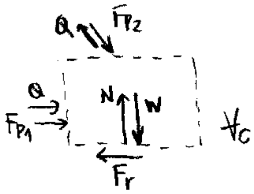
P1



T.C.M.

$$s/x \quad \sum F_x = (\rho Q v)_{sale} - (\rho Q v)_{entra}$$

$$F_{p1} + F_{p2}\cos\theta - F_r = -\rho Q V_{sx} - \rho Q v_e$$

$V_e = V - V_c$ sistema solidario al carro

$F_{p_1} = F_{p_2} = 0$ (chorro a presión atmosférica)

$F_r = C_\mu N$

$$Q = (v - v_c)\frac{\pi d^2}{4}$$

V_s: $B_1 = B_2$

$$\frac{v_1^2}{2g} + \cancel{\frac{p_1}{\gamma}}^{0} + h_1 = \frac{V_2^2}{2g} + \cancel{\frac{p_2}{\gamma}}^{0} + h_2$$ Despreciando $h_2 - h_1$

$$\Rightarrow v_1 = v_2$$

$$\Rightarrow v_s = v_e = V - V_c \qquad V_{sx} = (v - V_c)\cos\theta$$

TCM s/y: $N - W - \overset{0}{F_{p2}}\operatorname{sen}\theta = \rho Q v_{sy}$

$F_{p2} = 0$ $\qquad v_{sy} = (v - v_c)\operatorname{sen}\theta$

$W_T = W_{agua} + W_{carro}$

$$\Rightarrow N = W_T + \rho\left(v - v_c\right)\frac{\pi d^2}{4}(v - v_c)\operatorname{sen}\theta$$

$$\Rightarrow -C_\mu\left[W_T + \rho(v - v_c)\frac{\pi d^2}{4}\right](v - v_c)\operatorname{sen}\theta = -\rho(v - v_c)^2\frac{\pi d^2}{4}\cos\theta$$

$$-\rho(v - v_c)^2\frac{\pi d^2}{4}$$

$$\Rightarrow \rho\left(\frac{v - v_c}{2}\right)^2\left[C_\mu \pi d^2 \operatorname{sen}\theta + \pi d^2\cos\theta + \rho\pi d^2\right] = C_\mu W_T$$

$$\Rightarrow \left(\frac{v - v_c}{2}\right)^2 = \frac{C_\mu W_T}{\rho\pi d^2(C_\mu \operatorname{sen}\theta + \cos\theta + 1)}$$

$$v_c = V - 2\sqrt{\frac{C_\mu W_T}{\rho\pi d^2(C_\mu \operatorname{sen}\theta + \cos\theta + 1)}}$$