ARCH 614: Practice Quiz 7

Note: No aids are allowed for part 1. One side of a letter sized paper with notes is allowed during part 2, along with a silent, **non-programmable** calculator. There are reference charts on pages 2-3 for part 2.

Clearly show your work and answer.

Part 1) Worth 5 points (conceptual questions)

Part 2) Worth 45 points

(NOTE: The loads, bracing and end support conditions can and will be changed for the quiz! The unit system will not change.)

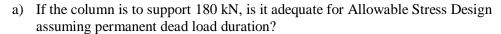
A 6 m tall, 125 mm x 200 mm (metric) glu-lam column is braced in the weak axis (y-y) at 3.2 m from the base. The ends can be considered to be pinned. The cross section and timber have the following properties:

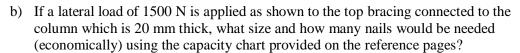
$$A = 25 \times 10^3 \text{ mm}^2$$

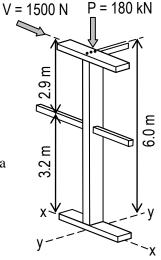
$$F_c = 13.8 \text{ MPa}$$

$$E = 12,400 \text{ MPa}$$

$$E'_{min} = 6300 \text{ MPa}$$







Answers - Not provided on actual quiz!

a) $P_{allowable} = 133 \text{ kN} :: No Good (P_{weak} = 176 \text{ kN})$

b) 2-40d nails (by total length and capacity)

REFERENCE CHARTS FOR QUIZ 7

Samed Cliebdam $\frac{\Gamma_{c}}{\Gamma_{c}}$ Sawed Cliebdam						(mm)			(ma)								
0.00 0.44 0.89 0.49 0.89 0.49 0.89 <th< th=""><th>, ved</th><th>Glu-Lam</th><th>FCE</th><th></th><th></th><th><u> </u></th><th>Sawed</th><th>lu-Lam</th><th>F. 15.</th><th></th><th></th><th>212</th><th>1</th><th>1 -</th><th>P. 2</th><th></th><th>Glu-Lam</th></th<>	, ved	Glu-Lam	FCE			<u> </u>	Sawed	lu-Lam	F. 15.			212	1	1 -	P. 2		Glu-Lam
0.010 0.44 0.58 0.58 0.64 0.67 1.22 0.75 0.83 1.24 0.89 0.83 1.24 0.89 0.83 0.84 0.89 0.83 0.83 0.84 0.89 0.83 0.83 0.89 <t< th=""><th>/ 8</th><th></th><th>0.40</th><th>0360</th><th>0377</th><th>080</th><th>0610</th><th>0,667</th><th>1 20</th><th></th><th>0.822</th><th>2.00</th><th></th><th> </th><th>3.40</th><th>0.930</th><th>0.962</th></t<>	/ 8		0.40	0360	0377	080	0610	0,667	1 20		0.822	2.00			3.40	0.930	0.962
0.000 0.42 0.33 0.430 0.63 0.43 0.43 0.63 0.43 0.44 0.74 <	90		0.41	0.367	0.386	0.81	0.614	0.672	1.22	_	0.826	2.0		_	3.45	0.931	0.963
0.050 0.44 0.84 0.63 0.54 0.845 1.05 0.74 0.875 0.95 3.55 0.95 0.95 0.95 0.95 0.95 0.95 0.95 0.85 0.85 0.85 0.85 0.85 0.85 0.85 0.85 0.87 0.84 0.77 0.84 0.87 0.85 0.87 0.84 0.87 0.85 0.87 0.85 0.87 0.85 0.87 0.89 0.99 0.99 0.99 0.99 0.99 0.99 0.99 0.86 0.87 0.78 0.85 0.87 0.89 0.99 0.99 0.99 0.86 0.77 0.88 0.27 0.89 0.99 0.89 0.78 0.78 0.78 0.78 0.79 0.89 0.89 0.78	020		0.42	0.375	0.394	0.82	0.619	829.0	1.24		0.831	2.0			3.50	0.932	0.963
0.044 0.349 0.411 0.84 0.263 0.649 0.244 0.399 0.411 0.84 0.623 0.648 1.28 0.773 0.844 0.295 0.373 0.649 0.894 0.273 0.649 0.894 0.273 0.649 0.895 0.648 0.648 0.648 0.648 0.648 0.648 0.648 0.648 0.648 0.648 0.649 0.649 0.649 0.649 0.649 0.649 0.649 0.649 0.649 0.649 0.649 0.649 0.649 0.649 0.649 0.649 0.649 0.649 0.649 0.749 0.659 0.749 0.649 0.749 0.649 0.741 0.749 0.649 0.741 0.749 0.749 0.749 0.749 0.749 0.749 0.749 0.749 0.749 0.749 0.744 0.749 0.749 0.749 0.749 0.749 0.749 0.749 0.749 0.749 0.749 0.749 0.749 0.749 0.	8		0.43	0.383	0.403	0.83	0.623	0.683	1.26		9:836	2.0			3.55	0.933	0.964
0.05 0.45 0.85 0.42 0.85 0.42 0.85 0.42 0.85 0.42 0.85 0.42 0.85 0.42 0.85 0.42 0.45 0.75 0.45 0.75 0.45 0.75 0.45 0.75 0.45 0.75 <th< td=""><td>8</td><td></td><td>0.44</td><td>0.390</td><td>0.411</td><td>0.84</td><td>0.628</td><td>0.688</td><td>1.28</td><td></td><td>0.840</td><td>2.0</td><td></td><td></td><td>3.60</td><td>0.934</td><td>0.965</td></th<>	8		0.44	0.390	0.411	0.84	0.628	0.688	1.28		0.840	2.0			3.60	0.934	0.965
0.06 0.46 0.405 0.435 0.68 0.64 0.47 0.48 0.67 0.68 0.77 0.88 212 0.77 0.88 212 0.78 0.89 0.89 0.64 0.78 0.644 0.88 0.645 0.78 0.644 0.88 0.645 0.78 0.78 0.88 2.18 0.89 0.89 0.78 0.78 0.88 0.78 0.78 0.89 0.89 0.78 0.78 0.89 0.89 0.78	649		0.45	0.398	0.420	0.85	0.632	0.693	1.30		0.844	2.10			3.65	0.936	0.965
0.099 0.44 0.45 0.45 0.79 1.34 0.781 0.875 2.14 0.87 0.41 0.45 0.49 0.44 0.485 0.441 0.785 0.875 2.14 0.879 0.999 3.79 0.999 0.099 0.49 0.44 0.645 0.78 0.49 0.77 0.87 0.899 0.899 0.71 0.78 0.899 0.899 0.71 0.78 0.899 0.8	.059		0.46	0.405	0.428	98.0	0.637	869:0	1.32		0.848	2.1.			3.70	0.937	0.966
0.05 0.44 0.44 0.88 0.645 0.778 0.85 0.85 0.16 0.89 0.44 0.89 0.44 0.48 0.44 0.48 0.44 0.48 0.44 0.48 0.47 0.48 0.77 1.48 0.78 0.85 0.22 0.88 0.93 0.94 0.109 0.51 0.441 0.469 0.663 0.721 1.44 0.890 0.882 0.932 0.93 0.940 0.118 0.52 0.441 0.469 0.663 0.731 1.44 0.890 0.882 0.23 0.893 0.949 0.118 0.52 0.441 0.490 0.666 0.731 1.44 0.890 0.894 0.24 0.88 0.734 1.28 0.894 0.894 0.894 0.894 0.894 0.894 0.894 0.894 0.894 0.894 0.894 0.894 0.994 0.994 0.994 0.994 0.994 0.994 0.994 0.994 0.99	0.069		0.47	0.412	0.436	0.87	0.641	0.703	1.34		0.852	2.1			3.75	0.938	0.966
0.089 0.45 0.475 0.453 0.484 0.475 0.485 0.784 0.889 0.489 0.881 0.893 0.893 0.993 0.899 0.893 0.893 0.993 0.994 0.994 0.994 0.993 0.884 0.892 0.893 0.993 0.994	929	0.079	0.48	0.419	0.444	0.88	0.645	0.708	1.36		0.855	2.1			3.80	0.938	0.967
0.099 0.44 0.461 0.466 0.778 0.778 0.882 0.220 0.883 0.929 0.940 0.109 0.51 0.441 0.469 0.921 0.668 0.722 1.42 0.796 0.865 0.722 0.883 0.923 0.941 0.118 0.52 0.444 0.487 0.566 0.727 1.44 0.806 0.738 1.44 0.806 0.934 4.00 0.94 0.118 0.54 0.441 0.892 0.666 0.727 1.44 0.80 0.886 0.944 4.00 0.93 0.118 0.54 0.444 0.892 0.666 0.726 1.44 0.80 0.88 0.992 0.864 0.726 1.44 0.80 0.88 0.992 0.866 0.726 1.44 0.80 0.88 0.894 0.993 0.944 0.993 0.894 0.894 0.994 0.994 0.994 0.994 0.994 0.994 0.994 0.994	0.088	0.089	0.49	0.427	0.453	0.89	0.649	0.713	1.38		0.859	2.18			3.85	0.939	0.968
(1) <td>860</td> <td>0.099</td> <td>0.50</td> <td>0.434</td> <td>0.461</td> <td>0.00</td> <td>0.653</td> <td>0.718</td> <td>1.40</td> <td></td> <td>0.862</td> <td>2.2</td> <td></td> <td></td> <td>3.90</td> <td>0.940</td> <td>0.968</td>	860	0.099	0.50	0.434	0.461	0.00	0.653	0.718	1.40		0.862	2.2			3.90	0.940	0.968
0.118 0.52 0.446 0.77 0.92 0.645 0.77 0.92 0.645 0.77 0.84 0.844 0.844 0.844 0.845 0.734 0.734 0.844 0.734 0.734 0.845 0.734 0.734 0.844 0.734 0.734 0.734 0.734 0.734 0.734 0.734 0.734 0.734 0.734 0.734 0.734 0.734 0.734 0.734<	107	0.109	0.51	0.441	0.469	0.91	0.658	0.722	1.42		0.865	2.2			3.95		0.969
0.128 0.55 0.454 0.484 0.95 0.656 0.731 1.46 0.807 0.874 0.286 0.994 4.05 0.944 0.689 0.735 1.48 0.807 0.874 0.289 0.994 0.944 0.689 0.735 1.48 0.807 0.874 0.289 0.935 0.674 0.74 0.589 0.959 0.944 0.74 0.589 0.959 0.874 1.22 0.884 0.877 0.744 1.22 0.813 0.889 0.939 4.415 0.944 0.167 0.540 0.687 0.544 1.52 0.849 0.877 1.246 0.889 0.939 0.949 4.415 0.944 0.167 0.540 0.684 0.752 1.54 0.884 0.787 1.246 0.889 0.939 0.939 4.420 0.944 0.168 0.540 0.684 0.752 1.54 0.889 0.289 0.939 4.430 0.944 4.43 9.943 4.	1117	0.118	0.52	0.448	0.477	0.92	0.661	0.727	1.44		0.868	2.2			4.00		0.969
0.13 0.54 0.46 0.492 0.75 0.74 0.897 0.874 0.28 0.897 0.935 0.94 0.94 0.75 0.74 0.887 0.887 0.29 0.893 0.944 0.94 0.94 0.94 0.87 0.87 0.887 0.23 0.889 0.935 0.94 0.94 0.94 0.94 0.87 0.87 0.884 0.95 0.84 0.72 0.81 0.887 0.23 0.891 0.937 0.84 0.72 0.81 0.884 0.937 0.94 4.20 0.94 0.106 0.25 0.484 0.523 0.949 0.584 0.72 1.54 0.884 0.894 0.947 4.20 0.945 0.116 0.25 0.444 0.550 0.949 0.746 1.72 0.889 0.894 0.947 4.26 0.944 0.126 0.241 0.262 0.549 0.744 0.744 0.883 0.894 0.244 0.944 4.26 </td <td>126</td> <td>0.128</td> <td>0.53</td> <td>0.454</td> <td>0.484</td> <td>0.93</td> <td>0.665</td> <td>0.731</td> <td>1.46</td> <td></td> <td>0.871</td> <td>2.2</td> <td></td> <td></td> <td>4.05</td> <td></td> <td>0.969</td>	126	0.128	0.53	0.454	0.484	0.93	0.665	0.731	1.46		0.871	2.2			4.05		0.969
0.157 0.255 0.468 0.500 0.95 0.673 0.744 1.50 0.810 0.877 2.23 0.888 0.937 4.15 0.944 0.157 0.458 0.500 0.96 0.677 0.744 1.50 0.813 0.879 2.24 0.881 0.937 4.15 0.944 0.176 0.580 0.484 0.530 0.99 0.684 0.725 1.58 0.891 2.24 0.893 0.937 4.15 0.944 0.176 0.580 0.99 0.684 0.726 1.56 0.892 0.889 1.24 0.893 0.949 4.40 0.994 4.40 0.994 4.40 0.94 4.40 0.994 4.40 0.994 4.40 0.994 4.40 0.994 4.40 0.994 4.40 0.994 4.40 0.994 4.40 0.994 4.40 0.994 4.40 0.994 4.40 0.994 4.40 0.994 4.40 0.994 4.40 <t< td=""><td>13%</td><td>0.138</td><td>25</td><td>0.461</td><td>0.492</td><td>0 94</td><td>0 669</td><td>0.735</td><td>1 48</td><td></td><td>0.874</td><td>2.2</td><td></td><td></td><td>4.10</td><td></td><td>0.970</td></t<>	13%	0.138	25	0.461	0.492	0 94	0 669	0.735	1 48		0.874	2.2			4.10		0.970
0.157 0.56 0.474 0.506 0.675 0.744 0.85 0.857 0.246 0.875 0.744 0.881 0.882 0.243 0.891 0.937 4.25 0.945 0.167 0.687 0.748 0.752 0.689 0.748 0.752 0.849 0.894 0.995 0.848 0.752 0.889 0.995 0.999 0.688 0.756 0.887 0.249 0.899 0.756 0.889 0.999 0.884 0.756 0.889 0.999 0.889 0.756 0.889 0.999 0.889 0.756 0.899 0.899 0.889 0.899 0.889 0.999 0.899 0.889 0.899 0.899 0.899 0.899 0.899 0.899 0.899 0.899 0.899 0.999 0.899 0.899 0.899 0.999 0.899 0.899 0.999 0.999 0.899 0.899 0.999 0.999 0.999 0.999 0.999 0.999 0.999 0.999 0.999<	1145		0.55	0.468	0.500	0.05	0.673	0.740	1.50		0.877	2.3			4.15		0.970
0.15 0.5 0.481 0.551 0.9 0.684 0.752 0.816 0.884 0.89	154		35	0.474	0.508	0.0	0.677	0.744	1.53		0.870	23			4.20		0.971
0.196 0.25 0.489 0.584 0.72 1.56 0.894 0.284 0.27 0.884 0.72 0.884 0.76 0.74 0.74 0.74 <th< td=""><td>164</td><td>0.167</td><td>0.20</td><td>0.481</td><td>0.50</td><td>0.00</td><td>0.00</td><td>0.748</td><td>154</td><td></td><td>0.880</td><td>2 6</td><td></td><td></td><td>4.25</td><td></td><td>1260</td></th<>	164	0.167	0.20	0.481	0.50	0.00	0.00	0.748	154		0.880	2 6			4.25		1260
0.136 0.59 0.484 0.754 0.894 0.894 0.894 0.894 0.994 0.494 0.754 0.884 0.887 0.894 0.994 0.440 0.994 0.440 0.994 0.444 0.994 0.444 0.894 0.944 0.744 0.894 0.744 0.894 0.944 0.744 0.764	3 5	0.10/	0.57	0.401	0.515	000	0.000	0.740	75.1		7000	2 6			4.30	0.047	0.000
0.155 0.050 0.539 0.749 0.530 0.759 0.749 0.750 0.899 0.240 0.940 4.45 0.940 0.224 0.650 0.550 0.750 0.771 0.761 0.771 0.784 0.890 0.240 0.94	277		00.00	0.40	0.323	0.30	0.003	7670	1.50		0.004	2, 6			4.35	0.047	0.000
0.155 0.60 0.538 1.00 0.691 0.760 0.885 0.889 2.40 0.894 0.940 446 0.946 0.205 0.61 0.560 0.545 1.01 0.684 0.764 1.62 0.887 0.891 2.45 0.897 0.941 4.45 0.949 0.214 0.62 0.512 0.552 1.01 0.684 0.764 1.62 0.887 0.895 2.55 0.901 4.45 0.949 0.224 0.564 0.573 1.03 0.701 0.774 1.66 0.835 0.899 2.55 0.901 4.45 0.949 0.224 0.566 0.536 0.704 0.774 1.66 0.837 0.899 2.56 0.904 4.45 0.949 0.224 0.566 0.536 0.701 0.774 0.784 0.904 2.76 0.904 4.75 0.949 0.224 0.566 0.537 0.71 0.784 0.74 0.9	.182		65.0	474	055.0	6.5	0.000	0:/30	1.50		0.857				4.2	0.747	716.0
0.224 0.65 0.545 1.01 0.684 0.764 0.887 0.891 245 0.941 445 0.949 0.234 0.62 0.512 0.552 1.02 0.689 0.767 1.64 0.893 2.50 0.899 0.943 4.50 0.949 0.234 0.62 0.518 0.559 1.03 0.701 0.771 1.66 0.887 0.899 2.50 0.994 4.50 0.949 0.234 0.64 0.524 0.566 1.04 0.774 1.77 0.887 0.899 2.50 0.994 4.50 0.949 0.242 0.64 0.546 0.774 0.774 0.774 0.789 0.779 0.899 0.899 0.994 4.50 0.990 0.242 0.64 0.774 0.784 0.774 0.784 0.994 0.994 0.944 4.50 0.999 0.994 4.50 0.991 0.250 0.54 0.54 0.774 0.784	191		09:0	0.500	0.538	1.00	0.691	0.760	1.60		0.889	2.4	_		4.40	0.948	0.972
0.214 0.62 0.512 0.552 1.02 0.688 0.767 1.64 0.830 0.839 0.543 4.56 0.949 0.224 0.63 0.518 0.559 1.02 0.688 0.771 1.64 0.835 0.550 0.944 4.55 0.950 0.233 0.64 0.528 0.556 1.04 0.774 1.68 0.835 0.899 0.945 4.60 0.940 0.242 0.64 0.524 0.566 0.536 0.530 1.06 0.714 0.784 1.70 0.899 2.56 0.949 4.60 0.940 0.242 0.66 0.536 0.530 1.06 0.714 0.784 1.70 0.899 2.56 0.949 4.60 0.950 0.242 0.66 0.536 0.530 1.06 0.714 0.784 0.903 2.75 0.910 9.774 4.68 0.903 4.70 0.949 0.257 0.66 0.536 0.539	200		0.61	0.506	0.545	1.01	0.694	0.764	1.62		0.891	2.4			4.45	0.949	0.973
0.224 0.653 0.518 0.559 1.03 0.701 0.771 1.66 0.832 0.895 2.55 0.901 0.944 4.55 0.950 0.223 0.64 0.524 0.566 1.04 0.704 0.774 1.68 0.835 0.897 2.60 0.904 4.60 0.950 0.224 0.66 0.536 0.536 1.06 0.711 0.781 1.77 0.840 0.904 0.946 4.60 0.950 0.225 0.66 0.536 0.580 1.06 0.711 0.781 1.74 0.840 0.904 2.76 0.949 4.70 0.950 0.250 0.66 0.536 0.587 1.06 0.717 0.784 0.904 2.70 0.996 4.75 0.950 0.250 0.66 0.548 0.774 0.784 1.76 0.804 0.904 4.76 0.950 0.270 0.68 0.548 0.904 0.904 0.904 4.7	209		0.62	0.512	0.552	1.02	0.698	0.767	1.64		0.893	2.5			4.50	0.949	0.973
0.242 0.64 0.524 0.546 1.04 0.704 0.774 1.68 0.835 0.897 2.60 0.904 0.946 4,60 0.950 0.242 0.65 0.530 0.573 1.05 0.778 1.77 0.840 0.901 2.65 0.906 0.947 4,65 0.950 0.252 0.66 0.536 0.580 1.06 0.711 0.784 1.74 0.890 2.65 0.906 0.947 4,65 0.950 0.252 0.66 0.536 0.587 1.06 0.714 0.784 1.74 0.840 0.901 2.75 0.910 0.959 4,75 0.952 0.270 0.68 0.548 0.569 1.76 0.794 1.78 0.846 0.906 2.75 0.910 0.955 4,75 0.952 0.270 0.69 0.573 0.794 1.80 0.844 0.906 2.94 4,75 0.952 0.279 0.69 0.552 </td <td>218</td> <td></td> <td>0.63</td> <td>0.518</td> <td>0.559</td> <td>1.03</td> <td>0.701</td> <td>0.771</td> <td>1.66</td> <td></td> <td>0.895</td> <td>2.5</td> <td></td> <td></td> <td>4.55</td> <td>0.950</td> <td>0.974</td>	218		0.63	0.518	0.559	1.03	0.701	0.771	1.66		0.895	2.5			4.55	0.950	0.974
0.242 0.65 0.530 0.573 1.05 0.708 0.778 1.70 0.837 0.899 2.65 0.906 0.947 4,65 0.951 0.252 0.66 0.536 0.580 1.06 0.711 0.784 1.74 0.840 0.901 2.70 0.908 0.949 4,70 0.952 0.261 0.66 0.536 0.580 1.06 0.714 0.784 1.74 0.840 0.901 0.908 0.949 4,75 0.952 0.270 0.68 0.548 0.593 1.06 0.717 0.784 0.904 2.80 0.914 0.952 4,75 0.952 0.279 0.69 0.553 0.607 1.10 0.720 0.794 1.80 0.849 0.906 2.94 4,75 0.952 0.279 0.69 0.553 0.607 1.10 0.720 0.794 1.80 0.849 0.906 0.916 4,75 0.952 0.279 0.69	722	0.233	0.64	0.524	0.566	1.04	0.704	0.774	1.68		0.897	2.6			4.60	0.950	0.974
0.252 0.66 0.536 0.580 0.106 0.711 0.781 1.72 0.840 0.901 2.70 0.908 0.949 4.70 0.952 0.261 0.66 0.536 0.580 1.06 0.711 0.784 1.74 0.840 0.901 2.70 0.990 4.75 0.952 0.270 0.68 0.548 0.593 1.06 0.717 0.784 1.76 0.844 0.904 2.80 0.912 0.951 4.75 0.952 0.270 0.68 0.583 0.600 1.10 0.720 0.791 1.78 0.846 0.906 2.80 0.914 0.953 4.80 0.953 0.279 0.600 1.10 0.720 0.791 1.80 0.849 0.906 2.95 0.914 0.953 4.90 0.953 0.279 0.70 0.526 0.791 1.80 0.849 0.906 2.95 0.914 0.954 4.90 0.954 0.27	0.235	0.242	0.65	0.530	0.573	1.05	0.708	0.778	1.70		0.899	2.6			4.65	0.951	0.974
0.261 0.67 0.542 0.587 1.07 0.714 0.784 1.74 0.842 0.903 2.75 0.910 0.950 4,75 0.952 0.270 0.68 0.548 0.593 1.08 0.717 0.784 0.904 2.80 0.912 0.951 4,85 0.953 0.279 0.69 0.553 0.600 1.09 0.720 0.794 1.80 0.846 0.906 2.85 0.914 0.952 4,85 0.953 0.289 0.60 0.559 0.607 1.10 0.726 0.794 1.80 0.846 0.906 2.95 0.914 0.955 4,90 0.955 0.290 0.71 0.564 0.613 1.11 0.726 0.794 1.80 0.895 0.911 0.956 4,75 0.956 0.290 0.72 0.78 0.80 1.11 0.729 0.80 1.84 0.853 0.911 0.956 9.95 0.912 0.912 0.9	244	0.252	99.0	0.536	0.580	1.06	0.711	0.781	1.72		0.901	2.7			4.70	0.952	0.975
0.270 0.68 0.548 0.593 1.08 0.717 0.788 1.76 0.844 0.904 2.80 0.912 0.951 4.80 0.953 0.279 0.69 0.553 0.600 1.09 0.720 0.794 1.89 0.846 0.906 2.85 0.914 0.952 4.85 0.953 0.288 0.609 0.559 0.607 1.10 0.724 1.80 0.849 0.906 2.95 0.914 0.952 4.90 0.954 0.297 0.71 0.564 0.613 1.11 0.726 0.797 1.82 0.851 0.909 2.95 0.917 0.954 5.00 0.918 0.955 6.00 0.955 0.955 0.917 0.954 8.00 0.945 0.909 0.955 0.917 0.954 9.00 0.955 0.917 0.954 9.00 0.955 0.917 0.954 9.00 0.954 0.90 0.955 0.917 0.954 0.90 0.954	3.253	0.261	0.67	0.542	0.587	1.07	0.714	0.784	1.74		0.903	2.7			4.75	0.952	0.975
0.279 0.69 0.553 0.600 1.09 0.770 0.771 1.78 0.846 0.906 2.85 0.914 0.952 4.85 0.953 0.288 0.70 0.559 0.607 1.10 0.724 1.80 0.849 0.906 2.95 0.914 0.953 4.90 0.954 0.297 0.71 0.564 0.613 1.11 0.726 0.797 1.82 0.817 0.909 2.95 0.917 0.954 5.00 0.954 0.904 0.904 0.906 0.919 0.955 0.907 0.954 0.905 0.904 0.905 0.904 0.905 0.904 0.905 0.904 0.905 0.904 0.905 0.904 0.905 0.904 0.905 0.904 0.905 0.904 0.905 0.905 0.905 0.905 0.905 0.905 0.905 0.905 0.905 0.905 0.905 0.905 0.905 0.905 0.905 0.905 0.905 0.905 <td< td=""><td>).261</td><td>0.270</td><td>99.0</td><td>0.548</td><td>0.593</td><td>1.08</td><td>0.717</td><td>0.788</td><td>1.76</td><td></td><td>0.904</td><td>2.8</td><td></td><td></td><td>4.80</td><td>0.953</td><td>0.975</td></td<>).261	0.270	99.0	0.548	0.593	1.08	0.717	0.788	1.76		0.904	2.8			4.80	0.953	0.975
0.288 0.70 0.559 0.607 1.10 0.723 0.794 1.80 0.849 0.908 2.90 0.916 0.953 4.90 0.954 0.297 0.71 0.564 0.613 1.11 0.726 0.797 1.82 0.851 0.909 2.95 0.917 0.954 5.00 0.955 0.306 0.72 0.669 0.11 0.726 0.797 1.84 0.853 0.911 3.00 0.919 0.955 6.00 0.955 0.315 0.72 0.569 0.619 1.12 0.729 0.800 1.84 0.853 0.911 3.05 0.926 8.00 0.955 0.324 0.74 0.806 1.14 0.734 0.806 1.86 0.855 0.914 3.10 0.925 9.00 0.995 0.334 0.75 0.580 0.644 1.16 0.740 0.811 1.94 0.865 0.916 3.15 0.925 0.905 9.905 1.	0.270	0.279	69:0	0.553	009:0	1.09	0.720	0.791	1.78		906.0	2.8			4.85	0.953	0.975
0.297 0.71 0.564 0.613 1.11 0.726 0.797 1.82 0.851 0.909 2.95 0.917 0.954 5.00 0.955 0.306 0.72 0.669 0.619 1.12 0.729 0.800 1.84 0.853 0.911 3.00 0.919 0.955 6.00 0.963 0.315 0.72 0.626 1.13 0.731 0.803 1.86 0.855 0.912 3.05 0.956 8.00 0.973 0.324 0.74 0.880 0.632 1.14 0.734 0.806 1.88 0.857 0.914 3.10 0.925 0.957 1.00 0.973 0.334 0.75 0.838 0.806 1.96 0.858 0.915 3.15 0.952 0.959 1.00 0.999 0.344 0.76 0.814 0.814 0.866 0.916 3.25 0.926 0.956 9.90 9.90 9.90 0.356 0.76 0.814 </td <td>0.278</td> <td></td> <td>0.70</td> <td>0.559</td> <td>209.0</td> <td>1.10</td> <td>0.723</td> <td>0.794</td> <td>1.80</td> <td></td> <td>906.0</td> <td>2.9</td> <td></td> <td></td> <td>4.90</td> <td></td> <td>9260</td>	0.278		0.70	0.559	209.0	1.10	0.723	0.794	1.80		906.0	2.9			4.90		9260
0.306 0.72 0.569 0.619 1.12 0.729 0.800 1.84 0.853 0.911 3.00 0.915 6.00 0.963 0.315 0.73 0.575 0.626 1.13 0.731 0.803 1.86 0.855 0.912 3.05 0.956 8.00 0.973 0.324 0.74 0.580 0.632 1.14 0.734 0.806 1.88 0.857 0.914 3.10 0.952 0.957 1.00 0.979 0.334 0.75 0.588 0.638 1.15 0.737 0.809 1.90 0.858 0.915 3.15 0.953 9.00 0.999 0.342 0.76 0.599 0.644 1.16 0.740 0.811 1.92 0.866 0.916 3.25 0.956 9.959 4.00 0.999 0.356 0.77 0.596 0.656 1.17 0.742 0.814 1.94 0.866 0.918 3.25 0.926 0.950 9.	.287		0.71	0.564	0.613	1.11	0.726	0.797	1.82		606.0	2.9			5.00		9260
0.315 0.72 0.575 0.626 1.13 0.731 0.803 1.86 0.855 0.912 3.05 0.956 8.00 0.973 0.324 0.74 0.580 0.632 1.14 0.734 0.806 1.86 0.857 0.914 3.10 0.922 0.957 1.00 0.979 0.334 0.75 0.838 0.806 1.90 0.858 0.915 3.15 0.923 0.958 20.0 0.996 0.342 0.76 0.590 0.644 1.16 0.740 0.811 1.92 0.860 0.916 3.20 0.952 0.959 40.0 0.996 0.351 0.77 0.595 0.650 1.17 0.742 0.814 1.94 0.862 0.918 3.25 0.926 0.960 6.00 0.996 0.356 0.78 0.660 0.616 1.18 0.747 0.819 1.98 0.860 0.916 3.25 0.926 0.960 6.00 0.	3.295		0.72	0.569	0.619	1.12	0.729	0.800	1.8		0.911	3.0			6.00		0.981
0.324 0.74 0.580 0.632 1.14 0.734 0.806 1.88 0.857 0.914 3.10 0.922 0.957 1.00 0.979 0.333 0.75 0.585 0.638 1.15 0.737 0.809 1.90 0.858 0.915 3.15 0.923 0.958 20.0 0.990 0.342 0.76 0.590 0.644 1.16 0.740 0.811 1.92 0.860 0.916 3.20 0.925 0.959 40.0 0.995 0.351 0.77 0.595 0.650 1.17 0.742 0.814 1.94 0.862 0.918 3.25 0.926 0.960 60.0 0.995 0.360 0.78 0.600 0.655 1.18 0.747 0.817 1.96 0.864 0.919 3.30 0.927 0.961 100.0 0.998 0.368 0.79 0.605 0.661 1.19 0.747 0.819 1.98 0.868 0.920 3.35 0.929 0.961 100.0 0.998	36		0.73	0.575	0.626	1.13	0.731	0.803	1.86		0.912	3.0			8.00		986.0
0.333 0.75 0.585 0.636 1.15 0.737 0.809 1.90 0.858 0.915 3.15 0.923 0.958 20.0 0.990 0.342 0.76 0.590 0.644 1.16 0.740 0.811 1.92 0.860 0.916 3.20 0.955 0.959 40.0 0.995 0.351 0.77 0.595 0.650 1.17 0.742 0.814 1.94 0.862 0.918 3.25 0.926 0.906 6.00 0.997 0.360 0.78 0.600 0.655 1.18 0.745 0.817 1.96 0.864 0.919 3.35 0.927 0.961 1.000 0.998 0.368 0.79 0.605 0.661 1.19 0.747 0.819 1.98 0.868 0.920 0.961 1.000 0.999	3.312		0.74	0.580	0.632	1.14	0.734	908.0	1.88		0.914	3.10			10.0		0.989
0.342 0.76 0.590 0.644 1.16 0.740 0.811 1.92 0.860 0.916 3.20 0.925 0.959 40.0 0.995 0.351 0.77 0.595 0.650 1.17 0.742 0.814 1.94 0.862 0.918 3.25 0.950 0.900 6.00 0.997 0.360 0.78 0.600 0.655 1.18 0.745 0.817 1.96 0.864 0.919 3.30 0.927 0.961 10.00 0.998 0.368 0.79 0.605 0.661 1.19 0.747 0.819 1.98 0.868 0.920 3.35 0.921 200.0 0.999	320		0.75	0.585	0.638	1.15	0.737	608:0	1.90		0.915	3.1			20.0		0.995
0.351 0.77 0.595 0.650 1.17 0.742 0.814 1.94 0.862 0.918 3.25 0.960 0.960 6.00 0.997 0.360 0.78 0.600 0.655 1.18 0.745 0.817 1.96 0.864 0.919 3.30 0.927 0.961 10.00 0.998 0.368 0.79 0.605 0.661 1.19 0.747 0.819 1.98 0.868 0.920 3.35 0.929 0.961 200.0 0.999	.328		0.76	0.590	0.644	1.16	0.740	0.811	1.92		0.916	3.2			40.0		0.997
0.360 0.78 0.600 0.655 1.18 0.745 0.817 1.96 0.864 0.919 3.30 0.927 0.961 10.00 0.998 0.368 0.79 0.605 0.661 1.19 0.747 0.819 1.98 0.868 0.920 3.35 0.929 0.961 2000 0.999	336		0.77	0.595	0.650	1.17	0.742	0.814	1.94		0.918	3.2			0:09		0.998
0.368 0.79 0.605 0.661 1.19 0.747 0.819 1.98 0.868 0.920 3.35 0.929 0.961 200,0 0.999	34		0.78	0.600	0.655	1.18	0.745	0.817	1.96		0.919	3.3			100.0		0.999
	0.352		0.70	200		_											

REFERENCE CHARTS FOR QUIZ 7

Side Member

Thickness (mm)

20

40

Lateral Load Capacity of common Wire Nails (N/nail)

Pennyweight

8d

10d

16d

20d

30d

40d

50d

60d

10d

16d

20d

30d 40d

50d

60d

Load per Nail

400

467

538

614

743

787

805

885

525

627

756

827

912

938

1067

(N)

Nail Length

75

90

100

115

125

140

150

75

90

100

115 125

140

150

(mm)

Solid-Sawn Lumber Side Members

TABLE 5.2 Modification Factors for Design Values for Structural Lumber for Load Duration*

Load Duration	Multiply Design Values by:	Typical Design Loads
Permanent	0.9	Dead load
Ten years	1.0	Occupancy live load
Two months .	1.15	Snow load
Seven days	1.25	Construction load
Ten minutes	1.6	Wind or earthquake load
Impact ^b	2.00	Impact load

Source: Adapted from the National Design Specification for Wood Construction, 2001 edition (Ref. 3), with permission of the publishers, American Forest & Paper Association.

*Load duration factors shall not apply to modulus of elasticity, E, nor to compression perpendicular to grain design values, $F_{\rm cz}$, based on a deformation limit.

Load duration factors greater than 1.6 shall not apply to structural members pressure-treated with water-borne preservatives, or fire retardant chemicals. The impact load duration factor shall not apply to connections.

Buckled shape of column shown by dashed line	(a)	(b)		(d)	(e)		
Theoretical K value	0.5	0.7	1.0	1.0	2.0	2.0	
Recommended design values when ideal conditions are approximated	0.65	0.80	1.0	1.2	2.10	2.0	
	444	Rotation fi	xed, Trans	slation fixe	ed		
End conditions	***	Rotation free, Translation fixed					
code	口	Rotation fi	xed, Trans	slation free	9		
	٩	Rotation free, Translation free					