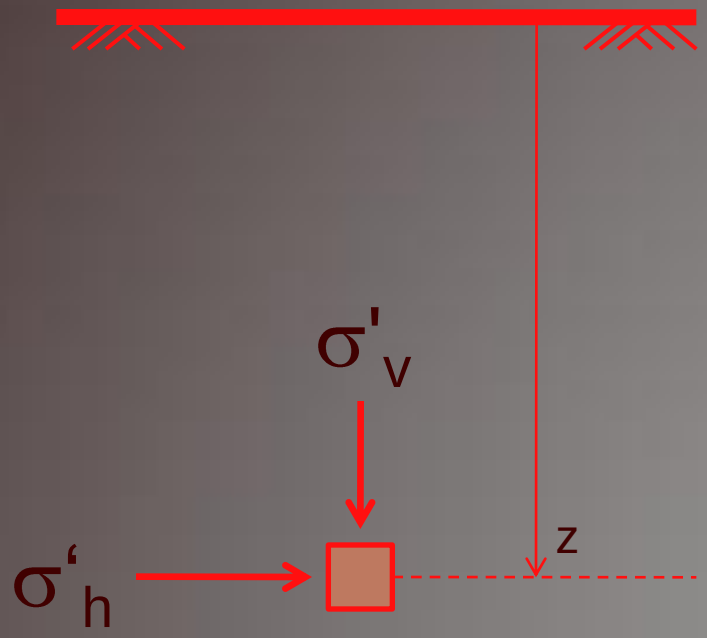
TEORI TEKANAN TANAH LATERAL

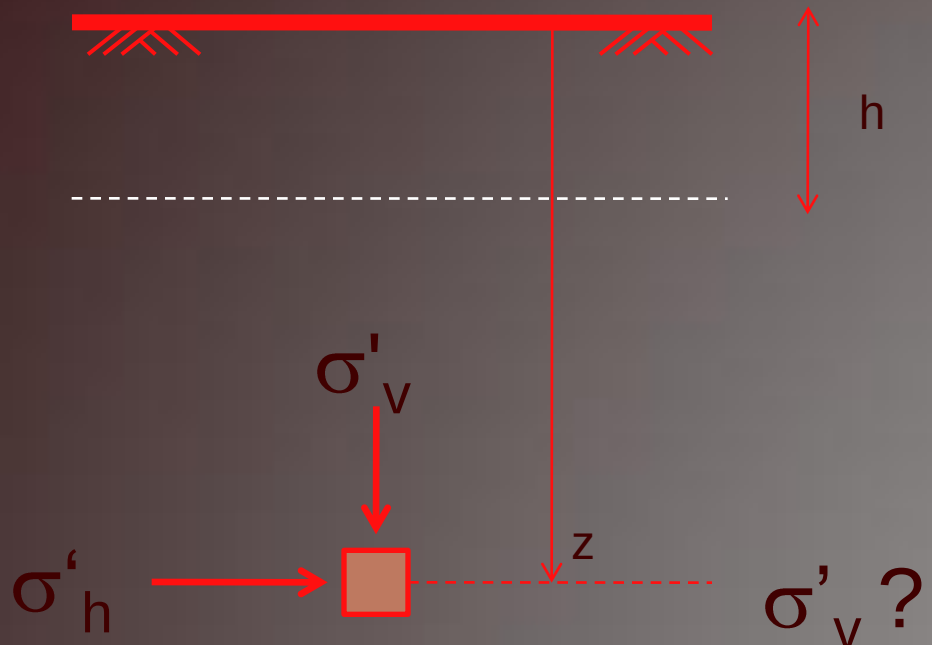
TEKANAN TANAH



$$\sigma'_h = K \cdot \sigma'_v$$

K = Koefisien tekanan tanah

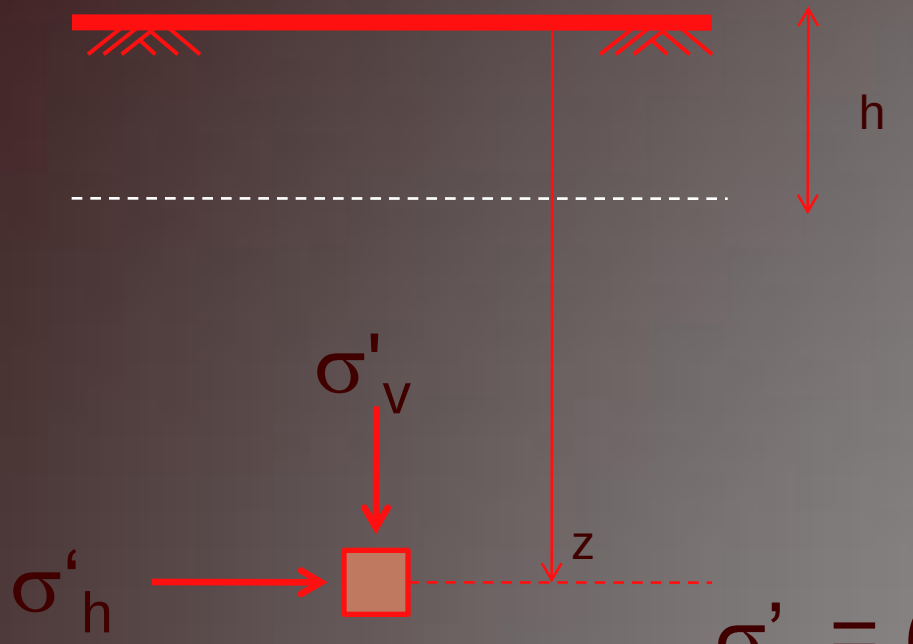
Refresh……..



σ'_v ?

σ'_h ?

Refresh……..



$$\sigma'_v = (\gamma_n . h) + (\gamma_{sat} - 1)(z-h)$$

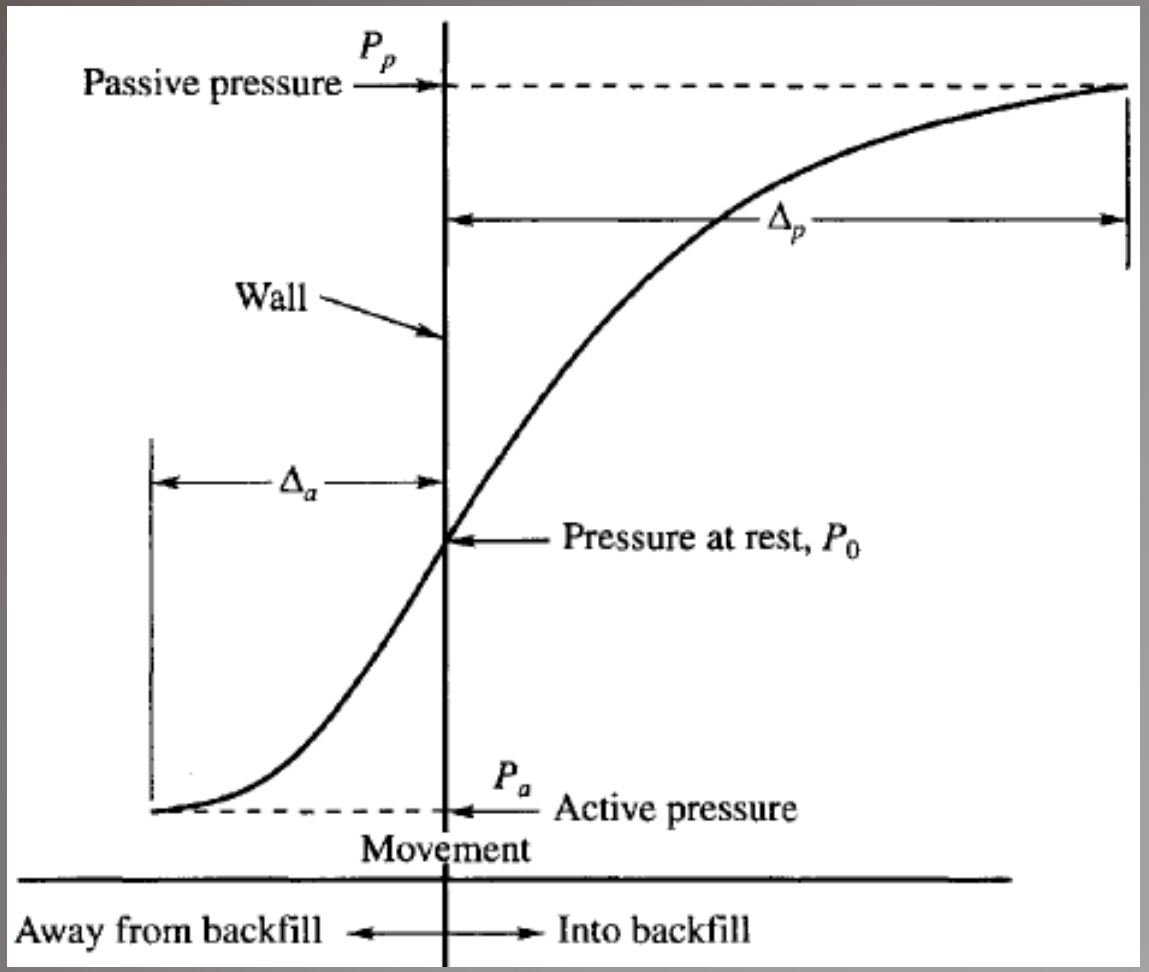
$$\sigma'_h = K . \sigma'_v$$

$$= K.(\gamma_n . h) + K.(\gamma_{sat} - 1)(z-h)$$

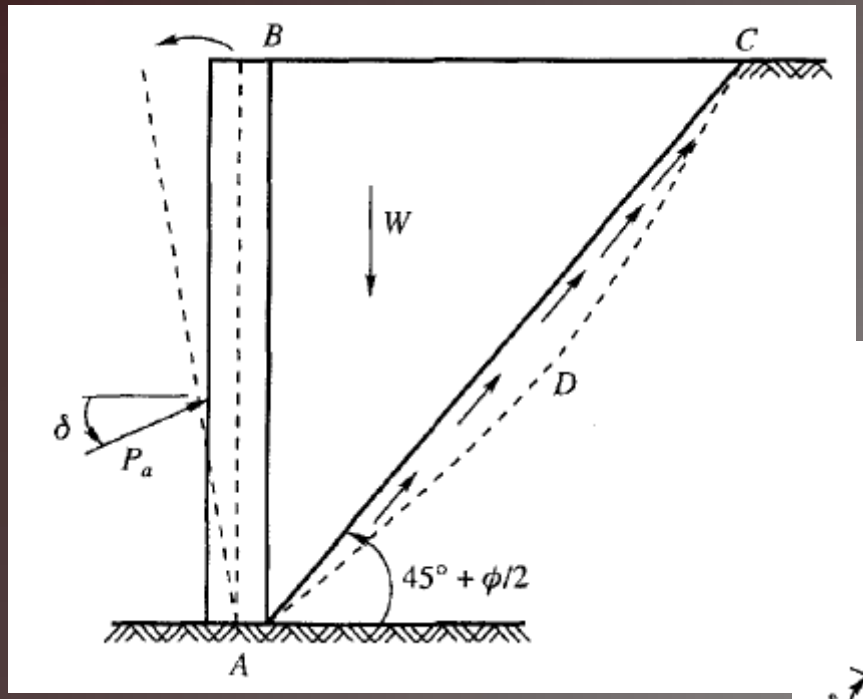
TEKANAN TANAH

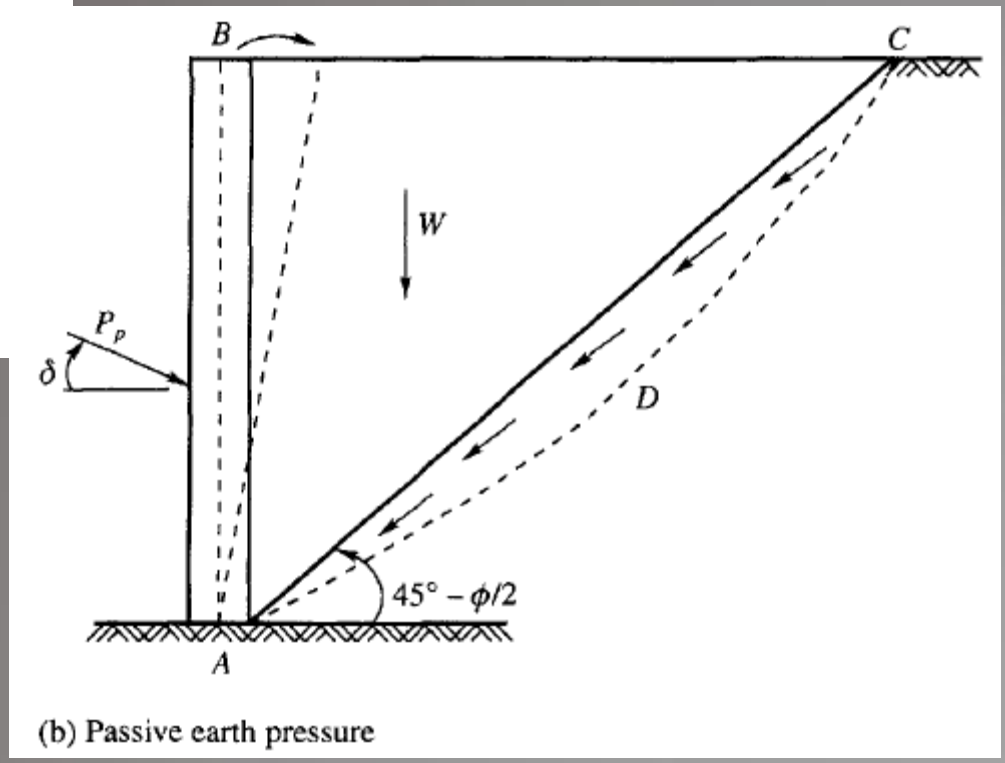
TEKANAN TANAH :

1. AKTIF
2. PASIF
3. AT REST



TEKANAN TANAH





(b) Passive earth pressure

KOEFISIEN TEKANAN TANAH

KOEFISIEN TEKANAN TANAH :

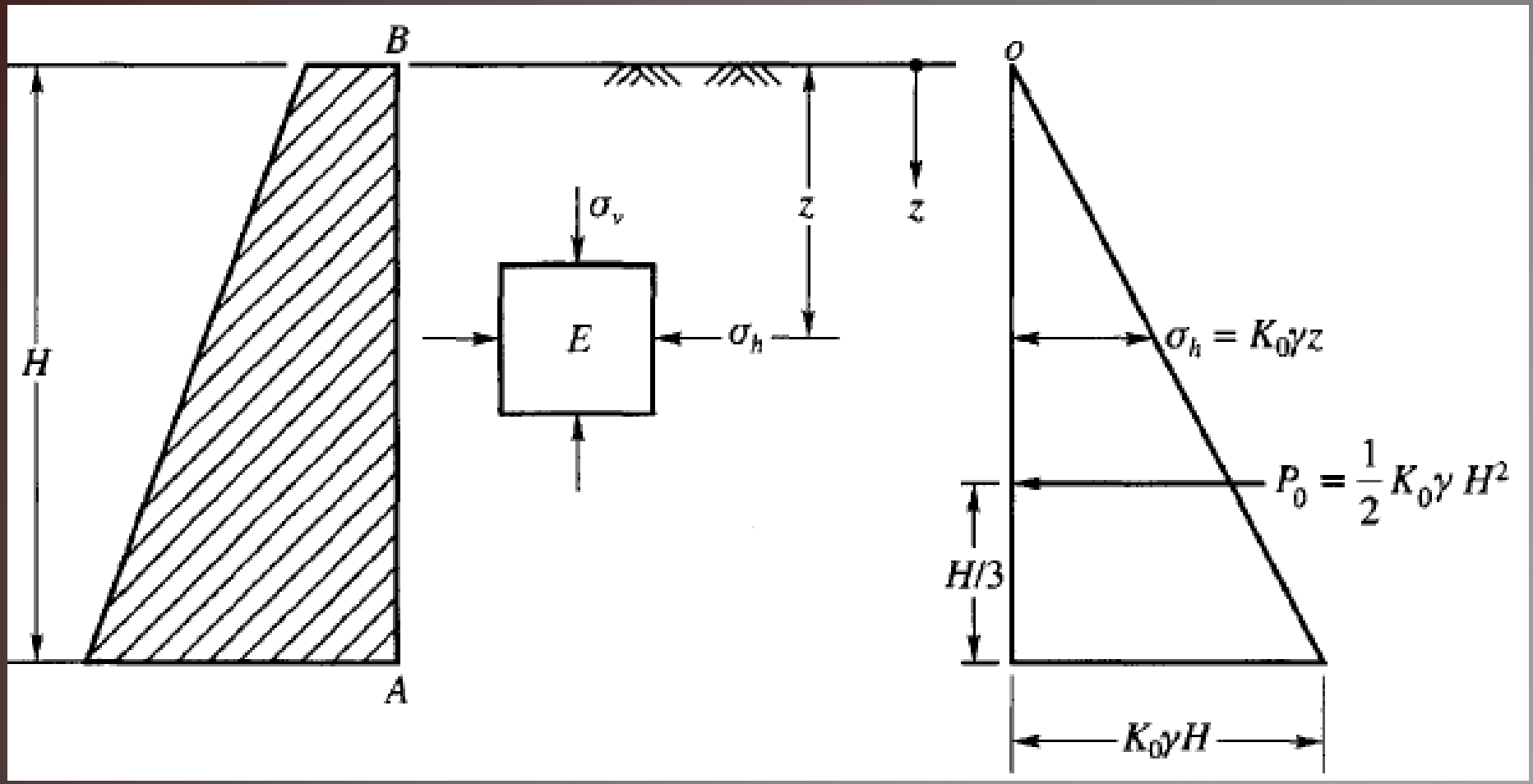
1. AKTIF → Ka
2. PASIF → Kp
3. AT REST → K_0

$K_0 = 1 - \sin \phi$ Jaky (1944)

Contoh 1

If a retaining wall 5 m high is restrained from yielding, what will be the at-rest earth pressure per meter length of the wall? Given: the backfill is cohesionless soil having $\phi = 30°$ and $\gamma = 18$ kN/m^3. Also determine the resultant force for the at-rest condition.

Contoh 1


B
A
H
E
σ_v
σ_h
z
z
O
$\sigma_h = K_0 \gamma z$
$P_0 = \frac{1}{2} K_0 \gamma H^2$
H/3
$K_0 \gamma H$

Contoh 1

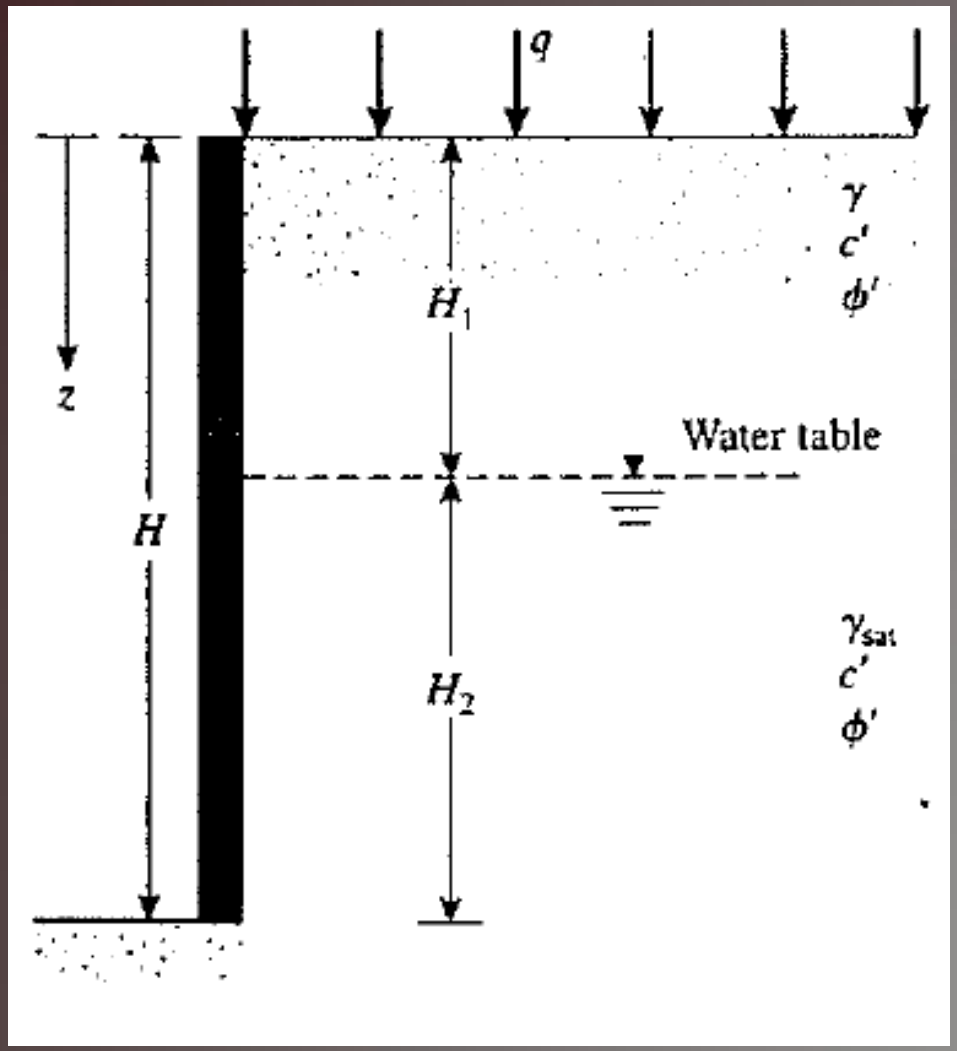
If a retaining wall 5 m high is restrained from yielding, what will be the at-rest earth pressure per meter length of the wall? Given: the backfill is cohesionless soil having $\phi = 30°$ and $\gamma = 18$ kN/m^3. Also determine the resultant force for the at-rest condition.

$$K_0 = 1 - \sin\phi = 1 - \sin 30° = 0.5$$

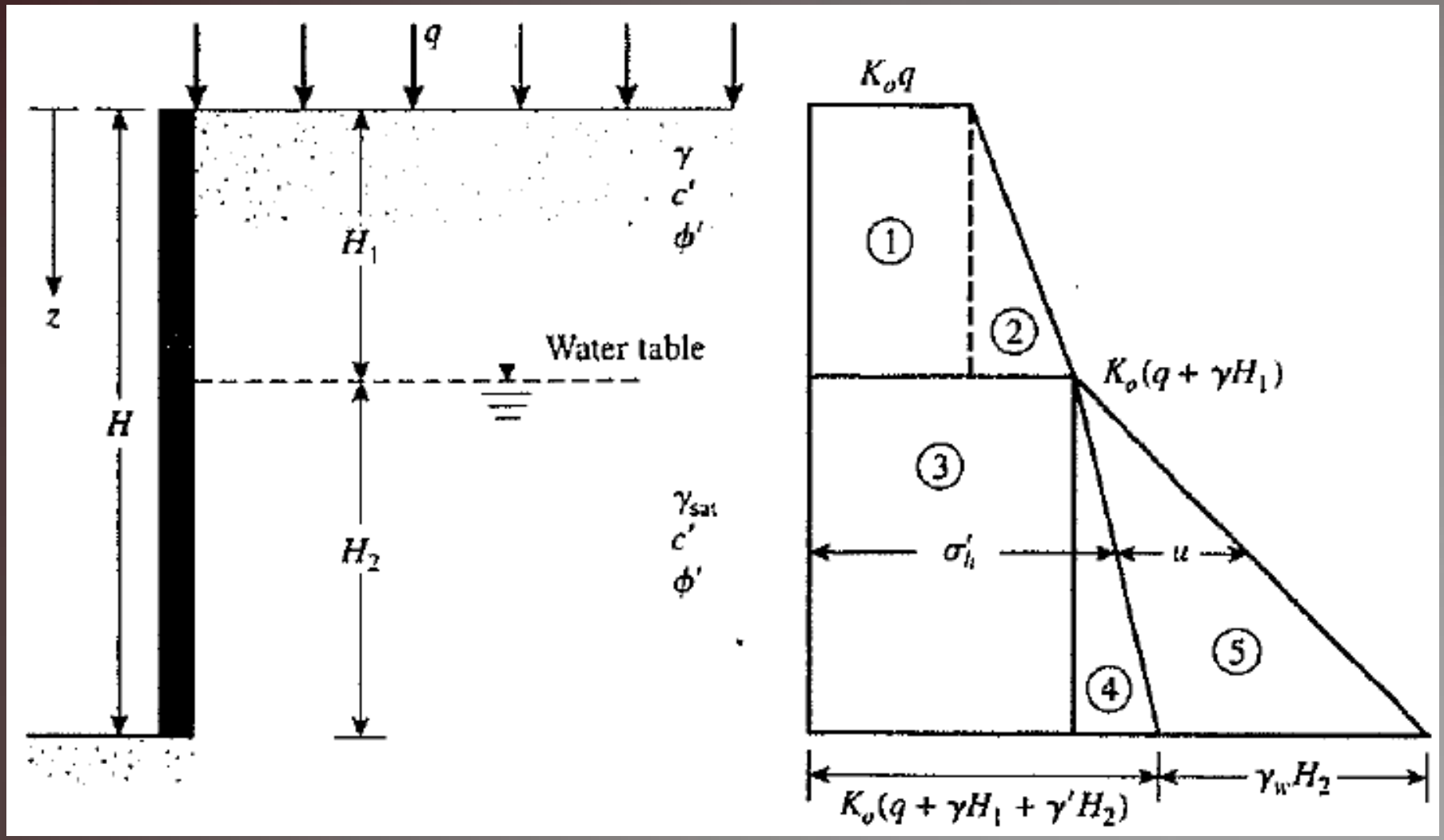
From Eq. (11.1b), $\sigma_h = K_o \gamma H = 0.5 \times 18 \times 5 = 45$ kN/m^2

$$P_0 = \frac{1}{2} K_0 \gamma H^2 = \frac{1}{2} \times 0.5 \times 18 \times 5^2 = 112.5 \text{ kN/m length of wall}$$

Contoh 2



Contoh 2


q
γ
c'
ϕ'
H1
z
Water table
H
γsat
c'
ϕ'
H2
Koq
1
2
Ko(q + γH1)
3
σ'h
u
5
4
Ko(q + γH1 + γ'H2)
γwH2

KOEFISIEN TEKANAN TANAH

KOEFISIEN TEKANAN TANAH

KOEFISIEN TEKANAN TANAH :

1. Metode Rankine

2. Metode Coulomb

KOEFISIEN TEKANAN TANAH

KOEFISIEN TEKANAN TANAH :

AKTIF → Kohesif (c, ϕ = 0)

→ Non Kohesif (c=0, ϕ)

→ c, ϕ

Pasif → Kohesif (c, ϕ = 0)

→ Non Kohesif (c=0, ϕ)

→ c, ϕ

RANKINE – AKTIF – KOHESIF

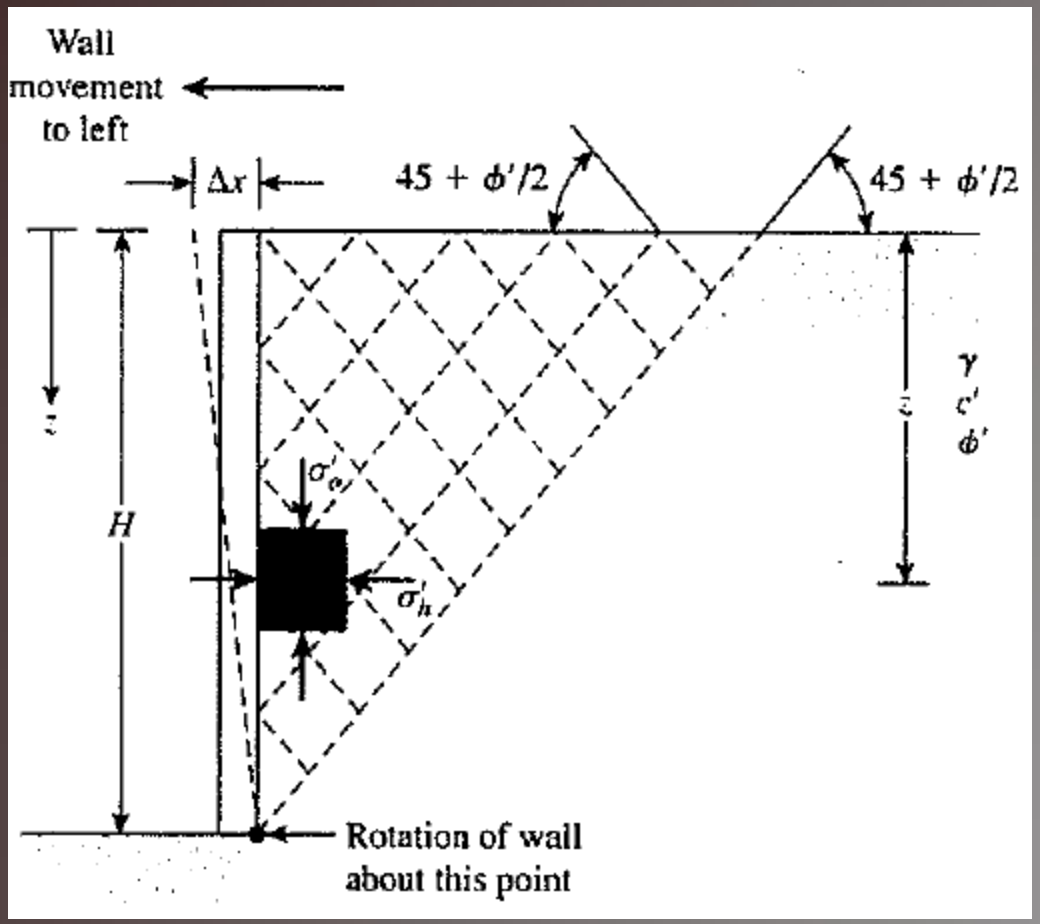
$$K_{a(1)} = \tan^2\left(45 - \frac{\phi_1'}{2}\right)$$ → RANKINE

Tanah Kohesif → Tension Crack

Tension crack → mengurangi nilai tekanan tanah aktif, menambah nilai tekanan tanah pasif

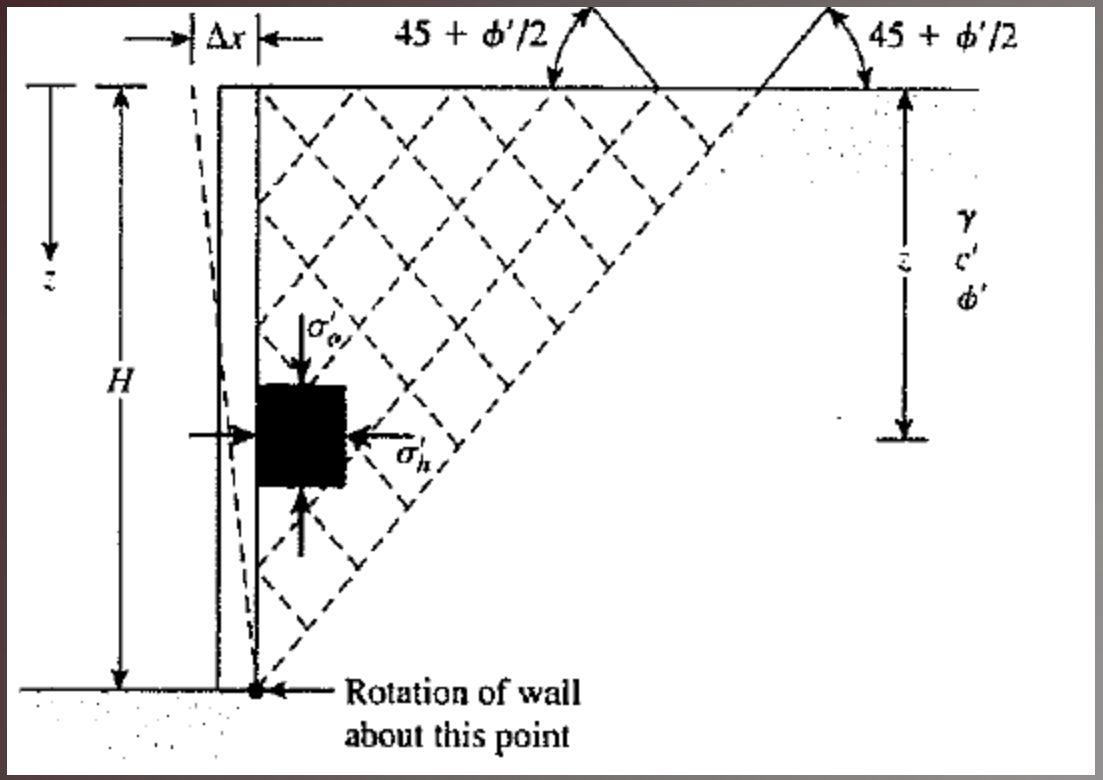
RANKINE – AKTIF – KOHESIF

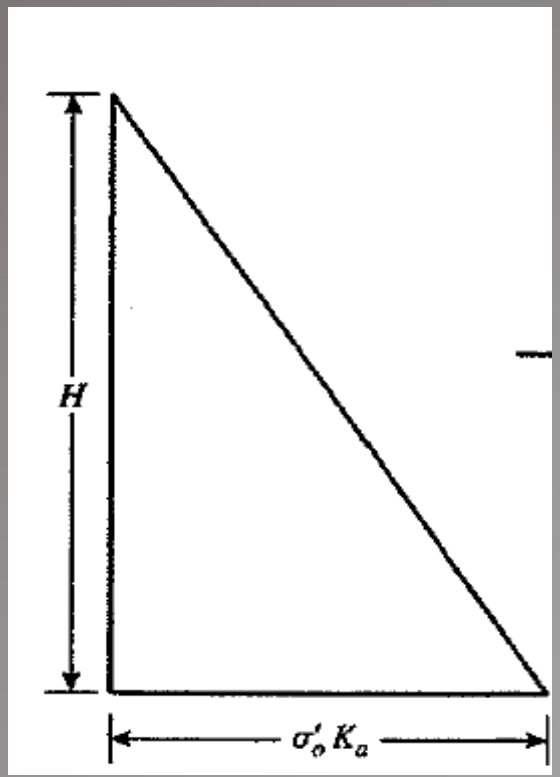
Contoh :



RANKINE – AKTIF – KOHESIF

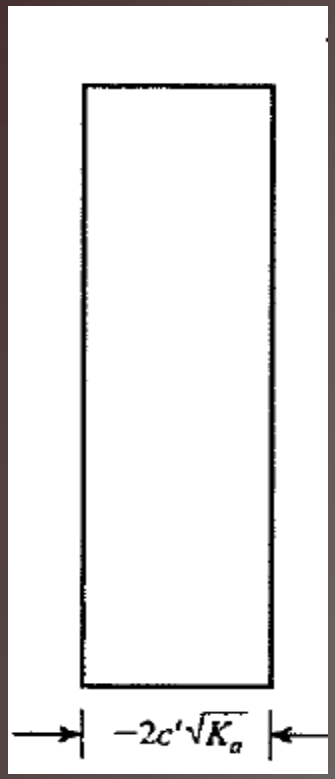
Contoh :





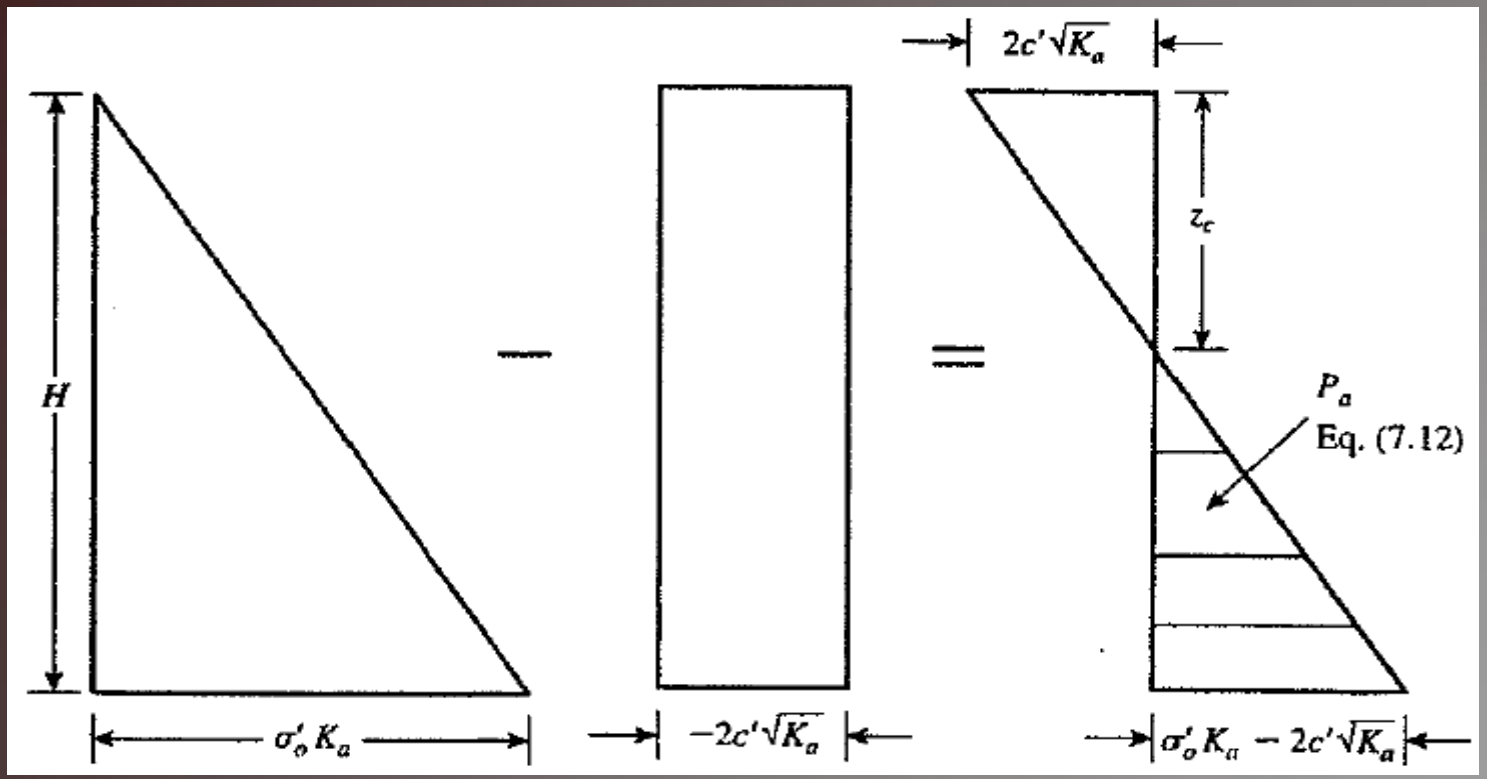
RANKINE – AKTIF – KOHESIF

Contoh :



RANKINE – AKTIF – KOHESIF

Contoh :



$$z_c = \frac{2c'}{\gamma\sqrt{K_a}}$$

Tinggi Galian Kritis