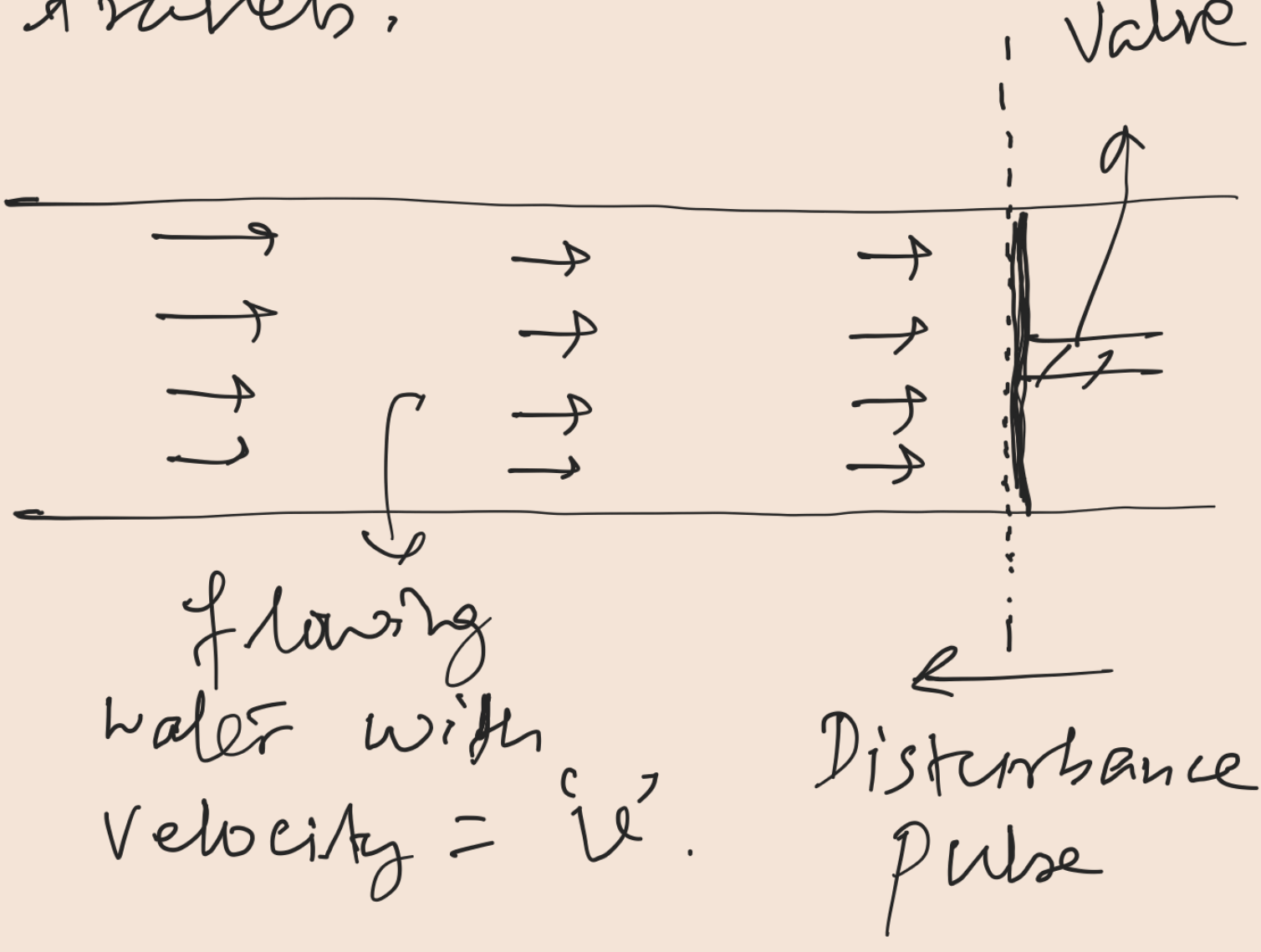
Let analyse first how the shock wave pulse travels.



When the shock wave pulse is travelling, it immediately brings the layers of fluid it is

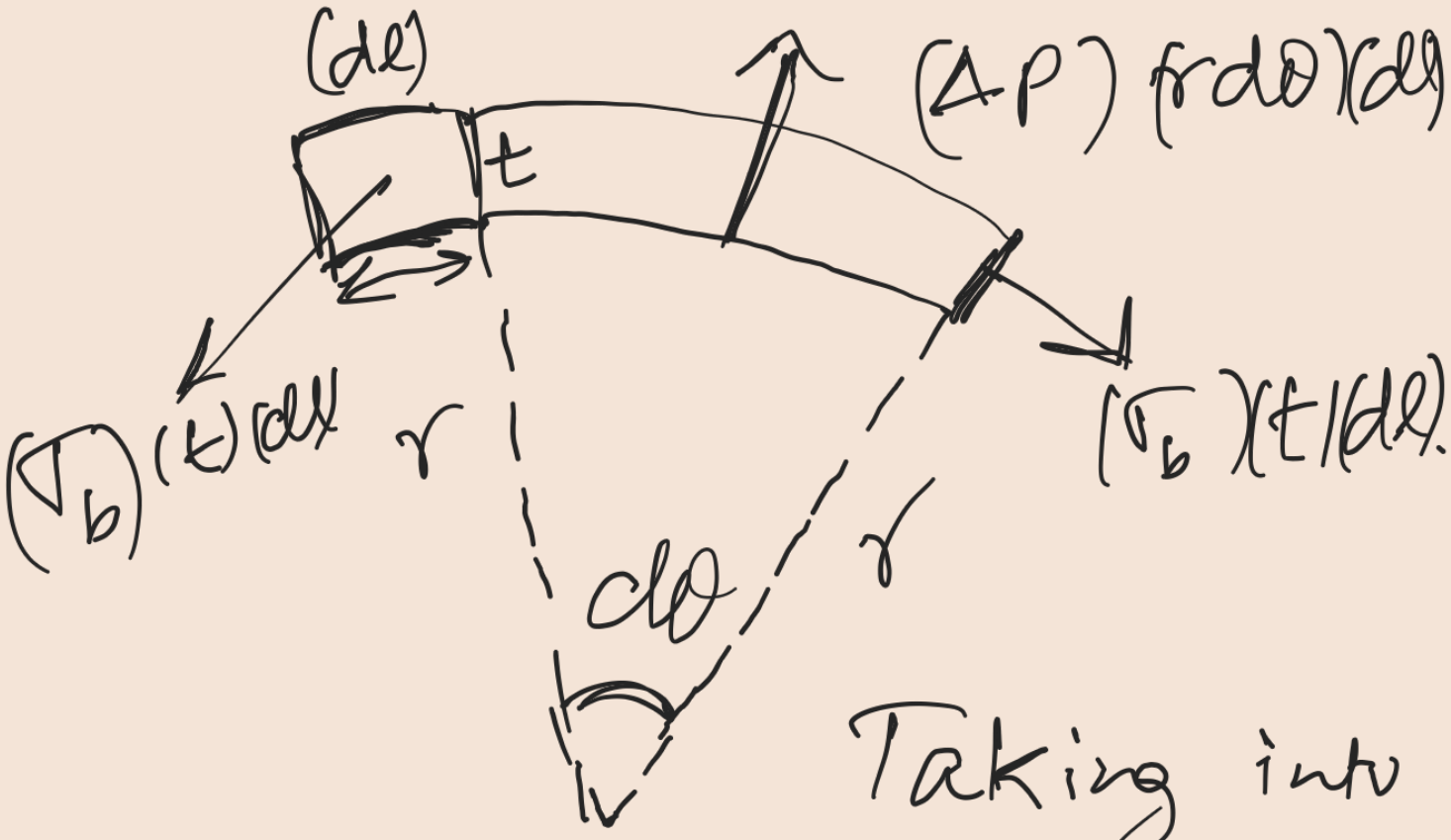
passing through, to a complete halt. This brings sudden change of momentum, thereby causing pressure increment. Now, the length of fluid layer intercepted by shock-wave pulse in time 'dt' is (c)(dt). The velocity of this length of section is suddenly

becoming '0' from 'v'.

So, decrement of momentum

$$dp = (\rho)(c\,dt)(v-0)(A)$$

$$\left(\frac{dp}{dt}\right) = (\rho)(c)(v)(A)$$ So, the pressure increment 'ΔP' $= (\rho c v)$. Now lets take 'dl' length of pipe of angular segment '$d\theta$'.



Taking into account the factor of safety, .

$$\gamma\left[\frac{(\tau_b)(t)(dl)}{y}\right]\left(\frac{d\theta}{2}\right)$$

$$= (\Delta p)(r)(d\theta)(dl)$$

Put $(A) = (S)(C)(V)$.

$$t = \frac{\eta \rho c v \gamma}{\nabla_b}$$