



TECH NOTES

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Design Load Tables for Wood Columns (Posts)

- 4x4 through 12x12
- Incised 4x4 and 4x6

In a wood structure, whether it is a deck or a five-story wood frame building, solid wood columns (posts) are often used. These columns are subject to axial compressive loads, and in some cases, eccentric loads.

The design loads of axial compression for simple wood columns subjected to concentric compression loads of commonly used lumber products are tabulated in Table 1. The design loads for 4x4 and 4x6 lumber for the commonly used grades are listed in Table 2, and for incised lumber in Table 3. Tables 4, 5, and 6 contain design loads for 6x, 8x, 10x and 12x timbers. Please note, these tables do not consider eccentric loads.

Species	Column Length (ft)	No. 2		No. 2 (incised lumber) ¹		STUD		STUD (incised lumber) ¹		Std&Btr	Std&Btr (incised lumber) ¹
		4x4	4x6 ²	4x4	4x6 ²	4x4	4x6 ²	4x4	4x6 ²	4x4	4x4
Douglas Fir-Larch	3	17426	26316	14174	21384	10371	15566	8376	12564	15662	12748
	4	15793	24001	13133	19907	9830	14807	8029	12076	14130	11771
	5	13469	20663	11591	17710	9018	13665	7510	11348	11972	10332
	6	10936	16923	9738	15010	7942	12136	6800	10346	9663	8627
	7	8728	13582	7955	12344	6752	10404	5951	9128	7685	7017
	8	7000	10929	6468	10079	5638	8741	5085	7854	6151	5690
	9	5690	8900	5300	8279	4696	7310	4301	6677	4993	4655
	10	4694	7351	4395	6876	3934	6140	3639	5668	4117	3856
Hem-Fir	3	16433	24849	13427	20277	9701	14567	7844	11771	14404	11749
	4	14477	22069	12173	18498	9127	13760	7477	11254	12827	10740
	5	11876	18295	10386	15932	8264	12547	6924	10478	10671	9297
	6	9343	14508	8435	13054	7155	10962	6179	9424	8485	7626
	7	7320	11416	6734	10479	5989	9249	5324	8187	6688	6134
	8	5810	9084	5402	8433	4946	7682	4491	6951	5326	4942
	9	4694	7349	4391	6868	4091	6377	3765	5854	4311	4028
	10	3858	6046	3623	5673	3413	5331	3168	4939	3548	3329

¹ Incising is a procedure for improving penetration of preservative treatment whereby incisions are cut into the surfaces of wood.

² See Figure A

Design Considerations

1. Engineering formulas used in computing axial compression design loads are taken from Section 3.7 of the *National Design Specification for Wood Construction (NDS)*, 2001 Edition.
2. Design values for dimension lumber and timbers are those published in *Western Lumber Grading Rules 1998* and the *NDS Supplement*, 2001 Edition.
3. A load duration factor (C_D) of 1.0 is used in determining design loads in this Tech Note. This is conservative for load durations less than normal load duration.
4. Tables 1 and 3 contain the axial compression design loads for incised lumber. Lumber design values are adjusted by the incising factor C_i .

Design Properties	C_i
MOE (E)	0.95
$F_{C//}$	0.80

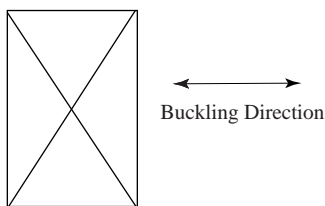
No incising adjustment is required for timbers with a nominal thickness of 5" and thicker, $C_i = 1.0$; all tabulated values for 5" and thicker are applicable to both non-incised and incised lumber.

5. Most preservative treatments have no significant affect on the mechanical properties of lumber. No adjustment is considered in this Tech Note.
6. The sizes and grades covered in this Tech Note are those commonly manufactured by Western mills. The availability of these sizes and grades may vary between regions.

Additional Information

Technical information on Western lumber products is available through the Association's web site at www.wwpa.org and our *Online Technical Guide* at www.wwpa.org/techguide. You can receive a publications order form via fax by calling 732-544-2876 and following the recorded instructions.

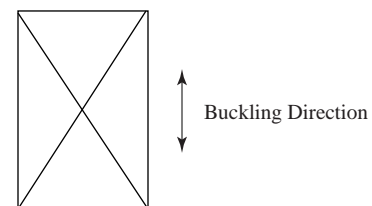
Figure A: Weak Axis Buckling



Example Application:

Single standing column with no bracing or lateral support except at the ends, i.e., deck posts seated in post bases.

Figure B: Strong Axis Buckling



Example Application:

Post or column sandwiched between structural panels, laterally braced full length (structural panels fastened on narrow faces of wood members with nails, bolts or screws), i.e. walls sheathed with structural wood panels on both sides.

Table 2														
AXIAL COMPRESSION LOAD CAPACITY FOR 4x4 and 4x6 COLUMNS														
Column Capacity (lbs.)														
Species	Column Length (ft)	Select Structural			No. 1			No. 2			Stud			Std&Btr
		4x4	4x6 ²	4x6 ¹	4x4	4x6 ²	4x6 ¹	4x4	4x6 ²	4x6 ¹	4x4	4x6 ²	4x6 ¹	4x4
Douglas Fir-Larch	2	23098	35531	34779	20392	31356	30704	18384	28237	27679	10701	16233	16033	16559
	3	21799	34897	32933	19266	30806	29103	17426	27766	26316	10371	16064	15566	15662
	4	19579	33910	29784	17342	29949	26375	15793	27036	24001	9830	15809	14807	14130
	5	16483	32468	25323	14645	28700	22492	13469	25975	20663	9018	15453	13665	11972
	6	13232	30466	20503	11788	26966	18260	10936	24504	16923	7942	14971	12136	9663
	7	10488	27882	16335	9358	24723	14573	8728	22590	13582	6752	14339	10404	7685
	8	8379	24880	13089	7484	22105	11688	7000	20326	10929	5638	13541	8741	6151
	9	6795	21782	10632	6072	19387	9500	5690	17930	8900	4696	12584	7310	4993
	10	5598	18883	8769	5004	16830	7838	4694	15635	7351	3934	11514	6140	4117
	11	4682	16335	7338	4186	14573	6561	3929	13582	6158	3326	10404	5200	3444
	12	3967	14168	6222	3548	12648	5563	3332	11815	5225	2840	9324	4445	2920
	13	3402	12349	5337	3042	11030	4773	2859	10319	4484	2449	8325	3835	2504
	14	2948	10828	4626	2636	9675	4137	2478	9062	3888	2130	7430	3338	2170
Hem-Fir	2	20341	31330	30631	18338	28213	27613	17578	27127	26475	10049	15266	15057	15326
	3	19125	30741	28903	17299	27706	26136	16433	26577	24849	9701	15090	14567	14404
	4	17045	29819	25951	15523	26917	23616	14477	25713	22069	9127	14823	13760	12827
	5	14196	28467	21836	13050	25763	20053	11876	24437	18295	8264	14447	12547	10671
	6	11298	26589	17522	10465	24161	16217	9343	22667	14508	7155	13935	10962	8485
	7	8909	24183	13885	8289	22095	12912	7320	20428	11416	5989	13262	9249	6688
	8	7098	21434	11092	6620	19700	10342	5810	17935	9084	4946	12416	7682	5326
	9	5746	18654	8994	5367	17234	8399	4694	15487	7349	4091	11420	6377	4311
	10	4729	16100	7410	4422	14932	6926	3858	13290	6046	3413	10337	5331	3548
	11	3952	13885	6196	3697	12912	5795	3221	11416	5051	2877	9249	4500	2965
	12	3348	12017	5251	3133	11196	4913	2727	9853	4278	2452	8224	3839	2511
	13	2870	10459	4502	2686	9757	4215	2337	8559	3666	2111	7299	3307	2153
	14	2486	9161	3901	2328	8554	3653	2023	7487	3176	1834	6484	2876	1865

¹ See Figure A

² See Figure B

Table 3**AXIAL COMPRESSION LOAD CAPACITY FOR 4x4 and 4x6 INCISED COLUMNS**

Column Capacity (lbs.)

Species	Column Length (ft)	Select Structural (incised lumber)			No. 1 (incised lumber)			No. 2 (incised lumber)			Stud (incised lumber)			Std&Btr (incised lumber)
		4x4	4x6 ²	4x6 ¹	4x4	4x6 ²	4x6 ¹	4x4	4x6 ²	4x6 ¹	4x4	4x6 ²	4x6 ¹	4x4
Douglas Fir-Larch	2	18594	28485	27989	16414	25138	24707	14794	22635	22266	8592	13003	12870	13328
	3	17756	28066	26796	15687	24774	23672	14174	22323	21384	8376	12890	12564	12748
	4	16339	27424	24787	14459	24216	21932	13133	21847	19907	8029	12723	12076	11771
	5	14263	26499	21821	12656	23415	19357	11591	21165	17710	7510	12491	11348	10332
	6	11842	25224	18279	10537	22310	16260	9738	20228	15010	6800	12181	10346	8627
	7	9593	23550	14901	8553	20860	13283	7955	18996	12344	5951	11778	9128	7017
	8	7760	21512	12101	6927	19088	10800	6468	17478	10079	5085	11269	7854	5690
	9	6340	19258	9908	5663	17119	8849	5300	15766	8279	4301	10646	6677	4655
	10	5247	16999	8212	4689	15134	7338	4395	14009	6876	3639	9921	5668	3856
	11	4401	14901	6895	3934	13283	6163	3691	12344	5780	3097	9128	4834	3237
	12	3738	13046	5859	3342	11639	5238	3137	10848	4916	2656	8312	4152	2750
	13	3210	11447	5034	2870	10218	4501	2696	9544	4227	2297	7518	3594	2362
	14	2784	10085	4368	2490	9007	3906	2339	8425	3670	2002	6777	3136	2049
	Hem-Fir	2	16381	25120	24659	14763	22619	22223	14164	21754	21324	8071	12230	12091
3		15597	24731	23544	14093	22284	21268	13427	21391	20277	7844	12113	11771	11749
4		14267	24132	21659	12958	21770	19660	12173	20830	18498	7477	11937	11254	10740
5		12339	23266	18899	11299	21031	17289	10386	20015	15932	6924	11693	10478	9279
6		10150	22069	15684	9370	20010	14466	8435	18885	13054	6179	11365	9424	7626
7		8170	20502	12701	7584	18671	11783	6734	17414	10479	5324	10936	8187	6134
8		6585	18614	10273	6133	17042	9564	5402	15673	8433	4491	10394	6951	4942
9		5367	16563	8391	5008	15245	7828	4391	13829	6868	3765	9736	5854	4028
10		4436	14545	6945	4145	13448	6487	3623	12061	5673	3168	8986	4939	3329
11		3718	12701	5825	3476	11783	5445	3033	10479	4753	2685	8187	4195	2789
12		3155	11088	4947	2952	10312	4627	2572	9116	4033	2297	7389	3593	2367
13		2708	9710	4248	2535	9045	3975	2206	7963	3461	1983	6635	3105	2032
14		2349	8543	3685	2199	7968	3449	1912	6993	3001	1727	5946	2705	1762

¹ See Figure A² See Figure B

Table 4 AXIAL COMPRESSION LOAD CAPACITY FOR 6x6 and 6x8 COLUMNS

Column Capacity (lbs.)

Species	Column Length (ft)	Select Structural			No. 1			No. 2		
		6x6	6x8 ²	6x8 ¹	6x6	6x8 ²	6x8 ¹	6x6	6x8 ²	6x8 ¹
Douglas Fir-Larch	2	34461	47201	46993	30004	41072	40915	21027	28768	28674
	3	34028	46896	46402	29680	40842	40473	20834	28630	28410
	4	33371	46450	45506	29194	40509	39810	20547	28431	28018
	5	32438	45843	44234	28511	40058	38879	20147	28164	27473
	6	31162	45047	42493	27586	39473	37618	19612	27820	26744
	7	29482	44031	40203	26373	38731	35963	18915	27388	25793
	8	27387	42756	37347	24841	37807	33874	18032	26853	24589
	9	24965	41189	34044	23015	36676	31384	16958	26202	23124
	10	22400	39311	30546	20989	35315	28621	15721	25421	21437
	11	19894	37138	27128	18906	33720	25781	14386	24500	19617
	12	17586	34729	23981	16902	31909	23048	13035	23437	17775
	13	15539	32184	21190	15061	29932	20538	11742	22248	16011
	14	13761	29617	18765	13421	27863	18302	10550	20960	14386
	15	12230	27128	16678	11984	25781	16342	9478	19617	12925
	16	10916	24787	14886	10734	23758	14637	8530	18262	11632
	Hem-Fir	2	29205	40010	39825	25494	34904	34764	17276	23633
3		28820	39739	39300	25205	34700	34370	17122	23524	23348
4		28235	39343	38502	24770	34402	33777	16894	23365	23037
5		27400	38802	37364	24156	33999	32940	16577	23153	22605
6		26256	38092	35804	23323	33474	31803	16154	22880	22028
7		24750	37182	33750	22227	32807	30310	15603	22537	21277
8		22883	36039	31204	20849	31975	28430	14906	22115	20326
9		20749	34633	28294	19219	30953	26208	14055	21600	19166
10		18525	32953	25262	17436	29726	23777	13070	20983	17822
11		16385	31019	22344	15633	28292	21317	11997	20255	16359
12		14440	28895	19691	13922	26675	18985	10902	19414	14866
13		12731	26676	17360	12371	24926	16869	9843	18469	13422
14		11255	24464	15348	11000	23116	15000	8860	17440	12081
15		9991	22344	13624	9806	21317	13371	7971	16359	10870
16		8910	20368	12149	8772	19588	11962	7181	15262	9793

¹ See Figure A

² See Figure B

Applicable to both non-incised and incised lumber

Table 5 AXIAL COMPRESSION LOAD CAPACITY FOR 8x8 and 8x10 COLUMNS										
Column Capacity (lbs.)										
Species	Column Length (ft)	Select Structural			No. 1			No. 2		
		8x8	8x10 ²	8x10 ¹	8x8	8x10 ²	8x10 ¹	8x8	8x10 ²	8x10 ¹
Douglas Fir-Larch	2	64365	81685	81529	56007	71059	70942	39229	49760	49690
	3	63949	81362	81002	55694	70816	70546	39041	49614	49452
	4	63341	80898	80232	55240	70468	69970	38770	49405	49109
	5	62513	80279	79183	54625	70005	69192	38406	49129	48647
	6	61428	79488	77809	53827	69418	68181	37937	48781	48053
	7	60042	78504	76053	52815	68691	66899	37347	48352	47306
	8	58303	77299	73851	51556	67807	65304	36618	47835	46383
	9	56166	75843	71144	50012	66747	63349	35731	47217	45259
	10	53606	74106	67901	48157	65488	60999	34665	46489	43909
	11	50643	72056	64147	45982	64007	58244	33408	45637	42317
	12	47358	69675	59987	43513	62286	55116	31960	44649	40482
	13	43887	66960	55591	40817	60313	51702	30338	43514	38428
	14	40387	63937	51156	37995	58088	48127	28582	42227	36204
	15	36993	60664	46857	35156	55632	44531	26750	40788	33883
	16	33801	57225	42814	32398	52986	41037	24903	39208	31544
	Hem-Fir	2	54559	69245	69108	47596	60393	60289	32227	40877
3		54190	68959	68640	47318	60176	59936	32078	40761	40632
4		53649	68547	67956	46912	59866	59422	31862	40594	40358
5		52912	67998	67022	46362	59453	58725	31572	40375	39992
6		51944	67294	65796	45646	58928	57819	31200	40098	39520
7		50703	66416	64224	44737	58277	56667	30733	39757	38928
8		49144	65339	62250	43602	57483	55229	30156	39347	38198
9		47227	64036	59821	42209	56530	53464	29455	38858	37309
10		44935	62478	56918	40535	55395	51345	28613	38282	36244
11		42298	60639	53578	38580	54059	48868	27621	37608	34986
12		39402	58505	49909	36374	52506	46074	26474	36828	33534
13		36376	56078	46076	33990	50727	43054	25185	35932	31901
14		33360	53392	42256	31522	48728	39928	23782	34914	30124
15		30469	50504	38594	29069	46533	36821	22308	33776	28257
16		27774	47496	35181	26711	44186	33834	20812	32522	26362

¹ See Figure A

² See Figure B

Applicable to both non-incised and incised lumber

Table 6**AXIAL COMPRESSION LOAD CAPACITY FOR 10x10, 10x12 and 12x12 COLUMNS**

Column Capacity (lbs.)

Species	Column Length (ft)	Select Structural				No. 1				No. 2			
		10x10	10x12 ²	10x12 ¹	12x12	10x10	10x12 ²	10x12 ¹	12x12	10x10	10x12 ²	10x12 ¹	12x12
Douglas Fir-Larch	2	103467	125374	125250	151768	90008	109051	108957	132009	63029	76355	76299	92430
	3	103058	125039	124755	151363	89700	108798	108584	131703	62844	76203	76075	92246
	4	102470	124562	124043	150786	89259	108439	108050	131269	62580	75988	75755	91985
	5	101687	123933	123094	150024	88673	107968	107341	130698	62231	75705	75332	91643
	6	100685	123141	121882	149065	87929	107376	106440	129981	61789	75352	74797	91216
	7	99438	122169	120372	147889	87008	106654	105326	129107	61246	74924	74140	90697
	8	97912	121001	118525	146474	85889	105789	103971	128060	60590	74413	73346	90079
	9	96068	119613	116293	144795	84546	104768	102345	126825	59809	73813	72400	89352
	10	93867	117982	113629	142820	82951	103575	100415	125380	58886	73115	71283	88508
	11	91271	116079	110486	140517	81076	102190	98145	123704	57807	72310	69977	87533
	12	88255	113879	106834	137853	78896	100596	95506	121774	56555	71388	68462	86417
	13	84816	111354	102672	134797	76396	98771	92480	119565	55118	70337	66722	85145
	14	80987	108486	98037	131325	73578	96700	89068	117058	53487	69147	64748	83705
	15	76842	105265	93019	127426	70467	94368	85302	114235	51664	67808	62541	82084
	16	72485	101702	87745	123113	67115	91770	81245	111090	49663	66313	60118	80273
	Hem-Fir	2	87710	106285	106176	128661	76497	92685	92602	112198	51778	62723	62678
3		87348	105989	105737	128303	76223	92461	92270	111926	51630	62602	62500	75781
4		86827	105566	105106	127791	75830	92141	91794	111539	51420	62430	62245	75574
5		86130	105008	104263	127116	75307	91721	91161	111030	51142	62206	61908	75302
6		85239	104304	103184	126263	74642	91192	90356	110391	50791	61925	61483	74961
7		84127	103440	101838	125217	73817	90547	89357	109609	50359	61584	60961	74549
8		82763	102399	100187	123957	72812	89773	88141	108672	49839	61178	60332	74057
9		81113	101160	98189	122457	71604	88857	86679	107564	49220	60702	59582	73481
10		79139	99701	95800	120691	70167	87785	84939	106266	48490	60148	58699	72811
11		76810	97997	92980	118628	68475	86539	82890	104758	47637	59511	57666	72040
12		74106	96024	89707	116240	66507	85102	80509	103018	46649	58781	56469	71156
13		71033	93759	85987	113497	64254	83456	77781	101026	45514	57951	55095	70151
14		67629	91186	81867	110383	61722	81586	74716	98762	44225	57011	53536	69013
15		63971	88303	77439	106893	58942	79483	71351	96216	42782	55953	51789	67733
16		60161	85123	72827	103044	55969	77143	67751	93383	41194	54772	49866	66303

¹ See Figure A² See Figure B

Applicable to both non-incised and incised lumber