

moderately seasoned lumber of average quality and not for a high grade of well-seasoned material.

(6) Age and use do not destroy the strength of timber unless decay or season checking takes place.

(7) Timber, unlike materials of a more homogeneous nature, as iron or steel, has no well-defined limit of elasticity. As a rule, it can be strained very near to the breaking point without serious injury, which accounts for the continuous use of many timber structures with the material strained far beyond the usually accepted safe limits. On the other hand, sudden and frequently inexplicable failures of individual sticks at very low limits are liable to occur.

(8) Knots, even when sound and tight, are one of the most objectionable features of timber, both for beams and struts. The full-size tests of every experimenter have demonstrated not only that beams break at knots, but that invariably timber struts will fail at a knot or owing to the proximity of a knot, by reducing the effective area of the stick and causing curly and cross-grained fibres, thus exploding the old practical view that sound and tight knots are not detrimental to timber in compression.

(9) Excepting in top logs of a tree or very small and young timber, the heart wood is, as a rule, not as strong as the material farther away from the heart. This becomes more generally apparent, in practice, in large sticks with considerable heart wood cut from old trees in which the heart has begun to decay or been wind shaken. Beams cut from such material frequently season check along middle of beam and fail by longitudinal shearing.

(10) Top logs are not as strong as butt logs, provided the latter have sound timber.

(11) The results of compression tests are more uniform and vary less for one species of timber than any other kind of test; hence, if only one kind of test can be made, it would seem that a compressive test will furnish the most reliable comparative results.

(12) Long timber columns generally fail by lateral deflection or "buckling" when the length exceeds the least cross-sectional dimension of the stick by 20; in other words, when the column is longer than 20 diameters. In practice the unit stress for all columns over 15 diameters should be reduced in accordance with the various rules and formulae established for long columns.

(13) Uneven end bearings and eccentric loading of columns produce more serious

disturbances than are usually assumed.

(14) The tests of full-size long compound columns, composed of several sticks bolted and fastened together at intervals, show essentially the same ultimate unit resistance for the compound column as each component stick would have if considered as a column by itself.

(15) More attention should be given in practice to the proper proportion of bearing areas, in other words, the compressive bearing resistance of timber with and across grain, especially the latter, owing to the tendency of an excessive crushing stress across grain to indent the timber, thereby destroying the fiber and increasing the liability to speedy decay,

especially when exposed to the weather and the continual working produced by moving loads.

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