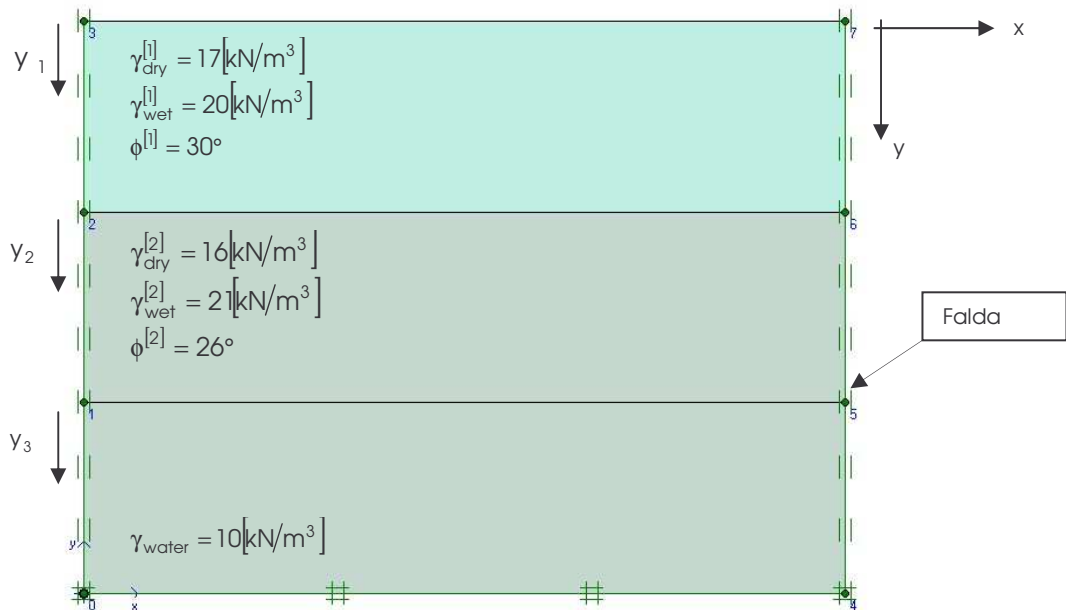


SCHEDE APPLICATIVE DI GEOTECNICA

| | | | |
|--------------------|-------------------------------------|---------------|--------|
| Argomento | Tensioni Totali e Tensioni efficaci | | |
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STRATIGRAFIA DEL TERRENO



La potenza del primo strato è pari a 5 (m), mentre quella del secondo strato è pari a 10 (m). La falda è alta 5 (m).

CALCOLO DELLE TENSIONI TOTALI VERTICALI

$$\sigma_{yy} = \gamma_{dry}^{[1]} \cdot y_1$$

$$\sigma_{yy}(y_1 = 0) = 0 \quad (\text{kPa})$$

$$\sigma_{yy}(y_1 = 5) = \gamma_{dry}^{[1]} \cdot h_1 = 17 \cdot 5 = 85 \quad (\text{kPa})$$

$$\sigma_{yy} = \gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot y_2$$

$$\sigma_{yy}(y_2 = 0) = \gamma_{dry}^{[1]} \cdot h_1 = 17 \cdot 5 = 85 \quad (\text{kPa})$$

$$\sigma_{yy}(y_2 = 5) = \gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot h_2 = 17 \cdot 5 + 16 \cdot 5 = 165 \quad (\text{kPa})$$

$$\sigma_{yy} = \gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot h_2 + (\gamma_{wet}^{[2]} - \gamma_{water}) \cdot y_3 + \gamma_{water} \cdot y_3$$

$$\sigma_{yy}(y_3 = 0) = \gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot h_2 = 17 \cdot 5 + 16 \cdot 5 = 165 \quad (\text{kPa})$$

$$\sigma_{yy}(y_3 = 5) = \gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot h_2 + (\gamma_{wet}^{[2]} - \gamma_{water}) \cdot y_3 + \gamma_{water} \cdot y_3 \quad (\text{kPa})$$

$$\sigma_{yy}(y_3 = 5) = 17 \cdot 5 + 16 \cdot 5 + (21 - 10) \cdot 5 + 10 \cdot 5 = 270$$

CALCOLO DELLE TENSIONI EFFICACI VERTICALI

$$\sigma'_{yy} = \gamma_{dry}^{[1]} \cdot y_1$$

$$\sigma'_{yy}(y_1 = 0) = 0 \quad (\text{kPa})$$

$$\sigma'_{yy}(y_1 = 5) = \gamma_{dry}^{[1]} \cdot h_1 = 17 \cdot 5 = 85 \quad (\text{kPa})$$

$$\sigma'_{yy} = \gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot y_2$$

$$\sigma'_{yy}(y_2 = 0) = \gamma_{dry}^{[1]} \cdot h_1 = 17 \cdot 5 = 85 \quad (\text{kPa})$$

$$\sigma'_{yy}(y_2 = 5) = \gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot h_2 = 17 \cdot 5 + 16 \cdot 5 = 165 \quad (\text{kPa})$$

$$\sigma'_{yy} = \gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot h_2 + (\gamma_{wet}^{[2]} - \gamma_{water}) \cdot y_3$$

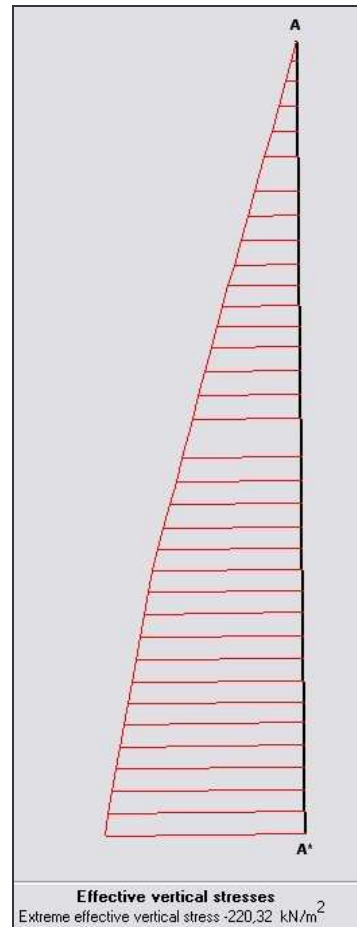
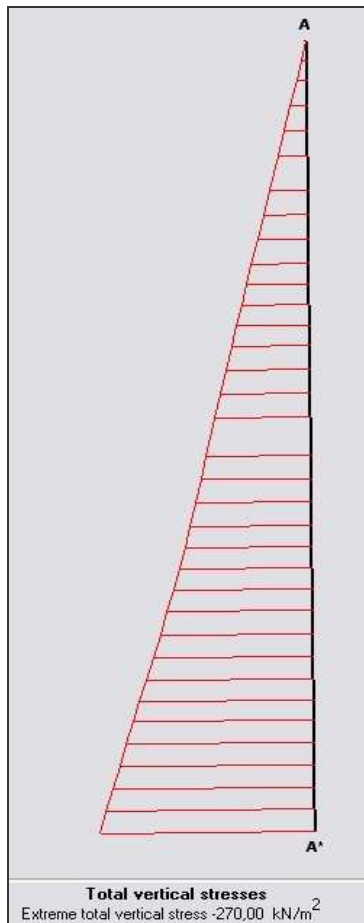
$$\sigma'_{yy}(y_3 = 0) = \gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot h_2 = 17 \cdot 5 + 16 \cdot 5 = 165 \quad (\text{kPa})$$

$$\sigma'_{yy}(y_3 = 5) = \gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot h_2 + (\gamma_{wet}^{[2]} - \gamma_{water}) \cdot y_3 \quad (\text{kPa})$$

$$\sigma'_{yy}(y_3 = 5) = 17 \cdot 5 + 16 \cdot 5 + (21 - 10) \cdot 5 = 220$$

SCHEDE APPLICATIVE DI GEOTECNICA

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CALCOLO DELLE TENSIONI TOTALI ORIZZONTALI

Calcolo del coefficiente di spinta a riposo:

$$\begin{cases} k_0^{[1]} = 1 - \sin\phi^{[1]} = 1 - \sin(30) = 0.50 \\ k_0^{[2]} = 1 - \sin\phi^{[2]} = 1 - \sin(26) = 0.5616 \end{cases} \quad (-)$$

$$\sigma_{xx} = k_0^{[1]} \cdot \gamma_{dry}^{[1]} \cdot y_1$$

$$\sigma_{xx}(y_1 = 0) = 0 \quad (\text{kPa})$$

$$\sigma_{xx}(y_1 = 5) = k_0^{[1]} \cdot \gamma_{dry}^{[1]} \cdot h_1 = 0.50 \cdot 17 \cdot 5 = 42.50 \quad (\text{kPa})$$

$$\sigma_{xx} = k_0^{[2]} \cdot (\gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot y_2)$$

$$\sigma_{xx}(y_2 = 0) = k_0^{[2]} \cdot \gamma_{dry}^{[1]} \cdot h_1 = 0.5616 \cdot 17 \cdot 5 = 47.74 \quad (\text{kPa})$$

$$\sigma_{xx}(y_2 = 5) = k_0^{[2]} \cdot (\gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot h_2) = 0.5616 \cdot (17 \cdot 5 + 16 \cdot 5) = 92.664 \quad (\text{kPa})$$

$$\sigma_{xx} = k_0^{[2]} \cdot [\gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot h_2 + (\gamma_{wet}^{[2]} - \gamma_{water}) \cdot y_3] + \gamma_{water} \cdot y_3$$

$$\sigma_{xx}(y_3 = 0) = k_0^{[2]} \cdot [\gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot h_2] = 0.5616 \cdot (17 \cdot 5 + 16 \cdot 5) = 92.664 \quad (\text{kPa})$$

$$\sigma_{xx}(y_3 = 5) = k_0^{[2]} \cdot [\gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot h_2 + (\gamma_{wet}^{[2]} - \gamma_{water}) \cdot y_3] + \gamma_{water} \cdot y_3 \quad (\text{kPa})$$

$$\sigma_{xx}(y_3 = 5) = 0.5616 \cdot [17 \cdot 5 + 16 \cdot 5 + (21 - 10) \cdot 5] + 10 \cdot 5 = 173.55$$

SCHEDE APPLICATIVE DI GEOTECNICA

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CALCOLO DELLE TENSIONI EFFICACI ORIZZONTALI

Calcolo del coefficiente di spinta a riposo:

$$\left\{ \begin{aligned} k_0^{[1]} &= 1 - \sin\phi^{[1]} = 1 - \sin(30) = 0.50 \\ k_0^{[2]} &= 1 - \sin\phi^{[2]} = 1 - \sin(26) = 0.5616 \end{aligned} \right. \quad (-)$$

$$\sigma'_{xx} = k_0^{[1]} \cdot \gamma_{dry}^{[1]} \cdot y_1$$

$$\sigma'_{xx}(y_1 = 0) = 0$$

$$\sigma'_{xx}(y_1 = 5) = k_0^{[1]} \cdot \gamma_{dry}^{[1]} \cdot h_1 = 0.50 \cdot 17 \cdot 5 = 42.50$$

(kPa)

(kPa)

$$\sigma'_{xx} = k_0^{[2]} \cdot (\gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot y_2)$$

$$\sigma'_{xx}(y_2 = 0) = k_0^{[2]} \cdot \gamma_{dry}^{[1]} \cdot h_1 = 0.5616 \cdot 17 \cdot 5 = 47.74$$

$$\sigma'_{xx}(y_2 = 5) = k_0^{[2]} \cdot (\gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot h_2) = 0.5616 \cdot (17 \cdot 5 + 16 \cdot 5) = 92.664$$

(kPa)

(kPa)

$$\sigma'_{xx} = k_0^{[2]} \cdot [\gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot h_2 + (\gamma_{wet}^{[2]} - \gamma_{water}) \cdot y_3]$$

$$\sigma'_{xx}(y_3 = 0) = k_0^{[2]} \cdot [\gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot h_2] = 0.5616 \cdot (17 \cdot 5 + 16 \cdot 5) = 92.664$$

$$\sigma'_{xx}(y_3 = 5) = k_0^{[2]} \cdot [\gamma_{dry}^{[1]} \cdot h_1 + \gamma_{dry}^{[2]} \cdot h_2 + (\gamma_{wet}^{[2]} - \gamma_{water}) \cdot y_3]$$

$$\sigma'_{xx}(y_3 = 5) = 0.5616 \cdot [17 \cdot 5 + 16 \cdot 5 + (21 - 10) \cdot 5] = 123.55$$

(kPa)

(kPa)

