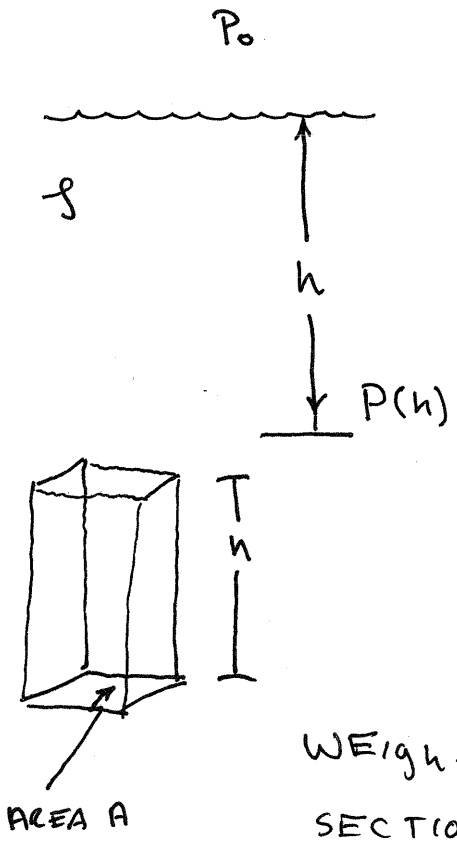
DENSITY

$$\rho \equiv \frac{\text{Mass}}{\text{Volume}} \qquad \frac{kg}{m^3} \qquad \text{"Rho"}$$

PASCAL'S LAW

INCOMPRESSIBLE FLUID $\equiv$ $\rho \equiv$ CONSTANT



$$\text{PRESSURE} = \frac{\text{Force}}{\text{AREA}} \qquad \left\{ \frac{N}{m^2} \equiv Pa \right\}$$

PRESSURE at DEPTH h = PRESSURE at SURFACE + WEIGHT of FLUID/AREA at DEPTH h

WEIGHT OF FLUID COLUMN OF CROSS SECTIONAL AREA A AND HEIGHT h WITH DENSITY ρ =>

$$W = mg \qquad m = \rho V \qquad V = A \cdot h$$

$$\Rightarrow W = (\rho g)(Ah) \qquad W/_{AREA} = W/A$$

$$\Rightarrow W/A = \rho g h \equiv \text{PRESSURE due to fluid at DEPTH h}$$

$$\{P(h) = P_0 + \rho g h\}$$

DISCUSSION #22

OFten P_o = ATMOSPHERIC PRESSURE $\equiv P_{Atm}$

$P_{Atm} = 1.013 \times 10^5 \ N/m^2 = 1.013 \times 10^5 \ Pa$

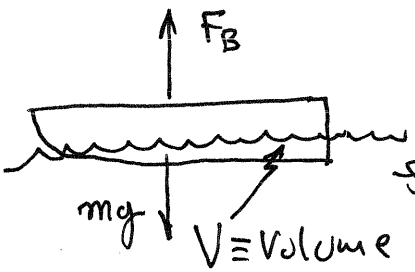
The term ρgh is the additional pressure above P_o due to the fluid and is called The "Gauge pressure" $\equiv$ difference between P_o and $P(h)$. This is the pressure a normal pressure gauge registers. The TOTAL PRESSURE $P(h) = P_o + \rho gh$ is the Absolute PRESSURE.

ARCHIMEDES' PRINCIPLE

The Bouyant Force on an object immersed in a FLuid = Weight of fluid displaced

$F_B = \rho \cdot V \cdot g$ $V \equiv$ Volume of displaced Fluid

$\rho \equiv$ fluid Density



$F_B = \rho_{H_2O} \cdot V \cdot g$

$F_B = mg$ Boat FLOATS

$F_B < mg$ Boat SINKS