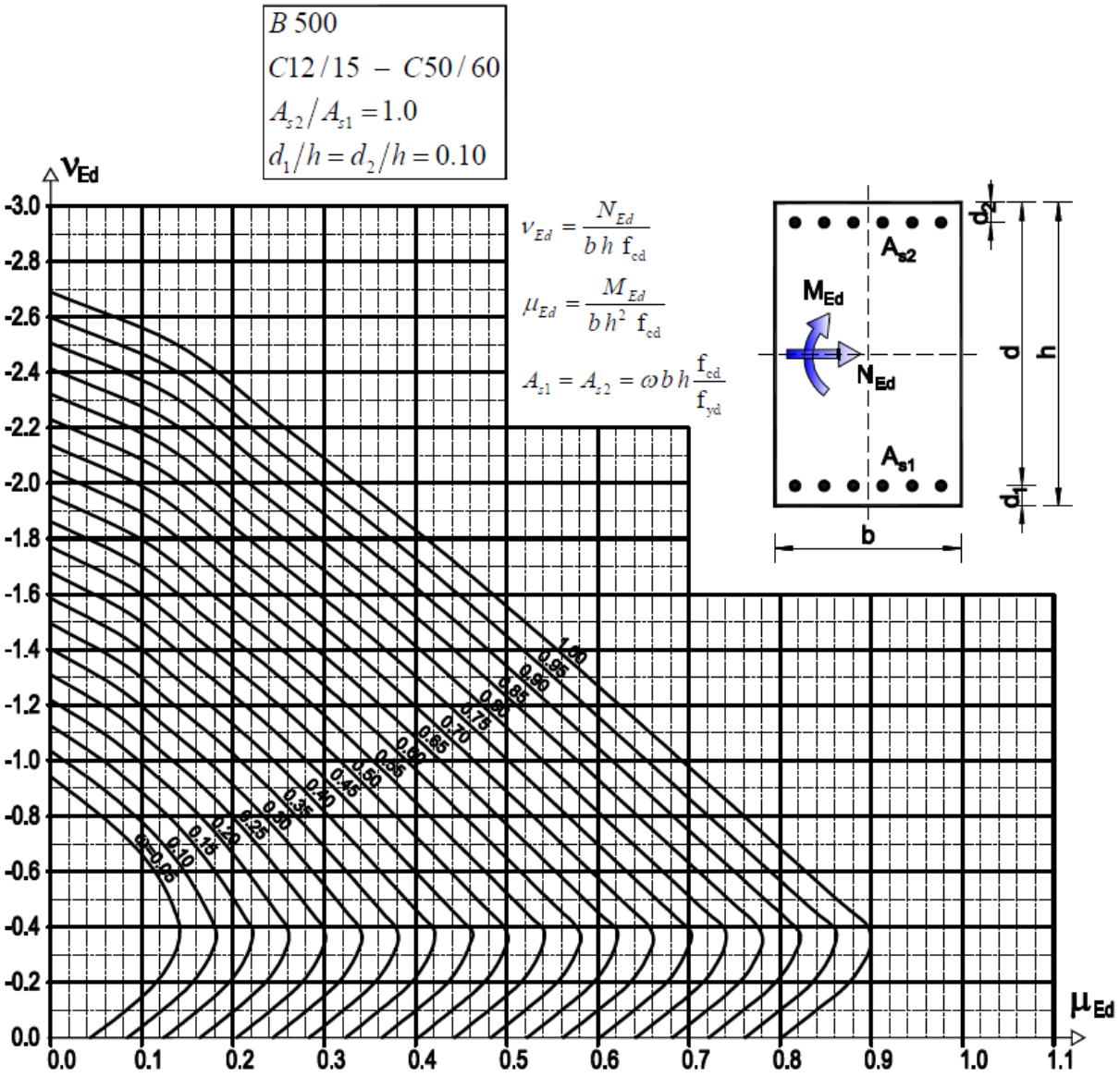
Tablica za dimenzioniranje AB pravokutnih presjeka prema HRN EN 1992
Za betone razreda ≤ C50/60

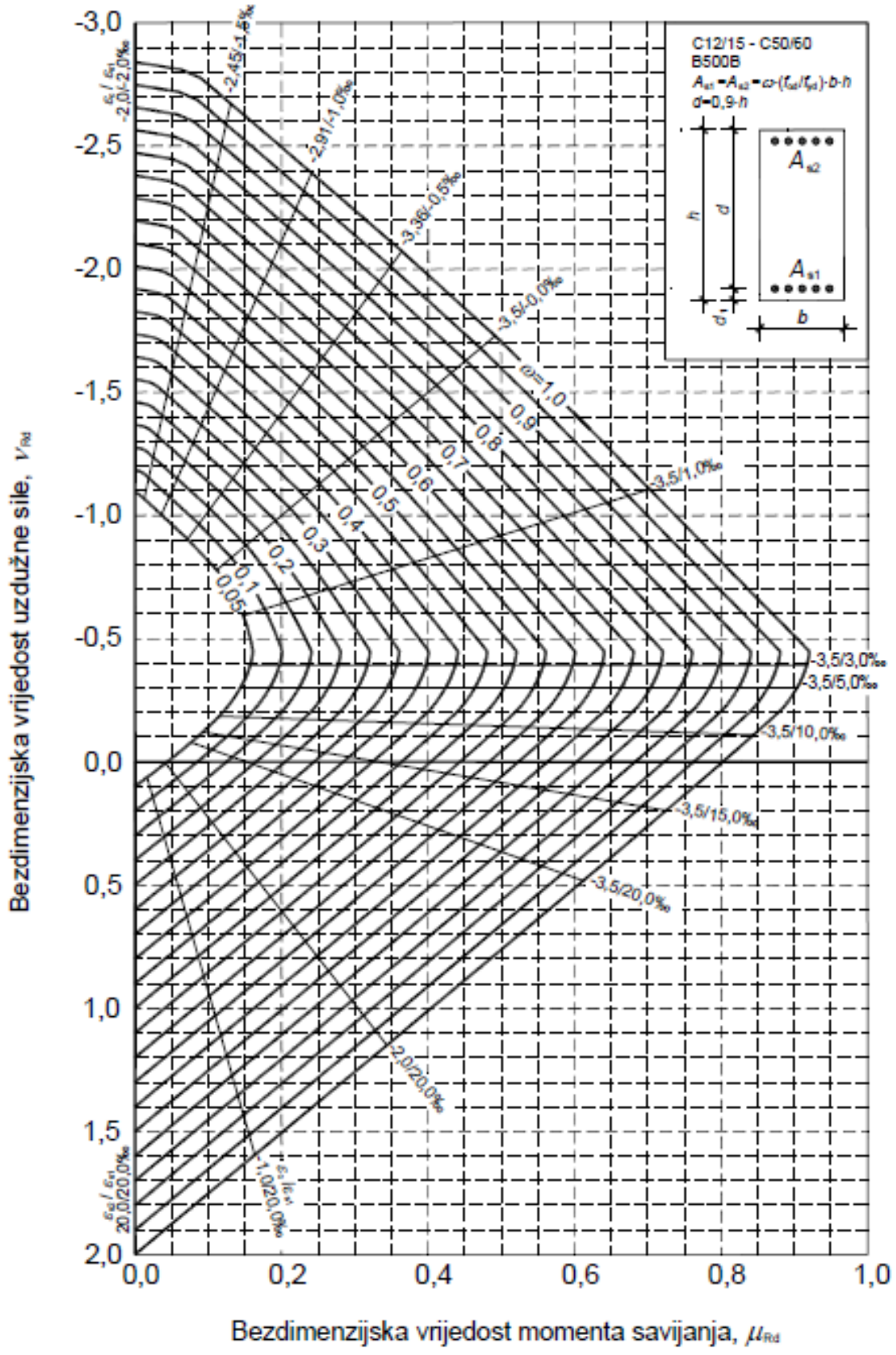
ε_{c2} (‰)	ε_{s1} (‰)	ξ=x/d	ζ=z/d	μ_{Rd}	ω
-0,1	20	0,005	0,998	0	0
-0,2	20	0,010	0,997	0,001	0,001
-0,3	20	0,015	0,995	0,002	0,002
-0,4	20	0,020	0,993	0,004	0,004
-0,5	20	0,024	0,992	0,006	0,006
-0,6	20	0,029	0,990	0,008	0,008
-0,7	20	0,034	0,988	0,010	0,010
-0,8	20	0,038	0,987	0,013	0,013
-0,9	20	0,043	0,985	0,016	0,016
-1	20	0,048	0,983	0,020	0,020
-1,1	20	0,052	0,982	0,023	0,023
-1,2	20	0,057	0,980	0,027	0,027
-1,3	20	0,061	0,978	0,030	0,031
-1,4	20	0,065	0,977	0,034	0,035
-1,5	20	0,070	0,975	0,038	0,039
-1,6	20	0,074	0,973	0,042	0,043
-1,7	20	0,078	0,971	0,046	0,048
-1,8	20	0,083	0,970	0,050	0,052
-1,9	20	0,087	0,968	0,055	0,056
-2	20	0,091	0,966	0,059	0,061
-2,1	20	0,095	0,964	0,063	0,065
-2,2	20	0,099	0,962	0,066	0,069
-2,3	20	0,103	0,960	0,070	0,073
-2,4	20	0,107	0,958	0,074	0,077
-2,5	20	0,111	0,957	0,078	0,081
-2,6	20	0,115	0,955	0,082	0,086
-2,7	20	0,119	0,953	0,085	0,090
-2,8	20	0,123	0,951	0,089	0,094
-2,9	20	0,127	0,949	0,093	0,098
-3,0	20	0,130	0,947	0,096	0,101
-3,1	20	0,134	0,945	0,100	0,105
-3,2	20	0,138	0,944	0,103	0,109
-3,3	20	0,142	0,942	0,106	0,113
-3,4	20	0,145	0,940	0,110	0,117
-3,5	20	0,149	0,938	0,113	0,121
-3,5	19,5	0,152	0,937	0,115	0,123
-3,5	19,0	0,156	0,935	0,118	0,126
-3,5	18,5	0,159	0,934	0,120	0,129
-3,5	18,0	0,163	0,932	0,123	0,132
-3,5	17,5	0,167	0,931	0,126	0,135
-3,5	17,0	0,171	0,929	0,128	0,138
-3,5	16,5	0,175	0,927	0,131	0,142
-3,5	16,0	0,179	0,925	0,134	0,145
-3,5	15,5	0,184	0,923	0,138	0,149
-3,5	15,0	0,189	0,921	0,141	0,153
-3,5	14,5	0,194	0,919	0,145	0,157

-3,5	14,0	0,200	0,917	0,148	0,162
-3,5	13,5	0,206	0,914	0,152	0,167
-3,5	13,0	0,212	0,912	0,157	0,172
-3,5	12,5	0,219	0,909	0,161	0,177
-3,5	12,0	0,226	0,906	0,166	0,183
-3,5	11,5	0,233	0,903	0,171	0,189
-3,5	11,0	0,241	0,900	0,176	0,195
-3,5	10,5	0,250	0,896	0,181	0,202
-3,5	10,0	0,259	0,892	0,187	0,210
-3,5	9,5	0,269	0,888	0,194	0,218
-3,5	9,0	0,280	0,884	0,200	0,227
-3,5	8,5	0,292	0,879	0,207	0,236
-3,5	8,0	0,304	0,873	0,215	0,246
-3,5	7,5	0,318	0,868	0,223	0,258
-3,5	7,0	0,333	0,861	0,232	0,270
-3,5	6,5	0,350	0,854	0,242	0,283
-3,5	6,0	0,368	0,847	0,253	0,298
-3,5	5,5	0,389	0,838	0,264	0,315
-3,5	5,0	0,412	0,829	0,276	0,333
-3,5	4,5	0,438	0,818	0,290	0,354
-3,5	4,0	0,467	0,806	0,304	0,378

Dijagram interakcije za betone razreda C12/15 do C50/60:



Dijagram međudjelovanja za betone razreda C12/15 do C50/60:



Tablice za odabir armature (ploča, zid)

Razmak šipki	Površina presjeka u cm^2 na širini ploče od 100 cm							
	Promjer šipke u mm							
t (cm)	6	8	10	12	14	16	18	20
7.0	4.04	7.18	11.22	16.16	21.99	28.73	36.36	44.87
7.5	3.77	6.70	10.47	15.08	20.52	26.81	33.93	41.88
8.0	3.53	6.28	9.82	14.14	19.24	25.14	31.81	39.26
8.5	3.33	5.91	9.24	13.31	18.11	23.66	29.94	36.95
9.0	3.14	5.59	8.73	12.57	17.10	22.34	28.28	34.90
9.5	2.98	5.29	8.27	11.90	16.20	21.17	26.79	33.06
10.0	2.83	5.03	7.85	11.31	15.39	20.11	25.45	31.41
10.5	2.69	4.79	7.48	10.77	14.66	19.15	24.24	29.91
11.0	2.57	4.57	7.14	10.28	13.99	18.28	23.14	28.55
11.5	2.46	4.37	6.83	9.84	13.39	17.49	22.13	27.31
12.0	2.36	4.19	6.54	9.42	12.83	16.76	21.21	26.17
12.5	2.26	4.02	6.28	9.05	12.32	16.09	20.36	25.13
13.0	2.17	3.87	6.04	8.70	11.84	15.47	19.58	24.16
13.5	2.09	3.72	5.82	8.38	11.40	14.90	18.85	23.27
14.0	2.02	3.59	5.61	8.08	11.00	14.36	18.18	22.44
14.5	1.95	3.47	5.42	7.80	10.62	13.87	17.55	21.66
15.0	1.89	3.35	5.24	7.54	10.26	13.41	16.97	20.94
15.5	1.82	3.24	5.07	7.30	9.93	12.97	16.42	20.27
16.0	1.77	3.14	4.91	7.07	9.62	12.57	15.90	19.64
16.5	1.71	3.05	4.76	6.85	9.33	12.19	15.42	19.04
17.0	1.66	2.96	4.62	6.65	9.05	11.83	14.97	18.48
17.5	1.62	2.87	4.49	6.46	8.79	11.49	14.54	17.95
18.0	1.57	2.79	4.36	6.28	8.55	11.17	14.14	17.46
18.5	1.53	2.72	4.25	6.11	8.32	10.87	13.76	16.94
19.0	1.49	2.65	4.13	5.95	8.10	10.58	13.39	16.54
19.5	1.45	2.58	4.03	5.80	7.89	10.31	13.05	16.11
20.0	1.41	2.51	3.93	5.65	7.69	10.05	12.72	15.72

Tablice za odabir armature ploče ili zida za uobičajene razmake 10, 12.5, 15 i 20 cm.

ϕ (mm)	razmak	A_s
8	20	2.51
8	15	3.35
10	20	3.93
8	12.5	4.02
8	10	5.03
10	15	5.24
12	20	5.65
10	12.5	6.28
12	15	7.54
14	20	7.70
10	10	7.85
12	12.5	9.05
16	20	10.05
14	15	10.26
12	10	11.31
14	12.5	12.32
16	15	13.40
14	10	15.39
20	20	15.71
16	12.5	16.08
22	20	19.01
16	10	20.11
20	15	20.94
25	20	24.54
20	12.5	25.13
22	15	25.34
22	12.5	30.41
28	20	30.79
20	10	31.42
25	15	32.72
22	10	38.01
25	12.5	39.27
32	20	40.21
28	15	41.05
25	10	49.09
28	12.5	49.26
36	20	50.89
32	15	53.62
28	10	61.58
32	12.5	64.34
36	15	67.86
32	10	80.42
36	12.5	81.43
36	10	101.79

Tablice za odabir armature (grede)

fi (mm)	kg/m	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
8	0,405	0,50	1,01	1,51	2,01	2,51	3,02	3,52	4,02	4,52	5,03	5,53	6,03	6,54	7,04	7,54
10	0,634	0,79	1,57	2,36	3,14	3,93	4,71	5,50	6,20	7,07	7,85	8,64	9,42	10,21	11,00	11,78
12	0,911	1,13	2,26	3,39	4,52	5,66	6,79	7,92	9,05	10,18	11,31	12,44	13,57	14,70	15,83	16,97
14	1,242	1,54	3,08	4,62	6,16	7,70	9,24	10,78	12,32	13,86	15,39	16,93	18,47	20,01	21,55	23,09
16	1,621	2,01	4,02	6,03	8,04	10,05	12,06	14,07	16,09	18,10	20,11	22,12	24,13	26,14	28,15	30,16
18	2,170	2,54	5,09	7,63	10,18	12,72	15,27	17,81	20,36	22,90	25,45	27,99	30,54	33,08	35,63	38,17
19	2,288	2,84	5,67	8,51	11,34	14,18	17,01	19,85	22,68	25,52	28,35	31,19	34,02	36,86	39,69	42,53
20	2,536	3,14	6,28	9,43	12,57	15,71	18,85	21,99	25,13	28,27	31,42	34,56	37,70	40,84	43,98	47,12
22	3,058	3,80	7,60	11,40	15,21	19,01	22,81	26,64	30,41	34,21	38,01	41,81	45,62	49,42	53,22	57,02
24	3,652	4,52	9,05	13,57	18,10	22,62	27,14	31,67	36,19	40,72	45,24	49,76	54,29	58,81	63,34	67,86
25	3,951	4,91	9,82	14,73	19,64	24,54	29,45	34,36	39,27	44,18	49,09	54,00	58,90	63,81	68,72	73,63
28	4,956	6,16	12,32	18,47	24,63	30,79	36,95	43,10	49,26	55,42	61,58	67,73	73,88	80,05	86,21	92,36
32	6,474	8,04	16,09	24,13	32,17	40,21	48,26	56,30	64,34	72,38	80,42	88,47	96,50	104,55	112,60	120,64
36	8,200	10,18	20,36	30,54	40,72	50,89	61,07	71,25	81,43	91,61	101,79	111,97	122,15	132,32	142,50	152,68
razmak armature/m		100,00	50,00	33,34	25,00	20,00	16,67	14,30	12,50	11,11	10,00	9,10	8,33	7,70	7,14	6,67

Tablice za odabir armature grede.

kom	ϕ (mm)	A_s
2	8	1.01
3	8	1.51
2	10	1.57
4	8	2.01
2	12	2.26
3	10	2.36
5	8	2.51
2	14	3.08
4	10	3.14
3	12	3.39
5	10	3.93
2	16	4.02
4	12	4.52
3	14	4.62
5	12	5.65
3	16	6.03
4	14	6.16
2	20	6.28
2	22	7.60
5	14	7.70
4	16	8.04
3	20	9.42
2	25	9.82
5	16	10.05
3	22	11.40
2	28	12.32
4	20	12.57
3	25	14.73
4	22	15.21
5	20	15.71
2	32	16.08
3	28	18.47
5	22	19.01
4	25	19.63
2	36	20.36
3	32	24.13
5	25	24.54
4	28	24.63
3	36	30.54
5	28	30.79
4	32	32.17
5	32	40.21
4	36	40.72
5	36	50.89

R mreže

Tip	Profili (mm)	Razmaci (mm)	Dimenzije (m)	kg/m2	kg/kom
R 131	5,0x4,2	150x250	6,00x2,20	1,50	19,80
R 131	5,0x4,6	150x250	6,00x2,20	1,63	21,50
R 139	4,2x4,2	100x250	6,00x2,20	1,55	20,50
R 166	4,6x4,2	100x250	6,00x2,20	1,76	23,30
R 166	4,6x4,6	100x250	6,00x2,20	1,85	24,50
R 188	6,0x4,2	150x250	6,00x2,20	1,96	26,00
R 188	6,0x4,6	150x250	6,00x2,20	2,08	27,50
R 196	5,0x4,2	150x250	6,00x2,20	2,00	26,50
R 226	6,0x4,2	125x250	6,00x2,20	2,27	30,00
R 257	7,0x5,0	150x250	6,00x2,20	2,72	35,80
R 283	6,0x4,6	100x250	6,00x2,20	2,77	36,60
R 283	6,0x5,0	100x250	6,00x2,20	2,88	38,00
R 335	8,0x5,0	150x250	6,00x2,20	3,33	44,00
R 335	8,0x6,0	150x250	6,00x2,20	3,63	48,00
R 385	7,0x5,0	100x250	6,00x2,20	3,68	48,60
R 424	9,0x6,0	150x250	6,00x2,20	4,34	57,30
R 503	8,0x5,0	100x200	6,00x2,20	4,77	63,00
R 503	8,0x5,0	100x250	6,00x2,20	4,58	60,50
R 503	8,0x6,0	100x250	6,00x2,20	4,89	64,60
R 524	10,0x6,0	150x250	6,00x2,15	5,15	68,00
R 636	9,0x6,0	100x250	6,00x2,15	5,95	78,50
R 785	10,0x6,0	100x250	6,00x2,15	7,35	97,00
R 785	10,0x6,0	100x200	6,00x2,20	7,39	97,50

Q mreže

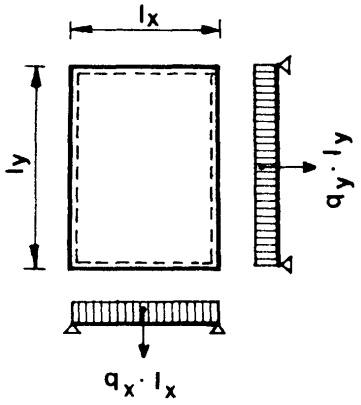
Tip	Profili (mm)	Razmaci (mm)	Dimenzije (m)	kg/m2	kg/kom
Q 069	4,2x4,2	200x200	6,00x2,20	1,10	14,50
Q 131	5,0x5,0	150x150	6,00x2,20	2,12	28,00
Q 139	4,2x4,2	100x100	6,00x2,20	2,20	29,05
Q 166	4,6x4,6	100x100	6,00x2,20	2,64	34,90
Q 188	6,0x6,0	150x150	6,00x2,20	3,06	40,40
Q 196	5,0x5,0	100x100	6,00x2,15	3,07	40,50
Q 226	6,0x6,0	125x125	6,00x2,20	3,63	48,00
Q 257	7,0x7,0	150x150	6,00x2,20	4,16	55,00
Q 283	6,0x6,0	100x100	6,00x2,20	4,48	59,15
Q 335	8,0x8,0	150x150	6,00x2,20	5,45	72,00
Q 385	7,0x7,0	100x100	6,00x2,20	6,10	80,60
Q 424	9,0x9,0	150x150	6,00x2,20	6,81	90,00
Q 503	8,0x8,0	100x100	6,00x2,20	8,03	106,00
Q 524	10,0x10,0	150x150	6,00x2,20	8,40	110,90
Q 636	9,0x9,0	100x100	6,00x2,20	10,08	133,05
Q 785	10,0x10,0	100x100	6,00x2,20	12,46	164,50

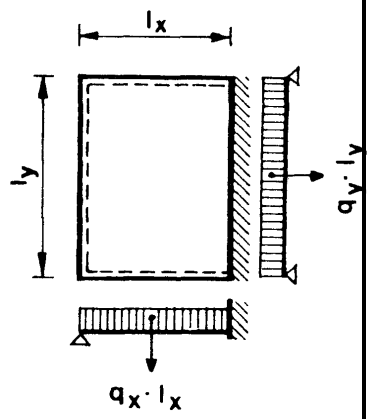
Tablice za proračun ploča nosivih u dva okomita smjera opterećenih ravnomjerno podijeljenim opterećenjem po cijeloj ploči

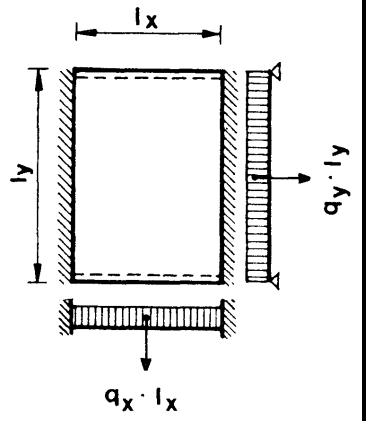
$$\lambda = \frac{l_y}{l_x} \qquad M_{xmaks} = \frac{q\, l_x^2}{\varphi_x} \qquad M_{ymaks} = \frac{q\, l_y^2}{\varphi_y} \qquad q_x = \kappa \cdot q \qquad q_y = (1-\kappa x)q$$

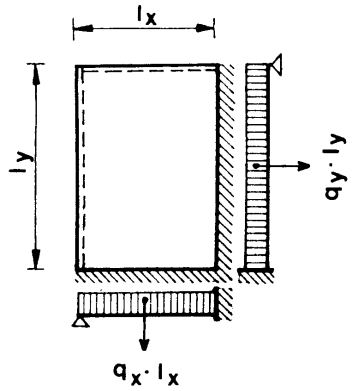
++++++++++++++ upeti ležaj

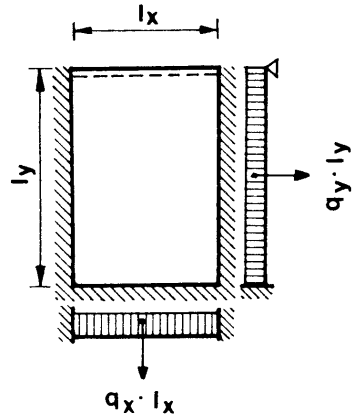
---------- slobodno položeni ležaj

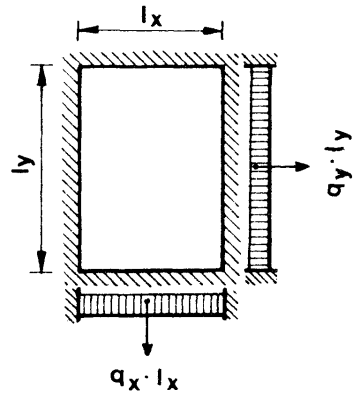
Slučaj 1	λ	φ1x	Δ	φ1y	Δ	κ1x	Δ
	1	2	3	4	5	6	7
	0.50	169.17		10.57		0.0588	
	0.55	125.10	8.814	11.35	0.156	0.0838	0.0050
	0.60	94.94	6.031	12.30	0.190	0.1147	0.0062
	0.65	75.31	3.927	13.44	0.228	0.1515	0.0073
	0.70	61.60	2.741	14.79	0.270	0.1936	0.0084
	0.75	51.69	1.983	16.35	0.313	0.2404	0.0093
	0.80	43.97	1.544	18.01	0.331	0.2906	0.0100
	0.85	38.29	1.136	20.15	0.427	0.3430	0.0105
	0.90	34.26	0.807	22.36	0.444	0.3962	0.0106
	0.95	30.44	0.764	24.79	0.486	0.4489	0.0105
	1.00	27.43	0.602	27.43	0.527	0.5000	0.0102
	1.10	22.79	0.464	33.37	0.594	0.5942	0.0094
	1.20	19.45	0.334	40.34	0.697	0.6747	0.0080
	1.30	17.02	0.244	48.60	0.826	0.7407	0.0066
	1.40	15.22	0.180	58.45	0.985	0.7935	0.0053
	1.50	13.87	0.135	70.22	1.176	0.8351	0.0042
	1.60	12.88	0.099	84.43	1.421	0.8666	0.0033
	1.70	12.06	0.082	100.77	1.634	0.8931	0.0025
	1.80	11.45	0.061	121.69	2.092	0.9130	0.0020
	1.90	10.97	0.048	143.00	2.131	0.9287	0.0016
	2.00	10.57	0.040	169.17	2.617	0.9412	0.0012

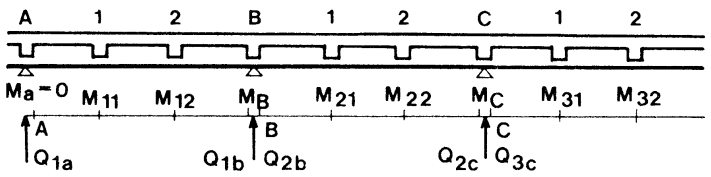
Slučaj 2	λ	φ_{2x}	Δ	φ_{2y}	Δ	κ_{2x}	Δ
	8	9	10	11	12	13	14
	0.50	140.91		11.28		0.1351	
	0.55	107.37	6.707	12.38	0.217	0.1862	0.0102
	0.60	85.30	4.414	13.70	0.266	0.2447	0.0117
	0.65	70.59	2.942	15.29	0.320	0.3086	0.0128
	0.70	59.24	2.270	17.19	0.379	0.3751	0.0133
	0.75	50.86	1.676	19.41	0.444	0.4417	0.0133
	0.80	44.56	1.259	21.99	0.516	0.5059	0.0129
	0.85	39.70	0.971	24.96	0.595	0.5661	0.0121
	0.90	35.74	0.792	28.37	0.683	0.6212	0.0110
	0.95	32.54	0.640	32.30	0.786	0.6706	0.0099
	1.00	29.93	0.522	36.75	0.890	0.7143	0.0087
	1.10	26.02	0.391	47.58	1.083	0.7854	0.0071
	1.20	23.33	0.269	61.38	1.381	0.8383	0.0053
	1.30	21.43	0.191	78.75	1.736	0.8772	0.0039
	1.40	20.04	0.138	100.28	2.153	0.9057	0.0029
	1.50	19.02	0.103	126.64	2.636	0.9268	0.0021
l_y UVIJEK PARALELNO S UKLIJEŠTENIM RUBOM	1.60	18.30	0.071	158.52	3.189	0.9425	0.0016
	1.70	17.63	0.067	196.69	3.817	0.9543	0.0012
	1.80	17.05	0.059	239.81	4.312	0.9633	0.0009
	1.90	16.67	0.037	295.08	5.527	0.9702	0.0007
	2.00	16.50	0.021	357.03	6.195	0.9756	0.0005

Slučaj 3	λ	φ_{3x}	Δ	φ_{3y}	Δ	κ_{3x}	Δ
	15	16	17	18	19	20	21
	0.50	136.06		12.48		0.2381	
	0.55	107.42	5.728	14.10	0.323	0.3139	0.0152
	0.60	87.62	3.960	16.12	0.404	0.3932	0.0159
	0.65	73.76	2.772	18.60	0.496	0.4716	0.0157
	0.70	63.69	2.014	21.16	0.603	0.5456	0.0148
	0.75	56.16	1.505	25.24	0.725	0.6127	0.0134
	0.80	50.42	1.148	29.56	0.864	0.6709	0.0116
	0.85	45.97	0.891	34.66	1.021	0.7230	0.0104
	0.90	42.48	0.698	40.65	1.199	0.7664	0.0087
	0.95	39.70	0.555	47.64	1.398	0.8029	0.0073
	1.00	37.47	0.446	55.74	1.620	0.8333	0.0061
	1.10	34.18	0.329	75.33	1.959	0.8798	0.0046
	1.20	31.93	0.225	101.68	2.635	0.9120	0.0032
	1.30	30.34	0.159	134.65	3.298	0.9346	0.0023
	1.40	29.18	0.116	175.88	4.123	0.9505	0.0016
	1.50	28.31	0.087	226.65	5.077	0.9620	0.0012
l_y UVIJEK PARALELNO S UKLIJEŠTENIM RUBOM	1.60	27.64	0.067	288.36	6.171	0.9704	0.0008
	1.70	27.12	0.052	362.50	7.414	0.9766	0.0006
	1.80	26.71	0.041	450.72	8.822	0.9813	0.0005
	1.90	26.37	0.034	555.49	10.377	0.9849	0.0004
	2.00	26.09	0.028	675.81	12.132	0.9877	0.0003

Slučaj 4	λ	φ_{4x}	Δ	φ_{4y}	Δ	κ_{4x}	Δ
	22	23	24	25	26	27	28
	0.50	271.75		16.98		0.0588	
	0.55	194.98	6.707	17.84	0.171	0.0838	0.0050
	0.60	145.73	4.414	18.89	0.209	0.1147	0.0062
	0.65	112.92	2.942	20.16	0.254	0.1515	0.0073
	0.70	90.16	2.270	21.65	0.298	0.1936	0.0084
	0.75	73.99	1.676	23.41	0.353	0.2404	0.0093
	0.80	62.18	1.259	25.47	0.411	0.2906	0.0100
	0.85	53.34	1.768	27.84	0.465	0.3430	0.0105
	0.90	46.58	1.352	30.56	0.543	0.3962	0.0106
	0.95	41.52	1.052	33.65	0.619	0.4489	0.0105
	1.00	37.15	0.833	37.15	0.700	0.5000	0.0102
	1.10	31.09	0.606	45.52	0.837	0.5942	0.0094
	1.20	27.01	0.408	56.01	1.063	0.6747	0.0080
	1.30	24.17	0.285	69.02	1.287	0.7407	0.0066
	1.40	22.12	0.204	84.99	1.596	0.7935	0.0053
	1.50	20.62	0.150	104.38	1.940	0.8351	0.0042
	1.60	19.49	0.113	127.72	2.334	0.8676	0.0033
	1.70	18.62	0.087	155.54	2.782	0.8931	0.0025
	1.80	17.95	0.068	188.41	3.287	0.9130	0.0020
	1.90	17.41	0.053	226.93	3.852	0.9287	0.0016
	2.00	16.98	0.043	271.75	4.882	0.9412	0.0012

Slučaj 5	λ	φ_{5x}	Δ	φ_{5y}	Δ	κ_{5x}	Δ
	29	30	31	32	33	34	35
	0.50	246.42		17.88		0.1111	
	0.55	186.97	11.891	19.12	0.251	0.1547	0.0087
	0.60	138.61	9.671	20.68	0.313	0.2058	0.0102
	0.65	110.30	5.661	22.60	0.384	0.2631	0.0114
	0.70	90.65	3.931	24.92	0.464	0.3244	0.0123
	0.75	76.58	2.814	27.69	0.555	0.3876	0.0126
	0.80	66.24	2.068	30.98	0.658	0.4503	0.0125
	0.85	58.46	1.556	34.84	0.772	0.5108	0.0121
	0.90	52.51	1.191	39.35	0.900	0.5675	0.0114
	0.95	47.86	0.980	44.56	1.043	0.6196	0.0104
	1.00	44.18	0.736	50.57	1.201	0.6667	0.0094
	1.10	38.84	0.535	65.30	1.474	0.7454	0.0079
	1.20	35.27	0.357	84.25	1.895	0.8057	0.0060
	1.30	32.79	0.248	108.24	2.398	0.8510	0.0045
	1.40	31.01	0.178	138.11	2.987	0.8848	0.0038
	1.50	29.71	0.130	174.79	3.669	0.9101	0.0025
l_y UVIJEK PARALELNO SA SLOBODNO POLOŽENIM RUBOM	1.60	28.73	0.093	219.29	4.450	0.9291	0.0019
	1.70	27.97	0.075	272.66	5.337	0.9435	0.0014
	1.80	27.38	0.059	336.02	6.337	0.9545	0.0011
	1.90	26.92	0.047	410.58	7.456	0.9631	0.0009
	2.00	26.54	0.038	497.61	8.702	0.9697	0.0007

Slučaj 6	λ	φ_{6x}	Δ	φ_{6y}	Δ	κ_{6x}	Δ
	36	37	38	39	40	41	42
	0.50	436.53		27.28		0.0588	
	0.55	310.15	25.276	28.38	0.220	0.0838	0.0050
	0.60	229.50	16.130	29.74	0.273	0.1147	0.0062
	0.65	175.97	10.706	31.41	0.334	0.1515	0.0073
	0.70	139.24	7.346	33.43	0.404	0.1936	0.0084
	0.75	113.30	5.189	35.85	0.483	0.2404	0.0093
	0.80	94.51	3.757	38.71	0.573	0.2906	0.0100
	0.85	80.60	2.782	42.08	0.673	0.3430	0.0105
	0.90	70.10	2.100	46.00	0.784	0.3962	0.0106
	0.95	62.04	1.614	50.53	0.907	0.4489	0.0105
	1.00	55.74	1.259	55.74	1.043	0.5000	0.0102
	1.10	46.77	0.897	68.48	1.274	0.5942	0.0094
	1.20	40.90	0.588	84.80	1.632	0.6747	0.0080
	1.30	36.89	0.400	105.38	2.057	0.7407	0.0066
	1.40	34.08	0.282	130.92	2.555	0.7935	0.0053
	1.50	32.04	0.204	162.22	3.130	0.8351	0.0042
	1.60	30.54	0.151	200.13	3.790	0.8676	0.0033
	1.70	29.40	0.114	245.53	4.540	0.8931	0.0025
	1.80	28.52	0.088	299.38	5.385	0.9130	0.0020
	1.90	27.75	0.077	362.69	6.331	0.9287	0.0016
	2.00	27.28	0.047	436.53	7.384	0.9412	0.0012



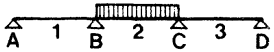
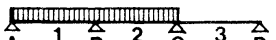
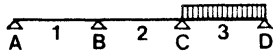
Nosač preko dva jednaka raspona

Način opterećenja	Statička veličina	Način opterećenja u opterećenom polju								
		x = (0.4 ÷ 0.5)l, P	P, 1/2 1/2	P P, 1/3 1/3 1/3	P P, 1/4 1/2 1/4	P P, 1/4 1/4 1/4 1/4	P P P, 1/6 1/3 1/3 1/6	1/2 1/2	0.4l 0.2l 0.4l	0.3l 0.4l 0.3l
								K = 0.5 · q · l	K = 0.6 · q · l	K = 0.7 · q · l
0.200l 0.200l A 1 B 2 C l l Za stalno opterećenje stavlja se G umjesto P, odnosno g, umjesto p	M_{11}	0.070 pl^2	0.156 Fl	0.222 Fl	0.180 Fl	0.258 Fl	0.184 Fl	0.095 Kl	0.094 Kl	0.089 Kl
	M_{12}	-	-	0.111 F	0.039 Fl	0.266 Fl	0.219 Fl	-	-	-
	M_{13}	-	-	-	-	0.023 Fl	-0.080 Fl	-	-	-
	M_{Bmin}	-0.125 pl^2	-0.188 Fl	-0.333 Fl	-0.281 Fl	-0.469 Fl	-0.396 Fl	-0.156 Kl	-0.155 Kl	-0.151 Kl
	$R_A = Q_{1A}$	0.375 pl	0.313 F	0.667F	0.719 F	1.031 F	1.104 F	0.344 K	0.345 K	0.349 K
	R_{Bmax}	1.250 pl	1.375 F	2.667 F	2.563 F	3.938 F	3.792 F	1.312 K	1.310 K	1.302 K
	Q_{1Bmin}	-0.625 pl	-0.688 F	-1.333 F	-1.281 F	-1.969 F	-1.896 F	-0.656 K	-0.655 K	-0.651 K
A 1 B 2 C	M_{11max}	0.096 pl^2	0.203 Fl	0.278 Fl	0.215 Fl	0.316 Fl	0.217 Fl	0.129 Kl	0.126 Kl	0.121 Kl
	M_{12max}	-	-	0.222 Fl	0.145 Fl	0.383 FL	0.318 Fl	-	-	-
	M_{13max}	-	-	-	-	0.200 Fl	0.085 Fl	-	-	-
	M_B	-0.063 pl^2	-0.094 Fl	-0.167 Fl	-0.141 Fl	-0.234 Fl	-0.198 Fl	-0.078 Kl	-0.078 Kl	-0.076 Kl
	$R_A = Q_{1Amax}$	0.438 pl	0.406 F	0.833 F	0.859 F	1.266 F	1.302 F	0.422 K	0.422 K	0.424 K
A B C	M_{11min}	-	-0.047 Fl	-0.056 Fl	-0.035 Fl	-0.059 Fl	-0.033 Fl	-0.035 Kl	-0.035 Kl	-0.034 Kl
	M_{12min}	-	-	-0.111 Fl	-0.106 Fl	-0.117 Fl	-0.099 Fl	-	-	-
	M_{13min}	-	-	-	-	-0.176 Fl	-0.165 Fl	-	-	-
	$R_A = Q_{1Amin}$	-0.063 pl	-0.094 F	-0.167 F	-0.141 F	-0.234 F	-0.198 F	-0.078 K	0.078 K	-0.076 K

Nosač preko tri jednaka raspona

Način opterećenja	Statička veličina	Način opterećenja u opterećenom polju								
		x = (0.4 ÷ 0.5) l, P	P, l/2, l/2	P, P, l/3, l/3, l/3	P, P, l/4, l/2, l/4	P, P, P, l/4, l/4, l/4, l/4	P, P, P, l/6, l/3, l/3, l/6	l/2, l/2	0.4l, 0.2l, 0.4l	0.3l, 0.4l, 0.3l
								$K = 0.5 \cdot q \cdot l$	$K = 0.6 \cdot q \cdot l$	$K = 0.7 \cdot q \cdot l$
0,2105 l, 0,2000 l A 1 B 2 C 3 D l l l	M_{11}	0.080 pl^2	0.175 Fl	0.244 Fl	0.194 Fl	0.281 Fl	0.197 Fl	0.108 Kl	0.107 Kl	0.102 Kl
	M_{12}	-	-	0.156 Fl	0.081 Fl	0.313 Fl	0.258 Fl	-	-	-
	M_{13}	-	-	-	-	0.094 Fl	-0.014 Fl			
	M_{21}	0.025 pl^2	0.100 Fl	0.067 Fl	0.025 Fl	0	-0.067 Fl	0.042 Kl	0.040 Kl	0.063 Kl
	M_{22}	-	-	0.067 Fl	0.025 Fl	0.125 Fl	0.100 Fl	-	-	-
	M_B	-0.100 pl^2	-0.150 Fl	-0.267 Fl	-0.225 Fl	-0.375 Fl	-0.317 Fl	-0.125 Kl	-0.124 Kl	-0.121 Kl
	$R_A = Q_{1A}$	0.400 pl	0.350 F	0.733 F	0.775 F	1.125 F	1.183 F	0.375 K	0.376 K	0.379 K
	R_B	1.100 pl	1.150 F	2.267 F	2.225 F	3.375 F	3.317 F	1.125 K	1.124 K	1.121 K
	Q_{1B}	-0.600 pl	-0.650 F	-1.267 F	-1.225 F	-1.875 F	-1.817 F	-0.625 K	-0.624 K	-0.621 K
	$Q_{2B} = -Q_{2C}$	0.500 pl	0.500 F	1.000 F	1.000 F	1.500 F	1.500 F	0.500 K	0.500 K	0.500 K
A 1 B 2 C 3 D	$M_{11\,max}$	0.101 pl^2	0.213 Fl	0.289 Fl	0.222 Fl	0.328 Fl	0.224 Fl	0.136 Kl	0.134 Kl	0.128 Kl
	$M_{12\,max}$	-	-	0.244 Fl	0.166 Fl	0.406 Fl	0.338 Fl	-	-	-
	$M_{13\,max}$	-	-	-	-	0.234 Fl	0.118 Fl			
	$M_{21\,min}$	-0.050 pl^2	-0.075 Fl	-0.133 Fl	-0.113 Fl	-0.188 Fl	-0.158 Fl* (-0.167 Fl)	-0.063 Kl	-0.062 Kl	-0.061 Kl
	$M_{22\,min}$	-	-	-0.133 Fl	-0.113 Fl	-0.188 Fl	-0.158 Fl	-	-	-
	M_B	-0.050 pl^2	-0.075 Fl	-0.133 Fl	-0.113 Fl	-0.188 Fl	-0.158 Fl	-0.063 Kl	-0.062 Kl	-0.061 Kl
	$R_{A\,max} = Q_{1A\,max}$	0.450 pl	0.425 F	0.867 F	0.888 F	1.313 F	1.342 F	0.375 K	0.376 K	0.379 K

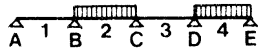
Nosač preko tri jednaka raspona

Način opterećenja	Statička veličina	Način opterećenja u opterećenom polju								
		$x=(0.4\div0.5)l$, p, l	P, 1/2, 1/2, l	P P, 1/3 1/3 1/3, 1 2, l	P P, 1/4 1/2 1/4, 1 2, l	P P P, 1/4 1/4 1/4 1/4, 1 2 3, l	P P P, 1/6 1/3 1/3 1/6, 1 2 3, l	1/2 1/2, l, K = 0.5 · q · l	0.4l 0.2l 0.4l, l, K = 0.6 · q · l	0.3l 0.4l 0.3l, l, K = 0.7 · q · l
	M_{11min}	-0.025 pl^2	-0.038 Fl	-0.044 Fl	-0.028 Fl	-0.047 Fl	-0.026 Fl	-0.028 Kl	-0.028 Kl	-0.027 Kl
	M_{12} min	-	-	-0.089 Fl	-0.084 Fl	-0.094 Fl	-0.079 Fl	-	-	-
	M_{13} min	-	-	-	-	-0.141 Fl	-0.132 Fl			
							0.092 Fl*			
	M_{21} max	0.075 pl^2	0.175 Fl	0.200 Fl	0.138 Fl	0.188 Fl	(0.100 Fl)	0.104 Kl	0.102 Kl	0.096 Kl
	M_{22} max	-	-	0.200 Fl	0.138 Fl	0.313 Fl	0.258 Fl	-		-
	M_B	-0.050 pl^2	-0.075 Fl	-0.133 Fl	-0.113 Fl	-0.188 Fl	-0.158 Fl	-0.063 Kl	-0.062 Kl	-0.061 Kl
	$R_A=Q_{1A}$ min	-0.050 pl	-0.075 F	-0.133 F	-0.113 F	-0.188 F	-0.158 F	-0.063 K	-0.062 K	-0.061 K
	M_B min	-0.117 pl^2	-0.175 Fl	-0.311 Fl	-0.263 Fl	-0.438 Fl	-0.369 Fl	-0.146 Kl	-0.145 Kl	-0.142 Kl
	M_C	-0.033 pl^2	-0.050 Fl	-0.089 Fl	-0.075 Fl	-0.125 Fl	-0.106 Fl	-0.041 Kl	-0.041 Kl	-0.041 Kl
	R_B max	1.200 pl	1.300 F	2.533 F	2.450 F	3.750 F	3.633 F	1.251 K	1.249 K	1.244 K
	Q_{1B} min	-0.617 pl	-0.675 F	-1.311 F	-1.263 F	-1.937 F	-1.869 F	-0.646 K	-0.645 K	-0.642 K
	Q_{2B} max	0.583 pl	0.625 F	1.222 F	1.188 F	1.813 F	1.764 F	0.605 K	0.604 K	0.602 K
	M_B max	0.017 pl^2	0.025 Fl	0.044 Fl	0.038 Fl	0.063 Fl	0.053 Fl	0.022 Kl	0.021 Kl	0.021 Kl
	M_C	-0.067 pl^2	-0.100 Fl	-0.178 Fl	-0.150 Fl	-0.250 Fl	-0.211 Fl	-0.083 Kl	-0.083 Kl	-0.081 Kl
	Q_{1B} max	0.017 pl	0.025 F	0.044 F	0.038 F	0.063 F	0.053 F	0.022 K	0.021 K	0.021 K
	Q_{2B} min	-0.083 pl	-0.125 F	-0.222 F	-0.188 F	-0.313 F	-0.264 F	-0.105 K	-0.104 K	-0.102 K

Nosač preko četiri jednaka raspona

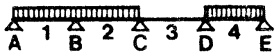
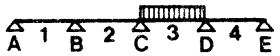
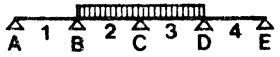
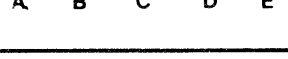
Način opterećenja	Statička veličina	Način opterećenja u opterećenom polju								
		x = (0,4 ÷ 0,5) l, p, l	P, l/2, l/2, l	P P, l/3 l/3 l/3, l	P P, l/4 l/2 l/4, l	P P P, l/4 l/4 l/4 l/4, l	P P P, l/6 l/3 l/3 l/6, l	l/2 l/2, l, K = 0,5 · q · l	0,4 l 0,2 l 0,4 l, l, K = 0,6 · q · l	0,3 l 0,4 l 0,3 l, l, K = 0,7 · q · l
0,2113 l 0,2105 l 0,2000 l A 1 B 2 C 3 D 4 E l l l l	M_{11}	0.077 pl^2	0.170 Fl	0.238 Fl	0.190 Fl	0.275 Fl	0.193 Fl	0.104 Kl	0.103 Kl	0.098 Kl
	M_{12}	-	-	0.143 Fl	0.069 Fl	0.299 Fl	0.247 Fl	-	-	-
	M_{13}	-	-	-	-	0.074 Fl	-0.033 Fl	-	-	-
	M_{21}	0.037 pl^2	0.116 Fl	0.079 Fl	0.029 Fl	0.007 Fl	-0.070 Fl	0.056 Kl	0.053 Kl	0.049 Kl
	M_{22}	-	-	0.111 Fl	0.069 Fl	0.165 Fl	0.134 Fl	-	-	-
	M_{23}	-	-	-	-	0.074 Fl	0.005 Fl	-	-	-
	M_B	-0.107 pl^2	-0.161 Fl	-0.286 Fl	-0.241 Fl	-0.402 Fl	-0.339 Fl	-0.134 Kl	-0.133 Kl	-0.130 Kl
	M_C	-0.071 pl^2	-0.107 Fl	-0.190 Fl	-0.161Fl	-0.268 Fl	-0.226 Fl	-0.089 Kl	-0.088 Kl	-0.086 Kl
	$R_A = Q_{1A}$	0.393 pl	0.339 F	0.714 F	0.759 F	1.098 F	1.161 F	0.366 K	0.367 K	0.370 K
	R_B	1.143 pl	1.214 F	2.381 F	2.321 F	3.536 F	3.452 F	1.179 K	1.178 K	1.174 K
	R_C	0.929 pl	0.892 F	1.810 F	1.839 F	2.732 F	2.774 F	0.910 K	0.910 K	0.912 K
	Q_{1B}	-0.607 pl	-0.661 F	-1.286 F	-1.241 F	-1.902 F	-1.839 F	-0.634 K	-0.633 K	-0.630 K
	Q_{2B}	0.536 pl	0.554 F	1.095 F	1.080 F	1.634 F	1.613 F	0.545 K	0.545 K	0.544 K
	Q_{2C}	-0.464 pl	-0.446 F	-0.905 F	-0.920 F	-1.366 F	-1.387 F	-0.455 K	-0.455 K	-0.456 K
A 1 B 2 C 3 D 4 E	M_{11max}	0.100 pl^2	0.210 Fl	0.286 Fl	0.220 Fl	0.325 Fl	0.222 Fl	0.134 Kl	0.132 Kl	0.126 Kl
	M_{12max}	-	-	0.238 Fl	0.160 Fl	0.400 Fl	0.332 Fl	-	-	-
	M_{13max}	-	-	-	-	0.224 Fl	0.109 Fl	-	-	-
	M_{21min}	-0.045 pl^2	-0.067 Fl	-0.127 Fl	-0.110 Fl	-0.184 Fl	-0.160 Fl* (-0.170 Fl)	-0.056 Kl	-0.056 Kl	-0.055 Kl
	M_{22min}	-	-	-0.111 Fl	-0.090 Fl	-0.167 Fl	-0.141 Fl	-	-	-
	M_{23min}					-0.151 Fl	-0.123 Fl* (-0.134 Fl)	-	-	-
	M_B	-0.054 pl^2	-0.080 Fl	-0.143 Fl	-0.121 Fl	-0.201 Fl	-0.170 Fl	-0.067 Kl	-0.067 Kl	-0.065 Kl
	M_C	-0.036 pl^2	-0.054 Fl	-0.095 Fl	-0.080 Fl	-0.134 Fl	-0.113 Fl	-0.045 Kl	-0.045 Kl	-0.044 Kl
	$R_A = Q_{1Amax}$	0.446 pl	0.420 F	0.857 F	0.879 F	1.299 F	1.330 F	0.433 K	0.433 K	0.435 K

Nosač preko četiri jednaka raspona

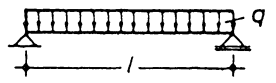
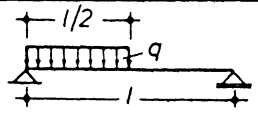
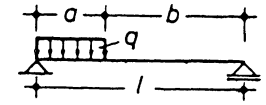
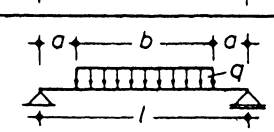
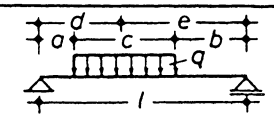
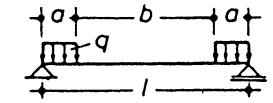
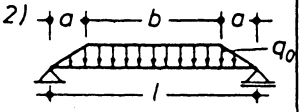
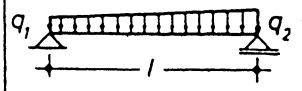
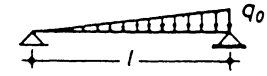
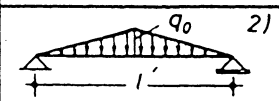
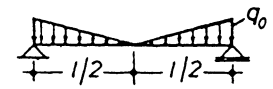
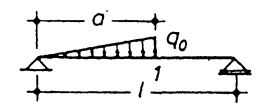
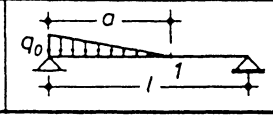
Način opterećenja	Statička veličina	Način opterećenja u opterećenom polju								
		x = (0.4 ÷ 0.5) l, P, l	P, l/2, l/2, l	P P, l/3 l/3 l/3, 1 2, l	P P, l/4 l/2 l/4, 1 2, l	P P P, l/4 l/4 l/4 l/4, 1 2 3, l	P P P, l/6 l/3 l/3 l/6, 1 2 3, l	l/2 l/2, l, K = 0,5 · q · l	0.4l 0.2l 0.4l, l, K = 0,6 · q · l	0.3l 0.4l 0.3l, l, K = 0,7 · q · l
	M_{11min}	-0.023 pl^2	-0.040 Fl	-0.048 Fl	-0.030 Fl	-0.050 Fl	-0.028 Fl	-0.030 Kl	-0.030 Kl	-0.029 Kl
	M_{12min}	-	-	-0.095 Fl	-0.090 Fl	-0.110 Fl	-0.085 Fl	-	-	-
	M_{13min}	-	-	-	-	-0.151 Fl	-0.141 Fl	-	-	-
	M_{21max}	0.080 pl^2	0.183 Fl	0.206 Fl	0.140 Fl	0.191 Fl	0.090 Fl* (0.099 Fl)	0.111 Kl	0.108 Kl	0.102 Kl
	M_{22max}	-	-	0.222 Fl	0.160 Fl	0.333 Fl	0.275 Fl	-	-	-
	M_{23max}	-	-	-	-	0.224 Fl	0.127 Fl* (0.139 Fl)	-	-	-
	M_B	-0.054 pl^2	-0.080 Fl	-0.143 Fl	-0.121 Fl	-0.201 Fl	-0.170 Fl	-0.067 Kl	-0.067 Kl	-0.065 Kl
	M_C	-0.036 pl^2	-0.054 Fl	-0.095 Fl	-0.080 Fl	0.134 Fl	-0.113 Fl	-0.045 Kl	-0.045 Kl	-0.044 Kl
	$R_A = Q_{1Amin}$	-0.054 pl	-0.080 F	-0.143 F	-0.121 F	-0.201 F	-0.170 F	-0.067 K	-0.067 K	-0.065 K

* Označeni način opterećenja ne daje točnu max. odnosno min. vrijednost jer se ova točka nalazi na vanjskom potezu nosača (između stalne točke i ležaja). Granična vrijednost dobivena drugačijim načinom opterećenja dana je u zagradi.

Nosač preko četiri jednaka raspona

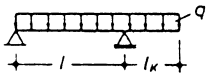
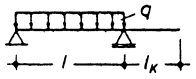
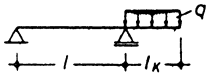
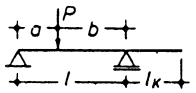
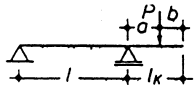
Način opterećenja	Statička veličina	Način opterećenja u opterećenom polju								
		x = (0,4 ÷ 0,5)l, p, l	P, 1/2, 1/2, l	P P, 1/3 1/3 1/3, 1 2, l	P P, 1/4 1/2 1/4, 1 2, l	P P P, 1/4 1/4 1/4 1/4, 1 2 3, l	P P P, 1/6 1/3 1/3 1/6, 1 2 3, l	1/2 1/2, l, K = 0,5 · q · l	0.4l 0.2l 0.4l, l, K = 0,6 · q · l	0.3l 0.4l 0.3l, l, K = 0,7 · q · l
	$M_{B\ min}$	-0.121 pl^2	-0.181 Fl	-0.321 Fl	-0.271 Fl	-0.452 Fl	-0.382 Fl	-0.151 Kl	-0.150 Kl	-0.146 Kl
	M_C	-0.018 pl^2	-0.027 Fl	-0.048 Fl	-0.040 Fl	-0.067 Fl	-0.057 Fl	-0.023 Kl	-0.022 Kl	-0.022 Kl
	M_D	-0.058 pl^2	-0.087 Fl	-0.155 Fl	-0.131 Fl	-0.218 Fl	-0.184 Fl	-0.072 Kl	-0.072 Kl	-0.070 Kl
	$R_{B\ max}$	1.223 pl	1.335 F	2.595 F	2.502 F	3.837 F	3.707 F	1.279 K	1.278 K	1.270 K
	$Q_{1B\ min}$	-0.621 pl	-0.681 F	-1.321 F	-1.271 F	-1.952 F	-1.882 F	-0.651 K	-0.650 K	-0.646 K
	$Q_{2B\ max}$	0.603 pl	0.654 F	1.274 F	1.231 F	1.885 F	1.825 F	0.628 K	0.628 K	0.624 K
	$M_{B\ max}$	0.013 pl^2	0.020 Fl	0.036 Fl	0.030 Fl	0.050 Fl	0.042 Fl	0.017 Kl	0.017 Kl	0.016 Kl
	M_C	-0.054 pl^2	-0.080 Fl	-0.143 Fl	-0.120 Fl	-0.201 Fl	-0.170 Fl	-0.066 Kl	-0.066 Kl	-0.064 Kl
	M_D	-0.049 pl^2	-0.074 Fl	-0.131 Fl	-0.110 Fl	-0.184 Fl	-0.156 Fl	-0.062 Kl	-0.061 Kl	-0.060 Kl
	$R_{B\ min}$	-0.080 pl	-0.121 F	-0.214 F	-0.181 F	-0.301 F	-0.254 F	-0.100 K	-0.100 K	-0.096 K
	$Q_{1B\ max}$	0.013 pl	0.020 F	0.036 F	0.030 F	0.050 F	0.042 F	0.017 K	0.017 K	0.016 K
	$Q_{2B\ min}$	-0.067 pl	-0.100 F	-0.178 F	-0.151 F	-0.251 F	-0.212 F	-0.083 K	-0.083 K	-0.080 K
	M_B	-0.036 pl^2	-0.054 Fl	-0.095 Fl	-0.080 Fl	-0.134 Fl	-0.113 Fl	-0.045 Kl	-0.045 Kl	-0.044 Kl
	$M_{C\ min}$	-0.107 pl^2	-0.161 Fl	-0.286 Fl	-0.241 Fl	-0.402 Fl	-0.339 Fl	-0.134 Kl	-0.133 Kl	-0.130 Kl
	$R_{C\ max}$	1.143 pl	1.214 F	2.381 F	2.321 F	3.536 F	3.452 F	1.178 K	1.176 K	1.172 K
	$Q_{2C\ min}$	-0.571 pl	-0.607 F	-1.191 F	-1.160 F	-1.768 F	-1.726 F	-0.589 K	-0.588 K	-0.586 K
	M_B	-0.071 pl^2	-0.107 Fl	-0.190 Fl	-0.161 Fl	-0.268 Fl	-0.226 Fl	-0.089 Kl	-0.088 Kl	-0.086 Kl
	$M_{C\ max}$	0.036 pl^2	0.054 Fl	0.095 Fl	0.080 Fl	0.134 Fl	0.113 Fl	0.045 Kl	0.045 Kl	0.044 Kl
	$R_{C\ min}$	-0.214 pl	-0.321 F	-0.571 F	-0.482 F	-0.804 F	-0.679 F	-0.268 K	-0.266 K	-0.260 K
	$Q_{2C\ max}$	0.107 pl	0.161 F	0,286 F	0.241 F	0.402 F	0.339 F	0.134 K	0.133 K	0.130 K

$(\alpha = a/l,\ \beta = b/l)$

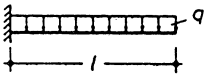
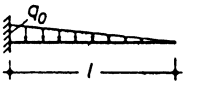
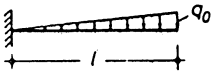
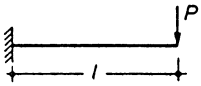
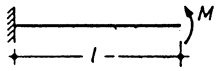
		Auflagerkräfte		max M	$EI\,f_{\text{Mitte}}$ [1])
		A	B	[an der Stelle x]	
1		$\frac{ql}{2}$	$\frac{ql}{2}$	$\frac{ql^2}{8}$ $[x = l/2]$	$\frac{5}{384}\,ql^4$
2		$\frac{3}{8}\,ql$	$\frac{1}{8}\,ql$	$\frac{9}{128}\,ql^2$ $[x = 3/8\ l]$	$\frac{5}{768}\,ql^4$
3		$\frac{qa}{l}\left(l - \frac{a}{2}\right)$	$\frac{qa^2}{2l}$	$\frac{A^2}{2q}$ $[x = A/q]$	$\frac{1}{48}\,qa^2l^2(1,5 - \alpha^2)$
4		$\frac{1}{2}\,qb$	$\frac{1}{2}\,qb$	$\frac{qb}{8}\,(2l - b)$ $[x = l/2]$	$\frac{1}{384}\,ql^4(5 - 24\alpha^2 + 16\alpha^4)$
5		$\frac{qc\,(2b+c)}{2l}$	$\frac{qc\,(2a+c)}{2l}$	$\frac{A^2}{2q} + A \cdot a$ $[x = a + A/q]$	$\frac{1}{384}\,ql^4(5 - 12\alpha^2 + 8\alpha^4 - 12\beta^2 + 8\beta^4)$
6		qa	qa	$\frac{1}{2}\,qa^2$ $[a \leqslant x \leqslant a + b]$	$\frac{q}{24}\,a^2l^2(1,5 - \alpha^2)$
7		$\frac{q_0}{2}\,(l - a)$	$\frac{q_0}{2}\,(l - a)$	$\frac{q_0}{24}\,(3l^2 - 4a^2)$ $[x = l/2]$	$\frac{1}{1920}\,q_0l^4(25 - 40\alpha^2 + 16\alpha^4)$
8		$(2q_1 + q_2)\,\frac{l}{6}$	$(q_1 + 2q_2)\,\frac{l}{6}$	$\approx 0{,}064\,(q_1 + q_2)l^2$ $[x \approx 0{,}55l]$	$\frac{5}{768}\,(q_1 + q_2)l^4$
9		$\frac{1}{6}\,q_0l$	$\frac{1}{3}\,q_0l$	$\frac{1}{9\sqrt{3}}\,q_0l^2$ $\left[x = \frac{1}{\sqrt{3}}\,l\right]$	$\frac{5}{768}\,q_0l^4$
10		$\frac{1}{4}\,q_0l$	$\frac{1}{4}\,q_0l$	$\frac{1}{12}\,q_0l^2$ $[x = l/2]$	$\frac{1}{120}\,q_0l^4$
11		$\frac{1}{4}\,q_0l$	$\frac{1}{4}\,q_0l$	$\frac{1}{24}\,q_0l^2$ $[x = l/2]$	$\frac{3}{640}\,q_0l^4$
12		$\frac{q_0a}{6}\,(3 - 2\alpha)$	$\frac{q_0a^2}{3l}$	$\frac{q_0a^2}{3}\sqrt{\left(1 - \frac{2}{3}\,\alpha\right)^3}$ $\left[x = a\sqrt{1 - \frac{2}{3}\,\alpha}\right]$	$EIf_1 = \frac{q_0a^3}{45}\,(1 - \alpha)(5l - 4a)$
13		$\frac{q_0a}{6}\,(3 - \alpha)$	$\frac{q_0a^2}{6l}$	$\frac{q_0a^2}{6l}\left(l - a + \frac{2}{3}\,a\sqrt{\frac{\alpha}{3}}\right)$	$EIf_1 = \frac{q_0a^3}{360}\,(1 - \alpha)(20l - 13a)$

		Auflagerkräfte		max M	$EI\,f_{Mitte}$ [1])
		A	B	[an der Stelle x]	
14	quadr. Parabel q_0	$\frac{q_0 l}{3}$	$\frac{q_0 l}{3}$	$\frac{5}{48}\,q_0 l^2$ $[x = l/2]$	$\frac{61\,q_0 l^4}{5760}$
15	quadr. Parabel q_0	$\frac{q_0 l}{2{,}4}$	$\frac{q_0 l}{4}$	$\frac{1}{11{,}15}\,q_0 l^2$ $[x = 0{,}446l]$	$\frac{11\,q_0 l^4}{1200}$
16	P	$\frac{P}{2}$	$\frac{P}{2}$	$\frac{Pl}{4}$ $[x = l/2]$	$\frac{1}{48}\,Pl^3$
17	P, a, b	$\frac{Pb}{l}$	$\frac{Pa}{l}$	$\frac{Pab}{l}$ $[x = a]$	$\frac{1}{48}\,Pl^3(3\alpha - 4\alpha^3)$ für $a \leqslant b$
18	P, a, b, P, a	P	P	Pa $[a \leqslant x \leqslant a+b]$	$\frac{1}{24}\,Pl^3(3\alpha - 4\alpha^3)$
19	n-1 gleiche Lasten P; $l = na$	$\frac{P(n-1)}{2}$	$\frac{P(n-1)}{2}$	Pl/r	max Ml^2/s
		n: 2	3	4	5	6	7
		r: 4	3	2	1,66	1,33	1,16
		s: 12	9,39	10,11	9,25	9,81	9,56
20	n gleiche Lasten P; $l = na$	$\frac{Pn}{2}$	$\frac{Pn}{2}$	Pl/r	max Ml^2/s
		n: 2	3	4	5	6	7
		r: 4	2,4	2	1,54	1,33	1,12
		s: 8,73	10,19	9,37	9,82	9,49	9,72
21	a, b, M	$\frac{M}{l}$	$-\frac{M}{l}$	$a \geqslant l/2$: $\frac{Ma}{l}$; $a \leqslant l/2$: $-\frac{Mb}{l}$	
22	M_1, M_2	$\frac{M_2 - M_1}{l}$	$\frac{M_1 - M_2}{l}$		$\frac{1}{16}\,l^2(M_1 + M_2)$
23	t°, t^u	0	0	0	$\frac{t^2}{8} \cdot \frac{t^u - t^\circ}{h}\,\alpha_t\,EI$
24	P, c, P, x	max $M = \frac{Pl}{8}\left(2 - \frac{c}{l}\right)^2$ für $x = \frac{l}{2} - \frac{c}{4}$; wenn $\frac{c}{l} > 0{,}586$, ist max $M = \frac{Pl}{4}$			h Querschnittshöhe; α_t Temperatur-dehnzahl
25	P_1, e, $P_2 < P_1$, x, c; $e = P_2 \cdot c/R$, $R = P_1 + P_2$	max $M = R\,\frac{(l-e)^2}{4l}$ für $x = \frac{l-e}{2}$; wenn $c \geqslant \frac{l}{2}$, kann P_1 $\frac{l}{4}$ maßgebend sein			

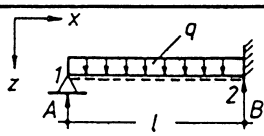
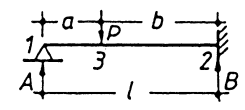
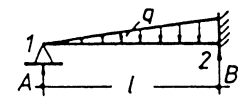
1.2 Einfeldträger mit Kragarm (die Formeln für f gelten nur bei EI = const)

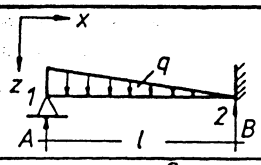
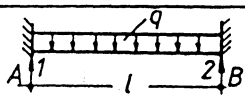
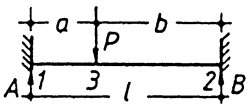
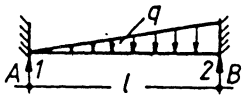
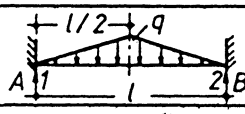
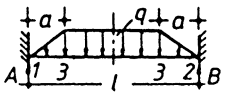
		Auflagerkräfte A	Auflagerkräfte B	max M_{Feld}	M_2	$EI\,f_{Mitte}$	$EI\,f_3$
1		$\frac{q}{2}\left(l-\frac{l_K^2}{l}\right)$	$\frac{q}{2}\left(l+\frac{l_K^2}{l}+2l_K\right)$	$\frac{A^2}{2q}$	$-\frac{ql_K^2}{2}$	$\frac{ql^2}{32}\left(\frac{5}{12}l^2-l_K^2\right)$	$\frac{ql_K}{24}(3l_K^3+4ll_K^2-l^3)$
2		$\frac{ql}{2}$	$\frac{ql}{2}$	$\frac{ql^2}{8}$	0	$\frac{5}{384}\,ql^4$	$-\frac{1}{24}\,ql^3l_K$
3		$-\frac{ql_K^2}{2l}$	$ql_K\left(1+\frac{l_K}{2l}\right)$		$-\frac{ql_K^2}{2}$	$-\frac{1}{32}\,ql^2l_K^2$	$\frac{ql_K^3}{24}(4l+3l_K)$
4		$\frac{Pb}{l}$	$\frac{Pa}{l}$	$\frac{Pab}{l}$	0	$\frac{Pl^3}{48}(3\alpha-4\alpha^3)$	$-\frac{Pabl_K}{6l}(l+a)$
5		$-\frac{Pa}{l}$	$\frac{P(a+l)}{l}$		$-Pa$	$-\frac{1}{16}(Pl^2\,a)$	$\frac{1}{6}Pa(2ll_K+3l_Ka-a^2)$

1.3 Eingespannte Kragträger (die Formeln für f und τ gelten nur bei EI = const)

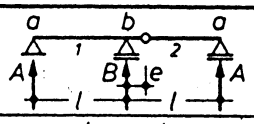
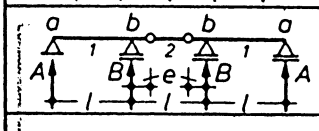
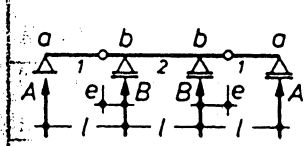
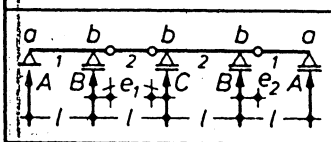
		A	M^E	$EI\,f$	$EI\,\tau$
1		ql	$-\frac{ql^2}{2}$	$\frac{ql^4}{8}$	$-\frac{ql^3}{6}$
2		$\frac{q_0l}{2}$	$-\frac{q_0l^2}{6}$	$\frac{q_0l^4}{30}$	$-\frac{q_0l^3}{24}$
3		$\frac{q_0l}{2}$	$-\frac{q_0l^2}{3}$	$\frac{11q_0l^4}{120}$	$-\frac{q_0l^3}{8}$
4		P	$-Pl$	$\frac{Pl^3}{3}$	$-\frac{Pl^2}{2}$
5		0	M	$-\frac{Ml^2}{2}$	Ml

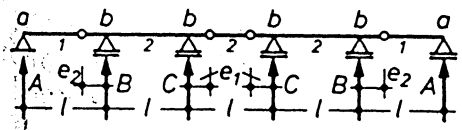
1.4 Eingespannte Einfeldträger (EI = const); vgl. auch S. 4.21 und 4.27

1		$A=\frac{3}{8}\,ql$ $B=\frac{5}{8}\,ql$	$M_2=-ql^2/8$ max $M_{Feld}=9\,ql^2/128$ bei $x=0{,}375\,l$	max $f=\frac{2}{369}\cdot\frac{ql^4}{EI}$ bei $x=0{,}4215\,l$
2		$A=\frac{Pb^2}{2l^3}(a+2l)$ $B=P-A$	$M_2=-\frac{Pab}{2l}\left(1+\frac{a}{l}\right)$ $M_3=\frac{Pab^2}{2l^3}(3a+2b)$	$f_3=\frac{Pa^2b^3}{12\,EI\,l^2}\left(3+\frac{a}{l}\right)$
3		$A=\frac{1}{10}\,ql$ $B=\frac{2}{5}\,ql$	$M_2=-ql^2/15$ max $M_{Feld}=ql^2/33{,}54$ bei $x=0{,}447\,l$	max $f=\frac{ql^4}{419{,}3\,EI}$ bei $x=0{,}447\,l$

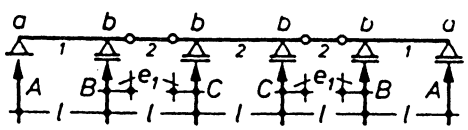
4		$A = \frac{11}{40}\,ql$ $B = \frac{9}{40}\,ql$	max $M_{Feld} = \frac{ql^2}{23{,}6}$ bei $x = 0{,}329\,l$	max $f = \frac{ql^4}{328{,}1\,EI}$ bei $x = 0{,}402\,l$
5		$A = B = \frac{ql}{2}$	max $M_{Feld} = \frac{ql^2}{24}$	max $f = \frac{1}{384} \cdot \frac{ql^4}{EI}$
6		$A = \frac{Pb^2}{l^3}\,(l+2a)$ $B = P - A$	$M_3 = 2P\,\frac{a^2b^2}{l^3}$	$f_3 = \frac{Pa^3b^3}{3\,EI\,l^3}$
7		$A = \frac{3}{20}\,ql$ $B = \frac{7}{20}\,ql$	max $M_{Feld} = \frac{ql^2}{46{,}6}$ bei $x = 0{,}548\,l$	max $f = \frac{ql^4}{764\,EI}$ bei $x = 0{,}525\,l$
8		$A = B = \frac{ql}{4}$	max $M_{Feld} = \frac{ql^2}{32}$	max $f = \frac{7\,ql^4}{3840\,EI}$
9		$A = B = \frac{q}{2}\,(l-a)$	max $M_{Feld} = \frac{ql^2}{24} \cdot (1-2\,\alpha^3)$	max $f = \frac{ql^4}{1920\,EI}$ $(5 - 20\,\alpha^3 + 17\,\alpha^4)$

1.5 Gelenkträger (Gerberträger)[1]) mit Streckenlast q

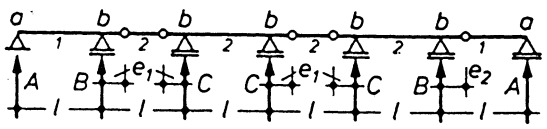
	$e = 0{,}1716\,l$	$A = 0{,}414\,ql$ $B = 1{,}172\,ql$	$M_1 = 0{,}0858\,ql^2$ $M_2 = 0{,}0858\,ql^2$ $M_b = -0{,}0858\,ql^2$	$f_1 = \frac{ql^4}{130\,EI}$
	$e = 0{,}22\,l$	$A = 0{,}414\,ql$ $B = 1{,}086\,ql$	$M_1 = 0{,}0858\,ql^2$ $M_2 = 0{,}0392\,ql^2$ $M_b = -0{,}0858\,ql^2$	$f_1 = \frac{ql^4}{130\,EI}$
	$e = 0{,}125\,l$	$A = 0{,}438\,ql$ $B = 1{,}063\,ql$	$M_1 = 0{,}0957\,ql^2$ $M_2 = 0{,}0625\,ql^2$ $M_b = -0{,}0625\,ql^2$	$f_1 = \frac{ql^4}{130\,EI}$
	$e = 0{,}1716\,l$	$A = 0{,}414\,ql$ $B = 1{,}086\,ql$	$M_1 = 0{,}0858\,ql^2$ $M_2 = 0{,}0392\,ql^2$ $M_b = -0{,}0858\,ql^2$	$f_1 = \frac{ql^4}{130\,EI}$
	$e_1 = 0{,}1465\,l$ $e_2 = 0{,}1250\,l$	$A = 0{,}438\,ql$ $B = 1{,}063\,ql$ $C = 1{,}000\,ql$	$M_1 = 0{,}0957\,ql^2$ $M_2 = 0{,}0625\,ql^2$ $M_b = -0{,}0625\,ql^2$	$f_1 = \frac{ql^4}{110\,EI}$



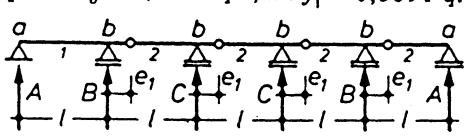
$e_1 = 0{,}1465\,l$
$e_2 = 0{,}1250\,l$



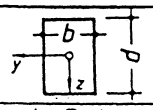
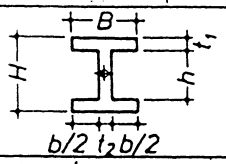
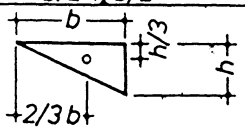
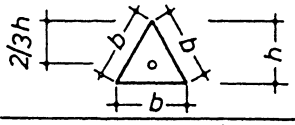
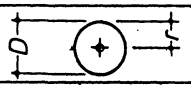
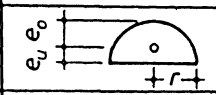
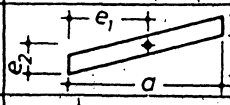
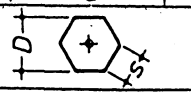
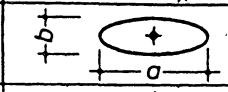
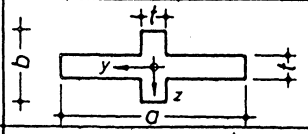
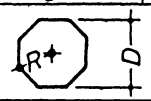
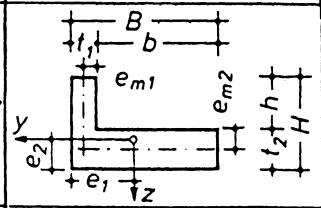
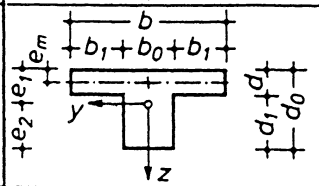
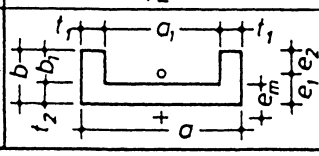
$A = 0{,}438\,ql$; $B = 1{,}063\,ql$; $C = ql$; $M_1 = 0{,}0957\,ql^2$; $M_2 = -M_b = 0{,}0625\,ql^2$; $EI\,f_1 = 0{,}0091\,ql^4$



mehr als 5, gerade Felderzahl



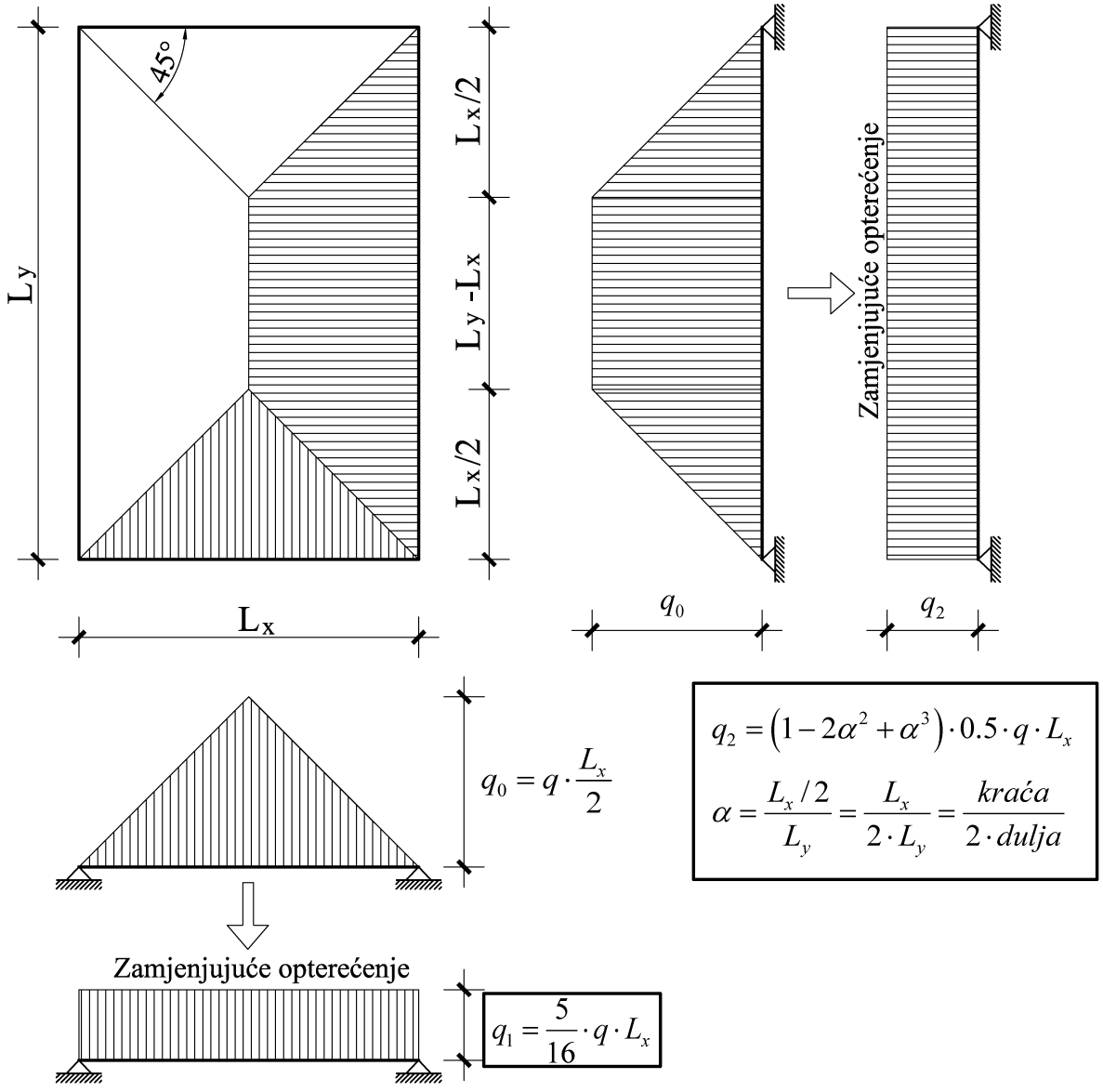
beliebige Felderzahl

	Querschnitt	A	I_y	I_z	W_y	W_z
1		$b\,d$	$\frac{b\,d^3}{12}$	$\frac{d\,b^3}{12}$	$\frac{b\,d^2}{6}$	$\frac{d\,b^2}{6}$
2		$2B\,t_1 + t_2 h$	$\frac{1}{12}(B\,H^3 - b\,h^3)$	$\frac{1}{12}(h\,t_2^3 + t_1 2B^3)$	$\frac{2\,I_y}{H}$	$\frac{2\,I_z}{B}$
3		$\frac{b\,h}{2}$	$\frac{b\,h^3}{36}$	$\frac{h\,b^3}{36}$	$W_o = \frac{b\,h^2}{12}$ $W_u = \frac{b\,h^2}{24}$	$W_l = \frac{h\,b^2}{24}$ $W_r = \frac{h\,b^2}{12}$
4		$\frac{b\,h}{2}$	$\frac{b\,h^3}{36}$	$\frac{h\,b^3}{48}$	$W_o = \frac{b\,h^2}{24}$ $W_u = \frac{b\,h^2}{12}$	$\frac{h\,b^2}{24}$
5		$r^2\pi$	$\frac{r^4\pi}{4}$	$\frac{r^4\pi}{4}$	$\frac{r^3\pi}{4}$	$\frac{r^3\pi}{4}$
6		$\frac{\pi}{4}(D^2 - d^2)$	$\frac{\pi}{64}(D^4 - d^4)$	$\frac{\pi}{64}(D^4 - d^4)$	$\frac{\pi}{32}\cdot\frac{(D^4 - d^4)}{D}$	$\frac{\pi}{32}\cdot\frac{(D^4 - d^4)}{D}$
7		$\frac{\pi\,r^2}{2}$	$r^4\left(\frac{\pi}{8} - \frac{8}{9\pi}\right)$	$\frac{r^4\pi}{8}$	$W_o = 0{,}191\,r^3$ $W_u = 0{,}259\,r^3$	$0.393\,r^3$
8		$a\,t$	$\frac{a\,t}{12}(h^2 + t^2)$	$\frac{t\,a^3}{12}$	$\frac{I_y}{e_2}$	$\frac{I_z}{e_1}$
9		$\frac{3\sqrt{3}\,s^2}{2}$	$\frac{5\sqrt{3}\,s^4}{16}$	$\frac{5\sqrt{3}\,s^4}{16}$	$\frac{5\,s^3}{8}$	$\frac{5\sqrt{3}\,s^3}{16}$
10		$\frac{\pi}{4}a\,b$	$\frac{\pi}{64}a\,b^3$	$\frac{\pi}{64}a^3 b$	$\frac{\pi}{32}a\,b^2$	$\frac{\pi}{32}a^2 b$
11		$t(a+b-t)$	$\frac{t\,b^3 + (a-t)\,t^3}{12}$	$\frac{t\,a^3 + (b-t)\,t^3}{12}$	$\frac{2\,I_y}{b}$	$\frac{2\,I_z}{a}$
12		$2{,}828\,R^2$	$\frac{1+2\sqrt{2}}{6}R^4$	$\frac{1+2\sqrt{2}}{6}R^4$	$0{,}6906\,R^3$	$0{,}6906\,R^3$
13		$BH - bh$	$\frac{1}{3}(t_1 H^3 + b\,t_2^3) - A\,e_2^2$	$\frac{1}{3}(h\,t_1^3 + t_2 B^3) - A\,e_1^2$	$W_o = \frac{I_y}{H - e_2}$ $W_u = \frac{I_y}{e_2}$	$W_r = \frac{I_z}{B - e_1}$ $W_l = \frac{I_z}{e_1}$
14		$bd + b_0 d_1$	$\frac{1}{3}(2b_1 d^3 + b_0 d_0^3) - A\,e_1^2$	$\frac{d b^3 + d_1 b_0^3}{12}$	$W_o = \frac{I_y}{e_1}$ $W_u = \frac{I_y}{e_2}$	$\frac{d b^3 + d_1 b_0^3}{6b}$
15		$t_2 a + 2 t_1 b_1$	$\frac{1}{3}[a e_1^3 - a_1(e_1 - t_2)^3 + 2 e_2^3 t_1]$	$\frac{b\,a^3 - b_1 a_1^3}{12}$	$W_o = \frac{I_y}{e_2}$ $W_u = \frac{I_y}{e_1}$	$\frac{b\,a^3 - b_1}{6\cdot a}$

○ Schwerpunkt ┼ Schubmittelpunkt ⊕ Schwerpunkt und Schubmittelpunkt

PRIJENOS OPTEREĆENJA S PLOČE NOSIVE U DVA SMJERA NA GREDE I ZIDOVE

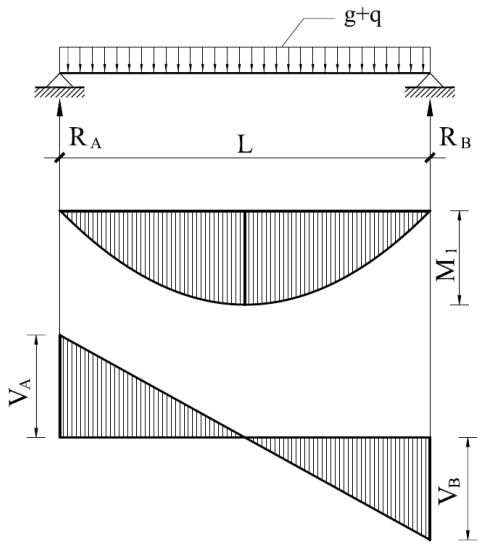
Ležajni pritisak pravokutnih ploča na grede ili zidove kontinuirano je promjenljiv oblika parabole. Za potrebe prakse ovo opterećenje zamjenjuje se trapeznim (za dužu stranu ploče) ili trokutnim (za kraću stranu ploče). Grede se radi jednostavnosti proračuna nadalje mogu proračunavati sa zamjenjujućim jednolikim kontinuiranim opterećenjem (prema izrazima danim na slici). Ovim zamjenjujućim opterećenjem dobiju se isti momenti savijanja, ali oko 25% veće poprečne sile.



$$q_2 = \left(1 - 2\alpha^2 + \alpha^3\right) \cdot 0.5 \cdot q \cdot L_x$$

$$\alpha = \frac{L_x / 2}{L_y} = \frac{L_x}{2 \cdot L_y} = \frac{kraća}{2 \cdot dulja}$$

Prosta greda:

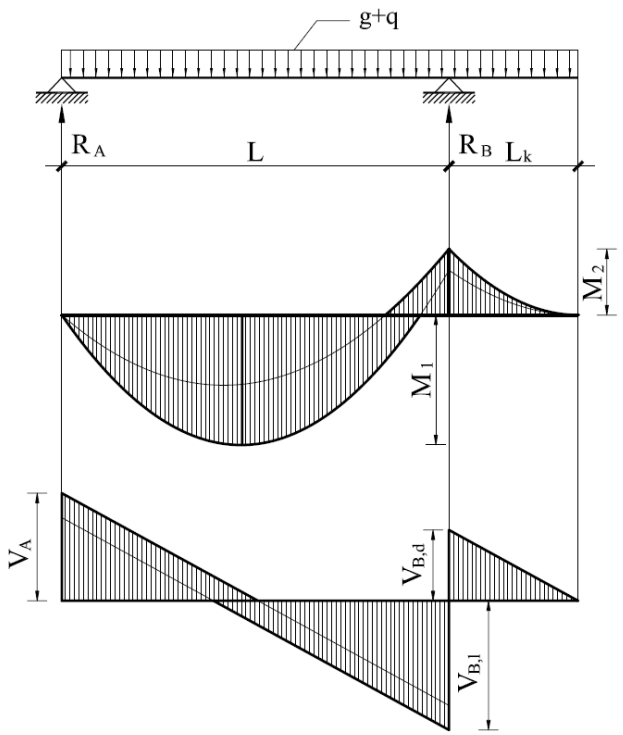


$R_{A,g}=R_{B,g}=V_{A,g}=V_{B,g} = 0.5\cdot g\cdot L$
$R_{A,q}=R_{B,q}=V_{A,q}=V_{B,q} = 0.5\cdot q\cdot L$

$M_{1,g}= 0.125\cdot g\cdot L^2$
$M_{1,q}= 0.125\cdot q\cdot L^2$

$M_{Ed}=1.35\cdot M_g+1.5\cdot M_q$
$V_{Ed}=1.35\cdot V_g+1.5\cdot V_q$

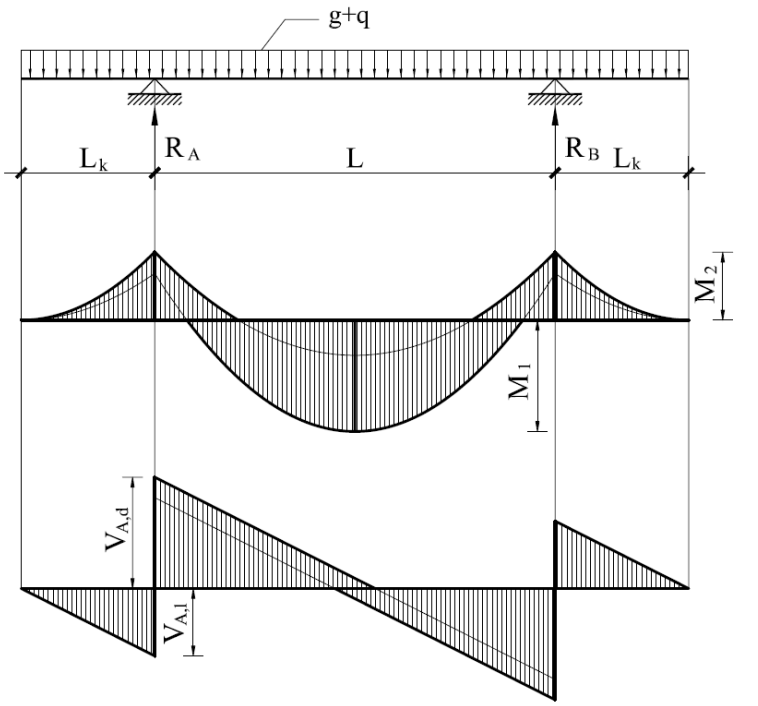
Prosta greda s jednim prepustom:



$$R_{A,g} = V_{A,g} = \frac{g}{2\cdot L}\cdot\left(L^2 - L_k^2\right)$$
$$R_{A,q} = V_{A,q} = 0.5\cdot q\cdot L$$
$$R_{B,g} = \frac{g}{2\cdot L}\cdot\left(L + L_k\right)^2$$
$$R_{B,q} = \frac{q}{2\cdot L}\cdot\left(L + L_k\right)^2$$
$$V_{B,l,g} = \frac{g}{2\cdot L}\cdot\left(L^2 + L_k^2\right)$$
$$V_{B,l,q} = \frac{q}{2\cdot L}\cdot\left(L^2 + L_k^2\right)$$
$$V_{B,d,g} = g\cdot L_k$$
$$V_{B,d,q} = q\cdot L_k$$

$$M_{1,g} = \frac{R_{A,g}^2}{2\cdot g}$$
$$M_{1,q} = 0.125\cdot q\cdot L^2$$
$$M_{2,g} = -0.5\cdot g\cdot L_k^2$$
$$M_{2,q} = -0.5\cdot q\cdot L_k^2$$

Prosta greda s dva prepusta:



$$R_{A,g} = \frac{g \cdot \left(L + 2 \cdot L_k\right)}{2}$$

$$R_{A,q} = \frac{q \cdot \left(L + 2 \cdot L_k\right)}{2}$$

$$V_{A,l,g} = g \cdot L_k$$

$$V_{A,l,q} = q \cdot L_k$$

$$V_{A,d,g} = R_{A,g} - V_{A,l,g}$$

$$V_{A,d,q} = R_{A,q} - V_{A,l,q}$$

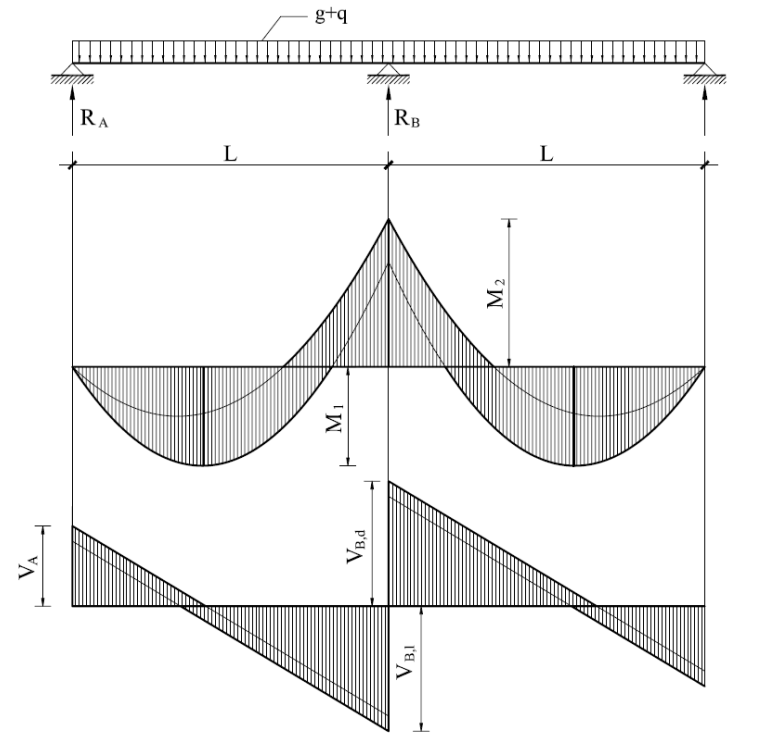
$$M_{1,g} = 0.125 \cdot g \cdot L^2 - 0.5 \cdot g \cdot L_k^2$$

$$M_{1,q} = 0.125 \cdot q \cdot L^2$$

$$M_{2,g} = -0.5 \cdot g \cdot L_k^2$$

$$M_{2,q} = -0.5 \cdot q \cdot L_k^2$$

Kontinuirani nosač preko dva raspona:



$$\mathrm{R_{A,g} = V_{A,g} = 0.375 \cdot g \cdot L}$$

$$\mathrm{R_{A,q} = V_{A,q} = 0.438 \cdot q \cdot L}$$

$$\mathrm{R_{B,g} = 1.25 \cdot g \cdot L}$$

$$\mathrm{R_{B,q} = 1.25 \cdot q \cdot L}$$

$$\mathrm{V_{B,g} = 0.625 \cdot g \cdot L}$$

$$\mathrm{V_{B,q} = 0.625 \cdot q \cdot L}$$

$$\mathrm{M_{1,g} = 0.070 \cdot g \cdot L^2}$$

$$\mathrm{M_{1,q} = 0.096 \cdot q \cdot L^2}$$

$$\mathrm{M_{2,g} = -0.125 \cdot g \cdot L^2}$$

$$\mathrm{M_{2,q} = -0.125 \cdot q \cdot L^2}$$