

It is, of course, impossible to maintain a beam in a kiln-dried state. As soon as it is exposed to the atmosphere, it at once commences to absorb moisture, and the absorption continues until there is an equilibrium between the hygrometric conditions of the beam and atmosphere. The beam is then in its normal state, and the experiments indicate that the increments of deflection, corresponding to this state, are approximately uniform. The rate of absorption depends essentially upon the nature of the timber, and proceeds more slowly as the density increases. The weight of a central 2 inch slab of beam 30 (spruce) increased 3.6 per cent. in 24 days and 8.5 per cent. in 47 days.

The influence of moisture on the deflection of a beam was well illustrated in the case of 15 inch x 6 inch Douglas fir beam on 186 inch centres. On June 15th, 1895, it was placed in position and was loaded with a weight of 1000 lbs. at the centre, producing a deflection of .071 inch. The daily observations, extending over several months, showed a continually increasing deflection, until, by the evaporation of the moisture, the beam had attained its normal state. The average deflection now remained constant, varying, for example, between .09 inch on August 24th, and .082 inch on September 2nd, the greater deflection of course corresponding to an increase of moisture in the atmosphere. On the 4th of September, the load was increased to 2000 lbs., which produced a deflection of .127 inch. This load remained on the beam until January 8th, 1896, the deflection during the same period varying between .129 inch and .114 inch.

Changes of temperature produced no appreciable effect upon the deflection, but its sensitiveness to the presence of moisture is shown by the following table of daily observations, taken at 12 p.m., from August to December.

UNDER A LOAD OF 1,000 LBS. DURING AUGUST.

Temp.	Def.	Remarks.	Temp.	Def.	Remarks.	Temp.	Def.	Remarks.
72.5	.080		75.3	.089	Cloudy and showery.	70.1	.085	Dull, cold and showery.
73.5	.080		74.9	.088	Cloudy.	70.6	.090	Continuous rain.
71.8	.081		74.0	.088	Fine.	72.2	.089	Showery, then fine.
73.0	.082		75.9	.088	"	72.5	.089	Fine.
75.0	.082		76.7	.086	"	73.8	.089	"
74.1	.088		76.4	.088	Stormy.	71.6	.089	"
73.0	.087		75.3	.088	"	71.3	.089	Dull and cool.
75.0	.087		73.5	.086	"	75.5	.082	Fine.
75.8	.087		72.0	.086	Fine and showery	71.9	.086	Showery.
71.9	.088		70.8	.085	Dull, cold and showery.			

UNDER A LOAD OF 2,000 LBS. DURING SEPTEMBER.

Temp.	Def.	Remarks.	Temp.	Def.	Remarks.	Temp.	Def.	Remarks.
77.3	.127		71.0	.129	Cloudy and cold.	71.3	.126	Fine and warm.
76.9	.129	Cloudy.	68.75	.129	"	77.3	.126	"
56.2	.129	"	58.0	.125	"	71.5	.128	Fine, but cooler.
77.0	.129	Rain.	69.5	.126	Fine and warm.	71.0	.126	"
75.8	.126	Fine and stormy.	66.0	.124	Fine and cold.	71.6	.128	Wet and stormy.
75.3	.126	Stormy.	69.4	.121	Fine and warm.	70.0	.128	Fine.
75.0	.129	Cloudy.	69.0	.125	"	67.1	.123	"
						65.8	.126	"