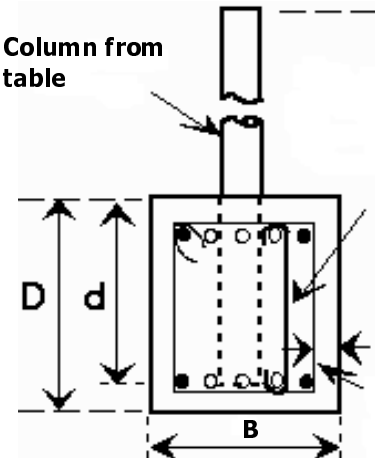
CANTILEVER STEEL PIPE COLUMN SELECTION TABLE
WITH LATERAL LOAD APPLIED AT TOP
California Building Code 2007 Edition (CBC), NDS 2005

DESIGN CRITERIA (Based on Working Stress Design Method):

Concrete f'_C = 2500 psi **Reinforcement f_Y = 40,000 psi (Deformed)**

Steel Pipe Column F_Y = 36 KSI + 1/3 increase included. Maximum unbraced length is zero.



CROSS-SECTION

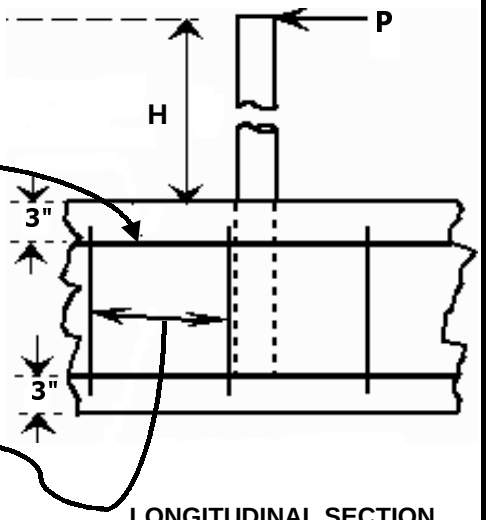
Reinforcement from table at both top and bottom. Space bars uniformly. When an odd number of bars are used at top and bottom, bend center bar 90° around column from each side.

When interior bars are more than 6" from an adjacent longitudinal bar, provide #3 Ties @ 12" o.c.

3" Typ

Provide #3 Ties @ 12" o.c. throughout, around the outside longitudinal bars.

Load "P" is applied to the stronger axis of the column.



LONGITUDINAL SECTION

Ø PIPE OUTSIDE DIAMETER / WALL THICKNESS		H = COLUMN HEIGHTS IN FEET									GRADE BEAM SIZE		
		7	8	9	10	11	12	13	14	15			
		MAXIMUM P IN POUNDS (Governed by Deflection = L / 200)									B	D	d
2½ Sch 80	P	118	90	71	58	47	40	34	29	25	12	12	9
O.D.=2.88"	Min A_S	0.083	0.073	0.065	0.059	0.052	0.048	0.045	0.041	0.038			
Wall t=0.276"	Re-Bars	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3			
2½ XXS	P	176	135	107	86	71	60	51	44	38	12	12	9
O.D.=2.88"	Min A_S	0.124	0.109	0.097	0.087	0.079	0.073	0.067	0.062	0.058			
Wall t=0.552"	Re-Bars	1-#4	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3			
3 Sch 40	P	186	142	112	91	75	63	53	46	40	12	12	9
O.D.=3.5"	Min A_S	0.131	0.115	0.102	0.092	0.083	0.076	0.070	0.065	0.061			
Wall t=0.216"	Re-Bars	1-#4	1-#4	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3			
3 Sch 80	P	239	183	145	117	97	81	69	59	52	12	12	9
O.D.=3.5"	Min A_S	0.169	0.148	0.132	0.118	0.108	0.098	0.091	0.083	0.079			
Wall t=0.3"	Re-Bars	1-#4	1-#4	1-#4	1-#4	1-#3	1-#3	1-#3	1-#3	1-#3			
3 XXS	P	369	282	223	180	149	125	107	92	80	12	12	9
O.D.=3.5"	Min A_S	0.261	0.228	0.203	0.182	0.166	0.151	0.140	0.130	0.121			
Wall t=0.6"	Re-Bars	2-#4	2-#4	2-#3	1-#4	1-#4	1-#4	1-#4	1-#4	1-#4			
4 Sch 40	P	445	341	269	218	180	151	129	111	97	12	12	9
O.D.=4.5"	Min A_S	0.315	0.275	0.244	0.220	0.200	0.183	0.169	0.157	0.147			
Wall t=0.237"	Re-Bars	2-#4	2-#4	2-#4	2-#3	1-#4	1-#4	1-#4	1-#4	1-#4			
4 Sch 80	P	592	453	358	290	239	201	171	148	129	12	12	9
O.D.=4.5"	Min A_S	0.418	0.366	0.325	0.293	0.265	0.244	0.224	0.209	0.195			
Wall t=0.337"	Re-Bars	3-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#3	1-#4			
4 XXS	P	943	722	570	462	381	320	273	235	205	12	12	9
O.D.=4.5"	Min A_S	0.667	0.583	0.518	0.467	0.423	0.388	0.358	0.332	0.311			
Wall t=0.674"	Re-Bars	4-#4	3-#4	3-#4	3-#4	3-#4	2-#4	2-#4	2-#4	2-#4			
6 Sch 40	P	1732	1326	1047	848	701	589	502	433	377	18	24	21
O.D.=6.63"	Min A_S	0.525	0.459	0.408	0.367	0.334	0.306	0.282	0.262	0.245			
Wall t=0.28"	Re-Bars	3-#4	3-#4	3-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4			
6 Sch 80	P	2496	1911	1510	1223	1011	849	723	624	543	18	24	21
O.D.=6.63"	Min A_S	0.756	0.662	0.588	0.529	0.481	0.441	0.407	0.378	0.353			
Wall t=0.432"	Re-Bars	4-#4	4-#4	3-#4	3-#4	3-#4	3-#4	3-#4	2-#4	2-#4			

DIVISION OF BUILDING AND SAFETY
COUNTY OF VENTURA

BUILDING OFFICIAL _____ *Jim MacDonald*

B & S STD **B-37**

SHEET 1 OF 5

DATE: 01/01/08

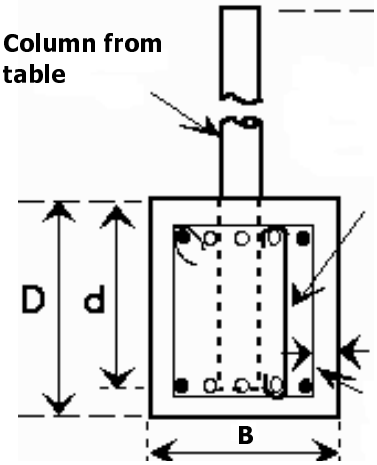
Effective date Jan 1, 2008

CANTILEVER STEEL TUBE COLUMN SELECTION TABLE
WITH LATERAL LOAD APPLIED AT TOP
California Building Code 2007 Edition (CBC), NDS 2005

DESIGN CRITERIA (Based on Working Stress Design Method):

Concrete f'_C = 2500 psi **Reinforcement f_Y = 40,000 psi (Deformed)**

Structural Steel (HSS) Tubing Column F_Y = 46 KSI + 1/3 increase included. Maximum unbraced length is zero.



CROSS-SECTION

Reinforcement from table at both top and bottom. Space bars uniformly. When an odd number of bars are used at top and bottom, bend center bar 90° around column from each side.

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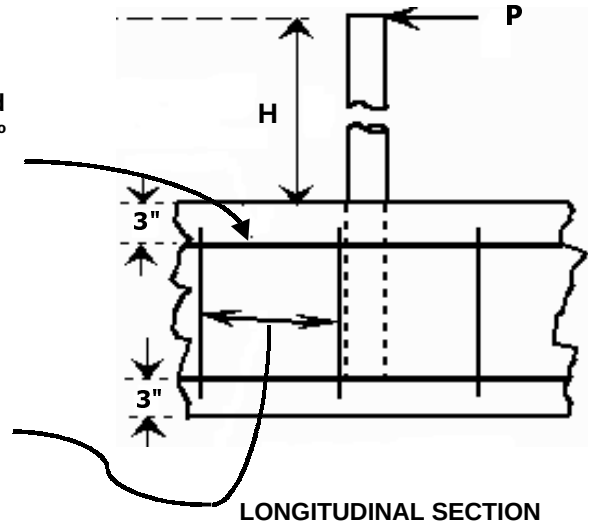
Load "P" is applied to the stronger axis of the column.



LONGITUDINAL SECTION

HSS □ - TUBE COLUMN SIZE INCHES		H = COLUMN HEIGHTS IN FEET									GRADE BEAM SIZE		
		7	8	9	10	11	12	13	14	15	B	D	d
		MAXIMUM P IN POUNDS (Governed by Deflection = L / 200)											
2.5x2.5 - 1/4	P	100	76	60	49	40	34	29	25	21	12	12	9
	Min A_S	0.071	0.061	0.055	0.049	0.044	0.041	0.038	0.035	0.032			
	Re-bars	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3			
2.5x2.5 - 5/16	P	112	85	67	54	45	38	32	28	24	12	12	9
	Min A_S	0.079	0.069	0.061	0.055	0.050	0.046	0.042	0.040	0.036			
	Re-bars	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3			
3x3 - 3/16	P	151	116	91	74	61	51	43	37	33	12	12	9
	Min A_S	0.107	0.094	0.083	0.075	0.068	0.062	0.056	0.052	0.050			
	Re-bars	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3			
3x3 - 1/4	P	186	142	112	91	75	63	53	46	40	12	12	9
	Min A_S	0.131	0.115	0.102	0.092	0.083	0.076	0.070	0.065	0.061			
	Re-bars	1-#4	1-#4	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3			
3x3 - 5/16	P	212	162	128	104	86	72	61	53	46	12	12	9
	Min A_S	0.150	0.131	0.116	0.105	0.096	0.087	0.080	0.075	0.070			
	Re-bars	1-#4	1-#4	1-#4	1-#3	1-#3	1-#3	1-#3	1-#3	1-#3			
3.5x3.5 - 3/16	P	249	191	151	122	101	84	72	62	54	12	12	9
	Min A_S	0.176	0.154	0.137	0.123	0.112	0.102	0.095	0.088	0.082			
	Re-bars	1-#4	1-#4	1-#4	1-#4	1-#4	1-#3	1-#3	1-#3	1-#3			
3.5x3.5 - 1/4	P	310	237	187	152	125	105	90	77	67	12	12	9
	Min A_S	0.219	0.191	0.170	0.153	0.139	0.127	0.118	0.109	0.101			
	Re-bars	2-#3	1-#4	1-#4	1-#4	1-#4	1-#4	1-#4	1-#3	1-#3			
3.5x3.5 - 5/16	P	360	275	217	176	145	122	104	90	78	12	12	9
	Min A_S	0.254	0.222	0.197	0.178	0.161	0.148	0.137	0.127	0.118			
	Re-bars	2-#4	2-#4	1-#4	1-#4	1-#4	1-#4	1-#4	1-#4	1-#4			
4x4 - 3/16	P	382	293	231	187	155	130	111	95	83	12	12	9
	Min A_S	0.270	0.237	0.210	0.189	0.172	0.158	0.146	0.134	0.126			
	Re-bars	2-#4	2-#4	2-#3	1-#4	1-#4	1-#4	1-#4	1-#4	1-#4			
4x4 - 1/4	P	480	368	290	235	194	163	139	120	104	12	12	9
	Min A_S	0.339	0.297	0.264	0.237	0.216	0.198	0.182	0.170	0.158			
	Re-bars	2-#4	2-#4	2-#4	2-#4	2-#3	1-#4	1-#4	1-#4	1-#4			

DIVISION OF BUILDING AND SAFETY
COUNTY OF VENTURA

BUILDING OFFICIAL _____ *Jim MacDonald*

Effective date Jan 1, 2008

B & S STD **B-37**

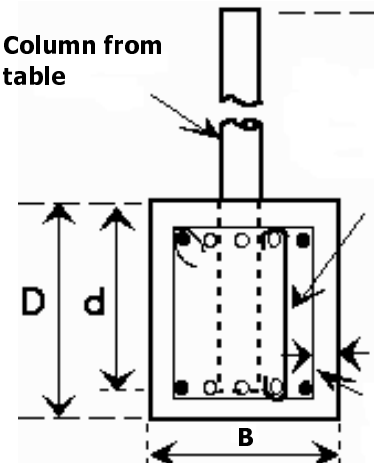
DATE: 01/01/08

CANTILEVER STEEL TUBE COLUMN SELECTION TABLE
WITH LATERAL LOAD APPLIED AT TOP
California Building Code 2007 Edition (CBC), NDS 2005

DESIGN CRITERIA (Based on Working Stress Design Method):

Concrete f'_C = 2500 psi **Reinforcement f_Y = 40,000 psi (Deformed)**

Structural Steel (HSS) Tubing Column F_Y = 46 KSI + 1/3 increase included. Maximum unbraced length is zero.



CROSS-SECTION

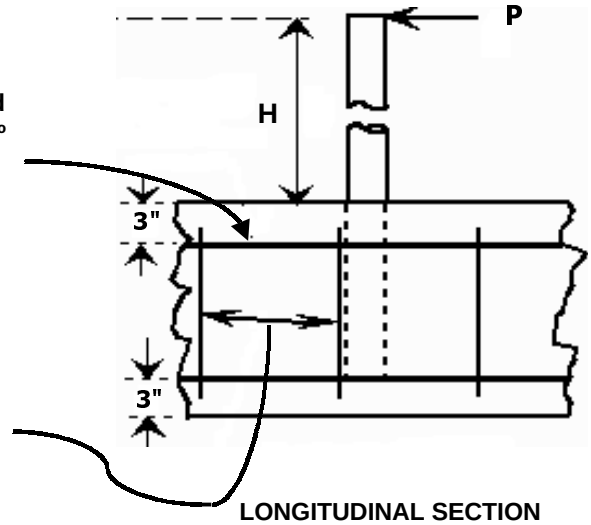
Reinforcement from table at both top and bottom. Space bars uniformly. When an odd number of bars are used at top and bottom, bend center bar 90° around column from each side.

When interior bars are more than 6" from an adjacent longitudinal bar, provide #3 Ties @ 12" o.c.

3" Typ

Provide #3 Ties @ 12" o.c. throughou around the outside longitudinal bars.

Load "P" is applied to the stronger axis of the column.



LONGITUDINAL SECTION

HSS □ - TUBE COLUMN SIZE INCHES		H = COLUMN HEIGHTS IN FEET									GRADE BEAM SIZE		
		7	8	9	10	11	12	13	14	15	B	D	d
		MAXIMUM P IN POUNDS (Governed by Deflection = L / 200)											
4x4 - 5/16	P	563	431	340	276	228	191	163	140	122	12	12	9
	Min A_S	0.398	0.348	0.309	0.279	0.253	0.231	0.214	0.198	0.185			
	Re-bars	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#3	1-#4	1-#4			
4x4 - 3/8	P	634	486	384	311	257	216	184	158	138	12	12	9
	Min A_S	0.448	0.393	0.349	0.314	0.285	0.262	0.242	0.223	0.209			
	Re-bars	3-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#3			
4x4 - 1/2	P	733	561	443	359	297	249	212	183	159	12	12	9
	Min A_S	0.518	0.453	0.403	0.363	0.330	0.302	0.278	0.259	0.241			
	Re-bars	3-#4	3-#4	3-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4			
4.5x4.5 - 1/4	P	702	538	425	344	284	239	203	175	153	15	15	12
	Min A_S	0.372	0.326	0.290	0.261	0.237	0.217	0.200	0.186	0.174			
	Re-bars	2-#4	2-#4	2-#4	2-#4	2-#4	2-#3	1-#4	1-#4	1-#4			
4.5x4.5 - 3/8	P	943.000	722.000	570.000	462.000	381.000	320.000	273.000	235.000	205.000	15	15	12
	Min A_S	0.500	0.437	0.389	0.350	0.317	0.291	0.269	0.249	0.233			
	Re-bars	3-#4	3-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4			
5x5 - 1/4	P	986	755	596	483	399	335	285	246	214	18	24	21
	Min A_S	0.299	0.261	0.232	0.209	0.190	0.174	0.160	0.149	0.139			
	Re-bars	2-#4	2-#4	2-#4	2-#3	1-#4	1-#4	1-#4	1-#4	1-#4			
5x5 - 3/8	P	1337	1024	809	655	541	455	387	334	291	18	24	21
	Min A_S	0.405	0.355	0.315	0.283	0.258	0.236	0.218	0.202	0.189			
	Re-bars	3-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#3	2-#3	1-#4			
5x5 - 1/2	P	1602	1227	969	785	649	545	464	400	349	18	24	21
	Min A_S	0.485	0.425	0.377	0.340	0.309	0.283	0.261	0.242	0.227			
	Re-bars	3-#4	3-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4			
6x6 - 1/4	P	1763	1349	1066	863	714	599	511	440	383	18	24	21
	Min A_S	0.534	0.467	0.415	0.373	0.340	0.311	0.288	0.267	0.249			
	Re-bars	3-#4	3-#4	3-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4			
6x6 - 3/8	P	2435	1864	1473	1193	986	828	706	608	530	18	24	21
	Min A_S	0.738	0.645	0.574	0.516	0.469	0.430	0.397	0.368	0.344			
	Re-bars	4-#4	4-#4	3-#4	3-#4	3-#4	3-#4	2-#4	2-#4	2-#4			

DIVISION OF BUILDING AND SAFETY
COUNTY OF VENTURA

BUILDING OFFICIAL _____ *Jim MacDonald*

Effective date Jan 1, 2008

B & S STD **B-37**

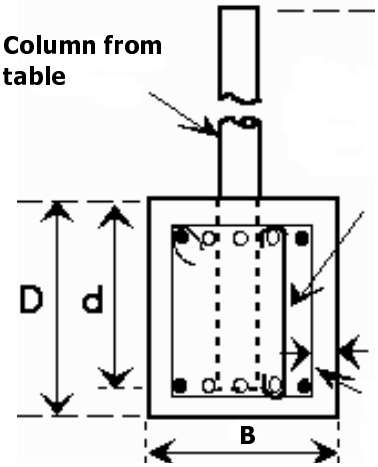
DATE: 01/01/08

CANTILEVER STEEL W-SHAPE COLUMN SELECTION TABLE
WITH LATERAL LOAD APPLIED AT TOP
California Building Code 2007 Edition (CBC), NDS 2005

DESIGN CRITERIA (Based on Working Stress Design Method):

Concrete f'_C = 2500 psi **Reinforcement f_Y = 40,000 psi (Deformed)**

Structural Steel W-Shape Column F_Y = 36 KSI + 1/3 increase included. Maximum unbraced length is zero.



CROSS-SECTION

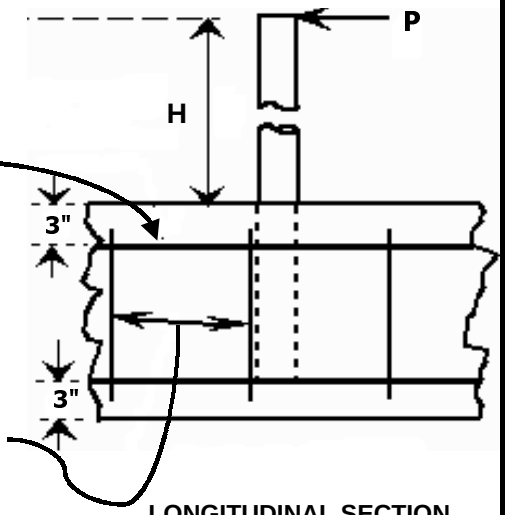
Reinforcement from table at both top and bottom. Space bars uniformly. When an odd number of bars are used at top and bottom, bend center bar 90º around column from each side.

When interior bars are more than 6" from an adjacent longitudinal bar, provide #3 Ties @ 12" o.c.

3" Typ

Provide #3 Ties @ 12" o.c. throughout, around the outside longitudinal bars.

Load "P" is applied to the stronger axis of the column.



LONGITUDINAL SECTION

W-SHAPE COLUMN SIZE		H = COLUMN HEIGHTS IN FEET									GRADE BEAM SIZE		
		7	8	9	10	11	12	13	14	15			
		MAXIMUM P IN POUNDS (Governed by Deflection = L / 200)									B	D	d
W 4 x 13	P	696	533	421	341	282	237	201	174	151	12	12	9
	Min A_S	0.492	0.431	0.383	0.344	0.313	0.287	0.264	0.246	0.229			
	Re-Bars	3-#4	3-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4			
W 5 x 16	P	1319	1010	798	646	534	448	382	329	287	18	24	21
	Min A_S	0.400	0.350	0.311	0.280	0.254	0.233	0.215	0.199	0.186			
	Re-Bars	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#3	1-#4	1-#4			
W 5 x 19	P	1621	1241	980	794	656	551	470	405	353	18	24	21
	Min A_S	0.491	0.430	0.382	0.344	0.312	0.286	0.264	0.245	0.229			
	Re-Bars	3-#4	3-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4			
W 6 x 9	P	1011	774	611	495	409	344	293	252	220	18	24	21
	Min A_S	0.306	0.268	0.238	0.214	0.195	0.179	0.165	0.153	0.143			
	Re-Bars	2-#4	2-#4	2-#4	2-#3	1-#4	1-#4	1-#4	1-#4	1-#4			
W 6 x 12	P	1362	1043	824	667	551	463	395	340	296	18	24	21
	Min A_S	0.413	0.361	0.321	0.289	0.262	0.240	0.222	0.206	0.192			
	Re-Bars	3-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#3	1-#4			
W 6 x 15	P	1806	1382	1092	885	731	614	523	451	393	18	24	21
	Min A_S	0.547	0.478	0.425	0.383	0.348	0.319	0.294	0.273	0.255			
	Re-Bars	3-#4	3-#4	3-#4	2-#4	2-#4	2-#4	2-#4	2-#4	2-#4			
W 6 x 16	P	1978	1515	1197	969	801	673	573	494	430	18	24	21
	Min A_S	0.599	0.525	0.466	0.419	0.381	0.350	0.322	0.299	0.279			
	Re-Bars	3-#4	3-#4	3-#4	3-#4	2-#4	2-#4	2-#4	2-#4	2-#4			
W 6 x 20	P	2558	1958	1547	1253	1036	870	741	639	557	18	24	21
	Min A_S	0.775	0.678	0.603	0.542	0.493	0.452	0.417	0.387	0.362			
	Re-Bars	4-#4	4-#4	2-#5	3-#4	3-#4	3-#4	3-#4	2-#4	2-#4			
W 6 x 25	P	3304	2529	1998	1619	1338	1124	958	826	719	18	24	21
	Min A_S	1.001	0.876	0.778	0.701	0.637	0.584	0.539	0.500	0.467			
	Re-Bars	2-#7	2-#6	4-#4	4-#4	4-#4	3-#4	3-#4	3-#4	3-#4			

DIVISION OF BUILDING AND SAFETY

COUNTY OF VENTURA

BUILDING OFFICIAL _____ *Jim MacDonald*

B & S STD **B-37**

DATE: 01/01/08

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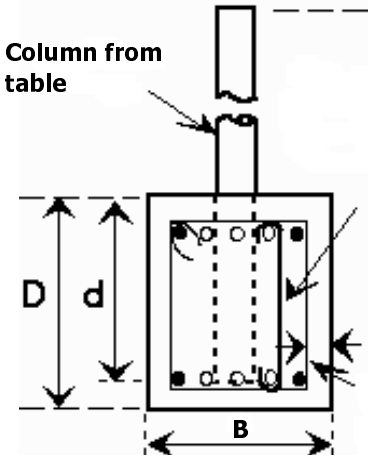
CANTILEVER STEEL W-SHAPE COLUMN SELECTION TABLE
WITH LATERAL LOAD APPLIED AT TOP
California Building Code 2007 Edition (CBC), NDS 2005

DESIGN CRITERIA (Based on Working Stress Design Method):

Concrete f'_C = 2500 psi **Reinforcement f_Y = 40,000 psi (Deformed)**

Structural Steel W-Shape Column F_Y = 36 KSI + 1/3 increase included. Maximum unbraced length is zero.



CROSS-SECTION

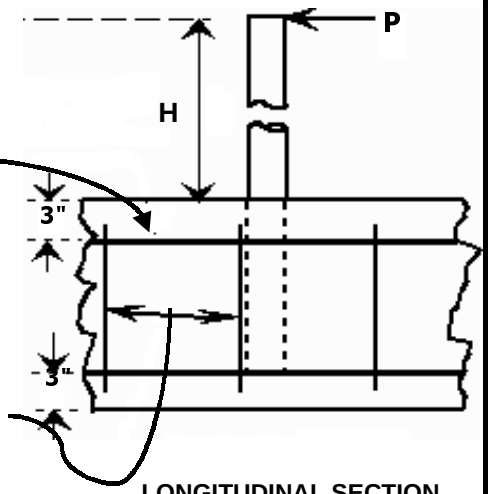
Reinforcement from table at both top and bottom. Space bars uniformly. When an odd number of bars are used at top and bottom, bend center bar 90º around column from each side.

When interior bars are more than 6" from an adjacent longitudinal bar, provide #3 Ties @ 12" o.c.

3" Typ

Provide #3 Ties @ 12" o.c. throughout, around the outside longitudinal bars.

Load "P" is applied to the stronger axis of the column.



LONGITUDINAL SECTION

W-SHAPE COLUMN SIZE		H = COLUMN HEIGHTS IN FEET									GRADE BEAM SIZE		
		7	8	9	10	11	12	13	14	15			
		MAXIMUM P IN POUNDS (Governed by Deflection = L / 200)									B	D	d
W 8 x 10	P	1898	1453	1148	930	768	646	550	474	413	24	24	21
	Min A_S	0.575	0.503	0.447	0.402	0.366	0.335	0.309	0.287	0.268			
	Re-Bars	3-#4	3-#4	3-#4	3-#4	2-#4	2-#4	2-#4	2-#4	2-#4			
W 8 x 13	P	2441	1869	1476	1196	988	830	707	610	531	24	24	21
	Min A_S	0.740	0.647	0.575	0.518	0.470	0.431	0.398	0.370	0.345			
	Re-Bars	4-#4	4-#4	3-#4	3-#4	3-#4	3-#4	2-#4	2-#4	2-#4			
W 8 x 15	P	2959	2265	1790	1450	1198	1006	857	739	644	24	24	21
	Min A_S	0.896	0.784	0.697	0.628	0.570	0.522	0.482	0.448	0.418			
	Re-Bars	3-#5	4-#4	4-#4	2-#5	3-#4	3-#4	3-#4	3-#4	3-#4			
W 8 x 18	P	3816	2921	2308	1869	1545	1298	1106	954	831	24	24	21
	Min A_S	1.156	1.011	0.899	0.809	0.736	0.674	0.622	0.578	0.539			
	Re-Bars	2-#7	2-#7	3-#5	2-#6	4-#4	4-#4	2-#5	3-#4	3-#4			
W 8 x 21	P	4642	3554	2808	2274	1879	1579	1345	1160	1010	24	24	21
	Min A_S	1.406	1.231	1.094	0.984	0.895	0.820	0.757	0.703	0.656			
	Re-Bars	2-#8	4-#5	2-#7	2-#7	3-#5	2-#6	4-#4	4-#4	4-#4			
W 8 x 24	P	5098	3903	3084	2498	2064	1734	1478	1274	1110	24	24	21
	Min A_S	1.544	1.351	1.201	1.081	0.983	0.901	0.832	0.772	0.721			
	Re-Bars	2-#8	2-#8	4-#5	2-#7	2-#7	3-#5	2-#6	4-#4	4-#4			
W 8 x 28	P	6041	4625	3654	2960	2446	2055	1751	1510	1315	24	24	21
	Min A_S	1.830	1.601	1.423	1.281	1.164	1.067	0.985	0.915	0.854			
	Re-Bars	3-#8	4-#6	2-#8	3-#6	2-#7	2-#7	2-#7	3-#5	2-#6			
W 8 x 31	P	6781	5192	4102	3322	2746	2307	1966	1695	1476	24	24	21
	Min A_S	2.054	1.798	1.598	1.438	1.307	1.198	1.106	1.027	0.958			
	Re-Bars	3-#8	3-#7	4-#6	2-#8	3-#6	2-#7	2-#7	2-#7	2-#7			
W 8 x 35	P	7829	5994	4736	3836	3170	2664	2270	1957	1705	24	24	21
	Min A_S	2.372	2.075	1.845	1.660	1.509	1.384	1.277	1.186	1.107			
	Re-Bars	4-#7	3-#8	3-#8	4-#6	2-#8	2-#8	3-#6	2-#7	2-#7			
W 8 x 40	P	9000	6891	5444	4410	3644	3062	2609	2250	1960	24	24	21
	Min A_S	2.520	2.386	2.121	1.909	1.735	1.590	1.468	1.363	1.272			
	Re-Bars	4-#8	4-#7	3-#8	3-#8	4-#6	4-#6	2-#8	2-#8	3-#6			
W 8 x 48	P	11343	8684	6862	5558	4593	3859	3288	2835	2470	24	24	21
	Min A_S	2.577	2.520	2.520	2.405	2.187	2.004	1.850	1.718	1.603			
	Re-Bars	4-#8	4-#8	4-#8	4-#8	3-#8	3-#8	3-#8	4-#6	4-#6			
W 8 x 58	P	14056	10761	8503	6887	5692	4782	4075	3514	3061	24	24	21
	Min A_S	3.194	2.794	2.520	2.520	2.520	2.484	2.293	2.129	1.987			
	Re-Bars	4-#9	4-#8	4-#8	4-#8	4-#8	4-#8	3-#8	3-#8	3-#8			
W 8 x 67	P	16768	12838	10144	8216	6790	5706	4861	4192	3651	24	24	21
	Min A_S	3.810	3.334	2.963	2.667	2.520	2.520	2.520	2.520	2.370			
	Re-Bars	4-#9	4-#9	4-#8	4-#8	4-#8	4-#8	4-#8	4-#8	3-#8			

DIVISION OF BUILDING AND SAFETY
COUNTY OF VENTURA

BUILDING OFFICIAL _____ *Jim MacDonald*

B & S STD **B-37**

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