

Owner

Sound Transit Authority, Seattle, Wash.

Project Engineer of Record

Hatch Mott McDonald, Millburn, N.J.

Bridge Engineer of Record

International Bridge Technologies Inc., San Diego, Calif.

Contractor

PCL Construction Services, Bellevue, Wash.

Contractor's Speciality Engineer

T.Y. Lin International, Olympia, Wash.

Precaster

Bethlehem Construction Inc., Cashmere, Wash.

Best Non-highway Bridge, Co-winner Seattle Sound Transit Tukwila Segment Light Rail Seattle, Wash.

The Seattle Sound Transit Tukwila Segment is a 4.9-mi-long (8 km) light-rail bridge in Seattle, Wash., that provides the final link in a 20-mi-long (32 km) mass-transit system known as the Sound Transit Central Link Light Rail.

The project was the last phase in an effort to connect the southern limit of the city to the Sea-Tac airport, but the project faced significant challenges to completion, including limited access to the project site, long-span crossings over major thoroughfares, environmental concerns, and seismic activity.

"Using precast concrete offered solutions to all of these challenges," says Christopher Hall, guideway engineer for International Bridge Technologies Inc. in San Diego, Calif.

The use of precast concrete with a design compressive strength of 6500 psi (45 MPa) allowed the dimensions of the box girder to be streamlined, delivering a lighter guideway and reducing seismic loads. External diaphragms at the ends of the span provided a wider bearing spacing to add stability, and the bottom face of the diaphragm was adjustable and set to the proper grade and cross-fall in the precast concrete manufacturer's yard so that only minor adjustments were needed when the span seated on the bearings.

This precast concrete segmental box-girder design resulted in a \$20 million savings on the project and accelerated the original construction schedule by six months.

Space and scheduling challenges were further addressed by limiting span lengths to increments of individual precast concrete segments and by using a standard curved vertical profile on long-span structures.

Precasting of superstructure segments took place in parallel with foundation and pier construction operations, and a single erection gantry was used to place most of the superstructure segments at a rapid pace, including periods where three spans were constructed within a week.

"Erecting from the top also eliminated many access issues associated with ground-based cranes or falsework and minimized impact to traffic and the environment," Hall says.

JUDGES' COMMENTS

The application of precast concrete sections demonstrates the versatility of this type of construction in meeting the needs of many projects. The segmental construction allows the aesthetics of the project to be easily demonstrated with a slender structure that meets the horizontal and vertical alignment constraints of the project.



Photo courtesy of International Bridge Technologies Inc.

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