

Programa BAUPRÉS. Propiedad de BAUPRES INGENIERIA.

MODULO 09: TENSIONES Y ABERTURA DE FISURAS POR LA INSTRUCCION EHE

TENSIONES DEBIDAS A LAS SOBRECARGAS DE TRAFICO
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| VAN | SEC | MAXIMO POSITIVO | | MAXIMO NEGATIVO | |
|-----|-----|------------------|------------------|------------------|------------------|
| | | SUPERIOR T/m2 | INFERIOR T/m2 | SUPERIOR T/m2 | INFERIOR T/m2 |
| 1 | 1 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1 | 2 | 96.69 | -108.98 | -19.65 | 22.15 |
| | | 101.63 | -120.40 | -20.66 | 24.47 |
| 1 | 3 | 200.05 | -236.55 | -41.32 | 48.86 |
| 1 | 4 | 267.02 | -315.20 | -61.98 | 73.16 |
| 1 | 5 | 333.89 | -393.56 | -82.60 | 97.36 |
| 1 | 6 | 340.55 | -400.95 | -91.05 | 107.20 |
| 1 | 7 | 372.56 | -438.26 | -109.21 | 128.47 |
| 1 | 8 | 402.71 | -473.44 | -127.37 | 149.74 |
| 1 | 9 | 416.88 | -489.94 | -145.53 | 171.03 |
| 1 | 10 | 420.46 | -494.14 | -163.71 | 192.40 |
| 1 | 11 | 424.15 | -498.68 | -181.94 | 213.91 |
| 1 | 12 | 400.32 | -471.08 | -200.23 | 235.63 |
| 1 | 13 | 376.50 | -443.65 | -218.57 | 257.55 |
| 1 | 14 | 344.84 | -407.09 | -236.90 | 279.66 |
| 1 | 15 | 294.47 | -348.44 | -255.14 | 301.90 |
| 1 | 16 | 244.70 | -290.35 | -273.16 | 324.12 |
| 1 | 17 | 229.53 | -273.24 | -348.92 | 415.36 |
| 1 | 18 | 151.32 | -180.74 | -379.03 | 452.72 |
| 1 | 19 | 120.11 | -143.82 | -431.88 | 517.13 |
| | | 114.41 | -130.00 | -411.39 | 467.42 |
| 1 | 20 | 106.07 | -120.65 | -480.66 | 546.73 |
| 1 | 21 | 107.47 | -122.29 | -566.47 | 644.57 |
| 2 | 1 | 107.47 | -122.29 | -566.47 | 644.57 |
| 2 | 2 | 89.10 | -101.32 | -403.91 | 459.35 |
| 2 | 3 | 83.67 | -95.01 | -308.49 | 350.28 |
| | | 87.85 | -105.10 | -323.90 | 387.51 |
| 2 | 4 | 148.94 | -177.57 | -251.96 | 300.38 |
| 2 | 5 | 224.88 | -266.81 | -209.03 | 248.00 |
| 2 | 6 | 280.61 | -331.37 | -174.79 | 206.41 |
| 2 | 7 | 360.96 | -424.64 | -173.20 | 203.75 |
| 2 | 8 | 425.18 | -498.71 | -171.45 | 201.10 |
| 2 | 9 | 463.20 | -542.16 | -169.72 | 198.66 |
| 2 | 10 | 490.17 | -572.99 | -168.12 | 196.52 |
| 2 | 11 | 501.82 | -586.36 | -177.20 | 207.05 |
| 2 | 12 | 498.63 | -582.89 | -190.56 | 222.76 |
| 2 | 13 | 482.39 | -564.62 | -204.16 | 238.96 |
| 2 | 14 | 444.07 | -520.87 | -217.96 | 255.65 |
| 2 | 15 | 388.65 | -457.22 | -231.83 | 272.73 |

| | | | | | |
|---|----|--------|---------|---------|--------|
| 2 | 16 | 322.14 | -380.41 | -245.55 | 289.97 |
| 2 | 17 | 273.56 | -324.55 | -295.06 | 350.06 |
| 2 | 18 | 187.47 | -223.49 | -337.76 | 402.67 |
| 2 | 19 | 119.13 | -142.52 | -409.37 | 489.76 |
| | | 113.46 | -128.83 | -389.90 | 442.72 |
| 2 | 20 | 107.25 | -121.97 | -486.07 | 552.78 |
| 2 | 21 | 115.63 | -131.58 | -608.23 | 692.08 |
| | | | | | |
| 3 | 1 | 115.63 | -131.58 | -608.23 | 692.08 |
| 3 | 2 | 105.51 | -119.99 | -485.06 | 551.64 |
| 3 | 3 | 111.83 | -126.98 | -388.96 | 441.65 |
| | | 117.42 | -140.48 | -408.39 | 488.59 |
| 3 | 4 | 186.57 | -222.43 | -336.85 | 401.58 |
| 3 | 5 | 268.79 | -318.90 | -294.23 | 349.09 |
| 3 | 6 | 318.82 | -376.50 | -244.89 | 289.19 |
| 3 | 7 | 391.68 | -460.78 | -231.24 | 272.03 |
| 3 | 8 | 448.29 | -525.82 | -217.42 | 255.02 |
| 3 | 9 | 478.73 | -560.34 | -203.68 | 238.40 |
| 3 | 10 | 498.15 | -582.32 | -190.14 | 222.26 |
| 3 | 11 | 501.53 | -586.03 | -176.83 | 206.62 |
| 3 | 12 | 490.82 | -573.76 | -170.81 | 199.67 |
| 3 | 13 | 467.02 | -546.62 | -172.82 | 202.28 |
| 3 | 14 | 420.93 | -493.72 | -174.96 | 205.22 |
| 3 | 15 | 357.92 | -421.07 | -177.12 | 208.36 |
| 3 | 16 | 283.96 | -335.33 | -179.12 | 211.53 |
| 3 | 17 | 229.89 | -272.75 | -214.37 | 254.34 |
| 3 | 18 | 150.36 | -179.26 | -257.75 | 307.28 |
| 3 | 19 | 87.68 | -104.90 | -330.13 | 394.95 |
| | | 83.51 | -94.82 | -314.42 | 357.01 |
| 3 | 20 | 88.87 | -101.07 | -410.26 | 466.57 |
| 3 | 21 | 107.18 | -121.95 | -565.26 | 643.19 |
| | | | | | |
| 4 | 1 | 107.18 | -121.95 | -565.26 | 643.19 |
| 4 | 2 | 105.79 | -120.33 | -479.51 | 545.42 |
| 4 | 3 | 114.14 | -129.69 | -410.30 | 466.18 |
| | | 119.83 | -143.48 | -430.74 | 515.76 |
| 4 | 4 | 151.99 | -181.55 | -377.94 | 451.43 |
| 4 | 5 | 231.04 | -275.03 | -347.89 | 414.14 |
| 4 | 6 | 251.12 | -297.96 | -272.35 | 323.16 |
| 4 | 7 | 303.11 | -358.65 | -254.39 | 301.00 |
| 4 | 8 | 348.43 | -411.33 | -236.19 | 278.83 |
| 4 | 9 | 379.80 | -447.55 | -217.90 | 256.77 |
| 4 | 10 | 400.39 | -471.17 | -199.59 | 234.87 |
| 4 | 11 | 421.01 | -494.98 | -181.34 | 213.20 |
| 4 | 12 | 414.11 | -486.67 | -163.15 | 191.74 |
| 4 | 13 | 407.35 | -478.74 | -145.03 | 170.44 |
| 4 | 14 | 396.89 | -466.59 | -126.93 | 149.22 |
| 4 | 15 | 362.95 | -426.95 | -108.83 | 128.02 |
| 4 | 16 | 329.01 | -387.36 | -90.73 | 106.82 |
| 4 | 17 | 326.56 | -384.93 | -82.30 | 97.01 |
| 4 | 18 | 266.80 | -314.94 | -61.75 | 72.89 |
| 4 | 19 | 187.49 | -221.70 | -41.17 | 48.68 |
| 4 | 20 | 100.98 | -119.63 | -20.58 | 24.38 |
| | | 96.08 | -108.29 | -19.58 | 22.07 |
| 4 | 21 | 0.00 | 0.00 | 0.00 | 0.00 |

TENSIONES DEBIDAS AL GRADIENTE TERMICO

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| VAN | SEC | SUPERIOR T/m2 | INFERIOR T/m2 |
|-----|-----|------------------|------------------|
| 1 | 1 | 0.00 | 0.00 |
| 1 | 2 | 3.52 | -3.97 |
| | | 3.70 | -4.38 |
| 1 | 3 | 7.40 | -8.75 |
| 1 | 4 | 11.10 | -13.10 |
| 1 | 5 | 14.79 | -17.44 |
| 1 | 6 | 18.48 | -21.76 |
| 1 | 7 | 22.17 | -26.08 |
| 1 | 8 | 25.85 | -30.39 |
| 1 | 9 | 29.54 | -34.71 |
| 1 | 10 | 33.23 | -39.05 |
| 1 | 11 | 36.93 | -43.42 |
| 1 | 12 | 40.65 | -47.84 |
| 1 | 13 | 44.38 | -52.30 |
| 1 | 14 | 48.11 | -56.79 |
| 1 | 15 | 51.82 | -61.31 |
| 1 | 16 | 55.48 | -65.83 |
| 1 | 17 | 59.06 | -70.30 |
| 1 | 18 | 62.53 | -74.68 |
| 1 | 19 | 65.98 | -79.00 |
| | | 62.85 | -71.40 |
| 1 | 20 | 66.19 | -75.29 |
| 1 | 21 | 69.62 | -79.22 |
| | | | |
| 2 | 1 | 69.62 | -79.22 |
| 2 | 2 | 68.62 | -78.04 |
| 2 | 3 | 67.75 | -76.92 |
| | | 71.13 | -85.10 |
| 2 | 4 | 70.30 | -83.81 |
| 2 | 5 | 69.40 | -82.34 |
| 2 | 6 | 68.30 | -80.66 |
| 2 | 7 | 67.05 | -78.88 |
| 2 | 8 | 65.75 | -77.12 |
| 2 | 9 | 64.46 | -75.45 |
| 2 | 10 | 63.21 | -73.90 |
| 2 | 11 | 62.04 | -72.49 |
| 2 | 12 | 60.94 | -71.24 |
| 2 | 13 | 59.91 | -70.12 |
| 2 | 14 | 58.91 | -69.09 |
| 2 | 15 | 57.90 | -68.12 |
| 2 | 16 | 56.85 | -67.13 |
| 2 | 17 | 55.67 | -66.04 |
| 2 | 18 | 54.33 | -64.77 |
| 2 | 19 | 52.96 | -63.36 |
| | | 50.44 | -57.27 |
| 2 | 20 | 49.21 | -55.96 |
| 2 | 21 | 48.08 | -54.70 |
| | | | |
| 3 | 1 | 48.08 | -54.70 |
| 3 | 2 | 49.21 | -55.96 |
| 3 | 3 | 50.44 | -57.27 |
| | | 52.96 | -63.36 |

| | | | |
|---|----|-------|--------|
| 3 | 4 | 54.33 | -64.77 |
| 3 | 5 | 55.66 | -66.04 |
| 3 | 6 | 56.84 | -67.13 |
| 3 | 7 | 57.90 | -68.12 |
| 3 | 8 | 58.90 | -69.09 |
| 3 | 9 | 59.90 | -70.11 |
| 3 | 10 | 60.94 | -71.24 |
| 3 | 11 | 62.04 | -72.49 |
| 3 | 12 | 63.21 | -73.89 |
| 3 | 13 | 64.46 | -75.44 |
| 3 | 14 | 65.75 | -77.12 |
| 3 | 15 | 67.05 | -78.88 |
| 3 | 16 | 68.30 | -80.65 |
| 3 | 17 | 69.40 | -82.34 |
| 3 | 18 | 70.30 | -83.81 |
| 3 | 19 | 71.13 | -85.10 |
| | | 67.74 | -76.92 |
| 3 | 20 | 68.62 | -78.04 |
| 3 | 21 | 69.62 | -79.22 |

| | | | |
|---|----|-------|--------|
| 4 | 1 | 69.62 | -79.22 |
| 4 | 2 | 66.19 | -75.29 |
| 4 | 3 | 62.84 | -71.40 |
| | | 65.97 | -79.00 |
| 4 | 4 | 62.53 | -74.68 |
| 4 | 5 | 59.06 | -70.30 |
| 4 | 6 | 55.48 | -65.83 |
| 4 | 7 | 51.82 | -61.31 |
| 4 | 8 | 48.11 | -56.80 |
| 4 | 9 | 44.39 | -52.30 |
| 4 | 10 | 40.66 | -47.84 |
| 4 | 11 | 36.94 | -43.43 |
| 4 | 12 | 33.24 | -39.06 |
| 4 | 13 | 29.55 | -34.72 |
| 4 | 14 | 25.86 | -30.40 |
| 4 | 15 | 22.17 | -26.08 |
| 4 | 16 | 18.49 | -21.76 |
| 4 | 17 | 14.80 | -17.44 |
| 4 | 18 | 11.10 | -13.10 |
| 4 | 19 | 7.40 | -8.75 |
| 4 | 20 | 3.70 | -4.38 |
| | | 3.52 | -3.97 |
| 4 | 21 | 0.00 | 0.00 |

MAXIMA TENSION DE COMPRESION DEL HORMIGON = 2400.00 T/m²
 HORMIGON EN CLASE II. MAXIMA TENSION DE TRACCION = -244.30 T/m²
 MAXIMA RESISTENCIA MEDIA A TRACCION = -350.88 T/m²

DATOS DEL HORMIGÓN Y DEL ACERO

RECUBRIMIENTO: Distancia entre la superficie exterior de las
 armaduras y la más cercana del hormigón = 4.000

cm

HORMIGÓN: Coeficiente de minoración de la resistencia = 1.500
 ACERO ACTIVO: Coeficiente de minoración del límite elástico = 1.150
 ACERO PASIVO: Límite elástico de cálculo = 4347.83 Kp/cm²
 Módulo de elasticidad = 2100000.0 Kp/cm²

| NUM | INTERVALO | | ARMADURA PAMTO SUPERIOR | | | ARMADURA PAMTO INFERIOR | | | | |
|-----|-----------|-----|-------------------------|----|----------|-------------------------|--------|----------|--------|--------|
| | VA | SEC | VA | SE | DIAMETRO | INICIO | FINAL | DIAMETRO | INICIO | FINAL |
| | | | | | mm | cm | cm | mm | cm | cm |
| 1 | 1 | 1 | 4 | 21 | 20.000 | 20.000 | 20.000 | 20.000 | 20.000 | 20.000 |

COMPOSICION DE TENSIONES ADMISIBLES EN LA HIPOTESIS NUMERO = 1
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COEFICIENTES DE PONDERACIÓN DE LAS ACCIONES

| | | |
|------------------------------|---|-------|
| Peso propio | = | 1.000 |
| Resto de la carga permanente | = | 1.000 |
| Sobrecargas | = | 0.000 |
| Pretensado final | = | 0.900 |
| Gradiente térmico | = | 0.500 |
| Asientos de apoyos | = | 0.000 |

| VAN | SEC | MAXIMO POSITIVO | | MAXIMO NEGATIVO | | BORDE VAINA MAS EXTEIOR | |
|-----|-----|-----------------|----------|-----------------|----------|-------------------------|----------|
| | | SUPERIOR | INFERIOR | SUPERIOR | INFERIOR | INFERIOR | SUPERIOR |
| | | T/m2 | T/m2 | T/m2 | T/m2 | T/m2 | T/m2 |
| 1 | 1 | 218.57 | 226.57 | 218.57 | 226.57 | 222.73 | 221.97 |
| 1 | 2 | 212.71 | 233.51 | 212.71 | 233.51 | 224.47 | 222.50 |
| | | 263.81 | 320.22 | 263.81 | 320.22 | 295.69 | 290.36 |
| 1 | 3 | 250.97 | 335.26 | 250.97 | 335.26 | 302.43 | 294.46 |
| 1 | 4 | 234.61 | 356.31 | 234.61 | 356.31 | 314.11 | 302.61 |
| 1 | 5 | 220.10 | 375.29 | 220.10 | 375.29 | 327.04 | 312.38 |
| 1 | 6 | 207.62 | 391.74 | 207.62 | 391.74 | 339.81 | 322.41 |
| 1 | 7 | 197.26 | 405.69 | 197.26 | 405.69 | 351.45 | 331.76 |
| 1 | 8 | 189.04 | 417.23 | 189.04 | 417.23 | 361.24 | 339.68 |
| 1 | 9 | 183.07 | 426.32 | 183.07 | 426.32 | 368.54 | 345.55 |
| 1 | 10 | 179.82 | 433.01 | 179.82 | 433.01 | 372.98 | 349.06 |
| 1 | 11 | 184.15 | 432.13 | 184.15 | 432.13 | 370.77 | 347.34 |
| 1 | 12 | 197.68 | 420.91 | 197.68 | 420.91 | 360.76 | 339.67 |
| 1 | 13 | 220.87 | 398.59 | 220.87 | 398.59 | 344.71 | 327.92 |
| 1 | 14 | 254.11 | 364.26 | 254.11 | 364.26 | 325.87 | 315.46 |
| 1 | 15 | 297.58 | 317.06 | 297.58 | 317.06 | 309.15 | 307.31 |
| 1 | 16 | 347.94 | 252.62 | 347.94 | 252.62 | 297.85 | 306.86 |
| 1 | 17 | 404.53 | 178.04 | 404.53 | 178.04 | 303.72 | 325.12 |
| 1 | 18 | 455.40 | 109.96 | 455.40 | 109.96 | 330.51 | 363.15 |
| 1 | 19 | 466.05 | 90.31 | 466.05 | 90.31 | 353.07 | 388.58 |
| | | 411.20 | 16.16 | 411.20 | 16.16 | 292.42 | 329.75 |
| 1 | 20 | 383.56 | 43.33 | 383.56 | 43.33 | 293.69 | 325.84 |
| 1 | 21 | 317.39 | 115.74 | 317.39 | 115.74 | 266.58 | 285.64 |
| 2 | 1 | 317.39 | 115.74 | 317.39 | 115.74 | 266.58 | 285.64 |
| 2 | 2 | 398.13 | 14.95 | 398.13 | 14.95 | 294.93 | 331.13 |
| 2 | 3 | 425.35 | -22.53 | 425.35 | -22.53 | 281.40 | 323.72 |
| | | 479.60 | 43.48 | 479.60 | 43.48 | 339.43 | 380.64 |
| 2 | 4 | 454.88 | 66.23 | 454.88 | 66.23 | 296.23 | 332.95 |
| 2 | 5 | 378.53 | 151.41 | 378.53 | 151.41 | 258.57 | 280.03 |
| 2 | 6 | 299.08 | 243.35 | 299.08 | 243.35 | 263.22 | 268.49 |
| 2 | 7 | 235.14 | 313.02 | 235.14 | 313.02 | 292.60 | 285.24 |

| | | | | | | | |
|---|----|--------|--------|--------|--------|--------|--------|
| 2 | 8 | 187.76 | 361.52 | 187.76 | 361.52 | 328.71 | 312.29 |
| 2 | 9 | 156.08 | 391.50 | 156.08 | 391.50 | 359.39 | 337.14 |
| 2 | 10 | 138.70 | 405.58 | 138.70 | 405.58 | 377.56 | 352.35 |
| 2 | 11 | 134.36 | 405.71 | 134.36 | 405.71 | 380.07 | 354.43 |
| 2 | 12 | 142.24 | 392.94 | 142.24 | 392.94 | 366.63 | 342.94 |
| 2 | 13 | 162.08 | 367.31 | 162.08 | 367.31 | 339.32 | 319.93 |
| 2 | 14 | 193.99 | 328.12 | 193.99 | 328.12 | 302.79 | 290.12 |
| 2 | 15 | 238.08 | 274.21 | 238.08 | 274.21 | 264.74 | 261.32 |
| 2 | 16 | 293.79 | 204.75 | 293.79 | 204.75 | 236.49 | 244.91 |
| 2 | 17 | 358.84 | 120.51 | 358.84 | 120.51 | 232.96 | 255.48 |
| 2 | 18 | 413.12 | 48.44 | 413.12 | 48.44 | 264.26 | 298.72 |
| 2 | 19 | 414.14 | 40.00 | 414.14 | 40.00 | 293.89 | 329.24 |
| | | 367.59 | -17.53 | 367.59 | -17.53 | 243.81 | 280.19 |
| 2 | 20 | 320.41 | 32.35 | 320.41 | 32.35 | 242.83 | 270.05 |
| 2 | 21 | 224.28 | 140.18 | 224.28 | 140.18 | 203.09 | 211.04 |
| | | | | | | | |
| 3 | 1 | 224.28 | 140.18 | 224.28 | 140.18 | 203.09 | 211.04 |
| 3 | 2 | 320.42 | 32.34 | 320.42 | 32.34 | 242.83 | 270.05 |
| 3 | 3 | 367.60 | -17.55 | 367.60 | -17.55 | 243.81 | 280.20 |
| | | 414.16 | 39.98 | 414.16 | 39.98 | 293.90 | 329.25 |
| 3 | 4 | 413.14 | 48.42 | 413.14 | 48.42 | 264.26 | 298.72 |
| 3 | 5 | 358.87 | 120.47 | 358.87 | 120.47 | 232.95 | 255.48 |
| 3 | 6 | 293.83 | 204.70 | 293.83 | 204.70 | 236.47 | 244.90 |
| 3 | 7 | 238.13 | 274.15 | 238.13 | 274.15 | 264.71 | 261.30 |
| 3 | 8 | 194.05 | 328.06 | 194.05 | 328.06 | 302.75 | 290.09 |
| 3 | 9 | 162.15 | 367.24 | 162.15 | 367.24 | 339.26 | 319.89 |
| 3 | 10 | 142.32 | 392.85 | 142.32 | 392.85 | 366.55 | 342.88 |
| 3 | 11 | 134.45 | 405.62 | 134.45 | 405.62 | 380.00 | 354.37 |
| 3 | 12 | 138.80 | 405.47 | 138.80 | 405.47 | 377.47 | 352.28 |
| 3 | 13 | 156.17 | 391.39 | 156.17 | 391.39 | 359.31 | 337.08 |
| 3 | 14 | 187.86 | 361.41 | 187.86 | 361.41 | 328.64 | 312.24 |
| 3 | 15 | 235.25 | 312.90 | 235.25 | 312.90 | 292.54 | 285.20 |
| 3 | 16 | 299.17 | 243.26 | 299.17 | 243.26 | 263.19 | 268.47 |
| 3 | 17 | 378.61 | 151.31 | 378.61 | 151.31 | 258.56 | 280.03 |
| 3 | 18 | 454.95 | 66.14 | 454.95 | 66.14 | 296.24 | 332.97 |
| 3 | 19 | 479.66 | 43.40 | 479.66 | 43.40 | 339.45 | 380.67 |
| | | 425.41 | -22.59 | 425.41 | -22.59 | 281.42 | 323.75 |
| 3 | 20 | 398.17 | 14.90 | 398.17 | 14.90 | 294.94 | 331.16 |
| 3 | 21 | 317.43 | 115.70 | 317.43 | 115.70 | 266.60 | 285.66 |
| | | | | | | | |
| 4 | 1 | 317.43 | 115.70 | 317.43 | 115.70 | 266.60 | 285.66 |
| 4 | 2 | 383.57 | 43.32 | 383.57 | 43.32 | 293.70 | 325.85 |
| 4 | 3 | 411.18 | 16.18 | 411.18 | 16.18 | 292.42 | 329.74 |
| | | 466.03 | 90.33 | 466.03 | 90.33 | 353.07 | 388.57 |
| 4 | 4 | 455.35 | 110.02 | 455.35 | 110.02 | 330.50 | 363.13 |
| 4 | 5 | 404.46 | 178.12 | 404.46 | 178.12 | 303.72 | 325.11 |
| 4 | 6 | 347.85 | 252.74 | 347.85 | 252.74 | 297.86 | 306.85 |
| 4 | 7 | 297.47 | 317.18 | 297.47 | 317.18 | 309.19 | 307.32 |
| 4 | 8 | 253.98 | 364.42 | 253.98 | 364.42 | 325.92 | 315.48 |
| 4 | 9 | 220.72 | 398.76 | 220.72 | 398.76 | 344.79 | 327.96 |
| 4 | 10 | 197.53 | 421.08 | 197.53 | 421.08 | 360.84 | 339.72 |
| 4 | 11 | 183.99 | 432.31 | 183.99 | 432.31 | 370.87 | 347.40 |
| 4 | 12 | 179.64 | 433.20 | 179.64 | 433.20 | 373.09 | 349.13 |
| 4 | 13 | 182.88 | 426.54 | 182.88 | 426.54 | 368.66 | 345.63 |
| 4 | 14 | 188.86 | 417.44 | 188.86 | 417.44 | 361.35 | 339.75 |
| 4 | 15 | 197.09 | 405.88 | 197.09 | 405.88 | 351.56 | 331.83 |
| 4 | 16 | 207.48 | 391.90 | 207.48 | 391.90 | 339.89 | 322.46 |
| 4 | 17 | 219.99 | 375.41 | 219.99 | 375.41 | 327.10 | 312.41 |
| 4 | 18 | 234.53 | 356.40 | 234.53 | 356.40 | 314.14 | 302.63 |

| | | | | | | | |
|---|----|--------|--------|--------|--------|--------|--------|
| 4 | 19 | 250.91 | 335.33 | 250.91 | 335.33 | 302.44 | 294.47 |
| 4 | 20 | 263.78 | 320.26 | 263.78 | 320.26 | 295.70 | 290.36 |
| | | 212.69 | 233.54 | 212.69 | 233.54 | 224.47 | 222.50 |
| 4 | 21 | 218.57 | 226.57 | 218.57 | 226.57 | 222.73 | 221.97 |

COMPROBACION DEL ESTADO LIMITE DE FISURACION

D: Cara Dorsal. F: Cara Frontal

(1): Profundidad de la zona comprimida. Está medida desde el paramento superior si el momento es positivo, y desde el inferior si es negativo.

(2): Acortamiento de la fibra extrema más comprimida del hormigón x 1000.

Ts, Tsr: Tensión de la armadura pasiva más traccionada. Positiva si está traccionada

| CA | | NEUTRALIZACION | | CARGAS EXTERIORES SIN PRETENSADO | | | MOMENTO DE | | | |
|------------|---------|----------------|---------|----------------------------------|---------|-------|------------|-------------|--------|-------|
| FISURACION | | ABERT. FISURAS | | MOMENTO | (1) | (2) | Ts | MOMENTO (1) | | |
| V SEC | RA Sm | AXIL | MOMENTO | | | | | MOMENTO | (1) | (2) |
| (2) | Tsr | Esm | Wk | mT | m | | Kp/cm2 | mT | m | |
| Kp/cm2 | | mm | | | | | | | | |
| ----- | | | | | | | | | | |
| 2 | 3 | D130.19 | 2710.31 | 916.66 | -347.10 | 1.204 | 0.1897 | 5.32 | 435.57 | 0.464 |
| 0.5431 | 1858.78 | 0.000001 | 0.000 | | | | | | | |
| 2 | 19 | F130.19 | 2355.73 | 940.23 | -449.95 | 1.212 | 0.1632 | 2.24 | 344.57 | 0.423 |
| 0.5435 | 2152.07 | 0.000000 | 0.000 | | | | | | | |
| | | | | | | | | | | |
| 3 | 3 | D130.19 | 2355.73 | 940.26 | -449.94 | 1.212 | 0.1632 | 2.26 | 344.54 | 0.423 |
| 0.5435 | 2152.07 | 0.000000 | 0.000 | | | | | | | |
| 3 | 19 | F130.19 | 2710.30 | 916.86 | -347.15 | 1.204 | 0.1897 | 5.39 | 435.37 | 0.464 |
| 0.5431 | 1858.79 | 0.000001 | 0.000 | | | | | | | |

COMPOSICION DE TENSIONES ADMISIBLES EN LA HIPOTESIS NUMERO = 2

=====

COEFICIENTES DE PONDERACIÓN DE LAS ACCIONES

| | | |
|------------------------------|---|-------|
| Peso propio | = | 1.000 |
| Resto de la carga permanente | = | 1.000 |
| Sobrecargas | = | 0.500 |
| Pretensado final | = | 0.900 |
| Gradiente térmico | = | 0.200 |
| Asientos de apoyos | = | 0.000 |

| VAN | SEC | MAXIMO POSITIVO | | MAXIMO NEGATIVO | | BORDE VAINA MAS EXTEIOR | |
|-------|-----|-----------------|----------|-----------------|----------|-------------------------|----------|
| | | SUPERIOR | INFERIOR | SUPERIOR | INFERIOR | INFERIOR | SUPERIOR |
| | | T/m2 | T/m2 | T/m2 | T/m2 | T/m2 | T/m2 |
| ----- | | | | | | | |
| 1 | 1 | 218.57 | 226.57 | 218.57 | 226.57 | 222.73 | 221.97 |

| | | | | | | | |
|---|----|--------|--------|--------|--------|--------|--------|
| 1 | 2 | 260.00 | 180.21 | 201.83 | 245.77 | 214.90 | 222.51 |
| | | 313.52 | 261.34 | 252.37 | 430.82 | 284.03 | 336.37 |
| 1 | 3 | 348.78 | 219.61 | 228.09 | 362.31 | 269.92 | 297.35 |
| 1 | 4 | 364.79 | 202.64 | 200.29 | 396.82 | 258.86 | 310.11 |
| 1 | 5 | 382.61 | 183.74 | 174.36 | 429.20 | 245.56 | 325.90 |
| 1 | 6 | 372.35 | 197.79 | 156.55 | 451.87 | 247.02 | 340.67 |
| 1 | 7 | 376.89 | 194.38 | 136.01 | 477.74 | 241.87 | 356.53 |
| 1 | 8 | 382.65 | 189.62 | 117.60 | 501.21 | 236.98 | 370.84 |
| 1 | 9 | 382.65 | 191.77 | 101.44 | 522.26 | 237.11 | 382.53 |
| 1 | 10 | 380.08 | 197.65 | 87.99 | 540.92 | 240.90 | 390.74 |
| 1 | 11 | 385.14 | 195.81 | 82.10 | 552.11 | 242.66 | 391.40 |
| 1 | 12 | 385.64 | 199.72 | 85.37 | 553.08 | 249.82 | 382.86 |
| 1 | 13 | 395.80 | 192.46 | 98.27 | 543.06 | 254.11 | 366.19 |
| 1 | 14 | 412.10 | 177.75 | 121.23 | 521.13 | 259.44 | 343.95 |
| 1 | 15 | 429.27 | 161.23 | 154.46 | 486.40 | 269.97 | 320.38 |
| 1 | 16 | 453.65 | 127.20 | 194.72 | 434.43 | 282.08 | 298.05 |
| 1 | 17 | 501.58 | 62.51 | 212.35 | 406.81 | 306.16 | 280.53 |
| 1 | 18 | 512.30 | 42.00 | 247.13 | 358.73 | 342.26 | 276.93 |
| 1 | 19 | 506.31 | 42.10 | 230.31 | 372.58 | 366.74 | 259.64 |
| | | 449.55 | -27.42 | 186.65 | 146.86 | 306.14 | 178.44 |
| 1 | 20 | 416.74 | 5.59 | 123.37 | 339.28 | 308.14 | 160.00 |
| 1 | 21 | 350.24 | 78.36 | 13.27 | 461.79 | 281.74 | 83.90 |
| | | | | | | | |
| 2 | 1 | 350.24 | 78.36 | 13.27 | 461.79 | 281.74 | 83.90 |
| 2 | 2 | 422.09 | -12.30 | 175.58 | 268.04 | 305.09 | 191.75 |
| 2 | 3 | 446.86 | -46.96 | 250.78 | 175.69 | 288.15 | 233.74 |
| | | 502.19 | 16.45 | 296.31 | 244.13 | 346.07 | 284.47 |
| 2 | 4 | 508.26 | 2.59 | 307.81 | 241.56 | 301.84 | 287.03 |
| 2 | 5 | 470.15 | 42.71 | 253.19 | 300.11 | 244.38 | 273.54 |
| 2 | 6 | 418.90 | 101.87 | 191.20 | 370.75 | 214.89 | 289.77 |
| 2 | 7 | 395.51 | 124.37 | 128.43 | 438.56 | 195.46 | 327.94 |
| 2 | 8 | 380.63 | 135.30 | 82.31 | 485.21 | 181.62 | 371.06 |
| 2 | 9 | 368.34 | 143.05 | 51.88 | 513.46 | 173.79 | 406.88 |
| 2 | 10 | 364.82 | 141.25 | 35.68 | 526.01 | 164.72 | 428.21 |
| 2 | 11 | 366.66 | 134.28 | 27.15 | 530.98 | 156.23 | 435.77 |
| 2 | 12 | 373.28 | 122.87 | 28.68 | 525.69 | 149.15 | 426.56 |
| 2 | 13 | 385.31 | 106.04 | 42.03 | 507.83 | 144.14 | 400.28 |
| 2 | 14 | 398.35 | 88.41 | 67.34 | 476.67 | 146.94 | 360.71 |
| 2 | 15 | 415.03 | 66.04 | 104.79 | 431.01 | 157.54 | 314.65 |
| 2 | 16 | 437.80 | 34.68 | 153.96 | 369.88 | 178.40 | 272.49 |
| 2 | 17 | 478.92 | -21.95 | 194.61 | 315.35 | 214.36 | 246.98 |
| 2 | 18 | 490.56 | -43.87 | 227.94 | 269.21 | 272.40 | 240.89 |
| 2 | 19 | 457.82 | -12.25 | 193.57 | 303.89 | 306.74 | 218.60 |
| | | 409.18 | -64.77 | 157.51 | 174.77 | 256.85 | 161.42 |
| 2 | 20 | 359.28 | -11.85 | 62.62 | 325.53 | 259.32 | 108.58 |
| 2 | 21 | 267.68 | 90.81 | -94.26 | 502.64 | 223.11 | -0.26 |
| | | | | | | | |
| 3 | 1 | 267.68 | 90.81 | -94.25 | 502.64 | 223.11 | -0.26 |
| 3 | 2 | 358.41 | -10.87 | 63.13 | 324.95 | 258.95 | 108.90 |
| 3 | 3 | 408.39 | -63.86 | 157.99 | 220.46 | 256.60 | 172.16 |
| | | 456.98 | -11.25 | 194.08 | 192.83 | 306.49 | 193.80 |
| 3 | 4 | 490.13 | -43.36 | 228.42 | 268.64 | 272.35 | 241.04 |
| 3 | 5 | 476.57 | -19.17 | 195.06 | 314.82 | 214.73 | 247.00 |
| 3 | 6 | 436.19 | 36.58 | 154.33 | 369.43 | 179.05 | 272.42 |
| 3 | 7 | 416.60 | 64.20 | 105.14 | 430.60 | 156.59 | 314.52 |
| 3 | 8 | 400.52 | 85.87 | 67.66 | 476.29 | 145.29 | 360.53 |
| 3 | 9 | 383.54 | 108.11 | 42.34 | 507.48 | 145.68 | 400.08 |
| 3 | 10 | 373.11 | 123.06 | 28.97 | 525.35 | 149.31 | 426.35 |
| 3 | 11 | 366.60 | 134.35 | 27.42 | 530.68 | 156.30 | 435.57 |

| | | | | | | | |
|---|----|--------|--------|--------|--------|--------|--------|
| 3 | 12 | 365.25 | 140.76 | 34.43 | 527.47 | 164.32 | 429.13 |
| 3 | 13 | 370.35 | 140.71 | 50.43 | 515.17 | 172.04 | 407.86 |
| 3 | 14 | 378.60 | 137.69 | 80.65 | 487.15 | 183.17 | 371.99 |
| 3 | 15 | 394.09 | 126.03 | 126.57 | 440.75 | 196.32 | 328.69 |
| 3 | 16 | 420.66 | 99.79 | 189.11 | 373.22 | 214.19 | 290.19 |
| 3 | 17 | 472.74 | 39.64 | 250.61 | 303.18 | 243.98 | 273.41 |
| 3 | 18 | 509.04 | 1.65 | 304.99 | 244.93 | 301.92 | 286.14 |
| 3 | 19 | 502.17 | 16.48 | 293.26 | 266.41 | 346.06 | 287.17 |
| | | 446.84 | -46.93 | 247.87 | 134.32 | 288.14 | 222.11 |
| 3 | 20 | 422.02 | -12.22 | 172.46 | 271.60 | 305.06 | 189.79 |
| 3 | 21 | 350.13 | 78.49 | 13.91 | 461.06 | 281.68 | 84.33 |
| | | | | | | | |
| 4 | 1 | 350.13 | 78.49 | 13.91 | 461.06 | 281.68 | 84.33 |
| 4 | 2 | 416.61 | 5.74 | 123.96 | 338.62 | 308.08 | 160.38 |
| 4 | 3 | 449.40 | -27.25 | 187.18 | 270.69 | 306.09 | 204.40 |
| | | 506.15 | 42.29 | 230.87 | 289.10 | 366.68 | 242.87 |
| 4 | 4 | 512.59 | 41.65 | 247.62 | 358.14 | 342.32 | 277.14 |
| 4 | 5 | 502.26 | 61.70 | 212.79 | 406.28 | 306.18 | 280.63 |
| 4 | 6 | 456.76 | 123.51 | 195.03 | 434.07 | 281.62 | 298.07 |
| 4 | 7 | 433.48 | 156.25 | 154.73 | 486.08 | 268.71 | 320.35 |
| 4 | 8 | 413.76 | 175.79 | 121.45 | 520.87 | 258.74 | 343.90 |
| 4 | 9 | 397.31 | 190.68 | 98.45 | 542.84 | 253.32 | 366.12 |
| 4 | 10 | 385.53 | 199.85 | 85.54 | 552.87 | 249.88 | 382.79 |
| 4 | 11 | 383.41 | 197.84 | 82.23 | 551.94 | 243.76 | 391.34 |
| 4 | 12 | 376.73 | 201.59 | 88.10 | 540.79 | 243.11 | 390.69 |
| 4 | 13 | 377.69 | 197.59 | 101.50 | 522.18 | 240.37 | 382.50 |
| 4 | 14 | 379.55 | 193.26 | 117.64 | 501.16 | 238.97 | 370.82 |
| 4 | 15 | 371.91 | 200.23 | 136.02 | 477.72 | 244.90 | 356.52 |
| 4 | 16 | 366.44 | 204.75 | 156.57 | 451.84 | 250.35 | 340.66 |
| 4 | 17 | 378.83 | 188.18 | 174.40 | 429.15 | 247.45 | 325.88 |
| 4 | 18 | 364.59 | 202.87 | 200.32 | 396.78 | 258.94 | 310.10 |
| 4 | 19 | 342.43 | 227.10 | 228.11 | 362.29 | 272.03 | 297.34 |
| 4 | 20 | 313.16 | 261.76 | 252.38 | 333.76 | 284.11 | 290.69 |
| | | 259.67 | 180.58 | 201.84 | 409.79 | 214.97 | 299.72 |
| 4 | 21 | 218.57 | 226.57 | 218.57 | 226.57 | 222.73 | 221.97 |

COMPROBACION DEL ESTADO LIMITE DE FISURACION

D: Cara Dorsal. F: Cara Frontal

(1): Profundidad de la zona comprimida. Está medida desde el paramento superior si el momento es positivo, y desde el inferior si es negativo.

(2): Acortamiento de la fibra extrema más comprimida del hormigón x 1000.

Ts, Tsr: Tensión de la armadura pasiva más traccionada. Positiva si está traccionada

| CA FISURACION | V SEC (2) | RA Sm Tsr mm | NEUTRALIZACION ABERT. FISURAS | | CARGAS EXTERIORES SIN PRETENSADO | | Ts Kp/cm2 | MOMENTO DE | |
|------------------|--------------|--------------------|----------------------------------|---------------------|----------------------------------|----------|--------------|------------|---------------|
| | | | AXIL Esm T mm | MOMENTO Wk mT | MOMENTO mT | (1) m | | (2) m | MOMENTO mT |

1 19 F130.19 2846.83 987.60 -379.69 1.193 0.2010 9.39 391.30 0.479
0.5420 1760.00 0.000002 0.000

| | | | | | | | | | | |
|--------|---------|----------|---------|---------|----------|-------|--------|-------|----------|-------|
| 2 | 2 | D130.19 | 2757.69 | 1102.47 | -546.23 | 1.238 | 0.1879 | -5.80 | 260.73 | 0.467 |
| 0.5389 | 1823.44 | 0.000000 | 0.000 | | | | | | | |
| 2 | 3 | D130.19 | 2710.31 | 916.66 | -288.85 | 1.129 | 0.2012 | 34.13 | 435.57 | 0.464 |
| 0.5431 | 1858.78 | 0.000007 | 0.001 | | | | | | | |
| 2 | 17 | D129.66 | 2359.98 | 274.88 | 311.28 | 1.204 | 0.2171 | 6.11 | 1020.65 | 0.445 |
| 0.5650 | 2063.31 | 0.000001 | 0.000 | | | | | | | |
| 2 | 18 | D129.66 | 2333.39 | 634.63 | -8.37 | 1.144 | 0.2225 | 31.03 | 653.12 | 0.423 |
| 0.5791 | 2287.97 | 0.000006 | 0.001 | | | | | | | |
| 2 | 19 | D129.66 | 2311.07 | 891.10 | -337.30 | 1.241 | 0.2049 | -7.24 | 392.67 | 0.411 |
| 0.5797 | 2392.49 | 0.000000 | 0.000 | | | | | | | |
| 2 | 19 | F130.19 | 2355.73 | 940.23 | -337.30 | 1.046 | 0.1868 | 65.39 | 344.57 | 0.423 |
| 0.5435 | 2152.07 | 0.000012 | 0.003 | | | | | | | |
| 2 | 20 | D130.19 | 2342.99 | 1097.85 | -621.44 | 1.234 | 0.1594 | -3.71 | 186.36 | 0.418 |
| 0.5399 | 2175.00 | 0.000000 | 0.000 | | | | | | | |
| 2 | 21 | D129.64 | 2342.10 | 1155.79 | -1907.25 | 1.043 | 0.2314 | 82.60 | -2617.72 | 0.613 |
| 0.4844 | 1007.64 | 0.000016 | 0.003 | | | | | | | |
| | | | | | | | | | | |
| 3 | 1 | D129.64 | 2342.10 | 1155.79 | -1907.25 | 1.043 | 0.2314 | 82.60 | -2617.72 | 0.613 |
| 0.4844 | 1007.64 | 0.000016 | 0.003 | | | | | | | |
| 3 | 2 | D130.19 | 2342.99 | 1097.87 | -623.80 | 1.237 | 0.1590 | -4.64 | 186.34 | 0.418 |
| 0.5399 | 2175.00 | 0.000000 | 0.000 | | | | | | | |
| 3 | 3 | D130.19 | 2355.73 | 940.26 | -339.50 | 1.049 | 0.1863 | 63.83 | 344.54 | 0.423 |
| 0.5435 | 2152.07 | 0.000012 | 0.003 | | | | | | | |
| 3 | 3 | F129.66 | 2311.07 | 891.13 | -339.50 | 1.244 | 0.2045 | -8.19 | 392.63 | 0.411 |
| 0.5797 | 2392.49 | 0.000000 | 0.000 | | | | | | | |
| 3 | 4 | D129.66 | 2333.39 | 634.67 | -9.51 | 1.146 | 0.2222 | 30.33 | 653.07 | 0.423 |
| 0.5791 | 2287.97 | 0.000006 | 0.001 | | | | | | | |
| 3 | 5 | D129.66 | 2359.98 | 274.96 | 305.20 | 1.212 | 0.2159 | 3.11 | 1020.57 | 0.445 |
| 0.5650 | 2063.31 | 0.000001 | 0.000 | | | | | | | |
| 3 | 19 | F130.19 | 2710.30 | 916.86 | -289.12 | 1.129 | 0.2012 | 34.10 | 435.37 | 0.464 |
| 0.5431 | 1858.79 | 0.000006 | 0.001 | | | | | | | |
| 3 | 20 | D130.19 | 2757.68 | 1102.62 | -546.57 | 1.238 | 0.1879 | -5.87 | 260.57 | 0.467 |
| 0.5389 | 1823.45 | 0.000000 | 0.000 | | | | | | | |
| | | | | | | | | | | |
| 4 | 3 | D130.19 | 2846.84 | 987.54 | -380.04 | 1.194 | 0.2009 | 9.20 | 391.36 | 0.479 |
| 0.5420 | 1760.00 | 0.000002 | 0.000 | | | | | | | |

COMPOSICION DE TENSIONES ADMISIBLES EN LA HIPOTESIS NUMERO = 3

=====

COEFICIENTES DE PONDERACIÓN DE LAS ACCIONES

| | | |
|------------------------------|---|-------|
| Peso propio | = | 1.000 |
| Resto de la carga permanente | = | 1.000 |
| Sobrecargas | = | 0.600 |
| Pretensado final | = | 0.900 |
| Gradiente térmico | = | 0.600 |
| Asientos de apoyos | = | 0.000 |

| VAN SEC | MAXIMO POSITIVO | | MAXIMO NEGATIVO | | BORDE VAINA MAS EXTEIOR | |
|---------|-----------------|----------|-----------------|----------|-------------------------|----------|
| | SUPERIOR | INFERIOR | SUPERIOR | INFERIOR | INFERIOR | SUPERIOR |
| | T/m2 | T/m2 | T/m2 | T/m2 | T/m2 | T/m2 |

| | | | | | | | |
|---|----|--------|---------|---------|--------|--------|--------|
| 1 | 1 | 218.57 | 226.57 | 218.57 | 226.57 | 222.73 | 221.97 |
| 1 | 2 | 271.08 | 167.72 | 201.27 | 246.40 | 212.66 | 222.51 |
| | | 325.16 | 247.55 | 251.79 | 450.93 | 281.29 | 345.52 |
| 1 | 3 | 371.74 | 192.45 | 226.92 | 363.70 | 262.29 | 297.50 |
| 1 | 4 | 395.93 | 165.88 | 198.53 | 398.90 | 245.65 | 310.49 |
| 1 | 5 | 421.91 | 137.41 | 172.02 | 431.96 | 225.85 | 326.59 |
| 1 | 6 | 413.80 | 148.99 | 154.84 | 453.88 | 223.68 | 341.29 |
| 1 | 7 | 423.02 | 140.12 | 133.95 | 480.16 | 213.73 | 357.36 |
| 1 | 8 | 433.26 | 130.12 | 115.21 | 504.03 | 204.50 | 371.89 |
| 1 | 9 | 436.15 | 128.89 | 98.70 | 525.47 | 201.88 | 383.77 |
| 1 | 10 | 435.42 | 132.62 | 84.91 | 544.54 | 204.41 | 392.14 |
| 1 | 11 | 442.33 | 128.58 | 78.68 | 556.13 | 206.21 | 392.88 |
| 1 | 12 | 441.94 | 133.48 | 81.61 | 557.50 | 216.59 | 384.30 |
| 1 | 13 | 451.21 | 127.17 | 94.17 | 547.90 | 225.41 | 367.47 |
| 1 | 14 | 465.83 | 114.33 | 116.78 | 526.38 | 236.85 | 344.90 |
| 1 | 15 | 479.44 | 101.86 | 149.67 | 492.06 | 255.04 | 320.81 |
| 1 | 16 | 500.31 | 71.83 | 189.59 | 440.52 | 275.13 | 297.75 |
| 1 | 17 | 548.15 | 7.07 | 201.08 | 420.23 | 307.33 | 277.91 |
| 1 | 18 | 552.44 | -5.95 | 234.23 | 374.13 | 350.56 | 271.60 |
| 1 | 19 | 544.71 | -3.88 | 213.51 | 392.69 | 379.77 | 250.46 |
| | | 486.13 | -68.98 | 170.65 | 140.16 | 319.23 | 164.36 |
| 1 | 20 | 453.83 | -36.59 | 101.78 | 363.84 | 324.29 | 146.24 |
| 1 | 21 | 388.84 | 34.44 | -15.53 | 494.56 | 299.54 | 64.80 |
| | | | | | | | |
| 2 | 1 | 388.84 | 34.44 | -15.53 | 494.56 | 299.54 | 64.80 |
| 2 | 2 | 458.44 | -53.65 | 162.64 | 282.76 | 320.52 | 183.64 |
| 2 | 3 | 482.33 | -87.23 | 247.03 | 179.95 | 299.27 | 231.81 |
| | | 539.43 | -28.09 | 292.38 | 268.27 | 357.02 | 286.91 |
| 2 | 4 | 551.27 | -48.69 | 310.73 | 238.08 | 306.36 | 287.94 |
| 2 | 5 | 520.40 | -16.91 | 260.05 | 291.97 | 236.60 | 273.90 |
| 2 | 6 | 474.28 | 36.47 | 201.04 | 359.13 | 192.55 | 287.83 |
| 2 | 7 | 458.42 | 50.35 | 137.93 | 427.38 | 157.34 | 324.14 |
| 2 | 8 | 449.45 | 54.58 | 91.47 | 474.47 | 129.14 | 365.96 |
| 2 | 9 | 440.45 | 58.66 | 60.69 | 503.15 | 110.74 | 400.98 |
| 2 | 10 | 439.13 | 54.39 | 44.16 | 516.10 | 94.78 | 421.97 |
| 2 | 11 | 441.66 | 46.64 | 34.25 | 522.69 | 83.97 | 430.39 |
| 2 | 12 | 447.52 | 36.08 | 34.00 | 519.48 | 79.27 | 422.64 |
| 2 | 13 | 457.51 | 21.53 | 45.58 | 503.68 | 81.00 | 397.90 |
| 2 | 14 | 466.32 | 8.69 | 69.11 | 474.60 | 95.10 | 359.72 |
| 2 | 15 | 477.06 | -6.93 | 104.77 | 431.03 | 119.96 | 314.66 |
| 2 | 16 | 492.75 | -30.21 | 152.14 | 372.02 | 156.24 | 272.85 |
| 2 | 17 | 528.54 | -80.83 | 187.37 | 323.94 | 206.68 | 246.60 |
| 2 | 18 | 531.03 | -92.13 | 215.90 | 283.57 | 276.65 | 237.13 |
| 2 | 19 | 490.91 | -51.84 | 173.82 | 327.53 | 316.47 | 208.70 |
| | | 440.71 | -100.56 | 138.69 | 210.04 | 266.74 | 154.88 |
| 2 | 20 | 389.68 | -46.44 | 33.69 | 358.42 | 272.23 | 90.47 |
| 2 | 21 | 298.47 | 55.77 | -135.85 | 549.96 | 237.32 | -27.85 |
| | | | | | | | |
| 3 | 1 | 298.47 | 55.77 | -135.85 | 549.96 | 237.32 | -27.85 |
| 3 | 2 | 388.65 | -45.25 | 34.30 | 357.73 | 271.78 | 90.85 |
| 3 | 3 | 439.74 | -99.47 | 139.27 | 241.71 | 266.44 | 162.51 |
| | | 489.91 | -50.64 | 174.42 | 212.73 | 316.17 | 183.12 |
| 3 | 4 | 530.52 | -91.51 | 216.47 | 282.89 | 276.60 | 237.31 |
| 3 | 5 | 525.72 | -77.48 | 187.90 | 323.31 | 207.12 | 246.63 |
| 3 | 6 | 490.81 | -27.92 | 152.58 | 371.50 | 157.02 | 272.77 |
| 3 | 7 | 478.92 | -9.12 | 105.18 | 430.56 | 118.84 | 314.50 |
| 3 | 8 | 468.91 | 5.66 | 69.48 | 474.16 | 93.13 | 359.51 |
| 3 | 9 | 455.38 | 24.03 | 45.93 | 503.27 | 82.87 | 397.67 |

| | | | | | | | |
|---|----|--------|--------|--------|--------|--------|--------|
| 3 | 10 | 447.30 | 36.33 | 34.33 | 519.09 | 79.47 | 422.40 |
| 3 | 11 | 441.57 | 46.75 | 34.55 | 522.34 | 84.06 | 430.16 |
| 3 | 12 | 439.62 | 53.82 | 42.64 | 517.88 | 94.32 | 423.09 |
| 3 | 13 | 442.83 | 55.87 | 58.93 | 505.22 | 108.66 | 402.17 |
| 3 | 14 | 446.99 | 57.47 | 89.46 | 476.83 | 131.02 | 367.08 |
| 3 | 15 | 456.70 | 52.37 | 135.68 | 430.03 | 158.39 | 325.04 |
| 3 | 16 | 476.37 | 33.99 | 198.52 | 362.11 | 191.71 | 288.33 |
| 3 | 17 | 523.49 | -20.57 | 256.93 | 295.68 | 236.12 | 273.74 |
| 3 | 18 | 552.20 | -49.80 | 307.33 | 242.13 | 306.46 | 286.88 |
| 3 | 19 | 539.39 | -28.05 | 288.70 | 271.87 | 357.01 | 284.88 |
| | | 482.29 | -87.18 | 243.53 | 148.80 | 299.26 | 222.03 |
| 3 | 20 | 458.35 | -53.54 | 158.88 | 287.04 | 320.48 | 181.29 |
| 3 | 21 | 388.69 | 34.60 | -14.77 | 493.69 | 299.47 | 65.30 |
| | | | | | | | |
| 4 | 1 | 388.69 | 34.60 | -14.77 | 493.69 | 299.47 | 65.30 |
| 4 | 2 | 453.66 | -36.40 | 102.48 | 363.04 | 324.21 | 146.69 |
| 4 | 3 | 485.95 | -68.78 | 171.29 | 288.74 | 319.16 | 195.50 |
| | | 544.52 | -3.65 | 214.18 | 315.65 | 379.70 | 235.10 |
| 4 | 4 | 552.80 | -6.38 | 234.84 | 373.41 | 350.63 | 271.85 |
| 4 | 5 | 548.99 | 6.08 | 201.63 | 419.58 | 307.35 | 278.04 |
| 4 | 6 | 504.06 | 67.38 | 189.98 | 440.05 | 274.57 | 297.78 |
| 4 | 7 | 484.51 | 95.86 | 150.02 | 491.65 | 253.53 | 320.78 |
| 4 | 8 | 467.85 | 111.94 | 117.07 | 526.04 | 236.00 | 344.84 |
| 4 | 9 | 453.04 | 125.00 | 94.42 | 547.59 | 224.46 | 367.38 |
| 4 | 10 | 441.83 | 133.59 | 81.84 | 557.22 | 216.65 | 384.21 |
| 4 | 11 | 440.28 | 130.97 | 78.88 | 555.88 | 207.50 | 392.79 |
| 4 | 12 | 431.43 | 137.29 | 85.08 | 544.34 | 207.03 | 392.06 |
| 4 | 13 | 430.24 | 135.82 | 98.81 | 525.33 | 205.76 | 383.71 |
| 4 | 14 | 429.58 | 134.44 | 115.29 | 503.93 | 206.86 | 371.85 |
| 4 | 15 | 417.08 | 147.11 | 134.01 | 480.08 | 217.35 | 357.34 |
| 4 | 16 | 406.73 | 157.31 | 154.89 | 453.82 | 227.65 | 341.26 |
| 4 | 17 | 417.41 | 142.71 | 172.09 | 431.88 | 228.11 | 326.57 |
| 4 | 18 | 395.71 | 166.13 | 198.59 | 398.83 | 245.74 | 310.48 |
| 4 | 19 | 364.14 | 201.43 | 226.95 | 363.66 | 264.81 | 297.49 |
| 4 | 20 | 324.74 | 248.04 | 251.80 | 334.45 | 281.39 | 290.70 |
| | | 270.69 | 168.17 | 201.29 | 466.36 | 212.74 | 326.05 |
| 4 | 21 | 218.57 | 226.57 | 218.57 | 226.57 | 222.73 | 221.97 |

COMPROBACION DEL ESTADO LIMITE DE FISURACION

D: Cara Dorsal. F: Cara Frontal

(1): Profundidad de la zona comprimida. Está medida desde el paramento superior si el momento es positivo, y desde el inferior si es negativo.

(2): Acortamiento de la fibra extrema más comprimida del hormigón x 1000.

Ts, Tsr: Tensión de la armadura pasiva más traccionada. Positiva si está traccionada

| CA | | NEUTRALIZACION | | CARGAS EXTERIORES SIN PRETENSADO | | | MOMENTO DE | | |
|------------|-------|----------------|---------|----------------------------------|-----|-----|------------|-------------|---|
| FISURACION | | ABERT. FISURAS | | | | | | | |
| V SEC | RA Sm | AXIL | MOMENTO | MOMENTO | (1) | (2) | Ts | MOMENTO (1) | |
| (2) | Tsr | Esm | Wk | | | | | | |
| | mm | T | mT | mT | m | | Kp/cm2 | mT | m |

| | | | | | | | | | | |
|--------|---------|----------|---------|---------|----------|-------|--------|--------|----------|-------|
| 1 | 18 | D129.66 | 2819.55 | 706.00 | -50.38 | 1.257 | 0.2497 | -15.62 | 692.97 | 0.468 |
| 0.6018 | 2032.60 | 0.000000 | 0.000 | | | | | | | |
| 1 | 19 | D129.66 | 2797.06 | 927.71 | -280.53 | 1.266 | 0.2455 | -18.71 | 467.55 | 0.460 |
| 0.5978 | 2071.42 | 0.000000 | 0.000 | | | | | | | |
| 1 | 19 | F130.19 | 2846.83 | 987.60 | -280.53 | 1.072 | 0.2218 | 64.16 | 391.30 | 0.479 |
| 0.5420 | 1760.00 | 0.000012 | 0.003 | | | | | | | |
| 1 | 20 | D130.19 | 2828.97 | 1124.64 | -496.39 | 1.167 | 0.2035 | 19.33 | 252.36 | 0.476 |
| 0.5385 | 1768.71 | 0.000004 | 0.001 | | | | | | | |
| 1 | 21 | D129.64 | 2818.02 | 1176.07 | -1817.83 | 1.235 | 0.2238 | -5.78 | -2741.19 | 0.674 |
| 0.5111 | 870.81 | 0.000000 | 0.000 | | | | | | | |

| | | | | | | | | | | |
|--------|---------|----------|---------|---------|----------|-------|--------|--------|----------|-------|
| 2 | 1 | D129.64 | 2818.02 | 1176.07 | -1817.83 | 1.235 | 0.2238 | -5.78 | -2741.19 | 0.674 |
| 0.5111 | 870.81 | 0.000000 | 0.000 | | | | | | | |
| 2 | 2 | D130.19 | 2757.69 | 1102.47 | -447.48 | 1.113 | 0.2070 | 41.72 | 260.73 | 0.467 |
| 0.5389 | 1823.44 | 0.000008 | 0.002 | | | | | | | |
| 2 | 3 | D130.19 | 2710.31 | 916.66 | -192.82 | 1.007 | 0.2238 | 99.54 | 435.57 | 0.464 |
| 0.5431 | 1858.78 | 0.000019 | 0.004 | | | | | | | |
| 2 | 3 | F129.66 | 2661.60 | 860.75 | -192.82 | 1.205 | 0.2433 | 6.41 | 503.00 | 0.447 |
| 0.5936 | 2152.04 | 0.000001 | 0.000 | | | | | | | |
| 2 | 4 | D129.66 | 2623.97 | 572.64 | 130.32 | 1.145 | 0.2513 | 34.72 | 781.36 | 0.453 |
| 0.5921 | 2106.50 | 0.000007 | 0.001 | | | | | | | |
| 2 | 5 | D129.66 | 2594.55 | 184.61 | 444.20 | 1.221 | 0.2367 | -0.59 | 1164.48 | 0.469 |
| 0.5774 | 1940.51 | 0.000000 | 0.000 | | | | | | | |
| 2 | 15 | D129.66 | 2410.95 | -375.98 | 944.02 | 1.247 | 0.2175 | -10.00 | 1695.43 | 0.497 |
| 0.5214 | 1592.67 | 0.000000 | 0.000 | | | | | | | |
| 2 | 16 | D129.66 | 2390.94 | -79.60 | 692.56 | 1.181 | 0.2251 | 15.63 | 1387.47 | 0.472 |
| 0.5427 | 1803.54 | 0.000003 | 0.001 | | | | | | | |
| 2 | 17 | D129.66 | 2359.98 | 274.88 | 438.26 | 1.022 | 0.2477 | 100.74 | 1020.65 | 0.445 |
| 0.5650 | 2063.31 | 0.000019 | 0.004 | | | | | | | |
| 2 | 18 | D129.66 | 2333.39 | 634.63 | 95.57 | 0.979 | 0.2504 | 129.37 | 653.12 | 0.423 |
| 0.5791 | 2287.97 | 0.000025 | 0.005 | | | | | | | |
| 2 | 19 | D129.66 | 2311.07 | 891.10 | -251.95 | 1.123 | 0.2224 | 40.26 | 392.67 | 0.411 |
| 0.5797 | 2392.49 | 0.000008 | 0.002 | | | | | | | |
| 2 | 19 | F130.19 | 2355.73 | 940.23 | -251.95 | 0.923 | 0.2100 | 141.72 | 344.57 | 0.423 |
| 0.5435 | 2152.07 | 0.000027 | 0.006 | | | | | | | |
| 2 | 20 | D130.19 | 2342.99 | 1097.85 | -538.85 | 1.111 | 0.1753 | 36.29 | 186.36 | 0.418 |
| 0.5399 | 2175.00 | 0.000007 | 0.002 | | | | | | | |
| 2 | 21 | D129.64 | 2342.10 | 1155.79 | -2020.34 | 0.951 | 0.2616 | 155.39 | -2617.72 | 0.613 |
| 0.4844 | 1007.64 | 0.000030 | 0.007 | | | | | | | |

| | | | | | | | | | | |
|--------|---------|----------|---------|---------|----------|-------|--------|--------|----------|-------|
| 3 | 1 | D129.64 | 2342.10 | 1155.79 | -2020.34 | 0.951 | 0.2616 | 155.39 | -2617.72 | 0.613 |
| 0.4844 | 1007.64 | 0.000030 | 0.007 | | | | | | | |
| 3 | 2 | D130.19 | 2342.99 | 1097.87 | -541.69 | 1.115 | 0.1747 | 34.66 | 186.34 | 0.418 |
| 0.5399 | 2175.00 | 0.000007 | 0.001 | | | | | | | |
| 3 | 3 | D130.19 | 2355.73 | 940.26 | -254.58 | 0.927 | 0.2093 | 138.90 | 344.54 | 0.423 |
| 0.5435 | 2152.07 | 0.000026 | 0.006 | | | | | | | |
| 3 | 3 | F129.66 | 2311.07 | 891.13 | -254.58 | 1.127 | 0.2218 | 38.45 | 392.63 | 0.411 |
| 0.5797 | 2392.49 | 0.000007 | 0.002 | | | | | | | |
| 3 | 4 | D129.66 | 2333.39 | 634.67 | 94.20 | 0.982 | 0.2500 | 127.55 | 653.07 | 0.423 |
| 0.5791 | 2287.97 | 0.000024 | 0.005 | | | | | | | |
| 3 | 5 | D129.66 | 2359.98 | 274.96 | 430.96 | 1.034 | 0.2456 | 92.86 | 1020.57 | 0.445 |
| 0.5650 | 2063.31 | 0.000018 | 0.004 | | | | | | | |
| 3 | 6 | D129.66 | 2390.95 | -79.49 | 687.48 | 1.187 | 0.2241 | 12.96 | 1387.37 | 0.472 |
| 0.5427 | 1803.54 | 0.000002 | 0.001 | | | | | | | |
| 3 | 7 | D129.66 | 2410.96 | -375.87 | 948.68 | 1.242 | 0.2184 | -7.97 | 1695.32 | 0.497 |
| 0.5214 | 1592.67 | 0.000000 | 0.000 | | | | | | | |
| 3 | 17 | D129.66 | 2594.56 | 184.89 | 451.82 | 1.212 | 0.2382 | 3.23 | 1164.19 | 0.469 |
| 0.5774 | 1940.51 | 0.000001 | 0.000 | | | | | | | |

| | | | | | | | | | | |
|--------|---------|----------|---------|---------|----------|-------|--------|-------|----------|-------|
| 3 | 18 | D129.66 | 2623.97 | 572.89 | 132.45 | 1.142 | 0.2519 | 36.27 | 781.11 | 0.453 |
| 0.5921 | 2106.51 | 0.000007 | 0.002 | | | | | | | |
| 3 | 19 | D129.66 | 2661.59 | 860.96 | -193.13 | 1.205 | 0.2433 | 6.35 | 502.79 | 0.447 |
| 0.5936 | 2152.05 | 0.000001 | 0.000 | | | | | | | |
| 3 | 19 | F130.19 | 2710.30 | 916.86 | -193.13 | 1.007 | 0.2237 | 99.45 | 435.37 | 0.464 |
| 0.5431 | 1858.79 | 0.000019 | 0.004 | | | | | | | |
| 3 | 20 | D130.19 | 2757.68 | 1102.62 | -447.88 | 1.113 | 0.2069 | 41.58 | 260.57 | 0.467 |
| 0.5389 | 1823.45 | 0.000008 | 0.002 | | | | | | | |
| 3 | 21 | D129.64 | 2818.01 | 1176.17 | -1815.87 | 1.237 | 0.2234 | -6.43 | -2741.29 | 0.674 |
| 0.5111 | 870.81 | 0.000000 | 0.000 | | | | | | | |

| | | | | | | | | | | |
|--------|---------|----------|---------|---------|----------|-------|--------|--------|----------|-------|
| 4 | 1 | D129.64 | 2818.01 | 1176.17 | -1815.87 | 1.237 | 0.2234 | -6.43 | -2741.29 | 0.674 |
| 0.5111 | 870.81 | 0.000000 | 0.000 | | | | | | | |
| 4 | 2 | D130.19 | 2828.97 | 1124.66 | -496.85 | 1.168 | 0.2034 | 19.11 | 252.34 | 0.476 |
| 0.5385 | 1768.71 | 0.000004 | 0.001 | | | | | | | |
| 4 | 3 | D130.19 | 2846.84 | 987.54 | -280.95 | 1.073 | 0.2216 | 63.84 | 391.36 | 0.479 |
| 0.5420 | 1760.00 | 0.000012 | 0.003 | | | | | | | |
| 4 | 3 | F129.66 | 2797.06 | 927.65 | -280.95 | 1.266 | 0.2454 | -18.91 | 467.61 | 0.460 |
| 0.5978 | 2071.42 | 0.000000 | 0.000 | | | | | | | |
| 4 | 4 | D129.66 | 2819.55 | 705.84 | -49.30 | 1.256 | 0.2499 | -15.23 | 693.13 | 0.468 |
| 0.6018 | 2032.60 | 0.000000 | 0.000 | | | | | | | |