Twin Bridges in Galilee Meet Area's Biblical Past, Environment, and Seismic Challenges

Construction is progressing on the new Nahal Amud and Nahal Acbara bridges as part of Israel's $100 million Upper Galilee interchange project.

Highway 85 is a 37 km east-west highway through the Galilee, a route that has been used since ancient times. Highway 65, a major southeast to northwest highway, offers the shortest route between the two major regions of Hadera and the Galilee. For thousands of years, people have traveled on or near this route from the coastal plain to reach Galilee and beyond to Golan, Syria, Lebanon, and Jordan.

In addition to the area's historical significance, engineers were faced with designing the bridge to withstand up to 6 inches of vertical displacement in the likely event of an earthquake, as the Dead Sea Fault runs through the area and could not be avoided.

Both bridges will be constructed using the precast segmental, balanced cantilever method, with ground-based cranes to erect the sections. Both sets of bridges will be comprised of three spans, 12.4 meters wide and 25 meters above the valley floor, and were designed to accommodate future widening.

The Nahal Amud Bridges are twin bridges with 8,383 square meters of deck area, single cell precast box 2.6 meters deep, with spans of 43m, 4 at 63m and 43m. The cross-section for this bridge will be modified to allow for segments to be cast using existing casting machines (12.5m top slab).

The Nahal Acbara Bridges are twin bridges with 2,976 square meters of deck area, single cell precast box 2.2 meters deep, with spans of 35m, 50m and 35m. The cross-section for these bridges will be modified to allow for the segments to be cast using existing Junction casting machines (12.5m top slab, 2.2m deep).

For the Acbara Bridge, designers also have worked to restore the old stream bed that previously had been filled-in. The goal is to restore the flora and fauna to the area, including recreating a 50-meter-long ecological animal crossing and rehabilitating the landscape and tracks for hikers at Nachal Amud and Nachal Achbara.

The project, which began in 2012, is expected to take 4 years to complete and includes detailed environmental planning to minimize any impact on local natural assets.

Amud bridge from the cantilever 5, last segment.(Photo Courtesy of Shikun & Binui - Solel Boneh Building & Infrastructure Ltd.)

Column reinforcement.
(Photo Courtesy of Shikun & Binui - Solel Boneh Building & Infrastructure Ltd.)

Owner: Israel National Roads Company Ltd.
Designers: Yenon Research & Design Ltd. (Construction Planning and Detailed Design)
FINLEY Engineering Group, Inc. (Segmental Bridge Design)
Design-Build Team: Shikun & Binui - Solel Boneh Building & Infrastructure Ltd.
and Yenon Research & Design Ltd.
Contractor: Shikun & Binui - Solel Boneh Building & Infrastructure Ltd.
Construction Engineering Services: **FINLEY Engineering Group, Inc.**
Constructability Review/ Estimating Services: Israel National Roads Company Ltd.
Construction Engineering Inspection: Baran Group
Precast Producer: Solel Boneh Precast Plant
Formwork for Precast Segments: Agam Steel Works
Post-Tensioning Materials: Anchorages — Sah Anahhute Germany
Hydraulic Jacks — Alga (Italy)
Strands — Wisco Wire Plant, China
Bearings: Maurer Sohne
Expansion Joints: **mageba**
Epoxy Supplier: **Sika Corporation** (Sika 31)
Prepackaged Grout: **Sika Corporation** (Grout 318)