# EBLHMA.png

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**ΠΑΝΕΠΙΣΤΗΜΙΟ ΔΥΤΙΚΗΣ ΑΤΤΙΚΗΣ**

**ΤΜΗΜΑ ΠΟΛΙΤΙΚΩΝ ΜΗΧΑΝΙΚΩΝ**

**Εργαστηριακοι Ελεγχοι Οπλισμενου Σκυροδεματοσ**

 Χειμερινό εξάμηνο

Ακαδ. έτος 2019-20

4η ΑΣΚΗΣΗ

**ΜΕΤΡΟ ΕΛΑΣΤΙΚΟΤΗΤΑΣ**

**ΚΑΙ ΛΟΓΟΣ POISSON**

Κατά την κεντρική θλίψη ενός κυλινδρικού δοκιμίου σκυροδέματος διαστάσεων h = 30 cm και d = 15 cm, ελήφθησαν οι κάτωθι τιμές δυνάμεων και μετατοπίσεων κατά τους δύο άξονες.

Δεδομένου ότι σας δίνονται οι τιμές δυνάμεων και μετατοπίσεων

1. Να σχεδιασθεί το διάγραμμα σ – ε
2. Να υπολογιστεί το μέτρο ελαστικότητας Ε και ο λόγος Poisson ν του σκυροδέματος
3. Να γραφτούν συμπεράσματα και παρατηρήσεις

Το μήκος *l*ο = 200 mm.

(Σημείωση: Οι τιμές των Δl και Δd στον παρακάτω πίνακα είναι πολλαπλασιασμένες επί 1000. Οι τιμές πρέπει να διαιρεθούν με το 1000 για να μετατραπούν σε mm).

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| **ΠΕΜΠΤΗ 9:00-11:00** |  |  | **ΠΕΜΠΤΗ 11:00-13:00** |  |
|  |  |  |  |  |  |  |
| **P (kN)** | **Δl (mm·10-3)** | **Δd (mm·10-3)** |  | **P (kN)** | **Δl (mm·10-3)** | **Δd (mm·10-3)** |
| 0 | 0.00 | 0.00 |  | 0 | 0.00 | 0.00 |
| 0.1326 | 0.06 | 0.02 |  | 0.1235 | 0.07 | 0.02 |
| 0.3264 | 0.16 | 0.04 |  | 0.304 | 0.18 | 0.05 |
| 0.765 | 0.37 | 0.11 |  | 0.7125 | 0.42 | 0.12 |
| 1.6932 | 0.81 | 0.26 |  | 1.577 | 0.93 | 0.28 |
| 16.4118 | 6.59 | 1.89 |  | 15.2855 | 7.49 | 2.28 |
| 19.7982 | 7.45 | 2.25 |  | 18.4395 | 8.48 | 2.30 |
| 26.7546 | 9.23 | 2.77 |  | 24.9185 | 10.50 | 2.68 |
| 38.4132 | 13.81 | 4.26 |  | 35.777 | 15.71 | 4.10 |
| 48.5724 | 16.94 | 5.33 |  | 45.239 | 19.26 | 5.95 |
| 57.6606 | 19.10 | 5.47 |  | 53.7035 | 21.72 | 6.66 |
| 66.9222 | 21.43 | 6.49 |  | 62.3295 | 24.37 | 6.53 |
| 76.143 | 23.94 | 6.83 |  | 70.9175 | 27.22 | 8.08 |
| 85.5372 | 27.05 | 7.63 |  | 79.667 | 30.76 | 8.11 |
| 93.9216 | 30.60 | 9.47 |  | 87.476 | 34.80 | 10.15 |
| 102.9894 | 32.83 | 9.90 |  | 95.9215 | 37.33 | 11.72 |
| 114.699 | 35.70 | 11.21 |  | 106.8275 | 40.60 | 11.95 |
| 120.564 | 38.24 | 11.67 |  | 112.29 | 43.48 | 12.94 |
| 131.631 | 43.72 | 13.34 |  | 122.5975 | 49.72 | 13.35 |
| 141.5046 | 47.52 | 14.11 |  | 131.7935 | 54.04 | 14.40 |
| 147.951 | 49.25 | 13.74 |  | 137.7975 | 56.01 | 14.90 |
| 160.4052 | 53.24 | 15.20 |  | 149.397 | 60.55 | 18.34 |
| 168.7896 | 57.01 | 15.82 |  | 157.206 | 64.84 | 17.31 |
| 177.4392 | 63.91 | 19.70 |  | 165.262 | 72.69 | 21.41 |
| 184.8648 | 67.52 | 20.16 |  | 172.178 | 76.79 | 20.54 |
| 197.1762 | 73.20 | 20.60 |  | 183.6445 | 83.24 | 22.32 |
| 204.0918 | 77.01 | 21.75 |  | 190.0855 | 87.58 | 25.33 |
| 213.9756 | 84.43 | 24.30 |  | 199.291 | 96.01 | 29.05 |
| 222.9516 | 88.46 | 24.26 |  | 207.651 | 100.60 | 31.18 |
| 232.7232 | 94.57 | 28.21 |  | 216.752 | 107.55 | 29.00 |
| 241.5768 | 100.06 | 27.08 |  | 224.998 | 113.80 | 33.50 |
| 251.9196 | 105.57 | 33.09 |  | 234.631 | 120.06 | 35.67 |
| 259.539 | 109.30 | 33.41 |  | 241.7275 | 124.30 | 37.69 |
| 268.9026 | 113.86 | 31.37 |  | 250.4485 | 129.49 | 35.65 |
| 278.2968 | 118.50 | 32.64 |  | 259.198 | 134.77 | 37.36 |
| 287.8542 | 127.50 | 35.53 |  | 268.0995 | 145.00 | 38.19 |
| 297.1566 | 132.60 | 36.43 |  | 276.7635 | 150.80 | 45.27 |
| 314.9862 | 147.90 | 46.28 |  | 293.3695 | 168.20 | 46.25 |
| 330.5004 | 163.20 | 45.85 |  | 307.819 | 185.60 | 54.67 |
| 354.6336 | 178.50 | 53.95 |  | 330.296 | 203.00 | 62.11 |
| 392.1492 | 193.80 | 52.60 |  | 365.237 | 220.40 | 61.15 |
| 416.2314 | 209.10 | 59.29 |  | 387.6665 | 237.80 | 72.64 |
| 435.0402 | 224.40 | 62.90 |  | 405.1845 | 255.20 | 78.26 |
| 458.9286 | 239.70 | 67.28 |  | 427.4335 | 272.60 | 80.77 |
| 477.8802 | 255.00 | 71.30 |  | 445.0845 | 290.00 | 88.72 |
| 498.7086 | 270.3 | 79.034 |  | 450.7275 | 295.80 | 84.88 |
| 520.5264 | 285.6 | 77.998 |  | 456.6555 | 301.60 | 82.55 |
| 538.2948 | 300.9 | 93.996 |  |  |  |  |
| 553.9722 | 316.2 | 94.456 |  |  |  |  |
| 572.5872 | 331.5 | 90.295 |  |  |  |  |
| 590.5596 | 346.8 | 102.263 |  |  |  |  |
| 609.2256 | 367.2 | 108.180 |  |  |  |  |
| 618.4872 | 382.5 | 115.129 |  |  |  |  |
| 628.065 | 397.8 | 120.053 |  |  |  |  |
| 636.3984 | 413.1 | 121.094 |  |  |  |  |
| 645.8946 | 433.5 | 123.916 |  |  |  |  |
| 661.5134 | 459 | 136.168 |  |  |  |  |
| 648.896 | 489.6 | 153.477 |  |  |  |  |
| 639.8835 | 499.8 | 153.386 |  |  |  |  |
| 630.8711 | 530.4 | 151.146 |  |  |  |  |
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| **ΠΕΜΠΤΗ 13:00-15:00** |  |  | **ΠΕΜΠΤΗ 15:00-17:00** |  |
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| **P (kN)** | **Δl (mm·10-3)** | **Δd (mm·10-3)** |  | **P (kN)** | **Δl (mm·10-3)** | **Δd (mm·10-3)** |
| 0 | 0.00 | 0.00 |  | 0 | 0.00 | 0.00 |
| 0.1001 | 0.05 | 0.01 |  | 0.117 | 0.05 | 0.02 |
| 0.2464 | 0.12 | 0.04 |  | 0.288 | 0.13 | 0.04 |
| 0.5775 | 0.27 | 0.08 |  | 0.675 | 0.31 | 0.09 |
| 1.2782 | 0.61 | 0.17 |  | 1.494 | 0.69 | 0.20 |
| 12.3893 | 4.91 | 1.51 |  | 14.481 | 5.55 | 1.65 |
| 14.9457 | 5.55 | 1.51 |  | 17.469 | 6.28 | 1.81 |
| 20.1971 | 6.88 | 1.92 |  | 23.607 | 7.79 | 2.18 |
| 28.9982 | 10.29 | 2.84 |  | 33.894 | 11.64 | 3.22 |
| 36.6674 | 12.62 | 3.94 |  | 42.858 | 14.28 | 4.03 |
| 43.5281 | 14.23 | 4.30 |  | 50.877 | 16.10 | 4.89 |
| 50.5197 | 15.97 | 4.57 |  | 59.049 | 18.07 | 5.13 |
| 57.4805 | 17.84 | 4.92 |  | 67.185 | 20.18 | 6.30 |
| 64.5722 | 20.15 | 6.10 |  | 75.474 | 22.80 | 7.08 |
| 70.9016 | 22.80 | 6.27 |  | 82.872 | 25.80 | 7.16 |
| 77.7469 | 24.46 | 6.66 |  | 90.873 | 27.68 | 8.33 |
| 86.5865 | 26.60 | 8.34 |  | 101.205 | 30.10 | 8.69 |
| 91.014 | 28.49 | 7.99 |  | 106.38 | 32.24 | 10.07 |
| 99.3685 | 32.57 | 9.62 |  | 116.145 | 36.86 | 11.56 |
| 106.8221 | 35.41 | 9.87 |  | 124.857 | 40.06 | 11.07 |
| 111.6885 | 36.69 | 11.44 |  | 130.545 | 41.52 | 12.38 |
| 121.0902 | 39.67 | 12.00 |  | 141.534 | 44.89 | 13.49 |
| 127.4196 | 42.48 | 13.04 |  | 148.932 | 48.07 | 13.19 |
| 133.9492 | 47.62 | 13.84 |  | 156.564 | 53.89 | 16.79 |
| 139.5548 | 50.31 | 14.26 |  | 163.116 | 56.93 | 15.65 |
| 148.8487 | 54.54 | 15.81 |  | 173.979 | 61.71 | 16.97 |
| 154.0693 | 57.38 | 16.70 |  | 180.081 | 64.93 | 20.19 |
| 161.5306 | 62.90 | 18.70 |  | 188.802 | 71.18 | 19.36 |
| 168.3066 | 65.91 | 19.98 |  | 196.722 | 74.58 | 22.15 |
| 175.6832 | 70.46 | 20.01 |  | 205.344 | 79.73 | 22.57 |
| 182.3668 | 74.56 | 21.45 |  | 213.156 | 84.37 | 22.97 |
| 190.1746 | 78.66 | 21.47 |  | 222.282 | 89.01 | 24.22 |
| 195.9265 | 81.44 | 23.86 |  | 229.005 | 92.16 | 26.87 |
| 202.9951 | 84.84 | 24.60 |  | 237.267 | 96.00 | 26.70 |
| 210.0868 | 88.30 | 24.74 |  | 245.556 | 99.91 | 27.40 |
| 217.3017 | 95.00 | 29.18 |  | 253.989 | 107.50 | 31.39 |
| 224.3241 | 98.80 | 29.45 |  | 262.197 | 111.80 | 30.61 |
| 237.7837 | 110.20 | 33.58 |  | 277.929 | 124.70 | 36.01 |
| 249.4954 | 121.60 | 36.42 |  | 291.618 | 137.60 | 42.76 |
| 267.7136 | 133.00 | 40.74 |  | 312.912 | 150.50 | 46.51 |
| 296.0342 | 144.40 | 43.83 |  | 346.014 | 163.40 | 47.66 |
| 314.2139 | 155.80 | 44.68 |  | 367.263 | 176.30 | 48.26 |
| 328.4127 | 167.20 | 46.62 |  | 383.859 | 189.20 | 53.16 |
| 346.4461 | 178.60 | 50.02 |  | 404.937 | 202.10 | 57.92 |
| 360.7527 | 190.00 | 54.35 |  | 421.659 | 215.00 | 66.57 |
| 376.4761 | 201.4 | 56.391 |  | 440.037 | 227.9 | 71.739 |
| 392.9464 | 212.8 | 59.327 |  | 459.288 | 240.8 | 67.842 |
| 406.3598 | 224.2 | 63.706 |  | 474.966 | 253.7 | 78.117 |
| 418.1947 | 235.6 | 69.137 |  | 488.799 | 266.6 | 80.697 |
| 432.2472 | 247 | 73.474 |  | 505.224 | 279.5 | 77.973 |
| 445.8146 | 258.4 | 77.699 |  | 521.082 | 292.4 | 86.182 |
| 459.9056 | 273.6 | 82.552 |  | 537.552 | 309.6 | 89.171 |
| 466.8972 | 285 | 77.120 |  | 545.724 | 322.5 | 97.929 |
| 474.1275 | 296.4 | 86.497 |  | 554.175 | 335.4 | 90.720 |
| 480.4184 | 307.8 | 94.988 |  | 561.528 | 348.3 | 95.406 |
| 487.5871 | 323 | 87.891 |  | 569.907 | 365.5 | 111.717 |
| 494.4093 | 342 | 102.522 |  | 577.881 | 387 | 110.839 |
| 476.2458113 | 372.4 | 110.069 |  | 569.3743986 | 421.4 | 119.716 |
| 455.8352766 | 399 | 114.809 |  | 548.6987919 | 451.5 | 125.246 |
| 427.5887 | 448.4 | 124.286 |  | 493.0336971 | 507.4 | 138.426 |
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| **ΠΕΜΠΤΗ 17:00-19:00** |  | **ΠΕΜΠΤΗ 19:00-21:00** |
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| **P (kN)** | **Δl (mm·10-3)** | **Δd (mm·10-3)** |  | **P (kN)** | **Δl (mm·10-3)** | **Δd (mm·10-3)** |
| 0 | 0.00 | 0.00 |  | 0 | 0.00 | 0.00 |
| 0.0975 | 0.05 | 0.01 |  | 0.0715 | 0.03 | 0.01 |
| 0.24 | 0.12 | 0.04 |  | 0.176 | 0.08 | 0.02 |
| 0.5625 | 0.29 | 0.08 |  | 0.4125 | 0.18 | 0.05 |
| 1.245 | 0.64 | 0.18 |  | 0.913 | 0.40 | 0.11 |
| 12.0675 | 5.17 | 1.51 |  | 8.8495 | 3.23 | 0.91 |
| 14.5575 | 5.85 | 1.68 |  | 10.6755 | 3.65 | 1.08 |
| 19.6725 | 7.24 | 2.18 |  | 14.4265 | 4.53 | 1.34 |
| 28.245 | 10.83 | 3.17 |  | 20.713 | 6.77 | 1.99 |
| 35.715 | 13.29 | 3.63 |  | 26.191 | 8.30 | 2.26 |
| 42.3975 | 14.98 | 4.29 |  | 31.0915 | 9.36 | 2.70 |
| 49.2075 | 16.81 | 4.69 |  | 36.0855 | 10.50 | 3.14 |
| 55.9875 | 18.77 | 5.76 |  | 41.0575 | 11.73 | 3.57 |
| 62.895 | 21.21 | 6.10 |  | 46.123 | 13.26 | 4.10 |
| 69.06 | 24.00 | 7.09 |  | 50.644 | 15.00 | 4.18 |
| 75.7275 | 25.75 | 7.20 |  | 55.5335 | 16.09 | 5.03 |
| 84.3375 | 28.00 | 8.51 |  | 61.8475 | 17.50 | 4.85 |
| 88.65 | 29.99 | 9.15 |  | 65.01 | 18.74 | 5.31 |
| 96.7875 | 34.29 | 9.64 |  | 70.9775 | 21.43 | 6.48 |
| 104.0475 | 37.27 | 11.26 |  | 76.3015 | 23.29 | 6.54 |
| 108.7875 | 38.63 | 11.48 |  | 79.7775 | 24.14 | 7.22 |
| 117.945 | 41.76 | 12.90 |  | 86.493 | 26.10 | 8.20 |
| 124.11 | 44.71 | 12.26 |  | 91.014 | 27.95 | 8.51 |
| 130.47 | 50.13 | 13.82 |  | 95.678 | 31.33 | 9.80 |
| 135.93 | 52.96 | 16.24 |  | 99.682 | 33.10 | 9.02 |
| 144.9825 | 57.41 | 17.50 |  | 106.3205 | 35.88 | 10.77 |
| 150.0675 | 60.40 | 17.96 |  | 110.0495 | 37.75 | 10.64 |
| 157.335 | 66.22 | 19.98 |  | 115.379 | 41.38 | 12.47 |
| 163.935 | 69.38 | 19.47 |  | 120.219 | 43.36 | 12.75 |
| 171.12 | 74.17 | 20.48 |  | 125.488 | 46.36 | 13.44 |
| 177.63 | 78.48 | 21.74 |  | 130.262 | 49.05 | 15.43 |
| 185.235 | 82.80 | 24.19 |  | 135.839 | 51.75 | 15.08 |
| 190.8375 | 85.73 | 23.15 |  | 139.9475 | 53.58 | 15.64 |
| 197.7225 | 89.30 | 24.54 |  | 144.9965 | 55.81 | 16.53 |
| 204.63 | 92.94 | 29.21 |  | 150.062 | 58.09 | 16.15 |
| 211.6575 | 100.00 | 27.95 |  | 155.2155 | 62.50 | 18.55 |
| 218.4975 | 104.00 | 30.30 |  | 160.2315 | 65.00 | 20.06 |
| 231.6075 | 116.00 | 36.47 |  | 169.8455 | 72.50 | 22.37 |
| 243.015 | 128.00 | 37.55 |  | 178.211 | 80.00 | 22.33 |
| 260.76 | 140.00 | 37.86 |  | 191.224 | 87.50 | 24.67 |
| 288.345 | 152.00 | 42.37 |  | 211.453 | 95.00 | 29.57 |
| 306.0525 | 164.00 | 48.88 |  | 224.4385 | 102.50 | 28.53 |
| 319.8825 | 176.00 | 50.34 |  | 234.5805 | 110.00 | 33.08 |
| 337.4475 | 188.00 | 57.36 |  | 247.4615 | 117.50 | 31.96 |
| 351.3825 | 200.00 | 62.52 |  | 257.6805 | 125.00 | 37.93 |
| 366.6975 | 212 | 66.320 |  | 268.9115 | 132.5 | 38.344 |
| 382.74 | 224 | 69.021 |  | 280.676 | 140 | 38.366 |
| 395.805 | 236 | 64.816 |  | 290.257 | 147.5 | 45.380 |
| 407.3325 | 248 | 74.508 |  | 298.7105 | 155 | 45.471 |
| 421.02 | 260 | 81.164 |  | 308.748 | 162.5 | 46.222 |
| 434.235 | 272 | 79.310 |  | 318.439 | 170 | 47.241 |
| 447.96 | 288 | 88.531 |  | 328.504 | 180 | 56.157 |
| 454.77 | 300 | 82.279 |  | 333.498 | 187.5 | 57.135 |
| 461.8125 | 312 | 96.812 |  | 338.6625 | 195 | 54.893 |
| 467.94 | 324 | 96.181 |  | 343.156 | 202.5 | 57.371 |
| 474.9225 | 340 | 102.995 |  | 348.2765 | 212.5 | 65.478 |
| 486.4069 | 360 | 98.904 |  | 356.6984 | 225 | 62.115 |
| 483.8775 | 368 | 100.669 |  | 354.8435 | 230 | 67.625 |
| 479.7801 | 380 | 105.614 |  | 351.8387 | 237.5 | 72.837 |
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