Fluid Saturation

suppose that the pore volume is partially filled with water (density ρ_w)

Define

$$S_w = \frac{\text{volume of water}}{\text{volume of pore}}$$

assume that ϕ is known

measure mass M_w

$$M_w = \rho_s(1-\phi)V + \rho_w(\phi V)S_w$$

but

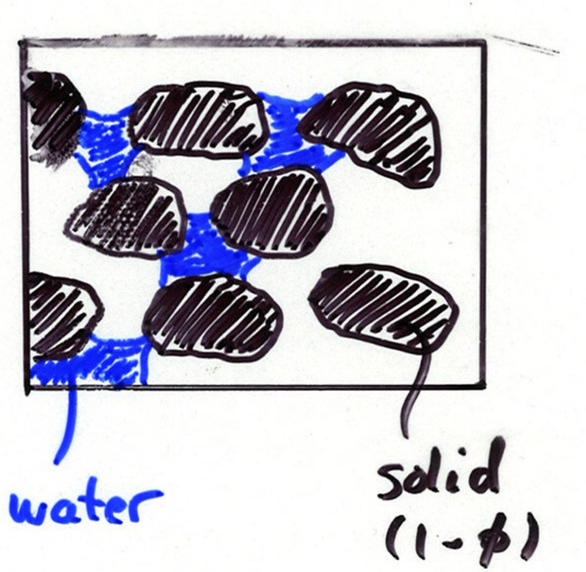
$$M_{dry} = \rho_s(1-\phi)V$$

so

$$M_w - M_{dry} = \rho_w \phi V S_w$$

or

$$S_w = \left(\frac{M_w - M_{dry}}{V}\right)\frac{1}{\rho_w \phi} = \left(\frac{\rho_w - \rho_{dry}}{\rho_w \phi}\right)$$



Surface tension

thanks to Rosemary Knight