

National University «Yuri Kondratyuk Poltava Polytechnic»
Educational and Scientific Institute of Architecture,
Construction and Land Management
Department of Construction and Civil Engineering

Explanatory Note
to the Bachelor's thesis

topic: **10-storey residential building in Odesa**

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Head of department: prof. Oleksandr Semko

Poltava - 2025

EXPLANATORY NOTE ON ARCHITECTURE

Architecture in this project encompasses the design philosophy, spatial organization, aesthetics, and functionality of the proposed multi-storey residential building. The architectural layout ensures that natural light, ventilation, and spatial flow are optimized across all ten floors and roof deck. The use of modern BIM tools such as Autodesk Revit allows for accurate visualization, coordination, and error reduction. Each floor plan reflects attention to residential standards, space utilization, and user comfort. The repetition of modular layouts simplifies construction and enhances clarity in design communication.

The project features a multi-story residential building with 9 levels above ground (Levels 2–10), a ground floor, and a roof deck. Repeating floor plans indicate modular unit layouts. It has a spatial hierarchy of :

1. Public Zones: Lobbies (6–8 m²) and balconies (5–8 m²) serve as transition spaces.
2. Private Zones: Bedrooms (10–16 m²) grouped for privacy; master bedrooms feature private balconies.
3. Service Cores: Toilets (4–6 m²) and kitchens (6–9 m²) clustered for efficient plumbing.

For the orientation and climate response , south and north elevation of the building maximize glazing while east and west elevation reduce glazing with balcony shading to mitigate solar gain.

Foundations

Foundations provide the structural base that transfers the building load safely into the ground. For this project, foundations are designed according to structural specifications and site soil conditions. Typically, reinforced concrete pad or raft foundations are utilized for multi-storey buildings. The foundation must resist settlement, differential movement, and uplift. The drawings and ProtaStructure calculations ensure that axial loads, moments, and shears are accounted for, ensuring stability and structural integrity from base to top.

The foundation in this project is a raft foundation due to High axial loads Variable soil conditions.it has Concrete grade C35/45 with reinforcement bars of Grade 410 steel with a soil bearing capacity of 200Kn/m² .it is designed based on BS8110 and BS5950

Structures

The structural system of this development is a reinforced concrete frame. Each column, beam, and slab element is designed based on detailed load analysis. ProtaStructure outputs show axial force, bending moment, shear, and interaction diagrams, demonstrating compliance with BS 8110 design standards. Structural elements include C35/45 grade concrete and Grade 410/460 reinforcement steel. Columns are cross-verified for slenderness, moment capacity, and reinforcement detailing. The construction sequence follows a vertical load path from slabs to beams and columns, terminating at the foundation.

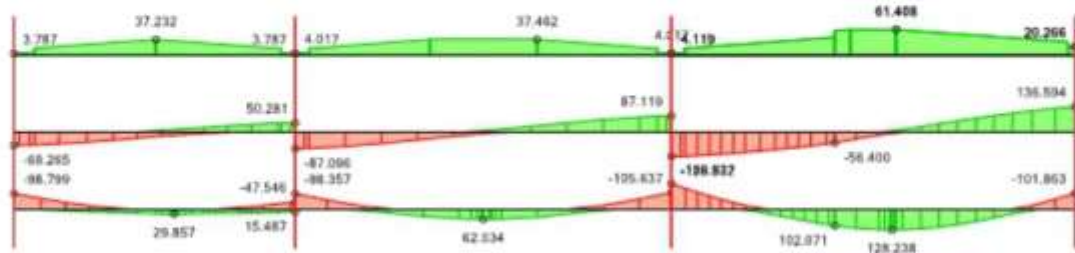
	UIN277IXCMCWPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

Beam Reinforcement Design

Axis: A Storey: 2

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2)) Concrete Cover: 20.0 mm

Diagrams



Bending

	2B1 L= 4531.5mm 230 x 600			2B2 L= 6059mm 230 x 600			2B3 L= 6500.5mm 230 x 600		
Flange B _f x H _f (Left) (Right)	---			---			---		
Top Edge									
M (kN.m)	98.8	19.1	47.5	98.4	1.1	105.6	160.9	0.0	101.9
d (mm)	560.0	560.0	560.0	560.0	562.0	560.0	560.0	560.0	560.0
K/K'	0.20	0.04	0.09	0.19	0.00	0.21	0.32	0.00	0.20
x (mm)	62.2	62.2	62.2	62.2	62.4	62.2	72.8	62.2	62.2
A _s (mm ²)	520.90	100.48	250.68	518.57	5.70	556.95	856.13	0.00	537.06
A _s ' (mm ²)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05	234.05	234.05	234.05	234.05	234.05	234.05
Bottom Edge									
M (kN.m)	11.1	29.9	23.3	7.0	62.0	6.0	2.6	128.2	30.7
d (mm)	562.0	562.0	562.0	562.0	562.0	562.0	560.0	560.0	560.0
K/K'	0.02	0.06	0.05	0.01	0.12	0.01	0.01	0.25	0.06
x (mm)	62.4	62.4	62.4	62.4	62.4	62.4	62.2	62.2	62.2
A _s (mm ²)	58.37	156.85	122.59	36.95	325.90	31.61	13.90	676.11	161.90
A _s ' (mm ²)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05	234.05	234.05	234.05	234.05	234.05	234.05

Shear And Torsion Design

V _z (kN)	69.3	50.3	87.1	87.1	128.9	136.6
v (MPa)	0.54	0.39	0.68	0.68	1.00	1.06
v _c (MPa)	0.53	0.53	0.53	0.61	0.61	0.53
v _{max} (MPa)	5.00	5.00	5.00	5.00	5.00	5.00
V _{nom} (kN)		217.1		207.3		217.1
T _d (kN.m)		0.0		0.0		0.0
v _t (MPa)		0.00		0.00		0.00
v _{t,min} (MPa)		0.00		0.00		0.00
d _{support} (mm)	0.0	0.0	0.0	0.0	0.0	0.0
Links	1T10-250	1T10-250	1T10-250	1T10-250	1T10-250	1T10-250

Deflection Check

L/d	8.06 ≤ 59.25 ✓	10.78 ≤ 50.17 ✓	11.61 ≤ 42.21 ✓
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Steel Areas (mm²)

Required			
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	UIN277IXCMCWPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

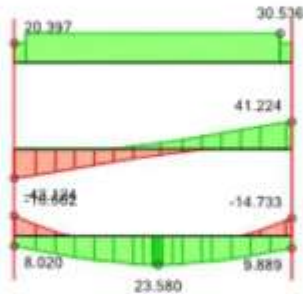
Top Edge	520.90	100.48	250.68	518.57	5.70	566.95	856.13	0.00	537.06
Bottom Edge	58.37	156.85	122.59	36.95	325.90	31.61	13.90	676.11	161.90
Supplied									
Top Edge	628.32	628.32	628.32	628.32	402.12	942.48	942.48	628.32	628.32
Bottom Edge	402.12	402.12	402.12	402.12	402.12	402.12	942.48	942.48	942.48
Steel Bars									
Top Bars	2Y20			2Y16				2Y20	
Top Sup Bars		2Y20		2Y20	3Y20		3Y20		
Top Sup Bars									
Bottom Bars	2Y16			2Y16				3Y20	
Bottom Bars									
Bot. Sup. Bars									
Side Bars									

	UIN277IXCMCWPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

Axis: A Storey: 2 (/ 2)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2)) Concrete Cover: 20.0 mm

Diagrams



Bending

	2B4		L= 2754mm
B _w x H (mm)	230 x 600		
Flange B _f x H _f (Left) (Right)	---		
Top Edge			
M (kN.m)	16.6	0.0	14.7
d (mm)	562.0	562.0	562.0
K/K'	0.03	0.00	0.03
x (mm)	62.4	62.4	62.4
A _s (mm ²)	87.22	0.00	77.40
A _s ' (mm ²)	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05
Bottom Edge			
M (kN.m)	15.7	23.6	17.4
d (mm)	562.0	562.0	562.0
K/K'	0.03	0.05	0.03
x (mm)	62.4	62.4	62.4
A _s (mm ²)	82.72	123.88	91.54
A _s ' (mm ²)	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05

Shear And Torsion Design

V _d (kN)	43.1		41.2
v (MPa)	0.33		0.32
v _c (MPa)	0.46		0.46
v _{max} (MPa)	5.00		5.00
V _{adm} (kN)		207.1	
T _d (kN.m)		0.0	
v _t (MPa)		0.00	
v _{c,adm} (MPa)		0.00	
b _{support} (mm)	0.0		0.0
Links	1T10-250	1T10-250	1T10-250

Deflection Check

L/d	4.9 ≤ 43.76 ✓
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Steel Areas (mm²)

Required			
Top Edge	87.22	0.00	77.40
Bottom Edge	82.72	123.88	91.54
Supplied			
Top Edge	402.12	402.12	402.12

	UIN277IXCMCPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

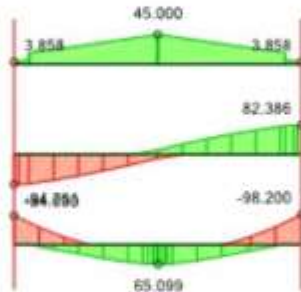
Bottom Edge	402.12	402.12	402.12
Steel Bars			
Top Bars		2Y16	
Top Sup Bars			
Top Sup Bars			
Bottom Bars		2Y16	
Bottom Bars			
Bot Sup Bars			
Side Bars			

	UIN277IXCMCWPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

Axis: 14 Storey: 2

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2)) Concrete Cover: 20.0 mm

Diagrams



Bending

	2B5		L= 5760mm
B _w x H (mm)	230 x 600		
Flange B _f x H _f (Left) (Right)	---		
Top Edge			
M (kN.m)	94.8	0.0	98.2
d (mm)	560.0	560.0	560.0
K/K'	0.19	0.00	0.19
x (mm)	62.2	62.2	62.2
A _s (mm ²)	499.61	0.00	517.74
A _s ' (mm ²)	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05
Bottom Edge			
M (kN.m)	24.7	65.1	23.2
d (mm)	562.0	562.0	562.0
K/K'	0.05	0.13	0.05
x (mm)	62.4	62.4	62.4
A _s (mm ²)	129.67	342.00	121.82
A _s ' (mm ²)	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05

Shear And Torsion Design

V _d (kN)	84.0		82.4
v (MPa)	0.65		0.64
v _c (MPa)	0.53		0.53
v _{max} (MPa)	5.00		5.00
V _{com} (kN)		217.1	
T _d (kN.m)		0.0	
v _t (MPa)		0.00	
v _{c,max} (MPa)		0.00	
b _{support} (mm)	0.0		0.0
Links	1T10-250	1T10-250	1T10-250

Deflection Check

L/d	10.25 ≤ 38.39 ✓
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Steel Areas (mm²)

Required			
Top Edge	499.61	0.00	517.74
Bottom Edge	129.67	342.00	121.82
Supplied			
Top Edge	628.32	628.32	628.32

	UIN277IXCMCPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

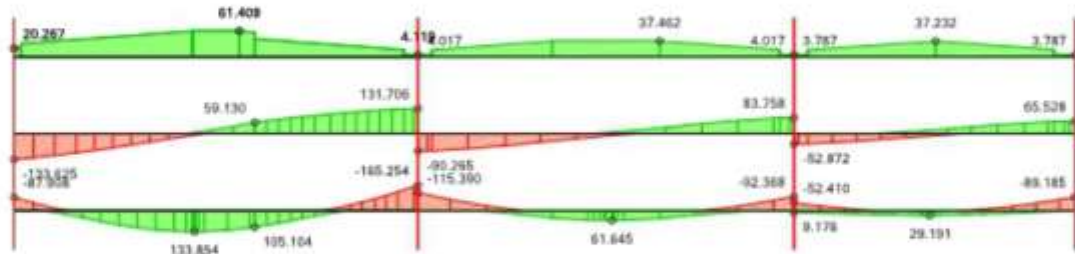
Bottom Edge	402.12	402.12	402.12
Steel Bars			
Top Bars		2Y20	
Top Sup Bars			
Top Sup Bars			
Bottom Bars		2Y16	
Bottom Bars			
Bot Sup Bars			
Side Bars			

	UIN277IXCMCPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

Axis: A Storey: 2 (/ 3)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2)) Concrete Cover: 20.0 mm

Diagrams



Bending

$B_w \times H$ (mm)	2B6 L= 6514.5mm 230 x 600			2B7 L= 6060mm 230 x 600			2B8 L= 4530mm 230 x 600		
Flange $B_f \times H_f$ (Left) (Right)	---			---			---		
Top Edge									
M (kN.m)	87.9	0.0	165.3	115.4	4.0	92.4	52.4	15.7	89.2
d (mm)	560.0	560.0	560.0	560.0	562.0	560.0	560.0	560.0	560.0
K/K'	0.17	0.00	0.33	0.23	0.01	0.18	0.10	0.03	0.18
x (mm)	62.2	62.2	74.9	62.2	62.4	62.2	62.2	62.2	62.2
A_s (mm ²)	463.48	0.00	880.72	608.37	20.99	486.99	276.32	82.60	470.21
A_s' (mm ²)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
$A_{s,min}$ (mm ²)	234.05	234.05	234.05	234.05	234.05	234.05	234.05	234.05	234.05
Bottom Edge									
M (kN.m)	38.6	133.9	1.3	1.8	61.6	10.5	19.4	29.2	14.5
d (mm)	560.0	560.0	560.0	562.0	562.0	562.0	562.0	562.0	562.0
K/K'	0.08	0.26	0.00	0.00	0.12	0.02	0.04	0.06	0.03
x (mm)	62.2	62.2	62.2	62.4	62.4	62.4	62.4	62.4	62.4
A_s (mm ²)	203.26	705.72	6.87	9.64	323.86	55.01	102.05	153.36	76.13
A_s' (mm ²)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
$A_{s,min}$ (mm ²)	234.05	234.05	234.05	234.05	234.05	234.05	234.05	234.05	234.05

Shear And Torsion Design

V_d (kN)	133.6	131.7	90.3	83.8	52.9	65.5
v (MPa)	1.04	1.02	0.70	0.65	0.41	0.51
v_c (MPa)	0.53	0.61	0.61	0.53	0.53	0.53
v_{tmax} (MPa)	5.00	5.00	5.00	5.00	5.00	5.00
$V_{t,lim}$ (kN)		217.1		207.3		217.1
T_d (kN.m)		0.0		0.0		0.0
v_t (MPa)		0.00		0.00		0.00
$v_{t,lim}$ (MPa)		0.00		0.00		0.00
$b_{support}$ (mm)	0.0	0.0	0.0	0.0	0.0	0.0
Links	1T10-250	1T10-250	1T10-250	1T10-250	1T10-250	1T10-250

Deflection Check

L/d	$11.63 \leq 40.71 \checkmark$	$10.78 \leq 50.46 \checkmark$	$8.06 \leq 59.25 \checkmark$
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Steel Areas (mm²)

Required									
Top Edge	463.48	0.00	880.72	608.37	20.99	486.99	276.32	82.60	470.21
Bottom Edge	203.26	705.72	6.87	9.64	323.86	55.01	102.05	153.36	76.13
Supplied									
Top Edge	628.32	628.32	942.48	942.48	402.12	628.32	628.32	628.32	628.32

	UIN277IXCMCPWIV (Fenerbahce_Do Not Use COMMERCIAL)								
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:								

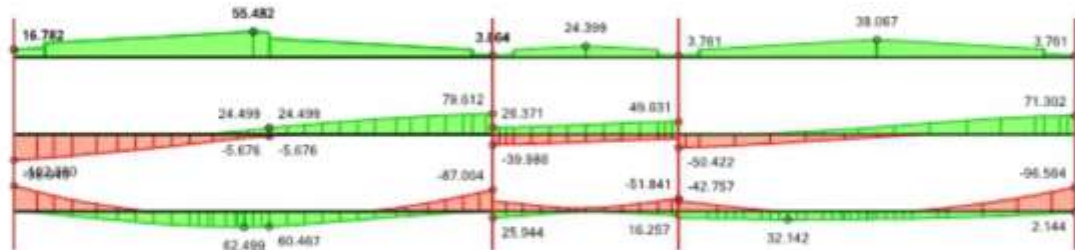
Bottom Edge	942.48	942.48	942.48	402.12	402.12	402.12	402.12	402.12	402.12
Steel Bars									
Top Bars	2Y20			2Y16				2Y20	
Top Sup Bars		3Y20		3Y20	2Y20		2Y20		
Top Sup Bars									
Bottom Bars	3Y20			2Y16				2Y16	
Bottom Bars									
Bot. Sup Bars									
Side Bars									

	UIN277IXCMCPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

Axis: 28 Storey: 2

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2)) Concrete Cover: 20.0 mm

Diagrams



Bending

B _w x H (mm)	2B11 L= 5231.1mm 230 x 600			2B10 L= 2030mm 230 x 600			2B9 L= 4330mm 230 x 600		
	Flange B _f x H _f (Left) (Right)	---			---			---	
Top Edge									
M (kN.m)	103.0	0.4	87.0	42.1	23.0	51.8	42.8	18.9	96.6
d (mm)	560.0	560.0	560.0	560.0	562.0	562.0	562.0	560.0	560.0
K/K'	0.20	0.00	0.17	0.08	0.05	0.10	0.08	0.04	0.19
x (mm)	62.2	62.2	62.2	62.2	62.4	62.4	62.4	62.2	62.2
A _s (mm ²)	542.94	1.99	458.71	222.21	120.99	272.35	224.63	99.79	509.12
A _s ' (mm ²)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05	234.05	234.05	234.05	234.05	234.05	234.05
Bottom Edge									
M (kN.m)	31.6	62.5	18.5	25.9	13.2	16.3	30.3	32.1	20.1
d (mm)	562.0	562.0	562.0	562.0	562.0	562.0	562.0	562.0	562.0
K/K'	0.06	0.12	0.04	0.05	0.03	0.03	0.06	0.06	0.04
x (mm)	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4
A _s (mm ²)	166.16	328.34	96.95	136.30	69.29	85.41	159.26	168.86	105.58
A _s ' (mm ²)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05	234.05	234.05	234.05	234.05	234.05	234.05

Shear And Torsion Design

V _d (kN)	98.9		79.6	40.0		49.0	50.4		71.3
v (MPa)	0.77		0.62	0.31		0.38	0.39		0.55
v _c (MPa)	0.53		0.53	0.53		0.46	0.46		0.53
v _{max} (MPa)	5.00		5.00	5.00		5.00	5.00		5.00
V _{com} (kN)		217.1			207.3			217.1	
T _d (kN.m)		0.0			0.0			0.0	
v _t (MPa)		0.00			0.00			0.00	
v _{c,req} (MPa)		0.00			0.00			0.00	
b _{support} (mm)	0.0		0.0	0.0		0.0	0.0		0.0
Links	1T10-250	1T10-250	1T10-250	1T10-250	1T10-250	1T10-250	1T10-250	1T10-250	1T10-250

Deflection Check

L/d	9.31 ≤ 51.89 ✓	3.61 ≤ 56.89 ✓	7.7 ≤ 59.25 ✓
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Steel Areas (mm²)

Required									
Top Edge	542.94	1.99	458.71	222.21	120.99	272.35	224.63	99.79	509.12
Bottom Edge	166.16	328.34	96.95	136.30	69.29	85.41	159.26	168.86	105.58
Supplied									
Top Edge	628.32	628.32	628.32	628.32	402.12	402.12	402.12	628.32	628.32

	UIN277IXCMCPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

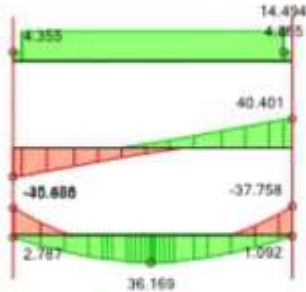
Bottom Edge	402.12	402.12	402.12	402.12	402.12	402.12	402.12	402.12	402.12
Steel Bars									
Top Bars		2Y20			2Y16			2Y20	
Top Sup Bars			2Y20	2Y20		2Y16		2Y16	
Top Sup Bars									
Bottom Bars		2Y16			2Y16			2Y16	
Bottom Bars									
Bot. Sup Bars									
Side Bars									

	UIN277IXCMCWPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

Axis: 13 Storey: 2

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2)) Concrete Cover: 20.0 mm

Diagrams



Bending

	2B12 L= 5760mm 230 x 600		
Flange B _f x H _f (Left) (Right)	---		
Top Edge			
M (kN.m)	35.4	0.0	37.8
d (mm)	562.0	562.0	562.0
K/K'	0.07	0.00	0.07
x (mm)	62.4	62.4	62.4
A _s (mm ²)	186.12	0.00	198.36
A _s ' (mm ²)	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05
Bottom Edge			
M (kN.m)	20.3	36.2	19.2
d (mm)	562.0	562.0	562.0
K/K'	0.04	0.07	0.04
x (mm)	62.4	62.4	62.4
A _s (mm ²)	106.47	190.02	100.83
A _s ' (mm ²)	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05

Shear And Torsion Design

V _d (kN)	40.0		40.4
v (MPa)	0.31		0.31
v _c (MPa)	0.46		0.46
v _{max} (MPa)	5.00		5.00
V _{adm} (kN)		207.1	
T _d (kN.m)		0.0	
v _t (MPa)		0.00	
v _{c,adm} (MPa)		0.00	
b _{support} (mm)	0.0		0.0
Links	1T10-250	1T10-250	1T10-250

Deflection Check

L/d	10.25 ≤ 43.76 ✓
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Steel Areas (mm²)

Required			
Top Edge	186.12	0.00	198.36
Bottom Edge	106.47	190.02	100.83
Supplied			
Top Edge	402.12	402.12	402.12

	UIN277IXCMCPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

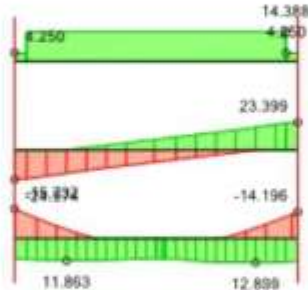
Bottom Edge	402.12	402.12	402.12
Steel Bars			
Top Bars		2Y16	
Top Sup Bars			
Top Sup Bars			
Bottom Bars		2Y16	
Bottom Bars			
Bot Sup Bars			
Side Bars			

	UIN277IXCMCWPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

Axis: C Storey: 2

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2)) Concrete Cover: 20.0 mm

Diagrams



Bending

	2B13 L= 2754mm 230 x 600		
Flange B _f x H _f (Left) (Right)	---		
Top Edge			
M (kN.m)	15.7	0.3	14.2
d (mm)	562.0	562.0	562.0
K/K'	0.03	0.00	0.03
x (mm)	62.4	62.4	62.4
A _s (mm ²)	82.65	1.53	74.58
A _s ' (mm ²)	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05
Bottom Edge			
M (kN.m)	11.9	12.8	12.9
d (mm)	562.0	562.0	562.0
K/K'	0.02	0.03	0.03
x (mm)	62.4	62.4	62.4
A _s (mm ²)	62.30	67.47	67.77
A _s ' (mm ²)	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05

Shear And Torsion Design

V _d (kN)	25.0		23.4
v (MPa)	0.19		0.18
v _c (MPa)	0.46		0.46
v _{max} (MPa)	5.00		5.00
V _{adm} (kN)		207.1	
T _d (kN.m)		0.0	
v _t (MPa)		0.00	
v _{c,req} (MPa)		0.00	
b _{support} (mm)	0.0		0.0
Links	1T10-250	1T10-250	1T10-250

Deflection Check

L/d	4.9 ≤ 43.76 ✓
-----	------------------

Steel Areas (mm²)

Required			
Top Edge	82.65	1.53	74.58
Bottom Edge	62.30	67.47	67.77
Supplied			
Top Edge	402.12	402.12	402.12

	UIN277IXCMCPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

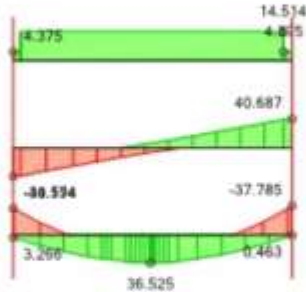
Bottom Edge	402.12	402.12	402.12
Steel Bars			
Top Bars		2Y16	
Top Sup Bars			
Top Sup Bars			
Bottom Bars		2Y16	
Bottom Bars			
Bot Sup Bars			
Side Bars			

	UIN277IXCMCWPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

Axis: 12 Storey: 2

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2)) Concrete Cover: 20.0 mm

Diagrams



Bending

	2B14	L= 5760mm	
B _w x H (mm)		230 x 600	
Flange B _f x H _f (Left) (Right)	---		
Top Edge			
M (kN.m)	34.6	0.0	37.8
d (mm)	562.0	562.0	562.0
K/K'	0.07	0.00	0.07
x (mm)	62.4	62.4	62.4
A _s (mm ²)	181.53	0.00	198.51
A _s ' (mm ²)	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05
Bottom Edge			
M (kN.m)	20.5	36.5	18.9
d (mm)	562.0	562.0	562.0
K/K'	0.04	0.07	0.04
x (mm)	62.4	62.4	62.4
A _s (mm ²)	107.54	191.89	99.25
A _s ' (mm ²)	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05

Shear And Torsion Design

V _d (kN)	40.2		40.7
v (MPa)	0.31		0.31
v _c (MPa)	0.46		0.46
v _{max} (MPa)	5.00		5.00
V _{adm} (kN)		207.1	
T _d (kN.m)		0.0	
v _t (MPa)		0.00	
v _{c,adm} (MPa)		0.00	
b _{support} (mm)	0.0		0.0
Links	1T10-250	1T10-250	1T10-250

Deflection Check

L/d	10.25 ≤ 43.76 ✓
-----	--------------------

Steel Areas (mm²)

Required			
Top Edge	181.53	0.00	198.51
Bottom Edge	107.54	191.89	99.25
Supplied			
Top Edge	402.12	402.12	402.12

	UIN277IXCMCPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

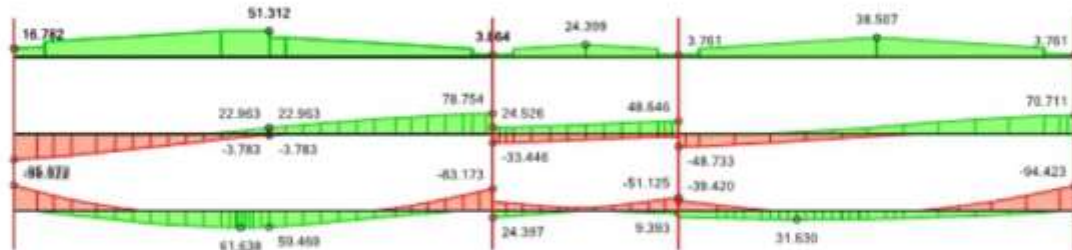
Bottom Edge	402.12	402.12	402.12
Steel Bars			
Top Bars		2Y16	
Top Sup Bars			
Top Sup Bars			
Bottom Bars		2Y16	
Bottom Bars			
Bot Sup Bars			
Side Bars			

	UIN277IXCMCPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

Axis: 2 Storey: 2

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2)) Concrete Cover: 20.0 mm

Diagrams



Bending

B _w x H (mm)	2B17 L= 5231.1mm 230 x 600			2B16 L= 2030mm 230 x 600			2B15 L= 4330mm 230 x 600		
Flange B _f x H _f (Left) (Right)	---			---			---		
Top Edge									
M (kN.m)	95.9	0.0	83.2	35.7	22.6	51.1	39.4	17.0	94.4
d (mm)	560.0	560.0	560.0	560.0	562.0	562.0	562.0	560.0	560.0
K/K'	0.19	0.00	0.16	0.07	0.04	0.10	0.08	0.03	0.19
x (mm)	62.2	62.2	62.2	62.2	62.4	62.4	62.4	62.2	62.2
A _s (mm ²)	505.47	0.00	438.52	188.40	118.48	268.59	207.10	89.85	497.83
A _s ' (mm ²)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05	234.05	234.05	234.05	234.05	234.05	234.05
Bottom Edge									
M (kN.m)	29.3	61.6	15.4	24.4	12.5	9.4	29.3	31.6	16.2
d (mm)	562.0	562.0	562.0	562.0	562.0	562.0	562.0	562.0	562.0
K/K'	0.06	0.12	0.03	0.05	0.02	0.02	0.06	0.06	0.03
x (mm)	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4
A _s (mm ²)	153.98	323.82	81.07	128.17	65.63	49.34	153.71	166.17	85.07
A _s ' (mm ²)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05	234.05	234.05	234.05	234.05	234.05	234.05

Shear And Torsion Design

V _d (kN)	98.3	78.8	33.4	48.6	48.7	70.7
v (MPa)	0.76	0.61	0.26	0.38	0.38	0.55
v _c (MPa)	0.53	0.53	0.53	0.46	0.46	0.53
v _{max} (MPa)	5.00	5.00	5.00	5.00	5.00	5.00
V _{adm} (kN)		217.1		207.3		217.1
T _d (kN.m)		0.0		0.0		0.0
v _t (MPa)		0.00		0.00		0.00
v _{c,adm} (MPa)		0.00		0.00		0.00
b _{support} (mm)	0.0	0.0	0.0	0.0	0.0	0.0
Links	1T10-250	1T10-250	1T10-250	1T10-250	1T10-250	1T10-250

Deflection Check

L/d	9.31 ≤ 52.57 ✓	3.61 ≤ 56.89 ✓	7.7 ≤ 59.25 ✓
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Steel Areas (mm²)

Required									
Top Edge	505.47	0.00	438.52	188.40	118.48	268.59	207.10	89.85	497.83
Bottom Edge	153.98	323.82	81.07	128.17	65.63	49.34	153.71	166.17	85.07
Supplied									
Top Edge	628.32	628.32	628.32	628.32	402.12	402.12	402.12	628.32	628.32

	UIN277IXCMCPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

Bottom Edge	402.12	402.12	402.12	402.12	402.12	402.12	402.12	402.12	402.12
Steel Bars									
Top Bars		2Y20			2Y16			2Y20	
Top Sup Bars			2Y20	2Y20		2Y16		2Y16	
Top Sup Bars									
Bottom Bars		2Y16			2Y16			2Y16	
Bottom Bars									
Bot. Sup Bars									
Side Bars									

	UIN277IXCMCPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

Axis: E1 Storey: 2

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2)) Concrete Cover: 20.0 mm

Diagrams



Bending

B _w x H (mm)	2B18 L= 4531.5mm 230 x 600			2B19 L= 4030mm 230 x 600		
	Flange B _f x H _f (Left) (Right)	---			---	
Top Edge						
M (kN.m)	107.7	10.8	55.4	65.6	4.9	80.9
d (mm)	560.0	560.0	562.0	562.0	560.0	560.0
K/K'	0.21	0.02	0.11	0.13	0.01	0.16
x (mm)	62.2	62.2	62.4	62.4	62.2	62.2
A _s (mm ²)	567.82	56.79	290.92	344.59	25.81	426.54
A _s ' (mm ²)	0.00	0.00	0.00	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05	234.05	234.05	234.05
Bottom Edge						
M (kN.m)	17.4	44.6	24.6	11.8	58.7	46.6
d (mm)	562.0	562.0	562.0	562.0	562.0	562.0
K/K'	0.03	0.09	0.05	0.02	0.12	0.09
x (mm)	62.4	62.4	62.4	62.4	62.4	62.4
A _s (mm ²)	91.61	234.15	129.06	62.08	308.35	245.05
A _s ' (mm ²)	0.00	0.00	0.00	0.00	0.00	0.00
A _{s,min} (mm ²)	234.05	234.05	234.05	234.05	234.05	234.05

Shear And Torsion Design

V _d (kN)	94.4	63.2	63.7	136.6
v (MPa)	0.73	0.49	0.49	1.06
v _c (MPa)	0.53	0.46	0.46	0.53
v _{max} (MPa)	5.00	5.00	5.00	5.00
V _{adm} (kN)		217.1		217.1
T _d (kN.m)		0.0		0.6
v _t (MPa)		0.00		0.00
v _{c,adm} (MPa)		0.00		0.00
b _{support} (mm)	0.0	0.0	0.0	0.0
Links	1T10-250	1T10-250	1T10-250	1T10-250

Deflection Check

L/d	8.06 ≤ 59.25 ✓	7.17 ≤ 54.95 ✓
-----	-------------------	-------------------

Steel Areas (mm²)

Required						
Top Edge	567.82	56.79	290.92	344.59	25.81	426.54
Bottom Edge	91.61	234.15	129.06	62.08	308.35	245.05
Supplied						
Top Edge	628.32	628.32	402.12	402.12	628.32	628.32

	UIN277IXCMCPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

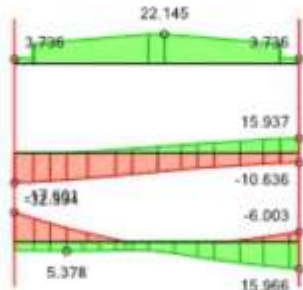
Bottom Edge	402.12	402.12	402.12	402.12	402.12	402.12
Steel Bars						
Top Bars		2Y20			2Y20	
Top Sup Bars			2Y16	2Y16		
Top Sup Bars						
Bottom Bars		2Y16			2Y16	
Bottom Bars						
Bot. Sup Bars						
Side Bars						

	UIN277IXCMCWPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

Axis: F1 Storey: 2

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2)) Concrete Cover: 20.0 mm

Diagrams



Bending

	2B20 L= 1622.5mm		
$B_w \times H$ (mm)	230 x 600		
Flange $B_f \times H_f$ (Left) (Right)	---		
Top Edge			
M (kN.m)	17.6	4.2	6.0
d (mm)	562.0	562.0	562.0
K/K'	0.03	0.01	0.01
x (mm)	62.4	62.4	62.4
A_s (mm ²)	92.47	22.10	31.54
A_s' (mm ²)	0.00	0.00	0.00
$A_{s,min}$ (mm ²)	234.05	234.05	234.05
Bottom Edge			
M (kN.m)	5.4	12.7	16.0
d (mm)	562.0	562.0	562.0
K/K'	0.01	0.02	0.03
x (mm)	62.4	62.4	62.4
A_s (mm ²)	28.25	66.53	83.88
A_s' (mm ²)	0.00	0.00	0.00
$A_{s,min}$ (mm ²)	234.05	234.05	234.05

Shear And Torsion Design

V_d (kN)	32.3		16.0
v (MPa)	0.25		0.12
v_c (MPa)	0.46		0.46
$v_{t,max}$ (MPa)	5.00		5.00
$V_{t,lim}$ (kN)		207.1	
T_d (kN.m)		0.1	
v_t (MPa)		0.00	
$v_{t,lim}$ (MPa)		0.00	
$b_{support}$ (mm)	0.0		0.0
Links	1T10-250	1T10-250	1T10-250

Deflection Check

L/d	$2.89 \leq$ 43.76 ✓
-----	------------------------

Steel Areas (mm²)

Required			
Top Edge	92.47	22.10	31.54
Bottom Edge	28.25	66.53	83.88
Supplied			
Top Edge	402.12	402.12	402.12

	UIN277IXCMCPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

Bottom Edge	402.12	402.12	402.12
Steel Bars			
Top Bars		2Y16	
Top Sup Bars			
Top Sup Bars			
Bottom Bars		2Y16	
Bottom Bars			
Bot Sup Bars			
Side Bars			

	UIN277IXCMCWPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

Storey: 2

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2)) Concrete Cover: 20.0 mm

Diagrams



Bending

	2B21	L= 1536.5mm	
$B_w \times H$ (mm)		230 x 600	
Flange $B_f \times H_f$ (Left) (Right)	---		
Top Edge			
M (kN.m)	42.0	25.6	8.5
d (mm)	562.0	562.0	562.0
K/K'	0.08	0.05	0.02
x (mm)	62.4	62.4	62.4
A_s (mm ²)	220.82	134.64	44.50
A_s' (mm ²)	0.00	0.00	0.00
$A_{s,min}$ (mm ²)	234.05	234.05	234.05
Bottom Edge			
M (kN.m)	0.0	0.8	0.7
d (mm)	562.0	562.0	562.0
K/K'	0.00	0.00	0.00
x (mm)	62.4	62.4	62.4
A_s (mm ²)	0.00	4.19	3.73
A_s' (mm ²)	0.00	0.00	0.00
$A_{s,min}$ (mm ²)	234.05	234.05	234.05

Shear And Torsion Design

V_d (kN)	37.5		22.4
v (MPa)	0.29		0.17
v_c (MPa)	0.46		0.46
v_{tk} (MPa)	5.00		5.00
V_{adm} (kN)		207.1	
T_d (kN.m)		0.1	
v_t (MPa)		0.00	
$v_{t,adm}$ (MPa)		0.00	
$b_{support}$ (mm)	0.0		0.0
Links	1T10-250	1T10-250	1T10-250

Deflection Check

L/d	$2.73 \leq$ 43.76 ✓
-----	------------------------

Steel Areas (mm²)

Required			
Top Edge	220.82	134.64	44.50
Bottom Edge	0.00	4.19	3.73
Supplied			
Top Edge	402.12	402.12	402.12

	UIN277IXCMCPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

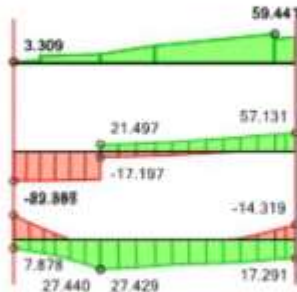
Bottom Edge	402.12	402.12	402.12
Steel Bars			
Top Bars		2Y16	
Top Sup Bars			
Top Sup Bars			
Bottom Bars		2Y16	
Bottom Bars			
Bot. Sup Bars			
Side Bars			

	UIN277IXCMCWPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

Axis: 7 Storey: 2

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2)) Concrete Cover: 20.0 mm

Diagrams



Bending

	2B22	L= 1536.5mm	
$B_w \times H$ (mm)		230 x 600	
Flange $B_f \times H_f$ (Left) (Right)	---		
Top Edge			
M (kN.m)	22.9	0.0	14.3
d (mm)	562.0	562.0	562.0
K/K'	0.04	0.00	0.03
x (mm)	62.4	62.4	62.4
A_s (mm ²)	120.28	0.00	75.23
A_s' (mm ²)	0.00	0.00	0.00
$A_{s,min}$ (mm ²)	234.05	234.05	234.05
Bottom Edge			
M (kN.m)	19.9	27.4	21.1
d (mm)	562.0	562.0	562.0
K/K'	0.04	0.05	0.04
x (mm)	62.4	62.4	62.4
A_s (mm ²)	104.56	144.16	110.79
A_s' (mm ²)	0.00	0.00	0.00
$A_{s,min}$ (mm ²)	234.05	234.05	234.05

Shear And Torsion Design

V_d (kN)	89.4		57.1
v (MPa)	0.69		0.44
v_c (MPa)	0.46		0.46
v_{tk} (MPa)	5.00		5.00
V_{adm} (kN)		207.1	
T_d (kN.m)		0.5	
v_t (MPa)		0.00	
$v_{t,adm}$ (MPa)		0.00	
$b_{support}$ (mm)	0.0		0.0
Links	1T10-250	1T10-250	1T10-250

Deflection Check

L/d	$2.73 \leq$ 43.76 ✓
-----	------------------------

Steel Areas (mm²)

Required			
Top Edge	120.28	0.00	75.23
Bottom Edge	104.56	144.16	110.79
Supplied			
Top Edge	402.12	402.12	402.12

	UIN277IXCMCPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Beam Reinforcement Design Rev. 1	Calc. By: Checked By:

Bottom Edge	402.12	402.12	402.12
Steel Bars			
Top Bars		2Y16	
Top Sup Bars			
Top Sup Bars			
Bottom Bars		2Y16	
Bottom Bars			
Bot Sup Bars			
Side Bars			

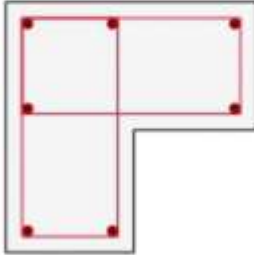
	UIN277XCMCMPWV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

Column Reinforcement Design

2C1 (A-2) (450/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

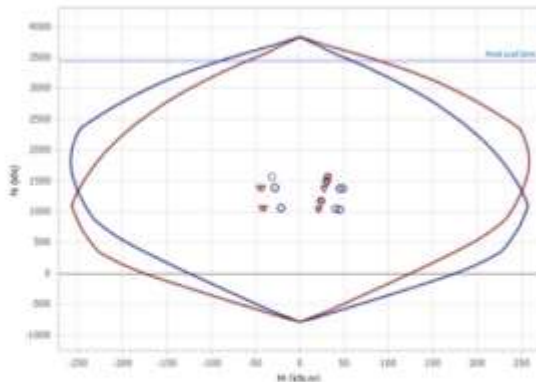
Section



Combinations

No	N_{Top} (kN)	$M_{1 Top}$ (kN.m)	$M_{2 Top}$ (kN.m)	N_{Bot} (kN)	$M_{1 Bot}$ (kN.m)	$M_{2 Bot}$ (kN.m)
1	1558.9	-28.3	31.6	1575.2	29.8	-30.1
2	1481.6	-26.1	29.6	1497.9	26.8	-29.4
3	1158.4	-19.8	21.7	1174.7	21.5	-19.4
4	1382.6	-42.7	8.6	1396.6	40.7	-10.6
5	1371.6	-5.1	44.8	1385.6	9.6	-40.1
6	1383.3	-46.0	5.0	1397.2	43.4	-7.8
7	1370.9	-1.7	48.4	1384.9	6.8	-42.9
8	1045.6	-39.6	-1.4	1057.2	36.7	-1.6
9	1032.7	4.3	40.9	1044.4	0.4	-35.9
10	1046.3	-43.5	-5.5	1058.0	39.9	1.8
11	1032.0	8.2	45.0	1043.6	-2.8	-39.3

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	1575.2	1575.2 kN
M_{11}	29.8	31.5 kN.m
M_{22}	31.6	31.6 kN.m
N_{max}	2773.8	

Concrete Cover = 25.0 mm

	UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

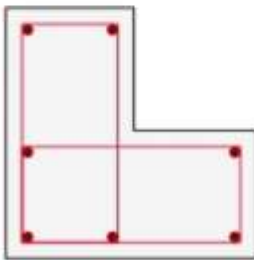
Neutral Axis: 0.0 mm / 0.00 °

Shear		Short Column...		Rebars	
$V_{d(1/2)} =$	0.1 / 1.2 kN	$L_{e1}/b_1 =$	9.1 < 10.0 ✓	As (Req):	%0.40 (min) 616.40 mm ²
$V_{c(1/2)} =$	0.74 / 1.14 N/mm ²	$L_{e2}/b_2 =$	9.0 < 10.0 ✓	As (Sup):	%1.43 2199.12 mm ²
$V_{(1/2)} =$	0.00 / 0.01 N/mm ²	$M_{add(1/2)} =$	0.0 / 0.0 kN.m	7Y20	
Links = T8-225					

2C2 (E1-2) (450/450)

Materials: C35/M5 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

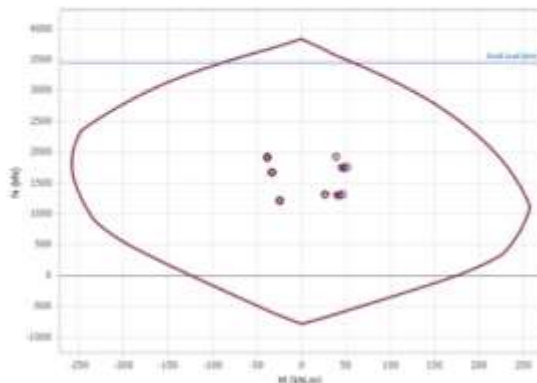
Section



Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1909.4	33.1	35.5	1925.7	-33.0	-35.3
2	1902.1	34.2	34.3	1918.4	-35.0	-34.7
3	1300.8	19.3	22.9	1317.1	-18.2	-22.2
4	1659.6	11.7	12.4	1673.6	-15.4	-16.0
5	1737.1	44.0	47.4	1751.1	-40.1	-43.5
6	1652.4	8.8	8.9	1666.4	-13.2	-13.3
7	1744.4	46.9	50.8	1758.4	-42.3	-46.2
8	1206.3	1.5	1.4	1218.0	-5.9	-5.6
9	1296.7	39.3	42.2	1308.4	-34.7	-37.7
10	1197.9	-1.8	-2.7	1209.5	-3.3	-2.4
11	1305.2	42.6	46.2	1316.8	-37.3	-40.8

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	1925.7	1925.7 kN

		UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)	
Column Reinforcement Design		Calc. By:	
Rev. 1		Checked By:	

M ₁₁	33.1	38.5	38.5 kN.m
M ₂₂	35.5	38.5	38.5 kN.m
N _{max}	2773.8		

Concrete Cover = 25.0 mm

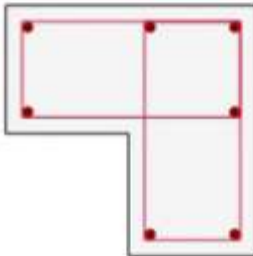
Neutral Axis: 0.0 mm / 0.00 °

Shear		Short Column...		Rebars	
V _{d(1/2)} =	0.1 / 0.5 kN	L _{col} /b ₁ =	9.1 < 10.0 ✓	As (Req):	%0.40 (min) 616.40 mm ²
V _{c(1/2)} =	0.72 / 0.95 N/mm ²	L _{col} /b ₂ =	9.7 < 10.0 ✓	As (Sup):	%1.43 2199.12 mm ²
V _(1/2) =	0.00 / 0.00 N/mm ²	M _{add(1/2)} =	0.0 / 0.0 kN.m	7Y20	
Links = T8-225					

2C3 (A-28) (450/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

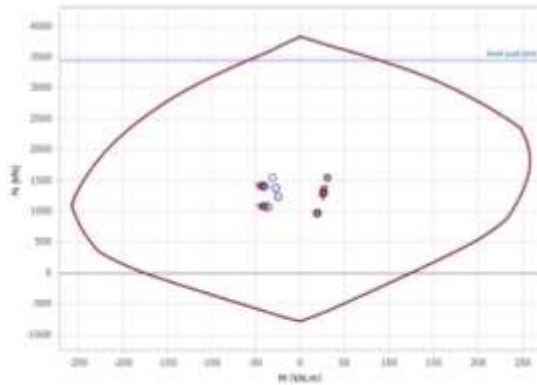


Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1526.5	-27.6	-27.1	1542.8	28.7	24.1
2	1358.5	-23.7	-22.0	1374.8	24.9	20.4
3	1228.6	-21.0	-22.0	1244.9	21.6	18.9
4	1392.4	-43.4	-39.5	1406.4	40.4	33.4
5	1303.3	-3.1	-6.2	1317.3	7.9	7.3
6	1400.6	-47.0	-42.7	1414.6	43.3	36.0
7	1295.0	0.5	-2.9	1309.0	5.0	4.8
8	1070.7	-40.7	-36.4	1082.3	36.8	30.4
9	966.7	6.3	2.4	978.4	-1.1	0.0
10	1080.3	-44.9	-40.2	1091.9	40.2	33.4
11	957.1	10.5	6.2	968.7	-4.5	-3.0

Interaction Diagram

Column Reinforcement Design Rev. 1	UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL) Calc. By: Checked By:
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Critical Loading: 1 - (G+Q)

	Min	Design
N	1542.8	1542.8 kN
M ₁₁	28.7	30.9 kN.m
M ₂₂	-27.1	-30.9 kN.m
N _{Max}	2773.8	

Concrete Cover = 25.0 mm

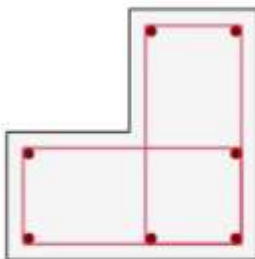
Neutral Axis: 0.0 mm / 0.00 °

Shear		Short Column...		Rebars	
V _{d(12)} =	0.8 / 2.3 kN	L _{e1} /b ₁ =	9.1 < 10.0 ✓	As (Req):	%0.40 (mm) 616.40 mm ²
V _{c(12)} =	1.16 / 1.24 N/mm ²	L _{e2} /b ₂ =	9.0 < 10.0 ✓	As (Sup):	%1.43 2199.12 mm ²
V _{s(12)} =	0.01 / 0.02 N/mm ²	M _{add(12)} =	0.0 / 0.0 kN.m	7Y20	
Links = T8-225					

2C4 (E1-28) (450/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section



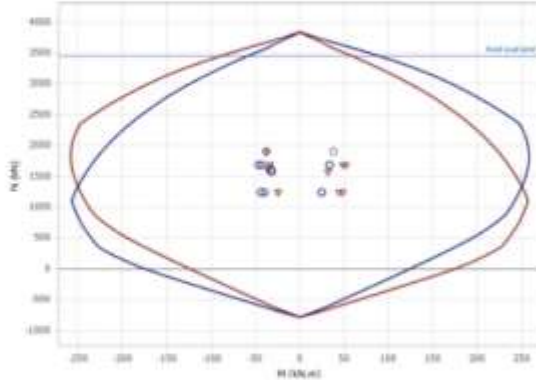
Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1880.9	34.6	-29.3	1897.2	-34.8	27.6
2	1594.9	35.2	-17.2	1611.2	-36.2	14.7
3	1560.3	20.7	-30.0	1576.6	-20.0	29.7
4	1673.4	9.6	-43.4	1687.4	-13.9	38.2
5	1673.3	48.7	-5.9	1687.2	-44.8	8.2
6	1673.8	6.1	-47.1	1687.7	-11.1	41.1
7	1672.9	52.2	-2.3	1686.9	-47.6	5.3
8	1232.4	-1.5	-39.8	1244.1	-3.3	34.4
9	1232.2	44.1	3.9	1243.9	-39.5	-0.7

Column Reinforcement Design		UIN277XCMCWPV (Fenerbahce_Do Not Use COMMERCIAL)				
Rev. 1		Calc. By: Checked By:				

10	1232.8	-5.6	-44.1	1244.5	-0.1	37.8
11	1231.8	48.2	8.2	1243.5	-42.7	-4.1

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	1897.2	1897.2 kN
M ₁₁	-34.8	-37.9 kN.m
M ₂₂	-29.3	-37.9 kN.m
N _{Max}	2773.8	

Concrete Cover = 25.0 mm

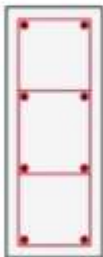
Neutral Axis: 0.0 mm / 0.00 °

Shear		Short Column...		Rebars	
V _{d1(z)} =	1.4 / 0.6 kN	L _{e1} /b ₁ =	9.1 < 10.0 ✓	As (Req):	%0.40 (min) 616.40 mm ²
V _{e1(z)} =	1.40 / 1.01 N/mm ²	L _{e2} /b ₂ =	9.7 < 10.0 ✓	As (Sup):	%1.43 2199.12 mm ²
V _{1(z)} =	0.01 / 0.00 N/mm ²	M _{add1(z)} =	0.0 / 0.0 kN.m	7Y20	
Links = T8-225					

2C5 (A-11) (230/600)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section



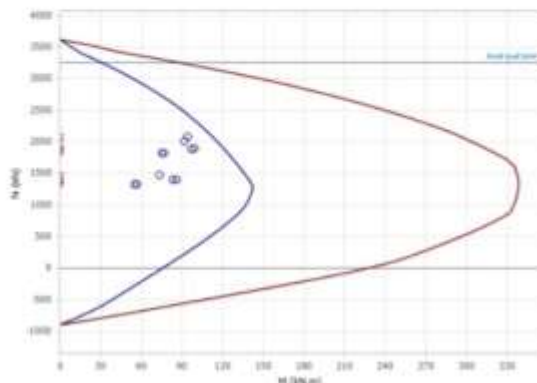
Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	2076.9	-39.6	-50.3	2091.5	46.3	50.6
2	1999.7	-37.0	-47.8	2014.3	42.6	48.9
3	1469.0	-27.5	-32.8	1483.6	32.7	32.3

		UIN277XCMCWPV (Fenerbahce_Do Not Use COMMERCIAL)	
Column Reinforcement Design		Calc. By:	
Rev. 1		Checked By:	

4	1877.3	-54.0	-50.8	1889.8	51.3	50.8
5	1819.4	-12.9	-33.7	1831.9	26.8	34.3
6	1882.6	-57.7	-52.5	1895.1	53.5	52.4
7	1814.1	-9.2	-32.0	1826.6	24.7	32.7
8	1393.4	-48.9	-40.3	1403.8	43.2	40.2
9	1325.8	-0.9	-20.3	1336.2	14.7	20.9
10	1399.6	-53.2	-42.3	1410.0	45.8	42.1
11	1319.6	3.4	-18.3	1330.0	12.1	19.0

Interaction Diagram



Critical Loading: 1 - (G+Q)

		Min	Design
N	2091.5	-	2091.5 kN
M ₁₁	46.3	41.8	0.0 kN.m
M ₂₂	50.6	24.1	93.9 kN.m
N _{Max}	2484.0		

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.337

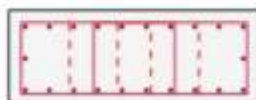
Beta = 0.61

Shear		Slender Column...		Rebars	
V _{d(12)} =	26.8 / 2.8 kN	L _{sl} /b ₁ =	13.8 ≥ 10.0	As (Req):	%1.13 1563.02 mm ²
V _{c(12)} =	1.65 / 1.47 N/mm ²	L _{sl2} /b ₂ =	9.9 < 10.0 ✓	As (Sup):	%1.82 2513.27 mm ²
V _{d(2)} =	0.20 / 0.02 N/mm ²	M _{add(12)} =	0.0 / 33.8 kN.m	8Y20	
Links = T8-225					

2C6 (C-7) (600/230)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section



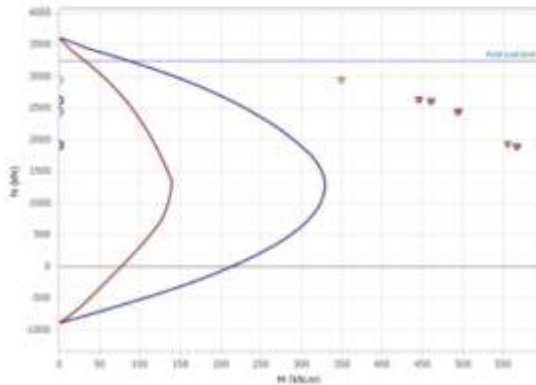
Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
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		UIN277XCMCWPWV (Fenerbahce_Do Not Use COMMERCIAL)	
Column Reinforcement Design		Calc. By:	
Rev. 1		Checked By:	

1	2930.1	0.1	-80.2	2944.7	0.6	87.2
2	2442.2	-0.1	-83.2	2456.8	0.4	88.3
3	2426.9	0.2	-45.7	2441.5	0.5	51.8
4	2600.7	-0.5	-97.4	2613.2	-1.0	97.1
5	2626.6	0.6	-37.5	2639.1	2.0	49.5
6	2598.3	-0.5	-103.2	2610.8	-1.3	101.7
7	2629.0	0.7	-31.7	2641.5	2.2	44.9
8	1892.0	-0.6	-83.7	1902.4	-1.4	80.8
9	1922.3	0.7	-13.8	1932.7	2.1	25.2
10	1889.2	-0.7	-90.5	1899.6	-1.7	86.1
11	1925.1	0.8	-7.0	1935.5	2.4	19.8

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	2944.7	2944.7 kN
M ₁₁	0.6	608.2 kN.m
M ₂₂	87.2	0.0 kN.m
N _{max}	2484.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.000

Beta = 0.00

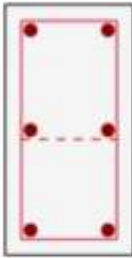
Shear		Slender Column...	Rebars	
V _(1/2) =	0.0 / 0.0 kN	L ₁ /b ₁ =	4.8 < 10.0	✓
v _{c(1/2)} =	0.73 / 0.91 N/mm ²	L ₂ /b ₂ =	54.8 ≥ 10.0	
v _(1/2) =	0.00 / 0.00 N/mm ²	M _{red(1/2)} =	0.0 / 594.6 kN.m	
Links = T8-125			As (Req):	%0.40 (min) 157000.00 mm ²
			As (Sup):	%1.80 2488.14 mm ²
				22Y12

2C7 (A-14) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

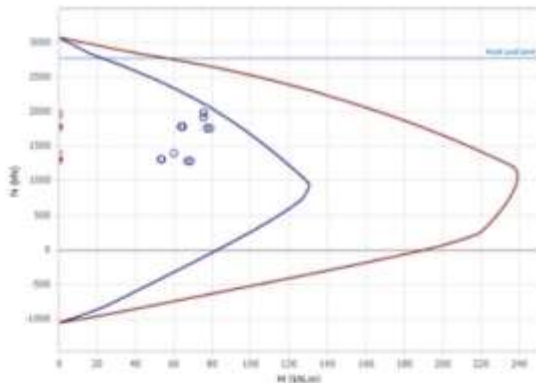
UIN277XCMCWPV (Fenerbahce_Do Not Use COMMERCIAL)	
Column Reinforcement Design Rev. 1	Calc. By: Checked By:



Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1979.3	-30.0	43.4	1990.3	34.2	-44.0
2	1907.9	-26.8	42.1	1918.9	31.0	-43.3
3	1394.6	-22.0	27.4	1405.5	24.7	-27.2
4	1770.7	-41.6	29.0	1780.1	43.1	-29.7
5	1753.0	-9.1	43.9	1762.4	14.7	-44.3
6	1772.2	-44.5	27.6	1781.6	45.6	-28.2
7	1751.6	-6.2	45.4	1761.0	12.2	-45.8
8	1305.4	-37.8	17.5	1313.2	38.0	-18.0
9	1284.7	0.1	34.8	1292.5	4.9	-35.1
10	1307.0	-41.2	15.8	1314.8	40.9	-16.3
11	1283.0	3.5	36.5	1290.8	2.0	-36.7

Interaction Diagram



Critical Loading: 1 - (G+Q)

		Min	Design
N	1990.3	-	1990.3 kN
M ₁₁	34.2	39.8	0.0 kN.m
M ₂₂	-44.0	-22.9	-75.5 kN.m
N _{Max}	1863.0		

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.427

Beta = 0.50

Shear		Slender Column...		Rebars	
V _{Q(1/2)} =	23.3 / 0.5 kN	L _{e1} /b ₁ =	13.1 ≥ 10.0	As (Req):	%2.47 2554.68 mm ²
V _{C(1/2)} =	1.96 / 1.28 N/mm ²	L _{e2} /b ₂ =	8.9 < 10.0 ✓	As (Sup):	%2.85 2945.24 mm ²
V _(1/2) =	0.24 / 0.00 N/mm ²	M _{Max(1/2)} =	0.0 / 22.4 kN.m	6Y25	

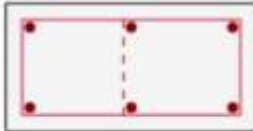
	UIN277XCMCWPWV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

Links = T8-300

2C8 (C1-4) (450/230)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

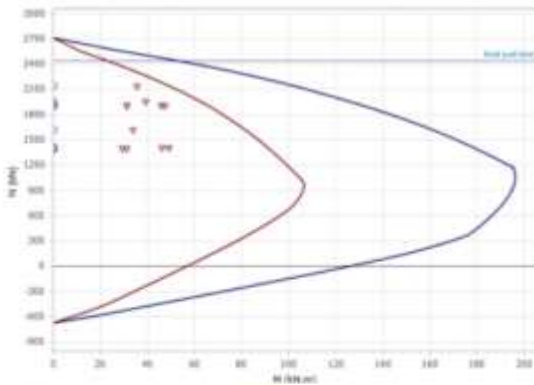
Section



Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	2134.1	-13.6	-18.4	2145.0	14.2	22.0
2	1945.1	-15.0	-20.5	1956.1	15.2	23.5
3	1612.9	-6.7	-9.4	1623.8	7.5	12.1
4	1901.8	-20.8	-30.2	1911.2	21.3	30.9
5	1897.7	-2.0	-0.9	1907.1	2.5	6.2
6	1902.3	-22.5	-33.0	1911.7	23.0	33.3
7	1897.3	-0.3	2.0	1906.6	0.9	3.8
8	1398.4	-19.1	-28.5	1406.2	19.4	28.0
9	1393.6	2.9	5.6	1401.4	-2.4	-0.7
10	1398.9	-21.0	-31.9	1406.8	21.4	30.8
11	1393.1	4.8	9.0	1400.9	-4.4	-3.6

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	2145.0	2145.0 kN
M ₁₁	14.2	35.6 kN.m
M ₂₂	22.0	0.0 kN.m
N _{max}	1863.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N_{bh}F_{cu} = 0.461

Beta = 0.46

Shear

Rebars

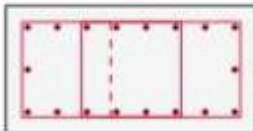
	UIN277XCMCMPWV (Fenerbahçe_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

$V_{d(12)}$ =	0.6 / 13.5 kN	Slender Column ...		A_s (Req):	%1.27	1317.86 mm ²
$V_{c(12)}$ =	1.44 / 1.89 N/mm ²	L_{d1}/b_1 =	8.3 < 10.0 ✓	A_s (Sup):	%1.82	1884.96 mm ²
$V_{l(2)}$ =	0.01 / 0.14 N/mm ²	L_{d2}/b_2 =	11.5 ≥ 10.0			
Links = T8-225		$M_{Add(12)}$ =	0.0 / 12.2 kN.m	6Y20		

2C9 (C-20) (450/230)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

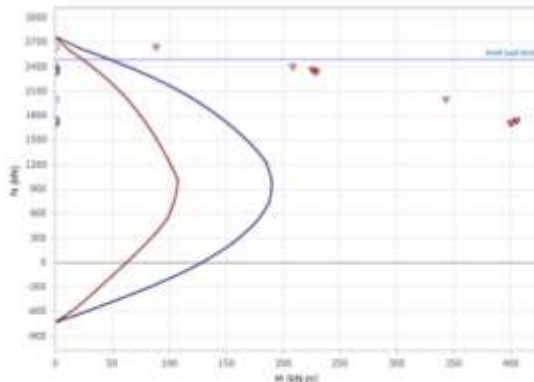
Section



Combinations

No	N_{Top} (kN)	$M_{1 Top}$ (kN.m)	$M_{2 Top}$ (kN.m)	N_{Bot} (kN)	$M_{1 Bot}$ (kN.m)	$M_{2 Bot}$ (kN.m)
1	2634.1	0.0	70.4	2645.1	0.4	-73.1
2	2392.7	-0.1	71.4	2403.6	0.3	-78.3
3	1991.6	0.1	42.8	2002.6	0.3	-40.2
4	2335.1	-0.4	41.6	2344.5	-0.8	-45.7
5	2356.1	0.4	77.2	2365.5	1.5	-77.6
6	2333.2	-0.5	38.0	2342.6	-1.0	-42.6
7	2358.0	0.5	80.7	2367.4	1.7	-80.7
8	1709.7	-0.5	23.0	1717.5	-1.1	-26.8
9	1734.2	0.5	64.5	1742.0	1.6	-63.9
10	1707.5	-0.6	18.8	1715.3	-1.3	-23.1
11	1736.4	0.6	68.6	1744.3	1.8	-67.6

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	2645.1	2645.1 kN
M_{11}	0.4	409.1 kN.m
M_{22}	-73.1	0.0 kN.m
N_{Max}	1863.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

$N/bhF_{cu} = 0.000$

	UIN277XCMCMPWV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

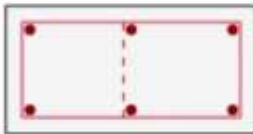
Beta =0.00

Shear $V_{d1(2)} = 0.0 / 0.0$ kN $V_{c1(2)} = 0.76 / 0.94$ N/mm ² $V_{(2)} = 0.00 / 0.00$ N/mm ²	Slender Column... $L_{e1}/b_1 = 6.0 < 10.0$ ✓ $L_{e2}/b_2 = 54.8 \geq 10.0$ $M_{ed1(2)} = 0.0 / 397.3$ kN.m	Rebars A_s (Req): %0.40 (min) 125600.00 mm ² A_s (Sup): %1.97 2035.75 mm ² 18Y12
Links = T8-125		

2C10 (E1-4) (450/230)

Materials: C35/M5 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

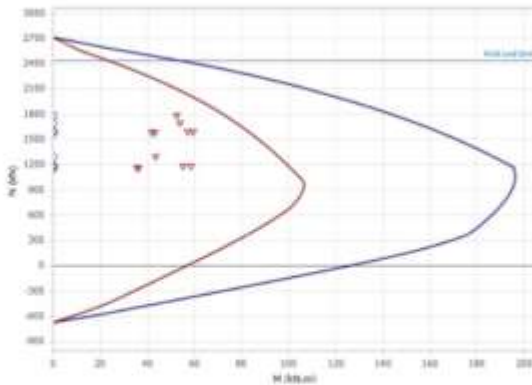
Section



Combinations

No	N_{Top} (kN)	$M_{1 Top}$ (kN.m)	$M_{2 Top}$ (kN.m)	N_{Bot} (kN)	$M_{1 Bot}$ (kN.m)	$M_{2 Bot}$ (kN.m)
1	1774.5	23.4	7.8	1785.5	-23.3	-7.6
2	1687.7	24.0	3.1	1698.7	-24.1	-3.2
3	1281.6	13.4	9.8	1292.5	-13.2	-9.4
4	1571.3	12.6	-18.4	1580.7	-12.8	18.0
5	1581.7	26.6	31.6	1591.1	-26.4	-30.9
6	1570.4	11.4	-23.3	1579.7	-11.6	22.8
7	1582.6	27.9	36.5	1592.0	-27.6	-35.7
8	1160.6	5.9	-24.0	1168.4	-6.1	23.5
9	1172.7	22.2	34.2	1180.5	-21.9	-33.5
10	1159.5	4.4	-29.8	1167.3	-4.7	29.1
11	1173.8	23.6	40.0	1181.6	-23.3	-39.1

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	1785.5	1785.5 kN
M_{11}	23.4	52.4 kN.m
M_{22}	7.8	0.0 kN.m
N_{max}	1863.0	

Concrete Cover = 25.0 mm

	UIN277XCMCWPWV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

(BS8110 - Cl. 3.8.4.5)

$N_{bh}f_{cu} = 0.383$

Beta = 0.55

Shear $V_{d(1/2)} = 25.1 / 14.9$ kN $V_{c(1/2)} = 2.48 / 1.73$ N/mm ² $V_{l(2)} = 0.26 / 0.15$ N/mm ² Links = T8-225	Slender Column... $L_{e1}/b_1 = 6.9 < 10.0$ ✓ $L_{e2}/b_2 = 12.7 \geq 10.0$ $M_{ed(1/2)} = 0.0 / 20.0$ kN.m	Rebars As (Req): %0.77 795.46 mm ² As (Sup): %1.82 1884.96 mm ² 6Y20
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2C11 (A-12) (230/300)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

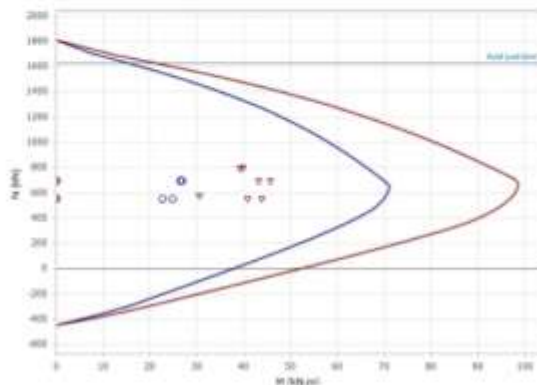
Section



Combinations

No	N_{Top} (kN)	$M_{1 Top}$ (kN.m)	$M_{2 Top}$ (kN.m)	N_{Bot} (kN)	$M_{1 Bot}$ (kN.m)	$M_{2 Bot}$ (kN.m)
1	794.6	-11.8	3.4	801.9	12.8	-3.6
2	790.4	-11.2	3.6	797.7	12.1	-3.7
3	571.8	-9.1	2.0	579.1	9.8	-2.1
4	691.4	-18.4	-2.5	697.6	19.0	2.4
5	691.6	-1.8	8.3	697.8	2.9	-8.4
6	691.2	-19.9	-3.5	697.4	20.5	3.5
7	691.8	-0.4	9.3	698.0	1.5	-9.4
8	548.6	-18.1	-4.1	553.9	18.5	4.1
9	548.9	1.2	8.4	554.1	-0.3	-8.5
10	548.4	-19.8	-5.4	553.7	20.2	5.3
11	549.1	2.9	9.7	554.3	-2.0	-9.7

Interaction Diagram



	UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

Critical Loading: 1 - (G+Q)

		Min	Design
N	801.9	-	801.9 kN
M ₁₁	12.8	12.0	39.8 kN.m
M ₂₂	-3.6	-9.2	0.0 kN.m
N _{Max}	1242.0		

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.258

Beta = 0.70

Shear		Slender Column...		Rebars		
V _{Ed1(2)} =	6.2 / 0.5 kN	L _{Ed1} /b ₁ =	11.6 ≥ 10.0	As (Req):	%0.40 (min)	276.00 mm ²
V _{Ed1(2)} =	1.50 / 1.32 N/mm ²	L _{Ed2} /b ₂ =	10.0 ≥ 10.0	As (Sup):	%1.82	1256.64 mm ²
V _{Ed2} =	0.09 / 0.01 N/mm ²	M _{Ed1(2)} =	12.2 / 11.8 kN.m	4Y20		
Links = T8-225						

2C12 (A-13) (230/300)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

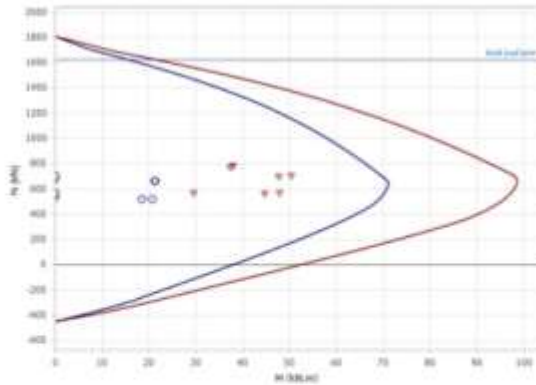


Combinations

No	N _{Top} (kN)	M _{11 Top} (kN.m)	M _{22 Top} (kN.m)	N _{Bot} (kN)	M _{11 Bot} (kN.m)	M _{22 Bot} (kN.m)
1	780.6	-11.6	-1.9	787.9	12.6	1.9
2	771.7	-11.1	-1.8	779.0	12.0	1.8
3	567.4	-8.9	-1.4	574.7	9.7	1.4
4	697.1	-18.2	-7.0	703.4	18.9	7.0
5	660.7	-1.7	-3.8	666.9	2.8	-3.8
6	700.5	-19.7	-8.1	706.8	20.3	8.1
7	657.3	-0.2	4.8	663.5	1.4	-4.8
8	561.0	-18.0	-7.5	566.2	18.4	7.5
9	518.4	1.3	5.0	523.6	-0.4	-5.1
10	564.9	-19.7	-8.7	570.2	20.1	8.7
11	514.5	3.0	6.3	519.7	-2.0	-6.3

Interaction Diagram

UIN277XCMCWPWV (Fenerbahce_Do Not Use COMMERCIAL)	
Column Reinforcement Design Rev. 1	Calc. By: Checked By:



Critical Loading: 1 - (G+Q)

		Min	Design
N	787.9	-	787.9 kN
M ₁₁	12.6	11.8	38.0 kN.m
M ₂₂	-1.9	-9.1	0.0 kN.m
N _{Max}	1242.0		

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.254

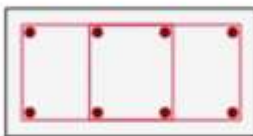
Beta = 0.71

Shear		Slender Column...		Rebars	
V _{d(1/2)} =	4.0 / 0.5 kN	L _{e1} /b ₁ =	11.6 ≥ 10.0	As (Req):	%0.40 _{min} 276.00 mm ²
V _{c(1/2)} =	1.46 / 1.32 N/mm ²	L _{e2} /b ₂ =	10.0 ≥ 10.0	As (Sup):	%1.82 1256.64 mm ²
V _{t(2)} =	0.06 / 0.01 N/mm ²	M _{red(1/2)} =	12.1 / 11.8 kN.m	4Y20	
Links = T8-225					

2C13 (A-8) (450/230)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

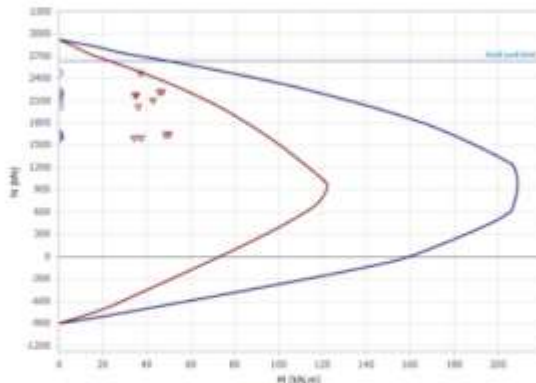


Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	2465.5	-13.5	28.7	2476.5	14.4	-31.2
2	2012.6	-6.0	43.1	2023.6	7.0	-46.1
3	2096.7	-15.5	2.2	2107.6	16.0	-3.3
4	2211.6	-19.9	3.9	2221.0	20.5	-7.5
5	2174.6	-2.8	44.1	2184.0	3.7	-44.8
6	2214.9	-21.4	0.0	2224.3	22.0	-3.9
7	2171.3	-1.3	48.1	2180.6	2.2	-48.4
8	1637.6	-18.0	-6.8	1645.4	18.4	3.5
9	1594.5	1.9	40.1	1602.3	-1.3	-39.9
10	1641.5	-19.7	-11.4	1649.3	20.1	7.8
11	1590.6	3.7	44.7	1598.4	-3.0	-44.2

	UIN277XCMCWPWV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	2476.5	2476.5 kN
M ₁₁	14.4	37.2 kN.m
M ₂₂	-31.2	0.0 kN.m
N _{max}	1863.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

NbhF_{cu} = 0.532

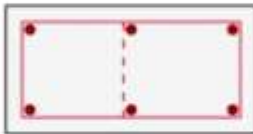
Beta = 0.38

Shear	Slender Column...	Rebars
V _{Ed(1/2)} = 1.2 / 1.0 kN	L _{e1} /b ₁ = 7.5 < 10.0 ✓	As (Req): %2.40 2480.45 mm ²
V _{c(1/2)} = 2.47 / 1.93 N/mm ²	L _{e2} /b ₂ = 12.4 ≥ 10.0	As (Sup): %2.43 2513.27 mm ²
V _{t(2)} = 0.01 / 0.01 N/mm ²	M _{Ed(1/2)} = 0.0 / 11.4 kN.m	8Y20
Links = T8-225		

2C14 (A-4) (450/230)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section



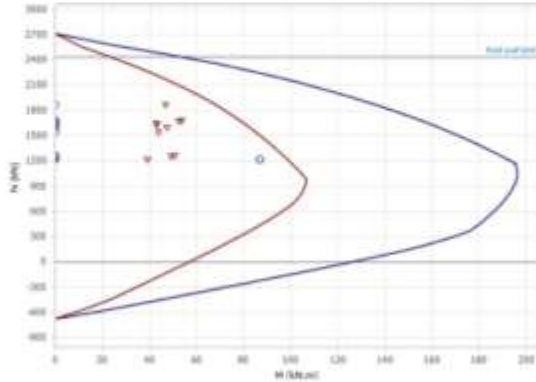
Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1865.0	-19.5	31.6	1875.9	19.4	-28.2
2	1589.8	-18.1	15.4	1600.8	18.0	-12.7
3	1536.3	-13.1	35.5	1547.2	13.0	-32.8
4	1670.3	-23.6	3.0	1679.7	23.4	-0.9
5	1635.8	-9.1	50.2	1645.2	9.2	-46.6
6	1673.4	-24.9	-1.7	1682.8	24.7	3.6
7	1632.7	-7.8	54.8	1642.0	7.9	-51.1

		UIN277XCMCWPV (Fenerbahce_Do Not Use COMMERCIAL)				
Column Reinforcement Design		Calc. By:				
Rev. 1		Checked By:				

8	1253.2	-20.2	-8.2	1261.0	20.0	9.3
9	1212.9	-3.3	47.0	1220.8	3.4	-44.0
10	1256.8	-21.7	-13.6	1264.7	21.4	14.6
11	1209.3	-1.8	52.4	1217.1	1.9	-49.3

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	1875.9	-
M ₁₁	-19.5	-21.6
M ₂₂	31.6	37.5
N _{max}	1863.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.403

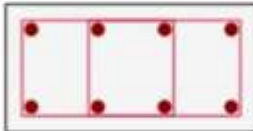
Beta = 0.53

Shear		Slender Column...		Rebars	
V _{q(1 2)} =	32.3 / 13.7 kN	L _{e1} /b ₁ =	7.2 < 10.0 ✓	As (Req):	%0.77
V _{c(1 2)} =	2.50 / 1.79 N/mm ²	L _{e2} /b ₂ =	12.4 ≥ 10.0	As (Sup):	%1.82
V _{s(1 2)} =	0.33 / 0.14 N/mm ²	M _{add(1 2)} =	18.2 / 0.0 kN.m		801.56 mm ²
Links = T8-225					1884.96 mm ²
				6Y20	

2C15 (A-19) (450/230)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section



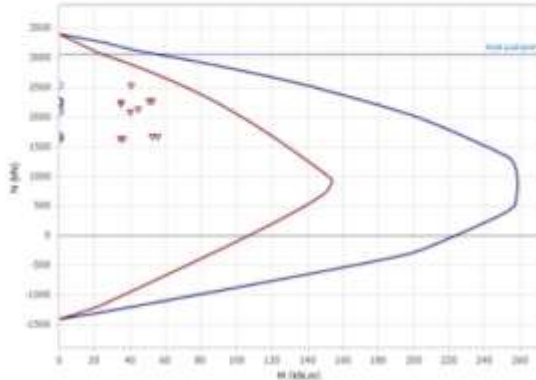
Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	2523.2	-13.7	-27.3	2534.2	14.6	28.7
2	2081.3	-8.3	-41.9	2092.2	9.2	43.3

		UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)	
Column Reinforcement Design		Calc. By:	
Rev. 1		Checked By:	

3	2123.9	-13.6	-1.2	2134.9	14.0	2.1
4	2257.3	-20.7	-43.0	2266.7	21.3	42.6
5	2231.6	-2.3	-2.7	2241.0	3.1	5.4
6	2259.5	-22.3	-46.9	2268.9	23.0	46.2
7	2229.4	-0.7	1.2	2238.7	1.5	1.8
8	1668.8	-18.8	-39.3	1676.7	19.3	38.3
9	1638.8	2.6	7.6	1646.6	-2.0	-5.0
10	1671.4	-20.7	-43.9	1679.3	21.2	42.6
11	1636.2	4.5	12.2	1644.0	-3.9	-9.3

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	2534.2	2534.2 kN
M ₁₁	14.6	40.6 kN.m
M ₂₂	28.7	0.0 kN.m
N _{max}	1863.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

$N/bhF_{cu} = 0.544$

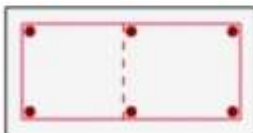
Beta = 0.37

Shear		Slender Column...		Rebars	
$V_{d(1/2)} =$	0.2 / 13.3 kN	$L_{e1}/b_1 =$	7.5 < 10.0 ✓	As (Req):	%2.61 2700.71 mm ²
$V_{c(1/2)} =$	1.48 / 2.32 N/mm ²	$L_{e2}/b_2 =$	12.4 ≥ 10.0	As (Sup):	%3.79 3926.99 mm ²
$V_{(1/2)} =$	0.00 / 0.14 N/mm ²	$M_{add(1/2)} =$	0.0 / 17.5 kN.m	8Y25	
Links = T8-300					

2C16 (A-24) (450/230)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

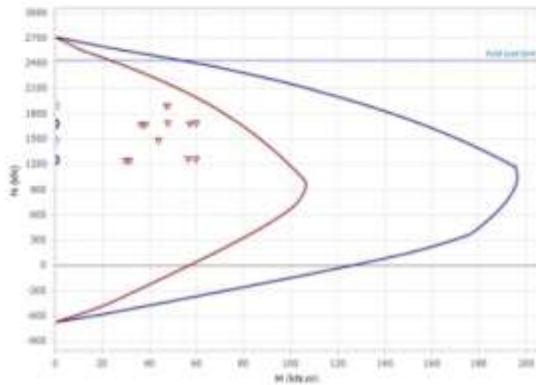


Combinations

	UIN277XCMCWPWV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1887.2	-20.6	-24.1	1898.1	20.1	20.1
2	1477.9	-14.2	-6.5	1488.8	13.6	3.0
3	1685.1	-18.9	-32.5	1696.0	18.6	29.6
4	1680.6	-25.6	-43.6	1690.0	24.9	39.5
5	1665.0	-9.1	3.0	1674.4	8.8	-5.6
6	1681.9	-27.1	-48.2	1691.2	26.4	43.9
7	1663.7	-7.6	7.6	1673.1	7.4	-10.0
8	1256.7	-22.1	-42.1	1264.5	21.5	38.7
9	1238.5	-2.8	12.3	1246.4	2.8	-13.8
10	1258.2	-23.8	-47.4	1266.0	23.2	43.9
11	1237.0	-1.1	17.6	1244.9	1.1	-19.0

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	1898.1	1898.1 kN
M ₁₁	-20.6	-21.8 kN.m
M ₂₂	-24.1	0.0 kN.m
N _{max}	1863.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.408

Beta = 0.52

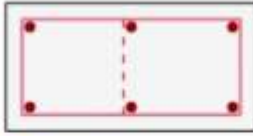
Shear		Slender Column...	Rebars	
V _{Q(1/2)} =	29.0 / 14.9 kN	L ₁ /b ₁ =	7.2 < 10.0	✓
V _{C(1/2)} =	2.56 / 1.78 N/mm ²	L ₂ /b ₂ =	12.4 ≥ 10.0	
V _(1/2) =	0.29 / 0.15 N/mm ²	M _{As(1/2)} =	17.9 / 0.0 kN.m	
Links = T8-225			As (Req):	%0.90 927.82 mm ²
			As (Sup):	%1.82 1884.96 mm ²
			6Y20	

2C17 (E1-20) (450/230)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

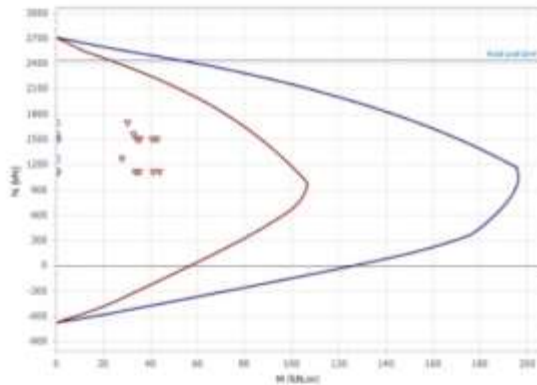
		UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design	Rev. 1	Calc. By: Checked By:



Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1690.0	1.6	37.9	1701.0	-0.4	-40.0
2	1557.2	3.8	37.7	1568.2	-2.5	-40.4
3	1270.6	-1.4	24.0	1281.5	2.0	-24.7
4	1504.1	-6.4	16.0	1513.5	7.6	-20.0
5	1500.3	9.0	48.1	1509.7	-8.2	-47.5
6	1504.2	-7.8	12.8	1513.6	9.0	-17.2
7	1500.2	10.4	51.2	1509.6	-9.6	-50.2
8	1111.9	-8.1	5.1	1119.7	9.0	-9.0
9	1107.4	9.9	42.6	1115.2	-9.4	-41.2
10	1111.9	-9.7	1.4	1119.8	10.6	-5.9
11	1107.3	11.5	46.3	1115.1	-11.0	-44.3

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	1701.0	1701.0 kN
M ₁₁	1.6	30.1 kN.m
M ₂₂	-40.0	0.0 kN.m
N _{Max}	1863.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

$N_{bh}f_{cu} = 0.365$

Beta = 0.57

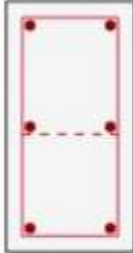
Shear		Slender Column...	Rebars	
$V_{d(12)}$ =	2.3 / 7.1 kN	$L_{e1}/b_1 =$	As (Req):	%0.40 (mm) 414.00 mm ²
$V_{c(12)}$ =	1.78 / 1.67 N/mm ²	$L_{e1}/b_1 =$	As (Sup):	%1.82 1884.96 mm ²
$V_{t(12)}$ =	0.02 / 0.07 N/mm ²	$L_{e2}/b_2 =$	6Y20	
Links = T8-225		$M_{Add(12)} =$	0.0 / 17.0 kN.m	

2C18 (B-2) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

	UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

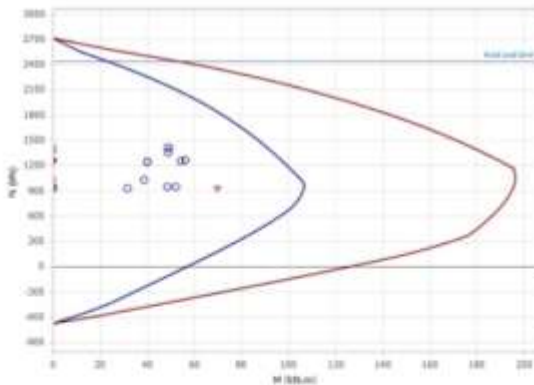
Section



Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1410.0	-6.3	20.0	1421.0	4.7	-18.9
2	1348.5	-2.5	19.2	1359.5	0.5	-18.6
3	1024.3	-7.5	12.9	1035.3	6.9	-11.7
4	1244.2	-31.9	8.7	1253.6	30.3	-7.8
5	1252.8	21.3	24.9	1262.2	-22.5	-23.9
6	1243.2	-36.7	7.1	1252.6	35.0	-6.3
7	1253.8	26.1	26.5	1263.2	-27.2	-25.5
8	929.6	-34.7	2.7	937.4	33.4	-2.1
9	939.6	27.4	21.6	947.5	-28.1	-20.8
10	928.4	-40.3	0.8	936.2	38.9	-0.3
11	940.8	32.9	23.4	948.6	-33.6	-22.7

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	1421.0	-
M ₁₁	-6.3	-28.4
M ₂₂	20.0	16.3
N _{max}	1863.0	1421.0 kN
		0.0 kN.m
		49.6 kN.m

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.305

Beta = 0.64

Shear			Rebars	
V _{Q1/Q2} =	0.3 / 25.1 kN	Slender Column...	A _s (Req):	%0.40 (min) 414.00 mm ²

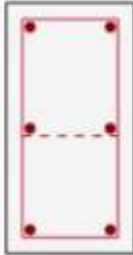
	UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

$V_{c(1/2)}$ =	1.35 / 2.11 N/mm ²	L_{e1}/b_1 =	12.5 \geq 10.0	A_s (Sup) =	%1.82	1884.96 mm ²
$V_{1(2)}$ =	0.00 / 0.26 N/mm ²	L_{e2}/b_2 =	6.4 < 10.0 ✓			
Links = T8-225		$M_{Add(1/2)}$ =	0.0 / 21.2 kN.m	6Y20		

2C19 (C1-2) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

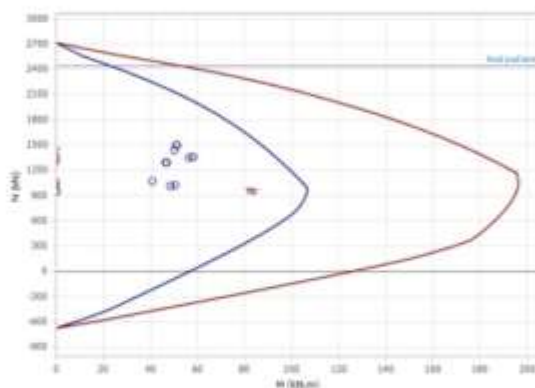
Section



Combinations

No	N_{Top} (kN)	$M_{1 Top}$ (kN.m)	$M_{2 Top}$ (kN.m)	N_{Bot} (kN)	$M_{1 Bot}$ (kN.m)	$M_{2 Bot}$ (kN.m)
1	1485.1	-29.4	21.7	1496.0	30.6	-21.1
2	1435.4	-27.4	20.5	1446.4	28.2	-20.1
3	1059.6	-19.7	14.4	1070.5	21.0	-13.8
4	1290.3	-50.5	9.7	1299.7	51.2	-9.1
5	1342.5	1.1	26.8	1351.9	0.3	-26.4
6	1285.4	-55.1	8.1	1294.8	55.7	-7.4
7	1347.3	5.7	28.5	1356.7	-4.3	-28.0
8	951.3	-47.9	3.2	959.1	48.2	-2.7
9	1012.2	12.3	23.1	1020.0	-11.2	-22.8
10	945.6	-53.2	1.3	953.5	53.5	-0.8
11	1017.9	17.7	25.1	1025.7	-16.4	-24.8

Interaction Diagram



Critical Loading: 7 - (G-Wy+Q)

	Min	Design
N	1356.7	1356.7 kN
M_{11}	5.7	0.0 kN.m
M_{12}	28.5	58.0 kN.m
N_{Max}	1863.0	

	UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

$N/bhF_{cu} = 0.291$

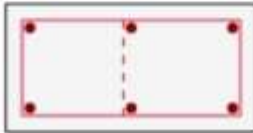
Beta = 0.66

Shear $V_{d(1/2)} = 15.8 / 0.3$ kN $v_{c(1/2)} = 1.63 / 1.50$ N/mm ² $v_{t(1/2)} = 0.16 / 0.00$ N/mm ² Links = T8-225	Slender Column... $L_{e1}/b_1 = 12.5 \geq 10.0$ $L_{e2}/b_2 = 6.4 < 10.0$ ✓ $M_{ed(1/2)} = 0.0 / 21.2$ kN.m	Rebars A_s (Req): %0.40 (min) 414.00 mm ² A_s (Sup): %1.82 1884.96 mm ²
		6Y20

2C20 (E1-7) (450/230)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

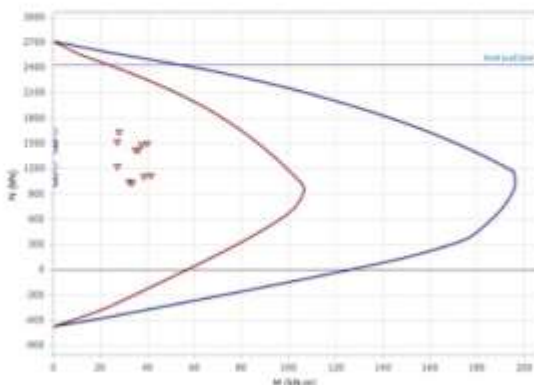
Section



Combinations

No	N_{Top} (kN)	$M_{1 Top}$ (kN.m)	$M_{2 Top}$ (kN.m)	N_{Bot} (kN)	$M_{1 Bot}$ (kN.m)	$M_{2 Bot}$ (kN.m)
1	1631.9	1.2	-28.7	1642.8	0.0	29.4
2	1510.6	0.2	-25.4	1521.6	0.6	25.7
3	1219.6	1.6	-21.4	1230.5	-0.5	22.3
4	1481.8	-6.3	-42.1	1491.2	7.4	41.1
5	1420.5	8.2	-6.3	1429.9	-7.4	8.6
6	1487.5	-7.6	-45.6	1496.9	8.8	44.3
7	1414.8	9.5	-2.8	1424.2	-8.7	5.4
8	1106.1	-7.9	-39.0	1113.9	8.7	37.5
9	1034.5	9.1	2.8	1042.4	-8.5	-0.4
10	1112.8	-9.4	-43.1	1120.6	10.3	41.2
11	1027.9	10.6	6.9	1035.7	-10.1	-4.1

Interaction Diagram



Critical Loading: 1 - (G+Q)

Min Design

		UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design	Rev. 1	Calc. By: Checked By:

N	1642.8	-	1642.8	kN
M ₁₁	1.2	18.9	27.7	kN.m
M ₂₂	29.4	32.9	0.0	kN.m
N _{max}	1863.0			

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.353

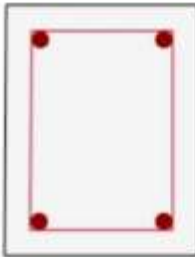
Beta = 0.59

Shear		Slender Column...		Rebars	
V _{u1(2)} =	1.0 / 0.1 kN	L _{u1} /b ₁ =	8.0 < 10.0 ✓	As (Req):	%0.40 (min) 414.00 mm ²
V _{c1(2)} =	1.63 / 1.28 N/mm ²	L _{u2} /b ₂ =	11.5 ≥ 10.0	As (Sup):	%1.82 1884.96 mm ²
V _{l(2)} =	0.01 / 0.00 N/mm ²	M _{u1(1/2)} =	0.0 / 17.4 kN.m	6Y20	
Links = T8-225					

2C21 (F1-5) (Polyline)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

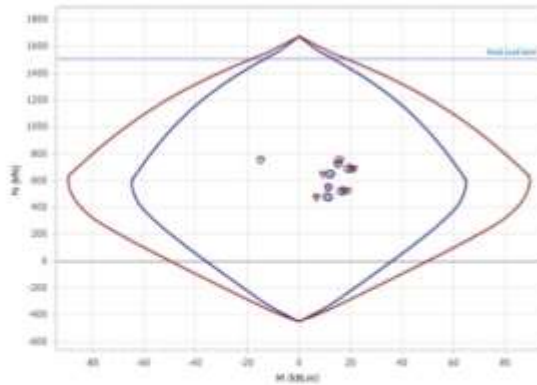


Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	751.4	16.4	4.4	758.0	-14.5	-3.9
2	719.3	14.6	4.3	725.9	-13.0	-3.8
3	546.5	11.8	2.7	553.1	-10.4	-2.4
4	647.0	7.1	-1.1	652.7	-5.4	1.5
5	684.0	20.4	8.4	689.7	-19.1	-8.0
6	643.6	5.9	-2.0	649.3	-4.1	2.5
7	687.5	21.6	9.3	693.1	-20.3	-8.9
8	476.0	2.3	-2.9	480.7	-0.9	3.3
9	519.1	17.8	8.1	523.9	-16.9	-7.9
10	472.0	0.9	-4.0	476.7	0.5	4.3
11	523.1	19.2	9.2	527.8	-18.3	-9.0

Interaction Diagram

UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)	
Column Reinforcement Design Rev. 1	Calc. By: Checked By:



Critical Loading: 1 - (G+Q)

		Min	Design
N	758.0	-	758.0 kN
M ₁₁	16.4	10.8	16.4 kN.m
M ₂₂	4.4	8.3	14.9 kN.m
N _{Max}	1122.0		

Concrete Cover = 25.0 mm

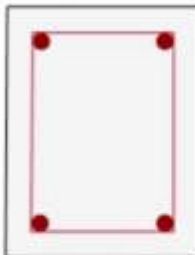
Neutral Axis: 0.0 mm / 0.00°

Shear		Slender Column...		Rebars	
V _{d(12)} =	2.7 / 0.1 kN	L _{e1} /b ₁ =	11.9 ≥ 10.0	As (Req):	%0.40 (mm) 249.33 mm ²
V _{c(12)} =	1.42 / 1.00 N/mm ²	L _{e2} /b ₂ =	9.3 < 10.0 ✓	As (Sup):	%2.02 1256.64 mm ²
V _{l(2)} =	0.04 / 0.00 N/mm ²	M _{add(12)} =	10.6 / 0.0 kN.m	4Y20	
Links = T8-225					

2C22 (F1-7) (Polyline)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section



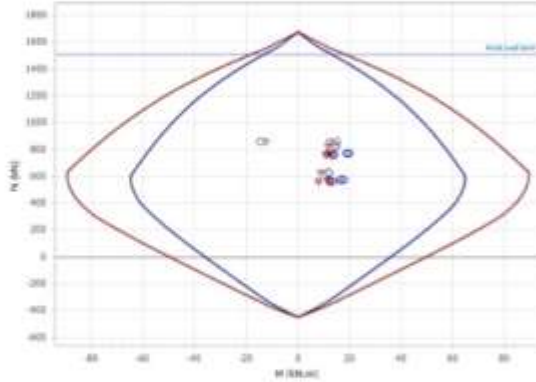
Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	857.9	5.6	3.8	864.5	-4.5	-3.2
2	820.7	4.7	3.7	827.3	-4.0	-3.2
3	619.1	4.2	2.3	625.7	-3.2	-2.0
4	756.1	-2.2	-1.6	761.7	3.2	2.1
5	767.2	11.5	7.9	772.9	-10.7	-7.5
6	755.2	-3.4	-2.5	760.9	4.4	3.0
7	768.1	12.7	8.8	773.7	-12.0	-8.4
8	558.4	-4.7	-3.3	563.1	5.5	3.7
9	571.5	11.3	7.7	576.2	-10.8	-7.5

Column Reinforcement Design Rev. 1		UIN277XCMCWPWV (Fenerbahce_Do Not Use COMMERCIAL) Calc. By: Checked By:				
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10	557.4	-6.1	-4.4	562.2	6.9	4.8
11	572.4	12.7	8.8	577.1	-12.3	-8.6

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	864.5	864.5 kN
M ₁₁	5.6	12.3 kN.m
M ₂₂	3.8	13.4 kN.m
N _{max}	1122.0	

Concrete Cover = 25.0 mm

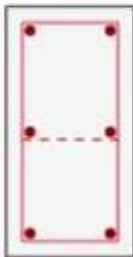
Neutral Axis: 0.0 mm / 0.00 °

Shear		Slender Column...		Rebars	
V _{d(1/2)} =	5.5 / 7.9 kN	L _{e1} /b ₁ =	11.9 ≥ 10.0	As (Req):	%0.40 (min) 249.33 mm ²
V _{e(1/2)} =	1.53 / 1.69 N/mm ²	L _{e2} /b ₂ =	9.3 < 10.0 ✓	As (Sup):	%2.02 1256.64 mm ²
V _{i(2)} =	0.09 / 0.13 N/mm ²	M _{ed(1/2)} =	9.6 / 0.0 kN.m	4Y20	
Links = T8-225					

2C23 (F-9) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section



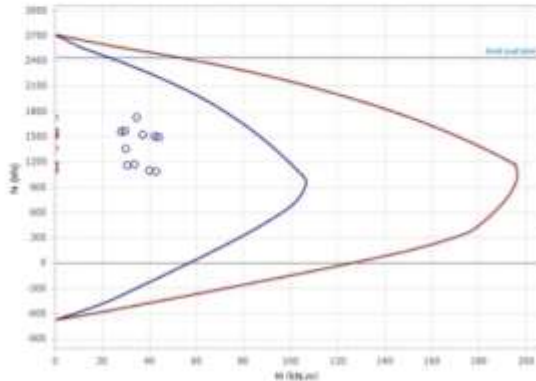
Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1717.5	-0.7	-8.5	1728.5	3.0	8.3
2	1519.0	-2.6	-10.5	1529.9	3.3	10.2
3	1352.4	1.5	-2.9	1363.3	1.5	3.0

		UIN277XCMCWPV (Fenerbahce_Do Not Use COMMERCIAL)	
Column Reinforcement Design		Calc. By:	
Rev. 1		Checked By:	

4	1496.5	-20.8	-15.4	1505.9	21.8	15.1
5	1559.0	19.6	1.2	1568.4	-16.8	-1.2
6	1490.9	-24.4	-17.0	1500.3	25.3	16.7
7	1564.7	23.2	2.8	1574.0	-20.2	-2.8
8	1089.2	-24.0	-14.6	1097.0	24.4	14.3
9	1162.1	23.1	4.7	1169.9	-20.7	-4.6
10	1082.6	-28.2	-16.5	1090.5	28.4	16.2
11	1168.7	27.3	6.6	1176.5	-24.7	-6.5

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	1728.5	-
M ₁₁	3.0	34.6
M ₂₂	-8.5	-19.9
N _{max}	1863.0	-

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.371

Beta = 0.56

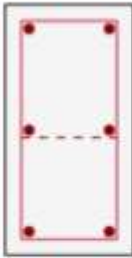
Shear		Slender Column		Rebars	
V _{d(12)} =	10.4 / 0.0 kN	L ₁₁ /b ₁ =	11.6 ≥ 10.0	As (Req):	%0.40 (min) 414.00 mm ²
V _{c(12)} =	1.67 / 0.76 N/mm ²	L ₂₂ /b ₂ =	6.8 < 10.0 ✓	As (Sup):	%1.82 1884.96 mm ²
V _{d(2)} =	0.11 / 0.00 N/mm ²	M _{add(12)} =	0.0 / 17.2 kN.m	6Y20	
Links = T8-225					

2C24 (B-28) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

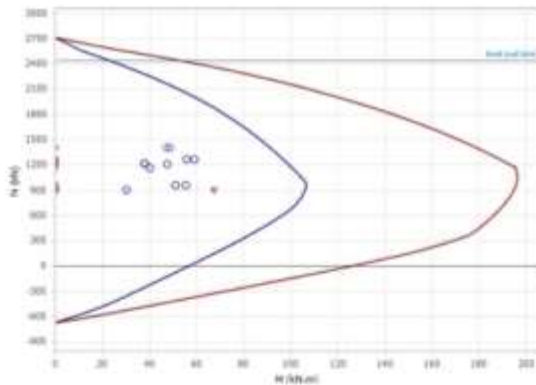
UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)	
Column Reinforcement Design Rev. 1	Calc. By: Checked By:



Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1394.7	-4.5	-19.0	1405.6	2.7	17.5
2	1150.8	-0.2	-11.9	1161.7	-1.3	10.5
3	1197.1	-6.8	-18.7	1208.1	5.5	17.6
4	1256.0	-33.8	-24.0	1265.4	32.0	22.6
5	1213.1	26.3	-8.0	1222.5	-27.4	6.8
6	1260.1	-39.1	-25.6	1269.5	37.3	24.2
7	1209.1	31.6	-6.4	1218.5	-32.7	5.2
8	950.1	-37.5	-21.0	957.9	36.1	19.9
9	900.0	32.5	-2.3	907.9	-33.2	1.4
10	954.8	-43.8	-22.8	962.7	42.3	21.8
11	895.3	38.7	-0.5	903.2	-39.4	-0.4

Interaction Diagram



Critical Loading: 1 - (G+Q)

		Min	Design
N	1405.6	-	1405.6 kN
M ₁₁	-4.5	-28.1	0.0 kN.m
M ₂₂	-19.0	-16.2	-48.6 kN.m
N _{max}	1863.0		

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.302

Beta = 0.65

Shear		Slender Column...		Rebars	
V _{Q(12)} =	0.0 / 0.4 kN	L _{e1} /b ₁ =	12.5 ≥ 10.0	As (Req):	%0.40 (min) 414.00 mm ²
V _{C(12)} =	0.96 / 1.49 N/mm ²	L _{e2} /b ₂ =	6.4 < 10.0 ✓	As (Sup):	%1.82 1884.96 mm ²
V ₍₁₂₎ =	0.00 / 0.00 N/mm ²	M _{Ed(12)} =	0.0 / 21.2 kN.m	6Y20	

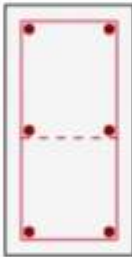
	UIN277XCMCWPWV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

Links = T8-225

2C25 (E-10) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

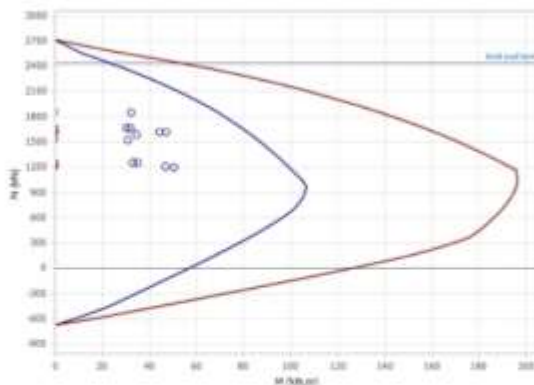
Section



Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1845.8	18.8	6.7	1856.7	-16.2	-7.0
2	1512.9	11.4	3.7	1523.9	-9.7	-3.9
3	1585.1	19.3	7.6	1596.1	-17.0	-7.8
4	1653.5	-8.1	-3.6	1662.9	9.7	3.4
5	1614.3	39.9	15.1	1623.7	-37.2	-15.3
6	1657.1	-12.4	-5.5	1666.5	13.9	5.2
7	1610.7	44.2	16.9	1620.1	-41.3	-17.2
8	1247.1	-16.1	-6.3	1254.9	16.9	6.2
9	1201.3	40.0	15.5	1209.1	-37.7	-15.6
10	1251.2	-21.1	-8.5	1259.1	21.8	8.3
11	1197.1	45.0	17.6	1205.0	-42.6	-17.8

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	1856.7	1856.7 kN
M ₁₁	18.8	37.1 0.0 kN.m
M ₂₂	-7.0	-21.4 -32.3 kN.m
N _{max}	1863.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

	UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

$N_{bh}F_{cu} = 0.399$

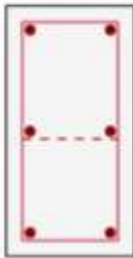
Beta = 0.53

Shear $V_{d(1/2)} = 11.2 / 27.8$ kN $V_c(1/2) = 1.75 / 2.49$ N/mm ² $V_d(1/2) = 0.11 / 0.28$ N/mm ²	Slender Column... $L_{d1}/b_1 = 11.6 \geq 10.0$ $L_{d2}/b_2 = 6.6 < 10.0$ ✓ $M_{Add(1/2)} = 0.0 / 16.2$ kN.m	Rebars	
		As (Req): %0.40 (min)	414.00 mm ²
Links = T8-225		As (Sup): %1.82	1884.96 mm ²
		6Y20	

2C26 (F1-10) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

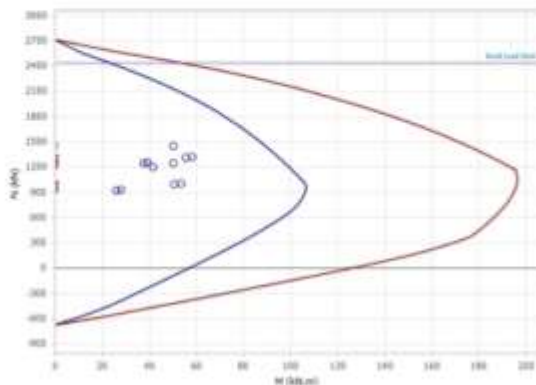
Section



Combinations

No	N_{Top} (kN)	$M_{1 Top}$ (kN.m)	$M_{2 Top}$ (kN.m)	N_{Bot} (kN)	$M_{1 Bot}$ (kN.m)	$M_{2 Bot}$ (kN.m)
1	1442.0	14.2	18.6	1453.0	-10.2	-19.4
2	1241.8	9.7	19.2	1252.7	-7.2	-20.0
3	1187.5	13.4	11.2	1198.5	-9.4	-11.8
4	1244.9	-6.5	8.1	1254.3	8.7	-9.0
5	1305.2	30.4	23.3	1314.6	-25.9	-23.9
6	1239.5	-9.7	6.6	1248.9	11.8	-7.6
7	1310.6	33.7	24.8	1320.0	-29.0	-25.3
8	923.9	-12.6	2.9	931.7	13.8	-3.7
9	994.2	30.4	20.7	1002.1	-26.6	-21.0
10	917.6	-16.4	1.2	925.4	17.4	-2.0
11	1000.5	34.2	22.4	1008.4	-30.1	-22.7

Interaction Diagram



Critical Loading: 1 - (G+Q)

	UIN277XCMCWPV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

	Min	Design
N	1453.0	- 1453.0 kN
M ₁₁	14.2	29.1 0.0 kN.m
M ₂₂	-19.4	-16.7 -50.2 kN.m
N _{max}	1863.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.312

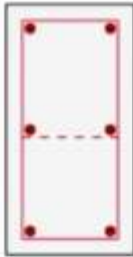
Beta = 0.64

Shear		Slender Column...		Rebars	
V _{d(1/2)} =	1.0 / 20.4 kN	L _{e1} /b ₁ =	12.8 ≥ 10.0	As (Req):	%0.40 (min) 414.00 mm ²
V _{c(1/2)} =	1.44 / 2.15 N/mm ²	L _{e2} /b ₂ =	7.1 < 10.0 ✓	As (Sup):	%1.82 1884.96 mm ²
V _{t(1/2)} =	0.01 / 0.21 N/mm ²	M _{add(1/2)} =	0.0 / 22.2 kN.m	6Y20	
Links = T8-225					

2C27 (F1-15) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

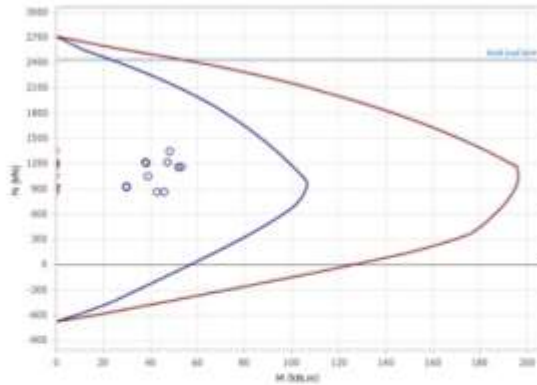


Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1336.1	8.6	-17.1	1347.1	-5.5	17.6
2	1208.3	4.7	-16.5	1219.3	-3.3	17.1
3	1045.1	9.4	-11.6	1056.0	-5.7	11.8
4	1157.7	-12.2	-22.1	1167.1	13.7	22.3
5	1204.5	26.8	-6.9	1213.9	-23.0	7.5
6	1153.6	-15.6	-23.6	1163.0	17.0	23.8
7	1208.6	30.2	-5.4	1218.0	-26.2	6.0
8	861.8	-17.3	-19.8	869.6	17.9	20.0
9	916.4	28.1	-2.1	924.3	-24.8	2.6
10	857.0	-21.4	-21.6	864.9	21.7	21.7
11	921.2	32.2	-0.4	929.0	-28.7	0.9

Interaction Diagram

Column Reinforcement Design Rev. 1	UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL) Calc. By: Checked By:
--	--



Critical Loading: 1 - (G+Q)

		Min	Design
N	1347.1	-	1347.1 kN
M ₁₁	8.6	26.9	0.0 kN.m
M ₂₂	17.6	15.5	48.2 kN.m
N _{Max}	1863.0		

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.289

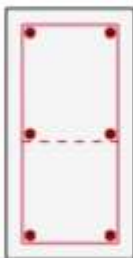
Beta = 0.66

Shear		Slender Column...		Rebars	
V _{d(1/2)} =	13.7 / 19.3 kN	L _{e1} /b ₁ =	12.8 ≥ 10.0	As (Req):	%0.40 _(min) 414.00 mm ²
V _{c(1/2)} =	1.52 / 2.05 N/mm ²	L _{e2} /b ₂ =	7.1 < 10.0 ✓	As (Sup):	%1.82 1884.96 mm ²
V _{t(1/2)} =	0.14 / 0.20 N/mm ²	M _{add(1/2)} =	0.0 / 22.3 kN.m	6Y20	
Links = T8-225					

2C28 (E-15) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section



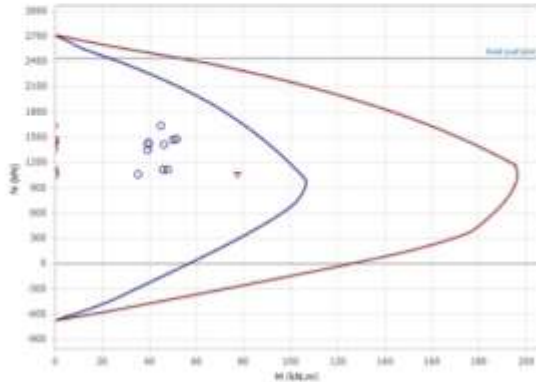
Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1631.0	17.5	-14.6	1641.9	-15.3	14.6
2	1341.6	6.5	-8.6	1352.5	-5.6	8.6
3	1401.0	22.2	-15.4	1411.9	-19.5	15.5
4	1464.4	-9.8	-19.3	1473.8	10.9	19.1
5	1421.2	39.3	-5.4	1430.5	-36.8	5.6

		UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)	
Column Reinforcement Design		Calc. By:	
Rev. 1		Checked By:	

6	1468.3	-14.2	-20.7	1477.7	15.2	20.4
7	1417.2	43.7	-4.0	1426.6	-41.1	4.3
8	1108.7	-17.5	-17.6	1116.5	18.0	17.3
9	1058.2	39.8	-1.3	1066.1	-37.6	1.6
10	1113.3	-22.6	-19.2	1121.1	23.0	18.8
11	1053.7	44.9	0.3	1061.5	-42.6	0.1

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	1641.9	-
M ₁₁	17.5	32.8
M ₂₂	14.6	18.9
N _{max}	1863.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

$N/bhF_{cu} = 0.353$

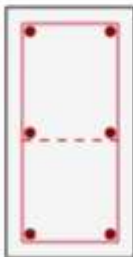
Beta = 0.59

Shear		Slender Column...		Rebars	
$V_{d(12)}$ =	0.1 / 27.8 kN	L_{ef}/b_1 =	12.8 ≥ 10.0	As (Req):	%0.40 (min) 414.00 mm ²
$V_{c(12)}$ =	1.22 / 2.28 N/mm ²	L_{ef}/b_2 =	6.6 < 10.0 ✓	As (Sup):	%1.82 1884.96 mm ²
$V_{l(12)}$ =	0.00 / 0.28 N/mm ²	$M_{add(12)}$ =	0.0 / 21.4 kN.m		6Y20
Links = T8-225					

2C29 (C1-28) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

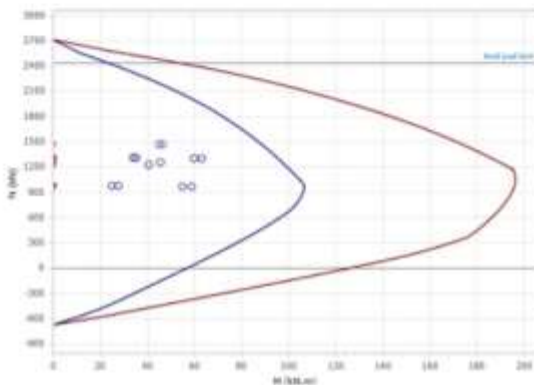


	UIN277XCMCMPWV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1465.9	-27.8	-16.7	1476.9	28.9	15.3
2	1216.3	-27.5	-10.4	1227.3	28.4	8.9
3	1247.3	-17.0	-16.4	1258.3	17.9	15.6
4	1296.7	-52.9	-22.1	1306.1	53.4	20.8
5	1301.6	6.2	-6.0	1311.0	-4.9	4.9
6	1296.5	-58.2	-23.7	1305.9	58.7	22.4
7	1301.9	11.5	-4.4	1311.3	-10.1	3.3
8	966.7	-51.2	-19.5	974.5	51.5	18.6
9	972.4	17.7	-0.7	980.2	-16.5	0.0
10	966.4	-57.4	-21.4	974.2	57.6	20.4
11	972.7	23.9	1.1	980.5	-22.6	-1.9

Interaction Diagram



Critical Loading: 6 - (G+Wy+Q)

		Min	Design
N	1305.9	-	1305.9 kN
M ₁₁	58.7	26.1	0.0 kN.m
M ₂₂	-23.7	-15.0	-63.0 kN.m
N _{max}	1863.0		

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N_{bh}F_{cu} = 0.280

Beta = 0.67

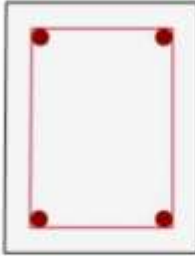
Shear		Slender Column...		Rebars	
V _{d(1,2)} =	0.2 / 36.5 kN	L _{sl} /b ₁ =	12.5 ≥ 10.0	As (Req):	%0.40 (mm) 414.00 mm ²
V _{c(1,2)} =	1.24 / 2.19 N/mm ²	L _{sl} /b ₂ =	6.4 < 10.0 ✓	As (Sup):	%1.82 1884.96 mm ²
V _{t(2)} =	0.00 / 0.37 N/mm ²	M _{ed(1,2)} =	0.0 / 21.2 kN.m	6Y20	
Links = T8-225					

2C30 (F1-20) (Polyline/)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

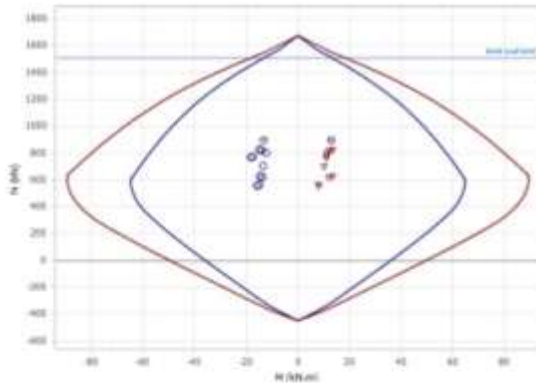
	UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:



Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	891.5	5.9	-2.4	898.1	-4.9	1.8
2	796.8	6.8	-1.2	803.4	-5.6	0.8
3	698.8	2.7	-2.5	705.4	-2.2	2.0
4	766.2	-2.2	-6.3	771.9	3.2	5.8
5	816.7	12.1	2.3	822.4	-11.4	-2.9
6	761.5	-3.5	-7.1	767.2	4.5	6.7
7	821.4	13.4	3.1	827.0	-12.7	-3.7
8	557.6	-4.8	-6.4	562.4	5.6	6.1
9	616.6	11.9	3.6	621.3	-11.4	-4.1
10	552.2	-6.3	-7.3	556.9	7.1	7.1
11	622.0	13.4	4.6	626.7	-13.0	-5.1

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	898.1	898.1 kN
M ₁₁	5.9	12.8 kN.m
M ₂₂	-2.4	-11.6 kN.m
N _{Max}	1122.0	

Concrete Cover = 25.0 mm

Neutral Axis: 0.0 mm / 0.00 °

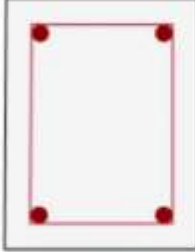
Shear		Slender Column...	Rebars	
V ₁₍₂₎ =	4.6 / 4.3 kN	L ₁ /b ₁ =	As (Req):	%0.40 (min) 249.33 mm ²
v ₁₍₂₎ =	1.51 / 1.63 N/mm ²	L ₂ /b ₂ =	As (Sup):	%2.02 1256.64 mm ²
V ₁₍₂₎ =	0.08 / 0.07 N/mm ²	M _{Ed(1)(2)} =		
Links = T8-225			4Y20	

2C31 (F1-22) (Polyline/)

	UIN277XCMCWPV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

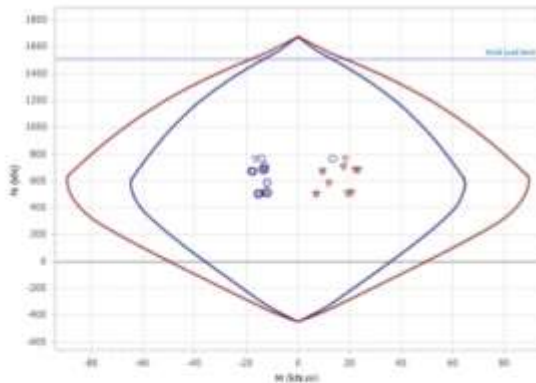
Section



Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	762.3	18.5	-3.0	768.9	-16.6	2.4
2	700.7	17.8	-1.9	707.3	-16.3	1.4
3	583.8	12.0	-2.9	590.4	-10.5	2.4
4	671.3	8.8	-6.8	676.9	-7.4	6.4
5	678.6	22.3	1.7	684.3	-20.5	-2.3
6	670.8	7.5	-7.7	676.4	-6.3	7.2
7	679.1	23.5	2.6	684.8	-21.7	-3.2
8	501.0	3.4	-6.8	505.7	-2.6	6.5
9	509.5	19.3	3.2	514.2	-17.9	-3.6
10	500.4	2.0	-7.8	505.1	-1.3	7.5
11	510.1	20.7	4.2	514.9	-19.2	-4.6

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	768.9	-
M ₁₁	18.5	10.9
M ₂₂	-3.0	-8.5
N _{Max}	1122.0	

Concrete Cover = 25.0 mm

Neutral Axis: 0.0 mm / 0.00 °

Shear		Slender Column...	Rebars	
V _{d1/2} =	4.8 / 12.7 kN	L ₁ /b ₁ =	As (Req):	%0.40 (min) 249.33 mm ²
V _{c1/2} =	1.46 / 1.58 N/mm ²		As (Sup):	%2.02 1256.64 mm ²

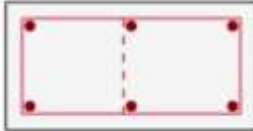
	UIN277XCMCWPWV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

$V_{(12)} =$ 0.08 / 0.21 N/mm ²	$L_{e2}/b_2 =$ 9.3 < 10.0 ✓	4Y20
Links = T8-225	$M_{Adj(12)} =$ 0.0 / 10.5 kN.m	

2C34 (C-9) (450/230)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

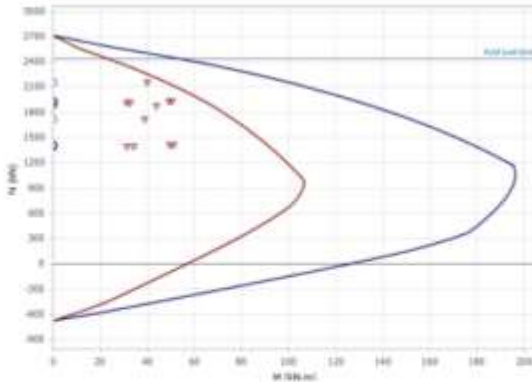
Section



Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	2150.1	-15.5	6.3	2161.1	16.5	-9.3
2	1709.4	-9.3	15.0	1720.3	9.9	-17.2
3	1870.9	-15.5	-4.4	1881.9	16.5	1.9
4	1923.3	-21.5	-17.0	1932.7	22.2	13.4
5	1909.3	-4.5	27.7	1918.7	5.5	-29.0
6	1924.6	-23.0	-21.4	1934.0	23.6	17.6
7	1908.0	-3.0	32.1	1917.3	4.0	-33.2
8	1410.7	-19.2	-21.8	1418.5	19.7	18.8
9	1394.3	0.5	30.3	1402.1	0.2	-30.7
10	1412.2	-21.0	-27.0	1420.0	21.4	23.7
11	1392.7	2.3	35.4	1400.6	-1.5	-35.6

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	2161.1	2161.1 kN
M ₁₁	16.5	39.7 kN.m
M ₂₂	-9.3	0.0 kN.m
N _{max}	1863.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

$N/bhF_{cu} = 0.464$

Beta = 0.46

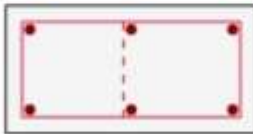
	UIN277XCMCWPWV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

Shear $V_{d(1/2)} = 16.1 / 0.1$ kN $V_{e(1/2)} = 2.73 / 1.19$ N/mm ² $V_{l(2)} = 0.16 / 0.00$ N/mm ²	Slender Column... $L_{e1}/b_1 = 6.9 < 10.0$ ✓ $L_{e2}/b_2 = 12.5 \geq 10.0$ $M_{add(1/2)} = 0.0 / 14.1$ kN.m	Rebars	
		As (Req): %1.45 As (Sup): %1.82	1500.28 mm ² 1884.96 mm ²
Links = T8-225		6Y20	

2C35 (B-4) (450/230)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

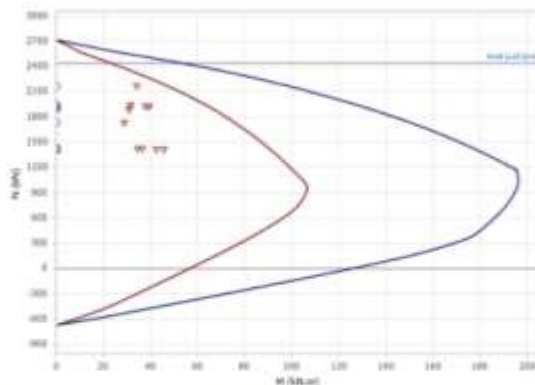
Section



Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	2160.8	4.9	12.6	2171.7	-5.2	-10.9
2	1884.2	4.8	-6.4	1895.1	-5.5	7.7
3	1721.1	3.1	26.6	1732.1	-3.0	-25.2
4	1925.8	-5.3	-12.1	1935.2	5.0	12.4
5	1917.6	13.5	33.3	1927.0	-13.8	-30.6
6	1926.5	-7.0	-16.6	1935.9	6.7	16.6
7	1916.8	15.2	37.7	1926.2	-15.5	-34.9
8	1421.6	-7.9	-18.9	1429.4	7.7	18.5
9	1412.1	14.0	34.1	1419.9	-14.2	-31.7
10	1422.5	-9.9	-24.1	1430.3	9.7	23.4
11	1411.2	16.0	39.3	1419.0	-16.2	-36.6

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	2171.7	2171.7 kN
M ₁₁	-5.2	-34.1 kN.m
M ₂₂	12.6	0.0 kN.m
N _{max}	1863.0	

Concrete Cover = 25.0 mm

	UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

(BS8110 - Cl. 3.8.4.5)

$N/bhF_{cu} = 0.466$

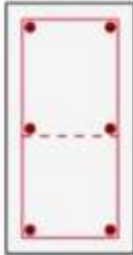
Beta = 0.46

Shear		Slender Column...	Rebars	
$V_{d(1/2)} =$	24.1 / 10.2 kN	$L_{d1}/b_1 =$	As (Req):	%1.37 1413.49 mm ²
$v_{c(1/2)} =$	2.78 / 1.90 N/mm ²	$L_{d2}/b_2 =$	As (Sup):	%1.82 1884.96 mm ²
$V_{l(2)} =$	0.25 / 0.10 N/mm ²	$M_{d(1/2)} =$	6Y20	
Links = T8-225				

2C36 (B-8) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

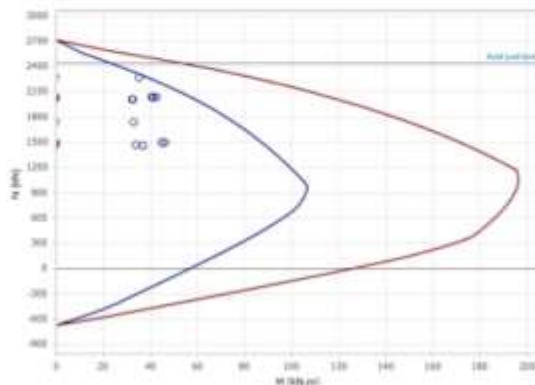
Section



Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	2263.3	13.5	-10.5	2274.2	-13.4	10.8
2	1734.9	6.6	-3.3	1745.9	-7.5	3.0
3	2030.4	15.2	-13.8	2041.4	-14.1	14.6
4	2029.4	-13.6	-15.3	2038.8	13.1	15.3
5	2006.2	36.3	-2.5	2015.6	-35.6	2.9
6	2031.6	-18.1	-16.6	2041.0	17.5	16.5
7	2004.1	40.8	-1.2	2013.5	-40.0	1.7
8	1488.5	-20.9	-14.1	1496.4	20.3	14.0
9	1461.5	37.4	0.8	1469.3	-36.5	-0.4
10	1491.1	-26.1	-15.6	1498.9	25.5	15.4
11	1459.0	42.6	2.3	1466.8	-41.6	-1.8

Interaction Diagram



	UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

Critical Loading: 1 - (G+Q)

		Min	Design
N	2274.2	-	2274.2 kN
M ₁₁	13.5	45.5	0.0 kN.m
M ₂₂	10.8	26.2	35.2 kN.m
N _{Max}	1863.0		

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.488

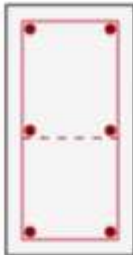
Beta = 0.43

Shear		Slender Column...		Rebars	
V _{Ed1(z)} =	0.4 / 26.7 kN	L _{ef1} /b ₁ =	12.7 ≥ 10.0	As (Req):	%1.71 1770.41 mm ²
V _{Ed2(z)} =	1.68 / 2.90 N/mm ²	L _{ef2} /b ₂ =	6.2 < 10.0 ✓	As (Sup):	%1.82 1884.96 mm ²
V _{1(z)} =	0.00 / 0.27 N/mm ²	M _{Ed1(z)} =	0.0 / 12.3 kN.m	6Y20	
Links = T8-225					

2C37 (C-11) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

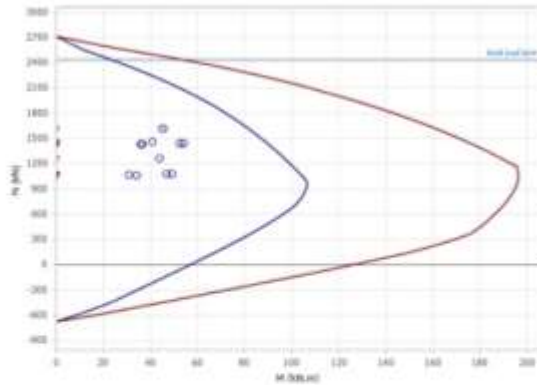


Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1612.3	22.9	-17.0	1623.3	-24.0	16.1
2	1450.1	26.5	-12.0	1461.1	-27.7	11.7
3	1255.8	10.4	-15.4	1266.8	-11.1	14.2
4	1434.3	1.8	-23.4	1443.7	-4.5	22.6
5	1423.9	36.8	-5.2	1433.3	-36.0	4.5
6	1435.4	-1.4	-25.2	1444.8	-1.7	24.3
7	1422.8	39.9	-3.5	1432.1	-38.8	2.7
8	1072.0	-6.4	-21.0	1079.8	3.6	20.4
9	1059.9	34.4	0.2	1067.8	-33.1	-0.7
10	1073.4	-10.1	-23.0	1081.2	6.9	22.4
11	1058.6	38.1	2.3	1066.4	-36.4	-2.8

Interaction Diagram

Column Reinforcement Design Rev. 1	UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL) Calc. By: Checked By:
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Critical Loading: 1 - (G+Q)

	Min	Design
N	1623.3	-
M ₁₁	-24.0	-32.5
M ₂₂	-17.0	-18.7
N _{Max}	1863.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.349

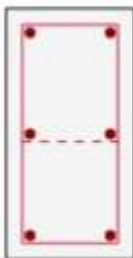
Beta = 0.59

Shear		Slender Column...		Rebars	
V _{d(1/2)} =	0.3 / 0.1 kN	L _{e1} /b ₁ =	12.3 ≥ 10.0	As (Req):	%0.40 _(min) 414.00 mm ²
V _{c(1/2)} =	1.41 / 0.94 N/mm ²	L _{e2} /b ₂ =	8.9 < 10.0 ✓	As (Sup):	%1.82 1884.96 mm ²
V _{t(2)} =	0.00 / 0.00 N/mm ²	M _{add(1/2)} =	0.0 / 19.8 kN.m	6Y20	
Links = T8-225					

2C38 (C-14) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section



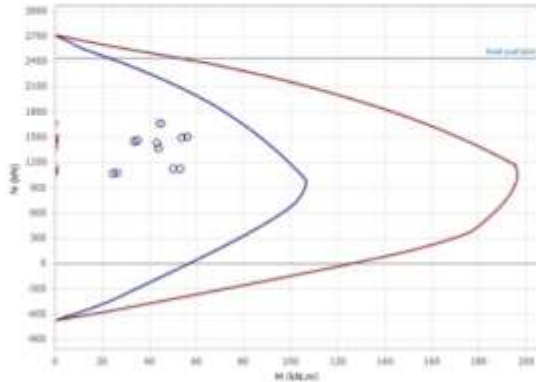
Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1659.0	33.0	19.2	1669.9	-33.7	-18.5
2	1426.2	37.1	13.3	1437.1	-37.5	-14.4
3	1356.2	16.3	17.7	1367.2	-17.0	-15.4
4	1450.9	11.8	8.7	1460.3	-14.5	-8.1
5	1491.7	43.9	23.7	1501.1	-42.3	-22.9

Column Reinforcement Design Rev. 1		UIN277XCMCWPWV (Fenerbahce_Do Not Use COMMERCIAL) Calc. By: Checked By:	
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6	1447.0	9.0	7.2	1456.4	-12.0	-6.7
7	1495.5	46.7	25.2	1504.9	-44.7	-24.4
8	1071.5	1.7	2.9	1079.3	-4.6	-2.6
9	1119.1	39.0	20.4	1126.9	-37.0	-19.9
10	1067.0	-1.7	1.2	1074.8	-1.7	-0.9
11	1123.6	42.4	22.1	1131.4	-39.9	-21.6

Interaction Diagram



Critical Loading: 7 - (G-Wy+Q)

	Min	Design	
N	1504.9	-	1504.9 kN
M ₁₁	46.7	30.1	0.0 kN.m
M ₂₂	25.2	17.3	56.1 kN.m
N _{max}	1863.0		

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.323

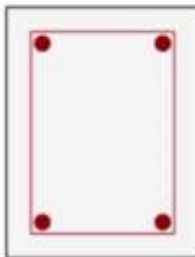
Beta = 0.62

Shear		Slender Column...	Rebars	
V _{Q(12)} =	13.9 / 0.0 kN	L _{sl} /b ₁ =	11.4 ≥ 10.0	As (Req): %0.40 (min) 414.00 mm ²
V _{C(12)} =	1.69 / 0.76 N/mm ²	L _{sl} /b ₂ =	8.9 < 10.0 ✓	As (Sup): %1.82 1884.96 mm ²
V ₍₁₂₎ =	0.14 / 0.00 N/mm ²	M _{add(12)} =	0.0 / 17.5 kN.m	6Y20
Links = T8-225				

2C39 (C-12) (230/300)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

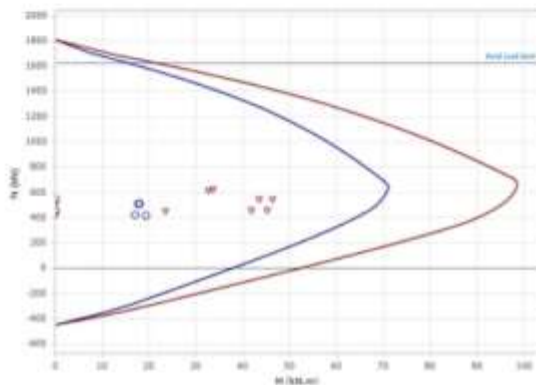


	UIN277XCMCWPWV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	610.5	11.1	1.9	617.8	-11.1	-2.0
2	618.9	11.7	2.0	626.2	-11.8	-2.1
3	445.2	7.3	1.2	452.5	-7.3	-1.2
4	507.2	1.3	-4.3	513.4	-1.5	4.2
5	540.8	17.8	7.5	547.1	-17.6	-7.5
6	504.0	-0.2	-5.4	510.3	0.0	5.3
7	543.9	19.2	8.6	550.2	-19.0	-8.6
8	415.2	-1.7	-5.6	420.4	1.4	5.5
9	454.5	17.5	8.1	459.7	-17.3	-8.1
10	411.6	-3.4	-6.9	416.8	3.1	6.8
11	458.1	19.3	9.5	463.3	-19.0	-9.4

Interaction Diagram



Critical Loading: 1 - (G+Q)

		Min	Design
N	617.8	-	617.8 kN
M ₁₁	11.1	9.3	32.7 kN.m
M ₂₂	-2.0	-7.1	0.0 kN.m
N _{max}	1242.0		

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.199

Beta = 0.77

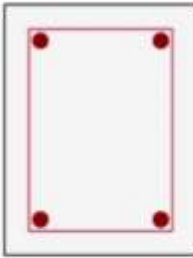
Shear		Slender Column...		Rebars	
V _{d(1,2)} =	4.4 / 0.0 kN	L _{sl} /b ₁ =	11.6 ≥ 10.0	As (Req):	%0.40 (mm) 276.00 mm ²
v _{c(1,2)} =	1.35 / 1.12 N/mm ²	L _{sl} /b ₂ =	10.0 ≥ 10.0	As (Sup):	%1.82 1256.64 mm ²
v _{d(1,2)} =	0.07 / 0.00 N/mm ²	M _{add(1,2)} =	9.6 / 9.3 kN.m		4Y20
Links = T8-225					

2C40 (C-13) (230/300)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

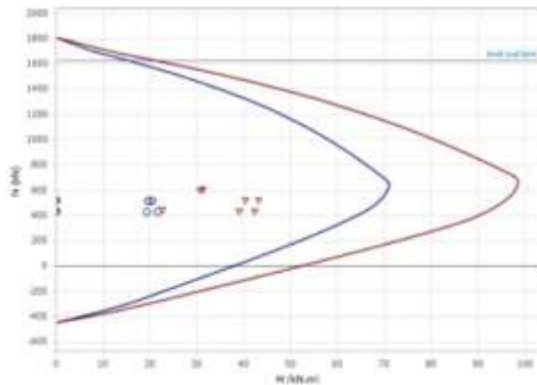
UIN277XCMCMPWV (Fenerbahce_Do Not Use COMMERCIAL)	
Column Reinforcement Design Rev. 1	Calc. By: Checked By:



Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	598.1	10.8	-0.6	605.5	-10.8	0.6
2	602.9	11.4	-0.5	610.2	-11.5	0.5
3	441.0	7.2	-0.6	448.3	-7.1	0.6
4	511.6	0.9	-6.4	517.8	-1.1	6.4
5	514.2	17.6	5.3	520.4	-17.4	-5.3
6	511.5	-0.6	-7.6	517.7	0.3	7.5
7	514.3	19.1	6.5	520.5	-18.9	-6.4
8	425.4	-2.0	-7.4	430.6	1.8	7.3
9	428.4	17.4	6.3	433.7	-17.3	-6.3
10	425.3	-3.8	-8.7	430.5	3.5	8.6
11	428.6	19.2	7.7	433.8	-19.0	-7.6

Interaction Diagram



Critical Loading: 1 - (G+Q)

		Min	Design
N	605.5	-	605.5 kN
M ₁₁	10.8	9.1	30.7 kN.m
M ₂₂	-0.6	-7.0	0.0 kN.m
N _{max}	1242.0		

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N_{bh}F_{cu} = 0.195

Beta = 0.78

Shear		Slender Column...		Rebars	
V _(1/2) =	5.5 / 12.1 kN	L _{e1} /b ₁ =	11.6 ≥ 10.0	As (Req):	%0.40 (min) 276.00 mm ²
V _{c(1/2)} =	1.37 / 1.45 N/mm ²	L _{e2} /b ₂ =	10.0 ≥ 10.0	As (Sup):	%1.82 1256.64 mm ²
V _(1/2) =	0.08 / 0.18 N/mm ²	M _{ax(1/2)} =	9.4 / 9.1 kN.m		4Y20

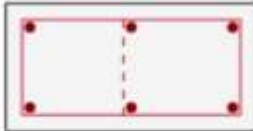
	UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

Links = T8-225

2C41 (C-17) (450/230)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

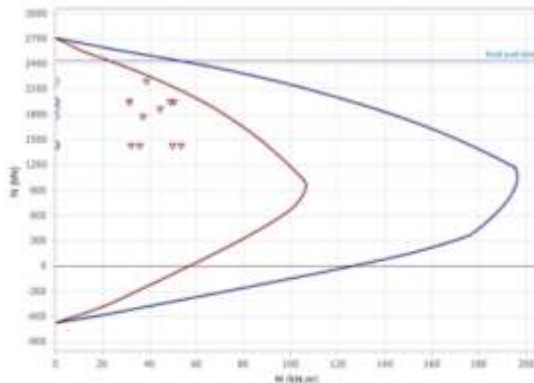
Section



Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	2184.2	-15.0	3.7	2195.2	16.1	-0.5
2	1771.9	-8.0	9.1	1782.9	8.9	-0.2
3	1864.1	-16.0	-3.5	1875.0	16.9	-0.4
4	1947.7	-21.6	-22.8	1957.1	22.4	24.8
5	1947.0	-3.6	28.9	1956.4	4.7	-25.5
6	1947.7	-23.2	-27.8	1957.1	23.9	29.6
7	1947.0	-2.0	34.0	1956.4	3.2	-30.4
8	1424.0	-19.5	-28.2	1431.8	19.9	29.3
9	1423.2	1.5	32.1	1431.0	-0.6	-29.4
10	1424.0	-21.3	-34.1	1431.8	21.8	35.0
11	1423.2	3.4	38.0	1431.0	-2.5	-35.1

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	2195.2	2195.2 kN
M ₁₁	16.1	38.7 kN.m
M ₂₂	3.7	0.0 kN.m
N _{max}	1863.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.471

Beta = 0.45

Shear

Rebars

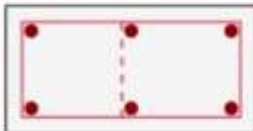
	UIN277XCMCWPWV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

$V_{d(1z)}$ = 1.0 / 0.7 kN	Slender Column ...	A_s (Req): %1.53	1588.35 mm ²
$V_{c(1z)}$ = 1.99 / 1.62 N/mm ²	L_{d1}/b_1 = 6.7 < 10.0 ✓	A_s (Sup): %1.82	1884.96 mm ²
$V_{l(2z)}$ = 0.01 / 0.01 N/mm ²	L_{d2}/b_2 = 12.5 ≥ 10.0		
Links = T8-225	$M_{add(1z)}$ = 0.0 / 13.5 kN.m	6Y20	

2C42 (B-24) (450/230)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

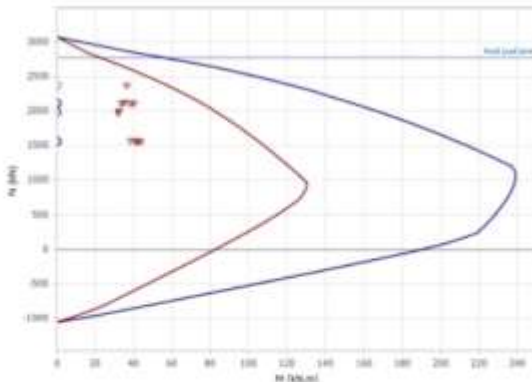
Section



Combinations

No	N_{Top} (kN)	$M_{1 Top}$ (kN.m)	$M_{2 Top}$ (kN.m)	N_{Bot} (kN)	$M_{1 Bot}$ (kN.m)	$M_{2 Bot}$ (kN.m)
1	2367.8	2.8	-12.0	2378.8	-3.1	8.8
2	1965.1	-1.3	-18.6	1976.0	0.7	16.1
3	1985.1	5.8	-0.8	1996.1	-5.7	-1.9
4	2109.6	-8.0	-32.1	2119.0	7.7	28.2
5	2100.3	12.6	11.9	2109.7	-12.9	-13.4
6	2110.5	-9.8	-36.4	2119.9	9.6	32.3
7	2099.5	14.4	16.2	2108.9	-14.7	-17.5
8	1559.6	-10.3	-33.0	1567.4	10.2	29.8
9	1548.7	13.7	18.2	1556.6	-13.9	-18.9
10	1560.6	-12.5	-38.1	1568.4	12.3	34.5
11	1547.8	15.8	23.3	1555.6	-16.0	-23.6

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	2378.8	2378.8 kN
M_{11}	-3.1	-36.2 kN.m
M_{22}	-12.0	0.0 kN.m
N_{max}	1863.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

$N/bhF_{cu} = 0.511$

	UIN277XCMCMPWV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

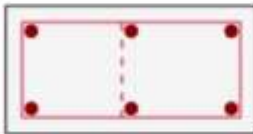
Beta =0.41

Shear $V_{u(1/2)} = 0.3 / 10.1 \text{ kN}$ $V_{c(1/2)} = 1.68 / 2.13 \text{ N/mm}^2$ $V_{s(1/2)} = 0.00 / 0.10 \text{ N/mm}^2$	Slender Column... $L_{e1}/b_1 = 7.2 < 10.0 \quad \checkmark$ $L_{e2}/b_2 = 11.5 \geq 10.0$ $M_{ext(1/2)} = 13.3 / 0.0 \text{ kN.m}$	Rebars $A_s \text{ (Req): } \%2.09 \quad 2160.60 \text{ mm}^2$ $A_s \text{ (Sup): } \%2.85 \quad 2945.24 \text{ mm}^2$ 6Y25
Links = T8-300		

2C43 (C1-24) (450/230)

Materials: C35/M5 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

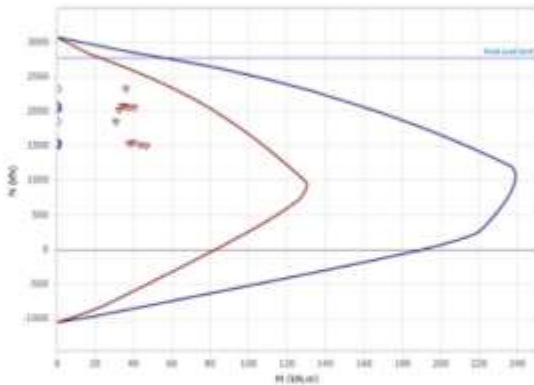
Section



Combinations

No	N_{Top} (kN)	$M_{1 Top}$ (kN.m)	$M_{2 Top}$ (kN.m)	N_{Bot} (kN)	$M_{1 Bot}$ (kN.m)	$M_{2 Bot}$ (kN.m)
1	2315.2	-1.3	-26.8	2326.1	1.8	24.5
2	2013.7	-2.6	-36.7	2024.7	2.6	35.1
3	1848.1	0.6	-6.8	1859.0	0.2	4.7
4	2045.3	-9.8	-46.0	2054.7	10.2	43.0
5	2072.4	7.7	0.8	2081.7	-7.2	-1.7
6	2042.9	-11.4	-50.6	2052.3	11.8	47.4
7	2074.8	9.2	5.4	2084.1	-8.8	-6.1
8	1502.6	-10.9	-44.0	1510.5	11.2	41.4
9	1534.2	9.5	10.6	1542.0	-9.1	-10.8
10	1499.8	-12.7	-49.4	1507.7	13.0	46.5
11	1537.0	11.3	16.0	1544.8	-11.0	-15.9

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	2326.1	2326.1 kN
M_{11}	1.8	35.7 kN.m
M_{22}	-26.8	0.0 kN.m
N_{Max}	1863.0	

Concrete Cover = 25.0 mm

	UIN277XCMCMPWV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

(BS8110 - Cl. 3.8.4.5)

$N_{bh}F_{cu} = 0.499$

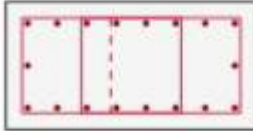
Beta = 0.42

Shear		Slender Column...	Rebars	
$V_{d(1/2)} =$	30.4 / 0.1 kN	$L_{e1}/b_1 =$	As (Req):	%1.90 1970.33 mm ²
$V_{c(1/2)} =$	3.03 / 1.47 N/mm ²	$L_{e2}/b_2 =$	As (Sup):	%2.85 2945.24 mm ²
$V_{t(2)} =$	0.31 / 0.00 N/mm ²	$M_{ed(1/2)} =$	6Y25	
Links = T8-300				

2C44 (E1-24) (450/230)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

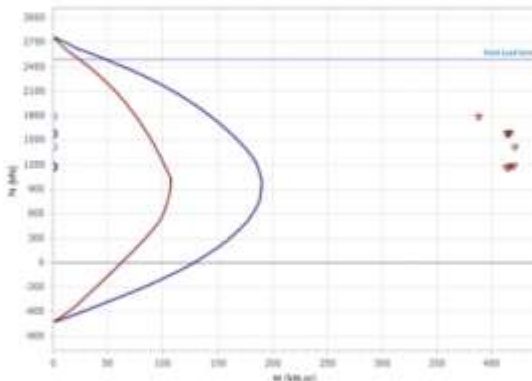
Section



Combinations

No	N_{Top} (kN)	$M_{1 Top}$ (kN.m)	$M_{2 Top}$ (kN.m)	N_{Bot} (kN)	$M_{1 Bot}$ (kN.m)	$M_{2 Bot}$ (kN.m)
1	1778.6	0.5	-7.9	1789.6	-0.1	7.3
2	1569.0	0.4	-16.8	1580.0	-0.2	16.4
3	1407.6	0.4	3.4	1418.5	0.0	-3.9
4	1584.4	0.0	-35.1	1593.8	-1.2	34.3
5	1575.3	0.8	21.7	1584.6	1.1	-21.8
6	1585.3	-0.1	-40.7	1594.7	-1.4	39.7
7	1574.4	0.9	27.2	1583.8	1.3	-27.2
8	1175.2	-0.2	-38.7	1183.0	-1.4	37.9
9	1164.5	0.8	27.6	1172.3	1.3	-27.5
10	1176.2	-0.3	-45.1	1184.0	-1.7	44.3
11	1163.5	0.9	34.1	1171.3	1.5	-33.9

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	1789.6	1789.6 kN
M ₁₁	0.5	20.6 617.0 kN.m

	UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

M_{zz} -7.9 -35.8 0.0 kN.m
 N_{Max} 1863.0

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

$N_{bh}F_{cu} = 0.000$

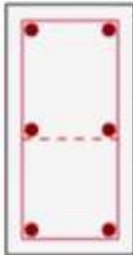
Beta = 0.00

Shear		Slender Column...	Rebars	
$V_{d(1,2)} =$	0.0 / 0.0 kN	$L_{e1}/b_1 =$	As (Req):	%0.40 (min) 107479.15 mm ²
$V_{c(1,2)} =$	0.76 / 0.94 N/mm ²	$L_{e2}/b_2 =$	As (Sup):	%1.97 2035.75 mm ²
$V_{l(2)} =$	0.00 / 0.00 N/mm ²	$M_{max(1,2)} =$	18Y12	
Links = T8-125				

2C45 (B-19) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

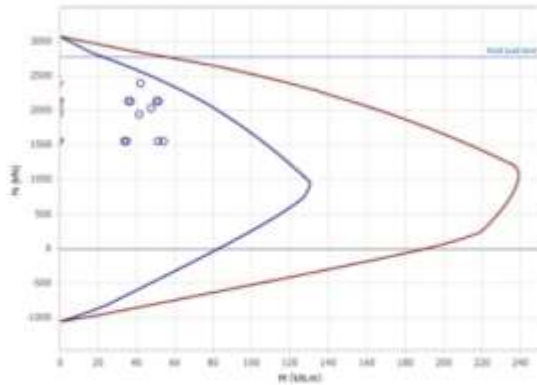


Combinations

No	N_{Top} (kN)	$M_{1 Top}$ (kN.m)	$M_{2 Top}$ (kN.m)	N_{Bot} (kN)	$M_{1 Bot}$ (kN.m)	$M_{2 Bot}$ (kN.m)
1	2383.6	10.6	17.2	2394.5	-12.0	-17.1
2	2029.2	0.2	17.4	2040.2	-5.8	-17.4
3	1937.9	16.7	10.5	1948.8	-13.3	-10.3
4	2123.7	-14.3	7.7	2133.1	11.8	-7.8
5	2124.4	32.0	21.3	2133.8	-31.9	-21.0
6	2123.5	-18.5	6.3	2132.9	15.7	-6.5
7	2124.6	36.2	22.7	2134.0	-35.7	-22.2
8	1554.9	-20.7	2.8	1562.8	18.3	-3.0
9	1555.8	33.4	18.7	1563.6	-32.6	-18.3
10	1554.7	-25.5	1.2	1562.6	22.8	-1.5
11	1556.0	38.2	20.3	1563.8	-37.1	-19.8

Interaction Diagram

	UIN277XCMCWPWV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:



Critical Loading: 1 - (G+Q)

	Min	Design
N	2394.5	2394.5 kN
M ₁₁	-12.0	0.0 kN.m
M ₂₂	17.2	42.1 kN.m
N _{Max}	1863.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

$N/bhF_{cu} = 0.514$

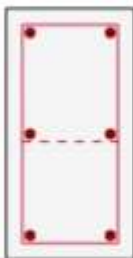
Beta = 0.40

Shear		Slender Column...		Rebars	
$V_{d(1/2)}$ =	12.7 / 1.9 kN	L_{e1}/b_1 =	12.7 ≥ 10.0	As (Req):	%2.21 2289.29 mm ²
$V_{c(1/2)}$ =	2.13 / 2.43 N/mm ²	L_{e2}/b_2 =	6.2 < 10.0 ✓	As (Sup):	%2.85 2945.24 mm ²
$V_{(1/2)}$ =	0.13 / 0.02 N/mm ²	$M_{ed(1/2)}$ =	0.0 / 16.1 kN.m	6Y25	
Links = T8-300					

2C46 (E-9) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section



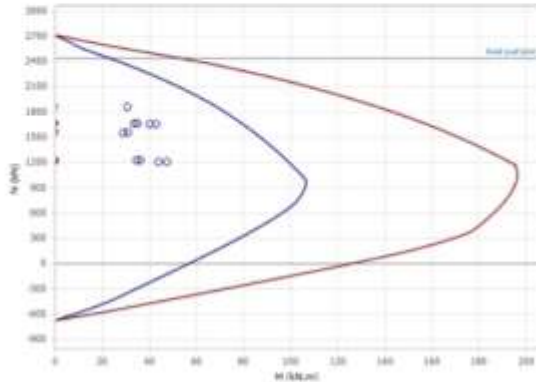
Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1855.9	21.3	2.1	1866.9	-20.0	-2.2
2	1550.5	7.7	2.9	1561.5	-7.4	-3.0
3	1547.3	26.2	1.0	1558.3	-24.4	-0.8
4	1658.1	-8.2	-6.0	1667.5	8.9	5.8
5	1646.5	43.8	9.7	1655.9	-42.4	-9.6

Column Reinforcement Design Rev. 1		UIN277XCMCMPWV (Fenerbahce_Do Not Use COMMERCIAL) Calc. By: Checked By:	
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6	1659.0	-12.8	-7.5	1668.4	13.4	7.3
7	1645.6	48.5	11.2	1655.0	-46.9	-11.1
8	1220.6	-17.8	-7.4	1228.4	18.1	7.4
9	1207.0	42.9	10.8	1214.9	-41.7	-10.6
10	1221.6	-23.2	-9.2	1229.5	23.4	9.1
11	1206.0	48.3	12.6	1213.8	-47.0	-12.4

Interaction Diagram



Critical Loading: 1 - (G+Q)

	Min	Design
N	1866.9	- 1866.9 kN
M ₁₁	21.3	37.3 0.0 kN.m
M ₂₂	-2.2	-21.5 -30.5 kN.m
N _{max}	1863.0	

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.401

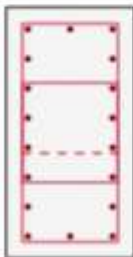
Beta = 0.53

Shear		Slender Column...	Rebars	
V _{Q(1 2)} =	7.9 / 30.3 kN	L _{sl} /b ₁ =	11.9 ≥ 10.0	As (Req): %0.40 (min) 414.00 mm ²
V _{c(1 2)} =	1.75 / 2.52 N/mm ²	L _{sl} /b ₂ =	6.5 < 10.0 ✓	As (Sup): %1.82 1884.96 mm ²
V _{s(1 2)} =	0.08 / 0.31 N/mm ²	M _{add(1 2)} =	0.0 / 16.8 kN.m	6Y20
Links = T8-225				

2C47 (E-17) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

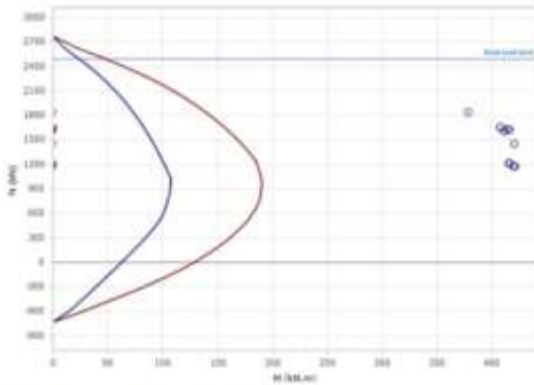


	UIN277XCMCMPWIV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1831.2	22.7	0.0	1842.1	-21.4	-0.2
2	1447.7	10.9	-0.1	1458.7	-10.0	-0.2
3	1601.5	25.2	0.0	1612.4	-23.9	-0.1
4	1648.2	-7.9	-0.4	1657.6	8.7	-1.3
5	1620.9	46.0	0.3	1630.2	-44.5	1.1
6	1650.6	-12.8	-0.5	1660.0	13.4	-1.6
7	1618.4	50.8	0.4	1627.8	-49.2	1.3
8	1205.8	-18.1	-0.4	1213.6	18.5	-1.5
9	1173.9	44.8	0.4	1181.8	-43.5	1.3
10	1208.6	-23.8	-0.5	1216.5	24.0	-1.8
11	1171.1	50.4	0.5	1178.9	-49.1	1.6

Interaction Diagram



Critical Loading: 1 - (G+Q)

		Min	Design
N	1842.1	-	1842.1 kN
M ₁₁	22.7	36.8	0.0 kN.m
M ₂₂	-0.2	-21.2	-633.9 kN.m
N _{max}	1863.0		

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.000

Beta = 0.00

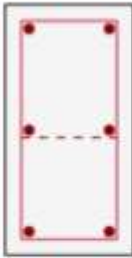
Shear		Slender Column...	Rebars	
V _{d(1,2)} =	0.0 / 0.0 kN	L _{sl} /b ₁ =	54.8 ≥ 10.0	As (Req): %0.40 (mm) 110798.28 mm ²
V _{c(1,2)} =	0.94 / 0.76 N/mm ²	L _{sl} /b ₂ =	6.5 < 10.0 ✓	As (Sup): %1.97 2035.75 mm ²
V _{t(2)} =	0.00 / 0.00 N/mm ²	M _{ed(1,2)} =	0.0 / 625.8 kN.m	18Y12
Links = T8-125				

2C48 (F-17) (230/450)

Materials: C35/45 / Grade 410 (Type 2) (Links: Grade 460 (Type 2))

Section

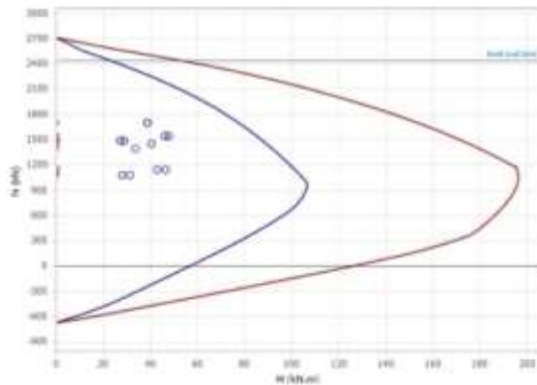
UIN277XCMCWPV (Fenerbahce_Do Not Use COMMERCIAL)	
Column Reinforcement Design Rev. 1	Calc. By: Checked By:



Combinations

No	N _{Top} (kN)	M _{1 Top} (kN.m)	M _{2 Top} (kN.m)	N _{Bot} (kN)	M _{1 Bot} (kN.m)	M _{2 Bot} (kN.m)
1	1694.3	-1.0	12.6	1705.3	3.3	-12.3
2	1382.8	-1.4	6.6	1393.8	2.4	-6.4
3	1445.6	-0.6	13.5	1456.5	3.2	-13.2
4	1483.5	-21.4	2.0	1492.9	22.4	-1.8
5	1535.9	19.6	19.3	1545.3	-16.8	-18.9
6	1478.8	-25.1	0.3	1488.2	25.9	-0.2
7	1540.6	23.3	20.9	1550.0	-20.3	-20.6
8	1075.2	-24.9	-2.6	1083.1	25.1	2.6
9	1136.5	23.0	17.6	1144.3	-20.6	-17.3
10	1069.8	-29.2	-4.6	1077.7	29.2	4.6
11	1141.9	27.3	19.5	1149.7	-24.7	-19.2

Interaction Diagram



Critical Loading: 1 - (G+Q)

		Min	Design
N	1705.3	-	1705.3 kN
M ₁₁	3.3	34.1	0.0 kN.m
M ₂₂	12.6	19.6	38.9 kN.m
N _{max}	1863.0		

Concrete Cover = 25.0 mm

(BS8110 - Cl. 3.8.4.5)

N/bhF_{cu} = 0.366

Beta = 0.57

Shear		Slender Column...		Rebars	
V _{Q(12)} =	12.3 / 1.2 kN	L _{e1} /b ₁ =	11.6 ≥ 10.0	As (Req):	%0.40 (min) 414.00 mm ²
V _{C(12)} =	1.71 / 2.04 N/mm ²	L _{e2} /b ₂ =	6.8 < 10.0 ✓	As (Sup):	%1.82 1884.96 mm ²
V ₍₁₂₎ =	0.13 / 0.01 N/mm ²	M _{ax(12)} =	0.0 / 17.3 kN.m	6Y20	

	UIN277XCMCWPV (Fenerbahce_Do Not Use COMMERCIAL)
Column Reinforcement Design Rev. 1	Calc. By: Checked By:

Links = T8-225

Construction Technology and Organization

This project employs conventional construction technology with modern tools. Key processes include site clearance, formwork erection, concrete casting, block laying, roofing, and internal finishes. BIM tools help manage timelines, materials, and coordination among disciplines. The construction is phased, enabling systematic building from the ground floor upward. Materials are selected for durability, cost-efficiency, and local availability. The project is organized by roles: architects handle design, engineers manage structure, while contractors execute construction. Site meetings, progress tracking, and safety inspections are integral to project success.

SEQUENCING & METHODOLOGY

1. Substructure

- Foundation excavation
- Formwork
- casting

2. Superstructure

- Formwork: Table forms for slabs; jump forms for cores.
- Vertical Erection: Prefab rebar cages lifted via tower crane.

3. Finishes:

- Balcony waterproofing → Tile installation → Glazing.

4. Quality & Logistics

Digital Integration:

- Revit: Coordinated architectural/MEP models.
- ProtaStructure: Real-time load validation during construction.

5. Material Management

- Just-in-time concrete delivery (pump placement).
- Rebar prefabrication off-site to reduce congestion.

6. Quality Assurance

- Cube tests (7/28-day concrete strength).
- Laser scanning for column alignment and walls

Occupational Safety and Health (OSH)

OSH is critical in managing construction risks. This includes the use of PPE, safety drills, proper scaffolding, edge protection, fall arrest systems, and hazard signage. Regular toolbox talks, safety audits, and training ensure compliance with Labor and Safety Codes. Fire safety, electrical safety, and machinery handling are also prioritized. Emergency response plans and first aid stations are established on-site. Workers' health is monitored to avoid fatigue and overexertion. Ensuring a safe work environment increases productivity and reduces incident-related costs.

1. Critical Hazards & Mitigation

Fall Risks (Height: 35.6 m to roof):

- Prevention: Perimeter guardrails, safety nets, and harness anchor points.
- Zoning: Red (no-access) zones under crane operations.

2. Structural safety:

- Temporary Supports: Props for fresh concrete slabs (until 28-day strength).
- Columns designed for short column behavior (avoiding shear failure) and ductile failure modes.
- Concrete cover of 25 mm to ensure fire resistance and corrosion protection.
- Load Monitoring: Sensors on formwork/shoring.

3. Material Handling:

- Rebar Safety: Gloves/eye protection; mechanical lifts for bundles >25 kg.
- Concrete Burns: pH-neutralizing wash stations.

4. Health Hazards:

- Silica Dust: Wet-cutting for concrete; N95 respirators.
- Noise Control: Acoustic barriers for pile drilling.

5. Training & Compliance

- Certifications:
 - Crane ops (CPCS), scaffolders (CISRS), confined-space entry.
- Protocols:
 - Daily toolbox talks; weekly rescue drills.

- Emergency response plan (ERP) for fire/structural failure.

6. SUSTAINABILITY & INNOVATION**

- Energy Efficiency:

- Balcony shading reduces cooling load by 15–20%.

- High-performance glazing (U-value ≤ 1.5 W/m²K).

- Material Innovation:

- Concrete mix: 30% GGBS (slag) replacement to cut CO₂.

- Water Management:

- Rainwater harvesting from roof deck for irrigation.