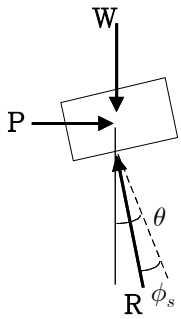
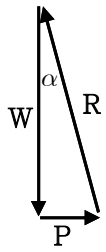
<8.3~8.4절>

8.6 $\mu_s = 0.25, \quad \mu_k = 0.20$

$\theta = 30°, \quad W = 500$ N

$\phi_s = \tan^{-1}0.25 = 14.036°$





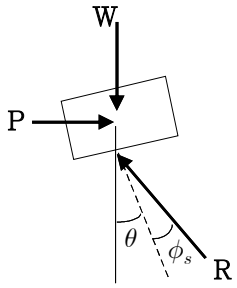
아래로 움직이려 할 때

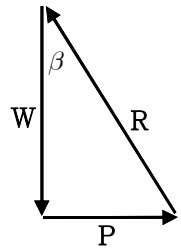
$\alpha = \theta - \phi_s = 30° - 14.036° = 15.964°$

$P = W \tan\alpha$

$= (500\text{ N}) \tan 15.964°$

$= 143.03$ N





위로 움직이려 할 때

$\beta = \theta + \phi_s = 30° + 14.036° = 44.036°$

$P = W \tan\beta$

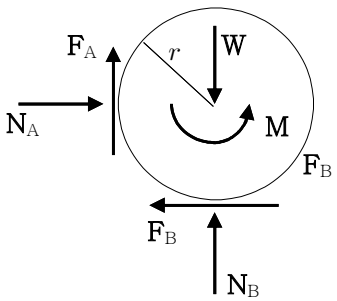
$= (500\text{ N}) \tan 44.036°$

$= 483.45$ N

$143.0\text{ N} \le P \le 483\text{ N}$

8.17 최대 $M \quad \Rightarrow \quad$ 움직이려 함

$F_A = \mu_s N_A, \quad F_B = \mu_s N_B$



$\rightarrow \Sigma F_x = 0$

$N_A - F_B = 0$

$\Rightarrow \quad N_A = F_B = \mu_s N_B$

$F_A = \mu_s(\mu_s N_B) = \mu_s^2 N_B$

$\uparrow \Sigma F_y = 0$

$N_B + F_A - W = 0$

$\Rightarrow \quad N_B + \mu_s^2 N_B = W \quad \Rightarrow \quad (1+\mu_s^2) N_B = W$

$$N_B = \frac{W}{1+\mu_s^2}, \quad F_B = \mu_s N_B = \frac{\mu_s W}{1+\mu_s^2}, \quad F_A = \mu_s^2 N_B = \frac{\mu_s^2 W}{1+\mu_s^2}$$

$\circlearrowleft \Sigma M_C = 0$

$M - r(F_A + F_B) = 0$

$\Rightarrow \quad M = r(F_A + F_B)$

$$= r\left(\frac{\mu_s^2 W}{1+\mu_s^2} + \frac{\mu_s W}{1+\mu_s^2}\right) = \frac{\mu_s(1+\mu_s)}{1+\mu_s^2} r W$$

$$\Rightarrow \quad M_{\max} = \frac{\mu_s(1+\mu_s)}{1+\mu_s^2} r W$$