

Geology and Geotechnical Considerations of the SSC Site in Texas:

SSC Tunnel Design Considerations

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(Overhead transparency notes only - no talk presented at meeting)

Material Presented at the meeting of the Underground Tunnelling Advisory Panel
April 30, 1989 at the
SSC Laboratory at Lawrence Berkeley Laboratory

SSC TUNNEL DESIGN CONSIDERATIONS

General:

- Given the length and suitability of the rock strata, Full Face Tunnel Boring Machines will be used.
- Detailed site investigation work will be necessary before completion of the conceptual and final design of the underground works, but the level of confidence in the host strata for design purposes is already high.
- The Texas site proposal documents have served as the base from which all the design notes have been derived.
- Considerable TBM experience has already been gained in the two principal rock formations (Austin Chalk and Taylor Marl).

- Given the presence of shale elements (including bentonite/illite/montmorillonite) in the rock strata, a full circular lining (shotcrete or grouted segmental) will be applied to all excavated rock surfaces.
- A grouted invert segment is proposed for the full length of the tunnel. "Wings" have been added to minimize the possibility of water contact and facilitate placement and cleaning of the linings.
- Given the probability of muck-bound TBM operation using the single track/Californian rail system, a widened invert segment option is proposed to allow twin track mucking operations.
- Given the long-term stability requirements for machine operation, wooden permanent support elements are not permitted.
- A 4" clearance has been added to the tunnel profile to allow for errors in tunnel alignment during excavation and support.

AUSTIN CHALK (AC)

- Past experience has shown disc cutters to give the best performance in this rock.
- A shotcrete layer (nom. th. 2") should ensure the long-term stability of the AC in most cases.
- It may be advantageous to shotcrete the tunnel as a separate rail mounted activity behind the TBM and back up during maintenance periods (implies a delay of 2-3 days between excavation and support.)
- Local water seepage should be captured and channeled to the floor invert before shotcreting.
- In local fault/fractured zones chainlink/rock-bolting/liner plate (Bernold or similar) may be placed.

TAYLOR MARL (TM)

(INC. AC TRANSITION)

- Picks and discs can be used in the Taylor Marl (TM); in the AC transition zones, preference may be given to discs.
- A fully grouted concrete segmental lining (nom. th. 6") is preferred given that the softer, less calcareous elements of the TM are liable to alteration (low stake durability) and the use of a rapidly applied, continuous, protective support structure is warranted.
- Four soffit concrete segments are preferred to allow tandem erection.
- Two sets of short wedges are preferred for blocking purposes.

EAGLE FORD SHALE (EFS)

- It is hoped to avoid the EFS by optimization of the main tunnel alignment once the site geology and ring configuration have been more precisely defined.
- Little excavation experience has been gained in this material, but it has shown itself to be highly susceptible to alteration and would require careful protection and support using a precast liner similar to that of the TM.
- If encountered, for even a short distance, the EFS would emerge from the base of the tunnel during an AC/TBM drive necessitating changes in the support procedures and complicating the whole chain of TBM operation.