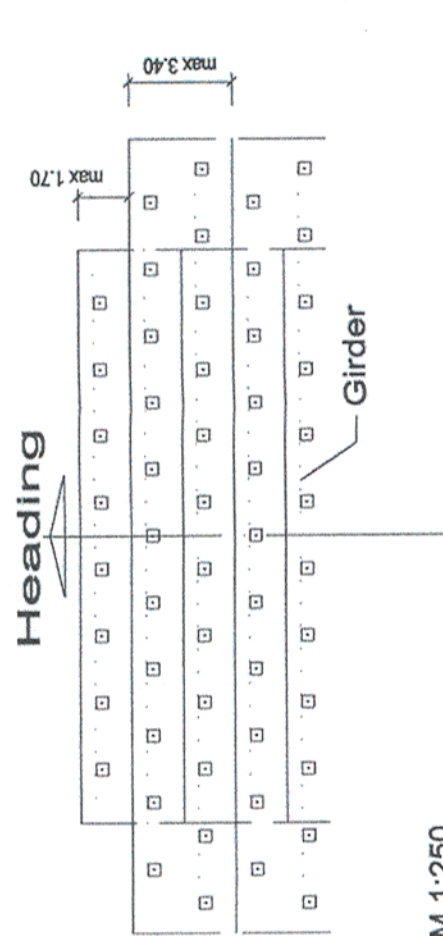
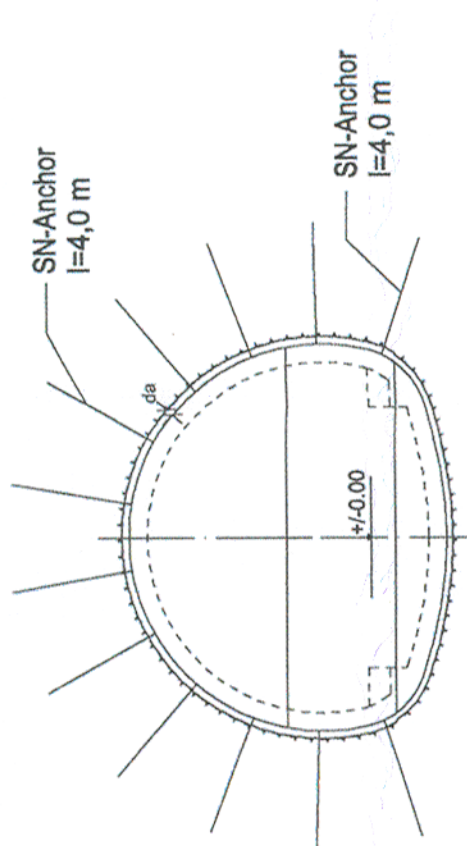
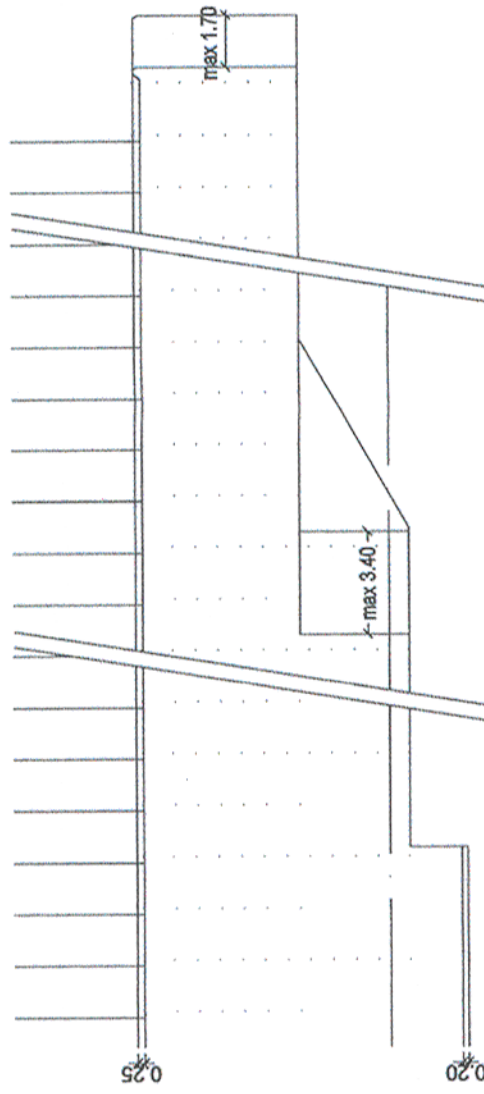


Excavation Class 4.2
Cross Section M 1:250



Execution M 1:250



Longitudinal section M 1:250

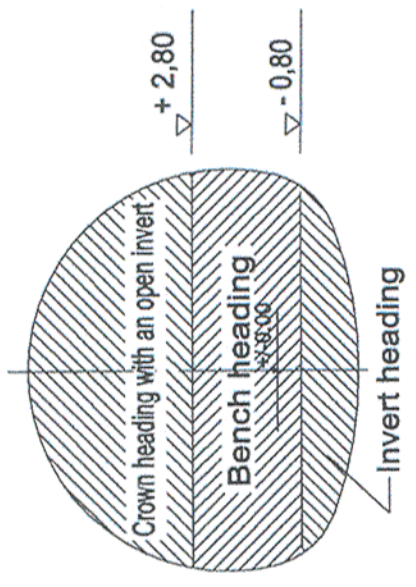
1. Crown
Excavation:
- Length of round max. 1,7 m
Reinforcement:
- Shotcrete after each round
- Steel fabric mats, steel sets, girder, shotcrete after each round
- Systematic anchoring at second round behind heading after each round
2. Bench:
- Trailing max. 200 m behind Crown
Excavation:
- Length of round max. 3.4 m
- half side
Reinforcement:
- Steel fabric mats, shotcrete after each round
- Every second steel set, girder is extended
- Systematic anchoring at first round behind heading after each round
3. Invert:
- Trailing distance not limited or according to measurement results
Excavation:
- Unsupported round length max. 10 m
Reinforcement:
- Steel fabric mats, shotcrete

ORT	Term	UNIT	QUANTITY PER LPM TUNNEL
Crown	Excavation section	m ³	53,86
	Steel fabric mats Q 257, 2 Layers, A	m ²	36,25
	Steel sets, girder Typ 1, e=1,7 m	m	10,66
	Shotcrete da=25 cm	m ²	17,74
	Anchor l=4,0 m, SN, 150 kN	St	5,00
	Sealing shotcrete face 6 cm	m ²	as required
Bench	Spiles with injection drill bolt l=3,5m	St	as required
	Excavation section	m ³	47,03
	Steel fabric mats Q 257, 2 Layer	m ²	14,83
	Steel sets, girder Type 1, e=3,4 m	m	2,18
	Shotcrete da=25 cm	m ²	7,44
	Anchor l=4,0 m, SN, 150 kN	St	1,76
Invert	Excavation section	m ³	17,10
	Steel fabric mats Q 257, 1 Layer	m ²	13,00
	Shotcrete da=20 cm	m ²	12,44

The quantity data are for cross section CS1 with inner shell thickness of 60 cm. In case of inner shell thickness of 40 cm (cross section CS2), the values to adjust.

Legend :

- Kf ... Enlarged footing
- l ... Length
- a ... Distance in transverse direction
- e ... Distance in longitudinal direction
- A ... Connection of the reinforcement between the crown and bench
- SN ... Rock anchor
- SB ... Injection bore anchors
- ... Length of anchor 4 m
- ... Length of anchor 6 m
- × ... Tunnel face anchors with a length 12 m
- Typ 1 ... Girder GI 100
- Typ 2 ... Girder GI 120
- FS ... Girder at the foot of the crown



BENEFICIAR / BENEFICIARY :



COMPANIA NAȚIONALĂ DE CĂI FERATE "CFR" SA



PROIECTANT / DESIGNER:

Aprobat / Approved	Sef de echipa / Team leader	C. Teodorescu	Data / Date	Semnatura / Signature
Verificat / Checked	Expert Cheie / Key Expert	M. Diegmann	06/2013	[Signature]
Aprobat / Approved	Adjunct Sef de echipa / Deputy Team leader	J. Werfling	06/2013	[Signature]
Proiectat / Designed	Inginer / Engineer	D. Ciotarnel	06/2013	[Signature]

"Reabilitarea liniei c.f. Frontieră - Curtici - Simeria, parte componentă a coridorului IV Pan - European pentru circulația trenurilor cu viteză maximă de 160 km/h"
Tronsoanel 2: km 614-Gurasada
"Rehabilitation of the Railway Line Border - Curtici - Simeria, component Part of the IV Pan - European Corridor for the Trains Circulation with maximum speed of 160 km/h"
Section 2 :km 614-Gurasada

Denumire desen / Drawing name:
EXCAVATION CLASS 4.2

Scara / Scale	Cod desen / Drawing Code	Nr / No
1:250	EC 2	EC 2