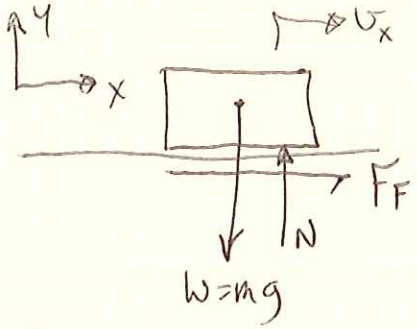
PROB. 12-6

$v_0 = 0$, $x - x_0 = 400^m$, $\mu = 0.80$, FIND v_{max} FOR
a) 62% W ON F.W.; (b) 43% W ON R.W.



$\Sigma F_y = ma_y$

$N - bW = 0$ $\quad (b = \%W)$

$N = bW = bmg$

$\Sigma F_x = ma_x$

$F_F = ma_x$

$F_F = \mu N = \mu bmg = ma_x$

$a_x = \mu bg$

$a_x = \frac{dv}{dt} = \mu bg$

$v - \cancel{v_0}^{\,0} = \mu bgt$

$v = \mu bgt$

$v = \frac{dx}{dt} = \mu bgt$

$x - x_0 = \frac{1}{2}\mu bgt^2$

$t = \sqrt{\frac{2(x - x_0)}{\mu bg}}$

$v = \mu bgt$

PROB. 12-6 CONT.

$$v = \mu b g \sqrt{\frac{2(x - x_0)}{\mu g b}}$$

$$v_{max} = \sqrt{2 \mu b g (x - x_0)}$$

PART a)

$$v_{max} = \sqrt{2(0.8)(0.62)\left(9.81 \frac{m}{s^2}\right)(400^m)} = \left(63.39 \frac{m}{s}\right)\left(\frac{3600 s}{HR}\right) \cdot \left(\frac{Km}{1000^m}\right)$$

$$\boxed{v_{max} = 224.6 \frac{Km}{H}}$$

PART b)

$$v_{max} = \sqrt{2(0.8)(0.43)\left(9.81 \frac{m}{s^2}\right)(400^m)} = 51.96 \frac{m}{s}$$

$$\boxed{v_{max} = 187.0 \frac{Km}{H}}$$