[1] Load Combinations <I>

Table 1: ASCE 7-05 Load Effects

Beam Geometry _[I]

Bending Stress Formula [Eq 1]

$$\sigma\blacksquare \;=\; \frac{M\blacksquare}{S\blacksquare}\;\blacksquare\blacksquare$$

[2] Loads and Geometry <V>

Table 2: Beam Loads and Properties

variable	value	[value]	description
D_1	3.80 psf	0.18 kPA	joists DL
D_2	2.10 psf	0.10 kPA	plywood DL
D_3	10.00 psf	0.48 kPA	partitions DL
D_4	1.00 klf	14.59 kN_m	fixed machinery DL
L_1	40.00 psf	1.92 kPA	ASCE7-O5 LL

Beam Geometry [file: 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

```
dead load : ASCE7-05 2.3.2   [Eq 2]
```

dl_1 = 1.2 * (W_1 *(D_1 + D_2 + D_3) + D_4)

dl_1	[dl_1]		D_3	D_4	D_1	W_1	D_2
1.24 klf	18.07 kN_m		10.00 psf	klf	3.80 psf	2.00 ft	2.10 psf

```
live load : ASCE7-05 2.3.2   [Eq 3]
```

ll_1 = 1.6 * W_1 * L_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]
```

omega_1 = dl_1 + ll_1

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

[3] Beam Section Properties <V>

```
rectangular section modulus  [Eq 5]
```

section_1 = rectsect(10*inch, 18*inch)

section_1	[section_1]		inch
540.00 in3	8849.01 cm3		inch

```
rectangular moment of inertia  [Eq 6]
```

inertia_1 = rectinertia(10*inch, 18*inch)

inertia_1	[inertia_1]		inch
4860.0 in4	202288.5 cm4		inch

[4] Force and Stress <V>

```
mid-span UDL moment  [Eq 7]
```

m_1 = omega_1 * S_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]
```

fb_1 = m_1 / section_1

fb_1	[fb_1]		m_1	section_1
743.8 psi	5.1 MPA		33.5 ft2·klf	540.0 inch3