# UDS
## Mi Universidad

# Ejercicios

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Análisis de cargas en losas macizas y casetón

Primer Parcial

Análisis de Estructuras

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Arquitectura

Quinto Cuatrimestre

Comitán de Domínguez, 19/Enero/2024
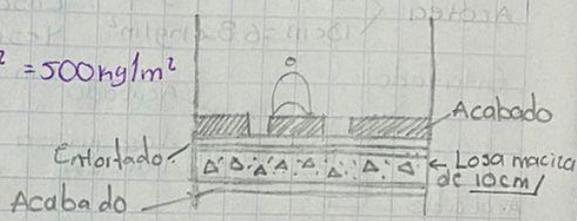
# Analisis de Estructura.

Peso de concreto: 2,400 $h \cdot m^2$

Losa de 10 = 240 kg/m²
Losa de 12 = 288 kg/m²
Losa de 13 = 312 kg/m²

← Casa habitación

| | |
|---|---|
| Acabado | 70 kg/m² |
| Entortado | 30 kg/m² |
| Loza maciza | 240 kg/m² |
| Yeso | 30 kg/m² |
| Cm Reglamento | 40 kg/m² |
| CM: | 410 kg/m² |
| CV: | 170 kg/m² |
| Total: | 580 kg/m² |

+ 90 kg/m² = 500 kg/m²

2400 h/m² (0.10m) = 240 kg/m²

Acabado
Entortado
Acabado → Losa maciza de 10cm

← Losa de 12 cm

| | |
|---|---|
| Acabado | 70 kg/m² |
| Entortado | 30 kg/m² |
| Losa maciza | 288 kg/m² |
| Yeso | 30 kg/m² |
| Cm Regla... | 40 kg/m² |
| CM: | 458 kg/m² |
| CV: | 170 kg/m² |
| Total | 628 kg/m² |

+ 90 kg/m² = 548 kg/m²

2400 kg·m² (0.12m) = 288 kg/m²

Acabado
Losa maciza de 12cm
Entortado
Acabado
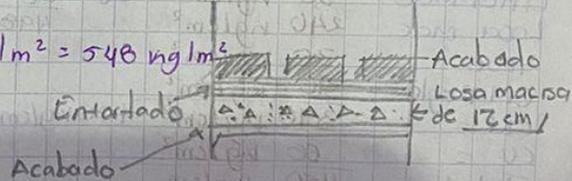
← Oficina

| | |
|---|---|
| Acabado | 70 kg/m² |
| Entortado | 80 kg/m² |
| Losa maciza | 312 kg/m² |
| Yeso | 30 kg/m² |
| CM Regla... | 40 kg/m² |
| CM: | 482 kg/m² |
| CV: | 170 kg/m² |
| Total: | 652 kg/m² |

+ 90 kg/m² = 572 kg/m²

Oficina de 10cm
410 cm
250 cv
660 kg/m²

Acabado
Losa Maciza de 13cm
Entortado
Acabado
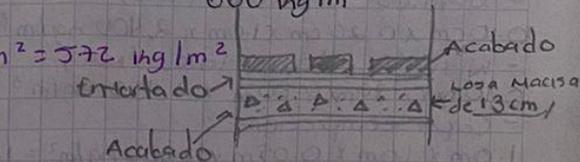
← Baño losa de 10 cm

| | |
|---|---|
| Relleno | 100 kg/cm² |
| Acabado | 70 kg/cm² |
| Entortado | 30 kg/cm² |
| Losa maciza | 240 kg/cm² |
| Yeso | 30 kg/cm² |
| CM Regla... | 40 kg/cm² |
| CM | 510 kg/cm² |
| CV | 170 kg/cm² |
| Total: | 680 kg/cm² |

Carga accidental    cm: 510 kg/cm² + 90 kg/m² = 572 kg/m²
CA: 90 kg/cm²
600 kg/cm²

Losa de 12 cm
Losa maciza: 288 kg/cm²    Losa maciza de 12cm
CM: 558 kg/m²
CV: 170 kg/m²
Total: 728 kg/cm²

Acabado
Entortado
Acabado → Losa maci. de 10cm

Acabado
Losa maci. de 12cm
Entortado
Acabado

Azotea    Teja              50 kg/cm²
Inclinada:  Entortado        30 kg/cm²
          Losa             295 kg/cm²
          Yeso              30 kg/cm²
          Cm Regla ··       40 kg/cm²
          CM :             445 kg/cm²
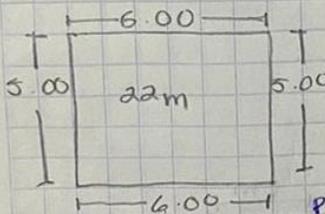          CV :              60 kg/cm²
          Total:           505 kg/cm²
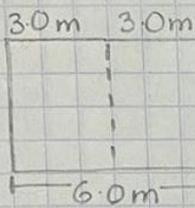
3.0m   3.0m          ① H de losa

                     $\dfrac{10}{170} + R \to H = \dfrac{20m}{170} + 0.04m = 0.15m$ /
          4.0m
                                    ↘ 4cm (Recubrimiento)
    6.0m             200 kg/cm² — 170 ⎤ Resistencia de
                     250 kg/cm² — 200 ⎦ concreto.
$\dfrac{14m}{170} + 0.04 = 0.12m$   $\dfrac{P}{170} + R = 4cm$
                          ↓
                     170 → 200 kg/cm²
                     200 → 250 kg/cm²

    6.00
                5.00   $d = \dfrac{Perimetro}{Reas.} + R = \dfrac{22m}{170} + 0.04 = 0.1694m = 0.25m$ /
5.00  22m
                          ↘ 170 — 200 kg/cm²
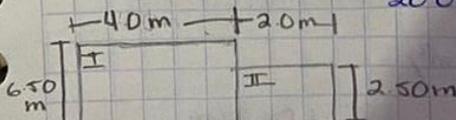                             200 — 250 kg/cm²
    6.00          $P = L_1 + L_2 + (L_1 + 1.25) + (L_2 \times 1.25)$
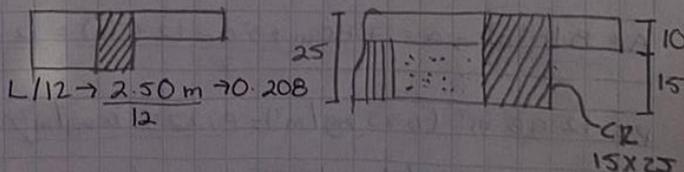                  $d = \dfrac{P \times 1.24}{F'C} + R$
                  $P = 5.0m + 6.0m + (5.0m \times 1.25m) + 6.0m \times 1.25) = 24.75m$
                  $d = \dfrac{2475}{200} + 0.04 = 0.1637m \to 0.25m$ /

  4.0m    2.0m
  6.50  ┌─┬─────┐           25 ⎤          ⎤ 10
  m     │I│  II │ 2.50m   $\dfrac{L}{12} \to \dfrac{2.50m}{12} \to 0.208$   ⎦ 15
        └─┴─────┘                                              CR
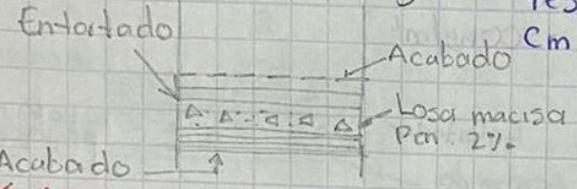     L > 3.0m = Trabe                                          15×25
     I → h = 0.16m → 25 cm
     II → h = 0.09m → 10 cm

← **Azotea (LOSA)**

Pendiente 2%

Azotea { 12 cm = 658 ng/m²
        13 cm = 682 ng/m²

Entortado

Acabado

Losa macisa
Pen. 2%

| | | |
|---|---|---|
| Relleno | 100 ng/m³ | |
| Acabado | 70 ng/m² | |
| Entortado | 30 ng/m² | |
| Losa Ma... | 240 ng/m² | |
| Yeso | 30 ng/m³ | |
| Cm Regla... | 40 ng/m² | |
| CM : | 510 ng/m² + 70 ng/m² = 580 ng/m² | |
| CV : | 100 ng/m² | |
| Total : | 610 ng/m² | |

← **Azotea (Teja)**

**10 cm**

| | |
|---|---|
| Teja | 50 ng/cm³ |
| Entortado | 30 ng/cm² |
| Losa Mac. | 240 ng/cm² |
| Yeso | 30 ng/cm² |
| CM Regla.. | 40 ng/cm² |
| CM = | 390 ng/cm² +20 ng/cm² = 410 ng/cm² |
| CV = | 60 ng/cm² |
| Total = | 450 ng/cm |

**12 cm**

CM = 438 ng/cm²
CV = 60 ng/cm²
498 ng/cm

**13 cm**

CM = 462 ng/cm²
CV = 60 ng/cm²
522 ng/cm²
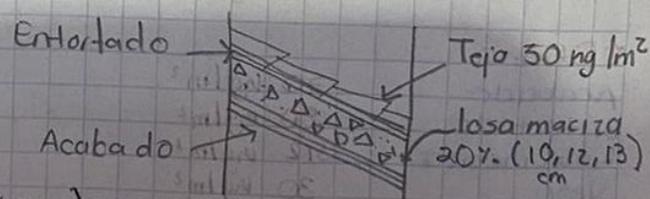
← **Losa de casetón.**
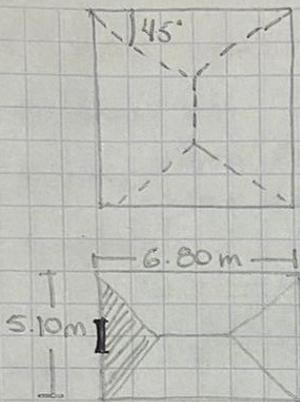
- Nervios Verticales (NN)
0.10cm × 0.20 cm × 1.0m × 2,400 ng/m³ (2 pz) = 96 ng/m²
- Nervios Horizontales (NN)
0.10m × 0.20m × 0.80m × 2,400 ng/m³ (2 pz) = 76.8 ng/m²
- Capa comprención.
1.0m × 1.0m × 0.05m × 2,400 ng/m² = 120 ng/m²
Peso del concreto. 292.8 ng/m²
- Dencidad del unicel. 15 ng/m³
0.60 m × 0.60m × 0.20 m (2.5 pz) (15 ng/m²) = 2.70 ng/m²
270 ng/m² + 292.8 ng/m² = 295.5 ng/m²
- P.P. Losa de casetón M: 25 cm → 295 ng/m²

\* Acotea:
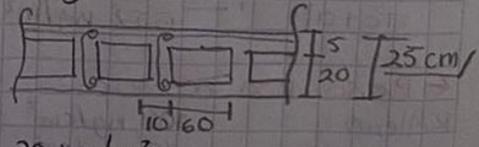
| Relleno | 100 ng/cm² |
|---|---|
| Acabado | 70 ng/cm² |
| Entortado | 30 ng/cm² |
| Losa | 295 ng/cm² |
| Yeso | 30 ng/cm² |
| CM Regla... | 40 ng/cm² |
| CM | 565 ng/cm² |
| CV | 100 ng/cm² |
| Total: | 665 ng/cm² |

\* Entrepiso:

| Acabado | 70 ng/cm² |
|---|---|
| Entortado | 30 ng/cm² |
| Losa | 295 ng/cm² |
| Yeso | 30 ng/cm² |
| CM Regl. | 40 ng/cm² |
| CM | 465 ng/cm² |
| CV | 170 ng/cm² |
| Total. | 635 ng/cm² |

Entortado

Acabado

Teja 50 ng/m²

losa maciza
20% (10, 12, 13) cm

5
20   25 cm
10  60

# AREAS TRIBUTARIAS.

45°

├─ 6.80 m ─┤

5.10 m

① H LOSA = 0.18 m = 0.25 m

② LOSA AZOTEA = 665 $kg/m^2$

③ TRIANGULAR
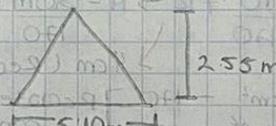
2.55 m

├─ 5.10 m ─┤

④ $A = \dfrac{b \times h}{2} \rightarrow 6.502 \, m^2$

⑤ P. Area
A × P.P. LOSA
⑥ 502 $m^2$ (665 $kg/m^2$) = 4323.83 $kg/m^2$

⑥ CARGA LINEAL (DIST)

$\dfrac{P.P}{L} \rightarrow \dfrac{4,323.83 \, kg/m^2}{5.10 \, m}$　　　$W = 847.80 \, kg$

├ 2.40 m ┼ 3.0 m ┼ 2.40 m ┤

4.80

TR-1
├─ 4 m ─┤
├──── 7.80 ────┤

H = 0.18 = 0.25

LOSA E.D = 6.35 $kg/m^2$
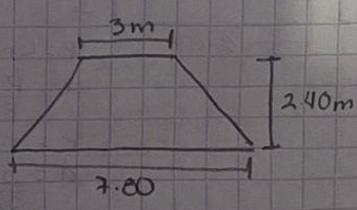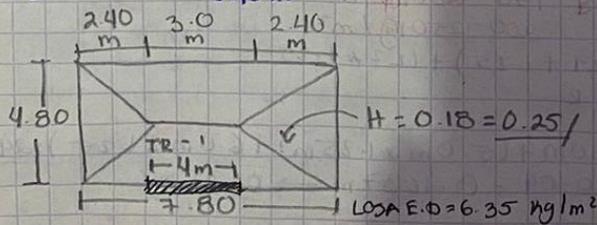
$A = \dfrac{B + b (h)}{2} \rightarrow A = \dfrac{7.80m + 3.0m (2.40m)}{2} = 12.96 \, m^2$

$P = 12.96 \, m^2 \, (635 \, kg/m^2) = 8,229.6 \, kg/m^2$

$W = \dfrac{8,229.6 \, kg/m^2}{7.80 \, m} = 1055.07 \, kg/m$

├─ 3 m ─┤
　　　　　　　　2.40 m
├───── 7.80 ─────┤

1.06 t/m

A ↓ ↓ ↓ ↓ B
├──── 4.0 m ────┤
TRAB. TR-1