RAPORT TEKNIK KONSTRUKTIV

OBJEKTI:

RIKONSTRUKSIONI I SHKOLLËS ARTISTIKE "NAIM FRASHËRI" NË QYTETIN E VLORËS

SKENA E SHKOLLES

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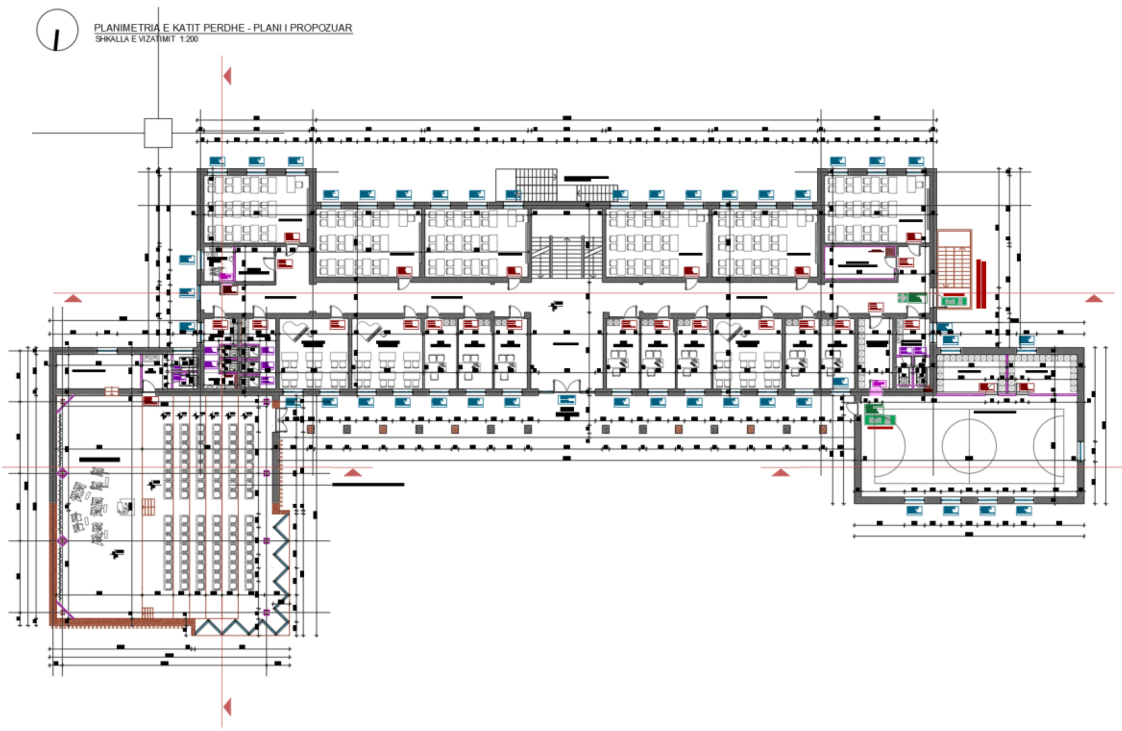
Hartoi Raportin: Inxh. Orbori Jaho Lic.K.2670/3

1-Pershkrim mbi vendndodhjen e objektit.

Ne perberje te ketij Raporti perfshihet, vetem analiza dhe llogaritjet e zones se skenes. Me poshte gjendet dhe planimetria ne pjesen jug-perendim. Ndertimi I kesaj te fundit eshte propozuar me konstruksion celiku.



2-Seksionet terthore te elementeve strukturale

Objekti qe do te ndertohet perbehet nga nje konstruskion b/a me sistemin me trare, kolona, “frame-system”:

- Jastek plinti C25/30 me dimensione 100x200x100
- Qafa kolonash C25/30 me dimensione 50x50
- Soleta monolite C25/30, kuota 0.00, me trashesi 20cm,
- Pilota D=400, Thellesi 5.0m, C25/30
- Xokol C25/30 me trashesi 20cm
- Kolona HEA 300, Trare IPE 400 etj, Kontraventime CHS 88.6x3.2 etj

3.Ngarkesat llogaritese te implementuara ne analize.

Ne llogaritjen e struktures, kemi marre parrasysh te dhenat e meposhtme:

Kategorite e ngarkesave sipas EC 1991.1.1.2002 Tabela 6.1 eshte si me poshte:

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Beton C25/30 me fck=25 N/mm2, fcu=30 N/mm2, y=1.5 ***per strukturat horizontale, trare dhe soleta, shkalla + themelin***

Celik B500 C   me fyk=500 N/mm2, E=210000 N/mm2, y=1.15

Shtresa mbrojtese Cnom(themele)=50mm, Cnom(kolona dhe trare)=25 mm, Cnom (soleta dhe shkalle)=15 mm.

- Pesha vetjake e struktures DL

Pesha vetjake e struktures llogaritet automatikisht nga program bazuar ne volumin e elementeve dhe peshen specifike te strukturave b/a 2500 kg/m3

- Ngarkesat e perhershem DL, LL,

- ***Ngarkesa e shtresave ne kuoten -+0.00 3.0 kN/m2,***
- ***Ngarkesa e Panelit Sandwich t=10cm, 0.18 kN/m2***
- ***Ngarkesa e tavanit te gipsit dhe pajisjeve te vendosura ne te, 1.0 kN/m2***
- ***Ngarkesa Live e Mbuleses 0.75 kN/m2***
- ***Prezenca e eres nuk eshte marre parasysh, per shkak, se strukturat jane pavarura, me rrethimin me murature tulle, dhe kjo e fundit perballohet prej kesaj.***
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Table 6.1 - Categories of use

Category	Specific Use	Example
A	Areas for domestic and residential activities	Rooms in residential buildings and houses; bedrooms and wards in hospitals; bedrooms in hotels and hostels kitchens and toilets.
B	Office areas	
C	Areas where people may congregate (with the exception of areas defined under category A, B, and D[1])	**C1:** Areas with tables, etc. e.g. areas in schools, cafés, restaurants, dining halls, reading rooms, receptions. **C2:** Areas with fixed seats, e.g. areas in churches, theatres or cinemas, conference rooms, lecture halls, assembly halls, waiting rooms, railway waiting rooms. **C3:** Areas without obstacles for moving people, e.g. areas in museums, exhibition rooms, etc. and access areas in public and administration buildings, hotels, hospitals, railway station forecourts. **C4:** Areas with possible physical activities, e.g. dance halls, gymnastic rooms, stages. **C5:** Areas susceptible to large crowds, e.g. in buildings for public events like concert halls, sports halls including stands, terraces and access areas and railway platforms.
D	Shopping areas	**D1:** Areas in general retail shops **D2:** Areas in department stores

Fig.3.1 Tabela e kategorizimit te ngarkesave sipas EC1

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Nga tabela e mesiperme ne shohim qe objekti jone I perket kategorise C2, C3, e per te nxjerre madhesine e ngarkeses bazohemi tek tabela 6.2 EC.1992.1.1.2002 si

Table 6.2 - Imposed loads on floors, balconies and stairs in buildings

Categories of loaded areas	q_k [kN/m^2]	Q_k [kN]
Category A		
- Floors	1,5 to2,0	2,0 to 3,0
- Stairs	2,0 to4,0	2,0 to 4,0
- Balconies	2,5 to 4,0	2,0 to 3,0
Category B	2,0 to 3,0	1,5 to 4,5
Category C		
- C1	2,0 to 3,0	3,0 to 4,0
- C2	3,0 to 4,0	2,5 to 7,0 (4,0)
- C3	3,0 to 5,0	4,0 to 7,0
- C4	4,5 to 5,0	3,5 to 7,0
- C5	5,0 to 7,5	3,5 to 4,5
category D		
- D1	4,0 to 5,0	3,5 to 7,0 (4,0)
- D2	4,0 to 5,0	3,5 to 7,0

Fig.3.2 Tabela e ngarkesave sipas EC1

Sipas te dhenave te hartave sizmike objekti do te ndertohet ne kategorine ***e truallit "C"***

Tab. 3-1 Tipet e truallit

Tipi i truallit	Përshkrim i profilit stratigrafik	Parametrat		
		$v_{s,30}$(m/s)	N_{SPT} (goditje/30cm)	c_u (kPa)
A	Shkëmb ose formacion tjetër gjeologjik i ngjashëm me shkëmbin, duke përfshirë të shumtën 5 m material më të dobët në sipërfaqe	> 800	–	–
B	Depozitime me rërë shumë të ngjeshur, zhavor ose argjilë shumë të ngurtë, të paktën me disa dhjetra metra trashësi, të karakterizuara nga një rritje graduale e vetive mekanike, me rritjen e thellësisë	360 – 800	> 50	> 250
C	Depozitime të thella me rërë të ngjeshur,ose gjysmë të ngjeshur, zhavorr ose argjilë të ngurtë, me trashësi nga disa dhjetra në disa qindra metra	180 – 360	15 – 50	70 – 250
D	Depozitime dherash të palidhur deri gjysmë të palidhur (me ose pa disa shtresa të buta lidhëse kohezive), ose depozitime dherash që në masën mbizotëruese janë të buta (të dobëta) deri në të forta, të lidhura	< 180	< 15	< 70
E	Një profil dheu që ka një shtresë sipërfaqësore aluvionesh me vlera v_s të tipit C dhe D dhe trashësi që ndryshon nga rreth 5 m deri në 20 m, e vendosur mbi një material të ngurtë mbështetës me v_s > 800 m/sek			
S_1	Depozitime që kanë ose përmbajnë një shtresë prej të paktën 10 m trashësi me argjila/lymra të buta me tregues (indeks) të lartë plasticiteti (PI > 40) dhe nivel të lartë ujërash nëntokësore	< 100 (tregues)	–	10 – 20
S_2	Depozitime dherash të lëngëzueshme, argjilash të ndjeshme (të dobëta) ose çdo profil tjetër dheu që nuk përfshihet në tipat A-E ose S_1			

Fig.3.3 Kategorizimi I truallit sipas EC8

Duke u mbeshtetur ne Harten Sizmike te IGJEUM, PGA eshte ***0.320 g***., koeficenti I rendesise 1.20, Objekti eshte klasifikuar ne kategorine e objekteve III, dhe koeficent rendesie 1.20, salla mbledhjesh, shkolla

Klasa e rëndësisë	Ndërtesat	γ_I
I	Ndërtesa të një rëndësie të vogël për sigurinë publike, p.sh. ndërtesa bujqësore etj.	0.8
II	Ndërtesa të zakonshme, që nuk u përkasin kategorive të tjera	1
III	Ndërtesa, rezistenca sizmike e të cilave është me rëndësi në këndvështrimin e rrjedhojave që shkakton një shembje, p.sh. shkolla, salla mbledhjesh, institucione kulturore etj.	1.2
IV	Ndërtesa, integriteti gjatë tërmetit i të cilave është me rëndësi jetësore për mbrojtjen civile, si p.sh. spitalet, stacionet e zjarrfikëseve, centralet energjetike etj.	1.4

Fig.3.4. Klasat e rendesise se objektit

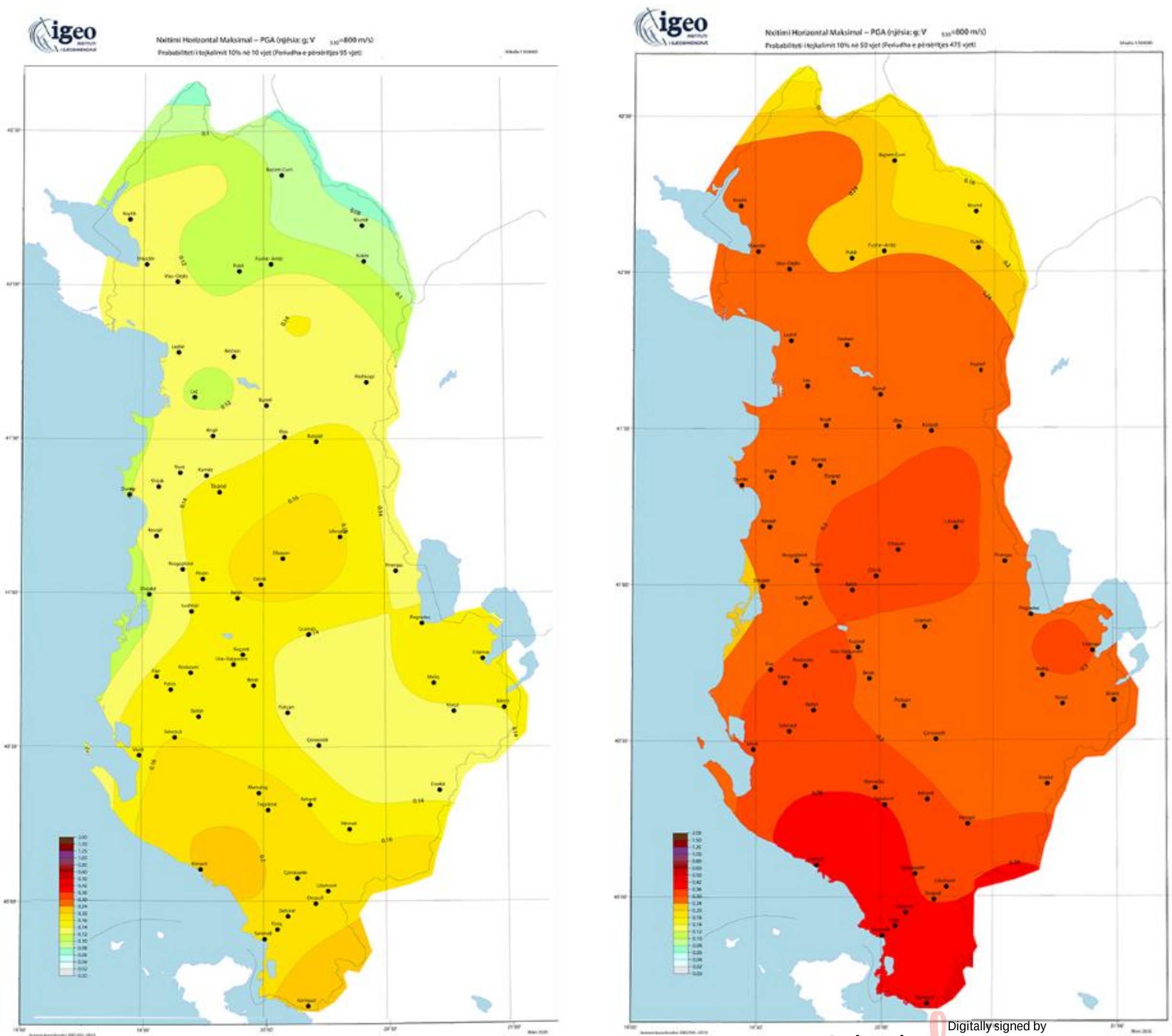

Fig.3.5 Harta e shperndarjes se nxitimit sizmik

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.Sipas hartave te mesiperme per objektin tone do te pranojme nje shpejtim te truallit PGA=0.320 m/s2 e pershkruar dhe ne raportin sizmik .Objekti hyn ne rendesine e objekteve te rendesie III

Te dhenat gjeologjike te sheshit te ndertimit pranuar sipas hartave ne zona te tilla.:

Aftesia mbajtese e bazamentit eshte Sigma=1.8 kg/cm2, Themeli do te jete jastek plinti I kombinuar me pilota per shkak te ndertimit te ketij te funditafer themelit te murатures ekzistuese

- **SPEKTRI I REAGIMIT ELASTIK PËR GJENDJEN E FUNDIT KUFITARE**

Për komponentet horizontale të veprimit sizmik, spektri i reagimit elastik *Se*(*T*) përcaktohet nga shprehjet vijuese:

$0 \leq T \leq T_B$ $\quad \boldsymbol{S_e = a_g * S * \left[1 + \frac{T}{T_B}(\eta * 2.5 \; - 1)\right]}$ **[3.9]**

$T_B \leq T \leq T_C$ $\quad \boldsymbol{S_e = a_g * S * \eta * 2.5}$ **[3.10]**

$T_C \leq T \leq T_D$ $\quad \boldsymbol{S_e = a_g * S * \eta * 2.5 * \left[\frac{T_C}{T}\right]}$ **[3.11]**

$T_D \leq T \leq 4$ $\quad \boldsymbol{S_e = a_g * S * \eta * 2.5 * \left[\frac{T_C \cdot T_D}{T^2}\right]}$ **[3.12]**

Periodat TB, TC dhe TD dhe faktori i truallit S, përshkruajnë formën e spektrit. Ato varen nga tipi i truallit. Ata gjithashtu varen nga tipi i spektrit të reagimit elastik (tipi “1” i referohet tërmetit me Magnitudë MS>5,5; tipi “2” i referohet tërmetit me Magnitudë MS ≤ 5,5). Për shkak të mungesës të të dhënave të mjaftueshme dhe të besueshme nga një burim sizmik i vetëm, këshillohet të përdoret kurba spektrale “mbështjellëse”, që konsideron vlerat maksimale të dy tipeve të tërmeteve, me magnitudë MS>5,5 dhe MS≤5,5. Ne rastin tone marrim ne studim Tipin 1

Tipi i truallit	S	T_B (s)	T_C (s)	T_D (s)
A	1,0	0,15	0,4	2,0
B	1,2	0,15	0,5	2,0
C	1,15	0,20	0,6	2,0
D	1,35	0,20	0,8	2,0
E	1,4	0,15	0,5	2,0

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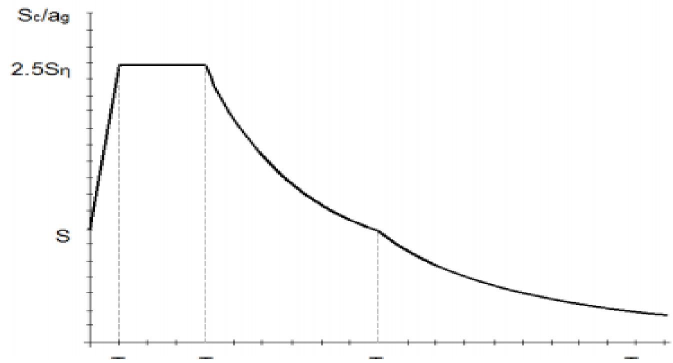
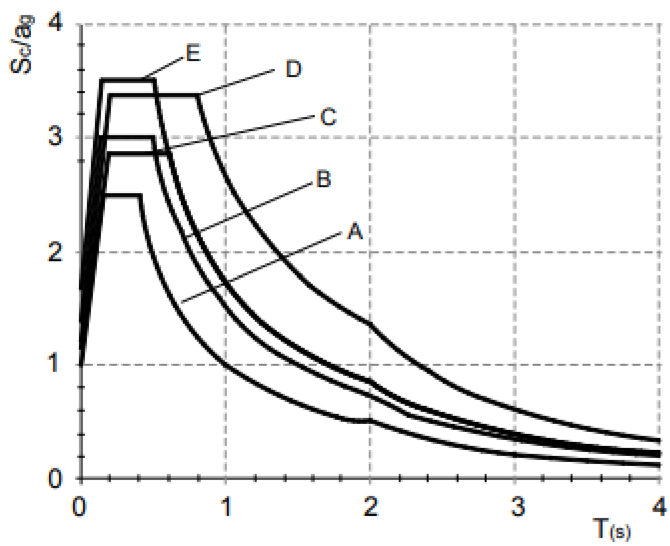
T është perioda e lëkundjeve e një sistemi linear me një shkallë lirie;
a_g është shpejtimi i projektimit të truallit në formacione shkëmbore ose pothuajse shkëmbore të tipit A ($a_g = \gamma_I\, a_{gR}$).
S është faktori i truallit i dhënë nga të dhënat gjeoteknike
T_B, T_C, T_D janë disa vlera specifike të periodave
η është faktori i korrigjimit të shuarjes me një vlerë referencë prej h = 1 për 5% shuarje viskoze.



Forma e reagimit te spektrit elastic te reagimit



Vlera e spektrit te reagimit per te gjitha kategorite e truallit me shuarje 5%

TIPI STRUKTUROR	DCM	DCH
Sistem rame,sistem dual, sistem me mure te çiftezuar	$3{,}0\alpha_u/\alpha_1$	$4{,}5\ \alpha_u/\alpha_1$
Sistem me mure	3,0	$4{,}0\ \alpha_u/\alpha_1$
Sistem me fleksibilitet perdredhes (i perkulshem nga perdredhja)	2,0	3,0
Sistem i tipit lavjerres i permbysur	1,5	2,0

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- <u>Kombinimi kryesor</u>

$$\sum_{j\geq 1} \gamma_{G,j} G_{k,j} + \gamma_{Q,1} Q_{k,1} + \sum_{i>1} \gamma_{Q,i} \psi_{o,i} Q_{k,i}$$

$G_{k,j}$	Vlera karakteristike e veprimit të përhershëm
$\gamma_{G,j}$	Koefiçienti pjesor i sigurisë (1.35) për veprimet e përhershme
$Q_{k,1}$	Vlera karakteristike e veprimit kryesor të përkohshëm
$\gamma_{Q,1}$	Koefiçienti pjesor i sigurisë për veprimin kryesor të përkohshëm (1.5)
$Q_{k,i}$	Vlera karakteristike e veprimit shoqërues të përkohshëm
$\gamma_{Q,i}$	Koefiçienti pjesor i sigurisë për veprimin shoqërues të përkohshëm (1.5)
$\psi_{o,i}$	Koefiçienti i jobesueshmërisë të veprimit të ngarkesave.

Për përmasimin paraprak të kolonave nisemi nga kriteri i projektimit sipas kapaciteteve "trarë të dobët - kolona të forta". Kushti që duhet të plotësohet është:

$$\sum M_{RC} \geq 1.3 \sum M_{RB}$$

Ku:

$\sum M_{RC}$ është shuma e momenteve rezistuese projektuese e kolonave që bëjnë pjesë në nyje. Vlera minimale e momentit rezistues të kolonës dhe forcës aksiale të saj, e marrë nga projektimi sizmik merret në konsideratë në këtë rast.

$\sum M_{RB}$ është shuma e momenteve rezistuese projektuese e trarëve që bëjnë pjesë në nyje. Kur përdoren lidhjet me fortësi të pjesshme, momenteve rezistuese projektuese të këtyre lidhjeve merren parasysh në llogaritjen e $\Sigma M_{Rb.}$ Kur përdoren lidhjet (nyjet) me fortësi të pjesshme, projektimi i kapacitetit të kolonës duhet të derivohet nga kapaciteti plastik i nyjeve.

- <u>Kombinimi sizmik</u>

$$\sum G_{k,j} + \sum \psi_{2,i} Q_{k,i} + \gamma E_{Ed}$$

Ku:

E_{Ed}	Vlera projektuese e veprimit sizmik
γ	Koefiçienti pjesor i sigurisë për veprimin sizmik. Për godinat e banimit γ=1
$\psi_{2,i}$	Koefiçienti i pjesëmarrjes së ngarkesave të përkohshme. Përcaktohet nga lloji i objektit. Për godinat e banimit =0.3

Në rastin tonë kemi neglizhuar efektin e veprimit sizmik në drejtimin vertikal duke marrë në konsideratë si më poshtë:

a) $E_{Edx} + 0.3E_{Edy}$
b) $0.3E_{Edx} + E_{Edy}$

Ku:

E_{Edx}	përfaqëson efektin për shkak të aplikimit të veprimit sizmik përgjatë aksit x të strukturës
E_{Edy}	përfaqëson efektin për shkak të aplikimit të veprimit sizmik përgjatë aksit y të strukturës

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-Detajimi I mureve bazohet ne rregullat e meposhtme:

Capacity design check at beam-column joints: (10)	$1.3\sum M_{Rb} \leq \sum M_{Rc}$ No moment in transverse direction of column		-
Verification for M_x-M_y-N:	Truly biaxial, or uniaxial with (M_z/0.7, N), (M_y/0.7, N)		
Axial load ratio $\nu_d=N_{Ed}/A_c f_{cd}$	≤ 0.55	≤ 0.65	-
Shear design:			
V_{Ed} seismic (11)	$1.3\dfrac{\sum M_{Rc}^{ends}}{l_{cl}}$ (11)	$1.1\dfrac{\sum M_{Rc}^{ends}}{l_{cl}}$ (11)	from analysis for design seismic action plus gravity
$V_{Rd,max}$ seismic (12), (13)	As in EC2: $V_{Rd,max}=0.3(1-f_{ck}(MPa)/250)b_{wo}zf_{cd}\sin2\delta$, $1\leq\cot\delta\leq2.5$		
$V_{Rd,s}$ seismic (12), (13), (14)	As in EC2: $V_{Rd,s}=b_w z\rho_w f_{ywd}\cot\delta+N_{Ed}(h-x)/l_{cl}$ (13), $1\leq\cot\delta\leq2.5$		

-Detajimi I kolonave bazohet ne rregullat e meposhtme:

	DCH	DCM	DCL
Cross-section sides, h_c, $b_c \geq$	0.25m; $h_v/10$ if $\theta=P\delta/Vh>0.1$ (1)	-	
"critical region" length (1) $\geq$	$1.5h_c$, $1.5b_c$, 0.6m, $l_c/5$	h_c, b_c, 0.45m, $l_c/6$	h_c, b_c
Longitudinal bars (L):			
ρ_{min}	1%		$0.1N_d/A_cf_{yd}$, 0.2% (0)
ρ_{max}	4%		4% (0)
$d_{bL}\geq$	8mm		
bars per side $\geq$	3		2
Spacing between restrained bars	$\leq$150mm	$\leq$200mm	-
Distance of unrestrained bar from nearest restrained nearest restrained bar	$\leq$150mm		
Transverse bars (w):			
Outside critical regions:			
$d_{bw}\geq$	6mm, $d_{bL}/4$		
spacing $s_w \leq$	$20d_{bL}$, h_c, b_c, 400mm		$12d_{bL}$, $0.6h_c$, $0.6b_c$, 240mm
at lap splices, if d_{bL}>14mm: $s_w\leq$	$12d_{bL}$, $0.6h_c$, $0.6b_c$, 240mm		
Within critical regions: (2)			
$d_{bw}\geq$ (3)	6mm, $0.4(f_{yd}/f_{ywd})^{1/2}d_{bL}$	6mm, $d_{bL}/4$	
$s_w\leq$ (3),(4)	$6d_{bL}$, $b_o/3$, 125mm	$8d_{bL}$, $b_o/2$, 175mm	-
$\omega_{wd}\geq$ (5)	0.08	-	
$\alpha\omega_{wd}\geq$ (4),(5),(6),(7)	$30\mu_\phi^* \nu_d\varepsilon_{sy,d}b_c/b_o-0.035$	-	
In critical region at column base:			
$\omega_{wd}\geq$	0.12	0.08	-
$\alpha\omega_{wd}\geq$ (4),(5),(6),(8),(9)	$30\mu_\phi\nu_d\varepsilon_{sy,d}b_c/b_o-0.035$		

-Detajimi I trareve realizohet sipas tabeles se meposhtme :

	DC H	DCM	DCL
"critical region" length	$1.5h_w$	h_w	
Longitudinal bars (L):			
ρ_{min}, tension side	$0.5f_{ctm}/f_{yk}$		$0.26f_{ctm}/f_{yk}$, $0.13\%^{(0)}$
ρ_{max}, critical regions$^{(1)}$	$\rho'+0.0018f_{cd}/(\mu_\phi\varepsilon_{sy,d}f_{yd})^{(1)}$		0.04
$A_{s,min}$, top & bottom	$2\Phi14$ ($308mm^2$)	-	
$A_{s,min}$, top-span	$A_{s,top\text{-}supports}/4$	-	
$A_{s,min}$, critical regions bottom	$0.5A_{s,top}{}^{(2)}$		-
$A_{s,min}$, supports bottom	$A_{s,bottom\text{-}span}/4^{(0)}$		
d_{bL}/h_c - bar crossing interior joint$^{(3)}$	$\le \dfrac{6.25(1+0.8\nu_d)}{(1+0.75\dfrac{\rho'}{\rho_{max}})}\dfrac{f_{ctm}}{f_{yd}}$	$\le \dfrac{7.5(1+0.8\nu_d)}{(1+0.5\dfrac{\rho'}{\rho_{max}})}\dfrac{f_{ctm}}{f_{yd}}$	-
d_{bL}/h_c - bar anchored at exterior joint$^{(3)}$	$\le 6.25(1+0.8\nu_d)\dfrac{f_{ctm}}{f_{yd}}$	$\le 7.5(1+0.8\nu_d)\dfrac{f_{ctm}}{f_{yd}}$	-
Transverse bars (w):			
(i) outside critical regions			
spacing $s_w\le$	$0.75d$		
$\rho_w\ge$	$0.08\sqrt{(f_{ck}(MPa)/f_{yk}(MPa)}^{(0)}$		
(ii) in critical regions:			
$d_{bw}\ge$	6mm		
spacing $s_w\le$	$6d_{bL}$, $\dfrac{h_w}{4}$, $24d_{bw}$, 175mm	$8d_{bL}$, $\dfrac{h_w}{4}$, $24d_{bw}$, 225mm	-
Shear design:			
V_{Ed}, seismic$^{(4)}$	$1.2\dfrac{\sum M_{Rb}}{l_{cl}}\pm V_{o,g+\psi_2 q}{}^{(4)}$	$\dfrac{\sum M_{Rb}}{l_{cl}}\pm V_{o,g+\psi_2 q}{}^{(4)}$	from analysis for design seismic action plus gravity
$V_{Rd,max}$ seismic $^{(5)}$	As in EC2: $V_{Rd,max}=0.3(1-f_{ck}(MPa)/250)b_{wo}zf_{cd}\sin2\delta$ $^{(5)}$, $1\le\cot\delta\le2.5$		
$V_{Rd,s}$, outside critical regions$^{(5)}$	As in EC2: $V_{Rd,s}=b_wz\rho_wf_{ywd}\cot\delta$ $^{(5)}$, $1\le\cot\delta\le2.5$		
$V_{Rd,s}$, critical regions$^{(5)}$	$V_{Rd,s}=b_wz\rho_wf_{ywd}$ ($\delta=45^o$)	As in EC2: $V_{Rd,s}=b_wz\rho_wf_{ywd}\cot\delta$, $1\le\cot\delta\le2.5$	
If $\zeta=V_{Emin}/V_{Emax}{}^{(6)}$ <-0.5: inclined bars at angle $\pm\alpha$ to beam axis, with cross-section A_s/direction	If $V_{Emax}/(2+\zeta)f_{ctd}b_wd>1$: $A_s=0.5V_{Emax}/f_{yd}\sin\alpha$ & stirrups for $0.5V_{Emax}$	-	

Shenim.Rregullat e mesiperme I perkasin klasave te ndryshme te duktilitetit, per objektin tone bazohemi tek klasa DCM.

5-Analiza Modale e objektit

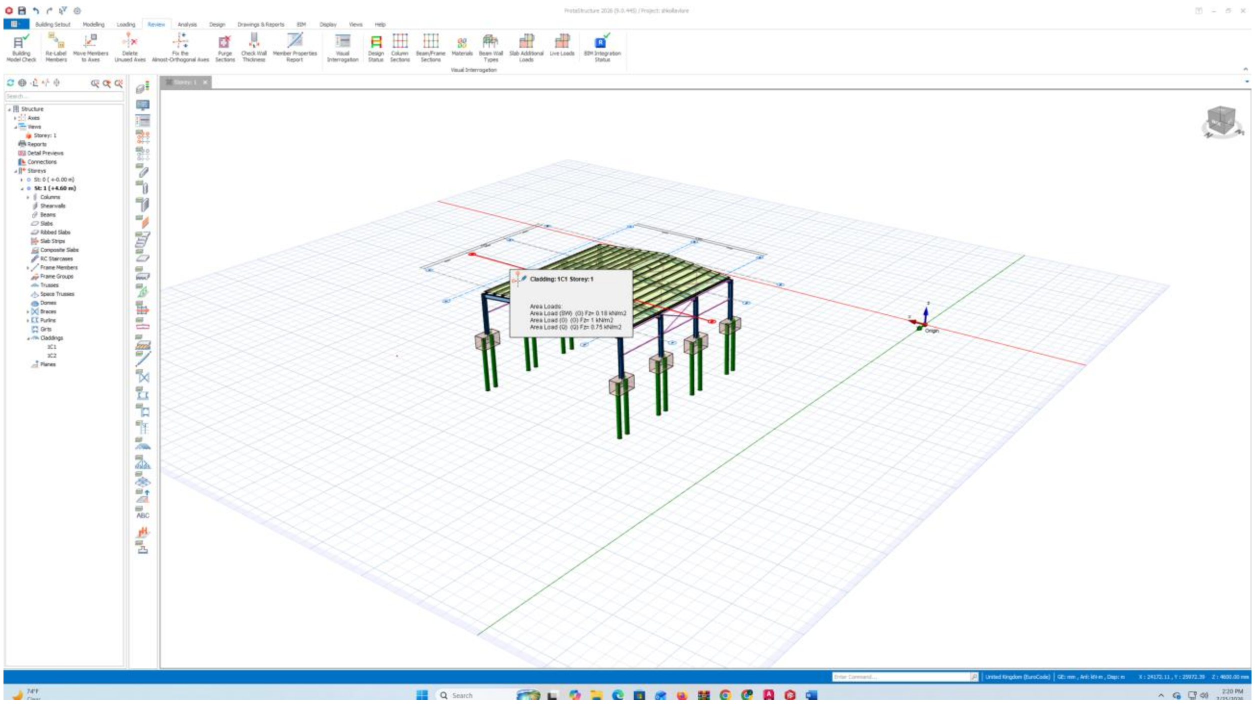

Fig.5.1. Modeli 3D I Struktures

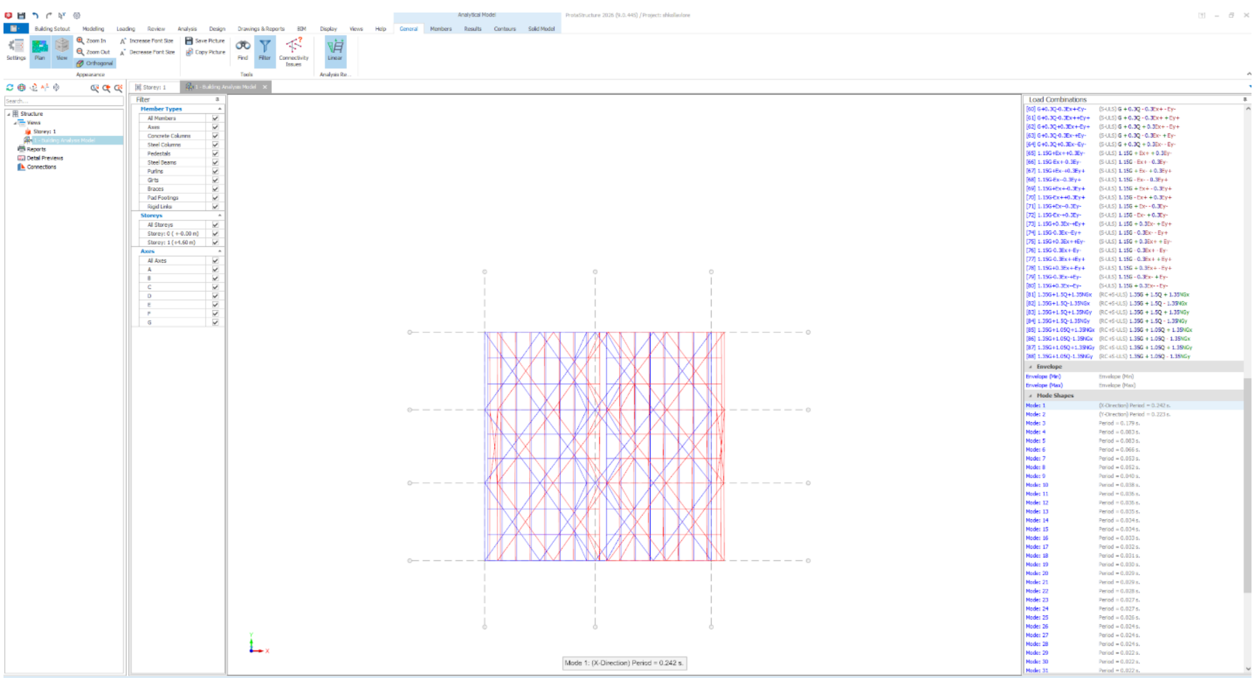

Fig.5.2. Modi, I pare I lekundjeve Levizje translative X-X

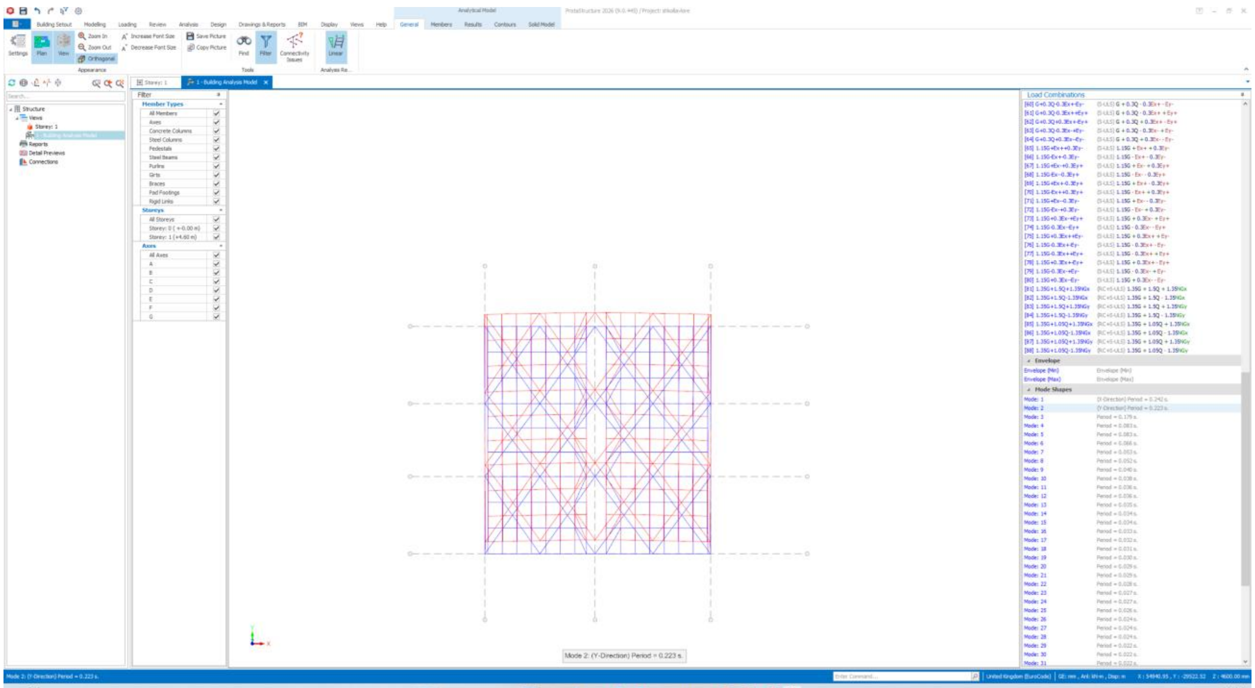

Fig.5.3. Modi, I dyte I lekundjeve Levizje paster translative Y-Y

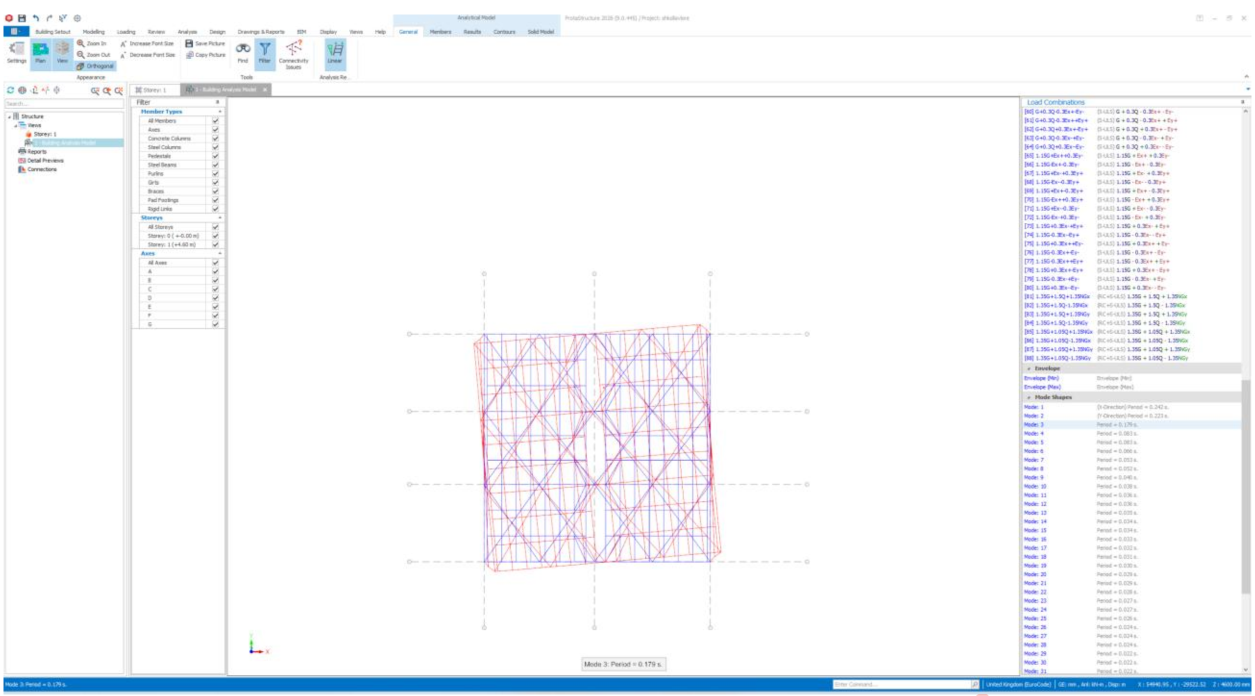

Fig.5.4. Modi, I trete I lekundjeve Levizje jo e paster translative

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- Modi I I I Lekundjeve 0.242 sek
- Modi I II I Lekundjeve 0.223 sek
- Modi I III I Lekundjeve 0.179 sek
- Perioda e perfaert $T=0.085*H^{3/4}=0.085*(4.5)^{*0.75}=0.267$ sek

Struktura ke ngurtesine e duhur

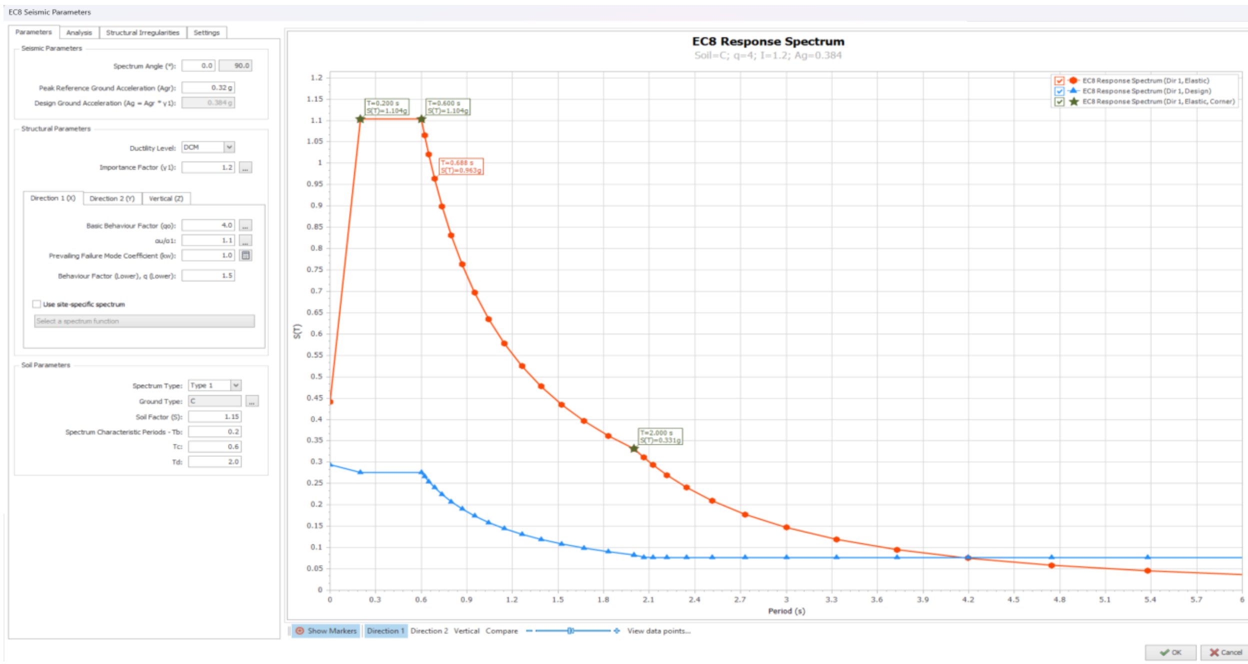

Fig.5.5. Spektri I projektimit dhe te dhenat x-x

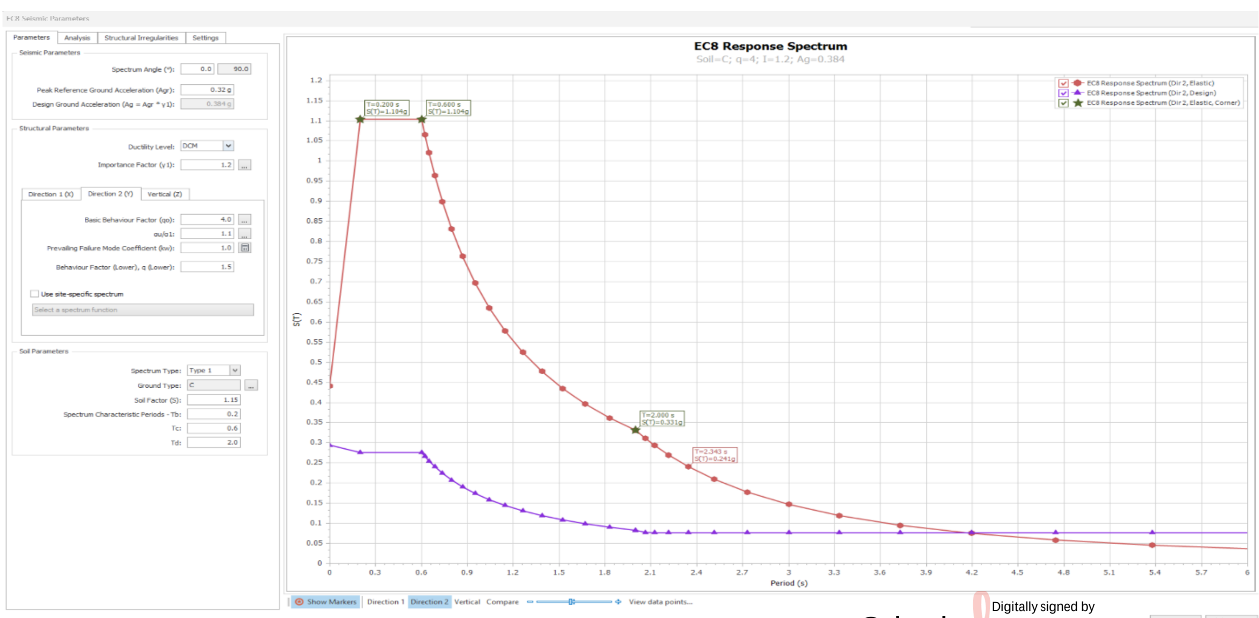

Fig.5.6. Spektri I projektimit dhe te dhenat y-y

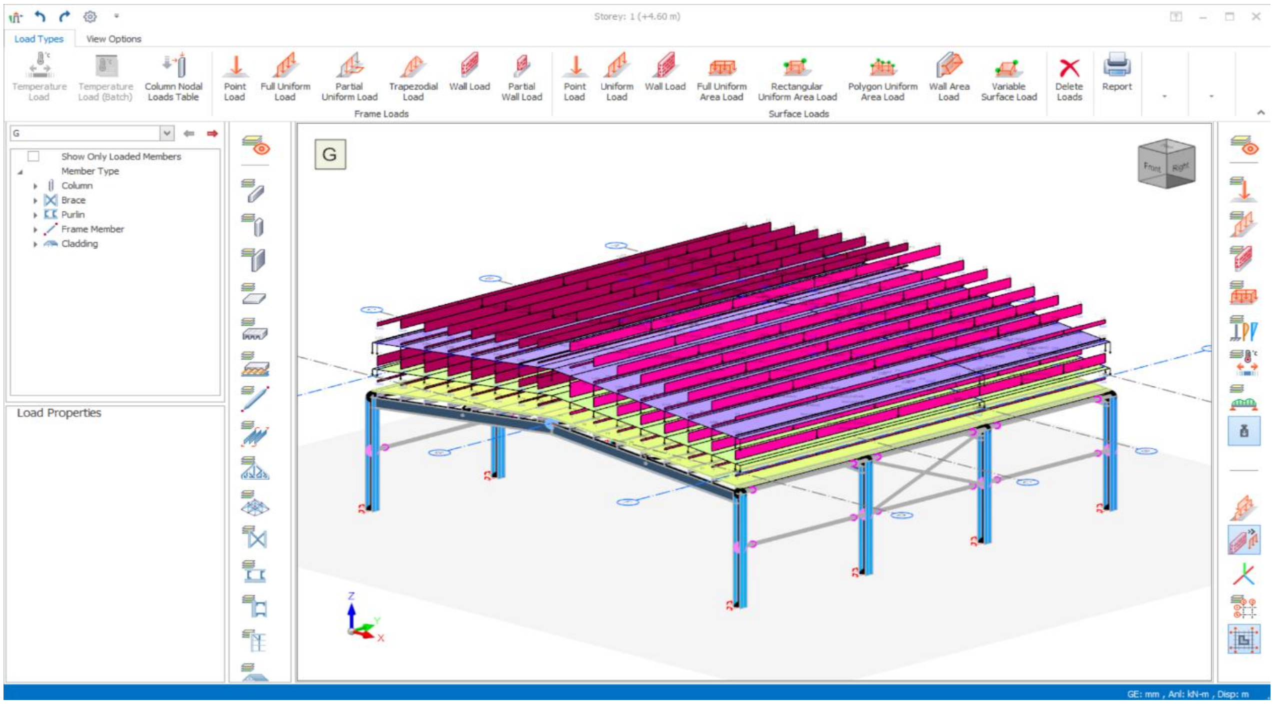

Fig.5.9. Ngarkesa e mbuleses G

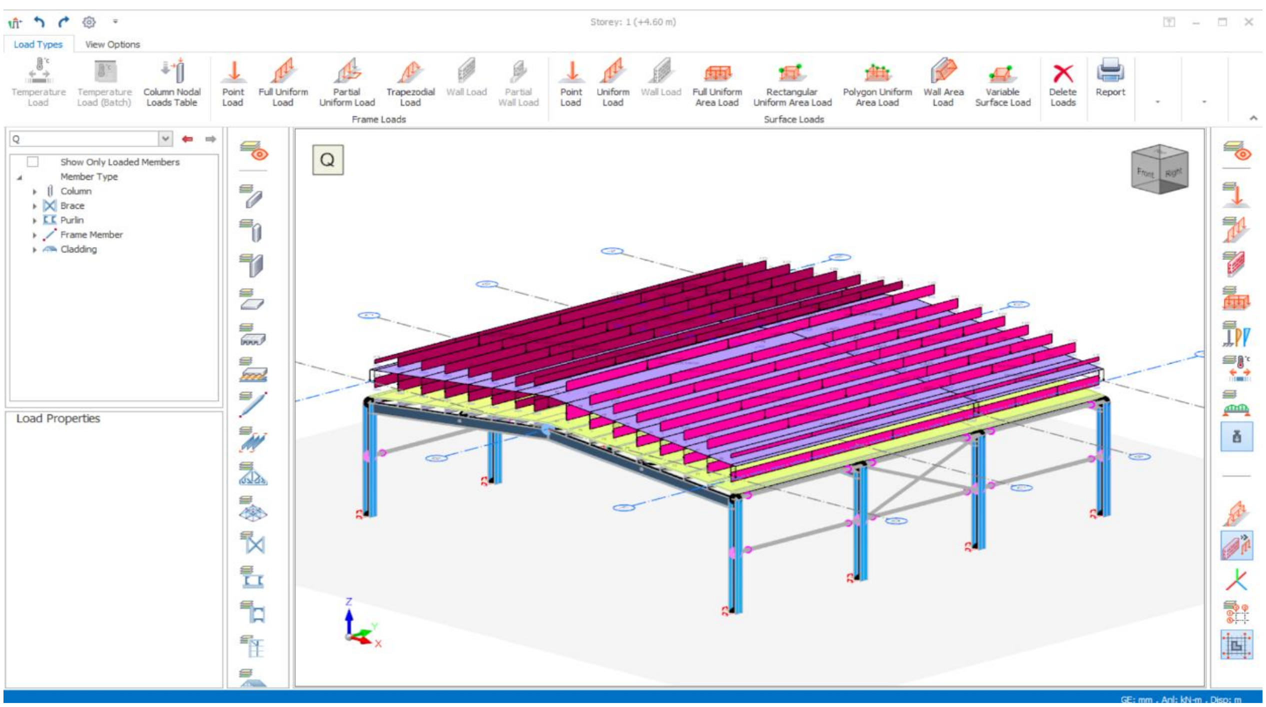

Fig.5.10. Ngarkesa e mbuleses Q

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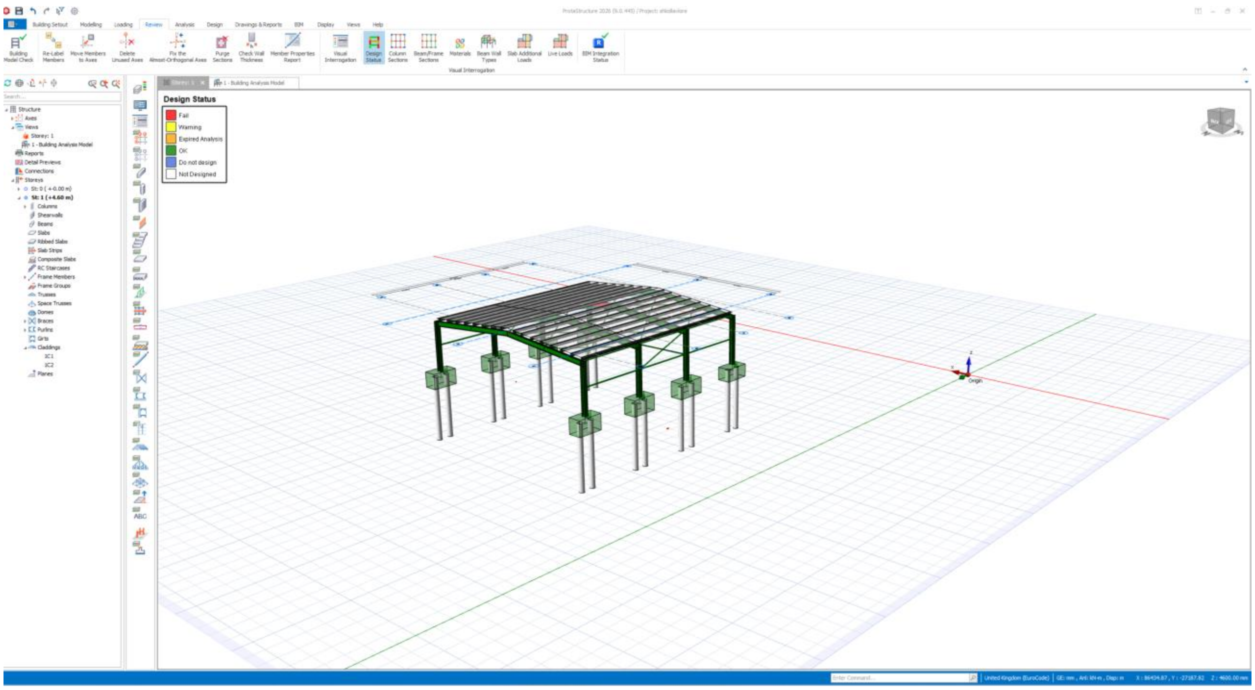

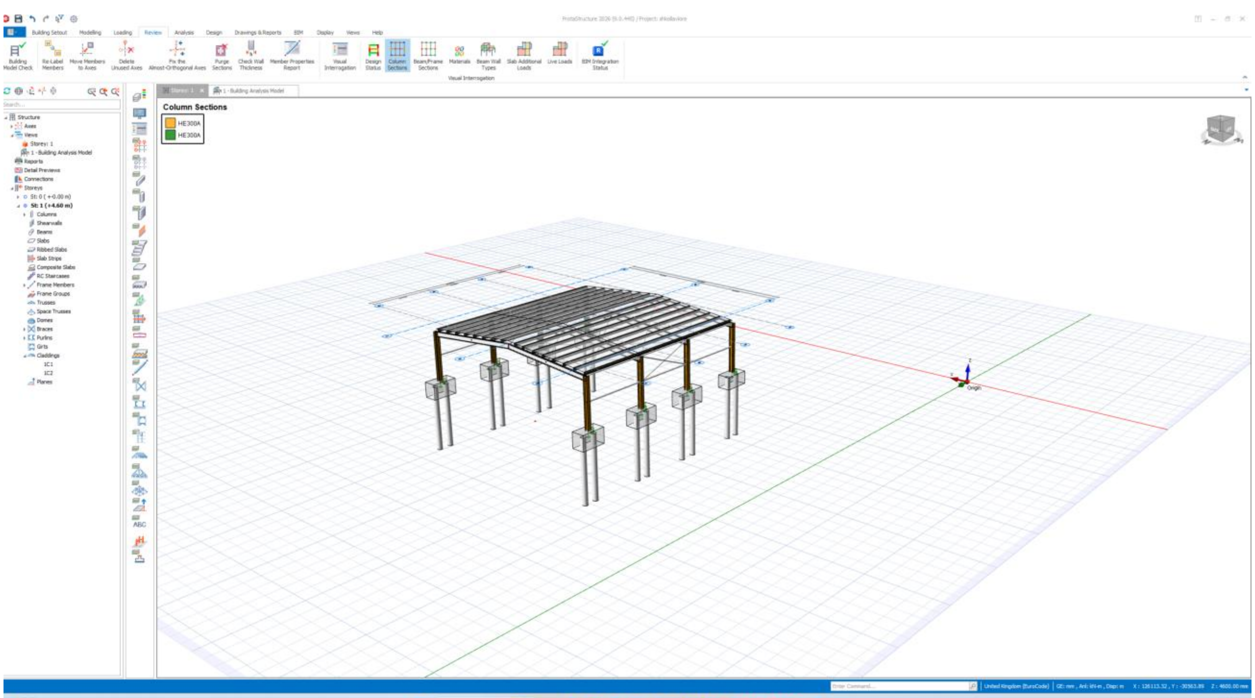

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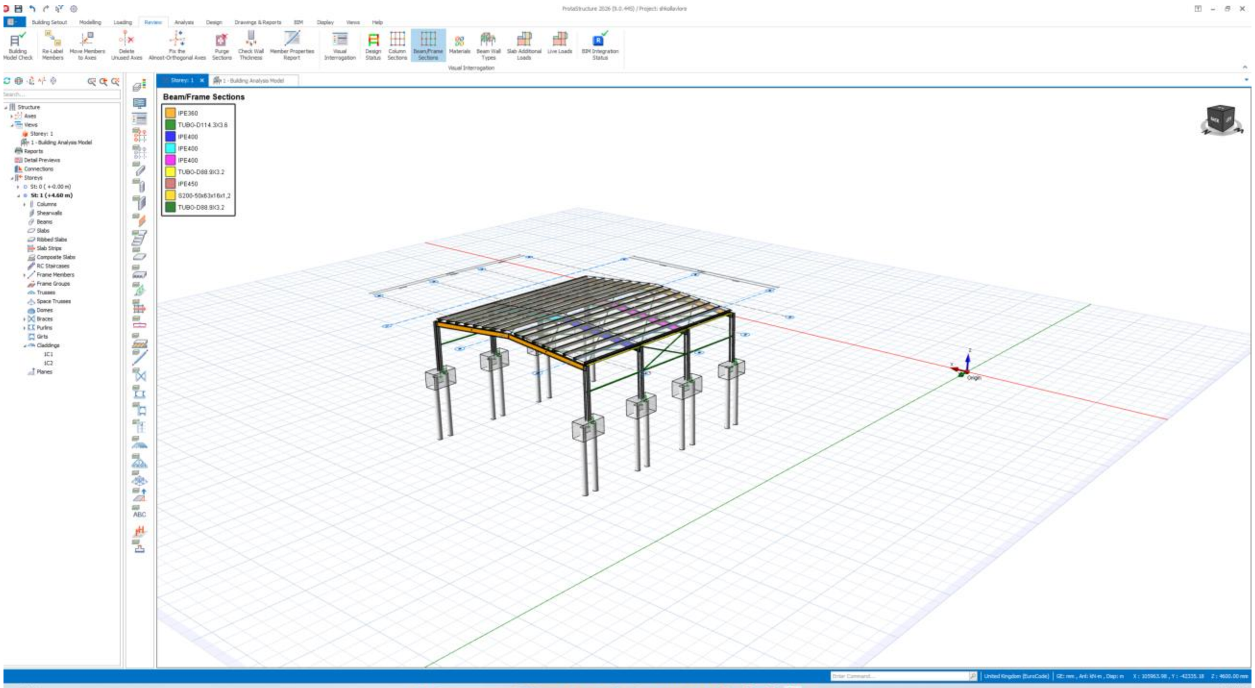


Pre-analysis Checks

Building Data

Number of Storeys = 1
Number of Effective Storeys = 1
Number of Rigid Basements = 0

Storey	Storey Height (mm)	Level (mm)	Live Load Simultaneous Presence Factor	Live Load Reduction Factor	Structural System Type	FE Shell Model
1	4600.00	4600.00	0.00	0.000	Steel	-

Analysis Parameters

Analysis Type = Mod Superposition Analysis

Storey Degrees of Freedom = X, Y and Torsion
Rigid Zones at Joints = NONE

Shearwall Analytical Model Type = FE Shell Model
Average Shell Size = 1000.00 / 1000.00 mm

Seismic Code = **Eurocode 8**
(EN 1998) Design of Structures for Earthquake Resistance (Base Code)

Concrete Design Code = **Eurocode 2**
(EN 1992) Design of Concrete Structures (Base Code)

Steel Design Code = **Eurocode 3**
(EN 1993) Design of Steel Structures (Base Code)

Wind Load Code = **EN-1991-1-4 [2005]**
Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions

Peak Reference Ground Acceleration, (Agr) = 0.32g
Design Ground Acceleration, (Ag) = 0.384g
Ductility Level = DCM

Direction: 1

Load Bearing System = B9
AlphaU/Alpha1 = 1.1
Basic Behavior Factor, (q0) = 4
Prevailing Failure Mode Coef. , (kw) = 1
Behavior Factor, (q) = 4

Direction: 2

Load Bearing System = B9
AlphaU/Alpha1 = 1.1
Basic Behavior Factor, (q0) = 4
Prevailing Failure Mode Coef. , (kw) = 1
Behavior Factor, (q) = 4

Building Usage and Type = Ordinary Buildings
Lateral Load Eccentricity = 5.0 %
Quasi-permanent Live Load Coef., (Psi2) = 0.30
Number of Modes to be Used = 50
Damping Ratio = 0.05

Seismic Response Spectrum Properties

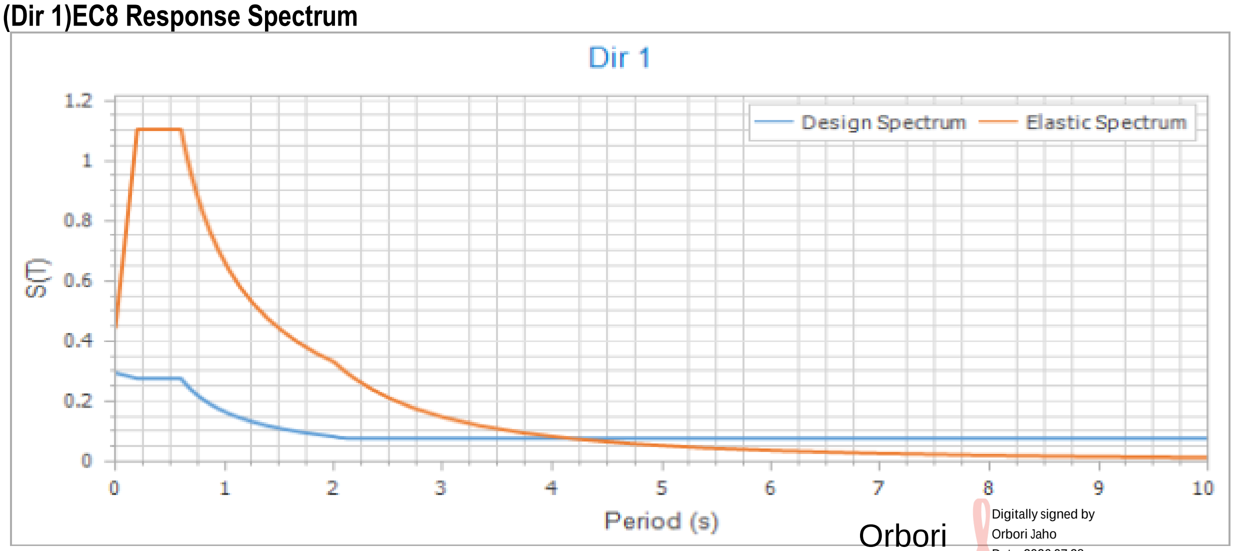
Local Soil Class = C
Spectrum Characteristic Periods Tb = 0.20 s
Tc = 0.60 s
Td = 2.00 s
Soil Factor = 1.15

Building Importance Factor I = 1.20

Earthquake Direction Dir-1 0.00 °
Dir-2 90.00 °

Spectrum Type = 1

(Dir 1)EC8 Response Spectrum



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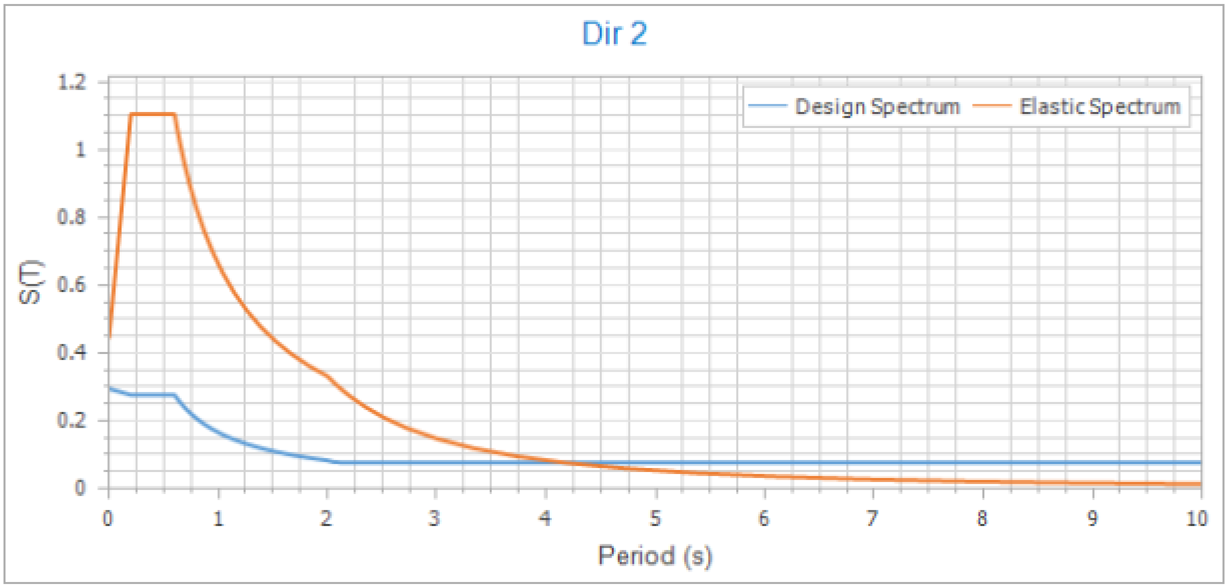
(Dir 2)EC8 Response Spectrum



Dir 1			Dir 2		
Period (s)	**Elastic Spectrum**	**Design Spectrum**	**Period (s)**	**Elastic Spectrum**	**Design Spectrum**
0.000	0.4416	0.2944	0.000	0.4416	0.2944
0.200	1.1040	0.2760	0.200	1.1040	0.2760
0.600	1.1040	0.2760	0.600	1.1040	0.2760
0.622	1.0652	0.2663	0.622	1.0652	0.2663
0.649	1.0203	0.2551	0.649	1.0203	0.2551
0.688	0.9635	0.2409	0.688	0.9635	0.2409
0.737	0.8991	0.2248	0.737	0.8991	0.2248
0.797	0.8312	0.2078	0.797	0.8312	0.2078
0.868	0.7632	0.1908	0.868	0.7632	0.1908
0.950	0.6973	0.1743	0.950	0.6973	0.1743
1.043	0.6351	0.1588	1.043	0.6351	0.1588
1.147	0.5776	0.1444	1.147	0.5776	0.1444
1.262	0.5250	0.1312	1.262	0.5250	0.1312
1.388	0.4774	0.1194	1.388	0.4774	0.1194
1.524	0.4346	0.1086	1.524	0.4346	0.1086
1.672	0.3962	0.0991	1.672	0.3962	0.0991
1.830	0.3619	0.0905	1.830	0.3619	0.0905
2.000	0.3312	0.0828	2.000	0.3312	0.0828
2.000	0.3312	0.0828	2.000	0.3312	0.0828
2.064	0.3110	0.0777	2.064	0.3110	0.0777
2.125	0.2934	0.0768	2.125	0.2934	0.0768
2.216	0.2698	0.0768	2.216	0.2698	0.0768
2.343	0.2413	0.0768	2.343	0.2413	0.0768
2.512	0.2099	0.0768	2.512	0.2099	0.0768
2.729	0.1779	0.0768	2.729	0.1779	0.0768
3.000	0.1472	0.0768	3.000	0.1472	0.0768
3.331	0.1194	0.0768	3.331	0.1194	0.0768
3.728	0.0953	0.0768	3.728	0.0953	0.0768
4.197	0.0752	0.0768	4.197	0.0752	0.0768
4.744	0.0589	0.0768	4.744	0.0589	0.0768
5.375	0.0459	0.0768	5.375	0.0459	0.0768
6.096	0.0357	0.0768	6.096	0.0357	0.0768
6.913	0.0277	0.0768	6.913	0.0277	0.0768
7.832	0.0216	0.0768	7.832	0.0216	0.0768
8.859	0.0169	0.0768	8.859	0.0169	0.0768
10.000	0.0132	0.0768	10.000	0.0132	0.0768

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Soil Properties

Soil Subgrade Reaction Coefficient = 50000.00 kN/m3
Allowable Soil Pressure = 200.0 kN/m2

Load Combinations

No	Combination	G	Gc	Q	Qc	Qp1	Qp2	Qp3	Qp4	Qp5	Ex+	Ex-
1	1.35G	1.35	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	1.35G+1.5Q	1.35	.00	1.50	.00	.00	.00	.00	.00	.00	.00	.00
3	1.35G+1.5Q	1.35	.00	1.50	.00	.00	.00	.00	.00	.00	.00	.00
4	1.35G+1.5Qp1	1.35	.00	.00	.00	1.50	.00	.00	.00	.00	.00	.00
5	1.35G+1.5Qp2	1.35	.00	.00	.00	.00	1.50	.00	.00	.00	.00	.00
6	1.35G+1.5Qp3	1.35	.00	.00	.00	.00	.00	1.50	.00	.00	.00	.00
7	1.35G+1.5Qp4	1.35	.00	.00	.00	.00	.00	.00	1.50	.00	.00	.00
8	1.35G+1.5Qp5	1.35	.00	.00	.00	.00	.00	.00	.00	1.50	.00	.00
9	1.35G+1.5Qp1	1.35	.00	.00	.00	1.50	.00	.00	.00	.00	.00	.00
10	1.35G+1.5Qp2	1.35	.00	.00	.00	.00	1.50	.00	.00	.00	.00	.00
11	1.35G+1.5Qp3	1.35	.00	.00	.00	.00	.00	1.50	.00	.00	.00	.00
12	1.35G+1.5Qp4	1.35	.00	.00	.00	.00	.00	.00	1.50	.00	.00	.00
13	1.35G+1.5Qp5	1.35	.00	.00	.00	.00	.00	.00	.00	1.50	.00	.00
14	G+Q	1.00	.00	1.00	.00	.00	.00	.00	.00	.00	.00	.00
15	Q	.00	.00	1.00	.00	.00	.00	.00	.00	.00	.00	.00
16	G+0.5Q	1.00	.00	0.50	.00	.00	.00	.00	.00	.00	.00	.00
17	Gc+0.3Qc+Ex++0.3Ey-	.00	1.00	.00	0.30	.00	.00	.00	.00	.00	1.00	.00
18	Gc+0.3Qc-Ex+-0.3Ey-	.00	1.00	.00	0.30	.00	.00	.00	.00	.00	- 1.00	.00
19	Gc+0.3Qc+Ex-+0.3Ey+	.00	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	1.00
20	Gc+0.3Qc-Ex--0.3Ey+	.00	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	- 1.00
21	Gc+0.3Qc+Ex+-0.3Ey+	.00	1.00	.00	0.30	.00	.00	.00	.00	.00	1.00	.00
22	Gc+0.3Qc-Ex++0.3Ey+	.00	1.00	.00	0.30	.00	.00	.00	.00	.00	- 1.00	.00
23	Gc+0.3Qc+Ex--0.3Ey-	.00	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	1.00
24	Gc+0.3Qc-Ex-+0.3Ey-	.00	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	- 1.00
25	Gc+0.3Qc+0.3Ex-+Ey+	.00	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	0.30
26	Gc+0.3Qc-0.3Ex--Ey+	.00	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	- 0.30
27	Gc+0.3Qc+0.3Ex++Ey-	.00	1.00	.00	0.30	.00	.00	.00	.00	.00	0.30	.00
28	Gc+0.3Qc-0.3Ex+-Ey-	.00	1.00	.00	0.30	.00	.00	.00	.00	.00	- 0.30	.00
29	Gc+0.3Qc-0.3Ex++Ey+	.00	1.00	.00	0.30	.00	.00	.00	.00	.00	- 0.30	.00
30	Gc+0.3Qc+0.3Ex+-Ey+	.00	1.00	.00	0.30	.00	.00	.00	.00	.00	0.30	.00
31	Gc+0.3Qc-0.3Ex-+Ey-	.00	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	- 0.30
32	Gc+0.3Qc+0.3Ex--Ey-	.00	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	0.30
33	1.15Gc+Ex++0.3Ey-	.00	1.15	.00	.00	.00	.00	.00	.00	.00	1.00	.00
34	1.15Gc-Ex+-0.3Ey-	.00	1.15	.00	.00	.00	.00	.00	.00	.00	- 1.00	.00
35	1.15Gc+Ex-+0.3Ey+	.00	1.15	.00	.00	.00	.00	.00	.00	.00	.00	1.00
36	1.15Gc-Ex--0.3Ey+	.00	1.15	.00	.00	.00	.00	.00	.00	.00	.00	- 1.00
37	1.15Gc+Ex+-0.3Ey+	.00	1.15	.00	.00	.00	.00	.00	.00	.00	1.00	.00
38	1.15Gc-Ex++0.3Ey+	.00	1.15	.00	.00	.00	.00	.00	.00	.00	- 1.00	.00
39	1.15Gc+Ex--0.3Ey-	.00	1.15	.00	.00	.00	.00	.00	.00	.00	.00	1.00
40	1.15Gc-Ex-+0.3Ey-	.00	1.15	.00	.00	.00	.00	.00	.00	.00	.00	- 1.00
41	1.15Gc+0.3Ex-+Ey+	.00	1.15	.00	.00	.00	.00	.00	.00	.00	.00	0.30
42	1.15Gc-0.3Ex--Ey+	.00	1.15	.00	.00	.00	.00	.00	.00	.00	.00	- 0.30
43	1.15Gc+0.3Ex++Ey-	.00	1.15	.00	.00	.00	.00	.00	.00	.00	0.30	.00
44	1.15Gc-0.3Ex+-Ey-	.00	1.15	.00	.00	.00	.00	.00	.00	.00	- 0.30	.00
45	1.15Gc-0.3Ex++Ey+	.00	1.15	.00	.00	.00	.00	.00	.00	.00	- 0.30	.00
46	1.15Gc+0.3Ex+-Ey+	.00	1.15	.00	.00	.00	.00	.00	.00	.00	0.30	.00
47	1.15Gc-0.3Ex-+Ey-	.00	1.15	.00	.00	.00	.00	.00	.00	.00	.00	- 0.30
48	1.15Gc+0.3Ex--Ey-	.00	1.15	.00	.00	.00	.00	.00	.00	.00	.00	0.30
49	G+0.3Q+Ex++0.3Ey-	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	1.00	.00
50	G+0.3Q-Ex+-0.3Ey-	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	- 1.00	.00
51	G+0.3Q+Ex-+0.3Ey+	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	.00	1.00
52	G+0.3Q-Ex--0.3Ey+	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	.00	- 1.00
53	G+0.3Q+Ex+-0.3Ey+	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	1.00	.00
54	G+0.3Q-Ex++0.3Ey+	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	- 1.00	.00

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55	G+0.3Q+Ex--0.3Ey-	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	.00	1.00
56	G+0.3Q-Ex-+0.3Ey-	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	.00	- 1.00
57	G+0.3Q+0.3Ex-+Ey+	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	.00	0.30
58	G+0.3Q-0.3Ex--Ey+	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	.00	- 0.30
59	G+0.3Q+0.3Ex++Ey-	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	0.30	.00
60	G+0.3Q-0.3Ex+-Ey-	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	- 0.30	.00
61	G+0.3Q-0.3Ex++Ey+	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	- 0.30	.00
62	G+0.3Q+0.3Ex+-Ey+	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	0.30	.00
63	G+0.3Q-0.3Ex-+Ey-	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	.00	- 0.30
64	G+0.3Q+0.3Ex--Ey-	1.00	.00	0.30	.00	.00	.00	.00	.00	.00	.00	0.30
65	1.15G+Ex++0.3Ey-	1.15	.00	.00	.00	.00	.00	.00	.00	.00	1.00	.00
66	1.15G-Ex+-0.3Ey-	1.15	.00	.00	.00	.00	.00	.00	.00	.00	- 1.00	.00
67	1.15G+Ex-+0.3Ey+	1.15	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.00
68	1.15G-Ex--0.3Ey+	1.15	.00	.00	.00	.00	.00	.00	.00	.00	.00	- 1.00
69	1.15G+Ex+-0.3Ey+	1.15	.00	.00	.00	.00	.00	.00	.00	.00	1.00	.00
70	1.15G-Ex++0.3Ey+	1.15	.00	.00	.00	.00	.00	.00	.00	.00	- 1.00	.00
71	1.15G+Ex--0.3Ey-	1.15	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.00
72	1.15G-Ex-+0.3Ey-	1.15	.00	.00	.00	.00	.00	.00	.00	.00	.00	- 1.00
73	1.15G+0.3Ex-+Ey+	1.15	.00	.00	.00	.00	.00	.00	.00	.00	.00	0.30
74	1.15G-0.3Ex--Ey+	1.15	.00	.00	.00	.00	.00	.00	.00	.00	.00	- 0.30
75	1.15G+0.3Ex++Ey-	1.15	.00	.00	.00	.00	.00	.00	.00	.00	0.30	.00
76	1.15G-0.3Ex+-Ey-	1.15	.00	.00	.00	.00	.00	.00	.00	.00	- 0.30	.00
77	1.15G-0.3Ex++Ey+	1.15	.00	.00	.00	.00	.00	.00	.00	.00	- 0.30	.00
78	1.15G+0.3Ex+-Ey+	1.15	.00	.00	.00	.00	.00	.00	.00	.00	0.30	.00
79	1.15G-0.3Ex-+Ey-	1.15	.00	.00	.00	.00	.00	.00	.00	.00	.00	- 0.30
80	1.15G+0.3Ex--Ey-	1.15	.00	.00	.00	.00	.00	.00	.00	.00	.00	0.30
81	1.35G+1.5Q+1.35NGx	1.35	.00	1.50	.00	.00	.00	.00	.00	.00	.00	.00
82	1.35G+1.5Q-1.35NGx	1.35	.00	1.50	.00	.00	.00	.00	.00	.00	.00	.00
83	1.35G+1.5Q+1.35NGy	1.35	.00	1.50	.00	.00	.00	.00	.00	.00	.00	.00
84	1.35G+1.5Q-1.35NGy	1.35	.00	1.50	.00	.00	.00	.00	.00	.00	.00	.00
85	1.35G+1.05Q+1.35NGx	1.35	.00	1.05	.00	.00	.00	.00	.00	.00	.00	.00
86	1.35G+1.05Q-1.35NGx	1.35	.00	1.05	.00	.00	.00	.00	.00	.00	.00	.00
87	1.35G+1.05Q+1.35NGy	1.35	.00	1.05	.00	.00	.00	.00	.00	.00	.00	.00
88	1.35G+1.05Q-1.35NGy	1.35	.00	1.05	.00	.00	.00	.00	.00	.00	.00	.00

No	Combination	Ey+	Ey-	NGx	NQx	NGy	NQy
1	1.35G	.00	.00	.00	.00	.00	.00
2	1.35G+1.5Q	.00	.00	.00	.00	.00	.00
3	1.35G+1.5Q	.00	.00	.00	.00	.00	.00
4	1.35G+1.5Qp1	.00	.00	.00	.00	.00	.00
5	1.35G+1.5Qp2	.00	.00	.00	.00	.00	.00
6	1.35G+1.5Qp3	.00	.00	.00	.00	.00	.00
7	1.35G+1.5Qp4	.00	.00	.00	.00	.00	.00
8	1.35G+1.5Qp5	.00	.00	.00	.00	.00	.00
9	1.35G+1.5Qp1	.00	.00	.00	.00	.00	.00
10	1.35G+1.5Qp2	.00	.00	.00	.00	.00	.00
11	1.35G+1.5Qp3	.00	.00	.00	.00	.00	.00
12	1.35G+1.5Qp4	.00	.00	.00	.00	.00	.00
13	1.35G+1.5Qp5	.00	.00	.00	.00	.00	.00
14	G+Q	.00	.00	.00	.00	.00	.00
15	Q	.00	.00	.00	.00	.00	.00
16	G+0.5Q	.00	.00	.00	.00	.00	.00
17	Gc+0.3Qc+Ex++0.3Ey-	.00	0.30	.00	.00	.00	.00
18	Gc+0.3Qc-Ex+-0.3Ey-	.00	- 0.30	.00	.00	.00	.00
19	Gc+0.3Qc+Ex-+0.3Ey+	0.30	.00	.00	.00	.00	.00
20	Gc+0.3Qc-Ex--0.3Ey+	- 0.30	.00	.00	.00	.00	.00
21	Gc+0.3Qc+Ex+-0.3Ey+	- 0.30	.00	.00	.00	.00	.00
22	Gc+0.3Qc-Ex++0.3Ey+	0.30	.00	.00	.00	.00	.00
23	Gc+0.3Qc+Ex--0.3Ey-	.00	- 0.30	.00	.00	.00	.00
24	Gc+0.3Qc-Ex-+0.3Ey-	.00	0.30	.00	.00	.00	.00
25	Gc+0.3Qc+0.3Ex-+Ey+	1.00	.00	.00	.00	.00	.00

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26	Gc+0.3Qc-0.3Ex--Ey+	- 1.00	.00	.00	.00	.00	.00
27	Gc+0.3Qc+0.3Ex++Ey-	.00	1.00	.00	.00	.00	.00
28	Gc+0.3Qc-0.3Ex+-Ey-	.00	- 1.00	.00	.00	.00	.00
29	Gc+0.3Qc-0.3Ex++Ey+	1.00	.00	.00	.00	.00	.00
30	Gc+0.3Qc+0.3Ex+-Ey+	- 1.00	.00	.00	.00	.00	.00
31	Gc+0.3Qc-0.3Ex-+Ey-	.00	1.00	.00	.00	.00	.00
32	Gc+0.3Qc+0.3Ex--Ey-	.00	- 1.00	.00	.00	.00	.00
33	1.15Gc+Ex++0.3Ey-	.00	0.30	.00	.00	.00	.00
34	1.15Gc-Ex+-0.3Ey-	.00	- 0.30	.00	.00	.00	.00
35	1.15Gc+Ex-+0.3Ey+	0.30	.00	.00	.00	.00	.00
36	1.15Gc-Ex--0.3Ey+	- 0.30	.00	.00	.00	.00	.00
37	1.15Gc+Ex+-0.3Ey+	- 0.30	.00	.00	.00	.00	.00
38	1.15Gc-Ex++0.3Ey+	0.30	.00	.00	.00	.00	.00
39	1.15Gc+Ex--0.3Ey-	.00	- 0.30	.00	.00	.00	.00
40	1.15Gc-Ex-+0.3Ey-	.00	0.30	.00	.00	.00	.00
41	1.15Gc+0.3Ex-+Ey+	1.00	.00	.00	.00	.00	.00
42	1.15Gc-0.3Ex--Ey+	- 1.00	.00	.00	.00	.00	.00
43	1.15Gc+0.3Ex++Ey-	.00	1.00	.00	.00	.00	.00
44	1.15Gc-0.3Ex+-Ey-	.00	- 1.00	.00	.00	.00	.00
45	1.15Gc-0.3Ex++Ey+	1.00	.00	.00	.00	.00	.00
46	1.15Gc+0.3Ex+-Ey+	- 1.00	.00	.00	.00	.00	.00
47	1.15Gc-0.3Ex-+Ey-	.00	1.00	.00	.00	.00	.00
48	1.15Gc+0.3Ex--Ey-	.00	- 1.00	.00	.00	.00	.00
49	G+0.3Q+Ex++0.3Ey-	.00	0.30	.00	.00	.00	.00
50	G+0.3Q-Ex+-0.3Ey-	.00	- 0.30	.00	.00	.00	.00
51	G+0.3Q+Ex-+0.3Ey+	0.30	.00	.00	.00	.00	.00
52	G+0.3Q-Ex--0.3Ey+	- 0.30	.00	.00	.00	.00	.00
53	G+0.3Q+Ex+-0.3Ey+	- 0.30	.00	.00	.00	.00	.00
54	G+0.3Q-Ex++0.3Ey+	0.30	.00	.00	.00	.00	.00
55	G+0.3Q+Ex--0.3Ey-	.00	- 0.30	.00	.00	.00	.00
56	G+0.3Q-Ex-+0.3Ey-	.00	0.30	.00	.00	.00	.00
57	G+0.3Q+0.3Ex-+Ey+	1.00	.00	.00	.00	.00	.00
58	G+0.3Q-0.3Ex--Ey+	- 1.00	.00	.00	.00	.00	.00
59	G+0.3Q+0.3Ex++Ey-	.00	1.00	.00	.00	.00	.00
60	G+0.3Q-0.3Ex+-Ey-	.00	- 1.00	.00	.00	.00	.00
61	G+0.3Q-0.3Ex++Ey+	1.00	.00	.00	.00	.00	.00
62	G+0.3Q+0.3Ex+-Ey+	- 1.00	.00	.00	.00	.00	.00
63	G+0.3Q-0.3Ex-+Ey-	.00	1.00	.00	.00	.00	.00
64	G+0.3Q+0.3Ex--Ey-	.00	- 1.00	.00	.00	.00	.00
65	1.15G+Ex++0.3Ey-	.00	0.30	.00	.00	.00	.00
66	1.15G-Ex+-0.3Ey-	.00	- 0.30	.00	.00	.00	.00
67	1.15G+Ex-+0.3Ey+	0.30	.00	.00	.00	.00	.00
68	1.15G-Ex--0.3Ey+	- 0.30	.00	.00	.00	.00	.00
69	1.15G+Ex+-0.3Ey+	- 0.30	.00	.00	.00	.00	.00
70	1.15G-Ex++0.3Ey+	0.30	.00	.00	.00	.00	.00
71	1.15G+Ex--0.3Ey-	.00	- 0.30	.00	.00	.00	.00
72	1.15G-Ex-+0.3Ey-	.00	0.30	.00	.00	.00	.00
73	1.15G+0.3Ex-+Ey+	1.00	.00	.00	.00	.00	.00
74	1.15G-0.3Ex--Ey+	- 1.00	.00	.00	.00	.00	.00
75	1.15G+0.3Ex++Ey-	.00	1.00	.00	.00	.00	.00
76	1.15G-0.3Ex+-Ey-	.00	- 1.00	.00	.00	.00	.00
77	1.15G-0.3Ex++Ey+	1.00	.00	.00	.00	.00	.00
78	1.15G+0.3Ex+-Ey+	- 1.00	.00	.00	.00	.00	.00
79	1.15G-0.3Ex-+Ey-	.00	1.00	.00	.00	.00	.00
80	1.15G+0.3Ex--Ey-	.00	- 1.00	.00	.00	.00	.00
81	1.35G+1.5Q+1.35NGx	.00	.00	1.35	.00	.00	.00
82	1.35G+1.5Q-1.35NGx	.00	.00	- 1.35	.00	.00	.00
83	1.35G+1.5Q+1.35NGy	.00	.00	.00	.00	1.35	.00
84	1.35G+1.5Q-1.35NGy	.00	.00	.00	.00	- 1.35	.00
85	1.35G+1.05Q+1.35NGx	.00	.00	1.35	.00	.00	.00
86	1.35G+1.05Q-1.35NGx	.00	.00	- 1.35	.00	.00	.00
87	1.35G+1.05Q+1.35NGy	.00	.00	.00	.00	1.35	.00

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88	1.35G+1.05Q-1.35NGy	.00	.00	.00	.00	- 1.35	.00

Bottom Part load case results are combined with the Upper Part results automatically. Therefore, they are not included in the combinations.

Vertical Load Cases

G	= Dead Loads
Gc	= Dead Loads (Cracked)
Q	= Live Loads
Qc	= Live Loads (Cracked)
Qp1	= Pattern Live Loads 1
Qp2	= Pattern Live Loads 2
Qp3	= Pattern Live Loads 3
Qp4	= Pattern Live Loads 4
Qp5	= Pattern Live Loads 5

Lateral Load Cases

Ex+	= Modal Superposition Seismic X (E+) (Cracked)
Ex-	= Modal Superposition Seismic X (E-) (Cracked)
Ey+	= Modal Superposition Seismic Y (E+) (Cracked)
Ey-	= Modal Superposition Seismic Y (E-) (Cracked)
NGx	= Notional Loads (G) x
NQx	= Notional Loads (Q) x
NGy	= Notional Loads (G) y
NQy	= Notional Loads (Q) y

Gc and **Qc** load cases uses **cracked sections** for being combined with seismic load cases.
G and **Q** load cases usesow **uncracked sections** for being combined with vertical load combinations.

Materials:

Concrete Grades

		F_{ck} (N/mm2)	F_{cd} (N/mm2)	F_{ctd} (N/mm2)	E (N/mm2)
Columns	C25/30	25.00	16.67	1.17	31000.0
Walls	C25/30	25.00	16.67	1.17	31000.0
Beams	C25/30	25.00	16.67	1.17	31000.0
Slabs	C25/30	25.00	16.67	1.17	31000.0
Ribbed Slabs	C25/30	25.00	16.67	1.17	31000.0
Foundations	C25/30	25.00	16.67	1.17	31000.0

Rebar Grades

		F_{yk} (N/mm2)	F_{yd} (N/mm2)	E (N/mm2)
Columns	Grade 500 (Type 2)	500.00	434.78	200000.0
Walls	Grade 500 (Type 2)	500.00	434.78	200000.0
- Web Longitudinal	Grade 500 (Type 2)	500.00	434.78	200000.0
- Web Horizontal	Grade 500 (Type 2)	500.00	434.78	200000.0
Beams	Grade 500 (Type 2)	500.00	434.78	200000.0
Slabs	Grade 500 (Type 2)	500.00	434.78	200000.0
Ribbed Slabs	Grade 500 (Type 2)	500.00	434.78	200000.0
Foundations	Grade 500 (Type 2)	500.00	434.78	200000.0
Links	Grade 500 (Type 2)	500.00	434.78	200000.0

Steel Grades

Label	F_y (N/mm2)	F_u (N/mm2)
S235	235.00	360.00
S275	275.00	430.00
S355	355.00	510.00

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Member Section Properties

Steel Column Section Properties

Section	b1xb2 (mm)	Area (m^2)	A_s (m^2)	I_{11} (m^4)	I_{22} (m^4)
HE300A	300x290	0.011	0.008	0.000183	0.000063
HE300A	300x290	0.011	0.008	0.000183	0.000063

Steel Beam Section Properties

Section	b1xb2 (mm)	Area (m^2)	A_s (m^2)	I_{11} (m^4)	I_{22} (m^4)
IPE360	170x360	0.007	0.004	0.000163	0.000010
TUBO-D114.3X3.6	D=114.3	0.001	0.001	0.000002	0.000002
IPE400	180x400	0.008	0.005	0.000231	0.000013
IPE400	180x400	0.008	0.005	0.000231	0.000013
IPE400	180x400	0.008	0.005	0.000231	0.000013
IPE450	190x450	0.010	0.006	0.000337	0.000017

Steel Purlin and Girt Section Properties

Section	b1xb2 (mm)	Area (m^2)	A_s (m^2)	I_{11} (m^4)	I_{22} (m^4)
S200-50x63x16x1,2	63x200	0.000	0.000	0.000003	0.000000

Steel Brace Section Properties

Section	b1xb2 (mm)	Area (m^2)	A_s (m^2)	I_{11} (m^4)	I_{22} (m^4)
L80X8	80x80	0.001	0.001	0.000001	0.000001
L80X8	80x80	0.001	0.001	0.000001	0.000001
TUBO-D88.9X3.2	D=88.9	0.001	0.001	0.000001	0.000001
TUBO-D88.9X3.2	D=88.9	0.001	0.001	0.000001	0.000001

Calculation of the Column and Wall Inertia Center

Coordinates of Center of Rigidity (x-R and y-R) is based on the coordinates of lower left column on the plan.

Storey	ΣEI_{xx} Column / Wall ($kN/m^2\ m^4$)	ΣEI_{xx} Total ($kN/m^2\ m^4$)	ΣEI_{yy} Column / Wall ($kN/m^2\ m^4$)	ΣEI_{yy} Total ($kN/m^2\ m^4$)	Σ x EI_{xx} Total ($m\ kN/m^2\ m^4$)	Σ y EI_{yy} Total ($m\ kN/m^2\ m^4$)	x_{cs} (m)	y_{cs} (m)
Storey: 1	1.041E+05	0.000000	1.041E+05	3.012E+05	0.000000	3.012E+05	7.750	7.800

Post-Analysis Checks

Building has only one storey, Interstorey Stiffness Irregularity Check is not necessary.

Building has only one storey, Mass Irregularity Check is not necessary

RELATIVE STOREY DRIFT CHECK:

(EN 1998-1 - Cl. 4.3.4 and 4.4.3.2(1)a)
h : Storey Height
d_e : Absolute Storey Displacement (reduced by q)
d_s : Absolute Storey Displacement ($d_s = d_e * q$)
d_r : Relative Storey Drift ($d_{s(i)} - d_{s(i-1)}$)
v : EC8 Reduction Factor

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EARTHQUAKE DIRECTION: 1 (Angle From X 0.000 Deg)

Load Case: Ex+

Storey	**h (m)**	**d_e (max) (m)**	**d_e (min) (m)**	**d_e (ave) (m)**	**d_s (m)**	**d_r (m)**	**$d_r^* v / h$**
Storey: 1	4.600	1C2 / 0.004	1C7 / 0.004	0.004	0.013	0.013	0.001 ≤ 0.005 √

Load Case: Ex-

Storey	**h (m)**	**d_e (max) (m)**	**d_e (min) (m)**	**d_e (ave) (m)**	**d_s (m)**	**d_r (m)**	**$d_r^* v / h$**
Storey: 1	4.600	1C8 / 0.004	1C1 / 0.004	0.004	0.013	0.013	0.001 ≤ 0.005 √

Dir 1... Relative Storey Drifts satisfies the Limits. √

EARTHQUAKE DIRECTION: 2 (Angle From X 90.000 Deg)

Load Case: Ey+

Storey	**h (m)**	**d_e (max) (m)**	**d_e (min) (m)**	**d_e (ave) (m)**	**d_s (m)**	**d_r (m)**	**$d_r^* v / h$**
Storey: 1	4.600	1C2 / 0.003	1C3 / 0.003	0.003	0.010	0.010	0.001 ≤ 0.005 √

Load Case: Ey-

Storey	**h (m)**	**d_e (max) (m)**	**d_e (min) (m)**	**d_e (ave) (m)**	**d_s (m)**	**d_r (m)**	**$d_r^* v / h$**
Storey: 1	4.600	1C7 / 0.003	1C4 / 0.003	0.003	0.010	0.010	0.001 ≤ 0.005 √

Dir 2... Relative Storey Drifts satisfies the Limits. √

TORSION FLEXIBILITY CHECK:

(EN 1998-1 - Cl. 4.2.3.2)

δ_{Min} : Minimum Absolute Storey Displacement
δ_{Max} : Maximum Absolute Storey Displacement
Δ : Relative Storey Drift ($\delta_{column,top}$ - $\delta_{column,bottom}$)
η_b : Δ_{Max} / Δ_{ave}

EARTHQUAKE DIRECTION: 1 (Angle From X 0.00 Deg)

Load Case: **Ex+** (Modal Superposition Seismic X (E+))

Storey	**δ_{Min} (m)**	**δ_{Max} (m)**	**Δ_{Min} (m)**	**Δ_{Max} (m)**	**Δ_{ave} (m)**	**η_b**	**Status**
Storey: 1	1C7 / 0.004	1C2 / 0.004	0.004	0.004	0.004	1.056 ≤ 1.20	---

Load Case: **Ex-** (Modal Superposition Seismic X (E-))

Storey	**δ_{Min} (m)**	**δ_{Max} (m)**	**Δ_{Min} (m)**	**Δ_{Max} (m)**	**Δ_{ave} (m)**	**η_b**	**Status**
Storey: 1	1C1 / 0.004	1C8 / 0.004	0.004	0.004	0.004	1.056 ≤ 1.20	---

Dir 1: Torsional Flexibility does not Exist. √

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EARTHQUAKE DIRECTION: 2 (Angle From X 90.00 Deg)

Load Case: **Ey+** (Modal Superposition Seismic Y (E+))

Storey	δ_{Min} (m)	δ_{Max} (m)	Δ_{Min} (m)	Δ_{Max} (m)	Δ_{ave} (m)	η_b	Status
Storey: 1	1C3 / 0.003	1C2 / 0.003	0.003	0.003	0.003	1.112 ≤ 1.20	---

Load Case: **Ey-** (Modal Superposition Seismic Y (E-))

Storey	δ_{Min} (m)	δ_{Max} (m)	Δ_{Min} (m)	Δ_{Max} (m)	Δ_{ave} (m)	η_b	Status
Storey: 1	1C4 / 0.003	1C7 / 0.003	0.003	0.003	0.003	1.110 ≤ 1.20	---

Dir 2: Torsional Flexibility does not Exist. √

EFFECTIVE MASS PARTICIPATION RATIO CHECK:

(EN 1998-1 - Cl. 4.3.3.3.1(3))

Mode	Dir	Ex+		Ex-		Ey+		Ey-	
1	X	99.604	> 90 √	99.604	> 90 √	99.604	> 90 √	99.604	> 90 √
	Y	0.000		0.000		0.000		0.000	
	Rot	0.001		0.001		0.001		0.001	
2	X	99.604	> 90 √	99.604	> 90 √	99.604	> 90 √	99.604	> 90 √
	Y	99.351	> 90 √	99.351	> 90 √	99.351	> 90 √	99.351	> 90 √
	Rot	0.003		0.003		0.003		0.003	
3	X	99.605	> 90 √	99.605	> 90 √	99.605	> 90 √	99.605	> 90 √
	Y	99.351	> 90 √	99.351	> 90 √	99.351	> 90 √	99.351	> 90 √
	Rot	37.148		37.148		37.148		37.148	
4	X	99.605	> 90 √	99.605	> 90 √	99.605	> 90 √	99.605	> 90 √
	Y	99.351	> 90 √	99.351	> 90 √	99.351	> 90 √	99.351	> 90 √
	Rot	37.198		37.198		37.198		37.198	
5	X	99.611	> 90 √	99.611	> 90 √	99.611	> 90 √	99.611	> 90 √
	Y	99.351	> 90 √	99.351	> 90 √	99.351	> 90 √	99.351	> 90 √
	Rot	37.198		37.198		37.198		37.198	
6	X	99.614	> 90 √	99.614	> 90 √	99.614	> 90 √	99.614	> 90 √
	Y	99.351	> 90 √	99.351	> 90 √	99.351	> 90 √	99.351	> 90 √
	Rot	37.222		37.222		37.222		37.222	
7	X	99.614	> 90 √	99.614	> 90 √	99.614	> 90 √	99.614	> 90 √
	Y	99.744	> 90 √	99.744	> 90 √	99.744	> 90 √	99.744	> 90 √
	Rot	37.412		37.412		37.412		37.412	
8	X	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √
	Y	99.748	> 90 √	99.748	> 90 √	99.748	> 90 √	99.748	> 90 √
	Rot	42.145		42.145		42.145		42.145	
9	X	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √
	Y	99.748	> 90 √	99.748	> 90 √	99.748	> 90 √	99.748	> 90 √
	Rot	42.151		42.151		42.151		42.151	
10	X	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √
	Y	99.749	> 90 √	99.749	> 90 √	99.749	> 90 √	99.749	> 90 √
	Rot	44.764		44.764		44.764		44.764	
11	X	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √
	Y	99.749	> 90 √	99.749	> 90 √	99.749	> 90 √	99.749	> 90 √
	Rot	44.764		44.764		44.764		44.764	
12	X	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √
	Y	99.750	> 90 √	99.750	> 90 √	99.750	> 90 √	99.750	> 90 √
	Rot	44.789		44.789		44.789		44.789	
13	X	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √

	Y	99.753	> 90 √	99.753	> 90 √	99.753	> 90 √	99.753	> 90 √
	Rot	47.167		47.167		47.167		47.167	
14	X	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √
	Y	99.753	> 90 √	99.753	> 90 √	99.753	> 90 √	99.753	> 90 √
	Rot	47.516		47.516		47.516		47.516	
15	X	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √
	Y	99.755	> 90 √	99.755	> 90 √	99.755	> 90 √	99.755	> 90 √
	Rot	49.491		49.491		49.491		49.491	
16	X	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √
	Y	99.755	> 90 √	99.755	> 90 √	99.755	> 90 √	99.755	> 90 √
	Rot	50.037		50.037		50.037		50.037	
17	X	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √
	Y	99.757	> 90 √	99.757	> 90 √	99.757	> 90 √	99.757	> 90 √
	Rot	50.248		50.248		50.248		50.248	
18	X	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √	99.617	> 90 √
	Y	99.757	> 90 √	99.757	> 90 √	99.757	> 90 √	99.757	> 90 √
	Rot	50.258		50.258		50.258		50.258	
19	X	99.618	> 90 √	99.618	> 90 √	99.618	> 90 √	99.618	> 90 √
	Y	99.758	> 90 √	99.758	> 90 √	99.758	> 90 √	99.758	> 90 √
	Rot	50.266		50.266		50.266		50.266	
20	X	99.618	> 90 √	99.618	> 90 √	99.618	> 90 √	99.618	> 90 √
	Y	99.759	> 90 √	99.759	> 90 √	99.759	> 90 √	99.759	> 90 √
	Rot	50.310		50.310		50.310		50.310	
21	X	99.618	> 90 √	99.618	> 90 √	99.618	> 90 √	99.618	> 90 √
	Y	99.759	> 90 √	99.759	> 90 √	99.759	> 90 √	99.759	> 90 √
	Rot	50.486		50.486		50.486		50.486	
22	X	99.618	> 90 √	99.618	> 90 √	99.618	> 90 √	99.618	> 90 √
	Y	99.761	> 90 √	99.761	> 90 √	99.761	> 90 √	99.761	> 90 √
	Rot	50.689		50.689		50.689		50.689	
23	X	99.619	> 90 √	99.619	> 90 √	99.619	> 90 √	99.619	> 90 √
	Y	99.764	> 90 √	99.764	> 90 √	99.764	> 90 √	99.764	> 90 √
	Rot	51.364		51.364		51.364		51.364	
24	X	99.619	> 90 √	99.619	> 90 √	99.619	> 90 √	99.619	> 90 √
	Y	99.778	> 90 √	99.778	> 90 √	99.778	> 90 √	99.778	> 90 √
	Rot	53.820		53.820		53.820		53.820	
25	X	99.622	> 90 √	99.622	> 90 √	99.622	> 90 √	99.622	> 90 √
	Y	99.779	> 90 √	99.779	> 90 √	99.779	> 90 √	99.779	> 90 √
	Rot	68.180		68.180		68.180		68.180	
26	X	99.627	> 90 √	99.627	> 90 √	99.627	> 90 √	99.627	> 90 √
	Y	99.793	> 90 √	99.793	> 90 √	99.793	> 90 √	99.793	> 90 √
	Rot	68.205		68.205		68.205		68.205	
27	X	99.632	> 90 √	99.632	> 90 √	99.632	> 90 √	99.632	> 90 √
	Y	99.797	> 90 √	99.797	> 90 √	99.797	> 90 √	99.797	> 90 √
	Rot	74.517		74.517		74.517		74.517	
28	X	99.633	> 90 √	99.633	> 90 √	99.633	> 90 √	99.633	> 90 √
	Y	99.798	> 90 √	99.798	> 90 √	99.798	> 90 √	99.798	> 90 √
	Rot	75.947		75.947		75.947		75.947	
29	X	99.635	> 90 √	99.635	> 90 √	99.635	> 90 √	99.635	> 90 √
	Y	99.799	> 90 √	99.799	> 90 √	99.799	> 90 √	99.799	> 90 √
	Rot	76.911		76.911		76.911		76.911	
30	X	99.643	> 90 √	99.643	> 90 √	99.643	> 90 √	99.643	> 90 √
	Y	99.800	> 90 √	99.800	> 90 √	99.800	> 90 √	99.800	> 90 √
	Rot	79.138		79.138		79.138		79.138	
31	X	99.643	> 90 √	99.643	> 90 √	99.643	> 90 √	99.643	> 90 √
	Y	99.800	> 90 √	99.800	> 90 √	99.800	> 90 √	99.800	> 90 √
	Rot	79.144		79.144		79.144		79.144	
32	X	99.643	> 90 √	99.643	> 90 √	99.643	> 90 √	99.643	> 90 √
	Y	99.800	> 90 √	99.800	> 90 √	99.800	> 90 √	99.800	> 90 √
	Rot	79.149		79.149		79.149		79.149	
33	X	99.645	> 90 √	99.645	> 90 √	99.645	> 90 √	99.645	> 90 √

	Y	99.802	> 90 √	99.802	> 90 √	99.802	> 90 √	99.802	> 90 √
	Rot	80.211		80.211		80.211		80.211	
34	X	99.645	> 90 √	99.645	> 90 √	99.645	> 90 √	99.645	> 90 √
	Y	99.802	> 90 √	99.802	> 90 √	99.802	> 90 √	99.802	> 90 √
	Rot	80.273		80.273		80.273		80.273	
35	X	99.646	> 90 √	99.646	> 90 √	99.646	> 90 √	99.646	> 90 √
	Y	99.804	> 90 √	99.804	> 90 √	99.804	> 90 √	99.804	> 90 √
	Rot	81.053		81.053		81.053		81.053	
36	X	99.646	> 90 √	99.646	> 90 √	99.646	> 90 √	99.646	> 90 √
	Y	99.805	> 90 √	99.805	> 90 √	99.805	> 90 √	99.805	> 90 √
	Rot	81.312		81.312		81.312		81.312	
37	X	99.646	> 90 √	99.646	> 90 √	99.646	> 90 √	99.646	> 90 √
	Y	99.805	> 90 √	99.805	> 90 √	99.805	> 90 √	99.805	> 90 √
	Rot	84.506		84.506		84.506		84.506	
38	X	99.646	> 90 √	99.646	> 90 √	99.646	> 90 √	99.646	> 90 √
	Y	99.809	> 90 √	99.809	> 90 √	99.809	> 90 √	99.809	> 90 √
	Rot	84.667		84.667		84.667		84.667	
39	X	99.646	> 90 √	99.646	> 90 √	99.646	> 90 √	99.646	> 90 √
	Y	99.809	> 90 √	99.809	> 90 √	99.809	> 90 √	99.809	> 90 √
	Rot	85.051		85.051		85.051		85.051	
40	X	99.646	> 90 √	99.646	> 90 √	99.646	> 90 √	99.646	> 90 √
	Y	99.809	> 90 √	99.809	> 90 √	99.809	> 90 √	99.809	> 90 √
	Rot	87.014		87.014		87.014		87.014	
41	X	99.646	> 90 √	99.646	> 90 √	99.646	> 90 √	99.646	> 90 √
	Y	99.812	> 90 √	99.812	> 90 √	99.812	> 90 √	99.812	> 90 √
	Rot	87.106		87.106		87.106		87.106	
42	X	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √
	Y	99.813	> 90 √	99.813	> 90 √	99.813	> 90 √	99.813	> 90 √
	Rot	89.646		89.646		89.646		89.646	
43	X	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √
	Y	99.814	> 90 √	99.814	> 90 √	99.814	> 90 √	99.814	> 90 √
	Rot	89.855		89.855		89.855		89.855	
44	X	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √
	Y	99.814	> 90 √	99.814	> 90 √	99.814	> 90 √	99.814	> 90 √
	Rot	96.296		96.296		96.296		96.296	
45	X	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √
	Y	99.814	> 90 √	99.814	> 90 √	99.814	> 90 √	99.814	> 90 √
	Rot	96.763		96.763		96.763		96.763	
46	X	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √
	Y	99.824	> 90 √	99.824	> 90 √	99.824	> 90 √	99.824	> 90 √
	Rot	96.997		96.997		96.997		96.997	
47	X	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √
	Y	99.837	> 90 √	99.837	> 90 √	99.837	> 90 √	99.837	> 90 √
	Rot	97.180		97.180		97.180		97.180	
48	X	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √
	Y	99.837	> 90 √	99.837	> 90 √	99.837	> 90 √	99.837	> 90 √
	Rot	98.571		98.571		98.571		98.571	
49	X	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √
	Y	99.840	> 90 √	99.840	> 90 √	99.840	> 90 √	99.840	> 90 √
	Rot	99.414		99.414		99.414		99.414	
50	X	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √	99.647	> 90 √
	Y	99.845	> 90 √	99.845	> 90 √	99.845	> 90 √	99.845	> 90 √
	Rot	100.000		100.000		100.000		100.000	

Effective Mass Ratio satisfies the code requirements. √

SECOND ORDER EFFECTS REQUIREMENT CHECK:

h_i : Storey Height
Δ_{ave} : Average Relative Storey Drift ($\delta_{column,top}$ - $\delta_{column,bottom}$)
W_i : Storey Seismic Weight (W = G + nQ)

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ΣW_{i-n} : Total Seismic Weight
V_i : Storey Base Shear

EARTHQUAKE DIRECTION: 1 (Angle From X 0.000 Deg)

Load Case: **Ex+** (Modal Superposition Seismic X (E+))

Storey	h (m)	Δ_{ave} (m)	W_i (kN)	ΣW_{i-n} (kN)	V_i (kN)	$\Theta_i = (W_i * \Delta_i) / (V_i * h_i)$
Storey: 1	4.600	0.004	380.1	380.1	104.8	0.0031 ≤ 0.10 √

Load Case: **Ex-** (Modal Superposition Seismic X (E-))

Storey	h (m)	Δ_{ave} (m)	W_i (kN)	ΣW_{i-n} (kN)	V_i (kN)	$\Theta_i = (W_i * \Delta_i) / (V_i * h_i)$
Storey: 1	4.600	0.004	380.1	380.1	104.8	0.0031 ≤ 0.10 √

Dir 1: Second Order Effects are considered using code based slenderness methods. √

EARTHQUAKE DIRECTION: 2 (Angle From X 90.000 Deg)

Load Case: **Ey+** (Modal Superposition Seismic Y (E+))

Storey	h (m)	Δ_{ave} (m)	W_i (kN)	ΣW_{i-n} (kN)	V_i (kN)	$\Theta_i = (W_i * \Delta_i) / (V_i * h_i)$
Storey: 1	4.600	0.003	380.1	380.1	104.5	0.0025 ≤ 0.10 √

Load Case: **Ey-** (Modal Superposition Seismic Y (E-))

Storey	h (m)	Δ_{ave} (m)	W_i (kN)	ΣW_{i-n} (kN)	V_i (kN)	$\Theta_i = (W_i * \Delta_i) / (V_i * h_i)$
Storey: 1	4.600	0.003	380.1	380.1	104.5	0.0025 ≤ 0.10 √

Dir 2: Second Order Effects are considered using code based slenderness methods. √

MEMBER EFFECTIVE SECTION STIFFNESS FACTORS

Member Type	Elasticity Module	Axial Area		Bending Stiffness	Shear Area	Torsional Stiffness
Walls (Shell)	1.000	1.000	In-Plane Out-Of-Plane	1.000 0.500	0.500 0.500	0.500
Walls (Frame)	1.000	1.000	Major Dir Minor Dir	0.500 0.500	0.500 0.500	0.500
Basement Walls	1.000	1.000	In-Plane Out-Of-Plane	0.500 0.500	0.500 0.500	0.500
Slabs	1.000	1.000	In-Plane Out-Of-Plane	0.500 0.500	0.500 0.500	0.500
Columns	1.000	1.000		0.500	0.500	0.100
Beams	1.000	1.000		0.500	0.500	0.100
Coupling Beams	1.000	1.000		0.500	0.500	0.100

STOREY MASSES:

h : Storey Height
m, mr^2 : Storey Mass and Mass Moment of Inertia
G, Q : Sum of Dead and Live Loads in Storey
Qs : Sum of Snow Loads in Storey
W : Storey Seismic Weight (W = G + nQ)
Slab Stiffness : In-Plane / Out-of-Plane Reduction Factors

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Storey	h (m)	m (t)	mr^2 (t.m2)	G (kN)	Q (kN)	Qs (kN)	W (kN)	Storey Diaphragm	Storey FE Mesh	Slab Stiffness
1	4.600	38.008	0.000	380.1	182.1		380.1	None	None	
Total				380.1	182.1		380.1			

STOREY CENTER OF GRAVITY TABLE

B_x, B_y : Plan Width of Storeys
X_g, Y_g : Story Center of Gravity Coordinates
e_x, e_y : Eccentricities (Percent of Plan Width)

Storey	B_x (m)	X_g (m)	e_x (%)	B_y (m)	Y_g (m)	e_y (%)
1	15.500	7.756	5.00	15.600	7.794	5.00

EARTHQUAKE DYNAMIC INERTIA FORCES:

EARTHQUAKE DIRECTION: 1 (Angle From X 0.00 Deg)

q(1) = 4.0... Earthquake forces are calculated using this response reduction factor value.
Any reduction to this factor due to irregularities has been reflected to design forces.

Earthquake Load Case: Ex+

Storey	Fx (kN)	Fy (kN)	Fz (kN)	Mz (kN.m)	β_{tE} Fx (kN)	β_{tE} Fy (kN)	β_{tE} Fz (kN)	β_{tE} Mz (kN.m)
1	104.8	0.2	0.0	0.0	104.8	0.2	0.0	0.0
Total	104.8	0.2	0.0	0.0	104.8	0.2	0.0	0.0

Earthquake Load Case: Ex-

Storey	Fx (kN)	Fy (kN)	Fz (kN)	Mz (kN.m)	β_{tE} Fx (kN)	β_{tE} Fy (kN)	β_{tE} Fz (kN)	β_{tE} Mz (kN.m)
1	104.8	0.2	0.0	0.0	104.8	0.2	0.0	0.0
Total	104.8	0.2	0.0	0.0	104.8	0.2	0.0	0.0

EARTHQUAKE DIRECTION: 2 (Angle From X 90.00 Deg)

q(2) = 4.0... Earthquake forces are calculated using this response reduction factor value.
Any reduction to this factor due to irregularities has been reflected to design forces.

Earthquake Load Case: Ey+

Storey	Fx (kN)	Fy (kN)	Fz (kN)	Mz (kN.m)	β_{tE} Fx (kN)	β_{tE} Fy (kN)	β_{tE} Fz (kN)	β_{tE} Mz (kN.m)
1	-0.2	104.5	0.0	0.0	-0.2	104.5	0.0	0.0
Total	-0.2	104.5	0.0	0.0	-0.2	104.5	0.0	0.0

Earthquake Load Case: Ey-

Storey	Fx (kN)	Fy (kN)	Fz (kN)	Mz (kN.m)	β_{tE} Fx (kN)	β_{tE} Fy (kN)	β_{tE} Fz (kN)	β_{tE} Mz (kN.m)
1	-0.2	104.5	0.0	0.0	-0.2	104.5	0.0	0.0
Total	-0.2	104.5	0.0	0.0	-0.2	104.5	0.0	0.0

SEISMIC OVERTURNING CHECK:

h_i : Total Building Height measured from foundation level
F_1, F_2 : Earthquake forces
M_{a1}, M_{a2} : Overturning Moments
M_{p1}, M_{p2} : Resisting Moments at storey level

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d_1, d_2	: Moment arm of resisting forces to overturning
X_g, Y_g	: Story Center of Gravity Coordinates
W	: Storey Seismic Weight (W = G + nQ)

Earthquake effects are calculated using the following behaviour factors: q(1) = 4.00   q(2) = 4.00

OVERTURNING EFFECTS:

Storey	**h (m)**	**F_1 (kN)**	**M_{a1} (kN.m)**	**F_2 (kN)**	**M_{a2} (kN.m)**
Storey: 1	4.600	104.8	482.0	104.5	480.7
Total			482.0		480.7

RESISTING EFFECTS (Negative Earthquake Direction):

Storey	**W (kN)**	**d_1 (m)**	**M_{p1} (kN.m)**	**d_2 (m)**	**M_{p2} (kN.m)**
Storey: 1	380.1	7.756	2948.0	7.794	2962.4
Foundation	482.0		3813.0		3807.6
Total			6761.0		6770.0

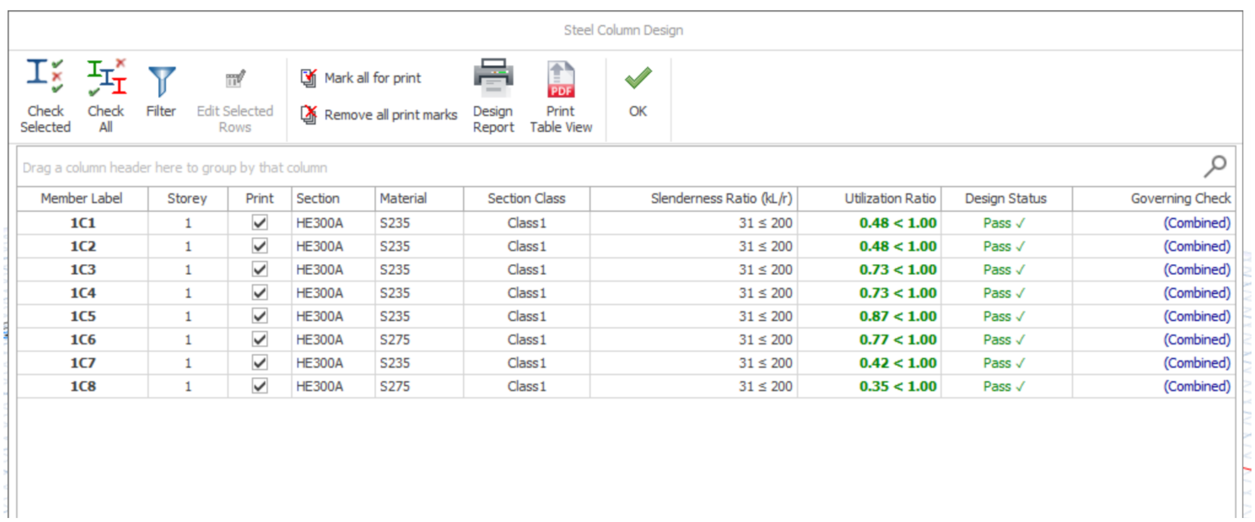
RESISTING EFFECTS (Positive Earthquake Direction):

Storey	**W (kN)**	**d_1 (m)**	**M_{p1} (kN.m)**	**d_2 (m)**	**M_{p2} (kN.m)**
Storey: 1	380.1	7.744	2943.2	7.806	2966.9
Foundation	482.0		3658.0		3711.6
Total			6601.2		6678.5

Overturning Check: Dir 1 ... M_{p1} / M_{a1} = 6601.2 / 482.0 = 13.6968 ≥ 2 Adequate √

Overturning Check: Dir 2 ... M_{p2} / M_{a2} = 6678.5 / 480.7 = 13.8921 ≥ 2 Adequate √

=



Member Label	Storey	Print	Section	Material	Section Class	Slenderness Ratio (kL/r)	Utilization Ratio	Design Status	Governing Check
1C1	1	✓	HE300A	S235	Class1	31 ≤ 200	0.48 < 1.00	Pass ✓	(Combined)
1C2	1	✓	HE300A	S235	Class1	31 ≤ 200	0.48 < 1.00	Pass ✓	(Combined)
1C3	1	✓	HE300A	S235	Class1	31 ≤ 200	0.73 < 1.00	Pass ✓	(Combined)
1C4	1	✓	HE300A	S235	Class1	31 ≤ 200	0.73 < 1.00	Pass ✓	(Combined)
1C5	1	✓	HE300A	S235	Class1	31 ≤ 200	0.87 < 1.00	Pass ✓	(Combined)
1C6	1	✓	HE300A	S275	Class1	31 ≤ 200	0.77 < 1.00	Pass ✓	(Combined)
1C7	1	✓	HE300A	S235	Class1	31 ≤ 200	0.42 < 1.00	Pass ✓	(Combined)
1C8	1	✓	HE300A	S275	Class1	31 ≤ 200	0.35 < 1.00	Pass ✓	(Combined)

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Steel Frame Member Design

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Type ▲

Member Label	Storey	Print	Section	Material	Section Class	Slenderness Ratio (kL/r)	Deflection (mm)	Utilization Ratio	Design Status	Governing Check
Type: Beam										
1F1	1	☑	IPE360	S235	Class1	51 ≤ 200	26.4 < 42.2 (L/180.0)	**0.77 < 1.00**	Pass ✓	(Combined)
1F3	1	☐	IPE400	S235	Class1	30 ≤ 200	33.2 < 42.2 (L/180.0)	**0.84 < 1.00**	Pass ✓	(Combined)
1F4	1	☐	IPE400	S355	Class1	48 ≤ 200	33.2 < 44.3 (L/180.0)	**0.75 < 1.00**	Pass ✓	(Deflection)
1F5	1	☐	IPE400	S275	Class1	30 ≤ 200	36.7 < 42.2 (L/180.0)	**0.87 < 1.00**	Pass ✓	(Deflection)
1F6	1	☑	IPE360	S235	Class1	51 ≤ 200	23.5 < 42.2 (L/180.0)	**0.62 < 1.00**	Pass ✓	(Combined)
1F7	1	☑	IPE360	S235	Class1	53 ≤ 200	23.5 < 44.3 (L/180.0)	**0.61 < 1.00**	Pass ✓	(Combined)
1F8	1	☐	IPE450	S355	Class1	29 ≤ 200	36.7 > 33.2 (L/240.0)	**1.10 ≥ 1.00**	Fail ✗	(Deflection)
1F2	1	☑	IPE360	S235	Class1	53 ≤ 200	26.4 < 44.3 (L/180.0)	**0.76 < 1.00**	Pass ✓	(Combined)
Type: Horizontal Brace										
1F15	1	☑	TUBO-D114.3X3.6	S235	Class1	135 ≤ 200	-	**0.11 < 1.00**	Pass ✓	(Axial Compression)
1F16	1	☑	TUBO-D114.3X3.6	S235	Class1	128 ≤ 200	-	**0.03 < 1.00**	Pass ✓	(Axial Tension)
1F17	1	☑	TUBO-D114.3X3.6	S235	Class1	135 ≤ 200	-	**0.10 < 1.00**	Pass ✓	(Axial Compression)
1F18	1	☑	TUBO-D114.3X3.6	S235	Class1	135 ≤ 200	-	**0.11 < 1.00**	Pass ✓	(Axial Compression)
1F19	1	☑	TUBO-D114.3X3.6	S235	Class1	128 ≤ 200	-	**0.03 < 1.00**	Pass ✓	(Axial Tension)
1F20	1	☑	TUBO-D114.3X3.6	S235	Class1	135 ≤ 200	-	**0.11 < 1.00**	Pass ✓	(Axial Compression)
1F9	1	☑	TUBO-D88.9X3.2	S275	Class1	175 ≤ 200	-	**0.08 < 1.00**	Pass ✓	(Axial Compression)
1F10	1	☑	TUBO-D88.9X3.2	S275	Class1	165 ≤ 0	-	**0.05 < 1.00**	Pass ✓	(Axial Tension)
1F11	1	☑	TUBO-D88.9X3.2	S275	Class1	175 ≤ 200	-	**0.11 < 1.00**	Pass ✓	(Axial Compression)
1F12	1	☑	TUBO-D88.9X3.2	S275	Class1	175 ≤ 200	-	**0.09 < 1.00**	Pass ✓	(Axial Compression)
1F13	1	☑	TUBO-D88.9X3.2	S275	Class1	165 ≤ 0	-	**0.05 < 1.00**	Pass ✓	(Axial Tension)
1F14	1	☑	TUBO-D88.9X3.2	S275	Class1	175 ≤ 200	-	**0.06 < 1.00**	Pass ✓	(Axial Compression)

Steel Brace Design

Check Selected | Check All | Filter | Mark all for print | Remove all print marks | Design Report | Print Table View | OK

Drag a column header here to group by that column

Member Label	Storey	Print	Section	Material	Section Class	Slenderness Ratio (kL/r)	Utilization Ratio	Design Status	Governing Check
1X1	1	☑	TUBO-D88.9X3.2	S275	Class1	219 > 200	**0.73 < 1.00**	Pass ✓	(Axial Compression)
1X2	1	☑	TUBO-D88.9X3.2	S275	Class1	219 > 200	**0.62 < 1.00**	Pass ✓	(Axial Compression)
1X3	1	☑	TUBO-D88.9X3.2	S275	Class1	211 > 200	**0.17 < 1.00**	Pass ✓	(Axial Compression)
1X4	1	☑	TUBO-D88.9X3.2	S275	Class1	211 > 200	**0.25 < 1.00**	Pass ✓	(Axial Compression)
1X5	1	☑	TUBO-D88.9X3.2	S275	Class1	219 > 200	**0.20 < 1.00**	Pass ✓	(Axial Compression)
1X6	1	☑	TUBO-D88.9X3.2	S275	Class1	219 > 200	**0.22 < 1.00**	Pass ✓	(Axial Compression)
1X7	1	☑	TUBO-D88.9X3.2	S275	Class1	215 > 200	**0.41 < 1.00**	Pass ✓	(Axial Compression)
1X8	1	☑	TUBO-D88.9X3.2	S275	Class1	215 > 200	**0.43 < 1.00**	Pass ✓	(Axial Compression)
1X9	1	☑	TUBO-D88.9X3.2	S275	Class1	207 > 200	**0.62 < 1.00**	Pass ✓	(Axial Compression)
1X10	1	☑	TUBO-D88.9X3.2	S275	Class1	207 > 200	**0.47 < 1.00**	Pass ✓	(Axial Compression)
1X11	1	☑	TUBO-D88.9X3.2	S275	Class1	215 > 200	**0.22 < 1.00**	Pass ✓	(Axial Compression)
1X12	1	☑	TUBO-D88.9X3.2	S275	Class1	215 > 200	**0.18 < 1.00**	Pass ✓	(Axial Compression)
1X13	1	☑	TUBO-D88.9X3.2	S275	Class1	176 ≤ 200	**0.90 < 1.00**	Pass ✓	(Axial Compression)
1X14	1	☑	TUBO-D88.9X3.2	S275	Class1	176 ≤ 200	**0.90 < 1.00**	Pass ✓	(Axial Compression)

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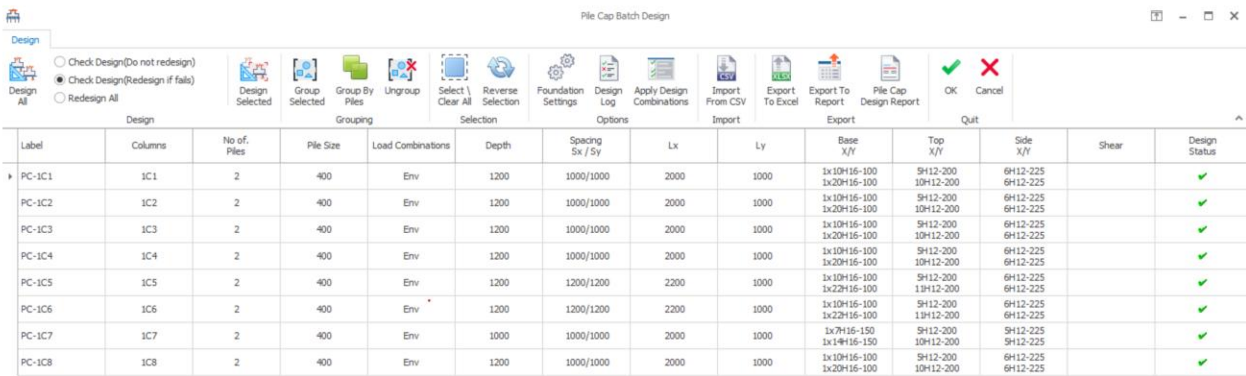
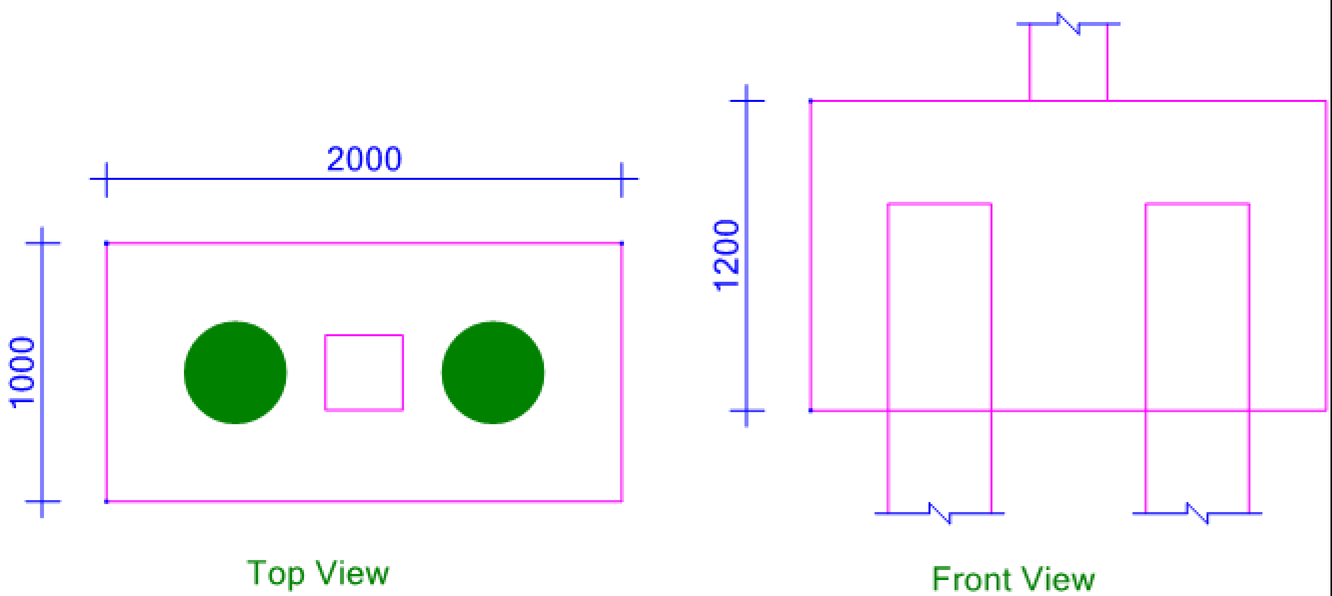


Label	Columns	No of. Piles	Pile Size	Load Combinations	Depth	Spacing Sx / Sy	Lx	Ly	Base X/Y	Top X/Y	Side X/Y	Shear	Design Status
PC-1C1	1C1	2	400	Env	1200	1000/1000	2000	1000	1x10H16-100 1x20H16-100	5H12-200 10H12-200	6H12-225 6H12-225		✔
PC-1C2	1C2	2	400	Env	1200	1000/1000	2000	1000	1x10H16-100 1x20H16-100	5H12-200 10H12-200	6H12-225 6H12-225		✔
PC-1C3	1C3	2	400	Env	1200	1000/1000	2000	1000	1x10H16-100 1x20H16-100	5H12-200 10H12-200	6H12-225 6H12-225		✔
PC-1C4	1C4	2	400	Env	1200	1000/1000	2000	1000	1x10H16-100 1x20H16-100	5H12-200 10H12-200	6H12-225 6H12-225		✔
PC-1C5	1C5	2	400	Env	1200	1200/1200	2200	1000	1x10H16-100 1x22H16-100	5H12-200 11H12-200	6H12-225 6H12-225		✔
PC-1C6	1C6	2	400	Env	1200	1200/1200	2200	1000	1x10H16-100 1x22H16-100	5H12-200 11H12-200	6H12-225 6H12-225		✔
PC-1C7	1C7	2	400	Env	1000	1000/1000	2000	1000	1x7H16-150 1x14H16-150	5H12-200 10H12-200	5H12-225 5H12-225		✔
PC-1C8	1C8	2	400	Env	1200	1000/1000	2000	1000	1x10H16-100 1x20H16-100	5H12-200 10H12-200	6H12-225 6H12-225		✔

Pile Cap Design

PC-1C1 Design Summary

Eurocode 2 (EN 1992) Design of Concrete Structures (Base Code)



Geometric Properties

Number of Piles	: 2
Shaft Type	: Circular
Pile Size	: 400.00

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Pile Penetration Distance : 800.00
Pile Distance (X/Y) : 1000.00 / 1000.00
Edge Distance (X/Y) : 300.00 / 300.00
Pile Cap Eccentricity (X/Y) : 0.00 / 0.00
Concrete Cover (Top/Bottom/Side) : 40.00 / 75.00 / 40.00

Column Shape : Rectangular
Column Size (B1/B2) : 300.00 / 290.00

Materials

Concrete Grade: C25/30	F_{cyl} = 25.00 N/mm2	F_{cu} = 30.00 N/mm2	E = 31000.0 N/mm2	U. Weight: 25.00 kN/m3
Rebar Grade: Grade 500 (Type 2)	F_{yk} = 500.00 N/mm2	F_{yd} = 434.78 N/mm2	E = 200000.0 N/mm2	
Link Grade: Grade 500 (Type 2)	F_{yk} = 500.00 N/mm2	F_{yd} = 434.78 N/mm2	E = 200000.0 N/mm2	

Analysis Options

Utilized Design Codes : Eurocode 2
Bending Moment Calculation Method : Cantilever
Effect of Column Dimensions on Bending : Excluded
Effect of Column Dimensions in Shear Span : Excluded
Deep Beam Theory : CIRIA
Banding Ratio (Effects Enhanced Shear Capacity) : Excluded

Pile Coordinates

Pile No						
	X	Y	X	Y	X	Y
1	500.00	0.00	0.00	0.00	500.00	0.00
2	-500.00	0.00	0.00	0.00	-500.00	0.00

Pile Capacities

Ultimate Compression Capacity : 150.0 kN
Ultimate Tension Capacity : 50.0 kN

Pile Axial Loads

Pile	Axial Load	EccX	EccY	M1	M2	V1	V2	Total Axial / Ulti. Capacity
1	65.8	0.0	0.0	-14.5	0.0	10.8	0.0	62.0 < 150.0 ✓
2	65.8	0.0	0.0	14.5	0.0	-10.8	0.0	69.5 < 150.0 ✓

Design Loads Transferred from Column(s)

Comb. No	Column	N	Vx	Vy	Mx	My	ΣN
Env	1C1	71.5	14.0	-59.9	-22.6	93.2	131.5

Design Checks

Load Combination: Env (Column: 1C1)

		Direction X	Direction Y
Pile Capacity Check		✓	✓
Base Design Moment	kN.m	34.8	0.0
Bending Design Result		✓	✓
Design Shear Force	kN	69.5	69.5
Distribution Depth Check	mm	0.96 > 0.75 ✓	✓
Column Base Face Perimeter Shear Stress Check	kN/m2	54.3 < 4381.8 ✓	
Shear Capacity (Shallow/Deep)	kN/m2	1188.4 / 2495.5	1188.4
Design Shear vs Shear Capacity	kN/m2	62.2 < 2495.5 ✓	31.1 < 1188.4 ✓
Longitudinal Reinforcement For Shear Check	kN/m2		0.0 < 0.0 ✓

Punching Shear Check Perimeter (1/2)	kN/m2	0.0 < 2721.5 ✓	
Max. Bearing Stress	kN/m2	3472.2 < 37878.8 ✓	0.0 < 37878.8 ✓

Design Summary

		Direction X	Direction Y
Spanning Theory (Min. Cantilever Span)		Deep Beam ✓	Shallow Beam ✓
Pile Capacity Check		✓	✓
Bending Design Result		✓	✓
Base Reinforcement (Provided vs Required)	mm2	2010.62 > 1489.83 ✓	4021.24 > 2979.67 ✓
Distribution Depth Check	mm	0.96 > 0.75 ✓	✓
Enhanced Shear Distance	mm	558.50	558.50
Shear Capacity (Shallow/Deep)	kN/m2	1188.4 / 2495.5	1188.4
Design Shear vs Shear Capacity	kN/m2	62.2 < 2495.5 ✓	31.1 < 1188.4 ✓
Longitudinal Reinforcement For Shear Check	kN/m2		0.0 < 0.0 ✓
Minimum Deep Beam Width	mm	25 ✓	25 ✓
Punching Shear Check Perimeter (1/2)	kN/m2	0.0 < 2721.5 ✓	

Spanning Theory (Max. Cantilever Span) is based on the max. cantilever span length and used to check longitudinal reinforcement for shear only. Spanning theory based on the min. cantilever span length is used for the rest of the calculations.

Reinforcement

	As-Prov / As-Req	Quantity	Diameter	Spacing	Spacing-2
Bottom Rebar (X-Dir)	2010.62 > 1489.83	10	H16	100	
Bottom Rebar (Y-Dir)	4021.24 > 2979.67	20	H16	100	
Side Rebar (X-Dir)		6	H16	225	
Side Rebar (Y-Dir)		6	H16	225	
Top Rebar (X-Dir)		5	H16	200	
Top Rebar (Y- Dir)		10	H16	200	

Rebar Design - Detailing Checks

	Status
Layer Spacing (X) = 150 < 300	√
Spacing (Y) = 100 > 100	√

PC-1C8 Design Summary

Eurocode 2 (EN 1992) Design of Concrete Structures (Base Code)

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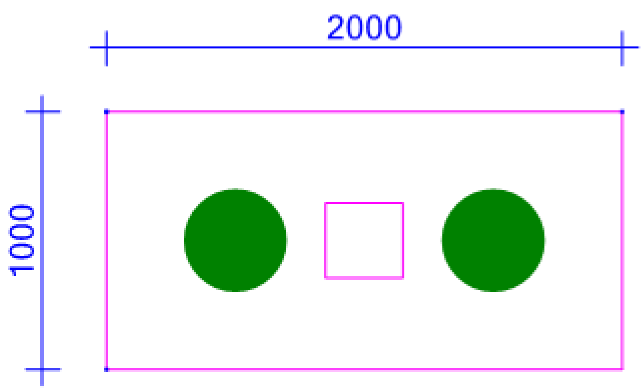
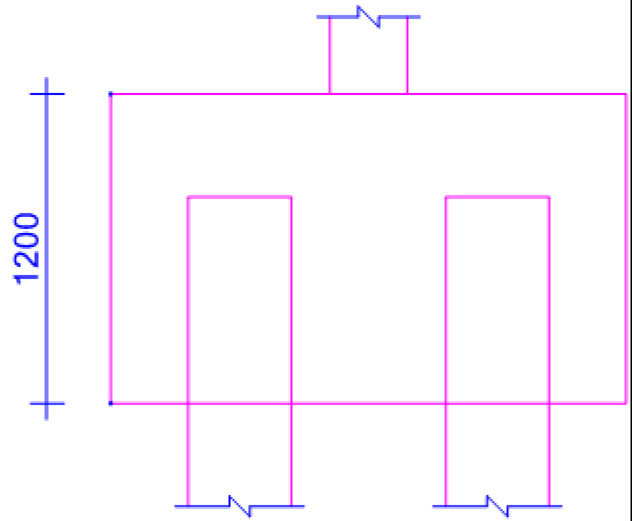


Top View



Front View

Geometric Properties

Number of Piles	: 2
Shaft Type	: Circular
Pile Size	: 400.00
Pile Penetration Distance	: 800.00
Pile Distance (X/Y)	: 1000.00 / 1000.00
Edge Distance (X/Y)	: 300.00 / 300.00
Pile Cap Eccentricity (X/Y)	: 0.00 / 0.00
Concrete Cover (Top/Bottom/Side)	: 40.00 / 75.00 / 40.00
Column Shape	: Rectangular
Column Size (B1/B2)	: 300.00 / 290.00

Materials

Concrete Grade: C25/30	F_{cyl} = 25.00 N/mm2	F_{cu} = 30.00 N/mm2	E = 31000.0 N/mm2	U. Weight: 25.00 kN/m3
Rebar Grade: Grade 500 (Type 2)	F_{yk} = 500.00 N/mm2	F_{yd} = 434.78 N/mm2	E = 200000.0 N/mm2	
Link Grade: Grade 500 (Type 2)	F_{yk} = 500.00 N/mm2	F_{yd} = 434.78 N/mm2	E = 200000.0 N/mm2	

Analysis Options

Utilized Design Codes	: Eurocode 2
Bending Moment Calculation Method	: Cantilever
Effect of Column Dimensions on Bending	: Excluded
Effect of Column Dimensions in Shear Span	: Excluded
Deep Beam Theory	: CIRIA
Banding Ratio (Effects Enhanced Shear Capacity)	: Excluded

Pile Coordinates

Pile No						
	X	Y	X	Y	X	Y
1	500.00	0.00	0.00	0.00	500.00	0.00
2	-500.00	0.00	0.00	0.00	-500.00	0.00

Pile Capacities

Ultimate Compression Capacity	: 150.0 kN
Ultimate Tension Capacity	: 50.0 kN

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Pile Axial Loads

Pile	Axial Load	EccX	EccY	M1	M2	V1	V2	Total Axial / Ulti. Capacity
1	60.5	0.0	0.0	14.5	0.0	-10.8	0.0	64.1 < 150.0 ✓
2	60.5	0.0	0.0	-14.5	0.0	10.8	0.0	56.8 < 150.0 ✓

Design Loads Transferred from Column(s)

Comb. No	Column	N	Vx	Vy	Mx	My	ΣN
Env	1C8	60.9	-14.1	51.7	22.6	-85.9	120.9

Design Checks

Load Combination: Env (Column: 1C8)

		Direction X	Direction Y
Pile Capacity Check		✓	✓
Base Design Moment	kN.m	32.1	0.0
Bending Design Result		✓	✓
Design Shear Force	kN	64.1	64.1
Distribution Depth Check	mm	0.96 > 0.75 ✓	✓
Column Base Face Perimeter Shear Stress Check	kN/m2	46.2 < 4381.8 ✓	
Shear Capacity (Shallow/Deep)	kN/m2	1188.4 / 2495.5	1188.4
Design Shear vs Shear Capacity	kN/m2	57.4 < 2495.5 ✓	28.7 < 1188.4 ✓
Longitudinal Reinforcement For Shear Check	kN/m2		0.0 < 0.0 ✓
Punching Shear Check Perimeter (1/2)	kN/m2	0.0 < 2721.5 ✓	
Max. Bearing Stress	kN/m2	3204.0 < 37878.8 ✓	0.0 < 37878.8 ✓

Design Summary

		Direction X	Direction Y
Spanning Theory (Min. Cantilever Span)		Deep Beam ✓	Shallow Beam ✓
Pile Capacity Check		✓	✓
Bending Design Result		✓	✓
Base Reinforcement (Provided vs Required)	mm2	2010.62 > 1489.83 ✓	4021.24 > 2979.67 ✓
Distribution Depth Check	mm	0.96 > 0.75 ✓	✓
Enhanced Shear Distance	mm	558.50	558.50
Shear Capacity (Shallow/Deep)	kN/m2	1188.4 / 2495.5	1188.4
Design Shear vs Shear Capacity	kN/m2	57.4 < 2495.5 ✓	28.7 < 1188.4 ✓
Longitudinal Reinforcement For Shear Check	kN/m2		0.0 < 0.0 ✓
Minimum Deep Beam Width	mm	20 ✓	20 ✓
Punching Shear Check Perimeter (1/2)	kN/m2	0.0 < 2721.5 ✓	

Spanning Theory (Max. Cantilever Span) is based on the max. cantilever span length and used to check longitudinal reinforcement for shear only. Spanning theory based on the min. cantilever span length is used for the rest of the calculations.

Reinforcement

	As-Prov / As-Req	Quantity	Diameter	Spacing	Spacing-2
Bottom Rebar (X-Dir)	2010.62 > 1489.83	10	H16	100	
Bottom Rebar (Y-Dir)	4021.24 > 2979.67	20	H16	100	
Side Rebar (X-Dir)		6	H16	225	
Side Rebar (Y-Dir)		6	H16	225	
Top Rebar (X-Dir)		5	H16	200	
Top Rebar (Y- Dir)		10	H16	200	

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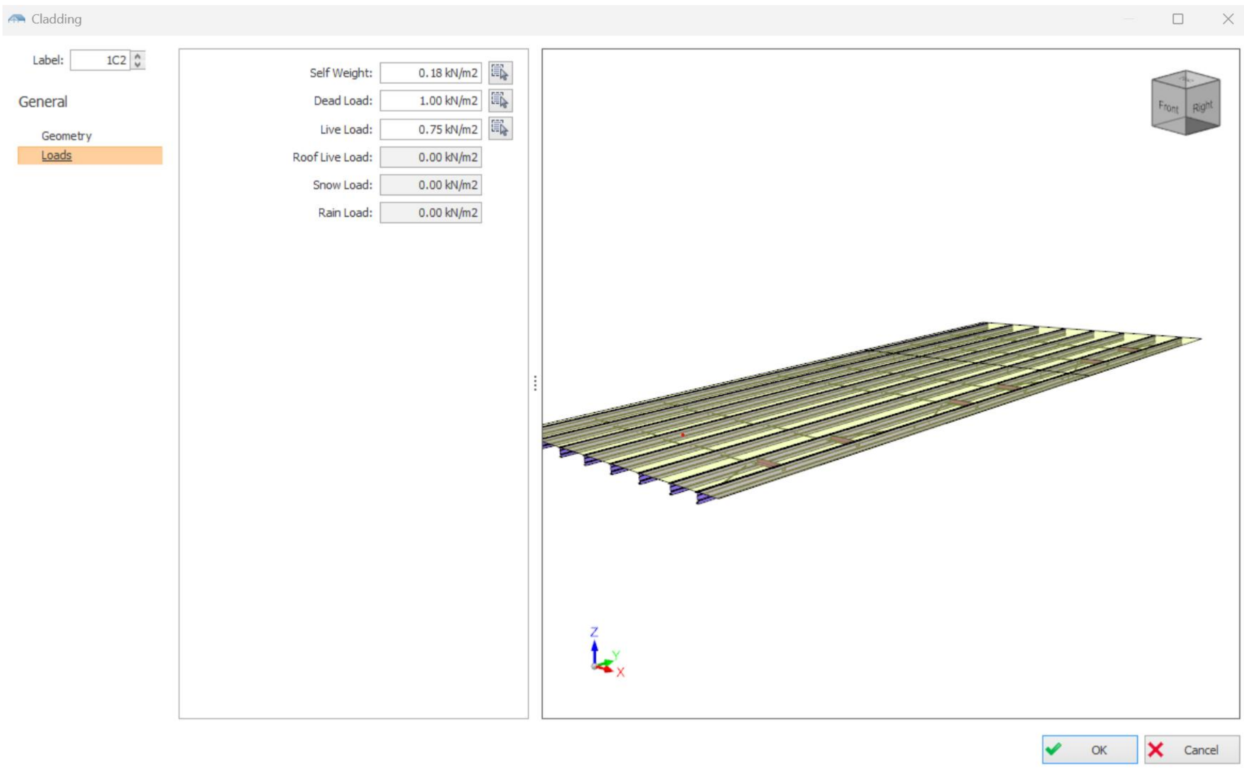
Rebar Design - Detailing Checks

	Status
Layer Spacing (X) = 150 < 300	√
Spacing (Y) = 100 > 100	√



Shenime te pergjithsme:

1. ***Gjate shpimit te pilotes se pare te thirret konstruktori per te vleresuar shtresat gjeologjike***
2. ***Percaktimi I themeleve me pilota per kolonat eshte perzgjedh per arsyen sepse ne pjesen me te madhe ne perimter ka murature tulle ekzistuese***

Hartoi raportin: Inxh. Orbori Jaho Lic.K.2670/3

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