

## DESIGN OF GRAVITY RETAINING WALL

### Inputs (kN-m units)

|                            |        |
|----------------------------|--------|
| b'                         | 0.40   |
| b                          | 1.70   |
| h                          | 3.60   |
| Unit wt. of wall           | 25.00  |
| Wet unit wt. of soil       | 18.00  |
| $\phi$ of soil             | 35.00  |
| Surcharge load, q          | 2.00   |
| Allowable bearing capacity | 350.00 |

### Calculations

$$k_a = 0.27$$

$$k_p = 3.69$$

$$\text{height above ground} =$$

$$2.5$$

**Moment arm about toe**

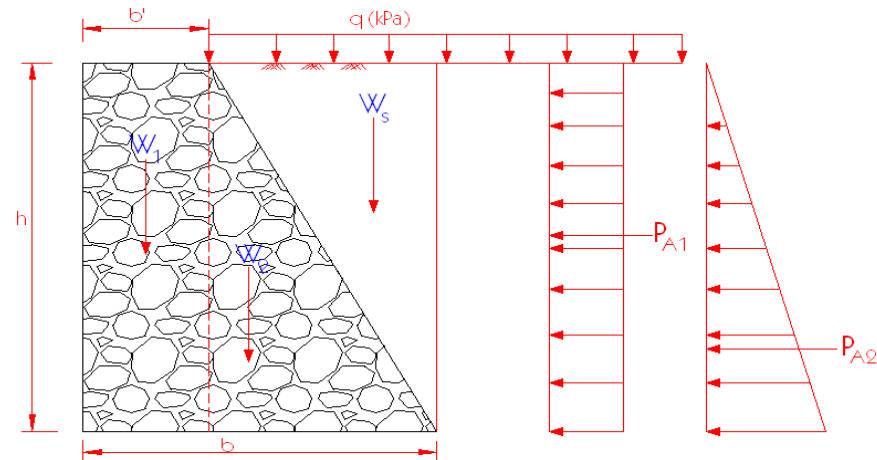
|            |       |      |
|------------|-------|------|
| $W_1 =$    | 36.00 | 0.20 |
| $W_2 =$    | 58.50 | 0.83 |
| $W_s =$    | 42.12 | 1.27 |
| $P_{A1} =$ | 1.95  | 1.80 |
| $P_{A2} =$ | 31.61 | 1.20 |
| $P_{P1} =$ | 11.96 | 0.37 |

### 1. Overturning

|                    |         |
|--------------------|---------|
| Resisting moment   | 113.69  |
| Overturning moment | 41.44   |
| Factor of safety = | 2.74 ok |

### 3. Sliding

|                    |         |
|--------------------|---------|
| Resistance         | 107.62  |
| Moving             | 33.56   |
| Factor of Safety = | 3.21 ok |



Instructions

Input Data: **Green Cells**

Output Data: **Orange Cells**

### 2. Tension

|                                    |         |
|------------------------------------|---------|
| Location pf resultant from toe (x) | 0.77    |
| Location pf resultant from toe (y) | 1.23    |
| $\theta =$                         | 81.01   |
| $b/6 =$                            | 0.28    |
| $e_x =$                            | 0.28 ok |

### 4. Bearing

|                 |           |
|-----------------|-----------|
| Vertical Stress | 159.81 ok |
|-----------------|-----------|



## DESIGN OF GRAVITY RETAINING WALL

### Inputs (kN-m units)

|                            |        |
|----------------------------|--------|
| b'                         | 0.40   |
| b                          | 2.50   |
| h                          | 3.85   |
| Unit wt. of wall           | 20.00  |
| Wet unit wt. of soil       | 17.50  |
| $\phi$ of soil             | 28.00  |
| Surcharge load, q          | 1.00   |
| Allowable bearing capacity | 300.00 |

### Calculations

$$k_a = 0.36$$

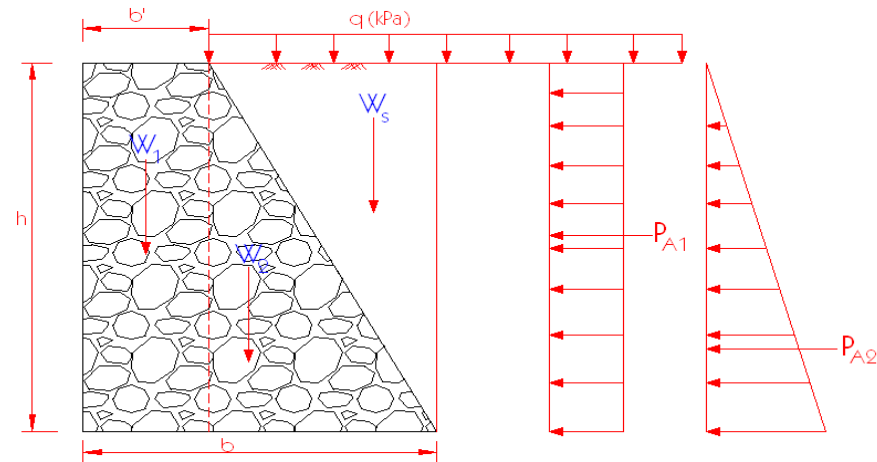
|            |       |  | Moment arm about toe |
|------------|-------|--|----------------------|
| $W_1 =$    | 30.80 |  | 0.20                 |
| $W_2 =$    | 80.85 |  | 1.10                 |
| $W_s =$    | 70.74 |  | 1.80                 |
| $P_{A1} =$ | 1.39  |  | 1.93                 |
| $P_{A2} =$ | 46.82 |  | 1.28                 |

#### 1. Overturning

|                    |         |
|--------------------|---------|
| Resisting moment   | 222.434 |
| Overturning moment | 62.77   |
| Factor of safety = | 3.54 ok |

#### 3. Sliding

|                    |         |
|--------------------|---------|
| Resistance         | 96.98   |
| Moving             | 48.21   |
| Factor of Safety = | 2.01 ok |



#### 2. Tension

|                                    |         |
|------------------------------------|---------|
| Location pf resultant from toe (x) | 1.22    |
| Location pf resultant from toe (y) | 1.30    |
| $\theta =$                         | 75.19   |
| $b/6 =$                            | 0.42    |
| $e_x =$                            | 0.37 ok |

#### 4. Bearing

|                 |           |
|-----------------|-----------|
| Vertical Stress | 138.55 ok |
|-----------------|-----------|

