

Rehabilitation of New Jersey Abutment of Bayonne Bridge

Location: Bayonne, New Jersey

Submitted by: Modjeski and Masters, Inc.

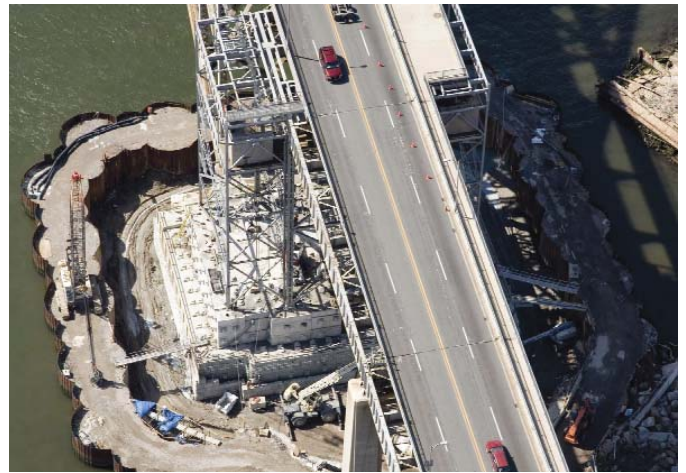
Owner: Port Authority of New York and New Jersey

Engineer(s): Modjeski and Masters, Inc.

Contractor: Spearin, Preston and Burrows

P/T Supplier: VSL

Other Contributors: The Port Authority of New York and New Jersey Structures and Material Divisions



Overview:

The New Jersey abutment of the Bayonne Bridge, connecting New Jersey, and Port Richmond on Staten Island, New York, showed signs of deterioration in the form of random cracking of the exposed concrete surfaces. Core samples, visual inspection and petrographic analysis revealed widespread Alkali-Silica Reaction (ASR) as the cause of cracking. The recommended rehabilitation scheme consisted of encasing the existing abutment in new concrete and tri-axially post-tensioning the abutment. The tri-axial post-tensioning pressure on the existing concrete was designed to counteract the internal pressure caused by the expansion of the ASR gel, thus eliminating the prospect of future microcracking of the concrete. To provide the required horizontal compressive stresses, post-tensioning tendons were installed in holes drilled through the abutment concrete. Similarly, rock anchors installed in holes drilled through the abutment to the underlying bedrock were used to achieve the required vertical compressive stress. The project was completed in 2007 at a total budget of approximately \$30 million.