ΜΕΛΕΤΗ ΕΠΕΚΤΑΣΗΣ ΓΕΦΥΡΑΣ ΣΤΗ ΘΕΣΗ ΚΟΚΚΙΝΟ ΣΠΗΛΙΟ ΟΔΟΥ ΑΝΔΡΙΤΣΑΙΝΑΣ

ΣΤΑΤΙΚΑ

ΤΕΧΝΙΚΗ ΕΚΘΕΣΗ - ΤΕΥΧΟΣ ΑΠΟΤΕΛΕΣΜΑΤΩΝ

ΠΕΡΙΕΧΟΜΕΝΑ

ΑΡΙΘΜΗΣΗ ΣΧΕΔΙΩΝ

3) ΓΕΝΙΚΑ

Στην παρούσα μελέτη περιλαμβάνει τις στατικές επιλύσεις του κιβωτοειδούς οχετού διατομής W x H = 4.00m x 6.00m και του πτερυγότοιχου εξόδου του τεχνικού. Οι ακριβείς διαστάσεις των τεχνικών δείχνονται στα αντίστοιχα σχέδια. Τα τεχνικά προβλέπεται να κατασκευαστούν από οπλισμένο σκυρόδεμα C20/25 και χάλυβα S500s και προβλέπεται να εδράζονται σε στρώση εξομάλυνσης ελάχιστου πάχους 0.15m από άοπλο σκυρόδεμα C8/10 (B10).

4) ΓΕΩΤΕΧΝΙΚΑ ΣΤΟΙΧΕΙΑ ΣΧΕΔΙΑΣΜΟΥ

Στους στατικούς υπολογισμούς λαμβάνονται υπόψη οι παρακάτω παράμετροι σχεδιασμού για τα υλικά επανεπίχωσης:

Ειδικό βάρος: $\gamma = 20\ KN/m^3$

Ενεργός γωνία εσωτερικής τριβής: $\varphi' = 30°$

Ενεργός συνοχή: $c' = 0$

Συντηρητικά λαμβάνεται υπόψη μέτρο συμπιέσεως για τον υπολογισμό του δείκτη εδάφους της έδρασης ίσο με E_s = 10.0 Mpa που αντιστοιχεί σε μαλακό έδαφος.

5) ΠΕΡΙΓΡΑΦΗ ΣΤΑΤΙΚΩΝ ΕΠΙΛΥΣΕΩΝ ΚΙΒΩΤΟΕΙΔΩΝ ΔΙΑΤΟΜΩΝ

Γενικά – Μοντέλο υπολογισμού

Για την ανάλυση του κλειστού κιβωτοειδούς οχετού, επιλύεται ένα τμήμα που αντιστοιχεί σε 1.00 m μήκους. Χρησιμοποιείται το γραμμικό μοντέλο που φαίνεται στο παρακάτω σχήμα (Σχήμα 1). Πρόκειται για ορθή τομή του κιβωτίου, ελεύθερου ανοίγματος L και ύψους H.

Η εξιδανίκευση του πτερυγότοιχου εξόδου έγινε με επιφανειακά πεπερασμένα στοιχεία κελύφους. Το πάχος των στοιχείων της πλάκας πυθμένα είναι 0.95m ενώ αυτό των τοιχωμάτων είναι μεταβλητό καθ'ύψος από 0.95m έως 0.30m. Για αυτόν τον λόγο τα πεπερασμένα στοιχεία έχουν μεταβλητό πάχος καθ'ύψος με τα τοιχώματα να χωρίζονται σε λωρίδες και να εφαρμόζεται το μέσο πάχος σε κάθε λωρίδα.

Φορτίσεις στον οχετό

ΦΟΡΤΙΣΕΙΣ ΧΩΡΙΣ ΣΕΙΣΜΟ

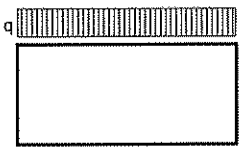
Μόνιμα φορτία

Φόρτιση 1 *Ίδιο βάρος* - αυτόματα από το πρόγραμμα με $\gamma = 25$ KN/m^3.

Φόρτιση 2 *Ίδιο βάρος επιχώματος.*

$q = \gamma_S H_{επ}$

για γ_S=20 KN/m^3

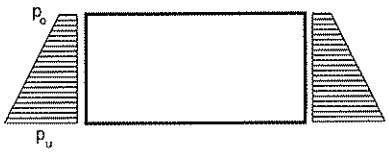


Φόρτιση 3 *Ωθήσεις γαιών*

$p_O = \lambda \gamma_S (H_{επ}+D_O/2)$ και

$p_U = \lambda \gamma_S (H_{επ}+D_u/2+H1)$ όπου :

$\lambda = 1-\sin\varphi$ (ωθήσεις ηρεμίας)



Φόρτιση 4 *Νερό στο εσωτερικό του οχετού.*

$q = \gamma_W H_W$ με γ_W=10 KN/m^3

Στην επίλυση του οχετού λαμβάνεται υπόψη μέγιστο ύψος νερού στο εσωτερικό του τόσο ώστε να έχει ελεύθερο περιθώριο ίσο με $H_{w,min,ελ.ύψος}$=0.50m.

Φόρτιση 5 *Συστολή πήξης άνω πλάκας (συρρίκνωση).*

Ισοδύναμη μεταβολή θερμοκρασίας ΔΤ= -20° C.

Φόρτιση 6,7 *Ομοιόμορφη μεταβολή θερμοκρασίας (ΔΤ= +20° C, ΔΤ= -30° C).*

Ισοδύναμη μεταβολή θερμοκρασίας ΔΤ= 20° C και ΔΤ= -30° C.

Φόρτιση 8,9 *Διαφορά θερμοκρασίας μέσα – έξω δΤ=7° C και δΤ=-3.5° C.*

Φορτίσεις κινητού

Υπολογίζεται φορτίο που οφείλεται σε όχημα SLW60/30. Το φορτίο κατανέμεται με το βάθος με γωνία 30° ως προς την κατακόρυφο (κατανομή κατά Eibl). Για $H_{επ}$ < 2.00m, υπολογίζεται το φορτίο κάθε τροχού από τη σχέση:

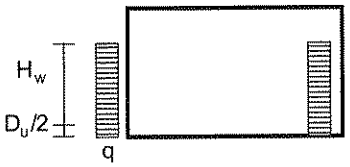
$$q = \frac{P \times \varphi}{(0.2 + 2 \times H_{επ} \times \tan 30^\circ) \times (0.6 + 2 \times H_{επ} \times \tan 30^\circ)}$$

όπου P = 100KN (φορτίο τροχού)

$\varphi = 1.4 - 0.008xL - 0.1xH_{επ} > 1.0$ (συντελεστής ταλάντωσης)

Φόρτιση 23 *Σεισμός νερού εσωτερικά.*

Λαμβάνεται υπόψη μείωση υδροστατικών πιέσεων στο αριστερό τοίχωμα και αύξηση κατά: $p = 7/12 \times \alpha \times \gamma_w \times H_w$ όπου p είναι η τιμή του ομοιόμορφου διαγράμματος που ισοδυναμεί με το παραβολικό διάγραμμα: $p(z) = 7/8 \times \alpha \times \gamma_w \times \sqrt{z} \times \sqrt{H_w}$ της σχέσης Westergaard.

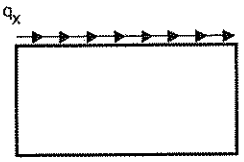


Φόρτιση 24 *Σεισμός κινητών.*

Υπολογίζονται οι δυνάμεις που προέρχονται από το φορτίο του οχήματος SLW 60/30t, θεωρώντας ότι κατανέμεται με το βάθος με γωνία 30° ως προς την κατακόρυφο (κατά Eibl) και ότι ασκείται σαν οριζόντιο, ομοιόμορφα κατανεμημένο στον άξονα της πάνω πλάκας, πολλαπλασιασμένο με τον σεισμικό συντελεστή α.

Ανάλογα με τη φόρτιση 10 με οριζόντιο φορτίο

$q_X = q \times \alpha$.



Φόρτιση 25 *Ομόφορη αύξηση ωθήσεων γαιών .*

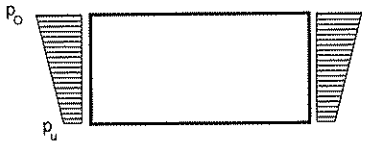
$p=0.75\ \alpha\ \gamma_S\ H_1$

Φόρτιση 26 *Αντίθετη αύξηση ωθήσεων γαιών*

Λαμβάνεται αντίθετη αύξηση των ωθήσεων γαιών.

$p_O = 1.5\ \alpha\ \gamma_S\ H_1$

$p_U = 0.5\ \alpha\ \gamma_S\ H_1$



Φορτίσεις στον πτερυγότοιχο

ΦΟΡΤΙΣΕΙΣ ΧΩΡΙΣ ΣΕΙΣΜΟ

Φόρτιση 1 : *Ίδιο βάρος*

Το ίδιο βάρος υπολογίζεται αυτόματα από το πρόγραμμα με $\gamma=25\ KN/m^3$.

Φόρτιση 4 : *Πρόσθετες ωθήσεις γαιών λόγω σεισμού*

Οι ωθήσεις σεισμού στο αριστερό τοίχωμα υπολογίζονται κατά Mononobe-Okabe, με συντελεστή ωθήσεων:

$$K_{AE} = \frac{\cos^2(\varphi - \theta - \beta)}{\cos\theta \cdot \cos^2\beta \cdot \cos(\delta + \beta + \theta) \cdot \left[1 + \sqrt{\frac{\sin(\varphi + \delta) \cdot \sin(\varphi - \theta - i)}{\cos(\delta + \beta + \theta) \cdot \cos(i - \beta)}}\right]^2}$$

όπου:

$$\theta = \arctan\left(\frac{\alpha_h}{1 - \alpha_v}\right)$$

$\alpha_h = \alpha$ και $\alpha_v = 0.2 \times \alpha$

Για τις υπόλοιπες παραμέτρους χρησιμοποιούνται οι ίδιες τιμές με αυτές που χρησιμοποιήθηκαν στο συντελεστή ενεργητικών ωθήσεων.

Επιλύεται η φόρτιση που αντιστοιχεί μόνο στις πρόσθετες ωθήσεις λόγω σεισμού, δηλαδή για συντελεστή ωθήσεων $K' = K_{AE} - K_E$. Η φόρτιση έχει παρόμοια μορφή με τη φόρτιση LC2, αλλά με ομόφορη διεύθυνση των ωθήσεων και για τα δύο τοιχώματα, θεωρώντας, επί το δυσμενέστερο, ότι ο σεισμός προκαλεί αύξηση ωθήσεων στο αριστερό τοίχωμα και μείωση στο δεξιό.

Για να ληφθεί υπόψη η πρόσθετη ροπή που προκαλεί η εφαρμογή της συνισταμένης δύναμης P στο 0.4H (αντί του H/3 που αντιστοιχεί σε τριγωνική κατανομή των ωθήσεων) προστίθεται ροπή

$$\Delta M = P \times (0.4H - H/3)$$

Η ροπή αυτή δίνεται ως τριγωνικά κατανεμημένο φορτίο καθ' ύψος των τοιχωμάτων με τιμή στη βάση:

$$\Delta m_u = \frac{1}{15} K_{AE} \cdot \gamma_S \cdot H^2$$

Φόρτιση 5 *Ωθήσεις σεισμού κινητού φορτίου*

Η επίλυση γίνεται για τις πρόσθετες ωθήσεις σεισμού κινητού οχήματος SLW 60/30t, στο αριστερό τοίχωμα. Η φόρτιση αυτή είναι ανάλογη με την LC3, με χρήση συντελεστή $K' = K_{AE} - K_E$.

Συνδυασμοί Φορτίσεων

Υπολογίζονται οι μέγιστες και ελάχιστες ροπές και αξονικές για όλους τους πιθανούς συνδυασμούς φορτίσεων με και χωρίς σεισμό για οριακή κατάσταση αστοχίας και λειτουργικότητας, που προβλέπονται από τον Ευρωκώδικα 1 (EC1).

Υπολογισμός Οπλισμού

Ο υπολογισμός του οπλισμού γίνεται όλους τους συνδυασμούς με και χωρίς σεισμό αυτόματα από το πρόγραμμα.

ΑΠΟΤΕΛΕΣΜΑΤΑ Η/Υ

ΣΤΑΤΙΚΗ ΕΠΙΛΥΣΗ ΚΙΒΩΤΟΕΙΔΟΥΣ ΟΧΕΤΟΥ

W x H = 4.00m x 6.00m $H_{επ}$ = 3.00m

(Πρόγραμμα: SOFiSTiK)

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Materials/Υλικά

Default design code is EuroNorm EN 1992 (2004) Concrete Structures (Europe) V 27.0
Structure and Tab.7.1N: AN (Buildings)
Snow load zone : 1

No. 1 C 20/25 (EN 1992)

Youngs-modulus	E	29962	[N/mm2]	Safetyfactor		1.50 [-]
Poisson-Ratio	mu	0.20	[-]	Strength	fc	20.00 [MPa]
Shear-modulus	G	12484	[N/mm2]	Nomin. strength	fck	20.00 [MPa]
Compression modulus		16646	[N/mm2]	Tens. strength	fctm	2.21 [MPa]
Weight		25.0	[kN/m3]	5 % t.strength	fctk	1.55 [MPa]
Weight buoyancy		25.0	[kN/m3]	95 % t.strength	fctk	2.87 [MPa]
Temp.elongat.coeff.		1.00E-05	[1/°K]	Bond strength	fbd	2.32 [MPa]
				Service strength		28.00 [MPa]
				Fatigue strength		12.27 [MPa]
				Ten.strngth fctd		1.03 [MPa]

Stress-Strain for serviceability
Is only valid within the defined
stress range

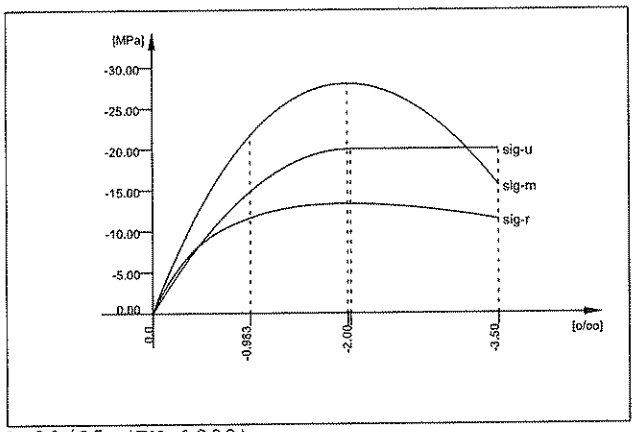
eps[o/oo]	sig-m[MPa]	E-t[N/mm2]
0.000	0.00	31460
-0.983	-21.66	13498
-1.967	-28.00	0
-3.500	-15.60	-15208
Safetyfactor		1.35

Stress-Strain for ultimate load
Is only valid within the defined
stress range

eps[o/oo]	sig-u[MPa]	E-t[N/mm2]
0.000	0.00	20000
-2.000	-20.00	0
-3.500	-20.00	0
Safetyfactor		1.50

Stress-Strain of calc. mean values
Is only valid within the defined
stress range

eps[o/oo]	sig-r[MPa]	E-t[N/mm2]
0.000	0.00	26217
-0.983	-11.61	4353
-1.967	-13.33	0
-3.500	-11.46	-2034
Safetyfactor		(1.50)



C 20/25 (EN 1992)

No. 2 B 500 C (EN 1992)

Youngs-modulus	E	200000	[N/mm2]	Safetyfactor		1.15 [-]
Poisson-Ratio	mu	0.30	[-]	Yield stress	fy	500.00 [MPa]
Shear-modulus	G	76923	[N/mm2]	Compr.yield val.	fyc	500.00 [MPa]
Compression modulus		166667	[N/mm2]	Tens. strength	ft	575.00 [MPa]
Weight		78.5	[kN/m3]	Compr. strength	fc	575.00 [MPa]
Weight buoyancy		78.5	[kN/m3]	Ultim. plast. strain		75.00 [o/oo]
Temp.elongat.coeff.		1.20E-05	[1/°K]	relative bond coeff.		1.00 [-]
max. thickness		32.00	[mm]	EC2 bondcoeff. K1		0.80 [-]
				Hardening modulus		0.00 [MPa]
				Proportional limit		500.00 [MPa]
				Dynamic stress range		152.17 [MPa]

Stress-Strain for serviceability

eps[o/oo]	sig-m[MPa]	E-t[N/mm2]

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Materials/Υλικά

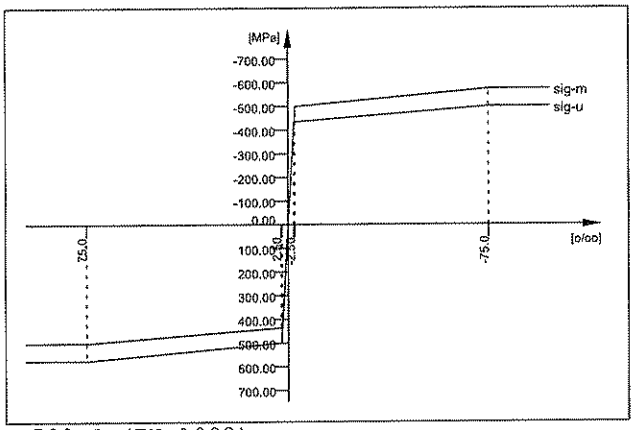
No. 2 B 500 C (EN 1992)

Is also extended beyond the defined stress range

1000.000	575.00	0
75.000	575.00	0
2.500	500.00	1034
0.000	0.00	200000
-2.500	-500.00	200000
-75.000	-575.00	1034
-1000.000	-575.00	0
Safetyfactor		1.15

Stress-Strain for ultimate load
Is also extended beyond the defined stress range

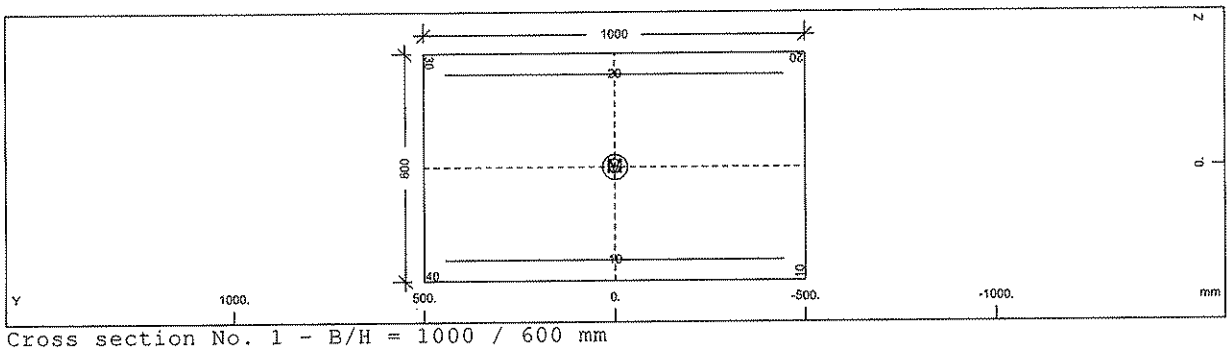
eps[o/oo]	sig-u[MPa]	E-t[N/mm2]
1000.000	500.00	0
75.000	500.00	0
2.174	434.78	896
0.000	0.00	200000
-2.174	-434.78	200000
-75.000	-500.00	896
-1000.000	-500.00	0
Safetyfactor		(1.15)



B 500 C (EN 1992)

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Sections/Διατομές

Cross section No. 1 - B/H = 1000 / 600 mm

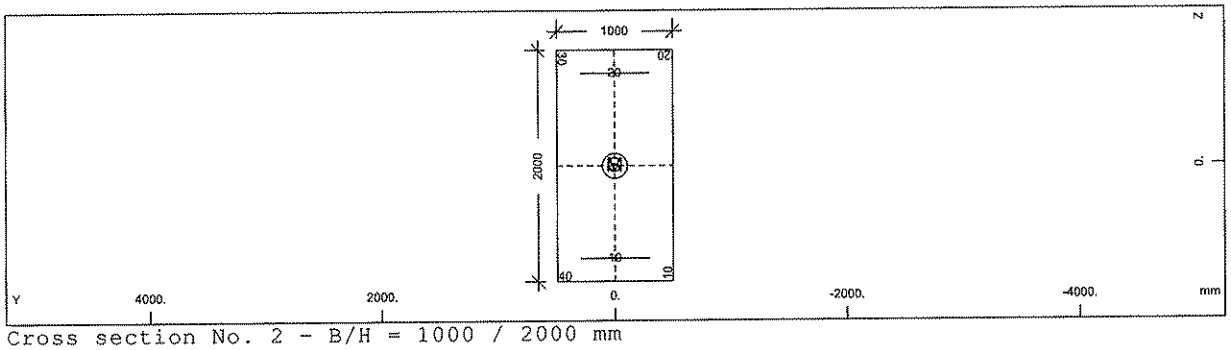


Cross section No. 1 - B/H = 1000 / 600 mm

Static properties of cross section

No.	Mat NoR	A[m2] It[m4]	Ay/Az/Ayz [m2]	Iy/Iz/Iyz [m4]	ys/zs [mm]	y/z-sc [mm]	modules [N/mm2]	gam [kN/m]
1	=	B/H = 1000 / 600 mm						
(CENT)	1	6.0000E-01		1.800E-02	0.0	0.0	29962	15.00
	2	4.471E-02		5.000E-02	0.0	0.0	12484	

Cross section No. 2 - B/H = 1000 / 2000 mm



Cross section No. 2 - B/H = 1000 / 2000 mm

Static properties of cross section

No.	Mat NoR	A[m2] It[m4]	Ay/Az/Ayz [m2]	Iy/Iz/Iyz [m4]	ys/zs [mm]	y/z-sc [mm]	modules [N/mm2]	gam [kN/m]
2	=	B/H = 1000 / 2000 mm						
(CENT)	11	2.0000E+00		6.667E-01	0.0	0.0	29962	15.00
	2	4.580E-01		1.667E-01	0.0	0.0	12484	

Mesh Generation

Supporting Lines

from	to	inc	type	ref	CA/CB	Title/Direction
2	---------					Line
						Total Length 4.000 [m]
						100.00 percent active
1003	1034	31	CN	S	2.44E+03	0.000 -1.000 0.000
1034	1035	1	CN	S	2.44E+03	0.000 -1.000 0.000
1035	1036	1	CN	S	2.44E+03	0.000 -1.000 0.000
1036	1037	1	CN	S	2.44E+03	0.000 -1.000 0.000
1037	1038	1	CN	S	2.44E+03	0.000 -1.000 0.000
1038	1039	1	CN	S	2.44E+03	0.000 -1.000 0.000
1039	1040	1	CN	S	2.44E+03	0.000 -1.000 0.000
1040	1041	1	CN	S	2.44E+03	0.000 -1.000 0.000
1041	1042	1	CN	S	2.44E+03	0.000 -1.000 0.000
1042	1043	1	CN	S	2.44E+03	0.000 -1.000 0.000
1043	1044	1	CN	S	2.44E+03	0.000 -1.000 0.000
1044	1045	1	CN	S	2.44E+03	0.000 -1.000 0.000
1045	1046	1	CN	S	2.44E+03	0.000 -1.000 0.000
1046	1004	-42	CN	S	2.44E+03	0.000 -1.000 0.000
2	---------					Line
						Total Length 4.000 [m]
						0.00 percent active
1003	1034	31	CT	S	1.22E+03	0.000 -1.000 0.000
1034	1035	1	CT	S	1.22E+03	0.000 -1.000 0.000
1035	1036	1	CT	S	1.22E+03	0.000 -1.000 0.000
1036	1037	1	CT	S	1.22E+03	0.000 -1.000 0.000
1037	1038	1	CT	S	1.22E+03	0.000 -1.000 0.000
1038	1039	1	CT	S	1.22E+03	0.000 -1.000 0.000
1039	1040	1	CT	S	1.22E+03	0.000 -1.000 0.000
1040	1041	1	CT	S	1.22E+03	0.000 -1.000 0.000
1041	1042	1	CT	S	1.22E+03	0.000 -1.000 0.000
1042	1043	1	CT	S	1.22E+03	0.000 -1.000 0.000
1043	1044	1	CT	S	1.22E+03	0.000 -1.000 0.000
1044	1045	1	CT	S	1.22E+03	0.000 -1.000 0.000
1045	1046	1	CT	S	1.22E+03	0.000 -1.000 0.000
1046	1004	-42	CT	S	1.22E+03	0.000 -1.000 0.000
6	---------					Line
						Total Length 0.250 [m]
						100.00 percent active
1004	1009	5	CN	S	2.50E+03	0.000 -1.000 0.000
6	---------					Line
						Total Length 0.250 [m]
						0.00 percent active
1004	1009	5	CT	S	1.25E+03	0.000 -1.000 0.000
12	---------					Line
						Total Length 0.250 [m]
						100.00 percent active
1012	1003	-9	CN	S	2.50E+03	0.000 -1.000 0.000
12	---------					Line
						Total Length 0.250 [m]
						0.00 percent active
1012	1003	-9	CT	S	1.25E+03	0.000 -1.000 0.000
11001	---------					Line
						Total Length 1.910 [m]
						100.00 percent active
1007	1060	53	CN	S	5.39E+03	-1.000 0.000 0.000
					5.39E+03	
1060	1061	1	CN	S	5.39E+03	-1.000 0.000 0.000
					5.39E+03	
1061	1062	1	CN	S	5.39E+03	-1.000 0.000 0.000
1062	1063	1	CN	S	5.39E+03	-1.000 0.000 0.000
1063	1064	1	CN	S	5.39E+03	-1.000 0.000 0.000
1064	1065	1	CN	S	5.39E+03	-1.000 0.000 0.000
1065	1014	-51	CN	S	5.39E+03	-1.000 0.000 0.000

Mesh Generation

Supporting Lines

from	to	inc	type	ref	CA/CB	Title/Direction
11002	---------					Line
						Total Length 2.160 [m]
						100.00 percent active
1014	1066	52	CN	S	8.08E+03	-1.000 0.000 0.000
1066	1067	1	CN	S	8.08E+03	-1.000 0.000 0.000
1067	1068	1	CN	S	8.08E+03	-1.000 0.000 0.000
1068	1069	1	CN	S	8.08E+03	-1.000 0.000 0.000
1069	1070	1	CN	S	8.08E+03	-1.000 0.000 0.000
1070	1071	1	CN	S	8.08E+03	-1.000 0.000 0.000
1071	1072	1	CN	S	8.08E+03	-1.000 0.000 0.000
1072	1013	-59	CN	S	8.08E+03	-1.000 0.000 0.000
11005	---------					Line
						Total Length 1.930 [m]
						100.00 percent active
1013	1073	60	CN	S	1.08E+04	-1.000 0.000 0.000
1073	1074	1	CN	S	1.08E+04	-1.000 0.000 0.000
1074	1075	1	CN	S	1.08E+04	-1.000 0.000 0.000
1075	1076	1	CN	S	1.08E+04	-1.000 0.000 0.000
1076	1077	1	CN	S	1.08E+04	-1.000 0.000 0.000
1077	1078	1	CN	S	1.08E+04	-1.000 0.000 0.000
1078	1008	-70	CN	S	1.08E+04	-1.000 0.000 0.000
11006	---------					Line
						Total Length 0.250 [m]
						100.00 percent active
1008	1012	4	CN	S	1.08E+04	-1.000 0.000 0.000
11007	---------					Line
						Total Length 0.250 [m]
						100.00 percent active
1011	1007	-4	CN	S	5.39E+03	-1.000 0.000 0.000

Mesh Generation

Supporting Lines

from	to	inc	type	ref	CA/CB	Title/Direction
11002	---------					Line
						Total Length 2.160 [m]
						100.00 percent active
1014	1066	52	CN	S	8.08E+03	-1.000 0.000 0.000
1066	1067	1	CN	S	8.08E+03	-1.000 0.000 0.000
1067	1068	1	CN	S	8.08E+03	-1.000 0.000 0.000
1068	1069	1	CN	S	8.08E+03	-1.000 0.000 0.000
1069	1070	1	CN	S	8.08E+03	-1.000 0.000 0.000
1070	1071	1	CN	S	8.08E+03	-1.000 0.000 0.000
1071	1072	1	CN	S	8.08E+03	-1.000 0.000 0.000
1072	1013	-59	CN	S	8.08E+03	-1.000 0.000 0.000
11005	---------					Line
						Total Length 1.930 [m]
						100.00 percent active
1013	1073	60	CN	S	1.08E+04	-1.000 0.000 0.000
1073	1074	1	CN	S	1.08E+04	-1.000 0.000 0.000
1074	1075	1	CN	S	1.08E+04	-1.000 0.000 0.000
1075	1076	1	CN	S	1.08E+04	-1.000 0.000 0.000
1076	1077	1	CN	S	1.08E+04	-1.000 0.000 0.000
1077	1078	1	CN	S	1.08E+04	-1.000 0.000 0.000
1078	1008	-70	CN	S	1.08E+04	-1.000 0.000 0.000
11006	---------					Line
						Total Length 0.250 [m]
						100.00 percent active
1008	1012	4	CN	S	1.08E+04	-1.000 0.000 0.000
11007	---------					Line
						Total Length 0.250 [m]
						100.00 percent active
1011	1007	-4	CN	S	5.39E+03	-1.000 0.000 0.000

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Calculation of forces and moments

Elementgroups

No	fac-S	fac-L	fac-D	fac-P	fac-B	PLC
0	1.000	1.000	0.000	1.000	1.000	0

Load Case 1 (G) Idio Varos

Factor forces and moments		1.000	
Factor dead weight	DL-XX	0.000	
Factor dead weight	DL-YY	1.000	
unfavourable safety factor		1.350	
favourable safety factor		1.000	
Combination coefficient ψ-0		1.000	(rare)
Combination coefficient ψ-1'		1.000	(non frequent)
Combination coefficient ψ-1		1.000	(frequent)
Combination coefficient ψ-2		1.000	(permanent)

Load Case 2 (G) Idio Varos Epixwsis

Factor forces and moments		1.000	
Factor dead weight	DL-XX	0.000	
Factor dead weight	DL-YY	0.000	
unfavourable safety factor		1.350	
favourable safety factor		1.000	
Combination coefficient ψ-0		1.000	(rare)
Combination coefficient ψ-1'		1.000	(non frequent)
Combination coefficient ψ-1		1.000	(frequent)
Combination coefficient ψ-2		1.000	(permanent)

Loads

Kind	Referenceto	Projection W[m]	Coordinates X[m]	Y[m]	Z[m]	Type	Loadvalue
Line			0.000	-6.500	0.000	PG	60.00 [kN/m]
			4.500	-6.500	0.000		60.00 [kN/m]
	gln -mult-				activated		100.00 percent

Load Case 3 (R) Othiseis Hremias

Factor forces and moments		1.000	
Factor dead weight	DL-XX	0.000	
Factor dead weight	DL-YY	0.000	
unfavourable safety factor		1.350	
favourable safety factor		1.000	
Combination coefficient ψ-0		1.000	(rare)
Combination coefficient ψ-1'		1.000	(non frequent)
Combination coefficient ψ-1		1.000	(frequent)
Combination coefficient ψ-2		0.000	(permanent)

Loads

Kind	Referenceto	Projection W[m]	Coordinates X[m]	Y[m]	Z[m]	Type	Loadvalue
Line			0.000	-6.500	0.000	PXX	33.00 [kN/m]
			0.000	0.002	0.000		99.00 [kN/m]
	gln -mult-				activated		100.00 percent
Line			4.500	-6.500	0.000	PXX	-33.00 [kN/m]
			4.500	0.000	0.000		-99.00 [kN/m]
	gln -mult-				activated		100.00 percent

Load Case 4 (Q) Water Pressure

Factor forces and moments		1.000	
Factor dead weight	DL-XX	0.000	
Factor dead weight	DL-YY	0.000	
unfavourable safety factor		1.500	
favourable safety factor		0.000	
Combination coefficient ψ-0		0.700	(rare)
Combination coefficient ψ-1'		1.000	(non frequent)
Combination coefficient ψ-1		0.500	(frequent)
Combination coefficient ψ-2		0.300	(permanent)

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Calculation of forces and moments

Loads Kind	Referenceto	Projection W[m]	Coordinates X[m]	Y[m]	Z[m]	Type	Loadvalue	
Line			4.500	-6.000	0.000	PXX	0.00	[kN/m]
			4.500	0.000	0.000		55.00	[kN/m]
	gln -mult-				activated		100.00	percent
Line			0.000	-6.000	0.000	PXX	0.00	[kN/m]
			0.000	0.000	0.000		-55.00	[kN/m]
	gln -mult-				activated		100.00	percent
Line			0.000	0.000	0.000	PG	55.00	[kN/m]
			4.500	0.000	0.000		55.00	[kN/m]
	gln -mult-				activated		100.00	percent

Load Case 5 (C) Shrinkage

Factor forces and moments	1.000	
Factor dead weight DL-XX	0.000	
Factor dead weight DL-YY	0.000	
unfavourable safety factor	1.000	
favourable safety factor	1.000	
Combination coefficient ψ-0	1.000	(rare)
Combination coefficient ψ-1'	1.000	(non frequent)
Combination coefficient ψ-1	1.000	(frequent)
Combination coefficient ψ-2	1.000	(permanent)

Loads Kind	Referenceto	Projection W[m]	Coordinates X[m]	Y[m]	Z[m]	Type	Loadvalue	
Line			4.250	-6.500	0.000	TEMP	-20.000	[°C]
			4.500	-6.500	0.000		-20.000	[°C]
	GLN 9				activated		100.00	percent
Line			0.000	-6.500	0.000	TEMP	-20.000	[°C]
			0.250	-6.500	0.000		-20.000	[°C]
	GLN 8				activated		100.00	percent
Line			0.250	-6.500	0.000	TEMP	-20.000	[°C]
			4.250	-6.500	0.000		-20.000	[°C]
	GLN 3				activated		100.00	percent

Load Case 6 (T) Uniform Temp +20

Factor forces and moments	1.000	
Factor dead weight DL-XX	0.000	
Factor dead weight DL-YY	0.000	
unfavourable safety factor	1.000	
favourable safety factor	0.000	
Combination coefficient ψ-0	0.600	(rare)
Combination coefficient ψ-1'	1.000	(non frequent)
Combination coefficient ψ-1	0.500	(frequent)
Combination coefficient ψ-2	0.000	(permanent)

Loads Kind	Referenceto	Projection W[m]	Coordinates X[m]	Y[m]	Z[m]	Type	Loadvalue	
Line			4.500	0.000	0.000	TEMP	20.000	[°C]
			4.250	0.000	0.000		20.000	[°C]
	GLN 12				activated		100.00	percent
Line			4.500	-0.250	0.000	TEMP	20.000	[°C]
			4.500	0.000	0.000		20.000	[°C]
	GLN 11				activated		100.00	percent
Line			4.500	-6.500	0.000	TEMP	20.000	[°C]
			4.500	-6.250	0.000		20.000	[°C]
	GLN 10				activated		100.00	percent
Line			4.250	-6.500	0.000	TEMP	20.000	[°C]
			4.500	-6.500	0.000		20.000	[°C]
	GLN 9				activated		100.00	percent
Line			0.000	-6.500	0.000	TEMP	20.000	[°C]
			0.250	-6.500	0.000		20.000	[°C]
	GLN 8				activated		100.00	percent

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Calculation of forces and moments

Loads Kind	Referenceto		Projection W[m]	Coordinates X[m]	Y[m]	Z[m]	Type	Loadvalue	
Line				0.000	-6.250	0.000	TEMP	20.000	[°C]
				0.000	-6.500	0.000		20.000	[°C]
	GLN	7				activated		100.00	percent
Line				0.250	0.000	0.000	TEMP	20.000	[°C]
				0.000	0.000	0.000		20.000	[°C]
	GLN	6				activated		100.00	percent
Line				0.000	0.000	0.000	TEMP	20.000	[°C]
				0.000	-0.250	0.000		20.000	[°C]
	GLN	5				activated		100.00	percent
Line				4.500	-6.250	0.000	TEMP	20.000	[°C]
				4.500	-0.250	0.000		20.000	[°C]
	GLN	4				activated		100.00	percent
Line				0.250	-6.500	0.000	TEMP	20.000	[°C]
				4.250	-6.500	0.000		20.000	[°C]
	GLN	3				activated		100.00	percent
Line				4.250	0.000	0.000	TEMP	20.000	[°C]
				0.250	0.000	0.000		20.000	[°C]
	GLN	2				activated		100.00	percent
Line				0.000	-0.250	0.000	TEMP	20.000	[°C]
				0.000	-6.250	0.000		20.000	[°C]
	GLN	1				activated		100.00	percent

Load Case 7 (T) Uniform Temp -30

Factor forces and moments	1.000	
Factor dead weight DL-XX	0.000	
Factor dead weight DL-YY	0.000	
unfavourable safety factor	1.000	
favourable safety factor	0.000	
Combination coefficient ψ-0	0.600	(rare)
Combination coefficient ψ-1'	1.000	(non frequent)
Combination coefficient ψ-1	0.500	(frequent)
Combination coefficient ψ-2	0.000	(permanent)

Loads Kind	Referenceto		Projection W[m]	Coordinates X[m]	Y[m]	Z[m]	Type	Loadvalue	
Line				4.500	0.000	0.000	TEMP	-30.000	[°C]
				4.250	0.000	0.000		-30.000	[°C]
	GLN	12				activated		100.00	percent
Line				4.500	-0.250	0.000	TEMP	-30.000	[°C]
				4.500	0.000	0.000		-30.000	[°C]
	GLN	11				activated		100.00	percent
Line				4.500	-6.500	0.000	TEMP	-30.000	[°C]
				4.500	-6.250	0.000		-30.000	[°C]
	GLN	10				activated		100.00	percent
Line				4.250	-6.500	0.000	TEMP	-30.000	[°C]
				4.500	-6.500	0.000		-30.000	[°C]
	GLN	9				activated		100.00	percent
Line				0.000	-6.500	0.000	TEMP	-30.000	[°C]
				0.250	-6.500	0.000		-30.000	[°C]
	GLN	8				activated		100.00	percent
Line				0.000	-6.250	0.000	TEMP	-30.000	[°C]
				0.000	-6.500	0.000		-30.000	[°C]
	GLN	7				activated		100.00	percent
Line				0.250	0.000	0.000	TEMP	-30.000	[°C]
				0.000	0.000	0.000		-30.000	[°C]
	GLN	6				activated		100.00	percent
Line				0.000	0.000	0.000	TEMP	-30.000	[°C]
				0.000	-0.250	0.000		-30.000	[°C]
	GLN	5				activated		100.00	percent
Line				4.500	-6.250	0.000	TEMP	-30.000	[°C]
				4.500	-0.250	0.000		-30.000	[°C]
	GLN	4				activated		100.00	percent

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Calculation of forces and moments

Loads Kind	Referenceto	Projection W[m]	X[m]	Y[m]	Z[m]	Type	Loadvalue
Line			0.250	-6.500	0.000	TEMP	-30.000 [°C]
			4.250	-6.500	0.000		-30.000 [°C]
	GLN 3				activated		100.00 percent
Line			4.250	0.000	0.000	TEMP	-30.000 [°C]
			0.250	0.000	0.000		-30.000 [°C]
	GLN 2				activated		100.00 percent
Line			0.000	-0.250	0.000	TEMP	-30.000 [°C]
			0.000	-6.250	0.000		-30.000 [°C]
	GLN 1				activated		100.00 percent

Load Case 8 (T) DT +7

Factor forces and moments	1.000	
Factor dead weight DL-XX	0.000	
Factor dead weight DL-YY	0.000	
unfavourable safety factor	1.000	
favourable safety factor	0.000	
Combination coefficient ψ-0	0.600	(rare)
Combination coefficient ψ-1'	1.000	(non frequent)
Combination coefficient ψ-1	0.500	(frequent)
Combination coefficient ψ-2	0.000	(permanent)

Loads Kind	Referenceto	Projection W[m]	X[m]	Y[m]	Z[m]	Type	Loadvalue
Line			4.500	0.000	0.000	dTz	7.000 [°C]
			4.250	0.000	0.000		7.000 [°C]
	GLN 12				activated		100.00 percent
Line			4.500	-0.250	0.000	dTz	7.000 [°C]
			4.500	0.000	0.000		7.000 [°C]
	GLN 11				activated		100.00 percent
Line			4.500	-6.500	0.000	dTz	7.000 [°C]
			4.500	-6.250	0.000		7.000 [°C]
	GLN 10				activated		100.00 percent
Line			4.250	-6.500	0.000	dTz	7.000 [°C]
			4.500	-6.500	0.000		7.000 [°C]
	GLN 9				activated		100.00 percent
Line			0.000	-6.500	0.000	dTz	7.000 [°C]
			0.250	-6.500	0.000		7.000 [°C]
	GLN 8				activated		100.00 percent
Line			0.000	-6.250	0.000	dTz	7.000 [°C]
			0.000	-6.500	0.000		7.000 [°C]
	GLN 7				activated		100.00 percent
Line			0.250	0.000	0.000	dTz	7.000 [°C]
			0.000	0.000	0.000		7.000 [°C]
	GLN 6				activated		100.00 percent
Line			0.000	0.000	0.000	dTz	7.000 [°C]
			0.000	-0.250	0.000		7.000 [°C]
	GLN 5				activated		100.00 percent
Line			4.500	-6.250	0.000	dTz	7.000 [°C]
			4.500	-0.250	0.000		7.000 [°C]
	GLN 4				activated		100.00 percent
Line			0.250	-6.500	0.000	dTz	7.000 [°C]
			4.250	-6.500	0.000		7.000 [°C]
	GLN 3				activated		100.00 percent
Line			4.250	0.000	0.000	dTz	7.000 [°C]
			0.250	0.000	0.000		7.000 [°C]
	GLN 2				activated		100.00 percent
Line			0.000	-0.250	0.000	dTz	7.000 [°C]
			0.000	-6.250	0.000		7.000 [°C]
	GLN 1				activated		100.00 percent

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Calculation of forces and moments

Load Case 9 (T) DT -3.5

Factor forces and moments	1.000	
Factor dead weight DL-XX	0.000	
Factor dead weight DL-YY	0.000	
unfavourable safety factor	1.000	
favourable safety factor	0.000	
Combination coefficient ψ-0	0.600	(rare)
Combination coefficient ψ-1'	1.000	(non frequent)
Combination coefficient ψ-1	0.500	(frequent)
Combination coefficient ψ-2	0.000	(permanent)

Loads

Kind	Referenceto	Projection Coordinates W[m]	X[m]	Y[m]	Z[m]	Type	Loadvalue
Line			4.500	0.000	0.000	dTz	-3.500 [°C]
			4.250	0.000	0.000		-3.500 [°C]
	GLN 12				activated		100.00 percent
Line			4.500	-0.250	0.000	dTz	-3.500 [°C]
			4.500	0.000	0.000		-3.500 [°C]
	GLN 11				activated		100.00 percent
Line			4.500	-6.500	0.000	dTz	-3.500 [°C]
			4.500	-6.250	0.000		-3.500 [°C]
	GLN 10				activated		100.00 percent
Line			4.250	-6.500	0.000	dTz	-3.500 [°C]
			4.500	-6.500	0.000		-3.500 [°C]
	GLN 9				activated		100.00 percent
Line			0.000	-6.500	0.000	dTz	-3.500 [°C]
			0.250	-6.500	0.000		-3.500 [°C]
	GLN 8				activated		100.00 percent
Line			0.000	-6.250	0.000	dTz	-3.500 [°C]
			0.000	-6.500	0.000		-3.500 [°C]
	GLN 7				activated		100.00 percent
Line			0.250	0.000	0.000	dTz	-3.500 [°C]
			0.000	0.000	0.000		-3.500 [°C]
	GLN 6				activated		100.00 percent
Line			0.000	0.000	0.000	dTz	-3.500 [°C]
			0.000	-0.250	0.000		-3.500 [°C]
	GLN 5				activated		100.00 percent
Line			4.500	-6.250	0.000	dTz	-3.500 [°C]
			4.500	-0.250	0.000		-3.500 [°C]
	GLN 4				activated		100.00 percent
Line			0.250	-6.500	0.000	dTz	-3.500 [°C]
			4.250	-6.500	0.000		-3.500 [°C]
	GLN 3				activated		100.00 percent
Line			4.250	0.000	0.000	dTz	-3.500 [°C]
			0.250	0.000	0.000		-3.500 [°C]
	GLN 2				activated		100.00 percent
Line			0.000	-0.250	0.000	dTz	-3.500 [°C]
			0.000	-6.250	0.000		-3.500 [°C]
	GLN 1				activated		100.00 percent

Load Case 10 (Q) Kinita Omoiomorfa

Factor forces and moments	1.000	
Factor dead weight DL-XX	0.000	
Factor dead weight DL-YY	0.000	
unfavourable safety factor	1.500	
favourable safety factor	0.000	
Combination coefficient ψ-0	0.700	(rare)
Combination coefficient ψ-1'	1.000	(non frequent)
Combination coefficient ψ-1	0.500	(frequent)
Combination coefficient ψ-2	0.300	(permanent)

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Calculation of forces and moments

Loads

Kind	Referenceto	Projection	Coordinates			Type	Loadvalue	
		W[m]	X[m]	Y[m]	Z[m]			
Line			0.000	-6.500	0.000	PG	13.68	[kN/m]
			4.500	-6.500	0.000		13.68	[kN/m]
	gln -mult-				activated		100.00	percent

Load Case 11 (Q_A) Troxopedisi

Factor forces and moments	1.000	
Factor dead weight DL-XX	0.000	
Factor dead weight DL-YY	0.000	
unfavourable safety factor	1.500	
favourable safety factor	0.000	
Combination coefficient ψ-0	0.700	(rare)
Combination coefficient ψ-1'	1.000	(non frequent)
Combination coefficient ψ-1	0.500	(frequent)
Combination coefficient ψ-2	0.300	(permanent)

Loads

Kind	Referenceto	Projection	Coordinates			Type	Loadvalue	
		W[m]	X[m]	Y[m]	Z[m]			
Line			0.000	-6.500	0.000	PXX	4.44	[kN/m]
			4.500	-6.500	0.000		4.44	[kN/m]
	gln -mult-				activated		100.00	percent

Load Case 12 (Q_A) Othiseis apo Kinita

Factor forces and moments	1.000	
Factor dead weight DL-XX	0.000	
Factor dead weight DL-YY	0.000	
unfavourable safety factor	1.500	
favourable safety factor	0.000	
Combination coefficient ψ-0	0.700	(rare)
Combination coefficient ψ-1'	1.000	(non frequent)
Combination coefficient ψ-1	0.500	(frequent)
Combination coefficient ψ-2	0.300	(permanent)

Loads

Kind	Referenceto	Projection	Coordinates			Type	Loadvalue	
		W[m]	X[m]	Y[m]	Z[m]			
Line			0.000	-6.500	0.000	PXX	6.21	[kN/m]
			0.000	0.000	0.000		3.35	[kN/m]
	gln -mult-				activated		100.00	percent
Line			4.500	-6.500	0.000	PXX	-2.50	[kN/m]
			4.500	0.000	0.000		-2.50	[kN/m]
	gln -mult-				activated		100.00	percent

Load Case 13 (G) Monima Strwsis Fthoras

Factor forces and moments	1.000	
Factor dead weight DL-XX	0.000	
Factor dead weight DL-YY	0.000	
unfavourable safety factor	1.350	
favourable safety factor	1.000	
Combination coefficient ψ-0	1.000	(rare)
Combination coefficient ψ-1'	1.000	(non frequent)
Combination coefficient ψ-1	1.000	(frequent)
Combination coefficient ψ-2	1.000	(permanent)

Loads

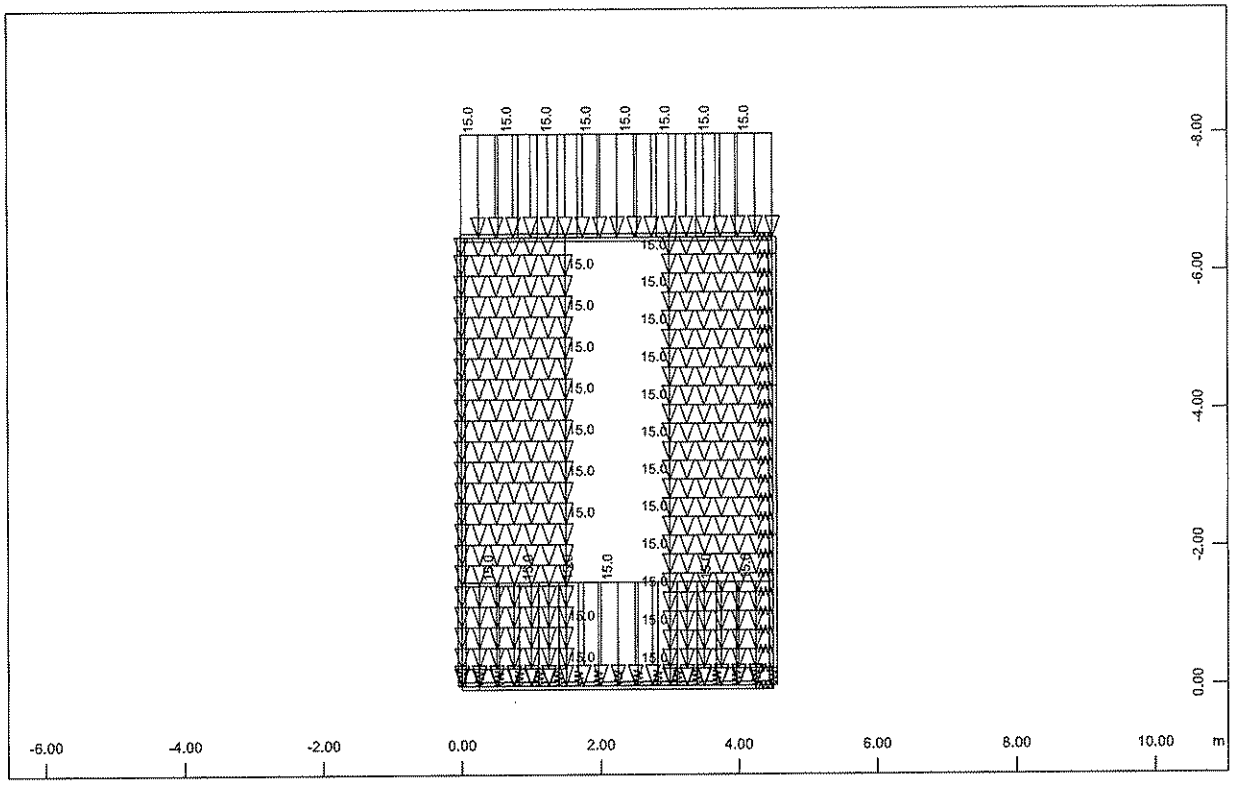
Kind	Referenceto	Projection	Coordinates			Type	Loadvalue	
		W[m]	X[m]	Y[m]	Z[m]			
Line			0.000	0.000	0.000	PG	5.00	[kN/m]
			4.500	0.000	0.000		5.00	[kN/m]
	gln -mult-				activated		100.00	percent

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Calculation of forces and moments

Sum of Reactions and Loads

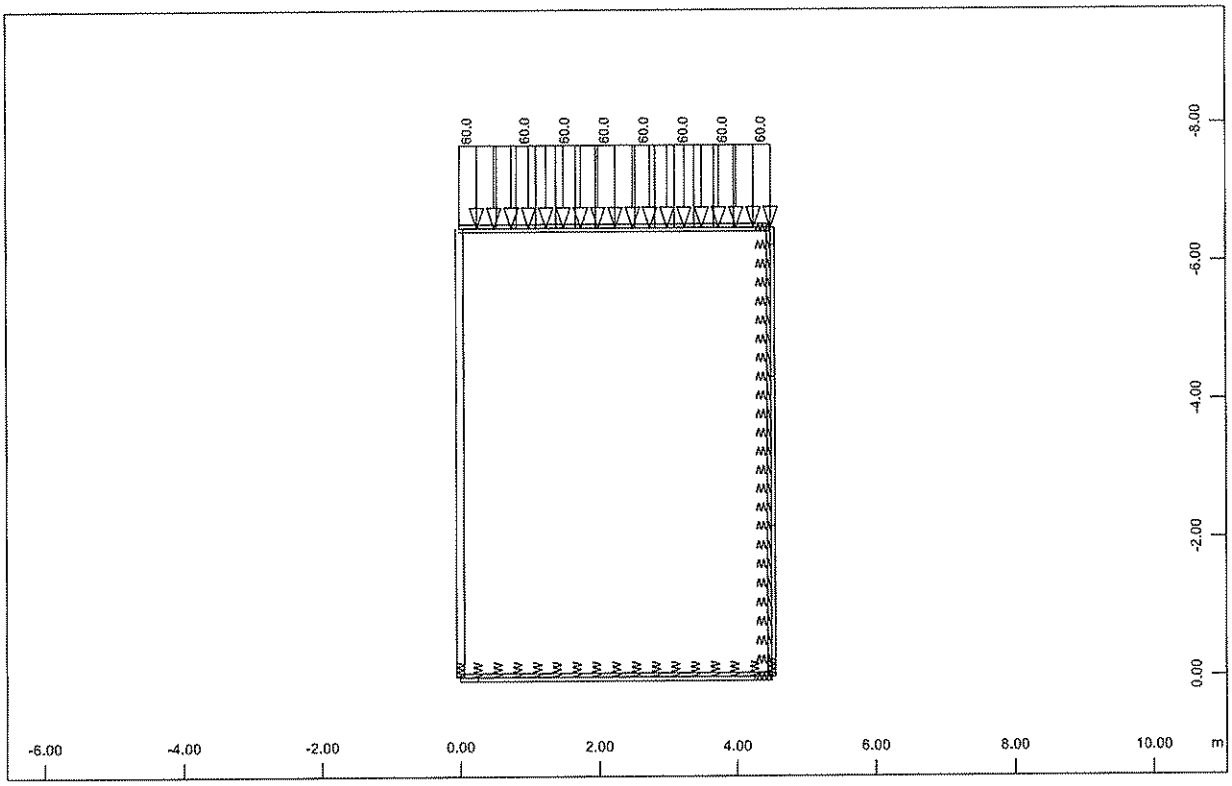
LC	Title	PXX[kN]	PYY[kN]	PZZ[kN]
1	Idio Varos	0.0	-330.0	0.0
		0.0	330.0	0.0
2	Idio Varos Epixwsis	0.0	-269.9	0.0
		0.0	269.9	0.0
3	Othiseis Hremias	-0.1	0.0	0.0
		0.1	0.0	0.0
4	Water Pressure	0.0	-247.4	0.0
		0.0	247.4	0.0
5	Shrinkage	0.0	0.0	0.0
		0.0	0.0	0.0
6	Uniform Temp +20	0.0	0.0	0.0
		0.0	0.0	0.0
7	Uniform Temp -30	0.0	0.0	0.0
		0.0	0.0	0.0
8	DT +7	0.0	0.0	0.0
		0.0	0.0	0.0
9	DT -3.5	0.0	0.0	0.0
		0.0	0.0	0.0
10	Kinita Omoiomorfa	0.0	-61.5	0.0
		0.0	61.5	0.0
11	Troxopedisi	-20.0	0.0	0.0
		20.0	0.0	0.0
12	Othiseis apo Kinita	-14.8	0.0	0.0
		14.8	0.0	0.0
13	Monima Strwsis Fthoras	0.0	-22.5	0.0
		0.0	22.5	0.0

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output



All loads (in components), Loadcase 1 Idio Varos , (1 cm 3D = unit) Beam dead load in global Y (Unit=10.0 kN/m) (Max=15.0)

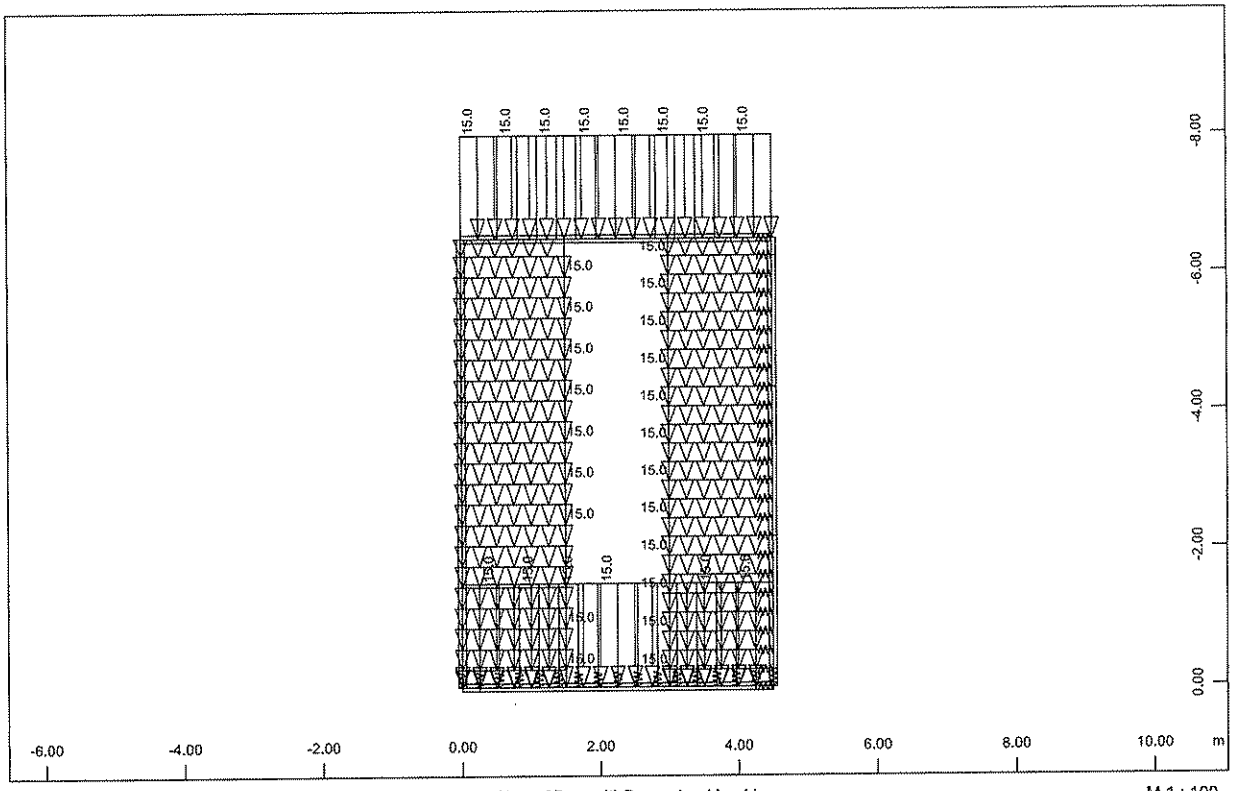
M 1 : 100



All loads (in components), Loadcase 2 Idio Varos Epixwsis , (1 cm 3D = unit) Beam line load (force) in global Y (Unit=50.0 kN/m) (Max=60.0)

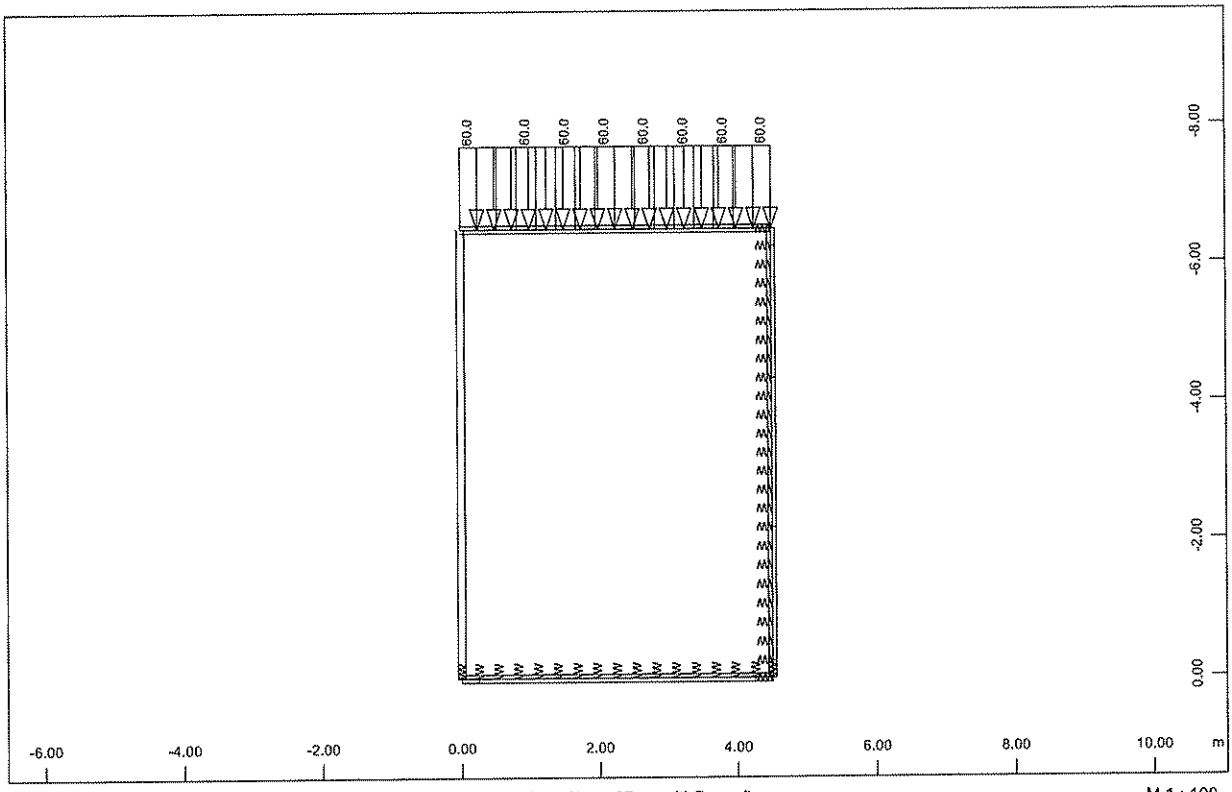
M 1 : 100

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output



All loads (in components), Loadcase 1 Idio Varos , (1 cm 3D = unit) Beam dead load in global Y (Unit=10.0 kN/m) (Max=15.0)

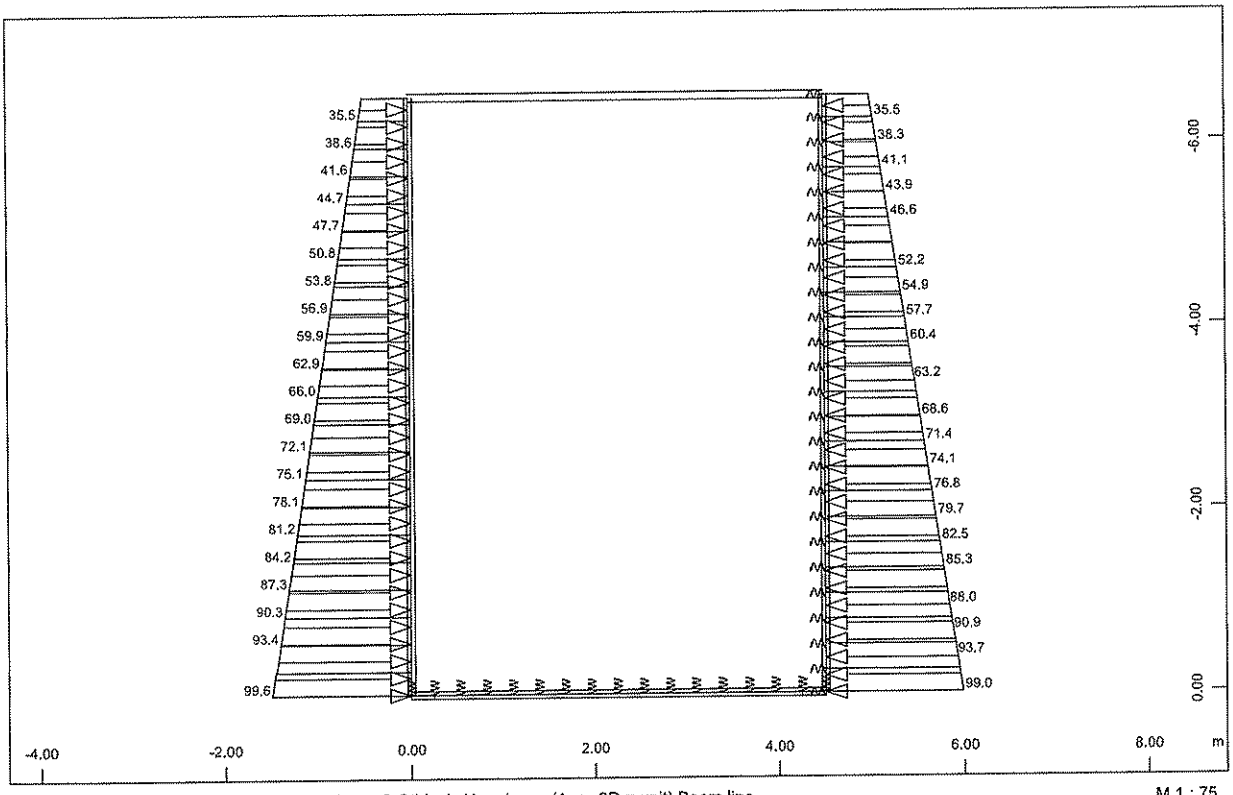
M 1 : 100



All loads (in components), Loadcase 2 Idio Varos Epixwsis , (1 cm 3D = unit) Beam line load (force) in global Y (Unit=50.0 kN/m) (Max=60.0)

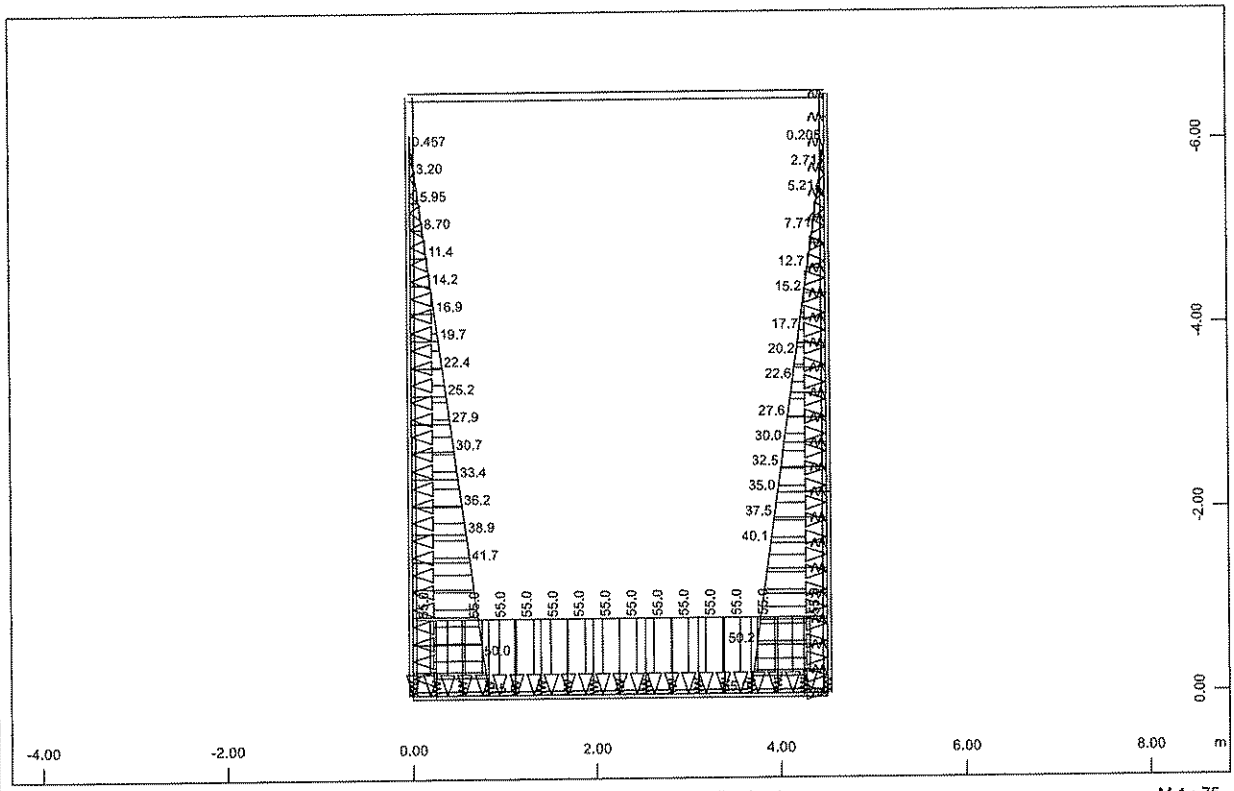
M 1 : 100

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output



M 1 : 75

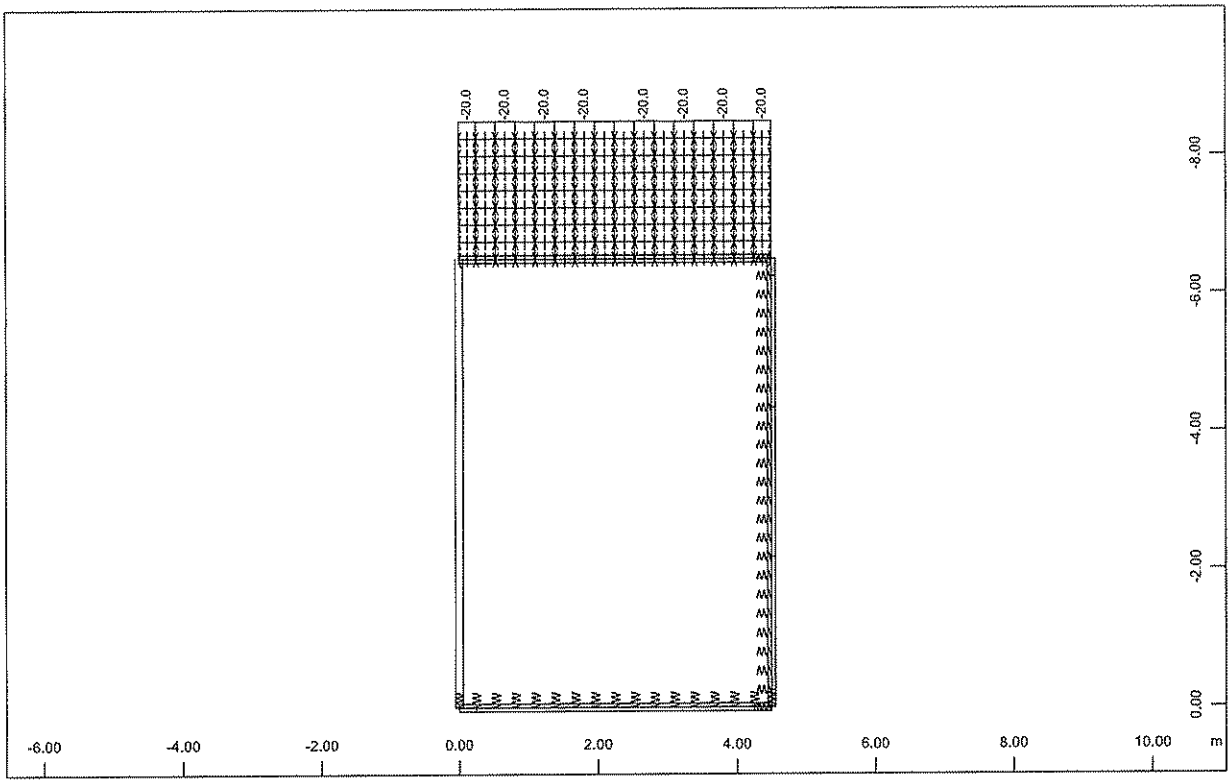
All loads (in components), Loadcase 3 Othiseis Hremias , (1 cm 3D = unit) Beam line load (force) in global X (Unit=50.0 kN/m) (Min=-99.0) (Max=99.6)



M 1 : 75

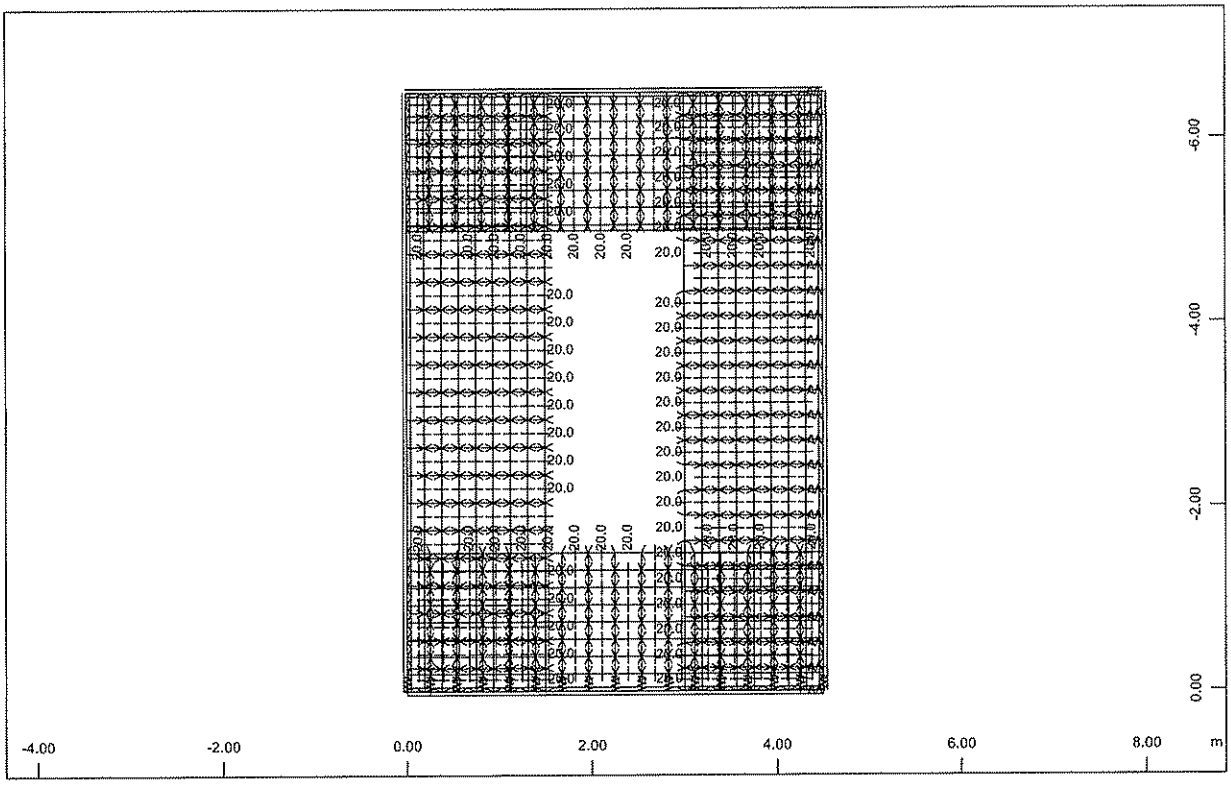
All loads (in components), Loadcase 4 Water Pressure , (1 cm 3D = unit) Beam line load (force) in global X (Unit=50.0 kN/m), Beam line load (force) in global Y (Unit=50.0 kN/m) (Min=-55.0) (Max=55.0)

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output



All loads (in components), Loadcase 5 Shrinkage , (1 cm 3D = unit) Beam line load (uniform temperature change) (Unit=10.0 °C ⟷) (Min=-20.0) (Max=0)

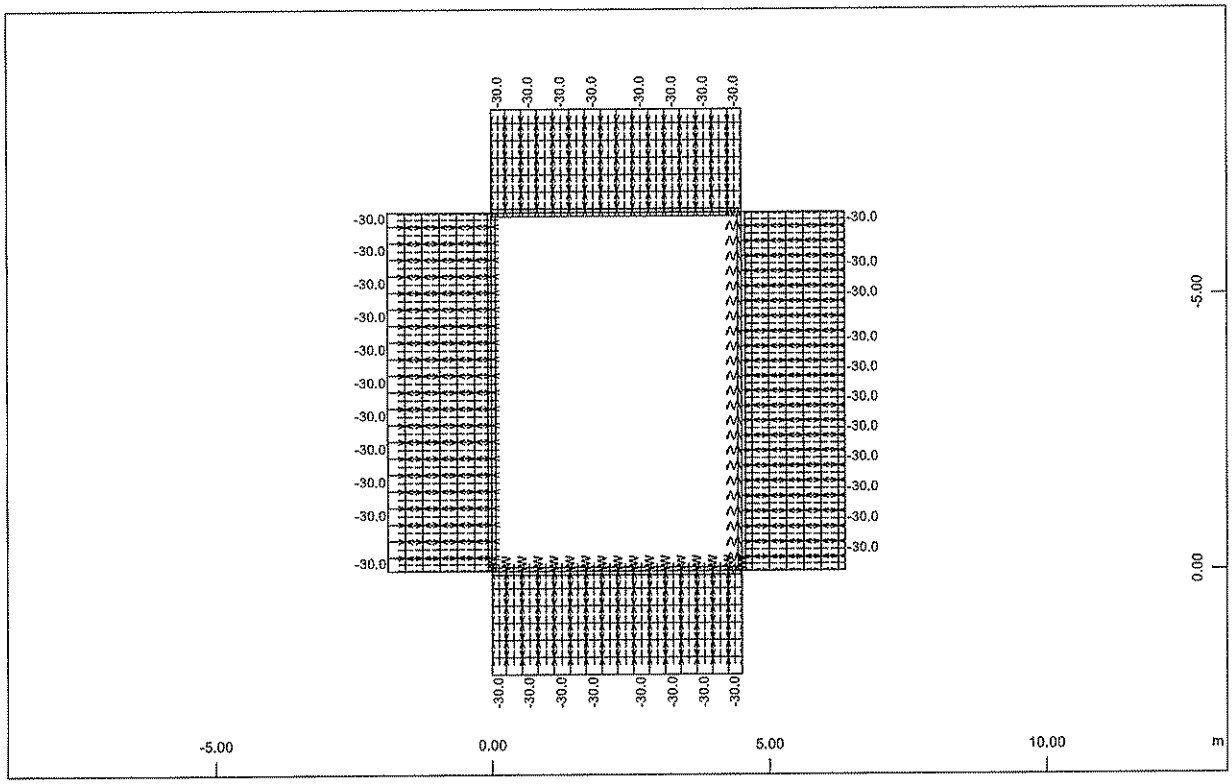
M 1 : 100



All loads (in components), Loadcase 6 Uniform Temp +20 , (1 cm 3D = unit) Beam line load (uniform temperature change) (Unit=10.0 °C ⟷) (Max=20.0)

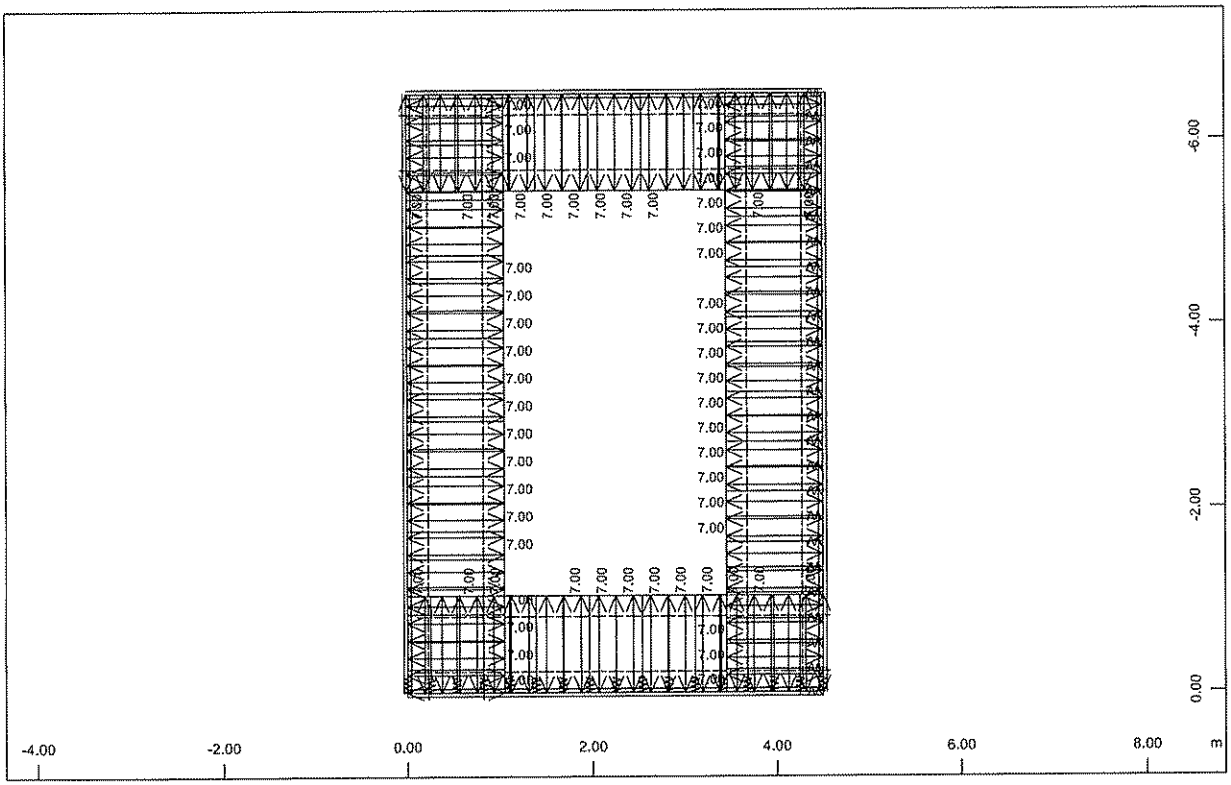
M 1 : 75

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output



All loads (in components), Loadcase 7 Uniform Temp -30 , (1 cm 3D ≈ unit) Beam line load (uniform temperature change) (Unit=20.0 °C ⟷) (Min=-30.0) (Max=0)

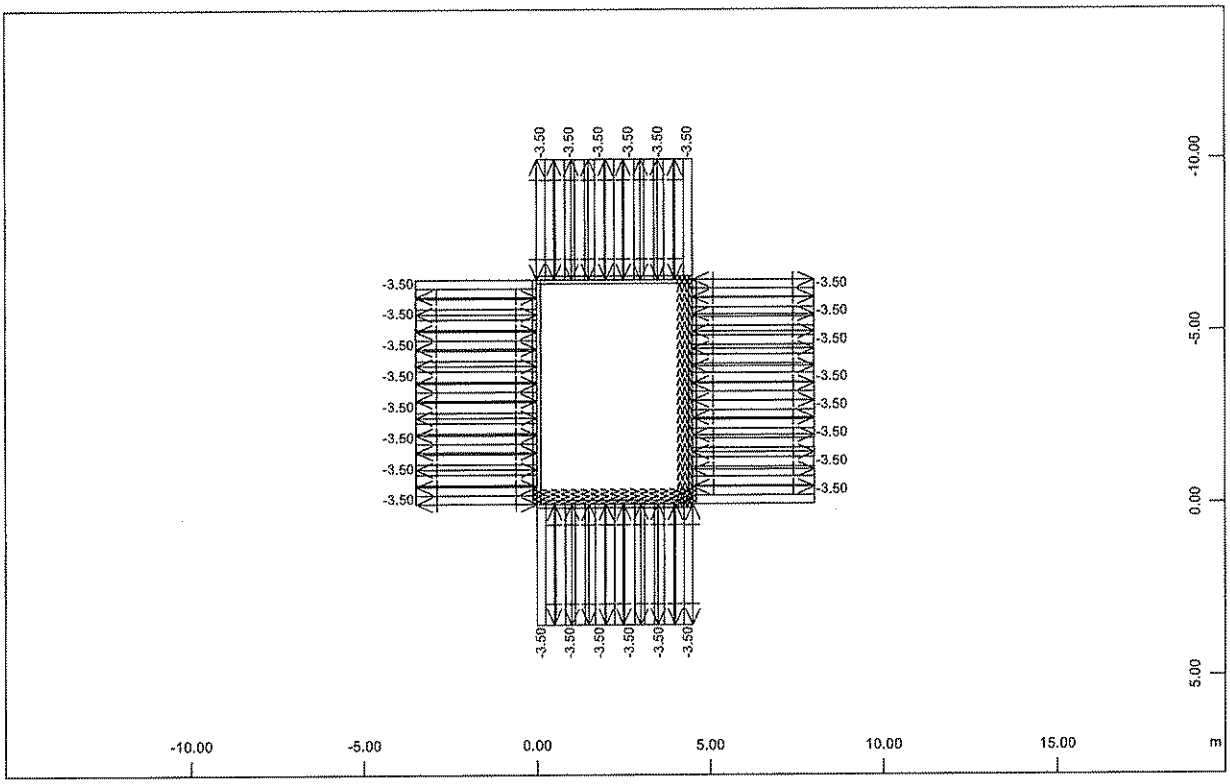
M 1 : 125



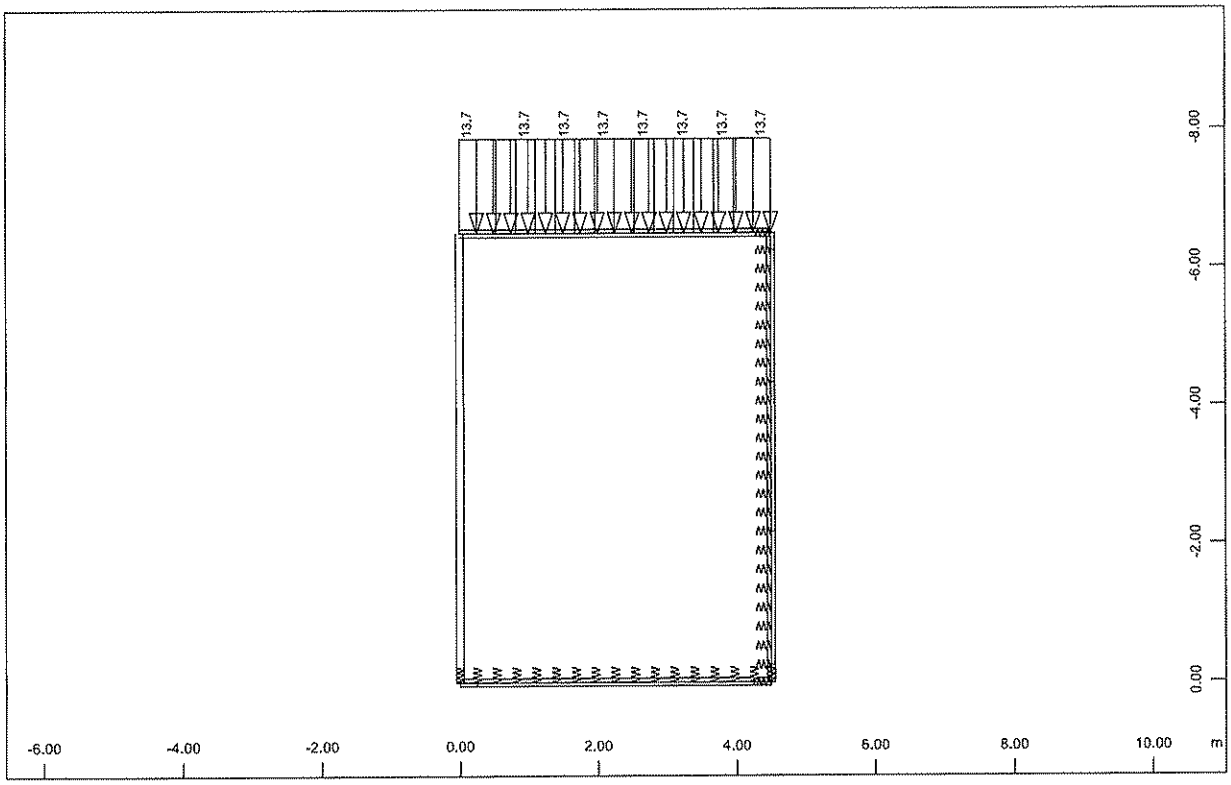
All loads (in components), Loadcase 8 DT +7 , (1 cm 3D = unit) Beam line load (temperature difference) in local z (Unit=5.00 °C ⟷) (Max=7.00)

M 1 : 75

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output

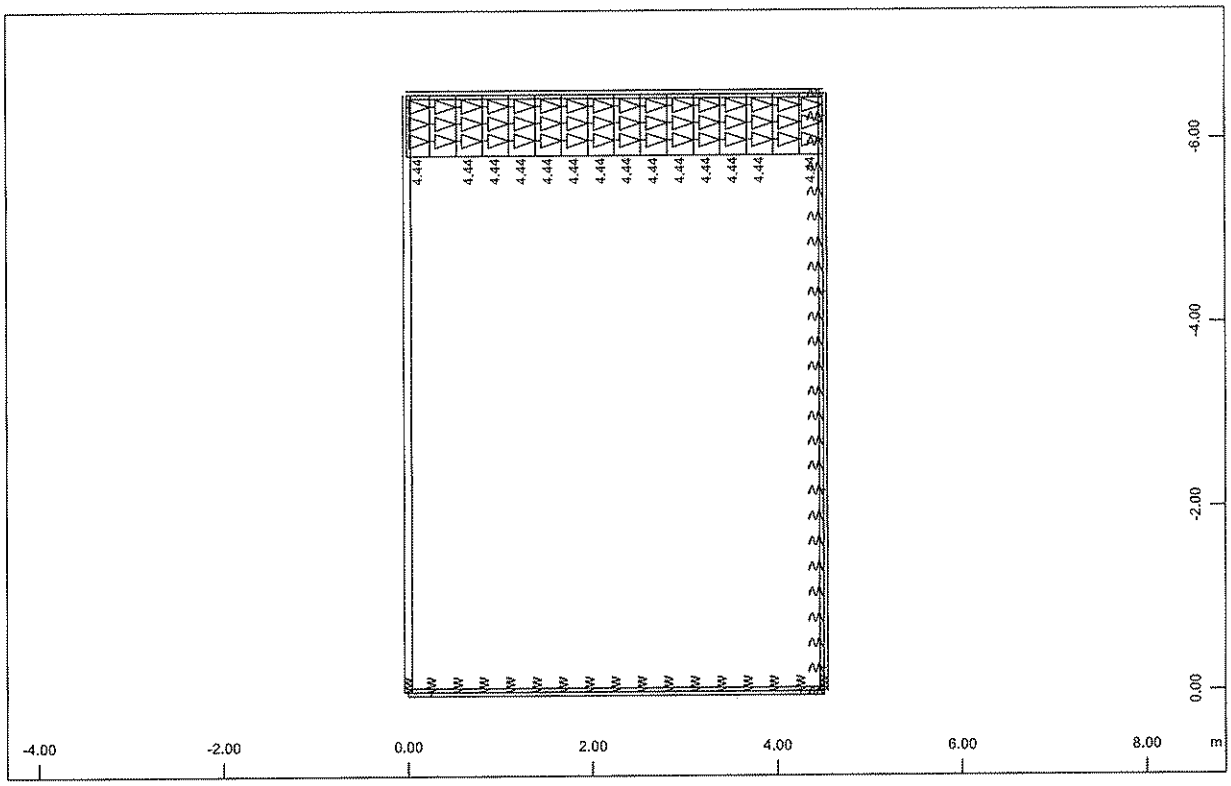


All loads (in components), Loadcase 9 DT -3.5 , (1 cm 3D = unit) Beam line load
(temperature difference) in local z (Unit=2.00 °C) (Min=-3.50) (Max=0)
M 1 : 200



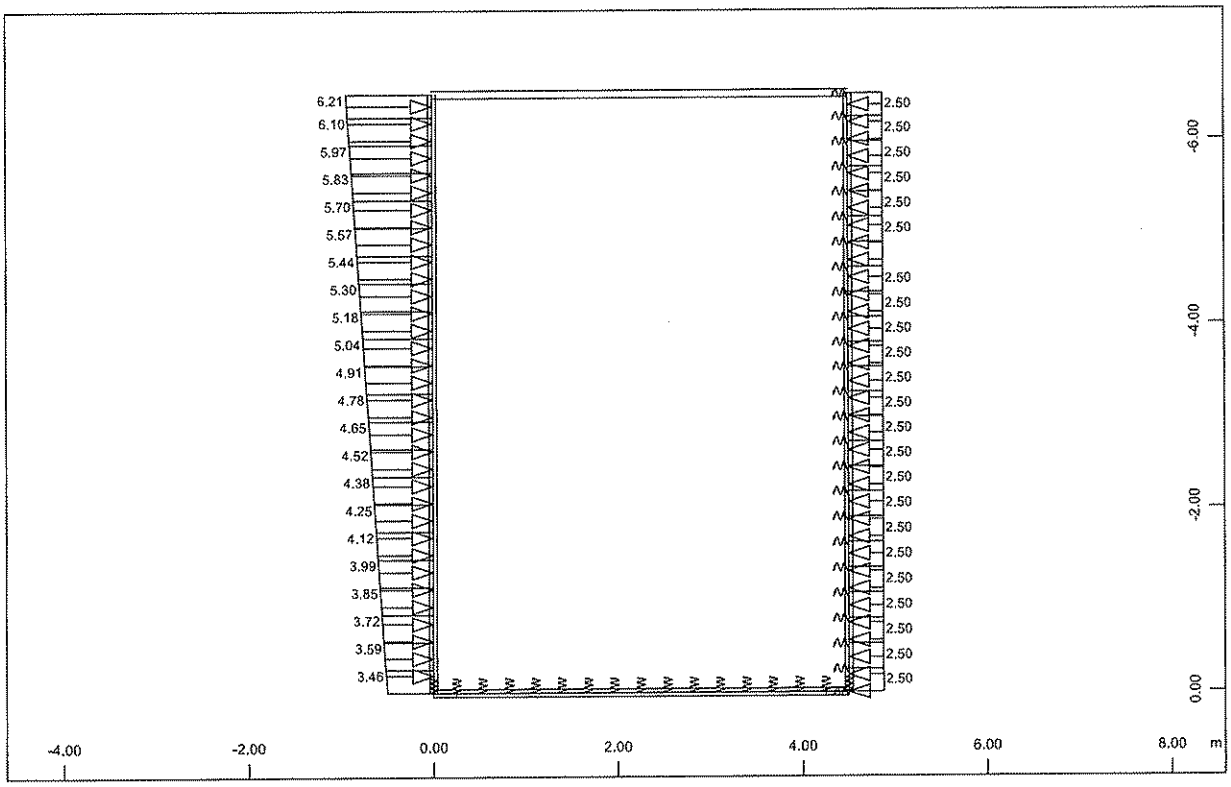
All loads (in components), Loadcase 10 Kinita Omoiomorfa , (1 cm 3D = unit) Beam line load (force) in global Y (Unit=10.0 kN/m) (Max=13.7)
M 1 : 100

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output



Z X Y
All loads (in components), Loadcase 11 Troxopedisi , (1 cm 3D = unit) Beam line load (force) in global X (Unit=5.00 kN/m) (Max=4.44)

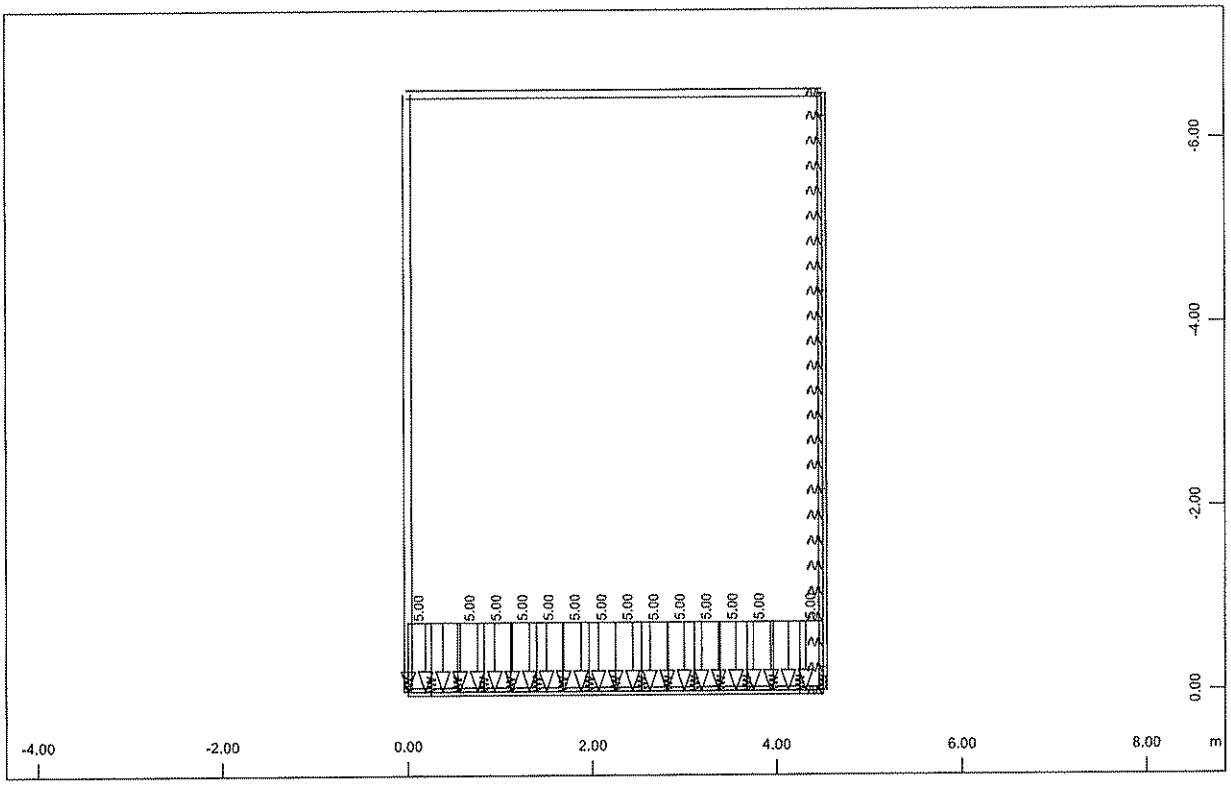
M 1 : 75



Z X Y
All loads (in components), Loadcase 12 Othiseis apo Kinita , (1 cm 3D = unit) Beam line load (force) in global X (Unit=5.00 kN/m) (Min=-2.50) (Max=6.21)

M 1 : 75

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output



All loads (in components), Loadcase 13 Monima Strwsis Fthoras , (1 cm 3D = unit) Beam
line load (force) in global Y (Unit=5.00 kN/m) (Max=5.00)

M 1 : 75

Οχετός 4.00m x 6.00 - 3.00m Επίχωση

Superposition according to EuroNorm EN 1992 (2004) Concrete Structures

Combination rule Number 100
Crack width
Superposition according to manual MAXIMA formula 7

$$E_{d,perm} = E\left\{\sum_{j\geq 1} G_{k,j} \oplus P_k \oplus \sum_{i\geq 1} \psi_{2,i} \cdot Q_{k,i}\right\}$$

Resulting loadcases type Service: Permanent combination

Loadcase selection and Actions

Act	type	LC	γ-u factor	γ-f Type of loadcase	γ-a	ψ-0	ψ-1	ψ-2	ψ-1'	Title
C	P		1.00	1.00	1.00	1.00	1.00	1.00	1.00	creep + shrinkage
		5	1.00	permanent load grouped in actions						Shrinkage
G	G		1.00	1.00	1.00	1.00	1.00	1.00	1.00	dead load
		1	1.00	permanent load grouped in actions						Idio Varos
		2	1.00	permanent load grouped in actions						Idio Varos Epixwsis
		13	1.00	permanent load grouped in actions						Monima Strwsis Fthoras
Q	Q		1.00	0.00	1.00	0.70	0.50	0.30	1.00	variable load
		4	1.00	Exclusive LC	A 8			Water Pressure		
		10	1.00	Exclusive LC	A 8			Kinita Omoiomorfa		
Q_A	Q		1.00	0.00	1.00	0.70	0.50	0.30	1.00	Pay load residential cat. A
		11	1.00	Conditional LC				Troxopedisi		
		12	1.00	Conditional LC				Othiseis apo Kinita		
R	G		1.00	1.00	1.00	1.00	1.00	0.00	1.00	earth pressure
		3	1.00	permanent load grouped in actions						Othiseis Hremias
T	Q		1.00	0.00	1.00	0.60	0.50	0.00	1.00	temperature loading
		6	1.00	Exclusive LC	A14			Uniform Temp +20		
		7	1.00	Exclusive LC	A14			Uniform Temp -30		
		8	1.00	Exclusive LC	A14			DT +7		
		9	1.00	Exclusive LC	A14			DT -3.5		

Combination rule Number 101
Deflections
Superposition according to manual MAXIMA formula 7

$$E_{d,perm} = E\left\{\sum_{j\geq 1} G_{k,j} \oplus P_k \oplus \sum_{i\geq 1} \psi_{2,i} \cdot Q_{k,i}\right\}$$

Resulting loadcases type Service: Permanent combination

Loadcase selection and Actions

Act	type	LC	γ-u factor	γ-f Type of loadcase	γ-a	ψ-0	ψ-1	ψ-2	ψ-1'	Title
C	P		1.00	1.00	1.00	1.00	1.00	1.00	1.00	creep + shrinkage
		5	1.00	permanent load grouped in actions						Shrinkage
G	G		1.00	1.00	1.00	1.00	1.00	1.00	1.00	dead load
		1	1.00	permanent load grouped in actions						Idio Varos
		2	1.00	permanent load grouped in actions						Idio Varos Epixwsis
		13	1.00	permanent load grouped in actions						Monima Strwsis Fthoras
Q	Q		1.00	0.00	1.00	0.70	0.50	0.30	1.00	variable load
		4	1.00	Exclusive LC	A 8			Water Pressure		
		10	1.00	Exclusive LC	A 8			Kinita Omoiomorfa		
Q_A	Q		1.00	0.00	1.00	0.70	0.50	0.30	1.00	Pay load residential cat. A
		11	1.00	Conditional LC				Troxopedisi		
		12	1.00	Conditional LC				Othiseis apo Kinita		
R	G		1.00	1.00	1.00	1.00	1.00	0.00	1.00	earth pressure

Οχετός 4.00m x 6.00 - 3.00m Επίχωση

Superposition according to EuroNorm EN 1992 (2004) Concrete Structures

Combination rule Number 100
Crack width
Superposition according to manual MAXIMA formula 7

$$E_{d,perm} = E\left\{\sum_{j\geq 1} G_{k,j} \oplus P_k \oplus \sum_{i\geq 1} \psi_{2,i} \cdot Q_{k,i}\right\}$$

Resulting loadcases type Service: Permanent combination

Loadcase selection and Actions

Act	type	γ-u	γ-f	γ-a	ψ-0	ψ-1	ψ-2	ψ-1'	
	LC	factor	Type of loadcase						Title
C	P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	creep + shrinkage
	5	1.00	permanent load grouped in actions						Shrinkage
G	G	1.00	1.00	1.00	1.00	1.00	1.00	1.00	dead load
	1	1.00	permanent load grouped in actions						Idio Varos
	2	1.00	permanent load grouped in actions						Idio Varos Epixwsis
	13	1.00	permanent load grouped in actions						Monima Strwsis Fthoras
Q	Q	1.00	0.00	1.00	0.70	0.50	0.30	1.00	variable load
	4	1.00	Exclusive LC	A 8			Water Pressure		
	10	1.00	Exclusive LC	A 8			Kinita Omoiomorfa		
Q_A	Q	1.00	0.00	1.00	0.70	0.50	0.30	1.00	Pay load residential cat. A
	11	1.00	Conditional LC				Troxopedisi		
	12	1.00	Conditional LC				Othiseis apo Kinita		
R	G	1.00	1.00	1.00	1.00	1.00	0.00	1.00	earth pressure
	3	1.00	permanent load grouped in actions						Othiseis Hremias
T	Q	1.00	0.00	1.00	0.60	0.50	0.00	1.00	temperature loading
	6	1.00	Exclusive LC	A14			Uniform Temp +20		
	7	1.00	Exclusive LC	A14			Uniform Temp -30		
	8	1.00	Exclusive LC	A14			DT +7		
	9	1.00	Exclusive LC	A14			DT -3.5		

Combination rule Number 101
Deflections
Superposition according to manual MAXIMA formula 7

$$E_{d,perm} = E\left\{\sum_{j\geq 1} G_{k,j} \oplus P_k \oplus \sum_{i\geq 1} \psi_{2,i} \cdot Q_{k,i}\right\}$$

Resulting loadcases type Service: Permanent combination

Loadcase selection and Actions

Act	type	γ-u	γ-f	γ-a	ψ-0	ψ-1	ψ-2	ψ-1'	
	LC	factor	Type of loadcase						Title
C	P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	creep + shrinkage
	5	1.00	permanent load grouped in actions						Shrinkage
G	G	1.00	1.00	1.00	1.00	1.00	1.00	1.00	dead load
	1	1.00	permanent load grouped in actions						Idio Varos
	2	1.00	permanent load grouped in actions						Idio Varos Epixwsis
	13	1.00	permanent load grouped in actions						Monima Strwsis Fthoras
Q	Q	1.00	0.00	1.00	0.70	0.50	0.30	1.00	variable load
	4	1.00	Exclusive LC	A 8			Water Pressure		
	10	1.00	Exclusive LC	A 8			Kinita Omoiomorfa		
Q_A	Q	1.00	0.00	1.00	0.70	0.50	0.30	1.00	Pay load residential cat. A
	11	1.00	Conditional LC				Troxopedisi		
	12	1.00	Conditional LC				Othiseis apo Kinita		
R	G	1.00	1.00	1.00	1.00	1.00	0.00	1.00	earth pressure

Οχετός 4.00m x 6.00 - 3.00m Επίχωση

Loadcase selection and Actions

Act type		γ-u	γ-f	γ-a	ψ-0	ψ-1	ψ-2	ψ-1'	
	LC	factor	Type of loadcase						Title
	3	1.00	permanent load grouped in actions						Othiseis Hremias
T	Q	1.00	0.00	1.00	0.60	0.50	0.00	1.00	temperature loading
	6	1.00	Exclusive LC	A14					Uniform Temp +20
	7	1.00	Exclusive LC	A14					Uniform Temp -30
	8	1.00	Exclusive LC	A14					DT +7
	9	1.00	Exclusive LC	A14					DT -3.5

Combination rule Number 103
charact. support reactions
Superposition according to manual MAXIMA formula 4

$$E_{d,rare} = E\left\{\sum_{j\geq 1} G_{k,j} \oplus P_k \oplus Q_{k,1} \oplus \sum_{i>1} \psi_{0,i} \cdot Q_{k,i}\right\}$$

Resulting loadcases type Service: Rare combination

Loadcase selection and Actions

Act type		γ-u	γ-f	γ-a	ψ-0	ψ-1	ψ-2	ψ-1'	
	LC	factor	Type of loadcase						Title
C	P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	creep + shrinkage
	5	1.00	permanent load grouped in actions						Shrinkage
G	G	1.00	1.00	1.00	1.00	1.00	1.00	1.00	dead load
	1	1.00	permanent load grouped in actions						Idio Varos
	2	1.00	permanent load grouped in actions						Idio Varos Epixwsis
	13	1.00	permanent load grouped in actions						Monima Strwsis Fthoras
Q	Q	1.00	0.00	1.00	0.70	0.50	0.30	1.00	variable load
	4	1.00	Exclusive LC	A 8					Water Pressure
	10	1.00	Exclusive LC	A 8					Kinita Omoiomorfa
Q_A	Q	1.00	0.00	1.00	0.70	0.50	0.30	1.00	Pay load residential cat. A
	11	1.00	Conditional LC						Troxopedisi
	12	1.00	Conditional LC						Othiseis apo Kinita
R	G	1.00	1.00	1.00	1.00	1.00	0.00	1.00	earth pressure
	3	1.00	permanent load grouped in actions						Othiseis Hremias
T	Q	1.00	0.00	1.00	0.60	0.50	0.00	1.00	temperature loading
	6	1.00	Exclusive LC	A14					Uniform Temp +20
	7	1.00	Exclusive LC	A14					Uniform Temp -30
	8	1.00	Exclusive LC	A14					DT +7
	9	1.00	Exclusive LC	A14					DT -3.5

Combination rule Number 104
Ultimate Design combination
Superposition according to manual MAXIMA formula 1

$$E_d = E\left\{\sum_{j\geq 1} \gamma_{G,j} \cdot G_{k,j} \oplus \gamma_P \cdot P_k \oplus \gamma_{Q,1} \cdot Q_{k,1} \oplus \sum_{i>1} \gamma_{Q,i} \cdot \psi_{0,i} \cdot Q_{k,i}\right\}$$

Resulting loadcases type Ultimate Design combination

Loadcase selection and Actions

Act type		γ-u	γ-f	γ-a	ψ-0	ψ-1	ψ-2	ψ-1'	
	LC	factor	Type of loadcase						Title
C	P	1.00	1.00	1.00	1.00	1.00	1.00	1.00	creep + shrinkage
	5	1.00	permanent load grouped in actions						Shrinkage
G	G	1.35	1.00	1.00	1.00	1.00	1.00	1.00	dead load
	1	1.00	permanent load grouped in actions						Idio Varos

Οχετός 4.00m x 6.00 - 3.00m Επίχωση

Loadcase selection and Actions

Act	type	γ-u	γ-f	γ-a	ψ-0	ψ-1	ψ-2	ψ-1'		Title
	LC	factor	Type of loadcase							
	2	1.00	permanent load grouped in actions							Idio Varos Epixwsis
	13	1.00	permanent load grouped in actions							Monima Strwsis Fthoras
Q	Q	1.50	0.00	1.00	0.70	0.50	0.30	1.00	variable load	
	4	1.00	Exclusive LC	A 8						Water Pressure
	10	1.00	Exclusive LC	A 8						Kinita Omoiomorfa
Q_A	Q	1.50	0.00	1.00	0.70	0.50	0.30	1.00	Pay load residential cat. A	
	11	1.00	Conditional LC							Troxopedisi
	12	1.00	Conditional LC							Othiseis apo Kinita
R	G	1.35	1.00	1.00	1.00	0.00	1.00	earth pressure		
	3	1.00	permanent load grouped in actions							Othiseis Hremias
T	Q	1.00	0.00	1.00	0.60	0.50	0.00	1.00	temperature loading	
	6	1.00	Exclusive LC	A14						Uniform Temp +20
	7	1.00	Exclusive LC	A14						Uniform Temp -30
	8	1.00	Exclusive LC	A14						DT +7
	9	1.00	Exclusive LC	A14						DT -3.5

Combination rule Number 105
equ.6.10a(EN 1990)
Superposition according to explicitly defined formula
γ*{G}+γ*{P}+(γ-u·ψ-0/0.00)*{Q1}+(γ-u·ψ-0/0.00)*{QI}
Resulting loadcases type Ultimate Design combination

Loadcase selection and Actions

Act	type	fac-u	fac-f	facu1	facf1	facu2	facf2	facu3	facf3	Title
	LC	factor	Type of loadcase							
C	P	1.00	1.00	creep + shrinkage						
	5	1.00	permanent load grouped in actions							Shrinkage
G	G	1.35	1.00	dead load						
	1	1.00	permanent load grouped in actions							Idio Varos
	2	1.00	permanent load grouped in actions							Idio Varos Epixwsis
	13	1.00	permanent load grouped in actions							Monima Strwsis Fthoras
Q	Q	1.05	0.00	1.05	0.00	variable load				
	4	1.00	Exclusive LC	A 8						Water Pressure
	10	1.00	Exclusive LC	A 8						Kinita Omoiomorfa
Q_A	Q	1.05	0.00	1.05	0.00	Pay load residential cat. A				
	11	1.00	Conditional LC							Troxopedisi
	12	1.00	Conditional LC							Othiseis apo Kinita
R	G	1.35	1.00	earth pressure						
	3	1.00	permanent load grouped in actions							Othiseis Hremias
T	Q	0.60	0.00	0.60	0.00	temperature loading				
	6	1.00	Exclusive LC	A14						Uniform Temp +20
	7	1.00	Exclusive LC	A14						Uniform Temp -30
	8	1.00	Exclusive LC	A14						DT +7
	9	1.00	Exclusive LC	A14						DT -3.5

Combination rule Number 106
equ.6.10b(EN 1990)
Superposition according to explicitly defined formula
ξ·γ*{G}+γ*{P}+γ*{Q1}+(γ-u·ψ-0/0.00)*{QI}
Resulting loadcases type Ultimate Design combination

Loadcase selection and Actions

Act	type	fac-u	fac-f	facu1	facf1	facu2	facf2	facu3	facf3	Title
	LC	factor	Type of loadcase							
C	P	1.00	1.00	creep + shrinkage						
	5	1.00	permanent load grouped in actions							Shrinkage
G	G	1.15	1.00	dead load						
	1	1.00	permanent load grouped in actions							Idio Varos
	2	1.00	permanent load grouped in actions							Idio Varos Epixwsis
	13	1.00	permanent load grouped in actions							Monima Strwsis Fthoras
Q	Q	1.05	0.00	1.50	0.00	variable load				
	4	1.00	Exclusive LC	A 8						Water Pressure

Οχετός 4.00m x 6.00 - 3.00m Επίχωση

Loadcase selection and Actions

Act	type	fac-u	fac-f	facu1	facf1	facu2	facf2	facu3	facf3	LC	factor	Type of loadcase	Title
										10	1.00	Exclusive LC A 8	Kinita Omoiomorfa
Q_A	Q	1.05	0.00	1.50	0.00							Pay load residential cat. A	
										11	1.00	Conditional LC	Troxopedisi
										12	1.00	Conditional LC	Othiseis apo Kinita
R	G	1.15	1.00									earth pressure	
										3	1.00	permanent load grouped in actions	Othiseis Hremias
T	Q	0.60	0.00	1.00	0.00							temperature loading	
										6	1.00	Exclusive LC A14	Uniform Temp +20
										7	1.00	Exclusive LC A14	Uniform Temp -30
										8	1.00	Exclusive LC A14	DT +7
										9	1.00	Exclusive LC A14	DT -3.5

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Earthquake Loading Combinations / Συνδυασμοί Φορτίσεων με Σεισμό

Load Case 1001 1.0G+1.0R+1.0C+0.3Q+1.0E

Factor forces and moments		1.000			
Factor dead weight	DL-XX	0.000			
Factor dead weight	DL-YY	1.000			
Loads partially copied from load case		1	with factor	1.000	
Loads partially copied from load case		2	with factor	1.000	
Loads partially copied from load case		13	with factor	1.000	
Loads partially copied from load case		3	with factor	1.000	
Loads partially copied from load case		5	with factor	1.000	
Loads partially copied from load case		10	with factor	0.300	
Loads partially copied from load case		21	with factor	1.000	
Loads partially copied from load case		22	with factor	1.000	
Loads partially copied from load case		23	with factor	1.000	
Loads partially copied from load case		24	with factor	0.300	
Loads partially copied from load case		25	with factor	1.000	
Loads partially copied from load case		27	with factor	1.000	

Load Case 1002 1.0G+1.0R+1.0C+0.3Q+1.0E

Factor forces and moments		1.000			
Factor dead weight	DL-XX	0.000			
Factor dead weight	DL-YY	1.000			
Loads partially copied from load case		1	with factor	1.000	
Loads partially copied from load case		2	with factor	1.000	
Loads partially copied from load case		3	with factor	1.000	
Loads partially copied from load case		5	with factor	1.000	
Loads partially copied from load case		13	with factor	1.000	
Loads partially copied from load case		12	with factor	0.300	
Loads partially copied from load case		21	with factor	1.000	
Loads partially copied from load case		22	with factor	1.000	
Loads partially copied from load case		23	with factor	1.000	
Loads partially copied from load case		24	with factor	0.300	
Loads partially copied from load case		25	with factor	1.000	
Loads partially copied from load case		27	with factor	1.000	

Load Case 1003 1.0G+1.0R+1.0C+0.3Q+1.0E

Factor forces and moments		1.000			
Factor dead weight	DL-XX	0.000			
Factor dead weight	DL-YY	1.000			
Loads partially copied from load case		1	with factor	1.000	
Loads partially copied from load case		2	with factor	1.000	
Loads partially copied from load case		3	with factor	1.000	
Loads partially copied from load case		5	with factor	1.000	
Loads partially copied from load case		13	with factor	1.000	
Loads partially copied from load case		10	with factor	0.300	
Loads partially copied from load case		26	with factor	1.000	

Load Case 1004 1.0G+1.0R+1.0C+0.3Q+1.0E

Factor forces and moments		1.000			
Factor dead weight	DL-XX	0.000			
Factor dead weight	DL-YY	1.000			
Loads partially copied from load case		1	with factor	1.000	
Loads partially copied from load case		2	with factor	1.000	
Loads partially copied from load case		3	with factor	1.000	
Loads partially copied from load case		5	with factor	1.000	
Loads partially copied from load case		13	with factor	1.000	
Loads partially copied from load case		12	with factor	0.300	
Loads partially copied from load case		26	with factor	1.000	

Load Case 1005 1.0G+1.0R+1.0C+0.3Q+1.0E

Factor forces and moments		1.000			
Factor dead weight	DL-XX	0.000			
Factor dead weight	DL-YY	1.000			
Loads partially copied from load case		1	with factor	1.000	
Loads partially copied from load case		2	with factor	1.000	
Loads partially copied from load case		5	with factor	1.000	
Loads partially copied from load case		13	with factor	1.000	

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Earthquake Loading Combinations / Συνδυασμοί Φορτίσεων με Σεισμό

Load Case 1005 1.0G+1.0R+1.0C+0.3Q+1.0E

Loads partially	copied from load case	30	with factor	1.000
Loads partially	copied from load case	10	with factor	0.300
Loads partially	copied from load case	21	with factor	1.000
Loads partially	copied from load case	22	with factor	1.000
Loads partially	copied from load case	23	with factor	1.000
Loads partially	copied from load case	24	with factor	0.300
Loads partially	copied from load case	25	with factor	1.000
Loads partially	copied from load case	27	with factor	1.000

Load Case 1006 1.0G+1.0R+1.0C+0.3Q+1.0E

Factor forces and moments				1.000
Factor dead weight	DL-XX			0.000
Factor dead weight	DL-YY			1.000
Loads partially	copied from load case	1	with factor	1.000
Loads partially	copied from load case	2	with factor	1.000
Loads partially	copied from load case	5	with factor	1.000
Loads partially	copied from load case	13	with factor	1.000
Loads partially	copied from load case	30	with factor	1.000
Loads partially	copied from load case	12	with factor	0.300
Loads partially	copied from load case	21	with factor	1.000
Loads partially	copied from load case	22	with factor	1.000
Loads partially	copied from load case	23	with factor	1.000
Loads partially	copied from load case	24	with factor	0.300
Loads partially	copied from load case	25	with factor	1.000
Loads partially	copied from load case	27	with factor	1.000

Load Case 1007 1.0G+1.0R+1.0C+0.3Q+1.0E

Factor forces and moments				1.000
Factor dead weight	DL-XX			0.000
Factor dead weight	DL-YY			1.000
Loads partially	copied from load case	1	with factor	1.000
Loads partially	copied from load case	2	with factor	1.000
Loads partially	copied from load case	5	with factor	1.000
Loads partially	copied from load case	13	with factor	1.000
Loads partially	copied from load case	30	with factor	1.000
Loads partially	copied from load case	10	with factor	0.300
Loads partially	copied from load case	26	with factor	1.000

Load Case 1008 1.0G+1.0R+1.0C+0.3Q+1.0E

Factor forces and moments				1.000
Factor dead weight	DL-XX			0.000
Factor dead weight	DL-YY			1.000
Loads partially	copied from load case	1	with factor	1.000
Loads partially	copied from load case	2	with factor	1.000
Loads partially	copied from load case	5	with factor	1.000
Loads partially	copied from load case	13	with factor	1.000
Loads partially	copied from load case	30	with factor	1.000
Loads partially	copied from load case	12	with factor	0.300
Loads partially	copied from load case	26	with factor	1.000

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Calculation of forces and moments

Load Case 21 Seismos kata X

Factor forces and moments		1.000	
Factor dead weight	DL-XX	0.000	
Factor dead weight	DL-YY	0.000	
unfavourable safety factor		1.500	
favourable safety factor		1.000	
accidential safety factor		0.998	
Combination coefficient ψ-0		1.000	(rare)
Combination coefficient ψ-1'		1.000	(non frequent)
Combination coefficient ψ-1		1.000	(frequent)
Combination coefficient ψ-2		1.000	(permanent)

Load Case 22 Seismos Epixwsis

Factor forces and moments		1.000	
Factor dead weight	DL-XX	0.000	
Factor dead weight	DL-YY	0.000	
unfavourable safety factor		1.500	
favourable safety factor		1.000	
accidential safety factor		0.998	
Combination coefficient ψ-0		1.000	(rare)
Combination coefficient ψ-1'		1.000	(non frequent)
Combination coefficient ψ-1		1.000	(frequent)
Combination coefficient ψ-2		1.000	(permanent)

Load Case 23 Seismos Nerou

Factor forces and moments		1.000	
Factor dead weight	DL-XX	0.000	
Factor dead weight	DL-YY	0.000	
unfavourable safety factor		1.500	
favourable safety factor		1.000	
accidential safety factor		0.998	
Combination coefficient ψ-0		1.000	(rare)
Combination coefficient ψ-1'		1.000	(non frequent)
Combination coefficient ψ-1		1.000	(frequent)
Combination coefficient ψ-2		1.000	(permanent)

Load Case 24 Seismos Kinitwn

Factor forces and moments		1.000	
Factor dead weight	DL-XX	0.000	
Factor dead weight	DL-YY	0.000	
unfavourable safety factor		1.500	
favourable safety factor		1.000	
accidential safety factor		0.998	
Combination coefficient ψ-0		1.000	(rare)
Combination coefficient ψ-1'		1.000	(non frequent)
Combination coefficient ψ-1		1.000	(frequent)
Combination coefficient ψ-2		1.000	(permanent)

Load Case 25 Omofores Othiseis

Factor forces and moments		1.000	
Factor dead weight	DL-XX	0.000	
Factor dead weight	DL-YY	0.000	
unfavourable safety factor		1.500	
favourable safety factor		1.000	
accidential safety factor		0.998	
Combination coefficient ψ-0		1.000	(rare)
Combination coefficient ψ-1'		1.000	(non frequent)
Combination coefficient ψ-1		1.000	(frequent)
Combination coefficient ψ-2		1.000	(permanent)

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Calculation of forces and moments

Load Case 26 Antifores Othiseis

Factor forces and moments		1.000
Factor dead weight	DL-XX	0.000
Factor dead weight	DL-YY	0.000
unfavourable safety factor		1.500
favourable safety factor		1.000
accidential safety factor		0.998
Combination coefficient ψ-0		1.000 (rare)
Combination coefficient ψ-1'		1.000 (non frequent)
Combination coefficient ψ-1		1.000 (frequent)
Combination coefficient ψ-2		1.000 (permanent)

Load Case 27 Seismos Strwsis Fthoras

Factor forces and moments		1.000
Factor dead weight	DL-XX	0.000
Factor dead weight	DL-YY	0.000
unfavourable safety factor		1.500
favourable safety factor		1.000
accidential safety factor		0.998
Combination coefficient ψ-0		1.000 (rare)
Combination coefficient ψ-1'		1.000 (non frequent)
Combination coefficient ψ-1		1.000 (frequent)
Combination coefficient ψ-2		1.000 (permanent)

Load Case 30 Energitikes Othiseis

Factor forces and moments		1.000
Factor dead weight	DL-XX	0.000
Factor dead weight	DL-YY	0.000
unfavourable safety factor		1.500
favourable safety factor		1.000
accidential safety factor		0.998
Combination coefficient ψ-0		1.000 (rare)
Combination coefficient ψ-1'		1.000 (non frequent)
Combination coefficient ψ-1		1.000 (frequent)
Combination coefficient ψ-2		1.000 (permanent)

Load Case 1001 1.0G+1.0R+1.0C+0.3Q+1.0E

Factor forces and moments		1.000
Factor dead weight	DL-XX	0.000
Factor dead weight	DL-YY	1.000

Loads partially copied from load case	1	with factor	1.000
Loads partially copied from load case	2	with factor	1.000
Loads partially copied from load case	13	with factor	1.000
Loads partially copied from load case	3	with factor	1.000
Loads partially copied from load case	5	with factor	1.000
Loads partially copied from load case	10	with factor	0.300
Loads partially copied from load case	21	with factor	1.000
Loads partially copied from load case	22	with factor	1.000
Loads partially copied from load case	23	with factor	1.000
Loads partially copied from load case	24	with factor	0.300
Loads partially copied from load case	25	with factor	1.000
Loads partially copied from load case	27	with factor	1.000

Load Case 1002 1.0G+1.0R+1.0C+0.3Q+1.0E

Factor forces and moments		1.000
Factor dead weight	DL-XX	0.000
Factor dead weight	DL-YY	1.000

Loads partially copied from load case	1	with factor	1.000
Loads partially copied from load case	2	with factor	1.000
Loads partially copied from load case	3	with factor	1.000
Loads partially copied from load case	5	with factor	1.000
Loads partially copied from load case	13	with factor	1.000
Loads partially copied from load case	12	with factor	0.300
Loads partially copied from load case	21	with factor	1.000
Loads partially copied from load case	22	with factor	1.000
Loads partially copied from load case	23	with factor	1.000

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Calculation of forces and moments

Load Case 1002 1.0G+1.0R+1.0C+0.3Q+1.0E

Loads partially	copied from load case	24	with factor	0.300
Loads partially	copied from load case	25	with factor	1.000
Loads partially	copied from load case	27	with factor	1.000

Load Case 1003 1.0G+1.0R+1.0C+0.3Q+1.0E

Factor forces and moments		1.000		
Factor dead weight	DL-XX	0.000		
Factor dead weight	DL-YY	1.000		
Loads partially	copied from load case	1	with factor	1.000
Loads partially	copied from load case	2	with factor	1.000
Loads partially	copied from load case	3	with factor	1.000
Loads partially	copied from load case	5	with factor	1.000
Loads partially	copied from load case	13	with factor	1.000
Loads partially	copied from load case	10	with factor	0.300
Loads partially	copied from load case	26	with factor	1.000

Load Case 1004 1.0G+1.0R+1.0C+0.3Q+1.0E

Factor forces and moments		1.000		
Factor dead weight	DL-XX	0.000		
Factor dead weight	DL-YY	1.000		
Loads partially	copied from load case	1	with factor	1.000
Loads partially	copied from load case	2	with factor	1.000
Loads partially	copied from load case	3	with factor	1.000
Loads partially	copied from load case	5	with factor	1.000
Loads partially	copied from load case	13	with factor	1.000
Loads partially	copied from load case	12	with factor	0.300
Loads partially	copied from load case	26	with factor	1.000

Load Case 1005 1.0G+1.0R+1.0C+0.3Q+1.0E

Factor forces and moments		1.000		
Factor dead weight	DL-XX	0.000		
Factor dead weight	DL-YY	1.000		
Loads partially	copied from load case	1	with factor	1.000
Loads partially	copied from load case	2	with factor	1.000
Loads partially	copied from load case	5	with factor	1.000
Loads partially	copied from load case	13	with factor	1.000
Loads partially	copied from load case	30	with factor	1.000
Loads partially	copied from load case	10	with factor	0.300
Loads partially	copied from load case	21	with factor	1.000
Loads partially	copied from load case	22	with factor	1.000
Loads partially	copied from load case	23	with factor	1.000
Loads partially	copied from load case	24	with factor	0.300
Loads partially	copied from load case	25	with factor	1.000
Loads partially	copied from load case	27	with factor	1.000

Load Case 1006 1.0G+1.0R+1.0C+0.3Q+1.0E

Factor forces and moments		1.000		
Factor dead weight	DL-XX	0.000		
Factor dead weight	DL-YY	1.000		
Loads partially	copied from load case	1	with factor	1.000
Loads partially	copied from load case	2	with factor	1.000
Loads partially	copied from load case	5	with factor	1.000
Loads partially	copied from load case	13	with factor	1.000
Loads partially	copied from load case	30	with factor	1.000
Loads partially	copied from load case	12	with factor	0.300
Loads partially	copied from load case	21	with factor	1.000
Loads partially	copied from load case	22	with factor	1.000
Loads partially	copied from load case	23	with factor	1.000
Loads partially	copied from load case	24	with factor	0.300
Loads partially	copied from load case	25	with factor	1.000
Loads partially	copied from load case	27	with factor	1.000

Load Case 1007 1.0G+1.0R+1.0C+0.3Q+1.0E

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Calculation of forces and moments

Load Case 1007 1.0G+1.0R+1.0C+0.3Q+1.0E

Factor forces and moments		1.000
Factor dead weight	DL-XX	0.000
Factor dead weight	DL-YY	1.000
Loads partially copied from load case	1 with factor	1.000
Loads partially copied from load case	2 with factor	1.000
Loads partially copied from load case	5 with factor	1.000
Loads partially copied from load case	13 with factor	1.000
Loads partially copied from load case	30 with factor	1.000
Loads partially copied from load case	10 with factor	0.300
Loads partially copied from load case	26 with factor	1.000

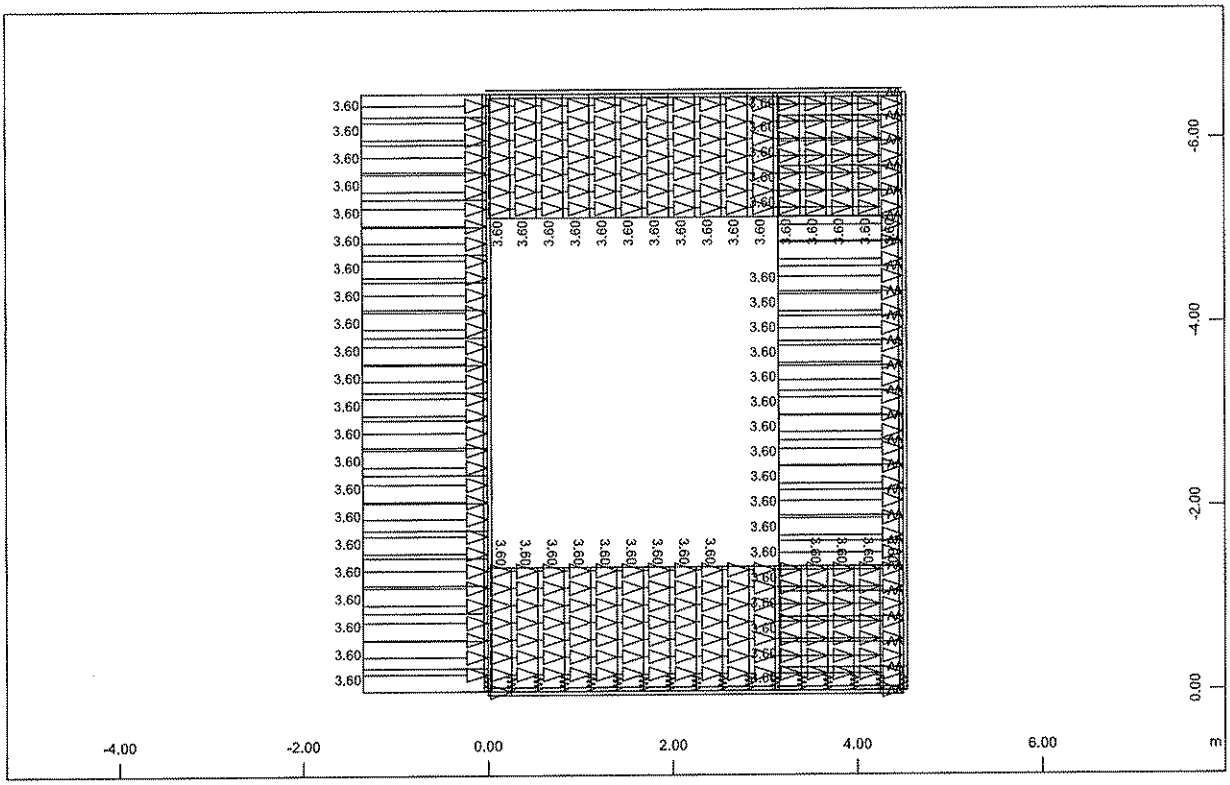
Load Case 1008 1.0G+1.0R+1.0C+0.3Q+1.0E

Factor forces and moments		1.000
Factor dead weight	DL-XX	0.000
Factor dead weight	DL-YY	1.000
Loads partially copied from load case	1 with factor	1.000
Loads partially copied from load case	2 with factor	1.000
Loads partially copied from load case	5 with factor	1.000
Loads partially copied from load case	13 with factor	1.000
Loads partially copied from load case	30 with factor	1.000
Loads partially copied from load case	12 with factor	0.300
Loads partially copied from load case	26 with factor	1.000

Sum of Reactions and Loads

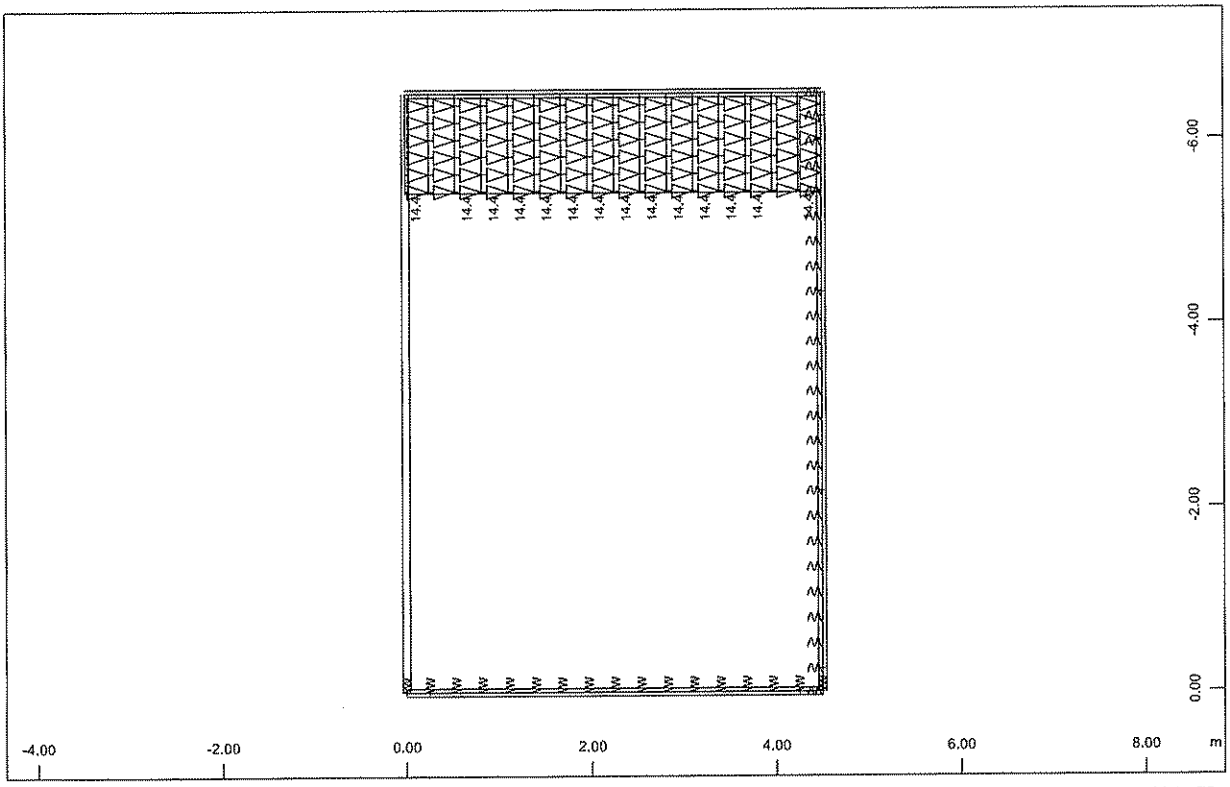
LC	Title	PXX[kN]	PYY[kN]	PZZ[kN]
21	Seismos kata X	-79.2	0.0	0.0
		79.2	0.0	0.0
22	Seismos Epixwsis	-64.8	0.0	0.0
		64.8	0.0	0.0
23	Seismos Nerou	-100.7	0.0	0.0
		100.7	0.0	0.0
24	Seismos Kinitwn	-14.8	0.0	0.0
		14.8	0.0	0.0
25	Omofores Othiseis	-463.2	0.0	0.0
		463.2	0.0	0.0
26	Antifores Othiseis	0.0	0.0	0.0
		0.0	0.0	0.0
27	Seismos Strwsis Fthoras	-5.4	0.0	0.0
		5.4	0.0	0.0
30	Energitikes Othiseis	0.0	0.0	0.0
		0.0	0.0	0.0
1001	1.0G+1.0R+1.0C+0.3Q+1.0E	-717.9	-640.9	0.0
		717.9	640.9	0.0
1002	1.0G+1.0R+1.0C+0.3Q+1.0E	-722.3	-622.4	0.0
		722.3	622.4	0.0
1003	1.0G+1.0R+1.0C+0.3Q+1.0E	-0.1	-640.9	0.0
		0.1	640.9	0.0
1004	1.0G+1.0R+1.0C+0.3Q+1.0E	-4.6	-622.4	0.0
		4.6	622.4	0.0
1005	1.0G+1.0R+1.0C+0.3Q+1.0E	-717.8	-640.9	0.0
		717.8	640.9	0.0
1006	1.0G+1.0R+1.0C+0.3Q+1.0E	-722.2	-622.4	0.0
		722.2	622.4	0.0
1007	1.0G+1.0R+1.0C+0.3Q+1.0E	0.0	-640.9	0.0
		0.0	640.9	0.0
1008	1.0G+1.0R+1.0C+0.3Q+1.0E	-4.5	-622.4	0.0
		4.5	622.4	0.0

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output



All loads (in components), Loadcase 21 Seismos kata X , (1 cm 3D = unit) Beam line load (force) in global X (Unit=2.00 kN/m) (Max=3.60)

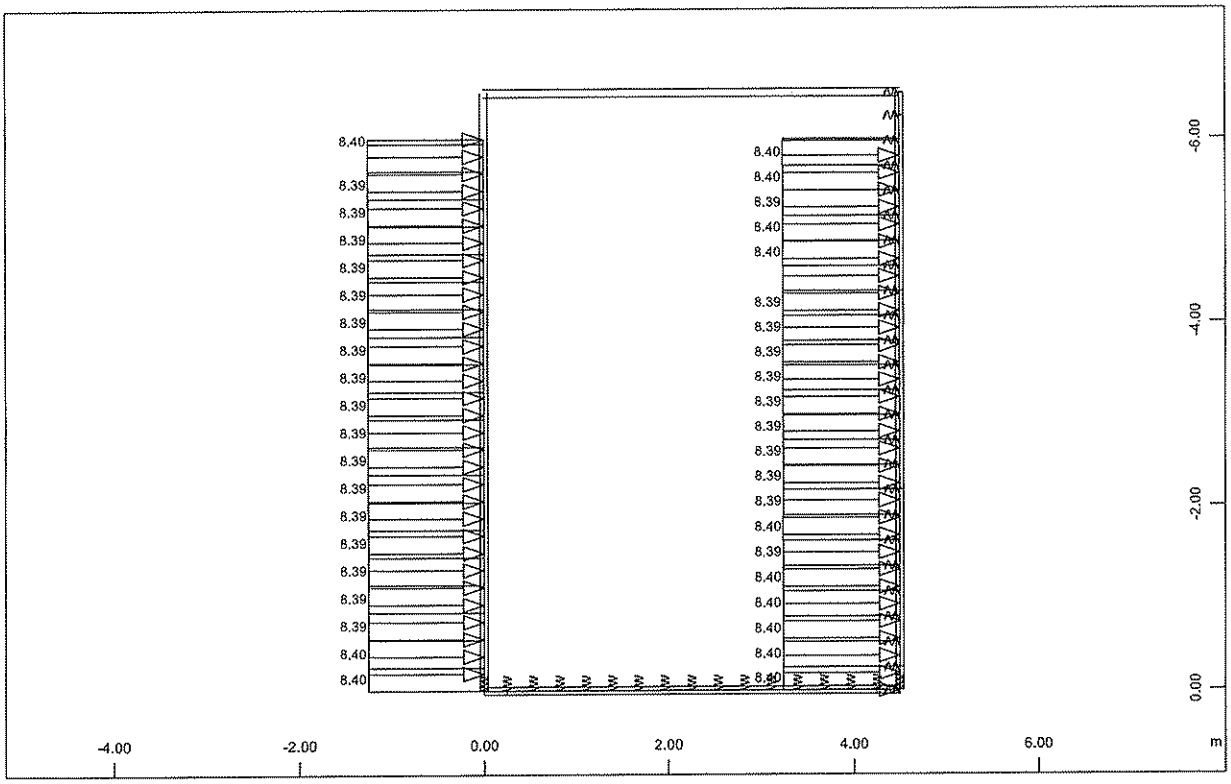
M 1 : 75



All loads (in components), Loadcase 22 Seismos Epixwsis , (1 cm 3D = unit) Beam line load (force) in global X (Unit=10.0 kN/m) (Max=14.4)

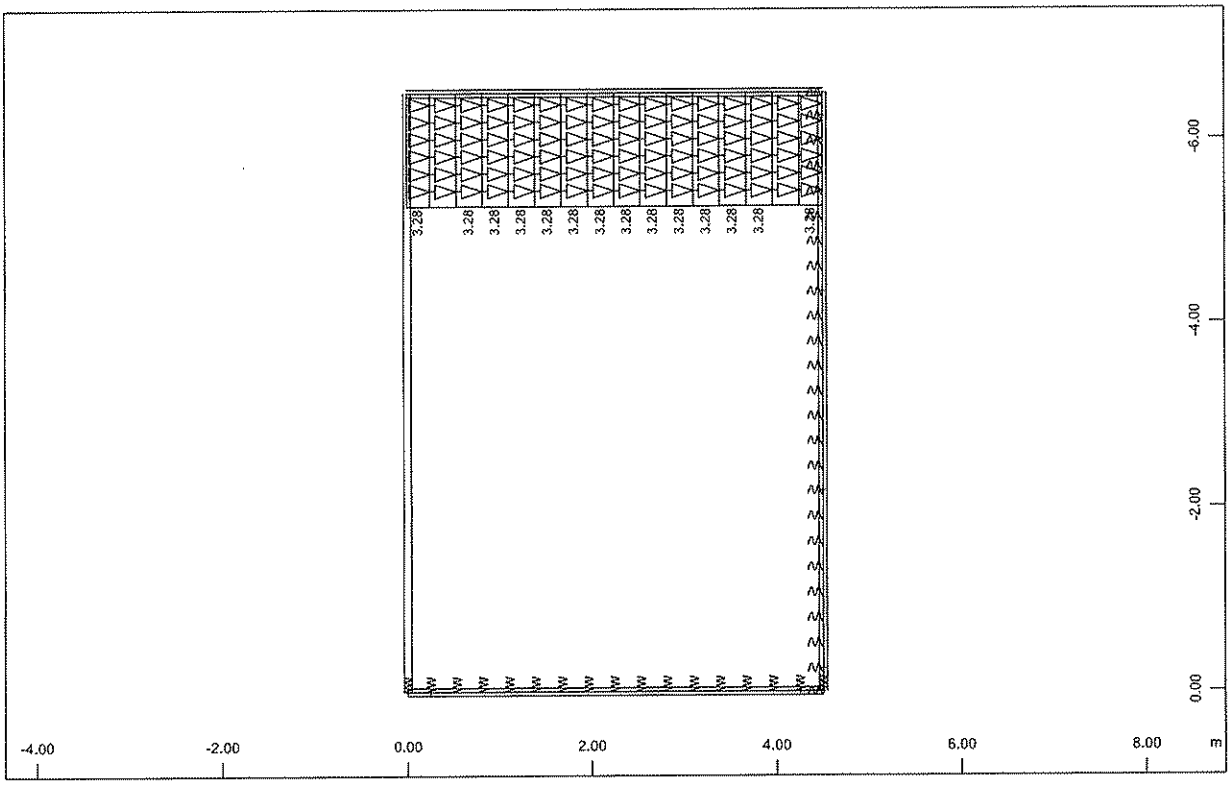
M 1 : 75

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output



All loads (in components), Loadcase 23 Seismos Nerou , (1 cm 3D = unit) Beam line load (force) in global X (Unit=5.00 kN/m) (Max=8.40)

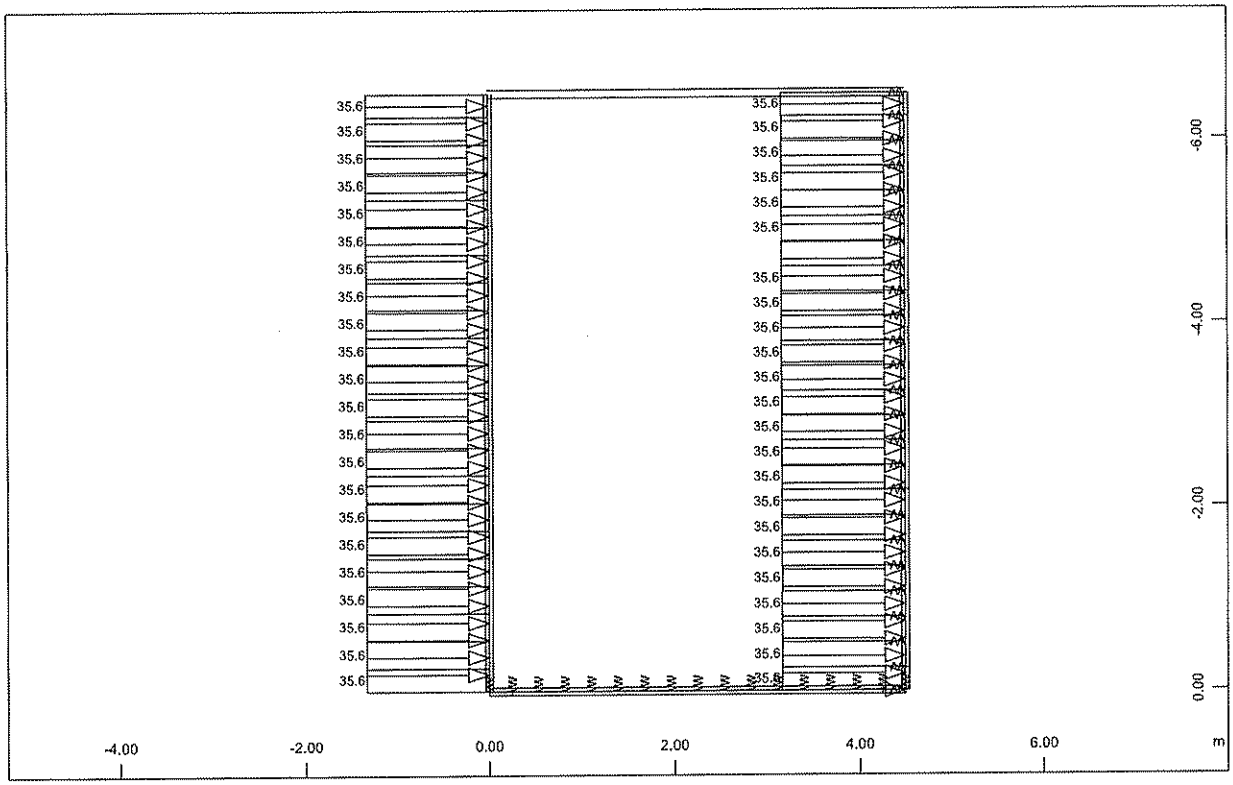
M 1 : 75



All loads (in components), Loadcase 24 Seismos Kinitwn , (1 cm 3D = unit) Beam line load (force) in global X (Unit=2.00 kN/m) (Max=3.28)

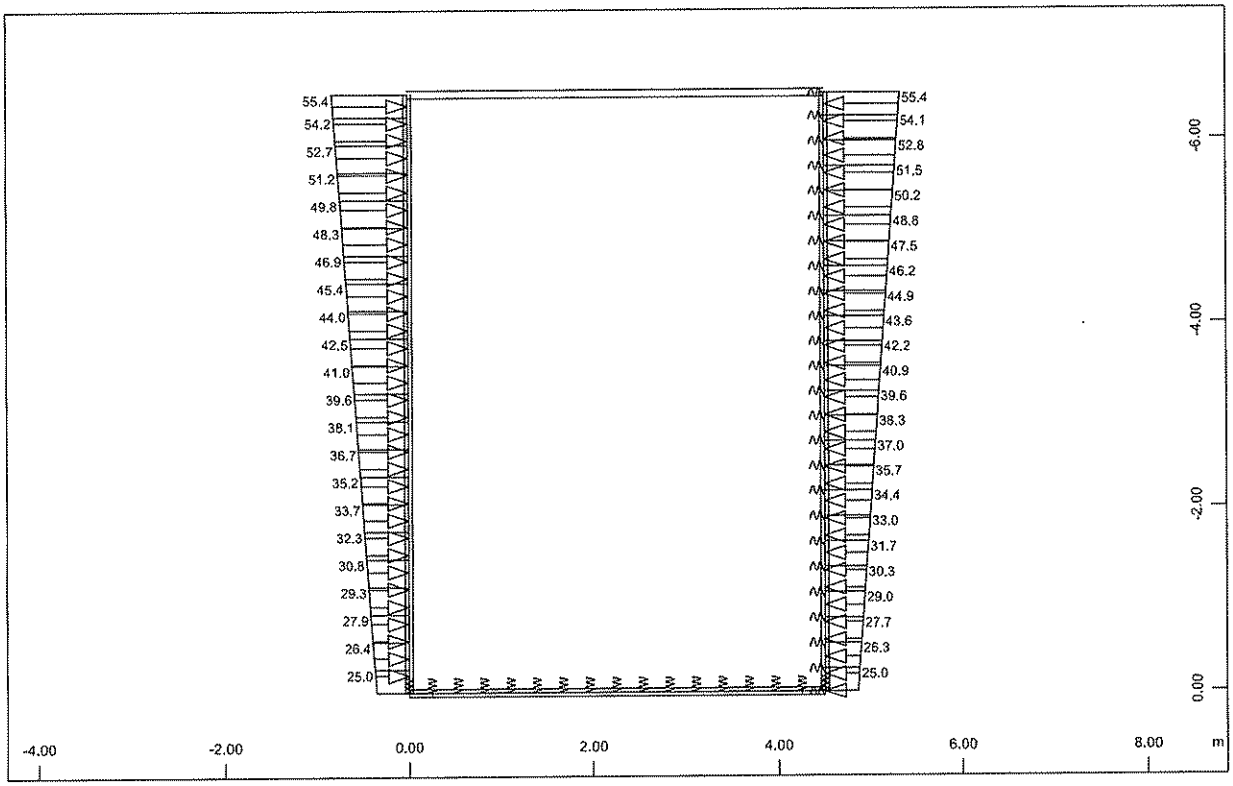
M 1 : 75

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output



All loads (in components), Loadcase 25 Omofores Othiseis , (1 cm 3D = unit) Beam line
load (force) in global X (Unit=20.0 kN/m) (Max=35.6)

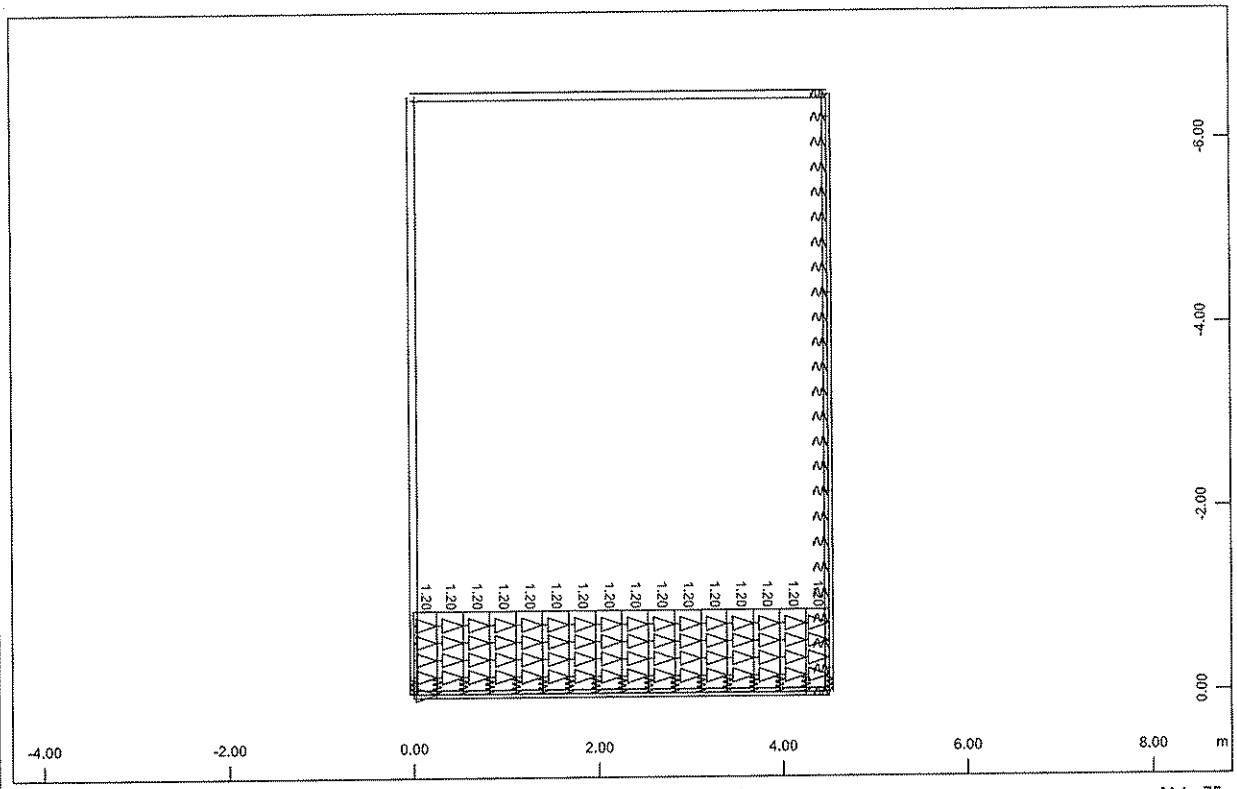
M 1 : 75



All loads (in components), Loadcase 26 Antifores Othiseis , (1 cm 3D = unit) Beam line
load (force) in global X (Unit=50.0 kN/m) (Min=-55.4) (Max=55.4)

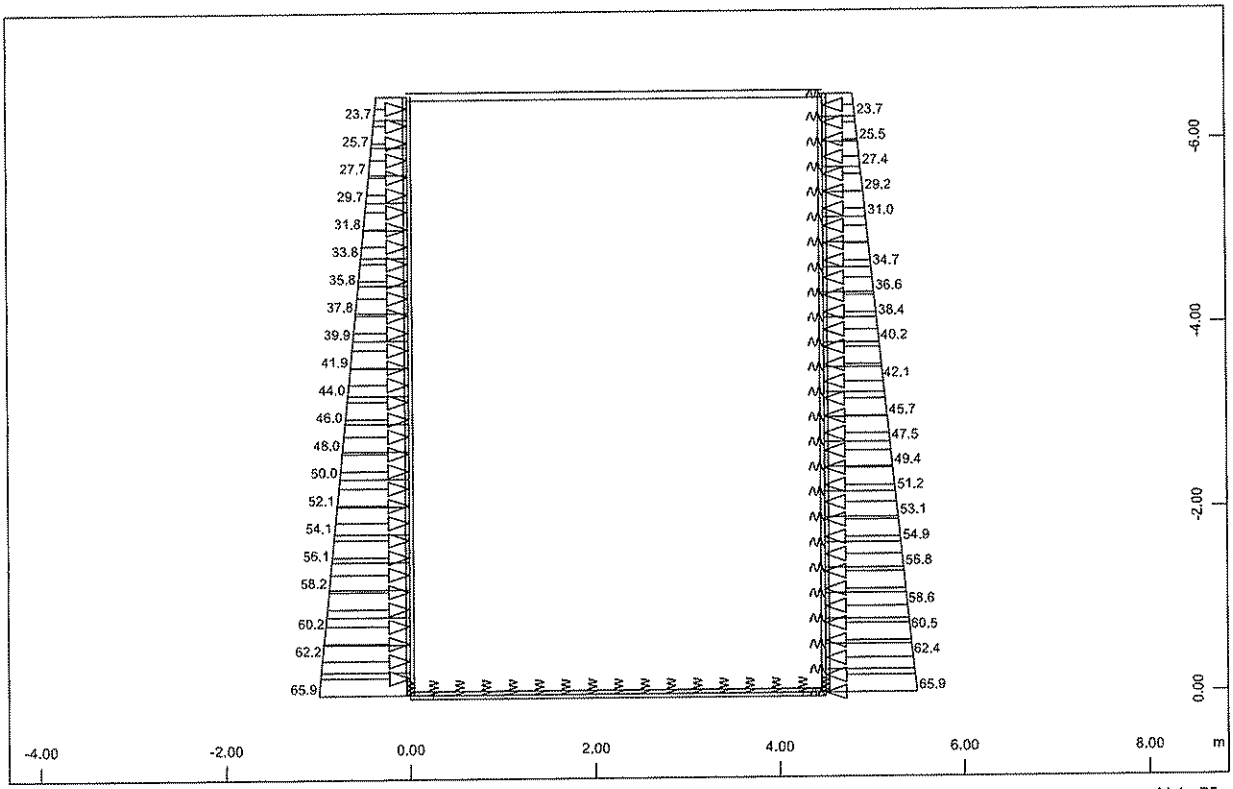
M 1 : 75

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output



All loads (in components), Loadcase 27 Seismos Strwsis Fthoras , (1 cm 3D = unit) Beam
line load (force) in global X (Unit=1.00 kN/m) (Max=1.20)

M 1 : 75

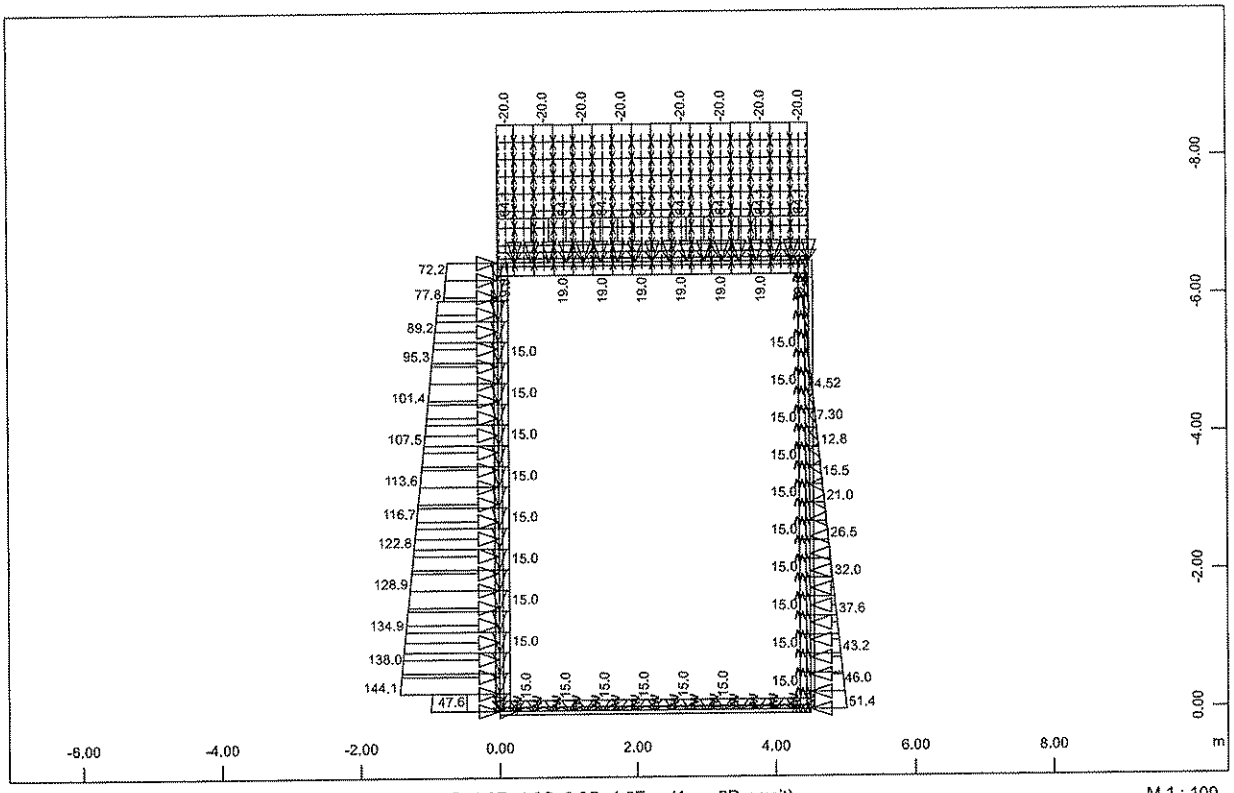


All loads (in components), Loadcase 30 Energitikes Othiseis , (1 cm 3D = unit) Beam
line load (force) in global X (Unit=50.0 kN/m) (Min=-65.9) (Max=65.9)

M 1 : 75

WINGRAF - GRAPHICS FOR FINITE ELEMENTS (V 15.08-27)

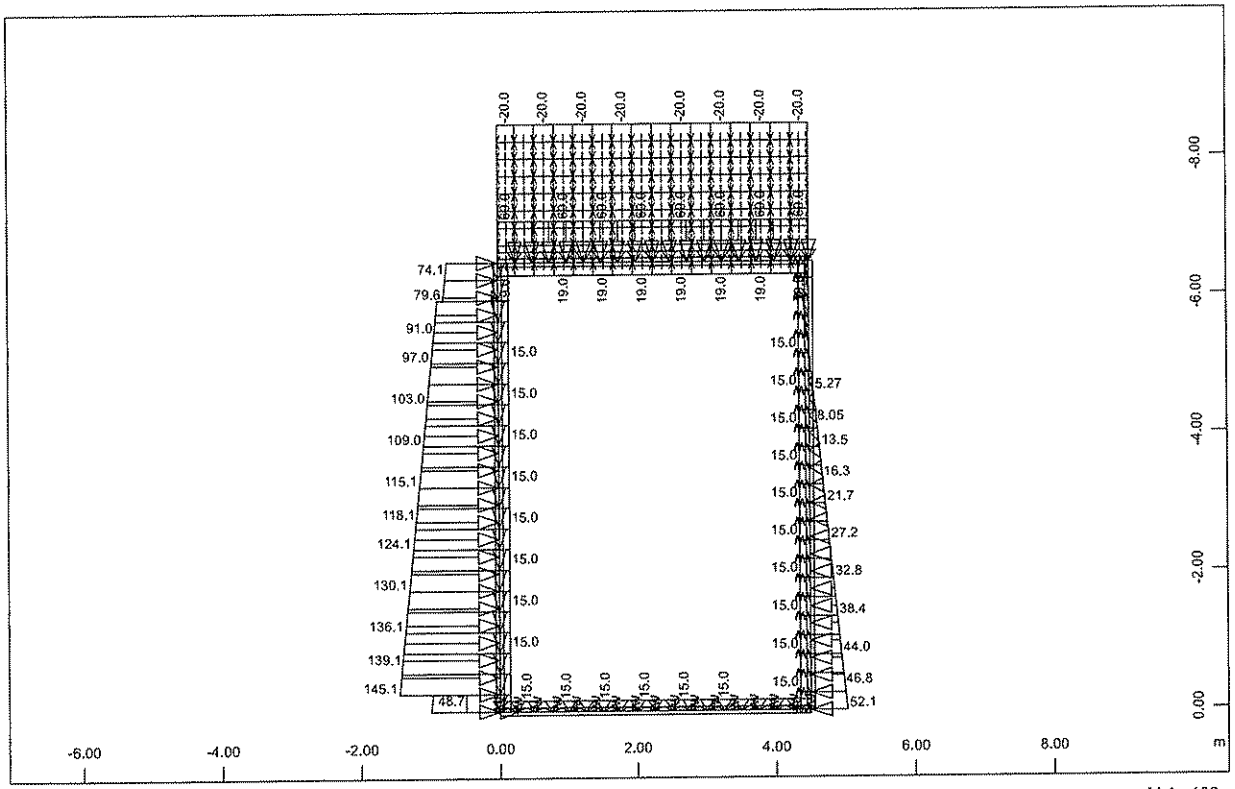
Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output



All loads (in components), Loadcase 1001 1.0G+1.0R+1.0C+0.3Q+1.0E , (1 cm 3D = unit) M 1 : 100

Z X Y

Beam line load (force) in global X (Unit=100.0 kN/m), Beam line load (force) in global Y (Unit=100.0 kN/m), Beam line load (uniform temperature change) (Unit=10.0

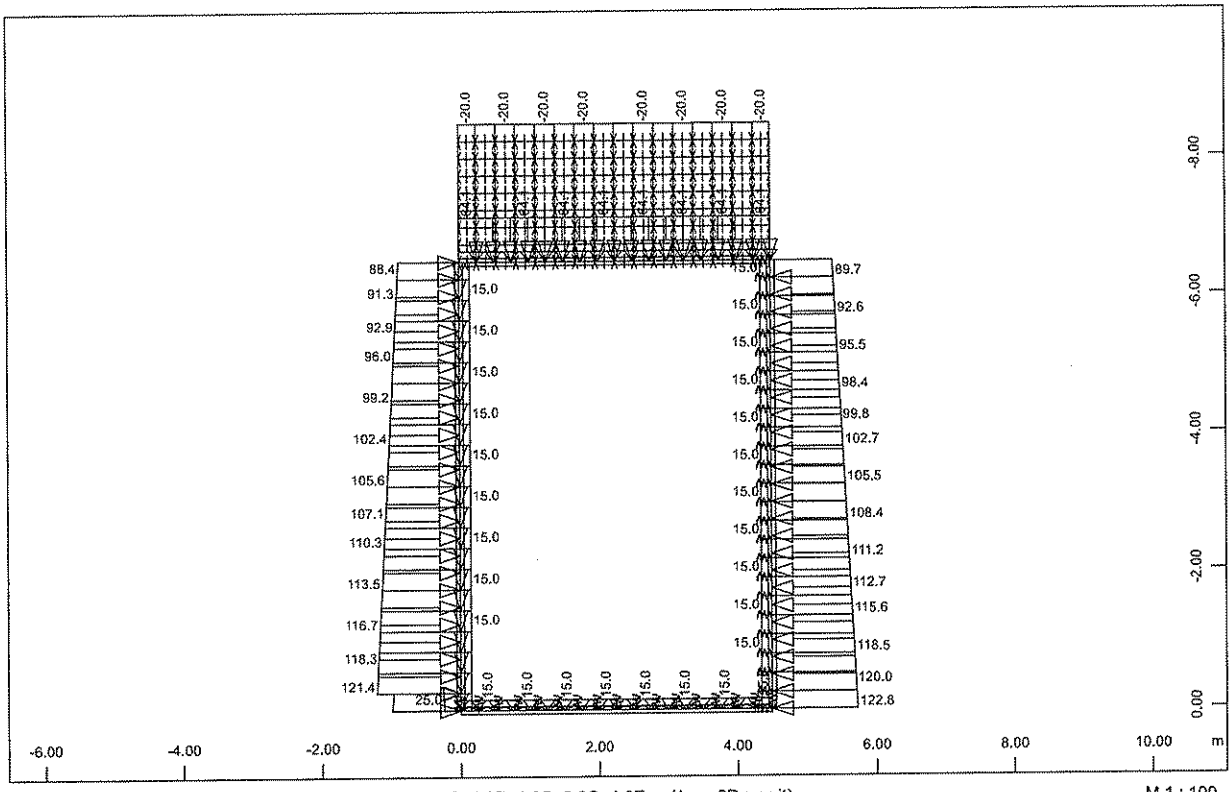


All loads (in components), Loadcase 1002 1.0G+1.0R+1.0C+0.3Q+1.0E , (1 cm 3D = unit) M 1 : 100

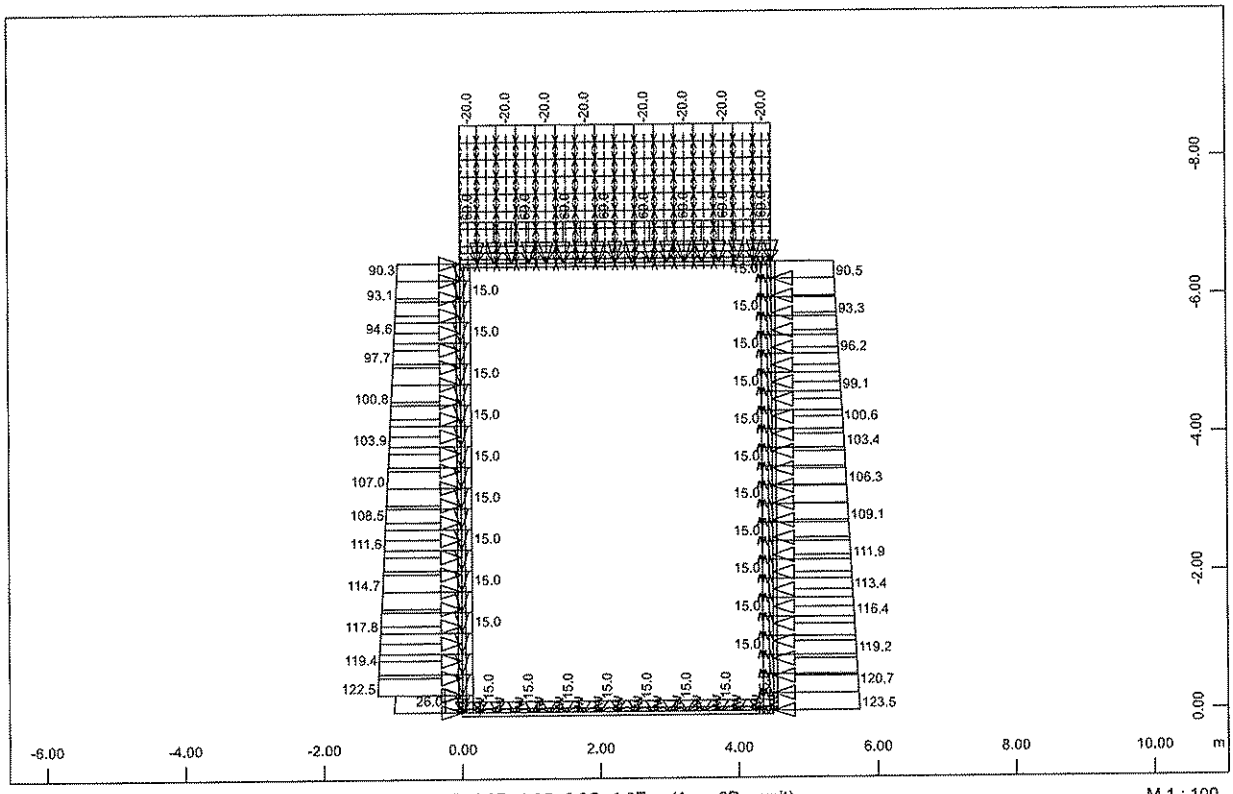
Z X Y

Beam line load (force) in global X (Unit=100.0 kN/m), Beam line load (force) in global Y (Unit=100.0 kN/m), Beam line load (uniform temperature change) (Unit=10.0

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output

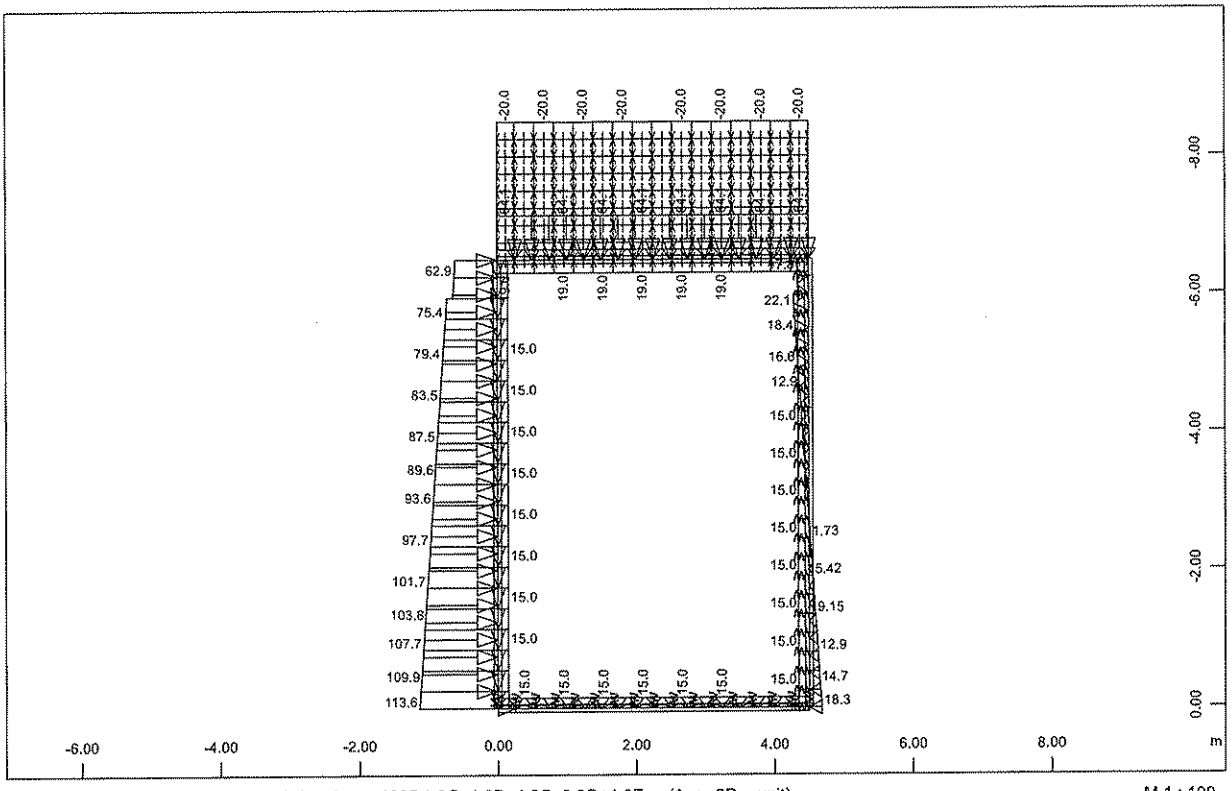


All loads (in components), Loadcase 1003 1.0G+1.0R+1.0C+0.3Q+1.0E , (1 cm 3D = unit) M 1 : 100
Beam line load (force) in global X (Unit=100.0 kN/m), Beam line load (force) in global Y (Unit=100.0 kN/m), Beam line load (uniform temperature change) (Unit=10.0



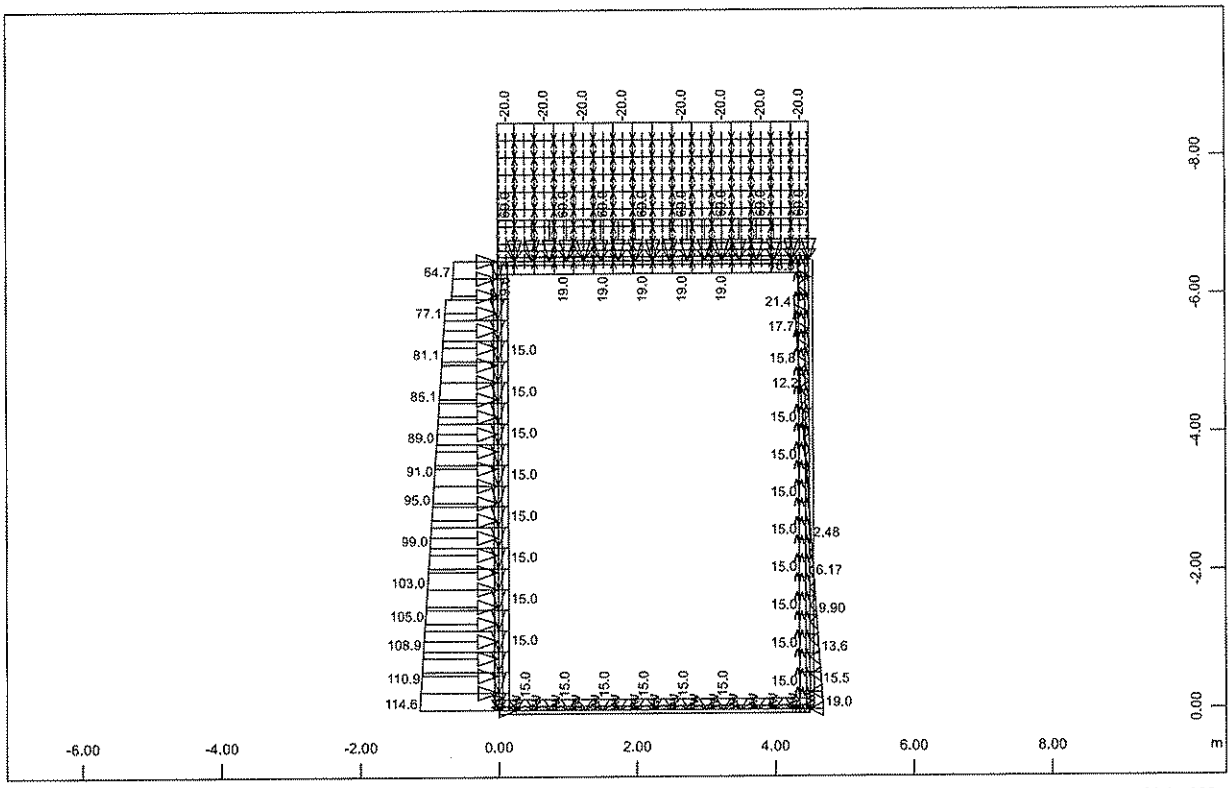
All loads (in components), Loadcase 1004 1.0G+1.0R+1.0C+0.3Q+1.0E . (1 cm 3D = unit) M 1 : 100
Beam line load (force) in global X (Unit=100.0 kN/m), Beam line load (force) in global Y (Unit=100.0 kN/m), Beam line load (uniform temperature change) (Unit=10.0

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output



All loads (in components), Loadcase 1005 1.0G+1.0R+1.0C+0.3Q+1.0E , (1 cm 3D = unit)
Beam line load (force) in global X (Unit=100.0 kN/m), Beam line load (force) in global Y (Unit=100.0 kN/m), Beam line load (uniform temperature change) (Unit=10.0

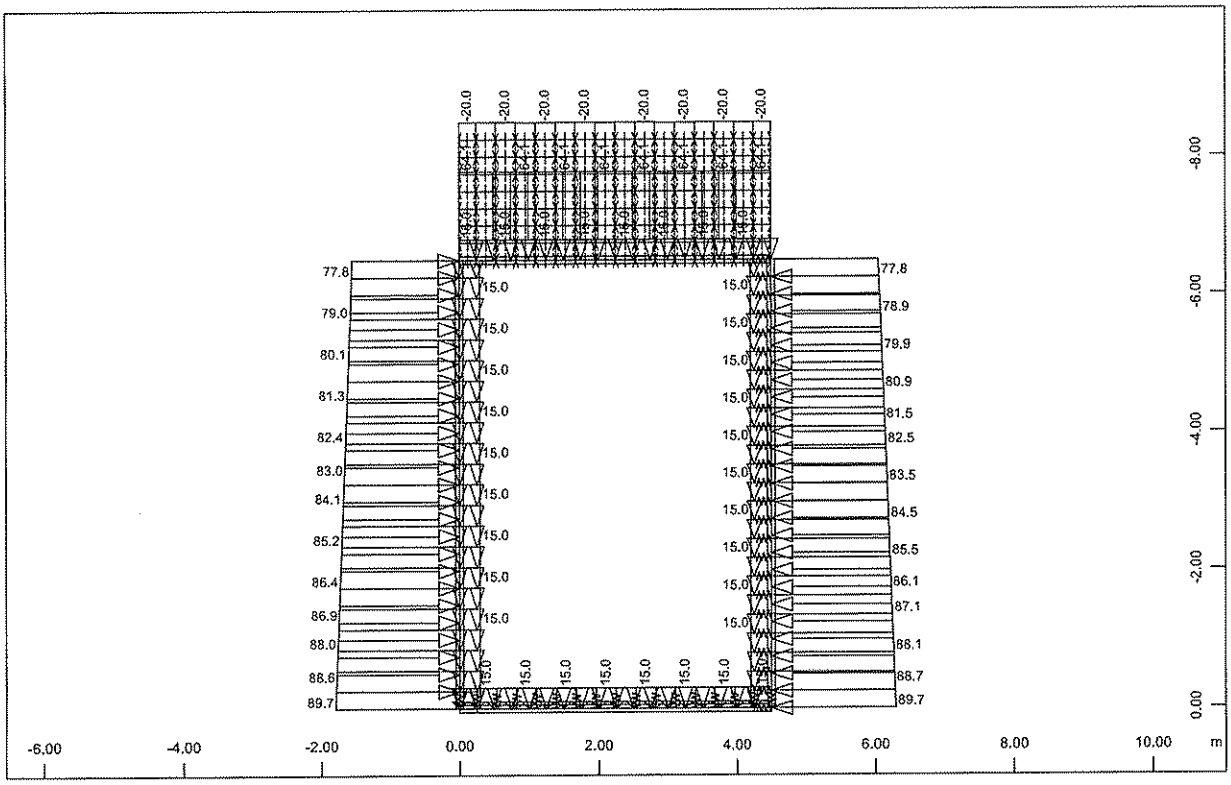
M 1 : 100



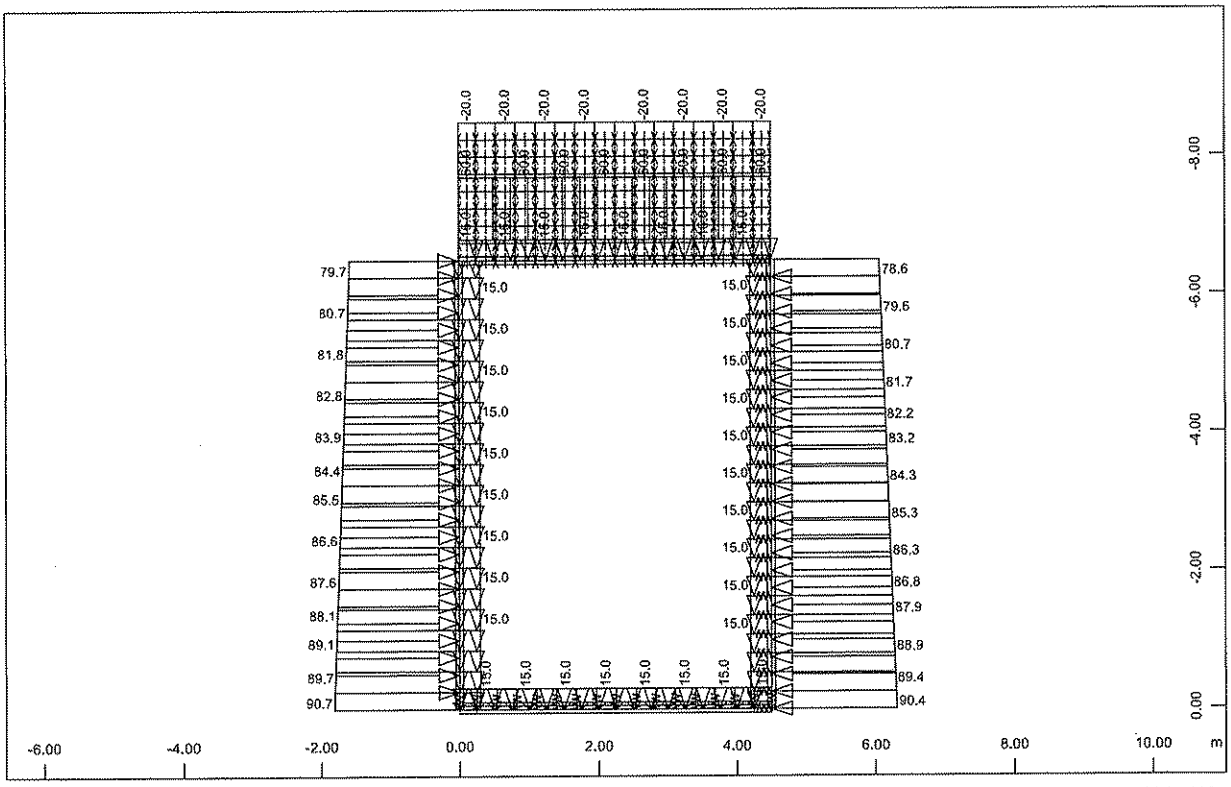
All loads (in components), Loadcase 1006 1.0G+1.0R+1.0C+0.3Q+1.0E , (1 cm 3D = unit)
Beam line load (force) in global X (Unit=100.0 kN/m), Beam line load (force) in global Y (Unit=100.0 kN/m), Beam line load (uniform temperature change) (Unit=10.0

M 1 : 100

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output



All loads (in components), Loadcase 1007 1.0G+1.0R+1.0C+0.3Q+1.0E , (1 cm 3D = unit)
M 1 : 100
Beam line load (force) in global X (Unit=50.0 kN/m), Beam line load (force) in global Y (Unit=50.0 kN/m), Beam line load (uniform temperature change) (Unit=10.0



All loads (in components), Loadcase 1008 1.0G+1.0R+1.0C+0.3Q+1.0E , (1 cm 3D = unit)
M 1 : 100
Beam line load (force) in global X (Unit=50.0 kN/m), Beam line load (force) in global Y (Unit=50.0 kN/m), Beam line load (uniform temperature change) (Unit=10.0

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
ULS design beams

Considered Load Cases

1001	1002	1003	1004	1005	1006
1007	1008	2121	2122	2125	2126
2129	2130	2221	2222	2225	2226
2229	2230	2321	2322	2325	2326
2329	2330				

Ultimate Load Design

Design for ultimate loads EuroNorm EN 1992 (2004) Concrete Structures
Uniaxial bending

Safety factors	SC-1	SC-2	SC-S	SS-1	SS-2	PIIa
	1.50	1.50	1.50	1.15	1.10	7

Strain limits	C1	C2	S1	S2	Z1	Z2
max	-3.50	-2.00	3.00	45.00	-3.50	18.00

parameters for reinforcements

Minimum reinforcements		compression		min. reinforcem.	maximum-
Bending.	Compress.	e/d	N/Npl	requ. section	reinforc.
0.00 [o/o]	0.20 [o/o]	3.50	0.0010	0.00	0.10	8.00

Tensile forces in the longitudinal reinforcements due to shear are NOT accounted for
Material of sections uses Ultimate Limit strain-stress law with individual safety fa
Material of reinforcements uses Ultimate Limit strain-stress law with individual saf

MNo.	temp lev.	Material-safety [-]	max.compr stress [MPa]	at strain [o/oo]	max.tens stress [MPa]	at strain [o/oo]	tension-stiffening [MPa]
1	0	1.500	-13.33	-2.00	0.00	0.00	
2	0	1.150	-500.00	-75.00	500.00	75.00	
11	0	1.500	-13.33	-2.00	0.00	0.00	

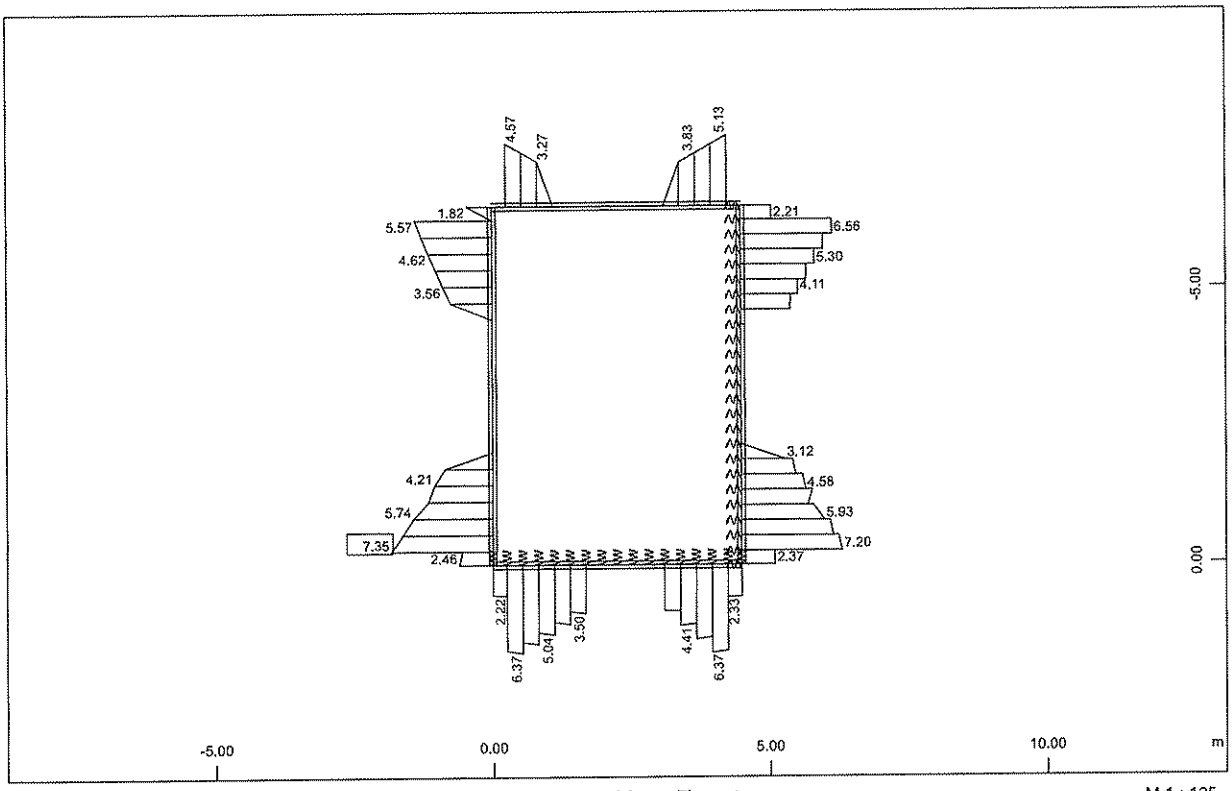
Shear Design

Design for shear Eurocode EN 1992 (2004)
Minimum shear factor or tan of inclination of compressive struts 0.40 / 2.50

MNo	f-cd [MPa]	tau-rd [MPa]	sigIIQ [MPa]	sigIIT [MPa]	sigIIQ+ [MPa]	fyd [MPa]
1	13.33	0.12	7.36	7.36	7.36	
2						434.78
11	13.33	0.12	7.36	7.36	7.36	

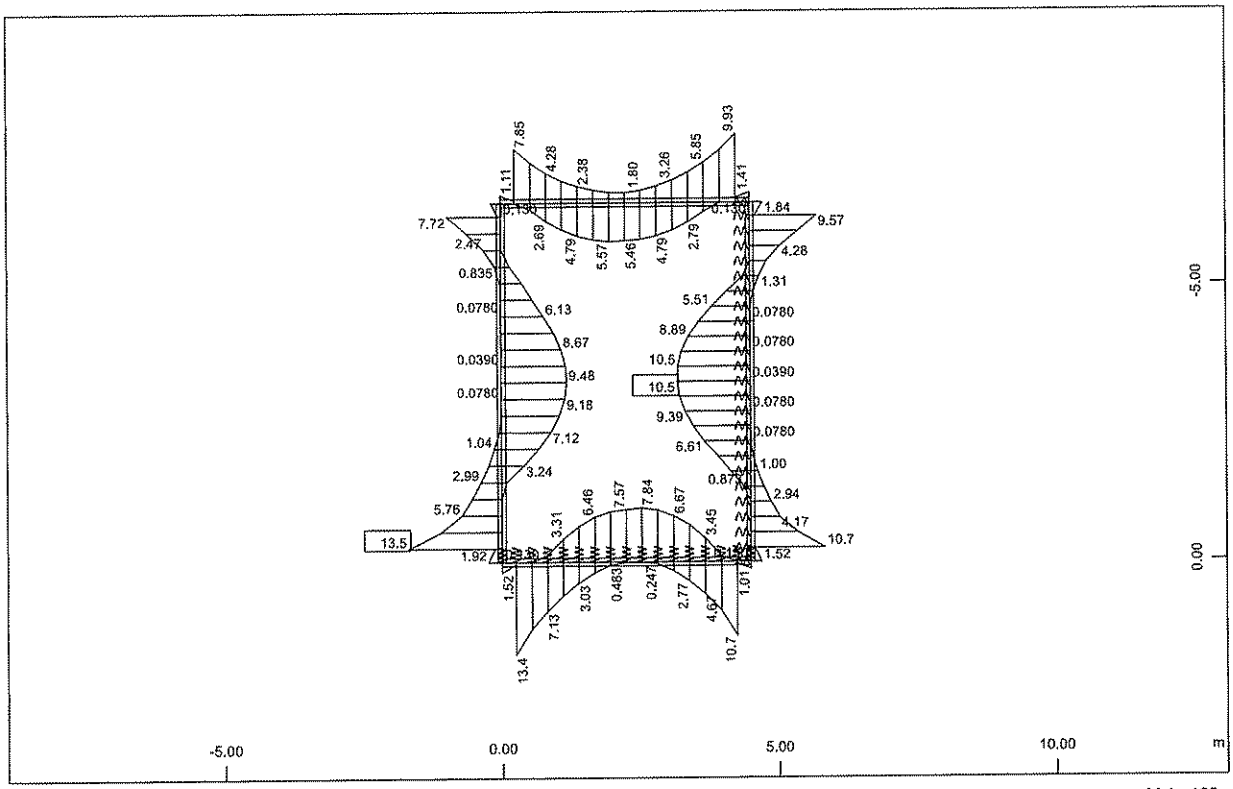
Tolerance for exceeding maximum shear or principal compression stress 0.0200

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output



Shear reinforcements (maximum), Design Case 1 , (1 cm 3D = unit) Beam Elements
(Unit=5.00 cm2/m), Beam Elements , Shear design error (Max=7.35)

M 1 : 125



Beam Elements , Longitudinal Reinforcements Lay. 1, Design Case 1 , 1 cm 3D = 10.0 cm2
(Max=10.5)
Beam Elements , Longitudinal Reinforcements Lay. 2, Design Case 1 , 1 cm 3D = 10.0 cm2

M 1 : 125

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
SLS design beams

Considered Load Cases

1121 1122 1125 1126 1129 1130

Parameters for nonlinear stresses

Iteration for all forces and moments

Material of sections uses Serviceability strain-stress law without safety factors
Material of reinforcements uses Serviceability strain-stress law without safety fact

MNo.	temp lev.	Material-safety [-]	max.compr stress [MPa]	at strain [o/oo]	max.tens stress [MPa]	at strain [o/oo]	tension-stiffening [MPa]
1	0	1.000	-28.00	-1.97	0.00	0.00	
2	0	1.000	-575.00	-75.00	575.00	75.00	
11	0	1.000	-28.00	-1.97	0.00	0.00	

Interaction thin walled normal- and shearstress via Prandtl flow rule

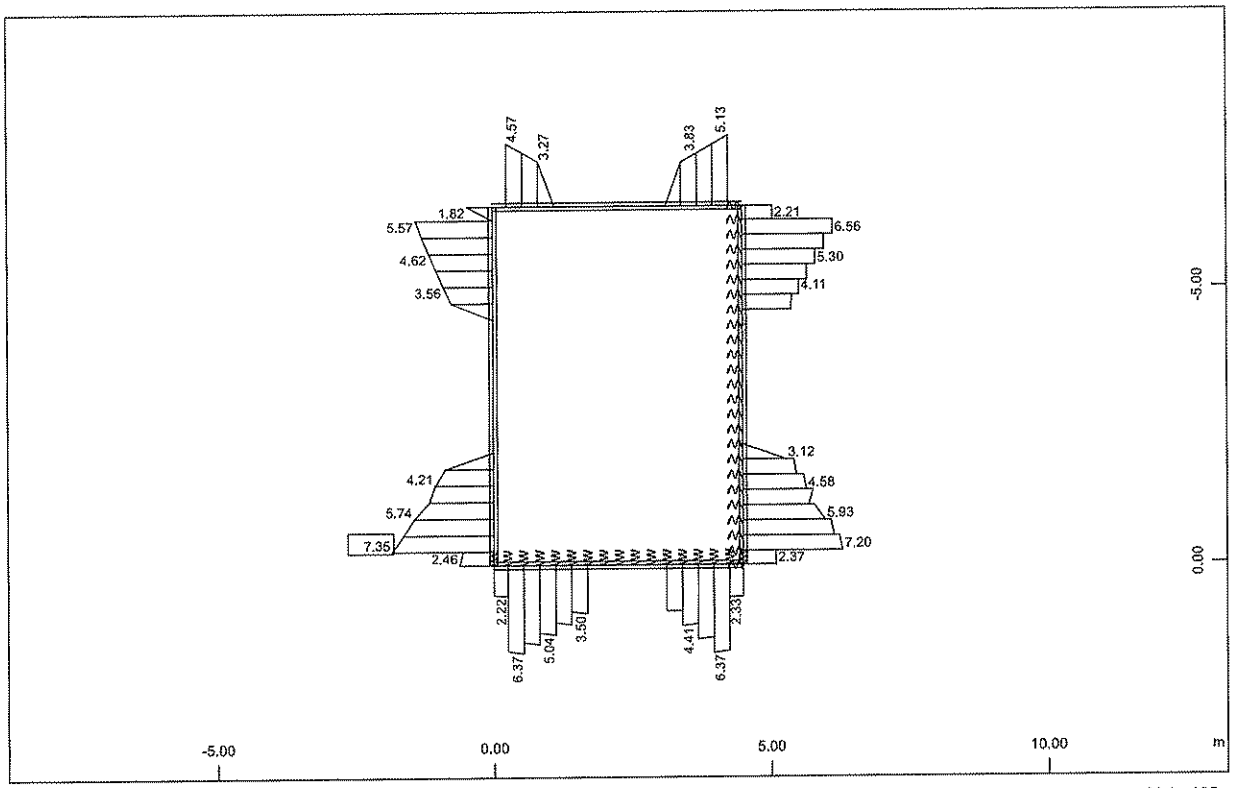
Parameters for nonlinear stress / Crackwidth EC2

MNo	sig-comp [MPa]	[o/o]	sig-tens [MPa]	[o/o]	design width [mm]	[mm]	bond [-]	load [-]	h-max [mm]
1	-8.37	69.73	0.00	100.0					
2	-34.95	8.10	177.76	41.22	0.200	0.200	0.80	0.50	800.0
11	-1.50	12.48	0.00	100.0					

Check for crack width passed with additional reinforcements

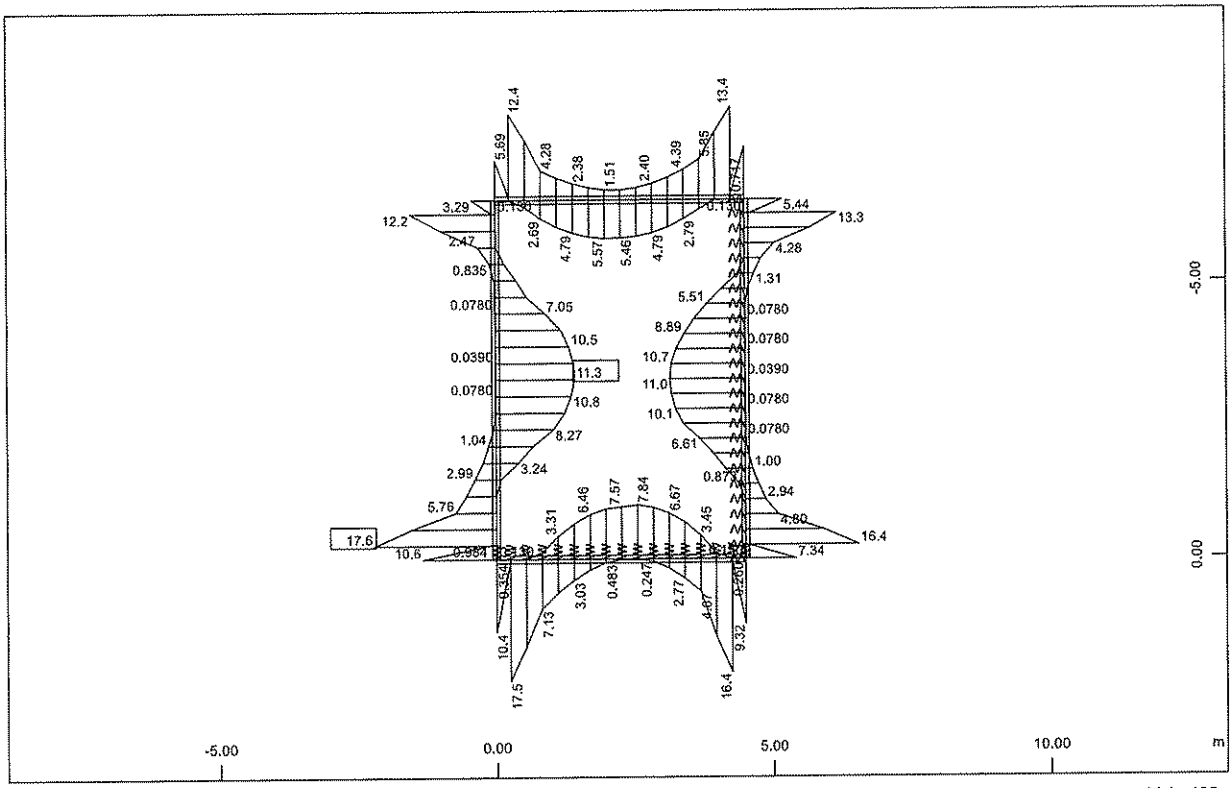
Stiffness is not saved in database

Οχετός 4.00m x 6.00 - 3.00m Επίχωση
Graphical Output



Shear reinforcements (maximum), Design Case 2 , (1 cm 3D = unit) Beam Elements
(Unit=5.00 cm2/m), Beam Elements , Shear design error (Max=7.35)

M 1 : 125



Beam Elements , Longitudinal Reinforcements Lay. 1, Design Case 2 , 1 cm 3D = 10.0 cm2
(Max=11.3)
Beam Elements , Longitudinal Reinforcements Lay. 2, Design Case 2 , 1 cm 3D = 10.0 cm2

M 1 : 125

ΣΤΑΤΙΚΗ ΕΠΙΛΥΣΗ ΠΤΕΡΥΓΟΤΟΙΧΟΥ

(Πρόγραμμα: SOFiSTiK)

Πτερυγότοιχος Εξόδου
Materials

Default design code is EuroNorm EN 1992 (2004) Concrete Structures (Europe) V 27.0
Structure and Tab.7.1N: AN (Buildings)
Snow load zone : 1

No. 1 C 20/25 (EN 1992)

Youngs-modulus	E	29962	[N/mm2]	Safetyfactor		1.50 [-]
Poisson-Ratio	mu	0.20	[-]	Strength	fc	20.00 [MPa]
Shear-modulus	G	12484	[N/mm2]	Nomin. strength	fck	20.00 [MPa]
Compression modulus		16646	[N/mm2]	Tens. strength	fctm	2.21 [MPa]
Weight		25.0	[kN/m3]	5 % t.strength	fctk	1.55 [MPa]
Weight buoyancy		25.0	[kN/m3]	95 % t.strength	fctk	2.87 [MPa]
Temp.elongat.coeff.		1.00E-05	[1/°K]	Bond strength	fbd	2.32 [MPa]
				Service strength		28.00 [MPa]
				Fatigue strength		12.27 [MPa]
				Ten.strngth fctd		1.03 [MPa]

Stress-Strain for serviceability
Is only valid within the defined stress range

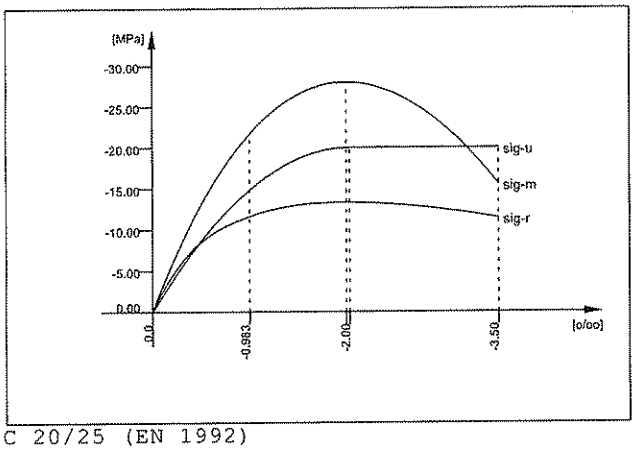
eps[o/oo]	sig-m[MPa]	E-t[N/mm2]
0.000	0.00	31460
-0.983	-21.66	13498
-1.967	-28.00	0
-3.500	-15.60	-15208
Safetyfactor		1.35

Stress-Strain for ultimate load
Is only valid within the defined stress range

eps[o/oo]	sig-u[MPa]	E-t[N/mm2]
0.000	0.00	20000
-2.000	-20.00	0
-3.500	-20.00	0
Safetyfactor		1.50

Stress-Strain of calc. mean values
Is only valid within the defined stress range

eps[o/oo]	sig-r[MPa]	E-t[N/mm2]
0.000	0.00	26217
-0.983	-11.61	4353
-1.967	-13.33	0
-3.500	-11.46	-2034
Safetyfactor		(1.50)



C 20/25 (EN 1992)

No. 2 B 500 C (EN 1992)

Youngs-modulus	E	200000	[N/mm2]	Safetyfactor		1.15 [-]
Poisson-Ratio	mu	0.30	[-]	Yield stress	fy	500.00 [MPa]
Shear-modulus	G	76923	[N/mm2]	Compr.yield val.	fyc	500.00 [MPa]
Compression modulus		166667	[N/mm2]	Tens. strength	ft	575.00 [MPa]
Weight		78.5	[kN/m3]	Compr. strength	fc	575.00 [MPa]
Weight buoyancy		78.5	[kN/m3]	Ultim. plast. strain		75.00 [o/oo]
Temp.elongat.coeff.		1.20E-05	[1/°K]	relative bond coeff.		1.00 [-]
max. thickness		32.00	[mm]	EC2 bondcoeff. K1		0.80 [-]
				Hardening modulus		0.00 [MPa]
				Proportional limit		500.00 [MPa]
				Dynamic stress range		152.17 [MPa]

Stress-Strain for serviceability

eps[o/oo]	sig-m[MPa]	E-t[N/mm2]

Πτερυγότοιχος Εξόδου
Materials

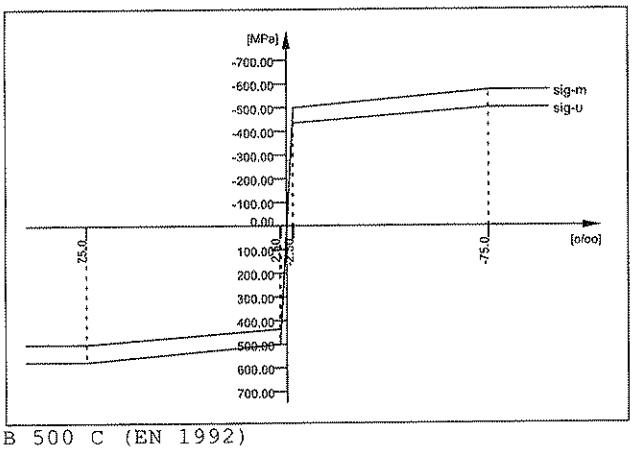
No. 2 B 500 C (EN 1992)

Is also extended beyond the defined stress range

1000.000	575.00	0
75.000	575.00	0
2.500	500.00	1034
0.000	0.00	200000
-2.500	-500.00	200000
-75.000	-575.00	1034
-1000.000	-575.00	0
Safetyfactor		1.15

Stress-Strain for ultimate load
Is also extended beyond the defined stress range

eps[o/oo]	sig-u[MPa]	E-t[N/mm2]
1000.000	500.00	0
75.000	500.00	0
2.174	434.78	896
0.000	0.00	200000
-2.174	-434.78	200000
-75.000	-500.00	896
-1000.000	-500.00	0
Safetyfactor		(1.15)



B 500 C (EN 1992)

Πτερυγότοιχος Εξόδου
Generation of Node and Element Loads

Actions

type	part	sup	Title	γ-u	γ-f	γ-a	ψ-0	ψ-1	ψ-2
G	G	perm	dead load	1.35	1.00	1.00	1.00	1.00	1.00
R	G	perm	earth pressure	1.35	1.00	1.00	1.00	1.00	0.00
Q	Q	cond	variable load	1.50	0.00	1.00	0.70	0.50	0.30

Πτερυγότοιχος Εξόδου
Calculation of forces and moments

Load Case 1 (G) Idio Varos

Factor forces and moments	1.000	
Factor dead weight DL-ZZ	1.000	
unfavourable safety factor	1.350	
favourable safety factor	1.000	
Combination coefficient ψ-0	1.000	(rare)
Combination coefficient ψ-1'	1.000	(non frequent)
Combination coefficient ψ-1	1.000	(frequent)
Combination coefficient ψ-2	1.000	(permanent)

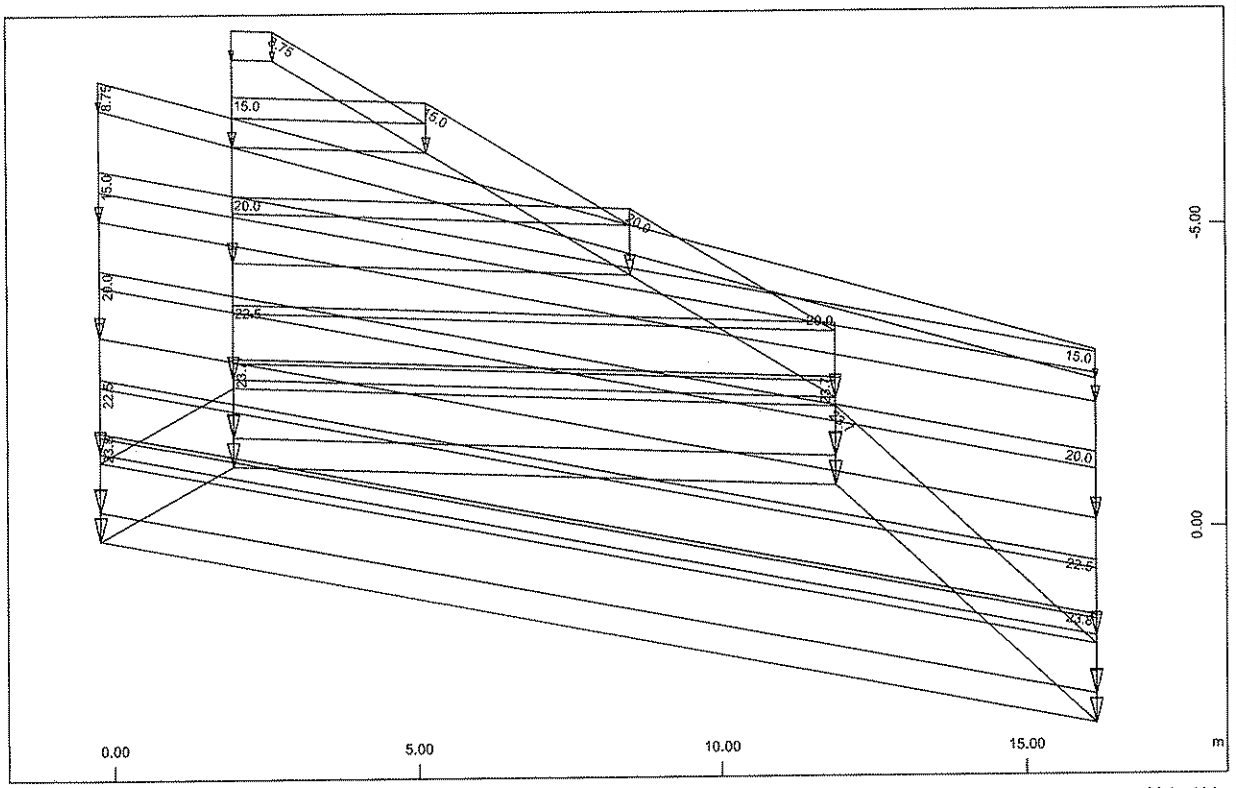
Load Case 2 (R) Energitikes Othiseis

Factor forces and moments	1.000	
unfavourable safety factor	1.350	
favourable safety factor	1.000	
Combination coefficient ψ-0	1.000	(rare)
Combination coefficient ψ-1'	1.000	(non frequent)
Combination coefficient ψ-1	1.000	(frequent)
Combination coefficient ψ-2	0.000	(permanent)

Load Case 3 (Q) Othiseis Kinitwn

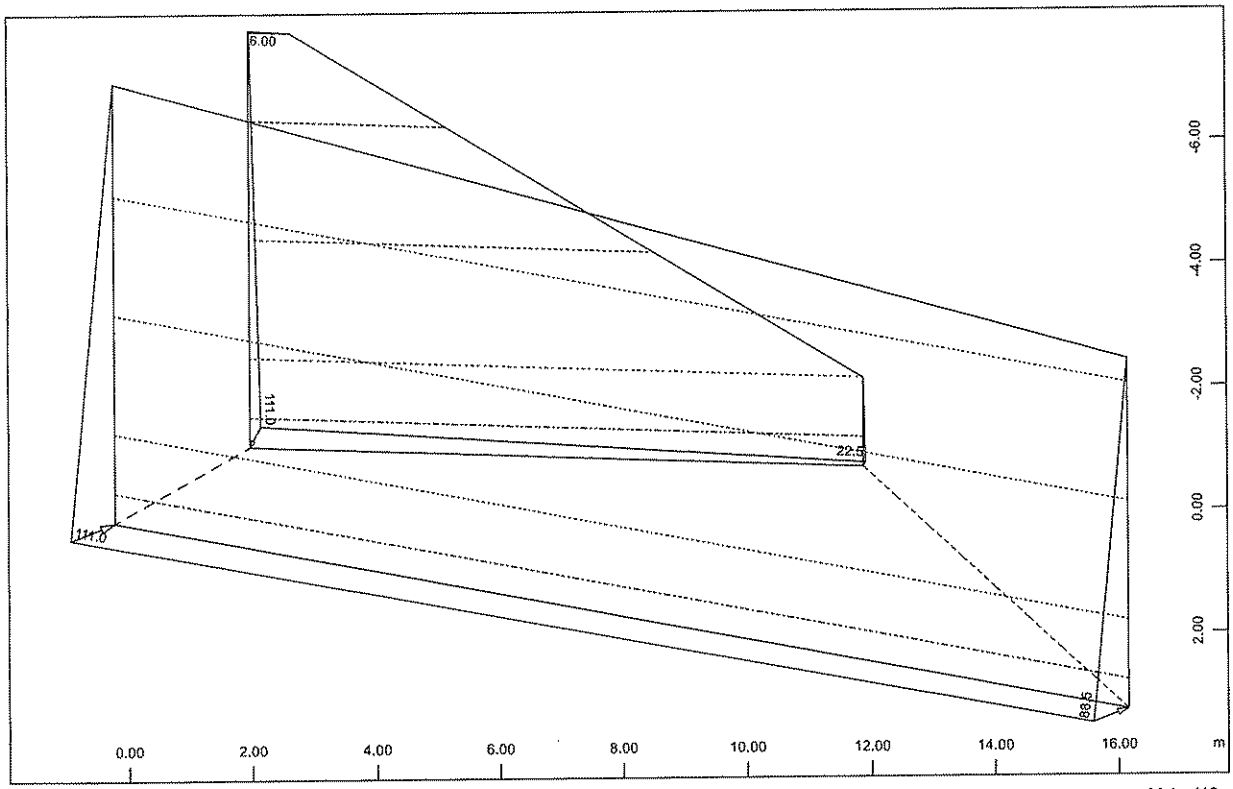
Factor forces and moments	1.000	
unfavourable safety factor	1.500	
favourable safety factor	0.000	
Combination coefficient ψ-0	0.700	(rare)
Combination coefficient ψ-1'	1.000	(non frequent)
Combination coefficient ψ-1	0.500	(frequent)
Combination coefficient ψ-2	0.300	(permanent)

Πτερυγότοιχος Εξόδου
Graphical Output



All loads (in components), Loadcase 1 Idio Varos , (1 cm 3D = unit) QUAD-Area dead load in global Z in Elements (Unit=20.0 kN/m2) (Max=23.8)

M 1 : 114
X * 0.502
Y * 0.906
Z * 0.962

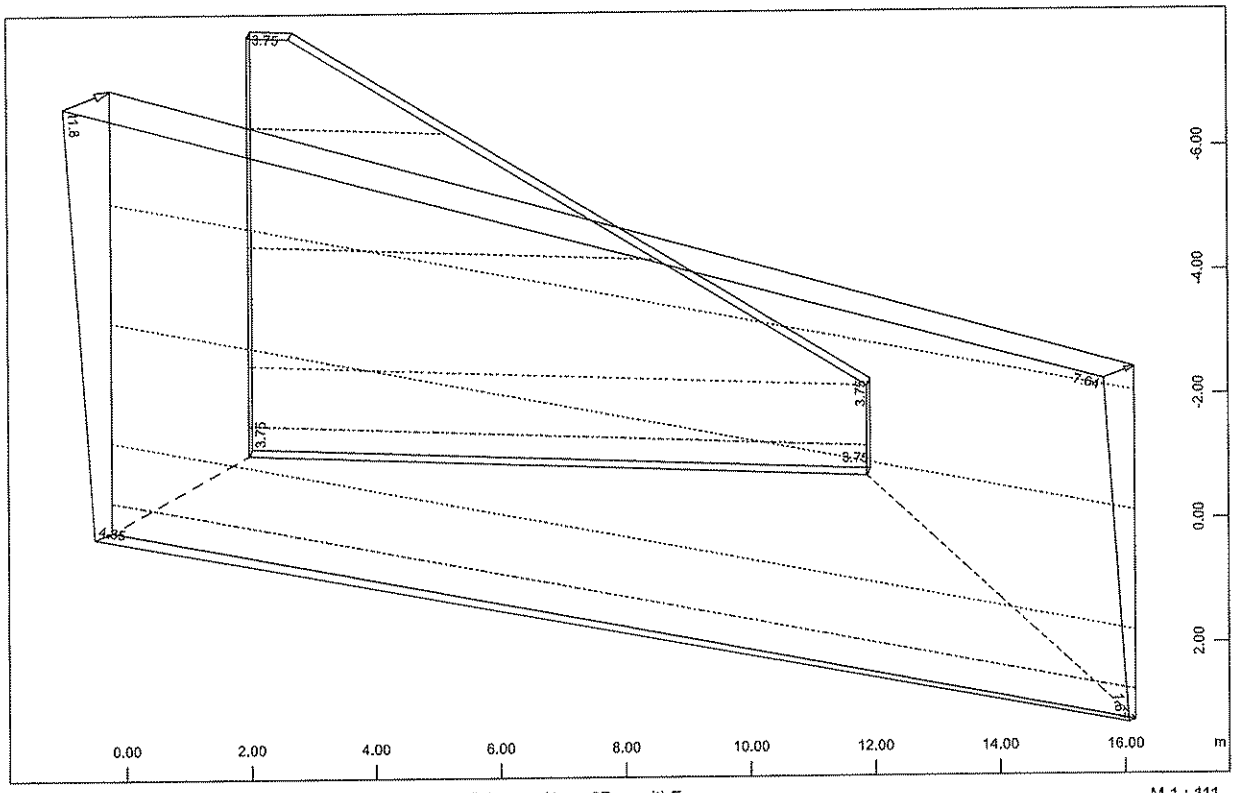


All loads (in components), Loadcase 2 Energitikes Othiseis , (1 cm 3D = unit) Free area load (force) in local z (Unit=100.0 kN/m2) (Min=-111.0) (Max= 1.6382e-09)

M 1 : 112
X * 0.502
Y * 0.806
Z * 0.962

WINGRAF - GRAPHICS FOR FINITE ELEMENTS (V 15.08-27)

Πτερυγότοιχος Εξόδου
Graphical Output



All loads (in components), Loadcase 3 Othiseis Kinitwn , (1 cm 3D = unit) Free area
load (force) in local z (Unit=10.0 kN/m2) (Min=-11.8) (Max=0)

M 1 : 111
X * 0.502
Y * 0.906
Z * 0.962

Πτερυγότοιχος Εξόδου

Superposition according to EuroNorm EN 1992 (2004) Concrete Structures

Combination rule Number 100
Crack width
Superposition according to manual MAXIMA formula 7

$$E_{d,perm} = E\left\{\sum_{j\geq 1} G_{k,j} \oplus P_k \oplus \sum_{i\geq 1} \psi_{2,i} \cdot Q_{k,i}\right\}$$

Resulting loadcases type Service: Permanent combination

Loadcase selection and Actions

Act type	LC	γ-u factor	γ-f	γ-a	ψ-0	ψ-1	ψ-2	ψ-1'	Type of loadcase / Title
G	G	1.00	1.00	1.00	1.00	1.00	1.00	1.00	dead load
	1	1.00							permanent load grouped in actions Idio Varos
Q	Q	1.00	0.00	1.00	0.70	0.50	0.30	1.00	variable load
	3	1.00							Conditional LC Othiseis Kinitwn
R	G	1.00	1.00	1.00	1.00	1.00	0.00	1.00	earth pressure
	2	1.00							permanent load grouped in actions Energitikes Othiseis

Combination rule Number 101
Deflections
Superposition according to manual MAXIMA formula 7

$$E_{d,perm} = E\left\{\sum_{j\geq 1} G_{k,j} \oplus P_k \oplus \sum_{i\geq 1} \psi_{2,i} \cdot Q_{k,i}\right\}$$

Resulting loadcases type Service: Permanent combination

Loadcase selection and Actions

Act type	LC	γ-u factor	γ-f	γ-a	ψ-0	ψ-1	ψ-2	ψ-1'	Type of loadcase / Title
G	G	1.00	1.00	1.00	1.00	1.00	1.00	1.00	dead load
	1	1.00							permanent load grouped in actions Idio Varos
Q	Q	1.00	0.00	1.00	0.70	0.50	0.30	1.00	variable load
	3	1.00							Conditional LC Othiseis Kinitwn
R	G	1.00	1.00	1.00	1.00	1.00	0.00	1.00	earth pressure
	2	1.00							permanent load grouped in actions Energitikes Othiseis

Combination rule Number 103
charact. support reactions
Superposition according to manual MAXIMA formula 4

$$E_{d,rare} = E\left\{\sum_{j\geq 1} G_{k,j} \oplus P_k \oplus Q_{k,1} \oplus \sum_{i>1} \psi_{0,i} \cdot Q_{k,i}\right\}$$

Resulting loadcases type Service: Rare combination

Loadcase selection and Actions

Act type	LC	γ-u factor	γ-f	γ-a	ψ-0	ψ-1	ψ-2	ψ-1'	Type of loadcase / Title
G	G	1.00	1.00	1.00	1.00	1.00	1.00	1.00	dead load
	1	1.00							permanent load grouped in actions Idio Varos
Q	Q	1.00	0.00	1.00	0.70	0.50	0.30	1.00	variable load

Πτερυγότοιχος Εξόδου

Loadcase selection and Actions

Act	type	γ-u	γ-f	γ-a	ψ-0	ψ-1	ψ-2	ψ-1'	Title
	LC	factor	Type of loadcase						
	3	1.00	Conditional LC						Othiseis Kinitwn
R	G	1.00	1.00	1.00	1.00	1.00	0.00	1.00	earth pressure
	2	1.00	permanent load grouped in actions						Energitikes Othiseis

Combination rule Number 104
Ultimate Design combination
Superposition according to manual MAXIMA formula 1

$$E_d = E\left\{\sum_{j\geq 1}\gamma_{G,j}\cdot G_{k,j} \oplus \gamma_P\cdot P_k \oplus \gamma_{Q,1}\cdot Q_{k,1} \oplus \sum_{i>1}\gamma_{Q,i}\cdot\psi_{0,i}\cdot Q_{k,i}\right\}$$

Resulting loadcases type Ultimate Design combination

Loadcase selection and Actions

Act	type	γ-u	γ-f	γ-a	ψ-0	ψ-1	ψ-2	ψ-1'	Title
	LC	factor	Type of loadcase						
G	G	1.35	1.00	1.00	1.00	1.00	1.00	1.00	dead load
	1	1.00	permanent load grouped in actions						Idio Varos
Q	Q	1.50	0.00	1.00	0.70	0.50	0.30	1.00	variable load
	3	1.00	Conditional LC						Othiseis Kinitwn
R	G	1.35	1.00	1.00	1.00	1.00	0.00	1.00	earth pressure
	2	1.00	permanent load grouped in actions						Energitikes Othiseis

Combination rule Number 105
equ.6.10a(EN 1990)
Superposition according to explicitly defined formula
γ*{G}+γ*{P}+(γ-u·ψ-0/0.00)*{Q1}+(γ-u·ψ-0/0.00)*{QI}
Resulting loadcases type Ultimate Design combination

Loadcase selection and Actions

Act	type	fac-u	fac-f	facu1	facf1	facu2	facf2	facu3	facf3	Title
	LC	factor	Type of loadcase							
G	G	1.35	1.00	dead load						
	1	1.00	permanent load grouped in actions							Idio Varos
Q	Q	1.05	0.00	1.05	0.00	variable load				
	3	1.00	Conditional LC							Othiseis Kinitwn
R	G	1.35	1.00	earth pressure						
	2	1.00	permanent load grouped in actions							Energitikes Othiseis

Combination rule Number 106
equ.6.10b(EN 1990)
Superposition according to explicitly defined formula
ξ·γ*{G}+γ*{P}+γ*{Q1}+(γ-u·ψ-0/0.00)*{QI}
Resulting loadcases type Ultimate Design combination

Loadcase selection and Actions

Act	type	fac-u	fac-f	facu1	facf1	facu2	facf2	facu3	facf3	Title
	LC	factor	Type of loadcase							
G	G	1.15	1.00	dead load						
	1	1.00	permanent load grouped in actions							Idio Varos
Q	Q	1.05	0.00	1.50	0.00	variable load				
	3	1.00	Conditional LC							Othiseis Kinitwn
R	G	1.15	1.00	earth pressure						
	2	1.00	permanent load grouped in actions							Energitikes Othiseis

Πτερυγότοιχος Εξόδου

Generated Loadcases

Number	Comb	Title
1101	100	MAXP-MXX QUAD Forces and moments
1102	100	MINP-MXX QUAD Forces and moments
1103	100	MAXP-MYY QUAD Forces and moments
1104	100	MINP-MYY QUAD Forces and moments
1105	100	MAXP-MXY QUAD Forces and moments
1106	100	MINP-MXY QUAD Forces and moments
1107	100	MAXP-VX QUAD Forces and moments
1108	100	MINP-VX QUAD Forces and moments
1109	100	MAXP-VY QUAD Forces and moments
1110	100	MINP-VY QUAD Forces and moments
1111	100	MAXP-NXX QUAD Forces and moments
1112	100	MINP-NXX QUAD Forces and moments
1113	100	MAXP-NYY QUAD Forces and moments
1114	100	MINP-NYY QUAD Forces and moments
1115	100	MAXP-NXY QUAD Forces and moments
1116	100	MINP-NXY QUAD Forces and moments
1101	100	MAXP-MXX QUAK Forces and moments
1102	100	MINP-MXX QUAK Forces and moments
1103	100	MAXP-MYY QUAK Forces and moments
1104	100	MINP-MYY QUAK Forces and moments
1105	100	MAXP-MXY QUAK Forces and moments
1106	100	MINP-MXY QUAK Forces and moments
1107	100	MAXP-VX QUAK Forces and moments
1108	100	MINP-VX QUAK Forces and moments
1109	100	MAXP-VY QUAK Forces and moments
1110	100	MINP-VY QUAK Forces and moments
1111	100	MAXP-NXX QUAK Forces and moments
1112	100	MINP-NXX QUAK Forces and moments
1113	100	MAXP-NYY QUAK Forces and moments
1114	100	MINP-NYY QUAK Forces and moments
1115	100	MAXP-NXY QUAK Forces and moments
1116	100	MINP-NXY QUAK Forces and moments
1471	101	MAXP-UX NODE Displacements
1472	101	MINP-UX NODE Displacements
1473	101	MAXP-UY NODE Displacements
1474	101	MINP-UY NODE Displacements
1475	101	MAXP-UZ NODE Displacements
1476	101	MINP-UZ NODE Displacements
1477	101	MAXPPHIX NODE Displacements
1478	101	MINPPHIX NODE Displacements
1479	101	MAXPPHIY NODE Displacements
1480	101	MINPPHIY NODE Displacements
1481	101	MAXPPHIZ NODE Displacements
1482	101	MINPPHIZ NODE Displacements
1483	101	MAXPPHIB NODE Displacements
1484	101	MINPPHIB NODE Displacements
1951	103	MAXR-PX NODE Support reactions
1952	103	MINR-PX NODE Support reactions
1953	103	MAXR-PY NODE Support reactions
1954	103	MINR-PY NODE Support reactions
1955	103	MAXR-PZ NODE Support reactions
1956	103	MINR-PZ NODE Support reactions
1957	103	MAXR-MX NODE Support reactions
1958	103	MINR-MX NODE Support reactions
1959	103	MAXR-MY NODE Support reactions
1960	103	MINR-MY NODE Support reactions
1961	103	MAXR-MZ NODE Support reactions
1962	103	MINR-MZ NODE Support reactions
1991	103	MAXR-MB NODE Support reactions
1992	103	MINR-MB NODE Support reactions
1917	103	MAXR-P QUAD Bedding stresses
1918	103	MINR-P QUAD Bedding stresses
1991	103	MAXR-PT QUAD Bedding stresses
1992	103	MINR-PT QUAD Bedding stresses
1993	103	MAXR-PTX QUAD Bedding stresses

Πτερυγότοιχος Εξόδου

Generated Loadcases

Number	Comb	Title
1994	103	MINR-PTX QUAD Bedding stresses
1995	103	MAXR-PTY QUAD Bedding stresses
1996	103	MINR-PTY QUAD Bedding stresses
1997	103	MAXR-PTZ QUAD Bedding stresses
1998	103	MINR-PTZ QUAD Bedding stresses
2151	104	MAX-PX NODE Support reactions
2152	104	MIN-PX NODE Support reactions
2153	104	MAX-PY NODE Support reactions
2154	104	MIN-PY NODE Support reactions
2155	104	MAX-PZ NODE Support reactions
2156	104	MIN-PZ NODE Support reactions
2157	104	MAX-MX NODE Support reactions
2158	104	MIN-MX NODE Support reactions
2159	104	MAX-MY NODE Support reactions
2160	104	MIN-MY NODE Support reactions
2161	104	MAX-MZ NODE Support reactions
2162	104	MIN-MZ NODE Support reactions
2191	104	MAX-MB NODE Support reactions
2192	104	MIN-MB NODE Support reactions
2117	104	MAX-P QUAD Bedding stresses
2118	104	MIN-P QUAD Bedding stresses
2191	104	MAX-PT QUAD Bedding stresses
2192	104	MIN-PT QUAD Bedding stresses
2193	104	MAX-PTX QUAD Bedding stresses
2194	104	MIN-PTX QUAD Bedding stresses
2195	104	MAX-PTY QUAD Bedding stresses
2196	104	MIN-PTY QUAD Bedding stresses
2197	104	MAX-PTZ QUAD Bedding stresses
2198	104	MIN-PTZ QUAD Bedding stresses
2101	104	MAX-MXX QUAD Forces and moments
2102	104	MIN-MXX QUAD Forces and moments
2103	104	MAX-MYY QUAD Forces and moments
2104	104	MIN-MYY QUAD Forces and moments
2105	104	MAX-MXY QUAD Forces and moments
2106	104	MIN-MXY QUAD Forces and moments
2107	104	MAX-VX QUAD Forces and moments
2108	104	MIN-VX QUAD Forces and moments
2109	104	MAX-VY QUAD Forces and moments
2110	104	MIN-VY QUAD Forces and moments
2111	104	MAX-NXX QUAD Forces and moments
2112	104	MIN-NXX QUAD Forces and moments
2113	104	MAX-NYY QUAD Forces and moments
2114	104	MIN-NYY QUAD Forces and moments
2115	104	MAX-NXY QUAD Forces and moments
2116	104	MIN-NXY QUAD Forces and moments
2101	104	MAX-MXX QUAK Forces and moments
2102	104	MIN-MXX QUAK Forces and moments
2103	104	MAX-MYY QUAK Forces and moments
2104	104	MIN-MYY QUAK Forces and moments
2105	104	MAX-MXY QUAK Forces and moments
2106	104	MIN-MXY QUAK Forces and moments
2107	104	MAX-VX QUAK Forces and moments
2108	104	MIN-VX QUAK Forces and moments
2109	104	MAX-VY QUAK Forces and moments
2110	104	MIN-VY QUAK Forces and moments
2111	104	MAX-NXX QUAK Forces and moments
2112	104	MIN-NXX QUAK Forces and moments
2113	104	MAX-NYY QUAK Forces and moments
2114	104	MIN-NYY QUAK Forces and moments
2115	104	MAX-NXY QUAK Forces and moments
2116	104	MIN-NXY QUAK Forces and moments
2251	105	MAX-PX NODE Support reactions
2252	105	MIN-PX NODE Support reactions
2253	105	MAX-PY NODE Support reactions
2254	105	MIN-PY NODE Support reactions

Πτερυγότοιχος Εξόδου

Generated Loadcases

Number	Comb	Title
2255	105	MAX-PZ NODE Support reactions
2256	105	MIN-PZ NODE Support reactions
2257	105	MAX-MX NODE Support reactions
2258	105	MIN-MX NODE Support reactions
2259	105	MAX-MY NODE Support reactions
2260	105	MIN-MY NODE Support reactions
2261	105	MAX-MZ NODE Support reactions
2262	105	MIN-MZ NODE Support reactions
2291	105	MAX-MB NODE Support reactions
2292	105	MIN-MB NODE Support reactions
2217	105	MAX-P QUAD Bedding stresses
2218	105	MIN-P QUAD Bedding stresses
2291	105	MAX-PT QUAD Bedding stresses
2292	105	MIN-PT QUAD Bedding stresses
2293	105	MAX-PTX QUAD Bedding stresses
2294	105	MIN-PTX QUAD Bedding stresses
2295	105	MAX-PTY QUAD Bedding stresses
2296	105	MIN-PTY QUAD Bedding stresses
2297	105	MAX-PTZ QUAD Bedding stresses
2298	105	MIN-PTZ QUAD Bedding stresses
2201	105	MAX-MXX QUAD Forces and moments
2202	105	MIN-MXX QUAD Forces and moments
2203	105	MAX-MYY QUAD Forces and moments
2204	105	MIN-MYY QUAD Forces and moments
2205	105	MAX-MXY QUAD Forces and moments
2206	105	MIN-MXY QUAD Forces and moments
2207	105	MAX-VX QUAD Forces and moments
2208	105	MIN-VX QUAD Forces and moments
2209	105	MAX-VY QUAD Forces and moments
2210	105	MIN-VY QUAD Forces and moments
2211	105	MAX-NXX QUAD Forces and moments
2212	105	MIN-NXX QUAD Forces and moments
2213	105	MAX-NYY QUAD Forces and moments
2214	105	MIN-NYY QUAD Forces and moments
2215	105	MAX-NXY QUAD Forces and moments
2216	105	MIN-NXY QUAD Forces and moments
2201	105	MAX-MXX QUAK Forces and moments
2202	105	MIN-MXX QUAK Forces and moments
2203	105	MAX-MYY QUAK Forces and moments
2204	105	MIN-MYY QUAK Forces and moments
2205	105	MAX-MXY QUAK Forces and moments
2206	105	MIN-MXY QUAK Forces and moments
2207	105	MAX-VX QUAK Forces and moments
2208	105	MIN-VX QUAK Forces and moments
2209	105	MAX-VY QUAK Forces and moments
2210	105	MIN-VY QUAK Forces and moments
2211	105	MAX-NXX QUAK Forces and moments
2212	105	MIN-NXX QUAK Forces and moments
2213	105	MAX-NYY QUAK Forces and moments
2214	105	MIN-NYY QUAK Forces and moments
2215	105	MAX-NXY QUAK Forces and moments
2216	105	MIN-NXY QUAK Forces and moments
2351	106	MAX-PX NODE Support reactions
2352	106	MIN-PX NODE Support reactions
2353	106	MAX-PY NODE Support reactions
2354	106	MIN-PY NODE Support reactions
2355	106	MAX-PZ NODE Support reactions
2356	106	MIN-PZ NODE Support reactions
2357	106	MAX-MX NODE Support reactions
2358	106	MIN-MX NODE Support reactions
2359	106	MAX-MY NODE Support reactions
2360	106	MIN-MY NODE Support reactions
2361	106	MAX-MZ NODE Support reactions
2362	106	MIN-MZ NODE Support reactions
2391	106	MAX-MB NODE Support reactions

Πτερυγότοιχος Εξόδου

Generated Loadcases

Number	Comb	Title
2392	106	MIN-MB NODE Support reactions
2317	106	MAX-P QUAD Bedding stresses
2318	106	MIN-P QUAD Bedding stresses
2391	106	MAX-PT QUAD Bedding stresses
2392	106	MIN-PT QUAD Bedding stresses
2393	106	MAX-PTX QUAD Bedding stresses
2394	106	MIN-PTX QUAD Bedding stresses
2395	106	MAX-PTY QUAD Bedding stresses
2396	106	MIN-PTY QUAD Bedding stresses
2397	106	MAX-PTZ QUAD Bedding stresses
2398	106	MIN-PTZ QUAD Bedding stresses
2301	106	MAX-MXX QUAD Forces and moments
2302	106	MIN-MXX QUAD Forces and moments
2303	106	MAX-MYY QUAD Forces and moments
2304	106	MIN-MYY QUAD Forces and moments
2305	106	MAX-MXY QUAD Forces and moments
2306	106	MIN-MXY QUAD Forces and moments
2307	106	MAX-VX QUAD Forces and moments
2308	106	MIN-VX QUAD Forces and moments
2309	106	MAX-VY QUAD Forces and moments
2310	106	MIN-VY QUAD Forces and moments
2311	106	MAX-NXX QUAD Forces and moments
2312	106	MIN-NXX QUAD Forces and moments
2313	106	MAX-NYY QUAD Forces and moments
2314	106	MIN-NYY QUAD Forces and moments
2315	106	MAX-NXY QUAD Forces and moments
2316	106	MIN-NXY QUAD Forces and moments
2301	106	MAX-MXX QUAK Forces and moments
2302	106	MIN-MXX QUAK Forces and moments
2303	106	MAX-MYY QUAK Forces and moments
2304	106	MIN-MYY QUAK Forces and moments
2305	106	MAX-MXY QUAK Forces and moments
2306	106	MIN-MXY QUAK Forces and moments
2307	106	MAX-VX QUAK Forces and moments
2308	106	MIN-VX QUAK Forces and moments
2309	106	MAX-VY QUAK Forces and moments
2310	106	MIN-VY QUAK Forces and moments
2311	106	MAX-NXX QUAK Forces and moments
2312	106	MIN-NXX QUAK Forces and moments
2313	106	MAX-NYY QUAK Forces and moments
2314	106	MIN-NYY QUAK Forces and moments
2315	106	MAX-NXY QUAK Forces and moments
2316	106	MIN-NXY QUAK Forces and moments

Πτερυγότοιχος Εξόδου
seismika fortia

Load Case 90 earthquake x

Factor forces and moments		1.000
Factor dead weight	DL-XX	0.240
Factor dead weight	DL-YY	0.000
Factor dead weight	DL-ZZ	0.000

Load Case 91 earthquake y

Factor forces and moments		1.000
Factor dead weight	DL-XX	0.000
Factor dead weight	DL-YY	0.240
Factor dead weight	DL-ZZ	0.000

Πτερυγότοιχος Εξόδου
Calculation of forces and moments

Load Case 4 Othiseis Gaiwn Seismoy

Factor forces and moments	1.000	
unfavourable safety factor	1.500	
favourable safety factor	1.000	
accidential safety factor	0.998	
Combination coefficient ψ-0	1.000	(rare)
Combination coefficient ψ-1'	1.000	(non frequent)
Combination coefficient ψ-1	1.000	(frequent)
Combination coefficient ψ-2	1.000	(permanent)

Load Case 5 Othiseis Kinitoy seismoy

Factor forces and moments	1.000	
unfavourable safety factor	1.500	
favourable safety factor	1.000	
accidential safety factor	0.998	
Combination coefficient ψ-0	1.000	(rare)
Combination coefficient ψ-1'	1.000	(non frequent)
Combination coefficient ψ-1	1.000	(frequent)
Combination coefficient ψ-2	1.000	(permanent)

Load Case 90 earthquake x

Factor forces and moments	1.000	
Factor dead weight DL-XX	0.240	

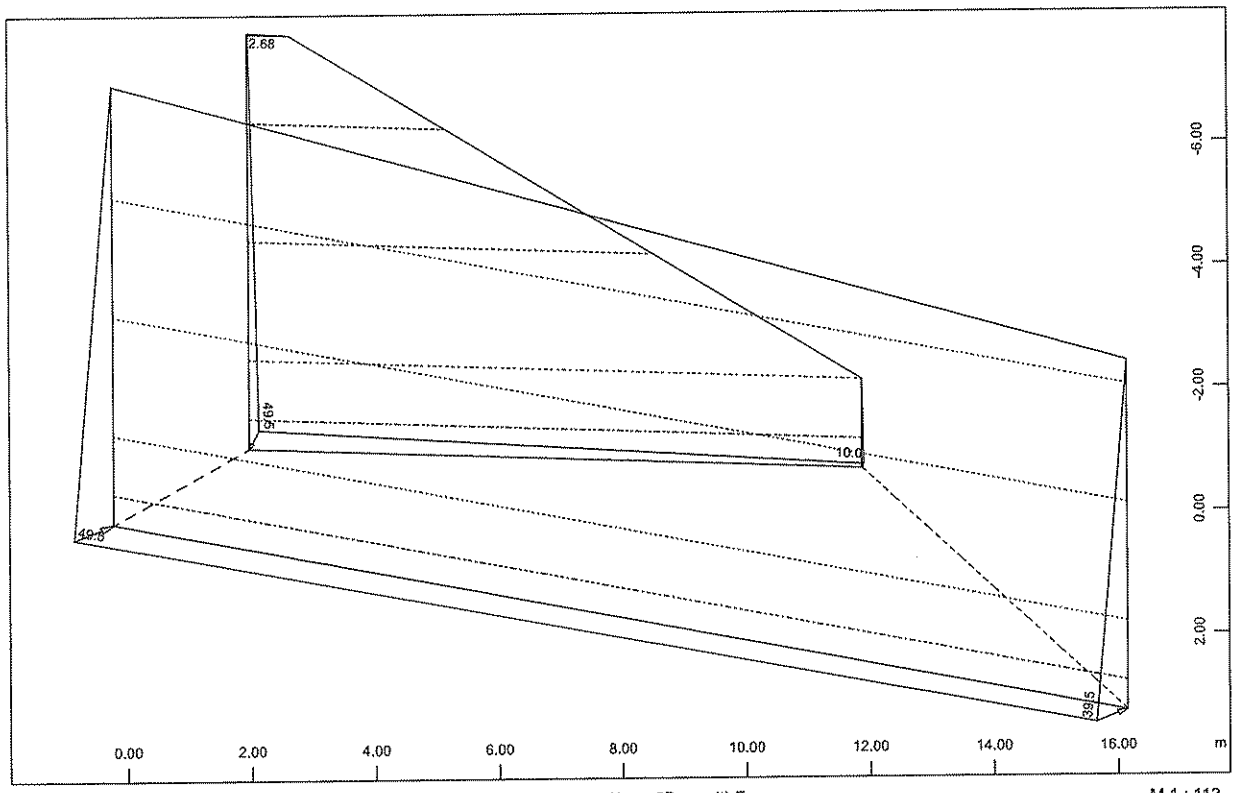
Load Case 91 earthquake y

Factor forces and moments	1.000	
Factor dead weight DL-YY	0.240	

Sum of Reactions and Loads

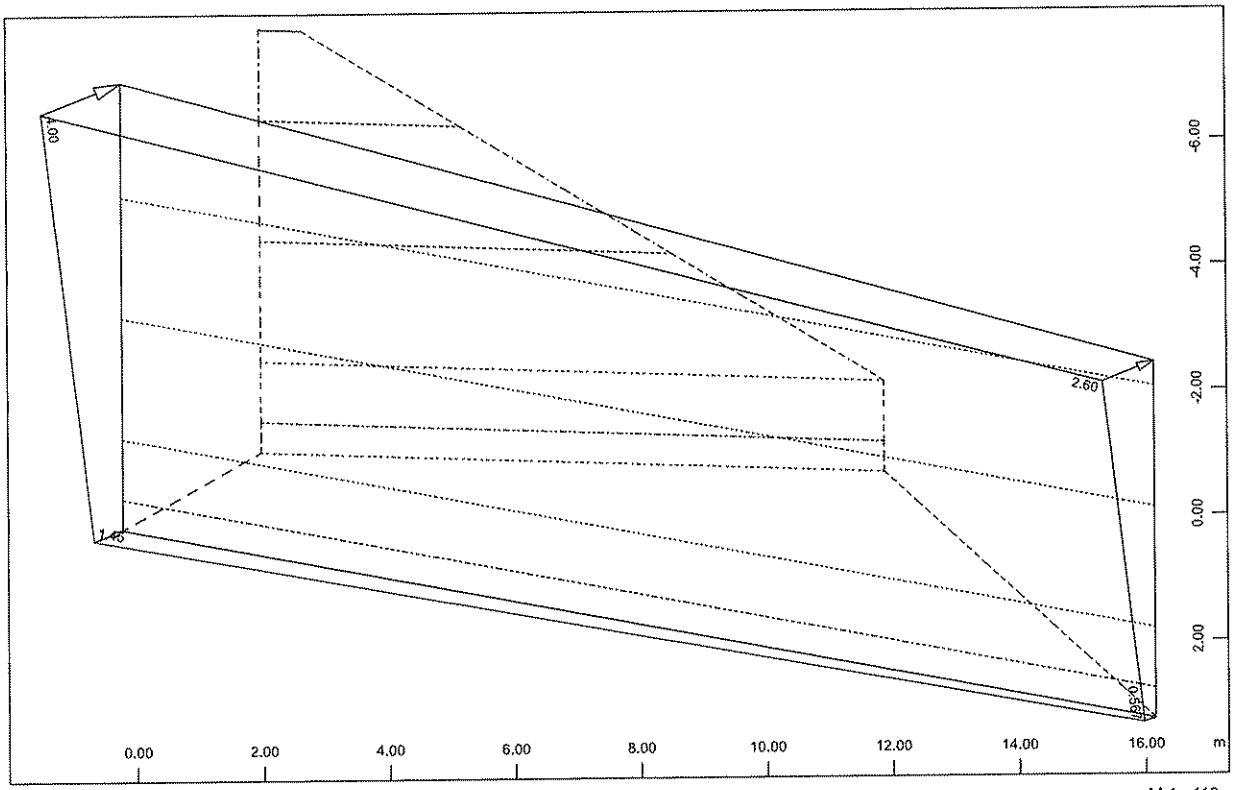
LC	Title	PXX[kN]	PYY[kN]	PZZ[kN]
4	Othiseis Gaiwn Seismoy	-2212.1	-699.3	0.0
		2212.1	699.3	0.0
5	Othiseis Kinitoy seismoy	-285.8	-45.3	0.0
		285.8	45.3	0.0
90	earthquake x	-1428.8	0.0	0.0
		1428.9	0.0	0.0
91	earthquake y	0.0	-1428.8	0.0
		0.0	1428.9	0.0

Πτερυγότοιχος Εξόδου
Graphical Output



All loads (in components), Loadcase 4 Othiseis Gaiwn Seismoy , (1 cm 3D = unit) Free
area load (force) in local z (Unit=50.0 kN/m2) (Min=-49.5) (Max= 1.4587e-09)

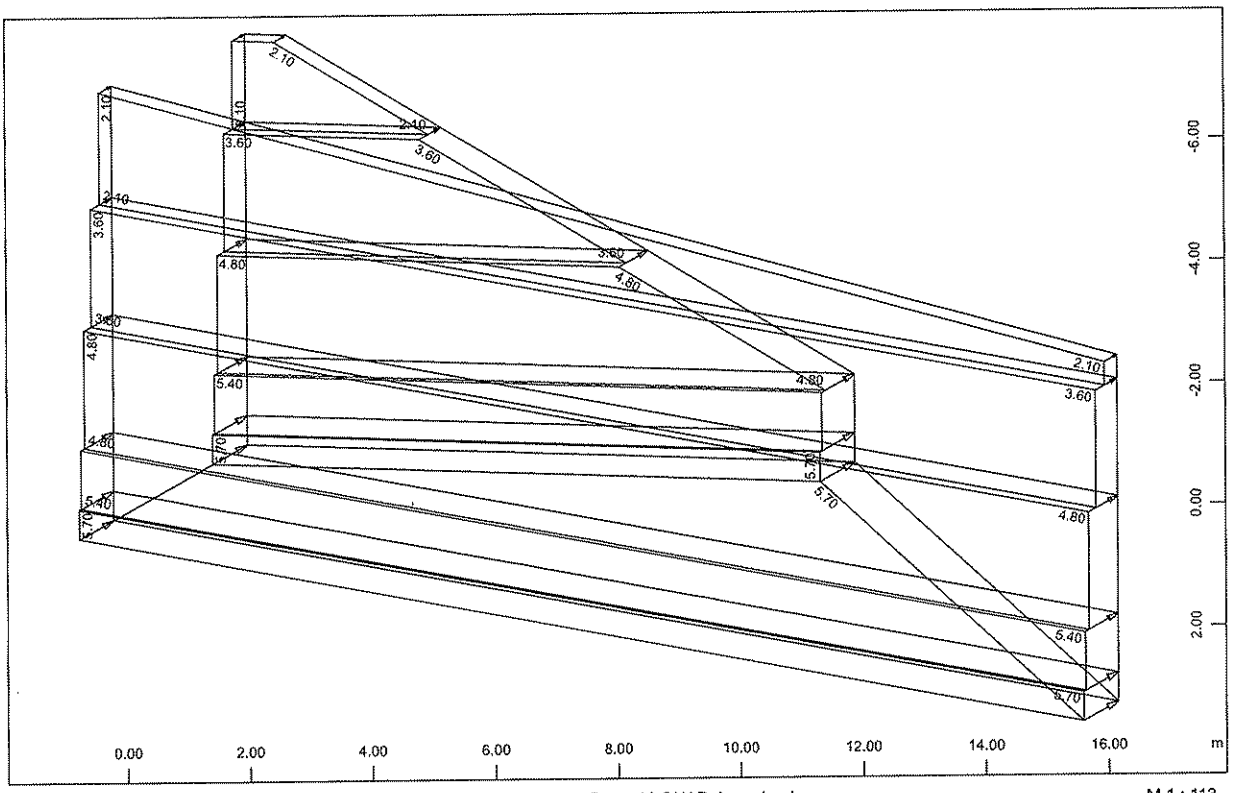
M 1 : 112
X * 0.502
Y * 0.906
Z * 0.962



All loads (in components), Loadcase 5 Othiseis Kinitoy seismoy , (1 cm 3D = unit) Free
area load (force) in local z (Unit=2.00 kN/m2) (Min=-4.00) (Max=0)

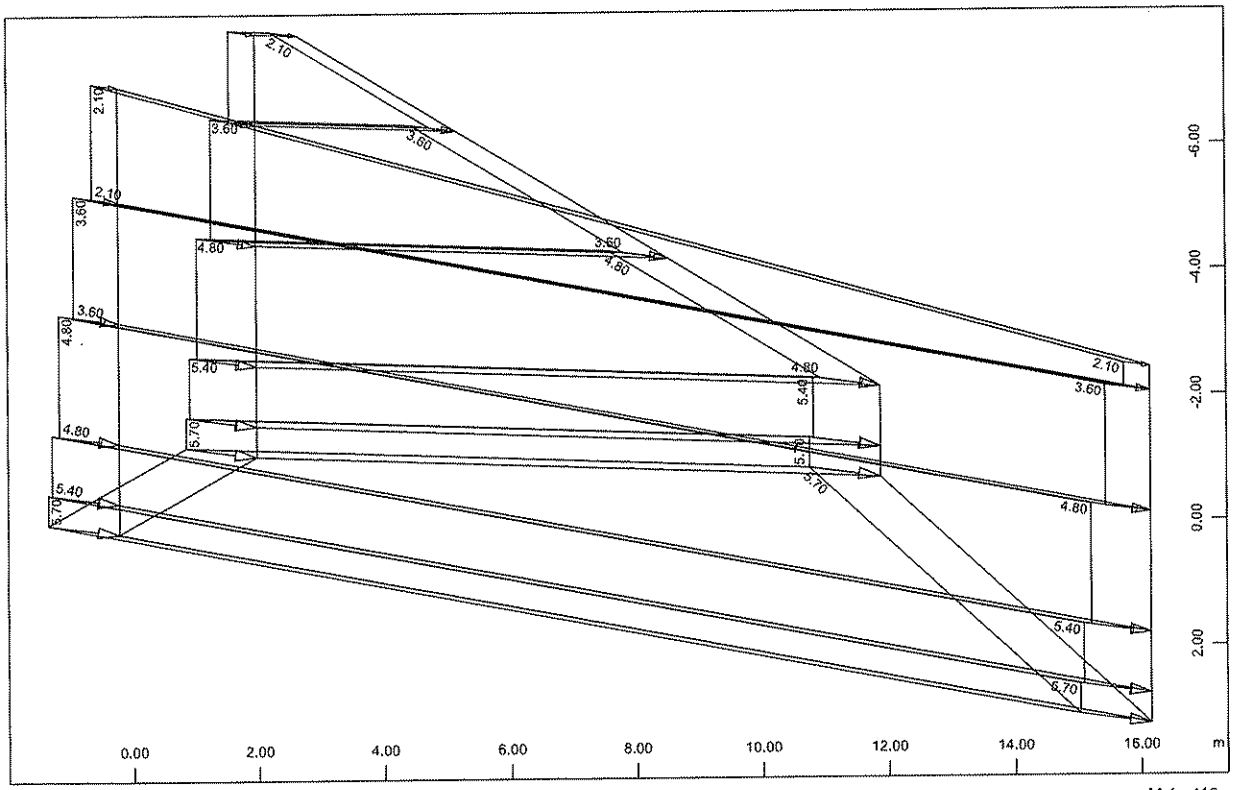
M 1 : 110
X * 0.502
Y * 0.906
Z * 0.962

Πτερυγότοιχος Εξόδου
Graphical Output



All loads (in components), Loadcase 90 earthquake x , (1 cm 3D = unit) QUAD-Area dead load in global X in Elements (Unit=5.00 kN/m2) (Max=5.70)

M 1 : 113
X * 0.502
Y * 0.906
Z * 0.962



All loads (in components), Loadcase 91 earthquake y , (1 cm 3D = unit) QUAD-Area dead load in global Y in Elements (Unit=5.00 kN/m2) (Max=5.70)

M 1 : 110
X * 0.502
Y * 0.906
Z * 0.962

Πτερυγότοιχος Εξόδου
Περιβάλλουσες από σεισμικούς συνδυασμούς

Combination rule Number 10
Περιβάλ. Σεισμικών Συνδυασμών
Resulting loadcases type Ultimate Design combination
Loadcase selection.

Number	factor	type	Title
1	1.00	permanent load grouped in actions	Idio Varos
3	0.30	Combined with LC	Othiseis Kinitwn
2	1.00	Combined with LC	Energitikes Othiseis
90	1.00	Exclusive LC	AG 1 earthquake x
91	0.30	Combined with LC	earthquake y
4	1.00	Combined with LC	Othiseis Gaiwn Seismoy
5	1.00	Combined with LC	Othiseis Kinitoy seismoy
90	1.00	Exclusive LC	AG 1 earthquake x
91	-0.30	Combined with LC	earthquake y
4	1.00	Combined with LC	Othiseis Gaiwn Seismoy
5	1.00	Combined with LC	Othiseis Kinitoy seismoy
90	-1.00	Exclusive LC	AG 1 earthquake x
91	0.30	Combined with LC	earthquake y
4	-1.00	Combined with LC	Othiseis Gaiwn Seismoy
5	-1.00	Combined with LC	Othiseis Kinitoy seismoy
90	-1.00	Exclusive LC	AG 1 earthquake x
91	-0.30	Combined with LC	earthquake y
4	-1.00	Combined with LC	Othiseis Gaiwn Seismoy
5	-1.00	Combined with LC	Othiseis Kinitoy seismoy
90	0.30	Exclusive LC	AG 1 earthquake x
91	1.00	Combined with LC	earthquake y
4	0.30	Combined with LC	Othiseis Gaiwn Seismoy
5	0.30	Combined with LC	Othiseis Kinitoy seismoy
90	0.30	Exclusive LC	AG 1 earthquake x
91	-1.00	Combined with LC	earthquake y
4	0.30	Combined with LC	Othiseis Gaiwn Seismoy
5	0.30	Combined with LC	Othiseis Kinitoy seismoy
90	-0.30	Exclusive LC	AG 1 earthquake x
91	1.00	Combined with LC	earthquake y
4	-0.30	Combined with LC	Othiseis Gaiwn Seismoy
5	-0.30	Combined with LC	Othiseis Kinitoy seismoy
90	-0.30	Exclusive LC	AG 1 earthquake x
91	-1.00	Combined with LC	earthquake y
4	-0.30	Combined with LC	Othiseis Gaiwn Seismoy
5	-0.30	Combined with LC	Othiseis Kinitoy seismoy

Generated Loadcases

Number	Comb	Title
201	10	MAX-MX QUAD
202	10	MIN-MX QUAD
203	10	MAX-MY QUAD
204	10	MIN-MY QUAD
205	10	MAX-MXY QUAD
206	10	MIN-MXY QUAD
207	10	MAX-NXX QUAD
208	10	MIN-NXX QUAD
209	10	MAX-NYY QUAD
210	10	MIN-NYY QUAD
211	10	MAX-NXY QUAD
212	10	MIN-NXY QUAD
213	10	MAX-VX QUAD
214	10	MIN-VX QUAD
215	10	MAX-VY QUAD
216	10	MIN-VY QUAD
201	10	MAX-UX NODE
202	10	MIN-UX NODE
203	10	MAX-UY NODE
204	10	MIN-UY NODE
205	10	MAX-UZ NODE
206	10	MIN-UZ NODE

Πτερυγότοιχος Εξόδου
ULS design

Design according to EN 1992-1-1:2004
Loadcases have been calculated in the Ultimate Limit State
In BEMESS no additional load safety factor is applied.

Load Cases for the Design

Loadcase 201 MAX-MX QUAD + Nodal reaction punching design
Loadcase 202 MIN-MX QUAD + Nodal reaction punching design
Loadcase 203 MAX-MY QUAD + Nodal reaction punching design
Loadcase 204 MIN-MY QUAD + Nodal reaction punching design
Loadcase 205 MAX-MXY QUAD + Nodal reaction punching design
Loadcase 206 MIN-MXY QUAD + Nodal reaction punching design
Loadcase 207 MAX-NXX QUAD
Loadcase 208 MIN-NXX QUAD
Loadcase 209 MAX-NYY QUAD
Loadcase 210 MIN-NYY QUAD
Loadcase 211 MAX-NXY QUAD
Loadcase 212 MIN-NXY QUAD
Loadcase 213 MAX-VX QUAD
Loadcase 214 MIN-VX QUAD
Loadcase 215 MAX-VY QUAD
Loadcase 216 MIN-VY QUAD
Loadcase 2101 MAX-MXX QUAD Forces and moments
Loadcase 2102 MIN-MXX QUAD Forces and moments
Loadcase 2103 MAX-MYY QUAD Forces and moments
Loadcase 2104 MIN-MYY QUAD Forces and moments
Loadcase 2105 MAX-MXY QUAD Forces and moments
Loadcase 2106 MIN-MXY QUAD Forces and moments
Loadcase 2107 MAX-VX QUAD Forces and moments
Loadcase 2108 MIN-VX QUAD Forces and moments
Loadcase 2109 MAX-VY QUAD Forces and moments
Loadcase 2110 MIN-VY QUAD Forces and moments
Loadcase 2111 MAX-NXX QUAD Forces and moments
Loadcase 2112 MIN-NXX QUAD Forces and moments
Loadcase 2113 MAX-NYY QUAD Forces and moments
Loadcase 2114 MIN-NYY QUAD Forces and moments
Loadcase 2115 MAX-NXY QUAD Forces and moments
Loadcase 2116 MIN-NXY QUAD Forces and moments
Loadcase 2117 MAX-P QUAD Bedding stres Bedding stresses for punching design
Loadcase 2118 MIN-P QUAD Bedding stres Bedding stresses for punching design
Loadcase 2151 MAX-PX NODE Support reac Nodal reaction punching design
Loadcase 2152 MIN-PX NODE Support reac Nodal reaction punching design
Loadcase 2153 MAX-PY NODE Support reac Nodal reaction punching design
Loadcase 2154 MIN-PY NODE Support reac Nodal reaction punching design
Loadcase 2155 MAX-PZ NODE Support reac Nodal reaction punching design
Loadcase 2156 MIN-PZ NODE Support reac Nodal reaction punching design
Loadcase 2157 MAX-MX NODE Support reac Nodal reaction punching design
Loadcase 2158 MIN-MX NODE Support reac Nodal reaction punching design
Loadcase 2159 MAX-MY NODE Support reac Nodal reaction punching design
Loadcase 2160 MIN-MY NODE Support reac Nodal reaction punching design
Loadcase 2161 MAX-MZ NODE Support reac Nodal reaction punching design
Loadcase 2162 MIN-MZ NODE Support reac Nodal reaction punching design
Loadcase 2191 MAX-MB NODE Support reac Bedding stresses for punching design
Loadcase 2192 MIN-MB NODE Support reac Bedding stresses for punching design
Loadcase 2193 MAX-PTX QUAD Bedding str Bedding stresses for punching design
Loadcase 2194 MIN-PTX QUAD Bedding str Bedding stresses for punching design
Loadcase 2195 MAX-PTY QUAD Bedding str Bedding stresses for punching design
Loadcase 2196 MIN-PTY QUAD Bedding str Bedding stresses for punching design
Loadcase 2197 MAX-PTZ QUAD Bedding str Bedding stresses for punching design
Loadcase 2198 MIN-PTZ QUAD Bedding str Bedding stresses for punching design
Loadcase 2201 MAX-MXX QUAD Forces and moments
Loadcase 2202 MIN-MXX QUAD Forces and moments
Loadcase 2203 MAX-MYY QUAD Forces and moments
Loadcase 2204 MIN-MYY QUAD Forces and moments
Loadcase 2205 MAX-MXY QUAD Forces and moments
Loadcase 2206 MIN-MXY QUAD Forces and moments

Πτερυγότοιχος Εξόδου
ULS design

Load Cases for the Design

Loadcase 2207	MAX-VX QUAD Forces and moments	
Loadcase 2208	MIN-VX QUAD Forces and moments	
Loadcase 2209	MAX-VY QUAD Forces and moments	
Loadcase 2210	MIN-VY QUAD Forces and moments	
Loadcase 2211	MAX-NXX QUAD Forces and moments	
Loadcase 2212	MIN-NXX QUAD Forces and moments	
Loadcase 2213	MAX-NYY QUAD Forces and moments	
Loadcase 2214	MIN-NYY QUAD Forces and moments	
Loadcase 2215	MAX-NXY QUAD Forces and moments	
Loadcase 2216	MIN-NXY QUAD Forces and moments	
Loadcase 2217	MAX-P QUAD Bedding stres	Bedding stresses for punching design
Loadcase 2218	MIN-P QUAD Bedding stres	Bedding stresses for punching design
Loadcase 2251	MAX-PX NODE Support reac	Nodal reaction punching design
Loadcase 2252	MIN-PX NODE Support reac	Nodal reaction punching design
Loadcase 2253	MAX-PY NODE Support reac	Nodal reaction punching design
Loadcase 2254	MIN-PY NODE Support reac	Nodal reaction punching design
Loadcase 2255	MAX-PZ NODE Support reac	Nodal reaction punching design
Loadcase 2256	MIN-PZ NODE Support reac	Nodal reaction punching design
Loadcase 2257	MAX-MX NODE Support reac	Nodal reaction punching design
Loadcase 2258	MIN-MX NODE Support reac	Nodal reaction punching design
Loadcase 2259	MAX-MY NODE Support reac	Nodal reaction punching design
Loadcase 2260	MIN-MY NODE Support reac	Nodal reaction punching design
Loadcase 2261	MAX-MZ NODE Support reac	Nodal reaction punching design
Loadcase 2262	MIN-MZ NODE Support reac	Nodal reaction punching design
Loadcase 2291	MAX-MB NODE Support reac	Bedding stresses for punching design
Loadcase 2292	MIN-MB NODE Support reac	Bedding stresses for punching design
Loadcase 2293	MAX-PTX QUAD Bedding str	Bedding stresses for punching design
Loadcase 2294	MIN-PTX QUAD Bedding str	Bedding stresses for punching design
Loadcase 2295	MAX-PTY QUAD Bedding str	Bedding stresses for punching design
Loadcase 2296	MIN-PTY QUAD Bedding str	Bedding stresses for punching design
Loadcase 2297	MAX-PTZ QUAD Bedding str	Bedding stresses for punching design
Loadcase 2298	MIN-PTZ QUAD Bedding str	Bedding stresses for punching design
Loadcase 2301	MAX-MXX QUAD Forces and moments	
Loadcase 2302	MIN-MXX QUAD Forces and moments	
Loadcase 2303	MAX-MYY QUAD Forces and moments	
Loadcase 2304	MIN-MYY QUAD Forces and moments	
Loadcase 2305	MAX-MXY QUAD Forces and moments	
Loadcase 2306	MIN-MXY QUAD Forces and moments	
Loadcase 2307	MAX-VX QUAD Forces and moments	
Loadcase 2308	MIN-VX QUAD Forces and moments	
Loadcase 2309	MAX-VY QUAD Forces and moments	
Loadcase 2310	MIN-VY QUAD Forces and moments	
Loadcase 2311	MAX-NXX QUAD Forces and moments	
Loadcase 2312	MIN-NXX QUAD Forces and moments	
Loadcase 2313	MAX-NYY QUAD Forces and moments	
Loadcase 2314	MIN-NYY QUAD Forces and moments	
Loadcase 2315	MAX-NXY QUAD Forces and moments	
Loadcase 2316	MIN-NXY QUAD Forces and moments	
Loadcase 2317	MAX-P QUAD Bedding stres	Bedding stresses for punching design
Loadcase 2318	MIN-P QUAD Bedding stres	Bedding stresses for punching design
Loadcase 2351	MAX-PX NODE Support reac	Nodal reaction punching design
Loadcase 2352	MIN-PX NODE Support reac	Nodal reaction punching design
Loadcase 2353	MAX-PY NODE Support reac	Nodal reaction punching design
Loadcase 2354	MIN-PY NODE Support reac	Nodal reaction punching design
Loadcase 2355	MAX-PZ NODE Support reac	Nodal reaction punching design
Loadcase 2356	MIN-PZ NODE Support reac	Nodal reaction punching design
Loadcase 2357	MAX-MX NODE Support reac	Nodal reaction punching design
Loadcase 2358	MIN-MX NODE Support reac	Nodal reaction punching design
Loadcase 2359	MAX-MY NODE Support reac	Nodal reaction punching design
Loadcase 2360	MIN-MY NODE Support reac	Nodal reaction punching design
Loadcase 2361	MAX-MZ NODE Support reac	Nodal reaction punching design
Loadcase 2362	MIN-MZ NODE Support reac	Nodal reaction punching design
Loadcase 2391	MAX-MB NODE Support reac	Bedding stresses for punching design
Loadcase 2392	MIN-MB NODE Support reac	Bedding stresses for punching design

Πτερυγότοιχος Εξόδου
ULS design

Load Cases for the Design

Loadcase 2393 MAX-PTX QUAD Bedding str Bedding stresses for punching design
Loadcase 2394 MIN-PTX QUAD Bedding str Bedding stresses for punching design
Loadcase 2395 MAX-PTY QUAD Bedding str Bedding stresses for punching design
Loadcase 2396 MIN-PTY QUAD Bedding str Bedding stresses for punching design
Loadcase 2397 MAX-PTZ QUAD Bedding str Bedding stresses for punching design
Loadcase 2398 MIN-PTZ QUAD Bedding str Bedding stresses for punching design

Material (EN 1992-1-1:2004)

Mat	f-ck	f-cr	f-yk	f-tk	f-ctm	N	minQ	type
	[N/mm2	[N/mm2	[N/mm2	[N/mm2	[N/mm2	[-]	[-]	
1	20.0	20.0			2.210	6.7	0.20	mainly static

Minimum reinforcement: 0.00 p.c. of stat. req. section

2			500.0	567.5				

Reduction of FC in case of transvers tension = 25.0 [o/o]

Material-safety-factors:

Mat	concr SC1	SC2	steel SS1	SS2
1	1.50	1.50		
2			1.15	1.15

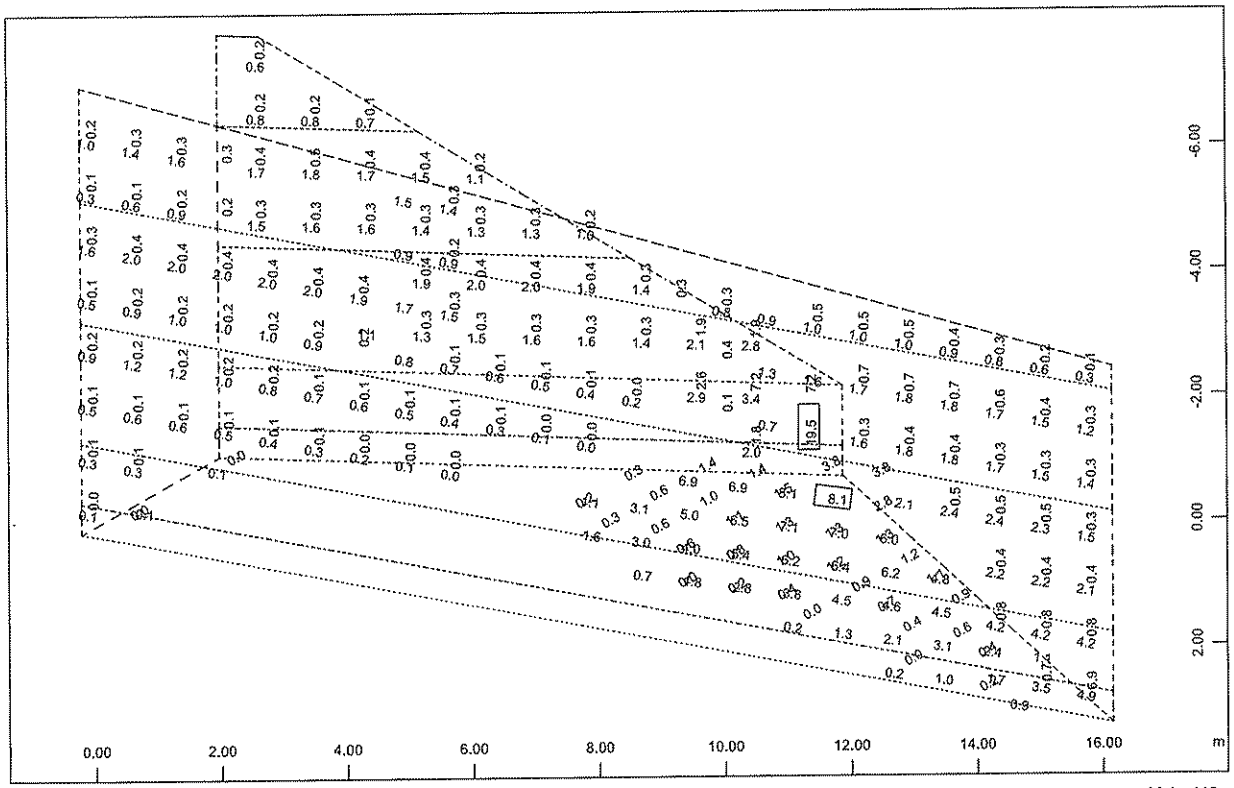
At direct supports from the face of the support up to 1.0*d
the shear force is reduced.
The maximum shear capacity is checked at the face of the support without reduction.
For punching design, the longitudinal reinforcement will be increased up to 1.50%
to avoid shear reinforcement [input PUNC...RO_V].
Outside the punching area, the normal slab shear design may increase the,
longitudinal reinforcement up to 0.20% [input CTRL...RO_V].

Reinforcementparameter two layer reinforcement

Selection Grp elem No.	bar-distance d1-u d1-l [mm]	d2-u d2-l [mm]	bar-diameter ds-u 2.lay [mm]	ds-l ds-2-l [mm]	crackwidth wk-u 2.lay [mm]	wk-l wk-2-l [mm]	steelstress sigsu 2.lay [MPa]	sigsl sigs2l [MPa]	min.reinf. asu 2.lay [cm2/m	asl asl2 [cm2/m
default	55.0	71.0	16	16	0.30	0.20	-	-	-	-
	55.0	71.0	16	20	0.30	0.20	-	-	-	-

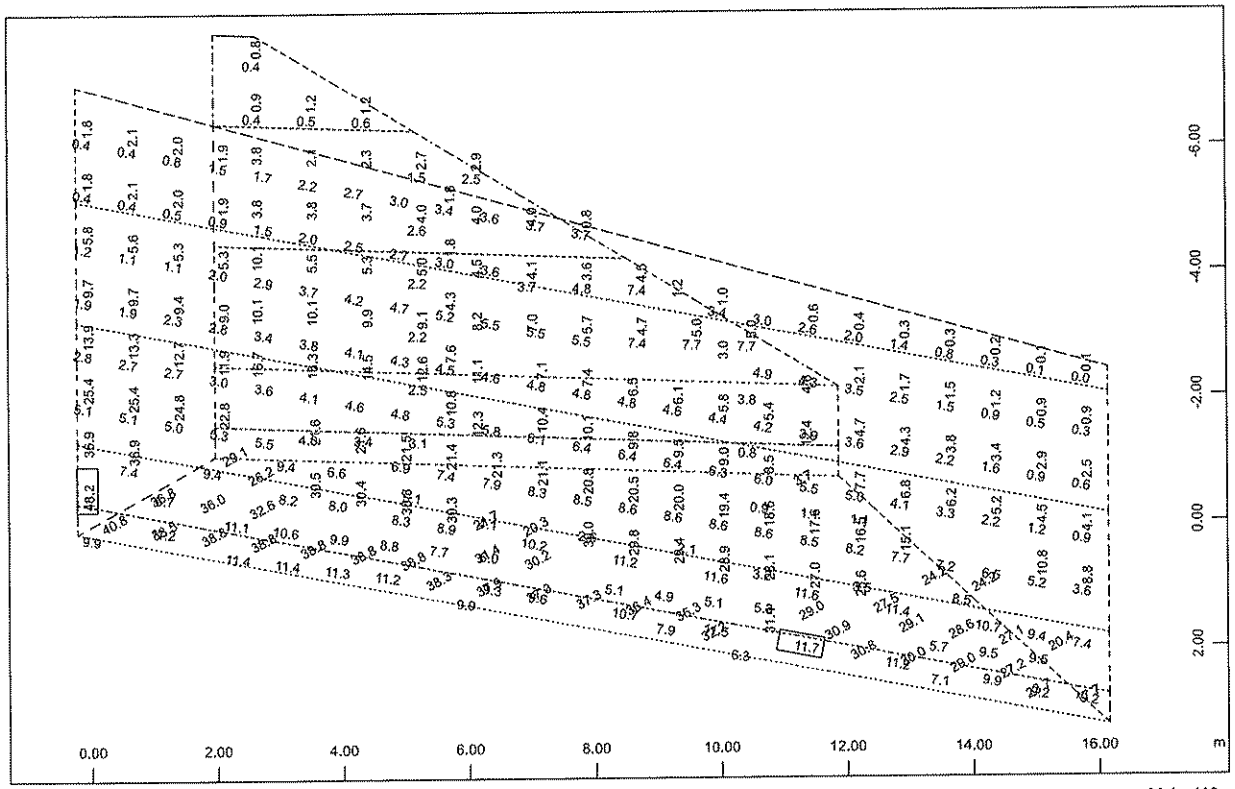
The reinforcement directions relate to the local coordinate system of
the elements and have to be plotted graphically.
With the input of a steel stress sigsu... the 'crack design according tables'
uses this given stress sigsu for the corresponding layer. With this input,
the check can be done for bar distances instead of bar diameters.
Reinforcement is saved in the data base file
Number of stored reinforcement-distribution: 1

Πτερυγότοιχος Εξόδου
Graphical Output



Quadrilateral Elements , upper Reinforcements in cm2/m, Design Case 1 (Max=19.5)

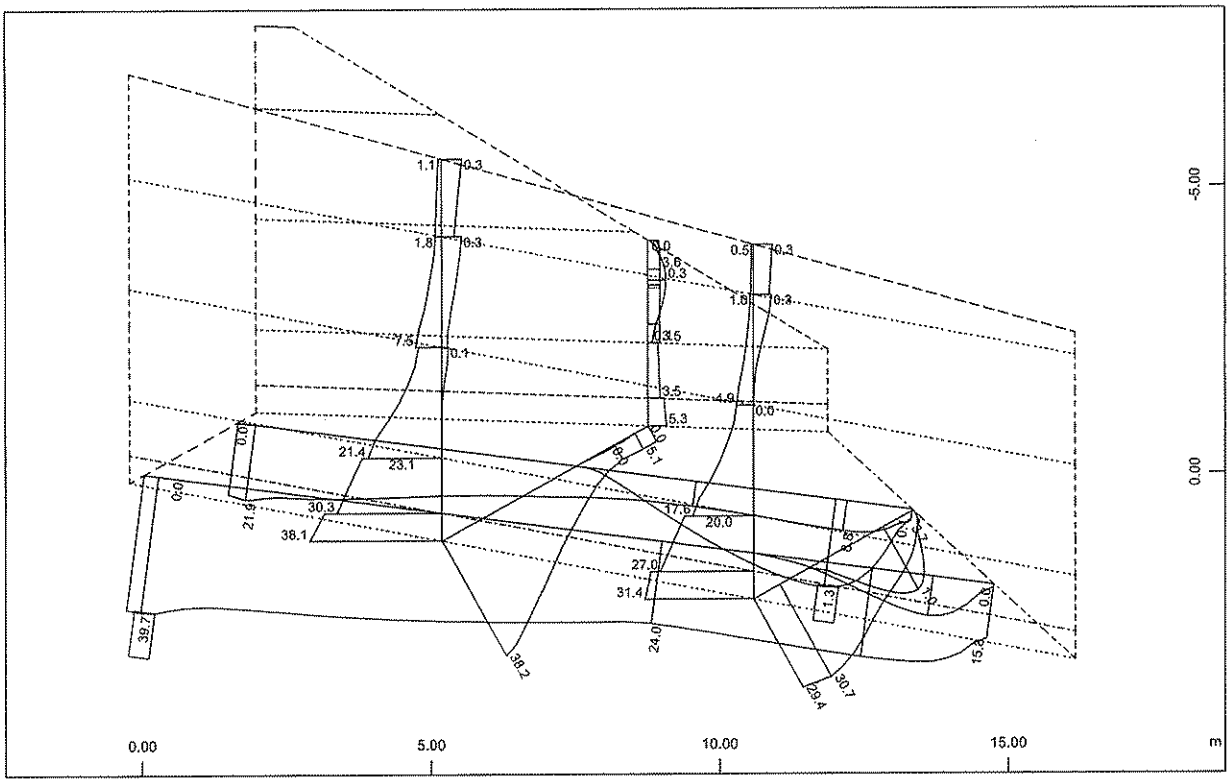
M 1 : 110
X * 0.502
Y * 0.906
Z * 0.962



Quadrilateral Elements , lower Reinforcements in cm2/m, Design Case 1 (Max=48.2)

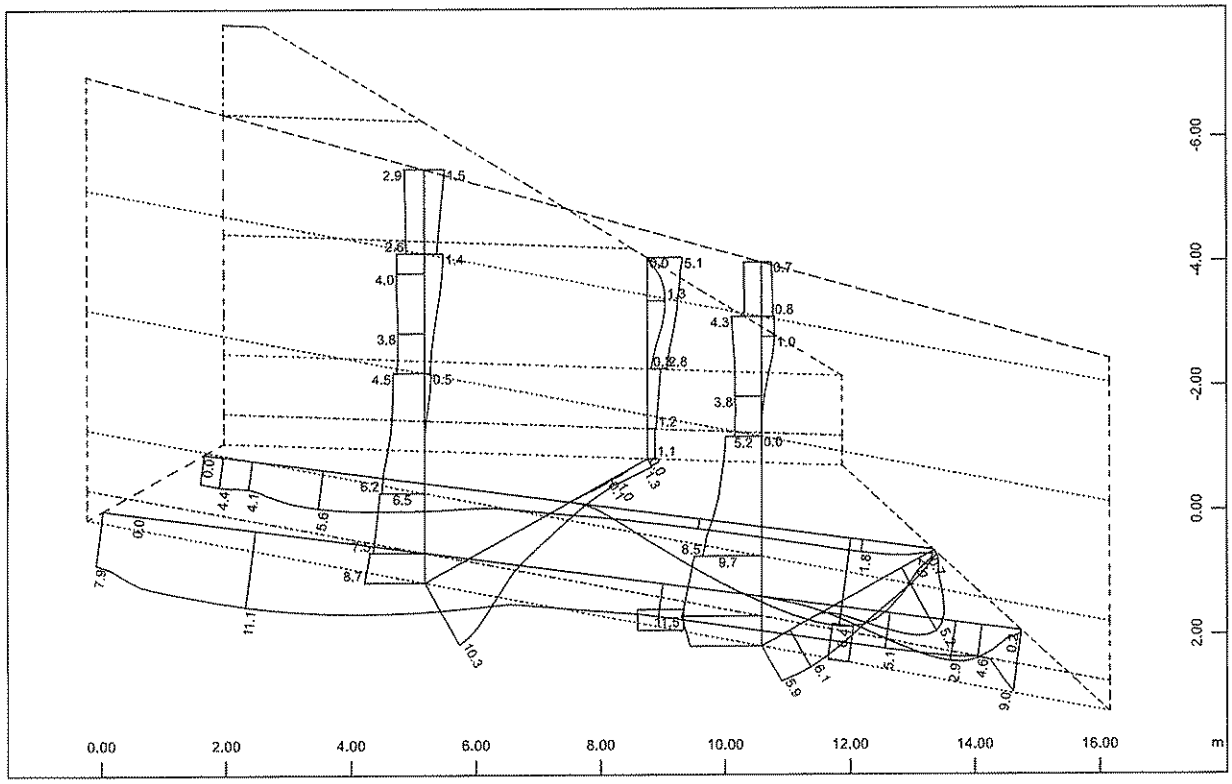
M 1 : 110
X * 0.502
Y * 0.906
Z * 0.962

Πτερυγότοιχος Εξόδου
Graphical Output



Quadrilateral Elements , upper Principal reinforcements (1st layer), Design Case 1 , 1
cm 3D = 1.00 cm2/m (Max=1.28)
Quadrilateral Elements , lower Principal reinforcements (1st layer), Design Case 1 , 1

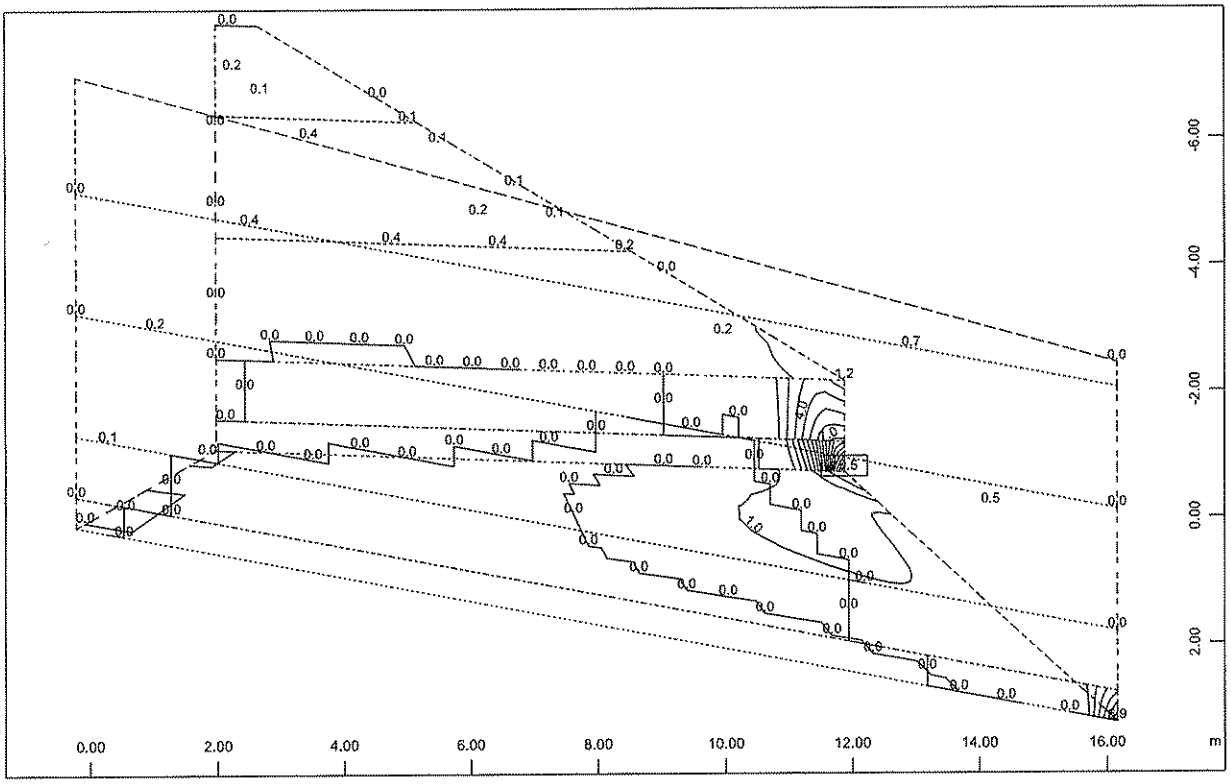
M 1 : 120
X * 0.502
Y * 0.906
Z * 0.962



Quadrilateral Elements , upper Cross reinforcements (2nd layer), Design Case 1 , 1 cm
3D = 5.00 cm2/m (Max=6.41)
Quadrilateral Elements , lower Cross reinforcements (2nd layer), Design Case 1 , 1 cm

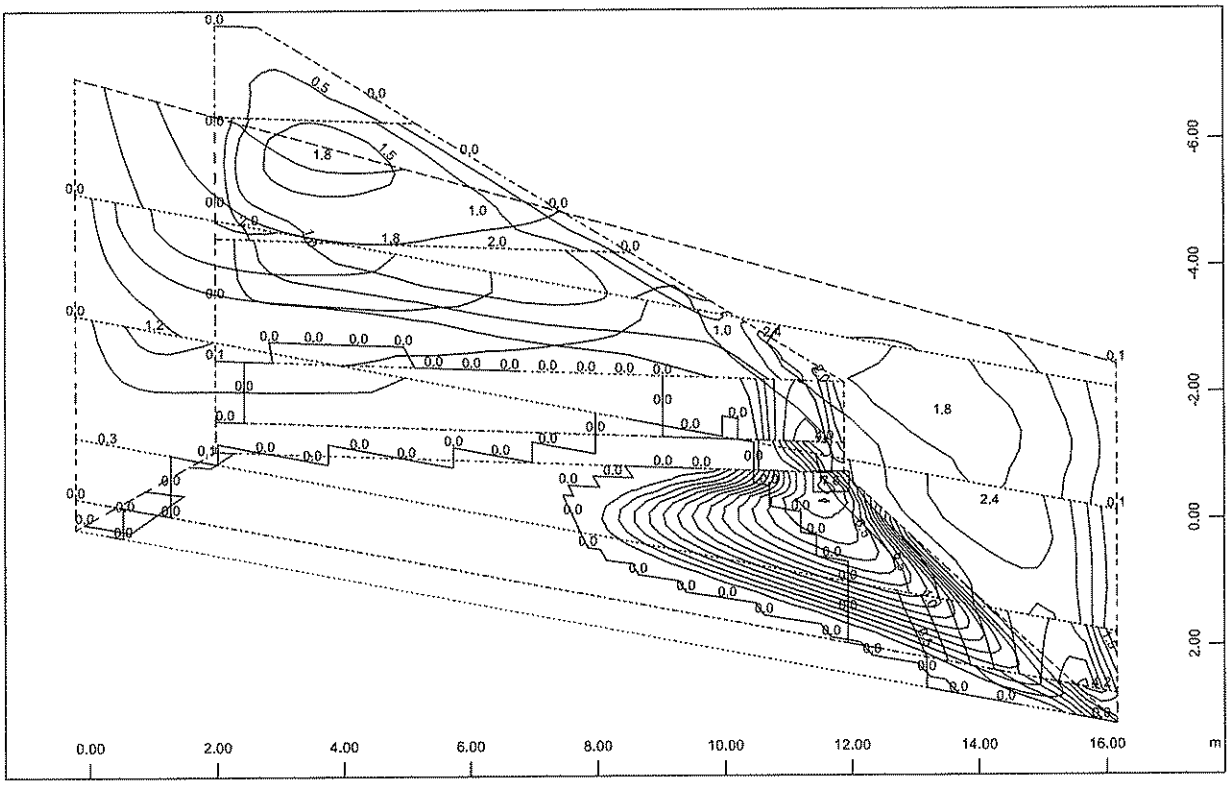
M 1 : 111
X * 0.502
Y * 0.906
Z * 0.962

Πτερυγότοιχος Εξόδου
Graphical Output



Quadrilateral Elements , upper Principal reinforcements (1st layer), Design Case 1 ,
from 0 to 19.5 step 1.00 cm2/m

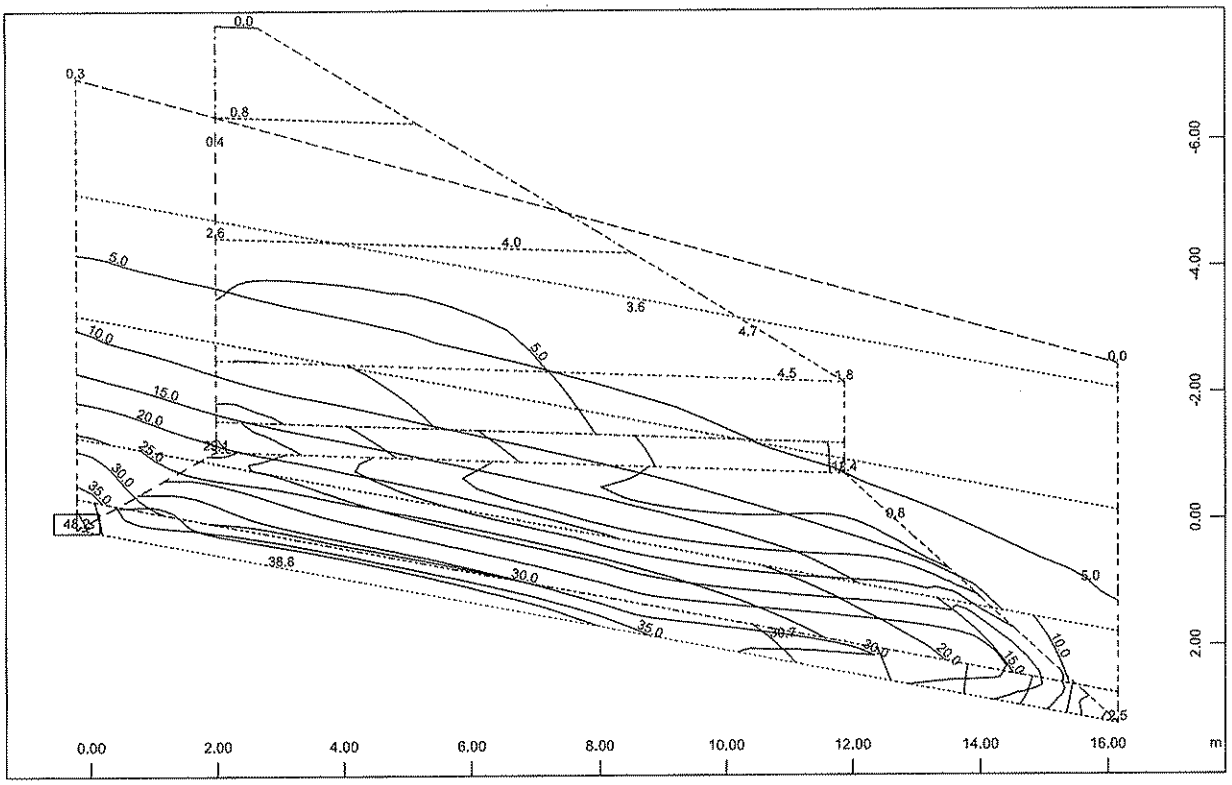
M 1 : 109
X * 0.502
Y * 0.906
Z * 0.962



Quadrilateral Elements , upper Cross reinforcements (2nd layer) ⇌, Design Case 1 ,
from 0 to 7.65 step 0.500 cm2/m

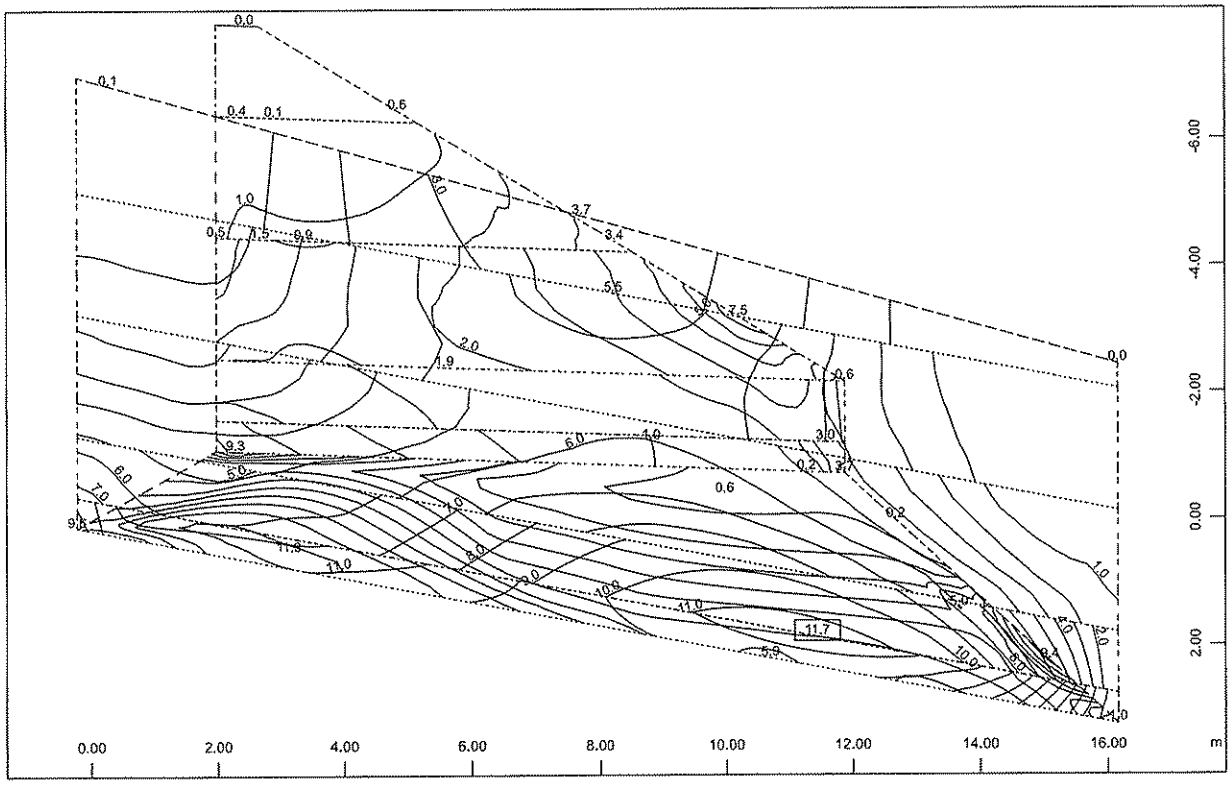
M 1 : 109
X * 0.502
Y * 0.906
Z * 0.962

Πτερυγότοιχος Εξόδου
Graphical Output



Quadrilateral Elements , lower Principal reinforcements (1st layer), Design Case 1 .
from 0 to 48.2 step 5.00 cm2/m

M 1 : 109
X * 0.502
Y * 0.906
Z * 0.962

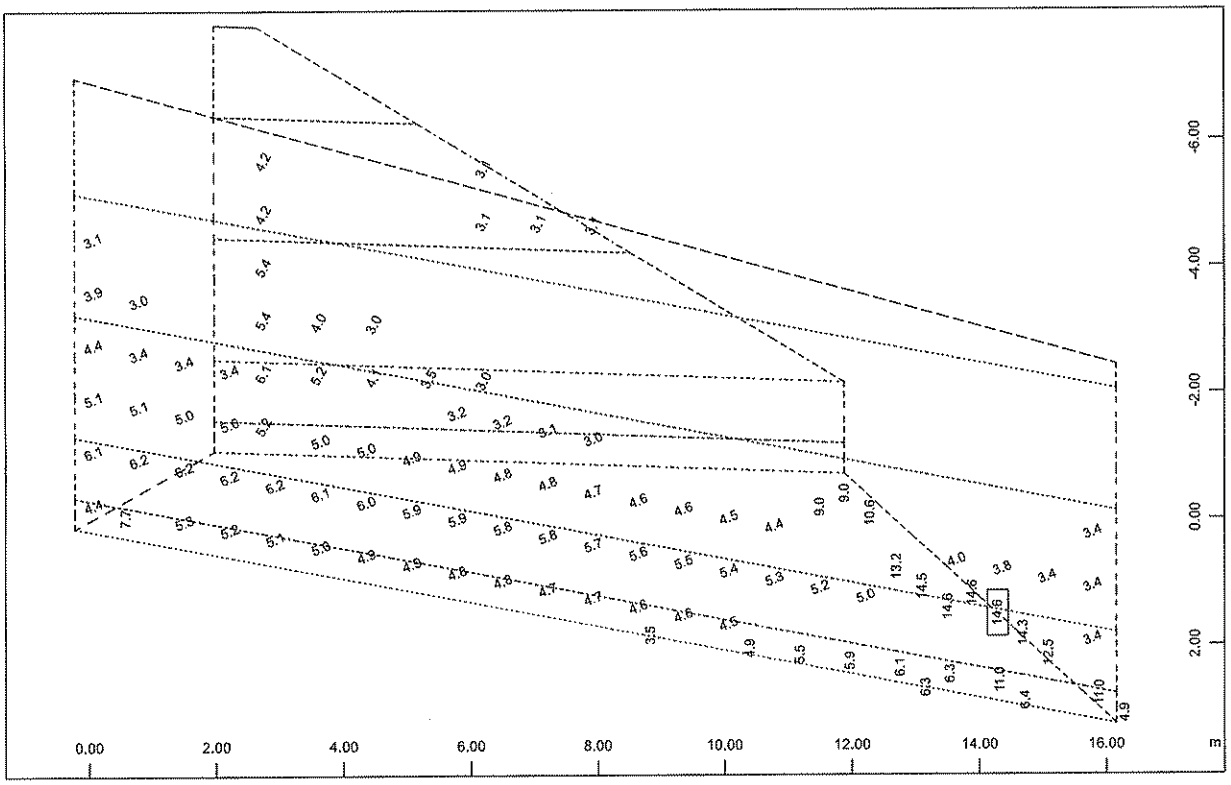


Quadrilateral Elements , lower Cross reinforcements (2nd layer)
from 0 to 11.7 step 1.00 cm2/m

⇌, Design Case 1 .

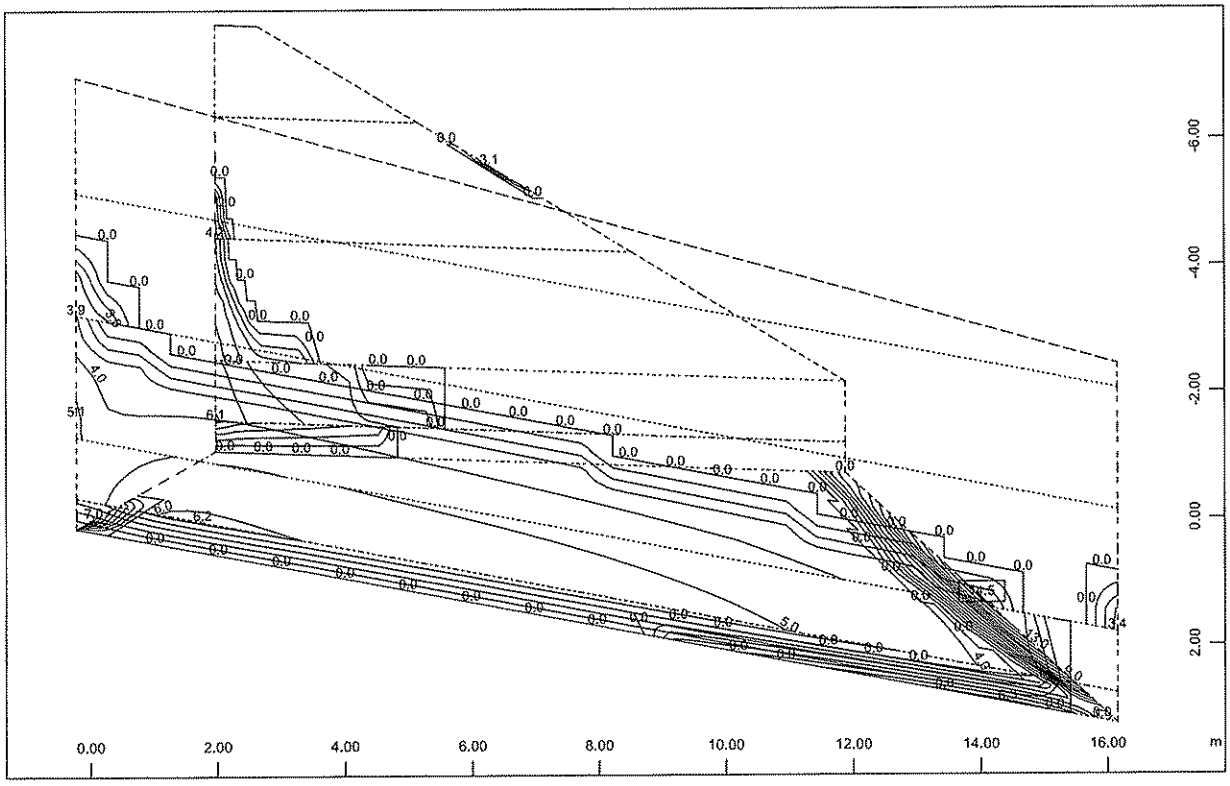
M 1 : 109
X * 0.502
Y * 0.906
Z * 0.962

Πτερυγότοιχος Εξόδου
Graphical Output



Shear reinforcement and punching in Elements in cm2/m2, Design Case 1 (Max=14.6)

M 1 : 109
X * 0.502
Y * 0.906
Z * 0.962



Quadrilateral Elements , Shear reinforcement, Design Case 1 , from 0 to 14.5 step 1.00
cm2/m2

M 1 : 109
X * 0.502
Y * 0.906
Z * 0.962

Πτερυγότοιχος Εξόδου
SLS design

Maximum of reinforcement-distributions
The reinforcement maximum was build out of the numbers of reinforcement-distribution
1
and stored as new reinforcement-distribution 2 .
Design according to EN 1992-1-1:2004
Loadcases have been calculated in the Serviceability State
In BEMESS no additional load safety factor is applied.

Load Cases for the Design

Loadcase 1101 MAXP-MXX QUAD Forces and moments
Loadcase 1102 MINP-MXX QUAD Forces and moments
Loadcase 1103 MAXP-MYY QUAD Forces and moments
Loadcase 1104 MINP-MYY QUAD Forces and moments
Loadcase 1105 MAXP-MXY QUAD Forces and moments
Loadcase 1106 MINP-MXY QUAD Forces and moments
Loadcase 1107 MAXP-VX QUAD Forces and moments
Loadcase 1108 MINP-VX QUAD Forces and moments
Loadcase 1109 MAXP-VY QUAD Forces and moments
Loadcase 1110 MINP-VY QUAD Forces and moments
Loadcase 1111 MAXP-NXX QUAD Forces and moments
Loadcase 1112 MINP-NXX QUAD Forces and moments
Loadcase 1113 MAXP-NYY QUAD Forces and moments
Loadcase 1114 MINP-NYY QUAD Forces and moments
Loadcase 1115 MAXP-NXY QUAD Forces and moments
Loadcase 1116 MINP-NXY QUAD Forces and moments
Loadcase 1471 MAXP-UX NODE Displacemen Nodal reaction punching design
Loadcase 1472 MINP-UX NODE Displacemen Nodal reaction punching design
Loadcase 1473 MAXP-UY NODE Displacemen Nodal reaction punching design
Loadcase 1474 MINP-UY NODE Displacemen Nodal reaction punching design
Loadcase 1475 MAXP-UZ NODE Displacemen Nodal reaction punching design
Loadcase 1476 MINP-UZ NODE Displacemen Nodal reaction punching design
Loadcase 1477 MAXPPHIX NODE Displaceme Nodal reaction punching design
Loadcase 1478 MINPPHIX NODE Displaceme Nodal reaction punching design
Loadcase 1479 MAXPPHIY NODE Displaceme Nodal reaction punching design
Loadcase 1480 MINPPHIY NODE Displaceme Nodal reaction punching design
Loadcase 1481 MAXPPHIZ NODE Displaceme Nodal reaction punching design
Loadcase 1482 MINPPHIZ NODE Displaceme Nodal reaction punching design
Loadcase 1483 MAXPPHIB NODE Displaceme Nodal reaction punching design
Loadcase 1484 MINPPHIB NODE Displaceme Nodal reaction punching design

Load Cases - with factors of dead load in per cent

LcNo	per cent	LcNo	per cent	LcNo	per cent	LcNo	per cent	LcNo	per cent
1101	100.0	1102	100.0	1103	100.0	1104	100.0	1105	100.0
1106	100.0	1107	100.0	1108	100.0	1109	100.0	1110	100.0
1111	100.0	1112	100.0	1113	100.0	1114	100.0	1115	100.0
1116	100.0								

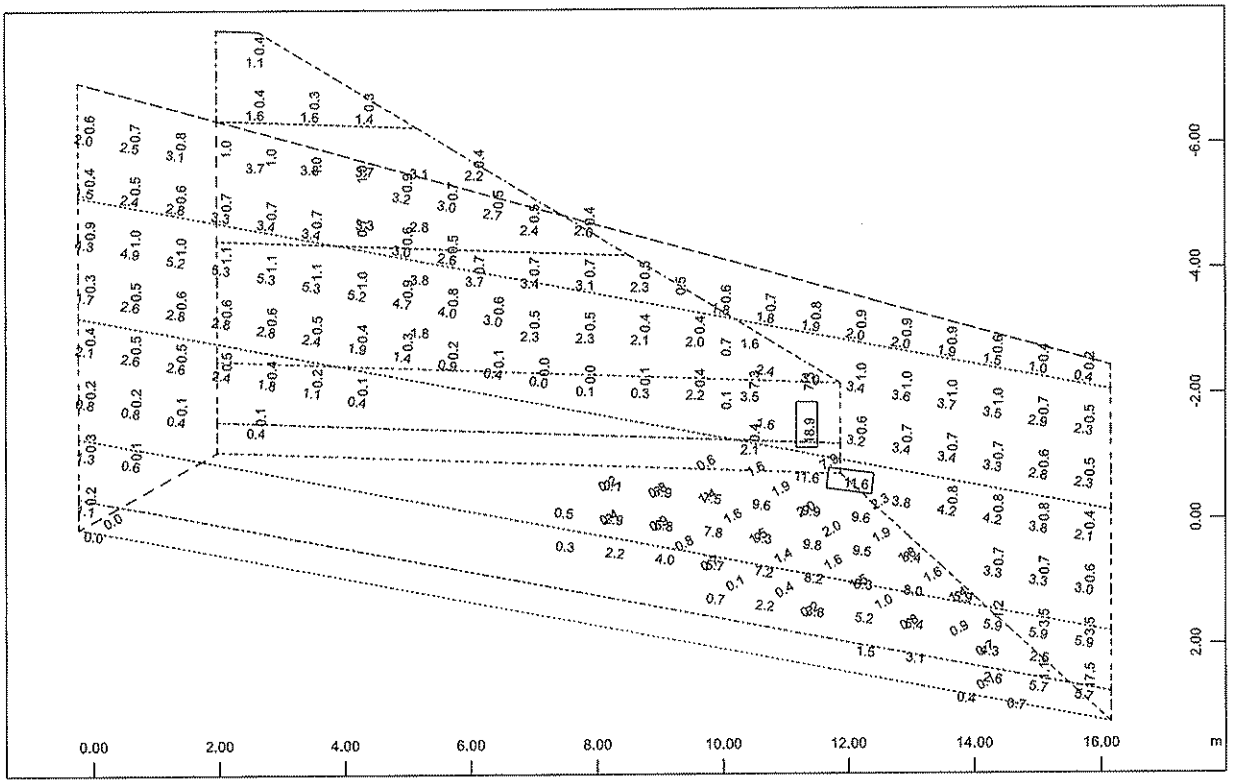
Material (EN 1992-1-1:2004)

Mat	f-ck [N/mm2]	f-cr [N/mm2]	f-yk [N/mm2]	f-tk [N/mm2]	f-ctm [N/mm2]	N [-]	minQ [-]	type
1	20.0	20.0			2.210	6.7	0.20	mainly static
Minimum reinforcement: 0.00 p.c. of stat. req. section								
2			500.0	567.5				

A robustness minimum reinforcement has not been requested [MREI] and
has to be checked separately.

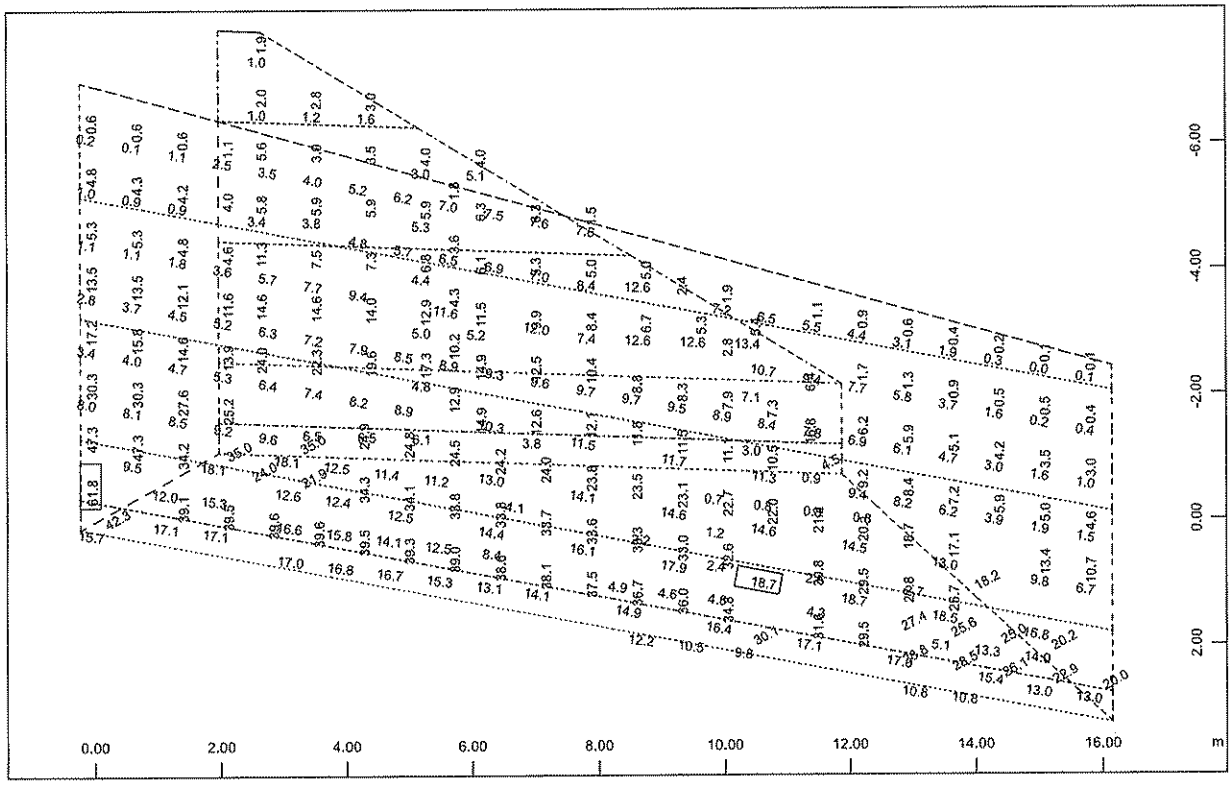
A minimum reinforcement has not been requested [MREI] and
has to be checked separately.

Πτερυγότοιχος Εξόδου
Graphical Output



Quadrilateral Elements , upper Reinforcements in Nodes in cm2/m, Design Case 2
(Max=18.9)

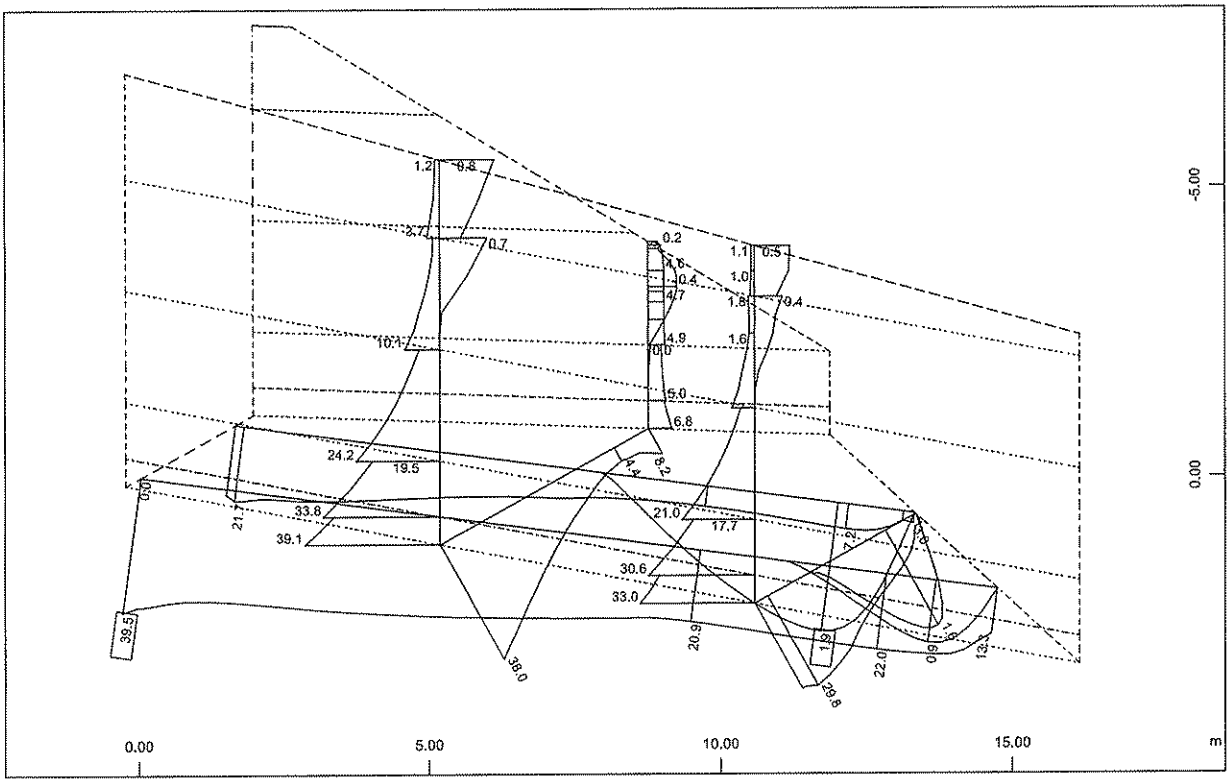
M 1 : 110
X * 0.502
Y * 0.906
Z * 0.962



Quadrilateral Elements , lower Reinforcements in Nodes in cm2/m, Design Case 2
(Max=61.8)

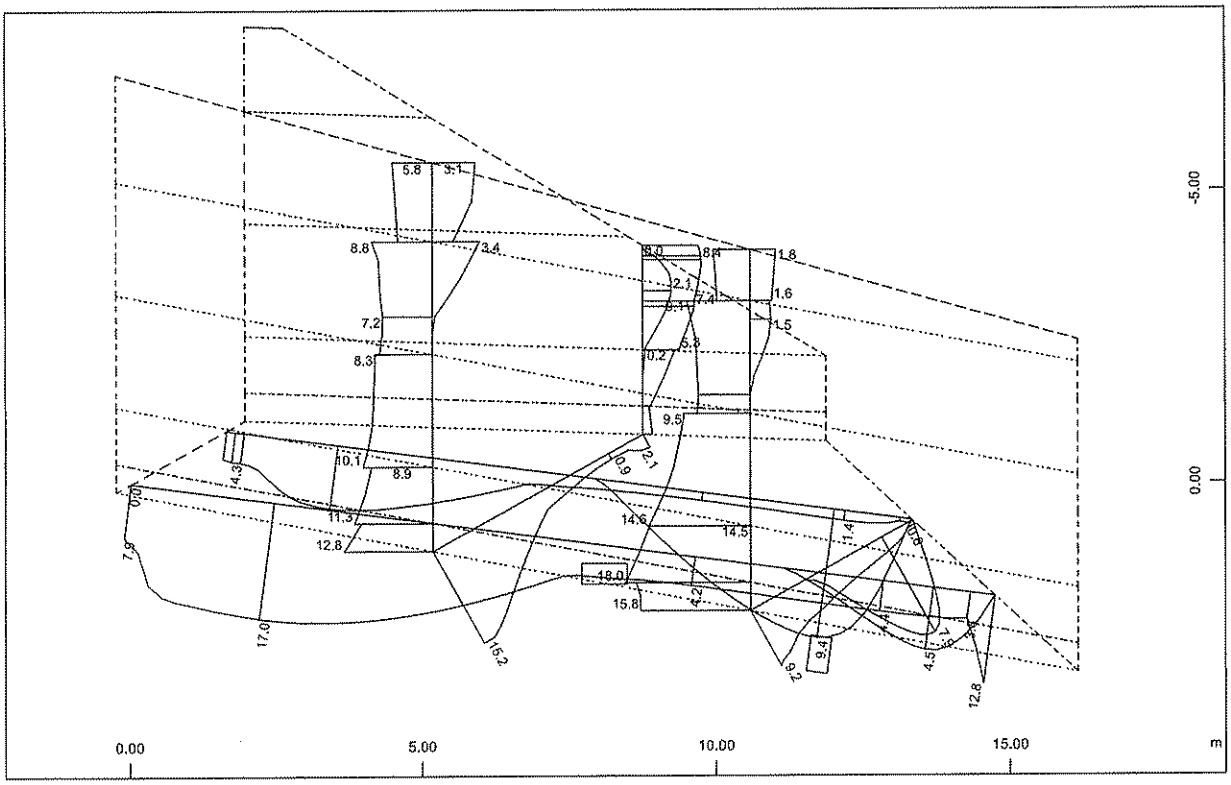
M 1 : 110
X * 0.502
Y * 0.906
Z * 0.962

Πτερυγότοιχος Εξόδου
Graphical Output



Quadrilateral Elements , upper Principal reinforcements (1st layer) in Nodes, Design
Case 2 , 1 cm 3D = 1.00 cm2/m (Max=1.87)
Quadrilateral Elements , lower Principal reinforcements (1st layer) in Nodes, Design

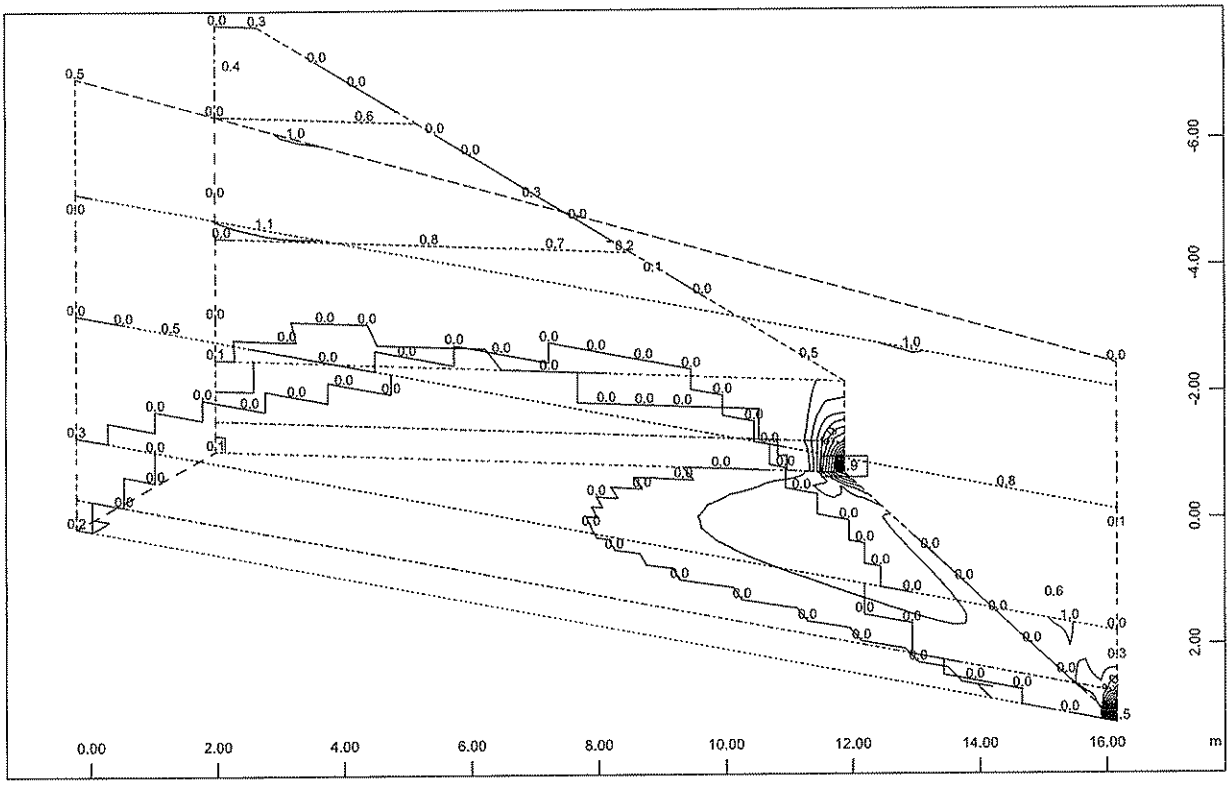
M 1 : 119
X * 0.502
Y * 0.906
Z * 0.962



Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Nodes, Design Case 2
, 1 cm 3D = 5.00 cm2/m (Max=9.37)
Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Nodes, Design Case 2

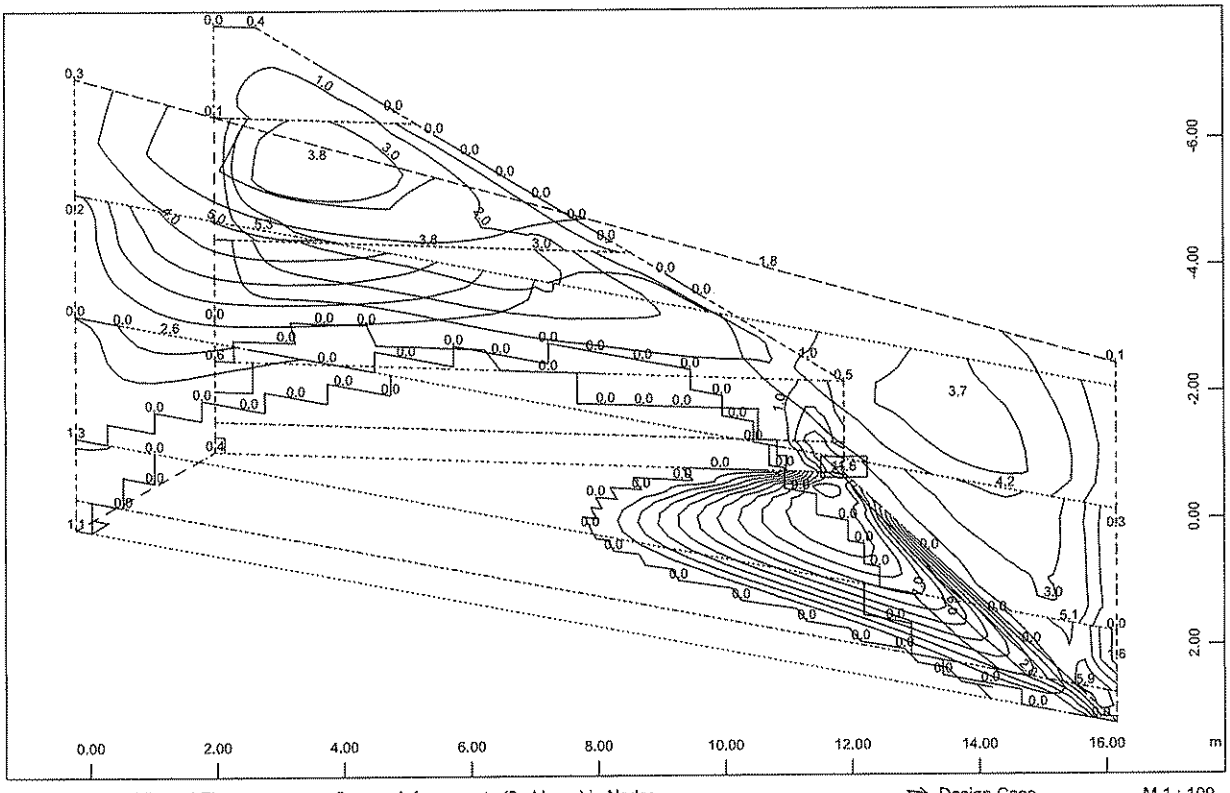
M 1 : 118
X * 0.502
Y * 0.906
Z * 0.962

Πτερυγότοιχος Εξόδου
Graphical Output



Quadrilateral Elements , upper Principal reinforcements (1st layer) in Nodes, Design Case 2 , from 0 to 18.9 step 1.00 cm2/m

M 1 : 109
X * 0.502
Y * 0.906
Z * 0.962

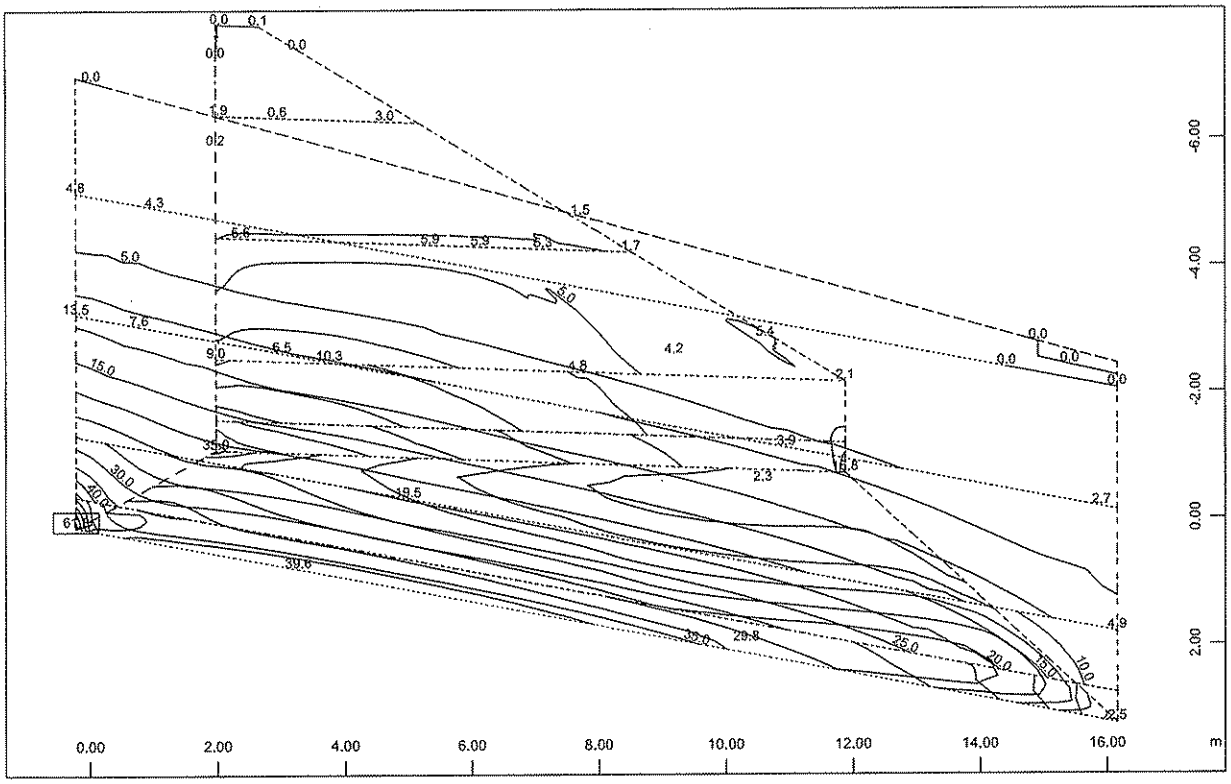


Quadrilateral Elements , upper Cross reinforcements (2nd layer) in Nodes 2 , from 0 to 11.6 step 1.00 cm2/m

⇌, Design Case

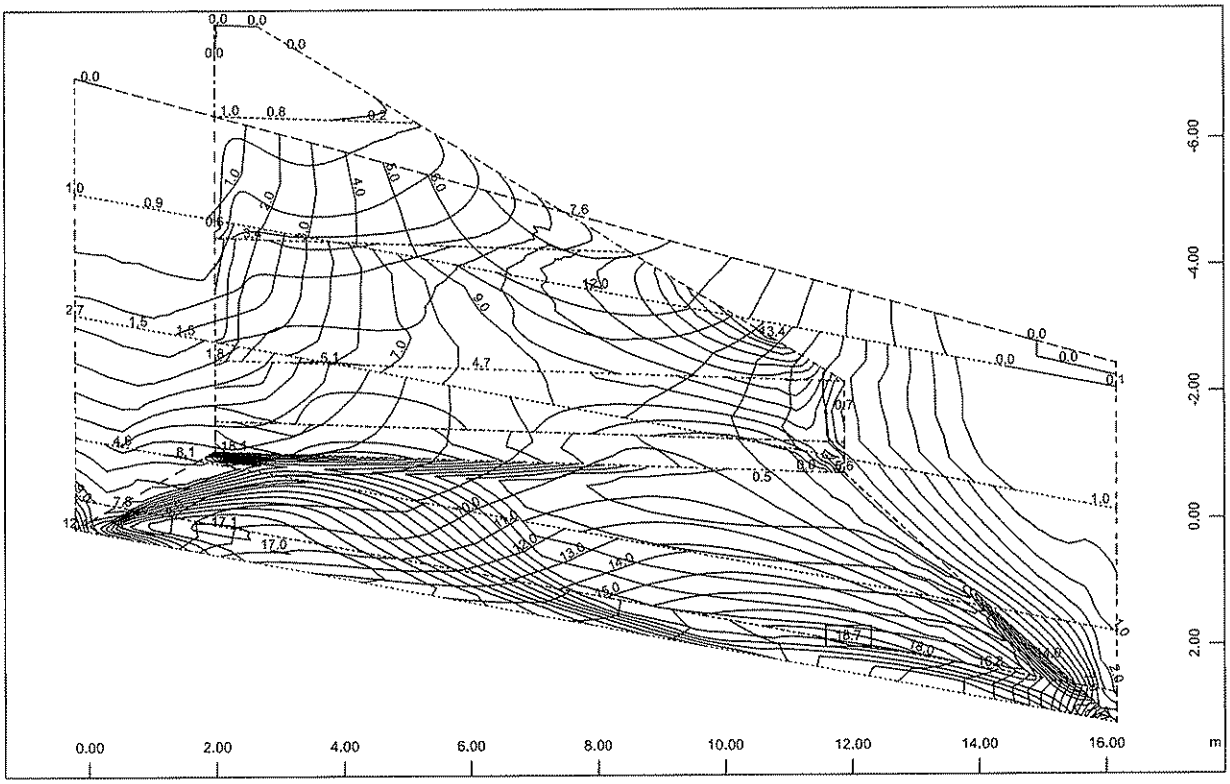
M 1 : 109
X * 0.502
Y * 0.906
Z * 0.962

Πτερυγότοιχος Εξόδου
Graphical Output



Quadrilateral Elements , lower Principal reinforcements (1st layer) in Nodes, Design Case 2 , from 0 to 61.8 step 5.00 cm2/m

M 1 : 109
X * 0.502
Y * 0.906
Z * 0.962

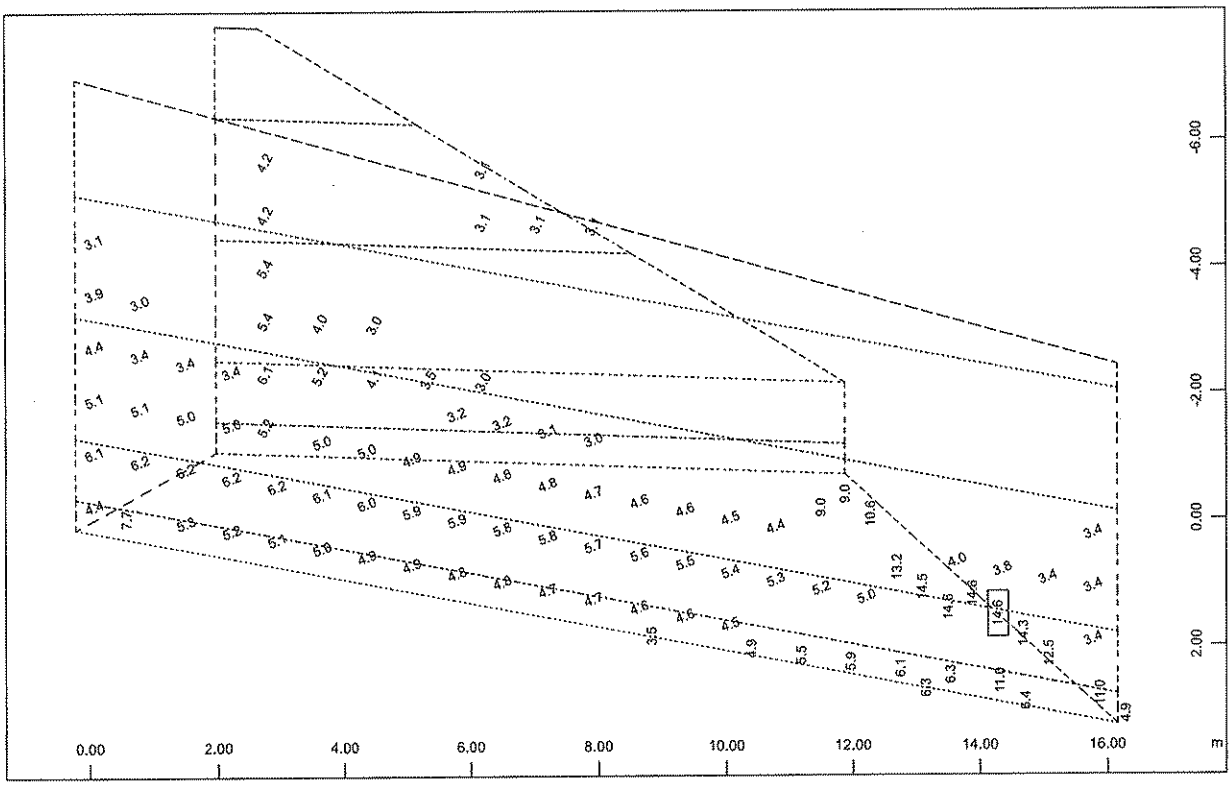


Quadrilateral Elements , lower Cross reinforcements (2nd layer) in Nodes
2 , from 0 to 18.7 step 1.00 cm2/m

, Design Case

M 1 : 109
X * 0.502
Y * 0.906
Z * 0.962

Πτερυγότοιχος Εξόδου
Graphical Output



Shear reinforcement and punching in Elements in cm2/m2, Design Case 2 (Max=14.6)

M 1 : 109
X * 0.502
Y * 0.906
Z * 0.962