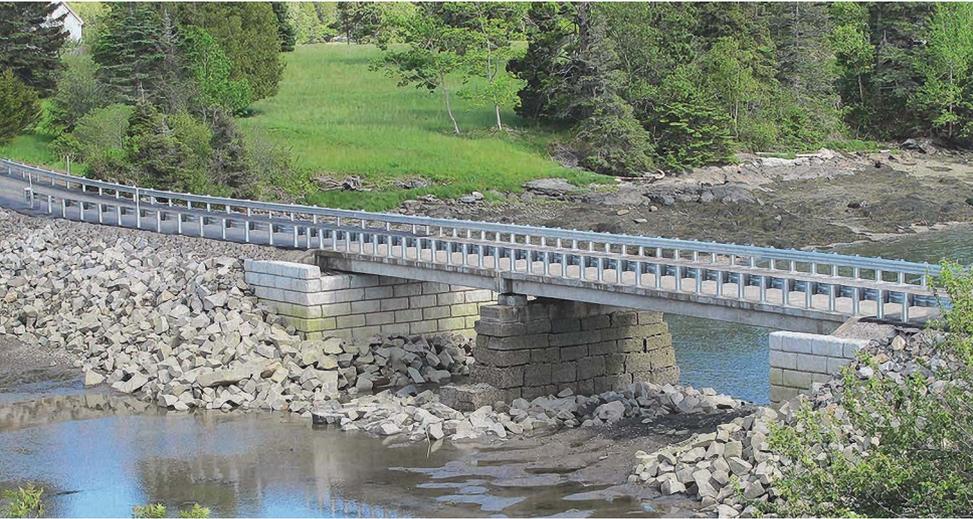


CREATIVE CONCRETE CONSTRUCTION

Lightweight Concrete Used for NEXT Beam Project in Maine

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Bridge open for traffic. All photos: Town of North Haven, Maine.



Detail view of closure joint with beaded studs.

The Beach Bridge in North Haven, Maine, was replaced in 2013 using precast, pretensioned NEXT beams constructed with lightweight concrete. This is the first bridge designed and constructed using lightweight concrete NEXT beams. The project was a joint effort of the town of North Haven and the Maine Department of Transportation.

The use of lightweight concrete beams allowed the designers to reuse the existing pier and to avoid design of a new foundation in difficult soil conditions. Eliminating reconstruction of the existing pier shortened the closure of the bridge during construction, which was beneficial because the bridge provides the only access to several homes, the local fishing wharf, and a popular beach. Using lightweight concrete also reduced the beam weight for shipping and handling, an important factor because the bridge site was located on an island and all construction materials for the bridge had to be transported 12 miles by barge to reach the site.

The self-consolidating, sand-lightweight concrete used for the beams had a design compressive strength of 6 ksi, a maximum plastic density of 120 lb/ft³, and a spread of 22 to 28 in. A ¾ in. to No. 4 gradation of expanded shale lightweight coarse aggregate was used.

View of completed bridge from beach.

The bridge utilizes the NEXT D section in which the top flange serves as the final bridge deck. An extra 0.5 in. of concrete was added to the standard 8-in.-thick top flange thickness as a wearing surface. The beams are 28.5 in. deep with an 8-ft 4-in.-wide top flange. Using NEXT D beams simplified construction by reducing the requirement for field-placed concrete at this remote site. The two beams used for each of the two spans were connected by an 8-in.-wide longitudinal closure joint that was filled with conventional concrete after erection. Span lengths are 56 ft 5 in. and

39 ft 5 in. Construction began during the winter, the girders were set in late April, and the bridge was reopened by early June, just in time for the summer fishing and beach season.



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