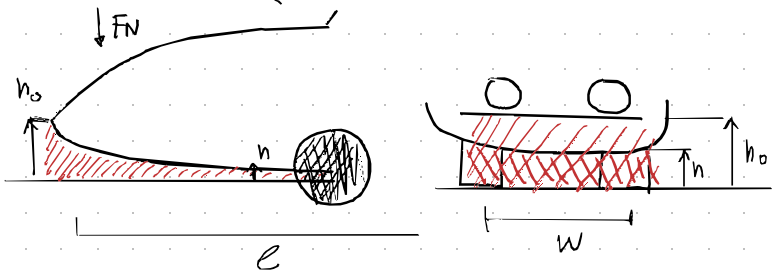
DZ – fluidi

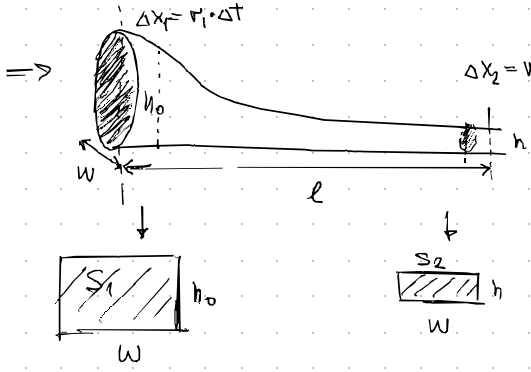
Zadatak 1)

$v = 31\,m/s$ ← $F = ?$ $\quad \rho_{zraka} = 1{,}21\,kg/m^3$



$l = 2{,}5m \quad h_0 = 3{,}16 \times 10^{-2}$

$w = 1{,}5m \quad h = 3{,}2 \times 10^{-2}$



$S_1 \cdot v_1 = S_2 \cdot v_2$

$$v_2 = \frac{S_1 \cdot v_1}{S_2} = \frac{h_0 \cdot w}{h \cdot w} \cdot v_1$$

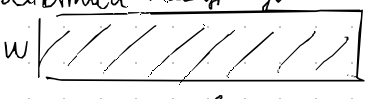
$$v_2 = \frac{h_0}{h} \cdot v_1 \rightarrow \boxed{v_1 = \frac{h_0}{h_1} \cdot v}$$

$$\triangle p_{dinamički} = \frac{\rho v_1^2}{2} - \frac{\rho v_2^2}{2}$$

$$\Delta p_d = \frac{\rho}{2}\left(v_1^2 - v_2^2\right)$$

$$* \; p = \frac{F}{A} \rightarrow \Delta p = \frac{F}{A}$$

dinamički tlak djeluje uzduž po površini auta (cca dolje)

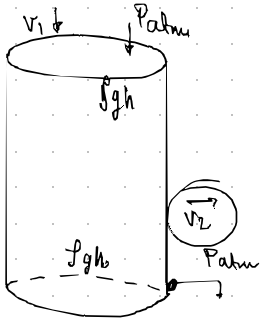


$$\Rightarrow \Delta p = \frac{F}{l \cdot w} \rightarrow F = \frac{\rho}{2}\left(v_1^2 - v_2^2\right) \cdot l \cdot w \quad (v_1 = v)$$

$$F = \frac{\rho}{2} l \cdot w \left(\left(\frac{h_0}{h_1}\right)^2 v^2 - v^2\right)$$

$$F = \frac{1}{2}\rho l w \cdot v^2 \left(\left(\frac{h_0}{h_1}\right)^2 - 1\right) = \boxed{579{,}13\,N}$$

Zadatak 2.)



$$p_{atm} + \rho g h + \frac{\rho v_1^2}{2} = p_{atm} + \rho g \cdot 0 + \frac{\rho v_2^2}{2}$$

$$\rho g h = \rho \frac{v_2^2}{2} \rightarrow v_2^2 = 2gh$$