

Chesapeake Bay Bridge-Tunnel in Virginia: An Engineering Wonder of the Modern World

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Since the opening of its original two-lane vehicular toll crossing on April 15, 1964, the Chesapeake Bay Bridge-Tunnel has captured worldwide attention as a modern engineering wonder and an important East Coast travel convenience. Crossing over and under open waters where the Chesapeake Bay meets the Atlantic Ocean, the Bridge-Tunnel provides a direct link between Southeastern Virginia and the Delmarva Peninsula, including Delaware and the Eastern Shore counties in Maryland and Virginia (Fig. 1)

Measured from shore to shore, length of the Bridge-Tunnel is 28.4km and it is considered the world's largest bridge-tunnel complex. The construction project included more than 19.2km of low-level trestle, two 1.6-km tunnels, two bridges, almost 3.2km of causeway, four manmade islands and 8.8km of approach roads, totaling 36.8km (Fig. 2). Construction began on September 7, 1960, and after 42 months, it was opened to traffic on April 15, 1964, with a total cost of \$200 million.

The individual components of the Bridge-Tunnel were not the longest or the largest ever built; however, the total project was complex and unique because of many different types of major structures involved in one crossing. In addition, construction of the facility was accomplished under severe conditions imposed by northeasters, hurricanes, and the unpredictable nature of Atlantic Ocean. Following its opening in 1964, the Chesapeake Bay Bridge-Tunnel was selected as "One of the Seven Engineering Wonders of the Modern World" by the American Society of Civil Engineers (ASCE) in a worldwide competition that included more than one hundred major projects. In 1965, it was again presented the ASCE award of "The Outstanding Civil Engineering Achievement" for that year.

In a study conducted by the Chesapeake Bay Bridge and Tunnel Commission, in conjunction with the Virginia Department of Transportation, from 1987 to 1989, it was concluded that parallel bridges, trestles, and roadways would be required by the year 2000 to meet future traffic demands and provide a safer crossing for travelers. The construction of the parallel structures began on June 16, 1995 and was opened to traffic on April 19, 1999, with a total construction time of 46 months. The total costs were \$250 million. Overviews of the bridge tunnel are shown in Figs. 3 to 6.

The following is a list of some information related to the Chesapeake Bay Bridge-Tunnel:

Length

36.8km total, including approach roads

32.0km, from toll plaza to toll plaza

28.4km, from shore to shore

Depth of water along route

7.6 to 30.5m

Building Time

Northbound: 42 Months, from September 7, 1960 to April 15, 1964

Southbound: 46 months, from 16, 1995 to April 19, 1999

Total Cost

Northbound: \$200 million

Southbound: \$250 million

Construction Features

19.3km of low-level trestle, 2 1.6-km-long tunnels, 2 bridges, 3.2km of causeway, 4 manmade islands and 8.8-km of approach roads

Trestles

Length 19.6km

Northbound width 8.5m curb-to-curb

Southbound width 11.0m curb-to-curb

Concrete Piles to Support Trestles

Northbound: 2,598

Southbound: 2,591

Tunnels (Trench Type)

Thimble Shoal Tunnel: 1,748m in length, portal to portal

Chesapeake Channel Tunnel: 1,653m in length, portal to portal

Four manmade islands

Each approximately 21,246m² of surface area, 9.1m above water

Rock Armor for Manmade Islands

1,183,295tons

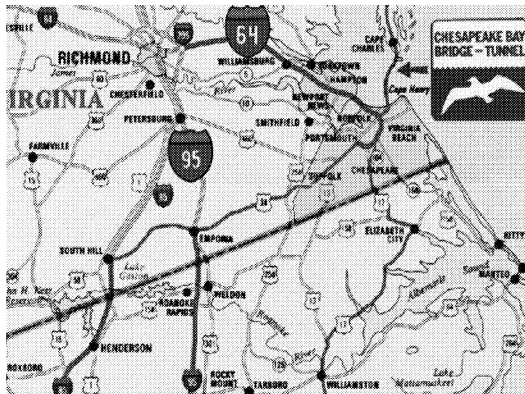


Fig. 1.

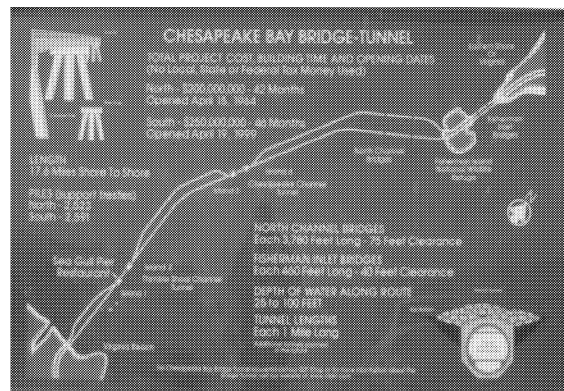


Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.