Dariusz Szul
162A High Road
London NW10 2PB
e-mail: dariuszul73@gmail.com

Stability of retaining wall RW-1

Loads:

$kNm := kN \cdot m$

Soil PS: $PS := 19\frac{kN}{m^2} \cdot 1.4m \cdot 1.0m \cdot 0.5 \cdot 1.2 \cdot 0.4$ $PS = 6.38 \cdot kN$

Water PW: $PW := 10kN \cdot 0.5 \cdot 1.2$ $PW = 6 \cdot kN$

$PS + PW = 12.38 \cdot kN$

Weight of 1m of retaining wall: $P1 := 0.3m \cdot 1.175m \cdot 1.0m \cdot 25\frac{kN}{m^3}$ $P1 = 8.81 \cdot kN$

$P2 := 0.2m \cdot 1.0m \cdot 1.2m \cdot 25\frac{kN}{m^3}$ $P2 = 6 \cdot kN$

Weight of 1m of outer leaf (brick): $P3 := 0.1m \cdot 1.5m \cdot 1.0m \cdot 19\frac{kN}{m^3}$ $P3 = 2.85 \cdot kN$

Weight of 1m of inner leaf (block): $P4 := 0.1m \cdot 1.5m \cdot 1.0m \cdot 9.6\frac{kN}{m^3}$ $P4 = 1.44 \cdot kN$

$P := P1 + P2 + P3 + P4$

$P = 19.1 \cdot kN$

Rotation (center in point A)

Rotating moment: $Mr := PS \cdot 0.667m + PW \cdot 0.9m$

$Mr = 9.66 \cdot kNm$

Holding moment: $Mh := P1 \cdot 1.05m + P2 \cdot 0.6m + P3 \cdot 1.15m + P4 \cdot 0.95 \cdot m$

$Mh = 17.5 \cdot kNm$

$Mr < Mh$

Rotation satisfied

Sliding

Lateral load: $Fm := PS + PW$ $Fm = 12.38 \cdot kN$

Resistance:

Dariusz Szul
162A High Road
London NW10 2PB
e-mail: dariuszul73@gmail.com

Friction coefficient: $\gamma t := 0.25$

Sliding resistance: $Ft := P \cdot \gamma t \cdot 1.2 \qquad Ft = 5.73 \cdot kN$

$Ft < Fm$ Lateral load is greater than sliding resistance

Stress transferred to the ground: $\sigma g := \frac{(Fm - Ft)}{0.2m \cdot 1.0m} \qquad \sigma g = 33.27 \cdot kPa$

Safe bearing capacity: $\sigma := 50kPa$

$\sigma g < \sigma$

Sliding satisfied