I-90 Floating Bridge Retrofit

Seattle and Mercer Island, WA

SDI Scope

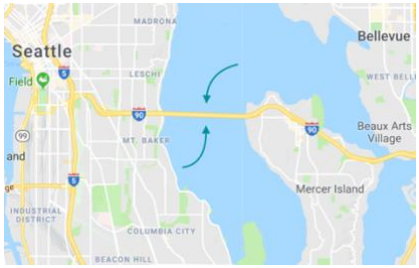
Strengthen floating pontoons to accommodate light rail system

Contractor

Kiewit-Hoffman, JV

Owner

Sound Transit/ Wash DOT



HOMER HADLEY MEMORIAL BRIDGE ON I-90

Completed in 1989, the Homer Hadley Memorial Bridge (or I-90 Floating Bridge) was conceived as a companion bridge for the Lacey Murrow Memorial Bridge. The parallel bridges span Lake Washington to connect Seattle and Mercer Island. The Lacey Murrow bridge remains a significant modern engineering feat (the first concrete pontoon floating bridge) and was designated a National Historic Civil Engineering Landmark by the American Society of Civil Engineers in 2008.

In 2008 voters approved a light rail expansion across the I-90/Homer Hadley Floating Bridge. Sound Transit and the WA-DOT sought pontoon strengthening procedures to enable the I-90 to carry the rail. Called the Interstate 90 Track Bridge, the rail track along the I-90 bridge is an engineering first, enabling the track to adjust and absorb the many dynamic forces acting on the floating pontoons while delivering a steady, safe path for the rail.

Although SDI's pontoon strengthening work is now complete, the East Link project is still developing; the rail system is due to travel across the bridge in 2023. The East Link rail will be the first light rail operating over a floating bridge.

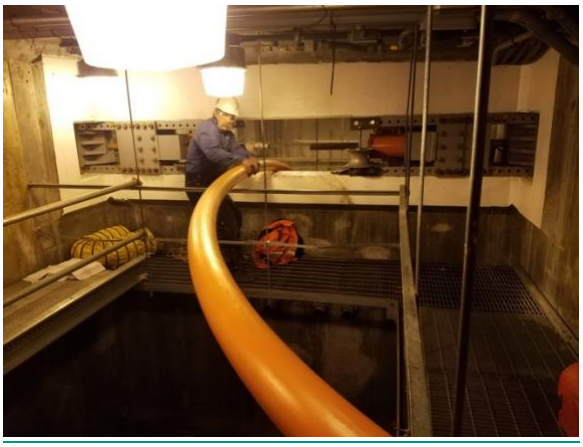
Schwager Davis, Inc.
198 Hillsdale Avenue – San Jose, CA 95136
Tel: (408) 281-9300 Fax: (408) 281-9301
www.schwagerdavis.com

I-90 Floating Bridge Retrofit

Seattle and Mercer Island, WA

SDI'S SCOPE OF WORK

In order to provide sufficient axial compression on bridge pontoons to safely carry the load of an added light rail system on the bridge, 20 post-tensioning tendons were added to the bridge. Each 3,600 ft., 15-strand tendon runs through 10 pontoons successively to provide the additional axial compression. When tensioned, each cable will elongate up to 280 inches (over 23 ft.). SDI engineer Jacob Myer tested installation procedures at headquarters as the tension, elongation, bridge age, wind, and water factors made this a uniquely challenging post-tensioning installation.



PROJECT HIGHLIGHTS AND FACTS

- Specially designed wedges were employed due to the significant elongation of the cables and corrosive natural environment.
- Over 70,000 ft. of HDPE pipe were installed, equipped with high pressure fittings.
- Prior to grouting, HDPE pipe was vacuum and leak tested to ensure safe grouting conditions. Once passed, over 8,000 bags of grout were required to encapsulate the tendons in their HDPE pipes.
- Vacuum grouting was performed to keep grout inject pressures below the allowable injection pressure.
- Nighttime temperatures on site were more stable than during the daytime, so grouting was done at night to maximize consistency.
- Installation had to be completed before the winter storm closure due to dangers imposed by inclement weather.

Schwager Davis, Inc.
198 Hillsdale Avenue – San Jose, CA 95136
Tel: (408) 281-9300 Fax: (408) 281-9301
www.schwagerdavis.com