## C A R A C T E R I S T I C I

- **Categoria de importanță:** Conform H.G. 766-oct 1997 - construcție de importanță normala (C).
- **Clasa de importanță:** Conform Normativului P100 (proiectarea antiseismică), clasa de importanță este III
- **Clasa de risc :** Conform OMT 290/2000 : clasa de risc 1A
- **Conditii seismice:** Conform Normativul P100-1/2006 : perioada de control (colț) Tc=0,7s şi ag=0,20g

## C O N D I T I I  G E O T E H N I C E

Conform: **Forajele geotehnice FTE 28, FTE 29, FAP 1 si FAP 2 - statia APATA** (date tema : ASTALROM / ITALFER)

Forajele geotehnice au urmatoarea stratificatie :

- la suprafata s-a intalnit un strat de pamant vegetal (0.30 m) in forajele FAP 1, FAP 2, iar in forajele FTE 28 si FTE 29 un strat de umplutura (0.90 - 1.20 m).
- urmeaza un complex coeziv format din argila prafoasa si praf nisipos argilos, cafenii, pana la adancimi de 2.30 - 5.30 m
- ocupa cea e-ai intalnit un orizont necoeziv de nisip cu pietris, cenusiu, cu indesare medie ... indesat, pana la 5.80 - 8.00 m
- in continuare, pana la adancimea de investigare (10.00 m), a fost interceptat un orizont coeziv de argila mamoasa, cenusie

Adancime nivel apa subterana : intre 1.20 - 2.60 m

Pentru orizontul coeziv - argile prafoase (ap), cafenii - situat deasupra nivelului apei subterane, pamanturile intercepatse se caracterizeaza astfel :

cu plasticitate mijlocie .... mare
cu starea de consistenta plastic consistenta
cu gradul de umiditate practic saturat
cu compresibilitate mare

Pentru orizontul coeziv - argile prafoase (ap), cafenii - situat sub nivelul apei subterane, pamanturile intercepatse se caracterizeaza astfel :

cu plasticitate mijlocie ... mare

Pentru traseul c.f. proiectat, pe intraga zona a statiei se executa lucrari de umplutura generala cu grosimi variabile (~1 + 4m)

Se va realiza fundarea directa a COPERTINELORR pe umplutura generala (platforma de pamant a liniilor c.f. - vezi lucrari de infrastructura c.f.), prin intermediul unei perne din balast compactat de 30cm grosime(cu grad de compactare D > 98% si asigurarea unei $p_{DPM}$ = 1.5 daN/cm²).

Este absolut necesara confirmarea caracteristicilor terenului de fundare si a gradului de compactare de catre proiectantul geotehnician, dupa executarea sapaturilor / umpluturilor (dupa caz).

*La executarea sapaturilor /umpluturilor, se va realiza un foraj suplimentar, de verificare, în amplasamentul copertinei pentru a se verifica daca informatiile provenite din forajele/sondele pentru proiectare sunt corecte. In cazul în care există eventuale diferente, lucrarile proiectate se vor adapta conform rezultatului acestor studii geotehnice de verificare.*

## *C H A R A C T E R I S T I C S*

- ***Importance category :*** *According to H.G. 766-oct 1997 : normal importance construction (C).*
- ***Importance class :*** *According to Norm P100 (anti-seismic design) : importance class III*
- ***Risk class :*** *According to OMT 290/2000 : risk class 1A*
- ***Seismic conditions :*** *According to Norm P100-1/2006: control period (corner) Tc=0,7s and ag=0,20g*

## *G E O T E C H N I C A L  C O N D I T I O N S*

*According to : **Geo-technical drills FTE 28, FTE 29, FAP 1 and FAP 2 - APATA** station (subject data: ASTALROM / ITALFER)*

*The geo-technical drills have the following ground stratification :*

- *a vegetal soil layer was found at the surface (0.30 m) in the drills FAP 1, FAP 2, and a filling layer (0.90 - 1.20 m) in the drills FTE 28 and FTE 29*
- *a cohesive complex made of brownish silty clay and clayey sandy silt was detected up to 2.30 - 5.30 m depth*
- *then a non-cohesive horizon made of grey sand with gravel, medium compaction, up to 5.80 - 8.00 m*
- *a cohesive horizon made of grey loamy clay was found up to the investigation depth (10.00 m)*

*Depth of the underground water level: between 1.20 - 2.60 m*

*For the cohesive horizon - brownish silty clays (ap) - placed above the underground water level, the soils are characterized as follows:*

*medium ... high plasticity*
*heavy-bodied consistency*
*saturated humidity degree*
*high compressibility*

*For the cohesive horizon - brownish silty clays (ap) - placed under the underground water level, the soils are characterized as follows:*

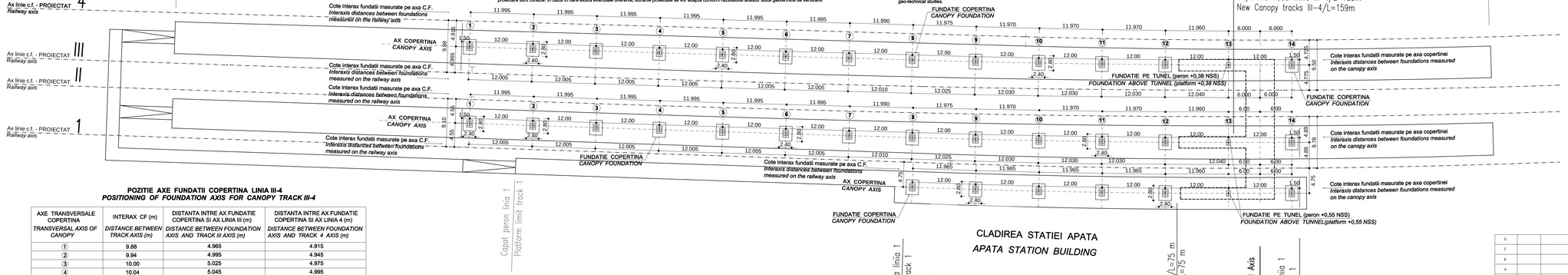
*medium ... high plasticity*

*For the designed railway route in the entire station area, general filling works will be carried out with variable thickness (~1 + 4m).*

*The CANOPIES will be directly founded on the general filling (earth sub-grade of railway lines - see railway infrastructure works), on a 30 cm thick compacted ballast cushion (compaction degree D > 98% with $p_{DPM}$ = 1.5 daN/cm²).*

*It is absolutely necessary that the geo-technician designer confirms the characteristics of the foundation ground and compaction degree, after carrying out the excavations / fillings (depending on the case).*

*During the excavation / filling works, one supplementary cheking borehole will be made in the canopies location to see if the information from the borehole for the design stage are correct. In case there are any differences, the designed works shall be adapted based on the results of these checking geo-technical studies.*

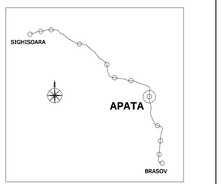



## LEGENDA

N.S.S. = cota nivel superior sina proiectat
C.S.F. = cota superioara fundatie
C.F. = cota de fundare
C.S.S. = cota superioara stalp

## *LEGEND*

*R.U.L. = designed rail upper level = N.S.S.*
*C.S.F. = foundation upper level*
*C.F. = foundation level*
*C.S.S. = pole upper level*




### POZITIE AXE FUNDATII COPERTINA LINIA III-4
### *POSITIONING OF FOUNDATION AXIS FOR CANOPY TRACK III-4*

| AXE TRANSVERSALE COPERTINA *TRANSVERSAL AXIS OF CANOPY* | INTERAX CF (m) *DISTANCE BETWEEN TRACK AXIS (m)* | DISTANTA INTRE AX FUNDATIE COPERTINA SI AX LINIA III (m) *DISTANCE BETWEEN FOUNDATION AXIS AND TRACK III AXIS (m)* | DISTANTA INTRE AX FUNDATIE COPERTINA SI AX LINIA 4 (m) *DISTANCE BETWEEN FOUNDATION AXIS AND TRACK 4 AXIS (m)* |
|---|---|---|---|
| 1 | 9.88 | 4.965 | 4.915 |
| 2 | 9.94 | 4.995 | 4.945 |
| 3 | 10.00 | 5.025 | 4.975 |
| 4 | 10.04 | 5.045 | 4.995 |
| 5 | 10.07 | 5.060 | 5.010 |
| 6 | 10.08 | 5.065 | 5.015 |
| 7 | 10.06 | 5.055 | 5.005 |
| 8 | 10.00 | 5.025 | 4.975 |
| 9 | 9.91 | 4.980 | 4.930 |
| 10 | 9.78 | 4.915 | 4.865 |
| 11 | 9.66 | 4.855 | 4.805 |
| 12 | 9.58 | 4.815 | 4.765 |
| 13 | 9.56 | 4.805 | 4.755 |
| 14 | 9.50 | 4.775 | 4.725 |

### POZITIE AXE FUNDATII COPERTINA LINIA I- II
### *POSITIONING OF FOUNDATION AXIS FOR CANOPY TRACK I- II*

| AXE TRANSVERSALE COPERTINA *TRANSVERSAL AXIS OF CANOPY* | INTERAX CF (m) *DISTANCE BETWEEN TRACK AXIS (m)* | DISTANTA INTRE AX FUNDATIE COPERTINA SI AX LINIA 1 (m) *DISTANCE BETWEEN FOUNDATION AXIS AND AXIS OF TRACK 1 (m)* | DISTANTA INTRE AX FUNDATIE COPERTINA SI AX LINIA II (m) *DISTANCE BETWEEN FOUNDATION AXIS AND AXIS OF TRACK II (m)* |
|---|---|---|---|
| 1 | 9.10 | 4.550 | 4.550 |
| 2 | 9.10 | 4.550 | 4.550 |
| 3 | 9.11 | 4.555 | 4.555 |
| 4 | 9.13 | 4.565 | 4.565 |
| 5 | 9.16 | 4.580 | 4.580 |
| 6 | 9.21 | 4.605 | 4.605 |
| 7 | 9.29 | 4.645 | 4.645 |
| 8 | 9.41 | 4.705 | 4.705 |
| 9 | 9.56 | 4.780 | 4.780 |
| 10 | 9.67 | 4.835 | 4.835 |
| 11 | 9.75 | 4.875 | 4.875 |
| 12 | 9.79 | 4.895 | 4.895 |
| 13 | 9.80 | 4.900 | 4.900 |
| 14 | 9.78 | 4.890 | 4.890 |

## NOTA - RECOMANDARI TEHNOLOGICE:

1. Toate cotele de trasare longitudinale, transversale si verticale ale copertinelor au ca elemente de referinta : axele liniilor C.F. , axa tunelului pietonal si cota ± 0.00 = NSS proiectata a fiecarei linii.

a. axele longitudinale ale fundatiilor stalpilor copertinelor se pozitioneaza fata de axele de cale ferata ale liniilor proiectate : 1, respectiv 1 - II, respectiv III - 4, conform planului ;

b. transversal, trasarea axelor pentru fundatiile stalpilor copertinelor se va face avand ca reper axa tunelului pietonal ; trasarea se va face 6 m stanga, 6 m dreapta fata de aceasta axa ;

c. cota de fundare, este data fata de ±0.00=NSS proiectat al fiecarei linii in parte, respectiv : pentru copertina la linia 1 cota de referinta este ±0.00=NSS linia 1, pentru copertina la liniile 1-II cota de referinta este ±0.00=NSS linia II, pentru copertina la liniile III-4 cota de referinta este ±0.00=NSS linia III .

2. Trebuie avut in vedere ca ait copertinele (cu fundatiile aferente), cit si peronele (cu platformele si grosimea pardoselilor) sunt la cote diferite.

3. Asociat cu - vrea din cadrul proiectului de situatie (amplasament) , planurile de suprastructura c.f. ale statiei si planurile de structura ale tunelului si ale peronelor.

4. Este importanta corelarea cotelor verticale ale liniei stalpii care se pozitioneaza pe grinzile tunelului (din axa 13 ) si stalpii si fundatiile adiacente ale copertinei, astfel incat sa se asigure continuitatea la nivelul superior al grinzilor transversale si panelor, cat si realizarea gabaritului pe intreaga lungime a copertinei.

5. Nu se vor prinde de elementele structurale ale copertinei alte echipamente sau dispozitive in afara celor prevazute in proiect (pentru orice modificare se va cere avizul proiectantului).

6. Pe zona statiei, distanta intre axele liniilor c.f. proiectate 1-II, respectiv III-4, nu este constanta , in consecinta alte copertinele (cat si peronele) au latimi variabile pe lungimea lor. (vezi tabel alatturat).

7. Pentru pozitionare si detalii stalpi linia de contact , vezi : PLAN DE SITUATIE MONTARI LC, aferent statiei.

8. Stalpii liniei de contact strapung copertina in zona invelitorii de policarbonat (se va face decuparea si etansarea policarbonatului dupa sectiunea stalpului LC).

## *NOTE - TECHNOLOGICAL RECOMMENDATIONS:*

*1. All longitudinal, transversal and vertical levels of the canopy have as a reference: the railway axis, the axis of the pedestrian tunnel and the RUL designed = ± 0.00 level of the rail (for each one)*

*a. the longitudinal axis of the canopy poles will be positioned, according to the drawing , as compared to the axis of designed track : 1, respectively 1 - II, respectively III - 4*

*b. the axis of the passengers tunnel shall be used as a guide mark when lining the transversal axis of the canopy poles. The lining shall be made from 6 m left and 6 m to right given the above-mentioned axis ;*

*c. the foundation level refers to ±0.00=RUL designed for each one, respectively : for canopy on line 1, the reference level is ±0.00=RUL line 1, for canopy to lines 1-II, the reference level is ±0.00=RUL line II, for canopy to lines III- 4, the reference level is ±0.00=RUL line III .*

*2. It is important that both the three canopies (with corresponding foundations) as well as new platforms , follow the longitudinal profile of the new designed lines.*

*3. This plan shall be read in correlation with: site layout plan , the drawings for railway station superstructure , and the structural drawings of the tunnel , and of the platforms.*

*4. It is important to ensure the compliance of the vertical levels between the canopy poles resting on the tunnel beams ( axis 13 ) and the adjacent poles (and corponding foundations) of the canopy. So, it will be ensured the continued level of transversal beams and purlins , and of the clearance for the entire canopy.*

*5. No other equipment or device, apart those foreseen in the project, shall be attached to the structural elements of the canopy .*

*6. In the station area, the distance between the designed railway axis 1-II, respectively III-4 is not a constant value ; consequently, both the canopies and platforms have variable widths all along their length. (see table nearby).*

*7. For positioning and details of contact line poles, see : LAYOUT MOUNTING PLAN LC afferent to the station.*

*8. The contact line poles pierce through the canopy in the central area of the polycarbonate covering (the polycarbonate will be cut off and sealed around the LC pole section).*

### MATERIALE

Beton de egalizare : C4/5 - T2/T3 - I 32,5 R/0 - 31
Beton simplu : C8/10 - T2/T3 - I 32,5 R/0 - 31
Beton armat : C18/22.5 , C16/20- T3/T4 - I 32,5 R/0 - 16
Otel beton : PC 52 , OB 37
Laminate : S235J2G3 (OL 37.2n), S275J2G3 (OL44.2n)
Buloane de ancorare M30-grupa 6.6

### *MATERIALS*

*Leveling concrete : C4/5 - T2/T3 - I 32,5 R / 0 - 31*
*Plain concrete : C8/10 - T2/T3 - I 32,5 R / 0 - 31*
*Reinforced concrete : C18/22.5 , C16/20- T3/T4 - I 32,5 R / 0 - 16*
*Steel concrete : PC 52 , OB 37*
*Laminated : S235J2G3 (OL 37.2n), S275J2G3 (OL44.2n)*
*Anchoring bolts M30 , resistance group 6.6*

# PLAN FUNDATII COPERTINE

scara 1:250

# *CANOPY FOUNDATION PLAN*

*scale 1:250*

CLADIREA STATIEI APATA

*APATA STATION BUILDING*

### OBSERVATIE

Pozitionarea copertinelor in amplasamentul statiei se va face conform PLAN DE SITUATIE PROPUS statia APATA, avand ca reper kilometrajul firului I proiectat.

### *OBSERVATION*

*The canopies will be positioned in the station location according to PROPOSED LAYOUT PLAN station APATA, having the kilometer positions of designed track I as reference*

| Index Index | Data Date | Modificare Modification/Revision | Proiectant Designer | Aprobat Consultant Approved Consultant | Aprobat CFR Approved CFR |
|---|---|---|---|---|---|
| D | | | | | |
| C | | | | | |
| B | | | | | |
| A | | | | | |

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CLIENT / CLIENT

C.N.C.F. "C.F.R." - S.A.

CONSULTANT / CONSULTANT

| | | | Data Date | Semnatura Signature |
|---|---|---|---|---|
| Aprobat Approved | Şef proiect Project manager | R. Liuzza | 12.2011 | |
| Aprobat Approved | Coordonator Capitole 1 Section 1 Coordinator | C. Gambelli | 12.2011 | |
| Verificat Checked | Verificator Verifier | Giuseppe Fioravanti | 12.2011 | |

SUBCONTRACTANT / SUBCONTRACTOR

| | | | | |
|---|---|---|---|---|
| Aprobat Approved | Responsabil Subconsultant Subconsultant Responsible | A.Stanciu - Dinulescu | 12.2011 | |
| Întocmit Elaborated | Proiectant Designer | ing. / eng. Tudor ALMALEH | 12.2011 | |

**Reabilitarea liniei de cale ferata Brasov - Simeria, parte componentă a coridorului IV Pan European, pentru circulația trenurilor cu viteza maximă de 160 km/h,**
**Tronsonul : Brașov - Sighișoara**
**Rehabilitation of the railway line Brasov - Simeria, component Part of the IV Pan-European Corridor, for the trains circulation with maximum speed of 160 km/h,**
**Section : Brașov - Sighișoara**

Proiect/Project: 2004/RO/16/P/PA/003

Faza / Phase: P.Th. / T.D.

Denumire desen / Drawing Title :

**COPERTINE STATIA APATA - PLAN FUNDATII COPERTINE**
***CANOPY APATA STATION - FOUNDATION PLAN***

| Codificare / Codification System | Scara / Scale 1 : 250 | LOT / LOT | Nr. / No. 01 / 01 |
|---|---|---|---|
| E A 5 1 0 1 C 0 9 P Z C C 0 0 5 3 0 0 3 1 | | | |

3 L A2 594 x 1365 = 0.81 m²

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