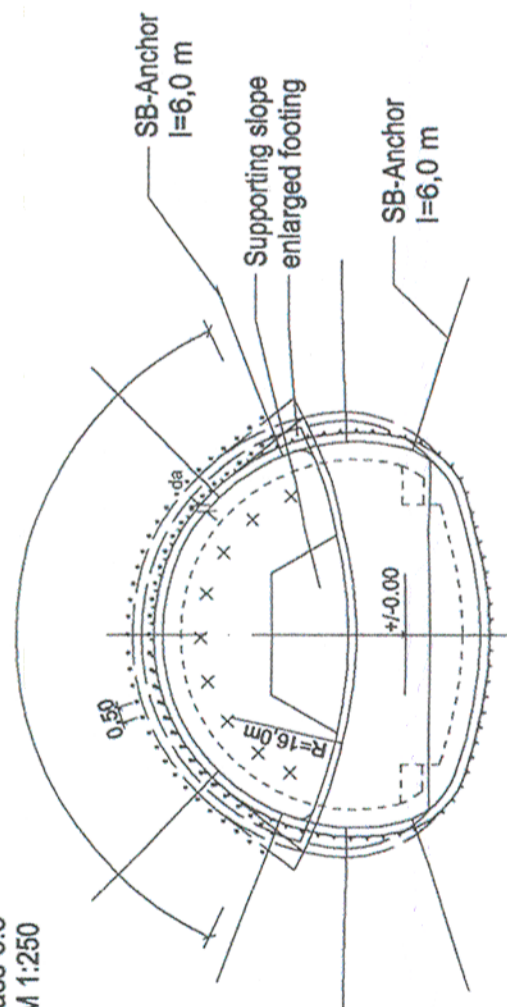
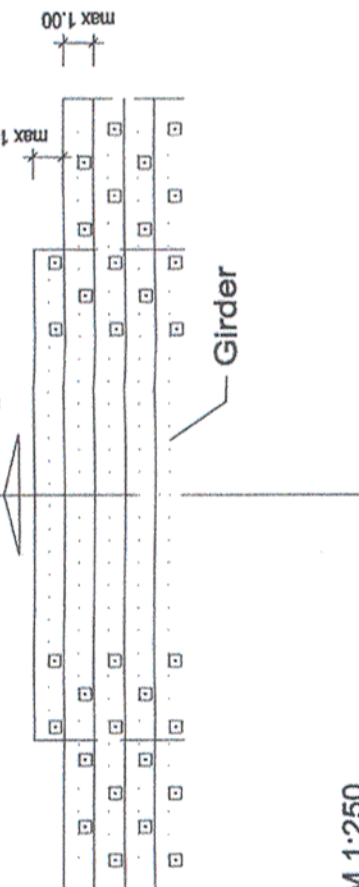


Excavation Class 6.5
Cross Section M 1:250

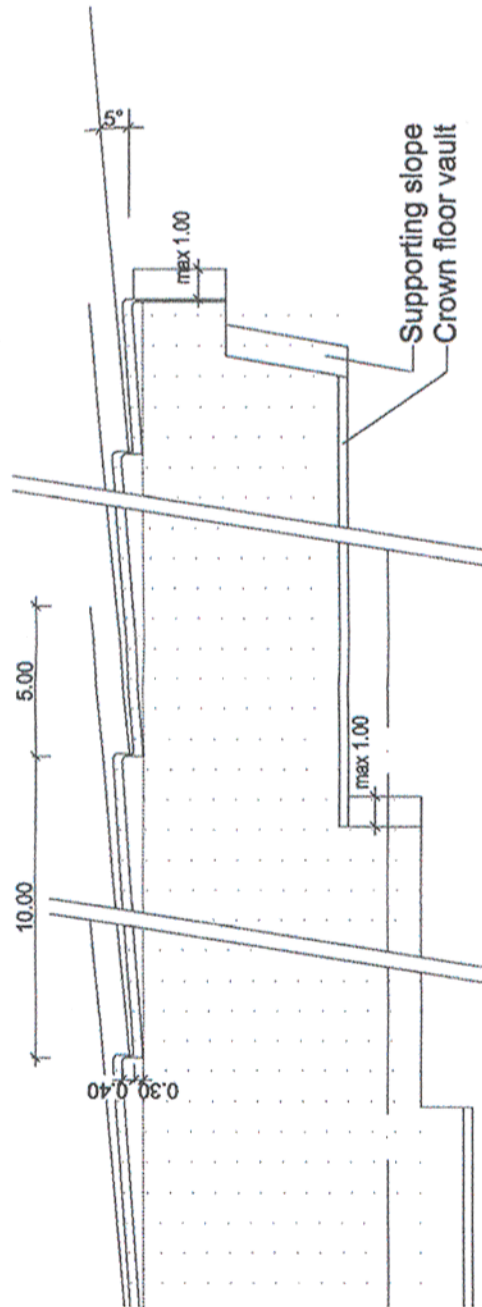
Advance support with pipe umbrella



Heading



Execution M 1:250



Longitudinal section M 1:250

1. Crown
- Advance support protection with pipe umbrella 10.0 m

Excavation:
- Sections, at the choice of the Contractor, length of round max. 1,0 m
- with supporting slope and enlarged footing - invert arch

Reinforcement:

- temporary crown face with shotcrete after each round
- Shotcrete after each round
- Tunnel face anchors with a length of 8,0 m as required
- Steel fabric mats, steel sets, girder, shotcrete after each round
- Systematic anchoring at second round behind heading after each round
- Trailing distance crown up to 6,0 m from the front of face
- Crown excavation - opening length up to 2,0 m in full width
- Arch of shotcrete in invert of crown after each excavation section

2. Bench:

- Trailing bench according to measurement results

Excavation:

- Length of round max. 1,0 m
- in full width with excavation section of shotcrete arch in invert of crown

Reinforcement:

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

3. Invert:

- Trailing distance between the invert excavation to the face of the bench max. 8,0 m

Excavation:

- Unsupported round length max. 2 m

Reinforcement:

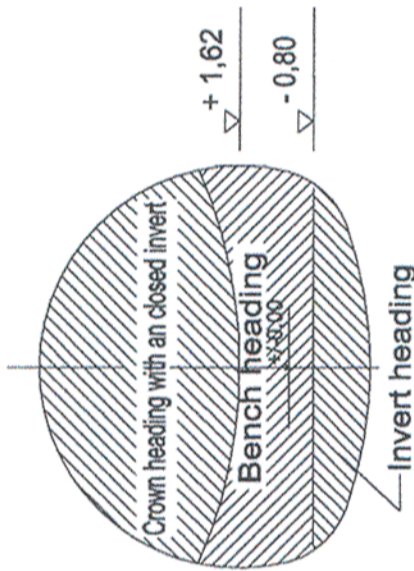
- Steel fabric mats, shotcrete after each round

ORT	Term	UNIT	QUANTITY PER LFM TUNNEL I.M.
Crown	Excavation section	m ³	67,91
	Steel fabric mats Q 335, 2 Layers, A	m ²	36,68
	Steel sets, girder, Typ 2, e=1,0 m, FS	m	18,34
	Shotcrete da=30 cm	m ²	18,34
	Anchor l=6,0 m, SB, 200 kN	St	3,00
	Reinforced shotcrete face 10 cm	m ²	42,50
	Tunnel face anchor l=12 m, e=8,0 m	St	1,125
	Steel pipe casings l=15 m, e=10,0 m	St	3,00
	Excavation section	m ³	0,50
	Shotcrete d=15 cm	m ³	0,50
Kf	Steel (fabric mats, horizontal bars)	kg	35,00
	Shotcrete da=30 cm	m ²	13,60
Crown	Steel fabric mats Q 257, 2 Layer	m ²	27,20
	Excavation section	m ³	39,55
Bench	Steel fabric mats Q 257, 2 Layer	m ²	15,76
	Steel sets, lattice girder, Type 2, e=1,0 m	m	7,88
	Shotcrete da=30 cm	m ²	10,35
	Anchor l=6,0 m, SB, 200 kN	St	4,00
Invert	Excavation section	m ³	18,42
	Steel fabric mats Q 257, 2 Layer	m ²	27,18
	Shotcrete da=30 cm	m ²	13,59

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



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

"Reabilitarea liniei c.f. Frontieră - Curtici - Simeria, parte componentă a coridorului IV Pan - European pentru circulația trenurilor cu viteză maximă de 160 km/h" Tronsonul 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 6.3

Scara / Scale	Cod desen / Drawing Code	Nr / No
1:250	EC 9	EC 9