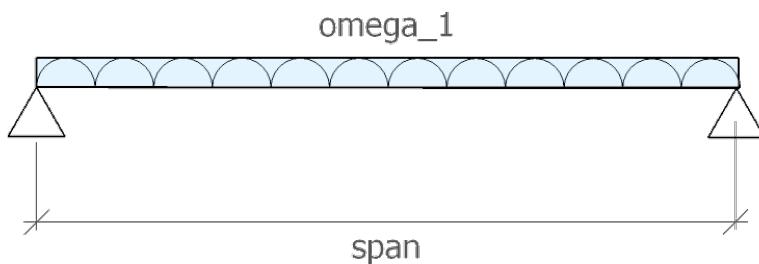


## [ 1i ] Load Combinations

**Table 1:** ASCE 7-05 Load Effects

Equation No.	Load Combination
16-1	1.4(D+F)
16-2	1.2(D+F+T) + 1.6(L+H) + 0.5(Lr or S or R)
16-3	1.2(D+F+T) + 1.6(Lr or S or R) + (f1L or 0.8W)



Beam Geometry

Bending Stress Formula [Eq 1]

$$\sigma_1 = \frac{M_1}{S_1}$$

## [ 2v ] Loads and Geometry

**Table 2:** Beam Loads and Properties

Beam Geometry [file: s-beam1-v.csv]

variable	value	[value]	description
W_1	2.00 ft	0.61 m	beam spacing
S_1	14.00 ft	4.27 m	beam span

Uniform Distributed Loads

dead load : ASCE7-05 2.3.2 [Eq 2]

$$dl_1 = 1.2 \cdot D_4 + 1.2 \cdot W_1 \cdot (D_1 + D_2 + D_3)$$

dl_1	[dl_1]	D_2	D_3	D_1	W_1	D_4

1.24 klf	18.07 kN_m		2.10 psf	10.00 psf	3.80 psf	2.00 ft	klf
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live load : ASCE7-05 2.3.2 [Eq 3]

$$\ll_1 = 1.6 \cdot L_1 \cdot W_1$$

$\ll_1$	$[\ll_1]$		$L_1$	$W_1$
0.13 klf	1.87 kN_m		40.00 psf	2.00 ft

total load : ASCE7-05 2.3.2 [Eq 4]

$$dl_1 = -\ll_1 + \omega_1$$

$\omega_1$	$[\omega_1]$		$ll_1$	$dl_1$
1.37 klf	19.94 kN_m		128.00 ft·psf	1.24 klf

### [ 3v ] Beam Section Properties

[Python file: s-sectprop.py]

function: rect sect modulus [Eq 5]

$$\text{section}_1 = \text{rectsect}(10\cdot\text{inch}, 18\cdot\text{inch})$$

$\text{section}_1$	$[\text{section}_1]$		$\text{inch}$
540.00 in <sup>3</sup>	8849.01 cm <sup>3</sup>		inch

function: rect moment inertia [Eq 6]

$$\text{inertia}_1 = \text{rectinertia}(10\cdot\text{inch}, 18\cdot\text{inch})$$

$\text{inertia}_1$	$[\text{inertia}_1]$		$\text{inch}$

4860.0 in4	202288.5 cm4		inch
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**[ 4v ] Force and Stress**

mid-span UDL moment [Eq 7]

$$m_1 = \frac{S_1 \cdot \omega_1^2}{8}$$

m_1	[m_1]		omega_1	S_1
33.47 ftkip	45.38 mkN		1.37 klf	14.00 ft

bending stress [Eq 8]

$$f_{b1} = \frac{m_1}{\text{section}_1}$$

f <sub>b</sub> _1	[f <sub>b</sub> _1]		section_1	m_1
743.8 psi	5.1 MPa		540.0 inch <sup>3</sup>	33.5 ft <sup>2</sup> ·klf