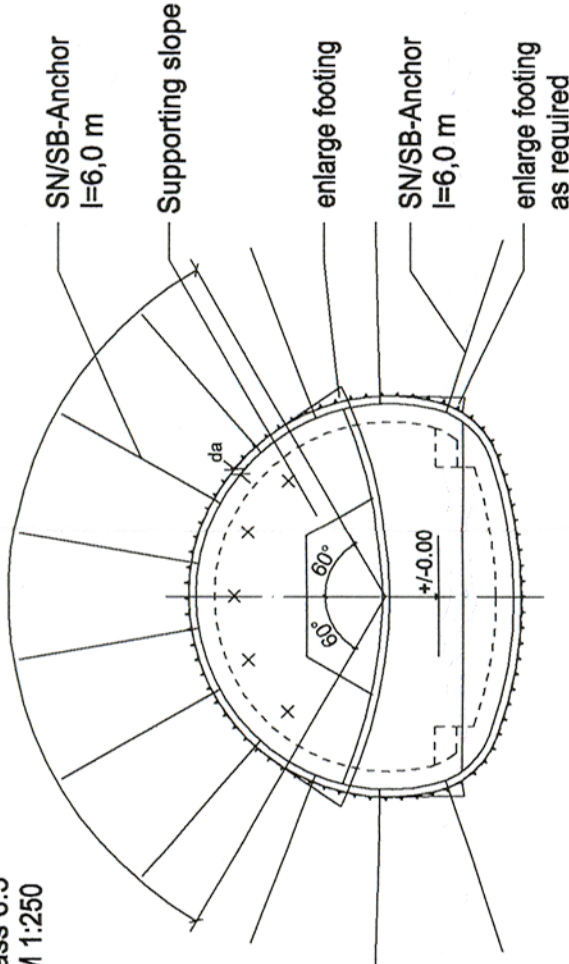
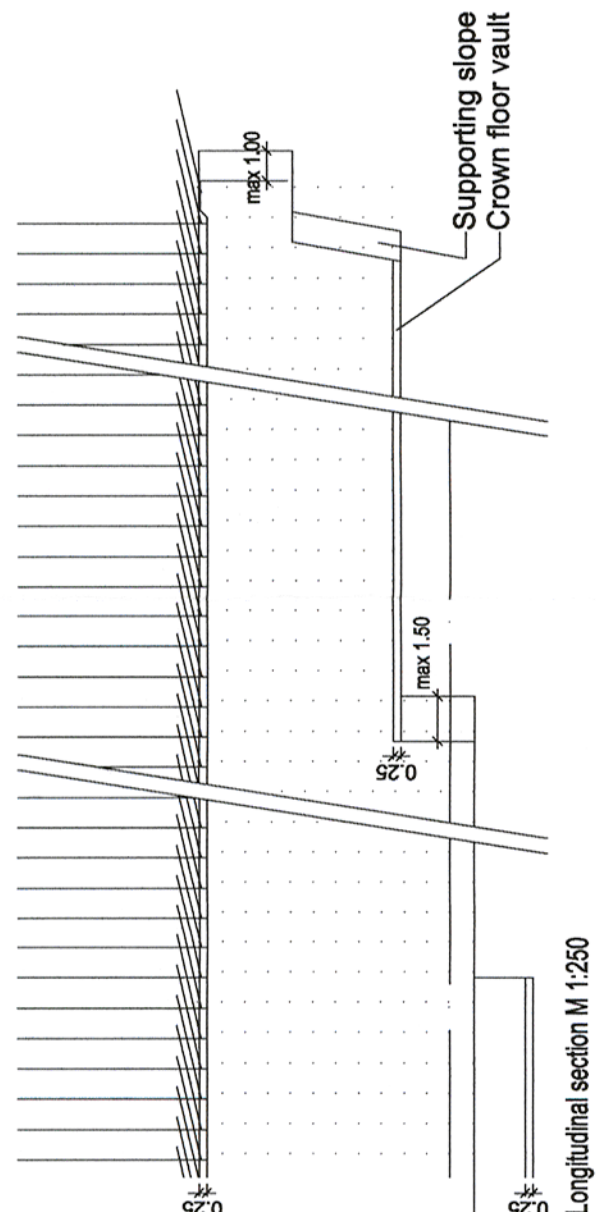
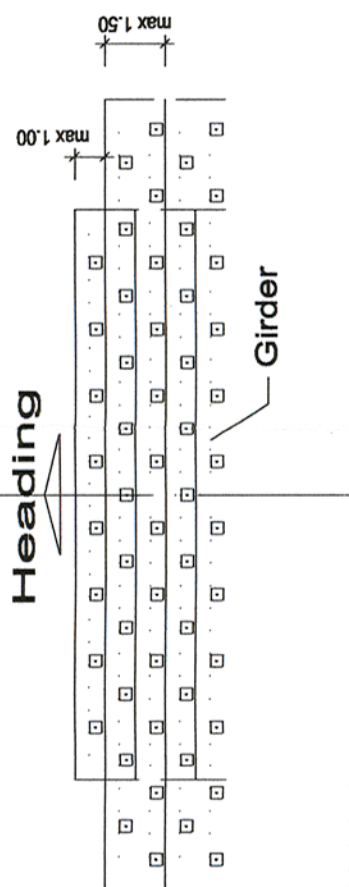


Advance support with spiles



Heading



1. Crown

- Protruding fuse with spears before each round
- Length of round max. 1.0 m
- with supporting slope and enlarged footing - Invert arch
- temporary crown face with shotcrete after each round
- Tunnel face anchors of 8 m
- Shotcrete after each round
- Steel fabric mats, steel sets, girder, shotcrete after each round
- Systematic anchoring at second round behind heading after each round
- Arch of shotcrete in invert of crown after each excavation section

2. Bench:

- Trailing max. 20 m behind Crown

Excavation:

- Length of round max. 1.50 m
- in full width with excavation section of shotcrete arch in invert of crown

Reinforcement:

- Steel fabric mats, shotcrete after each round
- Systematic anchoring at second round behind heading after each round

3. Invert:

- Trailing distance up to 20 m from the face of the bench

Excavation:

- Unsupported round length max. 3 m

Reinforcement:

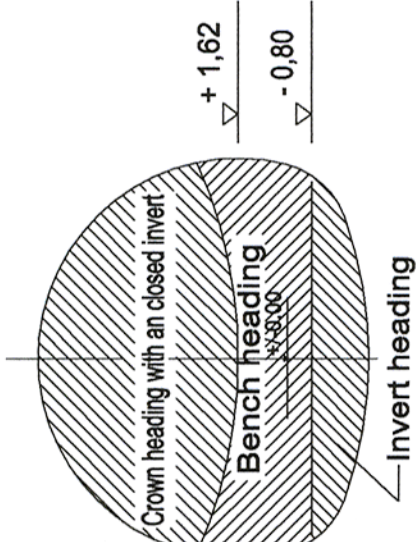
- Steel fabric mats, shotcrete after each round

ORT	Term	UNIT	QUANTITY PER LHM TUNNEL
Crown	Excavation section	m³	63.30
	Steel fabric mats Q 335, 2 Layers, A	m²	35.64
	Steel sets, girder Typ 2, e=1.0 m, FS	m	17.82
	Shotcrete da=25 cm	m²	17.82
	Anchor l=6.0 m, SN/SB, 200 kN	St	8.50
	Reinforced shotcrete face 10 cm	m²	38.50
	Tunnel face anchor l=12 m, e=8.0 m	St	0.625
Crown	Spiles with injection drill bolt l=3.5 m, a=0.3 m, e=1.0 m	St	47.00
	Shotcrete da=25 cm	m²	13.40
Kf	Steel fabric mats 2 x Q 257, 2 Layer	m²	26.80
	Excavation section	m³	0.50
Bench	Shotcrete=15 cm	m³	0.50
	Steel (fabric mats, horizontal bars)	kg	35.00
Invert	Excavation section	m³	37.58
	Steel fabric mats Q 257, 2 Layer	m²	15.44
Invert	Steel sets, girder Type 1, e=1.0 m	m	7.72
	Shotcrete da=25 cm	m²	7.72
Invert	Anchor l=6.0 m, SN/SB, 200 kN	St	4.00
	Excavation section	m³	17.75
Invert	Steel fabric mats Q 257, 2 Layer	m²	25.20
	Shotcrete da=25 cm	m²	12.85

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
- x ... 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



MINISTERUL
TRANSPORTURILOR



BENEFICIAR / BENEFICIARY :



COMPANIA NAȚIONALĂ DE CĂI FERATE "CFR" SA

PROIECTANT / DESIGNER:



Aprobat Approved	Sef de echipa Team leader	C. Teodorescu
Verificat Checked	Expert Cheie Key Expert	M. Diegmann
Aprobat Approved	Adjunct Sef de echipa Deputy Team leader	J. Werfling
Proiectat Designed	Inginer Engineer	D. Ciotarnei

Data Date	06/2013
Semnatura Signature	<i>[Signature]</i>
Data Date	06/2013
Semnatura Signature	<i>[Signature]</i>
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Semnatura Signature	<i>[Signature]</i>

"Reabilitarea liniei c.f. Frontieră - Curtici - Simeria, parte componentă a coridorului IV Pan - European pentru circulația trenurilor cu viteză maximă de 160 km/h"	Project 9i 35311.1
"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 6.2

Scara / Scale 1:250	Cod desen / Drawing Code EC 7	Nr / No EC 7
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