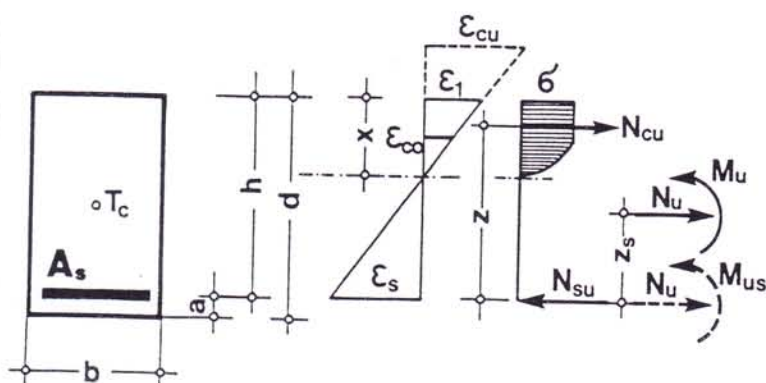




$$N_u = \sum N_i \cdot \gamma_{ui}$$

$$M_u = \sum M_i \cdot \gamma_{ui}$$

$$M_{us} = M_u - N_u \cdot z_s$$

$$k_h = \frac{M_{us}}{f_{cd} \cdot b \cdot h^2}$$

Enojna armatura:

$$A_s = k_s \cdot \frac{M_{us}}{h \cdot \sigma_s} + \frac{N_u}{\sigma_s}$$

Ekscentrični nateg $N > 0$

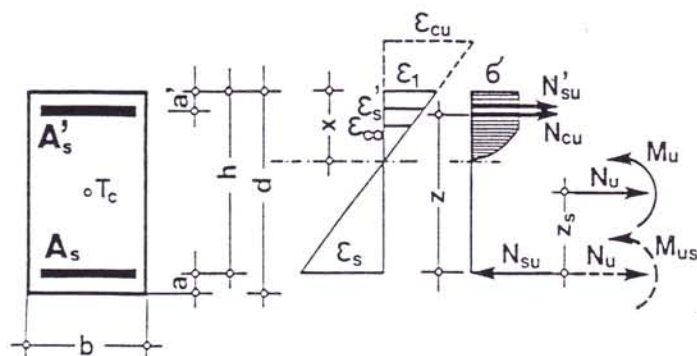
Ekscentrični tlak $N < 0$

Čisti upogib $N = 0$

Pravokotni prerez - enojna armatura

Tabela 2

ϵ_s [%]		1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50
		$-\epsilon_1$ [%]										
1.5	k_x	.400	.455	.500	.538	.571	.600	.625	.647	.667	.684	.700
	k_s	1.163	1.193	1.220	1.247	1.273	1.298	1.323	1.347	1.370	1.391	1.411
	k_h	.143	.189	.230	.268	.299	.325	.346	.364	.379	.391	.402
3.0	k_x	.250	.294	.333	.368	.400	.429	.455	.478	.500	.520	.538
	k_s	1.096	1.117	1.137	1.157	1.176	1.196	1.216	1.235	1.254	1.272	1.289
	k_h	.095	.130	.165	.197	.227	.252	.274	.293	.310	.325	.338
4.0	k_x	.200	.238	.273	.304	.333	.360	.385	.407	.429	.448	.467
	k_s	1.075	1.092	1.109	1.126	1.143	1.160	1.177	1.194	1.210	1.226	1.241
	k_h	.078	.108	.138	.168	.194	.218	.240	.259	.276	.291	.304
5.0	k_x	.167	.200	.231	.259	.286	.310	.333	.355	.375	.394	.412
	k_s	1.062	1.076	1.091	1.105	1.120	1.135	1.150	1.165	1.179	1.193	1.207
	k_h	.065	.092	.119	.145	.170	.192	.213	.231	.247	.262	.276
6.0	k_x	.143	.172	.200	.226	.250	.273	.294	.314	.333	.351	.368
	k_s	1.053	1.065	1.078	1.091	1.103	1.117	1.130	1.143	1.156	1.169	1.181
	k_h	.057	.080	.104	.128	.151	.172	.191	.208	.224	.239	.253
7.0	k_x	.125	.152	.176	.200	.222	.243	.263	.282	.300	.317	.333
	k_s	1.046	1.057	1.068	1.079	1.091	1.103	1.115	1.127	1.138	1.150	1.161
	k_h	.050	.071	.093	.115	.136	.155	.173	.190	.205	.219	.232
8.0	k_x	.111	.135	.158	.179	.200	.220	.238	.256	.273	.289	.304
	k_s	1.040	1.050	1.060	1.071	1.081	1.092	1.103	1.113	1.124	1.135	1.145
	k_h	.044	.064	.084	.104	.123	.141	.158	.174	.189	.202	.215
9.0	k_x	.100	.122	.143	.163	.182	.200	.217	.234	.250	.265	.280
	k_s	1.036	1.045	1.054	1.064	1.073	1.083	1.093	1.103	1.113	1.122	1.132
	k_h	.040	.058	.076	.095	.113	.130	.146	.161	.175	.188	.200
10.0	k_x	.091	.111	.130	.149	.167	.184	.200	.216	.231	.245	.259
	k_s	1.033	1.041	1.049	1.058	1.067	1.076	1.085	1.094	1.103	1.112	1.121
	k_h	.037	.053	.070	.087	.104	.120	.135	.149	.163	.175	.187



Ekscentrični nateg $N > 0$
 Ekscentrični tlak $N < 0$
 Čisti upogib $N = 0$

$$\delta = \frac{a'}{h}$$

$$\delta \leq 0.07 \quad k' = 1$$

$$\delta > 0.07 \quad k' > 1$$

$$N_u = \sum N_i \cdot \gamma_{u1}$$

$$M_u = \sum M_i \cdot \gamma_{u1}$$

$$M_{us} = M_u - N_u \cdot z_s$$

$$k_h = \frac{M_{us}}{f_{cd} \cdot b \cdot h^2}$$

Dvojna armatura:

$$A_s = k_s \cdot \frac{M_{us}}{h \cdot \delta_s} + \frac{N_u}{\delta_s}$$

$$A'_s = k' \cdot k_s \cdot \frac{M_{us}}{h \cdot \delta'_s}$$

Pravokotni prerez - dvojna armatura

Tabela 3

$-\varepsilon_1$ [%]	3.5		3.5			3.5			3.5		
ε_s [%]	1.5		3.0			5.0			10.0		
k_h	k_s	k'_s	k_h	k_s	k'_s	k_h	k_s	k'_s	k_h	k_s	k'_s
.430	1.389	.071	.350	1.281	.036	.290	1.200	.051	.190	1.120	.016
.450	1.375	.115	.360	1.276	.065	.300	1.196	.085	.200	1.118	.069
.490	1.350	.194	.380	1.265	.118	.310	1.192	.117	.210	1.116	.117
.520	1.334	.245	.390	1.260	.143	.320	1.189	.147	.220	1.114	.160
.570	1.312	.318	.410	1.251	.188	.330	1.185	.175	.220	1.114	.160
.620	1.293	.379	.420	1.247	.209	.340	1.182	.202	.230	1.112	.200
.680	1.273	.440	.440	1.239	.249	.360	1.176	.250	.240	1.111	.236
.750	1.255	.499	.460	1.232	.285	.380	1.171	.294	.250	1.109	.270
.850	1.234	.567	.480	1.226	.318	.390	1.168	.314	.270	1.107	.330
.970	1.214	.630	.510	1.217	.362	.410	1.164	.351	.280	1.106	.356
1.130	1.195	.693	.530	1.211	.389	.430	1.160	.384	.290	1.105	.381
1.350	1.175	.755	.560	1.204	.426	.460	1.154	.430	.310	1.103	.426
1.670	1.156	.817	.590	1.198	.459	.490	1.149	.469	.330	1.101	.465
2.210	1.136	.880	.630	1.190	.498	.520	1.145	.504	.350	1.100	.500
3.270	1.116	.943	.670	1.183	.532	.550	1.141	.535	.370	1.098	.531
			.720	1.176	.570	.590	1.137	.572	.400	1.097	.572
			.780	1.168	.609	.630	1.133	.604	.430	1.095	.607
			.840	1.161	.642	.690	1.128	.645	.470	1.093	.647
			.910	1.155	.676	.750	1.124	.679	.510	1.092	.680
			1.000	1.147	.712	.820	1.120	.713	.560	1.091	.716
			1.110	1.140	.748	.910	1.115	.749	.620	1.089	.751
			1.250	1.133	.784	1.020	1.111	.784	.690	1.088	.783
			1.420	1.126	.819	1.160	1.107	.819	.790	1.086	.820
			1.650	1.119	.855	1.350	1.102	.855	.920	1.085	.856
			1.980	1.112	.892	1.620	1.098	.892	1.100	1.083	.892
									1.370	1.082	.928
									1.810	1.080	.964

Koeficient	k'
$\delta = a'/h$	k'
.08	1.011
.09	1.022
.10	1.033
.12	1.057
.14	1.081
.16	1.107
.18	1.134
.20	1.163

Koeficient k'

$\delta = a' / h$ k'

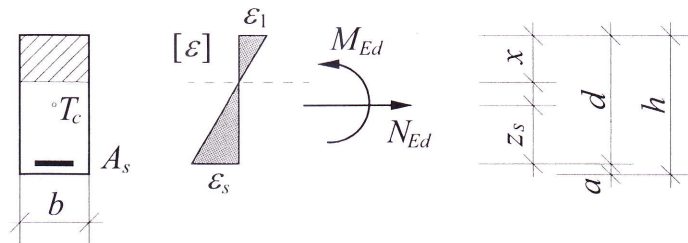
.08	1.011
.09	1.022
.10	1.033
.12	1.057
.14	1.081
.16	1.107
.18	1.134
.20	1.163

Pr. P1-3. Velika ekscentričnost – enojna armatura: betoni običajne trdnosti

$$M_{Eds} = M_{Ed} - N_{Ed} \cdot z_s$$

$$k_d = \frac{M_{Eds}}{f_{cd} \cdot b \cdot d^2} \rightarrow k_s \text{ in } k_x$$

$$A_s = k_s \frac{M_{Eds}}{d \cdot \sigma_s} + \frac{N_{Ed}}{\sigma_s}; \quad x = k_x \cdot d$$



Armatura			ϵ_s [%]		Beton $\leq C50/60$						
S 500-A	S 500-B	S 500			ϵ_1 [%]						
σ_s [kN/cm ²]	σ_s [kN/cm ²]	σ_s [kN/cm ²]			-0,50	-1,00	-1,50	-2,00	-2,50	-3,00	-3,50
30,00	30,00	30,00	1,5	k_x	0,250	0,400	0,500	0,571	0,625	0,667	0,700
				k_s	1,093	1,163	1,220	1,273	1,323	1,370	1,411
				k_d	0,052	0,143	0,230	0,299	0,346	0,379	0,402
43,48	43,48	43,48	2,17	k_x	0,187	0,315	0,408	0,479	0,535	0,580	0,617
				k_s	1,068	1,124	1,173	1,219	1,264	1,307	1,345
				k_d	0,040	0,117	0,196	0,262	0,310	0,345	0,371
43,56	43,54	43,48	3	k_x	0,143	0,250	0,333	0,400	0,455	0,500	0,538
				k_s	1,051	1,096	1,137	1,176	1,216	1,254	1,289
				k_d	0,031	0,095	0,165	0,227	0,274	0,310	0,338
43,65	43,61	43,48	4	k_x	0,111	0,200	0,273	0,333	0,385	0,429	0,467
				k_s	1,039	1,075	1,109	1,143	1,177	1,210	1,241
				k_d	0,024	0,078	0,138	0,194	0,240	0,276	0,304
43,75	43,68	43,48	5	k_x	0,091	0,167	0,231	0,286	0,333	0,375	0,412
				k_s	1,032	1,062	1,091	1,120	1,150	1,179	1,207
				k_d	0,020	0,065	0,119	0,170	0,213	0,247	0,276
43,84	43,76	43,48	6	k_x	0,077	0,143	0,200	0,250	0,294	0,333	0,368
				k_s	1,027	1,053	1,078	1,103	1,130	1,156	1,181
				k_d	0,017	0,057	0,104	0,151	0,191	0,224	0,253
43,94	43,83	43,48	7	k_x	0,067	0,125	0,176	0,222	0,263	0,300	0,333
				k_s	1,023	1,046	1,068	1,091	1,115	1,138	1,161
				k_d	0,015	0,050	0,093	0,136	0,173	0,205	0,232
44,03	43,90	43,48	8	k_x	0,059	0,111	0,158	0,200	0,238	0,273	0,304
				k_s	1,021	1,040	1,060	1,081	1,103	1,124	1,145
				k_d	0,013	0,044	0,084	0,123	0,158	0,189	0,215
44,13	43,97	43,48	9	k_x	0,053	0,100	0,143	0,182	0,217	0,250	0,280
				k_s	1,018	1,036	1,054	1,073	1,093	1,113	1,132
				k_d	0,012	0,040	0,076	0,113	0,146	0,175	0,200
44,22	44,05	43,48	10	k_x	0,048	0,091	0,130	0,167	0,200	0,231	0,259
				k_s	1,017	1,033	1,049	1,067	1,085	1,103	1,121
				k_d	0,011	0,037	0,070	0,104	0,135	0,163	0,187
44,70	44,41	43,48	15	k_x	0,032	0,063	0,091	0,118	0,143	0,167	0,189
				k_s	1,011	1,022	1,034	1,046	1,059	1,072	1,085
				k_d	0,007	0,025	0,049	0,075	0,099	0,121	0,141
45,18	44,77	43,48	20	k_x	0,024	0,048	0,070	0,091	0,111	0,130	0,149
				k_s	1,009	1,017	1,026	1,035	1,045	1,056	1,066
				k_d	0,006	0,019	0,038	0,059	0,078	0,096	0,113
45,41	44,96	43,48	22,5	k_x	0,022	0,043	0,063	0,082	0,100	0,118	0,135
				k_s	1,008	1,015	1,023	1,032	1,041	1,050	1,059
				k_d	0,005	0,017	0,034	0,053	0,070	0,087	0,103
-	45,50	43,48	30	k_x	0,016	0,032	0,048	0,063	0,077	0,091	0,104
				k_s	1,006	1,011	1,017	1,024	1,031	1,038	1,045
				k_d	0,004	0,013	0,026	0,041	0,055	0,068	0,081
-	46,23	43,48	40	k_x	0,012	0,024	0,036	0,048	0,059	0,070	0,080
				k_s	1,004	1,009	1,013	1,018	1,024	1,029	1,035
				k_d	0,003	0,010	0,020	0,031	0,042	0,053	0,063
-	46,59	43,48	45	k_x	0,011	0,022	0,032	0,043	0,053	0,063	0,072
				k_s	1,004	1,008	1,012	1,016	1,021	1,026	1,031
				k_d	0,002	0,009	0,018	0,028	0,038	0,047	0,057