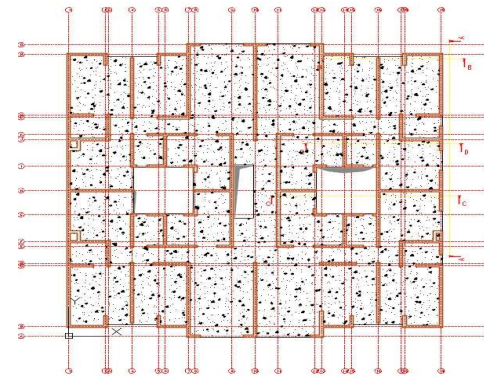
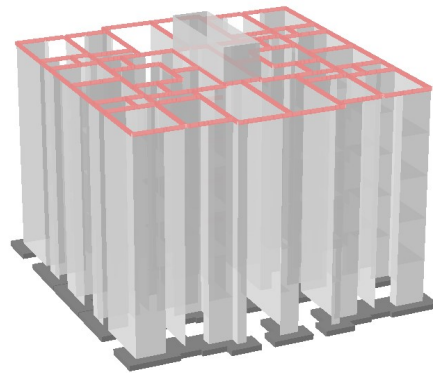


EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

MUROS VERTICALES  
EJES NUMERALES



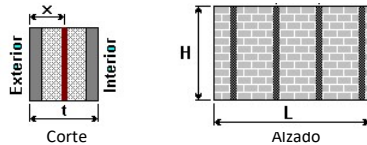


Universidad Santo Tomas

## Esp. Patología de la Construcción



| Propiedades de Geometría Muro |        |        |                                        |                       |                   |         |
|-------------------------------|--------|--------|----------------------------------------|-----------------------|-------------------|---------|
| X (mm)                        | L (mm) | H (mm) | h' (mm) (H-e <sub>placa</sub> ) altura | Ag (mm <sup>2</sup> ) | Groutig en Celdas | te (mm) |
| 75                            | 16950  | 2300   | 2300                                   | 2457750               | Con Refuerzo      | 71.2    |

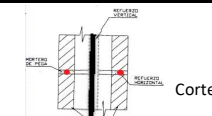
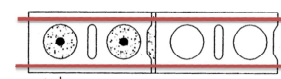


| Propiedades de Material |         |         |     |                      |         |                 |                |                |   | Prop. Diseño |                           |            |
|-------------------------|---------|---------|-----|----------------------|---------|-----------------|----------------|----------------|---|--------------|---------------------------|------------|
| f <sub>m</sub><br>(Mpa) | E (Mpa) | G (Mpa) | v   | f <sub>y</sub> (Mpa) | E (Mpa) | ε <sub>mu</sub> | ε <sub>y</sub> | Bloq<br>Compr. | α |              | φ Compr Y Flexo-<br>Compr | φ Cortante |
| 8.26                    | 6195    | 2478    | 0.2 | 420                  | 200000  | 0.0030          | 0.0021         | 0.85           | 3 | 0.32         | 0.85                      | 0.6        |

### ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| c       | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn    | φ    |       | φ Pn (kN) | φ Mn (kN-m) |
|---------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|-------|------|-------|-----------|-------------|
|         |      |        |        |        | 8085    | 6932    | Compresion - Controla Acero    |            |            | 0     | 0.85 |       | 5892      | 0.0         |
| 16950   | 0.86 | 13560  | 6778   | 0      | 6778    | 5811    |                                | 11489      | 0          | 11489 | 0.85 |       | 4940      | 9765        |
| 16247.6 | 0.86 | 12998  | 6497   | -10    | 6487    | 5562    |                                | 12838      | -84        | 12922 | 0.85 |       | 4727      | 10984       |
| 15545.3 | 0.86 | 12436  | 6216   | -24    | 6193    | 5309    |                                | 14029      | -197       | 14227 | 0.85 |       | 4513      | 12093       |
| 14842.9 | 0.86 | 11874  | 5935   | -42    | 5893    | 5053    |                                | 15063      | -346       | 15409 | 0.85 |       | 4295      | 13098       |
| 14140.6 | 0.86 | 11312  | 5655   | -63    | 5591    | 4794    |                                | 15939      | -516       | 16455 | 0.85 |       | 4075      | 13987       |
| 13438.2 | 0.86 | 10751  | 5374   | -90    | 5284    | 4530    |                                | 16657      | -722       | 17378 | 0.85 |       | 3851      | 14772       |
| 12735.9 | 0.86 | 10189  | 5093   | -125   | 4968    | 4260    |                                | 17217      | -974       | 18191 | 0.85 |       | 3621      | 15462       |
| 12033.5 | 0.86 | 9627   | 4812   | -173   | 4639    | 3978    |                                | 17619      | -1296      | 18916 | 0.85 |       | 3381      | 16078       |
| 11331.2 | 0.86 | 9065   | 4531   | -235   | 4296    | 3683    |                                | 17864      | -1687      | 19551 | 0.85 |       | 3131      | 16619       |
| 10628.8 | 0.86 | 8503   | 4250   | -320   | 3930    | 3370    | 17951                          | -2172      | 20123      | 0.85  |      | 2864  | 17104     |             |
| 9926.5  | 0.86 | 7941   | 3969   | -421   | 3549    | 3042    | Flexion - Controla Mamposteria | 17880      | -2734      | 20614 | 0.85 |       | 2586      | 17522       |
| 8933.8  | 0.86 | 7147   | 3572   | -534   | 3038    | 2605    |                                | 17510      | -3219      | 20730 | 0.85 |       | 2214      | 17620       |
| 7941.2  | 0.86 | 6353   | 3176   | -664   | 2511    | 2153    |                                | 16826      | -3667      | 20493 | 0.85 |       | 1830      | 17419       |
| 6948.5  | 0.86 | 5559   | 2779   | -791   | 1987    | 1704    |                                | 15826      | -3983      | 19809 | 0.85 |       | 1448      | 16838       |
| 5955.9  | 0.86 | 4765   | 2382   | -867   | 1515    | 1299    |                                | 14510      | -4011      | 18522 | 0.85 |       | 1104      | 15744       |
| 4963.2  | 0.86 | 3971   | 1985   | -970   | 1015    | 870     |                                | 12880      | -3896      | 16776 | 0.85 |       | 740       | 14259       |
| 3097.51 | 0.86 | 2478   | 1239   | -1239  | 0       | 0       |                                | 8963       | -3023      | 11986 | 0.85 |       | 0         | 10187.9     |
| 2104.9  | 0.86 | 1684   | 842    | -1369  | -528    | -452    |                                | 6425       | -2411      | 8836  | 0.85 |       | -385      | 7511        |
| 1112.2  | 0.86 | 890    | 445    | -1426  | -981    | -842    |                                | 3571       | -2053      | 5624  | 0.85 |       | -715      | 4781        |
| 119.6   | 0.86 | 96     | 48     | -1542  | -1494   | -1281   |                                | 403        | -1135      | 1538  | 0.85 |       | -1089     | 1307        |
| 0.0     | 0.86 | 0      | 0      | -1662  | -1662   | -1425   | 0                              | -133       | 133        | 0.85  |      | -1211 | 113       |             |

|                 |          |
|-----------------|----------|
| eficien. $\eta$ | $\rho_n$ |
| 0.35            | 0.00054  |



Planta

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 6931.8 (kN)  
φPn : 5892.0 (kN) ≥ 2134.7  
As : 3956 mm2  
ρ : 0.001617

Flexion Pura

b : 145.00 mm  
Ae : 1206731 mm2  
c : 3097.51 mm  
d : 16875 mm  
te : 71 mm  
t : 145 mm  
φ Mn : 10187.9 kN-m

Punto Balanceado

cb : 9926.5  
φ Mn : 17522 kN-m  
φPn : 2586.1 (kN)  
Mn : kN-m αMcr  
20614 ≥ 10227.05  
Si

Mu ≤ φ Mn  
1576.0 ≤ 18841

Si

0.1 f'm Ae : 2030.1 kN

0.25 Pb : 760.6 kN

Cortante

Mu/Vu d : 12.2  
Asv : 33.18 mm2  
Vn max permit : 1144.496 mm2 ≥

Si

Vm : 763.0 kN  
Vs : 196.0 kN  
Vu = Vn + Vs : 575.4 kN

6 AeVf'm : 2080.9  
4 AeVf'm : 1387.3

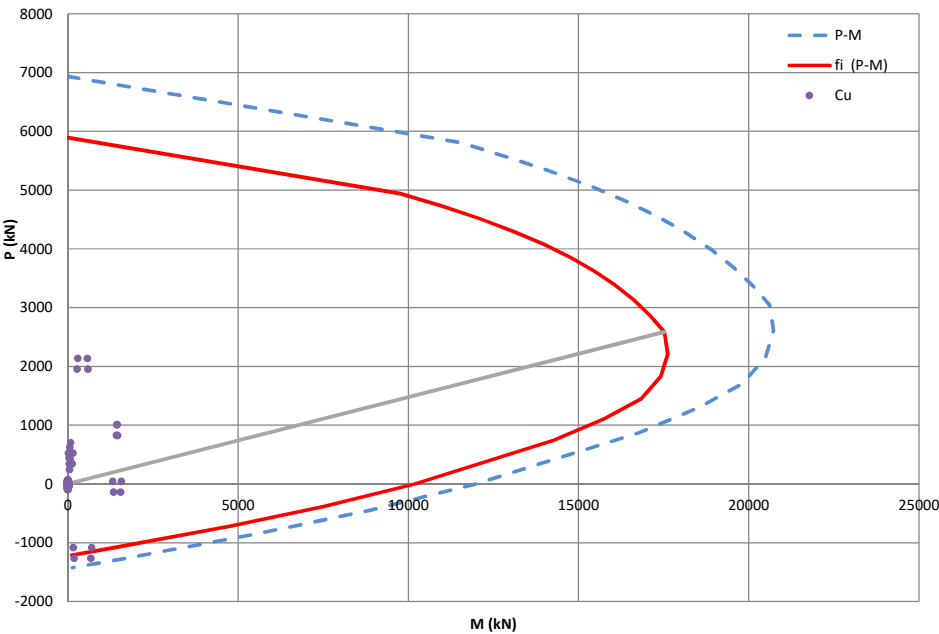
OK Refuerzo a Cortante Suficiente

0.2 f'm : 1652.0 kPa

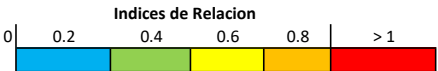
0.2 f'm ≥ 1769 kPa

Si Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

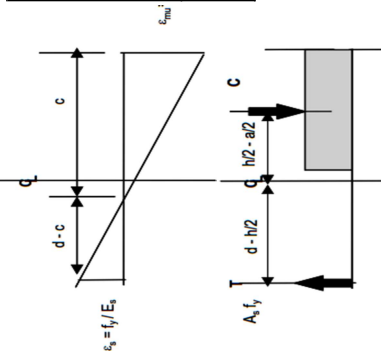


| Resumen         | Relacion |              |
|-----------------|----------|--------------|
| Compr. Axial    | 0.36     | ✓ Pu/ φPn    |
| Axial - Flexion | 0.08     | ✓ Mu/ φMn    |
| Cortante        | 0.50     | ✓ Vu/ Vn max |



Curva Interaccion φ Pn - φ Mn

OK



**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**

**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje

2

Piso

1

(B-N)

**Universidad Santo Tomas**  
**Esp. Patología de la Construcción**

|                                          |      |          |           |       |           |                                      |        |        |            |          |            |         |  |  |
|------------------------------------------|------|----------|-----------|-------|-----------|--------------------------------------|--------|--------|------------|----------|------------|---------|--|--|
| <b>Propiedades de Geometria Ladrillo</b> |      |          |           |       |           | <b>Propiedades de Geometria Muro</b> |        |        |            |          |            |         |  |  |
| a (mm)                                   | t    | Area     | esp Pared | Area  | Area Neta | X (mm)                               | L (mm) | H (mm) | h' (mm)    | Ag (mm2) | Groutig en | te (mm) |  |  |
| largo                                    | (mm) | Vacios x | (mm)      | Bruta | (mm2)     |                                      |        |        | (H-ealaca) |          |            |         |  |  |
| 300                                      | 145  | 5674.0   | 30        | 43500 | 30452     | 75                                   | 16950  | 2300   | 2300       | 2457750  | Con Refu   | 71.2    |  |  |

X

Exterior

Interior

t

Corte

H

L

Alzadu

Compressive Strength

Stress

Strain

0.33 x Compressive Strength

0.05 x Compressive Strength

$E_m = \frac{\Delta \text{Stress}}{\Delta \text{Strain}}$

|                                |         |         |     |          |         |        |        |             |   |      |                       |            |
|--------------------------------|---------|---------|-----|----------|---------|--------|--------|-------------|---|------|-----------------------|------------|
| <b>Propiedades de Material</b> |         |         |     |          |         |        |        |             |   |      | <b>Prop. Diseño</b>   |            |
| f'm (Mpa)                      | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | Emu    | EY     | Bloq Compr. | α |      | φ Compr Y Flexo-Compr | φ Cortante |
| 8.26                           | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32 | 0.85                  | 0.6        |

Distribucion de Refuerzo

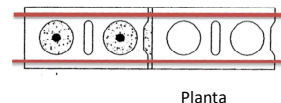
ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) | c       | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) | C*x (kN-m) | T*x (kN-m) | Mn    | φ    | φ Pn (kN) | φ Mn (kN-m) |
|-----------|---------|-------------------------|---------|------|--------|--------|--------|---------|---------|------------|------------|-------|------|-----------|-------------|
| 75.0      | 6       | 284                     | 16950   | 0.86 | 13560  | 6778   | 0      | 6778    | 5811    | 11489      | 0          | 11489 | 0.85 | 5851      | 0.0         |
| 225.0     | 5       | 199                     | 16247.6 | 0.86 | 12998  | 6497   | -10    | 6487    | 5562    | 12838      | -84        | 12922 | 0.85 | 4940      | 9765        |
| 1425.0    | 4       | 129                     | 15545.3 | 0.86 | 12436  | 6216   | -24    | 6193    | 5309    | 14029      | -197       | 14227 | 0.85 | 4727      | 10984       |
| 2625.0    | 4       | 129                     | 14842.9 | 0.86 | 11874  | 5935   | -42    | 5893    | 5053    | 15063      | -346       | 15409 | 0.85 | 4513      | 12093       |
| 3825.0    | 6       | 284                     | 14140.6 | 0.86 | 11312  | 5655   | -63    | 5591    | 4794    | 15939      | -516       | 16455 | 0.85 | 4295      | 13098       |
| 4425.0    | 5       | 199                     | 13438.2 | 0.86 | 10751  | 5374   | -90    | 5284    | 4530    | 16657      | -722       | 17378 | 0.85 | 4075      | 13987       |
| 5325.0    | 5       | 199                     | 12735.9 | 0.86 | 10189  | 5093   | -125   | 4968    | 4260    | 17217      | -974       | 18191 | 0.85 | 3851      | 14772       |
| 5925.0    | 4       | 129                     | 12033.5 | 0.86 | 9627   | 4812   | -173   | 4639    | 3978    | 17619      | -1296      | 18916 | 0.85 | 3621      | 15462       |
| 7125.0    | 5       | 199                     | 11331.2 | 0.86 | 9065   | 4531   | -234   | 4297    | 3684    | 17864      | -1683      | 19547 | 0.85 | 3381      | 16078       |
| 8465.0    | 0       | 0                       | 10628.8 | 0.86 | 8503   | 4250   | -315   | 3935    | 3374    | 17951      | -2157      | 20108 | 0.85 | 3132      | 16615       |
| 8475      | 6       | 284                     | 9926.5  | 0.86 | 7941   | 3969   | -412   | 3557    | 3050    | 17880      | -2707      | 20586 | 0.85 | 2868      | 17091       |
| 9825.0    | 0       | 0                       | 8933.8  | 0.86 | 7147   | 3572   | -519   | 3054    | 2618    | 17510      | -3171      | 20681 | 0.85 | 2592      | 17498       |
| 11025.0   | 5       | 199                     | 7941.2  | 0.86 | 6353   | 3176   | -640   | 2535    | 2173    | 16826      | -3593      | 20418 | 0.85 | 2225      | 17579       |
| 11625.0   | 4       | 129                     | 6948.5  | 0.86 | 5559   | 2779   | -757   | 2022    | 1733    | 15826      | -3875      | 19701 | 0.85 | 1847      | 17355       |
| 11625.0   | 5       | 199                     | 5955.9  | 0.86 | 4765   | 2382   | -831   | 1551    | 1330    | 14510      | -3899      | 18409 | 0.85 | 1473      | 16746       |
| 12525.0   | 5       | 199                     | 4963.2  | 0.86 | 3971   | 1985   | -930   | 1054    | 904     | 12880      | -3795      | 16675 | 0.85 | 1130      | 15648       |
| 13125.0   | 6       | 284                     | 2941.74 | 0.86 | 2353   | 1176   | -1187  | -11     | -9      | 8585       | -2935      | 11520 | 0.85 | 768       | 14174       |
| 14325.0   | 4       | 129                     | 1949.1  | 0.86 | 1559   | 779    | -1306  | -526    | -451    | 8585       | -2935      | 11520 | 0.85 | -8        | 9792.0      |
| 15525.0   | 4       | 129                     | 956.4   | 0.86 | 765    | 382    | -1371  | -989    | -848    | 5998       | -2366      | 8364  | 0.85 | -384      | 7109        |
| 16725.0   | 5       | 199                     | 460.1   | 0.86 | 368    | 184    | -1387  | -1203   | -1032   | 3095       | -1939      | 5034  | 0.85 | -720      | 4279        |
| 16875.0   | 6       | 284                     | 0.0     | 0.86 | 0      | 0      | -1590  | -1590   | -1363   | 1525       | -1824      | 3350  | 0.85 | -877      | 2847        |
|           | Total   | 3786                    |         |      |        |        |        |         |         | 0          | -133       | 133   | 0.85 | -1159     | 113         |

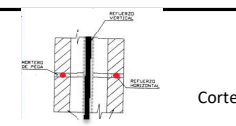
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 6.5                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 33.18                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00054 |



Planta



Corte

**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje 1  
Piso (B-N)

Universidad Santo Tomas  
Esp. Patología de la Construcción

**Compresion Axial**

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 6883.6 (kN)  
 $\phi Pn$  : 5851.1 (kN)  $\geq$  Pu 1489.9  
As : 3786 mm<sup>2</sup>  
 $\rho$  : 0.001547

**Flexion Pura**

b : 145.00 mm  
Ae : 1206731 mm<sup>2</sup>  
c : 2941.74 mm  
d : 16875 mm  
te : 71 mm  
t : 145 mm  
 $\phi Mn$  : 9792.0 kN-m

**Punto Balanceado**

cb : 9926.5  
 $\phi Mn$  : 17498 kN-m  
 $\phi Pn$  : 2592.5 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
20586  $\geq$  10227.05  
**Si**

$Mu \leq \phi Mn$   
1136  $\leq$  15986  
**Si**

0.1 f'm Ae : 2030.1 kN  
0.25 Pb : 762.5 kN

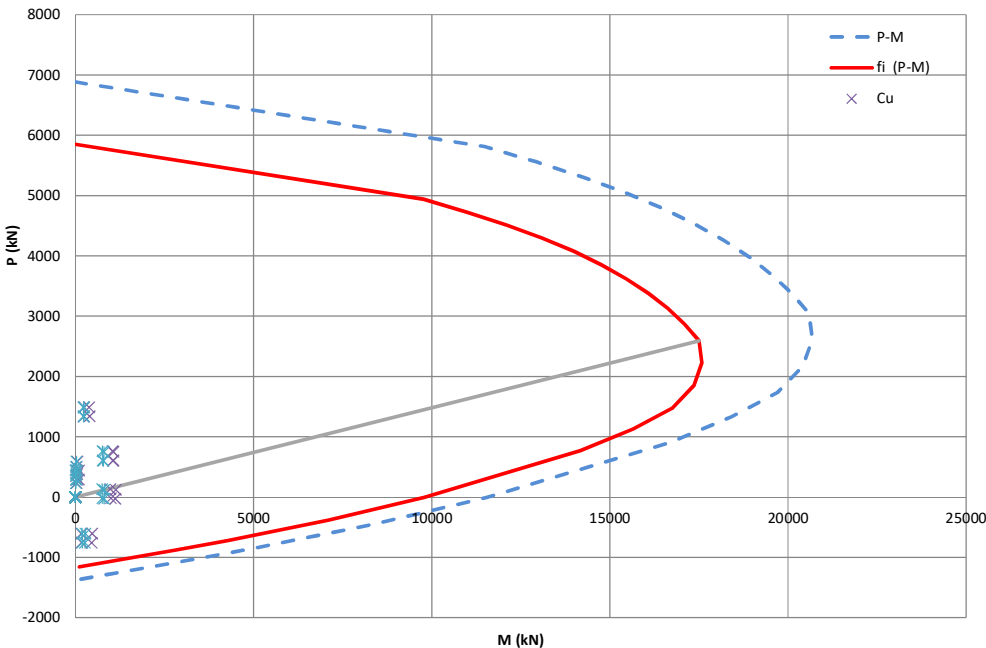
**Cortante**

Mu/Vu d : 6.6  
Asv : 33.18 mm<sup>2</sup>  
Vn max permit : 1144.496 mm<sup>2</sup>  $\geq$   
Vm : 763.0 kN  
Vs : 196.0 kN  
Vu= Vn+Vs : 575.4 kN  
**Si**

6 AeVf'm : 2080.9  
4 AeVf'm : 1387.3  
**OK Refuerzo a Cortante Suficiente**

0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  1235 kPa  
**OK No Necesita Elementos de Borde**

**Curva de Interaccion de Mamposteria Reforzada en Arcilla**

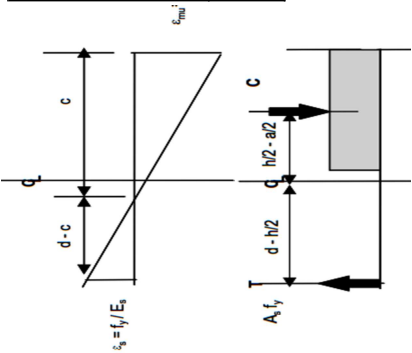


| Resumen         | Relacion |   |               |
|-----------------|----------|---|---------------|
| Compr. Axial    | 0.25     | ✓ | Pu/ $\phi Pn$ |
| Axial - Flexion | 0.07     | ✓ | Mu/ $\phi Mn$ |
| Cortante        | 0.50     | ✓ | Vu/ Vn max    |



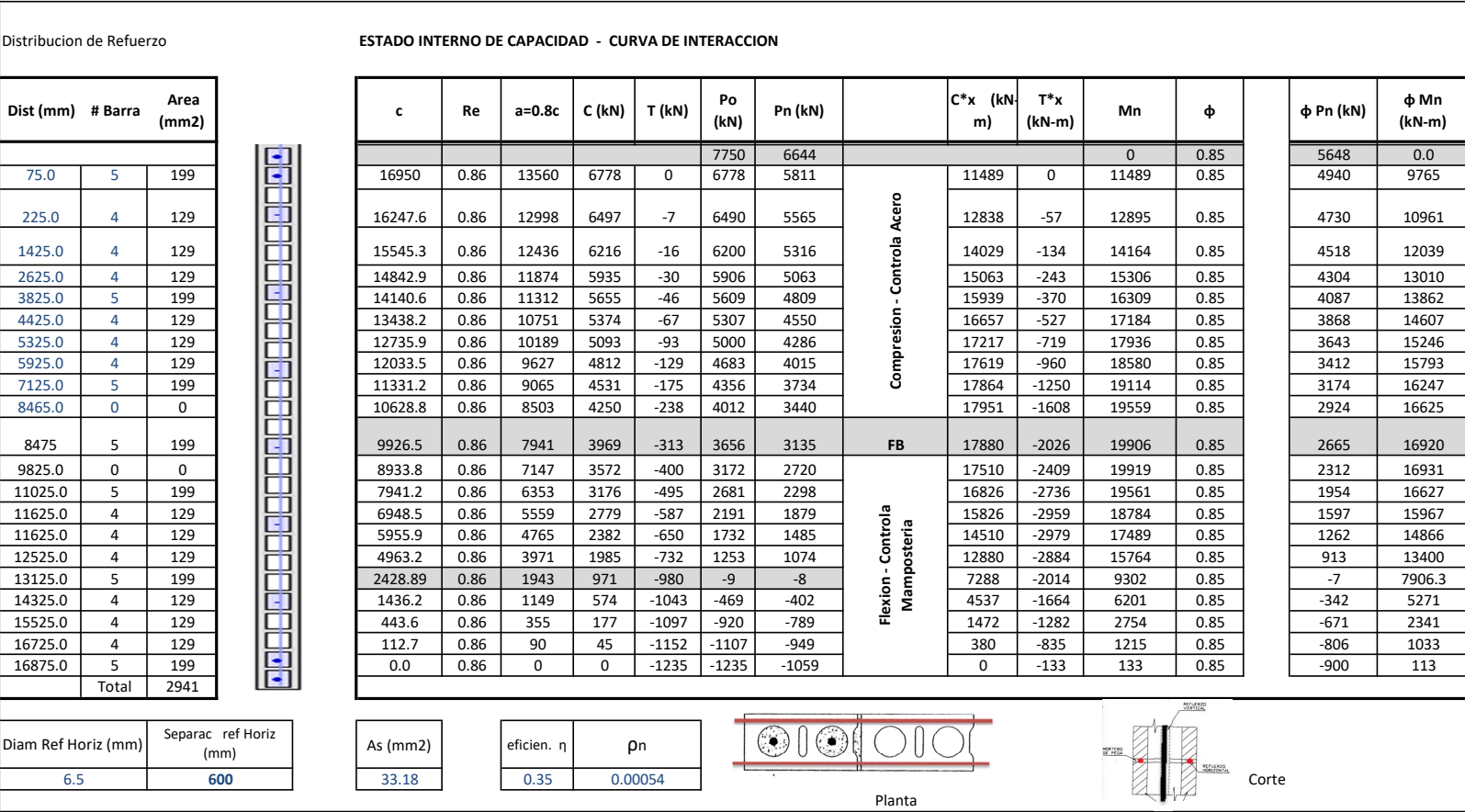
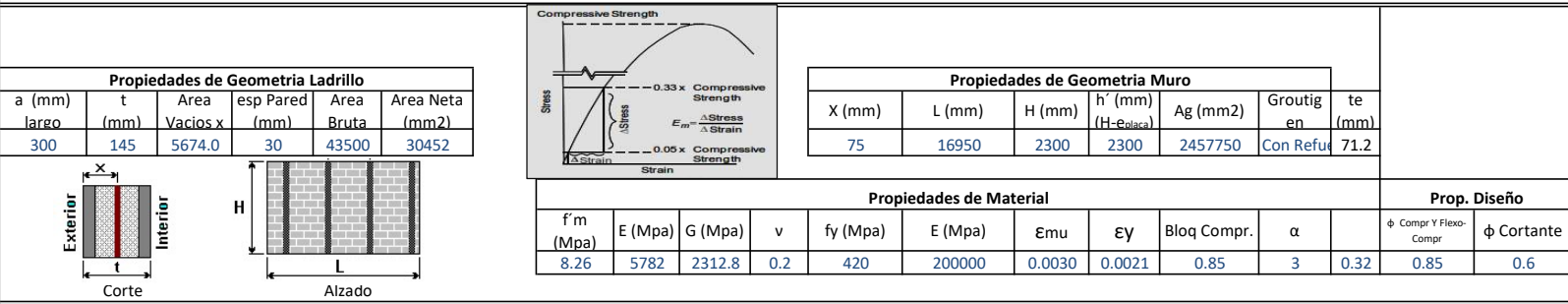
**Curva Interaccion  $\phi Pn - \phi Mn$**

OK ✓



TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 3 Piso 1  
(B-N) Universidad Santo Tomas  
Esp. Patología de la Construcción



Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 6644.3 (kN)  
 $\phi Pn$  : 5647.6 (kN)  $\geq$  842.3  
As : 2941 mm<sup>2</sup>  
 $\rho$  : 0.001202

Flexion Pura

b : 145.00 mm  
Ae : 1206731 mm<sup>2</sup>  
c : 2428.89 mm  
d : 16875 mm  
te : 71 mm  
t : 145 mm  
 $\phi Mn$  : 7906.3 kN-m

Punto Balanceado

cb : 9926.5  
 $\phi Mn$  : 16920 kN-m  
 $\phi Pn$  : 2664.7 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
19906  $\geq$  10227.05  
Si

$Mu \leq \phi Mn$   
745.3  $\leq$  11353.12  
Si

0.1 f'm Ae : 2030.1 kN  
0.25 Pb : 783.7 kN

Cortante

Mu/Vu d : 4.8  
Asv : 33.18 mm<sup>2</sup>  
Vn max permit : 1144.496 mm<sup>2</sup>  $\geq$   
Si

Vm : 763.0 kN  
Vs : 196.0 kN  
Vu = Vn + Vs : 575.4 kN

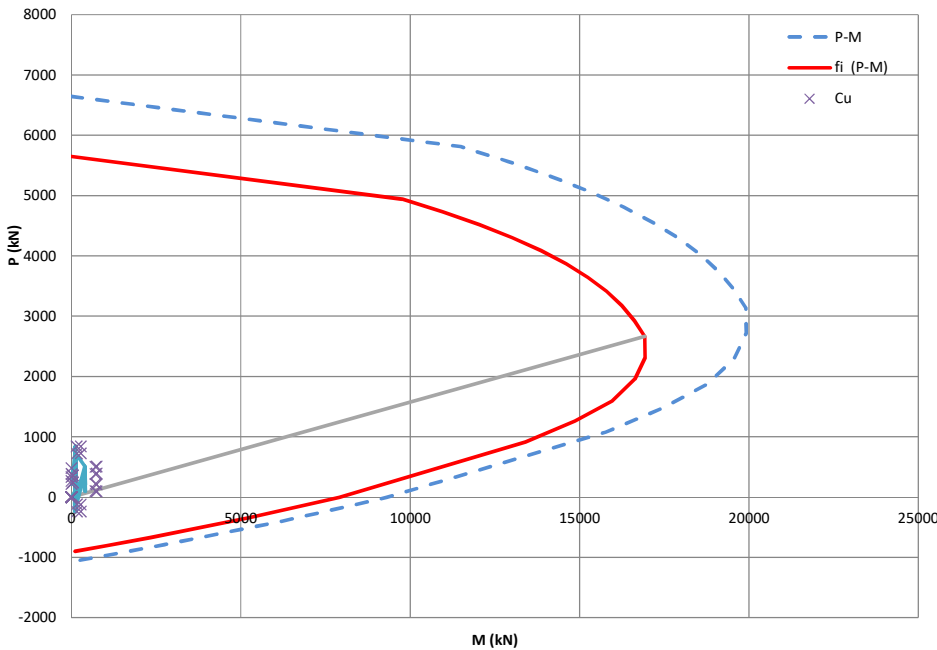
6 AeVf'm : 2080.9  
4 AeVf'm : 1387.3

OK Refuerzo a Cortante Suficiente

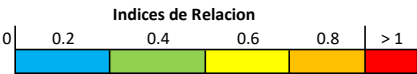
0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  698 kPa

OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

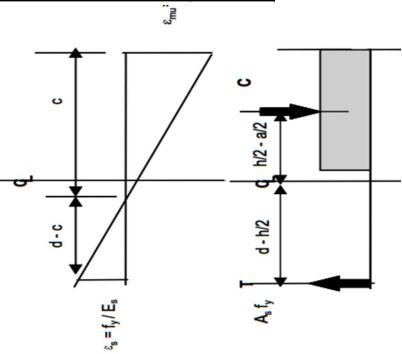


| Resumen         | Relacion |                                                   |
|-----------------|----------|---------------------------------------------------|
| Compr. Axial    | 0.15     | <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.07     | <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.50     | <input checked="" type="checkbox"/> Vu/ Vn max    |



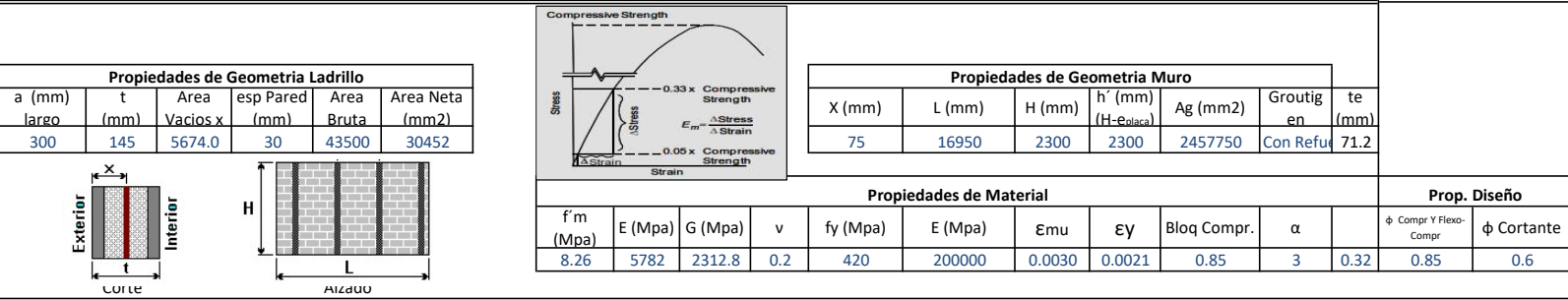
Curva Interaccion  $\phi Pn - \phi Mn$

OK ☒



TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 4 Piso 1  
1 (B-N) Universidad Santo Tomas  
Esp. Patología de la Construcción



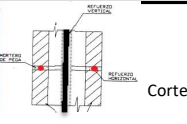
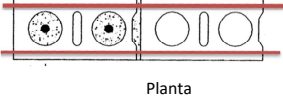
Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm2) | c       | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) | C*x (kN-m) | T*x (kN-m) | Mn    | φ    | φ Pn (kN) | φ Mn (kN-m) |
|-----------|---------|------------|---------|------|--------|--------|--------|---------|---------|------------|------------|-------|------|-----------|-------------|
| 75.0      | 4       | 129        | 16950   | 0.86 | 13560  | 6778   | 0      | 7588    | 6505    | 11489      | 0          | 11489 | 0.85 | 5530      | 0.0         |
| 225.0     | 4       | 129        | 16247.6 | 0.86 | 12998  | 6497   | -5     | 6492    | 5566    | 12838      | -44        | 12882 | 0.85 | 4940      | 9765        |
| 1425.0    | 4       | 129        | 15545.3 | 0.86 | 12436  | 6216   | -12    | 6204    | 5319    | 14029      | -104       | 14133 | 0.85 | 4731      | 10950       |
| 2625.0    | 4       | 129        | 14842.9 | 0.86 | 11874  | 5935   | -24    | 5911    | 5068    | 15063      | -195       | 15258 | 0.85 | 4521      | 12013       |
| 3825.0    | 4       | 129        | 14140.6 | 0.86 | 11312  | 5655   | -38    | 5617    | 4816    | 15939      | -302       | 16241 | 0.85 | 4308      | 12969       |
| 4425.0    | 4       | 129        | 13438.2 | 0.86 | 10751  | 5374   | -56    | 5318    | 4559    | 16657      | -437       | 17094 | 0.85 | 4093      | 13804       |
| 5325.0    | 4       | 129        | 12735.9 | 0.86 | 10189  | 5093   | -78    | 5014    | 4299    | 17217      | -598       | 17815 | 0.85 | 3875      | 14530       |
| 5925.0    | 4       | 129        | 12033.5 | 0.86 | 9627   | 4812   | -109   | 4703    | 4032    | 17619      | -801       | 18420 | 0.85 | 3654      | 15143       |
| 7125.0    | 4       | 129        | 11331.2 | 0.86 | 9065   | 4531   | -148   | 4383    | 3758    | 17864      | -1046      | 18910 | 0.85 | 3428      | 15657       |
| 8465.0    | 0       | 0          | 10628.8 | 0.86 | 8503   | 4250   | -202   | 4048    | 3471    | 17951      | -1351      | 19301 | 0.85 | 3194      | 16074       |
| 8475      | 4       | 129        | 9926.5  | 0.86 | 7941   | 3969   | -265   | 3704    | 3176    | 17880      | -1704      | 19584 | 0.85 | 2950      | 16406       |
| 9825.0    | 0       | 0          | 8933.8  | 0.86 | 7147   | 3572   | -341   | 3231    | 2770    | 17510      | -2045      | 19556 | 0.85 | 2699      | 16646       |
| 11025.0   | 4       | 129        | 7941.2  | 0.86 | 6353   | 3176   | -419   | 2757    | 2363    | 16826      | -2320      | 19145 | 0.85 | 2355      | 16622       |
| 11625.0   | 4       | 129        | 6948.5  | 0.86 | 5559   | 2779   | -494   | 2285    | 1959    | 15826      | -2514      | 18339 | 0.85 | 2009      | 16274       |
| 11625.0   | 4       | 129        | 5955.9  | 0.86 | 4765   | 2382   | -536   | 1846    | 1583    | 14510      | -2531      | 17042 | 0.85 | 1665      | 15588       |
| 12525.0   | 4       | 129        | 4963.2  | 0.86 | 3971   | 1985   | -596   | 1389    | 1190    | 12880      | -2450      | 15330 | 0.85 | 1345      | 14486       |
| 13125.0   | 4       | 129        | 2065.38 | 0.86 | 1652   | 826    | -834   | -8      | -7      | 6317       | -1576      | 7893  | 0.85 | 1012      | 13031       |
| 14325.0   | 4       | 129        | 1072.7  | 0.86 | 858    | 429    | -892   | -463    | -397    | 3451       | -1202      | 4654  | 0.85 | -6        | 6709.1      |
| 15525.0   | 4       | 129        | 80.1    | 0.86 | 64     | 32     | -975   | -943    | -809    | 270        | -553       | 823   | 0.85 | -338      | 3956        |
| 16725.0   | 4       | 129        | 100.0   | 0.86 | 80     | 40     | -975   | -935    | -802    | 337        | -553       | 890   | 0.85 | -687      | 700         |
| 16875.0   | 4       | 129        | 0.0     | 0.86 | 0      | 0      | -1029  | -1029   | -883    | 0          | -98        | 98    | 0.85 | -682      | 756         |
| Total     |         | 2451       |         |      |        |        |        |         |         |            |            |       |      | -750      | 83          |

| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 6.5                 | 600                    |

| As (mm2) | eficien. η | ρn      |
|----------|------------|---------|
| 33.18    | 0.35       | 0.00054 |



**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje 1 Piso (B-N)

Universidad Santo Tomas  
 Esp. Patología de la Construcción

**Compresion Axial**

h'/t : 15.9 < 30  
 Re : 0.86  
 Pn : 6505.5 (kN)  
 $\phi Pn$  : 5529.7 (kN)  $\geq$  Pu 342.5  
 Si  
 As : 2451 mm<sup>2</sup>  
 $\rho$  : 0.001002

**Flexion Pura**

b : 145.00 mm  
 Ae : 1206731 mm<sup>2</sup>  
 c : 2065.38 mm  
 d : 16875 mm  
 te : 71 mm  
 t : 145 mm  
 $\phi Mn$  : 6709.1 kN-m

**Punto Balanceado**

cb : 9926.5  
 $\phi Mn$  : 16646 kN-m  
 $\phi Pn$  : 2699.3 (kN)  
 Mn : kN-m  $\alpha M_{cr}$   
 19584  $\geq$  10227.05  
 Si

Mu  $\leq$   $\phi Mn$   
 322.2  $\leq$  7358.77  
 Si

0.1 f'm Ae : 2030.1 kN  
 0.25 Pb : 793.9 kN

**Cortante**

Mu/Vu d : 2.5  
 Asv : 33.18 mm<sup>2</sup>  
 Vn max permit : 1144.496 mm<sup>2</sup>  $\geq$   
 Si

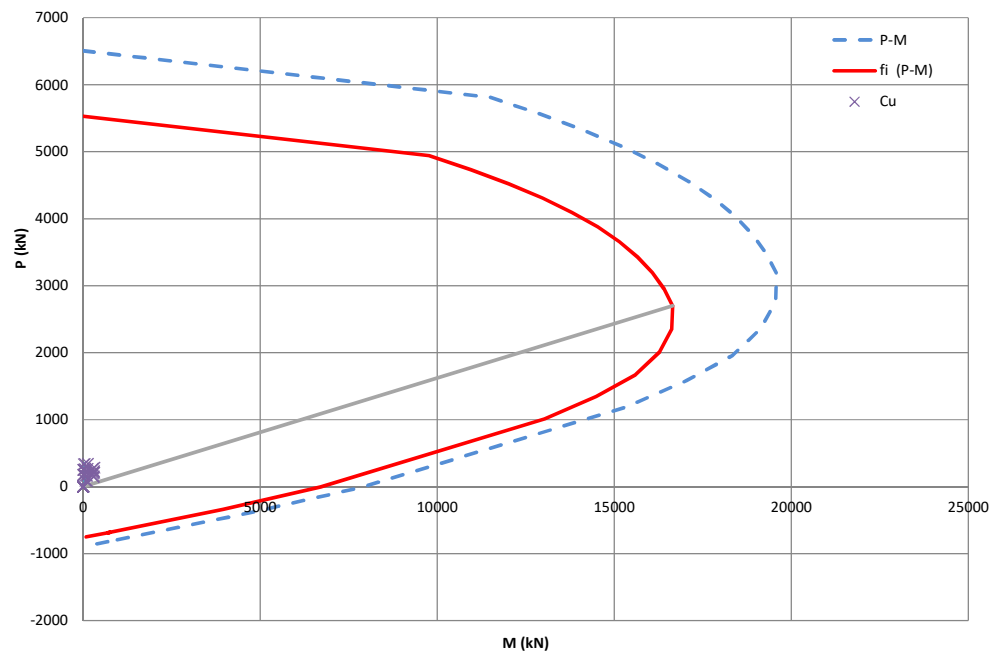
Vm : 763.0 kN  
 Vs : 196.0 kN  
 Vu = Vn + Vs : 575.4 kN

6 AeVf'm : 2080.9  
 4 AeVf'm : 1387.3

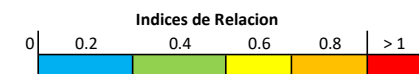
**OK Refuerzo a Cortante Suficiente**

0.2 f'm : 1652.0 kPa  
 0.2 f'm  $\geq$  284 kPa  
**OK No Necesita Elementos de Borde**

**Curva de Interaccion de Mamposteria Reforzada en Arcilla**

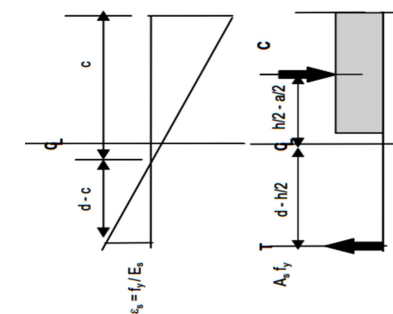


| Resumen         | Relacion |                 |
|-----------------|----------|-----------------|
| Compr. Axial    | 0.06     | ✓ Pu/ $\phi Pn$ |
| Axial - Flexion | 0.04     | ✓ Mu/ $\phi Mn$ |
| Cortante        | 0.50     | ✓ Vu/ Vn max    |



**Curva Interaccion  $\phi Pn - \phi Mn$**

OK ✓



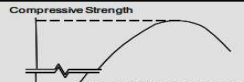
**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

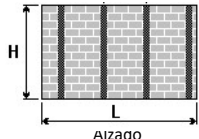
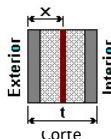
Muro : Eje

5 Piso  
1

(B-N)

Universidad Santo Tomas  
Esp. Patología de la Construcción

|                                          |        |               |                |            |                 |                                                                                    |        |                                      |                   |          |            |         |  |
|------------------------------------------|--------|---------------|----------------|------------|-----------------|------------------------------------------------------------------------------------|--------|--------------------------------------|-------------------|----------|------------|---------|--|
| <b>Propiedades de Geometria Ladrillo</b> |        |               |                |            |                 |  |        | <b>Propiedades de Geometria Muro</b> |                   |          |            |         |  |
| a (mm)                                   | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm2) | X (mm)                                                                             | L (mm) | H (mm)                               | h' (mm) (H-Elaca) | Ag (mm2) | Groutig en | te (mm) |  |
| 300                                      | 145    | 5674.0        | 30             | 43500      | 30452           | 75                                                                                 | 16950  | 2300                                 | 2300              | 2457750  | Con Refue  | 71.2    |  |



|                                |         |         |     |          |         |        |        |             |   |      |                       |            |
|--------------------------------|---------|---------|-----|----------|---------|--------|--------|-------------|---|------|-----------------------|------------|
| <b>Propiedades de Material</b> |         |         |     |          |         |        |        |             |   |      | <b>Prop. Diseño</b>   |            |
| f'm (Mpa)                      | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | Emu    | Ey     | Bloq Compr. | α |      | φ Compr Y Flexo-Compr | φ Cortante |
| 8.26                           | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32 | 0.85                  | 0.6        |

Distribucion de Refuerzo

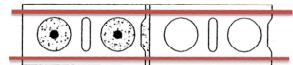
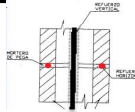
ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm2) | c       | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn    | φ    | φ Pn (kN) | φ Mn (kN-m) |
|-----------|---------|------------|---------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|-------|------|-----------|-------------|
| 75.0      | 4       | 129        |         |      |        |        |        | 7588    | 6505    |                                |            |            | 0     | 0.85 | 5530      | 0.0         |
| 225.0     | 4       | 129        | 16950   | 0.86 | 13560  | 6778   | 0      | 6778    | 5811    | Compresion - Controla Acero    | 11489      | 0          | 11489 | 0.85 | 4940      | 9765        |
| 1425.0    | 4       | 129        | 16247.6 | 0.86 | 12998  | 6497   | -5     | 6492    | 5566    |                                | 12838      | -44        | 12882 | 0.85 | 4731      | 10950       |
| 2625.0    | 4       | 129        | 15545.3 | 0.86 | 12436  | 6216   | -12    | 6204    | 5319    |                                | 14029      | -104       | 14133 | 0.85 | 4521      | 12013       |
| 3825.0    | 4       | 129        | 14842.9 | 0.86 | 11874  | 5935   | -24    | 5911    | 5068    |                                | 15063      | -195       | 15258 | 0.85 | 4308      | 12969       |
| 4425.0    | 4       | 129        | 14140.6 | 0.86 | 11312  | 5655   | -38    | 5617    | 4816    |                                | 15939      | -302       | 16241 | 0.85 | 4093      | 13804       |
| 5325.0    | 4       | 129        | 13438.2 | 0.86 | 10751  | 5374   | -56    | 5318    | 4559    |                                | 16657      | -437       | 17094 | 0.85 | 3875      | 14530       |
| 5925.0    | 4       | 129        | 12735.9 | 0.86 | 10189  | 5093   | -78    | 5014    | 4299    |                                | 17217      | -598       | 17815 | 0.85 | 3654      | 15143       |
| 7125.0    | 4       | 129        | 12033.5 | 0.86 | 9627   | 4812   | -109   | 4703    | 4032    |                                | 17619      | -801       | 18420 | 0.85 | 3428      | 15657       |
| 8465.0    | 0       | 0          | 11331.2 | 0.86 | 9065   | 4531   | -148   | 4383    | 3758    |                                | 17864      | -1046      | 18910 | 0.85 | 3194      | 16074       |
| 8475      | 4       | 129        | 10628.8 | 0.86 | 8503   | 4250   | -202   | 4048    | 3471    |                                | 17951      | -1351      | 19301 | 0.85 | 2950      | 16406       |
| 9825.0    | 0       | 0          | 9926.5  | 0.86 | 7941   | 3969   | -265   | 3704    | 3176    | FB                             | 17880      | -1704      | 19584 | 0.85 | 2699      | 16646       |
| 11025.0   | 4       | 129        | 8933.8  | 0.86 | 7147   | 3572   | -341   | 3231    | 2770    | Flexion - Controla Mamposteria | 17510      | -2045      | 19556 | 0.85 | 2355      | 16622       |
| 11625.0   | 4       | 129        | 7941.2  | 0.86 | 6353   | 3176   | -419   | 2757    | 2363    |                                | 16826      | -2320      | 19145 | 0.85 | 2009      | 16274       |
| 11625.0   | 4       | 129        | 6948.5  | 0.86 | 5559   | 2779   | -494   | 2285    | 1959    |                                | 15826      | -2514      | 18339 | 0.85 | 1665      | 15588       |
| 12525.0   | 4       | 129        | 5955.9  | 0.86 | 4765   | 2382   | -536   | 1846    | 1583    |                                | 14510      | -2531      | 17042 | 0.85 | 1345      | 14486       |
| 13125.0   | 4       | 129        | 4963.2  | 0.86 | 3971   | 1985   | -596   | 1389    | 1190    |                                | 12880      | -2450      | 15330 | 0.85 | 1012      | 13031       |
| 14325.0   | 4       | 129        | 2065.38 | 0.86 | 1652   | 826    | -834   | -8      | -7      |                                | 6317       | -1576      | 7893  | 0.85 | -6        | 6709.1      |
| 15525.0   | 4       | 129        | 1072.7  | 0.86 | 858    | 429    | -892   | -463    | -397    |                                | 3451       | -1202      | 4654  | 0.85 | -338      | 3956        |
| 16725.0   | 4       | 129        | 80.1    | 0.86 | 64     | 32     | -975   | -943    | -809    |                                | 270        | -553       | 823   | 0.85 | -687      | 700         |
| 16875.0   | 4       | 129        | 100.0   | 0.86 | 80     | 40     | -975   | -935    | -802    |                                | 337        | -553       | 890   | 0.85 | -682      | 756         |
| Total     |         | 2451       | 0.0     | 0.86 | 0      | 0      | -1029  | -1029   | -883    |                                | 0          | -98        | 98    | 0.85 | -750      | 83          |

|                     |                        |          |            |         |
|---------------------|------------------------|----------|------------|---------|
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) | As (mm2) | eficien. η | ρn      |
| 6.5                 | 600                    | 33.18    | 0.35       | 0.00054 |

Planta Corte

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 6505.5 (kN)  
 $\phi Pn$  : 5529.7 (kN)  $\geq$  216.5  
As : 2451 mm<sup>2</sup>  
 $\rho$  : 0.001002

Flexion Pura

b : 145.00 mm  
Ae : 1206731 mm<sup>2</sup>  
c : 2065.38 mm  
d : 16875 mm  
te : 71 mm  
t : 145 mm  
 $\phi Mn$  : 6709.1 kN-m

Punto Balanceado

cb : 9926.5  
 $\phi Mn$  : 16646 kN-m  
 $\phi Pn$  : 2699.3 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
19584  $\geq$  10227.05  
Si

$Mu \leq \phi Mn$   
116.5  $\leq$  6481.84  
Si  
0.1 f'm Ae : 2030.1 kN  
0.25 Pb : 793.9 kN

Cortante

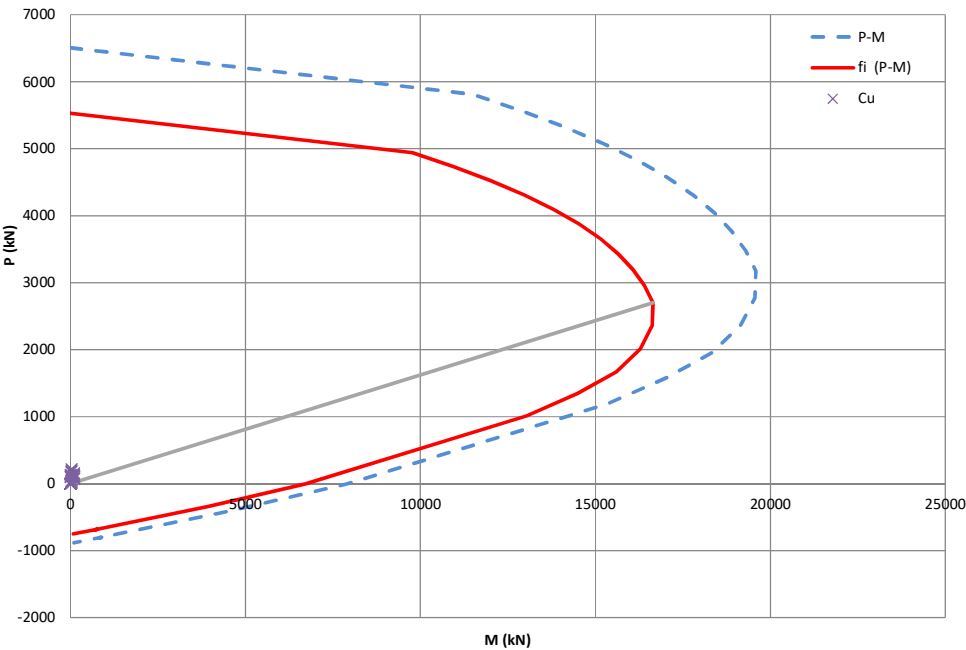
$Mu/Vu d$  : 1.4  
Asv : 33.18 mm<sup>2</sup>  
Vn max permit : 1144.496 mm<sup>2</sup>  $\geq$   
Si

Vm : 763.0 kN  
Vs : 196.0 kN  
Vu = Vn + Vs : 575.4 kN

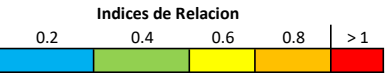
6 Ae V'f'm : 2080.9  
4 Ae V'f'm : 1387.3  
OK Refuerzo a Cortante Suficiente

0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  179 kPa  
OK No Necesita Elementos de Borde

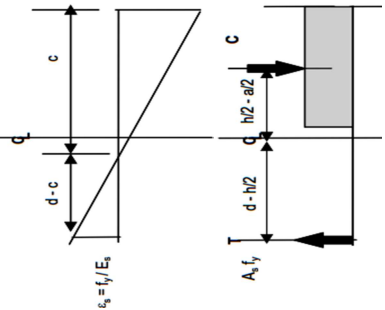
Curva de Interaccion de Mamposteria Reforzada en Arcilla

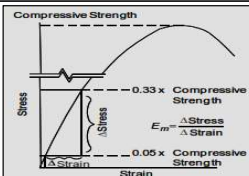
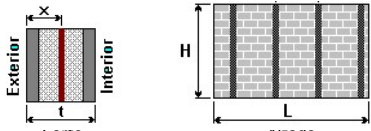


| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.04 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.02 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.50 <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$   
OK ☒



|                                                                                   |      |          |           |       |           |                                                                                    |                                      |         |        |            |          |            |         |                                                                  |   |      |  |
|-----------------------------------------------------------------------------------|------|----------|-----------|-------|-----------|------------------------------------------------------------------------------------|--------------------------------------|---------|--------|------------|----------|------------|---------|------------------------------------------------------------------|---|------|--|
| <b>Propiedades de Geometria Ladrillo</b>                                          |      |          |           |       |           |  | <b>Propiedades de Geometria Muro</b> |         |        |            |          |            |         | <b>Prop. Diseño</b><br>φ Compr Y Flexo-Compr 0.85 φ Cortante 0.6 |   |      |  |
| a (mm)                                                                            | t    | Area     | esp Pared | Area  | Area Neta |                                                                                    | X (mm)                               | L (mm)  | H (mm) | h' (mm)    | Ag (mm2) | Groutig en | te (mm) |                                                                  |   |      |  |
| largo                                                                             | (mm) | Vacios x | (mm)      | Bruta | (mm2)     |                                                                                    |                                      |         |        | (H-Eolaca) |          | Con Refu   |         |                                                                  |   |      |  |
| 300                                                                               | 145  | 5674.0   | 30        | 43500 | 30452     |                                                                                    |                                      |         |        |            |          |            |         |                                                                  |   |      |  |
|  |      |          |           |       |           |                                                                                    | <b>Propiedades de Material</b>       |         |        |            |          |            |         |                                                                  |   |      |  |
|                                                                                   |      |          |           |       |           | f'm (Mpa)                                                                          | E (Mpa)                              | G (Mpa) | v      | fy (Mpa)   | E (Mpa)  | Emu        | Ey      | Bloq Compr.                                                      | α |      |  |
|                                                                                   |      |          |           |       |           | 8.26                                                                               | 5782                                 | 2312.8  | 0.2    | 420        | 200000   | 0.0030     | 0.0021  | 0.85                                                             | 3 | 0.32 |  |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 375       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 675.0     | 6       | 284                     |
| Total     |         | 413                     |

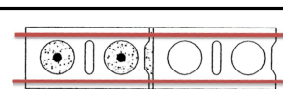


| c     | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|-------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|----|------|--|-----------|-------------|
|       |      |        |        |        | 473     | 406     |                                |            |            | 0  | 0.85 |  | 345       | 0.0         |
| 750   | 0.86 | 600    | 337    | 0      | 337     | 289     | Compresion - Controla Acero    | 25         | 0          | 25 | 0.85 |  | 245       | 21          |
| 714.7 | 0.86 | 572    | 321    | 0      | 321     | 275     |                                | 29         | 0          | 29 | 0.85 |  | 234       | 24          |
| 679.4 | 0.86 | 544    | 305    | 0      | 305     | 262     |                                | 32         | 0          | 32 | 0.85 |  | 222       | 27          |
| 644.1 | 0.86 | 515    | 289    | -8     | 281     | 241     |                                | 34         | -2         | 36 | 0.85 |  | 205       | 31          |
| 608.8 | 0.86 | 487    | 273    | -19    | 255     | 219     |                                | 36         | -6         | 42 | 0.85 |  | 186       | 35          |
| 573.5 | 0.86 | 459    | 258    | -30    | 227     | 195     |                                | 38         | -9         | 47 | 0.85 |  | 166       | 40          |
| 538.2 | 0.86 | 431    | 242    | -43    | 198     | 170     |                                | 39         | -13        | 52 | 0.85 |  | 145       | 44          |
| 502.9 | 0.86 | 402    | 226    | -58    | 168     | 144     |                                | 39         | -17        | 57 | 0.85 |  | 122       | 48          |
| 467.6 | 0.86 | 374    | 210    | -76    | 134     | 115     |                                | 39         | -23        | 62 | 0.85 |  | 98        | 53          |
| 432.4 | 0.86 | 346    | 194    | -96    | 99      | 84      |                                | 39         | -29        | 68 | 0.85 |  | 72        | 58          |
| 397.1 | 0.86 | 318    | 178    | -119   | 59      | 51      | Flexion - Controla Mamposteria | 39         | -36        | 74 | 0.85 |  | 43        | 63          |
| 357.4 | 0.86 | 286    | 161    | -119   | 41      | 35      |                                | 37         | -36        | 73 | 0.85 |  | 30        | 62          |
| 348.0 | 0.86 | 278    | 156    | -119   | 37      | 32      |                                | 37         | -36        | 73 | 0.85 |  | 27        | 62          |
| 338.0 | 0.86 | 270    | 152    | -119   | 33      | 28      |                                | 36         | -36        | 72 | 0.85 |  | 24        | 61          |
| 328.0 | 0.86 | 262    | 147    | -119   | 28      | 24      |                                | 36         | -36        | 72 | 0.85 |  | 20        | 61          |
| 325.0 | 0.86 | 260    | 146    | -119   | 27      | 23      |                                | 36         | -36        | 72 | 0.85 |  | 19        | 61          |
| 265.6 | 0.86 | 212    | 119    | -119   | 0       | 0       |                                | 32         | -36        | 68 | 0.85 |  | 0         | 57.7        |
| 225.9 | 0.86 | 181    | 101    | -119   | -18     | -15     |                                | 29         | -36        | 65 | 0.85 |  | -13       | 55          |
| 186.2 | 0.86 | 149    | 84     | -119   | -36     | -31     |                                | 25         | -36        | 61 | 0.85 |  | -26       | 52          |
| 146.5 | 0.86 | 117    | 66     | -119   | -54     | -46     |                                | 21         | -36        | 57 | 0.85 |  | -39       | 48          |
| 0.0   | 0.86 | 0      | 0      | -173   | -173    | -149    |                                | 0          | 0          | 0  | 0.85 |  | -126      | 0           |

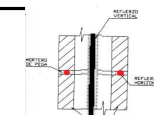
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00018 |

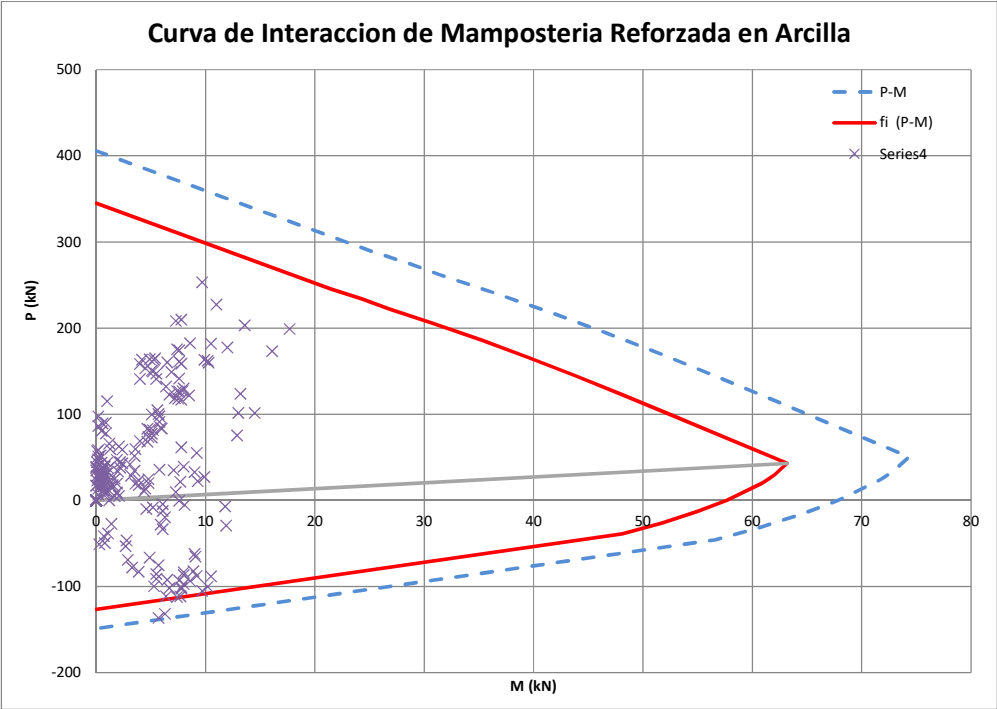


Planta

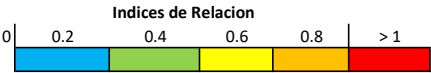


Corte

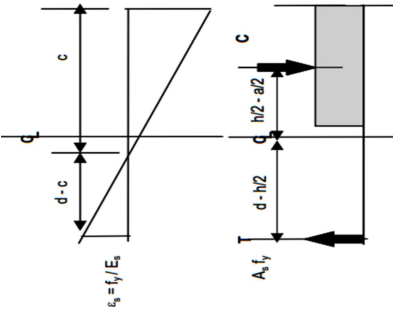
|                  |          |         |              |        |      |                                   |         |      |                       |        |     |
|------------------|----------|---------|--------------|--------|------|-----------------------------------|---------|------|-----------------------|--------|-----|
| Compresion Axial |          |         | Flexion Pura |        |      | Punto Balanceado                  |         |      |                       |        |     |
| h'/t :           | 15.9     | < 30    | b:           | 145.00 | mm   | cb:                               | 397.1   |      | Mu ≤ ϕ Mn             |        |     |
| Re :             | 0.86     |         | Ae :         | 59973  | mm2  |                                   |         |      | 17.7 ≤ 56.01          |        |     |
| Pn :             | 405.8    | (kN)    | c:           | 265.57 | mm   | ϕ Mn :                            | 63      | kN-m | Si                    |        |     |
| ϕPn :            | 344.9    | (kN)    | d:           | 675    | mm   | ϕPn :                             | 43.0    | (kN) |                       |        |     |
|                  |          | ≥ 253.3 | te :         | 80     | mm   |                                   |         |      |                       |        |     |
| As:              | 413      | mm2     | t:           | 145    | mm   | Mn :                              | kN-m    | αMcr |                       |        |     |
| ρ :              | 0.00422  |         | ϕ Mn :       | 57.7   | kN-m | 74                                | ≥ 22.49 |      | 0.1 f'mAe:            | 89.8   | kN  |
|                  |          |         |              |        |      |                                   | Si      |      | 0.25 Pb:              | 12.7   | kN  |
| Cortante         |          |         |              |        |      |                                   |         |      |                       |        |     |
| Mu/Vu d :        | 1.4      |         | Vm :         | 37.9   | kN   | 6 Ae√f'm:                         | 103.4   |      | 0.2 f'm:              | 1652.0 | kPa |
| Asv :            | 12.57    | mm2     | Vs :         | 3.0    | kN   | 4 Ae√f'm:                         | 68.9    |      | 0.2 f'm ≥             | 4315   | kPa |
| Vn max permit:   | 56.88002 | mm2     | Vu= Vn+Vs :  | 24.5   | kN   | OK Refuerzo a Cortante Suficiente |         |      | Si Elementos de Borde |        |     |
|                  |          | ≥       |              |        |      |                                   |         |      |                       |        |     |
|                  |          | Si      |              |        |      |                                   |         |      |                       |        |     |



| Resumen         | Relacion |              |
|-----------------|----------|--------------|
| Compr. Axial    | 0.73     | ✓ Pu/ ϕPn    |
| Axial - Flexion | 0.32     | ✓ Mu/ ϕMn    |
| Cortante        | 0.43     | ✓ Vu/ Vn max |



|                               |   |
|-------------------------------|---|
| Curva Interaccion ϕ Pn - ϕ Mn |   |
| OK                            | ✓ |





| c     | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn | φ    |      | φ Pn (kN) | φ Mn (kN-m) |
|-------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|----|------|------|-----------|-------------|
|       |      |        |        |        | 445     | 382     |                                |            |            | 0  | 0.85 |      | 324       | 0.0         |
| 750   | 0.86 | 600    | 337    | 0      | 337     | 289     | Compresion - Controla Acero    | 25         | 0          | 25 | 0.85 |      | 245       | 21          |
| 714.7 | 0.86 | 572    | 321    | 0      | 321     | 275     |                                | 29         | 0          | 29 | 0.85 |      | 234       | 24          |
| 679.4 | 0.86 | 544    | 305    | 0      | 305     | 262     |                                | 32         | 0          | 32 | 0.85 |      | 222       | 27          |
| 644.1 | 0.86 | 515    | 289    | -6     | 284     | 243     |                                | 34         | -2         | 36 | 0.85 |      | 207       | 30          |
| 608.8 | 0.86 | 487    | 273    | -13    | 260     | 223     |                                | 36         | -4         | 40 | 0.85 |      | 190       | 34          |
| 573.5 | 0.86 | 459    | 258    | -21    | 236     | 203     |                                | 38         | -6         | 44 | 0.85 |      | 172       | 37          |
| 538.2 | 0.86 | 431    | 242    | -30    | 211     | 181     |                                | 39         | -9         | 48 | 0.85 |      | 154       | 41          |
| 502.9 | 0.86 | 402    | 226    | -41    | 185     | 159     |                                | 39         | -12        | 52 | 0.85 |      | 135       | 44          |
| 467.6 | 0.86 | 374    | 210    | -53    | 157     | 135     |                                | 39         | -16        | 55 | 0.85 |      | 114       | 47          |
| 432.4 | 0.86 | 346    | 194    | -67    | 127     | 109     |                                | 39         | -20        | 59 | 0.85 |      | 93        | 50          |
| 397.1 | 0.86 | 318    | 178    | -84    | 95      | 81      | FB                             | 39         | -25        | 64 | 0.85 |      | 69        | 54          |
| 357.4 | 0.86 | 286    | 161    | -84    | 77      | 66      | Flexion - Controla Mamposteria | 37         | -25        | 62 | 0.85 |      | 56        | 53          |
| 348.0 | 0.86 | 278    | 156    | -84    | 73      | 62      |                                | 37         | -25        | 62 | 0.85 |      | 53        | 53          |
| 338.0 | 0.86 | 270    | 152    | -84    | 68      | 58      |                                | 36         | -25        | 61 | 0.85 |      | 50        | 52          |
| 328.0 | 0.86 | 262    | 147    | -84    | 64      | 55      |                                | 36         | -25        | 61 | 0.85 |      | 46        | 52          |
| 325.0 | 0.86 | 260    | 146    | -84    | 62      | 53      |                                | 36         | -25        | 61 | 0.85 |      | 45        | 52          |
| 186.1 | 0.86 | 149    | 84     | -84    | 0       | 0       |                                | 25         | -25        | 50 | 0.85 |      | 0         | 42.7        |
| 146.4 | 0.86 | 117    | 66     | -84    | -18     | -15     |                                | 21         | -25        | 46 | 0.85 |      | -13       | 39          |
| 106.7 | 0.86 | 85     | 48     | -84    | -36     | -31     |                                | 16         | -25        | 41 | 0.85 |      | -26       | 35          |
| 67.0  | 0.86 | 54     | 30     | -93    | -63     | -54     |                                | 10         | -22        | 33 | 0.85 |      | -46       | 28          |
| 0.0   | 0.86 | 0      | 0      | -138   | -138    | -118    |                                |            | 0          | 0  | 0    | 0.85 |           | -100        |

Diagrama de un muro de concreto reforzado con una columna central. Se muestran refuerzos verticales y horizontales, y mortero de pega en las juntas.

Corte

**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje 2/5/15/18 (M-N)  
 Piso 2 (B-C)

**Universidad Santo Tomas**  
**Esp. Patología de la Construcción**

**Compresion Axial**

h'/t : 15.9 < 30  
 Re : 0.86  
 Pn : 381.7 (kN)  
 $\phi Pn$  : 324.5 (kN)  $\geq$  112.2  
 As : 328 mm<sup>2</sup>  
 $\rho$  : 0.003351

**Flexion Pura**

b : 145.00 mm  
 Ae : 59973 mm<sup>2</sup>  
 c : 186.09 mm  
 d : 675 mm  
 te : 80 mm  
 t : 145 mm  
 $\phi Mn$  : 42.7 kN-m

**Punto Balanceado**

cb : 397.1  
 $\phi Mn$  : 54 kN-m  
 $\phi Pn$  : 69.1 (kN)  
 Mn : kN-m  $\alpha M_{cr}$   
 64  $\geq$  22.49  
**Si**

$Mu \leq \phi Mn$   
 20.8  $\leq$  47.40  
**Si**

0.1 f'm Ae : 89.8 kN  
 0.25 Pb : 20.3 kN

**Cortante**

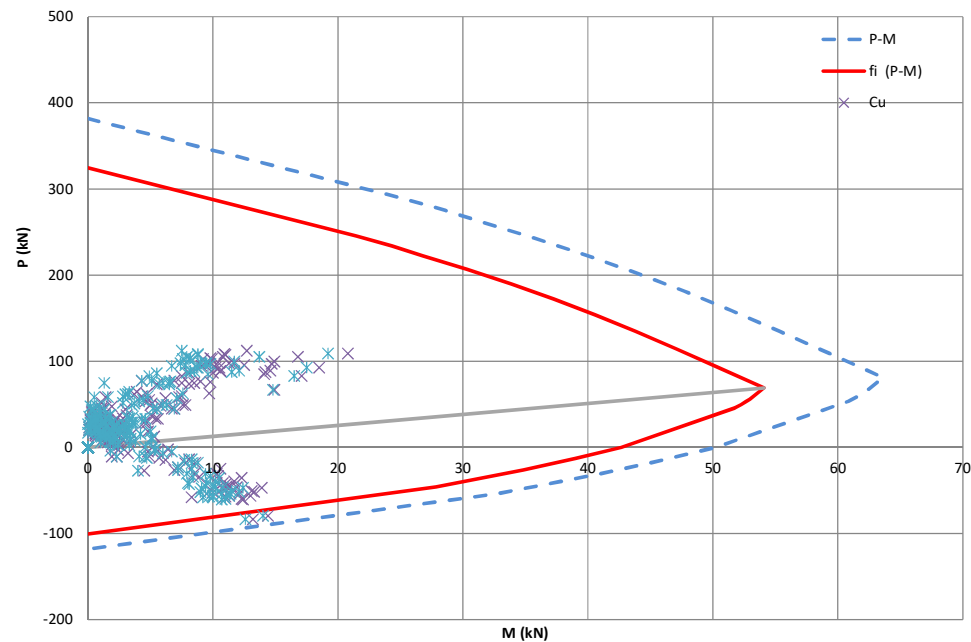
Mu/Vu d : 1.3  
 Asv : 12.57 mm<sup>2</sup>  
 Vn max permit : 56.88002 mm<sup>2</sup>  $\geq$   
 Vm : 37.9 kN  
 Vs : 3.0 kN  
 Vu = Vn + Vs : 24.5 kN  
**Si**

6 AeVf'm : 103.4  
 4 AeVf'm : 68.9  
**OK Refuerzo a Cortante Suficiente**

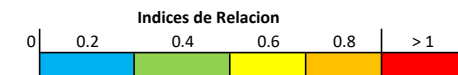
0.2 f'm : 1652.0 kPa  
 0.2 f'm  $\geq$  2015 kPa

**Si Elementos de Borde**

**Curva de Interaccion de Mamposteria Reforzada en Arcilla**

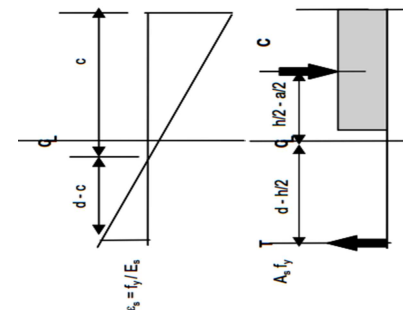


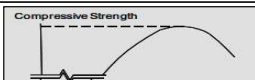
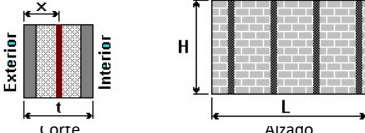
| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.35 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.44 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.43 <input checked="" type="checkbox"/> Vu/ Vn max    |



**Curva Interaccion  $\phi Pn - \phi Mn$**

OK ☒



|                                                                                   |      |          |           |       |           |                                                                                    |         |                                      |                       |          |            |         |                           |             |                     |      |      |     |  |
|-----------------------------------------------------------------------------------|------|----------|-----------|-------|-----------|------------------------------------------------------------------------------------|---------|--------------------------------------|-----------------------|----------|------------|---------|---------------------------|-------------|---------------------|------|------|-----|--|
| <b>Propiedades de Geometria Ladrillo</b>                                          |      |          |           |       |           |  |         | <b>Propiedades de Geometria Muro</b> |                       |          |            |         |                           |             | <b>Prop. Diseño</b> |      |      |     |  |
| a (mm)                                                                            | t    | Area     | esp Pared | Area  | Area Neta | X (mm)                                                                             | L (mm)  | H (mm)                               | h' (mm)<br>(H-ealaca) | Ag (mm2) | Groutig en | te (mm) | φ Compr Y Flexo-<br>Compr | φ Cortante  |                     |      |      |     |  |
| largo                                                                             | (mm) | Vacios x | (mm)      | Bruta | (mm2)     |                                                                                    |         |                                      |                       |          |            |         |                           |             |                     |      |      |     |  |
| 300                                                                               | 145  | 5674.0   | 30        | 43500 | 30452     | 75                                                                                 | 750     | 2300                                 | 2300                  | 108750   | Con Refu   | 80.0    |                           |             |                     |      |      |     |  |
|  |      |          |           |       |           | <b>Propiedades de Material</b>                                                     |         |                                      |                       |          |            |         |                           |             |                     |      |      |     |  |
|                                                                                   |      |          |           |       |           | f'm (Mpa)                                                                          | E (Mpa) | G (Mpa)                              | v                     | fy (Mpa) | E (Mpa)    | Emu     | Ey                        | Bloq Compr. | α                   |      |      |     |  |
|                                                                                   |      |          |           |       |           | 8.26                                                                               | 5782    | 2312.8                               | 0.2                   | 420      | 200000     | 0.0030  | 0.0021                    | 0.85        | 3                   | 0.32 | 0.85 | 0.6 |  |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm2) |
|-----------|---------|------------|
| 75.0      | 4       | 129        |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 375       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 675.0     | 4       | 129        |
| Total     |         | 258        |

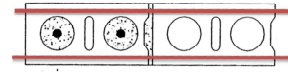


| c     | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|-------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|----|------|--|-----------|-------------|
| 750   | 0.86 | 600    | 337    | 0      | 422     | 362     | Compresion - Controla Acero    | 25         | 0          | 25 | 0.85 |  | 308       | 0.0         |
| 714.7 | 0.86 | 572    | 321    | 0      | 337     | 289     |                                | 29         | 0          | 29 | 0.85 |  | 245       | 21          |
| 679.4 | 0.86 | 544    | 305    | 0      | 321     | 275     |                                | 32         | 0          | 32 | 0.85 |  | 234       | 24          |
| 644.1 | 0.86 | 515    | 289    | -4     | 305     | 262     |                                | 34         | -1         | 35 | 0.85 |  | 222       | 27          |
| 608.8 | 0.86 | 487    | 273    | -8     | 286     | 245     |                                | 36         | -3         | 38 | 0.85 |  | 208       | 30          |
| 573.5 | 0.86 | 459    | 258    | -14    | 265     | 227     |                                | 38         | -4         | 42 | 0.85 |  | 193       | 33          |
| 538.2 | 0.86 | 431    | 242    | -20    | 244     | 209     |                                | 39         | -6         | 45 | 0.85 |  | 178       | 35          |
| 502.9 | 0.86 | 402    | 226    | -26    | 222     | 190     |                                | 39         | -8         | 47 | 0.85 |  | 162       | 38          |
| 467.6 | 0.86 | 374    | 210    | -34    | 199     | 171     |                                | 39         | -10        | 50 | 0.85 |  | 145       | 40          |
| 432.4 | 0.86 | 346    | 194    | -43    | 176     | 151     |                                | 39         | -13        | 52 | 0.85 |  | 128       | 42          |
| 397.1 | 0.86 | 318    | 178    | -54    | 151     | 129     | Flexion - Controla Mamposteria | 39         | -16        | 55 | 0.85 |  | 110       | 44          |
| 357.4 | 0.86 | 286    | 161    | -54    | 124     | 106     |                                | 37         | -16        | 53 | 0.85 |  | 90        | 47          |
| 348.0 | 0.86 | 278    | 156    | -54    | 106     | 91      |                                | 37         | -16        | 53 | 0.85 |  | 77        | 45          |
| 338.0 | 0.86 | 270    | 152    | -54    | 102     | 88      |                                | 36         | -16        | 53 | 0.85 |  | 74        | 45          |
| 328.0 | 0.86 | 262    | 147    | -54    | 98      | 84      |                                | 36         | -16        | 52 | 0.85 |  | 71        | 45          |
| 325.0 | 0.86 | 260    | 146    | -54    | 93      | 80      |                                | 36         | -16        | 52 | 0.85 |  | 68        | 44          |
| 120.6 | 0.86 | 97     | 54     | -54    | 92      | 79      |                                | 36         | -16        | 52 | 0.85 |  | 67        | 44          |
| 80.9  | 0.86 | 65     | 36     | -54    | 18      | 0       |                                | 18         | -16        | 34 | 0.85 |  | 0         | 28.9        |
| 41.2  | 0.86 | 33     | 19     | -108   | 0       | -15     |                                | 12         | -16        | 29 | 0.85 |  | -13       | 24          |
| 1.5   | 0.86 | 1      | 1      | -108   | -90     | -77     |                                | 7          | 0          | 7  | 0.85 |  | -65       | 6           |
| 0.0   | 0.86 | 0      | 0      | -108   | -108    | -92     |                                | 0          | 0          | 0  | 0.85 |  | -78       | 0           |
| 0.0   | 0.86 | 0      | 0      | -108   | -108    | -93     |                                | 0          | 0          | 0  | 0.85 |  | -79       | 0           |

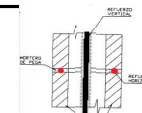
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm2) |
|----------|
| 12.57    |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00018 |



Planta



Corte

Compresion Axial

|        |          |                 |        |
|--------|----------|-----------------|--------|
| h'/t : | 15.9     | <               | 30     |
| Re :   | 0.86     |                 |        |
| Pn :   | 361.9    | (kN)            | Pu     |
| φPn :  | 307.6    | (kN)            | ≥ 51.1 |
|        |          |                 | Si     |
| As :   | 258      | mm <sup>2</sup> |        |
| ρ :    | 0.002636 |                 |        |

Flexion Pura

|        |        |                 |
|--------|--------|-----------------|
| b :    | 145.00 | mm              |
| Ae :   | 59973  | mm <sup>2</sup> |
| c :    | 120.63 | mm              |
| d :    | 675    | mm              |
| te :   | 80     | mm              |
| t :    | 145    | mm              |
| φ Mn : | 28.9   | kN-m            |

Punto Balanceado

|        |       |       |
|--------|-------|-------|
| cb :   | 397.1 |       |
| φ Mn : | 47    | kN-m  |
| φPn :  | 90.5  | (kN)  |
| Mn :   | kN-m  | αMcr  |
| 55     | ≥     | 22.49 |
|        |       | Si    |

|              |
|--------------|
| Mu ≤ φ Mn    |
| 10.5 ≤ 33.81 |
| Si           |

|              |      |    |
|--------------|------|----|
| 0.1 f'm Ae : | 89.8 | kN |
| 0.25 Pb :    | 26.6 | kN |

Cortante

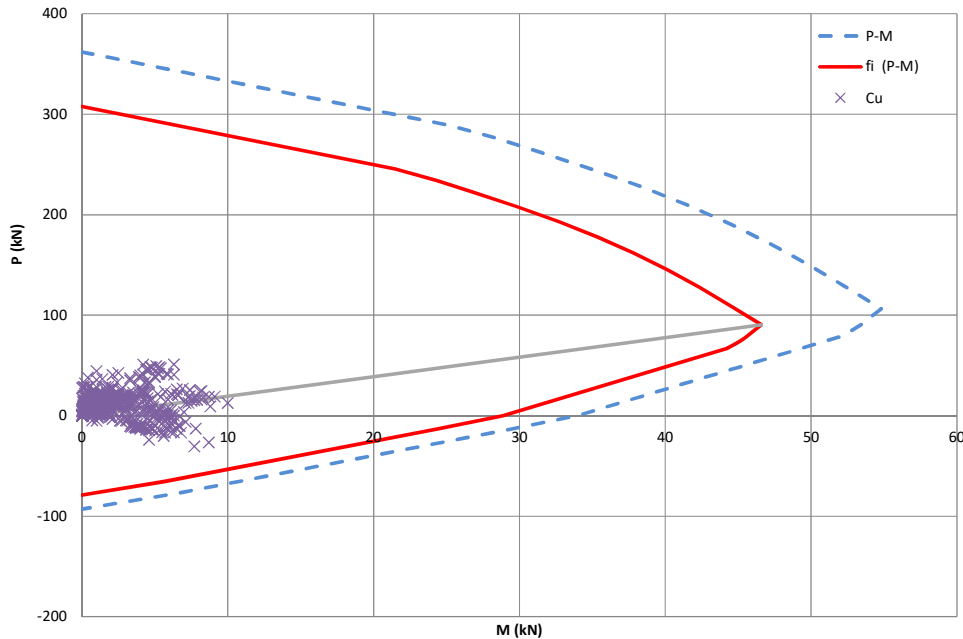
|                 |          |                   |
|-----------------|----------|-------------------|
| Mu/Vu d :       | 1.2      |                   |
| Asv :           | 12.57    | mm <sup>2</sup>   |
| Vn max permit : | 56.88002 | mm <sup>2</sup> ≥ |
|                 |          | Si                |

|             |      |    |
|-------------|------|----|
| Vm :        | 37.9 | kN |
| Vs :        | 3.0  | kN |
| Vu= Vn+Vs : | 24.5 | kN |

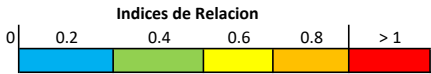
|                                          |       |
|------------------------------------------|-------|
| 6 AeVf'm:                                | 103.4 |
| 4 AeVf'm:                                | 68.9  |
| <b>OK Refuerzo a Cortante Suficiente</b> |       |

|                                          |        |     |
|------------------------------------------|--------|-----|
| f'm:                                     | 1652.0 | kPa |
| 2 f'm ≥                                  | 912    | kPa |
| <b>OK No Necesita Elementos de Borde</b> |        |     |

Curva de Interaccion de Mamposteria Reforzada en Arcilla

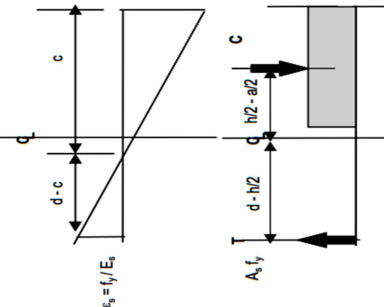


| Resumen         | Relacion          |
|-----------------|-------------------|
| Compr. Axial    | 0.17 ✓ Pu/ φPn    |
| Axial - Flexion | 0.31 ✓ Mu/ φMn    |
| Cortante        | 0.43 ✓ Vu/ Vn max |



Curva Interaccion φ Pn - φ Mn

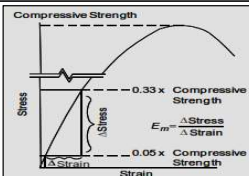
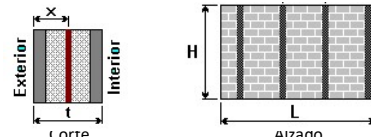
|    |   |
|----|---|
| OK | ✓ |
|----|---|



**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje 3/17 (C-F)

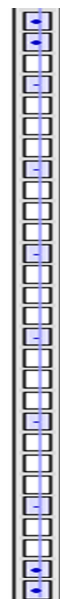
1 Piso  
 Universidad Santo Tomas  
 Esp. Patología de la Construcción

|                                                                                   |               |                         |                      |                     |                          |                                                                                    |                                      |                   |                |                                 |                    |                        |                 |                     |        |  |                               |                   |
|-----------------------------------------------------------------------------------|---------------|-------------------------|----------------------|---------------------|--------------------------|------------------------------------------------------------------------------------|--------------------------------------|-------------------|----------------|---------------------------------|--------------------|------------------------|-----------------|---------------------|--------|--|-------------------------------|-------------------|
| <b>Propiedades de Geometria Ladrillo</b>                                          |               |                         |                      |                     |                          |  | <b>Propiedades de Geometria Muro</b> |                   |                |                                 |                    |                        |                 |                     |        |  |                               |                   |
| a (mm)<br>largo                                                                   | t (mm)<br>145 | Area Vacios x<br>5674.0 | esp Pared (mm)<br>30 | Area Bruta<br>43500 | Area Neta (mm2)<br>30452 |                                                                                    | X (mm)<br>75                         | L (mm)<br>1650    | H (mm)<br>2300 | h' (mm)<br>(H-e_pilaca)<br>2300 | Ag (mm2)<br>239250 | Groutig en<br>Con Refu | te (mm)<br>78.6 |                     |        |  |                               |                   |
|  |               |                         |                      |                     |                          | <b>Propiedades de Material</b>                                                     |                                      |                   |                |                                 |                    |                        |                 |                     |        |  | <b>Prop. Diseño</b>           |                   |
|                                                                                   |               |                         |                      |                     |                          | f'm (Mpa)<br>8.26                                                                  | E (Mpa)<br>5782                      | G (Mpa)<br>2312.8 | v<br>0.2       | fy (Mpa)<br>420                 | E (Mpa)<br>200000  | Emu<br>0.0030          | Ey<br>0.0021    | Bloq Compr.<br>0.85 | α<br>3 |  | φ Compr Y Flexo-Compr<br>0.85 | φ Cortante<br>0.6 |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 5       | 199                     |
| 215.0     | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 825       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1435.0    | 4       | 129                     |
| 1575.0    | 6       | 284                     |
| Total     |         | 741                     |

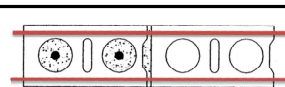


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 973     | 834     |                                |            |            | 0   | 0.85 |  | 709       | 0.0         |
| 1650   | 0.86 | 1320   | 728    | 0      | 728     | 624     | Compresion - Controla Acero    | 120        | 0          | 120 | 0.85 |  | 531       | 102         |
| 1577.6 | 0.86 | 1262   | 696    | 0      | 696     | 597     |                                | 135        | 0          | 135 | 0.85 |  | 508       | 115         |
| 1505.3 | 0.86 | 1204   | 664    | -8     | 657     | 563     |                                | 148        | -6         | 154 | 0.85 |  | 478       | 131         |
| 1432.9 | 0.86 | 1146   | 633    | -17    | 616     | 528     |                                | 159        | -13        | 172 | 0.85 |  | 449       | 146         |
| 1360.6 | 0.86 | 1088   | 601    | -31    | 569     | 488     |                                | 169        | -23        | 191 | 0.85 |  | 415       | 163         |
| 1288.2 | 0.86 | 1031   | 569    | -47    | 522     | 447     |                                | 176        | -34        | 210 | 0.85 |  | 380       | 178         |
| 1215.9 | 0.86 | 973    | 537    | -64    | 472     | 405     |                                | 182        | -46        | 228 | 0.85 |  | 344       | 194         |
| 1143.5 | 0.86 | 915    | 505    | -84    | 421     | 361     |                                | 186        | -60        | 246 | 0.85 |  | 307       | 209         |
| 1071.2 | 0.86 | 857    | 473    | -106   | 366     | 314     |                                | 187        | -76        | 264 | 0.85 |  | 267       | 224         |
| 998.8  | 0.86 | 799    | 441    | -132   | 309     | 265     |                                | 188        | -94        | 282 | 0.85 |  | 225       | 240         |
| 926.5  | 0.86 | 741    | 409    | -162   | 247     | 212     | Flexion - Controla Mamposteria | 186        | -115       | 301 | 0.85 |  | 180       | 256         |
| 833.8  | 0.86 | 667    | 368    | -173   | 195     | 167     |                                | 181        | -123       | 303 | 0.85 |  | 142       | 258         |
| 741.2  | 0.86 | 593    | 327    | -173   | 154     | 132     |                                | 173        | -123       | 295 | 0.85 |  | 112       | 251         |
| 648.5  | 0.86 | 519    | 286    | -173   | 113     | 97      |                                | 162        | -123       | 284 | 0.85 |  | 82        | 242         |
| 555.9  | 0.86 | 445    | 245    | -173   | 72      | 62      |                                | 148        | -123       | 270 | 0.85 |  | 52        | 230         |
| 463.2  | 0.86 | 371    | 204    | -173   | 31      | 27      |                                | 131        | -123       | 253 | 0.85 |  | 23        | 215         |
| 376.5  | 0.86 | 301    | 166    | -173   | -7      | -6      |                                | 112        | -123       | 235 | 0.85 |  | -5        | 199.4       |
| 283.8  | 0.86 | 227    | 125    | -173   | -48     | -41     |                                | 89         | -123       | 212 | 0.85 |  | -35       | 180         |
| 191.2  | 0.86 | 153    | 84     | -183   | -99     | -85     |                                | 63         | -117       | 180 | 0.85 |  | -72       | 153         |
| 98.5   | 0.86 | 79     | 44     | -228   | -184    | -158    |                                | 34         | -89        | 124 | 0.85 |  | -134      | 105         |
| 0.0    | 0.86 | 0      | 0      | -311   | -311    | -267    |                                | 0          | -27        | 27  | 0.85 |  | -227      | 23          |

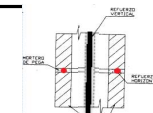
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00019 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 3/17 (J-M)  
1 Piso (C-F)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

$h'/t$  : 15.9 < 30  
 $Re$  : 0.86  
 $P_n$  : 834.3 (kN)  
 $\phi P_n$  : 709.2 (kN)  $\geq$   $P_u$  346.8  
 $As$  : 741 mm<sup>2</sup>  
 $\rho$  : 0.003245

Flexion Pura

$b$  : 145.00 mm  
 $A_e$  : 129671 mm<sup>2</sup>  
 $c$  : 376.49 mm  
 $d$  : 1575 mm  
 $t_e$  : 79 mm  
 $t$  : 145 mm  
 $\phi M_n$  : 199.4 kN-m

Punto Balanceado

$cb$  : 926.5  
 $\phi M_n$  : 256 kN-m  
 $\phi P_n$  : 180.1 (kN)  
 $M_n$  : kN-m  
 $\alpha M_{cr}$  : 106.98  
 $301 \geq$   
**Si**

$M_u \leq \phi M_n$   
 $58.7 \leq 249.26$   
**Si**

$0.1 f'_m A_e$  : 197.6 kN  
 $0.25 P_b$  : 53.0 kN

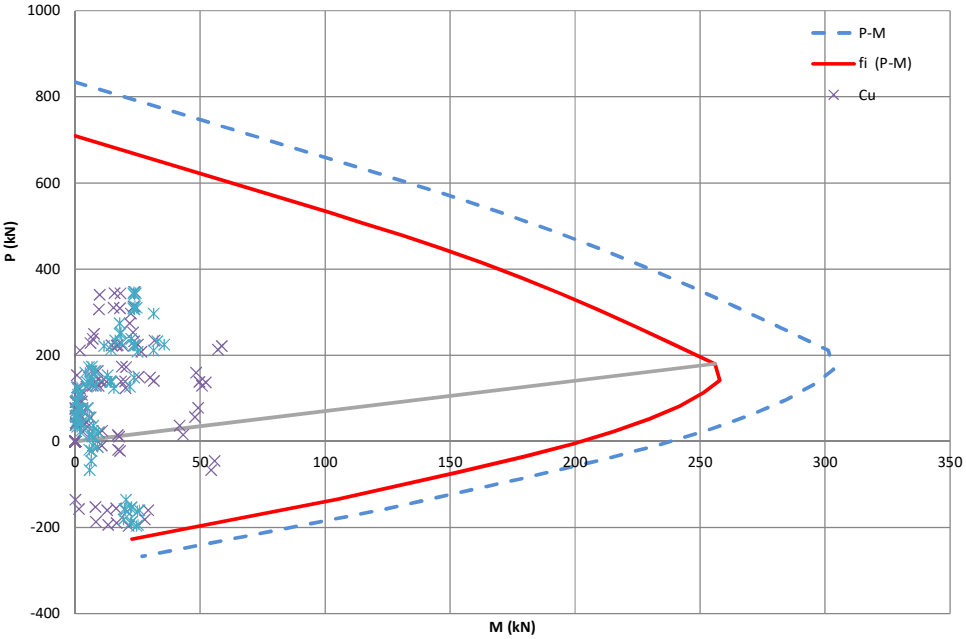
Cortante

$M_u/V_u d$  : 2.0  
 $As_v$  : 12.57 mm<sup>2</sup>  
 $V_n$  max permit : 122.9835 mm<sup>2</sup>  $\geq$   
**Si**  
 $V_m$  : 82.0 kN  
 $V_s$  : 6.9 kN  
 $V_u = V_n + V_s$  : 53.3 kN

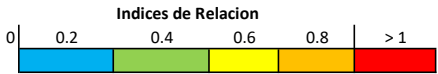
$6 A_e \sqrt{f'_m}$  : 223.6  
 $4 A_e \sqrt{f'_m}$  : 149.1  
**OK Refuerzo a Cortante Suficiente**

$0.2 f'_m$  : 1652.0 kPa  
 $0.2 f'_m \geq$  2683 kPa  
**Si Elementos de Borde**

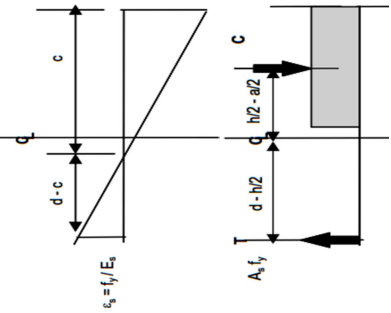
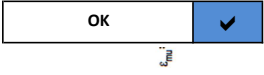
Curva de Interaccion de Mamposteria Reforzada en Arcilla

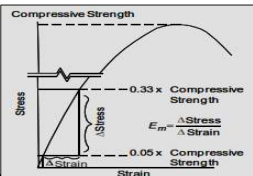
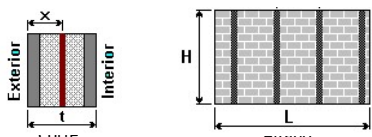


| Resumen         | Relacion                                                  |
|-----------------|-----------------------------------------------------------|
| Compr. Axial    | 0.49 <input checked="" type="checkbox"/> $P_u / \phi P_n$ |
| Axial - Flexion | 0.24 <input checked="" type="checkbox"/> $M_u / \phi M_n$ |
| Cortante        | 0.43 <input checked="" type="checkbox"/> $V_u / V_n$ max  |



Curva Interaccion  $\phi P_n - \phi M_n$

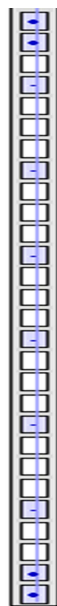


|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|------------------------------------------|------|----------|-----------|-------|-----------|------------------------------------------------------------------------------------|--------------------------------------|--------|--------|------------|----------|------------|---------|-----------------------------------------------------------------------------------|
| <b>Propiedades de Geometria Ladrillo</b> |      |          |           |       |           |  | <b>Propiedades de Geometria Muro</b> |        |        |            |          |            |         |  |
| a (mm)                                   | t    | Area     | esp Pared | Area  | Area Neta |                                                                                    | X (mm)                               | L (mm) | H (mm) | h' (mm)    | Ag (mm2) | Groutig en | te (mm) |                                                                                   |
| largo                                    | (mm) | Vacios x | (mm)      | Bruta | (mm2)     |                                                                                    |                                      |        |        | (H-eolaca) |          |            |         |                                                                                   |
| 300                                      | 145  | 5674.0   | 30        | 43500 | 30452     |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |
|                                          |      |          |           |       |           |                                                                                    |                                      |        |        |            |          |            |         |                                                                                   |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 5       | 199                     |
| 215.0     | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 825       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1435.0    | 4       | 129                     |
| 1575.0    | 6       | 284                     |
| Total     |         | 741                     |

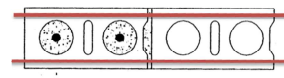


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 973     | 834     |                                |            |            | 0   | 0.85 |  | 709       | 0.0         |
| 1650   | 0.86 | 1320   | 728    | 0      | 728     | 624     | Compresion - Controla Acero    | 120        | 0          | 120 | 0.85 |  | 531       | 102         |
| 1577.6 | 0.86 | 1262   | 696    | 0      | 696     | 597     |                                | 135        | 0          | 135 | 0.85 |  | 508       | 115         |
| 1505.3 | 0.86 | 1204   | 664    | -8     | 657     | 563     |                                | 148        | -6         | 154 | 0.85 |  | 478       | 131         |
| 1432.9 | 0.86 | 1146   | 633    | -17    | 616     | 528     |                                | 159        | -13        | 172 | 0.85 |  | 449       | 146         |
| 1360.6 | 0.86 | 1088   | 601    | -31    | 569     | 488     |                                | 169        | -23        | 191 | 0.85 |  | 415       | 163         |
| 1288.2 | 0.86 | 1031   | 569    | -47    | 522     | 447     |                                | 176        | -34        | 210 | 0.85 |  | 380       | 178         |
| 1215.9 | 0.86 | 973    | 537    | -64    | 472     | 405     |                                | 182        | -46        | 228 | 0.85 |  | 344       | 194         |
| 1143.5 | 0.86 | 915    | 505    | -84    | 421     | 361     |                                | 186        | -60        | 246 | 0.85 |  | 307       | 209         |
| 1071.2 | 0.86 | 857    | 473    | -106   | 366     | 314     |                                | 187        | -76        | 264 | 0.85 |  | 267       | 224         |
| 998.8  | 0.86 | 799    | 441    | -132   | 309     | 265     |                                | 188        | -94        | 282 | 0.85 |  | 225       | 240         |
| 926.5  | 0.86 | 741    | 409    | -162   | 247     | 212     | Flexion - Controla Mamposteria | 186        | -115       | 301 | 0.85 |  | 180       | 256         |
| 833.8  | 0.86 | 667    | 368    | -173   | 195     | 167     |                                | 181        | -123       | 303 | 0.85 |  | 142       | 258         |
| 741.2  | 0.86 | 593    | 327    | -173   | 154     | 132     |                                | 173        | -123       | 295 | 0.85 |  | 112       | 251         |
| 648.5  | 0.86 | 519    | 286    | -173   | 113     | 97      |                                | 162        | -123       | 284 | 0.85 |  | 82        | 242         |
| 555.9  | 0.86 | 445    | 245    | -173   | 72      | 62      |                                | 148        | -123       | 270 | 0.85 |  | 52        | 230         |
| 463.2  | 0.86 | 371    | 204    | -173   | 31      | 27      |                                | 131        | -123       | 253 | 0.85 |  | 23        | 215         |
| 393.0  | 0.86 | 314    | 173    | -173   | 0       | 0       |                                | 116        | -123       | 238 | 0.85 |  | 0         | 202.6       |
| 300.3  | 0.86 | 240    | 133    | -173   | -41     | -35     |                                | 93         | -123       | 216 | 0.85 |  | -30       | 184         |
| 207.7  | 0.86 | 166    | 92     | -176   | -85     | -72     |                                | 68         | -121       | 189 | 0.85 |  | -62       | 161         |
| 115.0  | 0.86 | 92     | 51     | -228   | -177    | -152    |                                | 40         | -89        | 129 | 0.85 |  | -129      | 110         |
| 0.0    | 0.86 | 0      | 0      | -311   | -311    | -267    |                                | 0          | 0          | 0   | 0.85 |  | -227      | 0           |

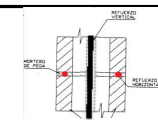
| Diam Ref Horiz (mm) | Separac. ref Horiz (mm) |
|---------------------|-------------------------|
| 4.0                 | 600                     |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00019 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 3/17 (J-M)  
2 Piso (C-F)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

$h'/t$  : 15.9 < 30  
Re : 0.86  
Pn : 834.3 (kN)  
 $\phi Pn$  : 709.2 (kN)  $\geq$  235.9  
As : 741 mm<sup>2</sup>  
 $\rho$  : 0.003245

Flexion Pura

b : 145.00 mm  
Ae : 129671 mm<sup>2</sup>  
c : 392.96 mm  
d : 1575 mm  
te : 79 mm  
t : 145 mm  
 $\phi Mn$  : 202.6 kN-m

Punto Balanceado

cb : 926.5  
 $\phi Mn$  : 256 kN-m  
 $\phi Pn$  : 180.1 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
301  $\geq$  106.98  
Si

$Mu \leq \phi Mn$   
50.1  $\leq$  228.88  
Si

0.1  $f'm Ae$  : 197.6 kN  
0.25 Pb : 53.0 kN

Cortante

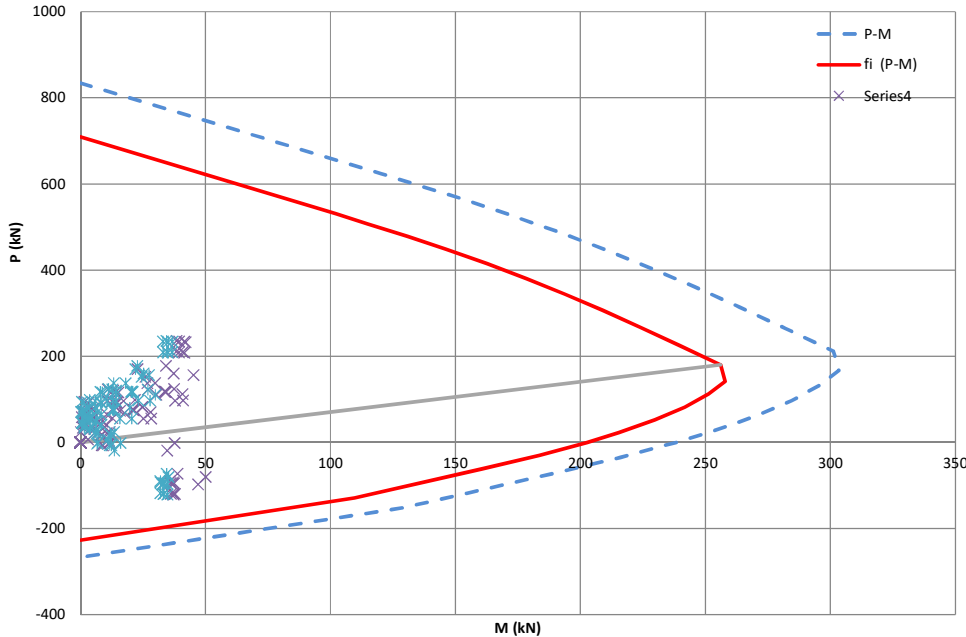
$Mu/Vu d$  : 1.4  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit : 122.9835 mm<sup>2</sup>  $\geq$   
Si

Vm : 82.0 kN  
Vs : 6.9 kN  
Vu = Vn + Vs : 53.3 kN

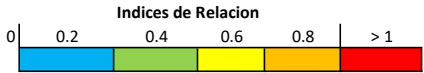
6 Ae  $\sqrt{f'm}$  : 223.6  
4 Ae  $\sqrt{f'm}$  : 149.1  
OK Refuerzo a Cortante Suficiente

0.2  $f'm$  : 1652.0 kPa  
0.2  $f'm \geq$  1834 kPa  
Si Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

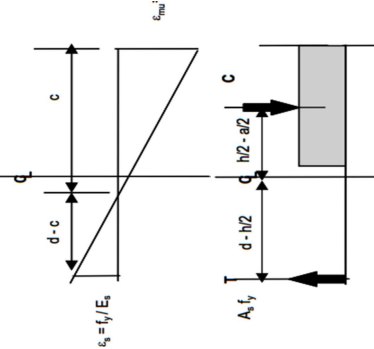


| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.33 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.22 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.43 <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

OK ☒

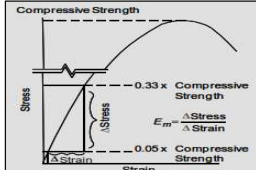
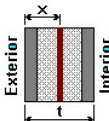
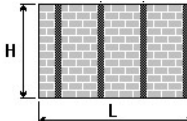


TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8

EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 3 /17 (C-F)  
(J-M)

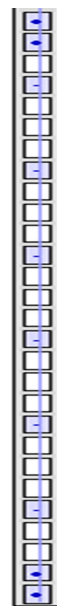
Universidad Santo Tomas  
Esp. Patología de la Construcción

|                                                                                                                                                                                                                                                                                                                                                   |         |          |                                                                                                                        |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |        |             |           |           |                       |            |      |           |         |       |       |             |     |        |                       |            |       |                                                                                                                                   |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |        |        |        |         |          |            |         |    |      |      |      |        |          |      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------|-------------|-----------|-----------|-----------------------|------------|------|-----------|---------|-------|-------|-------------|-----|--------|-----------------------|------------|-------|-----------------------------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|--------|--------|--------|--------|--------|--------|---------|----------|------------|---------|----|------|------|------|--------|----------|------|
| <div>Propiedades de Geometria Ladrillo</div> <table><tr><td>a (mm)</td><td>t</td><td>Area</td><td>esp Pared</td><td>Area</td><td>Area Neta</td></tr><tr><td>largo</td><td>(mm)</td><td>Vacios x</td><td>(mm)</td><td>Bruta</td><td>(mm2)</td></tr><tr><td>300</td><td>145</td><td>5674.0</td><td>30</td><td>43500</td><td>30452</td></tr></table> |         |          |                                                                                                                        |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                | a (mm)  | t      | Area        | esp Pared | Area      | Area Neta             | largo      | (mm) | Vacios x  | (mm)    | Bruta | (mm2) | 300         | 145 | 5674.0 | 30                    | 43500      | 30452 | <div>Stress</div> <div></div> <div>Strain</div> |        | <div>Propiedades de Geometria Muro</div> <table><tr><td>X (mm)</td><td>L (mm)</td><td>H (mm)</td><td>h' (mm)</td><td>Ag (mm2)</td><td>Groutig en</td><td>te (mm)</td></tr><tr><td>75</td><td>1650</td><td>2300</td><td>2300</td><td>239250</td><td>Con Refu</td><td>78.6</td></tr></table> |     |        |        |        | X (mm) | L (mm) | H (mm) | h' (mm) | Ag (mm2) | Groutig en | te (mm) | 75 | 1650 | 2300 | 2300 | 239250 | Con Refu | 78.6 |
| a (mm)                                                                                                                                                                                                                                                                                                                                            | t       | Area     | esp Pared                                                                                                              | Area      | Area Neta                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         |        |             |           |           |                       |            |      |           |         |       |       |             |     |        |                       |            |       |                                                                                                                                   |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |        |        |        |         |          |            |         |    |      |      |      |        |          |      |
| largo                                                                                                                                                                                                                                                                                                                                             | (mm)    | Vacios x | (mm)                                                                                                                   | Bruta     | (mm2)                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |        |             |           |           |                       |            |      |           |         |       |       |             |     |        |                       |            |       |                                                                                                                                   |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |        |        |        |         |          |            |         |    |      |      |      |        |          |      |
| 300                                                                                                                                                                                                                                                                                                                                               | 145     | 5674.0   | 30                                                                                                                     | 43500     | 30452                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |        |             |           |           |                       |            |      |           |         |       |       |             |     |        |                       |            |       |                                                                                                                                   |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |        |        |        |         |          |            |         |    |      |      |      |        |          |      |
| X (mm)                                                                                                                                                                                                                                                                                                                                            | L (mm)  | H (mm)   | h' (mm)                                                                                                                | Ag (mm2)  | Groutig en                                                                                                                                                                                                                                                                                                                                                                                                                                                     | te (mm) |        |             |           |           |                       |            |      |           |         |       |       |             |     |        |                       |            |       |                                                                                                                                   |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |        |        |        |         |          |            |         |    |      |      |      |        |          |      |
| 75                                                                                                                                                                                                                                                                                                                                                | 1650    | 2300     | 2300                                                                                                                   | 239250    | Con Refu                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 78.6    |        |             |           |           |                       |            |      |           |         |       |       |             |     |        |                       |            |       |                                                                                                                                   |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |        |        |        |         |          |            |         |    |      |      |      |        |          |      |
| <div>Exterior</div> <div></div> <div>Interior</div>                                                                                                                                                                                                              |         |          | <div>H</div> <div></div> <div>L</div> |           | <div>Propiedades de Material</div> <table><tr><td>f'm (Mpa)</td><td>E (Mpa)</td><td>G (Mpa)</td><td>v</td><td>f_y (Mpa)</td><td>E (Mpa)</td><td>E_mu</td><td>E_y</td><td>Bloq Compr.</td><td>α</td><td></td><td>φ Compr Y Flexo-Compr</td><td>φ Cortante</td></tr><tr><td>8.26</td><td>5782</td><td>2312.8</td><td>0.2</td><td>420</td><td>200000</td><td>0.0030</td><td>0.0021</td><td>0.85</td><td>3</td><td>0.32</td><td>0.85</td><td>0.6</td></tr></table> |         |        |             |           | f'm (Mpa) | E (Mpa)               | G (Mpa)    | v    | f_y (Mpa) | E (Mpa) | E_mu  | E_y   | Bloq Compr. | α   |        | φ Compr Y Flexo-Compr | φ Cortante | 8.26  | 5782                                                                                                                              | 2312.8 | 0.2                                                                                                                                                                                                                                                                                        | 420 | 200000 | 0.0030 | 0.0021 | 0.85   | 3      | 0.32   | 0.85    | 0.6      |            |         |    |      |      |      |        |          |      |
| f'm (Mpa)                                                                                                                                                                                                                                                                                                                                         | E (Mpa) | G (Mpa)  | v                                                                                                                      | f_y (Mpa) | E (Mpa)                                                                                                                                                                                                                                                                                                                                                                                                                                                        | E_mu    | E_y    | Bloq Compr. | α         |           | φ Compr Y Flexo-Compr | φ Cortante |      |           |         |       |       |             |     |        |                       |            |       |                                                                                                                                   |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |        |        |        |         |          |            |         |    |      |      |      |        |          |      |
| 8.26                                                                                                                                                                                                                                                                                                                                              | 5782    | 2312.8   | 0.2                                                                                                                    | 420       | 200000                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.0030  | 0.0021 | 0.85        | 3         | 0.32      | 0.85                  | 0.6        |      |           |         |       |       |             |     |        |                       |            |       |                                                                                                                                   |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |        |        |        |         |          |            |         |    |      |      |      |        |          |      |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm2) |
|-----------|---------|------------|
| 75.0      | 4       | 129        |
| 215.0     | 4       | 129        |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 825       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 1435.0    | 4       | 129        |
| 1575.0    | 5       | 199        |
| Total     |         | 586        |

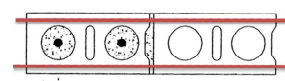


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 922     | 790     |                                |            |            | 0   | 0.85 |  | 672       | 0.0         |
| 1650   | 0.86 | 1320   | 728    | 0      | 728     | 624     | Compresion - Controla Acero    | 120        | 0          | 120 | 0.85 |  | 531       | 102         |
| 1577.6 | 0.86 | 1262   | 696    | 0      | 696     | 597     |                                | 135        | 0          | 135 | 0.85 |  | 508       | 115         |
| 1505.3 | 0.86 | 1204   | 664    | -6     | 659     | 565     |                                | 148        | -4         | 152 | 0.85 |  | 480       | 129         |
| 1432.9 | 0.86 | 1146   | 633    | -12    | 621     | 532     |                                | 159        | -9         | 168 | 0.85 |  | 452       | 143         |
| 1360.6 | 0.86 | 1088   | 601    | -23    | 578     | 495     |                                | 169        | -17        | 185 | 0.85 |  | 421       | 158         |
| 1288.2 | 0.86 | 1031   | 569    | -35    | 533     | 457     |                                | 176        | -25        | 201 | 0.85 |  | 389       | 171         |
| 1215.9 | 0.86 | 973    | 537    | -49    | 487     | 418     |                                | 182        | -35        | 217 | 0.85 |  | 355       | 184         |
| 1143.5 | 0.86 | 915    | 505    | -65    | 440     | 377     |                                | 186        | -46        | 231 | 0.85 |  | 321       | 197         |
| 1071.2 | 0.86 | 857    | 473    | -82    | 390     | 335     |                                | 187        | -58        | 246 | 0.85 |  | 284       | 209         |
| 998.8  | 0.86 | 799    | 441    | -103   | 338     | 290     |                                | 188        | -72        | 260 | 0.85 |  | 246       | 221         |
| 926.5  | 0.86 | 741    | 409    | -126   | 283     | 243     | Flexion - Controla Mamposteria | 186        | -89        | 274 | 0.85 |  | 206       | 233         |
| 833.8  | 0.86 | 667    | 368    | -138   | 230     | 197     |                                | 181        | -96        | 277 | 0.85 |  | 168       | 235         |
| 741.2  | 0.86 | 593    | 327    | -138   | 189     | 162     |                                | 173        | -96        | 269 | 0.85 |  | 138       | 228         |
| 648.5  | 0.86 | 519    | 286    | -138   | 149     | 127     |                                | 162        | -96        | 258 | 0.85 |  | 108       | 219         |
| 555.9  | 0.86 | 445    | 245    | -138   | 108     | 92      |                                | 148        | -96        | 244 | 0.85 |  | 78        | 207         |
| 463.2  | 0.86 | 371    | 204    | -138   | 67      | 57      |                                | 131        | -96        | 227 | 0.85 |  | 49        | 193         |
| 299.0  | 0.86 | 239    | 132    | -138   | -6      | -5      |                                | 93         | -96        | 189 | 0.85 |  | -4        | 160.5       |
| 206.4  | 0.86 | 165    | 91     | -141   | -50     | -43     |                                | 68         | -94        | 161 | 0.85 |  | -36       | 137         |
| 113.7  | 0.86 | 91     | 50     | -192   | -142    | -122    |                                | 39         | -63        | 102 | 0.85 |  | -103      | 87          |
| 21.1   | 0.86 | 17     | 9      | -246   | -237    | -203    |                                | 8          | -22        | 30  | 0.85 |  | -173      | 25          |
| 0.0    | 0.86 | 0      | 0      | -246   | -246    | -211    |                                | 0          | 0          | 0   | 0.85 |  | -179      | 0           |

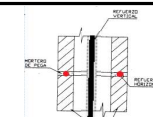
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm2) |
|----------|
| 12.57    |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00019 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 3/17 (J-M)  
Piso (C-F)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

$h'/t$  : 15.9 < 30  
Re : 0.86  
Pn : 790.4 (kN)  
 $\phi Pn$  : 671.9 (kN)  $\geq$  Pu 120.5 Si  
As : 586 mm<sup>2</sup>  
 $\rho$  : 0.002566

Flexion Pura

b : 145.00 mm  
Ae : 129671 mm<sup>2</sup>  
c : 299.00 mm  
d : 1575 mm  
te : 79 mm  
t : 145 mm  
 $\phi Mn$  : 160.5 kN-m

Punto Balanceado

cb : 926.5  
 $\phi Mn$  : 233 kN-m  
 $\phi Pn$  : 206.2 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
274  $\geq$  106.98 Si

$Mu \leq \phi Mn$   
36.1  $\leq$  169.74  
Si

0.1 f'm Ae : 197.6 kN  
0.25 Pb : 60.6 kN

Cortante

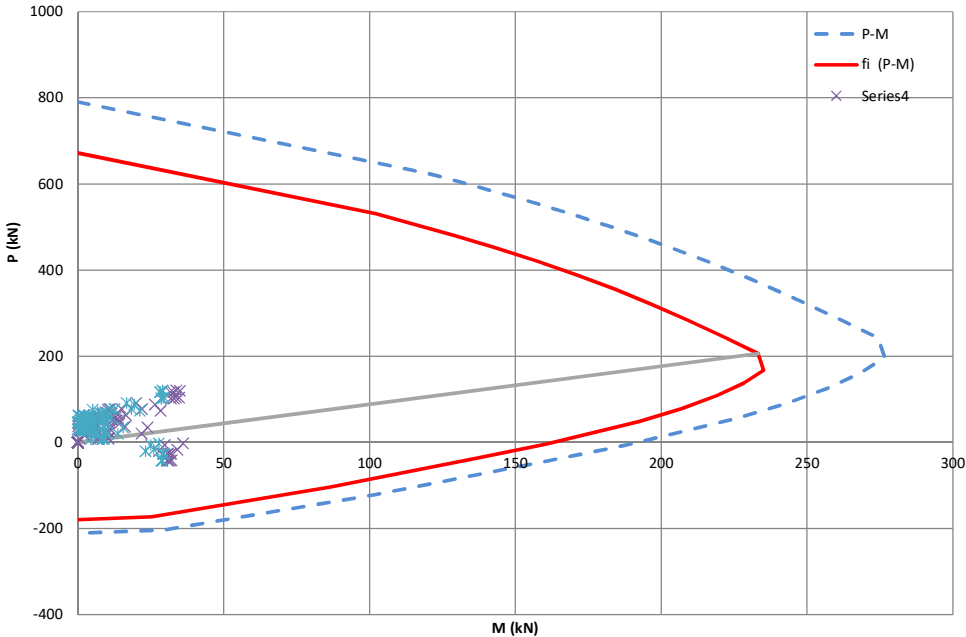
Mu/Vu d : 1.3  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit : 122.9835 mm<sup>2</sup>  $\geq$  Vu= Vn+Vs : 53.3 kN Si

Vm : 82.0 kN  
Vs : 6.9 kN  
Vu= Vn+Vs : 53.3 kN

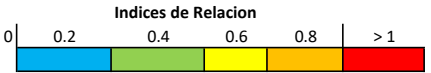
6 AeVf'm : 223.6  
4 AeVf'm : 149.1  
OK Refuerzo a Cortante Suficiente

0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  942 kPa  
OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

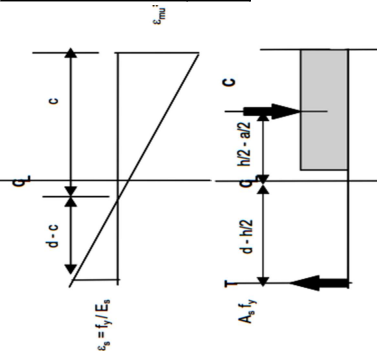


| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.18 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.21 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.43 <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

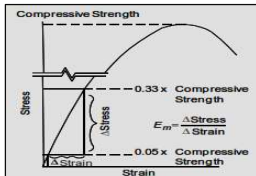
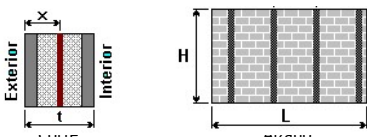
OK ☒



TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 3/17 (C-F)  
4 Piso

Universidad Santo Tomas  
Esp. Patología de la Construcción

|                                          |           |                  |                   |               |                    |                                                                                    |                                      |             |        |                         |                           |               |                     |                                                                                   |
|------------------------------------------|-----------|------------------|-------------------|---------------|--------------------|------------------------------------------------------------------------------------|--------------------------------------|-------------|--------|-------------------------|---------------------------|---------------|---------------------|-----------------------------------------------------------------------------------|
| <b>Propiedades de Geometria Ladrillo</b> |           |                  |                   |               |                    |  | <b>Propiedades de Geometria Muro</b> |             |        |                         |                           |               |                     |  |
| a (mm)<br>largo                          | t<br>(mm) | Area<br>Vacios x | esp Pared<br>(mm) | Area<br>Bruta | Area Neta<br>(mm2) |                                                                                    | X (mm)                               | L (mm)      | H (mm) | h' (mm)<br>(H-e Polaca) | Ag (mm2)                  | Groutig<br>en | te<br>(mm)          |                                                                                   |
| 300                                      | 145       | 5674.0           | 30                | 43500         | 30452              |                                                                                    | 75                                   | 1650        | 2300   | 2300                    | 239250                    | Con Refu      | 78.6                |                                                                                   |
| <b>Propiedades de Material</b>           |           |                  |                   |               |                    |                                                                                    |                                      |             |        |                         |                           |               | <b>Prop. Diseño</b> |                                                                                   |
| f'm<br>(Mpa)                             | E (Mpa)   | G (Mpa)          | v                 | fy (Mpa)      | E (Mpa)            | Emu                                                                                | Ey                                   | Bloq Compr. | α      |                         | φ Compr Y Flexo-<br>Compr | φ Cortante    |                     |                                                                                   |
| 8.26                                     | 5782      | 2312.8           | 0.2               | 420           | 200000             | 0.0030                                                                             | 0.0021                               | 0.85        | 3      | 0.32                    | 0.85                      | 0.6           |                     |                                                                                   |

Distribucion de Refuerzo

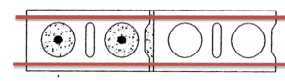
ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm2) | c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) | C*x (kN-m) | T*x (kN-m) | Mn  | φ    | φ Pn (kN) | φ Mn (kN-m) |
|-----------|---------|------------|--------|------|--------|--------|--------|---------|---------|------------|------------|-----|------|-----------|-------------|
| 75.0      | 4       | 129        |        |      |        |        |        | 899     | 771     |            |            | 0   | 0.85 | 655       | 0.0         |
| 215.0     | 4       | 129        | 1650   | 0.86 | 1320   | 728    | 0      | 728     | 624     | 120        | 0          | 120 | 0.85 | 531       | 102         |
| 0.0       | 0       | 0          | 1577.6 | 0.86 | 1262   | 696    | 0      | 696     | 597     | 135        | 0          | 135 | 0.85 | 508       | 115         |
| 0.0       | 0       | 0          | 1505.3 | 0.86 | 1204   | 664    | -4     | 661     | 567     | 148        | -3         | 151 | 0.85 | 482       | 128         |
| 0.0       | 0       | 0          | 1432.9 | 0.86 | 1146   | 633    | -8     | 625     | 536     | 159        | -6         | 165 | 0.85 | 455       | 140         |
| 0.0       | 0       | 0          | 1360.6 | 0.86 | 1088   | 601    | -16    | 584     | 501     | 169        | -12        | 180 | 0.85 | 426       | 153         |
| 0.0       | 0       | 0          | 1288.2 | 0.86 | 1031   | 569    | -26    | 543     | 465     | 176        | -18        | 194 | 0.85 | 395       | 165         |
| 0.0       | 0       | 0          | 1215.9 | 0.86 | 973    | 537    | -37    | 500     | 429     | 182        | -26        | 207 | 0.85 | 364       | 176         |
| 0.0       | 0       | 0          | 1143.5 | 0.86 | 915    | 505    | -49    | 456     | 391     | 186        | -34        | 219 | 0.85 | 332       | 187         |
| 0.0       | 0       | 0          | 1071.2 | 0.86 | 857    | 473    | -63    | 410     | 352     | 187        | -43        | 231 | 0.85 | 299       | 196         |
| 0.0       | 0       | 0          | 998.8  | 0.86 | 799    | 441    | -78    | 362     | 311     | 188        | -54        | 242 | 0.85 | 264       | 205         |
| 825       | 0       | 0          | 926.5  | 0.86 | 741    | 409    | -97    | 312     | 268     | 186        | -67        | 252 | 0.85 | 228       | 215         |
| 0.0       | 0       | 0          | 833.8  | 0.86 | 667    | 368    | -108   | 260     | 223     | 181        | -74        | 255 | 0.85 | 189       | 216         |
| 0.0       | 0       | 0          | 741.2  | 0.86 | 593    | 327    | -108   | 219     | 188     | 173        | -74        | 247 | 0.85 | 159       | 210         |
| 0.0       | 0       | 0          | 648.5  | 0.86 | 519    | 286    | -108   | 178     | 153     | 162        | -74        | 236 | 0.85 | 130       | 200         |
| 0.0       | 0       | 0          | 555.9  | 0.86 | 445    | 245    | -108   | 137     | 117     | 148        | -74        | 222 | 0.85 | 100       | 188         |
| 0.0       | 0       | 0          | 463.2  | 0.86 | 371    | 204    | -108   | 96      | 82      | 131        | -74        | 204 | 0.85 | 70        | 174         |
| 0.0       | 0       | 0          | 245.5  | 0.86 | 196    | 108    | -108   | 0       | 0       | 79         | -74        | 152 | 0.85 | 0         | 129.6       |
| 0.0       | 0       | 0          | 152.8  | 0.86 | 122    | 67     | -140   | -72     | -62     | 52         | -54        | 106 | 0.85 | -53       | 90          |
| 0.0       | 0       | 0          | 60.2   | 0.86 | 48     | 27     | -182   | -155    | -133    | 21         | -26        | 48  | 0.85 | -113      | 40          |
| 1435.0    | 4       | 129        | 10.0   | 0.86 | 8      | 4      | -217   | -212    | -182    | 4          | 0          | 4   | 0.85 | -155      | 3           |
| 1575.0    | 4       | 129        | 0.0    | 0.86 | 0      | 0      | -217   | -217    | -186    | 0          | 0          | 0   | 0.85 | -158      | 0           |
| Total     |         | 516        |        |      |        |        |        |         |         |            |            |     |      |           |             |

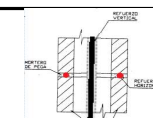
| Diam Ref Horiz (mm) | Separac. ref Horiz (mm) |
|---------------------|-------------------------|
| 4.0                 | 600                     |

| As (mm2) |
|----------|
| 12.57    |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00019 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 3/17 (J-M)  
4 Piso (C-F)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

$h'/t :$  15.9 < 30  
 $Re :$  0.86  
 $P_n :$  770.6 (kN)  
 $\phi P_n :$  655.0 (kN)  $\geq$   $P_u$  53.9  
 $As :$  516 mm<sup>2</sup>  
 $\rho :$  0.002259

Flexion Pura

$b :$  145.00 mm  
 $A_e :$  129671 mm<sup>2</sup>  
 $c :$  245.48 mm  
 $d :$  1575 mm  
 $te :$  79 mm  
 $t :$  145 mm  
 $\phi M_n :$  129.6 kN-m

Punto Balanceado

$cb :$  926.5  
 $\phi M_n :$  215 kN-m  
 $\phi P_n :$  227.6 (kN)  
 $M_n :$  kN-m  $\alpha M_{cr}$   
252  $\geq$  106.98  
**Si**

$M_u \leq \phi M_n$   
24.7  $\leq$  126.75  
**Si**

0.1  $f'_m A_e :$  197.6 kN  
0.25  $P_b :$  66.9 kN

Cortante

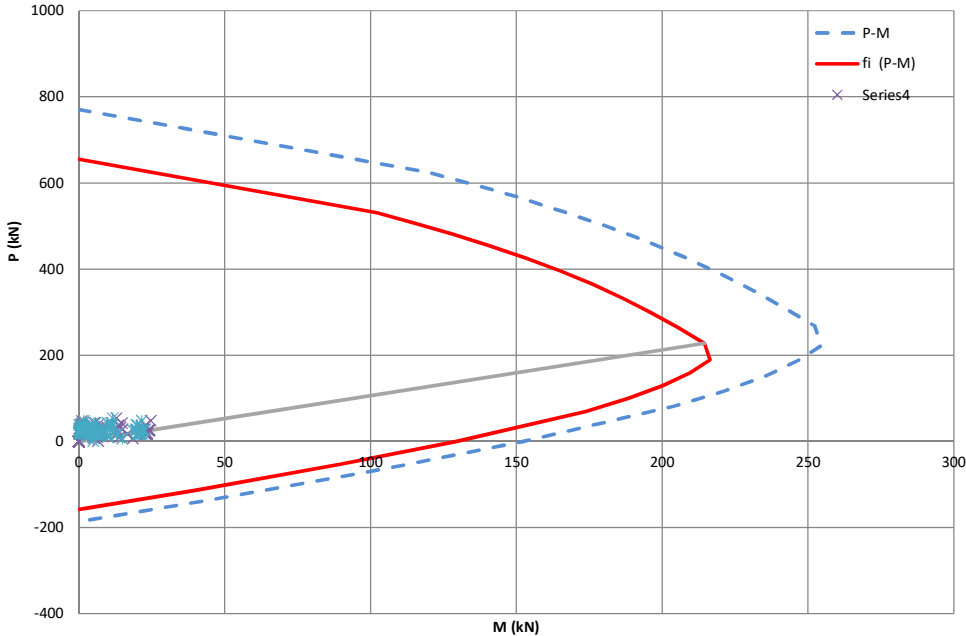
$M_u/V_u d :$  1.3  
 $As_v :$  12.57 mm<sup>2</sup>  
 $V_n \text{ max permit} :$  122.9835 mm<sup>2</sup>  $\geq$   
**Si**

$V_m :$  82.0 kN  
 $V_s :$  6.9 kN  
 $V_u = V_n + V_s :$  53.3 kN

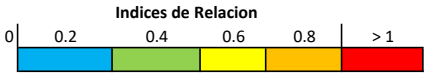
6  $A_e V_f m :$  223.6  
4  $A_e V_f m :$  149.1  
**OK Refuerzo a Cortante Suficiente**

0.2  $f'_m :$  1652.0 kPa  
0.2  $f'_m \geq$  421 kPa  
**OK No Necesita Elementos de Borde**

Curva de Interaccion de Mamposteria Reforzada en Arcilla

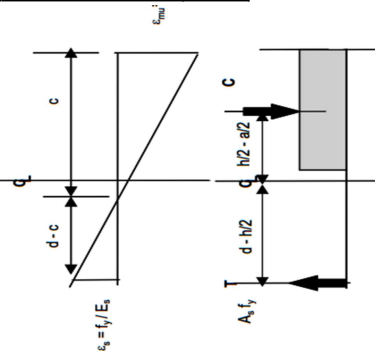


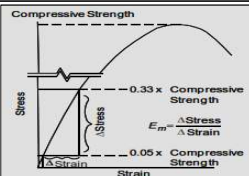
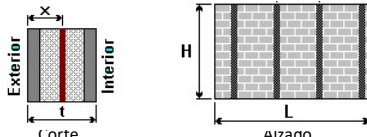
| Resumen         | Relacion                                                         |
|-----------------|------------------------------------------------------------------|
| Compr. Axial    | 0.08 <input checked="" type="checkbox"/> $P_u / \phi P_n$        |
| Axial - Flexion | 0.19 <input checked="" type="checkbox"/> $M_u / \phi M_n$        |
| Cortante        | 0.43 <input checked="" type="checkbox"/> $V_u / V_n \text{ max}$ |



Curva Interaccion  $\phi P_n - \phi M_n$

OK ☒

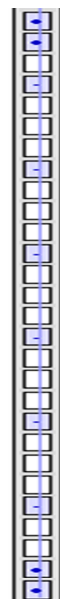


|                                                                                   |      |          |           |       |           |                                                                                    |                                      |         |        |            |          |            |         |             |   |                     |                       |            |
|-----------------------------------------------------------------------------------|------|----------|-----------|-------|-----------|------------------------------------------------------------------------------------|--------------------------------------|---------|--------|------------|----------|------------|---------|-------------|---|---------------------|-----------------------|------------|
| <b>Propiedades de Geometria Ladrillo</b>                                          |      |          |           |       |           |  | <b>Propiedades de Geometria Muro</b> |         |        |            |          |            |         |             |   |                     |                       |            |
| a (mm)                                                                            | t    | Area     | esp Pared | Area  | Area Neta |                                                                                    | X (mm)                               | L (mm)  | H (mm) | h' (mm)    | Ag (mm2) | Groutig en | te (mm) |             |   |                     |                       |            |
| largo                                                                             | (mm) | Vacios x | (mm)      | Bruta | (mm2)     |                                                                                    |                                      |         |        | (H-eolaca) |          |            |         |             |   |                     |                       |            |
| 300                                                                               | 145  | 5674.0   | 30        | 43500 | 30452     |                                                                                    |                                      |         |        |            |          |            |         |             |   |                     |                       |            |
|  |      |          |           |       |           | <b>Propiedades de Material</b>                                                     |                                      |         |        |            |          |            |         |             |   | <b>Prop. Diseño</b> |                       |            |
|                                                                                   |      |          |           |       |           | f'm (Mpa)                                                                          | E (Mpa)                              | G (Mpa) | v      | fy (Mpa)   | E (Mpa)  | Emu        | Ey      | Bloq Compr. | α |                     | φ Compr Y Flexo-Compr | φ Cortante |
|                                                                                   |      |          |           |       |           | 8.26                                                                               | 5782                                 | 2312.8  | 0.2    | 420        | 200000   | 0.0030     | 0.0021  | 0.85        | 3 | 0.32                | 0.85                  | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 215.0     | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 825       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1435.0    | 4       | 129                     |
| 1575.0    | 4       | 129                     |
| Total     |         | 516                     |

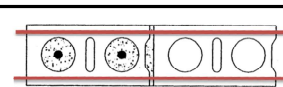


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 899     | 771     |                                |            |            | 0   | 0.85 |  | 655       | 0.0         |
| 1650   | 0.86 | 1320   | 728    | 0      | 728     | 624     | Compresion - Controla Acero    | 120        | 0          | 120 | 0.85 |  | 531       | 102         |
| 1577.6 | 0.86 | 1262   | 696    | 0      | 696     | 597     |                                | 135        | 0          | 135 | 0.85 |  | 508       | 115         |
| 1505.3 | 0.86 | 1204   | 664    | -4     | 661     | 567     |                                | 148        | -3         | 151 | 0.85 |  | 482       | 128         |
| 1432.9 | 0.86 | 1146   | 633    | -8     | 625     | 536     |                                | 159        | -6         | 165 | 0.85 |  | 455       | 140         |
| 1360.6 | 0.86 | 1088   | 601    | -16    | 584     | 501     |                                | 169        | -12        | 180 | 0.85 |  | 426       | 153         |
| 1288.2 | 0.86 | 1031   | 569    | -26    | 543     | 465     |                                | 176        | -18        | 194 | 0.85 |  | 395       | 165         |
| 1215.9 | 0.86 | 973    | 537    | -37    | 500     | 429     |                                | 182        | -26        | 207 | 0.85 |  | 364       | 176         |
| 1143.5 | 0.86 | 915    | 505    | -49    | 456     | 391     |                                | 186        | -34        | 219 | 0.85 |  | 332       | 187         |
| 1071.2 | 0.86 | 857    | 473    | -63    | 410     | 352     |                                | 187        | -43        | 231 | 0.85 |  | 299       | 196         |
| 998.8  | 0.86 | 799    | 441    | -78    | 362     | 311     |                                | 188        | -54        | 242 | 0.85 |  | 264       | 205         |
| 926.5  | 0.86 | 741    | 409    | -97    | 312     | 268     | Flexion - Controla Mamposteria | 186        | -67        | 252 | 0.85 |  | 228       | 215         |
| 833.8  | 0.86 | 667    | 368    | -108   | 260     | 223     |                                | 181        | -74        | 255 | 0.85 |  | 189       | 216         |
| 741.2  | 0.86 | 593    | 327    | -108   | 219     | 188     |                                | 173        | -74        | 247 | 0.85 |  | 159       | 210         |
| 648.5  | 0.86 | 519    | 286    | -108   | 178     | 153     |                                | 162        | -74        | 236 | 0.85 |  | 130       | 200         |
| 555.9  | 0.86 | 445    | 245    | -108   | 137     | 117     |                                | 148        | -74        | 222 | 0.85 |  | 100       | 188         |
| 463.2  | 0.86 | 371    | 204    | -108   | 96      | 82      |                                | 131        | -74        | 204 | 0.85 |  | 70        | 174         |
| 235.2  | 0.86 | 188    | 104    | -108   | -5      | -4      |                                | 76         | -74        | 150 | 0.85 |  | -3        | 127.1       |
| 142.5  | 0.86 | 114    | 63     | -148   | -85     | -73     |                                | 48         | -50        | 98  | 0.85 |  | -62       | 83          |
| 49.9   | 0.86 | 40     | 22     | -201   | -179    | -154    |                                | 18         | -11        | 29  | 0.85 |  | -131      | 25          |
| 10.0   | 0.86 | 8      | 4      | -217   | -212    | -182    |                                | 4          | 0          | 4   | 0.85 |  | -155      | 3           |
| 0.0    | 0.86 | 0      | 0      | -217   | -217    | -186    |                                | 0          | 0          | 0   | 0.85 |  | -158      | 0           |

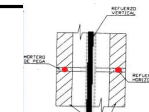
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00019 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 3/17 (J-M)  
5 Piso (C-F)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 770.6 (kN)  
 $\phi Pn$  : 655.0 (kN)  $\geq$  67.4  
As : 516 mm<sup>2</sup>  
 $\rho$  : 0.002259

Flexion Pura

b : 145.00 mm  
Ae : 129671 mm<sup>2</sup>  
c : 235.19 mm  
d : 1575 mm  
te : 79 mm  
t : 145 mm  
 $\phi Mn$  : 127.1 kN-m

Punto Balanceado

cb : 926.5  
 $\phi Mn$  : 215 kN-m  
 $\phi Pn$  : 227.6 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
252  $\geq$  106.98  
Si

$Mu \leq \phi Mn$   
40.2  $\leq$  134.09  
Si

0.1 f'm Ae : 197.6 kN  
0.25 Pb : 66.9 kN

Cortante

Mu/Vu d : 2.1  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit : 122.9835 mm<sup>2</sup>  $\geq$

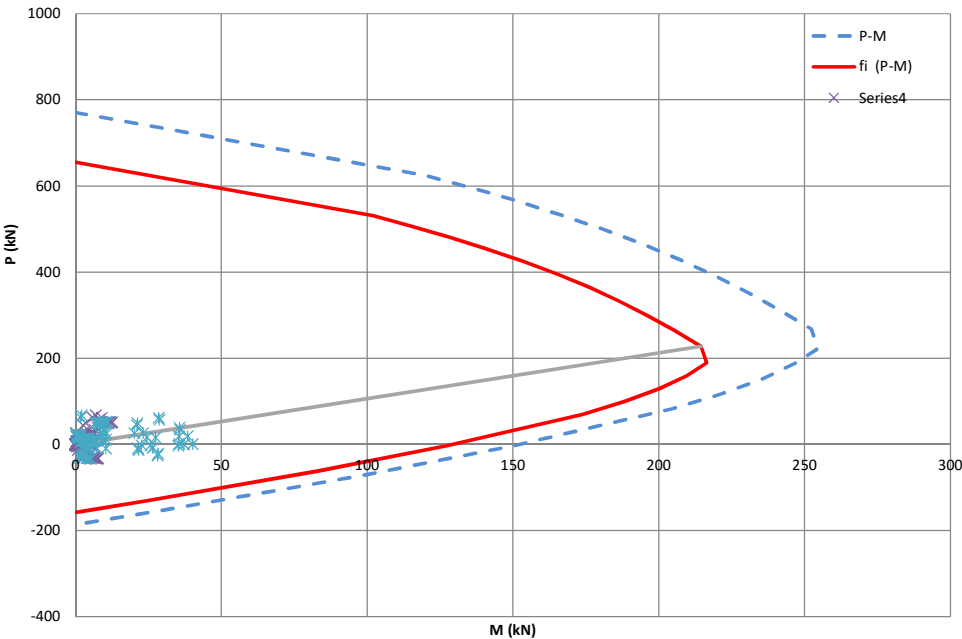
Vm : 82.0 kN  
Vs : 6.9 kN  
Vu = Vn + Vs : 53.3 kN

6 Ae√f'm : 223.6  
4 Ae√f'm : 149.1

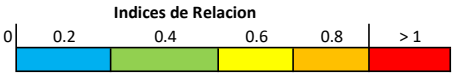
OK Refuerzo a Cortante Suficiente

0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  523 kPa  
OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

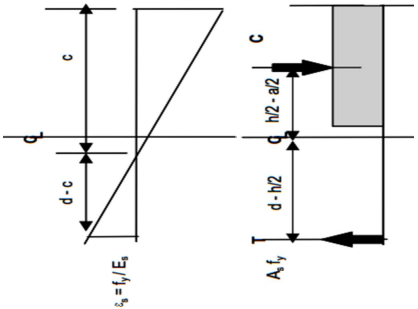


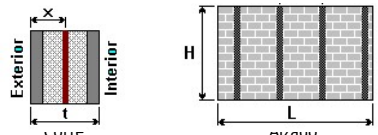
| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.10 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.30 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.43 <input checked="" type="checkbox"/> Vu/ Vn max    |

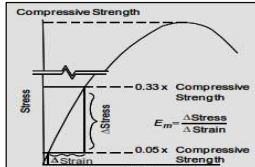


Curva Interaccion  $\phi Pn - \phi Mn$

OK ☒



|                                                                                   |      |          |           |       |           |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------|------|----------|-----------|-------|-----------|--|--|--|--|--|--|
|                                                                                   |      |          |           |       |           |  |  |  |  |  |  |
| Propiedades de Geometria Ladrillo                                                 |      |          |           |       |           |  |  |  |  |  |  |
| a (mm)                                                                            | t    | Area     | esp Pared | Area  | Area Neta |  |  |  |  |  |  |
| largo                                                                             | (mm) | Vacios x | (mm)      | Bruta | (mm2)     |  |  |  |  |  |  |
| 300                                                                               | 145  | 5674.0   | 30        | 43500 | 30452     |  |  |  |  |  |  |
|  |      |          |           |       |           |  |  |  |  |  |  |

|                                                                                    |         |         |            |          |           |                               |                         |             |   |      |                       |            |
|------------------------------------------------------------------------------------|---------|---------|------------|----------|-----------|-------------------------------|-------------------------|-------------|---|------|-----------------------|------------|
|  |         |         |            |          |           | Propiedades de Geometria Muro |                         |             |   |      |                       |            |
| X (mm)                                                                             | L (mm)  | H (mm)  | h' (mm)    | Ag (mm2) | Groutig   | te                            |                         |             |   |      |                       |            |
|                                                                                    |         |         | (H-Eolaca) |          | en        | (mm)                          |                         |             |   |      |                       |            |
| 75                                                                                 | 3750    | 2300    | 2300       | 543750   | Con Refue | 73.9                          |                         |             |   |      |                       |            |
|                                                                                    |         |         |            |          |           |                               | Propiedades de Material |             |   |      |                       |            |
| f'm                                                                                | E (Mpa) | G (Mpa) | v          | fy (Mpa) | E (Mpa)   | Emu                           | Ey                      | Bloq Compr. | α |      | φ Compr Y Flexo-Compr | φ Cortante |
| (Mpa)                                                                              |         |         |            |          |           |                               |                         |             |   |      |                       |            |
| 8.26                                                                               | 5782    | 2312.8  | 0.2        | 420      | 200000    | 0.0030                        | 0.0021                  | 0.85        | 3 | 0.32 | 0.85                  | 0.6        |

| Distribucion de Refuerzo |         |            | ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION |      |        |        |        |         |         |                             |                                |            |      |      |      |           |             |     |
|--------------------------|---------|------------|----------------------------------------------------|------|--------|--------|--------|---------|---------|-----------------------------|--------------------------------|------------|------|------|------|-----------|-------------|-----|
| Dist (mm)                | # Barra | Area (mm2) | c                                                  | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                             | C*x (kN-m)                     | T*x (kN-m) | Mn   | φ    |      | φ Pn (kN) | φ Mn (kN-m) |     |
| 75.0                     | 4       | 129        | 3750                                               | 0.86 | 3000   | 1557   | 0      | 1774    | 1521    | Compresion - Controla Acero | 584                            | 0          | 584  | 0.85 |      | 1293      | 0.0         |     |
| 215.0                    | 3       | 71         | 3591.2                                             | 0.86 | 2873   | 1491   | -2     | 1489    | 1277    |                             | 654                            | -3         | 657  | 0.85 |      | 1085      | 558         |     |
| 1275.0                   | 4       | 129        | 3432.4                                             | 0.86 | 2746   | 1425   | -7     | 1418    | 1216    |                             | 715                            | -12        | 727  | 0.85 |      | 1034      | 618         |     |
| 0.0                      | 0       | 0          | 3273.5                                             | 0.86 | 2619   | 1359   | -13    | 1346    | 1154    |                             | 769                            | -23        | 791  | 0.85 |      | 981       | 673         |     |
| 0.0                      | 0       | 0          | 3114.7                                             | 0.86 | 2492   | 1293   | -20    | 1273    | 1092    |                             | 813                            | -35        | 848  | 0.85 |      | 928       | 721         |     |
| 0.0                      | 0       | 0          | 2955.9                                             | 0.86 | 2365   | 1227   | -27    | 1200    | 1029    |                             | 850                            | -48        | 898  | 0.85 |      | 874       | 763         |     |
| 0.0                      | 0       | 0          | 2797.1                                             | 0.86 | 2238   | 1161   | -36    | 1126    | 965     |                             | 878                            | -62        | 940  | 0.85 |      | 820       | 799         |     |
| 0.0                      | 0       | 0          | 2638.2                                             | 0.86 | 2111   | 1095   | -45    | 1050    | 901     |                             | 898                            | -79        | 977  | 0.85 |      | 765       | 830         |     |
| 0.0                      | 0       | 0          | 2479.4                                             | 0.86 | 1984   | 1029   | -55    | 974     | 835     |                             | 909                            | -97        | 1006 | 0.85 |      | 710       | 855         |     |
| 0.0                      | 0       | 0          | 2320.6                                             | 0.86 | 1856   | 963    | -73    | 891     | 764     |                             | 912                            | -121       | 1034 | 0.85 |      | 649       | 878         |     |
| 1875                     | 0       | 0          | 2161.8                                             | 0.86 | 1729   | 897    | -92    | 805     | 690     |                             | Flexion - Controla Mamposteria | 907        | -149 | 1056 | 0.85 |           | 587         | 897 |
| 0.0                      | 0       | 0          | 1945.6                                             | 0.86 | 1556   | 808    | -105   | 703     | 602     |                             |                                | 886        | -160 | 1046 | 0.85 |           | 512         | 889 |
| 0.0                      | 0       | 0          | 1729.4                                             | 0.86 | 1384   | 718    | -117   | 601     | 515     | 850                         |                                | -167       | 1017 | 0.85 |      | 438       | 864         |     |
| 0.0                      | 0       | 0          | 1513.2                                             | 0.86 | 1211   | 628    | -133   | 495     | 424     | 798                         |                                | -177       | 974  | 0.85 |      | 361       | 828         |     |
| 0.0                      | 0       | 0          | 1297.1                                             | 0.86 | 1038   | 538    | -138   | 400     | 343     | 730                         |                                | -180       | 910  | 0.85 |      | 292       | 773         |     |
| 0.0                      | 0       | 0          | 1080.9                                             | 0.86 | 865    | 449    | -152   | 297     | 254     | 647                         |                                | -171       | 819  | 0.85 |      | 216       | 696         |     |
| 0.0                      | 0       | 0          | 454.1                                              | 0.86 | 363    | 189    | -192   | -4      | -3      | 319                         |                                | -147       | 466  | 0.85 |      | -3        | 396.3       |     |
| 0.0                      | 0       | 0          | 237.9                                              | 0.86 | 190    | 99     | -192   | -94     | -80     | 176                         |                                | -147       | 323  | 0.85 |      | -68       | 274         |     |
| 2475.0                   | 4       | 129        | 21.7                                               | 0.86 | 17     | 9      | -276   | -267    | -229    | 17                          |                                | 0          | 17   | 0.85 |      | -195      | 14          |     |
| 3535.0                   | 3       | 71         | 50.0                                               | 0.86 | 40     | 21     | -261   | -240    | -206    | 39                          |                                | -28        | 66   | 0.85 |      | -175      | 56          |     |
| 3675.0                   | 4       | 129        | 0.0                                                | 0.86 | 0      | 0      | -276   | -276    | -237    | 0                           | 0                              | 0          | 0.85 |      | -201 | 0         |             |     |
| Total                    |         | 658        |                                                    |      |        |        |        |         |         |                             |                                |            |      |      |      |           |             |     |

</

**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje 1/2/3/4/5 Piso  
4 (B-D)

**Universidad Santo Tomas**  
**Esp. Patología de la Construcción**

**Compresion Axial**

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 1521.1 (kN)  
φPn : 1293.0 (kN) ≥ 311.5  
As : 658 mm<sup>2</sup>  
ρ : 0.001235

**Flexion Pura**

b : 145.00 mm  
Ae : 277169 mm<sup>2</sup>  
c : 454.06 mm  
d : 3675 mm  
te : 74 mm  
t : 145 mm  
φ Mn : 396.3 kN-m

**Punto Balanceado**

cb : 2161.8  
φ Mn : 897 kN-m  
φPn : 586.6 (kN)  
Mn : kN-m αMcr  
1056 ≥ 519.69  
Si

Mu ≤ φ Mn  
116.0 ≤ 707.50  
Si

0.1 f'm Ae : 449.1 kN  
0.25 Pb : 172.5 kN

**Cortante**

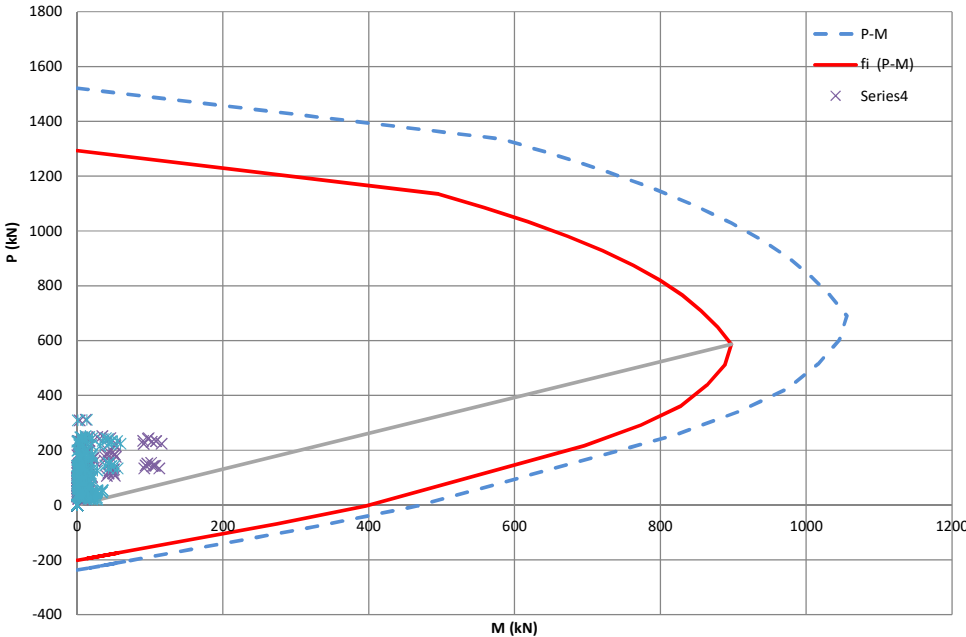
Mu/Vu d : 4.5  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit : 262.8746 mm<sup>2</sup> ≥

Vm : 175.2 kN  
Vs : 16.2 kN  
Vu= Vn+Vs : 114.8 kN

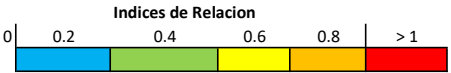
6 Ae√f'm : 478.0  
4 Ae√f'm : 318.6  
**OK Refuerzo a Cortante Suficiente**

0.2 f'm : 1652.0 kPa  
0.2 f'm ≥ 1124 kPa  
**OK No Necesita Elementos de Borde**

**Curva de Interaccion de Mamposteria Reforzada en Arcilla**

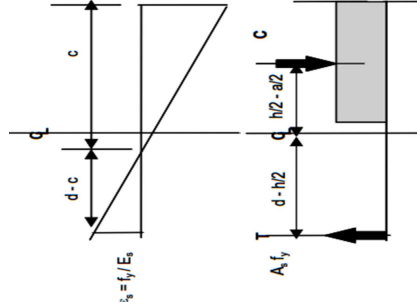


| Resumen         | Relacion          |
|-----------------|-------------------|
| Compr. Axial    | 0.24 ✓ Pu/ φPn    |
| Axial - Flexion | 0.16 ✓ Mu/ φMn    |
| Cortante        | 0.44 ✓ Vu/ Vn max |



**Curva Interaccion φ Pn - φ Mn**

OK ✓



TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8

EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

1/2/3/4/5 Piso

Universidad Santo Tomas

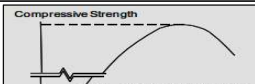
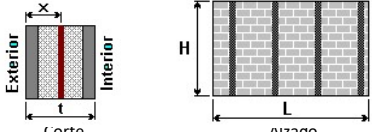
Muro : Eje

16

(B-D)

Esp. Patología de la Construcción

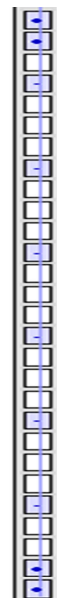
(L-N)

|                                                                                   |         |          |           |          |           |                                      |        |             |             |          |                       |                                                                                    |  |  |  |  |  |  |                     |  |
|-----------------------------------------------------------------------------------|---------|----------|-----------|----------|-----------|--------------------------------------|--------|-------------|-------------|----------|-----------------------|------------------------------------------------------------------------------------|--|--|--|--|--|--|---------------------|--|
|                                                                                   |         |          |           |          |           |                                      |        |             |             |          |                       |  |  |  |  |  |  |  |                     |  |
| <b>Propiedades de Geometria Ladrillo</b>                                          |         |          |           |          |           | <b>Propiedades de Geometria Muro</b> |        |             |             |          |                       |                                                                                    |  |  |  |  |  |  |                     |  |
| a (mm)                                                                            | t       | Area     | esp Pared | Area     | Area Neta | X (mm)                               | L (mm) | H (mm)      | h' (mm)     | Ag (mm2) | Groutig en            | te (mm)                                                                            |  |  |  |  |  |  |                     |  |
| largo                                                                             | (mm)    | Vacios x | (mm)      | Bruta    | (mm2)     |                                      |        |             | (H-Ecolaca) |          |                       |                                                                                    |  |  |  |  |  |  |                     |  |
| 300                                                                               | 145     | 5674.0   | 30        | 43500    | 30452     | 75                                   | 3750   | 2300        | 2300        | 543750   | Con Refu              | 73.9                                                                               |  |  |  |  |  |  |                     |  |
|  |         |          |           |          |           |                                      |        |             |             |          |                       | <b>Propiedades de Material</b>                                                     |  |  |  |  |  |  | <b>Prop. Diseño</b> |  |
| f'm (Mpa)                                                                         | E (Mpa) | G (Mpa)  | v         | fy (Mpa) | E (Mpa)   | Emu                                  | Ey     | Bloq Compr. | α           |          | φ Compr Y Flexo-Compr | φ Cortante                                                                         |  |  |  |  |  |  |                     |  |
| 8.26                                                                              | 5782    | 2312.8   | 0.2       | 420      | 200000    | 0.0030                               | 0.0021 | 0.85        | 3           | 0.32     | 0.85                  | 0.6                                                                                |  |  |  |  |  |  |                     |  |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 215.0     | 3       | 71                      |
| 1275.0    | 3       | 71                      |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1875      | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 2475.0    | 3       | 71                      |
| 3535.0    | 3       | 71                      |
| 3675.0    | 4       | 129                     |
| Total     |         | 542                     |

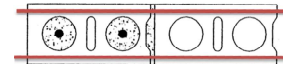


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |  | C*x (kN-m) | T*x (kN-m) | Mn   | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--|------------|------------|------|------|--|-----------|-------------|
|        |      |        |        |        | 1736    | 1488    |  |            |            | 0    | 0.85 |  | 1265      | 0.0         |
| 3750   | 0.86 | 3000   | 1557   | 0      | 1557    | 1335    |  | 584        | 0          | 584  | 0.85 |  | 1135      | 496         |
| 3591.2 | 0.86 | 2873   | 1491   | -2     | 1489    | 1277    |  | 654        | -3         | 657  | 0.85 |  | 1085      | 558         |
| 3432.4 | 0.86 | 2746   | 1425   | -7     | 1418    | 1216    |  | 715        | -12        | 727  | 0.85 |  | 1034      | 618         |
| 3273.5 | 0.86 | 2619   | 1359   | -13    | 1346    | 1154    |  | 769        | -23        | 791  | 0.85 |  | 981       | 673         |
| 3114.7 | 0.86 | 2492   | 1293   | -20    | 1273    | 1092    |  | 813        | -35        | 848  | 0.85 |  | 928       | 721         |
| 2955.9 | 0.86 | 2365   | 1227   | -27    | 1200    | 1029    |  | 850        | -48        | 898  | 0.85 |  | 874       | 763         |
| 2797.1 | 0.86 | 2238   | 1161   | -36    | 1126    | 965     |  | 878        | -62        | 940  | 0.85 |  | 820       | 799         |
| 2638.2 | 0.86 | 2111   | 1095   | -45    | 1050    | 901     |  | 898        | -79        | 977  | 0.85 |  | 765       | 830         |
| 2479.4 | 0.86 | 1984   | 1029   | -55    | 974     | 835     |  | 909        | -97        | 1006 | 0.85 |  | 710       | 855         |
| 2320.6 | 0.86 | 1856   | 963    | -70    | 893     | 766     |  | 912        | -120       | 1032 | 0.85 |  | 651       | 877         |
| 2161.8 | 0.86 | 1729   | 897    | -87    | 810     | 694     |  | 907        | -146       | 1053 | 0.85 |  | 590       | 895         |
| 1945.6 | 0.86 | 1556   | 808    | -96    | 712     | 611     |  | 886        | -154       | 1040 | 0.85 |  | 519       | 884         |
| 1729.4 | 0.86 | 1384   | 718    | -102   | 616     | 528     |  | 850        | -158       | 1008 | 0.85 |  | 449       | 856         |
| 1513.2 | 0.86 | 1211   | 628    | -111   | 517     | 443     |  | 798        | -163       | 961  | 0.85 |  | 377       | 817         |
| 1297.1 | 0.86 | 1038   | 538    | -114   | 425     | 364     |  | 730        | -165       | 895  | 0.85 |  | 309       | 761         |
| 1080.9 | 0.86 | 865    | 449    | -121   | 327     | 281     |  | 647        | -160       | 808  | 0.85 |  | 238       | 687         |
| 346.0  | 0.86 | 277    | 144    | -144   | 0       | 0       |  | 249        | -147       | 396  | 0.85 |  | 0         | 337.0       |
| 129.8  | 0.86 | 104    | 54     | -172   | -118    | -101    |  | 98         | -101       | 199  | 0.85 |  | -86       | 169         |
| 90.0   | 0.86 | 72     | 37     | -173   | -136    | -117    |  | 69         | -98        | 166  | 0.85 |  | -99       | 141         |
| 50.0   | 0.86 | 40     | 21     | -212   | -191    | -164    |  | 39         | -28        | 66   | 0.85 |  | -139      | 56          |
| 0.0    | 0.86 | 0      | 0      | -228   | -228    | -195    |  | 0          | 0          | 0    | 0.85 |  | -166      | 0           |

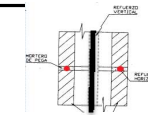
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00020 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 1/2/3/4/5 Piso 16 (B-D)  
(L-N)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 1488.3 (kN)  
 $\phi Pn$  : 1265.0 (kN)  $\geq$  339.1  
As : 542 mm<sup>2</sup>  
 $\rho$  : 0.001017

Flexion Pura

b : 145.00 mm  
Ae : 277169 mm<sup>2</sup>  
c : 346.00 mm  
d : 3675 mm  
te : 74 mm  
t : 145 mm  
 $\phi Mn$  : 337.0 kN-m

Punto Balanceado

cb : 2161.8  
 $\phi Mn$  : 895 kN-m  
 $\phi Pn$  : 590.3 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
1053  $\geq$  519.69  
Si

$Mu \leq \phi Mn$   
335.5  $\leq$  700.81  
Si

0.1 f'm Ae : 449.1 kN  
0.25 Pb : 173.6 kN

Cortante

Mu/Vu d : 5.2  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit : 262.8746 mm<sup>2</sup>  $\geq$

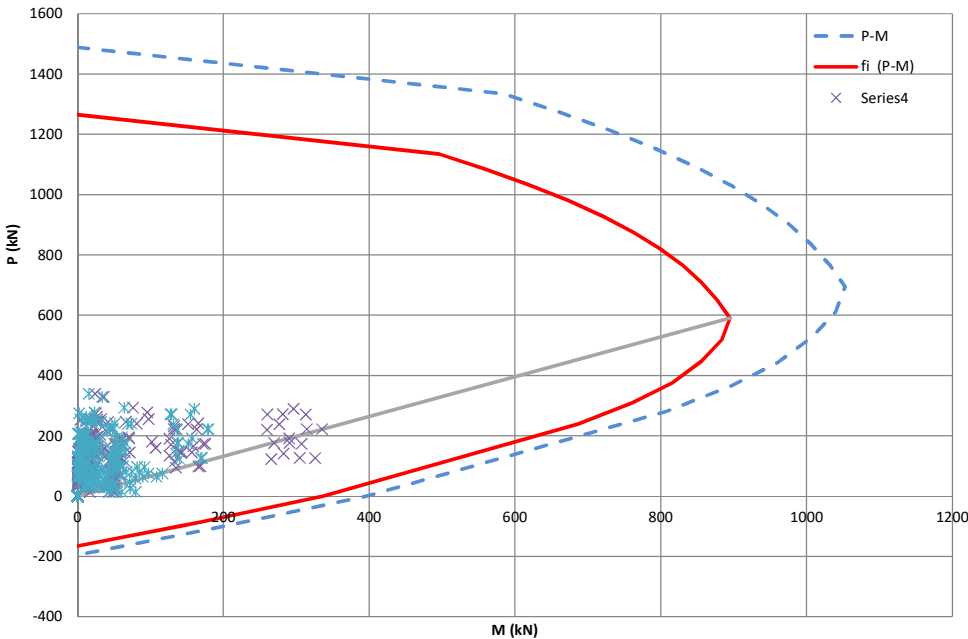
Vm : 175.2 kN  
Vs : 16.2 kN  
Vu = Vn + Vs : 114.8 kN

6 Ae√f'm : 478.0  
4 Ae√f'm : 318.6

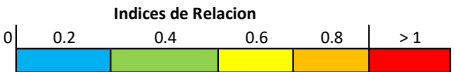
OK Refuerzo a Cortante Suficiente

0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  1224 kPa  
OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

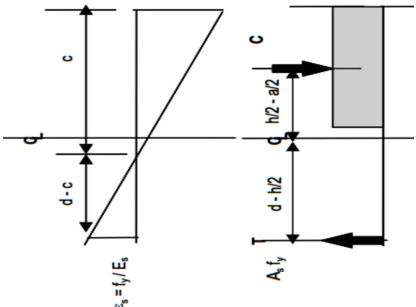


| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.27 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.48 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.44 <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

OK ☒



TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8

EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

1/2/3/4/5 Piso

Universidad Santo Tomas

Muro : Eje

4

(E-G)

Esp. Patología de la Construcción

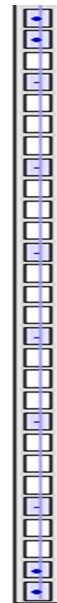
(I-K)

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Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 215.0     | 3       | 71                      |
| 1275.0    | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1050      | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 825.0     | 0       | 0                       |
| 1885.0    | 3       | 71                      |
| 2025.0    | 4       | 129                     |
| Total     |         | 529                     |

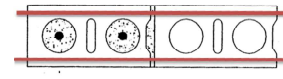


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|-----|------|--|-----------|-------------|
| 2100   | 0.86 | 1680   | 924    | 0      | 1099    | 942     | Compresion - Controla Acero    | 194        | 0          | 194 | 0.85 |  | 801       | 0.0         |
| 2009.1 | 0.86 | 1607   | 884    | -1     | 883     | 757     |                                | 218        | -1         | 218 | 0.85 |  | 673       | 165         |
| 1918.2 | 0.86 | 1535   | 844    | -4     | 840     | 720     |                                | 239        | -4         | 243 | 0.85 |  | 644       | 186         |
| 1827.4 | 0.86 | 1462   | 804    | -10    | 794     | 681     |                                | 257        | -9         | 266 | 0.85 |  | 612       | 206         |
| 1736.5 | 0.86 | 1389   | 764    | -17    | 748     | 641     |                                | 272        | -16        | 287 | 0.85 |  | 579       | 226         |
| 1645.6 | 0.86 | 1316   | 724    | -24    | 700     | 600     |                                | 284        | -23        | 306 | 0.85 |  | 545       | 244         |
| 1554.7 | 0.86 | 1244   | 684    | -32    | 652     | 559     |                                | 293        | -30        | 323 | 0.85 |  | 510       | 260         |
| 1463.8 | 0.86 | 1171   | 644    | -42    | 602     | 516     |                                | 299        | -39        | 338 | 0.85 |  | 475       | 275         |
| 1372.9 | 0.86 | 1098   | 604    | -53    | 551     | 473     |                                | 303        | -49        | 352 | 0.85 |  | 439       | 288         |
| 1282.1 | 0.86 | 1026   | 564    | -65    | 499     | 428     |                                | 303        | -60        | 364 | 0.85 |  | 402       | 299         |
| 1191.2 | 0.86 | 953    | 524    | -79    | 445     | 382     | Flexion - Controla Mamposteria | 301        | -74        | 374 | 0.85 |  | 364       | 309         |
| 1072.1 | 0.86 | 858    | 472    | -84    | 388     | 332     |                                | 293        | -78        | 371 | 0.85 |  | 324       | 318         |
| 952.9  | 0.86 | 762    | 419    | -92    | 327     | 281     |                                | 280        | -78        | 358 | 0.85 |  | 283       | 315         |
| 833.8  | 0.86 | 667    | 367    | -104   | 263     | 225     |                                | 263        | -78        | 341 | 0.85 |  | 239       | 304         |
| 714.7  | 0.86 | 572    | 314    | -120   | 194     | 166     |                                | 240        | -78        | 318 | 0.85 |  | 192       | 290         |
| 595.6  | 0.86 | 476    | 262    | -138   | 124     | 106     |                                | 213        | -78        | 290 | 0.85 |  | 142       | 270         |
| 194.4  | 0.86 | 156    | 86     | -143   | -57     | -49     |                                | 83         | -74        | 157 | 0.85 |  | 90        | 247         |
| 190.0  | 0.86 | 152    | 84     | -144   | -60     | -52     |                                | 81         | -73        | 154 | 0.85 |  | -42       | 133.6       |
| 120.0  | 0.86 | 96     | 53     | -168   | -115    | -99     |                                | 53         | -53        | 106 | 0.85 |  | -44       | 131         |
| 30.0   | 0.86 | 24     | 13     | -222   | -209    | -179    |                                | 14         | 0          | 14  | 0.85 |  | -84       | 90          |
| 0.0    | 0.86 | 0      | 0      | -222   | -222    | -190    |                                | 0          | 0          | 0   | 0.85 |  | -152      | 12          |
|        |      |        |        |        |         |         |                                |            |            |     |      |  | -162      | 0           |

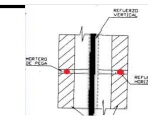
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00019 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 1/2/3/4/5 Piso  
(I-K) 4 (E-G)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 942.1 (kN)  
φPn : 800.8 (kN) ≥ 152.5  
As : 529 mm<sup>2</sup>  
ρ : 0.001802

Flexion Pura

b : 145.00 mm  
Ae : 164520 mm<sup>2</sup>  
c : 194.43 mm  
d : 2025 mm  
te : 78 mm  
t : 145 mm  
φ Mn : 133.6 kN-m

Punto Balanceado

cb : 1191.2  
φ Mn : 318 kN-m  
φPn : 324.4 (kN)  
Mn : kN-m αMcr  
374 ≥ 172.75  
Si

Mu ≤ φ Mn  
29.2 ≤ 236.89  
Si

0.1 f'm Ae : 251.5 kN  
0.25 Pb : 95.4 kN

Cortante

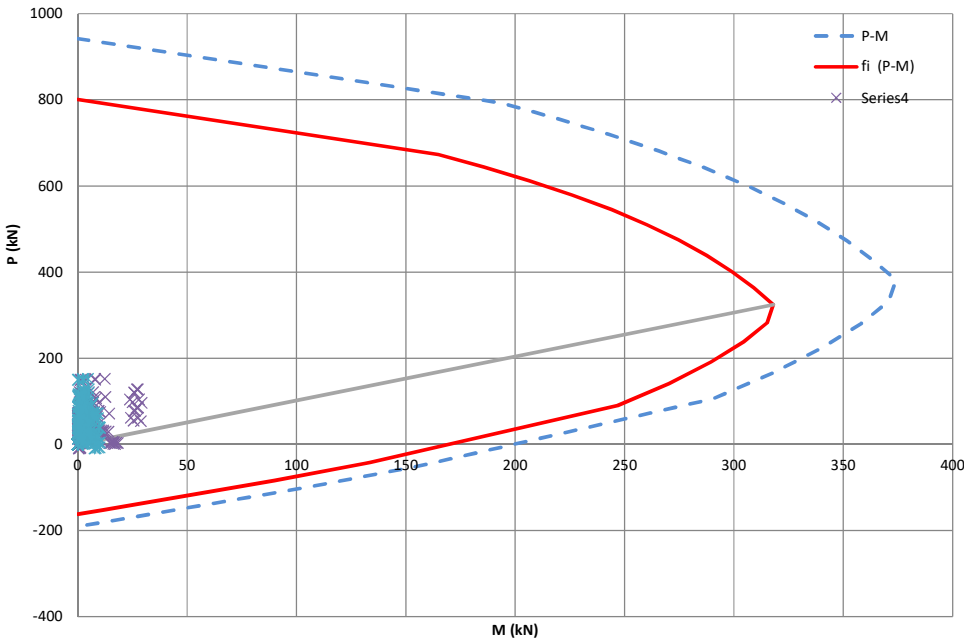
Mu/Vu d : 2.9  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit : 156.0352 mm<sup>2</sup> ≥  
Vu = Vn + Vs : 67.8 kN  
Si

Vm : 104.0 kN  
Vs : 8.9 kN  
Vu = Vn + Vs : 67.8 kN

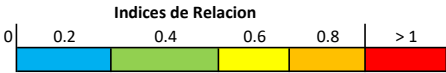
6 Ae √f'm : 283.7  
4 Ae √f'm : 189.1  
OK Refuerzo a Cortante Suficiente

0.2 f'm : 1652.0 kPa  
0.2 f'm ≥ 929 kPa  
OK No Necesita Elementos de Borde

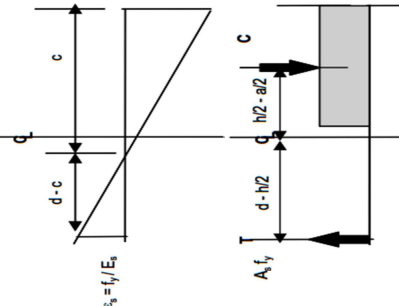
Curva de Interaccion de Mamposteria Reforzada en Arcilla



| Resumen         | Relacion          |
|-----------------|-------------------|
| Compr. Axial    | 0.19 ✓ Pu/ φPn    |
| Axial - Flexion | 0.12 ✓ Mu/ φMn    |
| Cortante        | 0.43 ✓ Vu/ Vn max |



Curva Interaccion φ Pn - φ Mn



TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8

EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

1/2/3/4/5

Piso

Universidad Santo Tomas

Esp. Patología de la Construcción

Muro : Eje

6/14

(E-G)

(I-K)

Compressive Strength

Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm)<br>(H-Eolaca) | Ag (mm2) | Groutig<br>en | te<br>(mm) |
|--------|--------|--------|-----------------------|----------|---------------|------------|
| 75     | 2100   | 2300   | 2300                  | 304500   | Con Refue     | 78.3       |

Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area<br>Vacíos x | esp Pared<br>(mm) | Area<br>Bruta | Area Neta<br>(mm2) |
|--------|--------|------------------|-------------------|---------------|--------------------|
| 300    | 145    | 5674.0           | 30                | 43500         | 30452              |

Propiedades de Material

| f'm<br>(Mpa) | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | Emu    | Ey     | Bloq Compr. | α |      | φ Compr Y Flexo-<br>Compr | φ Cortante |
|--------------|---------|---------|-----|----------|---------|--------|--------|-------------|---|------|---------------------------|------------|
| 8.26         | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32 | 0.85                      | 0.6        |

Prop. Diseño

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area<br>(mm2) |
|-----------|---------|---------------|
| 75.0      | 4       | 129           |
| 225.0     | 3       | 71            |
| 0.0       | 0       | 0             |
| 0.0       | 0       | 0             |
| 0.0       | 0       | 0             |
| 0.0       | 0       | 0             |
| 0.0       | 0       | 0             |
| 0.0       | 0       | 0             |
| 0.0       | 0       | 0             |
| 0.0       | 0       | 0             |
| 1050      | 4       | 129           |
| 0.0       | 0       | 0             |
| 0.0       | 0       | 0             |
| 0.0       | 0       | 0             |
| 0.0       | 0       | 0             |
| 0.0       | 0       | 0             |
| 0.0       | 0       | 0             |
| 0.0       | 0       | 0             |
| 0.0       | 0       | 0             |
| 1875.0    | 3       | 71            |
| 2025.0    | 4       | 129           |
| Total     |         | 529           |

| c      | Re   | a=0.8c | C (kN) | T (kN) | Po<br>(kN) | Pn (kN) |    | C*x (kN-<br>m) | T*x<br>(kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn<br>(kN-m) |
|--------|------|--------|--------|--------|------------|---------|----|----------------|---------------|-----|------|--|-----------|----------------|
|        |      |        |        |        | 1099       | 942     |    |                |               | 0   | 0.85 |  | 801       | 0.0            |
| 2100   | 0.86 | 1680   | 924    | 0      | 924        | 792     |    | 194            | 0             | 194 | 0.85 |  | 673       | 165            |
| 2009.1 | 0.86 | 1607   | 884    | -1     | 883        | 757     |    | 218            | -1            | 218 | 0.85 |  | 644       | 186            |
| 1918.2 | 0.86 | 1535   | 844    | -4     | 840        | 720     |    | 239            | -4            | 243 | 0.85 |  | 612       | 206            |
| 1827.4 | 0.86 | 1462   | 804    | -9     | 795        | 681     |    | 257            | -9            | 266 | 0.85 |  | 579       | 226            |
| 1736.5 | 0.86 | 1389   | 764    | -16    | 748        | 641     |    | 272            | -15           | 287 | 0.85 |  | 545       | 244            |
| 1645.6 | 0.86 | 1316   | 724    | -24    | 700        | 600     |    | 284            | -22           | 306 | 0.85 |  | 510       | 260            |
| 1554.7 | 0.86 | 1244   | 684    | -32    | 652        | 559     |    | 293            | -30           | 323 | 0.85 |  | 475       | 275            |
| 1463.8 | 0.86 | 1171   | 644    | -42    | 602        | 517     |    | 299            | -39           | 338 | 0.85 |  | 439       | 287            |
| 1372.9 | 0.86 | 1098   | 604    | -52    | 552        | 473     |    | 303            | -49           | 351 | 0.85 |  | 402       | 299            |
| 1282.1 | 0.86 | 1026   | 564    | -65    | 500        | 428     |    | 303            | -60           | 363 | 0.85 |  | 364       | 309            |
| 1191.2 | 0.86 | 953    | 524    | -79    | 446        | 382     | FB | 301            | -73           | 374 | 0.85 |  | 325       | 318            |
| 1072.1 | 0.86 | 858    | 472    | -84    | 388        | 332     |    | 293            | -77           | 370 | 0.85 |  | 283       | 315            |
| 952.9  | 0.86 | 762    | 419    | -92    | 327        | 281     |    | 280            | -77           | 358 | 0.85 |  | 239       | 304            |
| 833.8  | 0.86 | 667    | 367    | -104   | 263        | 225     |    | 263            | -77           | 340 | 0.85 |  | 192       | 289            |
| 714.7  | 0.86 | 572    | 314    | -120   | 194        | 166     |    | 240            | -77           | 318 | 0.85 |  | 142       | 270            |
| 595.6  | 0.86 | 476    | 262    | -138   | 124        | 106     |    | 213            | -77           | 290 | 0.85 |  | 90        | 247            |
| 314.0  | 0.86 | 251    | 138    | -138   | 0          | 0       |    | 128            | -77           | 205 | 0.85 |  | 0         | 174.4          |
| 190.0  | 0.86 | 152    | 84     | -146   | -62        | -54     |    | 81             | -71           | 152 | 0.85 |  | -45       | 130            |
| 120.0  | 0.86 | 96     | 53     | -168   | -115       | -99     |    | 53             | -53           | 106 | 0.85 |  | -84       | 90             |
| 30.0   | 0.86 | 24     | 13     | -222   | -209       | -179    |    | 14             | 0             | 14  | 0.85 |  | -152      | 12             |
| 0.0    | 0.86 | 0      | 0      | -222   | -222       | -190    |    | 0              | 0             | 0   | 0.85 |  | -162      | 0              |

As (mm2)

12.57

eficien. η

0.35

ρn

0.00019

Planta

Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 1/2/3/4/5 Piso  
(I-K) 6/14 (E-G)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

$h'/t$  : 15.9 < 30  
Re : 0.86  
Pn : 942.1 (kN)  
 $\phi Pn$  : 800.8 (kN)  $\geq$  143.6  
As : 529 mm<sup>2</sup>  
 $\rho$  : 0.001802

Flexion Pura

b : 145.00 mm  
Ae : 164520 mm<sup>2</sup>  
c : 314.02 mm  
d : 2025 mm  
te : 78 mm  
t : 145 mm  
 $\phi Mn$  : 174.4 kN-m

Punto Balanceado

cb : 1191.2  
 $\phi Mn$  : 318 kN-m  
 $\phi Pn$  : 324.7 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
374  $\geq$  172.75  
Si

$Mu \leq \phi Mn$   
86.4  $\leq$  231.42  
Si

0.1  $f'm Ae$  : 251.5 kN  
0.25 Pb : 95.5 kN

Cortante

$Mu/Vu d$  : 2.0  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit : 156.0352 mm<sup>2</sup>  $\geq$

Vm : 104.0 kN  
Vs : 8.9 kN  
Vu = Vn + Vs : 67.8 kN

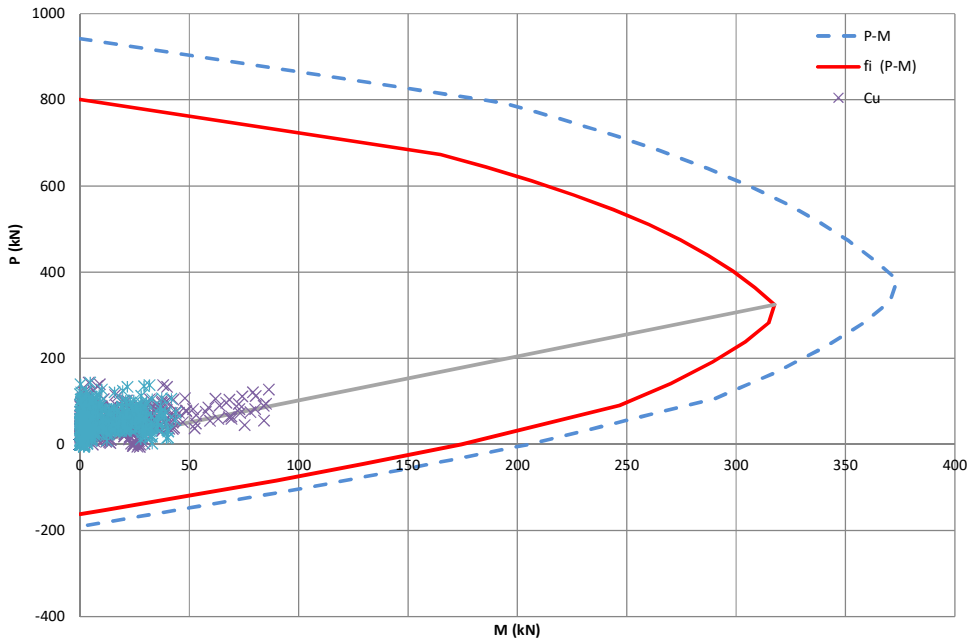
6 Ae  $\sqrt{f'm}$  : 283.7  
4 Ae  $\sqrt{f'm}$  : 189.1

OK Refuerzo a Cortante Suficiente

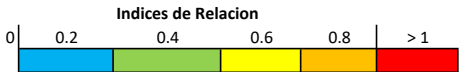
0.2  $f'm$  : 1652.0 kPa  
0.2  $f'm \geq$  873 kPa

OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

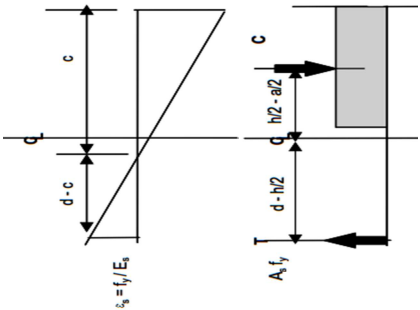


| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.18 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.37 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.43 <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

OK ☒



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 235.0     | 3       | 71                      |
| 675.0     | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 2325      | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 3975.0    | 4       | 129                     |
| 4415.0    | 3       | 71                      |
| 4575.0    | 6       | 284                     |
| Total     |         | 942                     |

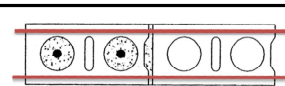


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn   | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|------|------|--|-----------|-------------|
|        |      |        |        |        | 2228    | 1910    |                                |            |            | 0    | 0.85 |  | 1623      | 0.0         |
| 4650   | 0.86 | 3720   | 1916   | 0      | 1916    | 1643    | Compresion - Controla Acero    | 891        | 0          | 891  | 0.85 |  | 1397      | 757         |
| 4454.1 | 0.86 | 3563   | 1836   | -5     | 1831    | 1570    |                                | 997        | -10        | 1008 | 0.85 |  | 1334      | 857         |
| 4258.2 | 0.86 | 3407   | 1755   | -14    | 1741    | 1492    |                                | 1091       | -32        | 1123 | 0.85 |  | 1269      | 954         |
| 4062.4 | 0.86 | 3250   | 1674   | -25    | 1649    | 1414    |                                | 1172       | -56        | 1228 | 0.85 |  | 1202      | 1044        |
| 3866.5 | 0.86 | 3093   | 1593   | -39    | 1554    | 1332    |                                | 1240       | -86        | 1327 | 0.85 |  | 1133      | 1128        |
| 3670.6 | 0.86 | 2936   | 1513   | -57    | 1456    | 1248    |                                | 1296       | -123       | 1419 | 0.85 |  | 1061      | 1206        |
| 3474.7 | 0.86 | 2780   | 1432   | -77    | 1355    | 1162    |                                | 1339       | -164       | 1503 | 0.85 |  | 988       | 1278        |
| 3278.8 | 0.86 | 2623   | 1351   | -99    | 1253    | 1074    |                                | 1370       | -210       | 1579 | 0.85 |  | 913       | 1342        |
| 3082.9 | 0.86 | 2466   | 1271   | -123   | 1147    | 984     |                                | 1387       | -261       | 1648 | 0.85 |  | 836       | 1401        |
| 2887.1 | 0.86 | 2310   | 1190   | -151   | 1039    | 890     |                                | 1392       | -319       | 1712 | 0.85 |  | 757       | 1455        |
| 2691.2 | 0.86 | 2153   | 1109   | -183   | 926     | 794     | Flexion - Controla Mamposteria | 1385       | -386       | 1771 | 0.85 |  | 675       | 1505        |
| 2422.1 | 0.86 | 1938   | 998    | -199   | 799     | 685     |                                | 1354       | -413       | 1766 | 0.85 |  | 583       | 1501        |
| 2152.9 | 0.86 | 1722   | 887    | -209   | 678     | 581     |                                | 1299       | -420       | 1719 | 0.85 |  | 494       | 1461        |
| 1883.8 | 0.86 | 1507   | 776    | -221   | 555     | 476     |                                | 1220       | -420       | 1640 | 0.85 |  | 404       | 1394        |
| 1614.7 | 0.86 | 1292   | 665    | -237   | 428     | 367     |                                | 1117       | -420       | 1538 | 0.85 |  | 312       | 1307        |
| 1345.6 | 0.86 | 1076   | 555    | -257   | 297     | 255     |                                | 991        | -420       | 1411 | 0.85 |  | 217       | 1199        |
| 636.2  | 0.86 | 509    | 262    | -262   | 0       | 0       |                                | 543        | -412       | 955  | 0.85 |  | 0         | 811.9       |
| 190.0  | 0.86 | 152    | 78     | -322   | -243    | -209    |                                | 176        | -310       | 486  | 0.85 |  | -177      | 413         |
| 120.0  | 0.86 | 96     | 49     | -341   | -292    | -250    |                                | 113        | -268       | 381  | 0.85 |  | -213      | 324         |
| 30.0   | 0.86 | 24     | 12     | -396   | -383    | -329    |                                | 29         | -146       | 175  | 0.85 |  | -279      | 149         |
| 0.0    | 0.86 | 0      | 0      | -396   | -396    | -339    |                                | 0          | 0          | 0    | 0.85 |  | -288      | 0           |

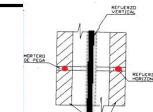
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00020 |



Planta



Corte

**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje  
(M-O)

1/2 Piso  
7/13 (A-D)

**Universidad Santo Tomas**  
**Esp. Patología de la Construcción**

**Compresion Axial**

h'/t : 15.9 < 30  
 Re : 0.86  
 Pn : 1909.9 (kN)  
 $\phi Pn$  : 1623.4 (kN)  $\geq$  576.4  
 Si  
 As : 942 mm<sup>2</sup>  
 $\rho$  : 0.00142

**Flexion Pura**

b : 145.00 mm  
 Ae : 341193 mm<sup>2</sup>  
 c : 636.17 mm  
 d : 4575 mm  
 te : 73 mm  
 t : 145 mm  
 $\phi Mn$  : 811.9 kN-m

**Punto Balanceado**

cb : 2691.2  
 $\phi Mn$  : 1505 kN-m  
 $\phi Pn$  : 674.6 (kN)  
 Mn : kN-m  $\alpha M_{cr}$   
 1771  $\geq$  793.27  
 Si

$Mu \leq \phi Mn$   
 387.5  $\leq$  1359.10  
 Si

0.1 f'm Ae : 556.9 kN  
 0.25 Pb : 198.4 kN

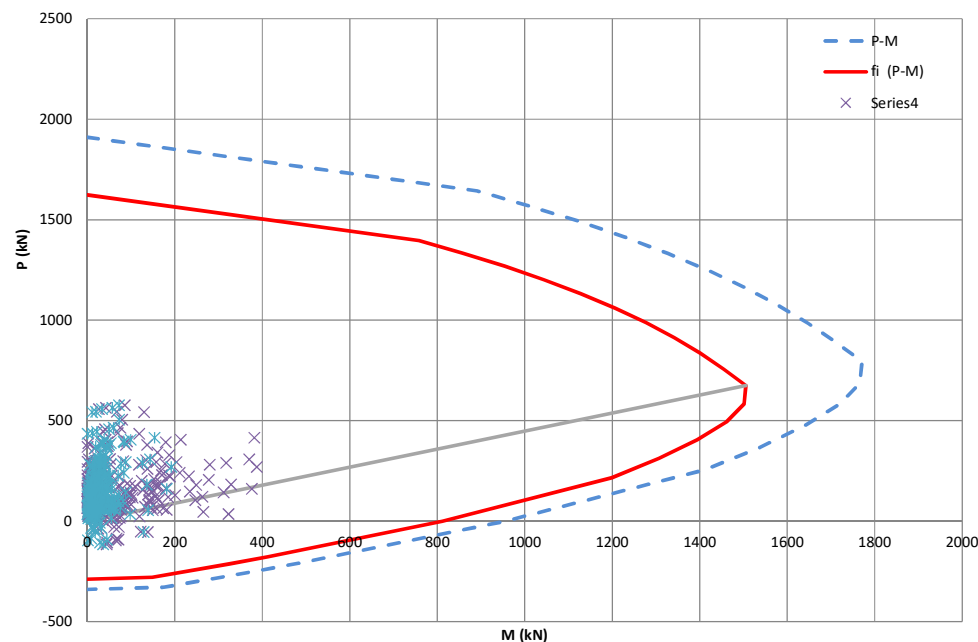
**Cortante**

Mu/Vu d : 3.4  
 Asv : 12.57 mm<sup>2</sup>  
 Vn max permit : 323.5967 mm<sup>2</sup>  $\geq$   
 Si  
 Vm : 215.7 kN  
 Vs : 20.1 kN  
 Vu = Vn + Vs : 141.5 kN

6 AeVf'm : 588.4  
 4 AeVf'm : 392.2  
**OK Refuerzo a Cortante Suficiente**

0.2 f'm : 1652.0 kPa  
 0.2 f'm  $\geq$  1690 kPa  
**Si Elementos de Borde**

**Curva de Interaccion de Mamposteria Reforzada en Arcilla**

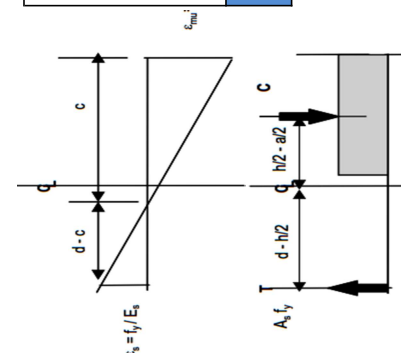


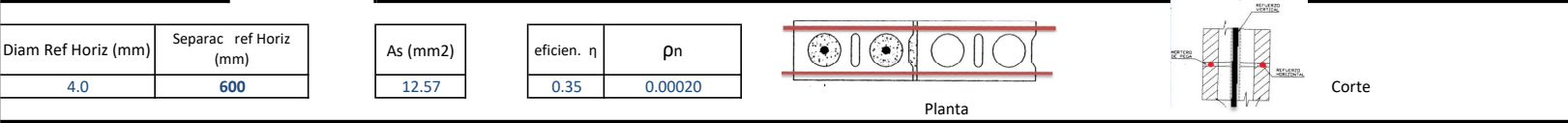
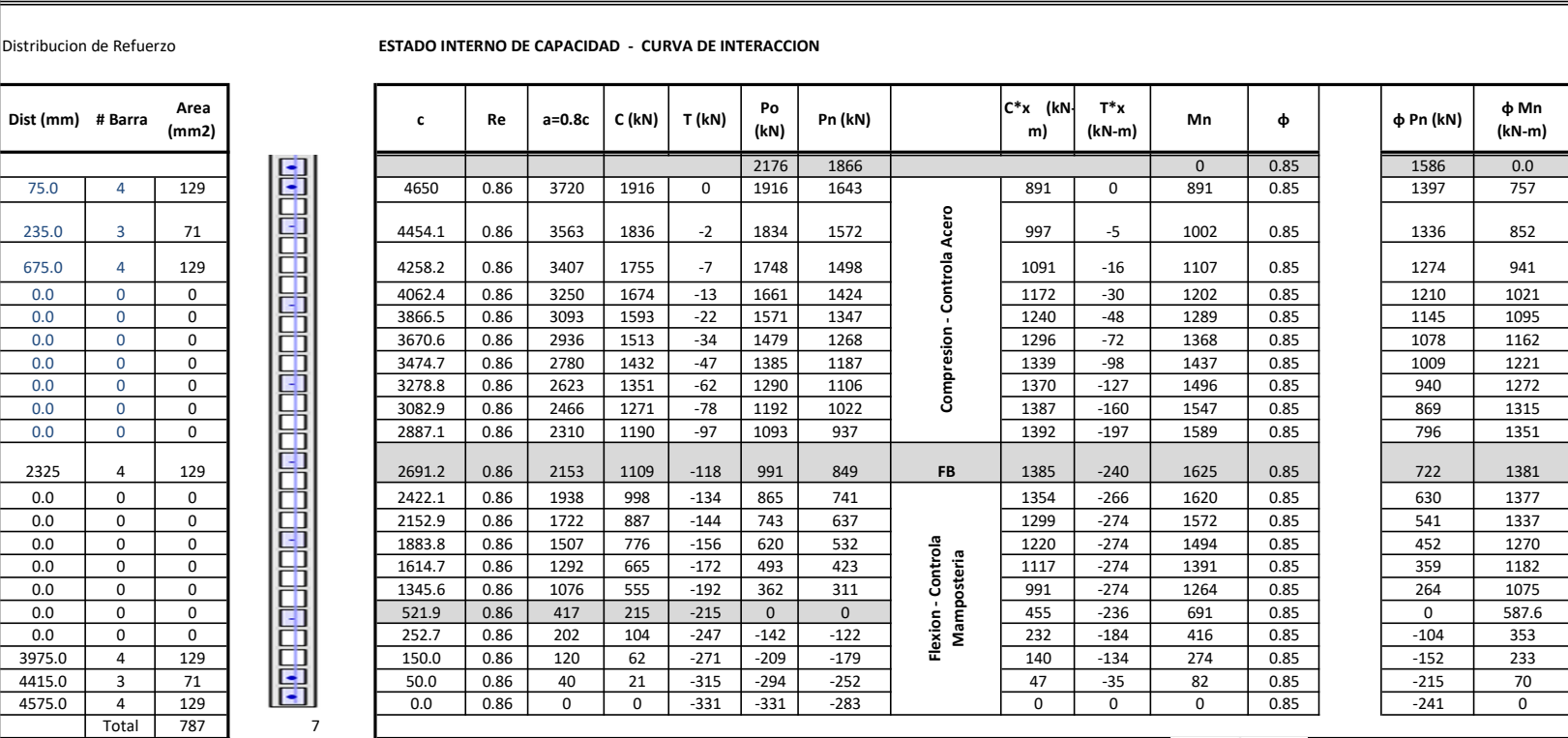
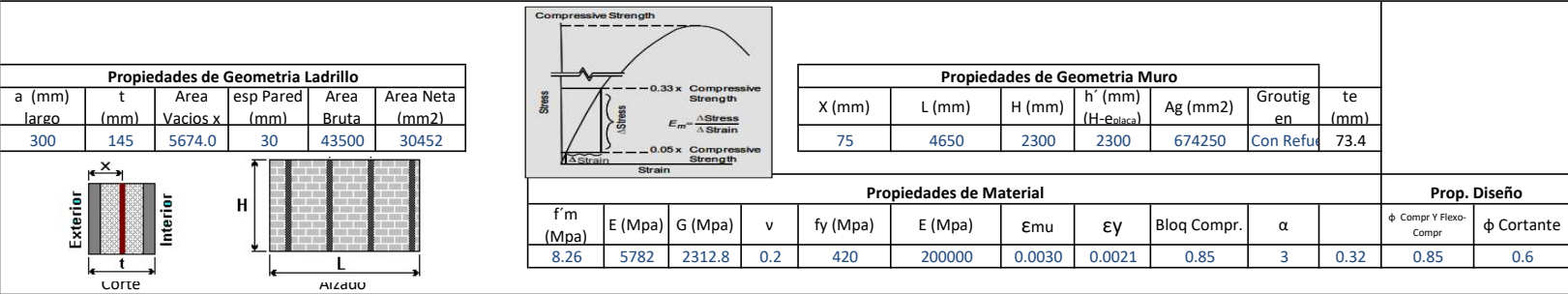
| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.36 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.29 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.44 <input checked="" type="checkbox"/> Vu/ Vn max    |



**Curva Interaccion  $\phi Pn - \phi Mn$**

OK ☒





Compresion Axial

|        |          |                 |         |
|--------|----------|-----------------|---------|
| h'/t : | 15.9     | <               | 30      |
| Re :   | 0.86     |                 |         |
| Pn :   | 1866.0   | (kN)            | Pu      |
| φPn :  | 1586.1   | (kN)            | ≥ 238.7 |
|        |          |                 | Si      |
| As :   | 787      | mm <sup>2</sup> |         |
| ρ :    | 0.001186 |                 |         |

Flexion Pura

|        |        |                 |
|--------|--------|-----------------|
| b :    | 145.00 | mm              |
| Ae :   | 341193 | mm <sup>2</sup> |
| c :    | 521.86 | mm              |
| d :    | 4575   | mm              |
| te :   | 73     | mm              |
| t :    | 145    | mm              |
| φ Mn : | 587.6  | kN-m            |

Punto Balanceado

|        |        |        |
|--------|--------|--------|
| cb:    | 2691.2 |        |
| φ Mn : | 1381   | kN-m   |
| φPn :  | 722.0  | (kN)   |
| Mn :   | kN-m   | αMcr   |
| 1625   | ≥      | 793.27 |
|        | Si     |        |

|                |
|----------------|
| Mu ≤ φ Mn      |
| 159.1 ≤ 858.11 |
| Si             |

|              |       |    |
|--------------|-------|----|
| 0.1 f'm Ae : | 556.9 | kN |
| 0.25 Pb :    | 212.4 | kN |

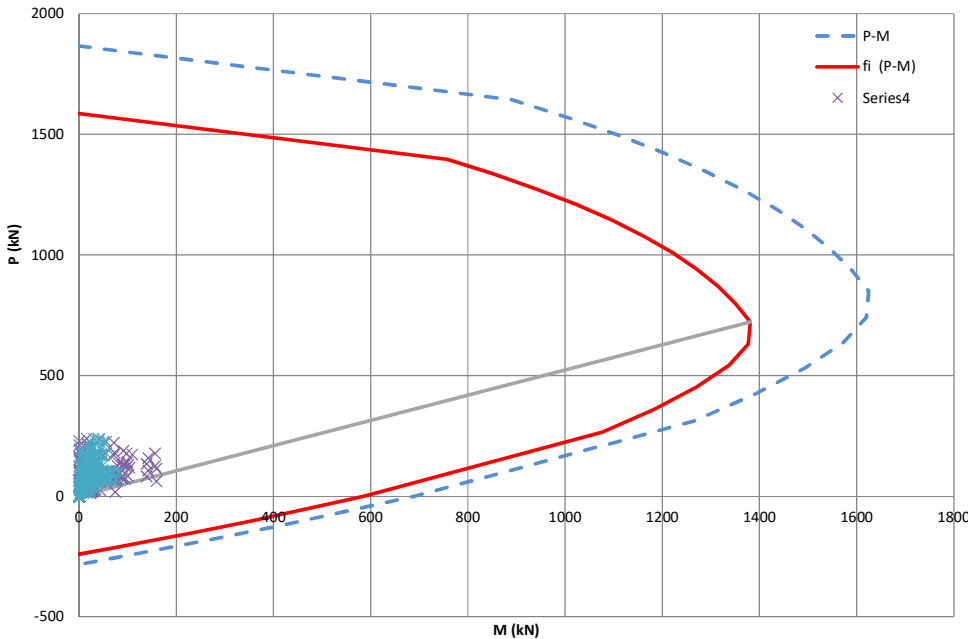
Cortante

|                |          |     |      |             |       |    |
|----------------|----------|-----|------|-------------|-------|----|
| Mu/Vu d :      | 1.8      |     | Vm : | 215.7       | kN    |    |
| Asv :          | 12.57    | mm2 | Vs : | 20.1        | kN    |    |
| Vn max permit: | 323.5967 | mm2 | ≥    | Vu= Vn+Vs : | 141.5 | kN |
|                |          |     | Si   |             |       |    |

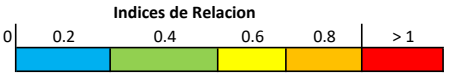
|                                   |       |
|-----------------------------------|-------|
| 6 AeVf'm :                        | 588.4 |
| 4 AeVf'm :                        | 392.2 |
| OK Refuerzo a Cortante Suficiente |       |

|                                   |        |     |
|-----------------------------------|--------|-----|
| 0.2 f'm :                         | 1652.0 | kPa |
| 0.2 f'm ≥                         | 700    | kPa |
| OK No Necesita Elementos de Borde |        |     |

Curva de Interaccion de Mamposteria Reforzada en Arcilla

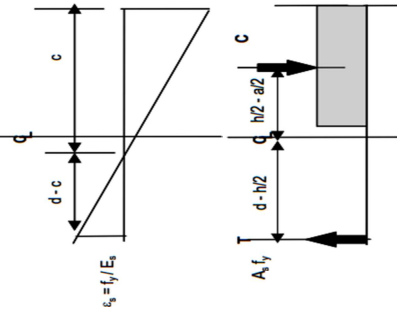


| Resumen         | Relacion          |
|-----------------|-------------------|
| Compr. Axial    | 0.15 ✓ Pu/ φPn    |
| Axial - Flexion | 0.19 ✓ Mu/ φMn    |
| Cortante        | 0.44 ✓ Vu/ Vn max |



Curva Interaccion φ Pn - φ Mn

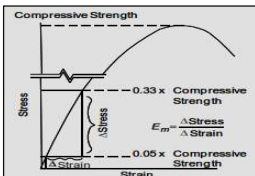
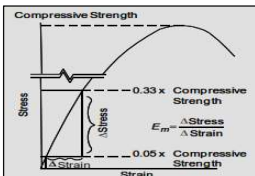
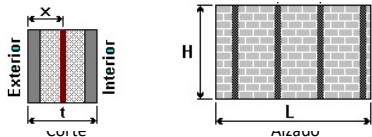
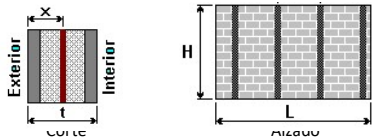
|    |   |
|----|---|
| OK | ✓ |
|----|---|



TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 1/2/3/4/5 Piso 8/12

(G-H) Universidad Santo Tomas  
Esp. Patología de la Construcción

|                                                                                   |        |                  |                   |               |                    |                                                                                    |                                      |         |        |                        |          |                     |                                                                                    |             |   |      |                           |            |
|-----------------------------------------------------------------------------------|--------|------------------|-------------------|---------------|--------------------|------------------------------------------------------------------------------------|--------------------------------------|---------|--------|------------------------|----------|---------------------|------------------------------------------------------------------------------------|-------------|---|------|---------------------------|------------|
| <b>Propiedades de Geometria Ladrillo</b>                                          |        |                  |                   |               |                    |  | <b>Propiedades de Geometria Muro</b> |         |        |                        |          |                     |  |             |   |      |                           |            |
| a (mm)<br>largo                                                                   | t (mm) | Area<br>Vacios x | esp Pared<br>(mm) | Area<br>Bruta | Area Neta<br>(mm2) |                                                                                    | X (mm)                               | L (mm)  | H (mm) | h' (mm)<br>(H-e-placa) | Ag (mm2) | Groutig<br>en       |                                                                                    | te (mm)     |   |      |                           |            |
| 300                                                                               | 145    | 5674.0           | 30                | 43500         | 30452              | 75                                                                                 | 450                                  | 2300    | 2300   | 65250                  | Con Refu | 90.1                |                                                                                    |             |   |      |                           |            |
|  |        |                  |                   |               |                    | <b>Propiedades de Material</b>                                                     |                                      |         |        |                        |          | <b>Prop. Diseño</b> |                                                                                    |             |   |      |                           |            |
|  |        |                  |                   |               |                    | f'm<br>(Mpa)                                                                       | E (Mpa)                              | G (Mpa) | v      | f_y (Mpa)              | E (Mpa)  | ε_mu                | ε_Y                                                                                | Bloq Compr. | α |      | φ Compr Y Flexo-<br>Compr | φ Cortante |
|                                                                                   |        |                  |                   |               |                    | 8.26                                                                               | 5782                                 | 2312.8  | 0.2    | 420                    | 200000   | 0.0030              | 0.0021                                                                             | 0.85        | 3 | 0.32 | 0.85                      | 0.6        |

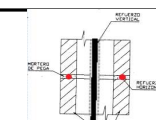
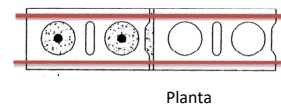
Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm2) | c     | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) | C*x (kN-m) | T*x (kN-m) | Mn | φ    | φ Pn (kN) | φ Mn (kN-m) |
|-----------|---------|------------|-------|------|--------|--------|--------|---------|---------|------------|------------|----|------|-----------|-------------|
| 75.0      | 4       | 129        | 450   | 0.86 | 360    | 228    | 0      | 313     | 268     | 10         | 0          | 10 | 0.85 | 228       | 0.0         |
| 0.0       | 0       | 0          | 427.1 | 0.86 | 342    | 216    | 0      | 216     | 185     | 12         | 0          | 12 | 0.85 | 166       | 9           |
| 0.0       | 0       | 0          | 404.1 | 0.86 | 323    | 204    | 0      | 204     | 175     | 13         | 0          | 13 | 0.85 | 157       | 10          |
| 0.0       | 0       | 0          | 381.2 | 0.86 | 305    | 193    | 0      | 193     | 165     | 14         | 0          | 14 | 0.85 | 149       | 11          |
| 0.0       | 0       | 0          | 358.2 | 0.86 | 287    | 181    | -4     | 178     | 152     | 15         | -1         | 15 | 0.85 | 141       | 12          |
| 0.0       | 0       | 0          | 335.3 | 0.86 | 268    | 170    | -9     | 160     | 138     | 15         | -1         | 17 | 0.85 | 129       | 13          |
| 0.0       | 0       | 0          | 312.4 | 0.86 | 250    | 158    | -16    | 142     | 122     | 16         | -2         | 18 | 0.85 | 117       | 14          |
| 0.0       | 0       | 0          | 289.4 | 0.86 | 232    | 146    | -23    | 123     | 106     | 16         | -3         | 19 | 0.85 | 104       | 15          |
| 0.0       | 0       | 0          | 266.5 | 0.86 | 213    | 135    | -32    | 103     | 89      | 16         | -5         | 21 | 0.85 | 90        | 17          |
| 0.0       | 0       | 0          | 243.5 | 0.86 | 195    | 123    | -42    | 81      | 70      | 16         | -6         | 22 | 0.85 | 75        | 18          |
| 225       | 0       | 0          | 220.6 | 0.86 | 176    | 112    | -54    | 57      | 49      | 15         | -8         | 23 | 0.85 | 59        | 19          |
| 0.0       | 0       | 0          | 198.5 | 0.86 | 159    | 100    | -54    | 46      | 40      | 15         | -8         | 23 | 0.85 | 42        | 20          |
| 0.0       | 0       | 0          | 176.5 | 0.86 | 141    | 89     | -54    | 35      | 30      | 14         | -8         | 22 | 0.85 | 34        | 19          |
| 0.0       | 0       | 0          | 154.4 | 0.86 | 124    | 78     | -54    | 24      | 21      | 13         | -8         | 21 | 0.85 | 26        | 19          |
| 0.0       | 0       | 0          | 132.4 | 0.86 | 106    | 67     | -54    | 13      | 11      | 12         | -8         | 20 | 0.85 | 17        | 18          |
| 0.0       | 0       | 0          | 110.3 | 0.86 | 88     | 56     | -54    | 2       | 1       | 10         | -8         | 18 | 0.85 | 9         | 17          |
| 0.0       | 0       | 0          | 107.1 | 0.86 | 86     | 54     | -54    | 0       | 0       | 10         | -8         | 18 | 0.85 | 1         | 15          |
| 0.0       | 0       | 0          | 84.0  | 0.86 | 67     | 42     | -54    | -12     | -10     | 8          | -8         | 16 | 0.85 | 0         | 15.3        |
| 0.0       | 0       | 0          | 54.0  | 0.86 | 43     | 27     | -84    | -57     | -49     | 6          | -4         | 9  | 0.85 | -9        | 14          |
| 0.0       | 0       | 0          | 30.0  | 0.86 | 24     | 15     | -108   | -93     | -80     | 3          | 0          | 3  | 0.85 | -42       | 8           |
| 375.0     | 4       | 129        | 0.0   | 0.86 | 0      | 0      | -108   | -108    | -93     | 0          | 0          | 0  | 0.85 | -68       | 3           |
| Total     |         | 258        |       |      |        |        |        |         |         |            |            |    |      | -79       | 0           |

| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm2) | eficien. η | ρn      |
|----------|------------|---------|
| 12.57    | 0.35       | 0.00016 |



Corte

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 268.2 (kN)  
 $\phi Pn$  : 228.0 (kN)  $\geq$  Pu 46.8  
As : 258 mm<sup>2</sup>  
 $\rho$  : 0.004745

Flexion Pura

b : 145.00 mm  
Ae : 40523 mm<sup>2</sup>  
c : 107.12 mm  
d : 375 mm  
te : 90 mm  
t : 145 mm  
 $\phi Mn$  : 15.3 kN-m

Punto Balanceado

cb : 220.6  
 $\phi Mn$  : 20 kN-m  
 $\phi Pn$  : 41.8 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
23  $\geq$  9.12  
Si

$Mu \leq \phi Mn$   
15.2  $\leq$  17.42  
Si

0.1 f'm Ae : 53.9 kN  
0.25 Pb : 12.3 kN

Cortante

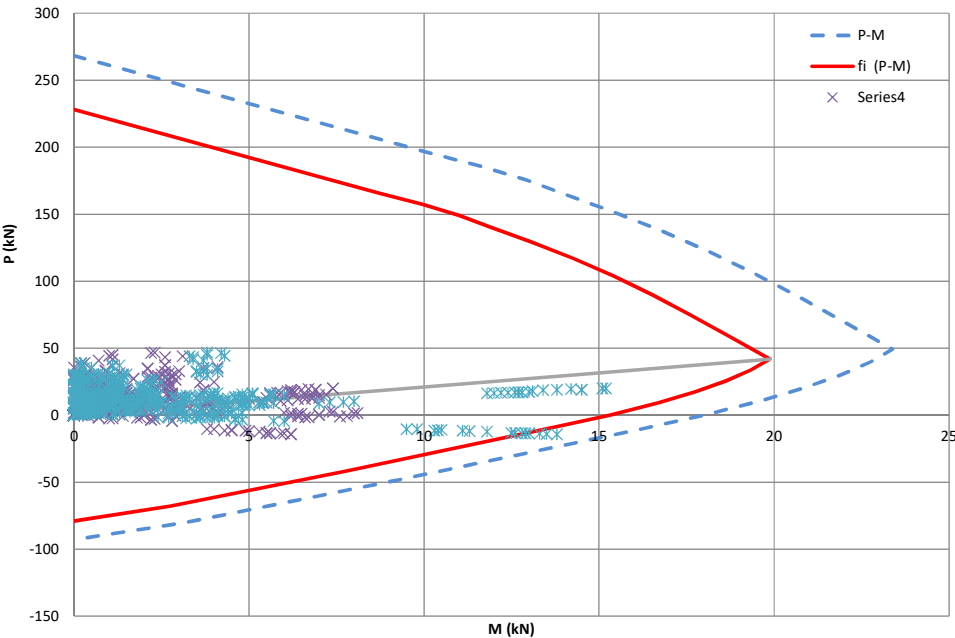
Mu/Vu d : 1.6  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit : 38.43311 mm<sup>2</sup>  $\geq$   
Si

Vm : 25.6 kN  
Vs : 1.6 kN  
Vu = Vn + Vs : 16.4 kN

6 AeVf'm : 69.9  
4 AeVf'm : 46.6  
OK Refuerzo a Cortante Suficiente

0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  1304 kPa  
OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

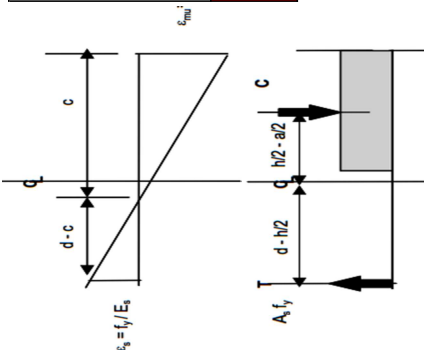


| Resumen         | Relacion |                                                   |
|-----------------|----------|---------------------------------------------------|
| Compr. Axial    | 0.21     | <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.87     | <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.43     | <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

No Cumple



**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

1/2/3/4/5 Piso

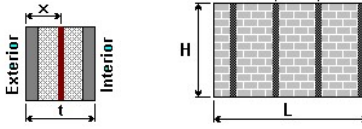
Universidad Santo Tomas  
 Esp. Patología de la Construcción

Muro : Eje

9/11

(D-K)

|                                          |      |          |           |       |           |                                      |        |        |             |          |            |      |  |  |
|------------------------------------------|------|----------|-----------|-------|-----------|--------------------------------------|--------|--------|-------------|----------|------------|------|--|--|
| <b>Propiedades de Geometria Ladrillo</b> |      |          |           |       |           | <b>Propiedades de Geometria Muro</b> |        |        |             |          |            |      |  |  |
| a (mm)                                   | t    | Area     | esp Pared | Area  | Area Neta | X (mm)                               | L (mm) | H (mm) | h' (mm)     | Ag (mm2) | Groutig en | te   |  |  |
| largo                                    | (mm) | Vacios x | (mm)      | Bruta | (mm2)     |                                      |        |        | (H-Espalca) |          |            | (mm) |  |  |
| 300                                      | 145  | 5674.0   | 30        | 43500 | 30452     | 75                                   | 7050   | 2300   | 2300        | 1022250  | Con Refu   | 75.3 |  |  |



|                                |         |         |     |          |         |        |        |             |   |      |                       |            |
|--------------------------------|---------|---------|-----|----------|---------|--------|--------|-------------|---|------|-----------------------|------------|
| <b>Propiedades de Material</b> |         |         |     |          |         |        |        |             |   |      | <b>Prop. Diseño</b>   |            |
| f'm                            | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | εmu    | εy     | Bloq Compr. | α |      | φ Compr Y Flexo-Compr | φ Cortante |
| 8.26                           | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32 | 0.85                  | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 215.0     | 4       | 129                     |
| 1275.0    | 4       | 129                     |
| 1415.0    | 4       | 129                     |
| 2475.0    | 4       | 129                     |
| 3375.0    | 3       | 71                      |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 3525      | 6       | 284                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 3675.0    | 3       | 71                      |
| 4575.0    | 4       | 129                     |
| 5635.0    | 4       | 129                     |
| 5775.0    | 4       | 129                     |
| 6835.0    | 4       | 129                     |
| 6975.0    | 4       | 129                     |
| Total     |         | 1716                    |



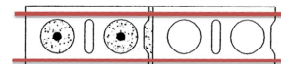
13

| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn   | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|------|------|--|-----------|-------------|
| 7050   | 0.86 | 5640   | 2982   | 0      | 2982    | 2556    | Compresion - Controla Acero    | 2102       | 0          | 2102 | 0.85 |  | 2586      | 0.0         |
| 6755.3 | 0.86 | 5404   | 2857   | -3     | 2854    | 2447    |                                | 2351       | -12        | 2363 | 0.85 |  | 2173      | 1787        |
| 6460.6 | 0.86 | 5168   | 2732   | -11    | 2722    | 2333    |                                | 2570       | -36        | 2607 | 0.85 |  | 2080      | 2008        |
| 6165.9 | 0.86 | 4933   | 2608   | -19    | 2589    | 2220    |                                | 2761       | -63        | 2823 | 0.85 |  | 1983      | 2216        |
| 5871.2 | 0.86 | 4697   | 2483   | -27    | 2456    | 2106    |                                | 2921       | -92        | 3014 | 0.85 |  | 1887      | 2400        |
| 5576.5 | 0.86 | 4461   | 2358   | -40    | 2318    | 1987    |                                | 3053       | -133       | 3185 | 0.85 |  | 1790      | 2562        |
| 5281.8 | 0.86 | 4225   | 2234   | -60    | 2174    | 1864    |                                | 3155       | -188       | 3343 | 0.85 |  | 1689      | 2708        |
| 4987.1 | 0.86 | 3990   | 2109   | -82    | 2027    | 1738    |                                | 3227       | -250       | 3477 | 0.85 |  | 1584      | 2841        |
| 4692.4 | 0.86 | 3754   | 1985   | -106   | 1878    | 1610    |                                | 3271       | -320       | 3590 | 0.85 |  | 1477      | 2956        |
| 4397.6 | 0.86 | 3518   | 1860   | -137   | 1722    | 1477    |                                | 3284       | -402       | 3687 | 0.85 |  | 1369      | 3052        |
| 4102.9 | 0.86 | 3282   | 1735   | -175   | 1560    | 1338    | Flexion - Controla Mamposteria | 3269       | -499       | 3768 | 0.85 |  | 1255      | 3134        |
| 3692.6 | 0.86 | 2954   | 1562   | -211   | 1350    | 1158    |                                | 3198       | -570       | 3768 | 0.85 |  | 1137      | 3203        |
| 3282.4 | 0.86 | 2626   | 1388   | -266   | 1122    | 962     |                                | 3071       | -635       | 3706 | 0.85 |  | 984       | 3203        |
| 2872.1 | 0.86 | 2298   | 1215   | -321   | 894     | 766     |                                | 2886       | -651       | 3538 | 0.85 |  | 818       | 3150        |
| 2461.8 | 0.86 | 1969   | 1041   | -382   | 659     | 565     |                                | 2645       | -660       | 3305 | 0.85 |  | 651       | 3007        |
| 2051.5 | 0.86 | 1641   | 868    | -463   | 404     | 347     |                                | 2346       | -643       | 2989 | 0.85 |  | 481       | 2809        |
| 1226.9 | 0.86 | 982    | 519    | -519   | 0       | 0       |                                | 1574       | -571       | 2145 | 0.85 |  | 295       | 2541        |
| 84.0   | 0.86 | 67     | 36     | -667   | -631    | -541    |                                | 124        | -187       | 311  | 0.85 |  | 0         | 1823.3      |
| 54.0   | 0.86 | 43     | 23     | -697   | -674    | -578    |                                | 80         | -83        | 163  | 0.85 |  | -460      | 264         |
| 30.0   | 0.86 | 24     | 13     | -721   | -708    | -607    |                                | 45         | 0          | 45   | 0.85 |  | -491      | 139         |
| 0.0    | 0.86 | 0      | 0      | -721   | -721    | -618    |                                | 0          | 0          | 0    | 0.85 |  | -516      | 38          |
|        |      |        |        |        |         |         |                                |            |            |      |      |  | -525      | 0           |

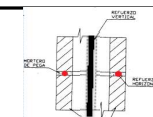
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρ <sub>n</sub> |
|------------|----------------|
| 0.35       | 0.00019        |



Planta



Corte

Compresion Axial

$h'/t$  : 15.9 < 30  
 $Re$  : 0.86  
 $P_n$  : 3042.4 (kN)  
 $\phi P_n$  : 2586.0 (kN)  $\geq$   $P_u$  749.9  
 $As$  : 1716 mm<sup>2</sup>  
 $\rho$  : 0.001697

Flexion Pura

$b$  : 145.00 mm  
 $A_e$  : 530837 mm<sup>2</sup>  
 $c$  : 1226.93 mm  
 $d$  : 6975 mm  
 $te$  : 75 mm  
 $t$  : 145 mm  
 $\phi M_n$  : 1823.3 kN-m

Punto Balanceado

$cb$  : 4102.9  
 $\phi M_n$  : 3203 kN-m  
 $\phi P_n$  : 1137.0 (kN)  
 $M_n$  : kN-m  $\alpha M_{cr}$   
3768  $\geq$  1871.20  
Si

$M_u \leq \phi M_n$   
827.4  $\leq$  3078.80  
Si

0.1  $f'_m A_e$  : 844.4 kN  
0.25  $P_b$  : 334.4 kN

Cortante

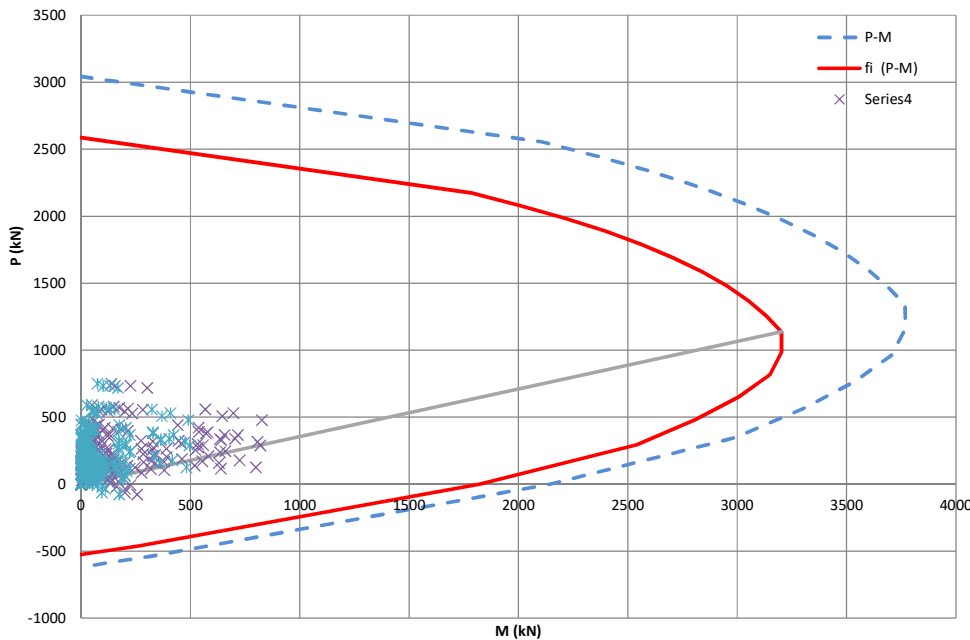
$M_u/V_u d$  : 4.6  
 $As_v$  : 12.57 mm<sup>2</sup>  
 $V_n$  max permit : 503.4602 mm<sup>2</sup>  $\geq$   
Si  
 $V_m$  : 335.6 kN  
 $V_s$  : 30.7 kN  
 $V_u = V_n + V_s$  : 219.8 kN

6  $A_e \sqrt{f'_m}$  : 915.4  
4  $A_e \sqrt{f'_m}$  : 610.3  
OK Refuerzo a Cortante Suficiente

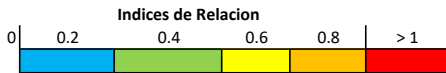
0.2  $f'_m$  : 1652.0 kPa  
0.2  $f'_m \geq$  1413 kPa

OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

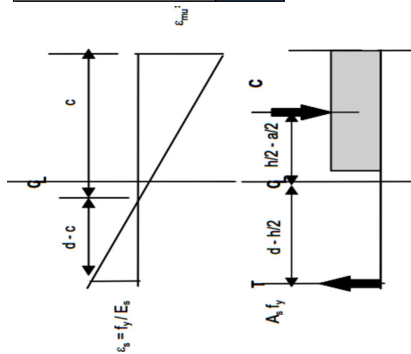


| Resumen         | Relacion |                    |
|-----------------|----------|--------------------|
| Compr. Axial    | 0.29     | ✓ $P_u / \phi P_n$ |
| Axial - Flexion | 0.27     | ✓ $M_u / \phi M_n$ |
| Cortante        | 0.44     | ✓ $V_u / V_n$ max  |



Curva Interaccion  $\phi P_n - \phi M_n$

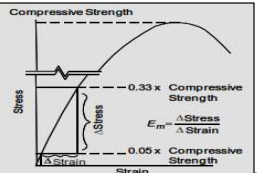
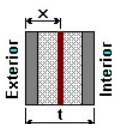
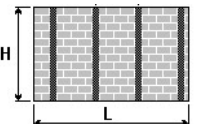
OK



**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje 10 (J-O)

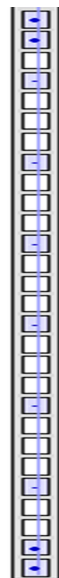
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|                                                                                   |         |                  |                |               |                 |                                                                                    |                                                                                   |             |        |                      |          |                       |                     |         |  |  |  |
|-----------------------------------------------------------------------------------|---------|------------------|----------------|---------------|-----------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------|--------|----------------------|----------|-----------------------|---------------------|---------|--|--|--|
| <b>Propiedades de Geometria Ladrillo</b>                                          |         |                  |                |               |                 |  | <b>Propiedades de Geometria Muro</b>                                              |             |        |                      |          |                       |                     |         |  |  |  |
| a (mm)<br>largo                                                                   | t (mm)  | Area<br>Vacios x | esp Pared (mm) | Area<br>Bruta | Area Neta (mm2) |                                                                                    | X (mm)                                                                            | L (mm)      | H (mm) | h' (mm)<br>(H-Elaca) | Ag (mm2) | Groutig<br>en         |                     | te (mm) |  |  |  |
| 300                                                                               | 145     | 5674.0           | 30             | 43500         | 30452           |                                                                                    |                                                                                   |             |        |                      |          |                       |                     |         |  |  |  |
|  |         |                  |                |               |                 |                                                                                    |  |             |        |                      |          |                       |                     |         |  |  |  |
| <b>Propiedades de Material</b>                                                    |         |                  |                |               |                 |                                                                                    |                                                                                   |             |        |                      |          |                       | <b>Prop. Diseño</b> |         |  |  |  |
| f'm (Mpa)                                                                         | E (Mpa) | G (Mpa)          | v              | fy (Mpa)      | E (Mpa)         | Emu                                                                                | Ey                                                                                | Bloq Compr. | α      |                      |          | φ Compr Y Flexo-Compr | φ Cortante          |         |  |  |  |
| 8.26                                                                              | 5782    | 2312.8           | 0.2            | 420           | 200000          | 0.0030                                                                             | 0.0021                                                                            | 0.85        | 3      | 0.32                 |          | 0.85                  | 0.6                 |         |  |  |  |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 215.0     | 4       | 129                     |
| 1275.0    | 4       | 129                     |
| 2315.0    | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 3000      | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 3685.0    | 4       | 129                     |
| 4725.0    | 4       | 129                     |
| 5785.0    | 4       | 129                     |
| 5925.0    | 4       | 129                     |
| Total     |         | 1032                    |

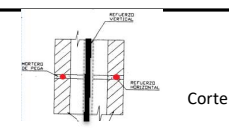
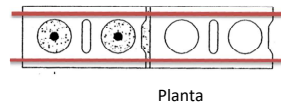


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn   | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|------|------|--|-----------|-------------|
|        |      |        |        |        | 2781    | 2384    |                                |            |            | 0    | 0.85 |  | 2027      | 0.0         |
| 6000   | 0.86 | 4800   | 2440   | 0      | 2440    | 2092    | Compresion - Controla Acero    | 1464       | 0          | 1464 | 0.85 |  | 1778      | 1244        |
| 5748.5 | 0.86 | 4599   | 2338   | -3     | 2335    | 2002    |                                | 1638       | -8         | 1646 | 0.85 |  | 1701      | 1399        |
| 5497.1 | 0.86 | 4398   | 2235   | -10    | 2225    | 1908    |                                | 1791       | -29        | 1820 | 0.85 |  | 1622      | 1547        |
| 5245.6 | 0.86 | 4196   | 2133   | -18    | 2115    | 1813    |                                | 1924       | -51        | 1975 | 0.85 |  | 1541      | 1679        |
| 4994.1 | 0.86 | 3995   | 2031   | -27    | 2004    | 1718    |                                | 2036       | -76        | 2112 | 0.85 |  | 1461      | 1795        |
| 4742.6 | 0.86 | 3794   | 1929   | -36    | 1892    | 1622    |                                | 2127       | -104       | 2231 | 0.85 |  | 1379      | 1896        |
| 4491.2 | 0.86 | 3593   | 1826   | -51    | 1775    | 1522    |                                | 2198       | -141       | 2339 | 0.85 |  | 1294      | 1988        |
| 4239.7 | 0.86 | 3392   | 1724   | -68    | 1656    | 1420    |                                | 2248       | -184       | 2432 | 0.85 |  | 1207      | 2067        |
| 3988.2 | 0.86 | 3191   | 1622   | -87    | 1535    | 1316    |                                | 2278       | -232       | 2510 | 0.85 |  | 1119      | 2133        |
| 3736.8 | 0.86 | 2989   | 1520   | -108   | 1411    | 1210    |                                | 2287       | -286       | 2573 | 0.85 |  | 1029      | 2187        |
| 3485.3 | 0.86 | 2788   | 1417   | -137   | 1280    | 1097    | Flexion - Controla Mamposteria | 2276       | -351       | 2627 | 0.85 |  | 933       | 2233        |
| 3136.8 | 0.86 | 2509   | 1276   | -161   | 1114    | 956     |                                | 2226       | -386       | 2612 | 0.85 |  | 812       | 2221        |
| 2788.2 | 0.86 | 2231   | 1134   | -187   | 947     | 812     |                                | 2137       | -419       | 2556 | 0.85 |  | 690       | 2173        |
| 2439.7 | 0.86 | 1952   | 992    | -202   | 790     | 677     |                                | 2008       | -430       | 2438 | 0.85 |  | 576       | 2072        |
| 2091.2 | 0.86 | 1673   | 850    | -225   | 625     | 536     |                                | 1840       | -434       | 2274 | 0.85 |  | 456       | 1933        |
| 1742.6 | 0.86 | 1394   | 709    | -242   | 467     | 400     |                                | 1632       | -423       | 2054 | 0.85 |  | 340       | 1746        |
| 785.0  | 0.86 | 628    | 319    | -319   | 0       | 0       |                                | 857        | -319       | 1177 | 0.85 |  | 0         | 1000.4      |
| 84.0   | 0.86 | 67     | 34     | -379   | -345    | -296    |                                | 101        | -158       | 260  | 0.85 |  | -251      | 221         |
| 54.0   | 0.86 | 43     | 22     | -409   | -387    | -332    |                                | 65         | -70        | 136  | 0.85 |  | -282      | 115         |
| 30.0   | 0.86 | 24     | 12     | -433   | -421    | -361    |                                | 36         | 0          | 36   | 0.85 |  | -307      | 31          |
| 0.0    | 0.86 | 0      | 0      | -433   | -433    | -372    |                                | 0          | 0          | 0    | 0.85 |  | -316      | 0           |

| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00020 |



Compresion Axial

|        |          |                 |       |
|--------|----------|-----------------|-------|
| h'/t : | 15.9     | <               | 30    |
| Re :   | 0.86     |                 |       |
| Pn :   | 2384.2   | (kN)            | Pu    |
| φPn :  | 2026.6   | (kN)            | 568.2 |
|        |          | ≥               | Si    |
| As :   | 1032     | mm <sup>2</sup> |       |
| ρ :    | 0.001201 |                 |       |

Flexion Pura

|        |        |                 |
|--------|--------|-----------------|
| b :    | 145.00 | mm              |
| Ae :   | 434392 | mm <sup>2</sup> |
| c :    | 784.99 | mm              |
| d :    | 5925   | mm              |
| te :   | 72     | mm              |
| t :    | 145    | mm              |
| φ Mn : | 1000.4 | kN-m            |

Punto Balanceado

|        |        |         |
|--------|--------|---------|
| cb :   | 3485.3 |         |
| φ Mn : | 2233   | kN-m    |
| φPn :  | 932.9  | (kN)    |
| Mn :   | kN-m   | αMcr    |
| 2627   | ≥      | 1303.18 |
|        |        | Si      |

$$\begin{aligned} \mu_u &\leq \phi M_n \\ 517.5 &\leq 1918.67 \\ \text{Si} \end{aligned}$$

|               |       |    |
|---------------|-------|----|
| 0.1 f' m Ae : | 718.6 | kN |
| 0.25 Pb :     | 274.4 | kN |

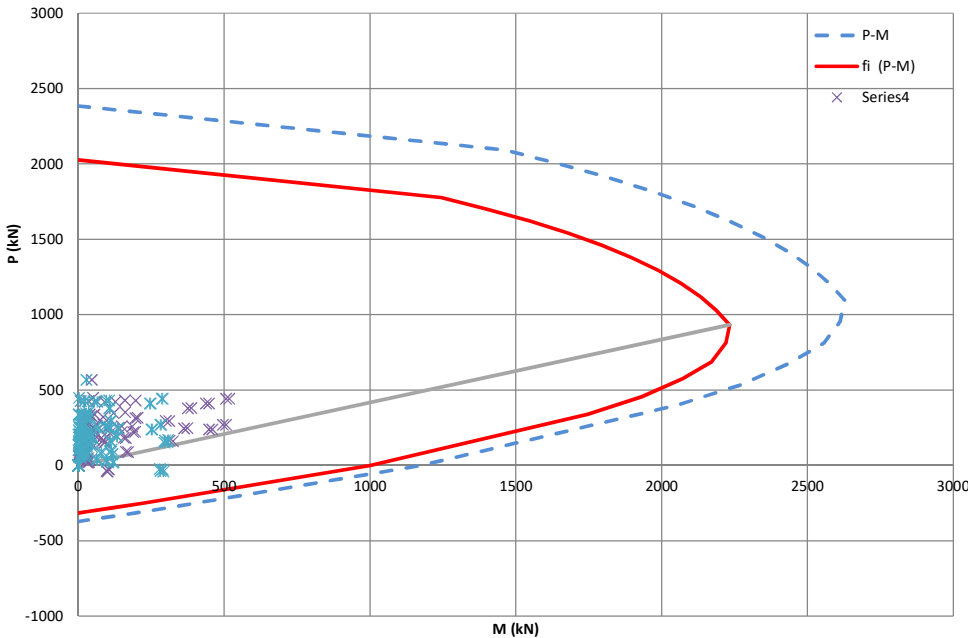
Cortante

|                |          |     |      |             |       |    |
|----------------|----------|-----|------|-------------|-------|----|
| Mu/Vu d :      | 4.4      |     | Vm : | 274.7       | kN    |    |
| Asv :          | 12.57    | mm2 | Vs : | 26.1        | kN    |    |
| Vn max permit: | 411.9892 | mm2 | ≥    | Vu= Vn+Vs : | 180.4 | kN |
|                |          |     | Si   |             |       |    |

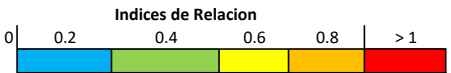
|                                   |       |
|-----------------------------------|-------|
| 6 AeVf' m :                       | 749.1 |
| 4 AeVf' m :                       | 499.4 |
| OK Refuerzo a Cortante Suficiente |       |

|                                   |        |     |
|-----------------------------------|--------|-----|
| 0.2 f' m :                        | 1652.0 | kPa |
| 0.2 f' m ≥                        | 1308   | kPa |
| OK No Necesita Elementos de Borde |        |     |

Curva de Interaccion de Mamposteria Reforzada en Arcilla

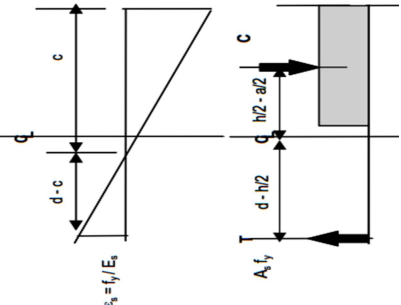


| Resumen         | Relacion          |
|-----------------|-------------------|
| Compr. Axial    | 0.28 ✓ Pu/ φPn    |
| Axial - Flexion | 0.27 ✓ Mu/ φMn    |
| Cortante        | 0.44 ✓ Vu/ Vn max |



Curva Interaccion φ Pn - φ Mn

|    |   |
|----|---|
| OK | ✓ |
|----|---|



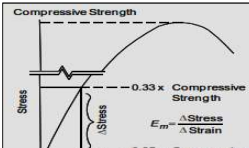
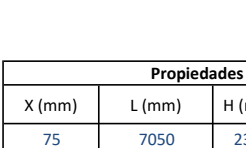
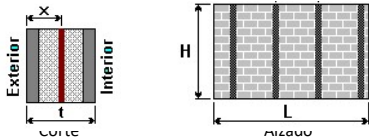
**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje

1/2/3/4/5 Piso  
16

(E-K)

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Esp. Patología de la Construcción

|                                                                                   |         |                  |                |               |                 |                                                                                    |                                      |             |        |                        |                       |                                |                                                                                     |         |  |  |  |                     |  |
|-----------------------------------------------------------------------------------|---------|------------------|----------------|---------------|-----------------|------------------------------------------------------------------------------------|--------------------------------------|-------------|--------|------------------------|-----------------------|--------------------------------|-------------------------------------------------------------------------------------|---------|--|--|--|---------------------|--|
| <b>Propiedades de Geometria Ladrillo</b>                                          |         |                  |                |               |                 |  | <b>Propiedades de Geometria Muro</b> |             |        |                        |                       |                                |  |         |  |  |  |                     |  |
| a (mm)<br>largo                                                                   | t (mm)  | Area<br>Vacios x | esp Pared (mm) | Area<br>Bruta | Area Neta (mm2) |                                                                                    | X (mm)                               | L (mm)      | H (mm) | h' (mm)<br>(H-e alaca) | Ag (mm2)              | Groutig<br>en                  |                                                                                     | te (mm) |  |  |  |                     |  |
| 300                                                                               | 145     | 5674.0           | 30             | 43500         | 30452           | 75                                                                                 | 7050                                 | 2300        | 2300   | 1022250                | Con Refu              | 73.7                           |                                                                                     |         |  |  |  |                     |  |
|  |         |                  |                |               |                 |                                                                                    |                                      |             |        |                        |                       | <b>Propiedades de Material</b> |                                                                                     |         |  |  |  | <b>Prop. Diseño</b> |  |
| f'm (Mpa)                                                                         | E (Mpa) | G (Mpa)          | v              | fy (Mpa)      | E (Mpa)         | Emu                                                                                | εy                                   | Bloq Compr. | α      |                        | φ Compr Y Flexo-Compr | φ Cortante                     |                                                                                     |         |  |  |  |                     |  |
| 8.26                                                                              | 5782    | 2312.8           | 0.2            | 420           | 200000          | 0.0030                                                                             | 0.0021                               | 0.85        | 3      | 0.32                   | 0.85                  | 0.6                            |                                                                                     |         |  |  |  |                     |  |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 225.0     | 3       | 71                      |
| 975.0     | 4       | 129                     |
| 1875.0    | 3       | 71                      |
| 2015.0    | 4       | 129                     |
| 2175.0    | 0       | 0                       |
| 2775.0    | 0       | 0                       |
| 3375.0    | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 3525      | 6       | 284                     |
| 0.0       | 0       | 0                       |
| 3675.0    | 0       | 0                       |
| 4275.0    | 0       | 0                       |
| 4275.0    | 0       | 0                       |
| 4875.0    | 0       | 0                       |
| 5035.0    | 4       | 129                     |
| 5175.0    | 3       | 71                      |
| 6075.0    | 4       | 129                     |
| 6825.0    | 3       | 71                      |
| 6975.0    | 4       | 129                     |
| Total     |         | 1342                    |

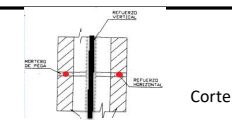
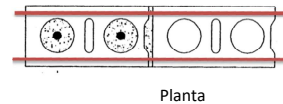


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn   | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|------|------|--|-----------|-------------|
| 7050   | 0.86 | 5640   | 2918   | 0      | 2918    | 2502    | Compresion - Controla Acero    | 2057       | 0          | 2057 | 0.85 |  | 2450      | 0.0         |
| 6755.3 | 0.86 | 5404   | 2796   | -3     | 2793    | 2395    |                                | 2301       | -10        | 2311 | 0.85 |  | 2126      | 1749        |
| 6460.6 | 0.86 | 5168   | 2674   | -9     | 2665    | 2285    |                                | 2516       | -29        | 2545 | 0.85 |  | 2035      | 1964        |
| 6165.9 | 0.86 | 4933   | 2552   | -15    | 2537    | 2175    |                                | 2702       | -50        | 2752 | 0.85 |  | 1942      | 2163        |
| 5871.2 | 0.86 | 4697   | 2430   | -24    | 2406    | 2063    |                                | 2859       | -80        | 2939 | 0.85 |  | 1849      | 2339        |
| 5576.5 | 0.86 | 4461   | 2308   | -36    | 2272    | 1948    |                                | 2988       | -116       | 3104 | 0.85 |  | 1753      | 2498        |
| 5281.8 | 0.86 | 4225   | 2186   | -49    | 2137    | 1832    |                                | 3087       | -156       | 3244 | 0.85 |  | 1656      | 2638        |
| 4987.1 | 0.86 | 3990   | 2064   | -66    | 1998    | 1713    |                                | 3158       | -205       | 3363 | 0.85 |  | 1557      | 2757        |
| 4692.4 | 0.86 | 3754   | 1942   | -90    | 1852    | 1588    |                                | 3201       | -268       | 3468 | 0.85 |  | 1456      | 2859        |
| 4397.6 | 0.86 | 3518   | 1820   | -117   | 1703    | 1460    |                                | 3214       | -339       | 3553 | 0.85 |  | 1350      | 2948        |
| 4102.9 | 0.86 | 3282   | 1698   | -148   | 1550    | 1329    | Flexion - Controla Mamposteria | 3199       | -420       | 3619 | 0.85 |  | 1241      | 3020        |
| 3692.6 | 0.86 | 2954   | 1528   | -179   | 1349    | 1157    |                                | 3130       | -483       | 3613 | 0.85 |  | 1129      | 3076        |
| 3282.4 | 0.86 | 2626   | 1359   | -217   | 1142    | 979     |                                | 3005       | -526       | 3532 | 0.85 |  | 983       | 3071        |
| 2872.1 | 0.86 | 2298   | 1189   | -261   | 928     | 795     |                                | 2825       | -555       | 3379 | 0.85 |  | 832       | 3002        |
| 2461.8 | 0.86 | 1969   | 1019   | -296   | 723     | 620     |                                | 2588       | -555       | 3143 | 0.85 |  | 676       | 2872        |
| 2051.5 | 0.86 | 1641   | 849    | -341   | 508     | 435     |                                | 2296       | -555       | 2851 | 0.85 |  | 527       | 2671        |
| 1379.8 | 0.86 | 1104   | 571    | -392   | 179     | 153     |                                | 1698       | -475       | 2173 | 0.85 |  | 370       | 2423        |
| 800.0  | 0.86 | 640    | 331    | -442   | -111    | -95     |                                | 1061       | -380       | 1442 | 0.85 |  | 130       | 1847.3      |
| 500.0  | 0.86 | 400    | 207    | -480   | -273    | -234    |                                | 688        | -285       | 973  | 0.85 |  | -81       | 1225        |
| 30.0   | 0.86 | 24     | 12     | -564   | -551    | -473    |                                | 44         | 0          | 44   | 0.85 |  | -199      | 827         |
| 0.0    | 0.86 | 0      | 0      | -564   | -564    | -483    |                                | 0          | 0          | 0    | 0.85 |  | -402      | 37          |
|        |      |        |        |        |         |         |                                |            |            |      |      |  | -411      | 0           |

| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00020 |



Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 2881.8 (kN)  
 $\phi Pn$  : 2449.5 (kN)  $\geq$  421.5  
As : 1342 mm<sup>2</sup>  
 $\rho$  : 0.001327

Flexion Pura

b : 145.00 mm  
Ae : 519489 mm<sup>2</sup>  
c : 1379.83 mm  
d : 6975 mm  
te : 74 mm  
t : 145 mm  
 $\phi Mn$  : 1847.3 kN-m

Punto Balanceado

cb : 4102.9  
 $\phi Mn$  : 3076 kN-m  
 $\phi Pn$  : 1129.4 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
3619  $\geq$  1831.20  
Si

$Mu \leq \phi Mn$   
803.7  $\leq$  2208.79  
Si

0.1 f'm Ae : 844.4 kN  
0.25 Pb : 332.2 kN

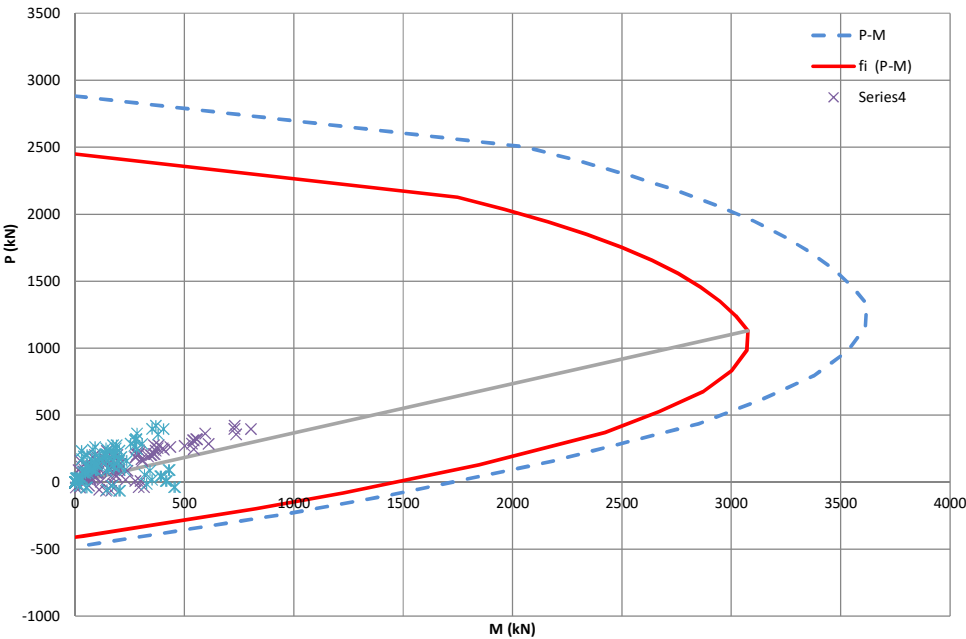
Cortante

Mu/Vu d : 4.8  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit : 492.6975 mm<sup>2</sup>  $\geq$   
Si  
Vm : 328.5 kN  
Vs : 30.7 kN  
Vu = Vn + Vs : 215.5 kN

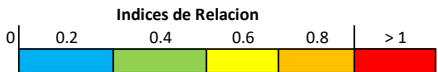
6 AeVf'm : 895.8  
4 AeVf'm : 597.2  
OK Refuerzo a Cortante Suficiente

0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  812 kPa  
OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

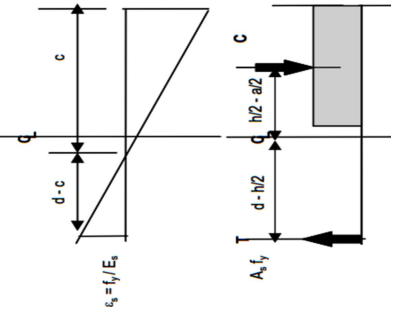


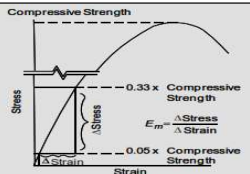
| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.17 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.36 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.44 <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

OK ☒

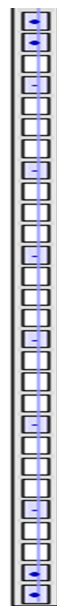


|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |          |           |          |            |         |           |             |           |      |                       |            |      |          |             |       |       |                       |            |        |      |        |       |                                                                                                                    |        |                                                                                                                                                                                                                                                                                            |        |      |   |      |      |        |                         |        |         |          |            |         |    |      |      |      |        |          |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|-----------|----------|------------|---------|-----------|-------------|-----------|------|-----------------------|------------|------|----------|-------------|-------|-------|-----------------------|------------|--------|------|--------|-------|--------------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|---|------|------|--------|-------------------------|--------|---------|----------|------------|---------|----|------|------|------|--------|----------|------|
| <div>Propiedades de Geometria Ladrillo</div> <table><tr><td>a (mm)</td><td>t</td><td>Area</td><td>esp Pared</td><td>Area</td><td>Area Neta</td></tr><tr><td>largo</td><td>(mm)</td><td>Vacios x</td><td>(mm)</td><td>Bruta</td><td>(mm2)</td></tr><tr><td>300</td><td>145</td><td>5674.0</td><td>30</td><td>43500</td><td>30452</td></tr></table> <div><div><div>Exterior</div><div>Corte</div><div>Interior</div></div><div><div>H</div><div>Aizado</div><div>L</div></div></div> |         |          |           |          |            | a (mm)  | t         | Area        | esp Pared | Area | Area Neta             | largo      | (mm) | Vacios x | (mm)        | Bruta | (mm2) | 300                   | 145        | 5674.0 | 30   | 43500  | 30452 | <div>Compressive Strength</div>  |        | <div>Propiedades de Geometria Muro</div> <table><tr><td>X (mm)</td><td>L (mm)</td><td>H (mm)</td><td>h' (mm)</td><td>Ag (mm2)</td><td>Groutig en</td><td>te (mm)</td></tr><tr><td>75</td><td>3900</td><td>2300</td><td>2300</td><td>565500</td><td>Con Refu</td><td>72.1</td></tr></table> |        |      |   |      |      | X (mm) | L (mm)                  | H (mm) | h' (mm) | Ag (mm2) | Groutig en | te (mm) | 75 | 3900 | 2300 | 2300 | 565500 | Con Refu | 72.1 |
| a (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | t       | Area     | esp Pared | Area     | Area Neta  |         |           |             |           |      |                       |            |      |          |             |       |       |                       |            |        |      |        |       |                                                                                                                    |        |                                                                                                                                                                                                                                                                                            |        |      |   |      |      |        |                         |        |         |          |            |         |    |      |      |      |        |          |      |
| largo                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | (mm)    | Vacios x | (mm)      | Bruta    | (mm2)      |         |           |             |           |      |                       |            |      |          |             |       |       |                       |            |        |      |        |       |                                                                                                                    |        |                                                                                                                                                                                                                                                                                            |        |      |   |      |      |        |                         |        |         |          |            |         |    |      |      |      |        |          |      |
| 300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 145     | 5674.0   | 30        | 43500    | 30452      |         |           |             |           |      |                       |            |      |          |             |       |       |                       |            |        |      |        |       |                                                                                                                    |        |                                                                                                                                                                                                                                                                                            |        |      |   |      |      |        |                         |        |         |          |            |         |    |      |      |      |        |          |      |
| X (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | L (mm)  | H (mm)   | h' (mm)   | Ag (mm2) | Groutig en | te (mm) |           |             |           |      |                       |            |      |          |             |       |       |                       |            |        |      |        |       |                                                                                                                    |        |                                                                                                                                                                                                                                                                                            |        |      |   |      |      |        |                         |        |         |          |            |         |    |      |      |      |        |          |      |
| 75                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3900    | 2300     | 2300      | 565500   | Con Refu   | 72.1    |           |             |           |      |                       |            |      |          |             |       |       |                       |            |        |      |        |       |                                                                                                                    |        |                                                                                                                                                                                                                                                                                            |        |      |   |      |      |        |                         |        |         |          |            |         |    |      |      |      |        |          |      |
| <div>Propiedades de Material</div> <table><tr><td>f'm (Mpa)</td><td>E (Mpa)</td><td>G (Mpa)</td><td>v</td><td>fy (Mpa)</td><td>E (Mpa)</td><td>Emu</td><td>Ey</td><td>Bloq Compr.</td><td>α</td><td></td><td>φ Compr Y Flexo-Compr</td><td>φ Cortante</td></tr><tr><td>8.26</td><td>5782</td><td>2312.8</td><td>0.2</td><td>420</td><td>200000</td><td>0.0030</td><td>0.0021</td><td>0.85</td><td>3</td><td>0.32</td><td>0.85</td><td>0.6</td></tr></table>                        |         |          |           |          |            |         | f'm (Mpa) | E (Mpa)     | G (Mpa)   | v    | fy (Mpa)              | E (Mpa)    | Emu  | Ey       | Bloq Compr. | α     |       | φ Compr Y Flexo-Compr | φ Cortante | 8.26   | 5782 | 2312.8 | 0.2   | 420                                                                                                                | 200000 | 0.0030                                                                                                                                                                                                                                                                                     | 0.0021 | 0.85 | 3 | 0.32 | 0.85 | 0.6    | <div>Prop. Diseño</div> |        |         |          |            |         |    |      |      |      |        |          |      |
| f'm (Mpa)                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | E (Mpa) | G (Mpa)  | v         | fy (Mpa) | E (Mpa)    | Emu     | Ey        | Bloq Compr. | α         |      | φ Compr Y Flexo-Compr | φ Cortante |      |          |             |       |       |                       |            |        |      |        |       |                                                                                                                    |        |                                                                                                                                                                                                                                                                                            |        |      |   |      |      |        |                         |        |         |          |            |         |    |      |      |      |        |          |      |
| 8.26                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 5782    | 2312.8   | 0.2       | 420      | 200000     | 0.0030  | 0.0021    | 0.85        | 3         | 0.32 | 0.85                  | 0.6        |      |          |             |       |       |                       |            |        |      |        |       |                                                                                                                    |        |                                                                                                                                                                                                                                                                                            |        |      |   |      |      |        |                         |        |         |          |            |         |    |      |      |      |        |          |      |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 6       | 284                     |
| 225.0     | 5       | 199                     |
| 142.5     | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1950      | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 3757.5    | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 3825.0    | 5       | 199                     |
| Total     |         | 940                     |

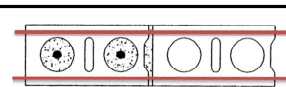


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |  | C*x (kN-m) | T*x (kN-m) | Mn   | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--|------------|------------|------|------|--|-----------|-------------|
|        |      |        |        |        | 1890    | 1621    |  |            |            | 0    | 0.85 |  | 1377      | 0.0         |
| 3900   | 0.86 | 3120   | 1580   | 0      | 1580    | 1354    |  | 616        | 0          | 616  | 0.85 |  | 1151      | 524         |
| 3735.0 | 0.86 | 2988   | 1513   | -3     | 1509    | 1294    |  | 690        | -6         | 696  | 0.85 |  | 1100      | 592         |
| 3570.0 | 0.86 | 2856   | 1446   | -13    | 1433    | 1229    |  | 755        | -23        | 778  | 0.85 |  | 1045      | 661         |
| 3405.0 | 0.86 | 2724   | 1379   | -23    | 1356    | 1163    |  | 811        | -42        | 853  | 0.85 |  | 988       | 725         |
| 3240.0 | 0.86 | 2592   | 1312   | -34    | 1278    | 1096    |  | 858        | -63        | 921  | 0.85 |  | 932       | 783         |
| 3075.0 | 0.86 | 2460   | 1245   | -46    | 1199    | 1028    |  | 897        | -86        | 982  | 0.85 |  | 874       | 835         |
| 2910.0 | 0.86 | 2328   | 1179   | -60    | 1119    | 959     |  | 926        | -111       | 1038 | 0.85 |  | 815       | 882         |
| 2745.0 | 0.86 | 2196   | 1112   | -76    | 1036    | 888     |  | 947        | -140       | 1087 | 0.85 |  | 755       | 924         |
| 2580.0 | 0.86 | 2064   | 1045   | -93    | 952     | 816     |  | 959        | -172       | 1131 | 0.85 |  | 694       | 961         |
| 2415.0 | 0.86 | 1932   | 978    | -113   | 865     | 742     |  | 962        | -208       | 1171 | 0.85 |  | 631       | 995         |
| 2250.0 | 0.86 | 1800   | 911    | -135   | 776     | 665     |  | 957        | -250       | 1207 | 0.85 |  | 565       | 1026        |
| 2025.0 | 0.86 | 1620   | 820    | -138   | 682     | 585     |  | 935        | -255       | 1190 | 0.85 |  | 497       | 1011        |
| 1800.0 | 0.86 | 1440   | 729    | -138   | 591     | 507     |  | 897        | -255       | 1151 | 0.85 |  | 431       | 979         |
| 1575.0 | 0.86 | 1260   | 638    | -138   | 500     | 429     |  | 842        | -255       | 1097 | 0.85 |  | 364       | 932         |
| 1350.0 | 0.86 | 1080   | 547    | -138   | 409     | 351     |  | 771        | -255       | 1026 | 0.85 |  | 298       | 872         |
| 1125.0 | 0.86 | 900    | 456    | -138   | 318     | 273     |  | 683        | -255       | 938  | 0.85 |  | 232       | 797         |
| 333.4  | 0.86 | 267    | 135    | -138   | -3      | -2      |  | 245        | -255       | 500  | 0.85 |  | -2        | 425.0       |
| 300.0  | 0.86 | 240    | 122    | -138   | -16     | -14     |  | 222        | -255       | 477  | 0.85 |  | -12       | 405         |
| 250.0  | 0.86 | 200    | 101    | -138   | -37     | -31     |  | 187        | -255       | 442  | 0.85 |  | -27       | 376         |
| 100.0  | 0.86 | 80     | 41     | -254   | -214    | -183    |  | 77         | -51        | 128  | 0.85 |  | -156      | 109         |
| 0.0    | 0.86 | 0      | 0      | -395   | -395    | -338    |  | 0          | 0          | 0    | 0.85 |  | -288      | 0           |

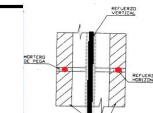
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 6.5                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 33.18                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00054 |



Planta



Corte

Compresion Axial

|             |          |                 |              |
|-------------|----------|-----------------|--------------|
| $h'/t$ :    | 15.9     | <               | 30           |
| Re :        | 0.86     |                 |              |
| Pn :        | 1620.5   | (kN)            | Pu           |
| $\phi Pn$ : | 1377.4   | (kN)            | $\geq$ 486.7 |
|             |          |                 | Si           |
| As :        | 940      | mm <sup>2</sup> |              |
| $\rho$ :    | 0.001695 |                 |              |

Flexion Pura

|             |        |                 |
|-------------|--------|-----------------|
| b :         | 145.00 | mm              |
| Ae :        | 281220 | mm <sup>2</sup> |
| c :         | 333.41 | mm              |
| d :         | 3825   | mm              |
| te :        | 72     | mm              |
| t :         | 145    | mm              |
| $\phi Mn$ : | 425.0  | kN-m            |

Punto Balanceado

|                 |               |
|-----------------|---------------|
| cb :            | 2250.0        |
| $\phi Mn$ :     | 1026          |
|                 | kN-m          |
| $\phi Pn$ :     | 565.4         |
|                 | (kN)          |
| Mn :            | kN-m          |
| $\alpha M_{cr}$ |               |
| 1207            | $\geq$ 548.38 |
|                 | Si            |

|                      |
|----------------------|
| $Mu \leq \phi Mn$    |
| 348.1 $\leq$ 1002.38 |
| Si                   |

|              |       |    |
|--------------|-------|----|
| 0.1 f'm Ae : | 467.1 | kN |
| 0.25 Pb :    | 166.3 | kN |

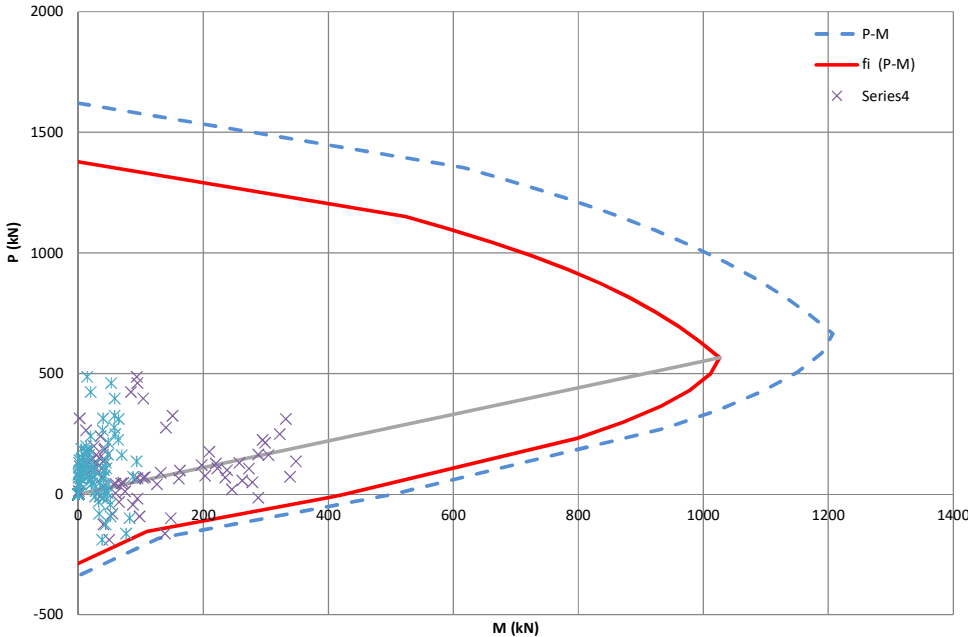
Cortante

|                |          |     |      |             |       |    |
|----------------|----------|-----|------|-------------|-------|----|
| Mu/Vu d :      | 2.5      |     | Vm : | 177.8       | kN    |    |
| Asv :          | 33.18    | mm2 | Vs : | 44.4        | kN    |    |
| Vn max permit: | 266.7167 | mm2 | ≥    | Vu= Vn+Vs : | 133.3 | kN |
|                |          |     | Si   |             |       |    |

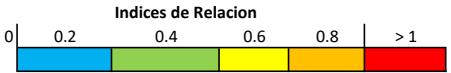
|                                   |       |
|-----------------------------------|-------|
| 6 AeVf'm :                        | 484.9 |
| 4 AeVf'm :                        | 323.3 |
| OK Refuerzo a Cortante Suficiente |       |

|                       |        |     |
|-----------------------|--------|-----|
| 0.2 f'm :             | 1652.0 | kPa |
| 0.2 f'm $\geq$        | 1732   | kPa |
| Si Elementos de Borde |        |     |

Curva de Interaccion de Mamposteria Reforzada en Arcilla

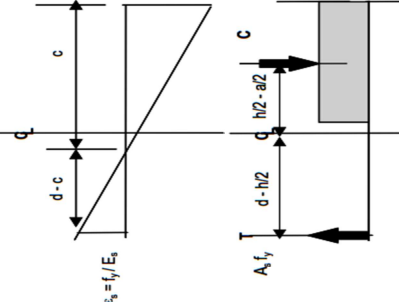


| Resumen         | Relacion             |
|-----------------|----------------------|
| Compr. Axial    | 0.35 ✓ Pu/ $\phi Pn$ |
| Axial - Flexion | 0.35 ✓ Mu/ $\phi Mn$ |
| Cortante        | 0.50 ✓ Vu/ Vn max    |

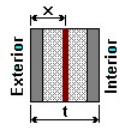


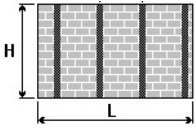
Curva Interaccion  $\phi Pn - \phi Mn$

|    |   |
|----|---|
| OK | ✓ |
|----|---|



|                                          |      |          |           |       |           |                                      |        |        |            |          |            |         |  |  |
|------------------------------------------|------|----------|-----------|-------|-----------|--------------------------------------|--------|--------|------------|----------|------------|---------|--|--|
| <b>Propiedades de Geometria Ladrillo</b> |      |          |           |       |           | <b>Propiedades de Geometria Muro</b> |        |        |            |          |            |         |  |  |
| a (mm)                                   | t    | Area     | esp Pared | Area  | Area Neta | X (mm)                               | L (mm) | H (mm) | h' (mm)    | Ag (mm2) | Groutig en | te (mm) |  |  |
| largo                                    | (mm) | Vacios x | (mm)      | Bruta | (mm2)     |                                      |        |        | (H-Ealaca) |          |            |         |  |  |
| 300                                      | 145  | 5674.0   | 30        | 43500 | 30452     | 75                                   | 3900   | 2300   | 2300       | 565500   | Con Refu   | 72.1    |  |  |





|                                |         |         |     |          |         |        |        |             |   |      |                       |            |
|--------------------------------|---------|---------|-----|----------|---------|--------|--------|-------------|---|------|-----------------------|------------|
| <b>Propiedades de Material</b> |         |         |     |          |         |        |        |             |   |      | <b>Prop. Diseño</b>   |            |
| f'm (Mpa)                      | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | Emu    | Ey     | Bloq Compr. | α |      | φ Compr Y Flexo-Compr | φ Cortante |
| 8.26                           | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32 | 0.85                  | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 5       | 199                     |
| 225.0     | 4       | 129                     |
| 142.5     | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1950      | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 3757.5    | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 3825.0    | 4       | 129                     |
| Total     |         | 715                     |

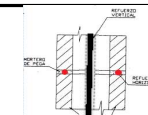
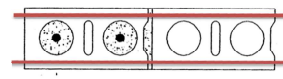


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |  | C*x (kN-m) | T*x (kN-m) | Mn   | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--|------------|------------|------|------|--|-----------|-------------|
|        |      |        |        |        | 1816    | 1557    |  |            |            | 0    | 0.85 |  | 1323      | 0.0         |
| 3900   | 0.86 | 3120   | 1580   | 0      | 1580    | 1354    |  | 616        | 0          | 616  | 0.85 |  | 1151      | 524         |
| 3735.0 | 0.86 | 2988   | 1513   | -2     | 1510    | 1295    |  | 690        | -4         | 694  | 0.85 |  | 1101      | 590         |
| 3570.0 | 0.86 | 2856   | 1446   | -10    | 1436    | 1231    |  | 755        | -18        | 772  | 0.85 |  | 1047      | 657         |
| 3405.0 | 0.86 | 2724   | 1379   | -18    | 1362    | 1167    |  | 811        | -32        | 843  | 0.85 |  | 992       | 717         |
| 3240.0 | 0.86 | 2592   | 1312   | -26    | 1286    | 1102    |  | 858        | -49        | 907  | 0.85 |  | 937       | 771         |
| 3075.0 | 0.86 | 2460   | 1245   | -36    | 1209    | 1037    |  | 897        | -66        | 963  | 0.85 |  | 881       | 819         |
| 2910.0 | 0.86 | 2328   | 1179   | -47    | 1132    | 970     |  | 926        | -86        | 1013 | 0.85 |  | 825       | 861         |
| 2745.0 | 0.86 | 2196   | 1112   | -59    | 1053    | 903     |  | 947        | -109       | 1056 | 0.85 |  | 767       | 898         |
| 2580.0 | 0.86 | 2064   | 1045   | -73    | 972     | 834     |  | 959        | -134       | 1093 | 0.85 |  | 709       | 929         |
| 2415.0 | 0.86 | 1932   | 978    | -88    | 890     | 763     |  | 962        | -163       | 1125 | 0.85 |  | 649       | 956         |
| 2250.0 | 0.86 | 1800   | 911    | -106   | 805     | 690     |  | 957        | -195       | 1152 | 0.85 |  | 587       | 979         |
| 2025.0 | 0.86 | 1620   | 820    | -108   | 712     | 610     |  | 935        | -200       | 1134 | 0.85 |  | 519       | 964         |
| 1800.0 | 0.86 | 1440   | 729    | -108   | 621     | 532     |  | 897        | -200       | 1096 | 0.85 |  | 452       | 932         |
| 1575.0 | 0.86 | 1260   | 638    | -108   | 530     | 454     |  | 842        | -200       | 1042 | 0.85 |  | 386       | 885         |
| 1350.0 | 0.86 | 1080   | 547    | -108   | 438     | 376     |  | 771        | -200       | 970  | 0.85 |  | 319       | 825         |
| 1125.0 | 0.86 | 900    | 456    | -108   | 347     | 298     |  | 683        | -200       | 883  | 0.85 |  | 253       | 751         |
| 262.3  | 0.86 | 210    | 106    | -108   | -2      | -2      |  | 196        | -200       | 395  | 0.85 |  | -2        | 336.2       |
| 150.0  | 0.86 | 120    | 61     | -147   | -86     | -74     |  | 115        | -133       | 248  | 0.85 |  | -63       | 210         |
| 100.0  | 0.86 | 80     | 41     | -195   | -155    | -133    |  | 77         | -47        | 124  | 0.85 |  | -113      | 105         |
| 50.0   | 0.86 | 40     | 20     | -276   | -256    | -220    |  | 39         | 104        | -65  | 0.85 |  | -187      | -55         |
| 0.0    | 0.86 | 0      | 0      | -300   | -300    | -257    |  | 0          | 0          | 0    | 0.85 |  | -219      | 0           |

| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00020 |



Corte

Compresion Axial

|        |          |                 |         |
|--------|----------|-----------------|---------|
| h'/t : | 15.9     | <               | 30      |
| Re :   | 0.86     |                 |         |
| Pn :   | 1556.8   | (kN)            | Pu      |
| φPn :  | 1323.3   | (kN)            | ≥ 186.9 |
|        |          |                 | Si      |
| As :   | 715      | mm <sup>2</sup> |         |
| ρ :    | 0.001289 |                 |         |

Flexion Pura

|        |        |                 |
|--------|--------|-----------------|
| b :    | 145.00 | mm              |
| Ae :   | 281220 | mm <sup>2</sup> |
| c :    | 262.25 | mm              |
| d :    | 3825   | mm              |
| te :   | 72     | mm              |
| t :    | 145    | mm              |
| φ Mn : | 336.2  | kN-m            |

Punto Balanceado

|        |        |        |
|--------|--------|--------|
| cb:    | 2250.0 |        |
| φ Mn : | 979    | kN-m   |
| φPn :  | 586.8  | (kN)   |
| Mn :   | kN-m   | αMcr   |
| 1152   | ≥      | 548.38 |
|        | Si     |        |

$$\begin{aligned} \mu &\leq \phi M_n \\ 199.0 &\leq 605.65 \end{aligned}$$

Si

$$\begin{aligned} 0.1 f'_m A_e &= 467.1 \text{ kN} \\ 0.25 P_b &= 172.6 \text{ kN} \end{aligned}$$

Cortante

|                |          |     |      |             |       |    |
|----------------|----------|-----|------|-------------|-------|----|
| Mu/Vu d :      | 1.8      |     | Vm : | 177.8       | kN    |    |
| Asv :          | 12.57    | mm2 | Vs : | 16.8        | kN    |    |
| Vn max permit: | 266.7167 | mm2 | ≥    | Vu= Vn+Vs : | 116.8 | kN |
|                |          |     | Si   |             |       |    |

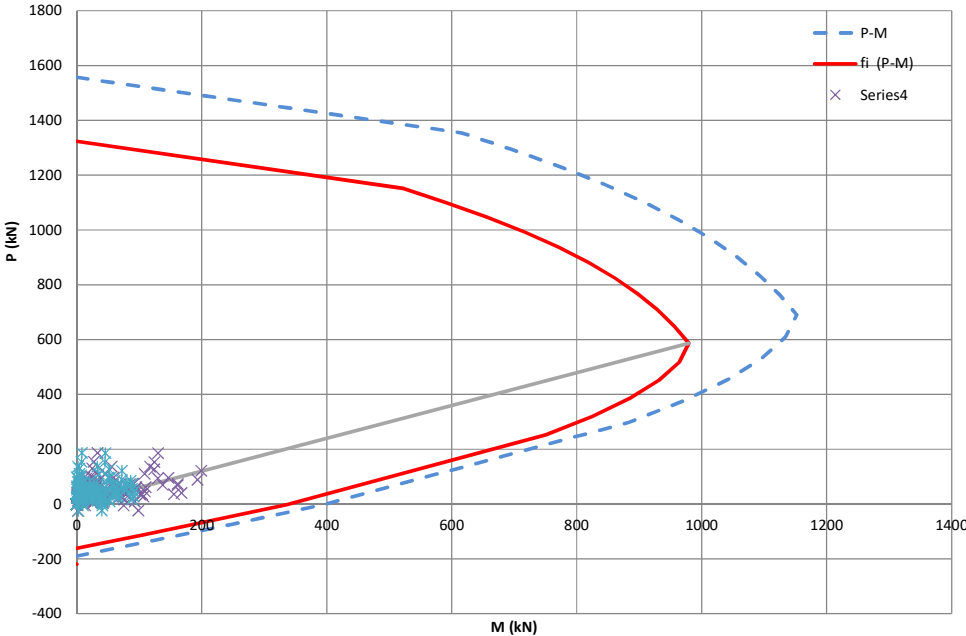
$$\begin{aligned} 6 A_e \sqrt{f'_m} &= 484.9 \\ 4 A_e \sqrt{f'_m} &= 323.3 \end{aligned}$$

OK Refuerzo a Cortante Suficiente

$$\begin{aligned} 0.2 f'_m &= 1652.0 \text{ kPa} \\ 0.2 f'_m &\geq 665 \text{ kPa} \end{aligned}$$

OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

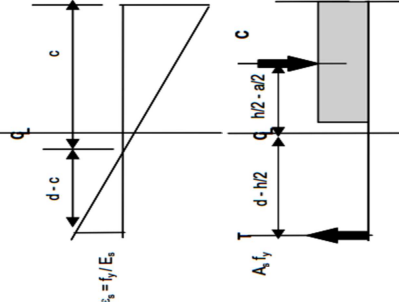


| Resumen         | Relacion          |
|-----------------|-------------------|
| Compr. Axial    | 0.14 ✓ Pu/ φPn    |
| Axial - Flexion | 0.33 ✓ Mu/ φMn    |
| Cortante        | 0.44 ✓ Vu/ Vn max |



Curva Interaccion φ Pn - φ Mn

OK ✓



| Propiedades de Geometria Ladrillo |        |               |                |            |                 |
|-----------------------------------|--------|---------------|----------------|------------|-----------------|
| a (mm)                            | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm2) |
| largo                             |        |               |                |            |                 |
| 300                               | 145    | 5674.0        | 30             | 43500      | 30452           |

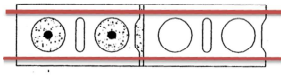
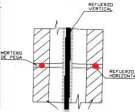
| Propiedades de Geometria Muro |        |        |                           |          |                      |         |
|-------------------------------|--------|--------|---------------------------|----------|----------------------|---------|
| X (mm)                        | L (mm) | H (mm) | h' (mm)<br>(H-e_ladrillo) | Ag (mm2) | Groutig en Con Refue | te (mm) |
| 75                            | 1500   | 2300   | 2300                      | 217500   |                      | 76.2    |

| Propiedades de Material |         |         |     |          |         |                 |                |             |   | Prop. Diseño          |            |
|-------------------------|---------|---------|-----|----------|---------|-----------------|----------------|-------------|---|-----------------------|------------|
| f'm (Mpa)               | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | ε <sub>mu</sub> | ε <sub>y</sub> | Bloq Compr. | α | φ Compr Y Flexo-Compr | φ Cortante |
| 8.26                    | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030          | 0.0021         | 0.85        | 3 | 0.85                  | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm2) | c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) | C*x (kN-m) | T*x (kN-m) | Mn  | φ    | φ Pn (kN) | φ Mn (kN-m) |
|-----------|---------|------------|--------|------|--------|--------|--------|---------|---------|------------|------------|-----|------|-----------|-------------|
| 85.0      | 5       | 199        | 1500   | 0.86 | 1200   | 642    | 0      | 867     | 743     |            |            | 0   | 0.85 | 632       | 0.0         |
| 0.0       | 0       | 0          | 1433.8 | 0.86 | 1147   | 614    | 0      | 614     | 526     | 96         | 0          | 96  | 0.85 | 468       | 82          |
| 0.0       | 0       | 0          | 1367.6 | 0.86 | 1094   | 585    | -4     | 581     | 498     | 108        | 0          | 108 | 0.85 | 447       | 92          |
| 0.0       | 0       | 0          | 1301.5 | 0.86 | 1041   | 557    | -10    | 546     | 469     | 119        | -3         | 122 | 0.85 | 423       | 103         |
| 0.0       | 0       | 0          | 1235.3 | 0.86 | 988    | 529    | -17    | 511     | 438     | 128        | -7         | 135 | 0.85 | 398       | 114         |
| 0.0       | 0       | 0          | 1169.1 | 0.86 | 935    | 500    | -25    | 475     | 407     | 135        | -12        | 147 | 0.85 | 373       | 125         |
| 0.0       | 0       | 0          | 1102.9 | 0.86 | 882    | 472    | -34    | 438     | 376     | 141        | -17        | 158 | 0.85 | 346       | 134         |
| 0.0       | 0       | 0          | 1036.8 | 0.86 | 829    | 444    | -44    | 400     | 343     | 146        | -22        | 168 | 0.85 | 319       | 143         |
| 0.0       | 0       | 0          | 970.6  | 0.86 | 776    | 415    | -55    | 361     | 309     | 149        | -29        | 178 | 0.85 | 292       | 151         |
| 0.0       | 0       | 0          | 904.4  | 0.86 | 724    | 387    | -67    | 320     | 274     | 150        | -36        | 187 | 0.85 | 263       | 159         |
|           |         |            |        |      |        |        |        |         |         | 150        | -45        | 195 | 0.85 | 233       | 166         |
| 750       | 6       | 284        | 838.2  | 0.86 | 671    | 359    | -82    | 277     | 237     | 149        | -55        | 203 | 0.85 | 202       | 173         |
| 0.0       | 0       | 0          | 754.4  | 0.86 | 604    | 323    | -84    | 239     | 205     | 145        | -56        | 200 | 0.85 | 174       | 170         |
| 0.0       | 0       | 0          | 670.6  | 0.86 | 536    | 287    | -104   | 183     | 157     | 138        | -56        | 194 | 0.85 | 133       | 165         |
| 0.0       | 0       | 0          | 586.8  | 0.86 | 469    | 251    | -131   | 120     | 103     | 129        | -56        | 185 | 0.85 | 88        | 157         |
| 0.0       | 0       | 0          | 502.9  | 0.86 | 402    | 215    | -167   | 48      | 41      | 118        | -56        | 174 | 0.85 | 35        | 148         |
| 0.0       | 0       | 0          | 460.0  | 0.86 | 368    | 197    | -191   | 6       | 5       | 111        | -56        | 167 | 0.85 | 4         | 142         |
| 0.0       | 0       | 0          | 454.4  | 0.86 | 364    | 194    | -194   | 0       | 0       | 110        | -56        | 166 | 0.85 | 0         | 141.2       |
| 0.0       | 0       | 0          | 300.0  | 0.86 | 240    | 128    | -203   | -74     | -64     | 81         | -56        | 136 | 0.85 | -54       | 116         |
| 0.0       | 0       | 0          | 250.0  | 0.86 | 200    | 107    | -203   | -96     | -82     | 70         | -56        | 125 | 0.85 | -70       | 106         |
| 0.0       | 0       | 0          | 100.0  | 0.86 | 80     | 43     | -203   | -160    | -137    | 30         | -56        | 86  | 0.85 | -117      | 73          |
| 1415.0    | 5       | 199        | 0.0    | 0.86 | 0      | 0      | -286   | -286    | -246    | 0          | 0          | 0   | 0.85 | -209      | 0           |
|           | Total   | 682        |        |      |        |        |        |         |         |            |            |     |      |           |             |

|                     |                        |          |            |         |                                                                                       |                                                                                       |
|---------------------|------------------------|----------|------------|---------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) | As (mm2) | eficien. η | ρn      |  |  |
| 4.0                 | 600                    | 12.57    | 0.35       | 0.00019 | Planta                                                                                | Corte                                                                                 |

Compresion Axial

|              |          |                 |              |
|--------------|----------|-----------------|--------------|
| $h'/t$ :     | 15.9     | <               | 30           |
| Re :         | 0.86     |                 |              |
| Pn :         | 743.5    | (kN)            | $P_u$        |
| $\phi P_n$ : | 632.0    | (kN)            | $\geq 327.6$ |
|              |          | Si              |              |
| As :         | 682      | mm <sup>2</sup> |              |
| $\rho$ :     | 0.003301 |                 |              |

Flexion Pura

|              |        |                 |
|--------------|--------|-----------------|
| b :          | 145.00 | mm              |
| Ae :         | 114272 | mm <sup>2</sup> |
| c :          | 454.39 | mm              |
| d :          | 1425   | mm              |
| te :         | 76     | mm              |
| t :          | 145    | mm              |
| $\phi M_n$ : | 141.2  | kN-m            |

Punto Balanceado

|                 |              |
|-----------------|--------------|
| cb :            | 838.2        |
| $\phi M_n$ :    | 173 kN-m     |
| $\phi P_n$ :    | 201.5 (kN)   |
| Mn :            | kN-m         |
| $\alpha M_{cr}$ |              |
| 203             | $\geq 85.70$ |
|                 | Si           |

|                     |
|---------------------|
| $M_u \leq \phi M_n$ |
| $40.6 \leq 207.92$  |
| Si                  |

|                  |       |    |
|------------------|-------|----|
| $0.1 f'_m A_e$ : | 179.7 | kN |
| $0.25 P_b$ :     | 59.3  | kN |

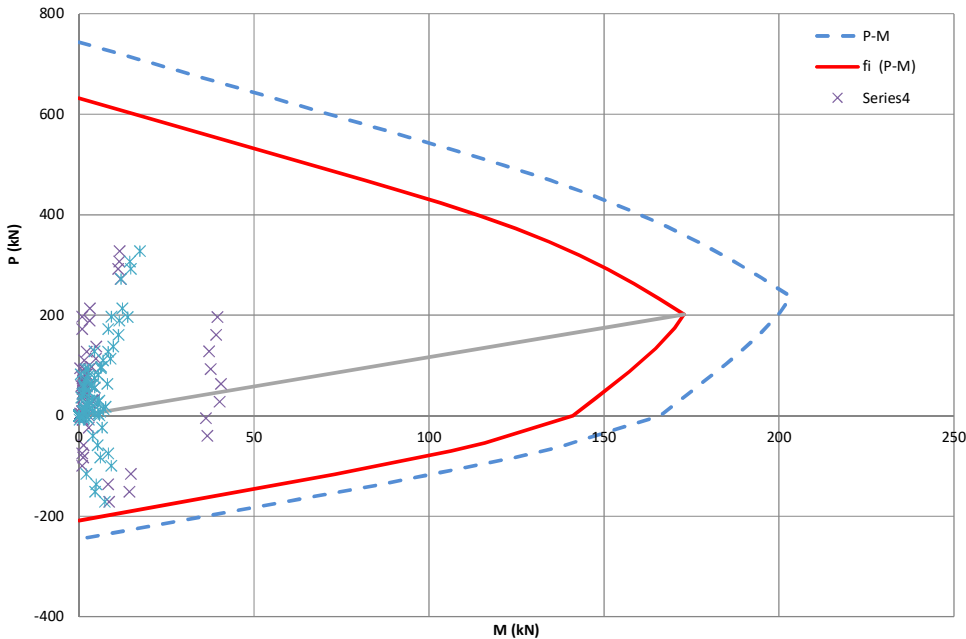
Cortante

|                 |          |                 |                     |      |    |
|-----------------|----------|-----------------|---------------------|------|----|
| $M_u/V_u d$ :   | 2.3      |                 | $V_m$ :             | 72.3 | kN |
| Asv :           | 12.57    | mm <sup>2</sup> | Vs :                | 6.3  | kN |
| Vn max permit : | 108.3787 | mm <sup>2</sup> | $V_u = V_n + V_s$ : | 47.1 | kN |
|                 |          | $\geq$          |                     |      |    |
|                 |          | Si              |                     |      |    |

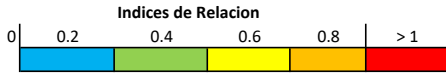
|                                   |       |
|-----------------------------------|-------|
| $6 A_e V f'_m$ :                  | 197.1 |
| $4 A_e V f'_m$ :                  | 131.4 |
| OK Refuerzo a Cortante Suficiente |       |

|                       |        |     |
|-----------------------|--------|-----|
| $0.2 f'_m$ :          | 1652.0 | kPa |
| $0.2 f'_m \geq$       | 2874   | kPa |
| Si Elementos de Borde |        |     |

Curva de Interaccion de Mamposteria Reforzada en Arcilla

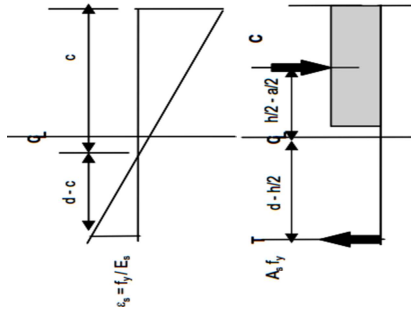


| Resumen         | Relacion              |
|-----------------|-----------------------|
| Compr. Axial    | 0.52 ✓ Pu/ $\phi P_n$ |
| Axial - Flexion | 0.20 ✓ Mu/ $\phi M_n$ |
| Cortante        | 0.43 ✓ Vu/ Vn max     |



Curva Interaccion  $\phi P_n - \phi M_n$

|    |   |
|----|---|
| OK | ✓ |
|----|---|



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 3/4/5 Piso  
(I-L) 19 (D-G)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

$h'/t$  : 15.9 < 30  
 $Re$  : 0.86  
 $P_n$  : 659.9 (kN)  
 $\phi P_n$  : 560.9 (kN)  $\geq$  113.3  
 $As$  : 387 mm<sup>2</sup>  
 $\rho$  : 0.001873

Flexion Pura

$b$  : 145.00 mm  
 $A_e$  : 114272 mm<sup>2</sup>  
 $c$  : 253.24 mm  
 $d$  : 1425 mm  
 $te$  : 76 mm  
 $t$  : 145 mm  
 $\phi Mn$  : 90.4 kN-m

Punto Balanceado

$cb$  : 838.2  
 $\phi Mn$  : 157 kN-m  
 $\phi P_n$  : 222.6 (kN)  
 $Mn$  : kN-m  $\alpha M_{cr}$   
184  $\geq$  85.70  
Si

$Mu \leq \phi Mn$   
72.3  $\leq$  123.89  
Si

0.1  $f'm A_e$  : 179.7 kN  
0.25  $P_b$  : 65.5 kN

Cortante

$Mu/Vu d$  : 2.0  
 $Asv$  : 12.57 mm<sup>2</sup>  
 $Vn$  max permit : 108.3787 mm<sup>2</sup>  $\geq$

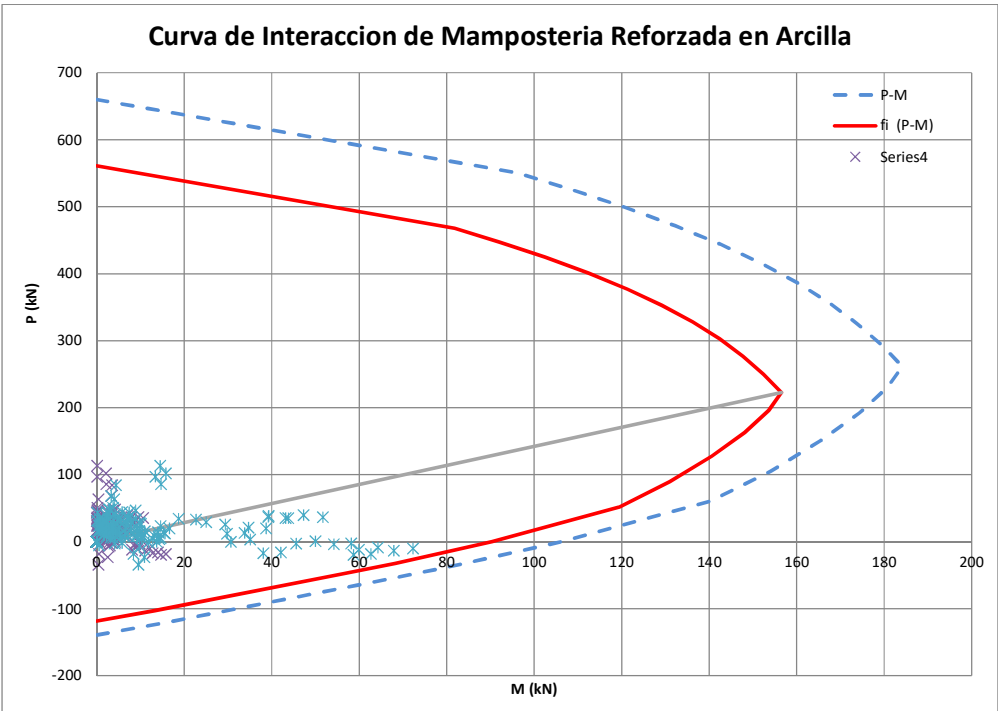
$V_m$  : 72.3 kN  
 $V_s$  : 6.3 kN  
 $V_u = V_n + V_s$  : 47.1 kN

6  $A_e \sqrt{f'm}$  : 197.1  
4  $A_e \sqrt{f'm}$  : 131.4

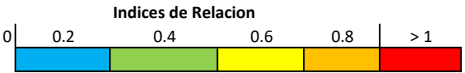
OK Refuerzo a Cortante Suficiente

0.2  $f'm$  : 1652.0 kPa  
0.2  $f'm \geq$  992 kPa

OK No Necesita Elementos de Borde

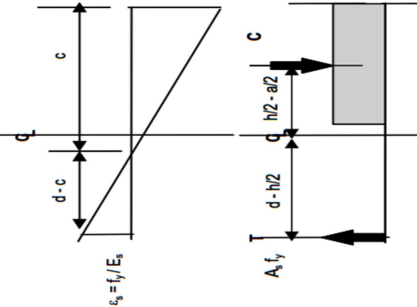


| Resumen         | Relacion                                                  |
|-----------------|-----------------------------------------------------------|
| Compr. Axial    | 0.20 <input checked="" type="checkbox"/> $P_u / \phi P_n$ |
| Axial - Flexion | 0.58 <input checked="" type="checkbox"/> $M_u / \phi Mn$  |
| Cortante        | 0.43 <input checked="" type="checkbox"/> $V_u / V_n$ max  |



Curva Interaccion  $\phi P_n - \phi Mn$

No Cumple ☒



**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje

19

1/2 Piso

(H-I)

**Universidad Santo Tomas**  
**Esp. Patología de la Construcción**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 5       | 199                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1275      | 6       | 284                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 2475.0    | 5       | 199                     |
|           | Total   | 682                     |

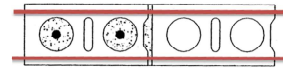


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 1250    | 1071    |                                |            |            | 0   | 0.85 |  | 911       | 0.0         |
| 2550   | 0.86 | 2040   | 1024   | 0      | 1024    | 878     | Compresion - Controla Acero    | 261        | 0          | 261 | 0.85 |  | 746       | 222         |
| 2440.6 | 0.86 | 1952   | 980    | -2     | 979     | 839     |                                | 293        | -2         | 295 | 0.85 |  | 713       | 251         |
| 2331.2 | 0.86 | 1865   | 936    | -7     | 929     | 796     |                                | 321        | -9         | 330 | 0.85 |  | 677       | 280         |
| 2221.8 | 0.86 | 1777   | 892    | -14    | 879     | 753     |                                | 345        | -16        | 361 | 0.85 |  | 640       | 307         |
| 2112.4 | 0.86 | 1690   | 848    | -20    | 828     | 710     |                                | 365        | -25        | 389 | 0.85 |  | 603       | 331         |
| 2002.9 | 0.86 | 1602   | 804    | -28    | 776     | 666     |                                | 381        | -34        | 415 | 0.85 |  | 566       | 353         |
| 1893.5 | 0.86 | 1515   | 761    | -37    | 724     | 621     |                                | 394        | -44        | 438 | 0.85 |  | 528       | 372         |
| 1784.1 | 0.86 | 1427   | 717    | -46    | 670     | 575     |                                | 402        | -55        | 458 | 0.85 |  | 489       | 389         |
| 1674.7 | 0.86 | 1340   | 673    | -57    | 616     | 528     |                                | 407        | -68        | 475 | 0.85 |  | 449       | 404         |
| 1565.3 | 0.86 | 1252   | 629    | -69    | 559     | 480     |                                | 408        | -83        | 491 | 0.85 |  | 408       | 418         |
| 1455.9 | 0.86 | 1165   | 585    | -84    | 501     | 430     | FB                             | 405        | -100       | 505 | 0.85 |  | 365       | 430         |
| 1310.3 | 0.86 | 1048   | 526    | -84    | 443     | 380     | Flexion - Controla Mamposteria | 395        | -100       | 495 | 0.85 |  | 323       | 421         |
| 1164.7 | 0.86 | 932    | 468    | -100   | 368     | 316     |                                | 379        | -100       | 479 | 0.85 |  | 268       | 407         |
| 1019.1 | 0.86 | 815    | 409    | -126   | 283     | 243     |                                | 355        | -100       | 455 | 0.85 |  | 206       | 387         |
| 873.5  | 0.86 | 699    | 351    | -162   | 189     | 162     |                                | 325        | -100       | 425 | 0.85 |  | 138       | 361         |
| 727.9  | 0.86 | 582    | 292    | -203   | 90      | 77      |                                | 288        | -100       | 388 | 0.85 |  | 65        | 330         |
| 505.1  | 0.86 | 404    | 203    | -203   | 0       | 0       |                                | 218        | -100       | 318 | 0.85 |  | 0         | 270.3       |
| 450.0  | 0.86 | 360    | 181    | -203   | -22     | -19     |                                | 198        | -100       | 298 | 0.85 |  | -16       | 253         |
| 300.0  | 0.86 | 240    | 120    | -203   | -82     | -71     |                                | 139        | -100       | 239 | 0.85 |  | -60       | 204         |
| 30.0   | 0.86 | 24     | 12     | -286   | -274    | -235    |                                | 15         | 0          | 15  | 0.85 |  | -200      | 13          |
| 0.0    | 0.86 | 0      | 0      | -286   | -286    | -246    |                                | 0          | 0          | 0   | 0.85 |  | -209      | 0           |

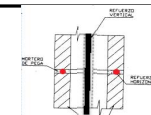
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 6.5                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 33.18                 |

| eficien. η | ρ <sub>n</sub> |
|------------|----------------|
| 0.35       | 0.00054        |



Planta



Corte

Compresion Axial

|              |        |                 |       |
|--------------|--------|-----------------|-------|
| $h'/t$ :     | 15.9   | <               | 30    |
| $Re$ :       | 0.86   |                 |       |
| $P_n$ :      | 1071.3 | (kN)            | $P_u$ |
| $\phi P_n$ : | 910.6  | (kN)            | 49.9  |
|              |        | $\geq$          | Si    |
| $A_s$ :      | 682    | mm <sup>2</sup> |       |
| $\rho$ :     | 0.0019 |                 |       |

Flexion Pura

|              |        |                 |
|--------------|--------|-----------------|
| $b$ :        | 145.00 | mm              |
| $A_e$ :      | 182347 | mm <sup>2</sup> |
| $c$ :        | 505.07 | mm              |
| $d$ :        | 2475   | mm              |
| $t_e$ :      | 72     | mm              |
| $t$ :        | 145    | mm              |
| $\phi M_n$ : | 270.3  | kN-m            |

Punto Balanceado

|              |        |                 |
|--------------|--------|-----------------|
| $cb$ :       | 1455.9 |                 |
| $\phi M_n$ : | 430    | kN-m            |
| $\phi P_n$ : | 365.2  | (kN)            |
| $M_n$ :      | kN-m   | $\alpha M_{cr}$ |
| 505          | $\geq$ | 232.49          |
|              |        | Si              |

|                     |    |
|---------------------|----|
| $M_u \leq \phi M_n$ |    |
| 46.1 $\leq$ 245.15  | Si |

|                  |       |    |
|------------------|-------|----|
| 0.1 $f'_m A_e$ : | 305.4 | kN |
| 0.25 $P_b$ :     | 107.4 | kN |

Cortante

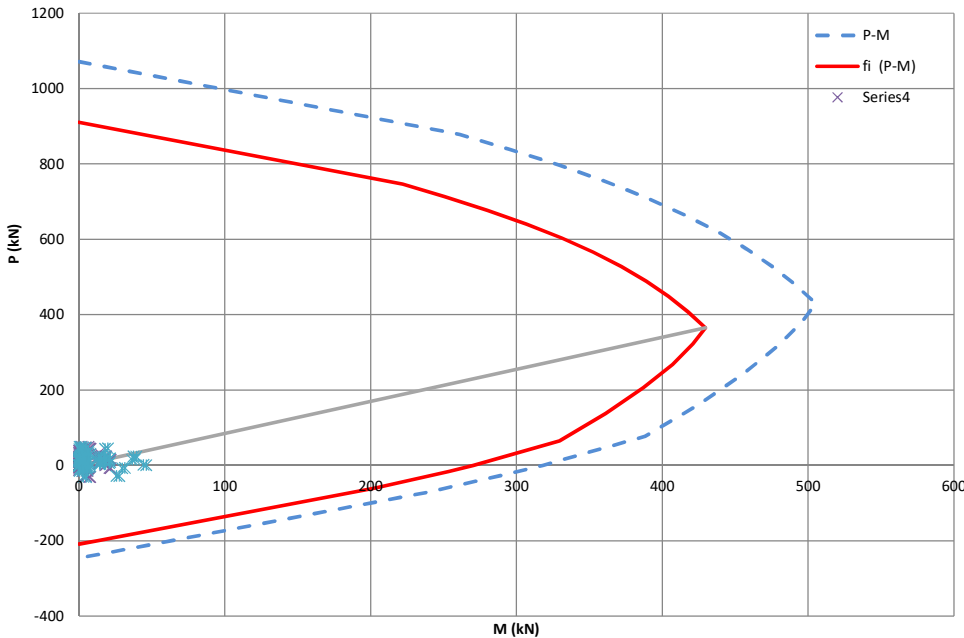
|                    |          |                 |                     |       |    |
|--------------------|----------|-----------------|---------------------|-------|----|
| $M_u/V_u d$ :      | 3.9      |                 | $V_m$ :             | 115.3 | kN |
| $A_{sv}$ :         | 33.18    | mm <sup>2</sup> | $V_s$ :             | 28.7  | kN |
| $V_n$ max permit : | 172.9428 | mm <sup>2</sup> | $V_u = V_n + V_s$ : | 86.4  | kN |
|                    |          | $\geq$          |                     |       | Si |

|                                   |       |
|-----------------------------------|-------|
| 6 $A_e \sqrt{f'_m}$ :             | 314.4 |
| 4 $A_e \sqrt{f'_m}$ :             | 209.6 |
| OK Refuerzo a Cortante Suficiente |       |

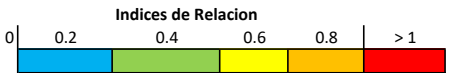
|                 |        |     |
|-----------------|--------|-----|
| 0.2 $f'_m$ :    | 1652.0 | kPa |
| 0.2 $f'_m \geq$ | 274    | kPa |

OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

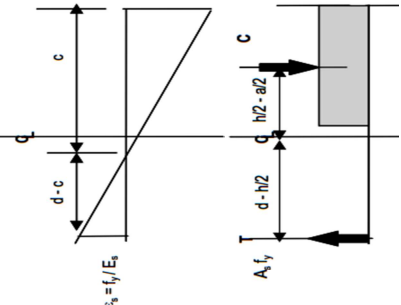


| Resumen         | Relacion |                  |
|-----------------|----------|------------------|
| Compr. Axial    | 0.05     | $P_u / \phi P_n$ |
| Axial - Flexion | 0.19     | $M_u / \phi M_n$ |
| Cortante        | 0.50     | $V_u / V_n$ max  |



Curva Interaccion  $\phi P_n - \phi M_n$

|    |   |
|----|---|
| OK | ✓ |
|----|---|



**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje

3/4/5 Piso  
19

(H-I)

Universidad Santo Tomas  
Esp. Patología de la Construcción

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm2) |
|-----------|---------|------------|
| 75.0      | 4       | 129        |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 1275      | 4       | 129        |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 2475.0    | 4       | 129        |
| Total     |         | 387        |

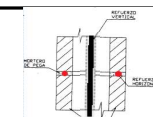
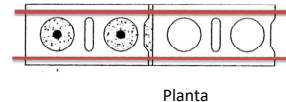


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|-----|------|--|-----------|-------------|
| 2550   | 0.86 | 2040   | 1024   | 0      | 1152    | 988     | Compresion - Controla Acero    | 261        | 0          | 261 | 0.85 |  | 840       | 0.0         |
| 2440.6 | 0.86 | 1952   | 980    | -1     | 1024    | 878     |                                | 293        | -1         | 294 | 0.85 |  | 746       | 222         |
| 2331.2 | 0.86 | 1865   | 936    | -5     | 979     | 840     |                                | 321        | -6         | 326 | 0.85 |  | 714       | 250         |
| 2221.8 | 0.86 | 1777   | 892    | -9     | 932     | 799     |                                | 345        | -11        | 355 | 0.85 |  | 679       | 277         |
| 2112.4 | 0.86 | 1690   | 848    | -13    | 884     | 758     |                                | 365        | -16        | 381 | 0.85 |  | 644       | 302         |
| 2002.9 | 0.86 | 1602   | 804    | -18    | 835     | 716     |                                | 381        | -22        | 403 | 0.85 |  | 609       | 324         |
| 1893.5 | 0.86 | 1515   | 761    | -24    | 786     | 674     |                                | 394        | -29        | 422 | 0.85 |  | 573       | 343         |
| 1784.1 | 0.86 | 1427   | 717    | -30    | 737     | 632     |                                | 402        | -36        | 438 | 0.85 |  | 537       | 359         |
| 1674.7 | 0.86 | 1340   | 673    | -37    | 687     | 589     |                                | 407        | -44        | 451 | 0.85 |  | 500       | 372         |
| 1565.3 | 0.86 | 1252   | 629    | -45    | 636     | 545     |                                | 408        | -54        | 462 | 0.85 |  | 463       | 384         |
| 1455.9 | 0.86 | 1165   | 585    | -54    | 584     | 500     | Flexion - Controla Mamposteria | 405        | -65        | 470 | 0.85 |  | 425       | 393         |
| 1310.3 | 0.86 | 1048   | 526    | -54    | 531     | 455     |                                | 395        | -65        | 460 | 0.85 |  | 387       | 400         |
| 1164.7 | 0.86 | 932    | 468    | -62    | 472     | 405     |                                | 379        | -65        | 444 | 0.85 |  | 344       | 391         |
| 1019.1 | 0.86 | 815    | 409    | -74    | 406     | 348     |                                | 355        | -65        | 420 | 0.85 |  | 296       | 377         |
| 873.5  | 0.86 | 699    | 351    | -90    | 336     | 288     |                                | 325        | -65        | 390 | 0.85 |  | 245       | 357         |
| 727.9  | 0.86 | 582    | 292    | -108   | 261     | 224     |                                | 288        | -65        | 353 | 0.85 |  | 190       | 331         |
| 269.8  | 0.86 | 216    | 108    | -108   | 184     | 158     |                                | 126        | -65        | 191 | 0.85 |  | 134       | 300         |
| 200.0  | 0.86 | 160    | 80     | -108   | 0       | 0       |                                | 96         | -65        | 161 | 0.85 |  | 0         | 162.8       |
| 150.0  | 0.86 | 120    | 60     | -108   | -28     | -24     |                                | 73         | -65        | 138 | 0.85 |  | -20       | 137         |
| 30.0   | 0.86 | 24     | 12     | -163   | -48     | -41     |                                | 15         | 0          | 15  | 0.85 |  | -35       | 117         |
| 0.0    | 0.86 | 0      | 0      | -163   | -150    | -129    |                                | 0          | 0          | 0   | 0.85 |  | -110      | 13          |
| 0.0    | 0.86 | 0      | 0      | -163   | -163    | -139    |                                | 0          | 0          | 0   | 0.85 |  | -118      | 0           |

| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm2) |
|----------|
| 12.57    |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00021 |



Corte

Compresion Axial

|              |          |                 |       |
|--------------|----------|-----------------|-------|
| $h'/t$ :     | 15.9     | <               | 30    |
| $Re$ :       | 0.86     |                 |       |
| $P_n$ :      | 987.7    | (kN)            | $P_u$ |
| $\phi P_n$ : | 839.6    | (kN)            | 49.9  |
|              |          | $\geq$          |       |
|              |          | Si              |       |
| $A_s$ :      | 387      | mm <sup>2</sup> |       |
| $\rho$ :     | 0.001078 |                 |       |

Flexion Pura

|              |        |                 |
|--------------|--------|-----------------|
| $b$ :        | 145.00 | mm              |
| $A_e$ :      | 182347 | mm <sup>2</sup> |
| $c$ :        | 269.79 | mm              |
| $d$ :        | 2475   | mm              |
| $t_e$ :      | 72     | mm              |
| $t$ :        | 145    | mm              |
| $\phi M_n$ : | 162.8  | kN-m            |

Punto Balanceado

|              |        |                 |
|--------------|--------|-----------------|
| $cb$ :       | 1455.9 |                 |
| $\phi M_n$ : | 400    | kN-m            |
| $\phi P_n$ : | 386.7  | (kN)            |
| $M_n$ :      | kN-m   | $\alpha M_{cr}$ |
| 470          | $\geq$ | 232.49          |
|              | Si     |                 |

|                     |
|---------------------|
| $M_u \leq \phi M_n$ |
| 46.1 $\leq$ 169.72  |
| Si                  |

|                  |       |    |
|------------------|-------|----|
| 0.1 $f'_m A_e$ : | 305.4 | kN |
| 0.25 $P_b$ :     | 113.7 | kN |

Cortante

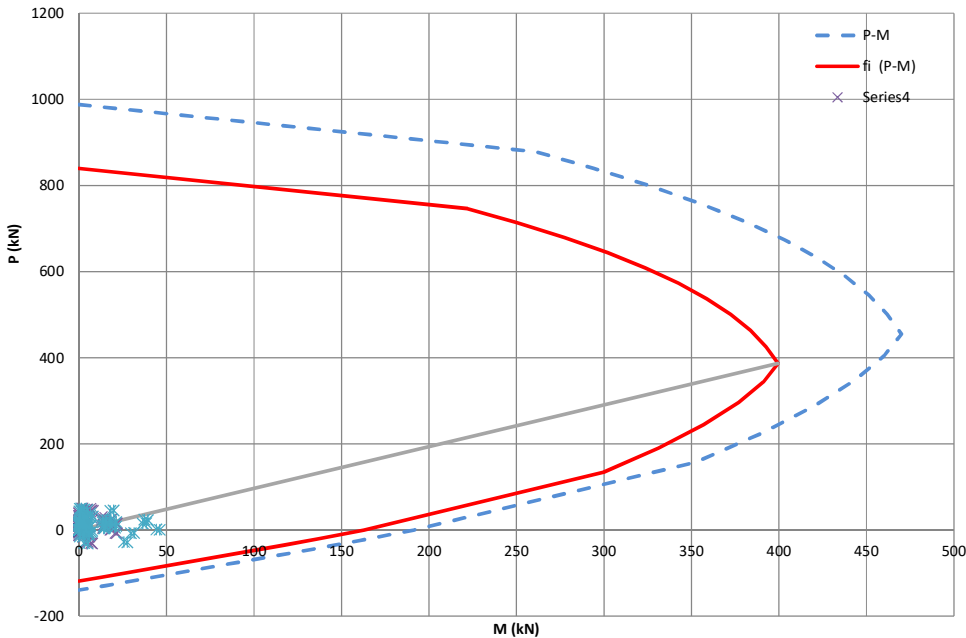
|                    |          |                 |                     |       |    |
|--------------------|----------|-----------------|---------------------|-------|----|
| $M_u/V_u d$ :      | 3.9      |                 | $V_m$ :             | 115.3 | kN |
| $A_{sv}$ :         | 12.57    | mm <sup>2</sup> | $V_s$ :             | 10.9  | kN |
| $V_n$ max permit : | 172.9428 | mm <sup>2</sup> | $V_u = V_n + V_s$ : | 75.7  | kN |
|                    | $\geq$   |                 |                     |       |    |
|                    | Si       |                 |                     |       |    |

|                                   |       |
|-----------------------------------|-------|
| 6 $A_e V f'_m$ :                  | 314.4 |
| 4 $A_e V f'_m$ :                  | 209.6 |
| OK Refuerzo a Cortante Suficiente |       |

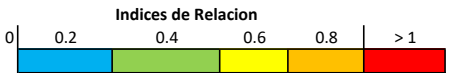
|                 |        |     |
|-----------------|--------|-----|
| 0.2 $f'_m$ :    | 1652.0 | kPa |
| 0.2 $f'_m \geq$ | 274    | kPa |

OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

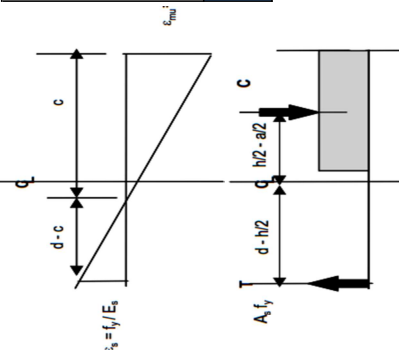


| Resumen         | Relacion                                                  |
|-----------------|-----------------------------------------------------------|
| Compr. Axial    | 0.06 <input checked="" type="checkbox"/> $P_u / \phi P_n$ |
| Axial - Flexion | 0.27 <input checked="" type="checkbox"/> $M_u / \phi M_n$ |
| Cortante        | 0.44 <input checked="" type="checkbox"/> $V_u / V_n$ max  |



Curva Interaccion  $\phi P_n - \phi M_n$

|    |                                     |
|----|-------------------------------------|
| OK | <input checked="" type="checkbox"/> |
|----|-------------------------------------|



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 235.0     | 4       | 129                     |
| 1275.0    | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 2325      | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 3375.0    | 4       | 129                     |
| 4415.0    | 4       | 129                     |
| 4575.0    | 4       | 129                     |
| Total     |         | 774                     |

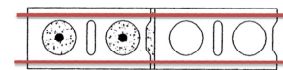


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn   | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|------|------|--|-----------|-------------|
| 4650   | 0.86 | 3720   | 1885   | 0      | 1885    | 1616    | Compresion - Controla Acero    | 876        | 0          | 876  | 0.85 |  | 1560      | 0.0         |
| 4454.1 | 0.86 | 3563   | 1805   | -2     | 1803    | 1546    |                                | 981        | -5         | 986  | 0.85 |  | 1373      | 745         |
| 4258.2 | 0.86 | 3407   | 1726   | -9     | 1717    | 1472    |                                | 1073       | -19        | 1092 | 0.85 |  | 1314      | 838         |
| 4062.4 | 0.86 | 3250   | 1646   | -16    | 1630    | 1397    |                                | 1153       | -36        | 1189 | 0.85 |  | 1251      | 928         |
| 3866.5 | 0.86 | 3093   | 1567   | -25    | 1542    | 1322    |                                | 1220       | -55        | 1275 | 0.85 |  | 1188      | 1010        |
| 3670.6 | 0.86 | 2936   | 1488   | -35    | 1453    | 1246    |                                | 1275       | -76        | 1350 | 0.85 |  | 1124      | 1083        |
| 3474.7 | 0.86 | 2780   | 1408   | -45    | 1363    | 1168    |                                | 1317       | -99        | 1416 | 0.85 |  | 1059      | 1148        |
| 3278.8 | 0.86 | 2623   | 1329   | -60    | 1269    | 1088    |                                | 1347       | -127       | 1474 | 0.85 |  | 993       | 1203        |
| 3082.9 | 0.86 | 2466   | 1249   | -78    | 1171    | 1004    |                                | 1364       | -162       | 1526 | 0.85 |  | 925       | 1253        |
| 2887.1 | 0.86 | 2310   | 1170   | -99    | 1071    | 918     |                                | 1369       | -201       | 1570 | 0.85 |  | 854       | 1297        |
| 2691.2 | 0.86 | 2153   | 1091   | -123   | 967     | 829     | Flexion - Controla Mamposteria | 1362       | -246       | 1608 | 0.85 |  | 780       | 1335        |
| 2422.1 | 0.86 | 1938   | 982    | -139   | 843     | 723     |                                | 1331       | -267       | 1598 | 0.85 |  | 705       | 1367        |
| 2152.9 | 0.86 | 1722   | 873    | -158   | 714     | 612     |                                | 1277       | -281       | 1559 | 0.85 |  | 614       | 1359        |
| 1883.8 | 0.86 | 1507   | 763    | -181   | 583     | 500     |                                | 1200       | -292       | 1492 | 0.85 |  | 520       | 1325        |
| 1614.7 | 0.86 | 1292   | 654    | -197   | 458     | 393     |                                | 1099       | -292       | 1391 | 0.85 |  | 425       | 1268        |
| 1345.6 | 0.86 | 1076   | 545    | -217   | 329     | 282     |                                | 974        | -292       | 1266 | 0.85 |  | 334       | 1182        |
| 534.7  | 0.86 | 428    | 217    | -217   | 0       | 0       |                                | 458        | -292       | 750  | 0.85 |  | 239       | 1076        |
| 84.0   | 0.86 | 67     | 34     | -271   | -237    | -203    |                                | 78         | -179       | 257  | 0.85 |  | 0         | 637.1       |
| 54.0   | 0.86 | 43     | 22     | -301   | -279    | -239    |                                | 50         | -111       | 161  | 0.85 |  | -173      | 218         |
| 30.0   | 0.86 | 24     | 12     | -325   | -313    | -268    |                                | 28         | -57        | 85   | 0.85 |  | -203      | 137         |
| 0.0    | 0.86 | 0      | 0      | -325   | -325    | -279    |                                | 0          | 0          | 0    | 0.85 |  | -228      | 72          |
|        |      |        |        |        |         |         |                                | 0          | 0          | 0    | 0.85 |  | -237      | 0           |

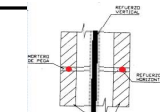
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00020 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 10  
1/2/3/4/5 Piso (A-D)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

$h'/t$  : 15.9 < 30  
 $Re$  : 0.86  
 $P_n$  : 1835.0 (kN)  
 $\phi P_n$  : 1559.7 (kN)  $\geq$   $P_u$  578.9  
 $As$  : 774 mm<sup>2</sup>  
 $\rho$  : 0.001167

Flexion Pura

$b$  : 145.00 mm  
 $A_e$  : 335519 mm<sup>2</sup>  
 $c$  : 534.74 mm  
 $d$  : 4575 mm  
 $te$  : 72 mm  
 $t$  : 145 mm  
 $\phi M_n$  : 637.1 kN-m

Punto Balanceado

$cb$  : 2691.2  
 $\phi M_n$  : 1367 kN-m  
 $\phi P_n$  : 704.9 (kN)  
 $M_n$  : kN-m  $\alpha M_{cr}$   
1608  $\geq$  780.08  
Si

$M_u \leq \phi M_n$   
333.4  $\leq$  1302.83  
Si

0.1  $f'_m A_e$  : 556.9 kN  
0.25  $P_b$  : 207.3 kN

Cortante

$M_u/V_u d$  : 6.2  
 $As_v$  : 12.57 mm<sup>2</sup>  
 $V_n$  max permit : 318.2153 mm<sup>2</sup>  $\geq$   
Si

$V_m$  : 212.1 kN  
 $V_s$  : 20.1 kN  
 $V_u = V_n + V_s$  : 139.4 kN

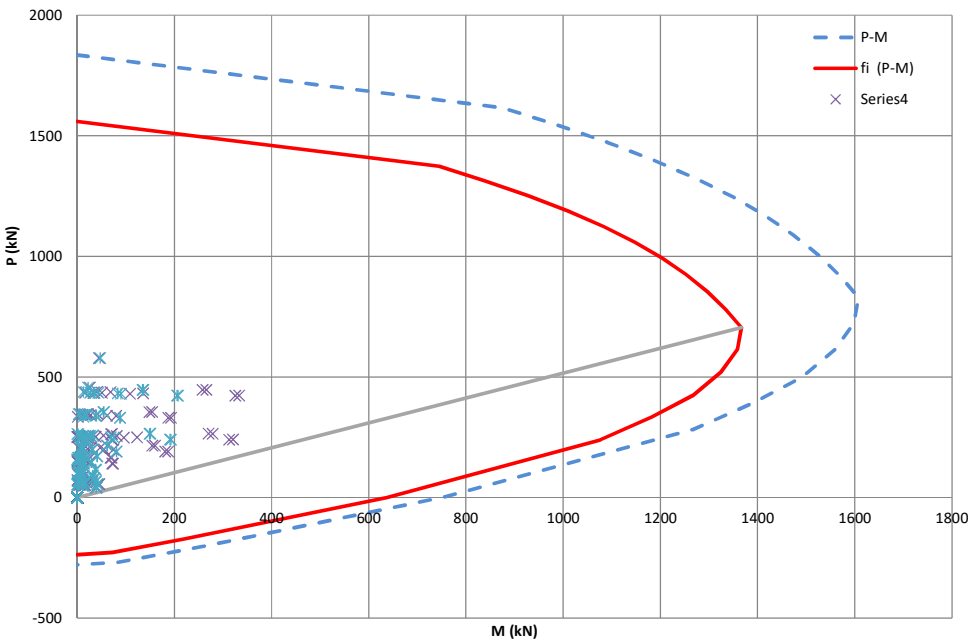
6  $A_e V f'_m$  : 578.6  
4  $A_e V f'_m$  : 385.7

OK Refuerzo a Cortante Suficiente

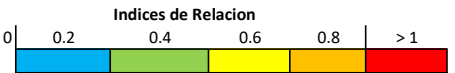
0.2  $f'_m$  : 1652.0 kPa  
0.2  $f'_m \geq$  1726 kPa

Si Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

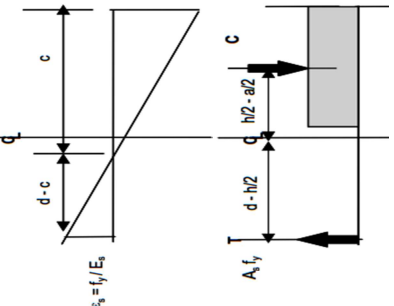


| Resumen         | Relacion |                    |
|-----------------|----------|--------------------|
| Compr. Axial    | 0.37     | ✓ $P_u / \phi P_n$ |
| Axial - Flexion | 0.26     | ✓ $M_u / \phi M_n$ |
| Cortante        | 0.44     | ✓ $V_u / V_n$ max  |



Curva Interaccion  $\phi P_n - \phi M_n$

OK ✓



**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje 13 (A-C)

Universidad Santo Tomas  
 Esp. Patología de la Construcción

|                                          |      |          |           |       |           |                                      |        |        |           |          |            |      |  |  |
|------------------------------------------|------|----------|-----------|-------|-----------|--------------------------------------|--------|--------|-----------|----------|------------|------|--|--|
| <b>Propiedades de Geometria Ladrillo</b> |      |          |           |       |           | <b>Propiedades de Geometria Muro</b> |        |        |           |          |            |      |  |  |
| a (mm)                                   | t    | Area     | esp Pared | Area  | Area Neta | X (mm)                               | L (mm) | H (mm) | h' (mm)   | Ag (mm2) | Groutig en | te   |  |  |
| largo                                    | (mm) | Vacios x | (mm)      | Bruta | (mm2)     |                                      |        |        | (H-Elaca) |          |            | (mm) |  |  |
| 300                                      | 145  | 5674.0   | 30        | 43500 | 30452     | 75                                   | 1650   | 2300   | 2300      | 239250   | Con Refu   | 78.6 |  |  |

</

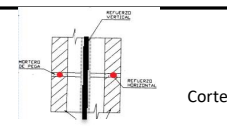
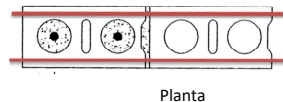
Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm2) | c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) | C*x (kN-m) | T*x (kN-m) | Mn  | φ    | φ Pn (kN) | φ Mn (kN-m) |
|-----------|---------|------------|--------|------|--------|--------|--------|---------|---------|------------|------------|-----|------|-----------|-------------|
| 75.0      | 4       | 129        | 1650   | 0.86 | 1320   | 728    | 0      | 880     | 754     | 120        | 0          | 120 | 0.85 | 641       | 0.0         |
| 235.0     | 0       | 0          | 1577.6 | 0.86 | 1262   | 696    | 0      | 696     | 597     | 135        | 0          | 135 | 0.85 | 531       | 102         |
| 1275.0    | 0       | 0          | 1505.3 | 0.86 | 1204   | 664    | -4     | 661     | 567     | 148        | -3         | 151 | 0.85 | 508       | 115         |
| 0.0       | 0       | 0          | 1432.9 | 0.86 | 1146   | 633    | -8     | 625     | 536     | 159        | -6         | 165 | 0.85 | 482       | 128         |
| 0.0       | 0       | 0          | 1360.6 | 0.86 | 1088   | 601    | -14    | 587     | 503     | 169        | -10        | 179 | 0.85 | 455       | 140         |
| 0.0       | 0       | 0          | 1288.2 | 0.86 | 1031   | 569    | -21    | 547     | 469     | 176        | -15        | 192 | 0.85 | 428       | 152         |
| 0.0       | 0       | 0          | 1215.9 | 0.86 | 973    | 537    | -30    | 507     | 435     | 182        | -21        | 203 | 0.85 | 399       | 163         |
| 0.0       | 0       | 0          | 1143.5 | 0.86 | 915    | 505    | -39    | 465     | 399     | 186        | -28        | 213 | 0.85 | 369       | 173         |
| 0.0       | 0       | 0          | 1071.2 | 0.86 | 857    | 473    | -50    | 423     | 362     | 187        | -35        | 223 | 0.85 | 339       | 181         |
| 0.0       | 0       | 0          | 998.8  | 0.86 | 799    | 441    | -62    | 378     | 325     | 188        | -44        | 232 | 0.85 | 308       | 189         |
| 825.0     | 4       | 129        | 926.5  | 0.86 | 741    | 409    | -77    | 332     | 285     | 186        | -54        | 240 | 0.85 | 276       | 197         |
| 0.0       | 0       | 0          | 833.8  | 0.86 | 667    | 368    | -84    | 284     | 244     | 181        | -58        | 239 | 0.85 | 242       | 204         |
| 0.0       | 0       | 0          | 741.2  | 0.86 | 593    | 327    | -93    | 234     | 201     | 173        | -58        | 231 | 0.85 | 207       | 203         |
| 0.0       | 0       | 0          | 648.5  | 0.86 | 519    | 286    | -105   | 181     | 155     | 162        | -58        | 220 | 0.85 | 171       | 196         |
| 0.0       | 0       | 0          | 555.9  | 0.86 | 445    | 245    | -121   | 124     | 106     | 148        | -58        | 206 | 0.85 | 132       | 187         |
| 0.0       | 0       | 0          | 463.2  | 0.86 | 371    | 204    | -138   | 66      | 57      | 131        | -58        | 189 | 0.85 | 90        | 175         |
| 0.0       | 0       | 0          | 313.0  | 0.86 | 250    | 138    | -138   | 0       | 0       | 97         | -58        | 155 | 0.85 | 48        | 161         |
| 0.0       | 0       | 0          | 84.0   | 0.86 | 67     | 37     | -138   | -101    | -87     | 29         | -58        | 88  | 0.85 | 0         | 131.7       |
| 375.0     | 0       | 0          | 54.0   | 0.86 | 43     | 24     | -168   | -144    | -124    | 19         | -36        | 55  | 0.85 | -74       | 74          |
| 1415.0    | 3       | 71         | 30.0   | 0.86 | 24     | 13     | -192   | -179    | -154    | 11         | -18        | 28  | 0.85 | -105      | 47          |
| 1575.0    | 4       | 129        | 0.0    | 0.86 | 0      | 0      | -192   | -192    | -165    | 0          | 0          | 0   | 0.85 | -131      | 24          |
| Total     |         | 458        |        |      |        |        |        |         |         |            |            |     |      | -140      | 0           |

| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm2) | eficien. η | ρn      |
|----------|------------|---------|
| 12.57    | 0.35       | 0.00019 |



TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 13  
1/2/3/4/5 Piso (A-C)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 754.2 (kN)  
φPn : 641.1 (kN) ≥ 216.6  
As: 458 mm<sup>2</sup>  
ρ: 0.002005

Flexion Pura

b: 145.00 mm  
Ae : 129671 mm<sup>2</sup>  
c: 313.04 mm  
d: 1575 mm  
te : 79 mm  
t: 145 mm  
φ Mn : 131.7 kN-m

Punto Balanceado

cb: 926.5  
φ Mn : 204 kN-m  
φPn : 242.2 (kN)  
Mn : kN-m αMcr  
240 ≥ 106.98  
Si

Mu ≤ φ Mn  
43.9 ≤ 190.29  
Si

0.1 f'm Ae: 197.6 kN  
0.25 Pb: 71.2 kN

Cortante

Mu/Vu d : 2.1  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit: 122.9835 mm<sup>2</sup> ≥  
Si

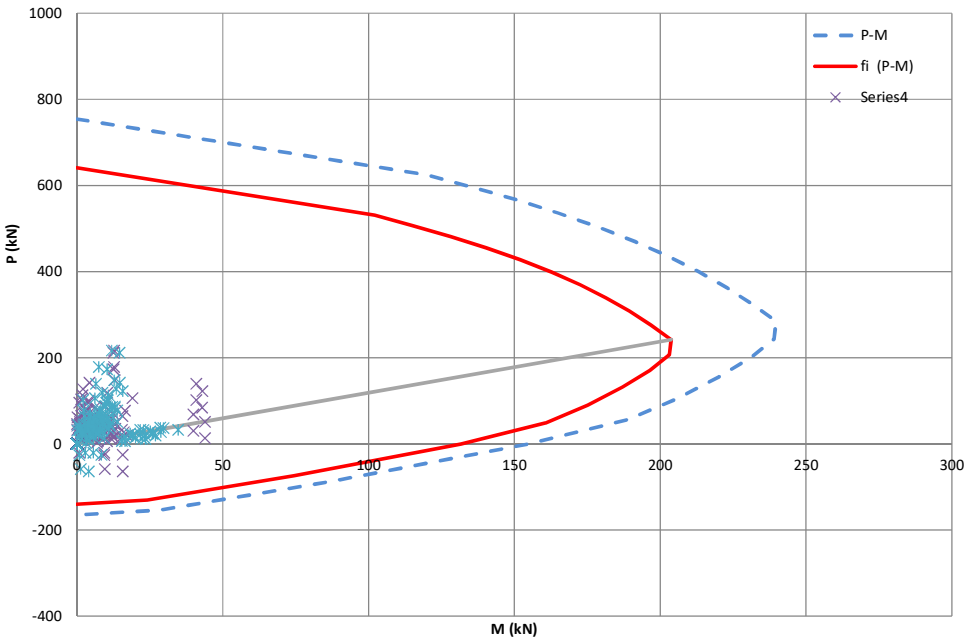
Vm : 82.0 kN  
Vs : 6.9 kN  
Vu= Vn+Vs : 53.3 kN

6 AeVf'm: 223.6  
4 AeVf'm: 149.1  
OK Refuerzo a Cortante Suficiente

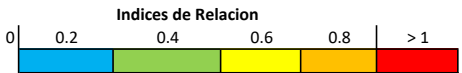
0.2 f'm: 1652.0 kPa  
0.2 f'm ≥ 1675 kPa

Si Elementos de Borde

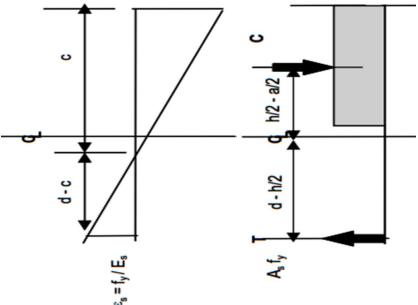
Curva de Interaccion de Mamposteria Reforzada en Arcilla



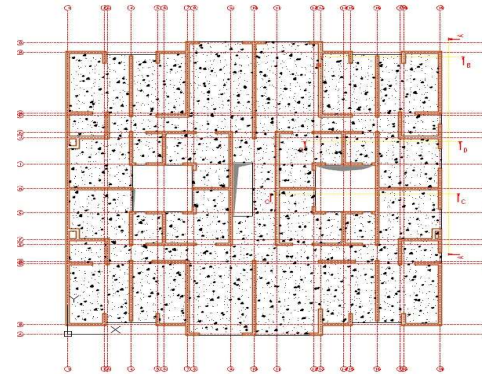
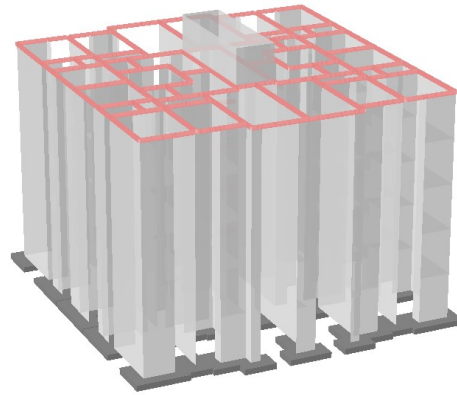
| Resumen         | Relacion          |
|-----------------|-------------------|
| Compr. Axial    | 0.34 ✓ Pu/ φPn    |
| Axial - Flexion | 0.23 ✓ Mu/ φMn    |
| Cortante        | 0.43 ✓ Vu/ Vn max |



Curva Interaccion φ Pn - φ Mn



**MUROS HORIZONTALES  
EJES LATERALES**



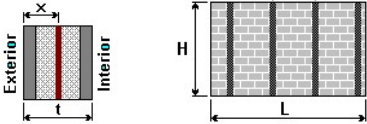
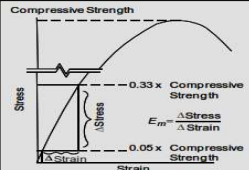


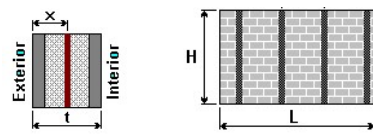
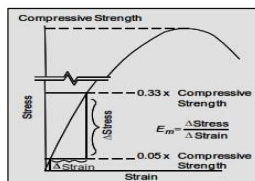
**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje

1/2/3/4/5 Piso  
A/O (7-8)  
(12-13)

Universidad Santo Tomas  
Esp. Patología de la Construcción

|                                                                                   |         |          |           |          |           |                                                                                    |        |             |            |          |                       |                         |  |  |  |  |  |              |  |
|-----------------------------------------------------------------------------------|---------|----------|-----------|----------|-----------|------------------------------------------------------------------------------------|--------|-------------|------------|----------|-----------------------|-------------------------|--|--|--|--|--|--------------|--|
|                                                                                   |         |          |           |          |           |                                                                                    |        |             |            |          |                       |                         |  |  |  |  |  |              |  |
| Propiedades de Geometria Ladrillo                                                 |         |          |           |          |           | Propiedades de Geometria Muro                                                      |        |             |            |          |                       |                         |  |  |  |  |  |              |  |
| a (mm)                                                                            | t       | Area     | esp Pared | Area     | Area Neta | X (mm)                                                                             | L (mm) | H (mm)      | h' (mm)    | Ag (mm2) | Groutig en            | te (mm)                 |  |  |  |  |  |              |  |
| largo                                                                             | (mm)    | Vacios x | (mm)      | Bruta    | (mm2)     |                                                                                    |        |             | (H-Ealaca) |          | Con Refu              |                         |  |  |  |  |  |              |  |
| 300                                                                               | 145     | 5674.0   | 30        | 43500    | 30452     | 75                                                                                 | 600    | 2300        | 2300       | 87000    |                       | 83.7                    |  |  |  |  |  |              |  |
|  |         |          |           |          |           |  |        |             |            |          |                       | Propiedades de Material |  |  |  |  |  | Prop. Diseño |  |
| f'm (Mpa)                                                                         | E (Mpa) | G (Mpa)  | v         | fy (Mpa) | E (Mpa)   | Emu                                                                                | Ey     | Bloq Compr. | α          |          | φ Compr Y Flexo-Compr | φ Cortante              |  |  |  |  |  |              |  |
| 8.26                                                                              | 5782    | 2312.8   | 0.2       | 420      | 200000    | 0.0030                                                                             | 0.0021 | 0.85        | 3          | 0.32     | 0.85                  | 0.6                     |  |  |  |  |  |              |  |



Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 300.0     | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 525.0     | 4       | 129                     |
| Total     |         | 258                     |

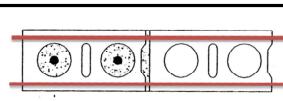


| c     | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|-------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|----|------|--|-----------|-------------|
|       |      |        |        |        | 367     | 315     |                                |            |            | 0  | 0.85 |  | 268       | 0.0         |
| 600   | 0.86 | 480    | 282    | 0      | 282     | 242     | Compresion - Controla Acero    | 17         | 0          | 17 | 0.85 |  | 206       | 14          |
| 570.9 | 0.86 | 457    | 269    | 0      | 269     | 230     |                                | 19         | 0          | 19 | 0.85 |  | 196       | 16          |
| 541.8 | 0.86 | 433    | 255    | 0      | 255     | 218     |                                | 21         | 0          | 21 | 0.85 |  | 186       | 18          |
| 512.6 | 0.86 | 410    | 241    | -2     | 239     | 205     |                                | 23         | 0          | 23 | 0.85 |  | 174       | 20          |
| 483.5 | 0.86 | 387    | 227    | -7     | 221     | 189     |                                | 24         | -1         | 26 | 0.85 |  | 161       | 22          |
| 454.4 | 0.86 | 364    | 214    | -12    | 202     | 173     |                                | 25         | -3         | 28 | 0.85 |  | 147       | 24          |
| 425.3 | 0.86 | 340    | 200    | -18    | 182     | 156     |                                | 26         | -4         | 30 | 0.85 |  | 133       | 26          |
| 396.2 | 0.86 | 317    | 186    | -25    | 161     | 138     |                                | 26         | -6         | 32 | 0.85 |  | 117       | 27          |
| 367.1 | 0.86 | 294    | 173    | -33    | 139     | 119     |                                | 26         | -7         | 34 | 0.85 |  | 102       | 29          |
| 337.9 | 0.86 | 270    | 159    | -43    | 116     | 100     |                                | 26         | -10        | 36 | 0.85 |  | 85        | 30          |
| 308.8 | 0.86 | 247    | 145    | -54    | 91      | 78      | FB                             | 26         | -12        | 38 | 0.85 |  | 66        | 32          |
| 277.9 | 0.86 | 222    | 131    | -54    | 77      | 66      | Flexion - Controla Mamposteria | 25         | -12        | 37 | 0.85 |  | 56        | 31          |
| 247.1 | 0.86 | 198    | 116    | -54    | 62      | 53      |                                | 23         | -12        | 36 | 0.85 |  | 45        | 30          |
| 216.2 | 0.86 | 173    | 102    | -54    | 48      | 41      |                                | 22         | -12        | 34 | 0.85 |  | 35        | 29          |
| 185.3 | 0.86 | 148    | 87     | -54    | 33      | 28      |                                | 20         | -12        | 32 | 0.85 |  | 24        | 27          |
| 154.4 | 0.86 | 124    | 73     | -54    | 18      | 16      |                                | 17         | -12        | 29 | 0.85 |  | 13        | 25          |
| 115.2 | 0.86 | 92     | 54     | -54    | 0       | 0       |                                | 14         | -12        | 26 | 0.85 |  | 0         | 22.1        |
| 84.0  | 0.86 | 67     | 40     | -54    | -15     | -13     |                                | 11         | -12        | 23 | 0.85 |  | -11       | 19          |
| 54.0  | 0.86 | 43     | 25     | -84    | -59     | -50     |                                | 7          | -5         | 12 | 0.85 |  | -43       | 11          |
| 30.0  | 0.86 | 24     | 14     | -108   | -94     | -81     |                                | 4          | 0          | 4  | 0.85 |  | -69       | 3           |
| 0.0   | 0.86 | 0      | 0      | -108   | -108    | -93     |                                | 0          | 0          | 0  | 0.85 |  | -79       | 0           |

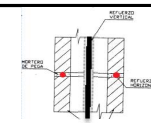
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00018 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje A/O (7-8)  
(12-13)  
1/2/3/4/5 Piso

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 315.1 (kN)  
 $\phi Pn$  : 267.8 (kN)  $\geq$  169.8  
As : 258 mm<sup>2</sup>  
p : 0.003389

Flexion Pura

b : 145.00 mm  
Ae : 50248 mm<sup>2</sup>  
c : 115.18 mm  
d : 525 mm  
te : 84 mm  
t : 145 mm  
 $\phi Mn$  : 22.1 kN-m

Punto Balanceado

cb : 308.8  
 $\phi Mn$  : 32 kN-m  
 $\phi Pn$  : 66.4 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
38  $\geq$  15.07  
Si

$Mu \leq \phi Mn$   
47.3  $\leq$  32.99  
No Cumple

0.1 f'm Ae : 71.9 kN  
0.25 Pb : 19.5 kN

Cortante

Mu/Vu d : 3.0  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit : 47.65657 mm<sup>2</sup>  $\geq$

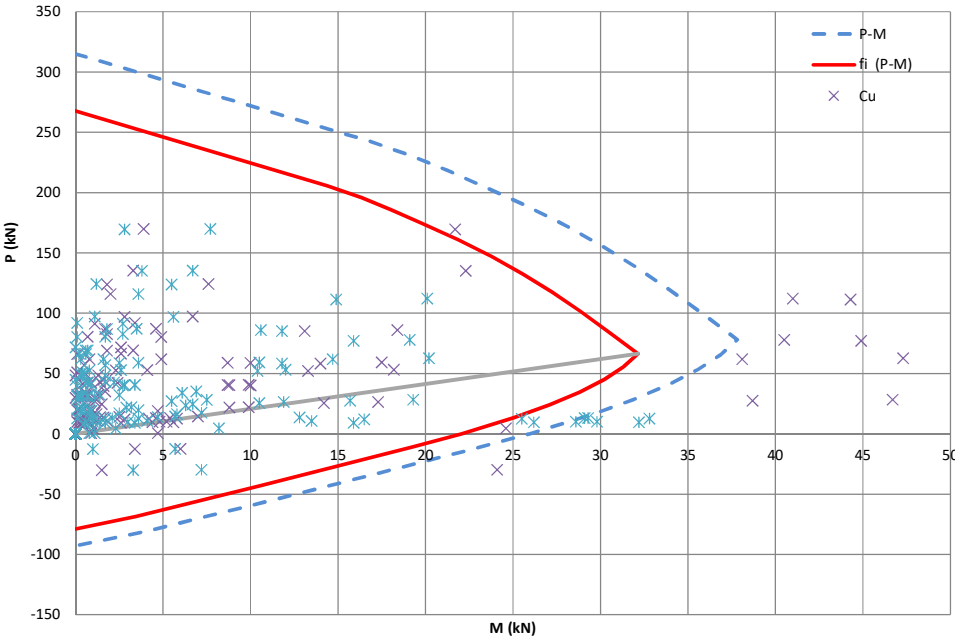
Si

Vm : 31.8 kN  
Vs : 2.3 kN  
Vu = Vn + Vs : 20.4 kN

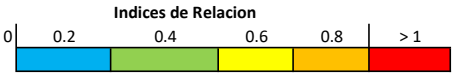
6 Ae√f'm : 86.6  
4 Ae√f'm : 57.8  
OK Refuerzo a Cortante Suficiente

0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  3852 kPa  
Si Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

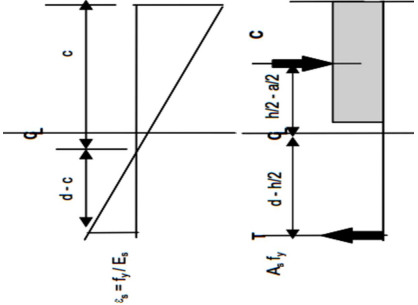


| Resumen         | Relacion                                    |
|-----------------|---------------------------------------------|
| Compr. Axial    | 0.63 <span>✓</span> $P_u / \phi P_n$        |
| Axial - Flexion | 1.43 <span>✗</span> $M_u / \phi M_n$        |
| Cortante        | 0.43 <span>✓</span> $V_u / V_n \text{ max}$ |



Curva Interaccion  $\phi P_n - \phi M_n$

No Cumple ✗



**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje

1/2/3/4/5 Piso  
 O (9-11)

Universidad Santo Tomas  
 Esp. Patología de la Construcción

**Propiedades de Geometría Ladrillo**

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |

**Propiedades de Geometría Muro**

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Palaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 1050   | 2300   | 2300               | 152250                | Con Refu   | 81.0    |

**Propiedades de Material**

| f'm (Mpa) | E (Mpa) | G (Mpa) | v   | f_y (Mpa) | E (Mpa) | ε <sub>mu</sub> | ε <sub>y</sub> | Bloq Compr. | α |      | φ Compr Y Flexo-Compr | φ Cortante |
|-----------|---------|---------|-----|-----------|---------|-----------------|----------------|-------------|---|------|-----------------------|------------|
| 8.26      | 5782    | 2312.8  | 0.2 | 420       | 200000  | 0.0030          | 0.0021         | 0.85        | 3 | 0.32 | 0.85                  | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 5       | 199                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 525.0     | 5       | 199                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 975.0     | 5       | 199                     |
| Total     |         | 597                     |

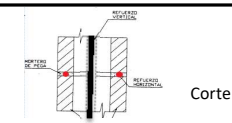
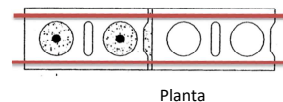


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 675     | 579     |                                |            |            | 0   | 0.85 |  | 492       | 0.0         |
| 1050   | 0.86 | 840    | 478    | 0      | 478     | 410     | Compresion - Controla Acero    | 50         | 0          | 50  | 0.85 |  | 348       | 43          |
| 1002.4 | 0.86 | 802    | 456    | 0      | 456     | 391     |                                | 57         | 0          | 57  | 0.85 |  | 333       | 48          |
| 954.7  | 0.86 | 764    | 435    | -3     | 432     | 370     |                                | 62         | -1         | 63  | 0.85 |  | 315       | 54          |
| 907.1  | 0.86 | 726    | 413    | -9     | 404     | 346     |                                | 67         | -4         | 71  | 0.85 |  | 294       | 60          |
| 859.4  | 0.86 | 688    | 391    | -16    | 375     | 322     |                                | 71         | -7         | 78  | 0.85 |  | 273       | 66          |
| 811.8  | 0.86 | 649    | 370    | -24    | 346     | 296     |                                | 74         | -11        | 85  | 0.85 |  | 252       | 72          |
| 764.1  | 0.86 | 611    | 348    | -33    | 315     | 270     |                                | 76         | -15        | 91  | 0.85 |  | 229       | 77          |
| 716.5  | 0.86 | 573    | 326    | -43    | 283     | 243     |                                | 78         | -19        | 97  | 0.85 |  | 206       | 83          |
| 668.8  | 0.86 | 535    | 304    | -55    | 250     | 214     |                                | 78         | -25        | 103 | 0.85 |  | 182       | 88          |
| 621.2  | 0.86 | 497    | 283    | -68    | 215     | 184     |                                | 78         | -31        | 109 | 0.85 |  | 157       | 92          |
| 573.5  | 0.86 | 459    | 261    | -84    | 177     | 152     | Flexion - Controla Mamposteria | 77         | -38        | 115 | 0.85 |  | 129       | 98          |
| 572.0  | 0.86 | 458    | 260    | -84    | 177     | 152     |                                | 77         | -38        | 115 | 0.85 |  | 129       | 98          |
| 560.0  | 0.86 | 448    | 255    | -84    | 171     | 147     |                                | 76         | -38        | 114 | 0.85 |  | 125       | 97          |
| 550.0  | 0.86 | 440    | 250    | -84    | 167     | 143     |                                | 76         | -38        | 114 | 0.85 |  | 122       | 97          |
| 540.0  | 0.86 | 432    | 246    | -84    | 162     | 139     |                                | 76         | -38        | 114 | 0.85 |  | 118       | 97          |
| 530.0  | 0.86 | 424    | 241    | -84    | 158     | 135     |                                | 76         | -38        | 113 | 0.85 |  | 115       | 96          |
| 333.8  | 0.86 | 267    | 152    | -152   | 0       | 0       |                                | 59         | -38        | 97  | 0.85 |  | 0         | 82.5        |
| 200.0  | 0.86 | 160    | 91     | -167   | -76     | -65     |                                | 41         | -38        | 78  | 0.85 |  | -55       | 66          |
| 54.0   | 0.86 | 43     | 25     | -214   | -189    | -162    |                                | 12         | -17        | 29  | 0.85 |  | -138      | 25          |
| 30.0   | 0.86 | 24     | 14     | -251   | -237    | -203    |                                | 7          | 0          | 7   | 0.85 |  | -173      | 6           |
| 0.0    | 0.86 | 0      | 0      | -251   | -251    | -215    |                                | 0          | 0          | 0   | 0.85 |  | -183      | 0           |

| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρ <sub>n</sub> |
|------------|----------------|
| 0.35       | 0.00018        |



TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje O 1/2/3/4/5 Piso (9-11)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 578.9 (kN)  
φPn : 492.1 (kN) Si  
As : 597 mm2  
ρ : 0.004223

Flexion Pura

b : 145.00 mm  
Ae : 85097 mm2  
c : 333.82 mm  
d : 975 mm  
te : 81 mm  
t : 145 mm  
φ Mn : 82.5 kN-m

Punto Balanceado

cb : 573.5  
φ Mn : 98 kN-m  
φPn : 129.4 (kN)  
Mn : kN-m αMcr  
115 ≥ 44.68 Si

Mu ≤ φ Mn  
47.3 ≤ 104.49  
Si

0.1 f'm Ae : 125.8 kN  
0.25 Pb : 38.0 kN

Cortante

Mu/Vu d : 3.0  
Asv : 12.57 mm2  
Vn max permit : 80.7083 mm2 ≥ Si

Vm : 53.8 kN  
Vs : 4.3 kN  
Vu = Vn + Vs : 34.9 kN

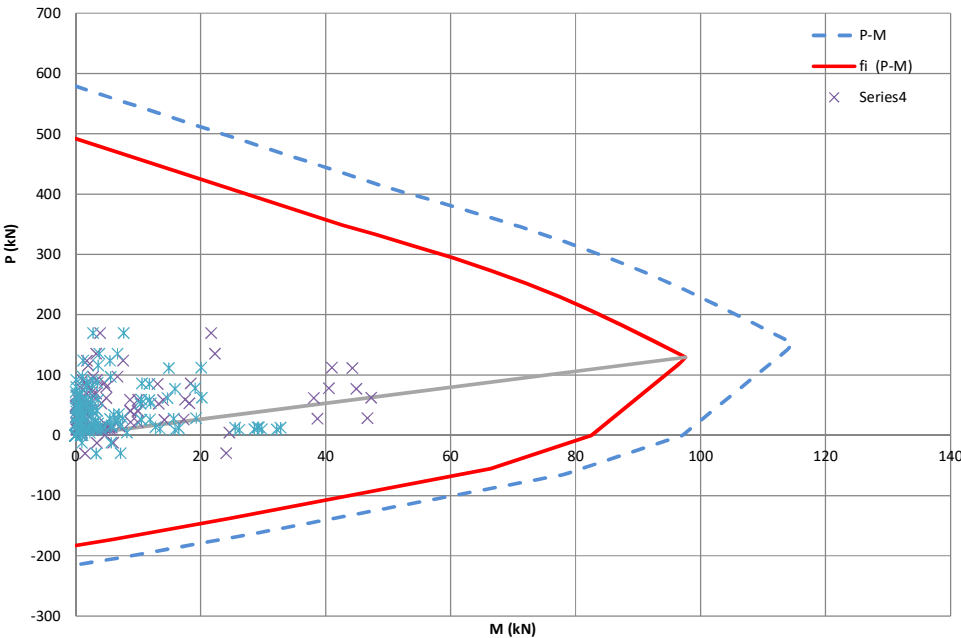
6 AeVf'm : 146.7  
4 AeVf'm : 97.8

OK Refuerzo a Cortante Suficiente

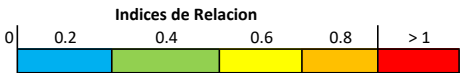
0.2 f'm : 1652.0 kPa  
0.2 f'm ≥ 2045 kPa

Si Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

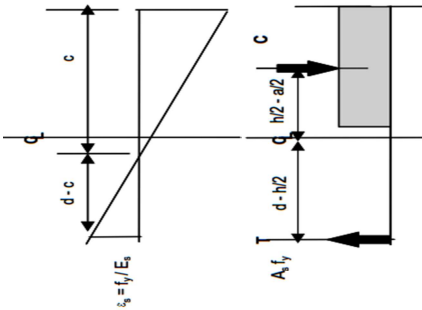


| Resumen         | Relacion          |
|-----------------|-------------------|
| Compr. Axial    | 0.35 ✓ Pu/ φPn    |
| Axial - Flexion | 0.45 ✓ Mu/ φMn    |
| Cortante        | 0.43 ✓ Vu/ Vn max |



Curva Interaccion φ Pn - φ Mn

OK ✓



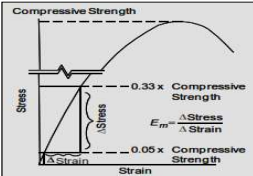
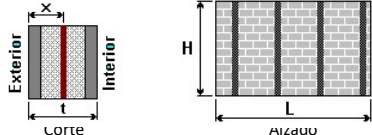
TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8

EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje B/N (17-19)

1/ Piso

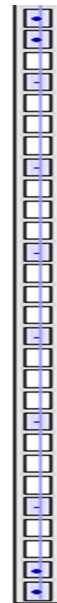
Universidad Santo Tomas  
Esp. Patología de la Construcción

|                                                                                   |         |          |           |          |           |                                                                                    |        |                                      |            |          |                       |                     |  |  |  |
|-----------------------------------------------------------------------------------|---------|----------|-----------|----------|-----------|------------------------------------------------------------------------------------|--------|--------------------------------------|------------|----------|-----------------------|---------------------|--|--|--|
| <b>Propiedades de Geometria Ladrillo</b>                                          |         |          |           |          |           |  |        | <b>Propiedades de Geometria Muro</b> |            |          |                       |                     |  |  |  |
| a (mm)                                                                            | t       | Area     | esp Pared | Area     | Area Neta | X (mm)                                                                             | L (mm) | H (mm)                               | h' (mm)    | Ag (mm2) | Groutig en            | te (mm)             |  |  |  |
| largo                                                                             | (mm)    | Vacios x | (mm)      | Bruta    | (mm2)     |                                                                                    |        |                                      | (H-Eolaca) |          |                       |                     |  |  |  |
| 300                                                                               | 145     | 5674.0   | 30        | 43500    | 30452     | 75                                                                                 | 1800   | 2300                                 | 2300       | 261000   | Con Refu              | 80.6                |  |  |  |
|  |         |          |           |          |           | <b>Propiedades de Material</b>                                                     |        |                                      |            |          |                       | <b>Prop. Diseño</b> |  |  |  |
| f'm                                                                               | E (Mpa) | G (Mpa)  | v         | fy (Mpa) | E (Mpa)   | Emu                                                                                | Ey     | Bloq Compr.                          | α          |          | φ Compr Y Flexo-Compr | φ Cortante          |  |  |  |
| 8.26                                                                              | 5782    | 2312.8   | 0.2       | 420      | 200000    | 0.0030                                                                             | 0.0021 | 0.85                                 | 3          | 0.32     | 0.85                  | 0.6                 |  |  |  |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 6       | 284                     |
| 225.0     | 5       | 199                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 900.0     | 5       | 199                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1575.0    | 5       | 199                     |
| 1725.0    | 6       | 284                     |
| Total     |         | 1165                    |

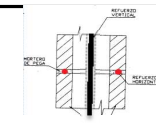
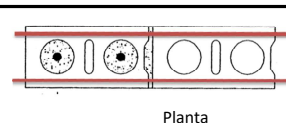


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 1198    | 1027    |                                |            |            | 0   | 0.85 |  | 873       | 0.0         |
| 1800   | 0.86 | 1440   | 815    | 0      | 815     | 699     | Compresion - Controla Acero    | 147        | 0          | 147 | 0.85 |  | 594       | 125         |
| 1721.5 | 0.86 | 1377   | 779    | 0      | 779     | 668     |                                | 165        | 0          | 165 | 0.85 |  | 568       | 140         |
| 1642.9 | 0.86 | 1314   | 744    | -9     | 735     | 630     |                                | 181        | -7         | 188 | 0.85 |  | 536       | 159         |
| 1564.4 | 0.86 | 1252   | 708    | -18    | 690     | 591     |                                | 194        | -15        | 209 | 0.85 |  | 503       | 178         |
| 1485.9 | 0.86 | 1189   | 673    | -35    | 638     | 547     |                                | 206        | -27        | 233 | 0.85 |  | 465       | 198         |
| 1407.4 | 0.86 | 1126   | 637    | -53    | 584     | 501     |                                | 215        | -41        | 256 | 0.85 |  | 426       | 218         |
| 1328.8 | 0.86 | 1063   | 602    | -73    | 529     | 453     |                                | 222        | -57        | 278 | 0.85 |  | 385       | 237         |
| 1250.3 | 0.86 | 1000   | 566    | -96    | 470     | 403     |                                | 226        | -74        | 301 | 0.85 |  | 343       | 256         |
| 1171.8 | 0.86 | 937    | 530    | -122   | 409     | 351     |                                | 229        | -94        | 323 | 0.85 |  | 298       | 274         |
| 1093.2 | 0.86 | 875    | 495    | -151   | 344     | 295     |                                | 229        | -117       | 346 | 0.85 |  | 251       | 294         |
| 1014.7 | 0.86 | 812    | 459    | -185   | 274     | 235     | Flexion - Controla Mamposteria | 227        | -143       | 370 | 0.85 |  | 200       | 314         |
| 913.2  | 0.86 | 731    | 413    | -203   | 211     | 181     |                                | 221        | -155       | 376 | 0.85 |  | 153       | 319         |
| 811.8  | 0.86 | 649    | 367    | -216   | 152     | 130     |                                | 211        | -155       | 366 | 0.85 |  | 111       | 311         |
| 710.3  | 0.86 | 568    | 322    | -235   | 87      | 74      |                                | 198        | -155       | 353 | 0.85 |  | 63        | 300         |
| 608.8  | 0.86 | 487    | 276    | -260   | 16      | 13      |                                | 181        | -155       | 336 | 0.85 |  | 11        | 285         |
| 600.0  | 0.86 | 480    | 272    | -263   | 9       | 8       |                                | 179        | -155       | 334 | 0.85 |  | 7         | 284         |
| 588.0  | 0.86 | 470    | 266    | -266   | 0       | 0       |                                | 177        | -155       | 332 | 0.85 |  | 0         | 282.0       |
| 400.0  | 0.86 | 320    | 181    | -286   | -105    | -90     |                                | 134        | -155       | 289 | 0.85 |  | -77       | 245         |
| 300.0  | 0.86 | 240    | 136    | -286   | -151    | -129    |                                | 106        | -155       | 261 | 0.85 |  | -110      | 222         |
| 100.0  | 0.86 | 80     | 45     | -370   | -325    | -278    |                                | 39         | -98        | 137 | 0.85 |  | -237      | 117         |
| 0.0    | 0.86 | 0      | 0      | -489   | -489    | -420    |                                | 0          | 0          | 0   | 0.85 |  | -357      | 0           |

| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 6.5                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 33.18                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00048 |



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje B/N (17-19)  
1/ Piso  
B/N (1-2)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 1027.4 (kN)  
 $\phi Pn$  : 873.3 (kN)  $\geq$  224.4  
As : 1165 mm<sup>2</sup>  
 $\rho$  : 0.004658

Flexion Pura

b : 145.00 mm  
Ae : 145070 mm<sup>2</sup>  
c : 588.05 mm  
d : 1725 mm  
te : 81 mm  
t : 145 mm  
 $\phi Mn$  : 282.0 kN-m

Punto Balanceado

cb : 1014.7  
 $\phi Mn$  : 314 kN-m  
 $\phi Pn$  : 199.8 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
370  $\geq$  130.56  
Si

$Mu \leq \phi Mn$   
174.8  $\leq$  307.50  
Si

0.1 f'm Ae : 215.6 kN  
0.25 Pb : 58.8 kN

Cortante

Mu/Vu d : 3.0  
Asv : 33.18 mm<sup>2</sup>  
Vn max permit : 137.5883 mm<sup>2</sup>  $\geq$

Vm : 91.7 kN  
Vs : 20.0 kN  
Vu = Vn + Vs : 67.1 kN

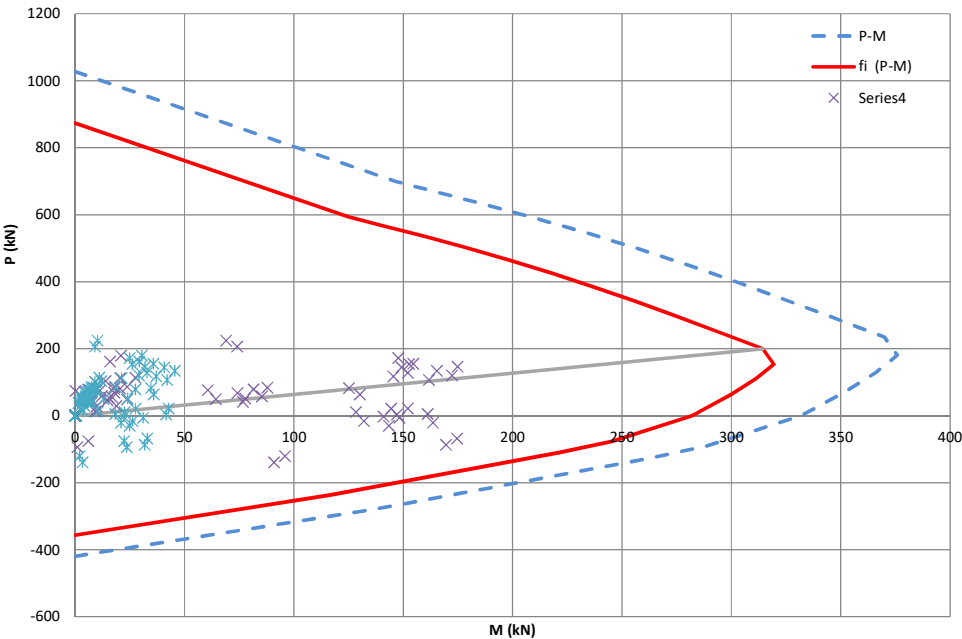
6 Ae√f'm : 250.2  
4 Ae√f'm : 166.8

OK Refuerzo a Cortante Suficiente

0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  1566 kPa

OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

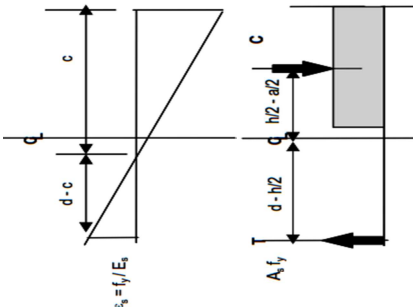


| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.26 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.57 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.49 <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

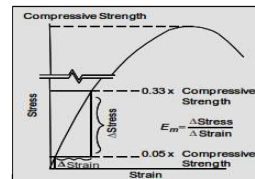
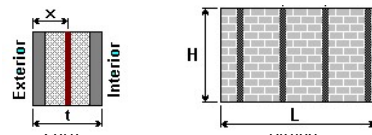
OK ☒



(17-19)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 1800   | 2300   | 2300               | 261000                | Con Refue  | 80.6    |

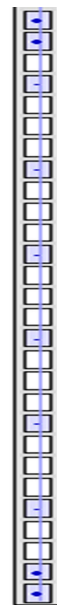
## Propiedades de Material

| f'm<br>(Mpa) | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | εmu    | εY     | Bloq Compr. | α |      | φ Compr Y Flexo-<br>Compr | φ Cortante |
|--------------|---------|---------|-----|----------|---------|--------|--------|-------------|---|------|---------------------------|------------|
| 8.26         | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32 | 0.85                      | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 5       | 199                     |
| 225.0     | 5       | 199                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 900.0     | 5       | 199                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1575.0    | 6       | 284                     |
| 1725.0    | 6       | 284                     |
| Total     |         | 1165                    |

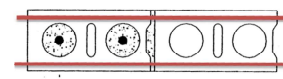


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |    | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|----|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 1198    | 1027    |    |            |            | 0   | 0.85 |  | 873       | 0.0         |
| 1800   | 0.86 | 1440   | 815    | 0      | 815     | 699     |    | 147        | 0          | 147 | 0.85 |  | 594       | 125         |
| 1721.5 | 0.86 | 1377   | 779    | 0      | 779     | 668     |    | 165        | 0          | 165 | 0.85 |  | 568       | 140         |
| 1642.9 | 0.86 | 1314   | 744    | -9     | 735     | 630     |    | 181        | -7         | 188 | 0.85 |  | 536       | 159         |
| 1564.4 | 0.86 | 1252   | 708    | -19    | 690     | 591     |    | 194        | -15        | 209 | 0.85 |  | 503       | 178         |
| 1485.9 | 0.86 | 1189   | 673    | -38    | 635     | 544     |    | 206        | -30        | 235 | 0.85 |  | 463       | 200         |
| 1407.4 | 0.86 | 1126   | 637    | -59    | 578     | 496     |    | 215        | -45        | 260 | 0.85 |  | 421       | 221         |
| 1328.8 | 0.86 | 1063   | 602    | -82    | 519     | 445     |    | 222        | -63        | 285 | 0.85 |  | 378       | 242         |
| 1250.3 | 0.86 | 1000   | 566    | -109   | 457     | 392     |    | 226        | -83        | 310 | 0.85 |  | 333       | 263         |
| 1171.8 | 0.86 | 937    | 530    | -139   | 391     | 336     |    | 229        | -106       | 335 | 0.85 |  | 285       | 285         |
| 1093.2 | 0.86 | 875    | 495    | -174   | 321     | 275     |    | 229        | -132       | 361 | 0.85 |  | 234       | 307         |
| 1014.7 | 0.86 | 812    | 459    | -213   | 246     | 211     | FB | 227        | -162       | 389 | 0.85 |  | 179       | 331         |
| 913.2  | 0.86 | 731    | 413    | -239   | 175     | 150     |    | 221        | -179       | 400 | 0.85 |  | 127       | 340         |
| 811.8  | 0.86 | 649    | 367    | -252   | 116     | 99      |    | 211        | -179       | 390 | 0.85 |  | 84        | 332         |
| 710.3  | 0.86 | 568    | 322    | -270   | 51      | 44      |    | 198        | -179       | 377 | 0.85 |  | 37        | 320         |
| 700.0  | 0.86 | 560    | 317    | -273   | 44      | 38      |    | 196        | -179       | 375 | 0.85 |  | 32        | 319         |
| 650.0  | 0.86 | 520    | 294    | -284   | 10      | 8       |    | 188        | -179       | 367 | 0.85 |  | 7         | 312         |
| 636.3  | 0.86 | 509    | 288    | -288   | 0       | 0       |    | 186        | -179       | 365 | 0.85 |  | 0         | 310.1       |
| 400.0  | 0.86 | 320    | 181    | -322   | -141    | -121    |    | 134        | -179       | 313 | 0.85 |  | -103      | 266         |
| 300.0  | 0.86 | 240    | 136    | -322   | -186    | -160    |    | 106        | -179       | 285 | 0.85 |  | -136      | 242         |
| 30.0   | 0.86 | 24     | 14     | -489   | -476    | -408    |    | 12         | -54        | 66  | 0.85 |  | -347      | 56          |
| 0.0    | 0.86 | 0      | 0      | -489   | -489    | -420    |    | 0          | 0          | 0   | 0.85 |  | -357      | 0           |

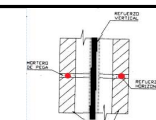
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 5.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 19.64                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00028 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje B/N (17-19)  
2/ Piso  
B/N (1-2)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

$h'/t$  : 15.9 < 30  
Re : 0.86  
Pn : 1027.4 (kN)  
 $\phi Pn$  : 873.3 (kN)  $\geq$  158.7  
As : 1165 mm<sup>2</sup>  
 $\rho$  : 0.004658

Flexion Pura

b : 145.00 mm  
Ae : 145070 mm<sup>2</sup>  
c : 636.30 mm  
d : 1725 mm  
te : 81 mm  
t : 145 mm  
 $\phi Mn$  : 310.1 kN-m

Punto Balanceado

cb : 1014.7  
 $\phi Mn$  : 331 kN-m  
 $\phi Pn$  : 179.3 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
389  $\geq$  130.56  
Si

$Mu \leq \phi Mn$   
160.8  $\leq$  286.07  
Si

0.1 f'm Ae : 215.6 kN  
0.25 Pb : 52.7 kN

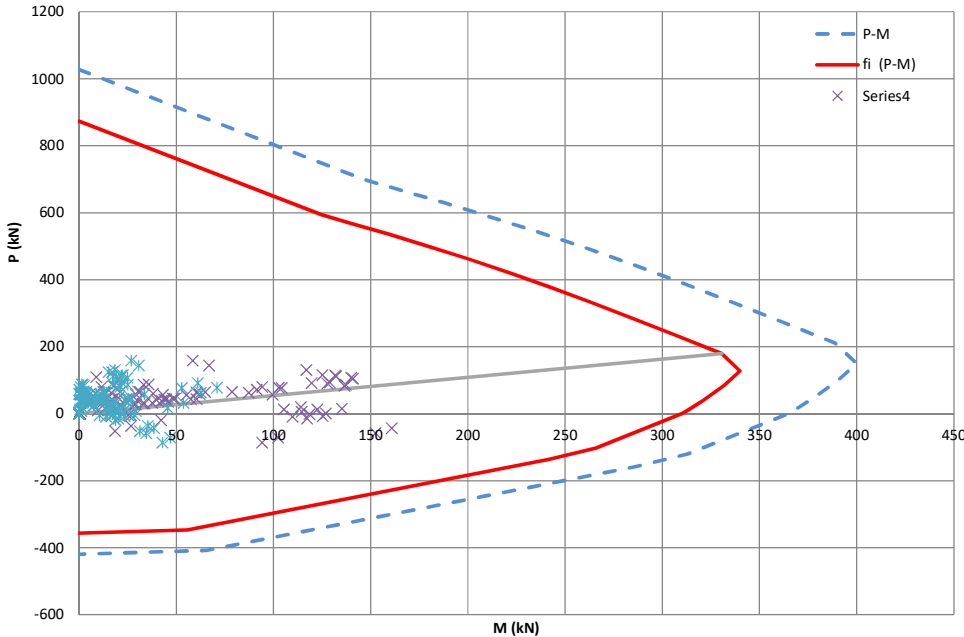
Cortante

$Mu/Vu d$  : 1.9  
Asv : 19.64 mm<sup>2</sup>  
Vn max permit : 137.5883 mm<sup>2</sup>  $\geq$   
Vu = Vn + Vs : 62.1 kN  
Vm : 91.7 kN  
Vs : 11.9 kN  
Si

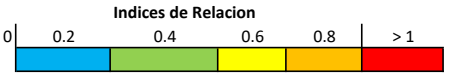
6 AeVf'm : 250.2  
4 AeVf'm : 166.8  
Insuficiente Refuerz. CORTANTE

0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  1111 kPa  
OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

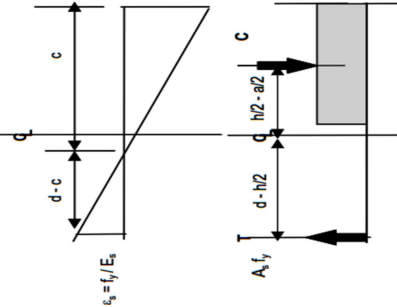


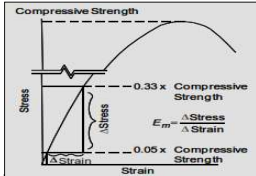
| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.18 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.56 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.45 <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

OK ☒



|                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |          |           |          |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |             |           |         |                       |                       |            |          |      |             |       |     |                       |            |      |       |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |         |          |            |         |     |      |      |      |        |          |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|-----------|----------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------|-----------|---------|-----------------------|-----------------------|------------|----------|------|-------------|-------|-----|-----------------------|------------|------|-------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|--------|--------|--------|---------|----------|------------|---------|-----|------|------|------|--------|----------|------|
| <div>Propiedades de Geometria Ladrillo</div> <table><tr><td>a (mm)</td><td>t</td><td>Area</td><td>esp Pared</td><td>Area</td><td>Area Neta</td></tr><tr><td>largo</td><td>(mm)</td><td>Vacios x</td><td>(mm)</td><td>Bruta</td><td>(mm2)</td></tr><tr><td>300</td><td>145</td><td>5674.0</td><td>30</td><td>43500</td><td>30452</td></tr></table> <div><div><div>Exterior</div><div>Lorte</div></div><div><div>Interior</div><div>Alzadu</div></div></div> |            |          |           |          |            | a (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                      | t      | Area        | esp Pared | Area    | Area Neta             | largo                 | (mm)       | Vacios x | (mm) | Bruta       | (mm2) | 300 | 145                   | 5674.0     | 30   | 43500 | 30452  | <div>Propiedades de Geometria Muro</div> <table><tr><td>X (mm)</td><td>L (mm)</td><td>H (mm)</td><td>h' (mm)</td><td>Ag (mm2)</td><td>Groutig en</td><td>te (mm)</td></tr><tr><td>75</td><td>1800</td><td>2300</td><td>2300</td><td>261000</td><td>Con Refu</td><td>80.6</td></tr></table> |     | X (mm) | L (mm) | H (mm) | h' (mm) | Ag (mm2) | Groutig en | te (mm) | 75  | 1800 | 2300 | 2300 | 261000 | Con Refu | 80.6 |
| a (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                     | t          | Area     | esp Pared | Area     | Area Neta  |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |             |           |         |                       |                       |            |          |      |             |       |     |                       |            |      |       |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |         |          |            |         |     |      |      |      |        |          |      |
| largo                                                                                                                                                                                                                                                                                                                                                                                                                                                      | (mm)       | Vacios x | (mm)      | Bruta    | (mm2)      |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |             |           |         |                       |                       |            |          |      |             |       |     |                       |            |      |       |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |         |          |            |         |     |      |      |      |        |          |      |
| 300                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 145        | 5674.0   | 30        | 43500    | 30452      |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |             |           |         |                       |                       |            |          |      |             |       |     |                       |            |      |       |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |         |          |            |         |     |      |      |      |        |          |      |
| X (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                     | L (mm)     | H (mm)   | h' (mm)   | Ag (mm2) | Groutig en | te (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |             |           |         |                       |                       |            |          |      |             |       |     |                       |            |      |       |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |         |          |            |         |     |      |      |      |        |          |      |
| 75                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1800       | 2300     | 2300      | 261000   | Con Refu   | 80.6                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |             |           |         |                       |                       |            |          |      |             |       |     |                       |            |      |       |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |         |          |            |         |     |      |      |      |        |          |      |
| <div>Compressive Strength</div>                                                                                                                                                                                                                                                                                                                                          |            |          |           |          |            | <div>Propiedades de Material</div> <table><tr><td>f'm (Mpa)</td><td>E (Mpa)</td><td>G (Mpa)</td><td>v</td><td>fy (Mpa)</td><td>E (Mpa)</td><td>Emu</td><td>Ey</td><td>Bloq Compr.</td><td>α</td><td></td><td>φ Compr Y Flexo-Compr</td><td>φ Cortante</td></tr><tr><td>8.26</td><td>5782</td><td>2312.8</td><td>0.2</td><td>420</td><td>200000</td><td>0.0030</td><td>0.0021</td><td>0.85</td><td>3</td><td>0.32</td><td>0.85</td><td>0.6</td></tr></table> |        | f'm (Mpa)   | E (Mpa)   | G (Mpa) | v                     | fy (Mpa)              | E (Mpa)    | Emu      | Ey   | Bloq Compr. | α     |     | φ Compr Y Flexo-Compr | φ Cortante | 8.26 | 5782  | 2312.8 | 0.2                                                                                                                                                                                                                                                                                        | 420 | 200000 | 0.0030 | 0.0021 | 0.85    | 3        | 0.32       | 0.85    | 0.6 |      |      |      |        |          |      |
| f'm (Mpa)                                                                                                                                                                                                                                                                                                                                                                                                                                                  | E (Mpa)    | G (Mpa)  | v         | fy (Mpa) | E (Mpa)    | Emu                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Ey     | Bloq Compr. | α         |         | φ Compr Y Flexo-Compr | φ Cortante            |            |          |      |             |       |     |                       |            |      |       |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |         |          |            |         |     |      |      |      |        |          |      |
| 8.26                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 5782       | 2312.8   | 0.2       | 420      | 200000     | 0.0030                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.0021 | 0.85        | 3         | 0.32    | 0.85                  | 0.6                   |            |          |      |             |       |     |                       |            |      |       |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |         |          |            |         |     |      |      |      |        |          |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |          |           |          |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |             |           |         |                       |                       |            |          |      |             |       |     |                       |            |      |       |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |         |          |            |         |     |      |      |      |        |          |      |
| <div>Prop. Diseño</div> <table><tr><td>φ Compr Y Flexo-Compr</td><td>φ Cortante</td></tr><tr><td>0.85</td><td>0.6</td></tr></table>                                                                                                                                                                                                                                                                                                                        |            |          |           |          |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |             |           |         |                       | φ Compr Y Flexo-Compr | φ Cortante | 0.85     | 0.6  |             |       |     |                       |            |      |       |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |         |          |            |         |     |      |      |      |        |          |      |
| φ Compr Y Flexo-Compr                                                                                                                                                                                                                                                                                                                                                                                                                                      | φ Cortante |          |           |          |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |             |           |         |                       |                       |            |          |      |             |       |     |                       |            |      |       |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |         |          |            |         |     |      |      |      |        |          |      |
| 0.85                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.6        |          |           |          |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |             |           |         |                       |                       |            |          |      |             |       |     |                       |            |      |       |        |                                                                                                                                                                                                                                                                                            |     |        |        |        |         |          |            |         |     |      |      |      |        |          |      |

Distribucion de Refuerzo

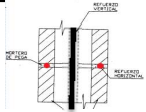
ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) | c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) | C*x (kN-m) | T*x (kN-m) | Mn  | φ    | φ Pn (kN) | φ Mn (kN-m) |
|-----------|---------|-------------------------|--------|------|--------|--------|--------|---------|---------|------------|------------|-----|------|-----------|-------------|
| 75.0      | 4       | 129                     | 1800   | 0.86 | 1440   | 815    | 0      | 1028    | 881     | 147        | 0          | 147 | 0.85 | 749       | 0.0         |
| 225.0     | 4       | 129                     | 1721.5 | 0.86 | 1377   | 779    | 0      | 779     | 668     | 165        | 0          | 165 | 0.85 | 594       | 125         |
| 0.0       | 0       | 0                       | 1642.9 | 0.86 | 1314   | 744    | -4     | 740     | 634     | 181        | -3         | 184 | 0.85 | 568       | 140         |
| 0.0       | 0       | 0                       | 1564.4 | 0.86 | 1252   | 708    | -8     | 700     | 600     | 194        | -7         | 201 | 0.85 | 539       | 156         |
| 0.0       | 0       | 0                       | 1485.9 | 0.86 | 1189   | 673    | -17    | 656     | 562     | 206        | -13        | 219 | 0.85 | 510       | 171         |
| 0.0       | 0       | 0                       | 1407.4 | 0.86 | 1126   | 637    | -27    | 610     | 523     | 215        | -21        | 235 | 0.85 | 478       | 186         |
| 0.0       | 0       | 0                       | 1328.8 | 0.86 | 1063   | 602    | -37    | 564     | 484     | 222        | -29        | 250 | 0.85 | 445       | 200         |
| 0.0       | 0       | 0                       | 1250.3 | 0.86 | 1000   | 566    | -49    | 516     | 443     | 226        | -38        | 264 | 0.85 | 411       | 213         |
| 0.0       | 0       | 0                       | 1171.8 | 0.86 | 937    | 530    | -63    | 467     | 401     | 229        | -48        | 277 | 0.85 | 376       | 225         |
| 0.0       | 0       | 0                       | 1093.2 | 0.86 | 875    | 495    | -79    | 416     | 357     | 229        | -60        | 289 | 0.85 | 341       | 235         |
| 900.0     | 4       | 129                     | 1014.7 | 0.86 | 812    | 459    | -97    | 362     | 311     | 227        | -74        | 301 | 0.85 | 303       | 246         |
| 0.0       | 0       | 0                       | 913.2  | 0.86 | 731    | 413    | -108   | 305     | 262     | 221        | -81        | 302 | 0.85 | 264       | 255         |
| 0.0       | 0       | 0                       | 811.8  | 0.86 | 649    | 367    | -117   | 251     | 215     | 211        | -81        | 293 | 0.85 | 222       | 257         |
| 0.0       | 0       | 0                       | 710.3  | 0.86 | 568    | 322    | -129   | 193     | 165     | 198        | -81        | 279 | 0.85 | 183       | 249         |
| 0.0       | 0       | 0                       | 608.8  | 0.86 | 487    | 276    | -145   | 130     | 112     | 181        | -81        | 262 | 0.85 | 140       | 237         |
| 0.0       | 0       | 0                       | 507.4  | 0.86 | 406    | 230    | -163   | 67      | 58      | 160        | -81        | 241 | 0.85 | 95        | 223         |
| 0.0       | 0       | 0                       | 359.1  | 0.86 | 287    | 163    | -163   | 0       | 0       | 123        | -81        | 204 | 0.85 | 49        | 205         |
| 0.0       | 0       | 0                       | 300.0  | 0.86 | 240    | 136    | -163   | -27     | -23     | 106        | -81        | 187 | 0.85 | 0         | 173.6       |
| 0.0       | 0       | 0                       | 200.0  | 0.86 | 160    | 91     | -172   | -82     | -70     | 74         | -75        | 149 | 0.85 | -19       | 159         |
| 1575.0    | 4       | 129                     | 100.0  | 0.86 | 80     | 45     | -217   | -171    | -147    | 39         | -45        | 84  | 0.85 | -60       | 127         |
| 1725.0    | 4       | 129                     | 0.0    | 0.86 | 0      | 0      | -271   | -271    | -232    | 0          | 0          | 0   | 0.85 | -125      | 71          |
| Total     |         | 645                     |        |      |        |        |        |         |         |            |            |     |      | -197      | 0           |

| Diam Ref Horiz (mm) | Separac ref Horiz (mm) | As (mm <sup>2</sup> ) | eficien. η | ρn      |
|---------------------|------------------------|-----------------------|------------|---------|
| 4.0                 | 600                    | 12.57                 | 0.35       | 0.00018 |

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 3/4/5 Piso  
(17-19) B/N (1-2)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 881.3 (kN)  
φPn : 749.1 (kN) ≥ 99.7  
As : 645 mm<sup>2</sup>  
ρ : 0.002579

Flexion Pura

b : 145.00 mm  
Ae : 145070 mm<sup>2</sup>  
c : 359.06 mm  
d : 1725 mm  
te : 81 mm  
t : 145 mm  
φ Mn : 173.6 kN-m

Punto Balanceado

cb : 1014.7  
φ Mn : 255 kN-m  
φPn : 264.1 (kN)  
Mn : kN-m αMcr  
301 ≥ 130.56  
Si

Mu ≤ φ Mn  
94.6 ≤ 186.88  
Si

0.1 f'm Ae : 215.6 kN  
0.25 Pb : 77.7 kN

Cortante

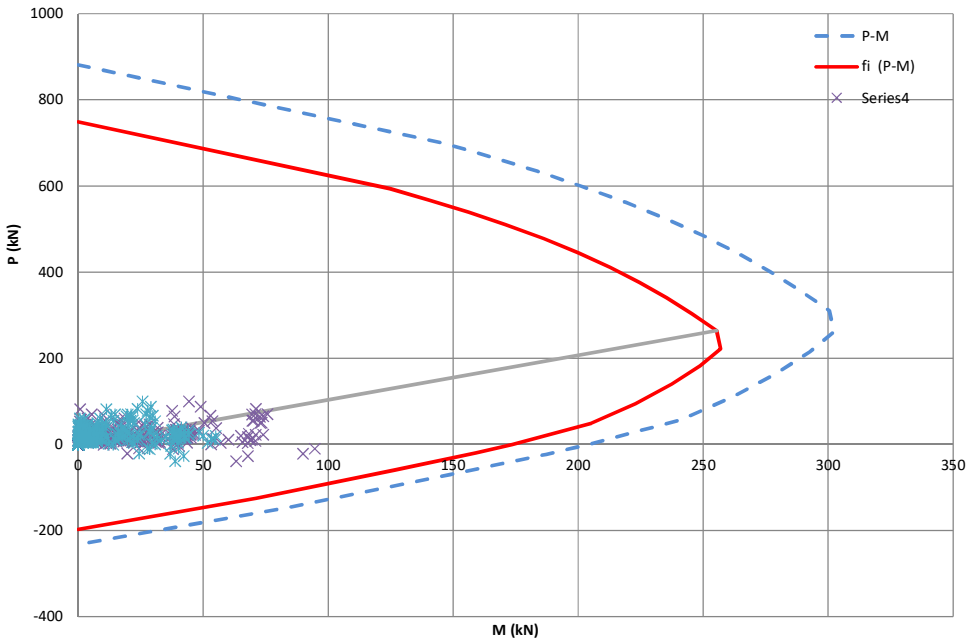
Mu/Vu d : 1.7  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit : 137.5883 mm<sup>2</sup> ≥

Vm : 91.7 kN  
Vs : 7.6 kN  
Vu = Vn + Vs : 59.6 kN

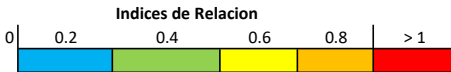
6 Ae√f'm : 250.2  
4 Ae√f'm : 166.8  
Insuficiente Refuerz. CORTANTE

0.2 f'm : 1652.0 kPa  
0.2 f'm ≥ 699 kPa  
OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

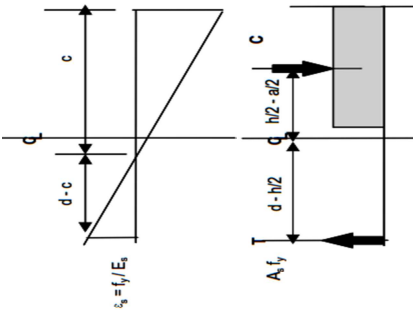


| Resumen         | Relacion          |
|-----------------|-------------------|
| Compr. Axial    | 0.13 ✓ Pu/ φPn    |
| Axial - Flexion | 0.51 ✓ Mu/ φMn    |
| Cortante        | 0.43 ✓ Vu/ Vn max |



Curva Interaccion φ Pn - φ Mn

OK ✓



**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

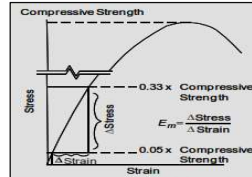
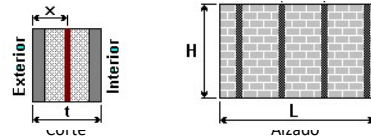
Muro : Eje

1/2 Piso  
 B/N  
 (13-15)

Universidad Santo Tomas  
 Esp. Patología de la Construcción

(13-15)

| Propiedades de Geometría Ladrillo |        |               |                |            |                 |
|-----------------------------------|--------|---------------|----------------|------------|-----------------|
| a (mm)                            | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm2) |
| 300                               | 145    | 5674.0        | 30             | 43500      | 30452           |



| Propiedades de Geometría Muro |        |        |                    |          |            |         |
|-------------------------------|--------|--------|--------------------|----------|------------|---------|
| X (mm)                        | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm2) | Groutig en | te (mm) |
| 75                            | 1500   | 2300   | 2300               | 217500   | Con Refue  | 83.7    |

| Propiedades de Material |         |         |     |          |         |        |        |             |   |      | Prop. Diseño          |            |
|-------------------------|---------|---------|-----|----------|---------|--------|--------|-------------|---|------|-----------------------|------------|
| f'm (Mpa)               | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | Emu    | Ey     | Bloq Compr. | α |      | φ Compr Y Flexo-Compr | φ Cortante |
| 8.26                    | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32 | 0.85                  | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm2) |
|-----------|---------|------------|
| 75.0      | 4       | 129        |
| 225.0     | 4       | 129        |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 750.0     | 4       | 129        |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 1275.0    | 5       | 199        |
| 1425.0    | 5       | 199        |
| Total     |         | 785        |

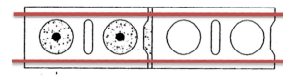


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |  | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 965     | 827     |  |            |            | 0   | 0.85 |  | 703       | 0.0         |
| 1500   | 0.86 | 1200   | 706    | 0      | 706     | 605     |  | 106        | 0          | 106 | 0.85 |  | 514       | 90          |
| 1433.8 | 0.86 | 1147   | 674    | 0      | 674     | 578     |  | 119        | 0          | 119 | 0.85 |  | 492       | 101         |
| 1367.6 | 0.86 | 1094   | 643    | -5     | 638     | 547     |  | 131        | -3         | 134 | 0.85 |  | 465       | 114         |
| 1301.5 | 0.86 | 1041   | 612    | -11    | 601     | 515     |  | 140        | -8         | 148 | 0.85 |  | 438       | 126         |
| 1235.3 | 0.86 | 988    | 581    | -22    | 559     | 479     |  | 149        | -14        | 163 | 0.85 |  | 407       | 139         |
| 1169.1 | 0.86 | 935    | 550    | -37    | 513     | 440     |  | 155        | -23        | 179 | 0.85 |  | 374       | 152         |
| 1102.9 | 0.86 | 882    | 519    | -53    | 465     | 399     |  | 160        | -33        | 194 | 0.85 |  | 339       | 165         |
| 1036.8 | 0.86 | 829    | 488    | -72    | 416     | 356     |  | 164        | -45        | 208 | 0.85 |  | 303       | 177         |
| 970.6  | 0.86 | 776    | 457    | -93    | 363     | 311     |  | 165        | -57        | 223 | 0.85 |  | 265       | 189         |
| 904.4  | 0.86 | 724    | 425    | -118   | 308     | 264     |  | 165        | -72        | 237 | 0.85 |  | 224       | 202         |
| 838.2  | 0.86 | 671    | 394    | -146   | 249     | 213     |  | 164        | -89        | 253 | 0.85 |  | 181       | 215         |
| 754.4  | 0.86 | 604    | 355    | -166   | 189     | 162     |  | 159        | -100       | 259 | 0.85 |  | 138       | 220         |
| 670.6  | 0.86 | 536    | 315    | -176   | 139     | 119     |  | 152        | -100       | 252 | 0.85 |  | 101       | 214         |
| 586.8  | 0.86 | 469    | 276    | -189   | 87      | 75      |  | 142        | -100       | 243 | 0.85 |  | 64        | 206         |
| 502.9  | 0.86 | 402    | 237    | -205   | 31      | 27      |  | 130        | -100       | 230 | 0.85 |  | 23        | 196         |
| 470.0  | 0.86 | 376    | 221    | -213   | 8       | 7       |  | 124        | -100       | 225 | 0.85 |  | 6         | 191         |
| 459.4  | 0.86 | 368    | 216    | -216   | 0       | 0       |  | 122        | -100       | 223 | 0.85 |  | 0         | 189.3       |
| 300.0  | 0.86 | 240    | 141    | -221   | -80     | -69     |  | 89         | -100       | 189 | 0.85 |  | -58       | 161         |
| 250.0  | 0.86 | 200    | 118    | -221   | -104    | -89     |  | 76         | -100       | 177 | 0.85 |  | -76       | 150         |
| 78.0   | 0.86 | 62     | 37     | -276   | -239    | -205    |  | 26         | -72        | 98  | 0.85 |  | -174      | 83          |
| 0.0    | 0.86 | 0      | 0      | -330   | -330    | -283    |  | 0          | 0          | 0   | 0.85 |  | -240      | 0           |

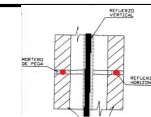
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 6.5                 | 600                    |

| As (mm2) |
|----------|
| 33.18    |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00046 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje B/N (13-15)  
1/2 Piso (5-7)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 827.3 (kN)  
 $\phi Pn$  : 703.2 (kN)  $\geq$  171.3  
As : 785 mm<sup>2</sup>  
p : 0.003799

Flexion Pura

b : 145.00 mm  
Ae : 125620 mm<sup>2</sup>  
c : 459.43 mm  
d : 1425 mm  
te : 84 mm  
t : 145 mm  
 $\phi Mn$  : 189.3 kN-m

Punto Balanceado

cb : 838.2  
 $\phi Mn$  : 215 kN-m  
 $\phi Pn$  : 181.1 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
253  $\geq$  94.22  
Si

$Mu \leq \phi Mn$   
125.5  $\leq$  189.83  
Si

0.1 f'm Ae : 179.7 kN  
0.25 Pb : 53.3 kN

Cortante

Mu/Vu d : 2.6  
Asv : 33.18 mm<sup>2</sup>  
Vn max permit : 119.1414 mm<sup>2</sup>  $\geq$

Vm : 79.4 kN  
Vs : 16.6 kN  
Vu = Vn + Vs : 57.6 kN

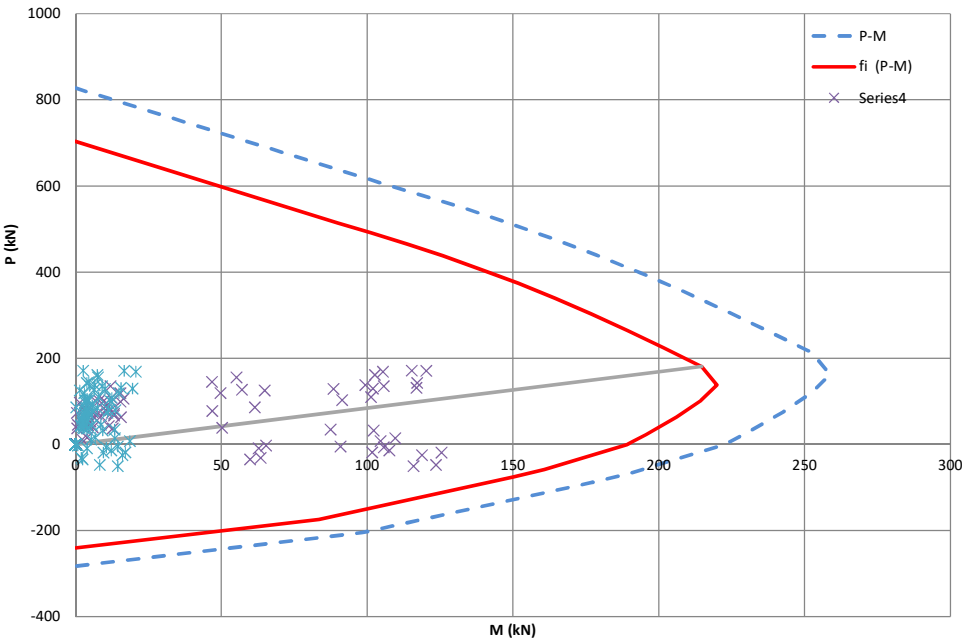
6 Ae√f'm : 216.6  
4 Ae√f'm : 144.4

OK Refuerzo a Cortante Suficiente

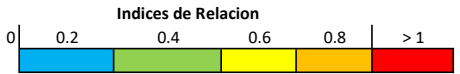
0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  1429 kPa

OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

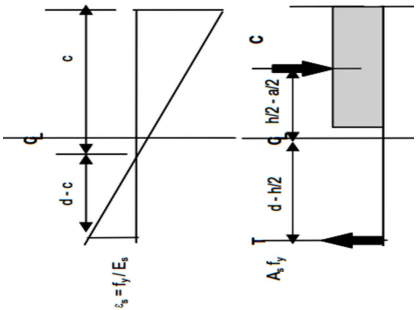


| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.24 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.66 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.48 <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

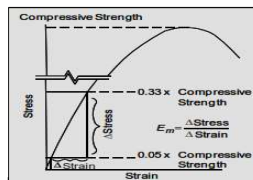
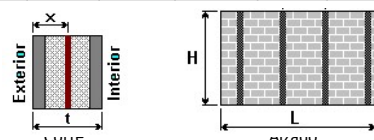
OK ☒



(13-15)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 1500   | 2300   | 2300               | 217500                | Con Refue  | 83.7    |

## Propiedades de Material

| Propiedades de Material |         |         |     |                      |         |                 |                |             |   | Propiedades               |             |
|-------------------------|---------|---------|-----|----------------------|---------|-----------------|----------------|-------------|---|---------------------------|-------------|
| f'm<br>(Mpa)            | E (Mpa) | G (Mpa) | v   | f <sub>y</sub> (Mpa) | E (Mpa) | ε <sub>mu</sub> | ε <sub>y</sub> | Bloq Compr. | α | φ Compr Y Flexo-<br>Compr | φ Cortante  |
| 8.26                    | 5782    | 2312.8  | 0.2 | 420                  | 200000  | 0.0030          | 0.0021         | 0.85        | 3 | 0.32                      | 0.85<br>0.6 |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 225.0     | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 750.0     | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1275.0    | 4       | 129                     |
| 1425.0    | 4       | 129                     |
| Total     |         | 645                     |

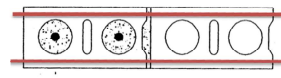


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |  | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 919     | 788     |  |            |            | 0   | 0.85 |  | 669       | 0.0         |
| 1500   | 0.86 | 1200   | 706    | 0      | 706     | 605     |  | 106        | 0          | 106 | 0.85 |  | 514       | 90          |
| 1433.8 | 0.86 | 1147   | 674    | 0      | 674     | 578     |  | 119        | 0          | 119 | 0.85 |  | 492       | 101         |
| 1367.6 | 0.86 | 1094   | 643    | -3     | 640     | 549     |  | 131        | -2         | 133 | 0.85 |  | 466       | 113         |
| 1301.5 | 0.86 | 1041   | 612    | -7     | 605     | 519     |  | 140        | -5         | 145 | 0.85 |  | 441       | 124         |
| 1235.3 | 0.86 | 988    | 581    | -14    | 567     | 486     |  | 149        | -9         | 158 | 0.85 |  | 413       | 134         |
| 1169.1 | 0.86 | 935    | 550    | -24    | 526     | 451     |  | 155        | -15        | 170 | 0.85 |  | 383       | 145         |
| 1102.9 | 0.86 | 882    | 519    | -35    | 484     | 415     |  | 160        | -22        | 182 | 0.85 |  | 353       | 155         |
| 1036.8 | 0.86 | 829    | 488    | -47    | 441     | 378     |  | 164        | -29        | 192 | 0.85 |  | 321       | 164         |
| 970.6  | 0.86 | 776    | 457    | -61    | 396     | 340     |  | 165        | -37        | 202 | 0.85 |  | 289       | 172         |
| 904.4  | 0.86 | 724    | 425    | -76    | 349     | 299     |  | 165        | -47        | 212 | 0.85 |  | 254       | 180         |
| 838.2  | 0.86 | 671    | 394    | -95    | 300     | 257     |  | 164        | -58        | 221 | 0.85 |  | 218       | 188         |
| 754.4  | 0.86 | 604    | 355    | -108   | 247     | 212     |  | 159        | -65        | 224 | 0.85 |  | 180       | 190         |
| 670.6  | 0.86 | 536    | 315    | -118   | 198     | 170     |  | 152        | -65        | 217 | 0.85 |  | 144       | 184         |
| 586.8  | 0.86 | 469    | 276    | -130   | 146     | 125     |  | 142        | -65        | 207 | 0.85 |  | 106       | 176         |
| 502.9  | 0.86 | 402    | 237    | -146   | 90      | 77      |  | 130        | -65        | 195 | 0.85 |  | 66        | 166         |
| 419.1  | 0.86 | 335    | 197    | -163   | 35      | 30      |  | 115        | -65        | 180 | 0.85 |  | 25        | 153         |
| 345.5  | 0.86 | 276    | 163    | -163   | 0       | 0       |  | 99         | -65        | 164 | 0.85 |  | 0         | 139.8       |
| 300.0  | 0.86 | 240    | 141    | -163   | -21     | -18     |  | 89         | -65        | 154 | 0.85 |  | -16       | 131         |
| 250.0  | 0.86 | 200    | 118    | -163   | -45     | -39     |  | 76         | -65        | 141 | 0.85 |  | -33       | 120         |
| 78.0   | 0.86 | 62     | 37     | -217   | -180    | -154    |  | 26         | -37        | 63  | 0.85 |  | -131      | 54          |
| 0.0    | 0.86 | 0      | 0      | -271   | -271    | -232    |  | 0          | 0          | 0   | 0.85 |  | -197      | 0           |

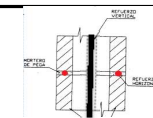
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00018 |



Planta



Corte

Compresion Axial

|              |          |                 |              |
|--------------|----------|-----------------|--------------|
| $h'/t$ :     | 15.9     | <               | 30           |
| Re :         | 0.86     |                 |              |
| Pn :         | 787.6    | (kN)            | $P_u$        |
| $\phi P_n$ : | 669.5    | (kN)            | $\geq 119.8$ |
|              |          | Si              |              |
| As :         | 645      | mm <sup>2</sup> |              |
| $\rho$ :     | 0.003122 |                 |              |

Flexion Pura

|              |        |                 |
|--------------|--------|-----------------|
| b :          | 145.00 | mm              |
| Ae :         | 125620 | mm <sup>2</sup> |
| c :          | 345.54 | mm              |
| d :          | 1425   | mm              |
| te :         | 84     | mm              |
| t :          | 145    | mm              |
| $\phi M_n$ : | 139.8  | kN-m            |

Punto Balanceado

|                 |              |
|-----------------|--------------|
| cb :            | 838.2        |
| $\phi M_n$ :    | 188 kN-m     |
| $\phi P_n$ :    | 218.5 (kN)   |
| Mn :            | kN-m         |
| $\alpha M_{cr}$ |              |
| 221             | $\geq 94.22$ |
|                 | Si           |

$$\begin{aligned} \mu_u &\leq \phi M_n \\ 108.9 &\leq 157.59 \end{aligned}$$

Si

$$\begin{aligned} 0.1 f'_m A_e &= 179.7 \text{ kN} \\ 0.25 P_b &= 64.3 \text{ kN} \end{aligned}$$

Cortante

|                 |          |                 |                     |      |    |
|-----------------|----------|-----------------|---------------------|------|----|
| $\mu_u/\mu_d$ : | 1.9      |                 | $V_m$ :             | 79.4 | kN |
| Asv :           | 12.57    | mm <sup>2</sup> | Vs :                | 6.3  | kN |
| Vn max permit : | 119.1414 | mm <sup>2</sup> | $V_u = V_n + V_s$ : | 51.4 | kN |
|                 |          | $\geq$          |                     |      |    |
|                 |          | Si              |                     |      |    |

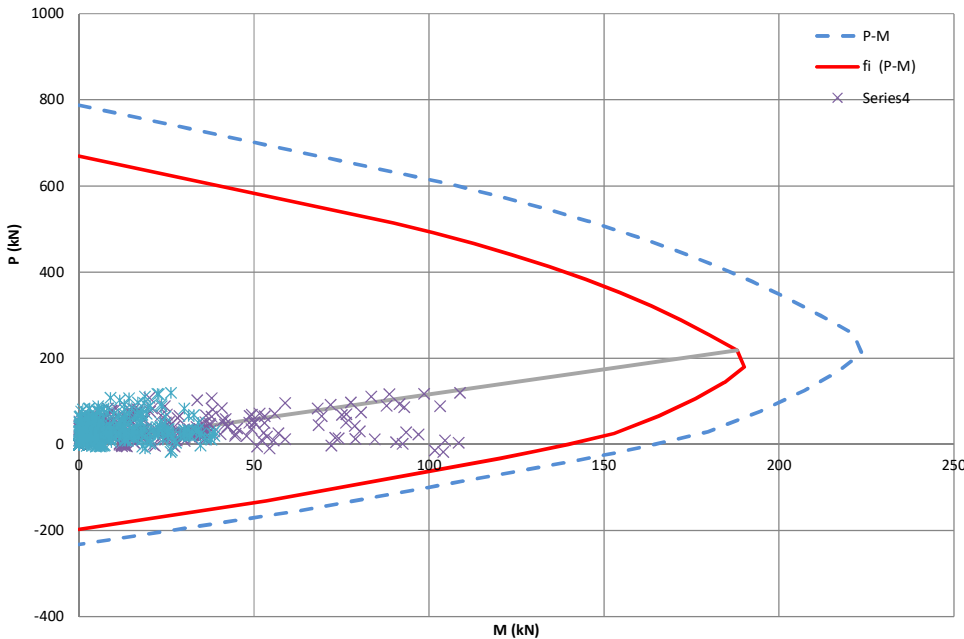
$$\begin{aligned} 6 A_e \sqrt{f'_m} &= 216.6 \\ 4 A_e \sqrt{f'_m} &= 144.4 \end{aligned}$$

Insuficiente Refuerz. CORTANTE

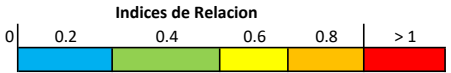
$$\begin{aligned} 0.2 f'_m &= 1652.0 \text{ kPa} \\ 0.2 f'_m &\geq 1015 \text{ kPa} \end{aligned}$$

OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

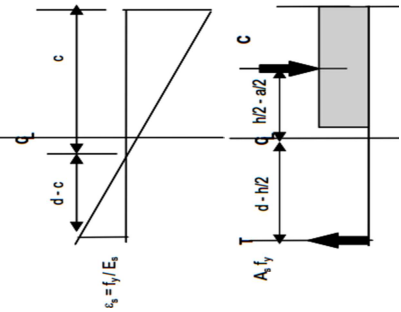


| Resumen         | Relacion                     |
|-----------------|------------------------------|
| Compr. Axial    | 0.18 ✓ $P_u/\phi P_n$        |
| Axial - Flexion | 0.69 ✓ $\mu_u/\phi M_n$      |
| Cortante        | 0.43 ✓ $V_u/V_n \text{ max}$ |



Curva Interaccion  $\phi P_n - \phi M_n$

No Cumple



**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje C/M (17-19)

1/2 Piso  
 Universidad Santo Tomas  
 Esp. Patología de la Construcción

(17-19)

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 1200   | 2300   | 2300               | 174000                | Con Refue  | 83.7    |

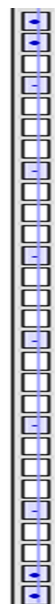
| f'm (Mpa) | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | Emu    | Ey     | Bloq Compr. | α |      |
|-----------|---------|---------|-----|----------|---------|--------|--------|-------------|---|------|
| 8.26      | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32 |

| φ Compr Y Flexo-Compr | φ Cortante |
|-----------------------|------------|
| 0.85                  | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 225.0     | 0       | 0                       |
| 375.0     | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 600.0     | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 825.0     | 6       | 284                     |
| 975.0     | 5       | 199                     |
| 1125.0    | 6       | 284                     |
| Total     |         | 896                     |

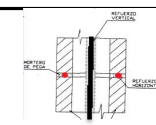
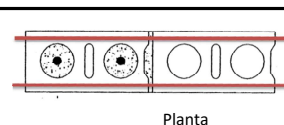


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |    | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|----|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 830     | 712     |    |            |            | 0   | 0.85 |  | 605       | 0.0         |
| 1200   | 0.86 | 960    | 564    | 0      | 564     | 484     |    | 68         | 0          | 68  | 0.85 |  | 411       | 58          |
| 1146.2 | 0.86 | 917    | 539    | 0      | 539     | 462     |    | 76         | 0          | 76  | 0.85 |  | 393       | 65          |
| 1092.4 | 0.86 | 874    | 514    | -5     | 509     | 436     |    | 84         | -3         | 86  | 0.85 |  | 371       | 73          |
| 1038.5 | 0.86 | 831    | 489    | -14    | 474     | 407     |    | 90         | -7         | 98  | 0.85 |  | 346       | 83          |
| 984.7  | 0.86 | 788    | 463    | -24    | 439     | 376     |    | 95         | -13        | 108 | 0.85 |  | 320       | 92          |
| 930.9  | 0.86 | 745    | 438    | -41    | 397     | 340     |    | 100        | -21        | 120 | 0.85 |  | 289       | 102         |
| 877.1  | 0.86 | 702    | 413    | -62    | 351     | 301     |    | 103        | -30        | 133 | 0.85 |  | 256       | 113         |
| 823.2  | 0.86 | 659    | 387    | -85    | 302     | 259     |    | 105        | -41        | 146 | 0.85 |  | 220       | 124         |
| 769.4  | 0.86 | 616    | 362    | -123   | 239     | 205     |    | 106        | -56        | 162 | 0.85 |  | 174       | 138         |
| 715.6  | 0.86 | 572    | 337    | -167   | 170     | 146     |    | 106        | -73        | 179 | 0.85 |  | 124       | 152         |
| 661.8  | 0.86 | 529    | 311    | -218   | 93      | 80      | FB | 104        | -93        | 198 | 0.85 |  | 68        | 168         |
| 595.6  | 0.86 | 476    | 280    | -261   | 19      | 16      |    | 101        | -106       | 207 | 0.85 |  | 14        | 176         |
| 580.0  | 0.86 | 464    | 273    | -273   | 0       | 0       |    | 100        | -109       | 210 | 0.85 |  | 0         | 178         |
| 580.0  | 0.86 | 464    | 273    | -273   | 0       | 0       |    | 100        | -109       | 210 | 0.85 |  | 0         | 178         |
| 580.0  | 0.86 | 464    | 273    | -273   | 0       | 0       |    | 100        | -109       | 210 | 0.85 |  | 0         | 178         |
| 580.0  | 0.86 | 464    | 273    | -273   | 0       | 0       |    | 100        | -109       | 210 | 0.85 |  | 0         | 178         |
| 579.8  | 0.86 | 464    | 273    | -273   | 0       | 0       |    | 100        | -109       | 210 | 0.85 |  | 0         | 178.3       |
| 300.0  | 0.86 | 240    | 141    | -322   | -181    | -155    |    | 68         | -121       | 189 | 0.85 |  | -132      | 160         |
| 250.0  | 0.86 | 200    | 118    | -322   | -205    | -175    |    | 59         | -121       | 180 | 0.85 |  | -149      | 153         |
| 78.0   | 0.86 | 62     | 37     | -322   | -285    | -245    |    | 21         | -121       | 142 | 0.85 |  | -208      | 120         |
| 0.0    | 0.86 | 0      | 0      | -376   | -376    | -323    |    | 0          | 0          | 0   | 0.85 |  | -274      | 0           |

| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 6.5                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 33.18                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00046 |



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje C/M (1-2)  
(17-19)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

$h'/t$  : 15.9 < 30  
 $Re$  : 0.86  
 $P_n$  : 711.7 (kN)  
 $\phi P_n$  : 604.9 (kN)  $\geq$   $P_u$  307.7  
 $As$  : 896 mm<sup>2</sup>  
 $\rho$  : 0.005493

Flexion Pura

$b$  : 145.00 mm  
 $A_e$  : 100496 mm<sup>2</sup>  
 $c$  : 579.80 mm  
 $d$  : 1125 mm  
 $t_e$  : 84 mm  
 $t$  : 145 mm  
 $\phi M_n$  : 178.3 kN-m

Punto Balanceado

$cb$  : 661.8  
 $\phi M_n$  : 168 kN-m  
 $\phi P_n$  : 68.1 (kN)  
 $M_n$  : kN-m  $\alpha M_{cr}$   
198  $\geq$  60.30  
**Si**

$M_u \leq \phi M_n$   
68.3  $\leq$  161.19  
**Si**

0.1  $f'_m A_e$  : 143.7 kN  
0.25  $P_b$  : 20.0 kN

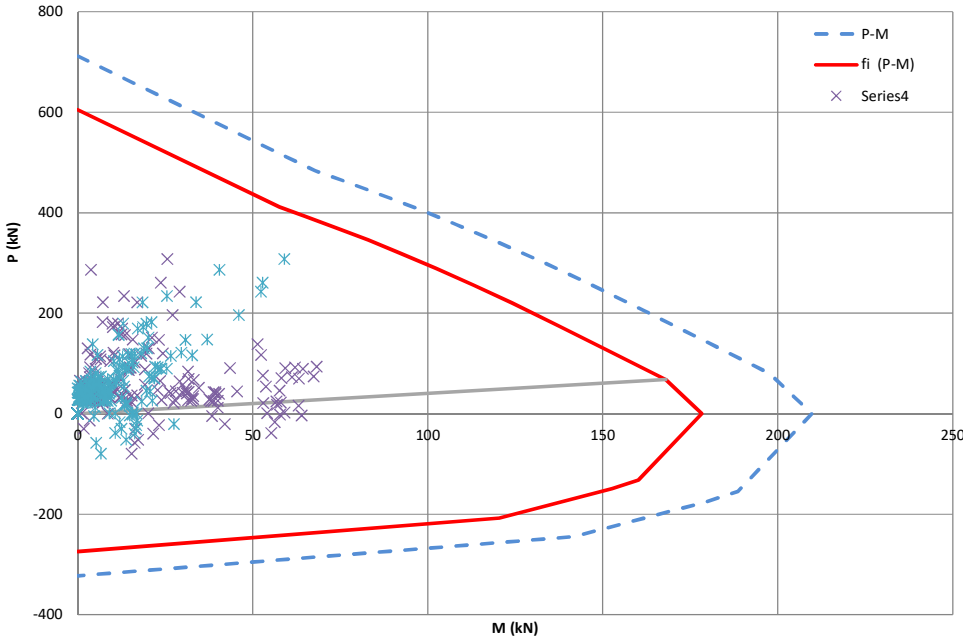
Cortante

$M_u/V_u d$  : 3.0  
 $As_v$  : 33.18 mm<sup>2</sup>  
 $V_n$  max permit : 95.31313 mm<sup>2</sup>  $\geq$   
**Si**  
 $V_m$  : 63.5 kN  
 $V_s$  : 13.1 kN  
 $V_u = V_n + V_s$  : 46.0 kN

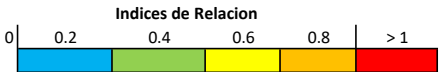
6  $A_e V_f / m$  : 173.3  
4  $A_e V_f / m$  : 115.5  
**OK Refuerzo a Cortante Suficiente**

0.2  $f'_m$  : 1652.0 kPa  
0.2  $f'_m \geq$  3097 kPa  
**Si Elementos de Borde**

Curva de Interaccion de Mamposteria Reforzada en Arcilla

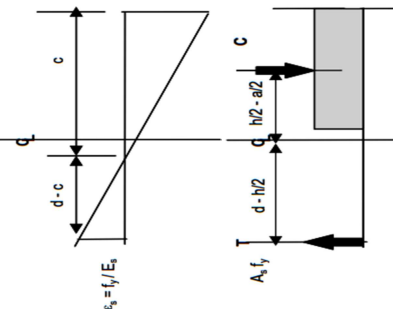


| Resumen         | Relacion                                                  |
|-----------------|-----------------------------------------------------------|
| Compr. Axial    | 0.51 <input checked="" type="checkbox"/> $P_u / \phi P_n$ |
| Axial - Flexion | 0.42 <input checked="" type="checkbox"/> $M_u / \phi M_n$ |
| Cortante        | 0.48 <input checked="" type="checkbox"/> $V_u / V_n$ max  |



Curva Interaccion  $\phi P_n - \phi M_n$

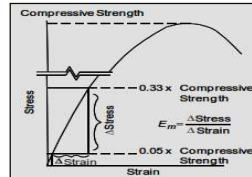
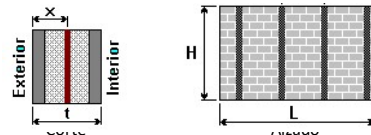
OK ☒



(17-19)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm)<br>(H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|-----------------------|-----------------------|------------|---------|
| 75     | 1200   | 2300   | 2300                  | 174000                | Con Refue  | 83.7    |

## Propiedades de Material

| f'm (Mpa) | E (Mpa) | G (Mpa) | v   | f_y (Mpa) | E (Mpa) | ε <sub>mu</sub> | ε <sub>y</sub> | Bloq Compr. | α |      | φ Compr Y Flexo-Compr | φ Cortante |
|-----------|---------|---------|-----|-----------|---------|-----------------|----------------|-------------|---|------|-----------------------|------------|
| 8.26      | 5782    | 2312.8  | 0.2 | 420       | 200000  | 0.0030          | 0.0021         | 0.85        | 3 | 0.32 | 0.85                  | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 225.0     | 0       | 0                       |
| 375.0     | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 600.0     | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 825.0     | 4       | 129                     |
| 975.0     | 4       | 129                     |
| 1125.0    | 4       | 129                     |
| Total     |         | 516                     |

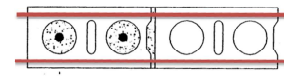


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 735     | 630     |                                |            |            | 0   | 0.85 |  | 536       | 0.0         |
| 1200   | 0.86 | 960    | 564    | 0      | 564     | 484     | Compresion - Controla Acero    | 68         | 0          | 68  | 0.85 |  | 411       | 58          |
| 1146.2 | 0.86 | 917    | 539    | 0      | 539     | 462     |                                | 76         | 0          | 76  | 0.85 |  | 393       | 65          |
| 1092.4 | 0.86 | 874    | 514    | -2     | 512     | 439     |                                | 84         | -1         | 85  | 0.85 |  | 373       | 72          |
| 1038.5 | 0.86 | 831    | 489    | -6     | 482     | 413     |                                | 90         | -3         | 94  | 0.85 |  | 351       | 80          |
| 984.7  | 0.86 | 788    | 463    | -11    | 452     | 388     |                                | 95         | -6         | 101 | 0.85 |  | 330       | 86          |
| 930.9  | 0.86 | 745    | 438    | -20    | 418     | 358     |                                | 100        | -10        | 110 | 0.85 |  | 305       | 93          |
| 877.1  | 0.86 | 702    | 413    | -31    | 382     | 328     |                                | 103        | -15        | 118 | 0.85 |  | 278       | 100         |
| 823.2  | 0.86 | 659    | 387    | -43    | 344     | 295     |                                | 105        | -20        | 125 | 0.85 |  | 251       | 106         |
| 769.4  | 0.86 | 616    | 362    | -62    | 300     | 257     |                                | 106        | -28        | 134 | 0.85 |  | 219       | 114         |
| 715.6  | 0.86 | 572    | 337    | -84    | 252     | 216     |                                | 106        | -36        | 142 | 0.85 |  | 184       | 121         |
| 661.8  | 0.86 | 529    | 311    | -110   | 201     | 173     | Flexion - Controla Mamposteria | 104        | -46        | 151 | 0.85 |  | 147       | 128         |
| 595.6  | 0.86 | 476    | 280    | -133   | 147     | 126     |                                | 101        | -54        | 155 | 0.85 |  | 107       | 132         |
| 529.4  | 0.86 | 424    | 249    | -152   | 97      | 84      |                                | 97         | -58        | 155 | 0.85 |  | 71        | 132         |
| 463.2  | 0.86 | 371    | 218    | -163   | 55      | 47      |                                | 90         | -61        | 151 | 0.85 |  | 40        | 129         |
| 397.1  | 0.86 | 318    | 187    | -163   | 24      | 21      |                                | 82         | -61        | 143 | 0.85 |  | 18        | 122         |
| 330.9  | 0.86 | 265    | 156    | -163   | -7      | -6      |                                | 73         | -61        | 134 | 0.85 |  | -5        | 114         |
| 345.5  | 0.86 | 276    | 163    | -163   | 0       | 0       |                                | 75         | -61        | 136 | 0.85 |  | 0         | 115.6       |
| 300.0  | 0.86 | 240    | 141    | -163   | -21     | -18     |                                | 68         | -61        | 129 | 0.85 |  | -16       | 109         |
| 250.0  | 0.86 | 200    | 118    | -163   | -45     | -39     |                                | 59         | -61        | 120 | 0.85 |  | -33       | 102         |
| 78.0   | 0.86 | 62     | 37     | -163   | -126    | -108    |                                | 21         | -61        | 82  | 0.85 |  | -92       | 70          |
| 0.0    | 0.86 | 0      | 0      | -217   | -217    | -186    |                                | 0          | 0          | 0   | 0.85 |  | -158      | 0           |

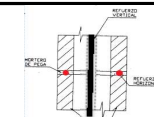
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 5.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 19.64                 |

| eficien. η | ρ <sub>n</sub> |
|------------|----------------|
| 0.35       | 0.00027        |



Planta



Corte

**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje D/L (13-15)  
 1 Piso  
 (5-7)

**Universidad Santo Tomas**  
**Esp. Patología de la Construcción**

**Compresion Axial**

h'/t : 15.9 < 30  
 Re : 0.86  
 Pn : 630.1 (kN)  
 $\phi Pn$  : 535.6 (kN)  $\geq$  74.1  
 Si  
 As : 516 mm<sup>2</sup>  
 $\rho$  : 0.003163

**Flexion Pura**

b : 145.00 mm  
 Ae : 100496 mm<sup>2</sup>  
 c : 345.54 mm  
 d : 1125 mm  
 te : 84 mm  
 t : 145 mm  
 $\phi Mn$  : 115.6 kN-m

**Punto Balanceado**

cb : 661.8  
 $\phi Mn$  : 128 kN-m  
 $\phi Pn$  : 146.8 (kN)  
 Mn : kN-m  $\alpha M_{cr}$   
 151  $\geq$  60.30  
 Si

$Mu \leq \phi Mn$   
 28.2  $\leq$  94.17  
 Si

0.1 f'm Ae : 143.7 kN  
 0.25 Pb : 43.2 kN

**Cortante**

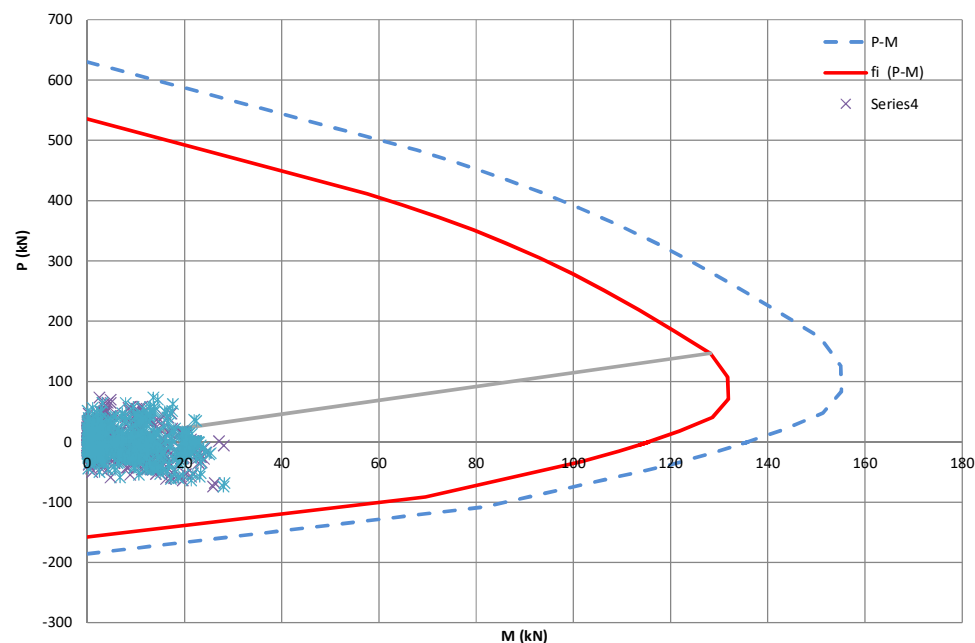
Mu/Vu d : 0.6  
 Asv : 19.64 mm<sup>2</sup>  
 Vn max permit : 122.7968 mm<sup>2</sup>  $\geq$

Vm : 0.0 kN  
 Vs : 7.7 kN  
 Vu = Vn + Vs : 4.6 kN

6 AeVf'm : 173.3  
 4 AeVf'm : 115.5  
**OK Refuerzo a Cortante Suficiente**

0.2 f'm : 1652.0 kPa  
 0.2 f'm  $\geq$  765 kPa  
**OK No Necesita Elementos de Borde**

**Curva de Interaccion de Mamposteria Reforzada en Arcilla**

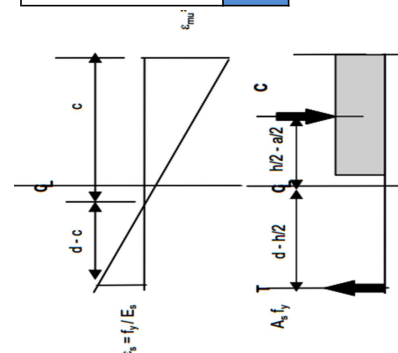


| Resumen         | Relacion |                 |
|-----------------|----------|-----------------|
| Compr. Axial    | 0.14     | ✓ Pu/ $\phi Pn$ |
| Axial - Flexion | 0.30     | ✓ Mu/ $\phi Mn$ |
| Cortante        | 0.04     | ✓ Vu/ Vn max    |



**Curva Interaccion  $\phi Pn - \phi Mn$**

OK ✓



## EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje

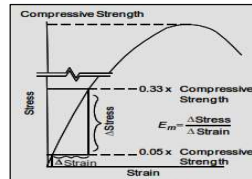
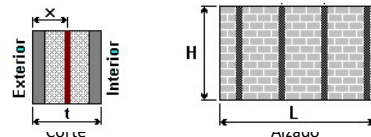
D/L  
(13-15)

Esp. Patología de la Construcción

(13-15)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 1650   | 2300   | 2300               | 239250                | Con Refue  | 82.0    |

## Propiedades de Material

| f'm<br>(Mpa) | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | εmu    | εγ     | Bloq Compr. | α |      | φ Compr Y Flexo-<br>Compr | φ Cortante |
|--------------|---------|---------|-----|----------|---------|--------|--------|-------------|---|------|---------------------------|------------|
| 8.26         | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32 | 0.85                      | 0.6        |

Distribucion de Refuerzo

## ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 6       | 284                     |
| 225.0     | 6       | 284                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 825.0     | 5       | 199                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1425.0    | 6       | 284                     |
| 1575.0    | 6       | 284                     |
| Total     |         | 1335                    |



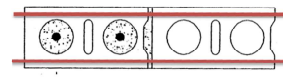
5

| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |  | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 1118    | 958     |  |            |            | 0   | 0.85 |  | 815       | 0.0         |
| 1650   | 0.86 | 1320   | 760    | 0      | 760     | 652     |  | 125        | 0          | 125 | 0.85 |  | 554       | 107         |
| 1577.6 | 0.86 | 1262   | 727    | 0      | 727     | 623     |  | 141        | 0          | 141 | 0.85 |  | 530       | 120         |
| 1505.3 | 0.86 | 1204   | 694    | -8     | 686     | 588     |  | 155        | -6         | 160 | 0.85 |  | 500       | 136         |
| 1432.9 | 0.86 | 1146   | 660    | -17    | 643     | 552     |  | 166        | -13        | 179 | 0.85 |  | 469       | 152         |
| 1360.6 | 0.86 | 1088   | 627    | -35    | 592     | 508     |  | 176        | -25        | 201 | 0.85 |  | 431       | 171         |
| 1288.2 | 0.86 | 1031   | 594    | -56    | 538     | 461     |  | 184        | -39        | 223 | 0.85 |  | 392       | 190         |
| 1215.9 | 0.86 | 973    | 560    | -80    | 481     | 412     |  | 190        | -55        | 245 | 0.85 |  | 350       | 208         |
| 1143.5 | 0.86 | 915    | 527    | -106   | 421     | 361     |  | 194        | -73        | 267 | 0.85 |  | 307       | 227         |
| 1071.2 | 0.86 | 857    | 494    | -136   | 357     | 306     |  | 196        | -94        | 290 | 0.85 |  | 260       | 246         |
| 998.8  | 0.86 | 799    | 460    | -171   | 289     | 248     |  | 196        | -117       | 313 | 0.85 |  | 211       | 266         |
| 926.5  | 0.86 | 741    | 427    | -211   | 216     | 185     |  | 194        | -144       | 338 | 0.85 |  | 157       | 288         |
| 833.8  | 0.86 | 667    | 384    | -239   | 146     | 125     |  | 189        | -161       | 350 | 0.85 |  | 106       | 297         |
| 741.2  | 0.86 | 593    | 341    | -252   | 89      | 77      |  | 180        | -161       | 342 | 0.85 |  | 65        | 290         |
| 648.5  | 0.86 | 519    | 299    | -271   | 28      | 24      |  | 169        | -161       | 330 | 0.85 |  | 20        | 281         |
| 630.0  | 0.86 | 504    | 290    | -276   | 15      | 13      |  | 166        | -161       | 327 | 0.85 |  | 11        | 278         |
| 625.0  | 0.86 | 500    | 288    | -277   | 11      | 10      |  | 166        | -161       | 327 | 0.85 |  | 8         | 278         |
| 609.4  | 0.86 | 488    | 281    | -281   | 0       | 0       |  | 163        | -161       | 324 | 0.85 |  | 0         | 275.6       |
| 300.0  | 0.86 | 240    | 138    | -322   | -184    | -158    |  | 97         | -161       | 258 | 0.85 |  | -134      | 220         |
| 250.0  | 0.86 | 200    | 115    | -322   | -207    | -177    |  | 84         | -161       | 245 | 0.85 |  | -151      | 208         |
| 78.0   | 0.86 | 62     | 36     | -441   | -405    | -348    |  | 29         | -89        | 118 | 0.85 |  | -296      | 100         |
| 0.0    | 0.86 | 0      | 0      | -561   | -561    | -481    |  | 0          | 0          | 0   | 0.85 |  | -409      | 0           |

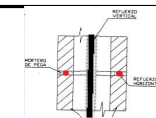
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 6.5                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 33.18                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00047 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje D/L (13-15)  
1 Piso (5-7)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

$h'/t$  : 15.9 < 30  
 $Re$  : 0.86  
 $P_n$  : 958.5 (kN)  
 $\phi P_n$  : 814.7 (kN)  $\geq$   $P_u$  277.4  
 $As$  : 1335 mm<sup>2</sup>  
 $\rho$  : 0.005846

Flexion Pura

$b$  : 145.00 mm  
 $A_e$  : 135345 mm<sup>2</sup>  
 $c$  : 609.45 mm  
 $d$  : 1575 mm  
 $te$  : 82 mm  
 $t$  : 145 mm  
 $\phi Mn$  : 275.6 kN-m

Punto Balanceado

$cb$  : 926.5  
 $\phi Mn$  : 288 kN-m  
 $\phi P_n$  : 157.3 (kN)  
 $Mn$  : kN-m  $\alpha M_{cr}$   
338  $\geq$  111.66  
Si

$Mu \leq \phi Mn$   
138.7  $\leq$  303.18  
Si

0.1  $f'_m Ae$  : 197.6 kN  
0.25  $P_b$  : 46.3 kN

Cortante

$Mu/Vu d$  : 3.5  
 $Asv$  : 33.18 mm<sup>2</sup>  
 $V_n$  max permit : 128.3649 mm<sup>2</sup>  $\geq$   
Si

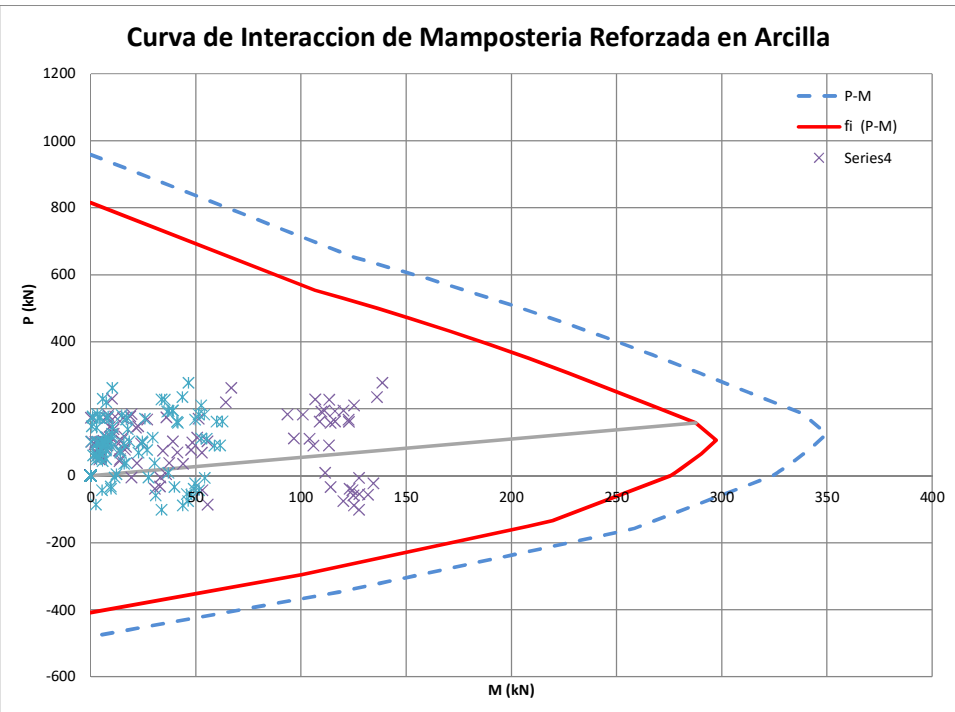
$V_m$  : 85.6 kN  
 $V_s$  : 18.3 kN  
 $V_u = V_n + V_s$  : 62.3 kN

6  $A_e V'_m$  : 233.4  
4  $A_e V'_m$  : 155.6

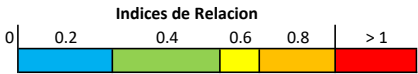
OK Refuerzo a Cortante Suficiente

0.2  $f'_m$  : 1652.0 kPa  
0.2  $f'_m \geq$  2104 kPa

Si Elementos de Borde

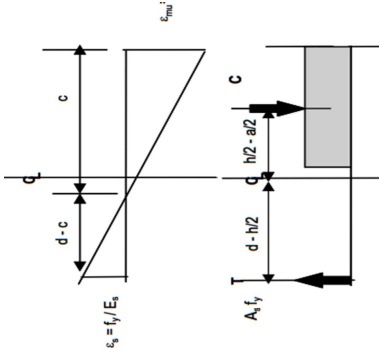


| Resumen         | Relacion                                                  |
|-----------------|-----------------------------------------------------------|
| Compr. Axial    | 0.34 <input checked="" type="checkbox"/> $P_u / \phi P_n$ |
| Axial - Flexion | 0.46 <input checked="" type="checkbox"/> $M_u / \phi Mn$  |
| Cortante        | 0.49 <input checked="" type="checkbox"/> $V_u / V_n$ max  |



Curva Interaccion  $\phi P_n - \phi Mn$

OK ☒



## EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje

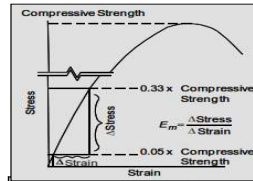
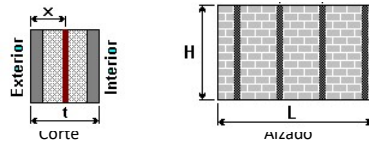
D/L  
(13-15)

Esp. Patología de la Construcción

(13-15)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 1650   | 2300   | 2300               | 239250                | Con Refue  | 82.0    |

## Propiedades de Material

| f'm<br>(Mpa) | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | εmu    | εγ     | Bloq Compr. | α |      | φ Compr Y Flexo-<br>Compr | φ Cortante |
|--------------|---------|---------|-----|----------|---------|--------|--------|-------------|---|------|---------------------------|------------|
| 8.26         | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32 | 0.85                      | 0.6        |

Distribucion de Refuerzo

## ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 5       | 199                     |
| 225.0     | 5       | 199                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 825.0     | 5       | 199                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1425.0    | 5       | 199                     |
| 1575.0    | 5       | 199                     |
| Total     |         | 995                     |



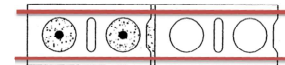
5

| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |  | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 1089    | 934     |  |            |            | 0   | 0.85 |  | 794       | 0.0         |
| 1650   | 0.86 | 1320   | 760    | 0      | 760     | 652     |  | 125        | 0          | 125 | 0.85 |  | 554       | 107         |
| 1577.6 | 0.86 | 1262   | 727    | 0      | 727     | 623     |  | 141        | 0          | 141 | 0.85 |  | 530       | 120         |
| 1505.3 | 0.86 | 1204   | 694    | -6     | 688     | 590     |  | 155        | -4         | 159 | 0.85 |  | 501       | 135         |
| 1432.9 | 0.86 | 1146   | 660    | -12    | 648     | 556     |  | 166        | -9         | 175 | 0.85 |  | 473       | 149         |
| 1360.6 | 0.86 | 1088   | 627    | -24    | 602     | 516     |  | 176        | -18        | 194 | 0.85 |  | 439       | 164         |
| 1288.2 | 0.86 | 1031   | 594    | -39    | 554     | 475     |  | 184        | -28        | 211 | 0.85 |  | 404       | 180         |
| 1215.9 | 0.86 | 973    | 560    | -56    | 504     | 432     |  | 190        | -39        | 228 | 0.85 |  | 368       | 194         |
| 1143.5 | 0.86 | 915    | 527    | -74    | 452     | 388     |  | 194        | -51        | 245 | 0.85 |  | 330       | 208         |
| 1071.2 | 0.86 | 857    | 494    | -96    | 398     | 341     |  | 196        | -66        | 261 | 0.85 |  | 290       | 222         |
| 998.8  | 0.86 | 799    | 460    | -120   | 340     | 292     |  | 196        | -82        | 278 | 0.85 |  | 248       | 236         |
| 926.5  | 0.86 | 741    | 427    | -148   | 279     | 239     |  | 194        | -101       | 295 | 0.85 |  | 203       | 251         |
| 833.8  | 0.86 | 667    | 384    | -167   | 217     | 186     |  | 189        | -113       | 302 | 0.85 |  | 158       | 256         |
| 741.2  | 0.86 | 593    | 341    | -181   | 161     | 138     |  | 180        | -113       | 293 | 0.85 |  | 117       | 249         |
| 648.5  | 0.86 | 519    | 299    | -200   | 99      | 85      |  | 169        | -113       | 282 | 0.85 |  | 72        | 240         |
| 555.9  | 0.86 | 445    | 256    | -225   | 31      | 27      |  | 154        | -113       | 267 | 0.85 |  | 23        | 227         |
| 540.0  | 0.86 | 432    | 249    | -230   | 19      | 16      |  | 152        | -113       | 264 | 0.85 |  | 14        | 225         |
| 517.1  | 0.86 | 414    | 238    | -238   | 0       | 0       |  | 147        | -113       | 260 | 0.85 |  | 0         | 221.1       |
| 300.0  | 0.86 | 240    | 138    | -251   | -113    | -96     |  | 97         | -113       | 210 | 0.85 |  | -82       | 179         |
| 250.0  | 0.86 | 200    | 115    | -251   | -136    | -116    |  | 84         | -113       | 196 | 0.85 |  | -99       | 167         |
| 78.0   | 0.86 | 62     | 36     | -334   | -298    | -256    |  | 29         | -63        | 91  | 0.85 |  | -217      | 78          |
| 0.0    | 0.86 | 0      | 0      | -418   | -418    | -358    |  | 0          | 0          | 0   | 0.85 |  | -305      | 0           |

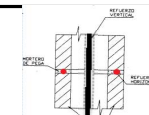
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 5.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 19.64                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00028 |



Planta



Corte

Compresion Axial

$h'/t$  : 15.9 < 30  
Re : 0.86  
Pn : 933.6 (kN)  
 $\phi Pn$  : 793.6 (kN)  $\geq$  183.0  
As : 995 mm<sup>2</sup>  
 $\rho$  : 0.004357

Flexion Pura

b : 145.00 mm  
Ae : 135345 mm<sup>2</sup>  
c : 517.11 mm  
d : 1575 mm  
te : 82 mm  
t : 145 mm  
 $\phi Mn$  : 221.1 kN-m

Punto Balanceado

cb : 926.5  
 $\phi Mn$  : 251 kN-m  
 $\phi Pn$  : 203.3 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
295  $\geq$  111.66  
Si

$Mu \leq \phi Mn$   
96.9  $\leq$  243.56  
Si

0.1 f'm Ae : 197.6 kN  
0.25 Pb : 59.8 kN

Cortante

$Mu/Vu d$  : 2.4  
Asv : 19.64 mm<sup>2</sup>  
Vn max permit : 128.3649 mm<sup>2</sup>  $\geq$   
Si

Vm : 85.6 kN  
Vs : 10.8 kN  
Vu = Vn + Vs : 57.8 kN

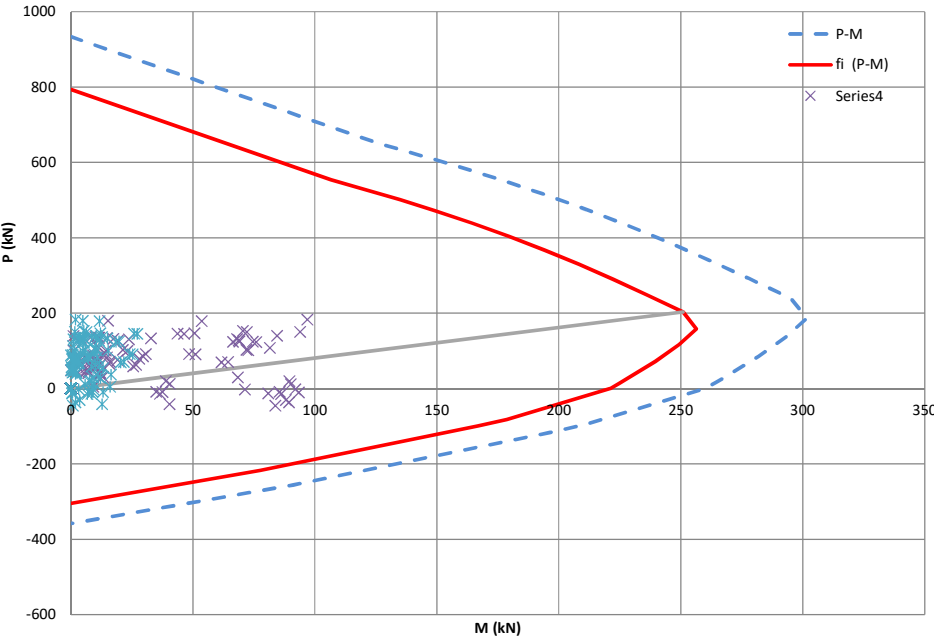
6 AeVf'm : 233.4  
4 AeVf'm : 155.6

OK Refuerzo a Cortante Suficiente

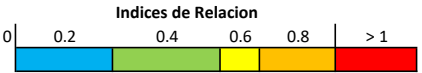
0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  1390 kPa

OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

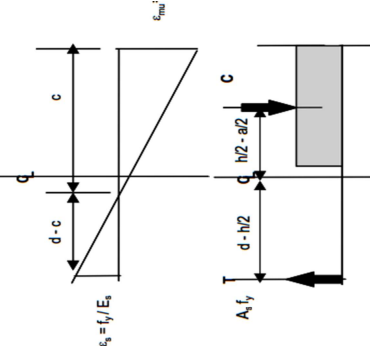


| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.23 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.40 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.45 <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

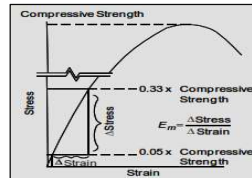
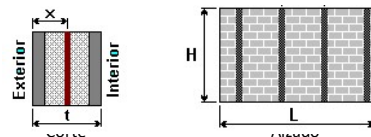
OK ☒



(13-15)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 1650   | 2300   | 2300               | 239250                | Con Refue  | 82.0    |

## Propiedades de Material

| f'm<br>(Mpa) | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | εmu    | εγ     | Bloq Compr. | α |      | φ Compr Y Flexo-<br>Compr | φ Cortante |
|--------------|---------|---------|-----|----------|---------|--------|--------|-------------|---|------|---------------------------|------------|
| 8.26         | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32 | 0.85                      | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 225.0     | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 825.0     | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1425.0    | 4       | 129                     |
| 1575.0    | 4       | 129                     |
| Total     |         | 645                     |



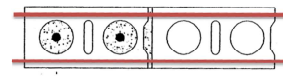
5

| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 973     | 834     |                                |            |            | 0   | 0.85 |  | 709       | 0.0         |
| 1650   | 0.86 | 1320   | 760    | 0      | 760     | 652     | Compresion - Controla Acero    | 125        | 0          | 125 | 0.85 |  | 554       | 107         |
| 1577.6 | 0.86 | 1262   | 727    | 0      | 727     | 623     |                                | 141        | 0          | 141 | 0.85 |  | 530       | 120         |
| 1505.3 | 0.86 | 1204   | 694    | -4     | 690     | 592     |                                | 155        | -3         | 157 | 0.85 |  | 503       | 134         |
| 1432.9 | 0.86 | 1146   | 660    | -8     | 653     | 559     |                                | 166        | -6         | 172 | 0.85 |  | 476       | 146         |
| 1360.6 | 0.86 | 1088   | 627    | -16    | 611     | 524     |                                | 176        | -11        | 187 | 0.85 |  | 445       | 159         |
| 1288.2 | 0.86 | 1031   | 594    | -25    | 568     | 487     |                                | 184        | -18        | 202 | 0.85 |  | 414       | 171         |
| 1215.9 | 0.86 | 973    | 560    | -36    | 524     | 449     |                                | 190        | -25        | 215 | 0.85 |  | 382       | 183         |
| 1143.5 | 0.86 | 915    | 527    | -48    | 479     | 410     |                                | 194        | -33        | 227 | 0.85 |  | 349       | 193         |
| 1071.2 | 0.86 | 857    | 494    | -62    | 432     | 370     |                                | 196        | -43        | 238 | 0.85 |  | 314       | 203         |
| 998.8  | 0.86 | 799    | 460    | -78    | 383     | 328     |                                | 196        | -53        | 249 | 0.85 |  | 279       | 212         |
| 926.5  | 0.86 | 741    | 427    | -96    | 331     | 284     | Flexion - Controla Mamposteria | 194        | -66        | 260 | 0.85 |  | 241       | 221         |
| 833.8  | 0.86 | 667    | 384    | -108   | 276     | 236     |                                | 189        | -73        | 262 | 0.85 |  | 201       | 223         |
| 741.2  | 0.86 | 593    | 341    | -117   | 224     | 192     |                                | 180        | -73        | 254 | 0.85 |  | 164       | 216         |
| 648.5  | 0.86 | 519    | 299    | -129   | 169     | 145     |                                | 169        | -73        | 242 | 0.85 |  | 123       | 206         |
| 555.9  | 0.86 | 445    | 256    | -146   | 110     | 95      |                                | 154        | -73        | 227 | 0.85 |  | 80        | 193         |
| 463.2  | 0.86 | 371    | 213    | -163   | 51      | 44      |                                | 137        | -73        | 210 | 0.85 |  | 37        | 178         |
| 352.8  | 0.86 | 282    | 163    | -163   | 0       | 0       |                                | 111        | -73        | 184 | 0.85 |  | 0         | 156.7       |
| 300.0  | 0.86 | 240    | 138    | -163   | -24     | -21     |                                | 97         | -73        | 171 | 0.85 |  | -18       | 145         |
| 250.0  | 0.86 | 200    | 115    | -163   | -47     | -41     |                                | 84         | -73        | 157 | 0.85 |  | -35       | 133         |
| 78.0   | 0.86 | 62     | 36     | -217   | -181    | -155    |                                | 29         | -41        | 69  | 0.85 |  | -132      | 59          |
| 0.0    | 0.86 | 0      | 0      | -271   | -271    | -232    |                                | 0          | 0          | 0   | 0.85 |  | -197      | 0           |

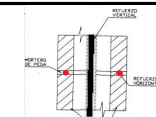
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00018 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 3/4/5 Piso  
D/L (5-7)  
(13-15)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 834.5 (kN)  
φPn : 709.3 (kN) ≥ 130.2  
As : 645 mm<sup>2</sup>  
ρ : 0.002824

Flexion Pura

b : 145.00 mm  
Ae : 135345 mm<sup>2</sup>  
c : 352.79 mm  
d : 1575 mm  
te : 82 mm  
t : 145 mm  
φ Mn : 156.7 kN-m

Punto Balanceado

cb : 926.5  
φ Mn : 221 kN-m  
φPn : 241.2 (kN)  
Mn : kN-m αMcr  
260 ≥ 111.66  
Si

Mu ≤ φ Mn  
44.1 ≤ 181.68  
Si

0.1 f'm Ae : 197.6 kN  
0.25 Pb : 71.0 kN

Cortante

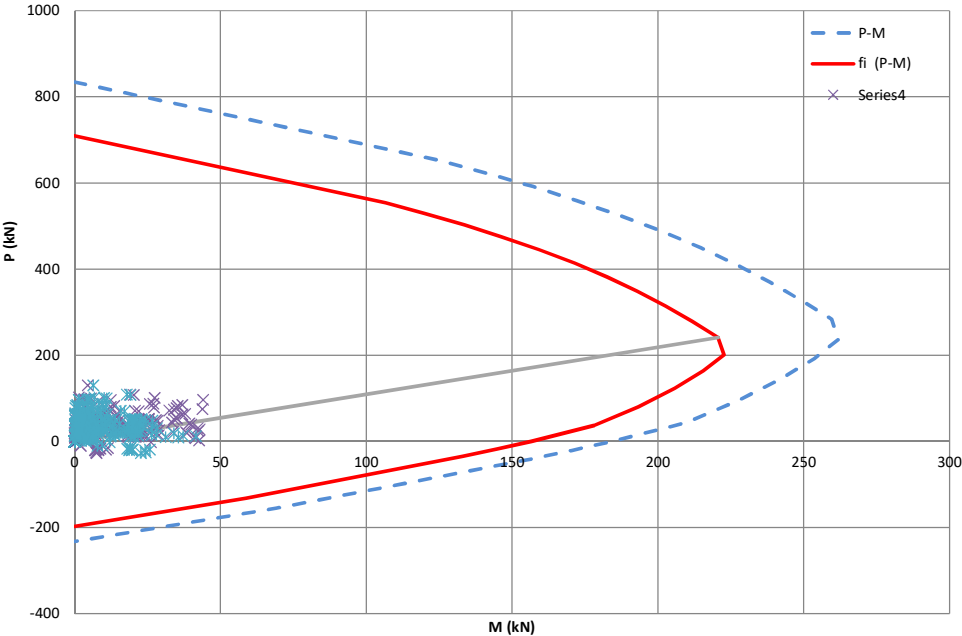
Mu/Vu d : 1.9  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit : 128.3649 mm<sup>2</sup> ≥  
Si

Vm : 85.6 kN  
Vs : 6.9 kN  
Vu = Vn + Vs : 55.5 kN

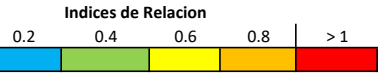
6 Ae √f'm : 233.4  
4 Ae √f'm : 155.6  
OK Refuerzo a Cortante Suficiente

0.2 f'm : 1652.0 kPa  
0.2 f'm ≥ 963 kPa  
OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

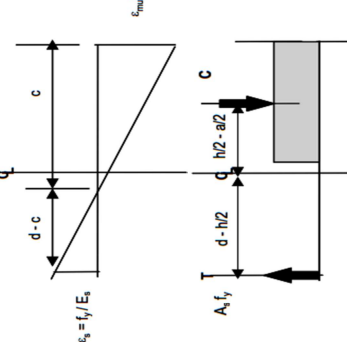


| Resumen         | Relacion |              |
|-----------------|----------|--------------|
| Compr. Axial    | 0.18     | ✓ Pu/ φPn    |
| Axial - Flexion | 0.24     | ✓ Mu/ φMn    |
| Cortante        | 0.43     | ✓ Vu/ Vn max |



Curva Interaccion φ Pn - φ Mn

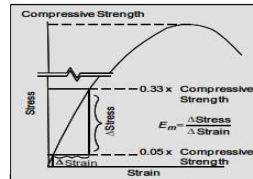
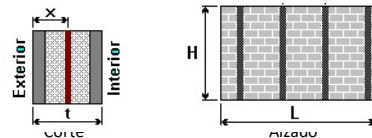
OK ✓



(13-15)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 2250   | 2300   | 2300               | 326250                | Con Refue  | 82.5    |

## Propiedades de Material

| f'm<br>(Mpa) | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | εmu    | εy     | Bloq Compr. | α |      | φ Compr Y Flexo-<br>Compr | φ Cortante |
|--------------|---------|---------|-----|----------|---------|--------|--------|-------------|---|------|---------------------------|------------|
| 8.26         | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32 | 0.85                      | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 6       | 284                     |
| 225.0     | 0       | 0                       |
| 525.0     | 5       | 199                     |
| 825.0     | 5       | 199                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1125.0    | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1425.0    | 5       | 199                     |
| 1725.0    | 5       | 199                     |
| 2025.0    | 6       | 284                     |
| 2175.0    | 6       | 284                     |
| Total     |         | 1648                    |



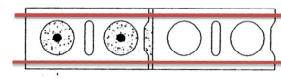
7

| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |  | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 1533    | 1314    |  |            |            | 0   | 0.85 |  | 1117      | 0.0         |
| 2250   | 0.86 | 1800   | 1042   | 0      | 1042    | 894     |  | 235        | 0          | 235 | 0.85 |  | 760       | 199         |
| 2152.9 | 0.86 | 1722   | 997    | -2     | 996     | 854     |  | 263        | -2         | 265 | 0.85 |  | 726       | 225         |
| 2055.9 | 0.86 | 1645   | 953    | -10    | 943     | 808     |  | 288        | -10        | 299 | 0.85 |  | 687       | 254         |
| 1958.8 | 0.86 | 1567   | 908    | -25    | 883     | 757     |  | 310        | -25        | 335 | 0.85 |  | 643       | 285         |
| 1861.8 | 0.86 | 1489   | 863    | -44    | 819     | 702     |  | 328        | -44        | 372 | 0.85 |  | 597       | 316         |
| 1764.7 | 0.86 | 1412   | 818    | -65    | 753     | 645     |  | 343        | -64        | 407 | 0.85 |  | 549       | 346         |
| 1667.6 | 0.86 | 1334   | 773    | -92    | 680     | 583     |  | 354        | -90        | 444 | 0.85 |  | 496       | 377         |
| 1570.6 | 0.86 | 1256   | 728    | -127   | 601     | 515     |  | 361        | -120       | 482 | 0.85 |  | 438       | 409         |
| 1473.5 | 0.86 | 1179   | 683    | -165   | 517     | 444     |  | 366        | -155       | 520 | 0.85 |  | 377       | 442         |
| 1376.5 | 0.86 | 1101   | 638    | -214   | 424     | 364     |  | 366        | -195       | 562 | 0.85 |  | 309       | 478         |
| 1279.4 | 0.86 | 1024   | 593    | -274   | 319     | 274     |  | 364        | -244       | 607 | 0.85 |  | 232       | 516         |
| 1151.5 | 0.86 | 921    | 533    | -326   | 207     | 178     |  | 354        | -277       | 631 | 0.85 |  | 151       | 537         |
| 1023.5 | 0.86 | 819    | 474    | -367   | 107     | 92      |  | 339        | -296       | 635 | 0.85 |  | 78        | 540         |
| 895.6  | 0.86 | 716    | 415    | -393   | 22      | 19      |  | 318        | -304       | 622 | 0.85 |  | 16        | 529         |
| 767.6  | 0.86 | 614    | 356    | -415   | -59     | -51     |  | 291        | -305       | 596 | 0.85 |  | -43       | 507         |
| 639.7  | 0.86 | 512    | 296    | -440   | -144    | -123    |  | 258        | -297       | 555 | 0.85 |  | -105      | 472         |
| 863.1  | 0.86 | 690    | 400    | -400   | 0       | 0       |  | 312        | -306       | 618 | 0.85 |  | 0         | 525.2       |
| 300.0  | 0.86 | 240    | 139    | -573   | -434    | -372    |  | 140        | -233       | 372 | 0.85 |  | -316      | 316         |
| 250.0  | 0.86 | 200    | 116    | -573   | -457    | -392    |  | 119        | -233       | 351 | 0.85 |  | -333      | 299         |
| 78.0   | 0.86 | 62     | 36     | -573   | -537    | -460    |  | 40         | -233       | 272 | 0.85 |  | -391      | 231         |
| 0.0    | 0.86 | 0      | 0      | -692   | -692    | -593    |  | 0          | 0          | 0   | 0.85 |  | -504      | 0           |

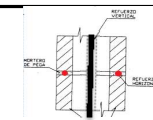
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 6.5                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 33.18                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00047 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 1  
(13-15) E/K (5-8) Piso

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 1314.3 (kN)  
 $\phi Pn$  : 1117.2 (kN)  $\geq$  261.2  
As : 1648 mm<sup>2</sup>  
 $\rho$  : 0.005226

Flexion Pura

b : 145.00 mm  
Ae : 185593 mm<sup>2</sup>  
c : 863.09 mm  
d : 2175 mm  
te : 82 mm  
t : 145 mm  
 $\phi Mn$  : 525.2 kN-m

Punto Balanceado

cb : 1279.4  
 $\phi Mn$  : 516 kN-m  
 $\phi Pn$  : 232.5 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
607  $\geq$  208.79  
Si

$Mu \leq \phi Mn$   
275.5  $\leq$  503.48  
Si

0.1 f'm Ae : 269.5 kN  
0.25 Pb : 68.4 kN

Cortante

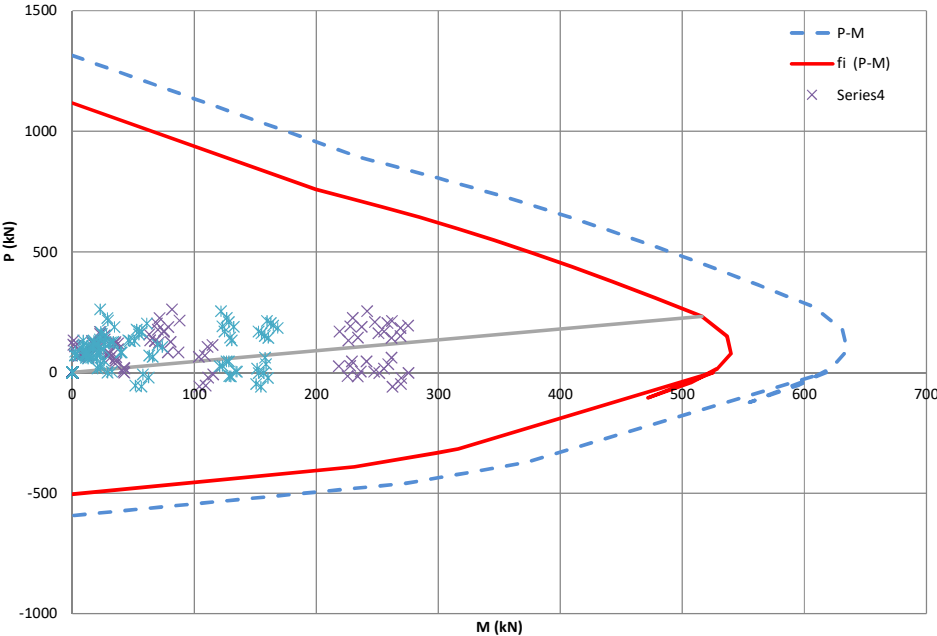
Mu/Vu d : 5.6  
Asv : 33.18 mm<sup>2</sup>  
Vn max permit : 176.0214 mm<sup>2</sup>  $\geq$   
Si

Vm : 117.3 kN  
Vs : 25.3 kN  
Vu = Vn + Vs : 85.6 kN

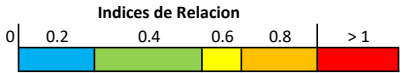
6 AeVf'm : 320.0  
4 AeVf'm : 213.4  
OK Refuerzo a Cortante Suficiente

0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  1417 kPa  
OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

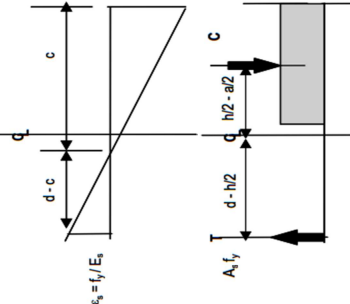


| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.23 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.55 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.49 <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

OK ☒



## EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje

E/K  
(13-15)

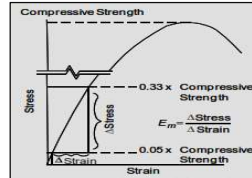
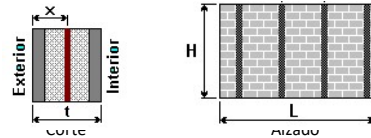
(5-8)

Esp. Patología de la Construcción

(13-15)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 2250   | 2300   | 2300               | 326250                | Con Refue  | 82.5    |

## Propiedades de Material

| f'm (Mpa) | E (Mpa) | G (Mpa) | v   | f_y (Mpa) | E (Mpa) | ε <sub>mu</sub> | ε <sub>y</sub> | Bloq Compr. | α | φ Compr Y Flexo-Compr | φ Cortante |
|-----------|---------|---------|-----|-----------|---------|-----------------|----------------|-------------|---|-----------------------|------------|
| 8.26      | 5782    | 2312.8  | 0.2 | 420       | 200000  | 0.0030          | 0.0021         | 0.85        | 3 | 0.32                  | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 5       | 199                     |
| 225.0     | 0       | 0                       |
| 525.0     | 5       | 199                     |
| 825.0     | 5       | 199                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1125.0    | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1425.0    | 5       | 199                     |
| 1725.0    | 6       | 284                     |
| 2025.0    | 6       | 284                     |
| 2175.0    | 5       | 199                     |
| Total     |         | 1563                    |



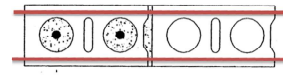
7

| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) | C*x (kN-m) | T*x (kN-m) | Mn  | φ    | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|------------|------------|-----|------|-----------|-------------|
| 2250   | 0.86 | 1800   | 1042   | 0      | 1533    | 1314    | 235        | 0          | 235 | 0.85 | 1117      | 0.0         |
| 2152.9 | 0.86 | 1722   | 997    | -1     | 996     | 854     | 263        | -1         | 264 | 0.85 | 760       | 199         |
| 2055.9 | 0.86 | 1645   | 953    | -7     | 946     | 811     | 288        | -7         | 296 | 0.85 | 726       | 225         |
| 1958.8 | 0.86 | 1567   | 908    | -19    | 889     | 762     | 310        | -19        | 329 | 0.85 | 689       | 251         |
| 1861.8 | 0.86 | 1489   | 863    | -35    | 828     | 710     | 328        | -35        | 363 | 0.85 | 648       | 280         |
| 1764.7 | 0.86 | 1412   | 818    | -53    | 765     | 656     | 343        | -52        | 394 | 0.85 | 603       | 308         |
| 1667.6 | 0.86 | 1334   | 773    | -79    | 694     | 595     | 354        | -75        | 428 | 0.85 | 557       | 335         |
| 1570.6 | 0.86 | 1256   | 728    | -112   | 616     | 528     | 361        | -103       | 464 | 0.85 | 506       | 364         |
| 1473.5 | 0.86 | 1179   | 683    | -150   | 533     | 457     | 366        | -135       | 500 | 0.85 | 449       | 395         |
| 1376.5 | 0.86 | 1101   | 638    | -197   | 441     | 378     | 366        | -172       | 538 | 0.85 | 388       | 425         |
| 1279.4 | 0.86 | 1024   | 593    | -256   | 337     | 289     | 366        | -217       | 580 | 0.85 | 321       | 458         |
| 1151.5 | 0.86 | 921    | 533    | -316   | 217     | 186     | 364        | -255       | 609 | 0.85 | 246       | 493         |
| 1023.5 | 0.86 | 819    | 474    | -366   | 108     | 92      | 354        | -279       | 619 | 0.85 | 246       | 493         |
| 895.6  | 0.86 | 716    | 415    | -393   | 22      | 19      | 339        | -288       | 606 | 0.85 | 158       | 518         |
| 767.6  | 0.86 | 614    | 356    | -415   | -59     | -51     | 318        | -289       | 580 | 0.85 | 79        | 526         |
| 639.7  | 0.86 | 512    | 296    | -440   | -144    | -123    | 291        | -289       | 580 | 0.85 | 16        | 515         |
| 863.1  | 0.86 | 690    | 400    | -400   | 0       | 0       | 258        | -281       | 539 | 0.85 | -43       | 493         |
| 300.0  | 0.86 | 240    | 139    | -573   | -434    | -372    | 258        | -281       | 539 | 0.85 | -105      | 458         |
| 250.0  | 0.86 | 200    | 116    | -573   | -457    | -392    | 312        | -290       | 602 | 0.85 | 0         | 511.5       |
| 78.0   | 0.86 | 62     | 36     | -573   | -537    | -460    | 140        | -217       | 356 | 0.85 | -316      | 303         |
| 0.0    | 0.86 | 0      | 0      | -656   | -656    | -563    | 119        | -217       | 335 | 0.85 | -333      | 285         |
|        |      |        |        |        |         |         | 40         | -217       | 256 | 0.85 | -391      | 218         |
|        |      |        |        |        |         |         | 0          | 0          | 0   | 0.85 | -478      | 0           |

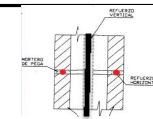
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 5.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 19.64                 |

| eficien. η | ρ <sub>n</sub> |
|------------|----------------|
| 0.35       | 0.00028        |



Planta



Corte

**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje E/K (13-15)  
 2 Piso  
 (5-8)

**Universidad Santo Tomas**  
**Esp. Patología de la Construcción**

**Compresion Axial**

h'/t : 15.9 < 30  
 Re : 0.86  
 Pn : 1314.3 (kN)  
 φPn : 1117.2 (kN) ≥ 184.9  
 Si  
 As : 1563 mm<sup>2</sup>  
 ρ : 0.004956

**Flexion Pura**

b : 145.00 mm  
 Ae : 185593 mm<sup>2</sup>  
 c : 863.09 mm  
 d : 2175 mm  
 te : 82 mm  
 t : 145 mm  
 φ Mn : 511.5 kN-m

**Punto Balanceado**

cb : 1279.4  
 φ Mn : 493 kN-m  
 φPn : 245.6 (kN)  
 Mn : kN-m αMcr  
 580 ≥ 208.79  
 Si

Mu ≤ φ Mn  
 177.3 ≤ 458.45  
 Si

0.1 f'm Ae : 269.5 kN  
 0.25 Pb : 72.2 kN

**Cortante**

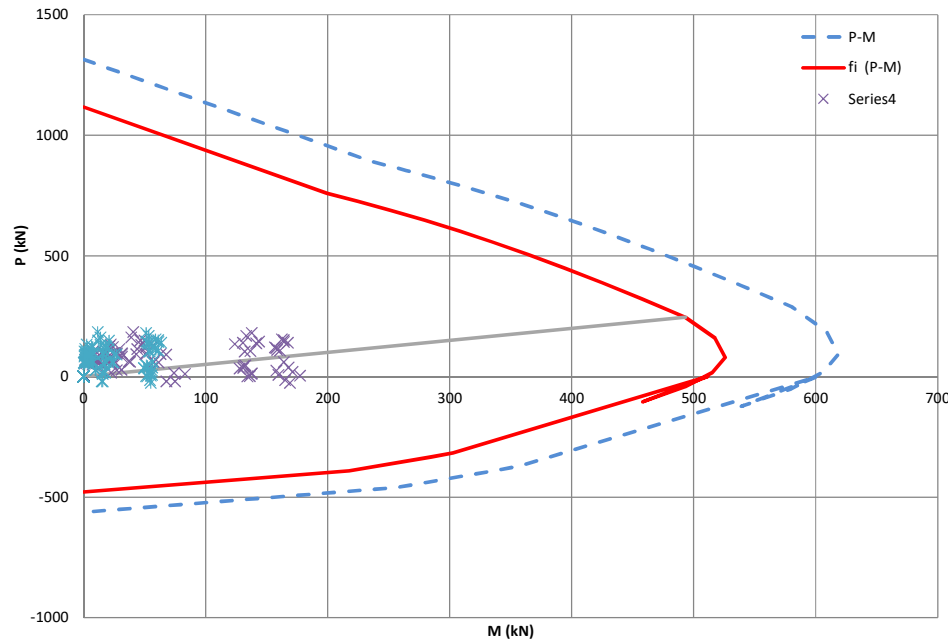
Mu/Vu d : 3.5  
 Asv : 19.64 mm<sup>2</sup>  
 Vn max permit : 176.0214 mm<sup>2</sup> ≥  
 Si

Vm : 117.3 kN  
 Vs : 14.9 kN  
 Vu= Vn+Vs : 79.4 kN

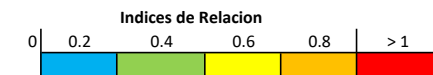
6 AeVf'm : 320.0  
 4 AeVf'm : 213.4  
**OK Refuerzo a Cortante Suficiente**

0.2 f'm : 1652.0 kPa  
 0.2 f'm ≥ 1001 kPa  
**OK No Necesita Elementos de Borde**

**Curva de Interaccion de Mamposteria Reforzada en Arcilla**

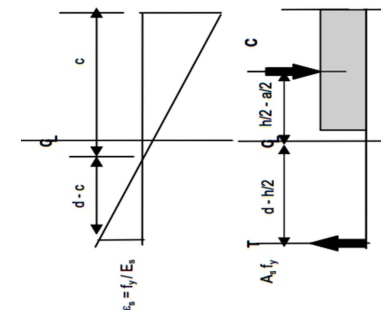


| Resumen         | Relacion          |
|-----------------|-------------------|
| Compr. Axial    | 0.17 ✓ Pu/ φPn    |
| Axial - Flexion | 0.39 ✓ Mu/ φMn    |
| Cortante        | 0.45 ✓ Vu/ Vn max |



**Curva Interaccion φ Pn - φ Mn**

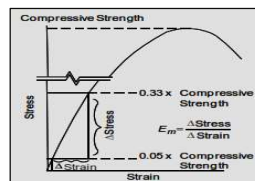
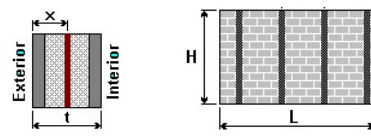
OK ✓



(13-15)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 2250   | 2300   | 2300               | 326250                | Con Refue  | 82.5    |

## Propiedades de Material

| f'm (Mpa) | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | Emu    | Ey     | Bloq Compr. | α | φ Compr Y Flexo-Compr | φ Cortante |
|-----------|---------|---------|-----|----------|---------|--------|--------|-------------|---|-----------------------|------------|
| 8.26      | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32                  | 0.85       |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 225.0     | 0       | 0                       |
| 525.0     | 4       | 129                     |
| 825.0     | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1125.0    | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1425.0    | 4       | 129                     |
| 1725.0    | 5       | 199                     |
| 2025.0    | 5       | 199                     |
| 2175.0    | 5       | 199                     |
| Total     |         | 1113                    |



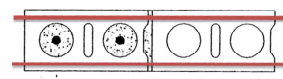
7

| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |                                | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--------------------------------|------------|------------|-----|------|--|-----------|-------------|
| 2250   | 0.86 | 1800   | 1042   | 0      | 1410    | 1209    | Compresion - Controla Acero    | 235        | 0          | 235 | 0.85 |  | 1028      | 0.0         |
| 2152.9 | 0.86 | 1722   | 997    | -1     | 996     | 854     |                                | 263        | -1         | 264 | 0.85 |  | 760       | 199         |
| 2055.9 | 0.86 | 1645   | 953    | -7     | 946     | 811     |                                | 288        | -7         | 296 | 0.85 |  | 726       | 225         |
| 1958.8 | 0.86 | 1567   | 908    | -17    | 890     | 763     |                                | 310        | -17        | 327 | 0.85 |  | 689       | 251         |
| 1861.8 | 0.86 | 1489   | 863    | -31    | 832     | 713     |                                | 328        | -31        | 359 | 0.85 |  | 649       | 278         |
| 1764.7 | 0.86 | 1412   | 818    | -45    | 772     | 662     |                                | 343        | -45        | 388 | 0.85 |  | 606       | 305         |
| 1667.6 | 0.86 | 1334   | 773    | -66    | 707     | 606     |                                | 354        | -64        | 417 | 0.85 |  | 563       | 330         |
| 1570.6 | 0.86 | 1256   | 728    | -92    | 635     | 545     |                                | 361        | -86        | 448 | 0.85 |  | 515       | 355         |
| 1473.5 | 0.86 | 1179   | 683    | -122   | 561     | 481     |                                | 366        | -112       | 478 | 0.85 |  | 463       | 381         |
| 1376.5 | 0.86 | 1101   | 638    | -158   | 479     | 411     |                                | 366        | -142       | 509 | 0.85 |  | 409       | 406         |
| 1279.4 | 0.86 | 1024   | 593    | -204   | 389     | 334     |                                | 366        | -142       | 509 | 0.85 |  | 349       | 432         |
| 1151.5 | 0.86 | 921    | 533    | -245   | 288     | 247     | Flexion - Controla Mamposteria | 364        | -178       | 541 | 0.85 |  | 284       | 460         |
| 1023.5 | 0.86 | 819    | 474    | -279   | 195     | 167     |                                | 354        | -204       | 559 | 0.85 |  | 210       | 475         |
| 895.6  | 0.86 | 716    | 415    | -296   | 118     | 102     |                                | 339        | -221       | 561 | 0.85 |  | 142       | 476         |
| 767.6  | 0.86 | 614    | 356    | -311   | 45      | 39      |                                | 318        | -227       | 545 | 0.85 |  | 86        | 463         |
| 639.7  | 0.86 | 512    | 296    | -327   | -31     | -27     |                                | 291        | -228       | 519 | 0.85 |  | 33        | 441         |
| 690.6  | 0.86 | 553    | 320    | -320   | 0       | 0       |                                | 258        | -223       | 480 | 0.85 |  | -23       | 408         |
| 300.0  | 0.86 | 240    | 139    | -413   | -274    | -235    |                                | 272        | -225       | 496 | 0.85 |  | 0         | 422.0       |
| 250.0  | 0.86 | 200    | 116    | -413   | -297    | -255    |                                | 140        | -181       | 320 | 0.85 |  | -200      | 272         |
| 78.0   | 0.86 | 62     | 36     | -413   | -377    | -323    |                                | 119        | -181       | 299 | 0.85 |  | -217      | 254         |
| 0.0    | 0.86 | 0      | 0      | -467   | -467    | -401    |                                | 40         | -181       | 220 | 0.85 |  | -275      | 187         |
|        |      |        |        |        |         |         |                                | 0          | 0          | 0   | 0.85 |  | -341      | 0           |

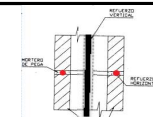
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00018 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 3/4/5 Piso  
E/K (5-8)  
(13-15)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 1209.0 (kN)  
 $\phi Pn$  : 1027.7 (kN)  $\geq$  123.9  
As : 1113 mm<sup>2</sup>  
 $\rho$  : 0.003529

Flexion Pura

b : 145.00 mm  
Ae : 185593 mm<sup>2</sup>  
c : 690.64 mm  
d : 2175 mm  
te : 82 mm  
t : 145 mm  
 $\phi Mn$  : 422.0 kN-m

Punto Balanceado

cb : 1279.4  
 $\phi Mn$  : 460 kN-m  
 $\phi Pn$  : 283.6 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
541  $\geq$  208.79  
Si

Mu  $\leq$   $\phi Mn$   
137.5  $\leq$  348.54  
Si

0.1 f'm Ae : 269.5 kN  
0.25 Pb : 83.4 kN

Cortante

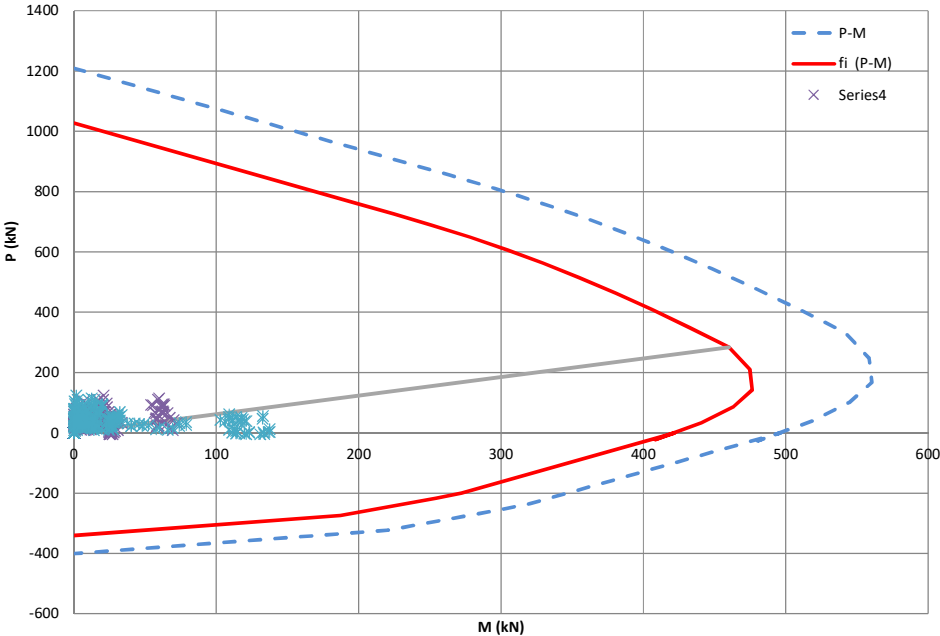
Mu/Vu d : 2.9  
Asv : 12.57 mm<sup>2</sup>  
Vu max permit : 176.0214 mm<sup>2</sup>  $\geq$   
Si

Vm : 117.3 kN  
Vs : 9.6 kN  
Vu = Vm + Vs : 76.1 kN

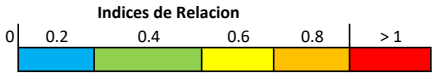
6 AeVf'm : 320.0  
4 AeVf'm : 213.4  
OK Refuerzo a Cortante Suficiente

0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  670 kPa  
OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

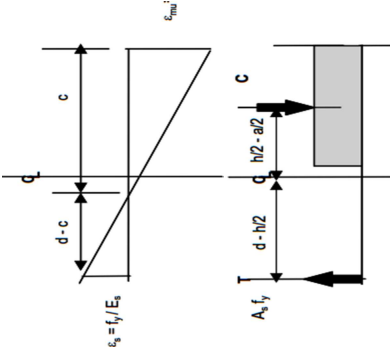


| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.12 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.39 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.43 <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

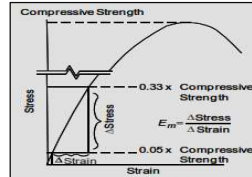
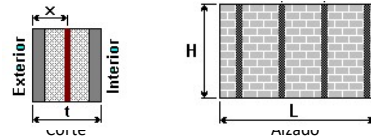
OK ☒



(13-15)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 750    | 2300   | 2300               | 108750                | Con Refue  | 87.5    |

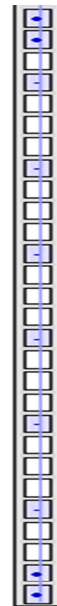
## Propiedades de Material

| f'm<br>(Mpa) | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | εmu    | εγ     | Bloq Compr. | α |      | φ Compr Y Flexo-<br>Compr | φ Cortante |
|--------------|---------|---------|-----|----------|---------|--------|--------|-------------|---|------|---------------------------|------------|
| 8.26         | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32 | 0.85                      | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 5       | 199                     |
| 225.0     | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 375.0     | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 525.0     | 4       | 129                     |
| 675.0     | 5       | 199                     |
| Total     |         | 527                     |

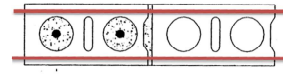


| c     | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |  | C*x (kN-m) | T*x (kN-m) | Mn | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|-------|------|--------|--------|--------|---------|---------|--|------------|------------|----|------|--|-----------|-------------|
|       |      |        |        |        | 542     | 465     |  |            |            | 0  | 0.85 |  | 395       | 0.0         |
| 750   | 0.86 | 600    | 369    | 0      | 369     | 316     |  |            |            | 28 | 0.85 |  | 269       | 24          |
| 714.7 | 0.86 | 572    | 351    | 0      | 351     | 301     |  |            |            | 31 | 0.85 |  | 256       | 27          |
| 679.4 | 0.86 | 544    | 334    | 0      | 334     | 286     |  |            |            | 34 | 0.85 |  | 243       | 29          |
| 644.1 | 0.86 | 515    | 317    | -6     | 311     | 267     |  |            |            | 37 | 0.85 |  | 227       | 33          |
| 608.8 | 0.86 | 487    | 299    | -13    | 286     | 245     |  |            |            | 39 | 0.85 |  | 209       | 37          |
| 573.5 | 0.86 | 459    | 282    | -21    | 261     | 224     |  |            |            | 41 | 0.85 |  | 190       | 40          |
| 538.2 | 0.86 | 431    | 265    | -30    | 234     | 201     |  |            |            | 42 | 0.85 |  | 171       | 44          |
| 502.9 | 0.86 | 402    | 247    | -44    | 203     | 174     |  |            |            | 43 | 0.85 |  | 148       | 47          |
| 467.6 | 0.86 | 374    | 230    | -62    | 167     | 144     |  |            |            | 43 | 0.85 |  | 122       | 51          |
| 432.4 | 0.86 | 346    | 213    | -84    | 129     | 111     |  |            |            | 43 | 0.85 |  | 94        | 56          |
| 397.1 | 0.86 | 318    | 195    | -109   | 87      | 74      |  |            |            | 42 | 0.85 |  | 63        | 60          |
| 357.4 | 0.86 | 286    | 176    | -120   | 56      | 48      |  |            |            | 41 | 0.85 |  | 41        | 61          |
| 317.6 | 0.86 | 254    | 156    | -134   | 22      | 19      |  |            |            | 39 | 0.85 |  | 16        | 61          |
| 300.0 | 0.86 | 240    | 147    | -138   | 10      | 8       |  |            |            | 38 | 0.85 |  | 7         | 60          |
| 280.0 | 0.86 | 224    | 138    | -138   | 0       | 0       |  |            |            | 36 | 0.85 |  | 0         | 59          |
| 280.0 | 0.86 | 224    | 138    | -138   | 0       | 0       |  |            |            | 36 | 0.85 |  | 0         | 59          |
| 280.2 | 0.86 | 224    | 138    | -138   | 0       | 0       |  |            |            | 36 | 0.85 |  | 0         | 59.0        |
| 200.0 | 0.86 | 160    | 98     | -138   | -39     | -34     |  |            |            | 29 | 0.85 |  | -29       | 53          |
| 150.0 | 0.86 | 120    | 74     | -138   | -64     | -55     |  |            |            | 23 | 0.85 |  | -47       | 48          |
| 78.0  | 0.86 | 62     | 38     | -138   | -99     | -85     |  |            |            | 13 | 0.85 |  | -72       | 39          |
| 0.0   | 0.86 | 0      | 0      | -221   | -221    | -190    |  |            |            | 0  | 0.85 |  | -161      | 0           |

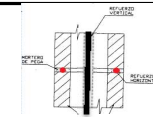
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 6.5                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 33.18                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00044 |



Planta



Corte

**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje  
 (13-15)

1/2 Piso  
 E/K (5-8)

**Universidad Santo Tomas**  
**Esp. Patología de la Construcción**

**Compresion Axial**

h'/t : 15.9 < 30  
 Re : 0.86  
 Pn : 464.9 (kN)  
 φPn : 395.2 (kN) ≥ 123.1  
 Si  
 As : 527 mm<sup>2</sup>  
 ρ : 0.005384

**Flexion Pura**

b : 145.00 mm  
 Ae : 65647 mm<sup>2</sup>  
 c : 280.21 mm  
 d : 675 mm  
 te : 88 mm  
 t : 145 mm  
 φ Mn : 59.0 kN-m

**Punto Balanceado**

cb : 397.1  
 φ Mn : 60 kN-m  
 φPn : 63.2 (kN)  
 Mn : kN-m αMcr  
 71 ≥ 24.62  
 Si

Mu ≤ φ Mn  
 21.3 ≤ 58.47  
 Si

0.1 f'm Ae : 89.8 kN  
 0.25 Pb : 18.6 kN

**Cortante**

Mu/Vu d : 0.6  
 Asv : 33.18 mm<sup>2</sup>  
 Vn max permit : 78.47044 mm<sup>2</sup> ≥

Vm : 0.0 kN  
 Vs : 7.8 kN  
 Vu = Vn + Vs : 4.7 kN

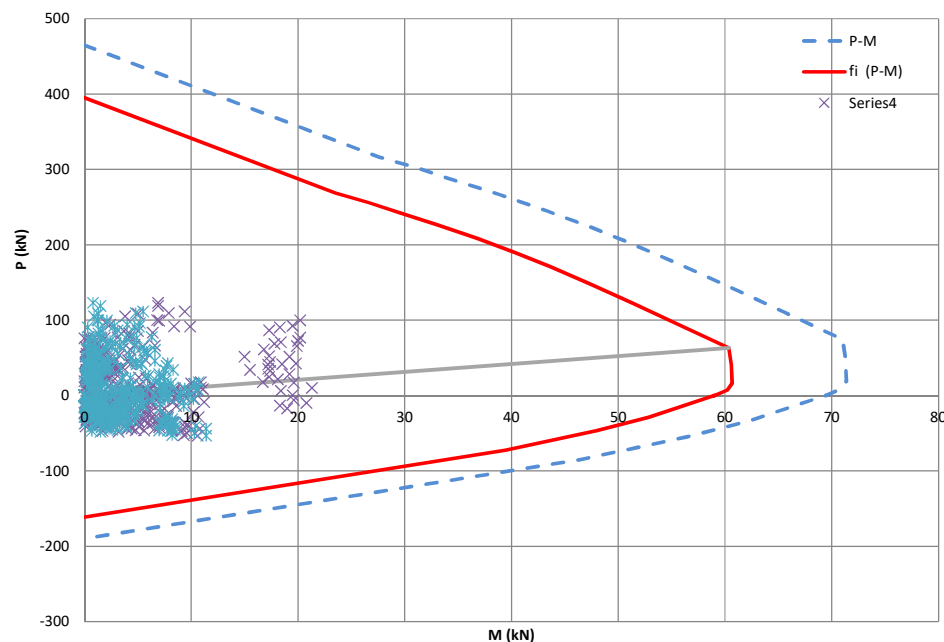
6 Ae√f'm : 113.2  
 4 Ae√f'm : 75.5

**OK Refuerzo a Cortante Suficiente**

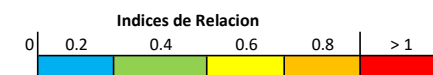
0.2 f'm : 1652.0 kPa  
 0.2 f'm ≥ 1935 kPa

**Si Elementos de Borde**

**Curva de Interaccion de Mamposteria Reforzada en Arcilla**

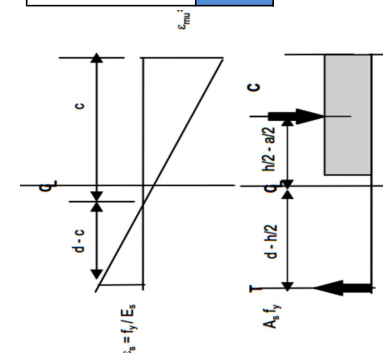


| Resumen         | Relacion          |
|-----------------|-------------------|
| Compr. Axial    | 0.31 ✓ Pu/ φPn    |
| Axial - Flexion | 0.36 ✓ Mu/ φMn    |
| Cortante        | 0.06 ✓ Vu/ Vn max |



**Curva Interaccion φ Pn - φ Mn**

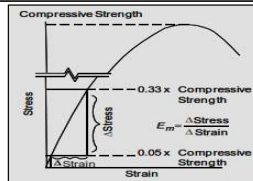
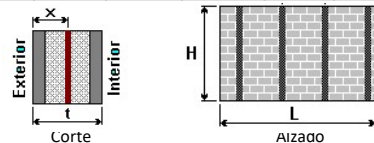
OK ✓



(13-15)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 750    | 2300   | 2300               | 108750                | Con Refue  | 87.5    |

## Propiedades de Material

| f'm (Mpa) | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | Emu    | Ey     | Bloq Compr. | α | φ Compr Y Flexo-Compr | φ Cortante |
|-----------|---------|---------|-----|----------|---------|--------|--------|-------------|---|-----------------------|------------|
| 8.26      | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32                  | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 225.0     | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 375.0     | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 525.0     | 4       | 129                     |
| 675.0     | 4       | 129                     |
| Total     |         | 387                     |



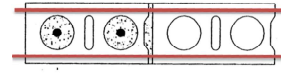
3

| c     | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |  | C*x (kN-m) | T*x (kN-m) | Mn | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|-------|------|--------|--------|--------|---------|---------|--|------------|------------|----|------|--|-----------|-------------|
|       |      |        |        |        | 497     | 426     |  |            |            | 0  | 0.85 |  | 362       | 0.0         |
| 750   | 0.86 | 600    | 369    | 0      | 369     | 316     |  | 28         | 0          | 28 | 0.85 |  | 269       | 24          |
| 714.7 | 0.86 | 572    | 351    | 0      | 351     | 301     |  | 31         | 0          | 31 | 0.85 |  | 256       | 27          |
| 679.4 | 0.86 | 544    | 334    | 0      | 334     | 286     |  | 34         | 0          | 34 | 0.85 |  | 243       | 29          |
| 644.1 | 0.86 | 515    | 317    | -4     | 313     | 268     |  | 37         | -1         | 38 | 0.85 |  | 228       | 33          |
| 608.8 | 0.86 | 487    | 299    | -8     | 291     | 249     |  | 39         | -3         | 42 | 0.85 |  | 212       | 36          |
| 573.5 | 0.86 | 459    | 282    | -14    | 268     | 230     |  | 41         | -4         | 45 | 0.85 |  | 196       | 38          |
| 538.2 | 0.86 | 431    | 265    | -20    | 245     | 210     |  | 42         | -6         | 48 | 0.85 |  | 179       | 41          |
| 502.9 | 0.86 | 402    | 247    | -30    | 217     | 186     |  | 43         | -8         | 51 | 0.85 |  | 158       | 44          |
| 467.6 | 0.86 | 374    | 230    | -44    | 186     | 160     |  | 43         | -12        | 55 | 0.85 |  | 136       | 47          |
| 432.4 | 0.86 | 346    | 213    | -60    | 153     | 131     |  | 43         | -16        | 58 | 0.85 |  | 111       | 50          |
| 397.1 | 0.86 | 318    | 195    | -79    | 116     | 100     |  | 42         | -20        | 62 | 0.85 |  | 85        | 53          |
| 357.4 | 0.86 | 286    | 176    | -90    | 85      | 73      |  | 41         | -22        | 62 | 0.85 |  | 62        | 53          |
| 317.6 | 0.86 | 254    | 156    | -105   | 51      | 44      |  | 39         | -24        | 63 | 0.85 |  | 38        | 53          |
| 300.0 | 0.86 | 240    | 147    | -108   | 39      | 34      |  | 38         | -24        | 62 | 0.85 |  | 29        | 53          |
| 280.0 | 0.86 | 224    | 138    | -108   | 29      | 25      |  | 36         | -24        | 61 | 0.85 |  | 21        | 51          |
| 250.0 | 0.86 | 200    | 123    | -108   | 15      | 12      |  | 34         | -24        | 58 | 0.85 |  | 11        | 49          |
| 220.4 | 0.86 | 176    | 108    | -108   | 0       | 0       |  | 31         | -24        | 55 | 0.85 |  | 0         | 47.1        |
| 200.0 | 0.86 | 160    | 98     | -108   | -10     | -9      |  | 29         | -24        | 53 | 0.85 |  | -7        | 45          |
| 150.0 | 0.86 | 120    | 74     | -108   | -35     | -30     |  | 23         | -24        | 48 | 0.85 |  | -25       | 40          |
| 78.0  | 0.86 | 62     | 38     | -108   | -70     | -60     |  | 13         | -24        | 38 | 0.85 |  | -51       | 32          |
| 0.0   | 0.86 | 0      | 0      | -163   | -163    | -139    |  | 0          | 0          | 0  | 0.85 |  | -118      | 0           |

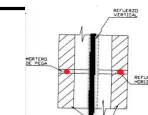
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00017 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 3/4/5 Piso  
(13-15) E/K (5-8)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

$h'/t$  : 15.9 < 30  
 $Re$  : 0.86  
 $P_n$  : 425.8 (kN)  
 $\phi P_n$  : 361.9 (kN)  $\geq$  57.5  
 $As$  : 387 mm<sup>2</sup>  
 $\rho$  : 0.003954

Flexion Pura

$b$  : 145.00 mm  
 $A_e$  : 65647 mm<sup>2</sup>  
 $c$  : 220.41 mm  
 $d$  : 675 mm  
 $te$  : 88 mm  
 $t$  : 145 mm  
 $\phi Mn$  : 47.1 kN-m

Punto Balanceado

$cb$  : 397.1  
 $\phi Mn$  : 53 kN-m  
 $\phi P_n$  : 84.6 (kN)  
 $Mn$  : kN-m  $\alpha M_{cr}$   
62  $\geq$  24.62  
**Si**

$Mu \leq \phi Mn$   
56.9  $\leq$  42.71  
**No Cumple**

0.1  $f'm A_e$  : 89.8 kN  
0.25  $P_b$  : 24.9 kN

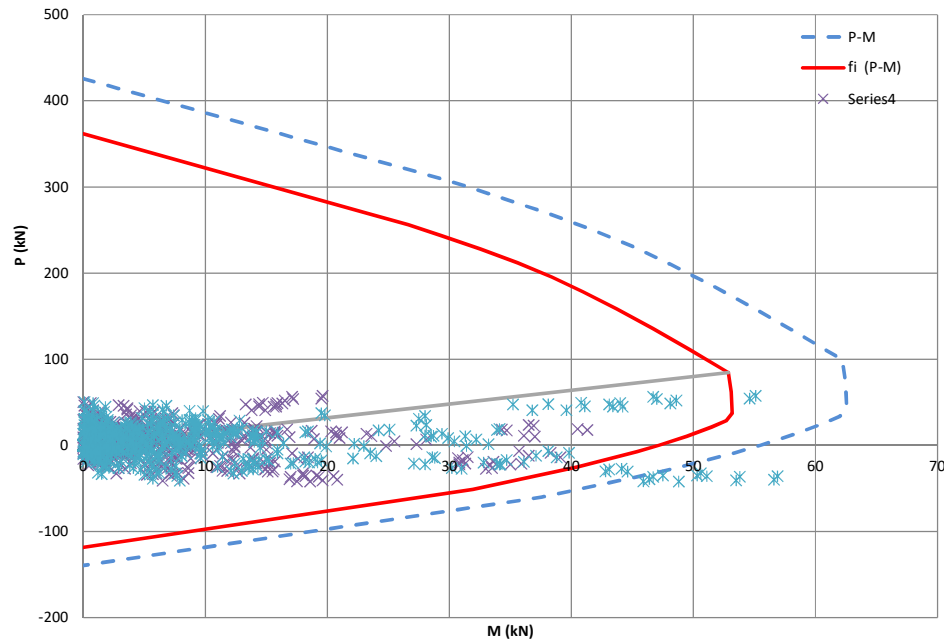
Cortante

$Mu/Vu d$  : 0.5  
 $Asv$  : 12.57 mm<sup>2</sup>  
 $V_n$  max permit : 84.0156 mm<sup>2</sup>  $\geq$   
**Si**  
 $V_m$  : 0.0 kN  
 $V_s$  : 3.0 kN  
 $V_u = V_n + V_s$  : 1.8 kN

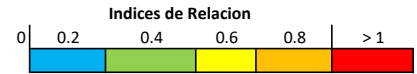
6  $A_e V_f m$  : 113.2  
4  $A_e V_f m$  : 75.5  
**Insuficiente Refuerz. CORTANTE**

0.2  $f'm$  : 1652.0 kPa  
0.2  $f'm \geq$  1045 kPa  
**OK No Necesita Elementos de Borde**

Curva de Interaccion de Mamposteria Reforzada en Arcilla

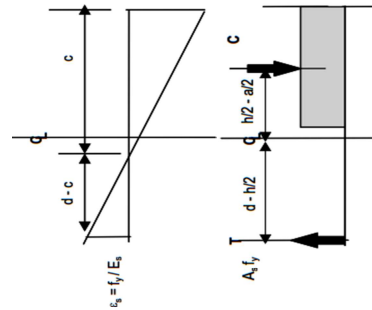


| Resumen         | Relacion |                    |
|-----------------|----------|--------------------|
| Compr. Axial    | 0.16     | ✓ $P_u / \phi P_n$ |
| Axial - Flexion | 1.33     | ✗ $M_u / \phi Mn$  |
| Cortante        | 0.02     | ✓ $V_u / V_n$ max  |



Curva Interaccion  $\phi P_n - \phi Mn$

No Cumple ✗



## EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje

F/J

(1-3)

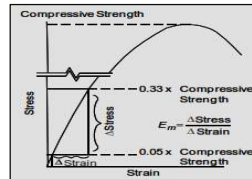
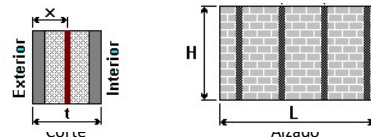
Esp. Patología de la Construcción

(17-19)

(17-19)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 1950   | 2300   | 2300               | 282750                | Con Refue  | 79.4    |

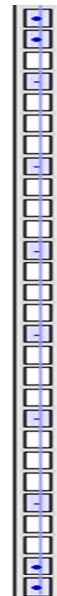
## Propiedades de Material

| f'm<br>(Mpa) | E (Mpa) | G (Mpa) | v   | f <sub>y</sub> (Mpa) | E (Mpa) | ε <sub>mu</sub> | ε <sub>y</sub> | Bloq Compr. | α |      | φ Compr Y Flexo-<br>Compr | φ Cortante |
|--------------|---------|---------|-----|----------------------|---------|-----------------|----------------|-------------|---|------|---------------------------|------------|
| 8.26         | 5782    | 2312.8  | 0.2 | 420                  | 200000  | 0.0030          | 0.0021         | 0.85        | 3 | 0.32 | 0.85                      | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 6       | 284                     |
| 375.0     | 0       | 0                       |
| 525.0     | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 825.0     | 5       | 199                     |
| 975.0     | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1425.0    | 6       | 284                     |
| 1575.0    | 6       | 284                     |
| 1875.0    | 6       | 284                     |
| Total     |         | 1335                    |

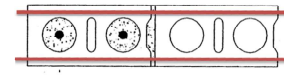


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |  | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 1279    | 1096    |  |            |            | 0   | 0.85 |  | 932       | 0.0         |
| 1950   | 0.86 | 1560   | 869    | 0      | 869     | 745     |  |            |            | 170 | 0.85 |  | 634       | 144         |
| 1865.3 | 0.86 | 1492   | 832    | -1     | 831     | 712     |  |            |            | 190 | -1   |  | 605       | 162         |
| 1780.6 | 0.86 | 1424   | 794    | -9     | 785     | 673     |  |            |            | 209 | -8   |  | 572       | 184         |
| 1695.9 | 0.86 | 1357   | 756    | -18    | 738     | 633     |  |            |            | 224 | -16  |  | 538       | 204         |
| 1611.2 | 0.86 | 1289   | 718    | -28    | 690     | 592     |  |            |            | 237 | -25  |  | 503       | 223         |
| 1526.5 | 0.86 | 1221   | 681    | -44    | 636     | 546     |  |            |            | 248 | -38  |  | 464       | 243         |
| 1441.8 | 0.86 | 1153   | 643    | -67    | 576     | 494     |  |            |            | 256 | -56  |  | 420       | 265         |
| 1357.1 | 0.86 | 1086   | 605    | -101   | 504     | 432     |  |            |            | 261 | -79  |  | 367       | 289         |
| 1272.4 | 0.86 | 1018   | 567    | -142   | 426     | 365     |  |            |            | 264 | -106 |  | 310       | 315         |
| 1187.6 | 0.86 | 950    | 530    | -188   | 341     | 293     |  |            |            | 265 | -137 |  | 249       | 342         |
| 1102.9 | 0.86 | 882    | 492    | -242   | 250     | 214     |  |            |            | 263 | -174 |  | 182       | 371         |
| 992.6  | 0.86 | 794    | 443    | -293   | 149     | 128     |  |            |            | 256 | -201 |  | 109       | 388         |
| 882.4  | 0.86 | 706    | 393    | -343   | 50      | 43      |  |            |            | 245 | -226 |  | 36        | 400         |
| 840.0  | 0.86 | 672    | 375    | -357   | 17      | 15      |  |            |            | 239 | -232 |  | 13        | 401         |
| 830.0  | 0.86 | 664    | 370    | -358   | 12      | 10      |  |            |            | 238 | -233 |  | 9         | 400         |
| 820.0  | 0.86 | 656    | 366    | -359   | 7       | 6       |  |            |            | 237 | -232 |  | 5         | 399         |
| 808.1  | 0.86 | 647    | 360    | -360   | 0       | 0       |  |            |            | 235 | -232 |  | 0         | 397.0       |
| 200.0  | 0.86 | 160    | 89     | -441   | -352    | -302    |  |            |            | 80  | -220 |  | -257      | 255         |
| 150.0  | 0.86 | 120    | 67     | -441   | -375    | -321    |  |            |            | 61  | -220 |  | -273      | 239         |
| 78.0   | 0.86 | 62     | 35     | -441   | -407    | -349    |  |            |            | 33  | -220 |  | -296      | 215         |
| 0.0    | 0.86 | 0      | 0      | -561   | -561    | -481    |  |            |            | 0   | 0    |  | -409      | 0           |

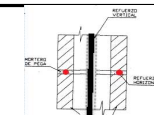
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 6.5                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 33.18                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00049 |



Planta



Corte

Compresion Axial

|             |         |                 |              |
|-------------|---------|-----------------|--------------|
| $h'/t$ :    | 15.9    | <               | 30           |
| Re :        | 0.86    |                 |              |
| Pn :        | 1096.2  | (kN)            | Pu           |
| $\phi Pn$ : | 931.8   | (kN)            | $\geq$ 160.1 |
|             |         |                 | Si           |
| As :        | 1335    | mm <sup>2</sup> |              |
| $\rho$ :    | 0.00491 |                 |              |

Flexion Pura

|             |        |                 |
|-------------|--------|-----------------|
| b :         | 145.00 | mm              |
| Ae :        | 154795 | mm <sup>2</sup> |
| c :         | 808.15 | mm              |
| d :         | 1875   | mm              |
| te :        | 79     | mm              |
| t :         | 145    | mm              |
| $\phi Mn$ : | 397.0  | kN-m            |

Punto Balanceado

|             |        |                 |
|-------------|--------|-----------------|
| cb :        | 1102.9 |                 |
| $\phi Mn$ : | 371    | kN-m            |
| $\phi Pn$ : | 182.0  | (kN)            |
| Mn :        | kN-m   | $\alpha M_{cr}$ |
| 436         | $\geq$ | 150.93          |
|             |        | Si              |

|                     |
|---------------------|
| $Mu \leq \phi Mn$   |
| 197.7 $\leq$ 341.48 |
| Si                  |

|              |       |    |
|--------------|-------|----|
| 0.1 f'm Ae : | 233.6 | kN |
| 0.25 Pb :    | 53.5  | kN |

Cortante

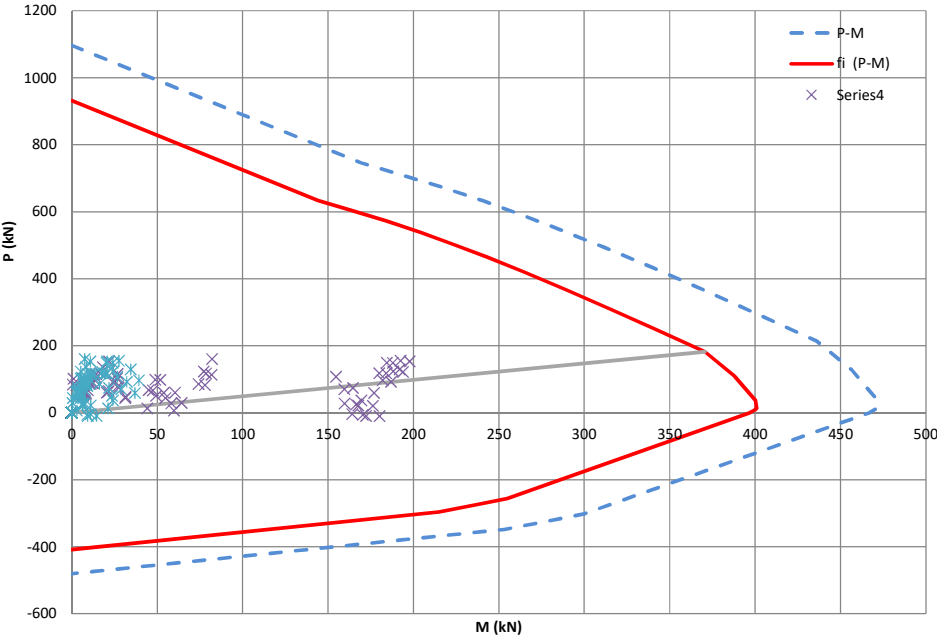
|                 |          |                 |
|-----------------|----------|-----------------|
| Mu/Vu d :       | 2.7      |                 |
| Asv :           | 33.18    | mm <sup>2</sup> |
| Vn max permit : | 146.8118 | mm <sup>2</sup> |
|                 | $\geq$   | Si              |

|             |      |    |
|-------------|------|----|
| Vm :        | 97.9 | kN |
| Vs :        | 21.8 | kN |
| Vu= Vn+Vs : | 71.8 | kN |

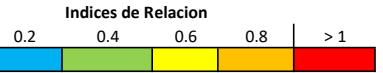
|                                |       |  |
|--------------------------------|-------|--|
| 6 AeVf'm :                     | 266.9 |  |
| 4 AeVf'm :                     | 178.0 |  |
| Insuficiente Refuerz. CORTANTE |       |  |

|                                   |        |     |
|-----------------------------------|--------|-----|
| 0.2 f'm :                         | 1652.0 | kPa |
| 0.2 f'm $\geq$                    | 1051   | kPa |
| OK No Necesita Elementos de Borde |        |     |

Curva de Interaccion de Mamposteria Reforzada en Arcilla

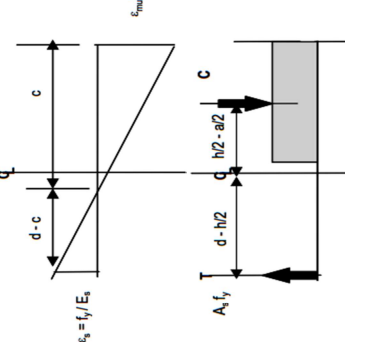


| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.17 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.58 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.49 <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

|                                        |
|----------------------------------------|
| OK <input checked="" type="checkbox"/> |
|----------------------------------------|



## EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje

F/J

(1-3)

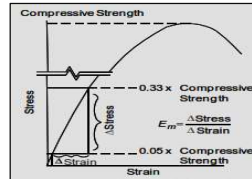
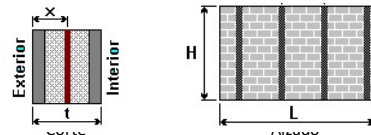
Esp. Patología de la Construcción

(17-19)

(17-19)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 1950   | 2300   | 2300               | 282750                | Con Refue  | 79.4    |

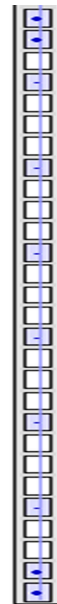
## Propiedades de Material

| f'm (Mpa) | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | Emu    | Ey     | Bloq Compr. | α | φ Compr Y Flexo-Compr | φ Cortante |
|-----------|---------|---------|-----|----------|---------|--------|--------|-------------|---|-----------------------|------------|
| 8.26      | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32                  | 0.85       |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 6       | 284                     |
| 375.0     | 0       | 0                       |
| 525.0     | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 825.0     | 5       | 199                     |
| 975.0     | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1425.0    | 6       | 284                     |
| 1575.0    | 6       | 284                     |
| 1875.0    | 5       | 199                     |
| Total     |         | 1250                    |

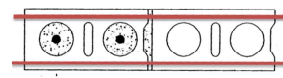


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |  | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |      | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--|------------|------------|-----|------|------|-----------|-------------|
|        |      |        |        |        | 1279    | 1096    |  |            |            | 0   | 0.85 |      | 932       | 0.0         |
| 1950   | 0.86 | 1560   | 869    | 0      | 869     | 745     |  |            |            | 170 | 0    | 0.85 | 634       | 144         |
| 1865.3 | 0.86 | 1492   | 832    | -1     | 831     | 713     |  |            |            | 190 | -1   | 0.85 | 606       | 162         |
| 1780.6 | 0.86 | 1424   | 794    | -6     | 788     | 675     |  |            |            | 209 | -6   | 0.85 | 574       | 182         |
| 1695.9 | 0.86 | 1357   | 756    | -13    | 744     | 637     |  |            |            | 224 | -11  | 0.85 | 542       | 200         |
| 1611.2 | 0.86 | 1289   | 718    | -20    | 699     | 599     |  |            |            | 237 | -18  | 0.85 | 509       | 217         |
| 1526.5 | 0.86 | 1221   | 681    | -33    | 648     | 556     |  |            |            | 248 | -28  | 0.85 | 472       | 234         |
| 1441.8 | 0.86 | 1153   | 643    | -52    | 591     | 507     |  |            |            | 256 | -42  | 0.85 | 431       | 253         |
| 1357.1 | 0.86 | 1086   | 605    | -81    | 524     | 449     |  |            |            | 261 | -61  | 0.85 | 382       | 274         |
| 1272.4 | 0.86 | 1018   | 567    | -118   | 450     | 386     |  |            |            | 264 | -84  | 0.85 | 328       | 296         |
| 1187.6 | 0.86 | 950    | 530    | -159   | 371     | 318     |  |            |            | 265 | -111 | 0.85 | 270       | 319         |
| 1102.9 | 0.86 | 882    | 492    | -206   | 286     | 245     |  |            |            | 263 | -141 | 0.85 | 208       | 343         |
| 992.6  | 0.86 | 794    | 443    | -258   | 185     | 158     |  |            |            | 256 | -169 | 0.85 | 135       | 361         |
| 882.4  | 0.86 | 706    | 393    | -308   | 86      | 74      |  |            |            | 245 | -194 | 0.85 | 62        | 373         |
| 800.0  | 0.86 | 640    | 357    | -326   | 31      | 26      |  |            |            | 234 | -200 | 0.85 | 22        | 369         |
| 770.0  | 0.86 | 616    | 343    | -331   | 13      | 11      |  |            |            | 229 | -199 | 0.85 | 9         | 364         |
| 750.0  | 0.86 | 600    | 334    | -334   | 0       | 0       |  |            |            | 226 | -199 | 0.85 | 0         | 361         |
| 749.5  | 0.86 | 600    | 334    | -334   | 0       | 0       |  |            |            | 226 | -199 | 0.85 | 0         | 360.7       |
| 200.0  | 0.86 | 160    | 89     | -406   | -317    | -271    |  |            |            | 80  | -188 | 0.85 | -231      | 228         |
| 150.0  | 0.86 | 120    | 67     | -406   | -339    | -291    |  |            |            | 61  | -188 | 0.85 | -247      | 212         |
| 78.0   | 0.86 | 62     | 35     | -406   | -371    | -318    |  |            |            | 33  | -188 | 0.85 | -270      | 188         |
| 0.0    | 0.86 | 0      | 0      | -525   | -525    | -450    |  |            |            | 0   | 0    | 0.85 | -383      | 0           |

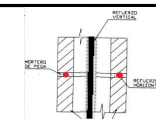
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 5.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 19.64                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00029 |



Planta



Corte

Compresion Axial

$h'/t$  : 15.9 < 30  
 $Re$  : 0.86  
 $P_n$  : 1096.2 (kN)  
 $\phi P_n$  : 931.8 (kN)  $\geq$  116.6  
 $As$  : 1250 mm<sup>2</sup>  
 $\rho$  : 0.004598

Flexion Pura

$b$  : 145.00 mm  
 $A_e$  : 154795 mm<sup>2</sup>  
 $c$  : 749.48 mm  
 $d$  : 1875 mm  
 $t_e$  : 79 mm  
 $t$  : 145 mm  
 $\phi M_n$  : 360.7 kN-m

Punto Balanceado

$cb$  : 1102.9  
 $\phi M_n$  : 343 kN-m  
 $\phi P_n$  : 208.1 (kN)  
 $M_n$  : kN-m  $\alpha M_{cr}$   
404  $\geq$  150.93  
**Si**

$M_u \leq \phi M_n$   
197.1  $\leq$  310.23  
**Si**

0.1  $f'_m A_e$  : 233.6 kN  
0.25  $P_b$  : 61.2 kN

Cortante

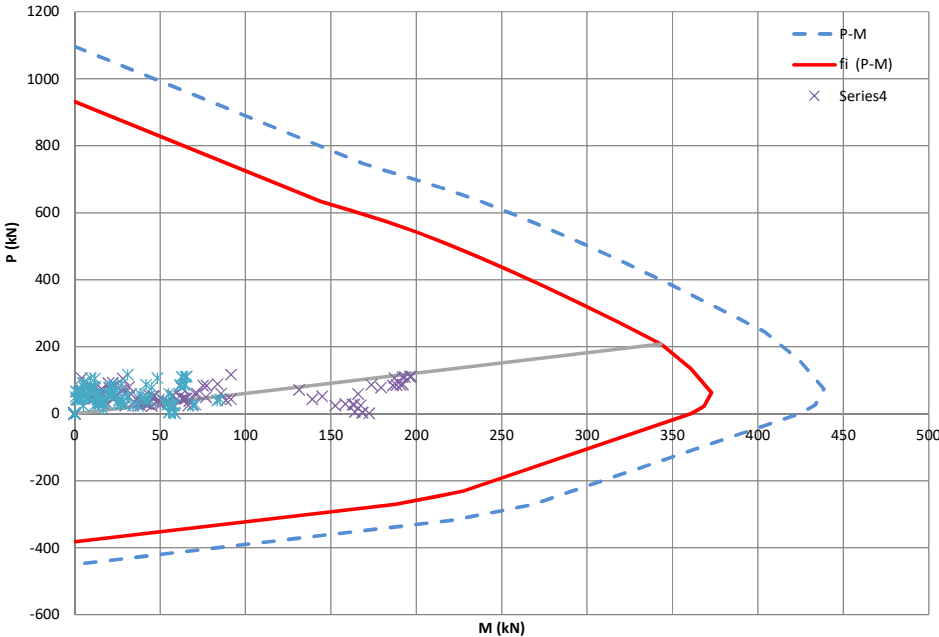
$M_u/V_u d$  : 1.8  
 $As_v$  : 19.64 mm<sup>2</sup>  
 $V_n$  max permit : 146.8118 mm<sup>2</sup>  $\geq$

$V_m$  : 97.9 kN  
 $V_s$  : 12.9 kN  
 $V_u = V_n + V_s$  : 66.5 kN

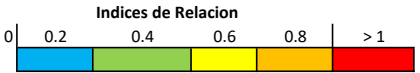
6  $A_e V_f' m$  : 266.9  
4  $A_e V_f' m$  : 178.0  
**Insuficiente Refuerz. CORTANTE**

0.2  $f'_m$  : 1652.0 kPa  
0.2  $f'_m \geq$  773 kPa  
**OK No Necesita Elementos de Borde**

Curva de Interaccion de Mamposteria Reforzada en Arcilla

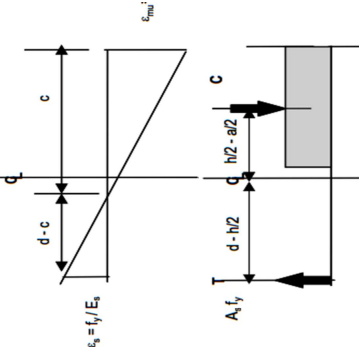


| Resumen         | Relacion                                                  |
|-----------------|-----------------------------------------------------------|
| Compr. Axial    | 0.13 <input checked="" type="checkbox"/> $P_u / \phi P_n$ |
| Axial - Flexion | 0.64 <input checked="" type="checkbox"/> $M_u / \phi M_n$ |
| Cortante        | 0.45 <input checked="" type="checkbox"/> $V_u / V_n$ max  |



Curva Interaccion  $\phi P_n - \phi M_n$

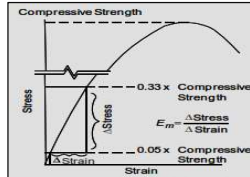
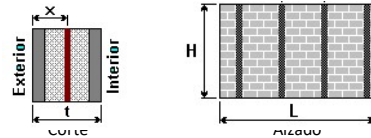
OK ☒



(17-19)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 1950   | 2300   | 2300               | 282750                | Con Refue  | 79.4    |

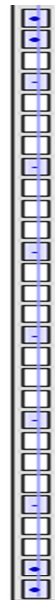
## Propiedades de Material

| f'm (Mpa) | E (Mpa) | G (Mpa) | v   | f <sub>y</sub> (Mpa) | E (Mpa) | ε <sub>mu</sub> | ε <sub>y</sub> | Bloq Compr. | α |      | φ Compr Y Flexo-Compr | φ Cortante |
|-----------|---------|---------|-----|----------------------|---------|-----------------|----------------|-------------|---|------|-----------------------|------------|
| 8.26      | 5782    | 2312.8  | 0.2 | 420                  | 200000  | 0.0030          | 0.0021         | 0.85        | 3 | 0.32 | 0.85                  | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 5       | 199                     |
| 375.0     | 0       | 0                       |
| 525.0     | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 825.0     | 5       | 199                     |
| 975.0     | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1425.0    | 5       | 199                     |
| 1575.0    | 5       | 199                     |
| 1875.0    | 4       | 129                     |
|           | Total   | 925                     |

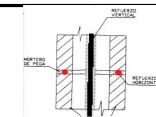
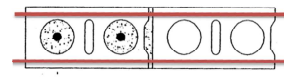


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |  | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |     | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--|------------|------------|-----|------|-----|-----------|-------------|
|        |      |        |        |        | 1175    | 1007    |  |            |            | 0   | 0.85 |     | 856       | 0.0         |
| 1950   | 0.86 | 1560   | 869    | 0      | 869     | 745     |  |            |            | 170 | 0.85 |     | 634       | 144         |
| 1865.3 | 0.86 | 1492   | 832    | 0      | 831     | 713     |  |            |            | 190 | 0.85 |     | 606       | 162         |
| 1780.6 | 0.86 | 1424   | 794    | -4     | 790     | 677     |  |            |            | 209 | -4   | 212 | 576       | 180         |
| 1695.9 | 0.86 | 1357   | 756    | -8     | 748     | 641     |  |            |            | 224 | -7   | 232 | 545       | 197         |
| 1611.2 | 0.86 | 1289   | 718    | -13    | 706     | 605     |  |            |            | 237 | -11  | 249 | 514       | 212         |
| 1526.5 | 0.86 | 1221   | 681    | -21    | 659     | 565     |  |            |            | 248 | -18  | 266 | 480       | 226         |
| 1441.8 | 0.86 | 1153   | 643    | -34    | 609     | 522     |  |            |            | 256 | -28  | 284 | 443       | 241         |
| 1357.1 | 0.86 | 1086   | 605    | -55    | 550     | 472     |  |            |            | 261 | -41  | 302 | 401       | 257         |
| 1272.4 | 0.86 | 1018   | 567    | -79    | 488     | 418     |  |            |            | 264 | -56  | 321 | 356       | 273         |
| 1187.6 | 0.86 | 950    | 530    | -108   | 422     | 362     |  |            |            | 265 | -74  | 339 | 307       | 288         |
| 1102.9 | 0.86 | 882    | 492    | -140   | 352     | 301     |  |            |            | 263 | -95  | 358 | 256       | 304         |
| 992.6  | 0.86 | 794    | 443    | -176   | 266     | 228     |  |            |            | 256 | -114 | 370 | 194       | 314         |
| 882.4  | 0.86 | 706    | 393    | -211   | 182     | 156     |  |            |            | 245 | -132 | 377 | 133       | 320         |
| 800.0  | 0.86 | 640    | 357    | -225   | 132     | 113     |  |            |            | 234 | -136 | 370 | 96        | 314         |
| 770.0  | 0.86 | 616    | 343    | -230   | 113     | 97      |  |            |            | 229 | -135 | 364 | 83        | 310         |
| 750.0  | 0.86 | 600    | 334    | -233   | 101     | 87      |  |            |            | 226 | -135 | 360 | 74        | 306         |
| 598.0  | 0.86 | 478    | 267    | -267   | 0       | 0       |  |            |            | 196 | -130 | 326 | 0         | 277.0       |
| 200.0  | 0.86 | 160    | 89     | -305   | -216    | -185    |  |            |            | 80  | -124 | 204 | -157      | 173         |
| 150.0  | 0.86 | 120    | 67     | -305   | -238    | -204    |  |            |            | 61  | -124 | 185 | -173      | 157         |
| 78.0   | 0.86 | 62     | 35     | -305   | -270    | -232    |  |            |            | 33  | -124 | 157 | -197      | 133         |
| 0.0    | 0.86 | 0      | 0      | -389   | -388    | -333    |  |            |            | 0   | 0    | 0   | -283      | 0           |

| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρ <sub>n</sub> |
|------------|----------------|
| 0.35       | 0.00018        |



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 3/4/5  
2 Piso  
(1-3)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 1007.5 (kN)  
φPn : 856.3 (kN) ≥ 85.8  
As : 925 mm<sup>2</sup>  
ρ : 0.003402

Flexion Pura

b : 145.00 mm  
Ae : 154795 mm<sup>2</sup>  
c : 598.04 mm  
d : 1875 mm  
te : 79 mm  
t : 145 mm  
φ Mn : 277.0 kN-m

Punto Balanceado

cb : 1102.9  
φ Mn : 304 kN-m  
φPn : 256.2 (kN)  
Mn : kN-m αMcr  
358 ≥ 150.93  
Si

Mu ≤ φ Mn  
124.9 ≤ 243.87  
Si

0.1 f'm Ae : 233.6 kN  
0.25 Pb : 75.4 kN

Cortante

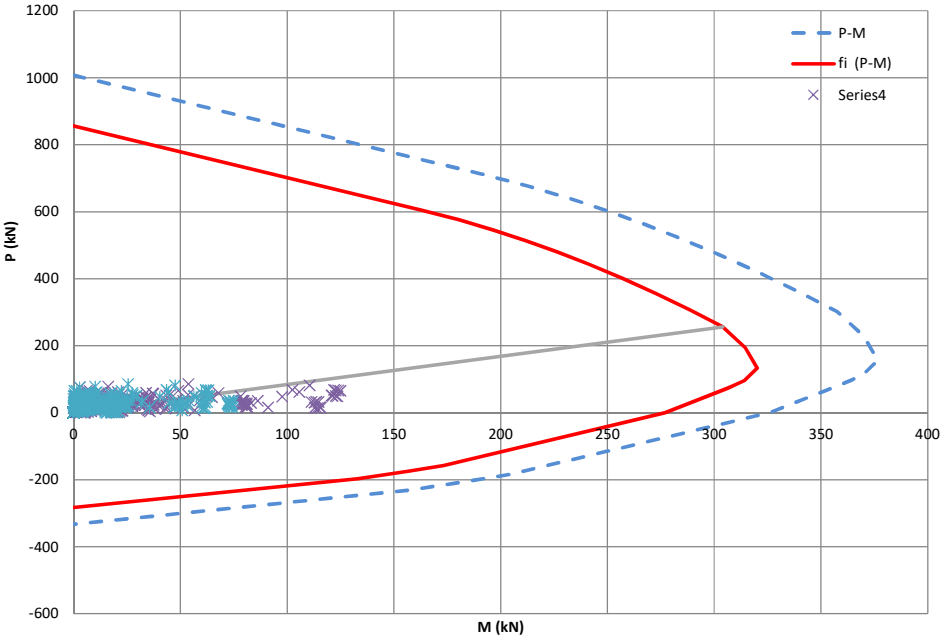
Mu/Vu d : 1.6  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit : 146.8118 mm<sup>2</sup> ≥  
Si

Vm : 97.9 kN  
Vs : 8.2 kN  
Vu = Vn + Vs : 63.7 kN

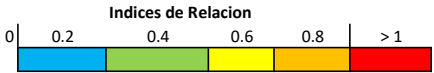
6 Ae √f'm : 266.9  
4 Ae √f'm : 178.0  
Insuficiente Refuerz. CORTANTE

0.2 f'm : 1652.0 kPa  
0.2 f'm ≥ 565 kPa  
OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

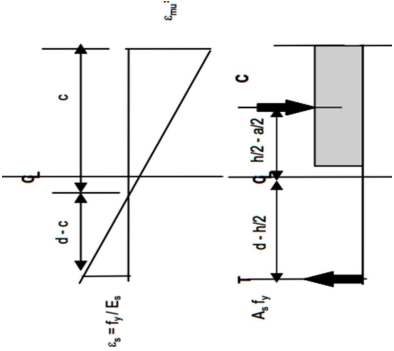


| Resumen         | Relacion          |
|-----------------|-------------------|
| Compr. Axial    | 0.10 ✓ Pu/ φPn    |
| Axial - Flexion | 0.51 ✓ Mu/ φMn    |
| Cortante        | 0.43 ✓ Vu/ Vn max |



Curva Interaccion φ Pn - φ Mn

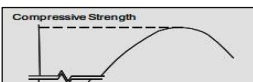
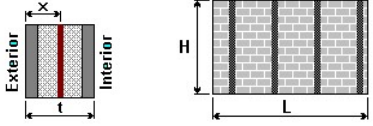
OK ✓



**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje 1/2/3/4/5 Piso G/I (4-5) (15-16)

**Universidad Santo Tomas**  
**Esp. Patología de la Construcción**

| (15-16)                                                                                                                                                                                                                                                                                                                        |            |                  |                         |               |                    |                                                                                                                                                                                                                                                                                                                                            |        | <table><tr><th colspan="6">Propiedades de Geometría Muro</th></tr><tr><th>X (mm)</th><th>L (mm)</th><th>H (mm)</th><th>h' (mm)<br/>(H-e_colaca)</th><th>Ag (mm2)</th><th>Groutig en<br/>(mm)</th></tr><tr><td>75</td><td>300</td><td>2300</td><td>2300</td><td>43500</td><td>Con Refu</td></tr></table> |   |      |  |                         |        | Propiedades de Geometría Muro |                   |               |                    |              |         | X (mm)  | L (mm) | H (mm)    | h' (mm)<br>(H-e_colaca) | Ag (mm2)                                                                                                                                                   | Groutig en<br>(mm) | 75          | 300 | 2300 | 2300 | 43500        | Con Refu |        |     |     |        |                           |            |      |     |      |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------|-------------------------|---------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------|--|-------------------------|--------|-------------------------------|-------------------|---------------|--------------------|--------------|---------|---------|--------|-----------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------|-----|------|------|--------------|----------|--------|-----|-----|--------|---------------------------|------------|------|-----|------|--|
| Propiedades de Geometría Muro                                                                                                                                                                                                                                                                                                  |            |                  |                         |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                                                                                                                                                                                                                                                         |   |      |  |                         |        |                               |                   |               |                    |              |         |         |        |           |                         |                                                                                                                                                            |                    |             |     |      |      |              |          |        |     |     |        |                           |            |      |     |      |  |
| X (mm)                                                                                                                                                                                                                                                                                                                         | L (mm)     | H (mm)           | h' (mm)<br>(H-e_colaca) | Ag (mm2)      | Groutig en<br>(mm) |                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                                                                                                                                                                                                                                                         |   |      |  |                         |        |                               |                   |               |                    |              |         |         |        |           |                         |                                                                                                                                                            |                    |             |     |      |      |              |          |        |     |     |        |                           |            |      |     |      |  |
| 75                                                                                                                                                                                                                                                                                                                             | 300        | 2300             | 2300                    | 43500         | Con Refu           |                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                                                                                                                                                                                                                                                         |   |      |  |                         |        |                               |                   |               |                    |              |         |         |        |           |                         |                                                                                                                                                            |                    |             |     |      |      |              |          |        |     |     |        |                           |            |      |     |      |  |
| <table><tr><th colspan="6">Propiedades de Geometría Ladrillo</th></tr><tr><th>a (mm)<br/>largo</th><th>t (mm)</th><th>Area<br/>Vacíos x</th><th>esp Pared<br/>(mm)</th><th>Area<br/>Bruta</th><th>Area Neta<br/>(mm2)</th></tr><tr><td>300</td><td>145</td><td>5674.0</td><td>30</td><td>43500</td><td>30452</td></tr></table> |            |                  |                         |               |                    | Propiedades de Geometría Ladrillo                                                                                                                                                                                                                                                                                                                                                                                            |        |                                                                                                                                                                                                                                                                                                         |   |      |  | a (mm)<br>largo         | t (mm) | Area<br>Vacíos x              | esp Pared<br>(mm) | Area<br>Bruta | Area Neta<br>(mm2) | 300          | 145     | 5674.0  | 30     | 43500     | 30452                   | <table><tr><th colspan="6">Prop. Diseño</th></tr><tr><th>φ Compr Y Flexo-<br/>Compr</th><th>φ Cortante</th></tr><tr><td>0.85</td><td>0.6</td></tr></table> |                    |             |     |      |      | Prop. Diseño |          |        |     |     |        | φ Compr Y Flexo-<br>Compr | φ Cortante | 0.85 | 0.6 |      |  |
| Propiedades de Geometría Ladrillo                                                                                                                                                                                                                                                                                              |            |                  |                         |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                                                                                                                                                                                                                                                         |   |      |  |                         |        |                               |                   |               |                    |              |         |         |        |           |                         |                                                                                                                                                            |                    |             |     |      |      |              |          |        |     |     |        |                           |            |      |     |      |  |
| a (mm)<br>largo                                                                                                                                                                                                                                                                                                                | t (mm)     | Area<br>Vacíos x | esp Pared<br>(mm)       | Area<br>Bruta | Area Neta<br>(mm2) |                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                                                                                                                                                                                                                                                         |   |      |  |                         |        |                               |                   |               |                    |              |         |         |        |           |                         |                                                                                                                                                            |                    |             |     |      |      |              |          |        |     |     |        |                           |            |      |     |      |  |
| 300                                                                                                                                                                                                                                                                                                                            | 145        | 5674.0           | 30                      | 43500         | 30452              |                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                                                                                                                                                                                                                                                         |   |      |  |                         |        |                               |                   |               |                    |              |         |         |        |           |                         |                                                                                                                                                            |                    |             |     |      |      |              |          |        |     |     |        |                           |            |      |     |      |  |
| Prop. Diseño                                                                                                                                                                                                                                                                                                                   |            |                  |                         |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                                                                                                                                                                                                                                                         |   |      |  |                         |        |                               |                   |               |                    |              |         |         |        |           |                         |                                                                                                                                                            |                    |             |     |      |      |              |          |        |     |     |        |                           |            |      |     |      |  |
| φ Compr Y Flexo-<br>Compr                                                                                                                                                                                                                                                                                                      | φ Cortante |                  |                         |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                                                                                                                                                                                                                                                         |   |      |  |                         |        |                               |                   |               |                    |              |         |         |        |           |                         |                                                                                                                                                            |                    |             |     |      |      |              |          |        |     |     |        |                           |            |      |     |      |  |
| 0.85                                                                                                                                                                                                                                                                                                                           | 0.6        |                  |                         |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                                                                                                                                                                                                                                                         |   |      |  |                         |        |                               |                   |               |                    |              |         |         |        |           |                         |                                                                                                                                                            |                    |             |     |      |      |              |          |        |     |     |        |                           |            |      |     |      |  |
|                                                                                                                                                                                                                                               |            |                  |                         |               |                    | <table><tr><th colspan="6">Propiedades de Material</th></tr><tr><th>f'm<br/>(Mpa)</th><th>E (Mpa)</th><th>G (Mpa)</th><th>v</th><th>f_y (Mpa)</th><th>E (Mpa)</th><th>ε_mu</th><th>ε_γ</th><th>Bloq Compr.</th><th>α</th><th></th><th></th></tr><tr><td>8.26</td><td>5782</td><td>2312.8</td><td>0.2</td><td>420</td><td>200000</td><td>0.0030</td><td>0.0021</td><td>0.85</td><td>3</td><td>0.32</td><td></td></tr></table> |        |                                                                                                                                                                                                                                                                                                         |   |      |  | Propiedades de Material |        |                               |                   |               |                    | f'm<br>(Mpa) | E (Mpa) | G (Mpa) | v      | f_y (Mpa) | E (Mpa)                 | ε_mu                                                                                                                                                       | ε_γ                | Bloq Compr. | α   |      |      | 8.26         | 5782     | 2312.8 | 0.2 | 420 | 200000 | 0.0030                    | 0.0021     | 0.85 | 3   | 0.32 |  |
| Propiedades de Material                                                                                                                                                                                                                                                                                                        |            |                  |                         |               |                    |                                                                                                                                                                                                                                                                                                                                                                                                                              |        |                                                                                                                                                                                                                                                                                                         |   |      |  |                         |        |                               |                   |               |                    |              |         |         |        |           |                         |                                                                                                                                                            |                    |             |     |      |      |              |          |        |     |     |        |                           |            |      |     |      |  |
| f'm<br>(Mpa)                                                                                                                                                                                                                                                                                                                   | E (Mpa)    | G (Mpa)          | v                       | f_y (Mpa)     | E (Mpa)            | ε_mu                                                                                                                                                                                                                                                                                                                                                                                                                         | ε_γ    | Bloq Compr.                                                                                                                                                                                                                                                                                             | α |      |  |                         |        |                               |                   |               |                    |              |         |         |        |           |                         |                                                                                                                                                            |                    |             |     |      |      |              |          |        |     |     |        |                           |            |      |     |      |  |
| 8.26                                                                                                                                                                                                                                                                                                                           | 5782       | 2312.8           | 0.2                     | 420           | 200000             | 0.0030                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.0021 | 0.85                                                                                                                                                                                                                                                                                                    | 3 | 0.32 |  |                         |        |                               |                   |               |                    |              |         |         |        |           |                         |                                                                                                                                                            |                    |             |     |      |      |              |          |        |     |     |        |                           |            |      |     |      |  |

Distribucion de Refuerzo ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm2) | c     | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) | C*x (kN-m) | T*x (kN-m) | Mn | φ    | φ Pn (kN) | φ Mn (kN-m) |
|-----------|---------|------------|-------|------|--------|--------|--------|---------|---------|------------|------------|----|------|-----------|-------------|
| 75.0      | 4       | 129        | 300   | 0.86 | 240    | 173    | 0      | 239     | 205     | 5          | 0          | 5  | 0.85 | 174       | 0.0         |
| 0.0       | 0       | 0          | 283.2 | 0.86 | 227    | 163    | 0      | 163     | 140     | 6          | 0          | 6  | 0.85 | 126       | 4           |
| 0.0       | 0       | 0          | 266.5 | 0.86 | 213    | 154    | 0      | 154     | 132     | 7          | 0          | 7  | 0.85 | 119       | 5           |
| 0.0       | 0       | 0          | 249.7 | 0.86 | 200    | 144    | 0      | 144     | 123     | 7          | 0          | 7  | 0.85 | 112       | 6           |
| 0.0       | 0       | 0          | 232.9 | 0.86 | 186    | 134    | 0      | 134     | 115     | 8          | 0          | 8  | 0.85 | 105       | 6           |
| 0.0       | 0       | 0          | 216.2 | 0.86 | 173    | 125    | -2     | 123     | 105     | 8          | 0          | 8  | 0.85 | 98        | 6           |
| 0.0       | 0       | 0          | 199.4 | 0.86 | 160    | 115    | -5     | 110     | 94      | 8          | 0          | 8  | 0.85 | 90        | 7           |
| 0.0       | 0       | 0          | 182.6 | 0.86 | 146    | 105    | -10    | 95      | 82      | 8          | -1         | 9  | 0.85 | 80        | 7           |
| 0.0       | 0       | 0          | 165.9 | 0.86 | 133    | 96     | -15    | 80      | 69      | 8          | -1         | 9  | 0.85 | 70        | 8           |
| 0.0       | 0       | 0          | 149.1 | 0.86 | 119    | 86     | -22    | 64      | 55      | 8          | -2         | 9  | 0.85 | 59        | 8           |
| 150.0     | 0       | 0          | 132.4 | 0.86 | 106    | 76     | -30    | 46      | 40      | 7          | -2         | 10 | 0.85 | 47        | 8           |
| 0.0       | 0       | 0          | 119.1 | 0.86 | 95     | 69     | -30    | 39      | 33      | 7          | -2         | 9  | 0.85 | 34        | 8           |
| 0.0       | 0       | 0          | 105.9 | 0.86 | 85     | 61     | -30    | 31      | 27      | 7          | -2         | 9  | 0.85 | 28        | 8           |
| 0.0       | 0       | 0          | 92.6  | 0.86 | 74     | 53     | -30    | 24      | 20      | 6          | -2         | 8  | 0.85 | 23        | 7           |
| 0.0       | 0       | 0          | 79.4  | 0.86 | 64     | 46     | -30    | 16      | 14      | 5          | -2         | 8  | 0.85 | 17        | 7           |
| 0.0       | 0       | 0          | 66.2  | 0.86 | 53     | 38     | -40    | -2      | -2      | 5          | -1         | 6  | 0.85 | 12        | 7           |
| 0.0       | 0       | 0          | 67.2  | 0.86 | 54     | 39     | -39    | 0       | 0       | 5          | -2         | 6  | 0.85 | -1        | 5           |
| 0.0       | 0       | 0          | 50.0  | 0.86 | 40     | 29     | -69    | -40     | -34     | 4          | 1          | 3  | 0.85 | 0         | 5.4         |
| 0.0       | 0       | 0          | 40.0  | 0.86 | 32     | 23     | -84    | -61     | -52     | 3          | 2          | 1  | 0.85 | -29       | 3           |
| 0.0       | 0       | 0          | 30.0  | 0.86 | 24     | 17     | -84    | -67     | -57     | 2          | 2          | 1  | 0.85 | -44       | 1           |
| 225.0     | 3       | 71         | 0.0   | 0.86 | 0      | 0      | -84    | -84     | -72     | 0          | 0          | 0  | 0.85 | -49       | 0           |
| Total     |         | 200        |       |      |        |        |        |         |         |            |            |    |      | -61       | 0           |

| Diam Ref Horiz (mm) | Separac ref Horiz (mm) | As (mm2) | eficien. η | ρn      | Planta |  | Corte |  |
|---------------------|------------------------|----------|------------|---------|--------|--|-------|--|
| 4.0                 | 600                    | 12.57    | 0.35       | 0.00014 |        |  |       |  |

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 1/2/3/4/5 Piso  
G/I (4-5)  
(15-16)

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Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 205.0 (kN)  
φPn : 174.2 (kN) ≥ 46.8  
As : 200 mm<sup>2</sup>  
ρ : 0.00613

Flexion Pura

b : 145.00 mm  
Ae : 30798 mm<sup>2</sup>  
c : 67.23 mm  
d : 225 mm  
te : 103 mm  
t : 145 mm  
φ Mn : 5.4 kN-m

Punto Balanceado

cb : 132.4  
φ Mn : 8 kN-m  
φPn : 33.9 (kN)  
Mn : kN-m αMcr  
10 ≥ 4.62  
Si

Mu ≤ φ Mn  
25.4 ≤ 9.06  
No Cumple

0.1 f'm Ae : 35.9 kN  
0.25 Pb : 10.0 kN

Cortante

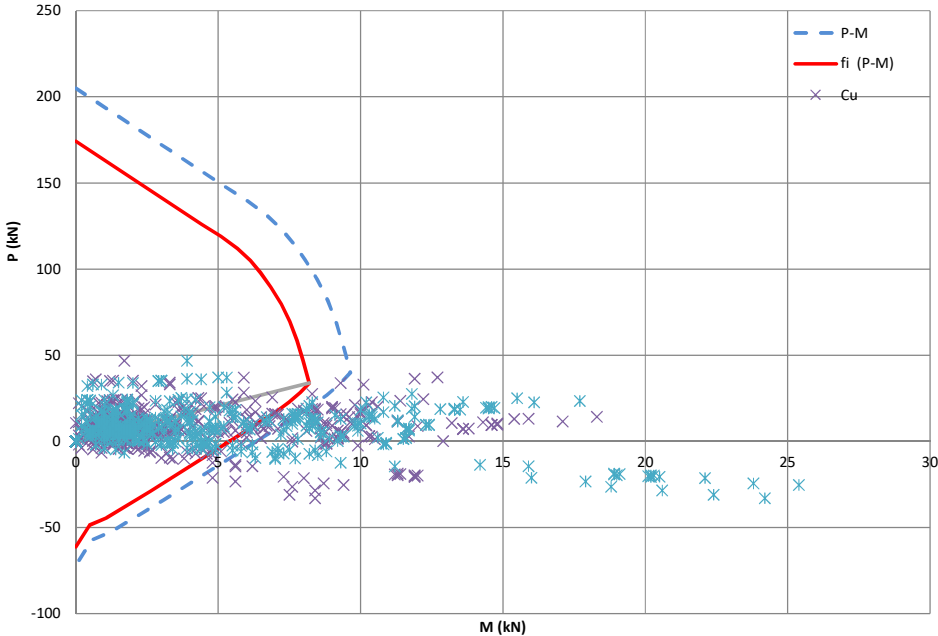
Mu/Vu d : 1.8  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit : 29.20966 mm<sup>2</sup> ≥  
Si

Vm : 19.5 kN  
Vs : 1.0 kN  
Vu = Vn + Vs : 12.3 kN

6 Ae √f'm : 53.1  
4 Ae √f'm : 35.4  
Insuficiente Refuerz. CORTANTE

0.2 f'm : 1652.0 kPa  
0.2 f'm ≥ 5744 kPa  
Si Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

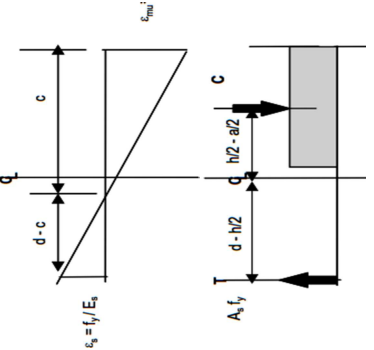


| Resumen         | Relacion          |
|-----------------|-------------------|
| Compr. Axial    | 0.27 ✓ Pu/ φPn    |
| Axial - Flexion | 2.80 ✗ Mu/ φMn    |
| Cortante        | 0.42 ✓ Vu/ Vn max |



Curva Interaccion φ Pn - φ Mn

No Cumple ✗



**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje

1/2/3/4/5

Piso

G/I

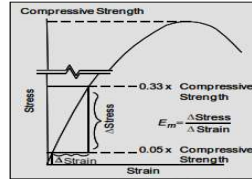
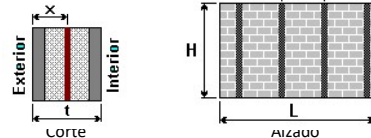
(5-6)

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(14-15)

**Propiedades de Geometría Ladrillo**

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



**Propiedades de Geometría Muro**

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 900    | 2300   | 2300               | 130500                | Con Refue  | 83.7    |

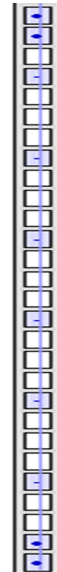
**Propiedades de Material**

| f'm (Mpa) | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | Emu    | Ey     | Bloq Compr. | α | φ Compr Y Flexo-Compr | φ Cortante |
|-----------|---------|---------|-----|----------|---------|--------|--------|-------------|---|-----------------------|------------|
| 8.26      | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32                  | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 450.0     | 4       | 129                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 825.0     | 4       | 129                     |
| Total     |         | 387                     |

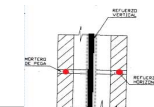
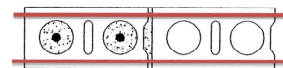


| c     | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |    | C*x (kN-m) | T*x (kN-m) | Mn | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|-------|------|--------|--------|--------|---------|---------|----|------------|------------|----|------|--|-----------|-------------|
|       |      |        |        |        | 551     | 473     |    |            |            | 0  | 0.85 |  | 402       | 0.0         |
| 900   | 0.86 | 720    | 423    | 0      | 423     | 363     |    |            |            | 38 | 0.85 |  | 309       | 32          |
| 858.5 | 0.86 | 687    | 404    | 0      | 404     | 346     |    |            |            | 43 | 0.85 |  | 294       | 37          |
| 817.1 | 0.86 | 654    | 384    | -1     | 384     | 329     |    |            |            | 47 | 0.85 |  | 280       | 40          |
| 775.6 | 0.86 | 620    | 365    | -5     | 360     | 309     |    |            |            | 51 | -2   |  | 262       | 45          |
| 734.1 | 0.86 | 587    | 345    | -10    | 336     | 288     |    |            |            | 54 | -4   |  | 245       | 49          |
| 692.6 | 0.86 | 554    | 326    | -15    | 311     | 267     |    |            |            | 56 | -6   |  | 227       | 53          |
| 651.2 | 0.86 | 521    | 306    | -21    | 286     | 245     |    |            |            | 58 | -8   |  | 208       | 56          |
| 609.7 | 0.86 | 488    | 287    | -27    | 259     | 222     |    |            |            | 59 | -10  |  | 189       | 59          |
| 568.2 | 0.86 | 455    | 267    | -35    | 232     | 199     |    |            |            | 60 | -13  |  | 169       | 62          |
| 526.8 | 0.86 | 421    | 248    | -44    | 204     | 175     |    |            |            | 59 | -16  |  | 149       | 64          |
| 485.3 | 0.86 | 388    | 228    | -54    | 174     | 149     | FB | 58         | -20        | 79 | 0.85 |  | 127       | 67          |
| 436.8 | 0.86 | 349    | 205    | -57    | 149     | 128     |    | 57         | -20        | 77 | 0.85 |  | 109       | 65          |
| 388.2 | 0.86 | 311    | 183    | -66    | 116     | 100     |    | 54         | -20        | 74 | 0.85 |  | 85        | 63          |
| 339.7 | 0.86 | 272    | 160    | -79    | 80      | 69      |    | 50         | -20        | 71 | 0.85 |  | 59        | 60          |
| 291.2 | 0.86 | 233    | 137    | -96    | 41      | 35      |    | 46         | -20        | 66 | 0.85 |  | 30        | 56          |
| 242.6 | 0.86 | 194    | 114    | -108   | 6       | 5       |    | 40         | -20        | 61 | 0.85 |  | 4         | 52          |
| 230.4 | 0.86 | 184    | 108    | -108   | 0       | 0       |    | 39         | -20        | 59 | 0.85 |  | 0         | 50.2        |
| 50.0  | 0.86 | 40     | 24     | -147   | -124    | -106    |    | 10         | -6         | 16 | 0.85 |  | -90       | 14          |
| 40.0  | 0.86 | 32     | 19     | -163   | -144    | -123    |    | 8          | 0          | 8  | 0.85 |  | -105      | 7           |
| 30.0  | 0.86 | 24     | 14     | -163   | -148    | -127    |    | 6          | 0          | 6  | 0.85 |  | -108      | 5           |
| 0.0   | 0.86 | 0      | 0      | -163   | -163    | -139    |    | 0          | 0          | 0  | 0.85 |  | -118      | 0           |

| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00018 |



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje G/I (14-15)  
1/2/3/4/5 Piso (5-6)

Universidad Santo Tomas  
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Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 472.6 (kN)  
 $\phi Pn$  : 401.7 (kN)  $\geq$  125.1  
As : 387 mm<sup>2</sup>  
 $\rho$  : 0.003235

Flexion Pura

b : 145.00 mm  
Ae : 75372 mm<sup>2</sup>  
c : 230.36 mm  
d : 825 mm  
te : 84 mm  
t : 145 mm  
 $\phi Mn$  : 50.2 kN-m

Punto Balanceado

cb : 485.3  
 $\phi Mn$  : 67 kN-m  
 $\phi Pn$  : 126.9 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
79  $\geq$  33.92  
Si

$Mu \leq \phi Mn$   
61.0  $\leq$  66.51  
Si

0.1 f' m Ae : 107.8 kN  
0.25 Pb : 37.3 kN

Cortante

Mu/Vu d : 1.5  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit : 71.48485 mm<sup>2</sup>  $\geq$   
Si

Vm : 47.7 kN  
Vs : 3.6 kN  
Vu = Vn + Vs : 30.8 kN

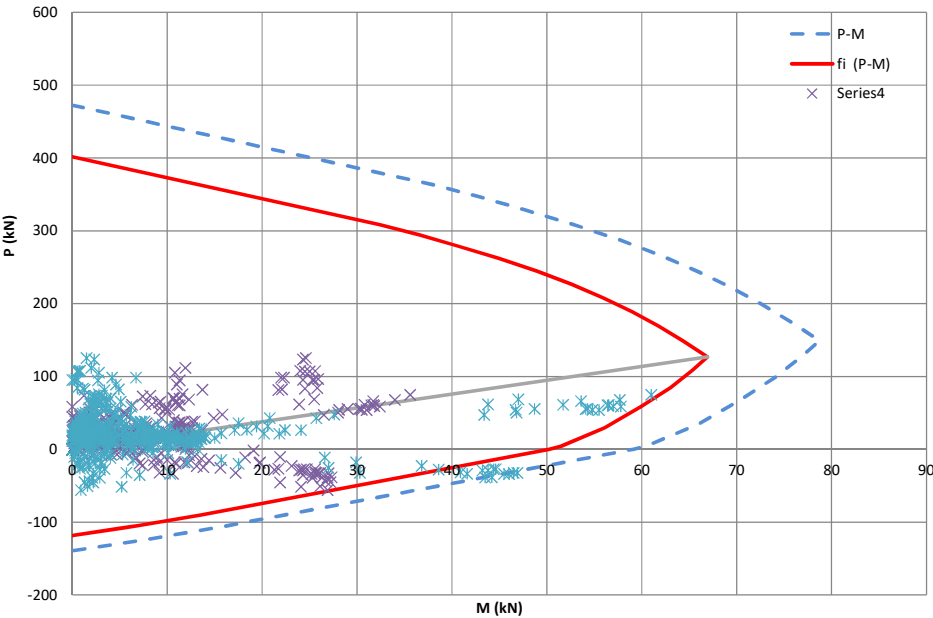
6 Ae V' f' m : 130.0  
4 Ae V' f' m : 86.6

Insuficiente Refuerz. CORTANTE

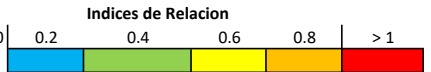
0.2 f' m : 1652.0 kPa  
0.2 f' m  $\geq$  1767 kPa

Si Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

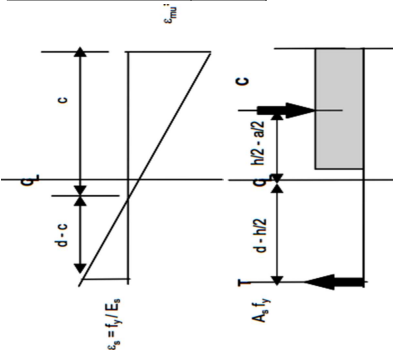


| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.31 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.92 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.43 <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

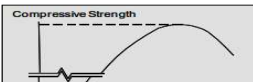
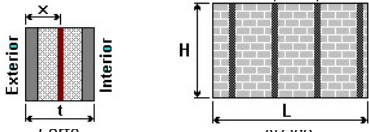
No Cumple ☒

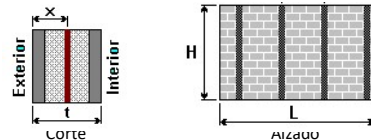
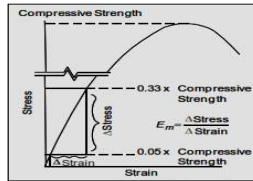


**TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8**  
**EVALUACIÓN DE LA ESTRUCTURA EXISTENTE**

Muro : Eje 1/2/3/4/5 Piso G/I (7-8) (12-13)

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**Esp. Patología de la Construcción**

|                                                                                   |         |          |           |          |           |                                                                                    |        |                                      |              |          |                       |                     |  |  |  |
|-----------------------------------------------------------------------------------|---------|----------|-----------|----------|-----------|------------------------------------------------------------------------------------|--------|--------------------------------------|--------------|----------|-----------------------|---------------------|--|--|--|
| <b>(12-13)</b>                                                                    |         |          |           |          |           |  |        | <b>Propiedades de Geometría Muro</b> |              |          |                       |                     |  |  |  |
| a (mm)                                                                            | t       | Area     | esp Pared | Area     | Area Neta | X (mm)                                                                             | L (mm) | H (mm)                               | h' (mm)      | Ag (mm2) | Groutig en            | te (mm)             |  |  |  |
| largo                                                                             | (mm)    | Vacios x | (mm)      | Bruta    | (mm2)     |                                                                                    |        |                                      | (H-e Polaca) |          |                       |                     |  |  |  |
| 300                                                                               | 145     | 5674.0   | 30        | 43500    | 30452     | 75                                                                                 | 600    | 2300                                 | 2300         | 87000    | Con Refu              | 83.7                |  |  |  |
|  |         |          |           |          |           | <b>Propiedades de Material</b>                                                     |        |                                      |              |          |                       | <b>Prop. Diseño</b> |  |  |  |
| f'm (Mpa)                                                                         | E (Mpa) | G (Mpa)  | v         | fy (Mpa) | E (Mpa)   | εmu                                                                                | εy     | Bloq Compr.                          | α            |          | φ Compr Y Flexo-Compr | φ Cortante          |  |  |  |
| 8.26                                                                              | 5782    | 2312.8   | 0.2       | 420      | 200000    | 0.0030                                                                             | 0.0021 | 0.85                                 | 3            | 0.32     | 0.85                  | 0.6                 |  |  |  |



Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm2) |
|-----------|---------|------------|
| 75.0      | 3       | 71         |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 300.0     | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 525.0     | 4       | 129        |
|           | Total   | 200        |

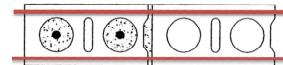


| c     | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |  | C*x (kN-m) | T*x (kN-m) | Mn | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|-------|------|--------|--------|--------|---------|---------|--|------------|------------|----|------|--|-----------|-------------|
|       |      |        |        |        | 348     | 299     |  |            |            | 0  | 0.85 |  | 254       | 0.0         |
| 600   | 0.86 | 480    | 282    | 0      | 282     | 242     |  | 17         | 0          | 17 | 0.85 |  | 206       | 14          |
| 570.9 | 0.86 | 457    | 269    | 0      | 269     | 230     |  | 19         | 0          | 19 | 0.85 |  | 196       | 16          |
| 541.8 | 0.86 | 433    | 255    | 0      | 255     | 218     |  | 21         | 0          | 21 | 0.85 |  | 186       | 18          |
| 512.6 | 0.86 | 410    | 241    | -2     | 239     | 205     |  | 23         | 0          | 23 | 0.85 |  | 174       | 20          |
| 483.5 | 0.86 | 387    | 227    | -7     | 221     | 189     |  | 24         | -1         | 26 | 0.85 |  | 161       | 22          |
| 454.4 | 0.86 | 364    | 214    | -12    | 202     | 173     |  | 25         | -3         | 28 | 0.85 |  | 147       | 24          |
| 425.3 | 0.86 | 340    | 200    | -18    | 182     | 156     |  | 26         | -4         | 30 | 0.85 |  | 133       | 26          |
| 396.2 | 0.86 | 317    | 186    | -25    | 161     | 138     |  | 26         | -6         | 32 | 0.85 |  | 117       | 27          |
| 367.1 | 0.86 | 294    | 173    | -33    | 139     | 119     |  | 26         | -7         | 34 | 0.85 |  | 102       | 29          |
| 337.9 | 0.86 | 270    | 159    | -43    | 116     | 100     |  | 26         | -10        | 36 | 0.85 |  | 85        | 30          |
| 308.8 | 0.86 | 247    | 145    | -54    | 91      | 78      |  | 26         | -12        | 38 | 0.85 |  | 66        | 32          |
| 277.9 | 0.86 | 222    | 131    | -54    | 77      | 66      |  | 25         | -12        | 37 | 0.85 |  | 56        | 31          |
| 247.1 | 0.86 | 198    | 116    | -54    | 62      | 53      |  | 23         | -12        | 36 | 0.85 |  | 45        | 30          |
| 216.2 | 0.86 | 173    | 102    | -54    | 48      | 41      |  | 22         | -12        | 34 | 0.85 |  | 35        | 29          |
| 185.3 | 0.86 | 148    | 87     | -54    | 33      | 28      |  | 20         | -12        | 32 | 0.85 |  | 24        | 27          |
| 154.4 | 0.86 | 124    | 73     | -54    | 18      | 16      |  | 17         | -12        | 29 | 0.85 |  | 13        | 25          |
| 115.2 | 0.86 | 92     | 54     | -54    | 0       | 0       |  | 14         | -12        | 26 | 0.85 |  | 0         | 22.1        |
| 50.0  | 0.86 | 40     | 24     | -75    | -52     | -45     |  | 7          | -7         | 14 | 0.85 |  | -38       | 12          |
| 40.0  | 0.86 | 32     | 19     | -84    | -65     | -56     |  | 5          | -5         | 11 | 0.85 |  | -48       | 9           |
| 30.0  | 0.86 | 24     | 14     | -84    | -70     | -60     |  | 4          | -5         | 10 | 0.85 |  | -51       | 8           |
| 0.0   | 0.86 | 0      | 0      | -84    | -84     | -72     |  | 0          | 0          | 0  | 0.85 |  | -61       | 0           |

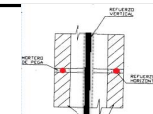
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm2) |
|----------|
| 12.57    |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00018 |

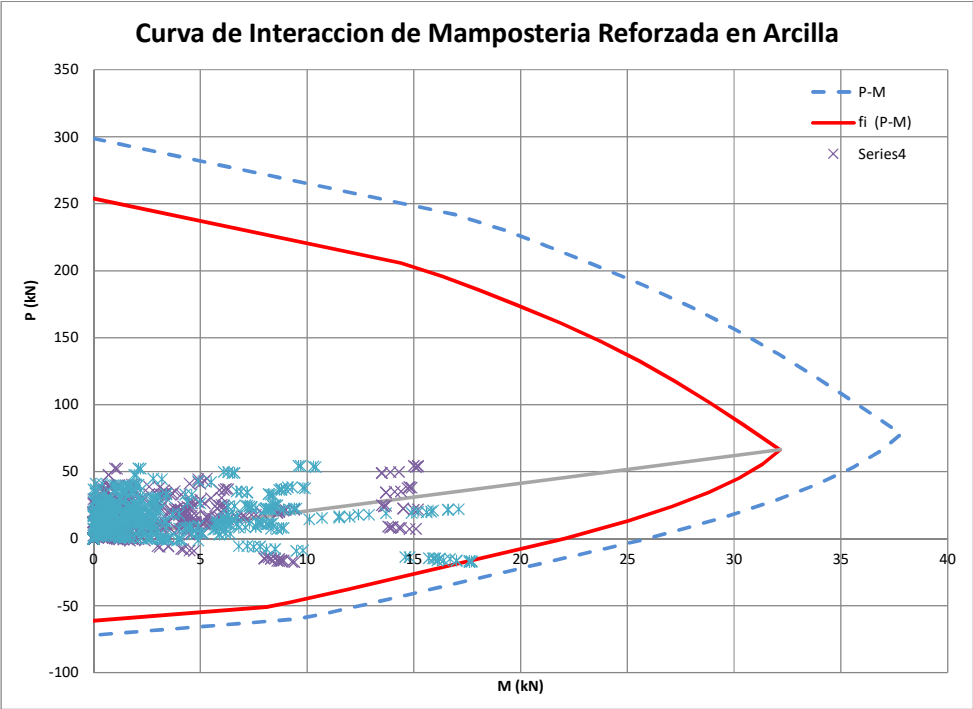


Planta

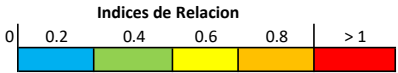


Corte

|                  |          |      |    |              |        |      |  |                                   |       |       |  |                                   |        |     |  |
|------------------|----------|------|----|--------------|--------|------|--|-----------------------------------|-------|-------|--|-----------------------------------|--------|-----|--|
| Compresion Axial |          |      |    | Flexion Pura |        |      |  | Punto Balanceado                  |       |       |  |                                   |        |     |  |
| h'/t :           | 15.9     | <    | 30 | b :          | 145.00 | mm   |  | cb :                              | 308.8 |       |  | Mu ≤                              | φ Mn   |     |  |
| Re :             | 0.86     |      |    | Ae :         | 50248  | mm2  |  |                                   |       |       |  | 17.7 ≤                            | 23.45  |     |  |
| Pn :             | 298.6    | (kN) |    | c :          | 115.18 | mm   |  | φ Mn :                            | 32    | kN-m  |  |                                   | Si     |     |  |
| φPn :            | 253.8    | (kN) | ≥  | d :          | 525    | mm   |  | φPn :                             | 66.4  | (kN)  |  |                                   |        |     |  |
|                  |          |      | Si | te :         | 84     | mm   |  |                                   |       |       |  |                                   |        |     |  |
| As :             | 200      | mm2  |    | t :          | 145    | mm   |  | Mn :                              | kN-m  | αMcr  |  | 0.1 f'mAe :                       | 71.9   | kN  |  |
| ρ :              | 0.002627 |      |    | φ Mn :       | 22.1   | kN-m |  | 38                                | ≥     | 15.07 |  | 0.25 Pb :                         | 19.5   | kN  |  |
|                  |          |      |    |              |        |      |  |                                   |       | Si    |  |                                   |        |     |  |
| Cortante         |          |      |    |              |        |      |  |                                   |       |       |  |                                   |        |     |  |
| Mu/Vu d :        | 1.6      |      |    | Vm :         | 31.8   | kN   |  | 6 Ae√f'm :                        | 86.6  |       |  | 0.2 f'm :                         | 1652.0 | kPa |  |
| Asv :            | 12.57    | mm2  |    | Vs :         | 2.3    | kN   |  | 4 Ae√f'm :                        | 57.8  |       |  | 0.2 f'm ≥                         | 1417   | kPa |  |
| Vn max permit :  | 47.65657 | mm2  | ≥  | Vu= Vn+Vs :  | 20.4   | kN   |  | OK Refuerzo a Cortante Suficiente |       |       |  | OK No Necesita Elementos de Borde |        |     |  |
|                  |          |      | Si |              |        |      |  |                                   |       |       |  |                                   |        |     |  |

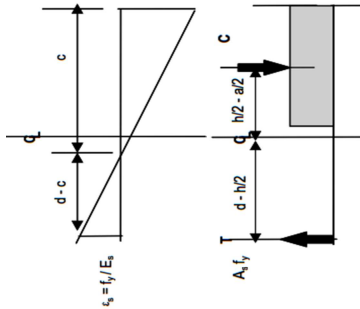


| Resumen         | Relacion |              |
|-----------------|----------|--------------|
| Compr. Axial    | 0.21     | ✓ Pu/ φPn    |
| Axial - Flexion | 0.75     | ✓ Mu/ φMn    |
| Cortante        | 0.43     | ✓ Vu/ Vn max |



Curva Interaccion φ Pn - φ Mn

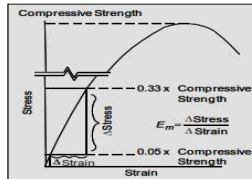
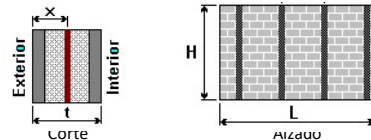
No Cumple



(16-19)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 3000   | 2300   | 2300               | 435000                | Con Refue  | 78.1    |

## Propiedades de Material

| f'm (Mpa) | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | Emu    | Ey     | Bloq Compr. | α | φ Compr Y Flexo-Compr | φ Cortante |
|-----------|---------|---------|-----|----------|---------|--------|--------|-------------|---|-----------------------|------------|
| 8.26      | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3 | 0.32                  | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 5       | 199                     |
| 225.0     | 5       | 199                     |
| 525.0     | 0       | 0                       |
| 825.0     | 0       | 0                       |
| 1725.0    | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1275.0    | 5       | 199                     |
| 1500.0    | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1275.0    | 0       | 0                       |
| 2175.0    | 6       | 284                     |
| 2475.0    | 6       | 284                     |
| 2775.0    | 6       | 284                     |
| 2925.0    | 6       | 284                     |
| Total     |         | 1733                    |



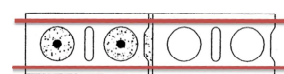
7

| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |  | C*x (kN-m) | T*x (kN-m) | Mn   | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--|------------|------------|------|------|--|-----------|-------------|
|        |      |        |        |        | 1888    | 1619    |  |            |            | 0    | 0.85 |  | 1376      | 0.0         |
| 3000   | 0.86 | 2400   | 1316   | 0      | 1316    | 1128    |  | 395        | 0          | 395  | 0.85 |  | 959       | 335         |
| 2872.1 | 0.86 | 2298   | 1259   | -3     | 1256    | 1077    |  | 442        | -4         | 447  | 0.85 |  | 916       | 380         |
| 2744.1 | 0.86 | 2195   | 1203   | -13    | 1190    | 1020    |  | 484        | -18        | 503  | 0.85 |  | 867       | 427         |
| 2616.2 | 0.86 | 2093   | 1147   | -30    | 1117    | 957     |  | 520        | -42        | 562  | 0.85 |  | 814       | 478         |
| 2488.2 | 0.86 | 1991   | 1091   | -50    | 1042    | 893     |  | 551        | -68        | 618  | 0.85 |  | 759       | 526         |
| 2360.3 | 0.86 | 1888   | 1035   | -79    | 956     | 820     |  | 575        | -104       | 680  | 0.85 |  | 697       | 578         |
| 2232.4 | 0.86 | 1786   | 979    | -113   | 866     | 743     |  | 594        | -146       | 740  | 0.85 |  | 631       | 629         |
| 2104.4 | 0.86 | 1684   | 923    | -156   | 766     | 657     |  | 607        | -197       | 804  | 0.85 |  | 558       | 684         |
| 1976.5 | 0.86 | 1581   | 867    | -211   | 656     | 562     |  | 615        | -258       | 873  | 0.85 |  | 478       | 742         |
| 1848.5 | 0.86 | 1479   | 811    | -272   | 538     | 461     |  | 617        | -327       | 943  | 0.85 |  | 392       | 802         |
| 1720.6 | 0.86 | 1376   | 755    | -343   | 411     | 352     |  | 612        | -406       | 1019 | 0.85 |  | 300       | 866         |
| 1548.5 | 0.86 | 1239   | 679    | -409   | 270     | 231     |  | 598        | -468       | 1066 | 0.85 |  | 196       | 906         |
| 1376.5 | 0.86 | 1101   | 604    | -457   | 147     | 126     |  | 573        | -505       | 1078 | 0.85 |  | 107       | 916         |
| 1204.4 | 0.86 | 964    | 528    | -484   | 44      | 38      |  | 538        | -517       | 1055 | 0.85 |  | 32        | 897         |
| 1100.0 | 0.86 | 880    | 482    | -496   | -14     | -12     |  | 511        | -515       | 1026 | 0.85 |  | -10       | 872         |
| 1070.0 | 0.86 | 856    | 469    | -500   | -31     | -26     |  | 503        | -514       | 1017 | 0.85 |  | -22       | 864         |
| 1124.5 | 0.86 | 900    | 493    | -493   | 0       | 0       |  | 518        | -515       | 1033 | 0.85 |  | 0         | 878.2       |
| 500.0  | 0.86 | 400    | 219    | -561   | -341    | -293    |  | 285        | -500       | 785  | 0.85 |  | -249      | 667         |
| 400.0  | 0.86 | 320    | 175    | -561   | -385    | -330    |  | 235        | -500       | 735  | 0.85 |  | -281      | 625         |
| 200.0  | 0.86 | 160    | 88     | -576   | -488    | -418    |  | 125        | -481       | 606  | 0.85 |  | -356      | 515         |
| 0.0    | 0.86 | 0      | 0      | -728   | -728    | -624    |  | 0          | 0          | 0    | 0.85 |  | -530      | 0           |

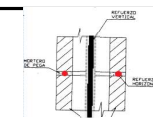
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 6.5                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 33.18                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00050 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje H (16-19)  
1/2 Piso (1-4)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

$h'/t$  : 15.9 < 30  
Re : 0.86  
Pn : 1618.8 (kN)  
 $\phi Pn$  : 1376.0 (kN)  $\geq$  476.7  
As : 1733 mm<sup>2</sup>  
 $\rho$  : 0.004086

Flexion Pura

b : 145.00 mm  
Ae : 234218 mm<sup>2</sup>  
c : 1124.48 mm  
d : 2925 mm  
te : 78 mm  
t : 145 mm  
 $\phi Mn$  : 878.2 kN-m

Punto Balanceado

cb : 1720.6  
 $\phi Mn$  : 866 kN-m  
 $\phi Pn$  : 299.6 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
1019  $\geq$  351.33  
Si

$Mu \leq \phi Mn$   
485.4  $\leq$  855.33  
Si

0.1  $f'm Ae$  : 359.3 kN  
0.25 Pb : 88.1 kN

Cortante

$Mu/Vu d$  : 3.3  
Asv : 33.18 mm<sup>2</sup>  
Vn max permit : 222.1387 mm<sup>2</sup>  $\geq$   
Si

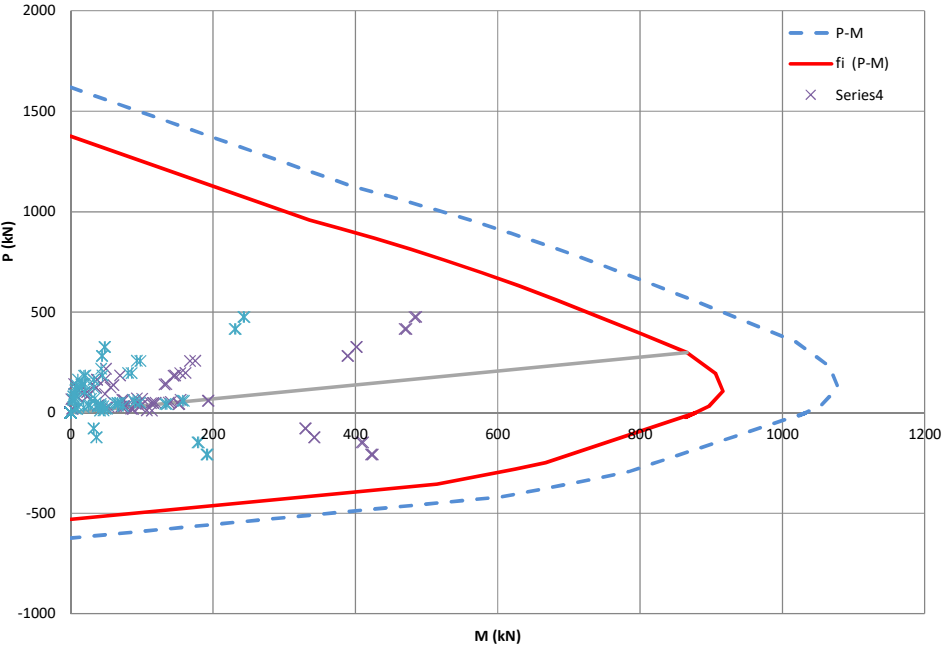
Vm : 148.1 kN  
Vs : 34.0 kN  
Vu = Vn + Vs : 109.2 kN

6 Ae  $\sqrt{f'm}$  : 403.9  
4 Ae  $\sqrt{f'm}$  : 269.3  
Insuficiente Refuerz. CORTANTE

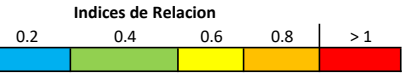
0.2  $f'm$  : 1652.0 kPa  
0.2  $f'm \geq$  2054 kPa

Si Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

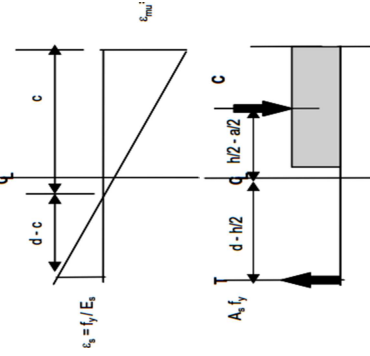


| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.35 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.57 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.49 <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

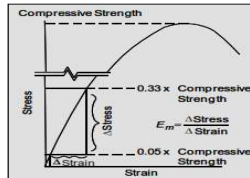
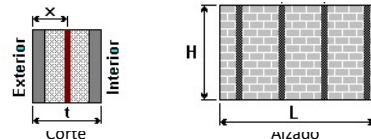
OK ☒



(16-19)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 3000   | 2300   | 2300               | 435000                | Con Refue  | 78.1    |

## Propiedades de Material

| f'm<br>(Mpa) | E (Mpa) | G (Mpa) | v   | f <sub>y</sub> (Mpa) | E (Mpa) | ε <sub>mu</sub> | ε <sub>y</sub> | Bloq Compr. | α |      | φ Compr Y Flexo-<br>Compr | φ Cortante |
|--------------|---------|---------|-----|----------------------|---------|-----------------|----------------|-------------|---|------|---------------------------|------------|
| 8.26         | 5782    | 2312.8  | 0.2 | 420                  | 200000  | 0.0030          | 0.0021         | 0.85        | 3 | 0.32 | 0.85                      | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 4       | 129                     |
| 225.0     | 4       | 129                     |
| 525.0     | 0       | 0                       |
| 825.0     | 0       | 0                       |
| 1725.0    | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1275.0    | 4       | 129                     |
| 1500.0    | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1275.0    | 0       | 0                       |
| 2175.0    | 4       | 129                     |
| 2475.0    | 4       | 129                     |
| 2775.0    | 4       | 129                     |
| 2925.0    | 4       | 129                     |
| Total     |         | 903                     |



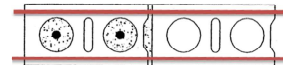
7

| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |    | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|----|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 1614    | 1384    |    |            |            | 0   | 0.85 |  | 1176      | 0.0         |
| 3000   | 0.86 | 2400   | 1316   | 0      | 1316    | 1128    |    | 395        | 0          | 395 | 0.85 |  | 959       | 335         |
| 2872.1 | 0.86 | 2298   | 1259   | -1     | 1258    | 1079    |    | 442        | -2         | 444 | 0.85 |  | 917       | 378         |
| 2744.1 | 0.86 | 2195   | 1203   | -6     | 1197    | 1027    |    | 484        | -8         | 493 | 0.85 |  | 873       | 419         |
| 2616.2 | 0.86 | 2093   | 1147   | -14    | 1133    | 972     |    | 520        | -19        | 539 | 0.85 |  | 826       | 458         |
| 2488.2 | 0.86 | 1991   | 1091   | -23    | 1069    | 916     |    | 551        | -31        | 581 | 0.85 |  | 779       | 494         |
| 2360.3 | 0.86 | 1888   | 1035   | -36    | 999     | 857     |    | 575        | -47        | 623 | 0.85 |  | 728       | 529         |
| 2232.4 | 0.86 | 1786   | 979    | -51    | 928     | 795     |    | 594        | -66        | 661 | 0.85 |  | 676       | 562         |
| 2104.4 | 0.86 | 1684   | 923    | -71    | 852     | 730     |    | 607        | -89        | 697 | 0.85 |  | 621       | 592         |
| 1976.5 | 0.86 | 1581   | 867    | -96    | 771     | 661     |    | 615        | -117       | 732 | 0.85 |  | 562       | 622         |
| 1848.5 | 0.86 | 1479   | 811    | -124   | 687     | 589     |    | 617        | -148       | 765 | 0.85 |  | 501       | 650         |
| 1720.6 | 0.86 | 1376   | 755    | -156   | 599     | 513     | FB | 612        | -185       | 797 | 0.85 |  | 436       | 677         |
| 1548.5 | 0.86 | 1239   | 679    | -186   | 493     | 423     |    | 598        | -213       | 811 | 0.85 |  | 359       | 689         |
| 1376.5 | 0.86 | 1101   | 604    | -207   | 396     | 340     |    | 573        | -229       | 802 | 0.85 |  | 289       | 682         |
| 1204.4 | 0.86 | 964    | 528    | -221   | 307     | 263     |    | 538        | -235       | 772 | 0.85 |  | 224       | 657         |
| 1032.4 | 0.86 | 826    | 453    | -235   | 218     | 187     |    | 492        | -232       | 724 | 0.85 |  | 159       | 615         |
| 860.3  | 0.86 | 688    | 377    | -254   | 123     | 106     |    | 436        | -227       | 663 | 0.85 |  | 90        | 564         |
| 551.0  | 0.86 | 441    | 242    | -271   | -29     | -25     |    | 309        | -223       | 533 | 0.85 |  | -21       | 452.8       |
| 400.0  | 0.86 | 320    | 175    | -271   | -95     | -82     |    | 235        | -223       | 459 | 0.85 |  | -70       | 390         |
| 300.0  | 0.86 | 240    | 132    | -271   | -139    | -119    |    | 182        | -223       | 405 | 0.85 |  | -102      | 344         |
| 200.0  | 0.86 | 160    | 88     | -281   | -193    | -165    |    | 125        | -211       | 336 | 0.85 |  | -141      | 285         |
| 0.0    | 0.86 | 0      | 0      | -379   | -379    | -325    |    | 0          | 0          | 0   | 0.85 |  | -276      | 0           |

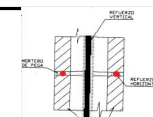
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 12.57                 |

| eficien. η | ρ <sub>n</sub> |
|------------|----------------|
| 0.35       | 0.00019        |



Planta



Corte

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 1383.7 (kN)  
 $\phi Pn$  : 1176.1 (kN)  $\geq$  Pu 169.7  
As : 903 mm2  
 $\rho$  : 0.002129

Flexion Pura

b : 145.00 mm  
Ae : 234218 mm2  
c : 551.02 mm  
d : 2925 mm  
te : 78 mm  
t : 145 mm  
 $\phi Mn$  : 452.8 kN-m

Punto Balanceado

cb : 1720.6  
 $\phi Mn$  : 677 kN-m  
 $\phi Pn$  : 436.2 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
797  $\geq$  351.33  
Si

$Mu \leq \phi Mn$   
217.4  $\leq$  478.27  
Si

0.1 f'm Ae : 359.3 kN  
0.25 Pb : 128.3 kN

Cortante

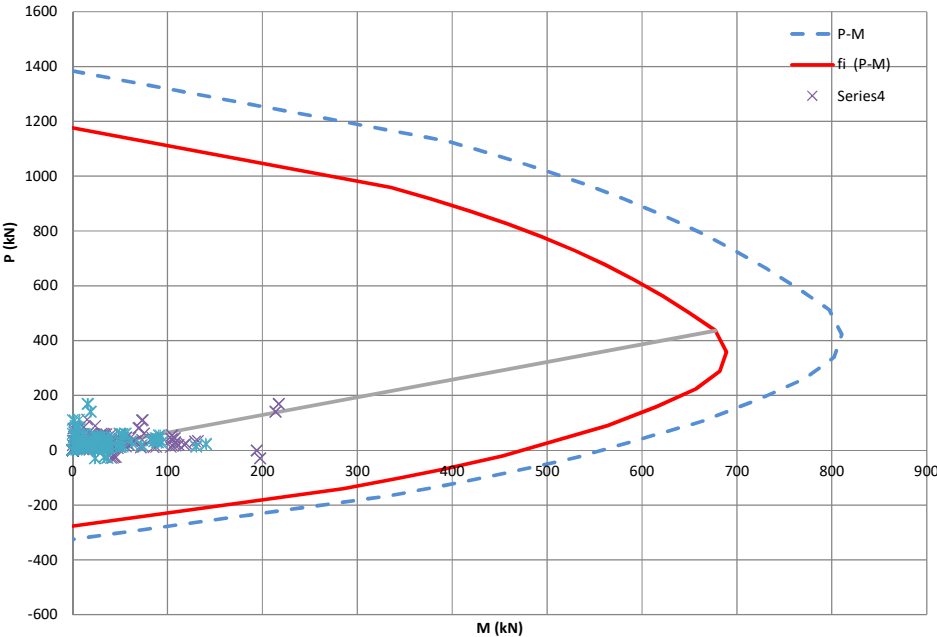
Mu/Vu d : 2.0  
Asv : 12.57 mm2  
Vn max permit : 222.1387 mm2  $\geq$   
Si

Vm : 148.1 kN  
Vs : 12.9 kN  
Vu= Vn+Vs : 96.6 kN

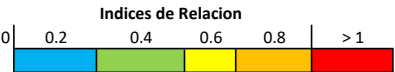
6 Ae√f'm : 403.9  
4 Ae√f'm : 269.3  
OK Refuerzo a Cortante Suficiente

0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  732 kPa  
OK No Necesita Elementos de Borde

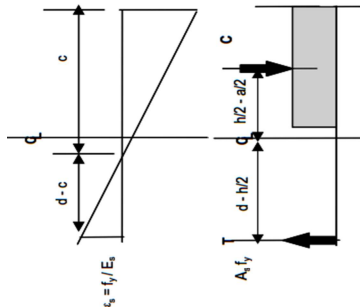
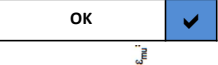
Curva de Interaccion de Mamposteria Reforzada en Arcilla



| Resumen         | Relacion             |
|-----------------|----------------------|
| Compr. Axial    | 0.14 ✓ Pu/ $\phi Pn$ |
| Axial - Flexion | 0.45 ✓ Mu/ $\phi Mn$ |
| Cortante        | 0.43 ✓ Vu/ Vn max    |



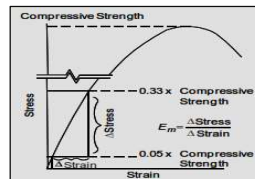
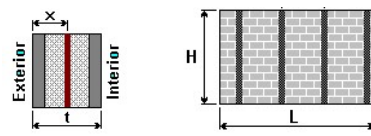
Curva Interaccion  $\phi Pn - \phi Mn$



(11-12)

## Propiedades de Geometría Ladrillo

| a (mm) | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm <sup>2</sup> ) |
|--------|--------|---------------|----------------|------------|------------------------------|
| 300    | 145    | 5674.0        | 30             | 43500      | 30452                        |



## Propiedades de Geometría Muro

| X (mm) | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm <sup>2</sup> ) | Groutig en | te (mm) |
|--------|--------|--------|--------------------|-----------------------|------------|---------|
| 75     | 1800   | 2300   | 2300               | 261000                | Con Refue  | 80.6    |

## Propiedades de Material

| f'm (Mpa) | E (Mpa) | G (Mpa) | v   | f <sub>y</sub> (Mpa) | E (Mpa) | ε <sub>mu</sub> | ε <sub>y</sub> | Bloq Compr. | α | φ Compr Y Flexo-Compr | φ Cortante |
|-----------|---------|---------|-----|----------------------|---------|-----------------|----------------|-------------|---|-----------------------|------------|
| 8.26      | 5782    | 2312.8  | 0.2 | 420                  | 200000  | 0.0030          | 0.0021         | 0.85        | 3 | 0.32                  | 0.6        |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm <sup>2</sup> ) |
|-----------|---------|-------------------------|
| 75.0      | 6       | 284                     |
| 225.0     | 6       | 284                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 900.0     | 6       | 284                     |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 0.0       | 0       | 0                       |
| 1575.0    | 6       | 284                     |
| 1725.0    | 6       | 284                     |
| Total     |         | 1420                    |



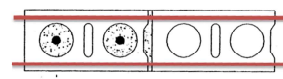
5

| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |  | C*x (kN-m) | T*x (kN-m) | Mn  | φ    |  | φ Pn (kN) | φ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|--|------------|------------|-----|------|--|-----------|-------------|
|        |      |        |        |        | 1198    | 1027    |  |            |            | 0   | 0.85 |  | 873       | 0.0         |
| 1800   | 0.86 | 1440   | 815    | 0      | 815     | 699     |  | 147        | 0          | 147 | 0.85 |  | 594       | 125         |
| 1721.5 | 0.86 | 1377   | 779    | 0      | 779     | 668     |  | 165        | 0          | 165 | 0.85 |  | 568       | 140         |
| 1642.9 | 0.86 | 1314   | 744    | -9     | 735     | 630     |  | 181        | -7         | 188 | 0.85 |  | 536       | 159         |
| 1564.4 | 0.86 | 1252   | 708    | -19    | 690     | 591     |  | 194        | -15        | 209 | 0.85 |  | 503       | 178         |
| 1485.9 | 0.86 | 1189   | 673    | -38    | 635     | 544     |  | 206        | -30        | 235 | 0.85 |  | 463       | 200         |
| 1407.4 | 0.86 | 1126   | 637    | -59    | 578     | 496     |  | 215        | -45        | 260 | 0.85 |  | 421       | 221         |
| 1328.8 | 0.86 | 1063   | 602    | -82    | 519     | 445     |  | 222        | -63        | 285 | 0.85 |  | 378       | 242         |
| 1250.3 | 0.86 | 1000   | 566    | -109   | 457     | 392     |  | 226        | -83        | 310 | 0.85 |  | 333       | 263         |
| 1171.8 | 0.86 | 937    | 530    | -139   | 391     | 336     |  | 229        | -106       | 335 | 0.85 |  | 285       | 285         |
| 1093.2 | 0.86 | 875    | 495    | -174   | 321     | 275     |  | 229        | -132       | 361 | 0.85 |  | 234       | 307         |
| 1014.7 | 0.86 | 812    | 459    | -213   | 246     | 211     |  | 227        | -162       | 389 | 0.85 |  | 179       | 331         |
| 913.2  | 0.86 | 731    | 413    | -239   | 175     | 150     |  | 221        | -179       | 400 | 0.85 |  | 127       | 340         |
| 811.8  | 0.86 | 649    | 367    | -257   | 110     | 95      |  | 211        | -179       | 390 | 0.85 |  | 80        | 332         |
| 710.3  | 0.86 | 568    | 322    | -284   | 37      | 32      |  | 198        | -179       | 377 | 0.85 |  | 27        | 320         |
| 700.0  | 0.86 | 560    | 317    | -287   | 30      | 25      |  | 196        | -179       | 375 | 0.85 |  | 22        | 319         |
| 680.0  | 0.86 | 544    | 308    | -294   | 14      | 12      |  | 193        | -179       | 372 | 0.85 |  | 10        | 316         |
| 662.2  | 0.86 | 530    | 300    | -300   | 0       | 0       |  | 190        | -179       | 369 | 0.85 |  | 0         | 313.9       |
| 500.0  | 0.86 | 400    | 226    | -358   | -131    | -113    |  | 158        | -179       | 337 | 0.85 |  | -96       | 287         |
| 400.0  | 0.86 | 320    | 181    | -358   | -177    | -152    |  | 134        | -179       | 313 | 0.85 |  | -129      | 266         |
| 200.0  | 0.86 | 160    | 91     | -379   | -289    | -247    |  | 74         | -165       | 239 | 0.85 |  | -210      | 203         |
| 0.0    | 0.86 | 0      | 0      | -596   | -596    | -511    |  | 0          | 0          | 0   | 0.85 |  | -435      | 0           |

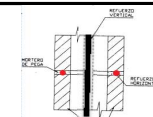
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 6.5                 | 600                    |

| As (mm <sup>2</sup> ) |
|-----------------------|
| 33.18                 |

| eficien. η | ρn      |
|------------|---------|
| 0.35       | 0.00048 |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje H (11-12)  
1/2 Piso (8-9)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 1027.4 (kN)  
 $\phi Pn$  : 873.3 (kN)  $\geq$  476.7  
As : 1420 mm<sup>2</sup>  
 $\rho$  : 0.005677

Flexion Pura

b : 145.00 mm  
Ae : 145070 mm<sup>2</sup>  
c : 662.18 mm  
d : 1725 mm  
te : 81 mm  
t : 145 mm  
 $\phi Mn$  : 313.9 kN-m

Punto Balanceado

cb : 1014.7  
 $\phi Mn$  : 331 kN-m  
 $\phi Pn$  : 179.3 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
389  $\geq$  130.56  
Si

$Mu \leq \phi Mn$   
485.4  $\leq$  371.26  
No Cumple

0.1 f'm Ae : 215.6 kN  
0.25 Pb : 52.7 kN

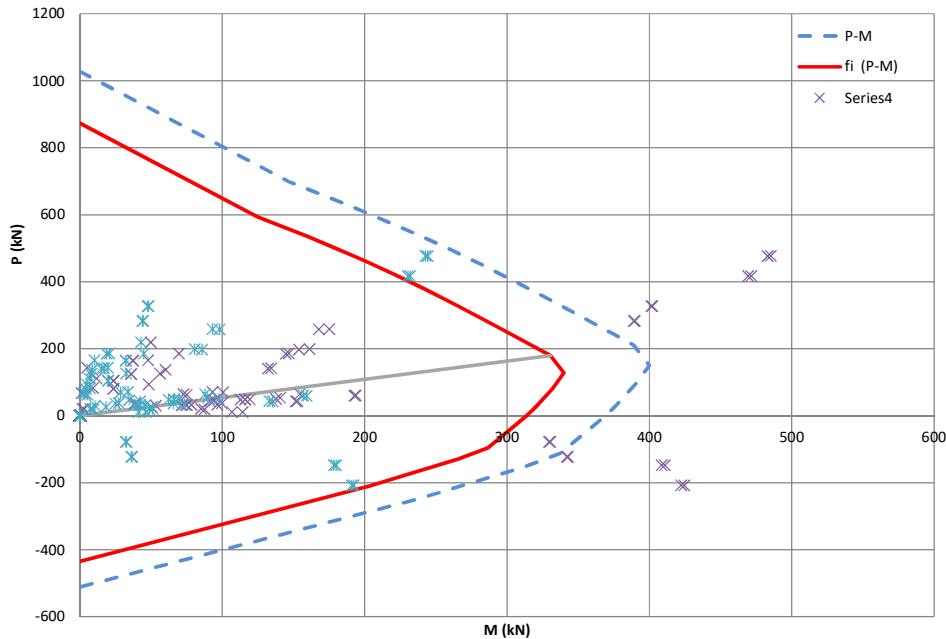
Cortante

Mu/Vu d : 3.3  
Asv : 33.18 mm<sup>2</sup>  
Vn max permit : 137.5883 mm<sup>2</sup>  $\geq$   
Si  
Vm : 91.7 kN  
Vs : 20.0 kN  
Vu = Vn + Vs : 67.1 kN

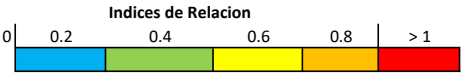
6 AeVf'm : 250.2  
4 AeVf'm : 166.8  
Insuficiente Refuerz. CORTANTE

0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  3423 kPa  
Si Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla

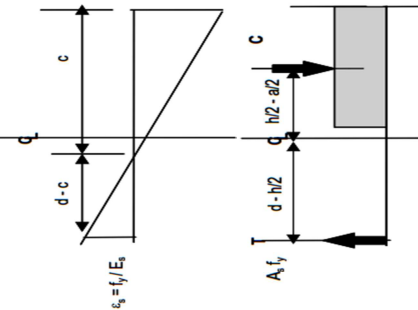


| Resumen         | Relacion |                 |
|-----------------|----------|-----------------|
| Compr. Axial    | 0.55     | ✓ Pu/ $\phi Pn$ |
| Axial - Flexion | 1.31     | ✗ Mu/ $\phi Mn$ |
| Cortante        | 0.49     | ✓ Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

No Cumple ✗



(11-12)

| Propiedades de Geometría Ladrillo |        |               |                |            |                 |
|-----------------------------------|--------|---------------|----------------|------------|-----------------|
| a (mm)                            | t (mm) | Area Vacios x | esp Pared (mm) | Area Bruta | Area Neta (mm2) |
| 300                               | 145    | 5674.0        | 30             | 43500      | 30452           |

Exterior

Interior

H

L

Compressive Strength

Stress

Strain

0.33 x Compressive Strength

0.05 x Compressive Strength

$E_m = \frac{\Delta \text{Stress}}{\Delta \text{Strain}}$

| Propiedades de Geometría Muro |        |        |                    |          |            |         |
|-------------------------------|--------|--------|--------------------|----------|------------|---------|
| X (mm)                        | L (mm) | H (mm) | h' (mm) (H-Eolaca) | Ag (mm2) | Groutig en | te (mm) |
| 75                            | 1800   | 2300   | 2300               | 261000   | Con Refue  | 80.6    |

| Propiedades de Material |         |         |     |          |         |        |        |             |          |                            | Prop. Diseño    |     |
|-------------------------|---------|---------|-----|----------|---------|--------|--------|-------------|----------|----------------------------|-----------------|-----|
| f'm (Mpa)               | E (Mpa) | G (Mpa) | v   | fy (Mpa) | E (Mpa) | Emu    | Ey     | Bloq Compr. | $\alpha$ | $\phi$ Compr Y Flexo-Compr | $\phi$ Cortante |     |
| 8.26                    | 5782    | 2312.8  | 0.2 | 420      | 200000  | 0.0030 | 0.0021 | 0.85        | 3        | 0.32                       | 0.85            | 0.6 |

Distribucion de Refuerzo

ESTADO INTERNO DE CAPACIDAD - CURVA DE INTERACCION

| Dist (mm) | # Barra | Area (mm2) |
|-----------|---------|------------|
| 75.0      | 4       | 129        |
| 225.0     | 4       | 129        |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 900.0     | 4       | 129        |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 0.0       | 0       | 0          |
| 1575.0    | 4       | 129        |
| 1725.0    | 4       | 129        |
| Total     |         | 645        |

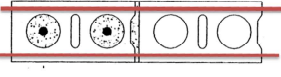


| c      | Re   | a=0.8c | C (kN) | T (kN) | Po (kN) | Pn (kN) |    | C*x (kN-m) | T*x (kN-m) | Mn  | $\phi$ |  | $\phi$ Pn (kN) | $\phi$ Mn (kN-m) |
|--------|------|--------|--------|--------|---------|---------|----|------------|------------|-----|--------|--|----------------|------------------|
|        |      |        |        |        | 1028    | 881     |    |            |            | 0   | 0.85   |  | 749            | 0.0              |
| 1800   | 0.86 | 1440   | 815    | 0      | 815     | 699     |    | 147        | 0          | 147 | 0.85   |  | 594            | 125              |
| 1721.5 | 0.86 | 1377   | 779    | 0      | 779     | 668     |    | 165        | 0          | 165 | 0.85   |  | 568            | 140              |
| 1642.9 | 0.86 | 1314   | 744    | -4     | 740     | 634     |    | 181        | -3         | 184 | 0.85   |  | 539            | 156              |
| 1564.4 | 0.86 | 1252   | 708    | -8     | 700     | 600     |    | 194        | -7         | 201 | 0.85   |  | 510            | 171              |
| 1485.9 | 0.86 | 1189   | 673    | -17    | 656     | 562     |    | 206        | -13        | 219 | 0.85   |  | 478            | 186              |
| 1407.4 | 0.86 | 1126   | 637    | -27    | 610     | 523     |    | 215        | -21        | 235 | 0.85   |  | 445            | 200              |
| 1328.8 | 0.86 | 1063   | 602    | -37    | 564     | 484     |    | 222        | -29        | 250 | 0.85   |  | 411            | 213              |
| 1250.3 | 0.86 | 1000   | 566    | -49    | 516     | 443     |    | 226        | -38        | 264 | 0.85   |  | 376            | 225              |
| 1171.8 | 0.86 | 937    | 530    | -63    | 467     | 401     |    | 229        | -48        | 277 | 0.85   |  | 341            | 235              |
| 1093.2 | 0.86 | 875    | 495    | -79    | 416     | 357     |    | 229        | -60        | 289 | 0.85   |  | 303            | 246              |
| 1014.7 | 0.86 | 812    | 459    | -97    | 362     | 311     | FB | 227        | -74        | 301 | 0.85   |  | 264            | 255              |
| 913.2  | 0.86 | 731    | 413    | -108   | 305     | 262     |    | 221        | -81        | 302 | 0.85   |  | 222            | 257              |
| 811.8  | 0.86 | 649    | 367    | -117   | 251     | 215     |    | 211        | -81        | 293 | 0.85   |  | 183            | 249              |
| 710.3  | 0.86 | 568    | 322    | -129   | 193     | 165     |    | 198        | -81        | 279 | 0.85   |  | 140            | 237              |
| 700.0  | 0.86 | 560    | 317    | -130   | 186     | 160     |    | 196        | -81        | 278 | 0.85   |  | 136            | 236              |
| 680.0  | 0.86 | 544    | 308    | -133   | 174     | 150     |    | 193        | -81        | 275 | 0.85   |  | 127            | 233              |
| 662.2  | 0.86 | 530    | 300    | -136   | 164     | 140     |    | 190        | -81        | 272 | 0.85   |  | 119            | 230.9            |
| 500.0  | 0.86 | 400    | 226    | -163   | 64      | 55      |    | 158        | -81        | 240 | 0.85   |  | 46             | 204              |
| 400.0  | 0.86 | 320    | 181    | -163   | 19      | 16      |    | 134        | -81        | 215 | 0.85   |  | 14             | 183              |
| 200.0  | 0.86 | 160    | 91     | -172   | -82     | -70     |    | 74         | -75        | 149 | 0.85   |  | -60            | 127              |
| 0.0    | 0.86 | 0      | 0      | -271   | -271    | -232    |    | 0          | 0          | 0   | 0.85   |  | -197           | 0                |

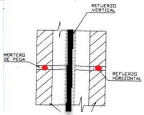
| Diam Ref Horiz (mm) | Separac ref Horiz (mm) |
|---------------------|------------------------|
| 4.0                 | 600                    |

| As (mm2) |
|----------|
| 12.57    |

| eficien. $\eta$ | $\rho_n$ |
|-----------------|----------|
| 0.35            | 0.00018  |



Planta



Corte

TPI : Patología Estructural por Explosión - Florida Parque - Bloque 8  
EVALUACIÓN DE LA ESTRUCTURA EXISTENTE

Muro : Eje 3/4/5 Piso  
H (8-9)  
(11-12)

Universidad Santo Tomas  
Esp. Patología de la Construcción

Compresion Axial

h'/t : 15.9 < 30  
Re : 0.86  
Pn : 881.3 (kN)  
 $\phi Pn$  : 749.1 (kN)  $\geq$  169.7  
As : 645 mm<sup>2</sup>  
 $\rho$  : 0.002579

Flexion Pura

b : 145.00 mm  
Ae : 145070 mm<sup>2</sup>  
c : 662.18 mm  
d : 1725 mm  
te : 81 mm  
t : 145 mm  
 $\phi Mn$  : 230.9 kN-m

Punto Balanceado

cb : 1014.7  
 $\phi Mn$  : 255 kN-m  
 $\phi Pn$  : 264.1 (kN)  
Mn : kN-m  $\alpha M_{cr}$   
301  $\geq$  130.56  
Si

$Mu \leq \phi Mn$   
217.4  $\leq$  220.15  
Si

0.1 f'm Ae : 215.6 kN  
0.25 Pb : 77.7 kN

Cortante

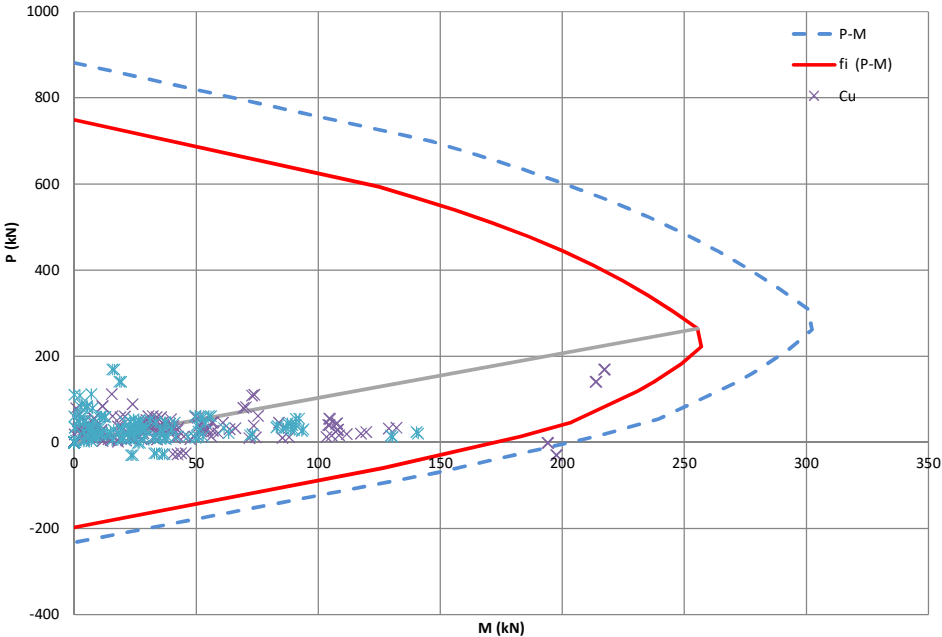
Mu/Vu d : 2.0  
Asv : 12.57 mm<sup>2</sup>  
Vn max permit : 137.5883 mm<sup>2</sup>  $\geq$   
Si

Vm : 91.7 kN  
Vs : 7.6 kN  
Vu = Vn + Vs : 59.6 kN

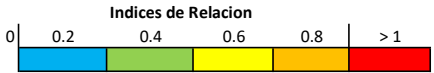
6 Ae V f'm : 250.2  
4 Ae V f'm : 166.8  
Insuficiente Refuerz. CORTANTE

0.2 f'm : 1652.0 kPa  
0.2 f'm  $\geq$  1231 kPa  
OK No Necesita Elementos de Borde

Curva de Interaccion de Mamposteria Reforzada en Arcilla



| Resumen         | Relacion                                               |
|-----------------|--------------------------------------------------------|
| Compr. Axial    | 0.23 <input checked="" type="checkbox"/> Pu/ $\phi Pn$ |
| Axial - Flexion | 0.99 <input checked="" type="checkbox"/> Mu/ $\phi Mn$ |
| Cortante        | 0.43 <input checked="" type="checkbox"/> Vu/ Vn max    |



Curva Interaccion  $\phi Pn - \phi Mn$

No Cumple ☒

