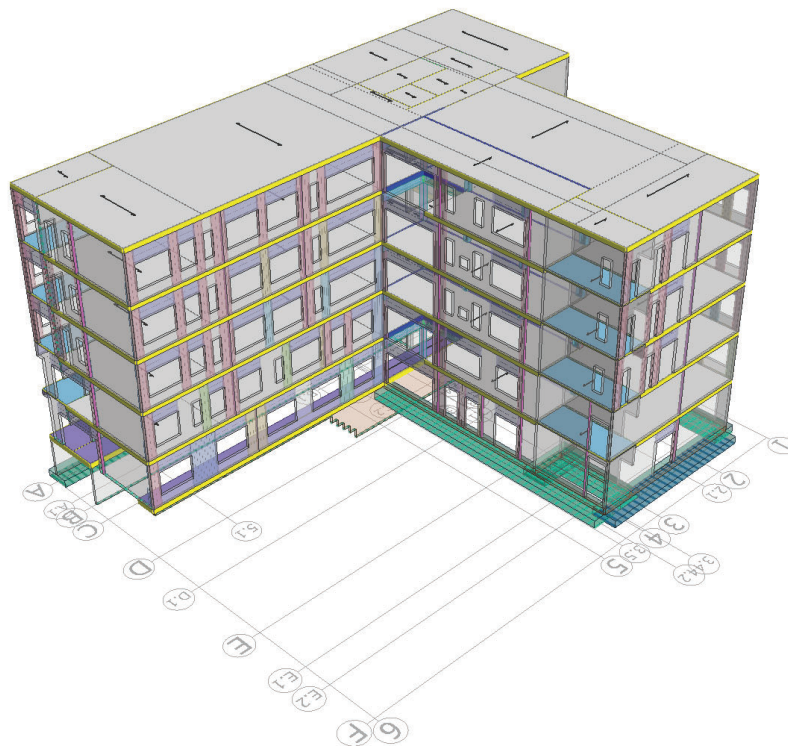


Projectcenter

Module 3



Project number: 123456
Customer: internal
QA by: ifs
Date: 9/23/2024
Software version: OPTUM CS 2022 3.0.314.0

Nomenclature

Symbol	Description
A	Cross-sectional area.
A, B, C, D, E, F, G	Load category for live loads.
A_c	Cross-sectional area of concrete.
A_s	Cross-sectional area of reinforcement.
A_{sc}, A_{st}	Cross-sectional area of reinforcement in compression side and cross-sectional area of reinforcement in tension side, respectively.
A_{sw}	Cross sectional area of shear reinforcement.
ALS	Accidental limit state.
E_{cd}	Design value of modulus of elasticity of concrete.
E_s	Design value of modulus of elasticity of reinforcing steel.
$E_{s,0}/E_s$	Modulus of elasticity reduction coefficient for heated reinforcement, related to fire exposure.
G1	Load category for self-weight, structures.
G2	Load category for self-weight, other.
K_{FI}	Factor applicable to actions for reliability differentiation.
L	Length.
L_s	Column length (height of wall slice).
LM	Load multiplier.
M	Bending moment.
M_{Ed}	Design value of the applied internal bending moment.
M_{Ed}/M_{Rd}	Maximum moment capacity utilization, taking M_{Rd+} and M_{Rd-} into account.
$M_{0Ed,x}, M_{0Ed,z}$	Design value of the applied internal bending moment. $M_{0Ed,x}$ is the in-plane moment, about the z-axis. $M_{0Ed,z}$ is the out-of-plane moment, about the x-axis. The "0" indicates that the moment contribution from the deformation times the normal force is not included.
M_{0Eqp}/M_{0Ed}	Ratio between moment contribution from permanent loads and the design moment.
$M_{Ed,max}, M_{Ed,min}$	Maximum and minimum design value of the applied internal bending moments. Stresses in the horizontal joint above the panel is included in the integration of the section forces.
M_{Rd}	Design value of the moment capacity.
$M_{0Rd,x}, M_{0Rd,z}$	Design value of the moment capacity. $M_{0Rd,x}$ is the in-plane moment capacity, about the z-axis. $M_{0Rd,z}$ is the out-of-plane moment capacity, about the x-axis. The "0" indicates that the moment capacity is reduced by the deformation times normal force.
M_{Rd+}, M_{Rd-}	Design values of the moment capacity for positive and negative moment, respectively.
N	Axial force.
$N_0, N_1, N_2, \dots$	Normal force components originating from walls above, decks and other loads.
N_a	Main rebar anchorage force required at beam ends, due to concrete compression strut. Value based on $ V_{Ed,max} $.
N_{Ed}	Design value of the applied axial force.

Symbol	Description
$N_{Ed, cen}$	Design value of the applied axial force determined in the center of the beam. The value is used in the moment capacity calculations. Stresses in the horizontal joint above the panel is included in the integration of the section forces.
P_{lat}	Design value of point load acting laterally on wall slice.
RH	Relative humidity.
S	Load category for snow load.
SLS	Serviceability limit state.
U	Vertical in-plane displacement. The displacement is determined in the finite element calculation, including effects of plastic strain in concrete and rebars. Cracked section stiffness, creep, shrinkage and tension stiffening is not included in the determination of the displacement.
U/L	Relative in-plane displacement.
ULS	Ultimate limit state.
Utilization	The moment utilization of the wall slice subjected to biaxial bending, $(M_{0Ed,z} / M_{0Rd,z}) + (M_{0Ed,x} / M_{0Rd,x})$.
Utilization	Maximum utilization of shear capacity and moment capacity of a beam.
V	Load category for wind load.
V	Shear force.
V_{Ed}	Design value of the applied shear force.
V_{Ed}/V_{Rd}	Shear capacity utilization, taking $V_{Rd,max}$ and $V_{Rd,s}$ into account.
$ V_{Ed,max} $	Maximum numerical design value of the applied internal shear force through the entire beam length. Stresses in the horizontal joint above the panel is included in the integration of the section forces.
$ V_{Ed,max} /V_{Rd,max}$	Shear capacity utilization, related to the concrete compression strut.
$ V_{Ed,s} $	Maximum numerical design value of the applied internal shear force used in stirrup capacity check. The maximum value is determined within ranges $\cot\theta \cdot z$ away from supports. Stresses in the horizontal joint above the panel is included in the integration of the section forces.
$ V_{Ed,s} /V_{Rd,s}$	Shear capacity utilization, related to the stirrups.
V_{Rd}	Design value of the shear force capacity
$V_{Rd,max}$	Design value of the shear capacity, related to the concrete compression strut. The capacity is based on the cross section in the center of the beam, in the panel part of the beam (excluding the joint).
$V_{Rd,s}$	Design value of the moment capacity, related to the stirrups. The capacity is based on the cross section in the center of the beam, in the panel part of the beam (excluding the joint).
X, Y, Z	Global coordinates.
a_k	Characteristic value of an accidental load.
a_z	Thickness of damaged and inactive concrete, due to fire exposure.
b	Width of a wall slice cross-section.
b	Beam width.
b_{eff}	Effective beam width, including reduction from from fire (a_z) in fire cases and large concrete cover in ULS cases.
c	Cohesion.
c_{back}, c_{front}	Rebar center distance in back and front of wall respectively. Mean value is used if more than one reinforcement is present.

Symbol	Description
$cover_{back}, cover_{front}$	Cover to reinforcement in back and front of wall respectively.
$\cot\theta$	Inclination of concrete compression strut.
d	Diameter.
e, e_x, e_z	Eccentricity of the applied normal force, N_{Ed} . Includes tolerances. e_x is in-plane and e_z is out-of-plane.
$e_0, e_1, e_2, \dots$	Eccentricities for normal force components originating from walls above, decks and other loads. Includes tolerances.
e_{shear}	Weighted mean value of the eccentricity of the transverse loads acting on a beam. The value is included in the calculation of shear capacities and N_a .
f_{cd}	Design value of concrete compressive strength
$f_{cd,eff}$	Effective design value of concrete compressive strength. The strength is reduced by skew principal stresses (non-vertical normal force).
f_{ck}	Characteristic compressive strength of concrete (compressive cylinder strength at 28 days).
$f_{sy,0}/f_{yk}$	Strength reduction coefficient for heated reinforcement, due to fire exposure.
f_{yd}	Design yield strength of reinforcement.
f_{yk}	Characteristic yield strength of reinforcement.
f_{ywd}	Design yield of shear reinforcement.
g_k	Characteristic value of a permanent load (self-weight).
$g_{k,sup}, g_{k,inf}$	Upper and lower characteristic values, respectively, of a permanent load (self-weight).
h	Height of cross-section (thickness of the wall slice).
h	Beam height.
$k_{c,M}$	Mean concrete strength reduction coefficient, due to fire exposure.
p_x, p_y, p_z	Distributed load acting in the x, y and z direction respectively.
q_k	Characteristic value of a variable load.
$q_{k,Live}, q_{k,Snow}, q_{k,Wind}$	Characteristic value of variable live load, snow load and wind load, respectively.
t	Thickness.
t	Fire exposure time.
t_0	The age of concrete at the time of loading.
u	Out of plane displacement.
u/L	Relative out of plane displacement.
w_k	Crack width.
w_{lat}	Lateral load acting on wall slice.
x	Neutral axis position.
x	Height of the compression zone. Determined in the moment capacity calculation.
x, y, z	Local coordinates.
z	Internal lever arm. Determined in the moment capacity calculation.
γ_c, γ_s	Partial factor for concrete and reinforcing steel respectively.
ϵ_c	Compressive concrete strain.

Symbol	Description
ϵ_s	Tensile rebar strain.
ϵ_s	Tensile reinforcement mesh strain.
$\epsilon_0/(1+\phi)$	Concrete strain in compression zone. Determined in the moment capacity calculation.
ν	Poisson's ratio.
ν	Strength reduction factor for concrete.
σ_{c0}	Concrete compression stress at edge.
σ_{c2}	Second concrete principal stress.
σ_{sc}, σ_{st}	Reinforcement stress in compression side and tension side respectively. Positive value for compression.
σ_{sc}, σ_{st}	Stress in outmost layer of reinforcement in compression side and tension side respectively. Positive value for tension. Determined in the moment capacity calculation.
σ_{sx}, σ_{sy}	Reinforcement stress in the x and y direction, respectively.
σ_x	Normal stress in rebars and stringers.
ϕ_0	Final creep value.
ϕ_s	Percentage of reinforcement in cross-section. $\phi_s = A_s / (b \cdot h)$.
	Percentage of reinforcement in cross-section in compression and tension respectively.
ϕ_c, ϕ_t	$\phi_c = A_{sc} / (b \cdot h)$. $\phi_t = A_{st} / (b \cdot h)$.
ϕ_{eff}	Effective creep value.
	Factors defining representative values of variable actions:
$\psi_0, \psi_1,$	ψ_0 for combination values.
ψ_2	ψ_1 for frequent values.
	ψ_2 for quasi-permanent values.

1 Overview

1.1 Visualizations

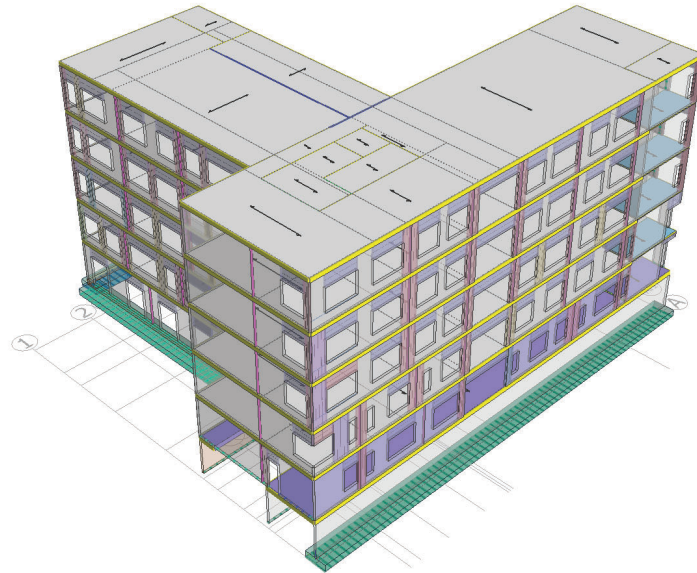


Figure 1: 3D overview from bottom left corner



Figure 2: 3D overview from top right corner

1.2 Summarized result overview

Table 1: Summarized results for all load combinations

Wall section	#	Analysis type	Load combination	Load multiplier	$ U _{\max}$	Strain check	Wall slice util.	Beam util.	References
5	1	EP	6.10a 1.2 gsup	-	5.6 mm	OK	50.3 %	41.9 % *	P. 142, 193, 221
	2	EP	6.10b 1.5 qk + 0.3 wk+ + gsup	-	5.6 mm	OK	76.8 %	71.1 % *	P. 145, 195, 222
	3	EP	6.10b 1.5 qk + 0.3 wk- + gsup	-	6.5 mm	OK	79.1 %	69.4 % *	P. 149, 197, 223
	4	EP	6.10b 1.5 wk+ + 0.9 qk + gsup	-	3.3 mm	OK	82.6 %	53.4 % *	P. 153, 199, 224
	5	EP	6.10b 1.5 wk- + 0.9 qk + gsup	-	9.8 mm	OK	93.2 %	46.1 % *	P. 157, 201, 225
	6	EP	6.10b 1.5 wk+ + 0.9 ginf	-	4.6 mm	OK	87.3 %	29.6 % *	P. 161, 203, 226
	7	EP	6.10b 1.5 wk- + 0.9 ginf	-	11.3 mm	OK	80.5 %	50.3 % *	P. 165, 205, 227
	8	EP	6.11 brand	-	3.9 mm	OK	68.3 %	60.3 % *	P. 169, 207, 228
	9	EP	6.11 Seismisk+	-	3.8 mm	OK	56.4 %	40.3 % *	P. 173, 209, 229
	10	EP	6.11 Seismisk-	-	12.0 mm	OK	58.7 %	47.5 % *	P. 177, 211, 230
	11	EP	SLS wk+	-	6.6 mm	OK	-	-	P. 181
	12	EP	SLS wk-	-	6.6 mm	OK	-	-	P. 185

*: Some beams do not contain stirrups. Shear capacity and shear utilization is not determined for those.

3.2.1 Wall blocks

150 mm C35 S550 2xØ6/150

Concrete:	C35
Thickness:	150 mm
Horizontal mesh:	2 × Ø6 / 150 (S550)
- Anchorage length:	240 mm
Vertical mesh:	2 × Ø6 / 150 (S550)
- Anchorage length:	240 mm
- Cover (front / back):	15 / 15 mm
Weight, cat. G1:	3.8 kN/m ² (25.0 kN/m ³)
Additional weight, cat. G2:	0.0 kN/m ²

200 mm C35 S550 2xØ6/150 S550 2xØ8/200

Concrete:	C35
Thickness:	200 mm
Horizontal mesh:	2 × Ø6 / 150 (S550)
- Anchorage length:	240 mm
Vertical mesh:	2 × Ø8 / 200 (S550)
- Anchorage length:	320 mm
- Cover (front / back):	25 / 25 mm
Weight, cat. G1:	5.0 kN/m ² (25.0 kN/m ³)
Additional weight, cat. G2:	0.0 kN/m ²

360 mm C45 S550 2xØ6/150

Concrete:	C45
Thickness:	360 mm
Horizontal mesh:	2 × Ø6 / 150 (S550)
- Anchorage length:	240 mm
Vertical mesh:	2 × Ø6 / 150 (S550)
- Anchorage length:	240 mm
- Cover (front / back):	15 / 15 mm
Weight, cat. G1:	9.0 kN/m ² (25.0 kN/m ³)
Additional weight, cat. G2:	0.0 kN/m ²

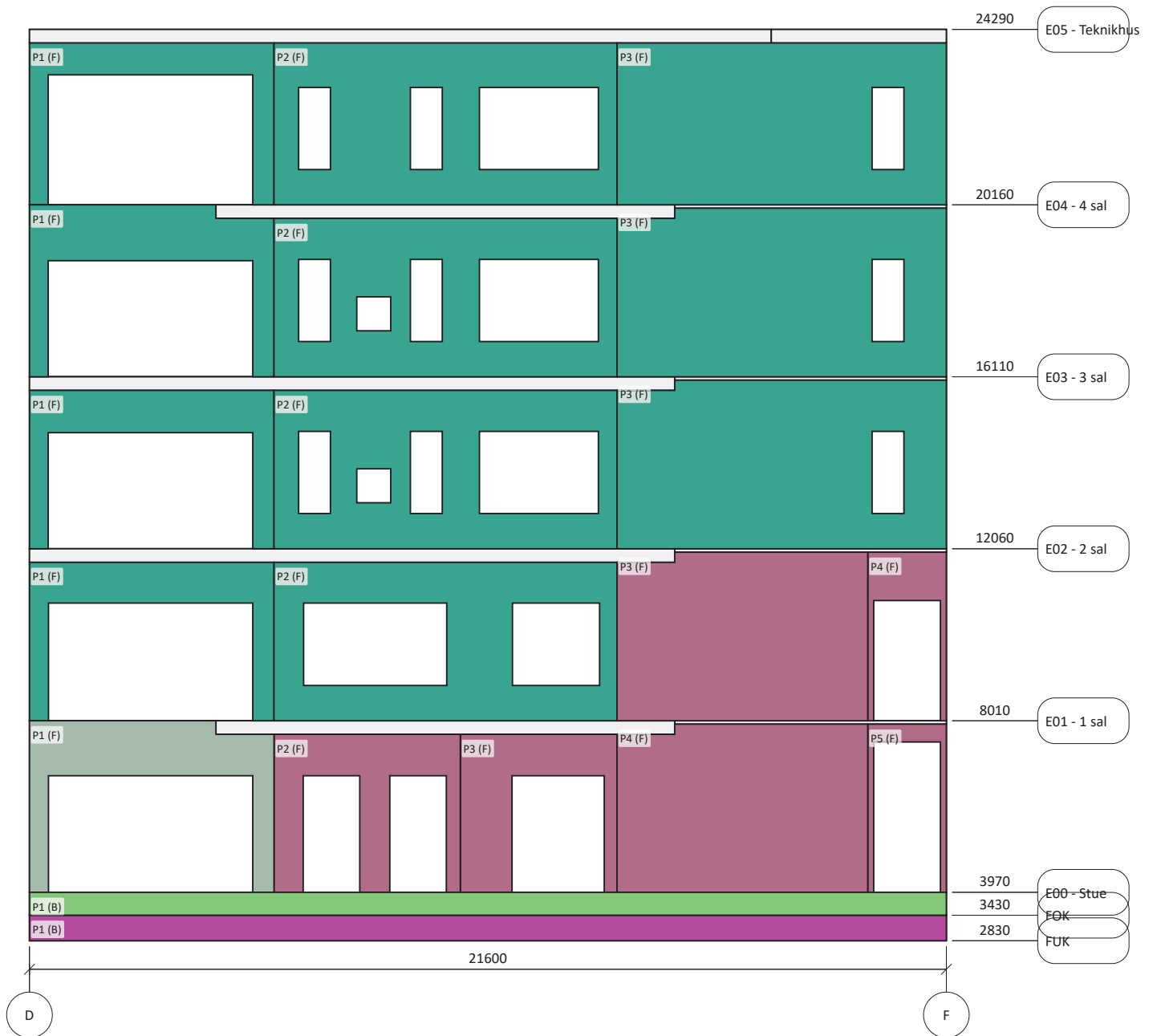


Figure 36: Wall elevation including element groups - (F): Front side visible, (B): Back side visible, (S): Right or left side visible, : Key element.

Element property groups for wall section: 5

Group	Block	Properties				Fire properties				
		Key el.	e_0	w_{lat} (cat.)	Init. curv.	Rating	Exposed front/back	Exp. in holes/sides	Rebar type	Length red.
	[-]	[-]	[mm]	[kN/m ²]	[1/mm]	[min]	[-]	[-]	[-]	[-]
	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	no	20	-1.06 (V)	1/400	120	Back	Yes	Quenched	0.7 L
	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	no	20	-1.06 (V)	1/400	120	Front	Yes	Quenched	0.7 L
	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	no	20	0	1/400	120	Front	Yes	Quenched	0.7 L
	Fundament	no	20	-	-	120	Front	Yes	Quenched	-
	Skaft	no	20	-	-	120	Front	Yes	Quenched	-

Note

Cat.	Load category. G1: Self-weight, structures. G2: Self-weight, other. A, B, C, D, E, F, G: Live loads. S: Snow load. V: Wind load. ALS: Accidental load.
w_{lat}	Characteristic value of lateral load acting on panel. Positive value is pressure on panel front side.
Fire properties	Properties on panels used in the fire case in Code check for wall slices and Code check for beams.
Exposed front/back	Side(s) of panel/column/beam exposed to fire. Front and/or back side.
Exp. in holes/sides	If the panel hole edges, the column sides, or the beam top and/or bottom sides are exposed to fire.
Length red.	Equivalent buckling length in the fire case, where L is the panel height.

Panel list for wall section: 5

Wall	Panel	Block	Base level	Top level	Width	Height	Thickness	Net area	Net weight
[-]	[-]	[-]	[-]	[-]	[mm]	[mm]	[mm]	[m ²]	[kN]
Wall 129	P1	Skaft	FOK	E00 - Stue	21600	540	200	11.664	58.3
Wall 130	P1	Fundament	FUK	FOK	21600	600	2000	12.960	648.0
Wall 14	P1	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E00 - Stue	E01 - 1 sal	5760	4040	200	9.624	48.1
	P2	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E00 - Stue	E01 - 1 sal	4390	3720	200	9.018	45.1
	P3	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E00 - Stue	E01 - 1 sal	3690	3720	200	7.765	38.8
	P4	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E00 - Stue	E01 - 1 sal	5908	3960	200	23.069	115.3
	P5	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E00 - Stue	E01 - 1 sal	1852	3960	200	1.769	8.8
Wall 31	P1	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E01 - 1 sal	E02 - 2 sal	5760	3730	200	8.151	40.8
	P2	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E01 - 1 sal	E02 - 2 sal	8080	3730	200	19.610	98.1
	P3	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E01 - 1 sal	E02 - 2 sal	5908	3970	200	23.128	115.6
	P4	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E01 - 1 sal	E02 - 2 sal	1852	3970	200	2.904	14.5
Wall 65	P1	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E02 - 2 sal	E03 - 3 sal	5760	3730	200	8.307	41.5
	P2	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E02 - 2 sal	E03 - 3 sal	8080	3730	200	21.178	105.9
	P3	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E02 - 2 sal	E03 - 3 sal	7760	3970	200	29.030	145.2
Wall 66	P1	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E03 - 3 sal	E04 - 4 sal	5760	4050	200	9.712	48.6
	P2	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E03 - 3 sal	E04 - 4 sal	8080	3730	200	21.178	105.9
	P3	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E03 - 3 sal	E04 - 4 sal	7760	3970	200	29.030	145.2
Wall 67	P1	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E04 - 4 sal	E05 - Teknikhus	5760	3810	200	7.196	36.0
	P2	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E04 - 4 sal	E05 - Teknikhus	8080	3810	200	22.465	112.3
	P3	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	E04 - 4 sal	E05 - Teknikhus	7760	3810	200	28.115	140.6

5.2 Load definitions

Line load values, *LL start* and *LL end* are calculated as *surface load* · *load depth*. A line load has a start load depth and end load depth.

Point load values are calculated as *surface load* · *load area*.

Note that the line load depths and point load areas in the load definitions are default values and not always the assigned values. The assigned values appear in Load elevations.

D1						
		Surface load		Line load		Point load
			Load depth / load area for line load / point load:	start	end	
				1.00 m	1.00 m	1.00 m ²
Characteristic loads						
Load type	Category	Surface load [kN/m ²]	Reduction factors	LL start [kN/m]	LL end [kN/m]	Point load [kN]
Huldæk	G1	4.22		4.22	4.22	4.22
Lette vægge	G2	1.20		1.20	1.20	1.20
Gulvbelægning 1...	G2	0.10		0.10	0.10	0.10
Overbeton 80 mm	G2	1.92		1.92	1.92	1.92
Installationer	G2	0.20		0.20	0.20	0.20
Loft	G2	0.10		0.10	0.10	0.10
C3	C	5.00	$\psi_0 = 0.6, \psi_1 = 0.6, \psi_2 = 0.5$	5.00	5.00	5.00
Design loads						
Combination (unfavorable only)		Surface load [kN/m ²]	Design load calculation	LL start [kN/m]	LL end [kN/m]	Point load [kN]
ULS 6.10a Permanent load		10.22	$= 1.1 \cdot 1.2 \cdot (4.22 + 1.20 + 0.10 + 1.92 + 0.20 + 0.10)$	10.22	10.22	10.22
ULS 6.10b Live load		16.76	$= 1.1 \cdot (4.22 + 1.20 + 0.10 + 1.92 + 0.20 + 0.10) + 1.1 \cdot 1.5 \cdot (5.00)$	16.76	16.76	16.76
ULS 6.10b Wind load		13.46	$= 1.1 \cdot (4.22 + 1.20 + 0.10 + 1.92 + 0.20 + 0.10) + 1.1 \cdot 1.5 \cdot (0.6 \cdot 5.00)$	13.46	13.46	13.46
SLS 6.14a/b Characteristic load		12.74	$= (4.22 + 1.20 + 0.10 + 1.92 + 0.20 + 0.10) + (5.00)$	12.74	12.74	12.74
ALS 6.11a/b Fire live load		10.74	$= (4.22 + 1.20 + 0.10 + 1.92 + 0.20 + 0.10) + (0.6 \cdot 5.00)$	10.74	10.74	10.74
ALS 6.11a/b Fire wind load		10.24	$= (4.22 + 1.20 + 0.10 + 1.92 + 0.20 + 0.10) + (0.5 \cdot 5.00)$	10.24	10.24	10.24
ALS 6.12a/b Seismic load		10.24	$= (4.22 + 1.20 + 0.10 + 1.92 + 0.20 + 0.10) + (0.5 \cdot 5.00)$	10.24	10.24	10.24

5.3.3 E02 - 2 sal

Elevation: 12060 mm

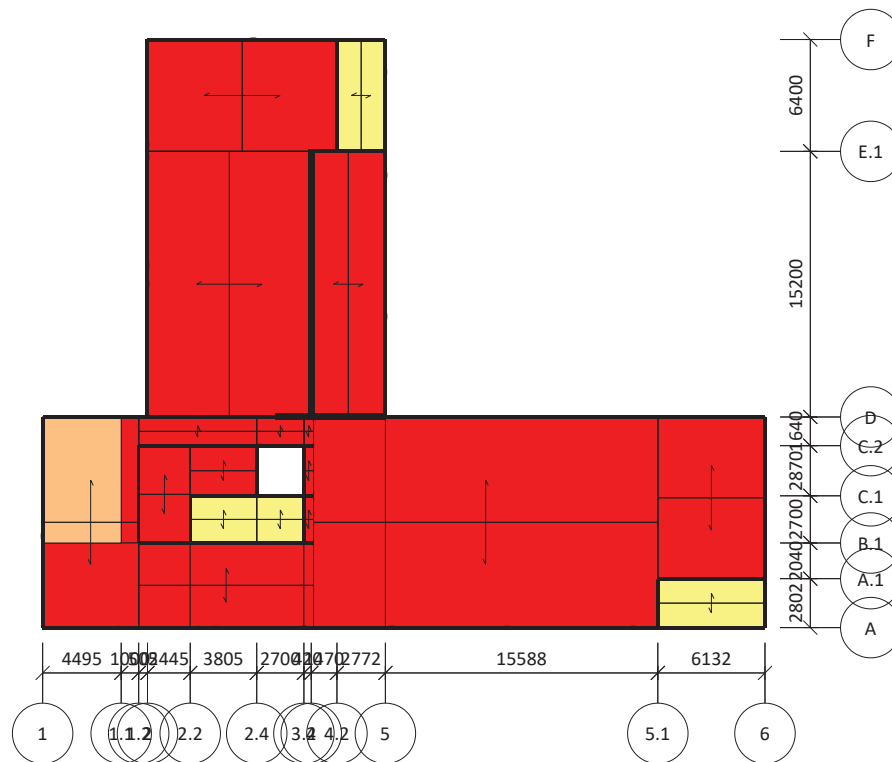


Figure 49: Load plan

Load definition	Area
D2	32.41 m ²
D1	699.51 m ²
TR1	52.49 m ²

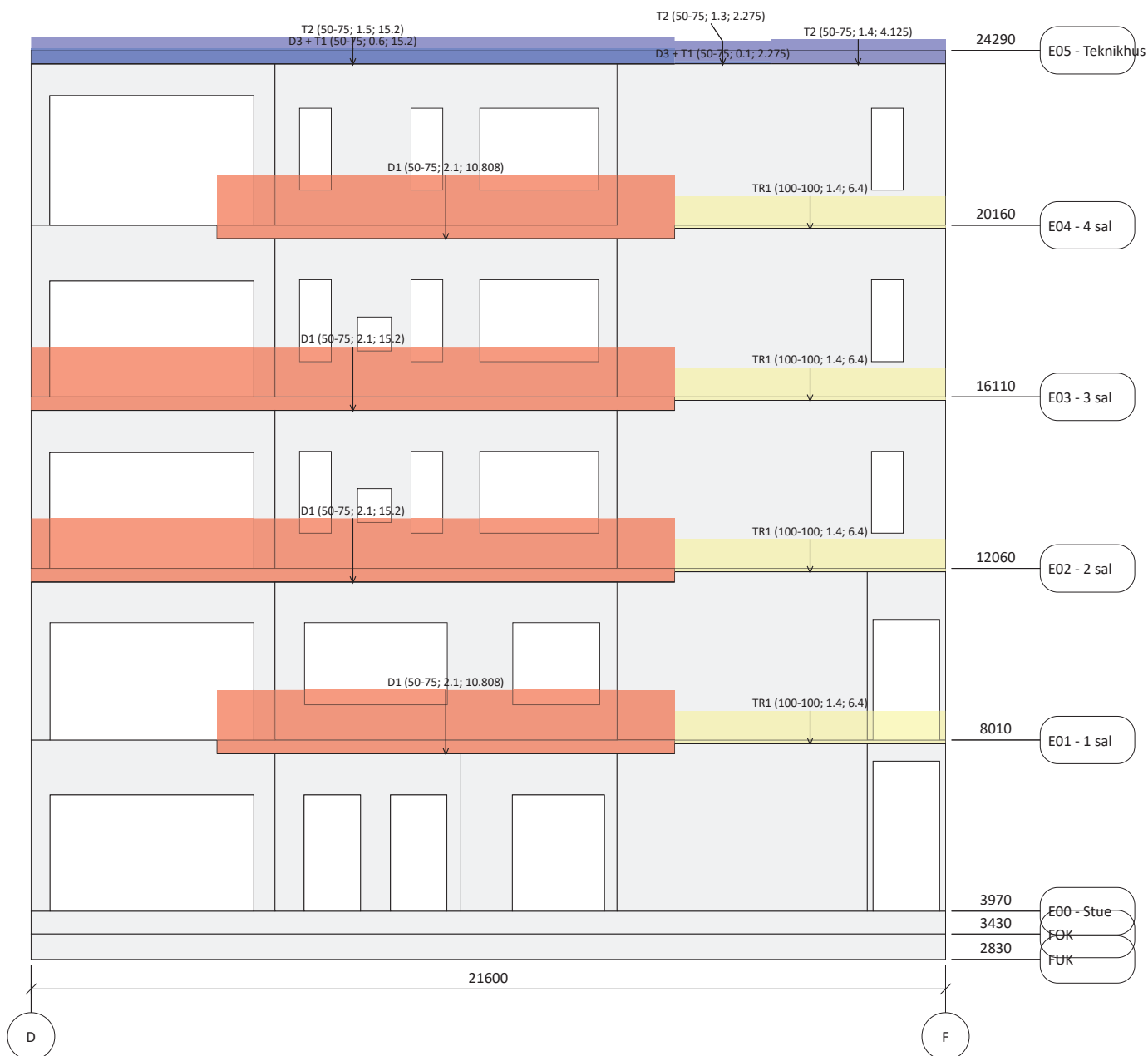


Figure 79: In-plane deck loads elevation

Tags on in-plane deck loads elevation: [load definition] ([eccentricity in mm]; [load depth in m]; [length in m]).

No in-plane line loads present.

No lateral line loads or point loads present.

5.5 User defined horizontal load cases

5.5.1 5 Seismisk+

Wall section: 5 (D - F) (FUK - E05 - Teknikhus)

Category: ALS (Accidental load)

Total characteristic force: 504.80 kN

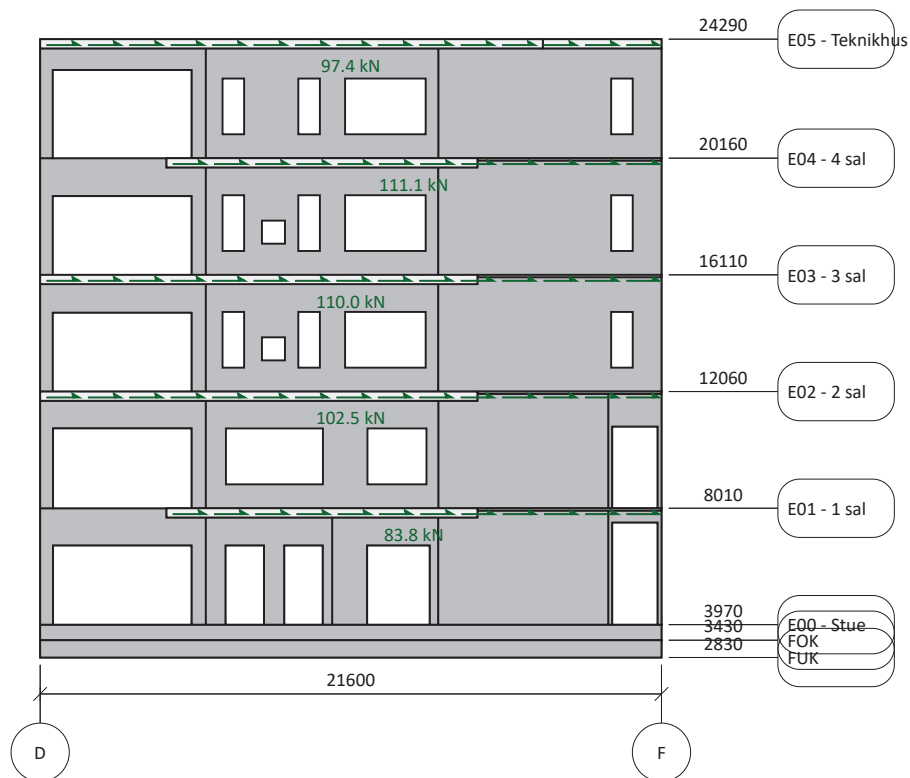


Figure 82: User-defined horizontal load case: 5 Seismisk+

5.5.2 5 Seismisk-

Wall section: 5 (D - F) (FUK - E05 - Teknikhus)

Category: ALS (Accidental load)

Total characteristic force: -504.80 kN

FE result for load combination: 6.10b 1.5 qk + 0.3 wk+ + gsup

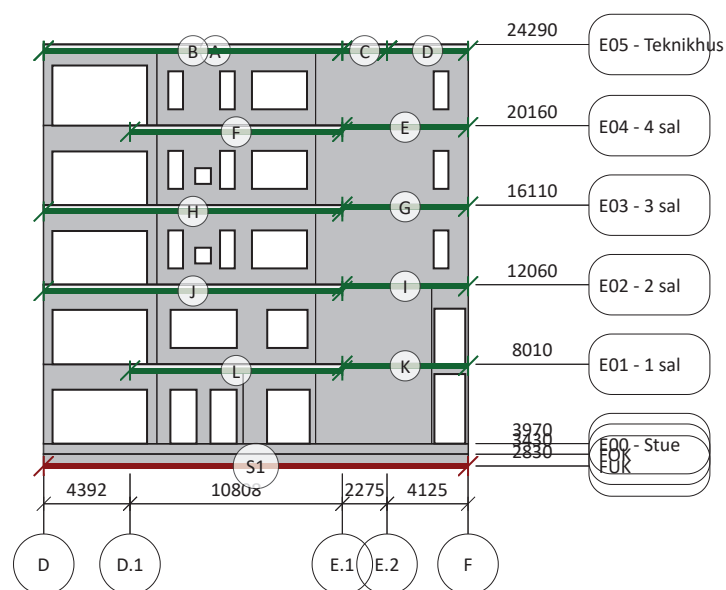


Figure 91: Elevation of wall with applied loads.

Maximum displacement:	5.6 mm
Design case:	ULS: 6.10b - Live load
Analysis type:	Elastoplastic analysis (cracked concrete)
Effectiveness factor (v'):	Fixed
Wind load case:	5 Vind+
Element type:	Mixed
Total number of elements:	11607
Concrete strain:	$\epsilon_c = 0.9\text{‰} < 3.5\text{‰}$ OK
Reinforcement mesh strain:	$\epsilon_s = 13\text{‰} < 50\text{‰}$ OK
Rebar strain:	$\epsilon_s = 1\text{‰} < 50\text{‰}$ OK

Table 6: Supports

Ref	Support type	Length mm	Start		End	
			X mm	Z mm	X mm	Z mm
①	Fundament 668 kN/m	21600	33652	2830	12052	2830

Table 7: Applied loads

Ref	Multiplier load?	Start					End			
		Length mm	X mm	Z mm	p _x kN/m	p _y kN/m	X mm	Z mm	p _x kN/m	p _y kN/m
(A)	No	17475	12052	23970	1.3	0.0	29527	23970	1.3	0.0
(B)	No	15200	12052	23970	0.0	-15.0	27252	23970	0.0	-15.0
(B)	No	15200	12052	23970	0.0	-2.7	27252	23970	0.0	-2.7
(C)	No	2275	27252	23970	0.0	-8.8	29527	23970	0.0	-8.8
(C)	No	2275	27252	23970	0.0	-1.5	29527	23970	0.0	-1.5
(D)	No	4125	29527	23970	0.0	-8.4	33652	23970	0.0	-8.4
(D)	No	4125	29527	23970	0.0	-1.4	33652	23970	0.0	-1.4
(D)	No	4125	29527	23970	1.3	0.0	33652	23970	1.3	0.0
(E)	No	6400	27252	20080	0.0	-7.6	33652	20080	0.0	-7.6
(E)	No	6400	27252	20080	0.0	-11.4	33652	20080	0.0	-11.4
(E)	No	6400	27252	20080	1.5	0.0	33652	20080	1.5	0.0
(F)	No	10808	16444	19840	0.0	-18.1	27252	19840	0.0	-18.1
(F)	No	10808	16444	19840	0.0	-17.5	27252	19840	0.0	-17.5
(F)	No	10808	16444	19840	1.5	0.0	27252	19840	1.5	0.0
(G)	No	6400	27252	16030	0.0	-7.6	33652	16030	0.0	-7.6
(G)	No	6400	27252	16030	0.0	-11.4	33652	16030	0.0	-11.4
(G)	No	6400	27252	16030	1.2	0.0	33652	16030	1.2	0.0
(H)	No	15200	12052	15790	0.0	-18.1	27252	15790	0.0	-18.1
(H)	No	15200	12052	15790	0.0	-17.5	27252	15790	0.0	-17.5
(H)	No	15200	12052	15790	1.2	0.0	27252	15790	1.2	0.0
(I)	No	6400	27252	11980	0.0	-7.6	33652	11980	0.0	-7.6
(I)	No	6400	27252	11980	0.0	-11.4	33652	11980	0.0	-11.4
(I)	No	6400	27252	11980	1.1	0.0	33652	11980	1.1	0.0
(J)	No	15200	12052	11740	1.1	0.0	27252	11740	1.1	0.0
(J)	No	15200	12052	11740	0.0	-18.1	27252	11740	0.0	-18.1
(J)	No	15200	12052	11740	0.0	-17.5	27252	11740	0.0	-17.5
(K)	No	6400	27252	7930	0.0	-7.6	33652	7930	0.0	-7.6
(K)	No	6400	27252	7930	0.0	-11.4	33652	7930	0.0	-11.4
(K)	No	6400	27252	7930	1.2	0.0	33652	7930	1.2	0.0
(L)	No	10808	16444	7690	0.0	-18.1	27252	7690	0.0	-18.1
(L)	No	10808	16444	7690	0.0	-17.5	27252	7690	0.0	-17.5
(L)	No	10808	16444	7690	1.2	0.0	27252	7690	1.2	0.0

Table 8: Reactions and equilibrium check

	Horizontal	Vertical
Applied fixed loads: $\sum Q_{\text{fixed}} =$	125.7 kN	-2670.3 kN
Selfweight fixed loads: $\sum Q_{g,\text{fixed}} =$	-	-2411.8 kN
Total:	125.7 kN	-5082.2 kN
Reactions (FEM):	-125.7 kN	5082.2 kN
Error (residual):	-0.002 kN	0.004 kN

Displacement $|U|$:

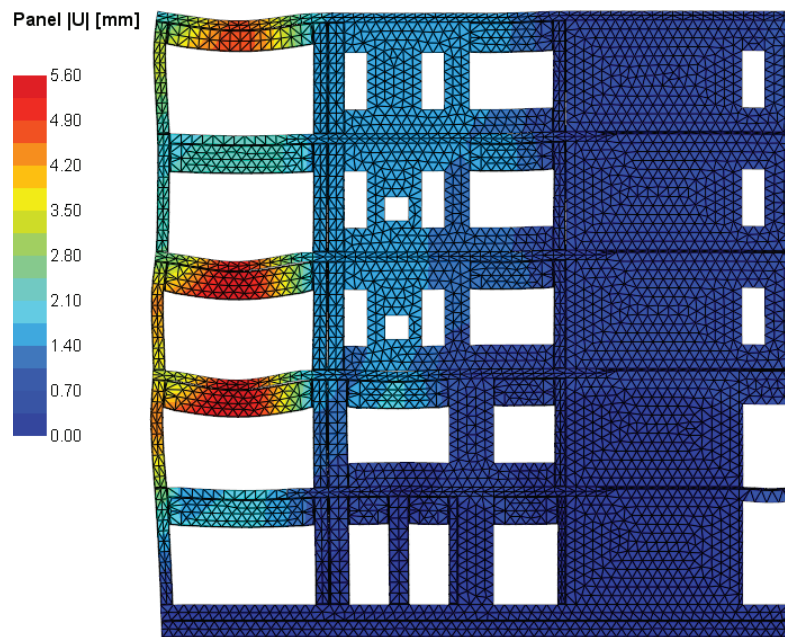


Figure 92: Displacement $|U|$

Second concrete principal stress σ_{c2} :

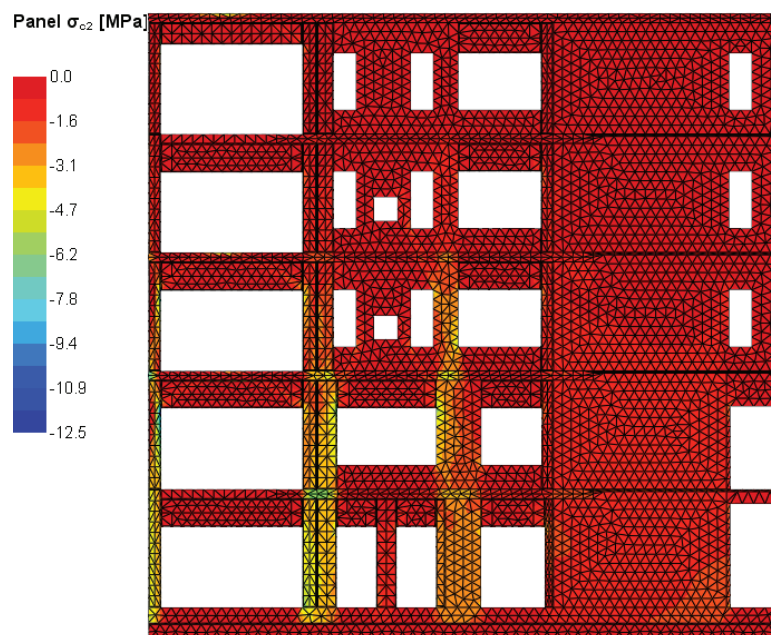


Figure 93: Second concrete principal stress σ_{c2}

Concrete strain: $\epsilon_c = 0.9\text{‰} < 3.5\text{‰}$ OK

Maximum stress in reinforcement mesh, $\max(\sigma_{sx}, \sigma_{sy})$:

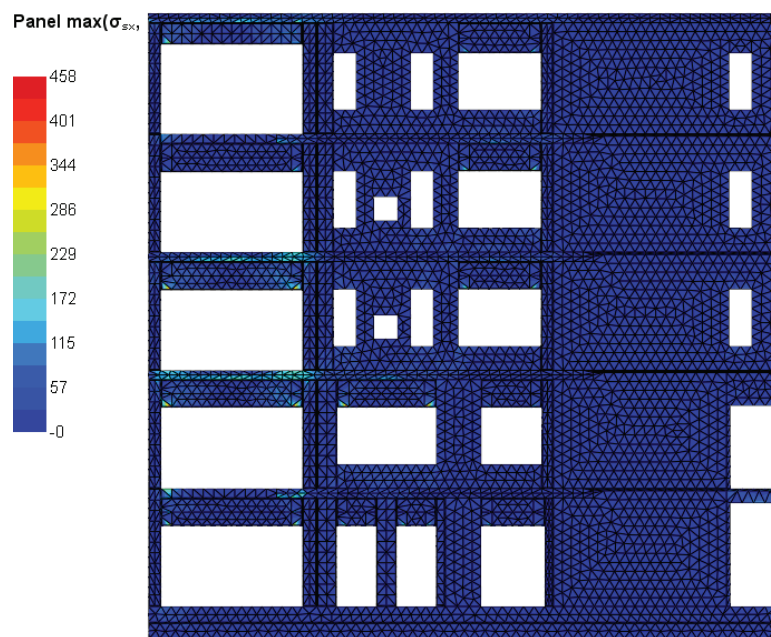


Figure 94: Maximum stress in reinforcement mesh, $\max(\sigma_{sx}, \sigma_{sy})$

Reinforcement mesh strain: $\epsilon_s = 13\% < 50\%$ OK

7 Code check for wall slices

This section contains results for all elastoplastic load combinations.

Nomenclature:

Symbol	Description
$M_{0Ed,x}$, $M_{0Ed,z}$	Design value of the applied internal bending moment. $M_{0Ed,x}$ is the in-plane moment, about the z-axis. $M_{0Ed,z}$ is the out-of-plane moment, about the x-axis. The "0" indicates that the moment contribution from the deformation times the normal force is not included.
$M_{0Rd,x}$, $M_{0Rd,z}$	Design value of the moment capacity. $M_{0Rd,x}$ is the in-plane moment capacity, about the z-axis. $M_{0Rd,z}$ is the out-of-plane moment capacity, about the x-axis. The "0" indicates that the moment capacity is reduced by the deformation times normal force.
N_{Ed}	Design value of the applied axial force.
Utilization	The moment utilization of the wall slice subjected to biaxial bending, $(M_{0Ed,z} / M_{0Rd,z}) + (M_{0Ed,x} / M_{0Rd,x})$
b	Width of wall slice cross-section.
u	Out of plane displacement.
w_{lat}	Lateral load acting on wall slice.

7.1 Result overview for wall slices

The most stressed wall slices are summarized in the following tables.

ULS/ALS

Table 39: Maximum utilization per wall section for all relevant load combinations

Wall section	Panel	Utilization	Load combination	Ref page
5	P1	93 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201

SLS

Table 40: Maximum displacement per wall section for all relevant load combinations

Wall section	Panel	u	Load combination	Ref page
5	P2	9.0 mm	SLS wk+	Page 213

7.2 Wall sections - envelopes

7.2.1 Wall section: 5

Highest utilization for each load combination

Load combination	Panel	Utilization	Ref page
6.10a 1.2 gsup	P1	50 %	Page 193
6.10b 1.5 qk + 0.3 wk+ + gsup	P1	77 %	Page 195
6.10b 1.5 qk + 0.3 wk- + gsup	P1	79 %	Page 197
6.10b 1.5 wk+ + 0.9 qk + gsup	P1	83 %	Page 199
6.10b 1.5 wk- + 0.9 qk + gsup	P1	93 %	Page 201
6.10b 1.5 wk+ + 0.9 ginf	P2	87 %	Page 203
6.10b 1.5 wk- + 0.9 ginf	P2	81 %	Page 205
6.11 brand	P2	68 %	Page 207
6.11 Seismisk+	P2	56 %	Page 209
6.11 Seismisk-	P2	59 %	Page 211



Figure 135: Critical wall slices. Utilization.

Result summary of wall slices

Panel	Level	Wall slice	Utilization	Load combination	Ref page
P1	E02 - 2 sal	1	88 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	2	69 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
P2	-	3	38 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	4	76 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	5	87 %	6.10b 1.5 wk+ + 0.9 ginf	Page 203
-	-	6	82 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	7	51 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
P3	-	8	35 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	9	32 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	10	29 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	11	30 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	12	43 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	13	36 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
P1	E00 - Stue	14	37 %	6.11 brand	Page 207
-	-	15	43 %	6.10b 1.5 qk + 0.3 wk- + gsup	Page 197
P2	-	16	53 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	17	67 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	18	41 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
P3	-	19	65 %	6.10b 1.5 wk- + 0.9 ginf	Page 205
-	-	20	41 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
P4	-	21	51 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	22	40 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	23	36 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
-	-	24	41 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
-	-	25	45 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
P1	E04 - 4 sal	26	69 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	27	58 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
P2	-	28	23 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
-	-	29	38 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
-	-	30	35 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
-	-	31	81 %	6.10b 1.5 wk- + 0.9 ginf	Page 205
-	-	32	42 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
P3	-	33	29 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
-	-	34	20 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
-	-	35	20 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
-	-	36	20 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
-	-	37	30 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	38	30 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
P1	E01 - 1 sal	39	93 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	40	66 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
P2	-	41	79 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	42	80 %	6.10b 1.5 wk- + 0.9 ginf	Page 205
-	-	43	72 %	6.10b 1.5 wk- + 0.9 ginf	Page 205
-	-	44	41 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
P3	-	45	42 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	46	36 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	47	32 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
-	-	48	34 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
-	-	49	40 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
P1	E03 - 3 sal	50	56 %	6.10b 1.5 wk- + 0.9 ginf	Page 205
-	-	51	52 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
P2	-	52	33 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	53	67 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
-	-	54	83 %	6.10b 1.5 wk+ + 0.9 ginf	Page 203
-	-	55	80 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	56	51 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
P3	-	57	35 %	6.10b 1.5 wk+ + 0.9 qk + gsup	Page 199
-	-	58	27 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	59	27 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201

Panel	Level	Wall slice	Utilization	Load combination	Ref page
-	-	60	27 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	61	42 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201
-	-	62	35 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 201

Result for load combination: 6.10b 1.5 qk + 0.3 wk+ + gsup



Figure 137: Utilization of wall slices.

Name	Utilization %	M _{0Ed,z} kNm	M _{0Rd,z} kNm	M _{0Ed,x} kNm	M _{0Rd,x} kNm	N _{Ed} kN	w _{lat} kN/m	b mm
Wall 14 - P1-12052-3970	31.3%	8.08	44.7	-8.35	112.5	357.8	0.0	448
Wall 14 - P1-17312-3970	38.7%	-11.84	50.0	-14.11	141.0	440.0	0.0	500
Wall 14 - P2-17812-3970	38.2%	-14.14	56.1	-12.23	220.8	511.4	-0.7	688
Wall 14 - P2-19832-3970	30.1%	-8.12	34.8	-14.65	132.3	170.0	-1.1	708
Wall 14 - P2-21872-3970	28.8%	-5.84	26.1	-2.82	46.8	168.6	-0.5	330
Wall 14 - P3-22202-3970	42.9%	-19.28	67.9	27.0	432.6	652.1	-1.2	1218
Wall 14 - P3-25592-3970	27.4%	-5.42	28.9	-3.73	42.8	111.3	-0.7	300
Wall 14 - P4-25892-3970	30.2%	-11.93	55.1	-16.36	363.2	410.0	-0.7	1360
Wall 14 - P4-27252-3970	26.9%	-9.38	44.5	-3.53	248.9	321.3	-0.6	1137
Wall 14 - P4-28389-3970	27.2%	-9.45	44.7	0.70	250.2	324.2	-0.6	1137
Wall 14 - P4-29526-3970	27.7%	-9.68	45.4	1.45	254.8	334.8	-0.6	1137
Wall 14 - P4-30663-3970	28.5%	-10.06	46.6	6.70	262.1	351.5	-0.6	1137
Wall 31 - P1-12052-8010	76.8%	-13.41	43.2	43.1	108.1	330.5	-1.5	448
Wall 31 - P1-17312-8010	45.9%	-12.87	41.9	-17.80	116.7	300.8	-1.5	500
Wall 31 - P2-17812-8010	51.2%	-16.51	56.5	39.7	225.8	517.7	-1.3	698
Wall 31 - P2-21882-8010	63.0%	-16.28	48.4	-45.42	188.0	499.4	-1.3	774
Wall 31 - P2-22656-8010	47.6%	-10.32	35.6	-21.43	131.5	293.4	-0.9	774
Wall 31 - P2-25482-8010	26.6%	-5.68	30.0	-4.83	62.7	117.6	-0.8	410
Wall 31 - P3-25892-8010	25.5%	-9.67	47.8	-5.74	308.8	306.7	-0.7	1360
Wall 31 - P3-27252-8010	24.1%	-7.85	39.7	-4.45	217.8	252.6	-0.6	1137
Wall 31 - P3-28389-8010	24.3%	-7.84	39.7	-0.52	217.7	252.2	-0.6	1137
Wall 31 - P3-29526-8010	24.4%	-7.84	39.7	0.92	217.7	252.2	-0.6	1137
Wall 31 - P3-30663-8010	28.8%	-8.14	40.6	11.8	224.0	265.7	-0.6	1137
Wall 65 - P1-12052-12060	70.7%	-10.75	36.1	35.0	85.1	210.2	-1.5	440
Wall 65 - P1-17312-12060	54.9%	-11.45	38.2	-25.86	103.6	236.1	-1.5	500
Wall 65 - P2-17812-12060	29.4%	-7.81	40.3	7.03	128.2	261.6	-0.5	580
Wall 65 - P2-19142-12060	48.1%	-5.00	18.2	-18.42	55.5	91.0	-0.7	620
Wall 65 - P2-20562-12060	55.3%	-4.20	13.8	11.2	27.9	69.7	-0.7	464
Wall 65 - P2-21776-12060	51.5%	-16.00	48.8	50.4	216.9	468.2	-1.4	876

Name	Utilization %	M _{0Ed,z} kNm	M _{0Rd,z} kNm	M _{0Ed,x} kNm	M _{0Rd,x} kNm	N _{Ed} kN	w _{lat} kN/m	b mm
Wall 65 - P2-25454-12060	38.6%	-6.62	30.4	-11.55	68.3	120.9	-1.0	438
Wall 65 - P3-25892-12060	26.7%	-8.33	43.4	-14.06	275.4	245.7	-0.7	1360
Wall 65 - P3-27252-12060	21.4%	-6.27	34.9	-5.17	187.0	179.8	-0.6	1163
Wall 65 - P3-28415-12060	20.7%	-6.05	34.2	-0.77	182.2	170.4	-0.6	1162
Wall 65 - P3-29577-12060	20.3%	-5.99	34.0	1.10	181.0	167.6	-0.6	1163
Wall 65 - P3-30740-12060	30.2%	-6.97	34.8	18.6	186.4	178.8	-0.8	1162
Wall 65 - P3-32652-12060	28.9%	-4.00	22.9	-21.23	108.5	59.7	-0.7	1000
Wall 66 - P1-12052-16110	25.4%	-4.94	28.3	-8.39	62.8	90.7	-1.5	440
Wall 66 - P1-17312-16110	33.4%	-6.64	30.3	-8.82	78.2	115.9	-1.5	500
Wall 66 - P2-17812-16110	19.0%	-4.75	31.0	3.53	94.0	122.5	-0.5	580
Wall 66 - P2-19142-16110	36.8%	-4.79	17.5	-5.03	52.9	81.5	-0.7	620
Wall 66 - P2-20562-16110	48.9%	-4.86	16.0	10.4	33.2	100.0	-0.7	464
Wall 66 - P2-21776-16110	40.5%	-10.88	33.4	4.44	141.9	235.3	-1.4	876
Wall 66 - P2-25454-16110	40.6%	-5.91	28.2	-12.23	62.2	89.0	-1.0	438
Wall 66 - P3-25892-16110	26.6%	-6.55	37.5	-17.68	229.7	164.7	-0.7	1360
Wall 66 - P3-27252-16110	17.8%	-4.50	29.1	-3.90	146.8	100.7	-0.6	1163
Wall 66 - P3-28415-16110	16.6%	-4.28	28.3	-0.48	141.7	91.1	-0.6	1162
Wall 66 - P3-29577-16110	16.4%	-4.28	28.3	1.13	141.6	90.8	-0.6	1163
Wall 66 - P3-30740-16110	28.3%	-5.33	29.4	15.3	149.1	105.3	-0.8	1162
Wall 66 - P3-32652-16110	20.5%	-3.73	22.0	-10.70	102.9	47.8	-0.7	1000
Wall 67 - P1-12052-20160	52.0%	-5.65	26.5	18.0	57.4	63.6	-1.5	440
Wall 67 - P1-17312-20160	42.6%	-6.15	28.0	-15.09	70.8	82.6	-1.5	500
Wall 67 - P2-17812-20160	14.9%	-2.37	25.5	-3.91	72.9	43.1	-0.5	580
Wall 67 - P2-19142-20160	16.4%	-2.46	18.8	-2.25	66.2	21.3	-0.7	942
Wall 67 - P2-20084-20160	18.7%	-2.88	20.4	7.75	77.1	41.8	-0.7	942
Wall 67 - P2-21776-20160	31.0%	-5.58	21.8	3.95	84.7	74.1	-1.4	876
Wall 67 - P2-25454-20160	27.5%	-3.76	25.3	-6.80	53.7	46.4	-1.0	438
Wall 67 - P3-25892-20160	18.1%	-3.05	26.4	-9.42	144.7	57.7	-0.6	1202
Wall 67 - P3-27094-20160	9.6%	-2.21	24.3	-1.99	127.5	31.4	-0.6	1202
Wall 67 - P3-28296-20160	9.1%	-2.14	24.2	-0.07	126.3	29.9	-0.6	1202
Wall 67 - P3-29498-20160	9.1%	-2.11	24.2	0.67	126.0	29.6	-0.6	1202
Wall 67 - P3-30700-20160	17.2%	-2.78	25.0	8.49	133.9	39.5	-0.8	1202
Wall 67 - P3-32652-20160	14.4%	-2.18	20.0	-6.29	87.8	22.8	-0.7	1000

Result for load combination: SLS wk+

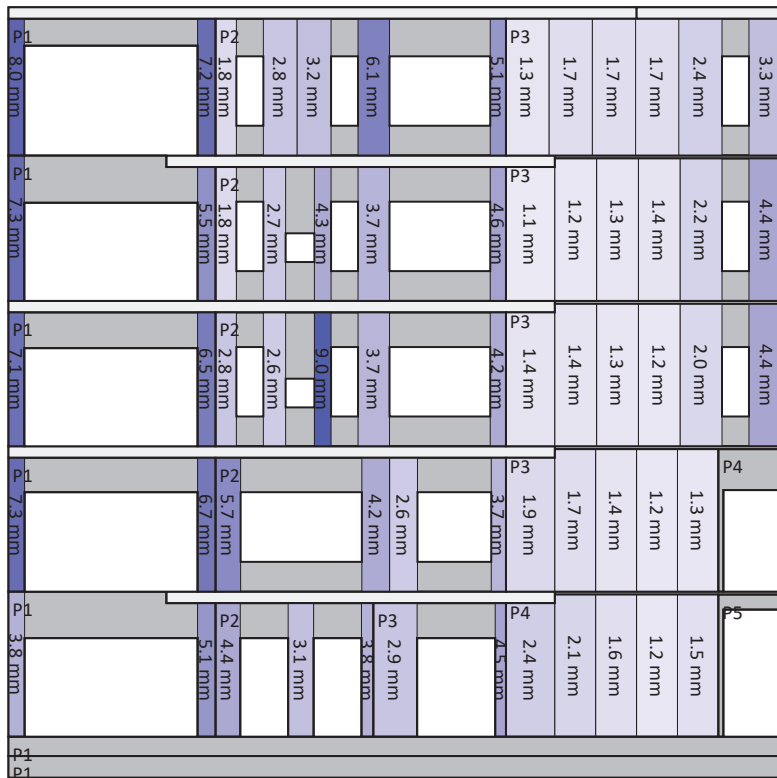


Figure 146: Out-of-plane deformation of wall slices, u.

Name	u mm	u/L _s -	w _k mm	M _{0Ed} kNm	N _{Ed} kN	w _{lat} kN/m	b mm	L _s mm
Wall 14 - P1-12052-3970	3.8	1/1059	uncracked	7.08	313.8	0.0	448	4040
Wall 14 - P1-17312-3970	5.1	1/728	uncracked	-11.95	470.2	0.0	500	3720
Wall 14 - P2-17812-3970	4.4	1/855	uncracked	-14.06	484.5	-1.4	688	3720
Wall 14 - P2-19832-3970	3.1	1/1192	0.007	-8.53	147.2	-2.2	708	3720
Wall 14 - P2-21872-3970	3.8	1/981	uncracked	-6.26	169.1	-1.1	330	3720
Wall 14 - P3-22202-3970	2.9	1/1303	uncracked	-16.55	486.4	-2.4	1218	3720
Wall 14 - P3-25592-3970	4.5	1/824	0.000	-7.04	158.0	-1.5	300	3720
Wall 14 - P4-25892-3970	2.4	1/1519	uncracked	-15.88	567.1	-1.4	1360	3720
Wall 14 - P4-27252-3970	2.1	1/1892	uncracked	-10.20	328.5	-1.2	1137	3960
Wall 14 - P4-28389-3970	1.6	1/2534	uncracked	-7.74	217.0	-1.2	1137	3960
Wall 14 - P4-29526-3970	1.2	1/3230	0.000	-5.69	123.6	-1.2	1137	3960
Wall 14 - P4-30663-3970	1.5	1/2574	0.009	-4.25	56.9	-1.2	1137	3960
Wall 31 - P1-12052-8010	7.3	1/514	0.006	-13.74	288.4	-3.0	448	3730
Wall 31 - P1-17312-8010	6.7	1/559	0.005	-14.06	297.0	-3.1	500	3730
Wall 31 - P2-17812-8010	5.7	1/655	uncracked	-17.96	540.1	-2.5	698	3730
Wall 31 - P2-21882-8010	4.2	1/884	uncracked	-14.55	374.7	-2.6	774	3730
Wall 31 - P2-22656-8010	2.6	1/1439	0.002	-8.49	173.6	-1.9	774	3730
Wall 31 - P2-25482-8010	3.7	1/1020	uncracked	-7.44	169.5	-1.5	410	3730
Wall 31 - P3-25892-8010	1.9	1/1973	uncracked	-12.48	410.4	-1.4	1360	3730
Wall 31 - P3-27252-8010	1.7	1/2363	uncracked	-8.27	240.2	-1.2	1137	3970
Wall 31 - P3-28389-8010	1.4	1/2843	uncracked	-6.82	174.4	-1.2	1137	3970
Wall 31 - P3-29526-8010	1.2	1/3257	0.001	-5.44	111.8	-1.2	1137	3970
Wall 31 - P3-30663-8010	1.3	1/3081	0.003	-4.72	78.4	-1.2	1137	3970
Wall 65 - P1-12052-12060	7.1	1/527	0.021	-11.54	186.6	-3.0	440	3730
Wall 65 - P1-17312-12060	6.5	1/577	0.014	-12.36	217.5	-3.1	500	3730
Wall 65 - P2-17812-12060	2.8	1/1327	uncracked	-8.20	262.3	-1.0	580	3730
Wall 65 - P2-19142-12060	2.6	1/1456	0.001	-7.09	158.3	-1.5	620	3730
Wall 65 - P2-20562-12060	9.0	1/414	0.169	-3.80	10.4	-1.3	464	3730
Wall 65 - P2-21776-12060	3.7	1/1020	0.001	-14.07	328.4	-2.8	876	3730

Name	u mm	u/L _s -	w _k mm	M _{0Ed} kNm	N _{Ed} kN	w _{lat} kN/m	b mm	L _s mm
Wall 65 - P2-25454-12060	4.2	1/884	0.007	-7.85	139.0	-1.9	438	3730
Wall 65 - P3-25892-12060	1.4	1/2689	uncracked	-9.33	266.0	-1.4	1360	3730
Wall 65 - P3-27252-12060	1.4	1/2865	uncracked	-6.92	175.6	-1.2	1163	3970
Wall 65 - P3-28415-12060	1.3	1/3142	0.000	-6.08	137.9	-1.2	1162	3970
Wall 65 - P3-29577-12060	1.2	1/3238	0.002	-5.17	96.1	-1.2	1163	3970
Wall 65 - P3-30740-12060	2.0	1/1995	0.010	-5.89	82.8	-1.6	1162	3970
Wall 65 - P3-32652-12060	4.4	1/894	0.069	-4.07	17.6	-1.5	1000	3970
Wall 66 - P1-12052-16110	7.3	1/557	0.040	-8.03	90.3	-3.0	440	4050
Wall 66 - P1-17312-16110	5.5	1/681	0.027	-8.83	117.4	-3.1	500	3730
Wall 66 - P2-17812-16110	1.8	1/2021	uncracked	-5.44	135.9	-1.0	580	3730
Wall 66 - P2-19142-16110	2.7	1/1374	0.010	-5.64	90.7	-1.5	620	3730
Wall 66 - P2-20562-16110	4.3	1/868	0.037	-4.44	54.3	-1.3	464	3730
Wall 66 - P2-21776-16110	3.7	1/1014	0.012	-10.98	184.6	-2.8	876	3730
Wall 66 - P2-25454-16110	4.6	1/806	0.026	-6.53	77.8	-1.9	438	3730
Wall 66 - P3-25892-16110	1.1	1/3431	0.000	-6.95	156.2	-1.4	1360	3730
Wall 66 - P3-27252-16110	1.2	1/3248	0.001	-5.22	98.4	-1.2	1163	3970
Wall 66 - P3-28415-16110	1.3	1/3163	0.003	-4.96	86.4	-1.2	1162	3970
Wall 66 - P3-29577-16110	1.4	1/2878	0.005	-4.61	69.8	-1.2	1163	3970
Wall 66 - P3-30740-16110	2.2	1/1790	0.015	-5.64	71.5	-1.6	1162	3970
Wall 66 - P3-32652-16110	4.4	1/907	0.067	-4.08	18.4	-1.5	1000	3970
Wall 67 - P1-12052-20160	8.0	1/478	0.071	-8.29	64.3	-3.0	440	3810
Wall 67 - P1-17312-20160	7.2	1/526	0.055	-8.93	87.8	-3.1	500	3810
Wall 67 - P2-17812-20160	1.8	1/2077	0.010	-3.12	37.7	-1.0	580	3810
Wall 67 - P2-19142-20160	2.8	1/1350	0.036	-3.89	32.7	-1.4	942	3810
Wall 67 - P2-20084-20160	3.2	1/1194	0.046	-3.74	25.5	-1.4	942	3810
Wall 67 - P2-21776-20160	6.1	1/622	0.075	-7.98	72.6	-2.8	876	3810
Wall 67 - P2-25454-20160	5.1	1/745	0.048	-5.24	36.3	-1.9	438	3810
Wall 67 - P3-25892-20160	1.3	1/2870	0.009	-4.03	52.2	-1.3	1202	3810
Wall 67 - P3-27094-20160	1.7	1/2296	0.019	-3.37	32.1	-1.3	1202	3810
Wall 67 - P3-28296-20160	1.7	1/2296	0.019	-3.32	31.1	-1.3	1202	3810
Wall 67 - P3-29498-20160	1.7	1/2266	0.020	-3.28	30.1	-1.3	1202	3810
Wall 67 - P3-30700-20160	2.4	1/1602	0.030	-4.23	35.6	-1.7	1202	3810
Wall 67 - P3-32652-20160	3.3	1/1155	0.055	-3.36	15.3	-1.5	1000	3810

8 Code check for beams

This section contains results for all elastoplastic load combinations.

Nomenclature:

Symbol	Description
L	Beam length.
$M_{Ed,max}$ $M_{Ed,min}$	Maximum and minimum design value of the applied internal bending moments. Stresses in the horizontal joint above the panel is included in the integration of the section forces.
M_{Rd+} M_{Rd-}	Design values of the moment capacity for positive and negative moment, respectively.
M_{Ed}/M_{Rd}	Maximum moment capacity utilization, taking M_{Rd+} and M_{Rd-} into account.
U	Vertical in-plane displacement. The displacement is determined in the finite element calculation, including effects of plastic strain in concrete and rebars. Cracked section stiffness, creep, shrinkage and tension stiffening is not included in the determination of the displacement.
U/L	Relative in-plane displacement.
Utilization	Maximum utilization of shear capacity and moment capacity.
$ V_{Ed,max} $	Maximum numerical design value of the applied internal shear force through the entire beam length. Stresses in the horizontal joint above the panel is included in the integration of the section forces.
$ V_{Ed,s} $	Maximum numerical design value of the applied internal shear force used in stirrup capacity check. The maximum value is determined within ranges $\cot\theta \cdot z$ away from supports. Stresses in the horizontal joint above the panel is included in the integration of the section forces.
$V_{Rd,max}$	Design value of the shear capacity, related to the concrete compression strut. The capacity is based on the cross section in the center of the beam, in the panel part of the beam (excluding the joint).
$V_{Rd,s}$	Design value of the moment capacity, related to the stirrups. The capacity is based on the cross section in the center of the beam, in the panel part of the beam (excluding the joint). Fully anchored vertical mesh reinforcement in wall is treated as closed stirrups if no stirrups are assigned.
V_{Ed}/V_{Rd}	Shear capacity utilization, taking $V_{Rd,max}$ and $V_{Rd,s}$ into account.

8.1 Result overview for beams

The most stressed beams are summarized in the following tables.

ULS/ALS

Table 41: Maximum utilization per wall section for all relevant load combinations

Wall section	Panel/beam	M_{Ed}/M_{Rd} [%]	V_{Ed}/V_{Rd} [%]	Load combination	Ref page
5	P5	71 %	Not checked	6.10b 1.5 qk + 0.3 wk + gsup	Page 222

SLS

Table 42: Max relative displacement per wall section for all relevant load combinations

Wall section	Panel/beam	U/L	Load combination	Ref page
5	P1	1/9999	SLS wk+	Page 231

8.2 Wall sections - envelopes

8.2.1 Wall section: 5

Highest utilization for each load combination

Load combination	Panel/beam	M_{Ed}/M_{Rd} [%]	V_{Ed}/V_{Rd} [%]	Ref page
6.10a 1.2 gsup	P1	42 %	39 %	Page 221
6.10b 1.5 qk + 0.3 wk+ + gsup	P5	71 %	Not checked	Page 222
6.10b 1.5 qk + 0.3 wk- + gsup	P5	69 %	Not checked	Page 223
6.10b 1.5 wk+ + 0.9 qk + gsup	P5	53 %	Not checked	Page 224
6.10b 1.5 wk- + 0.9 qk + gsup	P5	46 %	Not checked	Page 225
6.10b 1.5 wk+ + 0.9 ginf	P5	30 %	Not checked	Page 226
6.10b 1.5 wk- + 0.9 ginf	P2	50 %	16 %	Page 227
6.11 brand	P5	60 %	Not checked	Page 228
6.11 Seismisk+	P5	40 %	Not checked	Page 229
6.11 Seismisk-	P2	47 %	15 %	Page 230



Figure 148: Critical utilization of beams across all load combinations.

*: This beam does not contain stirrups. Shear capacity is not calculated. Moment utilization is shown.

Result summary of beams

Panel/beam	Level	Beam	M _{Ed} /M _{Rd} [%]	V _{Ed} /V _{Rd} [%]	Load combination	Ref page
P1	FUK	1	1 %	3 %	6.10b 1.5 wk+ + 0.9 ginf	Page 226
P2	E00 - Stue	2	44 %	10 %	6.10b 1.5 wk- + 0.9 ginf	Page 227
-	-	3	35 %	23 %	6.11 Seismisk-	Page 230
P3	-	4	47 %	18 %	6.10b 1.5 wk- + 0.9 ginf	Page 227
P5	-	5	71 %	Not checked	6.10b 1.5 qk + 0.3 wk+ + gsup	Page 222
P1	E01 - 1 sal	6	49 %	39 %	6.10b 1.5 qk + 0.3 wk- + gsup	Page 223
P2	-	7	45 %	43 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 225
-	-	8	50 %	16 %	6.10b 1.5 wk- + 0.9 ginf	Page 227
P4	-	9	23 %	Not checked	6.10b 1.5 wk- + 0.9 qk + gsup	Page 225
P1	E02 - 2 sal	10	44 %	40 %	6.10b 1.5 qk + 0.3 wk- + gsup	Page 223
P2	-	11	27 %	14 %	6.10b 1.5 wk- + 0.9 qk + gsup	Page 225
-	E03 - 3 sal	12	25 %	18 %	6.10b 1.5 wk+ + 0.9 ginf	Page 226
P1	E04 - 4 sal	13	44 %	25 %	6.11 brand	Page 228
P2	-	14	21 %	7 %	6.10b 1.5 wk- + 0.9 ginf	Page 227

Result for load combination: 6.10b 1.5 qk + 0.3 wk+ + gsup



Figure 150: Utilization of beams in load combination: 6.10b 1.5 qk + 0.3 wk+ + gsup.

*: This beam does not contain stirrups. Shear capacity is not calculated. Moment utilization is shown.

Name	M _{Ed} /M _{Rd} %	V _{Ed} /V _{Rd} %	M _{Ed,max} M _{Ed,min} kNm	V _{Ed,max} kN	V _{Ed,s} kN	M _{Rd+} kNm	M _{Rd-} kNm	V _{Rd,c} kN	V _{Rd,s} kN
Wall 130 - P1-12052-2830	2.1 %	1.6 %	3.91 -6.13	41.7	0.00	296.5	296.5	2578.1	74.1
Wall 14 - P2-18500-6715	15.0 %	10.5 %	1.33 -22.9	49.6	0.00	152.8	152.7	473.6	137.0
Wall 14 - P2-20540-6715	18.2 %	15.1 %	9.75 -28.3	72.8	0.00	155.0	154.9	483.5	138.9
Wall 14 - P3-23420-6715	18.6 %	22.5 %	25.4 -32.5	109.0	0.00	174.9	174.8	483.8	138.7
Wall 14 - P5-31940-7510	71.1 %	Not checked	3.05 -6.74	27.1	15.1	9.49	9.49	0.00	0.00
Wall 31 - P1-12500-10781	48.4 %	41.1 %	52.5 -66.4	87.8	48.5	137.1	137.2	385.3	118.1
Wall 31 - P2-18510-10781	24.5 %	30.3 %	21.2 -34.8	145.8	13.5	141.8	141.9	480.6	137.7
Wall 31 - P2-23430-10781	9.5 %	11.0 %	5.96 -14.0	44.1	0.00	147.2	147.3	400.9	121.4
Wall 31 - P4-31940-10840	14.6 %	Not checked	1.95 -14.1	78.0	0.00	96.6	96.6	0.00	0.00
Wall 65 - P1-12492-14794	43.1 %	41.5 %	64.9 -65.8	97.3	51.1	152.6	152.6	404.3	123.3
Wall 65 - P2-22652-14824	18.8 %	14.9 %	16.3 -27.2	61.3	5.92	144.6	144.6	412.8	124.2
Wall 66 - P2-22652-18874	19.0 %	15.4 %	17.6 -27.5	62.5	7.43	145.0	145.0	405.8	122.7
Wall 67 - P1-12492-23220	38.8 %	38.4 %	43.4 -25.6	56.5	36.6	111.8	111.8	309.9	95.1
Wall 67 - P2-22652-22924	12.2 %	7.8 %	11.2 -18.7	35.6	0.00	153.2	153.2	457.2	136.3

Panel P1

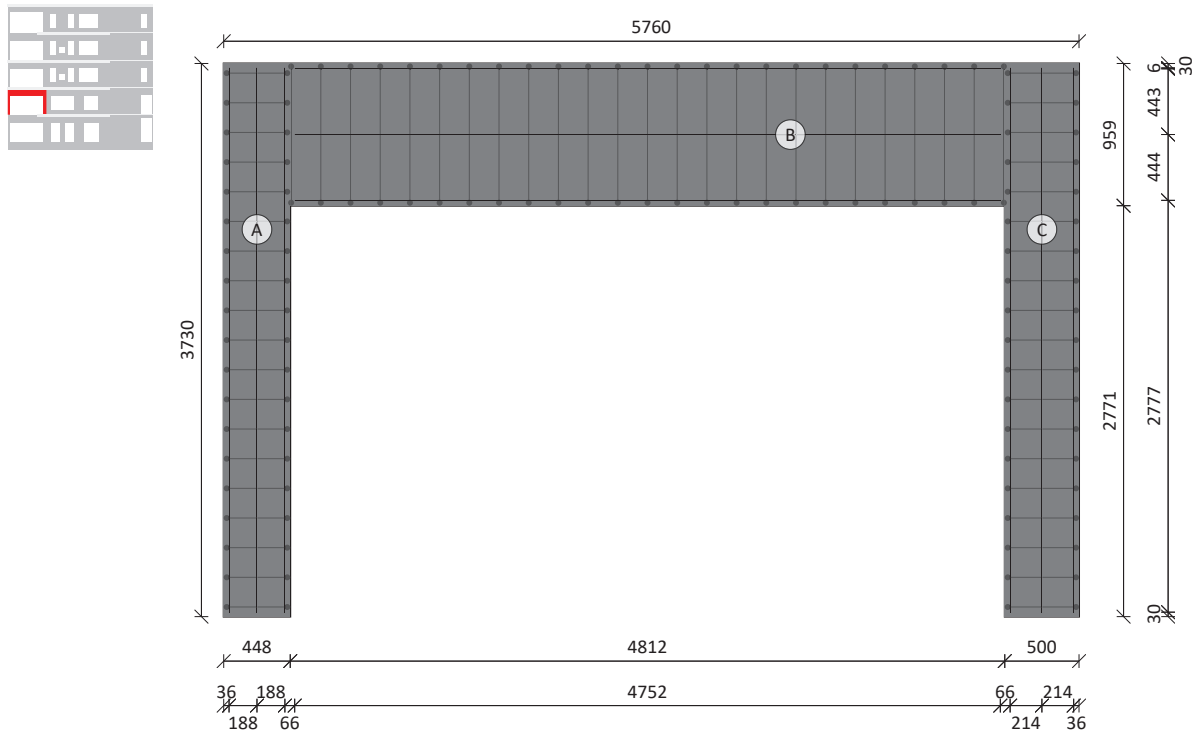


Figure 170: Panel

Type	200 mm C35 S550 2xØ6/150 S550 2xØ8/200	Net Area	8.151 m ²
Dimensions:	5760 mm × 3730 mm × 200 mm	Net Weight:	40.754 kN
In grid line:	5	Base/top level:	E01 - 1 sal / E02 - 2 sal
In wall:	Wall 31 @offset: 0 mm	Key element:	No
Ⓐ Søjle 3x2Y12 bjl k6/200 448 mm × 3730 mm Ⓑ Bjælke 3x2Y12 bjl k6/200 4812 mm × 959 mm Ⓒ Søjle 3x2Y12 bjl k6/200 500 mm × 3730 mm			

Panel P1 in Wall 31



Load combination: SLS wk+

Total weight of horizontal joint above panel: 15.20 kN

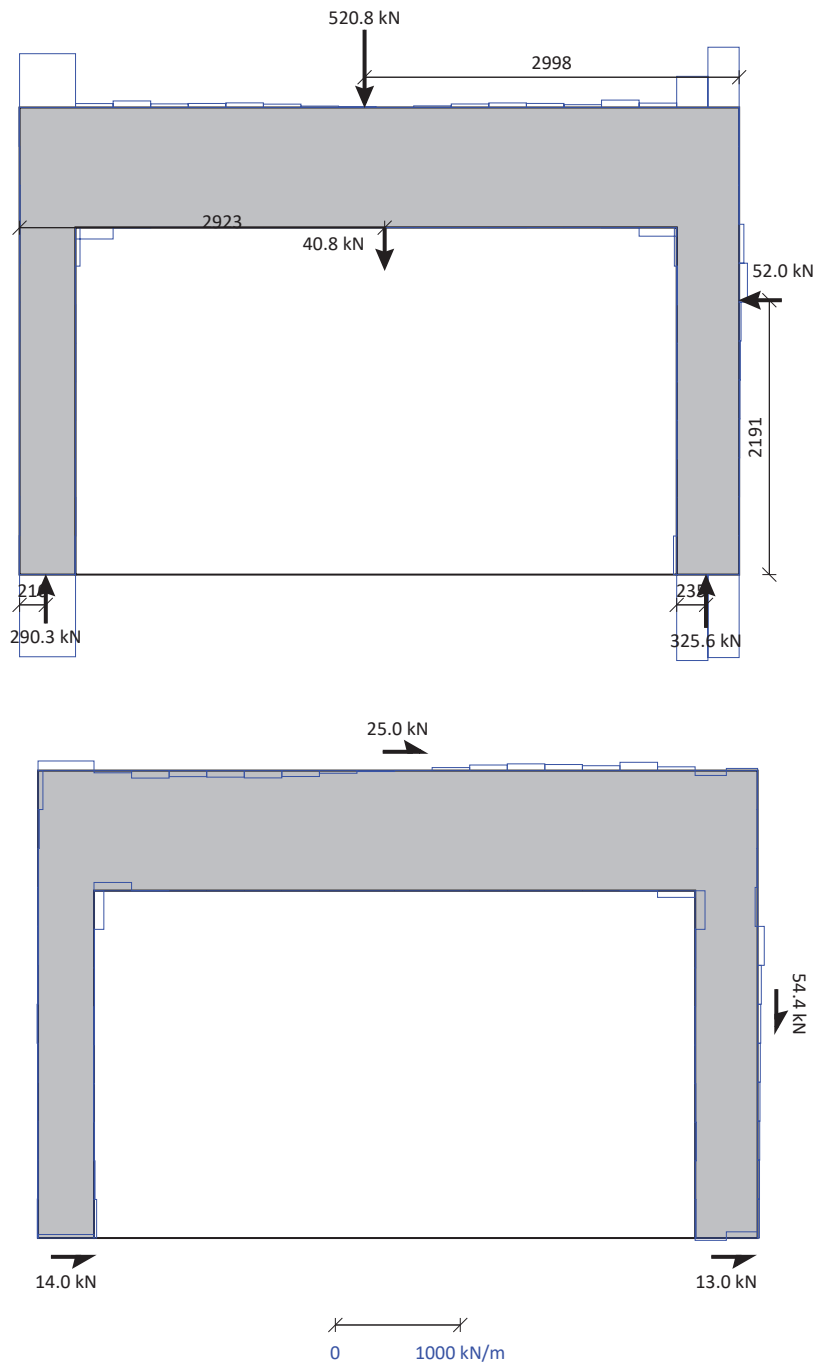
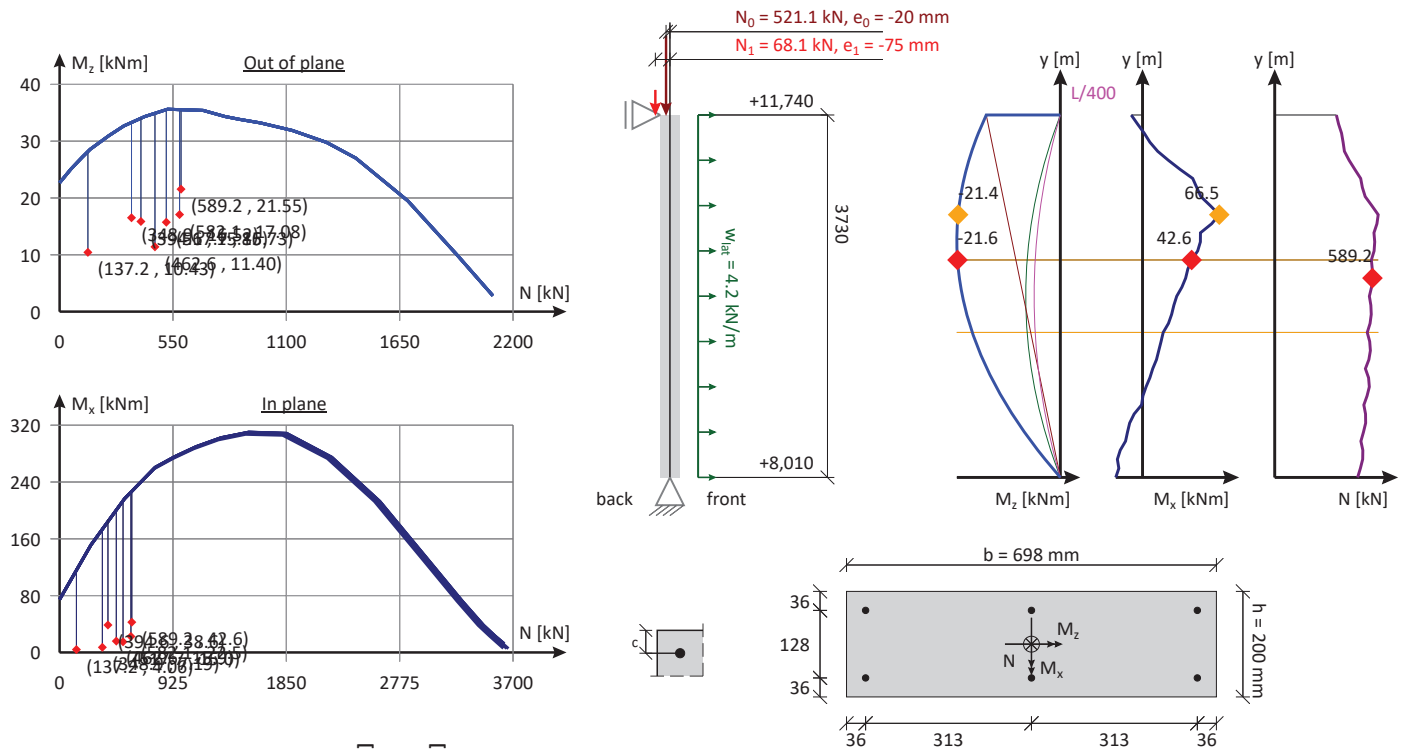


Figure 301: Normal forces and shear forces acting on panel

Wall slice analysis - Wall 31 - P2-17812-8010 - ULS calculations

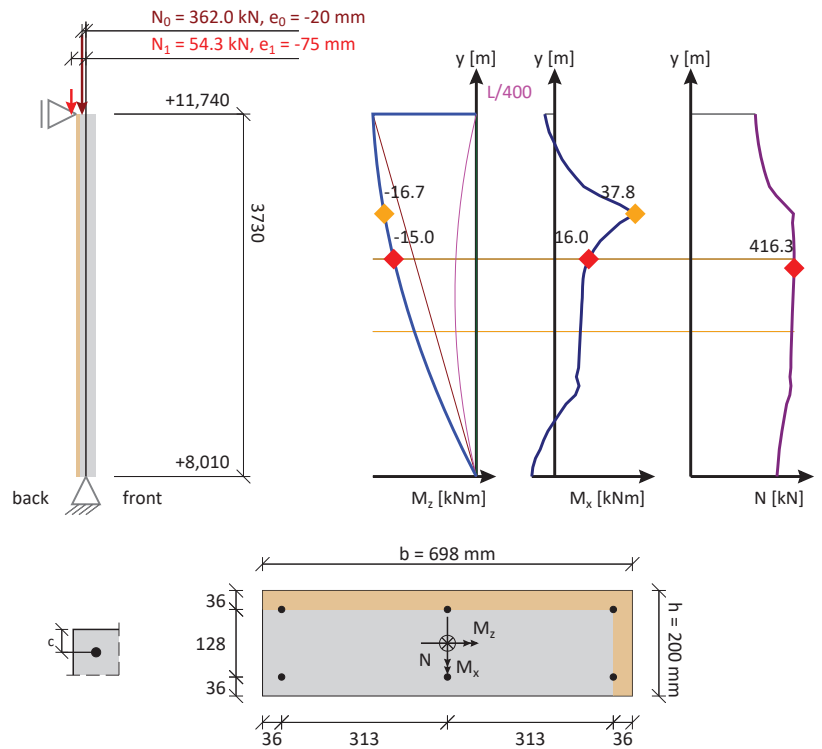
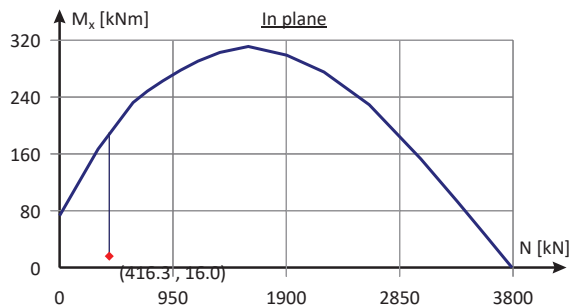
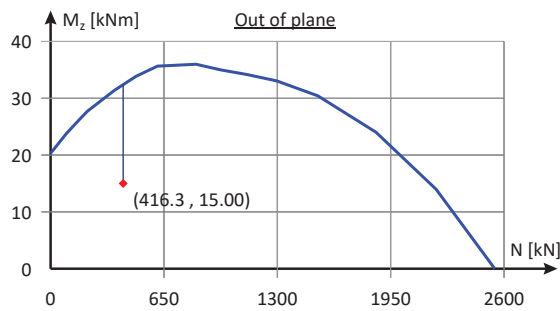
Geometry	L_s	3730 mm	h	200 mm	b	698 mm
Materials	f_{ck}	35.0 MPa	γ_c	1.40 -	f_{cd}	25.0 MPa
	f_{yk}	550 MPa	γ_s	1.20 -	f_{yd}	458 MPa
	Key element: No				E_{cd}	24341 MPa
Reinforcement	Mesh(vertical):		-	c_{front}	36 mm	
	Other rebars:		$6 \times \emptyset 12$	c_{back}	36 mm	
	Other rebars:		-	ϕ_c	0.24 %	
	Total rebar area:		A_s	679 mm^2	ϕ_t	0.24 %
Creep	RH	55 %	t_0	28 days	M_{0Eqp}/M_{0Ed}	0.80 -
			ϕ_0	2.07 -	ϕ_{eff}	1.66 -



	N_{Ed} [kN]	Utilization (1. order) [%]	Utilization (2. order) [%]	$\max M_{0Ed,z}$ [kNm]	$M_{Rd,z}$ [kNm]	$M_{0Ed,z}$ [kNm]	e_z [mm]	$\max M_{0Ed,x}$ [kNm]	$M_{Rd,x}$ [kNm]	$M_{0Ed,x}$ [kNm]	e_x [mm]	w_{lat} [kN/m]	u [mm]	f_{cd}^{eff} [MPa]	$\epsilon_0/(1+\phi)$ [%]	σ_{c0} [MPa]	σ_{st} [MPa]	σ_{sc} [MPa]	x [mm]
6.10a 1.2 gsup	462.6	39.6 %	40.4 %	-12.48	53.4	35.0	-26.1	35.5	212.3	202.6	-76.6	0.0	39.8	25.0	0.88	16.7	458	-262	82
6.10b 1.5 qk + 0.3 wk+ + gsup	517.7	46.7 %	51.2 %	-16.51	56.5	35.6	-29.0	39.7	225.8	214.1	-76.7	-1.3	40.4	25.0	0.93	17.4	458	-286	85
6.10b 1.5 qk + 0.3 wk- + gsup	582.1	49.8 %	57.6 %	-17.93	60.3	35.8	-28.0	48.6	242.0	227.4	-83.5	-1.3	42.0	25.0	1.00	18.2	458	-315	88
6.10b 1.5 wk+ + 0.9 qk + gsup	348.9	47.2 %	53.6 %	-16.53	46.5	33.4	-30.7	22.7	182.3	176.2	-65.0	-4.2	37.7	25.0	0.77	15.1	458	-211	75
6.10b 1.5 wk- + 0.9 qk + gsup	589.2	62.6 %	78.8 %	-21.69	60.7	35.8	-26.4	66.5	243.7	228.8	-112.9	-4.2	42.2	24.8	1.01	18.3	458	-318	88
6.10b 1.5 wk+ + 0.9 ginf	137.2	35.6 %	40.4 %	-10.54	32.5	28.2	-27.7	13.7	120.2	118.6	-100.0	-4.2	31.5	24.9	0.52	11.2	458	-114	61
6.10b 1.5 wk- + 0.9 ginf	394.6	61.8 %	67.2 %	-15.86	49.4	34.1	-22.7	60.4	194.7	187.2	-153.0	-4.2	38.7	24.6	0.81	15.8	458	-232	78

Wall slice analysis - Wall 31 - P2-17812-8010 - ALS-Fire calculations

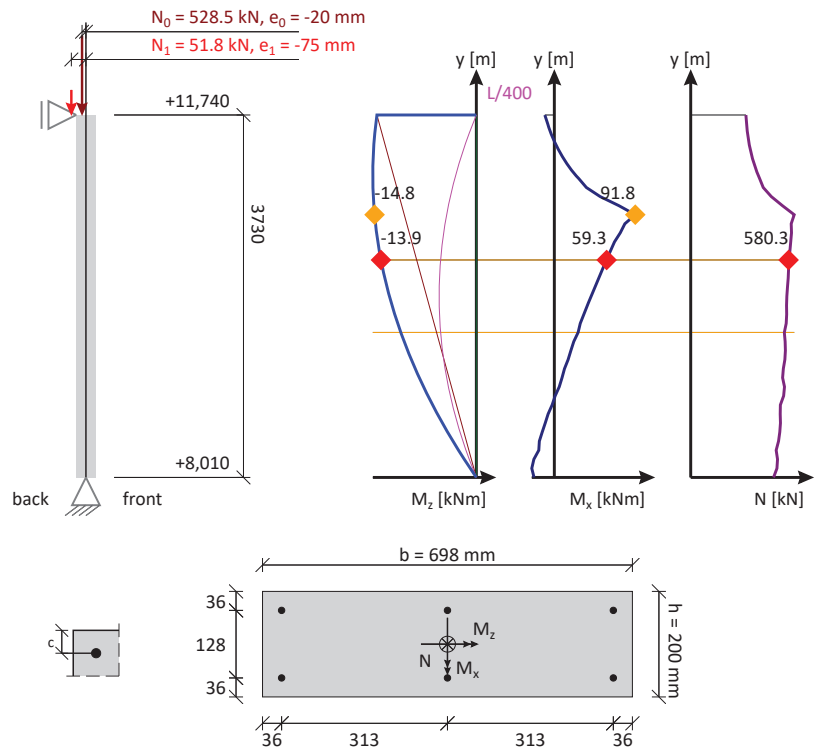
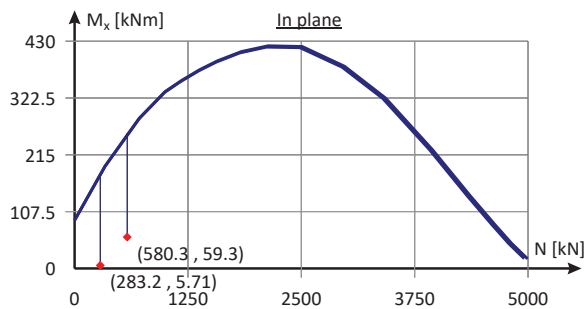
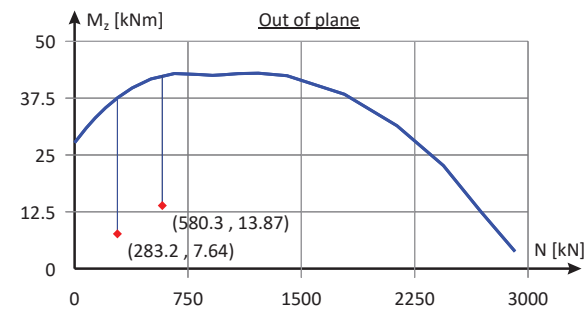
Geometry	L _s	2611 mm (0.7L)	h	200 mm	b	698 mm
Materials	f _{ck}	35.0 MPa	γ _c	1.00 -	f _{cd}	35.0 MPa
	f _{yk}	550 MPa	γ _s	1.00 -	f _{yd}	550 MPa
	Key element: No				E _{cd}	34077 MPa
Reinforcement	Mesh(vertical):		-	c _{front}	36 mm	
	Other rebars:		6 × Ø12	c _{back}	36 mm	
	Other rebars:		-	ϕ _c	0.24 %	
	Total rebar area:		A _s	679 mm ²	ϕ _t	0.24 %
Fire	t	120 min	Compression:		f _{sy,θ} /f _{yk}	0.54 -
	acting on Compression side				E _{s,θ} /E _s	0.72 -
	a _z	36 mm	Tension:		f _{sy,θ} /f _{yk}	0.91 -
	k _{c,M}	1.00 -			E _{s,θ} /E _s	0.97 -
	Aggregates: Calcareous			Rebar type:	Quenched	



	N_{Ed} [kN]	Utilization (1. order) [%]	Utilization (2. order) [%]	$\max M_{0Ed,z}$ [kNm]	$M_{Rd,z}$ [kNm]	$M_{0Rd,z}$ [kNm]	e_z [mm]	$\max M_{0Ed,x}$ [kNm]	$M_{Rd,x}$ [kNm]	$M_{0Rd,x}$ [kNm]	e_x [mm]	w_{lat} [kN/m]	u [mm]	f_{cd}^{eff} [MPa]	$\epsilon_o/(1+\phi)$ [%]	σ_{c0} [MPa]	σ_{st} [MPa]	σ_{sc} [MPa]	x [mm]
6.11 brand	416.3	54.4 %	54.6 %	-18.80	47.2	32.5	-45.1	37.8	198.9	190.3	-90.8	0.0	35.4	35.0	1.92	27.4	498	-275	52

Wall slice analysis - Wall 31 - P2-17812-8010 - ALS-Other calculations

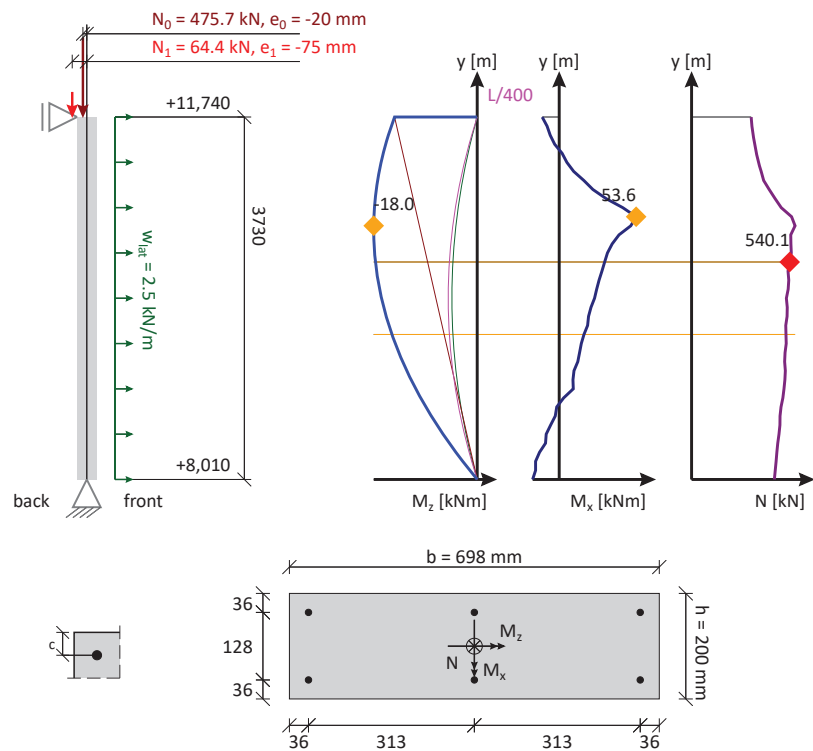
Geometry	L_s	3730 mm	h	200 mm	b	698 mm
Materials	f_{ck}	35.0 MPa	γ_c	1.00 -	f_{cd}	35.0 MPa
	f_{yk}	550 MPa	γ_s	1.00 -	f_{yd}	550 MPa
	Key element: No				E_{cd}	34077 MPa
Reinforcement	Mesh(vertical):		-	c_{front}	36 mm	
	Other rebars:		$6 \times \emptyset 12$	c_{back}	36 mm	
	Other rebars:		-	ϕ_c	0.24 %	
	Total rebar area:		A_s	679 mm^2	ϕ_t	0.24 %
Creep	RH	55 %	t_0	28 days	M_{0Eqp}/M_{0Ed}	0.80 -
			ϕ_0	2.07 -	ϕ_{eff}	1.66 -



	N_{Ed} [kN]	Utilization (1. order) [%]	Utilization (2. order) [%]	$\max M_{0Ed,z}$ [kNm]	$M_{Rd,z}$ [kNm]	$M_{0Ed,z}$ [kNm]	e_z [mm]	$\max M_{0Ed,x}$ [kNm]	$M_{Rd,x}$ [kNm]	$M_{0Ed,x}$ [kNm]	e_x [mm]	w_{lat} [kN/m]	u [mm]	f_{cd}^{eff} [MPa]	$\epsilon_0/(1+\phi)$ [%]	σ_{c0} [MPa]	σ_{st} [MPa]	σ_{sc} [MPa]	x [mm]
6.11 Seismisk+	283.2	27.0 %	23.5 %	-8.61	48.2	37.6	-30.1	19.7	183.9	179.3	-69.7	0.0	37.6	34.9	0.63	18.2	550	-139	62
6.11 Seismisk-	580.3	56.0 %	55.8 %	-15.05	67.5	42.5	-24.9	91.8	269.3	255.7	-158.2	0.0	43.1	34.7	0.88	23.4	549	-245	75

Wall slice analysis - Wall 31 - P2-17812-8010 - SLS calculations

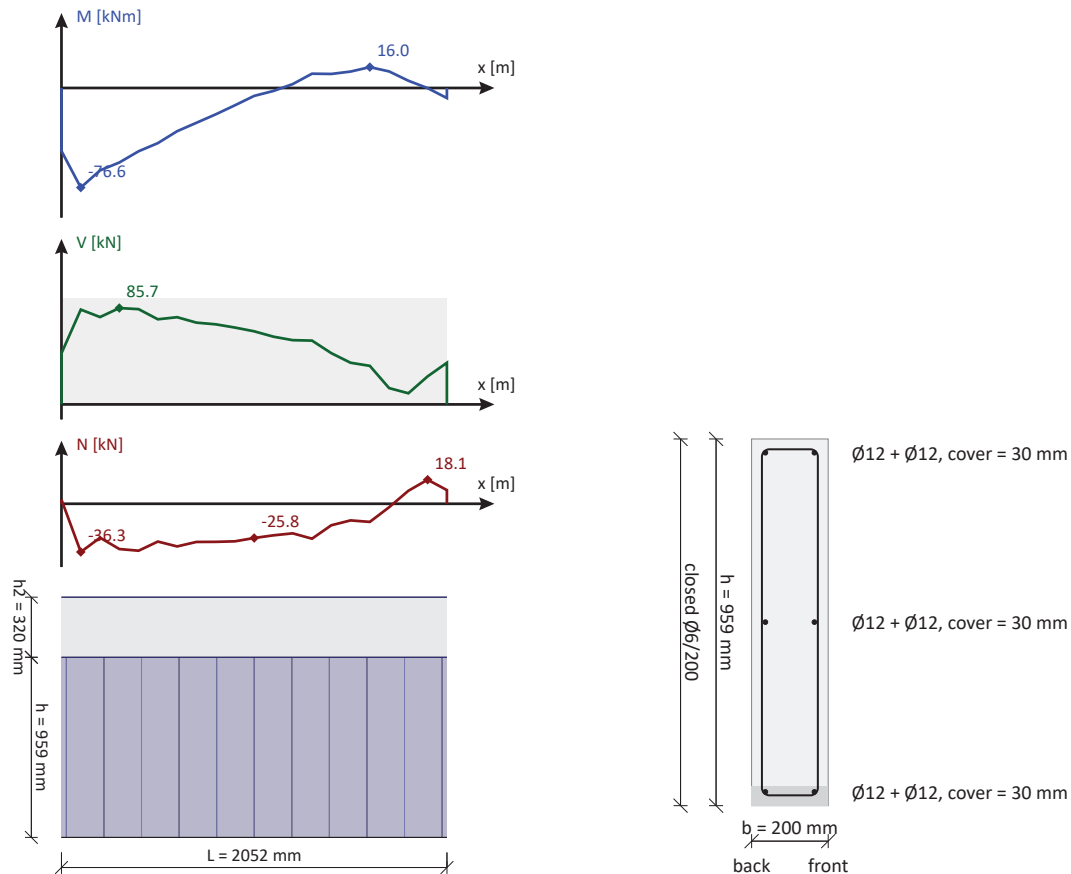
Geometry	L_s	3730 mm	h	200 mm	b	698 mm
Materials	f_{ck}	35.0 MPa	γ_c	1.00 -	f_{cd}	35.0 MPa
	f_{yk}	550 MPa	γ_s	1.00 -	f_{yd}	550 MPa
	Key element: No				E_{cd}	34077 MPa
Reinforcement	Mesh(vertical):		-	c_{front}	36 mm	
	Other rebars:		$6 \times \varnothing 12$	c_{back}	36 mm	
	Other rebars:		-	ϕ_c	0.24 %	
	Total rebar area:		A_s	679 mm^2	ϕ_t	0.24 %
Creep	RH	55 %	t_0	28 days	M_{0Eqp}/M_{0Ed}	0.80 -
			ϕ_0	2.07 -	ϕ_{eff}	1.66 -



	u [mm]	u/L [-]	w_k [mm]	N_{Ed} [kN]	$M_{0Ed,z}$ [kNm]	e_z [mm]	$M_{0Ed,x}$ [kNm]	e_x [mm]	w_{lat} [kN/m]	f_{cd}^{eff} [MPa]	σ_{c0} [MPa]	σ_{st} [MPa]	σ_{sc} [MPa]
SLS wk+	5.7	1/655	uncracked	540.1	-17.96	-26.6	53.6	-99.2	-2.5	35.0	7.6	-18	18
SLS wk-	5.7	1/655	uncracked	540.1	-17.96	-26.6	53.6	-99.2	-2.5	35.0	7.6	-18	18

Beam analysis - Wall 31 - P2-23430-10781 - ULS calculations

Geometry	L	2052 mm	h	959 mm	b	200 mm	b _{eff}	200 mm
Materials	Concrete:	f_{ck}	35.0 MPa	γ_c	1.40 -	f_{cd}	25.0 MPa	
	Longitudinal:	f_{yk}	550 MPa	γ_s	1.20 -	f_{yd}	458 MPa	
	Stirrups:	f_{yk}	550 MPa	γ_s	1.20 -	f_{yd}	458 MPa	
	Key element: No					E_{cd}	24341 MPa	
Reinforcement	Longitudinal:	A_s	679 mm ²	ϕ_s	0.35 %			
	Stirrups:	A_{sw}	283 mm ² /m	ϕ_s	0.14 %	cot θ	2.0 -	



Section forces, capacities and beam elevation.

Load combination: 6.10b 1.5 wk- + 0.9 ginf.

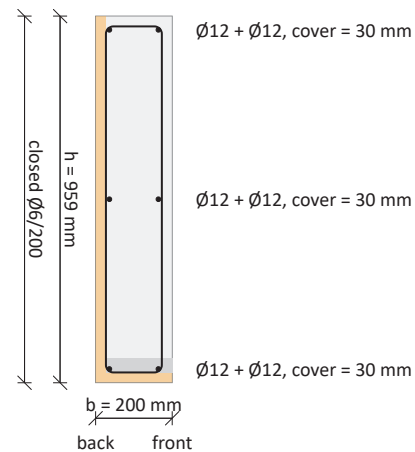
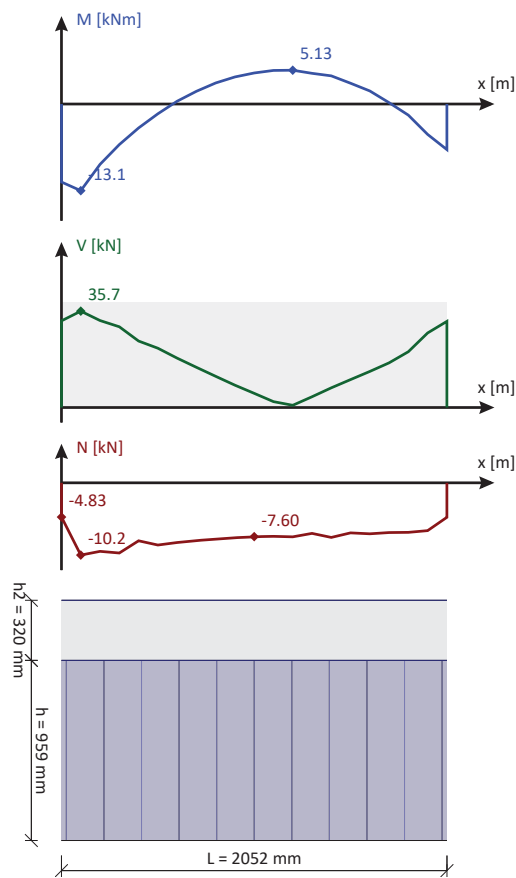
Analysed cross section.

Load combination: 6.10b 1.5 wk- + 0.9 ginf.

	M_{Ed}/M_{Rd} [%]	V_{Ed}/V_{Rd} [%]	$M_{Ed,max}$ [kNm]	$M_{Ed,min}$ [kNm]	$ V_{Ed,max} $ [kN]	$ V_{Ed,s} $ [kN]	$N_{Ed,cen}$ [kN]	U [mm]	M_{Rd+} [kNm]	M_{Rd-} [kNm]	$V_{Rd,max}$ [kN]	$V_{Rd,s}$ [kN]	x [mm]	$\epsilon_o/(1+\phi)$ [‰]	σ_{st} [MPa]	σ_{sc} [MPa]	z [mm]	e_{shear} [mm]	N_g [kN]
6.10a 1.2 gsup	9.7 %	8.5 %	4.28	-14.1	37.1	0.00	-10.5	0.08	145.6	145.7	436.5	128.9	49	2.89	458	-151	682	-55.8	54.7
6.10b 1.5 qk + 0.3 wk+ + gsup	9.5 %	11.0 %	5.96	-14.0	44.1	0.00	-14.2	0.19	147.2	147.3	400.9	121.4	49	2.89	458	-157	682	-68.5	69.9
6.10b 1.5 qk + 0.3 wk- + gsup	18.0 %	13.9 %	9.61	-26.4	58.7	0.00	-12.5	0.20	146.4	146.5	421.0	125.7	49	2.89	458	-154	682	-61.1	89.2
6.10b 1.5 wk+ + 0.9 qk + gsup	22.3 %	16.2 %	20.4	-35.3	67.5	0.00	-40.3	0.49	158.6	158.8	416.3	124.6	54	2.97	458	-195	680	-62.5	103.4
6.10b 1.5 wk- + 0.9 qk + gsup	41.9 %	18.2 %	14.4	-62.1	85.9	0.00	-16.1	0.98	148.0	148.1	473.0	136.2	50	2.89	458	-159	682	-44.7	118.6
6.10b 1.5 wk+ + 0.9 ginf	24.9 %	11.0 %	20.5	-39.1	53.5	0.00	-37.1	0.73	157.3	157.4	484.5	138.3	53	2.97	458	-191	680	-41.4	72.4
6.10b 1.5 wk- + 0.9 ginf	50.3 %	15.8 %	16.0	-76.6	85.7	0.00	-25.8	1.3	152.3	152.4	543.9	149.2	51	2.97	458	-175	681	-27.4	105.8

Beam analysis - Wall 31 - P2-23430-10781 - ALS-Fire calculations

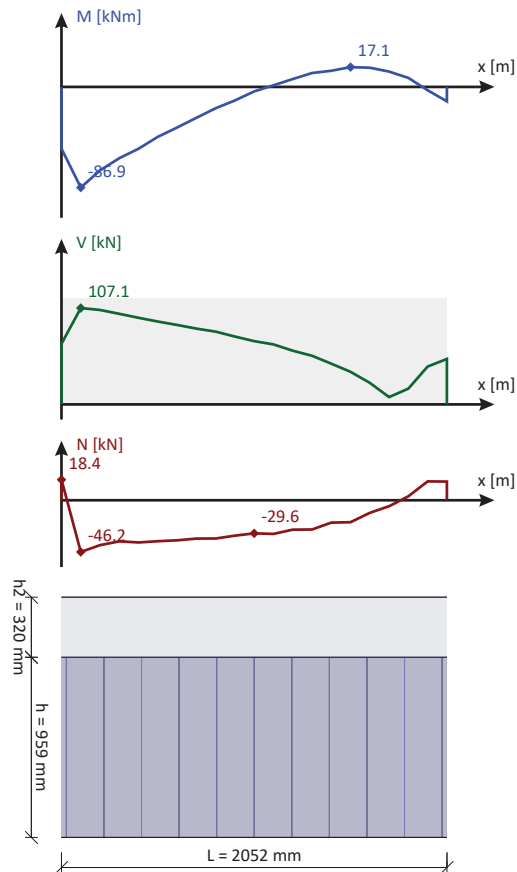
Geometry	L	2052 mm	h	959 mm	b	200 mm	b _{eff}	173 mm
Materials	Concrete:		f _{ck}	35.0 MPa	γ _c	1.00 -	f _{cd}	35.0 MPa
	Longitudinal:		f _{yk}	550 MPa	γ _s	1.00 -	f _{yd}	550 MPa
	Stirrups:		f _{yk}	550 MPa	γ _s	1.00 -	f _{yd}	550 MPa
	Key element: No						E _{cd}	34077 MPa
Reinforcement	Longitudinal:	A _s	679 mm ²	φ _s	0.35 %			
	Stirrups:	A _{sw}	283 mm ² /m	φ _s	0.14 %	cotθ	2.5 -	
Fire	t	120 min	Rebars: Quenched	Aggregates: Calcareous				
	acting on Back side		Top rebars:	f _{sy,θ} /f _{yk}	0.86 -	E _{s,θ} /E _s	0.96 -	
	a _z	27 mm	Bottom rebars:	f _{sy,θ} /f _{yk}	0.44 -	E _{s,θ} /E _s	0.62 -	
	k _{c,M}	1.00 -	Stirrups:	f _{sy,θ} /f _{yk}	0.80 -			



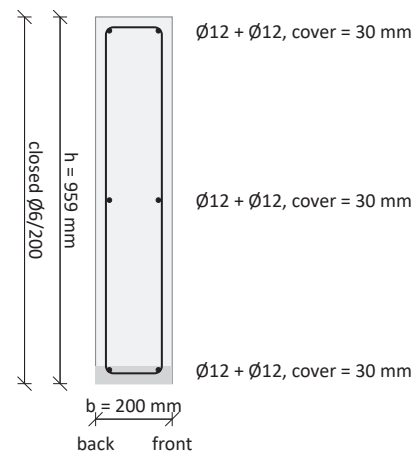
	M _{Ed} /M _{Rd} [%]	V _{Ed} /V _{Rd} [%]	M _{Ed,max} [kNm]	M _{Ed,min} [kNm]	V _{Ed,max} [kN]	V _{Ed,s} [kN]	N _{Ed,cent} [kN]	M _{Rd+} [kNm]	M _{Rd-} [kNm]	V _{Rd,max} [kN]	V _{Rd,s} [kN]	x [mm]	ε ₀ /(1+φ) [‰]	σ _{st} [MPa]	σ _{sc} [MPa]	z [mm]	e _{shear} [mm]	N _s [kN]
6.11 brand	9.1 %	9.3 %	5.13	-13.1	35.7	0.00	-7.60	103.1	144.7	382.8	136.3	38	4.39	472	-244	660	-71.5	76.5

Beam analysis - Wall 31 - P2-23430-10781 - ALS-Other calculations

Geometry	L	2052 mm	h	959 mm	b	200 mm	b _{eff}	200 mm
Materials	Concrete:	f_{ck}	35.0 MPa	γ_c	1.00 -	f_{cd}	35.0 MPa	
	Longitudinal:	f_{yk}	550 MPa	γ_s	1.00 -	f_{yd}	550 MPa	
	Stirrups:	f_{yk}	550 MPa	γ_s	1.00 -	f_{yd}	550 MPa	
	Key element: No					E_{cd}	34077 MPa	
Reinforcement	Longitudinal:	A_s	679 mm ²	ϕ_s	0.35 %			
	Stirrups:	A_{sw}	283 mm ² /m	ϕ_s	0.14 %	cot θ	2.0 -	



Section forces, capacities and beam elevation.
Load combination: 6.11 Seismisk-.

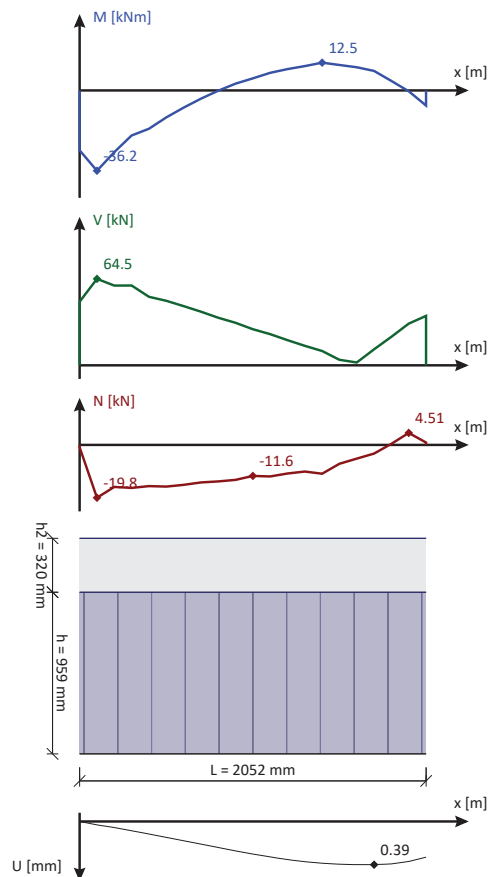


Analysed cross section.
Load combination: 6.11 Seismisk-.

	M_{Ed}/M_{Rd} [%]	V_{Ed}/V_{Rd} [%]	$M_{Ed,max}$ [kNm]	$M_{Ed,min}$ [kNm]	$ V_{Ed,max} $ [kN]	$ V_{Ed,s} $ [kN]	$N_{Ed,cen}$ [kN]	M_{Rd+} [kNm]	M_{Rd-} [kNm]	$V_{Rd,max}$ [kN]	$V_{Rd,s}$ [kN]	x [mm]	$\epsilon_{0/(1+\phi)}$ [%]	σ_{st} [MPa]	σ_{sc} [MPa]	z [mm]	e_{shear} [mm]	N_a [kN]
6.11 Seismisk+	24.7 %	12.1 %	24.3	-47.3	73.0	0.00	-49.3	191.5	191.6	605.0	153.6	50	2.89	550	-159	682	-57.2	108.7
6.11 Seismisk-	47.5 %	15.0 %	17.1	-86.9	107.1	0.00	-29.6	182.8	182.9	712.4	171.6	47	2.89	550	-135	683	-35.6	139.5

Beam analysis - Wall 31 - P2-23430-10781 - SLS calculations

Geometry	L	2052 mm	h	959 mm	b	200 mm	b_{eff}	0 mm
Materials	Concrete:	f_{ck}	35.0 MPa	γ_c	1.00 -	f_{cd}	35.0 MPa	
	Longitudinal:	f_{yk}	550 MPa	γ_s	1.00 -	f_{yd}	550 MPa	
	Stirrups:	f_{yk}	550 MPa	γ_s	1.00 -	f_{yd}	550 MPa	
	Key element: No					E_{cd}	34077 MPa	
Reinforcement	Longitudinal:	A_s	679 mm ²	ϕ_s	0.35 %			
	Stirrups:	A_{sw}	283 mm ² /m	ϕ_s	0.14 %			



Section forces, beam elevation and displacement.

Load combination: SLS wk+.

⚠ Creep, shrinkage and tension stiffening are not included in the determination of the displacement. The displacement is determined in the finite element calculation.

	$U / L [-]$	$U [mm]$	$M_{Ed,max} [kNm]$	$M_{Ed,min} [kNm]$	$ V_{Ed,max} [kN]$	$N_{Ed} [kN]$
SLS wk+	1/5212	0.39	12.5	-36.2	64.5	-19.8
SLS wk-	1/5212	0.39	12.5	-36.2	64.5	-19.8