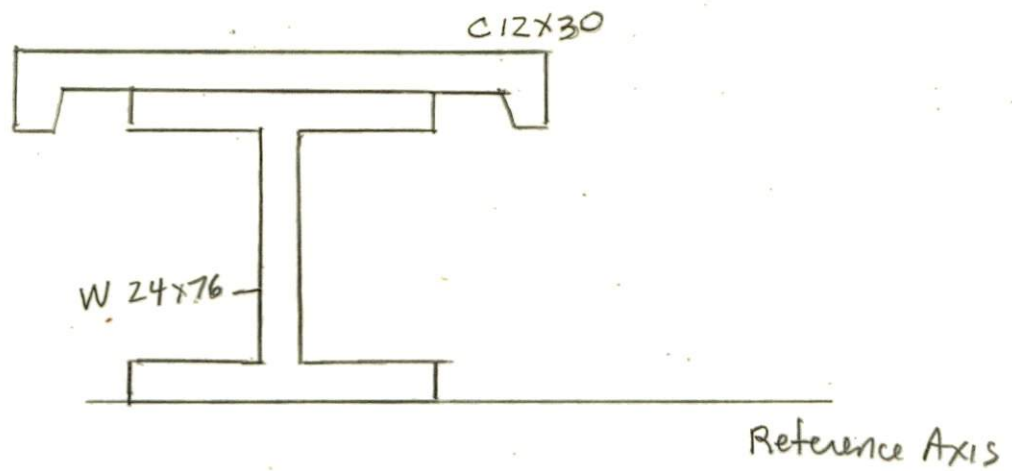A column is constructed from a W 24×84 wide flange section and a _C 12×30 channel. Determine the moment of inertia I_x wrt the centroidal x-axis.

C 12×30
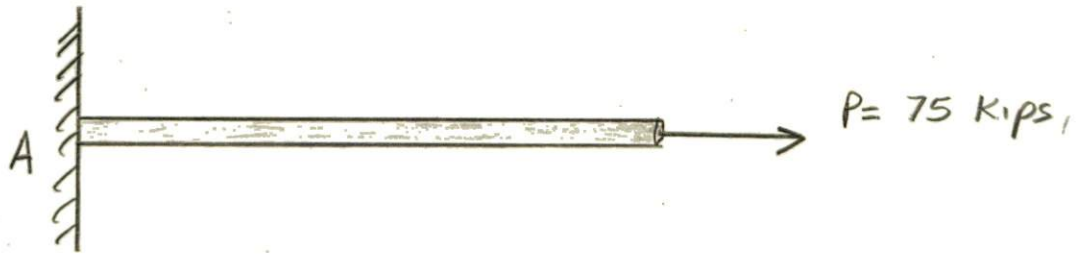

W 24×76 —

Reference Axis

Solution.

| Part	Area (in²)	y (in)	Ay (in.³)	$\bar{y}-y$ (in.)	$A(\bar{y}-y)^2$ (in.⁴)	I (in⁴)
Σ						

Determine the radius of Gyration about the horizontal centroidal axis.

Determine the size of a round steel rod, to the
nearest sixteenth of an inch, needed to support a tensile
load of 75 kips if the allowable tensile stress of
steel is 35 ksi.

P = 75 Kips,

A

If the above steel rod has a modulus of Elasticity
of E = 29 x 10⁶ psi, determine the strain.

A brass tube with an outside diameter of 2.00 in. and a wall thickness of 0.375 in. is connected to a steel tube with an inside diameter of 2.00 in. and a wall thickness of 0.250 in. by using a 0.750 in.-diameter pin as shown. Determine the shearing stress in the pin when the joint is carrying an axial load of 10 kip.
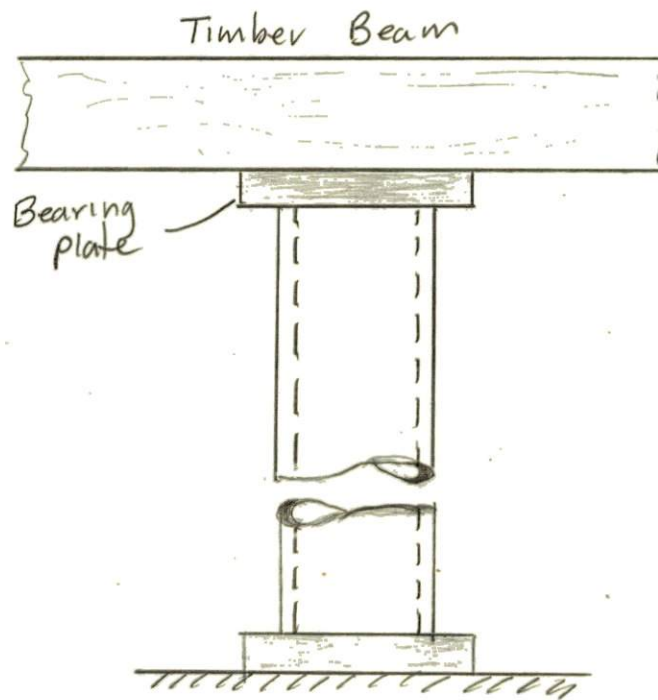
P ← ─── steel ─── ║ ─── Brass ─── → P
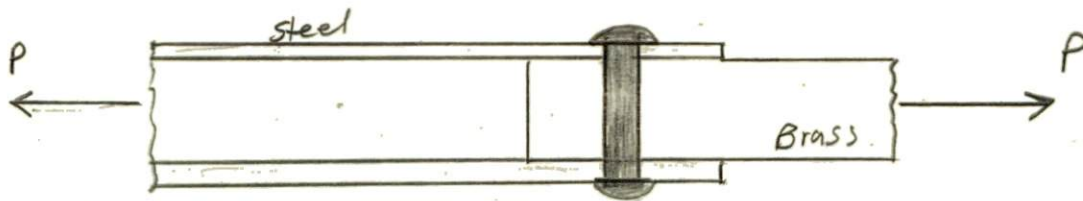
Solution.

The steel pipe column shown has an outside diameter of 6 in. and a wall thickness of $19/32$ in. The load imposed on the column by the timber beam is 34 Kips.

Determine

(a) the average bearing stress at the surface between the steel pipe column and the steel bearing plate.

(b) the diameter of a circular bearing plate if the average bearing stress between the steel bearing plate and the wood beam is not to exceed 0.4714 ksi.

Timber Beam

Bearing plate

Solution.