



SEIZMIČNA ANALIZA

1.1 Karakteristike materialov

Beton C20/25

$$f_{ck.C20} := 2.0 \text{ kN} \cdot \text{cm}^{-2}$$

$$\gamma_{M.c} := 1.5$$

$$f_{cd.C20} := f_{ck.C20} \div \gamma_{M.c} = 1.33 \cdot \text{kN} \cdot \text{cm}^{-2}$$

$$f_{ctm.C20} := 0.22 \text{ kN} \cdot \text{cm}^{-2}$$

$$f_{ctk.0.05.C20} := 0.15 \text{ kN} \cdot \text{cm}^{-2}$$

$$E_{cm.C20} := 3000 \cdot \text{kN} \cdot \text{cm}^{-2}$$

$$\gamma_c := 25 \text{ kN} \cdot \text{m}^{-3}$$

karakteristična tlačna trdnost

materialni varnostni faktor za beton

projektna tlačna trdnost

natezna trdnost betona - srednja vrednost

natezna trdnost betona - 5% fraktila

elastični modul

specifična teža betona

Beton C25/30

$$f_{ck.C25} := 2.5 \text{ kN} \cdot \text{cm}^{-2}$$

$$\gamma_{M.c} := 1.5$$

$$f_{cd.C25} := f_{ck.C25} \div \gamma_{M.c} = 1.67 \cdot \text{kN} \cdot \text{cm}^{-2}$$

$$f_{ctm.C25} := 0.26 \text{ kN} \cdot \text{cm}^{-2}$$

$$f_{ctk.0.05.C25} := 0.18 \text{ kN} \cdot \text{cm}^{-2}$$

$$E_{cm.C25} := 3100 \cdot \text{kN} \cdot \text{cm}^{-2}$$

$$\gamma_c := 25 \text{ kN} \cdot \text{m}^{-3}$$

karakteristična tlačna trdnost

materialni varnostni faktor za beton

projektna tlačna trdnost

natezna trdnost betona - srednja vrednost

natezna trdnost betona - 5% fraktila

elastični modul

specifična teža betona

Armatura S400

$$f_{yk.S400} := 24 \text{ kN} \cdot \text{cm}^{-2}$$

$$\gamma_{M.s} := 1.15$$

$$f_{yd.S400} := f_{yk.S400} \div \gamma_{M.s} = 20.87 \cdot \text{kN} \cdot \text{cm}^{-2}$$

$$E_s := 20000 \text{ kN} \cdot \text{cm}^{-2}$$

karakteristična vrednost meje elastičnosti armature

materialni varnostni faktor za armaturo

projektna vrednost meje elastičnosti armature

elastični

modul

Armatura S500

$$f_{yk.S500} := 50 \text{ kN} \cdot \text{cm}^{-2}$$

$$\gamma_{M.s} := 1.15$$

$$f_{yd.S500} := f_{yk.S500} \div \gamma_{M.s} = 43.48 \cdot \text{kN} \cdot \text{cm}^{-2}$$

$$E_s := 20000 \text{ kN} \cdot \text{cm}^{-2}$$

karakteristična vrednost meje elastičnosti armature

materialni varnostni faktor za armaturo

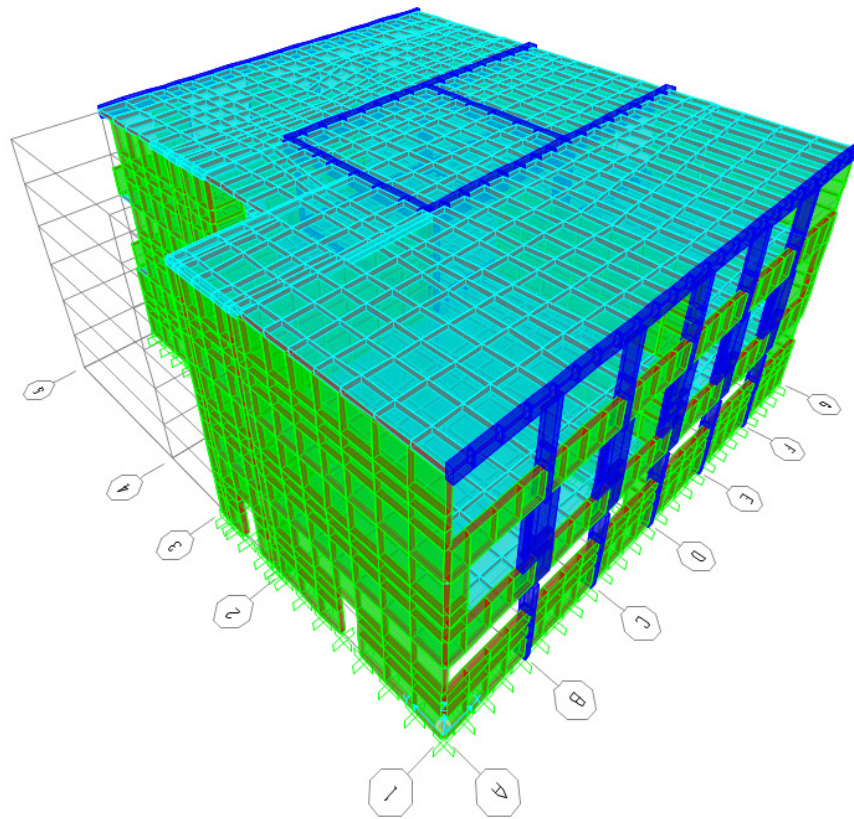
projektna vrednost meje elastičnosti armature

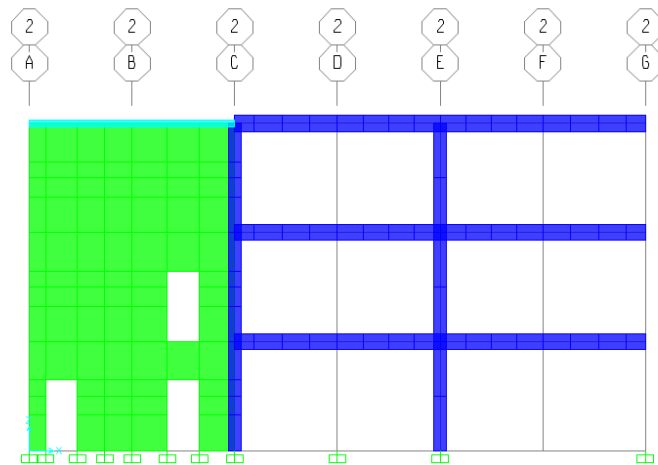
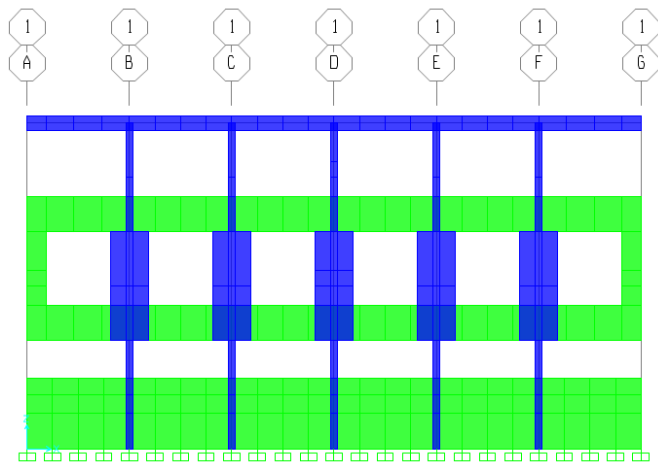
elastični

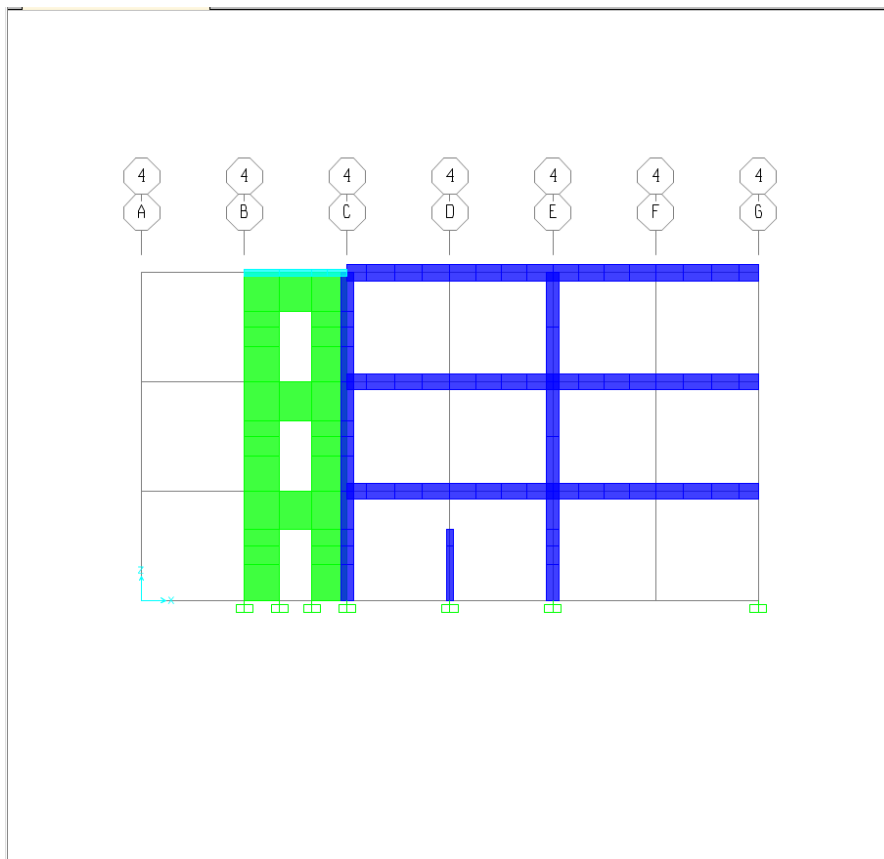
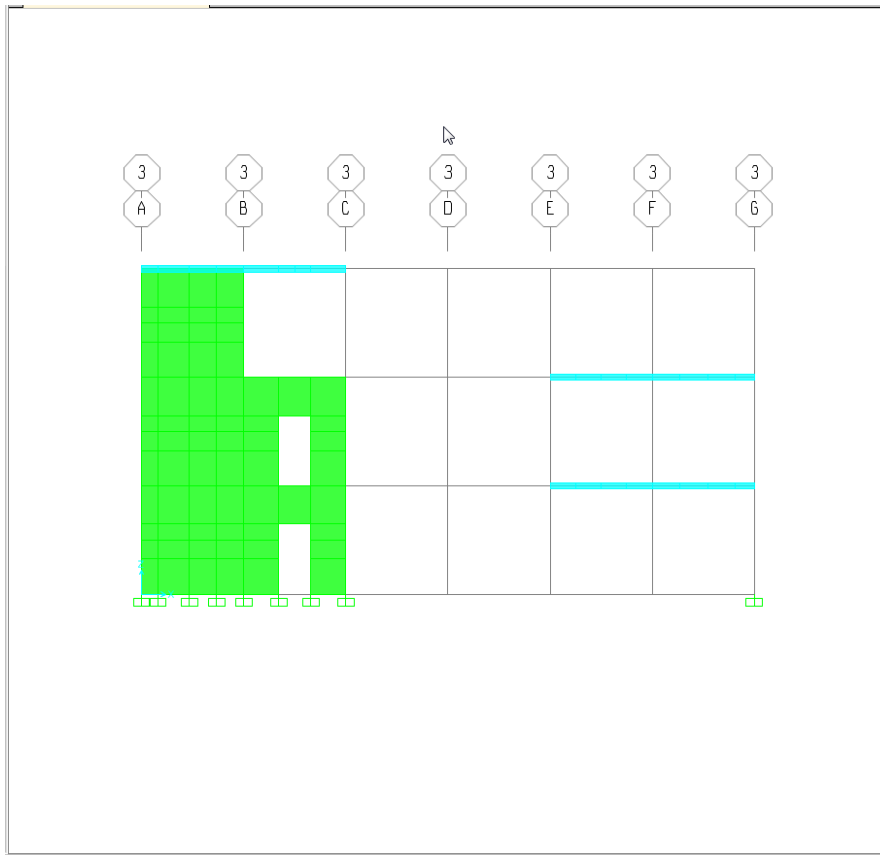
modul

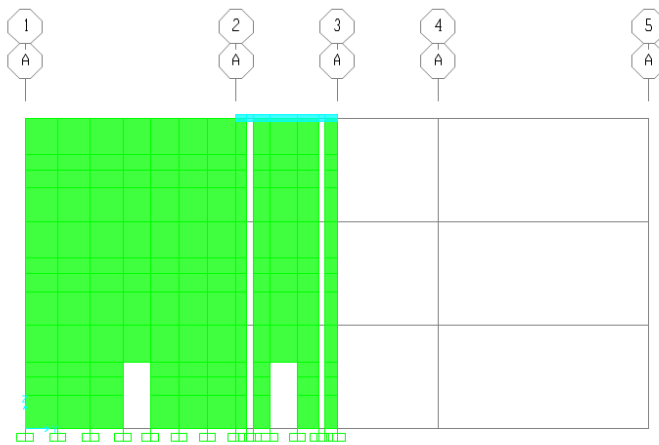
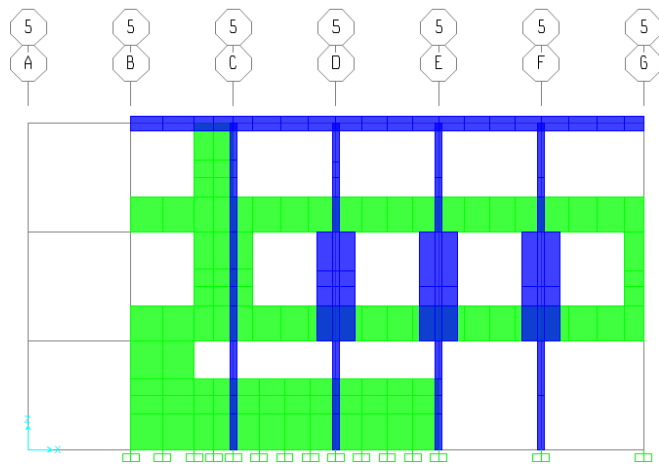
1.2 Računski model

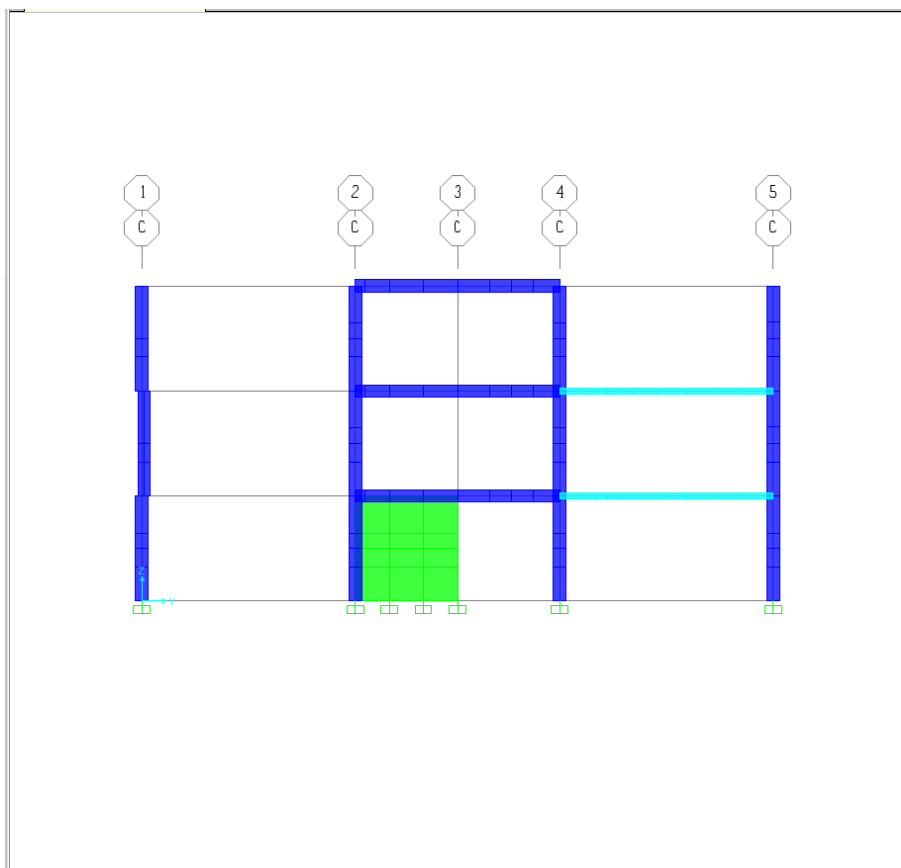
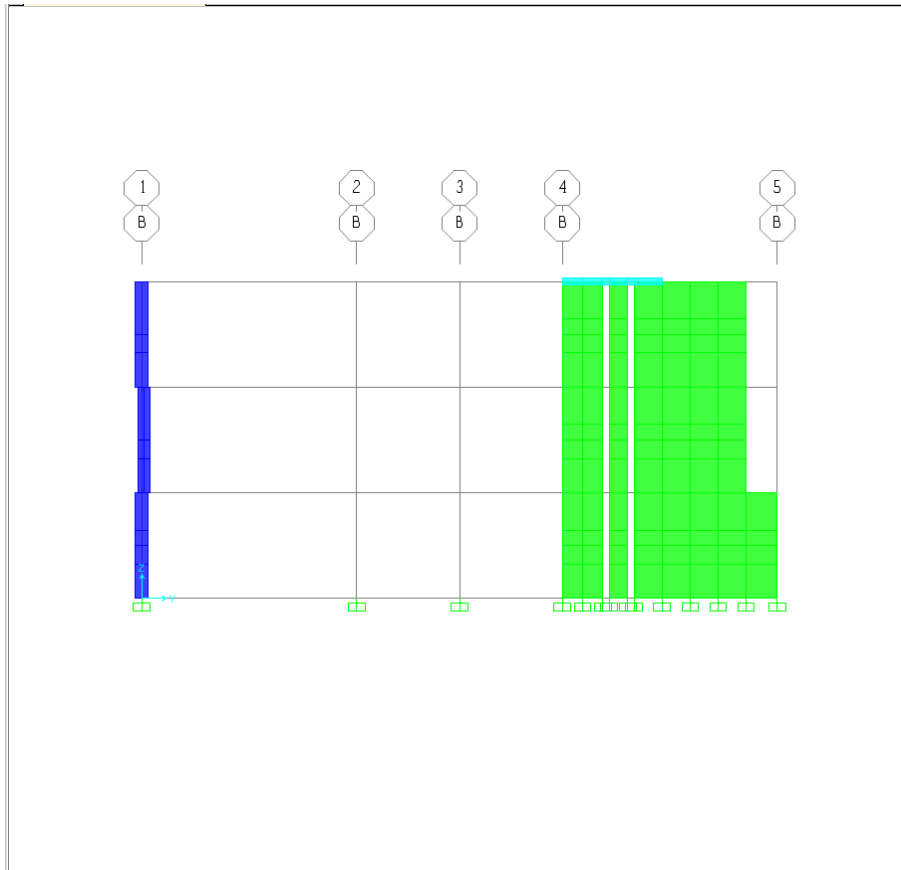
Za seizmično je uporabljena modalna analiza s spekrom odziva. Analiza je izvedena z računalniškim programom po metodi končnih elementov. Betonske stene in strope modeliramo s ploskovnimi elementi, stebre pa z linijskimi elementi. Upoštevana je razpokanost prerezov skladno s standardom EC8 (0.5EI). Upoštewane so koncentrirane točkovne mase in masni vztrajnostni momenti ter naključna ekscentričnost (5 %). Na nivoju stropnih plošč so upoštewane diafragme.

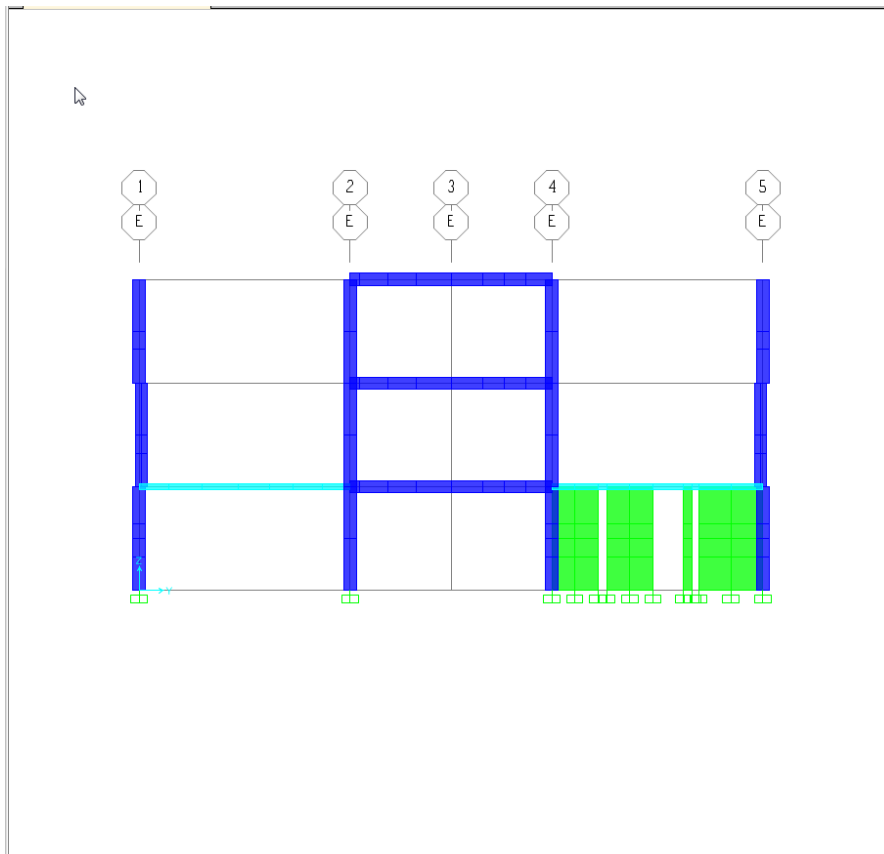
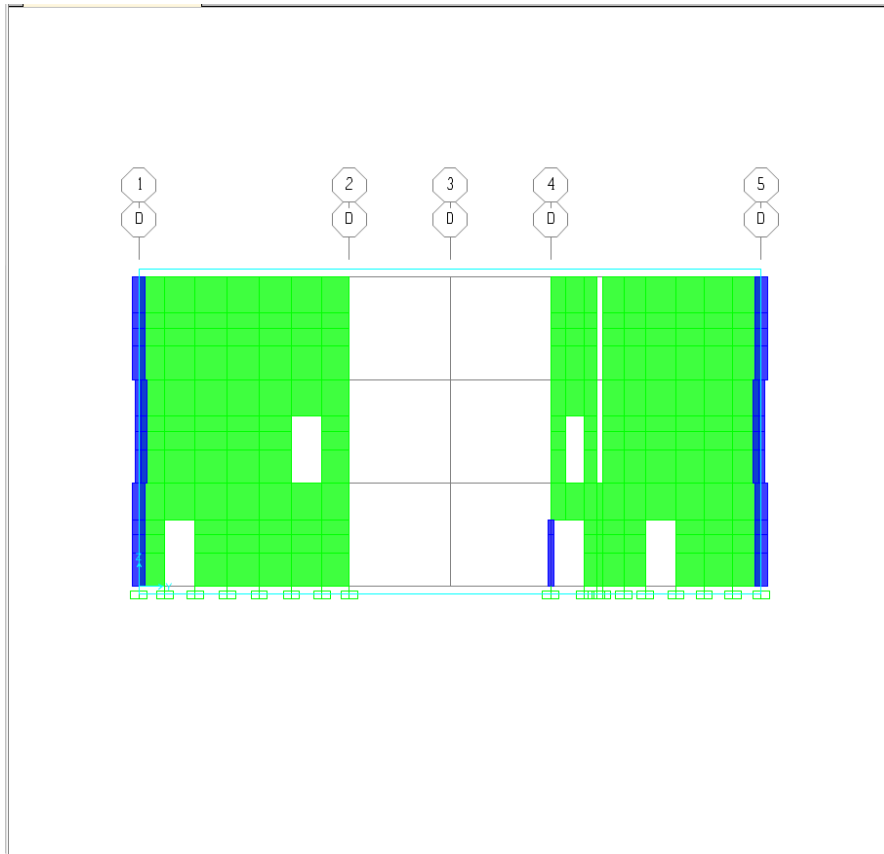


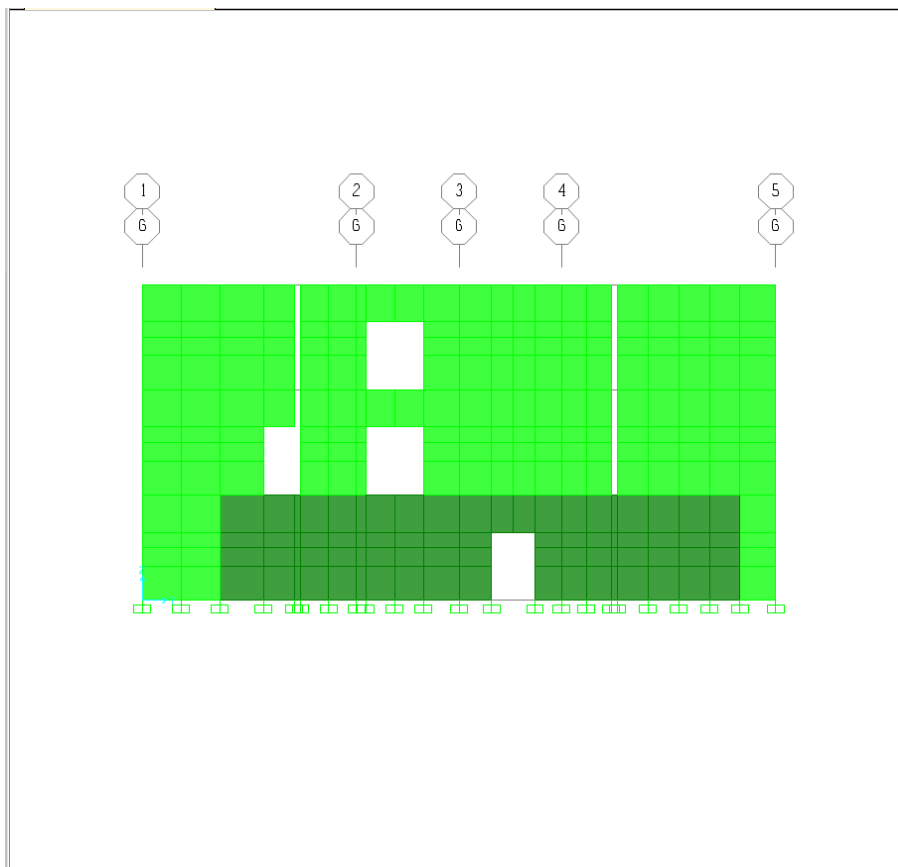
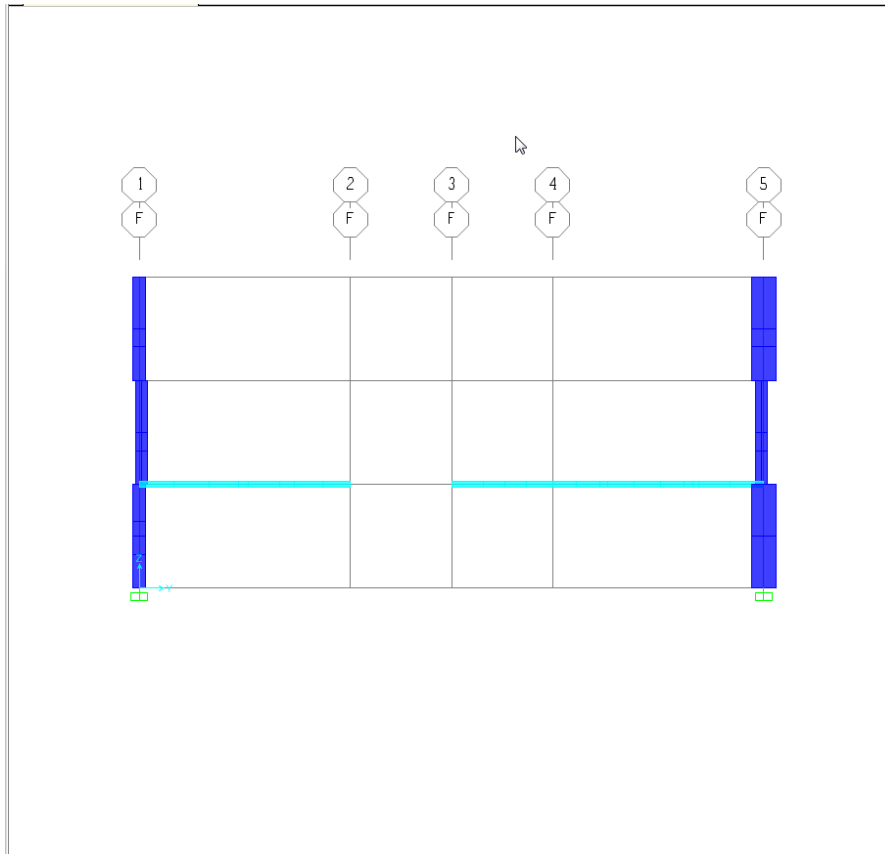












1.3 Obtežba

Lastna in stalna obtežba

Streha

$$g_{streha} := 0.66 \text{ kN} \cdot \text{m}^{-2}$$

$$g_{streha.1'} := g_{streha} \cdot (0.5 \cdot 6.9 \text{ m}) = 2.28 \cdot \text{kN} \cdot \text{m}^{-1}$$

$$g_{streha.2'} := g_{streha} \cdot (0.5 \cdot 6.9 \text{ m} + 3.3 \text{ m}) = 4.46 \cdot \text{kN} \cdot \text{m}^{-1}$$

Plošča nad 2N, 1N, P

$$g_{tlak} := 2 \text{ kN} \cdot \text{m}^{-2}$$

$$g_{pl} := 0.2 \text{ m} \cdot \gamma_c = 5 \cdot \text{kN} \cdot \text{m}^{-2}$$

(LT AB konstrukcije: samodejno upoštevano v programu)

Predelne stene (siporeks)

$$g_{pred} := 2.6 \text{ kN} \cdot \text{m}^{-2}$$

$$g_{pred'} := g_{pred} \cdot 3.2 \text{ m} = 8.32 \cdot \text{kN} \cdot \text{m}^{-1}$$

Koristna obtežba

Plošča nad P in 1N

$$q_{strop} := 3.0 \text{ kN} \cdot \text{m}^{-2}$$

Potresna obtežba

Potresni spekter (EC8, tip 1)

Pospešek temeljnih

$$a_g := 0.225$$

faktor pomembnosti

$$\gamma_l := 1.2$$

Parametri tal

C

$$S := k_{tt,1} = 1.15$$

$$T_B := k_{tt,2} = 0.2$$

$$T_C := k_{tt,3} = 0.6$$

$$T_D := k_{tt,4} = 2$$

faktor obnašanja

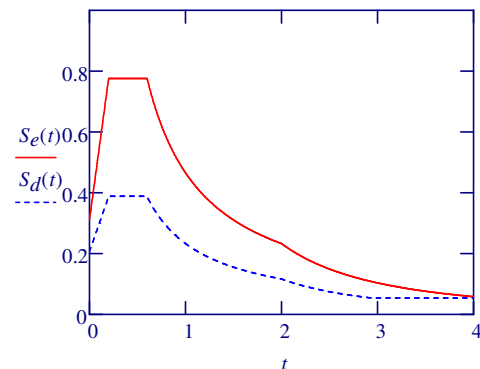
$$q := 2$$

"Tip tal"	"S"	"TB"	"TC"	"TD"
"A"	1.00	0.10	0.40	2.00
"B"	1.20	0.15	0.50	2.00
"C"	1.15	0.20	0.60	2.00
"D"	1.35	0.20	0.80	2.00
"E"	1.70	0.10	0.40	2.00

Elastični spekter

$\eta := 1$ za 5% viskoznega dušenja

$$S_e(T) := \begin{cases} a_g \cdot \gamma_l \cdot S \cdot \left[1 + \frac{T}{T_B} \cdot (\eta \cdot 2.5 - 1) \right] & \text{if } 0 \leq T \leq T_B \\ a_g \cdot \gamma_l \cdot S \cdot \eta \cdot 2.5 & \text{if } T_B \leq T \leq T_C \\ a_g \cdot \gamma_l \cdot S \cdot \eta \cdot 2.5 \cdot \left(\frac{T_C}{T} \right) & \text{if } T_C \leq T \leq T_D \\ a_g \cdot \gamma_l \cdot S \cdot \eta \cdot 2.5 \cdot \left(\frac{T_C \cdot T_D}{T^2} \right) & \text{if } T_D \leq T \leq 4 \end{cases}$$



Projektni spekter

$\beta := 0.2$ faktor za spodnjo mejo projektnega spektra

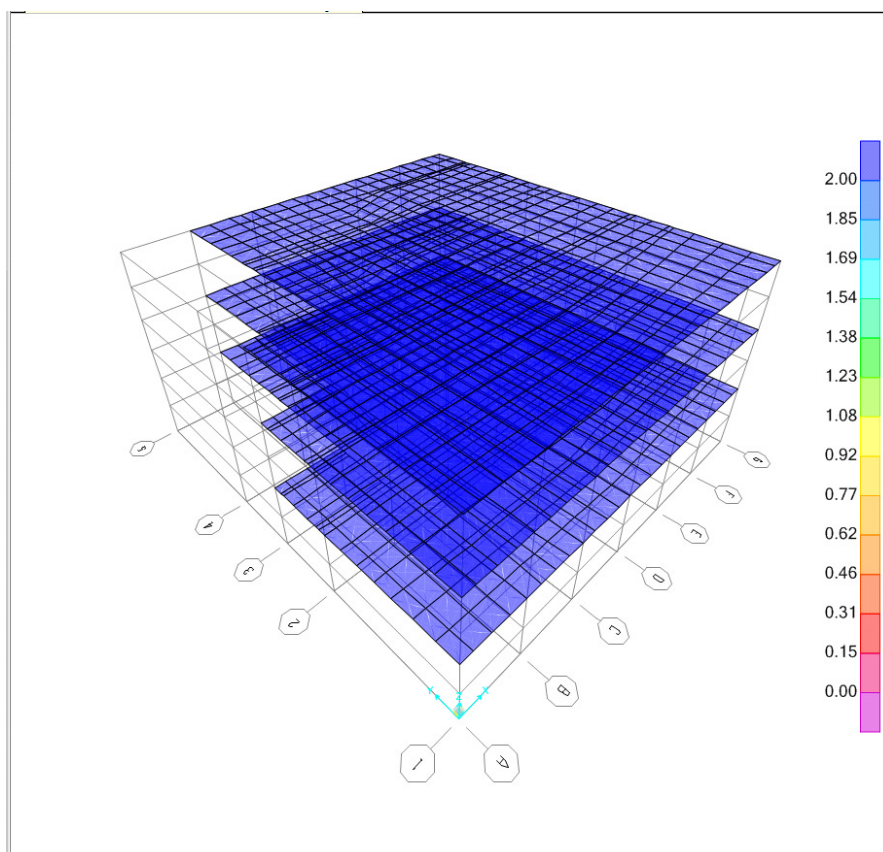
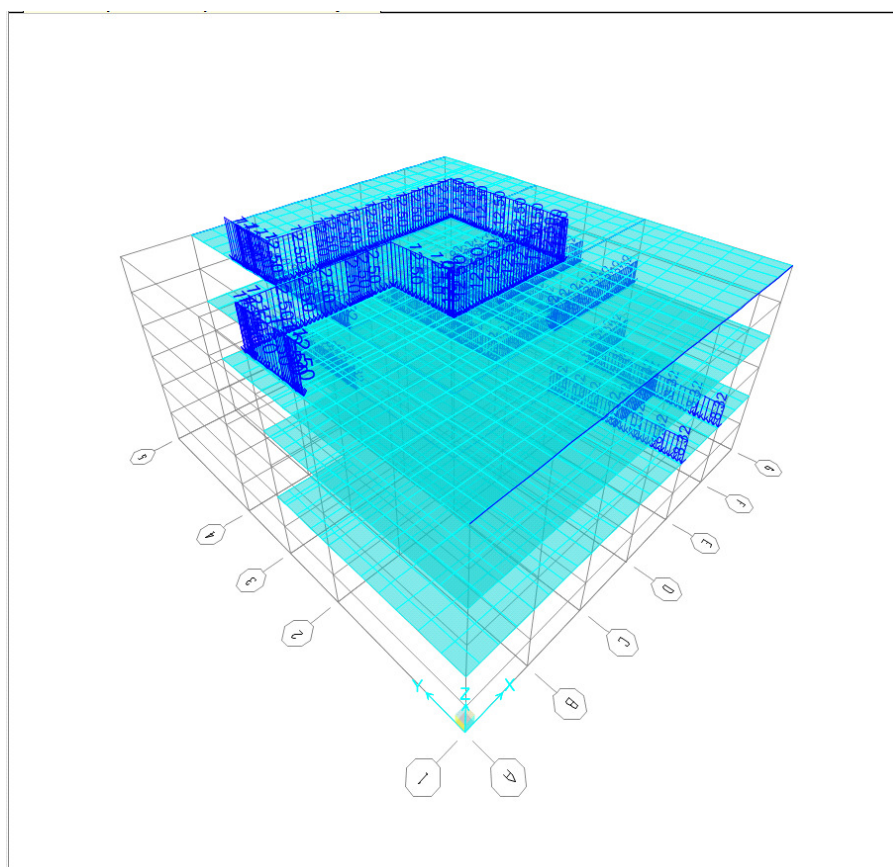
$$S_d(T) := \begin{cases} a_g \cdot \gamma_l \cdot S \cdot \left[\frac{2}{3} + \frac{T}{T_B} \cdot \left(\frac{2.5}{q} - \frac{2}{3} \right) \right] & \text{if } 0 \leq T \leq T_B \\ a_g \cdot \gamma_l \cdot S \cdot \frac{2.5}{q} & \text{if } T_B \leq T \leq T_C \\ \max \left[a_g \cdot \gamma_l \cdot S \cdot \frac{2.5}{q} \cdot \left(\frac{T_C}{T} \right), \beta \cdot a_g \cdot \gamma_l \right] & \text{if } T_C \leq T \leq T_D \\ \max \left[a_g \cdot \gamma_l \cdot S \cdot \frac{2.5}{q} \cdot \left(\frac{T_C \cdot T_D}{T^2} \right), \beta \cdot a_g \cdot \gamma_l \right] & \text{if } T_D \leq T \end{cases}$$

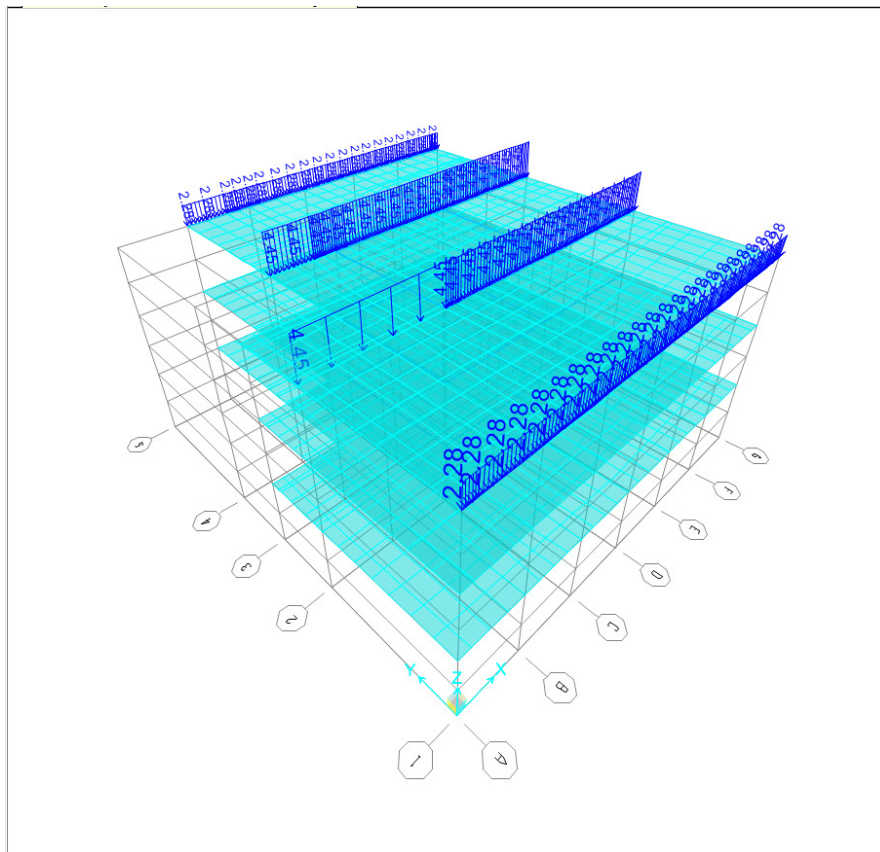
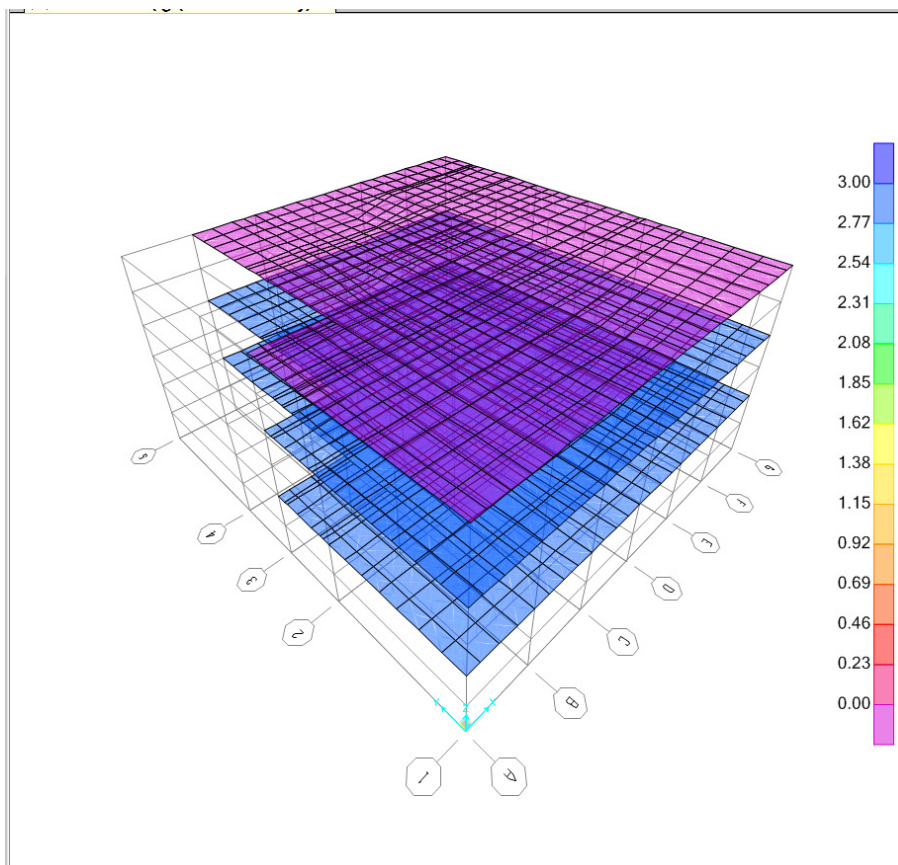
$$S_e(T_B) = 0.776$$

maksimalna vrednost v elastičnem spektru

$$S_d(T_B) = 0.3881$$

maksimalna vrednost v projektnem spektru

Obtežba G-tlak**Obtežba G-predelne stene**

Obtežba G-streha**Koristna obtežba Q**

1.4 Določitev mas za seizmično analizo

Obtežna kombinacija za določitev mas

$$1.0 \cdot G + \Psi \cdot E \cdot Q$$

$$\Psi_2 := 0.6 \quad \varphi := 0.5 \quad \Psi_E := \Psi_2 \cdot \varphi = 0.3$$

$$W_{SC,P} := 14087 \text{ kN} \quad \text{teža objekta nad pritličjem (prerez skozi 1/2 višine pritličja)}$$

$$W_{SC,1N} := 8769 \text{ kN} \quad \text{teža objekta nad 1N (prerez skozi 1/2 višine 1N)}$$

$$W_{SC,2N} := 4084 \text{ kN} \quad \text{teža objekta nad 2N (prerez skozi 1/2 višine 2N)}$$

$$W_P := W_{SC,P} - W_{SC,1N} = 5318 \text{ kN} \quad \text{teža etaže P}$$

$$W_{1N} := W_{SC,1N} - W_{SC,2N} = 4685 \text{ kN} \quad \text{teža etaže 1N}$$

$$W_{2N} := W_{SC,2N} = 4084 \text{ kN} \quad \text{teža etaže 2N}$$

2. nadstropje

Mase in masni vztrajnostni momenti

$$L_x := 19.2 \text{ m} \quad L_y := 20.4 \text{ m} \quad A_{etaža} := L_x \cdot L_y = 391.68 \cdot \text{m}^2 \quad r := \sqrt{\left(\frac{L_x^3 \cdot L_y}{12} + \frac{L_x \cdot L_y^3}{12} \right) \cdot \frac{1}{L_x \cdot L_y}} = 8.09 \cdot \text{m}$$

$$W := W_{2N} = 4084 \text{ kN}$$

$$\text{masa} := \frac{W}{g} = 416.45 \cdot \text{tonne} \quad M_{vztr} := r^2 \cdot \text{masa} = 27235.97 \cdot \text{tonne} \cdot \text{m}^2$$

Naključna ekscentričnost mase

$$e_x := 5\% \cdot L_x = 0.96 \cdot \text{m} \quad e_y := 5\% \cdot L_y = 1.02 \cdot \text{m}$$

1. nadstropje

Mase in masni vztrajnostni momenti

$$L_x := 19.2 \text{ m} \quad L_y := 20.4 \text{ m} \quad A_{etaža} := L_x \cdot L_y = 391.68 \cdot \text{m}^2 \quad r := \sqrt{\left(\frac{L_x^3 \cdot L_y}{12} + \frac{L_x \cdot L_y^3}{12} \right) \cdot \frac{1}{L_x \cdot L_y}} = 8.09 \cdot \text{m}$$

$$W := W_{1N} = 4685 \text{ kN}$$

$$\text{masa} := \frac{W}{g} = 477.74 \cdot \text{tonne} \quad M_{vztr} := r^2 \cdot \text{masa} = 31244 \cdot \text{tonne} \cdot \text{m}^2$$

Naključna ekscentričnost mase

$$e_x := 5\% \cdot L_x = 0.96 \cdot \text{m} \quad e_y := 5\% \cdot L_y = 1.02 \cdot \text{m}$$

Pritličje

Mase in masni vztrajnostni momenti

$$L_x := 19.2 \text{ m} \quad L_y := 20.4 \text{ m} \quad A_{etaža} := L_x \cdot L_y = 391.68 \cdot \text{m}^2 \quad r := \sqrt{\left(\frac{L_x^3 \cdot L_y}{12} + \frac{L_x \cdot L_y^3}{12} \right) \cdot \frac{1}{L_x \cdot L_y}} = 8.09 \cdot \text{m}$$

$$W := W_P = 5318 \text{ kN}$$

$$\text{masa} := \frac{W}{g} = 542.29 \cdot \text{tonne} \quad M_{vztr} := r^2 \cdot \text{masa} = 35465.44 \cdot \text{tonne} \cdot \text{m}^2$$

Naključna ekscentričnost mase

$$e_x := 5\% \cdot L_x = 0.96 \cdot \text{m} \quad e_y := 5\% \cdot L_y = 1.02 \cdot \text{m}$$

1.5 Obtežne kombinacije

COMB0: $1.0 \cdot G + 0.3 \cdot Q$

COMB1: $1.35 \cdot G + 1.5 \cdot Q$

COMB2x: $1.0 \cdot G + 0.6 \cdot Q + 1.0 \cdot E_x + 0.3 \cdot E_y$

COMB2y: $1.0 \cdot G + 0.6 \cdot Q + 0.3 \cdot E_x + 1.0 \cdot E_y$

stalna in koristna obtežba za določitev mas pri seizmični analizi

stalna in koristna obtežba za statično analizo

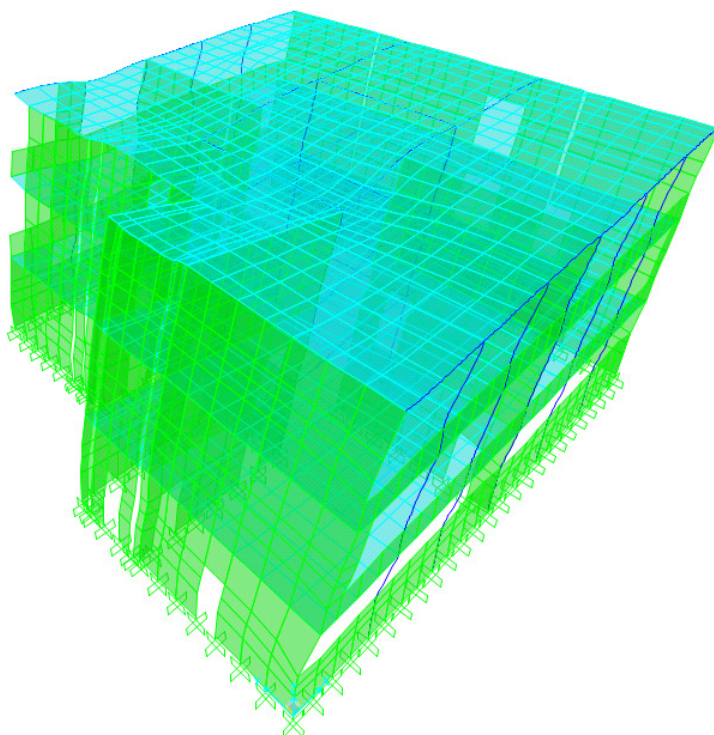
potres, X smer

potres, Y smer

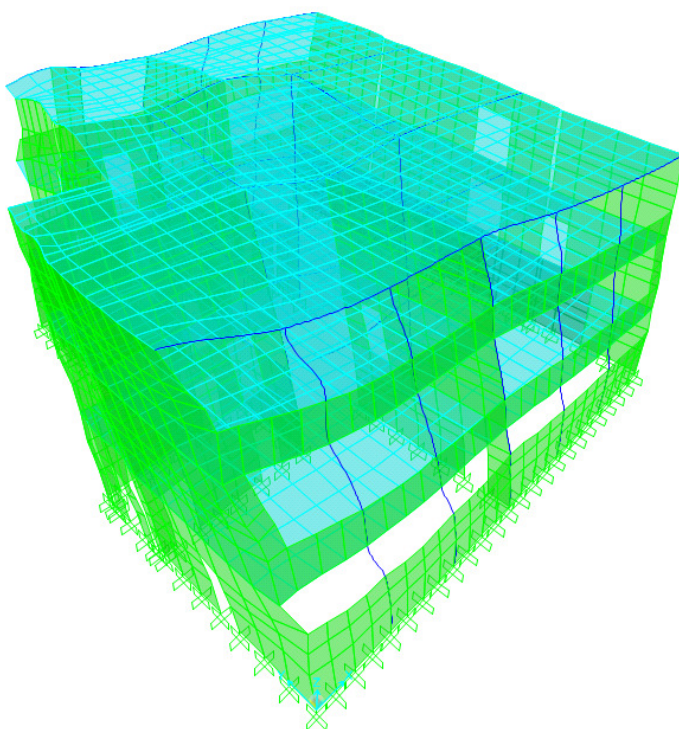
1.6 Rezultati seizmične analize

Modalna analiza

1. nihajna oblika:



2. nihajna oblika



3. nihajna oblika

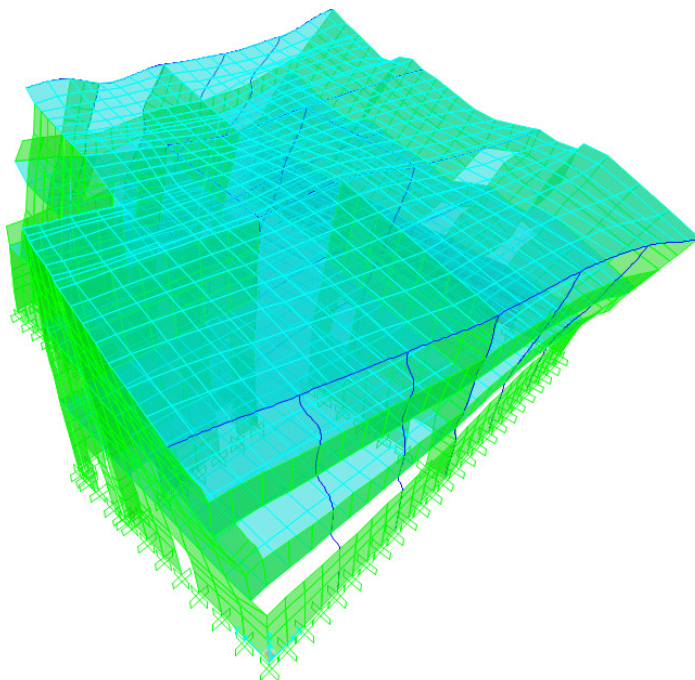


TABLE: Modal Participating Mass Ratios									
OutputCase	StepType	StepNum	Period	UX	UY	RZ	SumUX	SumUY	SumRZ
Text	Text	Unitless	Sec	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
MODAL	Mode	1	0.184	0.789	0.008	0.011	0.789	0.008	0.011
MODAL	Mode	2	0.111	0.017	0.508	0.280	0.807	0.516	0.291
MODAL	Mode	3	0.082	0.000	0.244	0.479	0.807	0.760	0.770
MODAL	Mode	4	0.067	0.170	0.001	0.000	0.976	0.762	0.770
MODAL	Mode	5	0.039	0.007	0.043	0.040	0.983	0.805	0.810
MODAL	Mode	6	0.038	0.016	0.053	0.038	1.000	0.857	0.848
MODAL	Mode	7	0.028	0.000	0.092	0.097	1.000	0.949	0.946
MODAL	Mode	8	0.023	0.000	0.012	0.005	1.000	0.960	0.951
MODAL	Mode	9	0.019	0.000	0.040	0.049	1.000	1.000	1.000

Upoštevano je več kot 90 % efektivne mase.
Torzijska nihajna oblika ni prevladujoča.

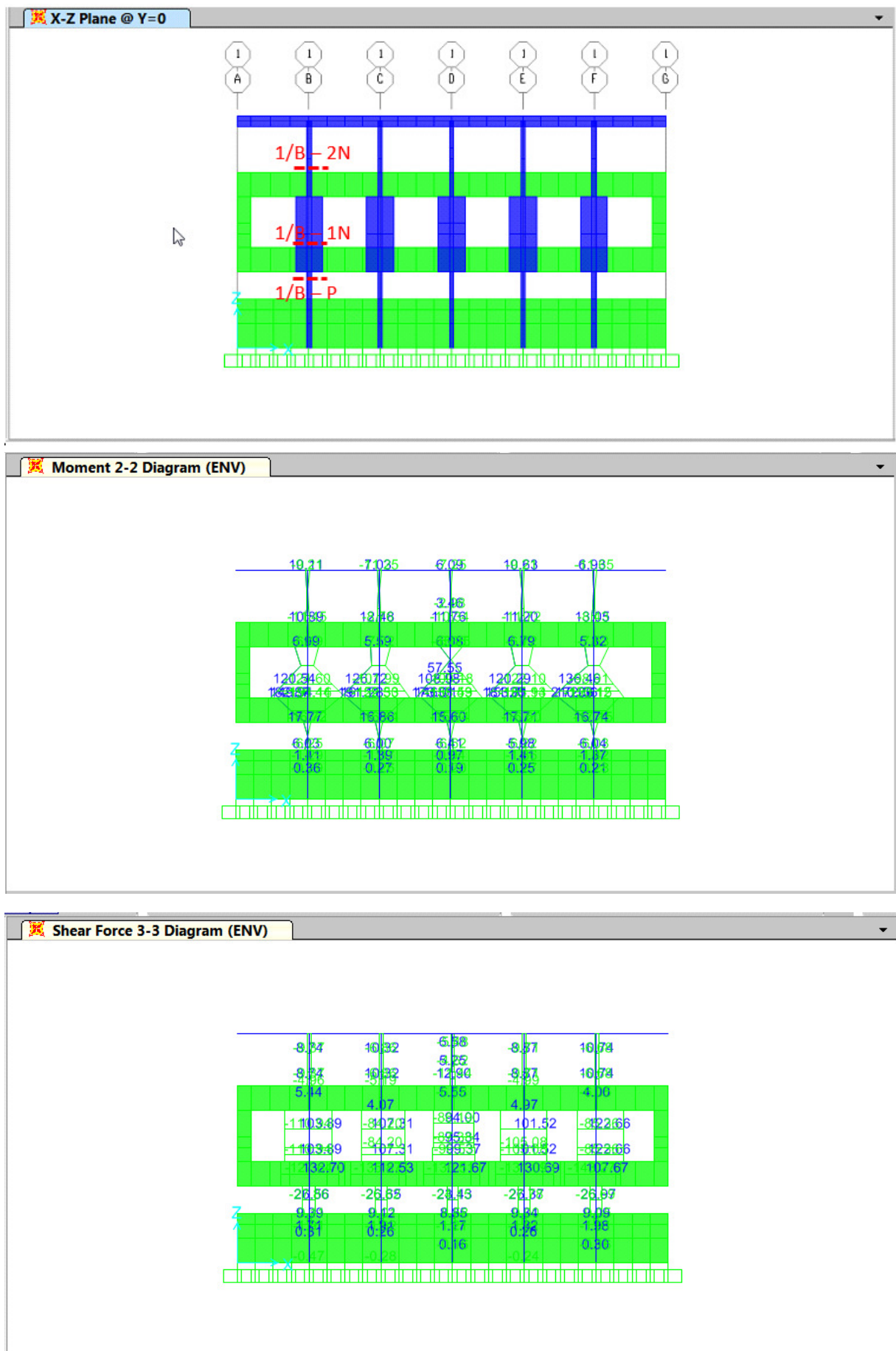
Kontrola etažnih pomikov pri potresni obtežbi

Kontrola etažnih pomikov, potres X smer								
etaža	h_{et}	d_x	d_y	$d_{r,x}$	$d_{r,y}$	d_r	$d_{dov}=h_{et}/80$	d_r / d_{dov}
(nivo)	cm	cm	cm	cm	cm	cm	cm	
2N	340	1.01	0.28	0.74	0.20	0.76	4.3	0.18
1N	340	0.61	0.18	0.61	0.18	0.64	4.3	0.15
P	340	0.27	0.08	0.27	0.08	0.29	4.3	0.07

Kontrola etažnih pomikov, potres Y smer								
etaža	h_{et}	d_x	d_y	$d_{r,x}$	$d_{r,y}$	d_r	$d_{dov}=h_{et}/80$	d_r / d_{dov}
(nivo)	cm	cm	cm	cm	cm	cm	cm	
2N	340	0.46	0.34	0.34	0.24	0.42	4.3	0.10
1N	340	0.27	0.22	0.27	0.22	0.35	4.3	0.08
P	340	0.12	0.09	0.12	0.09	0.15	4.3	0.04

Dovoljeni etažni pomiki pri potresni obtežbi niso prekoračeni.

1.7 Kontrola AB elementov OKVIR V OSI 1



AB STEBER os 1/B - P Materiali

$$f_{ck} := f_{ck.C20} = 20 \cdot \text{MPa}$$

$$f_{cd} := f_{cd.C20} = 13.33 \cdot \text{MPa}$$

$$f_{yd} := f_{yd.S400} = 208.7 \cdot \text{MPa}$$

Dimenzije

$$l_x := 0.2 \text{ m} \quad l_y := 0.4 \text{ m} \quad a := 4 \text{ cm} \quad A_c := l_x \cdot l_y = 800 \text{ cm}^2$$

Armatura

Upogibna armatura

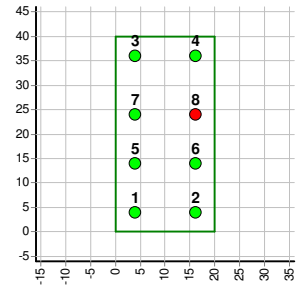
$$A_{sl.tot} := 8 \cdot A_{\varphi}(22 \text{ mm}) = 30.41 \text{ cm}^2$$

$$\rho_{sl} := \frac{A_{sl.tot}}{A_c} = 3.8 \%$$

Horizontalna armatura

$$A_{sw} := 2 \cdot A_{\varphi}(8 \text{ mm}) \quad s_w := 10 \text{ cm}$$

$$a_{sw} := \frac{A_{sw}}{s_w} = 0.1 \cdot \text{cm}^2 \cdot \text{cm}^{-1}$$

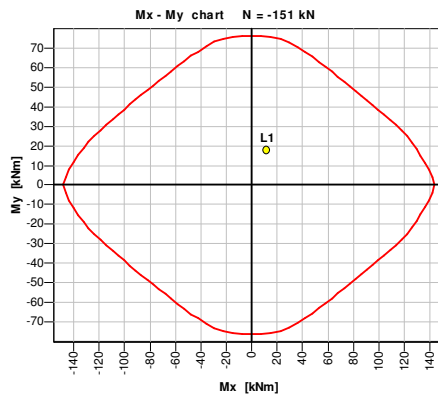


Obremenitev

TABLE: Element Forces - Frames										
Frame	Station	OutputCase	CaseType	StepType	P	V2	V3	T	M2	M3
Text	m	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
3	1.2	COMB2x	Combination	Max	-151	7	27	0	18	-9
3	1.2	COMB2x	Combination	Min	-345	4	-28	0	-17	-12
3	1.2	COMB2y	Combination	Max	-136	7	12	0	9	-9
3	1.2	COMB2y	Combination	Min	-359	4	-13	0	-8	-12

Upogibna nosilnost - dvoosni upogib

$$M_{Ed,x} := 12 \text{ kN}\cdot\text{m} \quad M_{Ed,y} := 18 \text{ kN}\cdot\text{m} \quad N_{Ed} := -151 \text{ kN}$$



$$A_{sl.potr} := 0.34 \text{ cm}^2 \cdot 8 = 2.72 \text{ cm}^2$$

$$\text{kontrola}(A_{sl.potr} \leq A_{sl.tot}) = \text{"JE izpolnjena"}$$

$$A_{sl.potr} \div A_{sl.tot} = 0.09$$

Strižna nosilnost - X smer

Obremenitev

$$V_{Ed} := 28 \text{ kN} \quad N_{Ed} := -151 \text{ kN}$$

Kontrola striga

$$f_{ck} := f_{ck.C25} \quad b_w := l_y = 40 \text{ cm} \quad h := l_x = 20 \text{ cm} \quad d := h - a = 16 \text{ cm} \quad A_{sl} := 0.5 A_{sl.tot} = 15.21 \text{ cm}^2$$

Strižna odpornost betona

$$V_{Rd,c} := V_{Rd,c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 74.71 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd,c}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd,c} = 0.37$$

Strižna odpornost armiranega prereza - stremena

$$V_{Rd,s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 30.21 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd,s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd,s} = 0.93$$

Strižna nosilnost - Y smer

Obremenitev

$$V_{Ed} := 7 \text{ kN} \quad N_{Ed} := -136 \text{ kN}$$

Kontrola striga

$$f_{ck} := 25 \cdot \text{MPa} \quad b_w := l_x = 20 \text{ cm} \quad h := l_y = 40 \text{ cm} \quad d := h - a = 36 \text{ cm} \quad A_{sl} := 0.5 A_{sl.tot} = 15.21 \text{ cm}^2$$

Strižna odpornost betona

$$V_{Rd,c} := V_{Rd,c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 73.91 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd,c}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd,c} = 0.09$$

Strižna odpornost armiranega prereza - stremena

$$V_{Rd,s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 67.98 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd,s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd,s} = 0.1$$

Nosilnost prereza je ustrezna

AB STEBER os 1/B - 1N

Materiali

$$f_{ck} := f_{ck.C20} = 20 \cdot \text{MPa} \quad f_{cd} := f_{cd.C20} = 13.33 \cdot \text{MPa} \quad f_{yd} := f_{yd.S400} = 208.7 \cdot \text{MPa}$$

Dimenzije

$$l_x := 1.2 \text{ m} \quad l_y := 0.4 \text{ m} \quad a := 4 \text{ cm}$$

$$t_x := 0.2 \text{ m} \quad t_y := 0.2 \text{ m} \quad A_c := l_x \cdot t_y + (l_y - t_x) \cdot t_y = 2800 \text{ cm}^2$$

Armatura

Upogibna armatura

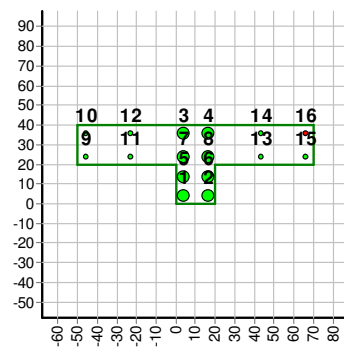
$$A_{sl.tot} := 8 \cdot A_{\varphi}(22 \text{ mm}) + 8 \cdot A_{\varphi}(12 \text{ mm}) = 39.46 \text{ cm}^2$$

$$\rho_{sl} := \frac{A_{sl.tot}}{A_c} = 1.41 \cdot \%$$

Horizontalna armatura

$$A_{sw} := 2 \cdot A_{\varphi}(8 \text{ mm}) \quad s_w := 10 \text{ cm}$$

$$a_{sw} := \frac{A_{sw}}{s_w} = 0.1 \cdot \text{cm}^2 \cdot \text{cm}^{-1}$$

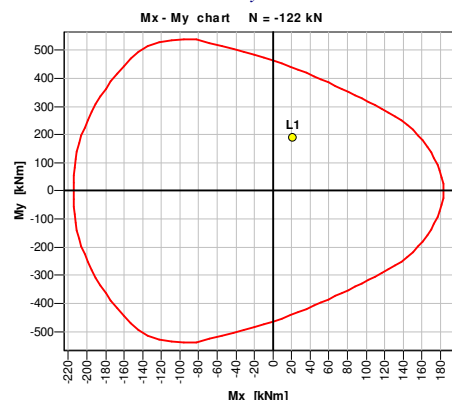


Obremenitev

TABLE: Element Forces - Frames										
Frame	Station	OutputCase	CaseType	StepType	P	V2	V3	T	M2	M3
Text	m	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
483	0	COMB2x	Combination	Max	-122	20	104	-1	183	21
483	0	COMB2x	Combination	Min	-210	18	-111	-1	-191	18
483	0	COMB2y	Combination	Max	-119	20	54	-1	95	20
483	0	COMB2y	Combination	Min	-213	18	-61	-1	-103	18

Upogibna nosilnost - dvoosni upogib

$$M_{Ed.x} := 21 \text{ kN}\cdot\text{m} \quad M_{Ed.y} := 191 \text{ kN}\cdot\text{m} \quad N_{Ed} := -122 \text{ kN}$$



$$A_{sl.potr} := 0.64 \text{ cm}^2 \cdot 16 = 10.24 \text{ cm}^2$$

$$\text{kontrola}(A_{sl.potr} \leq A_{sl.tot}) = \text{"JE izpolnjena"}$$

$$A_{sl.potr} \div A_{sl.tot} = 0.26$$

Strižna nosilnost - X smer

Obremenitev

$$V_{Ed} := 145 \text{ kN} \quad N_{Ed} := -109 \text{ kN}$$

Kontrola striga

$$f_{ck} := f_{ck.C25} \quad b_w := t_x = 20 \text{ cm} \quad h := l_x = 120 \text{ cm} \quad d := h - a = 116 \text{ cm} \quad A_{sl} := 4 A_{\varphi}(12 \text{ mm}) = 4.52 \text{ cm}^2$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 84.16 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"NI izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 1.72$$

Strižna odpornost armiranega prereza - stremena

$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 219.04 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 0.66$$

Strižna nosilnost - Y smer

Obremenitev

$$V_{Ed} := 21 \text{ kN} \quad N_{Ed} := -107 \text{ kN}$$

Kontrola striga

$$f_{ck} := 25 \cdot \text{MPa} \quad b_w := t_y = 20 \text{ cm} \quad h := l_y = 40 \text{ cm} \quad d := h - a = 36 \text{ cm} \quad A_{sl} := 4 A_{\varphi}(22 \text{ mm}) = 15.21 \text{ cm}^2$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 70 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 0.3$$

Strižna odpornost armiranega prereza - stremena

$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 67.98 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 0.31$$

Nosilnost prereza je ustrezna

AB STEBER os 1/B - 2N

Materiali

$$f_{ck} := f_{ck.C20} = 20 \cdot \text{MPa}$$

$$f_{cd} := f_{cd.C20} = 13.33 \cdot \text{MPa}$$

$$f_{yd} := f_{yd.S400} = 208.7 \cdot \text{MPa}$$

Dimenzije

$$l_x := 0.2 \text{ m} \quad l_y := 0.4 \text{ m} \quad a := 4 \text{ cm} \quad A_c := l_x \cdot l_y = 800 \text{ cm}^2$$

Armatura

Upogibna armatura

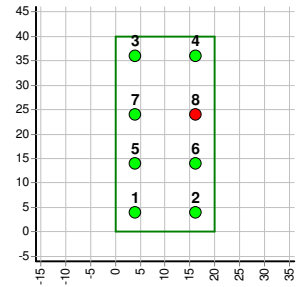
$$A_{sl.tot} := 8 \cdot A_{\varnothing(22\text{mm})} = 30.41 \text{ cm}^2$$

$$\rho_{sl} := \frac{A_{sl.tot}}{A_c} = 3.8 \cdot \%$$

Horizontalna armatura

$$A_{sw} := 2 \cdot A_{\varnothing(8\text{mm})} \quad s_w := 10 \text{ cm}$$

$$a_{sw} := \frac{A_{sw}}{s_w} = 0.1 \cdot \text{cm}^2 \cdot \text{cm}^{-1}$$

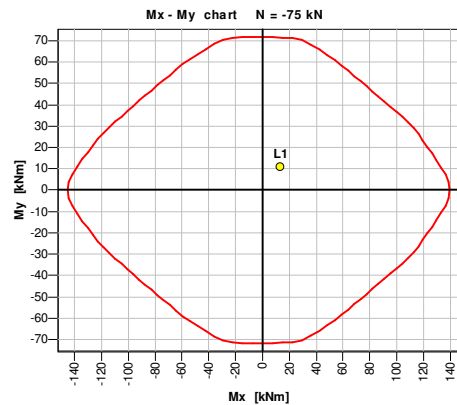


Obremenitev

TABLE: Element Forces - Frames										
Frame	Station	OutputCase	CaseType	StepType	P	V2	V3	T	M2	M3
Text	m	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
509	0	COMB2x	Combination	Max	-75	18	9	0	11	13
509	0	COMB2x	Combination	Min	-86	15	-9	0	-11	12
509	0	COMB2y	Combination	Max	-76	18	5	0	6	13
509	0	COMB2y	Combination	Min	-85	15	-5	0	-6	12

Upogibna nosilnost - dvoosni upogib

$$M_{Ed,x} := 13 \text{ kN}\cdot\text{m} \quad M_{Ed,y} := 11 \text{ kN}\cdot\text{m} \quad N_{Ed} := -75 \text{ kN}$$



$$A_{sl.potr} := 0.25 \text{ cm}^2 \cdot 8 = 2 \text{ cm}^2$$

$$\text{kontrola}(A_{sl.potr} \leq A_{sl.tot}) = \text{"JE izpolnjena"}$$

$$A_{sl.potr} \div A_{sl.tot} = 0.07$$

Strižna nosilnost - X smer

Obremenitev

$$V_{Ed} := 9 \text{ kN} \quad N_{Ed} := -75 \text{ kN}$$

Kontrola striga

$$f_{ck} := f_{ck.C25} \quad b_w := l_y = 40 \text{ cm} \quad h := l_x = 20 \text{ cm} \quad d := h - a = 16 \text{ cm} \quad A_{sl} := 0.5 A_{sl.tot} = 15.21 \text{ cm}^2$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 65.59 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 0.14$$

Strižna odpornost armiranega prereza - stremena

$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 30.21 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 0.3$$

Strižna nosilnost - Y smer

Obremenitev

$$V_{Ed} := 18 \text{ kN} \quad N_{Ed} := -76 \text{ kN}$$

Kontrola striga

$$f_{ck} := 25 \cdot \text{MPa} \quad b_w := l_x = 20 \text{ cm} \quad h := l_y = 40 \text{ cm} \quad d := h - a = 36 \text{ cm} \quad A_{sl} := 0.5 A_{sl.tot} = 15.21 \text{ cm}^2$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 65.81 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 0.27$$

Strižna odpornost armiranega prereza - stremena

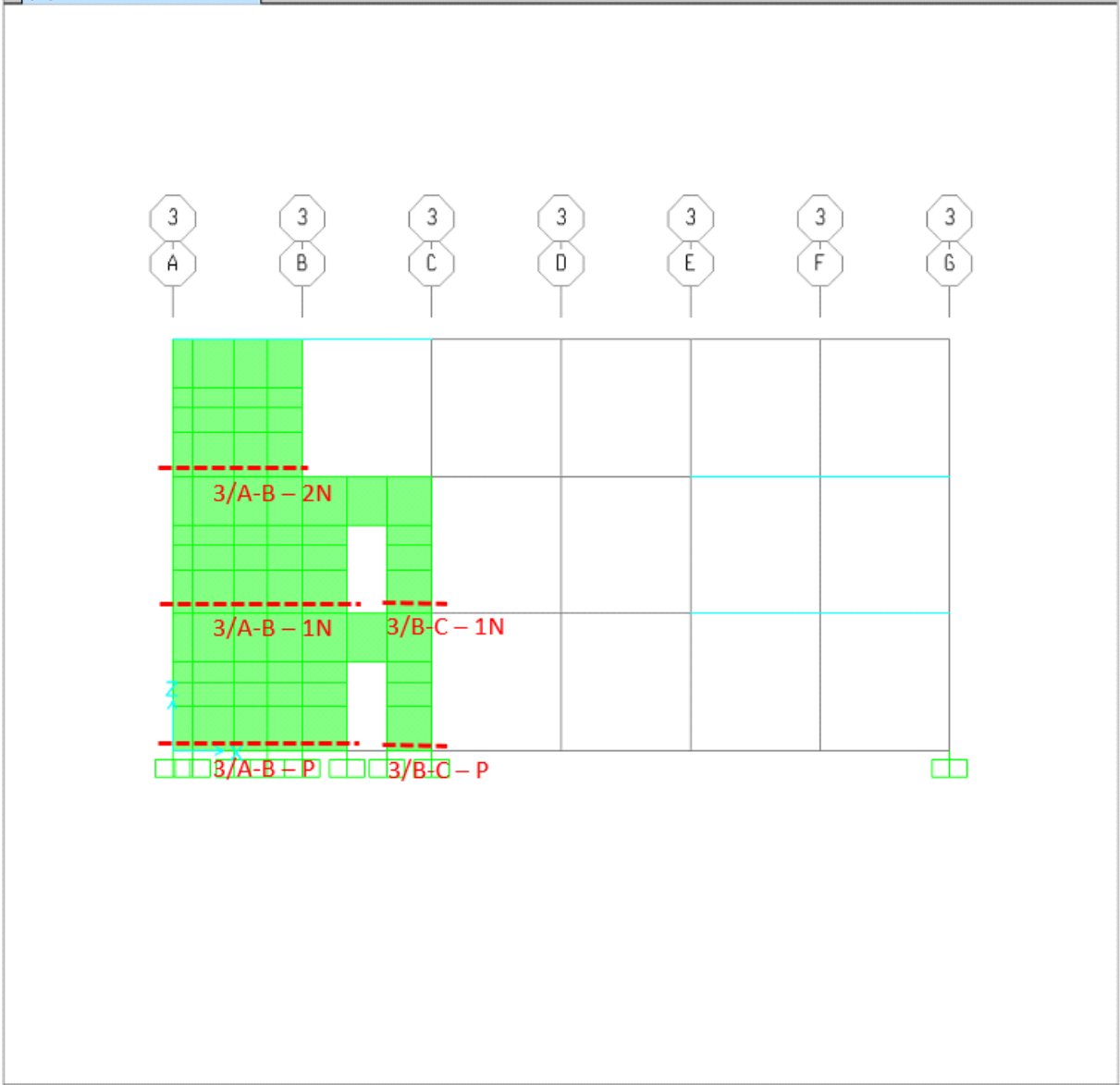
$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 67.98 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 0.26$$

Nosilnost prereza je ustrezna

STENA V OSI 3



AB STENA 3/A-B - P

Materiali

$$f_{ck} := f_{ck.C20} = 20 \cdot \text{MPa}$$

$$f_{cd} := f_{cd.C20} = 13.33 \cdot \text{MPa}$$

$$f_{yd} := f_{yd.S500} = 434.78 \cdot \text{MPa}$$

Dimenzije stene

$$l_x := 4.3 \text{ m} \quad l_y := 0.2 \text{ m} \quad A_c := l_x \cdot l_y = 8600 \text{ cm}^2$$

Armatura

Vertikalna armatura

$$A_{sl} := \frac{2 A_{\varphi(7mm)}}{15 \text{ cm}} \cdot l_x + 4 A_{\varphi(14mm)} + 2 A_{\varphi(12mm)} = 30.48 \cdot \text{cm}^2$$

$$a_{sl} := \frac{A_{sl}}{l_x} = 7.09 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

$$\rho_{sl} := \frac{A_{sl}}{A_c} = 0.35 \cdot \%$$

$$\rho_{min} := 0.3 \cdot \%$$

EC2, glede na celotni prerez stene

$$\rho_{max} := 4 \cdot \%$$

EC2, glede na celotni prerez stene

$$\rho_{c.min} := 0.5 \cdot \%$$

EC8, glede na robni element

Horizontalna armatura

$$a_{sw} := \frac{2 A_{\varphi(7mm)}}{15 \text{ cm}} = 5.13 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

Obremenitev

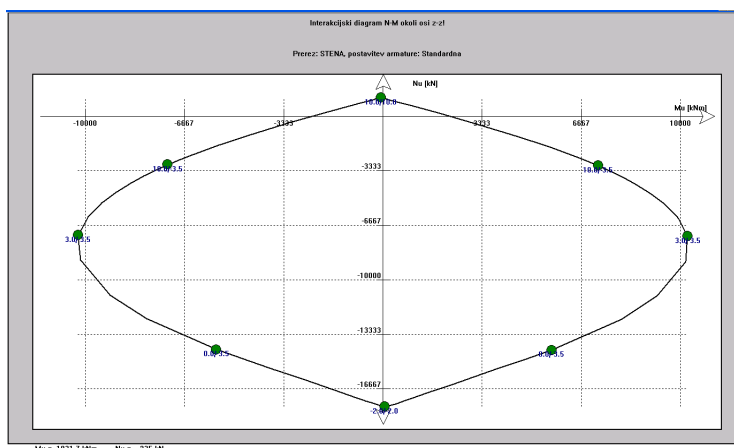
TABLE: Section Cut Forces - Analysis									
SectionCut	OutputCase	CaseType	StepType	F1	F2	F3	M1	M2	M3
Text	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
3/A-B_P	COMB2x	Combination	Max	1187	3	1021	7	2690	1
3/A-B_P	COMB2x	Combination	Min	-1055	-4	-77	-6	-2867	0
3/A-B_P	COMB2y	Combination	Max	516	4	854	10	1013	2
3/A-B_P	COMB2y	Combination	Min	-384	-6	90	-8	-1190	0

Upogibna nosilnost - X smer

Obremenitev

$$M_{Ed} := 2867 \text{ kN} \cdot \text{m}$$

$$N_{Ed} := 77 \text{ kN} \quad (+\text{nateg})$$



$$M_{Rd} := 2220 \text{ kN} \cdot \text{m}$$

$$\text{kontrola}(M_{Ed} \leq M_{Rd}) = \text{"NI izpolnjena"}$$

$$\frac{M_{Ed}}{M_{Rd}} = 1.29$$

Strižna nosilnost - X smer

Obremenitev

$$V_{Ed} := 1187 \text{ kN}$$

$$N_{Ed} = 77 \text{ kN}$$

Kontrola striga

$$f_{ck} := f_{ck.C20}$$

$$b_w := l_y = 20 \text{ cm}$$

$$h := l_x = 4.3 \text{ m}$$

$$d := 0.9 \cdot h = 387 \text{ cm}$$

$$A_{sl} := 0.5 \cdot A_{sl}$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 169.63 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"NI izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 7$$

Strižna odpornost armiranega prereza - stremena

$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 777.05 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"NI izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 1.53$$

Nosilnost prereza ni ustrezna. Upogibna nosilnost je prekoračena za 29 %, strižna nosilnost je prekoračena za 53 %.

AB STENA 3/B-C - P

Materiali

$$f_{ck} := f_{ck.C20} = 20 \cdot \text{MPa} \quad f_{cd} := f_{cd.C20} = 13.33 \cdot \text{MPa} \quad f_{yd} := f_{yd.S500} = 434.78 \cdot \text{MPa}$$

Dimenzije stene

$$l_x := 1.1 \text{ m} \quad l_y := 0.2 \text{ m} \quad A_c := l_x \cdot l_y = 2200 \text{ cm}^2$$

Armatura

Vertikalna armatura

$$A_{sl} := \frac{2 A_{\varphi(7mm)}}{15 \text{ cm}} \cdot l_x + 4 A_{\varphi(14mm)} + 2 A_{\varphi(12mm)} = 14.06 \cdot \text{cm}^2$$

$$a_{sl} := \frac{A_{sl}}{l_x} = 12.79 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

$$\rho_{sl} := \frac{A_{sl}}{A_c} = 0.64 \cdot \%$$

$$\rho_{min} := 0.3 \%$$

EC2, glede na celotni prerez stene

$$\rho_{max} := 4 \%$$

EC2, glede na celotni prerez stene

$$\rho_{c.min} := 0.5 \%$$

EC8, glede na robni element

Horizontalna armatura

$$a_{sw} := \frac{2 A_{\varphi(7mm)}}{15 \text{ cm}} = 5.13 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

Obremenitev

TABLE: Section Cut Forces - Analysis									
SectionCut	OutputCase	CaseType	StepType	F1	F2	F3	M1	M2	M3
Text	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
3/B-C_P	COMB2x	Combination	Max	303	1	337	2	267	1
3/B-C_P	COMB2x	Combination	Min	-315	-2	-50	-1	-265	-1
3/B-C_P	COMB2y	Combination	Max	115	2	319	3	104	1
3/B-C_P	COMB2y	Combination	Min	-127	-3	-32	-2	-103	-1

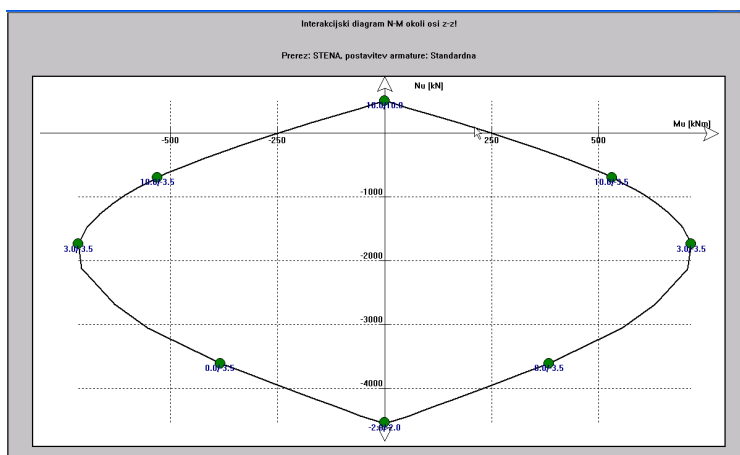
Upogibna nosilnost - X smer

Obremenitev

$$M_{Ed} := 267 \text{ kN} \cdot \text{m}$$

$$N_{Ed} := 50 \text{ kN}$$

(+nateg)



$$M_{Rd} := 265 \text{ kN} \cdot \text{m}$$

$$\text{kontrola}(M_{Ed} \leq M_{Rd}) = \text{"NI izpolnjena"}$$

$$\frac{M_{Ed}}{M_{Rd}} = 1.01$$

Strižna nosilnost - X smer

Obremenitev

$$V_{Ed} := 315 \text{ kN}$$

$$N_{Ed} = 50 \text{ kN}$$

Kontrola striga

$$f_{ck} := f_{ck.C20} \quad b_w := l_y = 20 \text{ cm} \quad h := l_x = 1.1 \text{ m} \quad d := 0.9 \cdot h = 99 \text{ cm} \quad A_{sl} = 14.06 \text{ cm}^2$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 76.66 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"NI izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 4.11$$

Strižna odpornost armiranega prereza - stremena

$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 198.78 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"NI izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 1.58$$

Nosilnost prereza ni ustrezna. Upogibna nosilnost je prekoračena za 1 %, strižna nosilnost je prekoračena za 58 %.

AB STENA 3/A-B - 1N

Materiali

$$f_{ck} := f_{ck.C20} = 20 \cdot \text{MPa}$$

$$f_{cd} := f_{cd.C20} = 13.33 \cdot \text{MPa}$$

$$f_{yd} := f_{yd.S500} = 434.78 \cdot \text{MPa}$$

Dimenzije stene

$$l_x := 4.3 \text{ m} \quad l_y := 0.2 \text{ m} \quad A_c := l_x \cdot l_y = 8600 \text{ cm}^2$$

Armatura

Vertikalna armatura

$$A_{sl} := \frac{2 A_{\varphi(7mm)}}{15 \text{ cm}} \cdot l_x + 4 A_{\varphi(14mm)} + 2 A_{\varphi(12mm)} = 30.48 \cdot \text{cm}^2$$

$$a_{sl} := \frac{A_{sl}}{l_x} = 7.09 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

$$\rho_{sl} := \frac{A_{sl}}{A_c} = 0.35 \cdot \%$$

$$\rho_{min} := 0.3 \cdot \%$$

EC2, glede na celotni prerez stene

$$\rho_{max} := 4 \cdot \%$$

EC2, glede na celotni prerez stene

$$\rho_{c.min} := 0.5 \cdot \%$$

EC8, glede na robni element

Horizontalna armatura

$$a_{sw} := \frac{2 A_{\varphi(7mm)}}{15 \text{ cm}} = 5.13 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

Obremenitev

TABLE: Section Cut Forces - Analysis									
SectionCut	OutputCase	CaseType	StepType	F1	F2	F3	M1	M2	M3
Text	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
3/A-B_1N	COMB2x	Combination	Max	678	-1	544	8	1130	4
3/A-B_1N	COMB2x	Combination	Min	-735	-5	116	1	-1434	0
3/A-B_1N	COMB2y	Combination	Max	301	1	562	12	371	5
3/A-B_1N	COMB2y	Combination	Min	-358	-7	99	-3	-675	-1

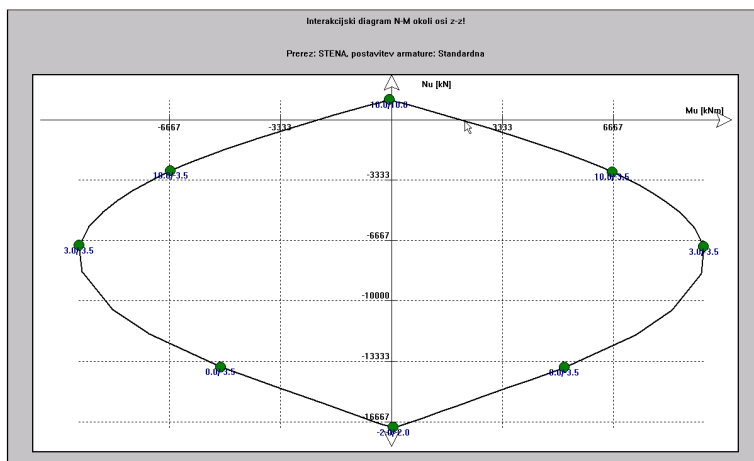
Upogibna nosilnost - X smer

Obremenitev

$$M_{Ed} := 1434 \text{ kN} \cdot \text{m}$$

$$N_{Ed} := -116 \text{ kN}$$

(+nateg)



$$M_{Rd} := 2490 \text{ kN} \cdot \text{m}$$

$$\text{kontrola}(M_{Ed} \leq M_{Rd}) = \text{"JE izpolnjena"}$$

$$\frac{M_{Ed}}{M_{Rd}} = 0.58$$

Strižna nosilnost - X smer

Obremenitev

$$V_{Ed} := 735 \text{ kN}$$

$$N_{Ed} = -116 \text{ kN}$$

Kontrola striga

$$f_{ck} := f_{ck.C20}$$

$$b_w := l_y = 20 \text{ cm}$$

$$h := l_x = 430 \text{ cm}$$

$$d := 0.9 \cdot h = 387 \text{ cm}$$

$$A_{sl} := 0.5 \cdot A_{sl}$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 195.68 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"NI izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 3.76$$

Strižna odpornost armiranega prereza - stremena

$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 777.05 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 0.95$$

Nosilnost prereza je ustrezna.

AB STENA 3/B-C - 1N

Materiali

$$f_{ck} := f_{ck.C20} = 20 \cdot \text{MPa} \quad f_{cd} := f_{cd.C20} = 13.33 \cdot \text{MPa} \quad f_{yd} := f_{yd.S500} = 434.78 \cdot \text{MPa}$$

Dimenzije stene

$$l_x := 1.1 \text{ m} \quad l_y := 0.2 \text{ m} \quad A_c := l_x \cdot l_y = 2200 \text{ cm}^2$$

Armatura

Vertikalna armatura

$$A_{sl} := \frac{2 A_{\varphi(7mm)}}{15 \text{ cm}} \cdot l_x + 4 A_{\varphi(14mm)} + 2 A_{\varphi(12mm)} = 14.06 \cdot \text{cm}^2$$

$$a_{sl} := \frac{A_{sl}}{l_x} = 12.79 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

$$\rho_{sl} := \frac{A_{sl}}{A_c} = 0.64 \%$$

$$\rho_{min} := 0.3 \%$$

EC2, glede na celotni prerez stene

$$\rho_{max} := 4 \%$$

EC2, glede na celotni prerez stene

$$\rho_{c.min} := 0.5 \%$$

EC8, glede na robni element

Horizontalna armatura

$$a_{sw} := \frac{2 A_{\varphi(7mm)}}{15 \text{ cm}} = 5.13 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

Obremenitev

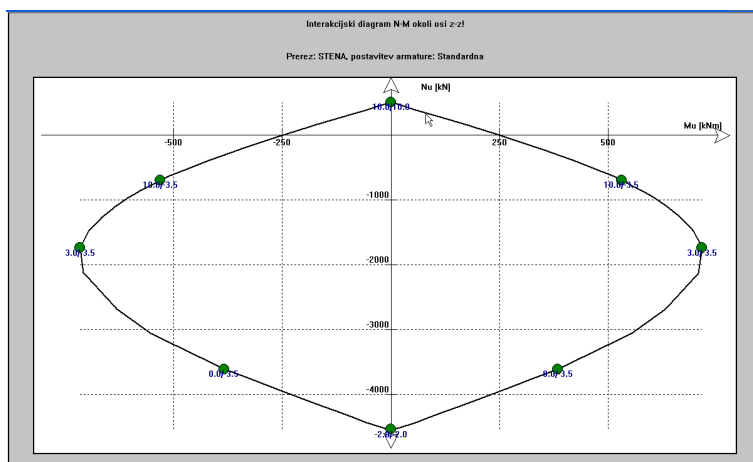
TABLE: Section Cut Forces - Analysis									
SectionCut	OutputCase	CaseType	StepType	F1	F2	F3	M1	M2	M3
Text	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
3/B-C_1N	COMB2x	Combination	Max	172	2	566	0	219	0
3/B-C_1N	COMB2x	Combination	Min	-163	0	-236	-4	-201	0
3/B-C_1N	COMB2y	Combination	Max	71	3	325	1	92	0
3/B-C_1N	COMB2y	Combination	Min	-62	-1	5	-4	-74	0

Upogibna nosilnost - X smer

Obremenitev

$$M_{Ed} := 201 \text{ kN} \cdot \text{m}$$

$$N_{Ed} := 236 \text{ kN} \quad (+\text{nateg})$$



$$M_{Rd} := 170 \text{ kN} \cdot \text{m}$$

$$\text{kontrola}(M_{Ed} \leq M_{Rd}) = \text{"NI izpolnjena"}$$

$$\frac{M_{Ed}}{M_{Rd}} = 1.18$$

Strižna nosilnost - X smer

Obremenitev

$$V_{Ed} := 172 \text{ kN}$$

$$N_{Ed} = 236 \text{ kN}$$

Kontrola striga

$$f_{ck} := f_{ck.C20} \quad b_w := l_y = 20 \text{ cm} \quad h := l_x = 110 \text{ cm} \quad d := 0.9 \cdot h = 99 \text{ cm} \quad A_{sl} = 14.06 \text{ cm}^2$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 51.55 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"NI izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 3.34$$

Strižna odpornost armiranega prereza - stremena

$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 198.78 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 0.87$$

Nosilnost prereza ni ustrezna. Upogibna nosilnost je prekoračena za 18 %.

AB STENA 3/A-B - 2N

Materiali

$$f_{ck} := f_{ck.C20} = 20 \cdot \text{MPa}$$

$$f_{cd} := f_{cd.C20} = 13.33 \cdot \text{MPa}$$

$$f_{yd} := f_{yd.S500} = 434.78 \cdot \text{MPa}$$

Dimenzije stene

$$l_x := 3.2 \text{ m} \quad l_y := 0.2 \text{ m} \quad A_c := l_x \cdot l_y = 6400 \text{ cm}^2$$

Armatura

Vertikalna armatura

$$A_{sl} := \frac{2 A_{\varphi(7\text{mm})}}{15\text{cm}} \cdot l_x + 4 A_{\varphi(14\text{mm})} + 4 A_{\varphi(14\text{mm})} = 28.74 \cdot \text{cm}^2$$

$$a_{sl} := \frac{A_{sl}}{l_x} = 8.98 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

$$\rho_{sl} := \frac{A_{sl}}{A_c} = 0.45\%$$

$$\rho_{min} := 0.3\%$$

EC2, glede na celotni prerez stene

$$\rho_{max} := 4\%$$

EC2, glede na celotni prerez stene

$$\rho_{c.min} := 0.5\%$$

EC8, glede na robni element

Horizontalna armatura

$$a_{sw} := \frac{2 A_{\varphi(7\text{mm})}}{15\text{cm}} = 5.13 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

Obremenitev

TABLE: Section Cut Forces - Analysis									
SectionCut	OutputCase	CaseType	StepType	F1	F2	F3	M1	M2	M3
Text	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
3/A-B_2N	COMB2x	Combination	Max	207	-3	339	8	350	1
3/A-B_2N	COMB2x	Combination	Min	-187	-5	62	3	-540	-2
3/A-B_2N	COMB2y	Combination	Max	120	-2	335	10	85	2
3/A-B_2N	COMB2y	Combination	Min	-100	-5	66	0	-276	-3

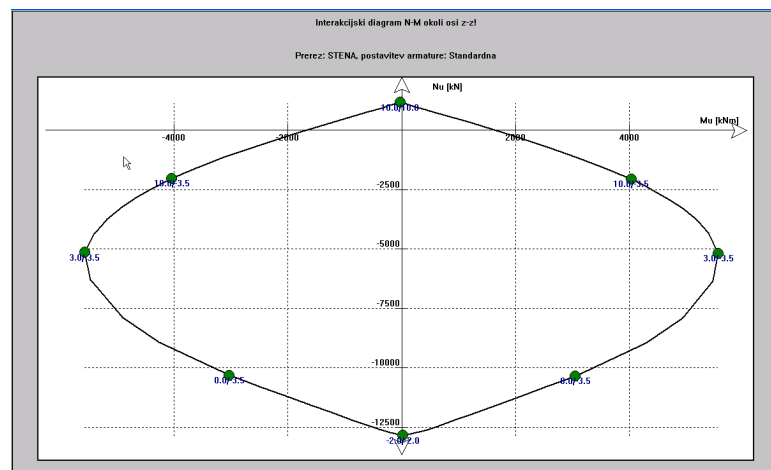
Upogibna nosilnost - X smer

Obremenitev

$$M_{Ed} := 540 \text{ kN} \cdot \text{m}$$

$$N_{Ed} := -62 \text{ kN}$$

(+nateg)



$$M_{Rd} := 1750 \text{ kN} \cdot \text{m}$$

$$\text{kontrola}(M_{Ed} \leq M_{Rd}) = \text{"JE izpolnjena"}$$

$$\frac{M_{Ed}}{M_{Rd}} = 0.31$$

Strižna nosilnost - X smer

Obremenitev

$$V_{Ed} := 207 \text{ kN}$$

$$N_{Ed} = -62 \text{ kN}$$

Kontrola striga

$$f_{ck} := f_{ck.C20}$$

$$b_w := l_y = 20 \text{ cm}$$

$$h := l_x = 320 \text{ cm}$$

$$d := 0.9 \cdot h = 288 \text{ cm}$$

$$A_{sl} := 0.5 \cdot A_{sl}$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 157.6 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"NI izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 1.31$$

Strižna odpornost armiranega prereza - stremena

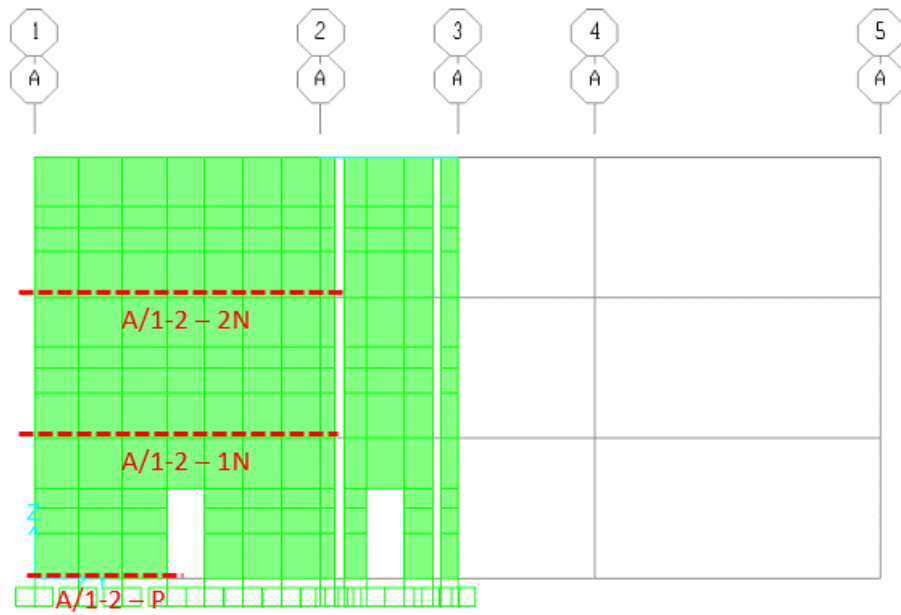
$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 578.27 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 0.36$$

Nosilnost prereza je ustrezna.

STENA V OSI A



AB STENA A/1-2 - P

Materiali

$$f_{ck} := f_{ck.C20} = 20 \cdot \text{MPa}$$

$$f_{cd} := f_{cd.C20} = 13.33 \cdot \text{MPa}$$

$$f_{yd} := f_{yd.S500} = 434.78 \cdot \text{MPa}$$

Dimenzije stene

$$l_y := 3.2 \text{ m} \quad l_x := 0.2 \text{ m} \quad A_c := l_x \cdot l_y = 6400 \text{ cm}^2$$

Armatura

Vertikalna armatura

$$A_{sl} := \frac{2 A_{\varphi(7\text{mm})}}{15\text{cm}} \cdot l_y + 4 A_{\varphi(14\text{mm})} + 2 A_{\varphi(12\text{mm})} = 24.84 \cdot \text{cm}^2$$

$$a_{sl} := \frac{A_{sl}}{l_y} = 7.76 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

$$\rho_{sl} := \frac{A_{sl}}{A_c} = 0.39\%$$

$$\rho_{min} := 0.3\%$$

EC2, glede na celotni prerez stene

$$\rho_{max} := 4\%$$

EC2, glede na celotni prerez stene

$$\rho_{c.min} := 0.5\%$$

EC8, glede na robni element

Horizontalna armatura

$$a_{sw} := \frac{2 A_{\varphi(7\text{mm})}}{15\text{cm}} = 5.13 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

Obremenitev

TABLE: Section Cut Forces - Analysis									
SectionCut	OutputCase	CaseType	StepType	F1	F2	F3	M1	M2	M3
Text	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
A/1-2_P	COMB2x	Combination	Max	9	329	796	537	16	-1
A/1-2_P	COMB2x	Combination	Min	4	-230	12	-558	-2	-13
A/1-2_P	COMB2y	Combination	Max	7	423	1007	610	11	-4
A/1-2_P	COMB2y	Combination	Min	5	-324	-199	-631	4	-9

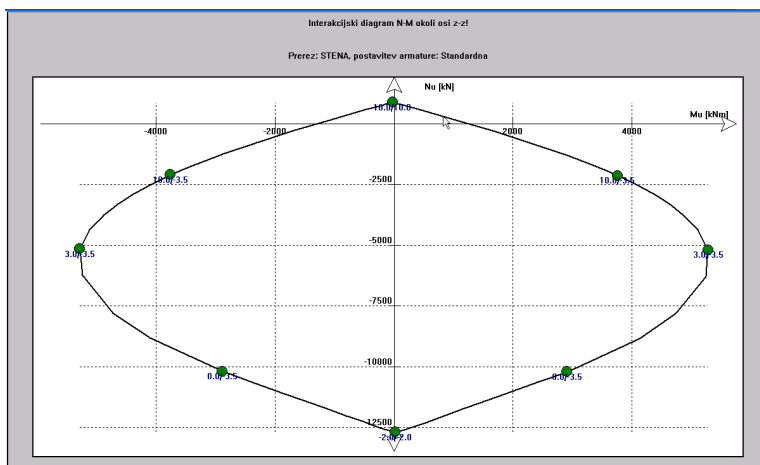
Upogibna nosilnost - Y smer

Obremenitev

$$M_{Ed} := 631 \text{ kN}\cdot\text{m}$$

$$N_{Ed} := 199 \text{ kN}$$

(+nateg)



$$M_{Rd} := 1100 \text{ kN}\cdot\text{m}$$

$$\text{kontrola}(M_{Ed} \leq M_{Rd}) = \text{"JE izpolnjena"}$$

$$\frac{M_{Ed}}{M_{Rd}} = 0.57$$

Strižna nosilnost - Y smer

Obremenitev

$$V_{Ed} := 423 \text{ kN}$$

$$N_{Ed} = 199 \text{ kN}$$

Kontrola striga

$$f_{ck} := f_{ck.C20}$$

$$b_w := l_x = 20 \text{ cm}$$

$$h := l_y = 320 \text{ cm}$$

$$d := 0.9 \cdot h = 288 \text{ cm}$$

$$A_{sl} := 0.5 \cdot A_{sl}$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 115.29 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"NI izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 3.67$$

Strižna odpornost armiranega prereza - stremena

$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 578.27 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 0.73$$

Nosilnost prereza je ustrezna.

AB STENA A/1-2 - 1N

Materiali

$$f_{ck} := f_{ck.C20} = 20 \cdot \text{MPa}$$

$$f_{cd} := f_{cd.C20} = 13.33 \cdot \text{MPa}$$

$$f_{yd} := f_{yd.S500} = 434.78 \cdot \text{MPa}$$

Dimenzije stene

$$l_y := 7.25 \text{ m} \quad l_x := 0.2 \text{ m} \quad A_c := l_x \cdot l_y = 14500 \text{ cm}^2$$

Armatura

Vertikalna armatura

$$A_{sl} := \frac{2 A_{\varphi(7mm)}}{15 \text{ cm}} \cdot l_y + 4 A_{\varphi(14mm)} + 4 A_{\varphi(14mm)} = 49.52 \cdot \text{cm}^2$$

$$a_{sl} := \frac{A_{sl}}{l_y} = 6.83 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

$$\rho_{sl} := \frac{A_{sl}}{A_c} = 0.34 \cdot \%$$

$$\rho_{min} := 0.3 \%$$

EC2, glede na celotni prerez stene

$$\rho_{max} := 4 \%$$

EC2, glede na celotni prerez stene

$$\rho_{c.min} := 0.5 \%$$

EC8, glede na robni element

Horizontalna armatura

$$a_{sw} := \frac{2 A_{\varphi(7mm)}}{15 \text{ cm}} = 5.13 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

Obremenitev

TABLE: Section Cut Forces - Analysis									
SectionCut	OutputCase	CaseType	StepType	F1	F2	F3	M1	M2	M3
Text	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
A/1-2_1N	COMB2x	Combination	Max	37	349	1719	1365	54	90
A/1-2_1N	COMB2x	Combination	Min	26	-336	-607	-1986	42	-57
A/1-2_1N	COMB2y	Combination	Max	38	747	1244	1859	54	51
A/1-2_1N	COMB2y	Combination	Min	24	-735	-132	-2481	43	-19

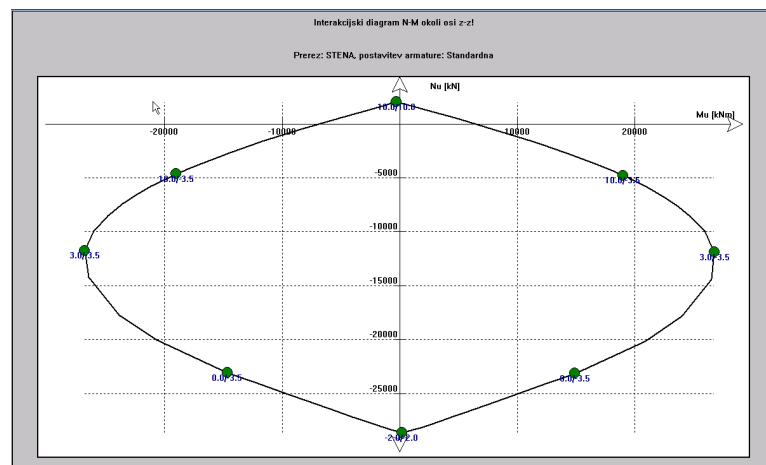
Upogibna nosilnost - Y smer

Obremenitev

$$M_{Ed} := 1986 \text{ kN} \cdot \text{m}$$

$$N_{Ed} := 607 \text{ kN}$$

(+nateg)



$$M_{Rd} := 4080 \text{ kN} \cdot \text{m}$$

$$\text{kontrola}(M_{Ed} \leq M_{Rd}) = \text{"JE izpolnjena"}$$

$$\frac{M_{Ed}}{M_{Rd}} = 0.49$$

Strižna nosilnost - Y smer

Obremenitev

$$V_{Ed} := 747 \text{ kN}$$

$$N_{Ed} := 132 \text{ kN}$$

Kontrola striga

$$f_{ck} := f_{ck.C20}$$

$$b_w := l_x = 20 \text{ cm}$$

$$h := l_y = 725 \text{ cm}$$

$$d := 0.9 \cdot h = 652.5 \text{ cm}$$

$$A_{sl} := 0.5 \cdot A_{sl}$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 269.2 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"NI izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 2.77$$

Strižna odpornost armiranega prereza - stremena

$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 1310.15 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 0.57$$

Nosilnost prereza je ustrezna.

AB STENA A/1-2 - 2N

Materiali

$$f_{ck} := f_{ck.C20} = 20 \cdot \text{MPa}$$

$$f_{cd} := f_{cd.C20} = 13.33 \cdot \text{MPa}$$

$$f_{yd} := f_{yd.S500} = 434.78 \cdot \text{MPa}$$

Dimenzije stene

$$l_y := 7.25 \text{ m} \quad l_x := 0.2 \text{ m} \quad A_c := l_x \cdot l_y = 14500 \text{ cm}^2$$

Armatura

Vertikalna armatura

$$A_{sl} := \frac{2 A_{\varphi(7\text{mm})}}{15\text{cm}} \cdot l_y + 4 A_{\varphi(14\text{mm})} + 4 A_{\varphi(14\text{mm})} = 49.52 \cdot \text{cm}^2$$

$$a_{sl} := \frac{A_{sl}}{l_y} = 6.83 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

$$\rho_{sl} := \frac{A_{sl}}{A_c} = 0.34 \cdot \%$$

$$\rho_{min} := 0.3 \cdot \%$$

EC2, glede na celotni prerez stene

$$\rho_{max} := 4 \cdot \%$$

EC2, glede na celotni prerez stene

$$\rho_{c.min} := 0.5 \cdot \%$$

EC8, glede na robni element

Horizontalna armatura

$$a_{sw} := \frac{2 A_{\varphi(7\text{mm})}}{15\text{cm}} = 5.13 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

Obremenitev

TABLE: Section Cut Forces - Analysis									
SectionCut	OutputCase	CaseType	StepType	F1	F2	F3	M1	M2	M3
Text	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
A/1-2_2N	COMB2x	Combination	Max	35	345	653	962	52	73
A/1-2_2N	COMB2x	Combination	Min	26	-322	-194	-1125	39	-45
A/1-2_2N	COMB2y	Combination	Max	36	547	515	1132	49	44
A/1-2_2N	COMB2y	Combination	Min	25	-524	-56	-1296	42	-15

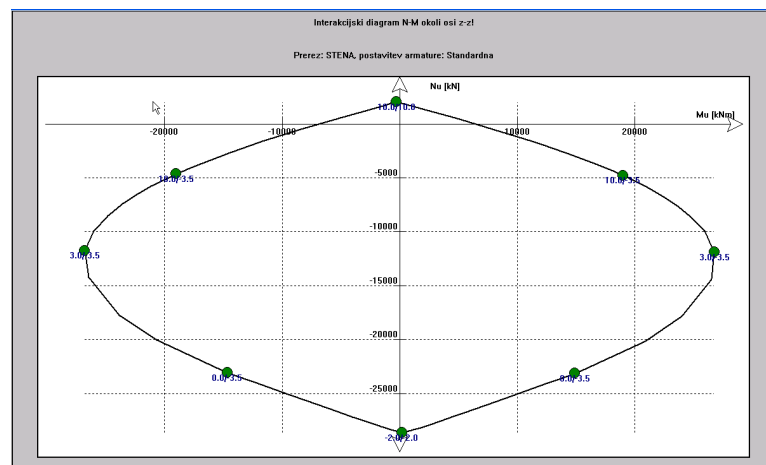
Upogibna nosilnost - Y smer

Obremenitev

$$M_{Ed} := 1296 \text{ kN} \cdot \text{m}$$

$$N_{Ed} := 194 \text{ kN}$$

(+nateg)



$$M_{Rd} := 5880 \text{ kN} \cdot \text{m}$$

$$\text{kontrola}(M_{Ed} \leq M_{Rd}) = \text{"JE izpolnjena"}$$

$$\frac{M_{Ed}}{M_{Rd}} = 0.22$$

Strižna nosilnost - Y smer

Obremenitev

$$V_{Ed} := 524 \text{ kN}$$

$$N_{Ed} := 56 \text{ kN}$$

Kontrola striga

$$f_{ck} := f_{ck.C20}$$

$$b_w := l_x = 20 \text{ cm}$$

$$h := l_y = 725 \text{ cm}$$

$$d := 0.9 \cdot h = 652.5 \text{ cm}$$

$$A_{sl} := 0.5 \cdot A_{sl}$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 279.46 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"NI izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 1.88$$

Strižna odpornost armiranega prereza - stremena

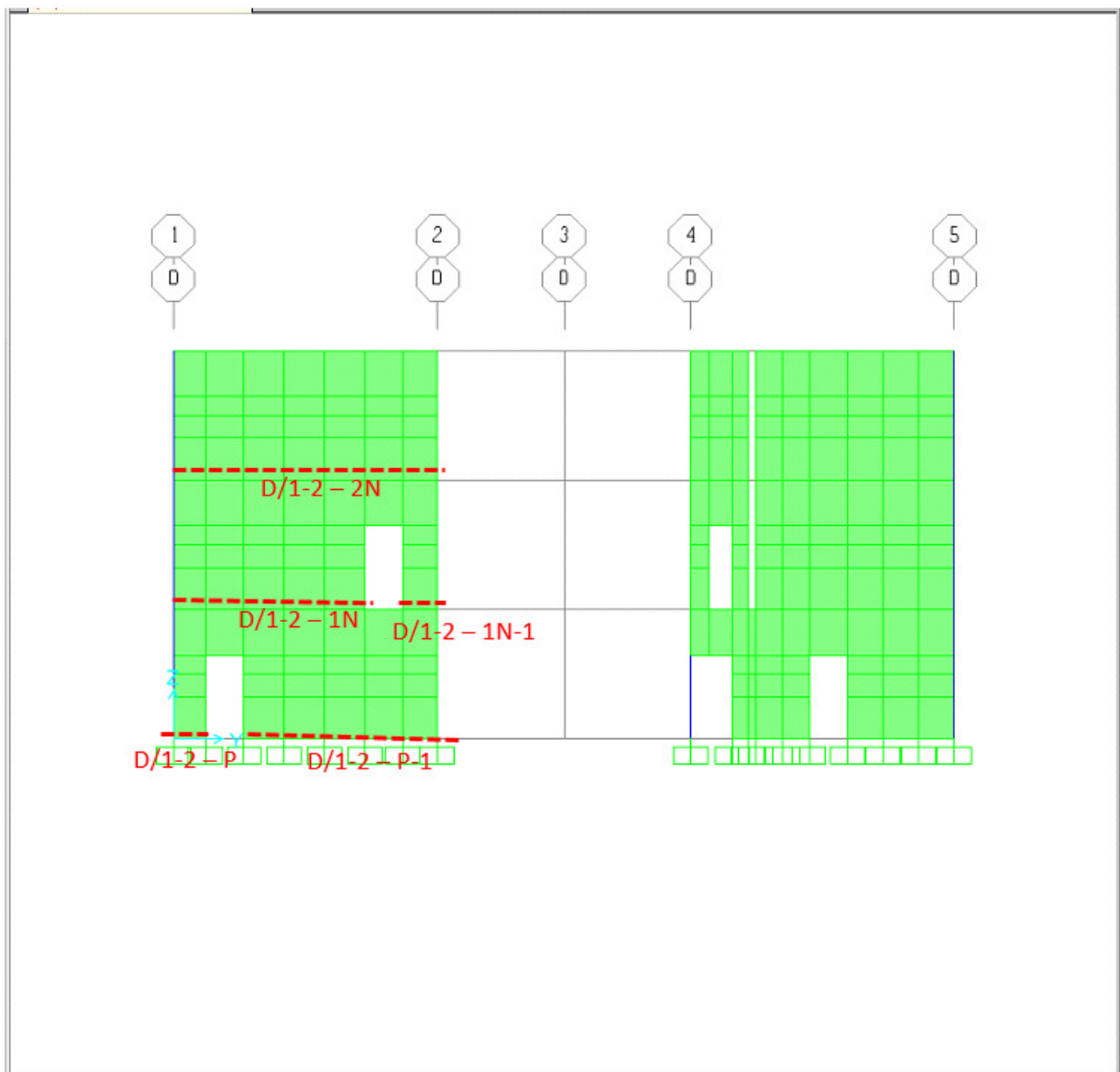
$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 1310.15 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 0.4$$

Nosilnost prereza je ustrezna.

STENA V OSI D



AB STENA D/1-2 - P

Materiali

$$f_{ck} := f_{ck.C20} = 20 \cdot \text{MPa}$$

$$f_{cd} := f_{cd.C20} = 13.33 \cdot \text{MPa}$$

$$f_{yd} := f_{yd.S500} = 434.78 \cdot \text{MPa}$$

Dimenzije stene

$$l_y := 0.85 \text{ m} \quad l_x := 0.2 \text{ m} \quad A_c := l_x \cdot l_y = 1700 \text{ cm}^2$$

Armatura

Vertikalna armatura

$$A_{sl} := \frac{2 A_{\varphi(7\text{mm})}}{15\text{cm}} \cdot l_y + 8 A_{\varphi(22\text{mm})} + 2 A_{\varphi(12\text{mm})} = 37.03 \cdot \text{cm}^2$$

$$a_{sl} := \frac{A_{sl}}{l_y} = 43.57 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

$$\rho_{sl} := \frac{A_{sl}}{A_c} = 2.18 \cdot \%$$

$$\rho_{min} := 0.3 \%$$

EC2, glede na celotni prerez stene

$$\rho_{max} := 4 \%$$

EC2, glede na celotni prerez stene

$$\rho_{c.min} := 0.5 \%$$

EC8, glede na robni element

Horizontalna armatura

$$a_{sw} := \frac{2 A_{\varphi(7\text{mm})}}{15\text{cm}} = 5.13 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

Obremenitev

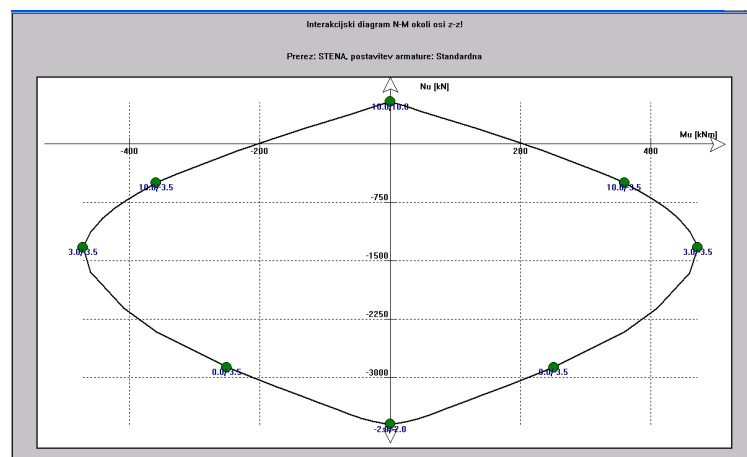
TABLE: Section Cut Forces - Analysis									
SectionCut	OutputCase	CaseType	StepType	F1	F2	F3	M1	M2	M3
Text	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
D/1-2_P	COMB2x	Combination	Max	0	83	264	-3	0	1
D/1-2_P	COMB2x	Combination	Min	0	2	130	-94	0	-1
D/1-2_P	COMB2y	Combination	Max	0	93	286	10	0	0
D/1-2_P	COMB2y	Combination	Min	0	-8	108	-107	0	-1

Upogibna nosilnost - Y smer

Obremenitev

$$M_{Ed} := 107 \text{ kN} \cdot \text{m}$$

$$N_{Ed} := -108 \text{ kN} \quad (+\text{nateg})$$



$$M_{Rd} := 240 \text{ kN} \cdot \text{m}$$

$$\text{kontrola}(M_{Ed} \leq M_{Rd}) = \text{"JE izpolnjena"}$$

$$\frac{M_{Ed}}{M_{Rd}} = 0.45$$

Strižna nosilnost - Y smer

Obremenitev

$$V_{Ed} := 93 \text{ kN}$$

$$N_{Ed} = -108 \text{ kN}$$

Kontrola striga

$$f_{ck} := f_{ck.C20}$$

$$b_w := l_x = 20 \text{ cm}$$

$$h := l_y = 85 \text{ cm}$$

$$d := 0.9 \cdot h = 76.5 \text{ cm}$$

$$A_{sl} := 0.5 \cdot A_{sl}$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 94.85 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 0.98$$

Strižna odpornost armiranega prereza - stremena

$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 153.6 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 0.61$$

Nosilnost prereza je ustrezna.

AB STENA D/1-2 - P-1

Materiali

$$f_{ck} := f_{ck.C20} = 20 \cdot \text{MPa}$$

$$f_{cd} := f_{cd.C20} = 13.33 \cdot \text{MPa}$$

$$f_{yd} := f_{yd.S500} = 434.78 \cdot \text{MPa}$$

Dimenzije stene

$$l_y := 5.05 \text{ m} \quad l_x := 0.2 \text{ m} \quad A_c := l_x \cdot l_y = 10100 \text{ cm}^2$$

Armatura

Vertikalna armatura

$$A_{sl} := \frac{2 A_{\varphi(7mm)}}{15 \text{ cm}} \cdot l_y + 4 A_{\varphi(14mm)} + 2 A_{\varphi(12mm)} = 34.33 \cdot \text{cm}^2$$

$$a_{sl} := \frac{A_{sl}}{l_y} = 6.8 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

$$\rho_{sl} := \frac{A_{sl}}{A_c} = 0.34 \cdot \%$$

$$\rho_{min} := 0.3 \cdot \%$$

EC2, glede na celotni prerez stene

$$\rho_{max} := 4 \cdot \%$$

EC2, glede na celotni prerez stene

$$\rho_{c.min} := 0.5 \cdot \%$$

EC8, glede na robni element

Horizontalna armatura

$$a_{sw} := \frac{2 A_{\varphi(7mm)}}{15 \text{ cm}} = 5.13 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

Obremenitev

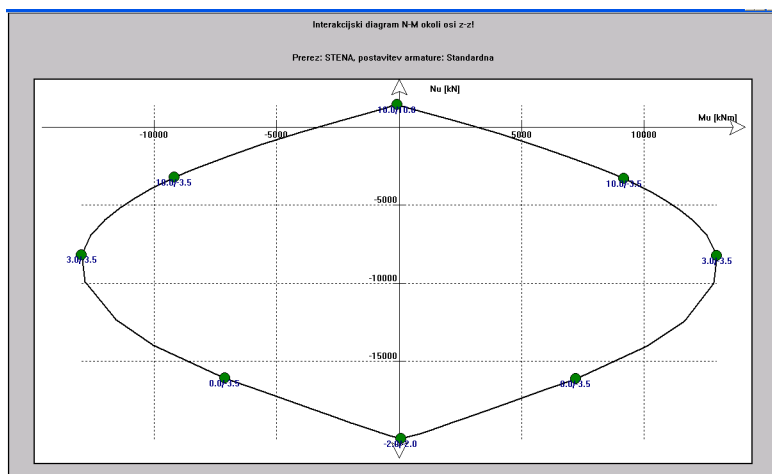
TABLE: Section Cut Forces - Analysis									
SectionCut	OutputCase	CaseType	StepType	F1	F2	F3	M1	M2	M3
Text	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
D/1-2_P-1	COMB2x	Combination	Max	19	247	1364	504	34	4
D/1-2_P-1	COMB2x	Combination	Min	-11	-218	1002	-879	-24	-2
D/1-2_P-1	COMB2y	Combination	Max	10	303	1510	733	16	3
D/1-2_P-1	COMB2y	Combination	Min	-2	-274	857	-1108	-7	-1

Upogibna nosilnost - Y smer

Obremenitev

$$M_{Ed} := 1108 \text{ kN} \cdot \text{m}$$

$$N_{Ed} := -857 \text{ kN} \quad (+\text{nateg})$$



$$M_{Rd} := 4800 \text{ kN} \cdot \text{m}$$

$$\text{kontrola}(M_{Ed} \leq M_{Rd}) = \text{"JE izpolnjena"}$$

$$\frac{M_{Ed}}{M_{Rd}} = 0.23$$

Strižna nosilnost - Y smer

Obremenitev

$$V_{Ed} := 303 \text{ kN}$$

$$N_{Ed} = -857 \text{ kN}$$

Kontrola striga

$$f_{ck} := f_{ck.C20}$$

$$b_w := l_x = 20 \text{ cm}$$

$$h := l_y = 505 \text{ cm}$$

$$d := 0.9 \cdot h = 454.5 \text{ cm}$$

$$A_{sl} := 0.5 \cdot A_{sl}$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 321.2 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 0.94$$

Strižna odpornost armiranega prereza - stremena

$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 912.58 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 0.33$$

Nosilnost prereza je ustrezna.

AB STENA D/1-2 - 1N

Materiali

$$f_{ck} := f_{ck.C20} = 20 \cdot \text{MPa}$$

$$f_{cd} := f_{cd.C20} = 13.33 \cdot \text{MPa}$$

$$f_{yd} := f_{yd.S500} = 434.78 \cdot \text{MPa}$$

Dimenzije stene

$$l_y := 5 \text{ m} \quad l_x := 0.2 \text{ m} \quad A_c := l_x \cdot l_y = 10000 \text{ cm}^2$$

Armatura

Vertikalna armatura

$$A_{sl} := \frac{2 A_{\varphi(7\text{mm})}}{15\text{cm}} \cdot l_y + 4 A_{\varphi(14\text{mm})} + 2 A_{\varphi(12\text{mm})} = 34.08 \cdot \text{cm}^2$$

$$a_{sl} := \frac{A_{sl}}{l_y} = 6.82 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

$$\rho_{sl} := \frac{A_{sl}}{A_c} = 0.34 \cdot \%$$

$$\rho_{min} := 0.3 \cdot \%$$

EC2, glede na celotni prerez stene

$$\rho_{max} := 4 \cdot \%$$

EC2, glede na celotni prerez stene

$$\rho_{c.min} := 0.5 \cdot \%$$

EC8, glede na robni element

Horizontalna armatura

$$a_{sw} := \frac{2 A_{\varphi(7\text{mm})}}{15\text{cm}} = 5.13 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

Obremenitev

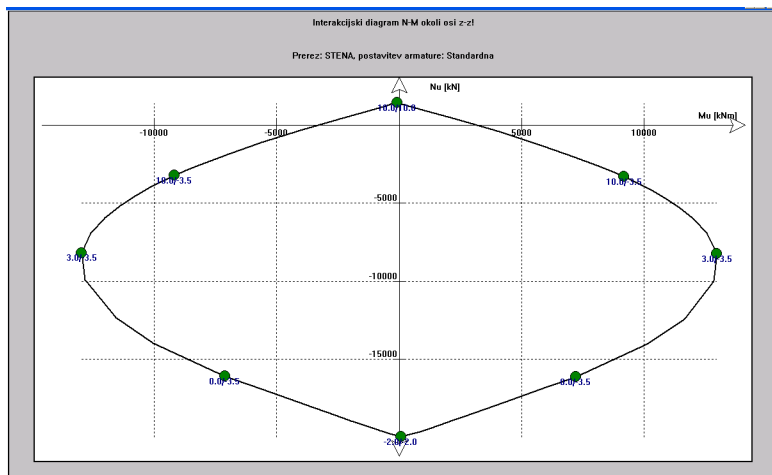
TABLE: Section Cut Forces - Analysis									
SectionCut	OutputCase	CaseType	StepType	F1	F2	F3	M1	M2	M3
Text	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
D/1-2_1N	COMB2x	Combination	Max	140	266	957	437	16	355
D/1-2_1N	COMB2x	Combination	Min	-121	-142	811	-666	-4	-334
D/1-2_1N	COMB2y	Combination	Max	67	362	933	696	11	161
D/1-2_1N	COMB2y	Combination	Min	-49	-238	835	-925	1	-140

Upogibna nosilnost - Y smer

Obremenitev

$$M_{Ed} := 925 \text{ kN}\cdot\text{m}$$

$$N_{Ed} := -835 \text{ kN} \quad (+\text{nateg})$$



$$M_{Rd} := 4800 \text{ kN}\cdot\text{m}$$

$$\text{kontrola}(M_{Ed} \leq M_{Rd}) = \text{"JE izpolnjena"}$$

$$\frac{M_{Ed}}{M_{Rd}} = 0.19$$

Strižna nosilnost - Y smer

Obremenitev

$$V_{Ed} := 362 \text{ kN}$$

$$N_{Ed} = -835 \text{ kN}$$

Kontrola striga

$$f_{ck} := f_{ck.C20}$$

$$b_w := l_x = 20 \text{ cm}$$

$$h := l_y = 500 \text{ cm}$$

$$d := 0.9 \cdot h = 450 \text{ cm}$$

$$A_{sl} := 0.5 \cdot A_{sl}$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 316.54 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"NI izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 1.14$$

Strižna odpornost armiranega prereza - stremena

$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 903.55 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 0.4$$

Nosilnost prereza je ustrezna.

AB STENA D/1-2 - 1N - 1

Materiali

$$f_{ck} := f_{ck.C20} = 20 \cdot \text{MPa}$$

$$f_{cd} := f_{cd.C20} = 13.33 \cdot \text{MPa}$$

$$f_{yd} := f_{yd.S500} = 434.78 \cdot \text{MPa}$$

Dimenzije stene

$$l_y := 0.9 \text{ m} \quad l_x := 0.2 \text{ m} \quad A_c := l_x \cdot l_y = 1800 \text{ cm}^2$$

Armatura

Vertikalna armatura

$$A_{sl} := \frac{2 A_{\varphi(7mm)}}{15 \text{ cm}} \cdot l_y + 4 A_{\varphi(14mm)} + 2 A_{\varphi(12mm)} = 13.04 \cdot \text{cm}^2$$

$$a_{sl} := \frac{A_{sl}}{l_y} = 14.49 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

$$\rho_{sl} := \frac{A_{sl}}{A_c} = 0.72 \cdot \%$$

$$\rho_{min} := 0.3 \%$$

EC2, glede na celotni prerez stene

$$\rho_{max} := 4 \%$$

EC2, glede na celotni prerez stene

$$\rho_{c.min} := 0.5 \%$$

EC8, glede na robni element

Horizontalna armatura

$$a_{sw} := \frac{2 A_{\varphi(7mm)}}{15 \text{ cm}} = 5.13 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

Obremenitev

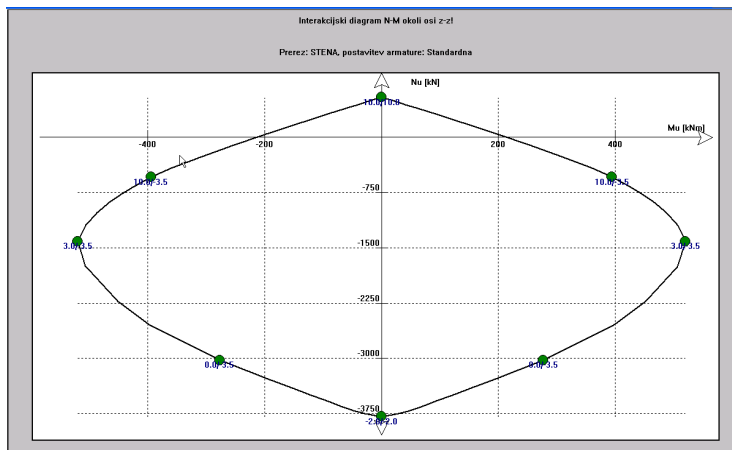
TABLE: Section Cut Forces - Analysis									
SectionCut	OutputCase	CaseType	StepType	F1	F2	F3	M1	M2	M3
Text	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
D/1-2_1N-1	COMB2x	Combination	Max	6	29	260	-19	10	0
D/1-2_1N-1	COMB2x	Combination	Min	-4	4	142	-49	-7	-1
D/1-2_1N-1	COMB2y	Combination	Max	3	34	306	-16	5	0
D/1-2_1N-1	COMB2y	Combination	Min	-1	-1	96	-52	-2	0

Upogibna nosilnost - Y smer

Obremenitev

$$M_{Ed} := 52 \text{ kN} \cdot \text{m}$$

$$N_{Ed} := -96 \text{ kN} \quad (+\text{nateg})$$



$$M_{Rd} := 240 \text{ kN} \cdot \text{m}$$

$$\text{kontrola}(M_{Ed} \leq M_{Rd}) = \text{"JE izpolnjena"}$$

$$\frac{M_{Ed}}{M_{Rd}} = 0.22$$

Strižna nosilnost - Y smer

Obremenitev

$$V_{Ed} := 34 \text{ kN}$$

$$N_{Ed} = -96 \text{ kN}$$

Kontrola striga

$$f_{ck} := f_{ck.C20}$$

$$b_w := l_x = 20 \text{ cm}$$

$$h := l_y = 90 \text{ cm}$$

$$d := 0.9 \cdot h = 81 \text{ cm}$$

$$A_{sl} := 0.5 \cdot A_{sl}$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 71.28 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 0.48$$

Strižna odpornost armiranega prereza - stremena

$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 162.64 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 0.21$$

Nosilnost prereza je ustrezna.

AB STENA D/1-2 - 2N

Materiali

$$f_{ck} := f_{ck.C20} = 20 \cdot \text{MPa}$$

$$f_{cd} := f_{cd.C20} = 13.33 \cdot \text{MPa}$$

$$f_{yd} := f_{yd.S500} = 434.78 \cdot \text{MPa}$$

Dimenzije stene

$$l_y := 6.9 \text{ m} \quad l_x := 0.2 \text{ m} \quad A_c := l_x \cdot l_y = 13800 \text{ cm}^2$$

Armatura

Vertikalna armatura

$$A_{sl} := \frac{2 A_{\varphi(7mm)}}{15 \text{ cm}} \cdot l_y + 4 A_{\varphi(14mm)} + 4 A_{\varphi(14mm)} = 47.72 \cdot \text{cm}^2$$

$$a_{sl} := \frac{A_{sl}}{l_y} = 6.92 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

$$\rho_{sl} := \frac{A_{sl}}{A_c} = 0.35 \%$$

$$\rho_{min} := 0.3 \%$$

EC2, glede na celotni prerez stene

$$\rho_{max} := 4 \%$$

EC2, glede na celotni prerez stene

$$\rho_{c.min} := 0.5 \%$$

EC8, glede na robni element

Horizontalna armatura

$$a_{sw} := \frac{2 A_{\varphi(7mm)}}{15 \text{ cm}} = 5.13 \cdot \text{cm}^2 \cdot \text{m}^{-1}$$

Obremenitev

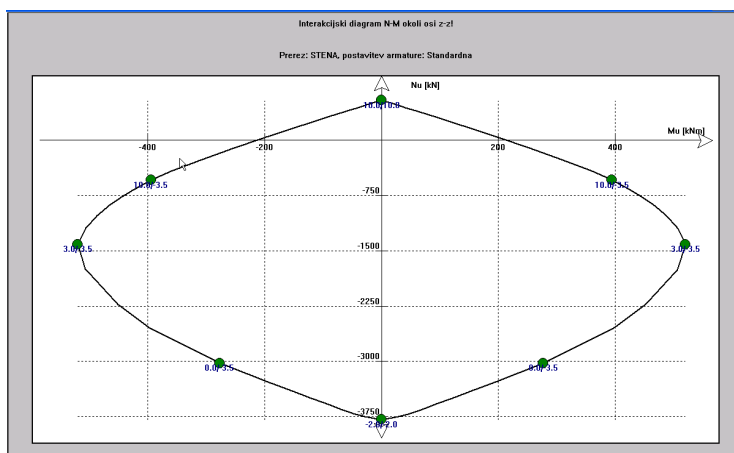
TABLE: Section Cut Forces - Analysis									
SectionCut	OutputCase	CaseType	StepType	F1	F2	F3	M1	M2	M3
Text	Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
D/1-2_2N	COMB2x	Combination	Max	8	448	557	128	26	91
D/1-2_2N	COMB2x	Combination	Min	2	40	497	-655	-16	-98
D/1-2_2N	COMB2y	Combination	Max	7	453	558	191	13	36
D/1-2_2N	COMB2y	Combination	Min	2	35	495	-718	-3	-42

Upogibna nosilnost - Y smer

Obremenitev

$$M_{Ed} := 718 \text{ kN} \cdot \text{m}$$

$$N_{Ed} := -495 \text{ kN} \quad (+\text{nateg})$$



$$M_{Rd} := 7400 \text{ kN} \cdot \text{m}$$

$$\text{kontrola}(M_{Ed} \leq M_{Rd}) = \text{"JE izpolnjena"}$$

$$\frac{M_{Ed}}{M_{Rd}} = 0.1$$

Strižna nosilnost - Y smer

Obremenitev

$$V_{Ed} := 453 \text{ kN}$$

$$N_{Ed} = -495 \text{ kN}$$

Kontrola striga

$$f_{ck} := f_{ck.C20}$$

$$b_w := l_x = 20 \text{ cm}$$

$$h := l_y = 690 \text{ cm}$$

$$d := 0.9 \cdot h = 621 \text{ cm}$$

$$A_{sl} := 0.5 \cdot A_{sl}$$

Strižna odpornost betona

$$V_{Rd.c} := V_{Rd.c}(f_{ck}, b_w, h, d, N_{Ed}, A_{sl}) = 342.15 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.c}) = \text{"NI izpolnjena"}$$

$$V_{Ed} \div V_{Rd.c} = 1.32$$

Strižna odpornost armiranega prereza - stremena

$$V_{Rd.s} := 0.9 \cdot d \cdot f_{yd} \cdot a_{sw} = 1246.9 \text{ kN}$$

$$\text{kontrola}(V_{Ed} \leq V_{Rd.s}) = \text{"JE izpolnjena"}$$

$$V_{Ed} \div V_{Rd.s} = 0.36$$

Nosilnost prereza je ustrezna.