ANDY WARHOL (SEVENTH STREET) BRIDGE

The Andy Warhol (Seventh Street) Bridge is an eye-bar chain, self-anchored suspension bridge carrying Seventh Street over the Allegheny River. It is one of the “Three Sisters” bridges constructed from 1924 to 1928 that comprise the only trio of identical, side-by-side bridges in the world and the first self-anchored suspension spans constructed in the United States. The trio is listed on the National Register of Historic Places.

Rehabilitation was required due to accelerating age-related deterioration. Construction involved replacement of the concrete bridge deck; full repainting of the superstructure; repairing fascia beam connections, floor beam connections, stiffening girders, and sidewalk brackets; substructure repairs; and installation of scour protection. Michael Baker International was chosen by the Allegheny County Department of Public Works to perform structural analysis and design of the rehabilitation. The design team combined recognition of historical significance with modern engineering practices to complete a structurally superior, sustainable rehabilitation that was also aesthetically pleasing.

Numerous materials – not normally used in modern bridge construction – were required to complete the rehabilitation, including new permanent tie-down anchorages, forged steel bridge pins and nuts, permanently lubricated bronze bushings and washers, and new cast bronze dedication plaques, which were required to replace missing dedication plaques. Thousands of rivets were replaced with high-strength bolts with button heads to mimic the look of rivets, improving structural capacity while being sensitive to appearance. Unlike all previous analyses, Michael Baker structural engineers built a complete three-dimensional finite element model of the bridge to study its behavior.