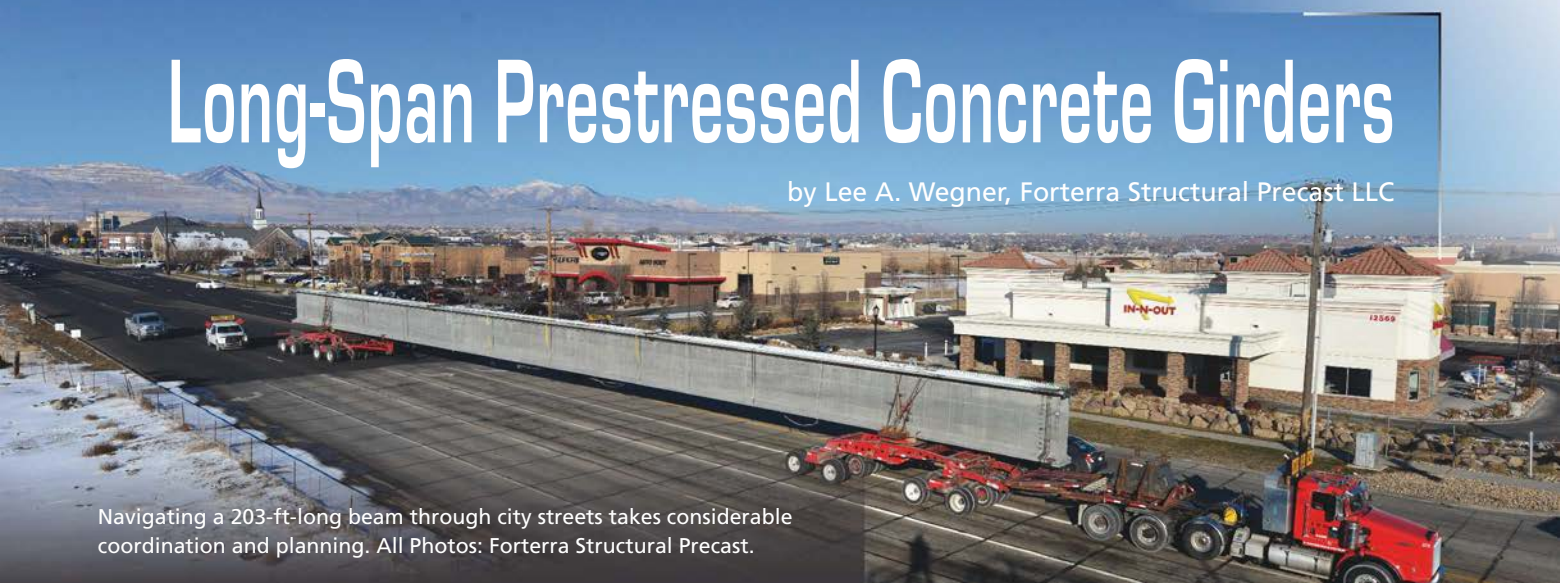
Long-Span Prestressed Concrete Girders

by Lee A. Wegner, Forterra Structural Precast LLC



Navigating a 203-ft-long beam through city streets takes considerable coordination and planning. All Photos: Forterra Structural Precast.

With the advent of the newer, more efficient girder shapes and higher concrete strengths, achievable span lengths continue to increase. The advantages of precast concrete for bridge girders are well known, including lower costs, longer durability, low long-term maintenance, rapid production, and short on-site erection times. These benefits have led designers and owners to maximize the use of precast concrete girders in span lengths that historically were exclusively in the realm of steel girders. Forterra Structural Precast's Salt Lake City, Utah, plant has been at the forefront of this exciting trend. The company has produced a 203-ft-long girder, the longest precast concrete girder in the state of Utah and the third longest in the nation.

One of the earliest challenges in this feat was overcoming the fear of the unknown. Up until the Beck Street Project (see the Project article in the Spring 2012 issue of *ASPIRE*®) in 2012, the longest precast concrete girder produced by the Salt Lake City facility was 162 ft. For the Beck Street Project, the company produced a 194-ft-5-in.-long girder. Innovation typically runs up against resistance. In this case, production personnel needed to be convinced that the company could successfully and safely produce, ship, and handle a piece of concrete that was significantly larger than anything it had done before.

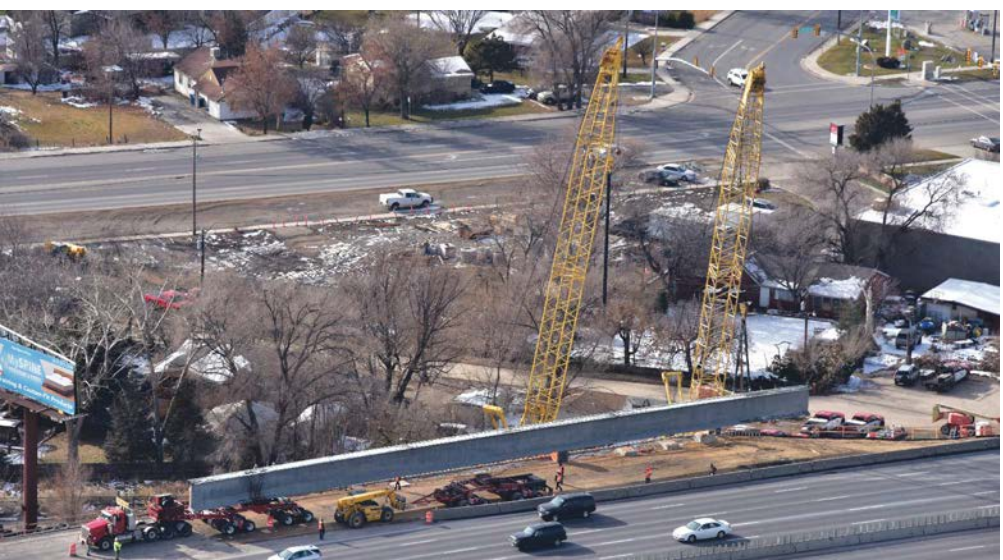
To produce girders for these long spans, it is paramount that the precaster is involved early in the design process. This is accomplished during the design-build procurement process. To date, every project for which Forterra has produced long-span girders has used a design-build delivery system. This process rewards ingenuity and the use of cutting-edge technology to deliver a project in the quickest, most economical way possible.

Shipping and installation are the final hurdles to overcome when producing long-span precast concrete girders. As has been well-documented in several PCI publications, such as *Recommended Practice for Lateral Stability of Precast, Prestressed Concrete Bridge Girders*,[1] stability during shipping and erection is a major concern. Forterra's method has been to add temporary top strands to the girders. This method has its own challenges. Detensioning these strands after a girder is installed, often over live traffic, must be taken into consideration and carefully planned during design. Also, the special equipment necessary to transport and erect a concrete girder of this size is not readily available; therefore, Forterra plans and schedules with shipping and crane companies well in advance of erection.

Anchorage detail for temporary top strands added by Forterra to ensure stability of a long girder during shipping and erection.

Forterra is currently in the midst of its third project producing girders in excess of 190 ft. The company is understandably proud of its ability to deliver a quality product that is at the forefront of today's precast concrete technology.

With long-span girders, planning for site logistics, adjacent traffic, and the use of multiple cranes is critical and needs to occur during the design phase.



Reference

1. Precast/Prestressed Concrete Institute (PCI). 2016. *Recommended Practice for Lateral Stability of Precast, Prestressed Concrete Bridge Girders*. Publication CB-02-16-E. Chicago, IL: PCI.

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