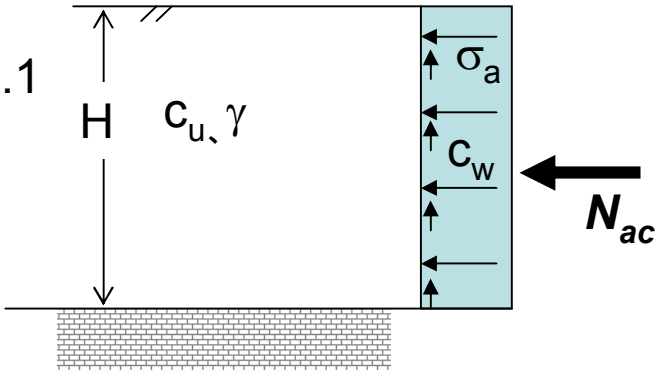
Home work 5

Fig.1



Slip line net work in this problem (Fig. 1)can be drawn as shown in Fig.2.

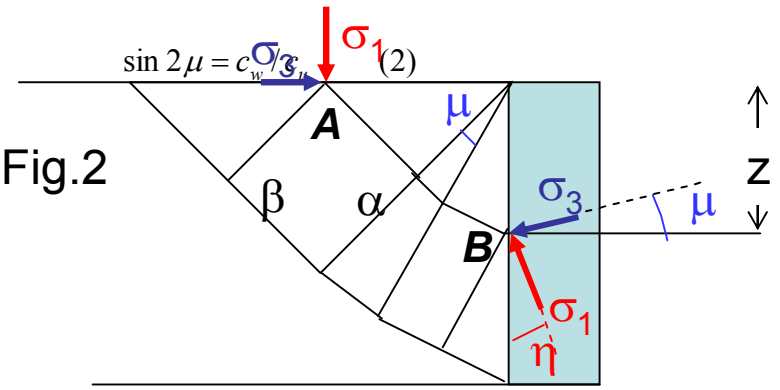
From Fig.3, at the point A, $s_A = -c_u$ (1)

At the point B, the direction of major principal stress is η from the vertical and the angle between stress σ_3 and σ_a is μ, and μ=η.

From the Mohr's stress circle at the point B (Fig.3),.

and $s_B = \sigma_a + c_u \cos 2\mu$ (3)

Fig.2



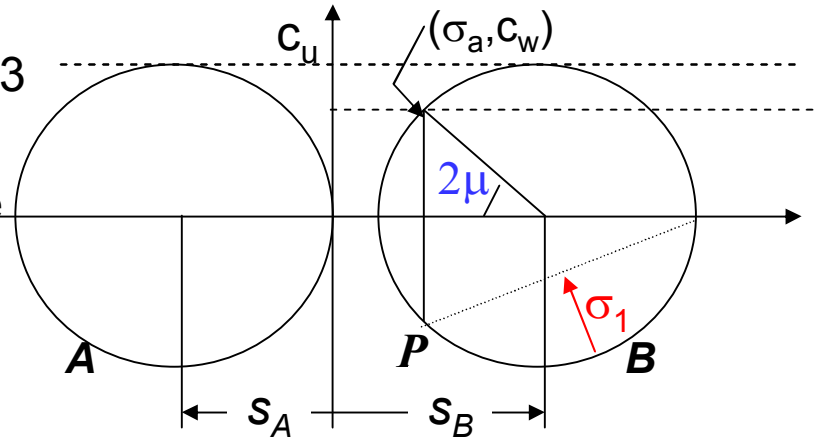
The rotation of the β slip line from A to B is μ.
The change of stress from s_A to s_B along the β slip line AB is given by Eq. (7.40).

$s_B - s_A = -2c_u\mu + \gamma z$ (4)

Hence from eqs.(1) to (4)

$$\sigma_a = \gamma z - c_u(1 + 2\mu + \cos 2\mu) \qquad (5)$$

Fig.3



Horizontal and vertical components of the active force are

$$N_{ac} = \frac{1}{2}\gamma z - c_u H(1 + 2\mu + \cos 2\mu) \qquad (6)$$

$$V_{ac} = c_w H \qquad (7)$$