Compute Actuator Transverse Component at P (Vector method) ~ Calculations:

Actuator direction from G_2 *to* P:

$$r = P - G_2 = (0.90905934 - 1.00,\ 0.41666667 - 0))$$

$$= (-0.09094066, 0.41666667)$$

Length of actuator line

$$|r| = \sqrt{(-0.09094066)^2 + (0.41666667)^2} = 0.426475456 \text{ m}$$

Unit vectors:

Beam unit vector $\hat{u}_{beam} = (cos\theta, sin\theta) = (0.90905934, 0.41666667)$

Actuator unit vector $\hat{u}_{act} = r/|r| = (-0.2133957, 0.9769693)$

Perpendicular component magnitude factor (2D cross product magnitude):

$$\left|\hat{u}_{act} \times \hat{u}_{beam}\right| = \left|\hat{u}_{act,x} \bullet \hat{u}_{beam,y} - \hat{u}_{act,y} \bullet \hat{u}_{beam,x}\right| \approx 0.9770003436$$

Actuator transverse (perpendicular) force at P:

$$F_{\perp} = F_a \bullet \left|\hat{u}_{act} \times \hat{u}_{beam}\right| = 35,810 \times 0.9770003436 \approx 34,986.38 \text{ N}$$

So essentially most of the actuator thrust contributes to bending