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Artikel: The Ahmed Hamdi Tunnel (Egypt)
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1. The Ahmed Hamdi Tunnel (Egypt)

Owner: The Ministry of Development and New Communities

Consultants: TAMS/ACE American/Egyptian Joint Venture

Contractors: OSMAC Joint Venture
The Arab Contractors, Osman Ahmed Osman & Co., Ltd.
Tarmac Overseas Limited

Designers: Sir William Halcrow & Partners

Tunnel Work Duration: 16 Months

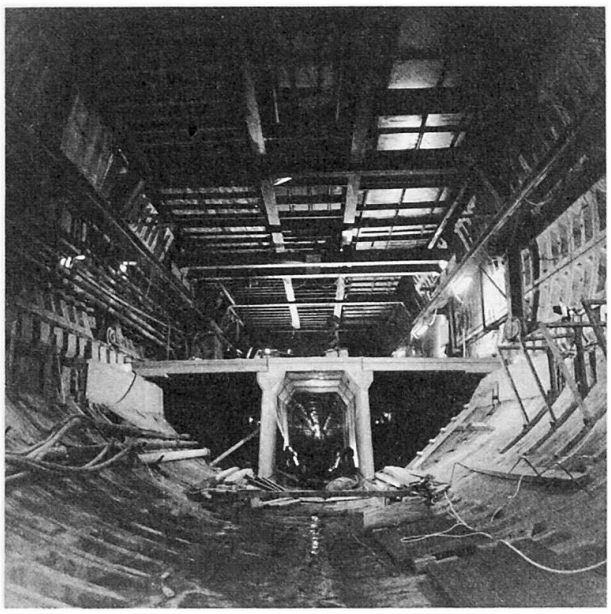
Service Date: 1980.

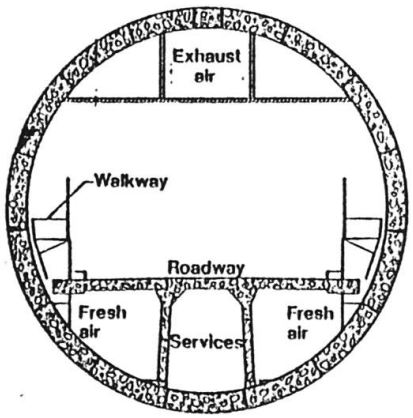
The name of the tunnel commemorates General Ahmed Hamdi of the Egyptian Army Corps of Engineers who was killed whilst directing assault bridging operations during the 1973 Egyptian/Israeli War. The tunnel is a two-lane road crossing driven under the Suez Canal 17 km North of Suez.

The Suez Canal Authority has long-term development plans for increasing the capacity of the canal by both deepening and widening the existing canal and the possible construction of a second parallel canal. Because of these development plans there has been a particular requirement for the Ahmed Hamdi Tunnel to be constructed to a maximum depth of 51 m.

The tunnel is driven through a hard blue clay and mudstone which extends throughout the entire length of the drive and forms part of the Shallufa Ridge. The primary tunnel lining is of reinforced pre-cast concrete segmental design 600 mm thick to withstand the ground pressure and the hydrostatic head of 45 m. Each ring 1.2 m long comprises 15 segments each weighing 3 tonnes and a key segment forming a 10.4 m internal diameter tunnel. A horizontal curve formed by taper segments was introduced into the alignment in order to avoid locally higher ground on the East Bank on a line normal to the canal. The secondary lining of the tunnel is formed by melamine faced sheets bolted to the primary lining.

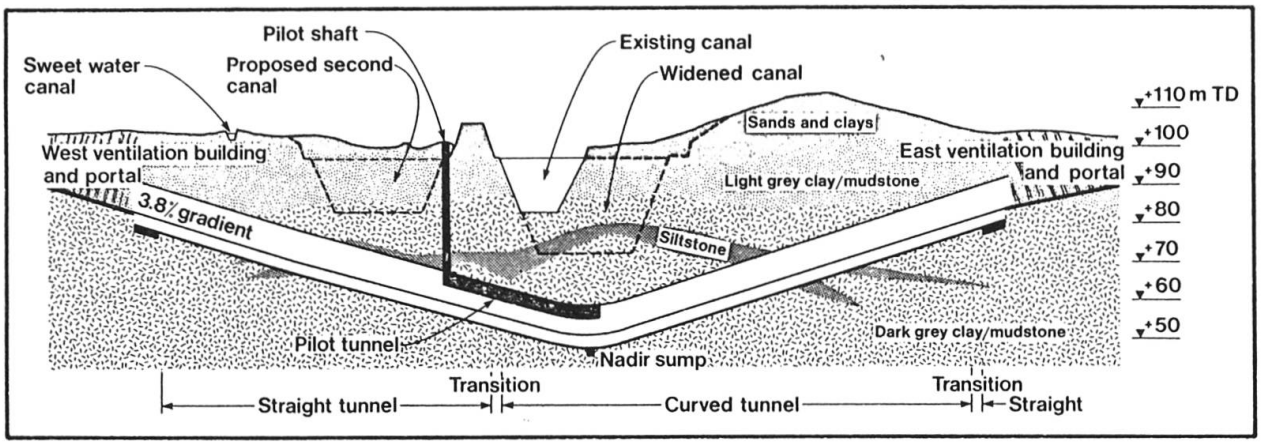
The Ahmed Hamdi Tunnel is technically unique in that it is the first in the world in which the permanent roadway was constructed directly behind the shield and used immediately by the muck disposal lorries and service vehicles.

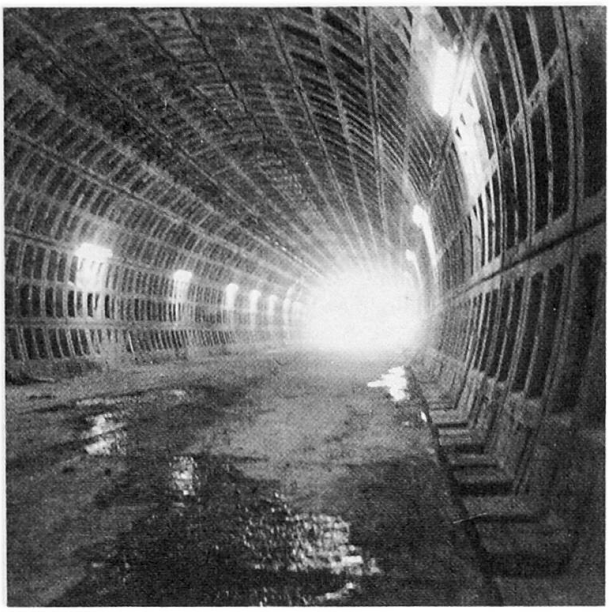




The road deck is of P.C. concrete units (the central culvert unit weighing 12 tonnes) placed by a gantry crane running under the shield trailers.

The 11.8 m outside diameter shield, associated equipment and trailers were designed, manufactured and erected by Bade-Theelen, Fed. Rep. of Germany. The shield was of the Greathead type and equipped with 30 hydraulic rams giving a total shove capacity of 10,000 tonnes. Excavation was carried out by means of 3 backhoe excavators covering the complete face and capable of extending 1.2 m for the excavation of each ring. The working platforms could also extend forward 1.2 m and full face support was provided by hinged hydraulically-operated breast plates. The handling of the segments and the ring building was achieved by a segment conveyor which placed the segments on a rotating erector.





Tunnel driving commenced in January 1979. During the first year of driving an average production of 18 rings per week was achieved representing 21.6 m complete with road deck. During a period from August 1979 until the end of February 1980, an average advance of 30 m per week was maintained.

Traffic approaching the tunnel will be regulated at the Vehicle Control Areas situated at the commencement of the approach ramps on the West and East Banks of the canal. The main control centre for the tunnel is located adjacent to the West Portal. Remote control television cameras and air sampling equipment will enable the operators in the control room to study and operate as necessary all the tunnel services including the lights, fans and emergency services. The ventilation system at Ahmed Hamdi is of the fully transverse type which provides a constant supply of fresh air throughout the entire length of the tunnel. Exhaust air is extracted continuously into a duct located above the ceiling of the tunnel. Inlet and outlet shafts for the ventilation system are located on either side of the main portals and separated by a distance designed to prevent any mutual interference in their functions.

(D. A. Harries)