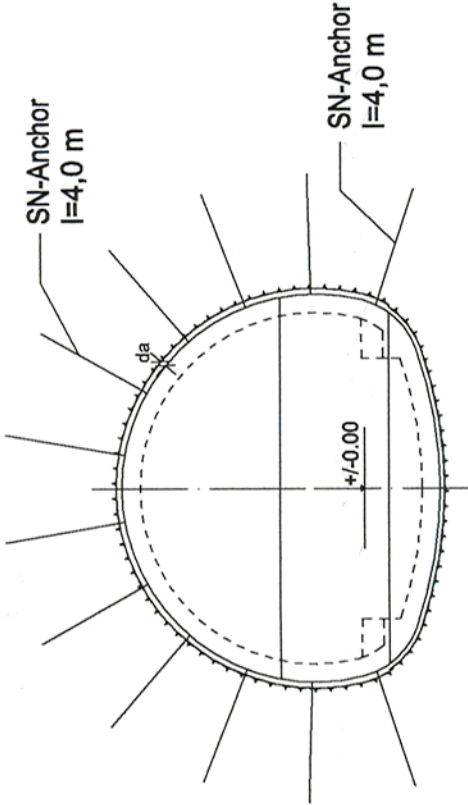
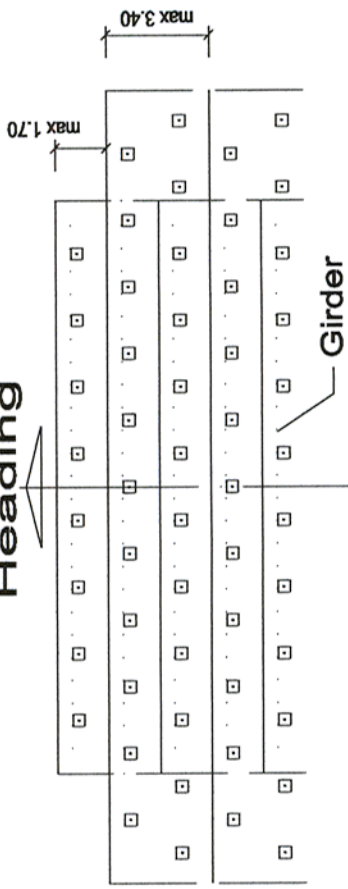


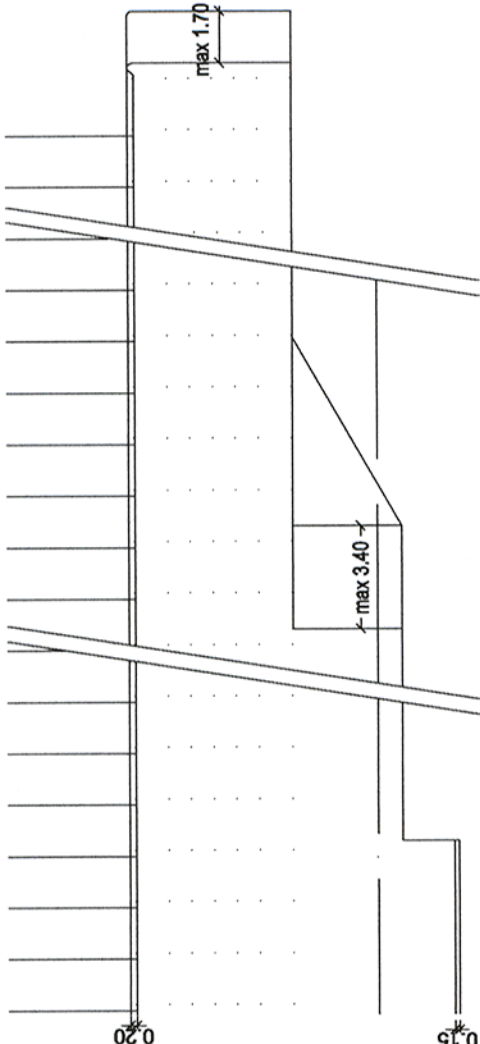
Excavation Class 4.1
Cross Section M 1:250



Heading



Execution M 1:250



Longitudinal section M 1:250

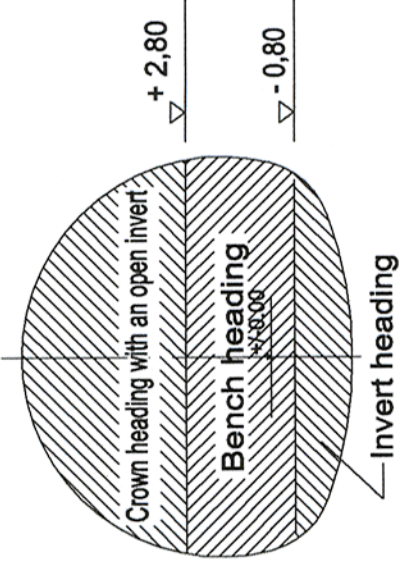
1. Crown
Excavation:
- Length of round max. 1,7 m
Reinforcement:
- Shotcrete after each round
- Steel fabric mats, steel sets, girder, shotcrete after each round
- Systematic anchoring at second round behind heading after each round
2. Bench:
- Trailing max. 200 m behind Crown
Excavation:
- Length of round max. 3,4 m
- half side or middle hawser
Reinforcement:
- Systematic anchoring and steel fabric mats after each round
- Shotcrete after every second deduction
3. Invert:
- Trailing distance not limited
Excavation:
- Unsupported round length max. 10 m
Reinforcement:
- Steel fabric mats, shotcrete

ORT	Term	UNIT	QUANTITY PER LFM TUNNEL
Crown	Excavation section	m ³	52,94
	Steel fabric mats Q188, 1 Layers, A	m ²	18,25
	Steel sets, girder Typ 1, e=1,70 m	m	10,62
	Shotcrete da=20 cm	m ²	17,74
	Anchor l=4,0 m, SN, 150 kN	St	5,00
	Spiles with injection drill bolt l=3,5m	St	as required
Bench	Excavation section	m ³	46,66
	Steel fabric mats Q 188, 1 Layer	m ²	7,42
	Shotcrete da=20 cm	m ²	7,44
	Anchor l=4,0 m, SN, 150 kN	St	1,76
Invert	Excavation section	m ³	16,44
	Steel fabric mats Q 188, 1 Layer	m ²	12,84
	Shotcrete da=15 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



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