

Virginia Dare Bridge

Location: Outer Banks, NC

Designer: Wilbur Smith Associates

Contractor: Balfour Beatty Construction Co.

Owner: NC DOT



History was made in North Carolina on August 16, 2002 when a new bridge opened. It is the longest bridge in the Carolinas; at 5.2 miles it is 2 miles longer than any bridge in the Carolinas and one of the longest concrete bridges on the East Coast. The Virginia Dare Bridge, US 64/US 264 (Manteo By-Pass), connects Manns Harbor and Roanoke Island over the Croatan Sound. It replaces an aging two-lane bridge located farther north; however, there are no current plans to dismantle the older bridge. The bridge was a bargain at \$91 million, when compared with the \$531 million Copper River Bridge replacement in Charleston, SC.

The Virginia Dare is a precast, pre-stressed concrete beam bridge with a cast-in-place lightweight concrete deck (riding surface). The design is simple—each beam rests on top of two piers or columns. When a vehicle passes, the beam carries and redistributes the load to the piers and foundations. The logistics were challenging—each component had to be made on site or brought in by water or specially designed rail. Two concrete batch plants were needed—one was built in Manns Harbor, the other was built on a floating platform. Everything else, including the massive cranes, came by barge or on an elevated railroad built to haul supplies without damaging the surround wetlands. At the peak of work, 50 boats were counted in the construction flotilla.

Contractors crafted giant concrete pilings, carried them by barge to the middle of the Croatan Sound, and then drove them as much as 100 feet into the sea bed. Concrete pile caps went on top of the piles and concrete beams rest on these to support the roadway. The design gets complicated at the 65-foot high main span, which allows ships to pass under the bridge safely; the girders here are post-tensioned using high tensile strength steel cables. The bridge relieves traffic congestion for local citizens and will be a key evacuation route off the beaches and out of the county when offshore storms threaten. Tourism officials hope that the new span will lure people from the Triangle, Piedmont, and Western North Carolina areas. Traditionally, these folks favor the central and southern coastal areas due to the perception of being closer. The new bridge will provide them another option.

The bridge is designed to last a century, twice as long as the preceding generation. Other numbers behind the creation: the bridge weighs more than 350,000 tons, and consists of 7,000 tons of reinforcing steel, 43,830 cubic yards of concrete, 42 acres of roadway, 2,368 concrete pilings, and over 250,000 tons of STALITE lightweight aggregate

