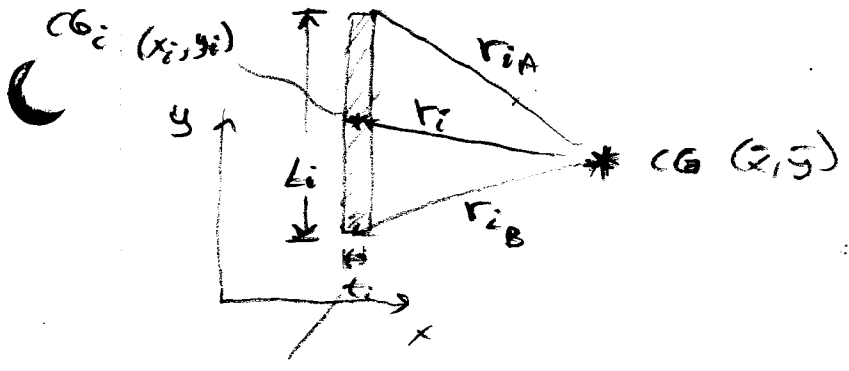


POLAR MOMENT OF WELD:



ASSUMED
SHEAR
AREA
WIDTH

POLAR MOMENT OF
WELD i ABOUT PATTERN
CG (// AXIS TRER.)

$$J_i = \bar{J}_i + A_i r_i^2$$

POLAR MOMENT OF
WELD i ABOUT
WELD CG i

$$\bar{J}_i = I_{x_i} + I_{y_i}$$

AREA MOMENTS ABOUT X & Y AXES

$$I_{x_i} = \frac{1}{12} t_i L_i^3$$

$$I_{y_i} = \frac{1}{12} L_i t_i^3$$

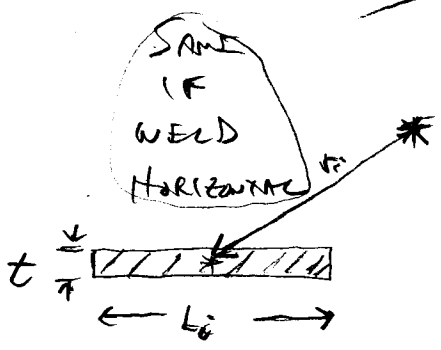
for $t_i \ll L_i$ (COMMON ASSUMP)

$$I_{y_i} \ll I_{x_i}$$

$$\Rightarrow \bar{J}_i \approx I_{x_i} = \frac{1}{12} t_i L_i^3$$

SO $J_i = \frac{1}{12} t_i L_i^3 + A_i r_i^2$

WHERE $r_i^2 = (\bar{x} - x_i)^2 + (\bar{y} - y_i)^2$



$$J = \sum_{i=1}^N J_i$$