

# RAPORT DE TESTARE

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PULL-OUT TEST MIHĂILEȘTI

**PRODFER CONSTRUCT S.R.L.**

CLUJ-NAPOCA | STRADA TIBERIU POPOVICIU, NR. 6, CLADIREA TEAM, ETAJ 2, BIROU 202

## **OPIS**

- 1. Introducere**
- 2. Date amplasament**
- 3. Procedura de testare**
- 4. Echipamente si mod de testare**
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## 1. Introducere:

Fondată în 2011, Prodfer Construct SRL, sub numele Parapet.ro, a dezvoltat, proiectat, construit și asigurat cu succes mentenanța pentru mai mult de 150 de proiecte fotovoltaice din Europa, totalizând o capacitate totală de peste 750 MWp.

Misiunea noastră este să oferim soluții integrate personalizate, la cele mai înalte standarde internaționale, care să răspundă și chiar să depășească așteptările clienților noștri.

La solicitarea clientului BILRO SUNNY S.R.L, în amplasamentul, situat în localitatea Mihăilești. Jud. Giurgiu au fost efectuate teste de tracțiune verticală, testele desfășurându-se între datele 01.10.2024-02.10.2024.

## 2. Amplasament:

- Coordonatele amplasamentului: 44°18'53.12"N, 25°52'9.09"E



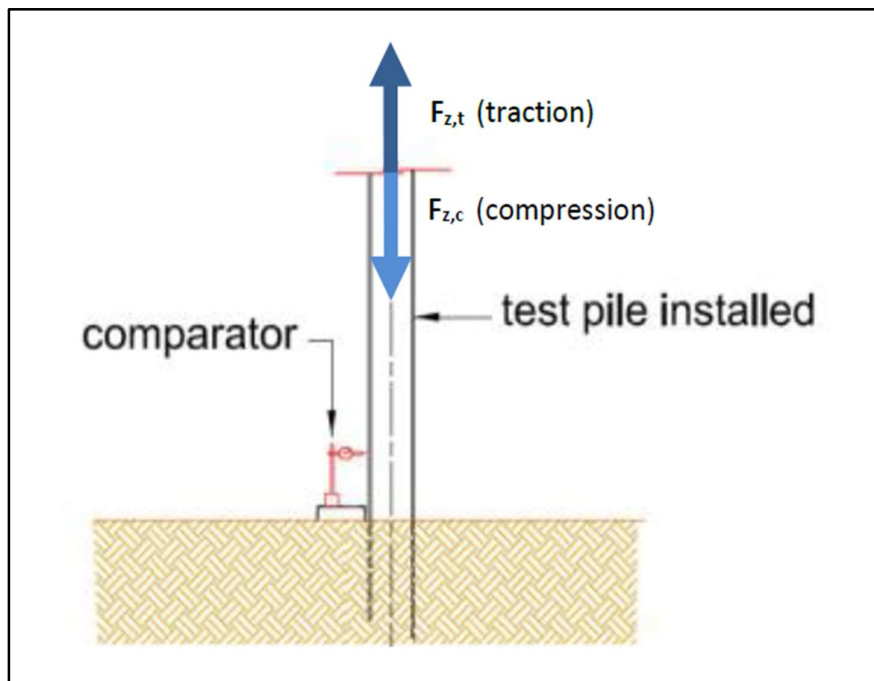


### 3. Procedura de testare si incarcari

#### Tractiune Axială:

În vederea realizării testelor de tip Pull-out, se va începe prin instalarea stâlpilor C100x50x15x3 conform planului, la adâncimile de fundare stabilite. Se va cronometra durata de instalare la cota dorită.

Se va considera că este depășită capacitatea portantă a stâlpului în momentul în care deplasarea sub încărcare ( $d_2$ ) este mai mare de 20 mm sau deplasarea fără încărcare ( $d_1$ ) este mai mare de 15 mm. Pentru fiecare stâlp, testul se va realiza crescând treptele de încărcare și menținând încărcarea pentru un anumit interval de timp



(vezi tabelul de centralizare a rezultatelor). În medie, durata de realizare a testelor pentru un stâlp este de 6 minute, iar încărcarea maximă la care se poate ajunge este de 19 kN. Dacă, la valoarea de 19 kN, deplasarea nu depășește 20 mm, se va crește încărcarea până la atingerea unei deplasări de 20 mm sau până la smulgere. Se va specifica valoarea încărcării la care a fost atinsă limita.

#### Exemplu:

- Pas 1 – Încărcare 4 kN (menținere 30 sec) - citire  $d_2$  – eliberare încărcare (0 kN) – citire  $d_1$
- Pas 2 – Încărcare 7 kN (menținere 30 sec) - citire  $d_2$  – eliberare încărcare (0 kN) – citire  $d_1$
- Pas 3 – Încărcare 10 kN (menținere 30 sec) - citire  $d_2$  – eliberare încărcare (0 kN) – citire  $d_1$
- Pas 4 – Încărcare 13 kN (menținere 60 sec) - citire  $d_2$  – eliberare încărcare (0 kN) – citire  $d_1$
- Pas 5 – Încărcare 16 kN (menținere 60 sec) - citire  $d_2$  – eliberare încărcare (0 kN) – citire  $d_1$
- Pas 6 – Încărcare 19 kN (menținere 60 sec) - citire  $d_2$  – eliberare încărcare (0 kN) – citire  $d_1$

Dacă nu s-a atins valoarea maximă admisibilă a deplasării, se va continua cu pasul următor, în care se va crește încărcarea până la smulgere sau până la atingerea unei deplasări de 30 mm.

**$d_2$**  - valoarea deplasării sub încărcare

**$d_1$**  - valoarea deplasării reziduale după eliberarea încărcării.

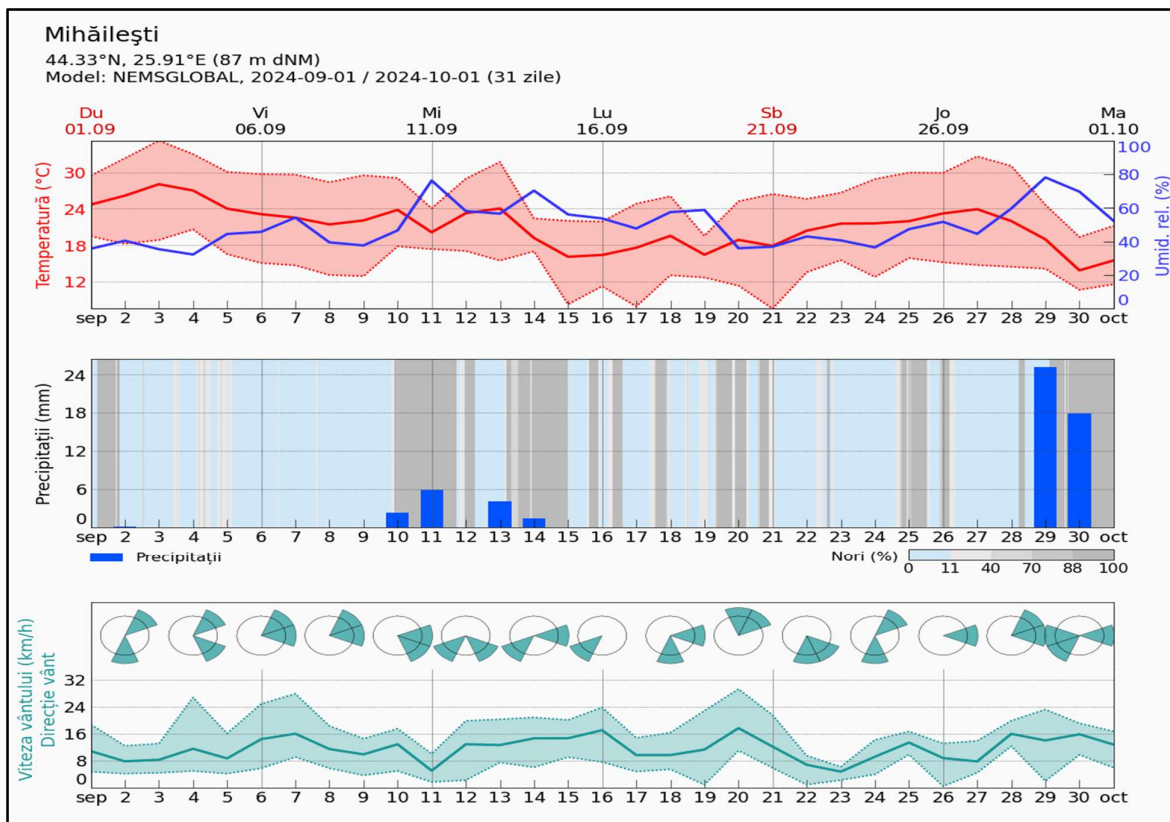
Secțiunea profilelor și lungimile utilizate pentru acest POT:

**C 100x50x15x3:**  
20 bucăți 2400 mm  
10 bucăți 3500 mm

Denumirea stalpilor pe care s-au efectuat testele:

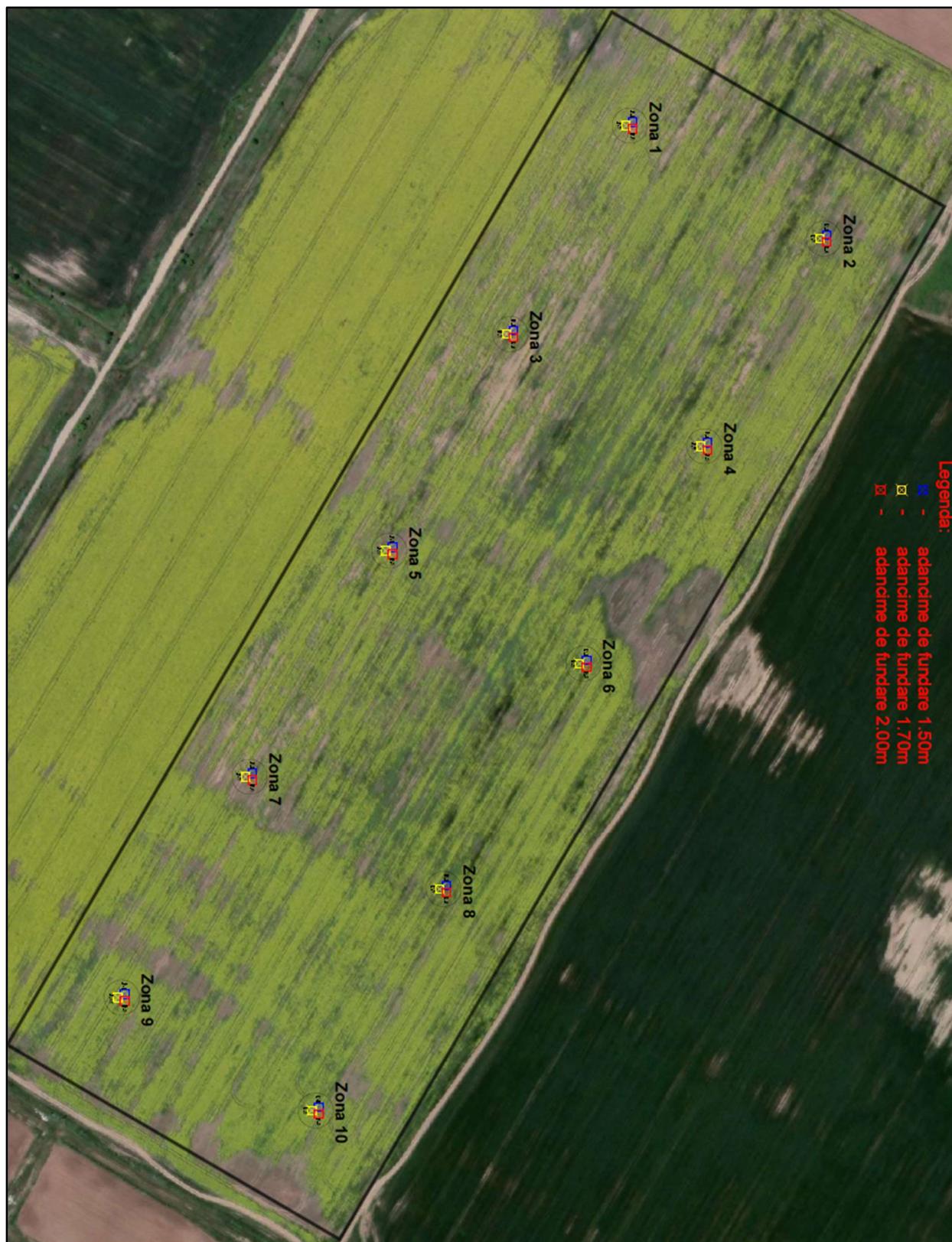
|                                                         |               |
|---------------------------------------------------------|---------------|
| Z.1-P.1, Z.1-P.2, Z.1-P.3 – 1.50 m / 1.70 m / 2.00 m    | C 100x50x15x3 |
| Z.2-P.1, Z.2-P.2, Z.2-P.3 – 1.50 m / 1.70 m / 2.00 m    | C 100x50x15x3 |
| Z.3-P.1, Z.3-P.2, Z.3-P.3 – 1.50 m / 1.70 m / 2.00 m    | C 100x50x15x3 |
| Z.4-P.1, Z.4-P.2, Z.4-P.3 – 1.50 m / 1.70 m / 2.00 m    | C 100x50x15x3 |
| Z.5-P.1, Z.5-P.2, Z.5-P.3 – 1.50 m / 1.70 m / 2.00 m    | C 100x50x15x3 |
| Z.6-P.1, Z.6-P.2, Z.6-P.3 – 1.50 m / 1.70 m / 2.00 m    | C 100x50x15x3 |
| Z.7-P.1, Z.7-P.2, Z.7-P.3 – 1.50 m / 1.70 m / 2.00 m    | C 100x50x15x3 |
| Z.8-P.1, Z.8-P.2, Z.8-P.3 – 1.50 m / 1.70 m / 2.00 m    | C 100x50x15x3 |
| Z.9-P.1, Z.9-P.2, Z.9-P.3 – 1.50 m / 1.70 m / 2.00 m    | C 100x50x15x3 |
| Z.10-P.1, Z.10-P.2, Z.10-P.3 – 1.50 m / 1.70 m / 2.00 m | C 100x50x15x3 |

Meteograma vremii anterioare perioadei de testare:



Plan amplasare puncte si tabel de coordonate:

| Denumire<br>Punct | Coordonate |            | Adancime fundare<br>[m] |
|-------------------|------------|------------|-------------------------|
|                   | X          | Y          |                         |
| Zona 1            |            |            |                         |
| P.1               | 569080.757 | 313283.488 | 1.5                     |
| P.2               | 569083.257 | 313278.488 | 1.7                     |
| P.3               | 569085.757 | 313283.488 | 2                       |
| Zona 2            |            |            |                         |
| P.1               | 569161.974 | 313423.063 | 1.5                     |
| P.2               | 569164.474 | 313418.063 | 1.7                     |
| P.3               | 569166.974 | 313423.063 | 2                       |
| Zona 3            |            |            |                         |
| P.1               | 569230.727 | 313197.52  | 1.5                     |
| P.2               | 569233.227 | 313192.52  | 1.7                     |
| P.3               | 569235.727 | 313197.52  | 2                       |
| Zona 4            |            |            |                         |
| P.1               | 569311.944 | 313337.096 | 1.5                     |
| P.2               | 569314.444 | 313332.096 | 1.7                     |
| P.3               | 569316.944 | 313337.096 | 2                       |
| Zona 5            |            |            |                         |
| P.1               | 569386.989 | 313110.504 | 1.5                     |
| P.2               | 569389.489 | 313105.504 | 1.7                     |
| P.3               | 569391.989 | 313110.504 | 2                       |
| Zona 6            |            |            |                         |
| P.1               | 569468.206 | 313250.079 | 1.5                     |
| P.2               | 569470.706 | 313245.079 | 1.7                     |
| P.3               | 569473.206 | 313250.079 | 2                       |
| Zona 7            |            |            |                         |
| P.1               | 569549.543 | 313009.859 | 1.5                     |
| P.2               | 569552.043 | 313004.859 | 1.7                     |
| P.3               | 569554.543 | 313009.859 | 2                       |
| Zona 8            |            |            |                         |
| P.1               | 569630.761 | 313149.434 | 1.5                     |
| P.2               | 569633.261 | 313144.434 | 1.7                     |
| P.3               | 569635.761 | 313149.434 | 2                       |
| Zona 9            |            |            |                         |
| P.1               | 569708.708 | 312917.928 | 1.5                     |
| P.2               | 569711.208 | 312912.928 | 1.7                     |
| P.3               | 569713.708 | 312917.928 | 2                       |
| Zona 10           |            |            |                         |
| P.1               | 569789.925 | 313057.504 | 1.5                     |
| P.2               | 569792.425 | 313052.504 | 1.7                     |
| P.3               | 569794.925 | 313057.504 | 2                       |



#### 4. Echipamente și metode de testare:

Pentru acest test de extragere a fost utilizat următorul echipament:

- ❖ Mașină de baterie Turchi 300-F 950/1200 Joule
- ❖ Telehandler-Manitou 7 tone
- ❖ Cantar digital
- ❖ Suport de măsurare magnetic
- ❖ Palan cu lanț capacitate 6 tone
- ❖ Celulă de sarcină capacitate 20 tone
- ❖ Ceasuri Comparatoare
- ❖ Toate echipamentele de siguranță și protecție



### Metodologia de fundare stalpi :

- prin batere directă în pământ



## 5. Concluzii:

- Pe parcursul desfășurării testelor în cele zece zone ale parcelei studiate, s-a observat un comportament relativ similar al interacțiunii dintre stâlpi și terenul de fundare. Nu se observă zone care să faciliteze acumularea apei.
- Eliminând din analiză valorile extreme, atât inferioare, cât și superioare, putem concluziona următoarele:
  - **Stâlpi 1.50m:** Valoarea minimă a rezistenței la smulgere 16.5 kN (1650 kg), valoarea maximă 19 kN (1900 kg).
  - **Stâlpi 1.70m:** Valoarea minimă a rezistenței la smulgere 18.6 kN (1860 kg), valoarea maximă 20,30 kN (2030 kg).
  - **Stâlpi 2.00m:** Valoarea minimă a rezistenței la smulgere 41.2 kN (4120 kg), valoarea maximă 43.50 kN (4350 kg).
- În zonele unde influența vântului asupra meselor fixe este mai mare (zone de capăt, expuse direct vântului), se recomandă analiza soluției de fundare a stâlpilor la adâncimi mai mari decât în zonele cu influență mai mică (zone centrale, ferite de expunere directă).
- Se va lua în considerare, în momentul stabilirii adâncimii de fundare, că rezultatele pull-out testelor se bazează pe o metodă empirică desfășurată în condiții de șantier, fiind recomandată aplicarea unei marje de siguranță de 1-1.5 kN.
- La stabilirea adâncimii de fundare se va ține cont și de informațiile obținute în urma realizării Studiului Geotehnic.
- Se recomandă realizarea unor teste de tip pull-out de control pe durata edificării parcului fotovoltaic. Se va utiliza doar un procent de 80-85% din valoarea efortului axial obținut în urma modelării structurii finale, pentru a nu afecta rezistența stâlpului testat (dacă testul se realizează pe un stâlp din componența unei mese).

**6. Anexe:**

- **Anexa 1 – Poze din timpul lucrărilor**
- **Anexa 2 – Rezultate teste**

Intocmit,

S.C. PRODFER CONSTRUCT S.R.L.

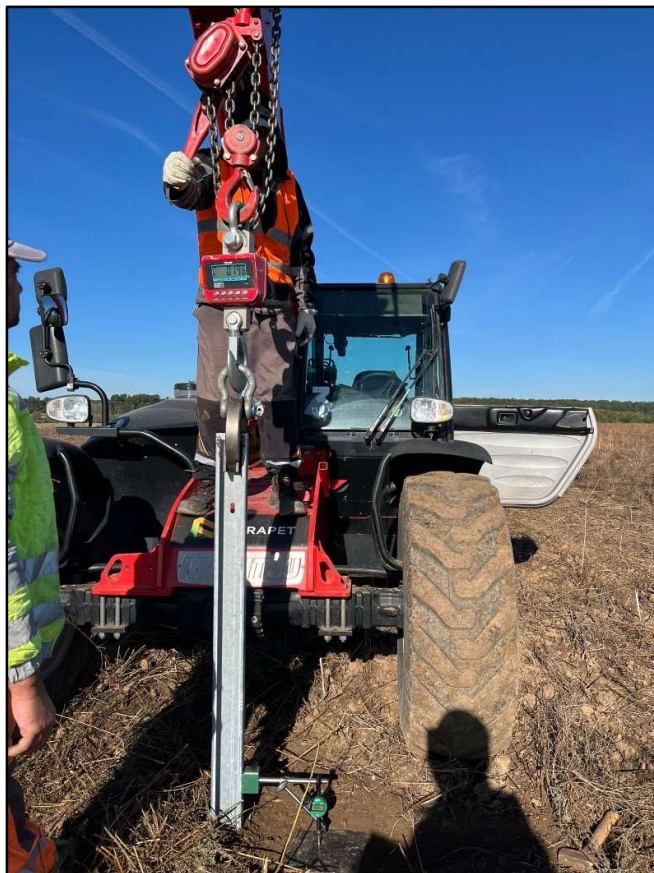
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ing. Septimiu Irimiaș

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ing. Petru Coșobea

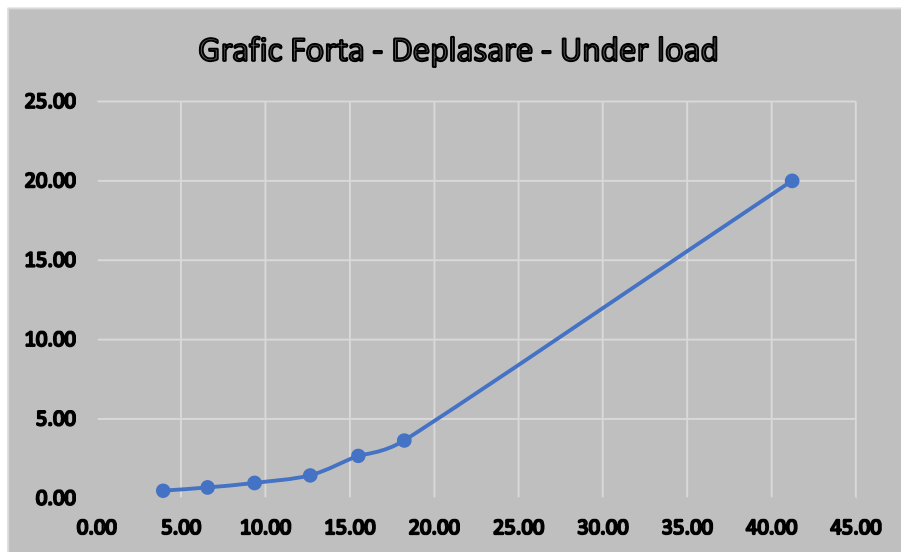
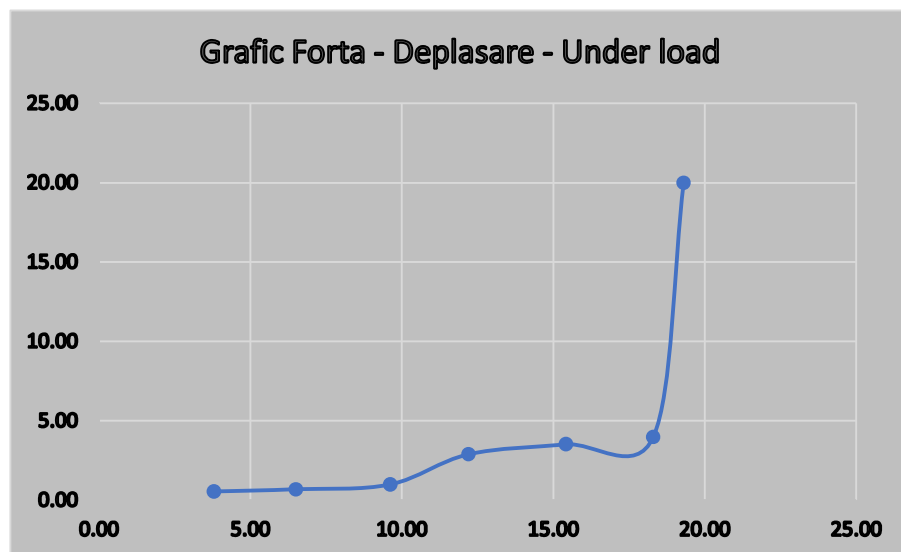
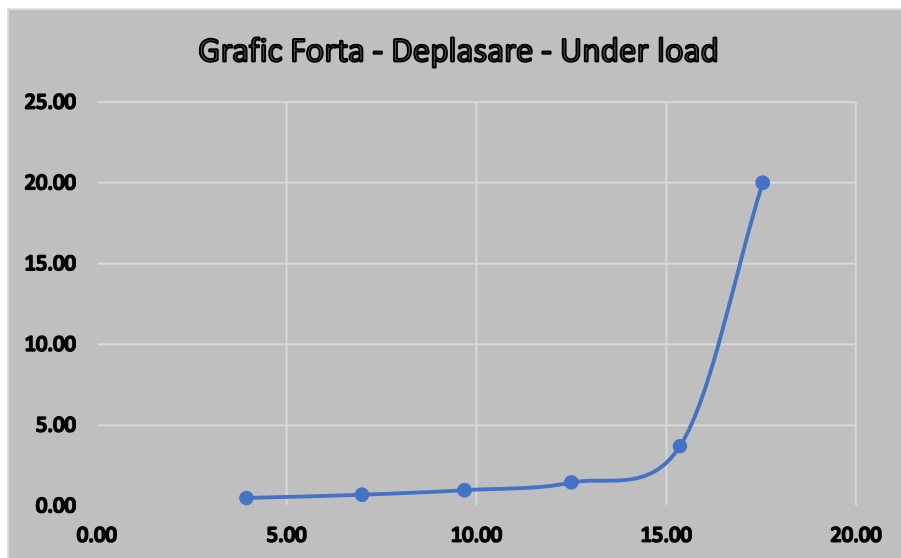
## Anexa 1 – Poze din timpul lucrărilor



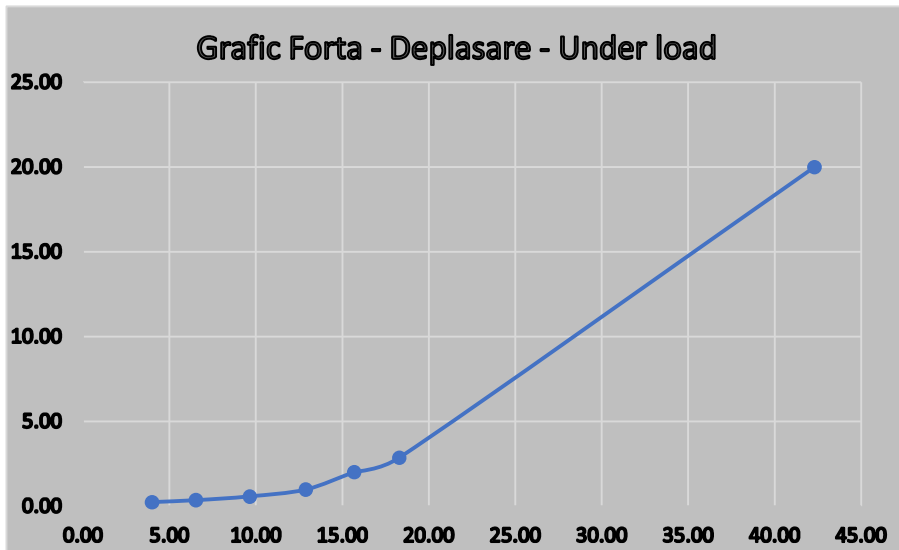
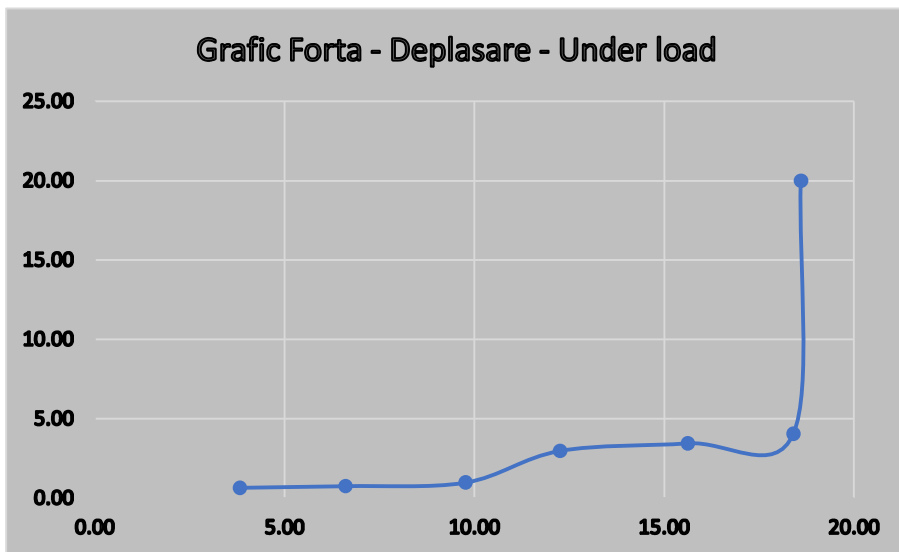
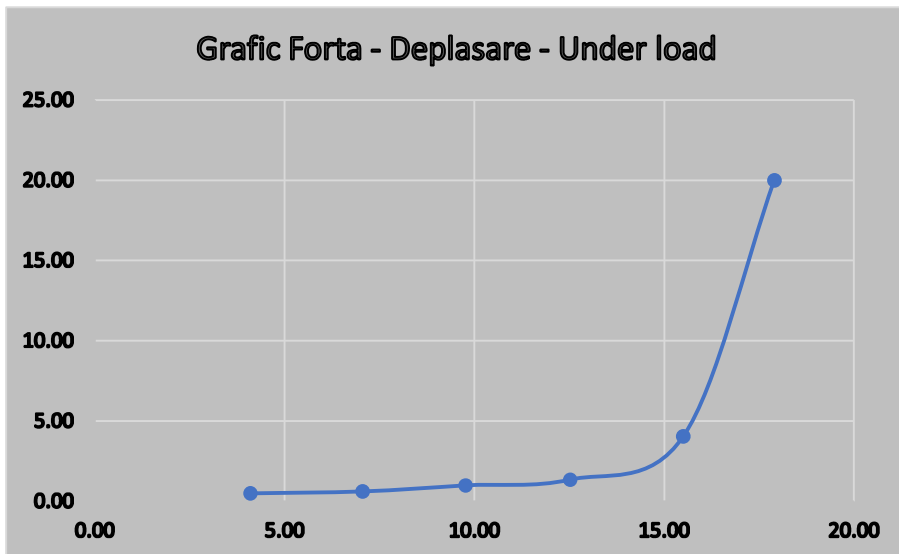


## Anexa 2 – Rezultate Teste

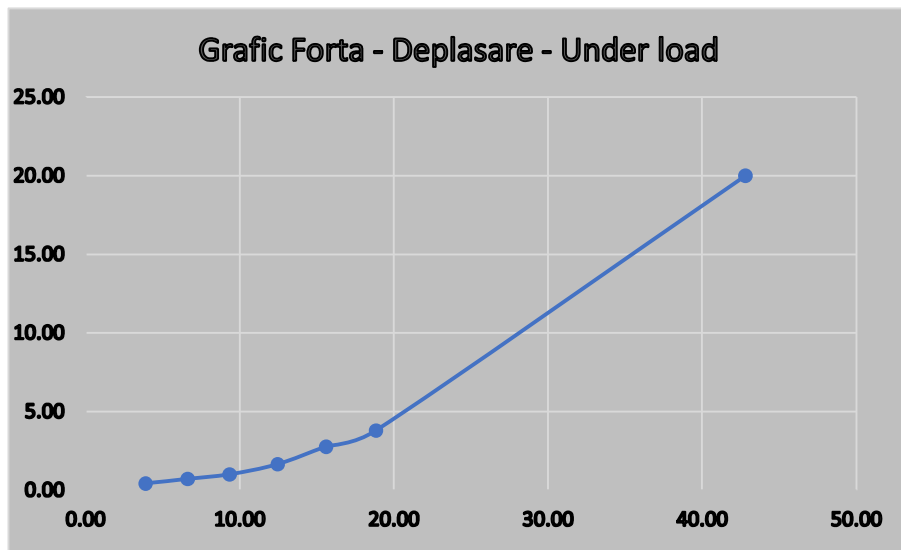
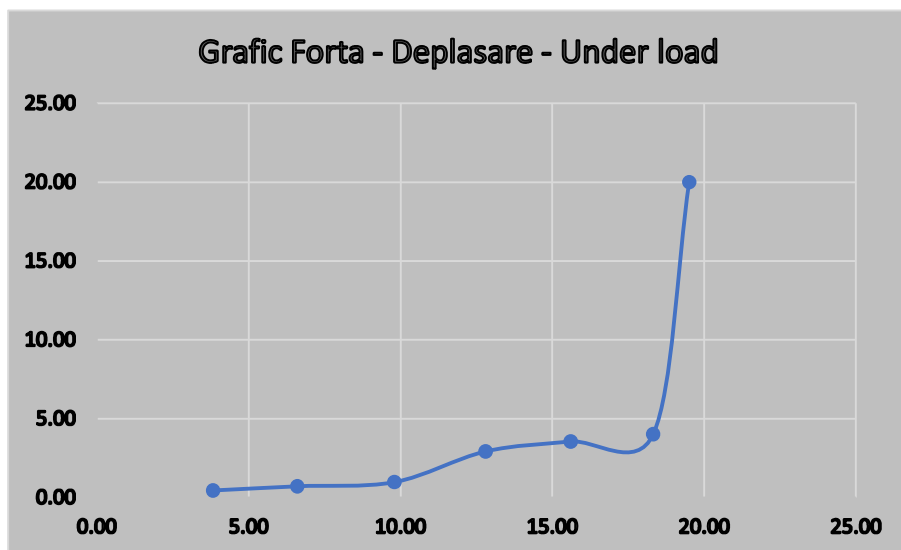
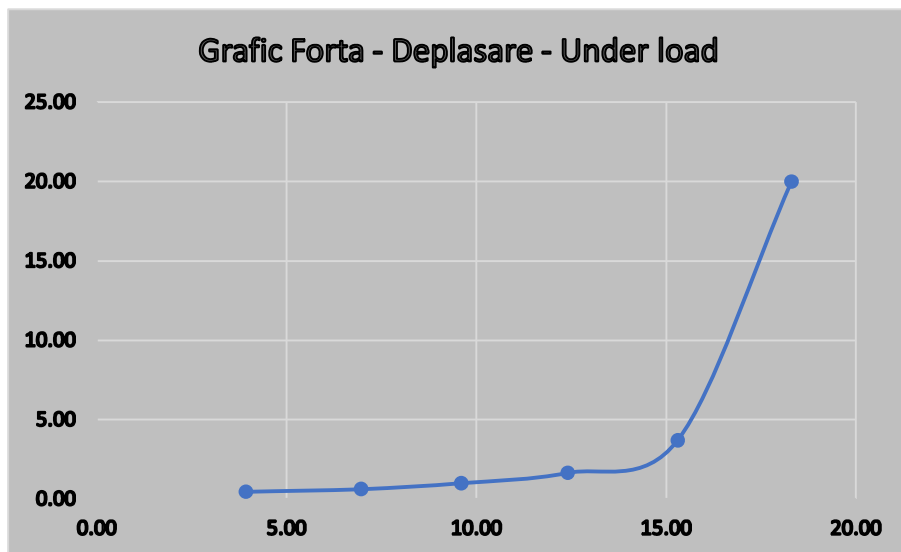
|                        |                  |               |                          |                 |               |
|------------------------|------------------|---------------|--------------------------|-----------------|---------------|
| <b>TEST NUMBER:</b>    | Zona 1 - P.1     |               | <b>DATE:</b>             | 01.10.2024      |               |
|                        |                  |               |                          |                 |               |
| <b>COORDINATES:</b>    |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:              | 44°18'57.63"N    |               | Type:                    | C               |               |
| Longitude:             | 25°51'51.96"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:          | 1min5sec         |               | Total length [m]         | 2.40m           |               |
|                        |                  |               | Embedment [m]            | 1.50            |               |
| <b>VERTICAL</b>        |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>  | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                          |                 |               |
| 1 (30 sec)             | 4                | 3.94          | 0                        | 0.49            | 0.23          |
| 2 (30 sec)             | 7                | 6.98          | -                        | 0.69            | 0.45          |
| 3 (30 sec)             | 10               | 9.68          | -                        | 0.98            | 0.75          |
| 4 (1 min)              | 13               | 12.50         | -                        | 1.45            | 1.12          |
| 5 (1 min)              | 16               | 15.36         | -                        | 3.69            | 2.98          |
| 6 (1 min)              | 19               | 17.54         | -                        | 20              |               |
| 7                      | To failure       |               | -                        |                 |               |
| <b>TEST NUMBER:</b>    | Zona 1 - P.2     |               | <b>DATE:</b>             | 01.10.2024      |               |
|                        |                  |               |                          |                 |               |
| <b>COORDINATES:</b>    |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:              | 44°18'57.47"N    |               | Type:                    | C               |               |
| Longitude:             | 25°51'52.07"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:          | 1min8sec         |               | Total length [m]         | 2.40m           |               |
|                        |                  |               | Embedment [m]            | 1.70            |               |
| <b>VERTICAL</b>        |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>  | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                          |                 |               |
| 1 (30 sec)             | 4                | 3.80          | 0                        | 0.55            | 0.32          |
| 2 (30 sec)             | 7                | 6.50          | -                        | 0.69            | 0.43          |
| 3 (30 sec)             | 10               | 9.62          | -                        | 0.99            | 0.65          |
| 4 (1 min)              | 13               | 12.20         | -                        | 2.90            | 1.03          |
| 5 (1 min)              | 16               | 15.42         | -                        | 3.52            | 1.88          |
| 6 (1 min)              | 19               | 18.3          | -                        | 3.98            | 2.45          |
| 7                      | To failure       | 19.3          | -                        | 20              |               |
| <b>TEST NUMBER:</b>    | Zona 1 - P.3     |               | <b>DATE:</b>             | 01.10.2024      |               |
|                        |                  |               |                          |                 |               |
| <b>COORDINATES:</b>    |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:              | 44°18'57.63"N    |               | Type:                    | C               |               |
| Longitude:             | 25°51'52.19"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:          | 5min53sec        |               | Total length [m]         | 3.50            |               |
|                        |                  |               | Embedment [m]            | 2.00            |               |
| <b>VERTICAL</b>        |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>  | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                          |                 |               |
| 1 (30 sec)             | 4                | 3.92          | 0                        | 0.49            | 0.12          |
| 2 (30 sec)             | 7                | 6.56          | -                        | 0.69            | 0.33          |
| 3 (30 sec)             | 10               | 9.34          | -                        | 0.98            | 0.49          |
| 4 (1 min)              | 13               | 12.64         | -                        | 1.45            | 1.13          |
| 5 (1 min)              | 16               | 15.5          | -                        | 2.69            | 2.01          |
| 6 (1 min)              | 19               | 18.22         | -                        | 3.66            | 2.65          |
| 7                      | To failure       | 41.2          | -                        | 20              |               |



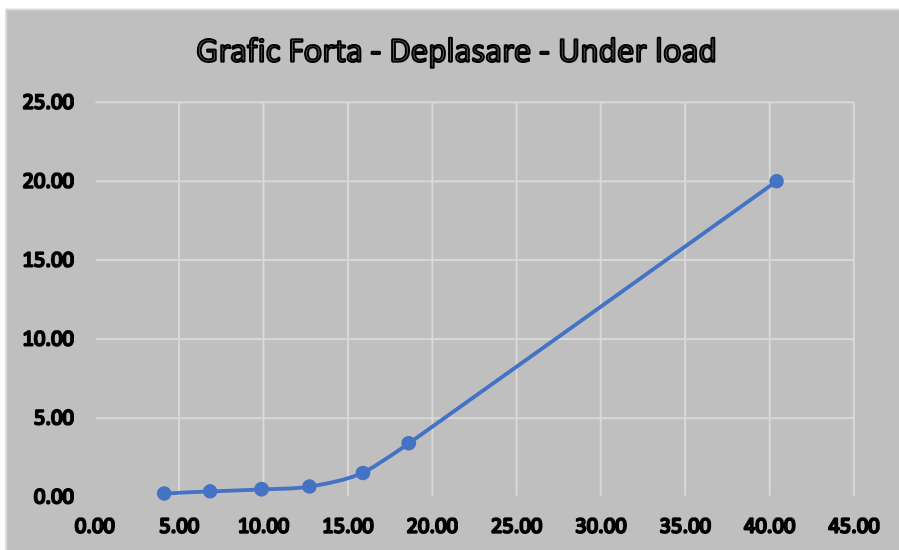
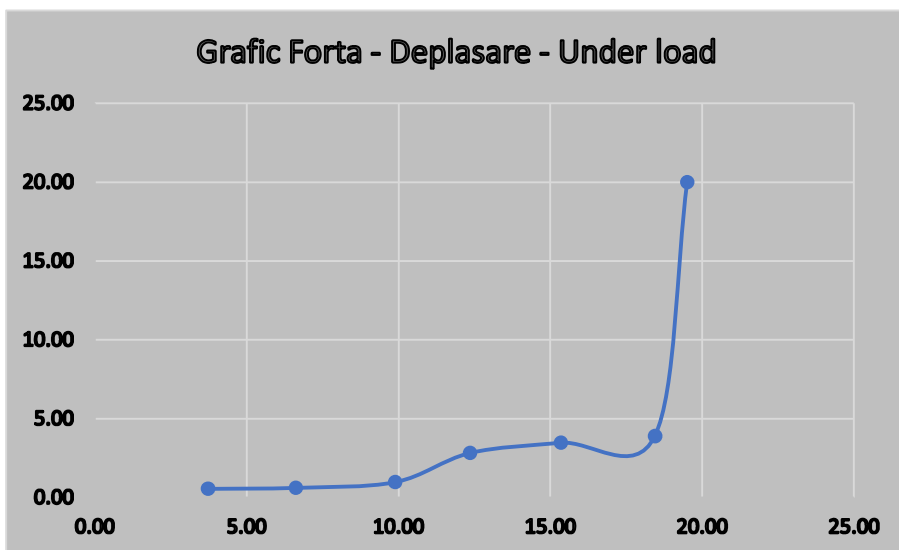
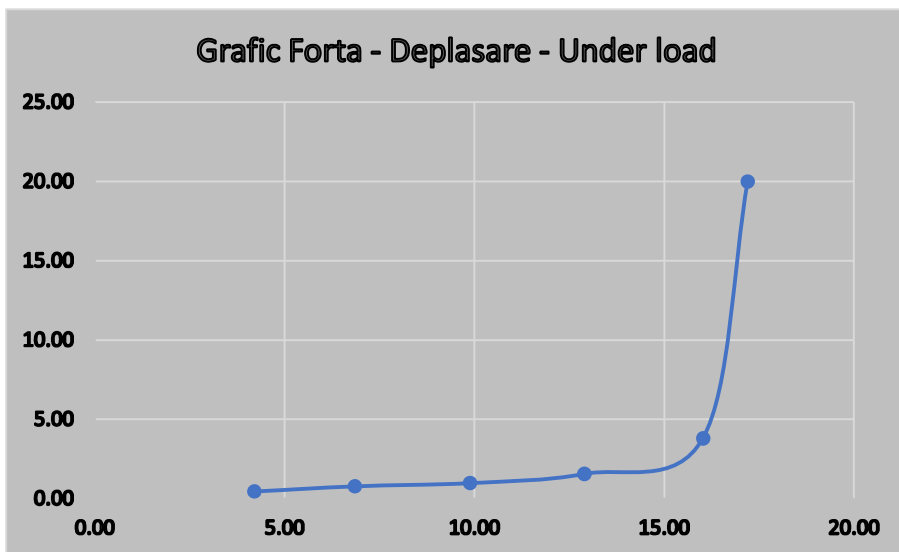
|                               |                  |               |                          |                 |               |
|-------------------------------|------------------|---------------|--------------------------|-----------------|---------------|
| <b>TEST NUMBER:</b>           | Zona 2 - P.1     |               | <b>DATE:</b>             | 01.10.2024      |               |
|                               |                  |               |                          |                 |               |
| <b>COORDINATES:</b>           |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:                     | 44°19'2.13"N     |               | Type:                    | C               |               |
| Longitude:                    | 25°51'55.69"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:                 | 1min33sec        |               | Total length [m]         | 2.40m           |               |
|                               |                  |               | Embedment [m]            | 1.50            |               |
| <b>VERTICAL</b>               |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>         | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                               | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| <b>Centralizare Rezultate</b> |                  |               |                          |                 |               |
| 1 (30 sec)                    | 4                | 4.10          | 0                        | 0.50            | 0.25          |
| 2 (30 sec)                    | 7                | 7.05          | -                        | 0.62            | 0.47          |
| 3 (30 sec)                    | 10               | 9.76          | -                        | 0.99            | 0.73          |
| 4 (1 min)                     | 13               | 12.52         | -                        | 1.35            | 1.25          |
| 5 (1 min)                     | 16               | 15.5          | -                        | 4.05            | 3.02          |
| 6 (1 min)                     | 19               | 17.9          | -                        | 20              |               |
| 7                             | To failure       |               | -                        |                 |               |
| <b>TEST NUMBER:</b>           | Zona 2 - P.2     |               | <b>DATE:</b>             | 01.10.2024      |               |
|                               |                  |               |                          |                 |               |
| <b>COORDINATES:</b>           |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:                     | 44°19'1.96"N     |               | Type:                    | C               |               |
| Longitude:                    | 25°51'55.80"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:                 | 1min14sec        |               | Total length [m]         | 2.40m           |               |
|                               |                  |               | Embedment [m]            | 1.70            |               |
| <b>VERTICAL</b>               |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>         | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                               | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| <b>Centralizare Rezultate</b> |                  |               |                          |                 |               |
| 1 (30 sec)                    | 4                | 3.82          | 0                        | 0.65            | 0.30          |
| 2 (30 sec)                    | 7                | 6.60          | -                        | 0.76            | 0.42          |
| 3 (30 sec)                    | 10               | 9.76          | -                        | 0.98            | 0.66          |
| 4 (1 min)                     | 13               | 12.25         | -                        | 2.98            | 1.10          |
| 5 (1 min)                     | 16               | 15.62         | -                        | 3.45            | 1.87          |
| 6 (1 min)                     | 19               | 18.4          | -                        | 4.06            | 2.98          |
| 7                             | To failure       | 18.6          | -                        | 20              |               |
| <b>TEST NUMBER:</b>           | Zona 2 - P.3     |               | <b>DATE:</b>             | 01.10.2024      |               |
|                               |                  |               |                          |                 |               |
| <b>COORDINATES:</b>           |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:                     | 44°19'2.12"N     |               | Type:                    | C               |               |
| Longitude:                    | 25°51'55.92"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:                 | 2min40sec        |               | Total length [m]         | 3.50            |               |
|                               |                  |               | Embedment [m]            | 2.00            |               |
| <b>VERTICAL</b>               |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>         | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                               | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| <b>Centralizare Rezultate</b> |                  |               |                          |                 |               |
| 1 (30 sec)                    | 4                | 3.99          | 0                        | 0.25            | 0.11          |
| 2 (30 sec)                    | 7                | 6.54          | -                        | 0.36            | 0.25          |
| 3 (30 sec)                    | 10               | 9.65          | -                        | 0.58            | 0.45          |
| 4 (1 min)                     | 13               | 12.88         | -                        | 0.99            | 0.87          |
| 5 (1 min)                     | 16               | 15.68         | -                        | 2.01            | 1.66          |
| 6 (1 min)                     | 19               | 18.3          | -                        | 2.87            | 2.02          |
| 7                             | To failure       | 42.3          | -                        | 20              |               |



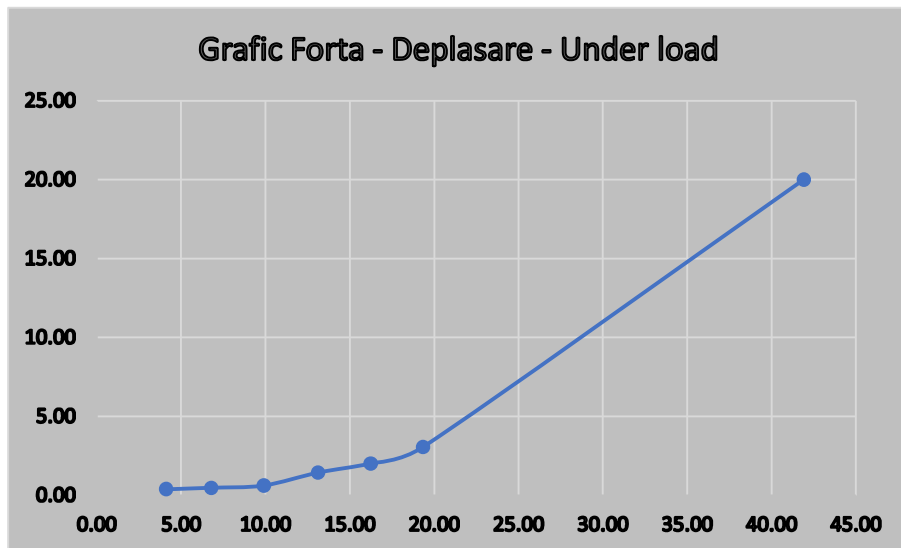
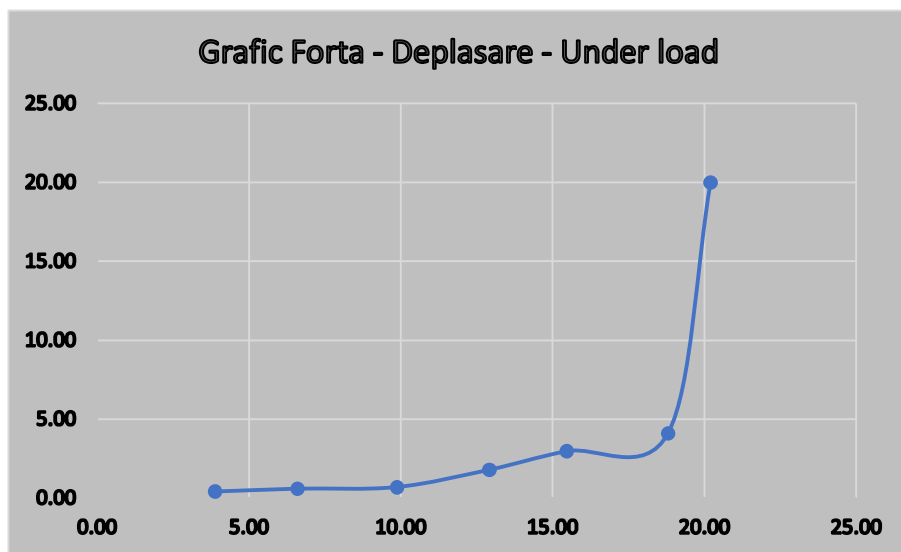
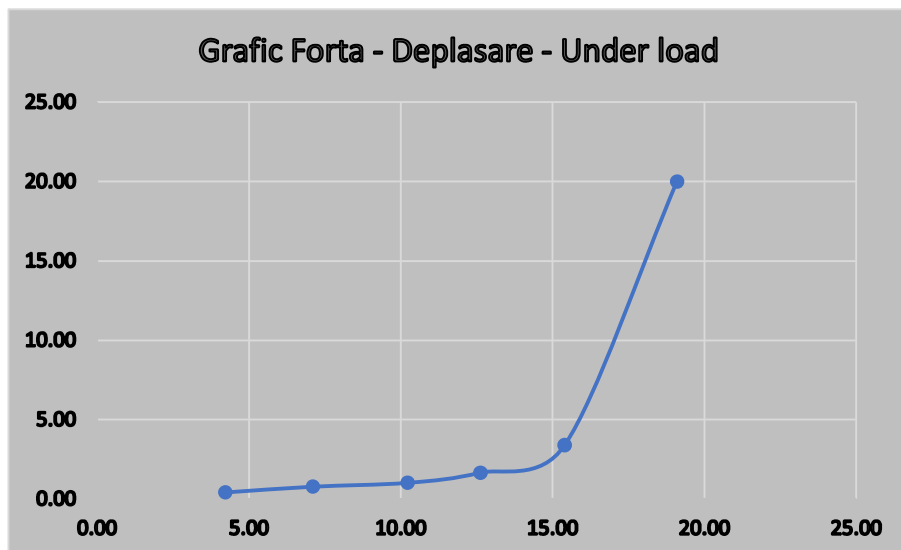
|                               |                  |               |                          |                 |               |
|-------------------------------|------------------|---------------|--------------------------|-----------------|---------------|
| <b>TEST NUMBER:</b>           | Zona 3 - P.1     |               | <b>DATE:</b>             | 01.10.2024      |               |
|                               |                  |               |                          |                 |               |
| <b>COORDINATES:</b>           |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:                     | 44°18'54.79"N    |               | Type:                    | C               |               |
| Longitude:                    | 25°51'58.69"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:                 | 1min42sec        |               | Total length [m]         | 2.40m           |               |
|                               |                  |               | Embedment [m]            | 1.50            |               |
| <b>VERTICAL</b>               |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>         | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                               | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| <b>Centralizare Rezultate</b> |                  |               |                          |                 |               |
| 1 (30 sec)                    | 4                | 3.92          | 0                        | 0.45            | 0.22          |
| 2 (30 sec)                    | 7                | 6.96          | -                        | 0.62            | 0.41          |
| 3 (30 sec)                    | 10               | 9.60          | -                        | 0.99            | 0.76          |
| 4 (1 min)                     | 13               | 12.40         | -                        | 1.65            | 1.42          |
| 5 (1 min)                     | 16               | 15.3          | -                        | 3.7             | 2.9           |
| 6 (1 min)                     | 19               | 18.3          | -                        | 20              |               |
| 7                             | To failure       |               | -                        |                 |               |
| <b>TEST NUMBER:</b>           | Zona 3 - P.2     |               | <b>DATE:</b>             | 01.10.2024      |               |
|                               |                  |               |                          |                 |               |
| <b>COORDINATES:</b>           |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:                     | 44°18'54.63"N    |               | Type:                    | C               |               |
| Longitude:                    | 25°51'58.80"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:                 | 1min13sec        |               | Total length [m]         | 2.40m           |               |
|                               |                  |               | Embedment [m]            | 1.70            |               |
| <b>VERTICAL</b>               |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>         | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                               | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| <b>Centralizare Rezultate</b> |                  |               |                          |                 |               |
| 1 (30 sec)                    | 4                | 3.82          | 0                        | 0.45            | 0.34          |
| 2 (30 sec)                    | 7                | 6.60          | -                        | 0.72            | 0.46          |
| 3 (30 sec)                    | 10               | 9.80          | -                        | 0.98            | 0.67          |
| 4 (1 min)                     | 13               | 12.80         | -                        | 2.92            | 1.06          |
| 5 (1 min)                     | 16               | 15.6          | -                        | 3.56            | 1.92          |
| 6 (1 min)                     | 19               | 18.32         | -                        | 4.02            | 2.66          |
| 7                             | To failure       | 19.5          | -                        | 20              |               |
| <b>TEST NUMBER:</b>           | Zona 3 - P.3     |               | <b>DATE:</b>             | 01.10.2024      |               |
|                               |                  |               |                          |                 |               |
| <b>COORDINATES:</b>           |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:                     | 44°18'54.79"N    |               | Type:                    | C               |               |
| Longitude:                    | 25°51'58.91"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:                 | 2min40sec        |               | Total length [m]         | 3.50m           |               |
|                               |                  |               | Embedment [m]            | 2.00            |               |
| <b>VERTICAL</b>               |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>         | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                               | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| <b>Centralizare Rezultate</b> |                  |               |                          |                 |               |
| 1 (30 sec)                    | 4                | 3.90          | 0                        | 0.44            | 0.15          |
| 2 (30 sec)                    | 7                | 6.62          | -                        | 0.72            | 0.36          |
| 3 (30 sec)                    | 10               | 9.34          | -                        | 1.02            | 0.55          |
| 4 (1 min)                     | 13               | 12.46         | -                        | 1.66            | 1.28          |
| 5 (1 min)                     | 16               | 15.6          | -                        | 2.78            | 2.1           |
| 6 (1 min)                     | 19               | 18.84         | -                        | 3.8             | 2.8           |
| 7                             | To failure       | 42.8          | -                        | 20              |               |



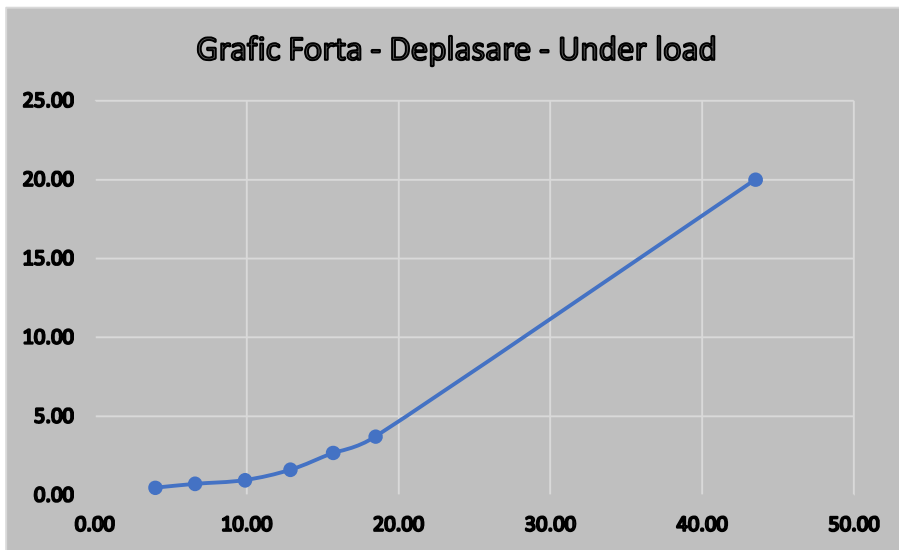
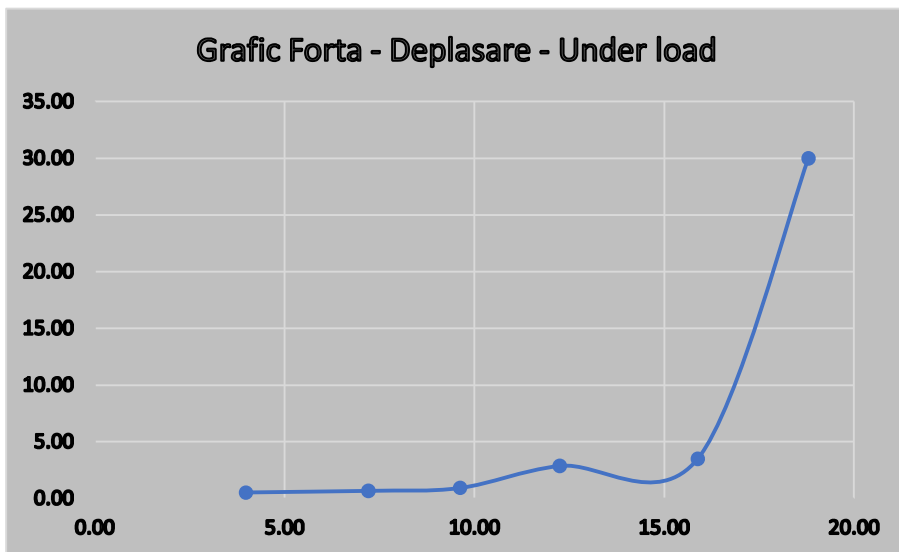
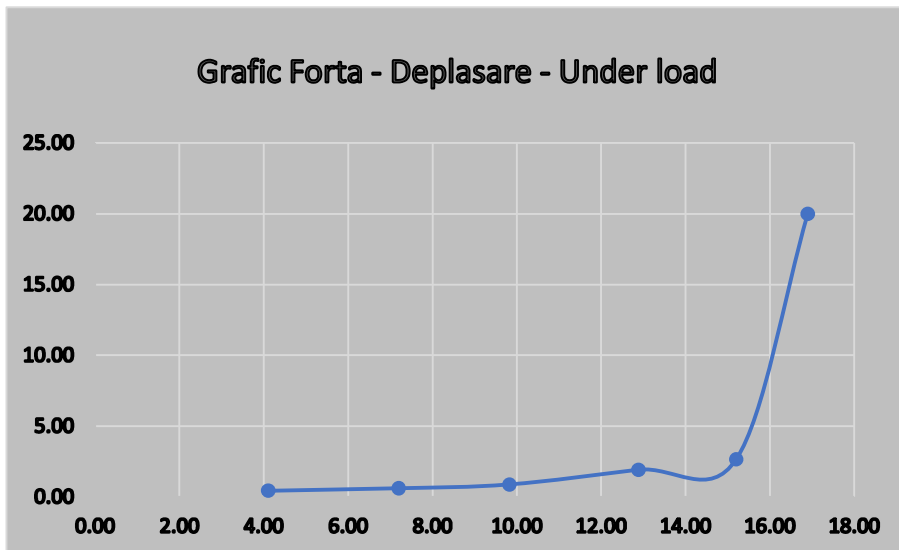
|                               |                  |               |                          |                 |               |
|-------------------------------|------------------|---------------|--------------------------|-----------------|---------------|
| <b>TEST NUMBER:</b>           | Zona 4 - P.1     |               | <b>DATE:</b>             | 02.10.2024      |               |
|                               |                  |               |                          |                 |               |
| <b>COORDINATES:</b>           |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:                     | 44°18'59.29"N    |               | Type:                    | C               |               |
| Longitude:                    | 25°52'2.42"E     |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:                 | 55sec            |               | Total length [m]         | 2.40m           |               |
|                               |                  |               | Embedment [m]            | 1.50            |               |
| <b>VERTICAL</b>               |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>         | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                               | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| <b>Centralizare Rezultate</b> |                  |               |                          |                 |               |
| 1 (30 sec)                    | 4                | 4.20          | 0                        | 0.45            | 0.25          |
| 2 (30 sec)                    | 7                | 6.85          | -                        | 0.78            | 0.56          |
| 3 (30 sec)                    | 10               | 9.88          | -                        | 0.98            | 0.82          |
| 4 (1 min)                     | 13               | 12.89         | -                        | 1.56            | 1.32          |
| 5 (1 min)                     | 16               | 16.02         | -                        | 3.8             | 3.05          |
| 6 (1 min)                     | 19               | 17.2          | -                        | 20              |               |
| 7                             | To failure       |               | -                        |                 |               |
| <b>TEST NUMBER:</b>           | Zona 4 - P.2     |               | <b>DATE:</b>             | 02.10.2024      |               |
|                               |                  |               |                          |                 |               |
| <b>COORDINATES:</b>           |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:                     | 44°18'59.13"N    |               | Type:                    | C               |               |
| Longitude:                    | 25°52'2.53"E     |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:                 | 1min12sec        |               | Total length [m]         | 2.40m           |               |
|                               |                  |               | Embedment [m]            | 1.70            |               |
| <b>VERTICAL</b>               |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>         | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                               | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| <b>Centralizare Rezultate</b> |                  |               |                          |                 |               |
| 1 (30 sec)                    | 4                | 3.72          | 0                        | 0.56            | 0.30          |
| 2 (30 sec)                    | 7                | 6.62          | -                        | 0.62            | 0.40          |
| 3 (30 sec)                    | 10               | 9.89          | -                        | 0.98            | 0.60          |
| 4 (1 min)                     | 13               | 12.35         | -                        | 2.82            | 1.20          |
| 5 (1 min)                     | 16               | 15.34         | -                        | 3.48            | 2.48          |
| 6 (1 min)                     | 19               | 18.44         | -                        | 3.9             | 3.02          |
| 7                             | To failure       | 19.5          | -                        | 20              |               |
| <b>TEST NUMBER:</b>           | Zona 4 - P.3     |               | <b>DATE:</b>             | 02.10.2024      |               |
|                               |                  |               |                          |                 |               |
| <b>COORDINATES:</b>           |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:                     | 44°18'59.29"N    |               | Type:                    | C               |               |
| Longitude:                    | 25°52'2.64"E     |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:                 | 3min09sec        |               | Total length [m]         | 3.50            |               |
|                               |                  |               | Embedment [m]            | 2.00            |               |
| <b>VERTICAL</b>               |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>         | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                               | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| <b>Centralizare Rezultate</b> |                  |               |                          |                 |               |
| 1 (30 sec)                    | 4                | 4.10          | 0                        | 0.22            | 0.14          |
| 2 (30 sec)                    | 7                | 6.82          | -                        | 0.36            | 0.24          |
| 3 (30 sec)                    | 10               | 9.88          | -                        | 0.48            | 0.36          |
| 4 (1 min)                     | 13               | 12.72         | -                        | 0.66            | 0.58          |
| 5 (1 min)                     | 16               | 15.88         | -                        | 1.52            | 1.22          |
| 6 (1 min)                     | 19               | 18.6          | -                        | 3.4             | 2.68          |
| 7                             | To failure       | 40.4          | -                        | 20              |               |



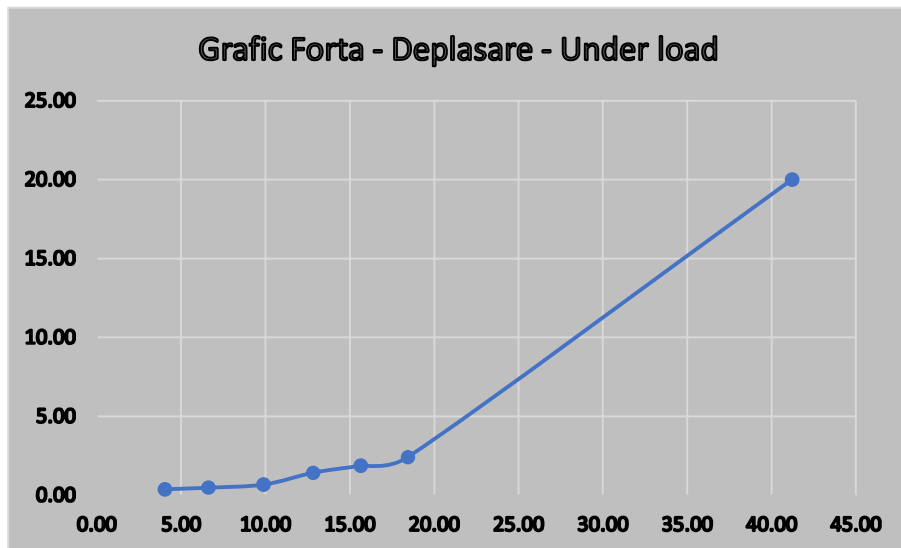
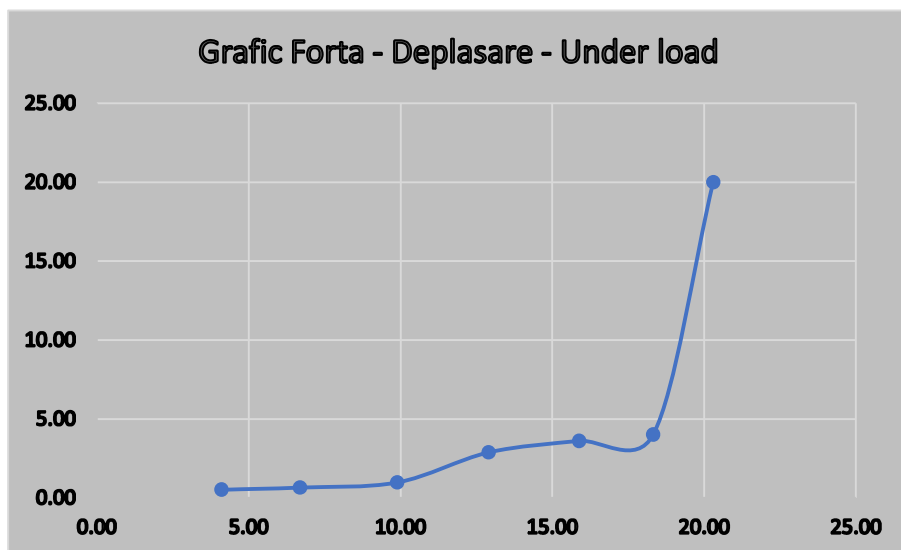
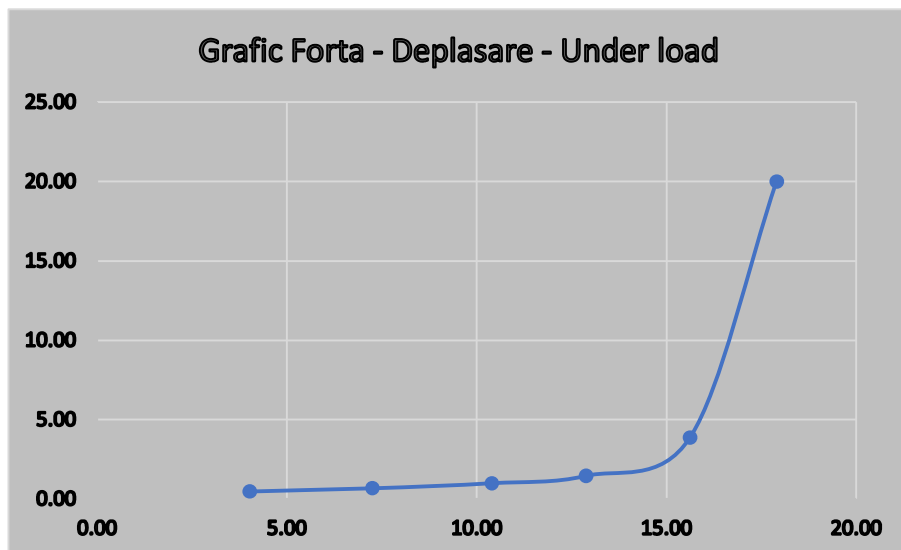
|                        |                  |               |                          |                 |               |
|------------------------|------------------|---------------|--------------------------|-----------------|---------------|
| <b>TEST NUMBER:</b>    | Zona 5 - P.1     |               | <b>DATE:</b>             | 02.10.2024      |               |
|                        |                  |               |                          |                 |               |
| <b>COORDINATES:</b>    |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:              | 44°18'51.92"N    |               | Type:                    | C               |               |
| Longitude:             | 25°52'5.69"E     |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:          | 1min03sec        |               | Total length [m]         | 2.40m           |               |
|                        |                  |               | Embedment [m]            | 1.50            |               |
| <b>VERTICAL</b>        |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>  | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                          |                 |               |
| 1 (30 sec)             | 4                | 4.22          | 0                        | 0.42            | 0.21          |
| 2 (30 sec)             | 7                | 7.10          | -                        | 0.78            | 0.43          |
| 3 (30 sec)             | 10               | 10.22         | -                        | 1.02            | 0.78          |
| 4 (1 min)              | 13               | 12.62         | -                        | 1.66            | 1.02          |
| 5 (1 min)              | 16               | 15.4          | -                        | 3.4             | 2.88          |
| 6 (1 min)              | 19               | 19.1          | -                        | 20              |               |
| 7                      | To failure       |               | -                        |                 |               |
| <b>TEST NUMBER:</b>    | Zona 5 - P.2     |               | <b>DATE:</b>             | 02.10.2024      |               |
|                        |                  |               |                          |                 |               |
| <b>COORDINATES:</b>    |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:              | 44°18'51.76"N    |               | Type:                    | C               |               |
| Longitude:             | 25°52'5.80"E     |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:          | 2min37sec        |               | Total length [m]         | 2.40m           |               |
|                        |                  |               | Embedment [m]            | 1.70            |               |
| <b>VERTICAL</b>        |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>  | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                          |                 |               |
| 1 (30 sec)             | 4                | 3.88          | 0                        | 0.42            | 0.30          |
| 2 (30 sec)             | 7                | 6.60          | -                        | 0.59            | 0.42          |
| 3 (30 sec)             | 10               | 9.88          | -                        | 0.70            | 0.53          |
| 4 (1 min)              | 13               | 12.92         | -                        | 1.80            | 1.29          |
| 5 (1 min)              | 16               | 15.46         | -                        | 2.98            | 1.78          |
| 6 (1 min)              | 19               | 18.8          | -                        | 4.1             | 2.99          |
| 7                      | To failure       | 20.2          | -                        | 20              |               |
| <b>TEST NUMBER:</b>    | Zona 5 - P.3     |               | <b>DATE:</b>             | 02.10.2024      |               |
|                        |                  |               |                          |                 |               |
| <b>COORDINATES:</b>    |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:              | 44°18'51.92"N    |               | Type:                    | C               |               |
| Longitude:             | 25°52'5.92"E     |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:          | 4min12sec        |               | Total length [m]         | 3.50            |               |
|                        |                  |               | Embedment [m]            | 2.00            |               |
| <b>VERTICAL</b>        |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>  | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                          |                 |               |
| 1 (30 sec)             | 4                | 4.10          | 0                        | 0.39            | 0.20          |
| 2 (30 sec)             | 7                | 6.78          | -                        | 0.48            | 0.36          |
| 3 (30 sec)             | 10               | 9.89          | -                        | 0.63            | 0.43          |
| 4 (1 min)              | 13               | 13.10         | -                        | 1.44            | 0.99          |
| 5 (1 min)              | 16               | 16.22         | -                        | 2.02            | 1.15          |
| 6 (1 min)              | 19               | 19.32         | -                        | 3.06            | 2.45          |
| 7                      | To failure       | 41.9          | -                        | 20              |               |



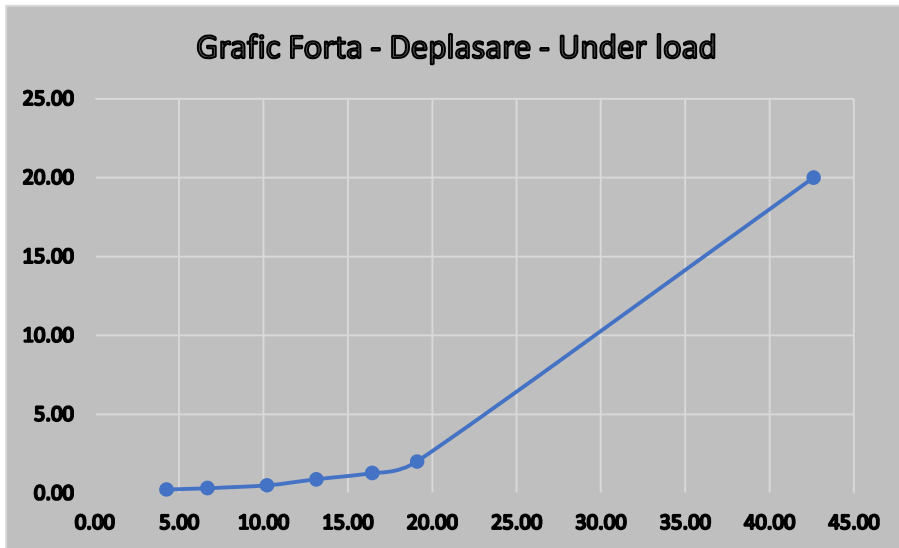
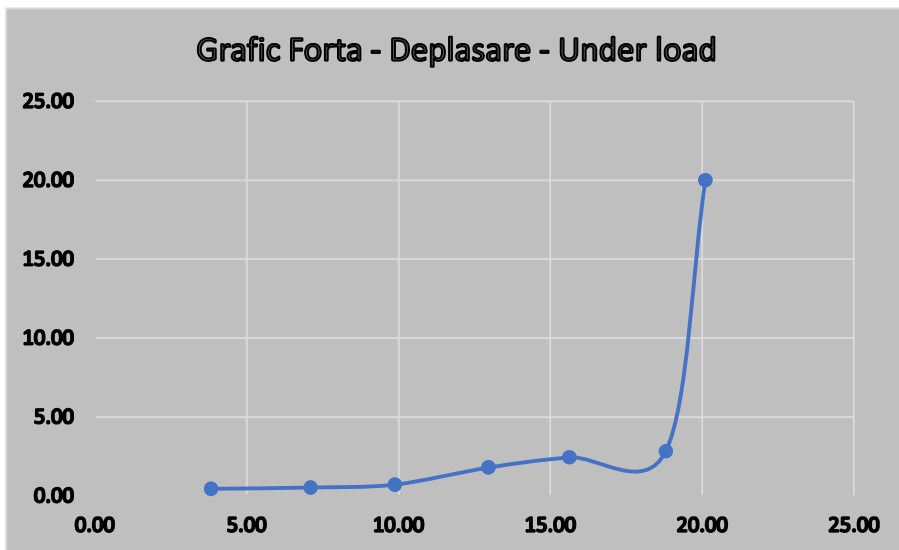
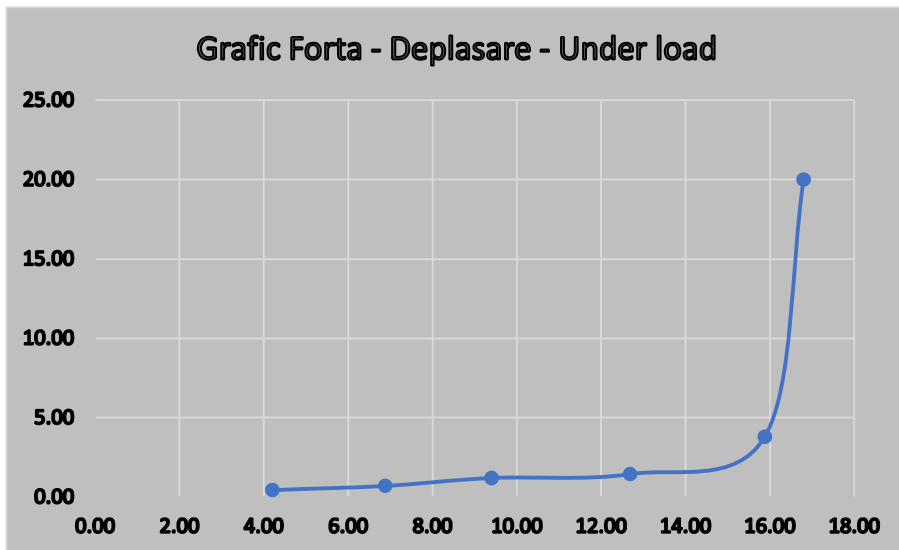
|                        |                  |               |                          |                 |               |
|------------------------|------------------|---------------|--------------------------|-----------------|---------------|
| <b>TEST NUMBER:</b>    | Zona 6 - P.1     |               | <b>DATE:</b>             | 02.10.2024      |               |
|                        |                  |               |                          |                 |               |
| <b>COORDINATES:</b>    |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:              | 44°18'56.42"N    |               | Type:                    | C               |               |
| Longitude:             | 25°52'9.43"E     |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:          | 1min14sec        |               | Total length [m]         | 2.40m           |               |
|                        |                  |               | Embedment [m]            | 1.50            |               |
| <b>VERTICAL</b>        |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>  | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                          |                 |               |
| 1 (30 sec)             | 4                | 4.10          | 0                        | 0.44            | 0.24          |
| 2 (30 sec)             | 7                | 7.20          | -                        | 0.62            | 0.49          |
| 3 (30 sec)             | 10               | 9.82          | -                        | 0.88            | 0.77          |
| 4 (1 min)              | 13               | 12.88         | -                        | 1.92            | 1.24          |
| 5 (1 min)              | 16               | 15.2          | -                        | 2.66            | 2.02          |
| 6 (1 min)              | 19               | 16.9          | -                        | 20              |               |
| 7                      | To failure       |               | -                        |                 |               |
| <b>TEST NUMBER:</b>    | Zona 6 - P.2     |               | <b>DATE:</b>             | 02.10.2024      |               |
|                        |                  |               |                          |                 |               |
| <b>COORDINATES:</b>    |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:              | 44°18'56.25"N    |               | Type:                    | C               |               |
| Longitude:             | 25°52'9.54"E     |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:          | 1min25sec        |               | Total length [m]         | 2.40m           |               |
|                        |                  |               | Embedment [m]            | 1.70            |               |
| <b>VERTICAL</b>        |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>  | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                          |                 |               |
| 1 (30 sec)             | 4                | 3.98          | 0                        | 0.52            | 0.28          |
| 2 (30 sec)             | 7                | 7.20          | -                        | 0.68            | 0.41          |
| 3 (30 sec)             | 10               | 9.62          | -                        | 0.93            | 0.66          |
| 4 (1 min)              | 13               | 12.24         | -                        | 2.88            | 1.45          |
| 5 (1 min)              | 16               | 15.88         | -                        | 3.49            | 2.44          |
| 6 (1 min)              | 19               | 18.8          | -                        | 30              |               |
| 7                      | To failure       |               | -                        |                 |               |
| <b>TEST NUMBER:</b>    | Zona 6 - P.3     |               | <b>DATE:</b>             | 02.10.2024      |               |
|                        |                  |               |                          |                 |               |
| <b>COORDINATES:</b>    |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:              | 44°18'56.41"N    |               | Type:                    | C               |               |
| Longitude:             | 25°52'9.65"E     |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:          | 2min22sec        |               | Total length [m]         | 3.50            |               |
|                        |                  |               | Embedment [m]            | 2.00            |               |
| <b>VERTICAL</b>        |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>  | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                          |                 |               |
| 1 (30 sec)             | 4                | 3.98          | 0                        | 0.48            | 0.13          |
| 2 (30 sec)             | 7                | 6.60          | -                        | 0.72            | 0.36          |
| 3 (30 sec)             | 10               | 9.89          | -                        | 0.96            | 0.56          |
| 4 (1 min)              | 13               | 12.88         | -                        | 1.62            | 1.12          |
| 5 (1 min)              | 16               | 15.69         | -                        | 2.69            | 2.03          |
| 6 (1 min)              | 19               | 18.49         | -                        | 3.72            | 2.88          |
| 7                      | To failure       | 43.5          | -                        | 20              |               |



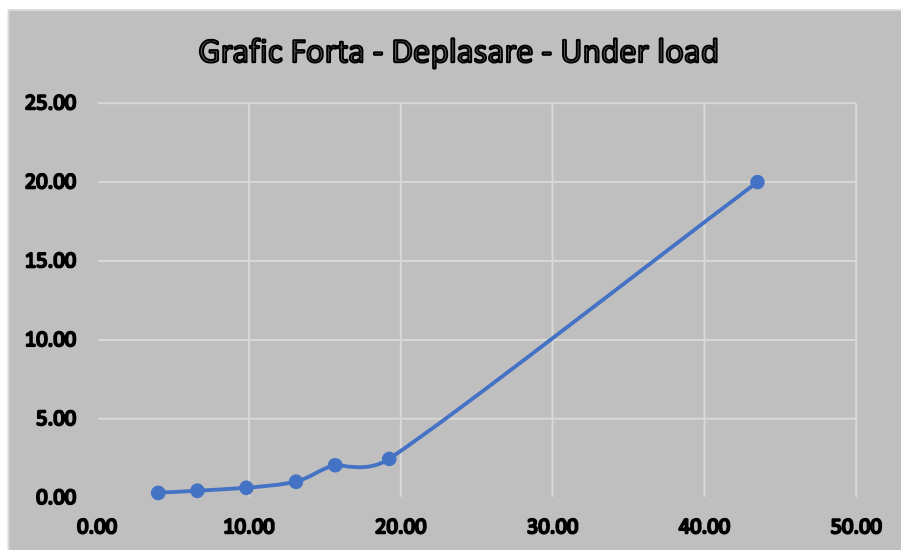
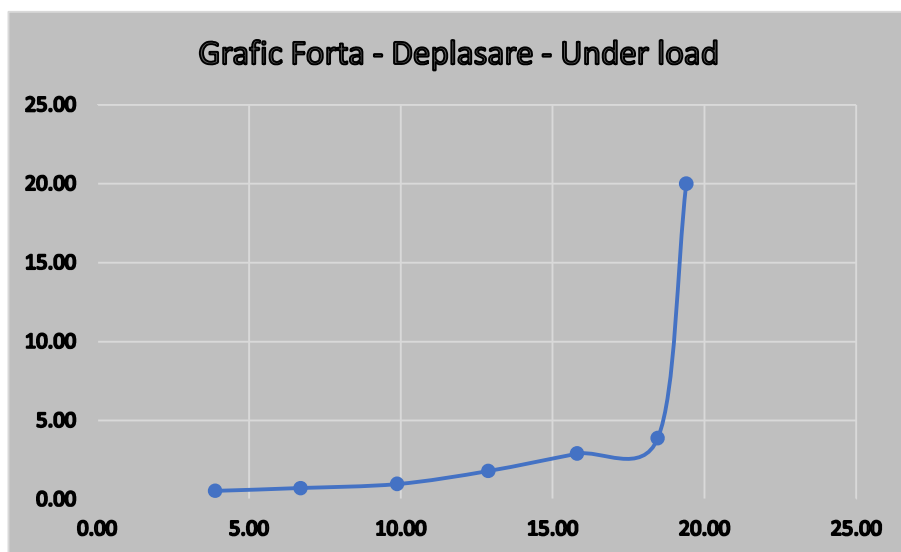
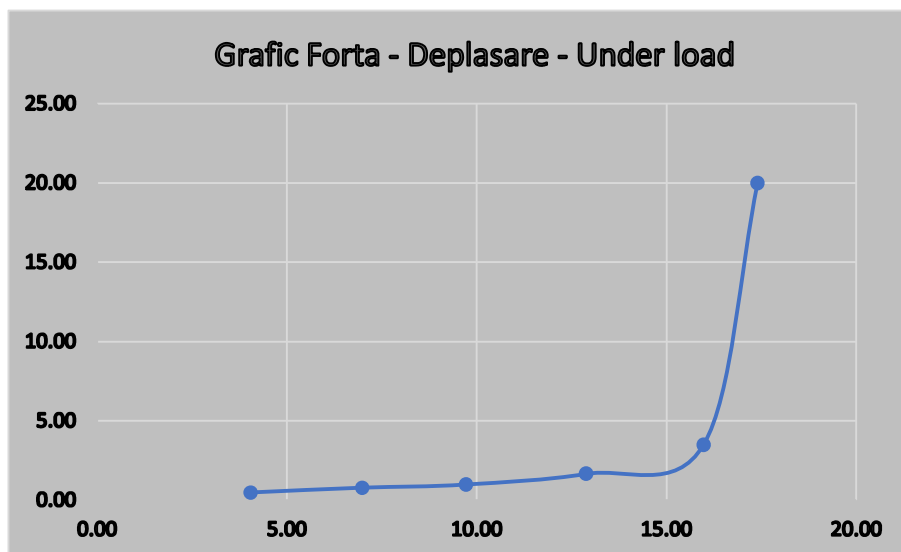
|                        |                  |               |                   |                 |               |
|------------------------|------------------|---------------|-------------------|-----------------|---------------|
| TEST NUMBER:           | Zona 7 - P.1     |               | DATE:             | 02.10.2024      |               |
|                        |                  |               |                   |                 |               |
| COORDINATES:           |                  |               | PILE:             |                 |               |
| Latitude:              | 44°18'48.60"N    |               | Type:             | C               |               |
| Longitude:             | 25°52'12.98"E    |               | Section [mm]:     | 100x50x15x3     |               |
| Ramming time:          | 1min18sec        |               | Total length [m]  | 2.40m           |               |
|                        |                  |               | Embedment [m]     | 1.50            |               |
| VERTICAL               |                  |               |                   |                 |               |
| STEP/LOAD TIME         | LOAD             |               | DISPLACEMENT [mm] |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial           | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                   |                 |               |
| 1 (30 sec)             | 4                | 4.02          | 0                 | 0.48            | 0.22          |
| 2 (30 sec)             | 7                | 7.25          | -                 | 0.68            | 0.44          |
| 3 (30 sec)             | 10               | 10.40         | -                 | 0.99            | 0.76          |
| 4 (1 min)              | 13               | 12.88         | -                 | 1.46            | 1.02          |
| 5 (1 min)              | 16               | 15.62         | -                 | 3.88            | 2.88          |
| 6 (1 min)              | 19               | 17.9          | -                 | 20              |               |
| 7                      | To failure       |               | -                 |                 |               |
| TEST NUMBER:           | Zona 7 - P.2     |               | DATE:             | 02.10.2024      |               |
|                        |                  |               |                   |                 |               |
| COORDINATES:           |                  |               | PILE:             |                 |               |
| Latitude:              | 44°18'48.44"N    |               | Type:             | C               |               |
| Longitude:             | 25°52'13.09"E    |               | Section [mm]:     | 100x50x15x3     |               |
| Ramming time:          | 2min44sec        |               | Total length [m]  | 2.40m           |               |
|                        |                  |               | Embedment [m]     | 1.70            |               |
| VERTICAL               |                  |               |                   |                 |               |
| STEP/LOAD TIME         | LOAD             |               | DISPLACEMENT [mm] |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial           | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                   |                 |               |
| 1 (30 sec)             | 4                | 4.10          | 0                 | 0.52            | 0.30          |
| 2 (30 sec)             | 7                | 6.69          | -                 | 0.66            | 0.40          |
| 3 (30 sec)             | 10               | 9.89          | -                 | 0.98            | 0.66          |
| 4 (1 min)              | 13               | 12.90         | -                 | 2.88            | 1.25          |
| 5 (1 min)              | 16               | 15.88         | -                 | 3.62            | 2.02          |
| 6 (1 min)              | 19               | 18.32         | -                 | 4.02            | 2.89          |
| 7                      | To failure       |               | -                 | 20              |               |
| TEST NUMBER:           | Zona 7 - P.3     |               | DATE:             | 02.10.2024      |               |
|                        |                  |               |                   |                 |               |
| COORDINATES:           |                  |               | PILE:             |                 |               |
| Latitude:              | 44°18'48.60"N    |               | Type:             | C               |               |
| Longitude:             | 25°52'13.21"E    |               | Section [mm]:     | 100x50x15x3     |               |
| Ramming time:          | 2min23sec        |               | Total length [m]  | 3.50            |               |
|                        |                  |               | Embedment [m]     | 2.00            |               |
| VERTICAL               |                  |               |                   |                 |               |
| STEP/LOAD TIME         | LOAD             |               | DISPLACEMENT [mm] |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial           | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                   |                 |               |
| 1 (30 sec)             | 4                | 4.02          | 0                 | 0.38            | 0.12          |
| 2 (30 sec)             | 7                | 6.62          | -                 | 0.49            | 0.21          |
| 3 (30 sec)             | 10               | 9.88          | -                 | 0.68            | 0.39          |
| 4 (1 min)              | 13               | 12.82         | -                 | 1.43            | 0.88          |
| 5 (1 min)              | 16               | 15.64         | -                 | 1.89            | 1.01          |
| 6 (1 min)              | 19               | 18.44         | -                 | 2.42            | 1.88          |
| 7                      | To failure       |               | -                 | 20              |               |



|                               |                  |               |                          |                 |               |
|-------------------------------|------------------|---------------|--------------------------|-----------------|---------------|
| <b>TEST NUMBER:</b>           | Zona 8 - P.1     |               | <b>DATE:</b>             | 02.10.2024      |               |
|                               |                  |               |                          |                 |               |
| <b>COORDINATES:</b>           |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:                     | 44°18'53.10"N    |               | Type:                    | C               |               |
| Longitude:                    | 25°52'16.71"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:                 | 1min07sec        |               | Total length [m]         | 2.40m           |               |
|                               |                  |               | Embedment [m]            | 1.50            |               |
| <b>VERTICAL</b>               |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>         | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                               | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| <b>Centralizare Rezultate</b> |                  |               |                          |                 |               |
| 1 (30 sec)                    | 4                | 4.20          | 0                        | 0.44            | 0.22          |
| 2 (30 sec)                    | 7                | 6.88          | -                        | 0.70            | 0.44          |
| 3 (30 sec)                    | 10               | 9.40          | -                        | 1.20            | 0.82          |
| 4 (1 min)                     | 13               | 12.68         | -                        | 1.44            | 0.98          |
| 5 (1 min)                     | 16               | 15.88         | -                        | 3.8             | 2.9           |
| 6 (1 min)                     | 19               | 16.8          | -                        | 20              |               |
| 7                             | To failure       |               | -                        |                 |               |
| <b>TEST NUMBER:</b>           | Zona 8 - P.2     |               | <b>DATE:</b>             | 02.10.2024      |               |
|                               |                  |               |                          |                 |               |
| <b>COORDINATES:</b>           |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:                     | 44°18'52.94"N    |               | Type:                    | C               |               |
| Longitude:                    | 25°52'16.82"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:                 | 1min12sec        |               | Total length [m]         | 2.40m           |               |
|                               |                  |               | Embedment [m]            | 1.70            |               |
| <b>VERTICAL</b>               |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>         | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                               | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| <b>Centralizare Rezultate</b> |                  |               |                          |                 |               |
| 1 (30 sec)                    | 4                | 3.82          | 0                        | 0.45            | 0.25          |
| 2 (30 sec)                    | 7                | 7.10          | -                        | 0.53            | 0.39          |
| 3 (30 sec)                    | 10               | 9.88          | -                        | 0.72            | 0.55          |
| 4 (1 min)                     | 13               | 12.96         | -                        | 1.80            | 1.06          |
| 5 (1 min)                     | 16               | 15.62         | -                        | 2.44            | 1.88          |
| 6 (1 min)                     | 19               | 18.8          | -                        | 2.83            | 1.98          |
| 7                             | To failure       | 20.1          | -                        | 20              |               |
| <b>TEST NUMBER:</b>           | Zona 8 - P.3     |               | <b>DATE:</b>             | 02.10.2024      |               |
|                               |                  |               |                          |                 |               |
| <b>COORDINATES:</b>           |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:                     | 44°18'53.10"N    |               | Type:                    | C               |               |
| Longitude:                    | 25°52'16.94"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:                 | 3min20sec        |               | Total length [m]         | 3.50            |               |
|                               |                  |               | Embedment [m]            | 2.00            |               |
| <b>VERTICAL</b>               |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>         | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                               | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| <b>Centralizare Rezultate</b> |                  |               |                          |                 |               |
| 1 (30 sec)                    | 4                | 4.24          | 0                        | 0.24            | 0.11          |
| 2 (30 sec)                    | 7                | 6.67          | -                        | 0.33            | 0.16          |
| 3 (30 sec)                    | 10               | 10.20         | -                        | 0.51            | 0.25          |
| 4 (1 min)                     | 13               | 13.12         | -                        | 0.89            | 0.69          |
| 5 (1 min)                     | 16               | 16.44         | -                        | 1.29            | 1.01          |
| 6 (1 min)                     | 19               | 19.1          | -                        | 2.02            | 1.66          |
| 7                             | To failure       | 42.6          | -                        | 20              |               |



|                        |                  |               |                          |                 |               |
|------------------------|------------------|---------------|--------------------------|-----------------|---------------|
| <b>TEST NUMBER:</b>    | Zona 9 - P.1     |               | <b>DATE:</b>             | 02.10.2024      |               |
| <b>COORDINATES:</b>    |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:              | 44°18'45.57"N    |               | Type:                    | C               |               |
| Longitude:             | 25°52'20.12"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:          | 1min42sec        |               | Total length [m]         | 2.40m           |               |
|                        |                  |               | Embedment [m]            | 1.50            |               |
| <b>VERTICAL</b>        |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>  | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                          |                 |               |
| 1 (30 sec)             | 4                | 4.04          | 0                        | 0.48            | 0.23          |
| 2 (30 sec)             | 7                | 6.98          | -                        | 0.78            | 0.44          |
| 3 (30 sec)             | 10               | 9.72          | -                        | 0.98            | 0.76          |
| 4 (1 min)              | 13               | 12.88         | -                        | 1.66            | 1.24          |
| 5 (1 min)              | 16               | 15.98         | -                        | 3.48            | 2.88          |
| 6 (1 min)              | 19               | 17.4          | -                        | 20              |               |
| 7                      | To failure       |               | -                        |                 |               |
| <b>TEST NUMBER:</b>    | Zona 9 - P.2     |               | <b>DATE:</b>             | 02.10.2024      |               |
| <b>COORDINATES:</b>    |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:              | 44°18'45.41"N    |               | Type:                    | C               |               |
| Longitude:             | 25°52'20.23"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:          | 1min18sec        |               | Total length [m]         | 2.40m           |               |
|                        |                  |               | Embedment [m]            | 1.70            |               |
| <b>VERTICAL</b>        |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>  | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                          |                 |               |
| 1 (30 sec)             | 4                | 3.88          | 0                        | 0.55            | 0.30          |
| 2 (30 sec)             | 7                | 6.70          | -                        | 0.72            | 0.45          |
| 3 (30 sec)             | 10               | 9.88          | -                        | 0.98            | 0.70          |
| 4 (1 min)              | 13               | 12.88         | -                        | 1.80            | 1.12          |
| 5 (1 min)              | 16               | 15.8          | -                        | 2.9             | 1.8           |
| 6 (1 min)              | 19               | 18.46         | -                        | 3.87            | 2.82          |
| 7                      | To failure       | 19.4          | -                        | 20              |               |
| <b>TEST NUMBER:</b>    | Zona 9 - P.3     |               | <b>DATE:</b>             | 02.10.2024      |               |
| <b>COORDINATES:</b>    |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:              | 44°18'45.57"N    |               | Type:                    | C               |               |
| Longitude:             | 25°52'20.34"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:          | 2min43sec        |               | Total length [m]         | 3.50            |               |
|                        |                  |               | Embedment [m]            | 2.00            |               |
| <b>VERTICAL</b>        |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>  | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                          |                 |               |
| 1 (30 sec)             | 4                | 4.02          | 0                        | 0.32            | 0.13          |
| 2 (30 sec)             | 7                | 6.60          | -                        | 0.44            | 0.30          |
| 3 (30 sec)             | 10               | 9.82          | -                        | 0.63            | 0.39          |
| 4 (1 min)              | 13               | 13.10         | -                        | 1.02            | 0.68          |
| 5 (1 min)              | 16               | 15.68         | -                        | 2.06            | 1.44          |
| 6 (1 min)              | 19               | 19.24         | -                        | 2.46            | 1.61          |
| 7                      | To failure       | 43.5          | -                        | 20              |               |



|                        |                  |               |                          |                 |               |
|------------------------|------------------|---------------|--------------------------|-----------------|---------------|
| <b>TEST NUMBER:</b>    | Zona 10 - P.1    |               | <b>DATE:</b>             | 02.10.2024      |               |
|                        |                  |               |                          |                 |               |
| <b>COORDINATES:</b>    |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:              | 44°18'50.06"N    |               | Type:                    | C               |               |
| Longitude:             | 25°52'23.85"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:          | 1min47sec        |               | Total length [m]         | 2.40m           |               |
|                        |                  |               | Embedment [m]            | 1.50            |               |
| <b>VERTICAL</b>        |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>  | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                          |                 |               |
| 1 (30 sec)             | 4                | 3.98          | 0                        | 0.49            | 0.22          |
| 2 (30 sec)             | 7                | 7.10          | -                        | 0.72            | 0.49          |
| 3 (30 sec)             | 10               | 9.70          | -                        | 0.99            | 0.72          |
| 4 (1 min)              | 13               | 12.86         | -                        | 1.46            | 1.09          |
| 5 (1 min)              | 16               | 16.24         | -                        | 2.98            | 2.22          |
| 6 (1 min)              | 19               | 18.6          | -                        | 20              |               |
| 7                      | To failure       |               | -                        |                 |               |
| <b>TEST NUMBER:</b>    | Zona 10 - P.2    |               | <b>DATE:</b>             | 02.10.2024      |               |
|                        |                  |               |                          |                 |               |
| <b>COORDINATES:</b>    |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:              | 44°18'49.90"N    |               | Type:                    | C               |               |
| Longitude:             | 25°52'23.96"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:          | 2min30sec        |               | Total length [m]         | 2.40m           |               |
|                        |                  |               | Embedment [m]            | 1.70            |               |
| <b>VERTICAL</b>        |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>  | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                          |                 |               |
| 1 (30 sec)             | 4                | 4.12          | 0                        | 0.52            | 0.31          |
| 2 (30 sec)             | 7                | 6.88          | -                        | 0.68            | 0.49          |
| 3 (30 sec)             | 10               | 10.28         | -                        | 1.02            | 0.68          |
| 4 (1 min)              | 13               | 13.48         | -                        | 3.04            | 1.56          |
| 5 (1 min)              | 16               | 15.66         | -                        | 3.66            | 1.99          |
| 6 (1 min)              | 19               | 18.9          | -                        | 4.01            | 2.49          |
| 7                      | To failure       | 22.8          | -                        | 20              |               |
| <b>TEST NUMBER:</b>    | Zona 10 - P.3    |               | <b>DATE:</b>             | 02.10.2024      |               |
|                        |                  |               |                          |                 |               |
| <b>COORDINATES:</b>    |                  |               | <b>PILE:</b>             |                 |               |
| Latitude:              | 44°18'41.20"N    |               | Type:                    | C               |               |
| Longitude:             | 25°52'23.99"E    |               | Section [mm]:            | 100x50x15x3     |               |
| Ramming time:          | 2min33sec        |               | Total length [m]         | 3.50            |               |
|                        |                  |               | Embedment [m]            | 2.00            |               |
| <b>VERTICAL</b>        |                  |               |                          |                 |               |
| <b>STEP/LOAD TIME</b>  | <b>LOAD</b>      |               | <b>DISPLACEMENT [mm]</b> |                 |               |
|                        | Target Load [kN] | Real Load[kN] | Initial                  | Under load (d2) | Residual (d1) |
| Centralizare Rezultate |                  |               |                          |                 |               |
| 1 (30 sec)             | 4                | 3.94          | 0                        | 0.48            | 0.14          |
| 2 (30 sec)             | 7                | 6.68          | -                        | 0.65            | 0.32          |
| 3 (30 sec)             | 10               | 9.48          | -                        | 0.99            | 0.51          |
| 4 (1 min)              | 13               | 12.68         | -                        | 1.46            | 1.03          |
| 5 (1 min)              | 16               | 15.88         | -                        | 2.79            | 1.88          |
| 6 (1 min)              | 19               | 18.46         | -                        | 3.05            | 2.59          |
| 7                      | To failure       | 44.5          | -                        | 20              |               |

