

## DISEÑO DE MURO DE GRAVEDAD

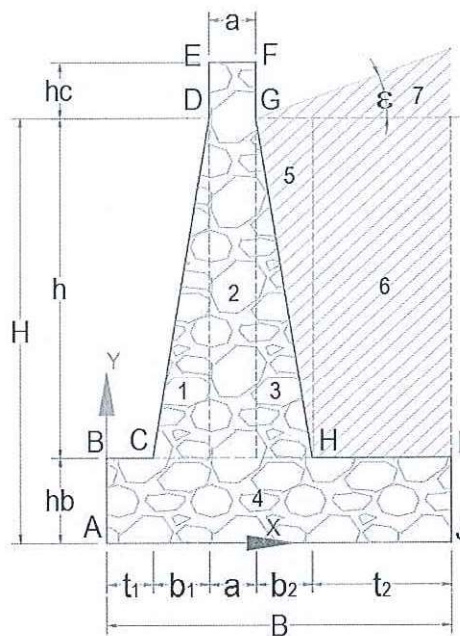
MURO (H = 1.20m):

### 1. DIMENSIONAMIENTO

#### 1.1 DATOS DISEÑO

|              |          |                    |
|--------------|----------|--------------------|
| $\gamma_s =$ | 2,000.00 | kg/m <sup>3</sup>  |
| $\gamma_c =$ | 2,300.00 | kg/m <sup>3</sup>  |
| $\phi =$     | 30.00    | °                  |
|              | 0.524    | rad                |
| $\epsilon =$ | 0.00     | °                  |
|              | 0.00     | rad                |
| $\sigma =$   | 1.50     | kg/cm <sup>2</sup> |
| $C =$        | 0.00     |                    |
| $S/C =$      | 250.00   | kg/m <sup>2</sup>  |
| $h_o =$      | 0.13     | m                  |

|           |       |        |
|-----------|-------|--------|
| Coef emp. | Kac = | 0.3333 |
|-----------|-------|--------|

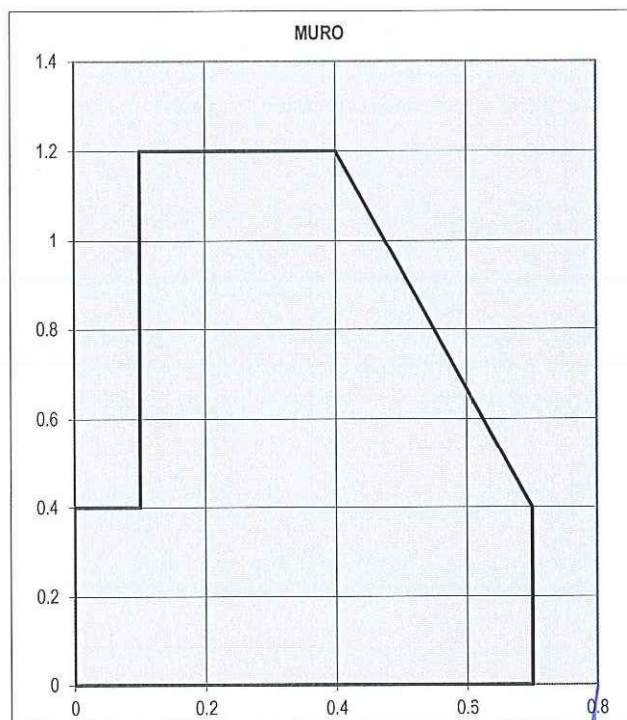


#### 1.2 PREDIMENSIONAMIENTO

##### 3.1.1 MURO

|         |      |   |
|---------|------|---|
| $t_1 =$ | 0.10 | m |
| $t_2 =$ | 0.00 | m |
| $b_1 =$ | 0.00 | m |
| $b_2 =$ | 0.30 | m |
| $a =$   | 0.30 | m |
| $hb =$  | 0.40 | m |
| $h =$   | 0.80 | m |
| $hc =$  | 0.00 | m |

|       |      |   |
|-------|------|---|
| $B =$ | 0.70 | m |
| $H =$ | 1.20 | m |



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## 2. CALCULOS INICIALES

### AREA Y CENTRO DE GRAVEDAD

#### 2.1 MURO

| ELEM.    | AREA | X    | Y    | X*A  | Y*A  |
|----------|------|------|------|------|------|
| 1        | 0    | 0.10 | 0.67 | 0.00 | 0.00 |
| 2        | 0.24 | 0.25 | 0.80 | 0.06 | 0.19 |
| 3        | 0.12 | 0.50 | 0.67 | 0.06 | 0.08 |
| 4        | 0.28 | 0.35 | 0.20 | 0.10 | 0.06 |
| $\Sigma$ | 0.64 |      |      | 0.22 | 0.33 |

|                  |      |                |
|------------------|------|----------------|
| A =              | 0.64 | m <sup>2</sup> |
| X <sub>g</sub> = | 0.34 | m              |
| Y <sub>g</sub> = | 0.51 | m              |

#### 2.2 RELLENO

| ELEM.    | AREA | X    | Y    | X*A  | Y*A  |
|----------|------|------|------|------|------|
| 5        | 0.12 | 0.60 | 0.93 | 0.07 | 0.11 |
| 6        | 0    | 0.70 | 0.80 | 0.00 | 0.00 |
| 7        | 0    | 0.60 | 1.20 | 0.00 | 0.00 |
| $\Sigma$ | 0.12 |      |      | 0.07 | 0.11 |

|                   |      |                |
|-------------------|------|----------------|
| A <sub>r</sub> =  | 0.12 | m <sup>2</sup> |
| X <sub>rg</sub> = | 0.60 | m              |
| Y <sub>rg</sub> = | 0.93 | m              |

## 3. ANALISIS DE ESTABILIDAD

### 3.1 CALCULO DE ESFUERZOS

#### 3.1.1 MURO

|                        |                  |          |      |
|------------------------|------------------|----------|------|
| Peso de la estructura: | W =              | 1,472.00 | kg   |
| Brazo de momento:      | X <sub>g</sub> = | 0.34     | m    |
| Momento:               | M <sub>w</sub> = | 501.40   | kg-m |

#### 3.1.2 RELLENO

|                   |                   |        |      |
|-------------------|-------------------|--------|------|
| Peso de relleno:  | W <sub>r</sub> =  | 240.00 | kg   |
| Brazo de momento: | X <sub>rg</sub> = | 0.60   | m    |
| Momento:          | M <sub>wr</sub> = | 144.00 | kg-m |

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### 3.1.3 SOBRECARGA

|                   |       |       |      |
|-------------------|-------|-------|------|
| Sobrecarga:       | Wsc = | 75.00 | kg   |
| Brazo de momento: | Xsc = | 0.55  | m    |
| Momento:          | Msc = | 41.25 | kg-m |

### 3.2 FUERZAS RESISTENTES

|                     |         |          |      |
|---------------------|---------|----------|------|
| Coef. Fricción:     | $\mu =$ | 0.58     |      |
| Fuerza normal:      | N =     | 1,787.00 | kg   |
| Fuerza resistente:  | FR =    | 1,031.72 | kg   |
| Momento resistente: | MR =    | 686.65   | kg-m |

### 3.3 FUERZAS ACTUANTES

|                   |      |        |      |
|-------------------|------|--------|------|
| Empuje activo:    | Ea = | 580.00 | kg   |
| Brazo de momento: | Ya = | 0.44   | m    |
| Momento actuante: | Ma = | 256.17 | kg-m |

### 3.4 SEGURIDAD CONTRA EL DESLIZAMIENTO

|           |          |    |
|-----------|----------|----|
| FR =      | 1,031.72 | kg |
| Ea =      | 580.00   | kg |
| $\eta' =$ | 1.78     | OK |

### 3.5 SEGURIDAD CONTRA EL VOLTEO

|            |        |    |
|------------|--------|----|
| MR =       | 686.65 | kg |
| Ma =       | 256.17 | kg |
| $\eta'' =$ | 2.68   | OK |

### 3.6 VERIFICACION DE ESFUERZO EN CIMENTACION

|                     |              |      |        |    |
|---------------------|--------------|------|--------|----|
| Excentricidad:      | e =          | 0.11 | m      |    |
| Tercio medio:       | B/6 =        | 0.12 | m      | OK |
| Presión máx. suelo: | $\sigma_1 =$ | 0.49 | kg/cm2 | OK |
| Presión mín. suelo: | $\sigma_2 =$ | 0.02 | kg/cm2 | OK |

  
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