

Concrete

PRODUCTS

CONCRETEPRODUCTS.COM

- Masonry check-off funding program on Capitol Hill, p. 4
- Baker Ready-Mix chief on regulatory accountability, p. 8
- Transamerica Pyramid aims for LEED Platinum, p. 14
- 2012 Market Forecast, p. 23
- Software to predict compressive strength, p. 38
- Cat Vocational Truck update, p. 40
- Solar-powered precast home, p.48

TAKE IT TO THE LIMIT

Value engineering, design-build methods steer states' record-length girder specs



HIGHWAY 61 BRIDGE

Cretex Concrete Products Maple Grove, Minnesota

Longest girders: 174 feet
Web height: 96 inches



PHOTO: Cretex Concrete Products; RENDERING: Minnesota Department of Transportation



The Minnesota Department of Transportation (MnDOT) MW beam profile is debuting on a design-build bridge about 40 miles south of the Twin Cities. The project likewise sets a new department record for pre-stressed girder length.

Cretex Concrete was among producers working with MnDOT and state bridge contractors in 2001 on the MW forerunner, the MN bulb tee, with 34-in. top and 30-in. bottom flanges. The Highway 61 Bridge design-build team spurred development of the MW beam, which features 48-in. top and 39-in. bottom flanges in depths up to 96 in., plus a cross section of 60 straight and 12 draped 0.6-in.-diameter strand.

Cretex Concrete is supplying 45 girders, 137- to 174-ft. long, for spans 7–11 on the Highway 61 Bridge north approach, above low-lying bank. (The main span and south approach designs call for a steel arch and cast-in-place concrete slab construction.) The first group of nine 174-ft.

members was delivered in October 2011, the second scheduled for early 2012 shipping. The MW girders are fabricated with 9,000-psi design strength mixes. Cretex Concrete uses a highly flowable concrete, exhibiting 10-in. spread, that achieves 8,000-psi release strength in 15 hours; target strength in 18 hours; and, 10,000-plus psi at seven days.

Thirty-five of the Highway 61 Bridge beams exceed 170 ft., all 96-in. deep. Design-build contractor Lunda/Ames Joint Venture and Parsons Engineering oriented the approach piers anticipating the MW girder's span capabilities. "The owners and contractor are happy with the cost effectiveness and projected service life of pre-stressed concrete, and see the savings these girders offer versus using steel alternatives," says Cretex Director of Engineering Joel Mich, P.E. "The MW beams' length potential, upward of 200 ft., minimizes piers and gives bridge designers more flexibility."

The producer had logged at least two prior girder-length records for MnDOT bridges: Highway 212 (2006), 158 ft., and a T.H. 169 Mississippi River (1995), 155 ft. The Highway 61 Bridge contract, coupled with the prospects for future record- or near-record length MW girder deliveries, drove a decision to order an eight-axle, 10-ft.-wide trailer from Cretex sister company Elk River Machine Co. Cretex Concrete and hauler Lefebvre & Sons Truck Line attained MnDOT approval on a 62-mile, plant-to-site route—mostly highway with no cloverleaf ramps—for daytime delivery in off-peak hours.

Scheduled for opening in 2013, with finishing touches the next year, the new four-lane bridge will replace a two-lane, functionally obsolete steel trestle structure built in 1950. Hastings' new Mississippi crossing will sport a free-standing, 545-ft. arch main span—the longest in North America.

AT MISSISSIPPI RIVER

TRUCK PHOTO: Cretex Concrete Products



BED PHOTO: Concrete Products

Beginning with the 45-piece Highway 61 Bridge contract, the MW girder launch saw Cretex Concrete modify its Hamilton Form-equipped Bed #7 with a new pallet, for a wider bottom flange, and side form for product up to 200 ft. The upgrade followed the arrival of an Elk River Machine remote-controlled pouring bucket. Operated from the gantry crane cab, the vessel can be readily set at ground level for dump truck charging—the hinge and wheels protecting the chute from impact. Above all, the bucket minimizes the potential for injuries by keeping crews off the tops of the form.