## Stress

Loading Type:

- Flexure
  - o Bending Stress
  - Shear Stress
- Torsion
  - o Shear Stress
- Bearing Stress--direct Shear

Examples of each type of loading and resulting stresses:

## Flexure:

A beam is loaded as shown in the following figure. The cross-section of the beam is a rectangular tube with dimensions as shown:



What is the value of the  $2^{nd}$  moment of area, I, in  $ft^4$ ?

What is the value of the **1<sup>st</sup> moment of area**, Q, in ft<sup>3</sup>?

Find the **bending stress** at x = 4', and x = 7'.

Will the top fibers in the beam be in tension or compression at these locations?

What are the shear forces at these locations?

What is the **shear stress** at these locations?

Torsion:

What are the analogous parameters for torsion:

Force, F	=	Torque, T
2 <sup>nd</sup> Moment of area, I	=	Polar 2 <sup>nd</sup> moment, J
moment arm, I	=	Radius, r
Bending stress	=	Shear stress