## Concrete Design Handbook – 4th Edition

## **CHAPTER 1: ADDITIONAL DESIGN AIDS**

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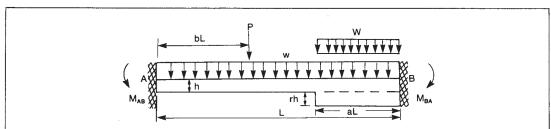
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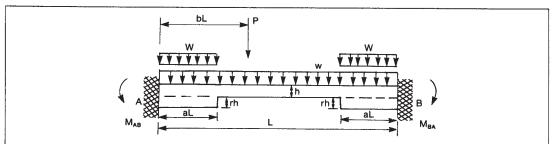
Table 1.20: Beams with Prismatic Haunch at One End



						Unif.	load			Conc	entrate	d load	F.E.M.	- coef.	× PL			Haund	h load
Right haunch		Carry-over factors		er Stiffness factors		F.E.M. coef. × wL <sup>2</sup>		b										F.E.M. coef. × WL <sup>2</sup>	
a	r							0.	0.1 0.3 0.5 0.7						0.	9			
		CAB	CBA	k <sub>AB</sub>	k <sub>BA</sub>	M <sub>AB</sub>	M <sub>BA</sub>	M <sub>AB</sub>	M <sub>BA</sub>	M <sub>AB</sub>	M <sub>BA</sub>	M <sub>AB</sub>	MBA	MAB	M <sub>BA</sub>	M <sub>AB</sub>	MBA	M <sub>AB</sub>	M <sub>BA</sub>
0.1	0.4 0.6 1.0 1.5 2.0	0.593 0.615 0.639 0.652 0.658	0.491 0.490 0.488 0.487 0.487	4.24 4.30 4.37 4.40 4.42	5.40 5.72 5.89	0.0749 0.0727 0.0703 0.0690 0.0684	0.1062 0.1114 0.1143	0.0797 0.0794 0.0792	0.0119 0.0125 0.0129	0.1378 0.1358 0.1346	0.0828 0.0873 0.0898	0.1074 0.1035 0.1012	0.1630 0.1716 0.1764	0.0439 0.0396 0.0373	0.1881 0.1974 0.2026	0.0029 0.0016 0.0008	0.0937 0.0966 0.0982	0.0001 0.0001 0.0000	0.0048 0.0049 0.0049
0.2	0.4 0.6 1.0 1.5 2.0	0.677 0.730 0.793 0.831 0.849	0.469 0.463 0.458 0.455 0.453	4.42 4.56 4.74 4.86 4.91	7.18 8.22 8.88	0.0706 0.0664 0.0610 0.0576 0.0559	0.1225 0.1353 0.1434	0.0785 0.0777 0.0772	0.0149 0.0168 0.0180	0.1302 0.1248 0.1214	0.1025 0.1154 0.1235	0.0942 0.0843 0.0781	0.1972 0.2207 0.2355	0.0335 0.0242 0.0182	0.2148 0.2368 0.2507	0.0037 0.0022 0.0012	0.0917 0.0951 0.0973	0.0010 0.0006 0.0003	0.0178 0.0187 0.0193
0.3	0.4 0.6 1.0 1.5 2.0	0.741 0.831 0.954 1.036 1.078	0.439 0.427 0.415 0.409 0.407	4.52 4.75 5.09 5.34 5.48	9.24 11.69 13.53	0.0698 0.0642 0.0559 0.0497 0.0464	0.1296 0.1511 0.1673	0.0777 0.0762 0.0751	0.0175 0.0215 0.0245	0.1255 0.1158 0.1085	0.1182 0.1440 0.1633	0.0877 0.0711 0.0587	0.2185 0.2621 0.2948	0.0338 0.0217 0.0128	0.2130 0.2436 0.2665	0.0045 0.0028 0.0017	0.0893 0.0930 0.0959	0.0036 0.0023 0.0014	0.0359 0.0391 0.0415
0.4	0.4 0.6 1.0 1.5 2.0	0.774 0.901 1.102 1.260 1.349	0.405 0.86 0.367 0.357 0.352	4.55 4.83 5.33 5.79 6.09	11.28 16.03 20.46	0.0703 0.0646 0.0549 0.0462 0.0407	0.1269 0.1548 0.1807	0.0774 0.0752 0.0732	0.0192 0.0257 0.0319	0.1240 0.1105 0.0982	0.1254 0.1658 0.2035	0.0875 0.0671 0.0485	0.2182 0.2780 0.3339	0.0377 0.0267 0.0173	0.1932 0.2222 0.2491	0.0049 0.0034 0.0022	0.0869 0.0904 0.0938	0.0089 0.0063 0.0037	0.0547 0.0616 0.0679
0.5	0.4 0.6 1.0 1.5 2.0	0.768 0.919 1.200 1.470 1.647	0.371 0.343 0.316 0.301 0.295	4.56 4.84 5.42 6.10 6.63	12.94 20.61 29.74	0.0700 0.0651 0.0561 0.0466 0.0393	0.1176 0.1451 0.1777	0.0774 0.0749 0.0720	0.0193 0.0280 0.0384	0.1240 0.1096 0.0934	0.1218 0.1709 0.2290	0.0884 0.0706 0.0516	0.1935 0.2486 0.3137	0.0386 0.0299 0.0215	0.1769 0.1993 0.2255	0.0051 0.0038 0.0027	0.0849 0.0877 0.0909	0.0167 0.0131 0.0094	0.0702 0.0802 0.0918
0.6	0.4 0.6 1.0 1.5 2.0	0.726 0.872 1.196 1.588 1.905	0.341 0.305 0.267 0.247 0.237	4.62 4.88 5.43 6.18 6.92	24.35 39.79	0.0675 0.0630 0.0560 0.0482 0.0412	0.1072 0.1277 0.1572	0.0771 0.0748 0.0718	0.0183 0.0274 0.0408	0.1214 0.1092 0.0939	0.1096 0.1537 0.2183	0.0835 0.0705 0.0572	0.1664 0.1999 0.2478	0.0368 0.0299 0.0237	0.1666 0.1804 0.1997	0.0038 0.0030	0.0837 0.0854 0.0878	0.0254 0.0212 0.0171	0.0813 0.0913 0.1055
0.7	0.4 0.6 1.0 1.5 2.0	0.657 0.770 1.056 1.491 1.944	0.321 0.275 0.224 0.196 0.183	4.86 5.14 5.62 6.24 6.95	14.39 26.45 47.48	0.0631 0.0580 0.0516 0.0463 0.0417	0.1006 0.1122 0.1304	0.0758 0.0738 0.0714	0.0167 0.0243 0.0371	0.1097 0.0992 0.0890	0.0955 0.1213 0.1633	0.0745 0.0626 0.0537	0.1543 0.1710 0.1959	0.0335 0.0269 0.0223	0.1621 0.1694 0.1796	0.0045 0.0035 0.0028	0.0832 0.0841 0.0854	0.0330 0.0280 0.0241	0.0890 0.0965 0.1076
0.8	0.4 0.6 1.0 1.5 2.0	0.583 0.645 0.818 1.128 1.533	0.319 0.263 0.196 0.155 0.135	5.46 5.89 6.47 6.98 7.47	27.06 50.85	0.0585 0.0516 0.0435 0.0385 0.0355	0.0990 0.1053 0.1130	0.0721 0.0696 0.0676	0.0160 0.0211 0.0296	0.0921 0.0781 0.0692	0.0907 0.1025 0.1175	0.0667 0.0521 0.0432	0.1520 0.1615 0.1715	0.0311 0.0232 0.0184	0.1614 0.1660 0.1705	0.0031 0.0024	0.0831 0.0838 0.0844	0.0388 0.0314 0.0268	0.0951 0.1004 0.1064
0.9	0.4 0.6 1.0 1.5 2.0	0.524 0.542 0.594 0.695 0.842	0.356 0.295 0.206 0.142 0.107	6.87 7.95 9.44 10.48 11.07	27.16 51.25	0.0604 0.0497 0.0372 0.0289 0.0245	0.0991 0.1052 0.1098	0.0623 0.0553 0.0506	0.0184 0.0226 0.0266	0.0866 0.0642 0.0492	0.0913 0.1023 0.1105	0.0691 0.0484 0.0346	0.1510 0.1609 0.1680	0.0339 0.0231 0.0159	0.1605 0.1656 0.1692	0.0032 0.0021	0.0830 0.0837 0.0842	0.0460 0.0337 0.0255	0.0985 0.1044 0.1089

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Table 1.21: Beams with Prismatic Haunch at Both Ends



				Unif. load		Haunch load both haunches									
		Carry-over factors	Stiffness factors	F.E.M. coef. × WL <sup>2</sup>											
					0.1		0.3		0.5		0.7		0.9		F.E.M. coef. × wL <sup>2</sup>
а	r	CAB = CBA	k <sub>AB</sub> = k <sub>BA</sub>	M <sub>AB</sub> = M <sub>BA</sub>	M <sub>AB</sub>	MBA	M <sub>AB</sub>	M <sub>BA</sub>	M <sub>AB</sub>	M <sub>BA</sub>	MAB	M <sub>BA</sub>	MAB		M <sub>AB</sub> = M <sub>BA</sub>
0.1	0.4	0.583	5.49	0.0921	0.0905	0.0053	0.1727	0.0606	0.1396	0.1396	0.0606	0.1727	0.0053	0.0905	0.0049
	0.6	0.603	5.93	0.0940	0.0932	0.0040	0.1796	0.0589	0.1428	0.1428	0.0589	0.1796	0.0040	0.0932	0.0049
	1.0	0.624	6.45	0.0961	0.0962	0.0023	0.1873	0.0566	0.1462	0.1462	0.0566	0.1873	0.0023	0.0962	0.0050
	1.5	0.636	6.75	0.0972	0.0980	0.0013	0.1918	0.0551	0.1480	0.1480	0.0551	0.1918	0.0013	0.0980	0.0050
	2.0	0.641	6.90	0.0976	0.0988	0.0008	0.1939	0.0543	0.1489	0.1489	0.0543	0.1939	0.0008	0.0988	0.0050
	0.4	0.634	7.32	0.0970	0.0874	0.0079	0.1852	0.0623	0.1506	0.1506	0.0623	0 1852	0 0079	0.0874	0.0187
	0.6	0.674	8.80	0.1007	0.0899	0.0066	0.1993	0.0584	0.1575	0.1575	0.0584	0.1993	0.0066	0.0074	0.0191
0.2	1.0	0.723	11.09	0.1049	0.0935	0.0046	0.2193	0.0499	0.1654	0.1654	0.0499	0.2193	0.0046	0.0935	0.0195
	1.5	0.752	12.87	0.1073	0.0961	0.0029	0.2338	0.0420	0.1699	0.1699	0.0420	0.2338	0.0029	0.0961	0.0197
	2.0	0.765	13.87	0.1084	0.0976	0.0018	0.2410	0.0372	0.1720	0.1720	0.0372	0.2410	0.0018	0.0976	0.0198
0.3	0.4	0.642	9.02	0.0977	0.0845	0.0097	0 1763	0 0707	0 1558	0.1558	0.0707	0 1763	0.0097	0.0845	0.0397
	0.6	0.697	12.09		0.0861	0.0095	0.1898	0.0700	0.1665	0.1665	0.0700	0.1100	0.0007	0.0043	0.0397
	1.0	0.775	18.68	0.1091	0.0890	0.0084	0.2136	0.0627	0.1803	0.1803	0.0627	0.2136	0.0084	0.0001	0.0426
	1.5	0.828	26.49	0.1132	0.0920	0.0065	0.2376	0.0492	0.1891	0.1891	0.0492	0.2376	0.0065	0.0000	0.0437
	2.0	0.855	32.77	0.1153	0.0943	0.0048	0.2555	0.0366	0.1934	0.1934	0.0366	0.2555	0.0048	0.0943	0.0442
	0.4	0.599	10.15	1	0.0825		.								
	0.6	0.652	14.52		0.0833	0.0106	0.1668	0.0732	0.1632	0.1509 0.1632	0.0732	0.1668	0.0101	0.0023	0.0642
0.4	1.0	0.744	26.06	0.1067	0.0847	0.0112	0.1790	0.0835	0.1833	0.1833	0.0776	0.1000	0.0100	0.0000	0.0000
	1.5	0.827	45.95		0.0862	0.0113	0.1919	0.0852	0.1995	0.1995	0.0000	0.1130	0.0113	0.0047	0.0746
	2.0	0.878	71.41		0.0876										
0.5	0.0	0.500	4.00	l .	0.0810				- 1				i		

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Table 1.22: Prismatic Member with Equal infinitely Stiff End Regions

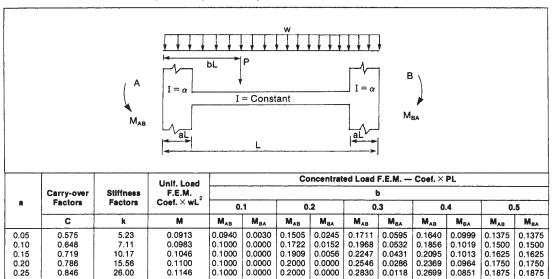


Table 1.23: Prismatic Member with Infinitely Stiff Region at One End

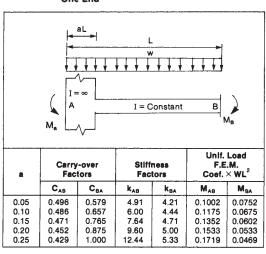


Table 1.24: Prismatic Member with Unequal Infinitely Stiff End Regions

