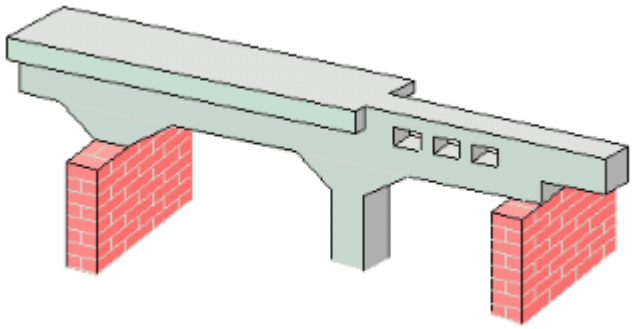
Pos. t305 **Трехпролетная балка**

t305 - Железобетонная балка (MSZ EN)



Программа предназначена для проектирования и расчёта многопролетной железобетонной балки согласно требованиям Венгерских норм MSZ EN 1992-1-1.

Возможно задание шарниров, вутов, консолей, стоек, упругих опор, частичного или полного защемления крайних опор.. Предусмотрен расчёт балки прямоугольного и таврового сечений. Могут задаваться распределённые и сосредоточенные нагрузки, а также температурные воздействия и осадки опор.

Расчётные сочетания усилий определяются автоматически, согласно MSZ EN 1990:2011.

Возможен расчет с перераспределением усилий за счет образования частичных шарниров на промежуточных опорах.

Продольная и поперечная арматура определяются на основе расчетов по предельным состояниям первой и второй групп.

При конструировании продольной арматуры, подбираются диаметры продольных стержней и определяются места их обрыва с учётом длин анкеровки. и места их обрыва для оптимизации количества арматуры. Длина стержней определяется с учётом анкеровки.

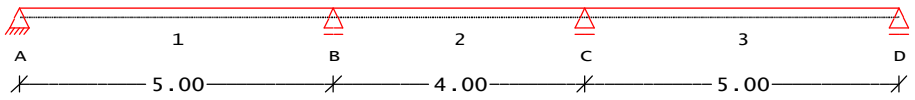
При конструировании поперечной арматуры определяется расположение хомутов и стержней поперечной арматуры, препятствующей срезу между стенкой и полками тавровых сечений.

При конструировании поперечной арматуры, определяется количество и расположение хомутов.

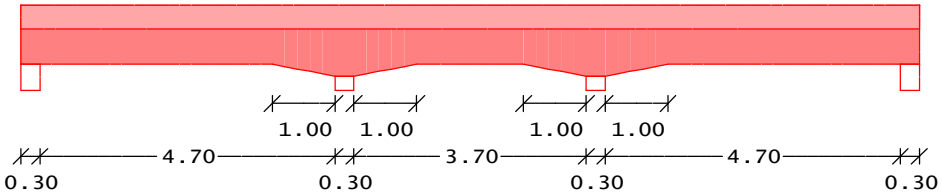
По результатам конструирования арматуры производится расчет ширины раскрытия трещин и прогибов.

Design scheme

M = 1 :120



M = 1 :120



Actions

№	Duration	Description
1	Permanent	Постоянное воздействие
2	Variable	постоянное - Категория C: зоны для собраний переменное Категория-C

Characteristics

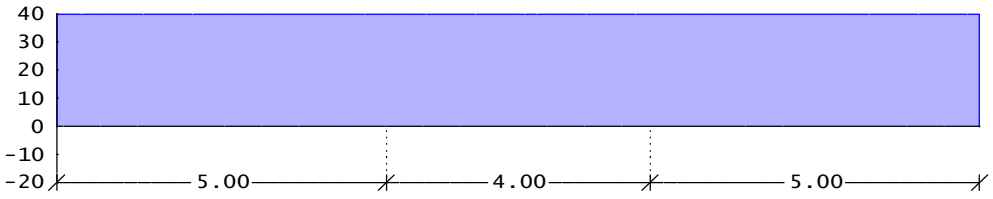
№	γ_F	ψ_0 ξ	ψ_1	ψ_2	group incomp.	sign	fields distrib
1	1.35	0.85					
2	1.50	0.70	0.70	0.60			adverse

Factor for reliability differentiation K_{FI} = 1.00
Combination of actions by formula (6.10) EN 1990

Loads

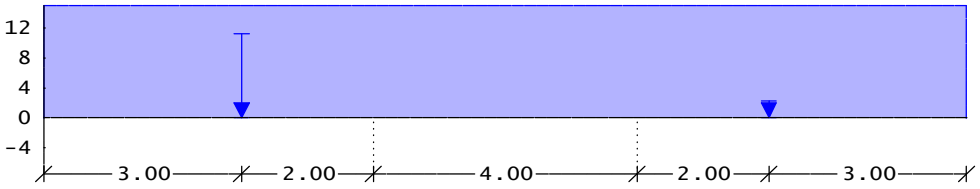
Action 1 постоянное - γ_f = 1.35

M = 1 :115



	N.	Field suppt	a [m]	s [m]	p_1/P [kN/m, kN,	$p_п$/M kNm]
Uniform	1	1-3			40.00	

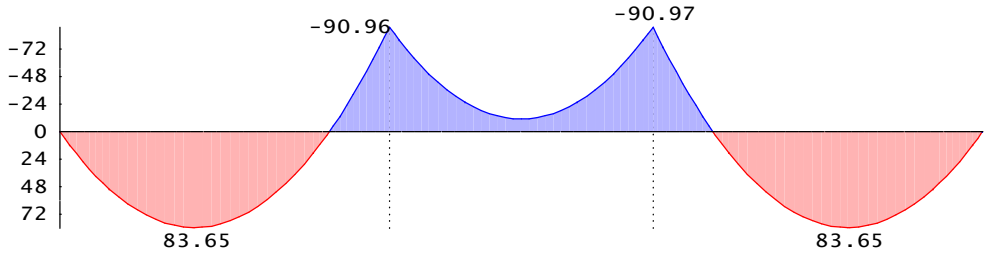
Action 2 переменное Категория-C γ_f = 1.50
M = 1 :115



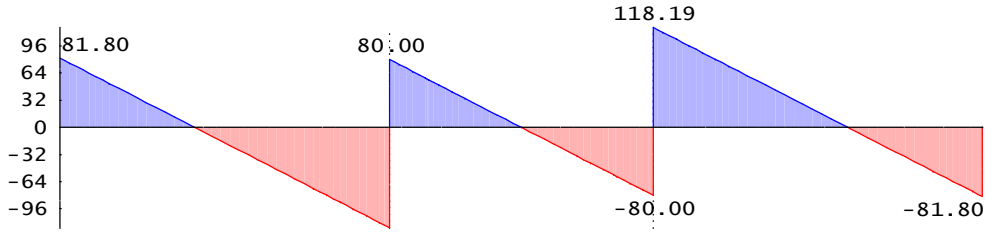
	N.	Field suppt	a [m]	s [m]	p_l/P [kN/m, kN,	p_n/M kNm]
Uniform	1	1-3			15.00	
Force	1	1	3.00		100.00	
	2	3	2.00		20.00	

Internal forces by linear elastic method

Action 1 moments M_{el} [kNm]
M = 1 :115



Action 1 shear forces Q_{el} [kN]
M = 1 :115

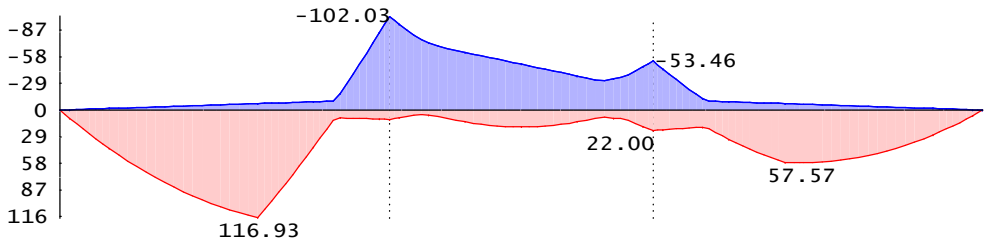


Action 1

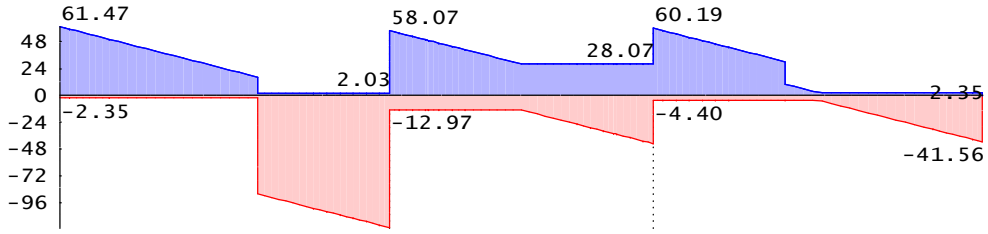
Field	x [m]		max M_{el} [kNm]	min M_{el} [kNm]	max Q_{el} [kN]	min Q_{el} [kN]
1	0.00		0.00	0.00	81.81	81.81
	0.15	s	11.82	11.82	75.81	75.81
	0.62	h0	42.93	42.93	57.05	57.05
	1.00		61.74	61.74	41.81	41.81
	2.00		83.57	83.57	1.81	1.81
	2.05	*	83.65	83.65	-0.00	-0.00
	3.00		65.40	65.40	-38.19	-38.19
	4.00		7.17	7.17	-78.19	-78.19
	4.28	h0	-16.37	-16.37	-89.43	-89.43
	4.85	s	-73.69	-73.69	-112.19	-112.19
	5.00		-90.97	-90.97	-118.19	-118.19
2	0.00		-90.97	-90.97	80.00	80.00
	0.15	s	-79.42	-79.42	74.00	74.00
	0.72	h0	-43.84	-43.84	51.24	51.24
	1.00		-31.00	-31.00	40.00	40.00

	2.00		-10.97	-10.97	0.00	0.00
	3.00		-31.00	-31.00	-40.00	-40.00
	3.28	h0	-43.84	-43.84	-51.24	-51.24
	3.85	s	-79.42	-79.42	-74.00	-74.00
	4.00		-90.97	-90.97	-80.00	-80.00
3	0.00		-90.97	-90.97	118.19	118.19
	0.15	s	-73.69	-73.69	112.19	112.19
	0.72	h0	-16.37	-16.37	89.43	89.43
	1.00		7.17	7.17	78.19	78.19
	2.00		65.40	65.40	38.19	38.19
	2.95	*	83.65	83.65	-0.00	-0.00
	3.00		83.57	83.57	-1.81	-1.81
	4.00		61.74	61.74	-41.81	-41.81
	4.38	h0	42.93	42.93	-57.05	-57.05
	4.85	s	11.82	11.82	-75.81	-75.81
	5.00		0.00	0.00	-81.81	-81.81

Action 2 envelope of moments M_{el} [kNm]
M = 1 :115



Loadung 2 envelope of shear forces Q_{el} [kN]
M = 1 :115



Action 2

Field	x [m]		max M_{el} [kNm]	min M_{el} [kNm]	max Q_{el} [kN]	min Q_{el} [kN]
1	0.00		0.00	-0.00	61.48	-2.35
	0.15	s	9.05	-0.35	59.23	-2.35
	0.62	h0	35.16	-1.46	52.19	-2.35
	1.00		53.95	-2.35	46.48	-2.35
	2.00		92.94	-4.70	31.48	-2.35
	3.00	*	116.93	-7.05	16.48	-2.35
	4.00		25.88	-9.41	2.03	-102.91
	4.28	h0	8.70	-21.16	2.03	-107.12
	4.85	s	9.86	-84.53	2.03	-115.66
	5.00		10.16	-102.05	2.03	-117.91
2	0.00		10.16	-102.05	58.07	-12.97
	0.15	s	8.22	-93.50	55.82	-12.97
	0.72	h0	6.76	-70.10	47.29	-12.97
	1.00		10.73	-65.02	43.07	-12.97
	2.00	*	18.24	-49.91	28.07	-12.97
	3.00		10.73	-34.81	28.07	-27.97
	3.28	h0	7.74	-32.38	28.07	-32.18
	3.85	s	17.79	-47.19	28.07	-40.72
	4.00		22.00	-53.46	28.07	-42.97

3	0.00		22.00	-53.46	60.19	-4.40
	0.15	s	21.34	-44.60	57.94	-4.40
	0.72	h0	18.84	-14.08	49.41	-4.40
	1.00		26.22	-9.41	45.19	-4.40
	2.00		57.18	-7.05	30.19	-4.40
	2.23	*	57.57	-6.52	6.75	-4.40
	3.00		53.10	-4.70	2.35	-11.56
	4.00		34.03	-2.35	2.35	-26.56
	4.38	h0	22.84	-1.46	2.35	-32.27
	4.85	s	6.07	-0.35	2.35	-39.31
	5.00		0.00	-0.00	2.35	-41.56

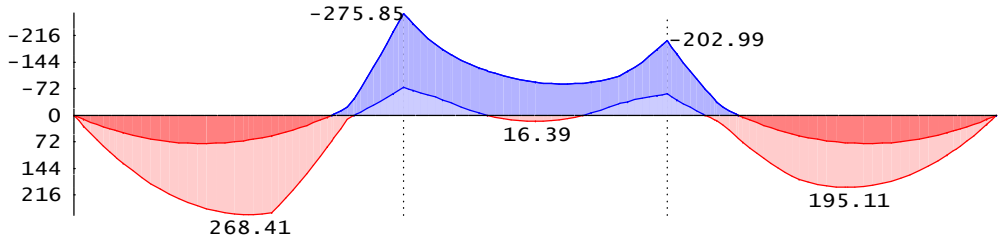
Support reactions

Action	support	max [kN]	min [kN]
1	A	81.81	81.81
	B	198.19	198.19
	C	198.19	198.19
	D	81.81	81.81
2	A	61.48	-2.35
	B	175.98	-15.00
	C	103.16	-32.47
	D	41.56	-2.35

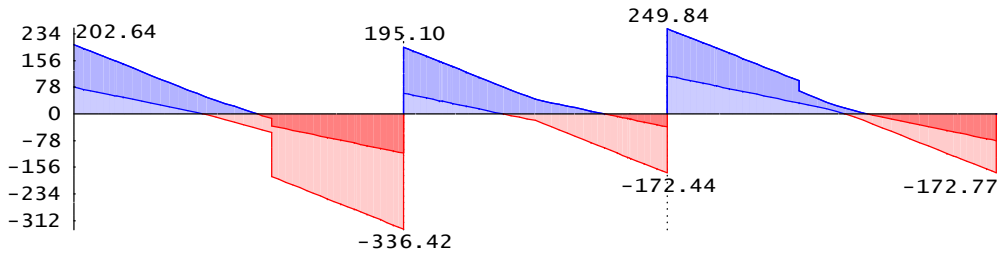
Load combinations

Combinations of loads by p. 6.4.3 MSZ EN 1990:2011
Basis of structural design.
fundamental combinations

Moment M [kNm]
M = 1 :115



Shear force Q [kN] fundamental combinations
M = 1 :115



Field	x [m]		max M_{Ed} [kNm]	min M_{Ed} [kNm]	max Q_{Ed} [kN]	min Q_{Ed} [kN]
1	0.00		0.00	0.00	202.65	78.28
	0.15	s	29.54	11.29	191.18	72.28
	0.62	h0	110.78	40.79	155.30	53.52
	1.00		164.27	58.21	126.15	38.28
	2.00		252.23	76.52	49.65	-1.72
	2.65	*	268.41	67.01	8.45	-36.14
	3.00		263.70	54.83	-13.48	-55.09
	4.00		48.51	-6.94	-75.15	-259.93
	4.28	h0	-3.28	-53.76	-86.39	-281.42
	4.85	s	-58.90	-226.28	-109.15	-324.95

	5.00		-75.73	-275.88	-115.15	-336.43
2	0.00		-75.73	-275.88	195.11	60.55
	0.15	s	-67.09	-247.48	183.63	54.55
	0.72	h0	-33.63	-164.27	140.11	31.79
	1.00		-14.91	-139.38	118.61	20.55
	2.00	*	16.39	-89.68	42.11	-19.45
	3.00		-14.91	-94.07	2.11	-95.95
	3.28	h0	-32.16	-107.69	-9.13	-117.45
	3.85	s	-52.73	-178.00	-31.89	-160.98
	4.00		-57.97	-203.01	-37.89	-172.45
3	0.00		-57.97	-203.01	249.85	111.59
	0.15	s	-41.68	-166.39	238.38	105.59
	0.72	h0	11.93	-43.14	194.85	82.83
	1.00		49.01	-6.94	173.35	71.59
	2.00		174.08	54.83	96.85	31.59
	2.74	*	195.11	74.77	15.05	-2.99
	3.00		192.48	76.52	1.72	-19.78
	4.00		134.40	58.21	-38.28	-96.28
	4.38	h0	92.29	40.79	-53.52	-125.42
	4.85	s	25.06	11.29	-72.28	-161.30
	5.00		0.00	0.00	-78.28	-172.78

Combinations of support reactions

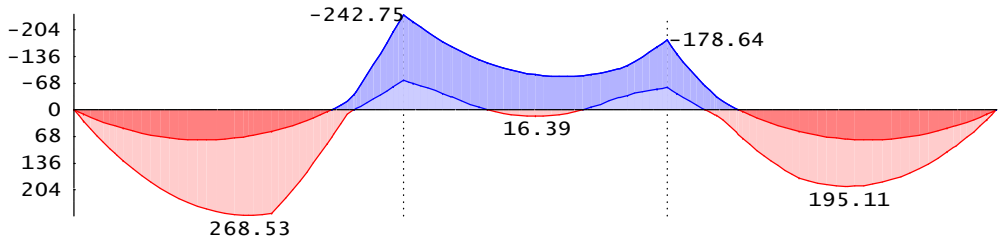
Combination	support	max [kN]	min [kN]
fundamental comb	A	202.65	78.28
	B	531.54	175.69
	C	422.30	149.48
	D	172.78	78.28

Moments redistribut.

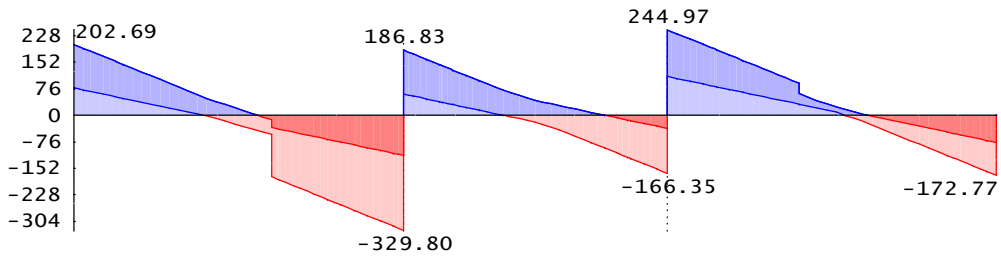
B	C
12.0%	12.0%

Results after moments redistribution.

Moment M [kNm] fundamental combinations
M = 1 :115



Shear force Q [kN] fundamental combinations
M = 1 :115



Field	x [m]		max M_{Ed} [kNm]	min M_{Ed} [kNm]	max Q_{Ed} [kN]	min Q_{Ed} [kN]
1	0.00		0.00	0.00	202.69	78.28
	0.15	s	29.54	11.29	191.22	72.28
	0.56	h0	101.96	37.72	159.62	55.76
	1.00		164.31	58.21	126.19	38.28
	2.00		252.31	76.52	49.69	-1.72
	2.65	*	268.53	67.00	8.42	-36.17
	3.00		263.83	54.83	-13.48	-55.09
	4.00		48.68	-6.94	-75.15	-253.32
	4.28	h0	-3.54	-47.72	-86.51	-275.02
	4.85	s	-58.90	-199.26	-109.15	-318.29
	5.00		-75.73	-242.78	-115.15	-329.81
2	0.00		-75.73	-242.78	186.83	60.55
	0.15	s	-67.09	-223.80	175.36	54.55
	0.72	h0	-33.82	-163.12	132.03	31.91
	1.00		-14.91	-139.22	110.30	20.55
	2.00	*	16.39	-89.57	42.11	-19.45
	3.00		-14.91	-94.01	2.11	-89.84
	3.28	h0	-32.06	-105.13	-9.25	-111.57
	3.85	s	-52.73	-160.39	-31.89	-154.86
	4.00		-57.97	-178.65	-37.89	-166.36
3	0.00		-57.97	-178.65	244.98	111.59
	0.15	s	-41.68	-142.77	233.51	105.59
	0.72	h0	11.68	-37.92	190.20	82.95
	1.00		49.01	-6.94	168.48	71.59
	2.00		174.08	54.83	91.98	31.59
	2.74	*	195.11	74.77	15.05	-2.99
	3.00		192.48	76.52	1.72	-19.78
	4.00		134.40	58.21	-38.28	-96.28
	4.44	h0	85.25	37.77	-55.72	-129.63
	4.85	s	25.06	11.29	-72.28	-161.30
	5.00		0.00	0.00	-78.28	-172.78

Combinations of support reactions

Combination	support	max [kN]	min [kN]
fundamental comb	A	202.69	78.28
	B	516.64	175.69
	C	411.34	149.48
	D	172.78	78.28

Strength design

By MSZ EN 1992-1-1: Design of concrete structures
Concrete C25/30, linkS400 *fyk=400MPa*
top S500 *fyk=500MPa ftk=525MPa*
bottom S500 *fyk=500MPa ftk=525MPa*

Protective layer

Field	ap b [mm]	ap t [mm]	ap l [mm]	a b [cm]	a t [cm]
1	28	28	15	3.7	3.4
2	28	28	15	3.4	3.4
3	28	28	15	3.6	3.4

Field 1

x [m]		max M [kNm]	min M [kNm]	A_{sb} (I) [cm^2]	A_{st} (I) [cm^2]	A_{sb} [cm^2]	A_{st} [cm^2]
0.00		0.1	0.0	2.82	0.00	2.82	0.00
0.15	s	29.5	11.3	2.82	0.00	2.82	0.00
1.00		164.3	58.2	7.98	0.00	7.98	0.00
2.00		252.3	76.5	12.34	0.00	12.34	0.00
2.65	*	268.5	67.0	13.15	0.00	13.15	0.00
3.00		263.8	54.8	12.91	0.00	12.91	0.00
3.84		88.3	5.7	4.26	0.00	4.26	0.00

3.86		83.5	4.2	4.04	0.00	4.04	0.00
3.91		70.4	0.0	3.36	0.00	3.36	5.24
4.00		48.7	-6.9	2.82	5.28	2.82	5.28
4.85	s	-58.9	-199.3	0.00	8.41	0.00	8.41
5.00		-75.7	-242.8	0.00	10.52	0.00	10.52

x [m]		V_{Ed} [kN]	V_{rdc} [kN]	V_{rds} [kN]	V_{rdmax} [kN]	A_{sw}/s [cm²/m]
0.00						
0.15	o	191.2	72.8	191.2	406.8	4.20
0.56	h0	159.6	72.8	159.6	406.6	4.20
1.00		126.2	83.4	126.2	401.7	3.36
2.00		49.7	83.4			3.00
3.00		55.1	83.4			3.00
3.84		241.1	83.4	241.1	402.2	6.42
3.86		242.6	82.4	242.6	403.6	6.44
3.91		246.7	77.1	246.8	411.0	6.43
4.00		253.3	73.9	253.3	420.4	6.45
4.28	h0	275.0	76.2	275.0	432.1	6.81
4.85	o	318.3	80.1	318.3	474.4	5.43
5.00						

Field 2

x [m]		max M [kNm]	min M [kNm]	A_{sb} (I) [cm²]	A_{st}(I) [cm²]	A_{sb} [cm²]	A_{st} [cm²]
0.00		-75.7	-242.8	0.00	10.52	0.00	10.52
0.15	s	-67.1	-223.8	0.00	9.59	0.00	9.59
1.00		-14.9	-139.2	0.00	6.88	0.00	6.88
1.14		-6.8	-129.0	0.00	6.56	0.00	6.56
1.16		-5.7	-127.6	0.00	6.49	0.00	6.49
2.00	*	16.4	-89.6	2.38	4.49	2.38	4.49
2.84		-5.7	-89.7	0.00	4.49	0.00	4.49
2.86		-6.8	-90.1	0.00	4.49	0.00	4.49
3.00		-14.9	-94.0	0.00	4.55	0.00	4.55
3.85	s	-52.7	-160.4	0.00	6.60	0.00	6.60
4.00		-58.0	-178.7	0.00	7.44	0.00	7.44

x [m]		V_{Ed} [kN]	V_{rdc} [kN]	V_{rds} [kN]	V_{rdmax} [kN]	A_{sw}/s [cm²/m]
0.00						
0.15	o	175.4	80.1	175.4	477.3	4.69
0.72	h0	132.0	76.2	132.0	428.4	3.30
1.00		110.3	71.3	113.7	405.7	3.00
1.14		99.6	70.3	110.3	393.5	3.00
1.16		98.1	70.2	110.0	392.6	3.00
2.00		42.1	58.0			3.00
2.84		77.6	63.8	110.7	395.2	3.00
2.86		79.1	63.9	111.0	396.0	3.00
3.00		89.8	64.8	114.5	408.5	3.00
3.28	h0	111.6	73.2	120.2	429.0	3.00
3.85	o	154.9	77.0	154.9	478.6	3.67
4.00						

Field 3

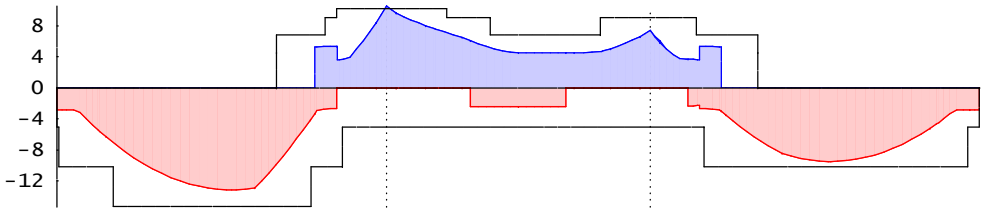
x [m]		max M [kNm]	min M [kNm]	A_{sb} (I) [cm²]	A_{st}(I) [cm²]	A_{sb} [cm²]	A_{st} [cm²]
0.00		-58.0	-178.7	0.00	7.44	0.00	7.44
0.15	s	-41.7	-142.8	0.00	5.84	0.00	6.08
1.00		49.0	-6.9	2.76	5.28	2.76	5.28
1.09		62.7	-0.1	2.99	5.24	2.99	5.24
1.09		63.0	0.1	3.00	0.00	3.00	0.00
1.14		71.2	4.2	3.43	0.00	3.43	0.00
1.16		74.2	5.7	3.57	0.00	3.57	0.00
2.00		174.1	54.8	8.44	0.00	8.44	0.00

2.74	*	195.1	74.8	9.48	0.00	9.48	0.00
3.00		192.5	76.5	9.35	0.00	9.35	0.00
4.00		134.4	58.2	6.50	0.00	6.50	0.00
4.85	s	25.1	11.3	2.82	0.00	2.82	0.00
5.00		0.0	0.0	2.82	0.00	2.82	0.00

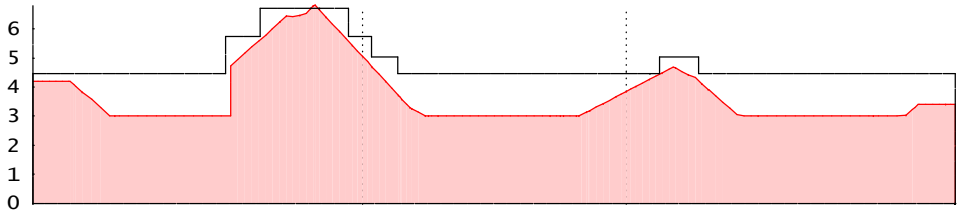
x [m]		V_{Ed} [kN]	V_{rdc} [kN]	V_{rds} [kN]	V_{rdmax} [kN]	A_{sw}/s [cm²/m]
0.00						
0.15	o	233.5	77.0	233.5	479.2	4.02
0.72	h0	190.2	66.5	190.2	434.7	4.68
1.00		168.5	64.8	168.5	412.6	4.37
1.09		162.0	67.4	162.0	408.1	4.25
1.09		161.8	67.6	161.8	408.1	4.25
1.14		157.8	72.0	157.8	408.0	4.14
1.16		156.2	72.9	156.2	408.0	4.10
2.00		92.0	72.9	114.2	407.4	3.00
3.00		19.8	72.9			3.00
4.00		96.3	72.9	114.0	406.9	3.00
4.44	h0	129.6	72.9	129.6	407.2	3.41
4.85	o	161.3	57.9	161.3	414.3	3.41
5.00						

Reinforc. designing

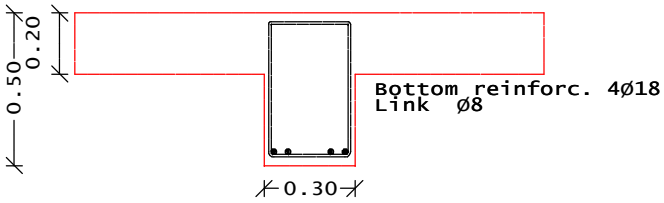
Longitud. reinforc. A_s [cm²]
M = 1 :115



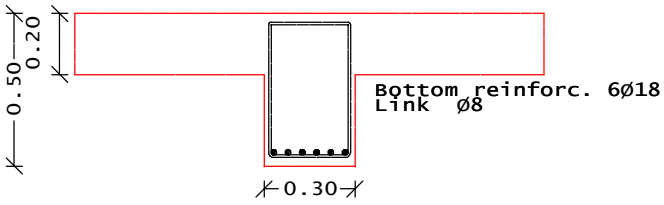
Shear reinforcement A_{sw}/s [cm²/m]
M = 1 :115



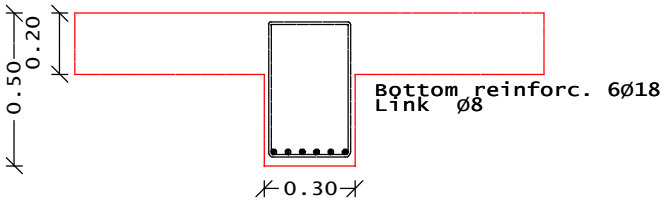
Field 1 reinforcement arrangement crossection at x= 0.00
M = 1 :25



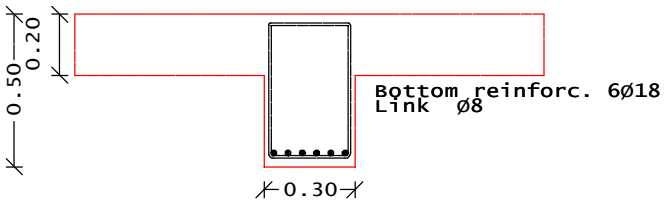
Field 1 reinforcement arrangement crossection at x= 1.00
M = 1 :25



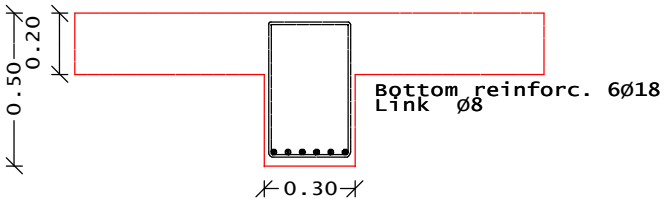
Field 1 reinforcement arrangement crossection at x= 2.00
M = 1 :25



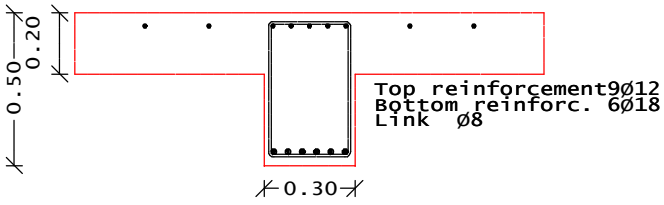
Field 1 reinforcement arrangement crossection at x= 2.65
M = 1 :25



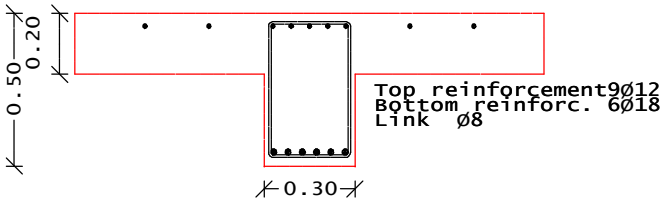
Field 1 reinforcement arrangement crossection at x= 3.00
M = 1 :25



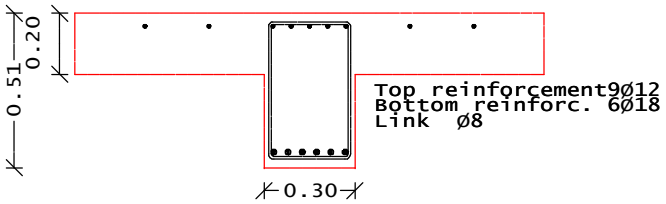
Field 1 reinforcement arrangement crossection at x= 3.84
M = 1 :25



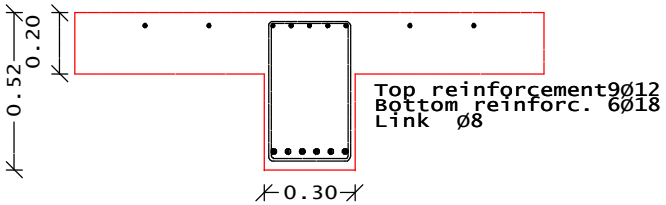
Field 1 reinforcement arrangement crossection at x= 3.86
M = 1 :25



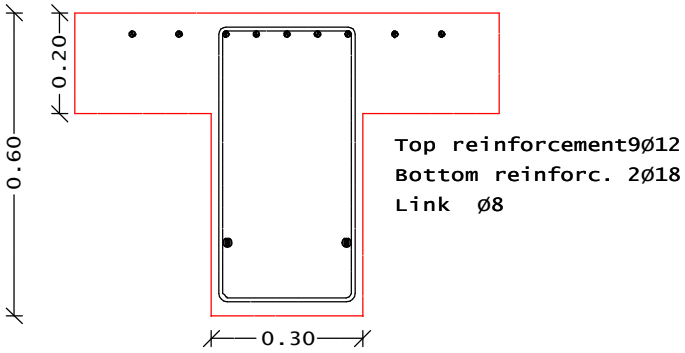
Field 1 reinforcement arrangement crossection at x= 3.91
M = 1 :25



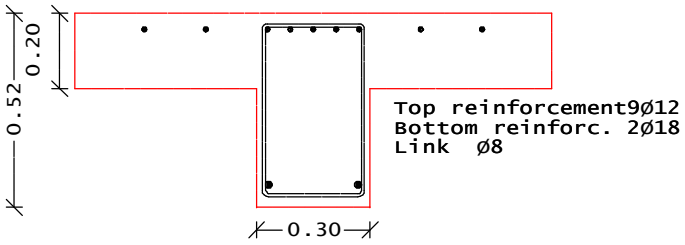
Field 1 reinforcement arrangement crossection at x= 4.00
M = 1 :25



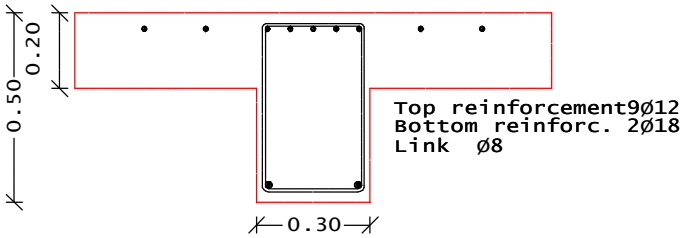
Field 2 reinforcement arrangement crossection at x= 0.15
M = 1 :15



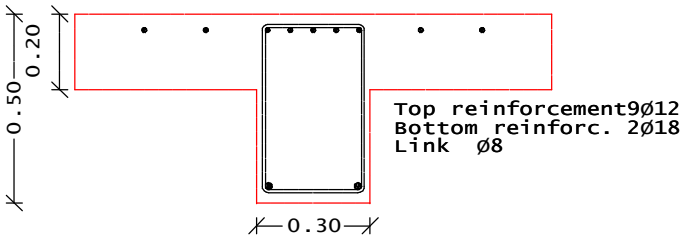
Field 2 reinforcement arrangement crossection at x= 1.00
M = 1 :20



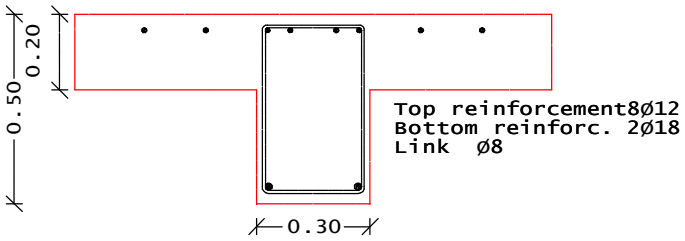
Field 2 reinforcement arrangement crossection at x= 1.14
M = 1 :20



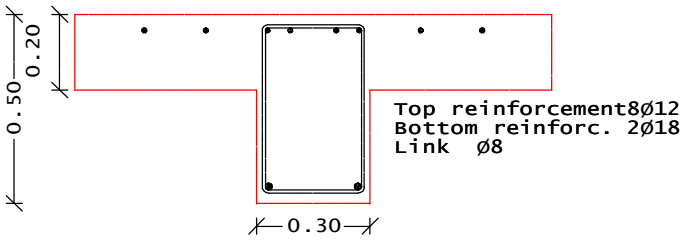
Field 2 reinforcement arrangement crossection at x= 1.16
M = 1 :20



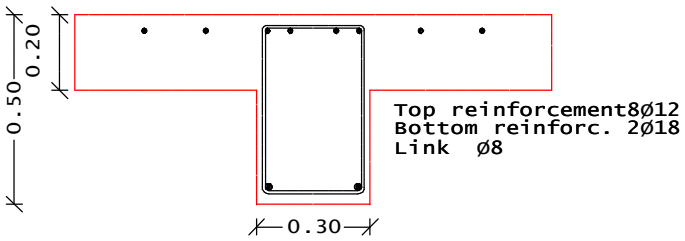
Field 2 reinforcement arrangement crossection at x= 2.00
M = 1 :20



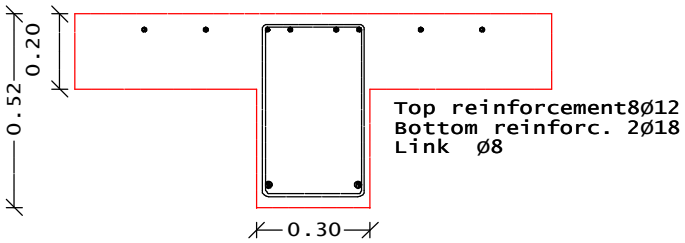
Field 2 reinforcement arrangement crossection at x= 2.84
M = 1 :20



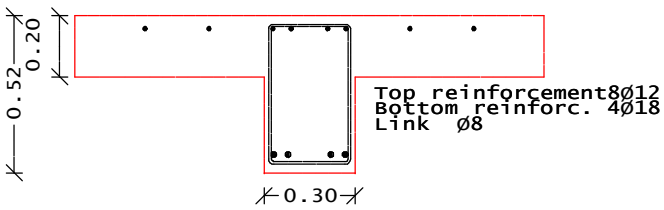
Field 2 reinforcement arrangement crossection at x= 2.86
M = 1 :20



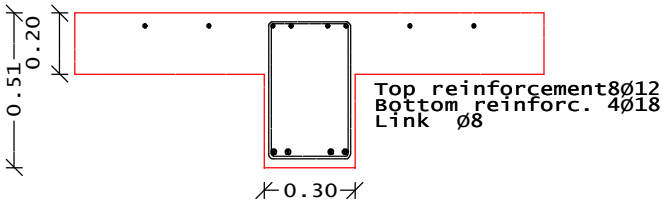
Field 2 reinforcement arrangement crossection at x= 3.00
M = 1 :20



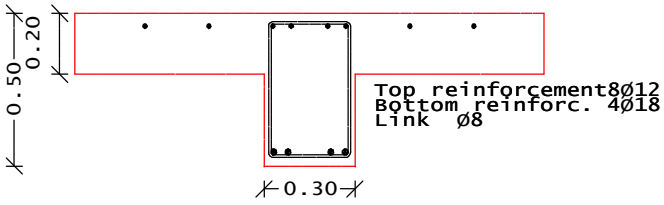
Field 3 reinforcement arrangement crossection at x= 1.00
M = 1 :25



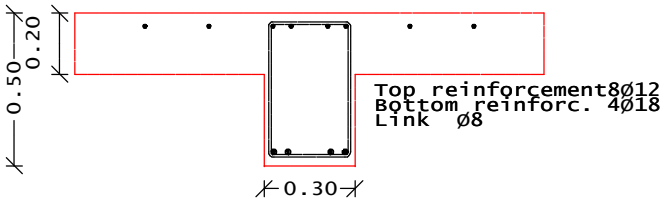
Field 3 reinforcement arrangement crossection at x= 1.09
M = 1 :25



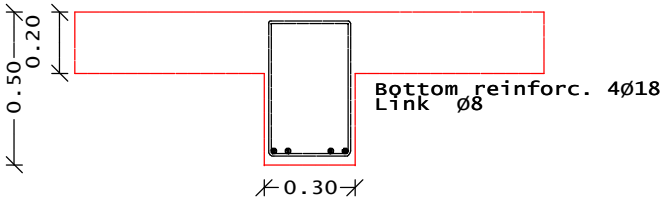
Field 3 reinforcement arrangement crossection at x= 1.14
M = 1 :25



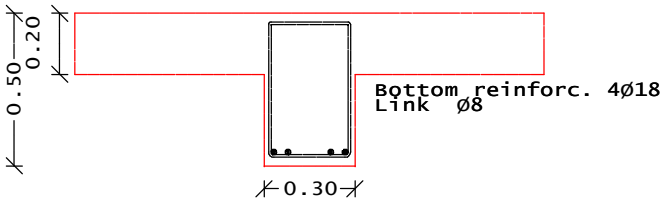
Field 3 reinforcement arrangement crossection at x= 1.16
M = 1 :25



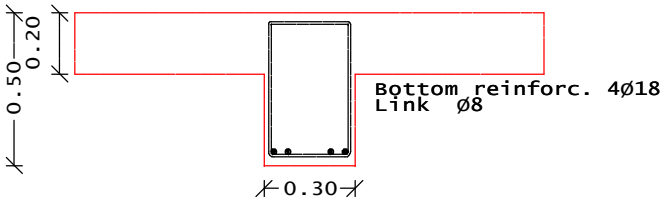
Field 3 reinforcement arrangement crossection at x= 2.00
M = 1 :25



Field 3 reinforcement arrangement crossection at x= 3.00
M = 1 :25



Field 3 reinforcement arrangement crossection at x= 4.00
M = 1 :25



Longitud. reinf.

field supp	typ	numb	d_s [mm]	row	$A_{s\,l}$ [cm^2]	a [m]	l [m]
1	b	2	18	1	5.09	-0.35	14.70
1	b	2	18	1	10.18	-0.32	5.36
1	b	2	18	1	15.27	0.48	3.73

3	**b**	**2**	**18**	**1**	**10.18**	**0.47**	**4.69**

Longitud. reinf.

field supp	typ	numb	d_s [mm]	row	A_{sl} [cm²]	a [m]	l [m]
B	**t**	**2**	**12**	**1**	**6.79**	**3.10**	**7.77**
B	**t**	**4**	**12**	**1**	**4.52**	**3.10**	**7.77**
B	**t**	**2**	**12**	**1**	**9.05**	**3.61**	**3.44**
B	**t**	**1**	**12**	**1**	**10.18**	**3.78**	**2.60**
C	**t**	**2**	**12**	**1**	**9.05**	**2.78**	**2.38**

Lengths are given with the anchoring

Links

Field	numb	n	ds [mm]	s [cm]	A_{sw}/s [cm²/m]	a [m]	l [m]
1	**14**	**2**	**8**	**23**	**4.47**	**0.00**	**2.93**
1	**3**	**2**	**8**	**18**	**5.74**	**2.93**	**0.52**
1	**6**	**2**	**8**	**15**	**6.70**	**3.45**	**0.90**
1	**3**	**2**	**8**	**15**	**6.70**	**4.34**	**0.45**
1	**2**	**2**	**8**	**18**	**5.74**	**4.79**	**0.35**
2	**2**	**2**	**8**	**20**	**5.03**	**0.14**	**0.40**
2	**17**	**2**	**8**	**23**	**4.47**	**0.54**	**3.83**
3	**4**	**2**	**8**	**20**	**5.03**	**0.50**	**0.60**
3	**18**	**2**	**8**	**23**	**4.47**	**1.10**	**4.05**

Typ of reinforcement	d [mm]	length [m]	numb	weight [kN]
longitud. reinforc.	**12**	**60.88**		**0.53**
longitud. reinforc.	**18**	**56.95**		**1.12**
links	**8**		**70**	

Shear between web and flanges

V_{rdc} = 0.48MPa, V_{rdmax} = 4.50MPa, d = 8mm

Field	x [m]	V_{Ed} [MPa]	A_{sw}/s [cm²/m]	s [cm]	n	A_{sw}/S [cm²/m]
1	0.00	0.91	5.24	18	1x2	5.59
	0.18	0.85	4.89	20	1x2	5.03
	0.38	0.66	3.78	24	1x2	4.19
	0.62	0.62	3.56	28	1x2	3.59
	0.90	0.53	3.03	32	1x2	3.14
	2.86	0.06	0.00	24	1x2	4.19
	3.10	0.71	4.06	22	1x2	4.57
	3.32	0.76	4.38	20	2x2	5.03
	3.72	0.86	4.97	18	1x2	5.59
	3.90	0.84	4.83	14	2x2	7.18
	4.18	0.89	4.41	18	3x2	5.59
	4.85	0.48	0.00	28	1x2	3.59
2	4.00	0.27	0.00	22	1x2	4.57
3	0.22	0.70	4.02	24	1x2	4.19
	0.65	0.32	0.00	22	2x2	4.57
	1.09	0.62	3.59	28	1x2	3.59
	1.37	0.54	3.09	32	2x2	3.14
	4.67	0.51	0.80	22	1x2	4.57
	4.89	0.74	4.25	11	1x2	9.14

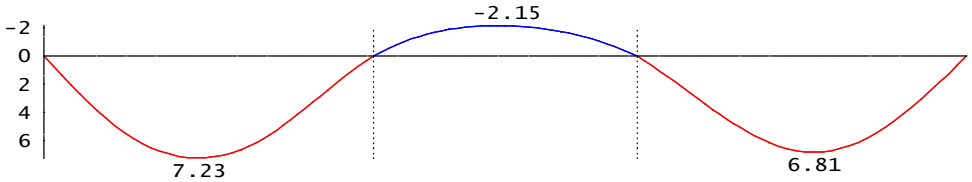
Cracks verification

Maximum permissible width of the cracks wk=0.30 mm

Normal cracks

Field	x [m]		M [kNm]	M_{crc} [kNm]	σ_s [MPa]	$A_{c,eff}$ [cm²]	w_k [mm]
1	0.00		0.0	49.2			
	0.15	o	17.3	49.2			
	1.00		94.1	49.2	14.9	277.50	0.16
	2.00		139.3	51.8	14.9	277.50	0.14
	2.65	*	142.5	51.8	14.9	277.50	0.14
	3.00		135.6	51.8	14.9	277.50	0.13
	3.84		44.1	49.5			
	3.86		41.5	49.6			
	3.91		34.4	50.6			
	4.00		22.7	49.5			
	4.85	o	-124.4	-97.5	14.0	714.00	0.22
	5.00		-152.2	-98.0	14.0	714.00	0.25
2	0.00		-152.2	-98.0	14.0	714.00	0.25
	0.15	o	-135.5	-98.0	14.0	714.00	0.21
	1.00		-70.0	-92.3	0.0	0.00	0.00
	1.14		-63.5	-86.7	0.0	0.00	0.00
	1.16		-62.7	-86.3	0.0	0.00	0.00
	2.00	*	-40.9	-86.3	0.0	0.00	0.00
	2.84		-47.4	-86.3	0.0	0.00	0.00
	2.86		-47.9	-86.7	0.0	0.00	0.00
	3.00		-51.9	-91.7	0.0	0.00	0.00
	3.85	o	-107.7	-97.5	14.0	714.00	0.18
	4.00		-123.1	-97.5	14.0	714.00	0.22
3	0.00		-123.1	-97.5	14.0	714.00	0.22
	0.15	o	-100.5	-96.6	14.0	714.00	0.26
	1.00		22.9	49.5			
	1.09		31.6	47.9			
	1.14		36.6	47.0			
	1.16		38.5	46.8			
	2.00		99.7	49.2	14.9	277.50	0.17
	2.74	*	116.1	49.2	14.9	277.50	0.20
	3.00		115.4	49.2	14.9	277.50	0.20
	4.00		82.2	49.2	14.9	277.50	0.13
	4.85	o	15.5	49.2			
	5.00		0.0	49.2			

Deflections [mm]
M = 1 :115



Deflections

Field	x [m]		M [kNm]	$100/\rho_I$ [1/m]	$100/\rho_{II}$ [1/m]	$100/\rho$ [1/m]	w [mm]
1	0.00		0.0	0.00	0.00	0.00	0.00
	1.00		94.1	0.19	0.26	0.24	4.61
	2.00		139.3	0.28	0.27	0.27	7.04
	2.33	*	143.6	0.29	0.28	0.28	7.23
	3.00		135.6	0.27	0.27	0.27	6.63
	4.00		22.7	0.04	0.00	0.04	3.57
	5.00		-139.0	-0.20	0.00	-0.20	0.00
2	0.00		-139.0	-0.20	0.00	-0.20	-0.00
	1.00		-70.0	-0.14	0.00	-0.14	-1.76
	2.00	*	-40.9	-0.09	0.00	-0.09	-2.15

	3.00		-51.9	-0.10	0.00	-0.10	-1.59
	4.00		-102.8	-0.15	0.00	-0.15	-0.00
3	0.00		-102.8	-0.15	0.00	-0.15	0.00
	1.00		22.9	0.04	0.00	0.04	3.28
	2.00		99.7	0.20	0.28	0.26	6.13
	2.67	*	115.7	0.23	0.32	0.30	6.81
	3.00		115.4	0.23	0.32	0.30	6.63
	4.00		82.1	0.16	0.23	0.20	4.25
	5.00		0.0	0.00	0.00	0.00	0.00

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