

Imp. Data

750 gm dry soil

$D_{60} = 6\text{mm}$

C.G.S

$D_{30} = 3\text{mm}$

$D_{10} = 1\text{mm}$

$w_L = 50\%$
 $w_p = 30\%$

Size	Weight retained
10mm	200gm
4.75mm	250gm
2mm	200gm
75 μ	40gm
	60gm

Gravel 450gm

Sand 240gm

Soil is C.G.S

Fineness

$$\frac{60^4 \text{ gm}}{750} \times \frac{100}{100} = 8\%$$

$$5\% < F < 12\%$$

C.G.S

C.G.S

G → Gravel

Grade ✓

Silt & clay ✓

$$C_u = \frac{D_{60}}{D_{10}}$$

$$= \frac{6}{1}$$

$$= 6$$

$$C_u > 4$$

$$C_c = \frac{D_{30}^2}{D_{60} \times D_{10}}$$

$$= \frac{(3)^2}{6 \times 1}$$

$$= 1.5$$

$$(1-3)$$

GW - G

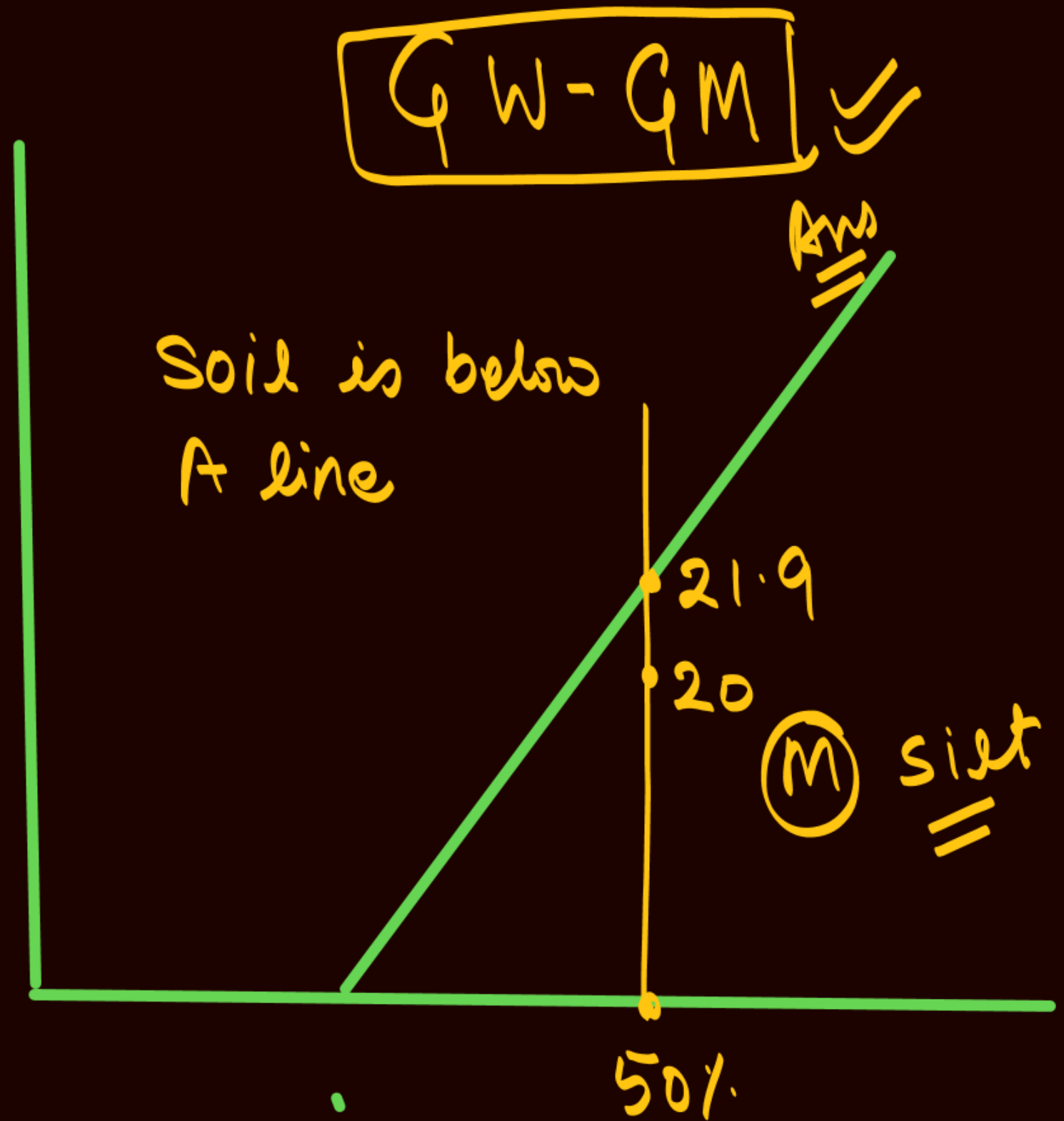
Concept of A-line

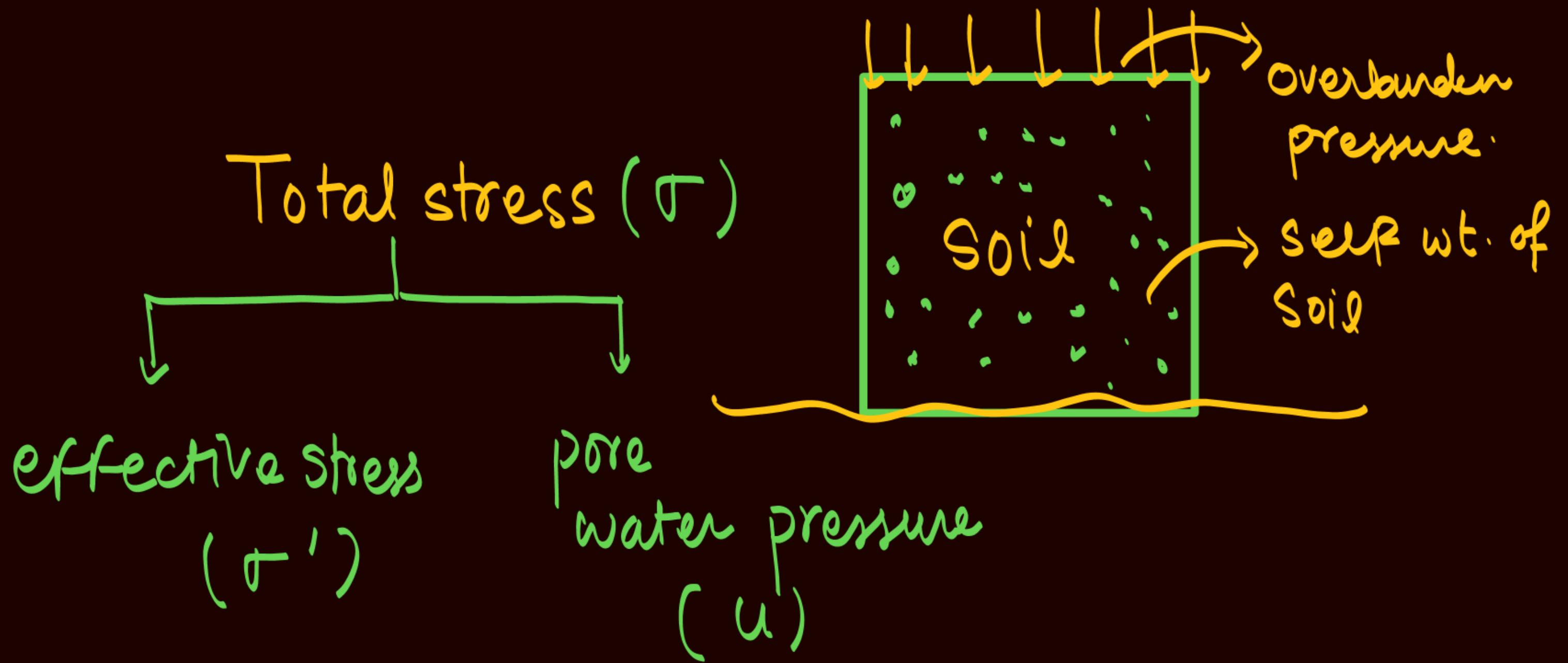
$$I_p = 0.73(W_L - 20)$$

$$= 0.73(50 - 20)$$

$$I_p = 21.9\%$$

$$\begin{aligned} I_p &= w_L - w_p \\ &= 50 - 30 \\ &= 20 \end{aligned}$$





$$\sigma = \sigma' + u$$

Case-1

$$\sigma' = \sigma - u$$

↓
effective stress



γ_{bulk}

pore water pressure

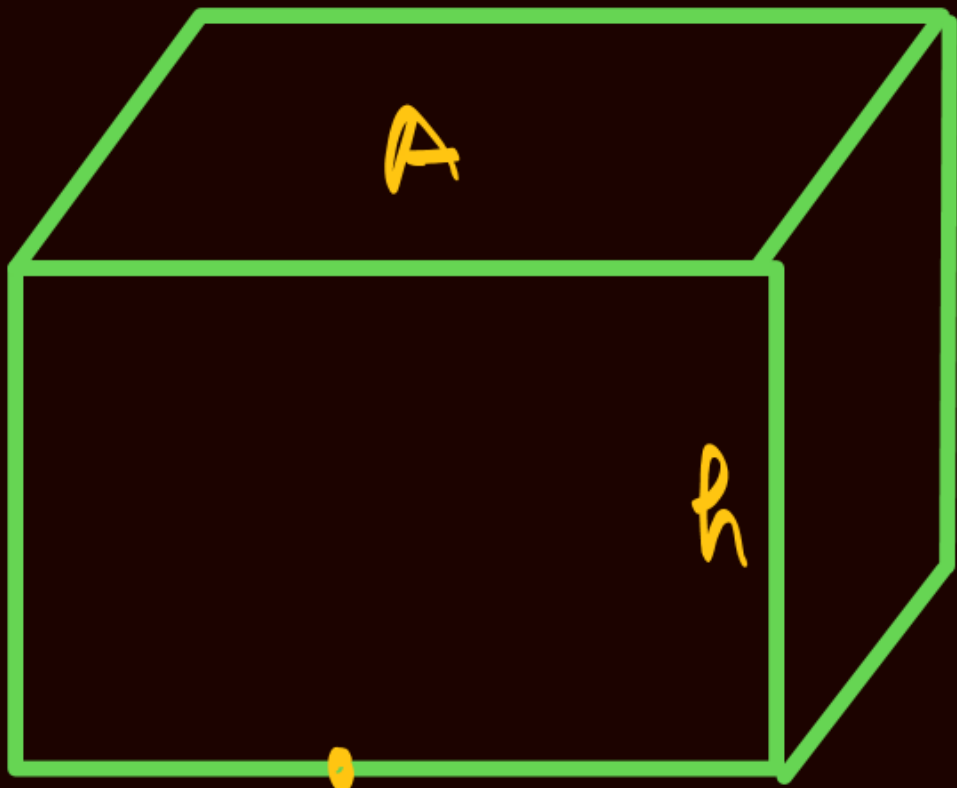
γ_{sat}

$$u = \gamma_w h_2$$

$$\sigma_A = \gamma_t h_1 + \gamma_{sat} h_2$$

↳ Total stress

Calculate Total stress
effective stress & pore
water pressure at point A?



$$\sigma_p = \gamma h$$

$$\text{Vol}^m = A \times h$$

pressure at p

$$= \frac{F}{A} = \frac{mg}{A}$$

$$= \frac{\gamma V}{A} = \frac{\gamma \cancel{A} h}{\cancel{A}}$$

$$= \gamma h$$

$$\rho = \frac{m}{V}$$

$$m = \rho V$$

$$mg = \rho g V$$

$$\text{weight} = \rho g V$$

$$\frac{\text{weight}}{\text{Vol}^m} = \rho g = \gamma$$

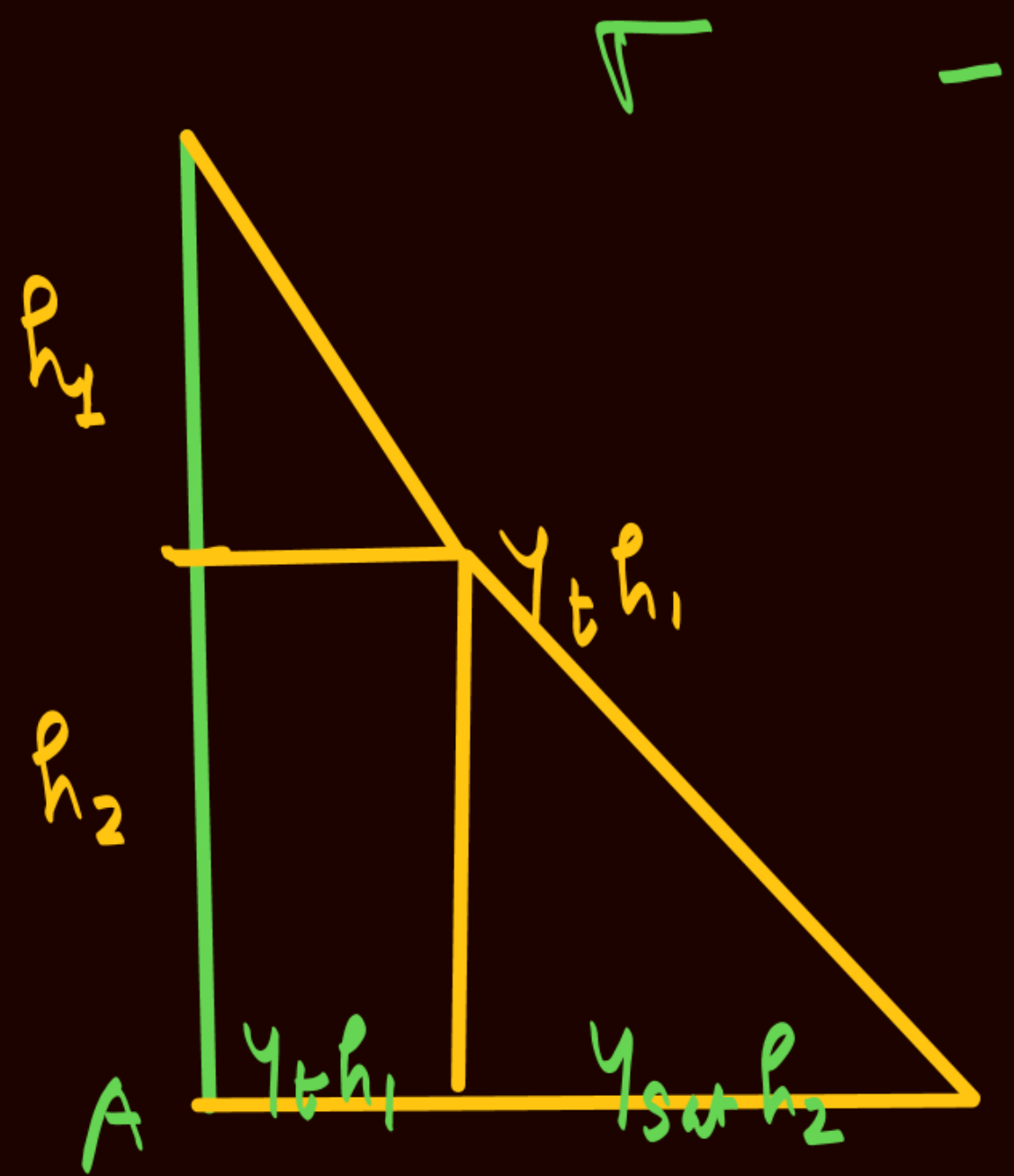
Effective stress

$$\sigma' = \sigma - u$$

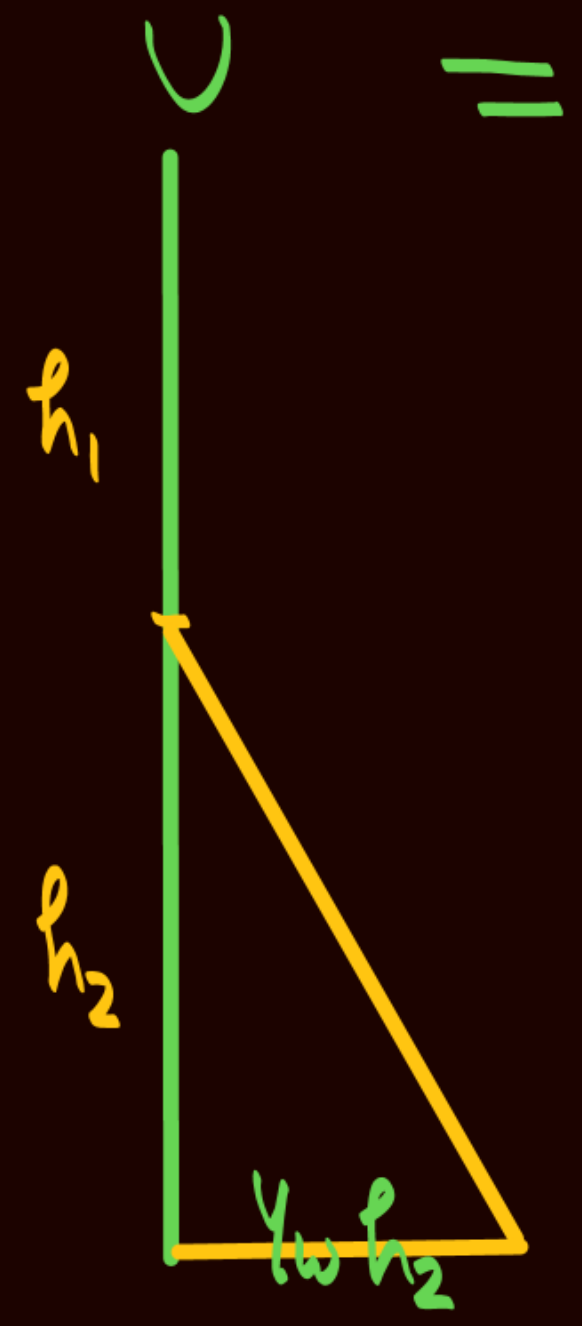
$$= \gamma_t h_1 + \gamma_{sat} h_2 - \gamma_w h_2$$

$$= \gamma_t h_1 + (\gamma_{sat} - \gamma_w) h_2$$

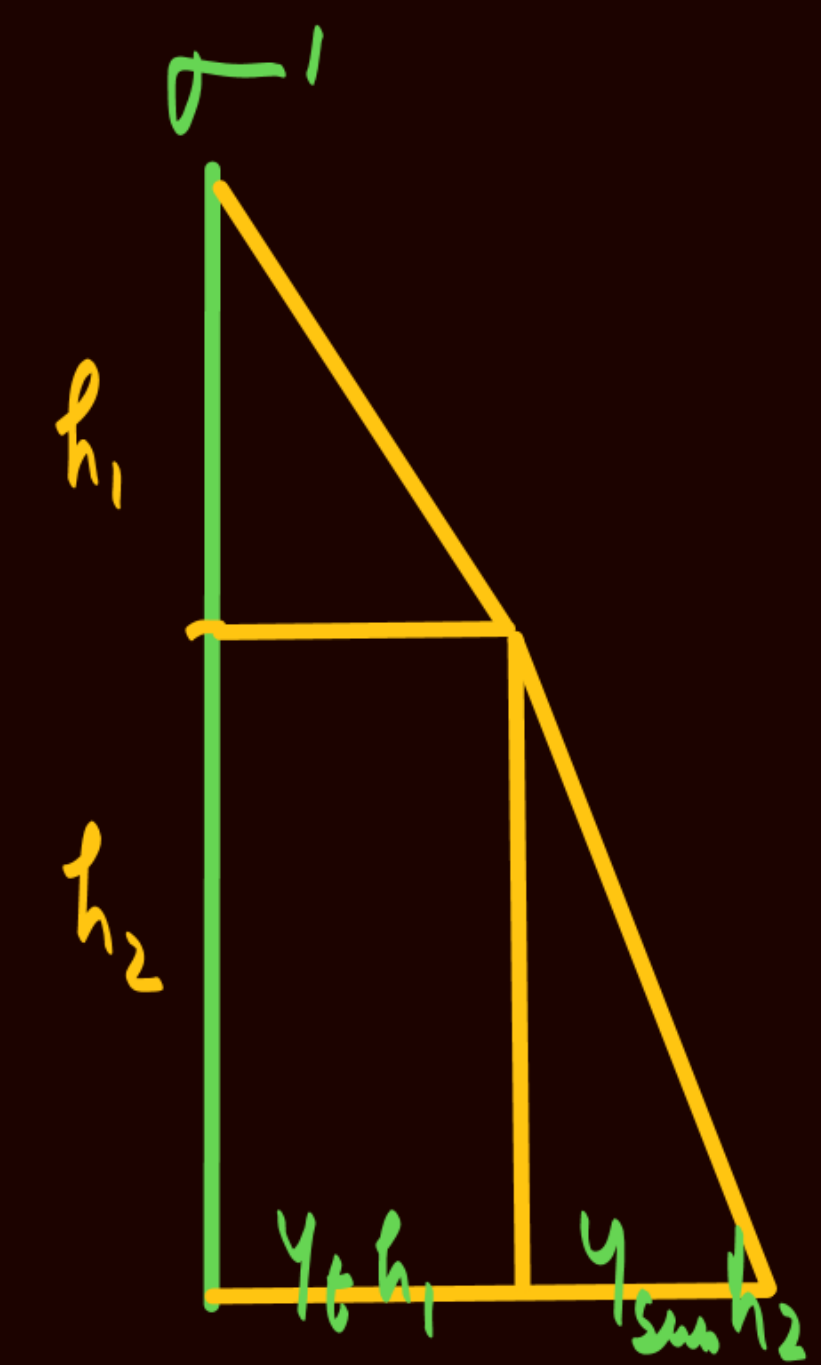
$$\sigma' = \gamma_t h_1 + \gamma_{sub} h_2$$



σ (Total stress)



u (pore pressure)



σ' (effective stress)