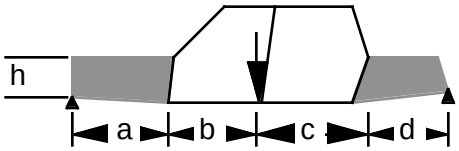
Homework 3

For the side frame on the following sheet

A. Compute the vehicle bending deflection Δ.



F=1500 Lb.
a = 20 in.
b = 40
c = 40
d = 10
h = 30

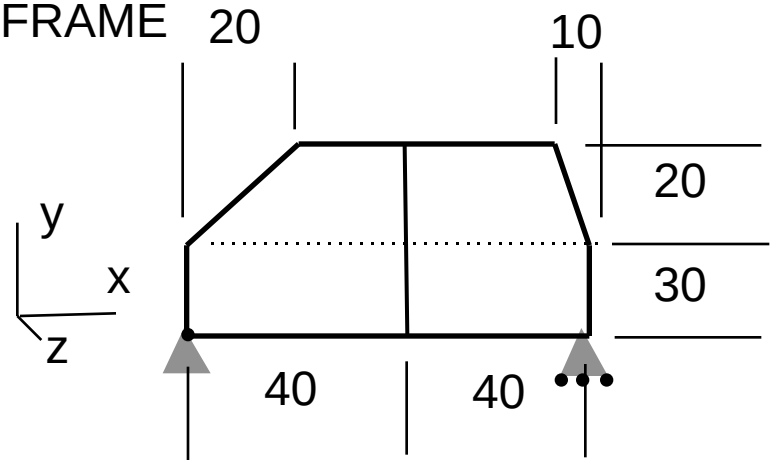
- Dimensions in Inches
- Frame is planar
- All metal thickness are .040 in
- Material Mild Steel
- Neglect Flanges - All sections are closed
- Sections are normal to beam axis
- All joints rigid except as noted

B. If the value for Δ computed in (A) exceeds the deflection requirement, which beam would you alter first and why?

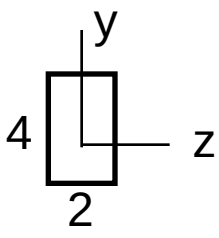
C. Compute $(Gt)_{EFF}$ for torsion.
Take Q=1650Lb

D. If the value for $(Gt)_{EFF}$ computed in (C) is too low compared to the requirement, which beam would you alter first and why?

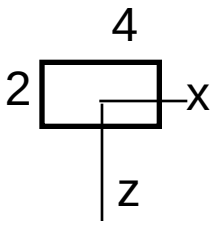
SIDE FRAME



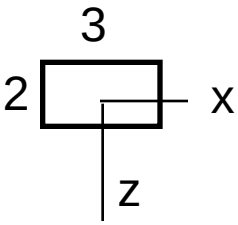
SECTIONS



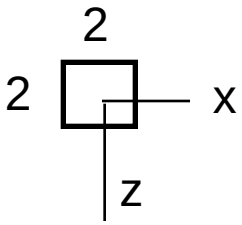
Rocker



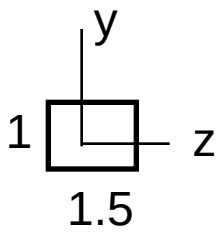
Hinge Pillar



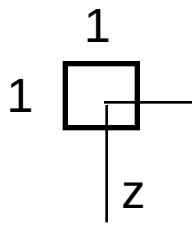
B Pillar Below Belt



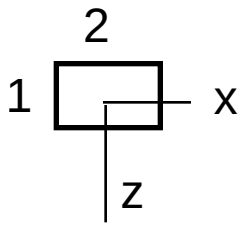
C Pillar Below Belt



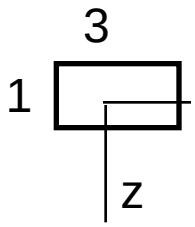
Roof Rail



A Pillar



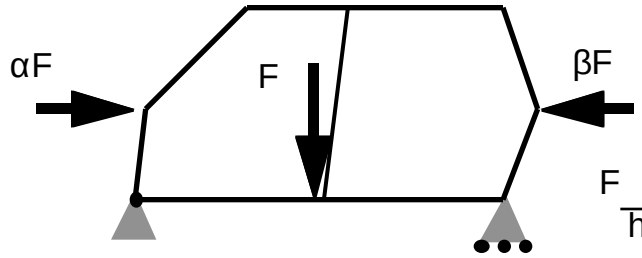
B Pillar above Belt



C Pillar above Belt

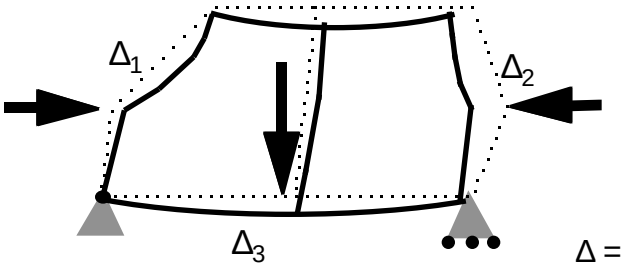
JOINT RATES Kzz (Nm/rad)

A Pillar-Hinge Pillar	.2E6
Hinge Pillar - Rocker	
B Pillar-Rocker	
C Pillar- Rocker	
All Connections to Roof Rail	.01E6

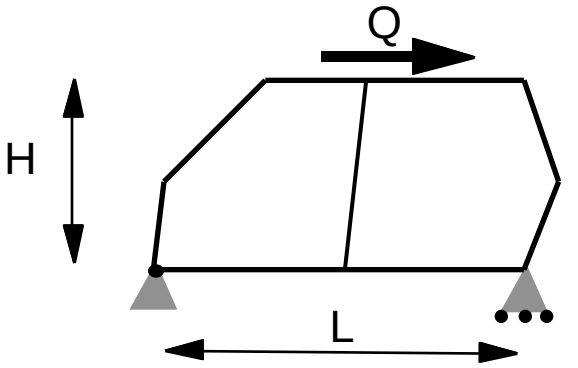


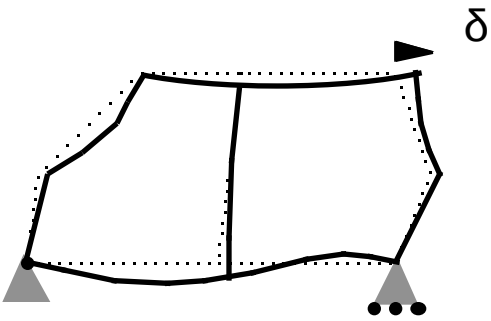
$F \frac{(c+d)a}{h(a+b+c+d)}$

$F \frac{(a+b)d}{h(a+b+c+d)}$



$\Delta = \alpha \Delta_1 + \beta \Delta_2 + \Delta_3$





$(Gt)_{EFF} = (Q/\delta)(L/H)$