

Section N-M interaction

Rectangular sections under axial force and bending · EN 1992-1-1 §6.1 · UK NA / PN-EN

Reference	NAE-RC-043 · version 1.0
Standards	BS EN 1992-1-1:2004 with UK NA · PN-EN 1992-1-1:2008 with Polish NA (NDP sources listed on the NDP sheet)
National Annex	Selectable: UK NA to BS EN 1992-1-1 or Polish NA to PN-EN 1992-1-1
Issued	30 October 2026

What it does

Resistance of a rectangular reinforced concrete section to an axial force, in compression or tension, together with a bending moment of either sign: the full N-M interaction diagram by strain compatibility for the top and the bottom face in compression, and the moment resistances at the design axial force.

How to use

1. Open the Calculation sheet and select the National Annex.
2. Fill in the shaded input cells. Everything else is calculated.
3. Read the Results block; every step below it quotes its clause. Print or save as PDF for your calculation package.

Scope and limitations

Rectangular section with one layer of bars at the top and one at the bottom, each with its own number and size (either may be empty). The section is checked as entered: design actions with any second order effects already included (use RC-008 or RC-041 for slender columns). Compression is positive, tension negative; a sagging moment compresses the top face. Minimum eccentricity $e_0 = \max(h/30; 20 \text{ mm})$ of 6.1(4), compression only: calculated here (input Yes) or already included in MEd (No). Where $|M_{Ed}| < N_{Ed} e_0$ the section must resist $N_{Ed} e_0$ in both senses: 6.1(4) is written for symmetrical reinforcement, and applying it in both senses to unequal layers is a conservative extension. Concrete: parabola-rectangle of 3.1.7(1) ($\epsilon_{c2} = 0.002$, $\epsilon_{cu2} = 0.0035$, $n = 2$) with the strain limits of 6.1(5): 0.0035 at the compressed face, or 0.002 at $3h/7$ from it once the whole section is compressed. Bars elastic-plastic (horizontal branch, no strain limit), the concrete displaced by the bars deducted. Resistances from a finite scan of the strain states refined by golden section (largest N) and bisection (roots of $N = N_{Ed}$): every resistance shown is an equilibrium state; a root missed between scan steps can only make it smaller. Concrete classes up to C50/60, $f_{yk} \leq 500 \text{ MPa}$. Detailing, crack widths, shear and side bars are not checked. The second-generation EN 1992-1-1:2023 is not yet implemented.

Further reading and independent cross-check

- The Concrete Centre, How to design concrete structures using Eurocode 2: Columns.
 - The Concrete Centre, Concise Eurocode 2, design charts for columns.
 - The Concrete Centre, RC Spreadsheets v4 (licensed product) can be used as an independent cross-check.
- NA Engineering is not affiliated with The Concrete Centre or CIRIA; their publications are referenced for information only.

About NA Engineering

NA Engineering is a structural engineering consultancy delivering structural design, reinforced concrete modelling and detailing, and steel detailing for residential, commercial, infrastructure, energy and refurbishment projects. We share tools like this one because good engineering should be transparent: every formula here is visible and referenced. If you need a design, a check or a full detailing package, talk to us.

Website	naengineering.uk
Email	adrian@naengineering.uk
Phone	+48 505 844 422
LinkedIn	linkedin.com/company/naengineering

Disclaimer

This spreadsheet is provided free of charge, as is, for use by competent engineers. It does not replace engineering judgement. The user is responsible for the input, for checking that the method suits the element being designed and for verifying the results. NA Engineering accepts no liability for any loss arising from its use. Sheets are password-protected and the workbook structure is locked so that the formulas and the NA Engineering details cannot be changed; only the shaded input cells can be edited.

Revision history

v1.0	30 Oct 2026 · First issue
------	---------------------------

Project
Element
Date

Job no.
Made by
Checked

Inputs · section

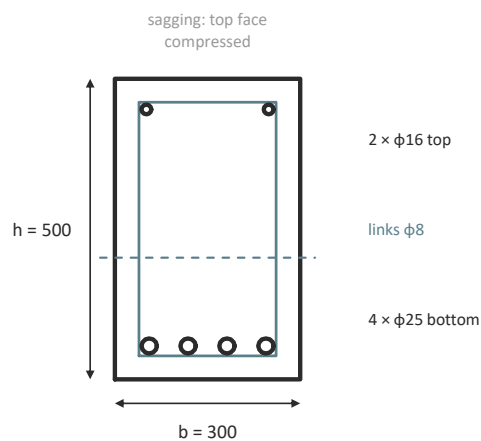
Shaded cells only

	National Annex		UK NA (BS EN)	
Table 3.1	Concrete strength class		C32/40	
3.2.2	Reinforcement characteristic yield strength (≤ 500 MPa)	f_{yk}	500	MPa
8.2(2)	Maximum aggregate size	d_g	20	mm
	Section width b	b	300	mm
	Section depth h	h	500	mm
4.4.1	Nominal cover to links	c_{nom}	35	mm
	Link diameter (0: no links, cover to the bars)	ϕ_w	8	mm
	Top bars (number)	n_t	2	
	Top bar diameter	ϕ_t	16	mm
	Bottom bars (number)	n_b	4	
	Bottom bar diameter	ϕ_b	25	mm

Inputs · design actions

ULS, second order effects included

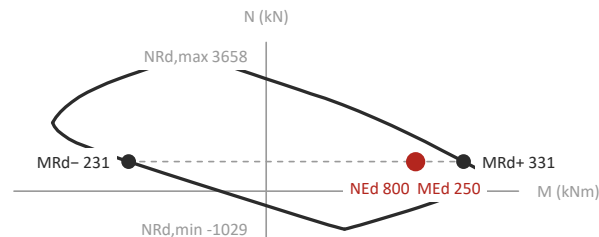
	Design axial force (compression +, tension -)	N_{Ed}	800	kN
	Design moment (sagging +, hogging -)	M_{Ed}	250.0	kNm
6.1(4)	Minimum eccentricity e_0 of 6.1(4) (No: already in M_{Ed})		Yes	
	Inputs valid and consistent			OK

Your section, to scale · neutral axis at the resistance for N_{Ed} in the sense of M_{Ed} (dashed)


Results

Section (NEd, MEd) inside the N-M curve	M_{Ed}	250.0	kNm	OK
Sagging moment resistance at NEd	M_{Rd+}	330.7	kNm	
Hogging moment resistance at NEd	M_{Rd-}	230.9	kNm	
Axial force $NR_{d,min} \leq N_{Ed} \leq NR_{d,max}$	N_{Ed}	800	kN	OK
Minimum eccentricity moment $N_{Ed} e_0$	M_{min}	16.0	kNm	As entered
Clear gap between bars (least: in each layer and between	a	38	mm	OK

N-M interaction · sagging M positive, hogging negative · design point (red) · resistances at NEd



Calculation · materials and section

2.4.2.4(1)	Partial factor, concrete	γ_c	1.50	NDP sheet
2.4.2.4(1)	Partial factor, reinforcement	γ_s	1.15	NDP sheet
3.1.6(1)	Coefficient on compressive strength (flexure)	α_{cc}	0.85	NDP sheet
Table 3.1	Characteristic cylinder strength	f_{ck}	32	MPa
Table 3.1	Mean tensile strength	f_{ctm}	3.02	MPa
3.1.6(1)	Design compressive strength $\alpha_{cc} f_{ck} / \gamma_c$	f_{cd}	18.13	MPa
3.2.7	Design yield strength	f_{yd}	434.8	MPa
	Gross area $b h$	A_c	150000	mm ²
	Top bars $n_t \pi \phi_t^2 / 4$	$A_{s,t}$	402	mm ²
	Bottom bars $n_b \pi \phi_b^2 / 4$	$A_{s,b}$	1963	mm ²
	Total reinforcement	A_s	2366	mm ²
	Depth of the top bars from the top face $c + \phi_w + \phi_t / 2$	d_t	51.0	mm
	Effective depth to the bottom bars $h - c - \phi_w - \phi_b / 2$	d	444.5	mm

Calculation · resistances (see the Interaction sheet)

6.1(5)	Largest N, top face compressed (scan, golden section)	$N_{max,S}$	3623.4	kN	
6.1(5)	Largest N, bottom face compressed (scan, golden section)	$N_{max,H}$	3658.4	kN	
6.1	Axial resistance in compression (the larger)	$N_{Rd,max}$	3658	kN	
6.1	Axial resistance in tension –As f _{yd}	$N_{Rd,min}$	-1029	kN	
	Largest sampled moment on the curves (scale of the chart)	M_{max}	362.3	kNm	
6.1	Axial force $NR_{d,min} \leq N_{Ed} \leq NR_{d,max}$	N_{Ed}	800	kN	OK
6.1	Top face compressed, $x \leq h$: moment at $N = N_{Ed}$ (when $N(h) \geq N$)	M_S	330.7	kNm	
6.1	Neutral axis depth from the top face	x_+	298	mm	
6.1	Bottom face compressed, $x \leq h$: moment at $N = N_{Ed}$ (when $N(h) \leq N$)	M_H	230.9	kNm	
6.1	Neutral axis depth from the bottom face	x_-	96	mm	

6.1	Top face compressed, $x \geq h$: scan steps where N passes NEd		0	
6.1	moments solved in the brackets of the largest and the smallest interpolated	–		kNm
6.1	Bottom face compressed, $x \geq h$: scan steps where N passes NEd		0	
6.1	moments solved in the brackets of the largest and the smallest interpolated	–		kNm
6.1	Sagging resistance at NEd (largest signed moment of the equilibrium)	M_{Rd+}	330.7	kNm
6.1	Hogging resistance at NEd (minus the smallest signed moment)	M_{Rd-}	230.9	kNm

Calculation · design moments and checks

6.1(4)	Minimum eccentricity $\max(h/30; 20 \text{ mm})$	e_0	20.0	mm	
6.1(4)	Minimum moment NEd e_0 (compression, when applied)	M_{min}	16.0	kNm	
6.1(4)	Sagging moment to resist (NEd e_0 when $ M_{Ed} < NEd e_0$)	M_{Ed+}	250.0	kNm	
6.1(4)	Hogging moment to resist ($-M_{Ed}$, or NEd e_0)	M_{Ed-}	-250.0	kNm	
6.1	Sagging $M_{Ed+} \leq MR_{d+}$	M_{Ed+}	250.0	kNm	OK
6.1	Hogging $M_{Ed-} \leq MR_{d-}$	M_{Ed-}	-250.0	kNm	OK

Calculation · bar spacing (8.2, a warning only)

8.2(2)	Least clear gap, top bars $\max(\phi_t; d_g + 5; 20)$	$a_{min,t}$	25	mm	
	Clear gap between top bars (9999: one bar or none)	a_t	182.0	mm	
8.2(2)	Least clear gap, bottom bars $\max(\phi_b; d_g + 5; 20)$	$a_{min,b}$	25	mm	
	Clear gap between bottom bars (9999: one bar or none)	a_b	38.0	mm	
8.2(2)	Least clear gap between the layers $\max(\phi_t; \phi_b; d_g + 5; 20)$	$a_{min,v}$	25	mm	
	Clear vertical gap between the layers $h - 2(c + \phi_w) - \phi_t - \phi_b$ (9999: one bar or none)	a_v	373.0	mm	

At NEd the section resists every moment from $-MR_{d-}$ to MR_{d+} . A negative MR_{d+} or MR_{d-} only means that the interval lies on one side of zero: with unequal top and bottom bars the plastic centre is not at mid-depth and moments are taken about the centre of the gross section. Once the whole section is in compression ($x > h$) the pivot of 6.1(5) lowers the strain of a layer above $3h/7$, so N need not rise with x : those states are sampled in 200 steps, the largest N refined by golden section and the roots of $N = NEd$ in the brackets of the extreme interpolated moments solved by bisection. Detailing (9.2, 9.5), shear and crack widths are not checked here; the bar gaps are a warning only.

Prepared with NA Engineering calculation tools · naengineering.uk · adrian@naengineering.uk. Free for use by competent engineers; see the About sheet for scope and disclaimer.

N-M interaction · strain compatibility, EN 1992-1-1 §6.1

Parabola-rectangle of 3.1.7(1), (3.17): $\epsilon_{c2} = 0.002$, $\epsilon_{cu2} = 0.0035$, $n = 2$, $f_{cd} = \alpha_{cc} f_{ck} / \gamma_c$, no tension. Strain limits of 6.1(5), Fig. 6.1: 0.0035 at the compressed face while $x \leq h$; once the whole section is compressed, 0.002 at $3h/7$ from that face, down to the uniform 0.002. Bars elastic-plastic, $E_s = 200$ GPa, horizontal branch (3.2.7(2)b); the concrete displaced by the bars is deducted at the concrete stress at each bar centre. S: top face compressed (sagging); H: bottom face compressed (hogging), M positive in its own sense unless marked signed (sagging +). M about the centre of the gross section, compression positive. $z_c = \min(x, h)$; $t = (4 z_c / 7) / (x - 3 z_c / 7)$.

	x (mm)	z _c (mm)	N S (kN)	M S (kNm)	N H (kN)	M H (kNm)
1	tension	0	-1028.5	131.3	-1028.5	-131.3
2	5	5	-1006.5	136.7	-1006.5	-125.8
3	15	15	-962.5	147.4	-962.5	-115.1
4	25	25	-918.4	157.6	-918.4	-104.9
5	38	38	-789.9	184.6	-669.4	-54.8
6	50	50	-639.1	215.4	-105.8	55.9
7	63	63	-530.6	237.2	241.8	123.9
8	75	75	-439.2	255.1	487.8	171.7
9	100	100	-282.5	283.8	843.3	238.9
10	125	125	-143.9	306.8	1104.3	285.5
11	150	150	-25.6	323.3	1303.8	317.8
12	175	175	84.5	336.0	1413.9	330.5
13	200	200	194.6	346.3	1524.0	340.8
14	225	225	304.7	354.4	1634.1	348.9
15	250	250	414.8	360.1	1744.2	354.7
16	275	275	531.4	362.3	1854.3	358.1
17	300	300	826.7	327.5	1999.4	352.4
18	325	325	1093.4	296.0	2141.9	344.8
19	350	350	1337.8	266.5	2279.8	335.9
20	375	375	1564.2	238.1	2414.0	325.4
21	400	400	1776.2	210.4	2545.1	313.3
22	425	425	1976.1	182.6	2673.8	299.3
23	450	450	2164.6	154.8	2800.4	283.5
24	475	475	2340.1	127.3	2924.0	266.0
25	500	500	2509.5	98.6	3046.3	246.4
26	525	500	2636.9	75.1	3136.2	230.1
27	550	500	2740.2	56.0	3207.5	217.2
28	600	500	2897.0	27.0	3312.2	198.3
29	675	500	3054.5	-2.3	3412.3	180.1
30	750	500	3159.0	-21.8	3475.2	168.6
31	875	500	3271.1	-42.8	3538.5	157.0
32	1000	500	3341.8	-56.1	3575.7	150.2
33	1250	500	3425.1	-71.8	3616.1	142.8
34	1500	500	3472.3	-80.8	3636.9	138.9
35	2000	500	3523.4	-90.5	3657.4	135.1
36	3000	500	3562.7	-99.9	3649.2	127.6

37	5000	500	3589.3	-106.5	3639.7	122.2
38	12500	500	3610.5	-111.9	3630.2	117.9
39	uniform	500	3623.4	-115.3	3623.4	115.3

The table draws the curves. $x \leq h$ (one root on each face, every strain and so N rising with x): bisection on $s = x / h$ until $N = NEd$.

Top face compressed, $x \leq h$

step	s low	s high	x (mm)	N (kN)	M (kNm)
1	0.000000	1.000000	250.0	414.8	360.1
2	0.500000	1.000000	375.0	1564.2	238.1
3	0.500000	0.750000	312.5	963.2	311.4
4	0.500000	0.625000	281.3	608.3	353.3
5	0.562500	0.625000	296.9	791.5	331.7
6	0.593750	0.625000	304.7	878.6	321.4
7	0.593750	0.609375	300.8	835.4	326.5
8	0.593750	0.601563	298.8	813.5	329.1
9	0.593750	0.597656	297.9	802.5	330.4
10	0.593750	0.595703	297.4	797.0	331.0
11	0.594727	0.595703	297.6	799.8	330.7
12	0.595215	0.595703	297.7	801.1	330.5
13	0.595215	0.595459	297.7	800.4	330.6
14	0.595215	0.595337	297.6	800.1	330.7
15	0.595215	0.595276	297.6	799.9	330.7
16	0.595245	0.595276	297.6	800.0	330.7
17	0.595245	0.595261	297.6	800.0	330.7
18	0.595253	0.595261	297.6	800.0	330.7
19	0.595257	0.595261	297.6	800.0	330.7
20	0.595257	0.595259	297.6	800.0	330.7
21	0.595258	0.595259	297.6	800.0	330.7
22	0.595258	0.595259	297.6	800.0	330.7
23	0.595258	0.595258	297.6	800.0	330.7
24	0.595258	0.595258	297.6	800.0	330.7
25	0.595258	0.595258	297.6	800.0	330.7
26	0.595258	0.595258	297.6	800.0	330.7
27	0.595258	0.595258	297.6	800.0	330.7
28	0.595258	0.595258	297.6	800.0	330.7
29	0.595258	0.595258	297.6	800.0	330.7
30	0.595258	0.595258	297.6	800.0	330.7
31	0.595258	0.595258	297.6	800.0	330.7
32	0.595258	0.595258	297.6	800.0	330.7
33	0.595258	0.595258	297.6	800.0	330.7
34	0.595258	0.595258	297.6	800.0	330.7
35	0.595258	0.595258	297.6	800.0	330.7
36	0.595258	0.595258	297.6	800.0	330.7
37	0.595258	0.595258	297.6	800.0	330.7
38	0.595258	0.595258	297.6	800.0	330.7
39	0.595258	0.595258	297.6	800.0	330.7
40	0.595258	0.595258	297.6	800.0	330.7
41	0.595258	0.595258	297.6	800.0	330.7
42	0.595258	0.595258	297.6	800.0	330.7
43	0.595258	0.595258	297.6	800.0	330.7
44	0.595258	0.595258	297.6	800.0	330.7
45	0.595258	0.595258	297.6	800.0	330.7

46	0.595258	0.595258	297.6	800.0	330.7
47	0.595258	0.595258	297.6	800.0	330.7
48	0.595258	0.595258	297.6	800.0	330.7
49	0.595258	0.595258	297.6	800.0	330.7
50	0.595258	0.595258	297.6	800.0	330.7
51	0.595258	0.595258	297.6	800.0	330.7
52	0.595258	0.595258	297.6	800.0	330.7
53	0.595258	0.595258	297.6	800.0	330.7
54	0.595258	0.595258	297.6	800.0	330.7
55	0.595258	0.595258	297.6	800.0	330.7
56	0.595258	0.595258	297.6	800.0	330.7
57	0.595258	0.595258	297.6	800.0	330.7
58	0.595258	0.595258	297.6	800.0	330.7
59	0.595258	0.595258	297.6	800.0	330.7
60	0.595258	0.595258	297.6	800.0	330.7

Bottom face compressed, $x \leq h$

step	s low	s high	x (mm)	N (kN)	M (kNm)
1	0.000000	1.000000	250.0	1744.2	354.7
2	0.000000	0.500000	125.0	1104.3	285.5
3	0.000000	0.250000	62.5	241.8	123.9
4	0.125000	0.250000	93.8	766.1	224.6
5	0.187500	0.250000	109.4	948.9	258.2
6	0.187500	0.218750	101.6	861.7	242.3
7	0.187500	0.203125	97.7	815.1	233.7
8	0.187500	0.195313	95.7	790.9	229.2
9	0.191406	0.195313	96.7	803.1	231.5
10	0.191406	0.193359	96.2	797.0	230.4
11	0.192383	0.193359	96.4	800.0	230.9
12	0.192383	0.192871	96.3	798.5	230.7
13	0.192627	0.192871	96.4	799.3	230.8
14	0.192749	0.192871	96.4	799.7	230.9
15	0.192810	0.192871	96.4	799.8	230.9
16	0.192841	0.192871	96.4	799.9	230.9
17	0.192856	0.192871	96.4	800.0	230.9
18	0.192863	0.192871	96.4	800.0	230.9
19	0.192863	0.192867	96.4	800.0	230.9
20	0.192865	0.192867	96.4	800.0	230.9
21	0.192865	0.192866	96.4	800.0	230.9
22	0.192866	0.192866	96.4	800.0	230.9
23	0.192866	0.192866	96.4	800.0	230.9
24	0.192866	0.192866	96.4	800.0	230.9
25	0.192866	0.192866	96.4	800.0	230.9
26	0.192866	0.192866	96.4	800.0	230.9
27	0.192866	0.192866	96.4	800.0	230.9
28	0.192866	0.192866	96.4	800.0	230.9
29	0.192866	0.192866	96.4	800.0	230.9
30	0.192866	0.192866	96.4	800.0	230.9
31	0.192866	0.192866	96.4	800.0	230.9
32	0.192866	0.192866	96.4	800.0	230.9
33	0.192866	0.192866	96.4	800.0	230.9
34	0.192866	0.192866	96.4	800.0	230.9

35	0.192866	0.192866	96.4	800.0	230.9
36	0.192866	0.192866	96.4	800.0	230.9
37	0.192866	0.192866	96.4	800.0	230.9
38	0.192866	0.192866	96.4	800.0	230.9
39	0.192866	0.192866	96.4	800.0	230.9
40	0.192866	0.192866	96.4	800.0	230.9
41	0.192866	0.192866	96.4	800.0	230.9
42	0.192866	0.192866	96.4	800.0	230.9
43	0.192866	0.192866	96.4	800.0	230.9
44	0.192866	0.192866	96.4	800.0	230.9
45	0.192866	0.192866	96.4	800.0	230.9
46	0.192866	0.192866	96.4	800.0	230.9
47	0.192866	0.192866	96.4	800.0	230.9
48	0.192866	0.192866	96.4	800.0	230.9
49	0.192866	0.192866	96.4	800.0	230.9
50	0.192866	0.192866	96.4	800.0	230.9
51	0.192866	0.192866	96.4	800.0	230.9
52	0.192866	0.192866	96.4	800.0	230.9
53	0.192866	0.192866	96.4	800.0	230.9
54	0.192866	0.192866	96.4	800.0	230.9
55	0.192866	0.192866	96.4	800.0	230.9
56	0.192866	0.192866	96.4	800.0	230.9
57	0.192866	0.192866	96.4	800.0	230.9
58	0.192866	0.192866	96.4	800.0	230.9
59	0.192866	0.192866	96.4	800.0	230.9
60	0.192866	0.192866	96.4	800.0	230.9

Whole section compressed ($x \geq h$): with unequal layers N need not rise with x . 1. scan $t = 1$ ($x = h$) to 0 (uniform strain) in 200 steps; 2. golden section over the two steps around the largest sampled N , its maximum inserted into the scan, every sample kept; 3. every step where N passes N_{Ed} brackets a root; the brackets of the largest and the smallest interpolated moment are solved by bisection on N itself. M signed: sagging +.

Top face compressed, $x \geq h$ · 1. scan

k	t	x (mm)	N (kN)	M signed
0	1.0000	500	2509.5	98.6
1	0.9950	501	2517.6	97.1
2	0.9900	503	2525.7	95.6
3	0.9850	504	2533.8	94.1
4	0.9800	506	2541.8	92.7
5	0.9750	507	2549.8	91.2
6	0.9700	509	2557.8	89.7
7	0.9650	510	2565.7	88.3
8	0.9600	512	2573.6	86.8
9	0.9550	513	2581.5	85.3
10	0.9500	515	2589.4	83.9
11	0.9450	517	2597.3	82.4
12	0.9400	518	2605.1	81.0
13	0.9350	520	2612.9	79.5
14	0.9300	522	2620.7	78.1
15	0.9250	523	2628.4	76.7
16	0.9200	525	2636.2	75.2
17	0.9150	527	2643.9	73.8
18	0.9100	528	2651.6	72.4
19	0.9050	530	2659.2	71.0

20	0.9000	532	2666.9	69.6
21	0.8950	534	2674.5	68.2
22	0.8900	535	2682.0	66.8
23	0.8850	537	2689.6	65.4
24	0.8800	539	2697.1	64.0
25	0.8750	541	2704.6	62.6
26	0.8700	543	2712.1	61.2
27	0.8650	545	2719.6	59.8
28	0.8600	547	2727.0	58.5
29	0.8550	548	2734.4	57.1
30	0.8500	550	2741.8	55.7
31	0.8450	552	2749.2	54.4
32	0.8400	554	2756.5	53.0
33	0.8350	556	2763.8	51.7
34	0.8300	559	2771.1	50.3
35	0.8250	561	2778.4	49.0
36	0.8200	563	2785.6	47.6
37	0.8150	565	2792.8	46.3
38	0.8100	567	2800.0	45.0
39	0.8050	569	2807.1	43.6
40	0.8000	571	2814.3	42.3
41	0.7950	574	2821.4	41.0
42	0.7900	576	2828.5	39.7
43	0.7850	578	2835.5	38.4
44	0.7800	581	2842.6	37.1
45	0.7750	583	2849.6	35.8
46	0.7700	585	2856.6	34.5
47	0.7650	588	2863.5	33.2
48	0.7600	590	2870.5	31.9
49	0.7550	593	2877.4	30.6
50	0.7500	595	2884.3	29.3
51	0.7450	598	2891.2	28.1
52	0.7400	600	2898.0	26.8
53	0.7350	603	2904.8	25.5
54	0.7300	606	2911.6	24.3
55	0.7250	608	2918.4	23.0
56	0.7200	611	2925.1	21.8
57	0.7150	614	2931.8	20.5
58	0.7100	617	2938.5	19.3
59	0.7050	620	2945.2	18.0
60	0.7000	622	2951.8	16.8
61	0.6950	625	2958.4	15.6
62	0.6900	628	2965.0	14.3
63	0.6850	631	2971.6	13.1
64	0.6800	634	2978.1	11.9
65	0.6750	638	2984.6	10.7
66	0.6700	641	2991.1	9.5
67	0.6650	644	2997.6	8.3
68	0.6600	647	3004.1	7.1
69	0.6550	650	3010.5	5.9
70	0.6500	654	3016.9	4.7
71	0.6450	657	3023.2	3.5

72	0.6400	661	3029.6	2.3
73	0.6350	664	3035.9	1.2
74	0.6300	668	3042.2	0.0
75	0.6250	671	3048.5	-1.2
76	0.6200	675	3054.7	-2.3
77	0.6150	679	3060.9	-3.5
78	0.6100	683	3067.1	-4.7
79	0.6050	687	3073.3	-5.8
80	0.6000	690	3079.4	-7.0
81	0.5950	694	3085.6	-8.1
82	0.5900	699	3091.7	-9.2
83	0.5850	703	3097.7	-10.4
84	0.5800	707	3103.8	-11.5
85	0.5750	711	3109.8	-12.6
86	0.5700	716	3115.8	-13.7
87	0.5650	720	3121.8	-14.9
88	0.5600	724	3127.7	-16.0
89	0.5550	729	3133.6	-17.1
90	0.5500	734	3139.5	-18.2
91	0.5450	739	3145.4	-19.3
92	0.5400	743	3151.3	-20.4
93	0.5350	748	3157.1	-21.4
94	0.5300	753	3162.9	-22.5
95	0.5250	759	3168.7	-23.6
96	0.5200	764	3174.4	-24.7
97	0.5150	769	3180.1	-25.8
98	0.5100	775	3185.8	-26.8
99	0.5050	780	3191.5	-27.9
100	0.5000	786	3197.2	-28.9
101	0.4950	791	3202.8	-30.0
102	0.4900	797	3208.4	-31.0
103	0.4850	803	3214.0	-32.1
104	0.4800	810	3219.5	-33.1
105	0.4750	816	3225.1	-34.2
106	0.4700	822	3230.6	-35.2
107	0.4650	829	3236.0	-36.2
108	0.4600	835	3241.5	-37.2
109	0.4550	842	3246.9	-38.3
110	0.4500	849	3252.3	-39.3
111	0.4450	856	3257.7	-40.3
112	0.4400	864	3263.1	-41.3
113	0.4350	871	3268.4	-42.3
114	0.4300	879	3273.7	-43.3
115	0.4250	887	3279.0	-44.3
116	0.4200	895	3284.2	-45.3
117	0.4150	903	3289.5	-46.3
118	0.4100	911	3294.7	-47.2
119	0.4050	920	3299.9	-48.2
120	0.4000	929	3305.0	-49.2
121	0.3950	938	3310.1	-50.1
122	0.3900	947	3315.2	-51.1
123	0.3850	956	3320.3	-52.1

124	0.3800	966	3325.4	-53.0
125	0.3750	976	3330.4	-54.0
126	0.3700	986	3335.4	-54.9
127	0.3650	997	3340.4	-55.8
128	0.3600	1008	3345.4	-56.8
129	0.3550	1019	3350.3	-57.7
130	0.3500	1031	3355.2	-58.6
131	0.3450	1042	3360.1	-59.6
132	0.3400	1055	3365.0	-60.5
133	0.3350	1067	3369.8	-61.4
134	0.3300	1080	3374.6	-62.3
135	0.3250	1093	3379.4	-63.2
136	0.3200	1107	3384.1	-64.1
137	0.3150	1121	3388.9	-65.0
138	0.3100	1136	3393.6	-65.9
139	0.3050	1151	3398.3	-66.8
140	0.3000	1167	3402.9	-67.6
141	0.2950	1183	3407.6	-68.5
142	0.2900	1200	3412.2	-69.4
143	0.2850	1217	3416.8	-70.3
144	0.2800	1235	3421.3	-71.1
145	0.2750	1253	3425.9	-72.0
146	0.2700	1272	3430.4	-72.8
147	0.2650	1292	3434.9	-73.7
148	0.2600	1313	3439.3	-74.5
149	0.2550	1335	3443.8	-75.4
150	0.2500	1357	3448.2	-76.2
151	0.2450	1380	3452.6	-77.1
152	0.2400	1405	3456.9	-77.9
153	0.2350	1430	3461.3	-78.7
154	0.2300	1457	3465.6	-79.5
155	0.2250	1484	3469.9	-80.3
156	0.2200	1513	3474.2	-81.2
157	0.2150	1543	3478.4	-82.0
158	0.2100	1575	3482.6	-82.8
159	0.2050	1608	3486.8	-83.6
160	0.2000	1643	3491.0	-84.4
161	0.1950	1679	3495.1	-85.1
162	0.1900	1718	3499.2	-85.9
163	0.1850	1759	3503.3	-86.7
164	0.1800	1802	3507.4	-87.5
165	0.1750	1847	3511.4	-88.3
166	0.1700	1895	3515.5	-89.0
167	0.1650	1946	3519.4	-89.8
168	0.1600	2000	3523.4	-90.5
169	0.1550	2058	3527.4	-91.3
170	0.1500	2119	3531.1	-92.1
171	0.1450	2185	3534.5	-92.9
172	0.1400	2255	3537.9	-93.8
173	0.1350	2331	3541.3	-94.6
174	0.1300	2412	3544.7	-95.4
175	0.1250	2500	3548.0	-96.2

176	0.1200	2595	3551.3	-97.0
177	0.1150	2699	3554.6	-97.9
178	0.1100	2812	3557.9	-98.7
179	0.1050	2935	3561.1	-99.5
180	0.1000	3071	3564.3	-100.3
181	0.0950	3222	3567.5	-101.1
182	0.0900	3389	3570.7	-101.8
183	0.0850	3576	3573.8	-102.6
184	0.0800	3786	3576.9	-103.4
185	0.0750	4024	3580.0	-104.2
186	0.0700	4296	3583.1	-104.9
187	0.0650	4610	3586.1	-105.7
188	0.0600	4976	3589.1	-106.5
189	0.0550	5409	3592.1	-107.2
190	0.0500	5929	3595.1	-108.0
191	0.0450	6563	3598.0	-108.7
192	0.0400	7357	3600.9	-109.5
193	0.0350	8378	3603.8	-110.2
194	0.0300	9738	3606.7	-111.0
195	0.0250	11643	3609.5	-111.7
196	0.0200	14500	3612.3	-112.4
197	0.0150	19262	3615.1	-113.1
198	0.0100	28786	3617.9	-113.9
199	0.0050	57357	3620.6	-114.6
200	0.0000	uniform	3623.4	-115.3

Top face compressed · 2. largest N, golden section

step	t a	t b	t1	t2	N(t1)	N(t2)
1	0.000000	0.005000	0.001910	0.003090	3622.316	3621.675
2	0.000000	0.003090	0.001180	0.001910	3622.712	3622.316
3	0.000000	0.001910	0.000729	0.001180	3622.956	3622.712
4	0.000000	0.001180	0.000451	0.000729	3623.107	3622.956
5	0.000000	0.000729	0.000279	0.000451	3623.200	3623.107
6	0.000000	0.000451	0.000172	0.000279	3623.258	3623.200
7	0.000000	0.000279	0.000106	0.000172	3623.294	3623.258
8	0.000000	0.000172	0.000066	0.000106	3623.316	3623.294
9	0.000000	0.000106	0.000041	0.000066	3623.329	3623.316
10	0.000000	0.000066	0.000025	0.000041	3623.338	3623.329
11	0.000000	0.000041	0.000016	0.000025	3623.343	3623.338
12	0.000000	0.000025	0.000010	0.000016	3623.346	3623.343
13	0.000000	0.000016	0.000006	0.000010	3623.348	3623.346
14	0.000000	0.000010	0.000004	0.000006	3623.349	3623.348
15	0.000000	0.000006	0.000002	0.000004	3623.350	3623.349
16	0.000000	0.000004	0.000001	0.000002	3623.350	3623.350
17	0.000000	0.000002	0.000001	0.000001	3623.351	3623.350
18	0.000000	0.000001	0.000001	0.000001	3623.351	3623.351
19	0.000000	0.000001	0.000000	0.000001	3623.351	3623.351
20	0.000000	0.000001	0.000000	0.000000	3623.351	3623.351
21	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
22	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
23	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
24	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351

25	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
26	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
27	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
28	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
29	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
30	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
31	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
32	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
33	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
34	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
35	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
36	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
37	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
38	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
39	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
40	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351
max	0.000000	0.000000	0.000000	0.000000	3623.351	3623.351

Top face compressed · 3. scan with the largest N inserted, crossings of NEd

k	t	x (mm)	N (kN)	M signed	hi at NEd	lo at NEd
0	1.000000	500	2509.5	98.6		
1	0.995000	501	2517.6	97.1		
2	0.990000	503	2525.7	95.6		
3	0.985000	504	2533.8	94.1		
4	0.980000	506	2541.8	92.7		
5	0.975000	507	2549.8	91.2		
6	0.970000	509	2557.8	89.7		
7	0.965000	510	2565.7	88.3		
8	0.960000	512	2573.6	86.8		
9	0.955000	513	2581.5	85.3		
10	0.950000	515	2589.4	83.9		
11	0.945000	517	2597.3	82.4		
12	0.940000	518	2605.1	81.0		
13	0.935000	520	2612.9	79.5		
14	0.930000	522	2620.7	78.1		
15	0.925000	523	2628.4	76.7		
16	0.920000	525	2636.2	75.2		
17	0.915000	527	2643.9	73.8		
18	0.910000	528	2651.6	72.4		
19	0.905000	530	2659.2	71.0		
20	0.900000	532	2666.9	69.6		
21	0.895000	534	2674.5	68.2		
22	0.890000	535	2682.0	66.8		
23	0.885000	537	2689.6	65.4		
24	0.880000	539	2697.1	64.0		
25	0.875000	541	2704.6	62.6		
26	0.870000	543	2712.1	61.2		
27	0.865000	545	2719.6	59.8		
28	0.860000	547	2727.0	58.5		
29	0.855000	548	2734.4	57.1		
30	0.850000	550	2741.8	55.7		
31	0.845000	552	2749.2	54.4		

32	0.840000	554	2756.5	53.0
33	0.835000	556	2763.8	51.7
34	0.830000	559	2771.1	50.3
35	0.825000	561	2778.4	49.0
36	0.820000	563	2785.6	47.6
37	0.815000	565	2792.8	46.3
38	0.810000	567	2800.0	45.0
39	0.805000	569	2807.1	43.6
40	0.800000	571	2814.3	42.3
41	0.795000	574	2821.4	41.0
42	0.790000	576	2828.5	39.7
43	0.785000	578	2835.5	38.4
44	0.780000	581	2842.6	37.1
45	0.775000	583	2849.6	35.8
46	0.770000	585	2856.6	34.5
47	0.765000	588	2863.5	33.2
48	0.760000	590	2870.5	31.9
49	0.755000	593	2877.4	30.6
50	0.750000	595	2884.3	29.3
51	0.745000	598	2891.2	28.1
52	0.740000	600	2898.0	26.8
53	0.735000	603	2904.8	25.5
54	0.730000	606	2911.6	24.3
55	0.725000	608	2918.4	23.0
56	0.720000	611	2925.1	21.8
57	0.715000	614	2931.8	20.5
58	0.710000	617	2938.5	19.3
59	0.705000	620	2945.2	18.0
60	0.700000	622	2951.8	16.8
61	0.695000	625	2958.4	15.6
62	0.690000	628	2965.0	14.3
63	0.685000	631	2971.6	13.1
64	0.680000	634	2978.1	11.9
65	0.675000	638	2984.6	10.7
66	0.670000	641	2991.1	9.5
67	0.665000	644	2997.6	8.3
68	0.660000	647	3004.1	7.1
69	0.655000	650	3010.5	5.9
70	0.650000	654	3016.9	4.7
71	0.645000	657	3023.2	3.5
72	0.640000	661	3029.6	2.3
73	0.635000	664	3035.9	1.2
74	0.630000	668	3042.2	0.0
75	0.625000	671	3048.5	-1.2
76	0.620000	675	3054.7	-2.3
77	0.615000	679	3060.9	-3.5
78	0.610000	683	3067.1	-4.7
79	0.605000	687	3073.3	-5.8
80	0.600000	690	3079.4	-7.0
81	0.595000	694	3085.6	-8.1
82	0.590000	699	3091.7	-9.2
83	0.585000	703	3097.7	-10.4

84	0.580000	707	3103.8	-11.5
85	0.575000	711	3109.8	-12.6
86	0.570000	716	3115.8	-13.7
87	0.565000	720	3121.8	-14.9
88	0.560000	724	3127.7	-16.0
89	0.555000	729	3133.6	-17.1
90	0.550000	734	3139.5	-18.2
91	0.545000	739	3145.4	-19.3
92	0.540000	743	3151.3	-20.4
93	0.535000	748	3157.1	-21.4
94	0.530000	753	3162.9	-22.5
95	0.525000	759	3168.7	-23.6
96	0.520000	764	3174.4	-24.7
97	0.515000	769	3180.1	-25.8
98	0.510000	775	3185.8	-26.8
99	0.505000	780	3191.5	-27.9
100	0.500000	786	3197.2	-28.9
101	0.495000	791	3202.8	-30.0
102	0.490000	797	3208.4	-31.0
103	0.485000	803	3214.0	-32.1
104	0.480000	810	3219.5	-33.1
105	0.475000	816	3225.1	-34.2
106	0.470000	822	3230.6	-35.2
107	0.465000	829	3236.0	-36.2
108	0.460000	835	3241.5	-37.2
109	0.455000	842	3246.9	-38.3
110	0.450000	849	3252.3	-39.3
111	0.445000	856	3257.7	-40.3
112	0.440000	864	3263.1	-41.3
113	0.435000	871	3268.4	-42.3
114	0.430000	879	3273.7	-43.3
115	0.425000	887	3279.0	-44.3
116	0.420000	895	3284.2	-45.3
117	0.415000	903	3289.5	-46.3
118	0.410000	911	3294.7	-47.2
119	0.405000	920	3299.9	-48.2
120	0.400000	929	3305.0	-49.2
121	0.395000	938	3310.1	-50.1
122	0.390000	947	3315.2	-51.1
123	0.385000	956	3320.3	-52.1
124	0.380000	966	3325.4	-53.0
125	0.375000	976	3330.4	-54.0
126	0.370000	986	3335.4	-54.9
127	0.365000	997	3340.4	-55.8
128	0.360000	1008	3345.4	-56.8
129	0.355000	1019	3350.3	-57.7
130	0.350000	1031	3355.2	-58.6
131	0.345000	1042	3360.1	-59.6
132	0.340000	1055	3365.0	-60.5
133	0.335000	1067	3369.8	-61.4
134	0.330000	1080	3374.6	-62.3
135	0.325000	1093	3379.4	-63.2

136	0.320000	1107	3384.1	-64.1
137	0.315000	1121	3388.9	-65.0
138	0.310000	1136	3393.6	-65.9
139	0.305000	1151	3398.3	-66.8
140	0.300000	1167	3402.9	-67.6
141	0.295000	1183	3407.6	-68.5
142	0.290000	1200	3412.2	-69.4
143	0.285000	1217	3416.8	-70.3
144	0.280000	1235	3421.3	-71.1
145	0.275000	1253	3425.9	-72.0
146	0.270000	1272	3430.4	-72.8
147	0.265000	1292	3434.9	-73.7
148	0.260000	1313	3439.3	-74.5
149	0.255000	1335	3443.8	-75.4
150	0.250000	1357	3448.2	-76.2
151	0.245000	1380	3452.6	-77.1
152	0.240000	1405	3456.9	-77.9
153	0.235000	1430	3461.3	-78.7
154	0.230000	1457	3465.6	-79.5
155	0.225000	1484	3469.9	-80.3
156	0.220000	1513	3474.2	-81.2
157	0.215000	1543	3478.4	-82.0
158	0.210000	1575	3482.6	-82.8
159	0.205000	1608	3486.8	-83.6
160	0.200000	1643	3491.0	-84.4
161	0.195000	1679	3495.1	-85.1
162	0.190000	1718	3499.2	-85.9
163	0.185000	1759	3503.3	-86.7
164	0.180000	1802	3507.4	-87.5
165	0.175000	1847	3511.4	-88.3
166	0.170000	1895	3515.5	-89.0
167	0.165000	1946	3519.4	-89.8
168	0.160000	2000	3523.4	-90.5
169	0.155000	2058	3527.4	-91.3
170	0.150000	2119	3531.1	-92.1
171	0.145000	2185	3534.5	-92.9
172	0.140000	2255	3537.9	-93.8
173	0.135000	2331	3541.3	-94.6
174	0.130000	2412	3544.7	-95.4
175	0.125000	2500	3548.0	-96.2
176	0.120000	2595	3551.3	-97.0
177	0.115000	2699	3554.6	-97.9
178	0.110000	2812	3557.9	-98.7
179	0.105000	2935	3561.1	-99.5
180	0.100000	3071	3564.3	-100.3
181	0.095000	3222	3567.5	-101.1
182	0.090000	3389	3570.7	-101.8
183	0.085000	3576	3573.8	-102.6
184	0.080000	3786	3576.9	-103.4
185	0.075000	4024	3580.0	-104.2
186	0.070000	4296	3583.1	-104.9
187	0.065000	4610	3586.1	-105.7

188	0.060000	4976	3589.1	-106.5
189	0.055000	5409	3592.1	-107.2
190	0.050000	5929	3595.1	-108.0
191	0.045000	6563	3598.0	-108.7
192	0.040000	7357	3600.9	-109.5
193	0.035000	8378	3603.8	-110.2
194	0.030000	9738	3606.7	-111.0
195	0.025000	11643	3609.5	-111.7
196	0.020000	14500	3612.3	-112.4
197	0.015000	19262	3615.1	-113.1
198	0.010000	28786	3617.9	-113.9
199	0.005000	57357	3620.6	-114.6
200	0.000000	uniform	3623.4	-115.3
201	0.000000	uniform	3623.4	-115.3

Top face compressed · 4. root in the bracket of the largest moment

step	t (N < NEd)	t (N ≥ NEd)	t	N (kN)	M signed
1	1.000000	0.995000	0.997500	2513.578	97.867
2	1.000000	0.997500	0.998750	2511.552	98.240
3	1.000000	0.998750	0.999375	2510.538	98.427
4	1.000000	0.999375	0.999688	2510.031	98.520
5	1.000000	0.999688	0.999844	2509.778	98.567
6	1.000000	0.999844	0.999922	2509.651	98.590
7	1.000000	0.999922	0.999961	2509.587	98.602
8	1.000000	0.999961	0.999980	2509.556	98.608
9	1.000000	0.999980	0.999990	2509.540	98.611
10	1.000000	0.999990	0.999995	2509.532	98.612
11	1.000000	0.999995	0.999998	2509.528	98.613
12	1.000000	0.999998	0.999999	2509.526	98.614
13	1.000000	0.999999	0.999999	2509.525	98.614
14	1.000000	0.999999	1.000000	2509.525	98.614
15	1.000000	1.000000	1.000000	2509.524	98.614
16	1.000000	1.000000	1.000000	2509.524	98.614
17	1.000000	1.000000	1.000000	2509.524	98.614
18	1.000000	1.000000	1.000000	2509.524	98.614
19	1.000000	1.000000	1.000000	2509.524	98.614
20	1.000000	1.000000	1.000000	2509.524	98.614
21	1.000000	1.000000	1.000000	2509.524	98.614
22	1.000000	1.000000	1.000000	2509.524	98.614
23	1.000000	1.000000	1.000000	2509.524	98.614
24	1.000000	1.000000	1.000000	2509.524	98.614
25	1.000000	1.000000	1.000000	2509.524	98.614
26	1.000000	1.000000	1.000000	2509.524	98.614
27	1.000000	1.000000	1.000000	2509.524	98.614
28	1.000000	1.000000	1.000000	2509.524	98.614
29	1.000000	1.000000	1.000000	2509.524	98.614
30	1.000000	1.000000	1.000000	2509.524	98.614
31	1.000000	1.000000	1.000000	2509.524	98.614
32	1.000000	1.000000	1.000000	2509.524	98.614
33	1.000000	1.000000	1.000000	2509.524	98.614
34	1.000000	1.000000	1.000000	2509.524	98.614
35	1.000000	1.000000	1.000000	2509.524	98.614

36	1.000000	1.000000	1.000000	2509.524	98.614
37	1.000000	1.000000	1.000000	2509.524	98.614
38	1.000000	1.000000	1.000000	2509.524	98.614
39	1.000000	1.000000	1.000000	2509.524	98.614
40	1.000000	1.000000	1.000000	2509.524	98.614
41	1.000000	1.000000	1.000000	2509.524	98.614
42	1.000000	1.000000	1.000000	2509.524	98.614
43	1.000000	1.000000	1.000000	2509.524	98.614
44	1.000000	1.000000	1.000000	2509.524	98.614
45	1.000000	1.000000	1.000000	2509.524	98.614
46	1.000000	1.000000	1.000000	2509.524	98.614
47	1.000000	1.000000	1.000000	2509.524	98.614
48	1.000000	1.000000	1.000000	2509.524	98.614
49	1.000000	1.000000	1.000000	2509.524	98.614
50	1.000000	1.000000	1.000000	2509.524	98.614

Top face compressed · 4. root in the bracket of the smallest moment

step	t (N < NEd)	t (N ≥ NEd)	t	N (kN)	M signed
1	1.000000	0.995000	0.997500	2513.578	97.867
2	1.000000	0.997500	0.998750	2511.552	98.240
3	1.000000	0.998750	0.999375	2510.538	98.427
4	1.000000	0.999375	0.999688	2510.031	98.520
5	1.000000	0.999688	0.999844	2509.778	98.567
6	1.000000	0.999844	0.999922	2509.651	98.590
7	1.000000	0.999922	0.999961	2509.587	98.602
8	1.000000	0.999961	0.999980	2509.556	98.608
9	1.000000	0.999980	0.999990	2509.540	98.611
10	1.000000	0.999990	0.999995	2509.532	98.612
11	1.000000	0.999995	0.999998	2509.528	98.613
12	1.000000	0.999998	0.999999	2509.526	98.614
13	1.000000	0.999999	0.999999	2509.525	98.614
14	1.000000	0.999999	1.000000	2509.525	98.614
15	1.000000	1.000000	1.000000	2509.524	98.614
16	1.000000	1.000000	1.000000	2509.524	98.614
17	1.000000	1.000000	1.000000	2509.524	98.614
18	1.000000	1.000000	1.000000	2509.524	98.614
19	1.000000	1.000000	1.000000	2509.524	98.614
20	1.000000	1.000000	1.000000	2509.524	98.614
21	1.000000	1.000000	1.000000	2509.524	98.614
22	1.000000	1.000000	1.000000	2509.524	98.614
23	1.000000	1.000000	1.000000	2509.524	98.614
24	1.000000	1.000000	1.000000	2509.524	98.614
25	1.000000	1.000000	1.000000	2509.524	98.614
26	1.000000	1.000000	1.000000	2509.524	98.614
27	1.000000	1.000000	1.000000	2509.524	98.614
28	1.000000	1.000000	1.000000	2509.524	98.614
29	1.000000	1.000000	1.000000	2509.524	98.614
30	1.000000	1.000000	1.000000	2509.524	98.614
31	1.000000	1.000000	1.000000	2509.524	98.614
32	1.000000	1.000000	1.000000	2509.524	98.614
33	1.000000	1.000000	1.000000	2509.524	98.614
34	1.000000	1.000000	1.000000	2509.524	98.614

35	1.000000	1.000000	1.000000	2509.524	98.614
36	1.000000	1.000000	1.000000	2509.524	98.614
37	1.000000	1.000000	1.000000	2509.524	98.614
38	1.000000	1.000000	1.000000	2509.524	98.614
39	1.000000	1.000000	1.000000	2509.524	98.614
40	1.000000	1.000000	1.000000	2509.524	98.614
41	1.000000	1.000000	1.000000	2509.524	98.614
42	1.000000	1.000000	1.000000	2509.524	98.614
43	1.000000	1.000000	1.000000	2509.524	98.614
44	1.000000	1.000000	1.000000	2509.524	98.614
45	1.000000	1.000000	1.000000	2509.524	98.614
46	1.000000	1.000000	1.000000	2509.524	98.614
47	1.000000	1.000000	1.000000	2509.524	98.614
48	1.000000	1.000000	1.000000	2509.524	98.614
49	1.000000	1.000000	1.000000	2509.524	98.614
50	1.000000	1.000000	1.000000	2509.524	98.614

Bottom face compressed, $x \geq h$ · 1. scan

k	t	x (mm)	N (kN)	M signed
0	1.0000	500	3046.3	-246.4
1	0.9950	501	3052.1	-245.3
2	0.9900	503	3057.9	-244.3
3	0.9850	504	3063.6	-243.3
4	0.9800	506	3069.3	-242.2
5	0.9750	507	3075.0	-241.2
6	0.9700	509	3080.6	-240.2
7	0.9650	510	3086.3	-239.2
8	0.9600	512	3091.9	-238.2
9	0.9550	513	3097.4	-237.2
10	0.9500	515	3103.0	-236.2
11	0.9450	517	3108.5	-235.2
12	0.9400	518	3114.0	-234.2
13	0.9350	520	3119.5	-233.2
14	0.9300	522	3124.9	-232.2
15	0.9250	523	3130.3	-231.2
16	0.9200	525	3135.7	-230.2
17	0.9150	527	3141.1	-229.3
18	0.9100	528	3146.4	-228.3
19	0.9050	530	3151.8	-227.3
20	0.9000	532	3157.1	-226.4
21	0.8950	534	3162.3	-225.4
22	0.8900	535	3167.6	-224.5
23	0.8850	537	3172.8	-223.5
24	0.8800	539	3178.0	-222.6
25	0.8750	541	3183.1	-221.7
26	0.8700	543	3188.3	-220.7
27	0.8650	545	3193.4	-219.8
28	0.8600	547	3198.5	-218.9
29	0.8550	548	3203.5	-218.0
30	0.8500	550	3208.6	-217.0
31	0.8450	552	3213.6	-216.1

32	0.8400	554	3218.6	-215.2
33	0.8350	556	3223.5	-214.3
34	0.8300	559	3228.4	-213.4
35	0.8250	561	3233.4	-212.6
36	0.8200	563	3238.2	-211.7
37	0.8150	565	3243.1	-210.8
38	0.8100	567	3247.9	-209.9
39	0.8050	569	3252.7	-209.0
40	0.8000	571	3257.5	-208.2
41	0.7950	574	3262.3	-207.3
42	0.7900	576	3267.0	-206.5
43	0.7850	578	3271.7	-205.6
44	0.7800	581	3276.4	-204.8
45	0.7750	583	3281.0	-203.9
46	0.7700	585	3285.6	-203.1
47	0.7650	588	3290.2	-202.2
48	0.7600	590	3294.8	-201.4
49	0.7550	593	3299.4	-200.6
50	0.7500	595	3303.9	-199.8
51	0.7450	598	3308.4	-199.0
52	0.7400	600	3312.9	-198.1
53	0.7350	603	3317.3	-197.3
54	0.7300	606	3321.7	-196.5
55	0.7250	608	3326.1	-195.7
56	0.7200	611	3330.5	-194.9
57	0.7150	614	3334.8	-194.2
58	0.7100	617	3339.1	-193.4
59	0.7050	620	3343.4	-192.6
60	0.7000	622	3347.7	-191.8
61	0.6950	625	3351.9	-191.1
62	0.6900	628	3356.1	-190.3
63	0.6850	631	3360.3	-189.5
64	0.6800	634	3364.5	-188.8
65	0.6750	638	3368.6	-188.0
66	0.6700	641	3372.8	-187.3
67	0.6650	644	3376.8	-186.5
68	0.6600	647	3380.9	-185.8
69	0.6550	650	3384.9	-185.1
70	0.6500	654	3388.9	-184.3
71	0.6450	657	3392.9	-183.6
72	0.6400	661	3396.9	-182.9
73	0.6350	664	3400.8	-182.2
74	0.6300	668	3404.7	-181.5
75	0.6250	671	3408.6	-180.8
76	0.6200	675	3412.5	-180.1
77	0.6150	679	3416.3	-179.4
78	0.6100	683	3420.1	-178.7
79	0.6050	687	3423.9	-178.0
80	0.6000	690	3427.6	-177.3
81	0.5950	694	3431.3	-176.6
82	0.5900	699	3435.0	-175.9
83	0.5850	703	3438.7	-175.3

84	0.5800	707	3442.4	-174.6
85	0.5750	711	3446.0	-173.9
86	0.5700	716	3449.6	-173.3
87	0.5650	720	3453.2	-172.6
88	0.5600	724	3456.7	-172.0
89	0.5550	729	3460.2	-171.4
90	0.5500	734	3463.7	-170.7
91	0.5450	739	3467.2	-170.1
92	0.5400	743	3470.7	-169.5
93	0.5350	748	3474.1	-168.8
94	0.5300	753	3477.5	-168.2
95	0.5250	759	3480.8	-167.6
96	0.5200	764	3484.2	-167.0
97	0.5150	769	3487.5	-166.4
98	0.5100	775	3490.8	-165.8
99	0.5050	780	3494.0	-165.2
100	0.5000	786	3497.3	-164.6
101	0.4950	791	3500.5	-164.0
102	0.4900	797	3503.7	-163.4
103	0.4850	803	3506.8	-162.8
104	0.4800	810	3510.0	-162.3
105	0.4750	816	3513.1	-161.7
106	0.4700	822	3516.2	-161.1
107	0.4650	829	3519.2	-160.6
108	0.4600	835	3522.3	-160.0
109	0.4550	842	3525.3	-159.5
110	0.4500	849	3528.3	-158.9
111	0.4450	856	3531.2	-158.4
112	0.4400	864	3534.2	-157.9
113	0.4350	871	3537.1	-157.3
114	0.4300	879	3539.9	-156.8
115	0.4250	887	3542.8	-156.3
116	0.4200	895	3545.6	-155.8
117	0.4150	903	3548.4	-155.2
118	0.4100	911	3551.2	-154.7
119	0.4050	920	3554.0	-154.2
120	0.4000	929	3556.7	-153.7
121	0.3950	938	3559.4	-153.2
122	0.3900	947	3562.1	-152.7
123	0.3850	956	3564.7	-152.3
124	0.3800	966	3567.3	-151.8
125	0.3750	976	3569.9	-151.3
126	0.3700	986	3572.5	-150.8
127	0.3650	997	3575.0	-150.4
128	0.3600	1008	3577.6	-149.9
129	0.3550	1019	3580.1	-149.4
130	0.3500	1031	3582.5	-149.0
131	0.3450	1042	3585.0	-148.5
132	0.3400	1055	3587.4	-148.1
133	0.3350	1067	3589.8	-147.6
134	0.3300	1080	3592.2	-147.2
135	0.3250	1093	3594.5	-146.8

136	0.3200	1107	3596.8	-146.3
137	0.3150	1121	3599.1	-145.9
138	0.3100	1136	3601.4	-145.5
139	0.3050	1151	3603.6	-145.1
140	0.3000	1167	3605.8	-144.7
141	0.2950	1183	3608.0	-144.3
142	0.2900	1200	3610.2	-143.9
143	0.2850	1217	3612.3	-143.5
144	0.2800	1235	3614.4	-143.1
145	0.2750	1253	3616.5	-142.7
146	0.2700	1272	3618.6	-142.3
147	0.2650	1292	3620.6	-142.0
148	0.2600	1313	3622.6	-141.6
149	0.2550	1335	3624.6	-141.2
150	0.2500	1357	3626.5	-140.9
151	0.2450	1380	3628.5	-140.5
152	0.2400	1405	3630.4	-140.1
153	0.2350	1430	3632.3	-139.8
154	0.2300	1457	3634.1	-139.5
155	0.2250	1484	3635.9	-139.1
156	0.2200	1513	3637.7	-138.8
157	0.2150	1543	3639.5	-138.4
158	0.2100	1575	3641.3	-138.1
159	0.2050	1608	3643.0	-137.8
160	0.2000	1643	3644.7	-137.5
161	0.1950	1679	3646.4	-137.2
162	0.1900	1718	3648.0	-136.9
163	0.1850	1759	3649.6	-136.6
164	0.1800	1802	3651.2	-136.3
165	0.1750	1847	3652.8	-136.0
166	0.1700	1895	3654.4	-135.7
167	0.1650	1946	3655.9	-135.4
168	0.1600	2000	3657.4	-135.1
169	0.1550	2058	3658.2	-134.7
170	0.1500	2119	3657.5	-134.0
171	0.1450	2185	3656.7	-133.3
172	0.1400	2255	3655.9	-132.6
173	0.1350	2331	3655.1	-132.0
174	0.1300	2412	3654.2	-131.3
175	0.1250	2500	3653.4	-130.6
176	0.1200	2595	3652.5	-129.9
177	0.1150	2699	3651.6	-129.3
178	0.1100	2812	3650.6	-128.6
179	0.1050	2935	3649.6	-128.0
180	0.1000	3071	3648.7	-127.3
181	0.0950	3222	3647.6	-126.7
182	0.0900	3389	3646.6	-126.0
183	0.0850	3576	3645.5	-125.4
184	0.0800	3786	3644.4	-124.8
185	0.0750	4024	3643.3	-124.1
186	0.0700	4296	3642.1	-123.5
187	0.0650	4610	3641.0	-122.9

188	0.0600	4976	3639.8	-122.3
189	0.0550	5409	3638.5	-121.7
190	0.0500	5929	3637.3	-121.1
191	0.0450	6563	3636.0	-120.5
192	0.0400	7357	3634.7	-119.9
193	0.0350	8378	3633.4	-119.3
194	0.0300	9738	3632.0	-118.7
195	0.0250	11643	3630.6	-118.1
196	0.0200	14500	3629.2	-117.5
197	0.0150	19262	3627.8	-117.0
198	0.0100	28786	3626.3	-116.4
199	0.0050	57357	3624.9	-115.8
200	0.0000	uniform	3623.4	-115.3

Bottom face compressed · 2. largest N, golden section

step	t a	t b	t1	t2	N(t1)	N(t2)
1	0.150000	0.160000	0.153820	0.156180	3658.024	3658.367
2	0.153820	0.160000	0.156180	0.157639	3658.367	3658.064
3	0.153820	0.157639	0.155279	0.156180	3658.236	3658.367
4	0.155279	0.157639	0.156180	0.156738	3658.367	3658.329
5	0.155279	0.156738	0.155836	0.156180	3658.317	3658.367
6	0.155836	0.156738	0.156180	0.156393	3658.367	3658.397
7	0.156180	0.156738	0.156393	0.156525	3658.397	3658.391
8	0.156180	0.156525	0.156312	0.156393	3658.386	3658.397
9	0.156312	0.156525	0.156393	0.156443	3658.397	3658.405
10	0.156393	0.156525	0.156443	0.156475	3658.405	3658.406
11	0.156443	0.156525	0.156475	0.156494	3658.406	3658.400
12	0.156443	0.156494	0.156463	0.156475	3658.407	3658.406
13	0.156443	0.156475	0.156455	0.156463	3658.406	3658.407
14	0.156455	0.156475	0.156463	0.156467	3658.407	3658.408
15	0.156463	0.156475	0.156467	0.156470	3658.408	3658.407
16	0.156463	0.156470	0.156465	0.156467	3658.408	3658.408
17	0.156465	0.156470	0.156467	0.156468	3658.408	3658.408
18	0.156465	0.156468	0.156467	0.156467	3658.408	3658.408
19	0.156467	0.156468	0.156467	0.156468	3658.408	3658.408
20	0.156467	0.156468	0.156467	0.156467	3658.408	3658.408
21	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
22	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
23	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
24	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
25	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
26	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
27	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
28	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
29	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
30	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
31	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
32	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
33	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
34	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
35	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
36	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408

37	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
38	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
39	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
40	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408
max	0.156467	0.156467	0.156467	0.156467	3658.408	3658.408

Bottom face compressed · 3. scan with the largest N inserted, crossings of NEd

k	t	x (mm)	N (kN)	M signed	hi at NEd	lo at NEd
0	1.000000	500	3046.3	-246.4		
1	0.995000	501	3052.1	-245.3		
2	0.990000	503	3057.9	-244.3		
3	0.985000	504	3063.6	-243.3		
4	0.980000	506	3069.3	-242.2		
5	0.975000	507	3075.0	-241.2		
6	0.970000	509	3080.6	-240.2		
7	0.965000	510	3086.3	-239.2		
8	0.960000	512	3091.9	-238.2		
9	0.955000	513	3097.4	-237.2		
10	0.950000	515	3103.0	-236.2		
11	0.945000	517	3108.5	-235.2		
12	0.940000	518	3114.0	-234.2		
13	0.935000	520	3119.5	-233.2		
14	0.930000	522	3124.9	-232.2		
15	0.925000	523	3130.3	-231.2		
16	0.920000	525	3135.7	-230.2		
17	0.915000	527	3141.1	-229.3		
18	0.910000	528	3146.4	-228.3		
19	0.905000	530	3151.8	-227.3		
20	0.900000	532	3157.1	-226.4		
21	0.895000	534	3162.3	-225.4		
22	0.890000	535	3167.6	-224.5		
23	0.885000	537	3172.8	-223.5		
24	0.880000	539	3178.0	-222.6		
25	0.875000	541	3183.1	-221.7		
26	0.870000	543	3188.3	-220.7		
27	0.865000	545	3193.4	-219.8		
28	0.860000	547	3198.5	-218.9		
29	0.855000	548	3203.5	-218.0		
30	0.850000	550	3208.6	-217.0		
31	0.845000	552	3213.6	-216.1		
32	0.840000	554	3218.6	-215.2		
33	0.835000	556	3223.5	-214.3		
34	0.830000	559	3228.4	-213.4		
35	0.825000	561	3233.4	-212.6		
36	0.820000	563	3238.2	-211.7		
37	0.815000	565	3243.1	-210.8		
38	0.810000	567	3247.9	-209.9		
39	0.805000	569	3252.7	-209.0		
40	0.800000	571	3257.5	-208.2		
41	0.795000	574	3262.3	-207.3		
42	0.790000	576	3267.0	-206.5		
43	0.785000	578	3271.7	-205.6		

44	0.780000	581	3276.4	-204.8
45	0.775000	583	3281.0	-203.9
46	0.770000	585	3285.6	-203.1
47	0.765000	588	3290.2	-202.2
48	0.760000	590	3294.8	-201.4
49	0.755000	593	3299.4	-200.6
50	0.750000	595	3303.9	-199.8
51	0.745000	598	3308.4	-199.0
52	0.740000	600	3312.9	-198.1
53	0.735000	603	3317.3	-197.3
54	0.730000	606	3321.7	-196.5
55	0.725000	608	3326.1	-195.7
56	0.720000	611	3330.5	-194.9
57	0.715000	614	3334.8	-194.2
58	0.710000	617	3339.1	-193.4
59	0.705000	620	3343.4	-192.6
60	0.700000	622	3347.7	-191.8
61	0.695000	625	3351.9	-191.1
62	0.690000	628	3356.1	-190.3
63	0.685000	631	3360.3	-189.5
64	0.680000	634	3364.5	-188.8
65	0.675000	638	3368.6	-188.0
66	0.670000	641	3372.8	-187.3
67	0.665000	644	3376.8	-186.5
68	0.660000	647	3380.9	-185.8
69	0.655000	650	3384.9	-185.1
70	0.650000	654	3388.9	-184.3
71	0.645000	657	3392.9	-183.6
72	0.640000	661	3396.9	-182.9
73	0.635000	664	3400.8	-182.2
74	0.630000	668	3404.7	-181.5
75	0.625000	671	3408.6	-180.8
76	0.620000	675	3412.5	-180.1
77	0.615000	679	3416.3	-179.4
78	0.610000	683	3420.1	-178.7
79	0.605000	687	3423.9	-178.0
80	0.600000	690	3427.6	-177.3
81	0.595000	694	3431.3	-176.6
82	0.590000	699	3435.0	-175.9
83	0.585000	703	3438.7	-175.3
84	0.580000	707	3442.4	-174.6
85	0.575000	711	3446.0	-173.9
86	0.570000	716	3449.6	-173.3
87	0.565000	720	3453.2	-172.6
88	0.560000	724	3456.7	-172.0
89	0.555000	729	3460.2	-171.4
90	0.550000	734	3463.7	-170.7
91	0.545000	739	3467.2	-170.1
92	0.540000	743	3470.7	-169.5
93	0.535000	748	3474.1	-168.8
94	0.530000	753	3477.5	-168.2
95	0.525000	759	3480.8	-167.6

96	0.520000	764	3484.2	-167.0
97	0.515000	769	3487.5	-166.4
98	0.510000	775	3490.8	-165.8
99	0.505000	780	3494.0	-165.2
100	0.500000	786	3497.3	-164.6
101	0.495000	791	3500.5	-164.0
102	0.490000	797	3503.7	-163.4
103	0.485000	803	3506.8	-162.8
104	0.480000	810	3510.0	-162.3
105	0.475000	816	3513.1	-161.7
106	0.470000	822	3516.2	-161.1
107	0.465000	829	3519.2	-160.6
108	0.460000	835	3522.3	-160.0
109	0.455000	842	3525.3	-159.5
110	0.450000	849	3528.3	-158.9
111	0.445000	856	3531.2	-158.4
112	0.440000	864	3534.2	-157.9
113	0.435000	871	3537.1	-157.3
114	0.430000	879	3539.9	-156.8
115	0.425000	887	3542.8	-156.3
116	0.420000	895	3545.6	-155.8
117	0.415000	903	3548.4	-155.2
118	0.410000	911	3551.2	-154.7
119	0.405000	920	3554.0	-154.2
120	0.400000	929	3556.7	-153.7
121	0.395000	938	3559.4	-153.2
122	0.390000	947	3562.1	-152.7
123	0.385000	956	3564.7	-152.3
124	0.380000	966	3567.3	-151.8
125	0.375000	976	3569.9	-151.3
126	0.370000	986	3572.5	-150.8
127	0.365000	997	3575.0	-150.4
128	0.360000	1008	3577.6	-149.9
129	0.355000	1019	3580.1	-149.4
130	0.350000	1031	3582.5	-149.0
131	0.345000	1042	3585.0	-148.5
132	0.340000	1055	3587.4	-148.1
133	0.335000	1067	3589.8	-147.6
134	0.330000	1080	3592.2	-147.2
135	0.325000	1093	3594.5	-146.8
136	0.320000	1107	3596.8	-146.3
137	0.315000	1121	3599.1	-145.9
138	0.310000	1136	3601.4	-145.5
139	0.305000	1151	3603.6	-145.1
140	0.300000	1167	3605.8	-144.7
141	0.295000	1183	3608.0	-144.3
142	0.290000	1200	3610.2	-143.9
143	0.285000	1217	3612.3	-143.5
144	0.280000	1235	3614.4	-143.1
145	0.275000	1253	3616.5	-142.7
146	0.270000	1272	3618.6	-142.3
147	0.265000	1292	3620.6	-142.0

148	0.260000	1313	3622.6	-141.6
149	0.255000	1335	3624.6	-141.2
150	0.250000	1357	3626.5	-140.9
151	0.245000	1380	3628.5	-140.5
152	0.240000	1405	3630.4	-140.1
153	0.235000	1430	3632.3	-139.8
154	0.230000	1457	3634.1	-139.5
155	0.225000	1484	3635.9	-139.1
156	0.220000	1513	3637.7	-138.8
157	0.215000	1543	3639.5	-138.4
158	0.210000	1575	3641.3	-138.1
159	0.205000	1608	3643.0	-137.8
160	0.200000	1643	3644.7	-137.5
161	0.195000	1679	3646.4	-137.2
162	0.190000	1718	3648.0	-136.9
163	0.185000	1759	3649.6	-136.6
164	0.180000	1802	3651.2	-136.3
165	0.175000	1847	3652.8	-136.0
166	0.170000	1895	3654.4	-135.7
167	0.165000	1946	3655.9	-135.4
168	0.160000	2000	3657.4	-135.1
169	0.156467	2040	3658.4	-134.9
170	0.155000	2058	3658.2	-134.7
171	0.150000	2119	3657.5	-134.0
172	0.145000	2185	3656.7	-133.3
173	0.140000	2255	3655.9	-132.6
174	0.135000	2331	3655.1	-132.0
175	0.130000	2412	3654.2	-131.3
176	0.125000	2500	3653.4	-130.6
177	0.120000	2595	3652.5	-129.9
178	0.115000	2699	3651.6	-129.3
179	0.110000	2812	3650.6	-128.6
180	0.105000	2935	3649.6	-128.0
181	0.100000	3071	3648.7	-127.3
182	0.095000	3222	3647.6	-126.7
183	0.090000	3389	3646.6	-126.0
184	0.085000	3576	3645.5	-125.4
185	0.080000	3786	3644.4	-124.8
186	0.075000	4024	3643.3	-124.1
187	0.070000	4296	3642.1	-123.5
188	0.065000	4610	3641.0	-122.9
189	0.060000	4976	3639.8	-122.3
190	0.055000	5409	3638.5	-121.7
191	0.050000	5929	3637.3	-121.1
192	0.045000	6563	3636.0	-120.5
193	0.040000	7357	3634.7	-119.9
194	0.035000	8378	3633.4	-119.3
195	0.030000	9738	3632.0	-118.7
196	0.025000	11643	3630.6	-118.1
197	0.020000	14500	3629.2	-117.5
198	0.015000	19262	3627.8	-117.0
199	0.010000	28786	3626.3	-116.4

200	0.005000	57357	3624.9	-115.8
201	0.000000	uniform	3623.4	-115.3

Bottom face compressed · 4. root in the bracket of the largest moment

step	t (N < NEd)	t (N ≥ NEd)	t	N (kN)	M signed
1	1.000000	0.995000	0.997500	3049.227	-245.871
2	1.000000	0.997500	0.998750	3047.782	-246.132
3	1.000000	0.998750	0.999375	3047.058	-246.263
4	1.000000	0.999375	0.999688	3046.696	-246.328
5	1.000000	0.999688	0.999844	3046.515	-246.361
6	1.000000	0.999844	0.999922	3046.425	-246.377
7	1.000000	0.999922	0.999961	3046.380	-246.385
8	1.000000	0.999961	0.999980	3046.357	-246.389
9	1.000000	0.999980	0.999990	3046.346	-246.391
10	1.000000	0.999990	0.999995	3046.340	-246.392
11	1.000000	0.999995	0.999998	3046.337	-246.393
12	1.000000	0.999998	0.999999	3046.336	-246.393
13	1.000000	0.999999	0.999999	3046.335	-246.393
14	1.000000	0.999999	1.000000	3046.335	-246.393
15	1.000000	1.000000	1.000000	3046.335	-246.393
16	1.000000	1.000000	1.000000	3046.335	-246.393
17	1.000000	1.000000	1.000000	3046.335	-246.393
18	1.000000	1.000000	1.000000	3046.335	-246.393
19	1.000000	1.000000	1.000000	3046.335	-246.393
20	1.000000	1.000000	1.000000	3046.334	-246.393
21	1.000000	1.000000	1.000000	3046.334	-246.393
22	1.000000	1.000000	1.000000	3046.334	-246.393
23	1.000000	1.000000	1.000000	3046.334	-246.393
24	1.000000	1.000000	1.000000	3046.334	-246.393
25	1.000000	1.000000	1.000000	3046.334	-246.393
26	1.000000	1.000000	1.000000	3046.334	-246.393
27	1.000000	1.000000	1.000000	3046.334	-246.393
28	1.000000	1.000000	1.000000	3046.334	-246.393
29	1.000000	1.000000	1.000000	3046.334	-246.393
30	1.000000	1.000000	1.000000	3046.334	-246.393
31	1.000000	1.000000	1.000000	3046.334	-246.393
32	1.000000	1.000000	1.000000	3046.334	-246.393
33	1.000000	1.000000	1.000000	3046.334	-246.393
34	1.000000	1.000000	1.000000	3046.334	-246.393
35	1.000000	1.000000	1.000000	3046.334	-246.393
36	1.000000	1.000000	1.000000	3046.334	-246.393
37	1.000000	1.000000	1.000000	3046.334	-246.393
38	1.000000	1.000000	1.000000	3046.334	-246.393
39	1.000000	1.000000	1.000000	3046.334	-246.393
40	1.000000	1.000000	1.000000	3046.334	-246.393
41	1.000000	1.000000	1.000000	3046.334	-246.393
42	1.000000	1.000000	1.000000	3046.334	-246.393
43	1.000000	1.000000	1.000000	3046.334	-246.393
44	1.000000	1.000000	1.000000	3046.334	-246.393
45	1.000000	1.000000	1.000000	3046.334	-246.393
46	1.000000	1.000000	1.000000	3046.334	-246.393
47	1.000000	1.000000	1.000000	3046.334	-246.393

48	1.000000	1.000000	1.000000	3046.334	-246.393
49	1.000000	1.000000	1.000000	3046.334	-246.393
50	1.000000	1.000000	1.000000	3046.334	-246.393

Bottom face compressed · 4. root in the bracket of the smallest moment

step	t (N < NEd)	t (N ≥ NEd)	t	N (kN)	M signed
1	1.000000	0.995000	0.997500	3049.227	-245.871
2	1.000000	0.997500	0.998750	3047.782	-246.132
3	1.000000	0.998750	0.999375	3047.058	-246.263
4	1.000000	0.999375	0.999688	3046.696	-246.328
5	1.000000	0.999688	0.999844	3046.515	-246.361
6	1.000000	0.999844	0.999922	3046.425	-246.377
7	1.000000	0.999922	0.999961	3046.380	-246.385
8	1.000000	0.999961	0.999980	3046.357	-246.389
9	1.000000	0.999980	0.999990	3046.346	-246.391
10	1.000000	0.999990	0.999995	3046.340	-246.392
11	1.000000	0.999995	0.999998	3046.337	-246.393
12	1.000000	0.999998	0.999999	3046.336	-246.393
13	1.000000	0.999999	0.999999	3046.335	-246.393
14	1.000000	0.999999	1.000000	3046.335	-246.393
15	1.000000	1.000000	1.000000	3046.335	-246.393
16	1.000000	1.000000	1.000000	3046.335	-246.393
17	1.000000	1.000000	1.000000	3046.335	-246.393
18	1.000000	1.000000	1.000000	3046.335	-246.393
19	1.000000	1.000000	1.000000	3046.335	-246.393
20	1.000000	1.000000	1.000000	3046.334	-246.393
21	1.000000	1.000000	1.000000	3046.334	-246.393
22	1.000000	1.000000	1.000000	3046.334	-246.393
23	1.000000	1.000000	1.000000	3046.334	-246.393
24	1.000000	1.000000	1.000000	3046.334	-246.393
25	1.000000	1.000000	1.000000	3046.334	-246.393
26	1.000000	1.000000	1.000000	3046.334	-246.393
27	1.000000	1.000000	1.000000	3046.334	-246.393
28	1.000000	1.000000	1.000000	3046.334	-246.393
29	1.000000	1.000000	1.000000	3046.334	-246.393
30	1.000000	1.000000	1.000000	3046.334	-246.393
31	1.000000	1.000000	1.000000	3046.334	-246.393
32	1.000000	1.000000	1.000000	3046.334	-246.393
33	1.000000	1.000000	1.000000	3046.334	-246.393
34	1.000000	1.000000	1.000000	3046.334	-246.393
35	1.000000	1.000000	1.000000	3046.334	-246.393
36	1.000000	1.000000	1.000000	3046.334	-246.393
37	1.000000	1.000000	1.000000	3046.334	-246.393
38	1.000000	1.000000	1.000000	3046.334	-246.393
39	1.000000	1.000000	1.000000	3046.334	-246.393
40	1.000000	1.000000	1.000000	3046.334	-246.393
41	1.000000	1.000000	1.000000	3046.334	-246.393
42	1.000000	1.000000	1.000000	3046.334	-246.393
43	1.000000	1.000000	1.000000	3046.334	-246.393
44	1.000000	1.000000	1.000000	3046.334	-246.393
45	1.000000	1.000000	1.000000	3046.334	-246.393
46	1.000000	1.000000	1.000000	3046.334	-246.393

47	1.000000	1.000000	1.000000	3046.334	-246.393
48	1.000000	1.000000	1.000000	3046.334	-246.393
49	1.000000	1.000000	1.000000	3046.334	-246.393
50	1.000000	1.000000	1.000000	3046.334	-246.393

Nationally Determined Parameters

Values used by the Calculation sheet for the selected National Annex. Sources: UK NA to BS EN 1992-1-1:2004, Table NA.1; PN-EN 1992-1-1:2008, Załącznik krajowy NA. Edit only if your project specifies different values.

Parameter	Clause	UK NA	PL NA	Notes
Partial factor, concrete γ_c	2.4.2.4(1)	1.5	1.4	Persistent & transient. UK NA: recommended; PL: NA.2, Table NA.2
Partial factor, reinforcement γ_s	2.4.2.4(1)	1.15	1.15	UK NA: recommended; PL: NA.2, Table NA.2
α_{cc} (compression in flexure / axial)	3.1.6(1)	0.85	1	UK NA: 0.85; PL: recommended (NA.9)
$\alpha_{cc,pl}$ (plain concrete, compression)	12.3.1(1)	0.6	0.8	UK NA Table NA.1: 0.6; PL: recommended (NA.9)
α_{cc} (shear and punching)	3.1.6(1)	1	1	UK NA: 1.0 for other phenomena; PL: recommended (NA.9)
α_{ct} (design tensile strength)	3.1.6(2)	1	1	Recommended value in both annexes
CRd,c numerator (CRd,c = value / γ_c)	6.2.2(1), 6.4.4(1)	0.18	0.18	Recommended value in both annexes
k1 (axial stress term, punching)	6.4.4(1)	0.1	0.1	Recommended value in both annexes
vRd,max factor (vRd,max = factor · v · fcd)	6.4.5(3)	0.5	0.4	UK NA: 0.5 v fcd; PL: recommended value (NA.9), 0.4 v fcd since EN 1992-1-1 AC:2010 (PN-EN 1992-1-1:2008)
kmax (vEd ≤ kmax · vRd,c at u1)	6.4.5	2	1.5	UK NA 6.4.5(3): 2 vRd,c. PL: no limit in PN-EN 1992-1-1:2008; 1.5 (A1:2014 recommendation) applied conse
ϕ_{large} (large bar threshold, mm)	8.8(1)	40	32	UK NA: 40 mm; PL: 32 mm recommended (NA.9)
cot θ upper limit (variable strut)	6.2.3(2)	2.5	2	UK NA: 2.5 (1.25 with axial tension); PL: NA.4, $1 \leq \cot \theta \leq 2.0$
k1 (x/d limit, $\delta \geq k1 + k2 x_u/d$)	5.5(4)	0.4	0.44	UK NA for $f_{yk} \leq 500$ MPa; PL: recommended (NA.9)
k2 (x/d limit, $\epsilon_{cu2} = 0.0035$)	5.5(4)	1	1.25	UK NA: $0.6 + 0.0014/\epsilon_{cu2}$; PL: $1.25(0.6 + 0.0014/\epsilon_{cu2})$
Upper limit on the (310/ σ_s) factor (0 = none)	7.4.2(2)	1.5	0	UK NA Table NA.5 Note 5: (310/ σ_s) or (500/ f_{yk})($A_s,prov/A_s,req$) ≤ 1.5; PL: none
L/d not to exceed 40 K (1 = applies)	7.4.2(2)	1	0	UK NA Table NA.5 Note 6; not in EN text
ϕ_{min} (longitudinal bars in columns, mm)	9.5.2(1)	12	6	UK NA: 12 mm; PL: NA.6, 6 mm
k3 (crack spacing)	7.3.4(3)	3.4	3.4	Recommended value in both annexes
k4 (crack spacing)	7.3.4(3)	0.425	0.425	Recommended value in both annexes
k1 (concrete stress, characteristic; XD, XF, XS)	7.2(2)	0.6	1	UK NA: recommended; PL: NA.5, $k1 = 1.0$
k2 (concrete stress, quasi-permanent; linear cr)	7.2(3)	0.45	0.45	Recommended value in both annexes (UK NA; PL NA.9)
k3 (steel stress, characteristic)	7.2(5)	0.8	0.8	Recommended value in both annexes (UK NA; PL NA.9)
k4 (steel stress, imposed deformation)	7.2(5)	1	1	Recommended value in both annexes (UK NA; PL NA.9)