Design and Construction of Harbor Siphons Tunnel Across New York Harbor: Brooklyn to Staten Island

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ABSTRACT
In 2005, the New York City Economic Development Corporation (NYCEDC), on behalf of the New York City Department of Environmental Protection (NYCDEP) and the Port Authority of New York and New Jersey (PANYNJ), retained the CDM Smith/HMM Joint Venture to provide conceptual, preliminary, and final design services for the replacement of two existing water siphons that cross the New York Harbor between Brooklyn and Staten Island. The project was a traditional Design-Bid-Build format. Design consisted of multi-phases including an initial assessment of alternative methods for constructing the new siphon. A 10,000-linear-foot (lf), 72-inch-diameter pipeline installed within a 12-foot-diameter tunnel constructed in soft ground and partially in rock was selected and designed.

The sequence of construction for the overall project included shafts, an EPBM tunnel, piping and a new chlorination station. For the tunnel shafts two methods were considered the slurry wall method and the ground freeze method. The siphon tunnel was excavated using a pressure-faced tunnel boring machine (TBM). Construction of the tunnel started on July 2012, encountered an 18-month delay when the shaft and tunnel were flooded by Hurricane Sandy (October 2012). The delay was primarily due to repairs to the TBM in the tunnel under 3 bars of pressures. On January 26, 2015 the tunnel holed-through. The project was completed in 2017. This talk will highlight various key aspects of the design and construction.

Mr. Schultz is a geotechnical engineer and senior vice president with CDM Smith. He is a graduate of Worcester Polytechnic Institute (WPI) and the Massachusetts Institute of Technology (MIT). In his role as Technical Strategy Leader, Michael provides senior level oversight and consulting, senior technical reviews and direction on complex efforts for the design and construction of tunnels and underground structures and geotechnical engineering aspects of projects. He provides consulting and facilitates risk workshops, leads the development of risk registers and risk mitigation, technical aspects of contracting and contract strategies, and dispute and claims resolution for DSCs involving deep excavation support systems, deep shafts and pump stations, tunnels, soil improvement systems including jet grouting, ground freezing and other ground improvement techniques. Michael is a registered engineer in over a dozen states and the District of Columbia.