# Design of Structure-2

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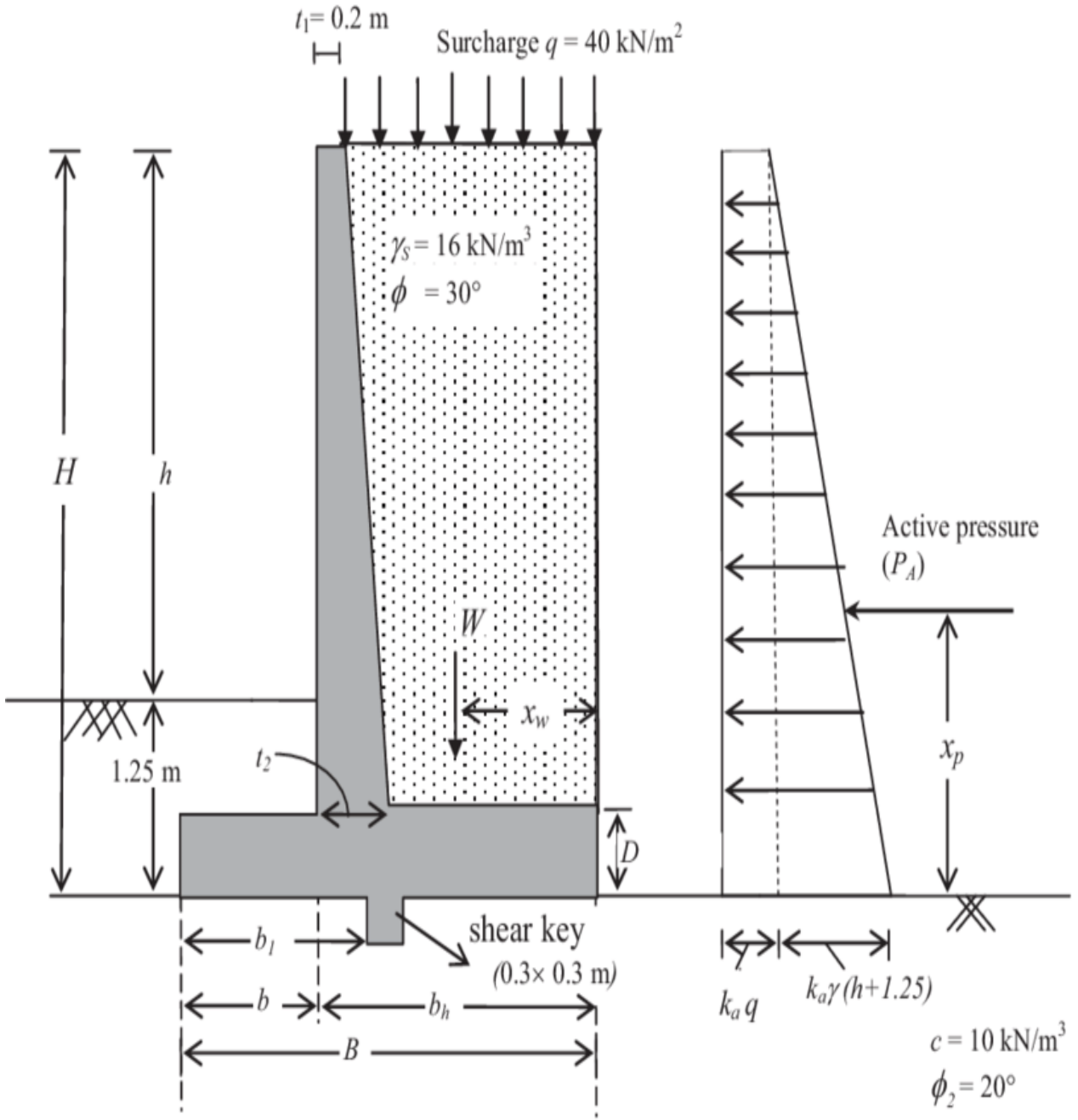
Civil Technology

# Cantilever Retaining Wall

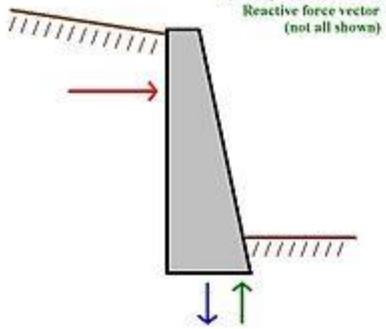
- Components of retaining wall
- Non surcharched retaining wall
- Earth Pressure


$t_1$= 0.2 m
Surcharge $q$ = 40 kN/m$^2$
$\gamma_S$ = 16 kN/m$^3$
$\phi$ = 30°
H
h
W
$x_w$
1.25 m
$t_2$
D
$b_1$
b
$b_h$
B
shear key
(0.3× 0.3 m)
Active pressure
($P_A$)
$x_p$
$k_a q$
$k_a \gamma (h+1.25)$
$c$ = 10 kN/m$^3$
$\phi_2$ = 20°

# Simplified explanation of typical retaining walls

## Gravity wall

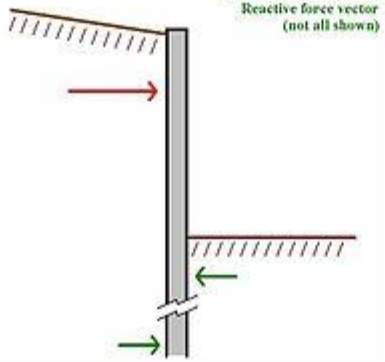
Earth pressure vector
Gravity vector (of wall)
Reactive force vector (not all shown)



Standard wall type that holds the earth mainly through its own weight. Can pivot and topple relatively easily, as the internal leverage of the earth pressure is very high.

## Piling wall

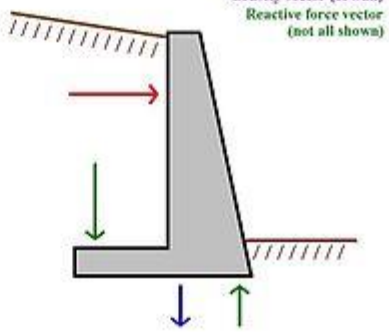
Earth pressure vector
Gravity vector (of wall)
Reactive force vector (not all shown)



Using long piles, this wall is fixed by soil on both sides of its lower length. If the piles themselves can resist the bending forces, this wall can take high loads.

## Cantilever wall

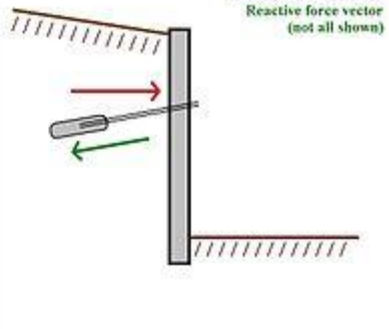
Earth pressure vector
Gravity vector (of wall)
Reactive force vector (not all shown)



The cantilever wall (which may also extend in the other direction) uses the same earth pressure trying to topple it to stabilize itself with a second lever arm.

## Anchored wall

Earth pressure vector
Gravity vector (of wall)
Reactive force vector (not all shown)



This wall keeps itself from toppling by having cables driven into the soil or rock, fixed by expanding anchors (can be combined with other types of walls).