max H	4.15	4.95	**5.91**	[1]+1.50*[5]
	max V	16.92	2.63	0.07	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	12.14	5.56	5.91	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Me	17.92	-0.46	-5.91	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qe	15.45	**-1.14**	-5.91	[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min H	9.93	-1.07	**-5.91**	[1]+1.50*[8]
	min V	6.87	1.77	-0.11	[1]+1.50*[14]
2	max qa	**26.26**	20.64	-0.20	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	24.29	**22.46**	0.20	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max H	8.63	10.47	**0.34**	[1]+1.50*[5]
	max V	25.45	21.73	0.00	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	20.84	20.75	0.34	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Me	24.13	17.72	-0.34	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qe	11.93	**7.44**	-0.34	[1]+1.50*[8]
	min V	9.98	8.65	-0.01	[1]+1.50*[14]
3	max qa	**7.18**	10.21	-1.66	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	max qe	4.39	**14.67**	1.00	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max H	1.10	7.83	**1.66**	[1]+1.50*[5]
	max V	5.68	13.62	0.02	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	3.25	14.09	1.66	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]

extreme wall loads (SUV)

for the permanent and temporary design situation

wall -		qa kN/m	qe kN/m	H kN	from load case -
	min qe	5.02	**3.95**	-1.66	[1]+1.50*[8]
	min V	2.87	5.70	-0.03	[1]+1.50*[14]
4	max qa	**3.53**	8.23	-3.29	1.35*[1]+1.50*[8]
	max qe	-1.85	**20.07**	1.97	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max H	-1.46	9.93	**3.29**	[1]+1.50*[5]
	max V	-0.35	18.85	0.04	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	-2.39	18.92	3.29	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Me	2.29	14.51	-3.29	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qa	**-2.69**	16.22	3.29	[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	min qe	3.22	**5.52**	-3.29	[1]+1.50*[8]
	min V	0.71	7.56	-0.06	[1]+1.50*[14]
5	max qa	**21.80**	-0.89	-0.60	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	9.74	**3.60**	1.00	1.35*[1]+1.50*[5]
	max H	6.74	3.16	**1.00**	[1]+1.50*[5]
	max V	20.86	0.40	0.01	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	16.64	2.50	1.00	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Me	20.30	-1.29	-1.00	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qe	17.30	**-1.73**	-1.00	[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min H	10.39	-0.62	**-1.00**	[1]+1.50*[8]
	min V	8.31	1.01	-0.02	[1]+1.50*[14]
6	max qa	**1.79**	8.64	-0.92	[1]+1.50*[11]
	max qe	-7.56	**28.97**	0.55	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-3.71	13.33	**0.92**	[1]+1.50*[14]
	max V	-4.25	26.16	-0.55	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	-7.53	26.79	0.92	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	-2.03	22.10	-0.92	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	max Va	1.45	12.48	-0.92	1.35*[1]+1.50*[11]
	min Va	-7.19	22.95	0.92	[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
7	max qa	**5.03**	9.59	-7.78	1.35*[1]+1.50*[11]
	max qe	-3.09	**27.03**	4.67	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-3.20	13.62	**7.78**	[1]+1.50*[14]
	max V	1.68	22.54	-4.67	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	-4.25	25.73	7.78	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	3.70	18.24	-7.78	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	min qa	**-4.53**	22.27	7.78	[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	min qe	4.76	**6.13**	-7.78	[1]+1.50*[11]
8	max qa	**34.27**	-9.95	-0.15	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	11.81	**-1.21**	0.24	[1]+1.50*[5]
	max V	33.63	-9.23	0.00	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	28.48	-6.67	0.24	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Me	30.80	-8.89	-0.24	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	max Ve	16.35	-2.03	0.24	1.35*[1]+1.50*[5]
	min H	14.13	-3.43	**-0.24**	[1]+1.50*[8]
	min V	12.87	-2.43	0.00	[1]+1.50*[14]
	min Ve	26.26	-8.08	-0.24	[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
9	max qa	**10.13**	12.28	-6.81	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	max qe	6.91	**18.05**	4.09	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max H	1.25	9.13	**6.81**	[1]+1.50*[5]
	max V	8.45	16.61	0.03	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	5.08	17.18	6.81	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	min qe	6.30	**4.24**	-6.81	[1]+1.50*[8]
	min V	3.73	6.64	-0.06	[1]+1.50*[14]
10	max qa	**6.17**	9.79	-16.09	1.35*[1]+1.50*[11]
	max qe	-1.45	**30.19**	9.65	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-3.35	15.03	**16.09**	[1]+1.50*[14]
	max V	4.01	24.83	-9.65	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	-3.18	28.74	16.09	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	5.91	19.80	-16.09	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	min qa	**-3.60**	25.04	16.09	[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	min qe	5.75	**6.09**	-16.09	[1]+1.50*[11]

extreme wall loads (SUV)

for the permanent and temporary design situation

wall		qa	qe	H	from load case
-		kN/m	kN/m	kN	-
11	max qa	**10.65**	17.75	-16.22	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	max qe	3.97	**27.84**	9.73	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-1.42	14.19	**16.22**	[1]+1.50*[14]
	max V	9.43	22.48	-9.73	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ve	1.55	26.69	16.22	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	min qe	7.68	**5.25**	-16.22	[1]+1.50*[11]
12	max qa	**8.48**	9.29	-4.51	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	max qe	3.40	**15.93**	2.71	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-0.38	9.32	**4.51**	[1]+1.50*[14]
	max V	5.48	14.02	-0.12	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max Ma	1.71	15.82	4.51	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	min qe	6.39	**2.79**	-4.51	[1]+1.50*[11]
	min V	2.92	5.97	0.19	[1]+1.50*[5]
13	max qa	**1.06**	9.60	-1.27	[1]+1.50*[11]
	max qe	-6.69	**31.12**	0.76	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-3.13	13.57	**1.27**	[1]+1.50*[14]
	max V	-4.18	28.74	-0.76	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	-6.54	28.42	1.27	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	-2.35	24.45	-1.27	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	max Va	0.70	13.65	-1.27	1.35*[1]+1.50*[11]
	min Va	-6.18	24.37	1.27	[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
14	max qa	**2.35**	12.33	-2.31	1.35*[1]+1.50*[8]
	max qe	-1.89	**27.81**	1.38	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max H	-1.18	12.05	**2.31**	[1]+1.50*[5]
	max V	-0.87	26.81	0.00	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	-2.18	25.35	2.31	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Me	1.18	22.00	-2.31	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qa	**-2.35**	21.72	2.31	[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	min qe	2.18	**8.70**	-2.31	[1]+1.50*[8]
	min V	0.49	10.36	-0.01	[1]+1.50*[14]
15	max qa	**20.92**	-1.24	-1.28	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max qe	7.94	**4.56**	2.13	1.35*[1]+1.50*[14]
	max H	5.15	4.11	**2.13**	[1]+1.50*[14]
	max V	19.28	0.51	-0.05	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max Ma	14.32	3.60	2.13	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	19.98	-2.06	-2.13	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	min qe	17.19	**-2.51**	-2.13	[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	min H	10.80	-1.55	**-2.13**	[1]+1.50*[11]
	min V	7.88	1.18	0.09	[1]+1.50*[8]
16	max qa	**18.55**	4.84	-3.12	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	13.16	**7.92**	5.19	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max H	4.77	5.25	**5.19**	[1]+1.50*[5]
	max V	15.95	7.55	3.12	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max Me	17.49	3.41	-5.19	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qe	9.11	**0.74**	-5.19	[1]+1.50*[8]
17	max qa	**2.97**	24.04	-2.52	1.35*[1]+1.50*[11]
	max qe	-1.83	**53.57**	1.51	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-1.55	21.64	**2.52**	[1]+1.50*[14]
	max V	-0.52	52.27	-0.03	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max Me	1.95	43.69	-2.52	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	max Ve	-2.36	48.09	2.52	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	min qa	**-2.57**	41.29	2.52	[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	min qe	2.76	**17.24**	-2.52	[1]+1.50*[11]
	min V	0.57	19.41	0.05	[1]+1.50*[5]
18	max qa	**-2.82**	17.99	-3.02	[1]+1.50*[11]
	max qe	-18.47	**56.57**	1.81	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-7.65	22.99	**3.02**	[1]+1.50*[14]
	max Ma	-17.00	50.87	3.02	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	-12.17	45.87	-3.02	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
19	max qa	**11.24**	14.64	-3.66	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]

extreme wall loads (SUV)

for the permanent and temporary design situation

wall -		qa kN/m	qe kN/m	H kN	from load case -
	max qe	8.52	**17.26**	3.66	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max H	2.02	8.64	**6.09**	[1]+1.50*[5]
	max Ma	6.61	16.36	6.09	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Me	11.14	11.99	-6.09	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qe	6.55	**4.27**	-6.09	[1]+1.50*[8]
20	max qa	**4.97**	9.75	-7.75	1.35*[1]+1.50*[11]
	max qe	-2.72	**27.83**	4.65	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-2.91	14.05	**7.75**	[1]+1.50*[14]
	max V	-0.40	25.53	-0.20	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max Ma	-3.83	26.51	7.75	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	3.74	18.67	-7.75	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	min qa	**-4.14**	22.97	7.75	[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	min qe	4.66	**6.20**	-7.75	[1]+1.50*[11]
	min V	0.80	10.05	0.33	[1]+1.50*[5]
21	max qa	**7.97**	15.81	-0.36	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	max qe	5.14	**21.53**	0.21	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	1.67	10.85	**0.36**	[1]+1.50*[14]
	max V	6.43	20.28	-0.01	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max Ma	4.00	20.34	0.36	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	min qe	5.63	**6.32**	-0.36	[1]+1.50*[11]
	min V	3.48	8.42	0.02	[1]+1.50*[8]
22	max qa	**17.64**	1.95	-1.31	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	12.55	**5.57**	2.19	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max H	4.85	4.61	**2.19**	[1]+1.50*[5]
	max V	16.42	3.38	0.01	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max Me	16.78	0.99	-2.19	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qe	9.09	**0.03**	-2.19	[1]+1.50*[8]
	min V	6.88	2.23	-0.01	[1]+1.50*[11]
24	max qa	**-3.43**	19.52	-0.21	[1]+1.50*[11]
	max qe	-19.36	**57.07**	0.12	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-6.52	23.55	**0.21**	[1]+1.50*[14]
	max Ma	-17.12	51.32	0.21	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	-14.02	47.29	-0.21	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
25	max qa	**36.18**	46.87	-0.39	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max qe	33.54	**50.05**	0.39	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	11.46	21.15	**0.65**	[1]+1.50*[14]
	max Ma	28.65	45.37	0.65	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	33.04	40.07	-0.65	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	min qe	15.85	**15.86**	-0.65	[1]+1.50*[11]
26	max qa	**51.52**	-18.86	-0.55	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max qe	16.78	**-2.14**	0.92	[1]+1.50*[14]
	max V	48.80	-15.46	0.55	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max Ma	41.92	-11.77	0.92	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	46.44	-17.45	-0.92	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	min H	21.30	-7.82	**-0.92**	[1]+1.50*[11]
27	max qa	**53.36**	-16.23	-0.46	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max qe	17.57	**-1.22**	0.77	[1]+1.50*[14]
	max V	50.74	-12.88	0.46	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max Ma	43.66	-9.53	0.77	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	48.03	-15.12	-0.77	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	max Ve	24.48	-2.63	0.77	1.35*[1]+1.50*[14]
	min H	21.94	-6.81	**-0.77**	[1]+1.50*[11]
	min Ve	41.12	-13.71	-0.77	[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
28	max qa	**36.69**	18.13	-2.61	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	33.56	**21.20**	2.61	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max H	11.00	10.65	**4.35**	[1]+1.50*[5]
	max V	35.28	19.81	0.05	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max Ma	28.42	20.09	4.35	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Va	33.63	14.97	-4.35	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qe	16.21	**5.53**	-4.35	[1]+1.50*[8]

extreme wall loads (SUV)

for the permanent and temporary design situation

wall -		qa kN/m	qe kN/m	H kN	from load case -
	min V	13.35	7.84	-0.08	[1]+1.50*[11]
29	max qa	**27.93**	-0.34	-5.12	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	10.99	**5.06**	8.54	1.35*[1]+1.50*[5]
	max H	7.38	4.53	**8.54**	[1]+1.50*[5]
	max V	26.27	1.57	0.10	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max Ma	20.22	4.62	8.54	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Me	26.12	-1.41	-8.54	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qe	22.51	**-1.94**	-8.54	[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min H	13.28	-1.50	**-8.54**	[1]+1.50*[8]
	min V	10.14	1.33	-0.16	[1]+1.50*[11]
30	max qa	**-4.36**	19.68	-1.01	[1]+1.50*[8]
	max qe	-22.25	**57.63**	0.61	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max H	-8.28	23.12	**1.01**	[1]+1.50*[5]
	max V	-20.86	56.82	0.01	1.35*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max Me	-16.04	48.11	-1.01	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	max Ve	-19.96	51.54	1.01	1.35*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	min V	-6.67	21.04	-0.02	[1]+1.50*[11]

9.2. exceptional design situation

9.3. safety against displacement

extreme wall loads (EQU)

for the calculation of safety against displacement

wall -		qa kN/m	qe kN/m	H kN	from load case -
1	max qa	**16.79**	0.23	-3.55	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	4.86	**5.15**	5.91	1.10*[1]+1.50*[5]
	max H	3.45	4.76	**5.91**	0.90*[1]+1.50*[5]
	max V	15.16	2.15	0.07	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	10.38	5.08	5.91	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Me	16.16	-0.95	-5.91	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qe	14.75	**-1.33**	-5.91	0.90*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min H	9.23	-1.26	**-5.91**	0.90*[1]+1.50*[8]
	min V	6.17	1.57	-0.11	0.90*[1]+1.50*[14]
2	max qa	**23.69**	18.40	-0.20	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	21.72	**20.22**	0.20	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max H	7.61	9.57	**0.34**	0.90*[1]+1.50*[5]
	max V	22.88	19.49	0.00	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	18.27	18.51	0.34	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Me	21.56	15.48	-0.34	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qe	10.90	**6.54**	-0.34	0.90*[1]+1.50*[8]
	min V	8.96	7.76	-0.01	0.90*[1]+1.50*[14]
3	max qa	**6.42**	8.74	-1.66	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	max qe	3.63	**13.20**	1.00	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max H	0.79	7.24	**1.66**	0.90*[1]+1.50*[5]
	max V	4.92	12.15	0.02	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	2.49	12.61	1.66	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	min qe	4.72	**3.36**	-1.66	0.90*[1]+1.50*[8]
	min V	2.57	5.11	-0.03	0.90*[1]+1.50*[14]
4	max qa	**3.31**	6.29	-3.29	1.10*[1]+1.50*[8]
	max qe	-2.07	**18.14**	1.97	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max H	-1.55	9.16	**3.29**	0.90*[1]+1.50*[5]
	max V	-0.57	16.92	0.04	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	-2.61	16.99	3.29	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Me	2.07	12.58	-3.29	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qa	**-2.78**	15.44	3.29	0.90*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	min qe	3.13	**4.75**	-3.29	0.90*[1]+1.50*[8]

extreme wall loads (EQU)

for the calculation of safety against displacement

wall -		qa kN/m	qe kN/m	H kN	from load case -
	min V	0.63	6.79	-0.06	0.90*[1]+1.50*[14]
5	**max qa**	**19.66**	-1.20	-0.60	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	7.60	**3.29**	1.00	1.10*[1]+1.50*[5]
	max H	5.88	3.03	**1.00**	0.90*[1]+1.50*[5]
	max V	18.71	0.08	0.01	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	14.50	2.18	1.00	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Me	18.16	-1.60	-1.00	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qe	16.44	**-1.86**	-1.00	0.90*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min H	9.54	-0.75	**-1.00**	0.90*[1]+1.50*[8]
	min V	7.46	0.89	-0.02	0.90*[1]+1.50*[14]
6	**max qa**	**1.89**	7.54	-0.92	0.90*[1]+1.50*[11]
	max qe	-7.32	**26.23**	0.55	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-3.62	12.23	**0.92**	0.90*[1]+1.50*[14]
	max V	-4.01	23.41	-0.55	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	-7.29	24.05	0.92	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	-1.79	19.36	-0.92	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	max Va	1.70	9.73	-0.92	1.10*[1]+1.50*[11]
	min Va	-7.10	21.85	0.92	0.90*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
7	**max qa**	**4.83**	7.12	-7.78	1.10*[1]+1.50*[11]
	max qe	-3.29	**24.57**	4.67	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-3.28	12.63	**7.78**	0.90*[1]+1.50*[14]
	max V	1.49	20.07	-4.67	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	-4.45	23.26	7.78	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	3.51	15.77	-7.78	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	min qa	**-4.61**	21.29	7.78	0.90*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	min qe	4.68	**5.15**	-7.78	0.90*[1]+1.50*[11]
8	**max qa**	**31.03**	-9.37	-0.15	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	10.51	**-0.98**	0.24	0.90*[1]+1.50*[5]
	max V	30.39	-8.65	0.00	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	25.24	-6.09	0.24	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Me	27.56	-8.31	-0.24	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	max Ve	13.10	-1.45	0.24	1.10*[1]+1.50*[5]
	min H	12.83	-3.20	**-0.24**	0.90*[1]+1.50*[8]
	min V	11.57	-2.19	0.00	0.90*[1]+1.50*[14]
	min Ve	24.97	-7.85	-0.24	0.90*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
9	**max qa**	**9.19**	10.61	-6.81	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	max qe	5.96	**16.37**	4.09	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max H	0.87	8.46	**6.81**	0.90*[1]+1.50*[5]
	max V	7.51	14.94	0.03	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	4.14	15.51	6.81	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	min qe	5.92	**3.57**	-6.81	0.90*[1]+1.50*[8]
	min V	3.35	5.97	-0.06	0.90*[1]+1.50*[14]
10	**max qa**	**5.87**	7.15	-16.09	1.10*[1]+1.50*[11]
	max qe	-1.75	**27.55**	9.65	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-3.47	13.97	**16.09**	0.90*[1]+1.50*[14]
	max V	3.71	22.19	-9.65	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	-3.48	26.10	16.09	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	5.61	17.16	-16.09	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	min qa	**-3.72**	23.98	16.09	0.90*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	min qe	5.63	**5.04**	-16.09	0.90*[1]+1.50*[11]
11	**max qa**	**9.87**	15.32	-16.22	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	max qe	3.19	**25.42**	9.73	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-1.73	13.22	**16.22**	0.90*[1]+1.50*[14]
	max V	8.65	20.05	-9.73	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ve	0.76	24.26	16.22	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	min qe	7.37	**4.28**	-16.22	0.90*[1]+1.50*[11]
12	**max qa**	**7.73**	7.77	-4.51	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	max qe	2.64	**14.41**	2.71	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-0.68	8.72	**4.51**	0.90*[1]+1.50*[14]
	max V	4.73	12.51	-0.12	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]

extreme wall loads (EQU)

for the calculation of safety against displacement

wall -		qa kN/m	qe kN/m	H kN	from load case -
	max Ma	0.96	14.30	4.51	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	min qe	6.09	**2.19**	-4.51	0.90*[1]+1.50*[11]
	min V	2.62	5.36	0.19	0.90*[1]+1.50*[5]
13	max qa	**1.16**	8.44	-1.27	0.90*[1]+1.50*[11]
	max qe	-6.43	**28.23**	0.76	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-3.03	12.41	**1.27**	0.90*[1]+1.50*[14]
	max V	-3.92	25.84	-0.76	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	-6.28	25.52	1.27	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	-2.09	21.55	-1.27	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	max Va	0.95	10.75	-1.27	1.10*[1]+1.50*[11]
	min Va	-6.08	23.21	1.27	0.90*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
14	max qa	**2.23**	9.74	-2.31	1.10*[1]+1.50*[8]
	max qe	-2.01	**25.22**	1.38	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max H	-1.23	11.02	**2.31**	0.90*[1]+1.50*[5]
	max V	-1.00	24.22	0.00	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max Ma	-2.30	22.76	2.31	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Me	1.06	19.40	-2.31	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qa	**-2.40**	20.68	2.31	0.90*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	min qe	2.13	**7.66**	-2.31	0.90*[1]+1.50*[8]
	min V	0.44	9.32	-0.01	0.90*[1]+1.50*[14]
15	max qa	**18.92**	-1.56	-1.28	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max qe	5.94	**4.24**	2.13	1.10*[1]+1.50*[14]
	max H	4.35	3.98	**2.13**	0.90*[1]+1.50*[14]
	max V	17.28	0.19	-0.05	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max Ma	12.33	3.28	2.13	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	17.99	-2.38	-2.13	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	min qe	16.39	**-2.64**	-2.13	0.90*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	min H	10.01	-1.68	**-2.13**	0.90*[1]+1.50*[11]
	min V	7.08	1.05	0.09	0.90*[1]+1.50*[8]
16	max qa	**16.81**	4.09	-3.12	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	11.42	**7.17**	5.19	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max H	4.08	4.95	**5.19**	0.90*[1]+1.50*[5]
	max V	14.21	6.80	3.12	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max Me	15.75	2.67	-5.19	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qe	8.41	**0.44**	-5.19	0.90*[1]+1.50*[8]
17	max qa	**2.82**	19.18	-2.52	1.10*[1]+1.50*[11]
	max qe	-1.98	**48.71**	1.51	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-1.61	19.69	**2.52**	0.90*[1]+1.50*[14]
	max V	-0.67	47.41	-0.03	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max Me	1.80	38.83	-2.52	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	max Ve	-2.51	43.23	2.52	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	min qa	**-2.64**	39.34	2.52	0.90*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	min qe	2.70	**15.29**	-2.52	0.90*[1]+1.50*[11]
	min V	0.51	17.46	0.05	0.90*[1]+1.50*[5]
18	max qa	**-2.30**	15.94	-3.02	0.90*[1]+1.50*[11]
	max qe	-17.16	**51.45**	1.81	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-7.12	20.94	**3.02**	0.90*[1]+1.50*[14]
	max Ma	-15.69	45.74	3.02	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	-10.86	40.75	-3.02	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
19	max qa	**10.16**	13.02	-3.66	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	7.45	**15.64**	3.66	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max H	1.59	7.99	**6.09**	0.90*[1]+1.50*[5]
	max Ma	5.54	14.75	6.09	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Me	10.07	10.38	-6.09	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qe	6.12	**3.62**	-6.09	0.90*[1]+1.50*[8]
20	max qa	**4.75**	7.22	-7.75	1.10*[1]+1.50*[11]
	max qe	-2.94	**25.30**	4.65	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-3.00	13.04	**7.75**	0.90*[1]+1.50*[14]
	max V	-0.62	22.99	-0.20	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max Ma	-4.05	23.98	7.75	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]

extreme wall loads (EQU)

for the calculation of safety against displacement

wall -		qa kN/m	qe kN/m	H kN	from load case -
	max Me	3.52	16.14	-7.75	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	min qa	**-4.23**	21.96	7.75	0.90*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	min qe	4.58	**5.19**	-7.75	0.90*[1]+1.50*[11]
	min V	0.71	9.03	0.33	0.90*[1]+1.50*[5]
21	max qa	**7.05**	13.67	-0.36	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	max qe	4.23	**19.39**	0.21	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	1.30	9.99	**0.36**	0.90*[1]+1.50*[14]
	max V	5.52	18.13	-0.01	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max Ma	3.09	18.19	0.36	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	min qe	5.26	**5.47**	-0.36	0.90*[1]+1.50*[11]
	min V	3.11	7.56	0.02	0.90*[1]+1.50*[8]
22	max qa	**15.90**	1.37	-1.31	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	10.81	**4.99**	2.19	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max H	4.16	4.38	**2.19**	0.90*[1]+1.50*[5]
	max V	14.68	2.80	0.01	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max Me	15.04	0.41	-2.19	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qe	8.39	**-0.20**	-2.19	0.90*[1]+1.50*[8]
	min V	6.18	2.00	-0.01	0.90*[1]+1.50*[11]
24	max qa	**-2.93**	17.37	-0.21	0.90*[1]+1.50*[11]
	max qe	-18.12	**51.68**	0.12	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	-6.02	21.40	**0.21**	0.90*[1]+1.50*[14]
	max Ma	-15.87	45.94	0.21	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	-12.78	41.91	-0.21	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
25	max qa	**32.76**	42.24	-0.39	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max qe	30.13	**45.42**	0.39	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max H	10.10	19.30	**0.65**	0.90*[1]+1.50*[14]
	max Ma	25.24	40.74	0.65	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	29.62	35.44	-0.65	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	min qe	14.48	**14.01**	-0.65	0.90*[1]+1.50*[11]
26	max qa	**46.76**	-17.62	-0.55	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max qe	14.88	**-1.64**	0.92	0.90*[1]+1.50*[14]
	max V	44.04	-14.21	0.55	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max Ma	37.16	-10.52	0.92	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	41.68	-16.20	-0.92	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	min H	19.40	-7.32	**-0.92**	0.90*[1]+1.50*[11]
27	max qa	**48.43**	-15.23	-0.46	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[11]
	max qe	15.59	**-0.82**	0.77	0.90*[1]+1.50*[14]
	max V	45.81	-11.87	0.46	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max Ma	38.72	-8.52	0.77	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[14]
	max Me	43.09	-14.11	-0.77	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
	max Ve	19.54	-1.62	0.77	1.10*[1]+1.50*[14]
	min H	19.96	-6.41	**-0.77**	0.90*[1]+1.50*[11]
	min Ve	39.14	-13.31	-0.77	0.90*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[11]
28	max qa	**33.28**	16.11	-2.61	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	30.16	**19.18**	2.61	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max H	9.64	9.84	**4.35**	0.90*[1]+1.50*[5]
	max V	31.87	17.79	0.05	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max Ma	25.02	18.06	4.35	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Va	30.23	12.94	-4.35	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qe	14.85	**4.72**	-4.35	0.90*[1]+1.50*[8]
	min V	11.99	7.03	-0.08	0.90*[1]+1.50*[11]
29	max qa	**25.35**	-0.72	-5.12	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[8]
	max qe	8.41	**4.68**	8.54	1.10*[1]+1.50*[5]
	max H	6.34	4.38	**8.54**	0.90*[1]+1.50*[5]
	max V	23.69	1.20	0.10	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max Ma	17.64	4.24	8.54	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	max Me	23.54	-1.79	-8.54	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min qe	21.47	**-2.09**	-8.54	0.90*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	min H	12.24	-1.65	**-8.54**	0.90*[1]+1.50*[8]
	min V	9.11	1.18	-0.16	0.90*[1]+1.50*[11]

extreme wall loads (EQU)

for the calculation of safety against displacement

wall -		qa kN/m	qe kN/m	H kN	from load case -
30	max qa	**-3.72**	17.54	-1.01	0.90*[1]+1.50*[8]
	max qe	-20.67	**52.28**	0.61	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[5]
	max H	-7.64	20.98	**1.01**	0.90*[1]+1.50*[5]
	max V	-19.28	51.47	0.01	1.10*[1]+1.50*[2]+0.50*1.50*[3]+0.60*1.50*[14]
	max Me	-14.46	42.76	-1.01	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[8]
	max Ve	-18.39	46.19	1.01	1.10*[1]+0.70*1.50*[2]+0.50*1.50*[3]+1.50*[5]
	min V	-6.04	18.90	-0.02	0.90*[1]+1.50*[11]

9.4. quasi-permanent combination

9.5. frequent combination

9.6. rare combination

10. extreme panel deformations

extreme corner point displacements (QS)

for the quasi-permanent combination

point -	at m		ux mm	uy mm	uz mm	from load case -
1	x = 0.00	max ux	**0.0000**	0.0000	-0.0430	[1]
	y = 0.00	max uy	0.0000	**0.0000**	-0.0430	[1]
		max uz	0.0000	0.0000	**-0.0430**	[1]
		min ux	**0.0000**	0.0000	-0.0430	[1]
		min uy	0.0000	**0.0000**	-0.0430	[1]
		min uz	0.0000	0.0000	**-0.0617**	[1]+0.30*[2]
2	x = 11.20	max ux	**0.0000**	0.0000	-0.2171	[1]
	y = 0.00	max uy	0.0000	**0.0000**	-0.2171	[1]
		max uz	0.0000	0.0000	**-0.2171**	[1]
		min ux	**0.0000**	0.0000	-0.2171	[1]
		min uy	0.0000	**0.0000**	-0.2171	[1]
		min uz	0.0000	0.0000	**-0.2723**	[1]+0.30*[2]
3	x = 0.00	max ux	**0.0000**	0.0000	0.3972	[1]
	y = 9.70	max uy	0.0000	**0.0000**	0.3972	[1]
		max uz	0.0000	0.0000	**0.4873**	[1]+0.30*[2]
		min ux	**0.0000**	0.0000	0.3972	[1]
		min uy	0.0000	**0.0000**	0.3972	[1]
		min uz	0.0000	0.0000	**0.3972**	[1]
4	x = 11.20	max ux	**0.0000**	0.0000	0.2231	[1]
	y = 9.70	max uy	0.0000	**0.0000**	0.2231	[1]
		max uz	0.0000	0.0000	**0.2768**	[1]+0.30*[2]
		min ux	**0.0000**	0.0000	0.2231	[1]
		min uy	0.0000	**0.0000**	0.2231	[1]
		min uz	0.0000	0.0000	**0.2231**	[1]

extreme corner point displacements (S)

for the rare combination

point -	at m		ux mm	uy mm	uz mm	from load case -
1	x = 0.00	max ux	**0.6961**	0.0502	-0.1018	[1]+[5]
	y = 0.00	max uy	-0.0136	**1.1596**	-0.1065	[1]+[14]
		max uz	0.0136	-1.1596	**0.0205**	[1]+[11]
		min ux	**-0.6961**	-0.0502	0.0157	[1]+[8]
		min uy	0.0136	**-1.1596**	0.0205	[1]+[11]
		min uz	-0.0136	1.1596	**-0.1434**	[1]+0.50*[2]+0.20*[3]+[14]
2	x = 11.20	max ux	**0.6961**	-0.0489	-0.1610	[1]+[5]
	y = 0.00	max uy	-0.0136	**1.1261**	-0.2807	[1]+[14]

extreme corner point displacements (S)

for the rare combination

point	at		ux	uy	uz	from load case
-	m		mm	mm	mm	-
		max uz	0.0136	-1.1261	**-0.1536**	[1]+[11]
		min ux	**-0.6961**	0.0489	-0.2732	[1]+[8]
		min uy	0.0136	**-1.1261**	-0.1536	[1]+[11]
		min uz	-0.0027	0.2252	**-0.4303**	[1]+[2]+0.20*[3]+0.20*[14]
3	x = 0.00	**max ux**	**0.7819**	0.0502	0.3384	[1]+[5]
	y = 9.70	**max uy**	0.0154	**1.1596**	0.4809	[1]+[14]
		max uz	0.0031	0.2319	**0.7415**	[1]+[2]+0.20*[3]+0.20*[14]
		min ux	**-0.7819**	-0.0502	0.4559	[1]+[8]
		min uy	-0.0154	**-1.1596**	0.3135	[1]+[11]
		min uz	-0.0154	-1.1596	**0.3135**	[1]+[11]
4	x = 11.20	**max ux**	**0.7819**	-0.0489	0.2791	[1]+[5]
	y = 9.70	**max uy**	0.0154	**1.1261**	0.3067	[1]+[14]
		max uz	0.0031	0.2252	**0.4350**	[1]+[2]+0.20*[3]+0.20*[14]
		min ux	**-0.7819**	0.0489	0.1670	[1]+[8]
		min uy	-0.0154	**-1.1261**	0.1394	[1]+[11]
		min uz	-0.0154	-1.1261	**0.1394**	[1]+[11]

11. verification of immovability

displacements

h_{ges} = 9.76 m; $\kappa = h_{ges}/(h_o+h_G)$ = 1.44; number of storeys: n_s = 5
ΣV = 0.494 MN (see sum of the V loads); FED = $\kappa\Sigma V$ = 0.714 MN; γ_{CE} = 1.2

X-direction: θ_{Sy} = 0.000455133 /MNm *)

$$EI_y = \frac{1}{\gamma_{CE}} \cdot \frac{h_G}{\theta_{Sy}} = 5310 \text{ MNm}^2$$

$$0.31 \frac{n_s}{n_s + 1.6} \cdot \frac{EI_y}{h_{ges}^2} = 13.09 \text{ >= FED}$$

verification fulfilled

Y-direction: θ_{Sx} = 0.0003501 /MNm *)

$$EI_x = \frac{1}{\gamma_{CE}} \cdot \frac{h_G}{\theta_{Sx}} = 6903 \text{ MNm}^2$$

$$0.31 \frac{n_s}{n_s + 1.6} \cdot \frac{EI_x}{h_{ges}^2} = 17.02 \text{ >= FED}$$

verification fulfilled

*) see unit deformations of the rigid plate

rotation about the z-axis

wall	E	I	a	EIa²	G	I_T	GI_T
-	MN/m²	m⁴	m	MNm⁴	MN/m²	m⁴	MNm²
4	11000.0	0.021	4.45	4591	4583.3	0.0048	22.0
2	11000.0	0.001	4.46	247	4583.3	0.0013	6.1
3	11000.0	0.008	4.46	1753	4583.3	0.0032	14.7
5	11000.0	0.004	4.46	939	4583.3	0.0024	11.0
1	11000.0	0.059	4.46	12919	4583.3	0.0071	32.4
30	11000.0	0.004	5.04	1062	4583.3	0.0023	10.4
28	11000.0	0.029	5.04	8255	4583.3	0.0053	24.4
29	11000.0	0.087	5.04	24412	4583.3	0.0085	39.1
6	11000.0	0.002	5.57	711	4583.3	0.0017	7.9
12	11000.0	0.016	5.57	5618	4583.3	0.0043	19.6
20	11000.0	0.038	5.57	12877	4583.3	0.0060	27.5
26	11000.0	0.002	5.58	711	4583.3	0.0017	7.9
7	11000.0	0.039	5.43	12766	4583.3	0.0061	28.1
15	11000.0	0.006	5.42	1951	4583.3	0.0028	12.8
21	11000.0	0.001	5.43	213	4583.3	0.0011	4.9
22	11000.0	0.011	1.34	228	4583.3	0.0036	16.5
24	11000.0	0.000	4.33	64	4583.3	0.0008	3.7
25	11000.0	0.001	4.33	291	4583.3	0.0015	6.7
27	11000.0	0.002	4.33	356	4583.3	0.0016	7.3
13	11000.0	0.003	2.50	196	4583.3	0.0010	4.4
17	11000.0	0.007	2.50	452	4583.3	0.0014	6.4
10	11000.0	0.200	0.90	1786	4583.3	0.0054	24.7
11	11000.0	0.209	1.75	7044	4583.3	0.0055	25.3
18	11000.0	0.009	3.00	920	4583.3	0.0016	7.2
9	11000.0	0.075	2.03	3403	4583.3	0.0037	16.8
19	11000.0	0.053	0.82	394	4583.3	0.0033	15.0
8	11000.0	0.001	2.03	30	4583.3	0.0005	2.3
14	11000.0	0.012	0.73	68	4583.3	0.0017	8.0

rotation about the z-axis

wall	E	I	a	EIa²	G	I_T	GI_T
-	MN/m²	m⁴	m	MNm⁴	MN/m²	m⁴	MNm²
16	11000.0	0.043	0.03	0	4583.3	0.0029	13.4
Σ			EI_ω =	104256		GI_T =	426.6

loads from rare combination (max V, serviceability):

wall	q_a	q_e	q_m	l	r	$\kappa q_m l r^2$
-	kN/m	kN/m	kN/m	m	m	MNm²
1	11.99	1.95	6.97	2.65	6.12	1.00
2	18.00	15.38	16.69	0.50	5.17	0.32
3	4.09	9.67	6.88	1.20	4.53	0.24
4	-0.14	13.34	6.60	1.80	6.53	0.73
5	14.76	0.39	7.58	0.90	4.69	0.22
6	-2.93	18.54	7.80	0.65	6.88	0.35
7	1.20	16.02	8.61	2.30	6.30	1.13
8	23.72	-6.38	8.67	0.45	2.36	0.03
9	6.01	11.74	8.88	3.25	4.35	0.79
10	2.79	17.61	10.20	4.80	2.15	0.33
11	6.60	15.96	11.28	4.90	2.59	0.53
12	3.95	9.95	6.95	1.60	5.84	0.55
13	-2.89	20.32	8.71	0.85	2.93	0.09
14	-0.53	18.91	9.19	1.55	0.73	0.01
15	13.65	0.47	7.06	1.05	5.43	0.32
16	11.33	5.33	8.33	2.60	4.03	0.51
17	-0.29	36.79	18.25	1.25	2.51	0.21
18	-12.83	39.76	13.46	1.40	3.09	0.26
19	7.92	10.40	9.16	2.90	4.11	0.65
20	-0.18	18.03	8.93	2.25	5.71	0.94
21	4.65	14.38	9.51	0.40	5.57	0.17
22	11.65	2.49	7.07	1.35	4.84	0.32
24	-13.41	40.20	13.40	0.30	4.61	0.12
25	23.73	35.22	29.47	0.55	5.30	0.66
26	34.44	-10.80	11.82	0.65	7.24	0.58
27	35.80	-8.99	13.41	0.60	6.35	0.47
28	24.88	14.02	19.45	2.00	5.18	1.51
29	18.55	1.20	9.87	3.20	5.78	1.52
30	-14.54	40.02	12.74	0.85	7.28	0.83
					$\Sigma F_{ED,j} r^2$ =	15.40

$$\frac{1}{h_{ges}}\sqrt{\frac{EI_\omega}{\sum F_{ED,j}\, r_j^2}} + \frac{1}{2.28}\sqrt{\frac{GI_T}{\sum F_{ED,j}\, r_j^2}} = 10.74 > 2.06 = \sqrt{\frac{n_s + 1.6}{0.31\, n_s}}$$

verification fulfilled

12. material-dependent verification results

12.1. wooden panels

wallpanel plate stress

back planking

failure due to: V = fastener, S = shear, B = buckling

Nr.	t_n	M_{yk}	f_{hk}	β	$F_{v,Rk}$	$F_{v,Rd}$	f_{vk}	f_{ck}	f_{vd}	f_{cd}	f_{v0d}	f_{v90d}
-	mm	Nmm	N/mm²	-	N	N	N/mm²	N/mm²	N/mm²	N/mm²	N/mm	N/mm
1	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.75 V	5.69 V
2	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	1.30 V	5.69 V
3	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.11 V	5.69 V
4	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.75 V	5.69 V
5	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	2.33 V	5.69 V
6	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	1.68 V	5.69 V
7	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.75 V	5.69 V
8	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	1.06 V	5.17 V
9	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	3.41 V	5.17 V
10	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	3.41 V	5.17 V
11	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	3.41 V	5.17 V
12	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.75 V	5.69 V
13	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	2.00 V	5.17 V

wallpanel plate stress

back planking

failure due to: V = fastener, S = shear, B = buckling

Nr.	t_n	M_{yk}	f_{hk}	β	$F_{v,Rk}$	$F_{v,Rd}$	f_{vk}	f_{ck}	f_{vd}	f_{cd}	f_{v0d}	f_{v90d}
-	mm	Nmm	N/mm²	-	N	N	N/mm²	N/mm²	N/mm²	N/mm²	N/mm	N/mm
14	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	3.41 V	5.17 V
15	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	2.72 V	5.69 V
16	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	3.41 V	5.17 V
17	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	2.94 V	5.17 V
18	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	3.29 V	5.17 V
19	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	3.41 V	5.17 V
20	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.75 V	5.69 V
21	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	1.04 V	5.69 V
22	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.50 V	5.69 V
24	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	0.78 V	5.69 V
25	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	1.42 V	5.69 V
26	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	1.68 V	5.69 V
27	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	1.55 V	5.69 V
28	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.75 V	5.69 V
29	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.75 V	5.69 V
30	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	2.20 V	5.69 V

front planking

failure due to: V = fastener, S = shear, B = buckling

Nr.	t_n	M_{yk}	f_{hk}	β	$F_{v,Rk}$	$F_{v,Rd}$	f_{vk}	f_{ck}	f_{vd}	f_{cd}	f_{v0d}	f_{v90d}
-	mm	Nmm	N/mm²	-	N	N	N/mm²	N/mm²	N/mm²	N/mm²	N/mm	N/mm
1	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.75 V	5.69 V
2	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	1.30 V	5.69 V
3	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.11 V	5.69 V
4	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.75 V	5.69 V
5	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	2.33 V	5.69 V
6	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	1.68 V	5.69 V
7	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.75 V	5.69 V
8	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	1.06 V	5.17 V
9	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	3.41 V	5.17 V
10	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	3.41 V	5.17 V
11	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	3.41 V	5.17 V
12	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.75 V	5.69 V
13	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	2.00 V	5.17 V
14	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	3.41 V	5.17 V
15	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	2.72 V	5.69 V
16	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	3.41 V	5.17 V
17	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	2.94 V	5.17 V
18	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	3.29 V	5.17 V
19	50	2617.5	41.45	0.763	671.6	516.6	6.80	12.70	5.23	9.77	3.41 V	5.17 V
20	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.75 V	5.69 V
21	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	1.04 V	5.69 V
22	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.50 V	5.69 V
24	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	0.78 V	5.69 V
25	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	1.42 V	5.69 V
26	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	1.68 V	5.69 V
27	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	1.55 V	5.69 V
28	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.75 V	5.69 V
29	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	3.75 V	5.69 V
30	45	2617.5	42.66	0.741	739.5	568.8	6.80	12.40	5.23	9.54	2.20 V	5.69 V

wallpanel plate stress

Nr.	k_{v1}	k_{v2}	f_{v0d}	f_{v90d}	s_{v0d}	s_{v90d}	u_0	u_{90}	U
-	-	-	N/mm	N/mm	N/mm	N/mm	-	-	-
1	0.66	0.50	7.51	11.38	2.23	0.96	0.30	0.00	0.30
2	0.66	0.50	2.59	11.38	0.67	0.75	0.26	0.00	0.26
3	0.66	0.50	6.21	11.38	1.39	1.15	0.22	0.00	0.22
4	0.66	0.50	7.51	11.38	1.83	1.11	0.24	0.00	0.24
5	0.66	0.50	4.66	11.38	1.11	0.85	0.24	0.00	0.24
6	0.66	0.50	3.37	11.38	1.41	0.69	0.42	0.00	0.42
7	0.66	0.50	7.51	11.38	3.38	1.39	0.45	0.00	0.45
8	0.66	0.50	2.12	10.33	0.54	0.81	0.25	0.00	0.25
9	0.66	0.50	6.82	10.33	2.10	2.25	0.31	0.00	0.31
10	0.66	0.50	6.82	10.33	3.35	2.07	0.49	0.00	**0.49**
11	0.66	0.50	6.82	10.33	3.31	3.82	0.49	0.00	0.49
12	0.66	0.50	7.51	11.38	2.82	1.14	0.38	0.00	0.38
13	0.66	0.50	4.00	10.33	1.49	0.94	0.37	0.00	0.37

wallpanel plate stress

Nr.	k_{v1}	k_{v2}	f_{v0d}	f_{v90d}	s_{v0d}	s_{v90d}	u_0	u_{90}	U
-	-	-	N/mm	N/mm	N/mm	N/mm	-	-	-
14	0.66	0.50	6.82	10.33	1.49	1.73	0.22	0.00	0.22
15	0.66	0.50	5.44	11.38	2.02	0.79	0.37	0.00	0.37
16	0.66	0.50	6.82	10.33	2.00	2.21	0.29	0.00	0.29
17	0.66	0.50	5.88	10.33	2.01	3.31	0.34	0.00	0.34
18	0.66	0.50	6.59	10.33	2.15	2.31	0.33	0.00	0.33
19	0.66	0.50	6.82	10.33	2.10	1.21	0.31	0.00	0.31
20	0.66	0.50	7.51	11.38	3.44	1.39	0.46	0.00	0.46
21	0.66	0.50	2.07	11.38	0.89	0.81	0.43	0.00	0.43
22	0.66	0.50	6.99	11.38	1.62	1.32	0.23	0.00	0.23
24	0.66	0.50	1.55	11.38	0.69	0.76	0.44	0.00	0.44
25	0.66	0.50	2.85	11.38	1.19	1.09	0.42	0.00	0.42
26	0.66	0.50	3.37	11.38	1.41	1.35	0.42	0.00	0.42
27	0.66	0.50	3.11	11.38	1.28	1.31	0.41	0.00	0.41
28	0.66	0.50	7.51	11.38	2.18	2.09	0.29	0.00	0.29
29	0.66	0.50	7.51	11.38	2.67	1.88	0.36	0.00	0.36
30	0.66	0.50	4.40	11.38	1.19	1.62	0.27	0.00	0.27

=> utilization: **U = 0.49 verification fulfilled**

wallpanel joist pressure

system data

Nr.	$A_{ef,li}$	$A_{ef,re}$	$A_{ef,in}$	x_1	k_{c90}	f_{v90d}	f_{c90d}	f_{rib}
-	mm^2	mm^2	mm^2	-	-	N/mm^2	N/mm^2	-
1	17600	17600	22400	1.00	1.25	11.38	2.31	1.000
2	17600	17600	569	1.00	1.25	11.38	2.31	1.000
3	17600	17600	22400	1.00	1.25	11.38	2.31	1.000
4	17600	17600	22400	1.00	1.25	11.38	2.31	1.000
5	17600	17600	22400	1.00	1.25	11.38	2.31	1.000
6	17600	17600	569	1.00	1.25	11.38	2.31	1.000
7	17600	17600	22400	1.00	1.25	11.38	2.31	1.000
8	13200	13200	387	1.00	1.25	7.73	1.85	1.000
9	13200	13200	16800	1.00	1.25	10.33	2.31	1.000
10	13200	13200	16800	1.00	1.25	10.33	2.31	1.000
11	13200	13200	16800	1.00	1.25	10.33	2.31	1.000
12	17600	17600	22400	1.00	1.25	11.38	2.31	1.000
13	13200	13200	16800	1.00	1.25	10.33	2.31	1.000
14	13200	13200	16800	1.00	1.25	10.33	2.31	1.000
15	17600	17600	22400	1.00	1.25	11.38	2.31	1.000
16	13200	13200	16800	1.00	1.25	10.33	2.31	1.000
17	13200	13200	16800	1.00	1.25	10.33	2.31	1.000
18	13200	13200	16800	1.00	1.25	10.33	2.31	1.000
19	13200	13200	16800	1.00	1.25	10.33	2.31	1.000
20	17600	17600	22400	1.00	1.25	11.38	2.31	1.000
21	17600	17600	569	1.00	1.25	11.38	2.31	1.000
22	17600	17600	22400	1.00	1.25	8.51	1.85	1.000
24	17600	17600	569	1.00	1.25	11.38	2.31	1.000
25	17600	17600	569	1.00	1.25	11.38	2.31	1.000
26	17600	17600	569	1.00	1.25	11.38	2.31	1.000
27	17600	17600	569	1.00	1.25	11.38	2.31	1.000
28	17600	17600	22400	1.00	1.25	8.51	1.85	1.000
29	17600	17600	22400	1.00	1.25	11.38	2.31	1.000
30	17600	17600	22400	1.00	1.25	11.38	2.31	1.000

effects of action

Nr.	$F_{c,d\ edge}$	$F_{c,d\ insde}$	$\sigma_{c,d\ li}$	$\sigma_{c,d\ in}$	$\sigma_{c,d\ re}$	U
-	N	N	N/mm^2	N/mm^2	N/mm^2	-
1	7912	5023	0.450	0.224	0.450	0.16
2	7990	0	0.454	0.000	0.454	0.16
3	7290	0	0.414	0.000	0.414	0.14
4	9450	6458	0.537	0.288	0.537	0.19
5	5470	0	0.311	0.000	0.311	0.11
6	8884	0	0.505	0.000	0.505	0.17
7	15610	12055	0.887	0.538	0.887	0.31
8	7651	0	0.580	0.000	0.580	0.25
9	10186	10657	0.772	0.634	0.772	0.27
10	16552	17502	1.254	1.042	1.254	0.43
11	15997	16677	1.212	0.993	1.212	0.42
12	11695	6846	0.664	0.306	0.664	0.23
13	9568	0	0.725	0.000	0.725	0.25

effects of action

Nr.	$F_{c,d\ edge}$	$F_{c,d\ insde}$	$\sigma_{c,d\ li}$	$\sigma_{c,d\ in}$	$\sigma_{c,d\ re}$	U
-	N	N	N/mm²	N/mm²	N/mm²	-
14	9897	9051	0.750	0.539	0.750	0.26
15	8111	0	0.461	0.000	0.461	0.16
16	7796	6490	0.591	0.386	0.591	0.20
17	15615	0	1.183	0.000	1.183	0.41
18	17287	13230	1.310	0.788	1.310	**0.45**
19	9991	10102	0.757	0.601	0.757	0.26
20	15973	12525	0.908	0.559	0.908	0.31
21	4582	0	0.260	0.000	0.260	0.09
22	925	7178	0.053	0.320	0.053	0.14
24	1135	0	0.064	0.000	0.064	0.02
25	11706	0	0.665	0.000	0.665	0.23
26	6001	0	0.341	0.000	0.341	0.12
27	15724	0	0.893	0.000	0.893	0.31
28	4807	15017	0.273	0.670	0.273	0.29
29	9051	4313	0.514	0.193	0.514	0.18
30	12101	0	0.688	0.000	0.688	0.24

=> utilization: **U = 0.45 verification fulfilled**

wallpanel pressure strap

system data

Nr.	$E_{0,05}$	f_{c0k}	l	A	i_r	k	k_c	β_c
-	N/mm²	N/mm²	m	mm²	mm	-	-	-
1	7333	21.0	2.65	12800	46.2	1.044	0.707	0.200
2	7333	21.0	0.50	12800	46.2	0.505	1.000	0.200
3	7333	21.0	1.20	12800	46.2	0.612	0.966	0.200
4	7333	21.0	1.80	12800	46.2	0.756	0.893	0.200
5	7333	21.0	0.90	12800	46.2	0.558	0.993	0.200
6	7333	21.0	0.65	12800	46.2	0.523	1.000	0.200
7	7333	21.0	2.30	12800	46.2	0.914	0.796	0.200
8	7333	21.0	0.45	9600	34.7	0.516	1.000	0.200
9	7333	21.0	3.25	9600	34.7	1.904	0.340	0.200
10	7333	21.0	4.80	9600	34.7	3.485	0.165	0.200
11	7333	21.0	4.90	9600	34.7	3.606	0.159	0.200
12	7333	21.0	1.60	12800	46.2	0.703	0.922	0.200
13	7333	21.0	0.85	9600	34.7	0.599	0.972	0.200
14	7333	21.0	1.55	9600	34.7	0.836	0.847	0.200
15	7333	21.0	1.05	12800	46.2	0.584	0.980	0.200
16	7333	21.0	2.60	9600	34.7	1.413	0.496	0.200
17	7333	21.0	1.25	9600	34.7	0.720	0.913	0.200
18	7333	21.0	1.40	9600	34.7	0.775	0.882	0.200
19	7333	21.0	2.90	9600	34.7	1.627	0.414	0.200
20	7333	21.0	2.25	12800	46.2	0.896	0.808	0.200
21	7333	21.0	0.40	12800	46.2	0.496	1.000	0.200
22	7333	21.0	1.35	12800	46.2	0.643	0.951	0.200
24	7333	21.0	0.30	12800	46.2	0.487	1.000	0.200
25	7333	21.0	0.55	12800	46.2	0.511	1.000	0.200
26	7333	21.0	0.65	12800	46.2	0.523	1.000	0.200
27	7333	21.0	0.60	12800	46.2	0.517	1.000	0.200
28	7333	21.0	2.00	12800	46.2	0.815	0.859	0.200
29	7333	21.0	3.20	12800	46.2	1.283	0.559	0.200
30	7333	21.0	0.85	12800	46.2	0.550	0.997	0.200

effects of action

Nr.	$\lambda_{rel,c}$	λ	Fv	$F_{c,d}$	f_{c0d}	$\sigma_{c,d}$	U
-	-	-	N	N	N/mm²	N/mm²	-
1	0.9761	57.30	5915	5915	16.2	0.46	0.04
2	0.1843	10.82	-337	337	16.2	0.03	0.00
3	0.4421	25.95	-1662	1662	16.2	0.13	0.01
4	0.6630	38.92	-3285	3285	16.2	0.26	0.02
5	0.3315	19.46	998	998	16.2	0.08	0.00
6	0.2394	14.06	-916	916	16.2	0.07	0.00
7	0.8473	49.74	-7780	7780	16.2	0.61	0.05
8	0.2209	12.97	242	242	16.2	0.03	0.00
9	1.5963	93.71	-6810	6810	16.2	0.71	0.13
10	2.3576	138.41	-16086	16086	16.2	1.68	0.63
11	2.4065	141.28	-16222	16222	16.2	1.69	**0.66**
12	0.5895	34.61	-4509	4509	16.2	0.35	0.02
13	0.4175	24.51	-1269	1269	16.2	0.13	0.01

effects of action

Nr.	$\lambda_{rel,c}$	λ	F_V	$F_{c,d}$	f_{c0d}	$\sigma_{c,d}$	U
-	-	-	N	N	N/mm²	N/mm²	-
14	0.7613	44.69	-2305	2305	16.2	0.24	0.02
15	0.3869	22.72	2126	2126	16.2	0.17	0.01
16	1.2770	74.97	5195	5195	16.2	0.54	0.07
17	0.6139	36.04	-2518	2518	16.2	0.26	0.02
18	0.6878	40.38	-3018	3018	16.2	0.31	0.02
19	1.4244	83.62	-6094	6094	16.2	0.63	0.09
20	0.8288	48.66	-7745	7745	16.2	0.61	0.05
21	0.1474	8.66	-358	358	16.2	0.03	0.00
22	0.4973	29.19	2186	2186	16.2	0.17	0.01
24	0.1104	6.48	-206	206	16.2	0.02	0.00
25	0.2026	11.89	-654	654	16.2	0.05	0.00
26	0.2394	14.06	916	916	16.2	0.07	0.00
27	0.2209	12.97	769	769	16.2	0.06	0.00
28	0.7368	43.25	-4354	4354	16.2	0.34	0.02
29	1.1788	69.21	8539	8539	16.2	0.67	0.07
30	0.3131	18.38	-1009	1009	16.2	0.08	0.00

=> utilization: **U = 0.66 verification fulfilled**

wallpanel ribs

system data ribs outside

Nr.	f_{c0k}	f_{c0d}	h	A	i_r	k	k_c	β_c	f_{rib}
-	N/mm²	N/mm²	m	mm²	mm	-	-	-	-
1	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
2	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
3	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
4	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
5	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
6	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
7	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
8	21.0	12.9	2.90	9600	34.7	1.627	0.414	0.200	1.000
9	21.0	16.2	2.90	9600	34.7	1.627	0.414	0.200	1.000
10	21.0	16.2	2.90	9600	34.7	1.627	0.414	0.200	1.000
11	21.0	16.2	2.90	9600	34.7	1.627	0.414	0.200	1.000
12	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
13	21.0	16.2	2.90	9600	34.7	1.627	0.414	0.200	1.000
14	21.0	16.2	2.90	9600	34.7	1.627	0.414	0.200	1.000
15	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
16	21.0	16.2	2.90	9600	34.7	1.627	0.414	0.200	1.000
17	21.0	16.2	2.90	9600	34.7	1.627	0.414	0.200	1.000
18	21.0	16.2	2.90	9600	34.7	1.627	0.414	0.200	1.000
19	21.0	16.2	2.90	9600	34.7	1.627	0.414	0.200	1.000
20	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
21	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
22	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
24	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
25	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
26	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
27	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
28	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
29	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
30	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000

system data ribs inside

Nr.	f_{c0k}	f_{c0d}	h	A	i_r	k	k_c	β_c	f_{rib}
-	N/mm²	N/mm²	m	mm²	mm	-	-	-	-
1	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
2	0.0	0.0	0.00	0	0.0	0.000	0.000	0.000	0.000
3	21.0	9.7	2.90	12800	46.2	1.147	0.638	0.200	1.000
4	21.0	12.9	2.90	12800	46.2	1.147	0.638	0.200	1.000
5	21.0	9.7	2.90	12800	46.2	1.147	0.638	0.200	1.000
6	0.0	0.0	0.00	0	0.0	0.000	0.000	0.000	0.000
7	21.0	12.9	2.90	12800	46.2	1.147	0.638	0.200	1.000
8	0.0	0.0	0.00	0	0.0	0.000	0.000	0.000	0.000
9	21.0	12.9	2.90	9600	34.7	1.627	0.414	0.200	1.000
10	21.0	12.9	2.90	9600	34.7	1.627	0.414	0.200	1.000
11	21.0	12.9	2.90	9600	34.7	1.627	0.414	0.200	1.000
12	21.0	12.9	2.90	12800	46.2	1.147	0.638	0.200	1.000

system data ribs inside

Nr.	f_{c0k}	f_{c0d}	h	A	i_r	k	k_c	β_c	f_{rib}
-	N/mm²	N/mm²	m	mm²	mm	-	-	-	-
13	21.0	9.7	2.90	9600	34.7	1.627	0.414	0.200	1.000
14	21.0	12.9	2.90	9600	34.7	1.627	0.414	0.200	1.000
15	21.0	9.7	2.90	12800	46.2	1.147	0.638	0.200	1.000
16	21.0	12.9	2.90	9600	34.7	1.627	0.414	0.200	1.000
17	21.0	9.7	2.90	9600	34.7	1.627	0.414	0.200	1.000
18	21.0	12.9	2.90	9600	34.7	1.627	0.414	0.200	1.000
19	21.0	12.9	2.90	9600	34.7	1.627	0.414	0.200	1.000
20	21.0	12.9	2.90	12800	46.2	1.147	0.638	0.200	1.000
21	0.0	0.0	0.00	0	0.0	0.000	0.000	0.000	0.000
22	21.0	12.9	2.90	12800	46.2	1.147	0.638	0.200	1.000
24	0.0	0.0	0.00	0	0.0	0.000	0.000	0.000	0.000
25	0.0	0.0	0.00	0	0.0	0.000	0.000	0.000	0.000
26	0.0	0.0	0.00	0	0.0	0.000	0.000	0.000	0.000
27	0.0	0.0	0.00	0	0.0	0.000	0.000	0.000	0.000
28	21.0	12.9	2.90	12800	46.2	1.147	0.638	0.200	1.000
29	21.0	16.2	2.90	12800	46.2	1.147	0.638	0.200	1.000
30	21.0	9.7	2.90	12800	46.2	1.147	0.638	0.200	1.000

effects of action ribs outside

Nr.	$\lambda_{rel,c}$	λ	F_V	$F_{c,d}$	$\sigma_{c,d}$	U
-	-	-	N	N	N/mm²	-
1	1.0683	62.72	5915	7912	0.62	0.06
2	1.0683	62.72	-337	7990	0.62	0.06
3	1.0683	62.72	1662	7290	0.57	0.06
4	1.0683	62.72	3285	9450	0.74	0.07
5	1.0683	62.72	998	5470	0.43	0.04
6	1.0683	62.72	916	8884	0.69	0.07
7	1.0683	62.72	7780	15610	1.22	0.12
8	1.4244	83.62	0	7651	0.80	0.15
9	1.4244	83.62	6810	10186	1.06	0.16
10	1.4244	83.62	16086	16552	1.72	0.26
11	1.4244	83.62	16222	15997	1.67	0.25
12	1.0683	62.72	4509	11695	0.91	0.09
13	1.4244	83.62	1269	9568	1.00	0.15
14	1.4244	83.62	2305	9897	1.03	0.15
15	1.0683	62.72	2126	8111	0.63	0.06
16	1.4244	83.62	5195	7796	0.81	0.12
17	1.4244	83.62	2518	15615	1.63	0.24
18	1.4244	83.62	3018	17287	1.80	**0.27**
19	1.4244	83.62	6094	9991	1.04	0.16
20	1.0683	62.72	7745	15973	1.25	0.12
21	1.0683	62.72	-358	4582	0.36	0.03
22	1.0683	62.72	2186	6092	0.48	0.05
24	1.0683	62.72	-206	1135	0.09	0.01
25	1.0683	62.72	-654	11706	0.91	0.09
26	1.0683	62.72	916	6001	0.47	0.05
27	1.0683	62.72	-769	15724	1.23	0.12
28	1.0683	62.72	4354	11510	0.90	0.09
29	1.0683	62.72	8539	9051	0.71	0.07
30	1.0683	62.72	1009	12101	0.95	0.09

effects of action ribs inside

Nr.	$\lambda_{rel,c}$	λ	$F_{c,d}$	$\sigma_{c,d}$	U
-	-	-	N	N/mm²	-
1	1.0683	62.72	5023	0.39	0.04
2	0.0000	0.00	0	0.00	-0.10
3	1.0683	62.72	0	0.00	0.00
4	1.0683	62.72	6667	0.52	0.06
5	1.0683	62.72	0	0.00	0.00
6	0.0000	0.00	0	0.00	-0.10
7	1.0683	62.72	11253	0.88	0.11
8	0.0000	0.00	0	0.00	-0.10
9	1.4244	83.62	9829	1.02	0.19
10	1.4244	83.62	15650	1.63	**0.30**
11	1.4244	83.62	14794	1.54	0.29
12	1.0683	62.72	7060	0.55	0.07
13	1.4244	83.62	0	0.00	0.00

Nr.	$\lambda_{rel,c}$	λ	$F_{c,d}$	$\sigma_{c,d}$	U
-	-	-	N	N/mm²	-
14	1.4244	83.62	9315	0.97	0.18
15	1.0683	62.72	0	0.00	0.00
16	1.4244	83.62	5739	0.60	0.11
17	1.4244	83.62	0	0.00	0.00
18	1.4244	83.62	13605	1.42	0.26
19	1.4244	83.62	9538	0.99	0.19
20	1.0683	62.72	11609	0.91	0.11
21	0.0000	0.00	0	0.00	-0.10
22	1.0683	62.72	7178	0.56	0.07
24	0.0000	0.00	0	0.00	-0.10
25	0.0000	0.00	0	0.00	-0.10
26	0.0000	0.00	0	0.00	-0.10
27	0.0000	0.00	0	0.00	-0.10

effects of action ribs inside

Nr.	$\lambda_{rel,c}$	λ	$F_{c,d}$	$\sigma_{c,d}$	U
-	-	-	N	N/mm²	-
28	1.0683	62.72	15017	1.17	0.14
29	1.0683	62.72	5199	0.41	0.04
30	1.0683	62.72	0	0.00	0.00

=> utilization: U = 0.30 verification fulfilled

wall panel deformation in the ultimate limit state

system data

Nr.	K_{ser}	k_{c90}	A	l_1	G_{mean}	$E_{0,mean}$	f_{c90}	u_{zul}
-	N/mm²	-	mm	mm	N/mm²	N/mm²	N/mm²	mm
1	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
2	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
3	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
4	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
5	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
6	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
7	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
8	941.2	1.25	9600	545	830.8	8461.5	1.92	29.0
9	941.2	1.25	9600	545	830.8	8461.5	1.92	29.0
10	941.2	1.25	9600	545	830.8	8461.5	1.92	29.0
11	941.2	1.25	9600	545	830.8	8461.5	1.92	29.0
12	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
13	941.2	1.25	9600	545	830.8	8461.5	1.92	29.0
14	941.2	1.25	9600	545	830.8	8461.5	1.92	29.0
15	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
16	941.2	1.25	9600	545	830.8	8461.5	1.92	29.0
17	941.2	1.25	9600	545	830.8	8461.5	1.92	29.0
18	941.2	1.25	9600	545	830.8	8461.5	1.92	29.0
19	941.2	1.25	9600	545	830.8	8461.5	1.92	29.0
20	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
21	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
22	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
24	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
25	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
26	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
27	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
28	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
29	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0
30	941.2	1.25	12800	545	830.8	8461.5	1.92	29.0

deformations

Nr.	σ_{c90}	K_d	u_k	u_G	u_E	u_v	Σu	U
-	N/mm²	N/mm²	mm	mm	mm	mm	mm	-
1	0.45	3375.48	0.99	0.19	0.22	0.34	1.75	0.06
2	0.45	-110.21	0.97	0.06	0.20	1.82	3.06	0.11
3	0.41	828.59	1.01	0.12	0.19	0.69	2.01	0.07
4	0.54	1675.57	1.01	0.16	0.19	0.60	1.96	0.07
5	0.31	504.83	1.00	0.10	0.19	0.69	1.98	0.07
6	0.50	251.02	1.64	0.12	0.33	1.56	3.65	0.13
7	0.89	2570.80	1.62	0.30	0.33	0.78	3.03	0.10
8	0.58	64.65	0.85	0.06	0.24	2.59	3.75	0.13
9	0.77	3632.94	0.84	0.24	0.31	0.48	1.87	0.06
10	1.25	5682.02	1.14	0.39	0.77	0.53	2.83	0.10
11	1.21	5814.17	1.12	0.39	0.79	0.50	2.79	0.10
12	0.66	1467.20	1.68	0.25	0.31	0.83	3.07	0.11
13	0.72	347.81	1.40	0.17	0.36	1.71	3.65	0.13
14	0.75	1013.60	0.91	0.17	0.22	0.97	2.27	0.08
15	0.46	713.57	1.62	0.18	0.30	0.88	2.98	0.10
16	0.59	2804.83	0.90	0.23	0.26	0.46	1.85	0.06
17	1.18	644.45	1.42	0.23	0.35	1.90	3.91	0.13
18	1.31	777.73	1.41	0.25	0.34	1.88	3.88	0.13
19	0.76	3121.42	0.89	0.24	0.29	0.52	1.95	0.07
20	0.91	2480.26	1.67	0.30	0.34	0.81	3.12	0.11
21	0.26	-108.78	1.56	0.08	0.34	1.31	3.29	0.11
22	0.05	1456.27	1.08	0.14	0.20	0.08	1.50	0.05
24	0.06	-85.89	1.56	0.06	0.34	0.43	2.40	0.08
25	0.67	-146.98	1.58	0.10	0.33	2.43	4.45	0.15
26	0.34	291.50	1.64	0.12	0.33	1.05	3.14	0.11
27	0.89	-153.13	1.59	0.11	0.32	3.00	5.02	**0.17**

deformations

Nr.	σ_{c90}	K_d	u_k	u_G	u_E	u_v	Σu	U
-	N/mm²	N/mm²	mm	mm	mm	mm	mm	-
28	0.27	-2399.20	1.13	0.19	0.22	0.27	1.81	0.06
29	0.51	4423.89	1.08	0.23	0.29	0.32	1.93	0.07
30	0.69	329.97	1.11	0.10	0.21	1.63	3.06	0.11

=> utilization: **U = 0.17 verification fulfilled**

12.2. summary

Nr	type, material	max. utilization	
1	woodpanel	30%	✓
2	woodpanel	26%	✓
3	woodpanel	22%	✓
4	woodpanel	24%	✓
5	woodpanel	24%	✓
6	woodpanel	42%	✓
7	woodpanel	45%	✓
8	woodpanel	25%	✓
9	woodpanel	31%	✓
10	woodpanel	63%	✓
11	woodpanel	66%	✓
12	woodpanel	38%	✓
13	woodpanel	37%	✓
14	woodpanel	26%	✓
15	woodpanel	37%	✓
16	woodpanel	29%	✓
17	woodpanel	41%	✓
18	woodpanel	45%	✓
19	woodpanel	31%	✓
20	woodpanel	46%	✓
21	woodpanel	43%	✓
22	woodpanel	23%	✓
24	woodpanel	44%	✓
25	woodpanel	42%	✓
26	woodpanel	42%	✓
27	woodpanel	41%	✓
28	woodpanel	29%	✓
29	woodpanel	36%	✓
30	woodpanel	27%	✓
	maximum	66%	✓

all required verifications successfully fulfilled.

13. parameters of the national annexes

selected verification parameters acc. to national annex

Deutschland

DIN EN 1995-1-1 and DIN EN 1995-1-2 (EC5)

modification coefficients

	service class		
clld	1	2	3
permane	0.60	0.60	0.50
longt	0.70	0.70	0.55
medter	0.80	0.80	0.65
shor	0.90	0.90	0.70
instantan	1.10	1.10	0.90

chapter	value	meaning
2.3.1.2(2)P	use of table NA.1	Assignment of loads to load-duration classes
2.4.1		partial factors
Tab. 2.3	γ_M = 1.30	solid timber
	γ_M = 1.30	glue laminated timber
	γ_M = 1.30	cross laminated timber
	γ_M = 1.30	LVL, plywood, OSB
	γ_M = 1.30	particleboards
	γ_M = 1.30	hard fibreboards
	γ_M = 1.30	medium fibreboards
	γ_M = 1.30	MDF-fibreboards
	γ_M = 1.30	soft fibreboards
	γ_M = 1.30	connections
	γ_M = 1.25	nail plattes
	γ_M = 1.30	steel in connections
	γ_M = 1.30	gypsum board, etc.
3.1.3	use of table NA.4	modification factors
8.3.2	use of table NA.15	f_{ax} , f_{head} threaded nails
8.3.1.2	use of NA.11	penetration depths > 4 d
8.5.3 (2)	threaded rods acc. to NAD	allowing threaded rods
6.3.3 (7)	tors. flex. buckl. NAD	t.f.b.-verification
8.2.4 (1)	simpl. procedure acc. to NAD	fastener
9.2.4.2 (NA.20)	red. of mech. resist.	for hor. joints and short panels
9.2.4.2 (NA.21)	incr. char. mech. resist.	for joist pressure about 20%
6.1 (NA.8.1.6)	red. of tensile strength	for symmetric tensile connections.
8.6 (NA.7)	drill hole diameter incr.	for steel parts about 1mm

crack factor

crack factor k_{cr} for specification of effective cross section width
in calculation of shear stress from shear force

k_{cr} = 2.0/fv,k coniferous timber
k_{cr} = 0.67 hardwood
k_{cr} = 2.5/fv,k glue laminated timber
k_{cr} = 1.0 otherwise