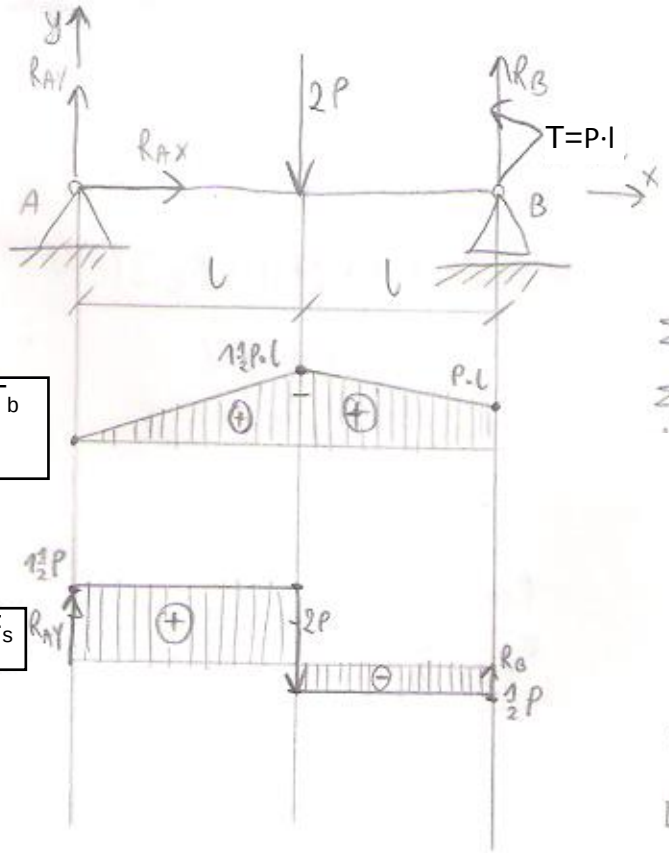
Find:
a=?



$\Sigma F_{ix}=0 \quad R_{AX}=0$

$\Sigma F_{iy}=0 \quad R_{AY}-2P+R_B=0$

$\Sigma M_{iA}=0 \quad 2P\cdot l - R_B\cdot 2l - T = 0$

$2R_B\cdot l = 2P\cdot l - P\cdot l \;/:l$

$2R_B = P$

$R_B = \frac{1}{2}P$

$R_{AY} = 2P - \frac{1}{2}P$

$R_{AY} = 1\frac{1}{2}P$

$0 < x < l$

$F_s = R_{AY}$

$T_b = R_{AY}\cdot x$

for $x=0$

$T_b = 0$

for $x=l$

$T_b = 1\frac{1}{2}P\cdot l$

$x=0,\ x=l \Big\} F_s = 1\frac{1}{2}P$

$l < x < 2l$

$F_s = R_{AY} - 2P$

$T_b = R_{AY}\cdot x - 2P\cdot(x-l)$

for $x=l$

$T_b = 1\frac{1}{2}P\cdot l - 0$

for $x=2l$

$T_b = 1\frac{1}{2}P\cdot 2l - 2P\cdot l$

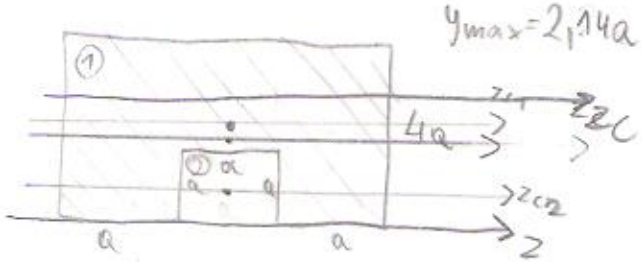
$T_b = 3P\cdot l - 2P\cdot l$

$T_b = P\cdot l$

$x=l,\ x=2l \Big\} F_s = 1\frac{1}{2}P - 2P$

$F_s = -\frac{1}{2}P$

$y_{max} = 2{,}14a$



$A_1 = 3a\cdot 4a = 12a^2 \qquad y_{c1} = 2a$

$A_2 = a^2 \qquad y_{c2} = \frac{1}{2}a$

$y_c = \frac{\sum A_i\cdot y_i}{\sum A_i} = \frac{12a^2\cdot 2a - a^2\cdot\frac{1}{2}a}{12a^2 - a^2}$

$y_c = \frac{24a^3 - \frac{1}{2}a^3}{11a^2} = \frac{23\frac{1}{2}}{11}a$

$= 2{,}14a$

$I_{z_1}^{①} = \frac{b\cdot h^3}{3} = \frac{3a\cdot(4a)^3}{3} = \frac{3a\cdot 64a^3}{3} = \frac{192}{3}a^4 = 64a^4$

$I_{z_2}^{②} = \frac{b\cdot h^3}{3} = \frac{a\cdot(a)^3}{3} = \frac{1}{3}a^4$

$I_z = I_z^{①} - I_z^{②} = 64a^4 - \frac{1}{3}a^4 = 63\frac{2}{3}a^4$

$d = 1{,}8a \qquad A = 12a^2 - a^2 = 11a^2$

$I_z = I_{z_c} + d^2\cdot A \qquad I_{z_c} = I_z - d^2\cdot A$

$I_{z_c} = 63\frac{2}{3}a^4 - (2{,}14a)^2\cdot 11a^2 = 63\frac{2}{3}a^4 - 50{,}37a^4 = 13{,}3a^4 \qquad I_{z_c} = 13{,}3a^4$

$\sigma = \frac{M_{gmax}}{J_z}\cdot y_{max} \le k_g$

$\frac{1\frac{1}{2}P\cdot l}{13{,}3a^4}\cdot 2{,}2a \le k_g$

$a \ge \left(\frac{1\frac{1}{2}P\cdot l\cdot 2{,}2}{13{,}3\,k_g}\right)^{1/3}$