SEMBENELLI

C O N S U L T I N G

CASTELLACCIO TUNNEL

Italy, 1995

PROJECT CHARACTERISTICS

Works: free flow tunnel, circular section, concrete lined.

Purpose: water conveyance for irrigation and industrial water supply in the province of Arezzo, Italy.

Dimensions:

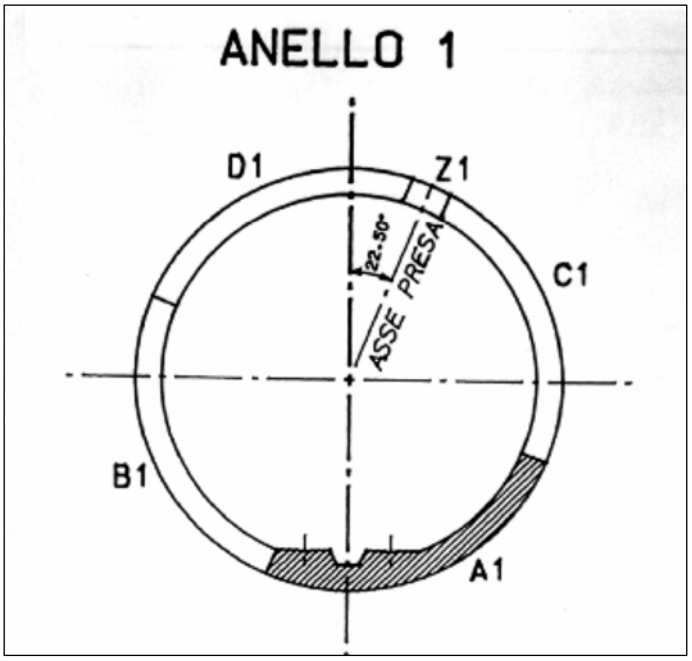
- *internal diameter:* 3.6 m
- *lining thickness:* 0.25 m
- *heading length*: 3.8 km
- *overall tunnel length*: 7 km

Subsurface conditions:

- sandstones and siltstones highly tektonized

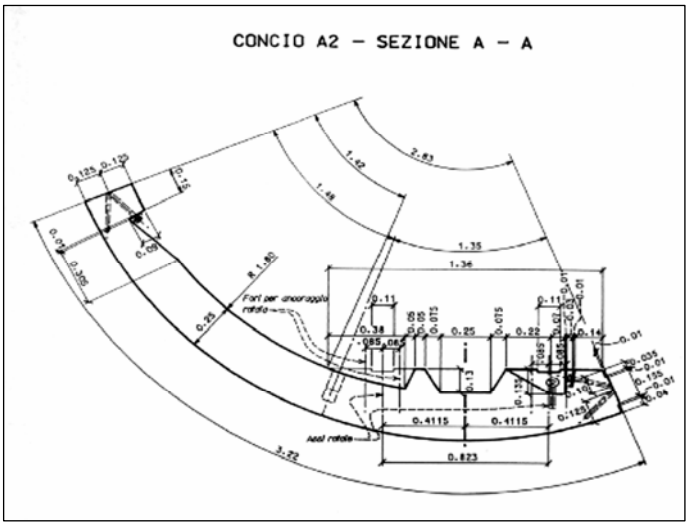
Construction method:

- full-face excavation with TBM
- first supports consisting of segmental precast concrete with locking crown wedge. Segments are locked with high strength bolts.
- Gravel back filling between lining and rock and waterproofing grouting of voids.



PROFESSIONAL SERVICES PERFORMED

Geological survey and profile along the tunnel. Substitution of conventional reinforcements in the precast lining elements with a staple reinforced concrete mix. Design of portal facilities and of the construction yard. Assistance during construction.



Castellaccio tunnel runs in waterbearing, relatively soft rocks, under moderate to very low overburden.
The fully mechanised construction requires a detailed forecast of the conditions that the TBM and the lining assembly will meet along the tunnel alignment.
Provisions must be taken beforehand to improve rock quality at all potentially weak points. The same applies to ground water and to preventing excessive water inflows at the front.
The substitution of conventional reinforcing bars in the segmental precast lining elements with steel staple reinforced concrete resulted in a substantial increase for the persisting yard productivity, in lower production costs and in lesses accidental spalling of the lining elements.

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