Retaining Walls

Gravity walls

Semi-gravity walls

Reinforced concrete walls

Crib walls

Gabion walls

Mechanically stabilized earth walls

The stability checks:

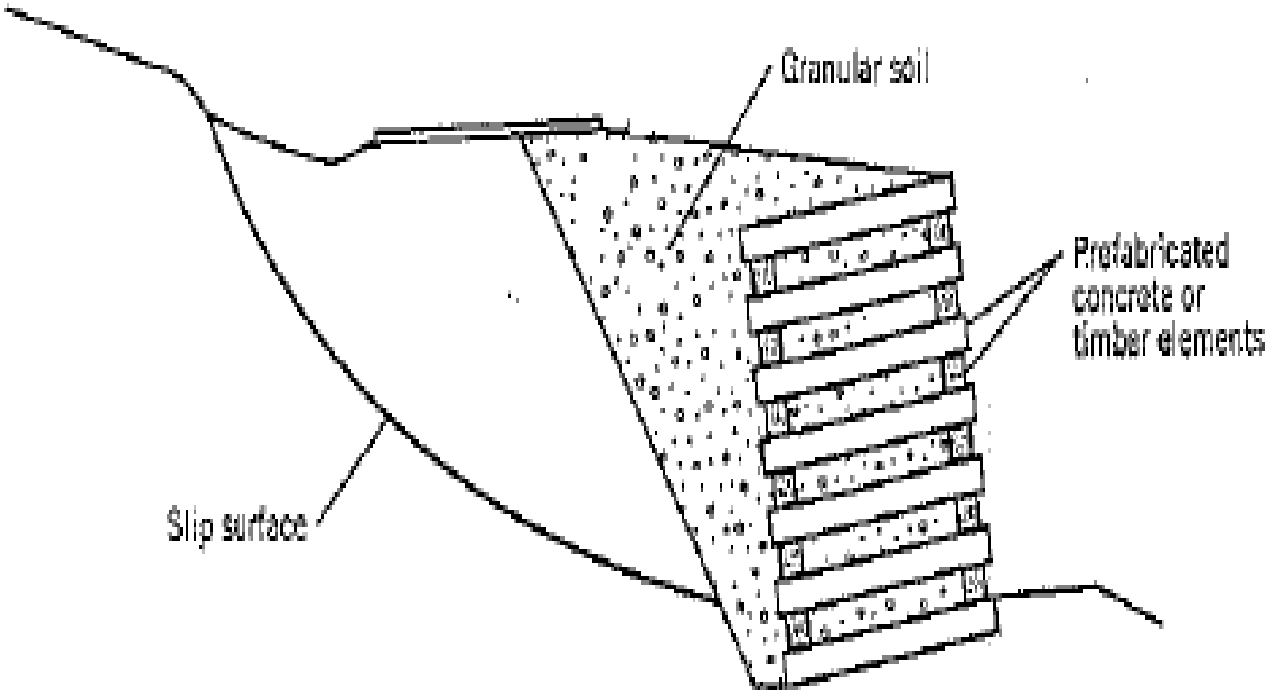
Overturning

Sliding

Base pressures ($q_{max} < q_a$; $q_{min} > 0$)

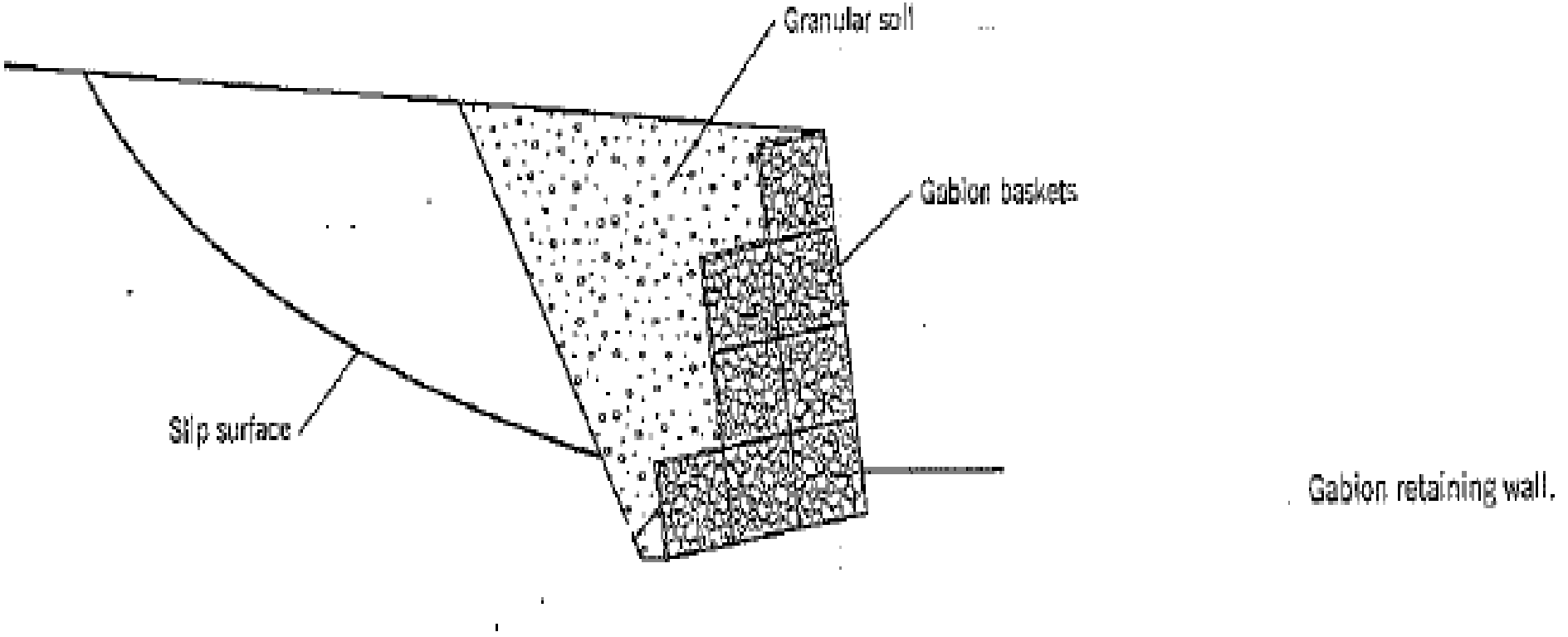
Slope stability

Crib walls



Crib retaining wall.

Gabion walls



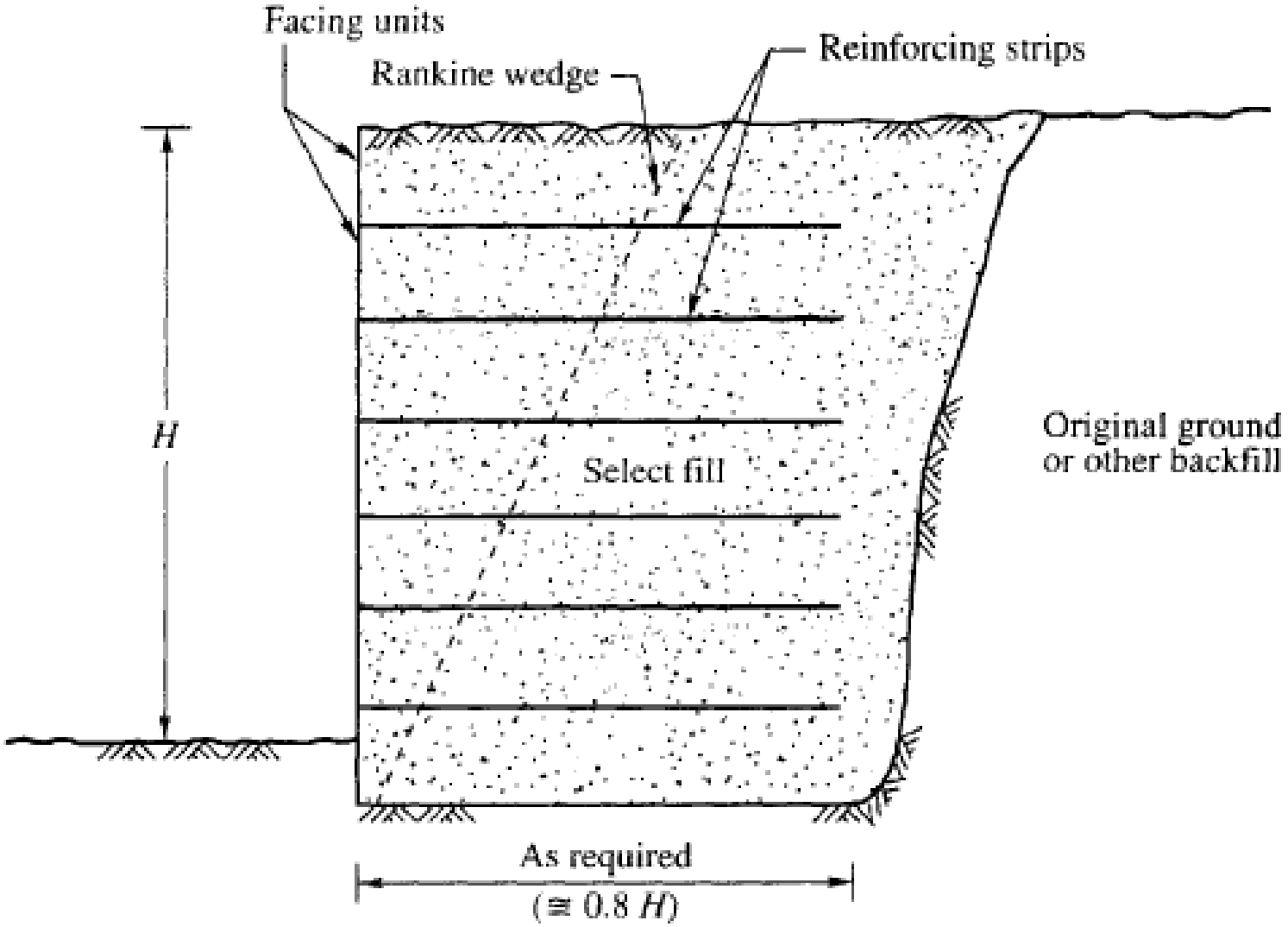
Mechanically stabilized earth walls

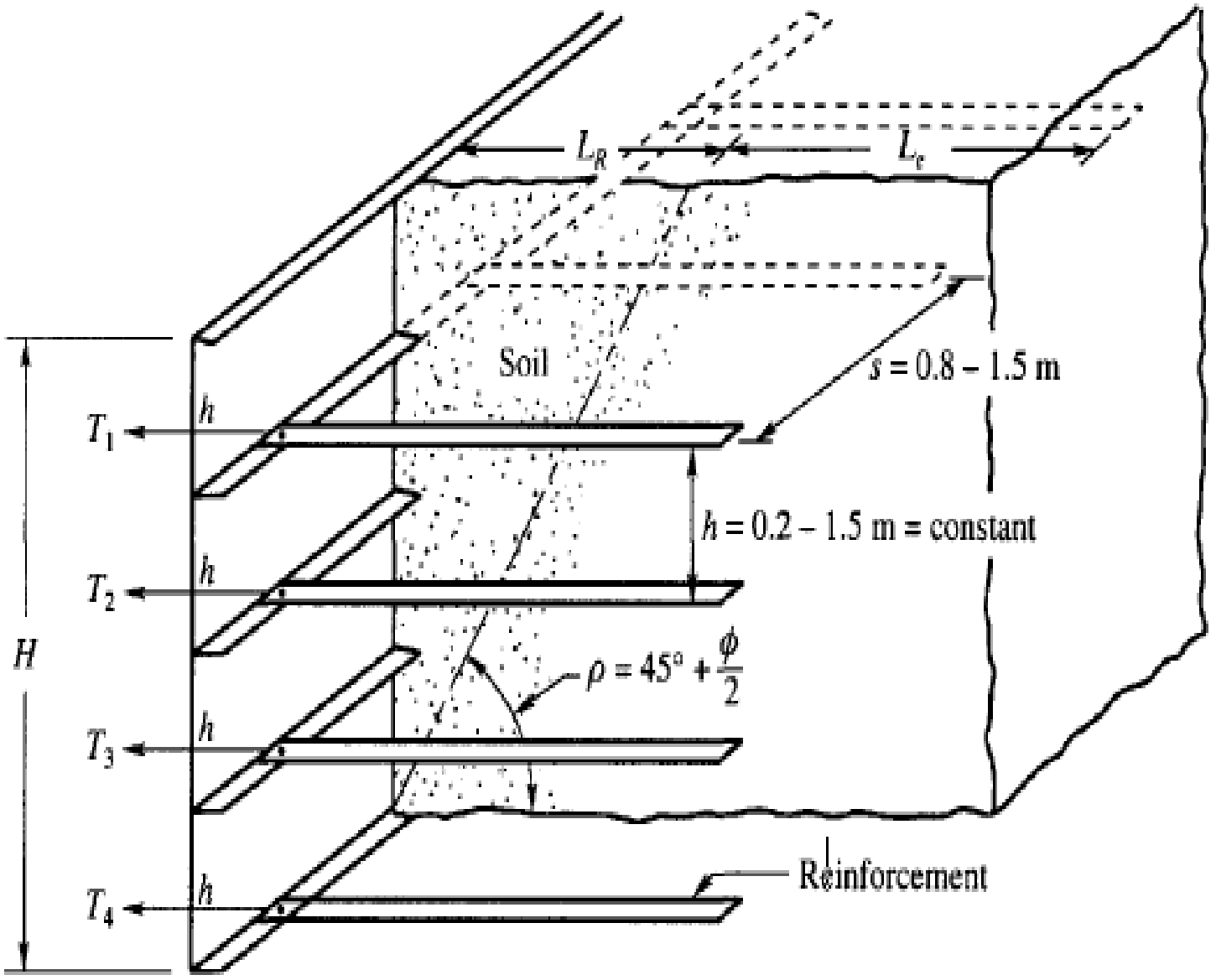
out face unit

reinforcement

backfill

Mechanically stabilized earth walls




L_R
L_e
Soil
$s = 0.8 - 1.5$ m
T_1
T_2
T_3
T_4
h
$h = 0.2 - 1.5$ m = constant
H
$\rho = 45° + \frac{\phi}{2}$
Reinforcement

$$L = L_R + L_e$$

$$L_R = (\mathrm{H} - \mathrm{z})\tan(45 - \frac{\emptyset}{2})$$

$$L_e = length\ outside\ the\ failure\ zone$$

$$L_e = \frac{(factor\ of\ safety)(T)}{2\gamma(zb)(tan\delta)}$$

$$T_i = (\gamma z + q)K_A\ sh$$

$$P_a = \frac{1}{2}\gamma H^2 K_a$$

$$P_a = \sum T_i$$

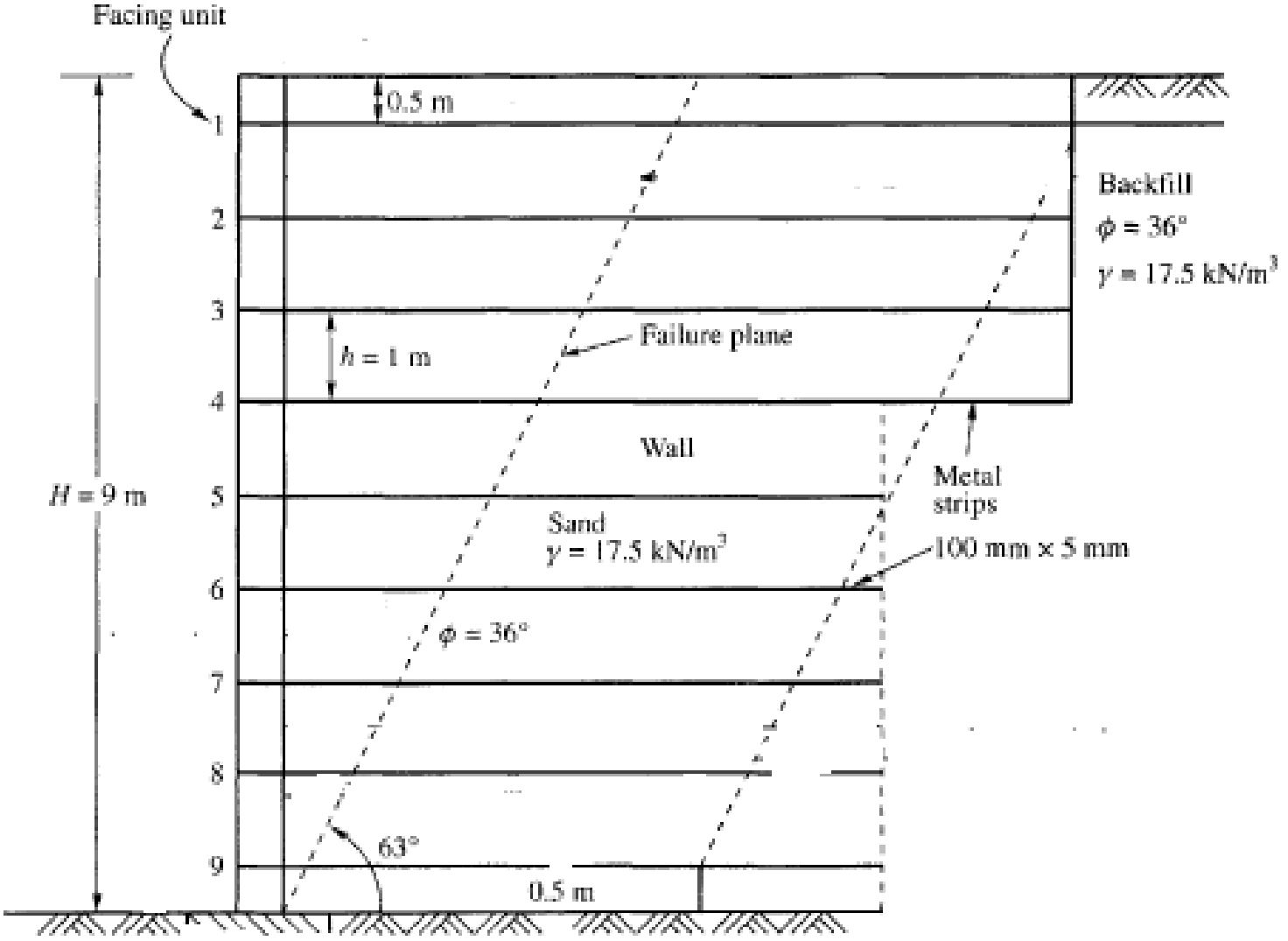
A typical section of a retaining wall with the backfill reinforced with metal strips is shown in Fig. . The following data are available:

Height $H = 9$ m; $b = 100$ mm; $t = 5$ mm;
$\phi = 36°$; $\gamma = 17.5$ kN/m^3; $\delta = 25°$; $h \times s = 1 \times 1$ m.

Required:

(a) Lengths L and L_e at varying depths.

(b) The largest tension T in the strip.



$$L = L_R + L_e$$

$$L_R = (\mathrm{H} - \mathrm{z})\tan(45 - \frac{\emptyset}{2})$$

$$L_e = length\ outside\ the\ failure\ zone$$

$$L_e = \frac{(factor\ of\ safety)(T)}{2\gamma(zb)(tan\delta)} = \frac{(1.5)(4.55z)}{2(17.5)(0.1z)(0.47)}$$

$$= 4.14\mathrm{m}$$

$$T_i = (\gamma z + q)K_A\, sh = (17.5z + 0)0.26(1m)(1m)$$

$$= 4.55\ \mathrm{kN/strip}$$

$$P_a = \frac{1}{2}\gamma H^2 K_a = \frac{1}{2}(17.5)(9^2)(0.26) = 184kN/m$$