FOR EQUATIONS SEE NATIONAL DESIGN STANDARD

''SPAN OF FLOOR JOIST'' EXAMPLE

Southern Yellow Pine Reference Design Values:

wood = No 1 Standard Southern Pine
load duration factor (CD) = 1.6 for 10 minute loads
Possible Values: 1.6 for ten minutes
1.25 for seven days
0.9 for dead load
deflection limit = span/360
design bearing length = 1.5 inches

TO GET ALLOWED WEIGHT PER SQUARE FOOT,
TAKE ALLOWED WEIGHT FOR ONE STRINGER PER FOOT,
MULITPLY BY THE NUMBER OF STRINGERS,
AND DIVIDE BY THE LENGTH OF THE TREAD IN FEET.

(1) ALLOWED WEIGHT IN LBF/FT BY MOMENT CAPACITY
(2) ALLOWED WEIGHT IN LBF/FT BY SHEAR
(3) ALLOWED WEIGHT IN LBF/FT BY DEFLECTION
(4) ALLOWED WEIGHT IN LBF/FT FOR 1.5 INCH BEARING
(5) MINIMUM OF ABOVE ALLOWED WEIGHTS IN LBF/FT

| Allowable Weight | Is Proportional To |
|---|---|
| (1) | stringer width, CD, 1/span-squared |
| (2) | stringer width, CD, 1/span |
| (3) | stringer width, deflection limit/span, 1/span-cubed |
| (4) | stringer width, bearing length, 1/span |

| SPAN FT | | 4x4 | 2x6 | 4x6 | 2x8 | 2x10 | 2x12 |
|---|---|---|---|---|---|---|---|
| 4 | (1) | 607.40 | 578.53 | 1349.91 | 930.79 | 1497.34 | 2109.38 |
| | (2) | 1109.03 | 746.90 | 1742.77 | 984.55 | 1256.15 | 1527.75 |
| | (3) | 416.84 | 693.23 | 1617.53 | 1587.83 | 3297.72 | 5932.62 |
| | (4) | 993.69 | 425.87 | 993.69 | 425.87 | 425.87 | 425.87 |
| | (5) | 416.84 | 425.87 | 993.69 | 425.87 | 425.87 | 425.87 |
| 6 | (1) | 269.95 | 257.12 | 599.96 | 413.69 | 665.49 | 937.50 |
| | (2) | 739.36 | 497.93 | 1161.84 | 656.37 | 837.43 | 1018.50 |
| | (3) | 123.51 | 205.40 | 479.27 | 470.47 | 977.10 | 1757.81 |
| | (4) | 662.46 | 283.91 | 662.46 | 283.91 | 283.91 | 283.91 |
| | (5) | 123.51 | 205.40 | 479.27 | 283.91 | 283.91 | 283.91 |
| 8 | (1) | 151.85 | 144.63 | 337.48 | 232.70 | 374.34 | 527.34 |
| | (2) | 554.52 | 373.45 | 871.38 | 492.28 | 628.08 | 763.88 |
| | (3) | 52.11 | 86.65 | 202.19 | 198.48 | 412.22 | 741.58 |
| | (4) | 496.85 | 212.93 | 496.85 | 212.93 | 212.93 | 212.93 |
| | (5) | 52.11 | 86.65 | 202.19 | 198.48 | 212.93 | 212.93 |
| 10 | (1) | 97.18 | 92.56 | 215.98 | 148.93 | 239.57 | 337.50 |
| | (2) | 443.61 | 298.76 | 697.11 | 393.82 | 502.46 | 611.10 |
| | (3) | 26.68 | 44.37 | 103.52 | 101.62 | 211.05 | 379.69 |
| | (4) | 397.48 | 170.35 | 397.48 | 170.35 | 170.35 | 170.35 |
| | (5) | 26.68 | 44.37 | 103.52 | 101.62 | 170.35 | 170.35 |
| 12 | (1) | 67.49 | 64.28 | 149.99 | 103.42 | 166.37 | 234.38 |
| | (2) | 369.68 | 248.97 | 580.92 | 328.18 | 418.72 | 509.25 |
| | (3) | 15.44 | 25.68 | 59.91 | 58.81 | 122.14 | 219.73 |
| | (4) | 331.23 | 141.96 | 331.23 | 141.96 | 141.96 | 141.96 |
| | (5) | 15.44 | 25.68 | 59.91 | 58.81 | 122.14 | 141.96 |
| 14 | (1) | 49.58 | 47.23 | 110.20 | 75.98 | 122.23 | 172.19 |
| | (2) | 316.87 | 213.40 | 497.93 | 281.30 | 358.90 | 436.50 |
| | (3) | 9.72 | 16.17 | 37.73 | 37.03 | 76.91 | 138.37 |
| | (4) | 283.91 | 121.68 | 283.91 | 121.68 | 121.68 | 121.68 |
| | (5) | 9.72 | 16.17 | 37.73 | 37.03 | 76.91 | 121.68 |

| SPAN FT | | 4x4 | 2x6 | 4x6 | 2x8 | 2x10 | 2x12 |
|---|---|---|---|---|---|---|---|
| 16 | (1) | 37.96 | 36.16 | 84.37 | 58.17 | 93.58 | 131.84 |
| | (2) | 277.26 | 186.73 | 435.69 | 246.14 | 314.04 | 381.94 |
| | (3) | 6.51 | 10.83 | 25.27 | 24.81 | 51.53 | 92.70 |
| | (4) | 248.42 | 106.47 | 248.42 | 106.47 | 106.47 | 106.47 |
| | (5) | 6.51 | 10.83 | 25.27 | 24.81 | 51.53 | 92.70 |
| 18 | (1) | 29.99 | 28.57 | 66.66 | 45.97 | 73.94 | 104.17 |
| | (2) | 246.45 | 165.98 | 387.28 | 218.79 | 279.14 | 339.50 |
| | (3) | 4.57 | 7.61 | 17.75 | 17.42 | 36.19 | 65.10 |
| | (4) | 220.82 | 94.64 | 220.82 | 94.64 | 94.64 | 94.64 |
| | (5) | 4.57 | 7.61 | 17.75 | 17.42 | 36.19 | 65.10 |
| 20 | (1) | 24.30 | 23.14 | 54.00 | 37.23 | 59.89 | 84.38 |
| | (2) | 221.81 | 149.38 | 348.55 | 196.91 | 251.23 | 305.55 |
| | (3) | 3.33 | 5.55 | 12.94 | 12.70 | 26.38 | 47.46 |
| | (4) | 198.74 | 85.17 | 198.74 | 85.17 | 85.17 | 85.17 |
| | (5) | 3.33 | 5.55 | 12.94 | 12.70 | 26.38 | 47.46 |
| 22 | (1) | 20.08 | 19.12 | 44.62 | 30.77 | 49.50 | 69.73 |
| | (2) | 201.64 | 135.80 | 316.87 | 179.01 | 228.39 | 277.77 |
| | (3) | 2.51 | 4.17 | 9.72 | 9.54 | 19.82 | 35.66 |
| | (4) | 180.67 | 77.43 | 180.67 | 77.43 | 77.43 | 77.43 |
| | (5) | 2.51 | 4.17 | 9.72 | 9.54 | 19.82 | 35.66 |
| 24 | (1) | 16.87 | 16.07 | 37.50 | 25.86 | 41.59 | 58.59 |
| | (2) | 184.84 | 124.48 | 290.46 | 164.09 | 209.36 | 254.62 |
| | (3) | 1.93 | 3.21 | 7.49 | 7.35 | 15.27 | 27.47 |
| | (4) | 165.62 | 70.98 | 165.62 | 70.98 | 70.98 | 70.98 |
| | (5) | 1.93 | 3.21 | 7.49 | 7.35 | 15.27 | 27.47 |
| 26 | (1) | 14.38 | 13.69 | 31.95 | 22.03 | 35.44 | 49.93 |
| | (2) | 170.62 | 114.91 | 268.12 | 151.47 | 193.25 | 235.04 |
| | (3) | 1.52 | 2.52 | 5.89 | 5.78 | 12.01 | 21.60 |
| | (4) | 152.88 | 65.52 | 152.88 | 65.52 | 65.52 | 65.52 |
| | (5) | 1.52 | 2.52 | 5.89 | 5.78 | 12.01 | 21.60 |

NOTES: (1) LRDF for pedestrian bridges requires
90 lbf / sqft, deflection limit = span/360

(2) For two-stringer boardwalk sections with
3 ft treads, this is met by
2x6's for 6 ft span
2x8's for 8 ft span
2x10's for 10 ft span
2x12's for 12 ft span

(3) For 4 ft treads this is met by the spans
just given if the design bearing length is
increased to 2.5 inchs for 2x10's and 2x12's

(4) If you double the number of stringers (to 4)
you can increase the span by a factor of
the cube root of 2 = 1.26.

(5) If you triple the number of stringers (to 6)
you can increase the span by a factor of
the cube root of 3 = 1.44.