# EDITORIAL

## The Many Applications of Concrete

Henry G. Russell, *Managing Technical Editor*

*Photo: Ted Lacey Photography.*

When we started *ASPIRE*™ more than 4 years ago, none of the staff realized how much we would discover about concrete bridges and their applications. We knew that we wanted to present solutions that used cast-in-place concrete; precast, prestressed concrete; and segmental construction. Within these broad categories, we have shown a host of options: arches, box beam bridges, bulb-tee beam bridges, cable-stayed bridges, I-beam bridges, spliced-girder bridges, stress ribbon bridges, and suspension bridges. Now, we even have new double-tee beam bridges (see page 46). We also set out with the goal of including transit and railway bridges, pedestrian bridges, and aircraft runway or taxiway bridges as well as highway bridges.

In addition, concrete is no longer plain vanilla concrete! Bridges can now be built with a variety of concretes:

- High-performance concrete for durability
- High-strength concrete to achieve longer spans and shallower beam cross sections
- Lightweight concrete to reduce dead loads and provide internal curing
- Flowable concrete to make consolidation easier
- Self-consolidating concrete to eliminate the need for vibration to achieve consolidation
- Ultra-high-performance concrete that will facilitate a new generation of bridges

In every issue, we include a variety of topics to illustrate the available options. We also show how bridges are built, particularly when there are environmental, traffic, space, or time restrictions that prevent the traditional methods of construction from being used.

The articles in this issue continue to meet our goals of illustrating the many applications of concrete. On page 26, we feature a cast-in-place, horizontally curved pedestrian bridge. However, it is not as simple as that. The bridge is also a self-anchored suspension bridge supported by an inclined mast. The author explains how equilibrium of forces was maintained and geometric compatibility was achieved.

The Phoenix Sky Harbor International Airport is constructing a 5-mile transit system to connect the various airport facilities. This system crosses an active taxiway requiring a 340-ft main span using a cast-in-place, post-tensioned, box-girder bridge (page 34).

In the process of producing *ASPIRE*, we have also noticed the pride that communities take in their bridges. Such is the case of the grade-separation railway bridge in Rancho Cucamonga, Calif., where the new bridge provides a city landmark that complements the dramatic backdrop of the mountains. See page 18.

In this issue, we feature three highway bridges to show their diverse applications. The Trinity River Bridge in Texas, described on page 22, uses a combination of structural systems with precast, prestressed concrete beams for the approach spans and variable depth, cast-in-place, twin segmental box girders for the main spans. The Colorado River Bridge in Moab, Utah, (page 14) is also a cast-in-place, twin segmental box-girder bridge, which is designed to blend with the surrounding environment.

When it comes to quantities of concrete components, it is hard to compete with the new I-10 Twin Span Bridges over Lake Ponchartrain in Louisiana (see page 30). Four manufacturers were needed to produce the necessary components for this bridge. The bridge had to be constructed rapidly because the I-10 traffic was using the old bridge that had been patched together following Hurricane Katrina. And talking of rapid construction, read about the FHWA Every Day Counts Initiative on page 38.

None of these articles would be possible without the ingenuity, creativity, and innovation of the bridge community. To the authors of our articles, we offer a big "Thank you."

Don't forget, we are always looking for innovative applications. If you have a project that you would like to have considered, whether large or small, please contact us at www.aspirebridge.org and select "Contact Us." We look forward to hearing from you.

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