

Project The House	Project number 777
Calcs for Steel Beam	Date 10 Jul 2018

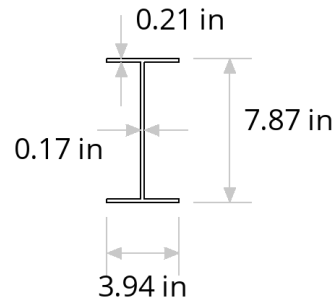
## Steel Beam Calculation

### Beam details

#### W8X10

Beam effective span length: **12 feet**  
 Minimum yield stress: **36,000 psi**

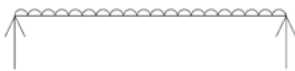
Width: **3.94 in**  
 Depth: **7.87 in**  
 Web: **0.17 in**  
 Flange: **0.21 in**  
 Mass per foot: **10.08 lbs/ft**



### Lateral bracing & deflection limits

Top flange of beam is laterally braced at least every 2 feet along its length  
 Live load deflection limit: **Span/360 = 0.4 in**  
 Total load deflection limit: **Span/240 = 0.6 in**

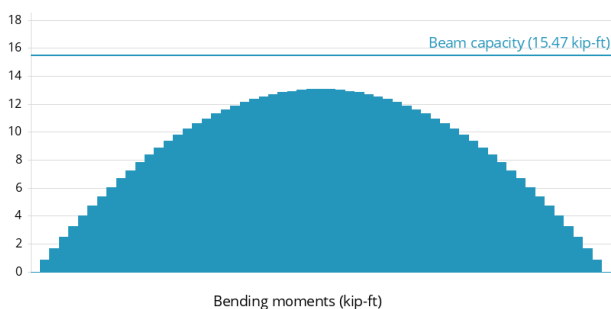
### Load details



#### UDL 1: Residential Floor

Dead load per square foot: **15 psf**  
 Live load per square foot: **40 psf**  
 Width of load perpendicular to beam, or height of load supported by beam: **13 feet**

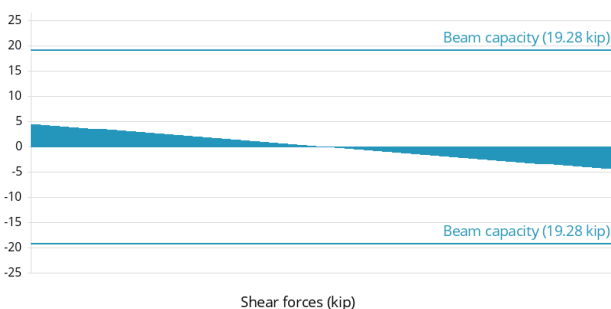
### Calculations



#### Bending moments

**$M_c = 15.47 \text{ kip-ft} > 13.05 \text{ kip-ft}$ , Therefore OK**

The top flange of the beam is to be laterally braced along its full length. To ensure adequate lateral bracing, bracing members should be attached with fasteners that provide a positive connection. Lateral bracing members should generally be regularly spaced at least every 2 feet.

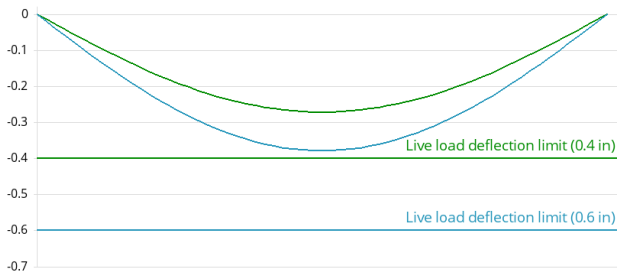


#### Shear forces

**Shear capacity  $V_c = 19.28 \text{ kip} > 4.35 \text{ kip}$ , Therefore OK**

Allowable shear =  $0.4 \times \text{minimum yield stress} \times d \times t_w$

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Live load deflection (green) and total load deflection (blue) in inches

### Deflection

Live load deflection = 0.27 in < 0.4 in, **Therefore OK**

Total load deflection = 0.38 in < 0.6 in , **Therefore OK**

## Notes

These calculations are based on the Manual of Steel Construction, Allowable Stress Design, Ninth Edition by the American Institute of Steel Construction.

Modulus of Elasticity,  $E = 29,000$  ksi