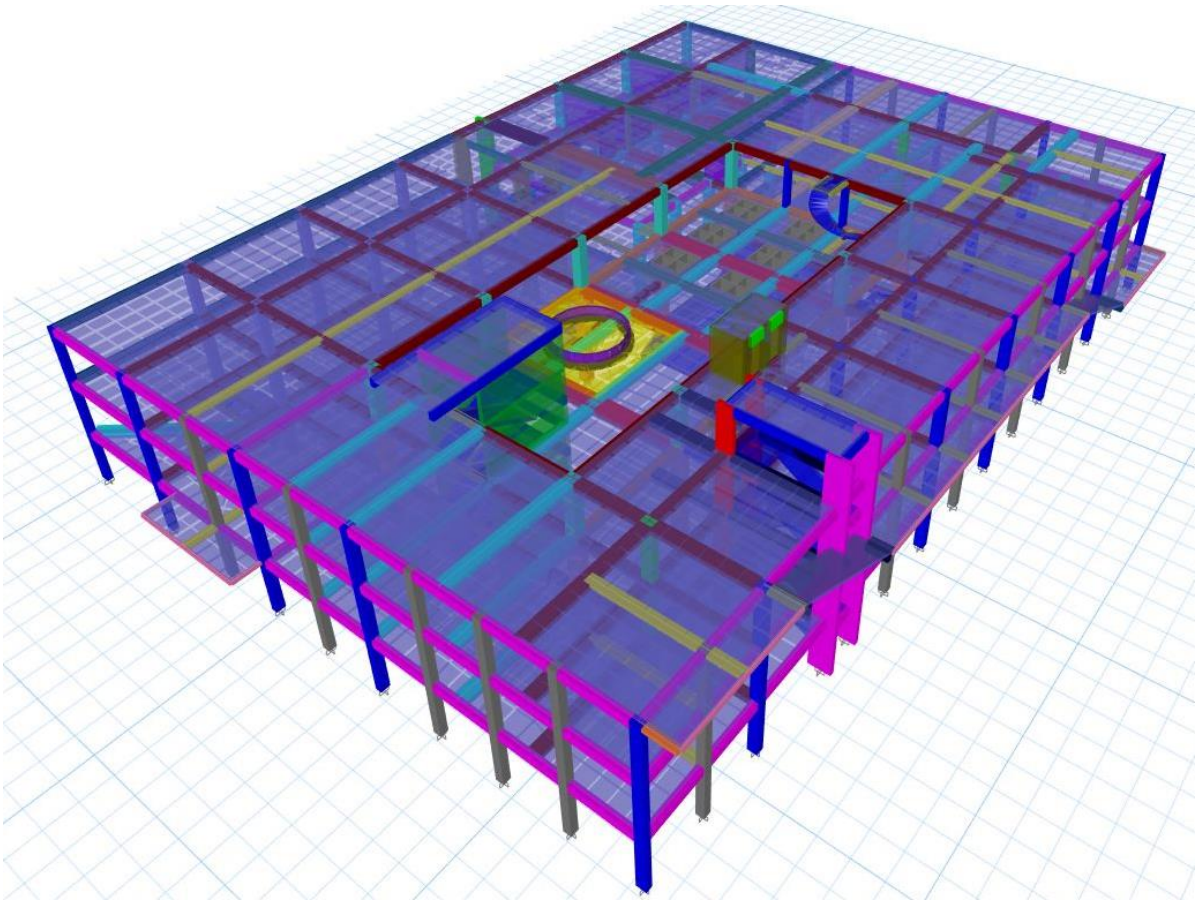
RAPORT TEKNIK

Mbi Llogaritjet Bazë Statike dhe Dinamike të Strukturës:

"NDËRTIMI I SHKOLLËS 9-VJECARE "PJETËR BUDI" ,

RRUGA "NIKOLLA LENA", TIRANË "



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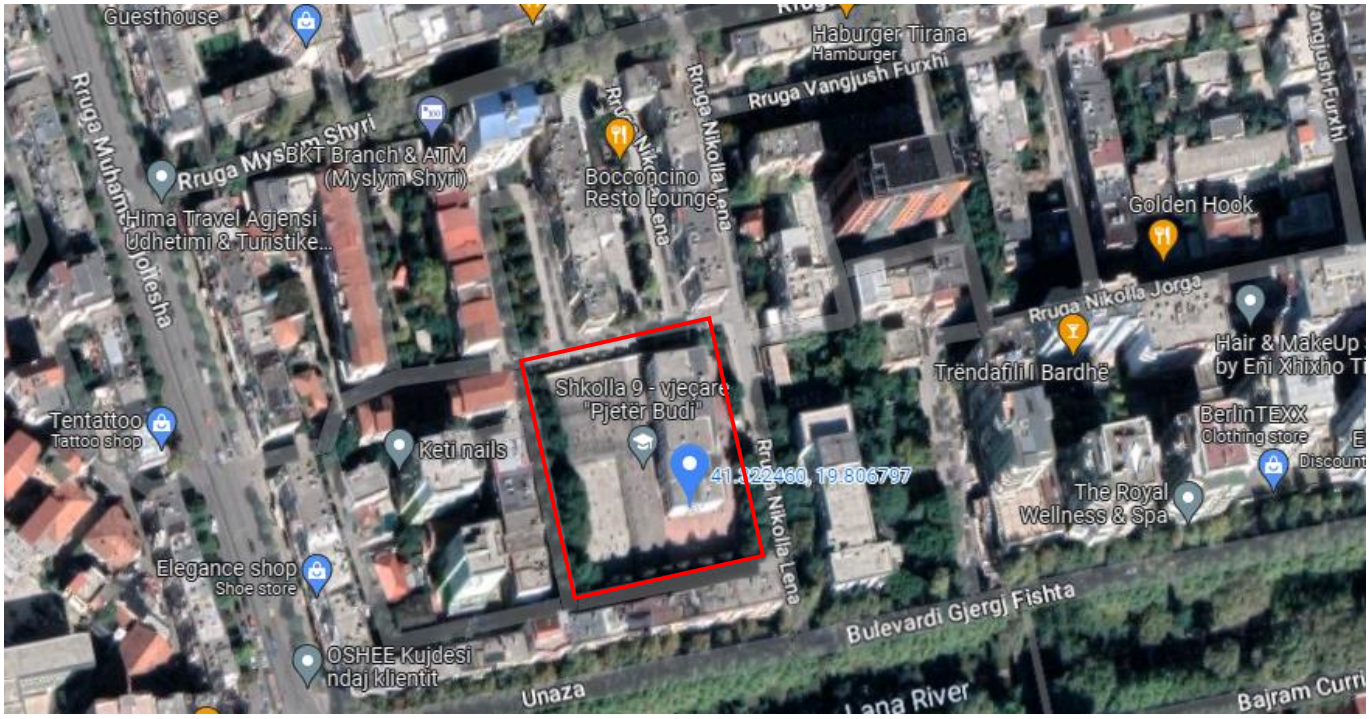
Lic. Nr.1510/2

Tirane, 2023

PERMBAJTJA:

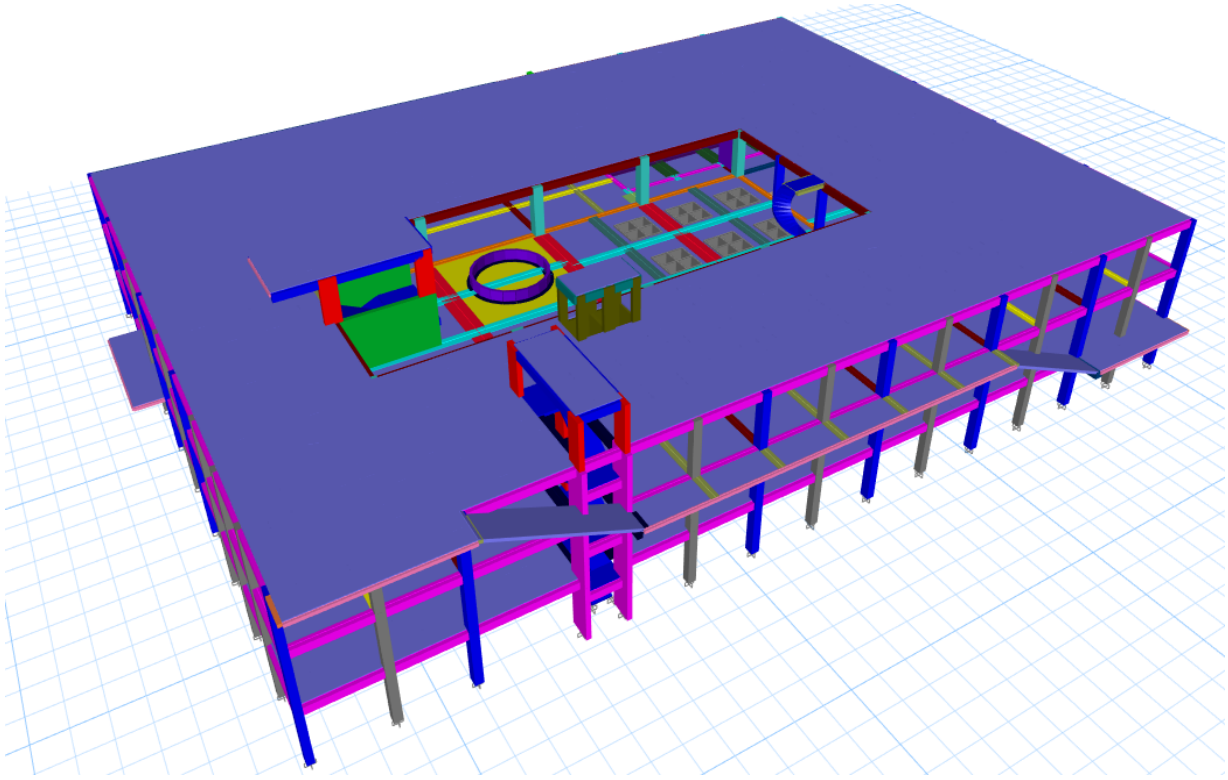
1. TE DHENA TE PERGJITHSHME

1.1. Vendndodhja e Objektit



Sheshi i ndërtimit ndodhet në Tiranë, në rrugën "Nikolla Lena", në vendodhjen e godinës së vjetër ekzistuese të shkollës 9 - vjecare "Pjeter Budi".

1.2. Pershkrimi i Struktures se Objektit



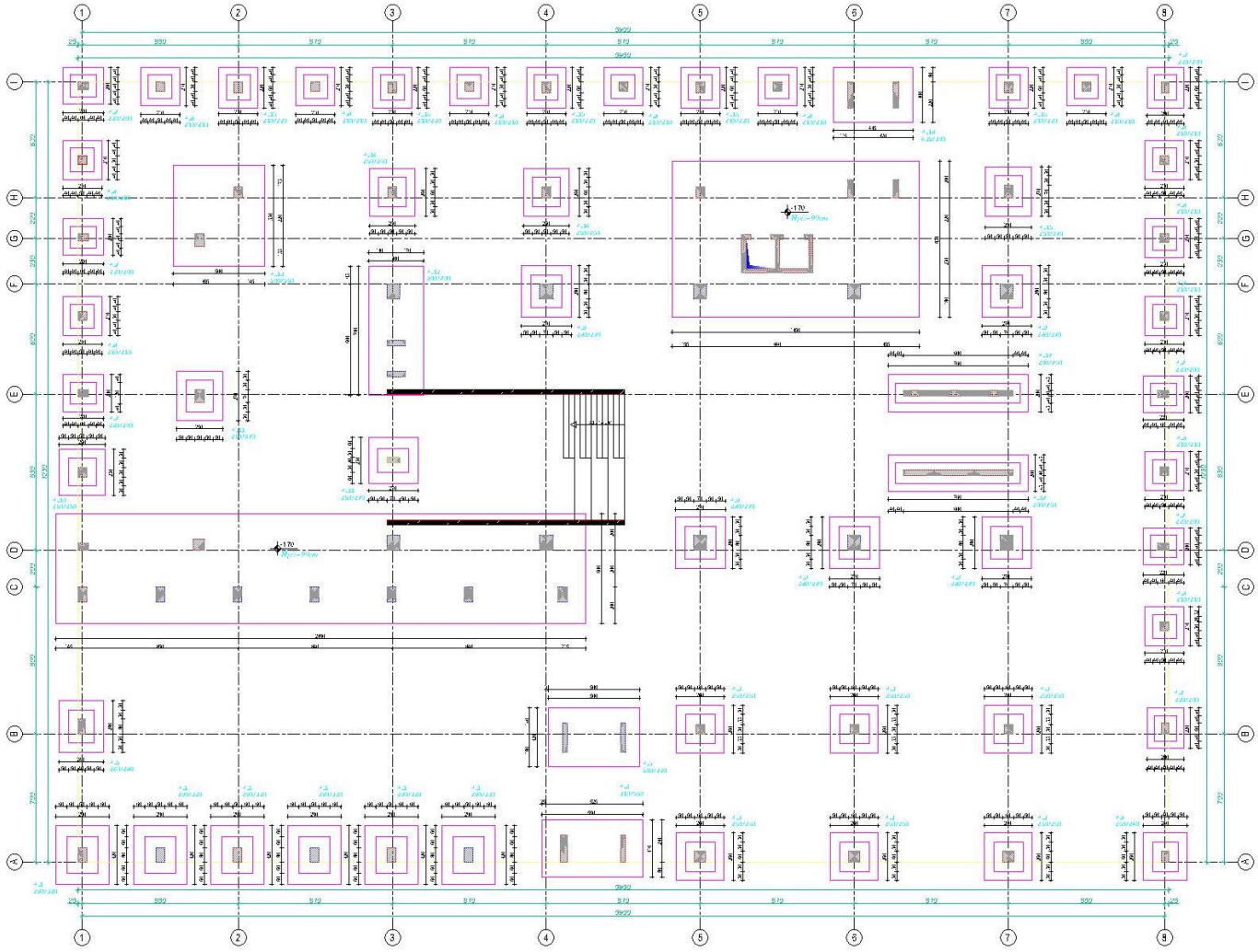
Modeli Matematikor 3 Permasor i Llogaritjes me Programe te Avancuara Kompjuterike

Objekti **"NDËRTIMI I SHKOLLËS 9-VJECARE "PJETËR BUDI"** perfaqeson nje objekt me 3 kate mbi toke. Objekti eshte i pa rregullt ne plan dhe ne vertikalitet. Destinacioni kryesor i tij eshte ai i sherbimit si institucion arsimor.

Struktura eshte konceptuar me konstruksion mbajtes te perbere, dual system me mure dhe rama beton arme. (EC8 Dual System), ku ngarkesa sizmike perballohet kryesisht nga muret dhe kolonat beton arme. Objekti i jep prioritet te dy drejtimeve perpendikulare me njeri tjetrin, per garantimin e zhvendosjeve te lejuara nga veprimet e ngarkesave te jashme, kryesisht atyre sizmike. Elementet konstruktive jane llogaritur dhe dimensionuar nen veprimin e ngarkesave maksimale te mundshme sipas kombinimit te ngarkesave. Gjate procesit te analizes te kesaj ndertese, eshte vendosur, qe struktura te modelohet me programin e avancuara kompjuterike, ***ETABS ULTIMATE 2018***.

Objekti perfaqeson nje strukture beton arme, te pa ndare me fuge, i cili paraqitet i pa rregullt ne plan dhe ne vertikalitet sipas EN 1998 1 2004: 4.2.3.2 dhe 4.2.3.3.

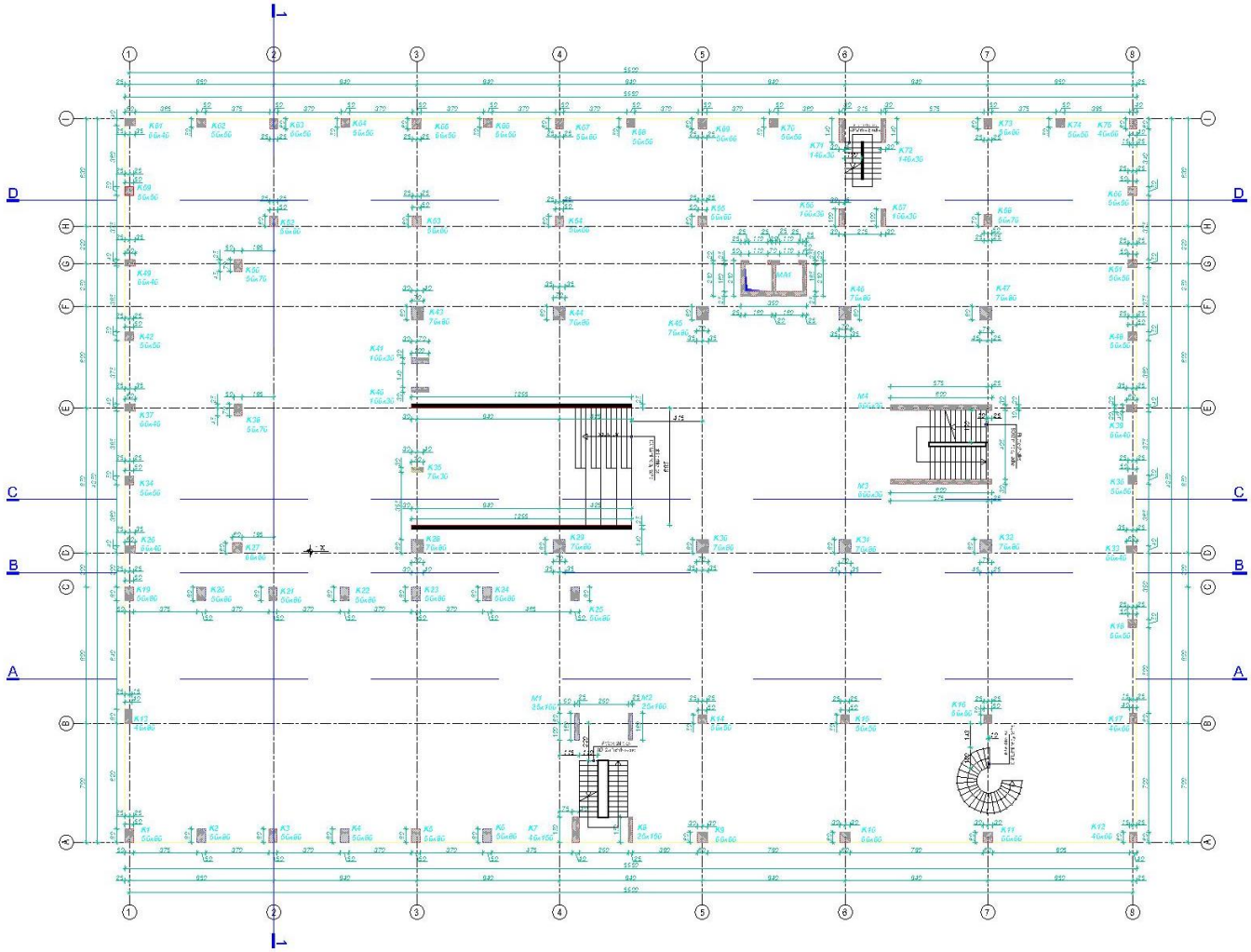
Themeli eshte projektuar me plinta te vecuar me trare lidhes ndermjet tyre. Permasimi i tyre eshte bere ne funksion te ngarkesave perkatese dhe vetive fiziko mekanike te terrenit. Kryesisht jane me permasa ne plane bxh = 270x250 cm, bxh = 290x320 cm, bxh = 260x260 cm, bxh = 270x280 cm, bxh = 210x210 cm, etj.



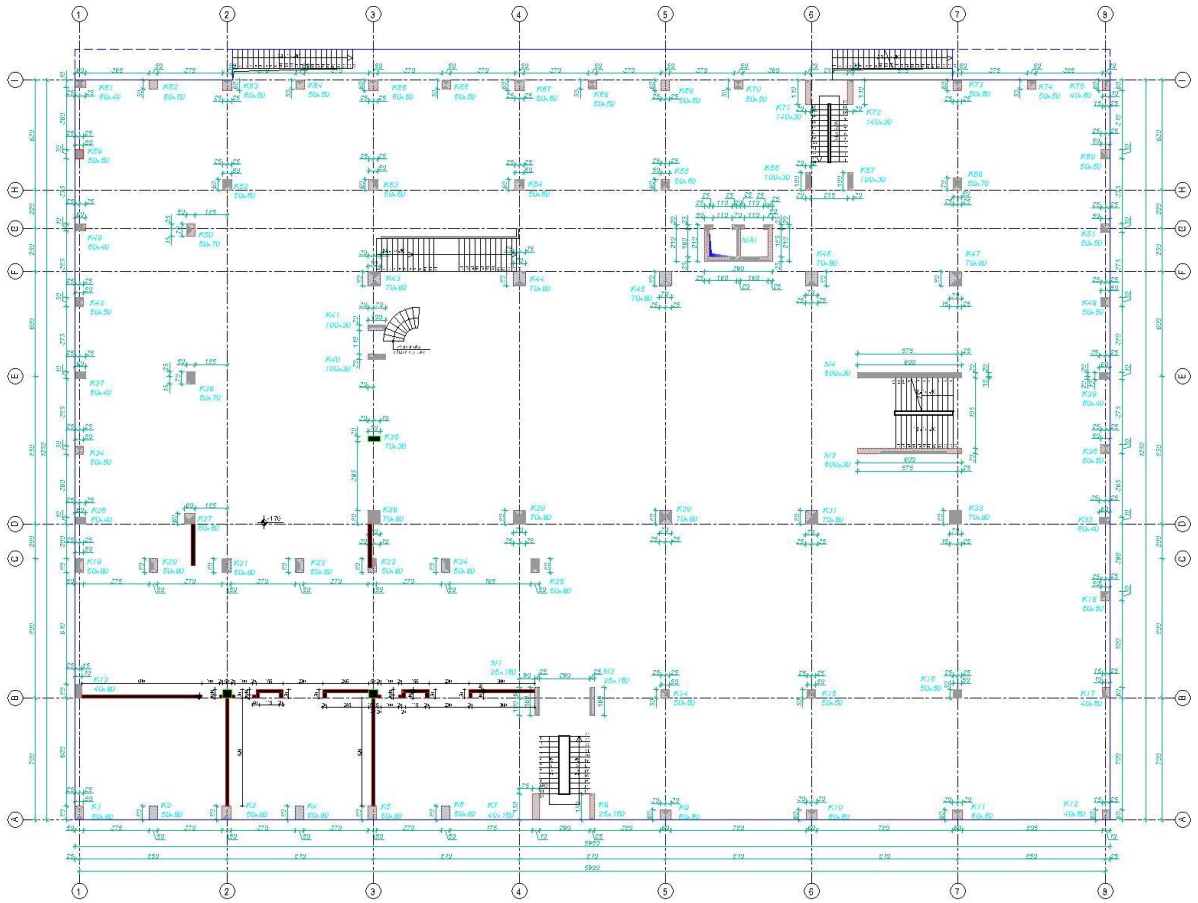
-Plani i Vendosjes dhe Piketimit te Plintave

Kolonat, jane projektuar me prerje terthore drejtkendore kryesisht me permasa si me poshte:

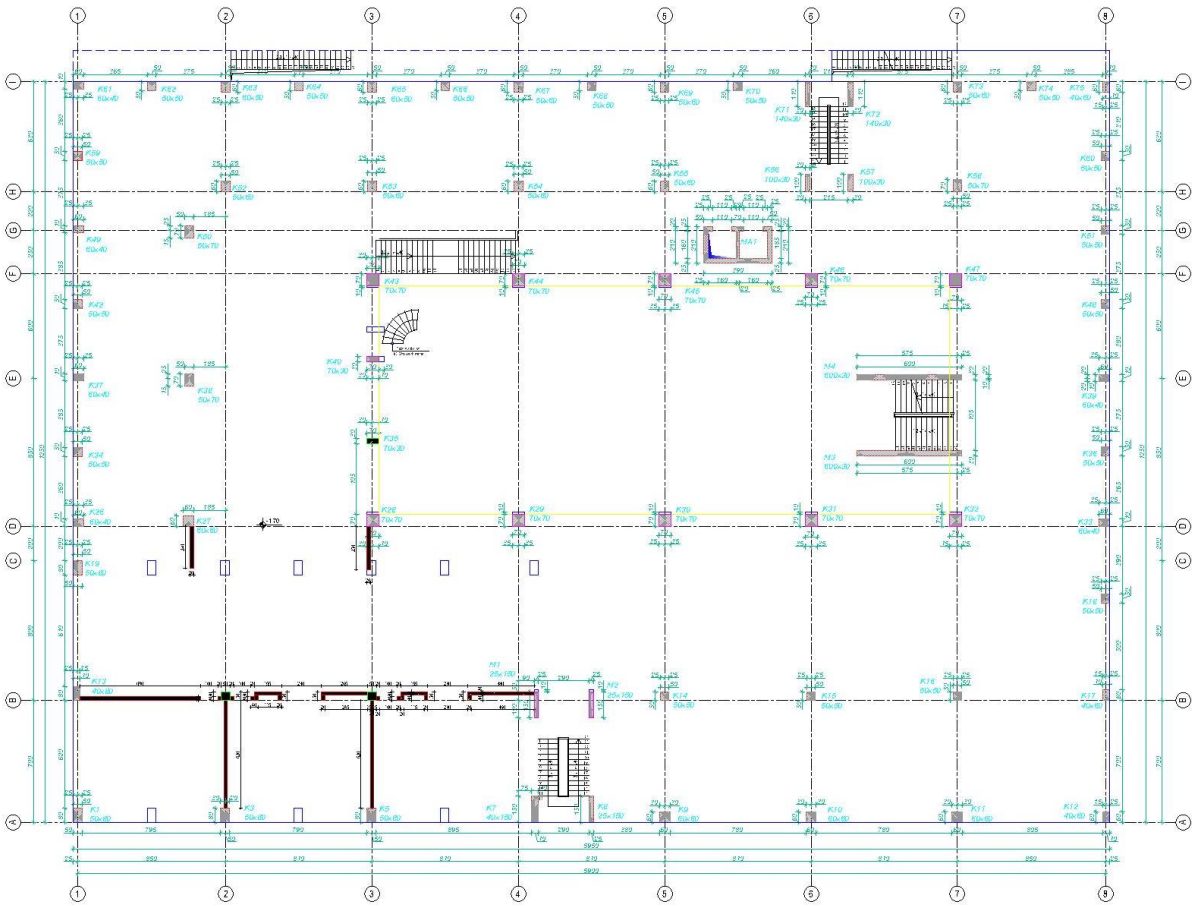
Kati	Permasat e Kolonave
Kati Perdhe	b x h = 140x30cm, b x h = 100x30cm, b x h = 70x80cm, b x h = 50x80cm, b x h = 60x60cm, b x h = 50x50cm, b x h = 40x60cm, b x h = 50x70cm
Kati 1	b x h = 140x30cm, b x h = 100x30cm, b x h = 70x80cm, b x h = 50x80cm, b x h = 60x60cm, b x h = 50x50cm, b x h = 40x60cm, b x h = 50x70cm
Kati 2	b x h = 140x30cm, b x h = 100x30cm, b x h = 70x70cm, b x h = 50x80cm, b x h = 60x60cm, b x h = 50x50cm, b x h = 40x60cm, b x h = 50x70cm



- *Plani i Piketimit te Kolonave ne Kuoten -0.15 m dhe +3.69 m*



- *Plani i Piketimit te Kolonave ne Kuoten +7.53 m*

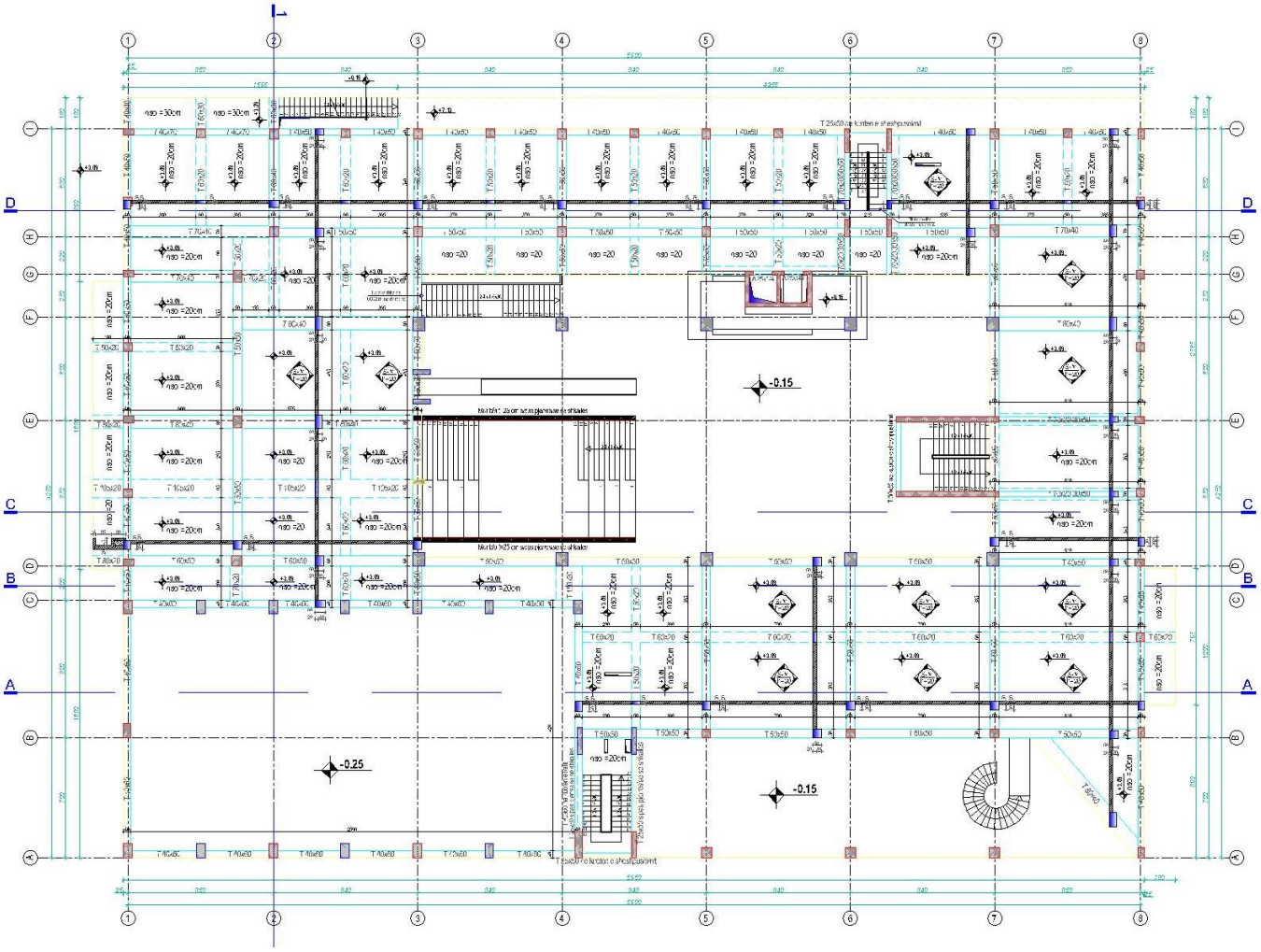


- *Plani i Piketimit te Kolonave ne Kuoten +11.27 m*

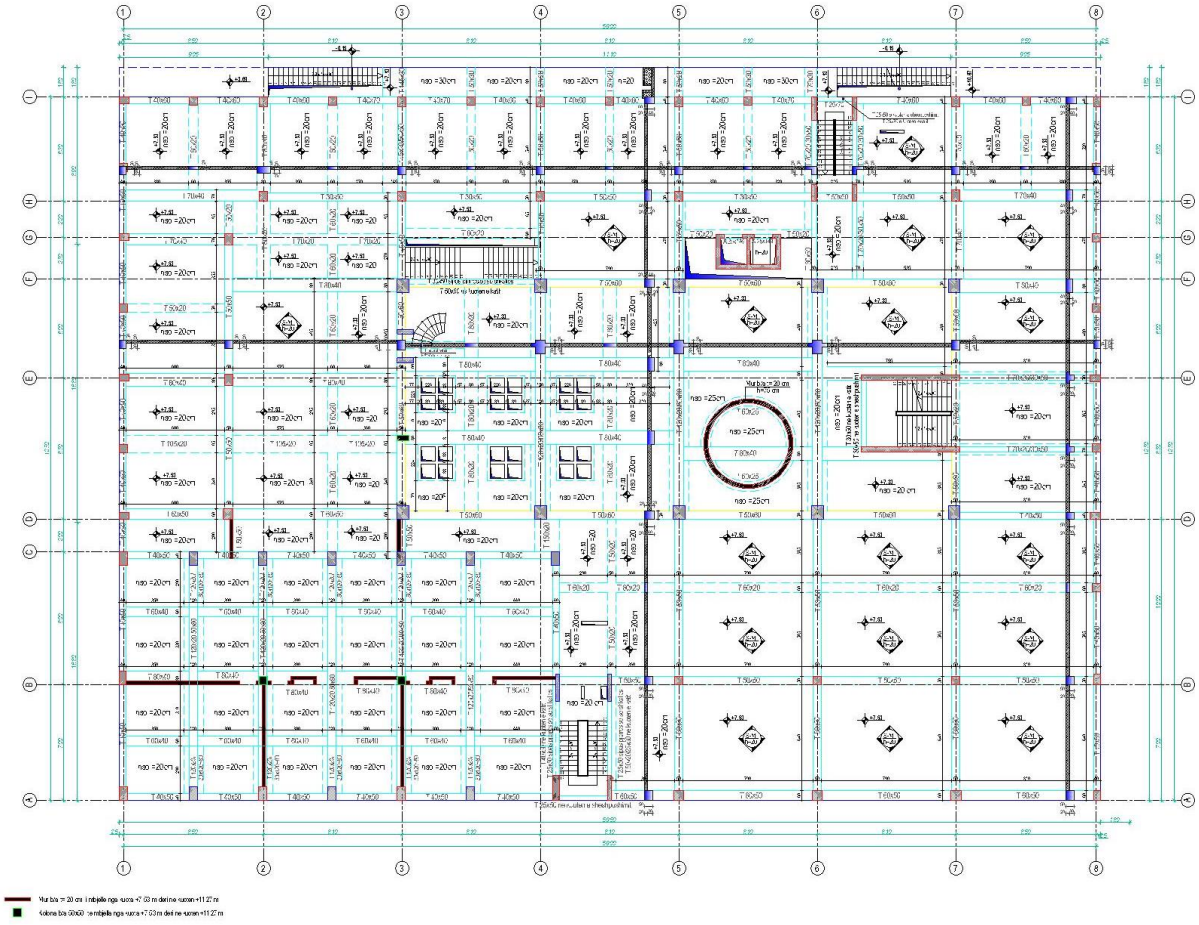
Muret, jane kryesisht me trashesi t= 25 cm, t=30 cm.

Traret, Nje pjese e trareve te perdorur jane me prerje terthore drejtkendore me dimensione bxh = 80x40cm, bxh = 70 x 40 cm, bxh = 60 x 40 cm, bxh = 60 x 50 cm, bxh = 50 x 50 cm, bxh = 40 x 60 cm, bxh = 40 x 50 cm, bxh = 105 x 20 cm, bxh = 60 x 20 cm etj. Gjithashtu ne katet e pare te objektit jane perdorur edhe trare me prerje terthore “T” me permasa bxh/bxh= 120 x 20 / 50 x 80 cm, bxh/bxh=120 x 20 / 50 x 120 ~ 80 cm, bxh/bxh= 120 x 20 / 60 x 80, bxh/bxh=70 x 20 / 30 x 50. Vendosja e trareve petashuq ne objekt eshte kushtezuar nga kerkesa arkitektonike per te patur nje siperfaqe te rrafshet tavani ne disa ambjentet.

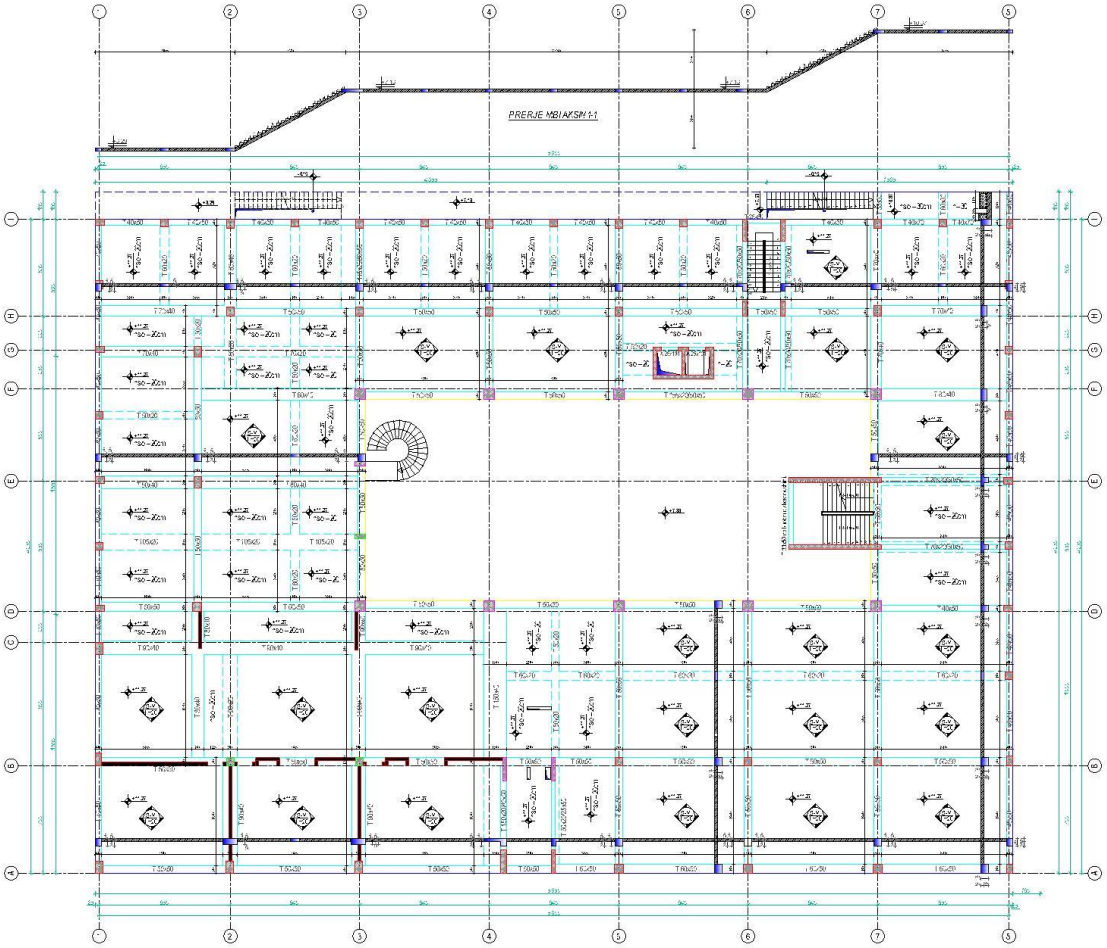
Soletat, jane projektuar monolite, tip kesone me trashesi 20 cm. Zgjedhja e tyre ka si qellim nje shperndarje me te mire te ngarkesave, qe veprojne mbi te, neper traret e objektit dhe per te siguruar me mire rolin e tyre si nje diafragme horizontale.



Plani i Strukturave ne Kuoten +3.69 m



- *Plani i Strukturave ne Kuoten +7.53 m*



- *Plani i Strukturave ne Kuoten +11.27 m*

1.3. TE DHENA GJEOLOGJIKE DHE SIZMIKE TE SHESHIT TE NDERTIMIT

1.3.1. Gjeologjia e Zones

Per sheshin e ndertimit te objektit ne fjale dhe per qellime te projektimit te ndertesave me destinacion sherbime komerciale mbi kete shesh, jane perdorur te dhena te marra nga studimi "Raport Gjeologo-Inxhinierik i Sheshit te Ndertimit per "Ndertim i Shkolles 9-Vjeçare "Pjeter Budi", ne Rrugen "Nikolla Lena" ", kryer nga **"ALTEA & GEOSTUDIO 2000"** me autor: Ing. Gjeolog Skender Hallkja, etj.

1.3.2. Shtresat perberese te bazamentit

Te dhenat gjeologjike jane marre nga nje studim i kryer ne sheshin e objektit tone, "Raport Gjeologo-Inxhinierik i Sheshit te Ndertimit per "Ndertim i Shkolles 9-Vjeçare "Pjeter Budi", ne Rrugen "Nikolla Lena"" kryer nga **"ALTEA & GEOSTUDIO 2000"** me autor: Ing. Gjeolog Skender Hallkja, etj. Duke permbledhur materialet e studimeve te ndryshme te shqyrtuara dhe duke u mbeshtetur edhe ne Harten Gjeologjike te qytetit te Tiranes si dhe ne studime te shumta te kryera nga instituti i Gjeologji Miniera 1965 – 1990, eshte pranuar profili stratigrafik i meposhtem, perfaqesuar nga disa shtresa gjeologjike me veti dhe karakteristika te ndryshme. Profili i detajuar si dhe karakteristikat dhe vetite e shtresave, jepen ne menyre te detajuar ne raportin gjeologjik ne te ciline eshte bazuar ky Raport.

Bazuar ne vrojtimet fushore, perberjen litologjike te sheshit te ndertimit, provat "INSITU" dhe karakteristikat fiziko-mekanike te dherave dhe shkembinjve qe takohen ne sheshin e studiuar, kemi veçuar 4 (kater) shtresa, te cilat po i trajtojme ne veçanti me poshte:

Shtresa Nr.1 Perfaqesohet nga: Mbushje dheu dhe zhavorre, kryer nga veprimtaria e njeriut, mbetje inerte te materialeve te ndertimit suargjila dhe surera me ngjyre kafe ne gri. Jane pak te ngjeshura.
Rekomandojme qe ne kete shtrese te mos mbeshteten themele te objektit. Kjo eshte e vlefshme edhe per ndertimet me lartesi te vogel. Takohet ne thellesite: shiko prerjet gjeologolitologjike.

Shtresa Nr.2 Perfaqesohet nga: Suargjila te mesme deri te lehta ngjyre bezhe ne kafe, te kuqerremte me lageshti plastike. Permbajne shtresa te holla rere, surere, guricka te vogla dhe zaje zhavorri. Jane mesatarisht te ngjeshura. Takohet ne thellesite: shiko prerjet gjeologo-litologjike.
Karakteristikat fiziko-mekanike per kete shtrese jane:

Perberja granulometrike

Fraksioni argjilor	< 0.002 mm	32.70 %
Fraksioni pluhuror	0.002-0.075 mm	36.50 %
Fraksioni rere	< 4.75 mm	20.90 %
Fraksioni zhavorror	> 4.75mm	9.90%

Plasticiteti

Kufiri i siperm i plasticitetit	Wrr = 41.60 %
Kufiri i poshtem i plasticitetit	Wp = 21.30 %
Numri i plasticitetit	Ip = 20.30
Lageshtia natyrore	Wn = 23.80 %
Pesha specifike	d = 2.67 T/m3
Pesha volumore ne gjendje natyrale	D = 1.96 T/m3
Koeficienti i porozitetit	$\varepsilon = 0.67$
Grada e lageshtise	G = 0.90
Moduli i kompresionit oedometrike	E = 94.60 kg/cm2
Kendi i ferkimit te brendshem	$\varphi = 19^{o}$

Kohezioni	C = 0.21 kg/ cm2
Ngarkesa e lejuar ne shtypje	σ = 1.80 kg/cm2
Numri mesatar i goditjeve te SPT per 30cm	Nspt = 12-14

Shtresa Nr.3 Perfaqesohet nga: Surera me ngjyre bezhe ne kafe me lageshti, plastike te buta. Jane ne gjendje plastike te buta. Permbajne shtresa te holla suargjilash. Jane pak deri ne mesatarisht ngjeshura. Takohet ne thellesite: shiko prerjet gjeologo-litologjike. Karakteristikat fiziko-mekanike per kete shtrese jane:

Perberja granulometrike

Fraksioni argjilor	< 0.002 mm	26.40 %
Fraksioni pluhuror	0.002-0.075 mm	38.50 %
Fraksioni rere	< 4.75 mm	31.50 %
Fraksioni zhavorror	> 4.75mm	3.60%

Plasticiteti

Kufiri i siperm i plasticitetit	Wrr = 32.90 %
Kufiri i poshtem i plasticitetit	Wp = 21.60 %
Numri i plasticitetit	Ip = 11.30
Lageshtia natyrore	Wn = 20.90 %
Pesha specifike	d = 2.67 gr/cm^3
Pesha volumore ne gjendje natyrale	D = 1.98 gr/cm^3
Koeficienti i porozitetit	ε = 0.70
Moduli i kompresionit oedometrike	E = 85 kg/cm2
Kendi i ferkimit te brendshem	φ = 20^o
Kohezioni	C = 0.18 kg/ cm2
Ngarkesa e lejuar ne shtypje	σ = 1.60 kg/cm2
Numri mesatar i goditjeve te SPT per 30cm	Nspt = 12-14

Shtresa Nr.4 Perfaqesohet nga: Argjilite, alevrolite dhe ranore, me ngjyre gri, me pak lageshti, me çimentim mesatar deri te mire, jane me çarje. Jane shume te ngjeshura. Takohet ne thellesine: shiko prerjen gjeologjike. Karakteristikat fiziko-mekanike per kete shtrese te merren:

Perberja granulometrike

Lageshtia natyrore	Wn = 9.40 %
Pesha specifike	d = 2.63 T/m^3
Pesha volumore ne gjendje natyrale	D = 2.26 T/m^3
Moduli i kompresionit oedometrike	E = 348 kg/cm^2
Kendi i ferkimit te brendshem	φ = 28.90^o
Kohezioni	C = 0.54 kg/ cm^2
Ngarkesa e lejuar ne shtypje	σ = 3.50 kg/cm^2
Rezistenca ne shtypje nje boshtore	R_{sh} = 19 - 21 kg/cm^2
Numri mesatar i goditjeve te SPT per 30cm	Nspt = 62-38

Niveli i ujit nentokesor (N.U.N) eshte (-6.30)m nga siperfaqja e tokes. Ne periudhe me reshje niveli i ujit nentokesor do te ngrihet deri ne thellesine (-2.50)m. Jane ujra neutral nuk jane agresive karshi hekurit dhe betonit.

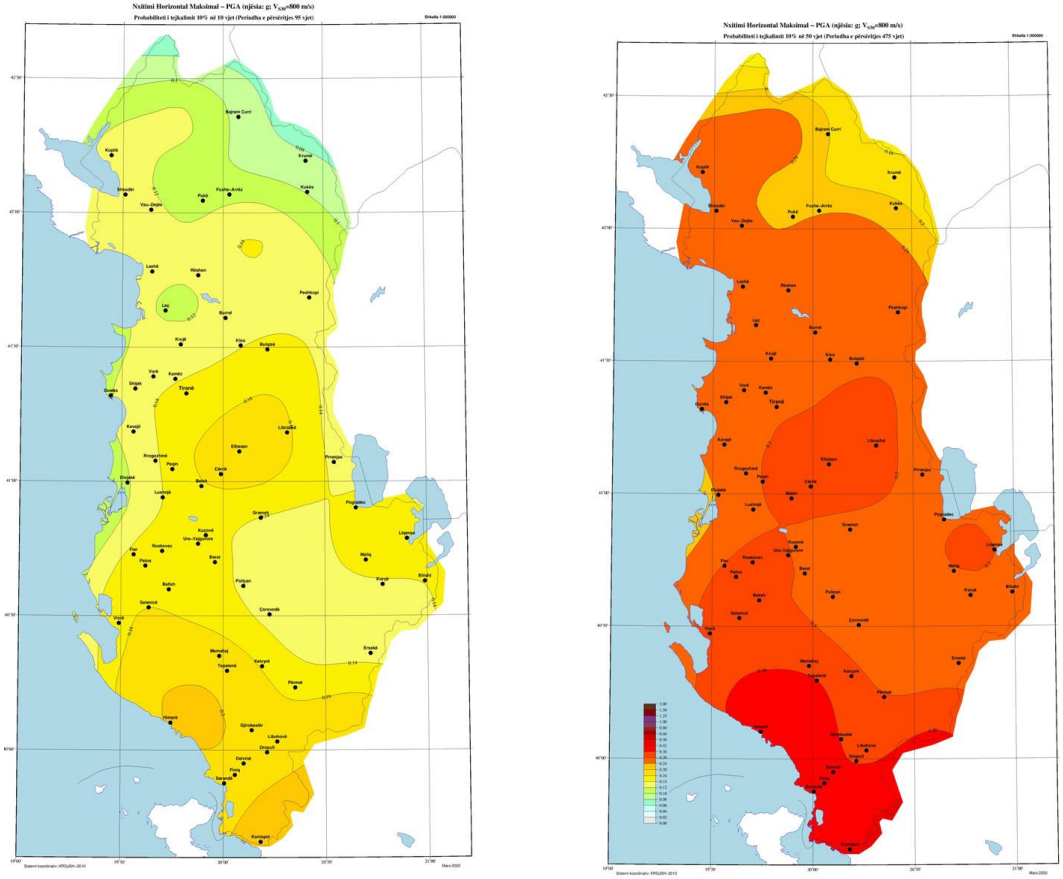
Me poshte paraqiten konkluzionet e Raportit Gjeologjik ne te cilin eshte bazuar ky Raport Teknike:

1. Ne sheshin e ndertimit takohen depozitimet e Kuaternarit (Q4al+el) qe perfaqesohen nga suargjila,

surera, rera dhe zhavore si dhe depozitimet Neogjenike qe perbehen nga argjilite, ranore, konglomerate.
2. Niveli i ujit nentokesor eshte (-6.30)m nga siperfaqja e tokes. Ne dimer ne periudhe me rreshje niveli i ujit nentokesor ngrihet deri ne thellesine (-2.50)m. Jane ujra neutrale dhe nuk jane agresive karshi hekurit dhe betonit.
3. Rekomandojme qe ne shtresen Nr.1 te mos mbeshteten themele te objektit.
4. Fenomene negative fiziko-gjeologjike ne sheshin e ndertimit qe te rrezikojne qendrueshmerine e objektit nuk jane konstatuar, por neqoftese nuk merren masa inxhinierike keto fenomene krijohen dhe rrezikojne qendrueshmerine e objekteve qe jane ngjitur me kete shesh ndertimi.
5. Rekomandojme qe skarpatat e gropes te mbrohen nga te gjitha anet me masa inxhinierike qe mund te jene mure me pilota ose diafragma betoni neqoftese do te kete kate nentoke.
6. Meqenese nga studimi i kryer shtresat gjeologjike jane ne formen e linzave qe paraqesin nje gjendje heterogjene, per te bere me homogjen kete shesh rekomandojme qe ne shesh te shtrohet nje shtrese zhavorri me trashesi 0.50-0.60 m dhe mbasi te jete ngjeshur kjo shtrese rekomandojme qe te filloje ndertimi i themeleve.
7. Rekomandojme qe masat inxhinierike per mbrojtjen e gropes te monitorohen me anen e incklinometrave te montuara ne pilotat ose ne diafragmen deri sa te perfundojne katet nentokes.
8. Rekomandojme qe ne rast se gjate hapjes se themeleve do te takohet ndonje shtrese me karakteristika te ndryshme me studimin e dhene duhet te merret mendimi i gjeologut dhe projektuesve per kalimin e situates.

1.3.3. Aktiviteti Sizmik

Mbeshtetur ne raportin inxhiniero sizmologjik të objektit “Studim Inxhiniero-Sizmologjik i Sheshit te Ndertimit per “Ndertim I Shkolles 9-Vjeçare “Pjeter Budi” ne Rrugen “Nikolla Lena”, ne punimet ``Sizmiciteti Sizmotektonika dhe Vleresimi i Riskut Sizmik ne Shqiperi, (me Autore Aliaj. etj. 2010), si dhe ne Hartat probabilitare të rrezikut sizmik, per sheshin e ndertimit, jane percaktuar parametrat sizmike te nevojshem per llogaritjet e kontrollit te struktures.



- Hartat probabilitare të rrezikut sizmik bazuar ne PGA

Me poshte paraqiten konkluzionet e Studimit inxhiniero-sizmologjik ne te cilin eshte bazuar ky Raport Teknike:

Mbeshtetur ne materialin e trajtuar ne kete studim inxhiniero-sizmologjik per vleresimin e rrezikut sizmik me programin kompjuterik "SHAKE 2000" te sheshit ku eshte ndertuar **"Ndertim i Shkolles 9-Vjeçare "Pjeter Budi"** ne zonen e rruges "Nikolla Lena", ne Tirane, nxirren keto perfundime kryesore:
1. Sheshi i ndertimit ne studim klasifikohet si truall i kategorise se II-te sipas KTP-N.2-89, truall i klases "C" sipas Eurokodit 8 (EC-8, 2003).
2. Parametrat kryesore te rrezikut sizmik te sheshit te ndertimit ne studim ne kushte trualli shkembor jane: a) per periudhe perseritje 95 vjet: shpejtimi maksimal PGA = 0.144 g b) per periudhe perseritje 475 vjet: shpejtimi maksimal PGA = 0.293 g.
3. Sipas Kodit Shqiptar te Projektimit KTP N.2 - 89 parametrat per sheshin konkret te ndertimit jane: intensitet 8 balle (MSK-64), truall i kategorise se II-te: kE = 0.22 g, β(T) = 2.0, dhe shpejtimi spektral maksimal : Sa = 0.44 g, TC = 0.4 sek, TD =1.23 sek.
4. Sipas Eurokodit 8, spektrat elastike te reagimit jane: Per probabilitet 10 % / 10 vjet per kategorine "C" te truallit sipas EC-8 rezultojne parametrat: shpejtimi spektral maksimal a0=0.1656 g; Se (T) = 0.414 g, S= 1.15, TB = 0.2 sek, TC = 0.6 sek, dhe TD = 2.0 sek, dhe Per probabilitet 10 % / 50 vjet per kategorine "C" te truallit sipas EC-8 rezultojne parametrat: shpejtimi spektral maksimal a0=0.33695 g; Se (T) = 0.842 g, S= 1.15, TB = 0.2 sek, TC = 0.6 sek, dhe TD = 2.0 sek. Per probabilitet 10 % / 10 vjet per kategorine "C" te truallit sipas EC-8 rezultojne parametrat: avg= 0. 144*0.9 = 0.1296g TB =0.05 sek., TC = 0.15 sek., dhe TD = 1.0 sek. Per probabilitet 10 % / 50 vjet per kategorine "C" te truallit sipas EC-8 rezultojne parametrat: avg= 0. 293*0.9 = 0.2637g TB =0.05 sek., TC = 0.15 sek., dhe TD = 1.0 sek.
5. Nje parameter i rendesishem per reagimin dinamik te truallit jane periodat e vibrimit te pakos se depozitimeve dherore te vendosur mbi shkembijte rrenjesore. Perioda predominuese e vibrimit te truallit ne sheshin e ndertimit sipas formules TP = 4H/ V rezulton: TP = 4 x 24 / 200.42 = 0.478 sek, (shih paragrafet 6.2, 6.3).

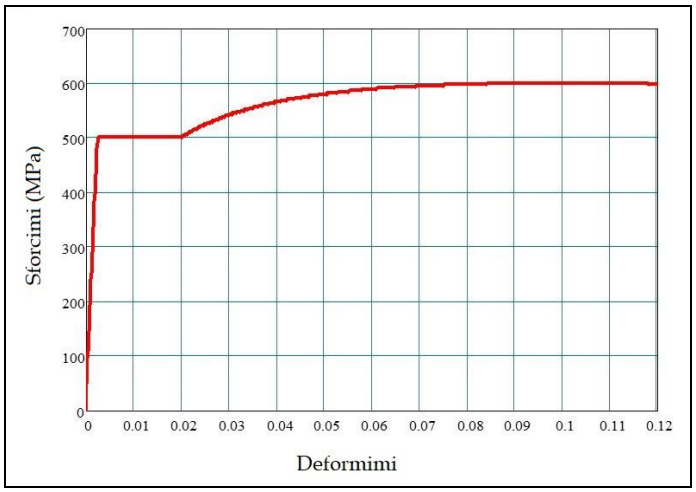
1.4. Vetite fiziko-mekanike te materialeve te cilat do perdoren

Materialet që do perdoren për strukturën (betoni dhe çeliku) duhet të plotësojnë të gjitha kriteret e parashikuara në KTP si dhe ato të parashikuara në Eurocode.

1.4.1. Çeliku i armimit

Çeliku i armimit duhet të gëzojë veti të mira si në rezistencë ashtu edhe në deformueshmëri (duktilitet) per te permbushur kriteret e performances sizmike. Në elementët parësorë për armaturën e hekurit eshte perdorur celik i tipit B500c.

Çelik B500C, f_{ys} *= 50 000 kN/m*^{2}*,* f_{us} *= 60 000 kN/m*^{2}*, E= 21 000 000 kN/m*^{2}*,* $\gamma_s = 1.15$*,* $\varepsilon_{sy} = 0.25\%$*,* $\varepsilon_{su} \geq 0.10\%$



- *Diagrama sforcim-deformim e çelikut B500C*

Armatura e Zakonshme

Klasa e Celikut te Zakonshem	B500C
Rezistenca Karakteristike e Rrjedhshmerise	fyk =500 MPa
Rezistenca Karakteristike e Shkaterrimit	ftk =600 MPa
Moduli i Elasticitetit	Es = 210 000 MPa =210GPa
Koeficienti i Sigurise Parciale te Celikut	γs = 1,15
Rezistenca Llogaritese e Celikut	fyd = fyk / γs = 435 MPa
Rezistenca Llogaritese e Celikut ne Prerje	Fywd = 500 MPa
Koeficienti i Puassonit	v = 0.30

CELIKU PER ARMIMIN E KONSTRUKSIONIT BETON ARME (STEEL FOR REBAR B500C)

Characteristic tensile stress ftk = 600 MPa

Characteristic yield stress fyk = 500 MPa

Characteristic ratio tensile/yield $1.3 \le (ft/fy)k \le 1.35$

Elastic Modulus E = 210 Gpa, Elongation $\ge 12\ \%$

1.4.2. Betoni

Ne perputhje me EC2 do te perdoren betone te klasave te ndryshme si me poshte:

Pllake themeli, trare e bazamente b/a	M-300 (B 30), C 25/30
Muret e xokolatures	M-300 (B 30), C 25/30
Kolonat dhe muret b/a	M-350 (B 35), C 30/37, M-450 (B 45), C 35/45
Soleta dhe traret kuota +3.69 m	M-350 (B 35), C 30/37
Soleta dhe traret kuota +7.53 m	M400 (B 40), C 32/40
Soleta dhe traret kuota +11.27 m deri +14.22 m	M-350 (B 35), C 30/37

$Beton - C25/30\,(Marka\,300)$

$f_{ck} = 2.5\,kN/cm^2,\ f_{cd} = 1.667\,kN/cm^2,\ \gamma_c = 1.5,\ \varepsilon_{cy} = 0.20\%,\ \varepsilon_{cu} = 0.35\%$

Beton – C25/30
(Marka 300)
$f_{ck} = 2.5\,kN/cm^2$
$\gamma_c = 1.5$
$f_{cd} = 1.667\,kN/cm^2$
$\varepsilon_{cy} = 0.20\%$
$\varepsilon_{cu} = 0.35\%$

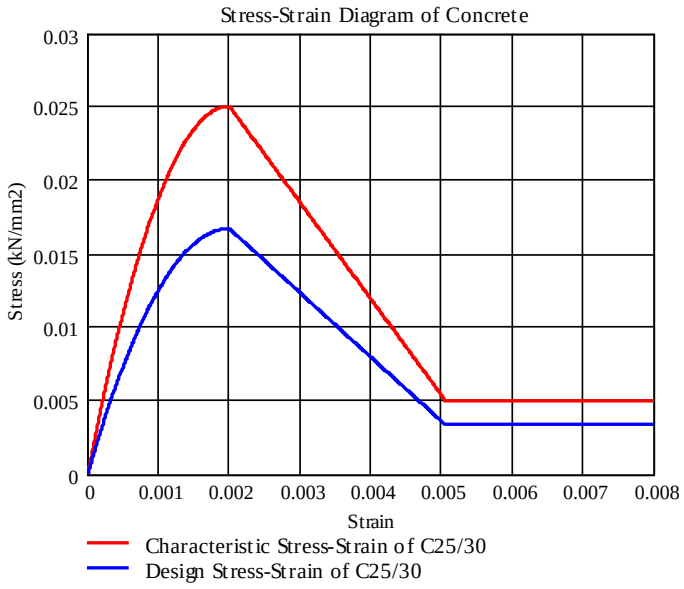


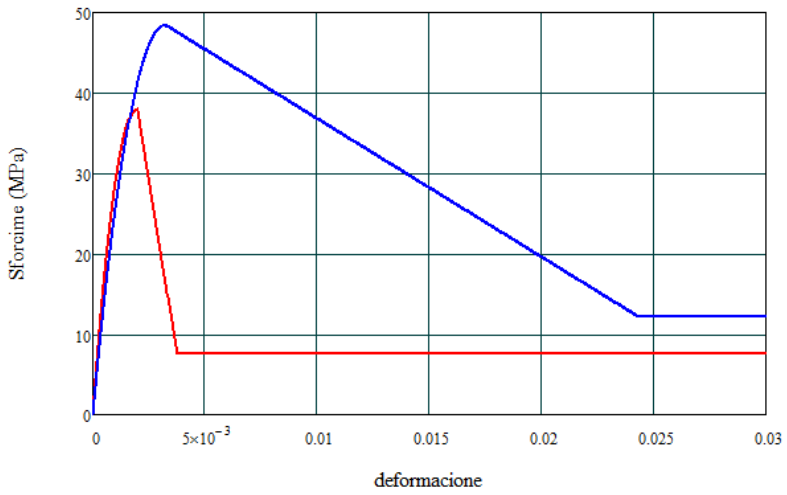
Figura 2: Diagrama Sforcim Deformim e Betonit C25/30

Parametrat e betonit të pa-shtrënguar (C25/30) jepen ne tabelen e meposhtme:

Klasa e Rezistences se Betonit	C25/30 MPa
Rezistenca Karakteristike Cilindrike	fck = 25 MPa
Rezistenca Karakteristike Kubike	Rck = 30 MPa (fck,cube)
Rezistenca Mesatare ne Shtypje (28 ditore)	fcm = fck+8=25+8 = 33 MPa
Rezistenca Mesatare ne Terheqje (≤C50/60)	fctm = 0,3·fck^2/3 = 2,50 MPa
Rezistenca Karakteristike ne Terheqje	f ctk(5%) = 0,7·fctm = 1,75 MPa
Rezistenca Karakteristike ne Terheqje	f ctk(95%) = 1,3·fctm = 3,25 MPa
Moduli Sekant i Elasticitetit te Betonit	Ecm=22[(fcm)/10] ^0,3= 35GPa
Moduli i Elasticitetit (Vlera Llogaritese)	Ecd= Ecm / γcE =35/1.2=29.4GPa
Koeficientet e Sigurise Parciale te Betonit	γc = 1,5 α = 0,85
Rezistenca Llogaritese ne Shtypje (SLU)	fcd = α·fck / γc = 13,33 MPa
Rezistenca Llogaritese ne Terheqje (SLU)	fctd = fctk(5%) / γc = 1,50 MPa
Koeficienti i Puassonit	ν = 0.20
Klasa e ekspozimit UNI EN 206-6	XC4/XF4
Klasa e Konsistences	S4

Beton –C30/37 (Marka 350)

f_{ck} = 3.0 kN/cm2, f_{cd} = 1.7000 kN/cm2, γ_c = 1.5, ε_{cy} = 0.20%, ε_{cu} = 0.35%

Beton C-30/37 Marka 350 fck = 30 MPa γc = 1,5	Stress-strain diagram of concrete  ***Fig: Diagrama Sforcim Deformim e Betonit C30/37***

Parametrat e Betonit të pa-shtrënguar dhe te shtrenguar (C30/37)

Parametrat e betonit të pa-shtrënguar (C30/37) jepen ne tabelen e meposhtme:

Klasa e Rezistences se Betonit	C30/37 MPa
Rezistenca Karakteristike Cilindrike	fck = 30 MPa
Rezistenca Karakteristike Kubike	Rck = 37 MPa (fck,cube)
Rezistenca Mesatare ne Shtypje (28 ditore)	fcm = fck+8=30+8 = 38 MPa
Rezistenca Mesatare ne Terheqje (≤C50/60)	fctm = 0,3·fck^2/3 = 2,95 MPa
Rezistenca Karakteristike ne Terheqje	f ctk(5%) = 0,7·fctm = 2,36 MPa
Rezistenca Karakteristike ne Terheqje	f ctk(95%) = 1,3·fctm = 3,10 MPa
Moduli Sekant i Elasticitetit te Betonit	Ecm=22[(fcm)/10] ^0,3= 33GPa
Moduli i Elasticitetit (Vlera Llogaritese)	Ecd= Ecm / γcE =36/1.2=72.0GPa
Koeficientet e Sigurise Parciale te Betonit	γc = 1,5 α = 0,85
Rezistenca Llogaritese ne Shtypje (SLU)	fcd = α·fck / γc = 17,00 MPa
Rezistenca Llogaritese ne Terheqje (SLU)	fctd = fctk(5%) / γc = 1,60 MPa
Koeficienti i Puassonit	ν = 0.21
Klasa e ekspozimit UNI EN 206-6	XC4/XF4
Klasa e Konsistences	S4

Beton –C35/45 (Marka 450)

f_{ck} = 3.5 kN/cm2, f_{cd} = 1.9830 kN/cm2, γ_c = 1.5, ε_{cy} = 0.20%, ε_{cu} = 0.35%

Klasa e Rezistences se Betonit	C35/45 MPa
Rezistenca Karakteristike Cilindrike	fck = 35 MPa
Rezistenca Karakteristike Kubike	Rck = 45 MPa (fck,cube)
Rezistenca Mesatare ne Shtypje (28 ditore)	fcm = fck+8=35+8 = 43 MPa
Rezistenca Mesatare ne Terheqje (≤C50/60)	fctm = 0,3·fck^2/3 = 3.21 MPa
Rezistenca Karakteristike ne Terheqje	f ctk(5%) = 0,7·fctm = 2,24 MPa
Rezistenca Karakteristike ne Terheqje	f ctk(95%) = 1,3·fctm = 4.17 MPa
Moduli Sekant i Elasticitetit te Betonit	Ecm=22[(fcm)/10] ^0,3= 34GPa
Moduli i Elasticitetit (Vlera Llogaritese)	Ecd= Ecm / γcE =38/1.2=76.0GPa
Koeficientet e Sigurise Parciale te Betonit	γc = 1,5 α = 0,85
Rezistenca Llogaritese ne Shtypje (SLU)	fcd = α·fck / γc = 19.83 MPa
Rezistenca Llogaritese ne Terheqje (SLU)	fctd = fctk(5%) / γc = 1,49 MPa
Koeficienti i Puassonit	ν = 0.21
Klasa e ekspozimit UNI EN 206-6	XC4/XF4
Klasa e Konsistences	S4

1.4.3. Rezistencat

Rezistencat llogaritese (te projektimit) per betonin dhe celikun jane marre nga reduktimi i rezistencave karakteristike sipas klases se betonit (apo celikut) te perdorur me faktorin e sigurise perkates si me poshte:

Per betonin: $f_{cd} = f_{ck}/\gamma_c$

$f_{cwd} = f_{cwk}/\gamma_c$

Per celikun: $f_{yd} = f_{yk}/\gamma_s$

$f_{ywd} = f_{ywk}/\gamma_s$

2. MODELIMI 3D I STRUKTURES

2.1. Principet e modelimit 3D

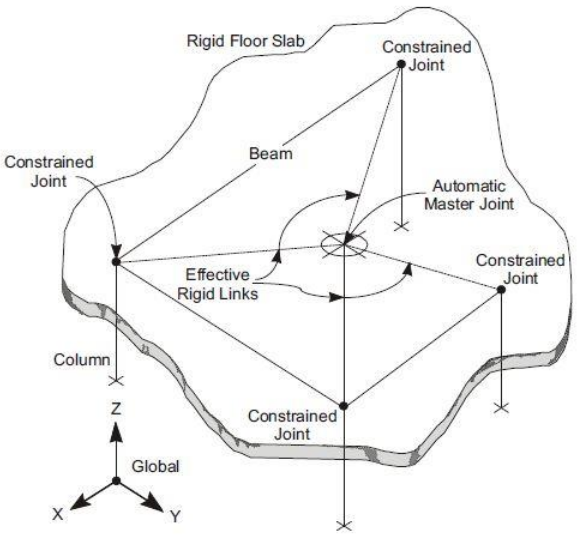


Figure 10
Use of the Diaphragm Constraint to Model a Rigid Floor Slab

Modeli matematikor perfaqeson nje idealizim te nje numri te caktuar elementesh si shell, frame, link, tendon dhe joint. Keto objekte brenda programeve perdoren per te perfaqesuar muret, soletat, kolonat, traret dhe objekte te tjere fizike. Sistemet konstruktive perfaqesohen nga nje rrjet tre dimensional. Sisteme reale teper komplekse mund te perfaqesohen me modele matematikore me te thjeshtuara. Duke perdorur metoden e llogaritjes me elemente te fundem merren rezultate shume te sakta ne lidhje me focat e jashtme dhe ato te brendshme. Rezultatet perfshijne edhe sjelljen ne perdredhje ose ate jashte planare. Zgjidhja e modelit tre dimensional mundeson nje perfshirje maksimale te kushteve reale ne te cilat punon objekti ne realitet.

Analiza mundeson studimin e veprimit te ngarkesave horizontale dhe vertikale mbi strukture. Programet ndjekin metoden e dekompozimit te ngarkesave ku ngarkesat e shperndara ne soleta dekompozohen automatikisht ne ngarkesa nyjore te cilat transmetohen ne nyjet e trareve dhe me pas kolonave duke u shkarkuar ne bazament. Programet automatikisht gjenerojne ngarkesat e eres dhe ato sizmike te cilat perputhen me kodet e projektimit. Modet e lekundjes 3 dimensionale, format, frekuencat dhe periodat e lekundjeve te lira vleresohen me metoden Eigenvector ose Ritzvector. Gjithshtu programet ne varesi te kodit te projektimit mund te marrin ne konsiderate ne analizat statike dhe dinamike edhe efektet e P-Delta te cilat sjellit sforcime suplementare.

Nepermjet ketyre programeve mund te behen analiza te tipit Response Spectrum, Time History ose Push Over.

Metoda qe perdoret per vleresimin e kapacitetit strukturor te nderteses eshte ajo e analizes Push Over e cila eshte nje analize etipit Nonlinear Static. Ne kete analize te dhenat per veprimini sizmik merren duke i dhene struktures nge zhvendosje te njohur ne nje pike te caktuar. Kjo zhvendosje aplikohet ne menyre te njetrajtshme ku reagimi i struktures monitorohet ne menyre te vazhdueshme duke krijuar kurben e kapacitetit strukturor deri ne momentin e krijimit te cernierave plastike ne trare dhe kolona. Duke krahasuar rezultatet e zhvendosjeve te marra nga analiza Response Spectrum (veprimi sizmik dhe ngarkesat vertikale) dhe ajo Push Over (kapaciteti i struktures), behet vleresimi i gjendjes se nderteses dhe aftesise se saj per te perbushur kushtet e sigurise dhe sherbimit.

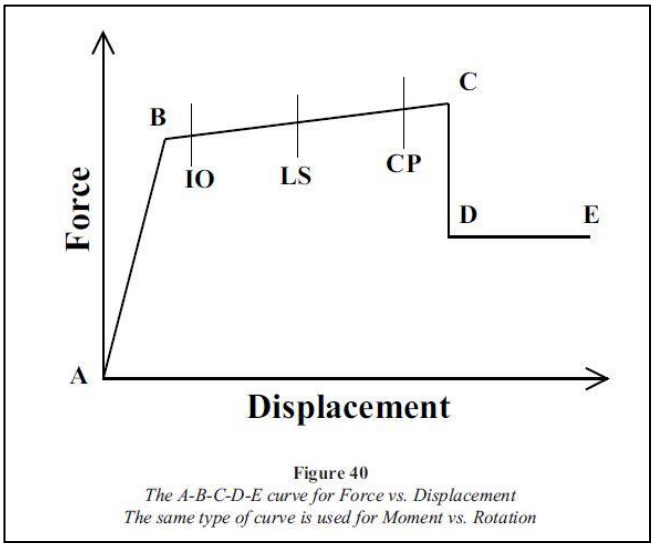
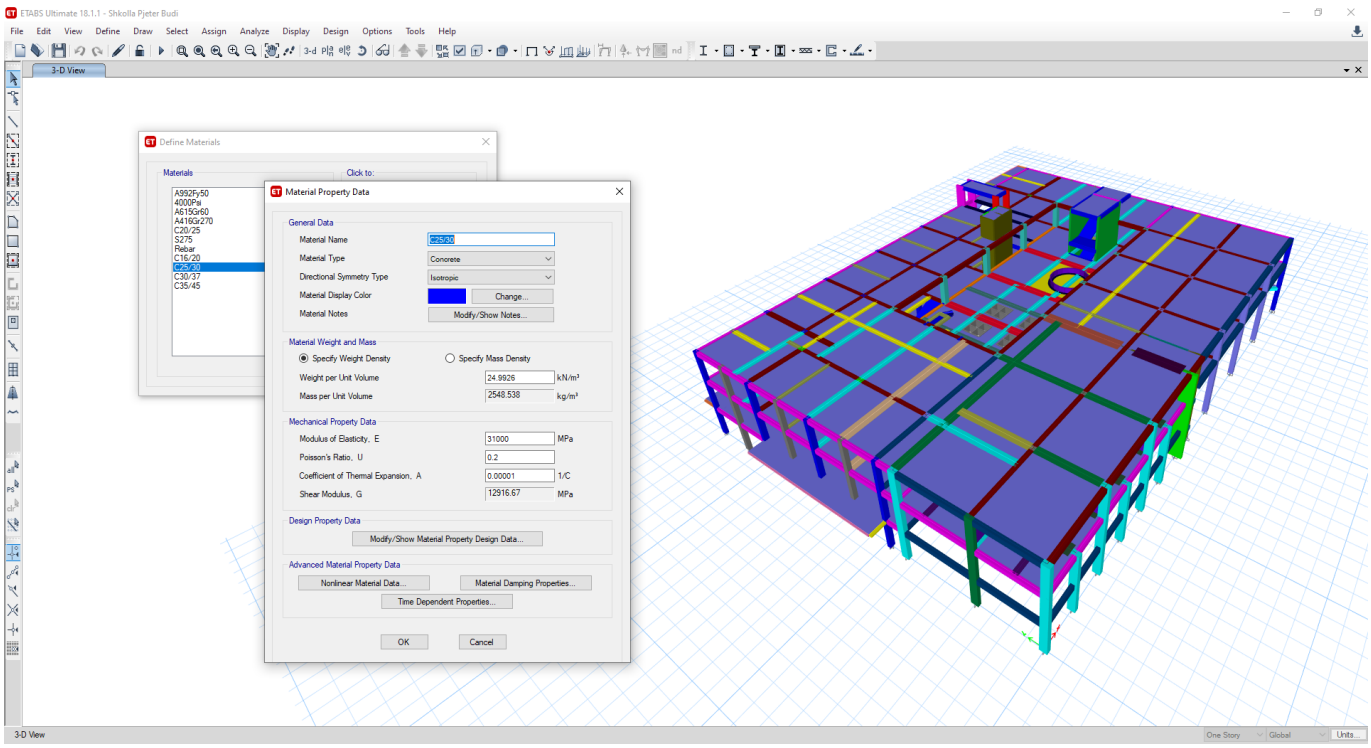


Figure 40
The A-B-C-D-E curve for Force vs. Displacement
The same type of curve is used for Moment vs. Rotation

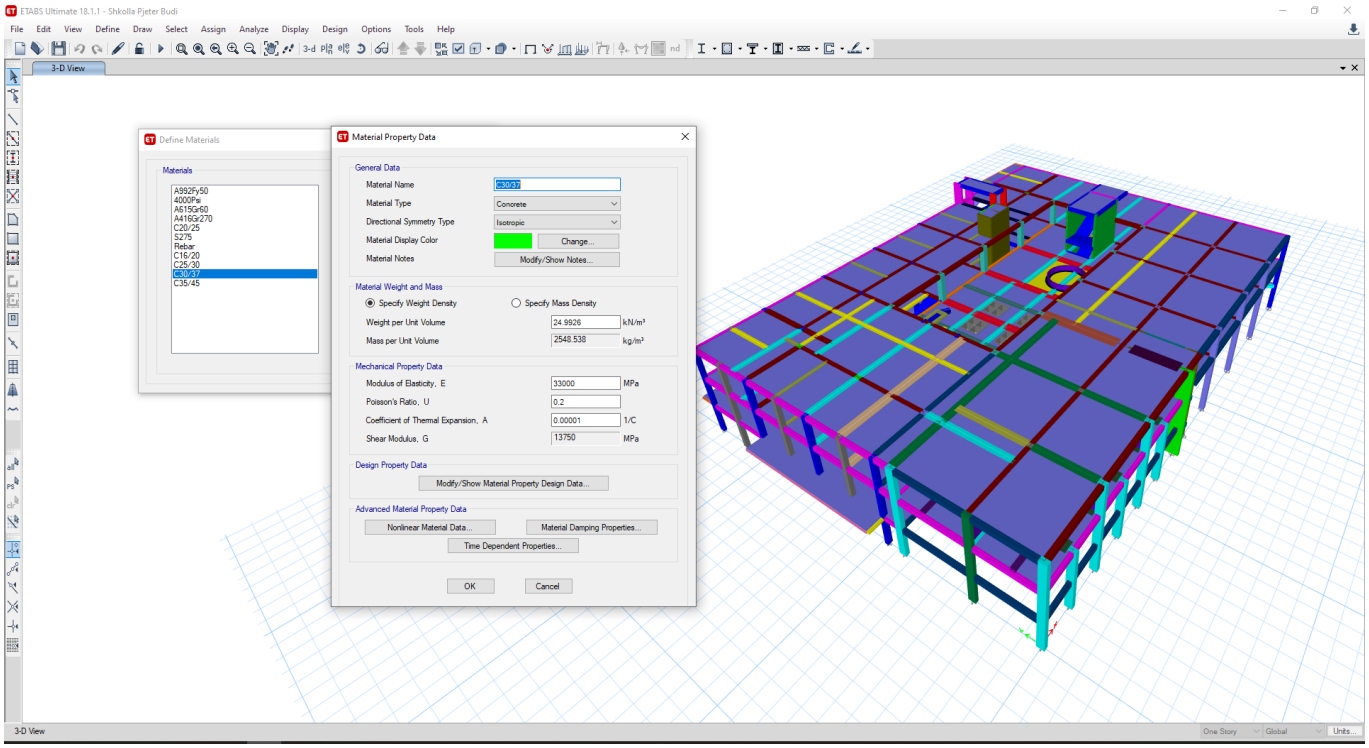
- *Marredhenia force-zhvendosje e cila perfaqeson kapacitetin e cernierave plastike te elementeve bazuar ne EC8*

2.2. Parametrat per Llogaritjen e Struktures - Inputet e modelit

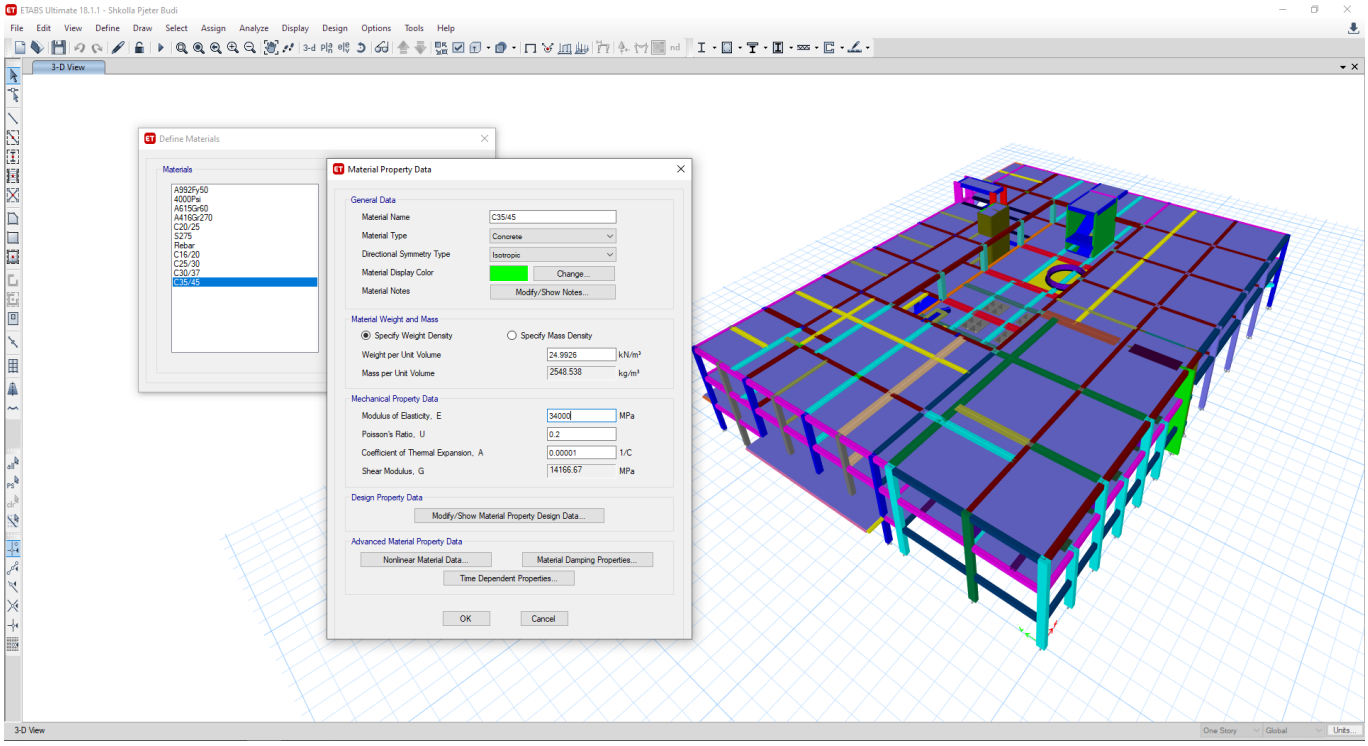
Te gjithe elementet perberes te struktures perfaqesohen ne modelin 3D nepermjet objekteve te cileve u vendosen karakteristikat fiziko mekanike te elementeve reale. Kjo arrihet nepermjet te dhenave qe futen ne program te cilat jane paraqitur me poshte:



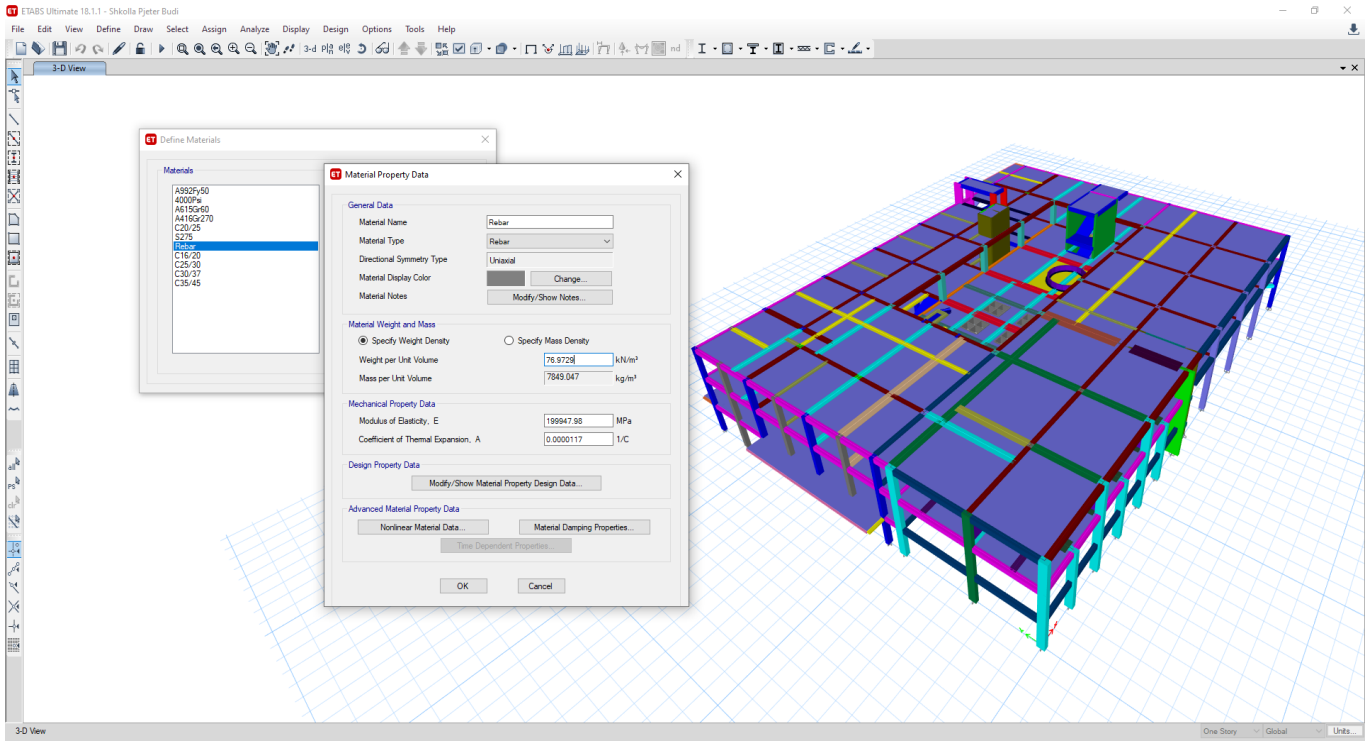
- *Materialet e Perdorura per Modelimin – Betoni C25/30*



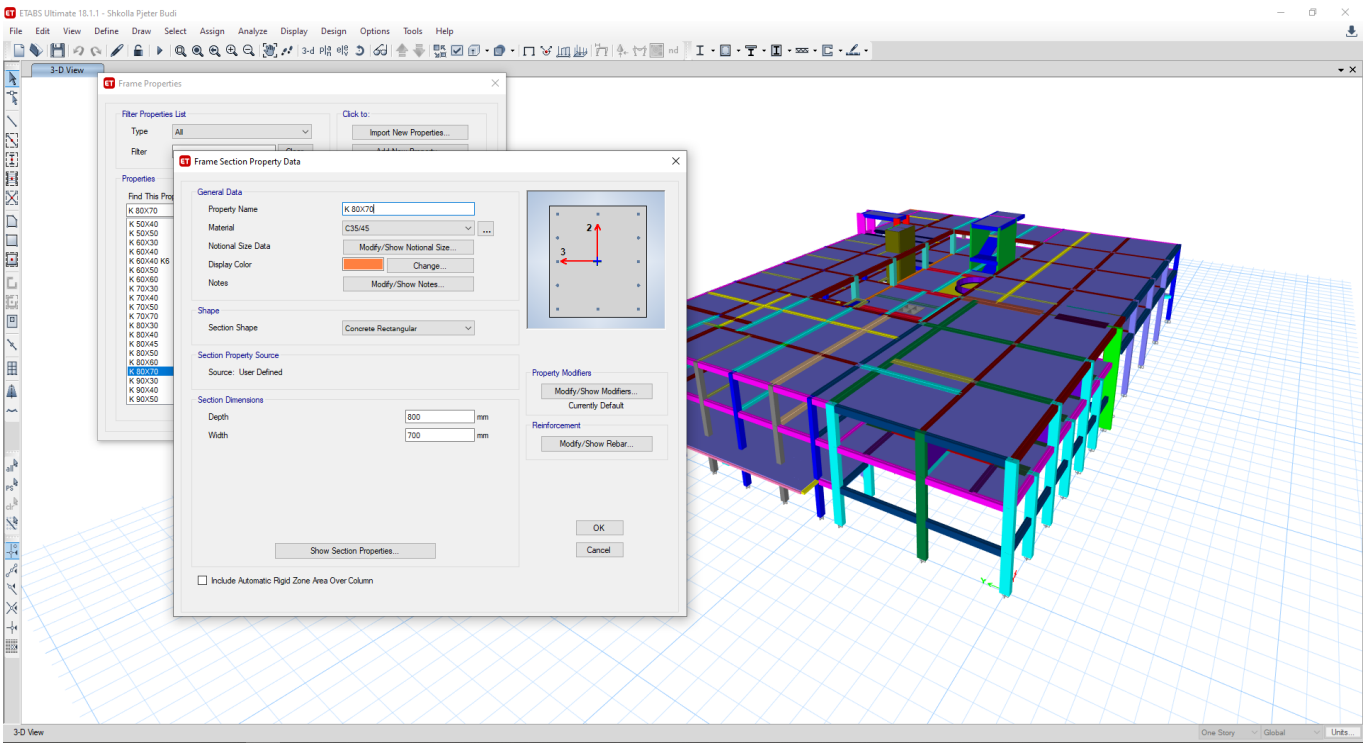
- *Materialet e Perdorura per Modelimin – Betoni C30/37*



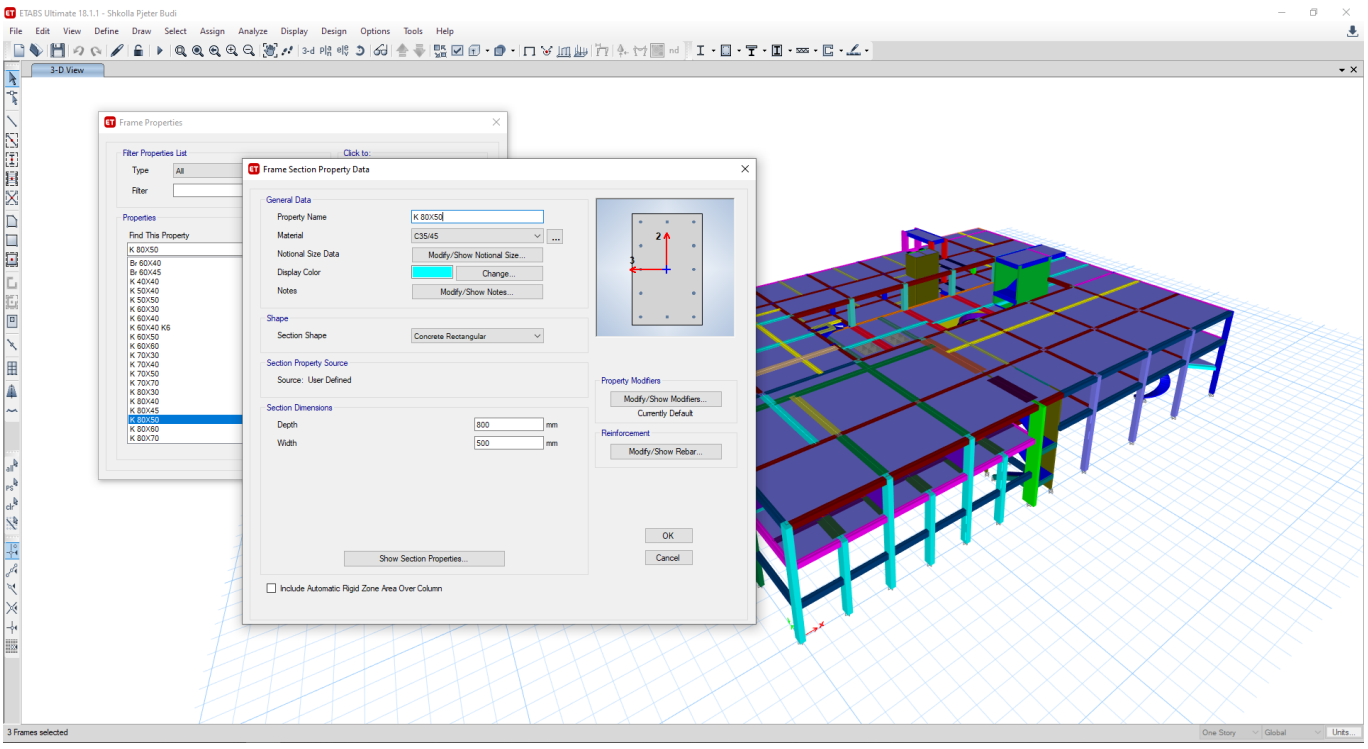
- *Materialet e Perdorura per Modelimin – Betoni C35/45*



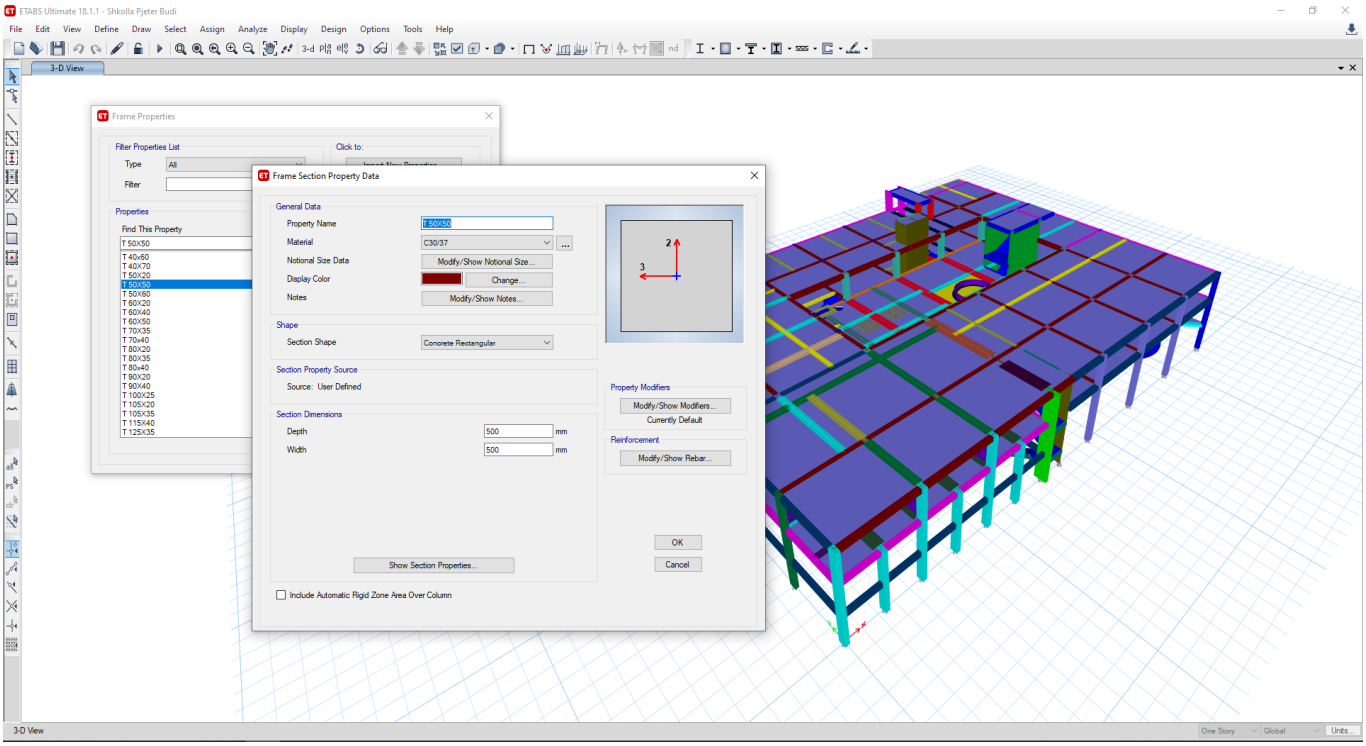
- *Materialet e Perdorura per Modelimin – Celiku steel Rebars- B500c*



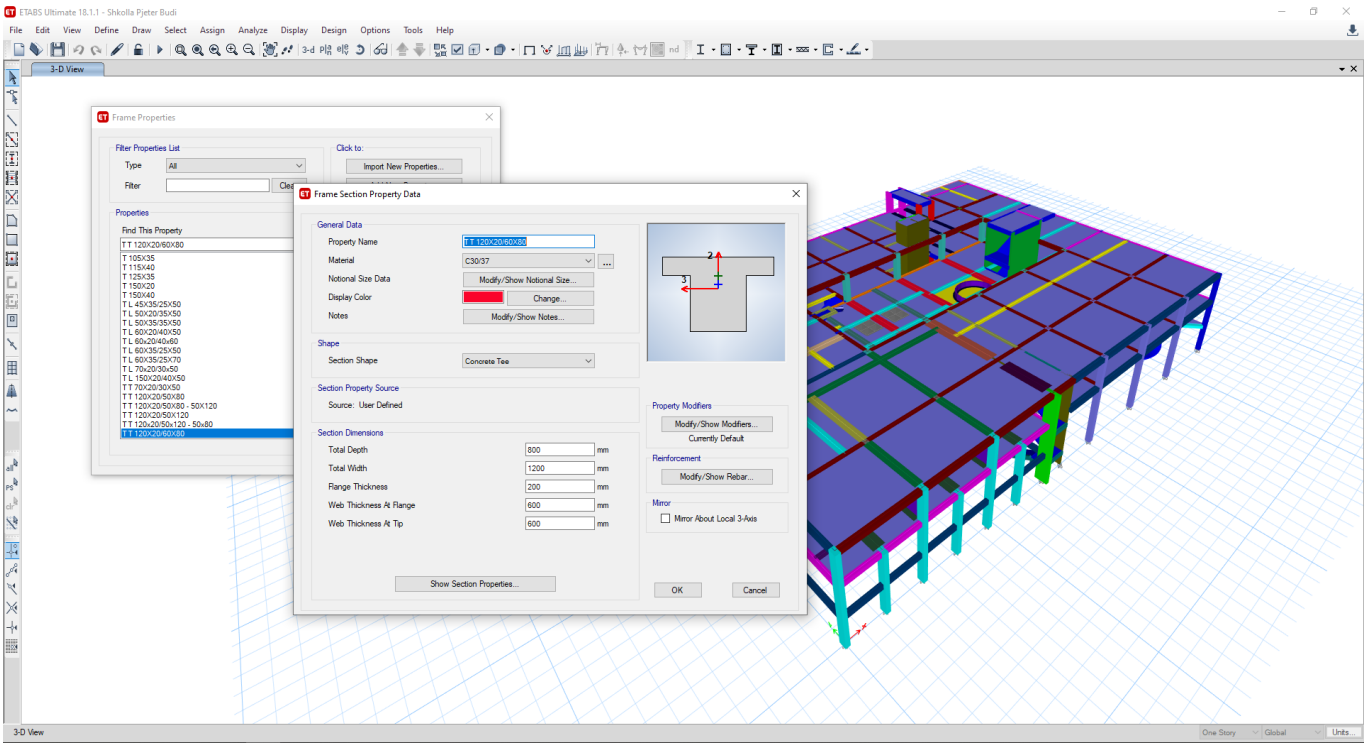
- *Seksionet e perdorura per modelimin – Kolona 80x70cm*



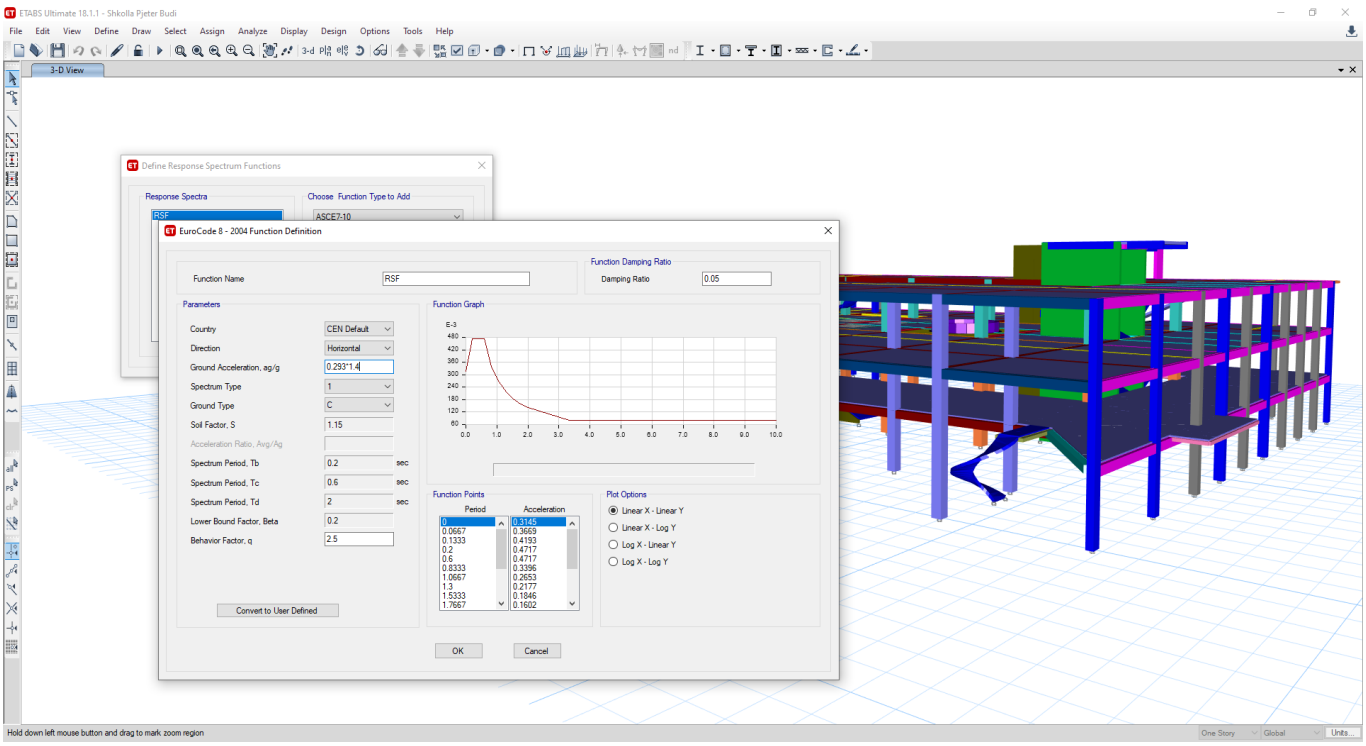
- *Seksionet e perdorura per modelimin – Kolona 80x50cm*



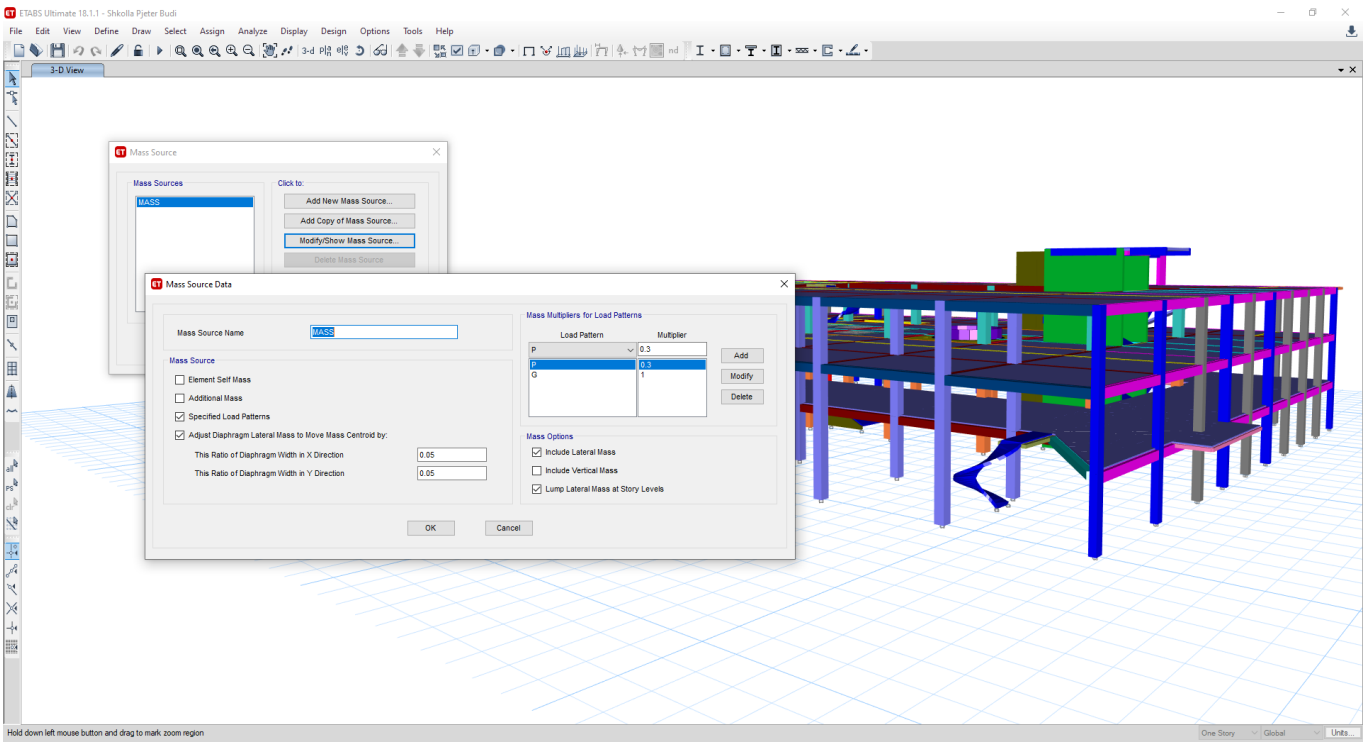
- *Seksionet e perdorura per modelimin – Tra 50x50cm*



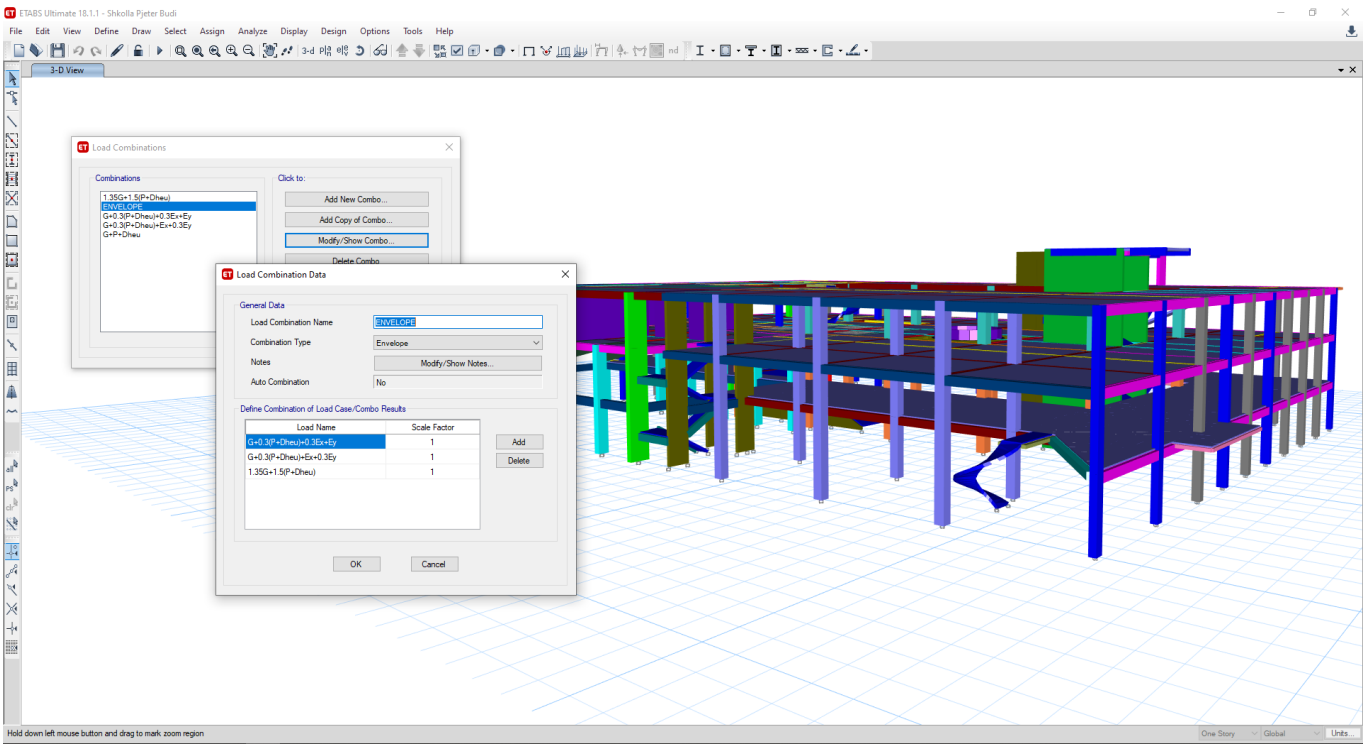
- *Seksionet e perdorura per modelimin – Tra T 120x20/60x80 cm*



- Te dhenat e perdorura per analizen sizmike Response Spectrum



- Percaktimi i Mases Sizmike



- Kombinimet e ngarkesave

Tab.1 Kombinimet e Ngarkesave

A	1.35G + 1.50Q		
1B	1.00G + 0.30Q + 1.00Ex+eccy + 0.30Ey+eccx	1C	1.00G + 0.30Q + 1.00Ex+eccy - 0.30Ey+eccx
1D	1.00G + 0.30Q + 0.30Ex+eccy + 1.00Ey+eccx	1E	1.00G + 0.30Q - 0.30Ex+eccy + 1.00Ey+eccx
1F	1.00G + 0.30Q - 1.00Ex+eccy - 0.30Ey+eccx	1G	1.00G + 0.30Q - 1.00Ex+eccy + 0.30Ey+eccx
1H	1.00G + 0.30Q - 0.30Ex+eccy - 1.00Ey+eccx	1I	1.00G + 0.30Q + 0.30Ex+eccy - 1.00Ey+eccx
2B	1.00G + 0.30Q + 1.00Ex-eccy + 0.30Ey+eccx	2C	1.00G + 0.30Q + 1.00Ex-eccy - 0.30Ey+eccx
2D	1.00G + 0.30Q + 0.30Ex-eccy + 1.00Ey+eccx	2E	1.00G + 0.30Q - 0.30Ex-eccy + 1.00Ey+eccx
2F	1.00G + 0.30Q - 1.00Ex-eccy - 0.30Ey+eccx	2G	1.00G + 0.30Q - 1.00Ex-eccy + 0.30Ey+eccx
2H	1.00G + 0.30Q - 0.30Ex-eccy - 1.00Ey+eccx	2I	1.00G + 0.30Q + 0.30Ex-eccy - 1.00Ey+eccx
3B	1.00G + 0.30Q + 1.00Ex+eccy + 0.30Ey-eccx	3C	1.00G + 0.30Q + 1.00Ex+eccy - 0.30Ey-eccx
3D	1.00G + 0.30Q + 0.30Ex+eccy + 1.00Ey-eccx	3E	1.00G + 0.30Q - 0.30Ex+eccy + 1.00Ey-eccx
3F	1.00G + 0.30Q - 1.00Ex+eccy - 0.30Ey-eccx	3G	1.00G + 0.30Q - 1.00Ex+eccy + 0.30Ey-eccx
3H	1.00G + 0.30Q - 0.30Ex+eccy - 1.00Ey-eccx	3I	1.00G + 0.30Q + 0.30Ex+eccy - 1.00Ey-eccx
4B	1.00G + 0.30Q + 1.00Ex-eccy + 0.30Ey-eccx	4C	1.00G + 0.30Q + 1.00Ex-eccy - 0.30Ey-eccx
4D	1.00G + 0.30Q + 0.30Ex-eccy + 1.00Ey-eccx	4E	1.00G + 0.30Q - 0.30Ex-eccy + 1.00Ey-eccx
4F	1.00G + 0.30Q - 1.00Ex-eccy - 0.30Ey-eccx	4G	1.00G + 0.30Q - 1.00Ex-eccy + 0.30Ey-eccx

Per llogaritjet statike dhe dinamike te struktures eshte perdorur programi ETABS 2018. Struktura eshte modeluar ne 3D me ndihmen e programeve te avancuara kompjuterike duke perdorur elementet “Frame” (per traret dhe kollonat b/a), ato “Shell” (per soletat dhe shkallet b/a) dhe “Wall” (per muret).Per themelet eshte perdorur si mbeshtetje koeficienti i Winklerit. Të gjitha parametrat e përdorura në kontrollin e elementeve te struktures janë të perfshira ne (“Eurocode”): projektimi strukturor eshte bazuar ne kodet e meposhtme:

[0] EN 1990 Eurocode 0 – Eurocode Basis of structural design
[1] EN 1991-1-1 Eurocode 1 – Action on structures: General Action
[2] EN 1991-1-4 Eurocode 1 – Action on structures: Wind Actions
[3] EN 1992-1-1 Eurocode 2 – Design of concrete structures: General Rules
[4] EN 1993-1-1 Eurocode 3 – Design of steel structures: General Rules
[5] EN 1994-1-1 Eurocode 2 – Design of composite steel and concrete structures: General Rules and rules for building
[6] EN 1998-1-1 Eurocode 8 – Design of structures for earthquake resistance

[7] KTP-N.2-89 Earthquake Resistant Design Regulations, issued by: Seismic Center, Academy of Science of Albania, Department of Design, Ministry of Construction

2.2.1 Ngarkesat Llogaritese Ne Projekt

Struktura e objektit eshte modeluar duke u konceptuar si sistem me konstruksion mbajtes miks me mure dhe rama beton arme. Ngarkesat dhe kombinimi i tyre jane percaktuar sipas Eurocode 1, 2, 3, 5, 8 dhe jane paraqitur ne menyre te permbledhur ne tabelen e meposhtme (ne modelet llogaritese jepen me hollesi ngarkesat, mbingarkesat dhe kombinimet e tyre). Ngarkesa nga pesha vetiake e elementeve strukturale beton arme dhe te celikut llogariten automatikisht nga programi bazuar ne volumin e elementit si dhe peshen njesi te b/a 2500 kg/m^3 dhe 7800 kg/m^3 per celikun. Gjate llogaritjes se objektit per qellimet e ketij studimi jane marre parasysh ngarkesat dhe kombinimet e tyre si me poshte.

- Ngarkesat dhe kombinimet e tyre jane konform KTP-N2-89 dhe Eurocode.

Ngarkesat Statike - (te Normuara) - <u>Ngarkesat e perhershme</u> *<u>(Dead Loads-DL)</u>*

Ne ngarkesat e perhershme jane perfshire: Pesha vetjake e gjithe elementeve mbajtes te struktures prej celiku dhe beton arme (themele, trare, kolona, mure, pesha vetjake e soletave, shtresave te dyshemese, muret ndares vetembajtes me tulla, dhe parapetet e ballkoneve, shkalleve etj). Ngarkesat e normuara, qe jane marre ne konsiderate per strukturen e mesiperme jane paraqitur ne tabelen e meposhtme:

DEAD LOADS					
Concrete specific gravity:	25.00	kN/m3	Slab coating:	1.50	kN/m²
Steel specific weight:	78.00	kN/m3	Steel deck sheet:	0.15	kN/m²
Sandwich panel weight:	0.60	kN/m²	Staircase tiling:	1.50	kN/m²
Dry wall weight:	0.18	kN/m²	Soil specific gravity:	18.00	kN/m^3

1) Te perhershme (te Normuara)

Pesha Vetjake e Soletes t = 20 cm gsol, 20 cm = 500 kg/m^2
Pesha Vetjake e Soletes t = 25 cm gsol, 25 cm = 625 kg/m^2
Pesha Vetjake e Soletes t = 30 cm gsol, 30 cm = 750 kg/m^2
Shtresat si ngarkese siperfaqesore gsht = 150 kg/m^2
Shtresat e taraces si ngarkese siperfaqesore g mb = 200 kg/m^2
Muret si ngarkese siperfaqesore e shperndare gm = 250 kg/m^2 - 300 kg/m^2
Ngarkesa nga tavanet e varura perfshire instalimet g tav = 60 kg/m^2
Vetratat e xhamit (fasadat) g xh = 100 kg/m^2

Ngarkesat Variable (te Normuara) - <u>Ngarkesat e perkohshme</u> *<u>(Live Loads - LL)</u>*

Si ngarkesa te perkohshme ne strukture jane llogaritur ngarkesat e shfrytezimit te dyshemeve, nderkateve, shkalleve, mbuleses etj, te cilat ne menyre te permbledhur jane paraqitur gjithashtu ne tabelen e meposhtme:

LIVE LOADS					
Classroom floors:	5.00	kN/m²	Offices floors:	2.00	kN/m²
Balconies floors:	5.00	kN/m²	Staircases	5.00	kN/m²
Stores floors:	5.00	kN/m²			

Ngarkesat e mesiperme jane nominale dhe varesi te kombinimit per te cilin do te kontrollohet struktura, ngarkesat e perhershme (DL) apo ato te perkohshme (LL) shumezohen me koeficientin perkates te sigurise.

2) Te perkohshme (te Normuara)

Ngarkesa e perkohshme 400 - 500 kg/m^2
Ngarkesa e perkohshme ambjente konsol 500 kg/m^2

Ngarkesa e perkohshme ne shkalle 500 kg/m^2

b. Ngarkesat Sizmike

Sizmiciteti i Zones	I = 8.0 balle (MSK-64, Harta e Mikrozonimit Sizmik te RSH)
Kategoria e Truallit	C (EC8 2004) , E Dyte II (sipas KTP-N.2-89)
Koeficienti i rendesise	kr = 1.4
Shpejtimi Sizmik	ag =0.293 (Studimi Inxhiniero-Sizmologjik)
Faktori i sjelljes	q =2.50 (i percaktuar teorikisht ne mbeshtetje me EC8 2005)
Koeficienti i shuarjes	ζ=5%
Faktori i korrigjimit te shuarjes	η= 1
Faktori i themeleve	β= 2.5
Spektri	TIPI 1

- **EUROCODE 8 2004 (EN 1998-1): NGARKIMI SIZMIK**

- Faktori i sjelljes

Table 5.1: Basic value of the behaviour factor, q_0, for systems regular in elevation

STRUCTURAL TYPE	DCM	DCH
Frame system, dual system, coupled wall system	$3{,}0\alpha_u/\alpha_1$	$4{,}5\alpha_u/\alpha_1$
Uncoupled wall system	3,0	$4{,}0\alpha_u/\alpha_1$
Torsionally flexible system	2,0	3,0
Inverted pendulum system	1,5	2,0

(3) For buildings which are not regular in elevation, the value of q_o should be reduced by 20% (see **4.2.3.1(7)** and Table 4.1).

Referuar EN 1998-1:2004 5.2.2.2 per faktorin e sjelljes *q*, kemi:

$q = q_o * k_w$

ku:

q_o – vlera baze e faktorit te sjelljes bazuar ne sistemin struktural dhe rregullsine ne vertikalitet.

k_w – faktor i cili perfaqeson moden predominuese te shkaterrimit ne sistemin me rame metalike

$q_o = 3.0\ \alpha_u / \alpha_1$

Per klase mesatare te duktilitetit DCM ne kete rast pranojme **q = 2.50**.

EN 1998-1:2004 Perioda Strukturore

Egzistojne tre opsione per llogaritjen e periodes strukturore te perdorur ne llogaritjet e ngarkeses sizmike anesore sipas EN 1998-1:2004. Ato jane:

Perioda e Perafert: Llogaritet perioda fundamentale duke u bazuar ne (EN 1998-1 Eqn. 4.6). Vlera e H percaktohe nga programet ne lidhje me lartesite e kateve ne inpute.

$$T = C_t H^{3/4} \qquad \text{(EN 1998-1 Eqn. 4.6)}$$

ku C_t perkufizohet si (EN 1998-1 section 4.3.3.2.2(3)):

C_t = 0.085 kur momenti perballohet nga ramat

= 0.075 kur momenti perballohet nga ramat e betonit

= 0.075 per ramat e celikut te lidhura me jashteqendersi

= 0.05 per cdo lloj tjeter strukture

Lartesia H matet nga minimumi i katit te pare te percaktuar ne maksimumin e katit te fundit te percaktuar ne metra.

Llogaritur nga programi: Programet fillojne me perioden e modit te llogaritur i cili ka pjesemarrjen me te madhe te mases ne drejtimin e llogaritur (X apo Y). Kjo quhet perioda T_{mode}
E Percaktuar: Ne kete rast perioda strukturore futet manualisht dhe programet e perdorin per llogaritjet. Nuk vendosen kunder T_A or $T_{mode.}$ Ky krahasim konsiderohet i kryer para se te percaktohet perioda.

Inpute dhe Koeficente Shtese

Spektri i projektimit, $S_d(T_1)$, eshte bazuar ne Seksionin 3.2.2.5(4) te EN 1998-1:2004 dhe ne Tab 3.2 ose ne Tab 3.3.

Perzgjedhja e rekomanduar e spektrit jepet ne EN 1998-1:2004 Seksioni 3.2.2.2(2)P Tabela 3.2 dhe Tabela 3.3.
Faktori i sjelljes, *q*, bazohet ne Seksionin 3.2.2.5 te EN 1998-1:2004 i cili eshte nje perafrim i raportit te forcave sizmike qe struktura do perballonte nese pergjigja do te ishte plotesisht elastike me 5% shuarje viskoze ndaj forcave sizmike te perdorura ne projektim ne analizen konvencionale elastike. Zakonisht vlera e q merret me e madhe se 1.5.
Faktori i kufirit te poshtem per spektrin horizontal te projektimit, β, jepet ne Aneksin kombetar. Vlera e rekomanduar e β eshte 0.2.

Lloji i bazamentit mund te jete A, B, C, D ose E. Sipas EN 1998-1:2004 Seksioni 3.1.2 per klasifikimin e nentokes. Tipi i tokes i kombinuar me perioden T_1, perdoren per percaktimin e spektrit te projektimit $S_d(T_1)$, sic pershkruhet ne Nenseksionin 3.2.2.5 te EN 1998-1:2004.

λ eshte factor korelues, vlera e λ eshte e barabarte me 0.85 nese $T_1 \leq 2T_c$ dhe nese ndertesa ka me shume se dy kate ose $\lambda = 1.0$ per cdo rast tjeter.

Algoritmi per Ngarkesen Sizmike sipas EN 1998-1:2004

Algoritmi per percaktimin e ngarkeses sizmike sipas EN 1998-1:2004 eshte bazuar ne Seksionin 4.3.3.2 te EN 1998-1:2004 i quajtur "*Metoda e Analizes se Ngarkeses Anesore*." Nje periode strukturore eshte percakturar si ne paragrafin me siper.

Programi llogarit spektrin e projektimit, $S_d(T_1)$ per ngarkesen horizontale bazuar ne Seksioni 3.2.2.5(4) sipas EN 1998-1:2004 Tabela 3.2 ose Tabela 3.3.

Forca perese horizontale ne baze, llogaritet sipas (EN 1998-1 Eqn. 4.5):

$F_b = S_d(T_1)\, W\, \lambda$ (EN 1998-1 Eqn. 4.5)
W = Masa e nderteses (bazuar ne masen e specifikuar)
λ = Faktor korigjues

Forca prerese horizontale ne baze, F_b, eshte shperndare pergjate lartesise se nderteses ne perputhje me (EN 1998-1 Eqn. 4.11).

$$F_{katit} = (W_{katit} * h_{katit} / \Sigma W_{katit} * h_{katit}) * V \qquad \textit{(EN 1998-1 Eqn. 4.11)}$$

ku,

F_{katit} = Pjesa e forces prerese horizontale e aplikuar ne kat
V = Forca perese horizontale ne ndertese
w_{katit} = Masa e katit (bazuar ne masen e specifikuar).
h_{katit} = Lartesia e katit, nga baza e struktures deri ne pjesen e siperme te katit.
n = Numri i kateve ne strukture.

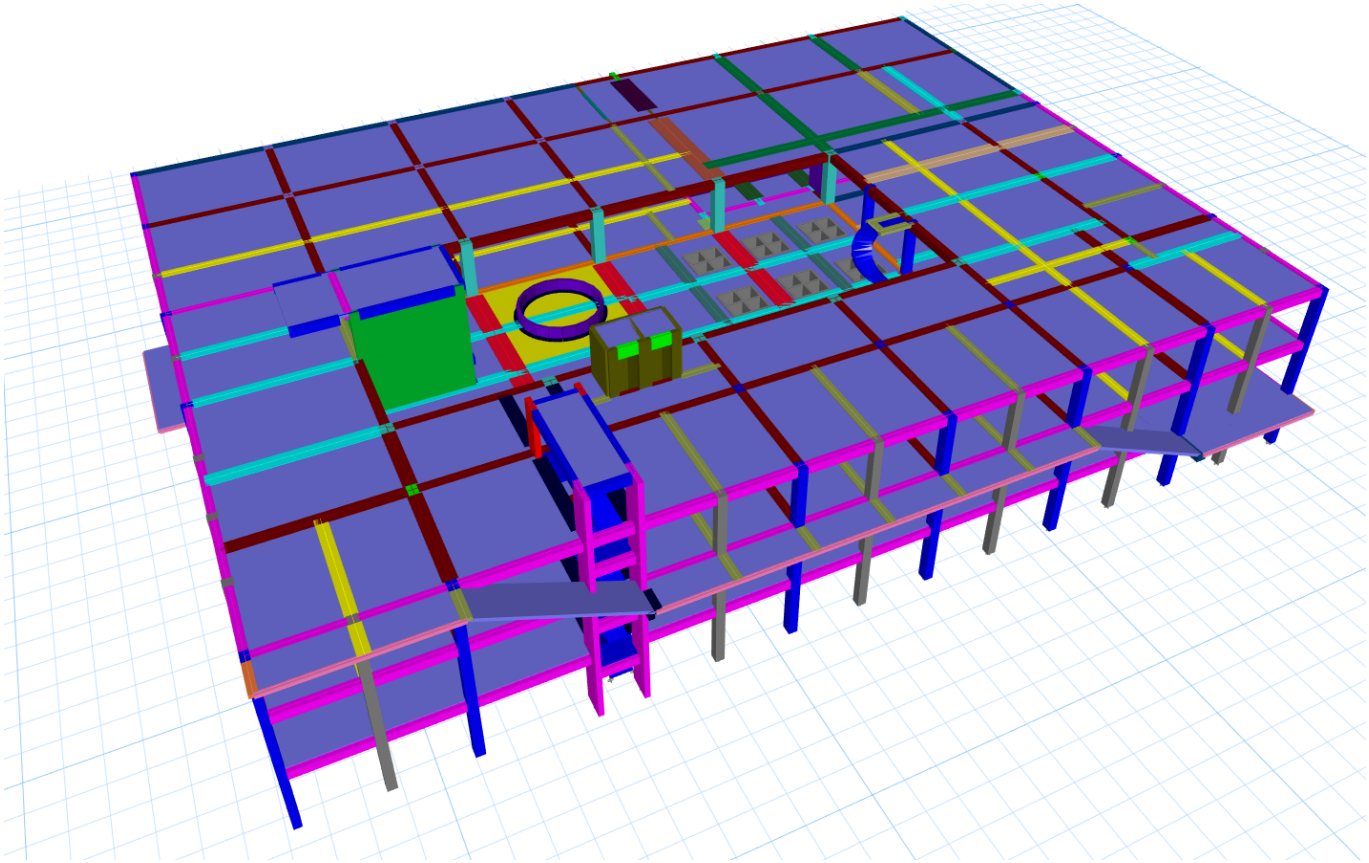
2.3. Analiza dhe rezultatet mbi modelin llogarites

Analiza statike dhe dinamike per te percaktuar reagimin e struktures ndaj tipeve te ndryshme te ngarkimit te struktures eshte kryer me programin ***ETABS 2018 ULTIMATE.*** Modelimi i struktures ne teresi dhe i cdo elementi behet mbi bazen e metodikes se elementeve te fundem (Finite Element Metode - FEM) e cila eshte nje metode e perafert dhe praktike duke gjetur perdorim te gjere sot ne kushtet e epersise, qe krijon perdorimi i programeve kompjuterike.

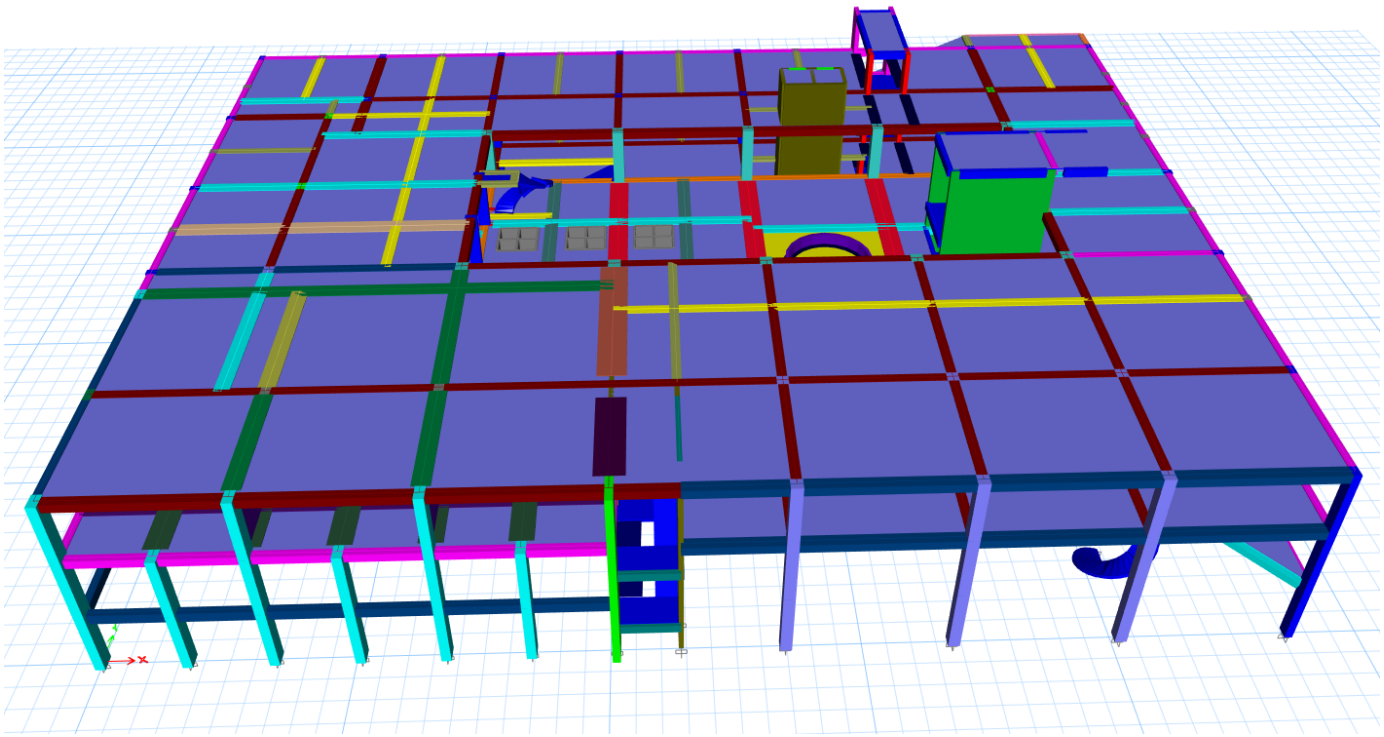
Analiza dinamike ka ne bazen e saj analizen modale me ***metoden e spektrit te reagimit***. Ne metoden e masave te perqendruara, ngarkesat dinamike, (sizmike) te llogaritura pranohen si ngarkesa ekuivalente statike dhe ushtrohen ne vendin e masave te perqendruara. Si baze per metoden e llogaritjeve dinamike me metoden e ***spektrit te reagimit*** sherben ***analiza e vlerave te veta dhe e vektoreve te vete***. Me ane te kesaj metode percaktohen format e lekundjeve vetjake dhe frekuencat e lekundjeve te lira. ***Vlerat dhe vektoret e vete*** japin pa dyshim nje pasqyre te qarte dhe te plote per percaktimin e sjelljes se struktures nen veprimin e ngarkesave dinamike. Programi ***Etabs 2018*** automatikisht kerkon modet me frekuenca rrethore me te uleta (perioda me te larta) *–shiko tabelen perkatese-* si me kontribuese ne thithjen e ngarkesave sizmike nga struktura. Numri maksimal i modeve te kerkuara nga programi eshte kushtezuar nga vete grupi i ekspertizes ne *n=24 mode*, nderkohe qe masat e kateve te ketij objekti jane konsideruar me tre shkalle lirie, na te cilat *1 rrotulluese dhe dy translative sipas planit te vete soletes*. Frekuenca ciklike f (cikle/sec), frekuenca rrethore ω (rad/sec) dhe perioda T (sec) jane lidhur midis tyre nepermjet relacioneve: ***T=1/f*** dhe ***f=ω/2π.*** Si rezultat i analizes merren zhvendosjet, forcat e brendshme (M, Q, N,) dhe sforcimet σ ne cdo element te struktures.

Llogaritja sizmike eshte kryer permes spektrit të reagimit, sipas KTP-N2-89 dhe Eurokodit 8 TIPI 1. Parametrat per llogaritjen ne sizmicitet janë marre sipas Eurokodit 8.

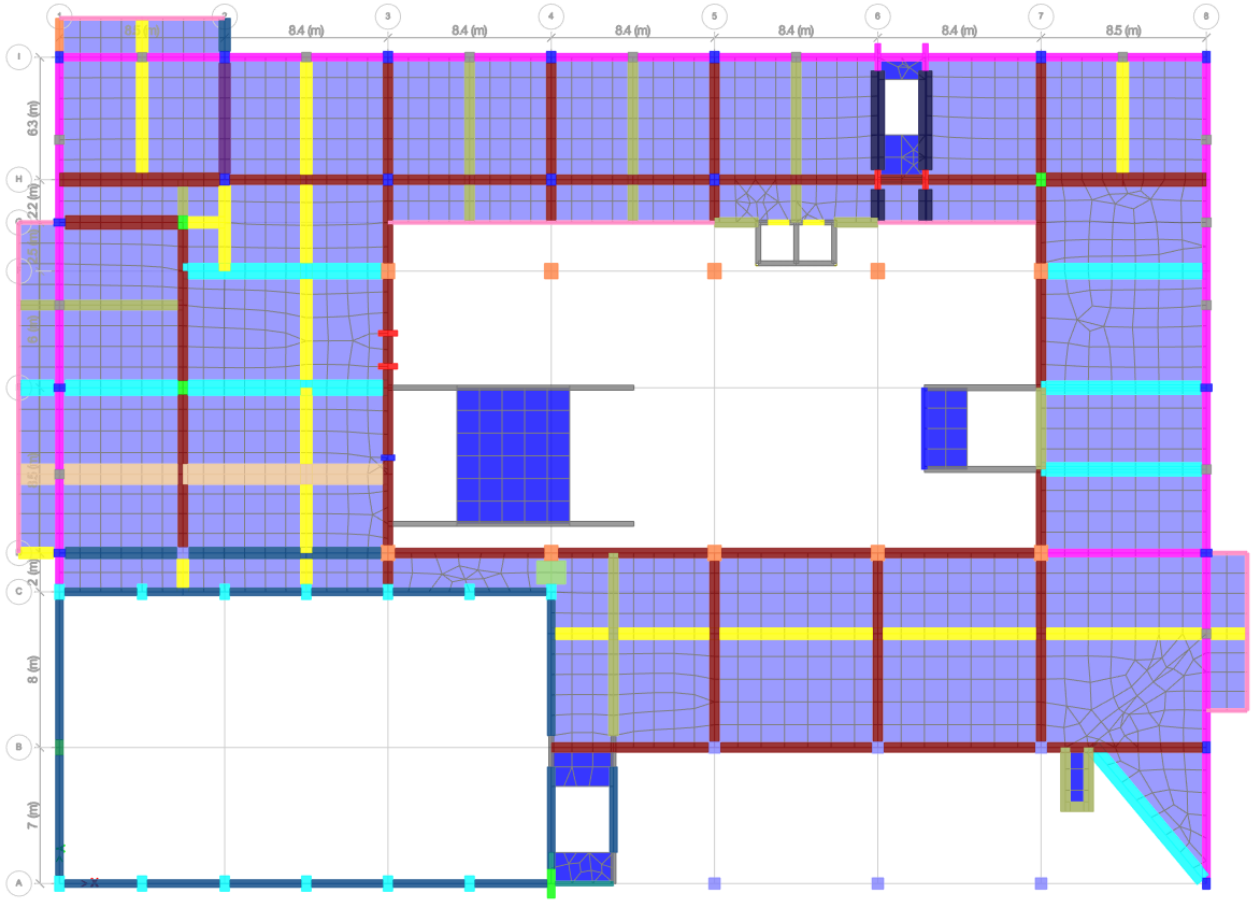
- *Me poshte tregohen fragmente te modelimit te struktures per qelimet e ketij projekti, me programin e avancuara kompjuterike Etabs 2018:*



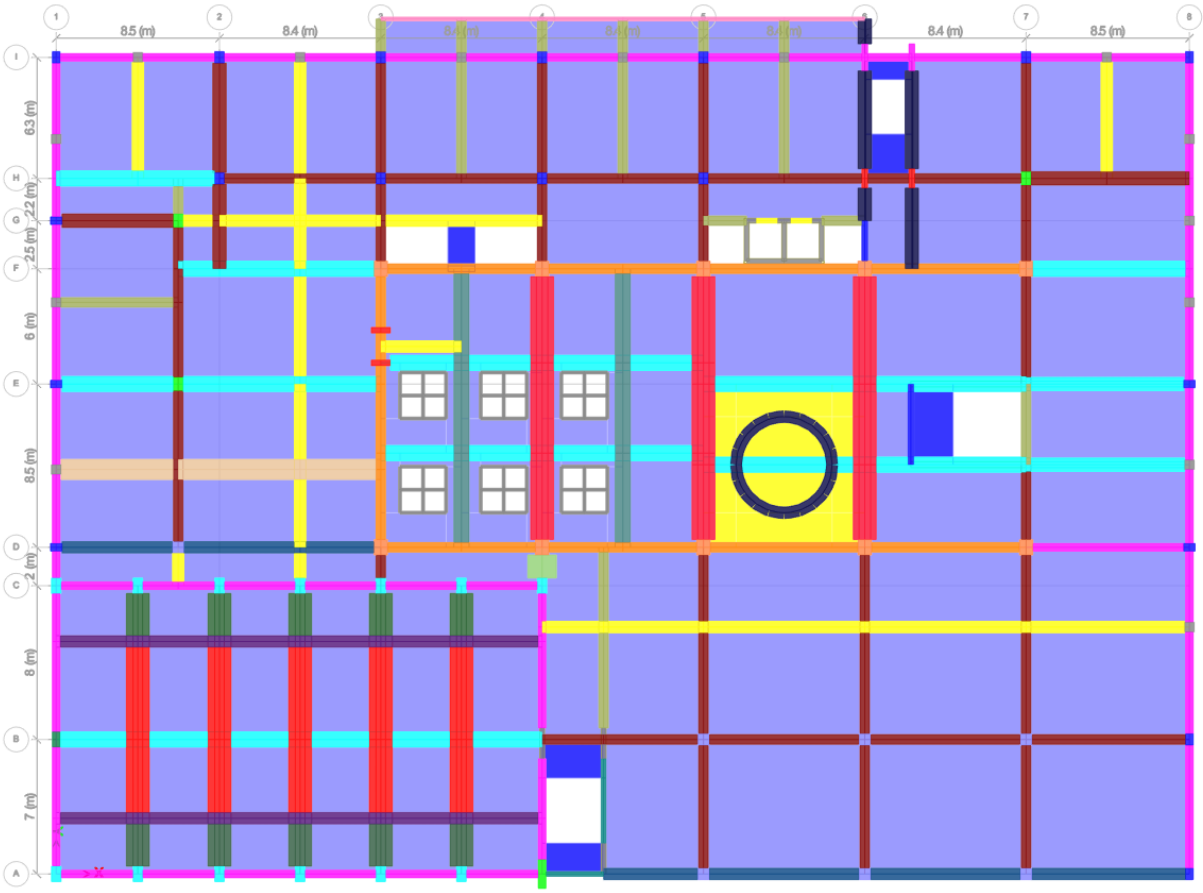
- *Pamje 3D e Modelit te Struktures*



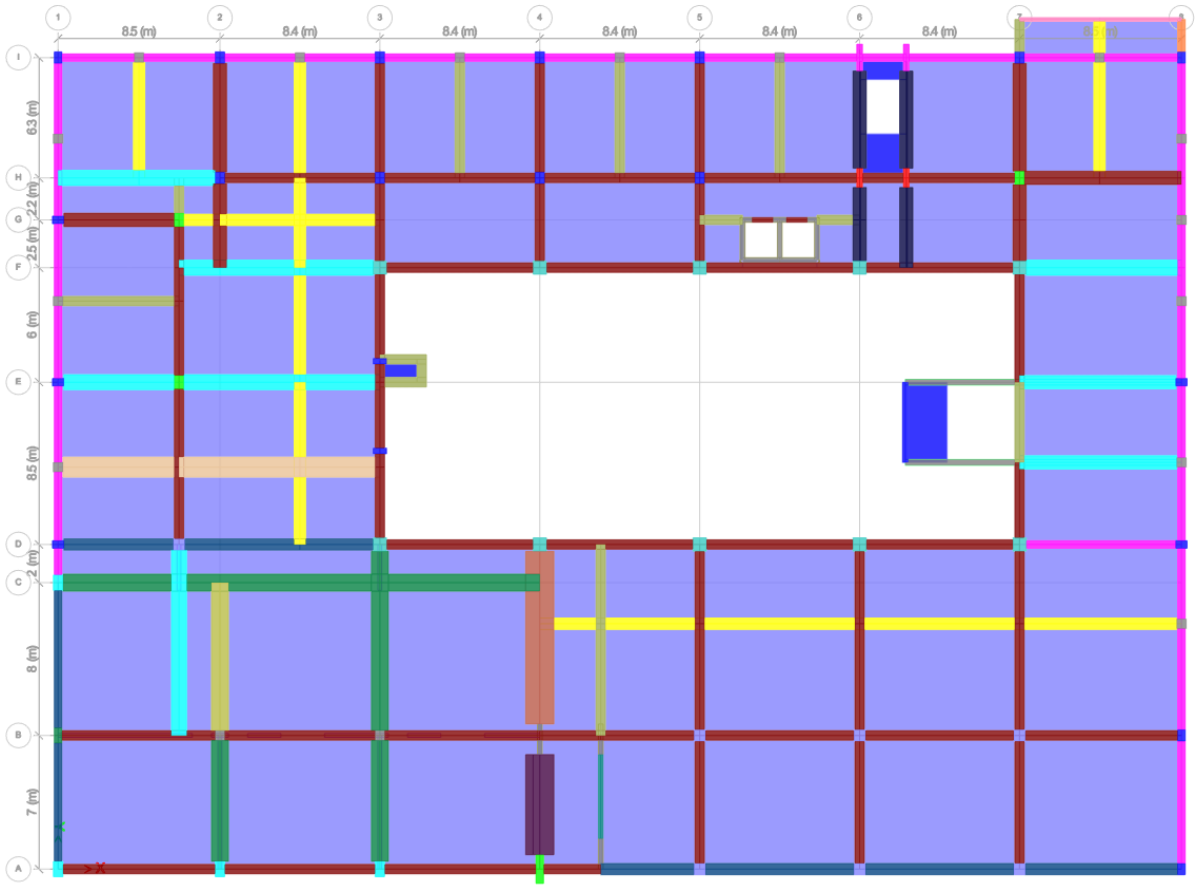
- *Pamje 3D e Modelit te Struktures*



- *Plani i strukturave te katit perdhe ne kuoten +3.69*

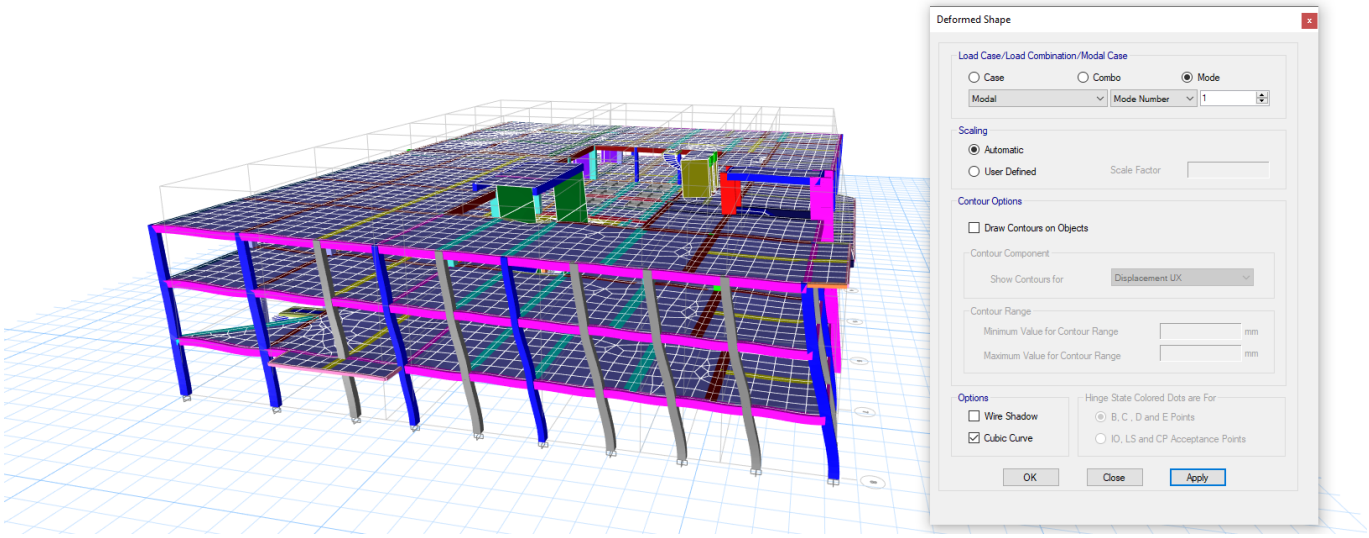


- *Plani i strukturave te katit te pare ne kuoten +7.53*

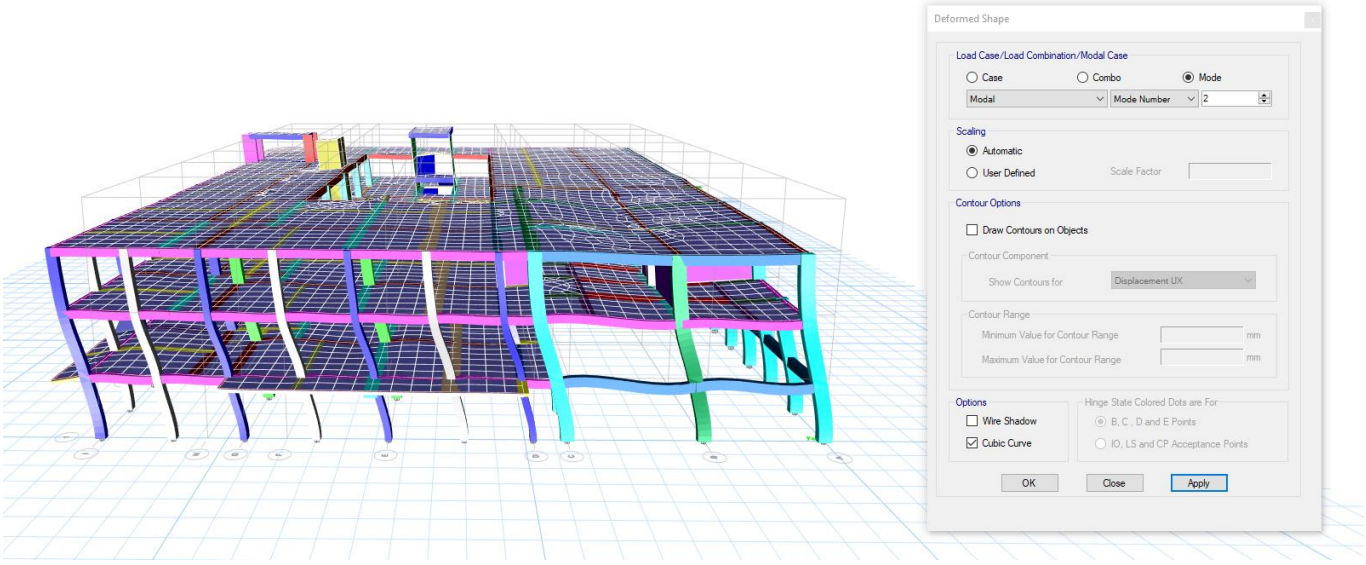


- *Plani i strukturave te katit te dyte ne kuoten +11.27*

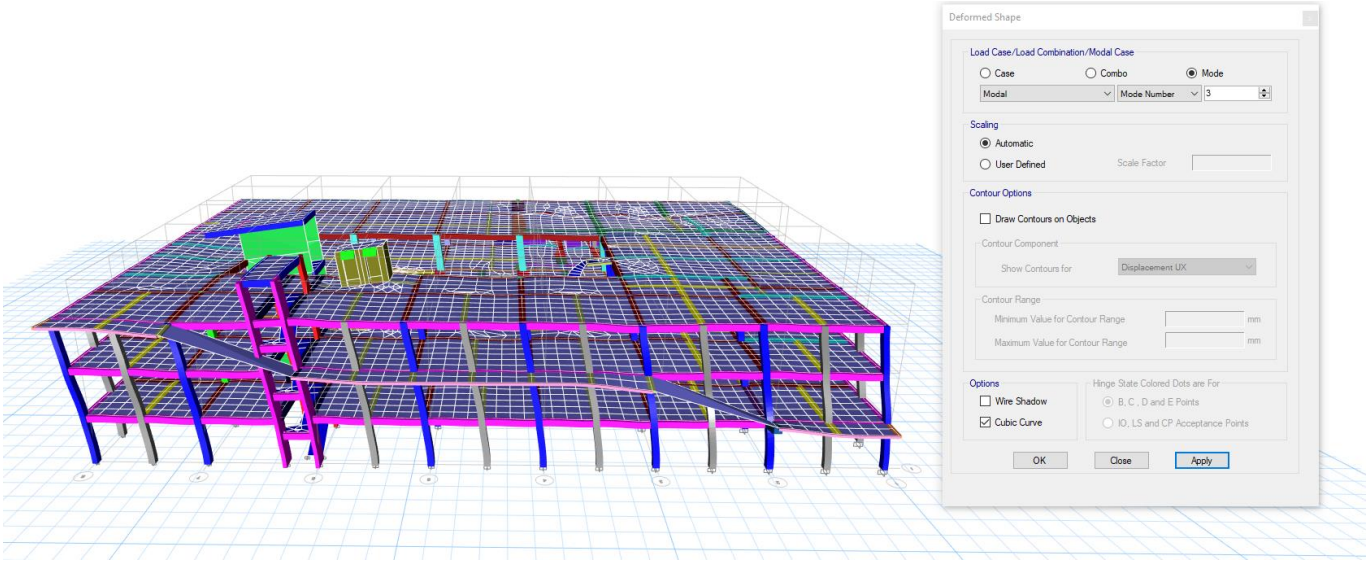
- Me poshte paraqiten disa fragmente nga llogaritjet e struktures per efektet e ketij projekti.



- Moda e Pare e Lekundjeve T =0.435



- Moda e Dyte e Lekundjeve T =0.375



-Moda e Trete e Lekundjeve T =0.263

-Perioda e lekundjeve te godines

TABLE: Modal Periods And Frequencies					
Case	Mode	Period	Frequency	CircFreq	Eigenvalue
		sec	cyc/sec	rad/sec	rad²/sec²
Modal	1	0.435	2.297	14.4297	208.2159
Modal	2	0.375	2.665	16.7439	280.3579
Modal	3	0.263	3.806	23.9121	571.7906
Modal	4	0.167	5.98	37.5727	1411.7107
Modal	5	0.12	8.342	52.4136	2747.1842
Modal	6	0.115	8.708	54.7122	2993.428
Modal	7	0.108	9.231	57.9976	3363.7222
Modal	8	0.092	10.87	68.2984	4664.672
Modal	9	0.08	12.575	79.0125	6242.977
Modal	10	0.077	12.947	81.3491	6617.6725
Modal	11	0.073	13.621	85.5832	7324.4809
Modal	12	0.071	14.088	88.5204	7835.8573
Modal	13	0.069	14.425	90.6338	8214.4784
Modal	14	0.067	14.873	93.4521	8733.2922
Modal	15	0.067	15.034	94.4599	8922.6762
Modal	16	0.065	15.279	95.9991	9215.834
Modal	17	0.055	18.106	113.7607	12941.5015
Modal	18	0.053	19.016	119.483	14276.1816
Modal	19	0.05	19.862	124.7987	15574.7216
Modal	20	0.048	20.626	129.5939	16794.5755
Modal	21	0.047	21.207	133.2469	17754.7294
Modal	22	0.046	21.719	136.4627	18622.0751
Modal	23	0.046	21.908	137.6536	18948.5064
Modal	24	0.045	22.11	138.92	19298.7782

- **Kontrolli I Periodes**

Sipas EC8 4.3.3.2.2 (4.6) perioda fundamentale e struktures per tre modet e para percaktohet sipas formules:

$T_1 = C_t * H^{3/4}$ ku:

T_1 – Perioda fundamentale e struktures

C_t – Faktor qe merret 0.075 per kete tip strukture sipas EC8

H – Lartesia totale e struktures

KONTROLLI I PERIODES FUNDAMNTALE					
MODE	Perioda	H	Ct	Ct*H^3/4	REZULTATI
	sec	m			
1	0.435	11.27	0.075	0.461	Pranohet

Perioda e cila rezulton nga programi per objektin eshte T= 0.435 s < T_1, më e vogel se ajo që rekomandon Eurokodi.

- **Driftet e Nderkateve te Objektit**

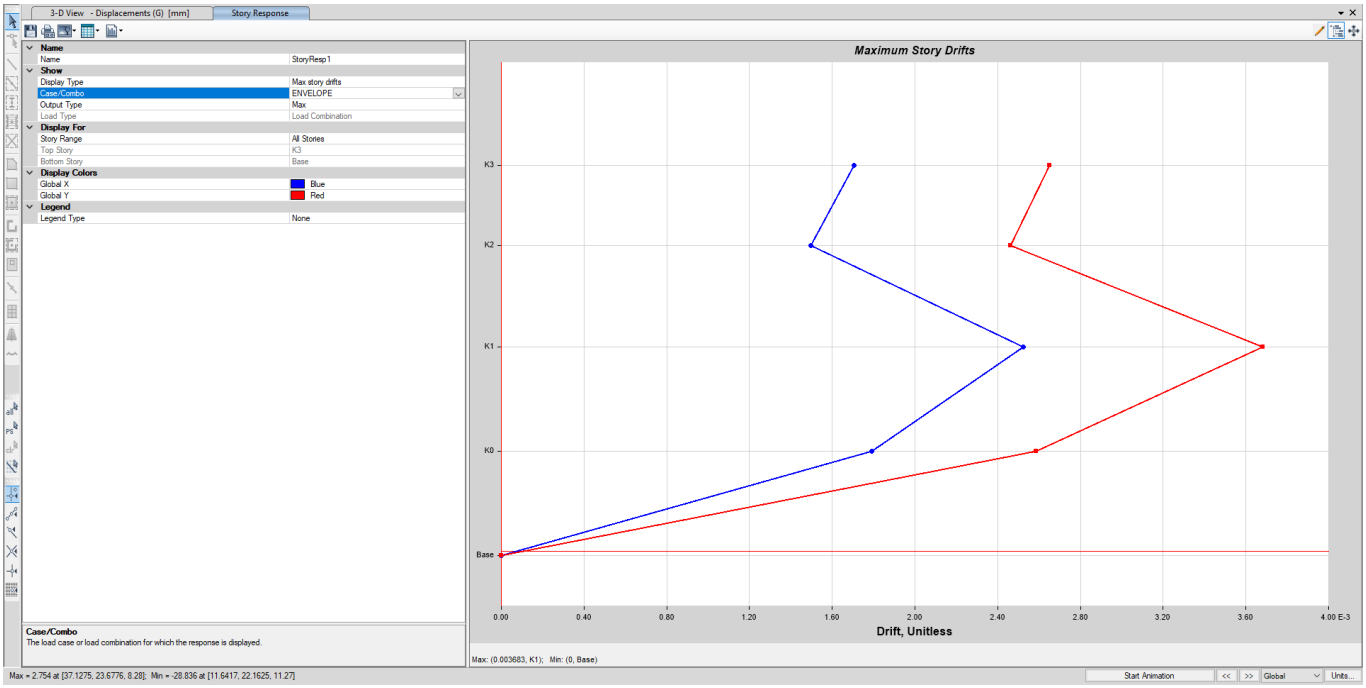
TABLE: Story Drifts							
Story	Output Case	Step Type	Direction	Drift	X	Y	Z
					m	m	m
K2	ENVELOPE	Max	X	0.001497	12.7	42.5	11.27
K2	ENVELOPE	Max	Y	0.002463	59	42.5	11.27
K2	ENVELOPE	Min	X	0.001243	12.7	42.5	11.27
K2	ENVELOPE	Min	Y	0.002093	59	42.5	11.27
K1	ENVELOPE	Max	X	0.002523	59	0	7.53
K1	ENVELOPE	Max	Y	0.003683	0	0	7.53
K1	ENVELOPE	Min	X	0.002446	59	0	7.53
K1	ENVELOPE	Min	Y	0.003453	0	36.2	7.53
K0	ENVELOPE	Max	X	0.001791	42.1	0	3.69
K0	ENVELOPE	Max	Y	0.002586	0	29.75	3.69
K0	ENVELOPE	Min	X	0.001834	33.7	0	3.69
K0	ENVELOPE	Min	Y	0.002488	0	7	3.69

- **Driftet maksimale te Nderkateve te Objektit**

TABLE: Story Max Over Avg Drifts						
Story	Output Case	Step Type	Direction	Max Drift	Avg Drift	Ratio
				mm	mm	
K2	ENVELOPE	Max	X	5.599	4.48	1.25
K2	ENVELOPE	Max	Y	9.213	7.598	1.213
K2	ENVELOPE	Min	X	4.647	3.844	1.209
K2	ENVELOPE	Min	Y	7.827	5.755	1.36
K1	ENVELOPE	Max	X	9.689	7.109	1.363
K1	ENVELOPE	Max	Y	14.142	10.127	1.397
K1	ENVELOPE	Min	X	9.394	6.764	1.389
K1	ENVELOPE	Min	Y	13.26	9.386	1.413
K0	ENVELOPE	Max	X	6.877	4.594	1.497
K0	ENVELOPE	Max	Y	9.93	6.94	1.431
K0	ENVELOPE	Min	X	7.042	4.654	1.513
K0	ENVELOPE	Min	Y	9.553	6.242	1.53

REAKSIONET NE BAZE							
KOMBINIMI	TIPI	FX	FY	FZ	MX	MY	MZ
		KN	KN	KN	KN-m	KN-m	KN-m
Envelope	Max	30590.6443	23903.5178	132744.0906	2983844.9762	-2101432	972170.0928
Envelope	Min	-30590.644	-23903.517	81198.8033	1600867.0486	-3906830	-972170.092

MASA PJESEMARRESE NE ANALIZEN MODALE				
ANALIZA	TIPI	DREJTIMI	STATIK	DINAMIK
			%	%
MODAL	Acceleration	UX	99.95	97.91
MODAL	Acceleration	UY	100	99.46



- *Driftet maksimale ne kate*

- **<u>Kontrolli i drifteve:</u>**

Sipas EC8 4.4.3.2 per struktura me elemente strukturore elastike dhe duktilitet mesatar deri te larte, driftet e nderkateve duhet te jene nen vlerat e lejuara te percaktuara si:

d_r *v $\leq$ 0,005 h ku:

d_r – Vlera e driftit te nderkatit

h – Lartesia e katit

v – Faktor reduktimi i cili merr parasysh periudhen me te ulet te rikthimit te veprimit sizmik per reduktim te nivelit te demtimit te struktures.

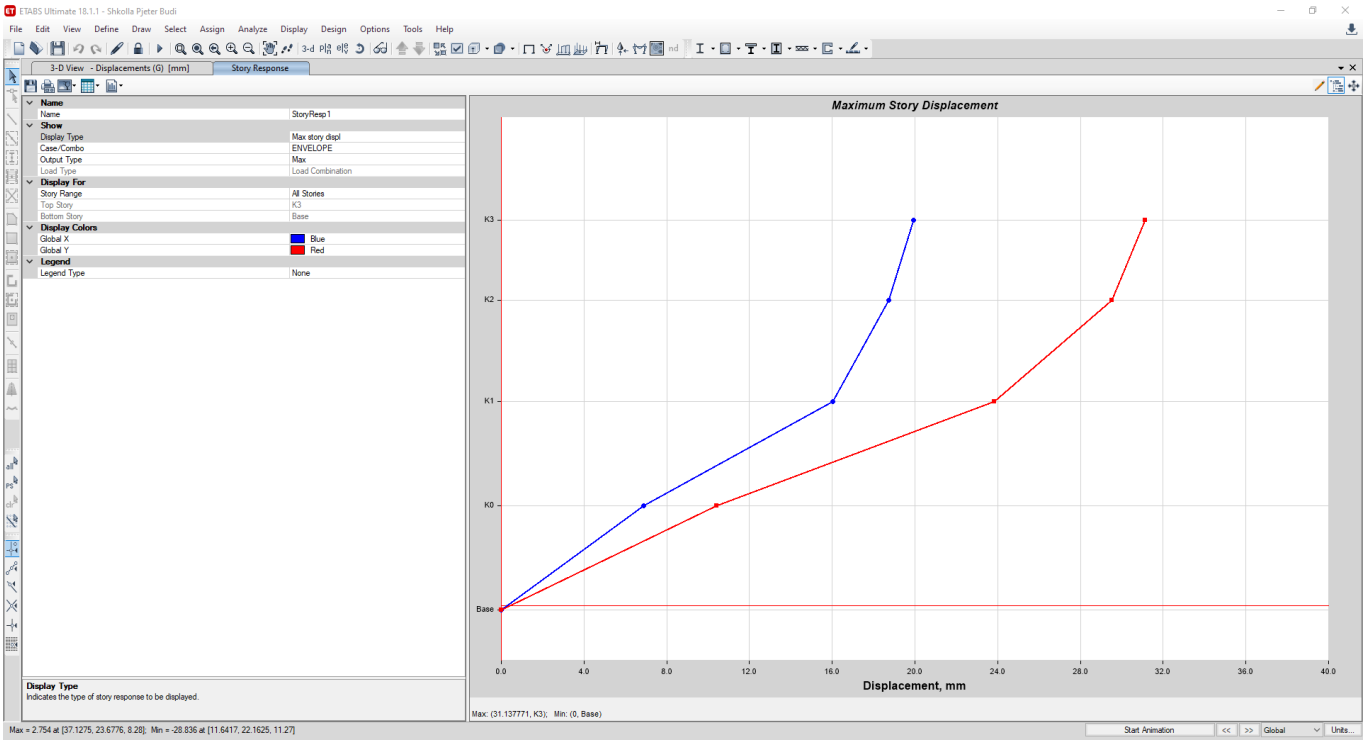
* Vlera e faktorit v rekomandohet te merret 0.5 per klasat e rendesise I dhe II sipas EC8

	DRIFT CHECK/Kontrolli i Drifteve							
Kati	h	DREJTIMI	ELASTIK DRIFT (dr)	INELASTIK DRIFT (dr*q)	v	dr*v	0.005*h	REZULTATI
	mm		mm	mm		mm	mm	
K2	3740	X	5.599	13.998	0.5	6.999	18.70	Pranohet
K2	3740	Y	9.213	23.033	0.5	11.516	18.70	Pranohet
K2	3740	X	4.647	11.618	0.5	5.809	18.70	Pranohet
K2	3740	Y	7.827	19.568	0.5	9.784	18.70	Pranohet
K1	3840	X	9.689	24.223	0.5	12.111	19.20	Pranohet
K1	3840	Y	14.142	35.355	0.5	17.678	19.20	Pranohet
K1	3840	X	9.394	23.485	0.5	11.743	19.20	Pranohet
K1	3840	Y	13.26	33.150	0.5	16.575	19.20	Pranohet
K0	3840	X	6.877	17.193	0.5	8.596	19.20	Pranohet
K0	3840	Y	9.93	24.825	0.5	12.413	19.20	Pranohet

K0	3840	X	7.042	17.605	0.5	8.803	19.20	Pranohet
K0	3840	Y	9.553	23.883	0.5	11.941	19.20	Pranohet

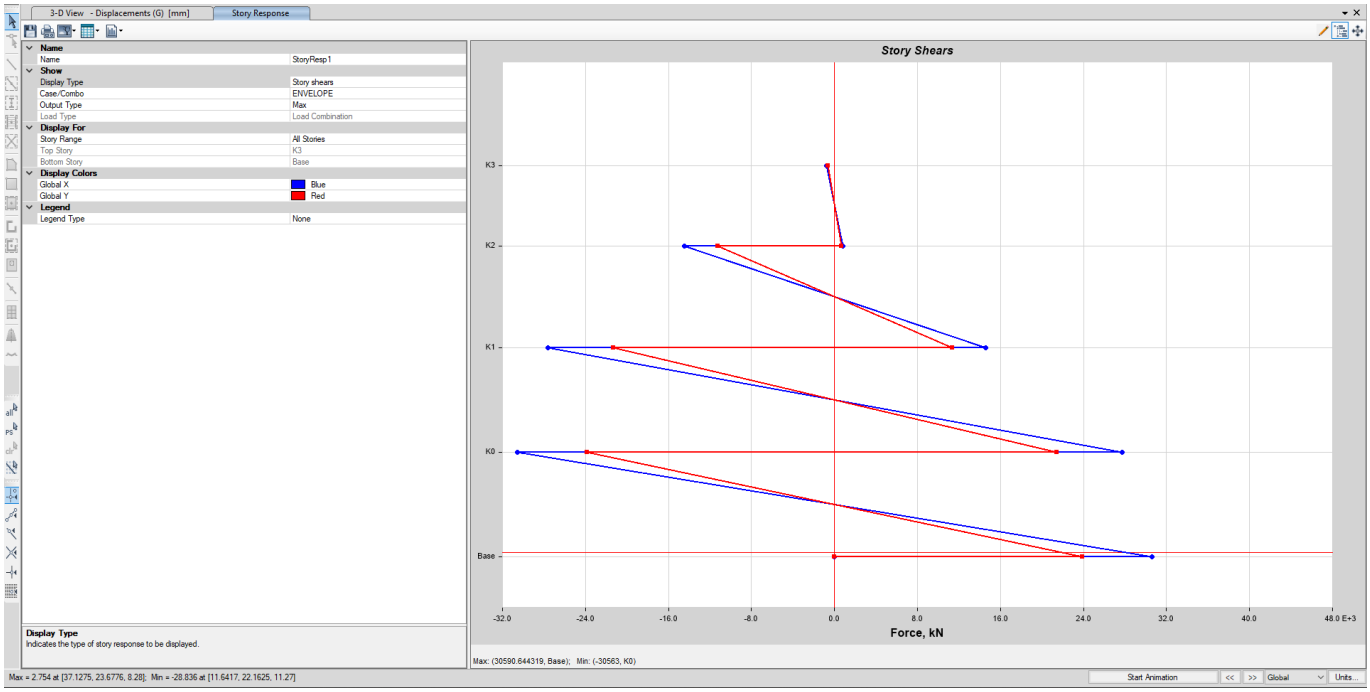
Me poshte paraqiten tabela, grafike dhe te rezultate te tjera te marra nga analizimi i struktures me ane te programit ETABS 2018:

- **<u>Zhvendosjet maksimale te objektit:</u>**

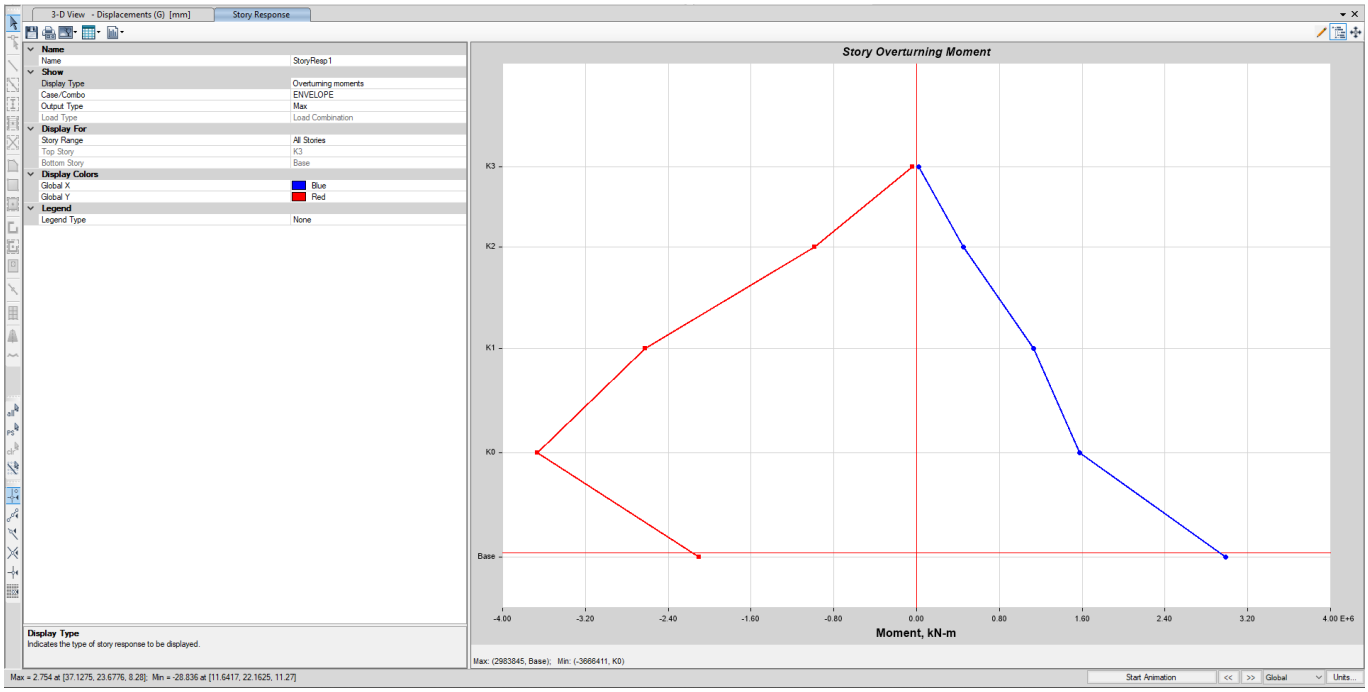


- *Zhvendosjet maksimale ne kate (cm)*

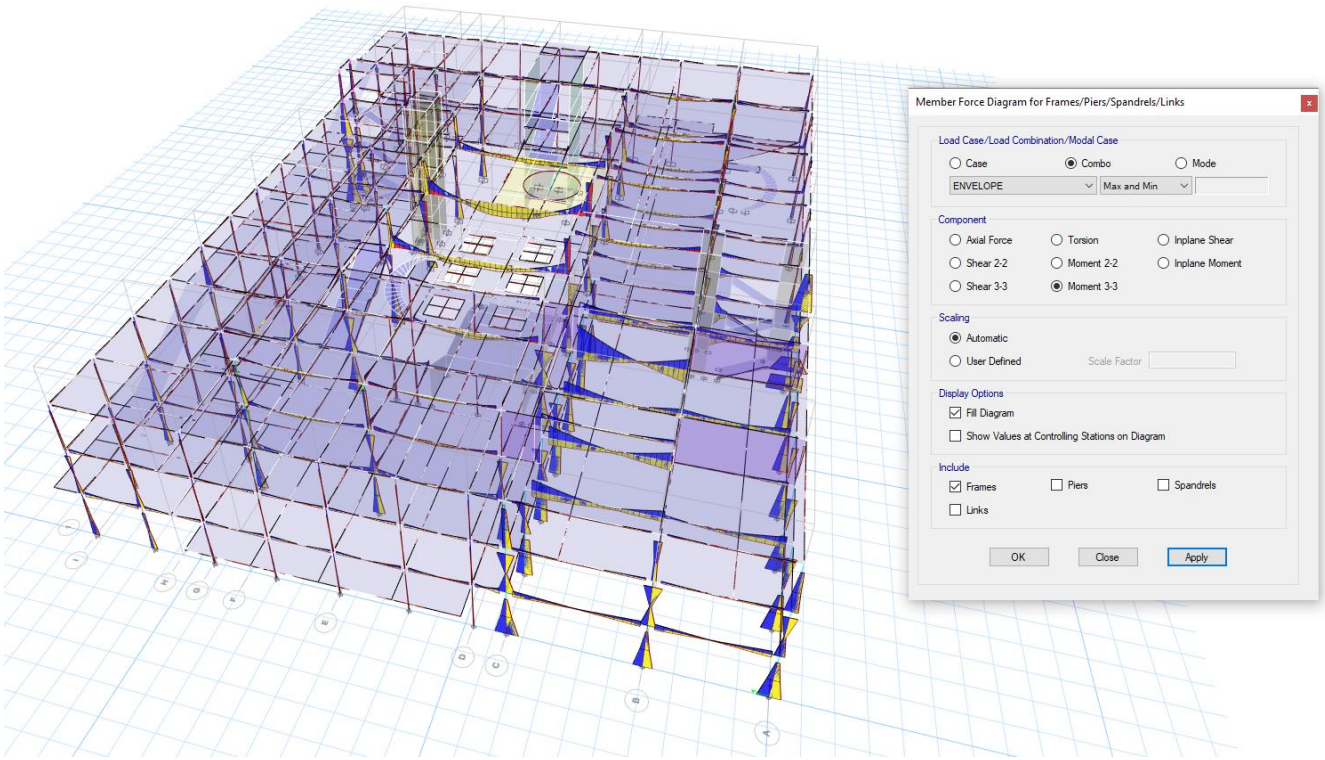
Ne rast te vepimit te termetit te projektimit zhvendosja maksimale e godines rezulton 3,11cm. Kjo zhvendosje eshte brenda vlerave qe lejojne Eurokodi apo KTP-ja ne fuqi. Sipas kodeve nuk lejohet zhvendosje elasto-plastike me shume se 1/150 e lartesise se godines pra maksimumi 7.51 cm.



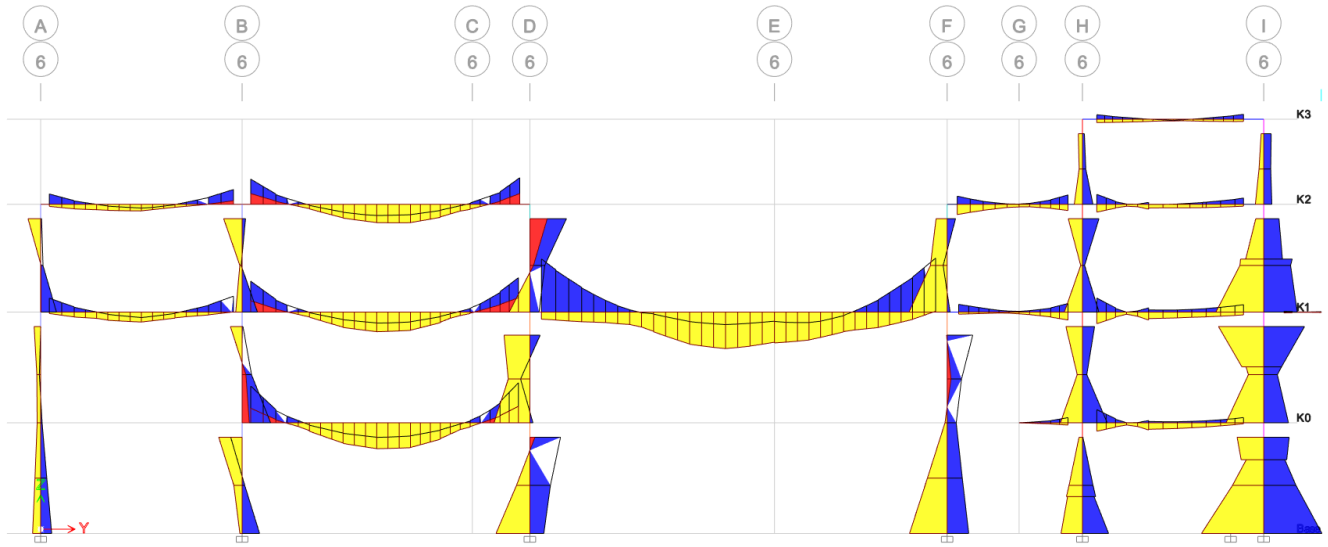
- *Forca Prerese maksimale ne kate (kN)*



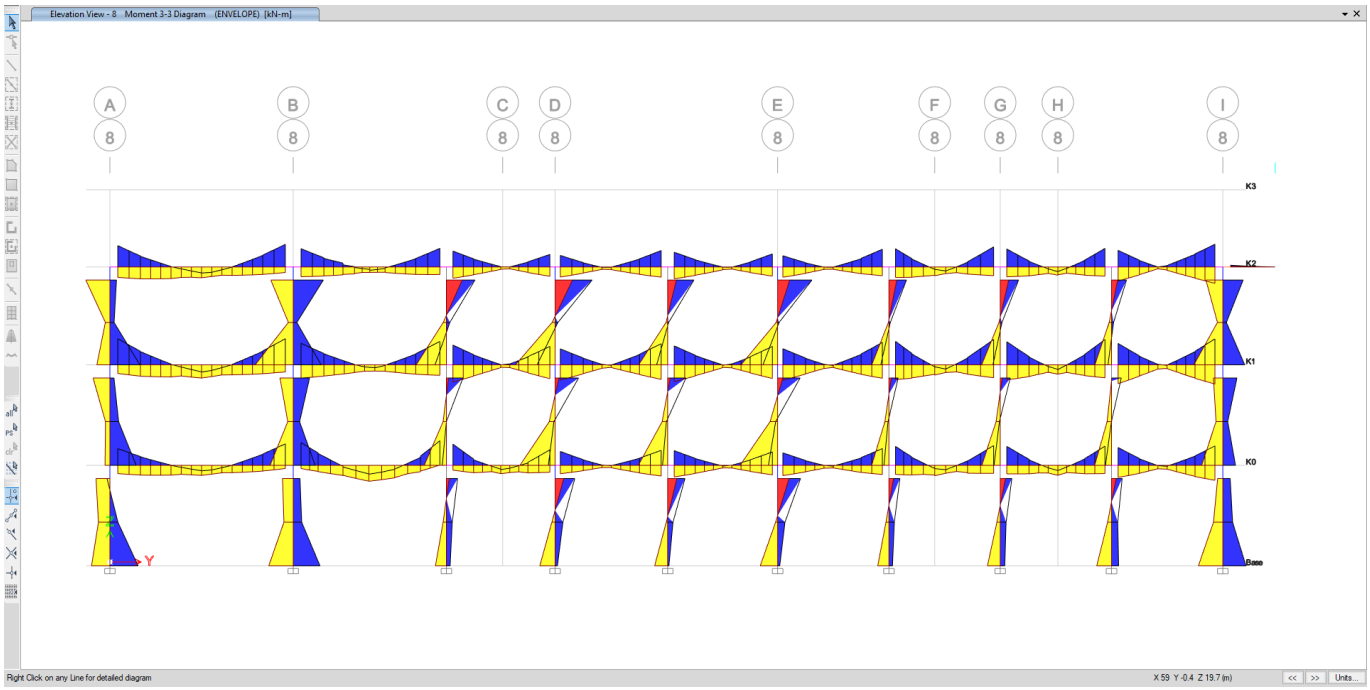
- *Momenti maksimale ne kate (kN-m)*



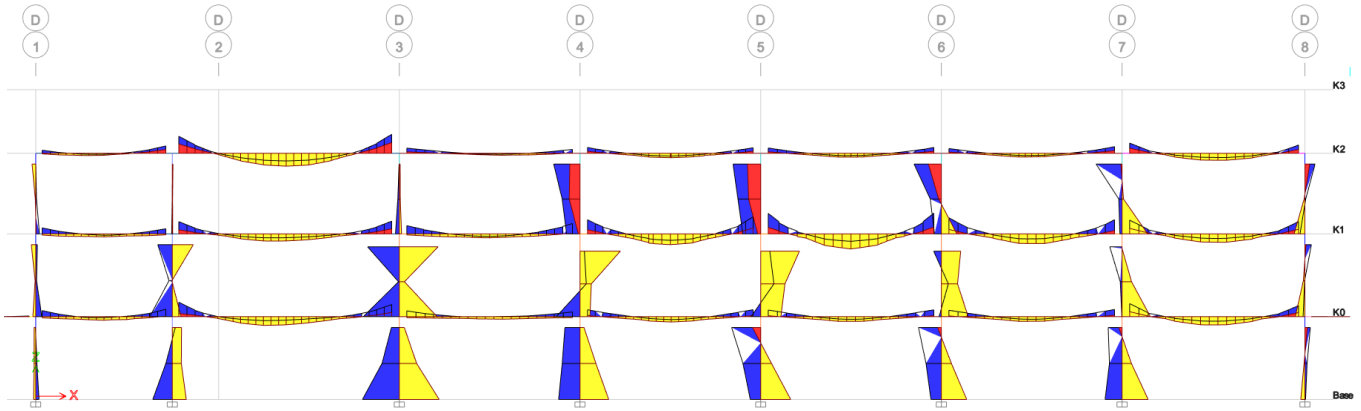
- *Paraqitje e momenteve karakteristike ne strukture – Pamje 3 Permasore*



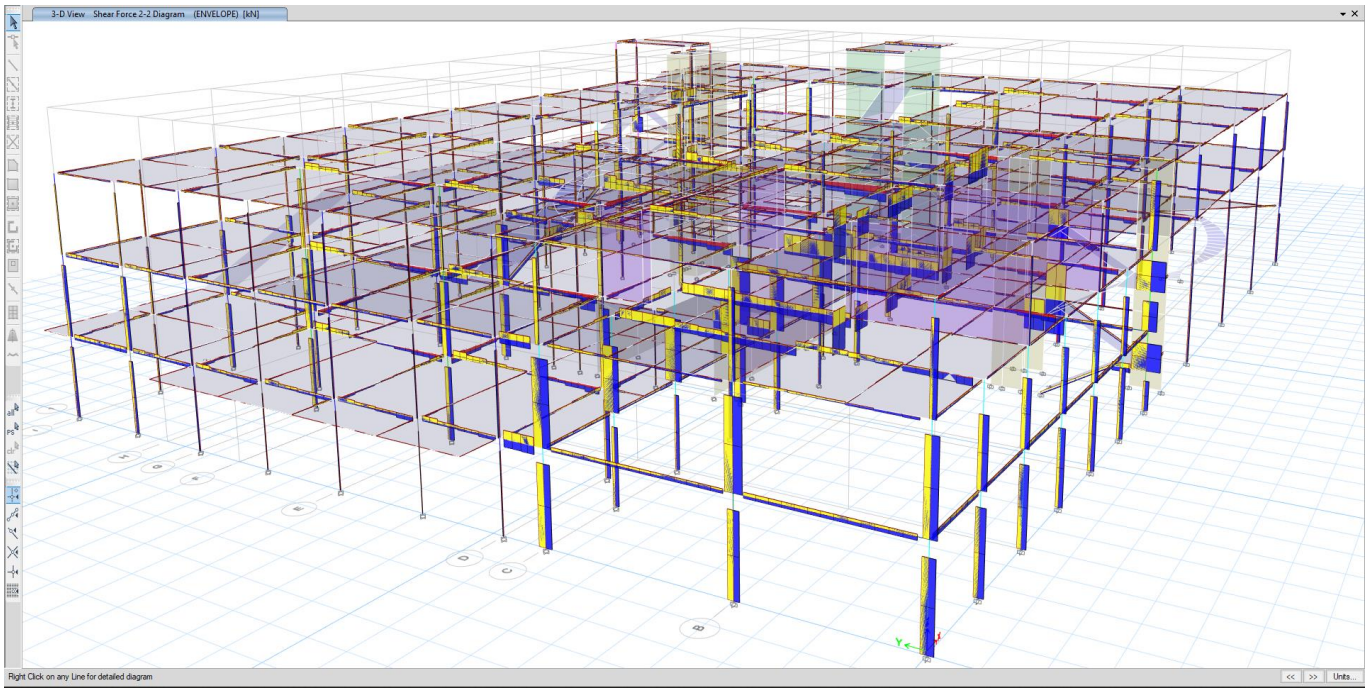
- *Paraqitje e momenteve karakteristike ne strukture - Aksi 6*



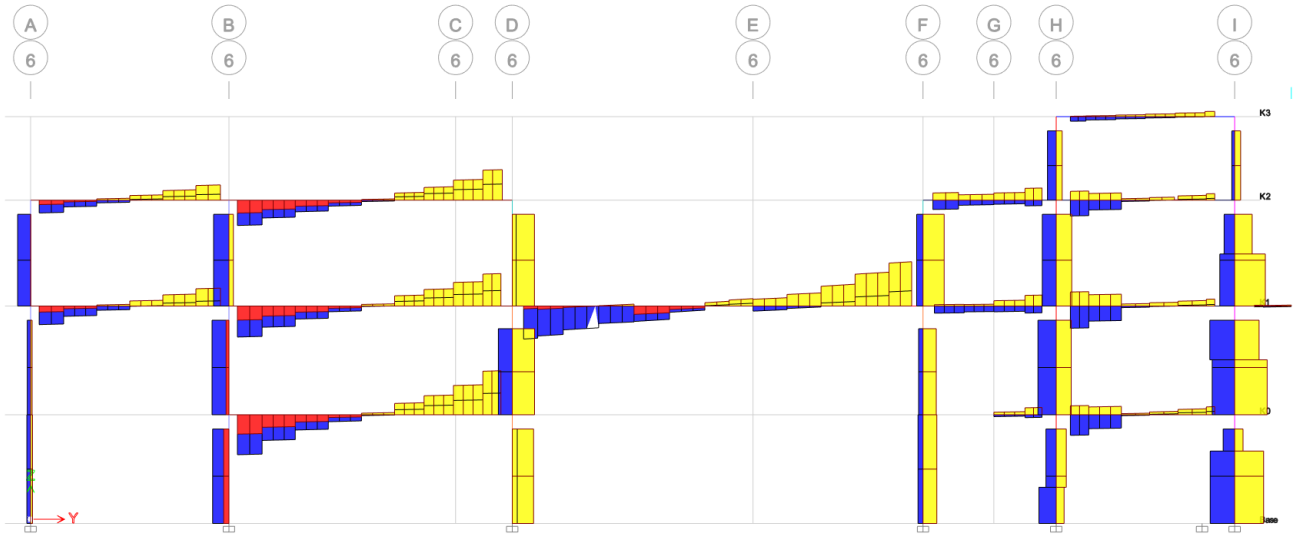
- *Paraqitje e momenteve karakteristike ne strukture - Aksi 8*



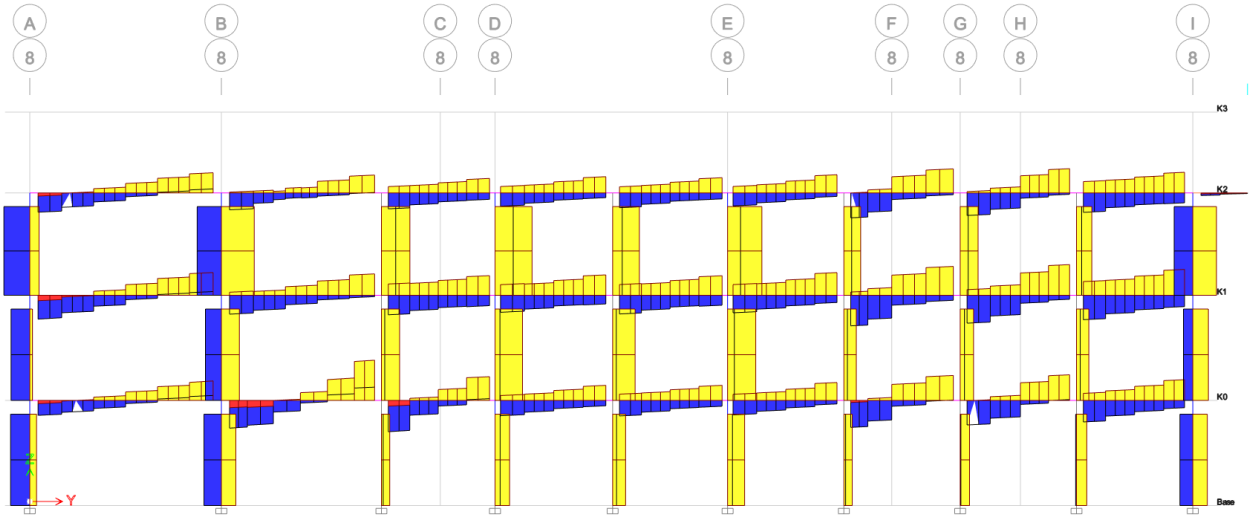
- *Paraqitje e momenteve karakteristike ne strukture - Aksi D*



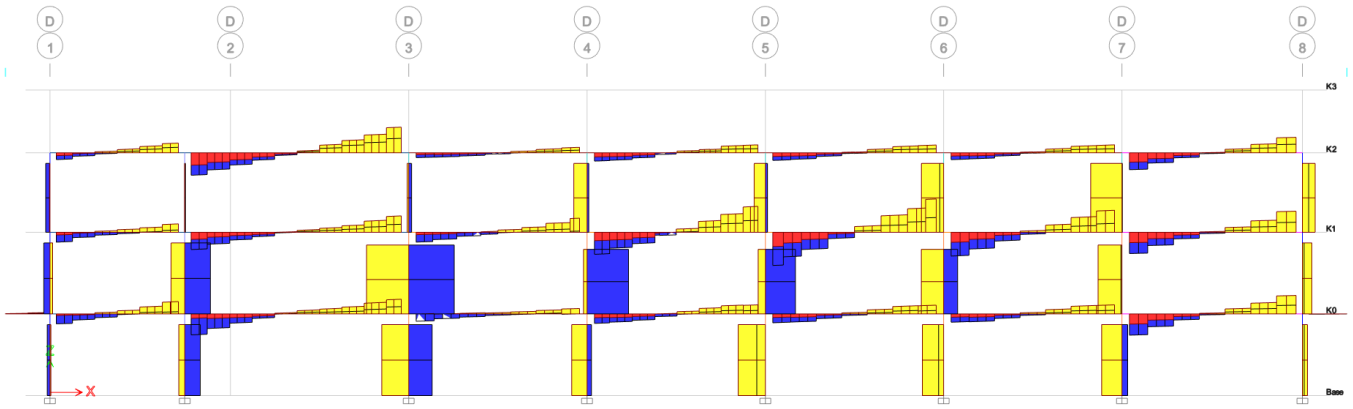
- *Paraqitje e forces prerese karakteristike ne strukture*



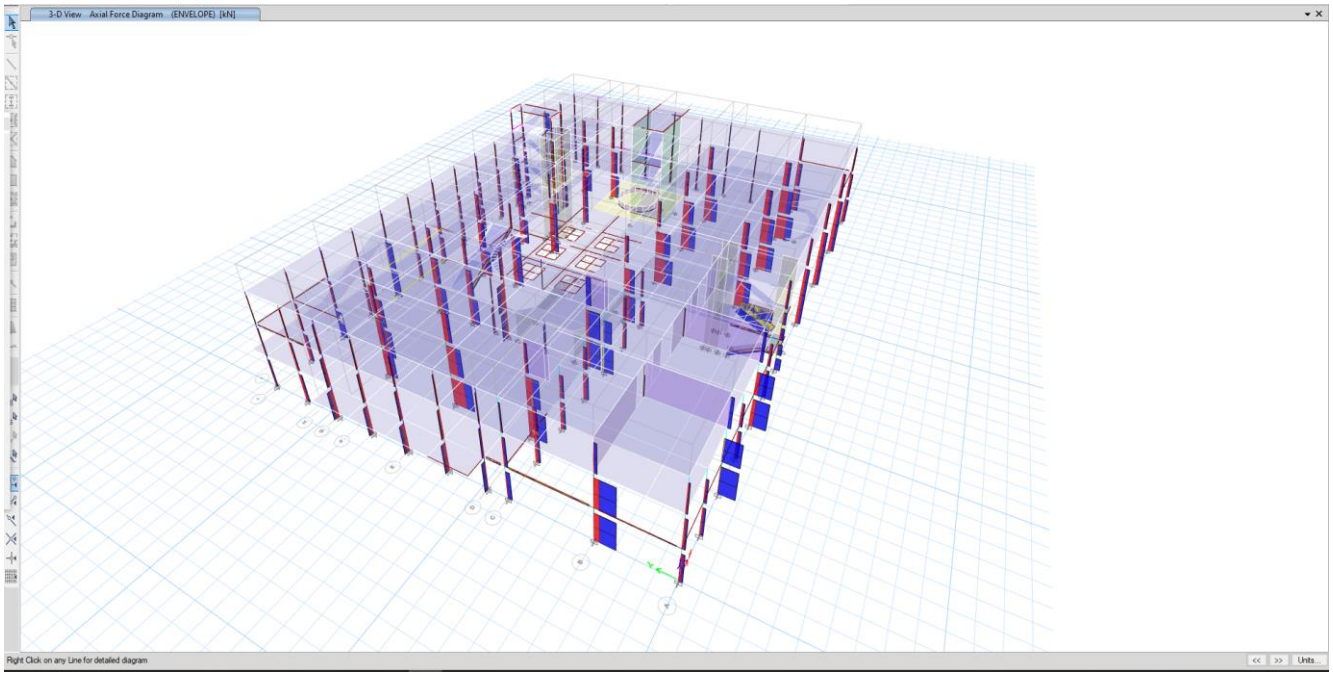
- *Paraqitje e forces prerese karakteristike ne strukture - Aksi 6*



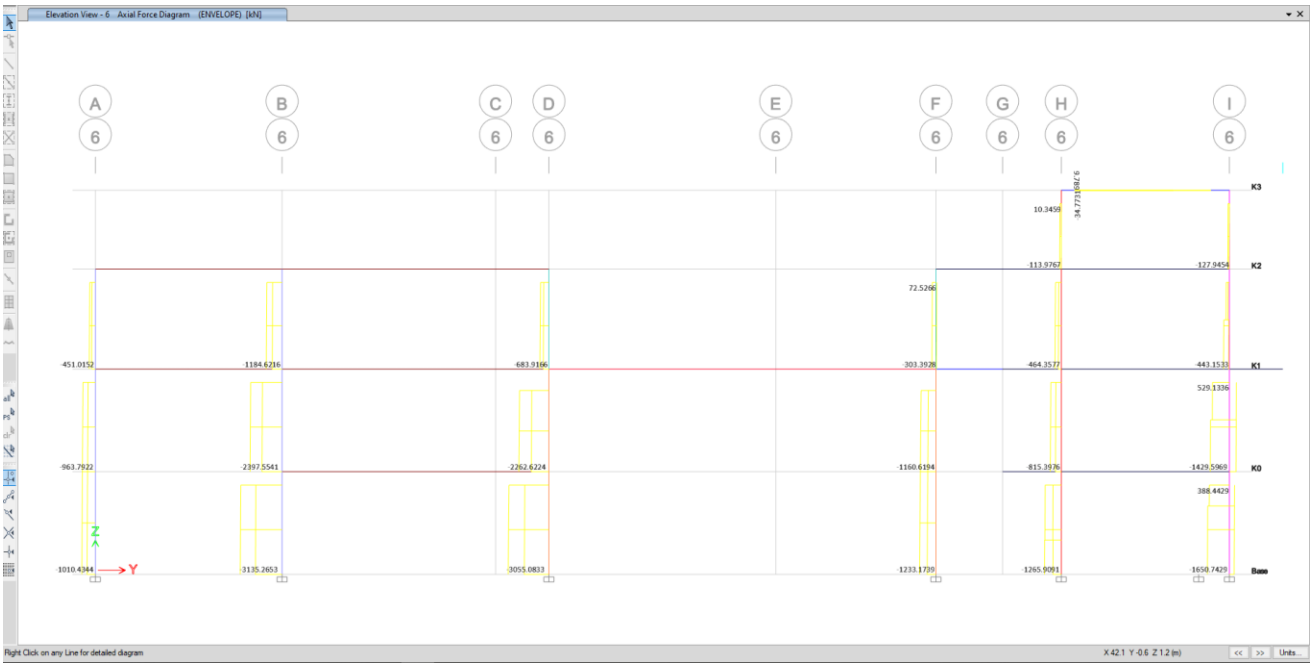
- *Paraqitje e forces prerese karakteristike ne strukture - Aksi 8*



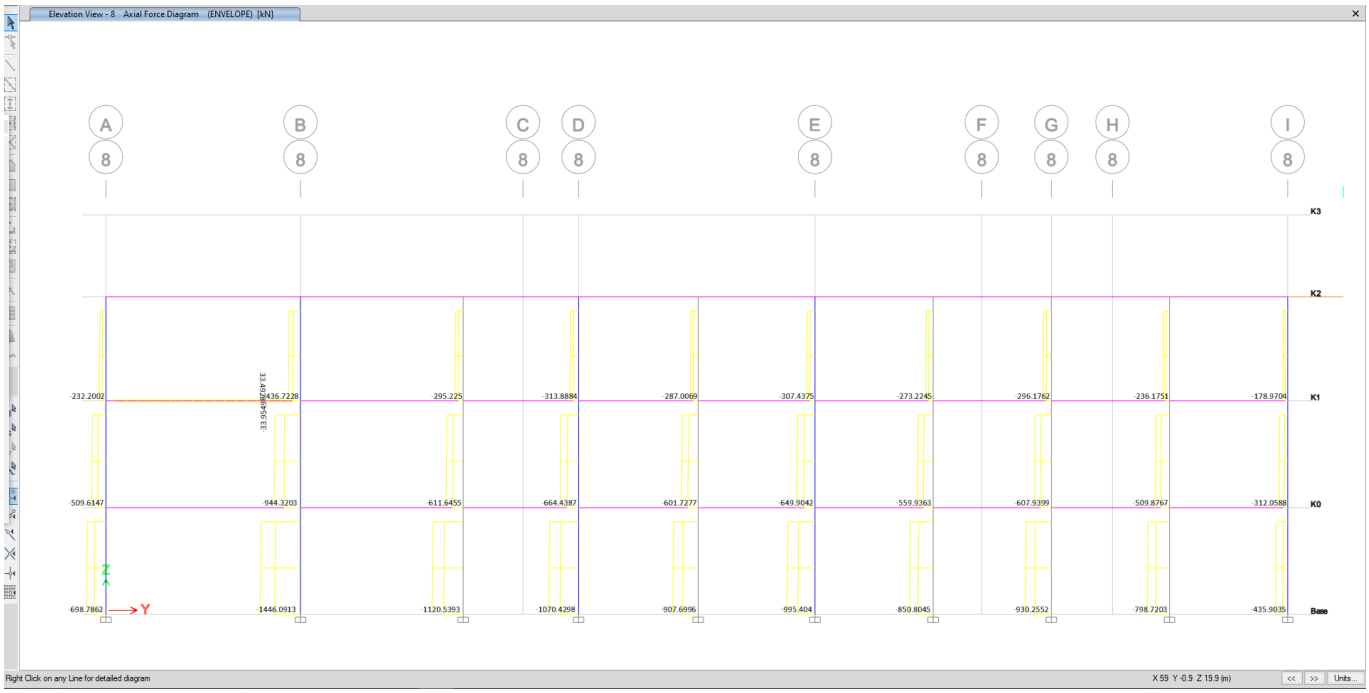
- *Paraqitje e forces prerese karakteristike ne strukture - Aksi D*



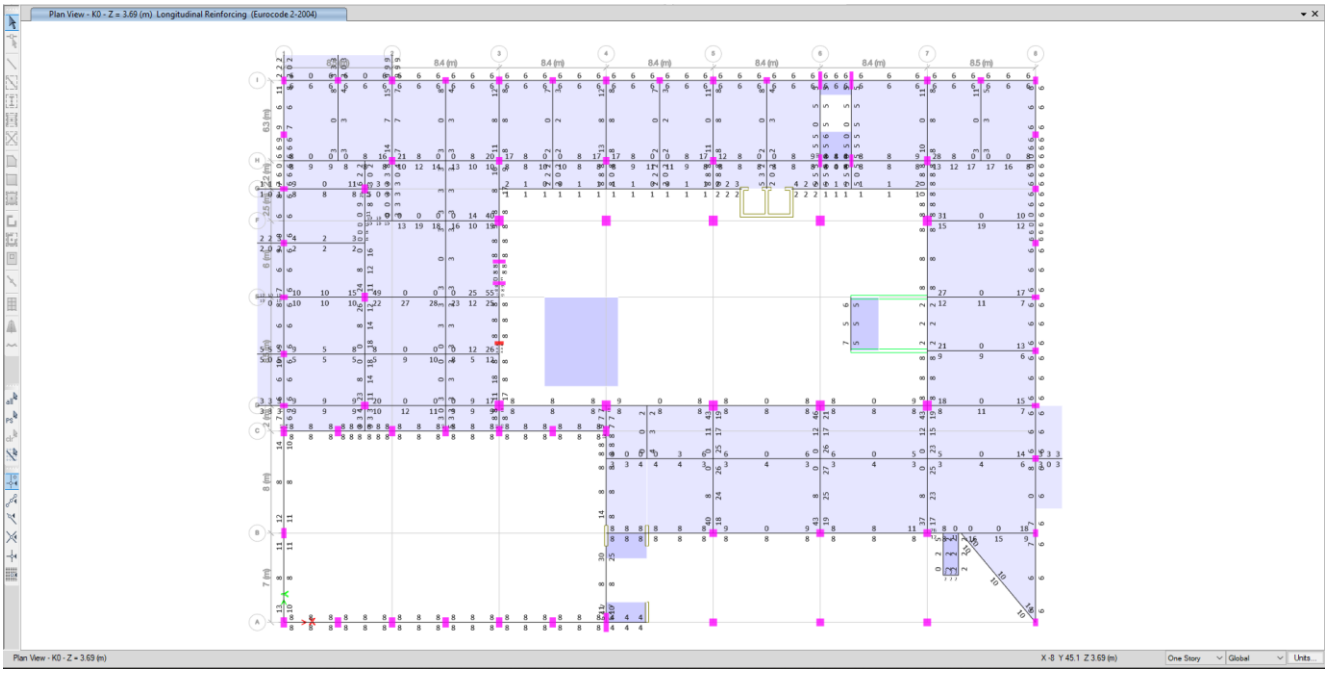
- *Paraqitje e forces Aksiale, Normale karakteristike ne strukture*



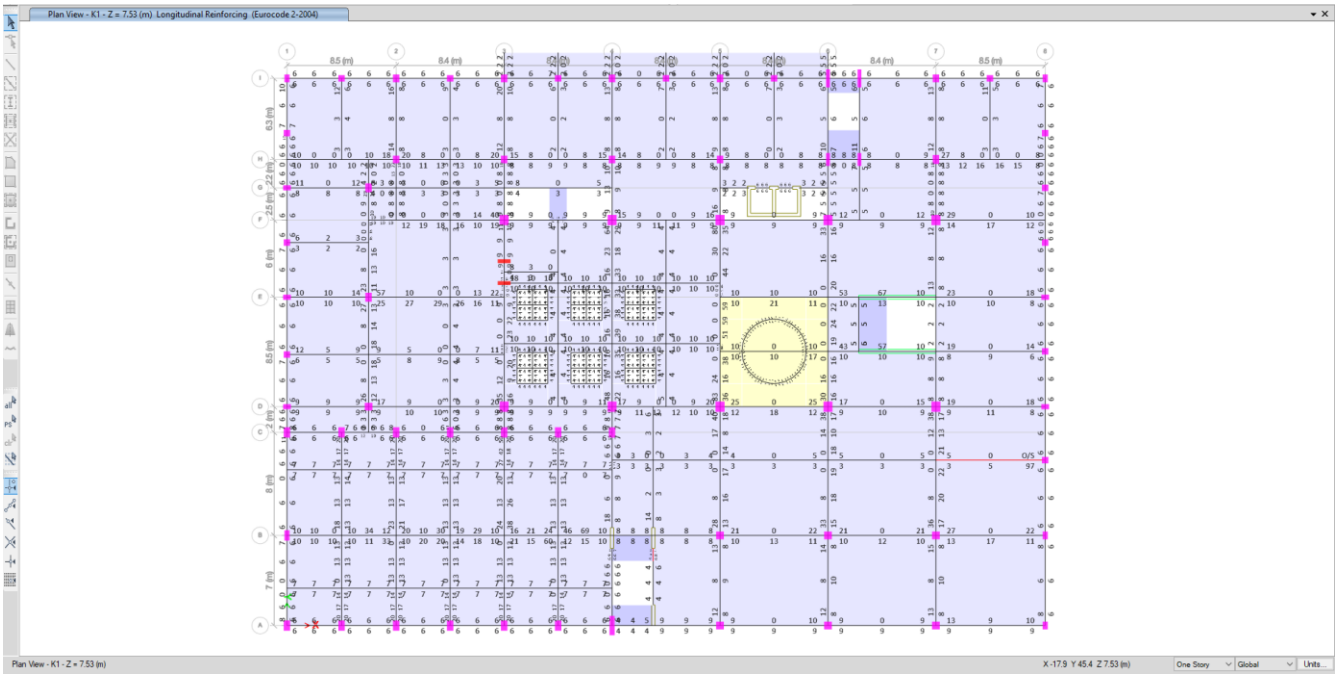
- *Paraqitje e forces Aksiale, Normale karakteristike ne strukture - Aksi 6*



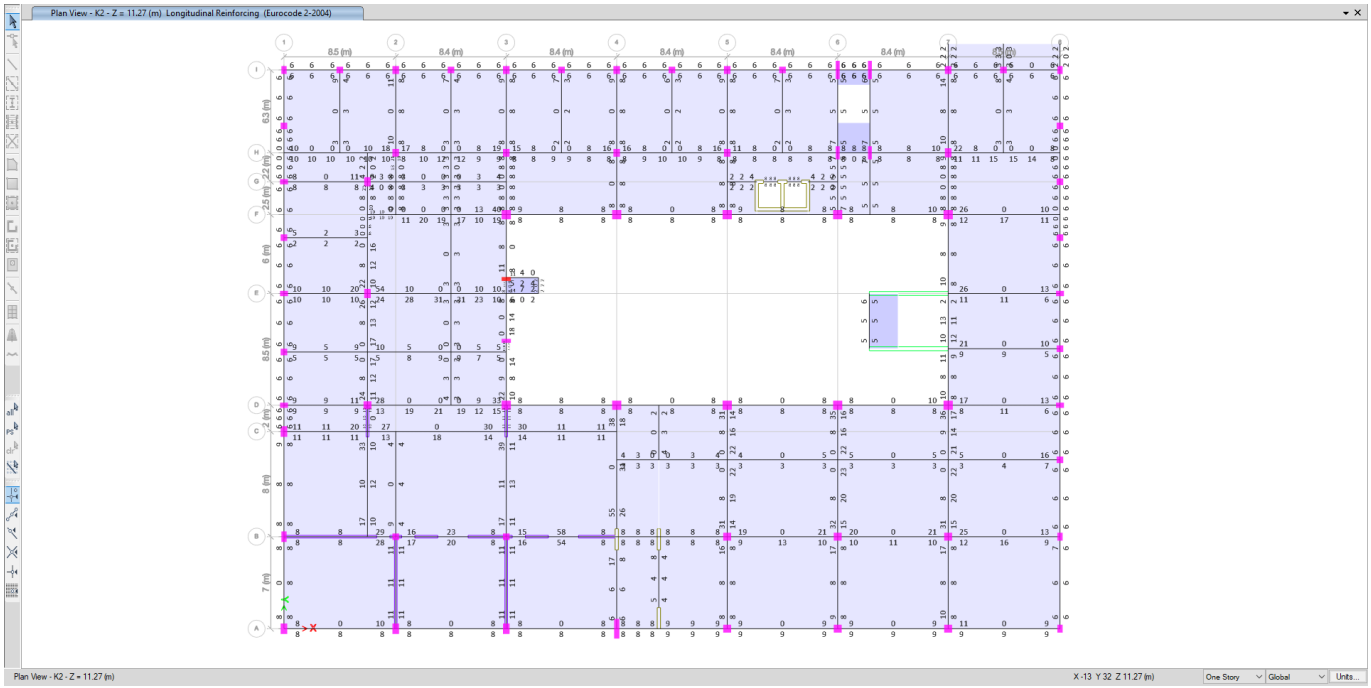
- *Paraqitje e forces Aksiale, Normale karakteristike ne strukture - Aksi 8*



- *Plani i strukturave te katit perdhe - paraqitje e sasise se armatures ne trare (cm^2)*



Plani i strukturave kuota +7.53 - paraqitje e sasise se armatures ne trare (cm^2)

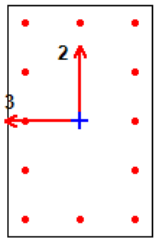


Plani i strukturave kati tip kuota +11.27 - paraqitje e sasise se armatures ne trare (cm^2)

- *Kontrolli ne Etabs 2018 i kolonave me te ngarkuara*

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K0	C139	4	K 80X50	ENVELOPE	0	3840	Nominal Stiffness	0.812

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
500	800	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
34000	35	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
220.4088	161.3713	-514.2382	4.4082	5.8776	41	1.03

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	-253.2142	6.2486	0	1	6480
Minor Bend(M2)	67.3496	2.6273	0	1	3240

Axial Compression Ratio

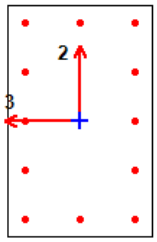
Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
9333.3333	0.052	0.65	Yes	Yes

Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	214.5622	211.951	214.5622	0.4	3.58
Minor, V_{Ed3}	201.136	256.7219	0	0.4	0

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K1	C139	287	K 80X50	ENVELOPE	2640	3840	Nominal Stiffness	0.825

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
500	800	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
34000	35	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
140.1249	-44.0528	-676.5881	2.8025	3.7367	59	1.47

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	-44.8963	3.9726	0	1	6480
Minor Bend(M2)	51.668	1.1089	0	1	2640

Axial Compression Ratio

Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
9333.3333	0.037	0.65	Yes	Yes

Shear Design for V_{Ed2} , V_{Ed3}

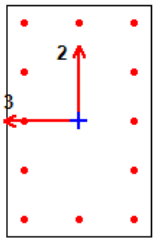
	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	160.7917	252.7297	0	0.4	0
Minor, V_{Ed3}	107.5985	263.7931	0	0.4	0

Joint Shear Check/Design

	Joint Shear A_{sh} kN	Shear V_{Ed} , Top kN	Shear V_{jhd} kN	Shear V_{Rd} Conc kN	Joint Area cm²	Shear Ratio Unitless
Major Shear, V_2	N/A	N/A	N/A	N/A	N/A	N/A
Minor Shear, V_3	N/A	N/A	N/A	N/A	N/A	N/A

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K1	C140	289	K 80X50	ENVELOPE	2640	3840	Nominal Stiffness	0.814

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
500	800	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
34000	35	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
197.1509	60.4652	676.5881	3.943	5.2574	58	1.44

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	148.9508	5.5893	0	1	6480
Minor Bend(M2)	-58.5356	1.5602	0	1	2640

Axial Compression Ratio

Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
9333.3333	0.038	0.65	Yes	Yes

Shear Design for V_{Ed2} , V_{Ed3}

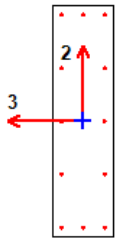
	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	161.4028	252.9862	0	0.4	0
Minor, V_{Ed3}	107.5985	242.5078	0	0.4	0

Joint Shear Check/Design

	Joint Shear A_{sh} kN	Shear V_{Ed} , Top kN	Shear V_{jhd} kN	Shear V_{Rd} Conc kN	Joint Area cm²	Shear Ratio Unitless
Major Shear, V_2	N/A	N/A	N/A	N/A	N/A	N/A
Minor Shear, V_3	N/A	N/A	N/A	N/A	N/A	N/A

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K2	C148	631	K 150X40	ENVELOPE	3240	3740	Nominal Stiffness	0.81

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
400	1500	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
110.1928	309.7387	-89.5409	2.2039	5.5096	60	1

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	315.9971	0.4013	0	1	3240
Minor Bend(M2)	-43.9157	1.6998	0	1	3240

Axial Compression Ratio

Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
12000	0.024	0.65	Yes	Yes

Shear Design for V_{Ed2} , V_{Ed3}

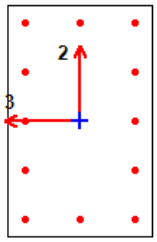
	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	120.7815	278.344	0	0.4	0
Minor, V_{Ed3}	64.0387	317.9693	0	0.4	0

Joint Shear Check/Design

	Joint Shear A_{sh} kN	Shear V_{Ed} , Top kN	Shear V_{jhd} kN	Shear V_{Rd} Conc kN	Joint Area cm²	Shear Ratio Unitless
Major Shear, V_2	N/A	N/A	N/A	N/A	N/A	N/A
Minor Shear, V_3	N/A	N/A	N/A	N/A	N/A	N/A

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K0	C141	7	K 80X50	ENVELOPE	0	3840	Nominal Stiffness	0.723

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
500	800	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
34000	35	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
147.2393	55.4385	547.1199	2.9448	3.9264	45	1.12

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	299.9966	1.0436	0	1	3240
Minor Bend(M2)	26.535	1.7551	0	1	3240

Axial Compression Ratio

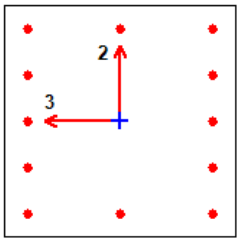
Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
9333.3333	0.074	0.65	Yes	Yes

Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	365.7585	283.017	365.7585	0.4	6.11
Minor, V_{Ed3}	199.0055	290.5937	0	0.4	0

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K0	C149	15	K 60X60	ENVELOPE	0	3840	Nominal Stiffness	0.603

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
600	600	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
481.7043	154.7172	-145.9246	9.6341	9.6341	36	1

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	-65.245	22.976	0	1	7180
Minor Bend(M2)	81.6224	22.976	0	1	7180

Axial Compression Ratio

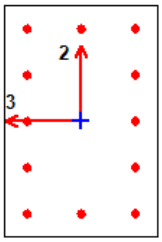
Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
7200	0.119	0.65	Yes	Yes

Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	168.2121	275.4964	0	0.4	0
Minor, V_{Ed3}	175.5299	275.4964	0	0.4	0

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K0	C155	21	K 60X40	ENVELOPE	3340	3840	Nominal Stiffness	0.67

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
400	600	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
393.6449	45.6846	142.3086	7.8729	7.8729	24	1

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	46.9622	4.063	0	1	3340
Minor Bend(M2)	-18.6988	6.4529	0	1	3340

Axial Compression Ratio

Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
4800	0.14	0.65	Yes	Yes

Shear Design for V_{Ed2} , V_{Ed3}

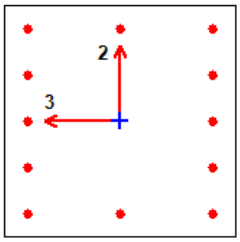
	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	164.9727	197.1882	0	0.4	0
Minor, V_{Ed3}	102.4657	198.2628	0	0.4	0

Joint Shear Check/Design

	Joint Shear A_{sh} kN	Shear V_{Ed} , Top kN	Shear V_{jhd} kN	Shear V_{Rd} Conc kN	Joint Area cm²	Shear Ratio Unitless
Major Shear, V_2	N/A	N/A	N/A	N/A	N/A	N/A
Minor Shear, V_3	N/A	N/A	N/A	N/A	N/A	N/A

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K2	C151	634	K 60X60	ENVELOPE	3240	3740	Nominal Stiffness	0.692

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
600	600	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
258.5442	-411.3411	34.4268	5.1709	5.1709	43	1.21

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	-16.9228	2.5111	0	1	3240
Minor Bend(M2)	40.4831	2.5111	0	1	3240

Axial Compression Ratio

Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
7200	0.062	0.65	Yes	Yes

Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	130.5726	230.0107	0	0.4	0
Minor, V_{Ed3}	114.6391	204.9106	0	0.4	0

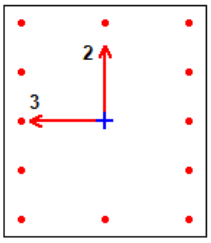
Joint Shear Check/Design

	Joint Shear A_{sh} kN	Shear V_{Ed} , Top kN	Shear V_{jhd} kN	Shear V_{Rd} Conc kN	Joint Area cm²	Shear Ratio Unitless
Major Shear, V_2	N/A	N/A	N/A	N/A	N/A	N/A

	Joint Shear A_{sh} kN	Shear V_{Ed} , Top kN	Shear V_{jhd} kN	Shear V_{Rd} Conc kN	Joint Area cm²	Shear Ratio Unitless
Minor Shear, V_3	N/A	N/A	N/A	N/A	N/A	N/A

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K0	C158	24	K 80X70	ENVELOPE	3340	3840	Nominal Stiffness	0.425

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
700	800	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
34000	35	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
2843.0596	-137.7782	-442.7168	66.3381	75.8149	56	1

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	156.6076	21.4134	0	1	3340
Minor Bend(M2)	54.1349	24.7593	0	1	3340

Axial Compression Ratio

Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
13066.6667	0.218	0.65	Yes	Yes

Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	624.6628	614.3406	624.6628	0.4	10.43
Minor, V_{Ed3}	535.4985	614.626	0	0.4	0

Joint Shear Check/Design

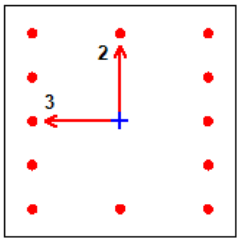
	Joint Shear A_{sh} kN	Shear V_{Ed} , Top kN	Shear V_{jhd} kN	Shear V_{Rd} Conc kN	Joint Area cm²	Shear Ratio Unitless
Major Shear, V_2	N/A	N/A	N/A	N/A	N/A	N/A
Minor Shear, V_3	N/A	N/A	N/A	N/A	N/A	N/A

(1.3) Beam/Column Capacity Ratio

Major Ratio	Minor Ratio
0.355	0.218

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K1	C167	315	K 50X50	ENVELOPE	0	3840	Nominal Stiffness	0.637

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
500	500	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
379.5092	139.7348	114.0917	7.5902	7.5902	25	1

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	43.9016	4.8073	0	1	3340
Minor Bend(M2)	43.3783	4.8073	0	1	3340

Axial Compression Ratio

Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
5000	0.122	0.65	Yes	Yes

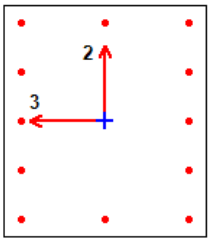
Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	116.7101	194.4867	0	0.4	0
Minor, V_{Ed3}	72.5536	163.8446	0	0.4	0

Rules: Joint shear stress ratio is only determined for a station
a) if the station has a beam-column joint (top of the column),
b) if the frame is a DCHe or DCM moment resisting frame,
c) if the column above is a concrete column when it exists,
d) if all the beams framing into the column are concrete beams
e) if the connecting member design results are available, and
f) if the load combo involves seismic load.

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K0	C162	28	K 80X70	ENVELOPE	0	3840	Nominal Stiffness	0.456

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
700	800	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
34000	35	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
637.2942	-135.5136	561.6879	14.8702	16.9945	56	1

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	284.8399	4.8	0	1	3340
Minor Bend(M2)	-51.8705	5.55	0	1	3340

Axial Compression Ratio

Conc Capacity (α_{cc} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
13066.6667	0.198	0.65	Yes	Yes

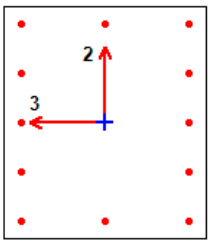
Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	388.425	340.1644	388.425	0.4	6.49
Minor, V_{Ed3}	353.1925	343.6255	353.1925	0.4	6.82

Rules: Joint shear stress ratio is only determined for a station
a) if the station has a beam-column joint (top of the column),
b) if the frame is a DCHe or DCM moment resisting frame,
c) if the column above is a concrete column when it exists,
d) if all the beams framing into the column are concrete beams
e) if the connecting member design results are available, and
f) if the load combo involves seismic load.

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K1	C10	353	K 80X70	ENVELOPE	3040	3840	Nominal Stiffness	0.491

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
700	800	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
34000	35	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
852.4211	-68.5008	-1039.4116	19.8898	22.7312	74	1.33

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	-307.7015	27.2419	0	1	6880
Minor Bend(M2)	-30.3927	31.4985	0	1	6880

Axial Compression Ratio

Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
13066.6667	0.146	0.65	Yes	Yes

Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	352.6896	541.0225	0	0.4	0
Minor, V_{Ed3}	235.506	542.8939	0	0.4	0

Joint Shear Check/Design

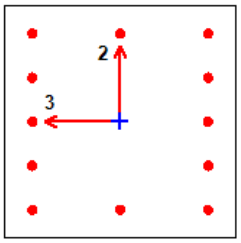
	Joint Shear A_{sh} kN	Shear V_{Ed} , Top kN	Shear V_{jhd} kN	Shear V_{Rd} Conc kN	Joint Area cm²	Shear Ratio Unitless
Major Shear, V_2	N/A	N/A	N/A	N/A	N/A	N/A
Minor Shear, V_3	N/A	N/A	N/A	N/A	N/A	N/A

(1.3) Beam/Column Capacity Ratio

Major Ratio	Minor Ratio
0.793	0.231

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K2	C170	651	K 50X50	ENVELOPE	3240	3740	Nominal Stiffness	0.819

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
500	500	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
156.4484	-245.5764	-166.4022	3.129	3.129	40	1.6

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	-65.7892	1.8649	0	1	3240
Minor Bend(M2)	50.7105	1.8649	0	1	3240

Axial Compression Ratio

Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
5000	0.052	0.65	Yes	Yes

Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	101.0234	167.2595	0	0.4	0
Minor, V_{Ed3}	69.9648	167.2595	0	0.4	0

Joint Shear Check/Design

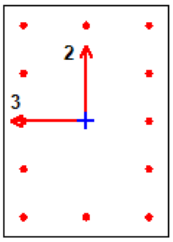
	Joint Shear A_{sh} kN	Shear V_{Ed} , Top kN	Shear V_{jhd} kN	Shear V_{Rd} Conc kN	Joint Area cm²	Shear Ratio Unitless
Major Shear, V_2	N/A	N/A	N/A	N/A	N/A	N/A
Minor Shear, V_3	N/A	N/A	N/A	N/A	N/A	N/A

(1.3) Beam/Column Capacity Ratio

Major Ratio	Minor Ratio
N/A	N/A

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K0	C180	46	K 70X50	ENVELOPE	3340	3840	Nominal Stiffness	0.449

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
500	700	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
2229.9659	-274.9922	86.7084	44.5993	52.0325	35	1

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	-74.8116	19.42	0	1	3340
Minor Bend(M2)	36.8994	28.2473	0	1	3340

Axial Compression Ratio

Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
7000	0.319	0.65	Yes	Yes

Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	326.0731	344.1204	0	0.4	0
Minor, V_{Ed3}	284.4751	344.0497	0	0.4	0

Joint Shear Check/Design

	Joint Shear A_{sh} kN	Shear V_{Ed} , Top kN	Shear V_{jhd} kN	Shear V_{Rd} Conc kN	Joint Area cm²	Shear Ratio Unitless
Major Shear, V_2	N/A	N/A	N/A	N/A	N/A	N/A
Minor Shear, V_3	N/A	N/A	N/A	N/A	N/A	N/A

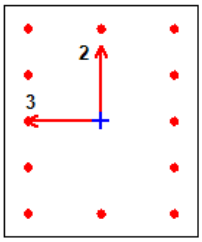
(1.3) Beam/Column Capacity Ratio

Major Ratio	Minor Ratio
0.244	0.522

Notes:
N/A: Not Applicable
N/C: Not Calculated
N/N: Not Needed

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K0	C190	56	K 60X50	ENVELOPE	3340	3840	Nominal Stiffness	0.452

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
500	600	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
2175.6894	-247.5878	16.4125	43.5138	43.5138	30	1

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	-66.2435	22.4561	0	1	3340
Minor Bend(M2)	23.3495	27.5597	0	1	3340

Axial Compression Ratio

Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
6000	0.363	0.65	Yes	Yes

Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	265.2016	295.1292	0	0.4	0
Minor, V_{Ed3}	253.8827	294.8997	0	0.4	0

Joint Shear Check/Design

	Joint Shear A_{sh} kN	Shear V_{Ed} , Top kN	Shear V_{jhd} kN	Shear V_{Rd} Conc kN	Joint Area cm²	Shear Ratio Unitless
Major Shear, V_2	N/A	N/A	N/A	N/A	N/A	N/A
Minor Shear, V_3	N/A	N/A	N/A	N/A	N/A	N/A

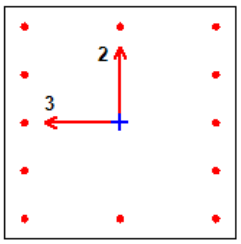
(1.3) Beam/Column Capacity Ratio

Major Ratio	Minor Ratio
0.382	0.549

Notes:
N/A: Not Applicable
N/C: Not Calculated
N/N: Not Needed

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K2	C159	642	K 70X70	ENVELOPE	0	3740	Nominal Stiffness	0.611

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
700	700	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
427.7034	-129.9121	649.0137	9.9797	9.9797	60	1.22

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	-277.5773	3.505	0	1	3240
Minor Bend(M2)	-53.9038	3.505	0	1	3240

Axial Compression Ratio

Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
9800	0.07	0.65	Yes	Yes

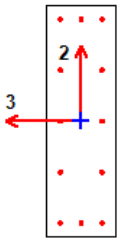
Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	272.7082	321.2129	0	0.4	0
Minor, V_{Ed3}	159.2563	321.2129	0	0.4	0

Rules: Joint shear stress ratio is only determined for a station
a) if the station has a beam-column joint (top of the column),
b) if the frame is a DCHe or DCM moment resisting frame,
c) if the column above is a concrete column when it exists,
d) if all the beams framing into the column are concrete beams
e) if the connecting member design results are available, and
f) if the load combo involves seismic load.

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K0	C7	74	K 100X30	ENVELOPE	3340	3840	Nominal Stiffness	0.711

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
300	1000	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
264.7473	-153.4853	-88.4858	5.2949	8.8249	35	1.17

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	50.9842	1.5698	0	1	3340
Minor Bend(M2)	28.2647	6.1482	0	1	3340

Axial Compression Ratio

Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?

Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
6000	0.087	0.65	Yes	Yes

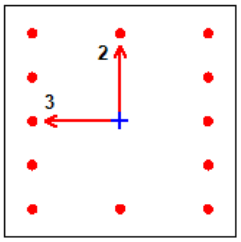
Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	496.7076	205.1454	496.7076	0.4	6.53
Minor, V_{Ed3}	106.8202	217.1758	0	0.4	0

Rules: Joint shear stress ratio is only determined for a station
a) if the station has a beam-column joint (top of the column),
b) if the frame is a DCHe or DCM moment resisting frame,
c) if the column above is a concrete column when it exists,
d) if all the beams framing into the column are concrete beams
e) if the connecting member design results are available, and
f) if the load combo involves seismic load.

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K0	C198	63	K 50X50	ENVELOPE	0	3840	Nominal Stiffness	0.637

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
500	500	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
410.1552	58.4759	173.3119	8.2031	8.2031	25	1

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	70.6273	5.1955	0	1	3340
Minor Bend(M2)	21.7615	5.1955	0	1	3340

Axial Compression Ratio

Conc Capacity (α_{cc} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
5000	0.14	0.65	Yes	Yes

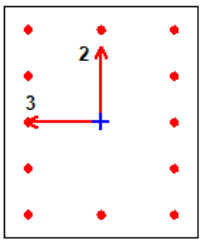
Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	150.9152	206.3297	0	0.4	0
Minor, V_{Ed3}	227.6997	206.3297	227.6997	0.4	6.39

Rules: Joint shear stress ratio is only determined for a station
a) if the station has a beam-column joint (top of the column),
b) if the frame is a DCHe or DCM moment resisting frame,
c) if the column above is a concrete column when it exists,
d) if all the beams framing into the column are concrete beams
e) if the connecting member design results are available, and
f) if the load combo involves seismic load.

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K0	C186	52	K 60X50	ENVELOPE	0	3840	Nominal Stiffness	0.568

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
500	600	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
17.6922	-90.6081	250.5622	0.3538	0.3538	30	1.01

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	100.138	0.1826	0	1	3340
Minor Bend(M2)	-36.1697	0.2241	0	1	3340

Axial Compression Ratio

Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
6000	0.239	0.65	Yes	Yes

Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	156.1577	135.7588	156.1577	0.4	3.57
Minor, V_{Ed3}	199.4583	295.1475	0	0.4	0

Rules: Joint shear stress ratio is only determined for a station
a) if the station has a beam-column joint (top of the column),
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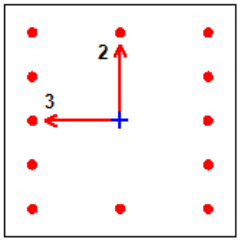
c) if the column above is a concrete column when it exists,
d) if all the beams framing into the column are concrete beams
e) if the connecting member design results are available, and
f) if the load combo involves seismic load.

ETABS Concrete Frame Design

Eurocode 2-2004 Column Section Design



Column Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
K0	C198	63	K 50X50	ENVELOPE	0	3840	Nominal Stiffness	0.637

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
500	500	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} kN	Design M_{Ed2} kN-m	Design M_{Ed3} kN-m	Minimum M2 kN-m	Minimum M3 kN-m	Rebar Area cm²	Rebar % %
410.1552	58.4759	173.3119	8.2031	8.2031	25	1

Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment kN-m	M_{add} Moment kN-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	70.6273	5.1955	0	1	3340
Minor Bend(M2)	21.7615	5.1955	0	1	3340

Axial Compression Ratio

Conc Capacity (α_{CC} *A*f_{cd}) kN	Compressive Ratio N_{Ed} /(α_{cc} *A*f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay?
5000	0.14	0.65	Yes	Yes

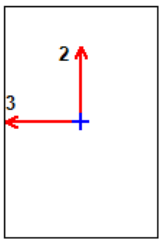
Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} kN	Shear V_{Rdc} kN	Shear V_{Rds} kN	tan(θ) Unitless	Rebar A_{sw} /s cm²/m
Major, V_{Ed2}	150.9152	206.3297	0	0.4	0
Minor, V_{Ed3}	227.6997	206.3297	227.6997	0.4	6.39

Rules: Joint shear stress ratio is only determined for a station
a) if the station has a beam-column joint (top of the column),
b) if the frame is a DCHe or DCM moment resisting frame,
c) if the column above is a concrete column when it exists,
d) if all the beams framing into the column are concrete beams
e) if the connecting member design results are available, and
f) if the load combo involves seismic load.

ETABS Concrete Frame Design

Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K0	B8	82	T 40x60	ENVELOPE	7600	8000	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
400	600	400	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	0		14	0	8	14
Bottom (-2 Axis)		133.6082	2	10	8	10

Shear Force and Reinforcement for Shear, V_{Ed2}

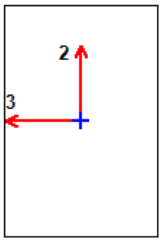
Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
73.6269	21.801	99.3294	100.4841	4.24

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
0.5267	11.2819	1344	1520	0	2.07E-01

ETABS Concrete Frame Design

Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K0	B7	81	T 40x60	ENVELOPE	400	7000	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
400	600	400	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-216.7447		13	0	8	13
Bottom (-2 Axis)		168.1459	1	10	8	10

Shear Force and Reinforcement for Shear, V_{Ed2}

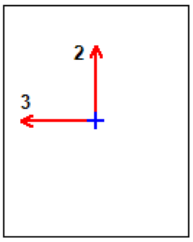
Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
81.7986	21.801	109.3086	185.1779	4.24

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
0.261	10.9729	1344	1520	0	1.026E-01

ETABS Concrete Frame Design

Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K0	B22	96	T 40X50	ENVELOPE	3950	4250	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
400	500	400	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-157.536		11	0	6	11
Bottom (-2 Axis)		124.9196	0	8	6	8

Shear Force and Reinforcement for Shear, V_{Ed2}

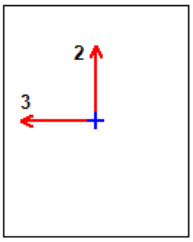
Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
94.5297	21.801	85.3099	105.7786	4.24

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
5.1484	0	1064	1320	0.52	2

ETABS Concrete Frame Design

Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K0	B26	100	T 40X50	ENVELOPE	3950	4200	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
400	500	400	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-40.16		3	0	6	6
Bottom (-2 Axis)		23.003	0	1	6	6

Shear Force and Reinforcement for Shear, V_{Ed2}

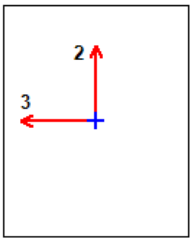
Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
33.6796	21.801	77.4339	150.8857	4.24

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
6.5863	19.5038	1064	1320	0	3

ETABS Concrete Frame Design

Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K0	B45	119	T 40X50	ENVELOPE	6700	7000	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
400	500	400	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-99.686		7	0	6	7
Bottom (-2 Axis)		49.843	0	3	6	6

Shear Force and Reinforcement for Shear, V_{Ed2}

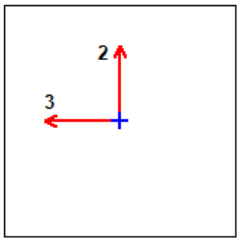
Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
64.7556	21.801	78.8875	95.0897	4.24

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
6.9547	6.1833	1064	1320	0.08	3

ETABS Concrete Frame Design

Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K0	B170	244	T 50X50	ENVELOPE	300	5850	0.898

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
500	500	500	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-501.8934		37	0	8	37
Bottom (-2 Axis)		250.9467	0	17	8	17

Shear Force and Reinforcement for Shear, V_{Ed2}

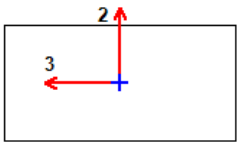
Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
371.3626	21.801	163.9655	479.2966	13.46

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
5.8278	0	1406.3	1500	0.44	2

ETABS Concrete Frame Design

Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K0	B101	173	T 80x40	ENVELOPE	6100	6350	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
800	400	800	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-175.1449		15	0	10	15
Bottom (-2 Axis)		87.5725	0	7	10	10

Shear Force and Reinforcement for Shear, V_{Ed2}

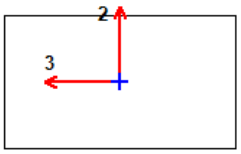
Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
135.287	21.801	147.1896	184.9321	8.47

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
7.5027	5.1819	1777.8	1866.7	0.13	3

ETABS Concrete Frame Design

Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K0	B105	177	T 70x40	ENVELOPE	6100	6350	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
700	400	700	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-127.4409		11	0	8	11
Bottom (-2 Axis)		63.7204	0	5	8	8

Shear Force and Reinforcement for Shear, V_{Ed2}

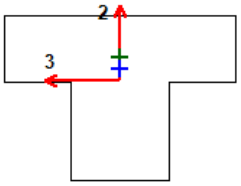
Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
132.6115	21.801	120.7413	171.6008	7.41

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
11.9682	0	1562	1690.9	0.76	5

ETABS Concrete Frame Design

Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K0	B94	166	T T 70X20/30X50	ENVELOPE	0	8500	0.864

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
300	500	700	200	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-354.6056		27	0	5	27
Bottom (-2 Axis)		177.3028	1	12	5	12

Shear Force and Reinforcement for Shear, V_{Ed2}

Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
225.358	21.801	103.8197	282.7549	7.94

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
3.3294	0	1004	1920	0.35	2

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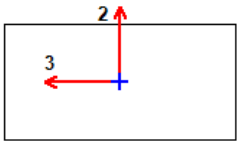
Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K0	B95	167	T 80x40	ENVELOPE	350	8500	0.935

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
800	400	800	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-344.7167		31	0	10	31
Bottom (-2 Axis)		172.3583	0	15	10	15

Shear Force and Reinforcement for Shear, V_{Ed2}

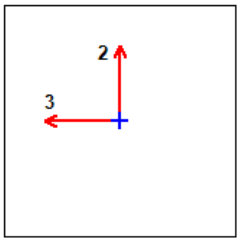
Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
284.4771	21.801	188.1036	340.6136	12.38

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
6.572	0	1777.8	1866.7	0.36	2

ETABS Concrete Frame Design

Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K0	B136	207	T 50X50	ENVELOPE	300	6300	0.97

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
500	500	500	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-194.2252		13	0	8	13
Bottom (-2 Axis)		97.1126	0	6	8	8

Shear Force and Reinforcement for Shear, V_{Ed2}

Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
160.244	21.801	115.1196	215.0319	6.04

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
1.5603	0	1406.3	1500	0.12	1

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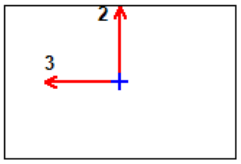
Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K0	B107	179	T 60X40	ENVELOPE	6000	6300	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
600	400	600	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-173.1067		15	0	7	15
Bottom (-2 Axis)		86.5533	0	7	7	7

Shear Force and Reinforcement for Shear, V_{Ed2}

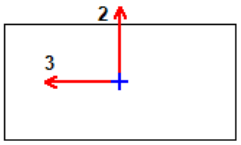
Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
147.3805	21.801	121.7612	192.5917	7

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
2.2016	0	1344	1520	0.17	1

ETABS Concrete Frame Design

Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K0	B101	173	T 80x40	ENVELOPE	6100	6350	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
800	400	800	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-175.1449		15	0	10	15
Bottom (-2 Axis)		87.5725	0	7	10	10

Shear Force and Reinforcement for Shear, V_{Ed2}

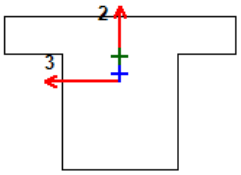
Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
135.287	21.801	147.1896	184.9321	8.47

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
7.5027	5.1819	1777.8	1866.7	0.13	3

ETABS Concrete Frame Design

Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K1	B253	580	T T 120X20/60X80	ENVELOPE	5600	6000	0.915

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
600	800	1200	200	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-814.0955		33	0	16	33
Bottom (-2 Axis)		407.0478	0	16	16	16

Shear Force and Reinforcement for Shear, V_{Ed2}

Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
482.5023	21.801	227.3596	601.3483	10.04

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
48.0586	0	3225	3400	1.62	18

ETABS Concrete Frame Design

Eurocode 2-2004 Beam Section Design

Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K1	B226	450	T T 120x20/50x120 - 50x80	ENVELOPE	400	2900	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
500	1200	1200	200	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Section is nonprismatic.

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-124.9841		3	0	20	20
Bottom (-2 Axis)		87.8323	0	2	20	20

Shear Force and Reinforcement for Shear, V_{Ed2}

Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
11.436	21.801	149.1204	165.9229	5.3

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
0.9072	151.5247	3937.7	4183.3	0	3.349E-01

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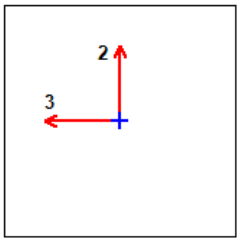
Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K1	B265	595	T 50X50	ENVELOPE	6700	7000	0.966

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
500	500	500	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-191.7343		13	0	8	13
Bottom (-2 Axis)		95.8671	0	6	8	8

Shear Force and Reinforcement for Shear, V_{Ed2}

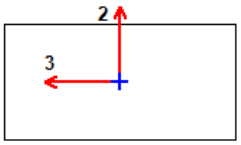
Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
153.2545	21.801	114.5963	201.6608	5.66

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
5.9422	0	1406.3	1500	0.44	2

ETABS Concrete Frame Design

Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K1	B76	568	T 80x40	ENVELOPE	0	4200	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
800	400	800	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-119.0136		10	0	10	10
Bottom (-2 Axis)		59.5068	0	5	10	10

Shear Force and Reinforcement for Shear, V_{Ed2}

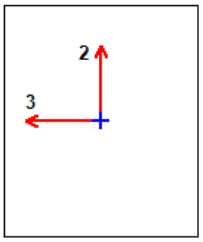
Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
99.5275	21.801	128.9274	154.8913	8.47

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
0.7	14.6124	1777.8	1866.7	0	2.554E-01

ETABS Concrete Frame Design

Eurocode 2-2004 Beam Section Design



Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K1	B228	555	T 50X60	ENVELOPE	350	8400	0.962

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
500	600	500	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-229.7359		12	0	9	12
Bottom (-2 Axis)		114.868	0	6	9	9

Shear Force and Reinforcement for Shear, V_{Ed2}

Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
190.7616	21.801	124.7193	243.6922	5.58

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
8.7597	0	1686	1654.5	0.55	3

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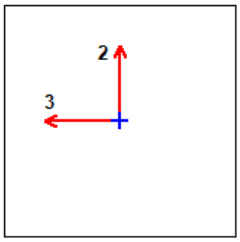

Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K1	B47	598	T 50X50	ENVELOPE	300	8500	0.799

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
500	500	500	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-384.0969		27	0	8	27
Bottom (-2 Axis)		192.0485	0	13	8	13

Shear Force and Reinforcement for Shear, V_{Ed2}

Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
281.4374	21.801	147.6129	349.5269	9.81

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
6.0002	0	1406.3	1500	0.45	2

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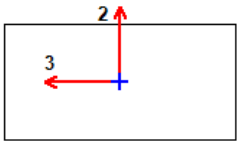

Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K2	B346	982	T 80x40	ENVELOPE	7599.8	8000	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
800	400	800	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-362.5089		33	0	10	33
Bottom (-2 Axis)		0	0	0	0	0

Shear Force and Reinforcement for Shear, V_{Ed2}

Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
239.7405	21.801	191.7232	278.2914	10.11

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
1.9684	0	1777.8	1866.7	0.11	1

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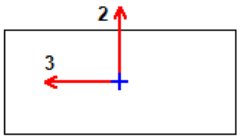

Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K2	B338	971	T 90X40	ENVELOPE	7599.8	8000	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
900	400	900	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-419.6294		39	0	11	39
Bottom (-2 Axis)		0	0	0	0	0

Shear Force and Reinforcement for Shear, V_{Ed2}

Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
277.2732	21.801	218.0494	319.345	11.6

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
3.5227	0	1991.7	2046.2	0.17	1

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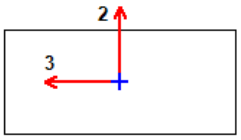

Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K2	B336	969	T 90X40	ENVELOPE	10550	10550	0.979

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
900	400	900	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-339.1663		30	0	11	30
Bottom (-2 Axis)		169.5831	0	14	11	14

Shear Force and Reinforcement for Shear, V_{Ed2}

Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
165.2671	21.801	201.2918	211.7947	9.53

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
8.6499	13.3425	1991.7	2046.2	0	3

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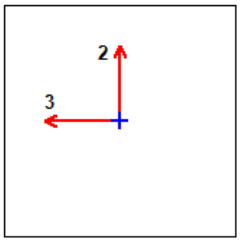

Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K2	B21	974	T 50X50	ENVELOPE	5500	8400	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
500	500	500	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-757.0373		58	0	8	58
Bottom (-2 Axis)		182.8965	15	12	8	15

Shear Force and Reinforcement for Shear, V_{Ed2}

Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
665.842	21.801	119.5873	665.842	18.7

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
4.1305	0	1406.3	1500	0.31	2

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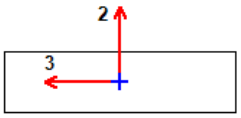

Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K2	B334	967	T 150X40	ENVELOPE	0	9400	0.733

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
1500	400	1500	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-610.3781		55	0	18	55
Bottom (-2 Axis)		305.1891	0	26	18	26

Shear Force and Reinforcement for Shear, V_{Ed2}

Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
352.1884	21.801	345.1952	443.4618	16.11

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
4.2046	0	3249.3	3168.4	0.11	1

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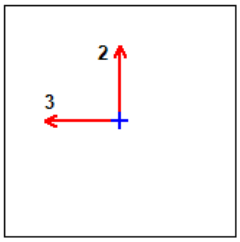

Beam Element Details Type: DC Medium

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
K2	B231	849	T 50X50	ENVELOPE	350	8400	1

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
500	500	500	0	60	60

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	E_s (MPa)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	30	1	200000	413.69	413.69

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar cm²	+Moment Rebar cm²	Minimum Rebar cm²	Required Rebar cm²
Top (+2 Axis)	-137.4842		9	0	8	9
Bottom (-2 Axis)		68.7421	0	4	8	8

Shear Force and Reinforcement for Shear, V_{Ed2}

Shear V_{Ed} kN	θ deg	Shear V_{Rdc} kN	Shear V_{Rds} kN	Rebar A_{sw} /S cm²/m
80.2672	21.801	102.0214	113.4555	5.3

Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} kN-m	T_{cr} kN-m	Area A_k cm²	Perimeter, u_K mm	Rebar A_t /s cm²/m	Rebar A_{sl} cm²
4.4071	10.1328	1406.3	1500	0	2

- *Kontrolli ne Etabs 2018 i Mureve*

ETABS Shear Wall Design

Eurocode 2-2004 Pier Design

Pier Details

Story ID	Pier ID	Centroid X mm	Centroid Y mm	Length mm	Thickness mm	$Height_{major}$ mm	$Height_{minor}$ mm	LLRF
K0	P2	47500	25500	6000	300	3840	3840	0.511

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	C30/37 (30)	C30/37 (1)	Rebar (413.69)	Rebar (413.69)

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{LCC}	IP_{MAX}	IP_{MIN}	P_{MAX}
1.5	1.15	1	0.85	0.04	0.0025	0.8

Pier Leg Location, Length and Thickness

Station Location	ID	Left X_1 mm	Left Y_1 mm	Right X_2 mm	Right Y_2 mm	Length mm	Thickness mm
Top	Leg 1	44500	25500	50500	25500	6000	300
Bottom	Leg 1	44500	25500	50500	25500	6000	300

Flexural Design for N_{Ed} , M_{Ed2} and M_{Ed3}

Station Location	Required Rebar Area (cm²)	Required Reinf Ratio	Current Reinf Ratio	Flexural Combo	N_{Ed} kN	M_{Ed2} kN-m	M_{Ed3} kN-m	Pier A_g cm²
Top	323	0.018	0.0022	ENVELOPE	635.0312	357.4174	25187.5259	18000
Bottom	432	0.024	0.0022	ENVELOPE	439.5236	514.3784	29350.5952	18000

Shear Design

Station Location	ID	Rebar cm²/m	Shear Combo	N_{Ed} kN	V_{Ed} kN	V_{Rc} kN	V_{Rd} kN
Top	Leg 1	43.55	ENVELOPE	635.0312	6768.165	748.2008	6768.165
Bottom	Leg 1	42.3	ENVELOPE	439.5236	6573.5627	792.8563	6573.5627

Boundary Element Check

Station Location	ID	Edge Length (mm)	Governing Combo	N_{Ed} kN	M_{Ed} kN-m	Normalized Comp. Stress	Normalized Stress Limit	C Depth mm
Top–Left	Leg 1	900	ENVELOPE	4046.7829	-13742.4818	0.494	0.15	1057.9
Top–Right	Leg 1	900	ENVELOPE	4046.7829	18934.0103	0.638	0.15	1057.9
Bottom–Left	Leg 1	900	ENVELOPE	4811.6006	-27940.1383	0.91	0.15	1201.7
Botttom–Right	Leg 1	900	ENVELOPE	4811.6006	29346.3758	0.949	0.15	1201.7

ETABS Shear Wall Design

Eurocode 2-2004 Pier Design

Pier Details

Story ID	Pier ID	Centroid X mm	Centroid Y mm	Length mm	Thickness mm	$Height_{major}$ mm	$Height_{minor}$ mm	LLRF
K0	P5	25300	6800	1600	250	3840	3840	0.517

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	C30/37 (30)	C30/37 (1)	Rebar (413.69)	Rebar (413.69)

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{LCC}	IP_{MAX}	IP_{MIN}	P_{MAX}
1.5	1.15	1	0.85	0.04	0.0025	0.8

Pier Leg Location, Length and Thickness

Station Location	ID	Left X_1 mm	Left Y_1 mm	Right X_2 mm	Right Y_2 mm	Length mm	Thickness mm
Top	Leg 1	25300	6000	25300	7600	1600	250
Bottom	Leg 1	25300	6000	25300	7600	1600	250

Flexural Design for N_{Ed} , M_{Ed2} and M_{Ed3}

Station Location	Required Rebar Area (cm²)	Required Reinf Ratio	Current Reinf Ratio	Flexural Combo	N_{Ed} kN	M_{Ed2} kN-m	M_{Ed3} kN-m	Pier A_g cm²
Top	75	0.0188	0.0031	ENVELOPE	464.6676	-55.934	1771.7932	4000
Bottom	129	0.0322	0.0031	ENVELOPE	503.0563	64.1424	2662.8897	4000

Shear Design

Station Location	ID	Rebar cm²/m	Shear Combo	N_{Ed} kN	V_{Ed} kN	V_{Rc} kN	V_{Rd} kN
Top	Leg 1	33.14	ENVELOPE	464.6676	1373.4633	231.5364	1373.4633
Bottom	Leg 1	33.14	ENVELOPE	503.0563	1373.4633	270.1212	1373.4633

Boundary Element Check

Station Location	ID	Edge Length (mm)	Governing Combo	N_{Ed} kN	M_{Ed} kN-m	Normalized Comp. Stress	Normalized Stress Limit	C Depth mm
Top–Left	Leg 1	615.6	ENVELOPE	3264.148	-351.9038	0.573	0.15	816.2
Top–Right	Leg 1	615.6	ENVELOPE	3264.148	431.2405	0.61	0.15	816.2
Bottom–Left	Leg 1	622.9	ENVELOPE	3302.5366	-2551.921	1.609	0.15	824.9
Botttom–Right	Leg 1	622.9	ENVELOPE	3302.5366	2658.0604	1.659	0.15	824.9

ETABS Shear Wall Design

Eurocode 2-2004 Pier Design

Pier Details

Story ID	Pier ID	Centroid X mm	Centroid Y mm	Length mm	Thickness mm	$Height_{major}$ mm	$Height_{minor}$ mm	LLRF
K2	P4	28500	6800	1600	250	3740	3740	0.802

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	C30/37 (30)	C30/37 (1)	Rebar (413.69)	Rebar (413.69)

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{LCC}	IP_{MAX}	IP_{MIN}	P_{MAX}
1.5	1.15	1	0.85	0.04	0.0025	0.8

Pier Leg Location, Length and Thickness

Station Location	ID	Left X_1 mm	Left Y_1 mm	Right X_2 mm	Right Y_2 mm	Length mm	Thickness mm
Top	Leg 1	28500	6000	28500	7600	1600	250
Bottom	Leg 1	28500	6000	28500	7600	1600	250

Flexural Design for N_{Ed} , M_{Ed2} and M_{Ed3}

Station Location	Required Rebar Area (cm²)	Required Reinf Ratio	Current Reinf Ratio	Flexural Combo	N_{Ed} kN	M_{Ed2} kN-m	M_{Ed3} kN-m	Pier A_g cm²
Top	28	0.0071	0.0031	ENVELOPE	286.0522	-74.2238	718.5949	4000
Bottom	39	0.0098	0.0031	ENVELOPE	323.4411	72.0852	990.0094	4000

Shear Design

Station Location	ID	Rebar cm²/m	Shear Combo	N_{Ed} kN	V_{Ed} kN	V_{Rc} kN	V_{Rd} kN
Top	Leg 1	9.17	ENVELOPE	286.0522	380.1586	161.0708	380.1586
Bottom	Leg 1	9.17	ENVELOPE	323.4411	380.1586	180.2752	380.1586

Boundary Element Check

Station Location	ID	Edge Length (mm)	Governing Combo	N_{Ed} kN	M_{Ed} kN-m	Normalized Comp. Stress	Normalized Stress Limit	C Depth mm
Top–Left	Leg 1	0	ENVELOPE	526.7361	-32.1403	0.081	0.15	195.1
Top–Right	Leg 1	375	ENVELOPE	526.7361	309.3229	0.211	0.15	195.1
Bottom–Left	Leg 1	375	ENVELOPE	577.2112	-653.4114	0.378	0.15	206.3
Botttom–Right	Leg 1	375	ENVELOPE	577.2112	986.9853	0.535	0.15	206.3

ETABS Shear Wall Design

Eurocode 2-2004 Pier Design

Pier Details

Story ID	Pier ID	Centroid X mm	Centroid Y mm	Length mm	Thickness mm	$Height_{major}$ mm	$Height_{minor}$ mm	LLRF
K2	P7	16900	15799.9	2400.2	200	3740	3740	0.691

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	C30/37 (30)	C30/37 (1)	Rebar (413.69)	Rebar (413.69)

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{LCC}	IP_{MAX}	IP_{MIN}	P_{MAX}
1.5	1.15	1	0.85	0.04	0.0025	0.8

Pier Leg Location, Length and Thickness

Station Location	ID	Left X_1 mm	Left Y_1 mm	Right X_2 mm	Right Y_2 mm	Length mm	Thickness mm
Top	Leg 1	16900	14599.8	16900	17000	2400.2	200
Bottom	Leg 1	16900	14599.8	16900	17000	2400.2	200

Flexural Design for N_{Ed} , M_{Ed2} and M_{Ed3}

Station Location	Required Rebar Area (cm²)	Required Reinf Ratio	Current Reinf Ratio	Flexural Combo	N_{Ed} kN	M_{Ed2} kN-m	M_{Ed3} kN-m	Pier A_g cm²
Top	58	0.012	0.0023	ENVELOPE	151.4477	75.2435	1781.2277	4800
Bottom	83	0.0173	0.0023	ENVELOPE	196.3175	41.7055	2757.2811	4800

Shear Design

Station Location	ID	Rebar cm²/m	Shear Combo	N_{Ed} kN	V_{Ed} kN	V_{Rc} kN	V_{Rd} kN
Top	Leg 1	26.69	ENVELOPE	151.4477	1659.2188	190.4797	1659.2188
Bottom	Leg 1	26.69	ENVELOPE	196.3175	1659.2188	217.9372	1659.2188

Boundary Element Check

Station Location	ID	Edge Length (mm)	Governing Combo	N_{Ed} kN	M_{Ed} kN-m	Normalized Comp. Stress	Normalized Stress Limit	C Depth mm
Top–Left	Leg 1	360	ENVELOPE	899.8366	-1478.9339	0.479	0.15	370.4
Top–Right	Leg 1	360	ENVELOPE	899.8366	316.3608	0.176	0.15	370.4
Bottom–Left	Leg 1	360	ENVELOPE	944.7064	-988.4214	0.356	0.15	383.1
Botttom–Right	Leg 1	360	ENVELOPE	944.7064	2755.4455	0.816	0.15	383.1

ETABS Shear Wall Design

Eurocode 2-2004 Pier Design

Pier Details

Story ID	Pier ID	Centroid X mm	Centroid Y mm	Length mm	Thickness mm	$Height_{major}$ mm	$Height_{minor}$ mm	LLRF
K0	P6	37900	32755.9	11900	250	3840	3840	0.69

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_{yk} (MPa)	f_{ywk} (MPa)
33000	C30/37 (30)	C30/37 (1)	Rebar (413.69)	Rebar (413.69)

Design Code Parameters

γ_C	γ_S	α_{CC}	α_{LCC}	IP_{MAX}	IP_{MIN}	P_{MAX}
1.5	1.15	1	0.85	0.04	0.0025	0.8

Pier Leg Location, Length and Thickness

Station Location	ID	Left X_1 mm	Left Y_1 mm	Right X_2 mm	Right Y_2 mm	Length mm	Thickness mm
Top	Leg 1	35950	31900	35950	34000	2100	250
Top	Leg 2	39850	31900	39850	34000	2100	250
Top	Leg 3	37900	31900	37900	34000	2100	250
Top	Leg 4	39350	34000	39850	34000	500	250
Top	Leg 5	35950	34000	36450	34000	500	250
Top	Leg 6	37550	34000	38250	34000	700	250
Top	Leg 7	35950	31900	39850	31900	3900	250
Bottom	Leg 1	35950	31900	35950	34000	2100	250
Bottom	Leg 2	39850	31900	39850	34000	2100	250
Bottom	Leg 3	37900	31900	37900	34000	2100	250
Bottom	Leg 4	39350	34000	39850	34000	500	250
Bottom	Leg 5	35950	34000	36450	34000	500	250
Bottom	Leg 6	37550	34000	38250	34000	700	250
Bottom	Leg 7	35950	31900	39850	31900	3900	250

Flexural Design for N_{Ed} , M_{Ed2} and M_{Ed3}

Station Location	Required Rebar Area (cm²)	Required Reinf Ratio	Current Reinf Ratio	Flexural Combo	N_{Ed} kN	M_{Ed2} kN-m	M_{Ed3} kN-m	Pier A_g cm²
Top	721	0.0248	0.0172	ENVELOPE	1227.0043	-24643.9918	23057.5988	29125
Bottom	993	0.0341	0.0172	ENVELOPE	1512.52	-29359.2901	-27711.5588	29125

Shear Design

Station Location	ID	Rebar cm²/m	Shear Combo	N_{Ed} kN	V_{Ed} kN	V_{Rc} kN	V_{Rd} kN
Top	Leg 1	OS	ENVELOPE	-3759.3752	2886.3827	0	0
Top	Leg 2	OS	ENVELOPE	-3305.3364	2745.1501	0	0
Top	Leg 3	OS	ENVELOPE	-727.8026	3149.1311	156.273	0
Top	Leg 4	35.48	ENVELOPE	-1469.9374	459.5058	0	459.5058
Top	Leg 5	OS	ENVELOPE	-1676.8512	503.4105	0	0
Top	Leg 6	OS	ENVELOPE	-1937.8396	755.5246	0	0
Top	Leg 7	OS	ENVELOPE	-8463.1347	4570.976	0	0
Bottom	Leg 1	OS	ENVELOPE	-3708.9901	2886.3827	0	0
Bottom	Leg 2	OS	ENVELOPE	-3254.9512	2745.1501	0	0
Bottom	Leg 3	OS	ENVELOPE	-677.4175	3149.1311	184.0974	0
Bottom	Leg 4	35.48	ENVELOPE	-1457.941	459.5058	0	459.5058
Bottom	Leg 5	OS	ENVELOPE	-1664.8547	503.4105	0	0
Bottom	Leg 6	OS	ENVELOPE	-1921.0445	755.5246	0	0
Bottom	Leg 7	OS	ENVELOPE	-8369.5623	4570.976	0	0

Boundary Element Check

Station Location	ID	Edge Length (mm)	Governing Combo	N_{Ed} kN	M_{Ed} kN-m	Normalized Comp. Stress	Normalized Stress Limit	C Depth mm
Top–Left	Leg 1	1585.7	ENVELOPE	3778.1261	-635.736	0.533	0.15	2100
Top–Right	Leg 1	1585.7	ENVELOPE	3778.1261	1324.61	0.72	0.15	2100
Top–Left	Leg 2	1585.7	ENVELOPE	4496.1055	-606.0751	0.593	0.15	2100
Top–Right	Leg 2	1585.7	ENVELOPE	4496.1055	1325.8939	0.789	0.15	2100
Top–Left	Leg 3	1124.6	ENVELOPE	1335.0464	-876.8138	0.366	0.15	1602.5
Top–Right	Leg 3	1124.6	ENVELOPE	1335.0464	1658.8847	0.579	0.15	1602.5
Top–Left	Leg 4	377.6	ENVELOPE	1901.3438	-438.3181	2.864	0.15	500
Top–Right	Leg 4	377.6	ENVELOPE	1901.3438	414.9233	2.752	0.15	500
Top–Left	Leg 5	377.6	ENVELOPE	1865.254	-477.4145	3.038	0.15	500
Top–Right	Leg 5	377.6	ENVELOPE	1865.254	462.8594	2.968	0.15	500
Top–Left	Leg 6	528.6	ENVELOPE	2386.0415	-690.5895	2.373	0.15	700
Top–Right	Leg 6	528.6	ENVELOPE	2386.0415	687.5712	2.366	0.15	700
Top–Left	Leg 7	2944.9	ENVELOPE	8340.7562	-709.608	0.484	0.15	3900
Top–Right	Leg 7	2944.9	ENVELOPE	8340.7562	1147.2552	0.518	0.15	3900
Bottom–Left	Leg 1	1585.7	ENVELOPE	3828.5113	-4767.3662	1.662	0.15	2100
Botttom–Right	Leg 1	1585.7	ENVELOPE	3828.5113	4555.2579	1.604	0.15	2100
Bottom–Left	Leg 2	1585.7	ENVELOPE	4546.4906	-4557.2421	1.673	0.15	2100
Botttom–Right	Leg 2	1585.7	ENVELOPE	4546.4906	4266.3235	1.594	0.15	2100
Bottom–Left	Leg 3	1573.2	ENVELOPE	1385.4315	-4935.8646	1.475	0.15	2086.7
Botttom–Right	Leg 3	1573.2	ENVELOPE	1385.4315	4635.8422	1.393	0.15	2086.7
Bottom–Left	Leg 4	377.6	ENVELOPE	1913.3403	-440.0754	2.878	0.15	500
Botttom–Right	Leg 4	377.6	ENVELOPE	1913.3403	465.0414	2.998	0.15	500
Bottom–Left	Leg 5	377.6	ENVELOPE	1877.2505	-487.3598	3.09	0.15	500
Botttom–Right	Leg 5	377.6	ENVELOPE	1877.2505	503.7042	3.169	0.15	500
Bottom–Left	Leg 6	528.6	ENVELOPE	2402.8366	-754.676	2.535	0.15	700
Botttom–Right	Leg 6	528.6	ENVELOPE	2402.8366	763.5327	2.556	0.15	700
Bottom–Left	Leg 7	2944.9	ENVELOPE	8434.3286	-8868.7941	1.132	0.15	3900
Botttom–Right	Leg 7	2944.9	ENVELOPE	8434.3286	9911.762	1.215	0.15	3900

TABLE: Concrete Column Design Summary - Eurocode 2-2004											
Story	Label	UniqueName	DesignSect	Station	Status	PMMCombo	AsMin	As	Mid Bar As	CornerBarAs	ErrMsg
				mm			cm²	cm²	cm²	cm²	
K3	C178	467	K 140X30	0	No Message	ENVELOPE	42	42	4	4	No Message
K3	C178	467	K 140X30	1225	No Message	ENVELOPE	42	42	4	4	No Message
K3	C178	467	K 140X30	2450	No Message	ENVELOPE	42	42	4	4	No Message
K3	C179	469	K 140X30	0	No Message	ENVELOPE	42	42	4	4	No Message
K3	C179	469	K 140X30	1225	No Message	ENVELOPE	42	42	4	4	No Message
K3	C179	469	K 140X30	2450	No Message	ENVELOPE	42	42	4	4	No Message
K3	C181	471	K 100X30	0	No Message	ENVELOPE	30	45	4	4	No Message
K3	C181	471	K 100X30	1225	No Message	ENVELOPE	30	30	3	3	No Message
K3	C181	471	K 100X30	2450	No Message	ENVELOPE	30	30	3	3	No Message
K3	C182	472	K 100X30	0	No Message	ENVELOPE	30	44	4	4	No Message
K3	C182	472	K 100X30	1225	No Message	ENVELOPE	30	30	3	3	No Message
K3	C182	472	K 100X30	2450	No Message	ENVELOPE	30	30	3	3	No Message
K2	C6	618	K 80X50	0	No Message	ENVELOPE	40	40	3	3	No Message
K2	C6	618	K 80X50	1570	No Message	ENVELOPE	40	40	3	3	No Message
K2	C6	618	K 80X50	3140	No Message	ENVELOPE	40	40	3	3	No Message
K2	C137	619	K 80X50	0	No Message	ENVELOPE	40	40	3	3	No Message
K2	C137	619	K 80X50	1620	No Message	ENVELOPE	40	40	3	3	No Message
K2	C137	619	K 80X50	3240	No Message	ENVELOPE	40	54	4	4	No Message
K2	C138	620	K 80X50	0	No Message	ENVELOPE	40	40	3	3	No Message
K2	C138	620	K 80X50	1620	No Message	ENVELOPE	40	40	3	3	No Message
K2	C138	620	K 80X50	3240	No Message	ENVELOPE	40	44	4	4	No Message
K2	C141	624	K 80X50	0	No Message	ENVELOPE	40	40	3	3	No Message
K2	C141	624	K 80X50	1570	No Message	ENVELOPE	40	40	3	3	No Message
K2	C141	624	K 80X50	3140	No Message	ENVELOPE	40	40	3	3	No Message
K2	C147	630	K 80X40	0	No Message	ENVELOPE	32	32	3	3	No Message
K2	C147	630	K 80X40	1570	No Message	ENVELOPE	32	32	3	3	No Message
K2	C147	630	K 80X40	3140	No Message	ENVELOPE	32	32	3	3	No Message
K2	C148	631	K 150X40	0	No Message	ENVELOPE	60	60	5	5	No Message
K2	C148	631	K 150X40	1620	No Message	ENVELOPE	60	60	5	5	No Message
K2	C148	631	K 150X40	3240	No Message	ENVELOPE	60	60	5	5	No Message
K2	C149	632	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
K2	C149	632	K 60X60	1620	No Message	ENVELOPE	36	36	3	3	No Message
K2	C149	632	K 60X60	3240	No Message	ENVELOPE	36	41	3	3	No Message
K2	C150	633	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
K2	C150	633	K 60X60	1620	No Message	ENVELOPE	36	36	3	3	No Message
K2	C150	633	K 60X60	3240	No Message	ENVELOPE	36	36	3	3	No Message
K2	C151	634	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
K2	C151	634	K 60X60	1620	No Message	ENVELOPE	36	36	3	3	No Message
K2	C151	634	K 60X60	3240	No Message	ENVELOPE	36	43	4	4	No Message
K2	C152	635	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
K2	C152	635	K 60X60	1620	No Message	ENVELOPE	36	36	3	3	No Message
K2	C153	636	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
K2	C153	636	K 60X60	1620	No Message	ENVELOPE	36	36	3	3	No Message
K2	C154	637	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
K2	C154	637	K 60X60	1620	No Message	ENVELOPE	36	36	3	3	No Message
K2	C155	638	K 60X40	0	No Message	ENVELOPE	24	24	2	2	No Message
K2	C155	638	K 60X40	1620	No Message	ENVELOPE	24	24	2	2	No Message
K2	C155	638	K 60X40	3240	No Message	ENVELOPE	24	35	3	3	No Message
K2	C156	639	K 60X40	0	No Message	ENVELOPE	24	43	4	4	No Message
K2	C156	639	K 60X40	1620	No Message	ENVELOPE	24	24	2	2	No Message
K2	C156	639	K 60X40	3240	No Message	ENVELOPE	24	48	4	4	No Message
K2	C157	640	K 60X40	0	No Message	ENVELOPE	24	31	3	3	No Message
K2	C157	640	K 60X40	1620	No Message	ENVELOPE	24	24	2	2	No Message
K2	C157	640	K 60X40	3240	No Message	ENVELOPE	24	44	4	4	No Message
K2	C158	641	K 70X70	0	No Message	ENVELOPE	49	49	4	4	No Message
K2	C158	641	K 70X70	1620	No Message	ENVELOPE	49	49	4	4	No Message
K2	C158	641	K 70X70	3240	No Message	ENVELOPE	49	76	6	6	No Message
K2	C159	642	K 70X70	0	No Message	ENVELOPE	49	60	5	5	No Message
K2	C159	642	K 70X70	1620	No Message	ENVELOPE	49	49	4	4	No Message
K2	C159	642	K 70X70	3240	No Message	ENVELOPE	49	56	5	5	No Message
K2	C160	643	K 70X70	1620	No Message	ENVELOPE	49	49	4	4	No Message

K2	C160	643	K 70X70	3240	No Message	ENVELOPE	49	58	5	5	No Message
K2	C161	644	K 70X70	1620	No Message	ENVELOPE	49	49	4	4	No Message
K2	C161	644	K 70X70	3240	No Message	ENVELOPE	49	53	4	4	No Message
K2	C162	645	K 70X70	0	No Message	ENVELOPE	49	49	4	4	No Message
K2	C162	645	K 70X70	1620	No Message	ENVELOPE	49	49	4	4	No Message
K2	C164	647	K 60X40	0	No Message	ENVELOPE	24	24	2	2	No Message
K2	C164	647	K 60X40	1620	No Message	ENVELOPE	24	24	2	2	No Message
K2	C164	647	K 60X40	3240	No Message	ENVELOPE	24	44	4	4	No Message
K2	C167	649	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K2	C167	649	K 50X50	1620	No Message	ENVELOPE	25	25	2	2	No Message
K2	C167	649	K 50X50	3240	No Message	ENVELOPE	25	40	3	3	No Message
K2	C168	646	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
K2	C168	646	K 60X60	1620	No Message	ENVELOPE	36	36	3	3	No Message
K2	C169	650	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K2	C169	650	K 50X50	1620	No Message	ENVELOPE	25	25	2	2	No Message
K2	C169	650	K 50X50	3240	No Message	ENVELOPE	25	36	3	3	No Message
K2	C170	651	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K2	C170	651	K 50X50	1620	No Message	ENVELOPE	25	25	2	2	No Message
K2	C170	651	K 50X50	3240	No Message	ENVELOPE	25	40	3	3	No Message
K2	C171	652	K 60X40	0	No Message	ENVELOPE	24	29	2	2	No Message
K2	C171	652	K 60X40	1620	No Message	ENVELOPE	24	24	2	2	No Message
K2	C171	652	K 60X40	3240	No Message	ENVELOPE	24	44	4	4	No Message
K2	C172	653	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K2	C172	653	K 50X50	1620	No Message	ENVELOPE	25	25	2	2	No Message
K2	C172	653	K 50X50	3240	No Message	ENVELOPE	25	35	3	3	No Message
K2	C173	654	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K2	C173	654	K 50X50	1620	No Message	ENVELOPE	25	25	2	2	No Message
K2	C173	654	K 50X50	3240	No Message	ENVELOPE	25	35	3	3	No Message
K2	C174	655	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K2	C174	655	K 50X50	1620	No Message	ENVELOPE	25	25	2	2	No Message
K2	C174	655	K 50X50	3240	No Message	ENVELOPE	25	36	3	3	No Message
K2	C175	656	K 60X40	0	No Message	ENVELOPE	24	24	2	2	No Message
K2	C175	656	K 60X40	1620	No Message	ENVELOPE	24	24	2	2	No Message
K2	C175	656	K 60X40	3240	No Message	ENVELOPE	24	24	2	2	No Message
K2	C176	657	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K2	C176	657	K 50X50	1620	No Message	ENVELOPE	25	25	2	2	No Message
K2	C176	657	K 50X50	3240	No Message	ENVELOPE	25	33	3	3	No Message
K2	C177	658	K 60X50	0	No Message	ENVELOPE	30	34	3	3	No Message
K2	C177	658	K 60X50	1620	No Message	ENVELOPE	30	30	3	3	No Message
K2	C177	658	K 60X50	3240	No Message	ENVELOPE	30	49	4	4	No Message
K2	C178	659	K 140X30	0	No Message	ENVELOPE	42	42	4	4	No Message
K2	C178	659	K 140X30	1620	No Message	ENVELOPE	42	42	4	4	No Message
K2	C178	659	K 140X30	1840	No Message	ENVELOPE	42	42	4	4	No Message
K2	C178	659	K 140X30	1840	No Message	ENVELOPE	42	42	4	4	No Message
K2	C178	659	K 140X30	3240	No Message	ENVELOPE	42	42	4	4	No Message
K2	C179	660	K 140X30	0	No Message	ENVELOPE	42	42	4	4	No Message
K2	C179	660	K 140X30	1090.8	No Message	ENVELOPE	42	42	4	4	No Message
K2	C179	660	K 140X30	1090.8	No Message	ENVELOPE	42	42	4	4	No Message
K2	C179	660	K 140X30	1620	No Message	ENVELOPE	42	42	4	4	No Message
K2	C179	660	K 140X30	1840	No Message	ENVELOPE	42	42	4	4	No Message
K2	C179	660	K 140X30	1840	No Message	ENVELOPE	42	42	4	4	No Message
K2	C179	660	K 140X30	3240	No Message	ENVELOPE	42	42	4	4	No Message
K2	C180	661	K 70X50	0	No Message	ENVELOPE	35	35	3	3	No Message
K2	C180	661	K 70X50	1620	No Message	ENVELOPE	35	35	3	3	No Message
K2	C181	662	K 100X30	0	No Message	ENVELOPE	30	30	3	3	No Message
K2	C181	662	K 100X30	1620	No Message	ENVELOPE	30	30	3	3	No Message
K2	C181	662	K 100X30	3240	No Message	ENVELOPE	30	30	3	3	No Message
K2	C182	663	K 100X30	0	No Message	ENVELOPE	30	30	3	3	No Message
K2	C182	663	K 100X30	1620	No Message	ENVELOPE	30	30	3	3	No Message
K2	C182	663	K 100X30	3240	No Message	ENVELOPE	30	30	3	3	No Message
K2	C183	664	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
K2	C183	664	K 60X50	1620	No Message	ENVELOPE	30	30	3	3	No Message
K2	C183	664	K 60X50	3240	No Message	ENVELOPE	30	32	3	3	No Message
K2	C184	665	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message

K2	C184	665	K 60X50	1620	No Message	ENVELOPE	30	30	3	3	No Message
K2	C184	665	K 60X50	3240	No Message	ENVELOPE	30	32	3	3	No Message
K2	C185	666	K 60X50	0	No Message	ENVELOPE	30	42	3	3	No Message
K2	C185	666	K 60X50	1620	No Message	ENVELOPE	30	30	3	3	No Message
K2	C185	666	K 60X50	3240	No Message	ENVELOPE	30	33	3	3	No Message
K2	C186	667	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
K2	C186	667	K 60X50	1620	No Message	ENVELOPE	30	30	3	3	No Message
K2	C186	667	K 60X50	3240	No Message	ENVELOPE	30	33	3	3	No Message
K2	C187	668	K 60X40	0	No Message	ENVELOPE	24	24	2	2	No Message
K2	C187	668	K 60X40	1620	No Message	ENVELOPE	24	24	2	2	No Message
K2	C187	668	K 60X40	3240	No Message	ENVELOPE	24	24	2	2	No Message
K2	C188	669	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
K2	C188	669	K 60X50	1620	No Message	ENVELOPE	30	30	3	3	No Message
K2	C188	669	K 60X50	3240	No Message	ENVELOPE	30	60	5	5	No Message
K2	C189	670	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
K2	C189	670	K 60X50	1620	No Message	ENVELOPE	30	30	3	3	No Message
K2	C189	670	K 60X50	3240	No Message	ENVELOPE	30	65	5	5	No Message
K2	C190	671	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
K2	C190	671	K 60X50	1620	No Message	ENVELOPE	30	30	3	3	No Message
K2	C190	671	K 60X50	3240	No Message	ENVELOPE	30	30	3	3	No Message
K2	C191	672	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
K2	C191	672	K 60X50	1620	No Message	ENVELOPE	30	30	3	3	No Message
K2	C191	672	K 60X50	3240	No Message	ENVELOPE	30	59	5	5	No Message
K2	C192	673	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K2	C192	673	K 50X50	1620	No Message	ENVELOPE	25	25	2	2	No Message
K2	C192	673	K 50X50	3240	No Message	ENVELOPE	25	37	3	3	No Message
K2	C193	674	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K2	C193	674	K 50X50	1620	No Message	ENVELOPE	25	25	2	2	No Message
K2	C193	674	K 50X50	3240	No Message	ENVELOPE	25	36	3	3	No Message
K2	C194	675	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K2	C194	675	K 50X50	1620	No Message	ENVELOPE	25	25	2	2	No Message
K2	C194	675	K 50X50	3240	No Message	ENVELOPE	25	37	3	3	No Message
K2	C195	676	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K2	C195	676	K 50X50	1620	No Message	ENVELOPE	25	25	2	2	No Message
K2	C195	676	K 50X50	3240	No Message	ENVELOPE	25	36	3	3	No Message
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K2	C196	677	K 50X50	3240	No Message	ENVELOPE	25	37	3	3	No Message
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K2	C198	678	K 50X50	1620	No Message	ENVELOPE	25	25	2	2	No Message
K2	C198	678	K 50X50	3240	No Message	ENVELOPE	25	37	3	3	No Message
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K2	C2	680	K 60X40	1620	No Message	ENVELOPE	24	24	2	2	No Message
K2	C2	680	K 60X40	3240	No Message	ENVELOPE	24	44	4	4	No Message
K2	C8	681	K 70X50	0	No Message	ENVELOPE	35	35	3	3	No Message
K2	C8	681	K 70X50	1620	No Message	ENVELOPE	35	35	3	3	No Message
K2	C8	681	K 70X50	3240	No Message	ENVELOPE	35	38	3	3	No Message
K2	C9	682	K 70X50	0	No Message	ENVELOPE	35	49	4	4	No Message
K2	C9	682	K 70X50	1620	No Message	ENVELOPE	35	35	3	3	No Message
K2	C10	687	K 70X70	1620	No Message	ENVELOPE	49	49	4	4	No Message
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K2	C11	683	K 70X70	1620	No Message	ENVELOPE	49	60	5	5	No Message
K2	C11	683	K 70X70	3240	No Message	ENVELOPE	49	49	4	4	No Message
K2	C12	684	K 70X70	1620	No Message	ENVELOPE	49	49	4	4	No Message
K2	C12	684	K 70X70	3240	No Message	ENVELOPE	49	49	4	4	No Message
K2	C13	685	K 70X70	0	No Message	ENVELOPE	49	49	4	4	No Message
K2	C13	685	K 70X70	1620	No Message	ENVELOPE	49	49	4	4	No Message
K2	C13	685	K 70X70	3240	No Message	ENVELOPE	49	49	4	4	No Message
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K2	C14	686	K 70X70	1620	No Message	ENVELOPE	49	49	4	4	No Message
K2	C4	150	K 70X30	1620	No Message	ENVELOPE	21	21	2	2	No Message

K2	C4	150	K 70X30	3240	No Message	ENVELOPE	21	21	2	2	No Message
K2	C5	689	K 70X30	1620	No Message	ENVELOPE	21	21	2	2	No Message
K2	C15	691	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
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K2	C15	691	K 50X50	3240	No Message	ENVELOPE	25	36	3	3	No Message
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K1	C6	284	K 80X50	0	No Message	ENVELOPE	40	40	3	3	No Message
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K1	C6	284	K 80X50	3340	No Message	ENVELOPE	40	40	3	3	No Message
K1	C17	288	K 80X50	0	No Message	ENVELOPE	40	40	3	3	No Message
K1	C17	288	K 80X50	1320	No Message	ENVELOPE	40	40	3	3	No Message
K1	C17	288	K 80X50	2640	No Message	ENVELOPE	40	58	5	5	No Message
K1	C137	285	K 80X50	0	No Message	ENVELOPE	40	40	3	3	No Message
K1	C137	285	K 80X50	1320	No Message	ENVELOPE	40	40	3	3	No Message
K1	C137	285	K 80X50	2640	No Message	ENVELOPE	40	40	3	3	No Message
K1	C138	286	K 80X50	0	No Message	ENVELOPE	40	40	3	3	No Message
K1	C138	286	K 80X50	1320	No Message	ENVELOPE	40	40	3	3	No Message
K1	C138	286	K 80X50	2640	No Message	ENVELOPE	40	40	3	3	No Message
K1	C139	287	K 80X50	0	No Message	ENVELOPE	40	40	3	3	No Message
K1	C139	287	K 80X50	1320	No Message	ENVELOPE	40	40	3	3	No Message
K1	C139	287	K 80X50	2640	No Message	ENVELOPE	40	59	5	5	No Message
K1	C140	289	K 80X50	0	No Message	ENVELOPE	40	40	3	3	No Message
K1	C140	289	K 80X50	1320	No Message	ENVELOPE	40	40	3	3	No Message
K1	C140	289	K 80X50	2640	No Message	ENVELOPE	40	58	5	5	No Message
K1	C141	290	K 80X50	0	No Message	ENVELOPE	40	40	3	3	No Message
K1	C141	290	K 80X50	1670	No Message	ENVELOPE	40	40	3	3	No Message
K1	C141	290	K 80X50	3340	No Message	ENVELOPE	40	40	3	3	No Message
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K1	C142	291	K 80X50	1320	No Message	ENVELOPE	40	40	3	3	No Message
K1	C143	292	K 80X50	0	No Message	ENVELOPE	40	40	3	3	No Message
K1	C143	292	K 80X50	1320	No Message	ENVELOPE	40	40	3	3	No Message
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K1	C144	293	K 80X50	1320	No Message	ENVELOPE	40	40	3	3	No Message
K1	C145	294	K 80X50	0	No Message	ENVELOPE	40	40	3	3	No Message
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K1	C146	295	K 80X50	0	No Message	ENVELOPE	40	40	3	3	No Message
K1	C146	295	K 80X50	1320	No Message	ENVELOPE	40	40	3	3	No Message
K1	C147	296	K 80X40	0	No Message	ENVELOPE	32	32	3	3	No Message
K1	C147	296	K 80X40	1670	No Message	ENVELOPE	32	32	3	3	No Message
K1	C147	296	K 80X40	3340	No Message	ENVELOPE	32	32	3	3	No Message
K1	C149	298	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
K1	C149	298	K 60X60	1670	No Message	ENVELOPE	36	36	3	3	No Message
K1	C149	298	K 60X60	3340	No Message	ENVELOPE	36	36	3	3	No Message
K1	C150	299	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
K1	C150	299	K 60X60	1670	No Message	ENVELOPE	36	36	3	3	No Message
K1	C150	299	K 60X60	3340	No Message	ENVELOPE	36	36	3	3	No Message
K1	C151	300	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
K1	C151	300	K 60X60	1670	No Message	ENVELOPE	36	36	3	3	No Message
K1	C151	300	K 60X60	3340	No Message	ENVELOPE	36	36	3	3	No Message
K1	C152	301	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
K1	C152	301	K 60X60	1670	No Message	ENVELOPE	36	36	3	3	No Message
K1	C152	301	K 60X60	3340	No Message	ENVELOPE	36	36	3	3	No Message
K1	C153	302	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
K1	C153	302	K 60X60	1670	No Message	ENVELOPE	36	36	3	3	No Message
K1	C153	302	K 60X60	3340	No Message	ENVELOPE	36	36	3	3	No Message
K1	C154	303	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
K1	C154	303	K 60X60	1670	No Message	ENVELOPE	36	36	3	3	No Message
K1	C154	303	K 60X60	3340	No Message	ENVELOPE	36	36	3	3	No Message
K1	C155	304	K 60X40	0	No Message	ENVELOPE	24	24	2	2	No Message
K1	C155	304	K 60X40	1670	No Message	ENVELOPE	24	24	2	2	No Message
K1	C155	304	K 60X40	3340	No Message	ENVELOPE	24	24	2	2	No Message
K1	C156	305	K 60X40	0	No Message	ENVELOPE	24	33	3	3	No Message

K1	C156	305	K 60X40	1670	No Message	ENVELOPE	24	24	2	2	No Message
K1	C156	305	K 60X40	3340	No Message	ENVELOPE	24	26	2	2	No Message
K1	C157	306	K 60X40	0	No Message	ENVELOPE	24	24	2	2	No Message
K1	C157	306	K 60X40	1670	No Message	ENVELOPE	24	24	2	2	No Message
K1	C157	306	K 60X40	3340	No Message	ENVELOPE	24	24	2	2	No Message
K1	C158	307	K 80X70	0	No Message	ENVELOPE	56	56	5	5	No Message
K1	C158	307	K 80X70	1620	No Message	ENVELOPE	56	56	5	5	No Message
K1	C158	307	K 80X70	3240	No Message	ENVELOPE	56	56	5	5	No Message
K1	C159	308	K 80X70	0	No Message	ENVELOPE	56	56	5	5	No Message
K1	C159	308	K 80X70	1520	No Message	ENVELOPE	56	56	5	5	No Message
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K1	C160	309	K 80X70	0	No Message	ENVELOPE	56	56	5	5	No Message
K1	C160	309	K 80X70	1520	No Message	ENVELOPE	56	56	5	5	No Message
K1	C161	310	K 80X70	0	No Message	ENVELOPE	56	56	5	5	No Message
K1	C161	310	K 80X70	1520	No Message	ENVELOPE	56	56	5	5	No Message
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K1	C162	311	K 80X70	0	No Message	ENVELOPE	56	56	5	5	No Message
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K1	C164	313	K 60X40	0	No Message	ENVELOPE	24	32	3	3	No Message
K1	C164	313	K 60X40	1670	No Message	ENVELOPE	24	24	2	2	No Message
K1	C164	313	K 60X40	3340	No Message	ENVELOPE	24	24	2	2	No Message
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K1	C167	315	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K1	C167	315	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K1	C167	315	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K1	C168	312	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
K1	C168	312	K 60X60	1670	No Message	ENVELOPE	36	36	3	3	No Message
K1	C168	312	K 60X60	3340	No Message	ENVELOPE	36	36	3	3	No Message
K1	C169	316	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K1	C169	316	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K1	C169	316	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K1	C170	317	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K1	C170	317	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K1	C170	317	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K1	C171	318	K 60X40	0	No Message	ENVELOPE	24	24	2	2	No Message
K1	C171	318	K 60X40	1670	No Message	ENVELOPE	24	24	2	2	No Message
K1	C171	318	K 60X40	3340	No Message	ENVELOPE	24	24	2	2	No Message
K1	C172	319	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K1	C172	319	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K1	C172	319	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K1	C173	320	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K1	C173	320	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K1	C173	320	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K1	C174	321	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K1	C174	321	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K1	C174	321	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K1	C175	322	K 60X40	0	No Message	ENVELOPE	24	24	2	2	No Message
K1	C175	322	K 60X40	1670	No Message	ENVELOPE	24	24	2	2	No Message
K1	C175	322	K 60X40	3340	No Message	ENVELOPE	24	24	2	2	No Message
K1	C176	323	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K1	C176	323	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K1	C176	323	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K1	C177	324	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
K1	C177	324	K 60X50	1670	No Message	ENVELOPE	30	30	3	3	No Message
K1	C177	324	K 60X50	3340	No Message	ENVELOPE	30	30	3	3	No Message
K1	C178	325	K 140X30	0	No Message	ENVELOPE	42	42	4	4	No Message
K1	C178	325	K 140X30	1670	No Message	ENVELOPE	42	42	4	4	No Message
K1	C178	325	K 140X30	1940	No Message	ENVELOPE	42	42	4	4	No Message
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K1	C178	325	K 140X30	3340	No Message	ENVELOPE	42	42	4	4	No Message
K1	C179	326	K 140X30	0	No Message	ENVELOPE	42	42	4	4	No Message

K1	C179	326	K 140X30	1670	No Message	ENVELOPE	42	42	4	4	No Message
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K1	C179	326	K 140X30	3340	No Message	ENVELOPE	42	42	4	4	No Message
K1	C180	327	K 70X50	0	No Message	ENVELOPE	35	35	3	3	No Message
K1	C180	327	K 70X50	1670	No Message	ENVELOPE	35	35	3	3	No Message
K1	C180	327	K 70X50	3340	No Message	ENVELOPE	35	35	3	3	No Message
K1	C181	328	K 100X30	0	No Message	ENVELOPE	30	30	3	3	No Message
K1	C181	328	K 100X30	1670	No Message	ENVELOPE	30	30	3	3	No Message
K1	C181	328	K 100X30	3340	No Message	ENVELOPE	30	30	3	3	No Message
K1	C182	329	K 100X30	0	No Message	ENVELOPE	30	30	3	3	No Message
K1	C182	329	K 100X30	1670	No Message	ENVELOPE	30	30	3	3	No Message
K1	C182	329	K 100X30	3340	No Message	ENVELOPE	30	30	3	3	No Message
K1	C183	330	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
K1	C183	330	K 60X50	1670	No Message	ENVELOPE	30	30	3	3	No Message
K1	C183	330	K 60X50	3340	No Message	ENVELOPE	30	30	3	3	No Message
K1	C184	331	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
K1	C184	331	K 60X50	1670	No Message	ENVELOPE	30	30	3	3	No Message
K1	C184	331	K 60X50	3340	No Message	ENVELOPE	30	30	3	3	No Message
K1	C185	332	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
K1	C185	332	K 60X50	1670	No Message	ENVELOPE	30	30	3	3	No Message
K1	C185	332	K 60X50	3340	No Message	ENVELOPE	30	34	3	3	No Message
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K1	C186	333	K 60X50	3340	No Message	ENVELOPE	30	30	3	3	No Message
K1	C187	334	K 60X40	0	No Message	ENVELOPE	24	24	2	2	No Message
K1	C187	334	K 60X40	1670	No Message	ENVELOPE	24	24	2	2	No Message
K1	C187	334	K 60X40	3340	No Message	ENVELOPE	24	24	2	2	No Message
K1	C188	335	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
K1	C188	335	K 60X50	1670	No Message	ENVELOPE	30	30	3	3	No Message
K1	C188	335	K 60X50	3340	No Message	ENVELOPE	30	30	3	3	No Message
K1	C189	336	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
K1	C189	336	K 60X50	1670	No Message	ENVELOPE	30	30	3	3	No Message
K1	C189	336	K 60X50	3340	No Message	ENVELOPE	30	30	3	3	No Message
K1	C190	337	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
K1	C190	337	K 60X50	1670	No Message	ENVELOPE	30	30	3	3	No Message
K1	C190	337	K 60X50	3340	No Message	ENVELOPE	30	30	3	3	No Message
K1	C191	338	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
K1	C191	338	K 60X50	1670	No Message	ENVELOPE	30	30	3	3	No Message
K1	C191	338	K 60X50	3340	No Message	ENVELOPE	30	30	3	3	No Message
K1	C192	339	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K1	C192	339	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K1	C192	339	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K1	C193	340	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K1	C193	340	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K1	C193	340	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K1	C194	341	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K1	C194	341	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K1	C194	341	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K1	C195	342	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K1	C195	342	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K1	C195	342	K 50X50	1920	No Message	ENVELOPE	25	25	2	2	No Message
K1	C195	342	K 50X50	1920	No Message	ENVELOPE	25	25	2	2	No Message
K1	C195	342	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K1	C196	343	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K1	C196	343	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K1	C196	343	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K1	C198	344	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K1	C198	344	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K1	C198	344	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K1	C1	345	K 60X40	0	No Message	ENVELOPE	24	24	2	2	No Message
K1	C1	345	K 60X40	1670	No Message	ENVELOPE	24	24	2	2	No Message
K1	C1	345	K 60X40	3340	No Message	ENVELOPE	24	24	2	2	No Message
K1	C2	346	K 60X40	0	No Message	ENVELOPE	24	24	2	2	No Message

K1	C2	346	K 60X40	1670	No Message	ENVELOPE	24	24	2	2	No Message
K1	C2	346	K 60X40	3340	No Message	ENVELOPE	24	24	2	2	No Message
K1	C8	347	K 70X50	0	No Message	ENVELOPE	35	35	3	3	No Message
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K1	C8	347	K 70X50	3340	No Message	ENVELOPE	35	35	3	3	No Message
K1	C9	348	K 70X50	0	No Message	ENVELOPE	35	35	3	3	No Message
K1	C9	348	K 70X50	1670	No Message	ENVELOPE	35	35	3	3	No Message
K1	C9	348	K 70X50	3340	No Message	ENVELOPE	35	35	3	3	No Message
K1	C10	353	K 80X70	0	No Message	ENVELOPE	56	56	5	5	No Message
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K1	C11	349	K 80X70	0	No Message	ENVELOPE	56	56	5	5	No Message
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K1	C14	352	K 80X70	3240	No Message	ENVELOPE	56	56	5	5	No Message
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K0	C17	5	K 80X50	3240	No Message	ENVELOPE	40	40	3	3	No Message
K0	C137	2	K 80X50	0	No Message	ENVELOPE	40	44	4	4	No Message
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K0	C143	9	K 80X50	1620	No Message	ENVELOPE	40	40	3	3	No Message
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K0	C144	10	K 80X50	1620	No Message	ENVELOPE	40	40	3	3	No Message
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K0	C149	15	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
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K0	C150	16	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
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K0	C151	17	K 60X60	3840	No Message	ENVELOPE	36	36	3	3	No Message
K0	C152	18	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
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K0	C166	32	K 80X50	0	No Message	ENVELOPE	40	40	3	3	No Message
K0	C166	32	K 80X50	1620	No Message	ENVELOPE	40	40	3	3	No Message
K0	C166	32	K 80X50	3240	No Message	ENVELOPE	40	40	3	3	No Message
K0	C167	33	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
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K0	C167	33	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K0	C168	29	K 60X60	0	No Message	ENVELOPE	36	36	3	3	No Message
K0	C168	29	K 60X60	1670	No Message	ENVELOPE	36	36	3	3	No Message
K0	C168	29	K 60X60	3340	No Message	ENVELOPE	36	36	3	3	No Message
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K0	C169	34	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
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K0	C170	35	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
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K0	C172	37	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
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K0	C172	37	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K0	C173	39	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K0	C173	39	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K0	C173	39	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K0	C174	40	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K0	C174	40	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K0	C174	40	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K0	C175	41	K 60X40	0	No Message	ENVELOPE	24	24	2	2	No Message
K0	C175	41	K 60X40	1670	No Message	ENVELOPE	24	24	2	2	No Message
K0	C175	41	K 60X40	3340	No Message	ENVELOPE	24	24	2	2	No Message
K0	C176	42	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
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K0	C177	43	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
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K0	C186	52	K 60X50	1670	No Message	ENVELOPE	30	30	3	3	No Message
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K0	C187	53	K 60X40	1670	No Message	ENVELOPE	24	24	2	2	No Message
K0	C187	53	K 60X40	3340	No Message	ENVELOPE	24	24	2	2	No Message

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K0	C188	54	K 60X50	1670	No Message	ENVELOPE	30	30	3	3	No Message
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K0	C190	56	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
K0	C190	56	K 60X50	1670	No Message	ENVELOPE	30	30	3	3	No Message
K0	C190	56	K 60X50	3340	No Message	ENVELOPE	30	30	3	3	No Message
K0	C191	57	K 60X50	0	No Message	ENVELOPE	30	30	3	3	No Message
K0	C191	57	K 60X50	1670	No Message	ENVELOPE	30	30	3	3	No Message
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K0	C192	58	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
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K0	C193	59	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
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K0	C194	60	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
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K0	C195	61	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
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K0	C196	62	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K0	C196	62	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K0	C196	62	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
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K0	C1	31	K 60X40	1670	No Message	ENVELOPE	24	24	2	2	No Message
K0	C1	31	K 60X40	3340	No Message	ENVELOPE	24	24	2	2	No Message
K0	C2	38	K 60X40	0	No Message	ENVELOPE	24	24	2	2	No Message
K0	C2	38	K 60X40	1670	No Message	ENVELOPE	24	24	2	2	No Message
K0	C2	38	K 60X40	3340	No Message	ENVELOPE	24	24	2	2	No Message
K0	C8	64	K 70X50	0	No Message	ENVELOPE	35	35	3	3	No Message
K0	C8	64	K 70X50	1670	No Message	ENVELOPE	35	35	3	3	No Message
K0	C8	64	K 70X50	3340	No Message	ENVELOPE	35	35	3	3	No Message
K0	C9	65	K 70X50	0	No Message	ENVELOPE	35	35	3	3	No Message
K0	C9	65	K 70X50	1670	No Message	ENVELOPE	35	35	3	3	No Message
K0	C9	65	K 70X50	3340	No Message	ENVELOPE	35	35	3	3	No Message
K0	C10	66	K 80X70	0	No Message	ENVELOPE	56	56	5	5	No Message
K0	C10	66	K 80X70	1920	No Message	ENVELOPE	56	56	5	5	No Message
K0	C10	66	K 80X70	3840	No Message	ENVELOPE	56	56	5	5	No Message
K0	C11	67	K 80X70	0	No Message	ENVELOPE	56	56	5	5	No Message
K0	C11	67	K 80X70	1920	No Message	ENVELOPE	56	56	5	5	No Message
K0	C11	67	K 80X70	3840	No Message	ENVELOPE	56	56	5	5	No Message
K0	C12	68	K 80X70	0	No Message	ENVELOPE	56	56	5	5	No Message
K0	C12	68	K 80X70	1920	No Message	ENVELOPE	56	56	5	5	No Message
K0	C12	68	K 80X70	3840	No Message	ENVELOPE	56	56	5	5	No Message
K0	C13	69	K 80X70	0	No Message	ENVELOPE	56	56	5	5	No Message
K0	C13	69	K 80X70	1670	No Message	ENVELOPE	56	56	5	5	No Message
K0	C13	69	K 80X70	3340	No Message	ENVELOPE	56	56	5	5	No Message
K0	C14	70	K 80X70	0	No Message	ENVELOPE	56	56	5	5	No Message
K0	C14	70	K 80X70	1670	No Message	ENVELOPE	56	56	5	5	No Message
K0	C14	70	K 80X70	3340	No Message	ENVELOPE	56	56	5	5	No Message
K0	C4	72	K 70X30	0	No Message	ENVELOPE	21	21	2	2	No Message
K0	C4	72	K 70X30	1670	No Message	ENVELOPE	21	21	2	2	No Message
K0	C5	73	K 100X30	0	No Message	ENVELOPE	30	30	3	3	No Message
K0	C5	73	K 100X30	1670	No Message	ENVELOPE	30	30	3	3	No Message
K0	C5	73	K 100X30	3340	No Message	ENVELOPE	30	30	3	3	No Message
K0	C7	74	K 100X30	0	No Message	ENVELOPE	30	30	3	3	No Message
K0	C7	74	K 100X30	1670	No Message	ENVELOPE	30	30	3	3	No Message

K0	C7	74	K 100X30	3340	No Message	ENVELOPE	30	35	3	3	No Message
K0	C15	75	K 50X50	0	No Message	ENVELOPE	25	25	2	2	No Message
K0	C15	75	K 50X50	1670	No Message	ENVELOPE	25	25	2	2	No Message
K0	C15	75	K 50X50	3340	No Message	ENVELOPE	25	25	2	2	No Message
K0	C18	693	K 150X40	0	No Message	ENVELOPE	60	60	5	5	No Message
K0	C18	693	K 150X40	710	No Message	ENVELOPE	60	60	5	5	No Message
K0	C18	693	K 150X40	1420	No Message	ENVELOPE	60	60	5	5	No Message
K0	C19	694	K 150X40	0	No Message	ENVELOPE	60	60	5	5	No Message
K0	C19	694	K 150X40	660	No Message	ENVELOPE	60	60	5	5	No Message
K0	C19	694	K 150X40	1320	No Message	ENVELOPE	60	60	5	5	No Message

Dhimitri Papa

Digitally signed by Dhimitri Papa
Date: 2023.04.07 19:55:23 +02'00'