ΟΡΓΑΝΙΣΜΟΣ ΑΝΑΠΤΥΞΗΣ ΚΡΗΤΗΣ Α.Ε.

" ΕΕΝ ΦΡΑΓΜΑΤΟΣ ΠΟΤΑΜΩΝ ΑΜΑΡΙΟΥ "

ΤΕΧΝΙΚΟΣ ΣΥΜΒΟΥΛΟΣ ΓΙΑ ΤΗΝ ΕΠΙΚΑΙΡΟΠΟΙΗΣΗ ΤΗΣ ΠΡΟΜΕΛΕΤΗΣ ΚΑΙ ΤΗ ΣΥΝΤΑΞΗ ΤΩΝ ΤΕΥΧΩΝ ΔΗΜΟΠΡΑΤΗΣΗΣ ΜΕΛΕΤΗΣ - ΚΑΤΑΣΚΕΥΗΣ ΤΟΥ ΕΡΓΟΥ "ΕΓΚΑΤΑΣΤΑΣΗ ΕΠΕΞΕΡΓΑΣΙΑΣ ΝΕΡΟΥ ΦΡΑΓΜΑΤΟΣ ΠΟΤΑΜΩΝ ΑΜΑΡΙΟΥ

ΘΕΜΑ ΣΧΕΔΙΟΥ:

ΜΟΝΑΔΑ ΔΙΥΛΙΣΗΣ

ΣΤΑΤΙΚΟΙ ΥΠΟΛΟΓΙΣΜΟΙ

ΑΡΙΘΜΟΣ ΣΧΕΔΙΟΥ: CA-05-ST-01

ΚΛΙΜΑΚΑ :

ΗΜΕΡΟΜΗΝΙΑ : ΜΑΪΟΣ 2018

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ΕΛΕΓΧΘΗΚΕ ΟΙ ΕΠΙΒΛΕΠΟΝΤΕΣ	ΠΕΝΘΕΡΟΥΔΑΚΗΣ ΜΑΝΩΛΗΣ Μηχανολόγος Μηχανικός	
	ΒΟΥΡΒΑΧΑΚΗΣ ΘΟΔΩΡΗΣ Πολιτικός Μηχανικός	
	ΛΑΜΠΡΙΝΟΣ ΣΤΕΛΙΟΣ Πολιτικός Μηχανικός	

05-ΔΙΥΛΙΣΗ
Materials

Default design code is EuroNorm EN 1992 (2004) Concrete Structures (Europe) V 30.0
Structure and Tab.7.1N: AN (Buildings)
Snow load zone : 1

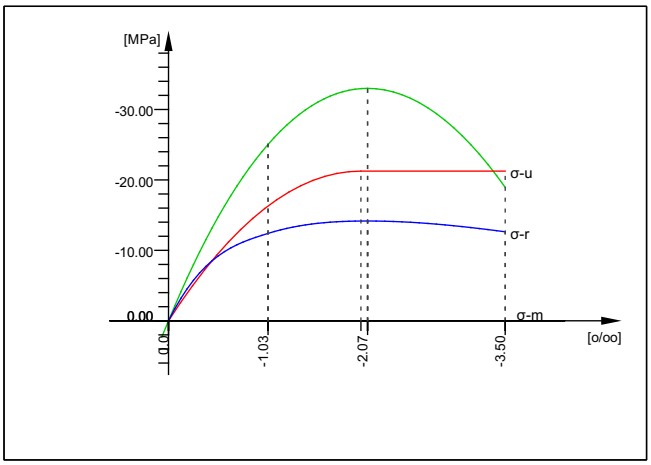
No. 1 C 25/30 (EN 1992)

Young's modulus	E	15500	[N/mm2]	Safetyfactor		1.50	[-]
Poisson ratio	μ	0.20	[-]	Strength	fc	21.25	[MPa]
Shear modulus	G	6458	[N/mm2]	Nominal strength	fck	25.00	[MPa]
Compression modulus	K	8611	[N/mm2]	Tensile strength	fctm	2.56	[MPa]
Weight	γ	25.0	[kN/m3]	Tensile strength	fctk,05	1.80	[MPa]
Density	ρ	2350.00	[kg/m3]	Tensile strength	fctk,95	3.33	[MPa]
Elongation coefficient	α	1.00E-05	[1/K]	Bond strength	fbd	2.69	[MPa]
				Service strength	fcm	33.00	[MPa]
				Fatigue strength	fcd,fat	15.00	[MPa]
				Tensile strength	fctd	1.20	[MPa]

Stress-Strain for serviceability	**ε[o/oo]**	**σ-m[MPa]**	**E-t[N/mm2]**
Is also extended beyond the	0.000	0.00	33050
defined stress range	-1.035	-25.04	15658
	-2.069	-33.00	0
	-3.500	-18.95	-19203
	Safetyfactor		1.50

Stress-Strain for ultimate load	**ε[o/oo]**	**σ-u[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	21250
stress range	-2.000	-21.25	0
	-3.500	-21.25	0
	Safetyfactor		1.50

Stress-Strain of calc. mean values	**ε[o/oo]**	**σ-r[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	27541
stress range	-1.035	-12.41	4259
	-2.069	-14.17	0
	-3.500	-12.64	-1802
	Safetyfactor		(1.50)



C 25/30 (EN 1992)

No. 2 B 500 C (EN 1992)

Young's modulus	E	200000	[N/mm2]	Safetyfactor		1.15	[-]
Poisson ratio	μ	0.30	[-]	Yield stress	fy	500.00	[MPa]
Shear modulus	G	76923	[N/mm2]	Compressive yield	fyc	500.00	[MPa]
Compression modulus	K	166667	[N/mm2]	Tensile strength	ft	575.00	[MPa]
Weight	γ	78.5	[kN/m3]	Compressive strength	fc	575.00	[MPa]
Density	ρ	7850.00	[kg/m3]	Ultimate strain		75.00	[o/oo]
Elongation coefficient	α	1.20E-05	[1/K]	relative bond coeff.		1.00	[-]
max. thickness		32.00	[mm]	EN 1992 bond coeff.	k1	0.80	[-]
				Hardening modulus	Eh	0.00	[MPa]
				Proportional limit	fp	500.00	[MPa]
				Dynamic allowance	σ-dyn	152.17	[MPa]

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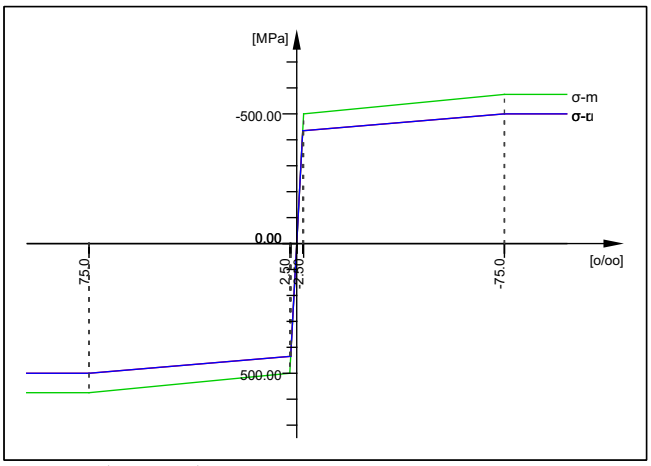
Materials

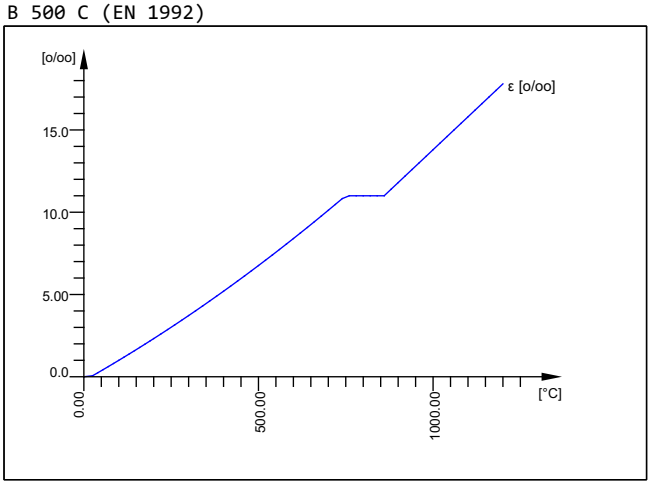
Stress-Strain for serviceability	ε[o/oo]	σ-m[MPa]	E-t[N/mm2]
Is also extended beyond the	1000.000	575.00	0
defined stress range	75.000	575.00	0
	2.500	500.00	1034
	0.000	0.00	200000
	-2.500	-500.00	1034
	-75.000	-575.00	0
	-1000.000	-575.00	0
	Safetyfactor		1.15

Stress-Strain for ultimate load	ε[o/oo]	σ-u[MPa]	E-t[N/mm2]
Is also extended beyond the	1000.000	500.00	0
defined stress range	75.000	500.00	0
	2.174	434.78	896
	0.000	0.00	200000
	-2.174	-434.78	896
	-75.000	-500.00	0
	-1000.000	-500.00	0
	Safetyfactor		(1.15)

Stress-Strain of calc. mean values	ε[o/oo]	σ-r[MPa]	E-t[N/mm2]
Is also extended beyond the	1000.000	500.00	0
defined stress range	75.000	500.00	0
	2.174	434.78	896
	0.000	0.00	200000
	-2.174	-434.78	896
	-75.000	-500.00	0
	-1000.000	-500.00	0
	Safetyfactor		(1.15)



B 500 C (EN 1992)



ε [o/oo]

No. 3 C 20/25 (EN 1992)

Young's modulus	E	29962	[N/mm2]	Safetyfactor		1.50	[-]
Poisson ratio	μ	0.20	[-]	Strength	fc	20.00	[MPa]

05-ΔΙΥΛΙΣΗ
Materials

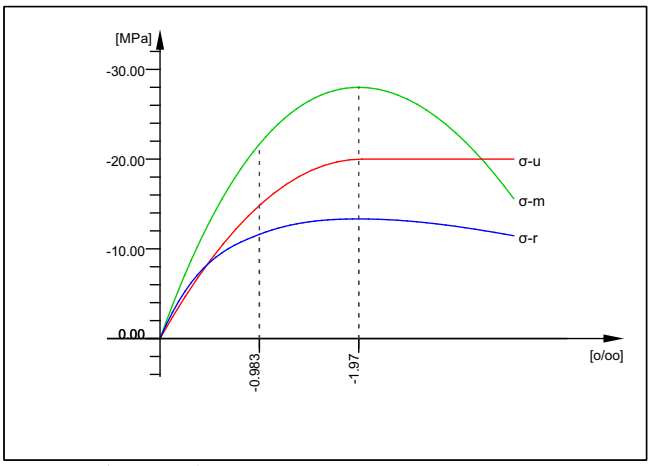
No. 3 C 20/25 (EN 1992)

Shear modulus	G	12484	[N/mm2]	Nominal strength	fck	20.00	[MPa]
Compression modulus	K	16646	[N/mm2]	Tensile strength	fctm	2.21	[MPa]
Weight	γ	25.0	[kN/m3]	Tensile strength	fctk,05	1.55	[MPa]
Density	ρ	2350.00	[kg/m3]	Tensile strength	fctk,95	2.87	[MPa]
Elongation coefficient	α	1.00E-05	[1/K]	Bond strength	fbd	2.32	[MPa]
				Service strength	fcm	28.00	[MPa]
				Fatigue strength	fcd,fat	12.27	[MPa]
				Tensile strength	fctd	1.03	[MPa]

Stress-Strain for serviceability	**ε[o/oo]**	**σ-m[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	31460
stress range	-0.983	-21.66	13498
	-1.967	-28.00	0
	-3.500	-15.60	-15208
	Safetyfactor		1.50

Stress-Strain for ultimate load	**ε[o/oo]**	**σ-u[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	20000
stress range	-2.000	-20.00	0
	-3.500	-20.00	0
	Safetyfactor		1.50

Stress-Strain of calc. mean values	**ε[o/oo]**	**σ-r[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	26217
stress range	-0.983	-11.61	4353
	-1.967	-13.33	0
	-3.500	-11.46	-2034
	Safetyfactor		(1.50)



C 20/25 (EN 1992)

No. 4 C 30/37 (EN 1992)

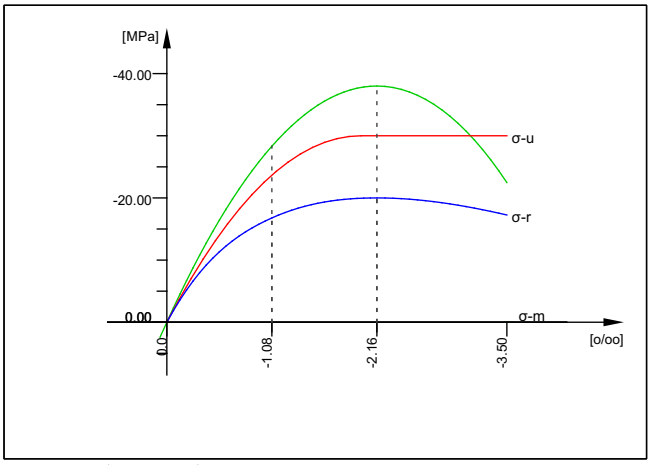
Young's modulus	E	16000	[N/mm2]	Safetyfactor		1.50	[-]
Poisson ratio	μ	0.20	[-]	Strength	fc	30.00	[MPa]
Shear modulus	G	6667	[N/mm2]	Nominal strength	fck	30.00	[MPa]
Compression modulus	K	8889	[N/mm2]	Tensile strength	fctm	2.90	[MPa]
Weight	γ	25.0	[kN/m3]	Tensile strength	fctk,05	2.03	[MPa]
Density	ρ	2350.00	[kg/m3]	Tensile strength	fctk,95	3.77	[MPa]
Elongation coefficient	α	1.00E-05	[1/K]	Bond strength	fbd	3.04	[MPa]
				Service strength	fcm	38.00	[MPa]
				Fatigue strength	fcd,fat	17.60	[MPa]
				Tensile strength	fctd	1.35	[MPa]

Stress-Strain for serviceability	**ε[o/oo]**	**σ-m[MPa]**	**E-t[N/mm2]**
Is also extended beyond the	0.000	0.00	34478
defined stress range	-1.081	-28.31	17746
	-2.162	-38.00	0
	-3.500	-22.47	-23499
	Safetyfactor		1.50

05-ΔΙΥΛΙΣΗ
Materials

Stress-Strain for ultimate load	ε[o/oo]	σ-u[MPa]	E-t[N/mm2]
Is only valid within the defined	0.000	0.00	30000
stress range	-2.000	-30.00	0
	-3.500	-30.00	0
	Safetyfactor		1.50

Stress-Strain of calc. mean values	ε[o/oo]	σ-r[MPa]	E-t[N/mm2]
Is only valid within the defined	0.000	0.00	28732
stress range	-1.081	-16.78	7018
	-2.162	-20.00	0
	-3.500	-17.25	-3601
	Safetyfactor		(1.50)



C 30/37 (EN 1992)

No. 5 C 25/30 (EN 1992)DUMMY

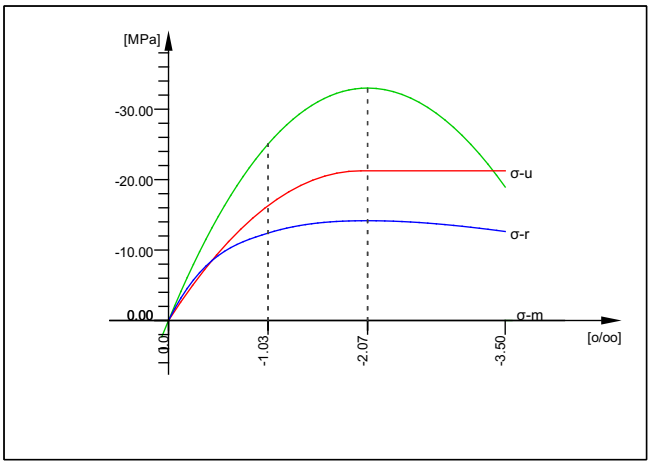
Young's modulus	E	1550000	[N/mm2]	Safetyfactor		1.50	[-]
Poisson ratio	μ	0.20	[-]	Strength	fc	21.25	[MPa]
Shear modulus	G	645833	[N/mm2]	Nominal strength	fck	25.00	[MPa]
Compression modulus	K	861111	[N/mm2]	Tensile strength	fctm	2.56	[MPa]
Weight	γ	25.0	[kN/m3]	Tensile strength	fctk,05	1.80	[MPa]
Density	ρ	2350.00	[kg/m3]	Tensile strength	fctk,95	3.33	[MPa]
Elongation coefficient	α	1.00E-07	[1/K]	Bond strength	fbd	2.69	[MPa]
				Service strength	fcm	33.00	[MPa]
				Fatigue strength	fcd,fat	15.00	[MPa]
				Tensile strength	fctd	1.20	[MPa]

Stress-Strain for serviceability	ε[o/oo]	σ-m[MPa]	E-t[N/mm2]
Is also extended beyond the	0.000	0.00	33050
defined stress range	-1.035	-25.04	15658
	-2.069	-33.00	0
	-3.500	-18.95	-19203
	Safetyfactor		1.50

Stress-Strain for ultimate load	ε[o/oo]	σ-u[MPa]	E-t[N/mm2]
Is only valid within the defined	0.000	0.00	21250
stress range	-2.000	-21.25	0
	-3.500	-21.25	0
	Safetyfactor		1.50

Stress-Strain of calc. mean values	ε[o/oo]	σ-r[MPa]	E-t[N/mm2]
Is only valid within the defined	0.000	0.00	27541
stress range	-1.035	-12.41	4259
	-2.069	-14.17	0
	-3.500	-12.64	-1802
	Safetyfactor		(1.50)

05-ΔΙΥΛΙΣΗ
Materials



C 25/30 (EN 1992)DUMMY

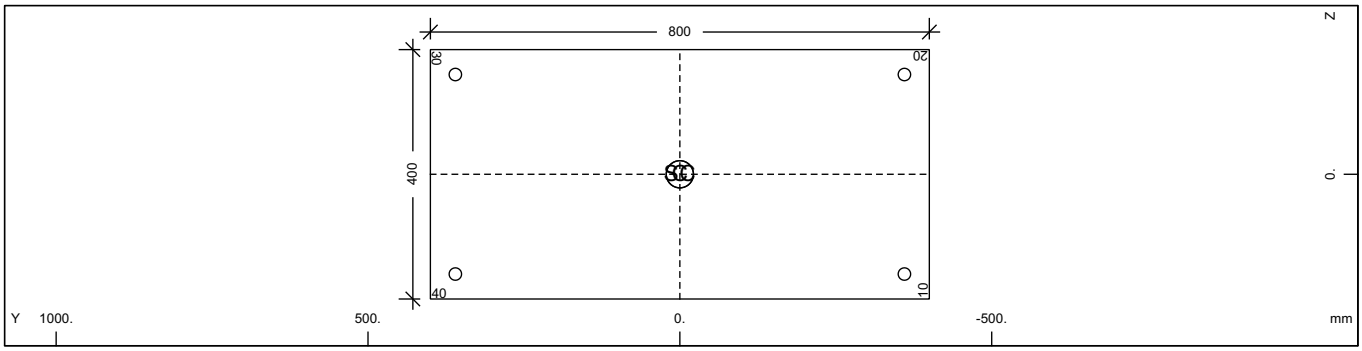
05-ΔΙΥΛΙΣΗ
Sections

Default design code is EuroNorm EN 1992 (2004) Concrete Structures (Europe) V 30.0
Structure and Tab.7.1N: AN (Buildings)
Snow load zone : 1

Materials

No. 1 C 25/30 (EN 1992)
No. 2 B 500 C (EN 1992)
No. 3 C 20/25 (EN 1992)
No. 4 C 30/37 (EN 1992)
No. 5 C 25/30 (EN 1992)DUMMY

Cross section No. 1 - B/H = 800 / 400 mm



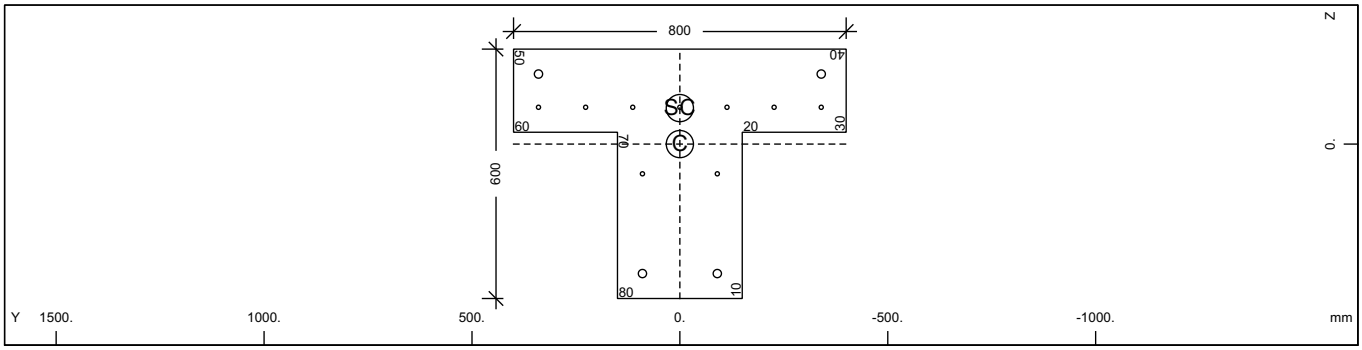
Cross section No. 1 - B/H = 800 / 400 mm

Static properties of cross section

No.	Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kN/m]
	MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]	
			Ayz[m2]	Iyz[m4]				
1	4	3.2000E-01		4.267E-03	0.0	0.0	16000	8.00
	2	1.172E-02		1.707E-02	0.0	0.0	6667	(COMPR)
	= B/H = 800 / 400 mm							

No.	section number	ysc,zsc	shear centre
Mat	material number	E	Young's modulus
A	sectional area	g	weight per length
Ay,Az,Ayz	transverse shear deformation area	MRf	reinforcement material number
Iy,Iz,Iyz	bending moment of inertia	It	torsional moment of inertia
yc,zc	centre of gravity	G	Shear modulus

Cross section No. 2 - B/H/Bw/Hf 800/600/300/200 mm



Cross section No. 2 - B/H/Bw/Hf 800/600/300/200 mm

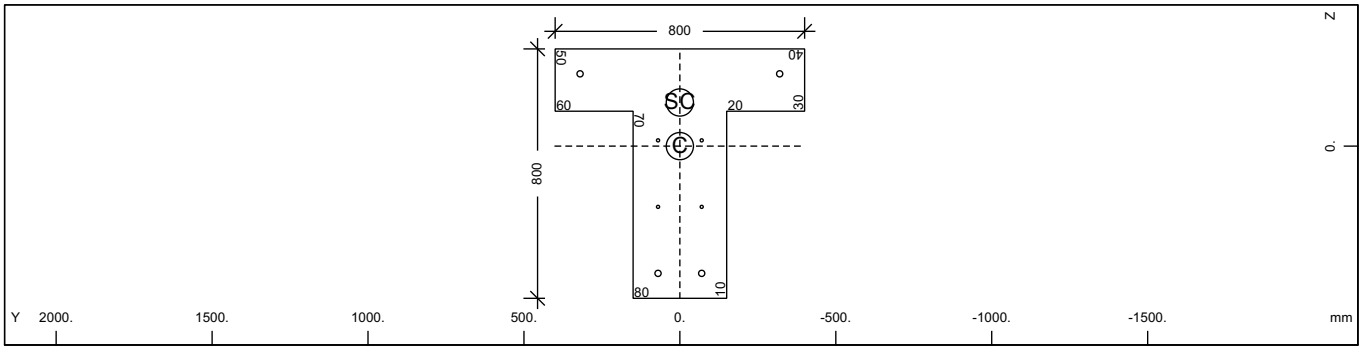
Static properties of cross section

No.	Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kN/m]
	MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]	
			Ayz[m2]	Iyz[m4]				
2	4	2.8000E-01		8.305E-03	0.0	0.0	16000	7.00
	2	4.394E-04		9.433E-03	0.0	-86.7	6667	(CENTR)
	= B/H/Bw/Hf 800/600/300/200 mm							

No.	section number	ysc,zsc	shear centre
Mat	material number	E	Young's modulus
A	sectional area	g	weight per length
Ay,Az,Ayz	transverse shear deformation area	MRf	reinforcement material number
Iy,Iz,Iyz	bending moment of inertia	It	torsional moment of inertia
yc,zc	centre of gravity	G	Shear modulus

05-ΔΙΥΛΙΣΗ
Sections

Cross section No. 3 - B/H/Bw/Hf 800/800/300/200 mm



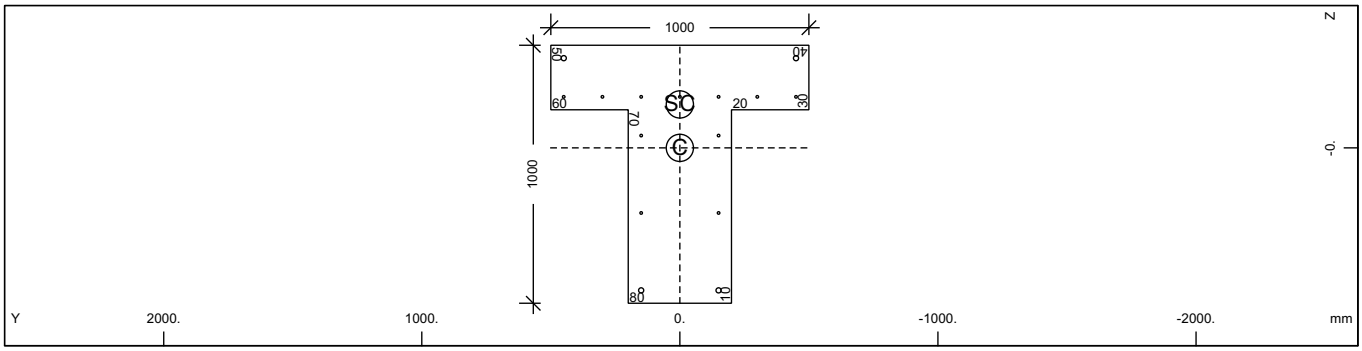
Cross section No. 3 - B/H/Bw/Hf 800/800/300/200 mm

Static properties of cross section

No.	Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kN/m]
	MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]	
			Ayz[m2]	Iyz[m4]				
3	4	3.4000E-01		1.949E-02	0.0	0.0	16000	8.50
	2	6.120E-04		9.883E-03	0.0	-139.8	6667	(CENTR)
	= B/H/Bw/Hf 800/800/300/200 mm							

No.	section number	ysc,zsc	shear centre
Mat	material number	E	Young's modulus
A	sectional area	g	weight per length
Ay,Az,Ayz	transverse shear deformation area	MRf	reinforcement material number
Iy,Iz,Iyz	bending moment of inertia	It	torsional moment of inertia
yc,zc	centre of gravity	G	Shear modulus

Cross section No. 4 - B/H/Bw/Hf 1000/1000/400/250 mm



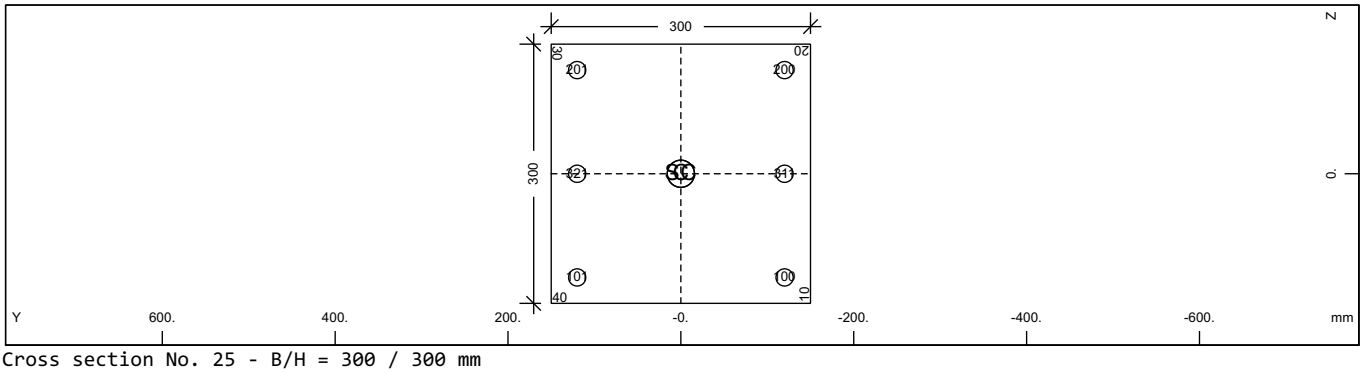
Cross section No. 4 - B/H/Bw/Hf 1000/1000/400/250 mm

Static properties of cross section

No.	Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kN/m]
	MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]	
			Ayz[m2]	Iyz[m4]				
4	4	5.5000E-01		4.946E-02	0.0	0.0	16000	13.75
	2	1.729E-03		2.483E-02	0.0	-168.3	6667	(CENTR)
	= B/H/Bw/Hf 1000/1000/400/250 mm							

No.	section number	ysc,zsc	shear centre
Mat	material number	E	Young's modulus
A	sectional area	g	weight per length
Ay,Az,Ayz	transverse shear deformation area	MRf	reinforcement material number
Iy,Iz,Iyz	bending moment of inertia	It	torsional moment of inertia
yc,zc	centre of gravity	G	Shear modulus

Cross section No. 25 - B/H = 300 / 300 mm



Cross section No. 25 - B/H = 300 / 300 mm

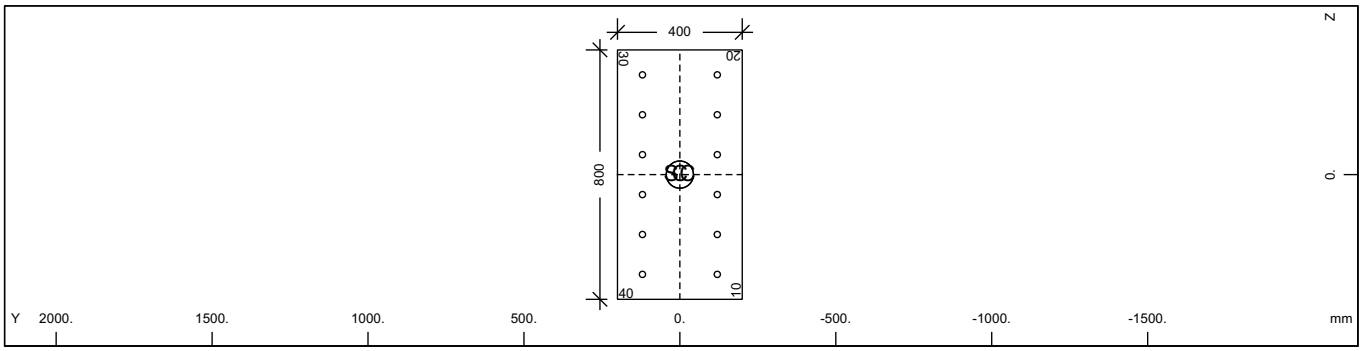
05-ΔΙΥΛΙΣΗ
Sections

Static properties of cross section

No.	Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kN/m]
	MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]	
			Ayz[m2]	Iyz[m4]				
25	4	9.0000E-02		6.750E-04	0.0	0.0	16000	2.25
	2	1.134E-03		6.750E-04	0.0	0.0	6667	(COMPR)
	= B/H = 300 / 300 mm							

No.	section number	ysc,zsc	shear centre
Mat	material number	E	Young's modulus
A	sectional area	g	weight per length
Ay,Az,Ayz	transverse shear deformation area	MRf	reinforcement material number
Iy,Iz,Iyz	bending moment of inertia	It	torsional moment of inertia
yc,zc	centre of gravity	G	Shear modulus

Cross section No. 101 - B/H = 400 / 800 mm



Cross section No. 101 - B/H = 400 / 800 mm

Static properties of cross section

No.	Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kN/m]
	MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]	
			Ayz[m2]	Iyz[m4]				
101	4	3.2000E-01		1.707E-02	0.0	0.0	16000	8.00
	2	1.172E-02		4.267E-03	0.0	0.0	6667	(COMPR)
	= B/H = 400 / 800 mm							

No.	section number	ysc,zsc	shear centre
Mat	material number	E	Young's modulus
A	sectional area	g	weight per length
Ay,Az,Ayz	transverse shear deformation area	MRf	reinforcement material number
Iy,Iz,Iyz	bending moment of inertia	It	torsional moment of inertia
yc,zc	centre of gravity	G	Shear modulus

KGS AIRPORT - MODULE M02 - REV 01
Generation of Node and Element Loads

Actions

type	part	sup	Title	γ-u	γ-f	γ-a	ψ-0	ψ-1	ψ-2	ψ-1'
G	G	perm	dead load	1.35	1.00	1.00	1.00	1.00	1.00	1.00
		1	SW							
		2	SDL							
		4	SH (-15)							
		6	EARTH PRESSURE							
		8	YDROSTATIKH							
Q	Q	cond	variable load	1.50	0.00	1.00	0.70	0.50	0.30	1.00
		3	LL							
		5	TEMP(-20)							
			Reduction coefficient xsi		0.850					

Load Case 1 (G) SW

Factor forces and moments		1.000
Factor dead weight	DL-XX	0.000
Factor dead weight	DL-YY	0.000
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 (G) SDL

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

Load Case 3 (Q) LL

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

Load Case 4 (G) SH (-15)

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

KGS AIRPORT - MODULE M02 - REV 01
Generation of Node and Element Loads

Load Case 5 (Q) TEMP(-20)

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

Load Case 6 (G) EARTH PRESSURE

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

Load Case 8 (G) YDROSTATIKH

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

05-ΔΙΥΛΙΣΗ
Calculation of forces and moments

Load Case 1 (G) SW

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 (G) SDL

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	1.000 (permanent)

Load Case 3 (Q) LL

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)

Load Case 4 (G) SH (-15)

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	1.000 (permanent)

Load Case 5 (Q) TEMP(-20)

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)

Load Case 6 (G) EARTH PRESSURE

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	1.000 (permanent)

Load Case 8 (G) YDROSTATIKH

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	1.000 (permanent)

05-ΔΙΥΛΙΣΗ
Calculation of forces and moments

Load Case 201 EQ_Y-Y q=1.50

Factor forces and moments 1.000
Factor dead weight DL-XX 0.138
Factor dead weight DL-YY 0.460
Factor dead weight DL-ZZ -1.000
Loads partially copied from load case 2 with factor 1.000
Loads partially copied from load case 3 with factor 0.300

Load Case 202 EQ_X-X q=1.50

Factor forces and moments 1.000
Factor dead weight DL-XX 0.460
Factor dead weight DL-YY 0.138
Factor dead weight DL-ZZ -1.000
Loads partially copied from load case 2 with factor 1.000
Loads partially copied from load case 3 with factor 0.300

Sum of Loadings

Loadcase	Σ(Loads)			Title
	X[kN]	Y[kN]	Z[kN]	
1	0.0	0.0	-41095.9	SW
2	0.0	0.0	-4308.5	SDL
3	0.0	0.0	-7180.8	LL
4	0.0	0.0	0.0	SH (-15)
5	0.0	0.0	0.0	TEMP(-20)
6	-0.0	0.8	0.0	EARTH PRESSURE
8	-1531.4	-0.7	-48413.0	YDROSTATIKH
201	6486.7	21622.3	-47558.7	EQ_Y-Y q=1.50
202	21622.3	6486.7	-47558.7	EQ_X-X q=1.50

05-ΔΙΥΛΙΣΗ

Actions

type	part	sup	Title	γ-u	γ-f	γ-a	ψ-0	ψ-1	ψ-2	ψ-1'
G	G	perm	dead load	1.35	1.00	1.00	1.00	1.00	1.00	1.00
Q	Q	cond	variable load	1.50	0.00	1.00	0.70	0.50	0.30	1.00
			Reduction coefficient xsi		0.850					

Load Case 201 EQ_Y-Y q=3.00

Factor forces and moments		1.000		
Factor dead weight	DL-XX	0.069		
Factor dead weight	DL-YY	0.230		
Factor dead weight	DL-ZZ	-1.000		
Loads partially copied from load case		2	with factor	1.000
Loads partially copied from load case		3	with factor	0.300

05-ΔΙΥΛΙΣΗ

Load Case 201 EQ_Y-Y q=3.00

Factor forces and moments 1.000
Factor dead weight DL-XX 0.069
Factor dead weight DL-YY 0.230
Factor dead weight DL-ZZ -1.000
Loads partially copied from load case 2 with factor 1.000
Loads partially copied from load case 3 with factor 0.300

Sum of Loadings

Loadcase	Σ(Loads)			Title
	X[kN]	Y[kN]	Z[kN]	
201	3243.4	10811.2	-47558.7	EQ_Y-Y q=3.00

05-ΔΙΥΛΙΣΗ

Load Case 202 EQ_Y-Y q=3.00

Factor forces and moments		1.000		
Factor dead weight	DL-XX	0.230		
Factor dead weight	DL-YY	0.069		
Factor dead weight	DL-ZZ	-1.000		
Loads partially copied from load case		2	with factor	1.000
Loads partially copied from load case		3	with factor	0.300

05-ΔΙΥΛΙΣΗ

Load Case 202 EQ_X-X q=3.00

Factor forces and moments 1.000
Factor dead weight DL-XX 0.230
Factor dead weight DL-YY 0.069
Factor dead weight DL-ZZ -1.000
Loads partially copied from load case 2 with factor 1.000
Loads partially copied from load case 3 with factor 0.300

Sum of Loadings

Loadcase	Σ(Loads)			Title
	X[kN]	Y[kN]	Z[kN]	
202	10811.2	3243.4	-47558.7	EQ_X-X q=3.00

05-ΔΙΥΛΙΣΗ
ULS COMBINATIONS NO EQ

Actions

type	part	sup	Title		γ-u	γ-f	γ-a	ψ-0	ψ-1	ψ-2	ψ-1'
G	G	perm	dead load		1.35	1.00	1.00	1.00	1.00	1.00	1.00
Q	Q	cond	variable load		1.50	0.00	1.00	0.70	0.50	0.30	1.00
			Reduction coefficient	xsi		0.850					

Load Case 101 ((D))

Factor forces and moments		1.000		
Factor dead weight	DL-XX	0.000		
Factor dead weight	DL-YY	0.000		
Factor dead weight	DL-ZZ	-1.350		
Loads partially copied from load case			1 with factor	1.350
Loads partially copied from load case			2 with factor	1.350
Loads partially copied from load case			3 with factor	1.500
Loads partially copied from load case			6 with factor	1.350
Loads partially copied from load case			8 with factor	1.350

Load Case 102 ((D))

Factor forces and moments		1.000		
Factor dead weight	DL-XX	0.000		
Factor dead weight	DL-YY	0.000		
Factor dead weight	DL-ZZ	-1.350		
Loads partially copied from load case			1 with factor	1.350
Loads partially copied from load case			2 with factor	1.350
Loads partially copied from load case			3 with factor	1.500
Loads partially copied from load case			4 with factor	1.000
Loads partially copied from load case			6 with factor	1.350
Loads partially copied from load case			8 with factor	1.350

Load Case 103 ((D))

Factor forces and moments		1.000		
Factor dead weight	DL-XX	0.000		
Factor dead weight	DL-YY	0.000		
Factor dead weight	DL-ZZ	-1.350		
Loads partially copied from load case			1 with factor	1.350
Loads partially copied from load case			2 with factor	1.350
Loads partially copied from load case			3 with factor	1.500
Loads partially copied from load case			4 with factor	1.000
Loads partially copied from load case			5 with factor	0.900
Loads partially copied from load case			6 with factor	1.350
Loads partially copied from load case			8 with factor	1.350

Load Case 104 ((D))

Factor forces and moments		1.000		
Factor dead weight	DL-XX	0.000		
Factor dead weight	DL-YY	0.000		
Factor dead weight	DL-ZZ	-1.350		
Loads partially copied from load case			1 with factor	1.350
Loads partially copied from load case			2 with factor	1.350
Loads partially copied from load case			3 with factor	1.050
Loads partially copied from load case			4 with factor	1.000
Loads partially copied from load case			5 with factor	1.500
Loads partially copied from load case			6 with factor	1.350
Loads partially copied from load case			8 with factor	1.350

05-ΔΙΥΛΙΣΗ
ULS COMBINATIONS NO EQ (101-104)

Reduced Beam-Stiffness in a Slab

cno	d-slab [m]	b-slab [m]	IY-0 [m4]	IY-red [m4]	A-0 [m2]	A-red [m2]	G-0 [kN/m3]	G-red [kN/m3]
1	0.240	0.400	4.267E-03	3.820E-03	0.3200	0.2240	25.0	17.5
1	0.267	0.800	4.267E-03	3.042E-03	0.3200	0.1067	25.0	8.3
2	0.200	0.400	8.305E-03	8.046E-03	0.2800	0.2000	25.0	17.9
2	0.200	0.800	8.305E-03	7.788E-03	0.2800	0.1200	25.0	10.7
3	0.250	0.400	1.949E-02	1.898E-02	0.3400	0.2400	25.0	17.6
3	0.250	0.800	1.949E-02	1.848E-02	0.3400	0.1400	25.0	10.3
4	0.250	1.000	4.946E-02	4.819E-02	0.5500	0.3000	25.0	13.6
101	0.240	0.400	1.707E-02	1.662E-02	0.3200	0.2240	25.0	17.5

The following nodes have been detected to connect beams with wall elements. The adjacent quad elements will get an internal inplane torsional stiffness to transforms the bending moment into pairs of forces on the quad nodes (see CTRL INPL):

1136 1139 1142 1144 1151 1160 1165 1166

+++++ warning no. 125 in program QUAD
Element 21228 edge too small -> WING-Extra-Elementinfo-QUADinfo
+++++ warning no. 125 in program QUAD
Element 21233 edge too small -> WING-Extra-Elementinfo-QUADinfo
+++++ warning no. 125 in program QUAD
Element 32000 edge too small -> WING-Extra-Elementinfo-QUADinfo
+++++ warning no. 125 in program QUAD
Element 32003 edge too small -> WING-Extra-Elementinfo-QUADinfo
+++++ warning no. 125 in program QUAD
Element 32020 edge too small -> WING-Extra-Elementinfo-QUADinfo
+++++ warning no. 125 in program QUAD
Element 32021 edge too small -> WING-Extra-Elementinfo-QUADinfo

Load Case 101 ((D))

Factor forces and moments 1.000
Factor dead weight DL-ZZ -1.350
Loads partially copied from load case 1 with factor 1.350
Loads partially copied from load case 2 with factor 1.350
Loads partially copied from load case 3 with factor 1.500
Loads partially copied from load case 6 with factor 1.350
Loads partially copied from load case 8 with factor 1.350

Sum of Loadings

Loadcase	Σ(Loads) X[kN]	Σ(Loads) Y[kN]	Σ(Loads) Z[kN]	Title
101	-2067.5	0.1	-137424.8	

Sum of Reactions and Loadings

Loadcase	Σ(Reactions) X[kN]	Σ(Reactions) Y[kN]	Σ(Reactions) Z[kN]	Title
	Σ(Loads)			
101	2067.5	-0.1	137424.7	DLZ= -1.35 sum_PZ=-137.4 MN .
	-2067.5	0.1	-137424.3	

05-ΔΙΥΛΙΣΗ
ULS COMBINATIONS NO EQ (101-104)

Load Case 102 ((D))

Factor forces and moments	1.000	
Factor dead weight	DL-ZZ	-1.350
Loads partially copied from load case	1 with factor	1.350
Loads partially copied from load case	2 with factor	1.350
Loads partially copied from load case	3 with factor	1.500
Loads partially copied from load case	4 with factor	1.000
Loads partially copied from load case	6 with factor	1.350
Loads partially copied from load case	8 with factor	1.350

05-ΔΙΥΛΙΣΗ
ULS COMBINATIONS NO EQ (101-104)

Analysis parameters

Calculation with nonlinear material properties
Nonlinear material properties are used for:
  Springelements[CRAC,YIEL,MUE,GAP], pilebedding, QUAD-bedding

Only linear material properties are used for:
  QUAD- and BRIQ-elements
  Truss-, cable-, Beam-, pile- und boundaryelements
  Beamelements

+++++ warning no. 270 in program STAB
T-beam components: E*A-slab > 0.9*E*A-beam for beam 10034 >echo plab extr
+++++ warning no. 271 in program STAB
T-beam components - IY-slab greater than 0.8*IY-beam for beam 10034
+++++ warning no. 270 in program STAB
T-beam components: E*A-slab > 0.9*E*A-beam for beam 10035 >echo plab extr
+++++ warning no. 271 in program STAB
T-beam components - IY-slab greater than 0.8*IY-beam for beam 10035
+++++ warning no. 270 in program STAB
T-beam components: E*A-slab > 0.9*E*A-beam for beam 10036 >echo plab extr
+++++ warning no. 271 in program STAB
T-beam components - IY-slab greater than 0.8*IY-beam for beam 10036
+++++ warning no. 270 in program STAB
T-beam components: E*A-slab > 0.9*E*A-beam for beam 10037 >echo plab extr
+++++ warning no. 271 in program STAB
T-beam components - IY-slab greater than 0.8*IY-beam for beam 10037
+++++ warning no. 270 in program STAB
T-beam components: E*A-slab > 0.9*E*A-beam for beam 10053 >echo plab extr
+++++ warning no. 271 in program STAB
T-beam components - IY-slab greater than 0.8*IY-beam for beam 10053
+++++ warning no. 129 in program STAB
Further warnings of type no 270 are supressed
+++++ warning no. 129 in program STAB
Further warnings of type no 271 are supressed
+++++ warning no. 267 in program STAB
FE-slabthicknes not equal T-beam-slabthicknes for cross section 3

Load Case 103 ((D))

Factor forces and moments 1.000
Factor dead weight DL-ZZ -1.350
Loads partially copied from load case 1 with factor 1.350
Loads partially copied from load case 2 with factor 1.350
Loads partially copied from load case 3 with factor 1.500
Loads partially copied from load case 4 with factor 1.000
Loads partially copied from load case 5 with factor 0.900
Loads partially copied from load case 6 with factor 1.350
Loads partially copied from load case 8 with factor 1.350

05-ΔΙΥΛΙΣΗ
ULS COMBINATIONS NO EQ (101-104)

Load Case 104 ((D))

Factor forces and moments 1.000
Factor dead weight DL-ZZ -1.350
Loads partially copied from load case 1 with factor 1.350
Loads partially copied from load case 2 with factor 1.350
Loads partially copied from load case 3 with factor 1.050
Loads partially copied from load case 4 with factor 1.000
Loads partially copied from load case 5 with factor 1.500
Loads partially copied from load case 6 with factor 1.350
Loads partially copied from load case 8 with factor 1.350

Sum of Loadings

Loadcase	Σ(Loads)			Title
	X[kN]	Y[kN]	Z[kN]	
104	-2067.5	0.1	-134193.4	

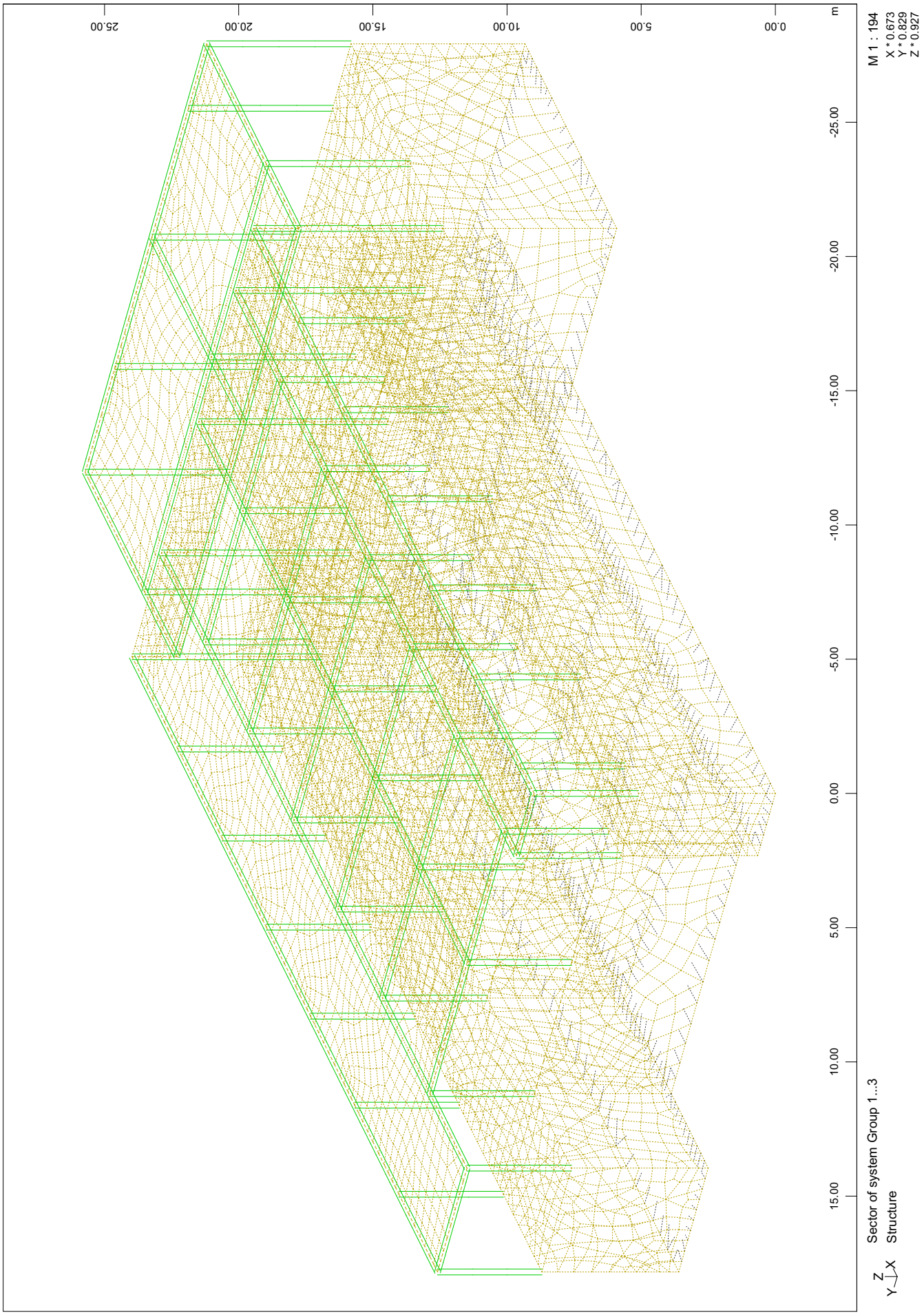
05-ΔΙΥΛΙΣΗ
SLS COMBINATIONS (301)

Load Case 301 ((P))

Factor forces and moments 1.000
Factor dead weight DL-ZZ -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 4 with factor 1.000
Loads partially copied from load case 5 with factor 1.000
Loads partially copied from load case 6 with factor 1.000
Loads partially copied from load case 8 with factor 1.000

05-ΔΙΥΛΙΣΗ

ΠΡΟΣΟΜΟΙΩΜΑ ΥΠΟΛΟΓΙΣΜΟΥ/CALCULATION MODEL



05-ΔΙΥΛΙΣΗ
ΦΟΡΤΙΑ ΥΠΟΛΟΓΙΣΜΟΥ / LOADS

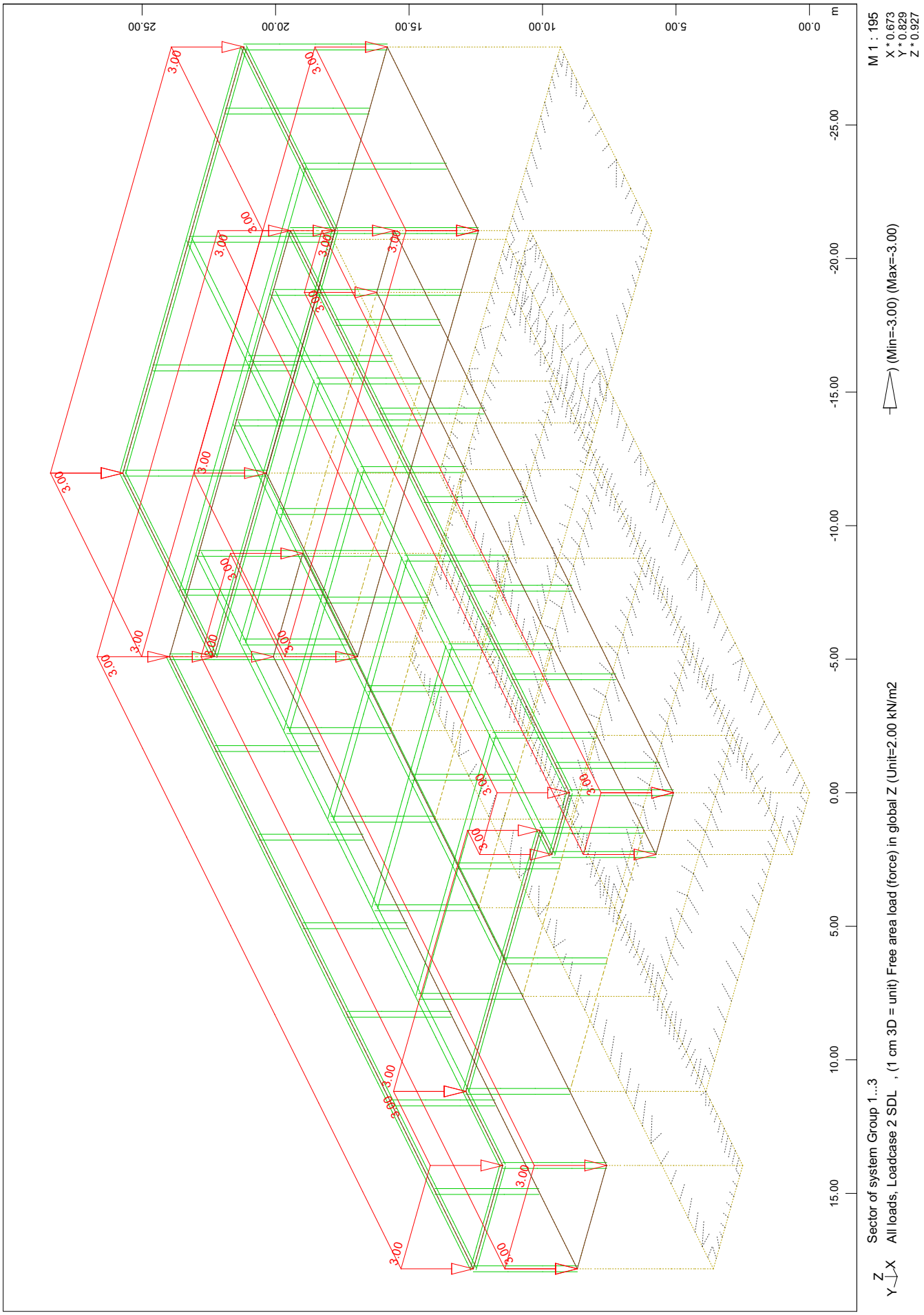
```
PROG WING $ Interactive Graphics
$ Dat : C:\...\sk\05-DIYLISH-PD-R0\SOFI\DIYLISH.dat  (#00h)        6/17/2018
$ Job : øÑó:000520                                                      1:31
HEAD $All loads  LC:     2
PAGE UNII 0
CTRL OPT INP
CTRL OPT GSTR VAL DEFA
CTRL OPT AXIS VAL DEFA
$ graphics    1 | Picture    1 | Layer    1 : All loads  LC:     2
PAGE LANO 1 UNIO 5
SIZE TYPE URS SC 0 SPLI '1*1'
SIZ2 SPLI DEFA
HEAD ΦΟΡΤΙΑ ΥΠΟΛΟΓΙΣΜΟΥ / LOADS
AND  POSI 1 POSL 0 POSR 100 POSD 0 POSU 100
SCHH H6 0.230000
SCH2 DIRE DEFA
LC   NO 2 DESI 1
MOVE X DEL DTYP QSEC
BOX
VIEW TYPE DIRE X 0 Y 0 Z -1 AXIS NEGY ROTA 0
DEFO TYPE NO EXPO 0 SMOV NO
SELE NUMB 0
MOVE X -1.605806 Y 33.76949 Z 0 UNIT WC A 0 SCHH 0.300000 FACW 0.700000 MARG 0 C 3001 CB 101 ALIG DEFA SET PBE
DRAW X 38.77285 Y 33.76949 Z 0 UNIT WC DTYP QSEC GRP NO MNO NO HINT NO DIST DEFA
MOVE X 5.492138 Y 40.01123 Z 0 UNIT WC GRNO 0 DTYP QSEC
DRAW X 5.492138 Y -1.848656 Z 0 UNIT WC DTYP QSEC
GRP  NUMB NODE OPTI OFFL
GRP  NUMB ENOD OPTI OFFL
GRP  NUMB EDGE OPTI OFFL
GRP  LC NO
GRP  NUMB 0 YES GLN
GRP  NUMB 0 YES QSEC
LOOP#GRP     2 ; GRP  NUMB 1+#GRP YES BEAM,QUAD,GLN,GAR  ; ENDLOOP
GRP  NUMB 3 OFF BEAM,GLN
GRP  NUMB 3 YES QUAD,GAR
GRP  NUMB 4 YES QUAD,GAR
GRP  NUMB 5 OFF BEAM,GLN
GRP  NUMB 5 YES QUAD,GAR
LOOP#GRP     3 ; GRP  NUMB 10+#GRP YES QUAD,GAR  ; ENDLOOP
GRP  NUMB 15 OFF
GRP  NUMB 16 YES QUAD,GAR
GRP  NUMB 20 OFF
GRP  NUMB 101 OFF
GRP  NUMB 103 OFF
GRP  NUMB 105 OFF
GRP  NUMB 115 OFF
GRP  NUMB 300 OFF
GRP  NUMB 400 OFF
VIEW TYPE DIRE X 0.739337 Y 0.558893 Z -0.375525 AXIS NEGZ ROTA 0
SELE NUMB 0
LOAD TYPE ALL UNIT DEFA SCHH YES SING VECT FILL NO REPR DREP ETYP ALL GTYP INP
$ graphics    2 | Picture    1 | Layer    1 : All loads  LC:     3
SIZ2
AND  POSI 1 POSL 0 POSR 100 POSD 0 POSU 100
LC   NO 3
GRP  NUMB 0 YES GLN
GRP  NUMB 0 YES QSEC
LOOP#GRP     3 ; GRP  NUMB 1+#GRP YES BEAM,QUAD,GLN,GAR  ; ENDLOOP
GRP  NUMB 4 YES QUAD,GAR
GRP  NUMB 5 YES BEAM,QUAD,GLN,GAR
LOOP#GRP     3 ; GRP  NUMB 10+#GRP YES QUAD,GAR  ; ENDLOOP
GRP  NUMB 15 YES BEAM,GLN
GRP  NUMB 16 YES QUAD,GAR
GRP  NUMB 20 OFF
GRP  NUMB 101 YES BEAM,GLN
GRP  NUMB 103 OFF BOUN
GRP  NUMB 103 YES BEAM,GLN
GRP  NUMB 105 YES BEAM,GLN
```

05-ΔΙΥΛΙΣΗ
ΦΟΡΤΙΑ ΥΠΟΛΟΓΙΣΜΟΥ / LOADS

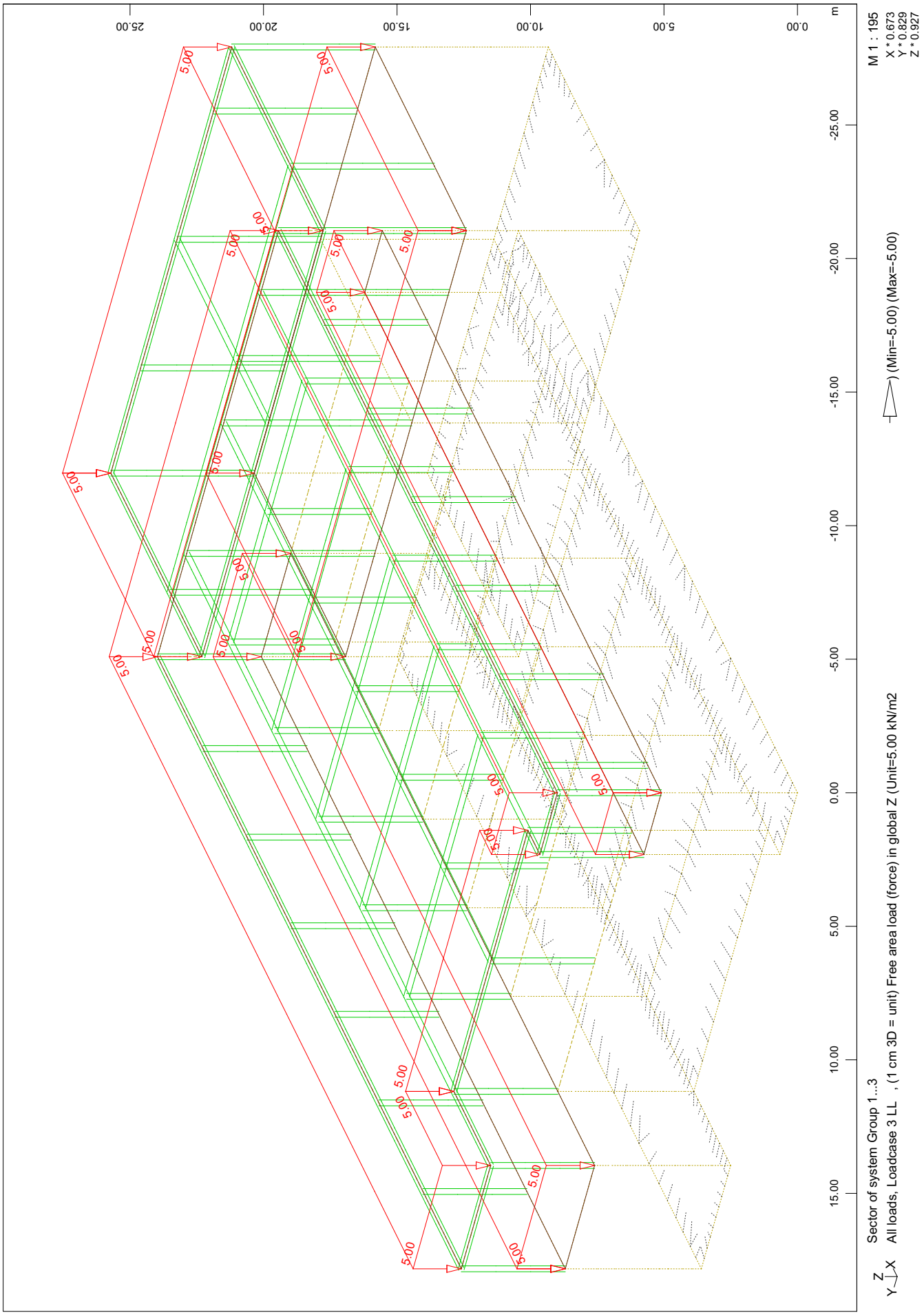
```
  69 GRP  NUMB 115 YES BEAM,GLN
  70 GRP  NUMB 300 OFF
  71 GRP  NUMB 400 YES BEAM,GLN
  72 SELE NUMB 0
  73 LOAD TYPE ALL UNIT DEFA SCHH YES SING VECT FILL NO REPR DREP ETYP ALL GTYP INP
  74 $ graphics    3 | Picture    1 | Layer    1 : All loads  LC:     6
  75 SIZ2
  76 AND  POSI 1 POSL 0 POSR 100 POSD 0 POSU 100
  77 LC   NO 6
  78 LOAD TYPE ALL UNIT DEFA SCHH YES SING VECT FILL NO REPR DREP ETYP ALL GTYP INP
  79 $ graphics    4 | Picture    1 | Layer    1 : All loads  LC:     7
  80 SIZ2
  81 AND  POSI 1 POSL 0 POSR 100 POSD 0 POSU 100
  82 LC   NO 7
  83 LOAD TYPE ALL UNIT DEFA SCHH YES SING VECT FILL NO REPR DREP ETYP ALL GTYP INP
+++++ warning no.   806 in program gr3_e_last
                 LOAD TYPE ALL loadcase 7 not valid : No values found
  84 $ graphics    5 | Picture    1 | Layer    1 : All loads  LC:     8
  85 SIZ2
  86 AND  POSI 1 POSL 0 POSR 100 POSD 0 POSU 100
  87 LC   NO 8
  88 LOAD TYPE ALL UNIT DEFA SCHH YES SING VECT FILL NO REPR DREP ETYP ALL GTYP INP
  89 $ graphics    6 | Picture    1 | Layer    1 : All loads  LC:     9
  90 SIZ2
  91 AND  POSI 1 POSL 0 POSR 100 POSD 0 POSU 100
  92 LC   NO 9
  93 LOAD TYPE ALL UNIT DEFA SCHH YES SING VECT FILL NO REPR DREP ETYP ALL GTYP INP
+++++ warning no.   806 in program gr3_e_last
                 LOAD TYPE ALL loadcase 9 not valid : No values found
  94 END
```

05-ΔΙΥΛΙΣΗ

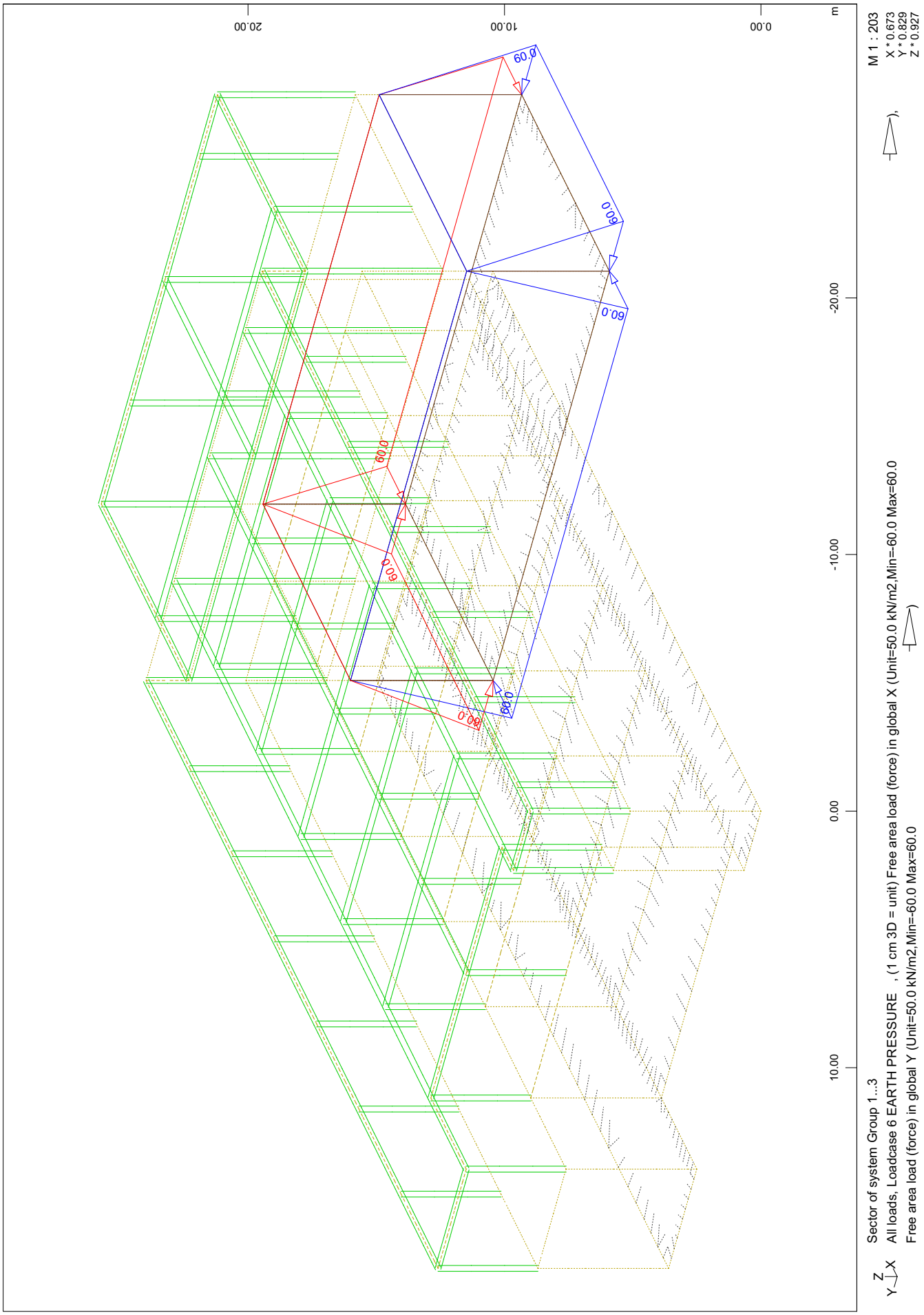
ΦΟΡΤΙΑ ΥΠΟΛΟΓΙΣΜΟΥ / LOADS



05-ΔΙΥΛΙΣΗ
ΦΟΡΤΙΑ ΥΠΟΛΟΓΙΣΜΟΥ / LOADS

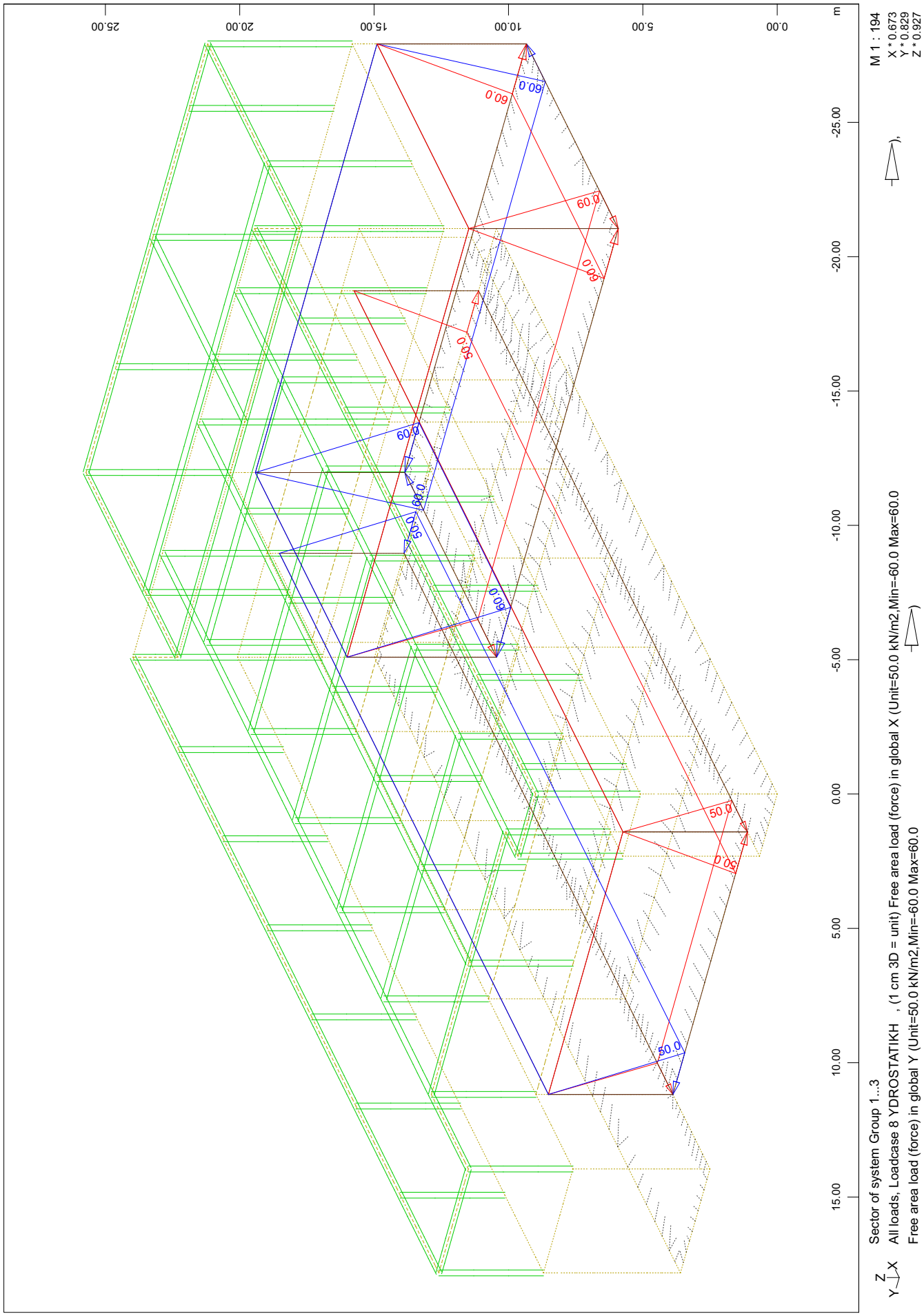


05-ΔΙΥΛΙΣΗ
ΦΟΡΤΙΑ ΥΠΟΛΟΓΙΣΜΟΥ / LOADS



05-ΔΙΥΛΙΣΗ

ΦΟΡΤΙΑ ΥΠΟΛΟΓΙΣΜΟΥ / LOADS



05-ΔΙΥΛΙΣΗ
design parameter list

Reinforcementparameter two layer reinforcement

Selection		distance		bar-diameter		crackwidth		steelstress		min.reinf.	
Grp	elem	d1-u	2.lay	ds-u	2.lay	wk-u	2.lay	sigsu	2.lay	asu	2.lay
no.	no.	d1-l	2.lay	ds-l	2.lay	wk-l	2.lay	sigsl	2.lay	asl	2.lay
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[MPa]	[MPa]	[cm2/m]	[cm2/m]
default		30.0	42.0	10	10	0.30	0.30	-	-	-	-
		30.0	42.0	12	10	0.30	0.30	-	-	-	-
0		35.0	45.0	10	10	0.15	0.15	-	-	-	-
		35.0	45.0	10	10	0.15	0.15	-	-	-	-
1		35.0	45.0	10	10	0.15	0.15	-	-	-	-
		35.0	45.0	10	10	0.15	0.15	-	-	-	-
2		35.0	45.0	10	10	0.15	0.15	-	-	-	-
		35.0	45.0	10	10	0.15	0.15	-	-	-	-

distance	upper / lower distance center of bar to surface
bar-diameter	upper / lower bar diameter
crackwidth	upper / lower required crack width
steelstress	upper / lower maximum steel stress in SLS check
min.reinf.	upper / lower minimum reinforcement

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.

05-ΔΙΥΛΙΣΗ
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	factor	Title
101	1.000	DLZ= -1.35 sum_PZ=-137.4 + Bedding stresses for punching design
102	1.000	DLZ= -1.35 sum_PZ=-137.4 + Bedding stresses for punching design
103	1.000	DLZ= -1.35 sum_PZ=-137.4 + Bedding stresses for punching design
104	1.000	DLZ= -1.35 sum_PZ=-134.2 + Bedding stresses for punching design

Material (EN 1992-1-1:2004)

MAT	fck [N/mm2]	fc [N/mm2]	fctm [N/mm2]	fy [N/mm2]	ft [N/mm2]	N	minT	Type
1	25.0	21.2	2.6			12.9	0.20	
2				500.0	567.5			
3	20.0	20.0	2.2			6.7	0.20	
4	30.0	30.0	2.9			12.5	0.20	
5	25.0	21.2	2.6			6.6	0.20	

MAT material number
fck nominal strength of the concrete
fc strength of the concrete
fctm tensile strength of the concrete
fy yield stress reinforcing steel
ft tensile stress reinforcing steel
N ratio Young's modules steel/concrete
minT minimum transverse reinforcement
Type character of the loading

Minimum reinforcement: 0.00 % of statically required section
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
3	1.50	1.50		
4	1.50	1.50		
5	1.50	1.50		

MAT material number
concr material safety SC1/SC2 = bending/compression
steel material safety steel bending/compression

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. no.	distance d1-u 2.lay d1-l 2.lay [mm] [mm]	bar-diameter ds-u 2.lay ds-l 2.lay [mm] [mm]	crackwidth wk-u 2.lay wk-l 2.lay [mm] [mm]	steelstress sigsu 2.lay sigsl 2.lay [MPa] [MPa]	min.reinf. asu 2.lay asl 2.lay [cm2/m] [cm2/m]
default	30.0 42.0	10 10	0.30 0.30	- -	- -
	30.0 42.0	12 10	0.30 0.30	- -	- -
0	35.0 45.0	10 10	0.15 0.15	- -	- -
	35.0 45.0	10 10	0.15 0.15	- -	- -
1	35.0 45.0	10 10	0.15 0.15	- -	- -
	35.0 45.0	10 10	0.15 0.15	- -	- -
2	35.0 45.0	10 10	0.15 0.15	- -	- -
	35.0 45.0	10 10	0.15 0.15	- -	- -

distance upper / lower distance center of bar to surface
bar-diameter upper / lower bar diameter
crackwidth upper / lower required crack width
steelstress upper / lower maximum steel stress in SLS check
min.reinf. upper / lower minimum reinforcement

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.
The reinforcement is saved in the data base as design case 1

At punching-nodes the bending moments have been reduced (rounded)
At column-nodes the slab-thickness for bending-design has been increased
with 1:3 starting at the column-edge (not at wall punching nodes)

05-ΔΙΥΛΙΣΗ
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	factor	Title
201	1.000	EQ_Y-Y q=3.00 + Bedding stresses for punching design
202	1.000	EQ_X-X q=3.00 + Bedding stresses for punching design

Material (EN 1992-1-1:2004)

MAT	fck [N/mm2]	fc [N/mm2]	fctm [N/mm2]	fy [N/mm2]	ft [N/mm2]	N	minT	Type
1	25.0	21.2	2.6			12.9	0.20	
2				500.0	567.5			
3	20.0	20.0	2.2			6.7	0.20	
4	30.0	30.0	2.9			12.5	0.20	
5	25.0	21.2	2.6			6.6	0.20	

MAT material number
fck nominal strength of the concrete
fc strength of the concrete
fctm tensile strength of the concrete
fy yield stress reinforcing steel
ft tensile stress reinforcing steel
N ratio Young's modules steel/concrete
minT minimum transverse reinforcement
Type character of the loading

Minimum reinforcement: 0.00 % of statically required section
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
3	1.50	1.50		
4	1.50	1.50		
5	1.50	1.50		

MAT material number
concr material safety SC1/SC2 = bending/compression
steel material safety steel bending/compression

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. no.	distance d1-u 2.lay d1-l 2.lay [mm]		bar-diameter ds-u 2.lay ds-l 2.lay [mm]		crackwidth wk-u 2.lay wk-l 2.lay [mm]		steelstress sigsu 2.lay sigsl 2.lay [MPa]		min.reinf. asu 2.lay asl 2.lay [cm2/m]	
default	30.0	42.0	10	10	0.30	0.30	-	-	-	-
	30.0	42.0	12	10	0.30	0.30	-	-	-	-
0	35.0	45.0	10	10	0.15	0.15	-	-	-	-
	35.0	45.0	10	10	0.15	0.15	-	-	-	-
1	35.0	45.0	10	10	0.15	0.15	-	-	-	-
	35.0	45.0	10	10	0.15	0.15	-	-	-	-
2	35.0	45.0	10	10	0.15	0.15	-	-	-	-
	35.0	45.0	10	10	0.15	0.15	-	-	-	-

distance upper / lower distance center of bar to surface
bar-diameter upper / lower bar diameter
crackwidth upper / lower required crack width
steelstress upper / lower maximum steel stress in SLS check
min.reinf. upper / lower minimum reinforcement

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.
The reinforcement is saved in the data base as design case 2

At punching-nodes the bending moments have been reduced (rounded)
At column-nodes the slab-thickness for bending-design has been increased
with 1:3 starting at the column-edge (not at wall punching nodes)

05-ΔΙΥΛΙΣΗ
SLS design

Maximum of reinforcement-distributions

The reinforcement maximum was build out of the numbers of reinforcement-distributions:
1
and stored as new reinforcement-distribution 3 .
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	factor	Title
301	1.000	DLZ= -1.00 sum_PZ=-101.0 + Bedding stresses for 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
301	100.0								

Material (EN 1992-1-1:2004)

MAT	fck [N/mm2]	fc [N/mm2]	fctm [N/mm2]	fy [N/mm2]	ft [N/mm2]	N	minT	Type
1	25.0	21.2	2.6			12.9	0.20	
2				500.0	567.5			
3	20.0	20.0	2.2			6.7	0.20	
4	30.0	30.0	2.9			12.5	0.20	
5	25.0	21.2	2.6			6.6	0.20	

MAT	material number	ft	tensile stress reinforcing steel
fck	nominal strength of the concrete	N	ratio Young's modules steel/concrete
fc	strength of the concrete	minT	minimum transverse reinforcement
fctm	tensile strength of the concrete	Type	character of the loading
fy	yield stress reinforcing steel		

Minimum reinforcement: 0.00 % of statically required section

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.

SERVICEABILITY LIMIT STATE CONTROL PARAMETERS

No	Code	dNW [mm]	wk [mm]
1	EN-1992	->para	->para

Calculation of crack-width acc." EN 1992 7.3.4

Reinforcementparameter two layer reinforcement

Selection Grp elem no. no.	distance d1-u 2.lay d1-l 2.lay [mm] [mm]	bar-diameter ds-u 2.lay ds-l 2.lay [mm] [mm]	crackwidth wk-u 2.lay wk-l 2.lay [mm] [mm]	steelstress sigsu 2.lay sigsl 2.lay [MPa] [MPa]	min.reinf. asu 2.lay asl 2.lay [cm2/m] [cm2/m]
default	30.0 42.0	10 10	0.30 0.30	- -	- -
	30.0 42.0	12 10	0.30 0.30	- -	- -
0	35.0 45.0	10 10	0.15 0.15	- -	- -
	35.0 45.0	10 10	0.15 0.15	- -	- -
1	35.0 45.0	10 10	0.15 0.15	- -	- -
	35.0 45.0	10 10	0.15 0.15	- -	- -
2	35.0 45.0	10 10	0.15 0.15	- -	- -
	35.0 45.0	10 10	0.15 0.15	- -	- -

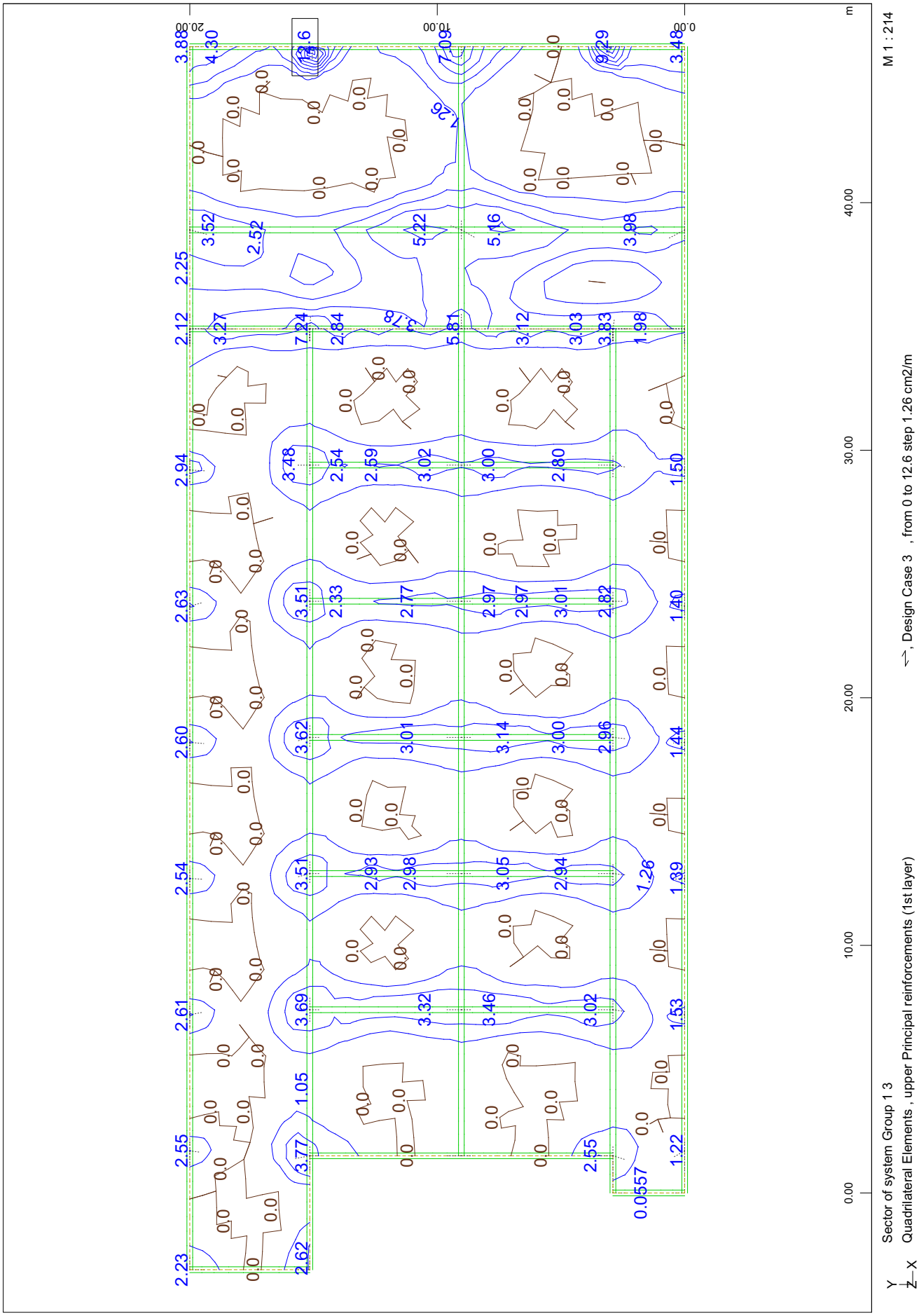
distance	upper / lower distance center of bar to surface
bar-diameter	upper / lower bar diameter
crackwidth	upper / lower required crack width
steelstress	upper / lower maximum steel stress in SLS check
min.reinf.	upper / lower minimum reinforcement

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.
The reinforcement is saved in the data base as design case 3

05-ΔΙΥΛΙΣΗ

ΟΠΛΙΣΜΟΙ ΠΛΑΚΩΝ ΟΡΟΦΗΣ/ROOF SLABS REINFORCEMENTS

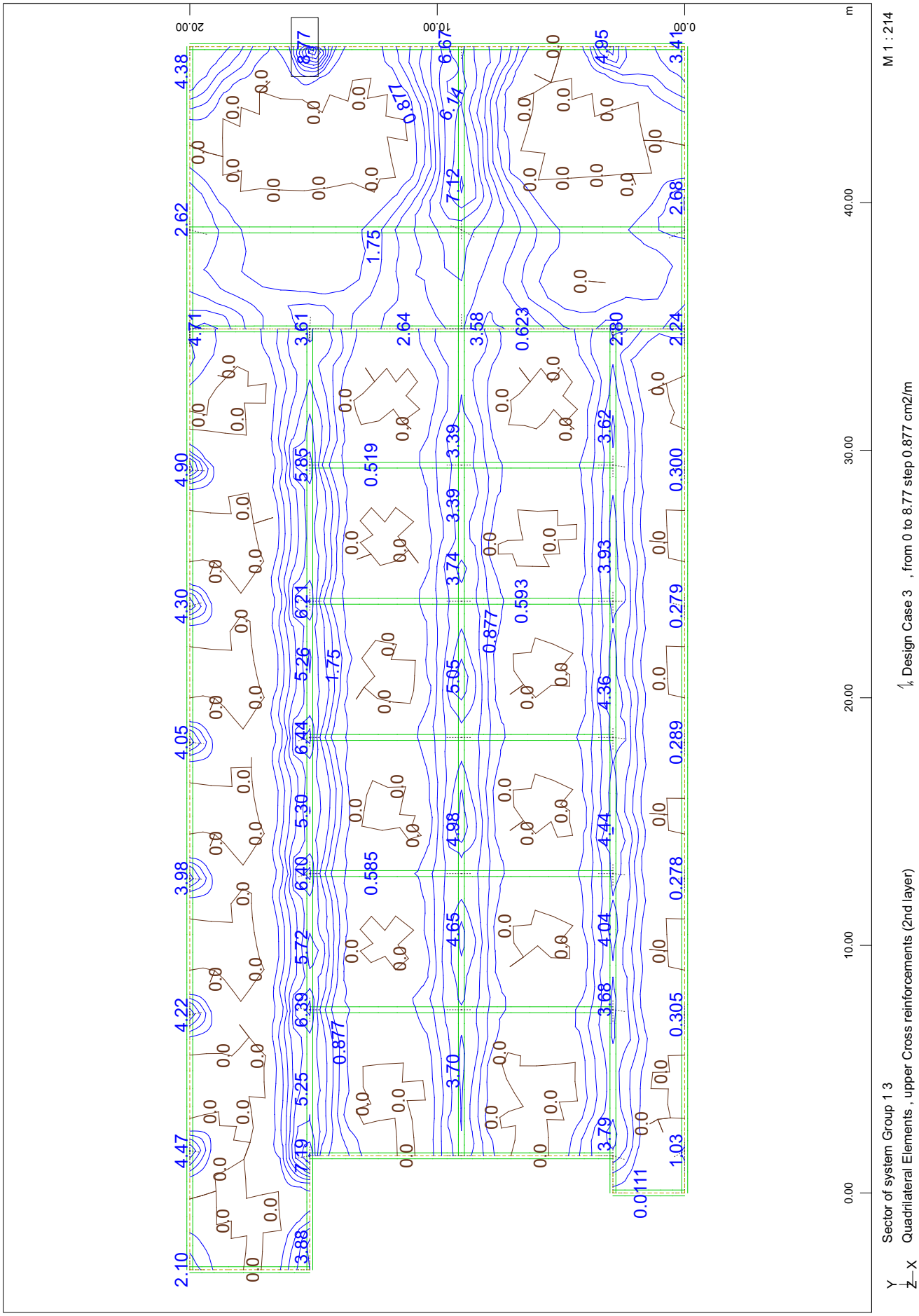
ΟΚΛ/SLS : LCR 3 (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)



05-ΔΙΥΛΙΣΗ

ΟΠΛΙΣΜΟΙ ΠΛΑΚΩΝ ΟΡΟΦΗΣ/ROOF SLABS REINFORCEMENTS

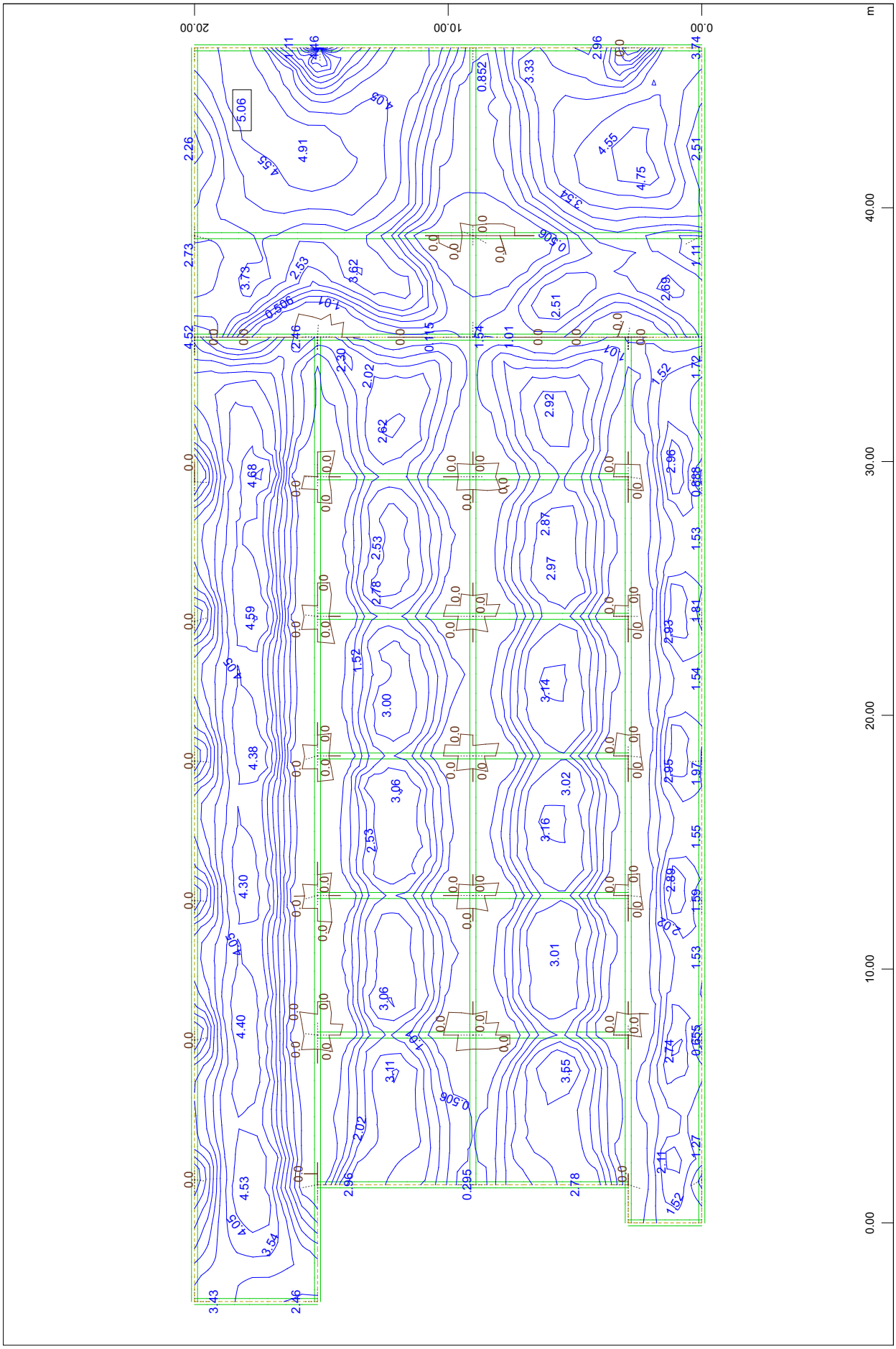
ΟΚΛ/SLS : LCR 3 (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)



05-ΔΙΥΛΙΣΗ

ΟΠΛΙΣΜΟΙ ΠΛΑΚΩΝ ΟΡΟΦΗΣ/ROOF SLABS REINFORCEMENTS

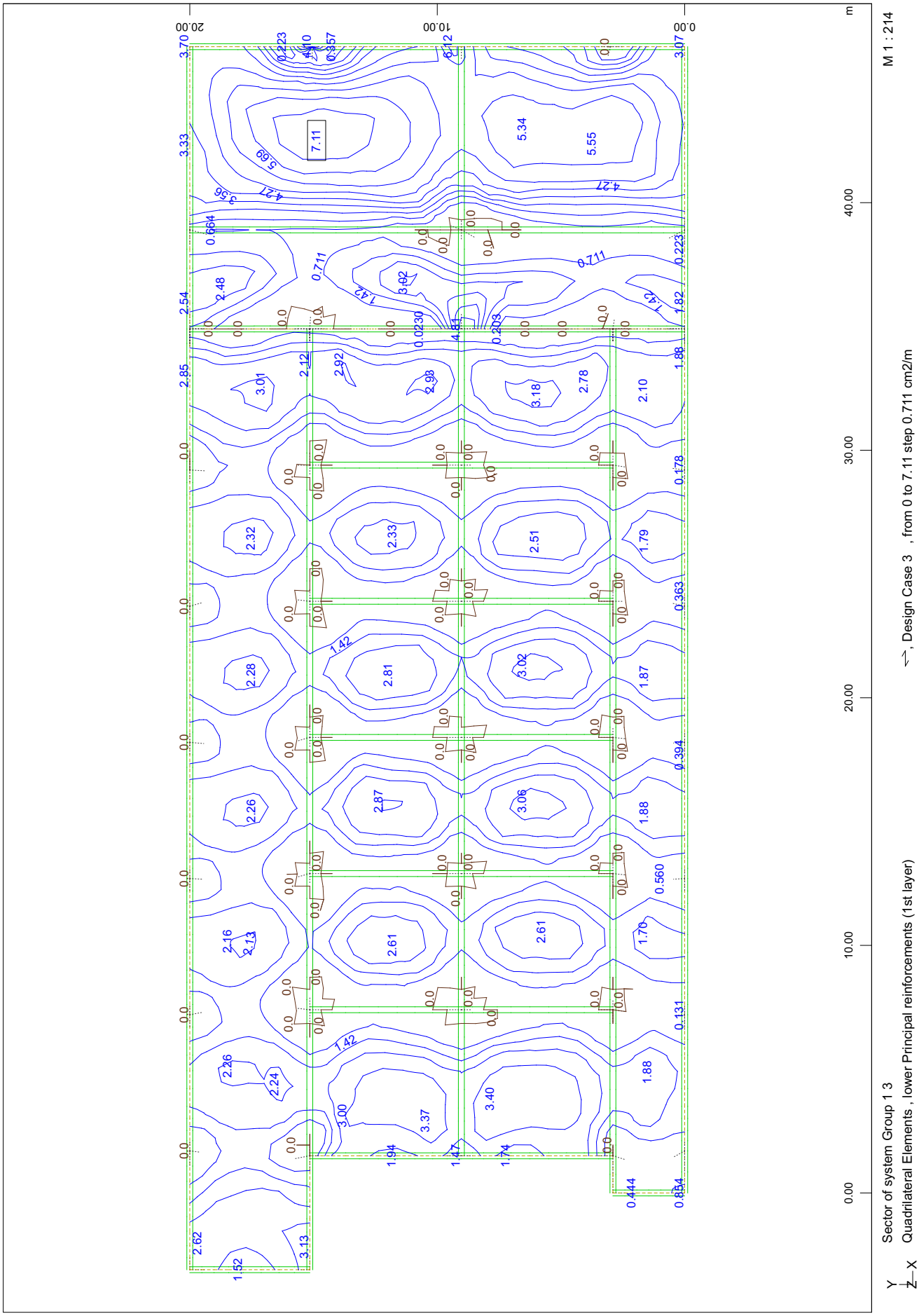
ΟΚΛ/SLS : LCR 3 (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)



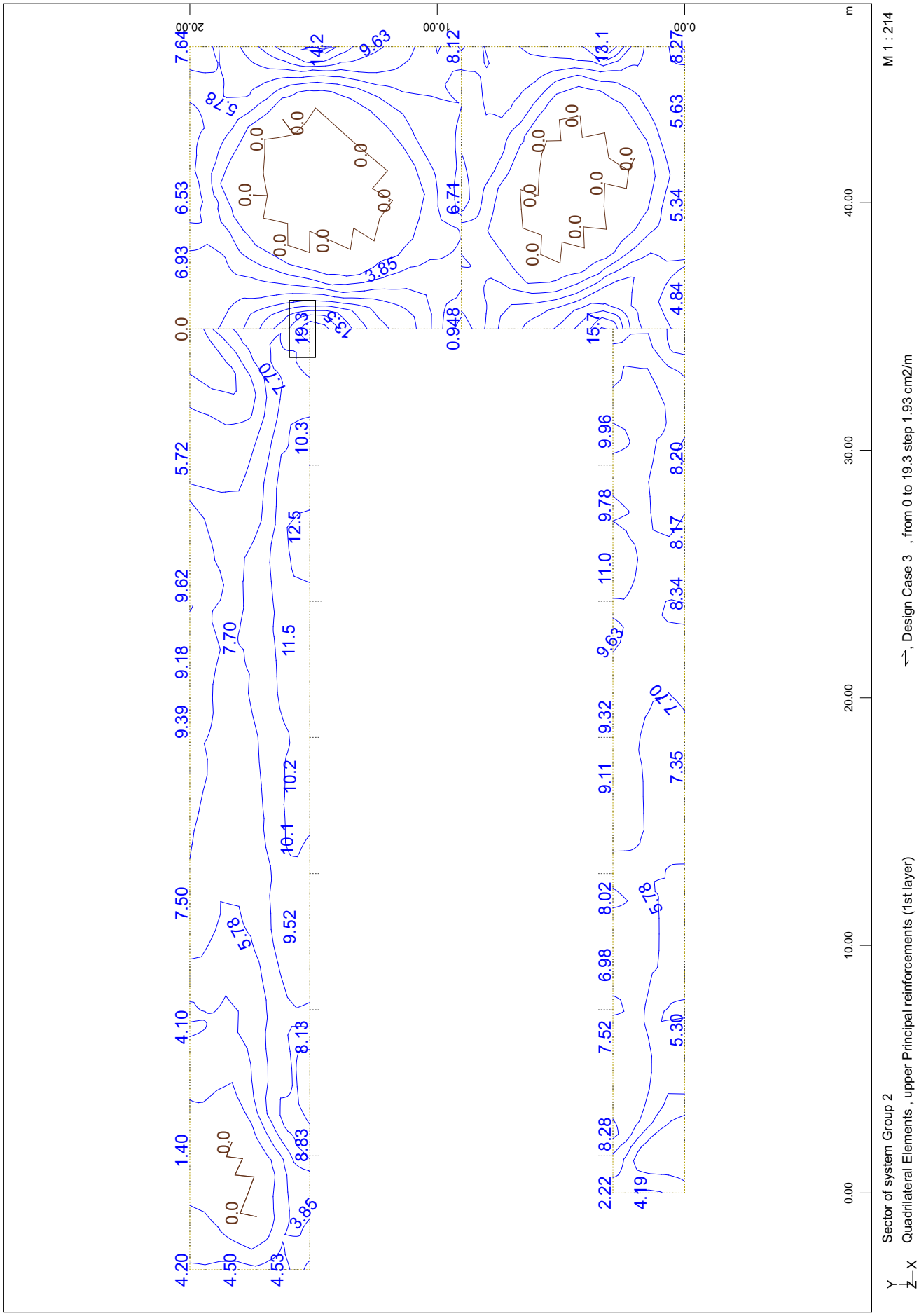
05-ΔΙΥΛΙΣΗ

ΟΠΛΙΣΜΟΙ ΠΛΑΚΩΝ ΟΡΟΦΗΣ/ROOF SLABS REINFORCEMENTS

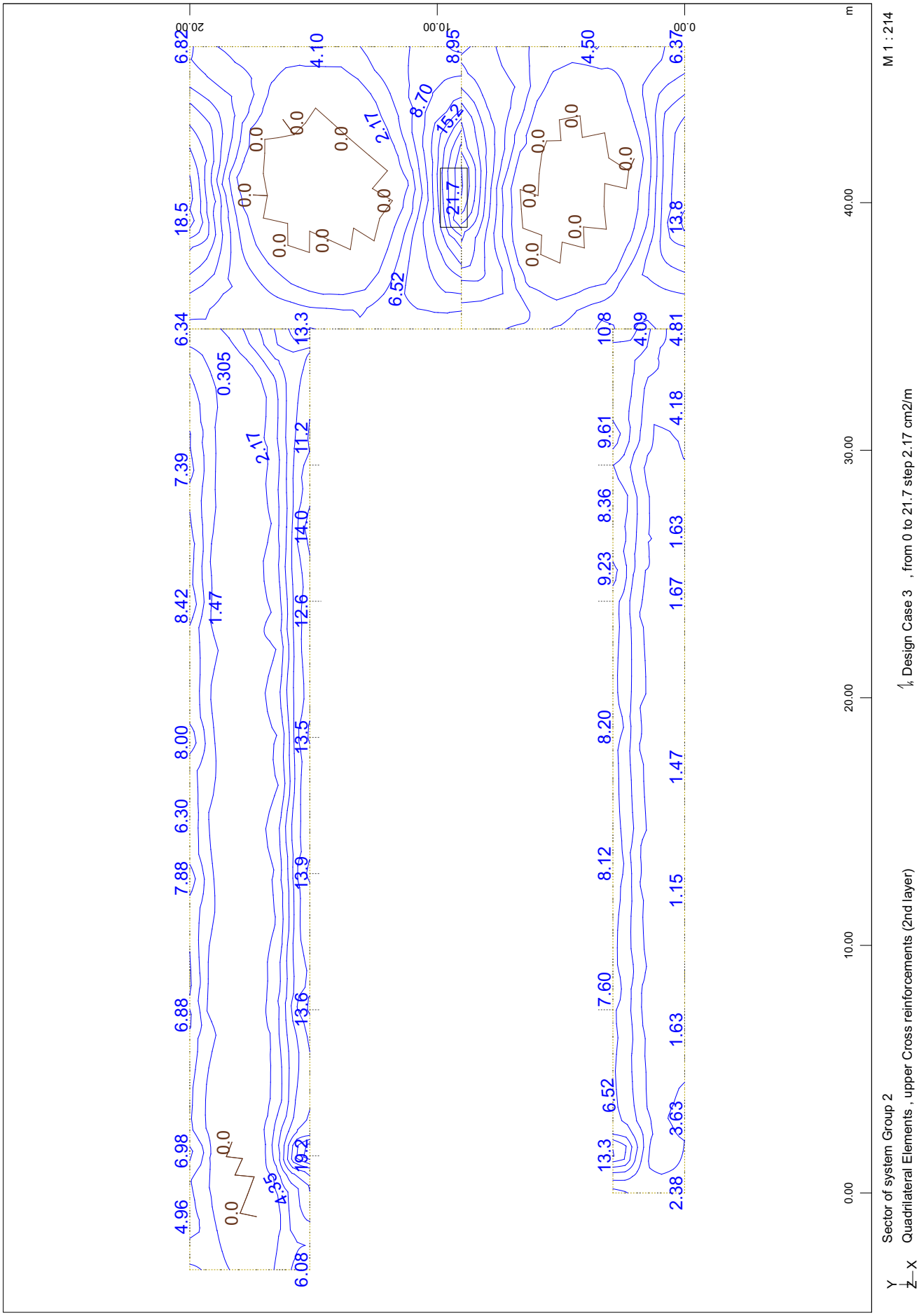
ΟΚΛ/SLS : LCR 3 (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)



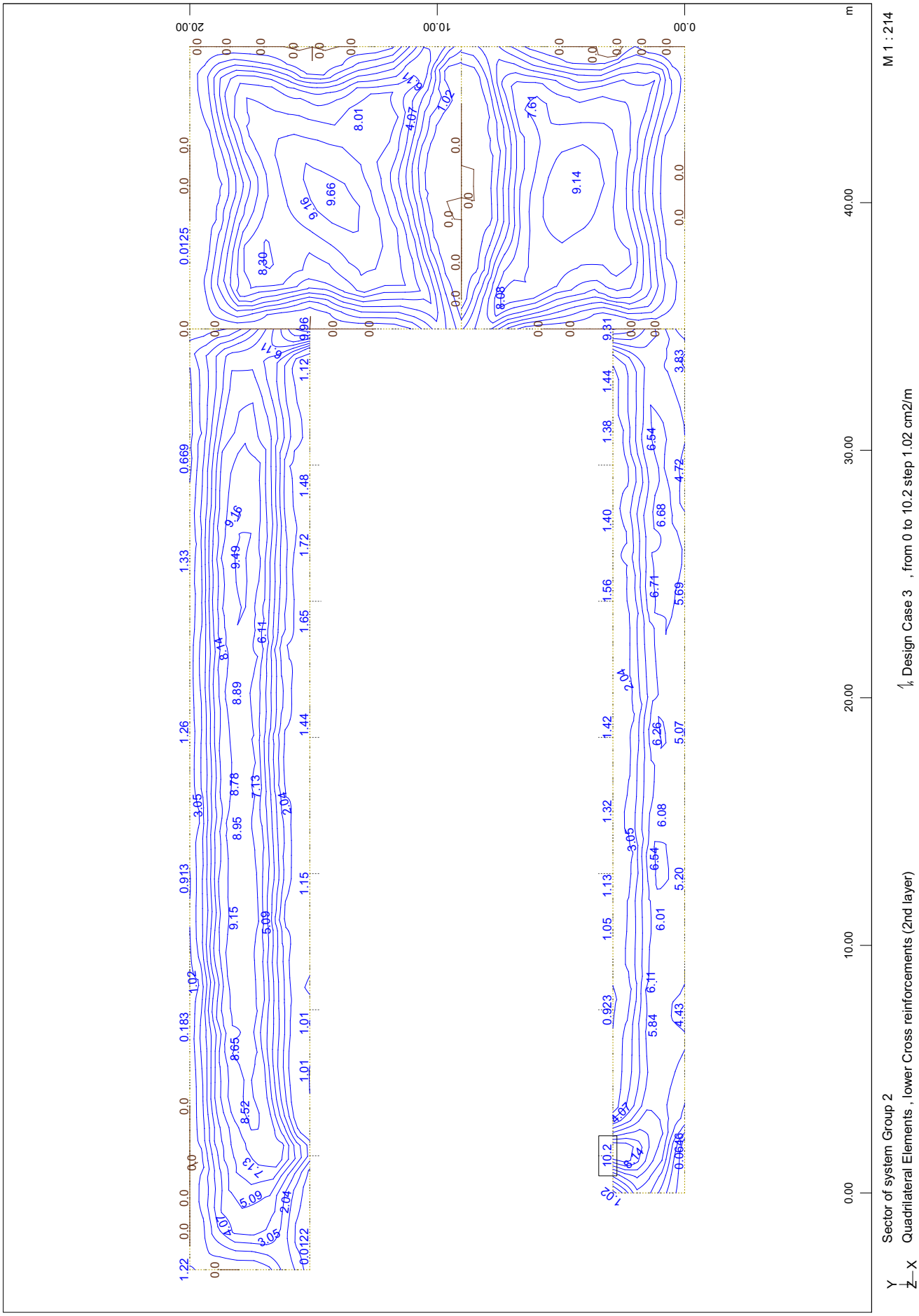
05-ΔΙΥΛΙΣΗ
ΟΠΛΙΣΜΟΙ ΠΛΑΚΩΝ ΥΠΟΓΕΙΟΥ / BASEMENT SLABS REINFORC
ΟΚΛ/SLS : LCR 3 (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)



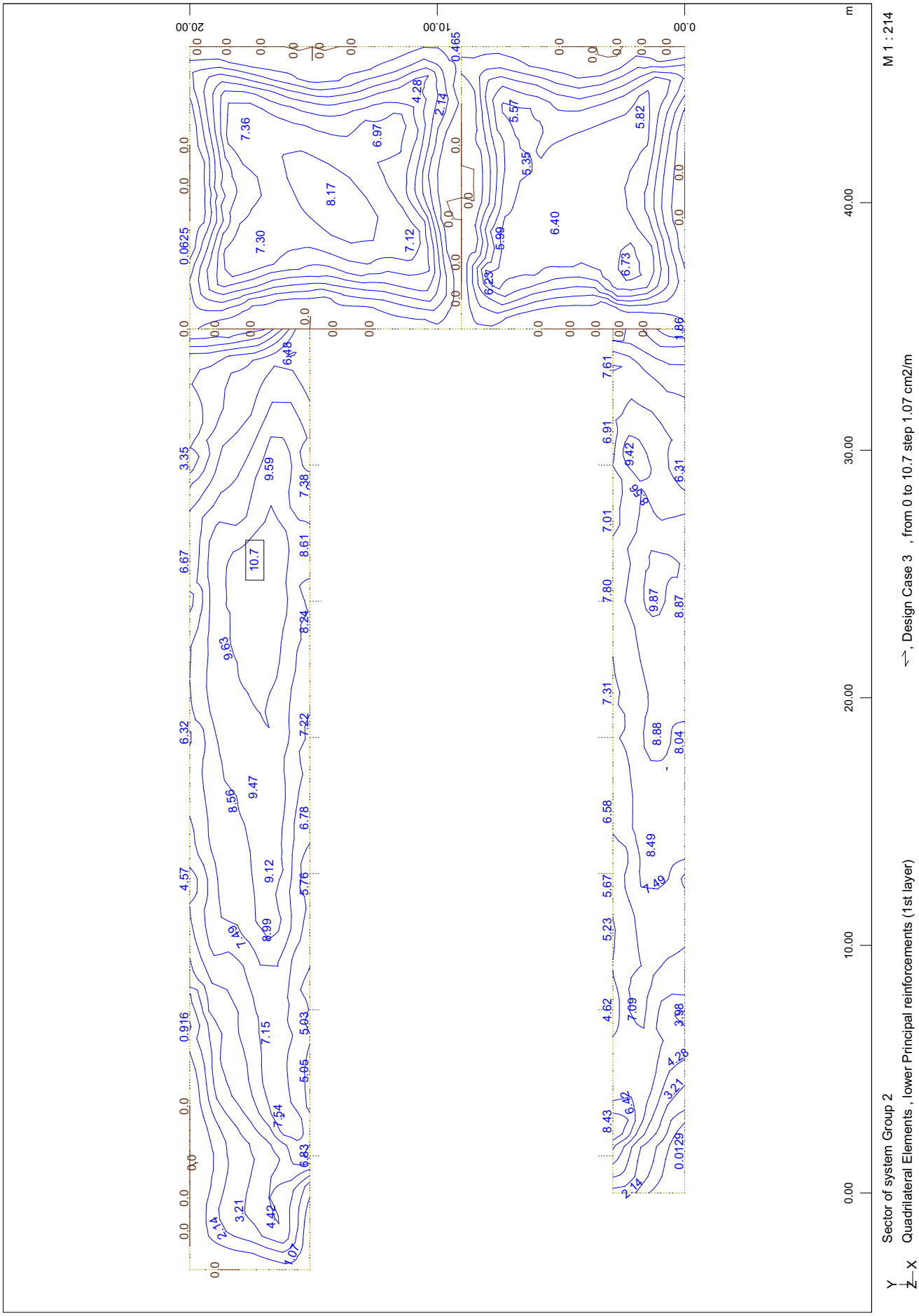
05-ΔΙΥΛΙΣΗ
ΟΠΛΙΣΜΟΙ ΠΛΑΚΩΝ ΥΠΟΓΕΙΟΥ / BASEMENT SLABS REINFORC
ΟΚΛ/SLS : LCR 3 (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)



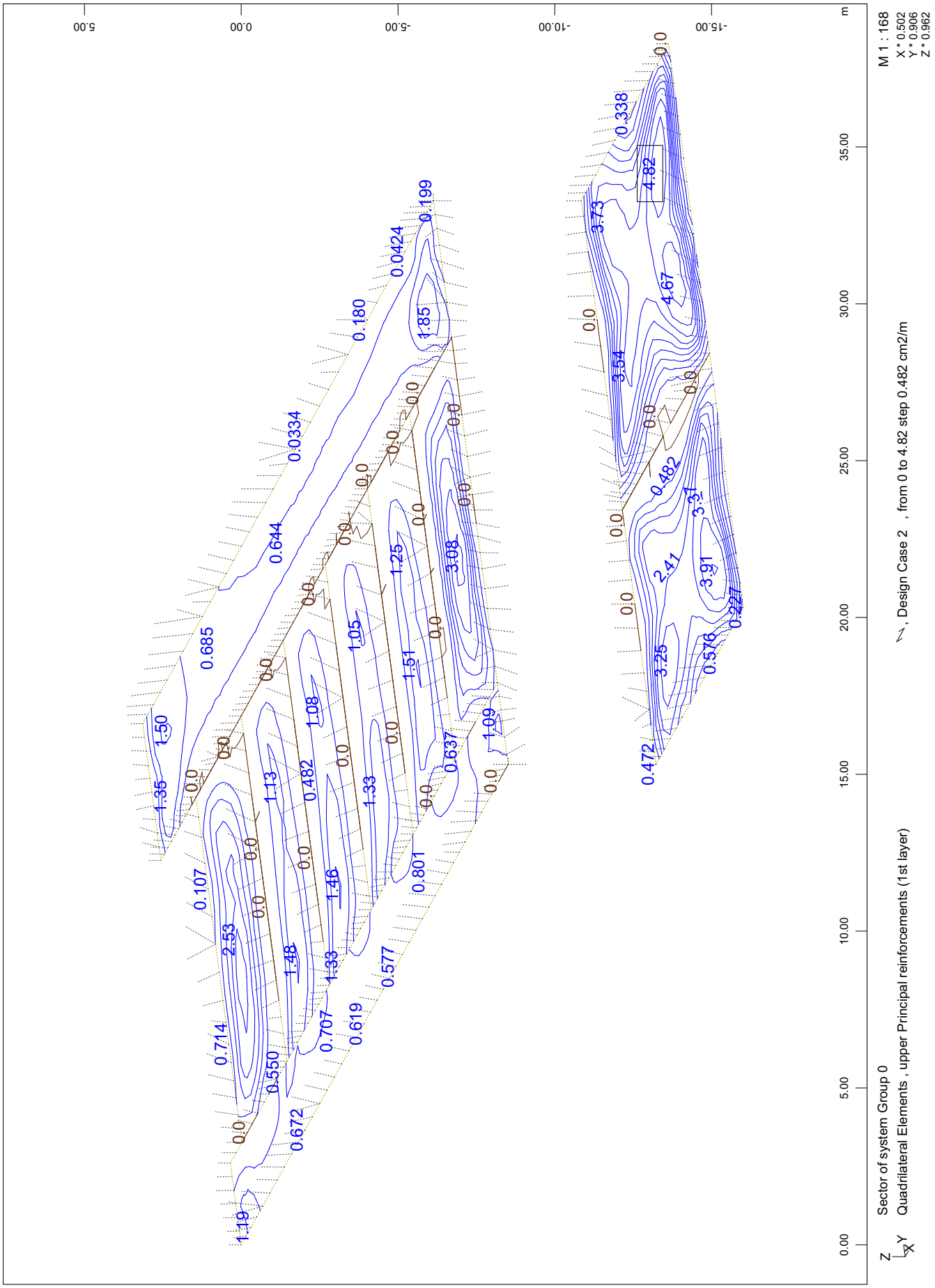
05-ΔΙΥΛΙΣΗ
ΟΠΛΙΣΜΟΙ ΠΛΑΚΩΝ ΥΠΟΓΕΙΟΥ / BASEMENT SLABS REINFORC
ΟΚΛ/SLS : LCR 3 (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)



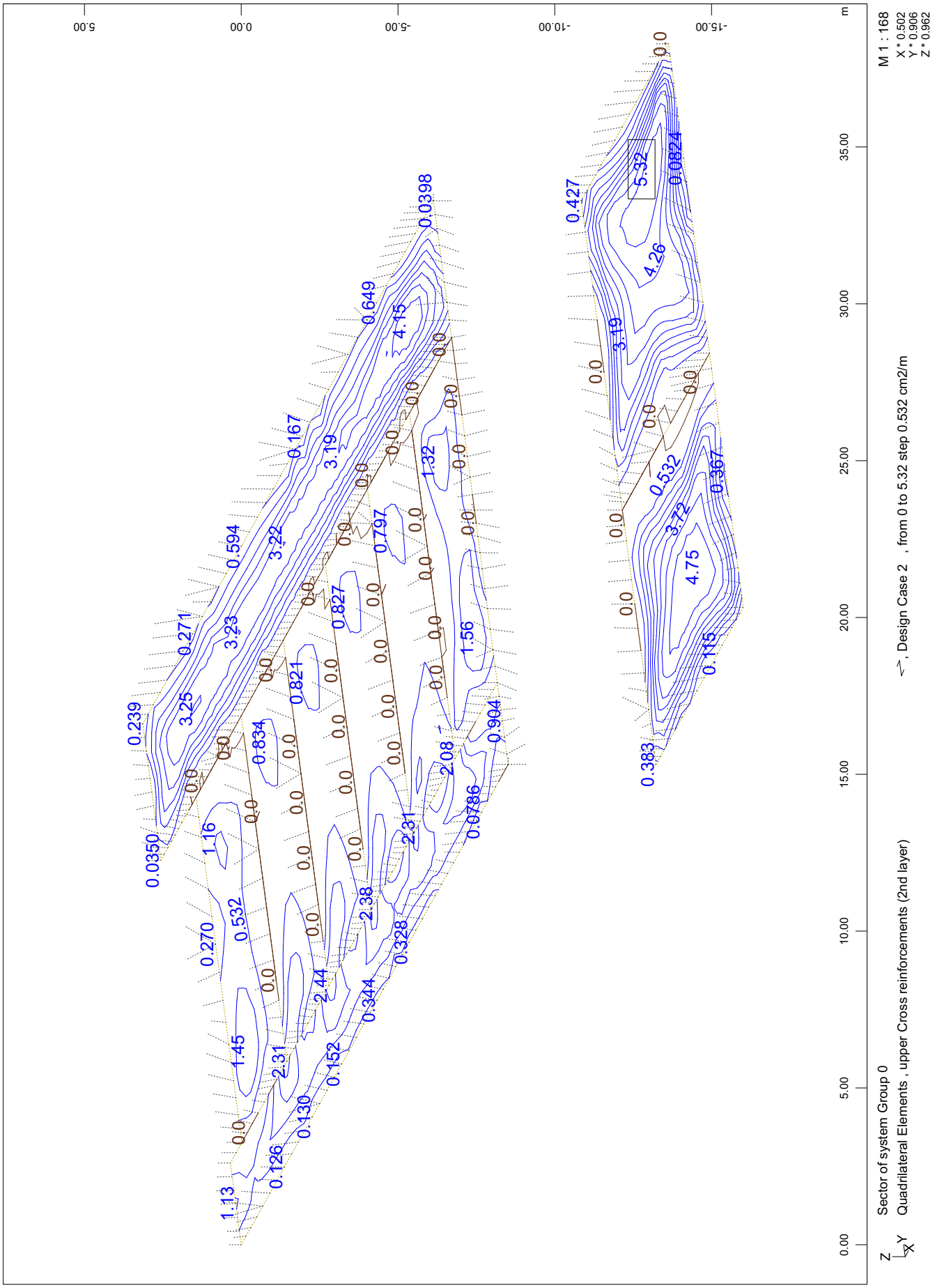
05-ΔΙΥΛΙΣΗ
ΟΠΛΙΣΜΟΙ ΠΛΑΚΩΝ ΥΠΟΓΕΙΟΥ / BASEMENT SLABS REINFORC
ΟΚΛ/SLS : LCR 3 (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)



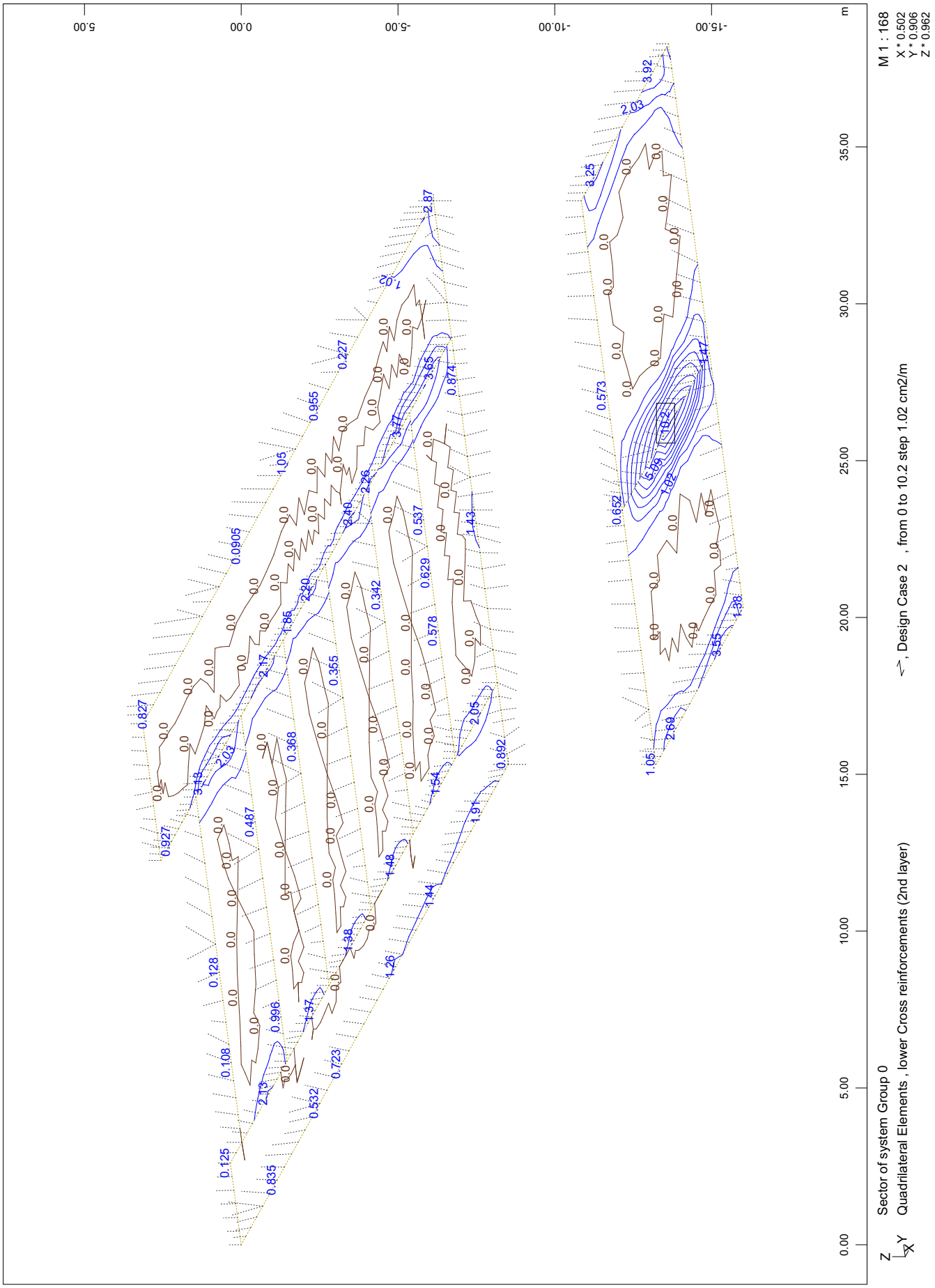
05-ΔΙΥΛΙΣΗ
ΟΠΛΙΣΜΟΙ ΘΕΜΕΛΙΩΣΗΣ ΥΠΟΓΕΙΟΥ / BASEMENT SLABS REINFORC
ΟΚΛ/SLS : LCR 3 (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)
ΟΚΑ/ULS (ΣΕΙΣΜΟΣ/EQ) : LCR 2



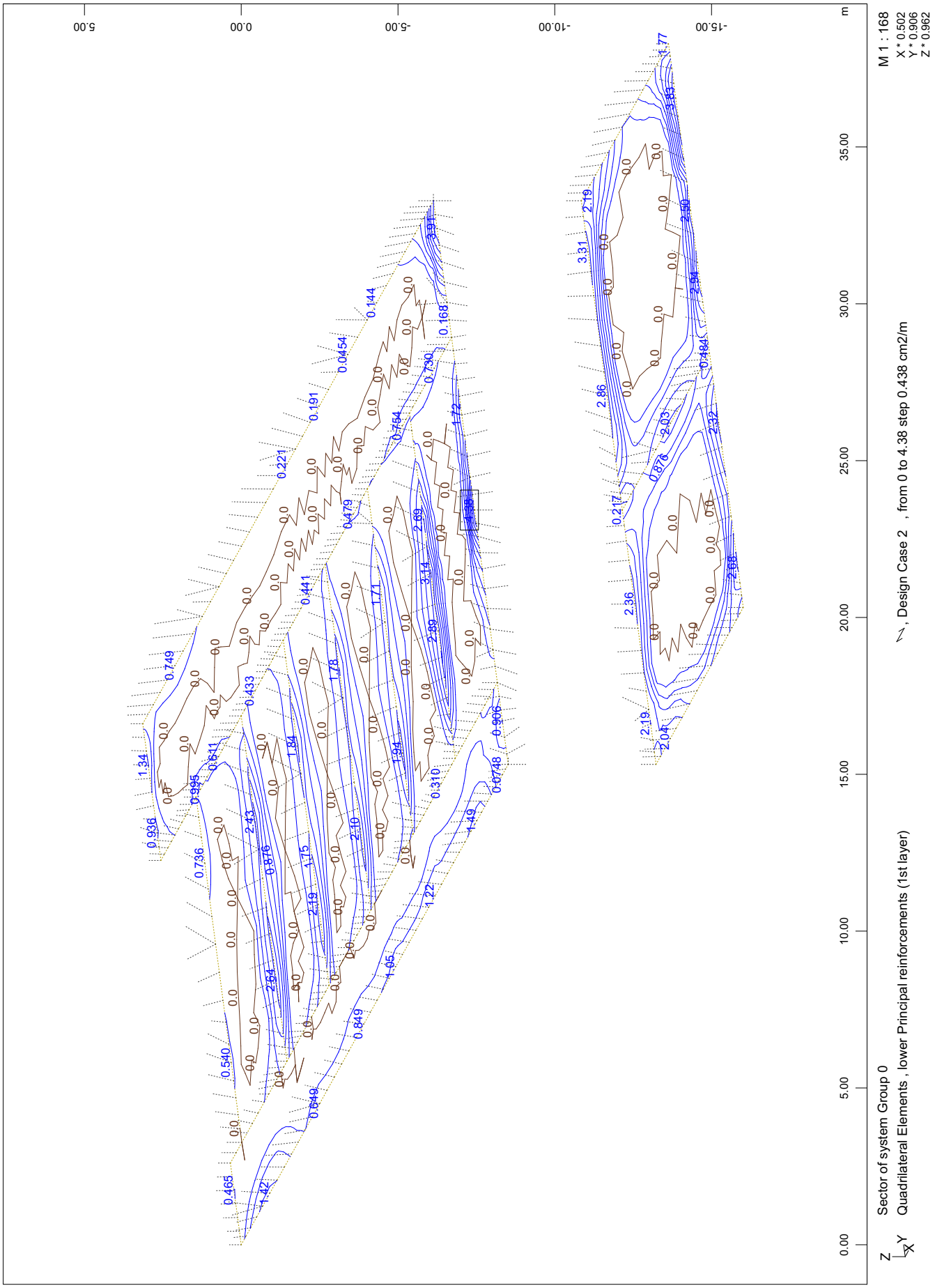
05-ΔΙΥΛΙΣΗ
ΟΠΛΙΣΜΟΙ ΘΕΜΕΛΙΩΣΗΣ ΥΠΟΓΕΙΟΥ / BASEMENT SLABS REINFORC
ΟΚΛ/SLS : LCR 3 (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)
ΟΚΑ/ULS (ΣΕΙΣΜΟΣ/EQ) : LCR 2



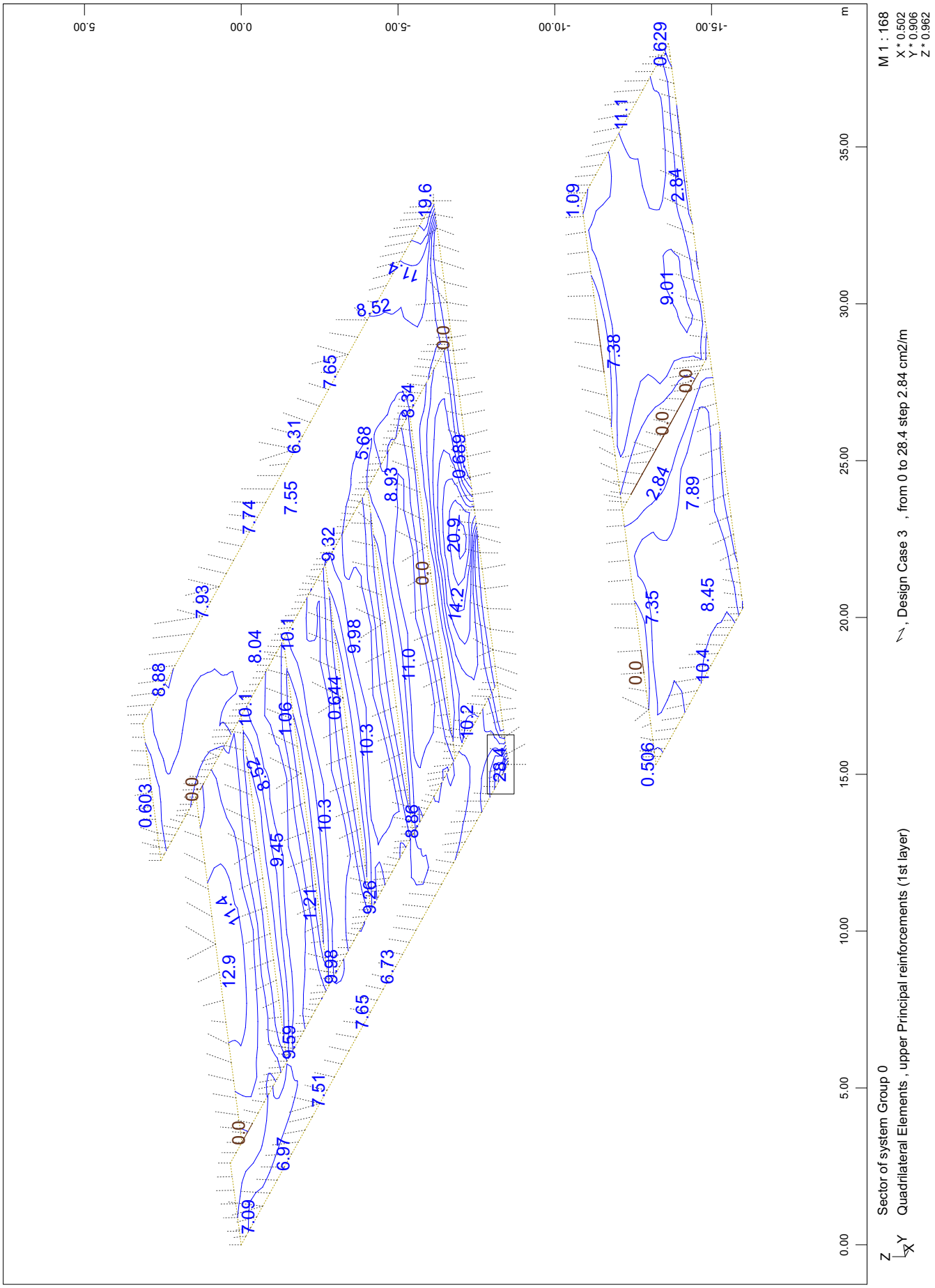
05-ΔΙΥΛΙΣΗ
ΟΠΛΙΣΜΟΙ ΘΕΜΕΛΙΩΣΗΣ ΥΠΟΓΕΙΟΥ / BASEMENT SLABS REINFORC
ΟΚΛ/SLS : LCR 3 (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)
ΟΚΑ/ULS (ΣΕΙΣΜΟΣ/EQ) : LCR 2



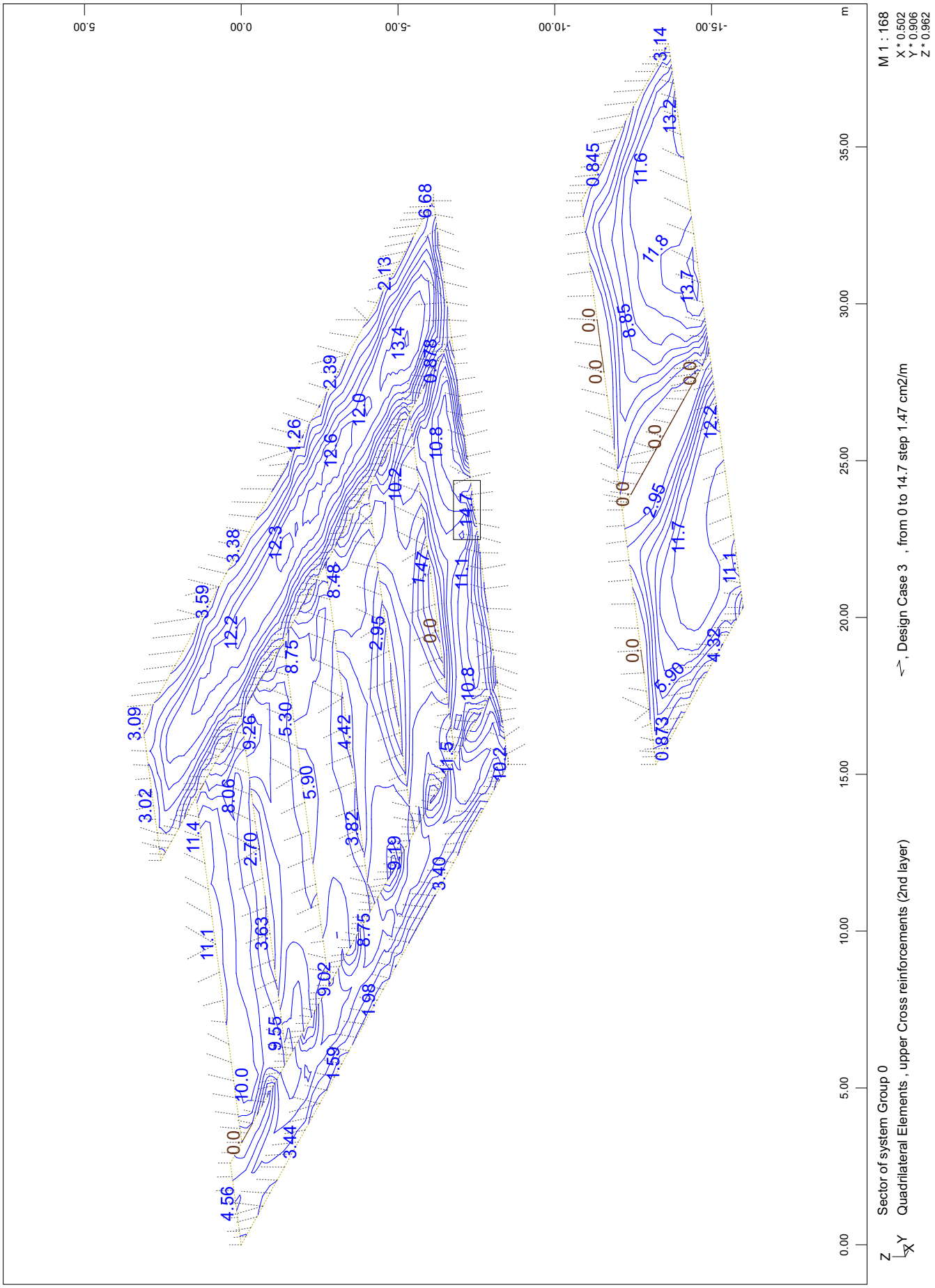
05-ΔΙΥΛΙΣΗ
ΟΠΛΙΣΜΟΙ ΘΕΜΕΛΙΩΣΗΣ ΥΠΟΓΕΙΟΥ / BASEMENT SLABS REINFORC
ΟΚΛ/SLS : LCR 3 (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)
ΟΚΑ/ULS (ΣΕΙΣΜΟΣ/EQ) : LCR 2



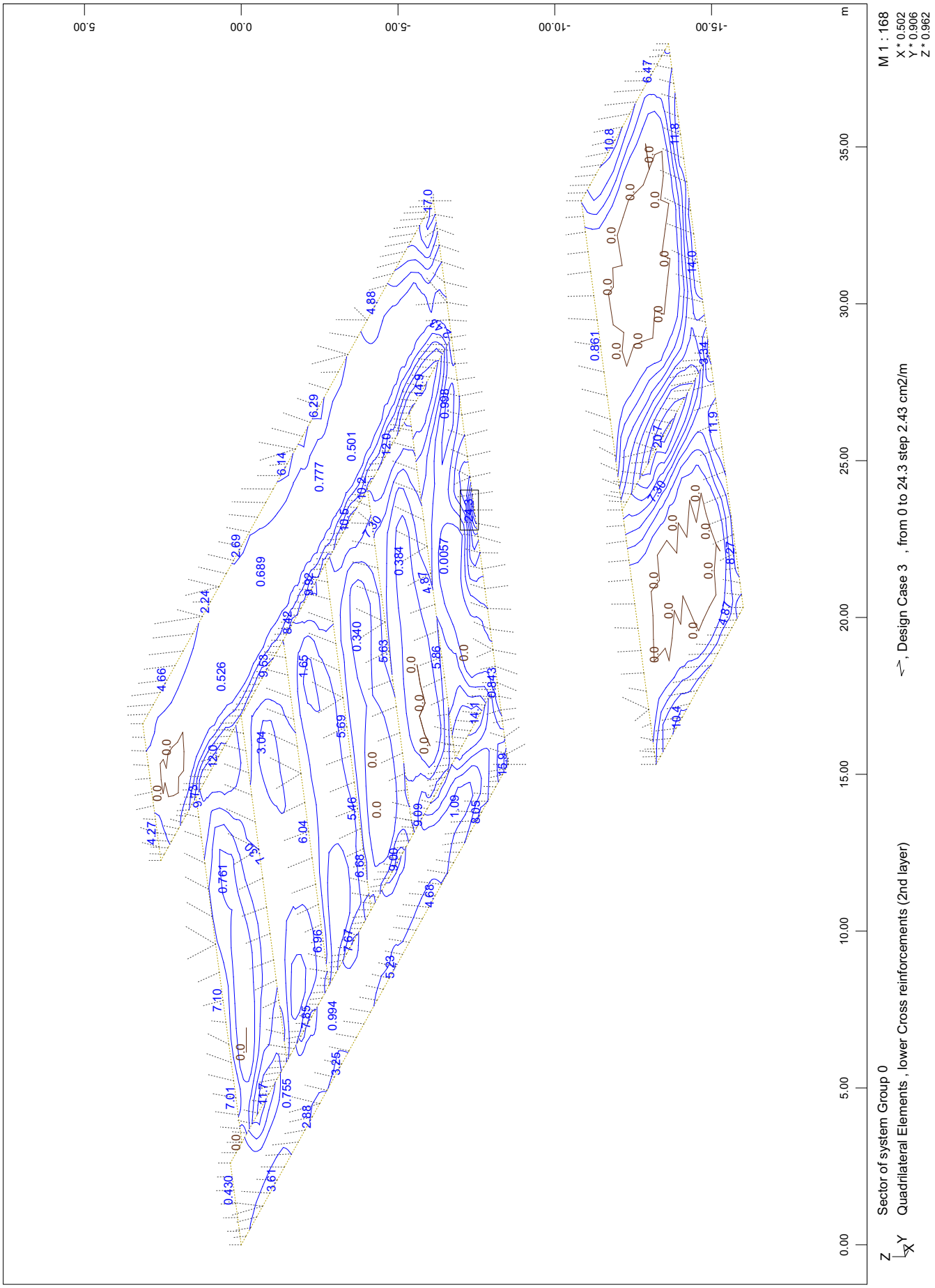
05-ΔΙΥΛΙΣΗ
ΟΠΛΙΣΜΟΙ ΘΕΜΕΛΙΩΣΗΣ ΥΠΟΓΕΙΟΥ / BASEMENT SLABS REINFORC
ΟΚΛ/SLS : LCR 3 (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)
ΟΚΑ/ULS (ΣΕΙΣΜΟΣ/EQ) : LCR 2



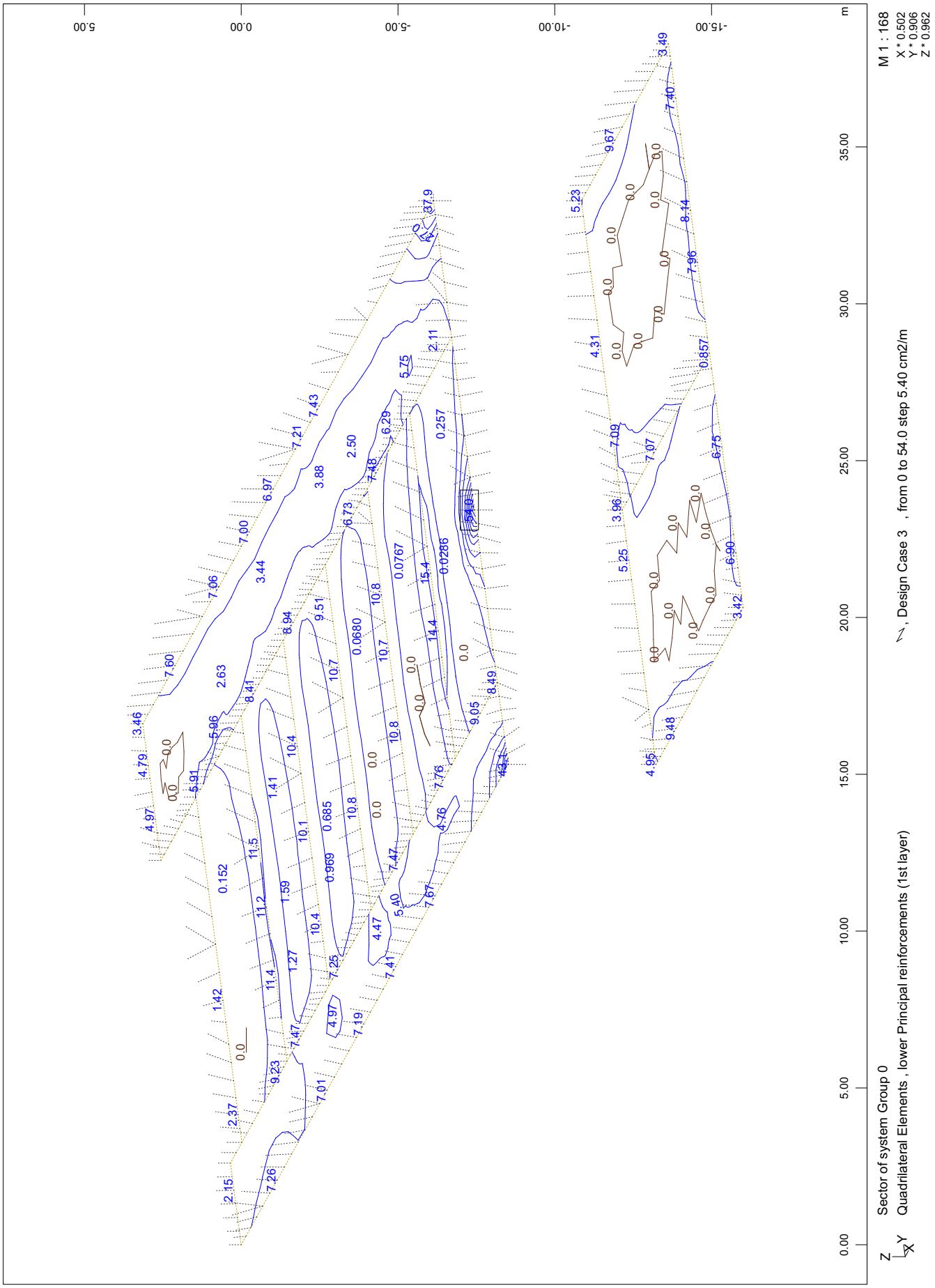
05-ΔΙΥΛΙΣΗ
ΟΠΛΙΣΜΟΙ ΘΕΜΕΛΙΩΣΗΣ ΥΠΟΓΕΙΟΥ / BASEMENT SLABS REINFORC
ΟΚΛ/SLS : LCR 3 (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)
ΟΚΑ/ULS (ΣΕΙΣΜΟΣ/EQ) : LCR 2



05-ΔΙΥΛΙΣΗ
ΟΠΛΙΣΜΟΙ ΘΕΜΕΛΙΩΣΗΣ ΥΠΟΓΕΙΟΥ / BASEMENT SLABS REINFORC
ΟΚΛ/SLS : LCR 3 (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)
ΟΚΑ/ULS (ΣΕΙΣΜΟΣ/EQ) : LCR 2



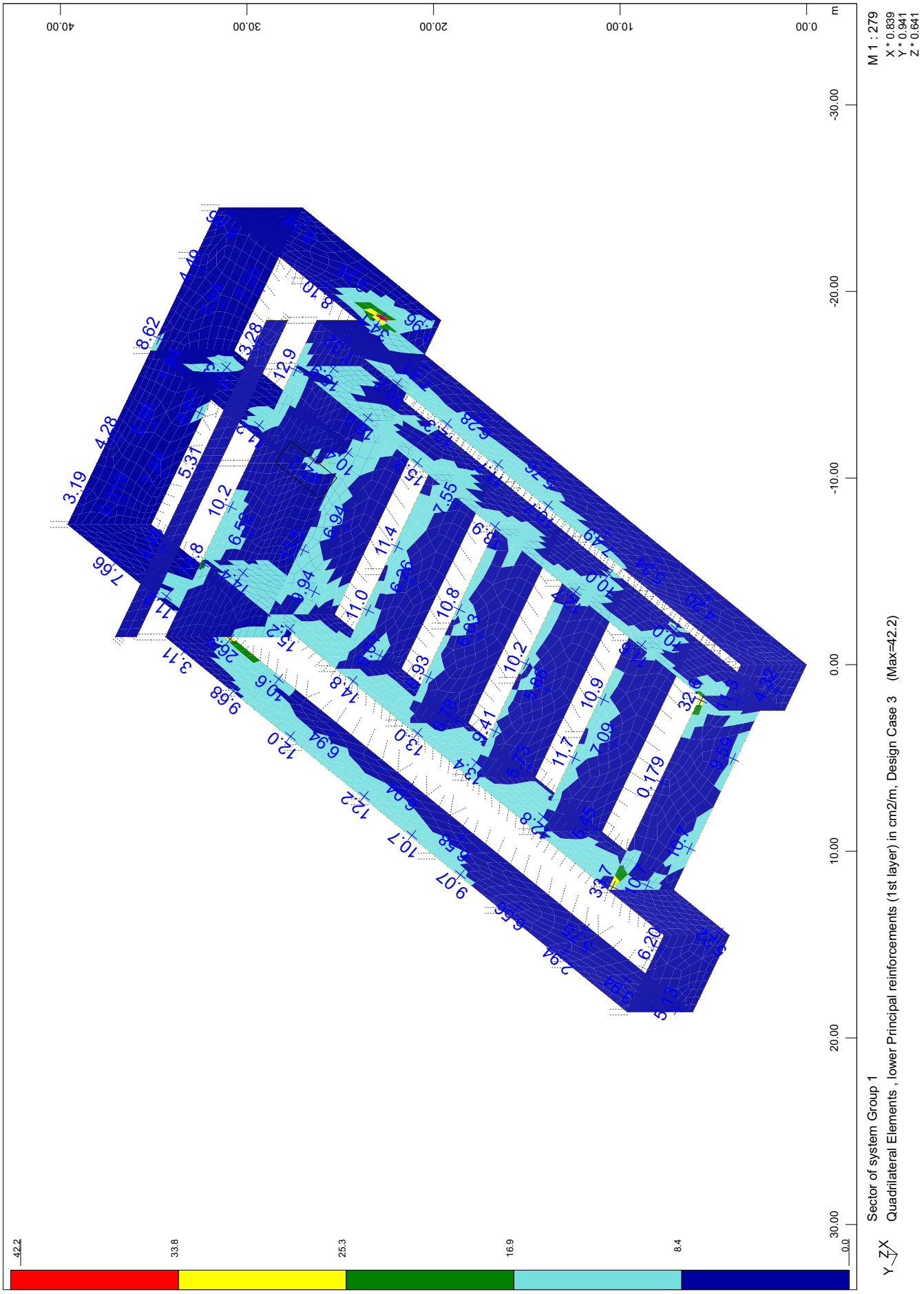
05-ΔΙΥΛΙΣΗ
ΟΠΛΙΣΜΟΙ ΘΕΜΕΛΙΩΣΗΣ ΥΠΟΓΕΙΟΥ / BASEMENT SLABS REINFORC
ΟΚΛ/SLS : LCR 3 (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)
ΟΚΑ/ULS (ΣΕΙΣΜΟΣ/EQ) : LCR 2



05-ΔΙΥΛΙΣΗ

ΟΠΛΙΣΜΟΙ ΤΟΙΧΩΜΑΤΩΝ ΔΕΞΑΜΕΝΩΝ/TANK WALLS REINFORCEMENTS

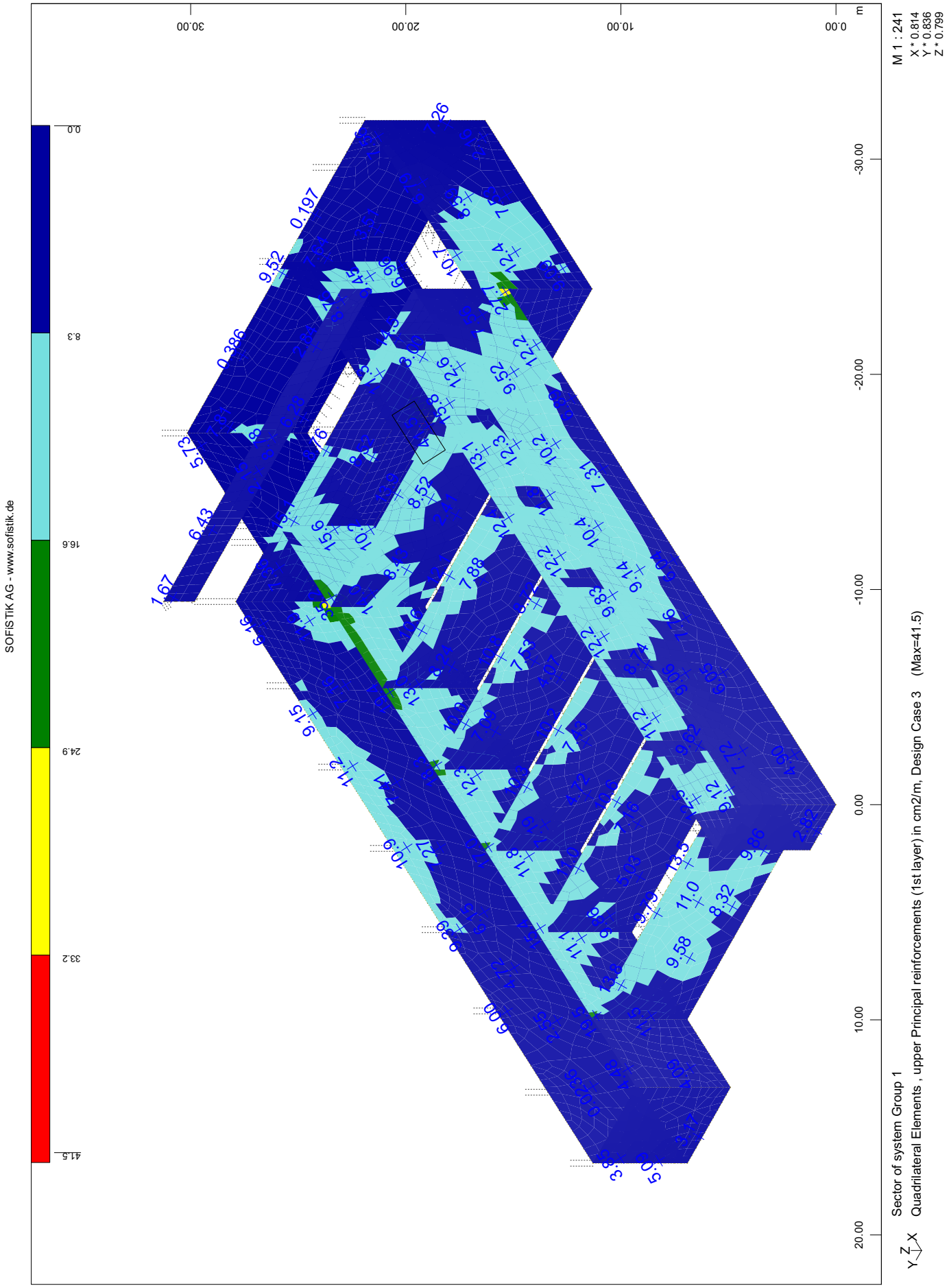
ΟΚΛ/SLS : LCR 3 (Wk<0.20mm) (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)



05-ΔΙΥΛΙΣΗ

ΟΠΛΙΣΜΟΙ ΤΟΙΧΩΜΑΤΩΝ ΔΕΞΑΜΕΝΩΝ/TANK WALLS REINFORCEMENTS

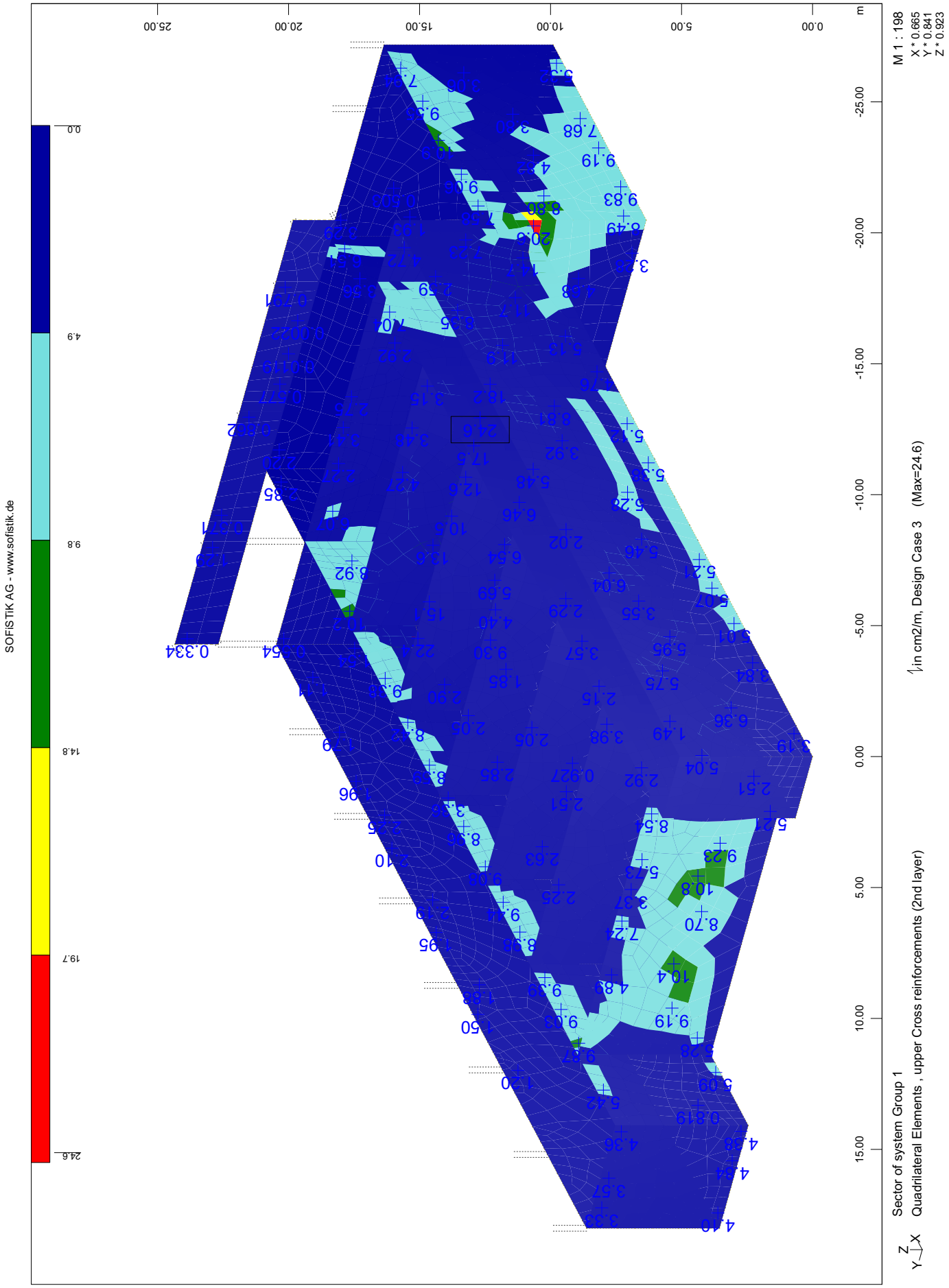
ΟΚΛ/SLS : LCR 3 (Wk<0.20mm) (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)



05-ΔΙΥΛΙΣΗ

ΟΠΛΙΣΜΟΙ ΤΟΙΧΩΜΑΤΩΝ ΔΕΞΑΜΕΝΩΝ/TANK WALLS REINFORCEMENTS

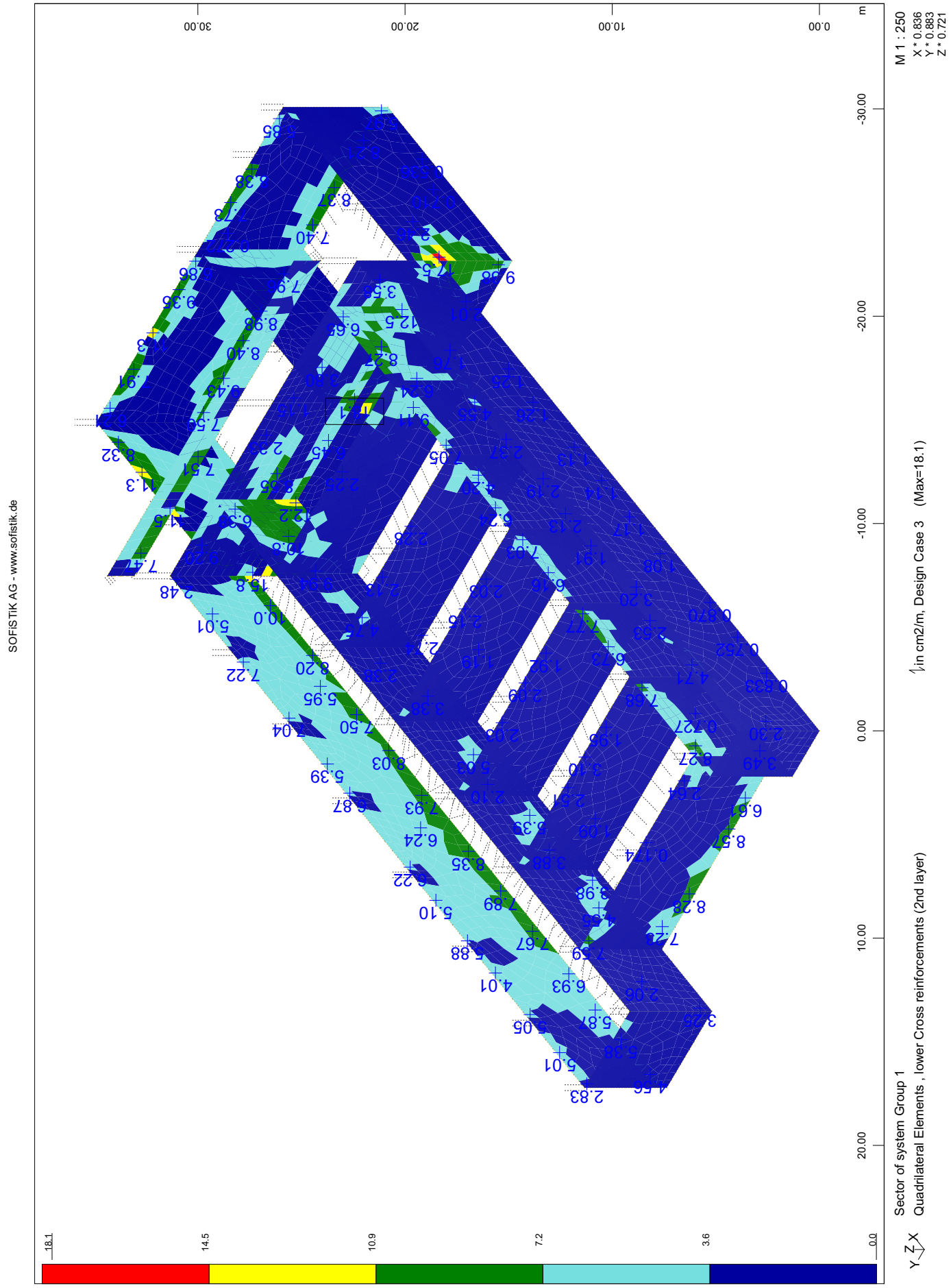
ΟΚΛ/SLS : LCR 3 (Wk<0.20mm) (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)



05-ΔΙΥΛΙΣΗ

ΟΠΛΙΣΜΟΙ ΤΟΙΧΩΜΑΤΩΝ ΔΕΞΑΜΕΝΩΝ/TANK WALLS REINFORCEMENTS

ΟΚΛ/SLS : LCR 3 (Wk<0.20mm) (ΟΚΑ LCR 1 ΠΕΡΙΛΑΜΒΑΝΕΤΑΙ/ULS INCLUDED)



05-ΔΙΥΛΙΣΗ
ULS design beams

Selected Beam Elements

FROM	TO	INC	X-VALUE	NC	MEMBER	CS0	CS1	CS2	CS3	CS4	CS5
all elements											

Default design code is EuroNorm EN 1992 (2004) Concrete Structures (Europe) V 30.0
Structure and Tab.7.1N: AN (Buildings)
Snow load zone : 1

Materials

No. 1 C 25/30 (EN 1992)
No. 2 B 500 C (EN 1992)
No. 3 C 20/25 (EN 1992)
No. 4 C 30/37 (EN 1992)
No. 5 C 25/30 (EN 1992)DUMMY

All moments will be smoothed out between face and support
Reinforcement will be accounted for sectional values as defined in AQUA
Reinforcements saved as design case LCR 10

Considered Load Cases

101 102 103 104

Ultimate Load Design

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

Safety factors	SC-1	SC-2	SC-S	SS-1	SS-2	SS-S	PIIa
	1.50	1.50	1.50	1.15	1.15	1.00	7

Strain limits	C1	C2	S1	S2	Z1	Z2
max	-3.50	-2.00	δ= 1.00	45.00	-3.50	20.00

parameters for reinforcements

Minimum reinforcements Bending.	Compress.	compression e/d	N/Npl	min. reinforcem. requ. section	maximum- reinforc.
0.13 [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 factors
Material of reinforcements uses Ultimate Limit strain-stress law with individual safety factors

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	-14.17	-2.00	0.00	0.00	
2	0	1.150	-500.00	-75.00	500.00	75.00	
3	0	1.500	-13.33	-2.00	0.00	0.00	
4	0	1.500	-20.00	-2.00	0.00	0.00	
5	0	1.500	-14.17	-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 / 1.00

MNo	f-cd [MPa]	tau-rd [MPa]	sigIIQ [MPa]	sigIIT [MPa]	sigIIQ+T [MPa]	fyd [MPa]
1	14.17	0.12	7.65	7.65	7.65	
2						434.78
3	13.33	0.12	7.36	7.36	7.36	
4	20.00	0.12	10.56	10.56	10.56	
5	14.17	0.12	7.65	7.65	7.65	

Tolerance for exceeding maximum shear or principal compression stress 0.0200

05-ΔΙΥΛΙΣΗ
ULS design beams

Selected Beam Elements

FROM	TO	INC	X-VALUE	NC	MEMBER	CS0	CS1	CS2	CS3	CS4	CS5
all elements											

Default design code is EuroNorm EN 1992 (2004) Concrete Structures (Europe) V 30.0
Structure and Tab.7.1N: AN (Buildings)
Snow load zone : 1

Materials

No. 1 C 25/30 (EN 1992)
No. 2 B 500 C (EN 1992)
No. 3 C 20/25 (EN 1992)
No. 4 C 30/37 (EN 1992)
No. 5 C 25/30 (EN 1992)DUMMY

All moments will be smoothed out between face and support
Reinforcement will be accounted for sectional values as defined in AQUA
Reinforcements saved as design case LCR 11

Considered Load Cases

201 202

Ultimate Load Design

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

Safety factors	SC-1	SC-2	SC-S	SS-1	SS-2	SS-S	PIIa
	1.50	1.50	1.50	1.15	1.15	1.00	7

Strain limits	C1	C2	S1	S2	Z1	Z2
max	-3.50	-2.00	δ= 1.00	45.00	-3.50	20.00

parameters for reinforcements

Minimum reinforcements Bending.	Compress.	e/d	N/Npl	compression requ.	min. reinforcem. section	maximum- reinforc.
0.13 [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 factors
Material of reinforcements uses Ultimate Limit strain-stress law with individual safety factors

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	-14.17	-2.00	0.00	0.00	
2	0	1.150	-500.00	-75.00	500.00	75.00	
3	0	1.500	-13.33	-2.00	0.00	0.00	
4	0	1.500	-20.00	-2.00	0.00	0.00	
5	0	1.500	-14.17	-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 / 1.00

MNo	f-cd [MPa]	tau-rd [MPa]	sigIIQ [MPa]	sigIIT [MPa]	sigIIQ+T [MPa]	fyd [MPa]
1	14.17	0.12	7.65	7.65	7.65	
2						434.78
3	13.33	0.12	7.36	7.36	7.36	
4	20.00	0.12	10.56	10.56	10.56	
5	14.17	0.12	7.65	7.65	7.65	

Tolerance for exceeding maximum shear or principal compression stress 0.0200

05-ΔΙΥΛΙΣΗ
CRACK CONTROL W<0.30mm BEAMS

Selected Beam Elements

FROM	TO	INC	X-VALUE	NC	MEMBER	CS0	CS1	CS2	CS3	CS4	CS5
all elements											

Default design code is EuroNorm EN 1992 (2004) Concrete Structures (Europe) V 30.0
Structure and Tab.7.1N: AN (Buildings)
Snow load zone : 1

Materials

No. 1 C 25/30 (EN 1992)
No. 2 B 500 C (EN 1992)
No. 3 C 20/25 (EN 1992)
No. 4 C 30/37 (EN 1992)
No. 5 C 25/30 (EN 1992)DUMMY

All moments will be smoothed out between face and support
Reinforcement will be accounted for sectional values as defined in AQUA
Reinforcements saved as design case LCR 12

Considered Load Cases

301

Ultimate Load Design

==========

Design for unfactured loads EuroNorm EN 1992 (2004) Concrete Structures
Biaxial bending

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

Strain limits	C1	C2	S1	S2	Z1	Z2
max	-3.50	-2.00	3.00	10.00	-3.50	10.00

parameters for reinforcements

Minimum reinforcements		compression		min. reinforcem.	maximum-
Bending.	Compress.	e/d	N/Npl	requ. section	reinforc.
0.00 [o/o]	0.30 [o/o]	3.50	0.0010	0.00	0.15	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 factors
Material of reinforcements uses Ultimate Limit strain-stress law with individual safety factors

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	-14.17	-2.00	0.00	0.00	
2	0	1.150	-500.00	-75.00	500.00	75.00	
3	0	1.500	-13.33	-2.00	0.00	0.00	
4	0	1.500	-20.00	-2.00	0.00	0.00	
5	0	1.500	-14.17	-2.00	0.00	0.00	

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 factors

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	-33.00	-2.07	0.00	0.00	
2	0	1.000	-575.00	-75.00	575.00	75.00	
3	0	1.000	-28.00	-1.97	0.00	0.00	
4	0	1.000	-38.00	-2.16	0.00	0.00	
5	0	1.000	-33.00	-2.07	0.00	0.00	

Interaction thin walled normal- and shearstress via Prandtl flow rule

05-ΔΙΥΛΙΣΗ
ULS design beams

Selected Beam Elements

FROM	TO	INC	X-VALUE	NC	MEMBER	CS0	CS1	CS2	CS3	CS4	CS5
all elements											

Default design code is EuroNorm EN 1992 (2004) Concrete Structures (Europe) V 30.0
Structure and Tab.7.1N: AN (Buildings)
Snow load zone : 1

Materials

No. 1 C 25/30 (EN 1992)
No. 2 B 500 C (EN 1992)
No. 3 C 20/25 (EN 1992)
No. 4 C 30/37 (EN 1992)
No. 5 C 25/30 (EN 1992)DUMMY

All moments will be smoothed out between face and support
Reinforcement will be accounted for sectional values as defined in AQUA
Reinforcements saved as design case LCR 20

Considered Load Cases

101 102 103 104 201 202

Ultimate Load Design

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

Safety factors	SC-1	SC-2	SC-S	SS-1	SS-2	SS-S	PIIa
	1.50	1.50	1.50	1.15	1.15	1.00	7

Strain limits	C1	C2	S1	S2	Z1	Z2
max	-3.50	-2.00	δ= 1.00	45.00	-3.50	20.00

parameters for reinforcements

Minimum reinforcements Bending.	Compress.	compression e/d	N/Npl	min. reinforcem. requ. section	maximum- reinforc.
0.13 [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 factors
Material of reinforcements uses Ultimate Limit strain-stress law with individual safety factors

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	-14.17	-2.00	0.00	0.00	
2	0	1.150	-500.00	-75.00	500.00	75.00	
3	0	1.500	-13.33	-2.00	0.00	0.00	
4	0	1.500	-20.00	-2.00	0.00	0.00	
5	0	1.500	-14.17	-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 / 1.00

MNo	f-cd [MPa]	tau-rd [MPa]	sigIIQ [MPa]	sigIIT [MPa]	sigIIQ+T [MPa]	fyd [MPa]
1	14.17	0.12	7.65	7.65	7.65	
2						434.78
3	13.33	0.12	7.36	7.36	7.36	
4	20.00	0.12	10.56	10.56	10.56	
5	14.17	0.12	7.65	7.65	7.65	

Tolerance for exceeding maximum shear or principal compression stress 0.0200

05-ΔΙΥΛΙΣΗ
CRACK CONTROL W<0.30mm BEAMS

Selected Beam Elements

FROM	TO	INC	X-VALUE	NC	MEMBER	CS0	CS1	CS2	CS3	CS4	CS5
all elements											

Default design code is EuroNorm EN 1992 (2004) Concrete Structures (Europe) V 30.0
Structure and Tab.7.1N: AN (Buildings)
Snow load zone : 1

Materials
No. 1 C 25/30 (EN 1992)
No. 2 B 500 C (EN 1992)
No. 3 C 20/25 (EN 1992)
No. 4 C 30/37 (EN 1992)
No. 5 C 25/30 (EN 1992)DUMMY

All moments will be smoothed out between face and support
Reinforcement will be accounted for sectional values as defined in AQUA
Reinforcements saved as design case LCR 21
Reinforcements superposed with existing design case LCR 20

Considered Load Cases
301

Ultimate Load Design
==========
Design for unfactured loads EuroNorm EN 1992 (2004) Concrete Structures
Biaxial bending

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

Strain limits	C1	C2	S1	S2	Z1	Z2
max	-3.50	-2.00	3.00	10.00	-3.50	10.00

parameters for reinforcements

Minimum reinforcements Bending.	Compress.	compression e/d	N/Npl	min. reinforcem. requ. section	maximum- reinforc.
0.00 [o/o]	0.30 [o/o]	3.50	0.0010	0.00	0.15	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 factors
Material of reinforcements uses Ultimate Limit strain-stress law with individual safety factors

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	-14.17	-2.00	0.00	0.00	
2	0	1.150	-500.00	-75.00	500.00	75.00	
3	0	1.500	-13.33	-2.00	0.00	0.00	
4	0	1.500	-20.00	-2.00	0.00	0.00	
5	0	1.500	-14.17	-2.00	0.00	0.00	

Parameters for nonlinear stresses
Iteration for all forces and moments

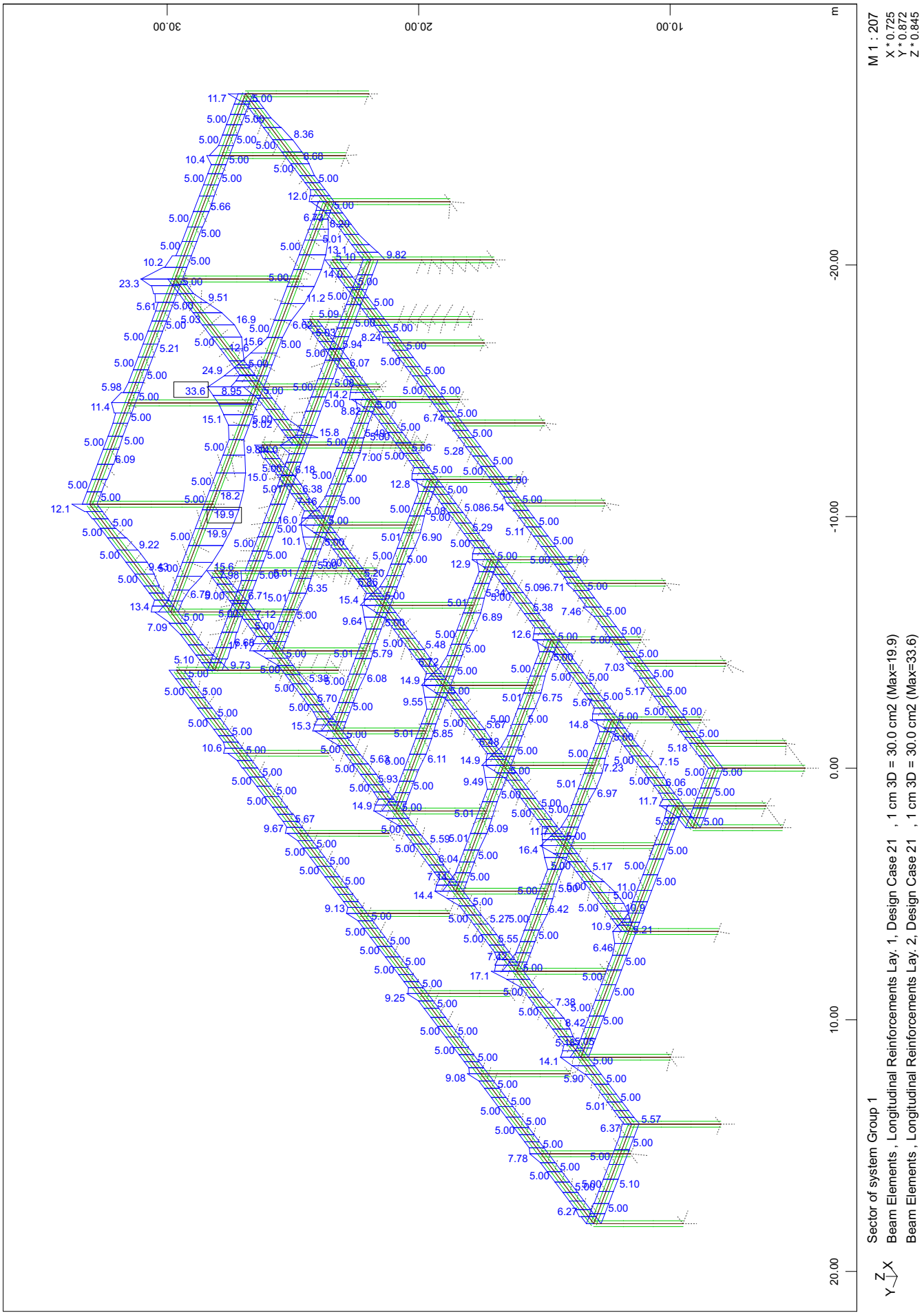
Material of sections uses Serviceability strain-stress law without safety factors
Material of reinforcements uses Serviceability strain-stress law without safety factors

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	-33.00	-2.07	0.00	0.00	
2	0	1.000	-575.00	-75.00	575.00	75.00	
3	0	1.000	-28.00	-1.97	0.00	0.00	
4	0	1.000	-38.00	-2.16	0.00	0.00	
5	0	1.000	-33.00	-2.07	0.00	0.00	

Interaction thin walled normal- and shearstress via Prandtl flow rule

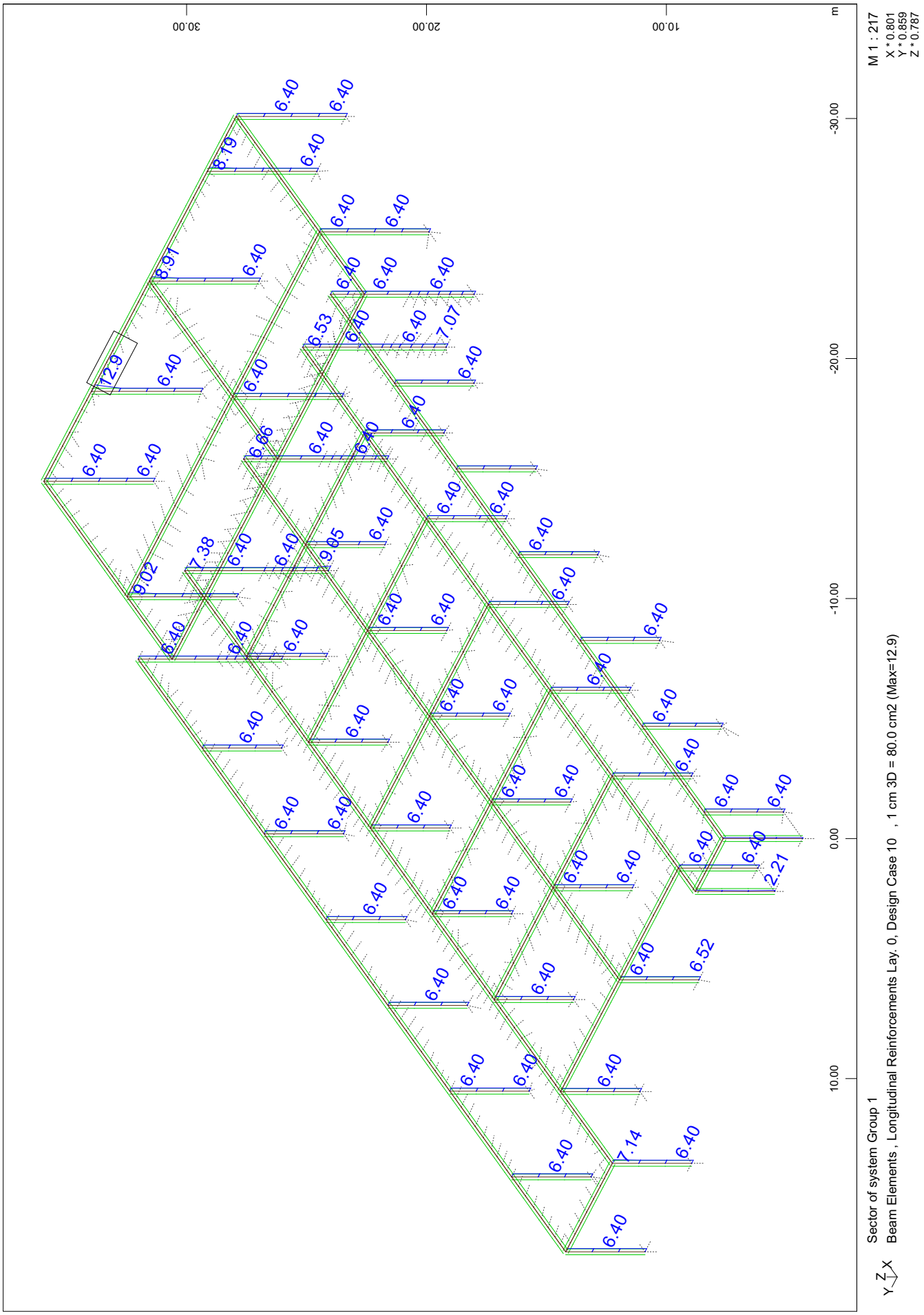
05-ΔΙΥΛΙΣΗ

ΠΕΡΙΒΑΛΛΟΥΣΑ ΟΠΛΙΣΜΩΝ ΔΟΚΩΝ ΟΡΟΦΗΣ (LCR 2



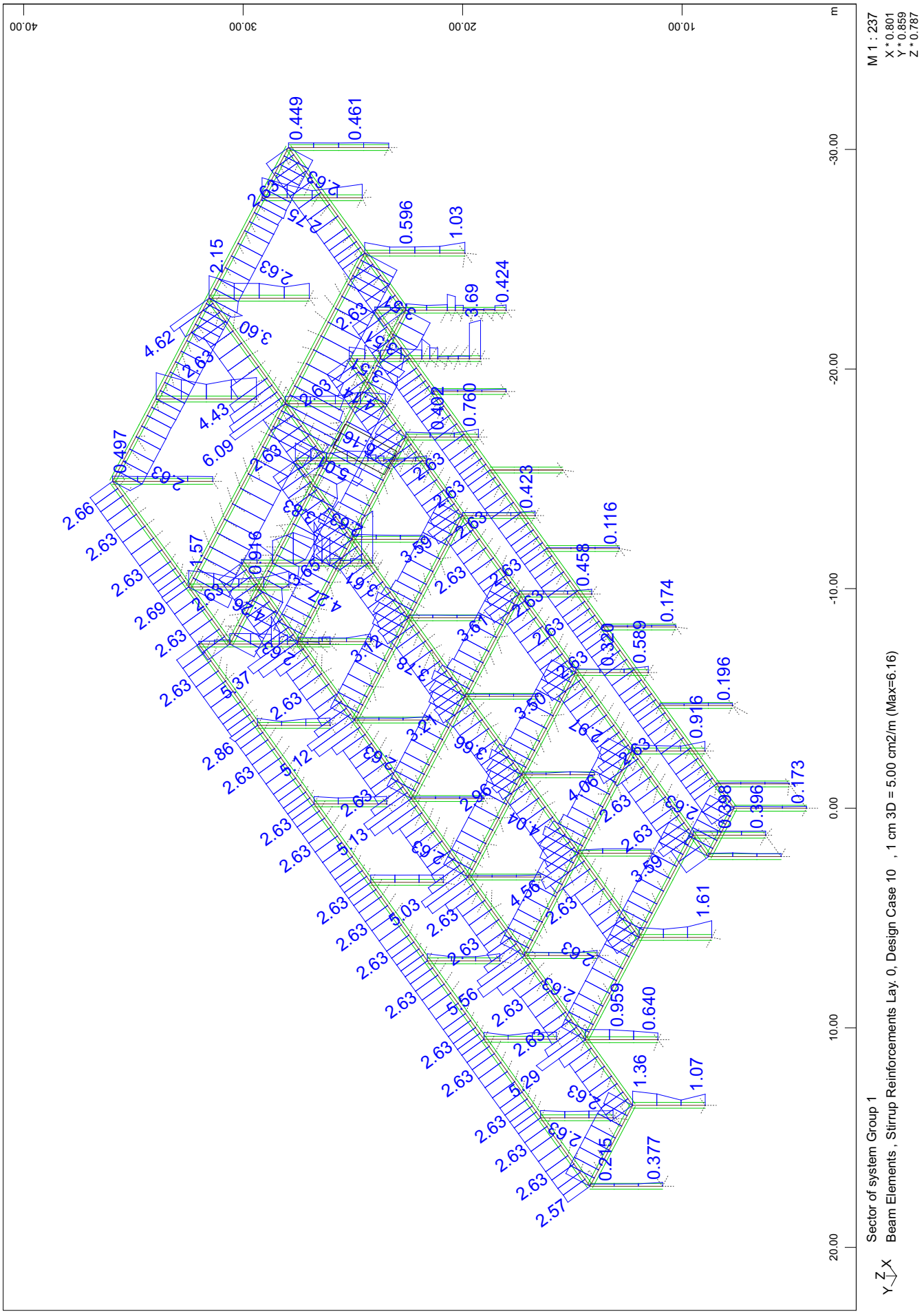
05-ΔΙΥΛΙΣΗ

ΟΠΛΙΣΜΟΙ ΥΠΟΣΤΥΛΩΜΑΤΩΝ ΟΚΑ (LCR 10)



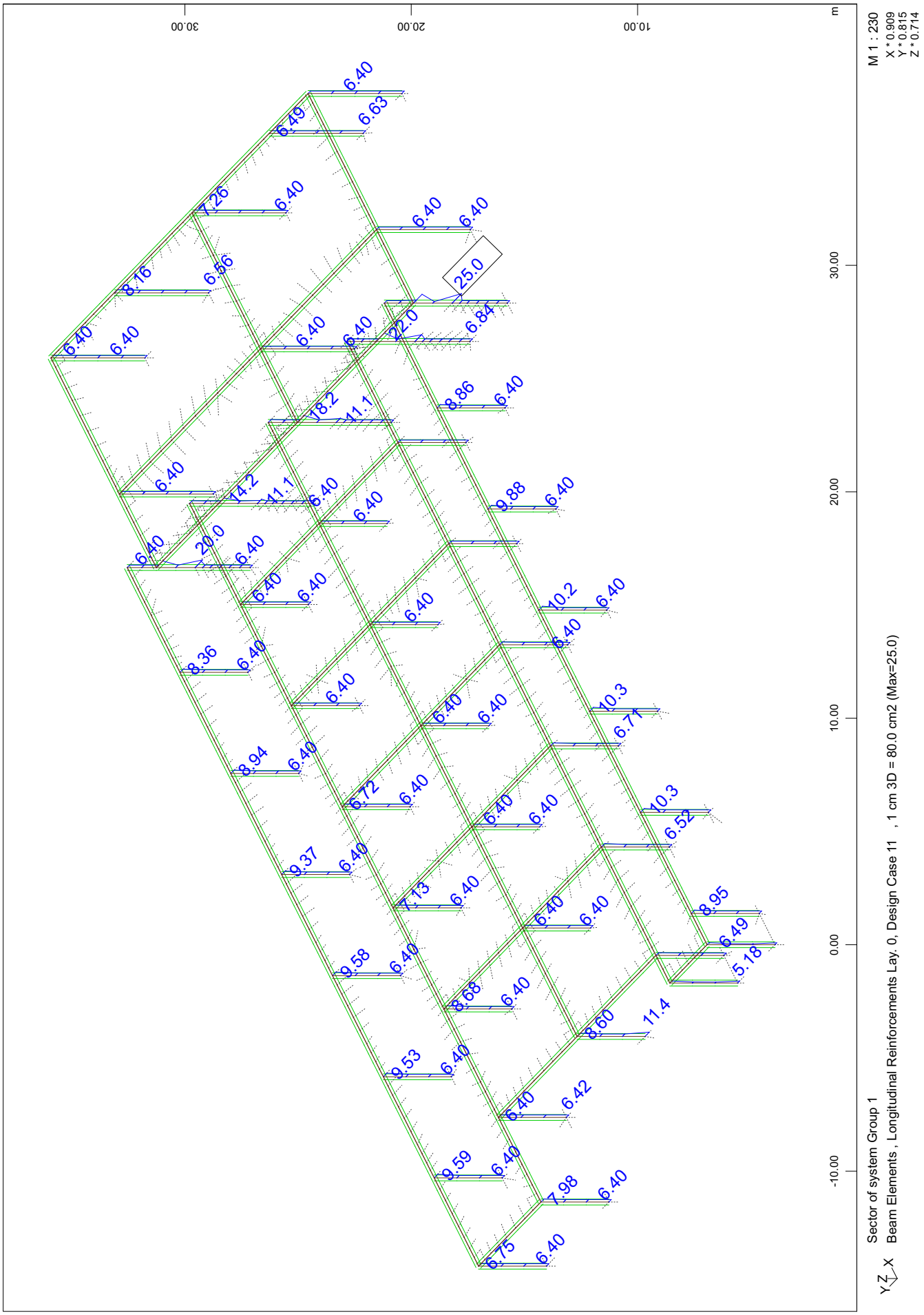
05-ΔΙΥΛΙΣΗ

ΟΠΛΙΣΜΟΙ ΥΠΟΣΤΥΛΩΜΑΤΩΝ ΟΚΑ (LCR 10)



05-ΔΙΥΛΙΣΗ

ΟΠΛΙΣΜΟΙ ΥΠΟΣΤΥΛΩΜΑΤΩΝ ΣΕΙΣΜΟΣ (LCR 11)



05-ΔΙΥΛΙΣΗ

ΟΠΛΙΣΜΟΙ ΥΠΟΣΤΥΛΩΜΑΤΩΝ ΣΕΙΣΜΟΣ (LCR 11)