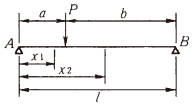
梁の公式(1/2)



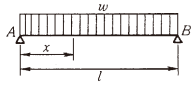
(1)

$R_A = \frac{Pb}{l}$, $R_B = \frac{Pa}{l}$

$Mx_1 = R_A x_1$, $max M = \frac{Pl}{4}$ (Pが中央に載る時)

$Mx_2 = R_A x_2 - P(x_2 - a)$

$max Mm = \frac{Pab}{l}$, $max\ \delta = \frac{Pa^2b^2}{3EIl}$



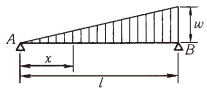
(2)

$R_A = R_B = \frac{wl}{2}$, $Sx = \frac{wl}{2} - wx$

$Mx = R_A x - \frac{wx^2}{2} = \frac{wx}{2}(l - x)$

$max M = \frac{wl^2}{8} = 0.125wl^2$

$max\ \delta = \frac{5wl^4}{384EI}$



(3)

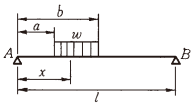
$R_A = \frac{1}{6}wl$, $R_B = \frac{1}{3}wl$

$Sx = \frac{w}{6l}(l^2 - 3x^2)$

$Mx = \frac{wx}{6l}(l^2 - x^2)$

$max M = 0.0642wl^2$ $x = 0.5774l$

$max\ \delta = 0.00652\ \frac{wl^4}{EI}$



(4)

$R_A = \frac{w}{2l}(b - a)(2l - b - a)$

$R_B = \frac{w}{2l}(b - a)(b + a)$

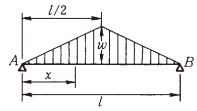
$Mx = R_A x - \frac{w}{2}(x - a)^2$

$x_0 = a + R_A / w$

$max M = R_A x_0 - \frac{w}{2}(x_0 - a)^2$

桁の中央に荷重が載った場合

$max Mx = 1/8w(b - a)(2l - b + a)$

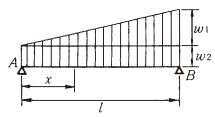


(5)

$R_A = R_B = \frac{wl}{4}$, $max M = \frac{wl^2}{12}$

$Sx = \frac{w}{4l}(l^2 - 4x^2)$

$Mx = \frac{wx}{12l}(3l^2 - 4x^2)$



(6)

$R_A = \frac{w_1 l}{6} + \frac{w_2 l}{2}$

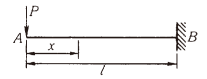
$R_B = \frac{w_1 l}{3} + \frac{w_2 l}{2}$

$Sx = \frac{w_1}{6l}(l^2 - 3x^2) + \frac{w_2}{2}(l - 2x)$

$Mx = \frac{w_2 x}{2}(l - x) + \frac{w_1 x}{6l}(l^2 - x^2)$

$max M = \frac{l^2}{16}(2w_2 + w_1)$ 近似式

$max\ \delta = \frac{5l^4}{768EI}(w_1 + 2w_2)$

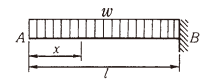


(7)

$R_A = 0$ $R_B = P$

$Sx = -P$ $Mx = -Px$

$max M_B = -Pl$ $max\ \delta = \frac{Pl^3}{3EI}$



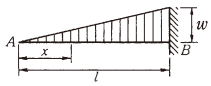
(8)

全長に等布荷重wが作用する場合

$R_A = 0$ $R_B = wl$

$Sx = -wx$ $Mx = -\frac{wx^2}{2}$

$max M_B = -\frac{wl^2}{2}$ $max\ \delta = -\frac{wl^4}{8EI}$

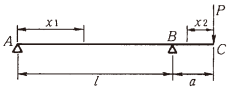


(9)

$R_B = \frac{wl}{2}$ $Sx = -\frac{wx^2}{2l}$

$Mx = -\frac{wx^3}{6l}$ $max M_B = -\frac{wl^2}{6}$

$max\ \delta = \frac{wl^4}{30EI}$



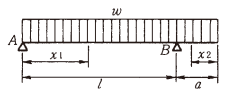
(10)

$R_A = -P\frac{a}{l}$ $R_B = P\frac{a+l}{l}$

$S_{A\sim B} = -R_A$ $S_{B\sim C} = P$

$M_B = R_A l = -Pa$, $Mx_2 = -Px_2$

$Mx_1 = R_A x_1$



(11)

$R_A = \frac{w(l+a)(l-a)}{2l}$ 若し$a > l$なればR_Aは負となる。

$R_B = \frac{w(l+a)^2}{2l}$

$Sx_1 = R_A - wx_1$ $Sx_2 = wx_2$

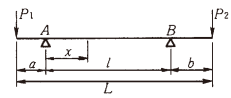
$S_B = R_A - wl$

$Mx_1 = R_A x_1 - \frac{wx_1^2}{2}$

$\left(x_1 = \frac{l^2 - a^2}{2l}\ \text{の場合}\right)$

$max M_B = \frac{w(l+a)^2(l-a)^2}{8l^2}$

$M_B = -\frac{wa^2}{2}$ $Mx_2 = -\frac{wx_2^2}{2}$



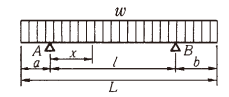
(12)

$R_A = \frac{P_1(l+a) - P_2 b}{l}$

$R_B = \frac{P_2(l+b) - P_1 a}{l}$

$M_A = -P_1 a$ $M_B = -P_2 b$

$Mx = R_A x - P_1(a + x)$



(13)

$R_A = \frac{wL(L/2 - b)}{l}$ $R_B = \frac{wL(L/2 - a)}{l}$

若し$a = b = l_1$なれば

$R_A = R_B = \frac{1}{2}wl + wl_1$

$M_A = -\frac{wa^2}{2}$ $M_B = -\frac{wb^2}{2}$

$Mx = R_A x - \frac{w(a+x)^2}{2}$